

## Project Summary and Environmental Analysis for the Proposed Adams County Sanitary Landfill Vertical Expansion

### General Facility Information

**Proposed Facility:** Adams County Sanitary Landfill Vertical Expansion  
License No. 3150  
Facility Identification Number (FID) 701040560

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**Licensee/Property Owner:** Adams County Solid Waste Department

**Facility Location:** S ½ of NE ¼ of Section 13, Township 18N, Range 5E, Town of Strong Prairie, Adams County, Wisconsin.

### Facility Description

The Vertical Landfill Expansion (proposed vertical expansion) of the Adams County Sanitary Landfill (the existing landfill) is proposed to be constructed as a contiguous, vertical expansion to the existing landfill, located at 1420 State Highway (S.T.H.) 21, Friendship, WI 53934. The proposed vertical expansion would overlay waste onto Phases 2 through 6<sup>1</sup> of the existing landfill and maintain the existing horizontal landfill footprint of 21.9 acres (Phases 1 through 4 were approved in 1988 and Phases 5 and 6 were approved in 2019). Liner for Phases 1 and 2 of the existing landfill consists of 5 feet of clay soil with no geomembrane. Liner for Phases 3 through 6 consists of 4 feet of clay soil and a 60 mil thick high density polyethylene (HDPE) geomembrane.

The existing landfill is located in a rural area in west-central Adams County, approximately 5 miles north-northwest from the primary county municipalities of Adams and Friendship. Adams County currently owns

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<sup>1</sup> While preparing the environmental analysis, the department learned the proposal to overlay the vertical expansion on Phase 2 or parts of Phase 2 conflicts with s. NR 504.06(1)(a), Wis. Adm. Code, which requires all major phases of landfills accepting municipal solid waste shall be designed, constructed, operated, and maintained with a composite liner. The Phase 2 liner is not a composite design, consisting of only 5 feet of clay soil. This conflict may result in a condition of feasibility limiting the expansion to only areas that have a composite liner.

approximately 581 acres of land at the existing landfill location and surrounding area. The existing landfill resides on 433 acres of contiguous property owned by Adams County. A closed construction and demolition (C&D) waste landfill and a material recovery facility (MRF) are also located on the contiguous property. The remaining acreage owned by Adams County is noncontiguous and located west and north of the existing landfill.

The proposed vertical expansion would consist of an 8.3-acre vertical overlay, increasing the height to a peak elevation of approximately 1,073.5 feet above mean sea level (MSL). The proposed vertical expansion would add approximately 247,500 cubic yards to the existing landfill capacity (1,248,000 cubic yards) for a total landfill capacity of approximately 1,495,500 cubic yards.

At the time addendum no. 1 to the feasibility report was prepared (approximately 2 years after the original feasibility report was received), Phase 6 of the existing landfill was being filled and the remaining site life for the facility was approximately three years, with the landfill's capacity projected to be consumed in 2028. The proposed vertical expansion would add approximately four years of site life based on estimated waste intake at the landfill from historic tracking of incoming waste; therefore, the anticipated date of closure with the proposed vertical expansion is approximately 2032.

The proposed vertical expansion is not expected to change the existing landfill's traffic routes. Access to the existing landfill is via S.T.H. 21, from which an access road extends north into Adams County's property and landfill area. The facility entrance is approximately 1.5 miles west of the S.T.H. 13 and 21 intersection. Access to Interstate Highway 39 is approximately 16 miles east of the facility entrance.

## Primary Service Area

The service area for the proposed vertical expansion would be the same as that of the existing landfill and includes Adams County and the surrounding counties of Columbia, Juneau, Marquette, Sauk, Waushara, and Wood; however, Adams County currently limits out of county waste to 25,000 tons per year.

## Proposed Waste Types and Leachate Characteristics

The waste types and average volumes that would be accepted in the proposed vertical expansion are expected to be similar to the existing landfill. The proposed vertical expansion is anticipated to primarily accept municipal solid waste (MSW) and C&D waste.

Anticipated waste types as an overall intake percentage at the proposed vertical expansion are as follows:

- MSW: >50% of total anticipated waste
- C&D: 0-50% of total anticipated waste
- MRF Residuals: 1-2% of total anticipated waste
- Special Wastes: <1% of total anticipated waste

Special wastes are wastes that require prior review or special handling. Special wastes may be non-MSW solid wastes that are not disposed on a recurring basis. To accept special waste, landfills develop and implement a special waste acceptance plan as a screening procedure to determine if the waste is suitable for disposal. Alternate daily cover (ADC) materials are also subject to the special waste acceptance plan. The existing landfill has an approved special waste acceptance plan; special waste acceptance at the proposed vertical expansion will vary but must meet the criteria listed in the previously approved special waste plan unless a new special waste acceptance plan is approved by the department as part of the plan of operation.

There has been a significant increase in the quantity of waste accepted at the existing landfill since 2013. In 2014, waste acceptance increased from 17,892 tons to 24,880 tons due to the closure of the Juneau County and Winnebago County landfills. Between 2018 and 2021, waste acceptance increased from 28,003 tons to 44,115 tons due to policy changes and a contract with a third-party hauler. Waste acceptance at the existing landfill has continued to increase in recent years, reaching 49,277 tons in 2024.

The waste intake changes seasonally with the months of December through March seeing a 25% to 50% reduction in tonnages. January and February are the lowest tonnage months, whereas July has historically seen the greatest tonnage intake. The amount of waste received fluctuates because of seasonal construction, nearby vacation homes, and outdoor work activities.

Leachate from the proposed vertical expansion would be expected to be similar in quantity and chemical composition to leachate from the existing landfill and other MSW landfills in Wisconsin. Leachate generated within the existing landfill is collected and treated off-site at the City of Adams Wastewater Treatment Facility and/or Village of Plover Wastewater Treatment Facility. The leachate treatment agreement between the existing landfill and the Village of Plover Wastewater Treatment Facility expired in 2023; however, addendum no. 1 to the feasibility report states the Village of Plover Wastewater Treatment Facility accepts up to one haul truck load of leachate from the existing landfill each day.

It is anticipated that the existing leachate treatment arrangements would continue with the proposed vertical expansion.

## Relevant Approvals/Permits

The following approvals and permits are required for the proposed vertical expansion:

- Favorable feasibility determination under ch. NR 512, Wis. Adm. Code
- Plan of operation approval under ch. NR 514, Wis. Adm. Code
- Construction documentation approval under ch. NR 516, Wis. Adm. Code
- Air Permit(s) under the NR 400, Wis. Adm. Code Series (Operating and Construction). The Adams County Sanitary Landfill currently has an air pollution control operation permit (701040560-S03 issued May 14, 2019). Adams County would need to apply for and be issued an air pollution control construction permit prior to utilizing the proposed vertical expansion. Adams County would also need to apply for a revision to its operation permit.
- Storm Water Permit under ch. NR 216, Wis. Adm. Code. Adams County currently has a Storm Water Permit (Tier 2 Industrial Storm Water Permit (FIN57845)). Separate coverage under a Storm Water Construction Site Permit would not be necessary provided the industrial Storm Water Pollution Prevention Plan (SWPPP) would be updated and submitted with the plan of operation for review prior to construction of the proposed vertical expansion.
- Local Negotiated Agreements with all participating affected municipalities and compliance with all applicable local rules and approvals. This process is independent from the department plan review process.

The affected municipalities as defined under s. 289.01(1), Wis. Stats, in the area of the proposed vertical expansion include: Town of Strong Prairie, Town of Preston, and Adams County. Notifications to the affected municipalities regarding the proposed vertical expansion were sent on May 18, 2022. Copies of the notification letters and responses from the affected municipalities are included in Appendix C of the feasibility report. A response from the Town of Preston specified the Adams County recycling ordinance, as well as the negotiated settlement agreement between Adams County and the Town of Preston. However, responses from the Town of Strong Prairie, Town of Preston, and Adams County did not specify any required applications for local approvals pertaining to the proposed vertical expansion.

Notification letters were also sent to the Waste Facility Siting Board and a standard municipal notice was received on July 18, 2022, located in Appendix C. The nearest airport, Adams County Legion Field, is greater than 5 miles from the proposed limits of vertical expansion and the existing MSW landfill was accepting waste prior to April 5, 2000; therefore, no notice or correspondence is required to be provided to the FAA or affected airport.

## Proposed Exemptions

Adams County has requested exemptions from the following Wisconsin Administrative Code (Wis. Adm. Code) requirements:

1. Multiple exemptions from Wis. Adm. Code, that pertain to geotechnical testing requirements.

The Adams County Sanitary Landfill was initially permitted in the late 1980s, and an expansion to the east was permitted in 2019. The subsurface conditions of the proposed vertical expansion area have been investigated during the feasibility review process for the initially permitted landfill, and as part of the most recent expansion permitted in 2019.

Because the proposed vertical expansion would be constructed within waste limits approved in 1988 and 2019, on top of areas that have either already been disturbed or will be disturbed for landfilling activities, no additional geotechnical investigation was conducted for the proposed vertical expansion. The horizontal limits of the landfill would not be changing, so any additional geotechnical investigation would involve drilling borings through waste into an approved liner and subbase system.

The proposed vertical expansion's feasibility report instead outlines and presents the relevant information included in the 1986 and 2017 feasibility submittals. Because of this, Adams County requested multiple exemptions for Wis. Adm. Code requirements that pertain to geotechnical testing requirements, which would typically be performed in an undisturbed area prior to construction of a landfill or its expansion.

Adams County is requesting the following exemptions from Wis. Adm. Code that pertain to geotechnical testing requirements (Note, s. NR 512.05(2), Wis. Adm. Code, was created and went into effect on October 1, 2025, to give an exclusion for proposed vertical only landfill expansions from providing the geotechnical information required by ss. NR 512.09, NR 512.10, and NR 512.11(2), (4) and (5) in the feasibility report.):

- a. An exemption from s. NR 512.09(1) and (2), Wis. Adm. Code, to utilize data from existing borings, water table wells, and piezometers.
- b. An exemption from s. NR 512.09(1)(a), Wis. Adm. Code, which requires borings to be located within 300 feet of the proposed limits of filling.
- c. An exemption from s. NR 512.09(1)(b), Wis. Adm. Code, which requires borings to extend a minimum of 25 feet below the anticipated sub-base grade.
- d. An exemption from s. NR 512.09(4)(a), Wis. Adm. Code, which requires conducting five geotechnical grain-size tests on each major soil unit encountered during the geotechnical investigation.
- e. An exemption from s. NR 512.09(4)(b), Wis. Adm. Code, which requires conducting two laboratory hydraulic conductivity tests for each fine-grained unit encountered during the geotechnical investigation.

- f. An exemption from s. NR 512.11, Wis. Adm. Code, which requires that the results from the subsurface investigations be presented on 24 inch x 36 inch plan sheets, unless an alternative size is approved by the department.
2. An exemption from ch. NR 140, Wis. Adm. Code, which establishes groundwater quality standards for a list of substances that need to be met at their designated point of standards application for the facility. Section NR 140.28(1), Wis. Adm. Code, states that the department may not approve a proposed facility at a location where a Preventive Action Limit (PAL) or an Enforcement Standard (ES) has been attained or exceeded in groundwater unless an exemption has been granted. Sections NR 140.28(2) through (4), Wis. Adm. Code, provide the criteria for granting exemptions where background concentrations of substances exceed their respective groundwater quality standards.

The 2018 feasibility determination issued by the department granted one requested exemption for lead at MW-30 and determined the other requested exemptions to be unnecessary. The feasibility determination issued by the department in 2018 determined lead exceedances at MW-30, located upgradient of the landfill, do not appear to be landfill related.

Addendum no. 1 to the feasibility report also requests an exemption for sulfate at MW-22 due to detections above the PAL and ES in samples collected in March, June and September 2025. MW-22 is located side-gradient of the existing landfill and downgradient of the closed C&D landfill. Sulfate has not been sampled at MW-22 historically and baseline monitoring for sulfate has not been completed.

The feasibility report states it is unlikely that construction of the proposed vertical expansion will cause further increases of any detected parameters as the performance of the existing landfill has shown landfilling activities can be conducted in an environmentally sound manner in this location.

3. An exemption from s. NR 507.215(3), Wis. Adm. Code, which states samples of leachate shall be taken quarterly from the sump or leachate collection tanks at a solid waste facility that recirculates leachate.

Adams County proposes to reduce the sampling frequency for the leachate collection tank from quarterly to semiannually. The feasibility report states variables such as the amount of precipitation and types and quantities of waste disposed can impact leachate chemistry; therefore, the feasibility report states quarterly monitoring would not provide any measurable benefit for determining the effects of leachate circulation, alone, on leachate chemistry. An exemption is not required for this request since s. NR 507.15, Wis. Adm. Code, allows the department to approve alternative sampling frequencies from what is outlined in ch. NR 507, Wis. Adm. Code.

## Land Use and Zoning

### *Site Property*

The proposed vertical expansion is located approximately 1.6 miles northwest of the S.T.H.13 and 21 intersection, on land zoned as industrial and approved for landfill use. Therefore, land use of the property will not be changed by the proposed vertical expansion as it will be located on property that is already zoned industrial and includes the existing landfill. The 433-acre contiguous property is owned by the Adams County Solid Waste Department.

### *Surrounding Properties*

The area around the 433-acre property owned by Adams County includes land parcels that are zoned as industrial, commercial, and agricultural, with some single-family homes present on smaller land parcels zoned single family residential. There are no residences located within 1,200 feet of the existing landfill or proposed vertical expansion.

Land to the north, west, and south is zoned as agricultural and primarily consists of woodlands and cultivated agricultural lands, with a few rural residences. Land use to the east consists of woodlands, agricultural land, and residential parcels with rural businesses.

### *Known Historical or Archeological Areas*

According to the ISI request, Ayres Associates, Inc. (Ayres) conducted a historical and archeological search at the Wisconsin Historical Society in Madison, WI using the Wisconsin Archeological Site Inventory (ASI) and the Architectural Historical Inventory (AHI) databases; no known historic or archaeological findings were identified within the proposed project area. A copy of the Archaeological and Architectural review results is included in Appendix B of the Initial Site Inspection Request (ISI).

Archaeological issues and historical structures for the site were cleared by the department's Archaeologist/Departmental Historic Preservation Officer, on June 6, 2022.

The department's internal cultural resources map was reviewed again on November 24, 2025, and similarly found no archeological or historical sites in Section 13, Township 18N, Range 5E, Adams County, Wisconsin.

### *Endangered or Threatened Resources*

An endangered resources (ER) review request application was submitted to the department's ER Review Program for the proposed vertical expansion. On January 19, 2022, the department's ER Review Program determined the project is covered under the broad incidental take permit/authorization for no/low impact activities and does not require a formal ER review letter.

### *Transportation and Access*

Access to the site is via S.T.H. 21, from which a gated facility access road extends north to the landfill area. The access road to the landfill is located approximately 1.5 miles west of the S.T.H. 13 and 21 intersection. S.T.H. 21 and 13 are not typically included in the seasonal posted roads restrictions imposed by the Wisconsin Department of Transportation (WIDOT), and Adams County has no local weight restrictions applied to county highways.

### *Airports*

There are no airports designed or planned within 10,000 feet of the proposed limits of waste. The nearest public airport is Adams County Legion Field, located approximately 5.1 miles southeast of the proposed vertical expansion. Adams County did not notify the Federal Aviation Administration since Adams County Legion Field is greater than 5 miles from the proposed vertical expansion. As a courtesy, the department notified Adams County Legion Field of the proposed vertical expansion on February 14, 2023.

### Regional and Site-Specific Geological Information

#### *Alternative Geotechnical Investigation Program*

Adams County proposed an alternative geotechnical investigation program (AGIP) for the proposed vertical expansion. The AGIP was detailed in a document titled, *Alternative Geotechnical Investigation Program, Vertical Landfill Expansion, Adams County Sanitary Landfill, FID 701040560, License No. 3150*, dated October 2022. The AGIP proposed to reference regional and site-specific geotechnical data and hydrogeologic information that has been collected over the course of previous investigations, including investigations conducted for the 1986 and 2017 feasibility submittals. The department accepted the proposed AGIP in a letter dated January 10, 2023.

### *Borings*

The landfill's existing footprint consists of six phases encompassing approximately 21.9 acres. The proposed vertical expansion would not increase the currently permitted landfill footprint. The proposed vertical expansion would overlay approximately 8.3 acres of the existing landfill footprint. Therefore, a total of 12 soil borings extending at least 25 feet below the subbase are required, per s. NR 512.09(1), Wis. Adm. Code.

All soil borings for the 2017 feasibility report were installed at least 25 feet below the proposed subbase grades with the exception of borings B-101 and B-104. The 1986 feasibility submittal details 22 boreholes, all installed at least 25 feet below the subbase with the exception of boring MW-18. The 1986 and 2017 feasibility submittals therefore include more than 12 borings that have been installed to the requirements of s. NR 512.09(1), Wis. Adm. Code, as summarized in Table 5-1 of the feasibility report. Soil boring logs are located in Appendix E of the feasibility report.

### *Monitoring Wells and Piezometers*

Based on the area the proposed vertical expansion will overlay (8.3 acres) and the coarse-grained soil environment the landfill is located within, s. NR 512.09(2), Wis. Adm. Code, requires six water table observation wells and three piezometers within 300 feet of the proposed limits of fill, with half of the groundwater monitoring wells located no more than 150 feet from the proposed limits of fill. Additionally, s. NR 512.09(2)(b), Wis. Adm. Code, requires a piezometer adjacent to a water table observation well at three separate locations (to create three well nests), with one well nest located within the proposed limits of filling.

A total of ten previously installed groundwater monitoring wells are proposed to define and investigate the proposed vertical expansion. The type and location of the proposed groundwater monitoring wells meet the requirements of s. NR 512.09(2), Wis. Adm. Code. Section 5.4 of the feasibility report summarizes the groundwater monitoring wells proposed to investigate the proposed vertical expansion.

### *Groundwater Sampling and Water Level Monitoring*

The ten existing groundwater monitoring wells proposed to define and investigate the proposed vertical expansion were installed during previous landfill phases. The subtitle D wells at the existing landfill include groundwater monitoring wells MW-7, MW-16, MW-18, and MW-30. Adams County is proposing to utilize these same subtitle D wells in the proposed vertical expansion.

### *Soils and Geology*

Natural Resources Conservation Service (NRCS) mapping indicates the surficial soils consist of Plainfield sands, which are formed on outwash plains, stream terraces and ground moraines, present on 2-12% slopes. The Plainfield sands are described as excessively drained and are classified as low to very low for water runoff. Infiltration rates/soil permeability are high to very high at the site (mapping indicates 6 to 20 inches per hour). Generally, the soils have low natural fertility.

Subsoils within the proposed vertical expansion are primarily comprised of glaciolacustrine deposits associated with Glacial Lake Wisconsin. The glaciolacustrine deposits are comprised of fine to coarse grained sand, silt, and clay and partly underlain by and mixed with outwash deposits. The upper soils consist of poorly graded silty sands. The majority of the upper soils are classified by the unified soil classification system (USCS) as silty sands (SM), inorganic silts (ML), and inorganic clays (CL). Boring logs from the 1986 feasibility submittal indicate the unconsolidated glacial material beneath the proposed vertical expansion is at least 100 feet thick.

A bedrock outcrop known as “Cottonville Rocks” is located approximately 1,200 feet east of the proposed vertical expansion. The outcrop and other outcrops in Adams County consist of resistant Upper Cambrian Wonewoc sandstone of the Elk Mound Group. Bedrock was not encountered during any of the previous onsite soil borings; private well logs in the area indicate bedrock is greater than 109 feet below ground surface (bgs). The well record for the private water supply well located approximately 1395 feet south of the existing waste limits is 124 feet deep and bedrock is encountered at 115 feet bgs.

Area mapping indicates that the bedrock in the immediate vicinity of the site consists of Cambrian-age sandstone (Trempealeau, Tunnel City, and Elk Mound Groups) that can range in thickness up to 440 feet and is underlain by Precambrian igneous and metamorphic rock (Devaul and Green, 1971; Mudrey et al., 1982).

## Hydrogeology

Groundwater is hydraulically connected throughout the site and monitored at two levels – the water table and piezometer level. The piezometers are given the designation ‘P’ at the end of the well name. No apparent confined or perched zones are present.

The private water supply well on the south side of the landfill office is screened around 120 feet bgs and draws water from the sandstone aquifer. The majority of water supply wells in the area draw water from the unconsolidated glacial aquifer or sandstone aquifer.

According to the U.S. Department of Agriculture (USDA), the glacial aquifer consists of outwash deposits with well yields as much as 1,000 gallons per minute (gpm) (USDA, 1980). The sand deposits are easily recharged due to their high permeability. Onsite, the deposits are classified as lacustrine. Due to the finer sediments associated with these types of deposits, well yields may be less locally.

The sandstone aquifer consists of fine to coarse grained Cambrian aged sandstone. Well yields from the sandstone aquifer range from 100 to 500 gpm (USDA, 1980). Groundwater in the basin is recharged by precipitation and by induced recharge from surface water bodies.

## Water Table

Depth to groundwater near the existing landfill footprint is approximately 25-45 feet bgs. The water table has historically varied by as much as 16 feet. A rise in groundwater elevation has been observed over the life of the existing landfill. During groundwater high conditions (September 2019) and subsequent sampling events, all monitoring well screens were submerged. During groundwater low conditions (December 2015), only one monitoring well screen was submerged. Groundwater contours for high and low groundwater conditions are presented in Plan Sheets 18 and 19 of the feasibility report, respectively.

## Groundwater Flow and Gradients

Regional groundwater flow is southwest and local groundwater flow is northwest. Although there is some variation in the direction of groundwater flow between high and low groundwater conditions, the overall direction of flow remains generally westward towards Big Roche A Cri Creek.

Based on groundwater elevations measured for the 2017 feasibility report, the horizontal groundwater gradient beneath the site ranges from 0.004 to 0.006 feet/foot, which correlates to an approximate 9-foot groundwater elevation change across the site. Hydraulic conductivity values as determined by slug tests for the 2017 feasibility report range from  $1.4 \times 10^{-3}$  to  $2.1 \times 10^{-2}$  centimeters per second (cm/sec).

Vertical groundwater gradients were also calculated during the 2017 feasibility study, using elevation measurements from five groundwater monitoring well nests. The values indicate a downward gradient in all five groundwater monitoring well nests, with an average downward gradient of 0.1297 feet/foot. Table 5-7 of the feasibility report presents the calculated vertical gradients.

Horizontal and vertical flow nets are presented in Plan Sheets 20 and 21 of the feasibility report, respectively. The flow nets suggest the high ground to the east is a groundwater recharge area, with groundwater discharge occurring generally west of the site. The flow nets are based on simplified assumptions that the groundwater flow environments are homogenous and isotropic.

### *Water Supply Wells*

There are no water supply wells located within 1,200 feet of the proposed vertical expansion. The nearest water supply well is located near the landfill office approximately 1,395 feet south of the proposed vertical expansion. One high-capacity, non-potable well is located west, beyond the 1,200-foot setback distance from the proposed vertical expansion. The high-capacity well is screened around 90 feet bgs and used for irrigation purposes.

### *Regional Groundwater Quality*

Groundwater is generally of good quality throughout the Central Wisconsin River Basin. Groundwater is typically low in hardness (i.e., soft) and total dissolved solids, with some isolated areas with high iron concentrations. Isolated areas of high nitrate concentrations are also present throughout the Central Wisconsin River Basin. High nitrate levels are attributed to agricultural areas where manure spreading, agricultural fertilizers, and legume cropping systems are used.

### *Baseline Groundwater Quality*

Baseline groundwater monitoring at the existing monitoring wells as required by s. NR 507.18, Wis. Adm. Code, was performed and evaluated for the landfill's 1986 and 2017 feasibility submittals. A summary of the inorganic and organic baseline sampling results is included in Table 5-8 of the feasibility report. Baseline sampling results from the 2017 feasibility submittal are also discussed in more detail in the next section.

Adams County is requesting an exemption from ch. NR 140, Wis. Adm. Code, groundwater quality standards for sulfate at MW-22 as part of the proposed vertical expansion. Sulfate has not been sampled at MW-22 historically and baseline monitoring for sulfate has not been completed. MW-22 is located side gradient of the existing landfill and near the northern edge of the closed C&D landfill.

### *Baseline Groundwater Quality – Inorganic Parameters*

Baseline sampling conducted as part of the 2017 feasibility submittal detected elevated levels of lead, vanadium, and manganese in select groundwater monitoring wells. The 2018 feasibility determination issued by the

department granted one requested exemption for lead at MW-30 and determined the other requested exemptions to be unnecessary.

Based on eight baseline samples collected for the 2017 feasibility submittal, water quality may be degraded in the vicinity of MW-31. Hardness and conductivity were slightly elevated at MW-31 relative to the other groundwater monitoring wells that were located, and subsequently abandoned, in the existing footprint of Phases 5 and 6. The feasibility report states the cause for the slight degradation in groundwater quality at MW-31 is not known. Laboratory results from the eight rounds of monitoring data associated with the 2017 feasibility submittal are provided in Appendix H of the feasibility report.

**Manganese** concentrations exceeded the PAL public welfare standard (25 micrograms per Liter [ $\mu\text{g}/\text{L}$ ]) in piezometer MW-30P during the December 17, 2015, sampling round. Historically, groundwater monitoring onsite has shown elevated background concentrations of manganese at MW-3P, 6P, 7P, and 18P. Detectable background levels in the Phase 5 and 6 expansion area ranged from 1.8  $\mu\text{g}/\text{L}$  (MW-3) to 29.2  $\mu\text{g}/\text{L}$  (MW-30P), which are within the historic range of detection at the site prior to waste filling. The range of background levels indicate manganese detects are likely naturally occurring and represent background water quality. Elevated manganese concentrations in piezometer MW-30P relative to the shallower water table observation well (MW-30) also support natural occurrence of manganese.

**Vanadium** concentrations above the PAL were reported in water table observation well MW-30 during the December 17, 2015, sampling round. Historically, only one exceedance has been detected at MW-30. Subsequent monitoring at MW-30 following the December 17, 2015, sampling round has resulted in one low level detect of vanadium, but no further PAL exceedances. Natural sources of vanadium in groundwater include dissolution of vanadium-rich rocks, such as mafic and andesitic rocks. Waste streams from industrial processes can also be a source of vanadium. The feasibility report states the exceedance on December 17, 2015 appears to be an anomaly relative to historic concentrations and, therefore, not related to the landfill.

**Lead** concentrations exceeded the PAL (1.5  $\mu\text{g}/\text{L}$ ) in groundwater monitoring wells MW-3, MW-3P, MW-17P, MW-30 and ES (15  $\mu\text{g}/\text{L}$ ) in groundwater monitoring well MW-31 during baseline sampling associated with the 2017 feasibility submittal. One PAL exceedance was detected at MW-3, MW-3P, and MW-17P, while three PAL exceedances were detected at MW-30. Only one ES exceedance was detected at MW-31.

MW-31 is located southeast of the landfill, upgradient relative to groundwater flow. One detection of lead (97.9  $\mu\text{g}/\text{L}$ ) has been observed at MW-31 historically. Sampling at MW-31 since the exceedance resulted in no detects of lead. Therefore, the ES exceedance at MW-31 is likely an anomaly attributed to sampling or laboratory contamination and not related to the landfill.

According to a study by the University of Wisconsin Stevens Point Center for Watershed Science Education, and referenced in the feasibility report, the Adams County Sanitary Landfill is located in a region where lead in groundwater has been found to be around 15  $\mu\text{g}/\text{L}$ . Historic sampling for lead from July 1986 to September 1987 at a number of groundwater monitoring wells throughout the site indicate background levels of lead are 5  $\mu\text{g}/\text{L}$  or less. Therefore, lead detects exceeding the PAL may be naturally occurring.

### *Baseline Groundwater Quality – VOCs*

No volatile organic compounds (VOCs) were detected as part of the baseline sampling for the 2017 feasibility submittal. Sporadic detects of low-level VOCs, primarily benzene, have been detected throughout historical, routine monitoring. The feasibility report states the sporadic VOC detects are most likely from ambient air exhaust associated with heavy equipment operation at the landfill.

## Constraints on Landfill Development

### Locational Criteria

The proposed vertical expansion would not be located within 300 feet of a navigable river or stream, or within a flood hazard area or floodplain. The proposed vertical expansion would not be located within 1,000 feet of a navigable lake, pond, or flowage, or within 1,000 feet of the edge of the right-of-way to a state or federal highway. The proposed vertical expansion would not be located within 10,000 feet of an airport runway used by turbojet aircraft, nor within 5,000 feet of an airport runway used by piston-type aircraft. The proposed vertical expansion would not be located within 1,200 feet of a water supply well. Detrimental effects on surface water would not be anticipated as a result of the construction or operation of the proposed vertical expansion. The nearest surface waterbody, apart from on-site storm water basins, is Big Roche A Cri Creek, located approximately 0.85 miles west of the proposed vertical expansion.

The proposed vertical expansion would not be located within 200 feet of a known Holocene fault or within a seismic impact zone, nor within an unstable area. Subbase excavation activities during previous liner construction events of the existing landfill encountered areas of poorly graded or gap-graded sandy soils. These soils were removed during previous construction events by excavating below the planned subbase and replacing with silty sand overburden from the clay borrow site, as well as crushed glass.

### Performance Standards

#### *Wetlands*

The proposed vertical expansion is not anticipated to have a significant adverse impact on wetlands. No wetlands are located within the expansion footprint, nor on the 433-acre contiguous property owned by the Adams County Solid Waste Department. The nearest wetlands are located within the floodplain of Big Roche A Cri Creek approximately 0.7 miles northwest of the proposed vertical expansion.

#### *Endangered or Threatened Species*

An endangered resources (ER) review request application was submitted to the department's ER Review Program for the proposed vertical expansion during the ISI process. On January 19, 2022, the department's ER Review Program determined the project is covered by Activity 1-A12 in Table 1 of the broad incidental take permit/authorization; therefore, the project does not require a formal ER Review letter. The Endangered Resources Review Verification Form (Form 1700-079) was completed by the department and is included in Appendix B of the feasibility report.

#### *Surface Water*

Detrimental effects on surface water adjacent to the proposed vertical expansion would not be anticipated as a result of the construction or operation of the proposed landfill. The proposed vertical expansion would be designed with appropriate storm water control features including, but not limited to, ditches, storm water basins, etc. The storm water basins at the existing landfill are designed for 100-year, 24-hour events. The distance between the proposed vertical expansion and the nearest surface water body, Big Roche A Cri Creek, is approximately 0.85 miles. The full storm water management system will be specified as part of the plan of operation.

## *Groundwater Quality*

Detrimental effects to groundwater quality as defined in s. NR 504.04(4)(d), Wis. Adm. Code, would not be anticipated as a result of the construction or operation of the proposed vertical expansion. The proposed vertical expansion would incorporate the existing composite liner within phases 3 through 6. The composite liner would consist of a 4-foot-thick compacted clay layer overlain by a 60-mil high density polyethylene (HDPE) geomembrane and leachate collection system. Phases 1 and 2 of the existing landfill contain clay liners rather than composite liners (see page 1, footnote 1); therefore, lysimeters have been installed in Phases 1 and 2 to monitor the performance of the clay soil liner. Phases 1 and 2 have been constructed with a composite final cover system and Phases 3 through 6 would be constructed with a composite final cover system. The composite final cover system would limit infiltration through closed portions of the landfill.

## *Explosive Gases*

The proposed vertical expansion would incorporate the current gas collection system by extending existing gas extraction wells vertically to newly proposed final elevations while maintaining connection to the existing gas collection system to be actively collected by the landfill blower. Adams County would also install 8 additional gas extraction wells, as previously approved in the 2019 conditional plan of operation approval. Landfill gas control system layout, details, and evaluation of the existing blower/flare system capacity would be included as part of the plan of operation report. The landfill monitoring system would include monitoring the active gas extraction system and existing gas probes installed around the perimeter of the landfill to routinely monitor for gas migration.

## *Hazardous Air Contaminants*

The current and proposed landfill gas collection system would control emissions of hazardous air pollutants in accordance with state and federal air pollution control requirements. Adams County does not propose ambient air monitoring for particulates or other constituents as part of the monitoring program. If necessary, ambient air monitoring requirements will be established through the department's Air Program permitting process. Adams County would need to control its air emissions in accordance with applicable local, state, and federal regulations.

## *Geotechnical Information*

### *Geologic*

The upper soils in the vicinity of the site consist of poorly graded silty sands; the majority of these soils are classified as silty sands (SM), inorganic silts (ML), and inorganic clays (CL), with minor areas of soils classified as CL-ML and SP-SC. Boring logs from the 1986 feasibility submittal indicate the unconsolidated glacial material beneath the proposed vertical expansion is at least 100 feet thick. Therefore, the required 10-foot separation between the subbase grades and the bedrock surface is met, as required by s. NR 504.06(2)(c), Wis. Adm. Code.

### *Hydrogeologic*

Hydrogeologic features which may affect the development of the proposed landfill site include depth to the water table and the groundwater flow directions in the soil and bedrock.

Depth to groundwater near the proposed vertical expansion is approximately 25-45 feet bgs but has historically varied by as much as 16 feet. During the 2017 feasibility submittal for the Phase 5 and 6 expansions, groundwater was detected from approximately 21 to 38 feet bgs. The geotechnical investigation associated with the 2017 feasibility submittal did not reveal any hydrogeologic features that would impact landfill development.

Subbase elevations in Phases 1-6 were designed at the time of construction to maintain the 10-foot separation distance to the seasonal high groundwater table, as required by s. NR 504.06(2)(b), Wis. Adm. Code.

Groundwater flow directions at both the water table and piezometer level have been consistent through the life of the existing landfill. Groundwater flow directions at both levels have been predominantly to the northwest. Regional groundwater flow is to the southwest. Vertical groundwater gradients calculated for the 2017 feasibility submittal indicate an average downward gradient of 0.1297 feet/foot.

### *Topographic*

The site topography is characterized by an eastward slope that follows the placement of waste from west to east. Landfill elevations at the existing landfill range from approximately 970 feet above MSL to 1028 feet above MSL. The subbase of the proposed vertical expansion is proposed to be the top of waste at various elevations across Phases 2 through 6. The hills east of the landfill, including the “Cottonville Rocks,” will help the site to blend into the surrounding topography after closure. The hills east of the landfill, large trees surrounding the landfill, and setback of the landfill from nearby roadways will continue to provide visual screening. Ground surface elevations for the proposed vertical expansion are presented on Plan Sheet 2 of the feasibility report.

### *Hydrologic*

Hydrologic conditions near the proposed vertical expansion are not anticipated to have an effect on landfill development nor be affected by landfill development. No natural surface waters or wetlands are present within 0.7 miles of the proposed vertical expansion. The coarse-grained soil environment surrounding the landfill will limit surface water runoff and promote infiltration of surface water into the subsurface.

Currently, storm water drains north, south and west away from the capped Phases 1 and 2. The remaining phases are either active and receiving waste or not yet constructed. The proposed vertical expansion would incorporate storm water control features and best management practices to maintain an approximate surface water balance compared to existing conditions. The proposed vertical expansion would incorporate existing storm water basins to allow collection and infiltration of surface water. Evaluation of the ability for the existing storm water features to handle additional surface water flow from the proposed vertical expansion would need to be evaluated in the plan of operation. Additional storm water control details are presented in Section 8.8 of the feasibility report.

### **Construction and Operation**

There are no construction or operational constraints anticipated that would restrict development of the proposed vertical expansion or prevent the proposed vertical expansion from maintaining compliance with current solid waste regulations. The proposed vertical expansion lies entirely within the footprint of the existing landfill and uses the liner and leachate collection and removal systems that were approved in 1988 and 2019.

Waste operations and support functions to be performed at the landfill would include waste compaction, placement of daily cover, road construction, snow removal, dust and litter control, security, monitoring and maintenance of environmental monitoring systems, and grounds maintenance.

Structures such as the scale, office, site entrance, leachate collection tank, environmental monitoring and gas extraction features, and storm water basins already exist or would be added to operate the proposed vertical expansion. Leachate would be recirculated and/or treated offsite at the City of Adams Wastewater Treatment Facility or Village of Plover Wastewater Treatment Facility. Addendum no. 1 to the feasibility report indicates soil materials for the next phase of final cover (3.3 acres in 2027) would be available within the previously

permitted soil borrow source northwest of the landfill. Additional details and sources of final cover soil would be provided as part of the plan of operation.

## Existing Facility Performance

### *Groundwater Quality Monitoring*

Groundwater monitoring wells assigned to the existing landfill are sampled semiannually in March and September. Twenty-one of the twenty-five groundwater monitoring wells on the property monitor the groundwater quality around the existing landfill. The remaining four groundwater monitoring wells (MW-25, MW-26, MW-27, and MW-28) monitor for only groundwater elevation around the solid waste processing and recycling facility. The existing twenty-five groundwater monitoring wells would continue to be sampled during operation of the proposed vertical expansion. The locations of the existing groundwater monitoring wells are presented on Plan Sheet 25R of the feasibility report addendum no. 1.

Four subtitle D wells (MW-7, MW-16, MW-18, and MW-30) are sampled semiannually for indicator parameters, chloride, and VOCs. The remaining groundwater monitoring wells assigned to the existing landfill are sampled semiannually for indicator parameters and chloride, and annually (March) for VOCs. Water elevation, specific conductance, pH, temperature, color, odor and turbidity are measured in the field at each well assigned to the existing landfill.

Well-specific preventive action limits (PALs) for indicator parameters such as alkalinity, hardness, and conductivity have been exceeded at multiple wells over the history of the existing landfill. Exceedances for alkalinity have historically been reported above well-specific PALs at groundwater monitoring wells MW-1, MW-6, MW-6P, MW-16, MW-18, MW-19, MW-19P, MW-20, MW-21, and MW-22. Exceedances for hardness have historically been reported above well-specific PALs at groundwater monitoring wells MW-1, MW-16, MW-18, MW-19, MW-20, MW-21, and MW-22. Exceedances for specific conductance have historically been reported above well-specific PALs at groundwater monitoring wells MW-1, MW-1P, MW-2, MW-6, MW-6P, MW-16, MW-18, MW-19, MW-19P, MW-20, MW-21, and MW-22.

Since 2020, the only parameter detected at a concentration above its respective NR 140 PAL or ES is the volatile organic compound (VOC) tetrachloroethylene (PCE). PCE was detected in the March 4, 2020 water sample collected from MW-1P at a concentration of 1.9 µg/L, which is above the NR 140 PAL of 0.5 µg/L, but below the NR 140 ES of 5 µg/L. PCE has not been detected in subsequent sampling rounds at MW-1P, or at any other monitoring wells around the landfill since 2020.

Additional VOCs have been detected at the landfill's monitoring wells since 2019 below the respective PAL for those substances. The VOC detections were isolated with no detections occurring in subsequent sampling rounds.

The VOC detections since 2019 are a small percentage of the overall VOC sampling done at the existing landfill. In addition, these VOC detections were not repeated. Therefore, despite routine exceedances of site-specific PALs for indicator parameters, the VOC monitoring data support a conclusion that the landfill's design and engineering features are functioning as intended, which is to contain, prevent and minimize releases to the environment.

All groundwater quality monitoring data is available to the public on the department's Groundwater and Environmental Monitoring System (GEMS) database online.

### *Gas Monitoring*

The existing landfill's gas extraction system consists of seven gas extraction wells that extract landfill gas from the waste mass for combustion in a blower and flare system. A total of 15 gas extraction wells were approved in the 2019 conditional plan of operation approval. Therefore, eight additional gas extraction wells will be installed as waste filling progresses. Landfill gas readings at the flare unit indicate the system is performing adequately and will be able to tolerate increases in gas production as more gas extraction wells are installed. Additional details and adjustments to the active gas system would be provided as part of the plan of operation report. The locations of existing gas extraction wells, as well as the remaining gas extraction wells to be constructed, are presented on Plan Sheet 25R of addendum no. 1 to the feasibility report.

The performance of the landfill gas extraction system is evaluated by monitoring the gas monitoring probes installed around the perimeter of the existing landfill. Four gas probes (GP-1, GP-2, GP-3 and GP-4) have been installed to monitor the existing landfill. GP-1 and GP-2 have been monitored quarterly since 2000, GP-3 has been monitored quarterly since 2022, and GP-4 was installed June 20, 2025. Methane has not been detected in the four gas probes with the exception of two monitoring events in 2011, where methane was detected at 0.9% and 0.4% in GP-1. The feasibility report attributes the two detections in 2011 to operator or equipment error. No detections of methane have been encountered in the gas probes while the active gas system has been operational. The locations of existing and proposed gas extraction probes are presented on Plan Sheet 25R of the feasibility report.

### *Leachate Monitoring*

The existing leachate collection system collected and removed approximately 3,552,045 gallons of leachate in 2021, which equates to approximately 9,732 gallons of leachate removed per day; leachate volumes pumped and recirculated are required to be reported monthly.

Leachate collection system performance is evaluated by the installation of leachate headwells, which are designed to directly measure the head build-up atop the liner system. Eight horizontal leachate headwells (LHW-5, LHW-6, LHW-7, LHW-8, LHW-9, LHW-9A, LHW-10, and LHW-10A) have been installed to monitor the existing landfill. Leachate headwells are monitored monthly for leachate head elevation. Leachate head on the landfill liner greater than one foot has been reported at leachate headwells LHW-5, LHW-9, and LHW-10A between May 2025 and September 2025; however, leachate head at these headwells has decreased over this period, nearing one foot as of September 2025. Addendum no. 1 to the feasibility report attributes leachate headwell elevations above one foot to rain events. The locations of the leachate headwells are presented on Plan Sheet 25R of the feasibility report.

Lysimeters (CLR-1 and CLR-2) are located beneath the clay liner of Phases 1 and 2, respectively, of the existing landfill, per s. NR 504.06(5)(u), Wis. Adm. Code. Phases 3-6 of the existing landfill consist of a composite liner and therefore do not require lysimeters. Lysimeters are designed to monitor the liner systems performance by collecting a liquid sample of leachate that may have permeated through the liner system. Lysimeters (CLR-1 and CLR-2) are monitored monthly for liquid quality and quantity. Since the installation of CLR-1 in 1990 and CLR-2 in 1993, liquid has been found present in both lysimeters; however, no VOCs have been detected in either lysimeter, suggesting the existing clay liner and leachate collection system are effectively managing leachate. The locations of the leachate lysimeters are presented on Plan Sheet 25R of addendum no. 1 to the feasibility report.

### *Surface Water Monitoring*

Adams County is not currently required to collect water samples from surface water bodies and/or storm water discharge outfalls for laboratory analysis. Monitoring of storm water runoff is performed in accordance with the existing landfill's Storm Water Pollution Prevention Plan (SWPPP) and Wisconsin Pollutant Discharge Elimination System (WPDES) Tier 2 Industrial Storm Water General Permit. This includes conducting quarterly

visual inspections at storm water outfalls, non-storm water discharge monitoring, and an Annual Facility Site Compliance Inspection (AFSCI). In general, storm water inspections and monitoring involve observing storm water outfalls for signs of storm water contamination and verifying compliance with the best management practices (BMPs) highlighted in the SWPPP. Since the start of landfill operations, storm water has rarely accumulated in enough quantity to be discharged from the sedimentation basin outfall. Storm water readily infiltrates into the ground due to the permeable nature of the surficial soils. The locations of the two infiltration basins and one storm water basin are presented on Plan Sheet 25R of addendum no. 1 to the feasibility report.

## Proposed Preliminary Landfill Design and Operation

The proposed vertical expansion would consist of an 8.3-acre vertical expansion and provide approximately 247,500 cubic yards of additional capacity for a total landfill capacity of 1,495,500 cubic yards. The proposed vertical expansion would overlay waste onto Phases 2 through 6 (see page 1, footnote 1) and utilize the liner within the existing landfill. The Phase 2 liner consists of 5 feet of clay soil with no geomembrane. Liner for Phases 3 through 6 consists of 4 feet of clay soil and a 60 mil thick high density polyethylene (HDPE) geomembrane. Section NR 504.06(1)(a), Wis. Adm. Code, requires that all major phases of landfills accepting municipal solid waste be designed, constructed, operated, and maintained with a composite liner.

The proposed vertical expansion would utilize the leachate collection system within the existing landfill. Leachate would be hauled to the City of Adams Wastewater Treatment Facility or Village of Plover Wastewater Treatment Facility. The proposed vertical expansion would incorporate the existing gas collection system by extending existing gas extraction wells vertically where necessary and installing eight additional gas extraction wells. Gas extracted from the waste mass would continue to be combusted in the existing blower and flare system.

### **Base and Subbase Grades**

The proposed vertical expansion would overlay base and subbase grades of the existing landfill. Therefore, no design or elevation changes are anticipated relative to the existing base and subbase grades. Subbase grades were designed at the time of construction to maintain the 10-foot separation distance to the seasonal high groundwater table, as required by s. NR 504.06(2)(b), Wis. Adm. Code. The existing landfill does not incorporate an underdrain or gradient control system. Boring logs from the 1986 feasibility submittal indicate the unconsolidated glacial material beneath the proposed vertical expansion is at least 100 feet thick. Therefore, the required 10-foot separation between the subbase grades and the bedrock surface is met, as required by s. NR 504.06(2)(c), Wis. Adm. Code.

### **Liner**

The proposed vertical expansion would incorporate the existing composite liner system within Phases 3 through 6. The composite liner in Phases 3 through 6 is generally comprised of a 4-foot-thick compacted clay layer, 60-mil HDPE geomembrane, geotextile cushion, and a 1-foot-thick granular leachate drainage layer. The liner system for Phase 2 consists of 5 feet of compacted clay followed by a 1-foot-thick granular leachate drainage layer, while the liner system for Phases 3 through 6 consists of a composite liner designed in accordance with s. NR 504.06, Wis. Adm. Code. Section NR 504.06(1)(a), Wis. Adm. Code, requires that all major phases of landfills accepting waste be designed, constructed, operated and maintained with a composite liner.

### **Leachate Collection**

The proposed vertical expansion would incorporate the leachate collection system of the existing landfill. The existing leachate collection system is designed to collect leachate off the liner and route it to the collection tanks,

or recirculate it back into the waste mass. Leachate that is routed to the collection tanks would be transported offsite to the City of Adams Wastewater Treatment Facility and/or Village of Plover Wastewater Treatment Facility.

The subbase and base of the existing liner system have been installed to convey leachate to a centrally located collection trench within each Phase (1 through 6). Leachate collection trenches contain geotextile, gravel bedding, and a 6-inch diameter Schedule 80 PVC perforated pipe. Leachate collection trenches would convey leachate to a collection sump located in each Phase. The existing leachate collection lines do not exceed 1,200 feet from the cleanout to the toe of the opposite slope.

Existing leachate extraction sumps, sideslope riser pipes, and submersible pumps would be utilized for leachate removal from the proposed vertical expansion. The sideslope riser pipes provide access for a submersible pump that transfers leachate from the sump to the leachate header system. The sideslope riser extends to a leachate extraction manhole at the top of the berm, which provides a maintenance/access point for the submersible pump and a discharge connection to the leachate header system. A valve connection is located on the discharge line that allows leachate to be recirculated back into the waste mass or discharged through the leachate header system. The leachate header system transports leachate to a 30,000-gallon underground leachate collection tank or 35,000 gallon above ground leachate collection tank where it is contained eventually taken offsite for treatment.

Two horizontal leachate headwells are located in each of Phases 3 through 6 to measure the leachate head on the liner system, per s. NR 504.09(2)(i), Wis. Adm. Code. All leachate collection features outside the composite lined area would have a form of secondary containment in the event the primary containment is compromised. Leachate collection system details are presented in Plan Sheet 22 of the feasibility report.

The proposed vertical expansion will increase the static long-term loading of leachate collection pipes in the vertical overlay area. Therefore, addendum no. 1 to the feasibility report includes leachate pipe strength calculations for the existing leachate collection lines below the proposed vertical expansion. Appendix J1 of addendum no. 1 includes the preliminary calculations for the pipe strength analysis.

## Leachate Generation Rate and Treatment

Adams County calculates the following leachate generation volumes for the proposed vertical expansion using generation rates in s. NR 512.12(3), Wis. Adm. Code. Leachate generation calculations are presented and summarized in Appendix M1 of addendum no. 1 to the feasibility report.

- Maximum during operation (assuming Phases 3 through 6 are open): 7,631 gallons per day
- Post-closure: 1,628 gallons per day

Leachate would be recirculated or discharged to the leachate collection tanks and hauled to the City of Adams Wastewater Treatment Facility or Village of Plover Wastewater Treatment Facility.

## Gas Collection and Management

The proposed vertical expansion would incorporate the gas extraction system for the existing landfill, which currently has seven of the scheduled 15 gas extraction wells installed. The existing gas extraction wells would be extended vertically while maintaining connection to the existing blower flare unit. Landfill gas would be extracted via a network of pipe laterals and headers and ultimately routed to the existing blower flare unit. Landfill gas generated would then be combusted (i.e. converted to carbon dioxide) by the flare.

Gas collection pipes would be present within and outside the waste limits. Gas collection piping that resides outside the waste would incorporate an approved secondary containment method in accordance with s. NR 504.08(2)(l), Wis. Adm. Code. The pipe network would convey condensate that may develop into the existing leachate collection tank; therefore, condensate would be treated as leachate.

Landfill gas containment would be achieved using the composite liner and composite cover systems in combination with the active gas system. The liner and cover systems would act as impermeable barriers to prevent the migration of landfill gas, while the active gas system imposed a vacuum to extract gas from the waste mass. Additional details and adjustments to the gas control system, if needed, would be provided as part of the plan of operation.

Existing gas monitoring probes (GP-1 through GP-4) around the perimeter of the landfill would continue to be monitored for subsurface migration of landfill gas.

## Final Waste Grades and Final Cover

The final cover system for the proposed vertical expansion would consist of a 5.5-foot-thick composite cap designed in accordance with s. NR 504.07, Wis. Adm. Code. Final cover grades are shown on Plan Sheet 24. The approved height of the landfill after final cover would have a peak elevation of approximately 1,073.5 feet above MSL. The final cover system, from top down, would consist of the following:

- 6 inches topsoil.
- 18-inch rooting layer.
- 12-inch granular drainage layer.
- 40 mil LLDPE geomembrane.
- Geosynthetic Clay Liner (GCL)
- 24-inch soil barrier layer
- 6-inch grading layer

## Surface Water Runoff Management

The surface water management system would be designed to meet the requirements of s. NR 504.09 and chs. NR 216 and NR 151, Wis. Adm. Code. During landfill operations, surface water runoff that contacts waste or daily cover would be treated as leachate.

Surface water monitoring in the form of sample collection is not performed at the existing landfill. No surface water bodies are present immediately adjacent to the existing landfill or proposed vertical expansion. The feasibility report attributes the lack of surface water to the permeable surficial soils, and states storm water has rarely accumulated in enough quantity to be discharged from the existing sedimentation basin outfall.

Storm water control would continue to be implemented in accordance with the requirements of a WPDES Tier 2 Industrial General Permit and site-specific SWPPP. Storm water control features and best management practices would continue in the form of ditching, storm water basins, and erosion control including, but not limited to, silt fencing, erosion mats, sediment logs, check dams, riprap, and re-establishment of vegetation.

Additional storm water control features would be provided and finalized as part of the plan of operation. Routine storm water inspections of the facility's storm water control features would also be performed in accordance with the facility's SWPPP.

## Proposed Soil Borrow Source

Adams County proposes to utilize the previously permitted soil borrow source northwest of the landfill to provide 2 feet of soil barrier layer material for the next phase of final cover construction (3.3 acres in 2027). This soil borrow source was initially approved as part of the 1988 conditional plan of operation approval, and an expansion of this soil borrow source was approved as part of the 2019 conditional plan of operation approval. Addendum no. 1 to the feasibility report calculates 10,650 cubic yards of soil barrier layer material needed to close the next phase of the final cover and 16,500 cubic yards of adequate soil barrier layer material available in the previously permitted soil borrow source.

Addendum no. 1 to the feasibility report states there is a deficit of fill material available at the previously permitted soil borrow source for full closure of the proposed vertical expansion. Therefore, Adams County proposes to provide more detailed volume calculations for the required final cover soil materials and available source materials in the plan of operation for the proposed vertical expansion.

## Proposed Visual Screening

The hills east of the landfill, including the “Cottonville Rocks,” will help the site to blend into the surrounding topography after closure. The hills east of the landfill, large trees surrounding the landfill, and setback of the landfill from nearby roadways will continue to provide visual screening from S.T.H. 21 and neighboring residences. No additional features to screen the operation are proposed in the feasibility report.

## Final Use

The current final use plan for the landfill is open green space. Access to the proposed vertical expansion and existing landfill would be maintained for long term care, maintenance, and monitoring of the landfill.

## Proposed Operations

The proposed landfill would be operated according to the provisions of ch. NR 506, Wis. Adm. Code, and the plan of operation for the proposed landfill.

### *Site Access and Control*

The site would be accessed via the existing gated facility access road along S.T.H. 21. Unauthorized access to the site would be restricted by gates, perimeter or property fencing, and natural barriers.

### *Proposed Development and Operation*

Development of the proposed vertical expansion would begin by removing intermediate cover that has been placed over Phase 3. Once the intermediate cover is removed, placement of waste would occur over existing waste in Phase 3. Adams County proposes to excavate and berm the extent of the Phase 3 vertical footprint where it intersects with the Phase 2 cap. Disturbance of Phase 2 is proposed to be minimally invasive; the extent is presented in Plan Sheet 24 of the feasibility report.

Storm water control features would be constructed during the preparation of Phases 2 and 3. Once the intermediate cover of Phase 3 is removed and the Phase 2 cap prepared, the general sequence of waste placement would be west to east; however, access would determine specific waste placement.

The working face would be kept to as small of an area as practical. Native onsite sand or approved ADC would be used for daily cover in the active area. Intermediate cover would be utilized on areas that do not receive solid waste for a period exceeding six months, per s. NR 506.06, Wis. Adm. Code.

### *Dust, Noise, Odor, And Liter Control*

Dust, noise, odor, and litter would be minimized in accordance with generally accepted standard operating procedures:

- Dust would be controlled by minimizing the active area and with a water truck as needed.
- Operating noise would occur during hours of operation. Operating noise would be handled by incorporating noise reduction systems where appropriate.
- Odors would be controlled by minimizing the active area, placing daily cover, and operating the active gas extraction system.
- Windblown debris would be controlled by proper waste compaction and placement of daily cover. Windblown debris would be collected in a timely manner and portable wind screens would be deployed around the active fill area to assist in preventing windblown debris as needed.

### **Environmental Monitoring**

The environmental monitoring program would remain similar to the monitoring requirements specified in the February 14, 2019, plan of operation approval. A sampling plan and proposed environmental monitoring schedule is included in addendum no. 1 to the feasibility report. A finalized sampling plan and environmental monitoring schedule would be submitted with the proposed plan of operation following ch. NR 507, Wis. Adm. Code.

### *Landfill Gas*

Landfill gas monitoring would continue to be performed at various points, including gas probes, gas extraction wells, and a flare. The gas extraction wells and flare would be monitored to optimize operations and minimize subsurface gas migration. Gas probes located around the perimeter of the landfill would be monitored to confirm that subsurface gas migration is not occurring.

Ambient air monitoring for particulates or other constituents is not proposed as part of the monitoring program. Ambient air monitoring requirements, if any, would be established through the air permitting process.

### *Landfill Leachate*

Leachate monitoring would continue to be performed at various existing and to be constructed monitoring points, including the leachate collection tanks, leachate head wells, and lysimeters. Monitoring would include analysis of leachate quality, monitoring of leachate head on the liner, and monitoring of leachate volumes managed. Additional leachate drainage basin monitoring related to leachate recirculation and additional liquids application would be performed as required under the leachate recirculation plan.

### *Groundwater*

The existing groundwater monitoring network approved in the February 14, 2019, plan of operation approval would be maintained as part of the proposed vertical expansion. The monitoring program includes wells which were originally installed to monitor the existing landfill. No additional groundwater monitoring wells are proposed as part of the proposed vertical expansion.

The existing monitoring plan is designed to provide water quality information for key chemical parameters at locations both upgradient and downgradient of the landfill. Water levels measured before sampling would be used to evaluate groundwater flow patterns and gradients at the site. Parameters and monitoring frequencies would continue as outlined in the February 14, 2019, plan of operation approval.

### *Surface Water*

Monitoring of storm water runoff is performed in accordance with the existing landfill's SWPPP and WPDES Tier 2 Industrial Storm Water General Permit. This includes conducting quarterly visual inspections at storm water outfalls, non-storm water discharge monitoring, and an AFSCI. In general, storm water inspections and monitoring involve observing storm water outfalls for signs of storm water contamination and verifying compliance with the BMPs highlighted in the SWPPP. These routine inspections and monitoring events would continue to be conducted for the proposed vertical expansion.

### Environmental Analysis

#### *Proposed Physical Changes*

##### *Terrestrial Resources*

Development of the proposed vertical expansion would involve filling waste within an area currently zoned for landfill use. Development of the proposed vertical expansion would not result in alterations of land around the existing landfill footprint, apart from soils obtained from the existing-site soil borrow source.

The proposed vertical expansion would result in a peak landfill elevation of approximately 1,073.5 feet above MSL. Landfill elevations at the existing landfill range from approximately 970 feet above MSL to 1028 feet above MSL. Therefore, the proposed vertical expansion may have some aesthetic visual impacts relative to the existing landfill. However, the hills east of the landfill, large trees surrounding the landfill, and setback of the landfill from nearby roadways would provide visual screening. There may also be some wind-blown material at and around the proposed vertical expansion, but wind screens would be utilized as necessary to control wind-blown debris.

Soil and clay used in development of the proposed vertical expansion would be obtained from both onsite and offsite sources. Soil used for cap construction would originate from the landfill's existing department-approved borrow source, as well as a soil borrow source yet to be determined. Soils excavated from soil borrow areas would be used as general fill in the construction of the landfill access roads, berms, daily cover, grading layer, and protective cover layer. Granular fill used in the liner leachate collection system would be obtained from an offsite source.

Storm water collection ditches around the perimeter of the existing landfill footprint would continue to be used to convey storm water runoff from the landfill cover to the existing storm water basins. Access roads along the perimeter of the existing landfill would be utilized and modified as necessary; additional details would be provided in the plan of operation.

##### *Aquatic Resources*

Development of the proposed vertical expansion is not anticipated to alter any adjacent aquatic features. No wetlands or natural surface water bodies are located on the property of the existing landfill. The closest surface water feature is Big Roche A Cri Creek, which is approximately 0.85 miles west of the landfill.

During landfill operations, surface water runoff that contacts waste or daily cover would be treated as leachate. The proposed vertical expansion would be designed with appropriate storm water control features including, but not limited to, ditches, storm water basins, silt fencing, erosion mats, sediment logs, check dams, and riprap. The storm water basins would limit the release of sediment and surface water and be designed to hold rainfall from a 100-year, 24-hour storm event. Best management practices would be implemented to minimize and control erosion.

### *Groundwater*

The proposed vertical expansion would incorporate the existing landfill's liner system. Phases 3 through 6 contain a composite liner comprised of a 4-foot-thick compacted clay layer overlain by a 60-mil high density polyethylene (HDPE) geomembrane and leachate collection system. Phases 1 and 2 contain a clay soil liner and leachate collection system, along with lysimeters to monitor the performance of the clay soil liner. Section NR 504.06(1)(a), Wis. Adm. Code, requires all major phases of landfills accepting municipal solid waste be designed, constructed, operated, and maintained with a composite liner. The proposed vertical expansion would also incorporate the gas collection system of the existing landfill. The proposed vertical expansion would include a 5.5-foot-thick composite final cover system, which would limit the amount of water that infiltrates the landfill, thereby reducing the amount of leachate generated. Groundwater would be protected by the existing and proposed engineering features.

### *Landfill Infrastructure*

The proposed vertical expansion would use the infrastructure established for the existing landfill, including the existing office and scale. The proposed vertical expansion would also continue use of the three existing storm water basins. Existing perimeter access and maintenance roads would be utilized to access the proposed vertical expansion, with additional details and potential modifications provided in the plan of operation report. No new buildings or modifications to the main site access road are anticipated as part of the proposed vertical expansion.

### *Emissions and Discharges*

All landfills produce emissions and discharges. The landfill emissions and discharges expected from the proposed landfill include:

**Engine Exhaust** – Engine exhaust from diesel and gasoline-powered vehicles and equipment would be discharged to the atmosphere. The discharge volume would vary depending on the number of vehicles or equipment pieces operating at a given time. Traffic volume during operation of the proposed vertical expansion would likely be similar to traffic volume at the existing landfill. However, traffic volume may increase as waste acceptance volumes are projected to increase over time. During post-closure, engine exhaust would be minimal and occur during routine maintenance activities and monitoring events.

**Dust** – Dust may be generated from gravel roads, earthwork activities, and wind blowing across exposed areas. Dust quantities would vary depending on the number of vehicles or equipment in operation, weather conditions, and the amount of open area at the site. Dust would be controlled with the application of water to access roads as needed during dry weather conditions. Dust would also be controlled by stabilizing disturbed areas as soon as practicable. During post-closure, dust would be significantly reduced since all areas would be capped and vegetated. Dust generated after landfill closure would likely be generated from access roads when vehicles are used for routine maintenance and monitoring activities.

**Noise** – Noise would be generated from the operation of motorized equipment and vehicles during typical landfill operations. During landfill construction events, noise impacts would occur from earth moving equipment. Noise

intensity would vary depending on the number of vehicles in operation and the activity. Noise impacts would occur during operating hours. Operating hours are determined in the local agreements with the host communities. Noise would be significantly reduced after landfill closure due to elimination of haulers accessing the site and a significant reduction in outdoor heavy equipment operations.

**Leachate** – Leachate would be generated as rainwater infiltrates the landfill and percolates through the waste mass. Leachate would be managed by the existing leachate collection system. Leachate would flow into the leachate collection pipes that route the leachate to sumps. From the sumps, leachate would be discharged through the leachate header system and to the leachate collection tanks or recirculated back into the waste mass of Phases 3 through 6. Leachate discharged to the leachate collection tanks would be transported offsite for treatment. The characteristics of the leachate would likely be similar to the leachate that is currently collected at the existing landfill. During post-closure, the final cover would be designed to shed water from the waste mass, reducing the volume of leachate generated.

**Landfill Gas** – Landfill gas from the decomposition of waste would be generated during operation of the proposed vertical expansion. Constituents from the existing landfill and general operations that could be emitted to the atmosphere include methane, carbon dioxide and monoxide, sulfur dioxide, nitrogen dioxide, and nonmethane organic compounds (NMOCs).

The proposed vertical expansion would utilize the liner and gas extraction systems of the existing landfill to mitigate gas emissions. The proposed vertical expansion also proposes a 5.5-foot-thick composite final cover system in accordance with s. NR 504.07, Wis. Adm. Code. Horizontal migration of landfill gas is not expected to occur due to the presence of the composite liner system and active gas extraction system, as well as the proposed final cover system. Four gas monitoring probes are located around the existing landfill to monitor for gas migration.

The gas collection system would continue to operate post-closure as gas would continue to be generated within the landfill. Continued collection of landfill gas after landfill closure would help reduce odors and potential emissions. Gas monitoring would also continue after closure to monitor for potential gas migration.

**Odors** - MSW generates landfill gas because of the biological breakdown of the organic fraction of waste in the landfill. Landfill gas generally contains methane, which is odorless, carbon dioxide, and a variety of other NMOCs.

Odors produced by decomposing waste would be noticeable during the operational life of the facility. The odors would vary depending on temperature, wind speed and direction, and other weather conditions. Odors would be controlled by minimizing the active area, placing daily cover, and operating the active gas extraction system.

**Surface Water Runoff** – The proposed vertical expansion would incorporate existing storm water basins to allow collection and infiltration of surface water. After landfill closure, storm water runoff would be expected to increase with the final cover system in place over the proposed vertical expansion and existing landfill. A detailed surface water management plan to manage runoff during operation and post-closure would be provided in the plan of operation report.

## Existing Environment

### *Physical Environment – Topography*

Topography within 1 mile of the proposed vertical expansion is shown on Figure 1 of the feasibility report. Land surface elevation over non-landfill areas of the proposed vertical expansion ranges from 960 to 980 feet above

MSL and gently slopes to the northwest and southwest. The regional low point, Big Roche A Cri Creek, is located approximately 0.85 miles west of the expansion and is approximately 920 feet above MSL. The regional high point consists of the “Cottonville Rocks,” which are located approximately 1,200 feet east of the proposed vertical expansion at approximately 1,100 feet above MSL.

### *Physical Environment – Regional Geology*

The proposed vertical expansion is located in the south-Central Wisconsin River Basin, which generally consists of Precambrian crystalline rock overlain by Cambrian sandstone. Along the extreme southern border of the basin, Cambrian sandstone is overlain by Ordovician-aged sedimentary rocks.

Unconsolidated glacial deposits are located throughout most of the Central Wisconsin River Basin. Deposits in the southern portion of the basin consist of glacial lake deposits associated with Glacial Lake Wisconsin, as well as outwash deposits. These deposits average about 100 feet in thickness but may be as thick as 200 feet in bedrock valleys. The glacial lake deposits are comprised of fine to coarse grained sand, silt, and clay and are partly underlain by and mixed with outwash deposits. Outwash deposits consist of thick deposits and stratified sand, gravel, and some silt and clay.

### *Physical Environment – Site-specific Geology*

Bedrock in the immediate vicinity of the proposed vertical expansion consists of Cambrian-age sandstone (Trempealeau, Tunnel City, and Elk Mound Groups), ranging in thickness up to 440 feet and underlain by Precambrian igneous and metamorphic rock. A bedrock outcrop known as “Cottonville Rocks” is located approximately 1,200 feet east of the proposed vertical expansion and consists of resistant, Upper Cambrian Wonewoc sandstone. Bedrock was not encountered during any of the previous onsite soil borings; private well logs in the area indicate bedrock is greater than 109 feet bgs.

NRCS mapping indicates the surficial soils consist of Plainfield sands, which are formed on outwash plains, stream terraces and ground moraines, present on 2-12% slopes. Plainfield sands are described as excessively drained, with high to very high infiltration rates of approximately 6 to 20 inches per hour.

Subsoils within the proposed vertical expansion are primarily comprised of glaciolacustrine deposits associated with Glacial Lake Wisconsin. The glaciolacustrine deposits are comprised of fine to coarse grained sand, silt, and clay and partly underlain by and mixed with outwash deposits. The upper soils consist of poorly graded silty sands; the majority of the upper soils are classified by the unified soil classification system (USCS) as silty sands (SM), inorganic silts (ML), and inorganic clays (CL). Boring logs from the 1986 feasibility submittal indicate the unconsolidated glacial material beneath the proposed vertical expansion is at least 100 feet thick.

### *Physical Environment – Water Quality*

**Surface Water** – The proposed vertical expansion is located within the Big Roche A Cri Creek and Castle Rock Lake-Wisconsin River watersheds. Big Roche A Cri Creek is the closest water feature, located approximately 0.85 miles west of the proposed vertical expansion. Big Roche A Cri Creek flows southwest towards the Wisconsin River. Surface water quality in the area is generally good.

**Hydrogeology** - Groundwater is hydraulically connected throughout the site and monitored at two levels – the water table and piezometer level. Depth to groundwater near the proposed vertical expansion is approximately 25-45 feet bgs. The water table has historically varied by as much as 16 feet; a rise in groundwater elevation has been observed over the life of the existing landfill. Regional groundwater flow is southwest and local groundwater flow is northwest. Although there is some variation in the direction of groundwater flow between high and low

groundwater conditions, the overall direction of flow remains generally westward towards Big Roche A Cri Creek. Groundwater flow at the piezometer level shows a similar pattern. Vertical gradients at the well nests indicate a downward component of flow at most locations. There are no water supply wells located within 1,200 feet of the proposed vertical expansion.

**Groundwater Quality** – Groundwater quality in the area of the proposed vertical expansion has been documented through baseline and historic groundwater monitoring for the existing landfill.

Groundwater monitoring for the existing landfill began in 1987. In 1995, groundwater quality was evaluated as part of the required Subtitle D groundwater plan modification. The plan modification evaluated groundwater quality standard exceedances and calculated PALs for indicator parameters including alkalinity, chemical oxygen demand (COD), conductivity and hardness. A copy of the May 7, 1995, plan modification, including calculated PALs, can be found in Appendix K of the feasibility report.

Baseline groundwater quality samples were also collected for the 2017 feasibility submittal for Phases 5 and 6 of the existing landfill and analyzed for the applicable parameters listed in Appendix I of s. NR 507, Wis. Adm. Code. A summary of the inorganic and organic baseline sampling results is included in Section 5.8.5 and Table 5-8 of the feasibility report. Appendix H of the feasibility report contains groundwater laboratory results and field forms, and Appendix K of the feasibility report contains approved PALs for the site.

### *Physical Environment – Air Quality*

The proposed vertical expansion would increase the operating life of the existing landfill and the amount of waste volume within the landfill. These changes would result in the generation of landfill gas for approximately 3-4 additional years if the proposed vertical expansion were approved. The increased waste volume associated with the proposed vertical expansion would add to the landfill gas generated from the facility during and after operation of the existing landfill. However, operations within the proposed vertical expansion are expected to be comparable to the existing landfill and air quality is expected to remain comparable to current conditions.

Air pollutants that are potentially being emitted from the existing landfill and operations include methane, carbon dioxide and monoxide, sulfur dioxide, nitrogen dioxide, and NMOCs. These pollutants are generated through the decomposition of organic refuse and volatilization of organic compounds in the absence of oxygen, and through use of operations equipment on site. Gas generated by the existing landfill is controlled by an active gas extraction system. The proposed vertical expansion would incorporate the existing gas extraction system and include additional gas extraction wells.

### *Physical Environment – Wetlands*

United States Geological Survey (USGS) topographic maps and the department's Surface Water Data Viewer (SWDV) do not indicate any wetlands are within the expansion footprint, nor on the 433-acre contiguous property owned by the Adams County Solid Waste Department. The nearest wetlands are located within the floodplain of Big Roche A Cri Creek approximately 0.7 miles northwest of the proposed vertical expansion.

### *Physical Environment – Soil Borrow Sources*

The soil materials needed for the next phase of final cover construction (3.3 acres in 2027) would be obtained from the previously permitted soil borrow source northwest of the landfill. This soil borrow source was initially approved as part of the 1988 conditional plan of operation approval, and an expansion of this soil borrow source was approved as part of the 2019 conditional plan of operation approval.

Addendum no. 1 to the feasibility report states there is a deficit of fill material available at the previously permitted soil borrow source for full closure of the proposed vertical expansion. Therefore, Adams County proposes to provide more detailed volume calculations for the required final cover soil materials and available source materials in the plan of operation for the proposed vertical expansion.

### *Biological Environment*

Tree species in the area of the proposed vertical expansion are typical of Adams County and consist of black oaks mixed with white pine and aspen. Invasive buckthorn and honeysuckle are also present in the area of the proposed vertical expansion. Wildlife use of the area is mostly for transient activities such as traveling, feeding, and resting. Principal game species include white-tailed deer, ruffed grouse, woodcock, squirrels, rabbits, snowshoe hares, ducks, and geese. Muskrat, beaver, mink, otter, and coyotes are the primary furbearers. Numerous other protected species attracted to the area include sandhill cranes, great blue herons, eagles, hawks, owls, shorebirds, and songbirds. Wolves and black bears have also been observed intermittently on the property. No natural surface water bodies are located in the immediate area. Big Roche A Cri Creek, located approximately 0.85 miles west of the landfill, is a class 2 trout water with brook and brown trout. Pirate perch are also present in Big Roche A Cri Creek.

### *Land Use*

Land use of the property will not be changed by the proposed vertical expansion as it will be located on property that is already zoned industrial and includes the existing landfill.

The area around the 433-acre property owned by Adams County includes lands that are zoned as industrial, commercial, and agricultural, with some single-family homes present on smaller land parcels zoned single family residential. There are no residences located within 1,200 feet of the existing landfill or proposed vertical expansion.

Land to the north, west, and south is zoned as agricultural and primarily consists of woodlands and cultivated agricultural lands, with a few rural residences. Land use to the east consists of woodlands, agricultural land, and residential parcels with rural businesses.

### *Social and Economic Conditions*

The presence of the existing landfill has no known impacts to any ethnic or cultural groups. The feasibility report indicates the existing landfill provides job opportunities and cost-effective waste disposal services to residents and businesses of Adams County.

### *Other Special Resources*

Archeological and historical sites are not located in the area of the proposed vertical expansion.

There are no public parks or state natural areas within 1,000 feet of the proposed vertical expansion.

The land immediately surrounding the existing landfill and proposed vertical expansion is not classified as prime farmland.

### *Environmental Consequences*

## *Physical Impacts*

The topography and drainage in the immediate vicinity of the proposed vertical expansion have been previously altered by the existing landfill. Elevations at the existing landfill range from approximately 970 feet above MSL to 1028 feet above MSL. The proposed vertical expansion would occupy approximately 8.3 acres atop the existing landfill and result in a peak landfill elevation of approximately 1,073.5 feet above MSL.

The regional high point consists of the “Cottonville Rocks,” which are located approximately 1,200 feet east of the proposed vertical expansion at approximately 1,100 feet above MSL. The regional high point east of the landfill, large trees surrounding the landfill, and setback of the landfill from nearby roadways will provide visual screening and help the site to blend into the surrounding topography after closure. The Ground surface elevations for the proposed vertical expansion are presented on Plan Sheet 2R of the feasibility report.

A portion of the Phase 2 final cover is proposed to be removed to construct the proposed vertical expansion. There is the potential for an increase in landfill gases (i.e., odors) and dust with final cover removal. A dust and odor control plan would be developed as part of the plan of operation. Exposure of waste to precipitation following final cover removal may also lead to an increase in leachate generation. Any additional leachate generated would be managed through existing containment and treatment systems to prevent any off-site impacts.

The proposal to place waste over the Phase 2 area appears to conflict with the requirement of s. NR 504.06(1)(a), Wis. Adm. Code, which requires that all areas of landfills accepting waste shall be designed, constructed, operated, and maintained with a composite liner, because Phase 2 liner consists of only 5 feet of clay soil.

Construction and operation of the proposed vertical expansion is not expected to impact surface water. Water that contacts waste would be contained by the composite liner system and associated perimeter and phase delineation berms around active fill areas. Water that contacts waste would be treated as leachate. Leachate would be discharged to the leachate collection tanks and/or recirculated back into the waste mass of the landfill. Leachate discharged to the leachate collection tank would be transported offsite for treatment.

As part of closure, a 5.5-foot-thick composite cap designed in accordance with s. NR 504.07, Wis. Adm. Code, would be constructed. The final cover system would reduce the infiltration of precipitation, and the volume of leachate generated would gradually diminish over time as closure progresses. Surface water runoff from the intermediate or final cover areas would be routed to existing storm water basins via storm water control features. If a favorable feasibility determination is granted, surface water control systems would be evaluated as part of the plan of operation to confirm if features in unchanged areas would adequately manage storm water runoff from the proposed vertical expansion area due to increases in slope length.

Impacts on groundwater would not be expected as a result of the proposed vertical expansion. To protect groundwater, the proposed vertical expansion would incorporate:

- a leachate collection system so that leachate does not accumulate on the base of the landfill,
- a composite liner system to reduce the potential for leachate to leave the landfill, and
- a composite cap to reduce infiltration and the volume of leachate generated post-closure.

Routine groundwater monitoring would be performed around the existing landfill and proposed vertical expansion during operation and after closure.

No significant impacts on air resources are expected to occur during the construction and operation of the proposed vertical expansion. During operation of the proposed vertical expansion, the release of particulate matter, fugitive dust, and air emissions (methane, carbon dioxide and monoxide, sulfur dioxide, nitrogen dioxide,

and NMOCs) are possible. The pollutants would be generated through the decomposition of organic refuse and the volatilization of organic compounds in the absence of oxygen and by operations equipment.

Impacts on air emissions would be controlled by daily and intermediate cover, and operation of the active gas extraction system. Operations with the proposed vertical expansion are expected to be comparable to the existing landfill; therefore, air quality is anticipated to remain comparable to current conditions. Adams County would need to control its air emissions in accordance with applicable local, state, and federal regulations.

The proposed vertical expansion would incorporate the liner system on the existing landfill and include a 5.5-foot-thick composite cap. The liner and cover system along with the existing and proposed gas extraction system would prevent surface and subsurface gas migration. Gas monitoring probes would continue to be utilized to monitor gas migration throughout operation and after closure.

Dust would be controlled by minimizing the active area and applying water to access roads during dry weather conditions. A dust control plan would be included as part of the plan of operation.

Odors would be controlled by minimizing the active area, placing daily cover, and operating the active gas extraction system. An odor control plan would be included as part of the plan of operation.

Windblown material would be controlled by proper waste compaction and placement of daily cover. Wind-blown debris would be collected in a timely manner and portable wind screens would be deployed around the active fill area as needed. A litter control plan would be included as part of the plan of operation.

Vectors (birds, insects, and other unwanted pests) may occur at the proposed vertical expansion. Vector impacts would be controlled by keeping the landfill operations confined to as small an area as possible, filling from the low point on the base of each phase and placing daily cover over waste at the end of each operating day.

### *Biological Impacts*

The proposed vertical expansion would overlay the existing landfill and be located on land presently used for landfilling. Therefore, the proposed vertical expansion is not anticipated to have an adverse impact on wildlife near the landfill. The existing landfill site and proposed vertical expansion area are not critical habitat areas for endangered or threatened species listed in ch. NR 27, Wis. Adm. Code. The most recent ER response from the department dated March 13, 2022, indicated one specie with required actions, one specie with recommended actions, and three species with no follow-up actions. Ayres performed a Level 1 vegetation survey on May 24, 2022, that satisfied the required action. No instances of the vegetation were identified in the project area. The use of the property post closure is proposed as open green space.

### *Land Use Impacts*

The proposed vertical expansion is located on land zoned as industrial and approved for landfill use. Therefore, land use of the property will not be changed by the proposed vertical expansion as it will be located on property that is already zoned industrial and includes the existing landfill. Both Adams County and the Town of Strong Prairie recognize the landfill as a continued land use in their respective comprehensive plans. The 433-acre contiguous property is owned by the Adams County Solid Waste Department.

The proposed vertical expansion would be constructed entirely within the existing landfill footprint. Therefore, no disturbance or conversion of adjacent lands, including prime agricultural lands, will occur. Adjacent land uses are not anticipated to impact, or be impacted by, the proposed vertical expansion. No future changes to adjacent land use are identified in either of the comprehensive plans for Adams County or the Town of Strong Prairie.

### *Social and Economic Impacts*

Significant adverse socioeconomic impacts are not expected from the proposed vertical expansion. The proposed vertical expansion would provide cost-effective waste disposal services to residents and businesses of Adams County. The proposed vertical expansion would also provide employment opportunities to a limited number of local residents, and indirect employment opportunities to waste haulers, waste collection companies, construction trades, and professional services.

Impacts on adjacent neighbors during operating hours are expected to be similar to those of the existing landfill, including but not limited to traffic, noise, dust, odors, and windblown debris. Since waste in the proposed vertical expansion would be placed at a higher elevation, impacts beyond those for the existing landfill may be experienced. Adams County would implement control measures outlined in dust, odor, and litter control plans to address and minimize impacts resulting from the increased landfill height. Operating hours are determined in the local agreements with the host communities.

Visual impacts may be possible as a result of the increased height of the landfill with the proposed vertical expansion. Visual impacts would be most pronounced for adjacent neighbors. Once the proposed vertical expansion is closed and capped, impacts to visual aesthetics would be reduced. The hills east of the landfill, large trees surrounding the landfill, and setback of the landfill from nearby roadways will continue to provide visual screening. There are no residences within 1,200 feet of the waste limits of the existing landfill.

No impacts to ethnic or cultural groups are expected to occur from the proposed landfill.

### *Special Resources*

The results of the historical and archaeological search conducted by Ayres at the Wisconsin Historical Society found no known historic or archeological sites within the proposed project area. The department's internal cultural resources map also indicates no archeological or historical sites are present within Section 13, Township 18N, Range 5E, Adams County, Wisconsin.

The proposed vertical expansion would be constructed entirely within the existing landfill footprint. Therefore, construction and operation of the proposed vertical expansion would not result in loss of land currently used for agriculture.

### *Probable Adverse Impacts that Cannot be Avoided*

If a favorable feasibility determination is issued, certain environmental impacts from the proposed vertical expansion may not be completely avoidable. Adams County would minimize these impacts to the maximum extent practicable through the proposed engineering design and the use of best management practices. Probable impacts that cannot be avoided include the following:

- Truck traffic, noise, dust, and engine emissions would exist to some degree at and around the existing landfill and proposed vertical expansion. Noise would be handled by incorporating noise reduction systems where appropriate. Dust would be controlled with a water truck as needed. Waste acceptance quantities may increase over time; traffic would increase proportionally.
- Odors may periodically occur, but with the use of daily cover, minimizing the active waste disposal area, and operating the active gas collection system, these issues may be limited in duration and intensity.

- Windblown litter may periodically occur and would be controlled by proper landfill operational procedures including compaction and placement of daily cover and the use of portable litter fencing when needed.
- The appearance and topography of the site would be altered during operation of the landfill and after the landfill is closed. The regional high point east of the landfill, large trees surrounding the landfill, and setback of the landfill from nearby roadways will provide visual screening and help the site to blend into the surrounding topography after closure.
- A waste mass would remain at the location which would have to be cared for in perpetuity to ensure it does not cause environmental pollution. Potential environmental impacts from the waste may be mitigated with proper construction and maintenance of the liner, final cover, and leachate and gas extraction systems. Landfill gas and groundwater monitoring devices would be used to monitor and evaluate potential environmental impacts.
- After the landfill is closed, there would be site use limitations. Institutional controls to prevent future agricultural use, building construction, and excavation of waste or final cover would be implemented. The current projected use of the landfill after final closure is green space.

If approved, the proposed vertical expansion would be constructed and operated with current industry standards and in compliance with department solid waste facility codes.

#### *Potential Cumulative Effects*

The increased waste volume associated with the proposed vertical expansion would add to the overall landfill gas and leachate generated from the site over the lifetime of the existing landfill. If properly collected and treated, the gas and leachate should not have a significant impact on the surrounding environment. Over time, mechanical and/or infrastructure failures can lead to gas emissions and leachate releases. Routine inspections and environmental monitoring can help prevent, identify, and mitigate releases to the surrounding environment. Upgrades and repairs to gas collection and destruction (flare) systems and some leachate infrastructure can also prevent and mitigate releases to the surrounding environment.

The increased waste volume and height associated with the proposed vertical expansion could also exacerbate common nuisances such as odors or windblown waste. However, engineering controls and best management practices can be implemented to mitigate the potential cumulative effects of common nuisances, as discussed previously.

#### Alternatives Analysis

There are several alternatives to landfilling; however, the alternatives do not eliminate the need for solid waste landfills. Alternatives to the proposed vertical expansion include: no action; enlarge, reduce, or modify the project to mitigate impacts; other locations or other landfills; and other waste management methods.

#### Alternative: No Action

This alternative assumes the proposed vertical expansion would not be developed. The existing landfill is anticipated to reach capacity by 2028. If the proposed vertical expansion is not constructed, approximately 50,000 tons per year of waste currently received and/or expected to be received would have to be disposed of at alternative landfills. Disposal at other landfills may require some waste to be hauled longer distances, resulting in

increased emissions and higher disposal costs for residents and businesses. Disposal at alternative landfills would also shorten the life of other landfills and increase the need for additional waste disposal facilities in the area.

### Alternative: Enlargement, Reduction or Modification of the Project

The feasibility report states the proposed vertical expansion has been designed to optimize available disposal volumes within the limitations of the existing landfill footprint, site boundaries, regulatory requirements, and environmental restrictions. The proposed vertical expansion would utilize many of the landfill features already in place to increase capacity while minimizing costs relative to the development of a new landfill. Development of a landfill of similar capacity in an undeveloped location would forgo the efficiencies of using the same liner, leachate and gas handling systems, access roadways, and monitoring network, and would also create entirely new impacts at the alternative location.

To enlarge the project further by creating additional volume capacity within the proposed expansion footprint, the design would exceed the maximum allowed final cover slopes for a landfill expansion. Alternatively, to reduce the project further would require Adams County site a separate landfill or expansion in the more immediate term. Reducing the project further is also unlikely to significantly lessen the potential for adverse impacts. Reducing the footprint of the proposed vertical expansion so that it does not overlay areas of existing landfill that do not have a composite liner would make the proposed expansion compatible with the requirements of s. NR 504.06(1)(a), Wis. Adm. Code.

### Alternative: Other Landfills or Locations

The waste tonnage reports for the existing landfill document a steady and consistent stream of waste acceptance at the existing landfill over many years. The existing landfill presently has much of the necessary infrastructure and land space and would not require the initial capital costs involved with developing a new landfill facility. Additionally, the time required to site a new landfill location could reasonably take up to 7 years. Therefore, the proposed vertical expansion would prolong the lifespan of the existing landfill and satisfy the waste disposal needs of the existing service area without significant time and cost investments.

The location and geological setting of the existing landfill have satisfactorily supported landfill operations for approximately 30 years with minimal environmental impacts. If landfill operations were moved to another location, it is not clear what environmental impacts may result at the alternative location, nor how impacts would compare to impacts from the existing landfill.

There are five neighboring facilities with service areas overlapping the existing landfill. The three closest facilities to the existing landfill are the Cranberry Creek Landfill in Wood County (30 miles north), the Monroe County Landfill (49 miles west), and the Valley Trail Landfill in Green Lake County (54 miles east). Utilization of these three facilities or any of the five neighboring facilities would generally result in greater hauling distances, thereby increasing waste disposal costs for many residents and businesses within the Adams County service area. Furthermore, the facility or facilities utilized for landfilling in place of the proposed vertical expansion would see an increase in waste quantities. Therefore, these facilities would see a decrease in their expected site lives due to additional loading from the Adams County service area.

### Alternative: Other Waste Management Methods

Alternative technologies are available for the management of solid waste, including recycling, composting, incineration, and processing. Many of these waste reduction and recycling technologies are mandated or are being voluntarily implemented in Wisconsin and within the service area.

Although activities like waste reduction and recycling can be and have been effective at reducing the quantity of waste entering the waste stream, the quantity is not enough to eliminate the need for landfills. Additionally, waste reduction and recycling technologies have residual waste that requires landfilling. Incineration and complete waste composting do not appear to be economically feasible at this time.

There are costs and benefits that need to be weighed for each technology and method available to best manage society's solid waste. In time, as suitable landfill space becomes scarcer and waste disposal costs increase, it is likely that the market would be a catalyst to increase recycling and improve other waste management technologies to handle waste disposal needs. At this time however, engineered landfills remain the most economical way to dispose of non-recyclable solid waste in a manner that prevents environmental pollution.

## **Evaluation of Implementing Alternatives to Land Disposal**

Adams County has implemented a waste reuse program by providing a collection area at the existing landfill's public drop-off area where local customers can donate goods suitable for reuse. Typical goods that are donated for reuse are toys, tools, furniture and housewares, mattresses and box springs, bedding, clothing, and other accessories. The program diverts anywhere from 2,000 pounds to 5,000 pounds of items from landfilling per year. The reuse project would continue to be implemented during operation of the proposed vertical expansion.

Adams County owns and operates a material recovery facility (MRF) at the existing landfill location. Materials recovered are primarily household recyclables and include aluminum, tin, glass, plastic, and paper products. In 2021, Adams County received approximately 3,982 tons of recyclables, of which 95% was processed onsite and shipped for reprocessing. Additionally, Adams County accepts other universal waste type items including batteries, used motor oil and filters, cooking grease, appliances, fluorescent bulbs, tires, scrap metal, sharps, and electronics. These materials are sent offsite for proper recycling or disposal by third parties.

Every other year, Adams County provides a "Clean Sweep" program that allows local residents to bring universal waste type items for proper recycling or disposal. The program offers low-cost recycling/disposal for these non-readily recyclable materials and reduces the amount of potentially hazardous materials from being mixed in with municipal solid waste.

Adams County operates a composting area in which yard waste including leaves, yard clippings, and brush are disposed of separately from the existing landfill. Material is stockpiled in a location away from landfilling activities and is allowed to decompose. The resulting compost product is available for sale to Adams County residents.

Incineration for energy recovery would require siting, permitting, construction, training, and management in order to provide this service. The large upfront capital costs and rural setting of the existing landfill do not allow incineration as a feasible alternative at this time.

## **Needs and Design Capacity Analysis**

Section 289.28, Wis. Stats., requires the department to determine whether a proposed facility is needed, and if there is insufficient need, to deny permission to construct or operate the proposed facility. The department has generally held that seven years or less of existing service area capacity suggests a new landfill is needed, because it could reasonably take up to seven years to site an alternative new landfill.

To determine if there is sufficient need for the proposed vertical expansion, the feasibility report compared the available waste disposal capacity and rate in the anticipated service area (Adams County and the surrounding counties of Columbia, Juneau, Marquette, Sauk, Waushara, and Wood) to the volume of waste suitable for

disposal in the anticipated service area. The waste disposal capacity and rate in the anticipated service area was estimated using tonnage reports, and the volume of waste suitable for disposal in the service areas was calculated by multiplying the estimated total service area population in 2025 by the state-wide average disposal rate (1.4 tons/capita/year). Using this information, Adams County estimated the waste disposal capacity available to the service area would be exhausted by 2030 without the proposed vertical expansion. Therefore, the feasibility report concludes the proposed vertical expansion is needed.

Section 289.29(1)(d), Wis. Stats., prohibits the department from approving a feasibility report for a proposed facility unless its proposed capacity is designed to be consumed between 10 to 15 years after it begins accepting waste. The projected site-life of the proposed vertical expansion contained in the feasibility report is approximately four years. The department will evaluate the need for the proposed landfill and the projected site-life and provide a determination on both in the feasibility determination.

### Wisconsin Environmental Policy Act (WEPA) Compliance

Pursuant to s. NR 150.35, Wis. Adm. Code, the department has determined that the landfill feasibility review and public input process for the proposed vertical expansion meets the requirements of the Wisconsin Environmental Policy Act (WEPA) under s. 1.11(2)(c), Wis. Stats., and s. NR 150.20, Wis. Adm. Code. Pursuant to s. NR 150.20(2)(a)(7), Wis. Adm. Code, a solid waste feasibility approval is an integrated analysis action, meaning department programmatic procedures provide for public disclosure and include an environmental analysis that provides sufficient information to establish that an environmental impact statement (EIS) is not required. This project summary contains an environmental analysis of the proposed landfill expansion. Pursuant to s. NR 512.06(3), Wis. Adm. Code, the department has made a preliminary determination that an EIS is not required for the proposed facility.

The landfill feasibility review process will provide for a 30-day public comment period, in which the public may submit written comments on the feasibility completeness determination, the environmental analysis, including the preliminary decision on the need for an EIS, and on the feasibility report. Members of the public may also request a public informational hearing on the proposed project during the 30-day public comment period.

Signed: December 29, 2025

Evaluators:

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