

Hillary Young, P.E.
Land Protection Division
Oklahoma Department of Environmental Quality (ODEQ)
707 N. Robinson Ave.
Oklahoma City, OK 73102

Re: 2nd Response to Comments
Tier III Permit Modification
Muskogee Community Recycling and Disposal Facility – Permit No. 3551020
Muskogee County, Oklahoma

Dear Ms. Young:

On behalf of Waste Management of Oklahoma, Inc., please find enclosed replacement pages for the referenced Tier III Permit Modification. The replacement pages were developed to incorporate comments included in your letter dated September 17, 2024. The replacement pages have been developed in redline/strikeout format to facilitate your review.

This response letter contains each item identified in the ODEQ comment letter (in bold) and a response to each item in the same order listed within ODEQ's comment letter.

A response to each of the ODEQ comments follows.

1. Maps and Drawings

- a. **Groundwater Resources and Usage Map – The Response states that the Groundwater Resource and Usage Map (Figure E-1-3) in Volume 2A of the Application was updated to depict the recharge and discharge areas within a three-mile radius of the expansion area; however, the revised map was not attached to the Response. In accordance with OAC 252:515-3-72(b)(3), please revise Figure E-1-3 to show recharge and discharge areas within a three- mile radius of the proposed site boundary.**

Response:

The base map on Figure E-1-3 Groundwater Resources and Usage Map has been updated to depict the recharge and discharge areas within a three-mile radius of the expansion.

- b. **Fill Cross Section Map - The Response states that the Cross-Sections A and B (Drawing 13) in Volume 1 of the Application were updated to depict the initial water level detected in WCG- 19, the only borehole with water observed at the time of drilling; however, Drawing 13 does not depict the initial and static water levels observed in the piezometers surrounding the disposal area. In accordance with OAC 252:515-3- 77(b)(2), please revise Drawing 13 to depict the recorded initial and static water levels, including those measured in piezometer from the approved drilling plan. The highest static level observed at each piezometer should be used in place of individual monthly measurements.**

Response

The piezometers don't fall within the cross sections shown on Drawing 13. Therefore, they were not originally included. Drawing 13 has been updated to project the piezometers into the cross sections and to include the initial and static water levels.

2. **Subsurface Investigation - Section 3.4.2 in Appendix E, Volume 2A of the Application states that "static potentiometric head elevation data have no regulatory implication in evaluating groundwater/waste separation", and thus the engineering design of the proposed expansion area considers the groundwater elevation at the time of drilling to be the highest groundwater for the purpose of evaluating groundwater/waste separation. In the technical NOD issued May 7, 2024, DEQ stated that additional information is needed to support this argument and that the Application be amended to either:**
- i. **Use data from the existing subsurface investigation including Attachment E-1-12: Highest Measured Groundwater Potentiometric Head Surface Contour Map to revise Drawing 7: Excavation Plan to maintain five-foot separation between the highest groundwater elevation and the lowermost surface on which waste will be placed, considering the highest groundwater to be the highest groundwater elevation ever recorded at any borehole, piezometer, or well across the site. Or:**
 - ii. **Provide supplemental data to confirm that the suspected aquifer thought to be confined by the weathered shale layer is indeed confined, which may include the installation of additional piezometers screened above the fractured weathered shale zone, a series of borings to ten feet below the proposed excavation depths, and groundwater/waste separation information from existing monitor wells and disposal cell construction data from the existing landfill to the east. The additional piezometer and borehole**

information may be used to generate a revised highest groundwater contour map as described by OAC 252:515-3-74(b)(I) and Drawing 7: Excavation Plan may be amended accordingly. Prior to drilling, a drilling plan and monitoring schedule shall be provided for DEQ approval.

To ensure that the engineering design presented by the Application maintains the required five-foot separation from groundwater year-round, the highest groundwater elevation measured during the subsurface investigation, which takes into account seasonal variability, must be utilized. Groundwater is mentioned throughout OAC 252:515, including in reference to piezometric measurements. It is not in alignment with OAC 252:515-3-74 or 252:515-3-75 to exclude groundwater elevation measured in a piezometer from consideration of highest groundwater. Groundwater observed at time of drilling does not entirely or adequately characterize groundwater elevation on its own.

The Response did not include either of the above requested amendments to the Application. As a result, several proposed excavation depths depicted in Drawing 7: Excavation Plan continue to be less than five feet above contours depicted in Attachment E-1-12: Highest Measured Groundwater Potentiometric Head Surface Contour Map, and therefore do not meet the requirements for separation of waste from the highest groundwater. In accordance with OAC 252:515-11-3(a), please revise the Application as described in 2.i or 2.ii above. DEQ recommends scheduling a meeting to discuss the regulatory requirements of separation of groundwater if any questions remain after review of this letter

Response:

Documentation provided in the October 10, 2023, Tier III Permit Modification and the July 5, 2024, Response to Comments indicates that the subsurface investigation, groundwater information, and piezometer information provided is in accordance with Oklahoma Administrative Code (OAC) regulatory definitions and requirements. Therefore, the liner system is designed and will be constructed in accordance with OAC 252:515-11-3(a).

However, WMO is willing to provide supplemental data during construction activities to confirm that groundwater is not within 5 feet of the lowermost surface on which waste, including leachate, will be placed. The method of supplemental data will be provided consistent with means that have been utilized and approved by ODEQ on this site historically and recently.

WMO contractors will dig an observation pit within the sump area of each cell to determine if groundwater is present within five feet of the proposed liner grades. The observation pit will be excavated approximately 5 feet below the sump elevation and verified by 3rd party CQA. WMO will document the observation pit in the construction

notice. ODEQ shall be notified at least 48 hours in advance of the observation pit excavation activities to allow for observation of the observation pit excavation activities if they choose.

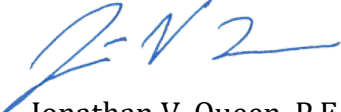
This means of supplemental data has been utilized and approved by ODEQ for previous cell construction as noted below.

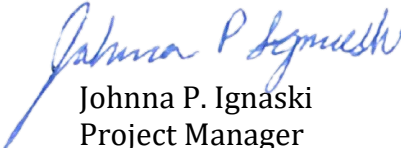
- Cells 12 and 13 – September 2022
- Cell 11B – May 2017
- Cell 11A – August 2015
- Cell 10B – May 2013
- Cell 10A – August 2010
- Cell 9 – August 2009

Section 2.2.1B Observation Pit Excavation has been added to Appendix K Quality Assurance/Quality Control Plan for Liner and Leachate Collection System Installation and Testing has been revised to indicate this method of supplemental data will be utilized and documented in the cell construction notices.

During the course of your review, if you need additional information or have any questions, please call.

Sincerely,
Weaver Consultants Group, LLC


Jonathan V. Queen, P.E.
Project Director


Johnna P. Ignaski
Project Manager

Attachments: Attachment 1 – Tier III Replacement Pages

cc: Guy R. Campbell, Waste Management of Oklahoma, Inc.

ATTACHMENT 1
TIER III REPLACEMENT PAGES

**MUSKOGEE COMMUNITY RECYCLING
AND DISPOSAL FACILITY
MUSKOGEE COUNTY, OKLAHOMA
ODEQ PERMIT NO. 3551020

TIER III PERMIT MODIFICATION
LANDFILL EXPANSION

VOLUME 1 OF 4**

Prepared for

Waste Management of Oklahoma, Inc.

October 2023
Revised July 2024

Revised January 2025



Prepared by

Weaver Consultants Group, LLC
CA 3804 PE 06/30/2025
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No. 0086-364-11-19

[Signature]
01/10/2025

WASTE MANAGEMENT OF OKLAHOMA, INC.

MUSKOGEE COMMUNITY RECYCLING AND DISPOSAL FACILITY

MUSKOGEE COUNTY, OKLAHOMA

LANDFILL EXPANSION

INDEX TO DRAWINGS

DRAWING NO	DRAWING TITLE
1	COVER SHEET AND SITE VICINITY MAP
2	LOCATION AND BOUNDARY MAP
3	EXISTING GROUND CONTOUR MAP
4	EXISTING PERMITTED DRAINAGE PLAN
5	POST-DEVELOPMENT DRAINAGE PLAN
6	SITE PLAN
7	EXCAVATION PLAN
8	TOP OF LINER PLAN
9	TOP OF PROTECTIVE COVER PLAN
10	CLOSURE CONTOUR AND STORMWATER MANAGEMENT PLAN
11	CROSS-SECTION LOCATION MAP-OPEN PHASES
12	CROSS-SECTION LOCATION MAP-CLOSED PHASES
13	CROSS-SECTION A AND B
14	LINER AND LEACHATE COLLECTION SYSTEM DETAILS
15	LINER AND LEACHATE COLLECTION SYSTEM DETAILS
16	FINAL COVER DETAILS
17	DRAINAGE DETAILS
18	DRAINAGE DETAILS
19	DRAINAGE DETAILS
20	DRAINAGE DETAILS

OCTOBER 2023
REVISED JULY 2024
REVISED JANUARY 2025

PREPARED FOR

WASTE MANAGEMENT OF OKLAHOMA, INC.

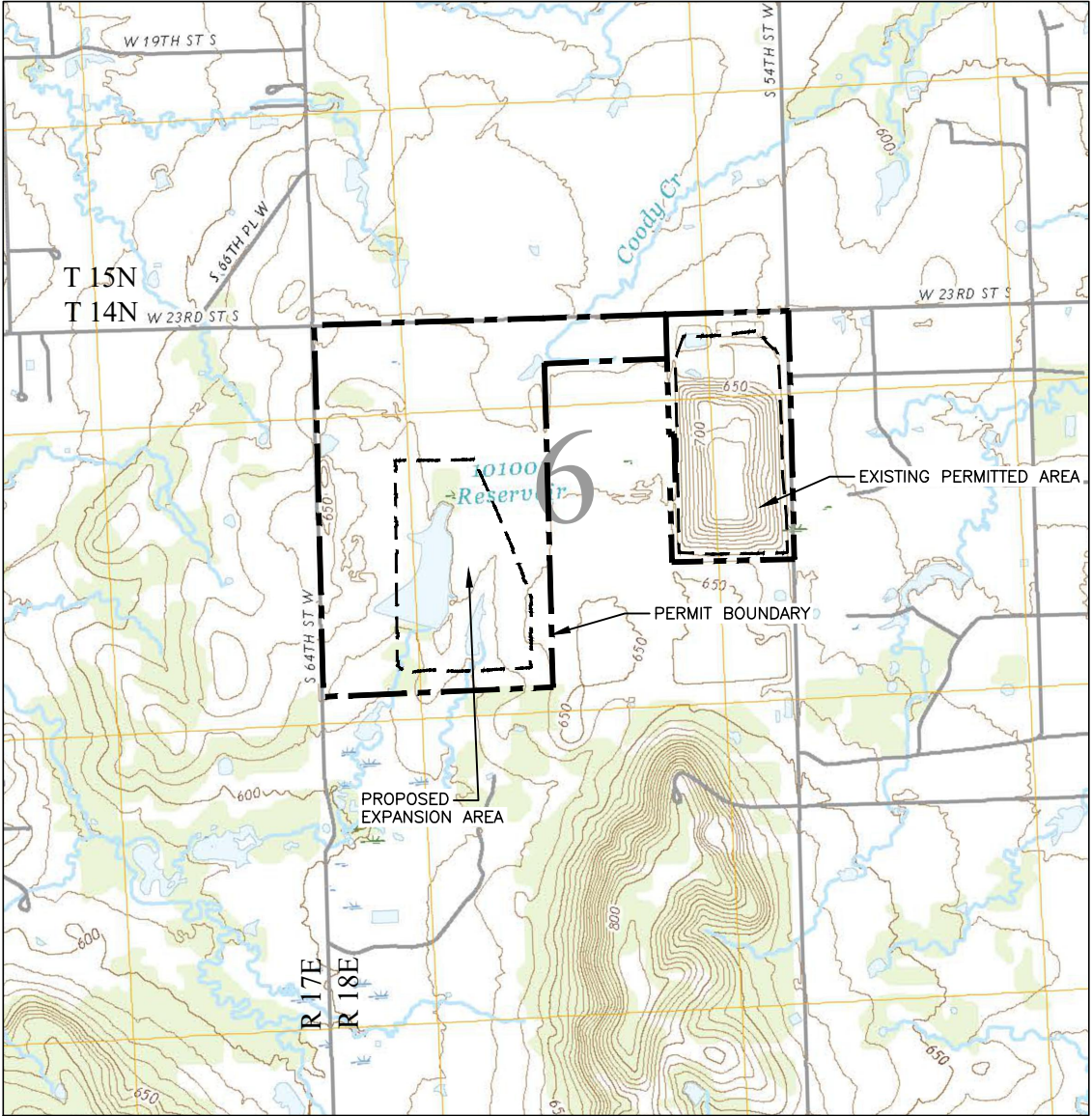


PREPARED BY

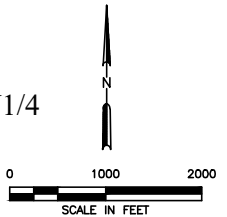


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(817) 735-9775 (FAX)
CA 3804 PE - 06/30/2025

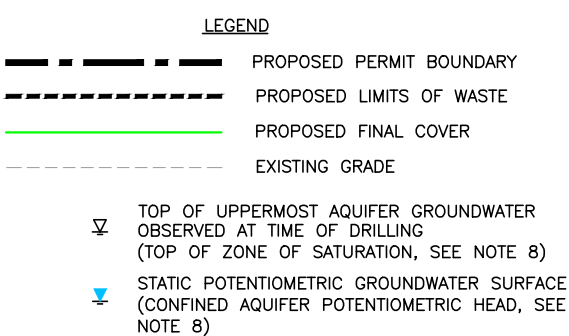
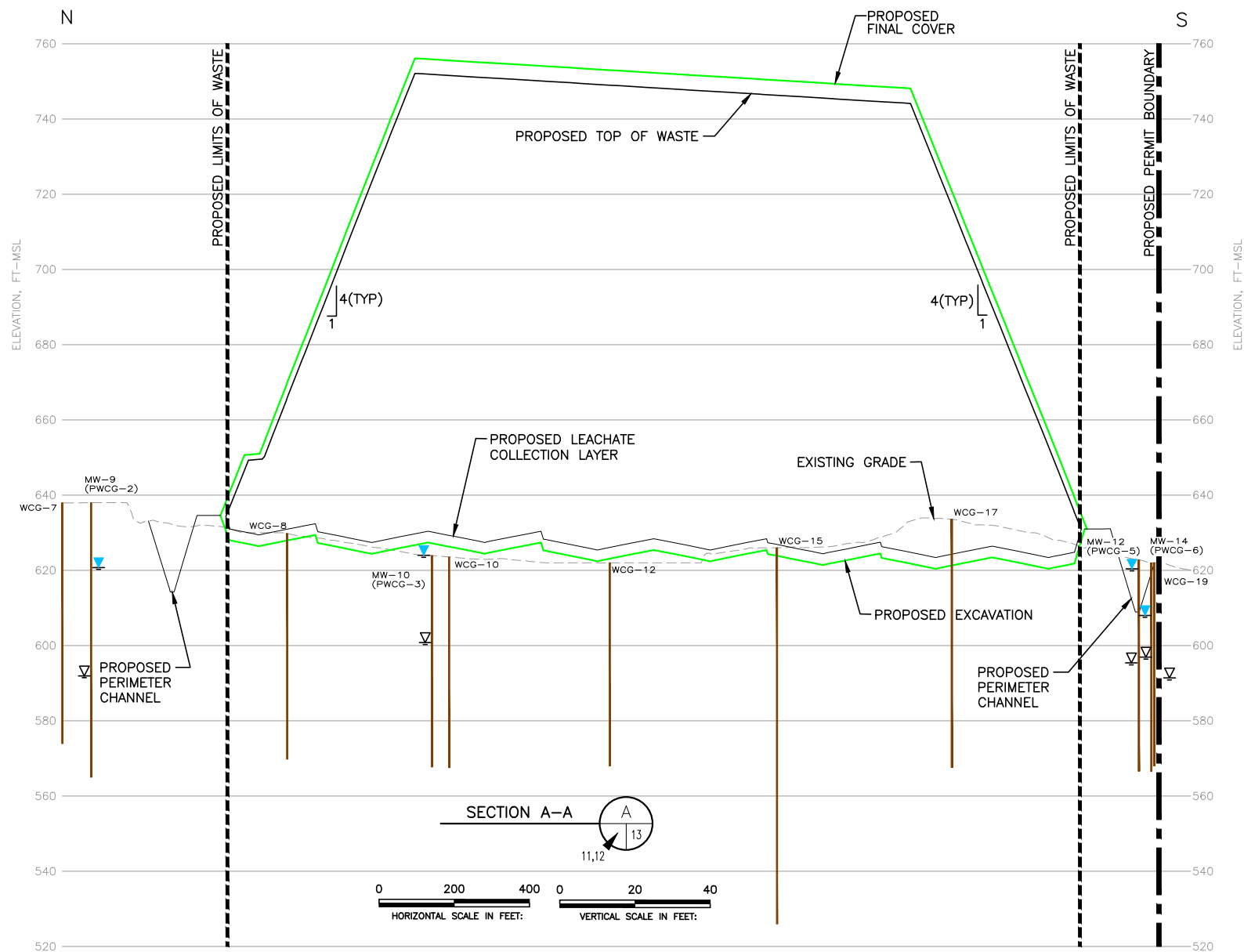
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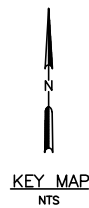
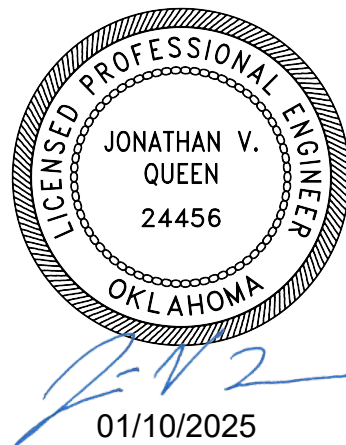
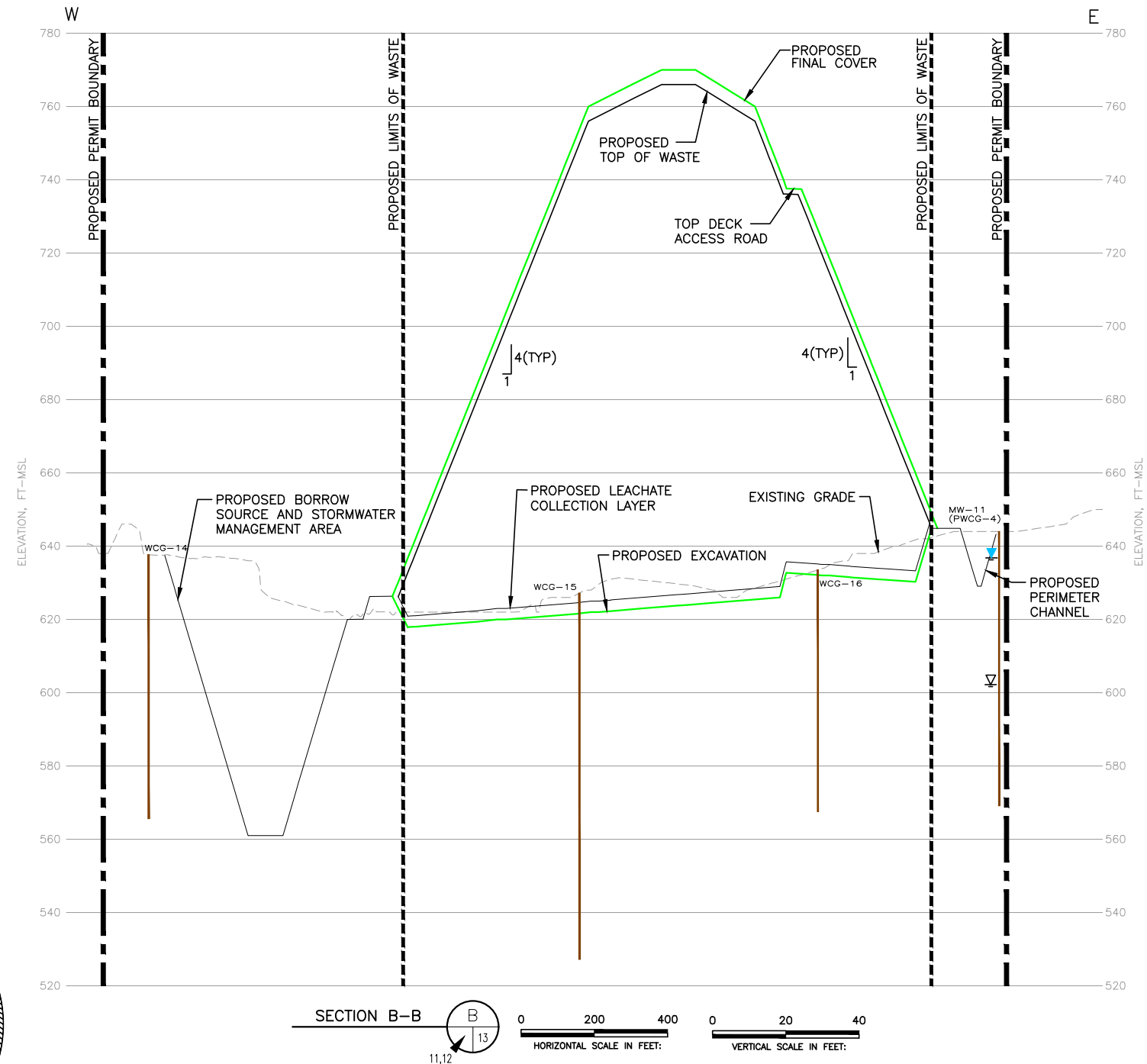
VICINITY MAP
U.S. GOVERNMENTS LOTS 3, 4, 5, 6, AND PART OF
U.S. GOVERNMENT LOTS 1 AND 2, SE1/4 NE1/4, AND NE1/4 SW1/4
T 14N, R 18E, SECTION 6
MUSKOGEE COUNTY, STATE OF OKLAHOMA




C:\0086\364\EXPANSION 2022\PERMIT DRAWINGS\13-CROSS SECTION.dwg, r arrington, 1:2



- NOTES:**
- EXISTING CONTOURS AND ELEVATIONS PROVIDED BY HYDREX ENVIRONMENTAL FROM AERIAL PHOTOGRAPHY FLOWN 01-24-2022.
 - REFER TO DRAWING 14 FOR LINER SYSTEM DETAILS.
 - REFER TO DRAWING 15 FOR LEACHATE COLLECTION SYSTEM DETAILS.
 - REFER TO DRAWING 16 FOR PERIMETER ROAD AND CHANNEL DETAILS.
 - REFER TO DRAWING 16 FOR FINAL COVER DETAILS.
 - POST DEVELOPMENT AND EXCAVATION GRADES ARE SHOWN ON DRAWINGS 11 AND 12.
 - ADDITIONAL BORING AND GROUNDWATER INFORMATION IS PROVIDED IN APPENDIX E.
 - TOP OF UPPERMOST AQUIFER GROUNDWATER ELEVATION OBSERVED AT TIME OF DRILLING INDICATED FOR BORING WCG-19, ALL OTHER BORINGS DEPICTED WERE DRY AT TIME OF DRILLING. THERE IS NO STATIC GROUNDWATER ELEVATION DATA FOR THE DEPICTED BORINGS WHICH WERE NOT COMPLETED AS GROUNDWATER PIEZOMETERS.



<div><input type="checkbox"/> DRAFT</div> <div><input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY</div> <div><input type="checkbox"/> ISSUED FOR CONSTRUCTION</div>		PREPARED FOR		TIER III PERMIT MODIFICATION CROSS-SECTIONS A AND B	
		WASTE MANAGEMENT OF OKLAHOMA, INC.			
DATE: 10/2023 FILE: 0086-364-11 CAD: 13-CROSS SECTION A.DWG		DRAWN BY: JDW DESIGN BY: JBP REVIEWED BY: JVQ		MUSKOGEE COMMUNITY RDF MUSKOGEE COUNTY, OKLAHOMA	
REVISIONS					
NO.	DATE	DESCRIPTION			
1	07/2024	ADDED GROUNDWATER ELEVATION SYMBOL TO LEGEND AND WCG-19 AND ADDED NOTE 8			
2	01/2025	ADDED PIEZOMETERS			
<div> Weaver Consultants Group</div> <div>CA 3804 PE - 06/30/2025</div>				WWW.WCGRP.COM	
				DRAWING 13	

**MUSKOGEE COMMUNITY RECYCLING
AND DISPOSAL FACILITY
MUSKOGEE COUNTY, OKLAHOMA
ODEQ PERMIT NO. 3551020

TIER III PERMIT MODIFICATION
LANDFILL EXPANSION

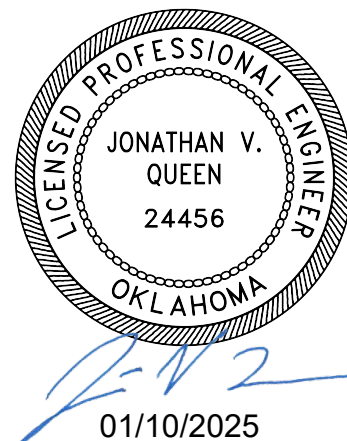
VOLUME 2A OF 4**

Prepared for

Waste Management of Oklahoma, Inc.

October 2023
Revised July 2024

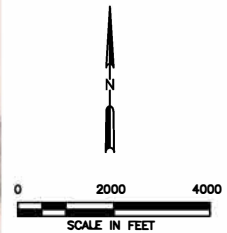
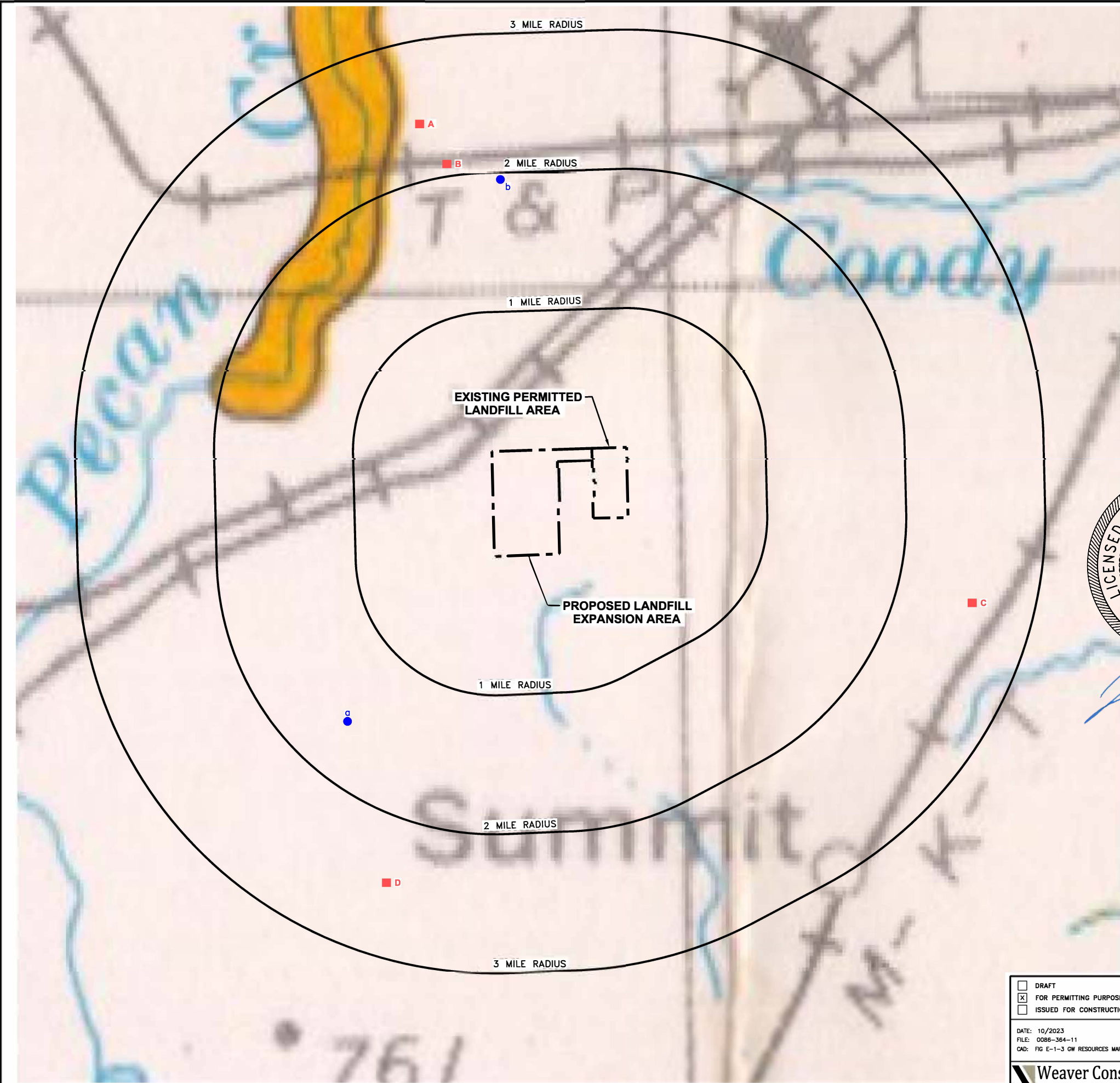
Revised January 2025



Prepared by

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817-735-9770

WCG Project No. 0086-364-11-19



LEGEND	
	EXISTING PERMIT BOUNDARY
	PROPOSED PERMIT BOUNDARY
	OWRB PRIVATE WATER WELL LOCATION WITHIN 2.0 MILE OF PROPOSED PERMIT BOUNDARY
	OWRB PRIVATE WATER SUPPLY WELL LOCATION WITHIN 3.0 MILES OF PROPOSED PERMIT BOUNDARY

EXPLANATION

Alluvium and Terrace Deposits and Their Recharge Areas (Quaternary in age). Unconsolidated deposits of sand, silt, clay, and gravel that occur along or adjacent to modern and ancient streams. Thickness generally ranges from 10 to 50 ft (locally as much as 100 ft). Wells generally yield 10 to 500 gpm of water (locally several thousand gpm), and most water is of good quality (less than 1,000 mg/L dissolved solids). Recharge areas are essentially the same as distribution of the alluvium and terrace deposits.

Bedrock Aquifers and Their Recharge Areas (Cambrian through Tertiary in age). Rock units and sediments that generally are favorable or moderately favorable for development of groundwater resources. Thickness of aquifers generally ranges from 100 ft to several thousand ft. Depths to fresh water range from a few feet to more than 1,000 ft, with most wells 100-400 ft deep. Wells drilled into these aquifers generally yield 25-300 gpm, although wells in some aquifers yield up to 600-2,500 gpm. Water in most aquifers is of good to fair quality (300-1,500 mg/L dissolved solids). Pattern on map also includes known and potential recharge areas for bedrock aquifers.



[Signature]
01/10/2025

PRIVATE WATER SUPPLY WELLS INSIDE 2 MILE RADIUS				
MAP ID	WELL ID #	OWNER	TOTAL DEPTH	GROUNDWATER ELEVATION
a	23573	B.E. DAVIS	N/A*	N/A*
b	23573	B.E. DAVIS	N/A*	N/A*

PRIVATE WATER SUPPLY WELLS INSIDE 3 MILE RADIUS				
MAP ID	WELL ID #	OWNER	TOTAL DEPTH	GROUNDWATER ELEVATION
A	168576	ANTHIS	75	14
B	185470	DONALD BROOKS	N/A*	60
C	36841	JACK ASHWOOD	N/A*	N/A*
D	71669	JIM HALEY	N/A*	N/A*

* INFORMATION NOT AVAILABLE ON THE OKLAHOMA WATER RESOURCES BOARD WEB PAGE.

- NOTES:**
- THIS FIGURE SHOWS THE SITE LOCATION ON THE "MAP OF AQUIFERS AND RECHARGE AREAS IN OKLAHOMA," COMPILED BY KENNETH S. JOHNSON, GEOLOGICAL SURVEY, 1991. THE 1991 MAP BRINGS TOGETHER DATA PREVIOUSLY PRESENTED ON TWO MAPS: ONE ON BEDROCK AQUIFERS AND THE OTHER ON ALLUVIUM AND TERRACE DEPOSITS COMPILED BY K.S. JOHNSON, 1983 (MAPS SHOWING PRINCIPAL GROUNDWATER RESOURCES AND RECHARGE AREAS IN OKLAHOMA; OKLAHOMA STATE DEPARTMENT OF HEALTH AND THE OKLAHOMA GEOLOGICAL SURVEY, 2 SHEETS). TYPICALLY, RECHARGE TO ALLUVIAL AND TERRACE DEPOSIT AQUIFERS IS FROM PERCOLATION OF SURFACE WATER FOLLOWING RAINFALL EVENTS.
 - PERMIT BOUNDARY WAS REPRODUCED FROM LEGAL DESCRIPTION PREPARED BY WEAVER CONSULTANTS GROUP, SIGNED BY MICHAEL D BYTNER, LLS# 1986.
 - PUBLIC WATER WELL RECORDS OBTAINED FROM THE OKLAHOMA WATER RESOURCES BOARD (OWRB) ON-LINE GIS DATABASES (SEPTEMBER 2022).
 - THE OWRB RECORDS INDICATE THERE ARE NO SURFACE WATER INTAKES LOCATED WITHIN 3.0 MILES DOWNSTREAM OF THE FACILITY.
 - NO WATER SUPPLY WELLS IDENTIFIED WITHIN 1 MILE RADIUS.

☐ DRAFT

☒ FOR PERMITTING PURPOSES ONLY

☐ ISSUED FOR CONSTRUCTION

DATE: 10/2023

FILE: 0086-364-11

CAD: FIG E-1-3 GW RESOURCES MAP.DWG

DRAWN BY: RAA

DESIGN BY: JBP

REVIEWED BY: JVO

PREPARED FOR

WASTE MANAGEMENT OF OKLAHOMA, INC.

REVISIONS

NO.	DATE	DESCRIPTION
1	01/2025	ADDED AQUIFER RECHARGE AREAS

WEAVER CONSULTANTS GROUP

CA 3804 PE-06/30/2025

TIER III PERMIT MODIFICATION

GROUNDWATER RESOURCES

AND USAGE MAP

MUSKOGEE COMMUNITY RDF

MUSKOGEE COUNTY, OKLAHOMA

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FIGURE E-1-3

0:\0086\364\EXPANSION 2022\APPENDIX E\E-1-3 GW RESOURCES & USAGE MAP.dwg, jqueen, 1:2

**MUSKOGEE COMMUNITY RECYCLING
AND DISPOSAL FACILITY
MUSKOGEE COUNTY, OKLAHOMA
ODEQ PERMIT NO. 3551020

TIER III PERMIT MODIFICATION
LANDFILL EXPANSION

VOLUME 3 OF 4**

Prepared for

Waste Management of Oklahoma, Inc.

October 2023
Revised July 2024

Revised January 2025



Prepared by

01/10/2025

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WCG Project No. 0086-364-11-19

**MUSKOGEE COMMUNITY
RECYCLING AND DISPOSAL FACILITY
MUSKOGEE COUNTY, OKLAHOMA
ODEQ PERMIT NO. 3551020**

APPENDIX K

**QUALITY ASSURANCE/QUALITY CONTROL PLAN
FOR LINER AND LEACHATE COLLECTION
SYSTEM INSTALLATION AND TESTING**

Prepared for

Waste Management of Oklahoma, Inc.

October 2023

Revised July 2024

Revised January 2025



Prepared by

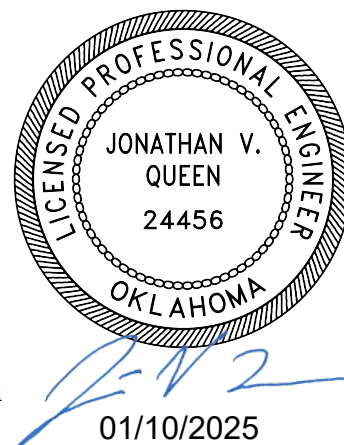
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WCG Project No. 0086-364-11-19

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2 CONSTRUCTION QUALITY ASSURANCE FOR EARTHWORK

2.1 Introduction

This section of the Quality Assurance/Quality Control (QA/QC) Plan addresses the construction of the earthwork components of the liner system and outlines the QA/QC Plan program to be implemented with regard to materials selection and evaluation, laboratory test requirements, field test requirements, and treatment of problems.

The landfill is designed to include a Subtitle D composite liner for the undeveloped liner area. The liner system for the undeveloped area will consist of a 2-foot-thick compacted clay liner and a 60-mil-thick high density polyethylene (HDPE) Flexible Membrane Liner (FML). An alternative liner option is also available for the which consists of replacing the 2 foot compacted clay layer with a geosynthetic clay liner (GCL) and a 1-foot-thick compacted clay layer ($k \leq 1 \times 10^{-7}$ cm/s). Refer to Section 3 of this QA/QC Plan for more information regarding the Construction Quality Assurance for the FML and GCL.

2.2 Earthwork Construction

The following paragraphs describe general construction procedures to be used for various earthwork components within the landfill. The earthwork construction specifications will be developed based on the material and construction procedures outlined in this section of the QA/QC Plan for each specific liner construction.

2.2.1A Subgrade

Subgrade refers to a surface which is exposed after stripping topsoil or excavating to establish the grade directly beneath the composite liner. The subgrade must be constructed to allow for the composite liner to conform to the permitted Top of Liner Plan.

Prior to beginning liner construction, the subgrade area will be stripped to a depth sufficient to remove all loose surface soils or soft zones within the exposed excavation. The upper 6 inches of the subgrade will be compacted to a minimum of 90 percent of the maximum dry density as determined by the Standard Proctor (ASTM D698), unless the subgrade is part of the perimeter berm. Perimeter berm soils shall be compacted to 95 percent of the maximum dry density. The liner

subgrade area will be proof rolled with heavy, rubber tired construction equipment to detect unstable areas. Unstable areas will be undercut to firm material and backfilled with suitable compacted general fill. The subgrade will also be scarified prior to placement of the first lift of clay liner.

Subgrade voids and cracks are expected to be minor. However, the subgrade will be re-worked as necessary to provide a foundation suitable for soil liner placement. Visual examination of the subgrade preparation by the CQA monitor will generally be sufficient to evaluate its suitability as a foundation for the subgrade. The CQA monitor may find that physical testing is necessary to evaluate the prepared subgrade or general fill placed in large voids.

The POR will approve the prepared subgrade prior to the placement of soil liner or general fill. Approval will be based on a review of test information, if applicable, and CQA monitoring of the subgrade preparation.

2.2.1B Observation Pit Excavation

Observation pits will be dug in each cells sump area prior to initiating construction activities. The observation pits will be excavated 5 feet below the sump elevation and verified by 3rd party COA. The observation pits will be used to verify that groundwater is not present within 5 feet of the sump elevation. This information will be included as part of the cell's construction notice. ODEQ shall be notified at least 48 hours in advance of observation pit excavation activities to allow for observation of excavation activities. If groundwater is encountered in the observation pit, a permit modification will be submitted to ODEQ to revise the cell grades.

2.2.2 General Fill

General fill material placed below the floor of the composite liner will be placed in uniform lifts to an elevation of subgrade minus 1 foot and proof-rolled with a heavy, rubber tired construction equipment to detect unstable areas. Unstable areas will be undercut to firm material and backfilled with suitable compacted general fill. The remaining 1 foot will be placed in uniform lifts that do not exceed 9 inches in loose thickness and are compacted to at least 90 percent of the maximum dry density as determined by the Standard Proctor (ASTM D698) at a moisture content equal to or greater than the optimum moisture content.

General fill material placed as part of the perimeter berm will be placed in uniform lifts that do not exceed 9 inches in loose thickness and are compacted to at least 95 percent of the maximum dry density as determined by the Standard Proctor (ASTM D698) at a moisture content equal to or greater than the optimum moisture content.

General fill material will be relatively homogeneous clay, silty clay, sandy clay, or clayey sand. The material shall be classified as CL, CH, ML, SM, or SC according to the Unified Soil Classification System (USCS). General fill shall be tested to determine

the USCS classification at a frequency of 1 per 50,000 cy. The general fill material interface strength parameters will be verified by the Design Engineer prior to construction by review of existing data or completion of additional testing to verify the assumed strength parameter values utilized in the site slope stability analysis. The analysis was developed using peak strength values and a factor of safety of 1.5 (long-term condition), 1.3 (short-term condition), and 1.15 (seismic condition). If test results differ from assumed values, the analysis will be updated to meet these minimum factor of safety values and the additional analysis will be placed in the Site Operating Record.

2.2.3 Soil Liner

The soil liner will consist of a minimum 2-foot-thick (or 1-foot minimum thickness if the GCL alternative liner system is used) compacted clay liner (measured perpendicular to the subgrade surface) that will extend along the floor and side slopes of the landfill. The soil liner will be constructed in continuous, single, compacted lifts (6 inches thick) parallel to the floor and sideslope subgrades with a permeability of 1×10^{-7} cm/s or less.

Surveying will be performed to verify that the excavation/bottom of clay liner grades is to the lines and grades specified in the design with a vertical tolerance of -0.2 feet to +0.0 feet to ensure that the clay liner will achieve a 2-foot minimum thickness (or 1-foot minimum thickness if the GCL alternative liner system is used).

2.2.3.1 Soil Liner Material

Adequate clayey soil liner material will be available from landfill excavations and/or onsite borrow sources. The liner soil will be free of debris, rock greater than 1 inch in diameter, vegetative matter, frozen materials, foreign objects, and organics. Laboratory tests will verify that materials are adequate to meet the compacted clay liner requirements prior to liner construction. As necessary, an off-site borrow source can be used for soil liner and protective cover construction. Representative samples from onsite and/or offsite borrow sources will be subject to the minimum pre-construction testing program shown in Table 2-1.