Environmental Consultants & Contractors

SCS ENGINEERS

August 19, 2025 File No. 27220345.00

Mr. Jeff Biddick Oklahoma Department of Environmental Quality Division of Land Protection 707 N. Robinson P.O. Box 1677 Oklahoma City, OK 73101-1677

Subject: Tier III Permit Modification – Response to May 13, 2025 NOD

American Environmental Landfill ODEQ Permit No.: 3557021

Dear Mr. Biddick:

On behalf of our Client, American Environmental Landfill, Inc., SCS Engineers is submitting this response to the Notice of Deficiency dated May 13, 2025, from the Oklahoma Department of Environmental Quality (ODEQ) associated with the American Environmental Landfill Tier III Permit Application dated May 31, 2024. SCS Engineers has addressed the deficiency noted in the Notice of Deficiency, and the response is shown below. The Revised Tier III Permit Modification and Permit Drawings, which have been revised from the previous submittal, are included in Attachment A.

1. **Groundwater elevations:** In accordance with OAC 252:515-11-3, please provide revised landfill contours ensuring 5-foot separation from the highest recorded groundwater elevation at each borehole, piezometer, or monitoring well across the site. Alternatively, DEQ may conceptually approve the waste disposal expansion area as proposed, but approval is conditioned upon the completion of an additional groundwater study prior to cell construction. The additional groundwater study should include submittal of a drilling plan and drilling notification to DEQ, installation of piezometers in the proposed disposal cell(s), and monthly monitoring of piezometers for 12 months. Based on the results, AEL must submit construction plans, with revised cell base grades as needed, to verify compliance with OAC 252:515-11-3.

Response: AEL revised Cell 7 base grades to account for the highest observed groundwater elevations in B-21, B-26, and B-34. Section 5.1 has been added to the permit application to include additional groundwater studies, prior to cell construction, in the remaining cells of the expansion area, as necessary, to maintain a minimum 5-foot separation between the lowest placement of waste and the highest recorded groundwater elevation. Section 6.2.1 of the permit application has been revised to reflect the capacity decrease associated with the revised contours of Cell 7 and to reflect the current permitted volume based on the ODEQ acceptance of Phase IVH/IVI/IVN, dated May 7, 2024.

The Permit Drawings have been revised to show the revised Cell 7 base grades, after accounting for the observed groundwater elevation in B-21, B-26, and B-34.

This response has been prepared to address the Notice of Deficiency dated May 13, 2025, in reference to the Tier III Permit Modification dated May 31, 2024. We trust that the attached documents include all the information sufficient for your approval. Should you have any questions or comments or need additional information, please do not hesitate to contact the undersigned at (405) 246-1577. Thank you very much for your time and effort in this matter.

Sincerely,

Trevar Lytle, P.E. Project Manager SCS Engineers Floyd Cotter, P.E. Vice President | Project Director SCS Engineers

cc: Mr. Wade Miller – American Environmental Landfill, Inc.

Attachments:

Revised Tier III Permit Application

Attachment A Revised Tier III Permit Application

APPLICATION TO MODIFY A SOLID WASTE DISPOSAL FACILITY PERMIT

	County: Osage
Send to: Solid Waste Permitting Unit Land Protection Division Dept. of Environmental Quality 707 N. Robinson (PO Box 1677) Oklahoma City, OK 73101-1677	FOR DEQ USE DEQ Log No. No. Copies Date Received:
(Applicant's Name)	es to modify the permit of ted at See Attached
(Facility Name)	(Exact legal description:
of existing permit number 3557021 as r Management Act and the Rules pursuant t Remarks & brief description of proposed mod Approximate 203 acre expansion of the landfill p	hereto.
Applicant or Authorized Agent	Preparing Engineer:
Applicant or Authorized Agent Signature Todd Green Typed Name Address: 1420 W. 35th Street, Suite B City: Tulsa State: OK	Preparing Engineer: Signature Floyd Cotter Typed Name Address: _8575 W, 110th St. Suite 100 City: _Overland Park
Signature Todd Green Typed Name Address: 1420 W. 35th Street, Suite B	Signature Floyd Cotter Typed Name Address: 8575 W, 110th St. Suite 100

VERIFICATION1

STATE OF OKLAHOMA)
COUNTY OF TUISA) ss)
Todd Green	, of lawful age, being first duly sworn, upon oath
state that I have read the foregoing A	PPLICATION TO MODIFY A SOLID WASTE in familiar with the matters set forth therein, and that
the same are true to the best of my information	on and belief.
	American Environmental Landfill, Inc.
	Applicant
Subscribed and sworn to before me t	his 21st day of May, 2024,
by Jarah Abbott	(Applicant or logal representative) SARAH ABBOTT Notary Public Notary Public
My commission expires:	
April 12, 2025	

¹ This Verification is required for a Tier III modification application.

American Environmental Landfill, Inc. Legal Description:

The Northeast Quarter (NE/4) of the Southeast Quarter (SE/4) and the East Half (E/2) of the Northwest Quarter (NW/4) of the Southeast Quarter (SE/4) and the Northwest Quarter (NW/4) of the Northwest Quarter (NW/4) of the Southeast Quarter (SE/4) of Section 36, Township 20 North, Range 10 East of the Indian Meridian, Osage County, Oklahoma.

AND

A tract of land being a part of the West Half (W/2) of Section 36 and the East Half (E/2) of Section 35, Township 20 North, Range 10 East of the Indian Meridian, Osage County, Oklahoma and being more particularly described as follows:

BEGINNING at the Southwest corner of said Section 36;

Thence North 01°10'20" East along the West line of said Section 36, a distance of 354.62 feet to the Southwest corner of the North Half (N/2) of the Southwest Quarter (SW/4) of said Section 36;

Thence South 89°15'49" West along the South line of the East Half (E/2) of the Northeast Quarter (NE/4) of the Southeast Quarter (SE/4) of said Section 35, a distance of 320.25 feet;

Thence North 01°03'24" West, a distance of 1413.21 feet:

Thence North 88°56'36" East, a distance of 273.38 feet;

Thence North 00°03'14" East parallel to and 100.00 feet West of the East line of the Northeast Quarter (NE/4) of said Section 35, a distance of 564.60 feet;

Thence North 88°42'49" East a distance of 100.03 feet to the Northwest corner of the South Half (S/2) of the South Half (S/2) of the Northwest Quarter (NW/4) of said Section 36:

Thence continuing North 88°42'49" East along the North line of the South Half (S/2) of the South Half (S/2) of the Northwest Quarter (NW/4) of said Section 36, a distance of 1318.42 feet;

Thence South 01°01'16" East, a distance of 606.18 feet;

Thence North 88°58'44" East, a distance of 400.00 feet;

Thence North 01°01'16" West, a distance of 608.04 feet to a point on the North line of the South Half (S/2) of the South Half (S/2) of the Northwest Quarter (NW/4) of said Section 36;

Thence North 88°42'49" East along the North line of the South Half (S/2) of the South Half (S/2) of the Northwest Quarter (NW/4) of said Section 36, a distance of 921.97 feet to the Northeast corner of the South Half (S/2) of the South Half (S/2) of the Northwest Quarter (NW/4) of said Section 36;

Thence South 00°06'30" East along the East line of the West Half (W/2) of said Section 36, a distance of 2360.46 feet to the Southeast corner of the Southwest Quarter (SW/4) of said Section 36;

Thence South 89°16'14" West along the South line of the Southwest Quarter (SW/4) of said Section 36, a distance of 2679.26 feet to the POINT OF BEGINNING.

Said tract of land contains 150.09 acres, more or less.

AND

The South 50.00 feet of the East 1165.11 feet of the Southeast Quarter (SE/4) of the Northeast Quarter (NE/4) of Section 36, Township 20 North, Range 10 East of the Indian Meridian, Osage County, Oklahoma.

Said tract of land contains 1.34 acres, more or less.

AND

A Tract of land in the East Half (E/2) of Section Thirty-five (35) and the West Half of the West Half (W/2 W/2) of Section Thirty-six (36), Township Twenty (20) North, Range Ten (10) East of the Indian Meridian, Osage County, Oklahoma and being more particularly described as follows:

BEGINNING at the Southeast Corner of said Section 35;

Thence S89°51'44"W on the South Line of said Section 35 a distance of 2,624.40 feet to the Southwest Corner of said E/2:

Thence N0°10'55"E on the West Line of said E/2 a distance of 2,083.00 feet;

Thence N44°26'58"E a distance of 1,254.02 feet to a point on the South Line of the North Half of the Northeast Quarter (N/2 NE/4) of said Section 35;

Thence N16°00'28"E a distance of 330.70 feet;

Thence N88°51'08"E parallel with the North Line of said E/2 a distance of 1684.00 feet to a point on the East Line of said Section 35;

Thence N87°55'47"E parallel with the North Line of said W/2 W/2 of Section 36 a distance of 1319.51 feet to a point on the East Line of said W/2 W/2;

Thence S0°03'02"E on the East Line of said W/2 W/2 a distance of 1006.10 feet to the Southeast Corner of the North Half of the Southwest Quarter of the Northwest Quarter (N/2 SW/4 NW/4) of said Section 36;

Thence S88°42'53"W on the South Line of said N/2 SW/4 NW/4 a distance of 1.84 feet to a Chiseled Cross found for a corner of the existing Permit Boundary (also the Northwest Corner of the tract known as the Cemetery, as described in JOURNAL ENTRY OF JUDGEMENT, Recorded in Book 1429 @ Page 693);

Thence continuing S88°42'53"W on the existing Permit Boundary and on the South Line of said N/2 SW/4 NW/4 a distance of 1318.20 feet to the Southwest Corner of said N/2 SW/4 NW/4;

Thence continuing S88°42'53"W on the existing Permit Boundary, entering said Section 35, a distance of 100.03 feet;

Thence S0°00'35"W on the existing Permit Boundary, parallel with the East Line of said Section 35 a distance of 564.60 feet;

Thence S88°57'36"W on the existing Permit Boundary a distance of 273.49 feet;

Thence S1°02'24"E on the existing Permit Boundary a distance of 1413.79 feet to a point on the South Line of the Northeast Quarter of the Southeast Quarter (NE/4 SE/4) of said Section 35;

Thence N89°12'15"E on the existing Permit Boundary and on the South Line of said NE/4 SE/4 a distance of 320.25 feet to the Southeast Corner of said NE/4 SE/4;

Thence S1°11'51"W on the existing Permit Boundary and on the East Line of said Section 35 a distance of 354.62 feet to the POINT OF BEGINNING, containing 202.5 acres more or less.

Tier III Permit Application American Environmental Landfill



American Environmental Landfill, Inc. 207 North 177th West Avenue Sand Springs, Oklahoma 74063

SCS ENGINEERS

27220345.00 | May 2024 Revised February 2025 Revised August 2025

8575 W. 110th Street, Suite 100 Overland Park, KS 66210 913-681-0030

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CERTIFICATION

This report has been prepared for exclusive use by American Environmental Landfill, Inc. for the American Environmental Landfill (AEL) for specific application to the project discussed, and it has been prepared in accordance with good engineering practices including consideration of industry standards and the requirements of the Oklahoma Department of Environmental Quality.

Prepared by:



Floyd Cotter, P.E. SCS Engineers

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Appendix A Adjacent Property Owner Notifications, Location Restriction Correspondences,

and Figures

Appendix B Subsurface Investigation

Appendix C Liner and Final Cover System Stability Analysis

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Appendix K Closure and Post-Closure Plan

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1.0 INTRODUCTION

SCS Engineers, on behalf of American Environmental Landfill, Inc., is submitting the necessary documents to expand the permit boundary, establish permit base grades for such area, and permit a leachate storage impoundment at the American Environmental Landfill (AEL). The AEL is located near Sand Springs, Oklahoma in Sections 35 and 36, Township 20 North, Range 10 East, in Osage County, Oklahoma. The project site is on the Wekiwa Oklahoma 7.5 Minute USGS Quadrangle map. AEL is bordered by the Arkansas River to the South (Figure 1). The AEL operates under the Oklahoma Department of Environmental Quality (ODEQ) Permit Number 3557021.

The current landfill has a permit boundary of approximately 222-acres, 150 of which are currently in operation. The proposed landfill lateral expansion area is approximately 203-acres located north and west of the existing permit boundary. Therefore, following approval of a Tier III permit modification, in accordance with Oklahoma Department of Environmental Quality (ODEQ), Oklahoma Administrative Code (OAC) 252:4-7-60, the landfill permit boundary will be comprised of approximately 425-acres. The proposed lateral expansion area will be utilized for a municipal solid waste (MSW) disposal area.

The AEL, (then Shell Creek Landfill) was issued Permit No. 3557021 on September 14, 1981 by the Oklahoma Department of Environmental Quality (ODEQ) and operates as a Subtitle D facility.

2.0 FILING OF APPLICATION & PUBLIC PARTICIPATION

In accordance with the Uniform Environmental Permitting Act and OAC 252:4-7-13(g)(1), the AEL will publish notice of the filing of this application in *The Sand Springs Leader* newspaper. The published notice will serve as the legal notice to the public. The publication will identify locations where the application may be reviewed by the public, including a location in Osage County, where the site is located. The publication will include notice of a 30-day opportunity to request a process meeting. If the ODEQ receives timely requests and determines that a significant degree of public interest in the application exists, the ODEQ shall schedule and hold a process meeting. In addition, notices will be provided by certified mail and return receipt request to adjacent landowners whose property may be affected by the lateral expansion of the AEL.

Upon conclusion and approval of the technical review for this Tier III application, the ODEQ will prepare a draft permit. Notice of the draft permit shall be given by the AEL by publishing a legal notice in *The Sand Springs Leader* newspaper. The notice shall identify locations where the draft permit and the application may be reviewed by the public, including a location in Osage County, where the site is located. The publication will include notice of a 30-day opportunity to request a public meeting on the permitting process. If the ODEQ receives timely requests and determines that a significant degree of public interest in the application exists, the ODEQ shall schedule and hold a public meeting. In addition, notices of the draft permit will be provided by certified mail and return receipt request to adjacent landowners whose property may be affected by the lateral expansion of the AEL.

Should the ODEQ determine the need for a public meeting, the ODEQ shall expeditiously schedule and hold a formal public meeting no more than 120 days after the date the notice was published. The public meeting shall be held at a location convenient to and near the AEL. At the meeting, any person may submit oral or written statements and data concerning the draft permit or permit application. The public comment period shall automatically be extended at the close of the public meeting. A representative of the AEL shall be present at the meeting to respond to questions.

After the public comment period, the ODEQ shall prepare a response to comments and issue a final denial or a proposed permit. If a proposed permit is prepared, the AEL shall provide notice of the proposed permit by publishing a legal notice in The Sand Springs Leader newspaper. The notice shall identify locations where the proposed permit and the ODEQ response to comments may be reviewed by the public, including a location in Osage County, where the site is located. The publication will include notice of a 20-day opportunity to request an administrative hearing. In addition, notices will be provided by certified mail and return receipt request to adjacent landowners whose property may be affected by the lateral expansion of the AEL.

The opportunity to request an administrative hearing shall be available to the AEL and any person or qualified interest group who claims that the construction or operation of the landfill would directly and adversely affect their interests. If no written administrative hearing request is received by the ODEQ by the end of the 20-day opportunity, the final permit shall be issued.

If an administrative hearing is timely requested on the proposed permit, the ODEQ shall schedule a hearing. All timely requests shall be combined in a single hearing, and the hearing shall be conducted by an Administrative Law Judge. A representative of the AEL shall attend the hearing, which shall be scheduled within 60-days of the end of the 20-day hearing request opportunity. Upon final issuance or denial of a permit for this Tier III application, the ODEQ shall provide public notice of the final permit decision and availability of the response to comments, if any. A written affidavit of all notice publications by the AEL should be submitted to ODEQ within 20-days of the publication.

3.0 GENERAL INFORMATION

Under solid waste disposal permit number 3557021, the AEL is allowed to accept municipal solid waste for disposal, including household waste, commercial solid waste, construction and demolition waste, non-hazardous industrial waste, contaminated soil, sludge, non-friable asbestos, friable asbestos, liquid waste, special waste, and approval from the EPA to accept CERCLA waste in Subtitle D areas of the permit waste footprint. The disposal of any quantity of hazardous, radioactive, regulated untreated infectious biomedical waste, or regulated polychlorinated biphenyl (PCB) waste is prohibited at the AEL. The general information for the facility is provided in the following table.

Facility Name:	American Environmental Landfill
Mailing Address:	207 North 177th W. Ave. Sand Springs, Oklahoma 74063
Physical Location:	207 North 177 th W. Ave. Sand Springs, Oklahoma 74063
Facility Owner/Operator:	American Environmental Landfill, Inc.
Facility Phone Number:	(918) 245-7786
Hours of Operation:	Monday-Friday 7:00am-5:00pm, Saturday 7:00am-3:00pm
Primary Contact:	Todd Green

Table 1. General Information

3.1 OATH

OAC 252:515-3-33 requires the applicant to sign the permit application under oath on forms provided by the ODEQ. The signed oath is attached to the cover letter of this application.

3.2 LEGAL DESCRIPTION

The legal description of the AEL permit boundary is as follows: The North $\frac{1}{2}$ of Section 35 and West $\frac{1}{2}$ of Section 36, Township 20 North, Range 10 East, in Osage County, Oklahoma.

3.3 LEGAL RIGHT TO PROPERTY

OAC 252:515-3-34(a)(1) requires that the AEL have a true and correct copy of a legal document filed in Osage County, demonstrating that the applicant possesses a legal right to access and use the property in the manner outlined in this application. Documentation showing that American Environmental Landfill, Inc. owns the property containing the AEL and its proposed expansion area is included as part of the Closure and Post-Closure Plan found in Appendix K of this application.

3.4 ADJACENT PROPERTY OWNER NOTIFICATION

Notification of the proposed landfill expansion was provided to adjacent property owners and copies of the notification letters and delivery confirmations are included in Appendix A.

3.5 AESTHETIC ENHANCEMENT

Due to the site's rural location and the dense vegetation surrounding the site, it is anticipated that the lateral expansion of the AEL will have a minimal effect on aesthetics. The guidelines outlined in the facility's Operations Plan included in Appendix I, should control vectors at the site and keep the AEL aesthetically pleasing.

3.6 AIR QUALITY

The AEL will conform to applicable ambient air quality and source control regulations. The AEL's current permitted capacity is greater than 2.5 million cubic yards as detailed in Section 6.2.1 and is subject to 40 CFR 60, Subpart XXX permitting. AEL operates under Operating Permit No. 2018-1562-TVR2. Odors will be controlled at the site through proper operations and, more specifically, through proper application of daily, intermediate, and final cover. Cover requirements are further discussed in Section 13. Dust and emission control is discussed in the site's Operations Plan included in Appendix I.

3.7 VARIANCE REQUEST

This permit modification includes a variance request in accordance with OAC 252:515-3-32. The variance request is for the location of the permit expansion with an area designated as alluvium or terrace deposits.

OAC 252:515-5-51 (a)(1) states that no area within the permit boundary of a new land disposal facility, or expansion of the permit boundary of an existing land disposal facility, shall be located within an area designated as alluvium or terrace deposits and their recharge areas, as shown on "Map of Aquifers and Recharge Areas in Oklahoma" compiled by Kenneth S. Johnson, Oklahoma Geological Survey (1991). As allowed by O.A.C. 252:515-5-51 (a)(2), Site-specific hydrological and geological data and other information may be submitted to demonstrate clearly and convincingly that the proposed location does not lie in a prohibited area.

Figure 2.5 of Appendix B contains a map showing the permit area on the referenced map is near an area designated as terrace or alluvium deposits. This map indicates there may be a portion of the proposed expansion that overlaps the area identified as terrace deposits on the map. However, as discussed in the Work Plan, previous boring logs from the Phase IV area east of the 203-acre expansion indicate sandstones and shales underlay the expansion site, which are consolidated formations and not terrace deposits. Borings performed for this investigation, only identified a few areas where unconsolidated materials will be beneath the planned expansion excavation and the materials were identified primarily as silty clay or sandy clay. Materials composed of primarily silt or primarily sand, indicative of terrace deposits, were not identified below the planned expansion excavation. However, few borings south of the planned waste boundary encountered material comprised primarily of sand and/or silt indicative of terrace deposits. Figure 3.4 of Appendix B, shows the proposed excavation grades within the waste disposal boundary are within the bedrock that underlies the site. Figure 3.3 of Appendix B shows the proposed excavation grades that are outside the limits of waste and are located in an area proposed for a stormwater detention structure. As detailed in Appendix G, any unstable areas will be undercut to firm material and refilled with suitable compacted earth fill.

By removing unsuitable material and compacting the subgrade in accordance with the QAQC Plan, this design will meet the protection afforded by OAC 252:515-5-51(a).

4.0 LOCATION RESTRICTIONS

All active solid waste disposal facilities are subject to the location restrictions set forth by the ODEQ in OAC 252:515-5. The subchapters of this section show compliance with the location restrictions for solid waste disposal facilities.

4.1 SCENIC RIVERS

No area within the permit boundary of the lateral expansion shall be located within the drainage basin of any river designated by the Oklahoma Scenic Rivers Commission Act. Appendix A contains a map provided by the OWRB showing that the AEL is not located in a drainage basin of any Oklahoma Scenic River.

4.2 RECREATION AND PRESERVATION AREAS

No area within the permit boundary of the lateral expansion shall be located within one-half mile of any area formally dedicated and managed for public recreation or natural preservation by a federal, state, or local government agency. Appendix A contains correspondences from the Oklahoma Archeological Survey dated June 12, 2020, and the Oklahoma Tourism and Recreation Department dated July 7, 2020. A letter was issued to the US Department of the Interior – Bureau of Reclamation dated June 2, 2020. No correspondence with the Bureau of Reclamation was received. Delivery confirmation is included in Appendix A. The letters indicate that the expansion of the AEL will not be within one-half mile of any area formally dedicated and managed for public recreation or national preservation.

4.3 ENDANGERED OR THREATENED SPECIES

For the AEL lateral expansion area, statements from the Oklahoma Department of Wildlife Conservation (ODWC), the United States Fish and Wildlife Service (USFWS), and the Oklahoma Biological Survey (OBS) shall be submitted regarding current information about endangered or threatened wildlife or plant species listed in state and federal laws that exist within one-mile of the expansion area. Appendix A contains correspondences from the USFWS dated February 10, 2020, the ODWC dated April 14, 2020, and the OBS dated February 6, 2020. The letters indicate that it is unlikely for endangered or threatened wildlife or plant species listed in state and federal laws to be located within one-mile of the expansion area and/or stating that the AEL lateral expansion is not likely to adversely affect any threatened or endangered species in the area.

4.4 WETLANDS

No solid waste disposal facility shall be located within wetland areas as designated by the Oklahoma Conservation Commission (OCC) or other appropriate agency. Appendix A includes correspondence that was submitted to the U.S. Army Corps of Engineers and a response dated September 21, 2017, stating that no jurisdictional wetlands were located within the reviewed area. However, the unnamed tributary of the Arkansas River was determined to be a regulated waterway. SCS submitted a Section 404 Individual Permit Application in May 2020 for the relocation of the jurisdictional waters. The U.S. Army Corps of Engineers granted a Section 404 Individual Permit (Permit No. SWT-2017-00339) in a response dated October 30, 2020. The correspondence and Section 404 Individual Permit are included in Appendix A.

4.5 WELLHEAD PROTECTION AREA

Under OAC 252:515-5-32(c), if the lateral expansion area is located within two-miles of a public water supply well, a wellhead protection area shall be identified and submitted to the ODEQ, as specified by the State Wellhead Protection Plan. Appendix A contains a map provided by the OWRB showing that the AEL is not located within two-miles of a public water supply well.

4.6 PUBLIC WATER SUPPLY

No solid waste disposal facilities shall be located within one-mile upgradient of an existing public water supply surface intake, including those permitted for construction, or within a one-year time of travel of a public water supply well. Appendix A contains a map provided by the OWRB showing that the AEL is not located within one-mile upgradient of an existing public water supply surface intake or is it located within a one-year time of travel of a public water supply well.

4.7 100-YEAR FLOODPLAIN

No solid waste disposal facilities shall be located within the 100-year floodplain. Appendix A of this application shows the Flood Insurance Rate Map for Osage County (Map Number 40113C1215K) published by the NFIP and effective on April 2, 2008. According to the map, the proposed expansion is not in or near the floodplain.

4.8 TERRACE DEPOSITS

OAC 252:515-5-51(a)(1) states, "no area within the permit boundary of a new land disposal facility, or expansion of the permit boundary of an existing land disposal facility, shall be located within an area designated as alluvium or terrace deposits and their recharge areas, as shown on "Map of Aquifers and Recharge Areas in Oklahoma" compiled by Kenneth S. Johnson, Oklahoma Geological Survey (1991). However, OAC 252:515-5-51(a)(2) states. "Site-specific hydrological and geological data and other information may be submitted to demonstrate clearly and convincingly that the proposed location does not lie in a prohibited area". Appendix A contains a map showing the permit area on the referenced map is near an area designated as terrace or alluvium deposits. Results and determinations of the subsurface investigation are provided in Appendix B.

4.9 KARST TERRAIN

Appendix A contains maps provided by the ODEQ GIS Data Server that no karst terrain exists in the vicinity of the proposed expansion area.

4.10 EARTHQUAKE EPICENTER AREA

No solid waste disposal facilities shall be located within five-miles of a known epicenter of an earthquake of more than 4.0 on the Richter Scale, or a number V on the modified Mercalli (MM) scale, as recorded by the Oklahoma Geological Survey. Appendix A contains a map provided by the ODEQ GIS Data Server that no magnitude 4.0 and/or MM V earthquakes have occurred within five-miles of the expansion area.

4.11 FAULT AREAS

No solid waste disposal facilities shall be located within 200-feet of a fault that has had displacement in Holocene time. Appendix A contains a map provided by the ODEQ GIS Data Server

showing that no known Holocene faults have occurred within 200-feet of the lateral expansion area. A topographic map of the area is included as Figure 3.

4.12 SEISMIC IMPACT ZONES

No solid waste disposal facilities shall be located in a seismic impact zone. This restriction may be waived upon successful demonstration that all containment structures, including liners, leachate collection system, and surface water control systems, are designed to resist the maximum horizontal and vertical displacement in lithified earth material for the site. Appendix A contains a map provided by the ODEQ GIS Data Server showing that the site is not located in a seismic impact zone, an area in which it is probable that the maximum horizontal acceleration will exceed .10-.11g in 250 years. Regardless, the Liner and Final Cover System Stability Analysis in Appendix C of this application demonstrates that the containment structures are designed to resist the potential maximum horizontal and vertical displacement.

4.13 UNSTABLE AREAS

No solid waste disposal facilities shall be located over a subsurface mining area or any other unstable area. Appendix A contains correspondence from the Oklahoma Department of Mines, dated July 8, 2020, stating that no known coal, non-coal permits, or any other surface reclamation efforts on record were located near the site location.

4.14 UTILITY/TRANSMISSION LINES

A minimum horizontal separation of 25-feet shall be maintained between disposal areas of land disposal facilities and any aboveground or underground pipeline or transmission line. Information on the locations and owners of all such lines and easements shall be provided to the ODEQ. Appendix A contains a certified mail receipt from a submittal to the Oklahoma Corporation Commission, dated June 2, 2020, but no response was received from the agency.

No utility or transmission line is located within 25-feet of the proposed waste boundary.

4.15 AIRPORTS

No solid waste disposal facilities shall be located within 10,000-feet of any airport runway end used by turbojet aircraft or within 5,000-feet of any airport runway end used by only piston-type aircraft. The Pogue Airport is located East and Northeast of the AEL and is used by turbojet aircraft. Appendix A contains a map showing that the AEL Expansion Area is not located within the 10,000-foot requirement for turbojet aircraft and therefore satisfies the location restriction for airports.

Since the AEL lateral expansion area is located within a 5-mile radius of the Pogue Airport, the airport and the Federal Aviation Administration (FAA) have been notified in writing of the planned expansion in accordance with OAC 252:515-5-52(e)(1). No responses were received. Copies of the certified mail receipts and the letters mailed to the FAA and the Pogue Airport are included in Appendix A.

4.16 BUFFER ZONES

In accordance with OAC 252:515-19-38(b)(2), municipal solid waste landfills incorporating land not permitted for disposal prior to July 1, 1994, shall have a waste-free buffer zone of at least 100-feet in width from the site's property boundary. As shown in the Permit Drawings of this application, the waste boundary of the proposed expansion area is 100-feet away from the property boundary of the AEL.

5.0 SUBSURFACE INVESTIGATION

In accordance with Oklahoma Administrative Code (OAC) 252:515-7, a subsurface investigation of approximately 203-acres was completed between November 2020 and August 2021. The field investigation for determining subsurface soil and groundwater characteristics consisted of drilling 42 exploratory borings, 13 of which were completed as piezometers. The results of the investigation are detailed in the report *Hydrogeologic and Geotechnical Investigation* prepared by SCS Engineers, dated December 2023, is included in this application as Appendix B. Results of the subsurface investigation were considered while designing the lateral expansion area for the AEL.

5.1 ADDITIONAL GROUNDWATER STUDIES

To verify compliance with OAC 252:515-11-3 and as allowed in the May 13, 2025, NOD, AEL revised Cell 7 base grades to account for the highest observed groundwater elevations in B-21, B-26, and B-34. Additional groundwater studies will be completed, prior to cell construction, in the remaining cells of the expansion area, as necessary, to maintain a minimum 5-foot separation between the lowest placement of waste and the highest observed groundwater elevation.

Additional groundwater studies will be conducted in general accordance with 252:616-7 and will consist of the following:

- Submittal of a drilling plan
- Submittal of a drilling notification
- Installation of piezometers in the proposed cell(s), at existing borehole locations
- Monthly monitoring of piezometers for 12 months

6.0 LANDFILL DEVELOPMENT

This section, in conjunction with the accompanying drawings and appendices, addresses the various design and operational elements of the AEL lateral expansion.

6.1 DESIGN CRITERIA

The development of the AEL lateral expansion was based on the following design criteria:

- Compliance with Subtitle D requirements
- Final side slopes will be created at a maximum 4:1. The slope of the top of the landfill (crown) will be no less than 4 percent.
- Drainage swales and letdowns will be developed to improve surface water drainage
- Surface water diversionary structures will be capable of handling at a minimum the 25year 24-hour storm event
- Seismic and stability design criteria established in the Liner and Final Cover Stability Analysis (Appendix C) are to be incorporated into the design

The applicable regulations followed in part or entirely are as follows:

- OAC 252:515
- 40 CFR Part 257 and 258 (Subtitle D)

6.2 LANDFILL DEVELOPMENT

The current landfill has a permit boundary of approximately 222-acres, 150 of which are currently in operation. The proposed landfill lateral expansion area is approximately 203-acres located north and west of the existing permit boundary. Therefore, following approval of a Tier III permit modification, in accordance with Oklahoma Department of Environmental Quality (ODEQ), Oklahoma Administrative Code (OAC) 252:4-7-60, the landfill permit boundary will be comprised of approximately 425-acres.

6.2.1 Capacity Increase

A summary of the capacity increase is listed below.

Table 2. Capacity Increase

Item	Volume
Current Design Capacity	24,025,786 Cubic Yards
Expansion Increase	55,747,188 Cubic Yards
Proposed Capacity	79,772,974 Cubic Yards

6.2.2 Sequence of Development

The landfill will be developed through the construction of phases. The first phase of the lateral expansion to be constructed will be the southern portions of Cell 7. Following the initial construction, the northern portions of Cell 7 will be constructed. The northern portions of the remaining Cells 8 – 10 will be constructed east to west utilizing temporary sumps. The final construction of the southern portions of Cells 8 - 10 will take place west to east and will feature permanent sumps.

Filling should begin at the lowest elevations of each phase and work toward higher elevations to prevent excess leachate generation. Temporary drainage swales and channels should be constructed, as needed, on intermediate contours to control surface water and minimize leachate generation. It should be recognized that the phasing plans are conceptual in nature and may require revision during the operation of the facility.

Under the area fill method, waste is placed next to the previous day's waste until an established row length is reached. Another row is then started parallel to the previously constructed row. As the rows form lifts over each area, the top of each landfill lift should slope in such a manner as to allow surface runoff to drain away from the working face. After a number of rows have been constructed (creating a lift), a second lift is constructed over the first lift. Waste placement will alternate between various lifts of waste and will allow landfill traffic to discharge waste at various levels. This method will allow the earthmoving equipment to stockpile daily cover at the top of the day's waste, if necessary.

The main two criteria used when establishing the sequence of fill are as follows:

- Areas should be small enough to allow organized, controlled development
- Development should be sequenced such that surface water runoff does not flow into the working area

A layer of 6-inches of daily cover or approved alternative daily cover will be placed on the top of waste each day.

The landfill will be developed to provide for long-term stability of the entire landfill. Included in Appendix C is a Liner and Final Cover Stability Analysis for the AEL. This analysis confirms the landfill is stable under active, intermediate, and final development of the landfill. The design of the expansion area, particularly the base grades and cap components, are based on meeting a factor of safety requirements and site-specific conditions.

7.0 GROUNDWATER MONITORING

A detailed hydrogeologic and geotechnical investigation has been conducted at this site. The report for this investigation entitled, *Hydrogeologic and Geotechnical Investigation*, is included in Appendix B. Results of this subsurface investigation were used in selecting locations for groundwater monitoring detection wells. A Groundwater Monitoring Plan has been included with this application in Appendix D. The Groundwater Monitoring Plan is intended to be used as a standalone document, a copy of which will be maintained within the facility's operating record. The Groundwater Monitoring Plan contains pertinent information for existing and proposed detection wells and piezometers, as well as schedules and proper sampling and statistical analysis procedures to complete groundwater monitoring events.

8.0 EXPLOSIVE GAS MONITORING

The decomposition of encapsulated solid waste within a landfill is known to produce landfill gas, typically consisting of approximately 50% methane (CH₄) and 50% carbon dioxide (CO₂). Trace amounts of non-methane organic compounds (NMOCs), oxygen, hydrogen sulfide, and reactive organic gases are also present (*Engineering and Design Landfill Off-Gas Collection and Treatment Systems*, U.S. Army Corps of Engineers, 1995).

Per OAC 252:515-15-2, the concentration of methane gas generated by the facility shall not exceed twenty-five percent (25%) of the lower explosive limit (LEL) for methane in all structures within the permit boundary or exceed the LEL for methane at the permit boundary. The LEL is defined as the lowest percent by volume of a mixture of explosive gases in air that will propagate a flame at 25°C and atmospheric pressure. The LEL for methane is 5% by volume in air.

OAC 252:515-15-3(a) requires an Explosive Gas Monitoring Plan to be submitted and approved by the ODEQ to demonstrate how compliance with the LEL listed in OAC 252:515-15-2 will be achieved. A copy of the Explosive Gas Monitoring Plan is included with this application as Appendix E. The Explosive Gas Monitoring Plan is intended to be used as a standalone document, a copy of which will be maintained within the facility's operating record.

9.0 STORMWATER MANAGEMENT

9.1 OKRO5 PERMIT REQUIREMENTS

State law requires an Oklahoma Pollutant Discharge Elimination System (OPDES) Permit be obtained to allow stormwater to discharge from this facility. Under state regulations, the AEL is subject to requirements of the ODEQ Department of Water Quality Division Sector L Industrial General Permit OKR05 (OKR05). Under the requirements of OKR05, the facility is to prepare and maintain a Stormwater Pollution Prevention Plan (SWP3). The SWP3 describes the AEL and its operations, identifies potential sources of stormwater pollution at the facility, recommends appropriate Best Management Practices (BMPs) or pollution control measures to reduce the discharge of pollutants in stormwater runoff, and provides procedures for regular inspections, stormwater monitoring, recordkeeping and reporting, and periodic review of the SWP3.

The SWP3 for the facility is maintained at the AEL. As shown in the Permit Drawings, the proposed permit modification will alter surface water drainage and outfall locations from their present locations. As stormwater confluence is altered at the facility, the site's SWP3 shall be amended accordingly.

9.2 RUN-ON CONTROL SYSTEMS

In accordance with OAC 252:515-17-2(1), the AEL has been designed to have a run-on control system to prevent flow onto active portions of the facility during the peak discharge from a 24-hour, 25-year storm event. The Permit Drawings show the design for a temporary separation berm. The temporary separation berms will be constructed, as needed, between phases as the landfill is expanded. Additional run-on control features such as diversion berms will be constructed upgradient of the construction areas and active portions of the landfill.

9.3 RUN-OFF CONTROL SYSTEMS

The peak volume and flow were calculated using the SCS TR-55 Hydrology Method and the SCS TR-55 Time of Concentration Method associated with Hydraflow Hydrographs Extension for AutoCAD Civil 3D 2020. The flows for each surface water structure were determined to show that the run-off controls are adequately sized to handle a 24-hour, 25-year single storm event. Surface water model results and calculations are included in the Stormwater Design System Report included as Appendix F.

The following surface water management structures will be constructed to control surface water flow:

- Drainage swales
- Letdown channels
- Perimeter channels
- Stormwater Detention Structures

9.3.1 Drainage Swales

The drainage swales are V-shaped, with 4:1 uphill side slope and 2:1 downhill side slope. The drainage swales have a height of 3.5-feet and will be sloped at approximately 1.0 percent towards the letdown channels on side slopes, as shown in the Permit Drawings. Design calculations for drainage swales can be found in Appendix F.

9.3.2 Letdown Channels

The drainage area for the letdown channel was determined based on channel and sheet flow from each sub-basin draining to the letdown channel. A peak flow was determined by utilizing a time of concentration for the worst-case point (i.e., the point within the drainage area located furthest away from the letdown) and applying that time of concentration to the entire area. Thus, a conservative design is achieved. Calculations for the letdown channel are shown in the Surface Water System Design Report located in Appendix F.

The letdown is trapezoidal shaped with 2:1 side slope, a bottom width of 8-feet, and a depth of 2-feet. The letdown channels are sloped at approximately 25 percent towards the perimeter drainage channels. Alternate materials may be used to line the letdown channel such as HDPE, Rip-Rap, manufactured erosion controls, etc., but must be approved by ODEQ prior to installation.

9.3.3 Perimeter Drainage Channels

The perimeter drainage channels will vary in dimension but generally will be vegetated channels or lined with rip-rap, 3-feet to 3.5-feet deep with a bottom width of 0-feet to 10-feet and 3:1 side slope. The channels will be sloped toward a discharge point at an approximate average slope of 1 to 6 percent. Design calculations for perimeter ditches can be found in the Surface Water System Design Report in Appendix F.

9.3.4 Detention Structures

There are two stormwater detention structures proposed for the AEL. A North Stormwater Detention Structure and a South Stormwater Detention Structure are proposed to allow for the discharge of stormwater to impaired waterbodies. These stormwater detention structures allow for a settling period, to achieve the quality of stormwater as set by the 2022 OKR05 General Permit, by discharging stormwater through a perforated riser. The stormwater detention structures are designed to discharge typical stormwater events (25-year, 24-hour storm event) through a perforated riser. Secondary discharge structures associated with the stormwater detention structures were designed to discharge stormwater from a 100-year, 24-hour storm event while maintaining minimum freeboard requirements. Design calculations for the stormwater detention structures can be found in the Surface Water System Design Report in Appendix F.

10.0 LINER CONSTRUCTION

A composite liner system will be constructed to protect groundwater quality. The composite liner system will maintain a minimum 5-foot vertical separation between the highest groundwater elevation and the lowermost surface on which waste will be placed, conform to specifications included in OAC 252:515-11, and consist of the following layers from bottom to top:

- Compacted subgrade
- 24-inches of compacted soil liner (less than or equal to 1x10-7 centimeters per second (cm/sec) hydraulic conductivity)
- 60-mil high-density polyethylene (HDPE) smooth or double-sided textured geomembrane liner
- 8 oz/sy non-woven geotextile fabric cushion layer
- 24-inches of granular drainage/protective cover material (greater than or equal to 1x10-3 cm/sec hydraulic conductivity)

Where fill is necessary to achieve subgrade elevations, the subgrade component of the liner will be placed in uniform lifts that do not exceed 9-inches in loose thickness and are compacted to at least 95 percent of standard Proctor (ASTM D 698) at a moisture content ranging from one percentage point below optimum to three percentage points above optimum. The top 6-inches of compacted fill material underlying the soil liner will have a maximum particle size of 2-inch diameter. Where excavation is necessary to achieve subgrade elevations, the upper 6 inches of soil subgrade will be recompacted and graded to provide a relatively smooth workable surface on which to construct the compacted soil liner component.

The compacted soil liner will be constructed by placing uniform lifts that do not exceed 9-inches in loose thickness to produce compacted lifts of approximately 6-inches. The soil liner will be compacted to a moisture content and density condition consistent with that necessary to produce a competent liner with a hydraulic conductivity less than or equal to 1×10^{-7} cm/sec. The appropriate moisture content and density condition will be determined prior to construction for each type of material to be used.

Generally, densities greater than 95 percent of Standard Proctor maximum dry density and moisture contents exceeding the optimum moisture content are necessary to achieve a hydraulic conductivity of less than or equal to 1×10^{-7} cm/sec. Compaction will be completed utilizing an appropriately heavy, properly ballasted, penetrating-foot compactor (such as a CAT 815 or equivalent). Dozer or scraper equipment will not be used for primary compaction efforts. One of the goals of compaction is to allow thorough remolding of the clay by kneading action. Following construction, the compacted soil liner will be protected from desiccation or freeze/thaw cycles by geosynthetics and protective cover materials as necessary.

The soils used in the construction of the compacted soil liner will meet the following minimum specifications:

- Contain less than or equal to 20 percent gravel (dry-weight percentage retained on the No. 4 sieve)
- Allow more than 30 percent passage through a Number 200 Sieve
- Have a liquid limit greater than or equal to 24 percent
- Have a plasticity index greater than or equal to 10 percent
- Particle size shall be less than 1-inch diameter
- After the soil is compacted, the water content of the soil shall be equal to or greater than optimum
- After the soil is compacted, the minimum density of the soil shall be greater than or equal to 95 percent of the standard proctor density (ASTM D698) or 90 percent of the modified proctor density (ASTM D1557)

The geomembrane will be installed in accordance with the manufacturer's recommendation for a facility of this type. A geotextile cushion layer will then be placed in accordance with manufacturer's recommendations to protect the geomembrane from the overlying granular leachate collection layer.

Specific information pertaining to quality assurance and quality control during construction of the liner system is included in the Quality Assurance / Quality Control (QA/QC) Plan for Liner and Leachate Collection System Installation and Testing, which is included with this application in Appendix G. The QA/QC Plan is intended to be used as a standalone document, a copy of which will be maintained within the facility's operating record.

Appendix C includes liner stability calculations. These calculations confirm the stability of the liner system for the proposed design.

11.0 LEACHATE COLLECTION AND MANAGEMENT

SCS Engineers utilized the Hydrologic Evaluation of Landfill Performance (HELP) model, Version 4.0 Beta (2018) for the design of the leachate collection system (LCS). The following criteria apply:

- Minimum slope along the leachate pipe is 0.5 percent
- Minimum slope to the leachate pipe is 0.5 percent
- Twelve inches or less of head must be maintained on the liner during all phases (active, interim, and closed). To accomplish this, a drainage media will be used and will have a minimum hydraulic conductivity of 1.0x10-3 cm/sec.

The LCS, designed to collect and remove leachate from the landfill and reduce the potential leachate head on the liner system, has been included in the design of the expansion. This system has been designed in accordance with OAC 252:515-13 to effectively manage leachate for both the operating life of the landfill and the 30-year post-closure period. Specifically, the system has been designed to function without clogging through the scheduled operating life, closure, and post-closure of the landfill. In general, the LCS will use gravity drainage from the existing landfill as well as in the expansion area to drain to the sumps at the perimeter of the landfill.

The LCS will consist of the following:

- Collection pipe network
- 8-oz/sy non-woven geotextile
- 24-inches of granular material
- Leachate collection sumps
- Associated leachate pumping systems
- Leachate evaporation pond

An 8-oz/sy non-woven geotextile will be placed directly on top of the 60-mil HDPE geomembrane liner prior to placement of the granular material for cushioning purposes. The effectiveness of the LCS has been evaluated using the Hydrologic Evaluation of Landfill Performance (HELP) model, Version 4.0. Design details of the landfill and weather data for the Sand Springs, Oklahoma area were used to determine leachate volumes produced during the life of the landfill as well as the maximum hydraulic head created on the liner system.

The HELP model was run for three operating scenarios to model the landfill at various stages of its development (active, interim, and closed). The table below summarizes the modeling scenarios.

Table 3. HELP Model Scenarios

ACTIVE - 20-FEET OF MSW IN PLACE

INTERIM - 120-FEET OF MSW IN PLACE

CLOSED - 397-FEET OF MSW IN PLACE

Modeling indicated that the design will not result in a leachate head greater than 12-inches on the liner system for each scenario as required by OAC 252:515-13-31(b)(1). HELP model results are located in Appendix H.

HELP modeling was completed on a "1-acre" basis to allow for leachate generation quantities to be applied to various operating stages of the landfill. Specifically, active, interim, and closed leachate generation quantities were applied to the estimated acreage of active, interim, and closed conditions, respectively, to estimate leachate volumes at different stages of landfill development. A summary of leachate generation quantities is included in Appendix H.

11.1 LEACHATE DRAINAGE LAYER

A leachate drainage layer is necessary above the liner to drain leachate away from the waste to the leachate collection sumps. The leachate drainage layer will consist of a minimum of 12-inches of granular material placed on top of the bottom liner system. Prior to placement of the granular material, an 8-oz/sy non-woven geotextile cushion will be placed directly on top of the geomembrane liner to cushion and protect the geomembrane liner from the overlying granular leachate collection material. The granular material should be clean, with a minimum hydraulic conductivity of 1x10-3 cm/sec.

Aggregate placement/spreading techniques that minimize the potential for damage to the underlying geomembrane liner shall be used. Specifically, the granular material will be placed by advancing the aggregate in fingers across the underlying geotextile and geomembrane liner. Low-ground pressure equipment, such as a light-weight, wide-tracked dozer, will be used for spreading the aggregate. A 12-inch granular protective cover layer will be placed on top of the 12-inch leachate collection layer. The 12-inch granular leachate collection layer and 12-inch protective layer will likely consist of the same material and be installed in conjunction.

Specific information pertaining to quality assurance and quality control during construction of the leachate collection system is included in the Quality Assurance / Quality Control (QA/QC) Plan for Liner and Leachate Collection System Installation and Testing, which is included with this application in Appendix G. The QA/QC Plan is intended to be used as a standalone document, a copy of which will be maintained within the facility's operating record.

11.2 LEACHATE COLLECTION PIPE NETWORK

In the expansion area, perforated, 6-inch HDPE SDR 7.3 leachate collection pipes will be strategically placed on top of the geosynthetic liner and geotextile within the granular drainage material to direct leachate flow to the collection sump. The collection pipes are located to minimize the distance that leachate will flow through the drainage layer prior to intercepting a collection pipe. The collection pipes are sloped at a minimum of 0.5 percent toward leachate collection sumps located along the Southern berm of the landfill.

The 6-inch collection pipes will be constructed of HDPE material with a Standard Dimension Ratio (SDR) of 7.3 or equivalent. Pipe perforations will consist of three rows of 0.5-inch diameter holes drilled at a 60-degree angle from vertical on the bottom of each side of the pipe. Holes will be spaced in 4-inch increments. The collection pipes will be bedded in granular material and protected by a geotextile to serve as a filtering mechanism to keep silt and other fines from clogging the pipes. Per OAC 252:515-13-34, the leachate collection pipes shall be cleaned out after placement of protective cover layer, again after the placement of the first lift of waste, and once per year thereafter.

Design calculations were completed to evaluate the structural strength imposed by the overlying waste and potential equipment loads (see Appendix H for calculations). Typical details for collection pipes, pipe perforations, and surrounding granular material are shown in the Permit Drawings.

11.3 LEACHATE COLLECTION SUMPS

Four leachate collection sumps are proposed. The sumps will provide collection points from which leachate can be removed from the landfill. Leachate will drain into the sumps through collection pipes directly from the drainage layer. The sumps will be located on the South side of the expansion area and will have dimensions of approximately 24-feet by 24-feet by 2-feet deep. The sumps will be filled with clean, non-carbonate drainage stone to an elevation even with the surrounding granular material layer.

11.4 LEACHATE PUMPING SYSTEM

Leachate will be removed from the sumps using submersible pumps or above-ground pumps. One, 18-inch diameter perforated PVC or HDPE pipe, holding submersible pumps, will be buried in the sump to access the leachate. The 18-inch HDPE SDR 11 or PVC Schedule 80 perforated pipes will exit the sump as a solid pipe and follow the 3:1 side slope to the top of the landfill composite liner system, where it can be accessed outside of the landfill footprint. This access point will allow pumps and associated hoses and cables to be lowered into the sump and removed, as needed, for maintenance or replacement. The leachate collection system will be equipped with a system for automatic and continuous removal of leachate not requiring intervention by the owner/operator. Leachate levels will be monitored with a pressure transducer and level readout at the surface. The system will also be equipped with a high-level alarm to inform site personnel when the leachate head on the liner exceeds 12-inches.

11.5 LEACHATE STORAGE AND DISPOSAL

Leachate generated within existing Phase IV A-N collects and is pumped to the existing leachate storage impoundments located East and West of existing landfill.

Leachate collected in the proposed expansion area, Cells 7-10, will be pumped up the side slope to a dual-contained force main and transported via the dual-contained force main to the proposed leachate storage impoundment. The proposed leachate storage impoundment will be constructed in accordance with the Quality Assurance/Quality Control Plan for Liner and Leachate Collection System Installation and Testing. A composite liner system will be constructed to protect groundwater quality. The composite liner system will conform to specifications included in OAC 252:515-11 and consist of the following layers from bottom to top:

- Compacted subgrade
- 24-inches of compacted soil liner (less than or equal to 1x10-7 centimeters per second (cm/sec) hydraulic conductivity)
- 60-mil high-density polyethylene (HDPE) smooth on floor and double-sided textured geomembrane liner on slope

The HELP model calculated the highest daily leachate drainage collected rate which occurred during peak interim conditions and is equal to 5.98 gallons/acre/day. Based upon the approximate 163-acres of proposed cell development within Cells 7-10, the estimated annual drainage collected is 355,780 gallons/year. The design capacity considers the two existing leachate storage impoundments located East and West of the existing landfill. The existing leachate storage capacity is 12,131,166-gallons and 6,550,018-gallons respectively. Therefore, the proposed leachate storage impoundment will maintain a minimum 3-feet of freeboard with a design capacity of 19,155,653-gallons.

Leachate stored in the leachate storage impoundments will be recirculated in accordance with their approved plan. A Leachate Recirculation Plan is included as Appendix M.

12.0 SITE OPERATIONS

In accordance with OAC 252:515-19, an Operations Plan has been prepared and is included with this application in Appendix I. The Operations Plan is intended to be used as a standalone document, a copy of which will be maintained within the facility's operating record. The Operations Plan provides pertinent operational methods and procedures to provide public access control, control litter, control emissions, control disease vectors, place waste, and measure and report incoming waste. The Operations Plan outlines acceptable waste streams, limitations on incoming waste streams, as well as recordkeeping and reporting requirements for the AEL.

Acceptable and prohibited wastes for the AEL are outlined in depth in the Waste Exclusion Plan, included with this application in Appendix J. The Waste Exclusion Plan is intended to be used as a standalone document, a copy of which is maintained within the facility's operating record. The Waste Exclusion Plan also provides information on restrictions for the disposal of bulk liquids, restrictions on the disposal of municipal sewages, as well as recordkeeping and reporting requirements for incoming waste streams.

This permit application includes a Salvage and Recycling Plan. The plan is part of the site's Operations Plan, included as Appendix I. The recycling/salvage operation at the AEL will be conducted as outlined in the Operations Plan.

13.0 COVER AND SOIL BORROW REQUIREMENTS

Cover will be applied to reduce fire hazards, infiltration, odors, and blowing litter; to control gas venting and vectors; to discourage scavenging; and to provide a pleasing appearance.

13.1 DAILY AND INTERMEDIATE COVER

Daily soil cover or an alternative daily cover will be applied at the end of each operating day, regardless of weather, as required by ODEQ, to deter disease vectors, fires, odors, and blowing litter. The daily soil cover material should consist of nominally compacted earthen material free of garbage, trash, or other unsuitable material. The minimum thickness of the daily soil cover will be 6-inches.

Intermediate cover will consist of at least 12-inches of nominally compacted soil over refuse. Proper surface grades and side slopes will be maintained to promote runoff and minimize infiltration without excessive erosion. Internal side slopes will not exceed a slope of 3:1 and external side slopes will not exceed a slope of 4:1. The final top of slope will be graded to a minimum of 4 percent.

13.2 FINAL COVER SYSTEM

The final cover system will be constructed once the landfill reaches final grade. The AEL is permitted to use an alternate evapotranspiration final cover system. The cover system conforms to ODEQ specifications and includes the following components from bottom to top:

- 12-inches of intermediate cover soil
- 24-inches of vegetation support soil
- 12-inches of vegetation topsoil

Once the cover system and surface water control structures are constructed as prescribed, the vegetative soil layer will be fertilized, seeded, and mulched to develop a thick stand of vegetation.

Each layer of this final cover system will be supportive of vegetative growth. The soils that make up the vegetative topsoil layer will be tested for proper application of lime, fertilizer, or other soil conditioning amendments. Once the proper amendments have been disked into the soil, seeding of a hardy grass mixture such as fescue and clover will take place. At the conclusion of seeding, the vegetative layer will be mulched to prevent soil erosion and assist with soil moisture retention and seed germination. The vegetative crop will be cared for (e.g., irrigated, reseeded, etc.) to establish a healthy stand of grass as quickly as possible. Both the crown and side slopes of the completed portions of the landfill will be seeded in the fall or early spring. The vegetative soil cover will be tested to determine the lime and fertilizer rates as needed.

13.3 BORROW SOURCES

The active borrow area for the site is located North and West of the existing landfill in the proposed expansion area. Based on proposed base and final grades for the expansion area, it is estimated that approximately 17,710,976 CY of soil will need to be excavated and 428,782 CY of soil will need to be filled in the expansion area to achieve top-of-subgrade elevations.

13.4 BORROW AREA RECLAMATION

The borrow areas should have a gently sloping topography which provides wet weather drainage. The borrow areas will be excavated in a manner that results in final contours similar to those present before disturbance, except the area will have a lower elevation. A minimum of approximately 12-inches of unconsolidated material will be left in place. The area will be excavated in a manner to provide positive drainage and possibly create one or more impoundments. In the case that impoundments are proposed or constructed, all applicable permits will be obtained and copies provided to the ODEQ. Activities will be scheduled to minimize erosion and sedimentation. Disturbance of vegetation will be limited to the extent possible. Attempts will be made to save trees where practicable. The borrow areas will be regraded in a manner to provide sufficient soil material for the re-establishment of vegetation. Revegetation activities should be scheduled for spring and fall.

14.0 CLOSURE AND POST-CLOSURE

A Closure and Post-Closure (CPC) Plan is included in Appendix K. The CPC Plan is in general accordance with OAC 252:515-25. The CPC Plan is intended to be used as a standalone document, a copy of which will be maintained within the facility's operating record. The CPC Plan includes the necessary actions to be completed at the site before the facility can be certified closed and sets forth the maintenance and monitoring requirements during the post-closure period. The post-closure period will be in effect for 30 years. The closed landfill facility will be maintained in order to retain its integrity and will not pose a threat to human health or the environment. The CPC Plan also addresses cost estimates and financial assurance requirements for the AEL.

15.0 GENERAL COMMENTS

This permit application is based on the available information as provided by SCS Engineers. If, upon further evaluation or during construction, inconsistencies become apparent, re-evaluation of this report will be necessary.

This report has been prepared for the exclusive use of the AEL and American Environmental Landfill, Inc. for the specific application to the project discussed and has been prepared in accordance with generally accepted engineering practices. No warranties, expressed or implied, are intended or made. In the event of any changes in the nature, design, or location of the project as outlined in this report, this report shall not be considered valid, unless the changes are reviewed and this report modified or verified in writing by the engineer.

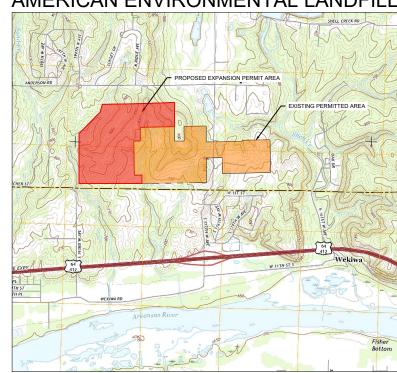
Permit Drawings

AMERICAN ENVIRONMENTAL LANDFILL WEST EXPANSION PERMITTING

ODEQ Permit No. 3510007 December 2023

Revised August 2025

PREPARED FOR AMERICAN ENVIRONMENTAL LANDFILL



207 N. 177TH W. AVENUE SAND SPRINGS, OKLAHOMA

SHEET LIST TABLE	
Sheet Number	Sheet Title
0	Cover
1	Existing Contour Map
2	Site Layout
3	Seasonal High Water Level
4	Top of Subgrade Grading Plan
5	Top of Clay Grading Plan
6	Top of Final Cover Grading Plan
7	Cross Section Locator Map
8	Fill Cross Section A-A'
9	Fill Cross Section B-B'
10	Fill Cross Section C-C'
11	Fill Cross Section D-D'
12	Watershed Plan
13	Details
14	Details
15	Details
16	Details
17	Details
18	Details

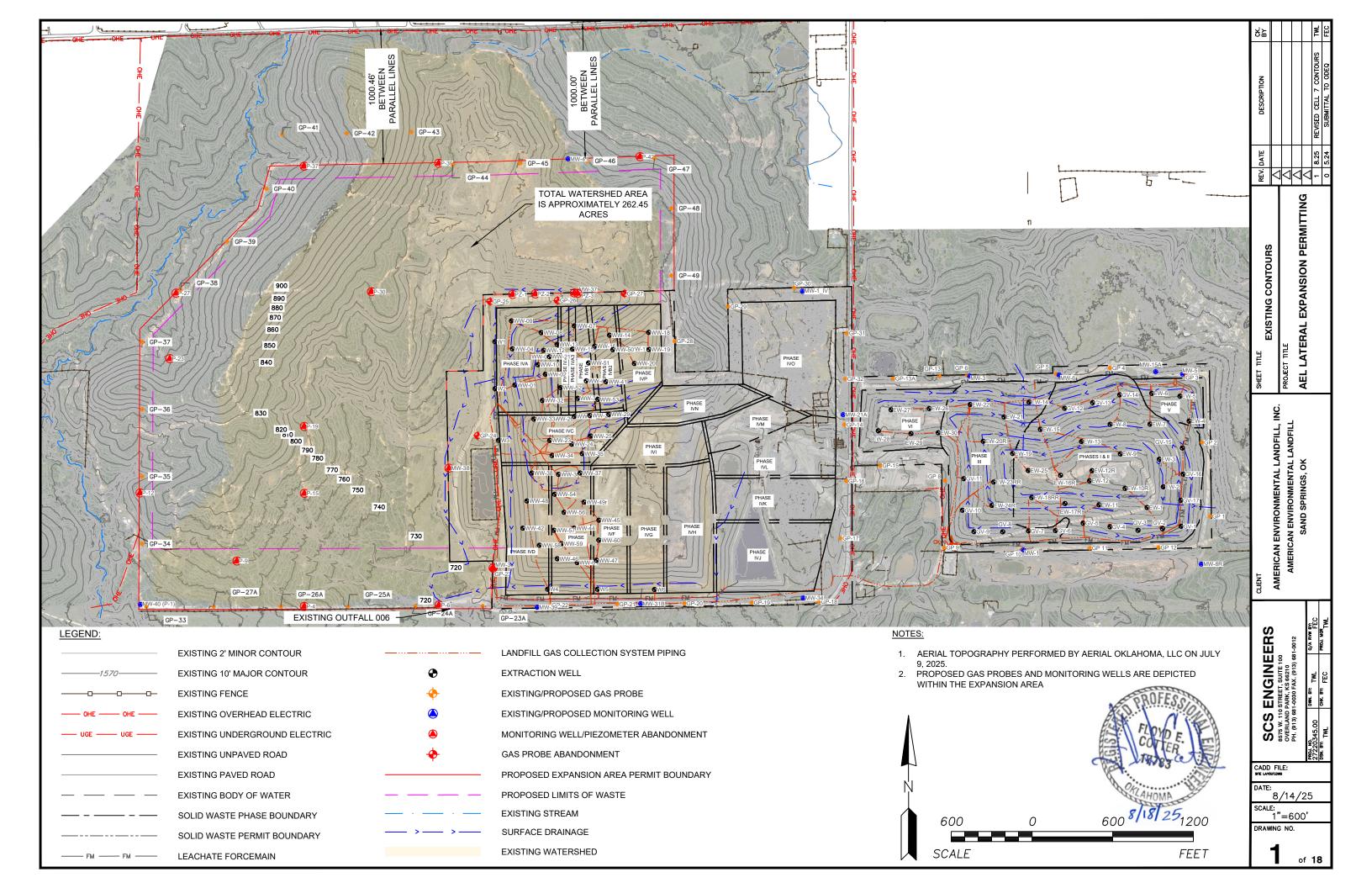
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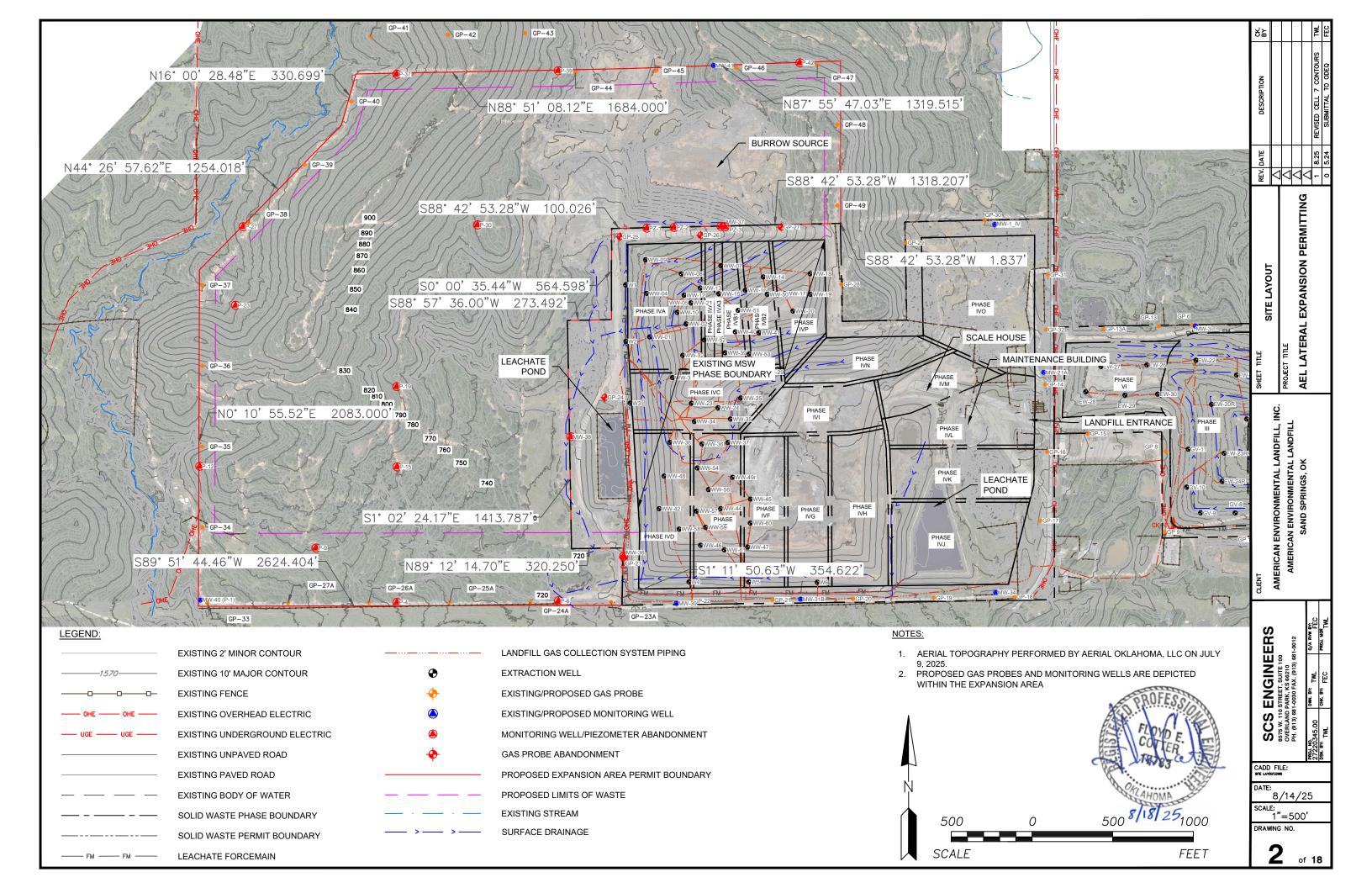
SCS ENGINEERS

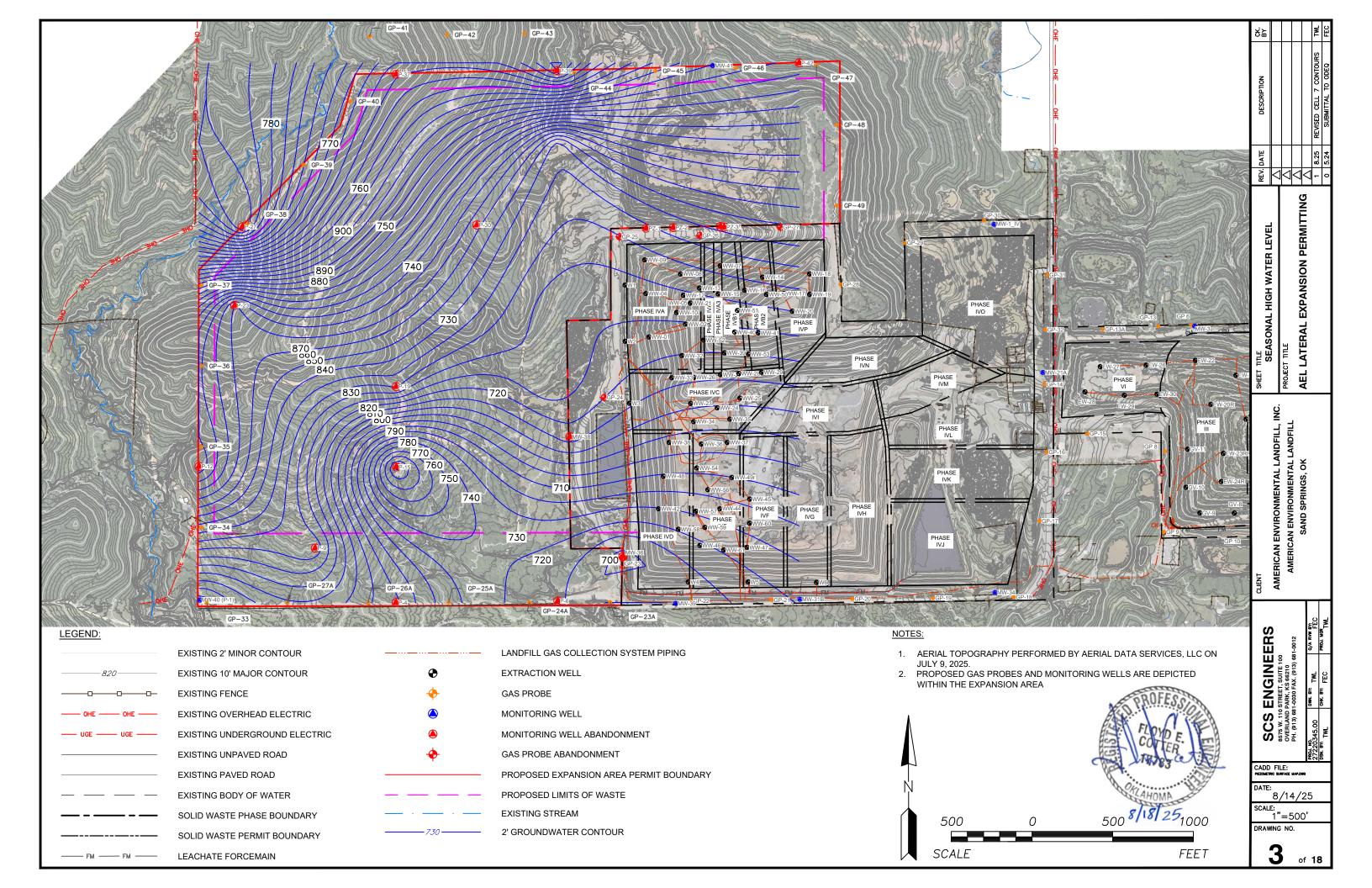
8575 W. 110 Street, Suite 100 Overland Park, KS 66210 PH (913) 681-0030 FAX (913) 681-0012 Project No. 27220345.00

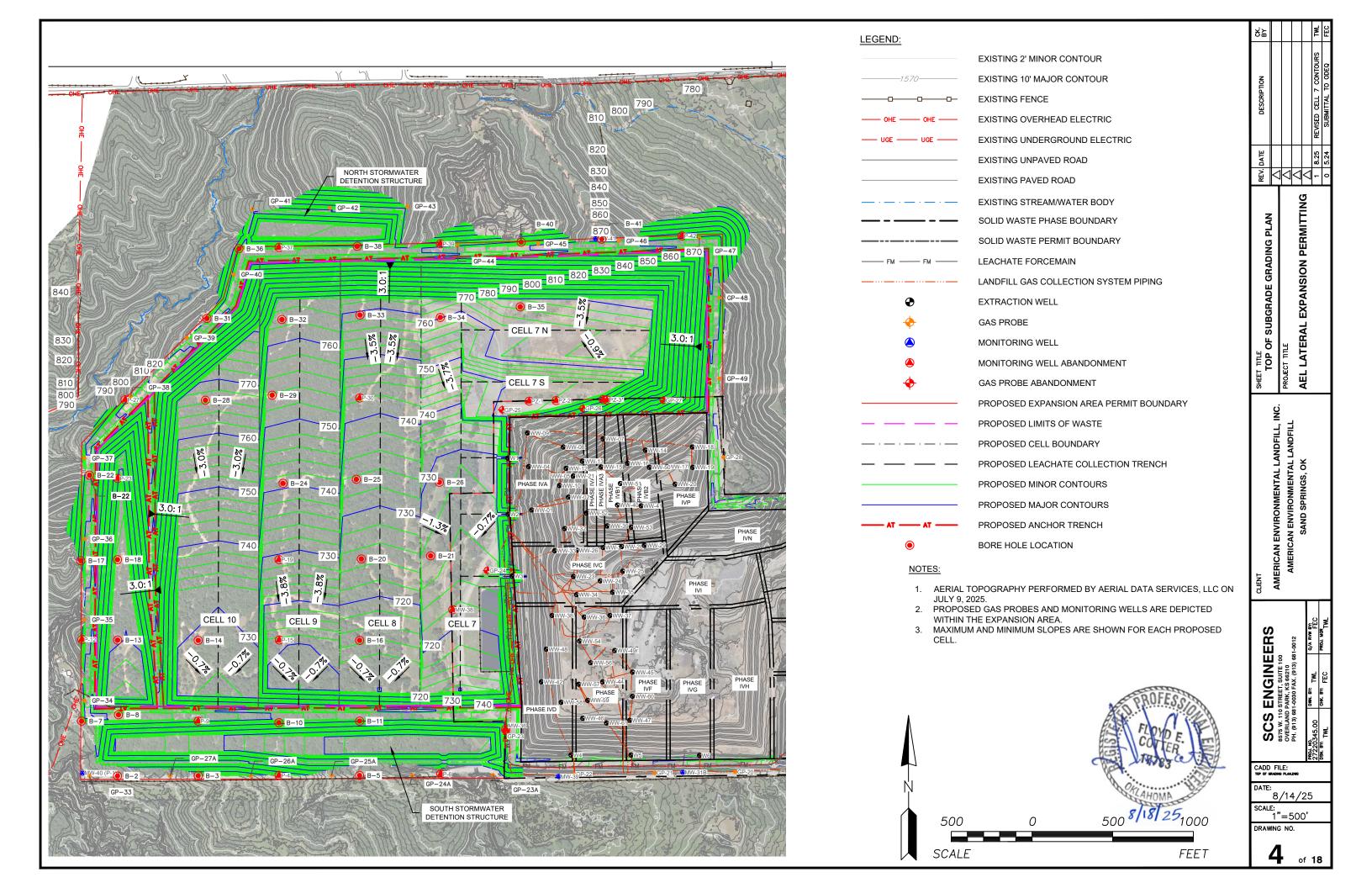


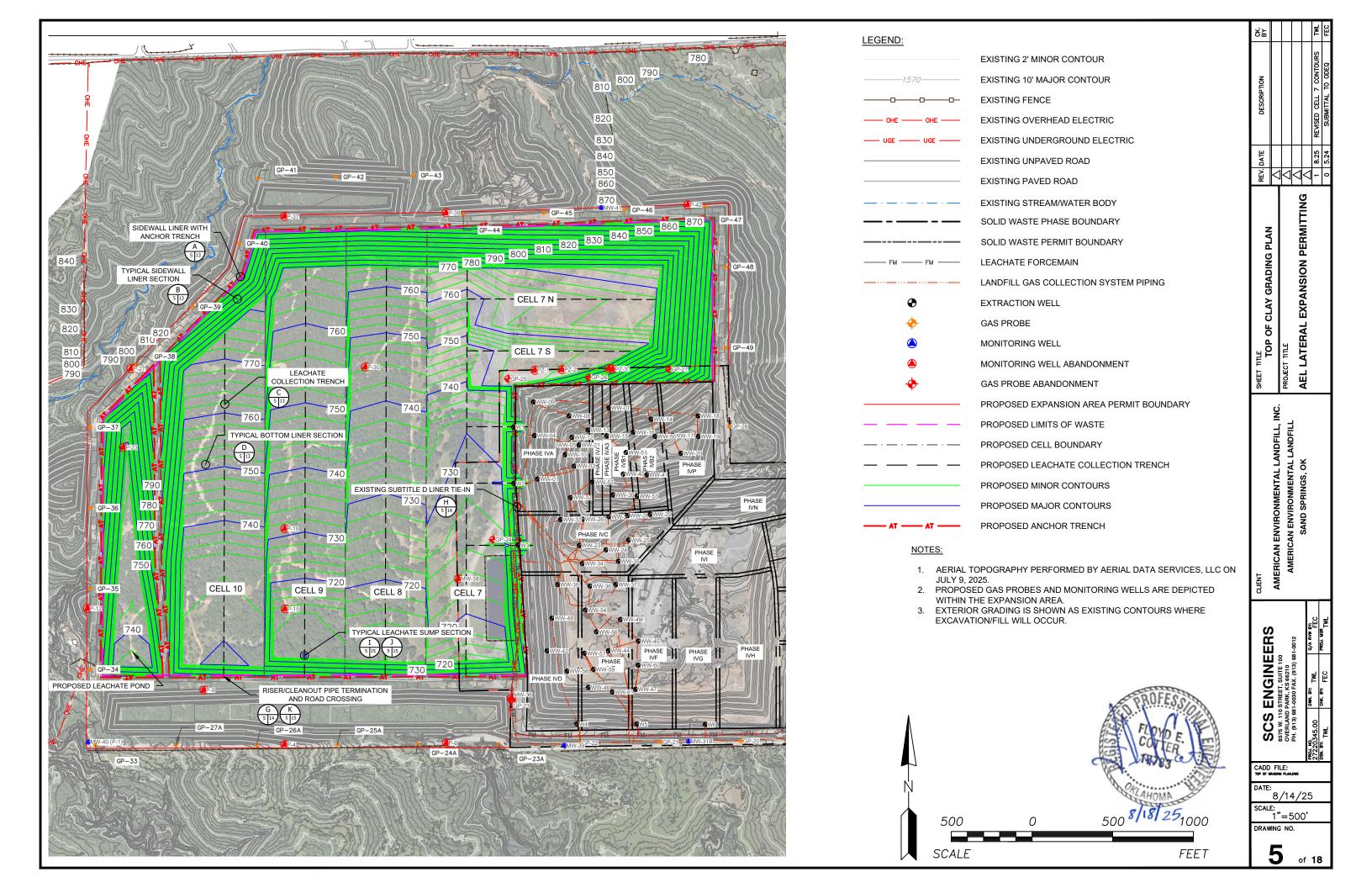
FOR PERMITTING PURPOSES ONLY

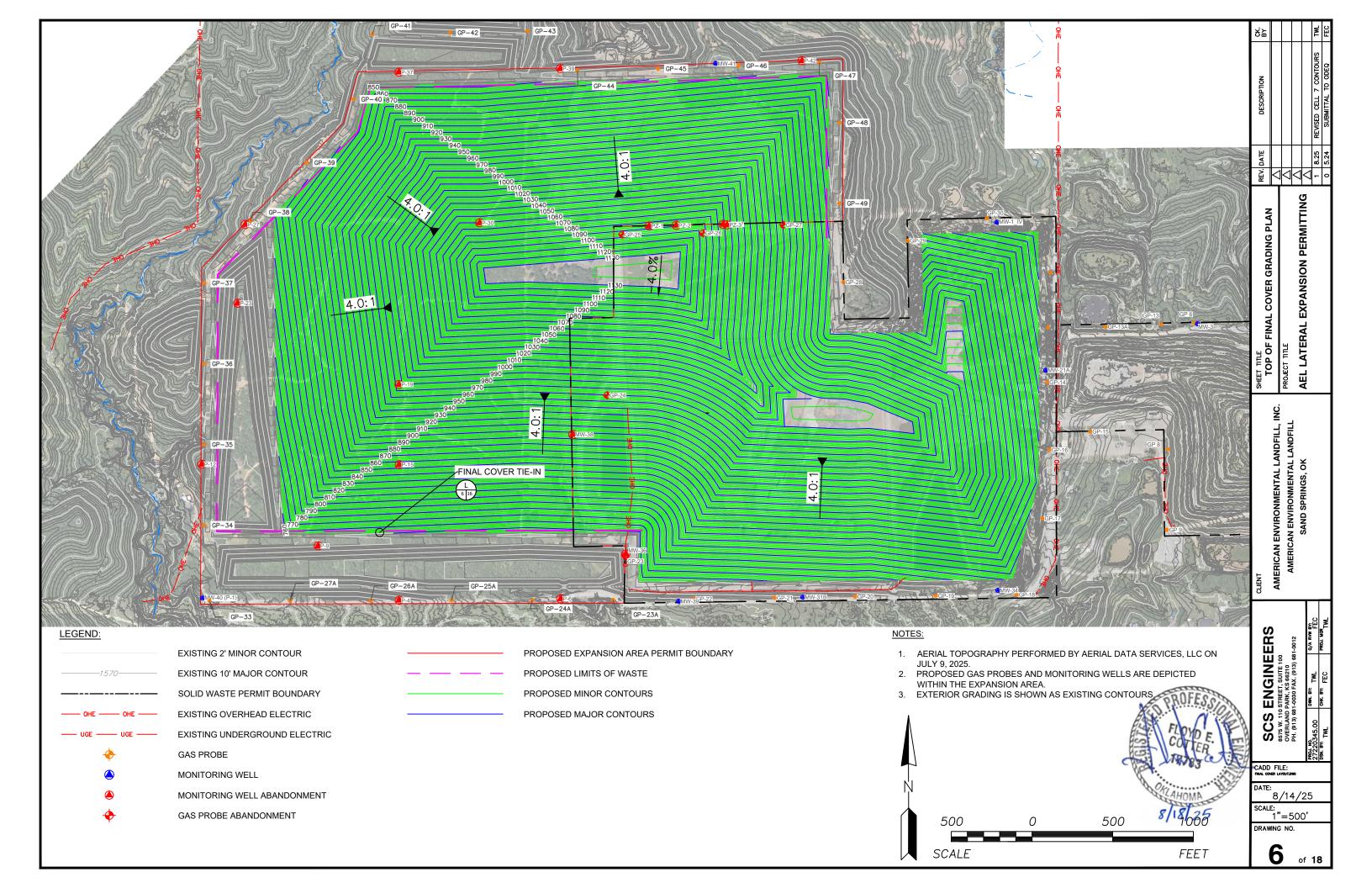


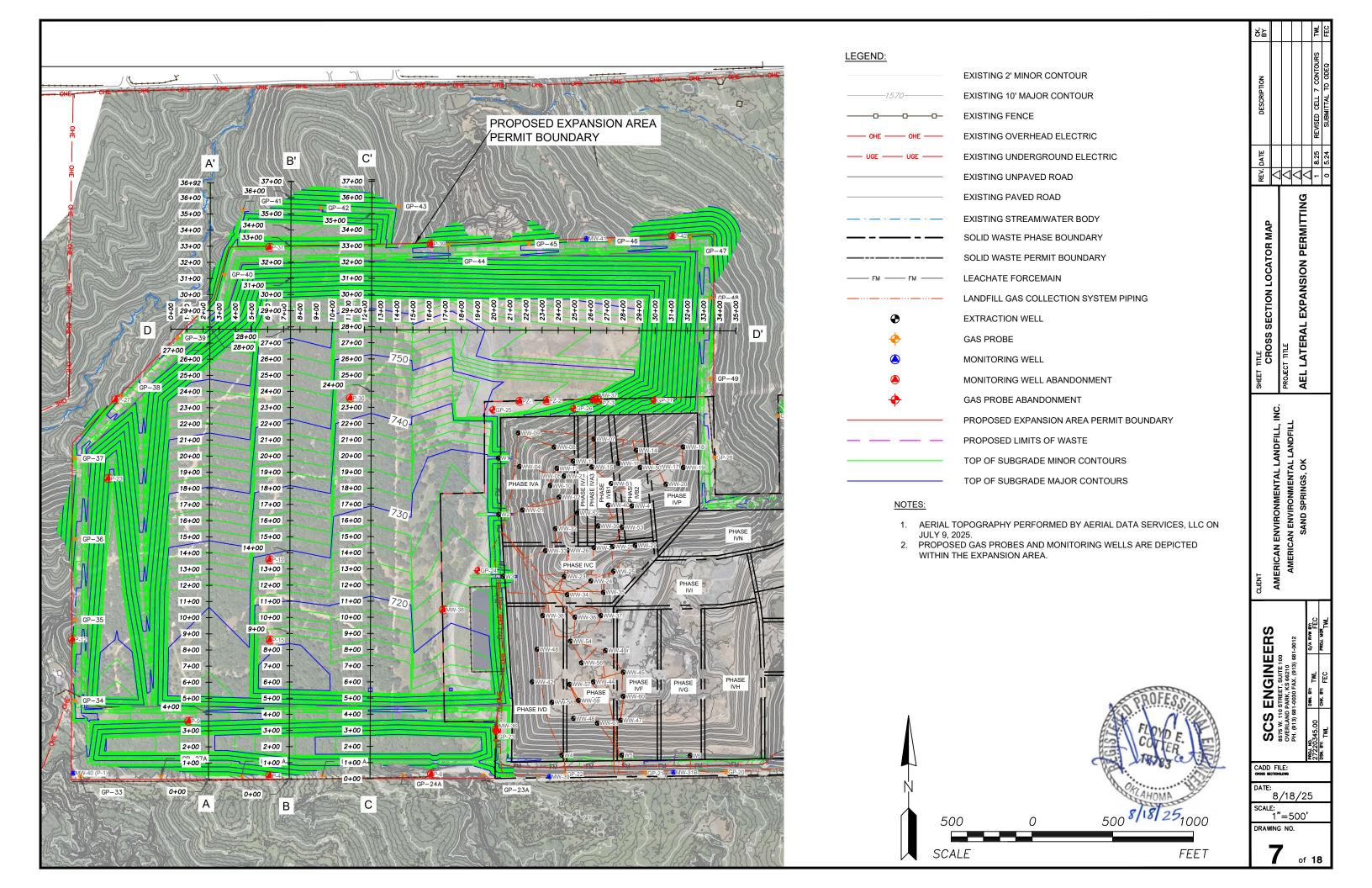


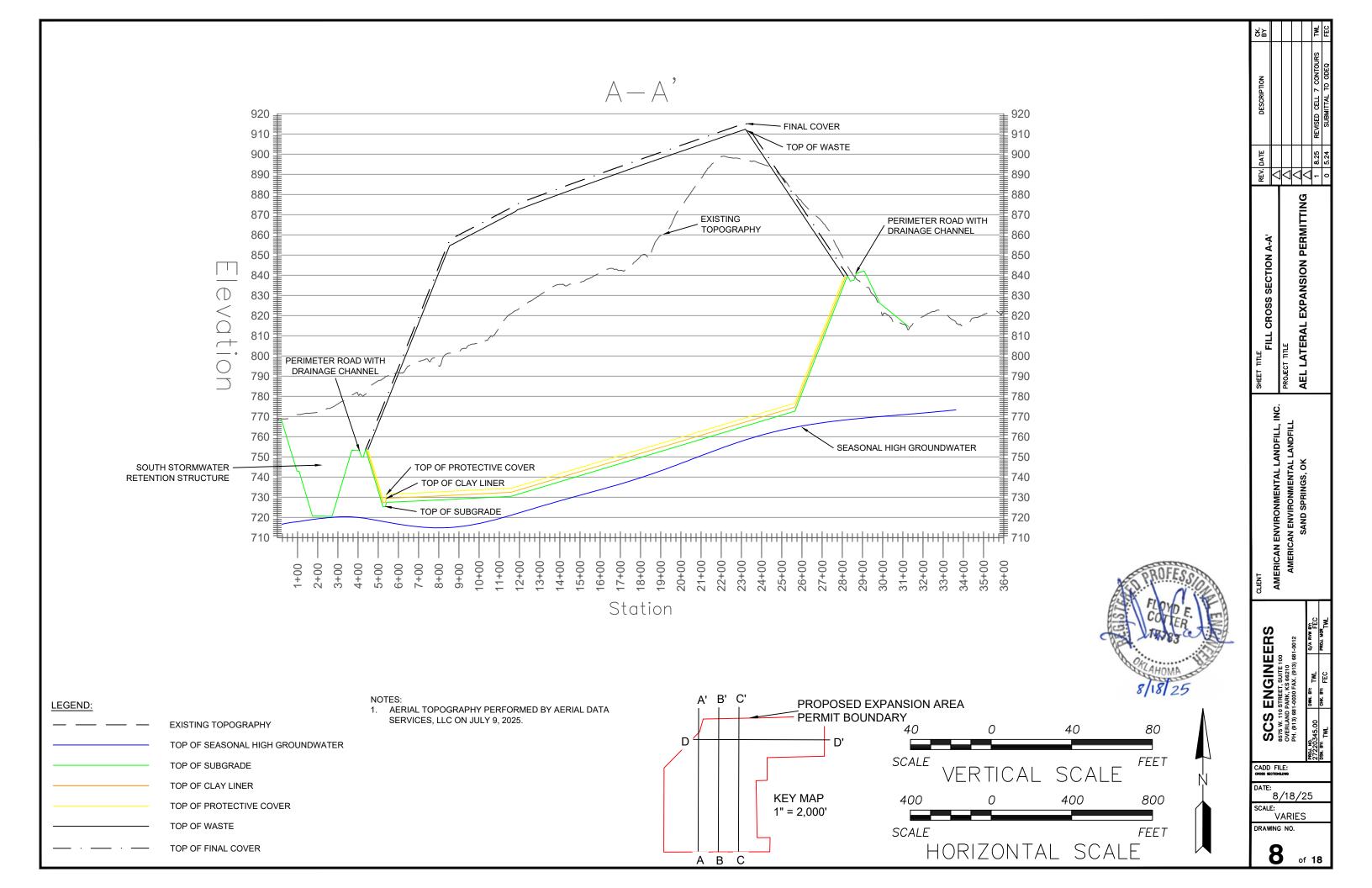


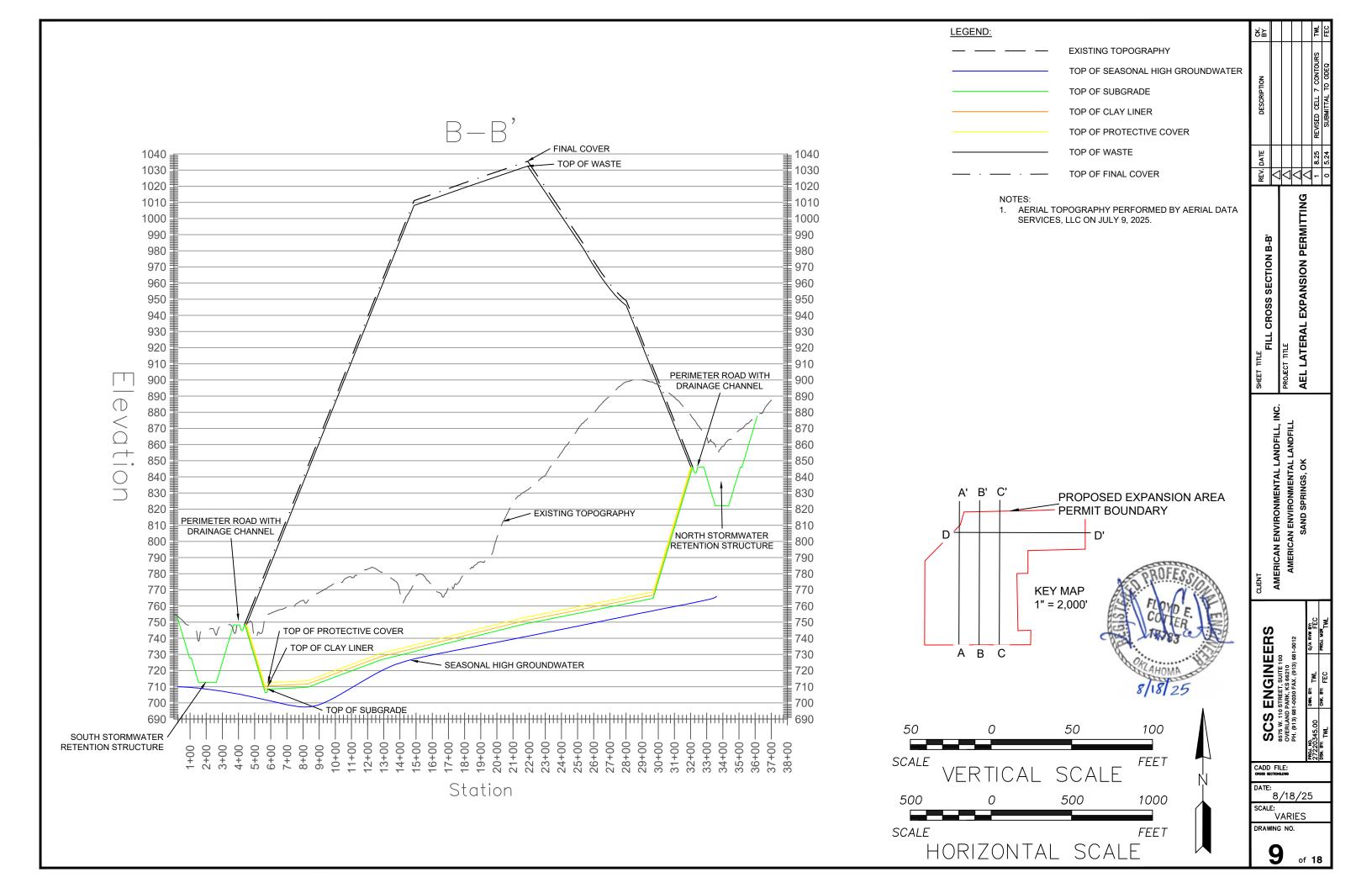


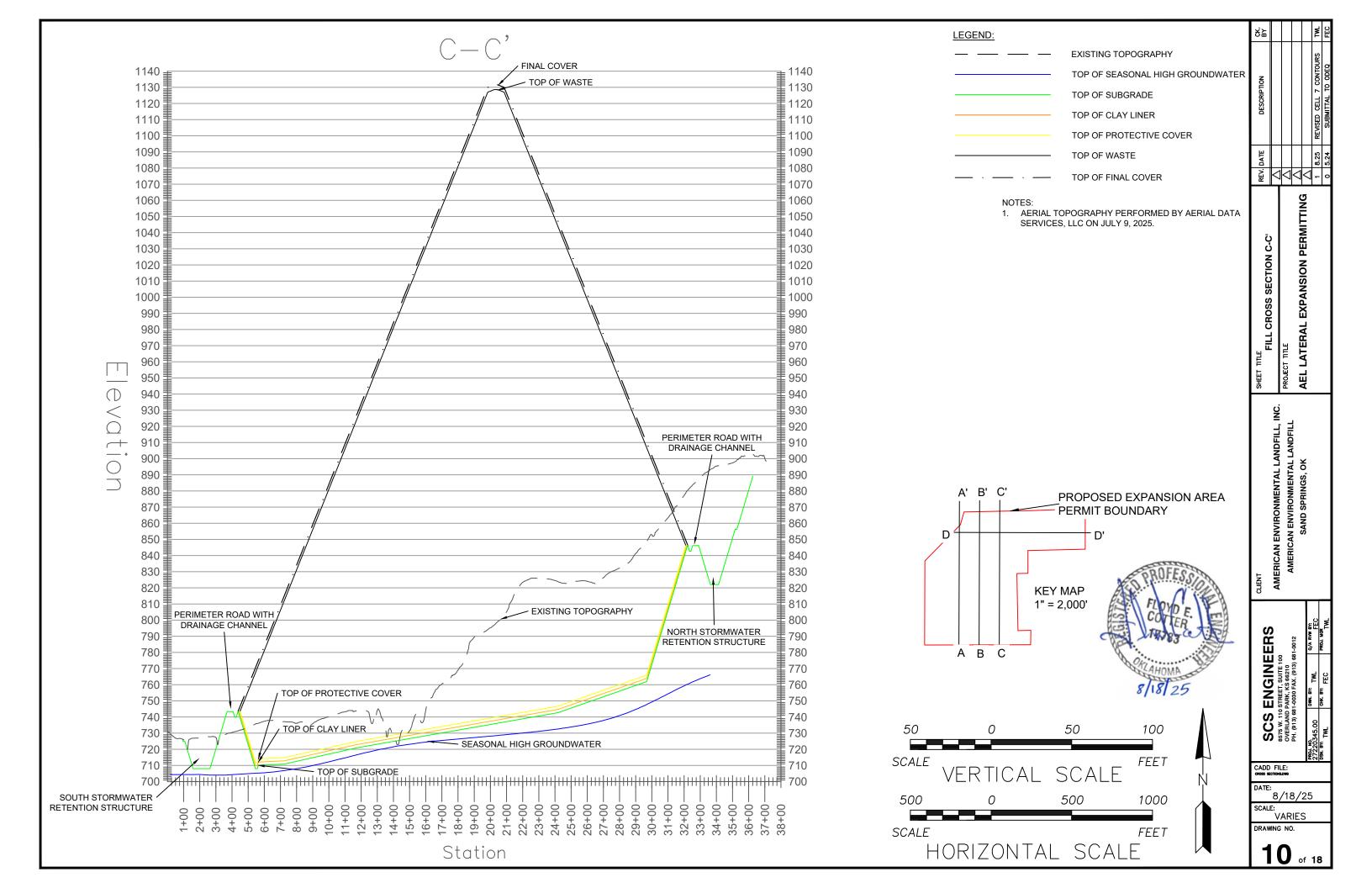


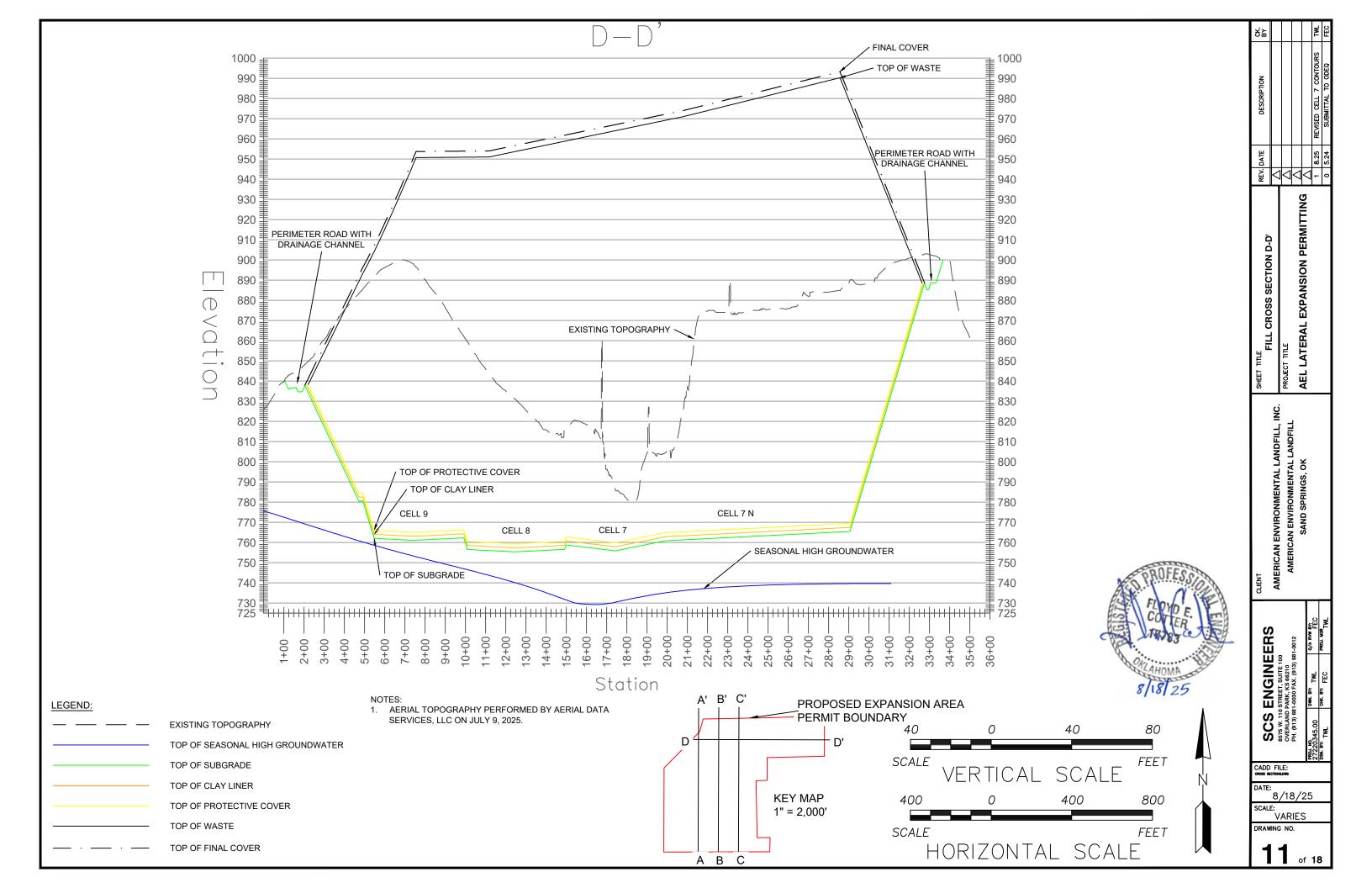


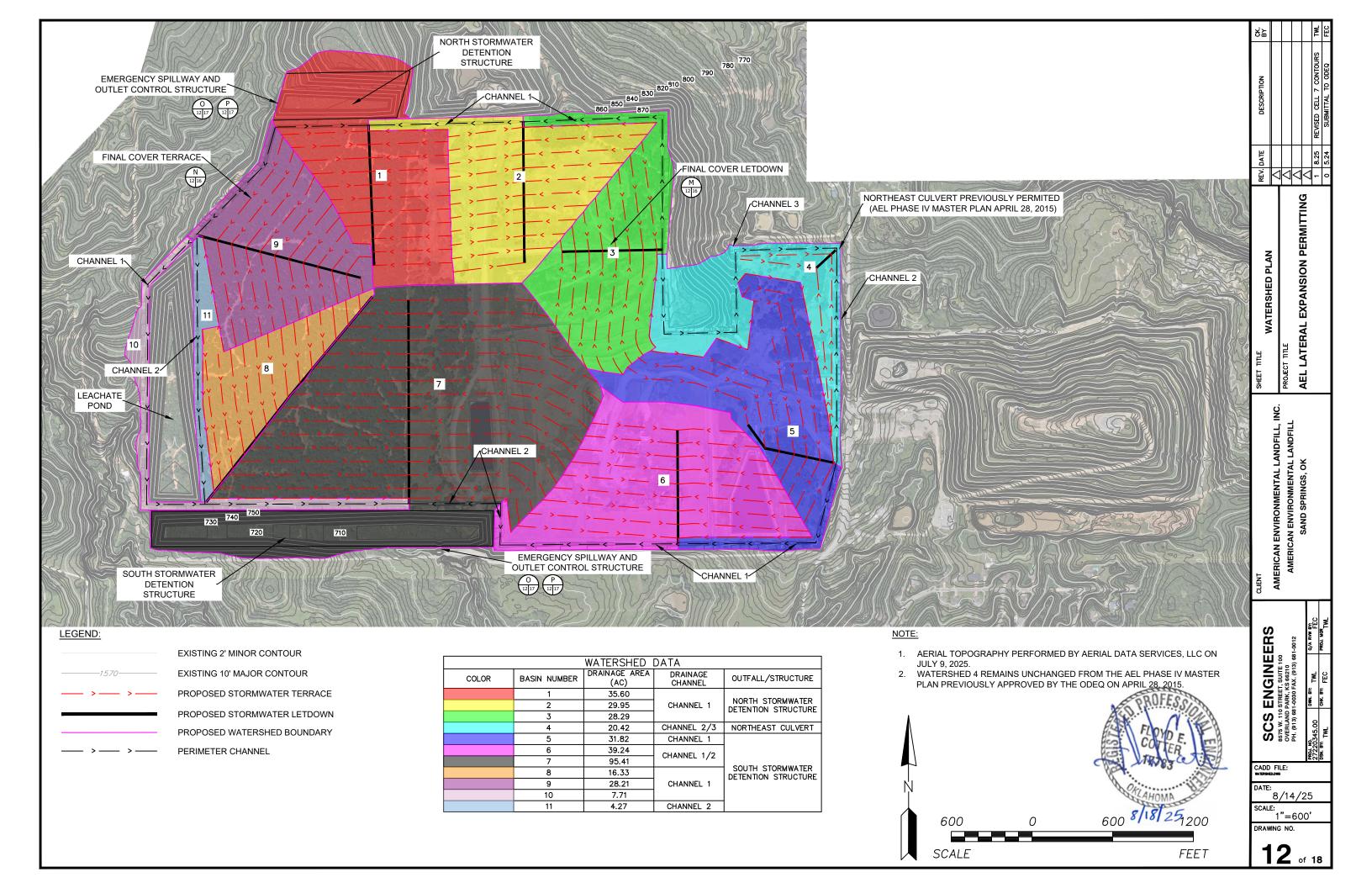


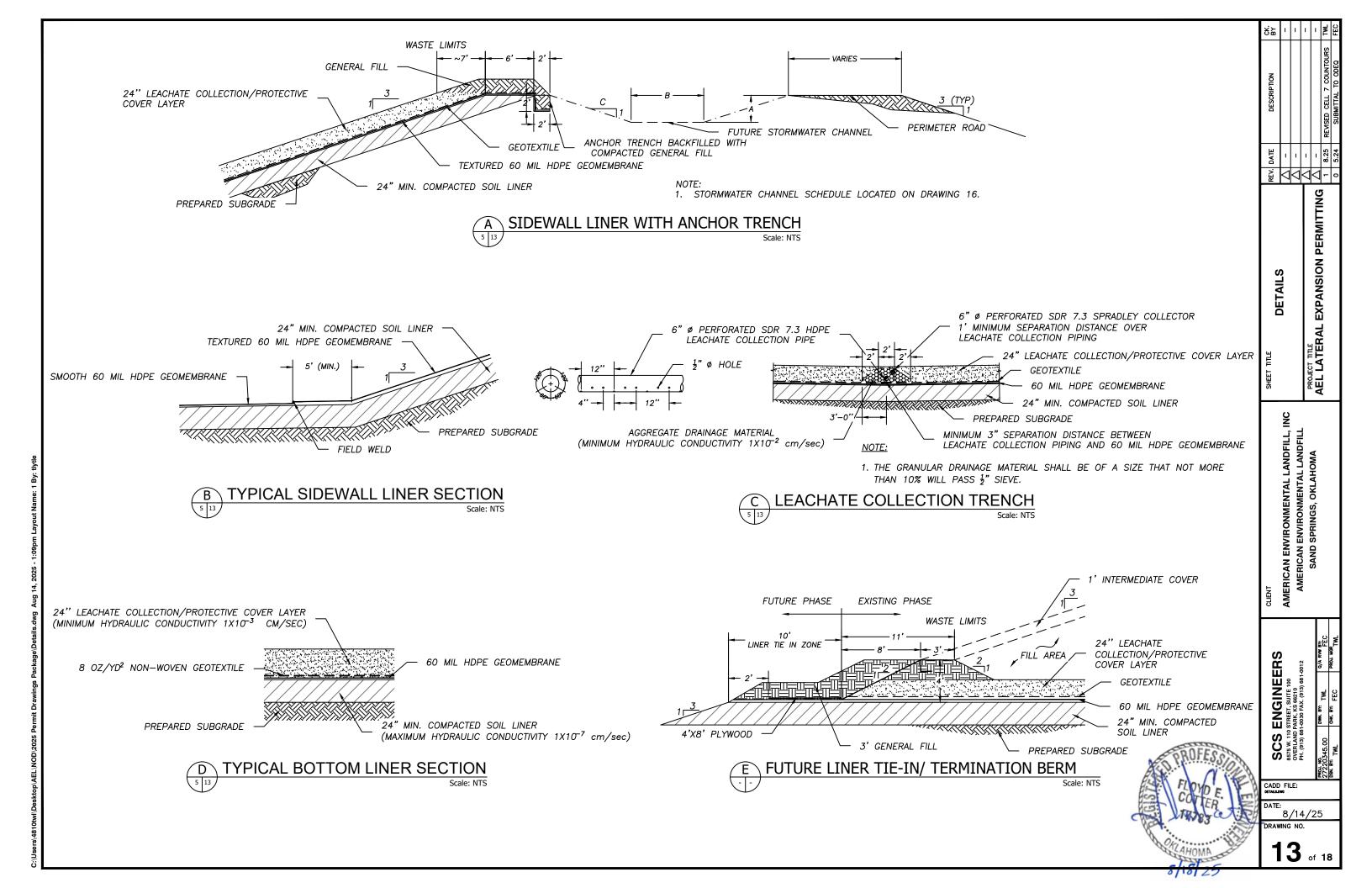


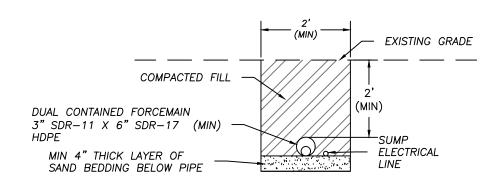


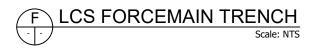


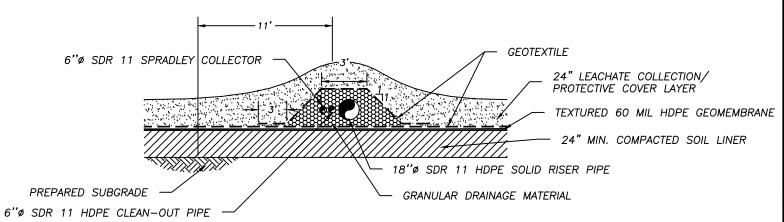




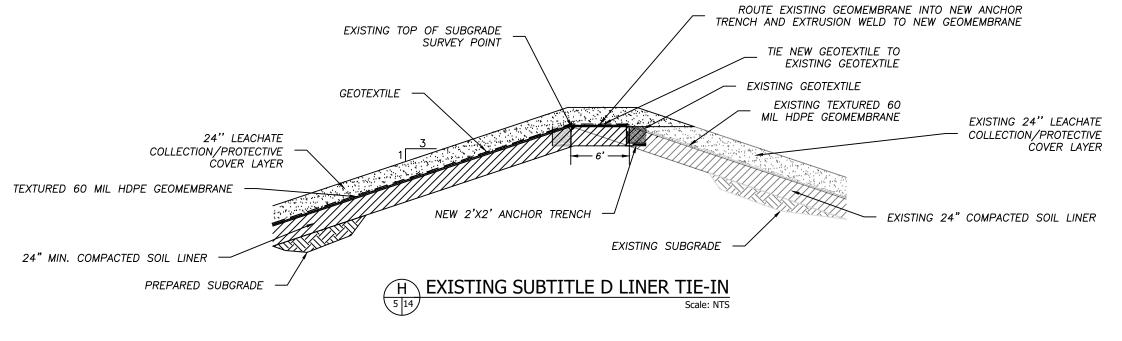








G RISER/CLEANOUT PIPE SIDEWALL SECTION
Scale: NTS





PROJECT TITE
AEL LATERAL EXPANSION PERMITTING DETAILS AMERICAN ENVIRONMENTAL LANDFILL, INC AMERICAN ENVIRONMENTAL LANDFILL SAND SPRINGS, OKLAHOMA

SCS ENGINEERS

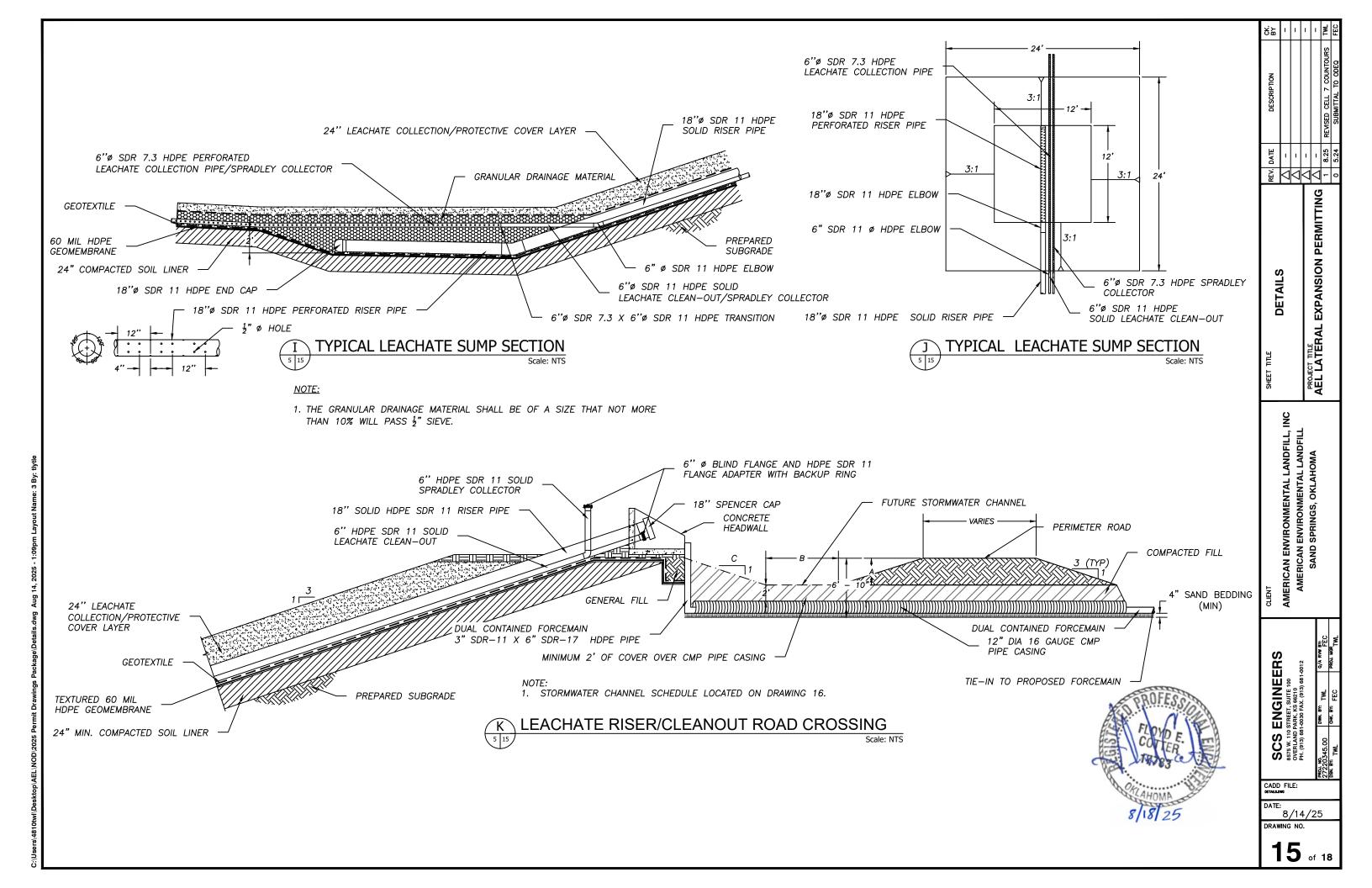
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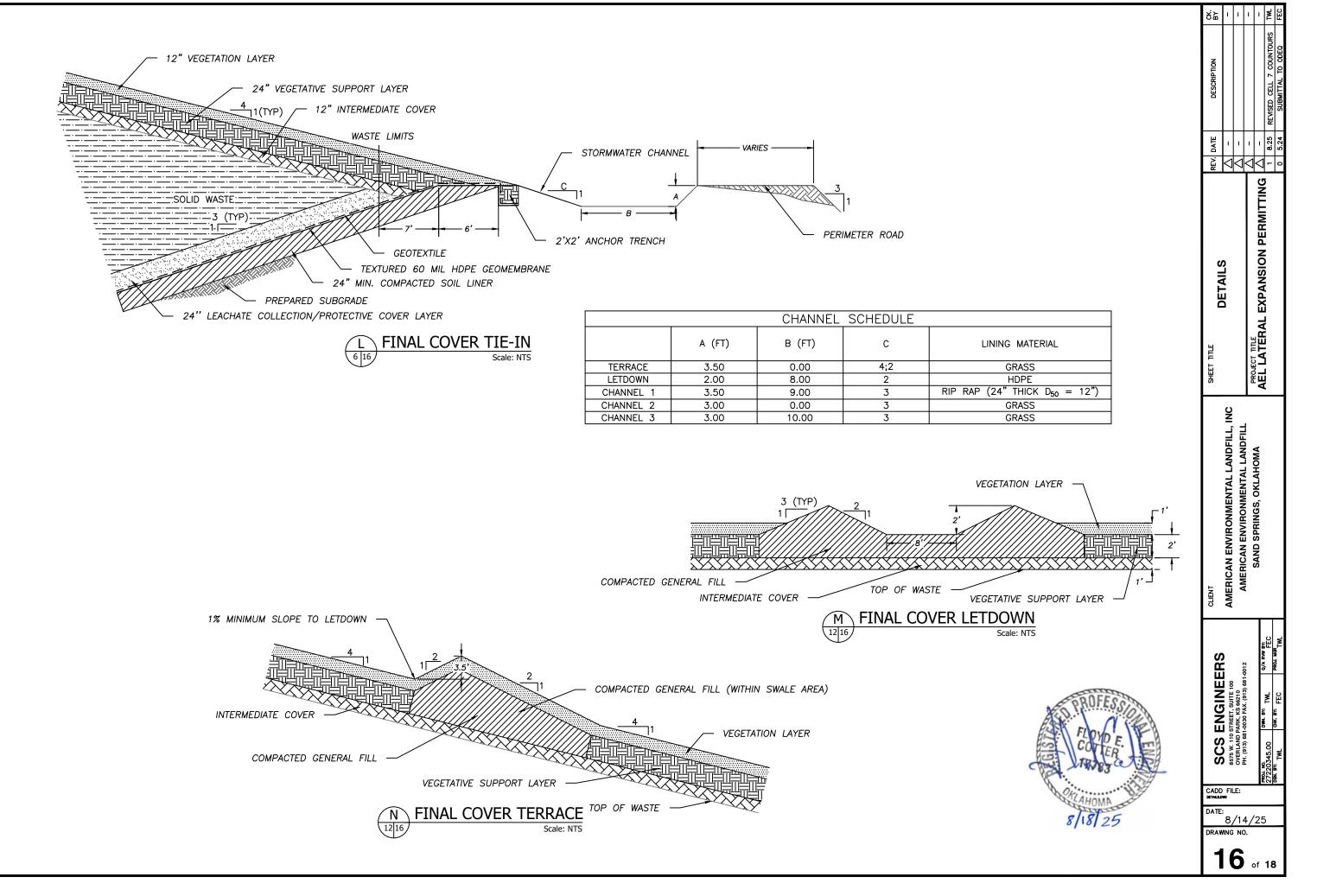
SB75 W. 10 STREET, SUITE 100
OVERLAND PARK KS 6820
PH. (FIN) 681-0012

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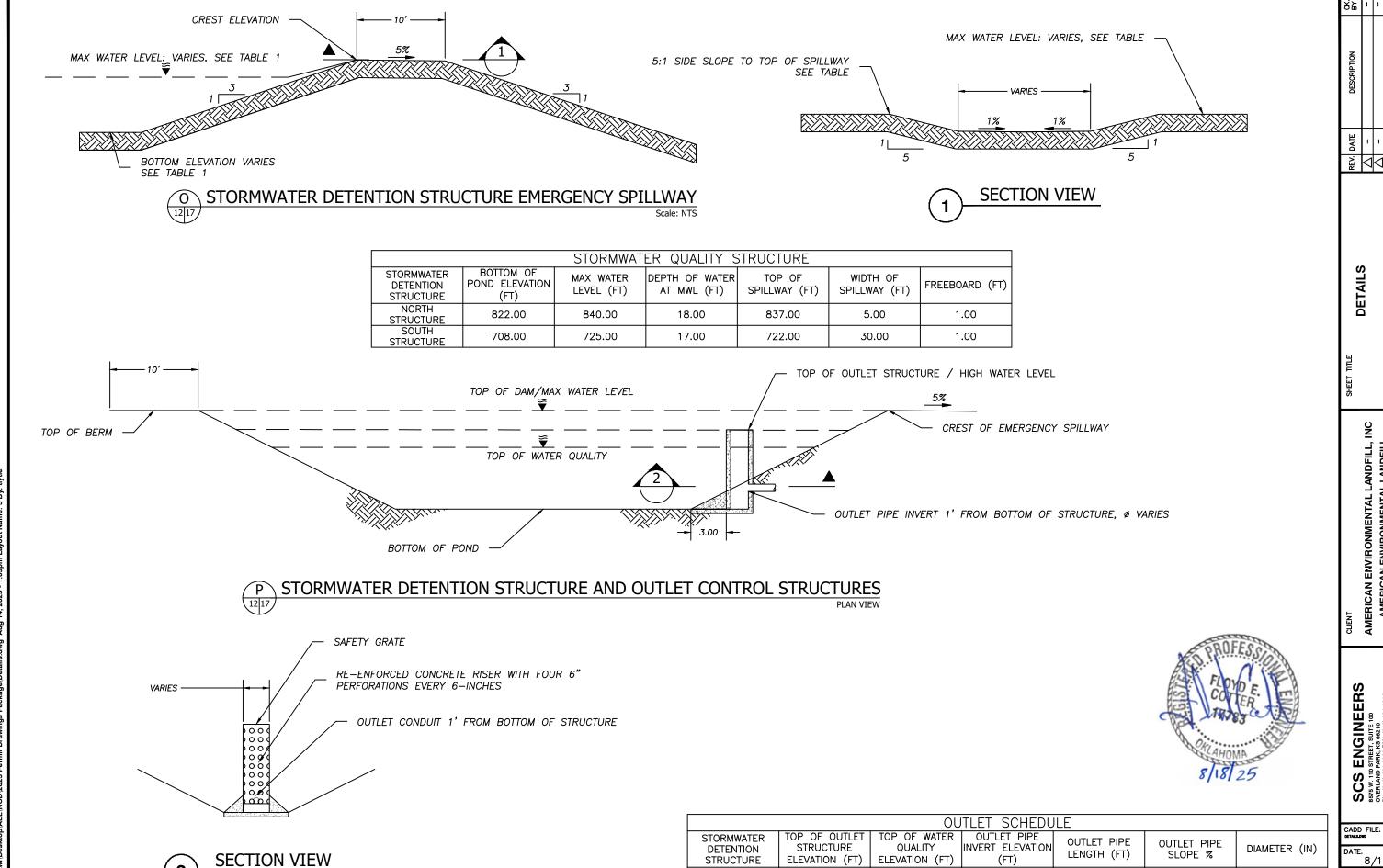
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NORTH

STRUCTURE SOUTH

STRUCTURE

833.00

720.00

823.00

709.00

835.00

720.00

100.00

180.00

1.70

1.00

PROJECT TITE
AEL LATERAL EXPANSION PERMITTING

AMERICAN ENVIRONMENTAL LANDFILL, INC AMERICAN ENVIRONMENTAL LANDFILL SAND SPRINGS, OKLAHOMA

24

48

8/14/25 DRAWING NO.



SURFACE SEAL: CONCRETE OR CEMENT GROUT PLACED ABOVE THE ANNULAR SEAL FROM A DEPTH OF 2-FT TO GROUND SURFACE.



ANNULAR SEAL: BENTONITE CHIPS, CEMENT/BENTONITE GROUT, OR BENTONITE GROUT (SEE NOTE 1) PLACED FROM FILTER PACK SEAL TO WITHIN 2-FT OF GROUND SURFACE



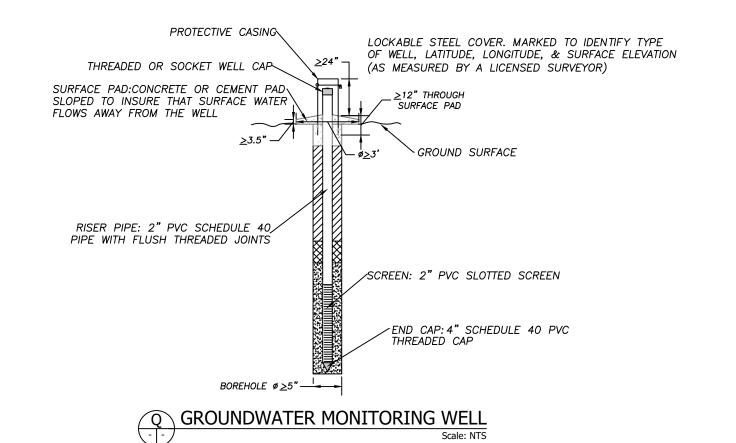
FILTER PACK SEAL: AT LEAST 2-FT OF HYDRATED BENTONITE (0.25"-0.75" IN SIZE) PLACED ABOVE FILTER PACK.

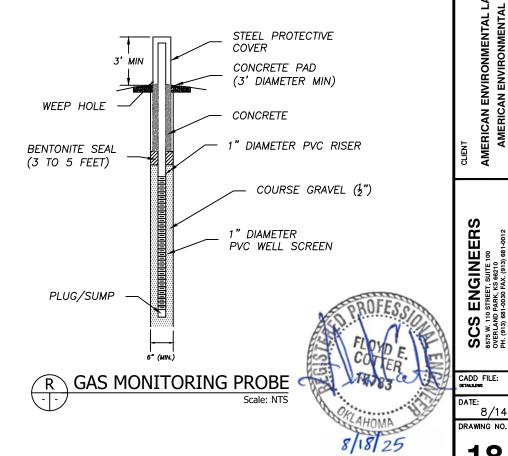


FILTER PACK: SILICA SAND; PLACED FROM BOTTOM OF BOREHOLE TO 2-FT ABOVE THE TOP OF SCREEN.

NOTES:

- 1. ANNULAR SEAL: CEMENT GROUT MIX RATIO OF 94-LBS CEMENT TO A MAXIMUM OF 6-GAL WATER IS USED, AND MIXED TO THE CONSISTENCY RECOMMENDED BY THE CEMENT MANUFACTURER. MAXIMUM OF TWENTY PERCENT (20%) BENTONITE BY DRY WEIGHT MAY BE ADDED TO THE CEMENT GROUT TO FORM THE CEMENT/BENTONITE GROUT MIXTURE. THE BENTONITE IS PREHYDRATED TO THE MANUFACTURER'S RECOMMENDED CONSISTENCY. THE BENTONITE GROUT HAS AT LEAST TWENTY PERCENT (20%) BENTONITE BY DRY WEIGHT, AND IS MIXED ACCORDING TO THE MANUFACTURER'S RECOMMENDED CONSISTENCY.
- 2. WHEN THE PLACEMENT OF GROUT WILL EXCEED 20-FT, THE GROUT IS PLACED THROUGH A TREMIE PIPE AND FILLED OR PUMPED FROM





PROJECT TITLE
AEL LATERAL EXPANSION PERMITTING

AMERICAN ENVIRONMENTAL LANDFILL, INC AMERICAN ENVIRONMENTAL LANDFILL SAND SPRINGS, OKLAHOMA

8/14/25

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Appendix A

Adjacent Property Owner Notifications, Location Restriction Correspondences, and Figures

Appendix B Subsurface Investigation

Appendix C

Liner and Final Cover System Stability Analysis

Appendix D Groundwater Monitoring Plan

Appendix E

Explosive Gas Monitoring Plan

Appendix F Surface Water System Design Report

Appendix G

Quality Assurance/Quality Control Plan for Liner and Leachate Collection System Installation and Testing

Appendix H

Leachate Collection System Design Report

Appendix I

Operations Plan

Appendix J

Waste Exclusion Plan

Appendix K Closure and Post-Closure Plan

Appendix L

Quality Assurance/Quality Control Plan for Evapotranspiration Alternative Earthen Final Cover Construction

Appendix M

Leachate Recirculation Plan