Loudon County Solid Waste Disposal Commission
June 19th, 2025
6:00PM
Loudon County Annex

Roll Call

Public Comment

LCSWDC:
- 05.15.2025 Minutes
- 2025 Auditor
- Minor Modification Edit and Approval
- Cell A Leachate Disconnect Update
- Leachate Storage Tank Update
- New Borrow Pit Update
- Storm Water Ponds Update
- Protocol for Communication with Republic, including operations, onsite developments, and communications with TDEC
- Asbestos Disposal Recertification
- Partial Closure Plan
- 2025-26 Bond
- Annual Stakeholder Price Adjustment
- Authorization to Hire Co-Counsel
- Adjustment to attorney fees
- Gasification
- Jurisdictional Determination Letter

Republic:
- Engineering Report
- Operations
- Host & Security Fees Letter
- Airspace Utilization Report
- Quarterly Origin Report
- TDEC Inspection
- Loudon Financial Information

Action Items

Adjourn

LOUDON COUNTY SOLID WASTE DISPOSAL COMMISSION
LOUDON COUNTY, TENNESSEE
Thursday, May 15, 2025
Courthouse Annex Building
MINUTES

Opening of Meeting:

BE IT REMEMBERED That the Loudon County Solid Waste Disposal Commission convened in regular session in Loudon, Tennessee on the 15th day of May 2025.

Commission Chairman Mr. Waller called the meeting to order at 6:00 p.m. eastern time.

Roll Call:

Upon Roll Call, the following Commission Members were present: Ms. Monty Ross, Mr. Gary Hendrix, Chairman Mr. Adam Waller, and Mr. Gary Busch

Not present: Mr. Larry Jameson - resigned, Mr, Lawson absent

Legal Representation Ms. Elizabeth Murphy participated via phone

In attendance from Republic Services were representatives – Mr. David Hollinshead and Mr. Stoddard Pickerell Republic Environmental Engineer.

Ms. Turtle was not present.

General Public Comments:

Public Comments were made by:

Mr. Brian Viars would like update on the legal matter of the landfill and has pictures of large clay rocks and mud on the road will provide to commission chairman Mr. Waller & legal representative Ms. Elizabeth Murphy per request.

Mr. Richard Anklin requested information on access regarding any records being digitized. Any information on the planning for closure

Republic Services Environmental Engineer Mr. Stoddard Pickerell provided a update on the progress being made towards closure that should be completed by year end.

Ms. Hunter noted packet from Republic missing facility inspection report, questioned why information from Republic not complying with contract and providing into operations packet and included into packet provided to public.

Would also like an update on the buzzard situation and camera status.

Legal Discussions:

Chairman Mr. Waller requested an update from commission attorney Ms. Murphy where negotiations stand.

Commission legal representative Ms. Murphy provided high level overview, noting at least ten top-line issues provided to Republic legal representatives, and the mud-resolution issue is one of them. All ten top-line issues need to have some level of resolution agreed upon prior to moving forward. If a resolution can't be achieved on some or all ten, then the courthouse route is the alternative, however; we want to exhaust all options first. Ms. Murphy will not get into the details publicly, however; she fully expects to sit down and go over some of the details within the next week.

Approval of April 17th, 2025 Minutes:

A motion was made by commission member Ms. Ross to approve the, April 17th, 2025, minutes as written with one name change, seconded by commission member Mr. Hendrix,

A voice vote was taken; motion was unanimously approved 4-0.

Absent was commission members Mr. Jameson and Mr. Lawson.

Cell A Leachate Disconnect Update: (Joint Submission)

Commission Chairman Mr. Waller raised the issue regarding to the leachate problem and requested an update from commission legal representative Ms. Murphy regarding communications with TDEC.

Commission legal representative Ms. Murphy discussed TDEC letter, and the response didn't note any additional findings. Summary, TDEC wasn't much help here with the leachate findings, they are assuming that both parties of the joint commission knew about the situation of concern prior to submission and won't change their position.

The Commission legal representative Ms. Murphy is going to write back to TDEC to clarify the record with them, while the commission needs to keep in mind that TDEC is the minimum, the enforcement approving body. For starters, TDEC has not been much help in this area of concern.

Republic has all the site operational controls, responsible for the design and engineering, then submits it to the commission for approvals, without the commission having all the necessary information at the time of giving approval.

Plan is to get a meeting between Republic and the Commission legal representation after Memorial Day. It would be great if someone from the commission could make a site visit to see if the leachate appears to be addressed. Commission member Ms. Ross noted that a visit is currently planned by multiple commissioners for May 20th at 10am. Check to see if Mr. Cline may be available to attend.

Commissioner Ms. Ross raised the item regarding flushing of the pipe in module A to make sure if it is clear of debris every 6 months. Questioned if this has been incorporated into the operations plan.

Republic Engineer Mr. Stoddard Pickerell responded that he is budgeting to have it done quarterly to ensure the long-term health of the landfill. Mr. Pickerell provided more information related to the processes of slip-lining and use of stents and what both are comprised of and why these solutions should address the outstanding concerns with leachate flow controls including from module A.

New Borrow Pit Update:

Commission Chairman Mr. Waller requested an update from Republic Systems Environmental Engineer Mr. Stoddard regarding the borrow pit.

Republic Systems Environmental Engineer Mr. Stoddard provided the commission with an update on the details with the current status regarding areas and zoning along with long term usage.

Commission Chairman Mr. Waller noted that the county has different zoning requirements now for landfill and will follow up on this item and provide to Mr. Stoddard.

Commission attorney Ms. Murphy is working on the Bond issue. She doesn't have an answer yet from TDEC if they indeed have the Bond in hand and will circle back with them. Republic has stated that the Bond is not needed yet, while TDEC has stated that they wanted the Bond in hand at the time of expansion approval.

Storm Water Ponds Update:

Commission Chairman Mr. Waller last meeting commission asked for a timeline for this project, what is status?

Republic Systems Environmental Engineer Mr. Stoddard provided an update on draining of the pond, soil samples collection and sampling. The timeline should be drained within next two weeks.

Minor Modification:

Commission Chairman Mr. Waller requested an update from Commission legal representative Ms. Murphy.

Commission legal representative Ms. Murphy stated that TDEC requested sticking with the original five (5) issues that were submitted. This approach could be reviewed and approved more quickly, which is the direction taken.

Commission Chairman Mr. Waller requested for a Motion to approve the Minor Modifications

Commission member Mr. Busch made a Motion to approve the Minor Modification inclusive of fixing the redline changes for the call out of No. #57 gravel found on pages #7, 8 and #15, 19.

Motion was seconded by Commission member Ms. Ross.

A voice vote was taken, motion approved 4-0 with 2 members absent

Protocol for Communication with Republic: ***(Including Operations, onsite developments and communications with TDEC)***

Commission legal representative Ms. Murphy discussed the flow of information from Republic that is going to TDEC that the commission may not be copied on or receives late. This is not working currently and needs to be addressed.

Commission Chairman Mr. Waller noted that the commission will discuss this further at the June meeting.

Invoices & Reimbursements:

None submitted at this meeting.

Republic Report:

Operations:

Commission member Ms. Ross raised concerns on the storage tank issue, Republic Services Environmental Engineer Mr. Stoddard from Republic responded by providing an update on actions and status of the tank.

Host & Security Fees Letter:

Nothing noted

Airspace Utilization Report:

Nothing noted

Quarterly Origin Report:

Nothing noted

TDEC Inspection:

Nothing noted

Loudon Financial Information:

Nothing noted

Action Items:

None noted at this time by Commission Chairman Mr. Waller

Adjournment:

Motion to adjourn the meeting made by Commission member Mr. Busch and Seconded by Commission member Mr. Hendrix.

Voice vote taken, 4–0 in favor, 2 absent.

The May 15th, 2025 Loudon County Solid Waste Disposal Commission was adjourned 7:12p.m.

The next Loudon County Solid Waste Disposal Commission meeting will be held June 19th 2025, at 6:00p.m. at the Loudon County Annex Building.

Respectfully Submitted by Gary M Busch LCSWDC Secretary,

Adam Waller - Chairman

Loudon County Solid Waste Disposal Committee

NOTE: Full Video of LCSWDC meeting can be found using below link

Loudon County Solid Waste Disposal Commission Meeting, May 15, 2025 (youtube.com)

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APPENDICES

CONSTRUCTION QUALITY ASSURANCE / QUALITY CONTROL PLAN

EXECUTIVE SUMMARY

This Construction Quality Assurance/Quality Control Plan (CQA/QC Plan) addresses the construction of the liner system, leachate management system, landfill gas system, final cover system, sedimentation basins, and ancillary components. This CQA/QC Plan also addresses the inspection and documentation procedures that will be utilized before, during, and after construction.

The CQA/QC Plan describes the following:

- Field and laboratory sampling and testing procedures;
- Testing frequency;
- Sampling parameters and sample locations;
- Material specifications;
- Procedures to follow if a test fails;
- Management structure;
- Experience and training of the testing personnel; and
- Contingency plan for anticipated construction difficulties.

In the context of this CQA/QC Plan, the terms CQA and QC are defined as follows:

- CQA and Conformance Testing refers to measures taken by the Owner to ascertain if the Contractor's materials and workmanship are in compliance with the Contract Documents, Permit specifications, and design requirements.
- Quality Control (QC) refers to measures taken by the supplier or Contractor to verify that the material has been prepared and the work has been performed in compliance with the requirements for materials and workmanship as stated in the Contract Documents, Permit specifications, and design requirements.

The principal parties involved in the CQA process include the Permitting Agency [Tennessee Department of Environment and Conservation (TDEC)], the Owner [Loudon County Solid Waste Disposal Commission, Matlock Bend Landfill], the operator, Santek Environmental, LLC (Santek), a subsidiary of Republic Services, Inc., the Construction Manager, the Area Environmental Manager (AEM), the Environmental Manager (EM), the Permit/Design Engineer, the CQA Consultant, the Soils CQA Laboratory, the Geosynthetics CQA Laboratory, the Earthwork Contractor, the Geosynthetics Manufacturer(s), the Geosynthetics Installer(s), and the Surveyor. Note that the EM and Construction Manager are representatives of the Operator and may be the same person. The Permit Engineer and the Design Engineer may also be the same person and/or engineering firm. The

CQA Consultant is responsible for observing and documenting activities related to the permit documents and the CQA/QC Plan. The CQA Consultant is also responsible for issuing documentation reports.

The CQA/QC Plan addresses the CQA activities associated with construction involving the use of soils and aggregates for construction of base liner systems and final cover systems. These components will include:

- Excavation;
- Structural Fill;
- Liner System Barrier Soil Layer;
- Liner System Protective Cover/Leachate Collection System; and
- Final Cover Soil (compacted soil cover, final cover soil, and vegetative cover).

Tables A-1 and A-2 included in Appendix A present the laboratory and field test methods that will be used to characterize and evaluate the construction quality of soils and aggregates. The tests shall be conducted in accordance with the current versions of the corresponding standard methods given. Table A-3 provides recommended minimum test frequencies to characterize and evaluate the quality of soils and aggregates, and to test the construction. Table A-3 also presents the sample size, acceptance criteria, and sample locations for soils and aggregate testing. Both field and laboratory tests will be performed prior to construction to confirm that the characteristics of the soil and aggregate from the proposed sources meet the material acceptance requirements.

The CQA Consultant shall document the inventory, testing, and placement of geosynthetics. Accordingly, this CQA/QC Plan presents information related to the manufacture, shipment, storage, testing, and installation of geosynthetic products (i.e., geomembranes, geosynthetic clay liners, geotextiles, geonets, and geocomposites) required for the construction of both liner systems and final cover systems. Each proposed geosynthetic test, along with its corresponding methodology and conformance testing frequency, are summarized in Tables A-4(a) through A-8.

Surveying shall be conducted at the site as part of the CQA/QC activities. Surveying of lines and grades shall be conducted on a continuous basis during the construction of soil and geosynthetic components. Surveying shall be performed to provide documentation for record drawings, to document quantities of soils and geosynthetics used in the construction, and to assist the Earthwork Contractor in complying with the required landfill grades. Survey results for record drawings shall be certified by a land surveyor or professional engineer registered in Tennessee and submitted to the CQA Consultant for review.

The CQA Consultant shall document that the quality assurance requirements presented in the CQA/QC Plan have been addressed and satisfied. Accordingly, the CQA Consultant shall provide the

Construction Manager with signed descriptive remarks, data sheets, logs, and reports to document that monitoring activities have been accomplished. The CQA Consultant shall also maintain a file of design drawings, the CQA/QC Plan, checklists, test procedures, daily logs, and other relevant information at the project site.

At the completion of the work, the CQA Consultant shall prepare a final documentation report, which shall include a professional engineer's seal (registered in Tennessee) and supporting field and laboratory test results.

1.0 USE AND APPLICATION OF CQA/QC PLAN

1.1 INTRODUCTION

This Construction Quality Assurance/Quality Control Plan (CQA/QC Plan) has been prepared for use at the Matlock Bend Landfill, owned by the Loudon County Solid Waste Disposal Commission and operated by Santek Environmental, LLC (Santek), a subsidiary of Republic Services.

1.2 SELECTION AND TESTING OF SOILS AND AGGREGATES

The CQA/QC Plan shall be used to confirm soil and aggregate material quality and installation. The selection of soils and aggregates shall be based on the permitted design for the facility. Given the selected soils and aggregates to be utilized for a project, this CQA/QC Plan shall be used to govern the material testing and installation. The CQA/QC Plan narrative and Table A-3 included in Appendix A have been prepared utilizing general terminology so that the CQA/QC Plan would be applicable to a range of soil and aggregate materials selected from the permitted design.

1.3 SELECTION AND TESTING OF GEOSYNTHETICS

The CQA/QC Plan shall be used to confirm geosynthetic material quality and installation. The geosynthetic materials shall be selected for a given project to satisfy applicable site-specific design requirements.

Following selection of suppliers or manufacturers for each geosynthetic component required for a given project, the applicable conformance testing tables provided in Appendix A shall be completed. The CQA Consultant or Operator's Representative shall insert the Manufacturer MARV values into the last column of each geosynthetic conformance testing table to be used for the project. Conformance testing shall be completed and reviewed with respect to the Manufacturer MARV values in each conformance test table. These completed conformance testing tables shall be provided to the Geosynthetic CQA Laboratory prior to the start of testing. These tables shall also be included with the certification report.

1.4 MINIMUM FIELD MONITORING FREQUENCY

This CQA/QC Plan addresses the selection, testing, and installation of materials needed for the construction of various landfill components. During the installation/construction phase of a project, field monitoring is necessary to ensure that the desired materials are utilized and installed in a proper fashion. Consistent with the personnel requirements specified in Section 3.3.1 of the CQA/QC Plan, the field personnel shall be trained and act under the control of a professional engineer registered in Tennessee. The scope of field monitoring activities may vary, depending on the type of construction

being completed. During a given construction project, certain aspects may be monitored with part-time field visits, or on a full-time basis.

- Part-time monitoring is where a CQA/QC technician is not on-site full-time. Sufficient visits are made to the project to inspect each key item of construction prior to being covered by the next. During these visits to the project, the CQA/QC Technician will most likely be on-site for a limited time, less than the full workday.
- Full-time monitoring is where the CQA/QC technician is on-site for the full work period during each day when work is performed. The CQA/QC technical would typically be on-site and at the project area when key construction is taking place, or when monitoring the work prior to the covering with the next component.

During a typical disposal cell or closure construction project, the CQA/QC technician(s) shall provide full-time monitoring starting with preparation of the subgrade and/or buffer layer and continuing throughout installation of the protective cover layer. Generally, other construction monitoring activities may be performed on a part-time basis.

2.0 GENERAL

2.1 INTRODUCTION

This CQA/QC Plan addresses the construction of the base liner system, leachate management system, final cover system, sedimentation basins, and ancillary components.

Work shall be performed to the lines, grades, and dimensions indicated within the permit drawings. This CQA/QC Plan addresses the inspection and documentation procedures that shall be utilized before, during, and after construction to provide assurance, with a reasonable degree of certainty, that the facility meets the permitted design standards and specifications.

2.2 SCOPE OF THE CQA/QC PLAN

This CQA/QC Plan describes:

- Sampling and testing procedures to be used in the field and in the laboratory;
- Testing frequencies;
- Sampling parameters and sample locations;
- Material specifications;
- Procedures to be followed if a test fails;
- The management structure, experience, and training of testing personnel; and
- Contingency plan for anticipated construction difficulties.

2.3 DEFINITIONS AND USE OF TERMS

The following provides general information regarding specific terms, references, and units used within this CQA/QC Plan.

2.3.1 Use of Terms

In the context of this CQA/QC Plan, the terms CQA and QC are used as follows:

- CQA and Conformance Testing refers to measures taken by the Owner to determine if the Contractor's materials and workmanship are in compliance with the Contract Documents, Permit specifications, and design requirements;
- QC and Quality Control refers to measures taken by the supplier or Contractor to verify that the material has been prepared and the work has been performed in compliance with the requirements for materials and workmanship as stated in the Contract Documents, Permit specifications, and design requirements; and

- Manufacturer MARV values refer to the property or test values as published on the most recent manufacturer's standard specification sheet.

Note: For the purposes of this CQA/QC Plan, the term "geosynthetics" refers to geomembrane, geotextile, geonet, geocomposite, geosynthetic clay liner, or other manufactured component materials.

2.3.2 References to Standards

The CQA/QC Plan includes references to standard test procedures defined by the ASTM International (ASTM), and the Geosynthetic Institute.

2.3.3 Units

Properties and dimensions given in the CQA/QC Plan are expressed in U.S. units and may be followed by approximate equivalent values of International System of Units (SI) shown in parentheses. The values given in SI are typically accurate within ten percent of the governing U.S. units specification. In cases of conflict, the U.S. units govern.

3.0 RESPONSIBLE PARTIES AND LINES OF AUTHORITY GENERAL

3.1 RESPONSIBILITY AND AUTHORITY

The principal parties involved in the CQA process include the Permitting Agency, the Owner, the Construction Manager, the Environmental Manager, the Permit Engineer, the Design Engineer, the CQA Consultant, the Soils CQA Laboratory, the Geosynthetics CQA Laboratory, the Earthwork Contractor, the Geosynthetics Manufacturer, the Geosynthetics Installer, and the surveyor. The general responsibilities and authorities of each of these parties are described in the following paragraphs. The responsibility and/or authority of a given party may be modified or expanded as dictated by specific project needs during Pre-Construction Meetings.

3.1.1 Permitting Agency

The Permitting Agency (TDEC) is authorized to issue the permit for construction of the waste containment facility based on review and acceptance of the permit application. Additionally, the Permitting Agency provides formal acceptance of the Construction Certification Report prior to the use of the constructed item.

3.1.2 Owner

The Owner is the Loudon County Solid Waste Disposal Commission. The Owner contracts with the Operator, Santek, to operate the facility and to engage the various services needed to permit, design, and construct the facility.

3.1.3 Operator

The Operator, Santek, is responsible for coordinating the design and construction of the landfill. The Environmental Manager and Construction Manager are the two representatives of the Operator responsible for coordinating the design and construction of the landfill facility.

- Environmental Manager is responsible for the management of the Design Engineer, CQA Consultant, and other entities directly contracted to the Owner for engineering, surveying, laboratory testing, or other professional services. This responsibility includes compliance with the permit and review/submission of the CQA documentation demonstrating that the facility was constructed in general accordance with the approved permit and design specifications. The Environmental Manager is responsible for procuring a consultant to provide the surveying necessary for the certification documentation. The Environmental Manager has the authority to select and dismiss parties charged with design and CQA. The Environmental

Manager also has the authority to accept or reject design drawings and specifications, CQA/QC Plans, and CQA reports.

- Construction Manager, if used, is the official representative of the Owner responsible for coordinating schedules, meetings, and field activities. This responsibility includes communications to the Operator, CQA Consultant, Surveyor, Contractors, Manufacturers, and other involved parties. The Construction Manager has the authority to select and dismiss parties charged with construction activities. The Construction Manager also has the authority to direct contractors hired by the Owner and to accept or reject their materials and workmanship. Construction Manager responsibilities may be fulfilled by on-site facility employed personnel or a selected representative assigned by the Owner.

3.1.4 Permit/Design Engineer

The Permit/Design Engineer is a firm or person, retained by the Operator, to prepare documents for acceptance by the Permitting Agency and/or construction of the facility. The permit documents establish the limits, type, and details of the liner system, leachate management system, and other components of the site. The permit documents provide minimum specifications and are the governing document when a specification contradiction arises. Optional construction documents and drawings may be prepared in some cases to provide additional information for a specific construction project.

During construction, the Permit/Design Engineer may prepare applications to the Permitting Agency for approval of substantive changes to the design drawings or specifications of the facility. Substantive changes include changes that modify or impact the technical basis for engineered components of the facility design. Such changes will require the approval of the Permitting Agency.

3.1.5 CQA Consultant

The CQA Consultant is responsible for observing and documenting activities related to the permit documents and CQA/QC Plan. The CQA Consultant is represented on-site by the CQA Resident Engineer and supported on-site by CQA monitoring personnel, the specific number of which will be determined by workload.

In general, the responsibilities and authorities of the CQA Consultant include:

- Having a complete understanding of the permit documents, drawings, and specifications;
- Attending construction meetings and preparing meeting minutes;
- Scheduling, coordinating, and performing CQA activities;
- Verifying that the selected geosynthetic products meet or exceed the design;

- Performing independent on-site observation of the work in progress to assess compliance with the CQA/QC Plan, permit documents, drawings, and specifications (if applicable);
- Recognizing and reporting deviations from the CQA/QC Plan, permit documents, drawings, and/or specifications (if applicable) to the Environmental Manager and Construction Manager;
- Verifying that test equipment meets testing and calibration requirements, and that tests are conducted according to standardized procedures defined in the CQA/QC Plan;
- Recording and maintaining test data accurately;
- Identifying CQA tested work that should be accepted, rejected, or further evaluated;
- Verifying that corrective measures are implemented;
- Documenting and reporting CQA activities;
- Collecting data needed for record documentation; and
- Maintaining open lines of communication with other parties involved in the construction.

The CQA Consultant is also responsible for issuing certifications for major construction activities. Certifications shall bear the seal of a Professional Engineer registered in the state of Tennessee. Possible construction activities include:

- Structural Fill;
- Geologic Buffer Layer;
- Barrier Soil Layer;
- Geomembrane Liner;
- Protective Cover;
- Leachate Collection System;
- Leachate Management System Piping;
- Erosion and Sedimentation Control Structures;
- Final Cover Geomembrane;
- Final Cover Drainage Layer;
- Intermediate and Final Cover Soil;
- Gas Monitoring System; and
- Groundwater Monitoring System.

3.1.6 Soils CQA Laboratory

The Soils CQA Laboratory is responsible for performing the laboratory testing required by the CQA/QC Plan to determine specific characteristics of the soils and aggregates. The Soils CQA Laboratory is also responsible for providing adequate documentation of analytical results, test

methods followed, and testing equipment used. Work of the Soils CQA Laboratory shall be administered by, and reported to, the CQA Consultant.

3.1.7 Geosynthetics CQA Laboratory

The Geosynthetics CQA Laboratory is responsible for performing the laboratory testing required by the CQA/QC Plan to determine specific characteristics of the geosynthetics. The Geosynthetics CQA Laboratory is also responsible for providing adequate documentation of analytical results, test methods followed, and testing equipment used. Work performed by the Geosynthetics CQA Laboratory shall be administered by, and reported to, the CQA Consultant.

3.1.8 Earthwork Contractor

The Earthwork Contractor is responsible for all activities assigned by the Operator, these may include such things as: moving earth to establish the liner grades, installing structural fill, installing the barrier soil layer, placing pipe and granular materials for construction of the leachate collection and management systems, preparing the intermediate cover surface, placing final cover soils, or other related work items. The Earthwork Contractor may also be responsible for construction of sedimentation and erosion control facilities, anchor trenches for liner installation, and other support activities outside the immediate project area.

It is the responsibility of the Earthwork Contractor to supply equipment and perform work that results in completed project components that are in conformance with the CQA/QC Plan.

3.1.9 Geosynthetics Manufacturer

The Geosynthetics Manufacturer is responsible for the production of geosynthetics that meet the requirements of the CQA/QC Plan. The Geosynthetics Manufacturer is also responsible for providing adequate documentation regarding the characteristics of the resin and the finished product, the testing performed to determine the characteristics, and the quality control measures taken during manufacturing.

The Geosynthetics Manufacturer is responsible for safe transportation of the geosynthetics between the manufacturing plant and the site. The Geosynthetics Manufacturer is responsible for carefully loading and transporting geosynthetics and accepts full responsibility for damage to the geosynthetics that may occur during these operations.

3.1.10 Geosynthetics Installer

The Geosynthetics Installer is responsible for unloading, field handling, storing, placing, seaming, temporarily anchoring against wind, and other aspects of geosynthetics installation in accordance with the CQA/QC Plan. The Geosynthetics Installer may also be responsible for the preparation and completion of anchor trenches.

Prior to installation, the Geosynthetics Installer is responsible for preparation of the panel layout drawing, which identifies fabricated and field seams including dimensions and details. Prior to site mobilization, the Geosynthetics Installer is responsible for providing the installation schedule and a list of proposed field personnel and their qualifications. The Geosynthetics Installer is responsible for providing quality control documentation and subgrade acceptance certificates. Upon completion of the installation, the Geosynthetics Installer shall provide the geomembrane installation certification, the Manufacturer's warranty, and the installation warranty.

3.1.11 Surveyor

The Surveyor is a firm or person, retained by the Operator or Construction Manager, responsible for delineating and documenting the lines and grades associated with construction of the landfill. Activities include surveying of construction grades, including original ground surface, excavation and placement of structural fill, barrier soil layer, and subsequent liner components. Additionally, the surveyor shall delineate the limits of the soils construction area and geosynthetic components, the location and elevation of pipes, and the limits and elevations of perimeter ditches, roads, and other relevant features. The Surveyor is also responsible for preparation of the construction Record Drawings which include plan views of constructed components or cross-sections necessary to estimate quantities of construction materials.

3.2 PROJECT MEETINGS

Clear, open channels of communication are essential to achieve a high degree of quality during installation. The following meetings should be held when appropriate to coordinate activities between the Operator, CQA Consultant, and Contractor, as well as set up proper lines of authority and reporting. The type and purpose of meetings to be held for this project are described in this section. The actual meeting discussion points and meeting timeframes should be agreed to by the affected parties at the beginning of each construction project. The Owner shall be kept informed in a timely manner by the Operator of all construction schedules, work interruptions and delays, developments that may produce a work delay of more than several days, all changes to the construction schedule, and receive advance notice of meetings and inspections with the State permitting authority related to the foregoing. Notice shall be provided in writing to the Loudon County Solid Waste Disposal Commission Chair, Vice Chair and the appointed engineer for the Commission.

3.2.1 Pre-Construction Meeting

A Pre-Construction Meeting may be held at the site prior to earthwork construction and prior to geosynthetics placement. At a minimum, the meeting shall be attended by the Environmental Manager, the Construction Manager, the CQA Consultant's Certifying Engineer (registered in Tennessee), the CQA Consultant's Lead Monitor(s), the Geosynthetics Installer's Superintendent, the Earthwork Contractor's Superintendent, and the Permit/Design Engineer and other involved parties. The Permit Agency (TDEC) shall be invited to attend all Pre-Construction Meetings. Possible topics to be discussed shall follow the Pre-Construction Meeting Agenda in Appendix B.

The purpose of this meeting is to begin planning for coordination of tasks, anticipate problems that might cause difficulties and delays in construction, and, above all, present the CQA/QC Plan to the parties involved. It is very important that the rules regarding testing, repair, etc., be known and accepted.

The meeting shall include the following activities:

- Distribute relevant documents;
- Review critical design details of the project;
- Review the CQA/QC Plan;
- Make appropriate modifications to the CQA/QC Plan to include CQA activities specific to the project;
- Select testing equipment and review protocols for the testing of materials;
- Confirm the methods for documenting and reporting, and for distributing documents and reports; and
- Confirm the lines of authority and communication.

A mandatory topic during the Pre-Construction Meeting will be the selection of geosynthetic materials. The CQA Consultant shall present a table for each geosynthetic material which lists the Manufacturer MARV values. This table will be reviewed and used to verify that the selected materials meet or exceed the design requirements.

The meeting shall be documented by the CQA Consultant and minutes shall be transmitted, within 24 hours, to the parties involved.

3.2.2 Daily Meetings

A daily meeting may be held between the CQA Consultant, the Geosynthetics Installer, the Earthwork Contractor, the Construction Manager, and other involved parties on an as-needed basis. Those attending will discuss, plan, and coordinate the work and CQA activities to be completed that day.

These meetings may be held informally, and meeting minutes summarizing these meetings are not necessary.

3.2.3 Progress Meetings

Progress meetings may be held between the Environmental Manager, the Construction Manager, the CQA Consultant, the Geosynthetic Installer, the Earthwork Contractor, and other involved parties, on an as-needed basis, approximately one per week. Those attending will discuss current progress, planned activities for the next week, and new business or revisions to the work. The CQA Consultant will log problems, decisions, or questions arising at this meeting. The meeting shall be documented by the CQA Consultant, and minutes shall be transmitted to involved parties within 48 hours of the meeting.

3.2.4 Problem or Work Deficiency Meetings

A special meeting shall be held when, and if, a problem or deficiency that would impact the construction schedule is present or likely to occur. At a minimum, the meeting shall be attended by the affected contractors, the Construction Manager, and the CQA Consultant. The purpose of the meeting is to define and resolve the problem or work deficiency as follows:

- Define and discuss the problem or deficiency;
- Review alternative solutions; and
- Implement an action plan to resolve the problem or deficiency.

The meeting shall be documented by the CQA Consultant and minutes shall be transmitted within 24 hours to the parties involved.

3.3 QUALIFICATIONS OF KEY PERSONNEL AND ORGANIZATIONS

The following qualifications shall be required of the key personnel and organizations involved in the construction of solid waste containment systems.

3.3.1 CQA Consultant

The CQA Consultant shall be pre-qualified and approved by the Operator. The CQA Consultant shall be a qualified firm with experience in construction quality assurance and quality control, particularly on projects involving similar facets as the project to be completed. The CQA Consultant shall designate a Certifying Engineer who is a Professional Engineer registered in Tennessee. The Certifying Engineer shall be responsible for the CQA personnel and their activities, as well as the preparation of a certification report to certify the project has been constructed in substantial

compliance with the CQA/QC Plan, permit documents, drawings, and specifications (as applicable). The CQA Consultant shall be capable of assigning technically qualified personnel to the project, including an on-site Lead CQA Monitor and CQA Monitors, as needed. The CQA Consultant may utilize multiple Lead CQA Monitors, such that each Lead CQA Monitor may be brought on-site when project tasks for which the Lead CQA Monitor is experienced or specifically trained are being performed. The person designated as the Lead CQA Monitor shall possess a thorough knowledge of all aspects of earthwork and geosynthetic construction.

CQA Monitors shall be specifically trained in quality assurance of geosynthetics, earthwork, etc. Unless otherwise approved by the Operator, the Lead Geosynthetic CQA Monitor shall be experienced in supervising the installation of a minimum of 1,000,000 ft^2 (92,900 m^2) of various geosynthetic materials or otherwise approved by the Operator.

3.3.2 Soils CQA Laboratory

The Soils CQA Laboratory shall be pre-qualified by the Operator or CQA Consultant. The Soils CQA Laboratory shall be experienced in performing laboratory tests to determine soils characteristics as required by this CQA/QC Plan. The Soils CQA Laboratory shall demonstrate that it follows the standard test methods listed in the CQA/QC Plan and maintains the appropriate calibrated equipment to perform the tests.

3.3.3 Geosynthetics CQA Laboratory

The Geosynthetics CQA Laboratory shall be pre-qualified by the Operator or CQA Consultant. The Geosynthetics CQA Laboratory shall be experienced in performing laboratory tests to determine geosynthetics characteristics as required by this CQA/QC Plan. The Geosynthetics CQA Laboratory shall demonstrate that it follows the standard test methods listed in the CQA/QC Plan and maintains the appropriate, calibrated equipment to perform the tests.

3.3.4 Earthwork Contractor

The Earthwork Contractor shall be pre-qualified and approved by the Operator. The Earthwork Contractor shall be capable of assigning the personnel and equipment required to perform the work within the project schedule.

3.3.5 Geosynthetics Manufacturer

The Geosynthetics Manufacturer shall be able to provide sufficient production capacity and experience to meet the demands of the project. The Geomembrane Manufacturer shall be pre-qualified and approved by the Operator.

3.3.6 Geosynthetics Installer

The Geosynthetics Installer shall be trained and qualified to install geosynthetics. Prior to execution of contractual agreements with the Operator, the Geomembrane Installer shall provide the Construction Manager with information demonstrating qualifications as required by this CQA/QC Plan.

The Geomembrane Installer shall provide the Construction Manager with a list of proposed seaming personnel and their professional resumes. This certificate shall be reviewed by the Construction Manager and CQA Consultant. Proposed seaming personnel deemed inexperienced shall not be accepted by the Construction Manager.

The Geomembrane Installer shall designate one representative as a Superintendent, who will represent the Installer on-site and at site meetings. The Superintendent shall be qualified by experience. The Superintendent must have supervised the installation of a minimum of 2,000,000 ft^2 (185,800 m^2) of geomembrane, 500,000 ft^2 (46,450 m^2) of geotextile, 500,000 ft^2 (46,450 m^2) of geocomposite, and must also exhibit good management skills. The Superintendent shall be approved by the Construction Manager. The Superintendent or designee approved by the Environmental Manager shall be on-site at all times during geosynthetic deployment and seaming activities.

In addition, the Geomembrane Installer shall designate a Master Seamer, who shall not be the Superintendent. The Master Seamer shall be present during seaming operations and shall have a minimum of 5,000,000 ft^2 (464,500 m^2) of field seaming experience. The Master Seamer shall also be experienced with extrusion welding, fusion welding, and welding in both hot and cold weather.

4.0 SOILS AND AGGREGATES

4.1 INTRODUCTION

This section of the CQA/QC Plan addresses the CQA activities associated with construction involving the use of soils and aggregates for the construction of liner systems and final cover. These components include:

- Structural Fill;
- Excavation;
- Geologic Buffer Material (if native material requires processing);
- Barrier Soil Layer;
- Protective Cover; and
- Intermediate Cover, Compacted Soil Cover, and Final Cover Soils.

The above components shall meet requirements related to material characteristics and construction quality. The proposed soils shall undergo field and laboratory testing to evaluate that the proposed soils meet the specifications included in Appendix A. Throughout construction, field and laboratory testing shall be performed to ensure that the in-place soil material meets the requirements of this CQA/QC Plan with regard to material acceptance and construction quality.

4.2 TEST METHODS AND SAMPLING REQUIREMENTS

Tables A-1 and A-2 (Appendix A) present the laboratory and field test methods that shall be used to characterize and evaluate the construction quality of the installed foundation soils. Direct shear testing and interface shear testing shall be completed by the CQA Consultant before construction commences. Refer to Table A-9 (Appendix A) for testing conditions. The tests shall be conducted in accordance with the current versions of the corresponding standard methods given.

Table A-3 (Appendix A) provides minimum test frequencies. The table presents the sample size, acceptance criteria, and general locations of where samples shall be collected. Four types of sampling location methods shall be used for the various soil and aggregate components, including:

- As required by the CQA Consultant to evaluate material characteristics prior to use of the material in construction. These samples may come from the source of a potential material such as an aggregate production plant or from a test pit/stockpile/ borrow area;
- For specific bulk volumes of material in stockpiles [e.g., 1 sample per 5,000 cy (3,800 m^3)]. These samples are usually taken from material which has been processed or segregated for a particular purpose;

- For materials placed over a long linear extent (such as roads and embankments), using stationing, offsets, and approximate elevation. Stationing should be designated as 1+00, 2+00, etc. and offsets should be designated as left or right of the stationing line based on view toward increased stations; and
- Grid pattern sampling methods shall be used on placed material. These samples are usually taken from within a liner/final cover construction area or other aerially extensive construction project. Grids and stations shall be clearly marked and the perimeter or station markers should be surveyed.

Tables A-1, A-2, and A-3 shall be used in conjunction with the text of this section of the CQA/QC Plan.

4.3 STRUCTURAL FILL

Structural fill is used within low areas to raise existing grades to design grades, construct perimeter berms, construct intercell berms, or other items. The areas where structural fill will be placed shall be stripped of topsoil and proof-rolled as an initial step. Deleterious materials such as soft soils or organics shall be removed and the resulting void shall be filled with structural fill. In areas that require structural fill to establish design grades, structural fill shall be placed on the proof-rolled surface. Structural fill shall be placed and the structural fill material selected to prevent voids or bridging within the fill.

Refer to Appendix A for the specific test methods to be used, a summary of the field and laboratory testing to be performed, sample locations, sample sizes, test frequencies, and acceptance criteria for structural fill material and placement requirements. In addition to the testing and confirmation of placed structural fill lifts, the CQA Monitor shall periodically observe structural fill placement to confirm construction practices. The CQA Consultant shall prepare a certification report for the structural fill based on a review of the CQA information and CQA monitoring performed during installation of structural fill.

4.3.1 Structural Fill Repair

During placement of structural fill, the CQA Monitor shall monitor placement and compaction. Monitoring activities include both field and laboratory soils testing outlined in Appendix A, as well as visual observation of lift thickness and compaction. As structural fill is placed and compacted, pumping or rutting shall be noted. If pumping or rutting is determined to be excessive by either the CQA Monitor or the Operator, the material exhibiting pumping shall be removed and replaced with competent structural fill material, using the following general procedures:

- The deficient material shall be removed from the structural fill area;

- Efforts shall be made to remove all materials contributing to the pumping or rutting;
- Repairs may include (but not limited to):
    - The installation of drains and piping to de-water the area;
    - The installation of a re-enforcing geotextile or geogrid prior to backfilling the excavated area;
    - The first structural fill lift placed over the soft materials shall be one and a half (1.5) times the normal lift thickness. This initial structural fill lift, specifically containing a dry, higher rock content material than normal structural fill, shall act as a 'bridge'. The purpose of the initial lift is to provide a solid base for subsequent lifts of overlying structural fill and barrier soil layer soils;
- Should pumping or rutting persist, excavation of deficient soils shall be performed again; and
- If pumping is suspected to be a result of decaying trees and/or vegetation, efforts shall be made to remove the organic and deficient materials.

4.4 EXCAVATION GRADE

The excavation grade refers to the top of the natural soil layer functioning as the geologic buffer below the liner system. The geologic buffer provides an additional barrier to liquid migration. Field exploration and laboratory testing documented in the MBLF Supplemental Hydrogeologic Investigation Report demonstrate that a 5-feet thick geologic buffer with a maximum hydraulic conductivity of 1×10^{-6} cm/sec is provided by the native soils underlying the proposed cells at the site. Excavation grade refers to the bottom of the barrier soil layer, which also equals the upper surface of the geologic buffer.

Prior to placement of the barrier soil layer component of the liner system, the Earthwork Contractor shall excavate overburden materials to the excavation grade elevations shown on the Drawings. The prepared excavation grade should conform to the contours shown on the grading plan, as verified by the surveyor. The excavation of existing soils or placement of structural fill meeting the requirements of the geologic buffer specifications may be required to establish these grades.

Upon completion of the subgrade preparation and prior to placement of any of the barrier soil layer soils, the CQA Monitor shall visually observe the exposed subgrade materials for signs of unsuitable materials such as isolated lenses or pockets of sand, organic materials, or other unsuitable materials. If these materials are present, the unsuitable materials will be removed by undercutting the full 5 feet depth of the geologic buffer. Replace the material excavated with compacted geologic buffer soils per the Technical Specifications. Removal and replacement of unsuitable soils shall extend laterally as far as necessary to remove the unsuitable soils.

The excavation grade shall be proof rolled by the Earthwork Contractor with suitable compaction equipment. The excavation grade should be accepted by the CQA Consultant if it does not pump or rut excessively. If excessive pumping or rutting occurs, the area should be reworked or removed by excavating the deficient soil until competent soils are exposed. The procedure outlined within Section 4.3.1, Structural Fill Repair, shall be followed for excavation and reconstruction of the excavation grade due to pumping or rutting.

4.5 BARRIER SOIL LAYER

The barrier soil layer is a uniform, compacted 24-inch-thick soil layer placed over the subgrade (i.e. top of geologic buffer) surface for liner construction projects prior to the placement of the landfill liner geosynthetic components. The 24-inch thick barrier soil layer shall consist of relatively homogenous, fine-grained soils that are free of rock-sized particles or clods greater than 1-1/2 inches in any dimension, frozen material, organic material, and other foreign debris. The CQA Consultant shall obtain samples from within the identified borrow area and subject the soils to the testing indicated in Table A-3 of Appendix A. Table A-3 provides information regarding the minimum test frequencies associated with the barrier soil layer. The table presents the sample size, acceptance criteria, and locations of where the samples shall be collected.

Soil laboratory test results will identify borrow sources that are acceptable for potential use as barrier soil layer material, as determined by the Operator or CQA Consultant. The material will also be subjected to laboratory remolded permeability tests to develop a moisture/density relationship. Subsequently, a window of moisture/density values corresponding to the required permeability shall be delineated based upon the results of laboratory testing. This window will then be used as the acceptable range of moisture/density values for field compaction CQA testing.

4.5.1 Test Pad

After the barrier soil layer borrow source has been selected and preliminary testing has been performed, a test pad shall be constructed for each borrow source to establish construction details or verify or amend the construction details proposed in the approved permit. In addition, a test pad shall be constructed whenever there is a significant change in soil material properties. The test pad shall be used to evaluate the following:

- Material handling and placement requirements;
- Lift thickness;
- Water content necessary to achieve the desired compaction;
- Compaction equipment type, weight, and number of passes; and
- Field permeability.

The results of test pad construction may be used to verify or amend construction details proposed in the approved permit for the site. Test pads shall be constructed using the same material, equipment, and procedures to be used in construction of the barrier soil layer. The test pad will have a minimum width of three times the width of the compaction equipment and a length that is two times the length of the compaction equipment, including power equipment and attachments. The test pad will consist of at least four lifts with in-situ density and moisture testing performed at least three times per lift. The construction of the pad shall be closely monitored, and the following tests shall be performed at a frequency of at least twice per lift:

- Maximum dry density; and
- Optimum moisture content.

Following construction of the test pad, a determination of permeability through field testing shall be performed.

The test results shall be used to verify that the specified construction procedures yield recommendations that meet the design and performance criteria. Refer to Table A-3 for a summary of the field and laboratory testing to be performed, sample locations, sample sizes, test frequencies, and acceptance criteria for the test pad.

4.5.2 Construction Quality Assurance

Prior to placement of the barrier soil layer, the surface of the excavation grade shall consist of relatively homogenous, fine-grained soils that are free of debris, rocks greater than 1/2 inch in diameter, vegetation and organic materials, frozen materials, foreign objects, excess silt, and soft areas. The surface shall be non-yielding, uniform, and smooth.

Lifts of the barrier soil layer shall be placed in uniform layers not to exceed 8 inches in uncompacted thickness. The lift thickness shall be determined manually throughout construction. The finished thickness of the barrier soil layer shall be verified by the measurement of survey points before and after installation of the barrier soil layer is completed. The minimum total thickness of the barrier soil layer shall be 2 feet. Soil clods shall be broken down to 1-1/2 inches or half the lift thickness, whichever is less. Moisture conditioning shall be conducted to preserve the homogeneity of the soil and to obtain a relatively uniform moisture content throughout the soil mass. The moisture content of the barrier soil layer shall be field tested during placement and compaction. Each lift shall be scarified prior to placing the subsequent lift to sufficiently bond it to the previous lift. Each lift of the barrier soil layer shall be rolled and compacted to the moisture content and density as specified in Table A-3.

Visual monitoring of the barrier soil layer construction shall consist of observing and verifying:

- Identification of changes in material characteristics causing a change in construction specifications;
- Adequate spreading of barrier soil layer material to obtain complete coverage and loose lift thickness;
- Removal of debris, rocks, vegetation and organic materials, frozen materials, foreign objects, excess silt, and soft and/or wet areas;
- Adequate clod-size reduction of the barrier soil layer material;
- Spreading and incorporation of water to obtain full penetration through clods and uniform distribution of the specified water content;
- Proper adjustment of the water content of in-place material in the event of prolonged rain or drought during construction;
- Prevention of significant water loss and desiccation cracking before and after compaction;
- Use of compaction equipment of the proper type, configuration, and weight;
- Appropriate equipment speed and number of equipment passes used for compaction;
- Uniformity of coverage by compaction equipment, particularly at fill edges, in equipment turn-around areas, and on slopes;
- Use of sufficient methods to tie lifts together;
- Use of sufficient methods to blend new barrier layer soils into existing clay layer soils at tie-ins to existing cells;
- Proper repair of penetrations resulting from the use of density and moisture probes using bentonite or a soil-bentonite mixture;
- Sealing the working surface at the close of each day's work or when work is stopped for a period of time by compacting the surface and sloping it to allow run-off of precipitation;
- All loose or dry materials have been removed from the final surface prior to FML deployment;
- All protrusions or stones capable of damaging the overlying FML by protruding ¾ inch or more above the prepared surface are removed;
- Depressions and holes up to ¾ inch deep shall be filled with clean soil meeting barrier soil criteria;
- The final surface is prepared such that the deployment of the final cover geomembrane would not dislodge large particles that would remain beneath the geomembrane;
- Timely placement of protective covers or the overlying FML to prevent desiccation of barrier soil layer material between the installation of lifts or after completion of the barrier soil layer;
- Prevention of accidental damage or weather-related degradation to installed portions of the barrier soil layer; and
- Observation and verification of activities to correct conditions not meeting specifications for the construction of the barrier soil layer.

Perforations in the barrier soil layer created by nuclear density gauge probes, sample retrieval, stakes, or other penetrating objects shall be filled with fine grained soil from the barrier soil layer stockpile, bentonite, a soil-bentonite mixture, or an approved equal. Test holes in the barrier soil layer that are filled with fine grained barrier soil layer material shall be backfilled with maximum 0.25-inch soil particles and compacted in three equal compacted lifts. The finished surface of the barrier soil layer shall be uniform, non-yielding, and smooth. Surveying shall be performed to document that the finished barrier soil layer thickness and dimensions are as specified in the design.

Refer to Table A-3 for sample locations, sample sizes, test frequencies, the specific test methods to be used, a summary of the field and laboratory testing to be performed, and acceptance criteria for the barrier soil layer.

The barrier soil layer shall be maintained and protected by the Earthwork Contractor until formal written acceptance of the barrier soil layer is given to the CQA Consultant by the Geosynthetics Installer. The Earthwork Contractor shall protect, maintain and repair (at no additional cost to the Operator), the barrier soil layer from excessive desiccation, cracking, water, or wind erosion and damage during construction.

4.6 PROTECTIVE COVER LAYER

The protective cover layer shall be composed of aggregate meeting the gradation and general requirements of protective cover as specified within Table A-3 in Appendix A. Soil may also be used for the protective cover layer as long as aggregate is still used above leachate collections pipes as indicated on the drawings. The aggregate and soil shall be substantially free of organics, frozen material, deleterious materials, and other foreign objects.

Table A-3 presents the specific test methods to be used, a summary of the field and laboratory testing to be performed, sample locations, sample sizes, test frequencies, and acceptance criteria for the protective cover material.

Low ground-pressure equipment shall be used to grade and smooth the protective cover layer aggregate. The low-ground pressure equipment shall only be allowed to move across the protective cover over the full protective cover placement thickness. Equipment utilized to haul the protective cover material shall only be allowed to travel over 3-foot-thick roadway areas. These roadway areas shall be reduced in thickness by the low-ground pressure equipment once the road is no longer needed.

4.7 COVER SOILS

Soils for the operation and closure of the landfill include daily covers, intermediate cover soil, compacted soil cover, and the final cover soil. This CQA Plan addresses the field and laboratory tests

to be performed, prior to and during construction, to evaluate the suitability of the proposed soils. Table A-3, within Appendix A, provides a summary of the necessary tests and minimum testing frequency for the final cover soils. This table includes a summary of the sample size and acceptance criteria.

4.7.1 Intermediate Cover Soils

Intermediate cover shall meet the gradation and requirements described in Table A-3 in Appendix A. Intermediate cover soil shall be substantially free of organics, frozen material, foreign objects, or other deleterious materials.

Intermediate cover soil shall be placed in one loose lift resulting in a final layer thickness of at least 12 inches. After spreading, the soil shall be tracked-in and densified with at least four passes using a Cat D6 bulldozer or similar. The CQA technician shall observe the densification process and verify the layer is firm. This material should meet the gradation requirements for intermediate cover described in Table A-3.

4.7.1.1 Intermediate Cover Thickness Verification

Prior to the installation of final cover geosynthetics, the thickness of the existing intermediate cover soil layer shall be verified by the CQA Consultant. The intermediate cover soil layer shall be a minimum 12 inches thick and provide a suitable surface for the installation of the final cover geosynthetics. The thickness of the intermediate cover shall be verified by field test pits, dug with a hand shovel or power equipment. The frequency of this testing is one test per acre, as noted in Table A-3.

Following installation of the densified12-inch-thick intermediate cover, the thickness of the intermediate cover shall be verified through field survey, excavation of test pits, or use of depth gauges during placement. The frequency of this testing is provided in Table A-3.

4.7.2 Compacted Soil Layer Soils

Compacted soil layer soils shall meet the gradation and other requirements described in Table A-3 in Appendix A. Compacted soil layer soil shall be substantially free of organics, frozen material, foreign objects, or other deleterious materials.

Compacted soil layer soil shall be placed in loose lifts with a maximum compacted thickness of 6 inches. After spreading, the soil shall be moisture conditioned and compacted using appropriate equipment.

4.7.2.1 Compacted Soil Layer Thickness Verification

Prior to the installation of final cover geosynthetics, the thickness of the existing Compacted Soil Layer shall be verified by the CQA Consultant. The Compacted Soil Layer shall be a minimum 12 inches thick, and provide a suitable surface for the installation of the final cover geosynthetics. The thickness of the Compacted Soil Layer shall be verified by field test pits, dug with a hand shovel or power equipment, or use of depth gauges during placement. The frequency of this testing is one test per 10,000 square feet, as noted in Table A-3. Testing, as outlined in Table A-3, shall be performed as close as practical to the day the geomembrane is to be installed for the final cover.

4.7.2.2 Compacted Soil Layer Surface Inspection

Prior to the installation of final cover geosynthetics, the CQA Consultant and Geosynthetics Installer shall inspect the exposed compacted soil layer area for wet areas, large or non-round rocks, or other items which could compromise the integrity of the final cover system. This inspection should occur as close as practical to the day the geomembrane installation is planned. All degraded areas as described below will be restored prior to geomembrane deployment.

Excessively dry desiccated, wet, frozen, and soft areas identified with during surface inspection shall be repaired. The full extent of the unacceptable area shall be excavated and repaired. Excavated waste and leachate-impacted soil must be re-disposed within active portions of the landfill. Any excavation into the waste shall be backfilled with tire chips, sand, drainage aggregate, or other high permeability material to allow wet areas to drain back into the waste mass. The excavation shall be backfilled to within 1-foot of the top of the intermediate cover, then 1-foot-thick intermediate cover soil and the 1-foot-thick compacted soil layer shall then be replaced over the repaired area returning the area to surrounding grade.

Before the installation of final cover components, the surface of the compacted soil cover soil shall be graded smooth and rolled with a smooth drum roller. Depressions in excess of ¾ inch deep shall be filled with a clean, uniform sand.
. For the direct deployment of the final cover flexible membrane liner (FML) on to the compacted soil layer, the prepared surface:

- Shall not contain loose or dry materials;
- Shall not contain sharp objects;
- All protrusions or stones capable of damaging the overlying FML by protruding ¾ inch or more above the prepared surface shall be removed;
- Not be excessively wet, or contain ponded water;
- Not contain fragments greater than ¾ inch on the surface;

- Be prepared such that the deployment of the final cover FML would not dislodge large particles which would remain beneath the FML; and
- Shall not contain localized significant grade changes (holes).

4.7.3 Final Cover Soil

Following the installation of the final cover geosynthetics, the contractor shall place the final cover soil. The final cover soil shall be 24 inches thick and the upper 12 inches of the soil must be capable of supporting and sustaining vegetative growth and satisfy the requirements of Table A-3 in Appendix A.

The 24-inch-thick final cover soil shall be spread by a low ground pressure dozer in one lift to its full depth. The contractor shall place the soil by working across final cover benches with the soil then proceeding uphill from each bench. The only compactive effort to be exerted to the final cover soil shall be that applied by the bulldozer spreading the soil. Haul equipment shall travel to the placement area over roadways of thickened final cover soil with a minimum thickness of 3 feet. During the hauling and placement of final cover soil, the dozer operator shall grade and shape the placed final cover soil and final cover soil roadways to prevent excessive pumping or rutting by the equipment. Maintenance of roadway or other areas of thickened final cover soil placement may be performed by non-low ground pressure equipment. At no time shall final cover soil be placed where the soil is inadequate to provide support for the haul or placement equipment.

The thickness of the final cover soil shall be verified following placement through field survey or excavation of test pits or use of depth gauges during placement. If test pits are to be used for the verification of thickness, care must be taken to not damage the underlying geosynthetics. Depth gauges may be utilized to aid in placement of the soil and provide quality assurance of thickness of placed material during construction. Depth gauges shall be collapsible materials such as Styrofoam, non-rigid plastic, cardboard, or other material which would not result in damage to the final cover geosynthetics if the gauges were hit by construction equipment. If the depth gauge is of a known height or a marker line is added to the gauge prior to placement of the soil, visual confirmation of the soil height relative to the marker is sufficient confirmation of final cover soil thickness.

Independent of the method utilized to confirm the thickness of the final cover soil, a field survey of the bench area shall be completed. The field survey shall be oriented along the benches to ensure that the benches have the appropriate drainage features, i.e., slope and width.

4.8 CONTINGENCY PLAN FOR ANTICIPATED CONSTRUCTION DIFFICULTIES

During construction, the frequency of testing may be increased at the discretion of either the CQA Consultant or the Owner when visual observations of construction performance indicate a potential

problem. Additional testing for suspected areas will be considered when the following conditions are observed:

- Excessive pumping or cracking of material;
- Adverse weather conditions;
- Work conducted in difficult areas; and
- High frequency of failing tests.

If a defect is discovered in the earthwork construction, the CQA Consultant shall determine the extent and nature of the defect. If the defect is indicated by an unsatisfactory test result, the CQA Consultant shall determine the extent of the deficient area by additional tests, observations, a review of records, or other means that the CQA Consultant deems appropriate. All deficiencies shall be corrected by the Earthwork Contractor to the satisfaction of the CQA Consultant and the Owner.

4.8.1 Notification

The CQA Consultant shall notify the Earthwork Contractor immediately upon discovering the defect. After determining the extent and nature of the defect, the CQA Consultant shall notify the Construction Manager as necessary.

4.8.2 Repairs and Retesting

The Earthwork Contractor shall correct the deficiency to the satisfaction of the CQA Consultant and Owner. If a design specification criterion cannot be met, or unusual weather conditions hinder the work, the CQA Consultant shall develop and present to the Owner suggested solutions for approval.

The CQA Consultant shall schedule appropriate retests after the work deficiency has been corrected. Retests recommended by the CQA Consultant must document that the defect has been corrected before any additional work is performed by the Earthwork Contractor in the area of the deficiency.

5.0 GEOMEMBRANE

5.1 INTRODUCTION

This section of the CQA/QC Plan presents information related to geomembrane products for use in both liner system and final cover construction.

Following selection of the geomembrane manufacturer, as described in Section 1.3, the manufacture, shipment, and installation of geomembrane shall be conducted in accordance with the conformance test tables included in Appendix A. Throughout this section, laboratory and field tests will be referred to by name. Appendix A outlines each proposed geomembrane test and corresponding methodology and also lists the corresponding required testing values for each test. The CQA Consultant shall document the inventory, testing, and placement of geosynthetics.

5.2 MANUFACTURE, SHIPMENT, AND STORAGE

The following text addresses the activities associated with the manufacture of the geomembrane; the shipment, handling, and delivery of geomembrane to the site; conformance testing of delivered geomembrane; and the storage of the geomembrane prior to installation.

5.2.1 Manufacture of Geomembrane

The Geomembrane Manufacturer shall provide documentation that the material meets the requirements of the design specifications and that adequate quality control measures have been implemented during the manufacturing process.

5.2.1.1 Resin Quality

The raw material composing the geomembrane shall be first quality resin containing no more than 2 percent clean recycled polymer by weight. Prior to the shipment of geomembrane material, the Geomembrane Manufacturer shall provide the Construction Manager and CQA Consultant with the following information:

- The origin (Resin Supplier's name and resin production plant), identification (brand name, and number), and production date of the resin;
- A copy of the quality control certificates issued by the Resin Supplier;
- Reports of the tests conducted by the Manufacturer that document the quality of the resin meets the requirements indicated above; and
- A statement that reclaimed polymer is not added to the resin (however, the use of polymer recycled during the manufacturing process may be permitted if done correctly with

appropriate cleanliness and if recycled polymer does not exceed 2 percent of the total resin by weight).

At the Owner's discretion and cost, testing may be carried out on the resin by the Geosynthetics CQA Laboratory for purposes of documenting conformance. If the results of the Manufacturer and the Geosynthetics CQA Laboratory testing differ, the testing shall be repeated by the Geosynthetics CQA Laboratory. The Geomembrane Manufacturer will be permitted to monitor the retesting. The results of this latter series of tests will prevail, provided that the applicable test methods have been followed.

5.2.1.2 Certification of Property Values

In addition to information regarding the raw material, the Geomembrane Manufacturer shall provide the Construction Manager and the CQA Consultant with the following prior to shipment of the geomembrane:

- Manufacturer certification values for all test properties presented in Table A-4(a) for 60-mil High Density Polyethylene (HDPE) Geomembrane, and Table A-5(a), Final Cover Geomembrane; and
- Manufacturer typical content range (expressed as percent of total resin) of polyethylene, carbon black, and additive package. The additive package may be described in general terms for major constituents if valid copyrights/trademarks are held by the manufacturer or manufacturer's supplier.

The CQA Consultant shall utilize the property values certified by the Geomembrane Manufacturer to complete the Manufacturer's MARV information for the conformance testing tables.

5.2.1.3 Quality Control Certificates

Prior to shipment, the Geomembrane Manufacturer shall provide the Construction Manager and the CQA Consultant with quality control certificates for the geomembrane. The quality control certificates will be signed by a responsible party employed by the Geomembrane Manufacturer. The quality control certificate will include:

- Roll numbers and identification; and
- Sampling procedures and results of quality control tests.

The Manufacturer shall be required to perform, at a minimum, the testing scope and frequency presented in Tables A-4(a) and A-5(a) included in Appendix A.

The CQA Consultant shall:

- Verify that quality control certificates have been provided at the frequency defined by the Manufacturer QC Test Frequency specified within the conformance tables included in Appendix A;
- Review the quality control certificates to document that the testing methodology and resulting values comply with the requirements specified within the conformance tables included in Appendix A; and
- Verify that the quality control results meet or exceed the Manufacturer MARV values.

5.2.2 Shipment and Handling

Shipment of the geomembrane to the site is the responsibility of the Geomembrane Manufacturer. Handling the geomembrane on-site is the responsibility of the Installer.

The CQA Consultant shall observe that:

- Handling equipment used on-site pose minimal risk of damage to the geomembrane; and
- The Geomembrane Installers personnel handle the geomembrane with care.

Upon delivery to the site, the Installer and the CQA Consultant shall conduct a surface inspection of the exposed geomembrane rolls for defects, damage, and labeling. This examination shall be conducted without unrolling rolls unless defects or damages, are found or suspected. All labels identifying rolls shall be weatherproof. The CQA Consultant will indicate to the Construction Manager:

- Rolls, or portions thereof, that should be rejected and removed from the site because they have severe flaws;
- Rolls that have minor repairable flaws; and
- Rolls that do not have proper identification.

Rolls without proper identification shall be identified by the CQA Consultant for rejection by the Owner.

5.2.3 Conformance Testing of Geomembrane

Upon, or if possible prior to, delivery of geomembrane rolls, the CQA Consultant shall document that samples are removed and forwarded to the Geosynthetics CQA Laboratory for testing to document conformance with the test methods and values presented within Tables A-4(a) and A-5(a). Samples shall be taken and tested at the minimum frequency specified by the tables included in Appendix A.

Direct shear testing and interface shear testing shall be completed by the CQA Consultant before construction commences. Refer to Table A-9 (Appendix A) for testing conditions.

5.2.3.1 Sample Collection

Using the packing list provided by the manufacturer or a sequential inventory list made by the CQA Consultant, rolls shall be selected for sampling at a minimum frequency specified in Tables A-4(a) and A-5(a). If the material is shipped in identifiable lots or manufacturing runs, sample selection should be adjusted to assure that the minimum frequency is met and that each different lot or manufacturing run is represented by at least one test sample.

Samples will be recovered from a geomembrane roll by removing a 3-foot (1-m) length of geomembrane across the entire width of a roll. The CQA Consultant shall mark the machine direction on the samples with an arrow.

5.2.3.2 Test Results

The results of the conformance testing shall be evaluated in accordance with the following procedure:

1. If the average test values for the sample meet the requirements presented in Tables A-4(a) and A-5(a) included in Appendix A, as well as the Design Requirement values, the sample passes.
2. If the average test value for the sample does not meet one or more of the required values, additional evaluation procedures will be implemented by the CQA Consultant. Extra tests required by an additional evaluation shall be at no expense to the Owner.
    a. In the case of failing parameter(s), two additional tests for the failing parameter shall be performed on sub-samples taken from the failing sample. These tests may be performed by another CQA Geosynthetics Laboratory at the discretion of the CQA Consultant and the Construction Manager.
    b. If additional testing is done on the failed sample, and the average test values for each of the two additional tests meet the required values, the roll and adjacent rolls pass and are acceptable.
    c. If additional testing of the failed sample is not performed or the average test values from the additional testing do not meet conformance testing requirements, the roll will be rejected and samples will be collected from the closest numerical roll on both sides of the failed roll and tested again for the failed parameter(s). If one or both of these tests do not meet requirements, those roll(s) will be rejected and the CQA Consultant and Construction Manager shall determine further testing protocol and criteria for identifying the limits of rejected rolls.

5.2.4 Storage

The Installer shall be responsible for the storage of the geomembrane on-site. Storage space should protect the geomembrane from theft, vandalism, passage of vehicles, water, and weather.
The CQA Consultant shall document that storage of the geomembrane provides adequate protection against dirt, shock, and other sources of damage.

5.3 GEOMEMBRANE INSTALLATION

The installation of the geomembrane involves three primary tasks; earthwork, placement of geomembrane field panels, and seaming of the field panels.

5.3.1 Earthwork

The earthwork immediately beneath the geomembrane and the anchoring of the geomembrane are crucial to the performance of the material. Earthwork construction activities shall be closely monitored by the CQA Consultant.

The CQA Consultant shall document that:

- A qualified Surveyor has verified lines and grades; and
- The requirements of the CQA/QC Plan are satisfied.

The Installer shall certify in writing that the surface on which the geomembrane will be installed is acceptable. This subgrade acceptance certificate shall be given by the Installer to the CQA Consultant prior to commencement of geomembrane installation in the area under consideration. The Construction Manager will be given a copy of this certificate by the CQA Consultant.

It is the Installer's responsibility to protect the contacting soil beneath the geomembrane after it has been accepted. After the soil has been accepted by the Installer, it shall be the responsibility of the Installer and the CQA Consultant to indicate to the Construction Manager changes in the soil condition that may require repair work.

5.3.2 Geomembrane Placement

The placement of geomembrane field panels is the responsibility of the Installer and shall be performed in accordance with the approved panel layout drawing and the following specifications.

5.3.2.1 Panel Layout

On or before a Pre-Construction Meeting, the Geomembrane Installer shall provide the Construction Manager and the CQA Consultant with a drawing of the facility to be lined showing expected seams (panel layout drawing). The CQA Consultant shall review the panel layout drawing and document it as consistent with the accepted state of practice and the CQA/QC Plan. The panel layout drawing shall be approved by the CQA Consultant's Certifying Engineer (registered in Tennessee) or Environmental Manager (EM) or Area EM. The Geosynthetics Installer is responsible, at no cost to Owner, for the repair or re-installation of any materials installed prior to the verbal or written approval of the panel layout drawing by the Certifying Engineer (registered in Tennessee) or EM or AEM.

Geomembrane panel seams should be oriented parallel to the line of maximum slope, i.e., placed along the length of the slope, not perpendicular to it. In corners and odd-shaped geometric locations, the number of seams should be minimized. Horizontal seams should be avoided on slope areas 3H:1V or steeper, and within 5 feet (1.5 m) from the toe of a 3H:1V or steeper slope, or areas of potential stress concentration, unless otherwise authorized.

5.3.2.2 Field Panel Identification

The CQA Consultant shall document that the Installer labels each field panel with an "identification code" (number and/or letter) consistent with the layout plan. This identification code shall be agreed upon by the Construction Manager, Installer, and CQA Consultant. It is the responsibility of the Installer and the CQA Consultant to document that each installed field panel can be traced back to the original roll number. The identification code will be marked at a location agreed upon by the Geosynthetics Installer, and CQA Consultant at the Pre-Construction Meeting.

The CQA Consultant shall establish a table or chart showing correspondence between geomembrane roll numbers and installed field panel identification codes. The field panel identification code will be used for quality assurance records.

5.3.2.3 Location

The CQA Consultant shall document that field panels are installed at the location indicated on the Installer’s panel layout drawing, as approved or modified.

5.3.2.4 Installation Schedule

Field panels shall be placed one at a time unless otherwise approved by the CQA Consultant and the Construction Manager. Each field panel shall be seamed after its installation in order to minimize the number of unseamed field panels exposed to weather.

It is beneficial to "shingle" panel overlaps in the downward direction to facilitate drainage in the event of precipitation. It is also beneficial to proceed in the direction of prevailing winds. Scheduling decisions shall be made during installation, depending upon varying weather and other construction conditions. The Installer shall be fully responsible for the decision made regarding placement procedures.

The CQA Consultant shall record the identification code, location, date of installation, time of installation, and ambient temperature of each field panel. The CQA Consultant shall also evaluate field changes by the Installer which may affect the original schedule proposed by the Installer and advise the Construction Manager on the acceptability of that change.

5.3.2.5 Weather Conditions

Geomembrane panel installation shall not proceed when measured sheet temperature exceeds the constraints as specified in Section 5.3.3.4. Deviations from this temperature criteria shall only occur when authorized by the Construction Manager and with concurrence of the CQA Consultant based on passing trial welds at sheet temperatures identical or in excess of the anticipated liner temperature. Geomembrane placement shall not be performed during precipitation, fog, snow, in an area of ponded water, or in the presence of excessive winds.

The CQA Consultant shall document that the above conditions are fulfilled and shall inform the Construction Manager of deviations from the accepted installation procedures.

5.3.2.6 Geomembrane Anchor Trench

Anchor trenches shall be excavated by the Earthwork Contractor (unless otherwise specified) to the lines and widths shown on the drawings prior to geomembrane installation. The CQA Consultant shall document that anchor trenches have been constructed according to the design drawings.

Slightly rounded corners shall be provided along the trench length where the geomembrane enters the trench to avoid sharp bends that could increase geomembrane stress concentrations and potentially damage the geomembrane. Loose soil shall not underlie the geomembrane within the trench. Panel seaming shall continue through the anchor trench. Following the placement of each geosynthetic layer within the trench, the geosynthetics installer is responsible for temporary anchorage within the anchor trench. Temporary anchorage shall be achieved with sandbags, rolls of geosynthetic material, or other material which allows for removal from the trench for the placement of additional geosynthetic layers. The Earthwork Contractor is responsible for the placement and compaction of soil within the anchor trench as permanent anchorage, following notice of backfill request by the Construction Manager. Backfilling of anchor trenches shall be performed in accordance with this CQA/QC Plan and Table A-3.

5.3.2.7 Method of Placement

The following is the responsibility of the Geomembrane Installer, and the CQA Consultant shall document that these conditions are satisfied:

- The geomembrane is not damaged by equipment through handling, traffic, excessive heat, leakage of liquids, or other means;
- The prepared soil surface underlying the geomembrane has not deteriorated since previous acceptance and is still acceptable immediately prior to geomembrane installation;
- Geosynthetic materials immediately underlying a proposed geomembrane layer to be installed are clean and free of debris;
- Personnel working on the geomembrane do not smoke, wear damaging shoes, or engage in other activities that could damage the geomembrane;
- The method and equipment utilized to deploy panels does not cause scratches or crimps in the geomembrane and does not damage the barrier soil layer;
- The method used to place the panels minimizes wrinkles (especially differential wrinkles between adjacent panels);
- Adequate temporary loading and/or anchoring (e.g., sandbags, geosynthetic rolls), not likely to damage the geomembrane, has been placed to prevent uplift by wind (in case of high winds, continuous loading, e.g., by adjacent sand bags, is recommended along the edges of panels to minimize the risk of wind flow under the panels); and
- Direct contact with the geomembrane is minimized; i.e., the geomembrane is protected by a sacrificial layer of geomembrane, or other suitable materials, in areas where excessive traffic may be expected.

The CQA Consultant shall inform the Construction Manager if the above conditions are not fulfilled.

5.3.2.8 Damage

The CQA Consultant shall visually inspect each panel after placement and prior to, during, or following seaming for damage. The CQA Consultant shall advise the Construction Manager if any panels, or portions of panels, should be rejected, repaired, or accepted. Damaged panels or portions of damaged panels which have been rejected shall be marked and their removal from the work area recorded by the CQA Consultant. Repairs shall be made according to procedures described in Section 5.3.4.

As a minimum, the CQA Consultant shall document:

- The panel is placed in such a manner that is unlikely to be further damaged; and
- Tears, punctures, holes, thin spots, etc. are either marked for repair or the panel is rejected.

5.3.3 Field Seaming

Field seaming is the responsibility of the Installer and shall be performed in accordance with the following.

5.3.3.1 Requirements of Personnel

At the Pre-Construction Meeting, the Geomembrane Installer will provide the CQA Consultant with a list of proposed seaming personnel and their professional resumes. This documentation will be reviewed and approved by the Construction Manager and the CQA Consultant.

5.3.3.2 Seaming Equipment and Products

HDPE Geomembrane shall be used for all FML components within the baseliner. Approved processes for HDPE Geomembrane field seaming are extrusion seaming and fusion seaming. Proposed alternate HDPE Geomembrane field seaming processes shall be documented and submitted to the Owner and TDEC for approval. Only alternate seaming equipment which has been specifically approved by make and model shall be used. The Installer shall submit seaming equipment documentation to the Construction Manager and the CQA Consultant for approval.

Non-HDPE Geomembrane products may be used as the FML within the final cover system; however, the specific type of FML and the method proposed to seam the FML are subject to the Construction Manager and the CQA Consultant for approval.

The following is the responsibility of the Installer, and the CQA Consultant shall document these conditions are met:

- The Installer maintains on-site a number of spare operable seaming devices that were approved for seaming at the Pre-Construction Meeting;
- Equipment used for seaming is not likely to damage the geomembrane;
- The extruder is purged prior to beginning a seam until heat-degraded extrudate has been removed from the barrel;
- For cross seams, the edge of the cross seam is ground to a smooth incline (top and bottom) prior to seaming;
- The electric generator is placed upon a flat smooth base and a rub sheet such that no damage occurs to the geomembrane; and
- A smooth insulating plate or fabric is placed beneath the hot seaming apparatus after usage.

- **Extrusion Process**
  - The extrusion seaming apparatus shall be equipped with gauges that show extrudate, nozzle, and preheat temperatures of the apparatus.
  - The Installer shall provide documentation on the extrudate to the Construction Manager and the CQA Consultant and shall certify that the extrudate is compatible with the design specifications and is comprised of the same resin as the geomembrane sheeting.
  - The CQA Consultant shall log apparatus temperatures, ambient temperatures, extrudate temperatures, and sheet temperatures at appropriate intervals.

- **Fusion Process**
  - The fusion seaming apparatus must be an automated mechanical device, equipped with gauges giving the applicable temperatures. Pressure settings shall be verified by the Installer prior to each seaming period. The CQA Consultant shall log ambient temperatures, sheet temperatures, and seaming apparatus temperatures, speeds, and pressures. The Geosynthetic Installer shall maintain at least one spare, operable seaming unit on-site at all times.
  - The single-track fusion seaming method shall be allowed only with prior approval of the Owner. Any alternative seaming methods proposed by the Geosynthetic Installer must be approved by the Owner and TDEC prior to use on the project.

5.3.3.3 Seam Preparation

The following is the responsibility of the Installer; the CQA Consultant shall document these conditions are met:

- Prior to seaming, the area to be seamed shall be clean and free of moisture, dust, dirt, oils, greases, foreign material, and debris. The geomembrane panels to be welded together shall be wiped with a clean cloth, brush or other cleaning equipment just prior to seaming;
- A rub sheet shall be used to protect the liner while cutting materials;
- If seam overlap grinding is required, the process will be completed within 1 hour of the seaming operation, adhering to the Geomembrane Manufacturer's instructions, and performed in a way that does not damage the geomembrane;
- No abrasions are visible when welding is complete;
- Seams are aligned with the fewest possible number of wrinkles and "fishmouths"; and
- No metal objects that could potentially damage the liner are permitted to be used within the lined area.

5.3.3.4 Weather Conditions for Seaming

The required weather conditions for seaming are as follows:

- The sheet temperatures shall be measured on the surface of the geomembrane sheet with a thermometer;
- Unless authorized in writing by the Construction Manager, no seaming shall be attempted at a sheet temperature above 120°F for extrusion welding and 140°F for fusion welding; in both fusion and extrusion welding, no seaming shall be attempted at a sheet temperature below 32°F; and
- The geomembrane shall be dry and protected from wind.

If the Installer wishes to use methods which allow seaming at ambient temperatures above 120°F for extrusion welding, and above 140°F for fusion welding or below 32°F for both types of welding, the Installer shall demonstrate through trial welds that such methods produce seams which are equivalent to seams produced at ambient temperatures above 32°F and below 120°F for extrusion welding and 140°F for fusion welding. The Installer shall also demonstrate that the overall quality of the geomembrane is not adversely affected and the Construction Manager and CQA Consultant shall concur with the installer.

The above specified temperature constraints apply to general construction for disposal areas and final cover projects. However, if repair activities are necessary for previously constructed areas and the repairs cannot await improved weather due to construction considerations, scheduling, or importance of the repair, these repairs may be completed at a wider range of ambient temperatures. For these repair situations, welding may be performed at ambient temperatures between 120°F and 20°F for both types of welding, the Installer shall demonstrate through trial welds that such methods produce seams which are acceptable when compared to the seam requirements of Tables 4(b) and 5(b) in Appendix A. When these repairs are performed outside of normal ambient welding temperatures, trial welds shall be performed once per four hours. The CQA Consultant shall document that these weather conditions are complied with and will advise the Construction Manager accordingly.

5.3.3.5 Overlapping and Temporary Bonding

The following shall be the responsibility of the Installer and shall be verified by the CQA Consultant:

- In general, geomembrane panels shall have a finished overlap of a minimum of 3 inches (75-mm) for extrusion seaming and 4 inches (100 mm) for fusion seaming (or otherwise specified by the manufacturer), but in any event, sufficient overlap will be provided to allow peel tests to be performed on the seam; and
- The procedure used to temporarily bond adjacent panels together does not damage the geomembrane (in particular, the temperature of hot air at the nozzle of a spot seaming apparatus will be controlled such that the geomembrane is not damaged).

The CQA Consultant shall log appropriate temperatures and conditions and shall log and report deviations to the Construction Manager.

5.3.3.6 Trial Seam, Geomembrane Seaming

Trial seams shall be made on scrap pieces of geomembrane liner under the same weather and field conditions to be encountered during the seaming period to document that seaming conditions and procedures are adequate and in accordance with Appendix A. Such trial seams shall be made at the beginning of each seaming period, and at least once every 5 hours, whichever time period is less. A passing trial seam shall be made for each seaming device and technician.

For fusion welding with a self-propelled machine, re-trial welding shall be required if any setting on the machine is altered from those used for the preparation of the previous passing trial seam. With fusion welding, once a machine has passed trial weld testing, any qualified welding technician may utilize that machine. For extrusion or other manually advanced welding equipment, a change in technician, machine, or machine settings from that used for the preparation of the previous passing trial weld shall warrant completion of a new passing trial weld. With extrusion or other manually advanced welding equipment, only a qualified technician who utilized that machine shall be allowed to use that machine without the preparation of a new trial weld.

A trial seam shall also be made in the event that the sheet temperature varies more than 20°F since the last passing trial seam. Trial seams shall be made under the same conditions as actual seams. If the seaming apparatus is turned off for any reason, a new passing trial seam must be completed for that specific seaming apparatus.

The Installer shall provide the tensiometer required for field trial seam shear and peel testing. The tensiometer shall be automatic and have a direct digital readout. The tensiometer shall be calibrated at the site prior to use. The Installer shall provide the CQA Consultant with the calibration certification.

The trial seam sample shall be at least 5 feet (1.5 m) long by 1-foot (0.3 m) wide (after seaming) with the seam centered lengthwise. Seam overlap shall be as indicated in Section 5.2.3.5. Six specimens, 1 inch (25-mm) wide each, shall be cut from the trial seam sample by the Installer. Three specimens shall be tested in shear and three in peel (each track for a double track fusion welder) using a field tensiometer. A passing welded seam is achieved in peel and shear when the specimen meets the criteria presented in Tables A-4(b) and A-5(b).

If a specimen fails, the trial seam operation shall be repeated. If the additional specimen fails, the seaming apparatus and seamer shall not be accepted and shall not be used for seaming until the deficiencies are corrected and two consecutive, successful, trial seams are achieved.

The CQA Consultant shall observe trial seam procedures. The remainder of the successful trial seam sample shall be assigned a number and marked accordingly by the CQA Consultant, who will also log the date, hour, ambient temperature, number of seaming unit, name of seamer, and pass or fail description. The remainder of the successful trial seam sample shall be archived at the site until the Permitting Agency has approved the final documentation.

5.3.3.7 General Seaming Procedure

Unless otherwise specified, the general seaming procedure used by the Installer shall be as follows:

- While fusion seaming, a movable protective layer of plastic may be required to be placed directly below each overlap of geomembrane that is to be seamed. This is to help prevent moisture build-up between the panels to be seamed;
- If required, a firm substrate will be provided by using a flat board or similar hard surface directly under the seam overlap to achieve proper support;
- Wrinkles at the seam overlaps will be cut along the ridge of the wrinkle in order to achieve a flat overlap. Cut wrinkles will be seamed and portions where the overlap is inadequate will then be patched with an oval or round patch of the same geomembrane extending a minimum of 6-inches (150 mm) beyond the cut in all directions;
- With respect to the anchor trench, seaming will extend to the outside edge of panels installed within the anchor trench; and
- No field seaming shall take place without the on-site presence of the Geosynthetic Installer's Master Seamer.

The CQA Consultant shall document that the above seaming procedures are followed and shall inform the Construction Manager of deviations.

5.3.3.8 Non-Destructive Seam Continuity Testing

The Installer shall non-destructively test field seams over their full length using a vacuum test unit (for extrusion seams only), air pressure test, or other Owner approved method. The testing shall be carried out to the accepted standards of the industry. The purpose of non-destructive testing is to inspect the continuity of geomembrane panels seams. Continuity testing shall be carried out simultaneously, as the seaming work progresses (maximum of 3,000 lineal feet (1,000 m) of seam), not at the completion of all field seaming, unless otherwise approved by the Construction Manager. The Installer shall complete required repairs in accordance with Section 5.3.4. Non-destructive testing shall not be permitted to occur before sunrise or after sunset unless the Installer demonstrates the capabilities to do so.

Air Pressure Testing

Unless otherwise specified, the general air pressure testing procedure used by the Installer shall be as follows:

- Inflate the test channel to a range of 30 to 35 pounds per square inch (psi). Close valve;
- Provide an Initial 2-minute relaxation period after pressurization prior to start of test;
- Observe and record the air pressure 5 minutes after start of test, record ending and initial pressures. If loss of pressure exceeds 3 psi, or if the pressure does not stabilize, locate the faulty area and repair;
- At the conclusion of the pressure test, the end of the seam opposite the pressure gauge shall be cut. A decrease in a gauge pressure must be observed or the air channel will be considered "blocked" and the test will have to be repeated after the blockage is corrected;
- Remove needle or other approved pressure feed device and seal the resulting hole by extrusion welding; and
- Testing will be recorded by the CQA Consultant.

Non-Complying Air Pressure Test

In the event of a non-complying air pressure test, the following procedure shall be followed:

- Check the seals at the end of the seam and retest the seam;
- If deviation with specified maximum pressure differential reoccurs, cut 1-inch (25 mm) samples from each end of the suspect area; and
- Perform destructive peel tests on the samples using the field tensiometer.

If all samples pass destructive testing, the Installer may:

- Cap-strip the suspect area;
- When sufficient overlap exists [2-inch (50 mm)], heat tack the overlap and extrusion weld the entire seam. Test the entire length of the repaired seam by vacuum testing; or
- Further isolate the air pressure failure as agreed upon by the CQA Consultant and Construction Manager;
- If one or more samples fail the peel tests, additional samples will be taken. When two passing samples are located, the suspect area between the passing tests will be considered geomembrane material that is in non-compliance. This section of failing seam shall be cap stripped, or the overlap created by the wedge welder will be heat tacked in place along the entire length of the seam and the entire length of the seam will be extrusion welded. Subsequently, the entire length of the repaired seam will be inspected by vacuum testing;

- If the seam is in non-compliance due to air channel blockage, the blockage shall be isolated, as agreed upon by the CQA Consultant and the Construction Manager; and
- All sections shall be retested and repaired in accordance with Section 5.3.4.2.

Vacuum Testing

Unless otherwise specified, the general vacuum testing procedure used by the Installer shall be as follows:

- Turn on vacuum pump to reduce pressure within the vacuum box to approximately 5 psi (0.35 kg/cm^3);
- Apply a generous amount of a solution composed of liquid soap and water to the area to be tested;
- Place the vacuum box over the area to be tested and apply sufficient downward pressure to "seat" the seal strip against the liner;
- Close the bleed valve and open the vacuum valve;
- Ensure that a leak tight seal is created;
- For a period of not less than 10 seconds, examine the geomembrane through the viewing window for the presence of soap bubbles; and
- If no bubbles appear after 10 seconds, close the vacuum valve and open the bleed valve, move the box over the next adjoining area with a minimum 3-inch (75 mm) overlap and repeat the process.

Non-Complying Vacuum Test

In the event of a non-complying vacuum test, the following procedure shall be followed:

- Mark all areas where soap bubbles appear and repair the marked areas, as specified in Section 5.3.4.2; and
- Retest repaired areas.

CQA Responsibilities

The CQA Consultant shall:

- Document all continuity testing;
- Record location, date, test unit number, name of tester, and outcome of testing; and
- Inform the Installer and Construction Manager of required repairs.

When defects are located, the CQA Consultant shall:

- Observe the repair and retesting of the repairs;
- Mark on the geomembrane that the repair has been made; and
- Document the results.

Non-Testable Areas

The Installer shall use the following procedures at locations where seams cannot be non-destructively tested.

- Spark testing or other method approved by the CQA Consultant and Owner shall be employed, if possible;
- All such seams shall be cap-stripped with the same geomembrane material;
- If the seam is accessible to testing equipment prior to final installation, the seam shall be non-destructively tested prior to final installation; and
- If the seam cannot be tested prior to final installation, the seaming and cap-stripping operations shall be observed by the CQA Consultant and Installer for uniformity and completeness.

The seam number, date of observation, name of tester, and outcome of the test or observation shall be recorded by the CQA Consultant.

5.3.3.9 Destructive Testing, Geomembrane Seaming

Destructive seam tests shall be performed at selected locations. The purpose of these tests is to evaluate seam strength. Seam strength testing shall be done as the seaming work progresses [maximum of 3,000 lineal feet (1,000 m) of seam], not at the completion of all field seaming, unless otherwise approved by the Construction Manager or CQA Consultant. Seam lengths shall be tracked separately for each type of welding.

Location and Frequency

The CQA Consultant shall select locations where geomembrane panel seam samples will be cut out for laboratory testing. Those locations shall be established as follows:

- A minimum frequency specified in Tables A-4(b) and A-5(b). This minimum frequency is to be determined as an average taken throughout the entire facility;
- The minimum frequency specified in Table A-4(b) and A-5(b) shall be satisfied for each type of welding (i.e., extrusion and fusion); and

- Test locations will be determined during seaming at the CQA Consultant's discretion. Selection of such locations may be prompted by suspicion of excess crystallinity, contamination, offset seams, or other potential cause of defective seaming.

The Installer shall not be informed in advance of destructive seam tests locations.

Sampling Procedure

Samples shall be cut by the Installer as the seaming progresses in order to have passing laboratory test results before the geomembrane is covered by another liner material. The CQA Consultant shall:

- Observe sample cutting;
- Assign a number to each sample and mark it accordingly;
- Record the destructive sample location on the appropriate geomembrane panel layout drawing; and
- Record the reason for taking the sample at this location (e.g., statistical routine or suspicious feature of the geomembrane).

Holes in the geomembrane resulting from destructive seam sampling shall be repaired in accordance with repair procedures described in Section 5.3.4.2 of the CQA/QC Plan. The continuity of the new seams in the repaired area will be tested according to Section 5.3.3.8.

Size of Samples

At a given sampling location, two types of samples shall be taken by the Installer. Initially, two specimens for field testing shall be taken. Each of these specimens will be 1-inch (25 mm) wide by 12 inches (300 mm) long, with the seam centered parallel to the width. The distance between these two specimens will be 42 inches (106 cm) (or 30 inches (76 cm).

The sample for laboratory testing shall be located between the two specimens for field testing. The destructive sample will be 12 inches (30 cm) wide by 42 inches (106 cm) long, if the Geomembrane Installer requests a sample; otherwise, the destructive samples will be 12 inches (30 cm) wide and 30 inches long (76 cm) with the seam centered lengthwise. The sample shall be cut into three parts and distributed as follows:

- One portion to the Installer for laboratory testing, 12 inches x 12 inches (30 cm x 30 cm);
- One portion to the Owner for archive storage, 12 inches x 12 inches (30 cm x 30 cm); and
- One portion for Geosynthetics CQA Laboratory testing, 12 inches x 18 inches (30 cm x 45 cm).

Final determination of the sample sizes shall be made at the Pre-Construction Meeting. The CQA Consultant shall witness destructive sample collection and label samples and portions with their number. The CQA Consultant shall also log the date and time, seam identification, and sample location.

Field Testing

The two 1-inch (25 mm) wide specimens described in the previous section may be tested in the field with a tensiometer, for peel and shear respectively, and shall meet the minimum requirements presented in Tables A-4(b) and A-5(b), included in Appendix A. If any field test sample fails to pass, the procedures outlined in the Destructive Test Failure section will be followed. The CQA Consultant shall observe and document the results of the field tests.

Geosynthetics CQA Laboratory Testing

Destructive test samples shall be packaged and shipped, if necessary, by the CQA Consultant in a manner that will not damage the test sample. The Construction Manager shall be responsible for storing the archive samples. Test samples shall be tested by the Geosynthetics CQA Laboratory.

At least five specimens will be tested, each for shear and peel as shown in Tables A-4(b) and A-5(b). A maximum of one non-Film Tear Bond (FTB) failure is acceptable for each method provided the strength requirements are met on that sample.

The Geosynthetics CQA Laboratory shall provide test results, in writing, no more than 24 hours after they receive the samples. The CQA Consultant shall review laboratory test results as soon as they become available and make appropriate recommendations to the Construction Manager. If a sample fails, the procedures given in the Destructive Test Failure section shall be followed.

Installer's Laboratory Testing

The Installer's laboratory test results shall be presented to the Construction Manager and the CQA Consultant for review within 24 hours of sample collection.

Destructive Test Failure

The following procedures shall apply whenever a sample fails a destructive test, whether that test is conducted by the Geosynthetics CQA Laboratory, the Installer's laboratory, or by the field tensiometer.

- The Installer can reconstruct the seam between any two passed destructive seam test locations; or
- The Installer can trace the seaming path to an intermediate location [at least 10 feet (3 m) from the point of the failed test in each direction] and take a small sample for an additional field test at each location. If these additional samples pass field tensiometer testing, then full destructive laboratory samples are taken. If these destructive laboratory samples pass the tests, then the seam is reconstructed between these locations by capping via extrusion or fusion welds. If either the field tensiometer or the laboratory test sample fails, then the process is repeated to establish the zone in which the seam should be reconstructed.

If a fusion type seam fails destructive testing and the Installer chooses to cap the seam, the only acceptable capping method is as described in Section 5.3.4.2.

All acceptable seams must be bounded by two locations from which destructive samples passing laboratory tests have been taken. In cases exceeding 150 feet (45 m) of reconstructed seam, a sample shall be taken from the zone in which the seam has been reconstructed. This sample must pass destructive testing or the procedure outlined here must be repeated.

The CQA Consultant shall document all actions taken in conjunction with destructive test failures.

5.3.4 Defects and Repairs

All seams and non-seam areas of the geomembrane shall be examined by the CQA Consultant for identification of defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. Because light reflected by the geomembrane helps to detect defects, the surface of the geomembrane will be clean at the time of examination. The geomembrane surface shall be swept or washed by the Installer if the amount of dust or mud inhibits examination.

5.3.4.1 Evaluation

Each suspected defect location, both in seam and non-seam areas, shall be non-destructively tested, as necessary, using the methods described in Section 5.3.3.9. Each location which fails the non-destructive testing shall be marked with an identification code by the CQA Consultant and repaired by the Installer. Work shall not proceed with any subsequent materials which will cover locations which have been repaired until field or laboratory test results with passing values are available.

5.3.4.2 Repair Procedures

Any portion of the geomembrane exhibiting a flaw, failing a destructive test, or failing a non-destructive test, shall be repaired. Several procedures exist for the repair of these areas. The final

decision as to the appropriate repair procedure shall be approved by the Construction Manager and the CQA Consultant. The procedures available include:

- Patching - Apply a new piece of geomembrane sheet over, and at least 6 inches (150 mm) beyond the limits of a defect. The patch shall be extrusion seamed to the underlying geomembrane. This method should be used to repair holes, tears, destructive test locations, undispersed raw materials, contamination by foreign matter, dents, pinholes, and pressure test holes;
- Capping - Apply a new strip of geomembrane along the length of a delineated faulty seam. The cap strip shall extend at least 6 inches (150 mm) beyond the limit of the seam and the edges will be extrusion seamed to the underlying geomembrane. This method should be used to repair lengths of extrusion or fusion seams; and
- Replacement - The faulty seam is removed and replaced.

In addition, the following provisions shall be satisfied:

- Surfaces of the geomembrane which are to be repaired will be abraded no more than one hour prior to the repair;
- All surfaces must be clean and dry at the time of the repair;
- All seaming equipment used in repairing procedures must be approved;
- The repair procedures, materials, and techniques will be approved in advance of the specific repair by the CQA Consultant and Installer;
- Patches or caps will extend at least 6 inches (150 mm) beyond the edge of the defect and all patch corners will be rounded; and
- Seam repairs over 150 feet (45 m) long will require a destructive test to be taken from the repair.

5.3.4.3 Verification of Repairs

Each repair shall be numbered and logged by the CQA Consultant and the Installer. Each repair shall be non-destructively tested, as necessary, using the methods described in Section 5.3.3.8. Repairs which pass the non-destructive test will be taken as an indication of an adequate repair. However, if the CQA Consultant suspects a repair to be questionable, although it passes non-destructive testing, a destructive test can be requested. Failed tests will require the repair to be redone and retested until a passing test result is achieved. The CQA Consultant shall observe non-destructive testing of repairs and shall record the repair test date, location, and test outcome.

5.3.4.4 Large Wrinkles

When seaming of the geomembrane panels is completed (or when seaming of a large area of the geomembrane is completed) and prior to placing overlying liner materials, the CQA Consultant shall inspect the geomembrane for the presence of wrinkles. The CQA Consultant will indicate to the Construction Manager which wrinkles should be cut and re-seamed by the Installer. The resulting seam produced by removing the wrinkle will be tested like any other repair.

5.3.5 Backfilling of Anchor Trench

Anchor trenches will be adequately drained to prevent ponding or otherwise softening of the adjacent soils while the trench is open. Anchor trenches shall be backfilled and compacted as soon as possible. Care shall be taken when backfilling the trenches to prevent any damage to the geosynthetics.

The CQA Consultant shall observe the backfilling operation and advise the Construction Manager of any problems. Testing of the anchor trench backfill shall be completed and monitored consistent with the requirements of Table A-3.

5.3.6 Installed Geomembrane Certification/Acceptance

The Installer and the Manufacturer shall retain ownership and responsibility for the geosynthetics installed within the facility until acceptance by the Owner.

The liner system shall be accepted by the Owner when:

- The installation is finished;
- Verification of the adequacy of seams and repairs, including associated testing, is complete;
- Installer's representative furnishes the Construction Manager with certification that the geomembrane was installed in accordance with the Manufacturer's recommendations as well as the design drawings and specifications;
- All documentation of installation is completed including the CQA Consultant's final report; and
- Certification, including record drawings, sealed by a Professional Engineer registered in Tennessee has been received by the EM or AEM.

The CQA Consultant shall provide certification that installation has proceeded in accordance with this CQA/QC Plan for the project except as noted to the EM or AEM or Construction Manager.

5.3.7 Materials in Contact with the Geomembranes

The quality assurance procedures indicated in this subsection are only intended to document that the installation of these materials does not damage the geomembrane. Additional quality assurance procedures provided in subsequent sections of this CQA/QC Plan are necessary to document that the systems built with these materials are constructed to perform as designed.

5.3.7.1 Appurtenances

The Design Engineer shall provide design specifications for appurtenances to the Construction Manager and the CQA Consultant.

The CQA Consultant shall document that:

- Installation of the geomembrane in appurtenance areas and connection of geomembrane to appurtenances have been made according to the design specifications;
- Extreme care is taken while seaming around appurtenances since neither non-destructive nor destructive testing may be feasible in these areas; and
- The geomembrane has not been visibly damaged while making connections to appurtenances.

The CQA Consultant will inform the Construction Manager if the above conditions are not fulfilled.

5.3.8 Geomembrane Rain Flaps

Geomembrane rainflaps may be installed to subdivide lined areas for leachate quantity management. The purpose of the flap is to prevent stormwater from entering the leachate collection system. The CQA Consultant shall document the material, configuration, and installation of the rainflap. Additionally, the CQA Consultant shall confirm that the berm installation does not harm the liner system.

5.4 TESTING OF SUMP AREAS

Liner construction projects which include the installation of a leachate sump area shall include additional inspection in these areas. Additional inspection shall be performed to verify that the liner material and installation has been completed with no identifiable defects. This inspection may be achieved through complete vacuum box testing, spark testing or a hydrostatic test. Inspection of the sump area shall be performed following the installation and detailing of the liner installation

throughout the sump area. The inspection of the sump area shall be clearly noted and discussed in the field reports prepared by the CQA Consultant.

5.4.1 Vacuum Box Testing of Sump Areas

Following installation of the liner throughout the sump area, complete vacuum box testing can be performed to provide adequate testing of the sump area. Standard vacuum box testing procedures, as outlined in Section 5.3.3.8 shall be followed for the inspection of all seams and sheet material within the limits of the depressed portion of the sump. The CQA Consultant shall provide a field monitor to accompany the geosynthetic installer throughout the vacuum box testing of the sump area. Defects identified during this testing shall be marked, repaired, and re-tested.

5.4.2 Spark Testing of Sump Areas

Following installation of the liner throughout the sump area, complete spark testing can be performed to provide adequate testing of the sump area. With the testing equipment and liner properly powered, the spark testing wand shall be moved slowly over all seam and sheet area within the limits of the depressed portion of the sump. The geosynthetic installer technician performing the spark testing shall be properly trained and demonstrate this training with written certification or resume experience. The speed and distance above the liner which the wand is moved shall be initially confirmed with the testing of a trial seam or liner material with a known defect to ensure that the sparking can be seen. The CQA Consultant shall provide a field monitor to accompany the geosynthetic installer throughout the vacuum box testing of the sump area. Defects identified during this testing shall be marked, repaired, and re-tested.

5.4.3 Hydrostatic Testing of Sump Areas

Following installation of the liner throughout the sump area, a hydrostatic test of the sump area can be performed to document its integrity. The sump shall be tested by filling the sump with clean water to a minimum of 2 inches (51 mm) above the crest of the depressed portion of the sump, unless otherwise specified by Owner and CQA Consultant. The horizontal limits of the water surface shall be delineated on the primary liner at the start of the testing period with markers or paints. The water shall remain in the sump for a minimum of 8 continuous hours. Loss of test water may be determined by comparing horizontal limits of the water surface with the interim limits. At a minimum of once every 1 hour (more frequently as possible), the test water level in the sump interim water loss amounts and time shall be noted as part of the test.

At the end of the testing period, the level of liquid in the sump shall be evaluated. If no liquid loss is noted, the hydrostatic test is deemed to pass. If appreciable liquid decrease is noted, the test is deemed as non-passing and the sump shall be emptied and inspected for leaks or hydrostatic testing may be

run at various liquid depths within the sump to locate possible leaks. If no possible leaks are located, other possible avenues of infiltration through the sump shall be investigated and the test shall be re-run.

6.0 GEOSYNTHETIC CLAY LINER (GCL)

6.1 INTRODUCTION

The manufacture, shipment, and installation of a Geosynthetic Clay Liner (GCL) shall be in accordance with this section of the CQA/QC Plan. GCLs shall be utilized in accordance with the permitted design for the facility, as an alternative to the upper 1-foot of the 2-foot-thick barrier soil layer. Laboratory and field tests will be referred to by name throughout this section. For the specific test method corresponding to the named tests, see Table A-8. These tables specify the test parameters and frequencies of the Manufacturer quality control testing as well as the conformance testing. The CQA Consultant shall document inventory, testing, and placement of all GCLs.

6.2 MANUFACTURER'S DOCUMENTATION

Prior to delivery, the GCL Manufacturer shall provide documentation which demonstrates that the GCL property values of the material adheres to project specifications. Site delivered rolls of GCL shall be appropriately labeled.

6.2.1 Certification of Property Values

The GCL Manufacturer shall provide the Construction Manager with a list of guaranteed "minimum average roll value" properties (as defined by the Design Engineer) for the specific type of GCL to be supplied. The GCL Manufacturer shall provide the Construction Manager with a written certification, signed by the appropriate GCL Manufacturer representative. The certification shall state that the site delivered GCLs have properties which meet or exceed the guaranteed "minimum average roll values".

The CQA Consultant shall examine the Manufacturer's certifications to document that the property values listed on the certifications meet or exceed the Manufacturer's MARV values. Deviations shall be reported to the Construction Manager.

6.2.2 Labeling

The GCL Manufacturer shall identify all rolls of GCL. Each GCL roll shall have a weatherproof label containing the following:

- Manufacturer's name;
- Product identification;
- Lot number;
- Roll number;
- Roll weight; and
- Roll dimensions.

In addition, if any special handling of the GCL is required, it shall be marked on the top surface of the GCL, e.g., "This Side Up". Rolls without proper identification shall be identified by the CQA Consultant for rejection by the Owner.

The CQA Consultant shall examine rolls upon delivery and deviations from the above requirements shall be reported to the Construction Manager.

6.3 SHIPMENT AND STORAGE

During shipment and storage, the GCL shall be protected from ultraviolet light exposure, precipitation, snow, inundation, mud, dirt, dust, puncture, cutting, or other damaging or deleterious conditions. GCL rolls shall be wrapped in plastic sheets or otherwise protected. In addition to maintaining in-tact wrappings for the GCLs, the rolls shall be stored off of the ground and covered with an additional tarp, stored in a truck, van, building or other area that would provide protection against damage and exposure. Wrappings protecting the GCL rolls should not be removed more than one hour prior to unrolling the GCL.

GCLs shall not be exposed to precipitation prior to being installed. Wet GCLs are heavy which makes them difficult to deploy, can degrade the desired performance of the material and can also affect liner welding when the geomembrane is adjacent to the GCL.

The CQA Consultant shall observe rolls upon delivery and prior to installation, deviation from the above requirements shall be reported to the Construction Manager. Damaged rolls shall be rejected and replaced at no cost to the Owner.

6.4 CONFORMANCE TESTING OF GCL

Upon or prior to delivery of GCL rolls, samples shall be forwarded to the Geosynthetics CQA Laboratory for conformance testing. Direct shear testing and interface shear testing shall be completed by the CQA Consultant before construction commences. Refer to Table A-9 (Appendix A) for testing conditions.

6.4.1 Sample Collection

Using the packing list provided by the manufacturer or a sequential inventory list made by the CQA Consultant, rolls shall be selected for sampling at the minimum frequency shown in Table A-8 in Appendix A. If the material is shipped in identifiable lots or manufacturing runs, sample selection should be adjusted so that the minimum frequency is met and that each different lot or manufacturing run is represented by at least one sample. If a roll is not identifiable by roll number, the CQA

Consultant shall inform the Construction Manager. If the roll cannot be tracked, the Construction Manager shall reject the roll.

Unless otherwise specified, sample dimensions will be 3 feet (1 m) long by the roll width. The sample shall be marked with the machine direction on the samples with an arrow.

6.4.2 Test Results

The results of the conformance testing shall be evaluated in accordance with the following procedure:

1. If the average test values for the sample comply with all of the values given in the Manufacturer's MARV values (as listed in Table A-8), the sample passes.
2. If the average test value for the sample does not meet one or more of the required values, additional evaluation procedures will be implemented by the CQA Consultant. Additional tests required for further evaluation shall be done at no expense to the Owner.
    a. For the failing parameter(s), perform two additional tests on the sample. These tests may be performed by another CQA Geosynthetics Laboratory at the discretion of the CQA Consultant and the Construction Manager.
    b. If the average test values for each of the two additional tests meet the required values, the roll and adjacent rolls pass and are acceptable.
    c. If one or more of the average test values do not meet requirements, the roll shall be rejected. Samples shall be collected from the closest numerical roll on both sides of the failed roll and the samples shall be tested for the failed parameter(s). If one or both of these samples do not meet requirements, the failing roll(s) shall be rejected and the CQA Consultant and Construction Manager shall determine further testing protocol and criteria for identifying the limits of rejected rolls.

6.5 HANDLING AND PLACEMENT

The Installer shall handle GCLs in such a manner as to minimize damage and shall comply with the following:

- GCL shall not be deployed by allowing the roll to freely unroll down a slope;
- GCLs shall be cut using an approved cutter only. If the GCL is in-place, special care must be taken to protect underlying materials from damage which could be caused by the cutting of the GCLs;
- The Installer shall take necessary precautions to prevent damage to the underlying geosynthetic or granular layers during placement of the GCLs;

- During placement of GCLs, care shall be taken not to entrap stones, excessive dust, or moisture that could damage the GCL, generate clogging of drains or filters, or hamper subsequent seaming;
- During and after installation, the surface of the GCL shall be examined and harmful foreign objects, such as needles, shall be removed;
- Geomembrane installation shall immediately follow the GCL installation. In-place GCL shall be covered with geomembrane before the Contractor leaves the site at the end of the day that the GCL was placed. Geomembrane seams shall be welded after each geomembrane panel is placed;
- Geomembrane shall not be placed on a GCL which has sufficiently hydrated. Degree of hydration shall be determined by visual inspection by the CQA Consultant;
- Geomembrane defects and destructive sample locations shall be immediately repaired; and
- The CQA Consultant shall be present during cutting of the material overlaying the GCL to ensure that no incisions have been made into the GCL.

The CQA Consultant shall note deviations and report them to the Construction Manager.

6.6 SEAMS AND OVERLAPS

GCLs shall be overlapped a minimum of 6 inches on the edges of the panels and 12 to 18 inches between roll ends. Manufacturer's recommendations shall be consulted with respect to the need for loose bentonite on the seam overlaps. Horizontal seams on side slopes steeper than 25 percent (3H:1V) shall be made with a 3-foot overlap. Horizontal seams on side slopes steeper than 25 percent (4H:1V) shall also be offset by a minimum of 10 feet. The Installer shall pay particular attention that no material is inadvertently inserted beneath the GCL.

The CQA Consultant shall note deviations and report them to the Construction Manager.

6.7 REPAIRS

Holes or tears in the GCL shall be repaired by the Installer as follows:

- A patch made from the same GCL shall be placed and anchored over the defect or other method to "tack" it in place and lie no closer than 12 inches from any edge. Should a horizontal tear exceed 10 percent of the width of the roll, that roll shall be removed from the slope and replaced.

Care shall be taken to remove soil or other material which may have penetrated the torn GCL. The CQA Consultant shall observe repairs, note deviations with the above requirements, and report them to the Construction Manager.

6.8 PLACEMENT OF MATERIALS ON GCLS

The Installer shall place materials on the GCL in the following manner:

- In a way that causes no damage to the GCL and underlying geosynthetics;
- Allows minimal slippage of the GCL on underlying layers; and
- Equipment used for placing the overlying material shall not be driven directly on the GCL, unless approved by the CQA Consultant and Construction Manager.

Deviations shall be noted by the CQA Consultant and reported to the Construction Manager.

7.0 GEOTEXTILE

7.1 INTRODUCTION

The manufacture, shipment, and installation of geotextiles shall be in accordance with this section of the CQA/QC Plan. Geotextiles shall be utilized in accordance with the permitted design for the facility. Laboratory and field tests will be referred to by name throughout this section. For the specific test method corresponding to the named tests, see Table A-6(a) through A-6(c). These tables specify the test parameters and frequencies of the Manufacturer quality control testing as well as the conformance testing. The CQA Consultant shall document inventory, testing, and placement of geotextiles.

7.2 MANUFACTURER'S DOCUMENTATION

Prior to delivery, the Geotextile Manufacturer shall provide documentation which demonstrates that the geotextile property values of the material adhere to project specifications. Site delivered rolls of geotextile shall be appropriately labeled.

7.2.1 Certification of Property Values

The Geotextile Manufacturer shall provide the Construction Manager with a list of guaranteed "minimum average roll value" properties (as defined by the Design Engineer) for each specific type of geotextile to be supplied. The Geotextile Manufacturer shall provide the Construction Manager with a written certification, signed by the appropriate Geotextile Manufacturer representative. The certification shall state that the site delivered geotextiles have properties which meet or exceed the guaranteed "minimum average roll values".

The CQA Consultant shall examine the Manufacturer's certifications to document that the property values listed on the certifications meet or exceed the Manufacturer's MARV values. Deviations shall be reported to the Construction Manager.

7.2.2 Labeling

The Geotextile Manufacturer shall identify the rolls of geotextile. Each geotextile roll shall have a weatherproof label containing the following:

- Manufacturer's name;
- Product identification;
- Lot number;
- Roll number;

- Roll weight; and
- Roll dimensions.

In addition, if special handling of the geotextile is required, it shall be marked on the top surface of the geotextile, e.g., "This Side Up". Rolls without proper identification shall be identified by the CQA Consultant for rejection by the Owner.

The CQA Consultant shall examine rolls upon delivery and deviations from the above requirements shall be reported to the Construction Manager.

7.3 SHIPMENT AND STORAGE

During shipment and storage, the geotextile shall be protected from ultraviolet light exposure, precipitation, snow, inundation, mud, dirt, dust, puncture, cutting, or other damaging or deleterious conditions. Geotextile rolls shall be wrapped in plastic sheets or otherwise protected. Wrappings protecting the geotextile rolls should not be removed less than one hour prior to unrolling the geotextile.

Geotextiles shall not be exposed to precipitation prior to being installed. Wet geotextiles are heavy, which makes them difficult to deploy and can also affect liner welding when the geomembrane is adjacent to the geotextile. During cold weather, geotextiles must be protected from freezing.

The CQA Consultant shall observe rolls upon delivery and prior to installation, deviations from the above requirements shall be reported to the Construction Manager. Damaged rolls shall be rejected and replaced at no cost to the Owner.

7.4 CONFORMANCE TESTING OF GEOTEXTILE

Upon or prior to delivery of geotextile rolls, samples shall be forwarded to the Geosynthetics CQA Laboratory for conformance testing. Direct shear testing and interface shear testing shall be completed by the CQA Consultant before construction commences. Refer to Table A-9 (Appendix A) for testing conditions.

7.4.1 Sample Collection

Using the packing list provided by the manufacturer or a sequential inventory list made by the CQA Consultant, rolls shall be selected for sampling at the minimum frequency shown in Table A-6(a) through A-6(c), in Appendix A. If the material is shipped in identifiable lots or manufacturing runs, sample selection should be adjusted so that the minimum frequency is met and that each different lot or manufacturing run is represented by at least one sample. If a roll is not identifiable by roll number,

the CQA Consultant shall inform the Construction Manager immediately. If the roll cannot be tracked, the Construction Manager shall reject the roll.

Samples will be recovered across the entire width of the roll and will not include the first 3 lineal feet (1 m). Unless otherwise specified, sample dimensions will be 3 feet (1 m) long by the roll width. The CQA Consultant will mark the machine direction on the samples with an arrow.

7.4.2 Test Results

The results of the conformance testing shall be evaluated in accordance to the following procedure:

1. If the average test values for the sample comply with all of the values given in the Manufacturer's MARV values, the sample passes.
2. If the average test value for the sample does not meet one or more of the required values, additional evaluation procedures will be implemented by the CQA Consultant. Additional tests required for further evaluation shall be done at no expense to the Owner.
    a. For the failing parameter(s), perform two additional tests on sub-samples taken from the previously failing sample. These tests may be performed by another CQA Geosynthetics Laboratory at the discretion of the CQA Consultant and the Construction Manager.
    b. If additional testing is done on the failed sample, and the average test values for each of the two additional tests meet the required values, the roll and adjacent rolls pass and are acceptable.
    c. If additional testing of the failed sample is not performed or the average test values from the additional testing do not meet requirements, the roll shall be rejected. Samples shall be collected from the closest numerical roll on both sides of the failed roll and shall be tested for the failed parameter(s). If one or both of these adjoining rolls do not meet requirements, the failing roll(s) will be rejected and the CQA Consultant and Construction Manager shall determine further testing protocol and criteria for identifying the limits of rejected rolls.

7.5 HANDLING AND PLACEMENT

The Installer shall handle geotextiles in such a manner as to minimize damage and shall comply with the following:

- After the wrapping has been removed, a geotextile shall not be exposed to sunlight for more than the time specified by the Geotextile Manufacturer;
- On slopes, the geotextiles shall be securely anchored and then rolled down the slope in such a manner as to continually keep the geotextile panel in tension;

- In the presence of wind, geotextiles shall be weighted with sandbags or the equivalent. Sandbags shall be installed during the placement and shall remain until replaced with the appropriate overlying liner material;
- Sandbags shall be filled with fine grained material and must be handled with care to avoid rupture;
- Geotextiles shall be kept continually under tension to minimize the presence of wrinkles forming within the geotextile;
- Geotextiles shall be cut using an approved cutter (hook blade only if within a cell project area). If the geotextile is in-place, special care must be taken to protect underlying materials from damage which could be caused by the cutting of the geotextiles;
- The Installer shall take necessary precautions to prevent damage to the underlying geosynthetic or granular layers during placement of the geotextiles;
- During placement of geotextiles, care shall be taken not to entrap stones, excessive dust, or moisture that could damage the geotextile, generate clogging of drains or filters, or hamper subsequent seaming;
- During and after installation, the surface of the geotextile shall be examined and harmful foreign objects, such as needles, shall be removed; and
- If white geotextile is used, precautions will be taken against "snow blindness" of personnel.

The CQA Consultant shall note deviations and report them to the Construction Manager.

7.6 SEAMS AND OVERLAPS

Geotextiles shall be continuously joined. Geotextiles shall be sewn using thread, which is as chemically and UV resistant as the geotextile itself. Thread shall be approved by the CQA Consultant and Owner.

Geotextiles shall be overlapped a minimum of 6 inches (150 mm) prior to seaming. The Installer shall pay particular attention that no material is inadvertently inserted beneath the geotextile.

The CQA Consultant shall note deviations and report them to the Construction Manager.

7.7 REPAIR

Holes or tears in the geotextile shall be repaired by the Installer as follows:

- On slopes steeper than 20 percent (5H:1V): A patch made from the same geotextile shall be sewn or thermally bonded over the defect and lie no closer than 12 inches from the edge of the defect. Should a horizontal tear exceed 10 percent of the width of the roll, that roll shall be removed from the slope and replaced; and

- On slopes less than or equal to 20 percent (5H:1V): A patch made from the same geotextile shall be sewn or thermally bonded over the defect and have a minimum of 24 inches (600 mm) of overlap in all directions.

Care shall be taken to remove soil or other materials which may have penetrated the torn geotextile. The CQA Consultant shall observe repairs, note deviations with the above requirements, and report them to the Construction Manager.

7.8 PLACEMENT OF MATERIALS ON GEOTEXTILES

The Installer shall place materials on the geotextile in the following manner:

- In a way that causes no damage to the geotextile and underlying geosynthetics;
- Allows minimal slippage of the geotextile on underlying layers; and
- Equipment used for placing the overlying material shall not be driven directly on the geotextile, unless approved by the CQA Consultant and Construction Manager.

Deviations shall be noted by the CQA Consultant and reported to the Construction Manager.

8.0 GEOCOMPOSITE

8.1 INTRODUCTION

The manufacture, shipment and installation of geocomposites shall be in accordance with this section of the CQA/QC Plan. A geocomposite consists of a HDPE geonet core, heat-bonded on both sides to a nonwoven geotextile. Table A-7 has been included in Appendix A to address the geonet component and finished geocomposite to be utilized as a final cover drainage layer. The geotextile component of geocomposites shall be tested separately for all parameters at the prescribed testing frequencies required for geotextiles, as presented in Section 7 of this CQA/QC plan.

The CQA Consultant shall document the inventory, testing, and placement of geocomposites.

8.2 MANUFACTURER'S DOCUMENTATION

Prior to delivery, the manufacturer shall provide documentation which demonstrates that the property values of the material adhere to the design specifications. Delivered rolls of geocomposite shall be appropriately labeled.

8.2.1 Certification of Property Values

The geocomposite Manufacturer (Manufacturer) shall provide the Construction Manager with a list of guaranteed “minimum average roll value" properties (as defined by the Design Engineer) for the type of geocomposite to be supplied. The Manufacturer shall provide the Construction Manager with a written certification, signed by the appropriate Manufacturer representative. The certification shall state that the site delivered geocomposite has properties which meet or exceed the guaranteed "minimum average roll values".

The CQA Consultant shall examine the Manufacturer's certifications to document that the property values listed on the certifications meet or exceed the Manufacturer's MARV values. Deviations shall be reported to the Construction Manager.

8.2.2 Labeling

The Manufacturer shall identify geocomposite rolls. Each roll shall have a weatherproof label which contains the following:

- Manufacturer's name;
- Product identification;
- Lot number;

- Roll number; and
- Roll dimensions.

The CQA Consultant shall examine rolls upon delivery and deviations from the above requirements shall be reported to the Construction Manager.

8.3 SHIPMENT AND STORAGE

Geocomposite cleanliness is essential to performance, therefore, measures must be taken during shipment and storage to protect them from dust and dirt. Geocomposite rolls shall be wrapped in plastic sheets or otherwise protected. Wrappings protecting the rolls should be removed less than one hour prior to unrolling the geocomposite.

The CQA Consultant shall document that the geocomposites are free of dirt and dust prior to being installed. If the roll is dirty or dusty, it shall be washed by the Installer prior to installation. Washing operations shall be observed and approved by the CQA Consultant.

The CQA Consultant shall examine rolls upon delivery and prior to installation. Deviations from the above requirements shall be reported to the Construction Manager. Damaged rolls shall be rejected and replaced at no cost to the Owner. Rolls without proper identification shall be identified by the CQA Consultant for rejection by the Owner.

8.4 CONFORMANCE TESTING OF GEOCOMPOSITE

Upon or prior to delivery of geocomposite rolls, samples shall be forwarded to the Geosynthetics CQA Laboratory for testing. Direct shear testing and interface shear testing shall be completed by the CQA Consultant before construction commences. Refer to Table A-9 (Appendix A) for testing conditions.

Sample Collection

Using the packing list provided by the Manufacturer or a sequential inventory list made by the CQA Consultant, rolls shall be selected for sampling at the minimum frequency specified in Table A-7. If the material is shipped in identifiable lots or manufacturing runs, sample selection should be adjusted so that the minimum frequency is met and that each different lot or manufacturing run is represented by at least one sample.

Samples will be taken across the entire width of the roll and will not include the first 3 lineal feet (1 m) of the roll. Unless otherwise specified, sample dimensions will be 3 feet (1 m) long by the roll width. The CQA Consultant will mark the machine direction on the samples with an arrow.

Test Results

The results of the conformance testing shall be evaluated in accordance with the following procedure:

1. If the average test values for the sample comply with the values given in the Manufacturer's MARV values, the sample passes.
2. If the average test value for the sample does not meet one or more of the required values, additional evaluation procedures will be implemented by the CQA Consultant. Additional tests required for further evaluation shall be done at no expense to the Owner.
    a. For the failing parameter(s), perform two additional tests on sub-samples taken from the previously failing sample. These tests may be performed by another CQA Geosynthetics Laboratory at the discretion of the CQA Consultant and the Construction Manager.
    b. If additional testing is done on the failed sample, and the average test values for each of the two additional tests meet the required values, the roll and adjacent rolls pass and are acceptable.
    c. If additional testing of the failed samples is not performed, or the average test values from the additional testing do not meet requirements, the roll shall be rejected. Samples shall be collected from the closest numerical roll on both sides of the failed roll and shall be tested for the failed parameter(s). If one or both of these adjoining rolls do not meet requirements, the failing roll(s) will be rejected and the CQA Consultant and Construction Manager shall determine further testing protocol and criteria for identifying the limits of rejected rolls.

8.5 HANDLING AND PLACEMENT

The Installer shall handle geocomposites in such a manner as to minimize damage and comply with the following:

- On slopes, the roll shall be secured in the anchor trench and then rolled in a parallel direction down the slope while maintaining a constant tension on the sheet. If necessary, the material shall be positioned by hand after being unrolled to minimize wrinkles. Efforts shall be made to place geocomposites parallel to the slope. However, in some landfill locations and/or some instances (e.g., at the toe of the slope, or if an extra geocomposite layer is required) the layer may be placed in the horizontal direction (i.e., across the slope). Such locations and cases shall be identified by the Design Engineer in the drawings;
- In the presence of wind, geocomposites shall be weighted with sandbags or the equivalent. Such sandbags shall be installed during placement and remain until replaced with overlying material;

- Sandbags shall be filled with fine grained material and must be handled with care to prevent rupture;
- Unless otherwise specified, geocomposites shall not be welded or attached to geomembranes;
- Geocomposites shall only be cut using appropriate equipment after deployment;
- The Installer shall take necessary precautions to prevent damage to underlying geosynthetic or granular layers during installation. Care should be taken not to leave tools on or beneath the geocomposite; and
- During placement, care shall be taken not to entrap dirt or excessive dust that could cause clogging of the drainage system, and/or stones that could damage the adjacent geosynthetics. If dirt, excessive dust, and/or stones are entrapped in or below the geocomposite it shall be washed or swept prior to placement of material over it.

The CQA Consultant shall note deviations and report them to the Construction Manager.

8.6 JOINING

Adjacent geocomposites shall be joined according to the drawings and design specifications. As a minimum, the following requirements shall be met:

- Adjacent rolls shall be overlapped by at least 4 inches (100 mm);
- These overlaps shall be secured by tying;
- Tying shall be achieved with net ties. Tying devices may be white or yellow for easy observation. Metallic devices are not permitted;
- Tying devices shall be placed every 5 feet (1.5 m) down the slope, every 2 feet (0.6 m) across the slope, every 6-inches (150 mm) in the anchor trench, and every 6 feet (2 m) on horizontal surfaces; and
- In the corners of the side slopes of rectangular landfills, where overlaps between perpendicular geocomposite strips are required, an extra layer of geocomposite shall be unrolled from top to bottom of the slope and placed upon the top of the previously installed geocomposites.

The CQA Consultant shall note deviations and report them to the Construction Manager.

8.7 REPAIR

Holes or tears shall be repaired by placing a geocomposite patch extending 2 feet (0.6 m) beyond the edges of the hole or tear. The patch shall be secured to the original geocomposite by tying placed at a frequency of every 6 inches (150 mm). Tying devices shall be as indicated in Subsection 8.6. If the hole or tear width across the roll is more than one-half the width of the roll, the damaged area shall be cut out and the two portions of the geocomposite shall be joined as indicated in Subsection 8.6.

The CQA Consultant shall observe repairs, note deviations with the above requirements, and report them to the Construction Manager.

8.8 PLACEMENT OF MATERIALS ON GEOCOMPOSITE

The placement of materials on geocomposite shall be as soon as possible, such that:

- The geocomposite and underlying geomembrane are not damaged;
- Minimal slippage of the geocomposite on the underlying geomembrane occurs;
- No excess tensile stresses occur in the geocomposite;
- A minimum thickness of 1 foot (30 cm) of soil must be maintained between light, low ground pressure equipment and the geocomposite; and
- Equipment used for placing overlying material shall not be driven directly on the geocomposite unless approved by the CQA Consultant and Construction Manager.

If portions of the geocomposite are exposed, the CQA Consultant shall periodically place marks on the geocomposite and the underlying geomembrane and measure the elongation of the geocomposite during the subsequent construction activities. Before a subsequent layer of material is placed on the geocomposite, the CQA Consultant should observe the geocomposite and underlying liner to determine if dirt, excessive dust, or stones are entrapped in or beneath the liner. If so, the geocomposite and geomembrane must be washed or the geocomposite removed so that the liner can be cleaned. Deviations shall be noted by the CQA Consultant and reported to the Construction Manager.

9.0 LEACHATE MANAGEMENT SYSTEM

9.1 INTRODUCTION

This section of the CQA/QC Plan addresses the CQA activities associated with the Leachate Management System (LMS). These components include:

- Protective Cover Layer (See Section 4.6); and
- Polyethylene Pipes and Fittings.

The above components shall meet requirements related to material characteristics and construction quality. Both field and laboratory tests shall be performed prior to construction to evaluate if the characteristics of soil and aggregate from proposed sources and the quality of pipes meet the material acceptance requirements of the permit and design specifications. Throughout construction, additional field and laboratory testing shall be performed to evaluate if the placed material meets the requirements of the permit and construction documents with regard to material acceptance and construction quality.

9.2 PROTECTIVE COVER LAYER

See Section 4.6 of this CQA/QC Plan for information related to the Protective Cover Layer.

9.3 POLYETHYLENE PIPE AND FITTINGS

9.3.1 Material Requirements

HDPE pipe and its associated fittings and joints shall meet material acceptance and construction quality requirements as stated in this section of the CQA/QC Plan and in the design specifications.

9.3.1.1 Pipe

HDPE pipe shall consist of Standard Dimension Ratio (SDR) pipe, as specified in the design specifications, and must conform to the requirements of ASTM D2837, Class PE3408 for a pressure rating of 160 psi at 73.4 F. HDPE pipe shall comply with the following standards:

- ASTM F714 - pipe S.T.D;
- ASTM D1248 - Type III, Class C, Category 5 - Grade P34; and
- PPI - PE3408.

9.3.1.2 Fittings

HDPE pipe fittings shall be furnished by the Manufacturer of the pipe with which they are used and shall conform to the requirements of ASTM D3261 for standard fittings.

9.3.1.3 Joints

Pipe joints shall be fusion welded, using only Manufacturer-approved methods and equipment. Unless otherwise approved, joints inside manholes shall be joined with mechanical transition couplings.

9.3.2 Fusion Process for Joints

HDPE pipes and fittings shall be joined by the Pipe Installer using the procedures outlined below, unless otherwise specified.

9.3.2.1 Preparation

Delivered pipes and fittings shall be examined by the Pipe Installer. The Installer shall document that pipes and fittings are not broken, cracked, or contain otherwise damaged or unsatisfactory material. Prior to fusing, the Installer shall document that the fusion surface area is clean and free of moisture, dust, dirt, debris, and foreign material.

The CQA Consultant shall notify the Construction Manager of deviations.

9.3.2.2 Weather Conditions for Butt-Fusion

Butt-fusion of HDPE pipe joints is normally performed in uncontrolled atmospheres. Fusion of the HDPE joints shall be performed at temperatures above 20°F, unless otherwise authorized by the Construction Manager.

9.3.3 Pressure Testing of Joints

The joints of non-perforated HDPE pipes shall be tested by the Pipe Installer using the pressure test procedures outlined below. The CQA consultant shall report nonconformance of testing methods or test results to the Project Manager.

9.3.3.1 Segment Testing: Pre-Installation

- Similar sizes of polyethylene piping shall be butt-fused together into testing segments not to exceed 2,000 feet (600 m). Segments shall be fitted with a cap on one end and testing apparatus on the other;
- The segment to be tested should be laid on the ground surface and allowed time to reach constant and/or ambient temperature before initiating the test;
- The test should be performed during a period when the pipe segment will be out of direct sunlight when possible (i.e., early morning, late evening, or cloudy days). This will minimize the pressure changes that will occur during temperature fluctuations;
- The test pressure shall be 10 psi for gravity leachate piping and 40-psi for other piping with working pressure/static head up to 90 psi. For those cases with high pressure systems over 90 psi, the testing pressure shall be established as the working pressure/static head by estimating the minimum test pressure as [Head in feet / 2.3 = Test Pressure in psi];
- Contractor shall submit verification and results of gauge calibration prior to (no later than 60 days) and after completion of project;
- The allowable pressure drop observed during the test shall not exceed one percent of the test pressure over 30 minutes. Pressure drop shall be corrected for temperature changes before determining pass or failure;
- The Owner shall be notified before the testing procedure and shall have the option of being present during the test; and
- Equipment for this testing procedure will be furnished by the contractor. This shall consist of a polyethylene flange adapter with a PVC blind flange equal in size to the blower inlet valve. Tapped and threaded into the blind flange will be a temperature gauge 32°F to 212°F (0° to 100°C), a pressure gauge 0 to 75-psi, a valve to facilitate an air compressor hose, and a ball valve to release pipe pressure at completion of the test. Polyethylene reducers shall be utilized to adapt the flange to the size of pipe being tested.

9.3.3.2 Test Failure

The following steps shall be performed when a pipe segment fails the 1 percent pressure drop per 30-minute test.

- The pipe and welds shall be inspected for cracks, pinholes, or perforations;
- Blocked risers and capped ends shall be inspected for leaks;
- Leaks shall be verified by applying a soapy water solution and observing soap bubble formation;
- Pipe and fused joint leaks shall be repaired by cutting out the leaking area and refusing the pipe; and
- After leaks are repaired, a retest shall be performed in accordance with Section 9.5.3.1.

9.3.3.3 Final Test

- When the total length of the conveyance pipeline exceeds 2,000 feet, a final test shall be made on the completed conveyance pipeline in accordance with Section 9.3.3.1 and 9.3.3.2; and
- The completed system when tested should be in its proper trench location and allowed time to reach constant and/or ambient temperature before initiating the test.

9.3.3.4 Test Reporting

Testing shall be reported in writing to the Owner and shall include the following information:

- Date and time;
- Person performing test;
- Name of CQA Consultant;
- Pipe length, size(s), and location;
- Test pressure at 10-minute intervals; and
- Ambient temperature at 10-minute intervals measured in trench for final test.

The following information shall be reported in writing if a failure occurs:

- Nature of leaks found; and
- Details of repair.

The CQA Consultant shall report deviations of testing methods or test results to the Construction Manager.

9.3.4 Cleaning of Pipes

All pipe installed as part of new cell construction shall be cleaned out to remove trimmings, dirt and other deleterious materials prior to placing waste in the new cell.

9.4 HDPE MANHOLES

Manholes constructed from HDPE materials shall meet material acceptance and construction quality requirements as stated in this section of the CQA/QC Plan and in the design specifications.

9.4.1 Manholes

The acceptability of manholes which routinely hold leachate shall be evaluated using a hydrostatic test evaluation. This test will consist of filling the manhole to the design level with water and taking water level measurements over a 30-minute period. The manhole will be acceptable if the water level does not change more than 1-inch.

10.0 FINAL COVER

10.1 INTRODUCTION

This section of the CQA/QC Plan addresses the activities related to construction of the final cover system. The final cover system shall be installed over areas that have received waste and have reached final grades. The final cover system shall consist of the following components (from bottom to top):

- Intermediate Cover (See Section 4.7);
- Final Cover Textured Flexible Membrane Liner (See Section 5.3);
- Geocomposite Drainage Layer (See Section 7 and 8); and
- Final Cover Soil Layer (See Section 4.7).

Each of these components will be discussed in this section of the CQA Plan.

During construction of the final cover system, care will be taken to ensure that existing landfill structures such as gas wells, gas trenches, and bench drains are not damaged or their performance compromised by moving equipment, laborers, or the placement of final cover components. Prefabricated boots or fittings shall be placed around gas wells or other landfill structures that penetrate the landfill final cover to ensure a complete seal. Throughout construction near final cover structures, CQA/QC inspectors, laborers, and equipment operators shall look for possible damage or unusual conditions to structures.

10.2 FINAL COVER GEOSYNTHETICS

Geosynthetics within the final cover system consist of a textured flexible membrane liner (FML) and a geocomposite drainage layer. The geocomposite drainage layer will be placed upon the FML and collect and drain infiltration from the final cover to designated surface water collection points.

This CQA Plan addresses the field and laboratory tests needed to be performed, prior to and during construction, to evaluate the suitability of the proposed geosynthetics to be used within the final cover system. The sections presented below reference the specific sections that outline the CQA requirements for each geosynthetic within the final cover system.

10.2.1 Final Cover Geocomposite Drainage Layer

Section 8.0, Geocomposite, within this CQA Plan specifies the material characteristics, construction quality, acceptance requirements, and testing frequency necessary for proposed geocomposite to be installed with the final cover system.

10.2.2 Final Cover FML

Section 5.0, Geomembrane, within this CQA Plan specifies the material characteristics, construction quality, acceptance requirements, and testing frequency necessary for the proposed FML to be installed with the final cover system.

11.0 SURVEYING

11.1 INTRODUCTION

Surveying of lines and grades shall be conducted during construction of soil and geosynthetic components. Surveying shall be performed to provide documentation for record drawings, document quantities of soils and geosynthetics, and to assist the Earthwork Contractor in complying with the required grades. Surveying conducted at the site shall be part of the construction quality assurance program.

11.2 SURVEY CONTROL

Benchmarks have previously been established for the sites. The vertical and horizontal controls for each site benchmark have been established within normal land surveying standards.

11.3 SURVEYING PERSONNEL

Surveying will be performed under the direct supervision of a qualified Land Surveyor or Professional Engineer licensed in the State of Tennessee. The survey crew will consist of the Senior Surveyor and as many Surveying Assistants as are required to satisfactorily undertake the work. Surveying personnel will be experienced in the provision of these services, in addition to preparing detailed and accurate documentation.

11.4 PRECISION AND ACCURACY

The survey instruments used for this work shall be precise and accurate to meet the needs of the project. Survey instruments shall be capable of reading to a precision of 0.01 foot (3.1 mm) with a setting accuracy of 10 seconds. Calibration certificates for survey instruments shall be submitted to the CQA Consultant prior to initiation of surveying activities.

11.5 LINES AND GRADES

When required, the following surfaces shall be surveyed to determine the lines and grades achieved during construction:

- Original ground surface;
- Surface of excavation/structural fill;
- Surface of the barrier soil layer (for disposal area construction, including edges, bottom, and limits of anchor trenches and sumps);
- Surface of the protective cover layer (including edges, bottom, and limits of pipes and sump);

- Surface of the intermediate soil cover and bench locations following placement of final cover soil layer, see Section 4.7;
- Surface and limits of geosynthetics;
- Anchor trench;
- Alignment and inverts of piping and tanks (both inside and outside the landfill); and
- Profiles, cross sections, ditch inverts, roads, and sedimentation basins.

11.6 FREQUENCY AND SPACING

Surveying shall be performed as soon as possible after completion of a given component installation to facilitate progress and avoid delaying the installation of subsequent components. When survey is utilized to confirm grades and thickness of various liner components, sufficient density of survey points shall be provided to determine that the constructed configuration is consistent with the permitted design. This density shall consist of spot elevations on a frequency of a 100-ft grid in base areas with additional shots at grade breaks, the limit of the area, trenches and other breaks in grade or configuration of the cell.

11.7 TOLERANCES

Acceptable tolerances on survey coordinates, within the waste containment areas, shall be ±0.20 feet (60 mm) on elevations and ±0.20 feet (60 mm) on coordinates, provided minimum permit conditions and state regulations are adhered to (i.e., thickness, grades, etc.). Surveying tolerances may need to be more stringent in the sump area to ensure accurate construction of this component.

11.8 DOCUMENTATION

Original field survey notes shall be retained by the Surveyor. A copy of these notes will be given to the CQA Consultant prior to the covering of the surveyed component. The results from the field surveys will be used as the basis for preparation of record drawings. At a minimum, these drawings shall show the final elevations of the surfaces listed in this section of the CQA/QC Plan at a scale of 1-inch (25 mm) equals 100 feet (30 m) with contour intervals no greater than 2 feet (0.6 m).

11.9 CERTIFICATION

Survey results will be certified by a land surveyor or professional engineer registered in Tennessee and submitted to the CQA Consultant for review.

12.0 DOCUMENTATION

12.1 INTRODUCTION

An effective CQA/QC Plan depends largely on recognition of construction activities that should be monitored and also upon assigning responsibilities for the monitoring of each construction activity. This is most effectively accomplished by the documenting of quality assurance activities. The CQA Consultant shall document that quality assurance requirements have been addressed and satisfied.

The CQA Consultant shall provide the Construction Manager with signed descriptive remarks, data sheets, and logs to document that monitoring activities have been accomplished. The CQA Consultant shall also maintain at the job site a complete file of design drawings, design specifications, the CQA/QC Plan, checklists, test procedures, daily logs, and other pertinent documents.

Appendix C contains some example field forms. Additional forms may be necessary for documentation of a specific project. The CQA Consultant may use different forms, but the level of information shall be equal or greater than the forms presented in Appendix C. Additional geosynthetic and soil testing forms will be required to be prepared by the CQA Consultant.

12.2 DAILY RECORDKEEPING

Standard reporting procedures shall include preparation of a daily report which, at a minimum, shall consist of a daily summary report including memoranda of meetings and/or discussions with the Owner and/or site contractors, observation logs, and test data sheets. Other forms of daily record keeping being used, as needed, include construction problem and solution data sheets and photographic reporting data sheets. This information shall be regularly submitted to and reviewed by the Construction Manager.

12.2.1 Daily Summary Report

The CQA Consultant shall prepare a daily summary report which shall include the following information:

- An identifying sheet number for cross referencing and document control;
- Date, project name, location, and other identification;
- Data on weather conditions;
- Information on meetings held or discussions which took place:
  - Names of parties to discussion;
  - Relevant subject matter or issues;
  - Decisions reached; and

- Activities planned and their schedule.
- A reduced-scale site drawing showing proposed work areas and test locations;
- Descriptions and locations of ongoing construction;
- Descriptions and specific locations of areas, or units, of work being tested and/or observed and documented;
- Locations where tests and samples were taken or reference to specific observation logs and/or test data sheets where such information can be found;
- A summary of field/laboratory test results or reference to specific observation logs and/or test data sheets;
- Calibrations or recalibrations of test equipment and actions taken as a result of recalibration, or reference to specific observation logs and/or test data sheets;
- Off-site materials received, including quality verification documentation;
- Decisions made regarding acceptance of units of work, and/or corrective actions to be taken in instances of substandard quality; and
- The CQA Consultant's signature.

12.2.2 Observation Logs and Test Data Sheets

The CQA Consultant's monitoring staff shall record observations of construction and CQA-related activities on project-specific logs and data sheets. At a minimum, the logs and data sheets shall include the following information:

- An identifying sheet numbered for cross referencing and document control;
- Date, project name, location and other identification;
- Description or title of activity monitored;
- Location of activity and locations of samples collected;
- Locations of field tests performed and their results;
- Results of laboratory tests received;
- Results of monitoring activity in comparison to specifications; and
- The CQA Monitor's signature.

12.2.3 Construction Problem and Solution Report

Reports describing special construction situations, as required by the Owner, shall be prepared by the CQA Consultant and cross-referenced to specific observation logs and test data sheets.

These reports shall include the following information:

- An identifying sheet number for cross-referencing and document control;

- A detailed description of the situation or deficiency;
- The location and probable cause of the situation or deficiency;
- How and when the situation or deficiency was found or located;
- Documentation of the corrective action taken to address the situation or deficiency;
- Final results of responses;
- Measures taken to prevent a similar situation from occurring in the future; and
- The signature of the Lead CQA Monitor, EM or AEM, and the Construction Manager indicating concurrence.

The Construction Manager shall be made aware of significant recurring non-conformances with the design specifications. The Construction Manager shall then determine the cause of the non-conformance and recommend appropriate changes in procedures or specifications to the EM or AEM. These changes will be submitted to the Design Engineer for Approval. When this type of evaluation is made, the results shall be documented and revisions to procedures, design specifications, or permit specifications will be approved by the EM or AEM, Design Engineer, and if necessary, TDEC DSWM.

12.2.4 Photographic Reporting

Photographic reporting, where used, shall be cross-referenced with observation logs and test data sheets and/or construction problem and solution reports.

These photographs will serve as a pictorial record of work progress, problems, and mitigation activities. The basic file shall contain color prints; negatives shall be stored in chronological order. In lieu of photographic documentation, videotaping may be used to record work progress, problems, and mitigation activities.

12.2.5 Design and/or Specification Changes

Design and/or permit specifications changes may be required during construction. In such cases, the CQA Consultant shall notify the EM or AEM and Construction Manager. The EM or AEM shall seek the approval of TDEC DSWM prior to the implementation of substantive changes.

Design and/or permit specification changes shall be made only with the written agreement of the EM or AEM and the Design Engineer and shall take the form of an addendum to the specifications.

12.3 REPORTS

The CQA Consultant shall prepare periodic reports that summarize construction activities and the results of observations and tests. Progress reports shall be prepared at regular time intervals to

document the status of the work. Certifications shall be prepared at the completion of major construction activities.

At the completion of the work, final documentation shall be prepared and shall include a professional engineer's seal (registered in Tennessee) and supporting field and laboratory test results.

12.3.1 Progress Reports

The CQA Consultant shall prepare a progress report at regular time intervals established at the Pre-Construction Meeting and submit it to the Construction Manager and EM or AEM. At a minimum, this report shall include the following information:

- A unique identifying sheet number for cross-referencing and document control;
- The date, project name, location, and other information;
- A summary of work activities performed during the reporting period;
- A summary of construction situations, deficiencies, and/or defects occurring during the reporting period;
- A summary of test results, failures, and retests; and
- The signature of the CQA Consultant's representative.

The Construction Manager shall distribute copies of the Progress Reports as decided at the Pre-Construction Meeting.

12.3.2 Certification of Major Construction Activities

The CQA Consultant shall prepare a certification for the following items:

- Structural Fill;
- Geologic Buffer Material;
- Barrier Soil Layer;
- Geosynthetic Liner;
- Protective Cover;
- Leachate Collection System;
- Leachate Management System;
- Erosion and Sedimentation Control Structures;
- Intermediate Cover Soil;
- Final Cover Geomembrane;
- Final Cover Drainage Layer;
- Final Cover Soil;

- Gas Monitoring System;
- Gas Extraction System; and
- Groundwater Monitoring System.

At the time of the Pre-Construction meeting, the landfill construction certification issue will be resolved as to either present certification documentation of each constructed landfill component separately or present the entire completed landfill construction documentation package at the end of construction to satisfy the permitting agency. The certification shall describe activities associated with the construction of the item including construction procedures, observations, and tests performed by CQA personnel. Each certification shall be signed and sealed by a professional engineer registered in Tennessee and submitted to the EM.

12.3.3 Certification Documentation

At the completion of the work, the CQA Consultant shall submit to the EM or AEM the signed Final Certification Documentation. At a minimum, the Final Report shall include:

- Summaries of construction activities;
- Tables demonstrating that the Manufacturer's MARV values for each geosynthetic material meet or exceed the design requirements for the site;
- Observation logs and test data sheets including sample location drawings, supporting field test results, and laboratory test results;
- Construction problem and solution reports;
- Changes from design and material specifications;
- Record drawings; and
- Completed, signed, and sealed TDEC Certification Statement.

The record drawings shall include scaled drawings depicting the location of the construction and details pertaining to the extent of construction (e.g., depths, drawing dimensions, elevations, soil component thicknesses, etc.). Surveying and base maps required for development of the record drawings shall be prepared by a qualified land surveyor.

12.4 STORAGE OF RECORDS

Handwritten data sheet originals, especially those containing signatures, shall be stored by the CQA Consultant in a safe repository on-site. Other reports may be stored by standard methods which will allow for easy access.

APPENDIX A

CQA/QC PLAN TESTING SUMMARIES

- Proper repair of penetrations resulting from the use of density and moisture probes using bentonite or a soil-bentonite mixture;
- Sealing the working surface at the close of each day's work or when work is stopped for a period of time by compacting the surface and sloping it to allow run-off of precipitation;
- All loose or dry materials have been removed from the final surface prior to FML deployment;
- All protrusions or stones capable of damaging the overlying FML by protruding ¾ inch or more above the prepared surface are removed;
- Depressions and holes up to ¾ inch deep shall be filled with clean soil meeting barrier soil criteria;
- The final surface is prepared such that the deployment of the final cover geomembrane would not dislodge large particles that would remain beneath the geomembrane;
- Timely placement of protective covers or the overlying FML to prevent desiccation of barrier soil layer material between the installation of lifts or after completion of the barrier soil layer;
- Prevention of accidental damage or weather related degradation to installed portions of the

June 9, 2025

Mr. Adam Waller
Chairman
Loudon County Solid Waste Disposal Committee
100 River Road #106
Loudon, TN 37774

RE: Module A Leachate Pipe Repair
Matlock Bend Landfill SNL530000203
Loudon County, Tennessee

Dear Mr. Waller:

"Module A, B, E, and H Pipe Penetration Scoping Summary" memorandum dated March 22, 2024, provided by Republic Services (Republic), evaluated the ability for existing leachate piping to withstand the additional overburden produced by the proposed expansion. CCI's initial review of the information identified an area of concern (AOC), a piping collapse in Module A. Proposed expansion methods did not address repairs specifically to the collapsed area. CCI's overall concern is the ability to adequately remove leachate from the existing Module A. CCI's initial recommendation was to excavate the AOC, uncover the collapse, and make a permanent repair. Republic initially objected to slip lining methods previously approval by TDEC during the 2024 expansion. After extended discussion, the commission requested Republic to provide engineering solutions to better ensure the ability for leachate to be removed from module A without obstruction.

Republic provided proposed solution "Matlock Bend – Module A Gravity Line", May 30, 2025, attached, describing the plan to repair the collapse in the piping at the assumed low point of Module A. Based on record drawings, the collapse is within the waste column, or low point, of Module A. Republic will insert a 3-inch perforated, stainless-steel pipe into the waste column to provide a conduit for leachate to leave Module A.

CCI has reviewed this plan and withdraws objections based on the currently provided approach. In addition to the construction approach, CCI has requested to be notified when work is planned to be conducted and that post construction CCTV be conducted and provided to the commission for review, ensuring piping is properly installed and extends into the waste cell.

CCI appreciates the opportunity to work for the commission on this matter. If you have any further concerns or questions, please feel free to reach out.

Sincerely,

Chris Cline, P.E.
Project Manager

Attachment: Matlock Bend – Module A Gravity Line, May 30, 2025 (Email)

Chris Cline

From: Pickrell, Stoddard <SPickrell@republicservices.com>
Sent: Friday, May 30, 2025 5:03 PM
To: Chris Cline
Cc: Waller, Adam; elizmurphy966@msn.com; Turtle, Lindsey; Hollinshead, David; Trompeter, Wells (NSH - X68759)
Subject: Matlock Bend - Module A Gravity Line
Attachments: Sheet 9 Mod E Leachate Pipe Details (002).pdf

Good afternoon Chris,

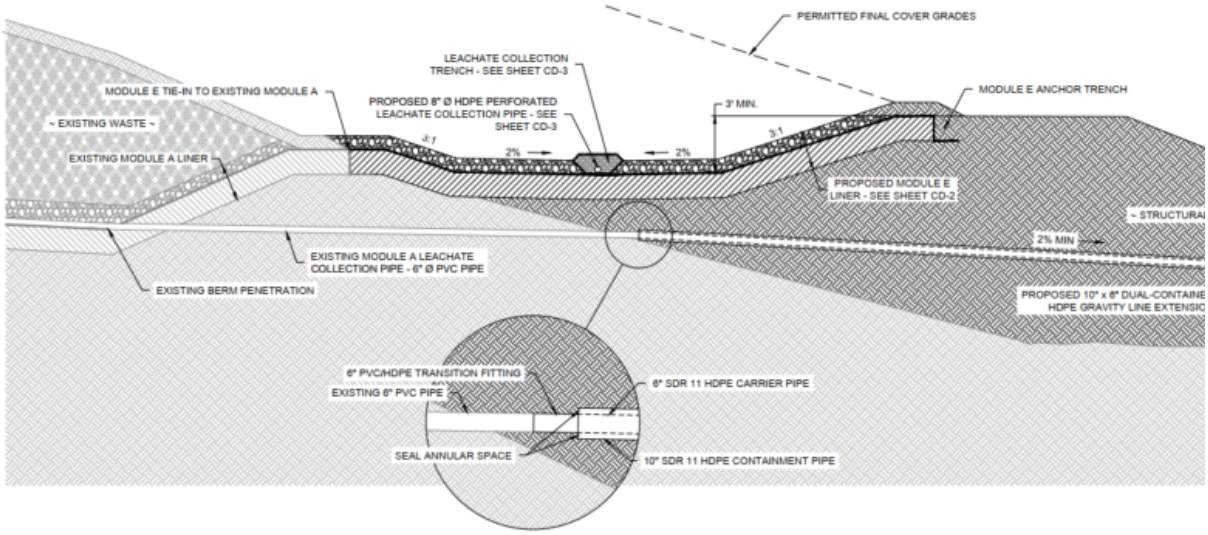
Hope you are doing well. It appears we may have some agreement on the slip-line approach for the Module A low-point and the associated gravity line. The permit references a conceptual approach; however, there will need to be field adjustments to accommodate the install.
Based on as-builts, it is assumed the apparent 'fernco' feature is within the waste column, upgradient of the liner (see attached). For this approach to be successful, we will drive a perforated section of stainless-steel pipe into the waste column. The perforated section of pipe will be beyond the base liner ensuring there will not be more than 12-inches of leachate on liner at any given time. With perforations being at the base liner, the plan is to have zero head on liner. We will also be conducting quarterly jet&vac work to ensure the system is not clogged. See attached and snippets of this approach. Let me know if you have any questions or comments. Thanks,

MODULE E DISCHARGE PIPING

Not To Scale

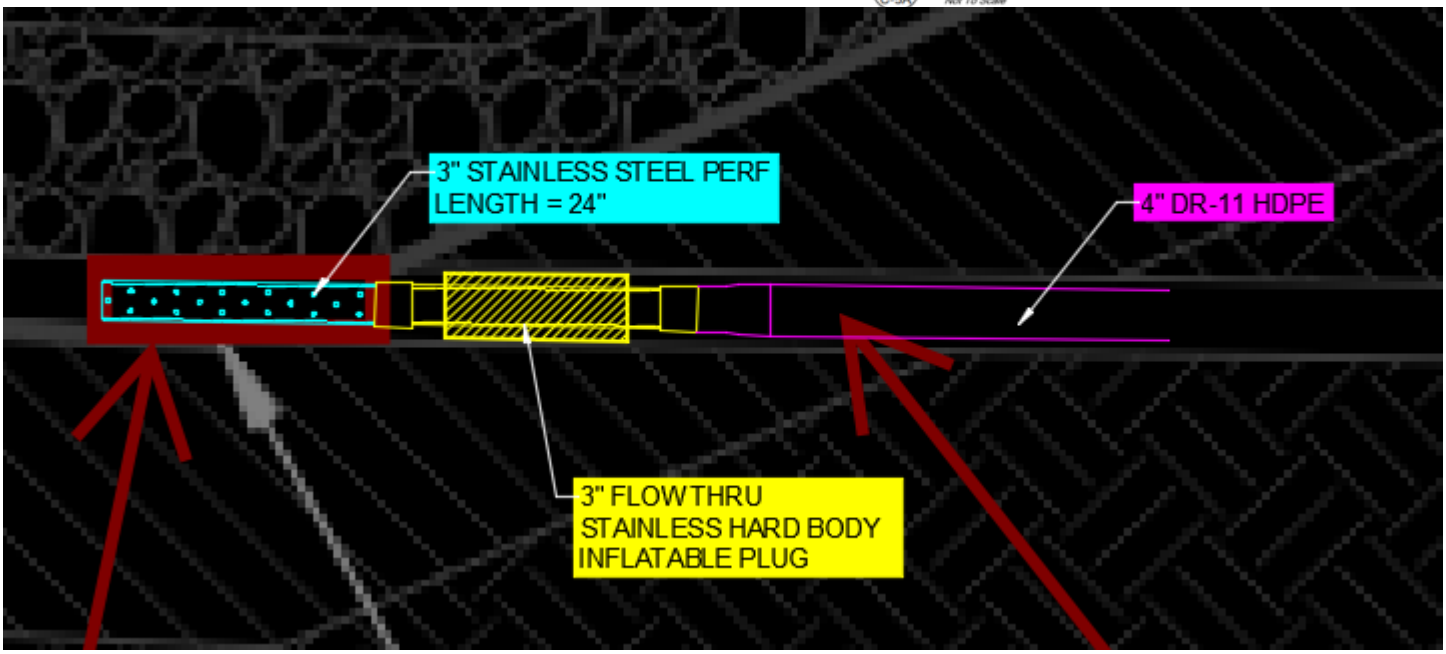
B C-5A CROSS SECTION - PRO

Not To Scale



C C-5A CROSS SECTION - EXISTING MODULE A LCP

Not To Scale



Stoddard Pickrell
Environmental Manager

Western NC / Eastern TN

1070 Riverside Drive
Asheville, NC 28804
e SPickrell@republicservices.com
o (828) 253-3929
c (828) 708-1271
w RepublicServices.com

Outlook

FW: SNL530000203 - Matlock Bend Leachate Tank

From Pickrell, Stoddard <SPickrell@republicservices.com>

Date Mon 6/16/2025 1:13 PM

To Lew Haynes <lew.haynes@tn.gov>

Cc Waller, Adam <wallera@loudoncounty-tn.gov>; Revendra Awasthi <revendra.awasthi@tn.gov>; Fox, Teresa <TFox@republicservices.com>; Turtle, Lindsey <LTurtle@republicservices.com>; McWhorter, William <WMcwhorter@republicservices.com>; Trompeter, Wells (NSH - X68759) <wells.trompeter@hklaw.com>; Elizabeth murphy <elizmurphy966@msn.com>

3 attachments (4 MB)

Matlock Bend Landfill - LCS Storage Tank 04-05.2025.pdf; May 2025 - Leachate Tank Soil Sample.pdf; 2H2024 Leachate Analysis.pdf;

Good afternoon Lew,

Following up on the leachate tank matter at Matlock Bend. The below description was sent on May 9th that detailed the event and the immediate response to the matter. There have been no issues related to this matter since the event.
The tank was cleaned and subsequently inspected by Southeastern Tank. There were no observed damages to the inside of the tank. The anchor bolts along the southern perimeter of the tank were sheared. Southeastern Tank is still finalizing their inspection report that will detail extent of damages and the associated repairs. There are two 20-gallon frac tanks onsite for storage as needed; however, the site has been discharging all leachate to the Loudon WWTP.
Attached is the soil sample from the area around the leachate tank. Additional analysis for leachability was also performed to determine if there was any correlation to Matlock Bend's leachate. It appears that the matter has been addressed. The 2H2024 leachate analysis is also attached for your review. Let me know if you have any comments, questions, or if additional information is required.

Thanks,

Stoddard Pickrell
Environmental Manager

Western NC / Eastern TN

1070 Riverside Drive
Asheville, NC 28804
e SPickrell@republicservices.com
o (828) 253-3929
c (828) 708-1271
w RepublicServices.com

AIRL, INC.

1550 37TH STREET, NE
CLEVELAND, TENNESSEE 37312
(423) 476 - 7766 Fax: (423) 476-7714
ISO/IEC 17025:2005, PJLA - 76332
Testing Accreditation

State of Tennessee (ID #02034)

Alabama Dept. of Environmental Management (ID #40780)

Scope of Accreditation:
Wastewater, Surface Water, Ground Water, Drinking Water, Solids, Hazardous Waste, Soils, Sediments, and Sludges.

Lab Report 370196

9773
Republic Services/Loudon
Attention: Holly Van Kirk
21712 Highway 72 North
Loudon, TN 37774

Date Received 5 /7 /2025
Date Sampled 5/6/2025
Date Requested 5 /19/2025
Rush Status Normal
Phone (865) 458-2651
Extension
☐ ***Fax***
☑ ***eMail:*** jhaworth
PO#

Sample Information

Leachecte Tank Soil

Lab Report: 370196	*Result*		*LCL*	*Method*	*SDL*	*Date*	*Time*	*Analyst*
RCRA Metals								
Arsenic (As)	52.0	mg/Kg	0.25	EPA 6010	0.25	5/7/2025	17:36	JAV
Barium (Ba)	16.4	mg/Kg	0.25	EPA 6010	0.25	5/7/2025	17:36	JAV
Cadmium (Cd)	1.65	mg/Kg	0.25	EPA 6010	0.25	5/7/2025	17:36	JAV
Chromium (Cr)	13.7	mg/Kg	0.25	EPA 6010	0.25	5/7/2025	17:36	JAV
Lead (Pb)	21.7	mg/Kg	0.25	EPA 6010	0.25	5/7/2025	17:36	JAV
Selenium (Se)	11.5	mg/Kg	0.25	EPA 6010	0.25	5/7/2025	17:36	JAV
Silver (Ag)	0.66	mg/Kg	0.25	EPA 6010	0.25	5/7/2025	17:36	JAV
RCRA Mercury (Hg)								
Mercury (Hg)	< 0.1	mg/Kg	0.1	EPA 7471 B	0.1	5/9/2025	7:00	JC
Volatiles 8260								
1,1,1,2-Tetrachloroethane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,1,1-Trichloroethane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,1,2,2-Tetrachloroethane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,1,2-Trichloroethane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,1-Dichloroethane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,1-Dichloroethene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,1-Dichloropropene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,2,3-Trichlorobenzene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,2,3-Trichloropropane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,2,4-Trichlorobenzene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,2,4-Trimethylbenzene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,2-Dibromo-3-Chloropropane (DBCP)	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,2-Dibromoethane (EDB)	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,2-Dichlorobenzene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,2-Dichloroethane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,2-Dichloroethene (Total)	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,2-Dichloropropane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,3,5-Trimethylbenzene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,3-Dichlorobenzene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,3-Dichloropropane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
1,4-Dichlorobenzene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
2,2-Dichloropropane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
2-Butanone	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
2-Chlorotoluene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
2-Hexanone	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
4-Chlorotoluene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP

	Result		LCL	Method	SDL	Date	Time	Analyst
Volatiles 8260								
4-Methyl-2-pentanone (MIBK)	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Acetone	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Benzene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Bromobenzene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Bromochloromethane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Bromodichloromethane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Bromoform	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Bromomethane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Carbon Disulfide	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Carbon Tetrachloride	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Chlorobenzene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Chloroethane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Chloroform	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Chloromethane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
cis-1,3-Dichloropropene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Dibromochloromethane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Dibromomethane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Dichlorodifluoromethane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Ethyl benzene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Hexachlorobutadiene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Isopropyl benzene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Methylene Chloride	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Naphthalene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
n-Butylbenzene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
n-Propylbenzene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
p-Isopropyltoluene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
sec-Butylbenzene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Styrene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
tert-Butylbenzene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Tetrachloroethene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Toluene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Total Xylenes	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
trans-1,3-Dichloropropene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Trichloroethene	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Trichlorofluoromethane	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Vinyl Acetate	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP
Vinyl Chloride	< 25	ug/Kg	25	EPA 8260C	25	5/8/2025	16:45	BJP

Lowest Calibration Level [LCL] - reporting limit; Sample Detection Level [SDL] - Sample Specific

QA/QC Procedures required by the Method(s) were followed unless otherwise noted. Performance and acceptance standards for required QA/QC procedures were achieved unless otherwise noted. No significant modifications have been made to the Method(s). I attest that, based upon my inquiry of those individuals immediately responsible for reviewing the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Report approved by:

TECHNICAL DIRECTOR

AIRE INC
1550 37th Street, NE • Cleveland, TN 37312
Phone: 423.476.7766 • Fax: 423.476.7719

Send The Report To
Republic Services
Stoddard Pickrell
21712 Hwy 72 N
Loudon TN 37774
828-708-1271
SPickrell@republicservices.com

Send Invoice To

Chain of Custody Record

Lab Number[s] 370196

Page ____ of ____

Project Site | Project N° | PO N°

Site Name | Report Due Date

Collected By Teresa Fox | Verbal / Fax / Hard Copy / Email / Other

Field Sample ID	Rush Factor	Sample Matrix	Sample Date	Sample Time	N° Containers	Analysis: RCRA metals	Analysis: VOC's	Remarks	R Cl	Presv.	pH
leachecute tank soil			5/6/25	1:30pm	1	X	X				

Remarks

Relinquished By Teresa Fox Date 5/7/25 Time 8:30AM

Received By	Date	Time	Relinquished By	Date	Time	Received By	Date	Time	Relinquished By	Date	Time

☐ Disposal By Laboratory ☐ Return to Originator Archive ____ ☐ Months

LAB USE ONLY

Received for lab by	Date	Time	Opened By	Date	Time	Temp °	Seal N°	Condition
	5/7/25	8:30am						

Remarks

OFFICE 020 REV 1 12/14

OK

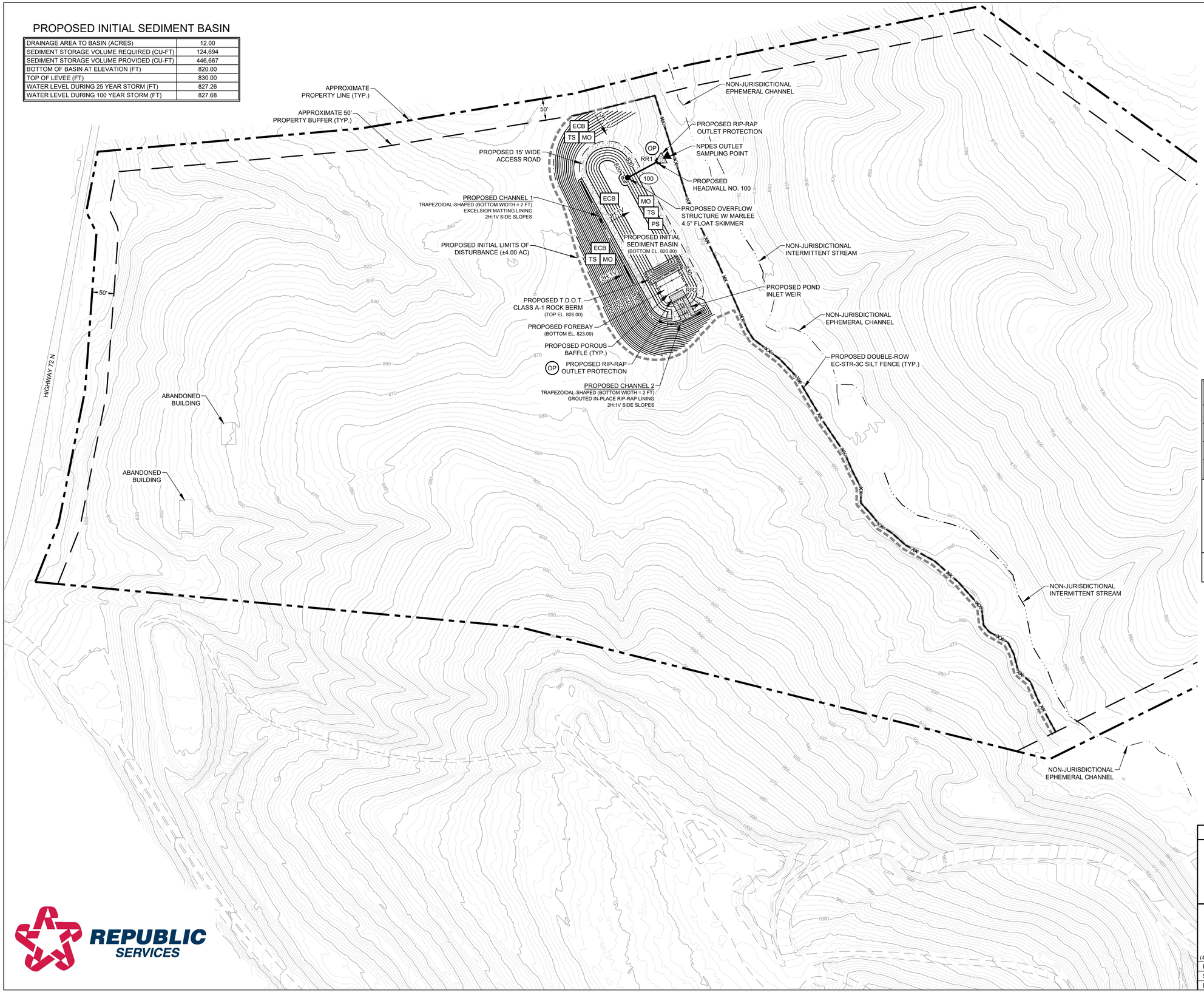
Impacted area following removal of liquids.

Impacted area following removal of soil.

Impacted area following removal of soil.

PROPOSED INITIAL SEDIMENT BASIN

DRAINAGE AREA TO BASIN (ACRES)	12.00
SEDIMENT STORAGE VOLUME REQUIRED (CU-FT)	124,694
SEDIMENT STORAGE VOLUME PROVIDED (CU-FT)	446,667
BOTTOM OF BASIN AT ELEVATION (FT)	820.00
TOP OF LEVEE (FT)	830.00
WATER LEVEL DURING 25 YEAR STORM (FT)	827.26
WATER LEVEL DURING 100 YEAR STORM (FT)	827.68



GENERAL NOTES:

1. SEE GENERAL NOTES ON SHEET 1.

EROSION CONTROL PLAN NOTES:

1. THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION AND MAINTENANCE OF EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO, OR CONCURRENT WITH, LAND DISTURBING ACTIVITIES.
2. EROSION CONTROL MEASURES SHALL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLANS DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE.
3. THE EROSION CONTROL MEASURES SHOWN ON THIS SHEET ARE CONSIDERED THE MINIMUM MEASURES THAT WILL BE USED. SHOULD ADDITIONAL EROSION CONTROL MEASURES BE REQUIRED BY THE ENGINEER OR LOCAL REGULATORY AGENCY, THEY WILL BE INSTALLED IN ACCORDANCE WITH THE TENNESSEE EROSION & SEDIMENT CONTROL HANDBOOK, LATEST EDITION.
4. ANY DISTURBED AREA LEFT EXPOSED FOR A PERIOD GREATER THAN 14 DAYS SHALL BE STABILIZED WITH MULCH OR TEMPORARY SEEDING.
5. STRIPPING OF VEGETATION, CLEARING, GRADING, AND OTHER LAND DISTURBING ACTIVITIES SHALL BE CONDUCTED TO MINIMIZE EROSION.
6. NO NON-STORMWATER DISCHARGES WILL BE ALLOWED DURING THIS PROJECT.
7. SOIL IS NOT TO BE STOCKPILED WITHIN 25 FEET OF THE EDGE OF ANY TRENCH EXCAVATION.
8. EXCELSIOR MATTING SLOPE STABILIZATION SHALL BE INSTALLED ON ALL SIDE SLOPES GREATER THAN 3(H):1(V).
9. BORROW AREA ACTIVITIES OUTSIDE THE INITIAL LIMITS OF DISTURBANCE MAY TAKE PLACE AFTER ALL INITIAL EROSION CONTROL MEASURES ARE INSTALLED. SUCH BORROW AREA ACTIVITIES SHALL NOT EXCEED THE EXCAVATION GRADES AND LIMITS OF THE OVERALL SITE GRADING PLAN SHOWN ON SHEET 3.
10. THE TOTAL DISTURBED AND UNDISTURBED DRAINAGE AREA TO THE INITIAL SEDIMENT BASIN SHALL NOT EXCEED 12 ACRES. STORMWATER RUN-OFF FROM ALL DISTURBED BORROW AREAS SHALL BE ROUTED TO THE INITIAL SEDIMENT BASIN UTILIZING NATURAL DRAINAGE PATHS AND/OR DIVERSION BERMS. LOCATION AND CHANNEL PROTECTION OF DIVERSION BERMS SHALL BE DETERMINED AT THE TIME OF BORROW EXCAVATION.

EROSION CONTROL LEGEND

MO	DIST. AREA W/ MULCH	PS	DIST. AREA W/ PERMANENT COVER
TS	DIST. AREA W/ TEMPORARY COVER	CRS	CONSTRUCTION ROAD STABILIZATION
ECB	SLOPE STABILIZATION		
xx	DOUBLE ROW EC-STR-3C SILT FENCE		

RIP-RAP OUTLET PROTECTION

	RIP-RAP SIZE	LENGTH(L)	W1	W2
RR1	CLASS A-1	9'	5'	11'
RR2	CLASS A-1	15'	35'	35'

NOTES: ALL OUTLET PROTECTION RIP-RAP SHALL BE GROUTED.

PROPOSED CHANNEL LININGS	CHANNEL NO.	LENGTH	SLOPE	CHANNEL LINING
	1	971'	1.00%	EXCELSIOR MATTING
	2	971'	1.00%	GROUTED RIP-RAP

PROPOSED DRAINAGE STRUCTURES

PIPE NO.	SIZE	LENGTH	SLOPE	MATERIAL	INLET INVERT	OUTLET INVERT
100	30"	78'	6.41%	RCP	823.00	818.00

HEADWALL NO.	INVERT
100	818.00

PRELIMINARY DRAFT
FOR REVIEW AND DISCUSSION

100 50 0 100 200
GRAPHIC SCALE IN FEET

INITIAL EROSION CONTROL PLAN

EROSION, SEDIMENTATION, AND POLLUTION CONTROL PLAN

MATLOCK BEND BORROW AREA
FOR
REPUBLIC SERVICES, INC.
LOUDON COUNTY, TENNESSEE

REPUBLIC SERVICES

HNTB ENVIRONMENTAL CONSULTANTS
HODGES, HARBIN, NEWBERRY & TRIBBLE, INC.
3920 ARKWRIGHT RD.
SUITE 101
MACON, GEORGIA 31210
(478) 743-7175

PROJ. NO.	6703-1217-01	MB_BORROW AREA PLAN_BASE.DWG	EDIT 05-02-2025
SCALE	1" = 100'	SHEET	2 OF 8
DATE	JUNE 2025		

APPROXIMATE PROPERTY LINE (TYP.)

APPROXIMATE 50' PROPERTY BUFFER (TYP.)

50'

NON-JURISDICTIONAL EPHEMERAL CHANNEL

PROPOSED FINAL SEDIMENT BASIN (BOTTOM EL. 820.00)

NON-JURISDICTIONAL INTERMITTENT STREAM

PROPOSED 15' WIDE ACCESS ROAD

NON-JURISDICTIONAL EPHEMERAL CHANNEL

HIGHWAY 72 N

ABANDONED BUILDING

ABANDONED BUILDING

PROPOSED DOWNCHUTE FLUME (SEE NOTE 4)

PROPOSED 15' WIDE X 2' DEEP DRAINAGE BENCH (TYP.)

NON-JURISDICTIONAL INTERMITTENT STREAM

PROPOSED RUN-ON DIVERSION BERM

NON-JURISDICTIONAL EPHEMERAL CHANNEL

GENERAL NOTES:

1. SEE GENERAL NOTES ON SHEET 1.

SITE GRADING PLAN NOTES:

1. THE PROPOSED CONTOURS REPRESENT THE FINAL BORROW AREA EXCAVATION GRADES. GRADING ACTIVITIES OUTSIDE OR BELOW THE FINAL EXCAVATION GRADES IS NOT PERMITTED.
2. EXCAVATION GRADES WITHIN THE BORROW AREA SHALL NOT EXCEED 2(H):1(V) AND SHALL MAINTAIN A MINIMUM SLOPE OF 2%.
3. CONSTRUCTION OF THE FINAL SEDIMENT BASIN SHALL BE COMPLETED BEFORE THE TOTAL DISTURBED AND UNDISTURBED DRAINAGE AREA TO THE FINAL SEDIMENT BASIN EXCEEDS 12 ACRES. STORMWATER RUN-OFF FROM ALL DISTURBED BORROW AREAS SHALL BE ROUTED TO THE FINAL SEDIMENT BASIN UTILIZING NATURAL DRAINAGE PATHS AND/OR DIVERSION BERMS. LOCATION AND CHANNEL PROTECTION OF DIVERSION BERMS SHALL BE DETERMINED AT THE TIME OF BORROW EXCAVATION.
4. ADDITIONAL DRAINAGE BENCHES OR DOWNCHUTE FLUMES MAY BE ADDED AT THE OPERATOR'S DISCRETION. DOWNCHUTE FLUMES MAY BE REPLACED WITH 24" DIA. CORRUGATED PLASTIC PIPES AT THE OPERATOR'S DISCRETION.
5. SOIL IS NOT TO BE STOCKPILED WITHIN 25 FEET OF THE EDGE OF ANY TRENCH EXCAVATION.

PRELIMINARY DRAFT
FOR REVIEW AND DISCUSSION

100 50 0 100 200
GRAPHIC SCALE IN FEET

SITE GRADING PLAN

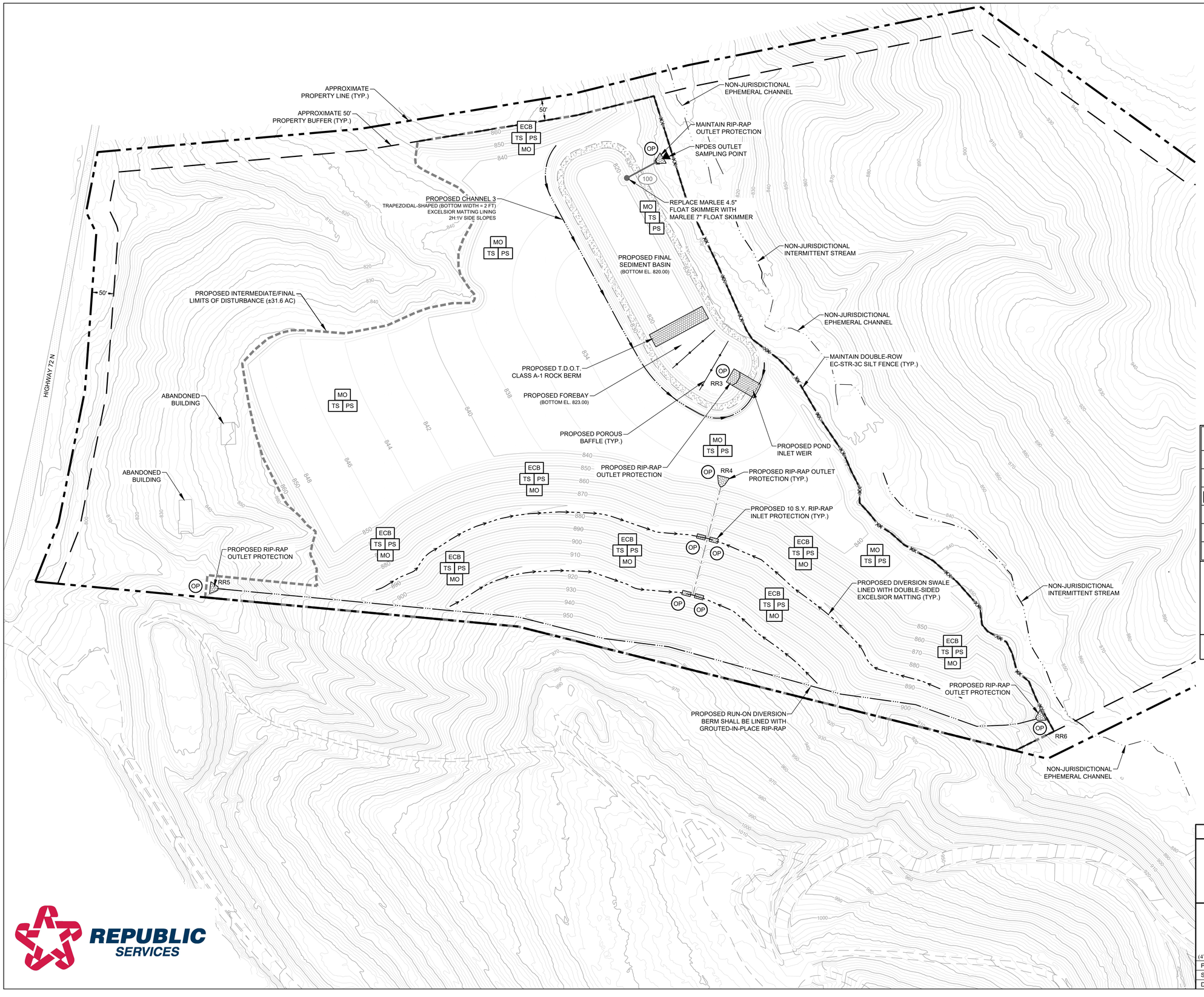
EROSION, SEDIMENTATION, AND POLLUTION CONTROL PLAN

MATLOCK BEND BORROW AREA
FOR
REPUBLIC SERVICES, INC.
LOUDON COUNTY, TENNESSEE

HNT ENVIRONMENTAL CONSULTANTS
HODGES, HARBIN, NEWBERRY & TRIBBLE, INC.
3920 ARKWRIGHT RD.
SUITE 101
MACON, GEORGIA 31210
(478) 743-7175

PROJ. NO.	6703-1217-01	MB_BORROW AREA PLAN_BASE.DWG	EDIT 05-02-2025
SCALE	1" = 100'	SHEET	3 OF 8
DATE	JUNE 2025		

REPUBLIC SERVICES



GENERAL NOTES:

1. SEE GENERAL NOTES ON SHEET 1.

EROSION CONTROL PLAN NOTES:

1. THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION AND MAINTENANCE OF EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO, OR CONCURRENT WITH, LAND DISTURBING ACTIVITIES.
2. EROSION CONTROL MEASURES SHALL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLANS DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE.
3. THE EROSION CONTROL MEASURES SHOWN ON THIS SHEET ARE CONSIDERED THE MINIMUM MEASURES THAT WILL BE USED. SHOULD ADDITIONAL EROSION CONTROL MEASURES BE REQUIRED BY THE ENGINEER OR LOCAL REGULATORY AGENCY, THEY WILL BE INSTALLED IN ACCORDANCE WITH THE TENNESSEE EROSION & SEDIMENT CONTROL HANDBOOK, LATEST EDITION.
4. ANY DISTURBED AREA LEFT EXPOSED FOR A PERIOD GREATER THAN 14 DAYS SHALL BE STABILIZED WITH MULCH OR TEMPORARY SEEDING.
5. STRIPPING OF VEGETATION, CLEARING, GRADING, AND OTHER LAND DISTURBING ACTIVITIES SHALL BE CONDUCTED TO MINIMIZE EROSION.
6. NO NON-STORMWATER DISCHARGES WILL BE ALLOWED DURING THIS PROJECT.
7. SOIL IS NOT TO BE STOCKPILED WITHIN 25 FEET OF THE EDGE OF ANY TRENCH EXCAVATION.
8. EXCELSIOR MATTING SLOPE STABILIZATION SHALL BE INSTALLED ON ALL SIDE SLOPES GREATER THAN 3(H):1(V).
9. INSTALLATION OF THE FINAL SEDIMENT BASIN BMPs SHALL BE COMPLETED BEFORE THE TOTAL DISTURBED AND UNDISTURBED DRAINAGE AREA TO THE FINAL SEDIMENT BASIN EXCEEDS 12 ACRES. STORMWATER RUN-OFF FROM ALL DISTURBED BORROW AREAS SHALL BE ROUTED TO THE FINAL SEDIMENT BASIN UTILIZING NATURAL DRAINAGE PATHS AND/OR DIVERSION BERMS. LOCATION AND CHANNEL PROTECTION OF DIVERSION BERMS SHALL BE DETERMINED AT THE TIME OF BORROW EXCAVATION.
10. BMPs WITHIN THE INITIAL SEDIMENT BASIN FOREBAY MAY BE RELOCATED OR EXTENDED AS NECESSARY DURING CONSTRUCTION OF THE FINAL SEDIMENT BASIN GRADES AND BMPs. SUCH MODIFICATIONS TO THE FOREBAY SHALL AT NO TIME ALLOW STORMWATER TO CIRCUMVENT THE FOREBAY OR DECREASE THE SEDIMENT STORAGE CAPACITY OF THE FOREBAY.

EROSION CONTROL LEGEND

MO	DIST. AREA W/ MULCH	PS	DIST. AREA W/ PERMANENT COVER
TS	DIST. AREA W/ TEMPORARY COVER	CRS	CONSTRUCTION ROAD STABILIZATION
ECB	SLOPE STABILIZATION		

xx — DOUBLE ROW EC-STR-3C SILT FENCE

STORMWATER DIVERSION SWALE

STORMWATER CHANNEL

RIP-RAP OUTLET PROTECTION

OP

W2, L, W1

	RIP-RAP SIZE	LENGTH(L)	W1	W2
RR3	CLASS A-1	9'	5'	11'
RR4	CLASS A-1	9'	5'	11'
RR5	CLASS A-1	21'	6'	23'
RR6	CLASS A-1	21'	6'	23'

NOTES: ALL OUTLET PROTECTION RIP-RAP SHALL BE GROUTED.

PROPOSED CHANNEL LININGS	CHANNEL NO.	LENGTH	SLOPE	CHANNEL LINING
	3	971'	1.00%	EXCELSIOR MATTING

PRELIMINARY DRAFT
FOR REVIEW AND DISCUSSION

100 50 0 100 200
GRAPHIC SCALE IN FEET

INTERMEDIATE EROSION CONTROL PLAN

EROSION, SEDIMENTATION, AND POLLUTION CONTROL PLAN

MATLOCK BEND BORROW AREA
FOR
REPUBLIC SERVICES, INC.
LOUDON COUNTY, TENNESSEE

HNT ENVIRONMENTAL CONSULTANTS
HODGES, HARBIN, NEWBERRY & TRIBBLE, INC.
3920 ARKWRIGHT RD.
SUITE 101
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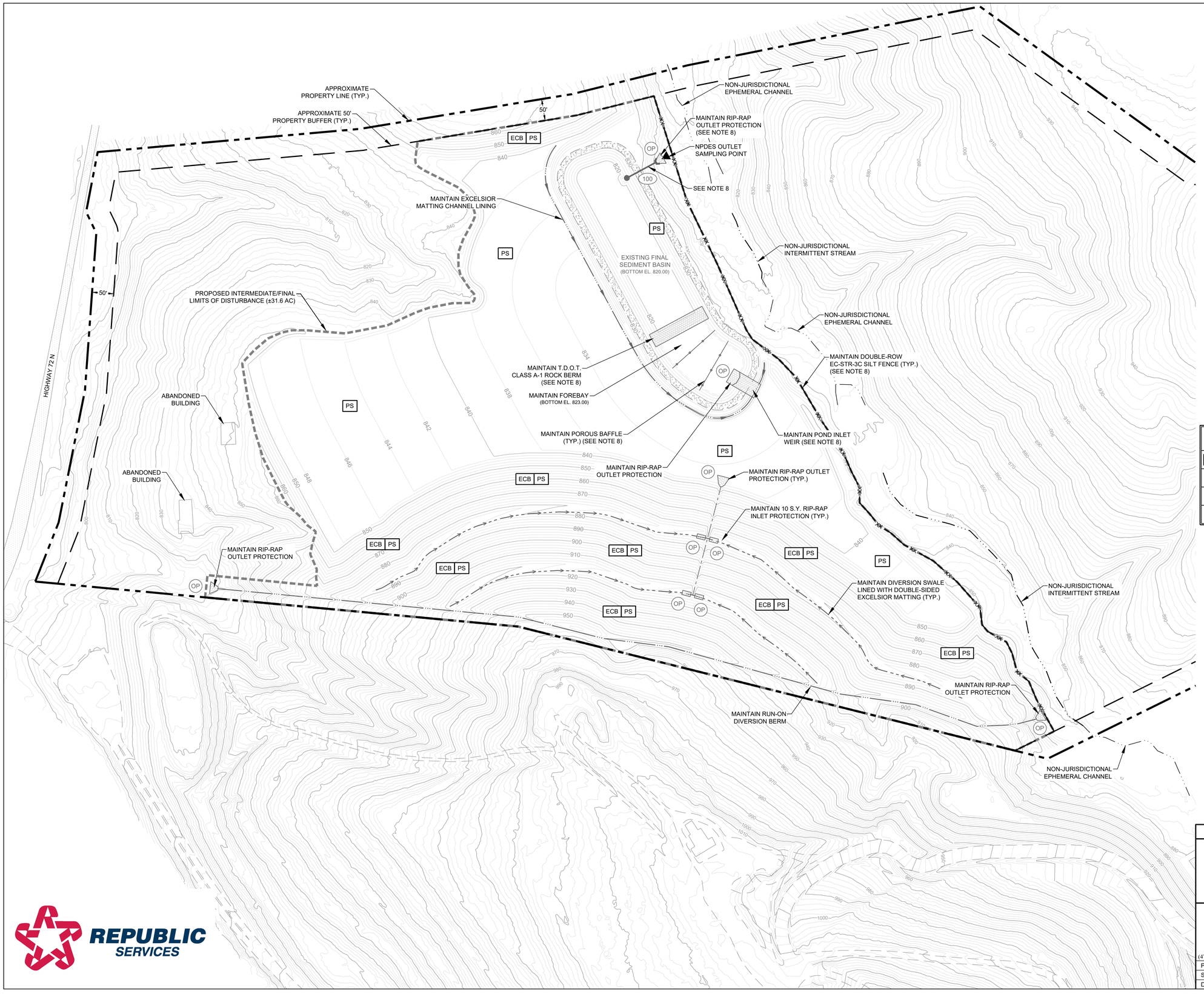
(478) 743-7175

PROJ. NO.	6703-1217-01	MB_BORROW AREA PLAN_BASE.DWG	EDIT 05-02-2025
SCALE	1" = 100'	SHEET	4 OF 8
DATE	JUNE 2025		

REPUBLIC SERVICES



GENERAL NOTES:

1. SEE GENERAL NOTES ON SHEET 1.

EROSION CONTROL PLAN NOTES:

1. THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION AND MAINTENANCE OF EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO, OR CONCURRENT WITH, LAND DISTURBING ACTIVITIES.
2. EROSION CONTROL MEASURES SHALL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLANS DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE.
3. THE EROSION CONTROL MEASURES SHOWN ON THIS SHEET ARE CONSIDERED THE MINIMUM MEASURES THAT WILL BE USED. SHOULD ADDITIONAL EROSION CONTROL MEASURES BE REQUIRED BY THE ENGINEER OR LOCAL REGULATORY AGENCY, THEY WILL BE INSTALLED IN ACCORDANCE WITH THE TENNESSEE EROSION & SEDIMENT CONTROL HANDBOOK, LATEST EDITION.
4. ANY DISTURBED AREA LEFT EXPOSED FOR A PERIOD GREATER THAN 14 DAYS SHALL BE STABILIZED WITH MULCH OR TEMPORARY SEEDING.
5. STRIPPING OF VEGETATION, CLEARING, GRADING, AND OTHER LAND DISTURBING ACTIVITIES SHALL BE CONDUCTED TO MINIMIZE EROSION.
6. NO NON-STORMWATER DISCHARGES WILL BE ALLOWED DURING THIS PROJECT.
7. SOIL IS NOT TO BE STOCKPILED WITHIN 25 FEET OF THE EDGE OF ANY TRENCH EXCAVATION.
8. EXCELSIOR MATTING SLOPE STABILIZATION SHALL BE INSTALLED ON ALL SIDE SLOPES GREATER THAN 3(H):1(V).
9. AFTER FINAL STABILIZATION OF ALL DISTURBED AREAS IS ACHIEVED, TEMPORARY EROSION CONTROL DEVICES SUCH AS SILT FENCE, POROUS BAFFLES, AND ROCK BERMS MAY BE REMOVED. THE SEDIMENT BASIN OVERFLOW STRUCTURE, SURFACE SKIMMER, AND CARRIER PIPE MAY BE REMOVED AND REPLACED WITH A PERMANENT GROUTED IN-PLACE RIP-RAP LINED CHANNEL.

EROSION CONTROL LEGEND

ECB	SLOPE STABILIZATION	PS	DIST. AREA W/ PERMANENT COVER
	xx DOUBLE ROW EC-STR-3C SILT FENCE		
	STORMWATER DIVERSION SWALE		
	STORMWATER CHANNEL		

PRELIMINARY DRAFT
FOR REVIEW AND DISCUSSION

100 50 0 100 200
GRAPHIC SCALE IN FEET

FINAL EROSION CONTROL PLAN

EROSION, SEDIMENTATION, AND POLLUTION CONTROL PLAN

MATLOCK BEND BORROW AREA
FOR
REPUBLIC SERVICES, INC.
LOUDON COUNTY, TENNESSEE

REPUBLIC SERVICES

HNT ENVIRONMENTAL CONSULTANTS
HODGES, HARBIN, NEWBERRY & TRIBBLE, INC.
3920 ARKWRIGHT RD.
SUITE 101
MACON, GEORGIA 31210
(478) 743-7175

PROJ. NO.	6703-1217-01	MB_BORROW AREA PLAN_BASE.DWG	EDIT 05-02-2025
SCALE	1" = 100'	SHEET	5 OF 8
DATE	JUNE 2025		

Outlook

RE: MBLF - Preliminary Borrow Area Plan

From Chris Cline <ccline@cci-corp.com>
Date Mon 6/9/2025 3:34 PM
To Elizabeth murphy <elizmurphy966@msn.com>; Waller, Adam <wallera@loudoncounty-tn.gov>

Adam,

The provided Preliminary Borrow Area Plan is at best an erosion prevention plan that indicates the area excavation planed for the borrow area. With this information we can only assume there is enough usable soil for a borrow area. A soil assessment should include information generally found in a geotechnical investigation. To accurately project usable soil, we would need bore logs to identify how much soil is available along with the type of soils available. Simply grading a site could end up with non-excavatable soils (rock) that are not usable in the landfill.

Thanks,

CHRIS CLINE, (*PE*)
PROJECT MANAGER
m. 865.254.5553 | **o.** 865.670.8555 | **d.** 865.770.3991
www.cci-corp.com
enhancing community life by design

From: Elizabeth murphy <elizmurphy966@msn.com>
Sent: Friday, June 6, 2025 11:56 AM
To: Chris Cline <ccline@cci-corp.com>; Waller, Adam <wallera@loudoncounty-tn.gov>
Subject: Fw: MBLF - Preliminary Borrow Area Plan

Chris,
Attached is the "soil borrow" area plan that Chair Waller requested from Republic. Please take a look and I believe Chair Waller wanted to schedule a call next week.
Elizabeth

From: Pickrell, Stoddard <SPickrell@republicservices.com>
Sent: Thursday, June 5, 2025 5:22 PM
To: Waller, Adam <wallera@loudoncounty-tn.gov>
Cc: Turtle, Lindsey <LTurtle@republicservices.com>; Fox, Teresa <TFox@republicservices.com>; Hollinshead, David <DHollinshead@republicservices.com>; McWhorter, William <WMcwhorter@republicservices.com>; Elizabeth murphy <elizmurphy966@msn.com>; Trompeter, Wells (NSH - X68759)

<wells.trompeter@hklaw.com>
Subject: MBLF - Preliminary Borrow Area Plan

Good afternoon Adam,

Following up from our discussion last week. Attached is a preliminary borrow area plan. The current grading plan will provide approximately 1 million CYs of excavated soils.
Please note, the plans are ensuring the buildings (one is the neighboring purdy structure) are not disturbed with appropriate buffers and the steam features are determined to be non-jurisdictional. That determination will require the submission of the previously discussed AJD and HD.

Let me know if you have any questions. Thanks,

Stoddard Pickrell
Environmental Manager

Western NC / Eastern TN

1070 Riverside Drive
Asheville, NC 28804
e SPickrell@republicservices.com
o (828) 253-3929
c (828) 708-1271
w RepublicServices.com

REPUBLIC SERVICES

Sustainability in Action

AIRL, INC.

1550 37TH STREET, NE
CLEVELAND, TENNESSEE 37312
(423) 476 - 7766 Fax: (423) 476-7714
ISO/IEC 17025:2005, PJLA - 76332
Testing Accreditation

State of Tennessee (ID #02034)

Alabama Dept. of Environmental Management (ID #40780)

Scope of Accreditation:
Wastewater, Surface Water, Ground Water, Drinking Water, Solids, Hazardous Waste, Soils, Sediments, and Sludges.

Lab Report 368787

9773
Republic Services/Loudon
Attention: Holly Van Kirk
21712 Highway 72 North
Loudon, TN 37774

Date Received 3 /20/2025
Date Sampled 3/20/2025
Date Requested 3 /27/2025
Rush Status Rush
Phone (865) 458-2651
Extension
☐ ***Fax***
☑ ***eMail:*** jhaworth
PO#

Sample Information

Matlock Bend - Pond 2

Lab Report: 368787		*Result*		*LCL*	*Method*	*SDL*	*Date*	*Time*	*Analyst*
j	alpha Terpineol	< 50	ug/L	50	EPA 625/8270C	50	3/27/2025	14:22	RRP
	Benzoic acid	< 50	ug/L	50	EPA 625/8270C	50	3/27/2025	14:22	RRP
	p-Cresol	< 10	ug/L	10	EPA 625/8270C	10	3/27/2025	14:22	RRP
	Phenol	< 10	ug/L	10	EPA 625/8270C	10	3/27/2025	14:22	RRP
	Zinc (Zn)	0.03	mg/L	0.01	EPA 200.7	0.01	3/21/2025	15:43	JAV
	Ammonia Nitrogen	19.3	mg/L	1	SM 4500-NH3 B.(4		3/25/2025	8:35	CAP
	BOD	27	mg/L	2	SM5210B	24	3/21/2025	11:30	SAL
	COD	236	mg/L	50	SM5220C	50	3/25/2025	8:15	SAL
@23C	pH	7.94	pH Units	0.1	SM4500-H+B	0.1	3/20/2025	14:15	CAP
Sample was out of holding time for this method.									
	TSS	22	mg/L	4	SM2540D	4	3/24/2025	14:35	SAL

Lowest Calibration Level [LCL] - reporting limit; Sample Detection Level [SDL] - Sample Specific

QA/QC Procedures required by the Method(s) were followed unless otherwise noted. Performance and acceptance standards for required QA/QC procedures were achieved unless otherwise noted. No significant modifications have been made to the Method(s). I attest that, based upon my inquiry of those individuals immediately responsible for reviewing the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Report approved by: Roy G Patterson
TECHNICAL DIRECTOR

AIRL INC
1550 37th Street, NE • Cleveland, TN 37312
Phone: 423.476.7766 • Fax: 423.476.7714

Send The Report To:
Company: Matlock Bend LF / Republic Services
Attn: Holly Van Kirk
Address: 21712 Hwy 72 North
Loudon, TN 37774
Phone: 615-956-9277
Email: HVankirk@republicservices.com

Send Invoice To:
Same

Chain of Custody Record

AIRL Lab #: 368787

Page _____ of _____

Project Site | Project Nº | PO Nº

Site Name | Report Due Date

Collected By [signature] | Verbal / Fax / Hard Copy / Email | Other:

Field Sample ID	Rush Factor	Sample Matrix	Sample Date	Sample Time	Nº Containers	Analysis *See Attached	Remarks	R CL	Presv.	pH
Matlock Bend-Pond 2			3/20/25	12:45 pm			5 pl Qt 6 pl other		None HNO_3	

Remarks

Relinquished By: Teresa Fox | Date: 3/20/25 | Time: 2:04 pm

Received By	Date	Time	Relinquished By	Date	Time	Received By	Date	Time	Relinquished By	Date	Time

☐ Disposal By Laboratory ☐ Return to Originator Archive _____ ☐ Months

LAB USE ONLY

Received For lab by	Date	Time	Opened By	Date	Time	Temp °	Seal Nº	Condition
Raima Attaie	3/20/25	1404				<6°C		

Remarks

Fox, Teresa

From: Van Kirk, Holly
Sent: Thursday, March 20, 2025 11:23 AM
To: Raina Hicks
Cc: larhonda@airlonline.com; Fox, Teresa; Pickrell, Stoddard
Subject: Matlock Bend - Sampling Request

Hello Raina,

We are grabbing another sample at Matlock Bend Landfill and will need to test for the parameters in the below table as well as COD. This is for Matlock Bend Landfill located at 21712 TN-72, Loudon, TN 37774. Similar to last time, Teresa Fox will drop of the sample and we would like to do a Rush TAT on the results. Could we please call this sample "Matlock Bend - Pond 2"? We are only sampling one location.

Table L-1. Numeric Effluent Limitations for Landfills and Land Application Sites

Effluent Characteristics	Effluent Limitations (mg/L)	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
Ammonia	10	4.9
Alpha Terpineol	0.033	0.016
Benzoic Acid	0.12	0.071
Biochemical Oxygen Demand (BOD-)	140	37
p-Cresol	0.025	0.014
pH	Within the range of 6.0 to 9.0	
Phenol	0.026	0.015
Total Suspended Solids (TSS)	88	27
Zinc (Total)	0.20	0.11

COD

Thanks!

Holly Van Kirk
Environmental Manager

750 E Jefferson Pike
Murfreesboro, TN 37130
e hvankirk@republicservices.com
c (615) 956-9277
w RepublicServices.com

Matlock Bend Landfill
21712 TN-72, Loudon, TN 37774
o 865.458.2651 republicservices.com

May 23, 2025

Mr. Lewis Haynes
Environmental Protection Specialist
Division of Solid Waste Management
Knoxville Environmental Field Office
3711 Middlebrook Pike
Knoxville, TN 37921

RE: Recertification of Authorization for Disposal of Asbestos Waste,
Matlock Bend Loudon County Landfill, SNL 53-0203

Dear Mr. Haynes,

Santek Environmental, LLC. respectfully requests recertification of Blanket Approval of ACM for Matlock Bend Loudon County Landfill, Permit No. SNL 53-0203. The previous Blanket Approval (dated June 9, 2022) is attached for reference.

Your consideration of this request would be appreciated.

If you have any questions regarding this letter or if you need additional information, please contact me at (828) 708-1271.

Best Regards,

Stoddard Pickrell

Stoddard Pickrell
Environmental Manager

cc: David Hollinshead, Republic Services
Lindsey Turtle, Republic Services

Attachments: June 2022 Loudon County Blanket Special Waste Approval

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
KNOXVILLE ENVIRONMENTAL FIELD OFFICE
DIVISION OF SOLID WASTE MANAGEMENT
3711 MIDDLEBROOK PIKE
KNOXVILLE, TENNESSEE 37921-6538
PHONE (865) 594-6035 STATEWIDE 1-888-891-8332 FAX (865) 594-6105

June 9, 2022

Mr. Luke Cunningham, Environmental Manager
Matlock Bend Loudon County Landfill
21712 HWY 72
Loudon, Tennessee 37774

RE: RECERTIFIED SPECIAL WASTE APPROVAL – Asbestos Containing Materials
Matlock Bend Loudon County Class I Landfill, SNL 53-0203

Dear Mr. Cunningham:

Rule 0400-11-01-.01(4)(b) of the *Solid Waste Processing and Disposal Regulations*, promulgated under the authority of the Tennessee Solid Waste Disposal Act, states that: "Except as may be specifically allowed in the permit, an operator may not accept for processing or disposal at his facility any special waste unless and until specifically approved to do so in writing by the Department."

In February 2020, the Matlock Bend Loudon County Landfill requested and was issued an updated blanket special waste approval in accordance with the Memorandum of Agreement (MOA) between the DSWM and the Division of Air Pollution Control (DAPC), dated May 6, 2016. That approval superseded the previous annual blanket approval letters for asbestos receipt and disposal. Currently the Division received your request letter on May 31, 2022, outlining your operational handling in accordance with the MOA and your site's desire to effectively recertify and continue the blanket special waste approval for asbestos containing materials in the Matlock Bend Loudon County Class I Landfill, SNL 53-0203.

In accordance with the updated DSWM and DAPC MOA, the DSWM has determined the waste is suitable for disposal into the Matlock Bend Loudon County Landfill contingent upon the following conditions/restrictions:

1. The waste generator must provide ten (10) working days advance notice to the DAPC to allow field personnel to observe the removal procedures at the originating site. This must be accomplished by submitting a "Notification of Demolition and/or Asbestos Renovation" state from CN-1055).[1]
2. The containers for the ACWM must be leak-tight containers and approved by the DAPPC.
3. The ACWM should be transported in an enclosed vehicle or on a covered carrier as described in T.C.A. § 39-14-503.
4. The "Asbestos Waste Shipment Record" (form CN-1054)[1] will be completed, be available for inspection upon request, and retained for a period of two (2) years.
5. Advance notice must be given by the waste transporter or generator to the landfill operator prior to receiving the ACWM or a routine schedule established such that the operator will have time to prepare an area to receive the ACWM. The only required documents the DAPC will need to meet its regulatory requirements is the "Asbestos Waste Shipment Record" (form CN-1054)[1] and proof

that the records are returned to the waste generator for disposal tracking purposes. Copies of the ten (10) day notice to DAPC are not necessary but can be referenced in a letter to the disposal site. The DAPC will track all "Notification of Demolition and/or Asbestos Renovation" (state form CN-1055) form received and update, copy, or advise DSWM of status on request. When the "Asbestos Waste Shipment Record" (state form CN-1054)[1] is not received by the waste generator confirming disposal, the DAPC will, upon receipt of such notice, contact the DSWM to request their cooperation in tracking the shipment and provide investigatory support off site if needed.

6. Vehicles transporting ACWM shall bear signs during loading and unloading as specified by DAPC Rules 1200-03-11-.02(2)(j)3 and 1200-03-.02(2)(k)4, stating:

DANGER
ASBESTOS DUST HAZARD
CANCERN AND LUNCH DISEASE HAZARD
Authorized Personnel Only

7. For a landfill seeking initial approval, the appropriate DSWM and DAPC representatives will observe the initial disposal to ensure proper handling and disposal procedures are followed. A representative of the DAPC will be able to observe subsequent disposal of ACWM at any time such material is to be transported to and disposed of at the designated landfill accepting the ACWM. DAPC observations are to be scheduled between the visiting DAPC staff members(s) and the receiving landfill in a manner deemed sufficient for DAPC staff to plan he visit.
8. The ACWM must be confined to a specific area, prepared by the landfill operator, at the disposal site to assure proper disposal with minimum complications.
9. The ACWM must be handled carefully and deliberately such that there will be no rupturing of containers nor visible emissions in the disposal process. When improperly packaged ACWM is observed by the landfill operator, both the DAPC and the DSWM must be notified so that independent investigations of the cause for improper packaging can be conducted at both the disposal site by the DSWM and at the point of removal by the DAPC.
10. The landfill operator will immediately apply one foot of non-ACWM over the ACWM and then compact the non-ACWM.
11. Upon closure, the site shall be recorded with the Register of Deeds as a former disposal site containing asbestos. The DSWM will notify the DAPC upon receipt of closure so the DAPC can update its internal document management system to flag this location as no longer being approved to accept ACWM for disposal purposes.
12. Specific area used for disposal of ACWM shall be noted on site plan.
13. This blanket special waste approval for ACWM will expire on July 1, 2025 unless prior to the expiration of the blanket special waste approval for ACWM disposal, Matlock Bend Loudon County Class I Landfill certifies to DSWM that it is in compliance with the requirements of this approval letter, the current MOA, and current DSWM Policy PN0043 (attached). If the Field Office determine that the landfill is likely to maintain compliance with these requirements, based both on conditions then current approval will remain for the three (3) year

Footnote

1 The State of Tennessee has four (4) local regulatory areas that oversee Air Pollution Control requirements; their respective programs are granted authorization (or are authorized) by the State of Tennessee Division of Air Pollution Control (DAPC). Each local air pollution regulatory program is required to follow all applicable DAPC Rules. Rule numbers and form numbers may vary between local air pollution regulatory programs; therefore, if applicable, please use the appropriate local air pollution regulatory authority's form.

This blanket approval is only for the waste described herein. The addition of any other waste under this approval letter not identified in this letter is prohibited.

This determination is only for the waste described herein. The addition of any other waste not identified in this letter will require re-evaluation. Be advised that the facility operator may refuse to accept any special waste, even if it has been approved in writing by the DSWM.

If you have any further questions, please do not hesitate to contact me at 865-304-3314, or email Paula.Plont@tn.gov.

Sincerely,

Paula Plont
Environmental Consultant
Division of Solid Waste Management

Revendra Awasthi
Environmental Field Office Manager
Division of Solid Waste Management

cc: DSWM NCO via electronic mail
DAPC Nashville via electronic mail

HHNT
ENVIRONMENTAL CONSULTANTS

478-743-7175
hhnt.com
3920 Arkwright Road, Suite 101
Macon, GA 31210

MEMO

TO: **Stoddard Pickrell**

FROM: **R. Brant Lane, P.E.** RBL

DATE: **March 19, 2025**

SUBJECT: **Matlock Bend Landfill – 2025 Partial Closure**
Closure Area 1 Limits

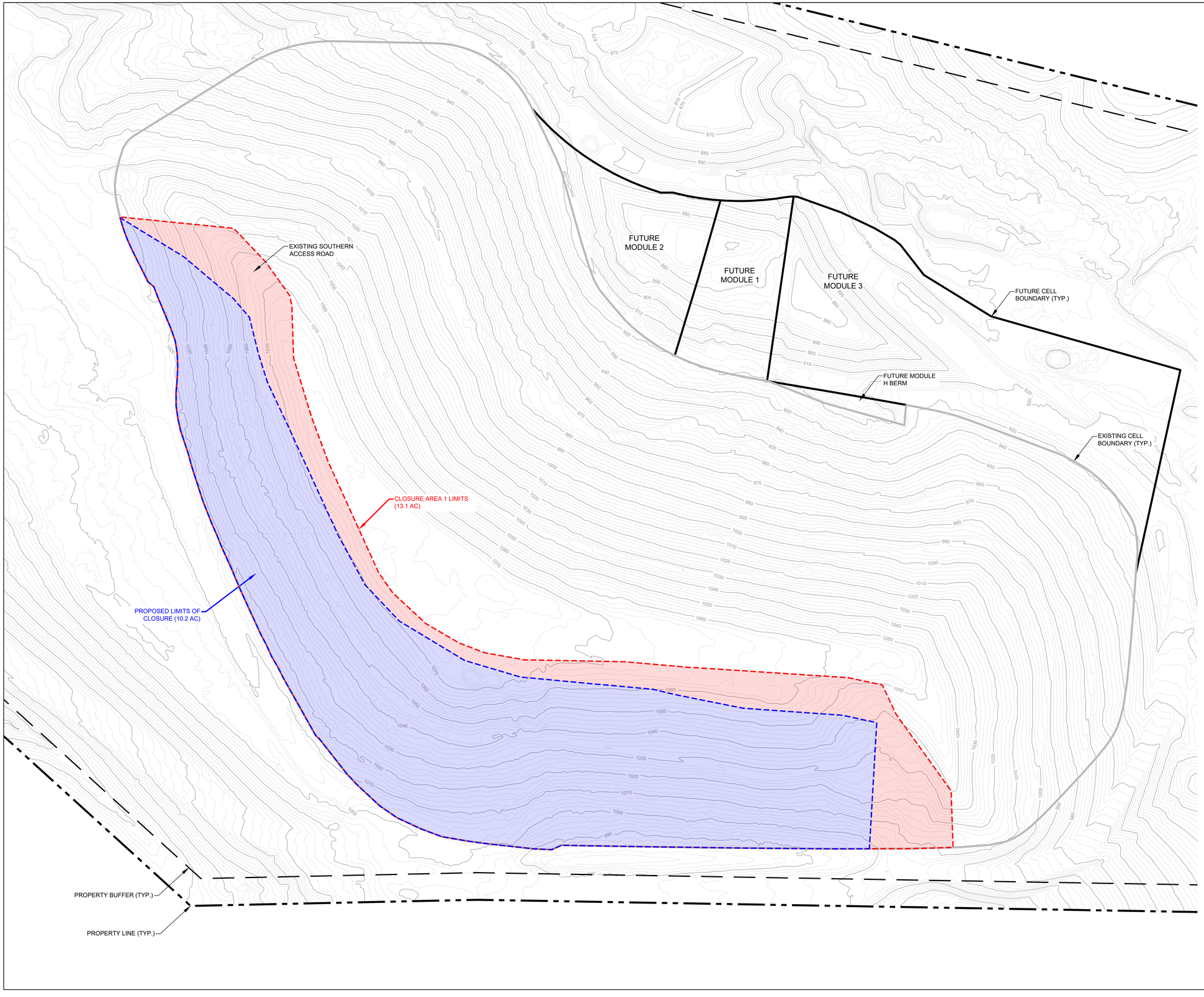
The Matlock Bend Landfill - 2025 Partial Closure Construction project for Closure Area 1 includes closing 10.2 acres on the eastern side of the existing landfill. This closure area is smaller than the previously proposed 13.1 acre Closure Area 1 for the following reasons:

- The north side of the landfill cannot be filled to the required elevations in order for the 13.1 acre Closure Area 1 limits to be installed due to Module H berm not being constructed. Attempting to fill this area prior to closure would create an unsafe condition for both landfill operations and construction personnel. The construction of a final closure system in this area without achieving permitted final grades would also result in a loss of airspace.

- The previous proposed 13.1 acre Closure Area 1 includes a portion of the permitted future access road in the north east corner of the landfill. Closure of the access road area would likely result in damage to the final closure system over time due to continued landfill operations traffic.

- The previous proposed 13.1 acre Closure Area 1 includes the currently utilized access road on the southern side of the landfill. The 10.2 acre closure area avoids this access road area to allow the current southern access road to remain in operation. It is our understanding that the site intends to continue utilizing the southern road after the partial closure construction to access the top deck and for future waste filling of Modules 1 and 2. Utilizing a closed area for access would likely result in damage to the final closure system over time due to continued landfill operations traffic.

In summary, the 2025 Partial Closure Construction project for Closure Area 1 is a 10.2 acre closure, instead of previously proposed 13.1 acre closure, to allow the site operations to safely fill the landfill, maintain access to current and future operational areas without damage to a permanent closure area, and avoid losses to the permitted airspace. Additionally, the final grades within the 10.2 acre Closure Area 1 meet the timing requirements of the first closure.



NOTES:

1. TOPOGRAPHY BY FIRMATEK, LLC., DATED DECEMBER 13, 2024.

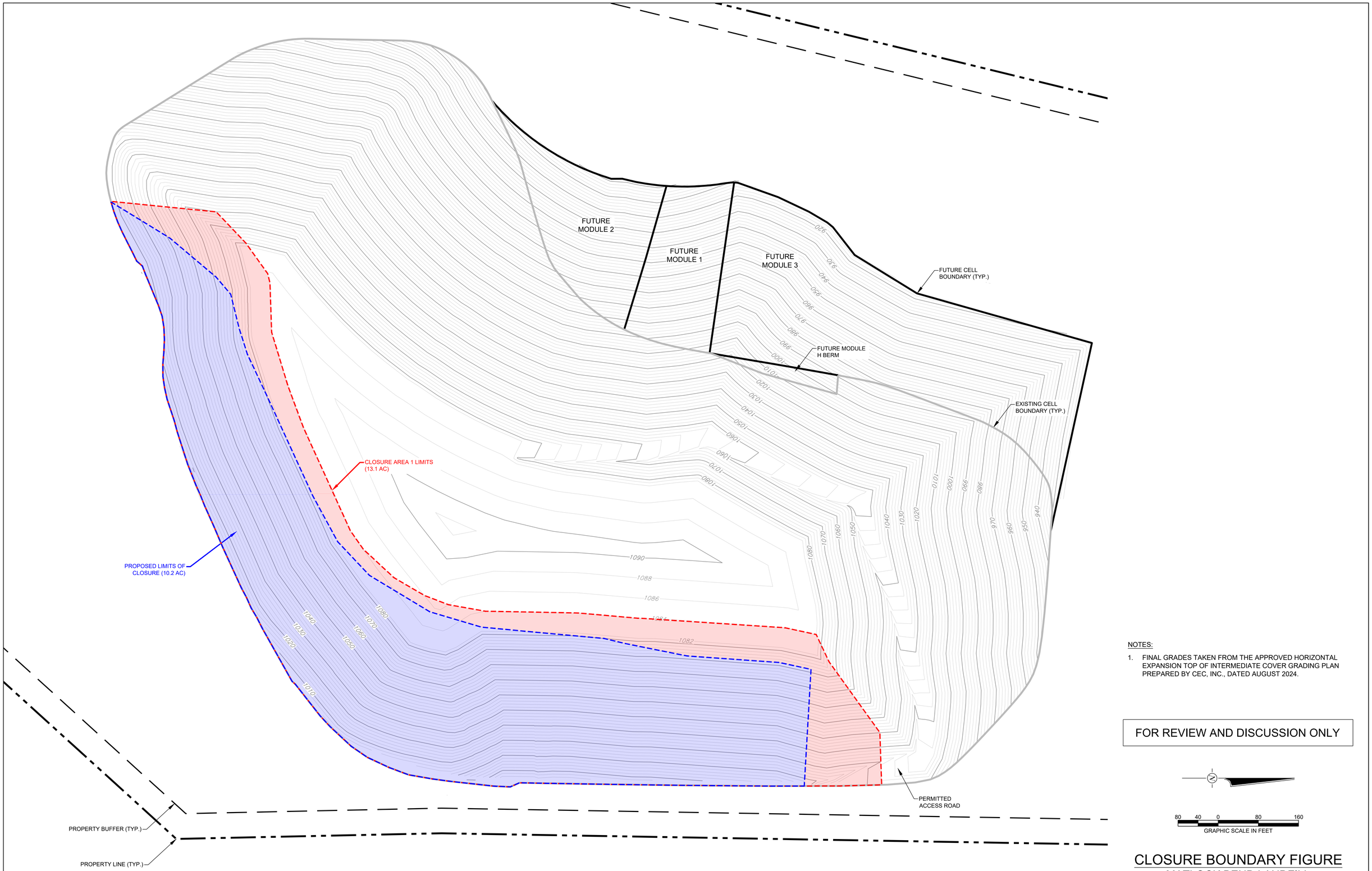
FOR REVIEW AND DISCUSSION ONLY

80 40 0 80 160

GRAPHIC SCALE IN FEET

CLOSURE BOUNDARY FIGURE

MATLOCK BEND LANDFILL
REPUBLIC SERVICES, INC
3/5/2025



NOTES:

1. FINAL GRADES TAKEN FROM THE APPROVED HORIZONTAL EXPANSION TOP OF INTERMEDIATE COVER GRADING PLAN PREPARED BY CEC, INC., DATED AUGUST 2024.

FOR REVIEW AND DISCUSSION ONLY

80 40 0 80 160

GRAPHIC SCALE IN FEET

CLOSURE BOUNDARY FIGURE

MATLOCK BEND LANDFILL
REPUBLIC SERVICES, INC
3/5/2025

REPUBLIC SERVICES

June 17, 2025

Mr. Adam Waller
Chair Loudon Landfill Commission
Loudon County, TN

Mr. Waller:

Effective July 1, 2025, there will be a contractual landfill disposal price increase to the stakeholders of the Loudon Landfill. The contractual price increase will be 5.2%. Please see attached.

Stakeholders' new disposal pricing will be as follows:

- Stakeholders Disposal Rate - $27.05 per ton

Previous Stakeholder disposal pricing was $25.71 per ton.

Thank you in advance,

David L. Hollinshead
Manager Municipal Sales
Republic Services

Cc: Lindsey Turtle; General Manager

Attachment (1)

Hollinshead, David

From: Stanford, Laura
Sent: Monday, June 16, 2025 5:57 PM
To: Hollinshead, David
Cc: Turtle, Lindsey
Subject: Loudon County PI - July 1 2025
Attachments: SeriesReport-20250616181530_1b8db6_WST_May 2024 - May 2025.xlsx

Hey David,

The PI for Loudon this year is 5.1995%. Their rate will go from $25.71 to $27.05 per ton effective July 1. CPI – WST support attached. Will you please notify them?

Consumer Price Index for All Urban Consumers (CPI-U)
Original Data Value

Series Id: CUUR0000SEHG
Not Seasonally Adjusted
Series Title: Water and sewer and trash collection services in U.S. city
Area: U.S. city average
Item: Water and sewer and trash collection services
Base Period: DECEMBER 1997=100
Years: 2024 to 2025

Year	Jan	Feb	Mar	Apr	May	Jun
2024	297.079	298.751	299.183	300.178	299.987	300.652
2025	310.239	313.344	313.925	314.820	315.585	

Current Rate	Fraction	New Rate 7/1/2025
$ 25.71	1.051995586	$ 27.05

Laura Stanford, MBA
Business Unit Finance Manager - BU237

750 E Jefferson Pike
Murfreesboro, TN 37130
e lstott@republicservices.com
o 615-617-9733
w RepublicServices.com

ORIGINAL

LANDFILL GAS LEASE

by and between

Loudon County Solid Waste Disposal Commission

as Lessor

and

Santek Environmental, Inc.

as Lessee

March 8, 2011

TABLE OF CONTENTS

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(continued)

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(continued)

Exhibits

LANDFILL GAS LEASE

THIS LANDFILL GAS LEASE (this "Lease") made as of this 8th day of March, 2011 (the "Effective Date") by and between the Loudon County Solid Waste Disposal Commission, an entity created under the laws of the State of Tennessee and the entity having legal jurisdiction over the ownership and management of the Matlock Bend Landfill ("Lessor"), and Santek Environmental, Inc., a corporation organized under the laws of the State of Tennessee (together with its permitted successors and assigns, "Lessee"). Lessor and Lessee may be referred to herein individually as a "Party" and collectively as the "Parties."

RECITALS:

WHEREAS, Lessor owns a sanitary landfill located in Loudon County, Tennessee, as more particularly described herein; and

WHEREAS, Lessee desires to lease from Lessor all of its right, title and interest in and to all Landfill Gas on the Landfill; and

WHEREAS, Lessor desires to lease the Landfill Gas to Lessee, together with all necessary and convenient land use and other rights to construct and operate the Collection System and Project Facility to make beneficial use of such Landfill Gas and Products (as defined below), all in accordance with the provisions of this Lease.

NOW, THEREFORE, for and in consideration of the premises, and of the mutual covenants and agreements hereinafter set forth, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged by the Parties, and intending to be legally bound, the Parties agree as follows:

ARTICLE I
DEFINITIONS

When used in this Lease, the following terms shall have the meanings specified below:

1.1 Defined Terms.

"Affiliate" of a Person means an entity that directly or indirectly has ownership of, or controls, is controlled by or is under common control with that Person. For purposes of the foregoing, "ownership" or "control" of a Person means that an entity possesses, directly or indirectly, the power to direct or cause the direction of the management and policies of such Person, whether through the ownership of voting securities, by contract, or otherwise.

"Assignor" has the meaning set forth in Section 17.3

"Assignment" has the meaning set forth in Section 17.1

"Business Day" means any calendar day, other than any day that commercial banks are authorized to be closed by the Federal Reserve.

"Claim" or "Claims" has the meaning set forth in Section 11.1.

"Collection Point" means the point(s) between the Landfill and the Collection System at which the Landfill Gas first passes into the recovery wells of the Collection System.

"Collection System" means all of the network of recovery wells and interconnecting pipes together with related valves, pumps, metering and monitoring devices and other extraction related equipment that are or will be located on the Landfill and constructed, owned or leased by Lessee for the purpose of extracting, recovering, capturing, collecting, processing, producing, measuring, transporting, and storing Landfill Gas, as the same may be altered or expanded from time to time.

"Effective Date" has the meaning set forth in the Preamble.

"Environmental Attribute" means any and all existing and future legal and beneficial rights that are capable of being measured, verified, calculated or commoditized, arising from a reduction in emissions of Greenhouse Gases or other gases, whether obtained through gas flaring and reduction or destruction, or otherwise destroying the Landfill Gas or other Products, generated, created or issued under a voluntary program or under a legislative, regulatory or governmental program or scheme of any kind, including any right, interest, credit, entitlement, benefit, allowance, certificate or registrable right, voluntary or compulsory that may be issued, generated or created at any time during the Term, related to, arising from or in connection with the Landfill Gas. An Environmental Attribute may include one or more of the following: avoided, reduced or offset NO_x, SO_x or Greenhouse Gas emissions, or as otherwise defined under an applicable program or Law, or as agreed between the Parties. Environmental Attributes include RECs and tradable emission allowances or other entitlements or credits to produce emissions issued by a Governmental or quasi-Governmental Authority, but do not include other non-governmental subsidies for the use of renewable energy, the generation of electricity, the reduction of emissions and any and all Tax Benefits.

"Environmental Laws" means any statute, law, act, ordinance, rule, regulation, standard, common law, requirement, order, decree, permit, license, guidance, policy, prohibition, restriction, directive, interpretation, approval, authorization or ruling of any federal, state and/or local government, or administrative regulatory body, agency, board, or commission or a judicial body, relating to the protection of human health, the environment, safety, wildlife, or natural resources, or that otherwise regulate and/or create rights or obligations regarding the presence, management, use, storage, disposal, treatment, handling, release, threatened release and/or transportation of a Hazardous Materials, including, the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), the Resource Conservation and Recovery Act ("RCRA"), the National Environmental Policy Act, the Federal Water Pollution Control Act, the Safe Drinking Water Act, the Endangered Species Act, the Federal Insecticide, Fungicide and Rodenticide Act, the Atomic Energy Act, the Occupational Safety and Health Act, the Clean Air Act, the Hazardous Materials Transportation Act, the Toxic Substances Control Act, and the Emergency Planning and Community Right To Know Act, as each of the same is amended or supplemented from time to time.

"Event of Force Majeure" means any act, event, or condition that is beyond a Party's reasonable control, including natural or accidental occurrences or casualties (such as fire, earthquake, explosion, flood, or epidemic); war, terrorism, sabotage, civil strife or other violence. Without limitation, an Event of Force Majeure shall not include (a) the effect of any Laws enacted or made effective after the date of this Lease, or changes to existing Laws; or (b) financial or economic hardship.

"Financing Assignment" has the meaning set forth in Section 17.3

"Good Industry Practices" means those practices, methods, acts and standards for safety and performance, that in the exercise of reasonable judgment in light of the facts known at the time the decision was made, would have been expected to accomplish the desired result in a manner consistent with reliability, safety and all applicable Laws, and that are generally accepted, prudent and in use by owners or operators of facilities similar to the Landfill, the Collection System or Project Facility, as applicable.

"Governmental Authority" means any federal, state, local, municipal, county, regional, or other governmental authority of any nature, or administrative, judicial or regulatory entity operating under Law, and includes any governmental agency, branch, department, bureau, commission, board, administrative agency or regulatory body of any government.

"Greenhouse Gases" means carbon dioxide, methane, nitrous oxide, hyrofluorocarbons, perfluorocarbons, sulfur hexafluoride or any other gas that an applicable voluntary, legislative or regulatory program, scheme or system defines to be a "greenhouse gas."

"Hazardous Material" means any substance, chemical, waste or material that is or becomes regulated by any Environmental Laws because of its toxicity, corrosivity, infectious nature, carcinogenicity, radioactivity, explosiveness, ignitability, or reactivity, or its effect or potential effect on public health, safety, and/or the environment.

"Landfill" means the Matlock Bend Landfill.

"Landfill Gas" or "Landfill Gases" means all of the gases and their constituents, including methane, carbon dioxide and other gases produced by the decomposition of matter within the Landfill or otherwise existing within the Landfill at any time during the Term, at such places at the Landfill and at depths as such landfill gas may exist.

"Law" or "Laws" means laws, treaties, conventions, directives, statutes, ordinances, rules, regulations, orders, writs, judgments, injunctions or decrees of any governmental authority, international conventions, and any other rules or directives of any duly constituted authority having jurisdiction over the Project.

"Lease" has the meaning set forth in the Preamble.

"Lender" means a bank, financial institution, insurance company, investor, or any other Person providing capital to either Party, or a trustee or agent for any such entity.

"Lender Assignee" has the meaning set forth in Section 17.3

"Lessee" has the meaning set forth in the Preamble.

"Lessee Persons" has the meaning set forth in Section 11.2.

"Lessor" has the meaning set forth in the Preamble.

"Lessor Persons" has the meaning set forth in Section 11.1.

"Loss" or "Losses" has the meaning set forth in Section 11.1.

"Material Change in Law" means a change in any Law that renders the implementation of or the realization of all or a material portion of the benefits to be derived from this Lease illegal or impossible to achieve.

"Matlock Bend Landfill" is a parcel of real property composed of approximately 151 acres of land off of Hwy. 72 North in Loudon County, Tennessee containing an old closed landfill (former Mt. Olive Landfill), as more particularly described and delineated as the area within the "Property Boundary" described in Exhibit A attached hereto, and such additional adjoining lands as may be acquired after the date of this Agreement by the owner of Matlock Bend Landfill for purposes of operating a Landfill.

"Operation Agreement" means that Sanitary Landfill Operation Agreement dated as of July 1, 2007, as may be amended from time to time, between Loudon County Solid Waste Commission and Santek Environmental, Inc., and any modifications or amendments thereto, or any similar subsequent agreements between the Parties.

"Operator" means any Person that from time to time operates the Landfill on behalf of Lessor.

"Option" has the meaning set forth in Section 14.1.

"Party" or "Parties" has the meaning set forth in the preamble.

"Periodic Statements" has the meaning set forth in Section 7.2.

"Permits" has the meaning set forth in Section 2.4.

"Person" means any individual, trustee, firm, corporation, limited liability company, limited partnership, Governmental Authority or other entity, whether acting in an individual, fiduciary or any other capacity.

"Plant Sites" means one or more parcels of real property located within the Matlock bend Landfill, each of which parcel of real property is large enough to accommodate and upon which the components of one or more Project Facility and the related Collection System will be located. The Plant Sites will be suitable in location and physical make up for the location and operation of the respective portion of the Project Facility and Collection System to be located thereon.

"Products" means the Landfill Gas, and all electricity, heat, steam and any other byproduct derived from the Landfill Gas, including Environmental Attributes and Renewable Energy Credits.

"Project" means all activities and efforts associated with the extraction, recovery, capture, collection, process, production, measure, transportation, storage, marketing, sale, transaction, conveyance, flaring and, reduction or destruction, of the Landfill Gas or other Products, Environmental Attributes, and Renewable Energy Credits, as applicable, pursuant to this Lease, and the location, installation, construction, maintenance, expansion, operation, abandonment and removal of the Collection System or any Project Facility.

"Project Facility" means all machinery, equipment, fixtures, buildings and improvements that are or will be located on the Landfill and constructed, owned or leased by Lessee and that are necessary or incidental to process, produce, measure, transport, store, market production, sell, transact, and convey Products, including the production and transmission of electricity, heat or steam, and condensate collection and return.

"Renewable Energy Credit" or "REC," which also may be known as a "Green Tag" or "Tradable Renewable Certificate (TRC)," means any and all existing and future legal and beneficial rights associated with the green or environmental attributes related to the flaring, reduction or destruction of the Landfill Gas, or production of electricity from a qualifying renewable resource, whether generated under a voluntary program or under a legislative, regulatory or governmental program or scheme of any kind created or recognized by a local, state, federal, international or foreign government authority, or certified or verified by a third party non-governmental or quasi-governmental entity that certifies or verifies RECs. For the purposes of this Lease, a REC may be bundled or unbundled from the associated electricity. A REC shall not be construed to include other Environmental Attributes except that a REC shall include Environmental Attributes to the extent a Governmental Authority, quasi-Governmental Authority or private certifying program mandates Environmental Attributes to be included in order to satisfy its requirements for a REC.

"Rent" has the meaning set forth in Section 7.1.

"Revenues" means the gross revenues received by Lessee and derived from the sale or transacting of Landfill Gas, Environmental Attributes, Renewable Energy Credits, or other Products, minus any applicable commissions, fees, refunds, credits, sales taxes or other taxes required to be paid to third-parties in respect of such sales or revenues. Revenue shall not include any value or benefits derived from Tax Benefits.

"Tax Benefits" means renewable energy related tax credits established under Section 48 or Section 45 of the Internal Revenue Code, as amended, or any similar or successor provision of the Internal Revenue Code (as well as grants that are obtained by Lessee that are in lieu of, or were otherwise designed to replicate the benefits of, such tax credits) and any other tax benefit associated with the Project or any Project Facility.

"Term" has the meaning set forth in Section 6.1.

1.2. Construction of Certain Terms and Phrases. Unless the context of this Lease otherwise requires: (a) words of either gender include the other gender; (b) words using the singular or plural also include the plural or singular, respectively; (c) the terms "hereof," "herein," "hereby," "hereto" and similar words refer to this entire Lease and not any particular Article, Section, Clause, Exhibit, Appendix or Schedule or any other subdivision of this Lease; (d) references to "Article," "Section," "Clause," "Exhibit," "Appendix" or "Schedule" are to the Articles, Sections, Clauses, Exhibits, Appendices and Schedules, respectively, of this Lease; (e) the words "include" or "including" shall be deemed to be followed by "without limitation" or "but not limited to" whether or not they are followed by such phrases or words of similar import; and (f) references to "this Lease" or any other agreement or document shall be construed as a reference to such agreement or document, including any Exhibits, Appendices, Attachments and Schedules hereto, as amended, modified or supplemented and in effect from time to time and shall include a reference to any document that amends, modifies or supplements it, or is entered into, made or given pursuant to or in accordance with its terms. Whenever this Agreement refers to a number of days, such number shall refer to calendar days unless Business Days are specified. All accounting terms used herein and not expressly defined herein shall have the meanings given to them under GAAP.

ARTICLE II
RIGHTS AND OBLIGATIONS OF LESSOR AND LESSEE

2.1. Lease and Conveyance. Lessor hereby grants, leases, conveys and demises to Lessee, free and clear of all liens, claims or any encumbrances whatsoever, the exclusive right, title and interest in and to all of the Landfill Gas and other Products, and, other than as expressly provided in Article VII hereof, the right to receive and retain all Revenues related to the Landfill Gas and Products, during the Term. Title to the Landfill Gas shall pass from Lessor to Lessee at the Collection Point.

2.2. Premises Accepted "As Is, Where Is." Lessee acknowledges that it has inspected the Landfill, and it is understood and agreed that Lessee is leasing the Landfill "AS IS, WHERE IS," and Lessor is under no obligation to make any repairs, alterations or improvements to the Landfill prior to or at the commencement of the Term or at any time thereafter. Except as expressly set forth in the Lease, Lessee has not relied and will not rely upon, and Lessor has not made and is not liable for or bound by, any express or implied warranties, guarantees, statements, representations or information pertaining to the Landfill or the Project.

2.3. Easements. Lessor hereby grants to Lessee a non-exclusive easement over, across and upon those portions of the Landfill reasonably necessary or appropriate for the purposes of construction, installation, operation, maintenance, repair, alteration and removal of the Collection System and any and all Project Facility, and for the purpose of ingress and egress to Lessee's facilities at the Plant Sites. At the request of either Party, the rights and obligations of Lessor and Lessee in respect of the easement granted hereby shall be further detailed in a separate easement agreement reasonably satisfactory to Lessor and Lessee, which easement agreement may be filed and recorded at Lessee's expense in the appropriate filing office. Without limitation of the foregoing, and pursuant to the grant of the lease and easements hereunder, Lessor hereby grants to Lessee such exclusive rights as may be necessary or convenient for Lessee, at Lessee's sole cost and election, consistent with Law:

(a) to conduct exploratory tests, extract, recover, capture, collect, process, produce, measure, transport, store, market production, sell, transact, convey, and flare or otherwise reduce or destroy, the Landfill Gas or other Products, as applicable;

(b) to locate, install, construct, maintain, expand, operate, cease to operate, abandon and remove the Collection System and one or more Project Facility for use in extracting, recovering, capturing, collecting, processing, producing, measuring, transporting, storing, marketing production, selling, transacting, conveying, and flaring or otherwise reducing or destroying the Landfill Gas or other Products, as applicable; and

(c) to install additional electric power and telephone facilities, and construct pipelines with appurtenant facilities, including data acquisition, treatment, compression and collection facilities, and construct additional temporary or permanent access roads on the Landfill, as may be necessary or desirable in connection with the rights granted to Lessee pursuant to Section 2.1 and this Section 2.2.

2.4. Duration and Nature of Lease and Easement. The duration of the lease and easement hereby granted shall be for the Term, as set forth in Section 6.1 of this Lease. The lease and easement granted hereunder are intended to be real property interests and shall run with the land.

2.5. Access to Plant Sites and Landfill. Subject to the limitations and conditions otherwise contained in this Lease, Lessor hereby grants to Lessee and its employees, representatives, agents, invitees, whether express or by implication, and independent contractors, unrestricted access to the Plant Sites and the Landfill on a twenty-four (24) hour per day, seven (7) day per week basis for the purpose of carrying out the exclusive rights granted to Lessee pursuant to Section 2.1 and Section 2.3. In connection with the access granted hereby and subject to the other terms and conditions hereof, Lessor grants to Lessee and its employees, representatives, agents, invitees, whether express or by implication, and independent contractors, the non-exclusive right to (a) use existing access, haul and service roads on the Landfill, and (b) use existing electric power and telephone facilities on the Landfill.

2.6. Precedence of Operations. The management and operation of the Landfill in accordance with all applicable Permits and Laws shall take precedence over the interests conveyed to Lessee pursuant to this Lease and over Lessor's obligations to Lessee hereunder; provided that Lessor shall not allow Operator to restrict Lessee's activities hereunder such that Lessee is unable to realize the benefit of the rights granted to it in the Lease.

ARTICLE III

REPRESENTATIONS AND WARRANTIES

3.1. Lessee Representations and Warranties. Lessee represents and warrants to Lessor as follows.

(a) Lessee is a corporation duly organized and validly existing under the laws of and authorized to do business in the State of Tennessee, with full legal right, power and authority to enter into and to perform its obligations hereunder.

(b) Lessee has duly authorized, executed and delivered this Lease and this Lease constitutes a legal, valid and binding obligation, enforceable against Lessee in accordance with its terms.

(c) Neither the execution nor delivery by Lessee of this Lease, nor the performance by Lessee of its obligations hereunder conflicts with, violates or results in a breach of any constitution, law or governmental regulation applicable to it, or materially conflicts with, violates or results in a breach of any term or condition of any order, judgment or decree or any agreement or instrument to which Lessee is a party or by which Lessee or any of its properties or assets are bound, or constitutes a default thereunder.

(d) Other than as previously disclosed by Lessee to Lessor in writing, no approval, authorization, order, consent, declaration, registration or filing with any Governmental Authority is required for the valid execution and delivery of this Lease by Lessee, except such as have been duly obtained or made.

(e) Lessee is entering into this Lease after a full opportunity to review its terms and conditions, and the risks inherent in the activities to be undertaken and the transactions contemplated by Lessee thereunder, and is financially capable of assuming those risks.

(f) Lessee has all the rights required to enter into this Lease and perform its obligations hereunder without the consent of any third party.

(g) Lessee has no knowledge of any action, suit or proceeding, at law or in equity, including any action or proceeding before or by any Governmental Authority, pending against Lessee, in which an unfavorable decision, ruling or finding would materially adversely affect the performance by Lessee of its obligations hereunder, or that, in any way, would materially adversely affect the validity or enforceability of this Lease.

(h) Lessee makes no representation or warranty, whether express or implied, of any kind or nature, as to the presence, quality or quantity of Landfill Gas on the Landfill.

3.2. Lessor Representations and Warranties. Lessor represents and warrants to Lessee as follows.

(a) Lessor is a political subdivision of the State of Tennessee duly organized and validly existing under the laws of and authorized to do business in the State of Tennessee, with full legal right, power and authority to enter into and to perform its obligations hereunder.

(b) Lessor is duly authorized to execute and deliver this Lease, and this Lease constitutes a legal, valid and binding obligation of Lessor, enforceable against Lessor in accordance with its terms.

(c) Neither the execution nor the delivery by Lessor of this Lease, nor the performance by Lessor of its obligations hereunder conflicts with, violates or results in a breach of any constitution, law or governmental regulation applicable to it, or materially conflicts with, violates or results in a breach of any term or condition of any order, judgment or decree, or any

agreement or instrument to which Lessor is a party or by which Lessor or any of its properties or assets are bound, or constitutes a default thereunder.

(d) Other than as previously disclosed by Lessor to Lessee in writing and as has been obtained, no approval, authorization, order, consent, declaration, registration or filing with any Governmental Authority is required for the valid execution, delivery and performance by Lessor of this Lease.

(e) Lessor has all the rights required to enter into this Lease and perform its obligations hereunder without the consent of any third party.

(f) There is no action, suit or proceeding, at law or in equity, including any action or proceeding before or by any Governmental Authority, pending against Lessor, in which an unfavorable decision, ruling or finding would materially adversely affect the performance by Lessor of its obligations hereunder, or that, in any way, would materially affect the validity or enforceability of this Lease or the exercise by Lessee of its rights hereunder.

(g) Lessor owns good and marketable title to the Landfill and to the Landfill Gas, free and clear of any mortgage, lien or other encumbrance.

(h) All activities and operations of Lessor in connection with the Landfill are in compliance with the requirements of all applicable Environmental Laws.

(i) Lessor makes no representation or warranty, whether express or implied, as to the presence, quality or quantity of Landfill Gas or the suitability of the Landfill to conduct the Project.

ARTICLE IV

ENVIRONMENTAL ATTRIBUTES; TAX BENEFITS

4.1. Allocation.

(a) From and after the Effective Date and at all times during the Term, Lessee has and shall possess and retain exclusive title to, and all rights, interests and benefits of, any and all Products derived pursuant to this Lease, including, the sole and exclusive right to use, sell, trade, assign, convey or otherwise engage in transactions involving the Landfill Gas and Products, in its sole discretion, and, other than as expressly provided in Article VII hereof, to receive and retain all Revenues generated from such transactions.

(b) Lessor hereby grants, makes and conveys to Lessee an absolute and irrevocable assignment of any and all right, title or interest that it may now or at any time own in respect of any Environmental Attributes or Renewable Energy Credits available during the Term in connection with the transactions contemplated under this Lease.

(c) Lessee shall at all times own and have all of the exclusive rights in and to, and the benefit of, all Tax Benefits.

4.2. Cooperation. Lessor shall, at no cost to Lessor, cooperate with Lessee in any action that Lessee reasonably determines is necessary or advisable with respect to the identification, creation, validation, verification, acquisition, sale and/or transfer of any Product.

ARTICLE V

LEASEHOLD

5.1 Property Description. The Landfill consists of the real property located in Loudon County, in the State of Tennessee, as more particularly described, in Exhibit A attached hereto.

5.2. Memorandum of Lease. Lessee may, but is not obligated to, at its own expense file and a record a Memorandum of Lease in respect of this Lease and the rights granted pursuant to Section 2.1 in the appropriate filing office.

5.3 Estoppel and Non-Disturbance. In the event that any or all of the Landfill is or becomes subject during the Term to a lease, security interest, lien, mortgage, deed of trust or similar encumbrance, Lessor shall ensure that the lessor or mortgagee enters into an agreement with Lessee or provides an estoppel reasonably acceptable to Lessee and its Lenders acknowledging and recognizing Lessee's rights under this Lease and acknowledging that the Collection System and Project Facility are the property of Lessee severable from the Landfill and that such lessor or mortgagee shall have no right or interest in or to the Collection System or Project Facility, except as expressly provided herein.

5.4 Possession. Lessee shall peaceably and quietly hold and enjoy possession of the Collection System and any Project Facility during the Term without hindrance or interruption by Lessor or any other person lawfully or equitably claiming by, through or under Lessor.

5.5 No Encumbrance by Lessee. Lessee shall not do any act which shall in any way encumber the title of Lessor in and to the Landfill, nor shall any interest or estate of Lessor in the Landfill be in any way subject to any claim by way of lien or encumbrance, and any claim or lien upon the Landfill arising from any act or omission of Lessee shall accrue only against the leasehold estate of Lessee. In the event any liens or encumbrances are placed on the Landfill as a result of any act or omission of Lessee, Lessee immediately shall take all necessary steps to cause the removal of such liens or encumbrances, at its sole cost and expense.

5.6 Successor Lessor. Lessor shall not sell, convey, transfer, assign or lease the Landfill to any Person unless such Person shall have assumed and agreed in writing with Lessee (in form reasonably satisfactory to Lessee) to be bound by Lessor's obligations under this Lease. Lessor shall give Lessee not less than thirty (30) days prior written notice of any such event.

5.7 Bankruptcy or Judgments. Lessee covenants and agrees that this Lease and the interest of Lessee hereunder shall not be subject to garnishment or sale under execution or otherwise in any suit or proceeding which may be brought against Lessee.

5.8 Compliance with Laws. Lessee shall comply with all applicable Laws in its use and conduct of activities at the Landfill pursuant to this Lease. In the event that any violations of Law occur arising out of or in connection with Lessee's use or conduct of activities at the Landfill pursuant to this Lease, Lessee shall be solely responsible for performing all requirements to achieve and maintain compliance with such Laws. Lessee's obligations under this paragraph shall survive termination or expiration of this Lease.

5.9 Notice of Environmental Spills, Leaks, Releases, or Accidents. Lessee shall immediately, upon discovery, furnish written notice to Lessor of all environmental spills, leaks, releases, or accidents that occur at the Landfill in connection with the production of the Products or that are otherwise related to or attributable to Lessee's actions at the Landfill pursuant to this Lease, and furnish Lessor with copies of all filings related thereto that are required by Law. Nothing in this paragraph shall place upon Lessor any duties to notify authorities or engage in cleanup, remediation, or other activities at the Landfill in connection with any such environmental spills, leaks, releases, or accidents. Any such duties are exclusively those of Lessee, and shall survive termination or expiration of this Lease.

5.10 Duty of Reasonable Care. Lessee shall exercise reasonable care and engage in Good Industry Practices in its use and conduct of activities at the Landfill under this Lease, and Lessee shall be responsible for any damage to the Landfill, or spills, leaks, or releases that occur during the term of the Lease as a result thereof. Lessee's obligations under this paragraph shall survive termination or expiration of this Lease.

ARTICLE VI

LEASE TERM

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6.1. Term. This Lease shall take effect as of the Effective Date and shall remain in full force and effect for twenty-five (25) years from the date of first production of the Products (the "Initial Term"), unless earlier terminated as provided herein. Thereafter, the term of this Lease shall automatically renew for successive five (5) year terms, unless either party gives the other party written notice of termination at least ninety (90) days prior to the end of the then current term (the Initial Term and all renewal terms of this Lease shall collectively be referred to as the "Term"). At the expiration of the Term, this Lease shall terminate, provided, that Lessee shall be afforded a reasonable period following the expiration of the Term for the removal of Lessee's property. Upon such termination, and except for any payments owing as of the date of such termination and for any provisions of this Lease which expressly or impliedly survive termination or expiration, including indemnities provided hereunder, Lessee and Lessor shall be relieved of all obligations under this Lease.

6.2. Termination for Convenience. At any time after the Effective Date, Lessee may terminate this Lease upon not less than thirty (30) days prior written notice to Lessor, if Lessee determines, in its sole discretion, that the Project is not economically viable or profitable for any reason, including the following: (a) the Landfill cannot or can no longer produce sufficient quantities of Landfill Gas; (b) any Permits required for the operation of the Collection Systems or any Project Facility have not or cannot be obtained, despite Lessee's good faith efforts; or (c) due to a Material Change in Law that cannot be addressed in accordance with Article IX.

6.3. Lessor's Right to Terminate.

(a) Upon the occurrence and during the continuation of one or more of the following events, Lessor shall have the option to terminate this Lease by providing Lessee with sixty (60) days notice of such termination:

(1) If Lessee has not initiated development of the Project within eighteen (18) months of the Effective Date;

(2) If Lessee has not begun producing Products within four (4) years after initiating development of the Project; or

(3) If Lessee has ceased production of Products has ceased for a continuous period of one (1) year at any time after such production has been initiated; or

(4) Upon the termination or expiration of the Operation Agreement between Lessor and Lessee.

(b) In the event Lessor exercises its option to terminate this Lease as provided in Subsection (a) above and in order to prevent Lessee's loss of capital investment in reliance on this Lease, at Lessee's option exercised by written notice to Lessor, Lessor shall purchase the Project Facility ("Lessee's Put"). The purchase price of the Lessee's Put shall be an amount equal to the fair market value of such Project Facility, determined by mutual agreement of the Parties. If the Parties fail to reach agreement on such fair market value within thirty (30) days following notice of the exercise of Lessee's Put, such fair market value shall be determined by an independent appraiser appointed by the Parties. The closing terms of Lessee's Put shall be substantially consistent with the closing terms of Section 14.1 of this Lease. Lessee's rights under this Section 6.3 shall survive the expiration, surrender or termination of this Lease.

ARTICLE VII

PAYMENTS

7.1 Payments.

(a) Payments. In consideration of the rights granted to Lessee pursuant to this Lease, Lessee agrees to pay to Lessor an amount equal to seven and one half (7.5) percent of Revenues received by Lessee on a quarterly basis.

(b) All payments from Lessee to Lessor shall be made by check to the order of Lessor at Lessor's mailing address, receipt of same being subject to collection.

(c) If Lessee shall fail to make any payment when due, such unpaid amount shall bear interest until paid at the rate of 1.5% per month for all sums which are in excess of ten (10) days overdue.

(d) In the event Lessee pays any rent or other charge by check or draft, and such check or draft is not honored by the bank on which it is drawn, an additional charge of $15.00 shall be due from Lessee to Lessor.

7.2. Periodic Statements. Lessee shall provide a statement (a "Periodic Statement") to Lessor not later than thirty (30) days after the end of each quarter (each such period being a "Billing Period"), showing, for the preceding Billing Period:

(a) The quantity of Landfill Gas (in MMBtu) collected from the Landfill during the Billing Period as measured in accordance with Section 8.2;

(b) Revenues during the Billing Period generated from the Landfill Gas, Environmental Attributes and Renewable Energy Credits (together with supporting calculations, showing gross receipts for Landfill Gas, Environmental Attributes and Renewable Energy Credits, and any applicable sales taxes or other taxes required to be paid to third-parties);

(c) The amount due to the Lessor based on the Revenues received during the Billing Period, in accordance with Section 7.1; and

(d) Any taxes or duties that Lessee is obliged to charge on the Rent due to Lessor for the Billing Period.

(e) Unless otherwise expressly provided herein, all monetary obligations of Lessee to Lessor under this Lease, of any type or nature shall be denominated as rent.

For the avoidance of doubt, Lessee shall prepare and send Lessor a Periodic Statement prepared in accordance with this Section 7.2, whether or not any Revenue has accrued and payment is due and payable to Lessor with respect to such Billing Period.

7.3. Billing and Payment. Within thirty (30) days of providing the Periodic Statement, Lessee shall pay to Lessor the amount due as shown in the Periodic Statement to the Lessor. At Lessee's request, Lessor shall send Lessee an invoice in a form reasonably agreed by the Parties for the Payments due for the relevant Billing Period. Payments shall be paid in lawful money of the United States to Lessor as set forth below in Section 7.1(c) or at such other place as Lessor shall from time to time direct Lessee by prior written notice.

7.4. WAIVER OF CLAIMS FOR SALES. LESSOR HEREBY ACKNOWLEDGES AND AGREES THAT LESSOR MAY NOT DICTATE THE PRICE, TIMING, OR TERMS OF ANY LESSEE'S SALE OF LANDFILL GAS, ENVIRONMENTAL ATTRIBUTES, RENEWABLE ENERGY CREDITS OR OTHER PRODUCTS DERIVED BY LESSEE UNDER THIS LEASE. LESSOR HEREBY WAIVES ANY CLAIM AGAINST LESSEE REGARDING THE PRICE, TIMING, OR TERMS THEREOF; EXCEPT TO THE EXTENT SUCH CLAIM DIRECTLY RELATES TO A THIRD-PARTY CLAIM AGAINST LESSOR COVERED BY SECTION 11.1(a) OF THIS LEASE.

7.5. Records and Financial Statements. Lessee shall at all times during the Term and for a period of three (3) years after the expiration or termination of this Lease, keep or cause to be kept true and complete books, records and accounts, together with applicable supporting

documentation, of all information used to support any other information: 1) necessary to establish Lessor's share of the Revenues generated from Lessee's sale of Products derived pursuant to this Lease; and 2) used to prepare the Periodic Statements. Lessee shall permit Lessor, at Lessor's sole cost and expense, to audit all such records, documents and data used in preparing its Periodic Statement on reasonable prior written notice during normal business hours.

ARTICLE VIII

COLLECTION SYSTEM AND PROJECT FACILITY; METERING

8.1. Construction of Collection System and Project Facility. Subject to Lessor's termination rights under Section 6.3(a), Lessee shall develop the Collection System or the Project Facility in its sole discretion.

8.2. Landfill Gas Measurement. Lessee shall be responsible for installing, operating and maintaining, at no cost to Lessor, all flow meters and measuring equipment necessary for accurately and continuously measuring the quantities of Landfill Gas collected from the Landfill and the composition of such Landfill Gas. Lessee shall periodically calibrate, verify and, if necessary, recalibrate the measuring equipment. Lessee shall record the quantities of Landfill Gas collected from the Landfill and shall maintain such records for not less than three (3) years. Lessee shall provide Lessor with reasonable access during normal business hours to all after the expiration or termination of this Lease. Lessor shall have the right, at any reasonable time and from time to time, to audit, inspect, and copy records, test data and, charts, and other information collected regarding the Landfill Gas.

ARTICLE IX

MATERIAL CHANGE IN LAW

In the event of a Material Change in Law, the Parties shall, to the extent necessary and possible, cooperate in good faith to reform this Lease to ensure compliance and conformity with such Material Change in Law and to restore or retain the Parties' original intended benefits and obligations under this Lease.

ARTICLE X

COORDINATION

The Parties acknowledge that as of the Effective Date, the Landfill is operated by an Operator. Lessee shall coordinate its activities at the Landfill with the Operator, and Lessor, to the extent permitted under the Operation Agreement, shall direct and require the Operator to coordinate its activities with Lessee, in order that Lessee may exercise its rights and enjoy its benefits under this Lease, and that neither Lessee nor Operator unreasonably interferes with each other's operations. At such time as there is no Operator operating the Landfill, Lessee and Lessor shall undertake to coordinate their respective operations at the Landfill in such manner so that neither Lessee nor Lessor unreasonably interferes with each other's operations.

ARTICLE XI

INDEMNIFICATION

11.1. Indemnification by Lessee.

(a) Lessee shall indemnify, defend, and hold harmless, subject to Section 11.2 hereof and to the terms of the Operation Agreement, Lessor, and its Affiliates and their respective officers, board members, employees, agents, contractors, subcontractors, invitees, and successors and assigns ("Lessor Persons") for, from, and against any and all liability, claims, damages, losses, costs, demands, penalties, fines, damages, expenses arising out of or in connection with causes of action, suits, or judgments, including, and expenses of any kind or nature (including reasonable attorneys' fees, and all court costs and experts' fees) actually incurred or paid by a Lessor Person (to the extent not actually recovered by insurance proceeds) (collectively, "Claim(s)" or "Loss(es)") which arise or accrue on or after the Effective Date and which are in any way related to: (i) Lessee's violation of Law or breach of the Lease by Lessee, or; (ii) Lessee's use, occupancy, conduct, operation, construction or management of the Collection System or any Project Facility, including without limitation (A) any violation of applicable Permits or Laws by any Lessee Person, and (B) any negligent, grossly negligent or intentional act or omission of a Lessee Person.

(b) Lessee's indemnification of Lessor Persons under this Section 11.1 shall not be applicable to the extent that Losses, or any portion thereof, are a result of any breach of this Lease by Lessor, or the negligence, willful misconduct or intentional acts or omissions attributable to any Lessor Person.

(c) Lessee shall promptly assume its defense and indemnification obligations (with counsel reasonably acceptable to Lessor) upon written notice of a claim against Lessor subject to coverage under Section 11.1. Lessor may participate in, but not control, the defense of a claim. At the request of Lessee, Lessor shall reasonably cooperate in the defense of a claim. Lessee shall not settle any non-monetary claim against Lessor without Lessor's written agreement, which agreement shall not be unreasonably withheld.

11.2. Indemnification by Lessor.

(a) Except as otherwise provided in the Lease, and subject to the terms of the Operation Agreement, Lessor shall, to the extent permitted by law, release, indemnify, defend, and hold harmless, subject to Section 11.1, Lessee, and its Affiliates and their respective officers, directors, shareholders, employees, agents, contractors, subcontractors, invitees, subcontractors, invitees, and successors and assigns ("Lessee Persons") for, from, and against any and all liability, claims, damages, losses, costs, demands, penalties, fines, damages, expenses arising out of or in connection with causes of action, suits, or judgments, including, and expenses of any kind or nature (including reasonable attorneys' fees, and all court costs and experts' fees) actually incurred or paid by a Lessee Person (to the extent not actually recovered by insurance proceeds), which arise or accrue on or after the Effective Date and which are in any way related to: (i) Lessor's violation of Law or breach of the Lease by Lessor; and (ii) Lessor's (or an Operator's other than Lessee) use, occupancy, conduct, operation or management of the Landfill

or the solid waste facility, including without limitation (A) any violation of applicable Permits or Laws or any negligent, grossly negligent or intentional act or omission by Lessor (other than Lessee).

(b) Lessor's indemnification of Lessee Persons under this Section 11.2 shall not be applicable to the extent that Losses, or any portion thereof, are the result of any breach of this Lease by Lessee, or the negligence, willful misconduct or intentional acts or omissions attributable to any Lessee Person.

(c) Lessor shall promptly assume its defense and indemnification obligations (with counsel reasonably acceptable to Lessee) upon written notice of a claim against Lessee subject to coverage under Section 11.2. Lessee may participate in, but not control, the defense of a claim. At the request of Lessor, Lessee shall reasonably cooperate in the defense of a claim. Lessor shall not settle any non-monetary claim against Lessee without Lessee's written agreement, which agreement shall not be unreasonably withheld.

11.3. Survival. All provisions of this Article XI shall survive the expiration, surrender or termination of this Lease.

ARTICLE XII

TAXES

12.1. Lessee Taxes. Lessee shall, during the term of this Lease, pay all personal property taxes and assessments, sales taxes, water and sewer charges, and charges for public utilities that may be levied upon or assessed against the Collection System, any Project Facility or Landfill Gas, and all other equipment and facilities constructed or installed by Lessee in, on, or adjacent to the Landfill under this Lease.

12.2. Lessor Taxes. Except as provided in Section 12.1 or otherwise provided in the Operation Agreement, during the term of this Lease, Lessor shall pay or arrange for the payment of all taxes, assessments, water and sewer charges, charges for public utilities, and other charges and fees that may be levied upon or assessed against the Project, Project Facility, Products, Collection System, or other property or activities related to Lessee's landfill gas operations under this Lease, and any property, land, facilities, equipment and improvements owned, constructed, located, or installed by Lessor in, on, or adjacent to the Landfill, including the solid waste facility.

ARTICLE XIII

FORCE MAJEURE

Except as otherwise provided in this Article XIII, a Party shall be excused from performance under this Lease, and shall not be considered to be in default hereunder for failure to perform an obligation under this Lease, to the extent that such Party is unable to, or otherwise fails to, perform or prevented from fulfilling the obligation due to an Event of Force Majeure. No Party shall be relieved of any obligation for the payment to pay money as a result of an Event of Force Majeure. If either Party's ability to perform its obligations under this Lease is affected

by an Event of Force Majeure, such Party shall: (i) promptly notify the other Party in writing of such event and its cause; and (ii) promptly supply such other Party available information about the Event of Force Majeure and its cause as may be reasonably requested by the other Party. A Party's suspension of performance by a Party of its obligations due to an Event of Force Majeure hereunder shall be of no greater scope and no longer duration than that which is necessary by reason of the Event of Force Majeure. The affected Party shall use commercially reasonable efforts to promptly mitigate or remedy its inability to perform its obligations under this Lease due to an Event of Force Majeure. An Event of Force Majeure shall not excuse compliance with any Permit or Law, except to the extent such compliance is excused by An Event of Force Majeure under the applicable Law or Permit.

ARTICLE XIV

DISPOSITION OF PROJECT FACILITY UPON LEASE TERMINATION OR EXPIRATION

14.1. Option to Purchase Project Facility.

(a) Lessee hereby grants to Lessor an irrevocable option (the "Option") to purchase the Project Facility owned by Lessee effective as of the date of expiration of this Lease. The purchase price of the Project Facility shall be an amount equal to the fair market value of such Project Facility, determined by mutual agreement of the Parties. If the Parties fail to reach agreement on such fair market value within thirty (30) days following notice by Lessor that it is exercising its option to purchase the Project Facility, such fair market value shall be determined by an independent appraiser appointed by the Parties. Any such sale and transfer shall be on an AS-IS, WHERE-IS basis and without warranty of any kind, whether express or implied, other than warranty as to Lessee's title to the Project Facility. Not later than 180 days prior to the expiration of this Lease, Lessor shall notify Lessee in writing whether Lessor elects to exercise the Option. If Lessor fails to deliver such notice in a timely manner, Lessor shall be deemed to have elected not to exercise the Option. For the avoidance of doubt, the Option shall not be exercisable by Lessor in the event this Lease is terminated prior to the expiration of the Term (other than a termination by Lessee pursuant to Section 6.2) and shall in no event apply to any Project Facility, or portions thereof, not owned by Lessee as of the date of expiration of this Lease.

(b) If Lessor exercises the option to purchase the Project Facility, the closing shall occur within thirty (30) days after the determination of the fair market value in accordance with Section 14.1(a). At the closing, (i) Lessor shall pay the agreed purchase price to Lessee; (ii) Lessee shall execute and deliver to Lessor an appropriate instrument or instruments to transfer the Project Facility, together with all related plans, specifications, operating manuals and any third-party warranties (if any) in Lessee's possession, to Lessor AS-IS, WHERE-IS, and without warranty of any kind, whether express or implied, other than warranty as to Lessee's title to the Project Facility, its authorization to execute and deliver title to Lessor, and that all activities and operations of Lessee under the Lease were conducted in compliance with applicable Law; and (iii) subject to provisions of the Lease surviving its expiration or termination, Lessee shall be released from any liability or obligation with respect to the Project Facility arising from Lessor's subsequent ownership or use of the Project Facilities.

14.2. Removal and Restoration Obligations. In the event that the Project Facility is not purchased by Lessor pursuant to Section 14.1, within thirty (30) days after termination or expiration of the Lease, Lessee, at no cost to Lessor, shall provide for the removal of any machinery and equipment of the Project Facility from the Landfill. Lessee's obligation shall not include any removal or restoration with respect to any buildings or improvements erected on the Landfill.

14.3. Collection System. Within thirty (30) days after the termination or expiration of this Lease, Lessee shall execute and deliver to Lessor an appropriate instrument or instruments to transfer the Collection System to Lessor, together with all related plans, specifications, operating manuals and any third-party warranties (if any) in Lessee's possession, to Lessor AS-IS, WHERE-IS, and without warranty of any kind, whether express or implied, other than warranty as to Lessee's title to the Collection System, its authorization to execute and deliver title to Lessor, and that all activities and operations of Lessee under the Lease were conducted in compliance with applicable Law. Upon such transfer, subject to provisions of the Lease surviving its expiration or termination, Lessee shall be relieved of any liability or obligation with respect of the Collection System arising from Lessor's subsequent ownership or use of the Collection System.

ARTICLE XV

CONDEMNATION

If, at any time during the Term, the Landfill, the Landfill Gas, the Collection System, the Project Facility, or any part thereof or interest therein, shall be taken or damaged by reason of any public improvement or condemnation proceeding, or in any other manner, or should Lessee or Lessor receive any notice or other information regarding such proceeding, the Party receiving such notice or other information shall give prompt written notice thereof to the other Party. Each of Lessee and Lessor shall be entitled to all condemnation proceeds relating to property owned by it, and shall be entitled at its option to commence, appear in and prosecute in its own name any action or proceedings.

ARTICLE XVI

DEFAULT

16.1. Lessee's Default.

(a) Lessor may notify Lessee in writing in the event that Lessee at any time fails to perform or fulfill its obligations hereunder. Lessee shall have thirty (30) days after receipt of such notice in which to cure its default, except with respect to the obligations to make payments, for which the cure period shall be ten (10) days. If Lessee fails to cure its default within the applicable cure period, Lessor shall have the right to terminate this Lease upon written notice to Lessee; provided, however, that with respect to any failure other than a failure to make any payment when due, if compliance within the thirty (30) day cure period provided for herein is not reasonably possible, so long as Lessee has commenced and is diligently pursuing such compliance efforts, Lessee shall have an additional ninety (90) days in which to cure its default.

(b) The occurrence of any one of the following events also shall constitute default of this Lease by Lessee:

(i) The making of an assignment or general arrangement for the benefit of creditors by Lessee, or a receiver or trustee being appointed for all or substantially all of the Lessee's assets and such receivership has not been terminated or stayed within sixty (60) days;

(ii) The attachment, execution or other judicial seizure of substantially all of Lessee's assets located in the leasehold premises or Lessee's interest in this Lease, where such seizure is not discharged within sixty (60) days; or

(iii) The filing by Lessee of a petition under any bankruptcy or insolvency law, or the filing of such a petition against Lessee which is not dismissed within sixty (60) days.

16.2 Lessor's Termination of Lease in Event of Lessee's Default. Upon the occurrence of any default and the lapse of any applicable cure period, Lessor shall have the right to terminate this Lease, in which event Lessee shall immediately surrender the leasehold premises to Lessor. If Lessee shall fail to do so, Lessor may, to the extent lawful, without notice or prejudice to any other statutory or common law remedy available, enter and take possession of the leasehold premises and remove Lessee or anyone occupying the leasehold premises and its effects, without being liable to prosecution or any claim for damages. Lessor also shall be entitled to recover from Lessee the entire amount of all monies due and unpaid hereunder as of the date of such termination.

16.3 Lessor's Default. Lessee may notify Lessor in writing in the event that Lessor at any time fails to perform or fulfill its obligations hereunder. Lessor shall have thirty (30) days after receipt of such notice in which to cure its default, except with respect to the obligations to make payments, for which the cure period shall be ten (10) days. If Lessor fails to cure its default within the applicable cure period, Lessee shall have the right to terminate this Lease upon written notice to Lessor; provided, however, that with respect to any failure other than a failure to make any payment when due, if compliance within the thirty (30) day cure period provided for herein is not reasonably possible, so long as Lessee has commenced and is diligently pursuing such compliance efforts, Lessor shall have an additional ninety 90) days in which to cure its default.

16.4. Remedies. Subject to the limitations of liabilities et forth herein, in the event of a default by a Party that is not cured with in the applicable time period for surc set forth above, the non-defaulting Party shall have the right to exercise any and all available legal and equitable remedies.

16.5 Litigation Expenses. If either Party hereto is required or elects to take legal or equitable action against the other to enforce its rights under this Lease or to require performance by the defaulting Party of its obligations under this Lease, then the non-prevailing Party shall immediately pay to the prevailing Party all costs and expenses, including, without limitation, reasonable attorneys' fees and all court costs and experts' fees, incurred by the prevailing party in such action. A Party is deemed to have prevailed if it obtains a judgment or settlement in its favor that substantially provides for the relief contemplated either in its complaint or responsive pleading.

16.6 Survival. Notwithstanding anything contained herein to the contrary, the rights and obligations in this Article XVI shall survive expiration or termination of this Lease.

ARTICLE XVII

ASSIGNMENT OR SUBSEQUENT TRANSFERS

17.1 Lessee Assignment. Lessee may assign this Lease to any of its Affiliates. Otherwise, Lessee shall not sell, assign, pledge, sublet, delegate or otherwise transfer (collectively, an "Assignment") this Lease, or any of its rights or obligations hereunder, without the prior written consent of the Lessor, whose consent shall not be unreasonably withheld, conditioned, or delayed. Lessee shall give Lessor no less than thirty (30) days prior written notice of any such assignment requiring consent hereunder.

17.2 Lessor Assignment. Lessor shall not sell, assign, pledge, sublet delegate or otherwise transfer (collectively, an "Assignment") this Lease, unless it is in connection with Lessor's sale of the Landfill in conformance with Section 5.6 of this Lease, without the prior written consent of the Lessee, whose consent shall not be unreasonably withheld, conditioned, or delayed. Where Lessee's prior written consent is required, Lessor shall give Lessee no less than thirty (30) days prior written notice of any such assignment requiring consent hereunder.

17.3 Financing Assignment.

(a) After written consent from the other Party is obtained, either Party may make an Assignment of this Lease for collateral security purposes to a Lender providing financing, directly or indirectly, in connection with the construction, operation, or ownership of that Party's facilities on the Landfill (a "Financing Assignment"). Any assignee of a Party's interest hereunder shall assume and agree in writing to perform all of the obligations of its assignor arising hereunder after the effective date of such Assignment. Any Party making a permitted Assignment (the "Assignor") pursuant to Section 17.1 or 17.2 shall promptly notify the other Party after the assignment is complete, and furnish such Party with a copy of such Assignment.

(b) In connection with a Financing Assignment as contemplated by this Section 17.3, the other Party shall, upon the reasonable request of the Assignor, cooperate with the Assignor in order to deliver such customary additional documentation as the Lender may reasonably request in order to effect the financing transaction. Such additional documentation

may include the following: (i) an acknowledgment by the non-assigning Party of the Financing Assignment, (ii) an estoppel certificate confirming the absence of (or identifying existing) breaches of this Lease by either of the Parties, and (iii) an agreement under which the non-assigning Party will provide the Lender with (A) all notices of default and/or termination of this Lease, (B) upon default by the Assignor under this Lease, rights of the Lender to cure such defaults and otherwise perform the obligations of the Assignor under this Lease, (C) upon default by the Assignor with respect to the financing transaction, foreclosure or "step-in" rights of the Lender (or an assignee of that Lender) (a "Lender Assignee") to assume the rights and obligations of the Assignor under this Lease without the consent of the non-assigning Party, and (D) the right of the Lender to receive direct payments of any amounts due to the Assignor. Neither the Lender nor a Lender Assignee shall be deemed to have assumed the obligations of Assignor under this Lease until the Lender or such Lender Assignee acquires the rights of Assignor under this Lease by virtue of the exercise by Lender of its foreclosure or "step-in" rights.

ARTICLE XVIII

INSURANCE

18.1 Insurance. Prior to undertaking any inspections or tests, or otherwise conducting any activities upon the leasehold property, Lessee shall deliver certificates of insurance to Lessor evidencing that Lessee and its contractors have in place insurance coverage, as follows: (i) commercial general liability insurance (in an amount not less than $1 million per occurrence and $2 million in the aggregate); (ii) errors and omissions insurance (in an amount not less than $2 million per occurrence and $2 million in the aggregate); (iii) automobile insurance (in an amount not less than $1 million per occurrence and $2 million in the aggregate); and (iv) workers' compensation insurance, with a statutory limit covering all persons working at the leasehold property, in each case on terms and amounts and from a company reasonable satisfactory to Lessor, covering any act, omission, occurrence or liability arising out of or in connection with the presence of Lessee and Lessee Persons and/or its representatives on the leasehold property, which certificates of insurance shall name Lessor as additional insured under each of the policies, as applicable.

18.2 Lessee's Property. All equipment, effects and property of every kind, nature and description of Lessee, Lessee Persons, and of all other persons claiming by, through or under Lessee which during the Term of this Lease or any occupancy of the Landfill by Lessee or anyone claiming under Lessee may be on the Landfill shall be at the sole risk and hazard of Lessee, and, if the whole or any part thereof shall be destroyed or damaged by fire, water or otherwise, by theft or from any other cause, no part of such loss or damage shall be charged to or be borne by Lessor unless such loss or damage is due to the negligence of Lessor.

ARTICLE XIX

NOTICE

All notices, demands and other communications under this Lease shall be in writing and shall be effective on the date of delivery by registered United States mail, overnight courier or confirmed facsimile transmission, to the Party to whom it is intended at the address of such Party set forth below:

To the Lessor:

Loudon County Solid Waste Disposal Commission
101 Mulberry Street, Suite 102
Loudon, Tennessee 37774

With a copy to:
C. Coulter Gilbert, Esquire
550 Main Street, Suite 400
Knoxville, Tennessee 37902

To the Lessee:

Santek Environmental, Inc.
650 25th Street, N.W., Suite 100
Cleveland, TN 37311
Attn: Eddie Caylor
Facsimile: (423) 479-1952

With a copy to:

G. Scott Thomas
Bass, Berry & Sims PLC
150 Third Avenue South
Suite 2800
Nashville, Tennessee 37201

Each Party to this Lease may change its address or facsimile number for notices hereunder by specifying such change in accordance with the foregoing.

ARTICLE XX

MISCELLANEOUS

20.1 Severability. If any provision of this Lease is invalid, illegal or unenforceable under any present or future law, such provision shall be fully severable and the remainder of this Lease should continue in full force and effect. In lieu of any severed provision, the Parties shall

negotiate in good faith to modify this Lease to add a provision with terms as similar as possible to the alleged invalid, illegal, or unenforceable provision so as to effect the original intent of the Parties to the extent practicable.

20.2 Governing Law. The laws of the State of Tennessee shall govern the validity, construction, interpretation and enforcement of this Lease, without regard to the conflicts of law rules thereof that would require application of the laws of any other jurisdiction.

20.3 WAIVER OF JURY TRIAL. LESSOR AND LESSEE ACKNOWLEDGE AND AGREE THAT ANY CONTROVERSY WHICH MAY ARISE HEREUNDER IS LIKELY TO INVOLVE COMPLICATED AND DIFFICULT ISSUES AND HEREBY WAIVE ANY RIGHT TO A TRIAL BY JURY IN ANY ACTION TO ENFORCE OR DEFEND ANY RIGHT OR OBLIGATION PURSUANT TO THE LEASE OR UNDER ANY DOCUMENT, INSTRUMENT, OR AGREEMENT DELIVERED OR TO BE DELIVERED IN CONNECTION WITH THIS LEASE, AND AGREE THAT ANY ACTION WILL BE TRIED BEFORE A COURT AND NOT BEFORE A JURY.

20.4 Counterparts. This Lease may be executed in one or more identical counterparts, each of which shall be deemed original, and all of which together shall constitute one and the same instrument.

20.5 Relationship of Parties. Nothing contained in this Lease or the transactions contemplated hereunder shall constitute or create a joint venture, partnership, agency, or any other similar association between the Parties, it being expressly understood and agreed that neither the provisions contained in this Lease nor any acts of the Parties shall be deemed to create any relationship between them other than as Lessor and Lessee. No officer, employee, agent or independent contractor of either Party will at any time be authorized to act as an agent for the other Party.

20.6 Consent. Unless otherwise specifically provided herein, whenever consent or approval of Lessor or Lessee is required under the terms of this Lease, such consent or approval shall not be unreasonably withheld, conditioned or delayed. If either party withholds any consent or approval, such party shall on written request deliver to the other party a written statement giving the reasons therefore.

20.7 Limitation of Liability. Notwithstanding any other provision of this Lease, in no event shall either party be liable to the other for any consequential, indirect, special or punitive damages or loss of profits or loss of goodwill, regardless of whether the Lessor or Lessee has been informed of the possibility of such damages or is negligent, and whether or not such damages were reasonable foreseeable.

20.8 Amendment. No amendment to this Lease shall be valid unless it is made in writing, specifically states that it amends this Lease, and is signed by authorized representatives of both parties. Each Party acknowledges and agrees that it shall not rely on any alleged oral or written statement as a modification to this Lease unless an amendment has been signed by authorized representatives of both Parties.

20.9 Headings. The headings of the articles, sections, and subsections of this Lease are inserted as a matter of convenience and for reference purposes only, are of no binding effect, and in no respect define, limit, or describe the scope of this Lease or the intent of any part thereof.

20.10 Parties Bound. This Lease shall be binding upon and inure to the benefit of the parties hereto and their respective successors and permitted assigns.

20.11. Waiver. A waiver of any of the provisions of this Lease shall only be effective if made in writing. Failure on the part of Lessor or Lessee to complain of any action or non-action on the part of the other party shall not be deemed to be a waiver of any rights hereunder. No waiver at any time of any of the provisions hereof by Lessor or Lessee shall be construed as a waiver at any subsequent time of the same provisions. The consent or approval of Lessor or Lessee to or of any action or non-action by Lessor or the other party requiring Lessor's or Lessee's consent or approval, shall not be deemed to waive or render unnecessary Lessor's or Lessee's consent or approval to or of any subsequent similar action or non-action by the other party.

20.12. Entire Contract. Subject to the Operation Agreement, the entire agreement between Lessor and Lessee with respect to the subject matter hereof is embodied herein and supersedes all prior oral or written agreements and understandings between the Parties or their respective Affiliates relating to the subject matter of this Lease. Any inconsistencies between the Operation Agreement and this Lease are to be resolved in favor of the Operation Agreement. No oral warranties, representations, or promises have been made or relied upon by either party as an inducement to or modification of this Lease.

20.13. No Third-Party Beneficiaries. Except as specifically provided herein with respect to the Lessor Persons and Lessee Persons, nothing contained herein is intended, or shall be deemed, to create or confer any rights upon any third, this Lease constitutes an agreement solely between the Parties hereto, and, except as otherwise provided herein, does not deem any person not party to this Lease a third-party beneficiary under or by reason of this Lease.

20.14. Further Assurances. In addition to the agreements herein provided, from time to time upon the reasonable request of the other party, each of the parties hereto shall execute and deliver such additional certificates, notices and documents, and shall take such other action as may reasonably be deemed necessary to implement provisions of this Lease giving full effect to the rights provided and the transactions contemplated thereunder.

[TURN TO SIGNATURE PAGE]

IN WITNESS WHEREOF, the parties have caused this Landfill Gas Lease to be executed by their duly authorized representatives as of the Effective Date.

LOUDON COUNTY SOLID WASTE DISPOSAL COMMISSION

By: _____
Name: _____
Title: _____
Date: _____

SANTEK ENVIRONMENTAL, INC.

By: _____
Name: _____
Title: _____

ACKNOWLEDGMENT

STATE OF TENNESSEE)

COUNTY OF Blount)

Personally appeared before me, a Notary Public in and for said State and County, Steve Field, with whom I am personally acquainted (or proved to me on the basis of satisfactory evidence), and who, upon oath, acknowledged himself to be the Chairman of the **LOUDON COUNTY SOLID WASTE DISPOSAL COMMISSION**, and that he, as such officer of said public corporation, executed the foregoing instrument for the purposes therein by signing the name of the public corporation by himself as such officer.

Witness my hand and seal at office, this 8th day of March, 2011.

Notary Public

My Commission Expires: 4/24/2013

STATE OF TENNESSEE)

COUNTY OF Bradley)

Personally appeared before me, a Notary Public in and for said State and County, Edward Cofer, with whom I am personally acquainted (or proved to me on the basis of satisfactory evidence), and who, upon oath, acknowledged himself/herself to be President of **SANTEK ENVIRONMENTAL, INC.**, and that he/she, as such officer of said corporation, executed the foregoing instrument for the purposes therein by signing the name of the corporation by himself/herself as such officer.

Witness my hand and seal at office, this 8th day of March, 2011.

Notary Public

My Commission Expires: 9/21/2013

Exhibit A

Matlock Bend Landfill

[Legal Description of Matlock Bend Landfill taken from Quit Claim Deed dated April 15, 1994 from Loudon County to the Loudon County Solid Waste Disposal Commission of record in the Loudon County Registers Office at Deed Book 212, Page 216]

LOCATED in the First Civil District of Loudon County, Tennessee, and being the part of the former Kate Wilson Mott farm inherited by her daughters, and being more particularly described as follows:

BEGINNING at a new iron pin in the North right-of-way line of old State Highway 72 (River Road), the said point of beginning being located 0.96 miles from the center line of Matlock Bend access road West along State Highway 72; thence with State Highway 72 North 51 deg. 30 min 36 sec. West 72.05 feet to a new iron pin; thence with Highway 72 North 56 deg. 18 min. 57 sec. West 95.84 feet to a new iron pin; thence with Highway 72 North 72 deg. 18 min. 15 sec. West 60. 65 feet to a new iron pin, corner to Ray Purdy; thence with Purdy North 04 deg. 57 min. 15 sec. East 1172.58 feet to a new iron pin; thence with Purdy North 13 deg. 39 min. 33 sec. East 1353.83 feet to a new iron pin (passing the Purdy-Ryan-Barrett corner which touches captioned line); thence with John Barrett III, North 13 deg. 20 min. 02 sec. East 2175.23 feet to a new iron pin corner to Jesse Ridenour; thence with Ridenour North 89 deg. 30 min. 41 sec. East 712.93 feet to an iron pin; thence with Ridenour North 85 deg. 41 min. 34 sec. East 606.7 feet to an existing iron pin, corner to AMFAC Foods Monterey, Inc.; thence with AMFAC South 00 deg. 36 min. 44 sec. West 2108.28 feet to a new iron pin; thence with AMFAC South 01 deg. 36 min. 54 sec. East 529.03 feet to an existing iron pin; thence with AMFAC South 41 deg. 54 min. 16 sec. West 1895.81 feet to an existing axle; thence with AMFAC South 53 deg. 09 min. 49 sec. West 492.95 feet to an existing iron pin; thence with AMFAC South 57 deg. 05 min. 39 sec. West 244.759 feet to a new iron pin; thence with AMFAC South 32 deg 22 min. 13 sec. West 126.705 feet to a new iron pin; thence with AMFAC South 29 deg. 34 min. 35 sec. 212.62 feet to the point of BEGINNING, according to the survey by M.C.I. Consulting Engineers, Inc., dated March 10, 1986, this being a Class A survey with bearings based on magnetic north, the said tract containing 150.849 acres, more or less.

THIS BEING the same property wherein John A. Mott (Widower) conveyed a stated one-half interest to Mary Alexandra Mott Hirsch, by deed dated May 8, 1965, and recorded in the Register's Office of Loudon County, Tennessee, in Deed Book 78, Page 425. However, reference is also made to deed from Mary Alexandra Mott Hirsch to John A. Mott (Widower) and Martha Jan Mott Powell, dated June 2, 1959, and recorded in Deed Book 56, Page 324.

THIS BEING the same property conveyed to Loudon County by Order and Judgment of the Circuit Court for Loudon County, Tennessee, in the cause styled Loudon County vs. Mary Alexandra Mott Hirsch and Martha Jan Mott Powell, being cause number 3904, the certified judgment being recorded in Deed Book 166, Page 4, Loudon County Register of Deeds office.

Matlock Bend Landfill
21712 TN-72, Loudon, TN 37774
o 865.458.2651 republicservices.com

June 19, 2025

Loudon County (Matlock Bend) Landfill Engineering Update

1) Module 1 and Module 2 Construction
    a. Expected completion end of June / first of July
    b. Minor mod Approval expected
        i. Began hauling in aggregate in anticipation of approval to better manage leachate in the area under construction.
    c. Slip-line of Module A Gravity Line.
        i. Plan in permit is conceptual. Unable to use 4"HDPE in area of penetration. Will reduce to 3"perforated stainless steel to drive into waste column.
            1. Modified approach will drive through "disconnect"and ensure no leachate stays on liner.
            2. Camera will confirm effectiveness
        ii. Cleanouts and Risers will be jet/vac'd on quarterly basis to ensure waste does not block perforations. Permit mentions semi-annual maintenance.
2) CA-1 Capping Event
    a. Revised approach from 13.1-acres to 10.1-acres.
        i. Main Driver - Revised approach due to preservation of airspace.
        ii. Module H Berm never constructed which limits final grade if area is closed.
        iii. Accessibility on the top deck for continued maintenance.
        iv. Reduction in acreage allows funding for improved infrastructure for future benefit.
            1. Additional gas wells to assist in future collection and dewatering.
            2. Air Compressor to allow for the utilization of pneumatic pumps.
            3. Current system is only for gas vents to prevent ballooning of cap.
    b. Timing – Goal to commence first Monday in August.
3) East Ditch – Leachate seeps controlled with additional rock sumps and pumps.
    a. Currently running with generator power. Working with Loudon Utility to bring overhead power to east side.
    b. Air compressor may alleviate need as we can utilize pneumatic pumps.
    c. Once weather permits, will be dredged and returned to compliance.
        i. Associated Pond #2 has been aerating for 6 weeks.
4) Leachate Tank
    a. Tank inspected – no observed internal damages.
        i. Anchor bolts and concrete pad have minor damages.
            1. Awaiting damage report to better understand extent of repairs.

5) Stormwater Basin Near Cell Construction
    a. Currently being pumped down and monitored by Contractor.
        i. Will coincide with road construction and will be mucked clean when weather permits.
        ii. Inclement weather causing delays.
            1. Over 8.5" of rain in May.
6) Track-Out
    a. Monitored extensively
        i. Current BMPs include stone on haul road, wheel wash, street sweeper.
            1. Very costly with materials and labor.
            2. Redundancies not possible with current BMPs.
        ii. Exploring additional options to implement with current setup.
            1. Cattle guards

ENVIRONMENTAL CONSULTANTS

478-743-7175
hhnt.com
3920 Arkwright Road, Suite 101
Macon, GA 31210

DRAFT

May 2, 2025

U.S. Army Corps of Engineers
Nashville District Regulatory Division
3701 Bell Road Nashville, Tennessee 37214

Re: Matlock Bend Landfill
Loudon County, TN
Approved Jurisdictional Determination Request
HHNT Project Number.: 6703-1209

To whom it may concern:

On behalf of Republic Services, Inc. (Republic), Hodges, Harbin, Newberry & Tribble, Inc., (HHNT) is submitting an Approved Jurisdictional Determination (AJD) for the ephemeral channels and the disconnected intermittent streams that we are proposing to be non-jurisdictional for Matlock Bend landfill. The overall Review Area consists of approximately ~100.22-acres which is located at 21712 TN-72, outside Loudon, Tennessee (Appendix A, Figure 1). Topography within the Review Area ranges from 840 to 1000 feet above mean sea level in elevation (Appendix A, Figure 2).

The delineation was conducted by HHNT staff on January 29th and 30th of 2025. Based upon the United States Army Corps of Engineers (USACE) Antecedent Precipitation Tool (ATP), conditions were drier than normal during the delineation. During this site visit, HHNT staff delineated approximately ~993 linear feet of ephemeral channel, and approximately ~962 linear feet of disconnected intermittent stream within the Review Area.

Since the conditions were drier than normal during the original delineation, HHNT returned on April 29th, 2025, to re-review the feature and confirm our findings from the initial site visit. During the second site visit, the weather conditions were deemed normal using the APT. Both the January and April APT are located in Appendix F.

An AJD form has been completed and is located in Appendix B of this application. Additionally, an OMBIL Regulatory Module (ORM) Aquatic Resources Upload Table has also been completed for the AJD and is in Appendix H of this application.

Streams identified within the Review Area were recorded with a Juniper Geode, which collects real-time sub meter data. All features within the Review Area have been mapped and flagged consistent with the 1987 Army Corps Wetlands Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0). Jurisdiction of streams within the Review Area was determined based upon the

Clean Water Act (CWA) regulation 88 FR 3004 ("2023 Rule") definition of Jurisdictional Waters of the U.S. conforming to the supreme court decision of *Sackett v. EPA* (2023) and the recent memorandum from the Environmental Protection Agency dated March 12, 2025.

There is a total of ~993 linear feet of ephemeral channel and ~962 linear feet of disconnected intermittent stream. It is the opinion of HHNT that all waters on site lack a relatively permanent connection to a traditional navigable water and are therefore proposed as non-jurisdictional. All features delineated within the Review Area are illustrated on Figures 6 in Appendix A.

At your earliest convenience, we respectfully request that the AJD be processed for the Project. Should you have any questions regarding the above referenced request please do not hesitate to contact me at rsulkers@hhnt.com and/or (615) 500-1264.

Sincerely,

HODGES, HARBIN, NEWBERRY & TRIBBLE, INC.

Rachael B. Sulkers, PWS
Senior Ecologist

RBS/fm

Enclosure

Appendices:

Appendix A – Figures
1. Location Map
2. Topographic Map
3. Soils Map
4. National Wetland Inventory Map
5. Floodplain Map
6. Delineation Map
7. Resource Identification Map

Appendix B – Application Forms

Appendix C – Stream Forms

Appendix D – Site Photographs

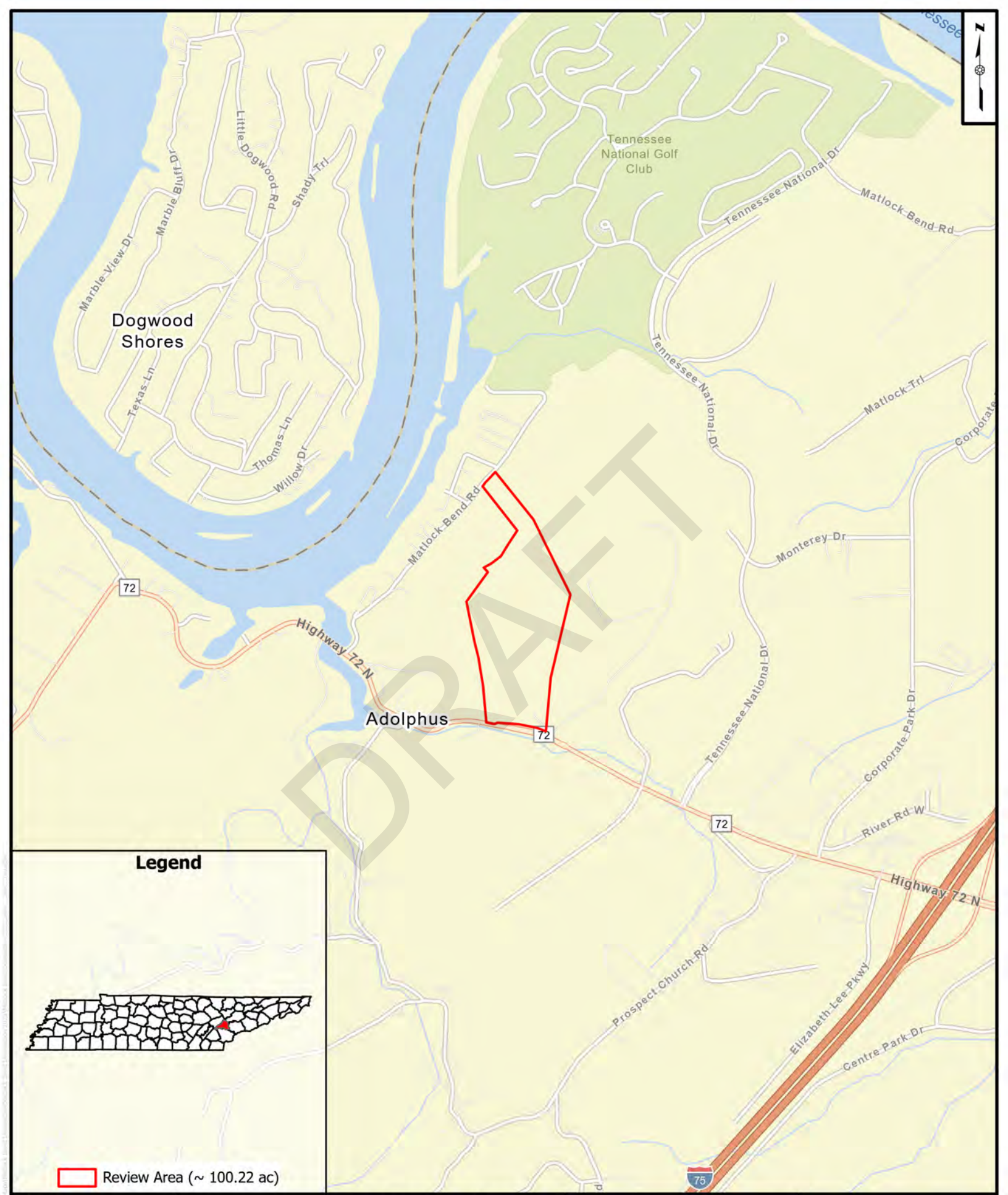
Appendix E – Antecedent Precipitation Tool Output

Appendix F – Property Owner Information

Appendix G – Tables
OMBIL Regulatory Module (ORM)

APPENDIX A: FIGURES

1. Location Map
2. Topographic Map
3. Soils Map
4. National Wetland Inventory Map
5. Floodplain Map
6. Delineation Map
7. Resource Identification Map



Legend

Review Area (~ 100.22 ac)

DISCLAIMER:
This drawing and the information contained herein is for general presentation purposes only and is a compilation of shapefile(s) provided by various source(s). The source and accuracy of the file(s) has not been verified by HHNT and therefore the drawing is not intended for use as a engineering drawing or for design purposes.

Figure 1
4/8/2025
0 1,000 2,000 Feet
1 inch equals 2000 feet

Location Map

Matlock Bend Landfill
Republic Services
Loudon County, Tennessee

Notes:
1. Imagery obtained from ESRI World Basemap. Source: Street View
2. Review Area boundary obtained from GIS Property Parcel Viewer.

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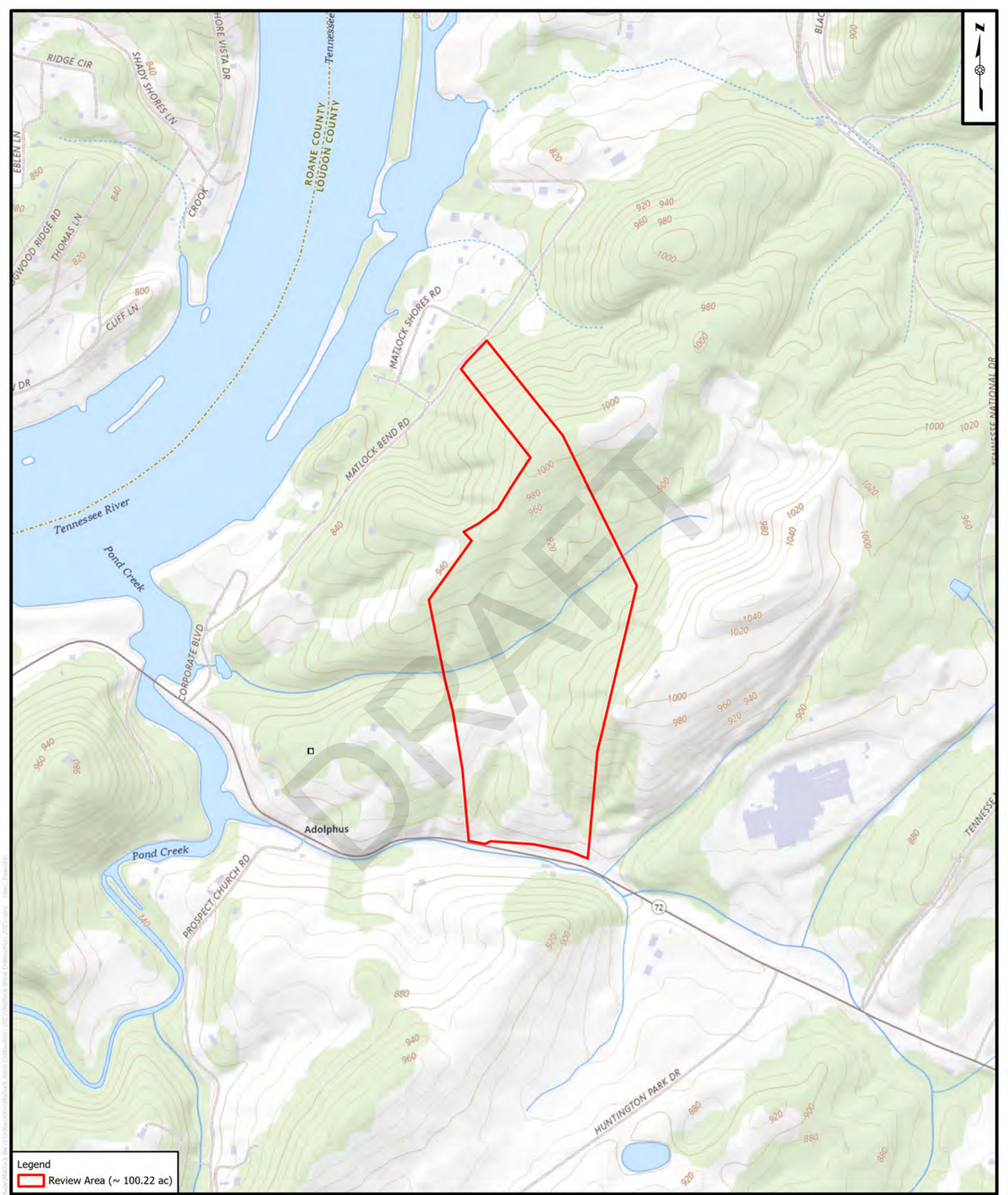

Legend

Review Area (~ 100.22 ac)

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Figure 2

4/8/2025

0 500 1,000

1 inch equals 1,000 feet

Topographic Map

Matlock Bend Landfill
Republic Services
Loudon County, Tennessee

Notes:
1. Imagery obtained from ESRI World Basemap. Source: USGS The National Map.
2. Review Area boundary obtained from GIS Property Parcel Viewer.

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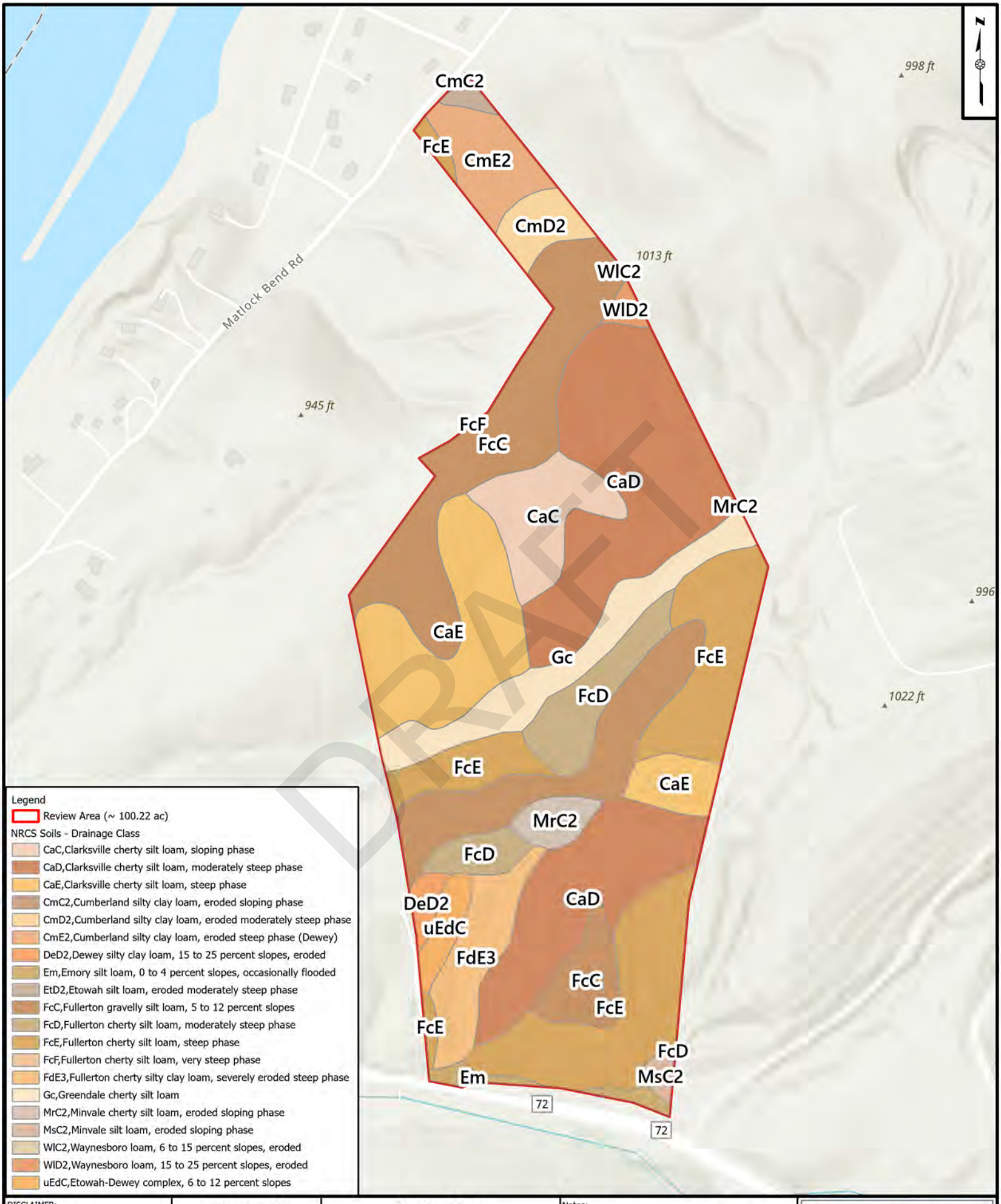

Legend

Review Area (~ 100.22 ac)

NRCS Soils - Drainage Class

- CaC,Clarksville cherty silt loam, sloping phase
- CaD,Clarksville cherty silt loam, moderately steep phase
- CaE,Clarksville cherty silt loam, steep phase
- CmC2,Cumberland silty clay loam, eroded sloping phase
- CmD2,Cumberland silty clay loam, eroded moderately steep phase
- CmE2,Cumberland silty clay loam, eroded steep phase (Dewey)
- DeD2,Dewey silty clay loam, 15 to 25 percent slopes, eroded
- Em,Emory silt loam, 0 to 4 percent slopes, occasionally flooded
- EtD2,Etowah silt loam, eroded moderately steep phase
- FcC,Fullerton gravelly silt loam, 5 to 12 percent slopes
- FcD,Fullerton cherty silt loam, moderately steep phase
- FcE,Fullerton cherty silt loam, steep phase
- FcF,Fullerton cherty silt loam, very steep phase
- FdE3,Fullerton cherty silty clay loam, severely eroded steep phase
- Gc,Greendale cherty silt loam
- MrC2,Minvale cherty silt loam, eroded sloping phase
- MsC2,Minvale silt loam, eroded sloping phase
- WlC2,Waynesboro loam, 6 to 15 percent slopes, eroded
- WlD2,Waynesboro loam, 15 to 25 percent slopes, eroded
- uEdC,Etowah-Dewey complex, 6 to 12 percent slopes

Figure 3

4/9/2025

0 250 500

1 inch equals 500 feet

Soils Map

Matlock Bend Landfill
Republic Services
Loudon County, Tennessee

Notes:
1. Review Area boundary obtained from GIS Property Parcel Viewer.
2. Soils data obtained from NRCS USDA Web Soil Survey.

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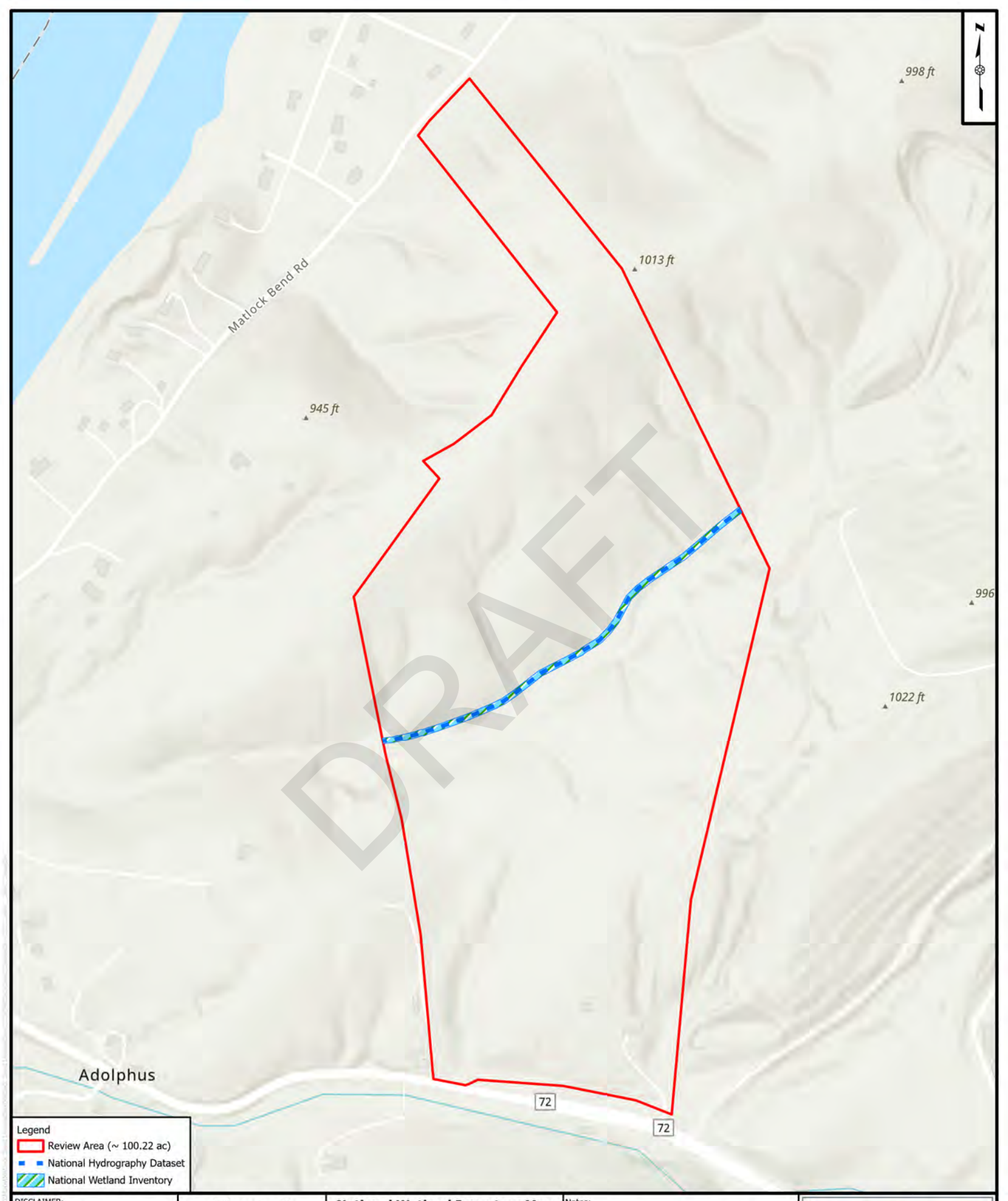

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Figure 4
4/8/2025
0 250 500
1 inch equals 500 feet

National Wetland Inventory Map

Matlock Bend Landfill
Republic Services
Loudon County, Tennessee

Notes:
1. Review Area boundary obtained from GIS Property Parcel Viewer.
2. Stream data obtained from USGS National Hydrography Dataset (NHD).
3. Wetland data obtained from USFWS National Wetland Inventory.

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Figure 5
4/8/2025
0 250 500
1 inch equals 500 feet

Floodplain Map

Matlock Bend Landfill
Republic Services
Loudon County, Tennessee

Notes:
1. Review Area boundary obtained from GIS Property Parcel Viewer.
2. Floodplain data obtained from the Federal Emergency Management Agency (FEMA)

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Legend

Review Area (~ 100.22 ac)

USACE Delineated Features

Non-Jurisdictional Ephemeral Channel (~ 993 LF)

Non-Jurisdictional Intermittent Stream (~ 962 LF)

DELINEATED WETLANDS AND STREAMS HAVE NOT BEEN APPROVED BY THE ACOE OR TDEC.

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Figure 6

4/17/2025

0 250 500

1 inch equals 500 feet

Delineation Map

Matlock Bend Landfill
Republic Services
Loudon County, Tennessee

Notes:
1. Review Area boundary obtained from GIS Property Parcel Viewer.
2. Aquatic resource delineation performed by HHNT scientists on January 29 and 30, 2025.
3. Depicted Waters of the U.S. Delineation remains an opinion of HHNT until formally verified in writing by the U.S. Army Corps of Engineers via a formal determination letter.

HHNT ENVIRONMENTAL CONSULTANTS

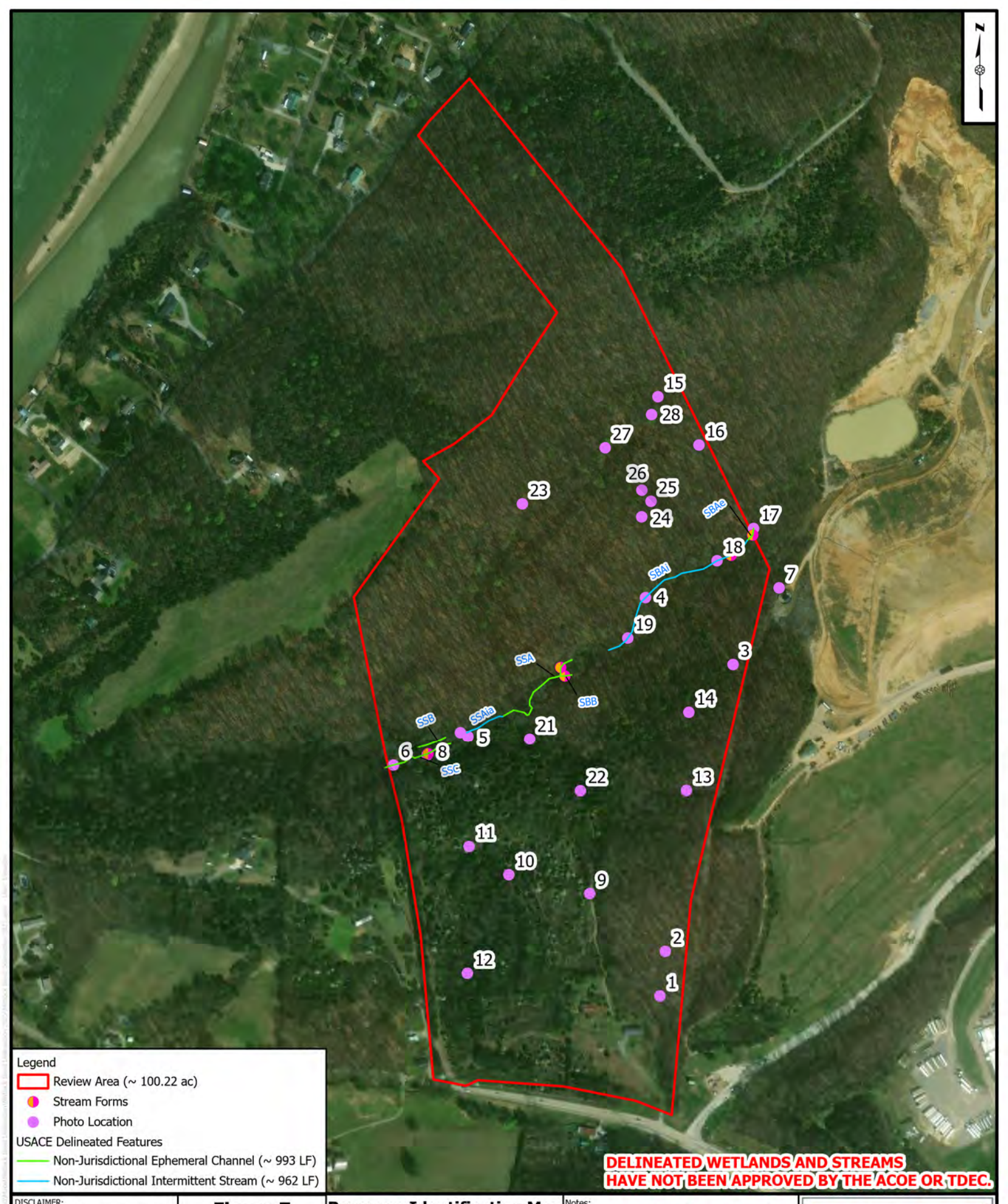

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Figure 7
4/17/2025
0 250 500
1 inch equals 500 feet

Resource Identification Map

Matlock Bend Landfill
Republic Services
Loudon County, Tennessee

Notes:
1. Imagery obtained from ESRI World Basemap. Source: Vivid, Maxar Date: 3/11/23.
2. Aquatic resource delineation performed by HHNT scientists on January 29 and 30, 2023.
3. Review Area boundary obtained from GIS Property Parcel Viewer.

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APPENDIX B: APPLICATION FORMS

U.S. Army Corps of Engineers (USACE)

REQUEST FOR JURISDICTIONAL DETERMINATION (JD)

For use of this form, see Sec 404 CWA, Sec 10 RHA, Sec 103 MPRSA; the proponent agency is CECW-COR.

Form Approved -
OMB No. 0710-0024
Expires 2024-04-30

DATA REQUIRED BY THE PRIVACY ACT OF 1974

Authority Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332.

Principal Purpose The information that you provide will be used in evaluating your request to determine whether there are any aquatic resources within the review area that are or that may be subject to federal jurisdiction under the regulatory authorities referenced above.

Routine Uses This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public, and may be made available as part of a public notice or FOIA request as required by federal law. Your name and property location where federal jurisdiction is to be determined will be included in any approved jurisdictional determination (AJD), which will be made available to the public on the District's website and on the Headquarters USACE website.

Disclosure Submission of requested information is voluntary, however, if the information is not provided there may be some delay in processing your request. Failure to provide this information will not result in an adverse action.
System of Record Notice (SORN): The information received is entered into our permit tracking database and a SORN has been completed (SORN #A1145b) and may be accessed at the following website:
http://dpcld.defense.gov/Privacy/SORNsIndex/DOD-wide-SORN-Article-View/Article/570115/a1145b-ce.aspx

The Agency Disclosure Notice (ADN)

The Public reporting burden for this collection of information, 0710-0024, is estimated to average 10 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or burden reduction suggestions to the Department of Defense, Washington Headquarters Services, at whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. To (*District Name*): Nashville District

2. I am requesting a JD on property located at (*Street Address*): 21712 TN-72, Loudon, TN 37774

City/Township/Parish: _____ County: Loudon State: Tennessee

Acreage of Parcel/Review Area for JD: 100.22

Section: _____ Township: _____ Range: _____

Latitude (*decimal degrees*): 35.746064 ° Longitude (*decimal degrees*): -84.418819 °

(*For linear projects, please include the center point of the proposed alignment.*)

3. Please attach a survey/plat map and vicinity map identifying location and review area for the JD.

4. ☐ I currently own this property. ☐ I plan to purchase this property.

☒ I am an agent/consultant acting on behalf of the requester.

☐ Other (*please explain*):

5. Reason for request: (*check as many as applicable*)

- ☐ I intend to construct/develop a project or perform activities on this parcel which would be designed to avoid all aquatic resources.
- ☐ I intend to construct/develop a project or perform activities on this parcel which would be designed to avoid all jurisdictional aquatic resources under Corps authority.
- ☒ I intend to construct/develop a project or perform activities on this parcel which may require authorization from the Corps, and the JD would be used to avoid and minimize impacts to jurisdictional aquatic resources and as an initial step in a future permitting process.
- ☐ I intend to construct/develop a project or perform activities on this parcel which may require authorization from the Corps; this request is accompanied by my permit application and the JD is to be used in the permitting process.
- ☐ I intend to construct/develop a project or perform activities in a navigable water of the U.S. which is included on the district Section 10 list and/or is subject to the ebb and flow of the tide.
- ☐ A Corps JD is required in order to obtain my local/state authorization.
- ☐ I intend to contest jurisdiction over a particular aquatic resource and request the Corps confirm that jurisdiction does/does not exist over the aquatic resource on the parcel.
- ☐ I believe that the site may be comprised entirely of dry land.
- ☐ Other:

6. Type of determination being requested:

- ☒ I am requesting an approved JD.
- ☐ I am requesting a preliminary JD.
- ☐ I am requesting a "no permit required" letter as I believe my proposed activity is not regulated.
- ☐ I am unclear as to which JD I would like to request and require additional information to inform my decision.

7. Typed or Printed Name: _____ Daytime Phone No.: _____

Company Name: _____ Email Address: _____

Address:

By signing below, you are indicating that you have the authority, or are acting as the duly authorized agent of a person or entity with such authority, to and do hereby grant Corps personnel right of entry to legally access the site if needed to perform the JD. Your signature shall be an affirmation that you possess the requisite property rights to request a JD on the subject property.

Signature:	Date:

APPENDIX C: STREAM FORMS

NC DWQ Stream Identification Form Version 4.11

Date: 1/29/25	**Project/Site**: Matlock Bend Landfill	**Latitude:** 35.7472282
Evaluator: B. Vaughn, S. Long	**County:** Loudon County, TN	**Longitude:** -84.4160916
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 10	**Stream Determination (pick one)** Ephemeral	**Other** *e.g. Quad Name*: SBA 8

A. Geomorphology (Subtotal = 5)	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	1 ✓	2	3
2. Sinuosity of channel along thalweg	0	1 ✓	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0 ✓	1	2	3
4. Particle size of stream substrate	0 ✓	1	2	3
5. Active/relict floodplain	0 ✓	1	2	3
6. Depositional bars or benches	0	1 ✓	2	3
7. Recent alluvial deposits	0 ✓	1	2	3
8. Headcuts	0 ✓	1	2	3
9. Grade control	0	0.5	1 ✓	1.5
10. Natural valley	0	0.5	1 ✓	1.5
11. Second or greater order channel	No = 0 ✓		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 2)				
12. Presence of Baseflow	0 ✓	1	2	3
13. Iron oxidizing bacteria	0 ✓	1	2	3
14. Leaf litter	1.5	1	0.5 ✓	0
15. Sediment on plants or debris	0	0.5	1 ✓	1.5
16. Organic debris lines or piles	0	0.5 ✓	1	1.5
17. Soil-based evidence of high water table?	No = 0 ✓		Yes = 3	

C. Biology (Subtotal = 3)				
18. Fibrous roots in streambed	3	2	1 ✓	0
19. Rooted upland plants in streambed	3	2 ✓	1	0
20. Macrobenthos (note diversity and abundance)	0 ✓	1	2	3
21. Aquatic Mollusks	0 ✓	1	2	3
22. Fish	0 ✓	0.5	1	1.5
23. Crayfish	0 ✓	0.5	1	1.5
24. Amphibians	0 ✓	0.5	1	1.5
25. Algae	0 ✓	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0 ✓			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 1/29/25	**Project/Site**: Matlock Bend Landfill	**Latitude:** 35.7469977
Evaluator: B. Vaughn, S. Long	**County:** Loudon County, TN	**Longitude:** -84.4164030
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 20.5	**Stream Determination (pick one)** Intermittent	**Other** *e.g. Quad Name*: SBA11

A. Geomorphology (Subtotal = 11.5)	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	1	2 ✓	3
2. Sinuosity of channel along thalweg	0	1 ✓	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2 ✓	3
4. Particle size of stream substrate	0	1	2 ✓	3
5. Active/relict floodplain	0 ✓	1	2	3
6. Depositional bars or benches	0	1 ✓	2	3
7. Recent alluvial deposits	0 ✓	1	2	3
8. Headcuts	0	1 ✓	2	3
9. Grade control	0	0.5	1 ✓	1.5
10. Natural valley	0	0.5	1	1.5 ✓
11. Second or greater order channel	No = 0 ✓		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 2.5)				
12. Presence of Baseflow	0 ✓	1	2	3
13. Iron oxidizing bacteria	0 ✓	1	2	3
14. Leaf litter	1.5	1 ✓	0.5	0
15. Sediment on plants or debris	0	0.5 ✓	1	1.5
16. Organic debris lines or piles	0	0.5	1 ✓	1.5
17. Soil-based evidence of high water table?	No = 0 ✓		Yes = 3	

C. Biology (Subtotal = 6.5)				
18. Fibrous roots in streambed	3 ✓	2	1	0
19. Rooted upland plants in streambed	3 ✓	2	1	0
20. Macrobenthos (note diversity and abundance)	0 ✓	1	2	3
21. Aquatic Mollusks	0 ✓	1	2	3
22. Fish	0 ✓	0.5	1	1.5
23. Crayfish	0 ✓	0.5	1	1.5
24. Amphibians	0	0.5 ✓	1	1.5
25. Algae	0 ✓	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0 ✓			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 1/29/25	**Project/Site**: Matlock Bend Landfill	**Latitude:** 35.7456442
Evaluator: B. Vaughn, S. Long	**County:** Loudon County, TN	**Longitude:** -84.4186942
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 8.5	**Stream Determination (pick one)** Ephemeral	**Other** *e.g. Quad Name*: SBB5

A. Geomorphology (Subtotal = 5)	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	1 ✓	2	3
2. Sinuosity of channel along thalweg	0 ✓	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1 ✓	2	3
4. Particle size of stream substrate	0	1 ✓	2	3
5. Active/relict floodplain	0 ✓	1	2	3
6. Depositional bars or benches	0 ✓	1	2	3
7. Recent alluvial deposits	0 ✓	1	2	3
8. Headcuts	0	1 ✓	2	3
9. Grade control	0 ✓	0.5	1	1.5
10. Natural valley	0	0.5	1 ✓	1.5
11. Second or greater order channel	No = 0 ✓		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 1.5)				
12. Presence of Baseflow	0 ✓	1	2	3
13. Iron oxidizing bacteria	0 ✓	1	2	3
14. Leaf litter	1.5	1	0.5 ✓	0
15. Sediment on plants or debris	0	0.5 ✓	1	1.5
16. Organic debris lines or piles	0	0.5 ✓	1	1.5
17. Soil-based evidence of high water table?	No = 0 ✓		Yes = 3	

C. Biology (Subtotal = 2)				
18. Fibrous roots in streambed	3	2	1 ✓	0
19. Rooted upland plants in streambed	3	2	1 ✓	0
20. Macrobenthos (note diversity and abundance)	0 ✓	1	2	3
21. Aquatic Mollusks	0 ✓	1	2	3
22. Fish	0 ✓	0.5	1	1.5
23. Crayfish	0 ✓	0.5	1	1.5
24. Amphibians	0 ✓	0.5	1	1.5
25. Algae	0 ✓	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0 ✓			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 1/29/25	**Project/Site**: Matlock Bend Landfill	**Latitude:** 35.7457326
Evaluator: B. Vaughn, S. Long	**County:** Loudon County, TN	**Longitude:** -84.4188509
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 13.5	**Stream Determination (pick one)** Ephemeral	**Other** *e.g. Quad Name*: SSA3

A. Geomorphology (Subtotal = 6)	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	1✓	2	3
2. Sinuosity of channel along thalweg	0	1✓	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1✓	2	3
4. Particle size of stream substrate	0	1✓	2	3
5. Active/relict floodplain	0✓	1	2	3
6. Depositional bars or benches	0✓	1	2	3
7. Recent alluvial deposits	0✓	1	2	3
8. Headcuts	0✓	1	2	3
9. Grade control	0	0.5	1✓	1.5
10. Natural valley	0	0.5	1✓	1.5
11. Second or greater order channel	No = 0✓		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 2.5)				
12. Presence of Baseflow	0✓	1	2	3
13. Iron oxidizing bacteria	0✓	1	2	3
14. Leaf litter	1.5	1✓	0.5	0
15. Sediment on plants or debris	0	0.5✓	1	1.5
16. Organic debris lines or piles	0	0.5	1✓	1.5
17. Soil-based evidence of high water table?	No = 0✓		Yes = 3	

C. Biology (Subtotal = 5)				
18. Fibrous roots in streambed	3	2✓	1	0
19. Rooted upland plants in streambed	3✓	2	1	0
20. Macrobenthos (note diversity and abundance)	0✓	1	2	3
21. Aquatic Mollusks	0✓	1	2	3
22. Fish	0✓	0.5	1	1.5
23. Crayfish	0✓	0.5	1	1.5
24. Amphibians	0✓	0.5	1	1.5
25. Algae	0✓	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0✓			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 1/29/25	**Project/Site**: Matlock Bend Landfill	**Latitude:** 35.7457326
Evaluator: B. Vaughn, S. Long	**County:** Loudon County, TN	**Longitude:** -84.41888509
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 13.5	**Stream Determination (pick one)** Ephemeral	**Other** *e.g. Quad Name*: SSC4

A. Geomorphology (Subtotal = 6)	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	1 ✓	2	3
2. Sinuosity of channel along thalweg	0 ✓	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1 ✓	2	3
4. Particle size of stream substrate	0	1 ✓	2	3
5. Active/relict floodplain	0 ✓	1	2	3
6. Depositional bars or benches	0	1 ✓	2	3
7. Recent alluvial deposits	0 ✓	1	2	3
8. Headcuts	0 ✓	1	2	3
9. Grade control	0	0.5	1 ✓	1.5
10. Natural valley	0	0.5	1 ✓	1.5
11. Second or greater order channel	No = 0 ✓		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 2.5)				
12. Presence of Baseflow	0 ✓	1	2	3
13. Iron oxidizing bacteria	0 ✓	1	2	3
14. Leaf litter	1.5	1 ✓	0.5	0
15. Sediment on plants or debris	0	0.5 ✓	1	1.5
16. Organic debris lines or piles	0	0.5	1 ✓	1.5
17. Soil-based evidence of high water table?	No = 0 ✓		Yes = 3	

C. Biology (Subtotal = 5)				
18. Fibrous roots in streambed	3 ✓	2	1	0
19. Rooted upland plants in streambed	3	2 ✓	1	0
20. Macrobenthos (note diversity and abundance)	0 ✓	1	2	3
21. Aquatic Mollusks	0 ✓	1	2	3
22. Fish	0 ✓	0.5	1	1.5
23. Crayfish	0 ✓	0.5	1	1.5
24. Amphibians	0 ✓	0.5	1	1.5
25. Algae	0 ✓	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0 ✓			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

APPENDIX D: SITE PHOTOGRAPHS

PHOTO 1: Project uplands

PHOTO 2: Project upland draw

Project No: 6703-1209

Date: March 24, 2025

Site Photographs
Matlock Bend Landfill
Republic Services Inc.

HNT ENVIRONMENTAL CONSULTANTS

PHOTO 3: Project upland draw

PHOTO 4: Looking downstream on Stream SBAi

PHOTO 5: Disconnection between SSAi and SSC

PHOTO 6: Looking downstream at wet weather conveyance SSC

PHOTO 7: Man made riprap area providing erosion and control measures from landfill

PHOTO 8: Looking upstream at SSC

PHOTO 9: Project uplands

PHOTO 10: Project upland draw

PHOTO 11: Project upland

PHOTO 12: Typical upland drainage on-site

PHOTO 13: Upland draw

PHOTO 14: Project uplands

PHOTO 15: Project uplands

PHOTO 16: Upland draw

PHOTO 17: Looking downstream at SBAe

PHOTO 18: Looking upstream at SBAi

PHOTO 19: Looking downstream at SBAi

PHOTO 20: Break point between SSAi and SSB

PHOTO 21: Project uplands

PHOTO 22: Project uplands

PHOTO 23: Project uplands

PHOTO 24: Project uplands

PHOTO 25: Project uplands

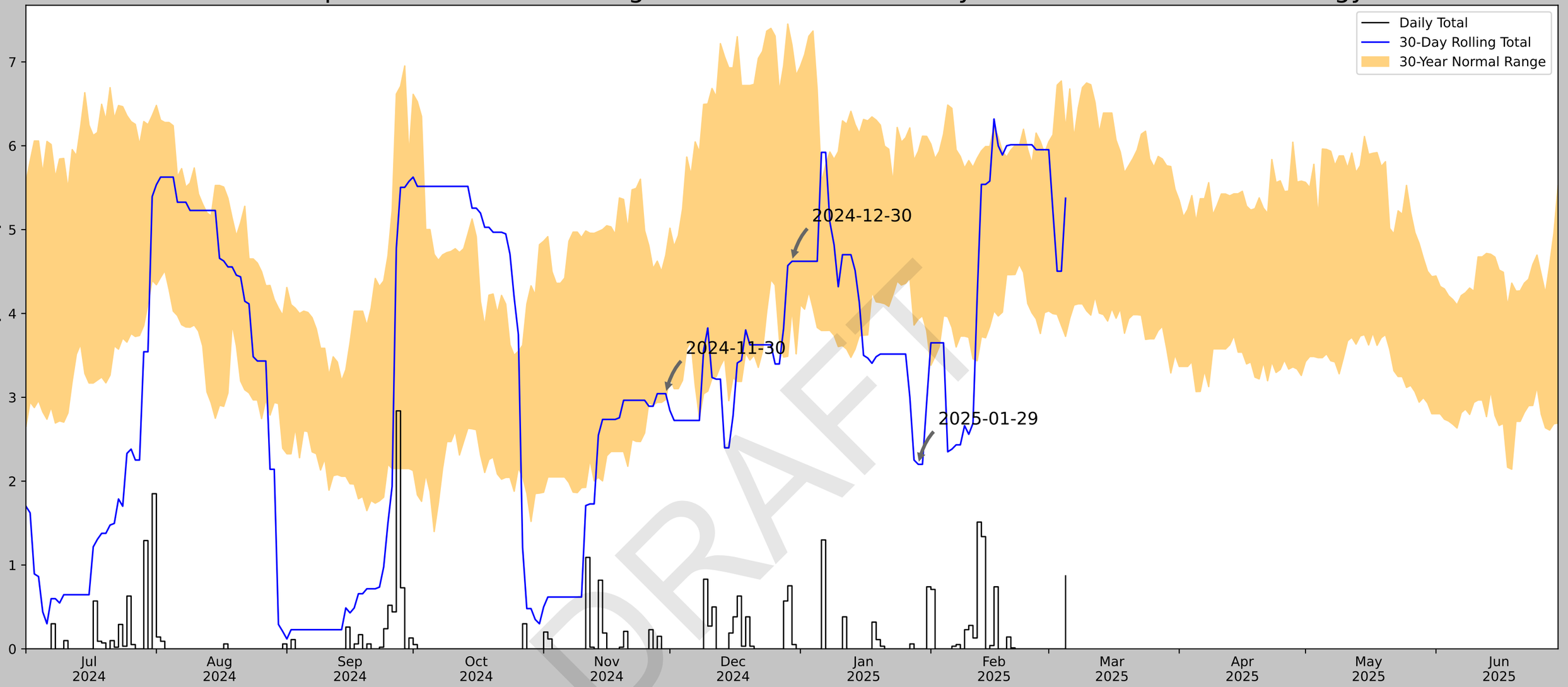
PHOTO 26: Project uplands

PHOTO 25: Project uplands

PHOTO 26: Project uplands

APPENDIX E: ANTECEDENT PRECIPITATION TOOL OUTPUT

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	35.7463875, -84.4191186
Observation Date	2025-01-29
Elevation (ft)	887.624
Drought Index (PDSI)	Mild drought
WebWIMP H_2O Balance	Wet Season

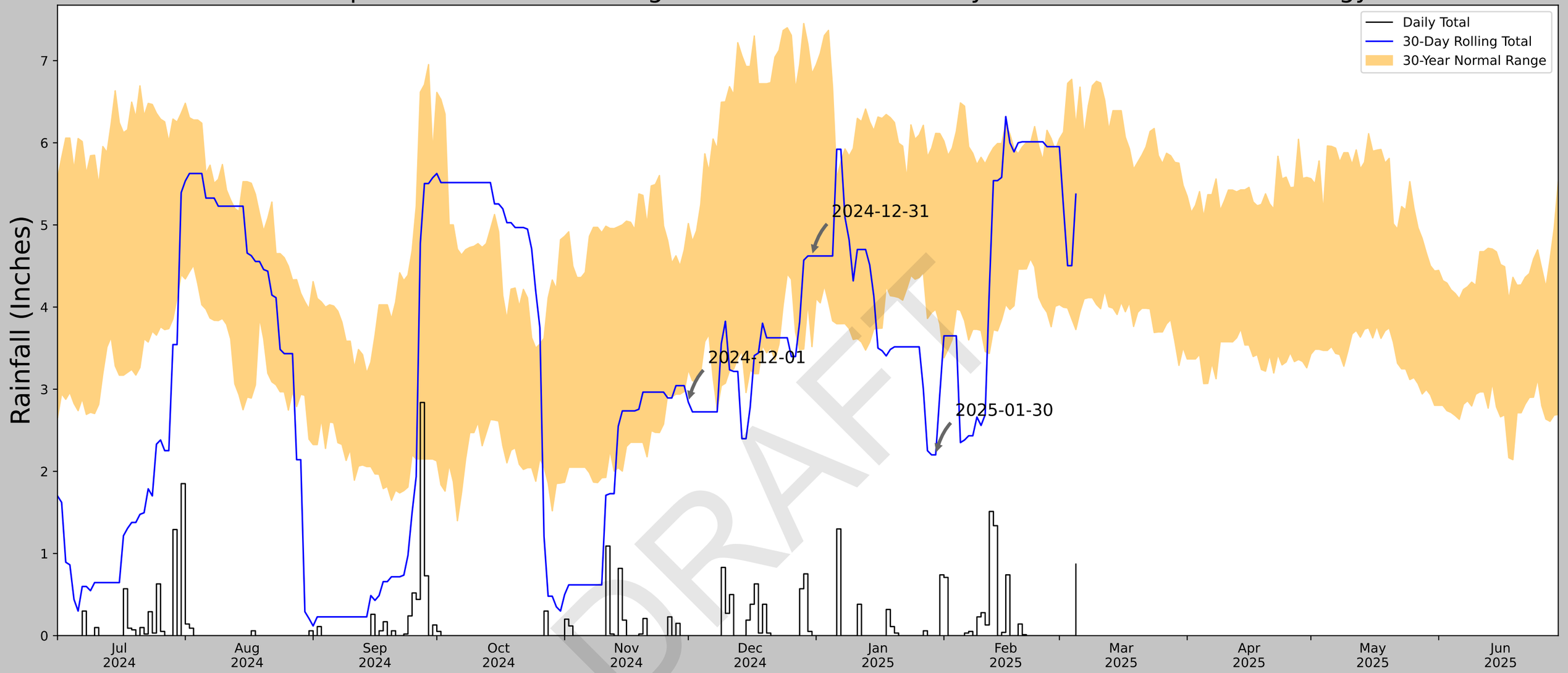
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2025-01-29	3.932284	5.932284	2.200787	Dry	1	3	3
2024-12-30	4.052756	7.203937	4.622047	Normal	2	2	4
2024-11-30	2.972835	4.693307	3.043307	Normal	2	1	2
Result							Drier than Normal - 9

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
LENOIR CITY	35.7875, -84.2622	785.105	9.244	102.519	5.108	10803	90
LOUDON 5.3 E	35.749, -84.265	855.971	2.665	70.866	1.388	2	0
LENOIR CITY 3.1 NE	35.8266, -84.2251	855.971	3.409	70.866	1.776	16	0
FRIENDSVILLE 3.6 NW	35.7998, -84.168	859.908	5.347	74.803	2.806	384	0
FRIENDSVILLE 4.6 NE	35.8113, -84.0839	928.15	10.126	143.045	6.005	35	0
OLIVER SPRINGS 5.6 SW	35.9695, -84.3855	839.895	14.345	54.79	7.241	1	0
KINGSTON	35.8572, -84.5281	813.976	15.656	28.871	7.497	108	0
OAK RIDGE ASOS	36.0231, -84.2336	899.934	16.357	114.829	9.239	4	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	35.7463875, -84.4191186
Observation Date	2025-01-30
Elevation (ft)	887.624
Drought Index (PDSI)	Mild drought
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2025-01-30	3.972835	6.114567	2.200787	Dry	1	3	3
2024-12-31	3.517717	6.841339	4.622047	Normal	2	2	4
2024-12-01	3.238189	5.017323	2.84252	Dry	1	1	1
Result							Drier than Normal - 8

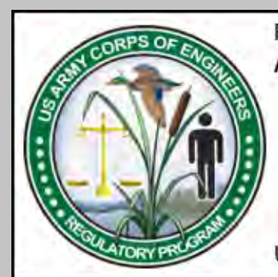
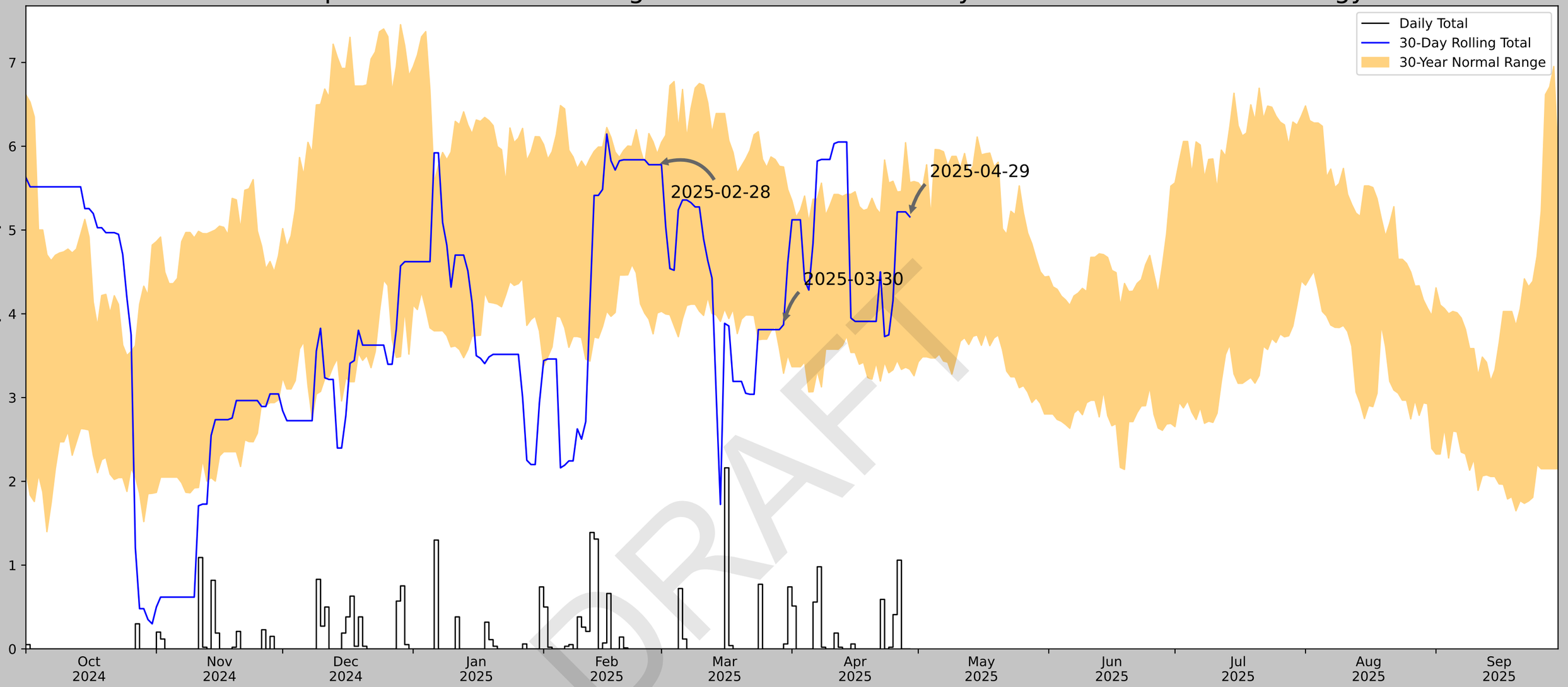


Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
LENOIR CITY	35.7875, -84.2622	785.105	9.244	102.519	5.107	10803	90
LOUDON 5.3 E	35.749, -84.265	855.971	2.665	70.866	1.388	2	0
LENOIR CITY 3.1 NE	35.8266, -84.2251	855.971	3.409	70.866	1.776	16	0
FRIENDSVILLE 3.6 NW	35.7998, -84.168	859.908	5.347	74.803	2.806	384	0
FRIENDSVILLE 4.6 NE	35.8113, -84.0839	928.15	10.126	143.045	6.005	35	0
OLIVER SPRINGS 5.6 SW	35.9695, -84.3855	839.895	14.345	54.79	7.241	1	0
KINGSTON	35.8572, -84.5281	813.976	15.656	28.871	7.497	108	0
OAK RIDGE ASOS	36.0231, -84.2336	899.934	16.357	114.829	9.239	4	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	35.746273, -84.417662
Observation Date	2025-04-29
Elevation (ft)	837.205
Drought Index (PDSI)	Mild drought (2025-03)
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2025-04-29	3.337795	5.566142	5.15748	Normal	2	3	6
2025-03-30	3.289764	5.752362	3.870079	Normal	2	2	4
2025-02-28	4.009843	5.908662	5.779528	Normal	2	1	2
Result							Normal Conditions - 12

US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
LENOIR CITY	35.7875, -84.2622	785.105	9.169	52.1	4.604	10803	73
LOUDON 5.3 E	35.749, -84.265	855.971	2.665	70.866	1.388	2	16
LENOIR CITY 3.1 NE	35.8266, -84.2251	855.971	3.409	70.866	1.776	16	0
FRIENDSVILLE 3.6 NW	35.7998, -84.168	859.908	5.347	74.803	2.806	384	1
FRIENDSVILLE 4.6 NE	35.8113, -84.0839	928.15	10.126	143.045	6.005	35	0
OLIVER SPRINGS 5.6 SW	35.9695, -84.3855	839.895	14.345	54.79	7.241	1	0
KINGSTON	35.8572, -84.5281	813.976	15.656	28.871	7.497	108	0
OAK RIDGE ASOS	36.0231, -84.2336	899.934	16.357	114.829	9.239	4	0

APPENDIX F: PROPERTY OWNER INFORMATION

Loudon County - Parcel: 039 026.00

Date: April 9, 2025

County: LOUDON
Owner: LOUDON COUNTY SOLID WASTE DISPOSAL COMMISSION
Address: HWY 72 N
Parcel ID: 039 026.00
Deeded Acreage: 40.87
Calculated Acreage: 0
Vexcel Imagery Date: 2023

1:9,028

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

Loudon County - Parcel: 031 047.00

Date: April 9, 2025

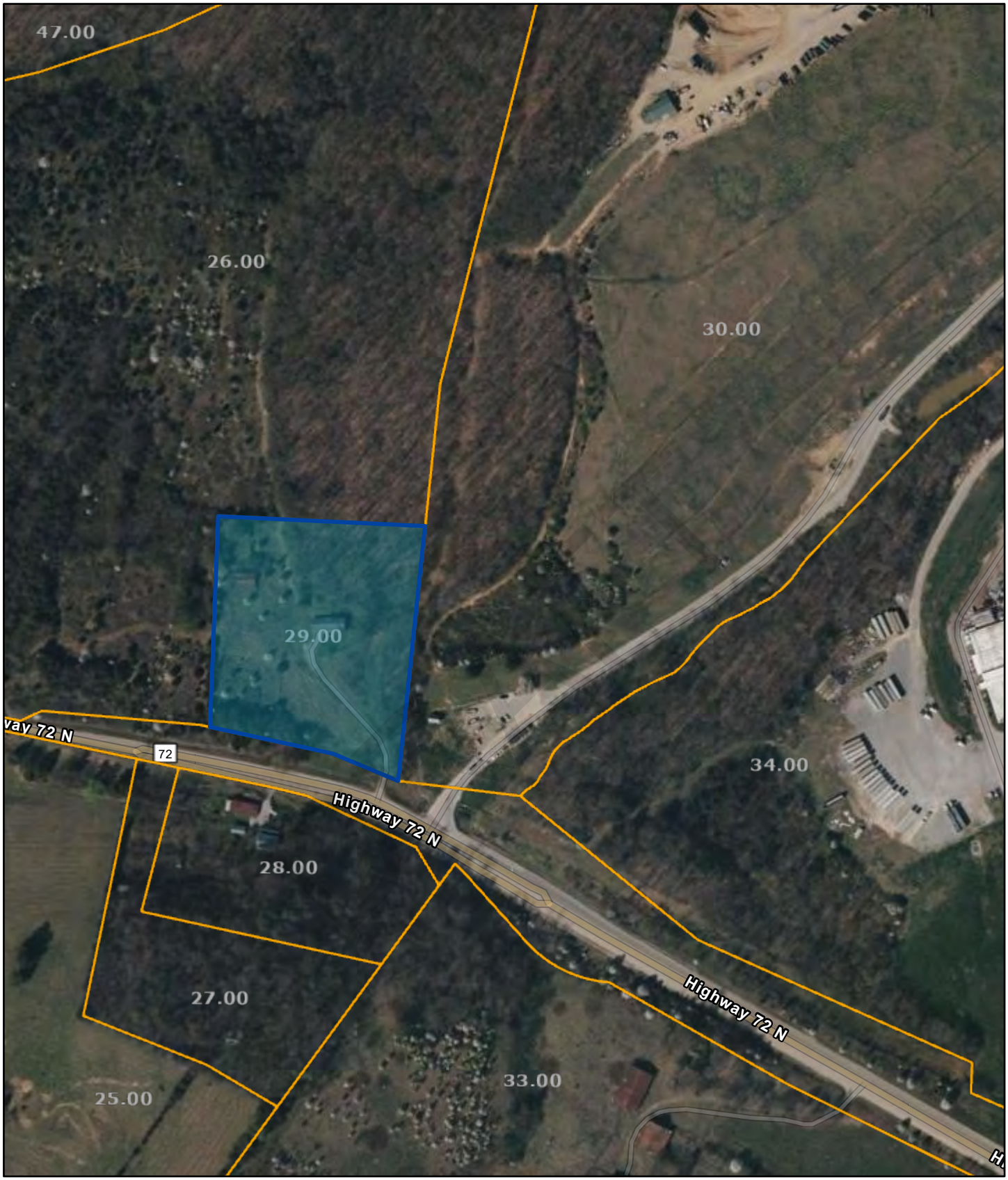
County: LOUDON
Owner: LOUDON COUNTY SOLID WASTE DISPOSAL COMMISSION
Address: MATLOCK BEND RD
Parcel ID: 031 047.00
Deeded Acreage: 52.56
Calculated Acreage: 52.56
Vexcel Imagery Date: 2023

1:9,028

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

Loudon County - Parcel: 039 029.00



Date: April 9, 2025

County: LOUDON
Owner: LOUDON COUNTY SOLID WASTE DISPOSAL COMMISSION
Address: HWY 72 N 21884
Parcel ID: 039 029.00
Deeded Acreage: 5.26
Calculated Acreage: 0
Vexcel Imagery Date: 2023

1:4,514

0 0.03 0.06 0.12 mi

0 0.05 0.1 0.2 km

APPENDIX G: TABLES

OMBIL Regulatory Module (ORM)

Waters_Name	State	Cowardin_Code	HGM_Code	Meas_Type	Amount	Units	Waters_Type	Latitude	Longitude	Local_Waterway
SBAe	TENNESSEE	R6	RIVERINE	Linear	60	FOOT	NON-WOTUS-TRIB.NEGATIVE-A5	35.74722820	-84.41609160	UT of Pond Creek
SBAi	TENNESSEE	R3	RIVERINE	Linear	794	FOOT	DELIN.CONC	35.74699770	-84.41640300	UT of Pond Creek
SBB	TENNESSEE	R6	RIVERINE	Linear	48	FOOT	NON-WOTUS-TRIB.NEGATIVE-A5	35.74564420	-84.41869420	UT of Pond Creek
SSA	TENNESSEE	R6	RIVERINE	Linear	460	FOOT	NON-WOTUS-TRIB.NEGATIVE-A5	35.74573260	-84.41885090	UT of Pond Creek
SSC	TENNESSEE	R6	RIVERINE	Linear	303	FOOT	NON-WOTUS-TRIB.NEGATIVE-A5	35.74573260	84.41888509	UT of Pond Creek
SBAia	TENNESSEE	R3	RIVERINE	Linear	168	FOOT	DELIN.CONC	35.74509610	84.41994660	UT of Pond Creek

REPUBLIC SERVICES

Monthly Operations Report
Matlock Bend Landfill
June 19, 2025

Presented by:

Republic Services, Inc.

I. OPERATIONS
   - A. Tonnage Report
   - B. Customer Activity Report
   - C. Materials Classification Report
   - D. Waste Characterization Report
   - E. Tire Report
   - F. Landfill Comments

II. Engineering Report

III. Airspace Utilization Report

IV. TDEC Inspection – June 2025

V. Host and Security Fees Letter

VI. Loudon Financial Information

Loudon Landfill Monthly Tonnages
Month Ending May 2025

Matlock Bend Landfill

Month	2024	2025	2024 to 2025
Jan	11,601	**14,498**	2,897
Feb	14,407	**14,212**	(195)
Mar	14,328	**17,577**	3,248
Apr	15,194	**17,012**	1,818
May	14,517	**15,581**	1,064
Jun	14,735	**0**	0
Jul	15,766	**0**	0
Aug	16,204	**0**	0
Sep	13,937	**0**	0
Oct	16,577	**0**	0
Nov	13,794	**0**	0
Dec	15,052	**0**	0
Total	176,112	**78,880**	8,833
% of Total Tonnage		**100%**	

Daily Avg. for any Running 30 Day Period **567**

Loudon County

Month	2024	2025	2024 to 2025
Jan	529	**477**	(51)
Feb	541	**478**	(64)
Mar	574	**603**	29
Apr	607	**562**	(44)
May	596	**621**	24
Jun	613	**0**	0
Jul	615	**0**	0
Aug	599	**0**	0
Sep	486	**0**	0
Oct	572	**0**	0
Nov	516	**0**	0
Dec	554	**0**	0
Total	6,804	**2,741**	(106)
% of Total Tonnage		**3%**	

Daily Avg. for any Running 22.5 Day Period **756**

Lenoir City

Month	2024	2025	2024 to 2025
Jan	434	**395**	(39)
Feb	478	**408**	(71)
Mar	529	**483**	(46)
Apr	524	**517**	(7)
May	565	**521**	(44)
Jun	455	**0**	0
Jul	484	**0**	0
Aug	485	**0**	0
Sep	424	**0**	0
Oct	494	**0**	0
Nov	399	**0**	0
Dec	403	**0**	0
Total	5,675	**2,323**	(208)
% of Total Tonnage		**3%**	

Loudon, City of

Month	2024	2025	2024 to 2025
Jan	452	**502**	50
Feb	467	**433**	(34)
Mar	521	**523**	2
Apr	572	**579**	7
May	572	**592**	20
Jun	538	**0**	0
Jul	573	**0**	0
Aug	557	**0**	0
Sep	498	**0**	0
Oct	526	**0**	0
Nov	444	**0**	0
Dec	517	**0**	0
Total	6,237	**2,629**	44
% of Total Tonnage		**3%**	

Republic Services, Inc.

Month	2024	2025	2024 to 2025
Jan	2,653	**2,501**	(152)
Feb	3,063	**2,499**	(565)
Mar	2,917	**2,584**	(334)
Apr	3,197	**2,695**	(502)
May	3,226	**2,867**	(359)
Jun	2,812	**0**	0
Jul	3,169	**0**	0
Aug	3,259	**0**	0
Sep	2,904	**0**	0
Oct	3,056	**0**	0
Nov	2,558	**0**	0
Dec	2,539	**0**	0
Total	35,353	**13,145**	(1,911)
% of Total Tonnage		**17%**	

Waste Management

Month	2024	2025	2024 to 2025
Jan	1,385	**1,401**	16
Feb	1,680	**1,546**	(134)
Mar	1,679	**1,604**	(75)
Apr	1,727	**1,690**	(37)
May	1,629	**1,580**	(49)
Jun	1,492	**0**	0
Jul	1,504	**0**	0
Aug	1,505	**0**	0
Sep	1,400	**0**	0
Oct	1,526	**0**	0
Nov	1,311	**0**	0
Dec	1,293	**0**	0
Total	18,132	**7,820**	(279)
% of Total Tonnage		**10%**	

Five Star Waste

Month	2024	2025	2024 to 2025
Jan	493	**932**	440
Feb	547	**1,155**	608
Mar	534	**1,463**	930
Apr	677	**1,566**	888
May	716	**1,633**	916
Jun	1,097	**0**	0
Jul	1,292	**0**	0
Aug	1,219	**0**	0
Sep	1,328	**0**	0
Oct	1,680	**0**	0
Nov	1,104	**0**	0
Dec	1,380	**0**	0
Total	12,067	**6,749**	3,783
% of Total Tonnage		**9%**	

Ward Waste

Month	2024	2025	2024 to 2025
Jan	0	**526**	526
Feb	0	**506**	506
Mar	0	**583**	583
Apr	0	**641**	641
May	0	**640**	640
Jun	0	**0**	0
Jul	0	**0**	0
Aug	0	**0**	0
Sep	0	**0**	0
Oct	0	**0**	0
Nov	287	**0**	0
Dec	605	**0**	0
Total	892	**2,897**	2,897
% of Total Tonnage		**4%**	

KCC ADC Material

Month	2024	2025	2024 to 2025
Jan	1,361	**3,503**	2,142
Feb	1,925	**3,012**	1,087
Mar	2,577	**4,440**	1,863
Apr	2,561	**3,643**	1,082
May	1,783	**2,266**	483
Jun	3,095	**0**	0
Jul	3,057	**0**	0
Aug	3,498	**0**	0
Sep	2,560	**0**	0
Oct	3,630	**0**	0
Nov	3,716	**0**	0
Dec	3,808	**0**	0
Total	33,571	**16,864**	6,657
% of Total Tonnage		**21%**	

All Other Tons

Month	2024	2025	2024 to 2025
Jan	4,036	**4,260**	224
Feb	6,039	**4,176**	(1,863)
Mar	5,530	**5,294**	(236)
Apr	6,005	**5,118**	(887)
May	6,146	**4,862**	(1,284)
Jun	5,730	**0**	0
Jul	6,363	**0**	0
Aug	6,301	**0**	0
Sep	5,664	**0**	0
Oct	6,773	**0**	0
Nov	4,850	**0**	0
Dec	5,939	**0**	0
Total	69,376	**23,710**	(4,046)
% of Total Tonnage		**30%**	

Materials Classification Report

Matlock Bend Landfill

Monthly Tonnage Summary May 2025

Material	Tonnage
MSW	
MSW	**10,376**
Special Waste	
Other	4,302
Ash	0
Sludge	902
Total Special Waste	**5,204**
Total MSW & SW	**15,580**
Tires	1
Total Material	**15,581**
% MSW	67%
% Special Waste	33%
% Sludge *	6%

* Sludge % is stand alone,
% Special Waste includes "Sludge"

2022 Sludge %		2023 Sludge %	
January	7%	January	6%
February	6%	February	9%
March	6%	March	7%
April	5%	April	7%
May	5%	May	4%
June	2%	June	6%
July	10%	July	4%
August	4%	August	6%
September	7%	September	6%
October	5%	October	5%
November	5%	November	8%
December	7%	December	7%

2024 Sludge %		2025 Sludge %	
January	4%	January	5%
February	7%	February	7%
March	8%	March	7%
April	7%	April	5%
May	5%	May	6%
June	6%	June	0%
July	4%	July	0%
August	6%	August	0%
September	5%	September	0%
October	5%	October	0%
November	6%	November	0%
December	6%	December	0%

2025 Loudon MSW and Special Waste Analysis

Material	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
MSW	7,862	8,286	9,661	10,153	10,376	0	0	0	0	0	0	0	**46,338**
Special Waste	6,635	5,926	7,916	6,859	5,204	0	0	0	0	0	0	0	**32,540**
Tires	0	0	0	0	1	0	0	0	0	0	0	0	**1**
Total	14,497	14,212	17,577	17,012	15,581	0	0	0	0	0	0	0	**78,879**
%													
MSW	54%	58%	55%	60%	67%	0%	0%	0%	0%	0%	0%	0%	**59%**
Special Waste	46%	42%	45%	40%	33%	0%	0%	0%	0%	0%	0%	0%	**41%**
Total	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	**100%**

2024-2025 Matlock Bend Landfill Tire Report

Month	Tons (OB)	Each (IB)
Jul-24	35.45	2,222
Aug-24	16.56	2,162
Sep-24	35.50	2,085
Oct-24	50.75	2,340
Nov-24	31.37	1,399
Dec-24	23.08	1,017
Jan-25	19.46	1,311
Feb-25	29.19	1,578
Mar-25	26.62	2,179
Apr-25	60.80	2,091
May-25	28.84	1,547
Jun-25	0.00	0
Total	**357.62**	**19,931**

Loudon Landfill Comments Log May 2025

Calendar Day	Day of Week	Time of Day	Complaintant Name	Complaintant Number	Complaint	Resolution	Res Time
1	TH	2:43PM	Brian Viars via Revendra	( ) -	Mud on road	Swept road	Immediately
2	F						
3	SA						
4	SU						
5	M						
6	T						
7	W						
8	TH						
9	F						
10	SA						
11	SU						
12	M						
13	T						
14	W						
15	TH						
16	F						
17	SA						
18	SU						
19	M						
20	T						
21	W						
22	TH						
23	F						
24	SA						
25	SU						
26	M						
27	T						
28	W						
29	TH	9:29AM	Brian Viars via Revendra		Mud on road	Swept road	Immediately
30	F						
31	SA						

REPUBLIC SERVICES

Matlock Bend Landfill
21712 TN-72, Loudon, TN 37774
o 865.458.2651 republicservices.com

June 19, 2025

Loudon County (Matlock Bend) Landfill Engineering Update

1) Module 1 and Module 2 Construction
    a. Expected completion end of June / first of July
    b. Minor mod Approval expected
        i. Began hauling in aggregate in anticipation of approval to better manage leachate in the area under construction.
    c. Slip-line of Module A Gravity Line.
        i. Plan in permit is conceptual. Unable to use 4" HDPE in area of penetration. Will reduce to 3" perforated stainless steel to drive into waste column.
            1. Modified approach will drive through "disconnect" and ensure no leachate stays on liner.
            2. Camera will confirm effectiveness
        ii. Cleanouts and Risers will be jet/vac'd on quarterly basis to ensure waste does not block perforations. Permit mentions semi-annual maintenance.
2) CA-1 Capping Event
    a. Revised approach from 13.1-acres to 10.1-acres.
        i. Main Driver - Revised approach due to preservation of airspace.
        ii. Module H Berm never constructed which limits final grade if area is closed.
        iii. Accessibility on the top deck for continued maintenance.
        iv. Reduction in acreage allows funding for improved infrastructure for future benefit.
            1. Additional gas wells to assist in future collection and dewatering.
            2. Air Compressor to allow for the utilization of pneumatic pumps.
            3. Current system is only for gas vents to prevent ballooning of cap.
    b. Timing - Goal to commence first Monday in August.
3) East Ditch - Leachate seeps controlled with additional rock sumps and pumps.
    a. Currently running with generator power. Working with Loudon Utility to bring overhead power to east side.
    b. Air compressor may alleviate need as we can utilize pneumatic pumps.
    c. Once weather permits, will be dredged and returned to compliance.
        i. Associated Pond #2 has been aerating for 6 weeks.
4) Leachate Tank
    a. Tank inspected - no observed internal damages.
        i. Anchor bolts and concrete pad have minor damages.
            1. Awaiting damage report to better understand extent of repairs.

REPUBLIC SERVICES
Matlock Bend Landfill
21712 TN-72, Loudon, TN 37774
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5) Stormwater Basin Near Cell Construction
    a. Currently being pumped down and monitored by Contractor.
        i. Will coincide with road construction and will be mucked clean when weather permits.
        ii. Inclement weather causing delays.
            1. Over 8.5" of rain in May.
6) Track-Out
    a. Monitored extensively
        i. Current BMPs include stone on haul road, wheel wash, street sweeper.
            1. Very costly with materials and labor.
            2. Redundancies not possible with current BMPs.
        ii. Exploring additional options to implement with current setup.
            1. Cattle guards

NOTES:

1. PROJECTED DAILY TONNAGE AND PROJECTED DENSITY PROVIDED BY REPUBLIC SERVICES, INC.
2. THE STOCKPILE VOLUME ISOPACH WAS DEVELOPED FROM THE FOLLOWING SURFACES:

BOTTOM SURFACE
AERIAL TOPOGRAPHIC SURVEY BY FIRMATEK, LLC., DATED MAY 2, 2025.

TOP SURFACE
OPERATIONAL CONSTRUCTED GRADING PLAN DEVELOPED BY HHNT AT THE DIRECTION AND APPROVAL OF REPUBLIC SERVICES, INC. CONTOURS REPRESENT TOP OF INTERMEDIATE COVER.

ELEVATIONS TABLE

NUMBER	MINIMUM ELEVATION	MAXIMUM ELEVATION	COLOR
1	-20.00	-15.00	
2	-15.00	-10.00	
3	-10.00	-5.00	
4	-5.00	0.00	
5	0.00	5.00	
6	5.00	10.00	
7	10.00	15.00	

HHNT
ENVIRONMENTAL CONSULTANTS

CONSTRUCTED REMAINING CAPACITY

MATLOCK BEND LANDFILL
REPUBLIC SERVICES, INC.

LOUDON COUNTY, TENNESSEE

0 200 400
GRAPHIC SCALE IN FEET

DATE: 06-06-2025

REPUBLIC SERVICES

June 3, 2025

Loudon County Solid Waste Disposal Commission
Attn: Chief Deputy Clerk
101 Mulberry Street Suite 203
Loudon, TN 37774

Dear Trustee:

Pursuant to Section 10.6 and 10.7 of the Sanitary Landfill Operation Agreement between Loudon and Santek as of July 1, 2007, Second Amendment Section 10.6 dated July 12, 2022, Santek agreed to pay the Commission a host fee and security fee as defined in the agreement. The following recap reflects the calculation for the period of May 2025:

	Host Fees (Greater of below)		
Total Tip Fees Billed	$485,016.95	Total Tonnage Received	15,581.03
Host Fee Percentage	5.5%	Rate per Ton	$1.00
	$26,675.93		$15,581.03
Minimum Fee	$10,750.00		
	==========		
	Security Fees		
Total Tip Fees Billed	$485,016.95		
Security Fee Percentage	5%		
	$24,250.85		
	=========		
	Minutes Payment		
Loudon County Minutes	$100.00		
	=========		
Total amount to be received	$51,026.78		
	=========		

Our checks in payment of the above fees have been remitted to the above address for the Commission. Should you have any questions or need additional information, please let me know.

Sincerely,

David L. Hollinshead
Manager Municipal Sales
Republic Services

LE03-AWIN MANAGEMENT INC
REPUBLIC SERVICES

No **20087349**
Check Date: 06/09/2025

LOUDON COUNTY SOLID WASTE DISPOSAL COMMISSION PO BOX 351 LOUDON, TN 37774-0351

Vendor Number: 10014896

INVOICE	DATE	DESCRIPTION	GROSS AMOUNT	DISCOUNT	NET AMOUNT
LC 053125	05/31/2025	URG RTD 5106	$51,026.78	$0.00	$51,026.78
Detach at perforation Before Depositing Check		**TOTALS:**	**$51,026.78**	**$0.00**	**$51,026.78**

THIS IS A WATERMARKED PAPER - DO NOT ACCEPT WITHOUT NOTING WATERMARK - HOLD TO LIGHT TO VERIFY WATERMARK

VOID VOID VOID

REPUBLIC SERVICES
LE03-AWIN MANAGEMENT INC
18500 NORTH ALLIED WAY
PHOENIX ARIZONA 85054

Bank of America
52-153/112 ME

Check Date
06/09/2025

Number
20087349

Amount

PAY FIFTY-ONE THOUSAND TWENTY-SIX AND 78/100 DOLLARS*****

$***51,026.78

Void after 180 Days

PAY TO THE ORDER OF
LOUDON COUNTY SOLID WASTE
DISPOSAL COMMISSION
PO BOX 351
LOUDON, TN 37774-0351

Authorized Signature

Security Features Included. Details on back.

⑈00 20087349⑈ ⑆011201539⑆ 000080231000⑈

Loudon County Department of Accounts and Budgets
Solid Waste Disposal Fund 207
Monthly Financial Report
May 2025

April 2025 Combined Ending Cash Balance per Monthly Report		6,433,363.35	
Adjustments:			
Trustee's Commission			
	0.00		
Total Adjustments		0.00	
Adjusted April 2025 Combined Ending Balance per Loudon Co Trustee			**6,433,363.35**
Solid Waste Disposal Commission Operating Fund			
Operating Fund Ending Balance April 2025		**6,404,534.63**	
Cash Receipts:			
Trustee's Collections - Prior Year	0		
Surcharge - Host Fees	27,634.65		
Surcharge - Security Fees	25,031.50		
Investment Income	16,637.81		
Total Monthly Revenue		69,303.96	
Cash Disbursements:			
Board & Committee Members Fees	(325.00)		
Social Security			
Employer Medicare			
Audit Services			
Legal Services			
Legal Notices	(180.00)		
Engineering Services	(13,422.50)		
Other Contracted Services			
Building & Content Insurance			
Trustee's Commission			
Total Cash Disbursements		(13,927.50)	
Expenditure Credit:			
Trustee Commission Adjustment			
Operating Fund Ending Balance May 2025			**6,459,911.09**
Poplar Springs Subfund			
Poplar Springs Subfund Balance April 2025		**28,828.72**	
Cash Receipts:			
Investment Income	311.17		
Total Monthly Revenue		311.17	
Cash Disbursements:			
Trustee Commission			
Total Cash Disbursements			
Poplar Springs Subfund Balance May 2025			**29,139.89**
TOTAL COMBINED OPERATING AND POPLAR SPRINGS MAY 2025 BALANCE			**6,489,050.98**

Combined Summary - May 2025	
Beginning Balance	**6,433,363.35**
Plus Operating Revenue	**69,615.13**
Less Operating and Poplar Springs Disbursements	(13,927.50)
TOTAL COMBINED BALANCE - MAY 2025	**6,489,050.98**

NOTE: May 2025 report from Trustee was not available when this report was prepared.