PRELIMINARY DETERMINATION

PERMIT RENEWAL
Lauderdale County Commission
P.O. Box 1059
Florence, Alabama 35631

Underwood Landfill
Permit No. 39-03

February 5, 2026

The Lauderdale County Commission submitted to the Alabama Department of Environmental Management (ADEM) an application to renew the permit for the Underwood Landfill (Permit No. 39-03**)**. The waste stream for Underwood Landfill would remain nonputrescible and nonhazardous construction and demolition waste and rubbish as defined by ADEM Admin. Code Rule 335-13-1-.03, particle board from furniture manufacturers, fabrics and fibers from the textile industry, appliances, and tires. The service area for the Underwood Landfill would remain Lauderdale County and all of its cities, towns and limits. The maximum average daily volume of waste disposed at Underwood Landfill would remain 100 tons per day.

The Underwood Landfill is described as being located in the Section 16, Township 2 South, Range 11 West in Lauderdale County, Alabama. The total permitted facility area for the Underwood Landfill is approximately 130.48 acres with approximately 47.7 acres permitted for disposal of construction and demolition waste and industrial waste and 56.8 acres closed industrial waste disposal area.

The Land Division has determined that the permit renewal application complies with the requirements of ADEM's Administrative Code Division 13 regulations for an industrial waste landfill.

Technical Contact:

Mr. Jonathan Crosby
Solid Waste Engineering Section
Land Division

SOLID WASTE DISPOSAL FACILITY PERMIT

PERMITTEE:	**Lauderdale County Commission**
FACILITY NAME:	**Underwood Landfill**
FACILITY LOCATION:	**Section 16, Township 2 South, Range 11 West in Lauderdale County, Alabama. The permitted facility boundary consists of approximately 130.48 acres with approximately 47.7 acres permitted for disposal of construction and demolition waste and industrial waste as defined in Section III.B. and 56.8 acres closed industrial waste disposal area.**
PERMIT NUMBER:	**39-03**
PERMIT TYPE:	**Industrial**
WASTE APPROVED FOR DISPOSAL:	**Nonputrescible and nonhazardous construction and demolition waste and rubbish as defined by ADEM Admin. Code Rule 335-13-1-.03, particle board from furniture manufacturers, fabrics and fibers from the textile industry, appliances, and tires.**
APPROVED WASTE VOLUME:	**Maximum Average Daily Volume of 100 tons per day**
APPROVED SERVICE AREA:	**Lauderdale County, Alabama and all its cities, towns and limits**

In accordance with and subject to the provisions of the Solid Wastes & Recyclable Materials Management Act, as amended, Code of Alabama 1975, SS 22-27-1 to 22-27-27 ("SWRMMA"), the Alabama Environmental Management Act, as amended, Code of Alabama 1975, SS 22-22A-1 to 22-22A-15, and rules and regulations adopted thereunder, and subject further to the conditions set forth in this permit, the Permittee is hereby authorized to dispose of the above-described solid wastes at the above-described facility location.

ISSUANCE DATE:	**XXXXXXXXX**
EFFECTIVE DATE:	**XXXXXXXXX**
EXPIRATION DATE:	**XXXXXXXXX**

Alabama Department of Environmental Management

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
SOLID WASTE PERMIT

Permittee:	Lauderdale County Commission P.O. Box 1059 Florence, Alabama 35631
Landfill Name:	Underwood Landfill
Landfill Location:	Section 16, Township 2 South, Range 11 West in Lauderdale County, Alabama
Permit Number:	39-03
Landfill Type:	Industrial

Pursuant to the Solid Wastes & Recyclable Materials Management Act, Code of Alabama 1975, §§22-27-1, *et seq*., as amended (the "Act"), and attendant regulations promulgated there under by the Alabama Department of Environmental Management (ADEM), this permit is issued to the Lauderdale County Commission (hereinafter called the Permittee), to operate a solid waste disposal facility, known as the Underwood Landfill.

The Permittee must comply with all terms and conditions of this permit. This permit consists of the conditions set forth herein (including those in any attachments), and the applicable regulations contained in ADEM Admin. Code 335-13-1 through 335-13-16 of the ADEM Administrative Code (hereinafter referred to as the "ADEM Admin. Code"). Rules cited are set forth in this document for the purpose of Permittee reference. Any rule that is cited incorrectly in this document does not constitute grounds for noncompliance on the part of the Permittee. Applicable ADEM Admin. Codes are those that are in effect on the date of issuance of this permit or any revisions approved after permit issuance.

This permit is based on the information submitted to the Department for permit renewal on March 28, 2023, and as amended, known as the Permit Application (hereby incorporated by reference and hereinafter referred to as the Application). Any inaccuracies found in this information could lead to the termination or modification of this permit and potential enforcement action. The Permittee must inform ADEM of any deviation from or changes in the information in the Application that would affect the Permittee's ability to comply with the applicable ADEM Admin. Code or permit conditions.

This permit is effective as of **XXXXXXXX,** and shall remain in effect until **XXXXXXXXX**, unless suspended or revoked.

_____ _____

Alabama Department of Environmental Management Date Signed

SECTION I. STANDARD CONDITIONS.

A. Effect of Permit. The Permittee is allowed to dispose of nonhazardous solid waste in accordance with the conditions of this permit and ADEM Administrative Code, Division 13. Issuance of this permit does not convey property rights of any sort or any exclusive privilege, nor does it authorize any injury to persons or property, any invasion of other private rights, or any infringement of state or local laws or regulations. Except for actions brought under the Act, compliance with the conditions of this permit shall be deemed to be compliance with applicable requirements in effect as of the date of issuance of this permit and any future revisions.

B. Permit Actions. This permit may be suspended, revoked or modified for cause. The filing of a request for a permit modification or the notification of planned changes or anticipated noncompliance on the part of the Permittee, and the suspension or revocation does not stay the applicability or enforceability of any permit condition.

C. Severability. The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

D. Definitions. For the purpose of this permit, terms used herein shall have the same meaning as those in 335-13, unless this permit specifically provides otherwise; where terms are not otherwise defined, the meaning associated with such terms shall be as defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

1. "EPA" for purposes of this permit means the United States Environmental Protection Agency.

2. "Permit Application" for the purposes of this permit, means all permit application forms, design plans, operational plans, closure plans, technical data, reports, specifications, plats, geological and hydrological reports, and other materials which are submitted to ADEM in pursuit of a solid waste disposal permit.

E. Duties and Requirements.

1. Duty to Comply. The Permittee must comply with all conditions of this permit except to the extent and for the duration such noncompliance is authorized by a variance granted by ADEM. Any permit noncompliance, constitutes a violation of the Act and is grounds for enforcement action, permit suspension, revocation, modification, and/or denial of a permit renewal application.

2. Duty to Reapply. If the Permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Permittee must apply for and obtain a new permit. The renewal application must be submitted to ADEM at least 180 days before this permit expires.

3. Permit Expiration. This permit and all conditions therein will remain in effect beyond the permit's expiration date if the Permittee has submitted a timely, complete application as required by Section I.,E.,2., and, through no fault of the Permittee, ADEM has not made a final decision regarding the renewal application.

4. Need to Halt or Reduce Activity Not A Defense. It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity to maintain compliance with the conditions of this permit.

5. Duty to Mitigate. In the event of noncompliance with this permit, the Permittee shall take all reasonable steps to minimize releases to the environment, and shall carry out such measures as are reasonable to prevent significant adverse impacts on human health or the environment.

6. Proper Operation and Maintenance. The Permittee shall at all times properly operate and maintain all facilities and systems of control (and related appurtenances) that are installed or used by the Permittee to achieve compliance with the conditions of this permit.

7. Duty to Provide Information. If requested, the Permittee shall furnish to ADEM, within a reasonable time, any information that ADEM may reasonably need to determine whether cause exists for denying, suspending, revoking, or modifying this permit, or to determine compliance with this permit. If requested, the Permittee shall also furnish ADEM with copies of records kept as a requirement of this permit.

8. Inspection and Entry. Upon presentation of credentials and other documents as may be required by law, the Permittee shall allow the employees of ADEM or their authorized representative to:

   a. Enter at reasonable times the Permittee's premises where the regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit.

   b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit.

   c. Inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit.

   d. Sample or monitor, at reasonable times, any substances or parameters at any location for the purposes of assuring permit compliance or as otherwise authorized by Code of Alabama 1975, §§22-27-1 *et seq*.

9. Monitoring, Corrective Actions, and Records.

   a. Samples and measurements taken for the purpose of monitoring or corrective action shall be representative of the monitored activity. The methods used to obtain representative samples to be analyzed must be the appropriate method from ADEM Admin. Code 335-13-4 or the methods as specified in the Application attached hereto and incorporated by reference. Laboratory methods must be those specified in Standard Methods for the Examination of Water and Wastewater (American Public Health Association, latest edition), Methods for Chemical Analysis of Water and Wastes (EPA-600/4-79-020), Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (EPA Publication SW-846, latest edition), other appropriate EPA methods, or as specified in the Application. All field tests must be conducted using approved EPA test kits and procedures.

   b. The Permittee shall retain records, at the location specified in Section I.,I., of all monitoring, or corrective action information, including all calibration and maintenance records, copies of all reports and records required by this permit, and records of all data used to complete the application for this permit for a period of at least three years from the date of the sample, measurement, report or record or for periods elsewhere specified in this permit. These periods may be extended by the request of ADEM at any time and are automatically extended during the course of any unresolved enforcement action regarding this facility.

   c. Records of monitoring and corrective action information shall include.

      i. The exact place, date, and time of sampling or measurement.

      ii. The individual(s) and company who performed the sampling or measurements.

      iii. The date(s) analyses were performed.

      iv. The individual(s) and company who performed the analyses.

v. The analytical techniques or methods used.

vi. The results of such analyses.

d. The Permittee shall submit all monitoring and corrective action results at the interval specified elsewhere in this permit.

10. Reporting Planned Changes. The Permittee shall notify ADEM, in the form of a request for permit modification, at least 120 days prior to any change in the permitted service area, increase in the waste received, or change in the design or operating procedure as described in this permit, including any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

11. Transfer of Permit. This permit may be transferred to a new owner or operator. All requests for transfer of permits shall be in writing and shall be submitted on forms provided by ADEM. Before transferring ownership or operation of the facility during its operating life, the Permittee shall notify the new owner or operator in writing of the requirements of this permit.

12. Certification of Construction. Before the Permittee may commence disposal of waste in any new cell or phase:

a. The Permittee must submit a letter to the Department signed by both the Permittee and a professional engineer stating that the facility has been constructed in compliance with the permit.

b. The Department must inspect the constructed cells or phases unless the permittee is notified that the Department will waive the inspection.

a. The Permittee may not commence disposal activities in any cells or phases until approval of the new cells or phases is granted by the Department.

13. Noncompliance. The Permittee shall report all instances of noncompliance with the permit at the time noncompliance is discovered.

14. Other Information. If the Permittee becomes aware that information required by the Application was not submitted or was incorrect in the Application or in any report to ADEM, the Permittee shall promptly submit such facts or information. In addition, upon request, the Permittee shall furnish to ADEM, within a reasonable time, information related to compliance with the permit.

F. Design and Operation of Facility. The Permittee shall maintain and operate the facility to minimize the possibility of a fire, explosion, or any unplanned sudden or nonsudden release of contaminants (including leachate and explosive gases) to air, soil, groundwater, or surface water, which could threaten human health or the environment.

G. Inspection Requirements.

1. The Permittee shall comply with all requirements of ADEM Admin. Code 335-13 4-.21(1)(b).

2. The Permittee shall conduct random inspections of incoming loads.

3. Records of all inspections shall be included in the operating record.

H. Recordkeeping and Reporting.

1. The Permittee shall maintain a written operating record at the location specified in Section I.,I. The operating record shall include:

   a. Documentation of inspection and maintenance activities.

   b. Daily Volume reports.

   c. Personnel training documents and records.

   d. Solid/Hazardous Waste Determination Forms for Industrial Wastes, and associated ADEM disposal approval correspondence for industrial waste and special waste.

   e. Groundwater monitoring records.

   f. Explosive gas monitoring records.

   g. Surface water and leachate monitoring records.

   h. Copies of this Permit and the Application.

   i. Copies of all variances granted by ADEM, including copies of all approvals of special operating conditions.

2. Quarterly Volume Report. Beginning with the effective date of this permit, the Permittee shall submit, within thirty (30) days after the end of each calendar quarter, a report summarizing the daily waste receipts for the previous (just ended) quarter. Copies of the quarterly reports shall be maintained in the operating record.

3. Monitoring and Corrective Action Reports. The Permittee shall submit reports on all monitoring and corrective actions conducted pursuant to the requirements of this permit, including, but not limited to, groundwater, surface water, explosive gas and leachate monitoring. The groundwater monitoring shall be conducted in March and September of each year, and the groundwater reports shall be submitted to ADEM within ninety (90) days of the sampling event, or as directed by ADEM. The reports should contain all monitoring results and conclusions from samples and measurements conducted during the sampling period. Explosive gas monitoring must be submitted once each year, and the reports should be submitted to ADEM and placed in the operating record within thirty (30) days of the monitoring event. Copies of the groundwater and explosive gas monitoring reports shall be maintained in the operating record.

4. Availability, Retention, and Disposition of Records.

   a. All records, including plans, required under this permit or 335-13 must be furnished upon request, and made available at reasonable times for inspection by any officer, employee, or representative of ADEM.

   b. All records, including plans, required under this permit or 335-13 shall be retained by the Permittee for a period of at least three years. The retention period for all records is extended automatically during the course of any unresolved enforcement action regarding the facility, or as requested by ADEM.

   c. A copy of records of waste disposal locations and quantities must be submitted to ADEM and local land authority upon closure of the facility.

I. Documents to be Maintained by the Permittee. The Permittee shall maintain, at the Underwood Landfill office the following documents and amendments, revisions and modifications to these documents until an engineer certifies closure of the permitted landfill.

1. Operating record.

2. Closure Plan.

J. Mailing Location. All reports, notifications, or other submissions which are required by this permit should be sent via signed mail (i.e. certified mail, express mail delivery service, etc.) or hand delivered to:

1. Mailing Address.
Chief, Solid Waste Branch, Land Division
Alabama Department of Environmental Management
P.O. Box 301463
Montgomery, AL 36130-1463

2. Physical Address.
Chief, Solid Waste Branch, Land Division
Alabama Department of Environmental Management
1400 Coliseum Blvd.
Montgomery, Alabama 36110-2400

K. Signatory Requirement. All applications, reports or information required by this permit, or otherwise submitted to ADEM, shall be signed and certified by the owner as follows:

1. If an individual, by the applicant.

2. If a city, county, or other municipality or governmental entity, by the ranking elected official, or by a duly authorized representative of that person.

3. If a corporation, organization, or other legal entity, by a principal executive officer, of at least the level of Vice President, or by a duly authorized representative of that person.

L. Confidential Information. The Permittee may claim information submitted as confidential pursuant to ADEM Admin. Code 335-1-1-.06.

M. State Laws and Regulations. Nothing in this permit shall be construed to preclude the initiation of any legal action or to relieve the Permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation.

SECTION II. GENERAL OPERATING CONDITIONS.

A. Operation of Facility. The Permittee shall operate and maintain the disposal facility consistent with the Application, this permit, and ADEM Admin. Code 335-13.

B. Open Burning. The Permittee shall not allow open burning without prior written approval from ADEM and other appropriate agencies. A burn request should be submitted in writing to ADEM outlining why that burn request should be granted. This request should include, but not be limited to, specifically what areas will be utilized, types of waste to be burned, the projected starting and completion dates for the project, and the projected days and hours of operation. The approval, if granted, shall be included in the operating record.

C. Prevention of Unauthorized Disposal. The Permittee shall follow the approved procedures, as provided in the Application, for detecting and preventing the disposal of free liquids, regulated hazardous waste, PCB's, regulated medical waste, and other unauthorized waste streams at the facility.

D. Unauthorized Discharge. The Permittee shall operate the disposal facility in such a manner that there will be no water pollution or unauthorized discharge. Any discharge from the disposal facility or practice thereof

may require a National Pollutant Discharge Elimination System permit under the Alabama Water Pollution Control Act.

E. Boundary Markers. The Permittee shall ensure that the facility is identified with a sufficient number of permanent boundary markers that are at least visible from one marker to the next.

F. Certified Operator. The Permittee shall be required to have an operator certified by the Department on-site during hours of operation, in accordance with the requirements of ADEM Admin. Code. 335-13-12.

SECTION III. SPECIFIC REQUIREMENTS FOR INDUSTRIAL WASTE LANDFILLS.

A. Waste Identification and Management.

1. Subject to the terms of this permit, the Permittee may accept for disposal the nonhazardous solid wastes listed in III.B. Disposal of any other waste is prohibited, except waste granted a temporary or one time waiver by the Director.

2. The total permitted facility area for the Underwood Landfill is approximately 130.48 acres with approximately 47.7 acres permitted for the disposal of construction and demolition waste and industrial waste as defined in Section III.B. and 56.8 acres closed industrial waste disposal area.

3. The maximum average daily volume of waste disposed of at the facility, as contained in the application, shall not exceed 100 tons/day. Should the average daily volume exceed this value by 20% or 100 tons/day, whichever is less, for two (2) consecutive quarters the permittee shall be required to modify the permit in accordance with ADEM Admin. Code 335-13-5-.06(2)(b)2. The average daily volume shall be computed as specified by ADEM Admin. Code 335-13-4-.23(2)(f).

B. Waste Streams. The Permittee may accept for disposal nonputrescible and nonhazardous construction and demolition waste and rubbish as defined by ADEM Admin. Code 335-13-1-.03, particle board from furniture manufacturers, fabrics and fibers from the textile industry, appliances, and tires.

C. Service Area. The Permittee is allowed to receive waste from Lauderdale County, Alabama and all of the cities, towns and limits.

D. Waste Placement, Compaction, and Cover. All waste shall be confined to an area as small as possible within a single working face and placed onto an appropriate slope not to exceed 4 to 1 (25%). All waste shall be spread in layers two feet or less in thickness and thoroughly compacted weekly with adequate landfill equipment prior to placing additional layers of waste or placing the weekly cover. A minimum of six inches of compacted earth or other alternative cover material approved by ADEM and listed in Section VIII, shall be added at the conclusion of each week's operation. These are minimum requirements for waste placement, compaction and cover unless a variance is granted in Section VIII.

E. Liner Requirements. At this time, the Permittee shall not be required to install a liner system. The base of the landfill shall be a minimum of five (5) feet above the highest measured groundwater level as determined by ADEM Admin. Code 335-13-4-.11(2)(a).

F. Security. The Permittee shall provide artificial and/or natural barriers, which prevent entry of unauthorized vehicular traffic to the facility.

G. All Weather Access Roads. The Permittee shall provide an all-weather access road to the dumping face that is wide enough to allow passage of collection vehicles.

H. Adverse Weather Disposal. The Permittee shall provide for disposal activities in adverse weather conditions.

I. Personnel. The Permittee shall maintain adequate personnel to ensure continued and smooth operation of the facility.

J. Environmental Monitoring and Treatment Structures. The Permittee shall provide protection and proper maintenance of environmental monitoring and treatment structures.

K. Vector Control. The Permittee shall provide for vector control as required by ADEM Admin. Code 335-13.

L. Bulk or Noncontainerized Liquid Waste. The Permittee shall not dispose of bulk or noncontainerized liquid waste, or containers capable of holding liquids, unless the conditions of ADEM Admin Code 335-13-4-.23(1)(j) are met.

M. Empty Containers. Empty containers larger than 10 gallons in size must be rendered unsuitable for holding liquids prior to disposal in the landfill unless otherwise approved by ADEM.

N. Other Requirements. ADEM may enhance or reduce any requirements for operating and maintaining the landfill as deemed necessary by the Land Division.

O. Other Permits. The Permittee shall operate the landfill according to this and any other applicable permits.

P. Scavenging and Salvaging Operations. The Permittee shall prevent scavenging and salvaging operations, except as part of a controlled recycling effort. Any recycling operation must be in accordance with plans submitted and approved by ADEM.

Q. Signs. If the landfill is available to the public or commercial haulers, the Permittee shall provide a sign outlining instructions for use of the site. The sign shall be posted and have the information required by ADEM Admin. Code 335-13-4-.23(1)(f).

R. Litter Control. The Permittee shall control litter.

S. Fire Control. The Permittee shall provide fire control measures.

SECTION IV. GROUNDWATER MONITORING REQUIREMENTS (CLOSED INDUSTRIAL WASTE DISPOSAL AREA).

A. The Permittee shall install and/or maintain a groundwater monitoring system, as specified below.

1. The permittee shall maintain the groundwater monitoring wells and piezometers identified in Table 1 at the locations specified in the Application, and any other groundwater monitoring wells which are added during the active life and the post closure care period.

3. The Permittee shall install and maintain additional groundwater monitoring wells as necessary to assess changes in the rate and extent of a plume of contamination or as otherwise deemed necessary to maintain compliance with the ADEM Admin. Code 335-13.

3. Prior to installing additional groundwater monitoring wells, the Permittee shall submit a plan to ADEM with a permit modification request specifying the design, location and installation of additional monitoring wells. This plan shall be submitted one hundred and twenty (120) days prior to the installation which, at a minimum, shall include.

a. Well construction techniques including proposed casing depths, proposed total depth, and proposed screened interval of well(s);

b. Well development method(s);

c. A complete analysis of well construction materials;

d. A schedule of implementation for construction; and

e. Provisions for determining the lithologic characteristics, hydraulic conductivity and grain-size distribution for the applicable aquifer unit(s) at the location of the new well(s).

B. Groundwater Monitoring Requirements.

1. The Permittee shall determine the groundwater surface elevation at each monitoring well and piezometer identified in Table 1 each time the well or piezometer is sampled and at least semi-annually throughout the active life and post-closure care period.

2. The Permittee shall determine the groundwater flow rate and direction in the first zone of saturation at least annually or each time groundwater is sampled and submit as required by ADEM Admin. Code 335-13.

3. Prior to the initial receipt of waste at the facility, the Permittee shall sample and analyze for the parameters listed in Appendix I of ADEM Admin. Code 335-13-4-.27, in all monitoring wells identified in Section IV.A.2. to establish background water quality and/or as directed by ADEM Admin. Code 335-13-4-.27(2)(j) and ADEM Admin. Code 335-13-4-.27(2)(a)(1).

4. The Permittee shall sample and analyze all monitoring wells identified in Table 1 for the parameters listed in Appendix I of ADEM Admin. Code 335-13-4-.27(3), on a semi-annual basis throughout the active life of the facility and the post-closure care period in accordance with ADEM Admin. Code 335-13-4-.27(3). Sampling shall be conducted during March and September of each year, beginning with the effective date of this permit. **The facility shall submit to ADEM the semi-annual groundwater reports within ninety (90) days of the March and September sampling events.**

5. In addition to the requirements of Sections IV., B.1., B.2., B.3. and B.4., the Permittee shall record water levels, mean sea level elevation measuring point, depth to water, and the results of field tests for pH and specific conductance at the time of sampling for each well.

C. Sampling and Analysis Procedures. The Permittee shall use the following techniques and procedures when obtaining and analyzing samples from the groundwater monitoring wells described in Section IV.A. to provide a reliable indication of the quality of the groundwater.

1. Samples shall be collected, preserved, and shipped (when shipped off-site for analysis) in accordance with the procedures specified in the Application. Monitoring wells shall be bailed or pumped to remove at least four times the well volume of water. Slow recharge wells shall be bailed until dry. Wells shall be allowed to recharge prior to sampling.

2. Samples shall be analyzed according to the procedures specified of the Application, Standard Methods for the Examination of Water and Wastewater (American Public Health Association, latest edition), Methods for Chemical Analysis of Water and Wastes (EPA-600/4-79-020), Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (EPA Publication SW-846, latest edition), or other appropriate methods approved by this Department. All field tests must be conducted using approved EPA test kits and procedures. **The Permittee is approved for intra-well statistical analysis.**

3. Samples shall be tracked and controlled using the chain-of-custody and QA/QC procedures specified in the Application.

D. Recordkeeping and Reporting Requirements.

1. Recording of Results. For each sample and/or measurement taken pursuant to the requirements of this permit, the Permittee shall record the information required by Section I.E.9.c.

2. Recordkeeping. Records and results of all groundwater monitoring, sampling, and analysis activities conducted pursuant to the requirements of this permit shall be included in the operating record required by Section I.I.1.

E. Permit Modification. If the Permittee or ADEM determines that the groundwater monitoring system no longer satisfies the requirements of ADEM Admin. Code 335-13-4-.14 or Section IV.A. of this permit, the Permittee must, within 120 days, submit an application for a permit modification to make necessary and/or appropriate changes to the system.

TABLE 1
GROUNDWATER MONITORING WELLS

Monitoring Well Number	Top of Casing (feet msl)	Part Monitoring
UPGRADIENT/BACKGROUND MONITORING WELL		
MW-1	657.1	Closed Landfill
DOWNGRADIENT MONITORING WELLS		
MW-3	626.40	Closed Landfill
MW-6	612.68	Closed Landfill
MW-7	596.51	Closed Landfill
MW-8	595.61	Closed Landfill
MW-9	616.20	Closed Landfill
MW-10	535.28	Closed Landfill

SECTION V. GAS MONITORING REQUIREMENTS

The permittee shall monitor explosive gases in accordance with ADEM Admin. Code 335-13-4-.16.

SECTION VI. SURFACE WATER MANAGEMENT REQUIREMENTS

The permittee shall construct and maintain run-on and run-off control structures. Any discharges from drainage control structures shall be permitted through a discharge permit issued by the ADEM Water Division.

SECTION VII. CLOSURE AND POST-CLOSURE REQUIREMENTS

The Permittee shall close the landfill and perform post-closure care of the landfill in accordance with ADEM Admin. Code 335-13.

A. Final Cover. The Permittee shall grade final soil cover such that surface water does not pond over the permitted area as specified in the Application.

B. Vegetative Cover. The Permittee shall establish a vegetative or other appropriate cover, as approved by the Department, within 90 days after completion of final grading requirements in the Application. Preparation of a vegetative cover shall include, but not be limited to, the placement of seed, fertilizer, mulch, and water.

C. Notice of Intent. The Permittee shall place in the operating record and notify the Department of their intent to close the landfill prior to beginning closure.

D. Completion of Closure Activities. The Permittee must complete closure activities of each landfill unit in accordance with the Closure Plan within 180 days of the last known receipt of waste.

E. Certification of Closure. Following closure of each unit, the Permittee must submit to the Department a certification, signed by a registered professional engineer, verifying the closure has been completed according to the Closure Plan.

F. Post-Closure Care Period. Post-closure care activities shall be conducted after closure of each unit throughout the life of this permit and continue for a period of thirty (30) years following closure of the facility. The Department may shorten or extend the post-closure care period applicable to the solid waste disposal facility.

G. Post-Closure Maintenance. The Permittee shall provide post closure maintenance of the facility to include regularly scheduled inspections. This shall include maintenance of the cover, vegetation, monitoring devices and pollution control equipment and correction of other deficiencies that may be observed by ADEM. Monitoring requirements shall continue throughout the post closure period as determined by the Department unless all waste is removed and no unpermitted discharge to waters of the State have occurred.

H. Post-Closure Use of Property. The Permittee shall ensure that post closure use of the property never be allowed to disturb the integrity of the final cover, liner, or any other component of the containment system. This shall preclude the growing of deep-rooted vegetation on the closed area.

I. Certification of Post-Closure. Following post-closure of each unit, the Permittee must submit to the Department a certification, signed by an independent engineer, verifying the post-closure has been completed according to the Post-Closure Plan.

J. Recording Instrument. The Permittee must provide documentation of compliance with the requirements of the Uniform Environmental Covenants Program in ADEM Admin. Code 335-5 and shall execute the following:

1. Record a notation onto the land deed within 90 days from the certification of closure. This notation shall state that the land has been used as a solid waste disposal facility, the name of the Permittee, type of disposal activity, location of the disposal facility, and beginning and closure dates of the disposal activity.

2. File the covenant at the courthouse where the land deed is held within thirty (30) days of receipt of the covenant signed by ADEM's Land Division Chief.

3. The Permittee shall submit a certified copy of the recording instrument to ADEM within 120 days after permit expiration, revocation, or as directed by ADEM as described in the Application.

K. Removal of Waste. If the Permittee, or any other person(s), wishes to remove waste, waste residues, or any liner or contaminated soil, the owner must request and receive prior approval from the Department.

SECTION VIII. VARIANCES

There are no approved variances for the Underwood Landfill.

Any variance granted by the Department may be terminated by the Department whenever the Department finds, after notice and opportunity for hearing, that the petitioner is in violation of any requirement, condition, schedule, limitation or any other provision of the variance, or that operation under the variance does not meet the minimum requirements established by state and federal laws and regulations or is unreasonably threatening the public health.

PERMIT APPLICATION

thompson
ENGINEERING

March 21, 2023

Mr. Jonathan Crosby
Alabama Department of Environmental Management
Land Division
Solid Waste Engineering Section
P.O. Box 301463
Montgomery, AL 36130-1463

Reference: Underwood Landfill
Solid Waste Permit Renewal (#39-03)
Florence, Lauderdale County, Alabama

Dear Mr. Crosby,

Please find attached ADEM form #439 and requested attachment for the renewal of the Underwood Landfill Industrial Solid Waste permit, along with the required $8,150.00 Industrial Landfill Permit fee.

Should you have any questions, please feel free to contact me at your earliest convenience at (256) 460-5759.

Sincerely,
Thompson Engineering, Inc.

Chris Gillentine
Senior Geologist

5613 Tennessee Ave., Suite 101
Chattanooga, Tennessee 37409
423.759.7970 ph. / 423.759.7950 fax
www.thompsonengineering.com

A THOMPSON HOLDINGS, INC. COMPANY

PERMIT APPLICATION
SOLID WASTE DISPOSAL FACILITY
ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
(Submit in Triplicate)

1. **Facility type:**
   - ____ Municipal Solid Waste Landfill (MSWLF)
   - __X__ Industrial Landfill (ILF)
   - __X__ Construction and Demolition Landfill (C/DLF)
   - ____ CCR Landfill (CCRLF)
   - ____ CCR Surface Impoundment (CCRSI)
   - ____ Other (explain)____

2. **Facility Name** Underwood Landfill (Permit No. 39-03-Reissuance)

3. **Applicant/Permittee:**

   Name: Lauderdale County Commission

   Address: P.O. Box 1059
   200 South Court Street
   Florence, AL 35631

   Telephone: 256-760-5750

   If applicant/permittee is a Corporation, please list officers:
   AS ABOVE

4. **Location: (include county highway map or USGS map)**

   Township 25 **Range** 11W
   Section 17 **County** Lauderdale

5. **Land Owner:**

   Name: AS ABOVE

   Address:

   Telephone:

   (Attach copy of agreement from landowner if applicable.)

6. **Contact Person:**

Name Mr. Danny Pettus

Position or Affiliation Lauderdale County Commission, Chairman

Address: AS ABOVE

Telephone: _____

7. **Size of Facility:** 130.48 **Acres**

Size of Disposal Area(s): 47.7 **Acres**

8. **Identify proposed service area or specific industry that waste will be received from:**

Lauderdale County and all of its cities, towns and limits.

9. **Proposed maximum average daily volume to be received at landfill (choose one):**

200 **Tons/Day** _____ **Cubic Yards/Day**

10. **List all waste streams to be accepted at the facility (i.e., household solid waste, wood boiler ash, tires, trees, limbs, stumps, etc.):**

Nonputrescible and nonhazardous construction and demolition waste and rubbish as defined by ADEM Rule 335-13-1-.03, particle board from furniture manufacturers, fabrics and fibers from the textile industry, appliances and tires.

SIGNATURE (Responsible official of permit applicant):

Danny Pettus **TITLE:** Lauderdale County Commission, Chairman

Mr. Danny Pettus **DATE:** 3/27/23

(please print or type name)

Lauderdale County Solid Waste Department

Florence, Lauderdale County, Alabama

Underwood Landfill Permit Renewal/Reissuance

Permit No. 39-03

March 21, 2023

Relevant documentation descriptions and responses:

- No current variances or special conditions
- Requesting an increase from 100 tons per day to a limit of 200 tons per day.
- Local Approval-Submitted in the updated and approved SWMP in September 2016
- Statement of Consistency-Submitted with SWMP in September 2016
- No siting requests
- Hydrogeological evaluation-submitted with expansion/permit modification in July 2009
- Stormwater Calcs-Submitted with expansion/permit modification in August 2009
- Operations Plan previously submitted in November 2009
- Groundwater Monitoring Plan-Previously Submitted in July 2018
- Methane Monitoring Plan-Previously submitted in November 2009
- Cell Certification-Submitted to you under cover and approved from ADEM Oct. 9, 2019 (Cell 4). Previous cell 1 (Sept 2011), cell 2 (Oct 2015) and cell 3 (Aug 2018) remain open. Final closure of the old landfill unit was submitted in March 2012.
- Permit Drawings-Submitted to your office during expansion/permit modification in August 2009.
- Boundary Plat and legal Description-Submitted to your office during expansion/permit modification in August 2009 (Performed in June 2008).
- A Cap Evaluation Report (CAP) was submitted to Ms. Nichole Shaw in March of 2021 as part of our current assessment monitoring. Our submittals and work continue on repairing and rehabilitation of those areas of deficiency (areas previously closed in 1995).

Groundwater Monitoring Plan

Prepared for:

Lauderdale County Solid Waste Department

5100 Highway 157

Florence, Alabama 35630

Underwood Landfill

Florence, Lauderdale County, Alabama

Solid Waste Permit #39-03

Project No: 24-1109-0008

October 2024

Chris Gillentine,
Senior Geologist

Cade Burgin, P.E.
Project Engineer

ALABAMA LICENSED No. 40475 PROFESSIONAL ENGINEER CADE BURGIN 10/23/2024

thompson ENGINEERING

October 23, 2024

Lauderdale County Solid Waste Department
5100 Hwy 157 North
Florence, Alabama 35633

Attn: Mr. Tom Smith, Lauderdale County Solid Waste Department Manager

Re: Groundwater Monitoring Plan
Underwood Landfill
Florence, Lauderdale County, Alabama
Thompson Project No.: 24-1109-0008

Dear Mr. Smith:

Thompson Engineering, Inc. (Thompson Engineering) is pleased to submit the enclosed Groundwater Monitoring Plan for the above-referenced site. We appreciate the opportunity to be of service to you on this project. If there are any questions regarding this report or if we may be of further assistance, please do not hesitate to contact us.

Sincerely,
Thompson Engineering, Inc.

Chris Gillentine
Senior Geologist

Cade Burgin, P.E.
Project Engineer

Table of Contents

1. INTRODUCTION

The Lauderdale County Commission and the Lauderdale County Solid Waste Department currently operate the Underwood C/D Landfill located at 5700 Highway 157, Florence, Alabama (Figure 1). The landfill (Figure 2) is required by solid waste permit No. 39-03 to perform semi-annual groundwater monitoring. Sampling events are currently performed in March and September. As shown on Figure 3, the groundwater monitoring network consists of seven groundwater monitoring wells: MW-1, MW-3, MW-6, MW-7, MW-8, MW-9 and MW-10.

1.1 Location

The older portion of the Underwood Landfill where monitoring is being conducted is located at a GPS (global positioning system) location of 34 degrees 52.824' N, 87 degrees 42.417' W and on the United States Geological Survey (USGS) Blackburn, Alabama 7.5 minute series quadrangle map in the western ¼ of Section 16 of Township 2 South, Range 11 West, north of Alabama Highway 157, in Lauderdale County, Alabama (refer to Exhibits 1 and 2). The older portion of the landfill consists of approximately 59 acres. Solid wastes are no longer being placed in the older portion of the landfill; however, groundwater monitoring is required. The Underwood Landfill has been expanded to an approximate 72-acre parcel located adjacent to the west. This expansion area receives only construction and demolition (C/D) waste, and groundwater monitoring is not required.

1.2 Operational History

The Lauderdale County Commission has operated the landfill under the name of Underwood Landfill since November, 1968. The landfill has been in operation since that time. Municipal solid waste was accepted and disposed into the older portion of the landfill until 1994 and the construction of the transfer station. The municipal solid waste cells were capped and closed in 1995 and the landfill became C/D only in 1996.

The site does not have an engineered clay or synthetic liner system. The facility has accepted household garbage and rubbish and commercial solid waste (wooden pallets, paper, demolition wastes, etc.) and ADEM approved special solid wastes. The facility has not accepted municipal solid waste for on-site disposal since 1995.

1.3 Status of Monitoring Program

The Underwood Landfill currently operates under Alabama Department of Environmental Management (ADEM) Permit #39-03. The permit specifies requirements for groundwater sampling, reporting, testing and recording of results. As a solid waste unit, the Underwood Landfill is regulated under the Solid Wastes Disposal Act as amended, Code of Alabama 1975, 22-27-1 to 22-27-27, the Alabama Environmental Management Act as amended, Code of Alabama 1975, 22-22A-1 to 22-22A-15 and the conditions set forth in the current permit. ADEM requires monitoring of all parameters listed in 40 CFR Part 258, Appendix I.

1.4 Site Geology/Hydrogeology

Regional geology of Lauderdale County reveals that the central portion of the county is located within the Interior Low Plateaus physiographic province. Rock within the Interior Low Plateaus province consists mainly of limestone, sandstone, shale and dolomite. Ages of these rocks range from the early Mississippian to the early Pennsylvanian. This region also lies on the southern flank of the Nashville dome with strata dipping primarily to the south and southwest at 25 to 30 feet

per mile. The site-specific area is underlain by the Tuscumbia Limestone of Upper-Mississippian age. It is described as a light-gray bioclastic or micritic limestone. It is partly oolitic and in beds that are generally more than one foot thick. Massively cross-bedded, very coarse bioclastic, crinoidal limestone beds are locally as much as 10 feet thick. Light gray and white chert nodules and banded chert concretions are abundant locally. Thickness of the Tuscumbia Limestone in this area is approximately 200 feet.

Major aquifers in the area include the Fort Payne Chert and Tuscumbia Limestone. These two formations are closely related in lithology and structural composition, and are often referred to as the Fort Payne Chert - Tuscumbia Limestone aquifer system. The Tuscumbia Limestone overlies the Fort Payne Chert and is the most important water-bearing unit in the northwest region of Alabama. However, the permeability of the formation is generally less in the subject area. The Chattanooga Shale, a black, fissile shale with minor amounts of fine sandstone, forms an aquiclude at the base of the unit and restricts the downward movement of water to lower geologic units.

The regolith (soil overlying bedrock) is comprised of reddish brown silty clays with varying amounts of chert. These soils are the residuum of the weathered in-place limestone units. The Tuscumbia limestone receives recharge from these overlying materials.

Groundwater elevations in the region generally coincide with the surface topography, although some anomalies occur. This indicates that groundwater moves horizontally down the slope of the land surface towards depressions, sinkholes, springs, streams and other points of discharge.

Differential weathering of the bedrock causes an irregular surface with significant elevation changes. The general trend of the bedrock surface dips to the west-southwest based on auger refusal depths and historical subsurface borings.

Groundwater in the area is contained primarily in the solutionally enlarged fractures, bedding planes and cavities in the bedrock limestones and in the regolith covering these strata. Solution cavities are not uniformly distributed in the limestone, making prediction of their occurrence extremely difficult. A well completed in a water-filled solution cavity may yield a substantial amount of water, whereas a well drilled just a few feet away that does not penetrate a solution cavity may be a dry hole. In addition, solution cavities may not be water saturated, or may be saturated only during periods of a high water table.

2. GROUNDWATER MONITORING

The groundwater monitoring system is a sequence of wells that are selected to monitor the area around a landfill so that a potential release from the landfill can be detected in the groundwater. The current network is composed of seven groundwater monitoring wells at the Underwood Landfill site: MW-01, MW-03, MW-06, MW-07, MW-08, MW-09 and MW-10 as shown in Figure 2.

Groundwater samples are analyzed for field and laboratory parameters described in ADEM Administrative Code R. 335-13-4-.27. The groundwater monitoring requirements are semiannual detection monitoring. The site is currently in semi-annual detection monitoring and no additional wells are anticipated to be installed at the site. The following sections present an overview of the groundwater monitoring program at Underwood Landfill regarding monitoring well construction, analytical parameter requirements, and statistical methodology. Tables 1-3 provide summaries of the analyte names, preservation methods, analytical methods, and reporting or practical quantitation limits for Detection and Background monitoring.

A review of the data from the site hydrology and the geometry of the landfill indicate that the seven current monitoring wells adequately cover the detection of a potential release from this facility. If conditions change that impact the monitoring network, then the Solid Waste Department will review and make changes as needed. If wells require replacement, then whenever possible and upon ADEM approval, the wells will be installed in the same general location as the abandoned well.

2.1.1 Monitoring Well Details

Any proposed new or replacement monitoring wells will be installed under the direction of a qualified geologist or engineer. Detection monitoring wells will be installed, typically using a hollow stem auger, so that the well screens are at or immediately below the water table and thus monitor the first saturated zone. Screening just below the water will enable collection of a more representative groundwater sample, less subject to redox or other geochemical changes associated with the vadose (unsaturated) zone.

The drilling will be performed so that a stable borehole can be maintained while the sand pack, the PVC screen and casing, and seal components are installed. The seal above the sand and annular-space seal to the surface will be placed such as not to disturb or contaminate the sand pack as well as to seal off the monitoring zone from possible higher groundwater occurrences. A protective casing will be grouted over the PVC casing with a concrete pad that will be formed so that water is shed away from the borehole. Bollards are not required, but may be used along roads to protect wells in areas of high traffic.

Well construction logs are contained within Appendix D.

2.1.2 Well Development

Any new groundwater monitoring wells will be developed to ensure that representative groundwater samples are obtained. Wells that are turbid (e.g. greater than 25 to 50 NTUs) will be redeveloped if quiescent (low flow) or other sampling techniques cannot reduce the turbidity. New wells will be developed by pumping or bailing a minimum of 24 hours after installation to agitate the well column and place particulate matter in suspension. Wells, existing or new, will

then be pumped or bailed until a minimum of five well volumes of water have been removed, where a well volume is defined as the volume of water in the well casing. This process will continue until the suspended matter has been removed, the turbidity has attenuated (ideally below 25 NTUs), and the specific conductance, temperature, and pH have stabilized.

2.1.3 Well Abandonment

If it is necessary to abandon and/or replace groundwater monitoring wells, the wells will be abandoned under the direction of a qualified geologist or engineer. The abandonment procedure will be in accordance with ADEM regulations. Abandonment may include either removing the existing casing and backfilling the well boring, or overdrilling (overdrilling may be conducted if the well is located within the landfill footprint and has a potential to act as a conduit). The details for well abandonment will be presented to the ADEM for approval, prior to conducting well abandonment field activities.

2.2 Background and Initial Sampling

The purpose of obtaining adequate background groundwater data is to approximate the true range of ambient concentrations of targeted compounds in the groundwater system being monitored. In other words, background groundwater data should eliminate, to the extent possible, all potential causes of significant changes in groundwater chemistry not attributable to the monitored facility. True background data is obtained by monitoring a sufficient number of wells upgradient of the facility (for inter-well comparisons), or wells downgradient of the facility not previously impacted by the waste management unit (for intra-well comparisons).

Three major components must be met to successfully achieve the goals of obtaining adequate background samples:

1. Collecting the minimum number of samples that satisfy the requirements of the data evaluation methods that are used (e.g. sufficient data to plot trends);
2. Incorporating seasonal or temporal variability into the background data set; and,
3. Incorporating the spatial component of variability into the background data set (the variability that comes with obtaining samples from different locations within the same groundwater zone).

The spatial component of variability constitutes a large percentage of the overall variability with data evaluation approaches. Eliminating the spatial component of variability (through the use of intra-well comparisons), or adequately incorporating it into the background data set (through the use of multiple upgradient wells in inter-well comparisons) is extremely important in developing an effective detection monitoring program. Since background has been established for existing wells, background only applies to new monitoring wells, if needed.

The parameters that will be potentially analyzed to establish the groundwater geochemical database are those listed in Appendix I (Table 3). Additional background indicator data may be collected from the existing wells for further characterization as described in Section 2.2.1. This list may be subject to change based on a contracted laboratory's ability to achieve the limits proposed on this table. These parameters are designed to provide an accurate characterization of the uppermost hydrogeologic unit and to establish the initial baseline concentrations for implementation of site-specific statistical evaluation. Additionally, a list of applicable practical quantitation limits (PQLs) or laboratory reporting limits (RL's) for these parameters are provided on Table 3.

2.2.1 Initial Sampling

After construction of new monitoring wells, each monitoring well will be sampled initially and analyzed for field and laboratory parameters as described in ADEM Administrative Code Rule 335-13-4-.27. The initial sampling event will be conducted within one year prior to placing waste in the associated cell being monitored. After the initial background sampling event, groundwater samples will be collected semiannually and analyzed for the groundwater indicator parameters listed in Rule 335-13-4-.27 and presented in Table 2 (see following sections).

A minimum of four background samples is required prior to initiating inter-well statistical analysis. Four samples will be collected within a six month period after new wells are installed. Intra-well monitoring requires eight sampling events per well prior to the implementation of statistics. For intrawell statistical analysis, four additional samples will be collected over the next year, until the eight sampling events are completed. In the interim, the data will be analyzed and interpreted using either up to down gradient (interwell) approaches or with approved visual data evaluation methods, such as time series plots and VOC detections above PQLs. Since background monitoring activities for the existing site were substantially completed for most wells, this schedule only applies to newly installed wells as a part of future monitoring activities.

Additional background data will not be required for replacement wells installed adjacent to existing wells. A demonstration will be made after collection of the initial sample from any replacement wells to show that the data sets are similar. If there is a difference between the replacement well and the former well, then the difference will be evaluated and accounted for. In cases where replacement wells have a different groundwater geochemistry, additional background may be collected as for inter-well and/or intra well analyses.

2.3 Detection Monitoring

Historically, groundwater samples have been analyzed in accordance with ADEM Administrative Code R. 333-13-4-.27 detection monitoring that is semi-annual for the constituents in Appendix I of ADEM Administrative Code R. 335-13-4-.27.

2.4 Statistical Data Evaluation

This section outlines the proposed evaluation methodology that may be used for detection of a release from the facility, by using PQLs (Practical Quantification Limits) as the concentration limits for VOCs (Volatile Organic Compounds), and prediction interval statistics for intra-well comparisons. Statistical evaluation will only be performed on Appendix I VOCs and metals.

During background sample collection, it will be necessary to examine the data for outliers, anomalies, and trends that might be an indication of a release. Outliers and anomalies are inconsistently large or small values that can occur due to sampling, laboratory, transportation or transcription errors, or even by chance alone. Significant trends indicate a source of systematic error, or an actual contamination occurrence, that must be evaluated and corrected before the detection monitoring program can be implemented. The inclusion of such values in the historical database used for statistical evaluation could cause misinterpretation of the data set, and result in an artificial increase in the magnitude of statistical limits, which could result in an increase in the false negative rate (i.e., a decrease in the sensitivity of the statistical procedure).

To remove the possibility of historical outliers and trends creating false statistical limits, the data for each well and each constituent will be tested for the existence of outliers using the SANITAS

for Groundwater™ program to define outliers in the background data set. Outliers may be removed from consideration during the establishment of all statistical limits. The statistical outlier and trend detection procedure will be performed for those wells that have had at least 5 measurements for a given constituent. Once the background database is established, the outlier procedure described above may be applied and appropriate statistical limits set.

There are no firm rules on how often to update background data. The Unified Guidance adopts the general principle that updating should occur when enough new measurements have been collected to allow a two-sample statistical comparison between the existing background data and a potential set of newer data. With semi-annual sampling, at least 4 to 8 new measurements will be gathered to enable such a test; this implies that updating background data will take place every 2-4 years.

With intrawell tests using prediction limits updating is performed both to enlarge initially small well-specific background samples and to ensure that more recent compliance measurements are not already impacted by a potential release (even if not triggered by the formal detection monitoring tests). A finding of significance using the above two-sample test means that the most recent data should not be added to intrawell background.

Updating intrawell background will not occur until at least 4 to 8 new compliance observations have been collected. Further, a potential update is predicated on there being no statistically significant increase [SSI] recorded for that well constituent, including since the last update. A non-significant result implies that the newer compliance data can be re-classified as background measurements and added to the existing intrawell background sample. On the other hand, a determination of significance suggests that the compliance observations should be reviewed to determine whether a gradual trend or other change has occurred that was missed by the intervening prediction limit test.

2.5 Statistical Methodology

The use of intra-well statistical comparisons for evaluation of groundwater chemistry data is supported by the USEPA (Unified Guidance). The following sections further discuss the selected statistical evaluation methods.

2.5.1 Volatile Organic Compounds

PQLs assure that the quantitative value of the analyte is close to the measured value. Conversely, method detection limits (MDLs), indicate that the analyte is present in the sample with a specified degree of confidence. For analytes with estimated concentrations greater than the MDL but not the PQL, it can only be concluded that the true concentration is greater than zero; the actual concentration cannot be determined. Comparison of a detected concentration to any regulatory standard (such as a maximum contaminant level (MCL)), or any other concentration limit, is by definition not meaningful unless the concentration is greater than the PQL.

If a MSWL facility actually produces a release to groundwater, multiple constituents contained in the leachate are typically associated with the source fluids and are subsequently detected by the groundwater monitoring program. A single constituent at very low concentration (i.e. below the PQL) typically is not the signature that is produced from an actual release.

Because these compounds are rarely detected in background groundwater samples, establishing monitor well-specific limits for VOCs is generally not an option. Therefore, detection decision rules based on laboratory-specific PQL will be used. The use of a PQL in the absence of a measurable background value is supported by 40 CFR 258.53(h)(5) which states that any PQL used in a statistical analysis: "...be the lowest concentration level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions that are available to the facility."

Any VOC detected and verified at a concentration above the PQL would be statistically significant, and therefore trigger assessment monitoring. These decision rules apply only in cases where the constituent has rarely, or has never, been detected in background.

2.5.2 Inorganic Pesticides

Prediction interval statistics will be utilized to evaluate inorganic constituents. The prediction interval is a statistical interval used to compare a single observation to a group of observations. In groundwater monitoring, a prediction interval approach may be used to make comparisons between background and compliance well data. The interval is constructed to contain all future observations with stated confidence. If any future observation exceeds this interval, this is statistically significant evidence that the observation is not representative of the background group.

Parametric prediction intervals are the first choice when performing prediction interval statistics. The parametric alternative is constructed assuming the background data have a normal or transformed-normal distribution. During parametric prediction interval analysis, the mean and the standard deviation are calculated for the raw or transformed background data. However, when the background data are not transformed-normal or contain between 50 and 90 percent observations below the detection limit, SANITASTM for Groundwater automatically constructs a non-parametric prediction interval. During non-parametric analysis, the highest value from the background data is used to set the upper limit of the prediction interval.

Simple substitution is not recommended in the Unified Guidance unless no more than 10-15% of the sample observations are non-detect. In those circumstances, substituting half the RL for each nondetect is not likely to substantially impact the results of statistical testing. For lower detection frequencies, non-parametric tests are recommended. Non-parametric prediction limits can be constructed as an alternative to parametric prediction limits.

When all data are non-detect, the Double Quantification rule can be used to define an approximate non-parametric prediction limit, with the RL as an upper bound. Before doing this, it should be determined whether chemicals never or not recently detected in groundwater should even be formally tested. This will depend on whether the monitored constituent from a large analytical suite is likely to originate in the waste or leachate.

2.6 Statistical Analysis

The statistical analysis for inorganic parameters will utilize the computer program SANITASTM, and will be based on prediction limits at all compliance point wells. Future intra-well measurements that do not exceed the statistical limits and do not exhibit a significant trend will be combined with historical data to update these estimates every two years.

2.7 Detection Verification Process

Once groundwater analysis results have been collected, checked for QA/QC consistency, and determined to be above the appropriate statistical level, the results must be verified in accordance with the objectives of 40 CFR Part 258.53. Verification re-sampling is an integral part of the statistical methodology described by EPA's Addendum to Interim Final Guidance Document. Without verification re-sampling, much larger statistical limits would be required to achieve site-wide false positive rates of 5% or less. Furthermore, the resulting false negative rate would be greatly increased. The following procedure will be performed for each compound determined to be initially above its statistical limit. Only compounds that initially exceed their statistical limit will be sampled for verification purposes. The use of a "pass 1 of 1" or "pass 1 of 2" verification options will be evaluated on a per event basis based on the calculated site-wide false positive rate.

2.7.1 Volatile Organic Compounds

If one or more VOCs are detected above their statistical limit (i.e., PQL), verification resamples will be scheduled no sooner than 30 days from receipt of the sample analytical results to provide sample independence because of the slow groundwater velocities beneath the site. A statistically significant increase (SSI) will be recorded if any single VOC is verified in each of the scheduled re-sampling events in a concentration greater than the PQL.

2.7.2 Inorganic Constituents

If one or more of the inorganic parameters are detected above their statistical limit (i.e., prediction limit), up to two verification re-samples will be collected as outlined above. Verification resampling for inorganic constituents will occur in the next semi-annual sampling event. A SSI will be recorded if verification of one elevated parameter is confirmed in a concentration greater than the control/prediction limit for each of the discrete verification re-samples. If the re-sampling program confirms that the initial sample represented a laboratory or sampling-induced outlier, the verification sample will replace the original reported value to eliminate bias from the perdiction interval calculation which considers all data points collected at the site.

2.7.3 Assessment Monitoring

Assessment monitoring, if required, will be in accordance with ADEM Administrative Code R. 335-13-4-.27(4). Assessment monitoring will be conducted if during detection monitoring, a SSI over background is detected, verified, and alternate sources ruled out in accordance with ADEM Admin. Code R. 335-13-4-.27(4) regulations. Upon commencement of assessment monitoring, a groundwater sample will be collected only from the well (or wells) for which the verified SSI was reported. This sampling will occur within a period of 90 days from the verified exceedance (inclusive of verification re-sampling activities). Samples collected for assessment monitoring will be analyzed for constituents listed in Appendix II of ADEM Admin. Code R. 335-13-4-.27. An alternate list may be submitted for review which deletes a portion of these parameters if the source of the organic fraction which exceeds the statistical limit is successfully determined to be landfill gas.

Data evaluation during assessment monitoring will consist of the establishment of Upper and Lower Confidence Limits, assuming that a minimum of four (4) background samples exist for each parameter and well detected during the Assessment Monitoring Program. If inadequate background data exists, sufficient background data will be collected to provide adequate sample size for statistical analysis. The well can return to Detection Monitoring if organic compounds are

not detected in concentrations greater than the PQL for two consecutive events or if approved in writing by ADEM.

2.7.4 Corrective Action

A Corrective Action Plan (CAP) was submitted to ADEM in August 2021. The CAP proposed additional compacted fill be added in areas within the existing cap that were found to be deficient in thickness. The CAP also proposed to repair slopes of the existing cap that had rills and gullies that compromised the cap's integrity. The Corrective Action plan for the site was approved in January 2022. Corrective action has been ongoing in accordance with ADEM Admin, Code r. 335-13-4-.27(5)(a) through (d) since May 2022. Lauderdale County is currently hauling cover material to the areas of deficiency and has placed approximately 19,135 cubic yards of material in their repair efforts. A completed post-fill survey will be completed, and the landfill cap will be recertified by a professional engineer once the work has been completed.

3. GROUNDWATER SAMPLING METHODOLOGY

Environmental quality sampling at the site will be accomplished by personnel trained in sampling protocol. This protocol is consistent with ADEM guidance and ASTM standards, and is in widespread use at other sites owned and/or operated by Waste Management. As site conditions change, activities related to monitoring at the site will be continually reviewed and scrutinized for completeness and integrity. Because sampling mechanisms affect the integrity of groundwater samples, considerable effort will be directed toward optimizing the sampling protocol and refining it as more information becomes available. The protocol for collecting groundwater samples will be documented and reported to ADEM with the analytical results.

Prior to performing any purging or sampling, each monitoring well will be inspected to assess its integrity. The condition of each well will be evaluated for physical damage that may have been caused by site equipment or other vehicular traffic. The security of each well will be noted to help assess whether outside source contaminants have been possibly introduced into the well. Inspection information, as well as the date and time, general weather conditions, and sampling personnel identification will be documented on a Field Information Form. The actual form that is utilized may vary in format.

Field personnel will record, at a minimum, the following:

- Date, time, and sampler's name
- Well number, elevation of measuring point, well depth, and depth to water
- Well casing material and inside diameter, if available
- Static water level prior to purging
- Sampling equipment used, if available
- Volume and\or rates of water purged prior to sampling, if available
- Sample container numbers, types, sizes, and preservatives (on Chain of Custody)
- pH, specific conductance, and temperature of water samples
- Comments about sample color, odor, and unusual characteristics, if observed
- Comments about weather conditions
- Comments about problems with accessibility and condition of well, if observed

3.1 Groundwater Elevation Measurement

The elevation of the groundwater table at each groundwater monitoring well will be measured prior to each purging and sampling event by utilizing a portable water-level indicator, tape, or other suitable measuring device capable of achieving an accuracy of 0.01 foot. Wells will be measured for depth to water on the same day (if conditions allow) and immediately prior to purging. The measuring device will be used in accordance with the manufacturer's recommendations and/or directions. Prior to measuring, equipment that may contact the groundwater will be decontaminated by triple rinsing with distilled or deionized water. Measurements of the depth to water from a surveyed reference datum (the top of the well casing) will be to the nearest 0.01 foot, and the values will be recorded on the Field Information Form, and the ADEM Groundwater Monitoring Report Form, if required. Total well depths shall be obtained as necessary if there is evidence of well tampering or siltation, but will not be routinely collected.

3.2 Well Purging

Immediately prior to sampling, the water within the well will be evacuated until measured water-

quality parameters indicate that formation water has entered the well or to sufficient volume to assure that stagnant water has been purged from the well. The wells will be evacuated using low-flow (minimal drawdown) sampling methods or, if necessary, the standard 3 to 5 well-volume purging method. Low-flow sampling methods are preferred. When low-flow methods are used, they will be in generally accordance with EPA/540/S-95/504, "Low-Flow (Minimal Drawdown) Groundwater Sampling Procedures".

When using the low-flow method, purging may be considered complete when parameter stabilization ensures that stagnant water is purged, and sampled groundwater is representative. In order to determine when a well has been adequately purged, samplers should:

- Monitor the field parameters pH, specific conductance, and temperature of the purged water;
- Record turbidity and/or dissolved oxygen of the groundwater removed during purging; and
- Record the purge rate and volume of water removed.

A well is adequately purged when the pH and specific conductance, stabilize. Dissolved oxygen and turbidity are useful parameters for measuring stabilization. Stabilization occurs as follows:

- pH: +/- 0.2 units Required
- Conductance: +/- 10.0 % of reading Required
- Dissolved oxygen: +/- 10.0% or 0.2 mg/L, the greater. Optional, if using turbidity
- Turbidity: +/- 10.0% Optional, if using D.O.

Temperature is not a good measurement of stabilization, being insensitive to differences between formation and stagnant water. Nevertheless, because temperature is an important parameter it should be measured and recorded.

While turbidity is not a direct measurement of water chemistry, it can be used as an indicator parameter of stabilization in place of D.O. Turbidity should also be measured any time the pumping rate is increased or the water level in the well drops noticeably. If the initial turbidity reading is high (>25-50 NTU) and the second reading is not significantly lower, the pump rate maybe adjusted so that the lowest turbidity value possible is obtained. The turbidity value measured prior to sampling should be recorded. If this value exceeds 25-50 NTU, procedures should be reviewed and the source of the elevated turbidity determined and, if possible, reduced prior to the next monitoring event (see well development procedures). Additional samples may be collected (field filtered or laboratory filtered) to evaluate if excess turbidity is biasing sample results high.

When using the standard 3 to 5 well volume method, purging can be considered complete when a minimum of three (3) well volumes (based upon well- construction records) have been evacuated from the well and two of the field measured parameters (pH, specific conductance and temperature) have stabilized, or to five (5) well volumes, or until the well is pumped/bailed dry. If three well volumes cannot be obtained due to the well being pumped or bailed dry, the well will be allowed to recover and then the samples will be collected within a 24 hour period from the well going dry. If sufficient water is not available for sampling within 24 hours of purging for slowly recovering wells, the well will be considered dry, and no sample will be collected.

3.3 Sampling Procedures

For sample collection, each monitoring well in the groundwater monitoring system will be sampled with methodologies that minimize the potential for alteration or contamination of the sample and that are capable of obtaining a sample representative of the formation groundwater. Non-dedicated equipment may be necessary for new wells or wells with pump issues. Care will be taken to avoid placing clean sampling equipment on the ground or on any contaminated surface. Additionally, personnel who contact sampling equipment that may contact the interior of the monitoring well or the groundwater will don powder free latex gloves. If applicable, non-impacted wells will be sampled prior to those wells that are known to be impacted.

Samples will be collected from each well through the discharge of pumps used to evacuate the well or by using a dedicated (or disposable) Teflon or polyethylene bailer. Samples will be collected at a rate that minimizes potential alteration of the sample due to agitation or oxidation. Pumping rates for collection of samples for volatiles analysis (VGA etc.) will be approximately 0.1 L/min or less, to the extent practical based on the sampling equipment. Pumping rates for collecting other samples may be increased, but will be adjusted to a rate that also prevents chemical alteration.

When low-flow sampling methods are employed, the sampling rate should not exceed the purging rate, with flow rates of approximately 0.1 to 0.5 L/min recommended. Sampling pumps will be operated in a continuous manner so that they do not produce samples that are aerated in the discharge tube. Groundwater samples will be collected as soon as possible after purging is deemed complete.

3.4 Decontamination and Cleaning Procedures

Any non-dedicated well equipment that may contact the interior of the well or groundwater will be decontaminated in the field immediately prior to use, or in the office/lab and protected using aluminum foil and/or plastic bags. However, for any sampling events requiring non-dedicated sampling equipment, decontamination procedures will consist of rinsing the equipment once with deionized or laboratory reagent-quality water, brushing the equipment with a laboratory-quality soap, and triple rinsing the equipment with deionized or laboratory-reagent quality water.

For nondedicated equipment such as the water level indicator, only triple rinsing will be necessary. For field meters that utilize a flow cell or do not contact the sample water, a deinonized rinse, followed by flushing with sample water (in the case of a flow cell) is sufficient.

4. ANALYTICAL PROGRAM

This section describes the procedures for completing successful laboratory analyses of the samples that are collected from the site.

4.1 Sampling Containers and Preservation

Samples will be collected and containerized in the order of the volatilization sensitivity of the parameter (i.e., volatile organics, organic compounds, inorganic species, and major cations and anions). Sample containers of the appropriate size and type, with the preservatives appropriate for the analytical tests to be performed from the sample, will be prepared and labeled by the independent testing laboratory utilized by the facility. The laboratory will specify the preservation methods based on knowledge of methods and procedures approved by ADEM and/or EPA. The facility owner/operator will contract for services with a laboratory that meets these requirements. Table 1 shows the current sample collection parameter, preservation, and holding times.

4.2 Packing and Shipping

Sample packaging involves preparation of the sample container for shipment to the laboratory for analysis. The procedures and materials used must adequately protect the sample container from accidental breakage and should be sufficient to prevent any spillage from escaping into the environment. Holding times, storage conditions, and transport conditions are important elements of the sampling protocol. They will be identified from references such as the most recent edition of SW-846 (Test Methods for Evaluating Solid Waste; Physical/Chemical Methods; EPA SW and Standard Methods for the Examination of Water and Wastewater Samples will be packaged securely in an iced cooler (kept at or below a temperature of 4°C) and transported to the analytical laboratory following strict chain-of-custody protocol.

4.3 Chain-of-Custody Procedures

Appropriate chain-of-custody (COC) procedures will be followed during the transfer of groundwater samples. Each sample container will be individually identified as to sample number, date and time taken, and source of sample. A chain-of-custody record will be prepared for all samples that will include:

- name of the person collecting the samples;
- identity and/or source of each sample (typically the well name)
- preservation provisions for each sample;
- analytical requirements; and
- name of person accepting sample.

Custody transfers of samples will be recorded on the chain-of-custody form by signatures of the transferor (relinquisher) and the transferee (receiver). This procedure will be repeated, as necessary, until final delivery is made to the analytical laboratory. For most samples, the COC is placed in a sealed container and shipped to the analytical laboratory. In these cases, the third party transporter is not required to sign the COC (the shipping manifest is sufficient to document transport).

4.4 Laboratory Quality Control Procedures

The quality assurance program for the analytical laboratory will be described in their Quality Assurance Program Plan (QAPP), which will be made available from the analytical laboratory,

upon request. The QAPP will describe mechanisms the laboratory will employ to ensure that all data reported meet or exceed all applicable USEPA and State requirements. It will describe the laboratory's experience, its organizational structure, and procedures in place to ensure quality of the analytical data. The QAPP outlines the sampling, analysis, and reporting procedures used by the laboratory. The laboratory is responsible for the implementation of and adherence to the quality assurance and quality control requirements outlined in the QAPP. Laboratory QA/QC standards will be initiated with the receipt of samples and will be maintained throughout the record-keeping time period.

Audits are an important component of the quality assurance program at the laboratory. Audits are conducted by the laboratory. Internal system and performance audits are conducted periodically to ensure adherence by all laboratory departments to the QAPP. External audits are conducted by accrediting agencies or states. These reports are transmitted to department managers for review and response. Corrective measures are made for deficiencies found in an internal or external audit.

4.4.1 Analytical Methodologies

Groundwater samples will be analyzed for the constituents specified in the detection-monitoring program. The suggested methods are those EPA-approved methods and procedures that are published in SW-846. The laboratory under contract to the facility shall use one of the approved methods.

Table 2 presents the analytical methodologies to be used by the laboratory for all of the parameters required in the monitoring program. All methods are USEPA approved and State-approved, if applicable and are fully described in the laboratory method and standard operating procedure documents.

Analytical methods used and referenced for meeting environmental testing requirements evolve over time due to changes in technology, updates and additions to published methodology, and when regulations change to require reference to different methods. In many instances there are equivalent methods for the same analyte published by different authorities on method development; e.g. the U.S. EPA Office of Water, U.S. EPA Office of Solid Waste, Standard Methods, and ASTM. Analytical methods listed in the Plan may be substituted provided that the alternate methods are generally approved for use, provide technically defensible data, and are appropriate for the media being tested. The use of alternative approved methods is considered an acceptable deviation from the prescribed methods in the Groundwater Monitoring Plan and will not be considered a violation of the requirements of the Groundwater Monitoring Plan.

5. WATER QUALITY MONITORING, REPORTING AND STATUS

Water quality monitoring reporting will be performed in accordance with ADEM Administrative Code Rule 333-13-4-.27 and with the facility permit. Water quality monitoring results for groundwater will be submitted to the appropriate ADEM division.

Groundwater monitoring data will be submitted in semi-annual reports that summarize detection monitoring activities for that sampling period. All analytical data are maintained in the site operating record.

Semi-annual groundwater monitoring has taken place at the site since the mid 1990s with the original monitoring wells being MW-1. MW-3, MW-6, and MW-7. Since the start of groundwater monitoring program, monitoring well MW-8 was added in 2010 and monitoring well MW-9 was added in 2018. With the addition of the last two monitoring wells, the monitoring program appears to be operating as intended by monitoring the presence of contamination and ensuring that the contaminant plume is not migrating offsite. The longevity of the program has provided enough data points to effectively evaluate and monitor groundwater quality and identify signs that would indicate a release has occurred.

6. REFERENCES

ASTM D 6312-98, 1998, Standard Guide for Developing Appropriate Statistical Approaches for Groundwater Detection Monitoring Programs.

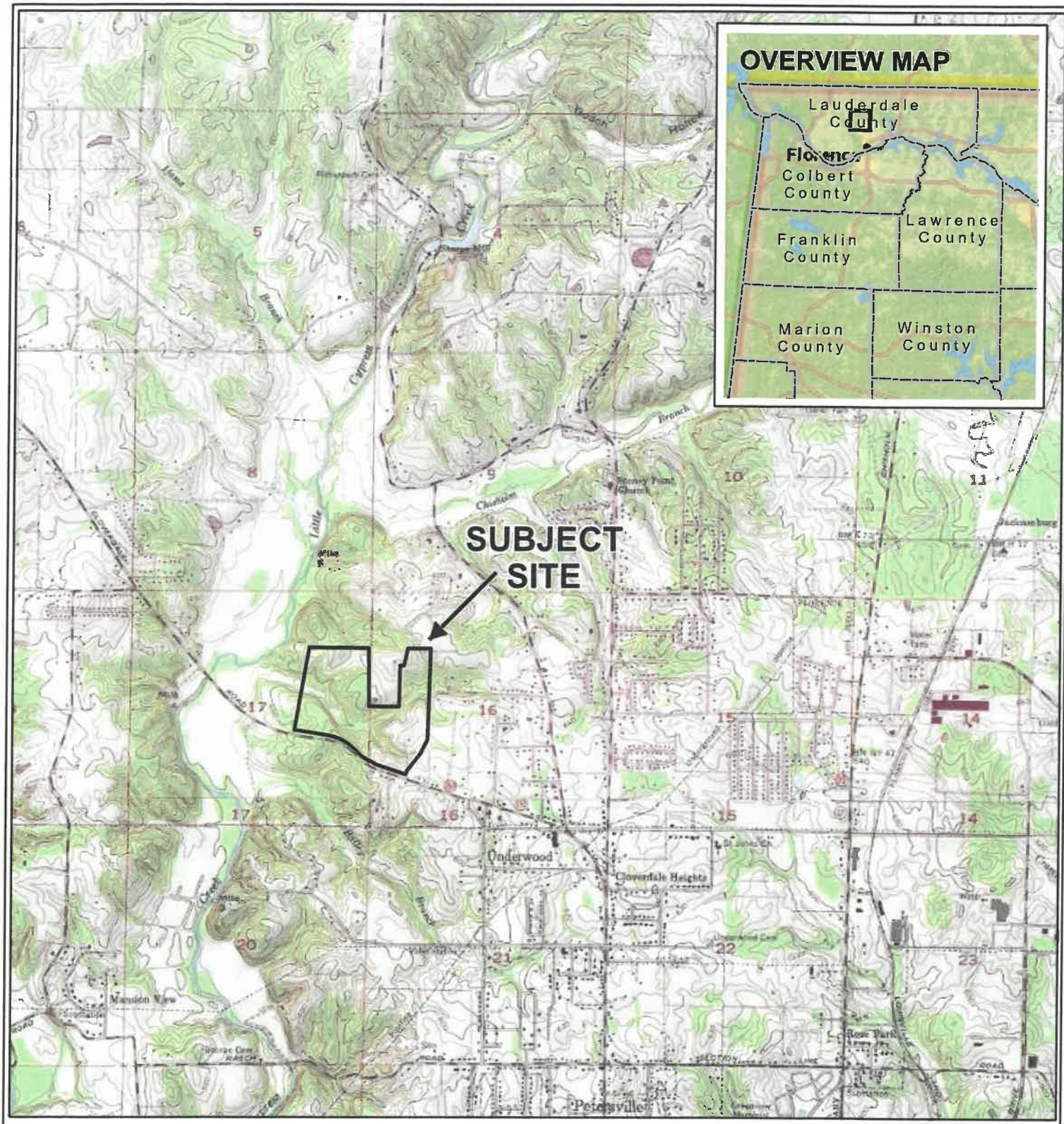
Plumb, R.H., 1991, The Occurrence of Appendix IX Organic Constituents in Disposal Site Groundwater: GWMR, 11(2):157164.

Puls, R.W., and Barcelona, M.J., 1996, Low-Flow (Minimal Drawdown) Groundwater Sampling Procedures, USEPA Groundwater Issue, EPA/540/S-95/504.

USEPA, 2009, Unified Guidance Document, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities. EPA 530/R-09-007

APPENDIX A

FIGURES



LEGEND

Project Site*

1:36,000

3,000 1,500 0 3,000 Feet

1 in = 3,000 ft

N

*NOT A SURVEY - For representation purposes only.

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GROUND WATER MONITORING
UNDERWOOD LANDFILL
5100 HIGHWAY 157
FLORENCE, LAUDERDALE COUNTY, ALABAMA

thompson ENGINEERING

FIGURE 1
VICINITY MAP

PROJECT NO.: 24-1109-0008

DATE: October 2024

LEGEND

Project Site*

Monitoring Well

1:6,000

500 250 0 500 Feet

1 in = 500 ft

N

*NOT A SURVEY - For representation purposes only. Approsimage Extents of subject property.

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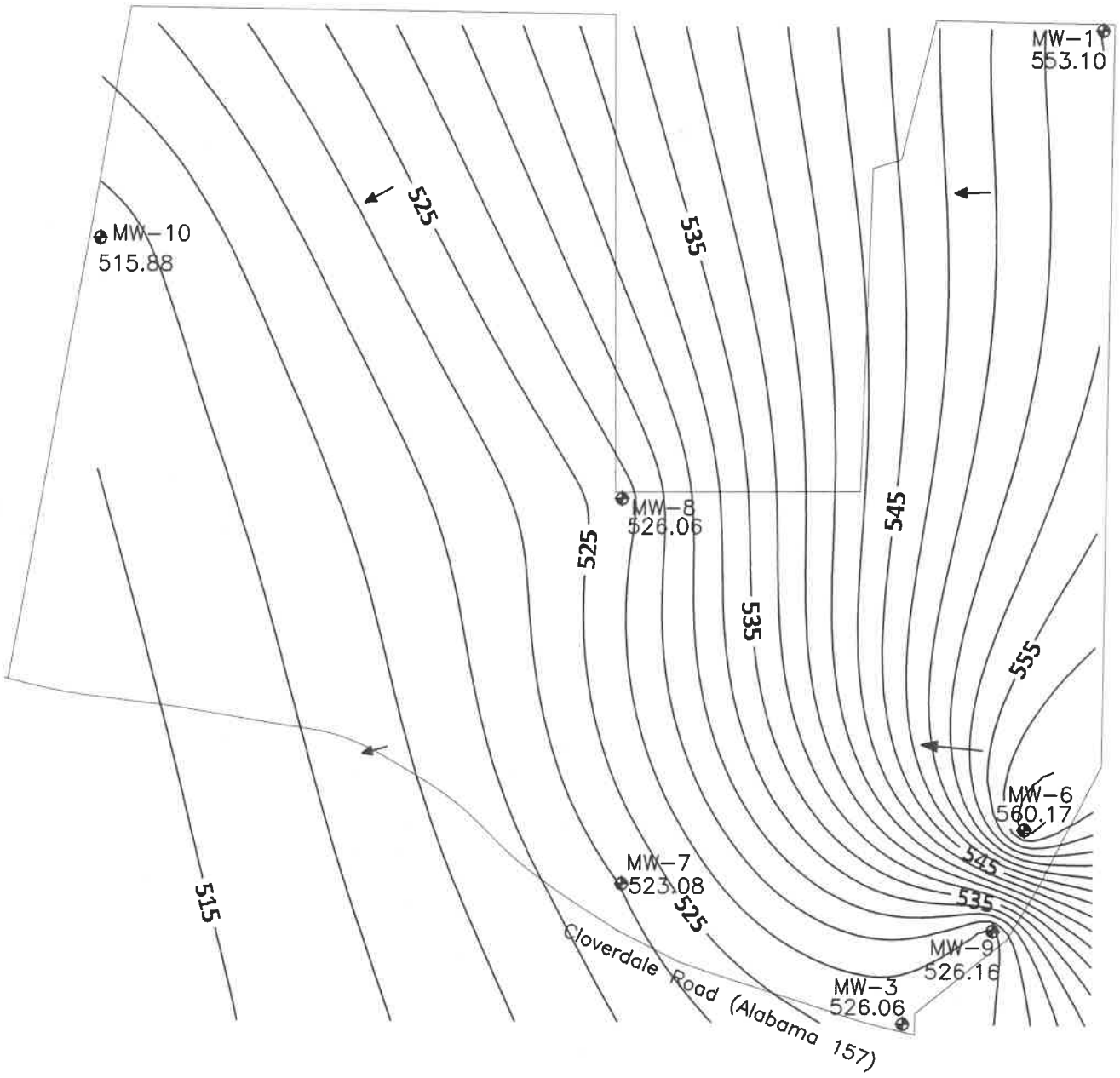
GROUND WATER MONITORING UNDERWOOD LANDFILL 5100 HIGHWAY 157 FLORENCE, LAUDERDALE COUNTY, ALABAMA	thompson ENGINEERING	FIGURE 2 AERIAL PHOTOGRAPH	
		PROJECT NO.: 24-1109-0008	DATE: October 2024



-N-

APPROXIMATE SCALE

0 125 250 500 FT.

LEGEND:

- MONITOR WELL LOCATION
- 500 GROUNDWATER ELEVATION CONTOUR
  CONTOUR INTERVAL 5 FEET
  (DASHED WHERE INFERRED)
- GROUNDWATER FLOW DIRECTION

NOTE:
The information depicted is intended to provide visual aid within the context of this report and should not be used as a sole reference in precise dimensioning of features indicated.

GROUNDWATER MONITORING
UNDERWOOD LANDFILL
5100 HIGHWAY 157
FLORENCE, LAUDERDALE COUNTY, ALABAMA

thompson
ENGINEERING

FIGURE 3
GROUNDWATER POTENTIOMETRIC
SURFACE MAP
MARCH 15, 2024

PROJECT NO: 24-1109-0008

DATE: October 2024

APPENDIX B

TABLES

Table 1 Sample Collection, Preservation, and Holding Times			
SAMPLE COLLECTION[2] PARAMETER	**SAMPLE[3,4] CONTAINER**	**RECOMMENDED[5] PRESRVATION**	**HOLDING TIME**
Acid Extractables	1000 ml Glass only (Amber) w/Teflon liner	Cool, 4° C	Extract within 7 days; analyze within 40 days
Alkalinity	100 ml P,G	Cool, 4° C	14 days
Ammonia	125 ml P,G	Cool, 4° C H2SO4 to pH <2	28 days
Base/Neutral Extractables	1000 ml Glass (priority pollutants) w/Teflon liner	Cool, 4° C only (Amber)	Extract within 7 days; analyze within 40 days
Biochemical Oxygen demand, 5 day (BOD5)	1000 ml P,G	Cool, 4° C	48 hours
Calcium	500 ml P	HNO_3 to pH <2	6 months
Chemical Oxygen demand (COD)	125 ml P,G	Cool, 4° C H2SO4 to pH <2	28 days
Chloride	250 ml P,G	None required	28 days
Colifrom, fecal and total	100 ml P,G sterilized	Cool, 4° C	24 hours
Cyanide	1000 ml P,G	Cool, 4° C NaOH to pH >12 0.6g ascorbic acid6	14 days[7]
Flouride	250 ml P	None required	28 days
Hardness	100 ml P,G	HNO_3 to pH <2	6 months
Nitrate[8]	125 ml P,G	Cool, 4° C	48 hours
Nitrite	125 ml P,G	Cool, 4° C	48 hours
Oil and Grease	1000 ml, G only	Cool, 4° C H2SO4 to pH <2	28 days
PCB (priority pollutant)	1000 ml Glass only (Amber) w/Teflon liner	Cool, 4° C	Extract within 7 days; analyze within 40 days
Metals			
Chromium (hexavalent)	200 ml P,G	Cool, 4° C	24 hours
Mercury (dissolved)	1000 ml P,G	Filter on site HNO_3 to pH <2	28 days
Mercury (total	1000 ml P,G	HNO_3 to pH <2	28 days
Other metals, (dissolved) (Arsenic, Barium, Boron, Cadmium, Chromium, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Zinc)	1000 ml P,G	Filter on site HNO3 to pH <2	6 months
Other metals, (totals) (Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, Zinc)	1000 ml P,G	HNO_3 to pH <2	6 months

SAMPLE COLLECTION[2] PARAMETER	SAMPLE[3,4] CONTAINER	RECOMMENDED[5] PRESRVATION	HOLDING TIME
Pesticides			
Endrin, Lindane, Toxaphene, Methoxychlor	1000 ml Glass only (Amber) w/Teflon liner	Cool, 4° C pH 5-9	Extract within 7 days; analyze within 40 days
pH (field)	25 ml P,G	None required	Analyze immediately
Phenols	500 ml G only	Cool, 4° C H2SO4 to pH <2	28 days
Phosphorous (total)	125 ml P,G	Cool, 4° C H2SO4 to pH <2	28 days
Semi-volatile Organics	1000 ml, G	Cool, 4° C	Extract within 7 days; analyze within 40 days
Specific Conductance (field)	100 ml P,G	None required	Analyze immediately
Sulfate	50 ml P,G	Cool, 4° C	28 days
Temperature (field)	1000 ml P,G	None required	Analyze immediately
Total Dissolved Solids residue on evaporation (TDS/ROE) 180° C	1000 ml P	Cool, 4° C	7 days
Total Organic Carbon (TOC)	2-40 ml P	Cool, 4° C H2SO4 to pH <2	28 days
Total Suspended Solids (TSS)	1000 ml P	Cool, 4° C	7 days
Volatile Organic Acids, Priority Pollutants	4-40 ml glass vial w/septum caps	Cool, 4° C HCl to pH < 2	14 days
Volatile Organics	4-40 ml glass vial w/septum caps	Cool, 4° C HCl to pH < 2	14 days

Notes:

1. Table may include more parameters than required for groundwater sampling. A general discussion on sampling water and industrial waste water may be found in ASTM, Part 31, pages 72-81 (1976) Method D-3370.

2. Plastic (P) or Glass (G). For metals, polyethylene with a polypropylene cap (no liner) is preferred.

3. Sample preservation should be performed immediately upon sample collection. For composite samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then samples may be preserved by maintaining at 4°C until compositing and sample splitting is completed.

4. When any sample is to be shipped by common carrier or sent through the United States mail, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring such compliance. For the preservation requirements of Table 5-4, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid (HCl) in water solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less (pH about 1.15 or greater); Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).

5. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still considered valid. Samples may be held for longer periods only if the permittee, or monitoring laboratory, has data on file to show that the specific types of sample under study are stable for the longer time, and has received a variance from the Regional Administrator. Some samples may not be stable for the maximum time period given in the table. A permittee, or monitoring laboratory, is obligated to hold the sample for a shorter time if knowledge exists to show this is necessary to maintain sample stability.

6. Should only be used in the presence of residual chlorine.

7. Maximum holding time is 24 hours when sulfide is present. Optionally, all samples may be tested with lead acetate paper before the pH adjustment in order to determine if sulfide is present. If sulfide is present, it can be removed by the addition of cadmium nitrate powder until a negative spot test is obtained. The sample is filtered and then NaOH is added to pH 12.

8. In accordance with 30 LAC 33:VII, Appendix C, sample preservation, handling, and analysis will meet the specifications described by "Test Methods for Evaluating Solid Waste Physical/Chemical Methods, third edition" (EPA Publication Number SW-846, 1986, as revised December, 1987) or an equivalent substitute as approved by the administrative authority

Note: Many tests can be combined in bottles. For example, Alkalinity, Chloride, Fluoride, Nitrate, Nitrite, pH, Sulfate, TDS, TSS will be collected in a 1 liter poly bottle.

Table 2 Detection Monitoring Parameters Methodologies for Testing and Analysis and Reporting Limits			
PARAMETER	**METHOD DESCRIPTION**	**METHOD**	**RL/PQL(µg/L)**
Metals			
Antimony	Atomic Emission/Mass Spectrometric	(A)200.7/6020B(D)	6
Arsenic	Atomic Emission/Mass Spectrometric	(A)200.7/6020B(D)	10
Barium	Atomic Emission Spectrometric	(A)200.7/6010B(D)	200
Beryllium	Atomic Emission/Mass Spectrometric	(A)200.7/6020B(D)	4
Cadmium	Atomic Emission Spectrometric	(A)200.7/6010B(D)	5
Chromium	Atomic Emission Spectrometric	(A)200.7/6010B(D)	10
Cobalt	Atomic Emission Spectrometric	(A)200.7/6010B(D)	50
Copper	Atomic Emission Spectrometric	(A)200.7/6010B(D)	25
Lead	Atomic Emission Spectrometric	(A)200.7/6010B(D)	5
Mercury	Atomic Emission Spectrometric	(A)200.7/6010B(D)	0.2
Nickel	Atomic Emission Spectrometric	(A)200.7/6010B(D)	40
Selenium	Atomic Emission Spectrometric	(A)200.7/6020B(D)	5
Silver	Atomic Emission Spectrometric	(A)200.7/6010B(D)	25
Thallium	Atomic Emission/Mass Spectrometric	(A)200.7/6020B(D)	2
Vanadium	Atomic Emission Spectrometric	(A)200.7/6020B(D)	3.6
Zinc	Atomic Emission Spectrometric	(A)200.7/6010B(D)	20
Organics			
Volatile Organics	Purge and Trap/GC/MS	624(e)/8260D/524.2	See next table
1,2-Dibromoethane (EDB)	GC/MS Microextraction	8011	0.02
1,2-Dibromo-3-Chloropropane (DBCP)	GC/MS Microextraction	8011	0.2
Indicator Parameters (Optional)			
Some or all Indicator Parameters listed in Table 3 may be collected to track groundwater geochemistry.			
Statistics will not be run on these parameters			

NOTE: Analytical methods listed above may be substituted for as deemed necessary provided that the alternate methods provide adequate analytical data to fulfill monitoring requirements and meet regulatory standards. Actual analyses will be based on the permitted groundwater monitoring plan. Analytical methods used and referenced for meeting environmental testing requirements evolve over time due to changes in technology, updates and additions to published methodology, and when regulations change to require reference to different methods. In many instances there are equivalent methods for the same analyte published by different authorities on method development; e.g. the U.S. EPA Office of Water, U.S. EPA Office of Solid Waste, Standard Methods, and ASTM. Analytical methods listed in the Plan may be substituted provided that the alternate methods are generally approved for use, provide technically defensible data, and are appropriate for the media being tested. The use of alternative approved methods is considered an acceptable deviation from the prescribed methods in the Groundwater Monitoring Plan and will not be considered a violation of the requirements of the Groundwater Monitoring Plan.

Table 3 Background Monitoring Parameters and Reporting Limits		
Appended Appendix I List	**Common Name**	**PQL/RL (ug/L)**
Inorganic Constituents (Total):		
1	Antimony	6
2	Arsenic	10
3	Barium	200
4	Beryllium	4
5	Cadmium	5
6	Chromium	10
7	Cobalt	50
8	Copper	25
9	Lead	5
10	Mercury	0.2
11	Nickel	40
12	Selenium	5
13	Silver	25
14	Thallium	2
15	Vanadium	25
16	Zinc	20
Organic Constituents:		
17	Acetone	20
18	Acrylonitrile	100
19	Benzene	5
20	Bromochloromethane	10
21	Bromodichloromethane	5
22	Bromoform; Tribromomethane	5
23	Carbon disulfide	5
24	Carbon tetrachloride	5
25	Chlorobenzene	5
26	Chloroethane; Ethyl chloride	10
27	Chloroform; Trichloromethane	5
28	Dibromochloromethane; Chlorodibromomethane	5
29	1,2-Dibromo-3-chloropropane; DBCP	0.2
30	1,2-Dibromoethane; Ethylene dibromide; EDB	0.05
31	o-Dichlorobenzene; 1,2-Dichlorobenzene	10
32	p-Dichlorobenzene; 1,4-Dichlorobenzene	10

Appended Appendix I List	Common Name	PQL/RL (ug/L)
33	Trans-1,4-Dichloro-2-butene	10
34	1,1-Dichloroethane;Ethylidene chloride	5
35	1,2-Dichloroethane;Ethylene dichloride	5
36	1,1-Dichloroethylene; 1,1-Dichloroethene; Vinylidene chloride	5
37	Cis-1,2-Dichloroethylene; cis-1,2- Dichloroethene	10
38	Trans-1,2-Dichloroethylene;trans-1,2-Dichloroethene	10
39	1,2-Dichloropropane; Propylene dichloride	5
40	Cis-1,3-Dichloropropene	5
41	Trans-1,3-Dichloropropene	5
42	Ethylbenzene	5
43	2-Hexanone; Methyl butyl ketone	10
44	Methyl bromide; Bromomethane	10
45	Methyl chloride; Chloromethane	10
46	Methylene bromide; Dibromomethane	10
47	Methylene chloride; Dichloromethane	5
48	Methyl ethyl ketone; MEK; 2-Butanone	50
49	Methyl iodide;Iodomethane	10
50	4-Methyl-2-pentanone;Methyl isobutyl ketone	10
51	Styrene	5
52	1,1,1,2-Tetrachloroethane	5
53	1,1,2,2-Tetrachloroethane	5
54	Tetrachloroethylene;Tetrachloroethene; Perchloroethylene	5
55	Toluene	5
56	1,1,1-Trichloroethane; Methylchloroform	5
57	1,1,2-Trichlolroethane	5
58	Trichloroethylene; Trichloroethene	5
59	Trichlorofluoromethane; CFC-11	10
60	1,2,3-Trichloropropane	10
61	Vinyl acetate	10
62	Vinyl chloride	2
63	Total Xylenes	10

Appended Appendix I List	Common Name	PQL/RL (ug/L)
Indicator Parameters		
(Optional for modifying the parameter list)		
64	Ammonia	100
65	Alkalinity (total, as CaCO3)	5,000
66	Calcium	200
67	Chloride	500
68	Magnesium	200
69	Manganese	15
70	Potassium	5,000
71	Sulfate	5,000
72	Sodium	5,000
73	Total Dissolved Solids (TDS)	10,000
74	Total Organic Carbon (TOC)	1,000

Notes

In accordance with Regulation 22, Appendix 1, sample preservation, handling, and analysis will meet the specifications described by "Test Methods for Evaluating Solid Waste Physical/Chemical Methods, third edition" (EPA Publication Number SW-846, 1986, as revised December, 1987) or an equivalent substitute as approved by the administrative authority (as noted in Table 2).

PQL – Laboratory equivalent of practical quantitation limit (PQL) referenced in SW-846.

RL – Reporting Limit; client or regulatory specific limit of quantitation greater than the MDL.

APPENDIX C

SAMPLE FIELD INFORMATION FORM
SAMPLE CHAIN OF CUSTODY FORM

Groundwater Sampling Log

Project:	Lauderdale County LF	Well No:	MW-1
Site:	Lauderdale County LF	Water Level:	
Date:		Well Depth:	
Purge Method:	12-Volt Pump	Well Dia:	4"
Sampling Device:	12-Volt Pump	Calc Purge Vol:	
Sampling Person:		Actual Purge Vol:	
Weather Conditions:		GPS Coordinates:	

Well Inspection: Lockable Cap: _____ Protective Casing: _____

Surface Pad: _____ Notes: _____

Purge Notes:

Time (CST)	Depth to Water (ft)	pH (SU)	Temp (°C)	Cond. (us/cm)	DO (mg/L)	Turbidity (NTU)	Flow Rate (mL/min)

Client Name/Address	Client Project Manager/Contact	Billing Information	For Laboratory Use Only
SEE PO Box 3241 Florence, AL 35630	Eric Curtis (256) 443-8306 ecurtis@see-env.com	Same	

Project Description	Project/Site Location (City/State)		Method of Shipment	Matrix Key
Lauderdale County Landfill Groundwater	Florence, AL	☐ RUSH – Additional charges apply ☐ Special Detection Limit(s) Date Results Needed	☐ Fed Ex ☐ UPS ☐ USPS ☑ Courier ☐ Client Drop Off Other	WW – Wastewater GW – Groundwater DW – Drinking Water S – Soil /Solid O – Oil P - Product M - Misc

Project Number	Project Manager Phone #	Project Manager Email	Purchase Order Number	Site/Facility ID #
	(256) 443-8306	ecurtis@see-env.com		

Waypoint ANALYTICAL
2790 Whitten Road
Memphis, TN 38133
(901) 213-2400

Unless noted, all containers per Table II of 40 CFR Part 136.

A	Cool < 10C Na2S2O3 (Micro Only)
B	Cool <= 6C
C	H2SO4 pH<2
D	None Required
E	NaOH pH>10
F	HNO3 pH<2
G	HCL pH<2
H	H3PO4 pH<2
I	Cool <= 6C NA2S2O3

Date	Time	Sample Identification	Number of Containers	Matrix (Refer to Key)	(G)rab or (C)omposite	Full Appendix II									Comments/Notes
						Required Analysis / Preservative									
			16	GW	G										
			16	GW	G										
			16	GW	G										
			16	GW	G										
			16	GW	G										
			16	GW	G										
			16	GW	G										

For Laboratory Use Only			Sampled by (Name – Print)	Client Remarks/Comments			
Ice Y / N	Custody Seals Y / N	Lab Comments					
Blank/Cooler Temp			Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time	
			Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time	
			Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time	

APENDIX D

WELL CONSTRUCTION LOGS

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AAP SM AASHTO R18

SOIL BORING/MONITORING WELL CONSTRUCTION LOG

CLIENT: Lauderdale County Solid Waste Department **T.O.C ELEVATION:** 657.1 FT

PROJECT: Uunderwood Landfill

JOB NO.: 24-1108-0009 **DATE DRILLED:** 05-01-1994 **GR. WATER DEPTH:**

BORING NO.: MW-1 **LOCATION:** see Exhibit A-2 **TYPE BORING:**

DEPTH IN FEET	SYMBOL	DESCRIPTION	WELL MATERIALS	ANNULAR MATERIALS	WELL DIAGRAM
0			WELL CONSTRUCTED OF 4" PVC WITH 20' OF 0.01" SLOTTED SCREEN		
20					
40					
60					
80					
100					
120					
140		TOTAL DEPTH: 137.8 FT BTOC *NOTE: Well installed by others. Complete construction logs are unavailable for this well at this time.			

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AASHTO R18

SOIL BORING/MONITORING WELL CONSTRUCTION LOG

CLIENT: Lauderdale County Solid Waste Department **T.O.C ELEVATION:** 626.4 FT

PROJECT: Uunderwood Landfill

JOB NO.: 24-1108-0009 **DATE DRILLED:** 10-01-1982 **GR. WATER DEPTH:**

BORING NO.: MW-3 **LOCATION:** see Exhibit A-2 **TYPE BORING:**

DEPTH IN FEET	SYMBOL	DESCRIPTION	WELL MATERIALS	ANNULAR MATERIALS	WELL DIAGRAM
0			WELL CONSTRUCTED OF 4" PVC WITH 20' OF 0.01" SLOTTED SCREEN		
25					
50					
75					
100					
125					
150					
175		TOTAL DEPTH: 163.5 FT BTOC *NOTE: Well installed by others. Complete construction logs are unavailable for this well at this time.			

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SOIL BORING/MONITORING WELL CONSTRUCTION LOG

CLIENT: Lauderdale County Solid Waste Department **T.O.C ELEVATION:** 612.68 FT

PROJECT: Uunderwood Landfill

JOB NO.: 24-1108-0009 **DATE DRILLED:** 03-19-2002 **GR. WATER DEPTH:**

BORING NO.: MW-6 **LOCATION:** see Exhibit A-2 **TYPE BORING:**

DEPTH IN FEET	SYMBOL	DESCRIPTION	WELL MATERIALS	ANNULAR MATERIALS	WELL DIAGRAM
0			WELL CONSTRUCTED OF 2" PVC WITH 10' OF 0.01" SLOTTED SCREEN		
22					
44					
66					
88					
110					
132					
154		TOTAL DEPTH: 144.6 FT BTOC *NOTE: Well installed by others. Complete construction logs are unavailable for this well at this time.			

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SOIL BORING/MONITORING WELL CONSTRUCTION LOG

CLIENT: Lauderdale County Solid Waste Department **T.O.C ELEVATION:** 596.51 FT

PROJECT: Uunderwood Landfill

JOB NO.: 24-1108-0009 **DATE DRILLED:** 03-20-2002 **GR. WATER DEPTH:**

BORING NO.: MW-7 **LOCATION:** see Exhibit A-2 **TYPE BORING:**

DEPTH IN FEET	SYMBOL	DESCRIPTION	WELL MATERIALS	ANNULAR MATERIALS	WELL DIAGRAM
0		TOTAL DEPTH: 92 FT BTOC	WELL CONSTRUCTED OF 2" PVC WITH 10' OF 0.01" SLOTTED SCREEN		
20					
40					
60					
80					
100					
120					
140		*NOTE: Well installed by others. Complete construction logs are unavailable for this well at this time.			

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SOIL BORING/MONITORING WELL CONSTRUCTION LOG

CLIENT: Lauderdale County Solid Waste Department **T.O.C ELEVATION:** 595.61 FT

PROJECT: Uunderwood Landfill

JOB NO.: 24-1108-0009 **DATE DRILLED:** 04-20-2010 **GR. WATER DEPTH:**

BORING NO.: MW-8 **LOCATION:** see Exhibit A-2 **TYPE BORING:**

DEPTH IN FEET	SYMBOL	DESCRIPTION	WELL MATERIALS	ANNULAR MATERIALS	WELL DIAGRAM
0			WELL CONSTRUCTED OF 2" PVC WITH 10' OF 0.01" SLOTTED SCREEN		
20					
40					
60					
80					
100		TOTAL DEPTH: 93.2 FT BTOC			
120					
140		*NOTE: Well installed by others. Complete construction logs are unavailable for this well at this time.			

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SOIL BORING/MONITORING WELL CONSTRUCTION LOG

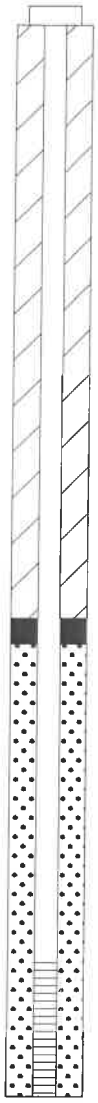
CLIENT: Lauderdale County Solid Waste Department **T.O.C ELEVATION:** 616.20 FT

PROJECT: Uunderwood Landfill

JOB NO.: 24-1108-0009 **DATE DRILLED:** 04-03-2018 **GR. WATER DEPTH:**

BORING NO.: MW-9 **LOCATION:** see Exhibit A-2 **TYPE BORING:**

DEPTH IN FEET	SYMBOL	DESCRIPTION	WELL MATERIALS	ANNULAR MATERIALS	WELL DIAGRAM
0		TOPSOIL			
		BROWN; CHERTY CLAY			
		RED/BROWN; WET; CHERTY CLAY			
15		WATER ENCOUNTERED @ 15 FT BGS			
		TAN/RED; WET; CHERTY CLAY			
30					
45		ROCK LENSE ENCOUNTERED @ 46 FT - 47 FT			
		BROWN; WET; CHERTY CLAY			
60					
75					
		AUGER REFUSAL @ 85.5 FT BGS			
90					
105		*NOTE: Well installed by others. Complete construction logs are unavailable for this well at this time.			



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AASHTO R18

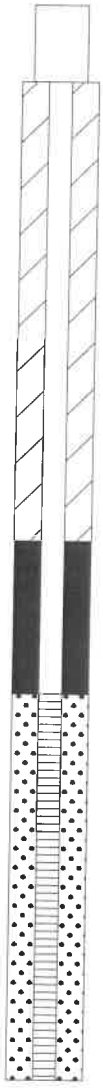
SOIL BORING/MONITORING WELL CONSTRUCTION LOG

CLIENT: Lauderdale County Solid Waste Department **T.O.C ELEVATION:** 535.28 FT

PROJECT: Uunderwood Landfill

JOB NO.: 24-1108-0009 **DATE DRILLED:** 04-04-2018 **GR. WATER DEPTH:**

BORING NO.: MW-10 **LOCATION:** see Exhibit A-2 **TYPE BORING:**

DEPTH IN FEET	SYMBOL	DESCRIPTION	WELL MATERIALS	ANNULAR MATERIALS	WELL DIAGRAM
0		TOPSOIL			
		RED/BROWN; CHERTY CLAY			
5					
10					
15					
20					
25		GROUNDWATER ENCOUNTERED @ 25.5 FT BGS			
		AUGER REFUSAL @ 28.1 FET BGS			
30					
35		*NOTE: Well installed by others. Complete construction logs are unavailable for this well at this time.			

Underwood Landfill
Adjacent Landowner List

Thomas Gilbert Osborn
350 County Road 310
Florence, Alabama 35633-7154

Hendon, Gail Berkey, Ronald Berkey, and Denise Berkey
542 Brandenburg Drive
Florence, Alabama 35634

Franks, Billy Ray ETUX Anna Sue
350 County Road 310
Florence, Alabama 35633

David Keith Hyde
635 County Road 137
Florence, Alabama 35633

Jean Underwood Wilson
402 Morris Blvd.
Birmingham, Alabama 35209

Underwood, Daniel T ETUX Shirley D
531 Arnold Lane
Florence, Alabama 35633

Billy Eugene Darby
483 Arnold Lane
Florence, Alabama 35633

Lauderdale Commission
P.O. Box 1059
Florence, Alabama 35631

Family Home Builders, LLC
50 County Road 357
Florence, Alabama 35633

Parrish, Howard L ETUX Elwanda
100 County Road 287
Florence, Alabama 35633

Clanton, Jojnny William ETUX Teresa Kay
5451 Highway 157
Florence, Alabama 35633

William H Murphy
1258 Peabody Ave.
Memphis, Tennessee 38104

Kenneth Wayne and Eva Dale Landers
5365 Highway 157
Florence, Alabama 35633

Hutchens, Charles A ETUX Joyce A
5343 Highway 157
Florence, Alabama 35633

Flower Wood Development C/O Joni Wood
P.O. Box 547
Florence, Alabama 35631

Connie M. Crunk Balentine
5310 Highway 157
Florence, Alabama 35633

Lana Shook Biggers
441 Price Drive
Florence, Alabama 35633

Holcombe, Edward ETUX Carol M.
393 Price Road
Florence, Alabama 35633

Biggers, Bobby Wayne ETUX Lana Sharron
441 Price Drive
Florence, Alabama 35633

Joseph Mark and Juanita Black Rickard
394 Price Drive
Florence, Alabama 35633

Rickard, Jerry M ETUX Carolyn Joyce
334 Price Drive
Florence, Alabama 35633

Holt, Charles L ETUX Janice L
151 County Road 310
Florence, Alabama 35633

Cockburn, Wayne ETUX Betty
545 County Road 124
Florence, Alabama 35633

Ora E “Life Estate” Kelly
5295 Highway 157
Florence, Alabama 35633