Project Summary and Environmental Analysis for the Proposed Dane County Landfill Site No. 3

General Facility Information

Proposed Facility:
Dane County Landfill Site No. 3
Monitoring No. 4911
FID No. 113450480

Authorized Contacts:
Mr. John Welch, Director
Dane County Department of Waste & Renewables
1919 Alliant Energy Center Way
Madison, WI 53713
(608) 266-4018
Welch.John@danecounty.gov

Consultant:
SCS Engineers
2830 Dairy Drive
Madison, WI 53718

Licensee/Property Owner:
Dane County Department of Waste & Renewables

Facility Location:
The proposed Dane County Landfill Site No. 3 (proposed landfill) would be located in the SE ¼ of Section 25 and N ½ of NE ¼ of Section 36, T7N, R10E, City of Madison, Dane County, Wisconsin.

Facility Description

The proposed landfill would be located south of US Highway (USH) 12 & 18, northeast of Interstate 90/39 (I-90/I-39) and west of County Highway (CTH) AB. The proposed landfill would be located on a parcel of land (parcel no. 251/0710-254-0098-9) totaling approximately 200 acres within the eastern portion of the existing Yahara Hills Golf Course. The proposed limits of waste include approximately 76.6 acres of new waste disposal area and would have a design capacity of approximately 12,182,300 cubic yards (cy). The anticipated site life of the proposed landfill is approximately 12 to 13 years based on estimated filling rates.

Primary Service Area

The anticipated service area includes municipalities and industries within Dane County. Waste may be accepted from outside Dane County, depending on local negotiations. The proposed landfill would receive approximately 447,700 to 951,300 tons of waste annually between 2028 and 2040. The estimated tonnage is based on the amount of waste received at the existing Dane County Landfill Site No. 2 (Rodefeld Landfill, FID 113127300, Lic. #3018).

Proposed Waste Types and Leachate Characteristics

The average waste types and volumes that would be accepted at the proposed landfill are expected to be similar to what is accepted at the existing Rodefeld Landfill, including residential and commercial solid waste (municipal solid waste, or MSW), industrial solid waste, construction and demolition (C&D) waste, special wastes (non-

municipal solid waste), and contaminated soil and other fee exempt waste for use as alternative daily cover (ADC).

Special wastes are wastes that require prior review or special handling. Special wastes may be non-MSW solid waste type wastes that are not disposed of 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. ADC materials would also be subject to the Special Waste Acceptance Plan. A Special Waste Acceptance Plan would be submitted by Dane County as part of a plan of operation.

Waste types as an overall intake percentage for the past 6 years (2018-2023) at the existing Rodefeld Landfill, which is anticipated to be representative of what would be disposed at the proposed landfill, are as follows:

- MSW – 74.9% of total anticipated waste
- Fee exempt waste used for ADC – 9.9% of total anticipated waste
- C&D fines (30% cap) – 6.9% of total anticipated waste
- C&D waste – 4.5% of total anticipated waste
- Material Recovery Facility (MRF) residuals (10% cap) – 2.4% of total anticipated waste
- Waste from a non-profit – 0.7% of total anticipated waste
- All other solid waste (non-hazardous) – 0.4% of total anticipated waste
- Publicly owned treatment works (POTW) sludge – 0.2% of total anticipated waste
- Waste generated by natural disaster – 0.1% of total anticipated waste

Leachate from the proposed landfill would be expected to be similar in chemical composition and concentration to leachate from the existing Rodefeld Landfill and other MSW landfills in Wisconsin. Leachate generated within the proposed landfill would be collected and treated off-site at a wastewater treatment facility. Alternatively, Dane County may request approval to recirculate leachate in active portions of the landfill in a plan of operation. Currently, Dane County disposes of leachate from the existing Rodefeld Landfill at the Madison Metropolitan Sewerage District (MMSD) publicly owned treatment works (POTW). It is anticipated that this leachate treatment arrangement would continue with the proposed landfill.

Relevant Approvals/Permits

The following approvals and permits are required for the proposed landfill:

- 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
- Solid waste facility license under s. NR 500.06, Wis. Adm. Code
- Air permit(s) under NR 400, Wis. Adm. Code, Series (operating and construction)
- Tier 2 Industrial Storm Water General Permit under ch. NR 216, Wis. Adm. Code.
- Local Negotiated Agreements with all participating affected municipalities and compliance with all applicable local rules and approvals. This process is independent from the department's plan review process.

The affected municipalities as defined under s. 289.01(1), Wis. Stats., in the area of the proposed landfill include the Town of Cottage Grove, the City of Madison, and Dane County. Notifications regarding the proposed landfill were sent to the affected municipalities by Dane County on April 28, 2023. Dane County received responses

from the City of Madison on July 19, 2023, and the Town of Cottage Grove on May 16, 2023. No local approvals were required by the City of Madison or the Town of Cottage Grove and both took the required steps to participate in the local siting process as defined in ch. 289, Wis. Stats. Dane County is not allowed to negotiate as an affected municipality but has been participating in the negotiation process with the affected municipalities as the applicant, as defined under s. 289.33(3)(a), Wis. Stats.

The Village of McFarland also filed a request to be included on the Local Negotiated Agreement Committee. The affected municipalities and Waste Facility Siting Board allowed the Village of McFarland on the committee as an "Additional Municipal Party," under s. 293.33(7n), Wis. Stats.

Requested Exemptions

Dane County is requesting exemptions from the following Wisconsin Administrative Code (Wis. Adm. Code) requirements:

1. An exemption from s. NR 504.04(3)(a), Wis. Adm. Code, which states that a landfill may not be established where the limits of filling would be located within 1,000 feet of any navigable lake, pond, or flowage, not including landfill drainage or sedimentation control structures. There is one pond within 1,000 feet of the proposed limits of filling (pond P-1 on Plan Sheet 2 of the feasibility report addendum no. 1). The department's Waterways Program concluded that pond P-1 is artificial in nature and that no regulatory authority regarding chapter 30 or 281, Wis. Adm. Code, applies to this wetland/waterbody (refer to Appendix B of the feasibility report).

2. An exemption from s. NR 504.04(3)(d), Wis. Adm. Code, which states that a landfill may not be established where the limits of filling would be located within 1,000 feet of the nearest edge of the right-of-way of any state trunk highway, interstate or federal aid primary highway or the boundary of any public park or state natural area, unless the landfill is screened by natural objects, plantings, fences or other appropriate means so that it is not visible from the highway, park, or natural area.

   The right-of-way of USH 12 & 18 to the north, and recreational areas to the west and south (Yahara Hills Golf Course and City of Madison Parks Yahara Hills Park South) are located within 1,000 feet of the proposed limits of filling. Dane County proposes to provide continuous screening of the waste within 1,000 feet of these areas.

3. An exemption from s. NR 504.06(2)(b), Wis. Adm. Code, which requires a minimum separation distance of 10 feet between the seasonal high groundwater table and the bottom of the clay component of a composite or clay liner. The depth to the seasonal high water groundwater table does not allow for 10-foot separation between the subbase grades and groundwater table in all areas of the proposed landfill. The proposed landfill would include an underdrain system that would maintain the water table below the bottom of the liner.

4. An exemption from s. NR 504.06(2)(c), Wis. Adm. Code, which requires a minimum separation distance of 10 feet between the top of bedrock and the bottom of the clay component of a composite liner. Based on the depth to bedrock information obtained from geotechnical investigations and the proposed subbase grades, the average separation to bedrock is more than 10 feet; however, due to the variability of the bedrock surface, the proposed separation distance is less than 10 feet in portions of the proposed

landfill footprint. Dane County exceeded the minimum requirement for borings and excavations to characterize the subsurface. The feasibility report states that subbase grades can be adjusted such that removal of competent bedrock would not be needed to construct the proposed landfill.

5. An exemption from s. NR 507.18(2)(a), Wis. Adm. Code, which requires baseline groundwater quality to be established at all wells installed outside the proposed limits of filling. Groundwater monitoring well MW-1 was not included in the baseline water quality monitoring program because it was within the preliminary proposed limits of waste when monitoring started; however, it is outside the currently proposed limits of waste and therefore subject to the baseline monitoring requirement. Overall, Dane County exceeded the minimum required number of baseline sample locations.

   Monitoring well MW-121 was included in the baseline groundwater water quality program because it was outside the preliminary proposed limits of waste; however, it is inside the current proposed limits and not subject to the baseline monitoring requirement. Additionally, baseline groundwater quality monitoring was performed at the remaining wells outside the proposed limits of waste, including 5 supplemental locations beyond 300 feet from the proposed limits of waste.

   Monitoring well MW-1 is located more than 150 feet from the limits of waste and in an anticipated traffic area; therefore, it may ultimately need to be replaced with a well in the same general area but closer to the limits of waste. Dane County would either complete 8 rounds of baseline monitoring at MW-1 or install a replacement well and complete 8 rounds of baseline monitoring at the replacement well.

6. 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 subbase grades. Three of the geotechnical investigation borings extended less than 25 feet below the proposed subbase grades. The borings that did not meet the 25-foot requirement include B-7 (completed 19.9 feet below subbase), B-214 (23.5 feet below subbase), and B-215 (22.0 feet below subbase). Boring B-7 extended into bedrock. Borings B-214 and B-215 were terminated in outwash 23.3 and 22.0 feet, respectively, below the subbase in the northern part of the site, where the bedrock surface is deeper. Dane County exceeded the minimum number of borings and excavations required by s. NR 512.09, Wis. Adm. Code, to define the physical characteristics of the proposed landfill's location.

7. An exemption from s. NR 512.09(2)(d), Wis. Adm. Code, which requires groundwater wells be located no more than 300 feet from the proposed limits of waste. Based on a 76.6-acre footprint, 20 water table observation wells are required to be located within 300 feet of the proposed limits of waste. A total of 25 water table observation wells were installed for the proposed landfill, of which 20 were within 300 feet of the proposed limits as presented in the feasibility report. However, with the slightly reduced footprint presented in the feasibility report addendum no. 1, the final number of water table observation wells within 300 feet of the proposed limits of waste is 19. MW-107 is located approximately 330 feet from the proposed limits of waste. Dane County proposes to install at least one additional water table observation well within 300 feet of the limits of waste as part of the future groundwater monitoring system for the landfill.

8. Exemptions from chapter 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 exemption where background concentrations of substances exceed their respective groundwater quality standards.

Land Use and Zoning

Site Property

The proposed landfill is located approximately 1 mile east of the I-90/I-39 and USH 12 & 18 interchange. USH 12 & 18 abuts the northern side of the proposed landfill and Brandt Road/CTH AB abuts the eastern side.
The current land use of the proposed landfill property is a municipal golf course. Dane County has purchased the property from the City of Madison and is leasing portions of it back to the City of Madison for golf course operations.

In October 2022, the property was rezoned from “Parks and Recreation” to “Industrial – General”. Dane County subsequently received a conditional use permit (CUP) under “IG” zoning code to allow a landfill and accessory landfill infrastructure on the property. The CUP was approved with conditions by the City of Madison on November 13, 2023 (Appendix D of the feasibility report).

Surrounding Properties

The Yahara Hills Golf Course immediately to the west and an adjacent property to the south of the proposed landfill property are zoned as parks and recreation, both of which are owned by the City of Madison.

Land uses to the north include the existing Rodefeld Landfill, as well as industrial, commercial, agriculture, some residential, and institutional/governmental. Land uses to the east and south predominantly include scattered rural residences, agriculture, and woodlands. Land uses to the west predominantly include recreation, commercial, woodlands, agriculture, open land, water, and vacant subdivided land.

Known Historical or Archaeological Areas

Archaeological Consulting Services, Inc. (ACS) reviewed available literature and records on cultural resources in the Yahara Hills Golf Course area. The study found no archaeological sites.

ACS performed an archaeological survey of the proposed landfill property in April and May 2022. A summary of the results is below:

- No previously reported Native American archaeological sites lie within the proposed landfill property.
- No Native American artifacts were found, and Euro-American materials were limited to items of recent age.
- The Yahara Hills Golf Course and Clubhouse were determined eligible for the National Register of Historic Places.
- No additional archaeological work was recommended for the proposed landfill property.

On October 25, 2022, the Wisconsin State Historic Preservation Office (SHPO) completed a review of the proposed landfill property and determined that no National Register of Historic Places would be affected, as none are present, but the Yahara Hills Golf Course and Clubhouse were found potentially eligible.

On October 6, 2023, Dane County submitted documents regarding the Yahara Hills Golf Course and Clubhouse potential eligibility to the department's Archaeologist/Departmental Historic Preservation (HP) Officer. On November 27, 2023, SHPO issued a letter based on input from the department HP that listed the following stipulations as part of the mitigation plan for the proposed project:

- Production of a Determination of Eligibility.
- Produce a display posted near a public entrance or gathering area of the existing golf course highlighting the historic significance of the golf course/course design and architecture.
- A webpage hosted on the course home page, or a similar physical publication that can be provided to the public that discusses the historic significance of the property.

Dane County produced and submitted the Determination of Eligibility on October 6, 2022, and the City of Madison agreed to complete the display and webpage stipulations.

Endangered or Threatened Resources

An endangered resources (ER) review request application was submitted to the department's ER Review Program for the entire 230-acre property (consisting of Lots 1 and 2, represented by the Project Property Line on Plan Sheet 2 of the feasibility report addendum no. 1). On June 10, 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 an ER review because no element occurrences were identified. Department Hydrogeologist Tyler Sullivan reviewed the National Heritage Inventory again on March 26, 2025, and similarly found that no endangered resources were identified in the project area.

Transportation and Access

Large haulers would access the proposed landfill directly off CTH AB/Brandt Road while residential customers would use an entrance off Millpond Road. The proposed transportation routes within the proposed landfill property include a main access road to the proposed scale north of the landfill and service roads around the perimeter to provide access to the disposal area.

Airports

There are no airports designed or planned within 10,000 feet of the proposed limits of waste. The nearest public airports are the Blackhawk Airfield and the Dane County Regional Airport, located approximately 5.25 miles and 7 miles from the proposed limits of waste, respectively. The nearest private use airport is the Uff-Da Airport located approximately 6.5 miles from the proposed limits of waste. Dane County notified the Federal Aviation Administration (FAA) of the proposed landfill on June 22, 2022.

Regional and Site-Specific Geological Information

Geotechnical Investigation

The standard s. NR 512.09, Wis. Adm. Code, geotechnical program was implemented to investigate the proposed landfill site. The 2022 field activities were conducted by Tetra Tech, Madison, Wisconsin, and results were included in a preliminary geotechnical investigation report dated May 20, 2022, and in the initial site report (ISR) for the proposed landfill dated September 1, 2022. Field activities from 2023 forward were conducted by SCS Engineers (SCS), Madison, Wisconsin. Soil and rock samples collected by Tetra Tech were re-examined by SCS geologists. SCS's additions and revisions to soil and rock descriptions and classification are noted on the Tetra Tech logs.

Borings

A total of 41 soil borings were installed for the standard s. NR 512.09, Wis. Adm. Code, geotechnical investigation of the proposed footprint. Additional borings and excavations beyond the minimum requirements s. NR 512.09, Wis. Adm. Code, were completed after submittal of the feasibility report to further characterize the subsurface. Soil laboratory analyses were performed in accordance with s. NR 512.09(4), Wis. Adm. Code.

Monitoring Wells and Piezometers

A total of 30 monitoring wells and piezometers were installed for the standard s. NR 512.09, Wis. Adm. Code, geotechnical investigation of the proposed footprint. Monitoring wells were also installed at five additional locations more than 300 feet from the proposed limits of waste, and piezometers were installed at two of those locations.

Groundwater Sampling and Water Level Monitoring

Five rounds of baseline groundwater quality samples were collected at wells outside the proposed limits of fill as required by s. NR 512.09(4)(g), Wis. Adm. Code. Eight rounds of water level monitoring were also completed.

As specified in s. NR 507.18, Wis. Adm. Code, the baseline samples were analyzed for public health parameters, public welfare parameters, and detection parameters, including volatile organic compounds (VOCs). The detection monitoring program included parameters required for landfills accepting MSW as listed in ch. NR 507, Appendix I, Table 1, Wis. Adm. Code. Five wells were also sampled for the Subtitle D well parameters listed in ch. NR 507, Appendix I, Table 3, Wis. Adm. Code.

Staff Gauges

Seven staff gauges (SG-1 through SG-7) were installed in March 2023 to monitor surface water elevations. Two additional staff gauges, SG-8 and SG-9, were installed in November 2023, following the Wisconsin Department of Transportation (WisDOT) Pond B construction.

Soils and Geology

The proposed landfill is located in an upland area of Ordovician-age bedrock, which is overlain by Quaternary-age glacial deposits of the Holy Hill Formation.

Based on regional information and the results of the geotechnical investigation, the unconsolidated sediments at the site overlie bedrock belonging to several major groups including the Sinnipee, Ancell, and Prairie du Chien Groups.

Holocene and Pleistocene Sediment

Sediment deposited by ice of the Green Bay Lobe is at the surface at the proposed landfill site. The sediment includes diamicton—a very poorly sorted mixture of particle sizes including gravel, sand, silt, and clay. Commonly, diamictons are interpreted as glacial till. The sediment also includes sand and gravel (commonly interpreted as outwash deposited by streams flowing away from the glacier), and sorted, generally laminated, fine sand, silt, and clay (generally interpreted as lake sediment). The glacial and related deposits in this part of Dane County belong to the Horicon Member of the Holy Hill Formation.

Holocene and Pleistocene Sediment: Loess

The loess is silt with fine sand and clay that was likely deposited predominantly by wind. The loess is generally a clay as defined by its liquid and plastic limits and consists of predominantly silt-sized particles. In the area of the proposed landfill the loess is generally approximately 3 feet thick and ranges from absent to a maximum of approximately 8 feet thick at the south/southwest end of the site at the locations of borings B-8 and B-225. The loess was generally classified as lean clay (CL) based on laboratory tests.

Holocene and Pleistocene Sediment: Till – Horicon Member of the Holy Hill Formation

Beneath the loess is silty sandy till. The matrix of the till is mostly fine sand with medium and coarse sand, is generally uniform and massive, and contains cobbles and boulders, many of which are sub-rounded dolomite. Till is the predominant sediment type at the site and is present over most of the proposed landfill area. The till ranges from a minimum of approximately 1 foot in thickness, to a maximum of approximately 42 feet thick at MW-107, which is at the northeast corner of the site. The average thickness of the till is approximately 10 feet. The till samples were all classified as silty sand (SM) based on laboratory tests.

Holocene and Pleistocene Sediment: Outwash – Horicon Member of the Holy Hill Formation

The outwash is generally loose, fine-to-coarse sand with some fine gravel. Typically, the outwash is horizontal or cross-bedded and includes finer and coarser-grained layers and lenses. The outwash is predominantly at the north end of the proposed landfill site. At B-106 the outwash is beneath till and lake sediment at a depth of approximately 32 to 39 feet, and at B-107 the outwash is beneath till at approximately 29 to 48 feet and overlies bedrock. Three outwash samples were classified as silty sand (SM) and two were classified as poorly graded sand with silt (SP-SM) based on laboratory tests.

Holocene and Pleistocene Sediment: Lake Sediment – Horicon Member of the Holy Hill Formation

Lake sediment is not a major unit at the proposed landfill site. Only small areas of lake sediment were found in the area of the proposed landfill, including one notable area at B-106. B-106 is north of the proposed landfill site, outside of the proposed landfill footprint. A sample of lake sediment from the B-106 location was classified as silty clay (CL-ML) based on laboratory tests.

Holocene and Pleistocene Sediment: Dolomite

Samples of dolomite from the screened interval of the monitoring wells were tested for grain-size distribution and Atterberg Limits if the dolomite at those locations was poorly indurated or was mechanically disaggregated by the drilling and sampling processes. Eight samples of dolomite were tested in the laboratory. All the samples tested as silty sand (SM), except one that tested as silty gravel (GM).

Bedrock

The Preliminary Bedrock Map of Dane County, by Brown and others (2013), included in Appendix H of the feasibility report, indicates that the uppermost bedrock in the vicinity of the proposed landfill is Ordovician sedimentary rocks of the Sinnipee, Ancell, and Prairie du Chien Groups.

The bedrock surface generally slopes down from southeast to northwest, as shown on the bedrock surface contour map in Attachment T of the feasibility report addendum no. 1. The top of bedrock elevations range from a high of approximately 920 feet above mean sea level (ft-MSL) near the southeast corner of the proposed landfill footprint to a low of approximately 835 ft-MSL on the northwest corner of the proposed landfill footprint.

Bedrock – Sinnipee Group

The Sinnipee Group includes the **Galena**, **Decorah,** and **Platteville Formations**. **The Galena Formation** consists of dolomite to cherty dolomite. **The Decorah Formation** consists of shaly and silty dolomite. **The Platteville Formation** consists of dolomite to shaly dolomite.

Bedrock – Ancell Group

The Ancell Group includes the **Glenwood** and **St. Peter Formations**. **The Glenwood Formation** consists of sandstone that is dolomitic, silty, and/or shaly, with shale or sandy dolomite. **The St. Peter Formation, Tonti Member** consists of sandstone that is medium to coarse grained, well rounded and well sorted. It may be poorly cemented by dolomite and have localized thin layers of pale green shale/silt. **The St. Peter Formation, Readstown Member** consists of sandstone, silty sandstone, and clayey sandstone, with shaly layers, and is interbedded with clay and/or silt.

Bedrock – Prairie du Chien Group

The Prairie du Chien Group includes the **Shakopee** and **Oneota Formations**. **The Shakopee Formation** consists of dolomite and sandy dolomite, that is interbedded with coarse grained well-rounded sandstone, and/or green to gray siltstone or clay. **The Oneota Formation** consists of dolomite and sandy dolomite.

Hydrogeology

Groundwater occurs in all geologic units at the site and is monitored at two levels – the water table and the piezometer level. The water table wells have designations MW-1 through MW-125, and the piezometers have designations MW-105A through MW-125A, as shown on Plan Sheet 2 of the feasibility report addendum no. 1. The geologic units are hydraulically connected with no apparent confining units or perched zones.

The onsite water supply well PW-E draws water from the Ancell Group. The onsite water supply wells PW-C, PW-D, and PW-E, all have open hole segments in the Prairie du Chien. The Sinnipee Group (Galena Platteville) also has potential use as a water supply.

Groundwater Flow – Water Table

The depth to groundwater at the proposed landfill site, measured in water table wells in March through December 2023, ranged from 0.3 and 51.2 feet below ground surface (bgs).

Groundwater elevations typically vary seasonally, generally with the highest water levels in spring and lowest water levels in winter. Plan Sheet 3 of the feasibility report addendum no. 1 is a seasonal high water table contour map based on March 2023 data. Groundwater flow was predominantly to the north with a component of flow to the east from the highest groundwater point in the southwest part of the site. A seasonal low water table contour map based on the December 2023 data is shown on Plan Sheet 4 of the feasibility report addendum no. 1. Flow directions and horizontal gradients were generally consistent with the high water table map. Regionally, the groundwater flow is generally to the southwest toward the Yahara River basin.

The horizontal hydraulic gradient at the water table in March 2023 ranged from about 0.010 to 0.037. The lowest horizontal hydraulic gradient (0.010) was in the central part of the site where the water table is predominantly in the till. The steepest horizontal hydraulic gradient (0.037) was on the east side of the site. The horizontal gradient of flow to the northwest was about 0.024.

In December 2023, the horizontal flow gradients to the northwest and to the east were about the same (0.023). The lowest horizontal hydraulic gradient (0.008) at the water table in December 2023 was in the central part of the site where the water table is predominantly in the till.

The geometric mean of the hydraulic conductivity test results from the water table wells is 9.9×10^{-4} centimeters per second (cm/s). The estimated horizontal velocity of groundwater flow at the water table ranges from about 30 to 130 feet per year. Groundwater velocity calculations are included in Appendix O of the feasibility report. Single well hydraulic conductivity test results are summarized in Tables 10-3a through 10-7 of the feasibility report addendum no. 1.

Groundwater Flow – Piezometer Level

Plan Sheet 5 of the feasibility report addendum no. 1 is a potentiometric surface contour map based on March 2023 data. Groundwater flow at the piezometer level was similar to flow at the water table with predominant flow to the north and a component of flow to the east from the highest groundwater elevation in the southwest part of the site at MW-120A.

The horizontal hydraulic gradient at the potentiometric surface ranged from about 0.018 to 0.033. The lowest horizontal hydraulic gradient (0.018) was in the central part of the site. The steepest horizontal hydraulic gradient (0.033) was on the east side of the site. The horizontal gradient of flow to the northwest was 0.020.

The geometric mean of the hydraulic conductivity test results from the piezometers, screened in various bedrock units, is 2.0×10^{-4} cm/s. The estimated horizontal velocity of groundwater flow at the piezometer level ranges from about 15 to 30 feet per year. Single well hydraulic conductivity test results are summarized in Tables 10-3a through 10-7 of the feasibility report addendum no. 1.

Groundwater Flow – Vertical Gradients

Most of the water table wells are screened in till or a combination of till and varying amounts of another unit. Between March and December 2023 (the highest and lowest water table levels recorded at the site), the vertical hydraulic gradient between the water table wells and piezometers in the bedrock ranged from 0.02 upward (till and Oneota Formation) to 0.09 downward (till and Readstown Member).

There are a few well nests where both water table wells and piezometers are screened within rock units. This allows vertical gradients within the rock units to be calculated. From March to December 2023, the vertical hydraulic gradients within the bedrock were mostly downward (ranging from 0.001 downward in the Tonti Member sandstone at MW116/MW116A to 0.317 downward between the Tonti Member sandstone and the Shakopee Formation dolomite at MW123/MW123A). However, upward gradients were observed within the Galena Formation dolomite at MW-109/MW-109A (0.02 to 0.03 upward) and between the Readstown Member (variable lithology) and the Prairie du Chien dolomite at MW-125/MW-125A (0.026 downward to 0.037 upward). Vertical gradients from March to December 2023 are summarized in Table 5-7 of the feasibility report and Table 10-1 of the feasibility report addendum no. 1.

Water Supply Wells

Six water supply wells are located within 1,200 feet of the proposed landfill. Dane County is not requesting an exemption to s. NR 504.04(3)(f), Wis. Adm. Code, for any of the water supply wells, but instead proposes to abandon the water supply wells as summarized below:

Table 1				
Water supply well within 1,200 ft. of proposed limits of waste	Wisconsin Unique Well Number (WUWN)	Well Owner	Well Address	Comment
Yahara Well PW-D (aka PW-3), WGNHS Geologic Log DN985	8AP358	Dane County	4402 Brandt Road, Madison, WI 53718	To be abandoned
Yahara Well PW-E (aka PW-4), WGNHS Geologic Log DN986	FF204	Dane County	4402 Brandt Road, Madison, WI 53718	To be abandoned
Yahara Well PW-C (aka PW-6), WGNHS Geologic Log DN988	8AP357	Dane County	4402 Brandt Road, Madison, WI 53718	To be abandoned
Formerly privately owned well	8AP872	Dane County	3124 Hope Hollow Trail, McFarland, WI 53558	To be abandoned
Privately owned well (Dane County has executed agreement to purchase the property - Attachment H of feasibility report addendum no. 1)	-	Privately owned	3098 Hope Hollow Trail, McFarland, WI 53558	To be abandoned
Privately owned well (Dane County has executed agreement to purchase the property - Attachment H of feasibility report addendum no. 1)	-	Privately owned	3108 Hope Hollow Trail, McFarland, WI 53558	To be abandoned

Baseline Groundwater Quality

Baseline groundwater quality monitoring was conducted at groundwater monitoring wells located outside of the proposed landfill limits of waste in May, June, July, August, and December 2023. Wells MW-105, MW-107, MW-111, MW-119, and MW-120 were sampled for the additional Subtitle D parameters. The baseline monitoring results are summarized in Tables 5-8 through 5-11 of the feasibility report, and Tables 14-1 and 14-2 of the feasibility report addendum no. 1. Exemptions from ch. NR 140, Wis. Adm. Code, groundwater quality standards are requested by Dane County to allow construction of the proposed landfill in an area with existing groundwater standard exceedances.

Baseline Groundwater Quality – Inorganic Parameters

Chapter NR 140, Wis. Adm. Code, groundwater quality standard exemptions are being requested for the following inorganic parameters: arsenic, manganese, nitrate plus nitrite, and sulfate.

Arsenic was detected at concentrations above the PAL (1 microgram per liter [µg/L]) at eight of the 23 wells included in the baseline monitoring program. Arsenic levels above the PAL are likely naturally occurring in the till soils and bedrock at the site.

Manganese concentrations exceeded the public welfare and/or health PAL (25 or 60 µg/L) and/or ES (50 or 300 µg/L) in samples from 19 of the 23 baseline monitoring wells. At most wells, the manganese concentrations decreased as the water quality stabilized following well installation. Manganese is likely naturally occurring in the unconsolidated sediments and the bedrock. Land use could potentially have contributed to elevated manganese through use of manganese-containing pesticides; however, the fact that manganese concentrations are generally higher in the piezometer samples than in the water table well samples suggests that the observed manganese levels are more likely naturally occurring.

Nitrate plus nitrite concentrations above the PAL (2 mg/L) were reported in samples from 13 of the 23 monitoring wells in the baseline program. None of the results exceeded the ES (10 mg/L). Nitrate plus nitrite levels above the PAL are likely due to land use in the proposed landfill area and possibly land use upgradient from the site. Fertilizers are a common source of nitrate in groundwater.

Sulfate concentrations greater than the PAL (125 mg/L) were detected in two of the four samples from MW-105A and one of the four samples from MW-122. Sulfate concentrations reported for these wells are likely due to natural background in the unconsolidated sediments. Land use may also have contributed to elevated sulfate levels, especially at the water table well, through potential use of sulfate-containing fertilizers.

Baseline Groundwater Quality – VOCs

1,2-Dichloroethane (1,2-DCA) was detected at 15 of the 23 monitoring wells in the baseline monitoring program at concentrations greater than the PAL (0.5 µg/L). Many of the wells had only a one-time detection of 1,2-DCA and/or did not have a reported concentration above the laboratory's limit of quantitation; however, three wells (MW-113, MW-120A, and MW-124A) had confirmed exceedances of the PAL and well MW-113 had one result exceeding the ES (5 µg/L).

The three wells with confirmed PAL exceedances for 1,2-DCA in the first four sampling events were sampled a fifth time in December 2023, along with MW-123B; none of the four results exceeded the PAL. Dane County is requesting exemptions for 1,2-DCA at MW-113, MW-120A, and MW-124A.

The existing Rodefeld Landfill, located north of the proposed landfill, is not a likely source of the 1,2-DCA detections because:

- The existing Rodefeld Landfill is downgradient from the proposed landfill, and
- 1,2-DCA is included in the groundwater monitoring program for the existing Rodefeld Landfill and has not been detected in any samples collected from the water table monitoring wells, piezometers, or water supply wells sampled for the existing site since monitoring began in the late 1980s.

Baseline Groundwater Quality – Additional Investigation, 1,2-DCA

Following submittal of the feasibility report in February 2024, additional rounds of groundwater sampling were conducted at the three wells at which PAL exceedances were confirmed for 1,2-DCA (MW-113, MW-120A, and MW-124A). The groundwater results are summarized in Table 14-1 of the feasibility report addendum no. 1.

There were no detections of VOCs at any of the three wells in December 2023 or March 2024, except for a 0.47 µg/L detection of 1,2-DCA at MW-124A in December 2023. In June 2024, 1,2-DCA was not detected at any of the three wells but was detected at a concentration of 0.79 µg/L in a sample collected from MW-1. MW-1 had previously been sampled three times for VOCs without any detections. MW-1 was sampled for VOCs in July 2024 to confirm the previous results; no VOCs were detected.

The golf course water supply well PW-D was sampled in March 2023 for VOCs to document the drilling water quality; 1,2-DCA was not detected. SCS sampled the golf course water supply wells PW-B and PW-E for VOCs on September 13, 2024, and 1,2-DCA was not detected in the samples. Three private residential wells are located to the east of the proposed landfill. The private wells were each sampled five to six times for VOCs between March 2022 and June 2023. 1,2-DCA was not detected in any of the samples.

The potential source of the 1,2-DCA is unknown. 1,2-DCA was used as an anti-knock compound in leaded gasoline until it was phased out in the 1990's. Household uses included cleaning products, paint and paint removers, and varnishes. It was an ingredient in pesticides and used as a grain and soil fumigant. It is still used in industry in the manufacture of polyvinyl chloride (PVC). There is no indication that a release of 1,2-DCA associated with any of these possible sources occurred at the proposed landfill site.

Dane County submitted a request for a no action required (NAR) determination to the department's Remediation and Redevelopment (RR) Program on January 20, 2025. The department's RR Program issued a Liability Clarification and NAR Determination Letter on March 12, 2025. The letter states that no response actions, including further site investigation activities, are required under chs. NR 700 to 799, Wis. Adm. Code, to respond to the identified discharges or environmental pollution.

Baseline Groundwater Quality – Additional Investigation, MW-122

Dane County is requesting additional groundwater quality standard exemptions for arsenic, barium, chromium, and lead at MW-122 due to detections of elevated concentrations of those parameters (arsenic PAL [1 µg/L] and ES [10 µg/L] exceedances, barium PAL [400 µg/L] exceedances, chromium PAL [10 µg/L] exceedances, and lead ES [15 µg/L] exceedances). The samples collected from the well had high concentrations of suspended sediment that likely contained naturally occurring metals. Dane County attributed the elevated metal concentrations to incomplete removal of suspended sediment by the sample filtering process. The field procedures were modified and in three subsequent sampling events (December 2023, March 2024, and June 2024), no metals were detected at concentrations greater than ch. NR 140, Wis. Adm. Code, groundwater quality standards. However, the well water continues to have high concentrations of sediment indicating a possible problem with the well construction or possible damage to the well screen. Additionally, in the September 2024 sampling event, arsenic was detected at a concentration greater than its PAL (1 µg/L), and manganese was detected at a concentration greater than its ES (300 µg/L). The well will be further evaluated and considered for abandonment and/or replacement depending on its role in the proposed landfill's monitoring program.

Constraints on Landfill Development

Locational Criteria

The proposed landfill would not be located within 300 feet of a navigable river or stream, or in a flood hazard area or floodplain. The proposed landfill 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 landfill would not be located within 200 feet of a known Holocene fault or within a seismic impact zone, nor within an unstable area.

The following locational criteria items were identified as potential constraints on landfill development, per s. NR 504.04(3)(a), (d), and (f), Wis. Adm. Code:

1. There is one pond within 1,000 feet of the proposed limits of filling (pond P-1 on Plan Sheet 2 of the feasibility report addendum no. 1). Dane County is requesting a locational criteria exemption in relation to this pond.

2. The right-of-way of USH 12 & 18 to the north, and recreational areas to the west and south (Yahara Hills Golf Course and City of Madison Parks Yahara Hills Park South) are located within 1,000 feet of the proposed landfill. Dane County proposes to provide continuous screening of the waste within 1,000 feet of these areas. Dane County is requesting a locational criteria exemption in relation to USH 12 & 18 and these recreational areas and proposes to provide continuous screening of the waste within 1,000 feet of these areas.

3. Six water supply wells are located within 1,200 feet of the proposed landfill. Dane County did not request any locational criteria exemptions in relation to these wells, but instead proposes to abandon the wells. See Table 1 above.

Performance Standards

Wetlands

The entire Dane County-owned property has been evaluated for wetlands. In November 2021, TRC Environmental Corporation (TRC) performed a wetland delineation study on the northern 157 acres (former parcel no. 251/0710-254-0099-7) and identified five wetlands and one pond (see Plan Sheet 2 of the feasibility report addendum no. 1 for surface water features):

- Wetland W-1, located in a depressional swale on the NE corner of the project area (3.66 acres),
- Wetland W-2, located in a swale on the NW corner of the project area (0.08 acres),
- Wetland W-3, located in a swale on the NW corner of the project area (0.01 acres),
- Wetland W-4, located within a shallow depression on the eastern portion of the project area (0.18 acres),
- Wetland W-5, located around the edge of a manmade pond in the central portion of the project area (0.11 acres), and
- Pond P-1, a manmade pond located in the central portion of the project area (2.02 acres).

No wetlands were identified on the southern 73 acres (former parcel no. 251/10-361-0099-0).

Approximately 3.05 acres of wetland W-1 were not evaluated as part of the proposed landfill project because that wetland area was previously filled as part of the WisDOT USH 12 & 18 and CTH AB interchange project and is no longer present.

The United States Army Corps of Engineers (USACE) concluded that none of the wetlands are waters of the US and are therefore not required to obtain USACE authorization to discharge dredged or fill material (refer to Appendix B of the feasibility report).

Pond P-1, the remaining portion of wetland W-1 (0.61 acres), wetland W-4, and wetland W-5 would be directly impacted by the proposed landfill. While on the property, wetlands W-2 and W-3 are located approximately 1,200 feet from the proposed limits of waste and would not be impacted by the proposed landfill.

The department's Waterways Program concluded that pond P-1, the remaining portion of wetland W-1 (0.61 acres), wetland W-4, and wetland W-5 are artificial wetlands exempt from state wetland regulations (refer to March 30, 2023, letter included in Appendix B of the feasibility report). The department's Waterways Program further clarified that pond P-1 was artificial in nature and that no regulatory authority regarding chapter 30 or 281, Wis. Adm. Code, applies to this wetland/waterbody (refer to Appendix B of the feasibility report).

Endangered or Threatened Species

An ER review request application was submitted to the department's ER Review Program for the entire 230-acre Dane County-owned property. On June 10, 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 an ER review because no element occurrences were identified.

Surface Water

Detrimental effects on surface water adjacent to the proposed landfill would not be anticipated as a result of the construction or operation of the proposed landfill. During landfill operations, surface water runoff that contacts waste or daily cover would be treated as leachate. Surface water runoff from intermediate or final cover areas would be routed via diversion berms, downslope flumes, and perimeter ditches to sedimentation basins. The sedimentation basins would limit the release of sediment to adjacent properties and surface waters in accordance with applicable soil erosion regulations and/or local, state and federal storm water runoff regulations. The storm water management system would be designed to meet department and Dane County storm water performance standards, which includes providing a post-development discharge rate for multiple storm events less than or equal to the predevelopment discharge rate. The full storm water management system design would be provided 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 landfill. The proposed landfill design includes a composite liner system, including a 4-foot-thick low-hydraulic conductivity clay layer overlain by a geomembrane liner and a leachate collection system. The facility would also include a composite final cover

system, which would limit infiltration through closed portions of the proposed landfill. In addition, the facility would include an underdrain system that would maintain the water table below the bottom of the liner.

Explosive Gases

The proposed landfill would include a landfill gas collection system. The landfill gas collection system would prevent the migration of explosive gases. A detailed landfill gas collection system design would be included as part of the plan of operation. Additionally, the landfill monitoring system would include gas probes installed around the perimeter of the landfill to routinely monitor for gas migration.

Hazardous Air Contaminants

The landfill gas collection system would control emissions of hazardous air pollutants in accordance with state and federal air pollution control requirements. Dane County would need to apply for and be issued an air pollution control construction permit prior to commencing construction of the proposed landfill. In addition, Dane County would need to apply for a revision to its existing air pollution control operation permit for the existing Rodefeld Landfill (Air Pollution Control Part 70 Operation Permit #113127300-P30). Dane County would need to control its air emissions in accordance with applicable local, state, and federal regulations.

Geotechnical Information

Geologic

The loess onsite meets the requirements for liner quality clay, so clay for the landfill liner and cover may be obtained onsite. The predominant soil that would remain in place below the proposed landfill subbase and in the areas adjoining the landfill is till. The till is dense and massive, with few interbedded stratified layers. The till has generally low hydraulic conductivity – on the order of 10^{-4} to 10^{-6} cm/sec, based on single well hydraulic conductivity testing and laboratory testing. There is very little glacial outwash or other sorted sediment at the site.

Geotechnical investigations conducted to date indicate the bedrock at the proposed landfill site is composed of heterogenous lithologies of carbonates and siliclastics (conglomerates, sandstone, siltstones, shale). There are several different bedrock units at the bedrock surface as shown on Figure 10-1 of the feasibility report addendum no. 1, which shows the uppermost bedrock unit at each drilling location. Many locations have more than one bedrock unit present within the upper 15 feet of bedrock, illustrating the potential for rock properties to vary within a narrow range of depths at a given location. The most recent drilling results indicate that rock type and characteristics also vary over short distances horizontally and vertically.

Based on the results of single-well response tests conducted on the piezometers installed as part of the geotechnical investigation program, the mean horizontal hydraulic conductivity of the bedrock is on the order of 10^{-3} to 10^{-4} cm/sec (Tables 10-4 through 10-7 of the feasibility report addendum no. 1).

Small solution features (vugs) were identified in the carbonate rocks, and poorly indurated layers, bedding plane partings, and fractures are present in both the carbonate and siliclastic rocks. However, no zones of voids, open voids, pervasive discrete fractures, or large dissolution features were observed during geotechnical investigation of the proposed landfill area.

The depth to bedrock does not allow for 10-foot separation between the subbase grades and the bedrock surface in all areas of the proposed landfill, as required by s. NR 504.06(2)(c), Wis. Adm. Code. Dane County is requesting an exemption from this requirement. See further discussion in the Subbase Grades and Drainage (Underdrain) Subsection of the Proposed Preliminary Landfill Design and Operation Section of this project summary.

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.

The depth to the water table varies seasonally from less than 1 foot below ground surface (bgs) in the central part of the site to more than 50 feet bgs at the southeast corner of the site. The depth to the seasonal high water groundwater table does not allow for 10-foot separation between the subbase grades and groundwater table in all areas of the proposed landfill, as required by s. NR 504.06(2)(b), Wis. Adm. Code. Dane County is requesting an exemption from this requirement and proposes to include an underdrain system to maintain the water table below the bottom of the composite liner system.

Groundwater flow directions at both the water table and the piezometer level were consistent through the monitoring period from March to December 2023. Groundwater flow directions at both levels have been predominantly to the north with a component of flow to the east from the highest groundwater elevations located in the southwest part of the site. Vertical gradients between the water table and piezometer level are generally very low, indicating the flow is predominantly horizontal.

Low RQDs (and dense fracture frequencies), poorly indurated layers, bedding planes, fractures, and small dissolution features (vugs) are common in the bedrock at the proposed landfill site, such that the properties of the bedrock more closely approximate those of a heterogeneous porous media than those of a discretely fractured media. The observed physical characteristics of the rocks are consistent with the range of hydraulic conductivity values (Tables 10-4 through 10-7 of the feasibility report addendum no. 1) indicating areas of higher permeability, such as at MW-4, but no zones of voids, open voids, pervasive discrete fractures, large dissolution features, or other features that may preferentially control groundwater flow across the proposed landfill area were observed during geotechnical investigation. The geologic units are hydraulically connected with no apparent confining units or perched zones.

Topographic

The site topography is characterized by a generally flat surface that slopes gently from the southeast at an elevation of approximately 930 ft-MSL, to the northwest at an elevation of approximately 870 ft-MSL. The proposed landfill subbase and underdrain system, designed to slope from south to north, utilize the original ground surface slope to allow gravity drainage of the underdrain system.

Hydrologic

Hydrologic features which may affect the development of the proposed landfill site include surface water features and wetlands. Five wetlands and one pond were identified on the proposed landfill site, as discussed above.

Pond P-1 would be filled-in to construct the proposed landfill. The pond may be connected to shallow groundwater, but no indication was found that there is preferential groundwater discharge to the pond, such as being spring fed, so that once drained and backfilled the pond is not anticipated to have an unfavorable effect on landfill development.

While the proposed landfill would impact pond P-1, and a portion of wetlands W-1, W-4, and W-5, they are not subject to permitting requirements as they are non-jurisdictional and artificial in nature. The surface water control features for the proposed landfill would maintain an approximate surface water balance compared to existing conditions.

Construction and Operation

Specialized engineering structures such as the scale, office, site entrance, leachate lift station, environmental monitoring and gas extraction features, and sedimentation basins are typical features constructed at other landfills and would need to be constructed for the proposed landfill. Further analysis and details would be provided as part of the plan of operation.

A proposed leachate forcemain would convey leachate to the existing City of Madison sewer line that would subsequently convey the collected leachate to MMSD. Appendix K of the feasibility report contains a conditional leachate acceptance letter from MMSD.

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

Proposed Preliminary Landfill Design and Operation

The proposed limits of waste include approximately 76.6 acres of new waste disposal area and a design capacity of approximately 12,182,300 cy. The proposed landfill would provide approximately 12 to 13 years of disposal capacity based on historical waste acceptance rates at the existing Rodefeld Landfill.

Clearing and grubbing of the golf course would occur as needed as the proposed landfill is developed. Existing trees and vegetation that do not need to be disturbed as construction is phased in would remain in place. The main access road would be constructed as part of initial construction. Access roads would also be constructed as needed during the phased development of the proposed landfill.

Subbase Grades and Drainage (Underdrain)

The subbase grades are above the top of bedrock for a majority of the site. However, there is a small area in the southeast corner of the site where subbase grades are currently below the bedrock surface, and there are areas in the east-central and northeast area of the site where a portion of the underdrain trench and/or sump would potentially be below the bedrock surface. The feasibility report states that subbase grades can be adjusted at the time of construction such that removal of competent bedrock would not be necessary to construct the proposed landfill. Any net loss of landfill capacity from that which would be approved, as a result from raising subbase grades, could not be regained by raising the final waste grades of the landfill above that which would be approved or by extending the lateral waste limits beyond that which would be approved. In addition, the landfill design requirements in s. NR 504.06, Wis. Adm. Code, for leachate collection systems would still need to be met.

These include limiting the leachate flow distance to no more than 130 feet across the base of the liner before encountering a leachate collection line, maintaining a minimum 0.5% slope on leachate collection lines after accounting for primary and secondary settlement, and maintaining a minimum 2% slope of the liner toward the leachate collection lines.

An underdrain system would be used to maintain the water table below the bottom of the composite liner system. The underdrain system would be designed to meet the following:

- The bottom of the clay component of the liner (i.e., subbase grades), except at the leachate line undercuts and sumps, would be above the projected high groundwater elevations with the underdrain system operating under gravity-drained conditions.

- At the leachate line undercuts and sumps, with the underdrain system operating under gravity-drained conditions, the projected high groundwater elevations would be below the top of the clay component of the liner.

The underdrain system would consist of groundwater collection pipes located below the liner. The design may include a partial sand or geocomposite drainage layer below the liner. The collected groundwater would flow via gravity to a manhole outside the limits of waste near the northwest corner of the proposed landfill. From the manhole, groundwater would be discharged via gravity or pumped. The underdrain discharge would be permitted under a Wisconsin Pollution Discharge Elimination System (WPDES) General Permit prior to construction. In addition, the collected groundwater would be periodically sampled, providing an early detection of any potential groundwater contamination. Section 8.4 of the feasibility report and Section 2.2 of the feasibility report addendum no. 1 include additional information about the design of the proposed underdrain system.

Base Grade Slopes and Elevations

The interior side slopes of the liner would be 3H:1V. The base grades for the proposed landfill would slope from a high point on the south end (highest elevation of approximately 924 ft-MSL) of the liner to the north (lowest elevation of approximately 874 ft-MSL). From the high point the base grades and the eight leachate collection trenches are proposed to slope at a minimum 1% and at a maximum 3%. The proposed slope on the liner base toward the leachate collection trenches varies between 2% and 4.8%.

Liner System

The proposed base grades are 4 feet higher than subbase grades to accommodate a composite liner system consisting of a 4-foot-thick compacted clay layer overlain by a 60-mil high-density polyethylene (HDPE) geomembrane to provide waste and leachate containment. A minimum 12-ounce protective geotextile would be placed over the geomembrane.

Leachate Collection and Extended Collection Lines

The leachate collection system would consist of a 12-inch-thick gravel drainage blanket constructed directly over the geotextile protecting the geomembrane component of the composite liner. Perforated 8-inch HDPE pipes surrounded by gravel would be placed in V-shaped leachate collection trenches constructed in the valleys on the base of the liner. The leachate collection lines would be sloped at a minimum 1% and at a maximum 3%.

Leachate collected in the drainage blanket would flow from the south to north into eight leachate collection pipes and then into leachate sumps at the north end of each collection pipe. Leachate would be pumped from each sump to a perimeter leachate vault or manhole. From there, a dual walled forcemain or gravity line would direct the leachate to a sampling and metering manhole and lift station, with discharge to the MMSD sanitary sewer system.

The leachate collection lines exceed 1,200 feet from cleanout to toe of opposite slope, with the longest proposed collection pipe measuring approximately 2,000 feet from the limits of waste to the toe slope from each direction. Because the proposal includes leachate collection line lengths exceeding 1,200 feet, the design would need to comply with s. NR 504.06(6), Wis. Adm. Code, for landfills with extended leachate collection lines.

At least two leachate headwells would be included in each major phase to measure the leachate head on the liner system as required in s. NR 504.08(2)(i), Wis. Adm Code.

Leachate Generation Rate and Treatment

Dane County calculates the following leachate generation volumes for the proposed landfill using generation rates in s. NR 512.12(3), Wis. Adm. Code (see Attachment B of the feasibility report addendum no. 1):

- Maximum during operation: 16,280 gallons per day
- Post-closure: 5,699 gallons per day

The collected leachate would be discharged into the MMSD sanitary sewer system. Alternatively, Dane County may request approval in a plan of operation to recirculate leachate in active portions of the landfill.

Gas Collection and Management

The design of the proposed landfill gas management system would include vertical gas extraction wells connected by lateral and header pipes. Driplegs and/or condensate sumps would be installed along the header piping as needed to prevent condensate buildup from limiting gas flow in the piping system. A blower system would draw landfill gas from the wellfield under vacuum and transfer it to a treatment system or control device. The gas collection system design would be provided as part of the plan of operation.

Dane County may pipe landfill gas from the proposed landfill to the existing renewable natural gas (RNG) plant located at the existing Rodefeld Landfill. It's anticipated that the existing RNG plant would reach capacity at some point during the life of the proposed landfill, and a new landfill gas treatment system for RNG or other beneficial use would be constructed on the proposed landfill property. Landfill gas may also be combusted in a flare at times when beneficial use options are not available.

Final Waste Grades and Final Cover

The proposed landfill would have final cover grades with a maximum of 4H:1V and minimum 5 percent slopes. The final cover would be seeded, fertilized, and mulched to limit erosion. The approved height of the landfill would have a peak elevation of approximately 1,136 ft-MSL. The maximum intermediate waste grades are proposed to be up to 10 percent higher (based on total waste thickness) than the final waste grades to allow for settlement.

Two final cover designs are being proposed and would consist of the following, from the top down:

Option 01

- Native vegetation or a WisDOT standard highway seed mixture under Section 630
- Six-inch topsoil layer
- Two and a half foot rooting zone layer
- Geocomposite drainage layer
- 40-mil linear low-density polyethylene (LLDPE) geomembrane
- Two-foot compacted clay layer
- Six-inch grading layer

Option 02

- Native vegetation or a WisDOT standard highway seed mixture under Section 630
- Six-inch topsoil layer
- Two and a half foot rooting zone layer
- Geocomposite drainage layer
- 40-mil LLDPE geomembrane
- geosynthetic clay layer (GCL) with a two-foot soil barrier layer
- Six-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 chapters 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 runoff from intermediate or final cover areas would be routed via diversion berms, downslope flumes, and perimeter ditches to sedimentation basins. The storm water management system would be designed to meet department and Dane County storm water performance standards, which includes providing a post-development discharge rate for multiple storm events less than or equal to the predevelopment discharge rate. The full storm water management system design, including appropriate sizing of stormwater control features, would be included in the plan of operation.

Key features of the storm water management system would include:

- Diversion berms to collect and route runoff from the final cover system to downslope flumes. The berms reduce the runoff slope length along the final cover, reducing the potential for erosion of the cover system.
- Downslope flumes to collect and convey surface water from the diversion berms to the perimeter ditches.
- Perimeter ditches to route surface water to the sedimentation basins.
- Culverts to route surface water from the perimeter ditches to the sedimentation basin and at other infrastructure crossings.
- A sedimentation basin (or basins) to provide treatment for the collected storm water before discharging to existing storm sewers, swales or downstream discharge locations.

Potential Construction and Demolition Residuals and Fines Monofill

Dane County may include a monofill area within the proposed landfill for the disposal of C&D residuals and/or fines from the C&D recycling facility located at the existing Rodefeld Landfill property. C&D residuals consist of materials that are not sent for post-market use; C&D residuals are currently disposed of with MSW at the existing Rodefeld Landfill. C&D fines consist of small (generally less than 2-inch) material from the C&D processing operation. C&D fines are currently used as alternative daily cover at the existing Rodefeld Landfill.

The monofill area would be designed to segregate the landfill gas generated by the C&D residuals and/or fines. Under anaerobic conditions within a landfill, gypsum-containing materials, such as plasters, drywall, ceiling tiles, partitions, and building blocks break down, and sulfates contained in those items are converted to hydrogen sulfide (H_2S), dimethyl sulfide, and mercaptans. The presence of H_2S in landfill gas may require additional treatment and maintenance of the landfill gas system features if it were to be processed for beneficial reuse (e.g., renewable natural gas, renewable electricity, etc.). If placed in a monofill, the organic fraction subject to decomposition and generation of H_2S is reduced. A separate landfill gas system could be installed in the monofill area to manage the high H_2S gas separately from the remaining landfill gas.

If Dane County decides to pursue this option, detailed design of the monofill area(s) would be provided as part of the plan of operation, including capacity needs, leachate collection system layout, landfill gas system layout, description of C&D material disposal and management in the monofill, closure sequencing, monitoring of the monofill area, and separation details as needed for overlay of MSW materials over the monofill area.

Proposed Visual Screening

The right-of-way of USH 12 & 18 to the north, and recreational areas to the west and south (Yahara Hills Golf Course and City of Madison Parks Yahara Hills Park South) are located within 1,000 feet of the proposed landfill.

Dane County proposes to provide continuous screening of the waste within 1,000 feet of these areas. In accordance with the approved neighborhood development plan (see Attachment O of the feasibility report addendum no. 1), Dane County would maintain a 150-foot buffer around the landfill limits of waste and would construct a 10-foot-high berm within the buffer. Dane County would use additional screening measures including:

- preserving as many existing mature trees around the perimeter of the proposed landfill as practicable.
- planting additional trees in select areas of the site.
- creating a waste berm along the outside edge of the waste mass that includes intermediate soil cover placed on the exterior slope, then placing waste on the interior side of the berm.
- constructing soil berms, as necessary, at the outside edge of the waste mass.

Waste would not be visible from an outside vantage point when using the waste or soil berms. During construction of waste or soil berms, waste would be screened by natural objects, plantings, or fences. For heights greater than what may be screened by natural objects, plantings, or fences, soil berms would be constructed prior to placing waste.

Tree planting would occur upon completion of grading and earthmoving activities to construct the perimeter berm with each phase of liner construction. Portions of the perimeter berm may be constructed ahead of liner construction, as necessary, to provide additional time for tree growth and maturity prior to waste placement. In

addition, existing trees would be preserved and protected outside of anticipated construction areas. Attachment D of the feasibility report addendum no. 1 includes an aerial view of the property with existing trees.

The estimated mature height and spread of the proposed trees is provided in Attachment D of the feasibility report addendum no. 1. As required by the approved neighborhood development plan with the City of Madison, the proposed planting plan includes, at minimum, 75 percent evergreen trees. This utilization of evergreen trees would aid in year-round screening.

Final Use

The current final use plan for the proposed landfill is open green space.

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. Development of the proposed landfill would occur in seven phases.

Support Structures

New buildings, scales, roads, material drop off facility, and other structures would be constructed to support landfill operations. The buildings and scales are planned to be constructed along the north end of the site. Landfill gas processing equipment is planned to be constructed south of the proposed landfill. Details and the final location would be shown as part of the plan of operation.

Site Access and Control

Large haulers would access the proposed landfill directly off CTH AB/Brandt Road while residential customers would use an entrance off Millpond Road. From the scales, access to the active working face would be provided on all-weather access roads. Perimeter access roads would be constructed as phases of the landfill are developed.

Unauthorized access to the site would be restricted by gates, perimeter or property fencing, and natural barriers. In addition, a perimeter litter fence would be installed to help control windblown litter.

Daily Landfill Operations

Daily landfill operations would be confined to as small an area as possible. Filling would proceed from the low point on the base of each phase, with waste placed and compacted in approximately 10- to 15-foot lifts. Daily cover consisting of soil, or an approved alternate daily cover material, would be placed over the waste at the end of each operation day. Upon reaching final waste grades, the final cover and surface water control features would be constructed as soon as practicable. Waste grades would be surveyed to ensure design capacity is not exceeded.

Dust, Noise, Odor, And Litter 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. A detailed dust control plan would be included as part of the plan of operation.

- Operational noise would occur during hours of operation, including typical business hours and may be adjusted as a result of local negotiations.

- Odors would be controlled through:
  - minimizing the active area, including installing permanent cap over closed areas of the landfill, and installing temporary cover soils over as much of the uncapped landfill area as possible,
  - placement of daily cover over the active area at the end of each operating day,
  - installing landfill gas wells sooner and potentially closer together than required to collect landfill gas as it is generated,
  - operating the active gas extraction system,
  - performing quarterly surface emission monitoring (SEM) and identifying areas in need of repair or additional soil cover,
  - utilizing odor masking agents when appropriate, and
  - utilizing an online odor reporting form.

  A detailed odor control plan would be included as part of the plan of operation.

- Windblown litter would be controlled by proper waste compaction and placement of daily cover, perimeter fencing, and the use of portable litter fencing, as needed. Wind-blown debris would be collected as necessary. A litter control plan would be included with the plan of operation.

Environmental Monitoring

A preliminary environmental monitoring program is included in Appendix P of the feasibility report. If a favorable feasibility determination is issued, the plan of operation would include a comprehensive environmental monitoring program that follows the requirements of ch. NR 507, Wis. Adm. Code. The environmental monitoring program would include routine monitoring of:

- groundwater quality at groundwater monitoring wells and water supply wells, and groundwater levels at groundwater monitoring wells,
- groundwater discharge from the proposed underdrain system,
- leachate quality and quantity at the leachate lift station,
- leachate head on the liner at the leachate headwells,
- surface water in accordance with WPDES General Permit requirements, as well as the Storm Water Pollution Prevention Plan (SWPPP) that would be included as part of the plan of operation, and
- landfill gas quality at the gas extraction wells and the blower system, as well as gas probes located around the perimeter of the proposed landfill to monitor for subsurface gas migration.

Proposed Soil Borrow Source

Clay used for construction of the proposed landfill liner and final cover capping layer may be obtained onsite and would also consist of imported material. The CTH N borrow source has been identified and approved for use at the existing Rodefeld Landfill. This borrow site is anticipated to be used at the proposed landfill. The volume of clay available at the CTH N site and the approximate volumes of clay required for the first phase of liner and cover construction are as follows:

- Volume of clay available at CTH N borrow site: 139,750 cy
- Volume of clay required for construction of Phase 1 liner: 92,930 cy
- Volume of clay required for construction of first phase of closure: 36,460 cy

The proposed clay borrow source has sufficient volume of clay to complete the first phase of liner and final cover construction for the proposed landfill. If the GCL/barrier soil final cover option is used, the CTH N site material may be used for barrier layer soil.

Environmental Analysis

Proposed Physical Changes

Terrestrial Resources

The proposed landfill property is currently used for recreation as a golf course. The proposed 76.6-acre landfill would be located on areas that have been previously disturbed for golf course development. The existing elevations in the proposed landfill area range from approximately 875 to 930 ft-MSL. The anticipated peak elevation of the proposed landfill is 1,136 ft-MSL, which is approximately 205-260 feet higher than the surrounding existing grades in the area.

The proposed landfill would have some aesthetic visual impacts. The approximately 205 to 260-foot height increase of the landfill would more greatly impact views from surrounding properties compared to the existing grades of the Yahara Hills Golf Course. There may also be wind-blown material at and around the facility. Screening would be utilized to minimize visual impacts and control wind-blown debris.

The footprint of the proposed landfill and its support features is well-maintained grass/turf in the tee boxes, fairway and greens for the golf course, along with longer grass, trees and shrubs in the rough. An existing golf course pond used for irrigation water supply would be removed during construction of the proposed landfill.

Clearing and grubbing of the golf course and construction of access roads would occur as needed as the proposed landfill is developed. Existing trees and vegetation that do not need to be disturbed would remain in place.

As the proposed landfill phases are constructed, utilities within the footprint such as water lines, electrical lines, storm water drainage pipes, and other utilities would be drained or deenergized, excavated, and properly disposed. If utilities are required for continued use, they would be relocated outside the proposed landfill footprint before or during construction of each phase of the landfill. The septic drain field near monitoring well nest MW-109/MW-109A would be excavated and properly disposed.

Soil and clay used in development of the proposed landfill would be obtained from both on-site and off-site sources. Soil removed within the landfill footprint may qualify as clay or soil barrier layer, subject to additional investigation. Select granular fill and aggregate materials would be obtained from off-site sources. Topsoil would be used from on-site stockpiled topsoil, approved off-site borrow sources, or additional off-site borrow sources as approved by the department.

Approximately 941,600 cy of soil would be excavated within the proposed landfill footprint, and approximately 561,600 cy of fill would also be required, to achieve subbase and perimeter grades, for a net cut of approximately 380,000 cy. This soil would be stockpiled on site for berm construction, daily and intermediate cover soil, and final cover rooting zone.

Aquatic Resources

Development of the proposed landfill would alter surface water drainage patterns in the immediate area of the landfill; however, the proposed landfill has been designed to minimize effects to aquatic resources.

During landfill operations, surface water runoff that contacts waste or daily cover would be treated as leachate. Surface water runoff from intermediate or final cover areas would be routed via diversion berms, downslope flumes, and perimeter ditches to a sedimentation basin. The sedimentation basin would limit the release of sediment to adjacent properties and surface waters. The storm water management system would be designed to provide an approximate balance or reduction in peak discharge rates for several storm events under post-development conditions compared to pre-development conditions. Best management practices would be implemented to minimize and control erosion.

The WisDOT Pond B footprint would be reduced to accommodate the proposed landfill and landfill support infrastructure. Preliminary storm water modeling has been performed to support that the pond footprint can be reduced as shown and still meet applicable storm water performance standards.

Groundwater

The proposed landfill includes a composite 4-foot-thick low-hydraulic conductivity clay layer with a geomembrane liner, a leachate collection and removal system, a gas collection system, and an underdrain system below the clay liner that would maintain the water table below the bottom of the liner. Collected groundwater would flow via gravity to a manhole outside the limits of waste near the northwest corner of the proposed landfill. The proposed landfill would also include a composite final cover system, which limits the amount of water that infiltrates the landfill, thereby reducing the amount of leachate it generates. Groundwater would be protected by the proposed engineering features.

Landfill Infrastructure

New buildings, scales, roads and other support structures would be constructed to support landfill operations. The buildings and scales are planned to be constructed along the north end of the site. The current estimated size of facilities and mileage of road to be constructed is as follows:

- Education and administration building: 24,000 square feet
- Maintenance building: 21,000 square feet
- Roads: 2.37 miles (excluding temporary roads internal to the proposed landfill)

New perimeter access roads would be constructed as phases of the landfill are developed. A perimeter fence is anticipated to be installed to limit access, as necessary. In addition, a litter fence would be installed along the landfill perimeter to help control windblown litter.

It is anticipated that a new landfill gas treatment system for RNG or other beneficial use of the landfill gas would be constructed on the proposed landfill property. Landfill gas may also be combusted in a flare at times when beneficial use options are not available. Landfill gas processing equipment is planned to be constructed south of the proposed landfill

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 during landfill construction events and typical landfill operations. Vehicle exhaust would be kept to a minimum by maintaining vehicles in good operating condition. The proposed landfill's initial traffic volume would likely be similar to what is experienced at the existing Rodefeld Landfill; however, annual waste acceptance volumes are projected to increase over time. During post-closure, engine exhaust would be minimal and would 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 would be controlled with the application of water or commercial dust suppressants to access roads as needed during dry weather conditions and stabilizing disturbed areas as soon as practicable. Dane County has developed a Dust Control Plan for the existing Rodefeld Landfill. A similar plan would be prepared for the proposed landfill as part of the plan of operation. During post-closure, dust would be significantly reduced since all areas would be capped and vegetated; dust would likely come from access roads when vehicles are used for routine maintenance and monitoring activities.

Noise – Noise would be generated from waste hauling trucks and landfill equipment during typical operations. During landfill construction events, noise impacts would occur from earth moving equipment. Noise impacts would occur during operating hours. Operating hours are determined in the local agreements with the host communities. Noise would be significantly reduced post-closure due to elimination of MSW haulers accessing the site and a significant reduction in outdoor heavy equipment operations.

Upon construction and operation of an anticipated new landfill gas treatment or control system at the proposed landfill, Dane County expects only nominal increases in the volume of noise from the gas treatment or control system. If a treatment system is developed on-site, processing of gas would take place within enclosed equipment and/or buildings.

Leachate – The proposed landfill would generate leachate that would be managed by a leachate collection system. Leachate would flow into the highly permeable drainage blanket to leachate collection pipes that route the leachate to sumps at the lowest base elevation of each phase. From these sumps, the leachate would either be pumped via an existing forcemain into an existing MMSD sanitary sewer system, or potentially recirculated back into the waste mass within the landfill if Dane County decides to pursue approval of leachate recirculation

as part of the plan of operation. The characteristics of the leachate would be expected to be similar to the leachate that is currently collected at the existing Rodefeld Landfill. During post-closure, no additional water would be added to the waste mass, reducing the volume of leachate generated.

Landfill Gas – Landfill gas from the decomposition of organic waste would be generated during operation of the proposed landfill. The chemical composition of the landfill gas would be expected to be similar to what is generated at the existing Rodefeld Landfill. The proposed landfill includes a composite liner system and composite final cover system with an active gas extraction system. Horizontal migration of landfill gas is not expected to occur due to the presence of the composite liner system and active gas extraction system. Gas monitoring probes would be installed around the landfill perimeter and would be monitored for gas migration. Dane County would also submit an air pollution control construction permit and operation permit application to the department's Air Program. Construction of the proposed landfill would not proceed until Dane County has obtained the air permit(s).

The proposed landfill's gas collection system would continue to operate post-closure as gas would continue to be generated within the landfill. Continued collection of landfill gas post-closure would also help reduce odors and potential emissions.

Odors - Municipal solid waste 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 non-methane organic compounds (NMOCs). Many of the compounds in landfill gas produce the landfill gas odor.

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 at the proposed landfill would be controlled through:

- minimizing the active area, including installing permanent cap over closed areas of the landfill, and installing temporary cover soils over as much of the uncapped landfill area as possible,
- placement of daily cover over the active area at the end of each day of operation,
- installing landfill gas wells sooner and potentially closer together than required to collect landfill gas as it is generated,
- operating the active gas extraction system,
- utilizing odor masking agents when appropriate, and
- utilizing an online odor reporting form.

An Odor Control Plan is currently in place for the existing Rodefeld Landfill. A similar plan would be included as part of the plan of operation for the proposed landfill. Post-closure, odors would significantly decrease since areas would be capped.

Surface Water Runoff – A sedimentation basin (or basins) would provide treatment for the collected storm water before discharging to existing storm sewers, swales, or downstream discharge locations. Post-closure, storm water runoff would be expected to increase with the final cover system in place over the entire proposed landfill. The storm water management features would be designed and adequately sized to manage runoff for the post-closure condition as part of the plan of operation.

Collected Groundwater – Groundwater collected from the underdrain would flow via gravity to a manhole outside the limits of waste near the northwest corner of the proposed landfill. From the manhole, groundwater would be discharged via gravity or pumped. Discharge from the underdrain system would be monitored in accordance with a WPDES General Permit that would be obtained prior to construction.

Existing Environment

Physical Environment - Topography

Topography within 1 mile of the proposed landfill is shown on Figure 1-1 of the feasibility report. The proposed landfill property is generally flat and gently rises to the southeast and southwest. The current ground surface ranges in elevation from approximately 875 ft-MSL in the northwestern portion of the property to approximately 930 ft-MSL in the far southern portions of the property. The existing topography is partially a result of ground surface modifications made during the development of the Yahara Hills Golf Course.

Physical Environment – Regional Geology

The proposed landfill area is located in an upland area of Ordovician-age bedrock (Sinnipee, Ancell, and Prairie du Chien Groups), which is overlain by Quaternary-age glacial deposits. The glacial deposits are associated with the most recent advance of the Green Bay Lobe of the Laurentide Ice Sheet. Sediments associated with the most recent ice advance into the area belong to the Holy Hill Formation (Syverson et. al., 2011). The deposits of the Holy Hill Formation cover most of southcentral Wisconsin including most of Dane County.

Physical Environment – Site-specific Geology

The geotechnical investigation at the proposed landfill site identified the major soil units as loess, till, and outwash. The unconsolidated sediments at the site overlie bedrock belonging to several major groups including the Sinnipee, Ancell, and Prairie du Chien Groups. The bedrock surface generally slopes down from southeast to northwest. The top of bedrock elevations range from a high of approximately 920 ft-MSL near the southeast corner of the proposed landfill footprint to a low of approximately 835 ft-MSL on the northwest corner of the proposed landfill footprint.

Physical Environment – Water Quality

Surface Water – The proposed landfill is located within the Yahara River and Lake Monona Watersheds. Two unnamed streams are the closest water features to the proposed landfill. One, located west of the proposed landfill property, flows to the north and northwest toward a floodplain which then drains towards Lake Waubesa via Upper Mud Lake. The other unnamed stream is located to the southeast of the proposed landfill and flows northeast before draining into Door Creek, eventually reaching Lake Kegonsa.

Hydrogeology – Groundwater at the proposed landfill site is monitored at two levels – the water table and the piezometer level or “A” wells. The depth to groundwater at the proposed landfill site, measured in water table wells in March through December 2023, was between approximately 0.3 and 51.2 feet bgs. Groundwater is generally higher in the spring and lower in the fall. Groundwater flow at the water table is predominantly to the north with a component of flow to the east. 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. Water supply wells in the vicinity of the landfill withdraw water from the bedrock units.

Groundwater Quality – Groundwater quality in the area of the proposed landfill has been documented through the background groundwater quality monitoring program. Background monitoring results for several parameters exceeded ch. NR 140, Wis. Adm. Code, PALs at one or more locations likely due to natural background conditions and/or land use. Tables 5-8, 5-9, 5-10, and 5-11 of the feasibility report, and Tables 14-1 and 14-2 of the feasibility report addendum no. 1, summarize groundwater quality sampling results.

Physical Environment – Air Quality

The department monitors ambient concentrations of several air pollutants throughout the state including ground-level ozone (O_3), particle pollution, sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and carbon monoxide (CO). These pollutants are called criteria pollutants and are regulated by the U.S. Environmental Protection Agency (EPA) as part of the Clean Air Act (CAA). Based on the 2023 Wisconsin Air Quality Trend Report and 2023 Air Quality Trends Report by County, the concentrations of most criteria pollutants have been decreasing in all regions of the state since monitoring began in the early 2000s, including in Dane County.

Physical Environment – Wetlands

Five wetlands and one pond (wetlands W-1 through W-5, and pond P-1) were identified on the northern 157 acres (former parcel no. 251/0710-254-0099-7) of the proposed landfill property. While the proposed landfill would impact pond P-1, a portion of wetland W-1, wetland W-4, and wetland W-5, they are not subject to permitting requirements as they are non-jurisdictional and artificial in nature. Wetlands W-2 and W-3 would not be impacted by the proposed landfill.

Physical Environment – Soil Borrow Sources

General fill would be obtained from material stockpiled on-site from excavation performed to establish the proposed landfill's subbase grades. Granular materials would be obtained from off-site quarries. Topsoil would be obtained from either off-site sources or from the excavated areas during landfill and/or ancillary infrastructure construction. Clay materials for construction of the landfill liner or final cover would be obtained from off-site clay borrow areas. Soil removed within the landfill footprint may qualify as clay or soil barrier layer, subject to additional investigation. Barrier soil for the GCL final cover alternative would be obtained from either on-site or off-site sources.

Biological Environment

The proposed landfill would be located in an area currently used as a golf course. Wildlife use of the area is mostly for transient activities such as traveling, feeding, and resting. The dominant animal species known to exist in the surrounding area include songbirds (e.g., sparrows, goldfinch, chickadees, etc.), raptors (e.g., red-tailed hawk, etc.), turkeys, small mammals (e.g., mice, vole, rabbits, etc.), and medium-sized mammals (e.g., coyotes, raccoons, etc.). Invasive and native aquatic plants occur in waterbodies near the proposed landfill.

The most recent Fisheries Management Program survey in the proposed landfill's vicinity was of Door Creek on September 22, 2008, at the confluence with the unnamed tributary that runs to the southeast of the proposed landfill. Multiple species were observed, including, but not limited to northern pike, pumpkinseed, bluegill, largemouth bass, common carp, yellow bullhead, and bluntnose minnow.

Tree species in the area of the proposed landfill consist of white pine, white spruce, red pine, cottonwood, paper birch, bur oak, and maple. The open-grown white pine and bur oak provide scenic aesthetic value and nesting habitat.

No endangered resources were identified in the project area based on the National Heritage Inventory.

Land Use

The land in the proposed landfill footprint is part of a municipal golf course. Figure 4-3 of the feasibility report shows current general land use type within 1 mile of the proposed landfill. The majority of land surrounding the proposed landfill property includes scattered rural residences, agriculture, woodlands, and open land located to the east and south; recreation, commercial, woodlands, agriculture, open land, water and vacant subdivided land to the west; a developing and expanding small tract residential subdivision located to the southwest; and industrial, commercial, open land, agriculture, some residential, institutional/governmental, and the existing Rodefeld Landfill located to the north.

Social and Economic Conditions

The Yahara Hills Golf Course, immediately to the west of proposed landfill property, and an adjacent property to the south of the are both zoned as parks and recreation. Both properties are owned by the City of Madison.

Ho-Chunk Gaming Madison is located west of the proposed landfill property. Neighborhoods within a mile of the proposed landfill consist of a diverse group of people typical of urban neighborhoods in the area. Dane County is not aware of any other specific ethnic or cultural groups in the area.

Businesses to the west of the proposed landfill property include a hotel, casino, gas station, restaurant, and motorcycle dealership. A 66-foot-wide easement has been provided at the southern end of the property for a future access road for these businesses.

Other Special Resources

The results of an archaeological survey of the proposed landfill property conducted in April and May 2022 found no previously reported archaeological sites within the study area.

According to the Natural Resources Conservation Service (NRCS) Soils Maps included in Attachment N of the feasibility report addendum no. 1, portions of the proposed landfill footprint are mapped as prime farmland. Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. The proposed landfill site, however, has been operated as a golf course since the 1960's.

Environmental Consequences

Physical Impacts

The topography and drainage in the immediate vicinity of the proposed landfill have been previously altered by golf course development activities. The topography would be further altered to construct the landfill, and

ultimately increase the height as waste filling and final closure activities progress. The proposed landfill would occupy approximately 76.6 acres. The final cover would extend to a maximum elevation of approximately 1,136 ft-MSL, which is approximately 205-260 feet higher than existing grades in the proposed landfill footprint.

Construction and operation of the proposed landfill is not expected to impact surface water. Water that contacts waste would be contained by the composite liner system and associated perimeter berms placed around active fill areas and treated as leachate. Collected leachate would be discharged into an MMSD sanitary sewer system or potentially recirculated back into the waste mass.

As part of closure, a final cover system 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 intermediate or final cover areas would be routed via diversion berms, downslope flumes, and perimeter ditches to a sedimentation basin. The sedimentation basin would limit the release of sediment to adjacent properties and surface waters. The storm water management system would be designed to provide an approximate balance or reduction in peak discharge rates for several storm events under post-development conditions compared to pre-development conditions.

The WisDOT Pond B footprint near the northeast corner of the proposed landfill would be reduced to accommodate the proposed landfill and support infrastructure.

Impacts on groundwater would not be expected as a result of the proposed landfill. To protect groundwater, the proposed landfill's design includes:

- 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
- an underdrain system that would maintain the water table below the bottom of the liner.

Routine groundwater monitoring would be performed around the proposed landfill during operation and after closure for a minimum of 40 years.

No significant impacts to air resources would be expected to occur due to the construction and operation of the proposed landfill. Dane County would need to comply with all conditions in its air pollution control construction permit during construction and initial operation. During operation of the proposed landfill, particulate matter, fugitive dust, hazardous air pollutant emissions, SO_2, CO, CO_2, methane, nitrogen oxides, and VOC emissions would be anticipated. The pollutants are generated through the decomposition of organic refuse and the volatilization of organic compounds in the absence of oxygen and by operations equipment on site. Dane County would need to comply with all conditions in its air pollution control operation permit during operation of the landfill. Air quality would be monitored to comply with Federal Title V (Clean Air Act) regulations.

The proposed landfill design includes a composite liner and cover system with an active gas extraction system. These controls would help prevent surface and subsurface gas migration. Gas monitoring probes would be installed around the proposed landfill to monitor gas migration throughout operation and after closure for a minimum of 40 years.

Odors would be controlled through minimizing the active area for waste placement, placement of daily cover at the end of each operating day, and operation of the active gas extraction system. An odor control plan, similar

to the odor control plan in place at the existing Rodefeld Landfill (Attachment K of the feasibility report addendum no. 1), would be included as part of the plan of operation.

Vectors (birds, insects, and other unwanted pests) may occur at the proposed landfill. Dane County would take measures to reduce vector impacts, including keeping landfill operations confined to as small an area as possible, filling from the low point on the base of each phase (reducing ponding), and placement of daily cover over waste at the end of each operating day.

Windblown litter would be controlled by proper landfill operational procedures including compaction and placement of daily cover, and the use of perimeter fencing and portable litter fencing. Paper and other windblown debris would be collected on an as-needed basis. A litter control plan, similar to the litter control plan in place at the existing Rodefeld Landfill (Attachment L of the feasibility report addendum no. 1) would be included as part of the plan of operation.

Dust would be controlled with the application of water or commercial dust suppressants to access roads as needed during dry weather conditions. A dust control plan, similar to the dust control plan in place at the existing Rodefeld Landfill (Attachment M to the feasibility report addendum no. 1) would be included as part of the plan of operation.

Biological Impacts

The proposed landfill would be located on land that has been used as a golf course; therefore, most of the native flora and fauna has already been displaced. Some local plant and animal populations would be disturbed by construction of the proposed landfill; however, after closure of the landfill, there may be more habitat at this site than there is currently as a golf course, as native vegetation has been approved and used at the existing Rodefeld Landfill and is proposed as an option for final cover at the proposed landfill.

Land Use Impacts

The proposed landfill footprint is part of a municipal 36-hole golf course, thus there would be recreation impacts if the proposed landfill is constructed. As part of the property purchase, Dane County and the City of Madison have mutually agreed to maintain recreation on the purchased property and at the City's remaining parcels to the west with 27 holes until the end of the 2025 golf season, and 18 holes until at least 2042. The levels of noise, odor, dust, and windblown debris in the immediate surrounding area of the proposed landfill would be greater than current impacts from the golf course.

The proposed landfill would not require displacement of residents or condemnations. Traffic patterns would shift from hauling to the existing Rodefeld Landfill along the north side of USH 12 & 18 to accessing the proposed landfill on the south side of USH 12 & 18. Initial traffic volume would likely be similar to what is experienced at the existing Rodefeld Landfill; however, annual waste acceptance volumes are projected to increase over time.

Social and Economic Impacts

Significant adverse socioeconomic impacts are not expected from the proposed landfill. The proposed landfill would provide cost effective and future waste disposal needs for residents and businesses. The proposed landfill operations would provide direct employment to a limited number of local residents, and indirect employment

opportunities through waste haulers, waste collection companies, construction trades, and professional services. Similar to the existing Rodefeld Landfill, the proposed landfill would operate as an enterprise fund, which means all its operations would be funded by the fees charged for services and not by taxpayer dollars.

There may be impacts to adjacent neighbors from construction and operation of the proposed landfill compared to the current impacts from the golf course. There would be an increase in truck traffic to the proposed landfill property. There may be equipment and truck noise, dust, and odors during construction and operation of the facility, as well as windblown debris. Operational activity would occur during normal business hours, not during evening hours. Dane County would implement control measures outlined in dust, odor, and litter control plans.

Visual impacts would be expected with the proposed landfill. Visual impacts would be most pronounced for adjacent neighbors. Once the proposed landfill is closed and covered with final cover, impacts to visual aesthetics would be reduced.

As part of the Local Negotiated Agreement (LNA), the proposed landfill would provide host and community fees to the adjacent municipalities. Dane County has also agreed to provide property value guarantees to nearby individual residents and address community concerns regarding traffic patterns and screening for the proposed landfill.

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

Special Resources

The results of an archaeological survey of the proposed landfill property conducted in April and May 2022 found no previously reported archaeological sites within the study area. The survey determined that the Yahara Hills Golf Course and Clubhouse were eligible for the National Register of Historic Places. Dane County produced and submitted the Determination of Eligibility on October 6, 2022.

Soils classified as prime agricultural land are located within the proposed landfill footprint. The proposed landfill site has operated as a golf course since the 1960's and has undergone significant earth moving activities as part of golf course construction. Construction and operation of the proposed landfill would not result in loss of land currently used for agriculture.

No other special resources, including state or local natural areas, would be impacted by the proposed landfill.

Probable Adverse Impacts that Cannot be Avoided

If a favorable feasibility determination is issued, certain environmental impacts from the proposed landfill may not be completely avoided. Dane 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 proposed landfill. The waste types accepted and the landfill operations at the proposed landfill would be similar to the current operations at the existing Rodefeld Landfill. Waste acceptance quantities would be expected to increase over time, so traffic is anticipated to 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, perimeter fencing, and the use of portable litter fencing when needed. Dane County would operate the proposed landfill in accordance with the LNA established with the affected municipalities. This LNA process would include establishment of a multi-level system to handle complaints involving potential odors, litter, or mud tracking on the public roadways from the proposed landfill.

- The appearance and topography of the site would be altered during operation of the landfill and after the landfill is closed.

- A waste mass would remain at the location which would have to be cared for in perpetuity to ensure that it does not cause environmental pollution. Potential environmental impacts from the waste may be prevented and minimized with proper construction of the liner, final cover, leachate extraction, and gas extraction systems and with ongoing proper maintenance of those systems as well as landfill gas and groundwater quality monitoring.

- After the landfill is closed, there would be site use limitations. Deed restrictions would be used as institutional controls to prevent future agricultural use, building construction, and excavation of waste or final cover.

Evaluation of Project Significance

Dane County is requesting an exemption from the 10-foot separation requirement to the seasonal high groundwater table. The significance of a less than 10-foot separation to the seasonal high groundwater table is that the 10-foot separation provides for some attenuation of contaminants, if leaked out of the landfill, reducing contaminant concentrations that may reach the groundwater. In addition, infiltration of groundwater into the clay component of the liner may reduce the absorption capacity of the clay soil as it becomes saturated. This limits the clay soil's ability to absorb and attenuate leachate from the waste should it leak from the landfill.

To mitigate the risk of groundwater contacting the clay liner, Dane County would utilize an underdrain system to maintain the water table below the bottom of the liner. In addition, the collected groundwater would be periodically sampled, providing an early detection of any potential groundwater contamination. The underdrain layer not only moves groundwater away from the bottom of the clay component of the liner, but it also provides a flow path for any contaminants, if leaked out of the landfill, to take instead of migrating into the lower groundwater. If this were to happen, the discharge from the underdrain system may need to be treated.

Dane County is also requesting an exemption from the 10-foot separation to bedrock. The significance of a less than 10-foot separation to bedrock is that bedrock surfaces can be highly variable, and issues may arise if knobs or spires of competent rock missed by the geotechnical investigation are encountered during landfill construction, which in certain circumstances may result in major design changes. To mitigate this risk, Dane County exceeded the minimum requirement for borings and excavations to characterize the subsurface and concluded that subbase grades can be adjusted such that removal of competent bedrock would not be necessary to construct the proposed landfill.

The less than 10-foot separation from bedrock may also be a more significant factor for bedrock types that display preferential flow patterns, such as through pervasive discrete fractures or solution channels, than for bedrock types that display a porous media flow, such as sandstone. Fractured bedrock displaying preferential flow potentially complicates the effective monitoring of groundwater.

The bedrock system at the proposed landfill site is not displaying preferential flow patterns. Consistently low RQDs and dense fracture frequencies are common in the bedrock at the proposed landfill site, such that the properties of the bedrock more closely approximate those of a heterogeneous porous media than those of a discretely fractured media. The distribution of hydraulic conductivities, horizontal and vertical gradients of groundwater flow, and consistency of groundwater quality data also suggest that the dense fracture network is connected such that the bedrock units can be monitored under a porous media approach, rather than targeting specific fractures or discretely fractured zones. Additionally, the groundwater levels and groundwater elevation contours depicted on the feasibility report plan sheets do not appear characteristic of preferential flow. Groundwater elevation contours depicting preferential flow patterns tend to depict dramatic and sporadic changes in groundwater elevation over short distances. No zones of voids, open voids, pervasive discrete fractures, large dissolution features, or other features that may preferentially control groundwater flow across the proposed landfill area were observed during geotechnical investigation.

The department has the authority to grant exemptions to the minimum code requirements when the applicant has demonstrated that the requested exemptions would be warranted. In determining this, the department considers the circumstances provided by the applicant explaining why the applicant cannot achieve the minimum code requirement and how the applicant's proposal is a special case. The department also considers whether granting the exemptions would result in the proposal not complying with the performance standards of s. NR 504.04(4), Wis. Adm. Code.

While each decision is made on a case-by-case basis, the department has previously granted exemptions to the 10-foot separation to groundwater requirement for facilities that utilized a groundwater gradient control or underdrain system under the liner to effectively route groundwater away from the bottom of the liner. The department has also previously granted exemptions to the 10-foot separation to bedrock for facilities that demonstrated, through additional investigation or other means, that a proposed landfill could be constructed given a less than 10-foot separation to bedrock. Therefore, these exemptions would not establish precedent.

Alternatives to Landfilling

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

The existing Rodefeld Landfill is anticipated to reach capacity in approximately 2028. If the proposed landfill is not constructed, approximately 447,700 – 951,300 tons of waste per year between 2028-2040 would have to be disposed of at an alternative location or other landfills. Given the need for landfill capacity for municipal solid waste in the service area, the impacts of the proposed landfill would be moved if waste was taken to an alternate location, not eliminated entirely.

Dane County notes that the benefits of locating the proposed landfill close to the existing Rodefeld Landfill include proximity to existing waste drop-off locations at the existing landfill, proximity to existing utilities that

could serve the proposed landfill, and a location that is accessible and central to Dane County residents and business that would be served by the proposed landfill.

Per s. 289.29(1)(d), Wis. Stats., the department may not approve a feasibility report for a landfill unless the design capacity of that landfill exceeds the expected waste to be disposed of at that landfill within 10 years after it begins operation. The proposed landfill would have approximately 12.5 years of site life from the time it would be anticipated to first accept waste in 2028. Thus, further reducing or modifying the proposed landfill may not be feasible.

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. Dane County is also pursuing development of a sustainable business park north of the proposed landfill. The purpose of the sustainable business park is to divert waste and create local circular economies. This would be accomplished by attracting reuse, repair, and recycling businesses; new waste management technologies; and research.

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 for landfilling.

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 landfill, the feasibility report compared the waste disposal capacity available to the service area (Dane County) to the amount of waste disposal capacity consumed each year (accounting for projected population growth) within the service area to estimate how many years of waste disposal capacity would be available as of 2024 without the proposed landfill. The year 2024 was used because it was the estimated time when a feasibility determination would be made. Based on this comparison, the feasibility report estimates the waste disposal capacity available to the service area would be completely exhausted early in 2030 without the proposed landfill. Therefore, there is approximately six years of waste disposal capacity available to the service area and the feasibility report concludes that the proposed landfill is needed. If a feasibility determination were to be issued in 2025, then there would be approximately five years of waste disposal capacity available to the service area.

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 contained in the feasibility report is approximately 12.5 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.

Public Participation

On May 15, 2025, the department determined that Dane County's feasibility report is complete. A public notice to that effect will be published in the Wisconsin State Journal and the Leader Independent and posted on the department's website on or around May 21, 2025. A 30-day public comment period begins once the department posts the public notice on its website. This comment period affords the public the opportunity to request an informational or contested case hearing in the matter of this proposal. Upon the completion of any hearing or within 90 days of the issuance of this completeness determination, the department will then issue a feasibility determination and a final decision on the need for an environmental impact statement (EIS).

If a favorable feasibility determination is made, then Dane County may submit a plan of operation report containing the proposed engineering details, specifications, environmental monitoring, and operational procedures for the project. Upon the department's approval of a plan of operation report, construction of the facility may commence. Site construction documentation and department inspections would occur throughout various phases of construction. A license to operate the facility as a municipal solid waste landfill would be issued following the department's approval of the site construction documentation report and proof of financial assurance. Dane County would also be required to obtain all other applicable federal, state, and local permits or approvals for construction and operation of the landfill.

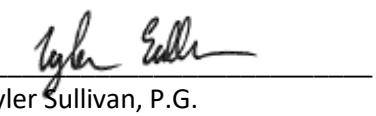
Wisconsin Environmental Policy Act (WEPA) Compliance

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 landfill 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 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 or contested case hearing on the proposed project during the 30-day public comment period.

Signed:

Evaluators:



Tyler Sullivan, P.G.
Hydrogeologist
South Central Region

Colin Maus, P.E.
Waste Management Engineer
South Central Region

Bridget Kelly
Waste & Materials Management Program Supervisor
South Central Region