PROJECT SUMMARY
FOR THE FEASIBILITY DETERMINATION OF THE PROPOSED
ORCHARD RIDGE RECYCLING AND DISPOSAL FACILITY (RDF) - EASTERN EXPANSION, SOUTHERN UNIT

Facility Identification Number (FID#): 268262940

Proposed Facility Name: Orchard Ridge RDF– Eastern Expansion, Southern Unit

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Site Location and Area

The WMWI-Orchard Ridge RDF – Eastern Expansion, Southern Unit (Southern Unit) is proposed to be constructed as a contiguous expansion (horizontal and vertical) to the existing Orchard Ridge RDF – East Expansion (Eastern Expansion) (License #4491). WMWI changed the name from East Expansion to Eastern Expansion. As part of its construction, the proposed Southern Unit would involve exhumation of the Boundary Road Landfill (BRL) (License # 0011), that is located in a majority of the proposed expansion footprint. The proposed expansion is located in the South ½ of the Northeast ¼ and Southeast ¼ of Section 1, Township 8 North, Range 20 East, in the Village of Menomonee Falls, Waukesha County, Wisconsin. Figure 1 shows the property location. The proposed expansion would be located within a 725-acre parcel owned by Waste Management of Wisconsin, Inc. (WMWI) that is located in the northeast corner of Waukesha County and the southeast corner of Washington County. The WMWI property is bound by Boundary Road (124th St.) to the east, Main Street (State Highway 100) to the south, Highway 145 to the west, and extends north across County Line Road to include the Omega Hills Landfill.

The waste disposal area of the expansion is proposed to occupy 76.6 acres (including approximately 17.0 acres of vertical expansion over the Eastern Expansion). Including all engineering features (e.g., berms, sedimentation basins) and ancillary infrastructure, the entire proposed Southern Unit development would cover an area of 114.3 acres. Access to the facility would continue to be from Boundary Road initially along an existing access road northeast of the Eastern Expansion. A gate and fence currently control access to all facilities on the property.

Present Land Use

The majority of the proposed landfill is currently occupied by the closed, unlined BRL (Lic. #0011). The northern area of the proposed horizontal component of the expansion would include a 150-foot-wide strip of landfill between the BRL and the Eastern Expansion landfill and also a small triangular area in the northwest corner of the proposed expansion designated the Triangle Area that contains a regulated wetland designated W-6 (discussed in later section). The southwest corner of the proposed expansion would include approximately 4 acres of the existing BRL Pond (stormwater basin 3). A portion of the proposed Southern Unit overlaps with the Eastern Expansion landfill to comprise the vertical overlay portion of the expansion. The proposed expansion would be contiguous with the active Eastern Expansion landfill (Lic. #4491) located to the north of the expansion footprint and adjacent to the active Orchard Ridge RDF (Lic. #3360), located to the west. The closed Parkview Landfill (Lic. #3108) borders the north side of the Eastern Expansion landfill, and the closed Omega Hills Landfill (Lic. #1678) is located to the north, across County Line Road. All of these landfills are owned by WMWI.

The original Orchard Ridge RDF and Eastern Expansion landfills are active, state-of-the-art landfills with composite liners, and active leachate and gas collection systems. The Eastern Expansion is the newest landfill on the WMWI property, was approved to accept waste on October 17, 2019, and is accepting all incoming waste for disposal. As phases of these landfills are filled to their approved final waste grades, they will be closed in accordance with an approved phasing plan with composite final cover systems. The adjacent Orchard Ridge RDF covers 162 acres with final cover placed over approximately half the landfill. This landfill is currently accepting only petroleum contaminated soils (biosoils) for processing and would be used for disposal of some of the waste exhumed from BRL. Phased closure of the remaining open area of the Orchard Ridge RDF will be performed every year for the next six years.

The closed 58-acre BRL includes a clay cap over a majority of the waste, a shallow bentonite cut-off wall with groundwater extraction, leachate extraction wells, and an active gas extraction system. A portion of the BRL is covered by an asphalt parking area. The BRL has been a federally designated Superfund site since 1984.

The closed Parkview Landfill contains a triple liner system consisting of a 5-foot-thick primary clay liner with a leachate collection system, a 3-foot-thick clay secondary liner and collection system, and a 2-foot-thick clay gradient control liner and groundwater collection system, along with an active gas extraction system and a clay cap.

The closed Omega Hills Landfill contains a clay cap, a bentonite cut-off wall, an active gas extraction system, and several groundwater extraction systems. The Omega Hills Landfill accepted hazardous waste after the federal cut-off date of July 26, 1983; therefore, it is regulated as both a solid waste and a hazardous waste landfill.

The Veolia Technical Solutions Hazardous Waste Treatment, Storage, and Disposal (TSD) Facility is located immediately northeast of the Eastern Expansion landfill. The former Sanders Salvage Yard had been partially incorporated into the footprint for the Eastern Expansion. Several single-family residences along with properties zoned for light- and heavy-industrial use are located further to the east across Boundary Road.

Proposed Capacity and Site Life

The Southern Unit has a proposed design capacity of 10,571,145 cubic yards (cy) and an approximate operational life of 7.7 years. The approved capacity of the active Eastern Expansion is 5,422,855 cy; therefore, their combined capacity would be a maximum of 15,994,000 cy and result in a site life of 13.5-years given that the Eastern Expansion began accepting waste in 2019. The actual footprint (acreage) and

waste capacity for the Southern Unit may be less because conditions of the feasibility determination require modifications to the design. The interim waste grades would be higher in elevation, and the associated waste volume would be larger, since up to a 5% waste thickness overfill is proposed to allow for waste settlement.

The proposed Southern Unit would accept an estimated 750,000 tons/year of waste. This estimate translates to the Southern Unit receiving approximately 37% of the projected waste disposal volume for 2021 in the four-county service area of Milwaukee, Waukesha, Ozaukee, and Washington counties. In addition, the Southern Unit would accept the majority of an estimated 1,300,000 cy of BRL waste and up to 298,000 cy of impacted soil removed from below the waste. The proposed Southern Unit is projected to close in 2032.

Proposed Waste Types and Leachate Characteristics

The currently operating Eastern Expansion landfill accepts municipal, commercial, and non-hazardous industrial solid waste. The proposed Southern Unit would receive the same waste stream as the existing landfills that currently operate on the WMWI property. This landfill and the adjacent Orchard Ridge RDF would also accept waste and contaminated soil from the exhumation of BRL. Hazardous waste would not be accepted, except for small amounts of household hazardous waste which is exempt from hazardous waste landfill disposal regulations.

The chemical characteristics of the leachate produced within the site would be expected to be similar to the existing Orchard Ridge RDF. A recent leachate sample collected in September 2019 contained detectable levels of benzene, chloride, chlorobenzene, chloroethane, iron, lead, manganese, naphthalene, various forms of nitrogen, potassium, sodium, sulfate and xylenes. The concentrations of these substances in the leachate are typically detected in leachate from this facility in the part per billion range. All the leachate from the expansion would be collected, combined with leachate from the exiting landfills and sent to Milwaukee Metropolitan Sewerage District (MMSD) for treatment.

The closed BRL contains an estimated 1,300,000 cy of waste. The waste material has been described as mostly municipal solid waste containing lesser amounts of industrial waste and demolition debris. WMWI reportedly submitted a Superfund notification form to U.S. EPA in 1981 indicating that the BRL accepted 10 million gallons of hazardous (and liquid) waste; and although general waste types/sources were listed on the form, no specific waste codes were provided. The BRL operated between roughly the mid-1950s and the early 1970s. This period pre-dates the Resource Conservation and Recovery Act (RCRA) as well as the majority of modern waste regulations. A waste investigation performed in 2019 identified a small number of waste samples exhibiting the characteristics of hazardous waste for lead and benzene. Any excavated waste from BRL that is identified as being a hazardous waste would have to be handled and disposed in accordance with Wisconsin's hazardous waste regulations. The plan of operation would need to include a plan that would identify any listed hazardous waste for proper management and disposal. Based on the available soil and groundwater data, the extent of significantly impacted soil below the BRL appears sporadic, limited to isolated locations or localized areas, and not extensive across the site. The available soil data are limited because of the logistical constraints and environmental risks of obtaining samples underneath existing BRL.

Primary Service Area

The service area identified in the feasibility report would include Waukesha, Ozaukee, Washington and Milwaukee Counties. Most of the waste that is received from Milwaukee County comes from sources located north of Interstate Highway 94.

Other Approval Requirements

- Plan of Operation Approval, Proof of Owner Financial Responsibility and License: Once the department has determined the proposed expansion is feasible, WMWI must submit a Plan of Operation Report to the department for review. If the department approves the Plan of Operation Report, then WMWI may begin construction of the landfill. Department inspectors would be on site to observe and inspect important aspects of the construction work. Documentation of the landfill construction must be submitted to and approved by the department. At that time, WMWI may submit an application for a Solid Waste Disposal License and proof of owner financial responsibility for landfill closure and long-term care. WMWI must provide proof of owner financial responsibility for long-term care as specified in ch. NR 520, Wis. Adm. Code for at least 40 years after site closure. Even though the code requires owner financial assurance for only 40 years after closure, WMWI will be responsible for the long-term care and for any detrimental environmental impacts if caused by the landfill, in perpetuity.

- Construction Documentation Approval: Before waste placement may begin and for each new area of liner and final cover construction, WMWI would need to arrange for department staff to inspect the constructed features of the landfill and must obtain construction documentation approval from the department under ch. NR 516, Wis. Adm. Code.

- WMWI's BRL Property Redevelopment Plan Approval: Prior to commencing exhumation of the existing BRL waste, WMWI must prepare a site-specific plan to unearth, manage, and dispose of the waste and surrounding soils. Management of these materials must include disposal and may include beneficial reuse of soil on the WMWI property, as well as on-site treatment prior to reuse. Sampling procedures to characterize the materials along with health-and-safety protocols must be developed as part of the plan. The plan must describe air monitoring, including for particulate matter emissions, fugitive dust, odor, and the potential release of hazardous air pollutant (HAP)/volatile organic compound (VOC) emissions from ruptured containers or other sources. A draft plan was submitted to the department on May 16, 2021, and various programs within the department provided preliminary comments on the plan to WMWI in an email on July 6, 2021.

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Remedy Decision(s): The BRL is on the National Priorities List (NPL) of CERCLA. This means the BRL is listed as a Superfund site by the federal government. This Superfund site is also referred to as "Lauer 1 Sanitary Landfill"). Institutional controls were required by the 1996 Record of Decision (ROD). These exist in the form of a deed restriction placed on the property in 2007 that restricts certain actions on the site without the prior approval of the department. WMWI must review the existing deed restriction, and request department approval prior to taking any actions that are prohibited in the deed restriction, such as impacts to the landfill cap. The department's Remediation and Redevelopment (RR) Program anticipates the decision document required to allow the new management approach described in this project summary and associated documents to proceed would be an Explanation of Significant Differences (ESD). The ESD process can be carried out concurrently with the design and construction of the landfill expansion.

Required Permits

- Wisconsin Wetland Individual Permit: It is estimated that between 3.41 and 3.72 acres of wetlands would be permanently impacted from the proposed expansion. Before any wetland excavation or filling could occur, WMWI must obtain a wetland individual permit under s. 281.36, Wis. Stats. WMWI has submitted an application to the department's Wetland and Waterways Management Program for a wetland individual permit. Discussion of the wetland areas in the project area are

provided in subsequent feasibility report addenda and reports submitted for the wetland permit application.

- U.S. Army Corps of Engineers Wetland and Stream Realignment Permit: Discharge of fill or dredged material into waters of the U.S. and the proposed stream realignment require federal approval by the U.S. Army Corps of Engineers (U.S. ACE). Approximately 3.24 acres of wetland under federal jurisdiction would be directly impacted. Before any wetland excavation or filling could occur, WMWI must obtain a wetland impact permit from the U.S. ACE under Sections 401 and 404 of the federal Clean Water Act. WMWI has submitted an application for this permit.

- Storm Water Discharge Permit: In accordance with s. NR 216.21 (2) (b) 7, Wis. Adm. Code within Subchapter II-Industrial Storm Water Discharge Permits, WMWI must maintain a Tier 2 industrial general storm water discharge permit during construction and operation of the landfill and for ancillary construction activities such as soil berm, support facilities and road construction. The final erosion and sediment control plan for this project would need to be submitted for review by the department's storm water staff in the Watershed Management Program prior to implementation.

- Wastewater Discharge Permit: Discharge to the Milwaukee Metropolitan Sewerage District (MMSD) is currently permitted (Permit No. 5514.09).

- Air Pollution Control Permits: Before beginning construction on the expansion, WMWI must obtain an Air Pollution Control Construction Permit from the department, in accordance with s. 285.60(1) (a), Wis. Stats., unless WMWI can demonstrate that they are exempt under ch. NR 406, Wis. Adm. Code. On February 2, 2021, the department's Air Management Program issued an Air Pollution Control Construction Permit (permit #20-BAP-148), authorizing construction of an expansion to an existing municipal solid waste landfill, and on February 11, 2021, the department's Air Management Program issued a revised Air Pollution Operation Control Part 70 Operational Permit (permit #26705866A-P31). The facility must control its air emissions in accordance with applicable state and federal regulations.

  Federal New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) for Municipal Solid Waste Landfills are included in the construction and operation permits as applicable. State hazardous air pollution regulations in ch. NR 445, Wis. Adm. Code, may apply to emissions from equipment not covered under the NESHAP.

Administrative Code Exemptions Requested

The feasibility determination grants exemptions requested for the following locational and groundwater quality requirements in Wisconsin Administrative Code:

Locational Criteria:

- Section NR 504.04 (3) (b), Wis. Adm. Code, which requires the limits of waste to be located a minimum of 300 feet from any navigable river or stream. The proposed limits of waste are within 300 feet of a navigable stream located in the southwest corner of the project area. This stream will require relocation for the proposed expansion under a Chapter 30, Wis. Stats. permit. WMWI has submitted an application for a stream relocation permit and this exemption is contingent on receiving a permit. If a permit is not issued, then the exemption will not apply and the landfill design must modified to maintain the 300-foot setback.

- Section NR 504.04 (3) (f), Wis. Adm. Code, which requires the limits of waste to be located a minimum of 1,200 feet from any public or private water supply well. The proposed limits of waste are within 1,200 feet of six private water supply wells. These wells have been identified as PWE07, PWE08, PWE09, PWE11, PWE12, and PWE13. All of the private supply wells are located across Boundary Road to the east or northeast of the proposed expansion.

- Section NR 812.08 (4) (g) 1, Wis. Adm. Code, which requires a 1,200-foot setback for new water supply wells to the limits of waste of a landfill. The department's Drinking Water and Groundwater Program must have granted variances to the requirement of s. NR 812.08 (4) (g) 1, Wis. Adm. Code, under the provisions of s. NR 812.43 (1) (a), Wis. Adm. Code for all six of the private water supply wells in order for the wells to remain in compliance. The department previously granted variances for four of these wells (PWE09, PWE11, PWE12, and PWE13) as part of the Eastern Expansion siting process. WMWI submitted completed variance applications for wells PWE07 and PWE08 to the department on April 15, 2021.

- Section NR 504.06 (2) (b), Wis. Adm. Code, which requires at least a 10-foot separation between the bottom of the clay liner (subbase) and the seasonal high groundwater table except for zone-of-saturation landfills. The minimum standards for a zone-of-saturation landfill are specified in s. NR 504.06 (4), Wis. Adm. Code. These include the locational criterion that the landfill be located in a fine-grained soil environment, as defined in s. NR 500.03 (86), Wis. Adm. Code. The feasibility report indicates that the proposed landfill site meets the definition of a fine-grained soil environment; however, the exemption was requested following department comments related to the presence of coarse-grained and/or non-plastic soils, which would not meet the definition of a fine grained soil environment. Additional investigation was not practical due to the presence of the existing BRL.

Groundwater Quality Standards:

- Section NR 140.28 (1), Wis. Adm. Code, which states the department may not approve a proposed facility at a location where a PAL or 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. The feasibility determination grants NR 140 exemptions to confirmed standard exceedance for specific pairs of wells and substances. The exemptions apply only to the Eastern Expansion and Southern Unit. These exemptions do not apply to other facilities on or off the WMWI property including the existing BRL during or after waste excavation and relocation. WMWI is responsible for any NR 140 groundwater standard exceedances attributable to the BRL or other landfills it owns on the property. Many of the substances which are subject oare inorganic and are attributable to naturally occurring conditions in the aquifer. The primary substances of concern from the BRL are volatile organic compounds (VOCs). Well-specific standards called alternative concentration limits (ACLs) would be established for inorganic substances and wells that are granted an exemption. The ACLs would apply to the Eastern Expansion and Southern Unit.

Regional and Site-Specific Geology

The regional geology in most of the area is a complex sequence of unconsolidated glacial deposits estimated to range between 100 and 200 feet in thickness and overlying the regional dolomitic bedrock. The unconsolidated soils at the site were deposited by the Lake Michigan Lobe of the Laurentide Ice Sheet during the last glacial period. The upper soils at the site are considered part of the Oak Creek Formation, which may extend to 100 feet or more. This formation is largely comprised of unstratified glacial till, with variable

amounts of fine-grained lacustrine sediments (deposited in lakes) along with coarse-grained glaciofluvial deposits typical of pro-glacial and ice-marginal streams. The overall composition of the Oak Creek Formation is estimated to range between approximately 80 and 90% silt and clay, although it also contains concentrated sand and gravel deposits that can be significant in extent. Beneath the Oak Creek Formation lies the Holy Hill Formation. The composition of the Holy Hill Formation is estimated to range from 35 to 75% sand. The upper bedrock across the area is the Niagara Dolomite, which is Silurian in age and up to approximately 360 feet in thickness. The depth of the Niagara Dolomite in the vicinity of the expansion site ranges from zero feet (where the bedrock reportedly outcrops to the northwest, near STH 145) to greater than 100 feet (east of the expansion site).

The proposed expansion is located east of a low-lying ridge interpreted to be an end moraine, trending roughly north-south. Some of these water-lain deposits have significant sand and gravel compositions. Based on a review of the AGIP soil exploration as well as prior subsurface investigation data, it appears the depth to bedrock in the proposed expansion is roughly 100 feet or greater. The uppermost bedrock in this area is the Niagara Dolomite. The proposed expansion is located on the east flank of a bedrock ridge trending northeast-southwest. Geologic cross-sections from the adjacent Eastern Expansion feasibility report and addendum indicate the bedrock surface has an elevation of approximately 670 feet above mean sea level (MSL) near the northwest corner of that facility, and approximately 650 feet MSL near its northeast corner. Consistent with the general topography in the Lake Michigan basin, the bedrock at the expansion site exhibits a southerly and easterly dip. Extrapolating this information to the expansion site and based on site-specific data, bedrock is roughly estimated to be 100 feet or greater below the proposed base grades at the Southern Unit.

The site-specific geology at the proposed expansion can be characterized as a matrix of undifferentiated, fine-grained soils interbedded with distinct coarse-grained and/or non-plastic deposits. Although the majority of soils at the site consists of silt and clay, the presence and extent of sand and gravel deposits increase the potential for contaminant transport (e.g., via groundwater). The site stratigraphy includes three separate intervals containing significant granular (sand and gravel) deposits that have been identified at the expansion site. In places, these deposits have been laterally correlated as a single, interconnected stratum. These delineated sand units are herein referred to as: (1) the Shallow Sand, (2) the Intermediate Sand, and (3) the Deep Sand. Collectively, these subparallel sand units exhibit an overall downward slope to the south/east. The sand units include a wide range of compositions and grain sizes, ranging from fine sand to gravel. Although some are more pronounced than others, it should be noted that the interpreted geological contacts (i.e., boundaries) for these sand units are approximate where discerned or inferred. The predominant silt/clay deposits are unstratified and form the surrounding soil matrix at the site. Herein, these fine-grained deposits have been generalized as a singular lithostratigraphic unit (glacial till).

Due to the uneven topography and changes proposed for the expansion site, the descriptions of the major lithostratigraphic units include references to elevations (instead of depths below an uneven and dynamic ground surface). Currently, the closed BRL has a maximum elevation of approximately 790 feet MSL. In general, the surface grade surrounding the historical waste is approximately 760 feet MSL, and the wetlands/waterways are at roughly 750 feet MSL.

Shallow Sand: Where present, the Shallow Sand is found between roughly 732 and 756 feet MSL. This unit is predominantly comprised of brown to gray, fine- to coarse-grained sand. In places, the Shallow Sand contains significant silt or gravel content. The vertical extent of this unit varies widely, up to a maximum estimated thickness of approximately 16 feet. In some places, the Shallow Sand appears to have been breached as a result of past aggregate mining and subsequent filling within the existing BRL waste footprint.

Intermediate Sand: Where present, the Intermediate Sand is found between roughly 694 and 729 feet MSL. This unit is predominantly comprised of gray, fine- to coarse-grained sand. In places, the Intermediate Sand

contains significant silt or gravel content. The vertical extent of this unit varies widely, up to a maximum estimated thickness of approximately 17 feet.

Deep Sand: Where present, the Deep Sand is found between roughly 671 and 692 feet MSL. This unit is predominantly comprised of gray, fine-grained sand. The Deep Sand contains significant silt content in places. The vertical extent of this unit varies widely, up to a maximum estimated thickness of approximately 13 feet.

Glacial Till: The glacial till is the predominant and most extensive lithostratigraphic unit at the site. It is present from anywhere between 660 feet MSL (roughly the maximum depth explored) and the ground surface; however, the extent of silt/sand/gravel seams intersecting can vary widely between locations across the site. The glacial till is generally brown, becoming gray with depth. This unit is predominantly comprised of clay with some silt, along with variable amounts of sand and gravel.

Fault Areas, Seismic Impact Zones and Unstable Areas

Section NR 504.04 (3), Wis. Adm. Code, does not allow the approval of a landfill that is located within 200 feet of a fault that has had displacement in the Holocene time, within an area that is unstable or within a seismic impact zone. The proposed landfill is not located within any of these areas.

Regional and Site-Specific Hydrogeology

The depth to groundwater shown in on-site monitoring wells is typically within 7 to 10 feet of the ground surface surrounding the proposed expansion site, at an elevation of roughly 750 feet MSL. This is based on groundwater elevations measured in water table observation wells screened in the upper portion of the Oak Creek Formation. Leachate head levels at the BRL were also used to better understand or infer groundwater elevations in this part of the proposed Southern Unit. The potentiometric surface, measured in piezometers screened in the lower intermediate and deeper sand unit or at a similar elevation, can be 2 feet or more higher than the groundwater table across the area of the proposed expansion. The reason is because groundwater in the sand layer is under confined or semi-confined conditions, causing upward pressure on the water in the sand.

Due to its relative proximity to the ground surface (generally within 7 to 10 feet), shallow groundwater in the Oak Creek Formation is influenced by atmospheric conditions (e.g., rain) and surface water features to a greater extent than deeper glacial formations or the underlying bedrock aquifer. Seasonal variations in shallow groundwater are illustrated on groundwater elevation maps for May 2020 and December 2019 (plan sheets 20 and 21, respectively, in the feasibility report addendum), which are meant to represent high and low water table conditions, respectively. As depicted on the maps, shallow groundwater at the site does not exhibit a singular, dominant flow direction.

Localized effects on ground water levels include the existing landfill features such as surface water control and drainage devices, liners below the water table, and gradient control layers (underdrains) designed to intercept and reroute groundwater. Other factors which may have localized effects on groundwater include surface cover materials (e.g., grass, areas of active filling) that affect both recharge and discharge, as well as subsurface heterogeneities such as unlined waste areas within the BRL footprint. In the northern part of the site (beneath the existing Eastern Expansion), groundwater exhibits a westerly flow direction before converging near Wetland W-1 and the intermittent stream, which drains toward the south. In the southern part of the expansion site, groundwater mounding is portrayed in the northeast part of the BRL. This results in a radial flow pattern outward; however, the strongest horizontal gradients indicate a significant southerly component to shallow groundwater flow towards Stormwater Basins 2 and 3, and the perennial stream/wetlands.

Hydraulic Gradients: A total of sixteen nested well pairs (each consisting of a water table observation well and a piezometer) were used to evaluate vertical hydraulic gradients at the site. The vertical hydraulic gradients at the site were evaluated using water level data from nested well pairs. Calculations of vertical gradients were achieved by comparing (1) shallow (water table)/intermediate wells, and (2) intermediate/deep wells. During multiple water level measuring events, the potentiometric surface was observed above the ground surface (i.e., artesian conditions) at four of the site piezometers (S401A, S402B, S403A, and S224A). All of these piezometers are situated along the southern/western perimeter of the Southern Unit. Moreover, wells screened to intersect the Intermediate Sand yielded higher potentiometric surfaces than those screened within the Deep Sand. The upward vertical gradients at these locations further suggest that the low-lying areas to the south/west of the proposed expansion serve as significant discharge areas for site groundwater.

Shallow groundwater at the site refers to the groundwater at or near the water table, and at atmospheric equilibrium (i.e. unconfined). Horizontal gradients for shallow groundwater range from approximately 0.001 to 0.06 feet per foot (ft./ft.). The steepest gradient (0.06 ft./ft.) is found in the southern part of the project area, where the water table drops several feet toward the perennial east-west waterway (flowing east) and the wetland to the south. Relatively steep horizontal gradients (0.04 to 0.05 ft./ft.) are also present toward the west. The shallowest gradient (0.001 ft./ft.) prevails in the northern part of the closed BRL where groundwater mounding occurs.

Below the shallow groundwater, the site hydrogeology includes other zones in which groundwater is under some type of pressure (e.g., semi-confined conditions). These zones can be described as an upper zone (interval between on-site shallow and intermediate wells) and a lower zone (interval between on-site intermediate and deep wells). In the upper zone (shallow/intermediate), upward gradients were exhibited in areas east and north of the site, as well as in the “Triangle Area” (northwest of the closed BRL). Conversely, downward gradients in the upper zone were found southeast of proposed expansion, in the area of Stormwater Basin 2. Water level measurements indicated both upward/downward gradients in locations to the south and west of the Southern Unit. During events when the gradients were upward, hydraulic gradients were calculated due to artesian (flowing) conditions. These observations demonstrate relatively strong upward gradients with seasonal variation within the upper zone in primary discharge areas for the site. Where measured, calculated upward vertical gradients ranged up to 0.201 ft./ft., while those for downward vertical gradients ranged up to -0.282 ft./ft. In the lower zone (intermediate/deep), upward gradients were consistently present, with minimal exceptions. Similar to some of the intermediate wells, artesian conditions were observed at deep piezometer S402B (southwest) during multiple events. Where measured, calculated upward gradients ranged up to 0.398 ft./ft., while those for the limited downward vertical gradients ranged up to -0.035 ft./ft.

Soil Properties: Hydraulic conductivities at the site were determined by a combination of laboratory testing and field data from slug tests. A slug test is a controlled field experiment in which a series of water level readings are taken to measure the response of a geologic formation following a sudden change in the water column. This can be accomplished by either introducing a “slug” (displacement) or rapidly evacuating water to induce drawdown within the well. At monitoring wells screened in predominantly fine-grained soils, the calculated hydraulic conductivities ranged from 4.3×10^{-8} centimeter per second (cm/s) to 7.1×10^{-4} cm/s with a geometric mean of 5.5×10^{-6} cm/s. In addition, hydraulic conductivities determined from laboratory analysis of fine-grained soils ranged from 6.5×10^{-9} cm/s to 2.1×10^{-7} cm/s with a geometric mean of 2.3×10^{-8} cm/s. Laboratory testing also indicated that the horizontal component of conductivity predominates over vertical conductivity within the fine-grained soils at the site. At monitoring wells screened in predominantly coarse-grained soils, the calculated hydraulic conductivities ranged from 5.9×10^{-6} cm/s to 7.2×10^{-1} cm/s with a geometric mean of 3.4×10^{-3} cm/s.

Grain size analyses were performed on soil samples from the glacial till as well as the major sand units. The mean percentages of clay and silt for the glacial till were 47.6% and 41.4%, respectively (i.e., a composition that is 88.2% fine-grained). The vast majority of soil samples from the glacial till were classified as "CL" (lean clay) in accordance with the Unified Soil Classification System (USCS). For soil samples of the glaciofluvial or glaciolacustrine deposits within the Oak Creek Formation, the mean percentages of sand and gravel were 74.7% and 11.6%, respectively (i.e., a composition that is 86.3% coarse-grained). Most of these soils from coarse-grained deposits within the Oak Creek Formation were classified as "SP" (poorly graded sand with or without gravel) or "SM" (silty sand with or without gravel) in accordance with the USCS.

Drinking Water Supply: In general, the Oak Creek Formation is not conducive with serving as a drinking water source for public, private or commercial purposes due to its low transmissivity. Sand and gravel deposits within the Oak Creek Formation generally are not substantial enough to sustain a dependable water supply. The Holy Hill Formation and the underlying Niagara Dolomite are the regional aquifers serving as conventional sources of drinking water for the vast majority of homes, businesses and public systems in the area.

Well construction details for the six private water supply wells within the 1,200-foot setback indicate that these wells are either set atop or screened in the Niagara Dolomite. These private supply wells range in depth from approximately 187 to 205 feet. Since the deepest monitoring wells at the expansion site are roughly 100 feet shallower and screened in different geologic formations, there are insufficient data to determine how the private well locations relate hydraulically to the expansion site (e.g., upgradient, downgradient) on a local level. No public water supply wells exist within 1,200 feet of the proposed fill limits.

Baseline Groundwater Quality and Characteristics

Prior to submitting the feasibility report, four rounds of monthly groundwater monitoring were completed for the proposed expansion; and the remaining four rounds of baseline data were submitted as part of Addendum 2 of the feasibility report. A total of 26 monitoring wells were used to establish background ("baseline") groundwater conditions. The well network included nine piezometers installed during the Alternative Geotechnical Investigation (AGI) and 17 pre-existing monitoring wells (observation wells and piezometers), two of which are located within the proposed waste footprint. Groundwater samples were analyzed for parameters specified in Ch. NR 507 (Appendix 1, Tables 1 and 3), Wis. Adm. Code. In addition, groundwater samples were analyzed for chemical oxygen demand (COD), cyanide, sodium, and ammonia as nitrogen (ammonia-N).

Due to its listing on the federal NPL since the mid-1980s, the closed BRL site has undergone considerable groundwater monitoring and continues to be monitored as a Superfund site (referred to as the "Lauer 1 Sanitary Landfill"). The most recent (fourth) Five-Year Review Report was prepared for the Superfund site in 2017. Contaminant trend analysis has illustrated that the existing engineered control systems that include a clay cap, bentonite cut-off wall, groundwater extraction, leachate extraction, and gas extraction, along with natural attenuation are effective in reducing groundwater impacts at the site within a reasonable timeframe. Furthermore, the historical groundwater plume from the closed BRL is considered to be stable or decreasing.

As part of the Superfund site monitoring, the general contaminants that have historically been found in the groundwater at the BRL include the following:

- Volatile organic compounds (VOCs) – These include ketones; benzene, toluene, ethylbenzene, and xylenes (BTEX), chlorinated ethenes (e.g., trichloroethene or TCE), and chlorinated ethanes.
- Semi-volatile organic compounds (SVOCs) – These include phenols, chlorinated benzenes, polycyclic aromatic hydrocarbons (PAHs), and phthalates.

- Polychlorinated biphenyls (PCBs)
- Pesticides

During recent baseline sampling, ch. NR 140, Wis. Adm. Code preventive action limit (PAL) and enforcement standard (ES) exceedances were documented for public welfare substances including chloride, manganese, and sulfate. The most widespread groundwater quality exceedances at the expansion site are metals, most notably arsenic and to a lesser extent, manganese. The only VOCs detected above groundwater quality standards in baseline samples were benzene, tetrahydrofuran, and dichloromethane (methylene chloride) which is a common laboratory contaminant. Historically, di(2-ethylhexly)phthalate (a SVOC) was also detected above its groundwater quality standards. Additional substances with exceedances during the baseline sampling include barium, antimony, nickel, fluoride, nitrate + nitrite (as nitrogen), and ammonia (as nitrogen).

Arsenic, boron and manganese are believed to be naturally occurring in this area. To some degree, these substances can all be attributed to naturally occurring minerals sometimes found in the glacial till and bedrock. However, there have been some recently observed increases in contaminant concentrations for specific substances (e.g., arsenic, sulfate) in deep piezometer S403B, located south of the BRL. Increasing contaminant trends typically warrant further evaluation, including (but not necessarily limited to) a preliminary discussion on the cause and significance. Similar increasing trends in the indicator parameter alkalinity were also recently discerned at this well, along with other deep piezometers such as S404B, located southeast of the BRL and P102, located west of the BRL. In its completeness letter, dated February 19, 2021, the department requested that WMWI provide additional discussion of its evaluation of site background prior to the feasibility determination, and WMWI provided its response in Addendum 2 of the feasibility report, prepared by TRC and dated April 2, 2021. Elevated chloride concentrations are frequently attributable to human activities, such as seasonal road salt application. The feasibility report indicates that the dichloromethane is likely the result of laboratory cross-contamination. The department also continues to evaluate background groundwater characteristics, as well as the requested NR 140 exemptions to groundwater quality standards.

Although the historical groundwater plume from the closed BRL is considered to be stable or decreasing, separating the waste from the groundwater with a composite liner would provide greater long-term protection and stability to the groundwater, because the waste may still contain toxic substances or have the potential to geochemically influence the aquifer (e.g., affect the pH) and cause or exacerbate the release of naturally occurring substances that would otherwise immobilized in the soil or rock.

The feasibility determination grants ch. NR 140, Wis. Adm. Code, groundwater quality standard exemptions where sufficient baseline sampling data show pre-construction exceedances of ch. NR 140, Wis. Adm. Code, groundwater quality standards. Alternative concentration limits for groundwater quality will be proposed in the plan of operation and reviewed by the department.

Proposed Preliminary Landfill Design

The Southern Unit would tie-into the existing Eastern Expansion landfill along the entire south edge and the southwest corner of the Eastern Expansion. The horizontal expansion area would be developed in six sequences (Phase 5 Modules 1 and 2, Phase 6 Modules 1 and 2, and Phase 7 Modules 1 and 2). Construction of the landfill would begin immediately south of the Eastern Expansion and progress in a southerly direction. The proposed maximum thickness of waste would be approximately 215 feet. The clay liner would be significantly below the water table. Base grades are proposed to be approximately 30 feet below the existing land surface on the east side of the landfill and approximately 20 feet below existing land surface on the west

side of the landfill. The proposed subbase grades on the east side of the landfill are significantly deeper than the base of the BRL waste, especially along the east toe of slope. The attached feasibility determination requires that the subbase grades on the east side of the proposed landfill be raised to more closely coincide with the existing base of waste grades for the BRL, since the exemption to allow subbase grades significantly below the water table is premised on the proposal to exhume the BRL waste The final grade side slopes would be 4-horizontal to 1 vertical (4:1) with a proposed peak elevation of 978 feet, approximately 200 feet above the existing topography.

The landfill would be designed to contain and collect leachate. Leachate is water or other liquid that has percolated through or comes in contact with waste. The base grade design consists of ridges and valleys to direct leachate to collection pipes. The base grades would be orientated in an east-west direction except for the Triangle Area. A high point that runs north-south on the liner base would be constructed across a central area of the landfill and leachate would flow from the high point to both the east and west sides of the landfill into leachate sumps. The proposed design includes a Triangle Area (northwest corner of the expansion) with leachate from the upper portion of the Triangle Area draining northeast into the existing leachate drainage stone in the Eastern Expansion and leachate in the lower portion of the Triangle Area collected in a leachate trench and discharging southeast into the northern most leachate sump on the west side of the Southern Unit.

The Triangle Area of the proposed landfill would tie into the southwest corner of the existing Eastern Expansion landfill where significant infrastructure for the Eastern Expansion exists. The Triangle Area would require modifications to:

- two underdrain pipes and an underdrain cleanout riser,
- a leachate collection system cleanout riser (CO1EA),
- a leachate sump riser pipe and manhole designated SSROE3,
- a horizontal leachate head well access riser pipe and
- two riser pipes for a landfill gas extraction system condensate drip leg (DL-3).

These engineering features would need to be extended and/or relocated to allow the expansion and leachate would need to be continually removed from the leachate sump that discharges through Manhole SSROE3 during the relocation and extension of the manhole and riser pipe. The feasibility determination requires modifications to the proposed design to limit the changes in pipe alignment because CO1EA is an extended leachate collection line with multiple existing bends. Section NR 504.06(6)(f), Wis. Adm. Code, requires the design minimize changes in pipe alignments for the entire leachate collection pipe length.

Subbase Grades and Drainage (Underdrain):

Subbase grades are the bottom of the clay component of a composite liner and would parallel the base grade contours along the top of the composite liner. The lowest proposed subbase grade outside the underdrain and leachate sumps on the east side of the landfill would be at an elevation of 732 feet MSL; however, as stated above, the attached feasibility determination requires that the subbase grades on the east side of the proposed landfill be raised to more closely coincide with the existing bottom of waste in the BRL. The lowest proposed subbase grades on the west side would be 744 feet, except for the subbase grades in the leachate sumps that would be approximately 3 to 4 feet lower.

The depth to groundwater is typically within 7 to 10 feet of the ground surface surrounding the proposed expansion. As proposed, subbase grades as well as base grades for the landfill would extend well below the water table. WWMI has proposed an exemption from the requirement for a 10-foot separation from the water table for the subbase grades of the expansion since the proposal includes exhumation of the BRL where waste is located below the water table in an unlined landfill.

WMWI has proposed that the design comply with the requirements in s. NR 504.06 (4) (d), Wis. Adm. Code, for a liner constructed below the groundwater table. Section 504.06 (4) (d), Wis. Adm. Code requires that subsoils be exposed on a 100-foot grid to a minimum depth of 5 feet below the gradient control layer and all detected granular or silty soils within this 5-foot depth must be removed and replaced with compacted, fine-grained soils (clay). Also, in areas where BRL waste exists below proposed subbase grades, once all waste and contaminated soil is exhumed, the areas must be backfilled with compacted fine-grained soils.

A geonet underdrain would be installed at the subbase grades to intercept groundwater seepage. Groundwater collected in the underdrain on the east side of the landfill would flow to one of three sumps at the toe of the east slope and be pumped and discharged into the MMSD sanitary sewer. Groundwater collected in the underdrain on the west side of the landfill would flow to one of seven sumps at the toe of the west slope and be pumped and discharged to the MMSD sanitary sewer.

Base Grade Slopes and Elevations:

The interior side slopes of the liner would be 3:1 with proposed berm heights of approximately 30 feet on the east side and 16 feet on the west side. The proposed berm height on the north and south sides would vary between 10 feet and 22 feet. The base grades for the proposed landfill would slope from a high point across the central area of the liner to both the east and west toe of slope. From the high point the base grades and the ten leachate collection trenches on the east side are proposed to slope at 6:1 for up to 80-feet (bench) then transition to between 1% and 1.5% downward. On the west side from the high point the ten leachate collection trenches are proposed to slope at a constant 1%. The proposed slope on the liner base toward the leachate collection trenches varies between 2% and 6%. The proposed maximum leachate flow distance on the liner base toward the leachate collection trenches would be approximately 90 feet. The attached feasibility determination requires that the subbase and base grades on the east side of the proposed landfill be raised to more closely coincide with the existing base of waste grades for the BRL, this would involve redesign of the base grades and leachate collection pipe slopes for the east side of the landfill.

In the Triangle Area of the expansion, the base grades in the upper northern tip of the triangle would slope at 8% toward the Eastern Expansion liner and the base grades on the lower southern half of the Triangle Area would slope at 3:1 toward a leachate collection trench that would discharge into the northern most leachate sump on the west side of the Southern Unit. Conditions of the feasibility determination require modification to the Triangle Area design to minimize pipe bends, which may impact base grades or the extent of the Triangle Area.

The proposed landfill includes a five-foot compacted clay wedge that would be constructed on top of the landfill side slope berm following liner construction. The clay wedge would provide for an additional five-foot depth of waste over the entire landfill.

Liner:

The Southern Unit would include 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 must be placed over the geomembrane.

Leachate Collection:

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 6-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.

Leachate collected in the drainage blanket on the east side of the landfill would flow from the central high point to the east into ten leachate collection pipes and then either directly or through leachate header pipes at the toe of the east slope into three leachate sumps. A majority of the leachate collected in the drainage blanket on the west side of the landfill would flow from the central high point to the west into ten leachate collection pipes and either directly or through leachate header pipes at the toe of the west slope into seven leachate sumps. The proposed design includes a change in pipe alignment at the center of the landfill because base grades on the east side of the landfill are proposed to be significantly deeper than on the west side of the landfill. The design proposes bends and a 6:1 slope to connect the east and west collection pipes. As stated above the attached feasibility determination requires that the subbase grades on the east side of the proposed landfill be raised to more closely coincide with the bottom of waste in the BRL, to satisfy this requirement the 6:1 bench must be removed.

Leachate in the upper portion of the Triangle Area would drain into the existing leachate drainage blanket in the Eastern Expansion and leachate in the lower portion of the Triangle Area would be collected in a leachate trench sloped at 4% to 7% and discharge to the south into the northern most leachate sump on the west side of the Southern Unit.

All the east-west leachate collection pipes exceed 1,200 feet from cleanout to toe of opposite slope, with the longest proposed collection pipe (measured from the top of the east slope to the toe of opposite slope) at approximately 1,650 feet. Because the proposal includes lengths in excess of 1,200 feet for leachate lines, the design would need to comply with s. NR 504.06(6), Wis. Adm. Code, for landfills with extended leachate collection lines.

Specifically, s. NR 504.06(6)(f)2., Wis. Adm. Code, requires landfills with extended leachate collection lines to minimize horizontal and vertical alignment changes. Minimizing changes in pipe alignment is important for long-term integrity of the pipe and for accessibility by pipe cleaning equipment.

In addition to the above, the proposed Triangle Area would require a 40-foot extension of an existing Eastern Expansion leachate cleanout pipe CO1EA and the additions of two pipe bends to this leachate pipe that presently contains three significant pipe bends. The total length of this Eastern Expansion leachate line is more than 1,200 feet and is also subject to the extended leachate collection line requirements, specifically the requirement to minimize changes in pipe alignment. The attached feasibility determination requires that the extension be revised to minimize pipe bends.

Gas Collection and Management:

Landfill gas would be extracted by vertical gas wells and potentially from the leachate cleanout risers and horizontal collection pipes placed in the landfill. Collected gas would be transferred to the existing landfill gas to energy facility. If the turbine capacity is exceeded, the landfill gas must be transferred to the gas flare currently serving the existing Orchard Ridge RDF.

A gas extraction well typically consists of a 3-foot-diameter borehole drilled into the waste mass and a slotted pipe that is installed into the borehole. The top of the borehole is sealed to allow a vacuum to be applied to the well, which pulls the landfill gas into the well. The vacuum would be applied by the gas to energy facility that would be connected to all the wells by buried piping.

Final Waste Grades and Final Cover:

The proposal includes placing waste above the approved final waste grades by up to 5% of the approved waste thickness to accommodate waste settlement prior to final cover placement. Waste in areas that do not settle to the approved final waste elevation must be removed at the time of final cover construction. The proposed composite final cover would consist (from the waste surface up) of a 6-inch-thick grading layer, 2 feet of clay or a 2-foot barrier layer and a geosynthetic clay liner (GCL), a 40-mil very-low-density polyethylene (VLDPE) geomembrane, a geonet composite drain layer, a 30-inch soil root zone, and 6 inches of topsoil that must be vegetated. Diversion berms and down slope flumes would be constructed on the final cover to direct surface water off the final cover.

Long-term care activities at the site would include leachate collection and treatment, gas extraction and treatment, as well as the monitoring of leachate, gas, and groundwater. The closed landfill would be grass-covered, open space.

Leachate Generation Rate and Treatment

During operation of the proposed landfill, the report indicates a maximum leachate generation rate of approximately 29,900 gallons per day (gpd) from the entire landfill. After final closure, the report indicates a leachate generation rate of approximately 7,800 gpd. Submersible pumps placed in the leachate sumps would pump the leachate out of the landfill and into leachate force main piping along the east and west sides of the landfill. The leachate force main piping would direct leachate from the expansion, south to a new sanitary sewer connection along State Hwy 74/100. From the connection to the Village of Menomonee Falls sanitary sewer, the leachate will discharge to the MMSD for treatment.

Proposed Soil Borrow Source

On-site clay excavated to attain landfill subbase grades and clay from the Metro landfill located 25 miles southeast of the landfill are initially proposed for use as the clay liner and potentially for the clay cap. The report indicates that 84,900 cy of clay would be needed to construct and close the initial Phase 5 Module 1 of the proposed expansion.

Proposed Operations

WMWI proposes to operate the landfill in the same manner that it does the currently active Eastern Expansion and to operate it in compliance with ch. NR 506, Wis. Adm. Code. The landfill would be constructed and filled in phases. A scale would be used to track the waste tonnages being brought into the landfill. The waste would be dumped on the active face and compacted and then covered by the end of each day. The area of active waste disposal must be minimized to the extent practicable. The exhumation of the BRL will take place in several phases. The waste would be disposed of initially in the adjacent Orchard Ridge RDF (Lic. #3360) that is nearing its final waste capacity. Waste from BRL would then be placed in the existing Eastern Expansion and the Southern Unit. The landfill has an office to house employees and maintain department approvals and operational records on site. The plan of operation for the Southern Unit would include a waste acceptance plan that would determine what wastes are suitable for disposal in the landfill. Section NR 506.16 (1), Wis. Adm. Code, requires that the landfill perform random inspections of incoming waste loads to check that unacceptable wastes are not being disposed of at the landfill.

Efforts must be made to minimize dust, odors, and litter. Windblown waste must be picked up as needed, and roads must be watered down as weather conditions demand. Operational equipment such as pumps, generators, monitoring devices, machinery and vehicles must be maintained and kept in proper operating condition. Back-up leachate pumps must be maintained for times when a leachate pump malfunctions.

Accumulated sediment in drainage ditches and sedimentation basins must be removed and properly handled as needed to maintain proper flow. Areas of the landfill that have not reached final waste grades, and would not be active for a period of time, would receive intermediate soil cover that is vegetated until the area becomes active again and the intermediate cover would be removed. Operational hours would be consistent with normal business days during daytime hours. For security, the property has a perimeter fence with a gate that is kept locked during closed hours.

Surface Water Runoff Management

Two sedimentation basins would be used to manage surface water runoff from the proposed expansion. As part of its closure, diversion berms and downslope flumes would be designed to convey surface water off the final cover and route it away from the landfill. The existing East Sedimentation Basin (northeast part of project area) would be modified to manage the additional volume from the Southern Unit. The balance of surface water originating from the expansion area would be routed to the proposed South Sedimentation Basis. These sedimentation basins would be designed to allow for removal of suspended sediment for storms up to a 25-year, 6-hour rainfall event. The emergency spillways would be designed to pass a 100-year time of concentrations storm event.

A drainage ditch would be constructed along the entire perimeter of the proposed landfill and direct storm water to either the existing East Sedimentation Basin or the proposed South Sedimentation Basin. Both basins would discharge at the southeast corner of the landfill into the perennial segment of Waterway S-1 located within/adjacent to Wetland W-1. From Waterway S-1, storm water would leave the property through a culvert under Boundary Road and enter a tributary of the Little Menomonee River.

Environmental Monitoring

The plan of operation approval would include a comprehensive environmental monitoring program that follows the requirements of ch. NR 507, Wis. Adm. Code. The environmental monitoring plan for the Eastern Expansion would be amended to account for the Southern Unit expansion and the Eastern Expansion as one landfill. Specific components of the environmental monitoring program for the whole landfill would include the following:

- Groundwater Monitoring: The groundwater monitoring program would involve 24 monitoring wells, including water table observation wells (shallow) and piezometers (deep) to evaluate groundwater quality. Six of the 24 monitoring wells would be designated as Subtitle D wells and monitored in accordance with additional federal requirements in the Resource Conservation and Recovery Act (RCRA). In addition, the groundwater monitoring network would include six private water supply wells within 1,200 feet of the Southern Unit's waste limits. The frequency of groundwater monitoring and the required parameters must be in accordance with ch. NR 507, Wis. Adm. Code. The detailed requirements for groundwater monitoring at the site would be established in the plan of operation approval.

- Leachate Monitoring: The proposed leachate monitoring program would utilize a network of twelve leachate head wells along with additional monitoring points in the leachate collection and transfer system (e.g., force mains, transfer manholes). Each module of landfill construction would include two leachate head wells used for monthly measurements of leachate head levels. Leachate volumes would be measured on a monthly basis. Four locations would be designated as sample collection points to characterize leachate quality on a semi-annual basis. The leachate samples must be analyzed for required parameters in accordance with ch. NR 507, Wis. Adm. Code. The detailed

requirements for leachate monitoring at the site would be established in the plan of operation approval.

- Landfill Gas Monitoring: The proposed landfill gas monitoring program would include gas extraction wells, gas turbines and flare, surface scans and gas probes. The gas probes must be positioned outside of the waste limits and used to monitor gas migration in the unsaturated (vadose) zone. The frequency of landfill gas monitoring and the required parameters must be in accordance with ch. NR 507, Wis. Adm. Code. The detailed requirements for landfill gas monitoring at the site would be established in the plan of operation approval.

- Surface Water Monitoring: The proposed surface water monitoring includes two locations. One of the locations is at the East Sedimentation Basin in the northeast part of the expansion site; the other is at the South Sedimentation Basin on the south side of the expansion.

- Air Monitoring: Ambient air monitoring for particulates or other constituents is not proposed as part of the environmental monitoring program. Ambient air monitoring requirements, if any, must be established through the air permitting process.

- Underdrain Monitoring (Collected Groundwater): Discharge from the groundwater underdrain system must be monitored for volume, indicator parameters and VOCs. Based on the analytical results, the collected groundwater would be discharged to WWTP or surface water. Additional details on contaminant levels that could allow for discharge to surface water would be submitted in the plan of operation.

- Settlement Monitoring: Ground or aerial (drone) surveys would be conducted on an annual basis to monitor the rate of surface subsidence resulting from the settlement of underlying waste in the landfill. Elevations would be measured at the locations of all landfill gas extraction wells. The detailed requirements for settlement monitoring at the site would be established in the plan of operation approval.

Proposed Physical Changes and Environmental Impacts

Land Use Impacts: The most significant and noticeable permanent physical change would be the exhumation of roughly 1,300,000 cy of buried waste from the BRL and its replacement with a lined landfill (the proposed Southern Unit). In addition, the topography would change to include a mound that would be 190 to 200 feet above the current ground level in the middle of the Southern Unit. The final cover of the proposed landfill would be vegetated with grass to create an open green space. A perimeter road would be constructed around the landfill to provide vehicle access.

At the time of licensure, the proposed expansion would utilize existing infrastructure currently used for the Orchard Ridge RDF. This includes internal access roads, scales, the office building, and the maintenance building. To maintain as long as possible the existing office and scale that are located in Phases 3B and 4C of the existing Eastern Expansion; these two phases would be the final area of the landfill liner construction. The office building and scale would be relocated along Boundary Road (124th Street) just south of the East Sedimentation Basin in order to construct Phases 3B and 4C.

Wetland Impacts: A total of six wetlands (identified as W-1 through W-6) were delineated within the project area. Four of the wetlands (W-2 through W-5) were determined to be artificially created and exempt from regulations. Two of the wetlands, W-1 and W-6, are regulated by the department and under the jurisdiction of the USACE. The environmental review of wetlands incorporated use of the Floristic Quality Index (FQI),

which is based on plant composition to assess the ecological integrity of an area. The FQI is calculated using coefficients of conservatism (C values) that are assigned to plant species. These C values range from 0 to 10 and represent an estimated probability that a plant is likely to occur in a habitat that is relatively unaltered from what is believed to be a pre-settlement condition. A plant species with a higher C value score (e.g. 10) has a *lower* tolerance to environmental degradation such as overgrazing or development and therefore is naturally restricted to undisturbed, remnant habitats.

Permanent impacts to wetlands would consist of filling and grading to support the proposed landfill expansion. Temporary wetland impacts would include open trenching with backfilling for the placement of infrastructure. Wetland W-1 would be impacted during the proposed construction of a box culvert and the realignment of Waterway S-1, which is discussed in the next section. To facilitate operations at the Southern Unit, a new access road is proposed as the main thoroughfare for disposal trucks and construction vehicles. The access road would be approximately 35-feet-wide, and its path would go along the expansion's western perimeter (adjacent to Wetland W-1 and Waterway S-1). Erosion control measures must be incorporated into every aspect of the proposed expansion (e.g., construction, active filling, post-closure). In general, leachate from the Southern Unit would be directed away from aquatic resources. Diversion berms, flumes, and perimeter surface ditches would convey surface runoff. However, the proposal includes using directional boring to install a leachate force main beneath Waterway S-1 (discussed in next section) and Wetland W-1 (described below). The force main must be pressure-tested prior to use, and routine leakage monitoring must be performed at the transfer manhole to which the force main would be connected. The potential would exist for wetland impacts in the future, should destructive activity related to the maintenance of or repairs to this force main be required.

It is estimated that between 3.41 and 3.72 acres of wetlands would be permanently impacted, with an additional 0.20 acre to be temporarily impacted. Moreover, indirect impacts to the wetlands could include loss of wildlife habitat, changes in sedimentation and erosion processes, temporary increases in surface water runoff, and changes to stormwater retention and groundwater processes. The physical characteristics of the two regulated wetlands (W-1 and W-6) and the extent of proposed impacts are discussed below.

Wetland W-1: This wetland covers approximately 32.79 acres and wraps around the west and south sides of the proposed expansion. The majority of this wetland is located on the undeveloped WMWI property to the south, although a contiguous strip of Wetland W-1 runs along the west side of the proposed expansion. This portion of Wetland W-1 is intersected or roughly bound on its east side by an intermittent, north-south waterway (S-1). The portion of the wetland to the south is intersected or similarly bound on its north side by a perennial, west-east segment of the same waterway (S-1). Waterways are described in the next section. Wetland W-1 is categorized as fresh (wet) meadow, shallow marsh, shrub-carr, and hardwood swamp. By virtue of area, this would be the wetland most impacted by the proposed expansion. Overall, the area that would be impacted consists of a relatively narrow strip of wetlands oriented north-south between two existing landfill areas. However, due to its location south of the proposed construction area, the vast majority (more than 29 acres) of Wetland W-1 would not be directly impacted. The floristic integrity of W-1 would be diminished as a result of permanent impacts to approximately 3.6 acres vegetated with shrub-carr. The FQI is low for the majority of areas that would be impacted, but higher in the southeast hardwood swamp portion of Wetland W-1 that would be subject to impacts.

Wetland W-6: This wetland is oriented east-west, has an area of approximately 0.24 acre, and is located near the northwest corner of the proposed expansion. It is also intersected or roughly bound (on its east side) by waterway S-1. Wetland W-6 is categorized as shrub-carr. The floristic integrity would be diminished by roughly halving the shrub-carr habitat (i.e., removing 0.12 acre); however, the FQI for Wetland W-6 is considered low.

The functional values of the wetlands are low in the following categories: wildlife habitat; human use; fish and aquatic habitat; floristic integrity; and, groundwater processes. The functional values of the wetlands are medium in the following categories: water quality protection, shoreline protection, and flood and storm water storage. Historical land use and position on the landscape in the context of its surroundings also influence the functional values of the wetlands, which have already been manipulated by human activity and do not provide high or exceptional functional values. In addition, flood and storm water storage functional values are currently compromised by the topography and lack of basin characteristics to retain large amounts of surface runoff. Much of the runoff in the project area is already directed to stormwater detention ponds. Permanent and temporary impacts to the wetlands would not significantly decrease flood or stormwater storage capacity

Wildlife habitat would be removed through the permanent filling of wetlands, most notably in the northern portion of Wetland W-1 and the eastern portion of Wetland W-6. These wetlands are centrally located within an existing landfill complex with active operations; nevertheless, they do provide potential habitat for birds, reptiles, amphibians, deer, and small mammals that could be displaced during the temporary construction period and subsequent filling operations. Because of their locations on the interior of the WMWI property, public access to these wetlands is already inhibited and would currently require a downstream approach with multiple portages past culverts and areas without enough standing water to traverse. The proposed impacts would not adversely impact human use values for the wetlands.

A detailed summary of the wetland areas to be affected is provided in the following table:

Proposed Wetland Impacts			
Wetland ID	Wetland Cover Type	Permanent Impacts (acres)	Temporary Impacts[2] (acres)
W-1	Fresh (wet) meadow	0.42	0.19
	Shallow Marsh	1.21	0.00
	Shrub-carr	1.83	0.01
	Hardwood swamp	0.14	0.00
W-2[3]	Fresh (wet) meadow	0.11	0.00
W-3[3]	Fresh (wet) meadow	0.01	0.00
W-4[3]	Fresh (wet) meadow	0.06	0.00
W-5 (REV 2019)[3]	Shallow Marsh	0.27	0.00
W-6	Shrub-carr	0.12	0.00

Footnotes:
(1) Revised from Table 8-1 presented in the response to USACE RFI-1, dated September 11, 2020.
(2) Wetland is proposed to be restored following construction. Compensatory mitigation is not proposed.
(3) WDNR determined the wetland was artificial and exempt from state wetland regulations. The USACE determined the wetland to be non-jurisdictional.

A detailed summary of the floristic scoring for the affected wetlands is provided in the following table:

Metric	Wetland / Wetland Subcomponent ID					
	W-6	W-6 West	W-6 East	W-6 North	W-1 South	W-1 North
Cover Type	Shrub-carr	Shrub-carr	Shrub-carr	Shrub-carr	Shrub-carr	Shrub-carr
Total Mean C	2.5	2.6	2.6	1.2	0.5	1.9
Native Mean C	3.1	3.3	3.0	1.8	1.3	2.9
Total FQI	11.2	10.1	10.4	2.9	1.4	7.4
Native FQI	12.4	11.4	11.2	3.6	2.3	9.2

Waterway (Stream) Impacts: The proposed landfill expansion property is located within the Menomonee River watershed, which has an estimated drainage of 137 square miles. The Menomonee River originates in the northeast corner of the Village of Germantown in the northeast corner of Washington County. It flows southeast through Washington, Waukesha, and Milwaukee counties. Lower reaches of the river run through the City of Milwaukee before it joins the Milwaukee River, which drains into Lake Michigan. The Menomonee River has a relatively flat gradient and is typically confined by low banks with a wide and level floodplain.

The majority of the expansion site has been disturbed since at least the early 1950s. The BRL site had operated as a sand/gravel mine before being used for landfilling between 1954 and 1971. Areas to the north and west are already operated/maintained as either active or closed landfills; therefore, past activity on the WMWI property has included the construction of engineered features such as surface ditches and sedimentation basins. New drainage ditches would be constructed to properly route surface water around the proposed landfill to sedimentation basins, where the water would be discharged and ultimately flow to navigable waterways. Neither lakes nor flowages were identified in the project area, and ponds, within 1,000 feet of the proposed limits of waste are limited to man-made, excavated stormwater ponds. The man-made pond currently located in the southwest corner of the BRL is partly within the proposed footprint for the Southern Unit.

Construction of the Southern Unit would involve the realignment of a waterway to accommodate the expansion footprint, as proposed. Two unnamed, navigable streams have been identified as being either directly impacted or potentially affected by the proposed expansion. The streams have been designated as Unnamed Stream 18350 and Unnamed Stream 5034151. Both of these streams are small drainageways that begin on site or within a mile of the project area. A description of each stream is provided below.

Unnamed Stream 18350: This stream is located off of the landfill property and is oriented northeast-southwest and comes in from the east before continuing south parallel with 124th Street (Boundary Road). Surface water from the expansion site drains to this tributary of the Little Menomonee River. The confluence of the on-property stream (discussed below) and Unnamed Stream 18350 is located downstream and off-site.

Unnamed Stream 5034151: This stream (also identified as Waterway S-1*)* runs along the western and southern perimeter of the project area and is within 300 feet of the proposed limits of waste. It is comprised of two distinct sections: (1) the upgradient segment is roughly 1,800 feet, oriented north-south, and characterized by its ephemeral nature; and (2) the downgradient segment is roughly 1,000 feet, oriented east-west, and has more consistent flow. The upgradient portion that runs along the west side of the proposed expansion is referred to as the *north-south intermittent waterway*. The downgradient part running along the south side of the project area is referred to as the *west-east perennial waterway*.

The north-south intermittent waterway is the segment of Waterway S-1 that is proposed for realignment during landfill construction. In this area, the stream morphology is largely confined between two artificial berms and no defined bed and bank typical of channelized flow; furthermore, it lacks riffle/pool sequences and other patterns characteristic of small streams. In places, the stream is in direct contact with wetlands, as discussed in the previous section. Approximately 2,578 linear feet of Waterway S-1 would have permanent impacts. Of this total footage of stream impacts, approximately 2,233 feet would be realigned and include approximately 237 linear feet conveyed by a culvert, if a stream realignment and a culvert permit are issued. Approximately 190 linear feet of the stream would be temporarily impacted as a result of construction equipment and activity. The desire to maximize landfill capacity notwithstanding, the rationale for stream realignment includes replacing the current waterway with functional and conditional improvements (e.g., added sinuosity). As a result of the proposed realignment for the north-south intermittent waterway S-1 (i.e., upgradient segment of Unnamed Stream 5034151) at the Southern Unit, Unnamed Stream 18350 could experience a temporary increase in turbidity downstream of the landfill. Temporary impacts would also occur

to the west-east perennial water S-1 during the installation of storm water management features in the southeast corner of the project area.

A detailed summary of the waterways to be affected is provided in the following table:

Proposed Waterway Impacts							
	Existing Conditions		Proposed Conditions				
Waterway	Impacted (Not Enclosed) (linear feet)	Impacted (Enclosed) (linear feet)	Realigned (Not Enclosed) (linear feet)	Realigned (Enclosed) (linear feet)	Temporary Impacts[3]	Permanent Impact to Waterway Bank	Permanent Take of Waterway[4] (linear feet)
North-South Waterway[2]	2,505	73	1,996	237	150 linear feet[5]	NA	345
West-East Perennial Waterway (S-1)	NA	NA	NA	NA	40 linear feet[6] 0.02 acres[6]	95 linear feet[6] 0.03 acres[6]	NA

Surface Water Impacts: Surface water runoff and flow patterns would be altered as part of the proposed expansion. This involves the relocation of an intermittent segment of a stream; however, the stream would be realigned to include added sinuosity (functional and aesthetic benefits). Surface water discharges would remain in the Menomonee River watershed.

Project Significance

BRL Waste Exhumation and Disposal: The proposed expansion involves the replacement of an unlined, clay-capped landfill with a composite-lined landfill that would include active leachate and gas collection systems as well as a composite final cover system. Under current conditions, groundwater is in contact with and moves through the waste in the BRL. The effect is that the groundwater may pick up contaminants from the waste and transport them through the groundwater to receptors such as wells. It is documented that the BRL has released contaminants into the groundwater at concentrations that exceed their respective groundwater quality standards. The waste is also currently in direct connection with different soil layers that intersect it, allowing contaminants to be spread across different geologic layers even if there is a natural confining unit that would otherwise prevent or minimize the flow of contaminants between distinct layers.

Constructing a composite liner system that separates the waste and any excavated contaminated soil from the groundwater would cut off this direct contact with the groundwater flow system and improve the containment of contaminants. The waste exhumation and soil excavation process may result in some short-term changes to geochemical groundwater conditions, including effects to redox potential, pH, alkalinity (buffering capacity) and the availability of organic carbon. This may result in a temporary increase in some contaminant concentrations. However, constructing a barrier between the waste and the groundwater, and actively removing landfill leachate and gas are expected to provide improved long-term protections and stability to groundwater quality. Removal of saturated waste from beneath the water table would also reduce the geochemical instability of the groundwater that can cause or enhance the mobility of naturally occurring substances, such as arsenic and some metals that would otherwise remain relatively stationary.

It is anticipated that this activity would generate some degree of particulate matter, fugitive dust, asbestos, and VOC and other hazardous air pollutant emissions. WMWI would need to comply with all conditions in its air pollution control construction permit. The waste excavation and relocation plan would also have to address all potential emissions and discharge concerns, providing proposed best management practices that must be used to control materials, and minimize and correct any discharges. A robust air and groundwater monitoring plan would be used to monitor air and groundwater quality and address any impacts in a timely manner.

Constructing the proposed landfill could also affect localized groundwater flow directions and gradients;

however, the deeper aquifer in the underlying bedrock (Niagara dolomite) and sand unit above the bedrock that is used as a water supply (part of the Holy Hill formation) would likely not be affected by localized changes to flow in the upper unconsolidated aquifer. The underdrain system would have the effect of helping to remediate any contaminated groundwater directly underneath the BRL by capturing some of it.

During the phased construction of the new landfill, the BRL would be excavated in several phases, during cold weather months. The final cover soils atop historical waste consist of topsoil, a soil root zone layer, the underlying clay cap, and a grading layer. These soil layers would be segregated during the phased excavation. Since these uppermost cover soils have not come in contact with underlying contaminants, the topsoil and soil root zone layer would be managed for reuse as vegetative surface layer material and in liner/cap construction respectively. The grading layer is comprised of approximately 305,000 cy of bioremediated petroleum-impacted soils, that were treated to reduce contaminants and referred to as "biosoils". These were used to attain positive slopes over the waste. The biosoils would be segregated for potential reuse. Roughly 1,300,000 cy of waste and 298,000 cy of underlying (mostly saturated) native soils impacted by the unlined landfill would be excavated and disposed of in the active landfills or managed on-site.

In August 2019, a subsurface investigation was performed within the BRL footprint to better understand the nature of the historical waste prior to its exhumation. Investigation was also performed of the overburden "grading layer" and the underlying native soil quality. A total of 12 exploratory borings (WC1 through WC12) were advanced through the waste. The final cover at the BRL consists largely of fine-grained soils and is approximately 4- to 5-feet thick. Beneath the final cover lies a grading layer that was constructed with biosoils. The thickness of this grading layer ranges from approximately 2 to 9 feet. The thickness of the waste layer ranges from approximately 10 to 27 feet. A significant portion of the waste is below the water table, and the extent of saturated waste at the boring locations ranges from approximately 2 to 13 feet. The waste has been described as being generally consistent with typical municipal solid waste. More notable waste that was encountered included crushed drums (at 2 locations) and paint waste. Petroleum, paint, and/or solvent-like odors were detected at several boring locations.

Numerous waste samples were collected as part of the 2019 investigation. Based on these samples, the composition of the waste appears to contain several different types of organic substances. These substances include petroleum hydrocarbons, specifically BTEX. To a lesser extent, the waste contains chlorinated VOCs [e.g., tetrachloroethene (PCE), TCE]. PCBs were found in most of the waste samples, both of individual aroclors as well as total PCBs. PCB concentrations were all less than 50 parts per million (ppm), which is the concentration at which PCB materials would have to be regulated under the federal Toxic Substances Control Act (TSCA). The results of Toxicity Characteristic Leaching Procedure (TCLP) analyses indicate at least some of the waste may be hazardous; exhibiting the leachability hazardous characteristic for both lead (metal) and benzene (VOC).

Leachate samples collected from BRL were generally consistent with the findings of the waste sampling. The greatest VOC impacts to leachate were from BTEX, and most notably benzene. Numerous metals were found in the leachate, although lead and zinc impacts were the most common. Similar to the waste samples, relatively widespread PCB impacts were detected. The leachate also contained impacts from several SVOCs, a contaminant group which includes PAHs.

The grading layer overlying the BRL waste consists of predominantly soils impacted by gasoline-range petroleum organics that were remediated to reduce contaminant levels (biosoils). Samples of the grading layer were found to exceed Residual Contaminant Levels (RCLs) based on groundwater protection for eight VOCs. Benzene impacts were the most ubiquitous, exceeding its RCL in 11 of the 12 grading layer samples. Similarly, the groundwater pathway RCLs of four PAHs were exceeded. The most prevalent PAH impacts

were from chrysene. Biosoils exhibiting residual impacts similar to this would likely need to undergo further remediation before they could be used outside of a landfill waste limits.

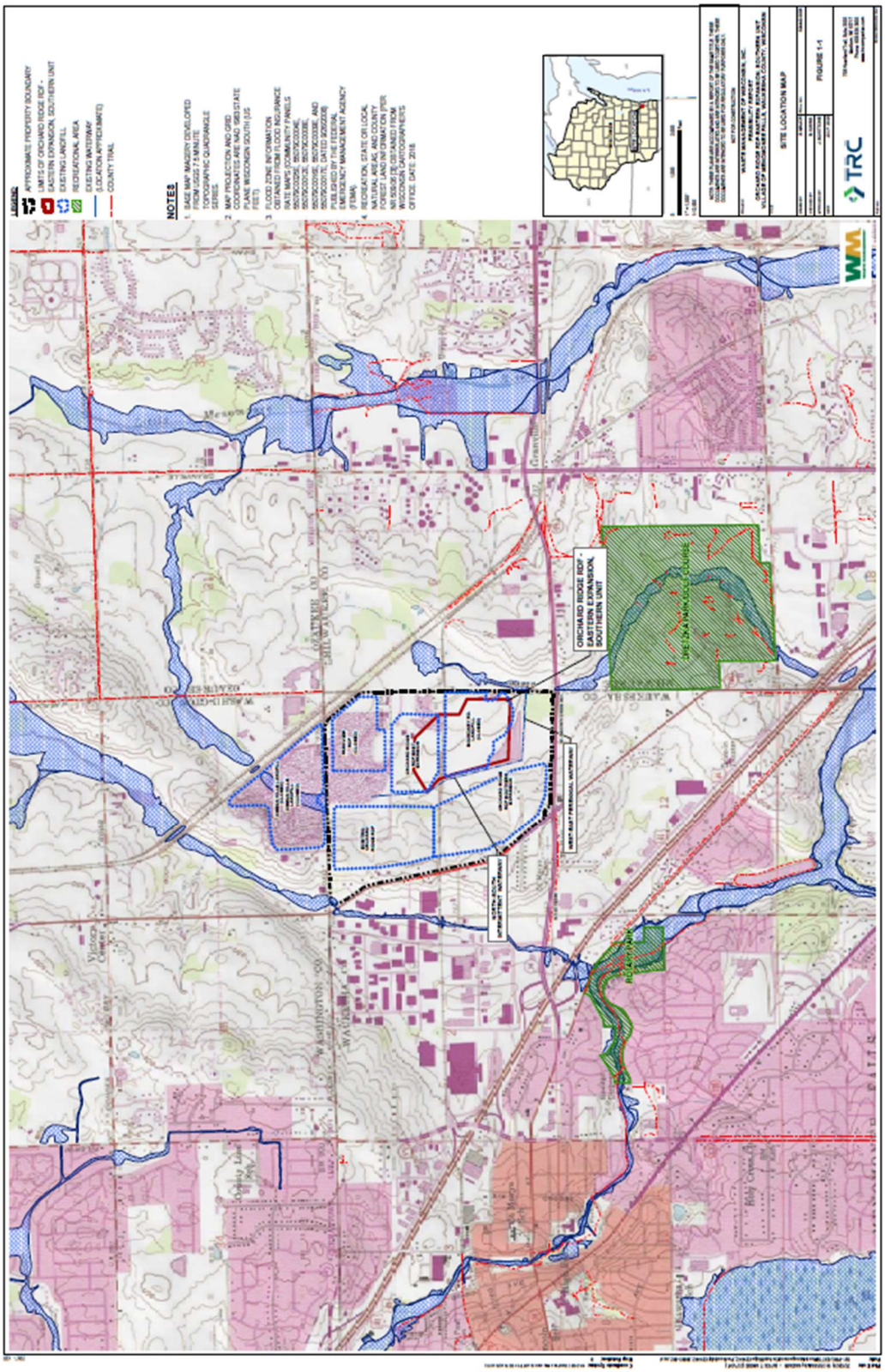
Beneath the BRL waste, samples of the immediate underlying native soil were collected from the upper 2 feet at all boring locations. Samples of the native soil were found to exceed RCLs for twelve VOCs. Most of the RCL exceedances were for the groundwater pathway. The most significant impacts were from BTEX constituents, with benzene exceeding its groundwater pathway RCL in 9 of the 12 samples. Limited impacts from chlorinated VOCs were found (e.g., TCE). The majority of soil samples were documented to be fine-grained, although the 25% of the native soil samples collected from just below the BRL waste was classified as silty sand or gravel. These data supplement the relatively limited geologic information available for soils beneath the existing BRL.

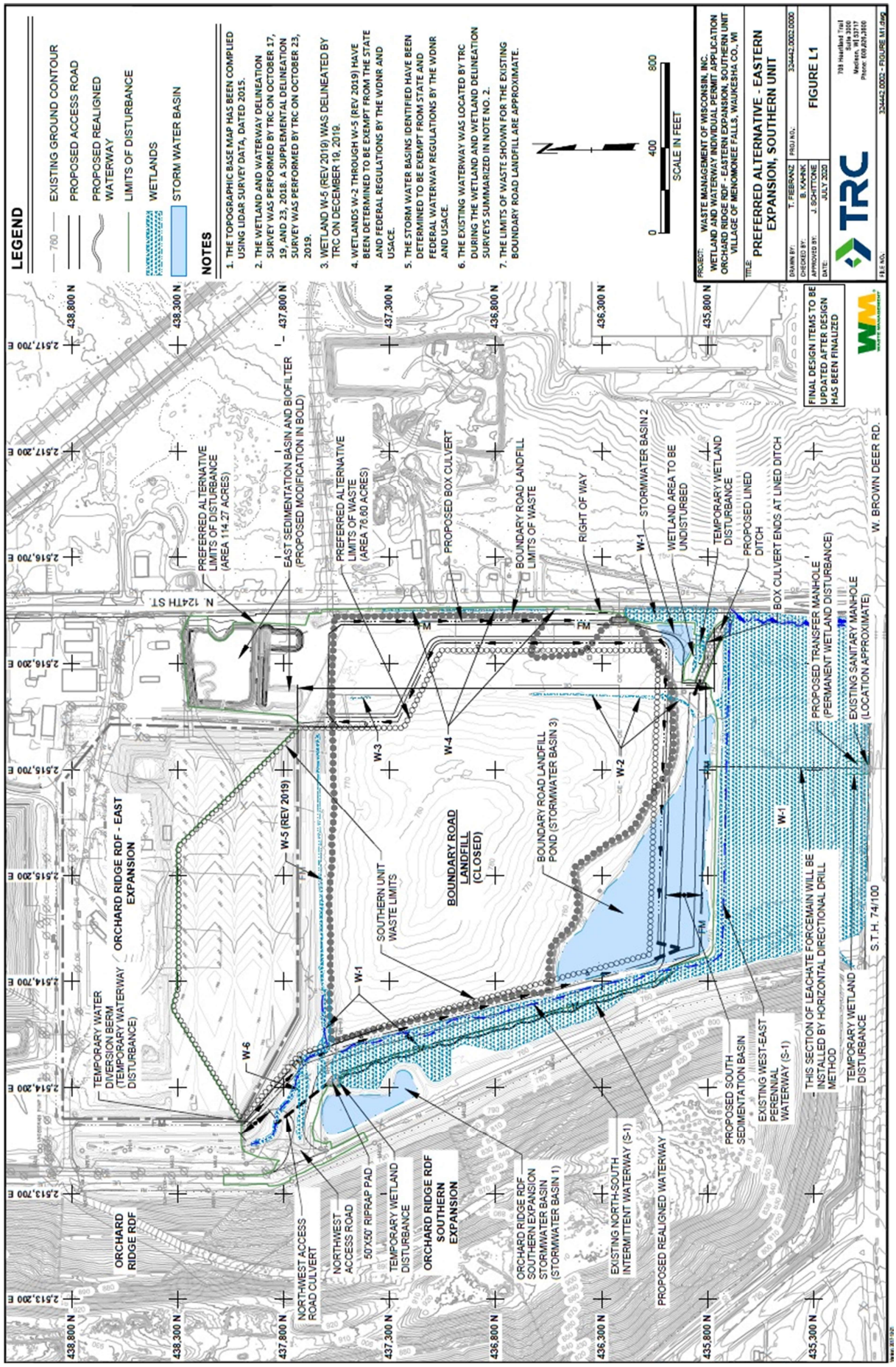
Based on site history, discrete portions of the BRL waste or soils may test as characteristic hazardous waste based on TCLP analysis. Waste or soil that is determined to be a listed or a characteristic hazardous waste would be required to be managed and disposed of in accordance with Wisconsin's hazardous waste regulations. File information documents that acceptance of waste was discontinued in the early 1970s, prior to publication of the first RCRA hazardous waste rules, so none of the solvent wastes were listed wastes at the time they were disposed of at BRL.

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 expansion meets the requirements of the Wisconsin Environmental Policy Act (WEPA) under s. 1.11(2)(c), Wis. Stats and s. NR 150.20, Wis. Adm. Code. Pursuant to s. NR 150.20(2)7, Wis. Adm. Code a solid waste feasibility approval is an integrated analysis action, meaning department programmatic procedures provide for public disclosure and include an environmental analysis that provides sufficient information to establish that an environmental impact statement (EIS) is not required.

Figures from the Feasibility Report




LEGEND
EXISTING GROUND CONTOUR
PROPOSED ACCESS ROAD
PROPOSED REALIGNED WATERWAY
LIMITS OF DISTURBANCE
WETLANDS
STORM WATER BASIN
NOTES
1. THE TOPOGRAPHIC BASE MAP HAS BEEN COMPILED USING LIDAR SURVEY DATA, DATED 2015.
2. THE WETLAND AND WATERWAY DELINEATION SURVEY WAS PERFORMED BY TRC ON OCTOBER 17, 19, AND 23, 2018. A SUPPLEMENTAL DELINEATION SURVEY WAS PERFORMED BY TRC ON OCTOBER 23, 2019.
3. WETLAND W-5 (REV 2019) WAS DELINEATED BY TRC ON DECEMBER 19, 2019.
4. WETLANDS W-2 THROUGH W-5 (REV 2019) HAVE BEEN DETERMINED TO BE EXEMPT FROM THE STATE AND FEDERAL REGULATIONS BY THE WDNR AND USACE.
5. THE STORM WATER BASINS IDENTIFIED HAVE BEEN DETERMINED TO BE EXEMPT FROM STATE AND FEDERAL WATERWAY REGULATIONS BY THE WDNR AND USACE.
6. THE EXISTING WATERWAY WAS LOCATED BY TRC DURING THE WETLAND AND WETLAND DELINEATION SURVEYS SUMMARIZED IN NOTE NO. 2.
7. THE LIMITS OF WASTE SHOWN FOR THE EXISTING BOUNDARY ROAD LANDFILL ARE APPROXIMATE.
0
400
800
SCALE IN FEET
PROJECT: WASTE MANAGEMENT OF WISCONSIN, INC.
WETLAND AND WATERWAY INDIVIDUAL PERMIT APPLICATION
ORCHARD RIDGE RDF - EASTERN EXPANSION, SOUTHERN UNIT
VILLAGE OF MENOMONEE FALLS, WAUKESHA CO., WI
TITLE: PREFERRED ALTERNATIVE - EASTERN EXPANSION, SOUTHERN UNIT
DRAWN BY: T. FEBRANZ
CHECKED BY: B. KAHNK
APPROVED BY: J. SCHITTONE
DATE: JULY 2020
PROJ NO.: 324442.0002.0000
FIGURE L1
TRC
703 Heartland Trail
Suite 3200
Madison, WI 53717
Phone: 608.826.3600
324442.0002 - FIGURE M1.dwg
FINAL DESIGN ITEMS TO BE UPDATED AFTER DESIGN HAS BEEN FINALIZED
ORCHARD RIDGE RDF - EAST EXPANSION
ORCHARD RIDGE RDF SOUTHERN EXPANSION
BOUNDARY ROAD LANDFILL (CLOSED)
SOUTHERN UNIT WASTE LIMITS
BOUNDARY ROAD LANDFILL POND (STORMWATER BASIN 3)
PREFERRED ALTERNATIVE LIMITS OF DISTURBANCE (AREA 114.27 ACRES)
PREFERRED ALTERNATIVE LIMITS OF WASTE (AREA 76.60 ACRES)
EAST SEDIMENTATION BASIN AND BIOFILTER (PROPOSED MODIFICATION IN BOLD)
PROPOSED BOX CULVERT
BOUNDARY ROAD LANDFILL LIMITS OF WASTE
RIGHT OF WAY
STORMWATER BASIN 2
WETLAND AREA TO BE UNDISTURBED
TEMPORARY WETLAND DISTURBANCE
PROPOSED LINED DITCH
BOX CULVERT ENDS AT LINED DITCH
PROPOSED TRANSFER MANHOLE (PERMANENT WETLAND DISTURBANCE)
EXISTING SANITARY MANHOLE (LOCATION APPROXIMATE)
W. BROWN DEER RD.
S.T.H. 74/100
N. 124TH ST
TEMPORARY WATER DIVERSION BERM (TEMPORARY WATERWAY DISTURBANCE)
NORTHWEST ACCESS ROAD CULVERT
NORTHWEST ACCESS ROAD
50'X50' RIPRAP PAD
TEMPORARY WETLAND DISTURBANCE
ORCHARD RIDGE RDF SOUTHERN EXPANSION
ORCHARD RIDGE RDF SOUTHERN EXPANSION STORMWATER BASIN (STORMWATER BASIN 1)
EXISTING NORTH-SOUTH INTERMITTENT WATERWAY (S-1)
PROPOSED REALIGNED WATERWAY
THIS SECTION OF LEACHATE FORCEMAIN WILL BE INSTALLED BY HORIZONTAL DIRECTIONAL DRILL METHOD
TEMPORARY WETLAND DISTURBANCE
PROPOSED SOUTH SEDIMENTATION BASIN
EXISTING WEST-EAST PERENNIAL WATERWAY (S-1)
W-1
W-2
W-3
W-4
W-5 (REV 2019)
W-6
FM
M