

PRELIMINARY DETERMINATION
PERMIT RENEWAL AND MINOR MODIFICATION

WCA of Alabama, LLC
13737 Plant Road
Childersburg, Alabama 35044

WCA of Alabama, LLC Industrial Landfill
Permit No. 61-16

April 1, 2026

WCA of Alabama, LLC, has submitted to the Alabama Department of Environmental Management (ADEM) an application for renewal and modification of the Solid Waste Disposal Facility Permit for the WCA of Alabama, LLC Industrial Landfill (Permit No. 61-16). The proposed modifications include an update to the Groundwater Monitoring Plan (Environmental Monitoring Plan) and an update to the Operations Manual to reflect current operations onsite, including the abandonment of monitoring wells MW-1, MW-3, and MW-5, and piezometers PZ-1 and PZ-2, and the installation of replacement well MW-1R. The waste stream for the WCA of Alabama, LLC Industrial Landfill would remain non-hazardous industrial wastes, construction and demolition wastes, asbestos, automobile shredder dirt and fluff, and tires. The service area for the WCA of Alabama, LLC Industrial Landfill would remain Bibb, Calhoun, Clay, Chilton, Cleburne, Etowah, Jefferson, Shelby, St. Clair, Talladega, and Tallapoosa Counties in Alabama. The maximum average daily volume of waste disposed at the WCA of Alabama, LLC Industrial Landfill would remain 750 tons per day. All conditions of the current permit, including previously approved variances, have been requested and would be granted in the renewed and modified permit.

The WCA of Alabama, LLC Industrial Landfill is located in Section 21, Township 19 South, Range 3 East in Talladega County, Alabama. The WCA of Alabama, LLC Industrial Landfill consists of approximately 104.88 acres with 57.95 acres approved for disposal operations.

The Land Division has determined that the permit renewal application and the minor modification application complies with the applicable requirements of ADEM's Administrative Code 335-13 regulations for an industrial solid waste landfill.

Technical Contact:

Melissa H. Adornato
Solid Waste Engineering Section
Land Division
(334) 270-5605



SOLID WASTE DISPOSAL FACILITY PERMIT

PERMITTEE: WCA of Alabama, LLC

FACILITY NAME: WCA of Alabama, LLC Industrial Landfill

FACILITY LOCATION: Section 21, Township 19 South, Range 3 East in Talladega County, Alabama. The total permitted area is approximately 104.88 acres with approximately 57.95 acres permitted for disposal operations.

PERMIT NUMBER: 61-16

PERMIT TYPE: Industrial Landfill

WASTE APPROVED FOR DISPOSAL: Non-hazardous industrial wastes, construction and demolition wastes, asbestos, automobile shredder dirt and fluff, and tires.

APPROVED WASTE VOLUME: Maximum Average Daily Volume of 750 tons per day

APPROVED SERVICE AREA: Bibb, Calhoun, Clay, Chilton, Cleburne, Etowah, Jefferson, Shelby, St. Clair, Talladega, and Tallapoosa counties in Alabama.

In accordance with and subject to the provisions of the Alabama Solid Wastes & Recyclable Materials Management Act, as amended, Code of Alabama 1975, § 22-27-1 to 22-27-27 ("SWRMMA"), the Alabama Environmental Management Act, as amended, Code of Alabama 1975, § 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: XXXXXXXX

EFFECTIVE DATE: XXXXXXXX

EXPIRATION DATE: XXXXXXXX

**ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
SOLID WASTE PERMIT**

Permittee: WCA of Alabama, LLC
13737 Plant Road
Childersburg, Alabama 35044

Landfill Name: WCA of Alabama, LLC Industrial Landfill

Landfill Location: Section 21, Township 19 South, Range 3 East in Talladega County, Alabama

Permit Number: 61-16

Landfill Type: Industrial

Pursuant to the Solid Wastes & Recyclable Materials Management Act, Code of Alabama 1975, §§22-27-1, *et seq.*, as amended, and attendant regulations promulgated thereunder by the Alabama Department of Environmental Management (ADEM), this permit is issued WCA of Alabama, LLC (hereinafter called the Permittee), to operate a solid waste disposal facility, known as the WCA of Alabama, LLC Industrial 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 Chapters 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 Administrative 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 on February 6, 2024, and as amended for permit renewal, 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 the Department 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 **XXXXXXXXXX**, and shall remain in effect until **XXXXXXXXXX**, 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 Admin. Code 335-13. 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 Code of Alabama 1975, §§22-27-1, *et seq.*, as amended, 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 ADEM Admin. Code 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 the Department 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 the Department. Any permit noncompliance constitutes a violation of Code of Alabama 1975, §§22-27-1, *et seq.*, as amended, 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 the Department at least one hundred eighty (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, Paragraph E, Subparagraph 2, and, through no fault of the Permittee, the Department 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 the Department, within a reasonable time, any information that the Department 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 the Department 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 the Department 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, Paragraph 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 the Department 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 the Department, in the form of a request for permit modification, at least one hundred twenty (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 the Department. 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.
 - c. The Permittee may not commence disposal activities in any new 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 the Department, the Permittee shall promptly submit such facts or information. In addition, upon request, the Permittee shall furnish to the Department, 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, Paragraph I. The operating record shall include:

- a. Documentation of inspections 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 wastes and special wastes.
 - e. Groundwater monitoring records, if required.
 - f. Explosive gas monitoring records, if required.
 - g. Surface water and leachate monitoring records, if required. **Monitoring is subject to applicable conditions of Section VI of this Permit.**
 - h. Copies of this Permit and the Application.
 - i. Copies of all variances granted by the Department, 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 action activities 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, or as directed by the Department, and the reports shall be submitted at least semi-annually, or as directed by the Department. The reports should contain all monitoring results and conclusions from samples and measurements conducted during the sampling period. Explosive gas monitoring must be conducted on a yearly basis, and the reports should be submitted to the Department 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 ADEM Admin. Code 335-13 must be furnished upon request and made available at reasonable times for inspection by any officer, employee, or representative of the Department.
 - b. All records, including plans, required under this permit or ADEM Admin. Code 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 the Department.
 - c. A copy of records of waste disposal locations and quantities must be submitted to the Department and local land authority upon closure of the facility.
- I. Documents to be Maintained by the Permittee. The Permittee shall maintain, at the WCA of Alabama, LLC Industrial 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 the Department, 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 the Department and other appropriate agencies. A burn request should be submitted in writing to the Department 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, PCBs, 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. Industrial Waste Disposal. The Permittee shall dispose of industrial waste as required by ADEM Admin. Code 335-13-4-.21(1)(c) and as specified in the Application.
- F. 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.
- G. 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 non-hazardous solid wastes listed in Section III, Paragraph B. Disposal of any other wastes is prohibited, except waste granted a temporary or one time waiver by the Director.
 - 2. The total permitted area for the WCA of Alabama, LLC Industrial Landfill is approximately 104.88 acres with approximately 57.95 acres permitted for disposal operations.
 - 3. The maximum average daily volume of waste disposed at the facility shall not exceed 750 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. An increase in the maximum average daily volume shall not be approved by the Department unless the Permittee has received local approval for the increased maximum average daily volume. 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 non-hazardous industrial wastes, construction and demolition wastes, asbestos, automobile shredder dirt and fluff, and tires.
- C. Service Area. The Permittee is allowed to receive waste for disposal from the following counties: Bibb, Calhoun, Clay, Chilton, Cleburne, Etowah, Jefferson, Shelby, St. Clair, Talladega, and Tallapoosa counties in Alabama.
- 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 3 to 1 (33%). (See Section VIII, Paragraph 2.) 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 approved by the Department and listed in Section VIII shall be added at the conclusion of each week's operation unless a variance is granted in Section VIII.
- E. Liner Requirements. The Permittee shall be allowed to use in situ soil with an in situ soil permeability of 1×10^{-7} cm/sec or less instead of a 2-foot soil liner. The Permittee shall be required to verify the soil permeability of the first 2 feet of in situ soil after excavation to cell bottom grade. All in situ soil permeability test results and test locations shall be submitted to the Department for approval before disposal of waste. If the in situ soil does not have a permeability of 1×10^{-7} cm/sec or less, the Permittee shall be required to install a 2-foot soil liner with a soil permeability of 1×10^{-7} cm/sec or less. The soil liner shall be compacted in lifts of 4 to 6 inches within 4 percent of the optimum moisture content (or as approved by the Department).

The base of the waste 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 the Department.
- N. Other Requirements. The Department 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 the Department.
- 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.

- 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 (Section IV, Paragraph A, Subparagraph 4) during the active life and the post-closure care period.
 - 2. The Permittee shall maintain groundwater monitoring well MW-2 as the background groundwater monitoring well for the entire facility.

3. The Permittee shall evaluate the groundwater data (statistical analysis) as described in the Application/Groundwater Monitoring Plan and ADEM Admin. Code 335-13-4-.27.
4. The Permittee shall install and maintain additional groundwater monitoring wells as necessary to assess changes in the rate and extent of any plume of contamination or as otherwise deemed necessary to maintain compliance with the ADEM Admin. Code 335-13.
5. Prior to installing any additional groundwater monitoring wells, the Permittee shall submit a plan to the Department with a permit modification request specifying the design, location, and installation of any additional monitoring wells. This plan shall be submitted at least one hundred 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, in all monitoring wells identified in Section IV, Paragraph A, Subparagraph 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 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 records and results of this sampling and analysis activity shall be submitted to the Department within ninety (90) days of the date of sampling.
5. In addition to the requirements of Sections IV, Paragraph B, Subparagraphs 1, 2, 3, and 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, Paragraph 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.
3. Samples shall be tracked and controlled using the chain-of-custody and QA/QC procedures specified of the Application.
4. The Permittee is approved for **inter-well** statistical analysis.

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, Paragraph E, Subparagraph 9c.
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, Paragraph I, Subparagraph 1.

- E. Permit Modification. If the Permittee or the Department determines that the groundwater monitoring system no longer satisfies the requirements of ADEM Admin. Code 335-13-4-.14 or Section IV, Paragraph A, of this permit, the Permittee must, within one hundred twenty (120) days, submit an application for a permit modification to make any 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-1R	487.52	Entire Landfill
MW-2	460.11	Entire Landfill
DOWNGRADIENT MONITORING WELLS		
MW-4	472.66	Entire Landfill
MW-6	439.02	Entire Landfill
MW-7	438.37	Entire Landfill
MW-8	432.20	Entire Landfill

SECTION V. GAS MONITORING REQUIREMENTS

The permittee must install and maintain an explosive gas monitoring system in accordance with ADEM Admin. Code 335-13.

SECTION VI. LEACHATE AND SURFACE WATER MANAGEMENT REQUIREMENTS

The Permittee must collect and dispose of the leachate that is generated at the facility. The Permittee shall install a leachate collection system designed to maintain less than 12 inches (30 cm) depth of leachate over the liner. Prior to initial disposal, the Permittee shall provide the Department with a letter from the receiving publicly or privately owned treatment works approving the acceptance of the leachate. Discharges to publicly or privately owned treatment works may be subject to the requirements of the ADEM Water Division's State Indirect Discharge (SID) Program.

The Permittee shall construct and maintain run-on and run-off control structures. Surface water discharges from drainage control structures shall be permitted through the ADEM Water Division's National Pollutant Discharge Elimination System (NPDES) Program.

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. The final cover system shall comply with ADEM Admin. Code 335-13. The Permittee has been granted a variance from ADEM Admin. Code 335-13-4-.20(2)(c)2. requiring a maximum 4 to 1 (25%) final grade for the final closure system. The final cover system shall not exceed a final grade of 3 to 1 (33.3%). (See Section VIII, Paragraph 1.)
- B. Vegetative Cover. The Permittee shall establish a vegetative or other appropriate cover, as approved by the Department, within ninety (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 one hundred eighty (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 continuing for a period of a minimum 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 the Department. 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 has 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 registered professional engineer, verifying the post-closure has been completed according to the Post-Closure Plan.
- J. Recording Instruments. 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 ninety (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 one hundred twenty (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 soils, the owner must request and receive prior approval from the Department.

SECTION VIII. VARIANCES AND SPECIAL CONDITIONS

1. The Permittee has been granted a variance from ADEM Admin. Code 335-13-4-.20(2)(c)2. requiring a maximum 4 to 1 (25%) final grade for the final closure system. The final cover system shall not exceed a final grade of grade of 3 to 1 (33.3%). (See Section VII., Paragraph A.)
2. The Permittee has been granted a variance from ADEM Admin. Code 335-13-4-.23(1)(c) requiring 4 to 1 (25%) operating slopes. The Permittee shall be allowed 3 to 1 (33.3%) operating slopes. (See Section III, Paragraph D.)
3. Foundry wastes are special wastes and are subject to the requirements of ADEM Admin. Code 335-13-4-.26(3). The foundry wastes must undergo a quarterly TCLP (Toxicity Characteristic Leaching Procedure) analysis for the RCRA (Resource Conservation and Recovery Act) 8 metals, submit each analysis to the Department, and maintain a copy in the landfill's operating records. The Permittee has been approved to accept foundry waste which exhibits less than 50 percent of each of the toxicity characteristics levels for metals as defined by the USEPA's TCLP for disposal at this landfill (See Section III, Paragraph B.)

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 No. 61-16 Renewal

Application and Modification

Application



January 31, 2023

Mr. Jared Kelly
Chief of Solid Waste
ADEM Land Division
1400 Coliseum Boulevard
Montgomery, AL 36110

**Re: WCA of Alabama, LLC Industrial Landfill
Solid Waste Permit Renewal
Permit Number: 61-16**

Dear Mr. Kelly:

The Solid Waste Permit for the subject facility expires on August 5, 2024. As required by ADEM regulations, a renewal application is required to be filed for permit renewal at least 180 days prior to the permit expiration (February 7, 2024). To satisfy this requirement, WCA of Alabama, LLC has enclosed the renewal application, which includes:

1. Completed application form for renewal (ADEM Form 439)
2. Fee in the amount of \$8,150.00 for the 10-year renewal application fee has been paid via the ADEM Online ePay website (receipt attached);
3. A list of adjacent property owners and a map showing the location of each property; and
4. A list of previously submitted and approved technical documents. We request that all previously approved variances be included in the renewed Permit.

No modifications to operations or engineering designs are being requested with this renewal application.

If you have any questions regarding this matter, please feel free to contact me.

Sincerely,

WCA of Alabama, LLC

Jonathan Williams
Jonathan Williams (Feb 1, 2024 08:32 CST)

Jonathan Williams
General Manager

Enclosure

cc: Batini Robinson (w/o enclosure)
Ed Hood (w/o enclosure)

Received

FEB 06 2024

Land Division

SOLID WASTE APPLICATION

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

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

2. Facility Name WCA of Alabama, LLC Industrial Landfill

3. Applicant/Permittee:

Name: WCA of Alabama, LLC

Address: 13737 Plant RD
Childersburg, AL 35044

Telephone: 205-368-0864

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

Patrick Dovigi - President Jonathan Lucas Pelosi - Treasurer Mindy Gilbert- Secretary

Melissa Bachhuber- Assistant Secretary

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

Township 19S Range 3E
Section 21 County Talladega

5. Land Owner:

Name: WCA of Alabama LLC

Address: 13737 Plant Road
Childersburg AL, 35044, USA

Telephone: 205-368-0864

(Attach copy of agreement from landowner if applicable.)

Solid Waste Permit Application
Page 2

6. Contact Person:

Name Jonathan Williams

Position or Affiliation General Manager

Address: 13737 Plant Rd
Childersburg, AL 35044

Telephone: 205-368-0864

7. Size of Facility: 104.88 Acres Size of Disposal Area(s): 57.95 Acres

8. Identify proposed service area or specific industry that waste will be received from:
Bibb, Calhoun, Clay, Chilton, Cleburne, Etowah, Jefferson, Shelby, St. Clair,
Talladega, and Tallapoosa Counties in Alabama.

9. Proposed maximum average daily volume to be received at landfill (choose one):
750 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.):
Nonhazardous industrial wastes, construction and demolition wastes,
asbestos, automobile shredder dirt and fluff, and tire.

SIGNATURE (Responsible official of permit applicant):

Jonathan Williams
Jonathan Williams (Feb 1, 2024 08:32 CST)

TITLE: General Manager

Jonathan Williams
(please print or type name)

DATE: 02/01/2024

Robert Heller

Subject: FW: ADEM - ADEM General Payment

From: receipts@alabamainteractive.org <receipts@alabamainteractive.org>

Sent: Monday, February 5, 2024 10:46 AM

To: Jonathan Williams <jonathan.williams@gflenv.com>

Subject: ADEM - ADEM General Payment

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Payment Receipt

02/05/2024 10:46 AM

Thank you for completing your transaction.
Please save a copy of this receipt for your records.

Receipt Confirmation Number: 2024020500007522

Agency: Alabama Department Of Environmental
Management

Application: ADEM General Payment

Payment Item	Fee
Application Fee	\$8,150.00
Total Fee through Alabama.gov <small>(learn more)</small>	\$8,396.50

This online service is provided by Alabama Interactive, LLC, a third party, working under a contract awarded and administered by Alabama's Department of Finance as authorized under contract number T001. The online price of items or services purchased through [Alabama.gov](https://alabama.gov), the state's official web portal, includes funds to develop, maintain, enhance and expand offerings of the state's portal.

This is a system generated message.
Please do not reply to this email.



WCA of Alabama, LLC Industrial Landfill- Permit No. 61-16
List of Previously Submitted Technical Documents - Feb 2024

Cell Approval (Most Recent)			
Description	Submittal Date	Approval Date	Notes
Cell 7A	9/3/2020	9/23/2020	
Cell 6	9/23/2009	10/2/2009	
Cell 4	2/12/2007	5/4/2007	
Cell 5	12/30/2005	1/11/2006	
Cell 3	1/31/2004		
Cell 2	7/26/2002	8/1/2002	
Cell 1	5/24/2000	5/31/2000	
List of Variances			
Description	Submittal Date	Approval Date	Notes
Variance to ADEM Rule 335-13-4-.20(2)(c)2. requiring a maximum 4H to 1V final grade for the final closure system. The maximum final grade for the landfill shall be 3H to 1V.	1/4/2019	8/6/2019	Submitted as a part of the 2019 5-year permit renewal.
Variance to ADEM Rule 335-13-4-.23(1)(c)2. requiring all waste shall be confined to an area as small as possible and placed on a slope not to exceed 4H to 1V. The Permittee shall be allowed to place waste onto a slope not to exceed 3H to 1V.	1/4/2019	8/6/2019	Submitted as a part of the 2019 5-year permit renewal.
Leachate Disposal Description			
Talladega Wastewater Treatment Plant			

MapID	PIN	Parcel	Owner	Address
1	27362	2005210000013000	WCA OF ALABAMA LLC	100 NEW PARK PLACE, 500, VAUGHAN, ON L4K0H9
2	27364	2005210000015000	STATE OF ALABAMA & AL DEPT OF CORRECTION	CORRECTIONS, MONTGOMERY, AL 36104
3	27363	2005210000014000	MCDONALD WILLIAM M & CORNELIA	PO BOX 80615, INDIANAPOLIS, IN 46280
4	66947	2005210000013003	CHILDERSBURG RIVER PROPERTY LLC	120 BISHOP CIRCLE, PELHAM, AL 35124
5	66946	2005210000013002	WMW LAND LLC	1300 GLENWOOD TERRACE, ANNISTON, AL 36207
6	66944	2005210000013001	FARLEY WENDELL	500 HAVEN HILL LANE, STERRETT, AL 35147
7	27359	2005210000002000	BLUE SPRINGS LLC	2230 2ND AVE S, BIRMINGHAM, AL 35233

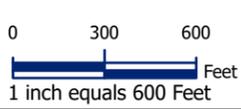


Legend	
	Adjacent Parcels
	Landfill Parcels

Notes:
 1. Imagery obtained from ESRI World Basemap. Source: ShelbyCounty2022, Date:1/11/2022. Surrounding aerial source: Vivid Maxar, Date: 4/27/2023.
 2. Parcel information obtained from Talladega Tax Assessors on 2/1/2024.

Adjacent Property Owners Map

Fines Landfill
 GFL Environmental
 Talladega County, Alabama
 2/1/2024



DISCLAIMER:
 This drawing and the information contained herein is for general presentation purposes only and is a compilation of shapefile(s) provided by various source(s). The source and accuracy of the file(s) has not been verified by HHNT and therefore the drawing is not intended for use as an engineering drawing or for design purposes.



Path: I:\GFL - Fines\Maps\Adjacent Property Owner Map\Adjacent Property Owner Map.aprx User: bmcgee

REVISED OPERATIONS MANUAL

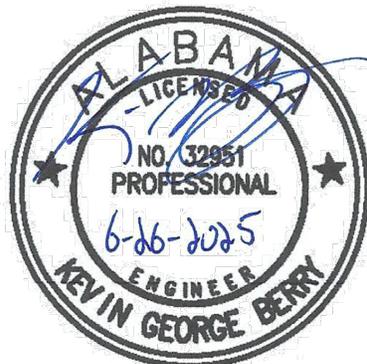
WCA OF ALABAMA LLC INDUSTRIAL LANDFILL
TALLADEGA COUNTY, ALABAMA
PERMIT NO. 61-16

PREPARED FOR:
WASTE CORPORATION OF ALABAMA

Original Plan Dated November 2007 Prepared By:
CDG Engineers and Associates

Amended June 2025 By:
Hodges, Harbin, Newberry & Tribble, Inc.

Engineer's Certification is limited to the underlined text on the affected pages included herein (Pages 1-6, 2-5, 2-7). All other pages and information contained in the plan have been (and remain) certified by the original preparer.



HODGES, HARBIN,
NEWBERRY & TRIBBLE, INC.

Consulting Engineers

1.8 CONTACT PERSONS

WCA of Alabama, LLC

Jonathan Williams

General Manager I

13737 Plant Rd

Childersburg, Alabama 35044

Phone: (205) 368-0864

jonathan.williams@gflenv.com

Bob Hayes

Regional Environmental Compliance Manager

1000 Social St #1100

Raleigh, North Carolina 27609

Phone: (984) 352-3458

bobhayes@gflenv.com

Edward Hood

Area Landfill Director

8880 Old Federal Rd

Ball Ground, Georgia 30107

Phone: (704) 785-4099

edward.hood@gflenv.com

1.8 CONTACT PERSONS

WCA of Alabama, LLC

John Sesera
Regional Vice President
14195 Plant Rd
Alpine, Alabama 35014
Phone: (205) 647-3200
jsesera@wcamerica.com

Chuck Green
Alabama State Manager
1130 County Line Rd
Trafford, Alabama 35172
Phone: (205) 647-3200
cgreen@wcamerica.com

Nick Marotta
Regional Engineer
14195 Plant Rd
Alpine, Alabama 35014
Phone: (954) 415-7230
nmarotta@wcamerica.com

CDG Engineers & Associates, Inc

R. Daniel Wells, P.E.
Project Manager
P.O. Box 278
Andalusia, Alabama 36420
Phone: (334) 222-9431
dwells@cdge.com

1. Leachate collection trenches are to be constructed as a part of the liner. A detail drawing of the collection trench can be located on page 10 of the permit plans.

2. A minimum of six inch perforated HDPE collection pipes shall be installed in the leachate trenches. The leachate collection trenches shall be backfilled with angular, non-calcareous stone to a depth of twelve inches above the pipe. The leachate collection pipe shall drain toward a leachate collection sump located at the toe of the west end of the site. During the construction of each cell, temporary sumps will be installed at the toe of each cell that will be abandoned once the permanent sumps are installed. Leachate will be transferred by a force main to a 150,000-gallon leachate tank located on the southern side of the site. Details of the leachate storage tank, sumps, and related features are shown on page 5B of the 2023 Minor Modification – Leachate Forcemain and Storage Tank.

The material chosen for use in the leachate collection and transfer pipe is HDPE, primarily due to its resistance to a wide range of chemicals. The wall is determined by evaluating the pipe deflection under earth loading. HDPE pipe with an SDR of 17 will be used throughout the project.

2.11 LEACHATE TREATMENT

Leachate treatment shall be accomplished using leachate removal stations, transfer mains, and a 150,000-gallon storage tank.

Leachate removal stations use submersible pumps to remove leachate from collection sumps at the lower end of each collection trench. These stations will be capable of manual or automatic pumping of leachate. The submersible pump will pump from the station to the leachate transfer main through a dually contained HDPE force main. Leachate sumps will be located at each station at the point of discharge from the cell to the transfer main. This provides access for pipe clean out and inspection. Details of the leachate removal stations are shown in the Permit Plans.

The leachate transfer main will accept leachate from the leachate removal stations. The main will be a 2-inch diameter HDPE pipe, carried inside a 4-inch HDPE containment pipe. This

1. Leachate collection trenches are to be constructed as a part of the liner. A detail drawing of the collection trench can be located on page 10 of the permit plans.

2. A minimum of six inch perforated HDPE collection pipes shall be installed in the leachate trenches. The leachate collection trenches shall be backfilled with angular, non-calcareous stone to a depth of twelve inches above the pipe. The leachate collection pipe shall drain toward a leachate collection sump located at the toe of the west end of the site. During the construction of each cell, temporary sumps will be installed at the toe of each cell that will be abandoned once the permanent sumps are installed. Leachate will be transferred by a force main to a 100,000 gallon leachate storage tank located on the southwest corner of the site. ~~Details of the leachate storage tank, sumps, and related features are shown on page 5 of the Permit Plans.~~

The material chosen for use in the leachate collection and transfer pipe is HDPE, primarily due to its resistance to a wide range of chemicals. The wall is determined by evaluating the pipe deflection under earth loading. HDPE pipe with an SDR of 17 will be used throughout the project.

2.11 LEACHATE TREATMENT

Leachate treatment shall be accomplished using leachate removal stations, transfer mains, and a ~~100,000 gallon~~ storage tank.

Leachate removal stations use submersible pumps to remove leachate from collection sumps at the lower end of each collection trench. These stations will be capable of manual or automatic pumping of leachate. The submersible pump will pump from the station to the leachate transfer main through a dually contained HDPE force main. Leachate sumps will be located at each station at the point of discharge from the cell to the transfer main. This provides access for pipe clean out and inspection. Details of the leachate removal stations are shown in the Permit Plans.

The leachate transfer main will accept leachate from the leachate removal stations. The main will be a 2-inch diameter HDPE pipe, carried inside a 4-inch HDPE containment pipe. This

The model results evaluating each scenario for leachate production potential are included in Appendix D of this manual.

2.13 GROUNDWATER MONITORING WELL SYSTEM

This section has been superseded by the EMP submitted as a part of the permit renewal, by Jett Environmental Consulting on October 24, 2024.

2.14 EXPLOSIVE GAS MONITORING SYSTEM

This section has been superseded by the EMP submitted as a part of the permit renewal, by Jett Environmental Consulting on October 24, 2024.

The model results evaluating each scenario for leachate production potential are included in Appendix D of this manual.

2.13 GROUNDWATER MONITORING WELL SYSTEM

The groundwater monitoring well system for the WCA of Alabama, LLC. Industrial Landfill is comprised of eight wells installed previously at the site. Wells that are currently installed are shown on page 9 of the Permit Plans. Wells MW-5 & MW-1 will be relocated due to construction of future cells. There are two piezometers located on site used to monitor groundwater elevations. These wells are also shown on page 9 of the Permit Plans. The Hydrogeological Report performed by Highland Technical Services on September 18, 2007 can be located in the Supplemental Groundwater Report submitted along with this manual.

2.14 EXPLOSIVE GAS MONITORING SYSTEM

The generation of explosive gases, especially methane (CH_4) can occur when organic wastes at the landfill decomposes. Landfill gas migration can result in vegetation damage (i.e. landfill cover vegetation) and can even result in explosions if concentrations exceed the Lower Explosive Limits (LOL) of 5% by volume. Permanent explosive gas monitoring points shall be identified at the facility for monitoring explosive gas levels during the active life, closure, and post-closure care period as required by ADEM.

2.14.1 Explosive Gas Monitoring Points

Permanent explosive gas monitoring points will be identified by flags and will be spaced along the landfill property boundary as shown on page 9 of the permit plans. As required by Rule 335-13-4-.17(4) of the ADEM Administrative Code, monitoring points shall be installed no more than 300 feet apart, and no more than 100 feet apart in areas where a dwelling is within 1000 feet of the landfill property boundary. The gas monitoring points shall be monitored using the barhole punch method penetrating to a depth of at least 4 feet. In addition to the monitoring points, other monitoring locations shall include on-site structures, culverts, drop inlets, and other locations which are conducive to gas accumulation. The WCA of Alabama, LLC Industrial Landfill will have a total of 49 monitoring points.

RE: Variance Information for the renewal of the permit for 61-16



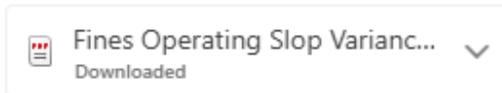
Robert Heller <rheller@HHNT.COM>



To: Adornato, Melissa H; **+2 others**

Fri 2/13/2026 7:40 AM

Cc: Heather Boyle <hboyle@HHNT.COM>



3 attachments (3 MB)

Save all to OneDrive - Alabama Department of Environmental Management

Download all

Melissa,

The facility has two variances, 3:1 operating slopes as well as 3:1 final slopes.

1. We have attached a page from the Operations Manual from November of 2007, stating that the operating slopes are not to exceed 3 to 1.
2. We have also attached the modifications to closure slopes drawings from November of 2000. These drawings depict a 3:1 final slope. Additionally, we have attached a letter to ADEM dated December 21, 2000, stating that a 3:1 closure slope can be maintained on the final closure slopes.

Please let us know if you need anything else.

Robert Heller, CHMM

Environmental Manager

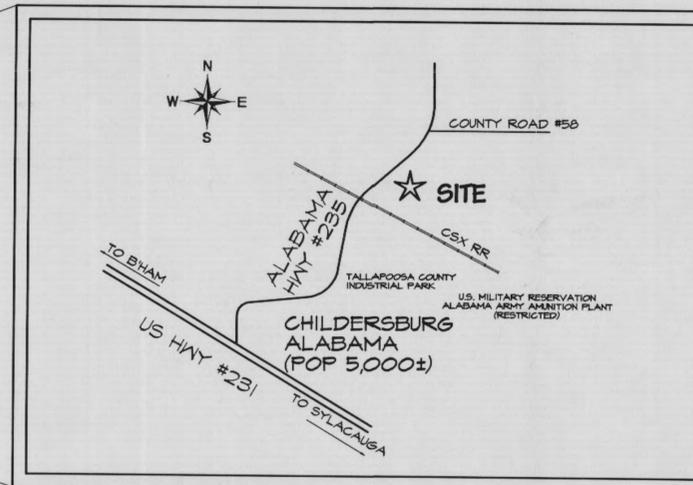
WASTE CORPORATION OF ALABAMA, L.L.C. INDUSTRIAL LANDFILL PERMIT #61-16

MODIFICATION TO CLOSURE SLOPES

NOVEMBER, 2000



LOCATION MAP
NTS

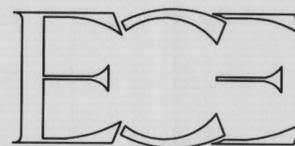


VICINITY MAP
NTS

Solid Waste Branch
Dept. of Environmental Management
Approved Plans For WCA
Permit No. 61-16
Approved By: [Signature]
New/Res/Mod Mod
Date 3-7-02

SHEET INDEX:

1. COVER SHEET
2. CELL LAYOUT
3. CELL CLOSURE & PROFILES
4. DETAILS



ENVIRONMENTAL CONSULTING & ENGINEERING, INC.
101 MARKET PLACE
MONTGOMERY, ALABAMA 36117
PHONE #(334) 271-2827
FAX #(334) 271-5722
EMAIL - ECEINC1@AOL.COM

COVER SHEET

ENVIRONMENTAL CONSULTING & ENGINEERING, INC.
101 MARKET PLACE
MONTGOMERY, ALABAMA 36117
PH (334) 271-2827 FAX (334) 271-5722

**WASTE CORPORATION
OF
ALABAMA, L.L.C.
INDUSTRIAL LANDFILL
MINOR MODIFICATION**

SHEET 1 OF 4

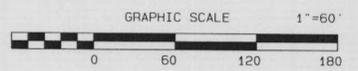
SCALE: NOTED
DATED: 11/22/2000
DRAWN BY: NBD
CHECKED BY: GBS

Copyrighted by Environmental Consulting & Engineering, Inc.
No part of this drawing may be copied, added to, altered or
reproduced by any means without the express written permission
from Environmental Consulting & Engineering, Inc.

This survey and drawing is not valid unless sealed with original
embossed or original stamped ink seal of the Survey or Engineer
as may apply. Digital stamp is valid only with original ink signature.

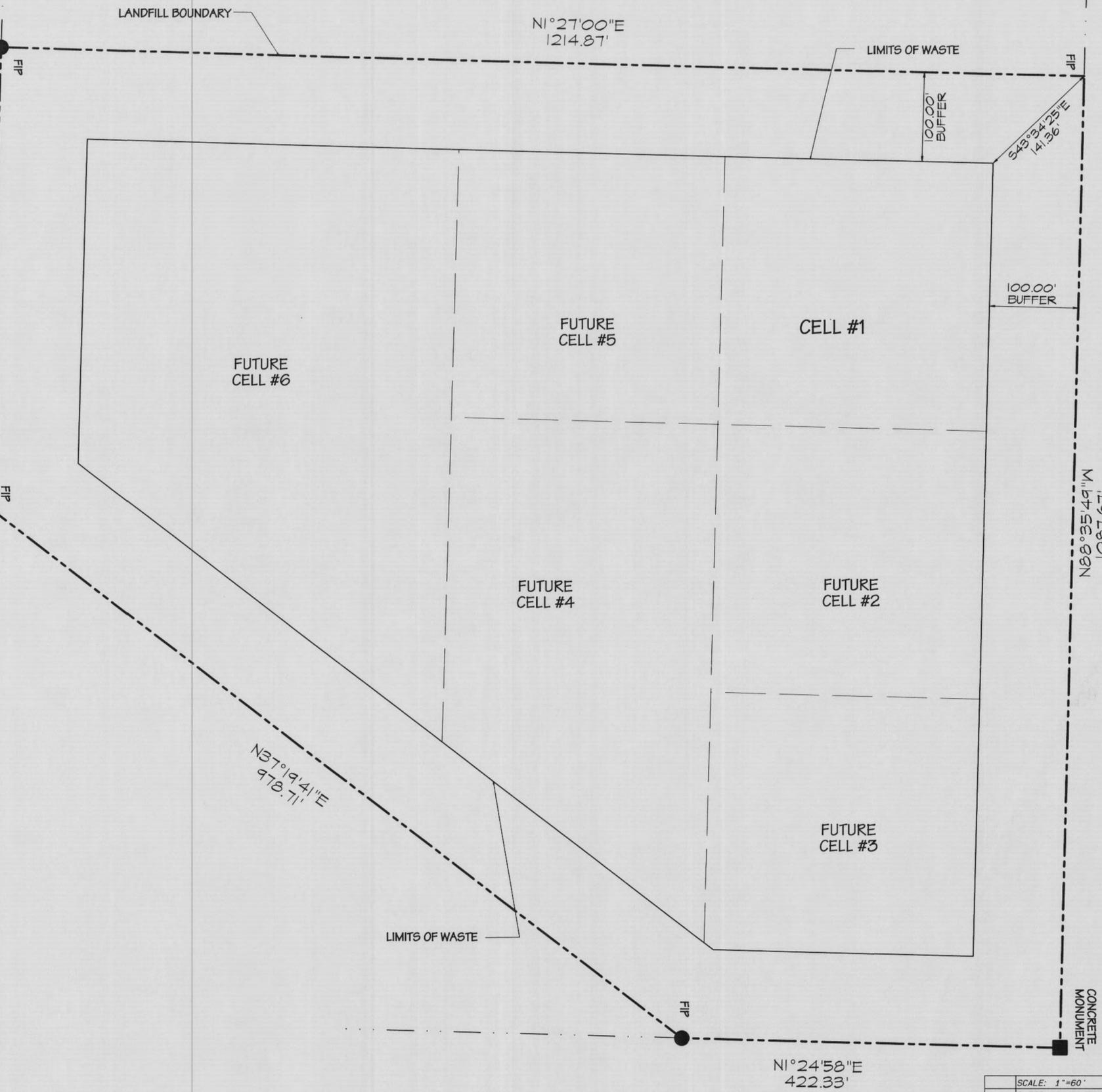
FILE: WCA Minor Mod.dwg





NOTE:
1. CONTOUR INTERVAL = 2'
2. DATUM BASED ON MSL

S88°35'49"E
514.34'



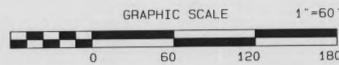
CELL LAYOUT



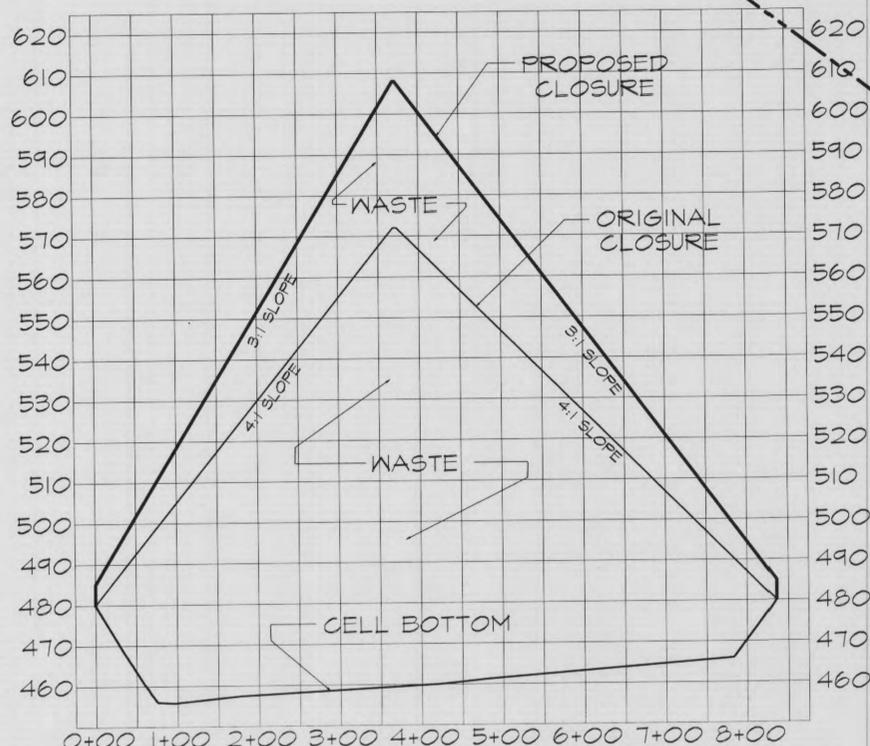
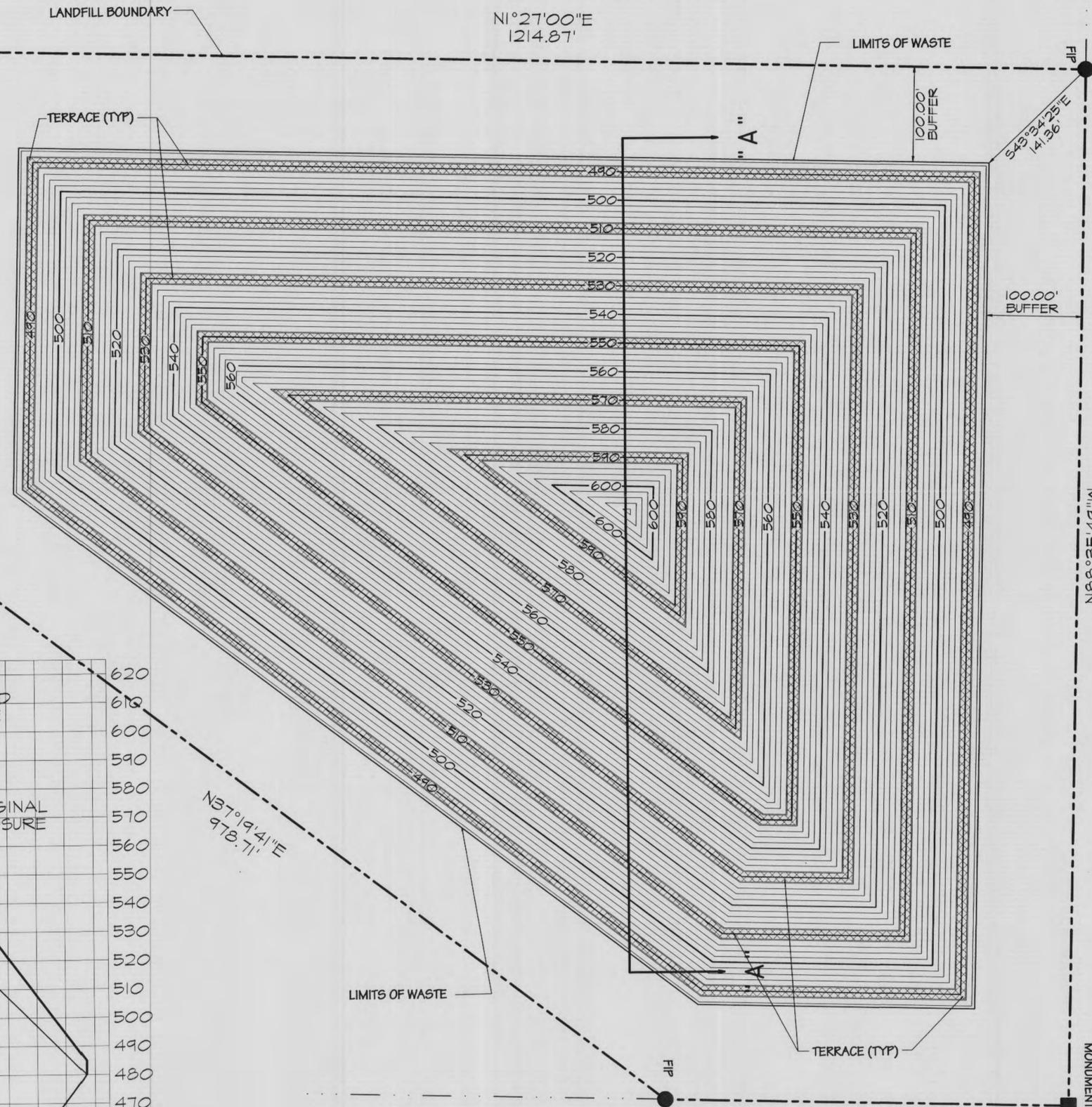
ENVIRONMENTAL CONSULTING & ENGINEERING, INC.
101 MARKET PLACE
MONTGOMERY, ALABAMA 36117
PH (334) 271-2827 FAX (334) 271-5722

**WASTE CORPORATION
OF
ALABAMA, L.L.C.
INDUSTRIAL LANDFILL
MINOR MODIFICATION**

SCALE:	1"=60'
DATED:	11/22/2000
DRAWN BY:	NBD
CHECKED BY:	GBS



NOTE:
 1. CONTOUR INTERVAL = 2'
 2. DATUM BASED ON MSL



SECTION "A-A"
 SCALE: 1"=100' HORIZ.
 1"=20' VERT.

**CELLS 1 THRU 6 WITH
 3:1 CLOSURE &
 COMPARITIVE PROFILES**

ENVIRONMENTAL CONSULTING & ENGINEERING, INC.
 101 MARKET PLACE
 MONTGOMERY, ALABAMA 36117
 PH (334) 271-2827 FAX (334) 271-5722

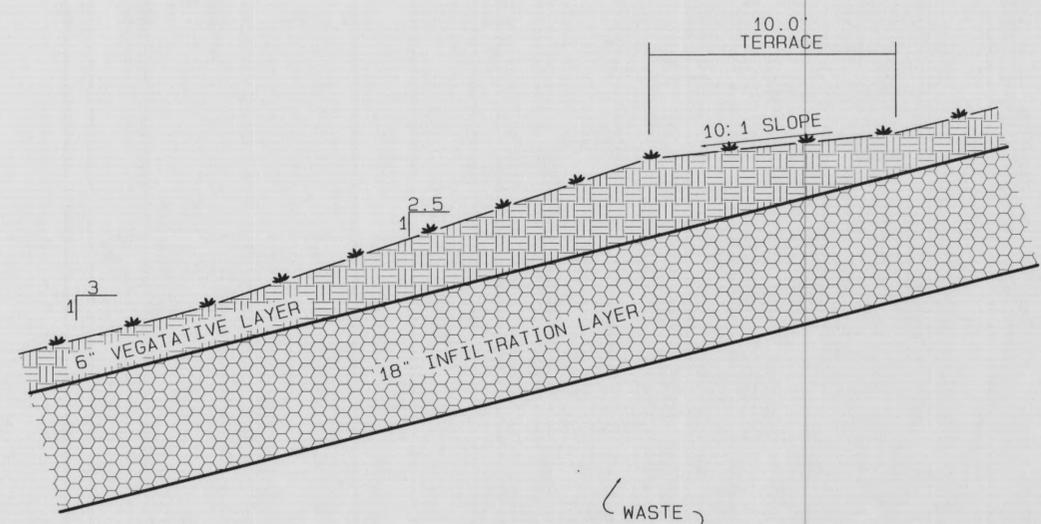
**WASTE CORPORATION
 OF
 ALABAMA, L.L.C.
 INDUSTRIAL LANDFILL
 MINOR MODIFICATION**

SCALE: NOTED
 DATED: 11/22/2000
 DRAWN BY: NBD
 CHECKED BY: GBS

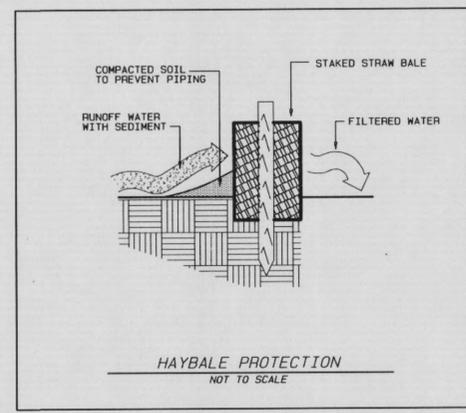
SHEET 3 OF 4



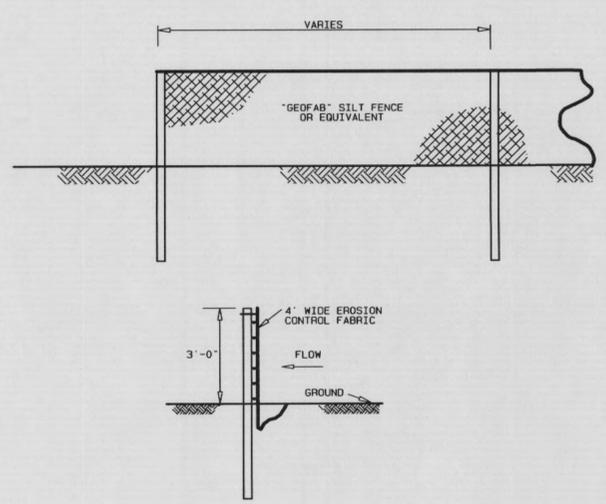
• General _____
 • Document Title _____
 • Document Date _____
 • Document Date _____
 • County Code _____
 • Project Name (Specify ID) _____
 • Project ID _____
 LVAO DIVISION FILING INSTRUCTIONS



WASTE
FINAL COVER SYSTEM
 (NOT TO SCALE)



HAYBALE PROTECTION
 NOT TO SCALE



EROSION CONTROL SILT FENCE
 (NOT TO SCALE)



DETAILS

EC ENVIRONMENTAL CONSULTING & ENGINEERING, INC.
 101 MARKET PLACE
 MONTGOMERY, ALABAMA 36117
 PH (334) 271-2827 FAX (334) 271-5722

WASTE CORPORATION
OF
ALABAMA, L.L.C.
INDUSTRIAL LANDFILL
MINOR MODIFICATION

SCALE:	NOTED
DATED:	11/22/2000
DRAWN BY:	NBD
CHECKED BY:	GBS

5.0 SPECIFIC REQUIREMENTS FOR INDUSTRIAL SOLID WASTE DISPOSAL

5.1 OPERATION

(a) All waste shall be covered as follows:

1. A minimum of six inches of compacted earth or other alternative cover material that includes but is not limited to foams, tarps, tire chips, geosynthetic or waste products, and is approved by the Department shall be added at the conclusion of each week's operation or as otherwise specified by the Department to control disease vectors, fire, odors, blown litter and scavenging.

2. Final closure shall be carried out in accordance with ADEM Administration Code 335-13-4-.20 of this Division along with the Permit Plans.

(b) All waste shall be thoroughly spread in layers two feet or less in thickness and thoroughly compacted daily with adequate landfill equipment prior to placing additional layers of waste or placing the weekly cover as specified in 335-13-4-.23(1)(a)1., unless otherwise approved by the Department. Waste which cannot be managed by landfill equipment in this manner shall be managed in a manner approved by the Department.

(c) All waste shall be confined to as small an area as possible and placed onto an appropriate slope not to exceed 3 to 1 (33%) or as approved by the Department.

(d) The facility shall be operated in accordance with approved plans and permits.

(e) The site shall be adequately secured to prevent entry except by authorized person(s) unless an operator is on site.

(f) Provisions shall be made for disposal activities in adverse weather conditions.

(g) Adequate personnel shall be provided to insure continued and smooth operation of the site.



EAST ALABAMA REGIONAL PLANNING AND DEVELOPMENT COMMISSION

1130 Quintard Avenue • Suite 300, Quintard Tower • P.O. Box 2186 • Anniston, Alabama 36202
Phone: (256) 237-6741 • FAX: (256) 237-6763 • E-mail: earpdc@adss.state.al.us
web site: www.earpdc.org

October 10, 2001

James W. (Bill) Curtis, AICP
Executive Director

Mr. Cole Burdett
Environmental Consulting and Engineering, Inc.
101 Market Place
Montgomery, AL 36117

RE: Statement of Consistency - WCA of Alabama, L.L.C. Industrial Landfill

Dear Mr. Burdett:

The East Alabama Regional Planning and Development Commission received your request on behalf of Waste Corporation of Alabama, L.L.C., dated September 20, 2001, for a Statement of Consistency for the modification to the existing permit to increase the service area of their industrial landfill located in Childersburg, Alabama. Local approval for this proposal was given by the Talladega County Commission on June 18, 2001.

The East Alabama Regional Planning and Development Commission has evaluated the proposal using the provisions of the current Solid Waste Assessment, prepared by the Commission, in particular the available existing capacity within the region and projected lifetime of such capacity. The Commission has identified that the proposed capacity is not in excess of the expected regional needs.

Based upon our evaluation of the proposal using the above criteria, the undersigned has determined that this proposal is consistent with the Solid Waste Assessment, prepared by the East Alabama Regional Planning and Development Commission.

Sincerely,

Bill Curtis
Executive Director

blp

cc: James G. Hilber



Chairman
WILLIAM E. KIMBROUGH
Mayor, Weaver

Vice-Chairman
BETTY S. ZIGLAR
Mayor, Roanoke

Secretary
CHARLES S. ROGERS
Mayor, Oak Grove

Treasurer
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Commissioner, Calhoun County

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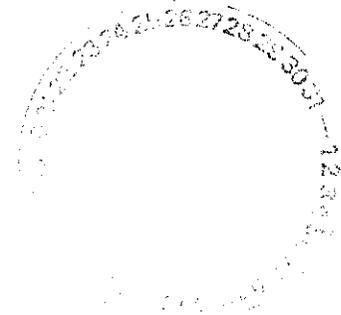


ENVIRONMENTAL CONSULTING & ENGINEERING, INC.

Civil & Environmental Engineering • Land Surveying

December 21, 2000

Mr. Jonathan Crosby
Land Division
Alabama Department of environmental Management
P.O. Box 301463
Montgomery, Al 36130-1463



RE: ***Proposed modification to closure slopes***
Waste Corporation of Alabama Industrial Landfill
Permit # 61-16
Talledega County, AL

Dear Jonathan:

Please find enclosed two (2) copies of plans showing proposed revised closure elevations at the above referenced facility. Based on the types of waste materials received at this site and the cover soils available, we feel that a 3:1 closure slope can be maintained on the final closure slopes.

Should you need additional information or have any questions, please feel free to give me a call.

Sincerely,

Environmental Consulting and Engineering, Inc.



Glen B. Smith, P.E.

c: Mr. Darry Ferguson
Waste Corp. Of America
Houston, TX



October 24, 2024

Ms. Melissa Adornato
Solid Waste Engineering Section
Solid Waste Branch, Land Division
Alabama Department of Environmental Management
1400 Coliseum Blvd.
Montgomery, Alabama 36110

Re: WCA of Alabama, LLC
Solid Waste Permit No. 61-16
Environmental Monitoring Plan

Dear Ms. Adornato:

I have enclosed an updated Environmental Monitoring Plan prepared by Jett Environmental Consulting for Fines Industrial Landfill.

If you have any questions, please feel free to contact Jonathan Williams at jonathan.williams@gflenv.com.

Sincerely,

A handwritten signature in black ink that reads 'Jonathan Williams'.

Jonathan Williams, General Manager
WCA Fines Industrial Landfill

Enclosure

cc: Robert Harbin, GFL
Rachel Kirkman, GFL
Bob Hayes, GFL
Ed Hood, GFL



October 24, 2024

Submitted via Electronic Mail

Ms. Melissa Adornato
Solid Waste Engineering Section - Land Division
Alabama Department of Environmental Management
Post Office Box 301463
Montgomery, Alabama 36130-1463

**Re: Updated Environmental Monitoring Plan & Response to 8/29/24 ADEM Comment Letter
WCA of Alabama, LLC Fines Industrial Landfill, Permit No. 61-16**

Dear Ms. Adornato:

On behalf of WCA of Alabama, LLC, Jett Environmental Consulting is submitting a response to an August 29, 2024 comment letter from the Alabama Department of Environmental Management (ADEM). The ADEM letter provided review/comments on the Environmental Monitoring Plan (EMP) that was submitted on May 21, 2024. The following are the ADEM comments and recommendations (in italics), followed by site responses:

ADEM Comment

- 1. The EMP is sufficient to incorporate the Department's previous comments and recommendations as requested in ADEM correspondence dated February 26, 2024. Also, the site groundwater monitoring network described in Section 3.1 of the EMP is updated and representative of the current groundwater monitoring system.*

Response: Acknowledged.

ADEM Comment

- 2. According to Section 4.2 of the EMP, interwell prediction limit analysis is provided as the statistical method to evaluate groundwater data. The Unified Guidance recommends the use of incorporating a retesting strategy with prediction limits. Therefore, the EMP should be modified to incorporate a retesting strategy as discussed in Chapter 19 of the Unified Guidance.*

Response: Confirmation sampling text has been added to Section 4.2 of the attached updated EMP.

ADEM Comment

- 3. According to Section 4.1 of the EMP, "due to the wide range of laboratory reporting limits utilized over time, the historical reporting limits (RLs) will be replaced with the median reporting limit prior to performing the outlier evaluation." It is not clear that replacing all historical RLs with the median reporting limit is advisable in all cases. According to Chapter 15 of the Unified Guidance, "in some cases, removal of the older, less reliable data may also resolve multiple detection limit problems. If non-detect values higher than other quantified data at reasonable detection limits are included in a data set (especially if dictated by reporting policy rather than analytical considerations), these will almost invariably need to be removed." According to Section 6.3.3 of the Unified Guidance, techniques which can properly account for multiple RLs should be considered for evaluating censored data. As a result, the EMP should state that a thorough review of data quality be performed prior to conducting a statistical evaluation of outliers.*

Response: The attached updated EMP recommends replacing historical, older non-detect data with non-detect values equal to the current event reporting limit prior to performing statistical analysis, which is the most conservative method to solve issues associated with multiple reporting limits over time. Removing all older

elevated non-detect data would remove large portions of the data set for many wells and parameters. In most cases, these scenarios involve a high percentage of non-detect data, which would default to a non-parametric statistical limit. The reporting limits in these scenarios would have no effect on the statistical limit, because the highest (non-outliers) value would be used to set the statistical limit. In cases where all data are non-detect for a parameter, using the current/lower reporting limit would result in a statistical limit equal to the current reporting limit, so any detection would be an automatic statistical exceedance (very conservative approach).

Omitting non-detects from statistical analysis can bias outcomes and prevent the statistical tests from detecting real differences (thus decreasing the statistical power of the method). As a general rule, non-detects should not be omitted but rather utilized and properly accounted for. The presence of non-detects provides valuable information about an environmental population. Eliminating non-detects can result in inaccurate test outcomes and lead to greatly elevated mean or median concentration estimates and, importantly, underestimated variances (*Groundwater Statistics and Monitoring Compliance*, The Interstate Technology & Regulatory Council, December 2013).

Per Section 15.2 of the *Unified Guidance*: "If the true concentration is completely unknown, but believed to be between zero and the RL, half the RL, or RL/2, may be a reasonable substitution, since this choice is the maximum likelihood estimate [MLE] of the mean or median for a population of measurement values uniformly distributed along the interval [0, RL]. In other cases, a conservative choice might be made to maximize the possible concentration levels present in non-detects by selecting the RL itself as the imputation."

The proposed approach in the updated EMP follows the recommendations of the Unified Guidance and is more conservative than that offered in the ADEM comment letter. In addition, language has been added in Section 4.1 (Background Outliers) to state, "A thorough review of data will be performed, such as review of field forms, laboratory quality assurance/quality control data, and visual outliers (via time series graphs) to assure reliability and validity of the data prior to conducting statistical evaluation of the data."

In addition, the EMP has been updated to reclassify well MW-1R as an upgradient monitoring well. MW-1R has historically been a hydraulically upgradient well since its installation; therefore, it is appropriate to include data from MW-1R in the upgradient pool of background data for statistical evaluations.

If you have any questions or comments, please contact me at steve.jett@jettenviro.com or 314-496-4654.

Sincerely,

Jett Environmental Consulting



Steve Jett, P.G.
Owner

Attachment: *Revised Environmental Monitoring Plan*

cc: *Rachel Kirkman, GFL (PDF via Email)*
 Bob Hayes, GFL (PDF via Email)
 Jonathan Williams, GFL(PDF via Email and 1 Hardcopy)
 Robert Harbin, GFL (PDF via Email)
 Ed Hood, GFL (PDF via Email)
 Robert Heller, HHNT(PDF via Email)

ENVIRONMENTAL MONITORING PLAN

**WCA of Alabama, LLC
Fines Industrial Landfill
13737 Plant Road
Childersburg, Alabama 35044
Talladega County
Permit No. 61-16**

Revised October 2024

Prepared by:



**18 Lexington Oaks Court
Foristell, MO 63348**

**314-496-4654
www.jettenviro.com**

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
2.0	GEOLOGIC CONDITIONS	1
2.1	Physiographic and Topographic Setting.....	1
2.2	Geology.....	1
2.3	Hydrogeology.....	2
3.0	GROUNDWATER MONITORING PLAN	2
3.1	Groundwater Monitoring Well Network	2
3.2	Groundwater Elevation, Gradient, & Direction.....	3
3.3	Potentiometric Surface.....	3
3.4	Sampling Methodology	3
3.5	Static Groundwater Level and Total Well Depth	3
3.6	Monitoring Well Purging and Groundwater Sampling.....	4
3.6.1	Calculation of Purge Volume	5
3.6.2	Monitoring Well Sample Collection	5
3.7	Equipment Cleaning	6
3.8	Sample Handling.....	6
3.9	Sample Documentation and Chain-of-Custody.....	6
3.10	Field Quality Assurance/Quality Control Samples	7
3.10.1	Trip Blanks.....	7
3.10.2	Field Duplicates	7
3.10.3	Field Blanks	7
3.11	Field Activities.....	7
3.12	Field Documentation	8
3.13	Recordkeeping	8
3.14	Laboratory Analysis	9
3.15	Detection Monitoring.....	9
3.16	Assessment Monitoring	10
3.17	Groundwater Reporting.....	10
4.0	STATISTICAL ANALYSIS.....	10
4.1	Background Outliers	11
4.2	Inter-Well Prediction Limits	11
4.3	Intra-Well Confidence Limits	12
5.0	GROUNDWATER MONITORING WELL INSTALLATION.....	12
5.1	Monitoring Well Installation	12
5.2	Boring Logs & Well Completion Diagrams.....	13
5.3	Monitoring Well Development	13
5.4	Monitoring Well Operations & Maintenance Procedures	13
5.5	Monitoring Well Abandonment.....	14
6.0	EXPLOSIVE GAS MONITORING PLAN	14
6.1	Barhole Punch and Methane Monitoring Locations	14
6.2	Barhole Punch Monitoring Procedures	14

6.3	Methane Monitoring Procedure	14
6.4	Structure Monitoring	15
6.5	Quality Assurance and Control Procedures	15
6.6	Evaluating and Reporting of Monitoring Results.....	15
6.7	Reporting	16
7.0	METHANE MONITORING PROBE INSTALLATION	16
7.1	Methane Monitoring Probe Installation.....	16
7.2	Reporting	17
8.0	REFERENCES.....	17

LIST OF TABLES

Table 1	Groundwater Monitoring Well Network
Table 2	Monitoring List of Constituents
Table 3	Laboratory Methods and Information

LIST OF FIGURES

Figure 1	Site Location Map
Figure 2	First Semi-Annual 2024 Event Potentiometric Surface Map with Approved Groundwater Monitoring Locations
Figure 3	Gas Monitoring Location Map

LIST OF APPENDICES

Appendix A	Geologic Cross Sections
Appendix B	Monitoring Well Construction Diagrams and Boring Logs
Appendix C	ADEM Appendix I and Appendix II Parameter Lists
Appendix D	Example Chain of Custody Form
Appendix E	Example Field Information Form
Appendix F	ADEM Groundwater Monitoring and Corrective Action Regulations

1.0 INTRODUCTION

This *Environmental Monitoring Plan* (EMP) was prepared for the WCA of Alabama, LLC (Fines Industrial Landfill), Solid Waste Permit Number 61-16, in general accordance with the Alabama Department of Environmental Management (ADEM) Administrative Code 335-13-4, revised August 2022. The EMP replaces the previous *Groundwater Monitoring Plan* by Highland Technical Services, Inc. (Highland), dated January 28, 2021. The enclosed EMP is intended to supersede all previous EMP/GMP versions.

This EMP has been written in accordance with groundwater monitoring requirements of ADEM Administrative Code 335-13-4-.14(1)(c) and 335-13-4-.27 and the explosive gas monitoring requirements of 335-13-4-.16. The purpose of this revised EMP is to provide information and procedures or techniques for the following:

- Maintaining the groundwater monitoring well network;
- Potentiometric surface maps with determination of groundwater flow directions;
- Groundwater sampling methodology, including purging, sample collection, preservation and shipment, and chain-of-custody control;
- Groundwater laboratory analytical procedures including quality assurance and quality control;
- Groundwater statistical analysis and reporting; and,
- Explosive gas monitoring and reporting.

The Fines Industrial Landfill is used for the disposal of nonhazardous industrial wastes, construction and demolition wastes, asbestos, automobile shredder dirt and fluff, and tires. The current permitted area is approximately 104.88 acres with approximately 57.95 acres permitted for disposal operations. The Fines Industrial Landfill has a two-foot clay liner and a leachate collection system. According to the *Hydrogeologic Evaluation* prepared by Highland, dated September 18, 2007, the site first accepted waste in June 2001. Waste placement began in Cell 1 and has continued sequentially through the subsequent cells. The site is permitted to accept several types of waste including non-hazardous industrial waste, construction and demolition waste, asbestos, automobile shredder dirt and fluff, and tires.

2.0 GEOLOGIC CONDITIONS

2.1 Physiographic and Topographic Setting

The Fines Industrial Landfill property is located at 13737 Plant Road in Childersburg, Talladega County, Alabama (see **Figure 1**). The landfill is located predominantly in the Southeast $\frac{1}{4}$ of Section 21, Township 19 South, Range 3 East and situated at approximately Latitude $33^{\circ} 21' 42''$ and Longitude $86^{\circ} 19' 46''$ (Highland, 2007).

According to the *Groundwater Monitoring Plan* (Highland, 2021), the site is located in the Coosa Valley District of the Alabama Valley and Ridge Physiographic Province. The Coosa Valley District extends from the Coosa Ridge District in the west to the Weisner Ridge and Piedmont Upland Districts in the east. Surface elevations range from 400 to 500 feet mean sea level (fmsl) in the Coosa Valley west of the Coosa River. Surface elevations east of the Coosa River range from approximately 500 feet to over 1,500 fmsl.

2.2 Geology

According to geologic information published by the Geological Survey of Alabama (1998), the subject property is underlain by the Knox Group Undifferentiated of Cambrian-Ordovician Age. The Knox Group typically consists of light gray to light-brown locally sandy dolomite, dolomitic limestone, and limestone characterized by abundant light-colored chert.

Based on information presented in the *Hydrogeologic Evaluation* (Highland, 2007), the bedrock that underlies the facility is part of the undifferentiated Knox Group of Upper Cambrian- to Lower Ordovician-aged dolomite, limestone, and cherty shale. These rocks generally weather to silty to sandy clay with chert cobbles and boulders. Soil overburden thickness ranges from approximately 40 to 117 feet. Geologic cross sections from the *Hydrogeologic Evaluation* (Highland, 2007) are included in **Appendix A**.

2.3 Hydrogeology

According to the *Hydrogeologic Evaluation* (Highland, 2007), groundwater in the Valley and Ridge physiographic province can occur as laterally discontinuous, transient water within the vadose zone of overburden soils (i.e., alluvium, colluvium and/or residuum), as an unconfined regional aquifer within residual soils, and as a series of confined to semi-confined, deeper aquifer systems that variably occur within solution-enlarged cavities in bedrock, transitionally-weathered bedrock, and overlying residual soils near the top of bedrock. Sometimes perched conditions can occur within saturated soils associated with laterally and vertically discontinuous sand and gravel lenses that have relatively higher porosity and permeability relative to the surrounding clay matrix. Water can accumulate in these discreet zones quickly as a result of precipitation but also drain quickly, lending to the temporally transient nature of water in the vadose zone.

The uppermost aquifer at the site occurs within the residual soils and shallow bedrock and is generally unconfined. Well construction details for active compliance monitoring wells including screened lithology are provided on **Table 1**. Recharge primarily occurs through precipitation and subsequent infiltration. Generally, groundwater flow takes place through intergranular pore spaces in the overburden and is controlled by topography and top of rock variations (Highland, 2007).

Although the bedrock is generally impermeable, transitional weathering above and within the upper portions of bedrock provides storage and sufficient secondary permeability and porosity for groundwater to readily flow through this media when voids or fractures are present. The hydraulic conductivity is on the order of 2.72×10^{-4} centimeters per second (cm/sec) or 281 feet per year (ft/yr) with the estimated effective porosity of 25 percent. Surface water drainage from the Coosa Valley district is primarily towards the Coosa River.

According to the *Geohydrology and Susceptibility of Major Aquifers to Surface Contamination in Alabama; Area 4*, prepared by the U. S. Geological Survey (USGS), dated February 21, 2005, the site is located within the recharge area for the Knox-Shady Aquifer. The City of Childersburg is included in the ADEM Wellhead Protection Program.

Surface water from the property generally flows west from higher topographic elevations to an unnamed tributary of the Coosa River located approximately 590 feet west-southwest of the landfill. This unnamed tributary discharges to the Coosa River which is located approximately 1,700 feet west-southwest of the landfill (Highland, 2021).

3.0 GROUNDWATER MONITORING PLAN

This section has been written in accordance with groundwater monitoring requirements of ADEM Administrative Code 335-13-4-.14(1) and 335-13-4-.27.

3.1 Groundwater Monitoring Well Network

Six wells are monitored at the site, consisting of two upgradient wells (MW-1R and MW-2) and four downgradient wells (MW-4, MW-6, MW-7, and MW-8). Monitoring wells MW-2 and MW-4 were initially sampled in 1999, whereas monitoring wells MW-1R, MW-6, MW-7, and MW-8 were initially sampled in 2020.

Monitoring well construction details are described in **Table 1**. Available copies of the well construction diagrams and borehole logs are included in **Appendix B** of this EMP for reference. If new monitoring wells are installed on site, they will be constructed in accordance with ADEM Rule 335-13-4-.27(2)(c)(2), as described in **Section 5.1**.

Wells recommended for monitoring have yielded sufficient groundwater volume to allow for laboratory analysis of the full suite of ADEM Rule 335-13-4: *Appendix I Constituents for Detection Monitoring*, described in **Section 3.15**.

Compliance wells MW-1, MW-3, and MW-5 were abandoned in May 2020 in accordance with the *Monitoring Well Abandonment and Installation Plan* prepared by Highland, dated January 15, 2020. Additionally, compliance well MW-1R was installed in May 2020 as a replacement for well MW-1. These activities were presented to the ADEM in a *Monitoring Well Abandonment & Installation Report* prepared by Highland, dated August 6, 2020.

3.2 Groundwater Elevation, Gradient, & Direction

Water levels will be measured in monitoring wells during each sampling event. Groundwater elevations in wells will be measured within a 24-hour period to avoid temporal variations in groundwater flow. A potentiometric surface map will be included with each semi-annual groundwater monitoring report that is submitted to document the groundwater flow direction and gradient.

3.3 Potentiometric Surface

Monitoring wells installed at the facility allow for the development of groundwater potentiometric surface maps. Water level data from the most recent annual sampling event (First Semi-Annual 2024) were utilized to develop a potentiometric surface map, which is shown in **Figure 2**. Groundwater flow direction is to the west towards the Coosa River, consistent with past events.

3.4 Sampling Methodology

The following guidelines describe groundwater sample collection, handling, and reporting procedures. The facility or its designated consultant will follow these guidelines during sample collection. The intent of these guidelines is to provide procedures designed to yield representative and comparable analytical data from each monitoring well, during each sampling event. The three steps for collection of groundwater samples from the site monitoring wells are:

- Measuring static groundwater levels
- Evacuating or purging well casings
- Collecting and preserving samples.

3.5 Static Groundwater Level and Total Well Depth

Data to establish the static elevations of groundwater will be collected prior to purging and/or sampling any monitoring wells. Data will include both depths to static groundwater levels and total well depths (periodic) as measured from a marked reference point on the top of the inner casing during each sampling event. Measurements will be made to an accuracy of 0.01 foot. For wells with dedicated sampling equipment installed, the borehole logs will provide total depths whenever a dedicated device makes total depth measurements impossible. The parts of water level measuring devices coming in contact with groundwater will be thoroughly washed with a non-phosphate detergent and rinsed with deionized water immediately after each use to avoid cross-contamination of wells. Groundwater elevations will be obtained by subtracting the measured depth to groundwater from the surveyed top of PVC inner casing elevation at each well.

3.6 Monitoring Well Purging and Groundwater Sampling

Purging wells prior to sample collection is necessary to remove stagnant water that may not be representative of the groundwater. Purging will be performed at a rate as close as possible to the recharge/recovery rate of the well.

One purging option is low-flow purging. Low-flow purging is a purging method that is widely used, and is an option for wells with dedicated pumps. This method involves using a pump (set at the level of the well screen) capable of low pumping rates (approximately one liter per minute or less). Field water quality parameters including pH, specific conductance, turbidity, temperature, dissolved oxygen, and oxidation reduction potential will be monitored/recorded while purging until equilibrium is achieved for the following parameters for at least three consecutive measurements based on United States Environmental Protection Agency (USEPA) Groundwater Sampling Guidance (2013):

- pH: $\pm 5\%$ or ± 0.1 SU, whichever is greater
- Specific Conductance: $\pm 5\%$
- Dissolved Oxygen (DO): 0.2 milligrams per liter (mg/L) or 10%, whichever is greater.

Oxidation reduction potential (ORP) should be measured but should not be used as a stabilization parameter; ranges should ideally fall within ± 10 millivolts. The optimal turbidity range for low-flow purging is 10 Nephelometric Turbidity Units (NTU) or less.

Field parameter measurements will be recorded on a portion of the sample that was placed in a separate field container, unless low-flow sampling is utilized via flow cell where measurements may occur directly within the flow cell (note that turbidity measurements should be collected outside of the flow cell). This procedure avoids cross contamination from field instrument probes. Certain allowances may need to be made regarding the definition of equilibrium depending on aquifer characteristics at specific locations. If dedicated or disposable purging equipment is not used, equipment will be properly cleaned (see **Section 3.7**). One of the major advantages of low-flow purging is the ability to achieve lower turbidity conditions during sampling which provide a more representative sample.

Where low-flow purging is impractical, three borehole volumes (See **Section 3.6.1**) will be purged, if possible. If a well purges dry prior to equilibrium, the well will be evacuated to the lowest reasonable level, allowed to recover, and then sampled. If bailed, new bailer and rope will be used for each well to prevent cross contamination of the wells.

When pumping devices are used to purge wells, low-flow purging techniques will be used, if possible. Pump discharge rates will be regulated or controlled to prevent turbulent flow, prevent damage to monitoring well components, and minimize the risk of introducing sediments into the monitoring well. For wells purged with pumps, purging will occur as follows:

1. Set up equipment and begin pumping at a rate of one liter per minute or less.
2. Record water quality parameters on a regular basis.
3. Note approximate pumping rate and total volume of water removed.
4. Continue pumping until the field parameters have stabilized.

Submersible pumps may still be used to perform purging if low-flow purging is not feasible. Generally, low-flow purging is not feasible when the low-flow rates cannot be established due to limitations with the pump or amount of water present. Many pumps are incapable of running at low-flow rates without damaging the pump or heating the sample. This necessitates the need for a higher flow rate that, by definition, is not low-flow purging. The purging method is similar to that described above in steps 1 through 4. The difference centers on establishing a flow rate (step 1). The flow rate will be higher and a minimum of three well volumes will be removed or pumping will continue until the well runs dry, whichever occurs first. Steps 2 through 4 are the same as previously described.

Both purging and sampling may be accomplished by utilizing dedicated bladder pumps. The bottoms of the pumps are placed approximately five feet from the bottom of the well. At each well, the pump will be activated and timing and pressure adjusted until the water level stabilizes. After the water level stabilizes and at least one equipment volume has cleared the flow cell, field parameters will be measured. Purging will continue until three consecutive measurements of these parameters, measured at appropriate intervals, are stable as defined by accepted low-flow purging guidelines detailed above. The purge water should be captured in five-gallon buckets to quantify the purge volumes. Samples should be collected immediately following parameter stabilization using the dedicated bladder pump after disconnecting the flow cell. Samples should not be collected via the flow cell.

The evacuated water from monitoring wells will be released no closer than ten feet from base of monitoring well on a downgradient slope unless field characteristics warrant otherwise.

3.6.1 Calculation of Purge Volume

Three borehole volumes will be purged in monitoring wells that do not utilize the low-flow purging method. A borehole volume is the water present in the well casing plus the water present in the pore space of the gravel pack surrounding the well casing. If the well is purged dry before the required minimum of three borehole volumes are evacuated, it shall be noted on the field forms. The calculation below will be used to determine the borehole volume.

$$\text{Casing Volume (gallons)} = (\pi \times rc^2 \times h_1) \times 7.48$$

where:

$$\pi = 3.14159$$

rc = radius of the inner casing (in feet)

h₁ = height of the water column in the well (feet)

7.48 = gallon/ft

(Height of the water column equals well depth minus initial water level)

$$\text{Filter Pack Volume(gallons)} = \{\pi \times (rb^2 - rc^2) \times h_2 \times 7.48\} \times 0.30$$

where:

rb = radius of borehole (in feet)

rc₂ = radius of the outer casing (in feet)

h₂ = height of saturated portion of filter pack (in feet)

7.48 = gallon/ft³

0.30 = is the porosity of the sand pack

3.6.2 Monitoring Well Sample Collection

Groundwater monitoring wells may be sampled as soon as they have recharged sufficiently and no later than 24 hours following completion of purging. Any observations such as unusual monitoring well recharge rates, equipment malfunction(s), and/or possible sample contamination sources need to be recorded if observed.

Prior to sample collection, field sampling staff will don new, single-use, non-powdered nitrile gloves. Gloves will be changed as often as deemed necessary to prevent contamination of the samples. A new piece of plastic should be placed on the ground to provide a clean work area.

The samples are poured into the bottles and are filled to the top without headspace. It is not good practice to leave samples in the sun; rather they should be removed to the ice chest as soon as possible.

Groundwater samples should be tested in the field for dissolved oxygen, oxidation-reduction potential, pH, specific conductance, temperature, and turbidity: DO and ORP should also be measured for wells that purged via low-flow sampling procedures. During Detection Monitoring, the Groundwater Monitoring Well Network (**Table 1**) will be analyzed in the laboratory for the inorganic and organic constituents contained in ADEM Rule 335-13-4: *Appendix I Constituents for Detection Monitoring*. Groundwater samples will not be field-filtered prior to laboratory analysis. **Table 2** provides a summary of the constituents listed above. A list of analytical methods, preservation methods, and holding times is presented in **Table 3**. The complete list of ADEM Appendix I and Appendix II parameters are included as **Appendix C** of this EMP.

Sample bottles should be filled in the following order:

- Metals
- Preserved inorganics
- Non-preserved inorganics
- Appendix II organic parameters (as required)
 - Chlorinated hydrocarbons
 - Polynuclear aromatic hydrocarbons
 - Pesticides
 - Herbicides
- Volatile organic compounds (VOCs)
- Wet chemistry (as required).

3.7 Equipment Cleaning

If used, non-dedicated purging and sampling equipment, including bailers, pumps, and water level indicators will be cleaned between wells. This does not apply to disposable equipment. A wash with a non-phosphate detergent and a thorough rinse, both inside and out, with deionized or distilled water is the minimum acceptable cleaning method.

3.8 Sample Handling

Sample handling and preservation techniques will depend on the analytical parameters. Sample bottles will be supplied by the laboratory in the correct sizes, quantity, and with any applicable preservative. Groundwater samples will be collected, preserved, and containerized in accordance with **Section 3.6.2**. The purpose of sample preservation is to stabilize parameters of interest by retarding chemical or biological changes. Samples should be placed on ice when collected and proper preservation will help ensure that samples are representative of groundwater.

3.9 Sample Documentation and Chain-of-Custody

The following documentation will accompany samples to the laboratory:

- Chain-of-Custody (COC) records - these records document in a legally defensible manner the history of collection, transfer, and transport of each sample. The COC record facilitates tracing the possession and handling of each sample from the time of field collection through laboratory analysis. Each individual responsible for the samples from the time of collection to the time they are received by the laboratory will be consecutively documented on the COC record. Each sample shipped, including trip blanks and other QA/QC samples, will be identified on the COC. An example COC form is available in **Appendix D**.
- Sample labels - identify samples in a unique manner. Sample labels should include name of the site, name of sampler (initials are sufficient), well designation, date and time of sample collection, any added preservatives, and analysis requested.

If shipped, a seal will be placed on the sample coolers prior to transport to ensure that containers are not opened or otherwise compromised prior to their receipt at the analytical laboratory. In addition, the field logbooks or field forms will be completed to document information about each sample collected from each monitoring point in the groundwater monitoring program.

3.10 Field Quality Assurance/Quality Control Samples

Field quality assurance/quality control (QA/QC) samples will be collected as part of the Fines Industrial Landfill groundwater sampling program. Quality assurance addresses the accuracy and repeatability of analytical results. Quality assurance is accomplished by incorporating a field duplicate sample into the analytical program. Quality control addresses preserving the integrity of samples in the field and shipping phases of collection. Quality control is accomplished by incorporating trip blanks, field blanks, and field duplicates into the analytical program.

3.10.1 Trip Blanks

A trip blank consists of deionized water placed in appropriate sample containers by the analytical laboratory and included in the shipping container with the other (empty) sample containers prior to shipment. The trip blank sample accompanies site groundwater samples sent back to the laboratory. When analyzing groundwater samples for VOCs, preparing and analyzing a trip blank for VOCs will assess the potential influences of transport-induced contamination of the samples, and can also be used to assess potential laboratory contamination. A minimum of one trip blank will be collected and analyzed for VOCs per sampling event.

3.10.2 Field Duplicates

Field duplicate samples are an extra set of samples collected from a certain monitoring point. This set of samples is independent of the primary sample set but collected as close as possible to the primary set in both location and time. Field duplicates provide an indication of the variability in analytical results associated with sampling and laboratory procedures. Given the significant amount of historical data available for this facility, field duplicates are not required. If used, a minimum of one field duplicate will be collected per event and will include the same parameter list as the monitoring well that is being duplicated.

3.10.3 Field Blanks

Field blanks consist of deionized water poured into sample containers at the site during the sampling event and under the same environmental conditions as the monitoring well samples. Such blanks can detect site conditions that may bias the sample suite. When groundwater samples are being analyzed for VOCs, a minimum of one field blank per sampling event will be prepared and analyzed to assess the potential influences of ambient air on sample quality.

3.11 Field Activities

Field activities will be conducted in a manner consistent with safe and proper work practices. Quality control checks will be incorporated into the sampling and analysis program. Quality control checks will be accomplished by ensuring that proper field calibration, sampling, transporting, analytical, and documentation procedures are followed. Equipment and instruments used in the field will be calibrated according to manufacturer specifications.

Each laboratory will have standard operating procedures and maintain full documentation of analytical work. Groundwater monitoring results will be submitted to the appropriate party performing the groundwater reporting. If statistical analyses are performed, groundwater monitoring results will be submitted via electronic data delivery (EDD) techniques to the appropriate party performing statistical analysis.

The following are the details for sample collection:

- As outlined in **Section 3.6.2**, groundwater samples are to be collected on a semi-annual basis (typically March/September) for purposes of detection monitoring.
- The site monitoring network is currently comprised of six monitoring wells (MW-1R, MW-2, MW-4, MW-6, MW-7, and MW-8), which are to be sampled during each semi-annual event (See **Table 1**).

3.12 Field Documentation

Field documentation will be maintained on a continuing basis for this project. Either field logbooks or field forms will include field observations, developing, purging, and well sampling details. Additionally, field documentation will contain the following information:

- Landfill name
- Site well designation
- Sample collector's name and affiliation (e.g., landfill, lab, or contract personnel)
- Weather conditions (e.g., rain, snow, fog, etc.) that could affect sample
- General condition of well and wellhead (note damage or suspected tampering)
- Static (pre-purge) depth to water
- Total depth (or depth to dedicated pump) from top of inner casing (if checked)
- Wetted casing volume
- Total volume evacuated
- Water level evacuation, to the nearest 0.01 foot
- Method of evacuation (type of bailer, pump, etc.)
- Any indication of redevelopment required
- Starting and ending times for well purging
- Field water quality measurements and approximate purge rate
- Sample collection date and time
- Calibration records for field instruments
- Any additional notes or comments pertinent to the sampling process.

An example field information form is available in **Appendix E**.

3.13 Recordkeeping

Records will be kept at the following:

Fines Industrial Landfill
13737 Plant Road
Childersburg, Alabama 35044

The records of the analyses and evaluations from the detection, assessment, and/or corrective action monitoring programs will be maintained throughout the active life of the facility, and throughout the post-closure care period as well.

3.14 Laboratory Analysis

The laboratory must have the ability to produce reliable quantitative results in accordance with established protocol. Adequate levels of accuracy, precision, and completeness must be maintained with a comprehensive laboratory QA/QC program. The laboratory's Quality Assurance Plan (QAP) will cover such laboratory functions as data acquisition, review and reporting, and establishes QA objectives and mechanisms by which these objectives are measured, documented, and reported.

All analytical reports will be complete with analytical data, sample ID, sample source, date sampled, date received, parameters tested, results, date extracted (if applicable) and analyzed, analyst, referenced methodologies, QC data such as percent recovery of matrix spikes and duplicate results, field logs, analysis request forms, and chain-of-custody forms. Signed copies of the monitoring results are required.

For each constituent, the practical quantitation limits utilized by the laboratory will be at or below the maximum contaminant level (MCL), site-specific Groundwater Protection Standards (GWPSs), or ADEM established GWPSs. Upon receipt of the laboratory analytical report, the data will be reviewed to determine if the analytical results are valid. Included on **Table 3** are the analytical methods currently being utilized at the site along with the preservation methods and respective holding times.

3.15 Detection Monitoring

In accordance with ADEM Regulation 335-13-4-.27(3), Detection Monitoring will occur at the facility semi-annually, typically during March and September. Detection monitoring will occur during the active life of the facility and also during the post-closure care period.

Regulations for initiating a response in the occurrence of a statistically significant increase (SSI) are established in ADEM Regulation 335-13-4-.27(3)(c). These regulations will be followed such that, if the Fines Industrial Landfill or its designated consultant determines that there is a confirmed SSI over background for one or more of the constituents listed in Appendix I, the owner or operator:

- Must, within 14 days of this finding, place a notice in the operating record, and submit a copy of this notice to the Department, indicating which constituents have shown statistically significant changes from background levels, and notify the Department that this notice was placed in the operating record; and
- Must establish an assessment monitoring program meeting the requirements of subparagraphs (4)(a) through (j) of this rule within 90 days except as provided for under subparagraph (2)(c)3. of this rule.
- May demonstrate that a source other than a LF unit caused the contamination or that the SSI resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.
 - A report documenting this demonstration must be certified by a qualified groundwater scientist, approved by the Department and be placed in the operating record.
 - If a successful demonstration is made and documented, the owner or operator may continue detection monitoring as specified in this rule. If, after 90 days, a successful demonstration is not made, the owner or operator must initiate an assessment monitoring program as required in subparagraphs (4)(a) through (j) of this rule.

ADEM Regulation 335-13-4-.27(3) is presented for reference in **Appendix F**.

3.16 Assessment Monitoring

In accordance with ADEM Regulation 335-13-4-.27(4), Assessment Monitoring is required whenever an SSI over background has been detected for one or more of the constituents listed in Appendix I or in the alternative list approved in accordance with subparagraph (3)(a) of this rule.

Per ADEM Regulation 335-13-4-.27(4)(b)2, a subset of wells and/or constituents may be considered for an Assessment Monitoring Program.

ADEM Regulation 335-13-4-.27(4) is presented for reference in **Appendix F**.

3.17 Groundwater Reporting

Within 30 days after receiving the analytical report(s), it should be determined whether there has been an SSI over background at each well. Statistical analysis should be conducted in accordance with **Section 4.0**. Within 90 days of sampling, the semi-annual reports will be submitted to ADEM. Semi-annual reports should include field reports, analytical reports, results of statistical analysis of the groundwater data, groundwater flow rates, a water table elevation contour map which includes flow directions and recommendations based on the results of the groundwater monitoring. The groundwater monitoring report will be presented in general accordance with Section 2.0 of the *Alabama Groundwater Monitoring Reporting Guidance for Solid Waste Facilities* (ADEM, 2011) and will include the following information:

1. Summary of the groundwater sampling activities
2. Description of groundwater quality
3. Laboratory analytical report
4. Copy of field notes and field data sheets
5. COC form(s)
6. Potentiometric surface map
7. Groundwater flow rate and direction
8. Documentation that the report is approved by a qualified groundwater scientist
9. Statistical evaluation
10. Any deviations from the EMP during the sampling event and reasons for the change.

4.0 STATISTICAL ANALYSIS

To determine whether the groundwater is receiving contamination from the site, it is necessary to compare the lab results from each semi-annual event to the background lab results. Statistical analysis of the groundwater data commences after the completion of background sampling events and after each subsequent semi-annual event. Statistical analysis will be performed in accordance with ADEM Rule 335-13-4-.27(2). Several inherent variabilities can affect the laboratory results and these inherent variabilities should be considered:

- The sampling technique will vary somewhat from event to event even under ideal conditions.
- The aquifer will contain a certain quantity of naturally occurring elements and spatial geochemical variability.
- The laboratory tests/detection limits can vary slightly.
- Seasonal variations can result in slightly different chemical constituents in the water samples.
- Turbidity of the sample can affect the results.

Within 30 days after receiving the analytical report(s), it will be determined whether there has been an SSI over background at each well. If it is determined that there is an SSI over background concentrations ADEM will be notified within 14 days of the finding and a copy of the notification should be placed in the operating record. A demonstration may be made that a source other than the landfill caused the detects or that the SSI resulted from natural variation in groundwater quality or from an error in sampling, analysis or statistical evaluation. This demonstration will be certified by a qualified groundwater scientist and will be submitted to ADEM. If the demonstration has not been made within 90 days, an assessment monitoring program that conforms with ADEM Rule 335-13-4-.27(4) should be initiated.

4.1 Background Outliers

The background data will be evaluated for the presence of statistical outliers. Methodologies for determining a statistical outlier are defined in the USEPA "*Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance*" (March 2009). Any statistical outliers that are determined will be removed from the background data set prior to performing inter-well prediction interval statistical analysis.

For inter-well analysis, the background data through the current event at monitoring wells MW-1R and MW-2 will be evaluated for the presence of statistical outliers. Data will be evaluated for outliers via two steps.

- First step: running Rosner's Outlier Screening for the MW-1R and MW-2 parameters that were normally distributed.
- Second step: running Tukey's Outlier Screening for the MW-1R and MW-2 parameters that were not normally distributed. Also, if a parameter could not be evaluated with the Rosner's method (i.e., too many values), then Tukey's method will be utilized.

Due to the wide range of laboratory reporting limits utilized over time, the historical reporting limits will be replaced with the current reporting limit prior to performing the outlier evaluation. . It should be noted, several parameters exhibited elevated concentrations at MW-2 during the September 2007 event; therefore, all data from September 2007 will be excluded (i.e., considered outliers) for the statistical evaluation. A thorough review of data will be performed, such as review of field forms, laboratory quality assurance/quality control data, and visual outliers (via time series graphs) to assure reliability and validity of the data prior to conducting statistical evaluation of the data.

4.2 Inter-Well Prediction Limits

The prediction interval is a statistical method used to compare a single observation to a group of observations. The prediction interval is calculated to include observations from the same population with a specified confidence. In groundwater monitoring, a prediction interval approach may be used to make comparisons between background and compliance data. The interval is developed to contain all future observations, within a certain probability. For the site, inter-well prediction intervals will be developed based on a 99% confidence that future observations will fall within the range. If any future observation exceeds the prediction interval, this is considered statistically significant evidence that the observation is not representative of the background group. Prediction intervals are calculated assuming that 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. The number of comparison observations, K , is defined to be included in the interval. If less than 15% of the background observations are nondetects, the nondetects are replaced with one half of the reporting limit prior to performing the analysis. If more than 15% but less than 50% of the background data are below the reporting limit, the data's sample mean and standard deviation are adjusted according to the Kaplan-Meier method. However, when the background data are not transformed-normal or contain greater than 50% observations below the reporting limit, *Sanitas*TM automatically constructs a nonparametric prediction interval. During nonparametric analysis, the highest value from the background data is used to set the upper limit of the prediction interval.

Due to the wide range of laboratory reporting limits utilized over time, the historical reporting limits will be replaced with the current reporting limit prior to performing the inter-well prediction limit evaluation.

Under the USEPA *Unified Guidance*, prediction limits directly incorporate verification sampling through the use of retesting schemes. As described in Section 19.1 of the USEPA *Unified Guidance*, a retesting scheme involves collecting a minimum of one new sample at each well that exhibits an exceedance above the statistical limit (i.e., a potential, unconfirmed SSI). A retesting scheme is generally expressed in the form of 1-of-m, where m is the total number of samples that must exhibit an exceedance in order to confirm the SSI.

The site's detection monitoring program will utilize a 1-of-2 retesting scheme. Following the collection of an initial sample from a detection monitoring well during a semi-annual sampling event, the concentration (or value) of each detection monitoring constituent will be compared to its respective statistical limit. If the concentration (or value) does not exceed the limit, no verification sampling will be necessary. If the concentration (or value) exceeds the limit, this represents a potential, unconfirmed SSI, and a verification sample may be necessary.

If both the initial sample and verification sample exhibit a concentration (or value) that exceeds the statistical limit, this represents a confirmed SSI. The response to a confirmed SSI is described in **Section 4.0**.

4.3 Intra-Well Confidence Limits

The following text outlines the procedures that will be used to statistically compare concentrations to GWPSs to determine if the groundwater concentrations exhibit a statistically significant level (SSL) above a GWPS.

Per the USEPA *Unified Guidance*, an intra-well Confidence Interval is constructed from sample data and is designed to contain the mean concentration of a well analyte in groundwater monitoring, with a designated level of confidence. A confidence interval generally is used when samples are being compared to a GWPS, which is typically the MCL or alternate limit.

A lower confidence interval analysis will be used to statistically compare to GWPSs. The method constructs a normal confidence interval on the mean concentration of a constituent incorporating, at a minimum, the four most recent measurements. For the site, at least the most recent eight semi-annual events will be utilized for constructing the confidence interval. The lower confidence interval on the mean will be compared to the GWPS to determine whether the mean concentration exceeded its GWPS. If the lower confidence interval on the mean exceeds the GWPS then there is statistically significant evidence that the mean concentration of that constituent exceeds the GWPS.

The distribution of the data is evaluated by applying the Shapiro-Wilk or Shapiro-Francis test for normality to the raw data or, when applicable, transformed data. If less than 15 percent of the observations are non-detects, the non-detects will be replaced with the reporting limit prior to performing the normality test and constructing the confidence limit.

5.0 GROUNDWATER MONITORING WELL INSTALLATION

5.1 Monitoring Well Installation

In accordance with ADEM Rule 335-13-4-.27(2)(a), groundwater monitoring wells should be designed to yield groundwater samples from the first saturated zone. The groundwater monitoring network should contain at least one well that represents the quality of background groundwater that has not been affected by the landfill (i.e., hydraulically upgradient with respect to the waste unit) and the monitoring network should be sufficient to represent the quality of groundwater passing the relevant point of compliance and detect a potential release from the waste unit.

Prior to installation of any groundwater monitoring well and in accordance with ADEM Rule 335-13-4-.27(2)(c)(2), ADEM will be contacted to determine if any additional information not covered in this EMP is required regarding well installation, design, construction, etc. If ADEM requires additional information, it will be provided for their approval prior to any well installation.

Groundwater monitoring wells will be constructed in accordance with "Design and Installation of Groundwater Monitoring Wells in Aquifers," American Society for Testing and Materials (ASTM) Subcommittee D18.21 on Groundwater Monitoring. A geologist who is registered in the state of Alabama will oversee the groundwater monitoring well installation and a drilling contractor will perform the installation. ASTM, National Science Foundation (NSF) rated, Schedule 40, 2-inch PVC with flush threaded connections will be used for the casing and well screens. The borehole diameter will be 6-inches or larger. The bottom 10 feet of the well will consist of a manufactured well screen with 0.010-inch slots. The top of the screened interval of each well will be placed approximately 2 feet below the stabilized water table at the time of drilling to account for a potential drop in the potentiometric surface.

The borehole annulus around the outside of the well screen to two feet above the top of the screen interval should be filled with washed filter-sand. A minimum two feet thick bentonite seal will immediately overlie the filter pack. A cement/bentonite mixture should be used as the annular sealant above the bentonite seal and below the frost line.

A 3-foot x 3-foot concrete pad should be constructed at the ground surface for each well. A cap with dedicated pump assembly or protective PVC will be placed on each well and a lockable steel cover will be placed over each well. Permanent well labels should be placed on the outside of the steel cover. A vent hole will be installed in the top of the PVC casing and will serve as an avenue for escape of gas. A weep hole will also be installed at the base of the metal casing and will provide an avenue for drainage of moisture from the casing. Wells that are subject to traffic will have four bollards placed around them.

5.2 Boring Logs & Well Completion Diagrams

Within 60 days of well installation, development and survey completion, a report documenting the well installation including boring logs, well diagrams and field procedures, will be submitted to ADEM. **Appendix B** contains a copy of the available geologic boring logs and well completion diagrams for the existing monitoring well network.

5.3 Monitoring Well Development

Well development will be performed on each newly installed well and any existing well when necessary. A minimum of two hours of development will be performed for each new well. Wells will be developed by first surging the well by lowering a surge block and surging the entire length of the well screen for several minutes to remove the fines from the well screen pack. Upon completion of surging, the well will be either bailed by hand or pumped out with a submersible pump. This cycle will be performed until the water is visually clear. If a well that already exists accumulates enough sediment to cause the well to become inappropriately turbid, then the well will be re-developed. The well will be re-developed by either bailing or pumping with a submersible pump until the water is visually clear and a sufficient quantity of sediment is removed from the well.

5.4 Monitoring Well Operations & Maintenance Procedures

To ensure that the monitoring wells perform to design specifications throughout the life of the monitoring program, monitoring wells will be inspected during each sampling event. During routine semi-annual groundwater monitoring, each well will be inspected to assure properly functioning dedicated purging/sampling equipment exists where applicable. Each well will also be visually inspected to assure that access is readily available and that the well can produce representative groundwater samples. The sampling team should inspect the well and note the condition of the well pad, casing, protective casing, and

security locks. If a well is determined not to be operating properly or needs repair, appropriate measures will be taken prior to the next regularly scheduled sampling event.

5.5 Monitoring Well Abandonment

If it is determined that monitoring well abandonment is necessary, the site will notify the ADEM prior to decommissioning the well(s).

Monitoring wells that require abandonment are generally decommissioned one of two ways. First the surface completion will be removed and an attempt will be made to pull the PVC casing from the well. If the PVC casing can be successfully removed, then the open boring will be grouted to approximately 1 foot below ground surface and capped off with surficial soils and/or bentonite chips. If the PVC cannot be removed or breaks off during removal then the well will be overdrilled to the total depth, then it will be grouted to 1 foot below ground surface and capped off with surficial soils and/or bentonite chips. A record of final well abandoning procedures will be submitted to the ADEM following abandonment activities.

6.0 EXPLOSIVE GAS MONITORING PLAN

Explosive gas monitoring will be conducted on an annual basis, typically in March, during the active life of the site and during the post closure care period. Barhole punches and methane monitoring locations will be used to measure explosive gas at the facility.

6.1 Barhole Punch and Methane Monitoring Locations

The location of barhole punches and methane monitoring locations are shown on **Figure 3** and are discussed below:

- 51 Barhole Punches (GP-1 through GP-51)
- Headspace of three monitoring wells (MW-1R, MW-2, and MW-4)
- Three on-site buildings (Garage, Scale House, and Maintenance Building).

6.2 Barhole Punch Monitoring Procedures

Barhole punches will be used to measure explosive gas at the facility. A new barhole punch will be punched during each event at the approved location. Screening at each location will consist of initially forming a small hole (1" diameter and a minimum of 4 feet into the soil) using a barhole punch. At most locations, this hole should remain open for sufficient time to allow for collection and measurement of gases within the soil. If the hole tends to collapse, the facility will consider installing soil gas sampling points in these locations. The hole will be sealed at ground surface for 30 to 60 minutes until tested. The hole will not be vented prior to sampling.

Between 30 and 60 minutes after punching the hole, an air sample from the hole will be withdrawn and analyzed with a combustible gas indicator. The combustible gas indicator should provide direct readings for methane concentrations [0-100% methane and 0-100% of the lower explosive limit (LEL)]. Percent methane by volume, percent LEL, and percent oxygen will be recorded on field forms. Other pertinent data such as ambient air temperatures and weather conditions should also be recorded. If an initial reading yields an exceedance, the hole will be sealed at ground surface again for 30 to 60 minutes and retested. Both the initial test and the retest should be reported.

6.3 Methane Monitoring Procedure

Three monitoring wells (MW-1R, MW-2, and MW-4) will also be used to measure explosive gas at the facility. Immediately after approaching the monitoring well and opening the casing, an air sample from the

well casing will be withdrawn and analyzed with a combustible gas indicator. The wells will not be allowed to vent for any period of time prior to methane monitoring. To prevent ambient air intrusion into the well/barhole punch and the potential loss of accumulated gas, either the top of the well should be sealed off during methane sampling or a quick connect attached to the well cap should be utilized. The combustible gas indicator must provide direct readings of methane concentrations (0-100% methane by volume) in order to record methane concentrations greater than 100% of the LEL. The combustible gas indicator must also be capable of providing accurate methane readings in an oxygen deficient environment and must provide oxygen readings.

Percent methane by volume, percent LEL, and percent oxygen will be recorded on field forms. The peak reading for methane should be recorded. Other pertinent data such as ambient air temperatures and weather conditions should also be recorded.

If an initial reading yields an exceedance, a retest will be performed. Both the initial test and the retest should be reported.

6.4 Structure Monitoring

Each explosive gas monitoring event will also include screening inside three buildings at the facility (garage, scale house, and maintenance building). Readings of percent methane by volume, percent LEL, and percent oxygen will be obtained at each point and readings will be recorded on field forms.

6.5 Quality Assurance and Control Procedures

The following quality assurance and control procedures will be implemented:

- The combustible gas indicator will be calibrated in the field immediately prior to each monitoring event and periodically calibrated by the manufacturer. These calibrations will be in accordance with the manufacturer's recommendations and schedule.
- Sampling will not be performed if conditions conducive to decreasing gas concentrations are present (e.g., subsurface gas pressure less than atmospheric pressure, rain). In this case, sampling will be delayed until conditions pass.
- Sampling should generally be conducted when gas pressures are at a maximum. Subsurface gas pressures have a diurnal cycle and generally are at a maximum during the afternoon.
- Gas production will vary with changes in seasons and climatic conditions. Each sampling event will be conducted under the same conditions, as near as possible, as the preceding event. Therefore, the operator will review the log of the times and conditions which existed during the preceding sampling event and attempt to emulate those conditions during subsequent events.

6.6 Evaluating and Reporting of Monitoring Results

Interpretation of annual explosive gas monitoring results will be as follows:

- Methane gas concentrations shall not exceed the LEL (5% methane) at the facility boundary.
- Methane gas concentrations shall not exceed 25% of the LEL (1.25% methane) in facility structures.

The results of the annual explosive gas monitoring will be submitted to ADEM within 30 days of the monitoring event. Reports will also be placed in the facility's operating record.

If during the annual monitoring, explosive gas levels exceed one of the above specified limits, the owner or operator will:

- Immediately take all necessary steps to ensure protection of human health and property and notify ADEM of the exceedance;
- Within seven days of the exceedance, place in the facility's operating record the explosive gas levels detected and the immediate steps to be taken to protect human health and property.
- Within twenty days of the exceedance, submit to ADEM for approval a remediation plan for the explosive gas releases. The plan should describe the nature and extent of the problem and the proposed remedy. The plan should be implemented upon approval of ADEM, within sixty days of the exceedance. Also, within sixty days of the exceedance, a copy of the plan should be placed in the facility's operating record and ADEM should be notified that the plan has been implemented.

6.7 Reporting

Methane gas monitoring results will be submitted to ADEM within 30 days of the methane monitoring event.

7.0 METHANE MONITORING PROBE INSTALLATION

The purpose of this Methane Monitoring Probe Installation Procedure is to outline the procedures that should be utilized if probes are installed at the facility in the future.

7.1 Methane Monitoring Probe Installation

Probe installation will be performed by an Alabama-licensed drilling contractor and will be supervised by an Alabama-licensed geologist or engineer. In the probe construction, commercially available Schedule 40, 2-inch nominal diameter PVC with flush threaded connections will be used for the casing and screens. The PVC screen and casing are chemically and physically stable. The borehole diameter will be 6 inches or larger. The screens will be manufactured with 0.020-inch slots. The top of the screened section will begin at approximately 5 feet below land surface and will extend to either: 1) 5 feet above the stabilized groundwater level; or 2) the confirmed top of competent bedrock, whichever is shallower.

The material used to construct the filter pack around the outside of the well screen will consist of commercially available, chemically inert, well-rounded, dimensionally stable, pea gravel. The filter pack will be placed in the borehole around the screen and will extend up to the top of the screened interval (approximately 5 feet below ground surface). A minimum of 0.5 feet of coarse silica sand will be placed on top of the filter pack. A minimum 1.0-foot bentonite seal, which will consist of chemically inert bentonite chips or granular bentonite, will overlie the coarse silica sand. Potable water will be used to hydrate the bentonite. The remaining approximate 3.5 feet of the borehole annulus will be filled up to the ground surface with a bentonite cement grout that is 3 to 5 percent bentonite by weight or with continuous-pour concrete.

The pea gravel, sand, and bentonite described above will be placed around the screen/casing by dropping the materials directly down the borehole. A tamping device may be used to reduce the potential for bridging of these materials. The cement-bentonite grout will be placed in the borehole via continuous pour or using a tremie pipe.

A 3-feet by 3-feet concrete pad will be constructed at the ground surface for each probe. A protective cap fitted with a barbed fitting to facilitate sampling will be placed on each probe and a protective steel casing with a keyed lock will be placed over each probe. A weep hole will be installed at the base of the steel casing. At each probe, permanent probe identification labels will be placed on the outside of the steel casing. Probes that are subject to traffic will have four bollards placed around them.

7.2 Reporting

Within sixty days of probe installation and survey completion, a report documenting the installation including boring logs, probe diagrams, and field procedures will be submitted to ADEM.

8.0 REFERENCES

ASTM D5092-17 (2017) – Standard Practice for Design and Installation of Groundwater Monitoring Wells, ASTM International, October.

Alabama Department of Environmental Management (2011) – Alabama Groundwater Monitoring Reporting Guidance for Solid Waste Facilities, March.

Alabama Department of Environmental Management (2021) – Land Division – Solid Waste Program, ADEM Admin. Code r. 335-13-x-xx, August 22.

Alabama Department of Environmental Management (2019) – WCA of Alabama, LLC Industrial Landfill, Solid Waste Disposal Permit No. 61-16, Issuance Date and Effective Date August 6, 2019, Expiration Date August 5, 2024.

Highland Technical Services, Inc. (2007) – Hydrogeologic Evaluation, Proposed Lateral Expansion, Waste Corporation of Alabama Industrial Landfill, Permit 61-16, September 18.

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Geological Survey of Alabama (1988) – Special Map 220, Geologic Map of Alabama.

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United States Environmental Protection Agency (2013) – Groundwater Sampling Guidance, Region 4, Science & Ecosystem Support Division, Effective Date March 6.

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TABLES

**Table 1
Groundwater Monitoring Well Network
Fines Industrial Landfill**

Well ID	Date Installed	Position	Sample Frequency	Sampling Equipment	Ground Surface Elevation (fmsl) ^{1,3}	Top of Casing Elevation ^{1,4} (fmsl)	Top of Screened Interval ^{2,4} (ft-bgs)	Bottom of Screened Interval ^{2,4} (ft-bgs)	Internal Casing Material	Internal Casing Diameter (inches)	Monitored Interval ⁴
MW-1R	4/30/2020	Upgradient	Semi-Annual	Dedicated Bladder Pump	484.81	487.52	60.00	80.00	PVC	2	Cherty, Interbedded Clay & Sand / Dolomitic Limestone
MW-2	11/17/1999	Upgradient	Semi-Annual	Dedicated Bladder Pump	NA	460.11	56.00	66.00	PVC	2	Cherty Clay / Limestone
MW-4	11/16/1999	Downgradient	Semi-Annual	Dedicated Bladder Pump	NA	472.66	62.18	77.18	PVC	2	Chert / Interbedded Clay & Sand / Cherty Limestone
MW-6	2/8/2007	Downgradient	Semi-Annual	Dedicated Bladder Pump	436.27	439.02	74.15	94.15	PVC	2	Limestone / Limestone & Shale / Interbedded Sandy Clay & Limestone
MW-7	2/12/2007	Downgradient	Semi-Annual	Dedicated Bladder Pump	435.97	438.37	75.15	95.15	PVC	2	Limestone
MW-8	2/11/2017	Downgradient	Semi-Annual	Dedicated Bladder Pump	429.30	432.20	34.98	49.38	PVC	2	Interbedded Clay & Sand / Dolomitic Limestone

Notes

1. fmsl - feet above mean sea level

2. ft-bgs - feet below ground surface

3. Ground surface elevation and monitored interval for wells MW-2, MW-4, MW-6, MW-7, and MW-8 obtained from the Hydrogeologic Evaluation by Highland Technical Services, Inc. dated September 18, 2007.

Ground surface elevation and monitored interval for well MW-1R obtained from the Monitoring Well Abandonment and Replacement Report by Highland Technical Services, Inc. dated August 6, 2020.

4. Top of PVC Casing Elevations, top of screened interval, and bottom of screened interval from the Groundwater Monitoring Plan by Highland Technical Services, Inc. dated January 28, 2021.

NA: Not Available

Table 2
Monitoring List of Constituents - Appendix I
Fines Industrial Landfill

Inorganic Parameters	Organic Parameters
Antimony Total	Acetone
Arsenic Total	Acrylonitrile
Barium Total	Benzene
Beryllium Total	Bromochloromethane
Cadmium Total	Bromodichloromethane
Chromium Total	Bromoform; Tribromomethane
Cobalt Total	Carbon disulfide
Copper Total	Carbon tetrachloride
Lead Total	Chlorobenzene; Monochlorobenzene
Mercury	Chloroethane; Ethyl chloride
Nickel Total	Chloroform; Trichloromethane
Selenium Total	Dibromochloromethane; Chlorodibromomethane
Silver Total	1,2-Dibromo-3-chloropropane; DBCP
Thallium Total	1,2-Dibromoethane; Ethylene dibromide; EDB
Vanadium Total	o-Dichlorobenzene; 1,2-Dichlorobenzene
Zinc Total	p-Dichlorobenzene; 1,4-Dichlorobenzene
Field pH	trans-1,4-Dichloro-2-butene
Field Specific Conductance	1,1-Dichloroethane; Ethylidene chloride
	1,2-Dichloroethane; Ethylene dichloride
	1,1-Dichloroethylene; 1,1,-Dichloroethene; Vinylidene chloride
	cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene
	trans-1,2-Dichloroethylene; trans-1,2-Dichloroethene
	1,2-Dichloropropane; Propylene dichloride
	cis-1,3-Dichloropropene
	trans-1,3-Dichloropropene
	Ethylbenzene
	2-Hexanone; Methyl butyl ketone
	Methyl bromide; Bromomethane
	Methyl chloride; Chloromethane
	Methylene bromide; Dibromomethane
	Methylene chloride; Dichloromethane
	Methyl ethyl ketone; MEK; 2-Butanone
	Methyl iodide; Iodomethane
	4-Methyl-2-pentanone; Methyl isobutyl ketone
	Styrene
	1,1,1,2-Tetrachloroethane
	1,1,2,2-Tetrachloroethane
	Tetrachloroethylene; Tetrachloroethene; Perchloroethylene
	Toluene
	1,1,1-Trichloroethane; Methylchloroform
	1,1,2-Trichloroethane
	Trichloroethylene; Trichloroethene
	Trichlorofluoromethane; CFC-11
	1,2,3-Trichloropropane
	Vinyl acetate
	Vinyl chloride
	Xylenes

**Table 3
Laboratory Methods and Information
Fines Industrial Landfill**

Parameter	Analytical Method	Preservative	Holding Time
335-13-4 - APPENDIX I CONSTITUENTS FOR DETECTION MONITORING			
Appendix I Volatile Organic Compounds (VOCs)	SW-846 8260B	HCL	14 days
Appendix I VOCs: 1-2-Dibromo-3-Chloropropane; 1-2-Dibromoethane	SW-846 8011	Na2S2O3	14 days
Appendix I Metals (Total)	SW-846 6020A	HNO3	180 days
Mercury	SW-846 7470A	HNO3	180 days
335-13-4 - APPENDIX II LIST OF HAZARDOUS INORGANIC AND ORGANIC CONSTITUENTS			
Appendix II VOCs (not also on the Appendix I list)	SW-846 8260B	HCL	14 days
Appendix II Metals (Total)	SW-846 6020B	HNO3	180 days
Bis(2-ethylhexyl)phthalate + Semi-Volatile Organic Compounds (SVOCs)	SW-846 8270D	Cool 6°C	7 day extraction, 40 day analysis
Chlorinated Herbicides	SW-846 8151A	Cool 6°C	7 day extraction, 40 day analysis
Cyanide	SW-846 9014	NaOH	14 days
Organochlorine Pesticides	SW-846 8081B	Cool 6°C	7 day extraction, 40 day analysis
Polychlorinated Biphenyls (PCBs)	SW-846 8082A	Cool 6°C	7 day extraction, 40 day analysis
Polynuclear Aromatic Hydrocarbons (PAHs)	SW-846 8270D	Cool 6°C	7 day extraction, 40 day analysis
Sulfide	SM 4500-S2-F	Zinc Acetate	28 days
Tin	SW-846 6010	HNO3	14 days

Notes

Analytical methods and/or holding times may be updated or modified based on USEPA available updates in the future.

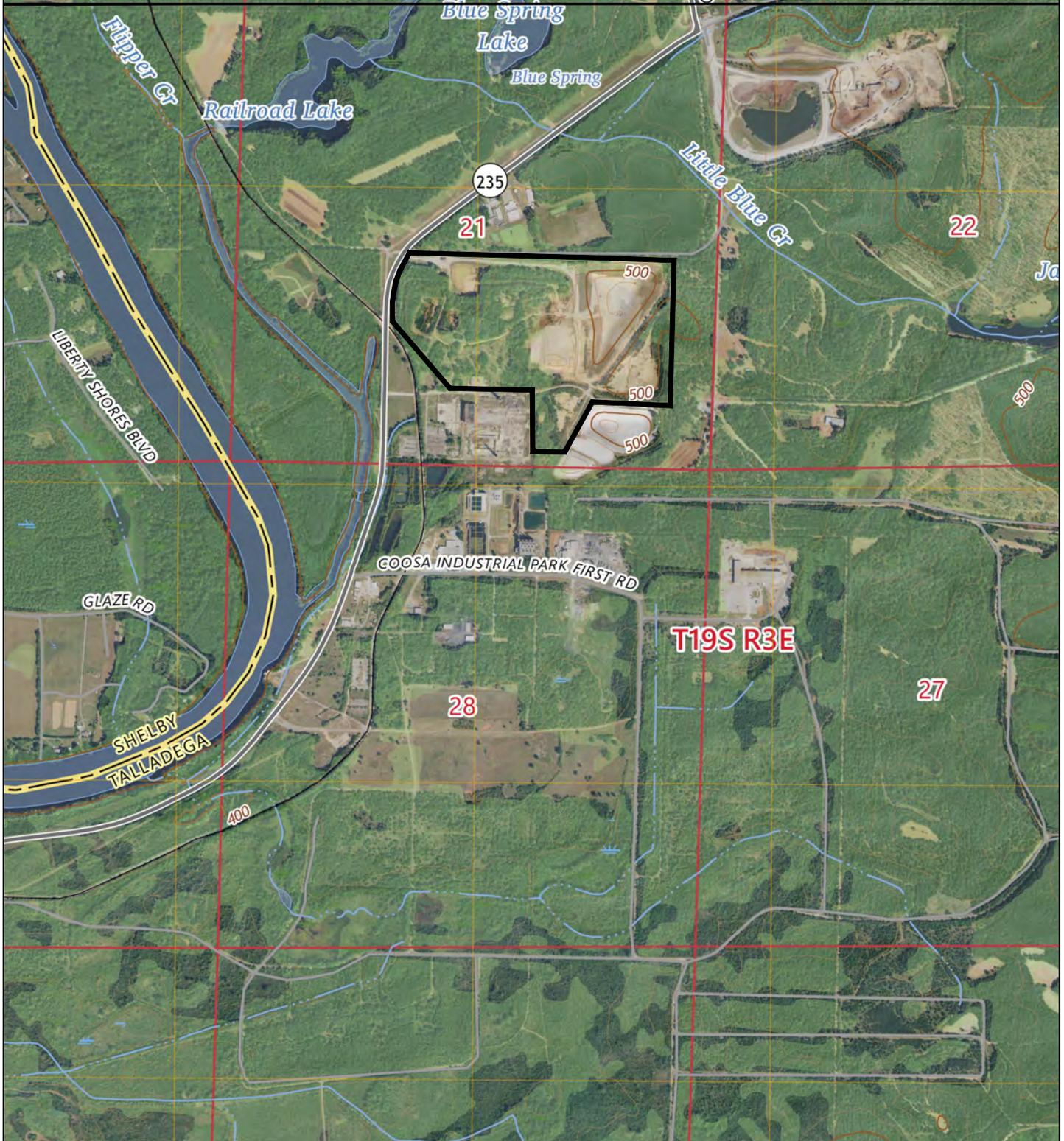
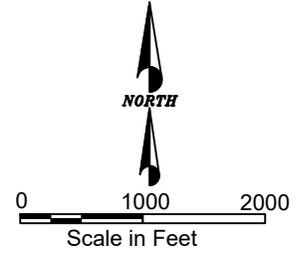
FIGURES

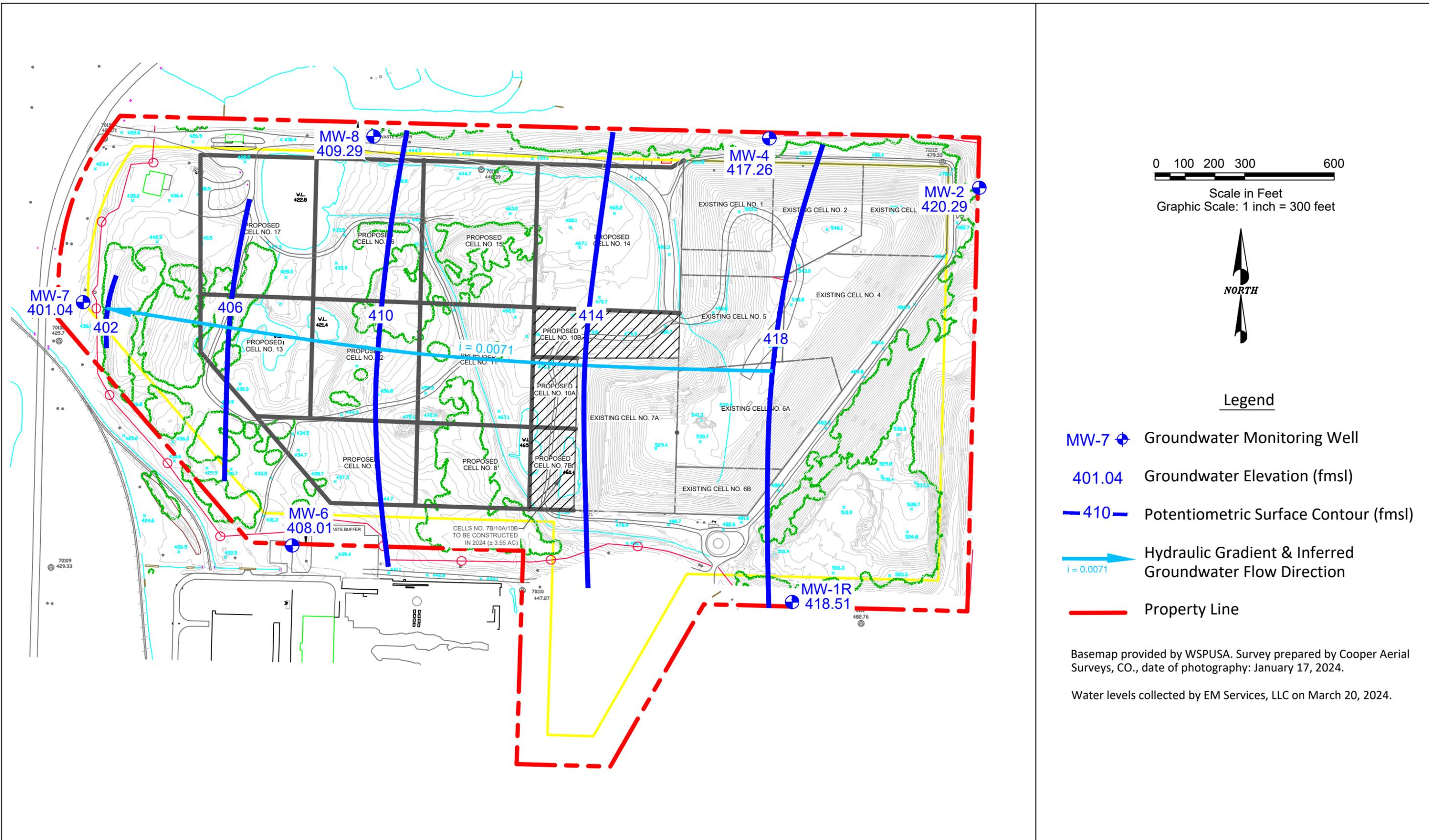
NOTES:

- 1. Topographic Map
7.5-Minute Series of the
Childersburg Quadrangle (2024).

LEGEND

— Site Location
(Approximate)





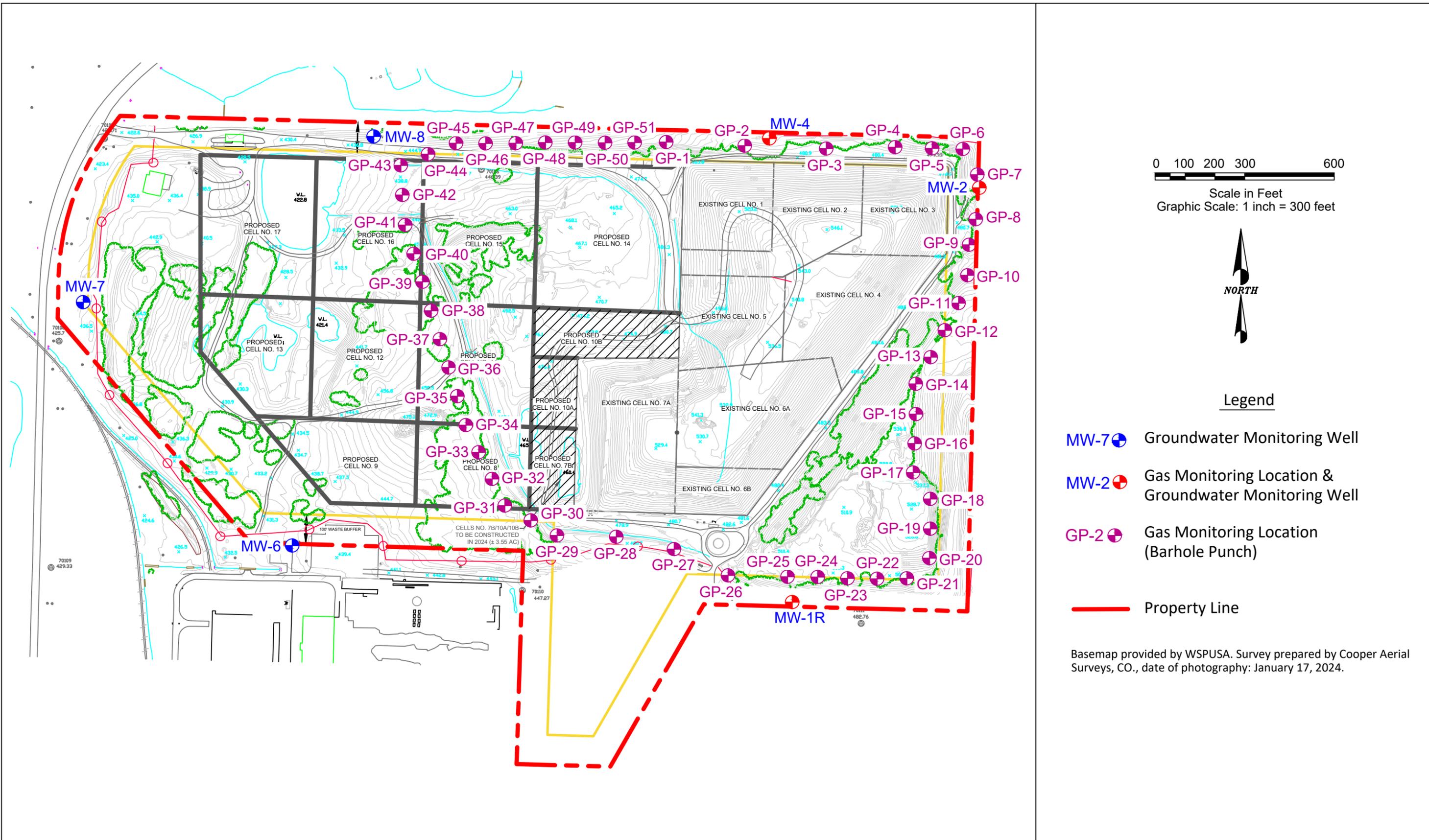
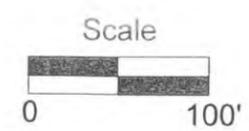
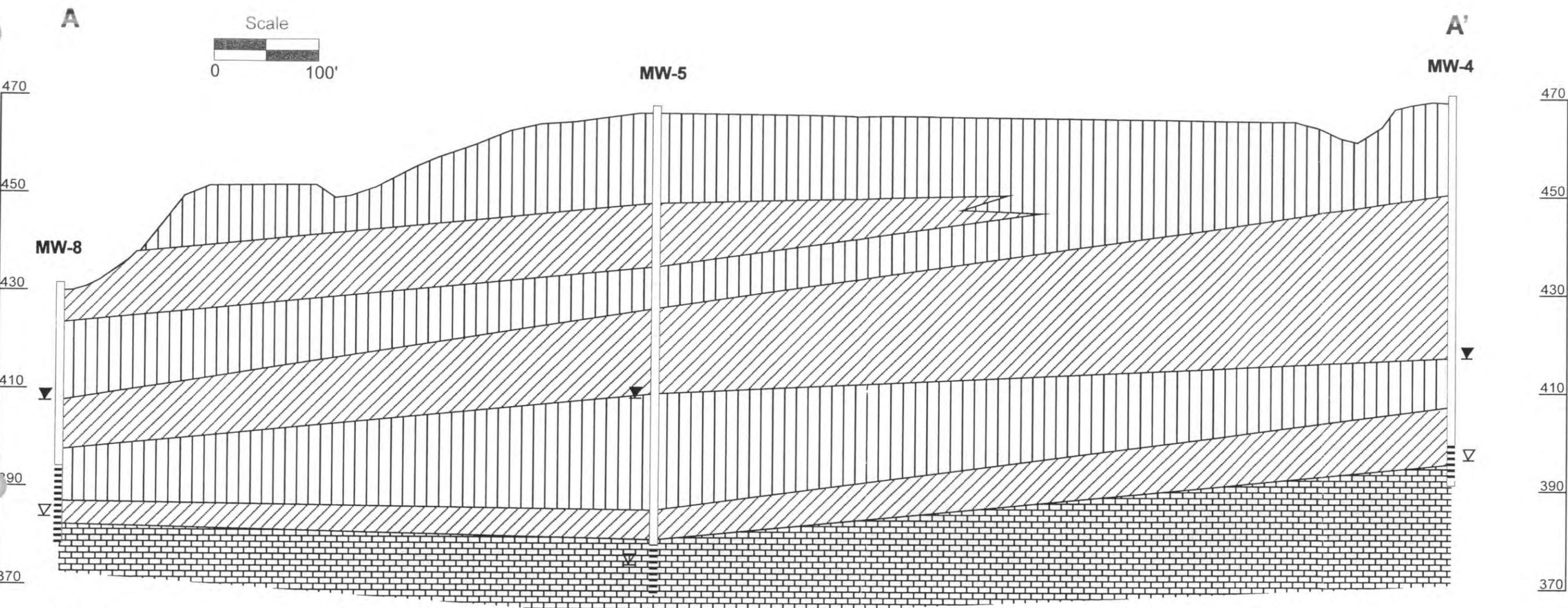


Figure 3
Gas Monitoring Location Map
Fines Industrial Landfill, Talladega County, Alabama

APPENDICES

APPENDIX A

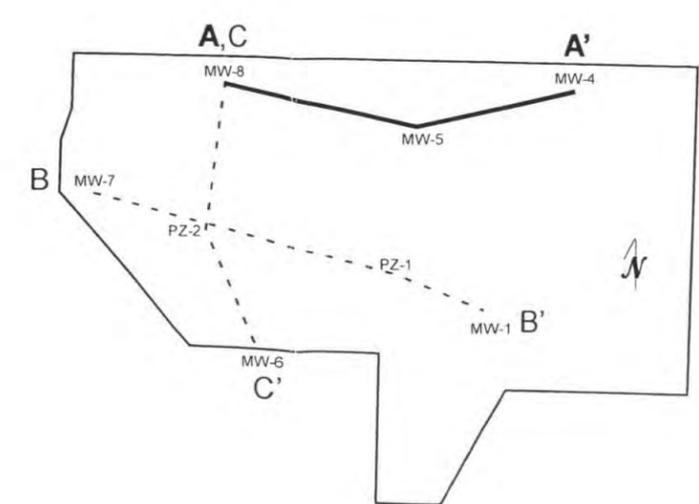
GEOLOGIC CROSS SECTIONS

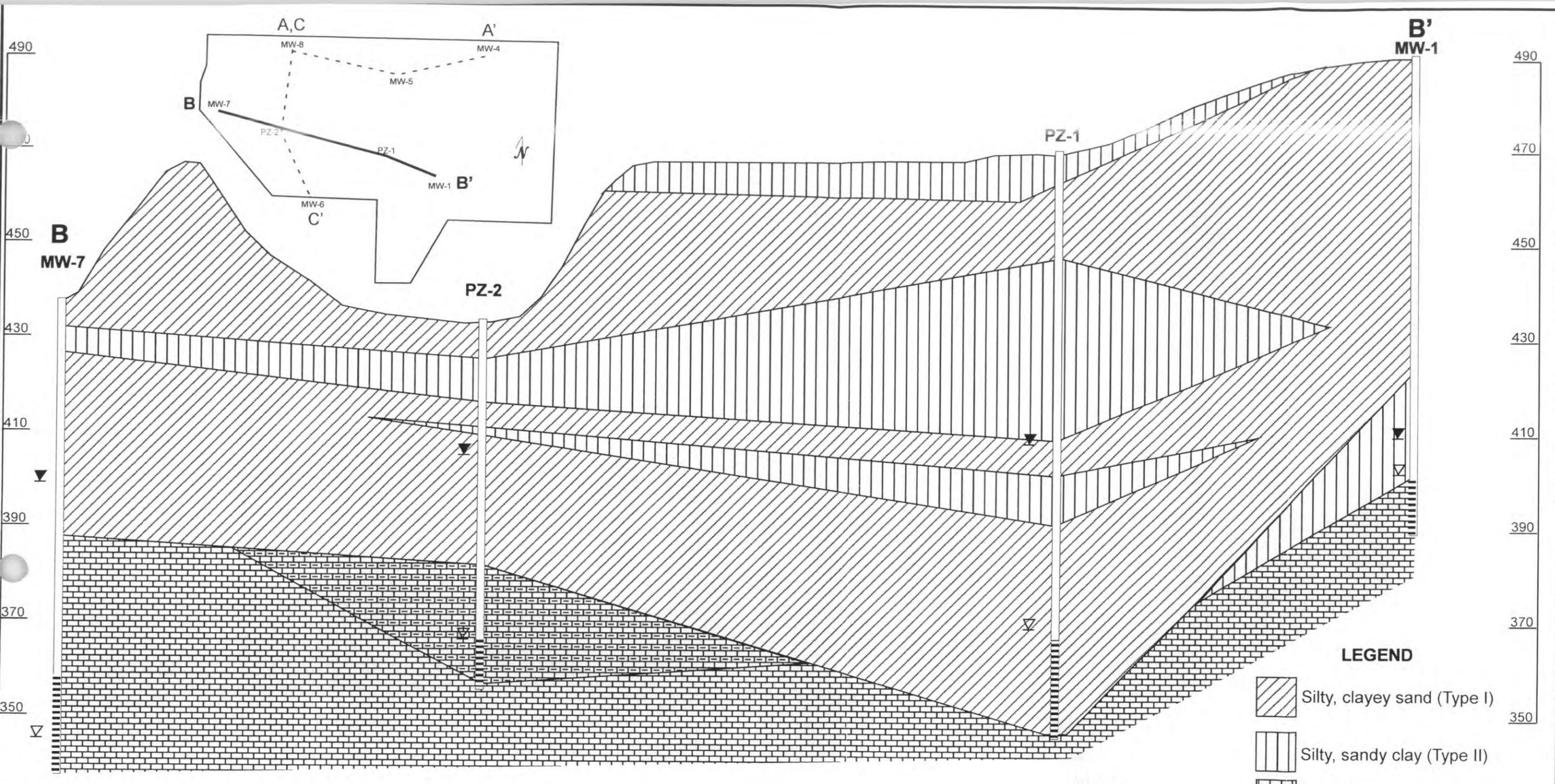


- LEGEND**
- Silty, clayey sand (Type I)
 - Silty, sandy clay (Type II)
 - Limestone
 - Water Level on 2/15/200 represents potentiometric surface
 - Water level during drilling event
 - Well screened interval

	MW-8	MW-4
Top of Casing	432.20 msl	472.66 msl
Pad Elevation	429.40 msl	469.84 msl
Total Depth	379.92 msl	391.71 msl
Water Level (2/15/2007)	407.78 msl	415.12 msl
Water Level (2/11/2007)	385.40 msl	407.20 msl

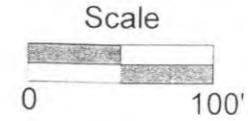
	MW-5
Top of Casing	469.61 msl
Pad Elevation	467.29 msl
Total Depth	370.26 msl
Water Level (2/15/2007)	411.26 msl
Water Level (5/20/2002)	378.29 msl



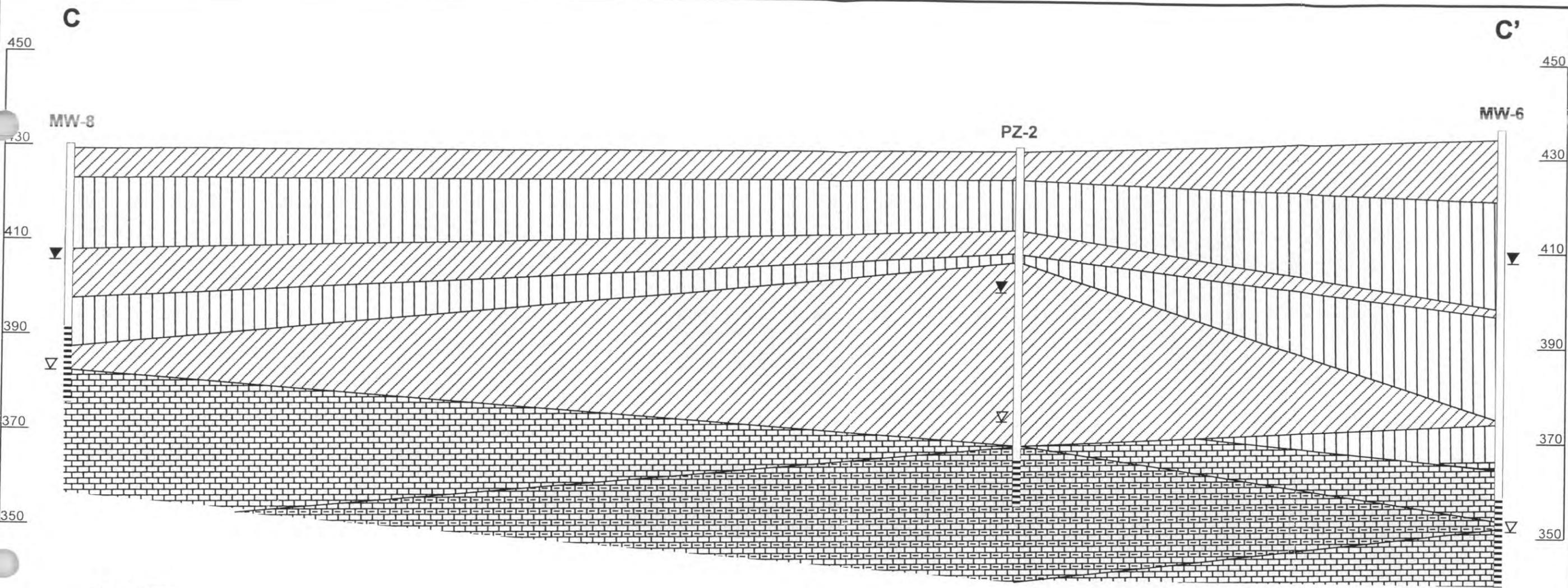


MW-7		PZ-2		PZ-1		MW-1	
Top of Casing	438.37 msl	Top of Casing	435.52 msl	Top of Casing	470.84 msl	Top of Casing	489.81 msl
Pad Elevation	436.12 msl	Pad Elevation	431.73 msl	Pad Elevation	467.56 msl	Pad Elevation	486.96 msl
Total Depth	340.82 msl	Total Depth	359.03 msl	Total Depth	349.94 msl	Total Depth	389.81 msl
Water Level (2/15/2007)	401.34 msl	Water Level (2/15/2007)	406.75 msl	Water Level (2/15/2007)	412.94 msl	Water Level (2/15/2007)	414.16 msl
Water Level (12/2007)	349.12 msl	Water Level (2/09/2007)	369.73 msl	Water Level (2/08/2007)	373.56 msl	Water Level (11/10/1999)	406.38 msl

- LEGEND**
- Silty, clayey sand (Type I)
 - Silty, sandy clay (Type II)
 - Limestone & Shale
 - Limestone
 - Water Level on 2/15/2007 represents potentiometric surface
 - Water level during drilling event
 - Well screened interval



HIGHLAND TECHNICAL SERVICES, INC. 528 MINERAL TRACE HOOVER, ALABAMA 30455 Phone: (205) 985-4874 Fax: (205) 987-6080	TITLE: B-B' Geologic Cross Section WCA Fines Landfill Childersburg, Alabama DATE: 8/2/07 DWN BY: CC DES. BY: CC SCALE: CC PROJECT: 07-230119A.01	FIGURE NO.: 5
 HTSI Highland Technical Services, Inc.		



LEGEND

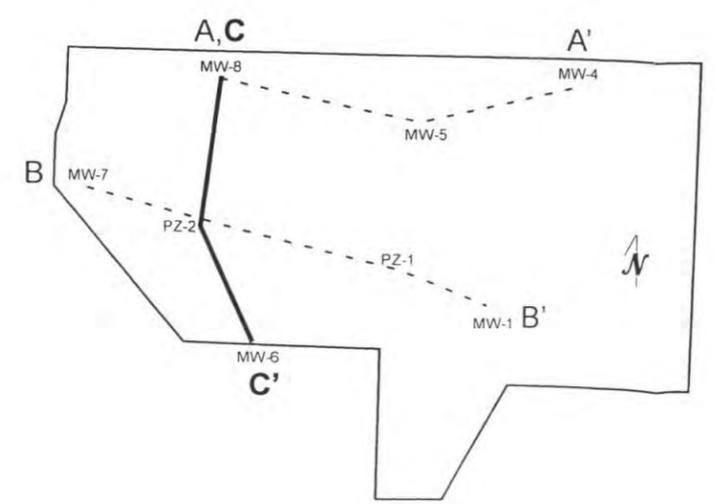
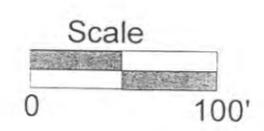
- ▼ Water Level on 2/15/200 represents potentiometric surface
- ▽ Water level during drilling event
- Well screened interval

- Silty, clayey sand (Type I)
- Silty, sandy clay (Type II)
- Limestone & Shale
- Limestone

MW-8	
Top of Casing	432.20 msl
Pad Elevation	429.40 msl
Total Depth	379.92 msl
Water Level (2/15/2007)	407.78 msl
Water Level (2/11/2007)	385.40 msl

PZ-2	
Top of Casing	435.52 msl
Pad Elevation	431.73 msl
Total Depth	359.03 msl
Water Level (2/15/2007)	406.75 msl
Water Level (2/09/2007)	369.73 msl

MW-6	
Top of Casing	439.02 msl
Pad Elevation	436.28 msl
Total Depth	342.12 msl
Water Level (2/15/2007)	408.37 msl
Water Level (2/08/2007)	353.28 msl



<p>HIGHLAND TECHNICAL SERVICES, INC. 528 MINERAL TRACE HOOVER, ALABAMA 30455 Phone: (205) 985-4874 Fax: (205) 987-6080</p>	<p>TITLE: C-C' Geologic Cross Section DES. BY: cc DWN BY: cc DATE: 8/2/07 SCALE: cc</p>	<p>FIGURE NO. 6 PROJECT 07-230119A.01</p>
<p>HTSI Highland Technical Services, Inc.</p>		

APPENDIX B
MONITORING WELL CONSTRUCTION DIAGRAMS
&
BORING LOGS



Monitoring Well Installation
 WCA of Alabama, LLC Industrial Landfill
 Childersburg, Talladega County, Alabama

Log for MW-1R

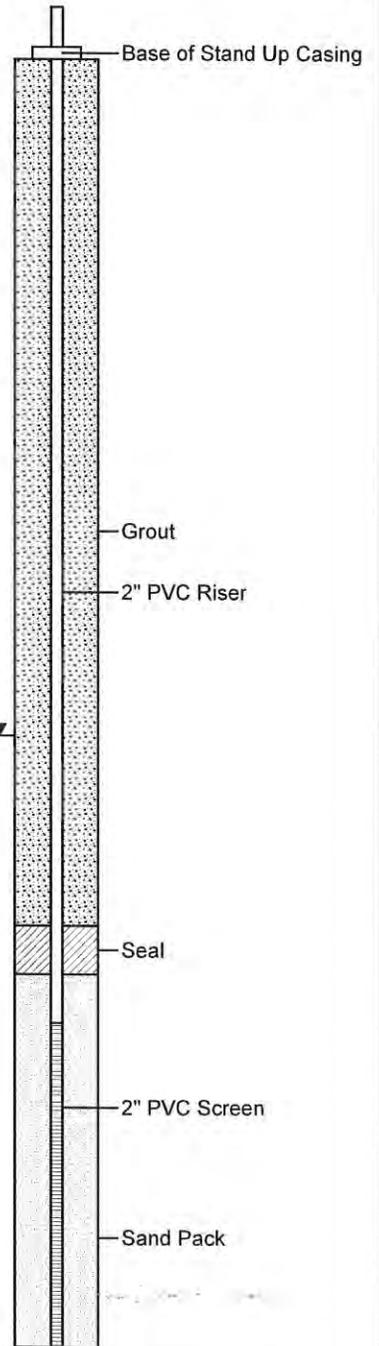
(Page 1 of 1)

Date Started : 4/29/20
 Date Completed : 4/30/20
 Hole Diameter : 4"
 Drilling Method : Sonic
 Sampling Method : Grab

Drilling Company : GSE
 Driller : Robert Morgan
 Latitude : 33.35904
 Longitude : -86.32863
 Logged By : Adam Hughes

Depth in Feet (bgs)	Surf. Elev. 484.81	USCS	GRAPHIC	DESCRIPTION	Water Encountered	Sample Locations	Depth in Feet (bgs)	REMARKS
0	484.81						0	
5	479.81			Light brown, tight, very firm, very dense, dry, nonplastic silty clays.			5	
10	474.81						10	
15	469.81						15	
20	464.81			Same as above.			20	
25	459.81						25	
30	454.81			Light brown/tan, medium dense, moderately stiff clay featuring chert rock fragments.			30	
35	449.81						35	
40	444.81						40	
45	439.81			Light tan/gray clay and gray very fine sand. Large chert fragments.			45	Depth to water measured after boring left open over night.
50	434.81						50	
55	429.81						55	
60	424.81			Same as above. Saturated.			60	
65	419.81						65	Saturated Clay encountered.
70	414.81						70	
75	409.81			Dolomitic limestone			75	
80				Boring advanced sufficiently into rock. Advancement terminated and well set.			80	

Well MW-1R
 TOC: 487.52 ft-amsl



08-06-2020 \\HTSI-FILE\Projects\2020\WCA\WCA Fines LFMMW Abandonment & Install\Boring Log\MW-1R.bor



MONITORING WELL/CONSTRUCTION LOG

PROJECT WCA WATER LEVEL 46.14
 MONITORING WELL # MONITORING WELL #2 ELEVATION GRD 462.09
 SITE LOCATION CHIDERSBURG, ALABAMA ELEVATION CSG 465.09
 LOGGED BY DALE CASE
 DATE 11/17/99

DEPTH/ELEV.	LITHOLOGY	DISCRIPTION	WELL CONSTRUCTION
0 -5 -10 -15 -20 -25 -30		CLAY AND SILT: RED TO BROWN SILTY CLAY WITH MINOR CHERT	
			GROUTED ANNULUS FROM SURFACE TO 46.5 FEET

-35

-40

-45

-50

-55

-60

-65



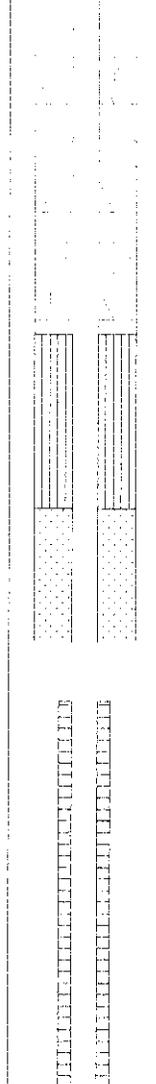
CLAY WITH CHERT:
RED TO BROWN CLAY
WITH CHERT



LIMESTONE: LIGHT
GRAY LIMESTONE



VOID: VOID LOST
RETURNS AT 58 FEET.
BOTTOM OF VOID AT
66 FEET



BENTONITE SEAL FROM
46.5 TO 51 FEET

SAND PACK ON GRAVEL
FROM 51 TO 54.5
FEET

GRAVEL PACK
APPROXIMATELY 800
POUNDS TO FILL VOID



MONITORING WELL/CONSTRUCTION LOG

PROJECT WCA WATER LEVEL 65.46
 MONITORING WELL # MONITORING WELL #4 ELEVATION GRD 474.78
 SITE LOCATION CHILDERSBURG, ALABAMA ELEVATION CSG 477.7
 LOGGED BY DALE CASE
 DATE 11/16/99

DEPTH/ELEV. LITHOLOGY DISCRIPTION WELL CONSTRUCTION

0
-5
-10
-15
-20
-25
-30



CLAY AND SAND: RED TO ORANGE SILTY AND SANDY CLAY

CLAY AND SAND WITH CHERT: RED TO BROWN SILTY CLAY WITH INCREASING AMOUNTS OF CHERT



GROUTED ANNULUS FROM SURFACE TO 60.5 FEET

-35
-40
-45
-50
-55
-60
-65
-70
-75
-80

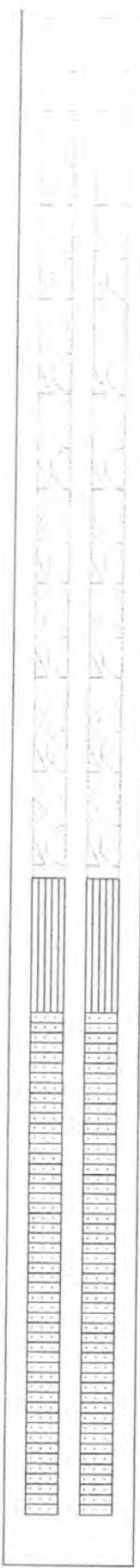


CLAY AND SILT: RED
TO BROWN SILTY CLAY

CHERT: HARD
CRYSTALLINE CHERT

CLAY AND SAND WITH
CHERT

CHERTY LIMESTONE:
DARK GRAY LIMESTONE
AND CHERT



TOP OF BENTONITE
SEAL 60.5-64.5 FEET

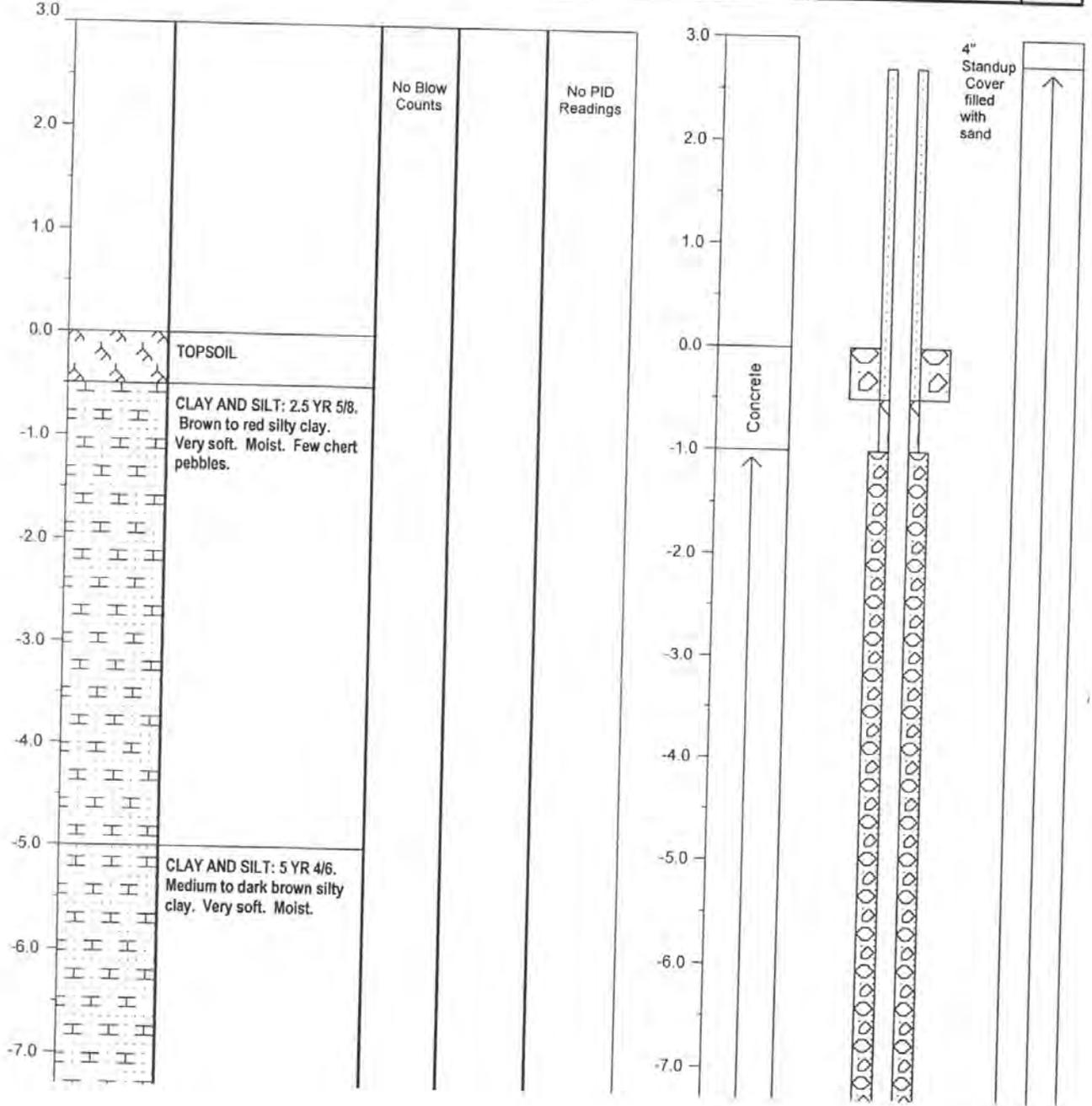
TOP OF FILTER PACK
AND TOP OF PVC
SCREEN



Boring/Well Log		PROJECT INFORMATION	
Boring/Well ID: B-6/MW-6		Project: Landfill Expansion Hydrologic Evaluation	
		Project Number: 07-230119A.01 Date Drilled: 2/7 - 2/8/2007	
Boring Depth (bgs) 94.15 ft.		Site Location: Childersburg, AL	
Total Depth (TOC): 96.90 ft.		Project Manager: Billy Cooch	
Depth to GW:		Logged By: Wes Sterling	
During Drilling: Σ 83.00 ft. bgs		Drilling Company: Boart Longyear	
After 24 Hours: ∇ 30.80 ft.		Driller: Kevin Smith	
Screened Interval: 94.15 - 74.15 ft. bgs.		Sampling Method: Core Barrell Sleeve	
Top of Casing Elevation: 439.02 ft. amsl		Drill Rig: GP24-300RS	
		Drilling Method: Sonic Advancement	

Notes: Total depth and DTW at 24 hrs based on TOC elev. Page 1 of 10

Depth	Lithology	Lithologic Description	Blow Counts	Sample ID	PID	Depth	Annulus Materials	Well Construction	Casing Materials
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Boring/Well Log
 Boring/Well ID:
B-6/MW-6

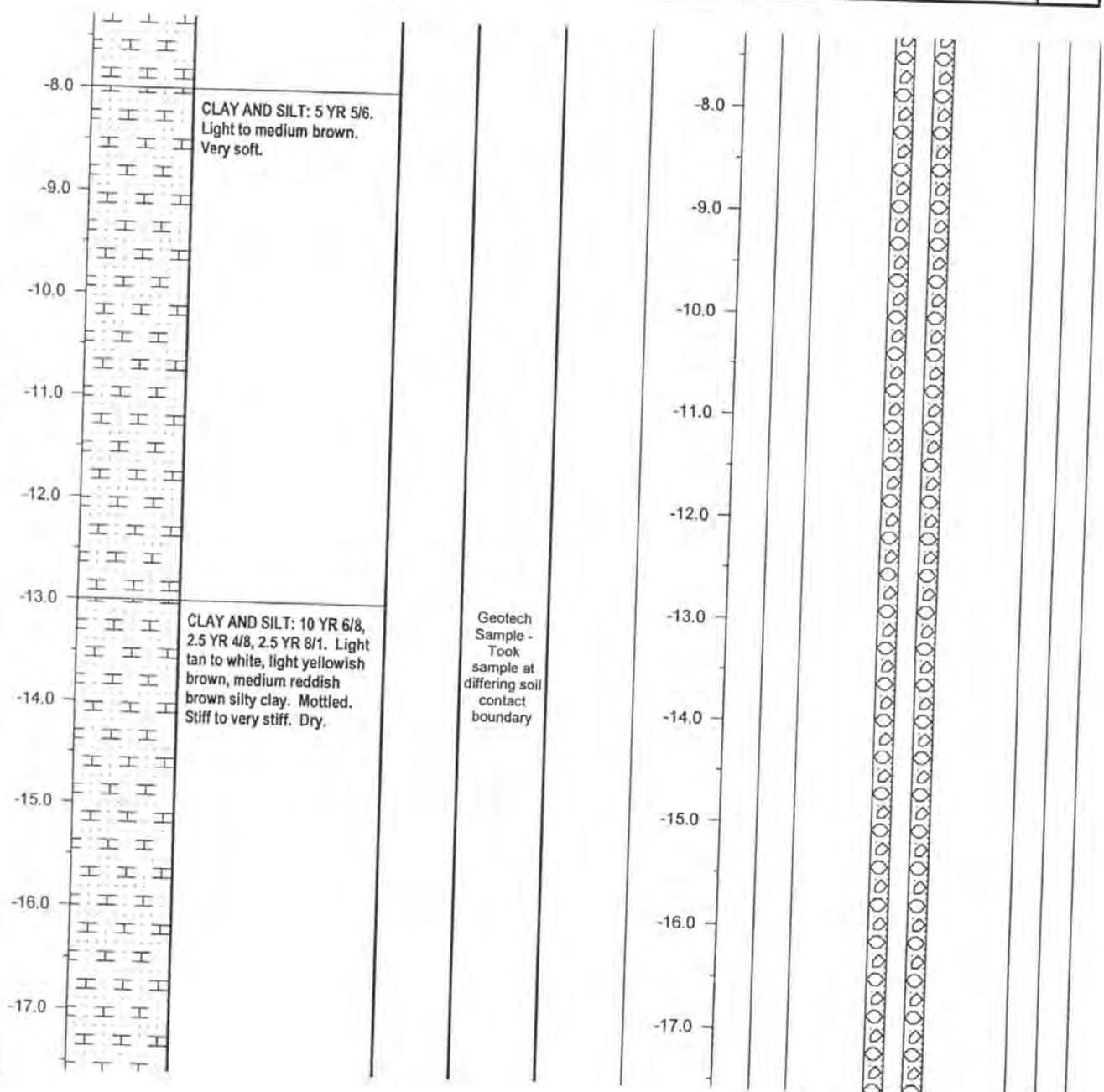
PROJECT INFORMATION

Project: Landfill Expansion Hydrologic Evaluation
Project Number: 07-230119A.01 **Date Drilled:** 2/7 - 2/8/2007
Site Location: Childersburg, AL
Project Manager: Billy Cooch
Logged By: Wes Sterling
Drilling Company: Boart Longyear
Driller: Kevin Smith **Sampling Method:** Core Barrell Sleeve
Drill Rig: GP24-300RS **Drilling Method:** Sonic Advancement

Boring Depth (bgs) 94.15 ft.
Total Depth (TOC): 96.90 ft.
Depth to GW:
 During Drilling: Σ 83.00 ft. bgs
 After 24 Hours: ∇ 30.80 ft.
Screened Interval: 94.15 - 74.15 ft. bgs.
Top of Casing Elevation: 439.02 ft. amsl

Notes: Total depth and DTW at 24 hrs based on TOC elev. Page 2 of 10

Depth	Lithology	Lithologic Description	Blow Counts	Sample ID	PID	Depth	Annulus Materials	Well Construction	Casing Materials
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Boring/Well Log

PROJECT INFORMATION

Boring/Well ID:
B-6/MW-6

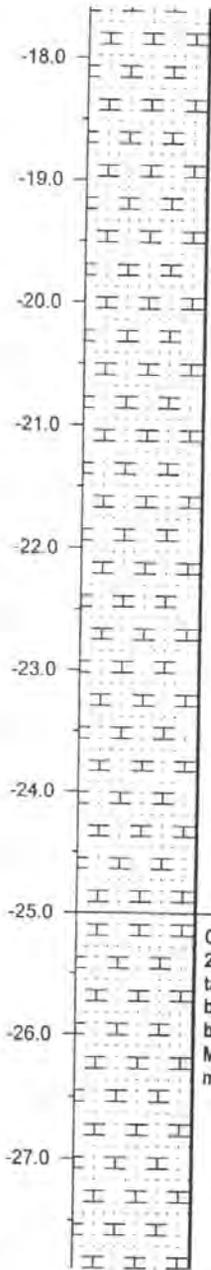
Project: Landfill Expansion Hydrologic Evaluation
Project Number: 07-230119A.01 **Date Drilled:** 2/7 - 2/8/2007

Boring Depth (bgs) 94.15 ft.
Total Depth (TOC): 96.90 ft.
Depth to GW:
 During Drilling: 83.00 ft. bgs
 After 24 Hours: 30.80 ft.
Screened Interval: 94.15 - 74.15 ft. bgs.
Top of Casing Elevation: 439.02 ft. amsl

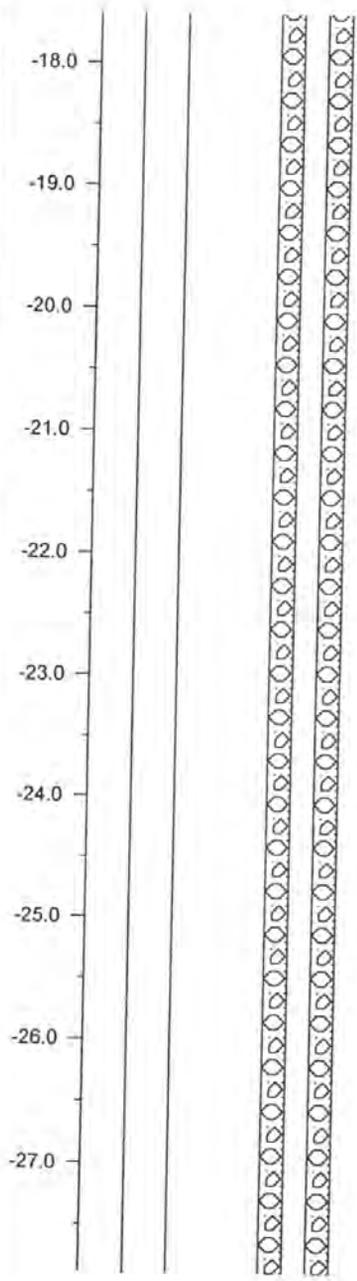
Site Location: Childersburg, AL
Project Manager: Billy Cooch
Logged By: Wes Sterling
Drilling Company: Boart Longyear
Driller: Kevin Smith **Sampling Method:** Core Barrell Sleeve
Drill Rig: GP24-300RS **Drilling Method:** Sonic Advancement

Notes: Total depth and DTW at 24 hrs based on TOC elev.

Depth	Lithology	Lithologic Description	Blow Counts	Sample ID	PID	Depth	Annulus Materials	Well Construction	Casing Materials
-------	-----------	------------------------	-------------	-----------	-----	-------	-------------------	-------------------	------------------



CLAY AND SILT: 10 YR 6/8, 2.5 YR 4/8, 2.5 YR 8/1. Light tan to white, light yellowish brown, medium reddish brown silty clay. Mottled. Medium stiff to stiff. Dry to moist.





Boring/Well Log

PROJECT INFORMATION

Boring/Well ID:
B-6/MW-6

Project: Landfill Expansion Hydrologic Evaluation
Project Number: 07-230119A.01 **Date Drilled:** 2/7 - 2/8/2007

Boring Depth (bgs) 94.15 ft.

Total Depth (TOC): 96.90 ft.

Depth to GW:

During Drilling: 83.00 ft. bgs

After 24 Hours: 30.80 ft.

Screened Interval: 94.15 - 74.15 ft. bgs.

Top of Casing Elevation: 439.02 ft. amsl

Site Location: Childersburg, AL

Project Manager: Billy Cooch

Logged By: Wes Sterling

Drilling Company: Boart Longyear

Driller: Kevin Smith

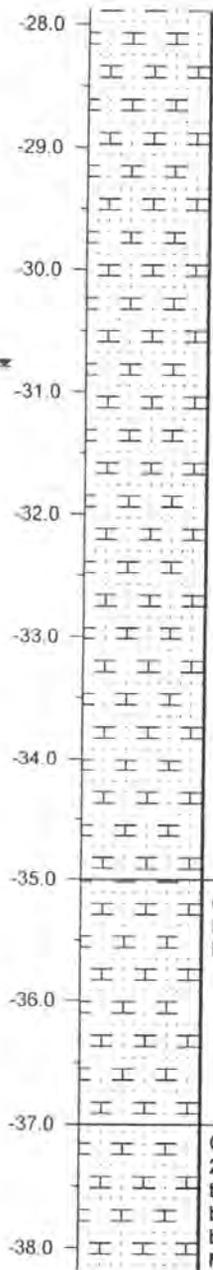
Sampling Method: Core Barrell Sleeve

Drill Rig: GP24-300RS

Drilling Method: Sonic Advancement

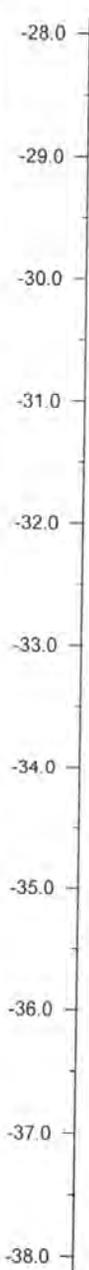
Notes: Total depth and DTW at 24 hrs based on TOC elev.

Depth	Lithology	Lithologic Description	Blow Counts	Sample ID	PID	Depth	Annulus Materials	Well Construction	Casing Materials
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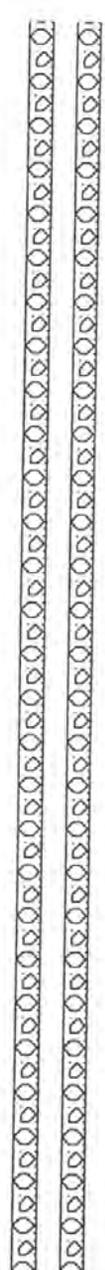


CLAY AND SILT: 10 YR 7/6, Light to medium yellow brown silty clay. Dry.

CLAY AND SILT: 10 YR 6/8, 2.5 YR 4/8, 2.5 YR 8/1. Light tan to white, light yellowish brown, medium reddish brown silty clay. Mottled. Medium stiff to stiff. Dry to



Seal and Grout



Sch. 40, 2 in. PVC Riser



Boring/Well Log

PROJECT INFORMATION

Boring/Well ID:

Project: Landfill Expansion Hydrologic Evaluation

B-6/MW-6

Project Number: 07-230119A.01 **Date Drilled:** 2/7 - 2/8/2007

Boring Depth (bgs): 94.15 ft.

Total Depth (TOC): 96.90 ft.

Depth to GW:

During Drilling: 83.00 ft. bgs

After 24 Hours: 30.80 ft.

Screened Interval: 94.15 - 74.15 ft. bgs.

Top of Casing Elevation: 439.02 ft. amsl

Site Location: Childersburg, AL

Project Manager: Billy Cooch

Logged By: Wes Sterling

Drilling Company: Boart Longyear

Driller: Kevin Smith

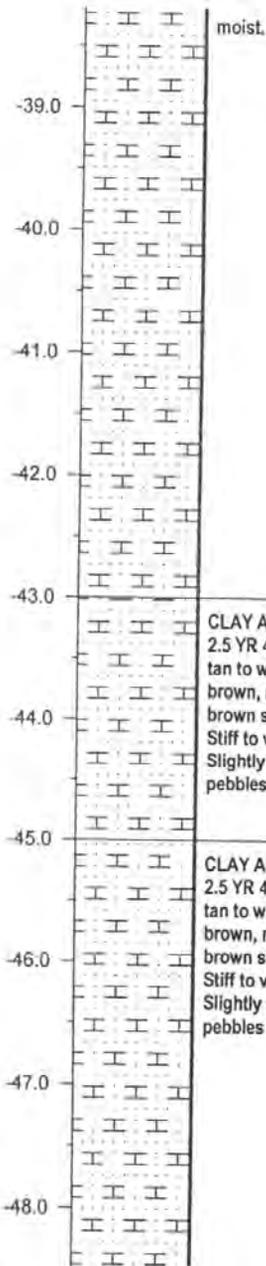
Sampling Method: Core Barrell Sleeve

Drill Rig: GP24-300RS

Drilling Method: Sonic Advancement

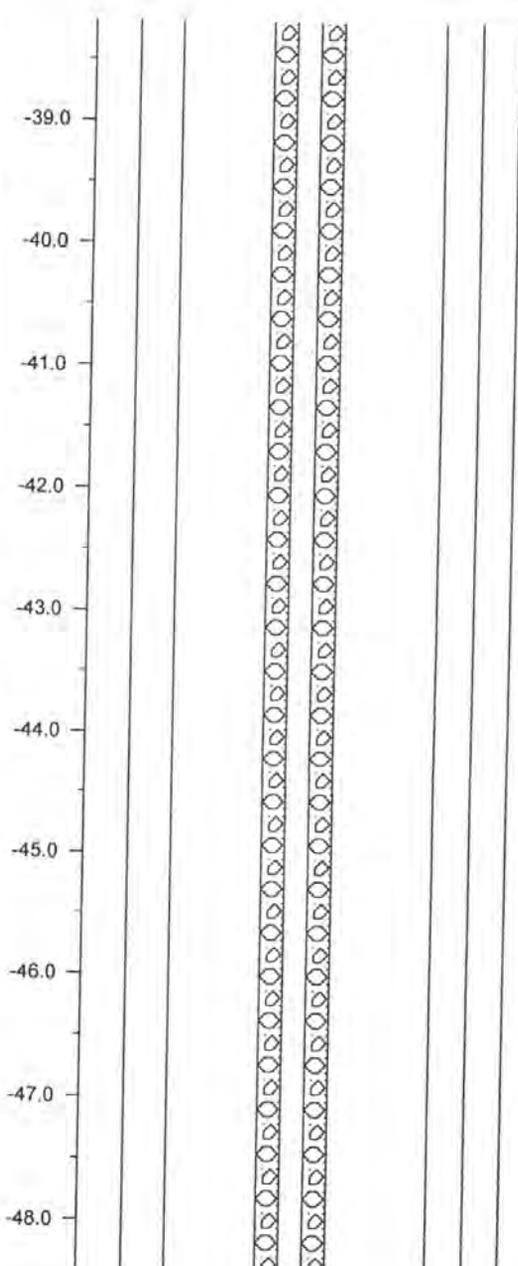
Notes: Total depth and DTW at 24 hrs based on TOC elev.

Depth	Lithology	Lithologic Description	Blow Counts	Sample ID	PID	Depth	Annulus Materials	Well Construction	Casing Materials
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CLAY AND SILT: 10 YR 6/8, 2.5 YR 4/8, 2.5 YR 8/1. Light tan to white, light yellowish brown, medium reddish brown silty clay. Mottled. Stiff to very stiff. Dry. Slightly sandy. Chert pebbles abundant.

CLAY AND SILT: 10 YR 6/8, 2.5 YR 4/8, 2.5 YR 8/1. Light tan to white, light yellowish brown, medium reddish brown silty clay. Mottled. Stiff to very stiff. Dry. Slightly sandy. Chert pebbles abundant.





Boring/Well Log

PROJECT INFORMATION

Boring/Well ID:
B-6/MW-6

Project: Landfill Expansion Hydrologic Evaluation
Project Number: 07-230119A.01 **Date Drilled:** 2/7 - 2/8/2007

Boring Depth (bgs) 94.15 ft.

Total Depth (TOC): 96.90 ft.

Depth to GW:

During Drilling: 83.00 ft. bgs

After 24 Hours: 30.80 ft.

Screened Interval: 94.15 - 74.15 ft. bgs.

Top of Casing Elevation: 439.02 ft. amsl

Site Location: Childersburg, AL

Project Manager: Billy Cooch

Logged By: Wes Sterling

Drilling Company: Boart Longyear

Driller: Kevin Smith

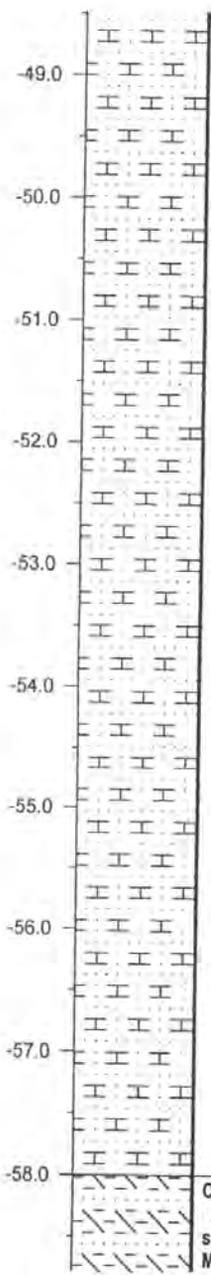
Sampling Method: Core Barrell Sleeve

Drill Rig: GP24-300RS

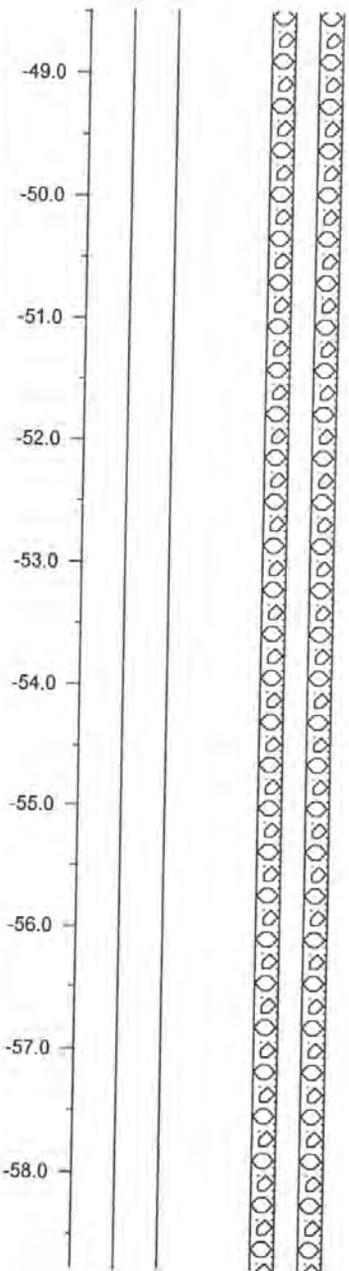
Drilling Method: Sonic Advancement

Notes: Total depth and DTW at 24 hrs based on TOC elev.

Depth	Lithology	Lithologic Description	Blow Counts	Sample ID	PID	Depth	Annulus Materials	Well Construction	Casing Materials
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CLAY AND SAND: 10 YR 5/6.
Light to medium brown sandy clay. Very soft. Moist.





Boring/Well Log

PROJECT INFORMATION

Boring/Well ID:
B-6/MW-6

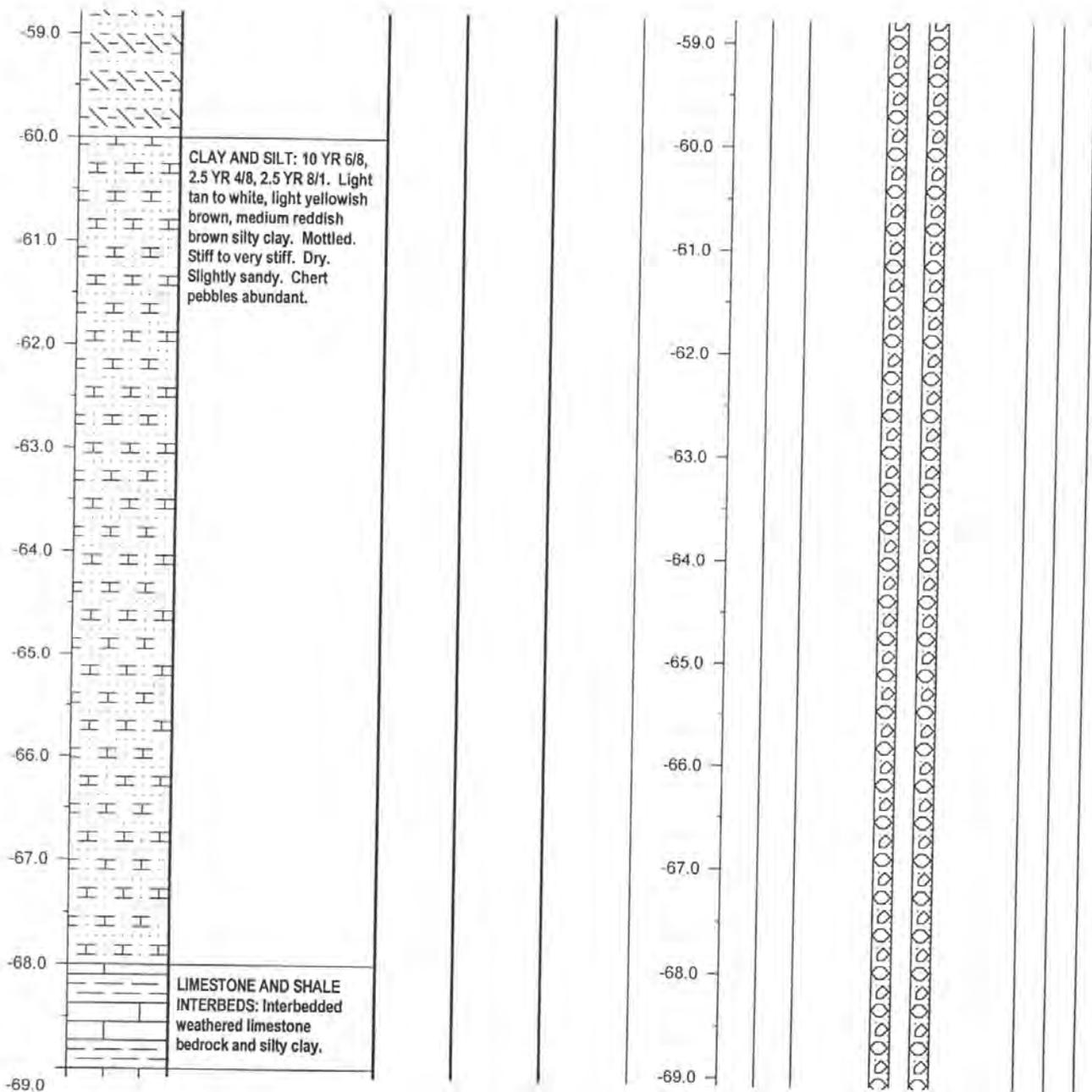
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Top of Casing Elevation: 439.02 ft. amsl

Site Location: Childersburg, AL
Project Manager: Billy Cooch
Logged By: Wes Sterling
Drilling Company: Boart Longyear
Driller: Kevin Smith **Sampling Method:** Core Barrell Sleeve
Drill Rig: GP24-300RS **Drilling Method:** Sonic Advancement

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Boring/Well Log

PROJECT INFORMATION

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B-6/MW-6

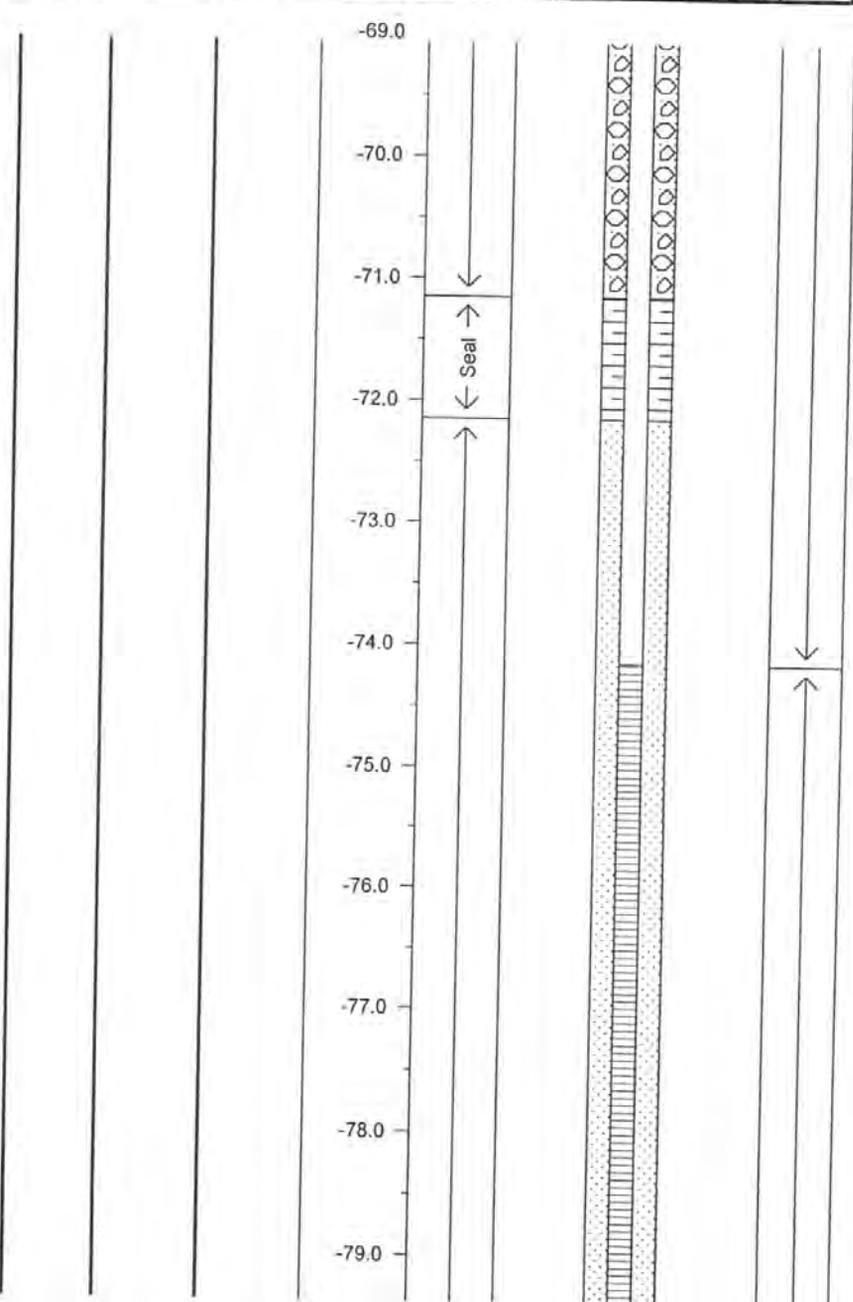
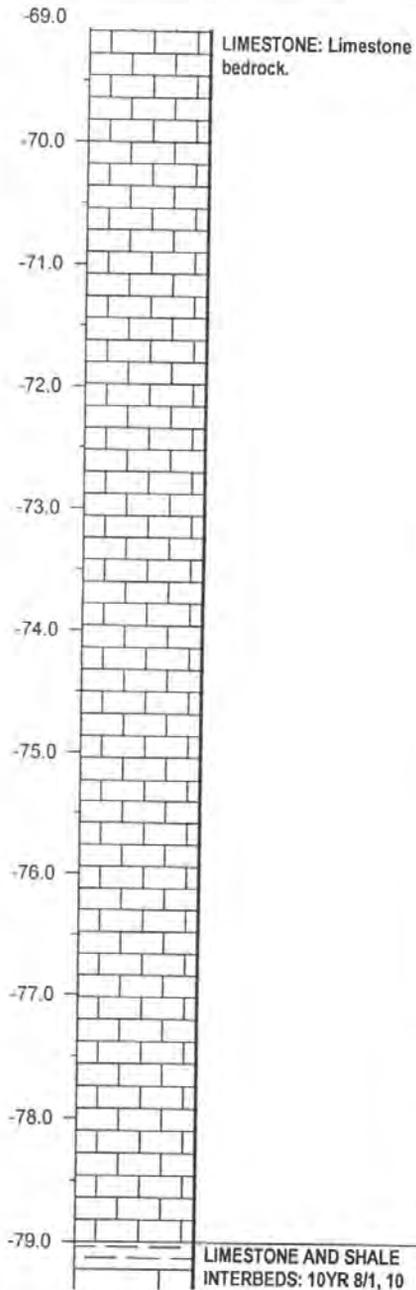
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Boring/Well Log

PROJECT INFORMATION

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B-6/MW-6

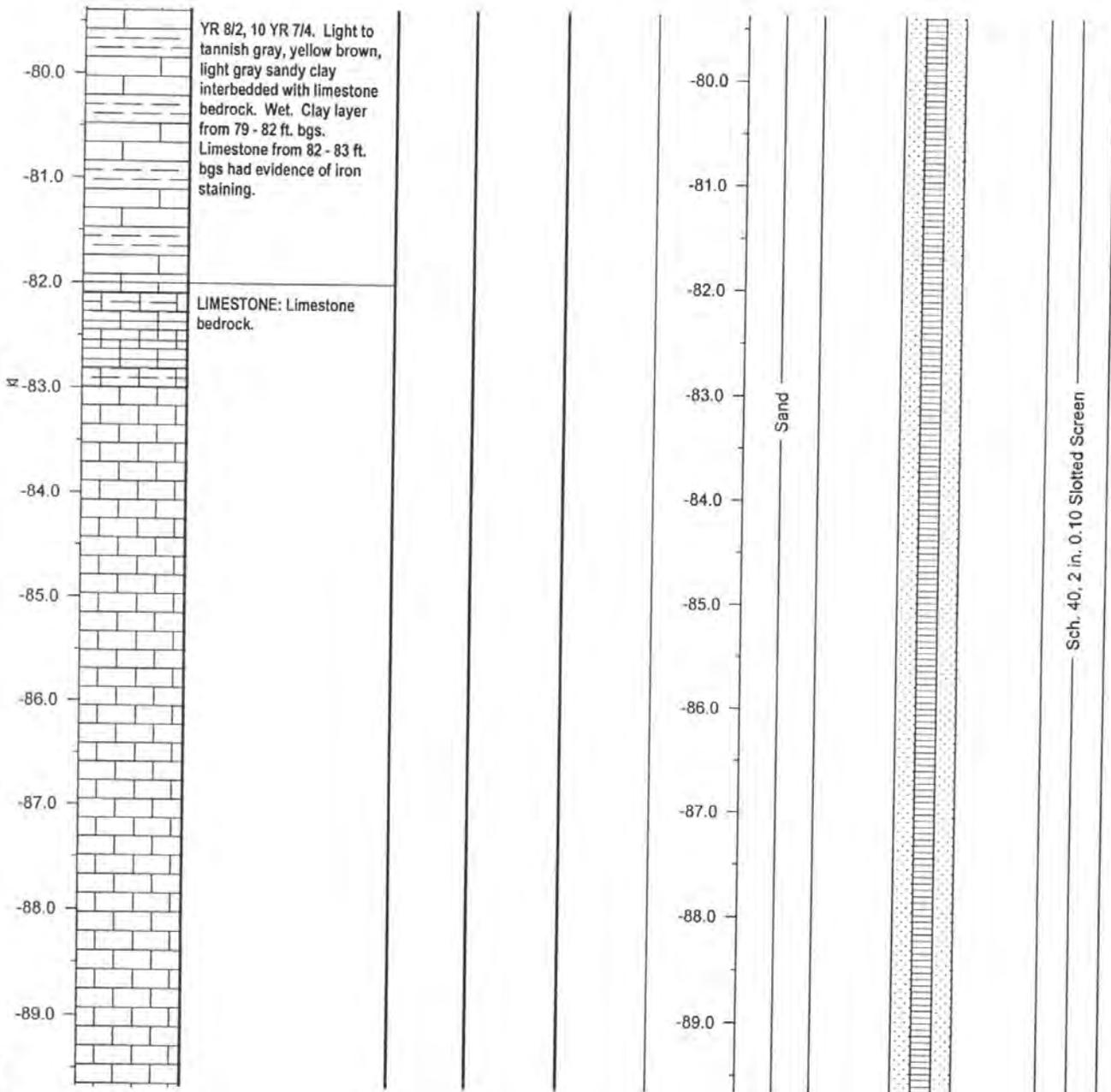
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Boring/Well Log

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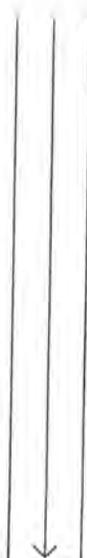
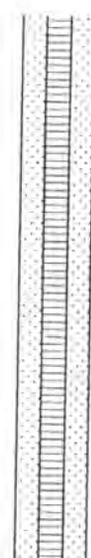
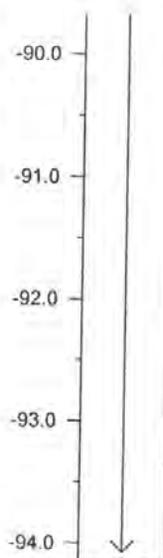
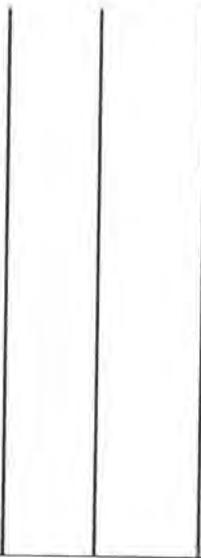
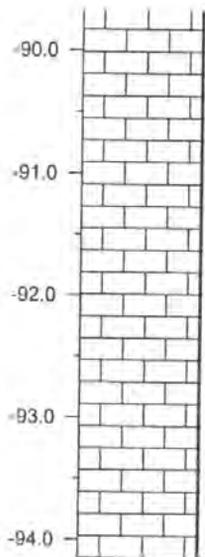
Sampling Method: Core Barrell Sleeve

Drill Rig: GP24-300RS

Drilling Method: Sonic Advancement

Notes: Total depth and DTW at 24 hrs based on TOC elev.

Depth	Lithology	Lithologic Description	Blow Counts	Sample ID	PID	Depth	Annulus Materials	Well Construction	Casing Materials
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Boring/Well Log

PROJECT INFORMATION

Boring/Well ID:
B-7/MW-7

Project: Landfill Expansion Hydrologic Evaluation
Project Number: 07-230119A.01 **Date Drilled:** 2/12/2007

Boring Depth (bgs) 95.15 ft. bgs.

Total Depth (TOC): 97.55 ft.

Depth to GW:

During Drilling: 87.00 ft. bgs.

After 24 Hours: 37.45 ft.

Screened Interval: 95.15 - 75.15 ft. bgs.

Top of Casing Elevation: 438.37 ft. amsl

Site Location: Childersburg, AL

Project Manager: Billy Cooch

Logged By: Wes Sterling

Drilling Company: Boart Longyear

Driller: Kevin Smith

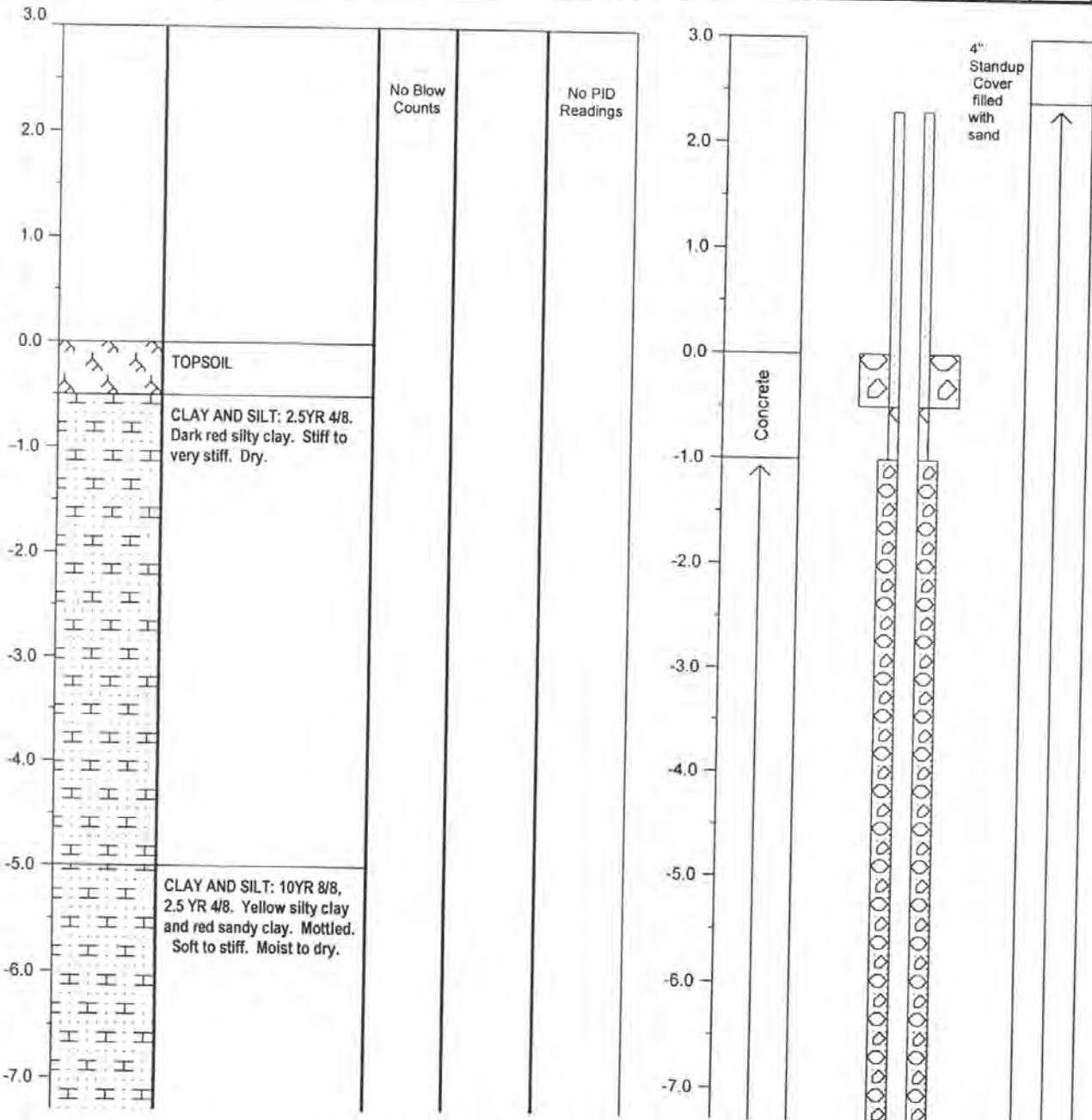
Sampling Method: Core Barrell Sleeve

Drill Rig: GP24-300RS

Drilling Method: Sonic Advancement

Notes: Total depth and DTW at 24 hrs based on TOC elev.

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Boring/Well Log

PROJECT INFORMATION

Boring/Well ID:
B-7/MW-7

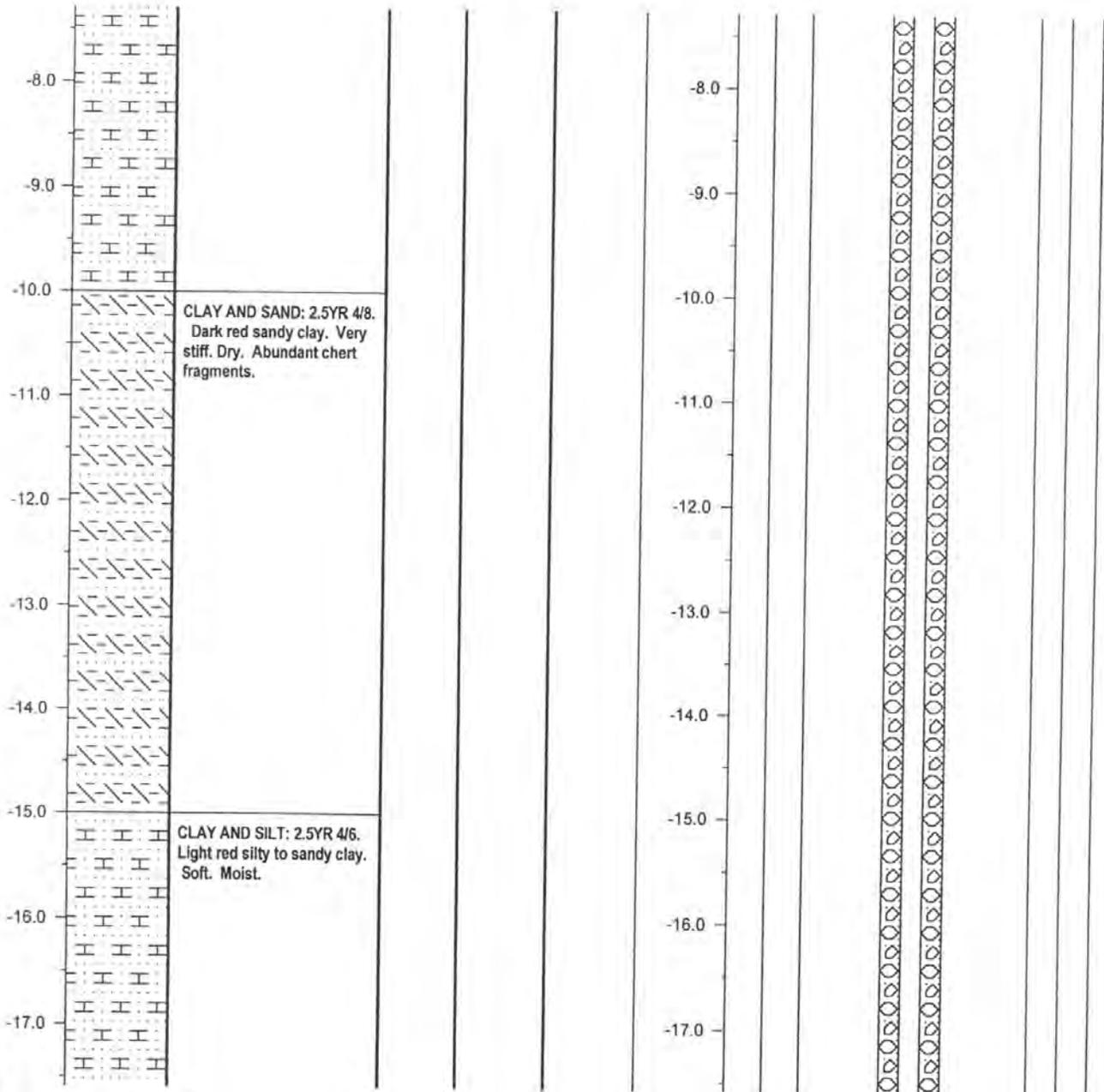
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Boring/Well Log

PROJECT INFORMATION

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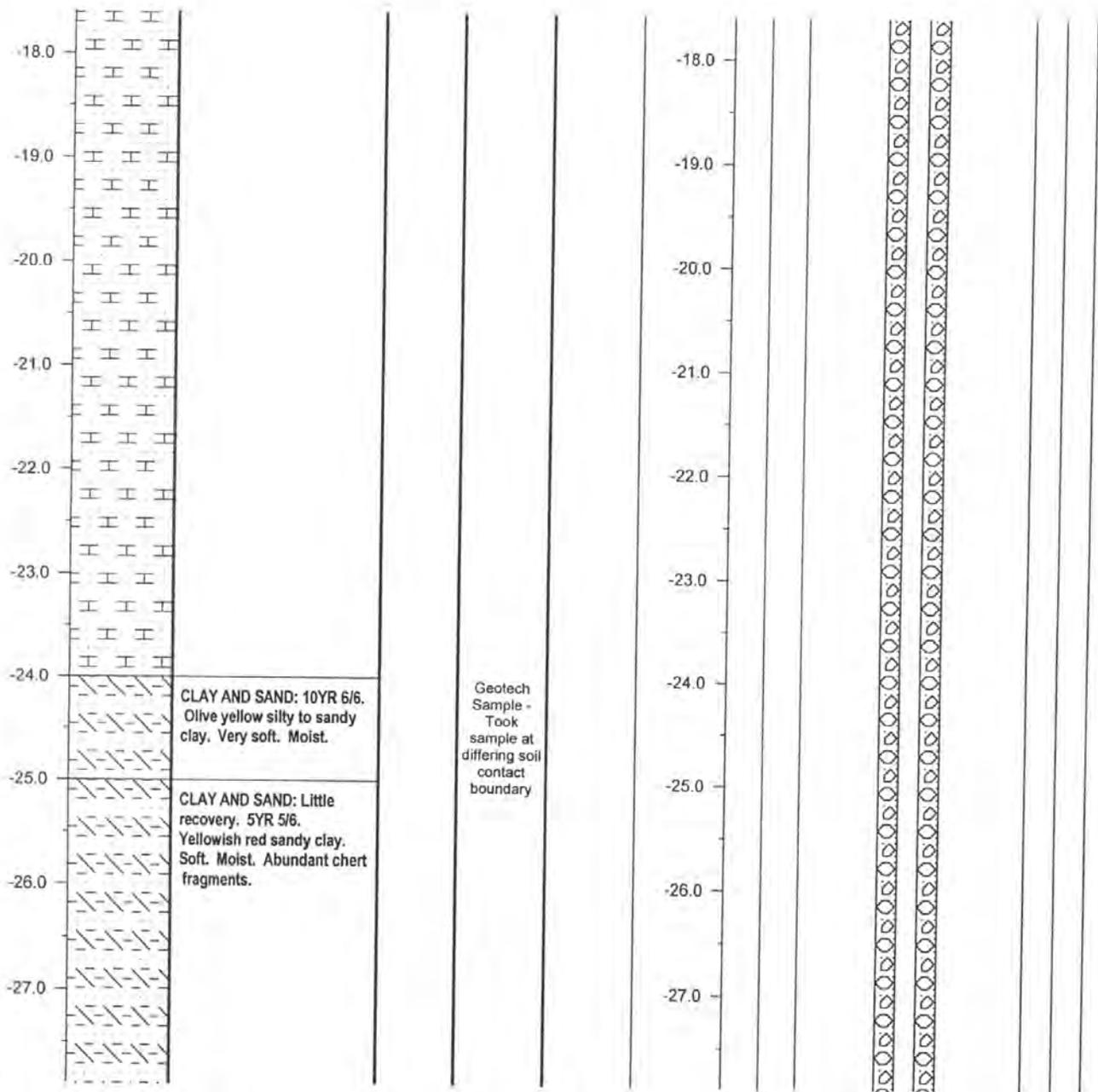
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Boring/Well Log

PROJECT INFORMATION

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B-7/MW-7

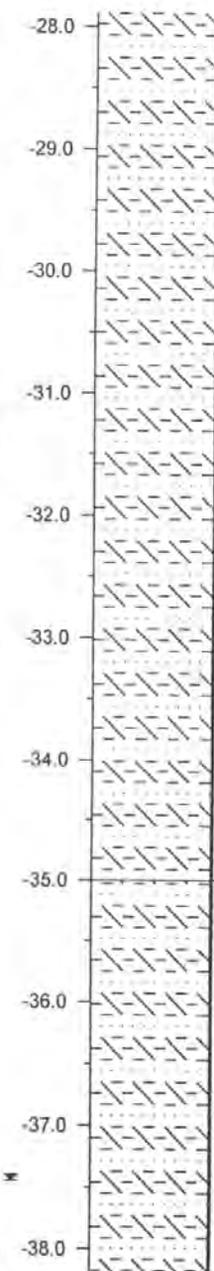
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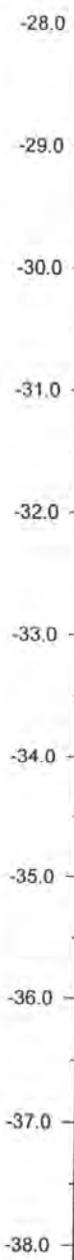
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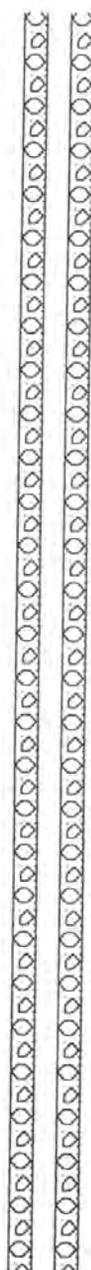
Depth	Lithology	Lithologic Description	Blow Counts	Sample ID	PID	Depth	Annulus Materials	Well Construction	Casing Materials
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CLAY AND SAND: 5YR 5/8.
Yellowish red sandy clay.
Saturated.



Seal and Grout



Sch. 40, 2 in. PVC Riser



Boring/Well Log

PROJECT INFORMATION

Boring/Well ID:
B-7/MW-7

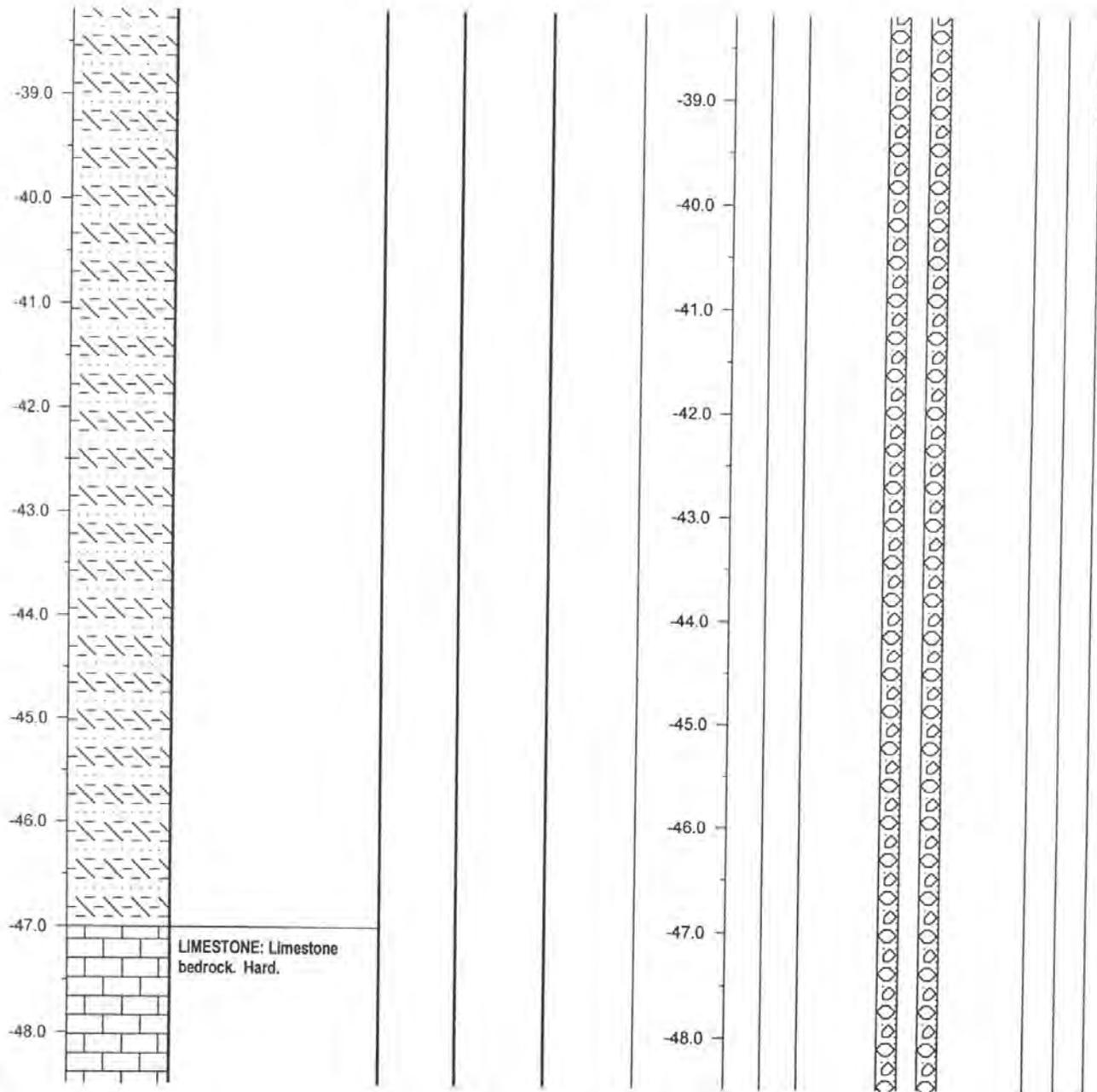
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Boring/Well Log

PROJECT INFORMATION

Boring/Well ID:
B-7/MW-7

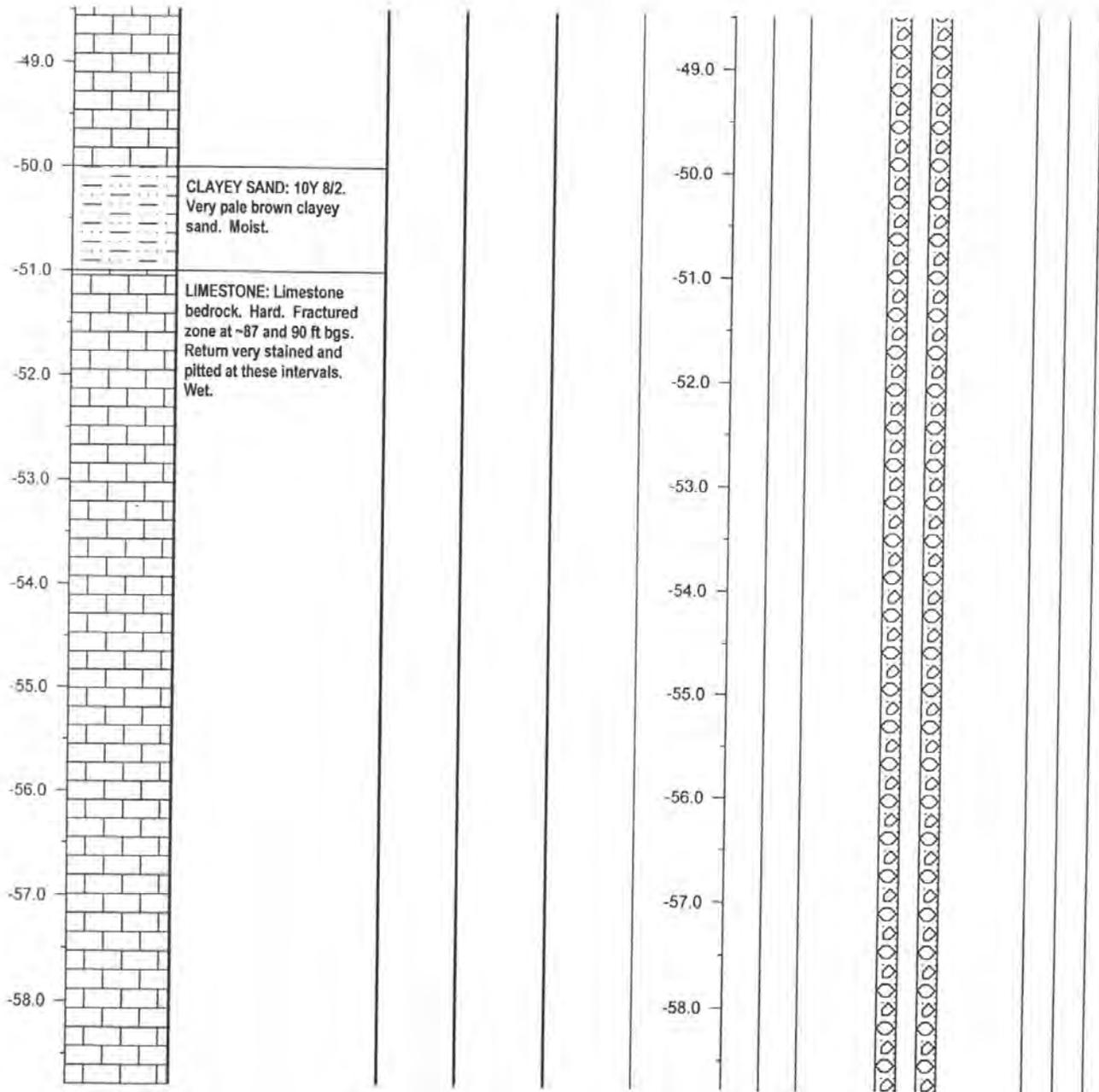
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Boring/Well Log

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B-7/MW-7

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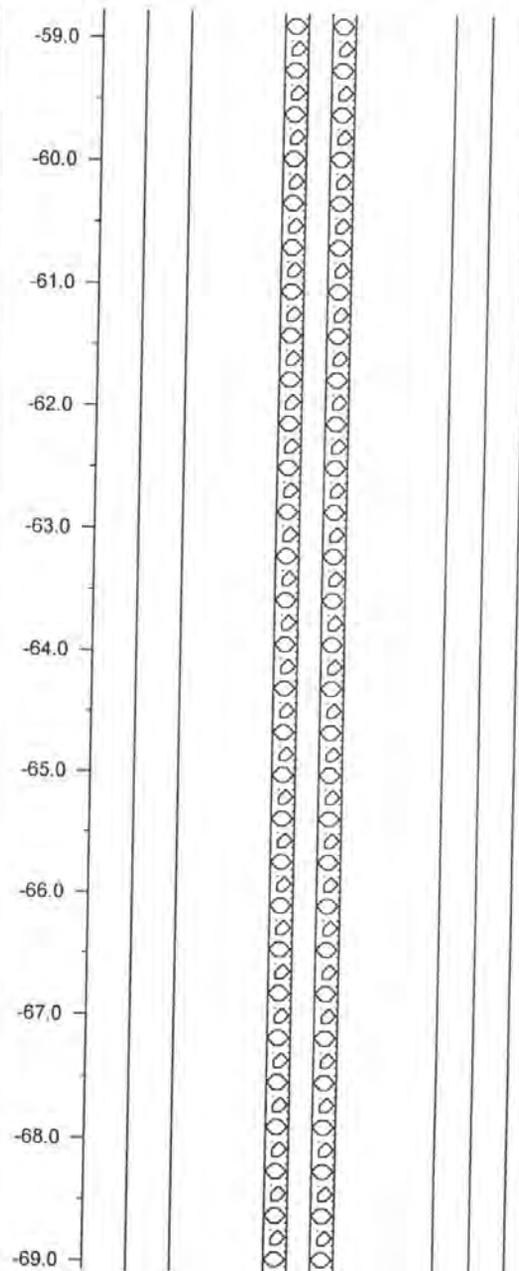
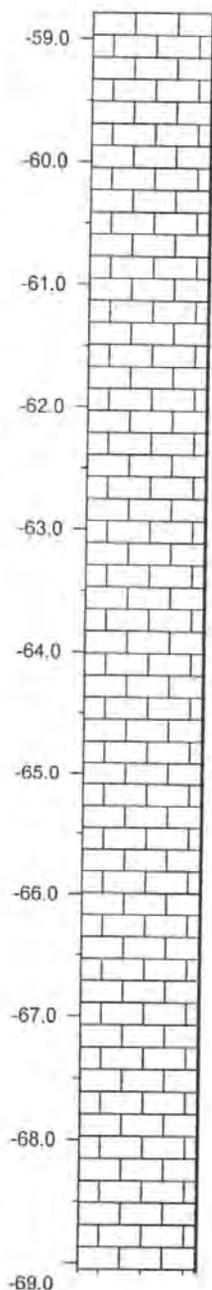
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Drill Rig: GP24-300RS

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Boring/Well Log

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B-7/MW-7

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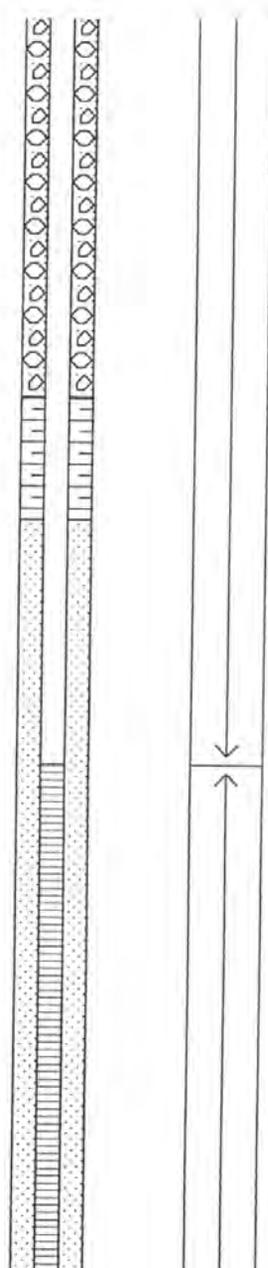
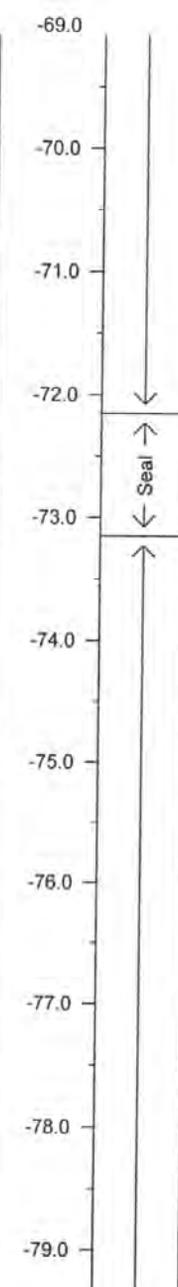
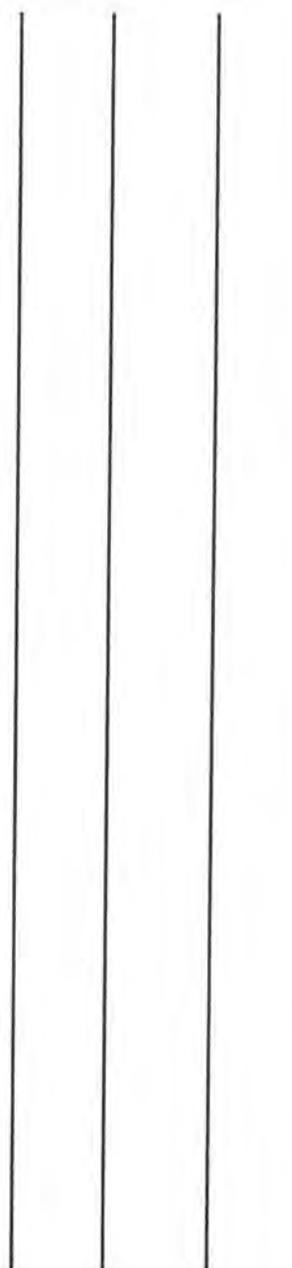
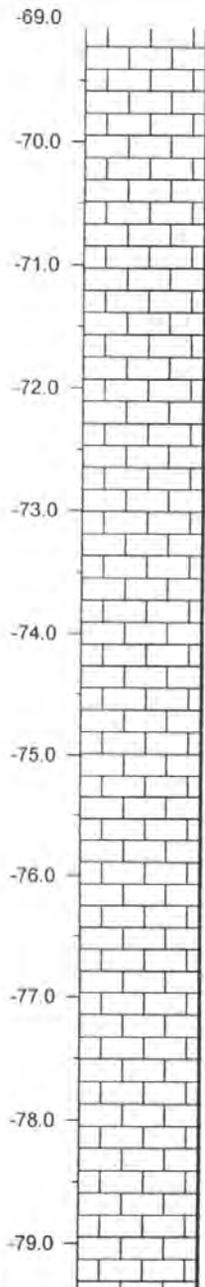
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Boring/Well Log

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B-7/MW-7

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Driller: Kevin Smith

Sampling Method: Core Barrell Sleeve

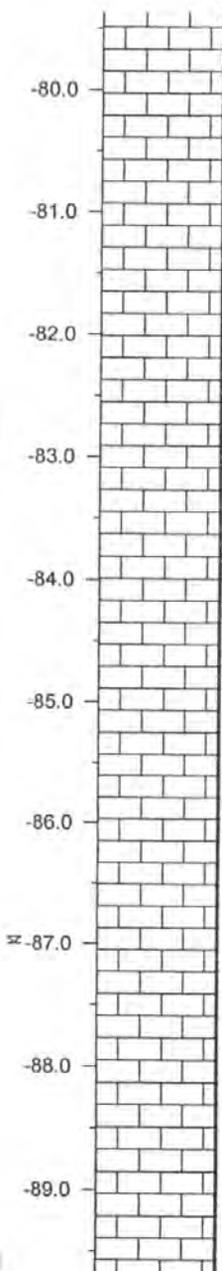
Drill Rig: GP24-300RS

Drilling Method: Sonic Advancement

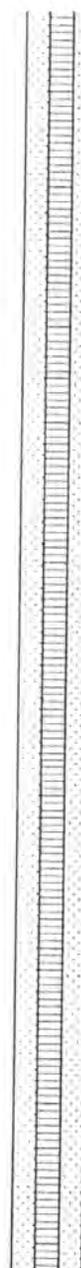
Notes: Total depth and DTW at 24 hrs based on TOC elev.

Page 9 of 10

Depth	Lithology	Lithologic Description	Blow Counts	Sample ID	PID	Depth	Annulus Materials	Well Construction	Casing Materials
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Sand



Sch. 40, 2 in. 0.10 Slotted Screen



Boring/Well Log

PROJECT INFORMATION

Boring/Well ID:

Project: Landfill Expansion Hydrologic Evaluation

B-7/MW-7

Project Number: 07-230119A.01 **Date Drilled:** 2/12/2007

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After 24 Hours: 37.45 ft.

Screened Interval: 95.15 - 75.15 ft. bgs.

Top of Casing Elevation: 438.37 ft. amsl

Site Location: Childersburg, AL

Project Manager: Billy Cooch

Logged By: Wes Sterling

Drilling Company: Boart Longyear

Driller: Kevin Smith

Sampling Method: Core Barrell Sleeve

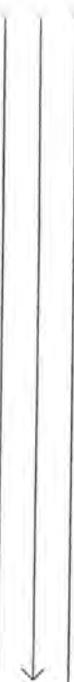
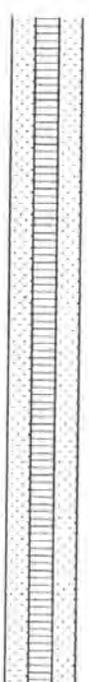
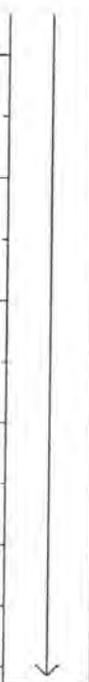
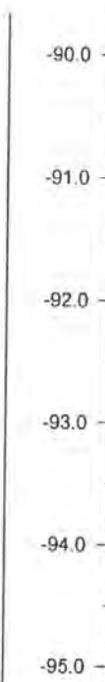
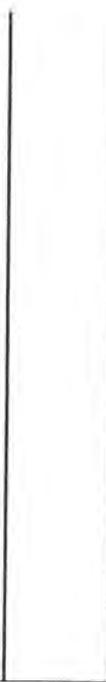
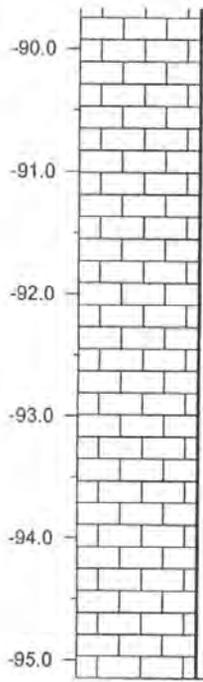
Drill Rig: GP24-300RS

Drilling Method: Sonic Advancement

Notes: Total depth and DTW at 24 hrs based on TOC elev.

Page 10 of 10

Depth	Lithology	Lithologic Description	Blow Counts	Sample ID	PID	Depth	Annulus Materials	Well Construction	Casing Materials
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Boring/Well Log

Boring/Well ID:
B-8/MW-8

PROJECT INFORMATION

Project: Landfill Expansion Hydrologic Evaluation
Project Number: 07-230119A.01 **Date Drilled:** 2/11/2007

Site Location: Childersburg, AL

Project Manager: Billy Cooch

Logged By: Wes Sterling

Drilling Company: Boart Longyear

Driller: Kevin Smith

Sampling Method: Core Barrell Sleeve

Drill Rig: GP24-300RS

Drilling Method: Sonic Advancement

Boring Depth (bgs): 49.38 ft.

Total Depth (TOC): 52.28 ft.

Depth to GW:

During Drilling: 44.0 ft. bgs.

After 24 Hours: 24.50 ft.

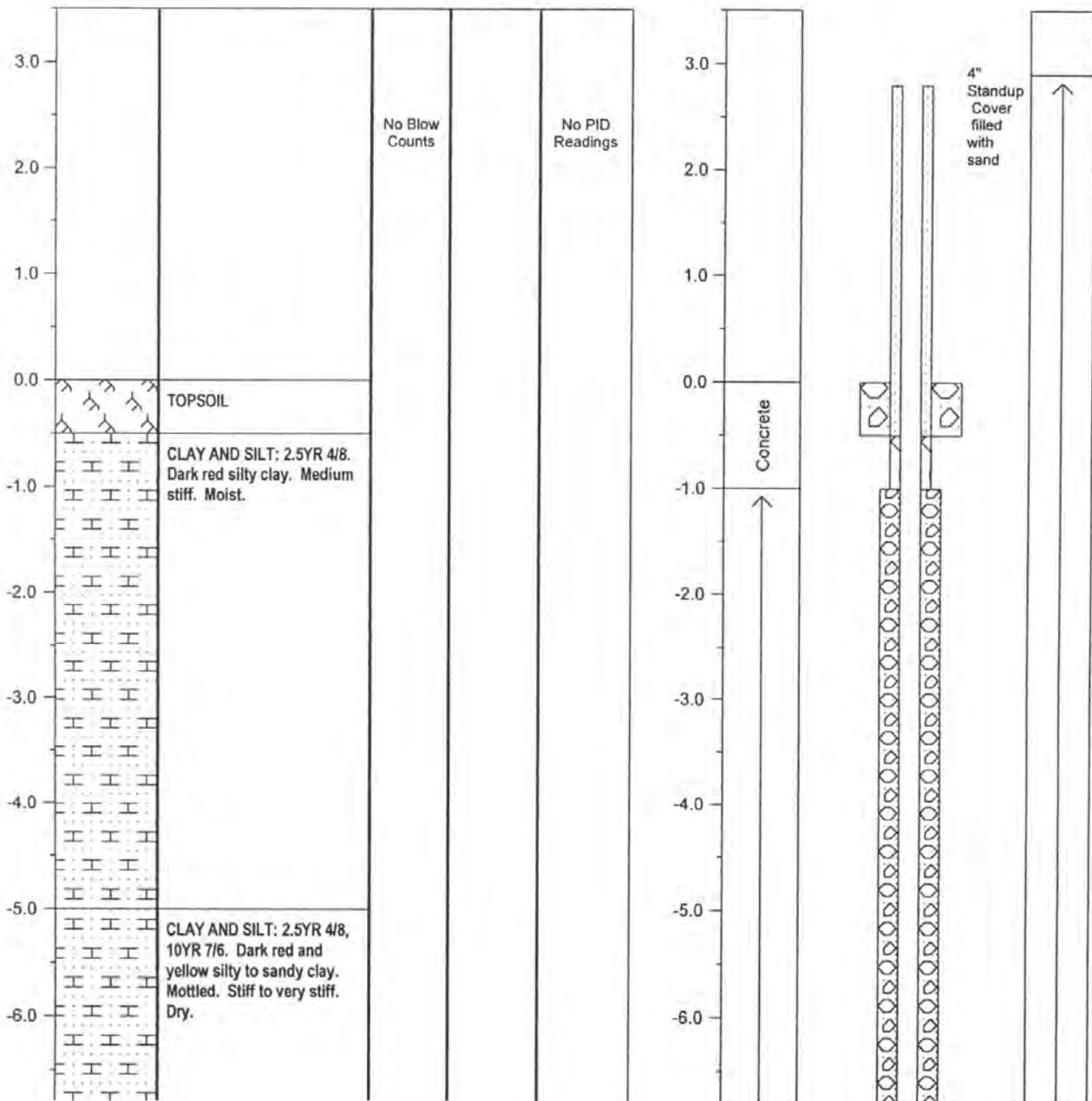
Screened Interval: 49.38 - 34.98 ft. bgs.

Top of Casing Elevation: 432.20 ft. amsl

Notes: Total depth and DTW at 24 hrs based on TOC elev.

Page 1 of 6

Depth	Lithology	Lithologic Description	Blow Counts	Sample ID	PID	Depth	Annulus Materials	Well Construction	Casing Materials
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Boring/Well Log

PROJECT INFORMATION

Boring/Well ID:
B-8/MW-8

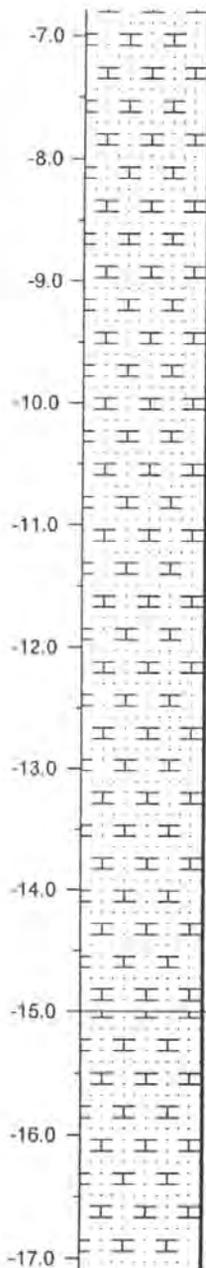
Project: Landfill Expansion Hydrologic Evaluation
Project Number: 07-230119A.01 Date Drilled: 2/11/2007

Boring Depth (bgs) 49.38 ft.
Total Depth (TOC): 52.28 ft.
Depth to GW:
During Drilling: Σ 44.0 ft. bgs.
After 24 Hours: ∇ 24.50 ft.
Screened Interval: 49.38 - 34.98 ft. bgs.
Top of Casing Elevation: 432.20 ft. amsl

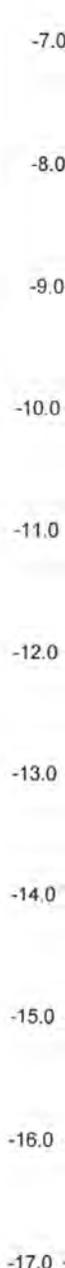
Site Location: Childersburg, AL
Project Manager: Billy Cooch
Logged By: Wes Sterling
Drilling Company: Boart Longyear
Driller: Kevin Smith Sampling Method: Core Barrell Sleeve
Drill Rig: GP24-300RS Drilling Method: Sonic Advancement

Notes: Total depth and DTW at 24 hrs based on TOC elev.

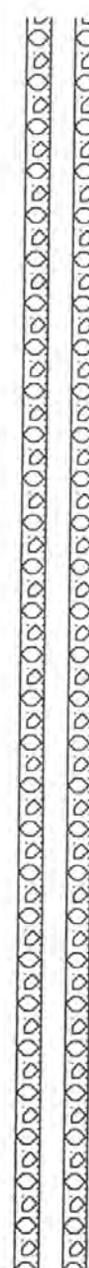
Depth	Lithology	Lithologic Description	Blow Counts	Sample ID	PID	Depth	Annulus Materials	Well Construction	Casing Materials
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CLAY AND SILT: 2.5YR 4/8,
10YR 7/6. Dark red and
yellow silty to sandy clay.
Mottled. Soft. Moist.



Seal and Grout



Sch. 40, 2 in. PVC Riser



Boring/Well Log

PROJECT INFORMATION

Boring/Well ID:
B-8/MW-8

Project: Landfill Expansion Hydrologic Evaluation
Project Number: 07-230119A.01 **Date Drilled:** 2/11/2007

Boring Depth (bgs): 49.38 ft.

Total Depth (TOC): 52.28 ft.

Depth to GW:

During Drilling: 44.0 ft. bgs.

After 24 Hours: 24.50 ft.

Screened Interval: 49.38 - 34.98 ft. bgs.

Top of Casing Elevation: 432.20 ft. amsl

Site Location: Childersburg, AL

Project Manager: Billy Cooch

Logged By: Wes Sterling

Drilling Company: Boart Longyear

Driller: Kevin Smith

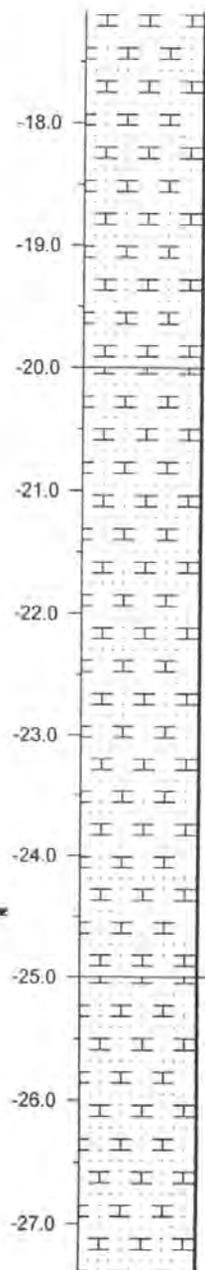
Sampling Method: Core Barrell Sleeve

Drill Rig: GP24-300RS

Drilling Method: Sonic Advancement

Notes: Total depth and DTW at 24 hrs based on TOC elev.

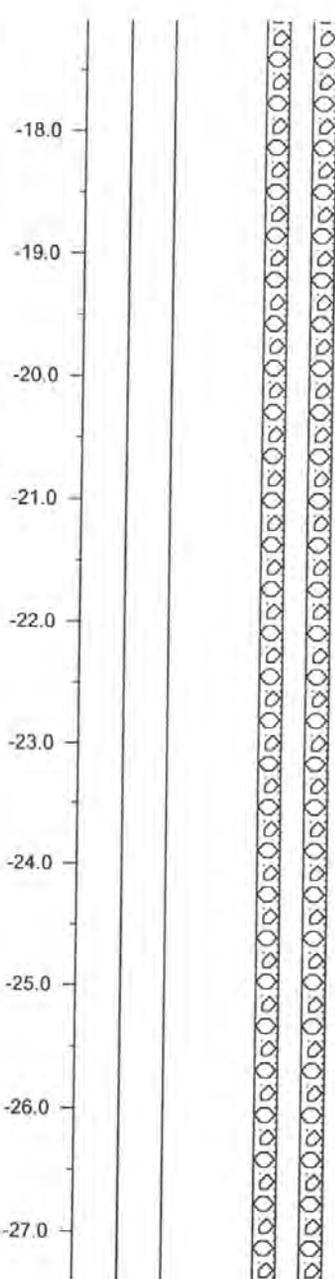
Depth	Lithology	Lithologic Description	Blow Counts	Sample ID	PID	Depth	Annulus Materials	Well Construction	Casing Materials
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CLAY AND SILT: 2.5YR 4/8.
Dark red silty clay. Medium stiff. Moist.

CLAY AND SILT: 7.5YR 6/8.
Reddish yellow silty clay. Soft to medium stiff. Moist.

Geotech Sample - Took sample at differing soil contact boundary





Boring/Well Log

PROJECT INFORMATION

Boring/Well ID:
B-8/MW-8

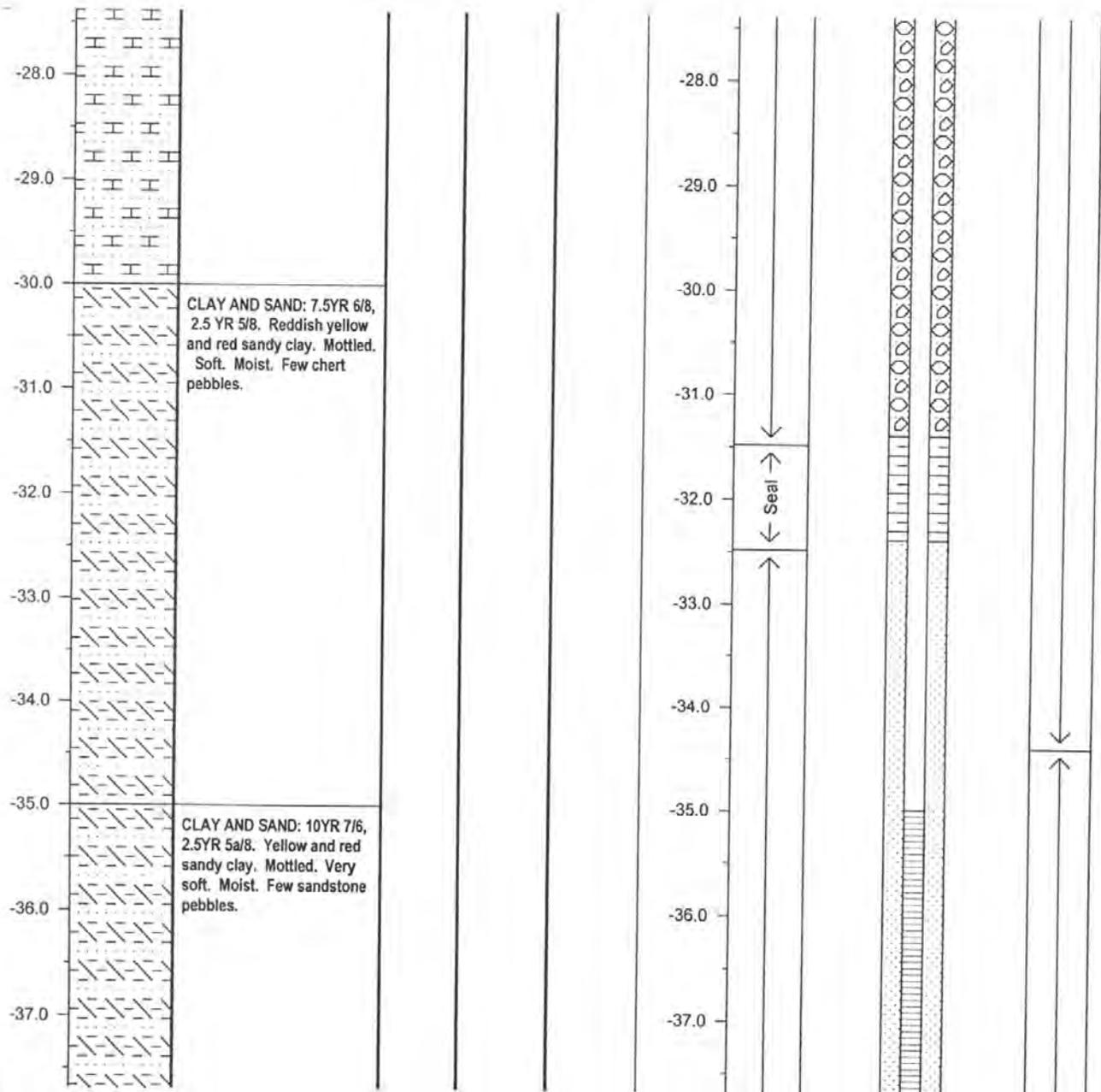
Project: Landfill Expansion Hydrologic Evaluation
 Project Number: 07-230119A.01 Date Drilled: 2/11/2007

Boring Depth (bgs): 49.38 ft.
 Total Depth (TOC): 52.28 ft.
 Depth to GW:
 During Drilling: 44.0 ft. bgs.
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 Top of Casing Elevation: 432.20 ft. amsl

Site Location: Childersburg, AL
 Project Manager: Billy Cooch
 Logged By: Wes Sterling
 Drilling Company: Boart Longyear
 Driller: Kevin Smith Sampling Method: Core Barrel Sleeve
 Drill Rig: GP24-300RS Drilling Method: Sonic Advancement

Notes: Total depth and DTW at 24 hrs based on TOC elev.

Depth	Lithology	Lithologic Description	Blow Counts	Sample ID	PID	Depth	Annulus Materials	Well Construction	Casing Materials
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Boring/Well Log

PROJECT INFORMATION

Boring/Well ID:
B-8/MW-8

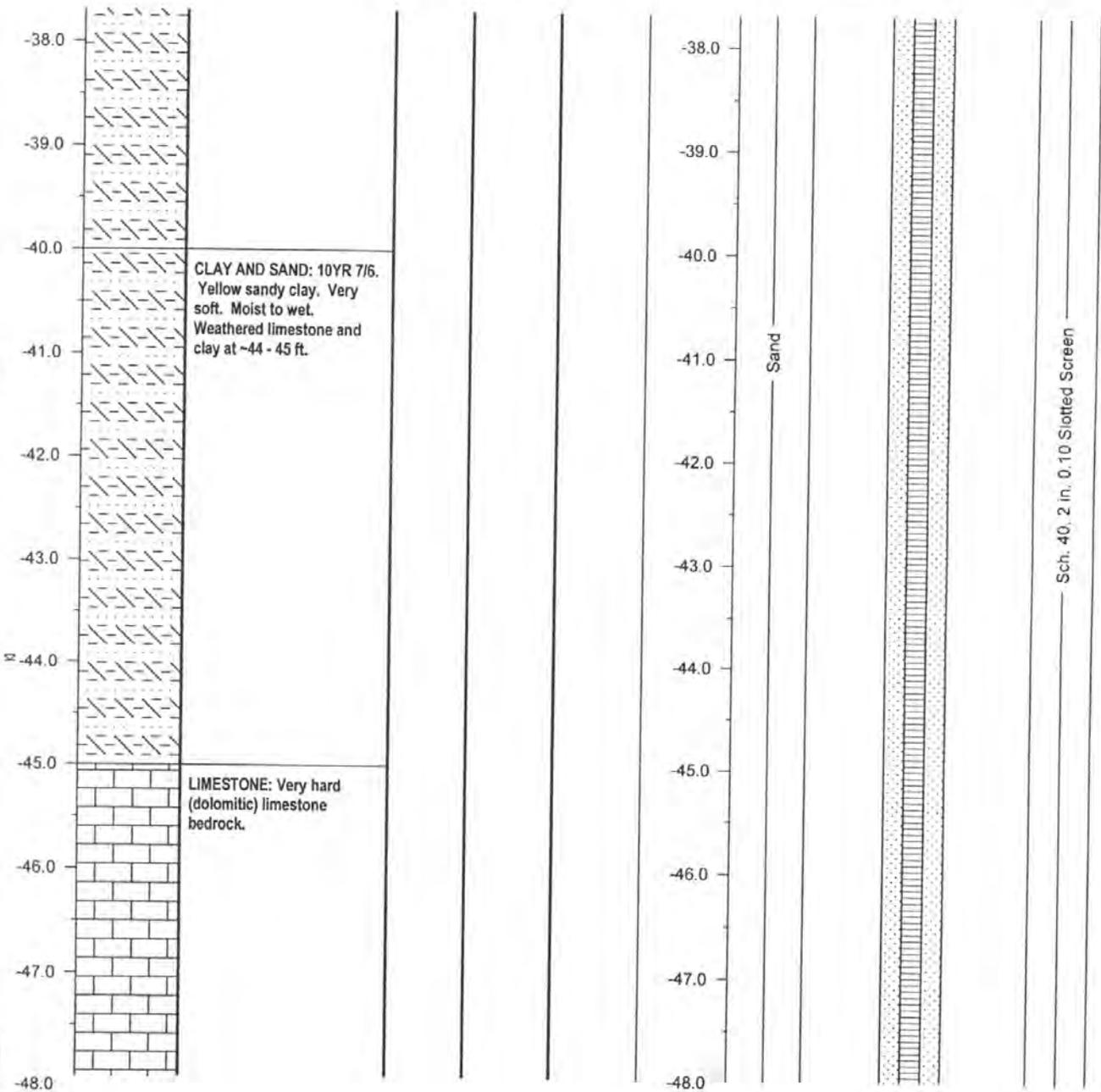
Project: Landfill Expansion Hydrologic Evaluation
 Project Number: 07-230119A.01 Date Drilled: 2/11/2007

Boring Depth (bgs): 49.38 ft.
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Site Location: Childersburg, AL
 Project Manager: Billy Cooch
 Logged By: Wes Sterling
 Drilling Company: Boart Longyear
 Driller: Kevin Smith Sampling Method: Core Barrell Sleeve
 Drill Rig: GP24-300RS Drilling Method: Sonic Advancement

Notes: Total depth and DTW at 24 hrs based on TOC elev.

Depth	Lithology	Lithologic Description	Blow Counts	Sample ID	PID	Depth	Annulus Materials	Well Construction	Casing Materials
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Boring/Well Log

PROJECT INFORMATION

Boring/Well ID:
B-8/MW-8

Project: Landfill Expansion Hydrologic Evaluation
Project Number: 07-230119A.01 **Date Drilled:** 2/11/2007

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Top of Casing Elevation: 432.20 ft. amsl

Site Location: Childersburg, AL

Project Manager: Billy Cooch

Logged By: Wes Sterling

Drilling Company: Boart Longyear

Driller: Kevin Smith

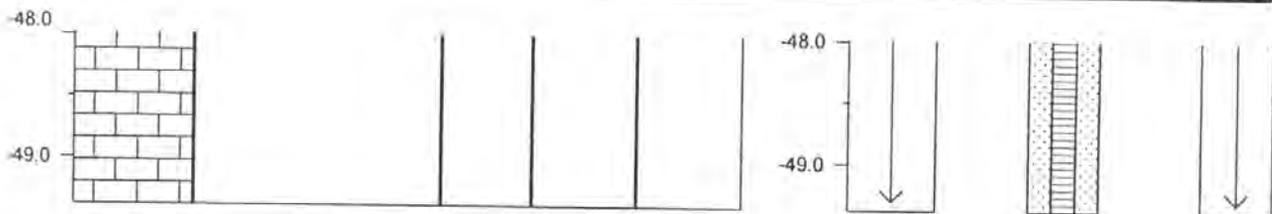
Sampling Method: Core Barrell Sleeve

Drill Rig: GP24-300RS

Drilling Method: Sonic Advancement

Notes: Total depth and DTW at 24 hrs based on TOC elev.

Depth	Lithology	Lithologic Description	Blow Counts	Sample ID	PID	Depth	Annulus Materials	Well Construction	Casing Materials
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APPENDIX C

ADEM APPENDIX I AND II PARAMETER LISTS

335-13-4-APPENDIX I CONSTITUENTS FOR DETECTION MONITORING¹

Common Name²	CAS Number³
pH ⁴	N/A
Specific Conductance ⁴	N/A
Inorganic Constituents	
1. Antimony	Total
2. Arsenic	Total
3. Barium	Total
4. Beryllium	Total
5. Cadmium	Total
6. Chromium	Total
7. Cobalt	Total
8. Copper	Total
9. Lead	Total
10. Mercury	Total
11. Nickel	Total
12. Selenium	Total
13. Silver	Total
14. Thallium	Total
15. Vanadium	Total
16. Zinc	Total
Organic Constituents	
17. Acetone	67-64-1
18. Acrylonitrile	107-13-1
19. Benzene	71-43-2
20. Bromochloromethane	74-97-5
21. Bromodichloromethane	75-27-4
22. Bromoform; Tribromomethane	75-25-2
23. Carbon disulfide	75-15-0
24. Carbon tetrachloride	56-23-5
25. Chlorobenzene	108-90-7
26. Chloroethane; Ethyl chloride	75-00-3
27. Chloroform; Trichloromethane	67-66-3
28. Dibromochloromethane; Chlorodibromomethane	124-48-1
29. 1,2-Dibromo-3-chloropropane (DBCP)	96-12-8
30. 1,2-Dibromoethane; Ethylene dibromide; EDB	106-93-4
31. o-Dichlorobenzene; 1,2-Dichlorobenzene	95-50-1
32. p-Dichlorobenzene; 1,4-Dichlorobenzene	106-46-7
33. trans-1,4-Dichloro-2-butene	110-57-6
34. 1,1-Dichloroethane; Ethylidene chloride	75-34-3
35. 1,2-Dichloroethane; Ethylene dichloride	107-06-2
36. 1,1-Dichloroethylene; 1,1-dichloroethene; Vinylidene chloride	75-35-4
37. cis-1,2-Dichloroethylene; cis-1,2Dichloroethene	156-59-2

38.	trans-1,2-Dichloroethylene; trans-1,2-Dichloroethene	156-60-5
39.	1,2-Dichloropropane; Propylene dichloride	78-87-5
40.	cis-1,3-Dichloropropene	10061-01-5
41.	trans-1,3-Dichloropropene	10061-02-6
42.	Ethylbenzene	100-41-4
43.	2-Hexanone; Methyl butyl ketone	591-78-6
44.	Methyl bromide; Bromomethane	74-83-9
45.	Methyl chloride; Chloromethane	74-87-3
46.	Methylene bromide; Dibromomethane	74-95-3
47.	Methylene chloride; Dichloromethane	75-09-2
48.	Methyl ethyl ketone; MEK; 2-Butanone	78-93-3
49.	Methyl iodide; Iodomethane	74-88-4
50.	4-Methyl-2-pentanone; Methyl isobutyl ketone	108-10-1
51.	Styrene	100-42-5
52.	1,1,1,2-Tetrachloroethane	630-20-6
53.	1,1,2,2-Tetrachloroethane	79-34-5
54.	Tetrachloroethylene; Tetrachloroethene; Perchloroethylene	127-18-4
55.	Toluene	108-88-3
56.	1,1,1-Trichloroethane; Methylchloroform	71-55-6
57.	1,1,2-Trichloroethane	79-00-5
58.	Trichloroethylene; Trichloroethene	79-01-6
59.	Trichlorofluoromethane; CFC-11	75-69-4
60.	1,2,3-Trichloropropane	96-18-4
61.	Vinyl acetate	108-05-4
62.	Vinyl chloride	75-01-4
63.	Xylenes	1330-20-7

Notes

- ¹ This list contains 47 volatile organics for which possible analytical procedure provided in EPA Report SW-846, "Test Methods for Evaluating Solid Waste," Third Edition, November 1986, as revised December 1987, includes Method 8260; and 15 metals for which SW-846 provides either Method 6010 or a method from the 7000 series of methods.
- ² Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.
- ³ Chemical Abstracts Service registry number. Where "Total" is entered, all species in the groundwater that contain this element are included.
- ⁴ State specific requirements.

Author: Russell A. Kelly; Heather Jones.

Statutory Authority: Code of Alabama 1975, §§ 22-27-4, 22-27-7.

History: Effective: November 2, 1993. **Amended:** Effective: July 26, 1996.

Amended: Filed: April 24, 2018; Effective: June 8, 2018.

335-13-4-APPENDIX II LIST OF HAZARDOUS INORGANIC AND ORGANIC CONSTITUENTS¹

Common Name ²	CAS Number ³	Chemical Abstracts Service Index Name ⁴	Suggested Methods ⁵	PQL (µg/L) ⁶
Acenaphthene	83-32-9	Acenaphthylene, 1,2-dihydro-	8100 8270	200 10
Acenaphthylene	208-96-8	Acenaphthylene	8100 8270	200 10
Acetone	67-64-1	2-Propanone	8260	100
Acetonitrile; Methyl cyanide	75-05-8	Acetonitrile	8015	100
Acetophenone	98-86-2	Ethanone, 1-phenyl-	8270	10
2-Acetylaminofluorene; 2-AAF	53-96-3	Acetamide, N-9H-fluoren-2-yl-	8270	20
Acrolein	107-02-8	2-Propenal	8030 8260	5 100
Acrylonitrile	107-13-1	2-Propenenitrile	8030 8260	5 200
Aldrin	309-00-2	1,4,5,8,-Dimethanonaphthalene 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-(1a,4a, 4aß,5a,8a,8aß)-	8080 8270	0.05 10
Allyl chloride	107-05-1	1-Propene, 3-chloro-	8010 8260	5 10
4-Aminobiphenyl	92-67-1	[1,1'-Biphenyl]-4-amine	8270	20
Anthracene	120-12-7	Anthracene	8100 8270	200 10
Antimony	(Total)	Antimony	6010 7040 7041	300 2000 30
Arsenic	(Total)	Arsenic	6010 7060 7061	500 10 20
Barium	(Total)	Barium	6010 7080	20 1000
Benzene	71-43-2	Benzene	8020 8021 8260	2 0.1 5
Benzo[a]anthracene; Benzanthracene	56-55-3	Benz[a]anthracene	8100 8270	200 10
Benzo[b]fluoranthene	205-99-2	Benz[e]acephenanthrylene	8100 8270	200 10
Benzo[k]fluoranthene	207-08-9	Benzo[k]fluoranthene	8100 8270	200 10
Benzo[ghi]perylene	191-24-2	Benzo[ghi]perylene	8100 8270	200 10
Benzo[a]pyrene	50-32-8	Benzo[a]pyrene	8100 8270	200 10
Benzyl alcohol	100-51-6	Benzenemethanol	8270	20
Beryllium	(Total)	Beryllium	6010 7090 7091	3 50 2
alpha-BHC	319-84-6	Cyclohexane, 1,2,3,4,5,6-hexachloro- (1a,2a,3ß,4a,5ß,6ß)-	8080 8270	0.05 10
beta-BHC	319-85-7	Cyclohexane, 1,2,3,4,5,6-hexachloro- (1a,2ß,3a,4ß,5a,6ß)-	8080 8270	0.05 20
delta-BHC	319-86-8	Cyclohexane, 1,2,3,4,5,6-hexachloro-(1a,2a,3a,4ß,5a,6ß)-	8080 8270	0.1 20
gamma-BHC; Lindane	58-89-9	Cyclohexane, 1,2,3,4,5,6-hexachloro- (1a,2a,3ß,4a,5a,6ß)-	8080 8270	0.05 20
Bis(2-chloroethoxy)methane	111-91-1	Ethane, 1,1'-[methylenebis(oxy)] bis[2-chloro-	8110 8270	5 10

Bis(2-chloroethyl) ether; Dichloroethyl ether	111-44-4	Ethane, 1,1 ¹ -oxybis[2-chloro-	8110 8270	3 10
Bis(2-chloro-1-methylethyl) ether 2,21-Dichlorodisopropyl ether; DCIP, See note 7	108-60-1	Propane, 2,2 ¹ -oxybis[1-chloro-	8110 8270	10 10
Bis(2-ethylhexyl) phthalate	117-81-7	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester	8060	20
Bromochloromethane; Chlorobromomethane	74-97-5	Methane, bromochloro-	8021 8260	0.1 5
Bromodichloromethane; Dibromochloromethane	75-27-4	Methane, bromodichloro-	8010 8021 8260	1 0.2 5
Bromoform; Tribromomethane	75-25-2	Methane, tribromo-	8010 8021 8260	2 15 5
4-Bromophenyl phenyl ether	101-55-3	Benzene, 1-bromo-4-phenoxy-	8110 8270	25 10
Butyl benzyl phthalate; Benzyl butyl phthalate	85-68-7	1,2-Benzenedicarboxylic acid, butyl phenylmethyl ester	8060 8270	5 10
Cadmium	(Total)	Cadmium	6010 7130 7131	40 50 1
Carbon disulfide	75-15-0	Carbon disulfide	8260	100
Carbon tetrachloride	56-23-5	Methane, tetrachloro-	8010 8021 8260	1 0.1 10
Chlordane	See note 8	4,7-Methano-1H-indene, 1,2,4,5, 6,7,8,8- octachloro- 2,3,3a,4,7,7a-hexahydro-	8080 8270	0.1 50
p-Chloroaniline	106-47-8	Benzenamine, 4-chloro-	8270	20
Chlorobenzene	108-90-7	Benzene, chloro-	8010 8020 8021 8260	2 2 0.1 5
Chlorobenzilate	510-15-6	Benzeneacetic acid, 4-chloro-a- (4-chlorophenyl)-a-hydroxy- ethyl ester	8270	10
p-Chloro-m-cresol; 4-Chloro-3- methylphenol	59-50-7	Phenol, 4-chloro-3-methyl-	8040 8270	5 20
Chloroethane; Ethyl chloride	75-00-3	Ethane, chloro-	8010 8021 8260	5 1 10
Chloroform; Trichloromethane	67-66-3	Methane, trichloro-	8010 8021 8260	0.5 0.2 5
2-Chloronaphthalene	91-58-7	Naphthalene, 2-chloro-	8120 8270	10 10
2-Chlorophenol	95-57-8	Phenol, 2-chloro-	8040 8270	5 10
4-Chlorophenyl phenyl ether	7005-72-3	Benzene, 1-chloro-4-phenoxy-	8110 8270	40 10
Chloroprene	126-99-8	1,3-Butadiene, 2-chloro-	8010 8260	50 20
Chromium	(Total)	Chromium	6010 7190 7191	70 500 10
Chrysene	218-01-9	Chrysene	8100 8270	200 10
Cobalt	(Total)	Cobalt	6010 7200 7201	70 500 10
Copper	(Total)	Copper	6010 7210 7211	60 200 10
m-Cresol; 3-methylphenol	108-39-4	Phenol, 3-methyl-	8270	10

o-Cresol; 2-methylphenol	95-48-7	Phenol, 2-methyl-	8270	10
p-Cresol; 4-methylphenol	106-44-5	Phenol, 4-methyl-	8270	10
Cyanide	57-12-5	Cyanide	8270	10
2,4-D; 2,4-Dichlorophenoxyacetic acid	94-75-7	Acetic acid, (2,4-dichlorophenoxy)-	8150	10
4,4 ¹ -DDD	72-54-8	Benzene, 1,1 ¹ -(2,2-dichloroethylidene) bis[4-chloro-	8080 8270	0.1 10
4,4 ¹ -DDE	72-55-9	Benzene, 1,1 ¹ -(dichloroethylenylidene)bis[4-chloro-	8080 8270	0.05 10
4,4 ¹ -DDT	50-29-3	Benzene, 1,1 ¹ -(2,2,2-trichloroethylidene)bis[4-chloro-	8080 8270	0.1 10
Diallate	2303-16-4	Carbamothioic acid, bis(1-methyl ethyl)-,S-(2,3-dichloro-2-propenyl) ester	8270	10
Dibenz[a,h]anthracene	53-70-3	Dibenz[a,h]anthracene	8100 8270	200 10
Dibenzofuran	132-64-9	Dibenzofuran	8270	10
Dibromochloromethane; Chlorodibromomethane	124-48-1	Methane, dibromochloro-	8010 8021 8260	1 0.3 5
1,2-Dibromo-3-chloropropane; DBCP	96-12-8	Propane, 1,2-dibromo-3-chloro-	8011 8021 8260	0.1 30 25
1,2-Dibromoethane; Ethylene dibromide; EDB	106-93-4	Ethane, 1,2-dibromo-	8011 8021 8260	0.1 10 5
Di-n-butyl phthalate	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester	8060 8270	5 10
o-Dichlorobenzene; 1,2-Dichlorobenzene	95-50-1	Benzene, 1,2-dichloro-	8010 8020 8021 8120 8260 8270	2 5 0.5 10 5 10
m-Dichlorobenzene; 1,3-Dichlorobenzene	541-73-1	Benzene, 1,3-Dichloro-	8010 8020 8021 8120 8260 8270	5 5 0.2 10 5 10
p-Dichlorobenzene; 1,4-Dichlorobenzene	106-46-7	Benzene, 1,4-dichloro-	8010 8020 8021 8120 8260 8270	2 5 0.1 15 5 10
3,3 ¹ -Dichlorobenzidine	91-94-1	[1,1 ¹ -Biphenyl]-4,4 ¹ -diamine, 3,3 ¹ -dichloro-	8270	20
trans-1,4-Dichloro-2-butene	110-57-6	2-Butene, 1,4-dichloro-, (E)-	8260	100
Dichlorodifluoromethane; CFC-12	75-71-8	Methane, dichlorodifluoro-	8021 8260	0.5 5
1,1-Dichloroethane; Ethyldidene chloride	75-34-3	Ethane, 1,1-dichloro-	8010 8021 8260	1 0.5 5
1,2-Dichloroethane; Ethylene dichloride	107-06-2	Ethane, 1,1-dichloro-	8010 8021 8260	0.5 0.3 5
1,1-Dichloroethylene; 1,1-Dichloroethene; Vinylidene chloride	75-35-4	Ethene, 1,1-dichloro-	8010 8021 8260	1 0.5 5
cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene	156-59-2	Ethene, 1,2-dichloro-,(Z)-	8021 8260	0.2 5
trans-1,2-Dichloroethylene; trans-1,2-Dichloroethene	156-60-5	Ethene, 1,2-dichloro-,(E)-	8010 8021	1 0.5

			8260	5
2,4-Dichlorophenol	120-83-2	Phenol, 2,4-dichloro-	8040 8270	5 10
2,6-Dichlorophenol	87-65-0	Phenol, 2,6-dichloro-	8270	10
1,2-Dichloropropane; Propylene dichloride	78-87-5	Propane, 1,2-dichloro-	8010 8021 8260	0.5 0.05 5
1,3-Dichloropropane; Trimethylene dichloride	142-28-9	Propane, 1,3-dichloro-	8021 8260	0.3 5
2,2-Dichloropropane; Isopropylidene chloride	594-20-7	Propane, 2,2-dichloro-	8021 8260	0.5 15
1,1-Dichloropropene	563-58-6	1-Propene, 1,1-dichloro-	8021 8260	0.2 5
cis-1,3-Dichloropropene	10061-01-5	1-Propene, 1,3-dichloro-, (Z)-	8010 8260	20 10
trans-1,3-Dichloropropene	10061-02-6	1-Propene, 1,3-dichloro-, (E)-	8010 8260	5 10
Dieldrin	60-57-1	2,7:3,6-Dimethanonaphth[2,3-b] oxirene, 3,4,5,6,9,9-hexa, chloro-1a, 2,2a,3,6,6a,7,7a-octahydro-, (1aa, 2β,2aa,3β, 6β,6aa,7β,7aa)-	8080 8270	0.05 10
Diethyl phthalate	84-66-2	1,2-Benzenedicarboxylic acid, diethyl ester	8060 8270	5 10
0,0-Diethyl 0-2-pyrazinyl; phosphorothioate Thionazin	297-97-2	Phosphorothioic acid, 0,0-diethyl 0-pyrazinyl ester	8141 8270	5 20
Dimethoate	60-51-5	Phosphorodithioic acid, 0,0-dimethyl S-[2-(methylamino)-2-oxoethyl] ester.	8141 8270	3 20
p-(Dimethylamino)azobenzene	60-11-7	Benzenamine, N,N-dimethyl-4-(phenylazo)-	8270	10
7,12-Dimethylbenz[a]anthracene	57-97-6	Benz[a]anthracene, 7,12-dimethyl-	8270	10
3,3'-Dimethylbenzidine	119-93-7	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-	8270	10
2,4-Dimethylphenol; m-Xylenol	105-67-9	Phenol, 2,4-dimethyl-	8040 8270	5 10
Dimethyl phthalate	131-11-3	1,2-Benzenedicarboxylic acid, dimethyl ester	8060 8270	5 10
m-Dinitrobenzene	99-65-0	Benzene, 1,3-dinitro-	8270	20
4,6-Dinitro-o-cresol 4,6-Dinitro- 2-methylphenol	534-52-1	Phenol, 2-methyl-4,6-dinitro-	8040 8270	150 50
2,4-Dinitrophenol	51-28-5	Phenol, 2,4-dinitro-	8040 8270	150 50
2,4-Dinitrotoluene	121-14-2	Benzene, 1-methyl-2,4-dinitro-	8090 8270	0.2 10
2,6-Dinitrotoluene	606-20-2	Benzene, 2-methyl-1,3-dinitro-	8090 8270	0.1 10
Dinoseb; DNBP; 2-sec-Butyl-4,6-dinitrophenol	88-85-7	Phenol, 2-(1-methylpropyl)-4,6-dinitro-	8150 8270	1 20
Di-n-octyl phthalate	117-84-0	1,2-Benzenedicarboxylic acid, dioctyl ester	8060 8270	30 10
Diphenylamine	122-39-4	Benzenamine, N-phenyl-	8270	10
Disulfoton	298-04-4	Phosphorodithioic acid, 0,0-diethyl S-[2-(ethylthio)ethyl] ester	8140 8141 8270	2 0.5 10
Endosulfan I	959-98-8	6,9-Methano-2,4,3-benzodioxathi epin, 6,7,8,9,10,10-hexachloro-1, 5,5a, 6,9,9a-hexahydro-, 3-oxide,	8080 8270	0.1 20
Endosulfan II	33213-65-9	6,9-Methano-2,4,3-benzodioxathi epin, 6,7,8,9,10,10-hexachloro-	8080 8270	0.05 20

		1,5,5a,6,9,9a-hexahydro-,3-oxide,(3a, 5aa, 6ß,9ß,9aa)-		
Endosulfan sulfate	1031-07-8	6,9-Methano-2,4,3-benzodioxathiepin,6,7,8,9,10,10-hexachloro-1,5,5a, 6,9,9a-hexahydro-3-3-dioxide.	8080	0.5
			8270	10
Endrin	72-20-8	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aa,2ß,2aß,3a,6a,6aß,7ß,7aa)-	8080	0.1
			8270	20
Endrin aldehyde	7421-93-4	1,2,4-Methenocyclopentac[d]penta[lene-5-carboxaldehyde, 2,2a,3,3,4, 7-hexachlorodecahydro-, (1a,2ß, 2aß, 4ß,4aß,5ß, 6aß,6bß,7R*)-	8080	0.2
			8270	10
Ethylbenzene	100-41-4	Benzene, ethyl-	8020	2
			8221	0.05
			8260	5
Ethyl methacrylate	97-63-2	2-Propenoic acid, 2-methyl-, ethyl ester	8015	5
			8260	10
			8270	10
Ethyl methanesulfonate	62-50-0	Methanesulfonic acid, ethyl ester	8270	20
Famphur	52-85-7	Phosphorothioic acid, 0-[4-[[dimethylamino)sulfonyl]phenyl] 0,0-dimethyl ester	8270	20
Fluoranthene	206-44-0	Fluoranthene	8100	200
			8270	10
Fluorene	86-73-7	9H-Fluorene	8100	200
			8270	10
Heptachlor	76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8, 8-heptachloro-3a,4,7,7a-tetrahydro-	8080	0.05
			8270	10
Heptachlor epoxide	1024-57-3	2,5-Methano-2H-indeno[1,2-b]oxirene, 2,3,4,5,6,7,7-heptachloro-1a, 1b,5,5a,6,6a-hexahydro-,(1aa,1bß, 2a,5a, 5aß,6ß,6aa)	8080	1
			8270	10
Hexachlorobenzene	118-74-1	Benzene, hexachloro-	8120	0.5
			8270	10
Hexachlorobutadiene	87-68-3	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	8021	0.5
			8120	5
			8260	10
			8270	10
Hexachlorocyclopentadiene	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	8120	5
			8270	10
Hexachloroethane	67-72-1	Ethane, hexachloro-	8120	0.5
			8260	10
			8270	10
Hexachloropropene	1888-71-7	1-Propene, 1,1,2,3,3,3-hexachloro-	8270	10
2-Hexanone; Methyl butyl ketone	591-78-6	2-Hexanone	8260	50
Indeno(1,2,3-cd)pyrene	193-39-5	Indeno(1,2,3-cd)pyrene	8100	200
			8270	10
Isobutyl alcohol	78-83-1	1-Propanol, 2-methyl-	8015	50
			8240	100
Isodrin	465-73-6	1,4,5,8-Dimethanonaphthalene,1,2,	8270	20

		3,4,10,10- hexachloro-1,4,4a,5,8,8a hexahydro-(1a,4a,4aß,5ß,8ß,8aß)-	8260	10
Isophorone	78-59-1	2-Cyclohexen-1-one, 3,5,5-trimethyl-	8090 8270	60 10
Isosafrole	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-	8270	10
Kepone	143-50-0	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a, 5b,6-decachlorooctahydro-	8270	20
Lead	(Total)	Lead	6010 7420 7421	400 1000 10
Mercury	(Total)	Mercury	7470	2
Methacrylonitrile	126-98-7	2-Propenenitrile, 2-methyl-	8015 8260	5 100
Methapyrilene	91-80-5	1,2-ethanediamine,N.N.-dimethyl-N ¹ -2-pyridinyl-N1/2-thienyl-methyl-	8270	100
Methoxychlor	72-43-5	Benzene, 1,1 ¹ -(1,2,2, trichloroethylidene) bis[4-methoxy-	8080 8270	2 10
Methyl bromide; Bromomethane	74-83-9	Methane, bromo-	8010 8021	20 10
Methyl chloride; Chloromethane	74-87-3	Methane, chloro-	8010 8021	1 0.3
3-Methylcholanthrene	56-49-5	Benz[j]aceanthrylene, 1,2-dihydro-3- methyl-	8270	10
Methyl ethyl ketone; MEK; 2-Butanone	78-93-3	2-Butanone	8015 8260	10 100
Methyl iodide; iodomethane	74-88-4	Methane,iodo-	8010 8260	40 10
Methyl methacrylate	80-62-6	2-Propenoic acid, 2-methyl-, methyl ester	8015 8260	2 30
Methyl methanesulfonate	66-27-3	Methanesulfonic acid, methyl ester	8270	10
2-Methylnaphthalene	91-57-6	Naphthalene, 2-methyl-	8270	10
Methyl parathion;Parathion methyl	298-00-0	Phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester	8140 8141 8270	0.5 1 10
4-Methyl-2-pentanone; Methyl isobutyl ketone	108-10-1	2-Pentanone, 4-methyl-	8015 8260	5 100
Methylene bromide; Dibromomethane	74-95-3	Methane, dibromo-	8010 8021 8260	15 20 10
Methylene chloride; Dichloromethane	75-09-2	Methane, dichloro-	8010 8021 8260	5 0.2 10
Naphthalene	91-20-3	Naphthalene	8021 8100 8260 8270	0.5 200 5 10
1,4-Naphthoquinone	130-15-4	1,4-Naphthalenedione	8270	10
1-Naphthylamine	134-32-7	1-Naphthalenamine	8270	10
2-Naphthylamine	91-59-8	2-Naphthalenamine	8270	10
Nickel	(Total)	Nickel	6010 7520	150 400
o-Nitroaniline; 2-Nitroaniline	88-74-4	Benzenamine, 2-nitro-	8270	50
m-Nitroaniline; 3-Nitroaniline	99-09-2	Benzenamine, 3-nitro-	8270	50
p-Nitroaniline; 4-Nitroaniline	100-01-6	Benzenamine, 4-nitro	8270	20
Nitrobenzene	98-95-3	Benzene, nitro-	8090 8270	40 10

o-Nitrophenol; 2-Nitrophenol	88-75-5	Phenol, 2-nitro-	8040 8270	5 10
p-Nitrophenol; 4-Nitrophenol	100-02-7	Phenol, 4-nitro-	8040 8270	10 50
N-Nitrosodi-n-butylamine	924-16-3	1-Butanamine, N-butyl-N-nitroso-	8270	10
N-Nitrosodiethylamine	55-18-5	Ethanamine, N-ethyl-N-nitroso-	8270	20
N-Nitrosodimethylamine	62-75-9	Methanamine, N-methyl-N-nitroso-	8070	2
N-Nitrosodiphenylamine	86-30-6	Benzenamine, N-nitroso-N-phenyl-	8070	5
N-Nitrosodipropylamine; N-Nitroso- N- dipropylamine; Di-n-propylnitrosamine	621-64-7	1-Propanamine, N-nitroso-N-propyl-	8070	10
N-Nitrosomethylethalamine	10595-95-6	Ethanamine, N-methyl-N-nitroso-	8270	10
N-Nitrosopiperidine	100-75-4	Piperidine, 1-nitroso-	8270	20
N-Nitrosopyrrolidine	930-55-2	Pyrrolidine, 1-nitroso-	8270	40
5-Nitro-o-toluidine	99-55-8	Benzenamine, 2-methyl-5-nitro-	8270	10
Parathion	56-38-2	Phosphorothioic acid, 0,0-diethyl 0-(4-nitrophenyl) ester	8141 8270	0.5 10
Pentachlorobenzene	608-93-5	Benzene, pentachloro-	8270	10
Pentachloronitrobenzene	82-68-8	Benzene, pentachloronitro-	8270	20
Pentachlorophenol	87-86-5	Phenol, pentachloro-	8040 8270	5 50
Phenacetin	62-44-2	Acetamide, N-(4-ethoxyphenyl)	8270	20
Phenanthrene	85-01-8	Phenanthrene	8100 8270	200 10
Phenol	108-95-2	Phenol	8040	1
p-Phenylenediamine	106-50-3	1,4-Benzenediamine	8270	10
Phorate	298-02-2	Phosphorodithioic acid, 0,0-diethyl-S-[(ethylthio)methyl] ester	8140 8141 8270	2 0.5 10
Polychlorinated biphenyls; PCBs;Aroclors	See Note 9	1,1'-Biphenyl, chloro derivatives	8080 8270	50 200
Pronamide	23950-58-5	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-	8270	10
Propionitrile; Ethyl cyanide	107-12-0	Propanenitrile	8015 8260	60 150
Pyrene	129-00-0	Pyrene	8100 8270	200 10
Safrole	94-59-1	1,3-Benzodioxole, 5-(2-propenyl)-	8270	10
Selenium	(Total)	Selenium	6010 7740 7741	750 20 20
Silver	(Total)	Silver	6010 7760 7761	70 100 10
Silvex; 2,4,5-TP	93-72-1	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-	8150	2
Styrene	100-42-5	Benzene, ethenyl-	8020 8021 8260	1 0.1 10
Sulfide	18496-25-8	Sulfide	9030	4000
2,4,5-T; 2,4,5-Trichlorophenoxyacetic acid	93-76-5	Acetic acid, (2,4,5-trichlorophenoxy)-	8150	2
1,2,4,5-Tetrachlorobenzene	95-94-3	Benzene, 1,2,4,5-tetrachloro-	8270	10
1,1,1,2-Tetrachloroethane	630-20-6	Ethane, 1,1,1,2-tetrachloro-	8010 8021 8260	5 0.05 5
1,1,2,2-Tetrachloroethane	79-34-5	Ethane, 1,1,2,2-tetrachloro-	8010 8021	0.5 0.1

			8260	5
Tetrachloroethylene; Tetrachloroethene;	127-18-4	Ethene, tetrachloro-	8010	0.5
Perchloroethylene			8021	0.5
			8260	5
2,3,4,6-Tetrachlorophenol	58-90-2	Phenol, 2,3,4,6-tetrachloro-	8270	10
Thallium	(Total)	Thallium	6010	400
			7840	1000
			7841	10
Tin	(Total)	Tin	6010	40
Toluene	108-88-3	Benzene, methyl-	8020	2
			8021	0.1
			8260	5
o-Toluidine	95-53-4	Benzenamine, 2-methyl-	8270	10
Toxaphene	See Note 10	Toxaphene	8080	2
1,2,4-Trichlorobenzene	120-82-1	Benzene, 1,2,4-trichloro-	8021	0.3
			8120	0.5
			8260	10
			8270	10
1,1,1-Trichloroethane; Methylchloroform	71-55-6	Ethane, 1,1,1-trichloro-	8010	0.3
			8021	0.3
			8260	5
1,1,2-Trichloroethane	79-00-5	Ethane, 1,1,2-trichloro-	8010	0.2
			8260	5
Trichloroethylene; Trichloroethene	79-01-6	Ethane, trichloro-	8010	1
			8021	0.2
			8260	5
Trichlorofluoromethane; CFC- 11	75-69-4	Methane, trichlorofluoro-	8010	10
			8021	0.3
			8260	5
2,4,5-Trichlorophenol	95-95-4	Phenol, 2,4,5-trichloro-	8270	10
2,4,6-Trichlorophenol	88-06-2	Phenol, 2,4,6-trichloro-	8040	5
			8270	10
1,2,3-Trichloropropane	96-18-4	Propane, 1,2,3-trichloro-	8010	10
			8021	5
			8260	15
O,O,0-Triethyl phosphorothioate	126-68-1	Phosphorothioic acid, 0,0,0- triethylester	8270	10
sym-Trinitrobenzene	99-35-4	Benzene, 1,3,5-trinitro-	8270	10
Vanadium	(Total)	Vanadium	6010	80
			7910	2000
			7911	40
Vinyl acetate	108-05-4	Acetic acid, ethenyl ester	8260	50
Vinyl chloride; Chloroethene	75-01-4	Ethene, chloro-	8010	2
			8021	0.4
			8260	10
Xylene (total)	See Note 11	Benzene, dimethyl-	8020	5
			8021	0.2
			8260	5
Zinc	(Total)	Zinc	6010	20
			7950	50
			7951	0.5

Notes

- 1 The regulatory requirements pertain only to the list of substances; the right hand columns (Methods and PQL) are given for informational purposes only. See also footnotes 5 and 6.
- 2 Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.
- 3 Chemical Abstracts Service registry number. Where "Total" is entered, all species in the groundwater that contain this element are included.

- 4 CAS index are those used in the 9th Collective Index.
- 5 Suggested Methods refer to analytical procedure numbers used in EPA Report SW-846 "Test Methods for Evaluating Solid Waste", third edition, November 1986, as revised, December 1987. Analytical details can be found in SW-846 and in documentation on file at the agency. CAUTION: The methods listed are representative SW-846 procedures and may not always be the most suitable method(s) for monitoring an analyte under the regulations.
- 6 Practical Quantitation Limits (PQLs) are the lowest concentrations of analytes in groundwaters that can be reliably determined within specified limits of precision and accuracy by the indicated methods under routine laboratory operating conditions. The PQLs listed are generally stated to one significant figure. PQLs are based on 5 mL samples for volatile organics and 1 L samples for semivolatile organics. CAUTION: The PQL values in many cases are based only on a general estimate for the method and not on a determination for individual compounds; PQLs are not a part of the regulation.
- 7 This substance is often called Bis(2-chloroisopropyl) ether, the name Chemical Abstracts Service applies to its noncommercial isomer, Propane, 2,2"-oxybis[2-chloro- (CAS RN 39638-32-9).
- 8 Chlordane: This entry includes alpha-chlordane (CAS RN 5103-71-9), beta-chlordane (CAS RN 5103-74-2), gamma-chlordane (CAS RN 5566-34-7), and constituents of chlordane (CAS RN 57-74-9 and CAS RN 12789-03-6). PQL shown is for technical chlordane. PQLs of specific isomers are about 20 $\mu\text{g}/\text{L}$ by method 8270.
- 9 Polychlorinated biphenyls (CAS RN 1336-36-3); this category contains congener chemicals, including constituents of Aroclor 1016 (CAS RN 12674-11-2), Aroclor 1221 (CAS RN 11104-28-2), Aroclor 1232 (CAS RN 11141-16-5), Aroclor 1242 (CAS RN 53469-21-9), Aroclor 1248 (CAS RN 12672-29-6), Aroclor 1254 (CAS RN 11097-69-1), and Aroclor 1260 (CAS RN 11096-82-5). The PQL shown is an average value for PCB congeners.
- 10 Toxaphene: This entry includes congener chemicals contained in technical toxaphene (CAS RN 8001-35-2), i.e., chlorinated camphene.
- 11 Xylene (total): This entry includes o-xylene (CAS RN 96-47-6), m-xylene (CAS RN 108-38-3), p-xylene (CAS RN 106-42-3), and unspecified xylenes (dimethylbenzenes) (CAS RN 1330-20-7). PQLs for method 8021 are 0.2 for o-xylene and 0.1 for m- or p-xylene. The PQL for m-xylene is 2.0 $\mu\text{g}/\text{L}$ by method 8020 or 8260.

Author: Russell A. Kelly; S. Scott Story.

Statutory Authority: Code of Alabama 1975, §§ 22-27-3, 22-27-7.

History: Effective: November 2, 1993. **Amended:** Filed: April 24, 2018; Effective: June 8, 2018.

APPENDIX D

EXAMPLE CHAIN OF CUSTODY FORM

Chain of Custody Instructions

***Pace Location Requested:** City and State of Pace Laboratory testing is to be performed at.

***Company Name:** Client's company name

***Street Address:** Client's mailing address

***City, State, Zip:** Client's city, state and zip code for mailing

***Contact/ Report to:** Person to receive results

Customer Project # and Project Name: Client's reference to the project or work involved with these samples.

Site Collection Info/ Facility ID: Client's location of project

Time Zone: Check time zone of sample to ensure proper hold times are met.

Purchase Order #: Client specific number to be listed on project invoice for client billing purposes.

Invoice To: Client contact the project invoice needs to be emailed to.

Invoice Email: Email address that project invoice will need to be emailed to

***Phone #:** Client's contact phone number

E-mail: Client's e-mail for correspondence and final report

Regulatory Program: List the program that is guiding the work to ensure proper regulations are followed: DW, RCRA, etc.

Data Deliverable: Please select or enter required deliverables.

***County/State Origin of Samples:** Enter the county to ensure proper handling of regulated soils. State required to ensure proper reporting.

Field Filtered: Indicate if samples have been filtered in the field. If samples are required to be field filtered and filtering is not indicated, a qualifier will be added to all associated data.

***Customer Sample ID:** The unique sample ID you want to appear on the analytical report

***Collected Date:** Date sample was collected. For composite samples, please fill in both beginning and end date.

***Collected Time:** Time sample was collected. For composite samples, please fill in both beginning and end time.

***Comp/Grab:** Please denote "GRAB" if the sample was collected at one time from one specific location. Please denote "COMP" if the sample is a composite of samples collected at one or more times or locations and combined to make one sample.

***Matrix:** Select from list provided list. If prepopulated chain is provided for you matrix codes may vary.

***Number and Type of Containers:** Total number of containers per container type submitted for the samples

***Container Size:** Specify container size from list.

***Container Preservation Type:** Specify sample preservation from provided list.

***Analysis Requested:** Write the analysis name (or an abbreviation), the name of a group of tests, or the method number you would like us to perform. Examples are BOD, TCLP Metals, PCBs, Method 624, etc. Place a check mark in the small boxes that correspond to the sample(s) on which you want these tests performed.

Sample Comment: List any notes or important information about the individual sample here. Please identify in the sample comment if a sample should be used for MS/MSD.

Customer Remarks/Special Conditions/Possible Hazards: List special instructions about the sample here. If the sample is known or suspected to be hazardous indicate that here and attach SDS if possible. This space can also be used for listing additional analyses, or to request an extra copy of the report to be sent to an alternate person/address, etc.

Rush request: If faster than standard turnaround time results are needed. Circle one of the rush options and note the day the results are requested by. All rush requests require preapproval by the laboratory. Surcharges will apply for non-standard turnaround times. Results will be due by the end of business on the date due based on standard turnaround time unless other arrangements have been made with your Project Manager.

Summarized Sample Acceptance Policy Requirements:

- Proper, full and completed chain-of-custody documentation
- Readable unique sample container identification written in indelible ink
- Appropriate sample container
- Sufficient sample volume to perform requested tests
- Received within required holding time
- Received within temperature preservation requirements
- Sample containers received in good condition (not leaking or broken)
- Any custody seal intact
- Properly preserved
- No headspace in volatile water samples
- **Note:** When sample specific Quality Control is required (e.g. MS/MSD) please ensure necessary sample containers and sample volume is provided.

A data qualifier and/or case narrative will be added to the final test report when the above sample acceptance requirements are not met.

Location Specific Sample Acceptance Policy available from your Project Manager

***Collected By:** Printed name of sample collector

***Collected By Signature:** Signature of sample collector

***Relinquished By/Received By:** This form **must be signed** each time the sample(s) changes hands. Custody seals are available upon request if needed.

***Required field:** Failure to fill in a required field may result in a sample(s) being put on hold until information can be obtained. This may result in a delay in receiving results.

APPENDIX E

EXAMPLE FIELD INFORMATION FORM

APPENDIX F

**ADEM GROUNDWATER MONITORING AND
CORRECTIVE ACTION REGULATIONS**

Amended: Effective: April 8, 2016. **Amended:** Filed: April 24, 2018; Effective: June 8, 2018. **Amended:** Filed: October 29, 2021; Effective: December 13, 2021.

335-13-4-.27 Groundwater Monitoring and Corrective Action. The requirements for groundwater monitoring and corrective action at MSWLFs, C/DLFs, and ILFs are presented in the following paragraphs:

(1) Applicability.

(a) The requirements in this rule shall apply to all MSWLF units and, when determined necessary by the Department to protect public health and the environment, the requirements in this rule or any part thereof shall apply to C/DLF units and/or ILF units, except as provided in subparagraph (b) of this paragraph.

(b) Groundwater monitoring requirements under paragraphs (2) through (4) of this rule may be suspended by the Department for a LF unit if the owner or operator can demonstrate that there is no potential for migration of hazardous constituents from that LF unit to the first saturated zone, as defined in 335-13-1-.03, during the active life of the unit and the post-closure care period. This demonstration must be certified by a qualified groundwater scientist, as defined in 335-13-1-.03, and approved by the Department, and must be based upon:

1. Site-specific field collected measurements, sampling, and analysis of physical, chemical, and biological processes affecting contaminant fate and transport, and

2. Contaminant fate and transport predictions that maximize contaminant migration and consider impacts on human health and environment.

(c) Owners and operators of LF units must comply with the groundwater monitoring requirements of this rule according to the following schedule.

1. All LF units must be in compliance with the groundwater monitoring requirements specified in paragraphs (2) through (4) of this rule.

2. New LF units must be in compliance with the groundwater monitoring requirements specified in paragraphs (2) through (4) of this rule before waste can be placed in the unit.

(d) Once established at a LF unit, groundwater monitoring shall be conducted throughout the active life and post-closure care period of that LF unit as specified in 335-13-4-.20.

(e) The Department may establish alternative schedules for demonstrating compliance with Department notification (and placement of notification in operating record) requirements of this rule.

(2) Groundwater Monitoring Requirements.

335-13-4-.27

(a) A groundwater monitoring system must be installed that consists of a sufficient number of wells, installed at appropriate locations and depths, to yield groundwater samples from the first saturated zone (as defined in 335-13-1-.03 that:

1. Represent the quality of background groundwater that has not been affected by leakage from a unit. A determination of background quality may include sampling of wells that are not hydraulically upgradient of the waste management area where:

(i) Hydrogeologic conditions do not allow the owner or operator to determine what wells are hydraulically upgradient; or

(ii) Sampling at other wells will provide an indication of background groundwater quality that is as representative or more representative than that provided by the upgradient wells; and

2. Represent the quality of groundwater passing the relevant point of compliance specified by the Department under subparagraph (a)3. of this paragraph.

(i) The downgradient monitoring system must be installed at the relevant point of compliance specified by the Department under subparagraph (a)3. of this paragraph that ensures detection of groundwater contamination in the first saturated zone.

(ii) When physical obstacles preclude installation of groundwater monitoring wells at the relevant point of compliance at existing units, the down-gradient monitoring system may be installed at the closest practicable distance hydraulically down-gradient from the relevant point of compliance specified by the Department under subparagraph (a)3. of this paragraph that ensures detection of groundwater contamination in the uppermost aquifer.

3. The relevant point of compliance shall be no more than 150 meters (492 feet) from the waste management unit boundary and shall be located on land owned by the owner of the landfill unit. In determining the relevant point of compliance, the following factors shall be considered, at a minimum:

(i) The hydrogeologic characteristics of the facility and surrounding land;

(ii) The volume and physical and chemical characteristics of the leachate;

(iii) The quantity, quality, and direction of groundwater flow;

(iv) The proximity and withdrawal rate of the groundwater users;

(v) The availability of alternative drinking water supplies;

(vi) The existing quality of the groundwater, including other sources of contamination and their cumulative impacts on the groundwater and whether groundwater is currently used or reasonably expected to be used for drinking water;

(vii) Public health, safety, and welfare effects; and

(viii) Practicable capability of the owner or operator.

(b) The Department may approve a multi-unit groundwater monitoring system instead of separate groundwater monitoring systems for each MSWLF unit when the facility has several units, provided the multi-unit groundwater monitoring system meets the requirement of subparagraph (a) of this paragraph and will be as protective of human health and the environment as individual monitoring systems for each MSWLF unit. This approval will be based on the following factors:

1. Number, spacing, and orientation of the MSWLF units;
2. Hydrogeologic setting;
3. Site history;
4. Engineering design of the MSWLF units; and
5. Type of waste accepted at the MSWLF units.

(c) Well design and construction

1. Groundwater monitoring wells shall be designed and constructed in accordance with the following reference: "Design and Installation of Groundwater Monitoring Wells in Aquifers", ASTM Subcommittee D18.21 on Groundwater Monitoring, or otherwise as specifically approved by the Department.

2. Plans for groundwater monitoring well location, design, construction and/or abandonment shall be submitted to the Department for review and approval prior to installation.

3. The monitoring wells must be cased in a manner that maintains the integrity of the monitoring well bore hole.

(i) This casing must be screened or perforated and packed with gravel or sand, where necessary, to enable collection of groundwater samples.

(ii) The annular space (i.e., the space between the bore hole and well casing) above the sampling depth must be sealed to prevent contamination of samples and the groundwater.

4. The owner or operator must notify the Department that the design, installation, development, and/or abandonment of any monitoring wells, piezometers and other measurement, sampling, and analytical devices has been documented and placed in the operating record; and

(d) Monitoring wells, piezometers, and other measurement, sampling, and analytical devices must be operated and maintained so that they perform to design specifications throughout the life of the monitoring program.

(e) Abandoned wells and bore holes shall be abandoned in accordance with the following procedures in order to prevent contamination of groundwater resources. A plan of abandonment must be submitted and approved by the Department prior to implementing abandonment of any well.

1. A well shall be measured for depth prior to sealing to ensure that it is free from any obstructions that may interfere with sealing operations.

2. Where feasible, wells shall be completely filled with neat cement. If the well cannot be completely filled, the sealing materials for the top 20 feet must be neat cement and no material that could impart taste, odor, or toxic components to water may be used in the sealing process.

3. Liner pipe shall be removed from each well in order to ensure placement of an effective seal. If the liner pipe cannot be readily removed, it shall be perforated to ensure that proper sealing is obtained.

4. Concrete, cement grout, or neat cement shall be used as primary sealing materials and shall be placed from the bottom upwards using methods that will avoid segregation or dilution of material.

5. Complete, accurate records of the abandonment procedure shall be kept for each well abandoned. The record of abandonment shall include, at a minimum, the depth of each layer of all sealing and backfilling materials, the quantity of sealing materials used, measurements of static water levels and depths, and any changes made in the well during the sealing. A copy of these records shall be submitted to the Department and a copy placed in the operating record.

(f) The number, spacing, and depths of monitoring systems shall be:

1. Determined based upon site-specific technical information that must include thorough characterization of:

(i) Aquifer thickness, groundwater flow rate, groundwater flow direction including seasonal and temporal fluctuations in groundwater flow; and

(ii) Saturated and unsaturated geologic units and fill materials overlying the uppermost aquifer, materials comprising the uppermost aquifer, and materials comprising the confining unit defining the lower boundary of the

uppermost aquifer, including, but not limited to: thickness, stratigraphy, lithology, hydraulic conductivity, porosity and effective porosity.

2. Certified by a qualified groundwater scientist and approved by the Department. Within 14 days of the Department's approval, the owner or operator must notify the Department that the certification has been placed in the operating record.

(g) The groundwater monitoring program must include consistent sampling and analytical methods that are:

1. Designed to ensure monitoring results that provide an accurate representation of groundwater quality at the background and downgradient wells which have been installed in compliance with subparagraph (a) of this paragraph.

(i) The groundwater monitoring program, and subsequent documentation, must be submitted to the Department for approval and appropriate copies placed in the operating record.

(ii) The program must include procedures and techniques for:

(I) Sample collection;

(II) Sample preservation and shipment;

(III) Analytical procedures;

(IV) Chain of custody control; and

(V) Quality assurance and quality control.

2. Appropriate for groundwater sampling and that accurately measure hazardous constituents and other monitoring parameters in groundwater samples.

(h) Groundwater samples shall not be field-filtered prior to laboratory analysis.

(i) The sampling procedures and frequency must be protective of human health and the environment.

1. Groundwater elevations must be measured in each well immediately prior to purging, each time groundwater is sampled.

2. Groundwater elevations in wells which monitor the same waste management area must be measured within a 48 hour period to avoid temporal variations in groundwater flow which could preclude accurate determination of groundwater flow rate and direction.

3. The owner or operator must determine the rate and direction of groundwater flow each time groundwater is sampled.

(j) The owner or operator must establish background groundwater quality in a hydraulically upgradient or background well(s) for each of the monitoring parameters or constituents required in the particular groundwater monitoring program that applies to the LF unit, as determined under subparagraphs (3)(a) or (4)(a) of this rule. Background groundwater quality may be established at wells that are not located hydraulically upgradient from the LF unit if it meets the requirements of subparagraph (a)1. of this paragraph.

(k) The number of samples collected to establish groundwater quality data must be consistent with the appropriate statistical procedures determined pursuant to subparagraph (l) of this paragraph. The sampling procedures shall be those specified under subparagraph (3)(b) of this rule for detection monitoring, subparagraphs (4)(b) and (4)(d) of this rule for assessment monitoring, and subparagraph (5)(b) of this rule for corrective action.

(l) The owner or operator must specify in writing to the Department and place in the operating record one of the following statistical methods to be used in evaluating groundwater monitoring data for each hazardous constituent. The statistical test chosen shall be conducted separately for each hazardous constituent in each well.

1. A parametric analysis of variance (ANOVA) followed by multiple comparisons procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each constituent.

2. An analysis of variance (ANOVA) based on ranks followed by multiple comparisons procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's median and the background median levels for each constituent.

3. A tolerance or prediction interval procedure in which an interval for each constituent is established from the distribution of the background data, and the level of each constituent in each compliance well is compared to the upper tolerance or prediction limit.

4. A control chart approach that gives control limits for each constituent.

5. Another statistical test method that meets the performance standards of subparagraph (m) of this paragraph. The owner or operator must place a justification for this alternative in the operating record and submit it to the Department for approval to use this alternative test. The justification must demonstrate that the alternative method meets the performance standards of subparagraph (m) of this paragraph.

(m) Any statistical method chosen under subparagraph (l) of this paragraph shall comply with the following performance standards, as appropriate:

1. The statistical method used to evaluate groundwater monitoring data shall be appropriate for the distribution of chemical parameters or hazardous constituents. If the distribution of the chemical parameters or hazardous constituents is shown by the owner or operator to be inappropriate for a normal theory test, then the data should be transformed or a distribution-free theory test should be used. If the distributions for the constituents differ, more than one statistical method may be needed.

2. If an individual well comparison procedure is used to compare an individual compliance well constituent concentration with background constituent concentrations or a groundwater protection standard, the test shall be done at a Type I error level no less than 0.01 for each testing period. If a multiple comparisons procedure is used, the Type I experiment wise error rate for each testing period shall be no less than 0.05; however, the Type I error of no less than 0.01 for individual well comparisons must be maintained. This performance standard does not apply to tolerance intervals, prediction intervals, or control charts.

3. If a control chart approach is used to evaluate groundwater monitoring data, the specific type of control chart and its associated parameter values shall be protective of human health and the environment. The parameters shall be determined after considering the number of samples in the background data base, the data distribution, and the range of the concentration values for each constituent of concern.

4. If a tolerance interval or a prediction interval is used to evaluate groundwater monitoring data, the levels of confidence and, for tolerance intervals, the percentage of the population that the interval must contain, shall be protective of human health and the environment. These parameters shall be determined after considering the number of samples in the background data base, the data distribution, and the range of the concentration values for each constituent of concern.

5. The statistical method shall account for data below the limit of detection with one or more statistical procedures that are protective of human health and the environment. Any practical quantitation limit (pql) that is used in the statistical method shall 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.

6. If necessary, the statistical method shall include procedures to control or correct for seasonal and spatial variability, as well as temporal correlation in the data.

(n) The owner or operator must determine and certify in writing to the Department if there is a statistically significant increase (SSI) over background values for each parameter or constituent required in the groundwater monitoring program.

1. In determining whether an SSI has occurred, the owner or operator must compare the groundwater quality of each parameter or constituent at each monitoring well to the background value of that constituent, according to the statistical procedures and performance standards specified under this rule.

2. Within 30 days after completing sampling and receiving analytical results, the owner or operator must determine whether there has been an SSI over background at each monitoring well.

3. If an SSI over background groundwater quality is detected, the owner/operator must notify the Department within 14 days of this event.

(3) Detection Monitoring.

(a) Detection monitoring is required at LF units for all groundwater monitoring wells defined under subparagraphs (2)(a)1.(i) and (ii) of this rule.

1. At a minimum, a detection monitoring program for MSWLF units must include monitoring for the constituents listed in Appendix I of this chapter.

2. Detection monitoring programs for C/DLFs or ILFs may include monitoring for constituents listed in Appendix I of this chapter, or an alternative list, as specified by the Department.

3. The Department may delete any of the detection monitoring parameters for a LF unit if it can be shown that the removed constituents are not reasonably expected to be contained in or derived from the waste contained in the unit.

4. The Department may establish an alternative list of indicator parameters for a MSWLF unit, in addition to the Appendix I constituents, if the additional parameters provide a reliable indication of releases from the MSWLF unit to the groundwater. In determining alternative parameters, the Department shall consider the following factors:

(i) The types, quantities, and concentrations of constituents in waste managed at the LF unit;

(ii) The mobility, stability, and persistence of waste constituents or their reaction products in the unsaturated zone beneath the LF unit;

(iii) The detectability of indicator parameters, waste constituents, and reaction products in the groundwater; and

(iv) The concentration or values and coefficients of variation of monitoring parameters or constituents in the groundwater background.

(b) Frequency.

1. The monitoring frequency for all constituents listed in Appendix I, or in the alternative list approved in accordance with subparagraph (a). of this paragraph, shall be at least semiannual during the active life of the facility (including closure) and the post-closure period. The owner or operator must submit a semi-annual report to the Department to coincide with and report the results of the semi-annual sampling event within ninety (90) days of the date of sampling. The report shall be certified by a qualified groundwater scientist.

(i) A minimum of four independent samples from each well (background and downgradient) must be collected and analyzed for the Appendix I constituents, or the alternative list approved in accordance with subparagraph (a) of this paragraph, during the first semiannual sampling event.

(ii) At least one sample from each well (background and downgradient) must be collected and analyzed during subsequent semiannual sampling events.

2. The Department may specify an appropriate alternative frequency for repeated sampling and analysis for Appendix I constituents, or the alternative list approved in accordance with subparagraph (a) of this paragraph, during the active life (including closure) and the post-closure care period.

(i) The alternative frequency during the active life (including closure) shall be no less than annual.

(ii) The alternative frequency shall be based on consideration of the following factors:

(I) Lithology of the aquifer and unsaturated zone;

(II) Hydraulic conductivity of the aquifer and unsaturated zone;

(III) Groundwater flow rates;

(IV) Minimum distance between upgradient edge of the LF unit and downgradient monitoring well screen (minimum distance of travel); and

(V) Resource value of the aquifer.

(c) If the owner or operator determines, pursuant to subparagraph (2)(l) of this rule, that there is an SSI over background for one or more of the constituents listed in Appendix I, or in the alternative list approved in accordance with subparagraph (a) of this paragraph, at any monitoring well at the boundary specified under subparagraph (2)(a)1.(ii) of this rule, the owner or operator:

1. Must, within 14 days of this finding, place a notice in the operating record, and submit a copy of this notice to the Department, indicating which constituents have shown statistically significant changes from background levels, and notify the Department that this notice was placed in the operating record; and

2. Must establish an assessment monitoring program meeting the requirements of subparagraphs (4)(a) through (j) of this rule within 90 days except as provided for under subparagraph (2)(c)3. of this rule.

3. May demonstrate that a source other than a LF unit caused the contamination or that the SSI resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

(i) A report documenting this demonstration must be certified by a qualified groundwater scientist, approved by the Department and be placed in the operating record.

(ii) If a successful demonstration is made and documented, the owner or operator may continue detection monitoring as specified in this rule. If, after 90 days, a successful demonstration is not made, the owner or operator must initiate an assessment monitoring program as required in subparagraphs (4)(a) through (j) of this rule.

(4) Assessment Monitoring.

(a) Assessment monitoring is required whenever an SSI over background has been detected for one or more of the constituents listed in Appendix I or in the alternative list approved in accordance with subparagraph (3)(a) of this rule.

(b) Frequency.

1. Within 90 days of triggering an assessment monitoring program, and annually thereafter, the owner or operator must sample and analyze the groundwater for all constituents identified in Appendix II of this Chapter.

(i) A minimum of one sample from each downgradient well must be collected and analyzed during each sampling event.

(ii) For any constituent detected in the downgradient wells as the result of the complete Appendix II analysis, a minimum of four independent samples from each well (background and downgradient) must be collected and analyzed to establish background for the new constituents.

2. The Department may specify an appropriate subset of wells to be sampled and analyzed for Appendix II constituents during assessment monitoring. The Department may delete any of the Appendix II monitoring parameters for a LF unit if it can be shown that the removed constituents are not

reasonably expected to be in or derived from the waste contained in the unit. The Department may establish an alternative list of parameters for a facility required to conduct groundwater monitoring, in addition to the Appendix II constituents, if the addition of the parameters is warranted based on waste handling practices at the facility. In determining alternative parameters, the Department shall consider the factors listed in 335-4-.27(3)(a)4.(i) through (iv).

(c) The Department may specify an appropriate alternate frequency for repeated sampling and analysis for the full set of Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, during the active life (including closure) and post-closure care of the unit considering the following factors:

1. Lithology of the aquifer and unsaturated zone;
2. Hydraulic conductivity of the aquifer and unsaturated zone;
3. Groundwater flow rates;
4. Minimum distance between upgradient edge of the LF unit and downgradient monitoring well screen (minimum distance of travel);
5. Resource value of the aquifer; and
6. Nature (fate and transport) of any constituents detected in response to this rule.

(d) After obtaining the results from the initial or subsequent sampling events required in subparagraph (b) of this paragraph, the owner or operator must:

1. Within 14 days, place a notice in the operating record identifying the Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, that have been detected and notify the Department that this notice has been placed in the operating record;
2. Within 90 days, and on at least a semiannual basis thereafter,
 - (i) Resample all wells specified by subparagraph (2)(a) of this rule with a minimum of one sample from each well (background and downgradient) being collected and analyzed during these sampling events,
 - (ii) Conduct analyses for all constituents in Appendix I or in the alternative list approved in accordance with subparagraph (3)(a) of this rule, and for those constituents in Appendix II, or in the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, that are detected in response to subparagraph (b) of this paragraph, and
 - (iii) Record their concentrations in the facility operating record.

(iv) The Department may specify an alternative monitoring frequency during the active life (including closure) and the post closure period for the constituents referred to in this paragraph. The alternative frequency for Appendix I constituents, or the alternative list approved in accordance with subparagraph (3)(a) of this rule, during the active life (including closure) shall be no less than annual. The alternative frequency shall be based on consideration of the factors specified in subparagraph (c) of this paragraph;

3. Establish background concentrations for any constituents detected pursuant to subparagraph (b) or subparagraph (d)2. of this paragraph; and

4. Establish groundwater protection standards for all constituents detected pursuant to subparagraph (b) or subparagraph (d)2. of this paragraph. The groundwater protection standards shall be established in accordance with subparagraphs (h) or (i) of this paragraph.

(e) If the concentrations of all Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, are shown to be at or below background values, using the statistical procedures in subparagraph (2)(l) of this rule, for two consecutive sampling events, the owner or operator must notify the Department of this finding and may return to detection monitoring.

(f) If the concentrations of any Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, are above background values, but all concentrations are below the groundwater protection standard established under subparagraphs (h) or (i) of this paragraph, using the statistical procedures in subparagraph (2)(l) of this rule, the owner or operator must continue assessment monitoring in accordance with this rule.

(g) If one or more Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, are detected at statistically significant levels above the groundwater protection standard established under subparagraphs (h) or (i) of this paragraph in any sampling event, within 14 days of this finding, the owner or operator must:

1. Place a notice in the operating record identifying the Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, that have exceeded the groundwater protection standard and

2. Notify the Department and all appropriate local government officials that the notice has been placed in the operating record.

3. And must, either:

(i) Characterize the nature and extent of the release by installing additional monitoring wells as necessary,

(ii) Install at least one additional monitoring well at the facility boundary in the direction of contaminant migration and sample this well in accordance with subparagraph (d)2. of this paragraph,

(iii) Notify all persons who own the land or reside on the land that directly overlies any part of the plume of contamination if contaminants have migrated off-site as indicated by sampling of wells in accordance with subparagraphs (g)3.(i) and (ii) of this paragraph, and

(iv) Initiate an assessment of corrective measures as required by subparagraphs (5)(a) through (d) of this rule within 90 days;

4. Or may demonstrate that a source other than a LF unit caused the contamination, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. A report documenting this demonstration must be certified by a qualified groundwater scientist or approved by the Department and placed in the operating record. If a successful demonstration is made, the owner or operator must continue monitoring in accordance with the assessment monitoring program pursuant to subparagraphs (a) through (j) of this paragraph, and may return to detection monitoring if the Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, are at or below background as specified in subparagraph (e) of this paragraph. Until a successful demonstration is made, the owner or operator must comply with subparagraph (g) of this paragraph, including initiating an assessment of corrective measures.

(h) The owner or operator must establish a groundwater protection standard for each Appendix II constituent, or each constituent in the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, detected in the groundwater. The groundwater protection standard shall be:

1. For constituents for which a maximum contaminant level (MCL) has been promulgated under Section 1412 of the Safe Drinking Water Act (codified) under 40 CFR 141, the MCL for that constituent;

2. For constituents for which MCLs have not been promulgated, the background concentration for the constituent established from wells in accordance with subparagraph (2)(a)1. of this rule; or

3. For constituents for which the background level is higher than the MCL identified under subparagraph (h)1. of this paragraph or health based levels identified under subparagraph (i)1. of this paragraph, the background concentration.

(i) The Department may establish an alternative groundwater protection standard for constituents for which MCLs have not been established. These groundwater protection standards shall be appropriate health based levels that satisfy the following criteria:

335-13-4-.27

1. The level is derived in a manner consistent with EPA guidelines for assessing the health risks of environmental pollutants (51 FR 33992, 34006, 34014, 34028, September 24, 1986);

2. The level is based on scientifically valid studies conducted in accordance with the Toxic Substances Control Act Good Laboratory Practice Standards (40 CFR 792) or equivalent;

3. For carcinogens, the level represents a concentration associated with an excess lifetime cancer risk level (due to continuous lifetime exposure) with the 1×10^{-4} to 1×10^{-6} range; and

4. For systemic toxicants, the level represents a concentration to which the human population (including sensitive subgroups) could be exposed to on a daily basis that is likely to be without appreciable risk of deleterious effects during a lifetime. For purposes of this rule, systemic toxicants include toxic chemicals that cause effects other than cancer or mutation.

(j) In establishing groundwater protection standards under subparagraph (i) of this paragraph, the Department may consider the following:

1. Multiple contaminants in the groundwater;
2. Exposure threats to sensitive environmental receptors; and
3. Other site-specific exposure or potential exposure to groundwater.

(5) Corrective Action Requirements.

(a) Within 90 days of finding that any of the constituents listed in Appendix II or in the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, have been detected at a statistically significant level exceeding the groundwater protection standards defined under subparagraphs (4)(h) or (i) of this rule, the owner or operator must initiate an assessment of corrective measures. Such an assessment must be completed within a reasonable period of time.

(b) The owner or operator must continue to monitor in accordance with the assessment monitoring program as specified in subparagraphs (4)(a) through (j) of this rule.

(c) The assessment shall include an analysis of the effectiveness of potential corrective measures in meeting all of the requirements and objectives of the remedy as described under subparagraphs (c) through (i) of this paragraph, addressing at least the following:

1. The performance, reliability, ease of implementation, and potential impacts of appropriate potential remedies, including safety impacts, cross-media impacts, and control of exposure to any residual contamination;

2. The time required to begin and complete the remedy;
3. The costs of remedy implementation; and
4. The institutional requirements such as State or local permit requirements or other environmental or public health requirements that may substantially affect implementation of the remedy(s).

(d) The owner or operator must discuss the results of the corrective measures assessment, prior to the selection of remedy, in a public meeting with interested and affected parties.

(e) Based on the results of the corrective measures assessment conducted under subparagraphs (5)(a) through (d) of this paragraph, the owner or operator must select a remedy that, at a minimum, meets the standards listed in this paragraph. The owner or operator must notify the Department, within 14 days of selecting a remedy, that a report describing the selected remedy has been placed in the operating record and how it meets the standards in this paragraph. Remedies must:

1. Be protective of human health and the environment;
2. Attain the groundwater protection standard as specified pursuant to subparagraphs (4)(h) or (i) of this rule;
3. Control the source(s) of releases so as to reduce or eliminate, to the maximum extent practicable, further releases of Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, into the environment that may pose a threat to human health or the environment; and
4. Comply with standards for management of wastes as specified in subparagraph (m) of this paragraph.

(f) In selecting a remedy that meets the standards of subparagraph (e) of this paragraph, the owner or operator shall consider the following evaluation factors:

1. The long- and short-term effectiveness and protectiveness of the potential remedy(ies), along with the degree of certainty that the remedy will prove successful based on consideration of the following:
 - (i) Magnitude of reduction of existing risks;
 - (ii) Magnitude of residual risks in terms of likelihood of further releases due to waste remaining following implementation of a remedy;
 - (iii) The type and degree of long-term management required, including monitoring, operation, and maintenance;

(iv) Short-term risks that might be posed to the community, workers, or the environment during implementation of such a remedy, including potential threats to human health and the environment associated with excavation, transportation, and redisposal or containment;

(v) Time until full protection is achieved;

(vi) Potential for exposure of humans and environmental receptors to remaining wastes, considering the potential threat to human health and the environment associated with excavation, transportation, redisposal, or containment;

(vii) Long-term reliability of the engineering and institutional controls;
and

(viii) Potential need for replacement of the remedy.

2. The effectiveness of the remedy in controlling the source to reduce further releases based on consideration of the following factors:

(i) The extent to which containment practices will reduce further releases;

(ii) The extent to which treatment technologies may be used.

3. The ease or difficulty of implementing a potential remedy(ies) based on consideration of the following types of factors:

(i) Degree of difficulty associated with constructing the technology;

(ii) Expected operational reliability of the technologies;

(iii) Need to coordinate with and obtain necessary approvals and permits from other agencies;

(iv) Availability of necessary equipment and specialists; and

(v) Available capacity and location of needed treatment, storage, and disposal services.

4. Practicable capability of the owner or operator, including a consideration of the technical and economic capability.

5. The degree to which community concerns are addressed by a potential remedy(ies).

(g) The owner or operator shall specify as part of the selected remedy a schedule(s) for initiating and completing remedial activities. Such a schedule must require the initiation of remedial activities within a reasonable period of

time taking into consideration the factors set forth in this paragraph. The owner or operator must consider the following factors in determining the schedule of remedial activities:

1. Extent and nature of contamination;
 2. Practical capabilities of remedial technologies in achieving compliance with groundwater protection standards established under subparagraphs (4)(h) or (i) of this rule and other objectives of the remedy;
 3. Availability of treatment or disposal capacity for wastes managed during implementation of the remedy;
 4. Desirability of utilizing technologies that are not currently available, but which may offer significant advantages over already available technologies in terms of effectiveness, reliability, safety, or ability to achieve remedial objectives;
 5. Potential risks to human health and the environment from exposure to contamination prior to completion of the remedy;
 6. Resource value of the aquifer including:
 - (i) Current and future uses;
 - (ii) Proximity and withdrawal rate of users;
 - (iii) Groundwater quantity and quality;
 - (iv) The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents;
 - (v) The hydrogeologic characteristic of the facility and surrounding land;
 - (vi) Groundwater removal and treatment costs; and
 - (vii) The cost and availability of alternative water supplies.
 7. Practicable capability of the owner or operator.
 8. Other relevant factors.
- (h) The Department may determine that remediation of a release of an Appendix II constituent, or a constituent in the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, from a LF unit is not necessary if the owner or operator demonstrates to the Department that:

1. The groundwater is additionally contaminated by substances that have originated from a source other than a LF unit and those substances are present in concentrations such that cleanup of the release from the LF unit would provide no significant reduction in risk to actual or potential receptors; or

2. The constituent(s) is present in groundwater that:

(i) Is not currently or reasonably expected to be a source of drinking water; and

(ii) Is not hydraulically connected with waters to which the hazardous constituents are migrating or are likely to migrate in a concentration(s) that would exceed the groundwater protection standards established under subparagraphs (4)(h) or (i) of this rule; or

3. Remediation of the release(s) is technically impracticable; or

4. Remediation results in unacceptable cross-media impacts.

(i) A determination by the Department pursuant to subparagraph (h) of this paragraph shall not affect the authority of the State to require the owner or operator to undertake source control measures or other measures that may be necessary to eliminate or minimize further releases to the groundwater, to prevent exposure to the groundwater, or to remediate the groundwater to concentrations that are technically practicable and significantly reduce threats to human health or the environment.

(j) Based on the schedule established under subparagraph (g) of this paragraph for initiation and completion of remedial activities the owner/operator must:

1. Establish and implement a corrective action groundwater monitoring program that:

(i) At a minimum, meets the requirements of an assessment monitoring program under subparagraphs (4)(a) through (j) of this rule;

(ii) Indicates the effectiveness of the corrective action remedy; and

(iii) Demonstrates compliance with groundwater protection standards pursuant to subparagraph (n) of this paragraph.

2. Implement the corrective action remedy selected under subparagraphs (e) through (i) of this paragraph; and

3. Take any interim measures necessary to ensure the protection of human health and the environment. Interim measures should, to the greatest extent practicable, be consistent with the objectives of and contribute to the performance of any remedy that may be required pursuant to subparagraphs (e) through (i) of this paragraph. The following factors must be considered by an owner or operator in determining whether interim measures are necessary:

(i) Time required to develop and implement a final remedy;

(ii) Actual or potential exposure of nearby populations or environmental receptors to hazardous constituents;

(iii) Actual or potential contamination of drinking water supplies or sensitive ecosystems;

(iv) Further degradation of the groundwater that may occur if remedial action is not initiated expeditiously;

(v) Weather conditions that may cause hazardous constituents to migrate or be released;

(vi) Risks of fire or explosion, or potential for exposure to hazardous constituents as a result of an accident or failure of a container or handling system; and

(vii) Other situations that may pose threats to human health and the environment.

(k) An owner or operator may determine, based on information developed after implementation of the remedy has begun or other information, that compliance with requirements of subparagraph (e) of this paragraph are not being achieved through the remedy selected. In such cases, the owner or operator must implement other methods or techniques that could practicably achieve compliance with the requirements, unless the owner or operator makes the determination under subparagraph (l) of this paragraph.

(l) If the owner or operator determines that compliance with requirements under subparagraph (e) of this paragraph cannot be practically achieved with any currently available methods, the owner or operator must:

1. Obtain certification of a qualified groundwater scientist or approval by the Department that compliance with requirements under subparagraph (e) of this paragraph cannot be practically achieved with any currently available methods;

2. Implement alternate measures to control exposure of humans or the environment to residual contamination, as necessary to protect human health and the environment; and

3. Implement alternate measures for control of the sources of contamination, or for removal or decontamination of equipment, units, devices, or structures that are:

(i) Technically practicable; and

(ii) Consistent with the overall objective of the remedy.

4. Notify the Department within 14 days that a report justifying the alternative measures prior to implementing the alternative measures has been placed in the operating record.

(m) All solid wastes that are managed pursuant to a remedy required under subparagraphs (e) through (i) of this paragraph, or an interim measure required under subparagraph (j)3. of this paragraph, shall be managed in a manner:

1. That is protective of human health and the environment; and
2. That complies with applicable RCRA requirements.

(n) Remedies selected pursuant to subparagraphs (e) through (i) of this paragraph shall be considered complete when:

1. The owner or operator complies with the groundwater protection standards established under subparagraphs (4)(h) or (i) of this rule at all points within the plume of contamination that lie beyond the groundwater monitoring well system established under subparagraph (3)(a) of this rule.

2. Compliance with the groundwater protection standards established under subparagraphs (4)(h) or (i) of this rule has been achieved by demonstrating that concentrations of Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, have not exceeded the groundwater protection standard(s) for a period of three consecutive years using the statistical procedures and performance standards in subparagraphs (4)(l) and (m) of this rule. The Department may specify an alternative length of time during which the owner or operator must demonstrate that concentrations of Appendix II constituents, or the alternative list approved in accordance with subparagraph (4)(b)2. of this rule, have not exceeded the groundwater protection standard(s) taking into consideration:

- (i) Extent and concentration of the release(s);
- (ii) Behavior characteristics of the hazardous constituents in the groundwater;
- (iii) Accuracy of monitoring or modeling techniques, including any seasonal, meteorological, or other environmental variabilities that may affect the accuracy; and
- (iv) Characteristics of the groundwater.

3. All actions required to complete the remedy have been satisfied.

(o) Upon completion of the remedy, the owner or operator must notify the Department within 14 days that a certification that the remedy has been completed in compliance with the requirements of subparagraph (n) of this

paragraph has been placed in the operating record. The certification must be signed by the owner or operator and by a qualified groundwater scientist or approved by the Department.

(p) When, upon completion of the certification, the owner or operator determines that the corrective action remedy has been completed in accordance with the requirements under subparagraph (n) of this paragraph, the owner or operator shall be released from the requirements for financial assurance for corrective action under 335-13-4-.28(4).

Author: Russell A. Kelly, Heather M. Jones.

Statutory Authority: Code of Alabama 1975, §§ 22-27-3, 22-27-4, 22-27-7.

History: Effective: November 2, 1993. **Amended:** Effective: July 26, 1996.

Amended: Filed: April 24, 2018; Effective: June 8, 2018; **Amended:** Filed: June 25, 2019; Effective: August 9, 2019. **Amended:** Filed: October 29, 2021; Effective: December 13, 2021.

335-13-4-.28 Financial Assurance Criteria.

(1) The requirements of 335-13-4-.28 apply to owners and operators of all MSWLF, except owners or operators who are state or federal government entities whose debts and liabilities are the debts and liabilities of the State or the United States.

(2) Financial Assurance for Closure.

(a) The owner or operator shall have a detailed written estimate, in current dollars, of the cost of hiring a third party to close the largest area of all landfill cells at the MSWLF ever requiring a final cover as required under 335-13-4-.20 at any time during the active life in accordance with the closure plan. The owner or operator shall place the closure cost estimate in the operating record and submit a copy of the estimate to ADEM for approval.

1. The closure cost estimate shall equal the cost of closing the largest area of the MSWLF ever requiring a final cover at any time during the active life when the extent and manner of its operation would make closure the most expensive, as indicated by its closure plan. The cost estimate shall include the costs of continuing the operation of the gas collection and control systems as may be required in 335-3-10-.02(75) or 335-3-19, as applicable.

2. During the active life of the MSWLF, the owner or operator shall annually adjust the closure cost estimate for inflation.

3. The owner or operator shall increase the closure cost estimate and the amount of financial assurance provided under 335-13-4-.28(2)(b) if changes to the closure plan or landfill conditions increase the maximum cost of closure at any time during the remaining active life.



January 15, 2020

Alabama Department of
Environmental Management
P.O. Box 301463
Montgomery, Alabama 36130-1463

VIA ELECTRONIC MAIL

Attention: Mr. Mark Schimmer
Solid Waste Branch

RE: Monitoring Well Abandonment and Replacement Plan
WCA Fines Industrial Landfill
Talladega County, Alabama
Permit No. 61-16

Dear Mr. Schimmer,

On behalf of Waste Corporation of Alabama (WCA), Highland Technical Services, Inc. (HTSI) is submitting this monitoring well abandonment and replacement plan for the WCA Fines Industrial Landfill – Permit No. 61-16, in Talladega County, Alabama (Figure 1).

The scope of work presented below was prepared in order to complete the abandonment and replacement of compliance well MW-1, and the abandonment of compliance wells MW-3 and MW-5. Two additional wells, piezometers PZ-1 and PZ-2, which were installed in February 2007 as part of a hydrogeologic study completed for the site and are not part of the Permit, will also be abandoned. These activities are being completed as part of a planned landfill expansion. Even though compliance well MW-3 is not in the area of expansion, this well is recommended for abandonment as it has consistently been dry. Monitoring well MW-5 is located in an area designated for future excavation. The location of each of these wells is provided on Figure 2.

HTSI recommends that each of the aforementioned wells be properly abandoned and a new well, designated as MW-1R, be installed with a similar screened interval and in close proximity to the former location of MW-1 in an effort to monitor groundwater in the same water-bearing zone.

MONITORING WELL ABANDONMENT

There is no indication that the original bentonite seal of wells MW-1, MW-3, MW-5, and piezometers PZ-1 and PZ-2 have been damaged; therefore, HTSI recommends leaving the casings in place. The abandonment will be accomplished by first filling the well casings with a neat cement/ bentonite mixture from the bottom of the well screens to the ground surface through a tremmie pipe. The protective covers will then be removed and the casings cut two feet below ground surface (ft-bgs). A concrete plug will then be installed over the casing. A summary of the monitoring well construction details for each of these wells are provided in Table 1.0 on the following page.

TABLE 1.0 - MONITORING WELL CONSTRUCTION SUMMARY

Monitoring Well ID	Well Material	Casing Diameter (inches)	Measuring Point Elevation (ft-amsl)	Measured Total Depth (ft-btoc)	Screened Interval (ft-bgs)
MW-1	PVC	2.0	489.81	100.92	87.0 – 97.0
MW-3	PVC	2.0	473.19	85.38	64.0 – 84.0
MW-5	PVC	2.0	469.61	80.95	86.0 – 96.0
PZ-1	PVC	2.0	470.84	120.90	97.80 – 117.80
PZ-2	PVC	2.0	435.52	76.49	62.99 – 72.99

ft-amsl – feet above mean sea level
ft-btoc – feet below top of casing
ft-bgs – feet below ground surface

MONITORING WELL INSTALLATION

Following the abandonment of MW-1, replacement well (MW-1R) will be installed at the approximate location shown on Figure 2. The exact location of the well will be selected in the field and will be placed in an area less prone to vehicle traffic and potential damage, and in an area which allows for overhead clearance of the drill derrick. The well will also be located outside of landfill Cell-7 so that the damage to the new well during future cell construction activities can be avoided.

Based on prior experience and understanding of site conditions, HTSI is anticipating that the boring for the new well will be advanced to a depth of approximately 100 ft-bgs using a sonic drill rig due to the lithology underlying the landfill, and will be installed as a Type II monitoring well. The drilling and installation of the replacement well will be supervised by a geoscientist experienced with groundwater investigations and monitoring well installation.

Replacement well MW-1R will be constructed using a minimum of a 20-foot section of 2-inch Schedule 40 PVC, 0.010-slotted screen and 2-inch PVC riser casing to ground surface. A sand filter pack will be installed to a minimum of one foot above the well screen. A minimum of two feet of bentonite will be placed above the sand pack and hydrated to form a seal, and the remainder of the annulus will be filled with a neat cement mixture to the ground surface. The well will then be completed with a stand-up protective aluminum cover with a locking cap and protected with four bollards.

The monitoring well will be installed and constructed in general accordance with the guidelines outlined in the most recent edition of EPA Region IV's *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual* and the most recent edition of the *Alabama Environmental Investigation and Remediation Guidance (AEIRG)*.

The location and top of casing of MW-1R will be surveyed by an Alabama licensed professional land surveyor. The survey will establish a measuring point elevation on the top of casing and will be referenced to mean sea level. Following completion of replacement well MW-1R, the well will be developed to remove sediments accumulated in the well screen and filter pack.

MINOR PERMIT MODIFICATION

In addition to the activities described above, HTSI (on behalf of WCA) will submit a request for a Minor Modification to the facility's Solid Waste Disposal Permit to include the new well (MW-1R) as a compliance well for the purpose of monitoring groundwater quality and for statistical analysis under the modified permit. The request for a Minor Modification to the Permit will also include the addition of existing wells MW-6, MW-7, and MW-8, which were installed in February 2007 as part of a Hydrogeologic Study, as compliance wells. The locations of these monitoring wells are provided on Figure 2. Monitoring well MW-6 is located along the southwestern boundary of the property, MW-7 is located along the western boundary of the property, and MW-8 is located along the northwestern boundary of the property. Each of these wells were installed in February 2007 as part of a Hydrogeologic Study. An updated *Groundwater Monitoring Plan* will also be completed concurrently with the Permit Modification.

WELL DEVELOPMENT AND REPLICATE SAMPLING

Four replicate groundwater samples will be collected from the newly installed well MW-1R, and existing wells MW-6, MW-7, and MW-8, at a frequency of no less than 14 days apart and analyzed for Appendix I volatile organic compounds (VOCs) and Appendix I metals. The replicate sample dataset will be used to establish water quality within the water-bearing zone to support future statistical evaluations of groundwater quality. Prior to collecting replicate samples from existing wells MW-6, MW-7, and MW-8, each of these wells will be developed to remove sediments accumulated in the well screen and filter pack

Upon completion of the monitoring well abandonment and installation activities, a letter report documenting these activities will be submitted to your office. HTSI appreciates your consideration in this matter. If you have any questions concerning this submittal or require any additional information, please contact our office at (205) 985-4874.

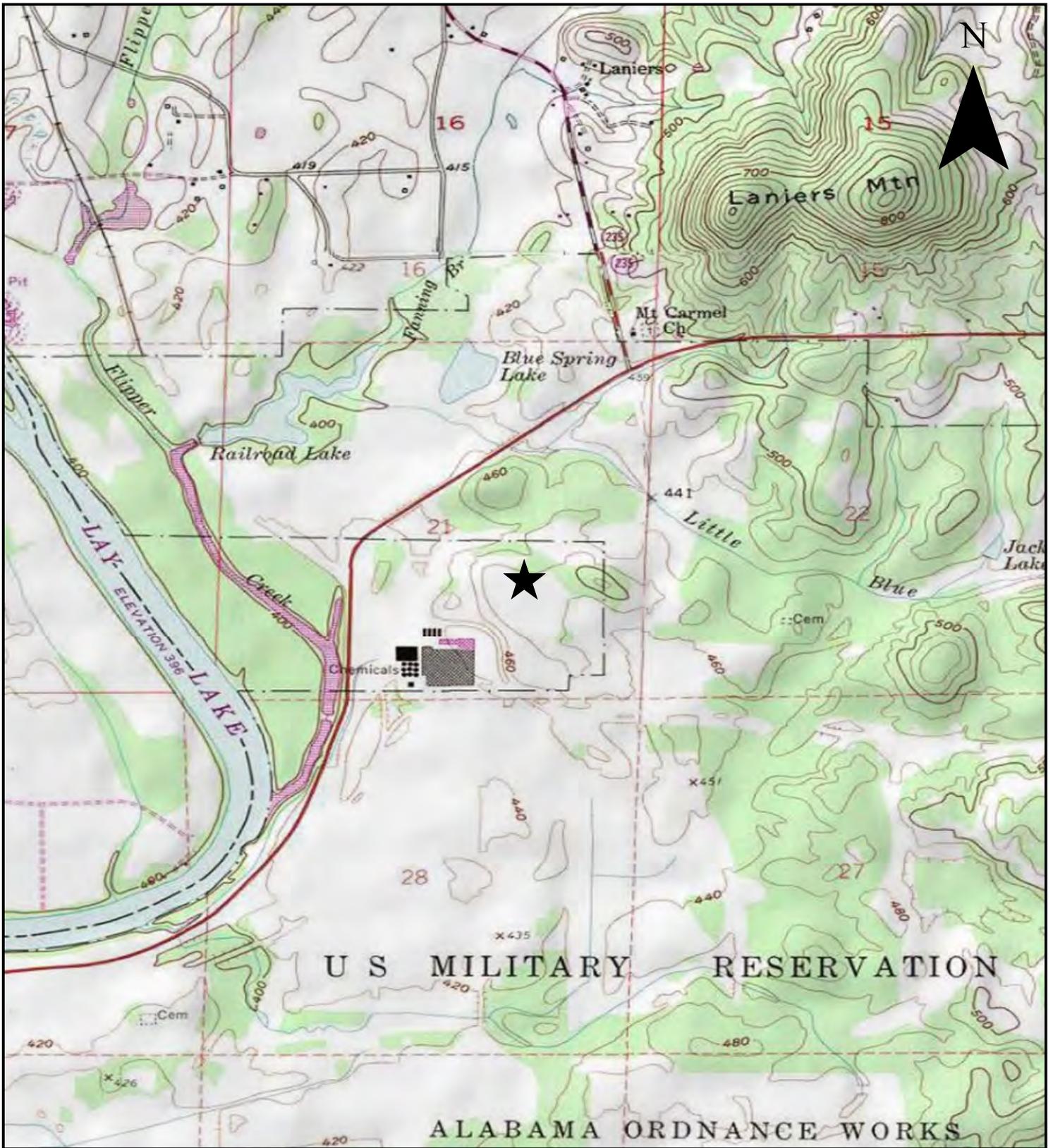
Sincerely,
HIGHLAND TECHNICAL SERVICES, INC.



Lori K. Norton, P.G.
Project Geologist

Attachments: Figure 1 – Site Location Map
Figure 2 – Site Layout Map

cc: Eduardo Choquis, Waste Corporation of America
Jonathan Williams, WCA Fines Industrial Landfill



Legend

★ Site Location



TITLE:
Site Location Map
WCA Landfill
Childersburg, Alabama

FIGURE NO.
1
 PROJECT NO.
General Map
 DRAWN BY
SWA

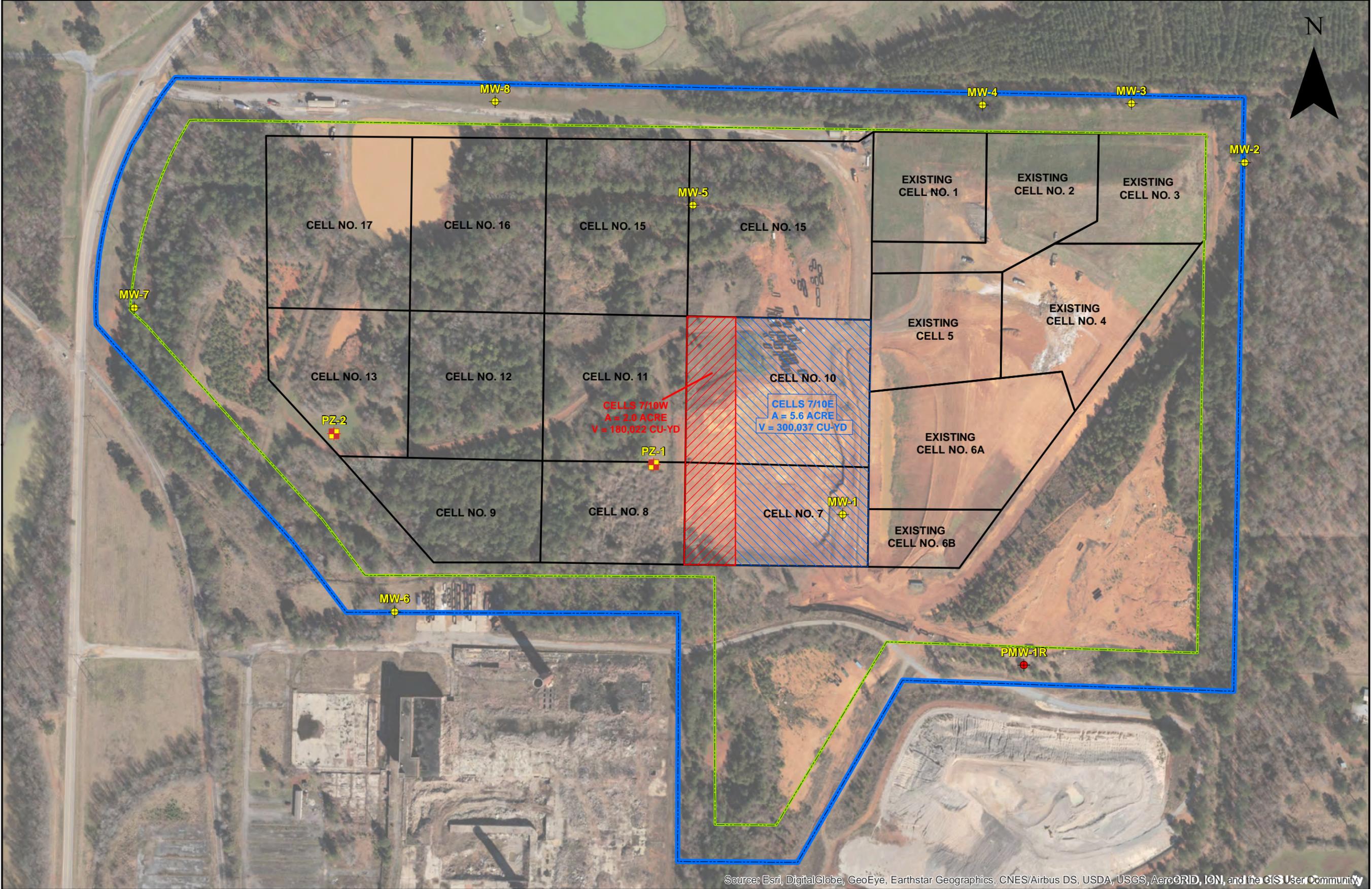
USGS Quad ID: 33086-C3
 Quad Name: Childersburg, AL

528 MINERAL TRACE
 HOOVER, AL 35244
 (205) 985-4874

SCALE:
 0 1,000 2,000

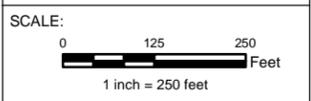
 1 inch = 2,000 feet

DATE DRAWN
4/10/2012



Legend

- EXISTING GROUNDWATER MONITORING WELL
- PROPOSED GROUNDWATER MONITORING WELL
- PIEZOMETER
- POTENTIAL GROUNDWATER MONITORING WELL
- CELLS 7/10W EXPANSION
- CELLS 7/10E EXPANSION
- CELL BOUNDARY
- 100 FT BUFFER
- PROPERTY LINE



TITLE:

Site Layout Map
WCA Fines Landfill
Childersburg, Alabama

FIGURE NO. 2	PROJECT NO. General Map
DRAWN BY: LKN	DRAWN DATE: 12-20-2019



528 MINERAL TRACE
HOOVER, AL 35244
(205) 985-4874

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Alabama Department of Environmental Management
adem.alabama.gov

1400 Coliseum Blvd. 36110-2400 ■ Post Office Box 301463
Montgomery, Alabama 36130-1463
(334) 271-7700 ■ FAX (334) 271-7950

April 13, 2020

Mr. Jonathan Williams
WCA of Alabama, LLC
13737 Plant Road
Childersburg, AL 35044

RE: Monitoring Well Abandonment and Replacement
WCA Industrial Landfill, Permit No. 61-16
Talladega County, AL

Dear Mr. Williams:

The Department has received the plan, submitted by Highland Technical Services on January 15, 2020, Inc. for replacement of groundwater monitoring well MW-1, as well as to abandon MW-3, MW-5, PZ-1, and PZ-2. After review, the Department approves this request. Upon completion of construction of groundwater monitoring well MW-1R, please submit a field report showing the groundwater monitoring well was installed according to the approved plan.

If you should have any questions, please contact Mr. Hunter Baker of the Solid Waste Engineering Section at (334) 270-5607.

Sincerely,

A handwritten signature in black ink that reads "Jared Kelly".

Jared Kelly, Chief
Solid Waste Engineering Section
Land Division

JDK/hb





January 28, 2021

Alabama Department of Environmental Management
Post Office Box 301463
Montgomery, Alabama 36130-1463

Attention: Mr. Hunter Baker
Solid Waste Branch

RE: Minor Permit Modification
WCA of Alabama, LLC Industrial Landfill
Childersburg, Alabama
Permit No.: 61-16

Dear Mr. Baker:

On behalf of the WCA of Alabama, LLC (WCA), Highland Technical Services, Inc. (HTSI) is submitting this letter to request a Minor Permit Modification to the WCA of Alabama, LLC Industrial Landfill's Solid Waste Permit No. 61-16 (Permit).

As discussed in the attached *Groundwater Monitoring Plan*, and the previously submitted *Monitoring Well Abandonment and Replacement Report* dated August 6, 2020, WCA abandoned compliance wells MW-1, MW-3, and MW-5 and installed replacement well MW-1R; therefore, WCA requests that wells MW-1, MW-3, and MW-5 be removed as compliance wells from the Permit, and that newly installed well MW-1R be added as a compliance well. Additionally, WCA is requesting to modify the Permit to include wells MW-6, MW-7, and MW-8, which were originally installed during a hydrogeological investigation completed for the landfill in 2007, as compliance wells at the facility.

Attached is the *Groundwater Monitoring Plan* incorporating the changes described above. The Minor Mod fee of \$1,460.00 will be paid by WCA of Alabama, LLC. If you have any questions concerning this submittal or require any additional information, please contact our office at (205) 985-4874.

Sincerely,
HIGHLAND TECHNICAL SERVICES, INC.

A handwritten signature in blue ink that reads "Lori K. Norton".

Lori K. Norton, P.G.
Senior Project Geologist

Attachments: Groundwater Monitoring Plan – January 28, 2021



GROUNDWATER MONITORING PLAN

**WCA OF ALABAMA, LLC INDUSTRIAL LANDFILL
13737 PLANT ROAD
CHILDERSBURG, TALLADEGA COUNTY, ALABAMA
PERMIT No.: 61-16
PROJECT No.: 19-230119A.06**

PREPARED FOR:

WCA OF ALABAMA, LLC
ONE RIVERWAY, SUITE 1400
HOUSTON, TEXAS 77056

JANUARY 28, 2021

PREPARED BY:

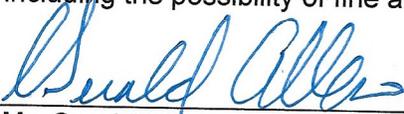
HIGHLAND TECHNICAL SERVICES, INC.
528 MINERAL TRACE
BIRMINGHAM, ALABAMA 35244
PHONE: (205) 985-4874 FAX: (205) 987-6080

Lori K. Norton, P.G.
Senior Project Geologist

William W. Cooch, P.G.
Principal Geologist

OWNER CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



Mr. Gerald Allen
Regional Landfill Manager
Alabama & Tennessee

2/2/21
Date

GEOLOGIST CERTIFICATION

I certify under penalty of law that I am a Registered Professional Geologist, licensed to practice in the State of Alabama and experienced in conducting hydro-geological investigations. The information submitted herein, to the best of my knowledge and belief is true, accurate and complete.

Lori K. Norton

Lori K. Norton, P.G.
Senior Project Geologist
Highland Technical Services, Inc.

01-28-2021
Date

TABLE OF CONTENTS

1.0	PURPOSE AND SCOPE	1
2.0	SITE HISTORY AND STATUS	1
3.0	ENVIRONMENTAL SETTING.....	2
3.1	SITE GEOLOGY AND HYDROGEOLOGY	2
3.2	SURFACE WATER.....	2
4.0	MONITORING WELL NETWORK AND GROUNDWATER FLOW.....	3
4.1	MONITORING WELL NETWORK.....	3
4.2	HISTORICAL SITE INFORMATION.....	3
4.3	GROUNDWATER FLOW	4
5.0	GROUNDWATER SAMPLING AND ANALYSIS.....	6
5.1	GROUNDWATER SAMPLE MANAGEMENT	8
6.0	DECONTAMINATION OF EQUIPMENT.....	11
7.0	SEMI-ANNUAL REPORTING	12
7.1	STATISTICAL PROCEDURES	12
7.2	TEST FOR NORMALITY	13
7.3	TESTS FOR OUTLIERS & UPDATING BACKGROUND DATASETS	14
7.4	TARGET CHEMICALS OF CONCERN	15
7.5	INTER-WELL STATISTICAL ANALYSIS.....	15
7.6	APPENDIX I VOC ANALYTICAL RESULTS	15
7.6.1	Double Quantification Rule (DQR) Discussion	16
7.7	SEN'S SLOPE TREND ANALYSIS.....	17
7.8	IDENTIFICATION OF A SSI (OR INITIAL EXCEEDANCE)	17
7.8.1	Retesting Plan	17
7.9	REPORTING	18
8.0	REFERENCES.....	19

FIGURES

Figure 1	Site Location Map
Figure 2	Site Layout Map
Figure 3	Potentiometric Surface Map – September 2020

APPENDICES

Appendix A	Example Flow Rate Calculations
Appendix B	Example Field Sampling Log
Appendix C	Example Monitoring Well Sampling Record
Appendix D	Example Chain of Custody
Appendix E	VOC Screening
Appendix F	Power Curves

1.0 PURPOSE AND SCOPE

WCA of Alabama, LLC has prepared this Groundwater Monitoring Plan (Plan) in order to incorporate monitoring wells MW-6, MW-7, and MW-8, which were installed as part of a *Hydrogeologic Site Investigation* completed for the WCA of Alabama, LLC Industrial Landfill Disposal Permit Number 61-16 (Permit) in September 2007. This Plan has also been prepared in order to incorporate new monitoring well MW-1R (replacement for MW-1) into the Permit, and to remove compliance wells MW-1, MW-3 and MW-5 which have been abandoned.

The WCA of Alabama, LLC Industrial Landfill is located in Childersburg, Talladega County, Alabama. This Plan has been prepared in accordance with the Alabama Department of Environmental Management (ADEM) Administrative Code 335-13. The following is a discussion of the site history, environmental setting, description of the monitoring requirements, and activities to be conducted over the life of the permitted facility.

2.0 SITE HISTORY AND STATUS

The WCA of Alabama, LLC Industrial Landfill (Permit No.: 61-16) is located at 13737 Plant Road in Childersburg, Alabama. The landfill is located predominantly in the Southeast $\frac{1}{4}$ of Section 21, Township 19 South, Range 3 East in Talladega County, Alabama. The site is situated at approximately Latitude $33^{\circ} 21' 42''$ and Longitude $86^{\circ} 19' 46''$. The site location is displayed on Figure 1.

The landfill is used for the disposal of nonhazardous industrial wastes, construction and demolition wastes, asbestos, automobile shredder dirt and fluff, and tires. The current permitted area is approximately 104.88 acres with approximately 57.95 acres permitted for disposal operations.

3.0 ENVIRONMENTAL SETTING

3.1 SITE GEOLOGY AND HYDROGEOLOGY

According to geologic information published by the Geological Survey of Alabama, the subject property is underlain by the Knox Group Undifferentiated of Cambrian-Ordovician Age. The Knox Group typically consists of light gray to light-brown locally sandy dolomite, dolomitic limestone, and limestone characterized by abundant light-colored chert.

The site is located in the Coosa Valley District of the Alabama Valley and Ridge Physiographic Province. The Coosa Valley District extends from the Coosa Ridge District in the west to the Weisner Ridge and Piedmont Upland Districts in the east. Surface elevations range from 400 to 500 feet above mean sea level (ft-amsl) in the Coosa Valley west of the Coosa River. Surface elevations east of the Coosa River range from approximately 500 feet to over 1,500 ft-amsl. Surface water drainage from the Coosa Valley district is primarily towards the Coosa River. Based on an interpretation of topographic features, surface water flow from the subject site is generally to the west towards an unnamed tributary of the Coosa River. The Coosa River is located approximately one mile west of the subject property.

According to the *Geohydrology and Susceptibility of Major Aquifers to Surface Contamination in Alabama; Area 4*, 1989 prepared by the U. S. Geological Survey (USGS), the site is located within the recharge area for the Knox-Shady Aquifer. The City of Childersburg is included in the ADEM Wellhead Protection Program.

3.2 SURFACE WATER

Surface water from the property generally flows west from higher topographic elevations on the landfill to an unnamed tributary of the Coosa River located approximately 590 feet west-southwest of the landfill. This unnamed tributary discharges to the Coosa River which is located approximately 1,700 feet west-southwest of the landfill.

4.0 MONITORING WELL NETWORK AND GROUNDWATER FLOW

4.1 MONITORING WELL NETWORK

The site will utilize six groundwater monitoring wells (MW-1R, MW-2, MW-4, MW-6, MW-7, and MW-8) for monitoring shallow groundwater beneath the site. Monitoring well MW-2 is designated as the upgradient (background) well for groundwater quality comparisons and is located along the northeastern boundary of the landfill. Monitoring wells MW-1R, MW-4, MW-6, MW-7, and MW-8 are designated as the downgradient (compliance) wells for the purpose of monitoring groundwater quality and for statistical analysis. Compliance wells MW-4 and MW-8 are located along the northern boundary; compliance well MW-7 is located along the western boundary; and compliance wells MW-1R and MW-6 are located along the southern boundary. The monitoring well locations are shown in Figure 2. The available well construction details for monitoring wells at the site are included in Table 4.1 below.

TABLE 4.1 – MONITORING WELL CONSTRUCTION DETAILS

WELL ID	MEASURING POINT ELEVATION (FT-AMSL)	MEASURED TOTAL DEPTH (FT-BTOC)	CASING DIAMETER	SCREENED INTERVAL (FT-BGS)
MW-1R	487.52	82.35	2-inch	70.00 – 80.00
MW-2	460.11	69.26	2-inch	56.00 – 66.00
MW-4	472.66	80.92	2-inch	62.18 – 77.18
MW-6	439.02	96.90	2-inch	74.15 – 94.15
MW-7	438.37	97.55	2-inch	75.15 – 95.15
MW-8	432.20	52.28	2-inch	49.38 – 34.98

ft-amsl – feet above mean sea level

ft-btoc – feet below top of casing

ft-bgs – feet below ground surface

4.2 HISTORICAL SITE INFORMATION

Compliance wells MW-1, MW-3, and MW-5 were abandoned in May 2020 in accordance with the *Monitoring Well Abandonment and Installation Plan* dated January 15, 2020. Additionally, compliance well MW-1R was installed in May 2020 as a replacement for well MW-1. These activities were presented to the ADEM in a *Monitoring Well Abandonment & Installation Report* dated August 6, 2020, which was submitted to the ADEM under separate cover.

4.3 GROUNDWATER FLOW

During each semi-annual monitoring event, static water level depth will be measured in each of the monitoring wells prior to purging. For reference, groundwater elevations measured during the September 2020 semi-annual sampling event ranged from 26.00 feet below top of casing (ft-btoc) in MW-8 to 72.95 ft-btoc in MW-1R and the groundwater elevations ranged from 400.12 ft-amsl in MW-7 to 414.57 ft-amsl in MW-1R. Groundwater elevation data is included in Table 4.3 below. The potentiometric surface calculated using September 2020 measurements is provided in Figure 3.

TABLE 4.3 – Groundwater Measurements and Elevations – SEPTEMBER 2020

WELL ID	MEASURING POINT ELEVATION (FT-AMSL)	MEASURED TOTAL DEPTH (FT-BTOC)	MEASURED DEPTH TO GW (FT-BTOC)	GROUNDWATER ELEVATION (FT-AMSL)
MW-1R	487.52	82.50	72.95	414.57
MW-2	460.11	69.26	46.08	414.03
MW-4	472.66	80.92	58.60	414.06
MW-6	439.02	96.90	33.35	405.67
MW-7	438.37	97.53	38.25	400.12
MW-8	432.20	52.42	26.00	406.20

ft-btoc = feet below top of casing
ft-amsl = feet above mean sea level
GW = groundwater

As illustrated by the potentiometric surface map (Figure 3), the general direction of groundwater flow beneath the landfill at the time of the September 2020 event was estimated to be predominantly to the west which is consistent with historical flow direction at the site. The calculated hydraulic gradient (dh/dl) during the September 2020 event was approximately 0.0040 feet per foot (ft/ft). Groundwater flow velocity in the subsurface materials underlying the site was calculated using the formula $V = (K) (dh/dl)/ne$, where K is hydraulic conductivity and ne is effective porosity.

Based on the characteristics of the underlying formation, representative hydraulic conductivity and effective porosity for silty clay, silty sand, and dolomite are estimated to be 2.718×10^{-4} centimeters per second (cm/sec) (using historical slug testing data from the site) and 25%, respectively (Freeze, p. 29 and 37). Using the calculated hydraulic conductivity of 2.718×10^{-4} cm/sec, an effective porosity of 25%, and the calculated gradient of 0.0040 ft/ft, the groundwater flow rate during the September 2020 event was estimated to be approximately 4.5244 feet per year (ft/year). This flow rate is consistent with past groundwater monitoring events. An example of the groundwater flow rate calculations (September 2020) is provided in Appendix A.

It should be noted that the potentiometric surface elevation maps are models of the groundwater potentiometric surface based upon available measured groundwater levels and should be considered only a general depiction of groundwater flow direction for the local area of the site. While the potentiometric surface typically parallels surface topography, the accuracy of the potentiometric surface map is limited to available data from the control points and may conflict with surface topography and/or the actual groundwater potentiometric surface at certain locations.

5.0 GROUNDWATER SAMPLING AND ANALYSIS

Groundwater samples will be collected on a semi-annual basis throughout the active life of the facility and the post-closure care period in accordance with ADEM Administrative Rule 335-13-4-.27. Unless otherwise specified by the ADEM, groundwater sampling will be conducted during March and September of each year.

During the semi-annual groundwater monitoring events, and prior to sample collection, static water level measurements will be taken in each monitoring well using an electronic water-level indicator to determine the depth of water and the measured water level as it relates to the screened interval of the well.

All samples will be collected using either a peristaltic or bladder pump (or similar instrument) following low-flow sampling protocols. In order to collect water in the screened interval, low-flow purging will be conducted by situating the pump-intake in the middle or slightly above the middle of the screened interval of the well. The intake velocity of the pump will then be set to a flow rate that minimizes draw-down inside the well casing, thereby reducing turbidity and agitation of the water column in the well in order to prevent volatilization of volatile organic compounds (VOCs), if present, and the introduction of suspended sediment into the water column. The pumping rate will be maintained between 200 to 500 milliliters per minute and the water level will be monitored every three to five minutes to determine steady-state flow. An attempt will be made to maintain a draw-down of one foot or less during purging.

Prior to sample collection, groundwater will be purged from each well at a rate approximately equal to the well recharge rate. The turbidity, temperature, specific conductance, dissolved oxygen (DO), oxidation-reduction (redox) potential, and pH of groundwater will be monitored and recorded every three to five minutes as the wells are purged. Samples will be collected when stabilization of these indicator parameters is recorded in three consecutive readings. The three successive readings should be within ± 0.1 for pH, $\pm 3\%$ for conductivity, ± 10 mv for redox potential, and $\pm 10\%$ for turbidity and DO. DO and turbidity usually require the longest time for stabilization. Conductivity, DO, and turbidity are the most sensitive parameters. The above stabilization guidelines are provided as estimates and may not always be achieved. Samples will be collected after field indicator parameters have stabilized and will be placed directly into the laboratory containers with minimal agitation to minimize volatilization of chemicals of concern (COCs). The field indicator parameters will be recorded for each well on a

field sampling log. An example field sampling log is included as Appendix B. Data collected in the field during sampling activities will be documented on a Monitoring Well Sampling Record (MWSR). An example MWSR is included as Appendix C.

Groundwater samples will be obtained by filling appropriate laboratory-prepared sample containers directly from the discharge tubing connected to the pump or from disposable polyethylene bailers. New tubing will be used for each sample, and the bladder pump will be decontaminated prior to use at each sample location. Subsequent to sample collection, the containers will be labeled and placed in a cooler with ice in an effort to achieve and maintain a sample temperature of 4°C. In the event one or more wells is purged dry, those wells will be allowed to recharge sufficiently prior to sampling. Once recharged, samples from those wells will be collected using a disposal bailer.

The samples will be delivered to a National Environmental Laboratory Accreditation Program (NELAP) certified laboratory, along with proper chain of custody documentation including project name and number; sampler's name and signature; sample identification numbers; sample date, time, and location; requested analyses; and sample container type and quantity. The samples will be analyzed for Appendix I VOCs and Appendix I metals using the EPA Methods shown in Table 5.0 below.

TABLE 5.0 – LABORATORY ANALYTICAL METHODS

PARAMETER	SAMPLE MATRIX	EPA METHOD
Appendix I Metals	Water	6010B or 6020
Mercury	Water	7470
Appendix I VOCs	Water	8260B

The laboratory analysis will follow the protocols provided in the *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods SW-846 (SW-846)*, *Standard Methods for the Examination of Water and Wastewater (latest edition)*, or other appropriate methods approved by the ADEM.

Both preserved and unpreserved groundwater samples will be collected for metals analysis during each monitoring event. The unpreserved samples will be retained in the event elevated metals concentrations are identified in one or more the groundwater samples. Specific

unpreserved samples to those that returned elevated metals will be submitted and filtered for analysis by the laboratory, on an as needed basis, to determine if any metals detected in the unfiltered samples are also present in dissolved concentrations. *Please note that field filtration is not allowed by ADEM guidelines.*

5.1 GROUNDWATER SAMPLE MANAGEMENT

In accordance with this Plan, each groundwater sample will be tracked from the time of collection by completing sample custody documentation. The sample custody documentation will include the field documentation and the chain of custody report. All samples will be placed in laboratory provided containers and preserved in a manner appropriate to the analytical method requested. Sample containers will be stored in a clean, secure area prior to use. Containerized samples will be labeled as they are collected and placed in a cooler with ice to maintain a sample temperature of 4°C until delivered to the analytical laboratory. Sample criteria are summarized in the Table 5.1 below.

TABLE 5.1 – GROUNDWATER SAMPLING CRITERIA

ANALYSIS	SAMPLE MATRIX	BOTTLE TYPE	PRESERVATIVE	HOLDING TIMES
Appendix I Metals	Water	(1) 250 ml Plastic	4°C / HNO ₃	180 Days Mercury 28 Days
Filtered Sample Appendix I Metals	Water	(1) 250 ml Plastic	4°C	180 Days Mercury 28 Days
Appendix I VOCs	Water	(2) 40 ml vials	4°C / HCL	14 Days

VOCs – Volatile Organic Carbons
ml – Milliliter
C – Celsius
HNO₃ – Nitric Acid
HCL – Hydrochloric Acid

Sample labels will be filled out and affixed to appropriate containers immediately prior to or following sample collection, as appropriate. The label will be filled out in indelible ink and will include the following information on the portion affixed to the sample container: sample ID number; analyses requested; project name; the person’s name collecting the sample; and, sample location number.

The field data recorded at the time of sample collection provides an unambiguous identification of each sample. These field data will be recorded on groundwater monitoring well field logs. Field notes will include the following:

- date and time of sampling;
- name(s) of field personnel conducting sampling;
- name(s) of any observers at the sampling site;
- purpose of sampling;
- description of sample point;
- number and size(s) of sample(s) taken;
- field sample identification number(s);
- deviation from sampling plan, if any;
- field observations;
- references (such as maps) of sampling site; and
- sample handling and shipping information.

Sample handling and shipping procedures will assure that samples are properly preserved, protected, and secured until delivered to the analytical laboratory. After sample containers are labeled, they will be sealed in plastic air cushion bags and wrapped in clear plastic bags to protect sample bottles and labels from potential moisture damage. Ice packs will be sealed in plastic bags and placed on top of samples in order to maintain an optimum temperature of 4°C until the samples are delivered to the laboratory. Any remaining void space in the ice chest will be filled with appropriate bubble-wrap packing material.

Samples will be hand delivered or shipped via overnight delivery service to the laboratory. Shipped samples will be accompanied by an appropriate freight (shipment) bill of lading form with the completed freight bill number recorded on the Chain of Custody accompanying each cooler shipment. The Chain of Custody will be sealed in a plastic bag and taped to the underside of the cooler lid. Coolers will be sealed with tape and a custody seal that will be initialed and dated to prevent any tampering during shipping and handling. The laboratory will be notified prior to shipment of samples that would arrive at the laboratory on a weekend or holiday to assure that the samples are properly received.

Sample custody documentation procedures will be maintained throughout the following activities:

- initial sample collection;
- transportation from sample collection site to analytical laboratory;
- receipt and preparation of laboratory sample extracts and digestives;
- storage at laboratory until an evaluation of analytical results determines that re-analysis is not required; and,
- final sample disposition.

At the time of sample collection, samples will be labeled and a record of the sampling activity will be recorded in the daily field log. Sample labeling procedures were discussed previously. Information required to identify sample custody and to request sample analyses are then entered on the Chain of Custody. The information recorded on the Chain of Custody will include:

- project name and number;
- sampler's name and signature;
- sample identification numbers;
- sample date, time, and location;
- requested analyses;
- sample container type and quantity;
- requested analytical turnaround time; and
- person to receive results and a contact telephone number to call in case problems arise.

A Sample Chain of Custody is included as Appendix D.

6.0 DECONTAMINATION OF EQUIPMENT

All non-disposable equipment and tools will be decontaminated or disposed of in accordance with the most recent edition of the *Alabama Environmental Investigation and Remediation Guidance* (AEIRG). Personnel decontamination will be performed on an as-needed basis only. Sampling equipment will be either disposable or decontaminated prior to use and between sampling locations. New disposable nitrile gloves will be used between each groundwater sample. Disposable polyethylene tubing will be used with the purge-pump during well purging and replaced with new tubing between wells. The water level indicator and bladder pump will be decontaminated by washing with distilled water and laboratory grade detergent wash, followed by rinsing with distilled water.

7.0 SEMI-ANNUAL REPORTING

Upon receipt of the laboratory analytical results, and within ninety (90) days of the date of sampling, a semi-annual report will be submitted to the ADEM discussing groundwater quality beneath the subject facility. The report will include a statistical analysis of groundwater in accordance with ADEM Administrative Code R. 335-13-4-.27(2)(I) and the Environmental Protection Agency (EPA) standards referenced in the *Statistical Analysis of Groundwater Monitoring Data at Resource Conservation Recovery Act (RCRA) Facilities Unified Guidance*, U.S. EPA, 2009 (Unified Guidance).

7.1 STATISTICAL PROCEDURES

In the application of statistics to groundwater monitoring data from this site, all data will be treated as independent and representative of the quality of groundwater at the site. Statistical methods used, and their application to data from this site, will be in general accordance with the EPA standards referenced in the Unified Guidance. The groundwater monitoring data will be analyzed statistically using Sanitas statistical software or comparable statistical software. The data sets used for statistical analysis were compiled from analytical results from November 1999 to the present. Historical groundwater data available for use in future statistical evaluations for the subject facility are as follows:

- Historical data is available for Appendix I VOCs and arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, thallium, vanadium, and zinc dating back to April 1999 for background well MW-2 and compliance well MW-4; to June 2020 for compliance well MW-1R; and to September 2020 for compliance wells MW-6, MW-7, and MW-8.
- Historical data is available for cobalt dating back to April 1999 for background well MW-2 and compliance well MW-4; to June 2020 for compliance well MW-1R; and to September 2020 for compliance wells MW-6, MW-7, and MW-8.

Cobalt was analyzed in groundwater samples collected from background well MW-2 and MW-4 from November 1999 through September 2017 at a detection limit that exceeded the EPA Regional Screening Level (RSL) for tapwater of 0.0006 milligrams per liter (mg/l); therefore, only data collected from each of these wells since March 2018, when the laboratory detection level was reduced to less than 0.0006 mg/l, will be used for statistical analysis. All of the samples collected from compliance wells MW-6, MW-7, and MW-8, have been analyzed for cobalt at the lower detection limits.

Upon receipt of the laboratory analytical results, the results will be reviewed to assess the potential for statistically significant increases (SSIs) of Appendix I VOCs and metals in groundwater samples collected from the facility monitoring well network.

Monitoring well MW-2 is designated as the background groundwater quality monitoring location used for statistical evaluations. Monitoring wells MW-1R, MW-4, MW-6, MW-7, and MW-8 are used as compliance wells. The historically detected constituents, data sets, and time versus concentrations graphs will be provided in each semi-annual report

When determining which historical data to use when evaluating current concentrations of COCs in samples collected from the monitoring well network, data from more recent events may be used in order to account for changes in sampling procedures and groundwater geochemistry over the life of the monitoring well program. Justification for removal of historical data will be provided in each semi-annual report.

7.2 TEST FOR NORMALITY

In accordance with the EPA Unified Guidance, a test for normality should be conducted on the appropriate constituents to determine the appropriate statistical method to be used to evaluate groundwater analytical data as it relates to the distribution of these constituents. A test for normality will be completed, as discussed in the following paragraphs, and will satisfy the performance standards required for the selection of the statistical procedures to be used at a facility in accordance with ADEM Administrative Code R. 335-13-4-.27(2)(m)1.

Typically, groundwater analytical data is subjected to a distribution analysis to determine if the data is normally distributed or can be transformed to a normal distribution using either log-normal or ladder of powers data transformations. If data is normally distributed, or can be transformed to create a normal distribution, a parametric statistical analysis is recommended. However, when the data contains a large percentage of non-detects (greater than 50%), the validity of distribution tests are questionable, suggesting that a non-parametric statistical analysis be used.

In order to determine if a parametric or non-parametric statistical analysis should be conducted, tests for normality will be completed for constituent(s) with less than 50% non-detects in an effort to determine if the data set for each constituent(s) is normally distributed or can be

transformed to a normal distribution. The Shapiro-Wilks Test for Normality will be used for constituents with less than 50 measurements and the Shapiro-Francia Test for Normality will be used for constituents with greater than 50 measurements, as discussed in Chapter 10 of the Unified Guidance.

If data is normally distributed, or can be transformed to create a normal distribution, a parametric statistical method will be used. When the data is not normally distributed, or cannot be transformed to create a normal distribution, a non-parametric statistical method will be used. Additionally, when the data contains a large percentage of non-detects (greater than 50%), the validity of distribution tests are questionable and it is suggested that a non-parametric method be used.

Depending on the results of the tests for normality, either parametric or non-parametric statistical analysis will be used to determine if there is an initial exceedance (SSI) for these constituents in samples collected from the landfill compliance wells. The results for the tests for normality will be submitted in each semi-annual groundwater monitoring report.

7.3 TESTS FOR OUTLIERS & UPDATING BACKGROUND DATASETS

A test for outliers will be conducted when multiple values in a dataset appear anomalously low or high when compared to other values (Unified Guidance). In order to screen for outliers, a Tukey's Outlier Screening, or either a Dixon's Test or a Rosner's Test, will be conducted. In the event an outlier is identified, an attempt will be made to determine the cause of the outlier, e.g. lab error, field error, etc., if possible. If outliers are identified within a constituent's dataset, a determination will be made as to whether the outlier(s) should remain or be removed from the dataset prior to completing the statistical analysis. A discussion regarding the removal of an outlier(s) will be provided in each semi-annual groundwater monitoring report.

In accordance with the EPA Unified Guidance, background datasets will be updated after four new compliance observations have been collected (every two years for sites undergoing semi-annual groundwater monitoring). Following receipt of the results of the fourth monitoring event, either a t-test (non-detects \leq 75%) or Wilcoxon rank-sum comparison (non-detects \geq 75%) will be conducted. Should the comparison indicate no significant difference between the newer compliance data and the existing background data, the newer data will be re-classified as background measurements and added to the existing background.

7.4 TARGET CHEMICALS OF CONCERN

Target constituents at the landfill include each of the sixteen (16) Appendix I metals. Each of the Appendix I metals are considered reliable indicators for statistical analysis during each semi-annual monitoring event. Historically detected Appendix I VOCs include benzene in background well MW-2; chloroform in compliance well MW-1R; and methylene chloride in background well MW-2 and compliance well MW-4. Statistical analysis for target Appendix I VOCs are discussed in Section 7.6 of this Plan.

7.5 INTER-WELL STATISTICAL ANALYSIS

Based on a review of the historical laboratory analytical results from groundwater samples collected from the background well location (MW-2) and compliance wells, an inter-well statistical analysis is recommended as part of future monitoring activities for the target metals.

The type of statistical method that will be used for evaluating groundwater data will be the Parametric or Non-Parametric Prediction Limit analysis in accordance with ADEM Administrative Code R. 335-13-4-.27(2)(l)3. As discussed in Section 7.2, the decision to use Parametric or Non-Parametric analysis will depend on the percentage of non-detects for each constituent, and if required, the results of tests for normality for constituents with a non-detect rate of less than 50%.

In the event an initial exceedance of a target metal is determined through statistical analysis and subsequent retesting to be a SSI, then the type of analysis to be performed (inter-well or intra-well) may be reevaluated based on the results of an alternate source demonstration, if needed. Additionally, trend analysis, as discussed in Section 7.7 of this Plan, may be performed on COCs that have exhibited an increase over background to determine if detected concentrations at that location have decreased, increased, or have shown no identifiable trend over time.

7.6 APPENDIX I VOC ANALYTICAL RESULTS

During each semi-annual groundwater monitoring event, samples are collected from the landfill monitoring well network for analysis of Appendix I VOCs. Following each semi-annual groundwater monitoring event, the analytical results will be reviewed to determine which, if any, of the Appendix I VOCs were detected in the samples collected from the monitoring well network.

As discussed in Section 7.4 of this Plan, detected concentrations of Appendix I VOCs that will be subjected to statistical analysis during future monitoring events will include benzene, chloroform, and methylene chloride (target VOCs).

In the event there is an initial exceedance of a target VOC, the procedures discussed in Section 7.8 of this Plan will be initiated and will include a notification to the ADEM, as well as, retesting of the well to confirm the existence of the constituent. If confirmed, an assessment monitoring program will be established and comply with ADEM Admin. Code 335-13-4-.27(4) unless a determination can be made that a source other than the landfill unit caused the contamination, or there was an error in sampling, analytical testing, or statistical analysis. In the event there is determination of an alternate source, a report will be submitted to the ADEM for approval and placed in the operating record.

7.6.1 Double Quantification Rule (DQR) Discussion

Historically, three (3) of the forty-seven (47) Appendix I VOCs have been detected in one or more of the wells in the monitoring well network. The detected constituents, as well as the date of their last detection, are provided in Appendix E (VOC Screening) and include benzene in background well MW-2; chloroform in compliance well MW-1R; and methylene chloride in background well MW-2 and compliance well MW-4. It should be noted that methylene chloride, which has only been detected in wells MW-2 (background) and MW-4, is a common laboratory contaminant.

Pursuant to the Unified Guidance, when background sample data consists entirely of non-detects for a specific constituent, but there are detections above the laboratory detection limit in samples collected from compliance wells, then the Double Quantification Rule (DQR) can be applied. The DQR states that an SSI is declared when a constituent/compliance well pair displays consecutive quantified detections above the detection limit and the constituent/background well pair(s) contains only non-detects. Therefore, when the DQR is applied, further analysis to determine a SSI is not warranted. If there are no consecutive detects, then the constituent/compliance well pair is not subjected to statistical analysis.

Forty-four (44) of the forty-seven (47) Appendix I VOCs have not been detected historically (100% non-detects) in the samples collected from background well MW-2 or the compliance wells. In the event one of these constituents is detected during future monitoring events, the

DQR will be applied with ADEM approval and retesting to determine whether the value detected was an error. If the constituent is detected during the resampling event, then that constituent will be subjected to statistical analysis.

7.7 SEN'S SLOPE TREND ANALYSIS

According to the Unified Guidance, the Sen's Non-Parametric Estimator of Slope is a method of estimating the true slope (change over time) of analytical data. If the data shows an upward slope, there is evidence of an upward trend or increase in a constituent concentration. No identifiable trend would indicate no significant increase or decrease in a particular constituent concentration over time. A decreasing trend would indicate decreasing constituent concentrations over time. Since this method is non-parametric, it is considered suitable for a high percentage of non-detects and is not significantly affected by outliers.

In an effort to address SSIs indicated for Appendix I constituents in samples collected from compliance wells during semi-annual groundwater monitoring events (VOCs and metals), a Sen's Slope Trend analysis will be performed to determine if there is an identifiable trend in the target constituent concentration over time.

7.8 IDENTIFICATION OF A SSI (OR INITIAL EXCEEDANCE)

Should the statistical analysis confirm the presence of an initial exceedance for one or more target constituents over background groundwater quality, WCA of Alabama, LLC Industrial Landfill will comply with the requirements of ADEM Admin. Code 335-13-4-.27(2)(n)3 and notify the ADEM within 14 days of the finding, and a retesting plan will be initiated in accordance with the Unified Guidance and this Plan as discussed in Section 7.8.1 below.

7.8.1 Retesting Plan

In order to determine the retesting schedule for detected COCs with initial exceedances within the compliance wells, power curves were generated to determine the proper number of resampling events that would be needed in order to meet the EPA recommended power requirements for determining if a release has occurred at the facility. Power curves are provided in Appendix F. It should be noted that tests for normality were conducted for each of the constituents prior to generating the power curves. In the event a COC could not be transformed, or had a non-detect rate greater than 50 percent, the power curves were generated using a Non-Parametric analysis. If the data set for a constituent could be

transformed, the power curves were generated using a Parametric analysis. In the event there is an initial exceedance over background using inter-well parametric or non-parametric prediction limit analysis, the power curves suggests that the results will be verified by conducting one retesting event (1 of 2). The retesting will be completed within 45 days of the original event for each of the constituents in each of the monitoring wells that returned an initial exceedance.

If the results of the retesting events indicate a SSI for a COC, and within 90 days of the determination of a SSI, an assessment monitoring program will be established and will comply with ADEM Admin. Code 335-13-4-.27(4) unless a determination can be made that a source other than the landfill unit caused the SSI, or there was an error in sampling, analytical testing, or statistical analysis. In the event there is determination of an alternate source, a report will be submitted to the ADEM for approval and placed in the operating record.

7.9 REPORTING

In addition to statistical analysis discussed above, the semi-annual report will also include, at a minimum, the following information:

- A discussion of the environmental setting of the facility.
- Summary tables of the laboratory analysis.
- Monitoring well sampling records.
- A table of historic groundwater elevations.
- Historically detected constituents, data sets, and time versus concentrations graphs.
- Copies of the laboratory reports.
- Potentiometric surface map(s) illustrating groundwater elevation and flow direction.
- Time versus Concentration Graphs for each detected constituent.
- Other supporting figures, such as site and well location maps.

8.0 REFERENCES

Alabama Department of Environmental Management, Administrative Code R. 335-13-x-xx.

Alabama Department of Environmental Management, WCA of Alabama, LLC Industrial Landfill, Solid Waste Disposal Permit No. 61-16, Issuance Date and Effective Date August 6, 2019, Expiration Date August 5, 2024.

Kopaska-Merkel, David Co., Dean, Lewis S., & Moore, James D. 2005. Hydrogeology and Vulnerability to Contamination of Major Aquifers in Alabama; Area 4: Geological Survey of Alabama, Circular 199 D, February 21, 2005.

Geological Survey of Alabama, Special Map 220, Geologic Map of Alabama, 1988.

Highland Technical Services, Inc., Hydrogeologic Evaluation, WCA of Alabama, LLC Industrial Landfill, September 18, 2007.

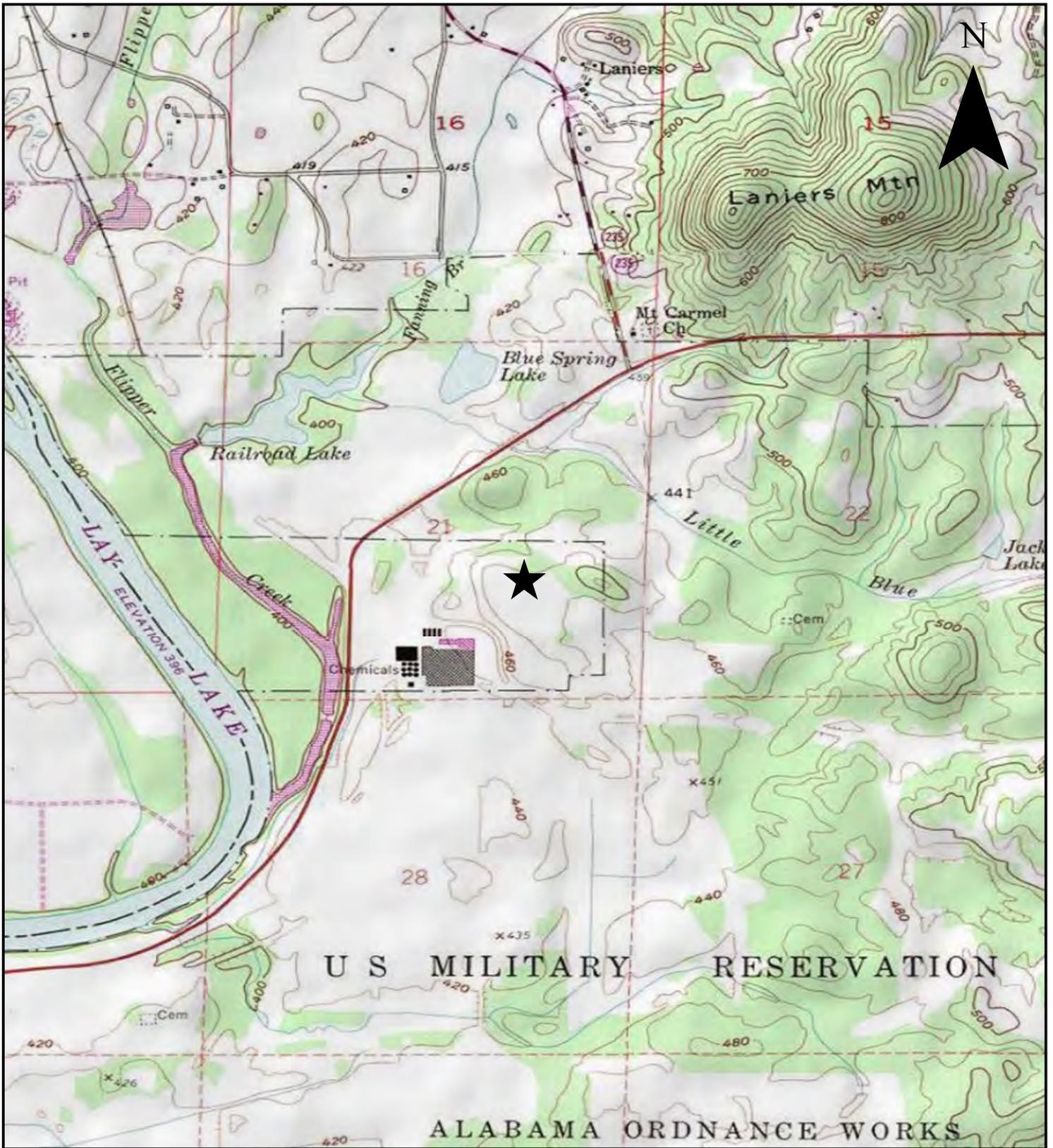
Highland Technical Services, Inc., Monitoring Well Abandonment & Replacement Report, WCA of Alabama, LLC Industrial Landfill, August 6, 2020.

Highland Technical Services, Inc., Semi-Annual Groundwater Monitoring Report - September 2020, December 16, 2020.

US EPA Region II, Ground Water Sampling Procedure Low Stress (Low Flow) Purging and Sampling, September 2001.

US EPA, Office of Solid Waste, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance, March 2009.

FIGURES



Legend

★ Site Location



TITLE:
Site Location Map
WCA Landfill
Childersburg, Alabama

FIGURE NO.
1
 PROJECT NO.
General Map
 DRAWN BY
SWA

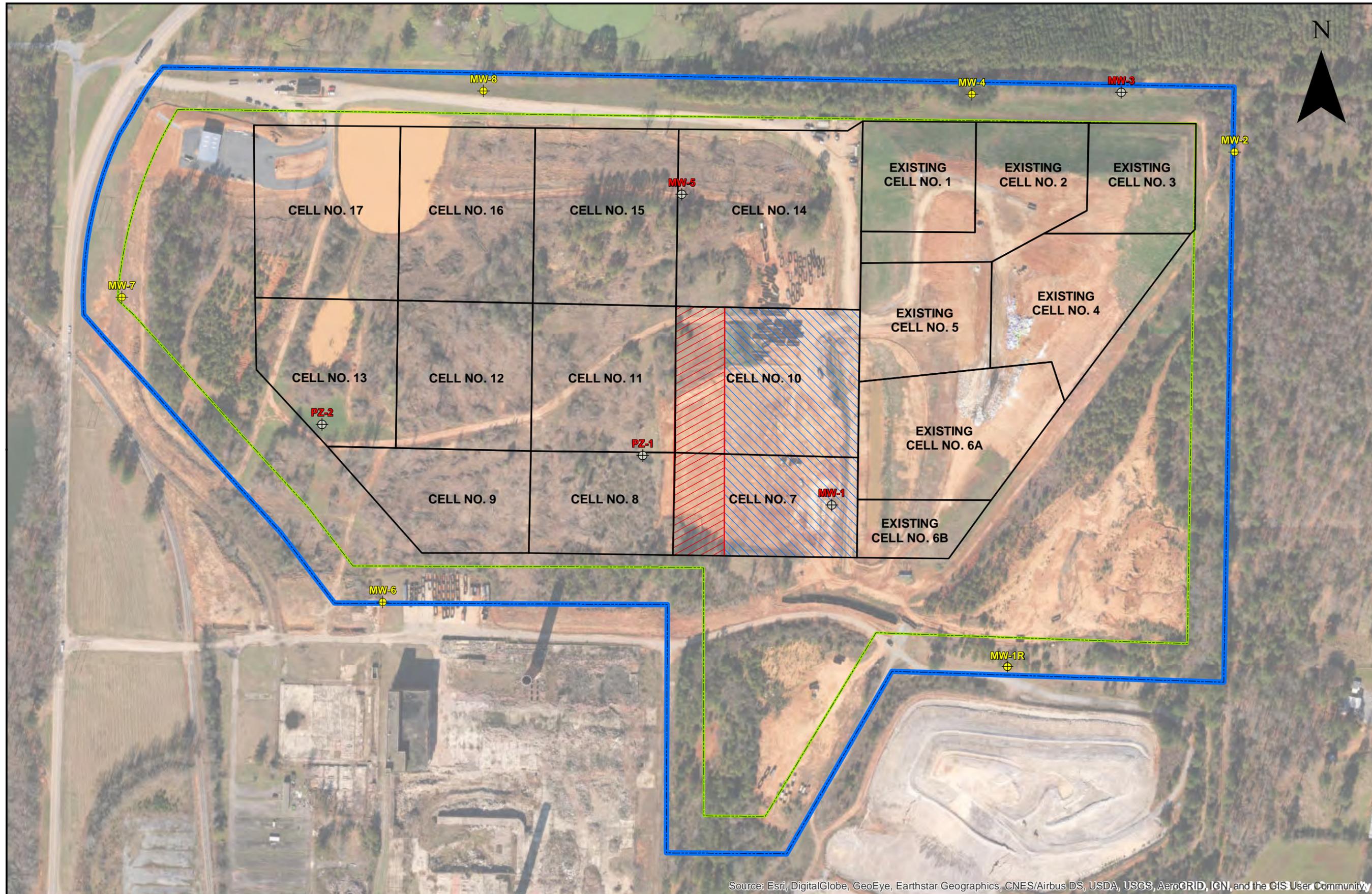
USGS Quad ID: 33086-C3
 Quad Name: Childersburg, AL

528 MINERAL TRACE
 HOOVER, AL 35244
 (205) 985-4874

SCALE:
 0 1,000 2,000

 1 inch = 2,000 feet

DATE DRAWN
4/10/2012



Legend

- CELL
- CELLS 7/10W MODIFICATION
- CELLS 7/10E MODIFICATION
- 100 FT
- PROPERTY LINE
- ⊕ Monitoring Well
- ⊕ Abandoned Well



TITLE:

Site Layout Map

WCA of Alabama, LLC
Industrial Landfill

Childersburg, Alabama

FIGURE NO.	PROJECT NO.
2	General Map
DRAWN BY:	DRAWN DATE:
LKN	07-28-2020



528 MINERAL TRACE
HOOVER, AL 35244
(205) 985-4874



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend Groundwater Monitoring Well Abandoned Monitoring Wells Abandoned Piezometers New Groundwater Monitoring Well Potentiometric Contour Line Landfill Property Line Groundwater Flow Direction (428.76) Measured Groundwater Elevation (ft-amsl) Gas Monitoring Location	 528 MINERAL TRACE HOOVER, AL 35244 (205) 985-4874	TITLE: Potentiometric Surface Map	FIGURE NO. 3
		September 25, 2020 WCA of Alabama, LLC Industrial Landfill Childersburg, Alabama	PROJECT NO. 19-230119A.06 DRAWN BY LKN
		SCALE: 1 inch = 500 feet	DATE DRAWN 12-15-2020

APPENDIX A

Appendix A Calculated Groundwater Flow Velocities September 25, 2020						
Monitoring Well	Groundwater Elevation (ft-amsl)	Distance Between Wells (feet)	Gradient (i)	Hydraulic Conductivity (cm/sec)	Effective Porosity (ne)	Estimated Flow Velocity (feet/year)
MW-2	414.03	3460.00		0.0002718	0.25	
MW-7	400.12		0.0040	0.0002718	0.25	4.5244
					average velocity	4.5244

Notes:

1. Effective porosity values from Freeze & Cherry (1979) Table 2.4.
 2. Hydraulic conductivity value from Slug Testing Completed in May 2007.
- ft-amsl - feet above mean sea level
cm/sec - centimeters per second

APPENDIX B

APPENDIX C

MONITORING WELL SAMPLING RECORD

PROJECT NO:

Page 1 of 1

PROJECT NAME:

WCA of Alabama, Inc. Industrial Landfill

SITE LOCATION:

Childersburg, Alabama

RECORDED BY:

WELL NUMBER	MW-1R	MW-2	MW-3	MW-4	MW-5
GENERAL WELL DATA					
Top of Casing (TOC) Elevation (ft)	487.52	460.11	473.19	472.66	469.61
Original Total Depth (ft below TOC)	82.35	Unknown	Unknown	Unknown	80.95
TOC Height (ft above/below grade)	2.71	2.90	1.88	2.82	2.32
Screened Interval (ft below grade)	70.0 - 80.0	56.0 - 66.0	64 - 84	65.0 - 80.0	86.0 - 96.0
Well Diameter (in)/Material	2 in, PVC	2 in, PVC	2 in, PVC	2 in, PVC	2 in, PVC
Current Well Condition	Good	Good	Abandoned	Good	Abandoned
WATER LEVEL DATA					
Date (mm/dd/yyyy)					
Time (military)					
Measured Total Depth (ft below TOC)					
Static Water Level (ft below TOC)					
Static Water Elevation (ft - AMSL)					
WELL PURGE DATA					
Purge Date (mm/dd/yyyy)					
Purge Time (military)					
Minimum Purge Volume (gal)					
Actual Purge Volume (gal)					
Equipment Used					
WELL SAMPLING DATA					
Sampling Date (mm/dd/yyyy)					
Sampling Time (military)					
Weather Conditions					
Equipment Used					
Groundwater pH (std units)					
Specific Conductance (mS/cm)					
Turbidity (NTU)					
Dissolved Oxygen (mg/L)					
Groundwater Temperature (degrees C)					
Oxidation-Reduction Potential (mV)					
Number of Containers Filled					
Water Clarity					
Parameters to be Analyzed	App I VOCs App I Metals	App I VOCs App I Metals	NA	App I VOCs App I Metals	NA
I certify that all water level measurement devices, purging equipment, and sampling equipment were properly cleaned prior to use in each well. <div style="text-align: right; margin-right: 100px;">Signature</div>					
REMARKS					
NA = Not Applicable					

HIGHLAND TECHNICAL SERVICES, INC.

528 Mineral Trace

Hoover, Alabama 35244

Phone (205) 985-4874 Fax (205) 987-6080

APPENDIX D



HIGHLAND TECHNICAL SERVICES, INC.

528 MINERAL TRACE
 BIRMINGHAM, ALABAMA 35244
 PHONE: (205) 985-4874
 FAX: (205) 987-6080
 EMAIL:

Analysis Required

Remarks:

Collected By:	Project Name:	Laboratory Name:
Signature:	Project No.:	Laboratory Address:

Sample ID	Lab ID	Comp/Grab	Sample Matrix	Sample Date	Sample Time	Sample Preservative

Matrix: **SS** – Soil/Solid **GW** – Groundwater **WW** – Waste Water
DW – Drinking Water **SW** – Stormwater **OT** - Other

Special Instructions:

Relinquished By:	Date:	Time:	Received By:	Date:	Time:	Samples Shipped Via:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:	Lab Remarks:
Relinquished By:	Date:	Time:	Received for Lab By:	Date:	Time:	

APPENDIX E

VOC Screening

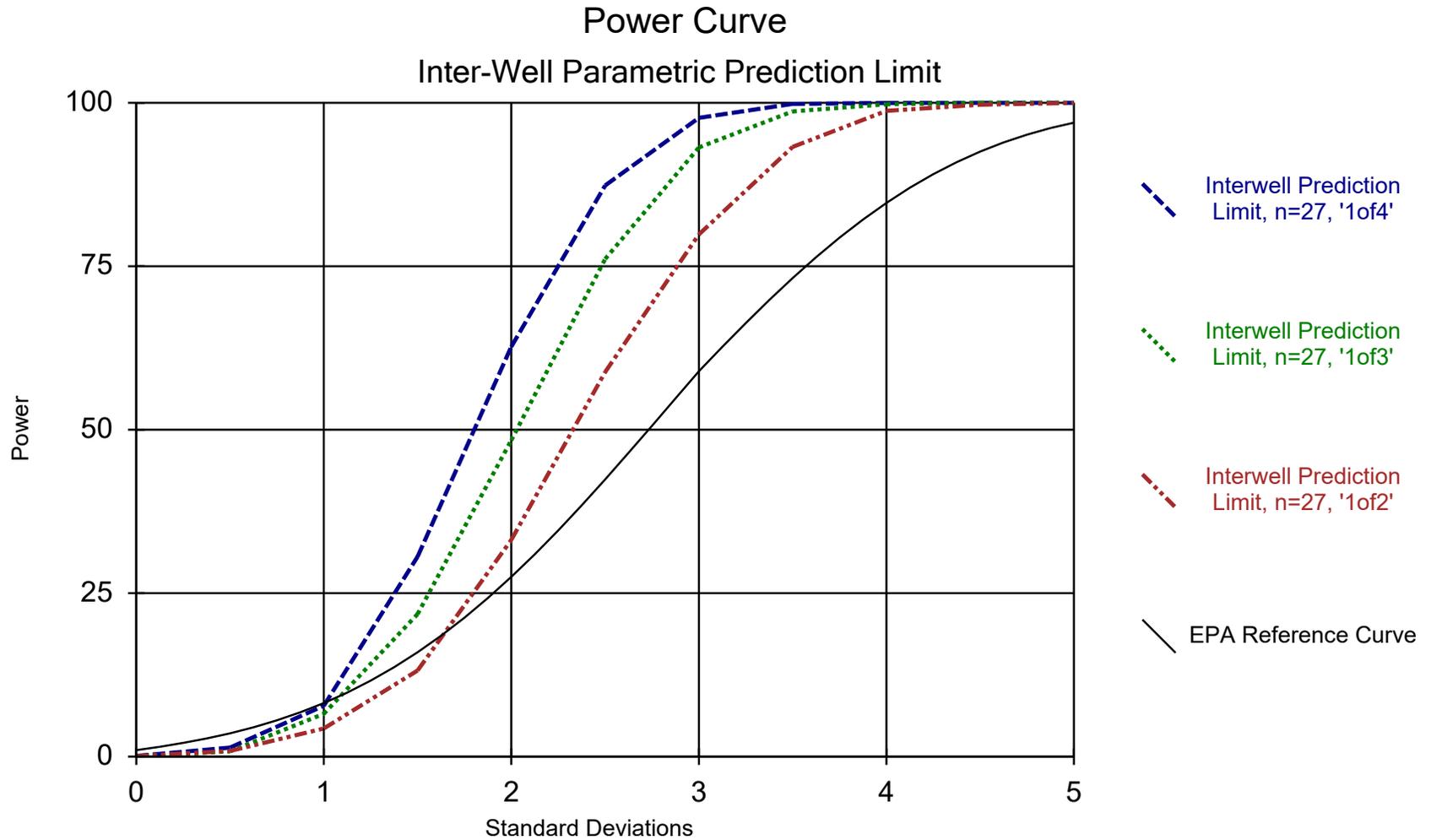
Analysis Run 1/25/2021 3:14 PM View: Default View - Multiple

WCA Fines Industrial LF Client: Waste Corp. of Alabama Data: WCA Fines Statistics Data

A listing of detects and trace values for 48 constituents in 3 wells on 52 dates:

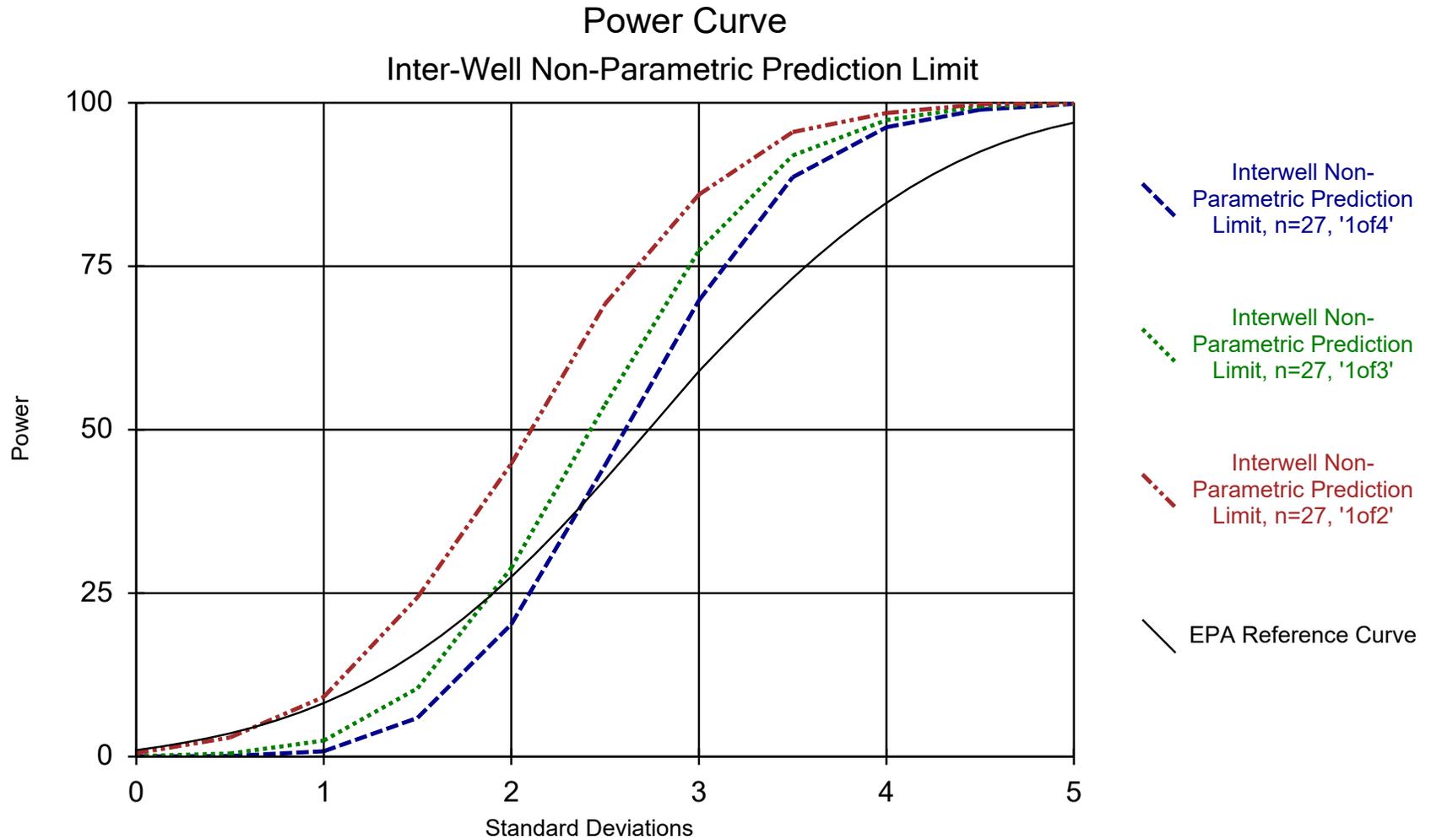
Benzene, MW-2 (bg), 1/13/2000: 2.2
Chloroform, MW-1R, 7/9/2020: 1.4
Methylene chloride, MW-2 (bg), 12/14/1999: 0.7
Methylene chloride, MW-4, 12/14/1999: 0.7

APPENDIX F



Analysis Run 1/27/2021 7:49 AM View: Default View - Multiple

WCA Fines Industrial LF Client: Waste Corp. of Alabama Data: WCA Fines Statistics Data



Analysis Run 1/27/2021 7:53 AM View: Default View - Multiple

WCA Fines Industrial LF Client: Waste Corp. of Alabama Data: WCA Fines Statistics Data



Alabama Department of Environmental Management
adem.alabama.gov

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Montgomery, Alabama 36130-1463
(334) 271-7700 ■ FAX (334) 271-7950

June 1, 2021

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Gerald Allen
13737 Plant Rd.,
Childersburg, AL 35044

RE: Monitoring Well Abandonment and Replacement Report,
Groundwater Monitoring Plan, and Minor Permit Modification Reviews
WCA of Alabama, LLC Industrial Landfill
Talladega County, Alabama
Permit # 61-16

Dear Mr. Allen:

The ADEM Solid Waste Branch requested a hydrogeological review of the Monitoring Well Abandonment and Replacement (MWAR) Report, the Groundwater Monitoring Plan (GWMP), and the Minor Permit Modification request which were submitted for review on behalf of the WCA of Alabama, LLC Industrial Landfill for Permit # 61-16. The following comments and recommendations are provided based on this review:

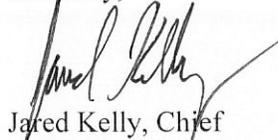
1. Monitoring wells MW-1, MW-3, and MW-5 and piezometers PZ-1 and PZ-2 appear to be abandoned in accordance with ADEM Admin. Code r. 335-13-4-.27(2)(e).
2. Monitoring well MW-1R appears to have been installed in accordance with ADEM Admin. Code r. 335-13-4-.27(2)(c). Because monitoring well MW-1R was installed at a location approximately 600 feet southeast of the abandoned monitoring well MW-1, the groundwater quality of MW-1R may not be representative of the groundwater quality at MW-1. Therefore, it is recommended that the groundwater data be statistically analyzed as separate and distinct wells.
3. Groundwater monitoring well MW-1R appears to have been constructed in accordance with ADEM Admin. Code r. 335-13-4-.27(2)(c)1. The MWAR Report states that the well was constructed with a 20-foot section of Schedule 40 PVC well screen at a depth interval of 60-80 feet. However, there is a discrepancy between this reported screened interval and the 10-foot screened interval reported in Table 4.1 of the GWMP. It is recommended that this discrepancy be clarified on this and subsequent reports.
4. Boring logs indicate the presence of dolomitic limestone beneath the site, and a sinkhole has been reported to have formed on the property adjacent to this facility in 2001. Therefore, it is recommended that the GWMP include information regarding the potential for karst conditions at the site in the description of site geology and hydrogeology.



5. In accordance with ADEM Admin. Code r. 335-13-4-.27(2), it appears appropriate for the permit to identify the monitoring well system to include monitoring well MW-2 as the background well and monitoring wells MW-1R, MW-4, MW-6, MW-7, and MW-8 as compliance wells.

If you have any questions regarding this matter, please contact Taylor Crocker of the Solid Waste Engineering Section at (334) 394-4338.

Sincerely,

A handwritten signature in black ink, appearing to read "Jared Kelly", with a long horizontal flourish extending to the right.

Jared Kelly, Chief
Solid Waste Engineering Section
Land Division

JDK/tfc