WASTE MANAGEMENT

LINER EVALUATION REPORT

PERMIT NO. MSW-249C

Cell WD-5

Austin Community Recycling & Disposal Facility
Travis County
Austin, Texas

July 2001

Prepared by:

RJR

RJR ENGINEERING, Ltd., L.L.P.
12651Briar Forest Dr. Suite 205
Houston, Texas 77077
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LINER EVALUATION REPORT
CELL WD-5

PERMIT NO. MSW 249-C

Prepared for:

AUSTIN COMMUNITY RECYCLING & DISPOSAL FACILITY
9900 GILES ROAD
AUSTIN, TEXAS

JULY 2001

Prepared by:

RJR ENGINEERING, Ltd., L.L.P.
12651 Briar Forest Drive
Houston, TX 77077

1.0 INTRODUCTION

This report documents the construction quality assurance (CQA) testing and observation performed for the construction of the underdrain system, Geosynthetic Clay Liner (GCL), geosynthetic liner system, leachate collection system, and the protective cover for Cell WD-5 at Waste Management's Austin Community's Recycling and Disposal Facility (ACRDF). This site is located in Travis County, east of Austin, Texas on Giles Road.

Cell WD-5 involves the construction of approximately 9.2 acres of cell area. It is located south of Cell WD-4 and east of an existing in-situ lined cell.

The construction involved installation of an underdrain system, GCL, 60 mil HDPE geomembrane and associated geosynthetic layers. The smooth HDPE liner on the floor was overlain with geonet and 8 oz geotextile layers. The textured 60 mil HDPE on the slopes was overlain with 16 oz geotextile. Two feet of protective cover was placed over the geotextiles. The cell was constructed in accordance with the site permit and the Soil and Liner Quality Control Plan (SLQCP). The construction procedures and quality assurance tasks are summarized in the following sections.

2.0 PERSONNEL

The quality assurance program documented herein was provided by RJR Engineering,Ltd.,L.L.P. (RJR) under contract with ACRDF. Longhorn Excavators was the earthwork contractor. ESI was the geosynthetic installer. Martin Survey Associates (MSA) was utilized for surveying services.

The key personnel and companies involved with the construction of ACRDF, Cell WD-5 are:

Waste Management of Texas, Austin Community Recycling & Disposal Facility - Owner

Rusty Fusilier	Construction Manager

RJR Engineering, Ltd., L.L.P. - Construction Quality Assurance

Jeff Reed, P.E.	Professional of Record
J.Roy Murray, P.E.	Professional of Record
Jean Wilson	Senior Site CQA Technician
Bob Wilson	Project Manager and CQA Technician
Joe Garza	CQA Technician

Longhorn Excavators - Earth Work Contractor

John Parker	Project Manager
John Cavazos	Construction Superintendent

ESI - Geosynthetic Contractor

Randy Story	Site Superintendent

CQA Testing Laboratories, Inc. - Soils and GCL Laboratory

Mike Griggs	Laboratory Manager

TRI/Environmental, Inc. - Geosynthetic Laboratory

Sam Allen	Geosynthetics Laboratory Manager

Martin Survey Associates, Inc. - Surveyor

Kevin Olson	Registered Surveyor

3.0 PROJECT DESCRIPTION

WD-5 construction consisted of excavating the cell to design subgrade elevations, exposing the existing in-situ liner limits, exposing the tie-in to the existing Cell WD-4 liner, and installing an underdrain system. The subgrade was smooth drum rolled to achieve a surface acceptable for liner installation. Some geomembrane materials used for this project were materials remaining from previous construction projects. Conformance testing results and certification documentation from the manufacturer were reviewed for compliance to both the manufacturer's product specifications and the SLQCP for all materials received onsite. Results are included in the Appendices.

GCL, along with smooth and textured 60 mil HDPE geomembrane was utilized for the project. Geonet and 8 oz. non-woven geotextile fabric were installed over the smooth geomembrane on the floor. Textured geomembrane on the slopes was overlain with a 16 oz. non-woven geotextile.

A leachate collection system was installed which connects to the Cell WD-4 system. The sump and riser are located in Cell WD-4.

On-site soil was used as the protective cover layer. A minimum of two feet of protective cover was placed over the geotextiles.

4.0 REFERENCE DOCUMENTS

A. "Soil and Liner Quality Control Plan" for Waste Management of Texas, Inc., Austin Community Recycling and Disposal Facility, Austin, Texas. Permit No. MSW-249-C, Revision 2b, approved by the State of Texas, November 1997.

B. Technical Guide #3, Liner Construction and Testing Handbook, TNRCC, July 1,1994.

C. Texas Natural Resources Conservation Commission Rules; Title 30 Texas Administrative Code, Chapter 330.

D. Cell WD-5 Construction Drawings prepared by RJR Engineering.

5.0 SCOPE OF SERVICES

The scope of services for the CQA work was outlined in a Service Agreement between ACRDF and RJR. RJR was contracted to provide CQA for the Cell WD-5 project construction. The duties which were required to be performed are described in the following sections.

5.1 CQA MANAGEMENT AND CERTIFICATION

A. Project initiation activities consisted of:
   1. Reviewing quality control data and conformance data.
   2. Reviewing daily logs, reports, and test results.

B. CQA project management activities consisted of:
   1. Monitoring the budget for RJR activities.
   2. Review of daily summary reports, logs, and test results.

C. Certification activities consisted of:
   1. Regular site visits by the Professional of Record to observe construction quality and progress.
   2. Review of field data and reports to assure proper CQA documentation and that the work is in compliance with the design, permit regulations, and general construction practices.
   3. Review all quality control submittals to assure completeness and accuracy.
   4. Interact with regulatory agency regarding the project report.

5.2 FIELD CQA SERVICES

This task includes the field services associated with the 9.2 acre Cell WD-5 construction of the landfill. Cell construction duties consisted of the following:

- Verifying the completion of grade for the liner, including verification that the existing in-situ liner to the west had been exposed.
- Observing and documenting the installation of the underdrain system.
- Providing density testing of the subgrade to ensure compliance with the SLQCP.
- Providing acceptance certification for the subgrade surface prior to geosynthetic deployment.
- Inventorying and sampling geosynthetic material arriving on site and reviewing geosynthetic manufacturers' certifications.
- Observing the installation of the GCL, 60-mil HDPE geomembrane, geonet, and geotextiles.

- Observing the installation of the two-foot thick protective cover along with the leachate collection system.

More specifically, the CQA activities for geosynthetics involved the following:

A. Reviewed manufacturer's certification data for each geosynthetic material for completeness and meeting specified minimum values.
B. Reviewed the conformance test data for meeting minimum specified values.
C. Observed and documented the installation of the geosynthetic liner system. Specifically, the CQA team documented the following:
   1. Trial weld
   2. Panel placement
   3. Panel seaming
   4. Nondestructive seam testing
   5. Destructive sampling and testing of seams
   6. Repair and retest of any failures and other general repairs
   7. GCL deployment and powdered bentonite placement at seam overlap
D. Monitored the installation of the geonet and geotextile layers.
E. Observed the placement of the on-site soil as protective cover.
F. Observed installation of the leachate collection system.

5.3 GEOSYNTHETIC LABORATORY TESTING

RJR utilized the services of qualified laboratories for testing the construction materials as follows:

A. TRI/Environmental, Inc. - Austin, TX. was utilized to perform the following tests.
   1. 60-mil HDPE Geomembrane
      a. Conformance Testing

• Tensile Properties	ASTM D 638
• Thickness	ASTM D 1593/5199
• Density	ASTM D 1505
• Carbon Black Content	ASTM D 1603
• Carbon Black Dispersion	ASTM D 5596
• Puncture Resistance	ASTM D 4833
• Tear Resistance	ASTM D 1004

      b. Construction Testing (Destructs)

• Seam Strength	ASTM D 4437
• Peel Adhesion	ASTM D 4437

2. Geosynthetic Clay Liner
   Conformance Testing
   - Permeability — GCL-GRI-2
   - Bentonite Mass/Unit Area — ASTM D 5993
   - Moisture Content — ASTM D 4643

B. GeoTesting Express – Boxborough, MA
   Geosynthetic Clay Liner
   - Interface Shear — ASTM D 5321

C. CQA Testing Laboratory - Columbus, IN.
   Drainage Stone
   - Gradation — ASTM C136
   - Calcium Carbonate — ASTM D 3042 (J&L Method)

5.4 GCLER/GLER DOCUMENTATION

This final documentation report includes the following items:

1. A narrative describing the construction sequence and documentation activities.
2. A statement certifying that construction was in substantial accordance with the plans and specifications and signed and sealed by a professional engineer registered in the State of Texas.
3. A completed GCLER and GLER.
4. A series of sections containing the following:
   a. Geosynthetic material inventory logs.
   b. Manufacturer's quality control documentation.
   c. Geosynthetic laboratory conformance test results.
   d. Subgrade acceptance reports.
   e. Geomembrane field documentation including:
      - Trial welds
      - Panel placement for both GCL and HDPE
      - Panel seaming
      - Nondestructive testing
      - Destructive testing
      - Repairs
   f. Photographs
   g. Resumes of key personnel
   h. Certificate of Completion
   i. Pertinent documentation
5. Set of record drawings consisting of the following:
   a. Drawing of construction area and previously filled areas.
   b. GCL panel locations

c. Geomembrane panel seam locations as well as locations of destructs and repairs.

d. Top of protective cover along with location of the underdrain system as well as the leachate collection trench.

6.0 CONSTRUCTION ACTIVITIES

6.1 EXCAVATION

The project began with Longhorn Excavators excavating the cell area to the design grades. Visual observations were made to determine that the west tie-in was excavated to expose the existing in-situ liner. The north side of the excavation area tied into Cell WD-4, a composite lined cell consisting of two feet of recompacted clay liner overlain with 60 mil geomembrane and 16 oz geotextile on the slopes and geonet and 8 oz geotextile on the floor. The limit of liner was exposed using a trackhoe with a metal bar welded over the teeth of the bucket to minimize damage to the geosynthetics while removing the protective cover at the edge. The existing geomembrane and geotextiles were folded back to expose the existing recompacted clay liner.

Prior to geosynthetic installation, the subgrade surface was smooth drum rolled. Any ruts or depressions were filled with sand and rerolled to achieve an acceptable surface to geosynthetics.

6.2 UNDERDRAIN SYSTEM

An underdrain system was required as part of the Cell WD-5 construction. The underdrain system included geocomposite material installed at 65 foot intervals one foot below the subgrade surface on the south slope from the toe of slope to the seasonal high ground water elevations. Clay soil was recompacted in lifts over the geocomposite. A toe drain was excavated in accordance with the construction plans. Geocomposite was installed into the toe drain connecting the sidewall geocomposite to form a continuous drain. A 6-inch HDPE sidewall dewatering riser was installed two feet below the subgrade surface. The sidewall riser connected to the toe drain at the low point of the toe drain. The lower ten feet of the riser was perforated, covered with drainage stone and encapsulated in filter fabric. The riser trench and toe drain were backfilled and compacted in lifts with clay soil material. For additional information on the underdrain system see Pertinent Information appendix.

6.3 GEOSYNTHETIC MATERIAL TESTING

The Construction Quality Assurance (CQA) program included a review of the geosynthetic material manufacturer's quality control test results and certifications. This information was reviewed and found to be in compliance with the design specifications.

The geosynthetic liner system consisted of five types of materials. The components of the geosynthetic liner system included the following:

1. Geosynthetic Clay Liner placed directly on the prepared subgrade surface.
2. 60-mil textured high-density polyethylene (HDPE) geomembrane for the geosynthetic component of the liner system. Smooth HDPE was installed on the

floor while textured HDPE was utilized on the slopes.

3. HDPE geonet for drainage on the floor.
4. A non-woven polypropylene geotextile with a minimum of 8 ounces per square yard. The 8 ounce geotextile was installed as a separation layer between the geonet and the protective cover on the floor.
5. A non-woven polypropylene geotextile with a minimum of 16 ounces per square yard was used to overlay the textured HDPE on the slopes.

The GCL material were delivered, inventoried, and stockpiled on site prior to the installation of the liner system. Conformance sampling of the GCL was performed at the manufacturing plant by a representative of TRI Environmental and shipped to the lab for testing. The results of conformance tests are included in the Appendices.

Conformance testing of the geomembrane material was performed as material arrived at the site. Testing was performed at a frequency rate of one test per 100,000 square feet or major fraction thereof for the geomembrane material with no less than one per resin lot. All test results passed the required values. The inventory logs as well as the results of the conformance tests are included in this report.

6.4 SUBGRADE ACCEPTANCE

Prior to the deployment of the geosynthetics, a final walk-through of the subgrade surface (ie. top of subgrade) was conducted by RJR personnel, the ESI Superintendent, and the Contractor's Superintendent. The walk-through was to identify any unacceptable areas or objects (rocks, ruts, ridges, and soft spots) requiring immediate attention. Once the area was deemed acceptable, the ESI Superintendent and the RJR Senior Site Manager would complete the Subgrade Surface Acceptance form. These forms are included in this report.

6.5 GEOSYNTHETIC INSTALLATION AND DOCUMENTATION

Upon arrival to the site, ESI supplied resumes of their personnel and calibration records for their tensiometer. These documents are included in this report.

The GCL material was deployed to overlap the existing recompacted clay liner at the WD-4 cell limit a minimum of three feet. At the west side, the GCL was deployed to the limit of the in-situ liner. The geomembrane liner was welded to the existing Cell WD-4 geomembrane.

CQA personnel were responsible for documenting panel placement of both GCL and geomembrane, trial weld testing, seam welding, nondestructive and destructive testing of completed seams and repairs, as well as visual inspection of the geomembrane. Panel thickness tests were also conducted along the leading edge of each geomembrane sheet. Field activities and observations were recorded on daily field reports. The data associated with the installation of the

geosynthetics is presented in this report.

ESI's deployment consisted of unrolling the GCL panels from rolls supported by a spreader bar attached to a front end loader. Rolls of GCL were typically 15 feet wide and 150 feet long. Powdered bentonite was placed along all seam overlaps at a minimum rate of 1/4 pound per linear foot. In accordance with the SLQCP, horizontal seams on the slope were located in the lower half of the slope, overlapped a minimum of three feet at the ends, and powdered bentonite was added at the overlaps. The rolls of geomembrane were an average of 23 feet wide by 500 feet long. The geomembrane was deployed directly on the GCL with a minimum overlap of six inches. Panel placement information for GCL includes roll and lot number, panel number, stationing, time and date of deployment. Panel placement information for geomembrane deployment includes panel number, roll number, stationing, time, date, location of panel, and field thickness.

Trial welds were run at a minimum of one every five hours for the use of each machine, usually each morning and after lunch or when construction activities dictated. Trial welds were also conducted as different welding machines were put into production, and when a welding machine was disconnected from its power source. Trial weld "bones" were tested on a certified calibrated field tensiometer by ESI and observed by RJR CQA personnel. Each trial weld sample consisted of testing two 1-inch "bones" for peel adhesion and two 1-inch "bones" for shear. Trial weld information included date, time, barrel, and preheat temperatures for extrusion welders, wedge temperature for fusion welders, seamer ID, tool ID, pass or fail result, and CQA Monitor ID.

For panel seaming, ESI utilized a double-tracked fusion welder to perform all major panel seaming work. The double-tracked fusion welder creates an air channel bounded by two fusion welds. The extrusion welding process was used for patches and repairs; and tying into existing liner. This method extrudes a bead from the HDPE rod onto the clean ground edge of liner and the underlying panel. Panel seaming information includes the date, seam number (identified by the two adjacent panels), seam length, seamer ID, tool ID, seam start time, and the CQA Monitor ID.

Nondestructive testing was performed to verify seam continuity and integrity. Air pressure testing was performed on the fusion welded seams. The testing involved sealing both ends of the air channel, inserting a needle and pressure gauge into the air channel, and pressurizing the air channel to approximately 30 psi. A seam was considered acceptable, or passing, if the seam exhibited a pressure loss of 3 psi or less over a five minute testing period and the seam displayed a pressure loss at the conclusion of the test when the opposite end of the seam was pierced or cut. This testing procedure ensures continuity throughout the entire length of the seam. The seam would be tested in smaller sections if the continuity of the seam was in question.

Nondestructive vacuum box testing was performed on all extrusion welds. The vacuum box consists of an 8 inch by 12 inch cast aluminum box, fitted with a clear viewing window and a

neoprene gasket to provide the appropriate seal required for testing. A pressure gauge is installed in the interior of the box and the exterior valve is connected to a portable air compressor, which controls the vacuum. The test procedure requires that the target seam be wetted with a soapy solution, the vacuum box placed over the area, and a vacuum created over the test area. Vacuum box tests were performed continuously with a vacuum of 5 pounds per square inch for a minimum of 10 seconds. RJR CQA personnel verified each acceptable seam segment by visually monitoring that no air bubbles were present. If bubbles appear, a leak exists which is located, repaired, and retested.

Destructive seam samples were designated and removed from welded seams at a minimum rate of one per 500 linear feet per welding machine (averaged over the area of the entire cell). The goal of this testing program was twofold: first to obtain samples that represent the overall quality of the installation and second, to test suspect areas. Each destructive sample measured a minimum of 34 inches long and 12 inches wide. The first section (18 inches by 12 inches) was sent to TRI Environmental Inc. for destructive testing, and the second section (12 inches by 12 inches) was retained in the Site's archive. Four "bones" were tested on-site (two for peel and two for shear) prior to the sample being sent to the lab. If the field testing failed, the seam was tracked back to where there were passing field tests prior to laboratory testing. If the laboratory samples failed, then the seam was also tracked back until a passing test was obtained for a particular machine. The failing seam would then be repaired and retested.

Typical repairs of the geomembrane included:

A. Patching locations of destructive seam samples and nondestructive air testing holes.
B. Repairing damage to the liner (cuts, tears, punctures, creases) created during the installation process.
C. Repairing any imperfections of the HDPE liner encountered during deployment.
D. Repairing failed field seams indicated by either failed destructive seam samples or failed nondestructive testing.
E. Burnouts and other machine malfunction locations.

A total of 47 original destructive seam samples were taken, of which four failed laboratory testing and two failed field testing. Failing destructive samples were tracked a minimum of ten feet in both the before "B" and after "A" direction. The seam area between the passing bounding samples was repaired in accordance with the SLQCP. The following table contains tracking information on failed destructive samples.

Destructive sample designation	"A" (after) sample	Lab results	"B" (before) sample	Lab results	Comments
DS 3 Sm 5/6 2+45	DS 3A1 Sm 7/8 1+57	Pass	DS 3B Sm 5/6 2+35	Pass	
DS 5 Sm 7/8 0+25	DS 5A Sm 7/8 0+55	Pass	DS 5B Sm 7/8 0+15	Pass	
DS 9 Sm 17/18 0+50	DS 9A Sm 17/18 0+62	Pass	DS 9B Sm 17/18 0+27	Pass	
DS 10 Sm 19/20 0+25	DS 10A Sm 21/22 0+12	Pass	DS 10B Sm 19/20 0+15	Pass	
DS 15 Sm 34/35 0+90	DS 15A1 SM 34/35 1+57	Pass	DS 15B Sm 34/35 0+80	Pass	
DS 47 Sm 116TI 2+10	No after sample	N/A	DS 47B Sm 116 TI 1+94	Pass	Capped in the after direction to end of seaming by this machine

Final walk-throughs were performed by RJR personnel prior to the deployment of geonet or geotextile to ensure all the necessary repairs and testing had been completed. Any areas needing addressing were noted, completed, and checked. A Certificate of Completion for the geomembrane liner is included in this report.

After completion of the geomembrane installation, geonet and 8 oz geotextile were deployed on the floor, 16 oz geotextile was deployed over the textured geomembrane. The geonet seams were tied using plastic ties at intervals of five feet along the edges and every six inches on cross seams. The geotextile seams were sewn with portable hand held sewing machines using a polymeric thread with chemical and ultraviolet light resistance properties equal to or exceeding those of the textile. All geonet and geotextile materials were deployed, overlapped, and connected as specified above and in the SLQCP.

MSA surveyors provided record drawing locations of the panels, seams, destructive seam samples, repairs and protective cover.

6.6 PROTECTIVE LAYER PLACEMENT

On-site soil was placed over the geotextiles to a minimum thickness of two feet. This soil was graded with a low ground pressure (less than 5 psi) track dozer. A three foot thick road was maintained for trucks to operate on. The soil was pushed and spread with the same dozer. The construction of the protective cover was performed under the observation of the CQA technician.

MSA surveyors verified the thickness at the same grid locations as the previous surveys. At all locations checked, the minimum thickness of 2 feet of protective material was maintained. The elevations which verify this thickness are shown on the record drawing.

6.7 LEACHATE COLLECTION SYSTEM

The leachate collection system consisted of a leachate trench connecting to the leachate trench in Cell WD-4. The leachate trench was constructed in accordance with the construction drawings. A perforated pipe was placed in the leachate trench and fusion welded to the Cell WD-4 pipe, covered with drainage aggregate mounded to one foot above the protective cover layer, and encapsulated in textile. The pipe was 6-inch HDPE SDR 17 perforated with $^3/_8$" holes. The location of the leachate trench is shown on the record drawing.

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TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
MUNICIPAL SOLID WASTE LANDFILL SITE
GEOMEMBRANE LINER EVALUATION REPORT

★★★★★ *READ THESE INSTRUCTIONS BEFORE COMPLETING THIS FORM* ★★★★★

This form is to be completed by a qualified professional experienced in geotechnical engineering and/or engineering geology who is experienced in geomembrane testing, the interpretation of these test results,and the proper methods of constructing impermeable synthetic liners that meet the requirements of the Texas Natural Resource Conservation Commission's (TNRCC) rules.

The purpose of the geomembrane evaluation requirement is to assure that ground water, as defined in the TNRCC rules, is protected from contamination resulting from the land disposal or storage of municipal solid waste. This synthetic liner evaluation is required to provide an opportunity for a professional, geotechnically qualified individual to inspect the trench or area and to document that the synthetic liner meets the TNRCC's regulatory requirements prior to filling operations.

Data and information required in this questionnaire are to provide the basis of the evaluation made by the Professional Of Record (POR). This report is to be supplemented with those quality-assurance/quality-control (QA/QC) tests as detailed in the permit's Soils and Liner Quality Control Plan (SLQCP) and shall be the basis of documentation of the quality control and acceptance of a constructed liner.

The term "geomembrane" as used in this report refers to the flexible membrane liner (or FML) as described in the TNRCC rules. The term "GLER" refers to this report form and is synonymous with the term "FMLER" as used in the TNRCC rules. The term "SLER" as used in this report is as described in the TNRCC rules and refers to either a conventional SLER or a GCLER (Geosynthetic Clay Liner Evaluation Report).

Attach additional sheets as needed, and on each sheet identify the appropriate Part and Paragraph number for each reference.

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RECEIVED
JUL 17 2001
MSW PERMITS SECTION
TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

PART A. SITE IDENTIFICATION

Permittee Austin Community Recycling & Disposal Facility

Permit No. 249-C Operational Classification Type I

County Travis

(SUBMIT THIS REPORT TO THE TNRCC IN TRIPLICATE)

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PART B. GENERAL INFORMATION

1. What type of liner is required by the Permit and is it detailed in the Site Development Plan? (SDP) Approved Site Development Plan - Subtitle D.

2. Is this part of a composite liner system as defined in Subtitle D of RCRA (Resource Conservation and Recovery Act)? Yes.

3. Does the SDP require a leachate collection system (LCS) for this liner system? Yes.

4. What are the dates of the most recent SLER/GLER submittals prior to this document's submission? GLER/GCLER April 2001.

5. Date of the current SLQCP that was used to develop this GLER. Revision 2b, November 1997
Does it follow the latest TNRCC guidelines? Yes.

   a. Was this plan followed? Yes.

   b. If not followed, why not? N/A.

PART C. LOCATIONS AND/OR DESCRIPTION OF AREAS CURRENTLY BEING EVALUATED

1. Attach to this report a copy of the original sectorized fill layout plan showing the areas or sectors of the landfill site currently under evaluation and noting areas previously filled. If a copy of the original site plan is not available or is determined to be inaccurate, then prepare and attach an updated site layout that identifies the areas already filled, those currently receiving waste material, and the area or areas now being evaluated, and the location designation and approval dates of prior liner evaluations. The required grid system must be shown on this drawing.

2. On a sketch(es) or drawing(s) of the area or areas under evaluation, indicate the following:

   a. Boundary lines distinguishing the bottom and sidewall areas of the trenches or fill areas being evaluated and SLER/GLER boundary markers.

   b. Site drawing showing area covered by the geomembrane, seam locations, panel numbers, location of destructive tests, all repairs, and SLER/GLER boundaries/markers.

   c. As-built elevations of the liner (if not provided in a preceding SLER or GLER for this cell/waste area).

3. Are boundary markers in place at the time of this submittal? Yes (See 30 TAC 330.55(b)(10)(A)(v) and (B)(v)).

000020

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

May 18, 2001

Mr. Marcos R. Elizondo, P.E.
District Manager
Waste Management/Austin Community LF
P.O. Box 141968
Austin, TX 78714-1969

RE: Municipal Solid Waste - Travis County
Austin Community Landfill - MSW Permit No. 249C
GCL Horizontal Sideslope Seams for Cell WD-5
ML#6478

Dear Mr. Elizondo:

On May 11, 2001, we received a request describing the procedures for installation of geosynthetic clay liner (GCL) horizontal sideslope seams for Cell WD-5. Mr. Jeffrey K. Reed, P.E. (#80103), RJR Engineering, Ltd., L.L.P. prepared this submittal which was signed and sealed by Mr. Reed on May 9, 2001. The request contains revisions to Soils and Liner Quality Control Plan (SLQCP) dated October 1995 Revision 2b and is considered an approved addendum to the SLQCP. Any deviation from this approved SLQCP addendum must have prior approval from the Texas Natural Resource Conservation Commission. Each Liner Evaluation Report must be prepared in accordance with the SLQCP and this addendum.

If you have any questions concerning this letter, you may contact Ms. Maryann Ryan, C.P.G., Geologist, Permit Team II, at 512/239-6264.

Sincerely,

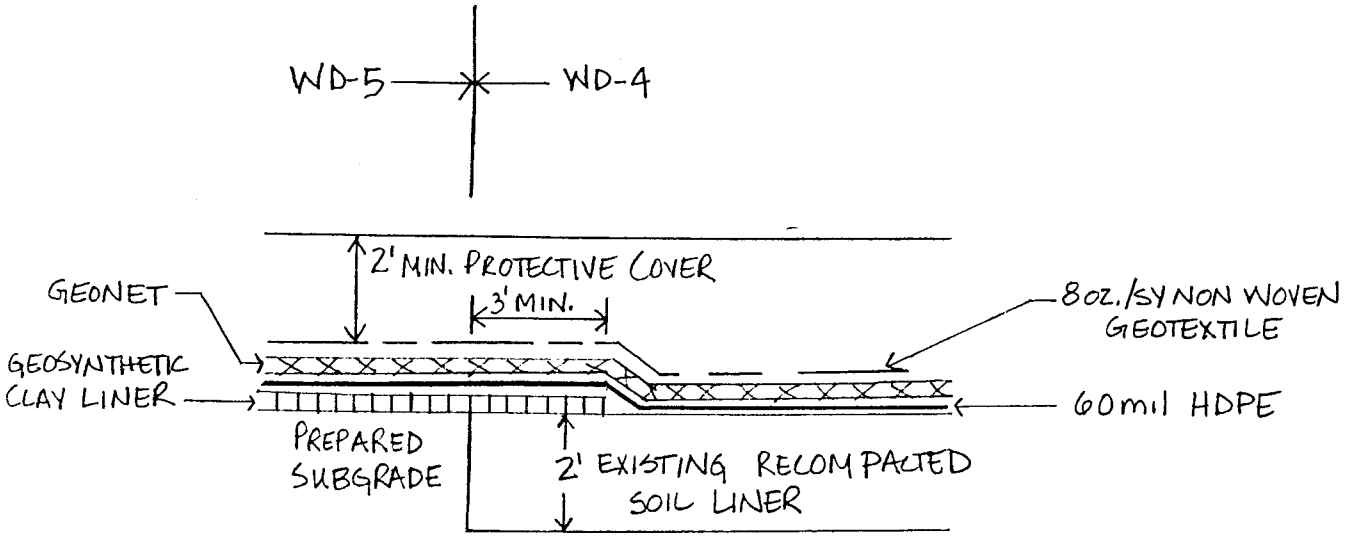
Jeff Davis, Team Leader
MSW Permits Section
Waste Permits Division

JD/MAR

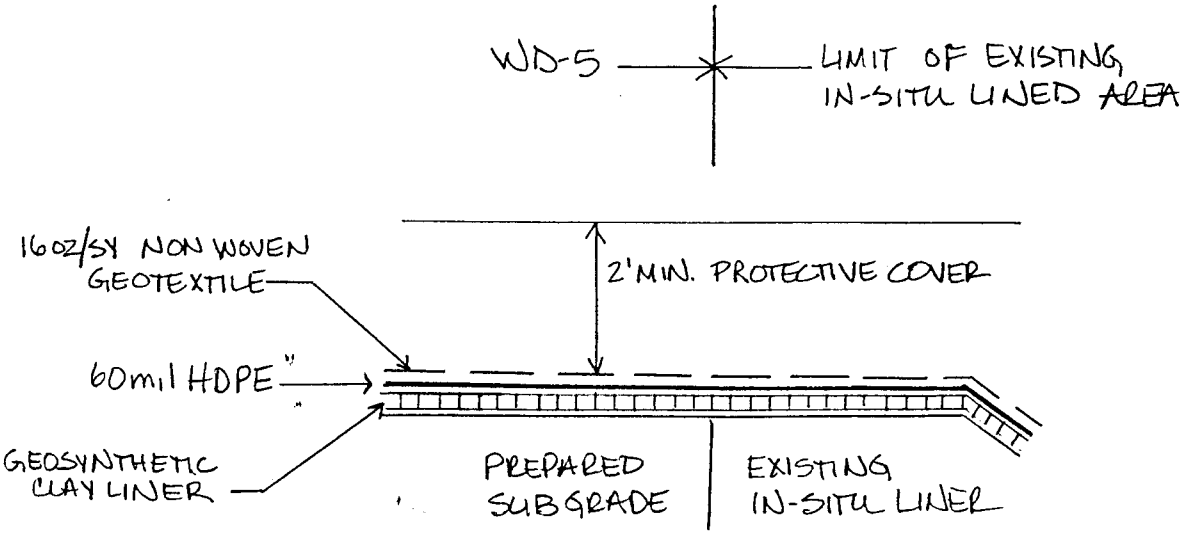
cc: Mr. Jeffrey K. Reed, P.E., RJR Engineering, Ltd., L.L.P.

RJR

JOB NAME_____
JOB NO._____
CALCULATED BY_____ DATE_____
CHECKED BY_____ DATE_____
SHEET_____ OF_____



GCL / SOIL LINER TIE-IN
NTS



GCL / IN-SITU LINED AREA TIE-IN
NTS

000022

4. Present evaluation location and area of coverage:

a. Trench, sector, or area identification or number (give grid/station boundary limits of this evaluation) N95584.39/E151401.44 N95091.85/E151145.43 N95442.12/E150491.26 N95559.25/E150487.60 N95865.93/E150860.36

b. Excavation depth 87 ft. Actual elevation of trench at: top 667 ft.; bottom 580 ft; Length of excavation at: top 550 ft.; bottom 360 ft. Width of excavation at: top 790 ft.; bottom 325 ft., and ratio of side slopes 3 H: 1 V.

c. Total number of square feet of geomembrane liner constructed for the floor 100,883 $ft.^2$ and for each individual side slope: (1) W 60,855 $ft.^2$; (2) E 87,780 $ft.^2$; (3) S 131,040 $ft.^2$; (4) _____ $ft.^2$ (if evaluated area has more than four sides, list all others below). Wcrest 20,650.

PART D. GEOMEMBRANE MATERIALS

1. Indicate type of geomembrane used on floor and sidewalls
60 mil textured - W crest & slopes 60 mil smooth - floor

2. Indicate geomembrane roll dimensions 23 x 500

3. Does the geomembrane material meet the specifications and the requirements given in the SDP and the SLQCP? Yes If not, please explain _____
_____ Attach roll delivery documentation, manufacturer's certification, and conformance testing results. Provide information on Geosynthetic Inventory form (attached) if not provided elsewhere.

PART E. INSTALLATION OF THE GEOMEMBRANE LINING

A professional engineer with geotechnical experience or a member of his or her staff qualified by training and experience shall monitor liner construction, but the final evaluation must be made by the aforementioned engineer.

Describe concisely on attached sheets the field and laboratory activities performed by yourself and/or your staff to accomplish this evaluation.

1. Dates synthetic liner was constructed June 5,6,7,10,11,12 & 13, 2001

2. Dates the POR actually visited the site JRoy Murray - June 15 & 29 , 2001
Jeff Reed May 30, June 6 & 20, 2001
Date of last visit made by POR? June 29 , 2001

000023

3. Dates that protective cover was installed June 18-23, 25-28, 2001 .(Also see PART I.2. below.)

4. Name(s) of the POR's technician and dates on site Jean Wilson May 17,18, 21-25,29-31, June 1, 4-23, 25-29, 2001 Bob Wilson June 6,13,16, 2001 Joe Garza June 11-15, 2001.

5. Was each panel checked for thickness by using a micrometer? Yes

6. Was the soil subgrade rolled with a smooth-wheel roller prior to geomembrane deployment? Yes Was the subgrade maintained in a suitable condition as described in the SLQCP prior to geomembrane placement? Yes Submit subgrade acceptance certificates.

7. Were anchor trenches properly prepared? Yes.

8. Were anchor trenches backfilled? Yes.

9. Type(s) of field seaming used Fusion and extrusion.

10. Submit Geomembrane Panel Deployment Summary and Geomembrane Seam Summary forms (attached).

Part F.GEOMEMBRANE EVALUATIONS CONDUCTED DURING THE CURRENT STUDY

Provide separate summaries for the tests listed below and show locations for destructive testing and repairs. Note: The POR or his or her engineering technician shall observe all test seam procedures, field tensile testing, and non-destructive testing.

1. Were all the QA/QC tests and the rate of testing performed in conformance with the current SLQCP? Yes If not, please explain

2. Start-Up Testing

   Were peel and shear test seams made by each seamer each day at the start-up of each seaming period and after the mid-day break, for each seaming apparatus he or she used that day? Yes. Did each seamer make at least one test seam each day he or she performed seaming? Yes. Submit applicable Geomembrane Fusion Trial Seam Summary and Geomembrane Extrusion Trial Seam Summary forms (attached).

3. Non-Destructive Testing

   a. Was continuous, non-destructive testing performed on all seams? Yes.

   b. Type of non-destructive testing: vacuum box Yes, air pressure Yes, other (please explain)

000024

c. Submit Air Pressure Test Summary form (attached) and other non-destructive test documentation on the applicable Geomembrane Seam Summary and Geomembrane Repair Summary forms (attached).

4. Destructive Testing

a. Number of locations where destructive tests were performed 47. Total length of seaming 21053 feet. Was destructive testing performed on every 500 linear feet of seam? Yes. Attach destructive test results.

b. Minimum number of peel tests required to be performed by quality control laboratory 5 (10 for fusion). Number actually performed 5 (10 for fusion). (Dual track welds must be tested independently.)

c. Minimum number of shear tests required to be performed by quality control laboratory 5. Number actually performed 5.

d. Where are samples from each destructive test location archived? On site.

e. Submit Destructive Test Summary form (attached) and laboratory destructive test data.

5. Repairs

Were all seams which failed destructive or non-destructive testing and other areas requiring repairs repaired in accordance with the SLQCP? Yes Submit Geomembrane Repair Summary form (attached).

PART G. LEACHATE COLLECTION SYSTEM/PROTECTIVE COVER

1. Gradient of bottom of evaluated area 2.0% min..

2. Gradient of leachate collection lines 1.0%.

3. What method of placement was used for the LCS and/or protective cover over the geomembrane? Off road trucks and dozers for protective cover Off road trucks and trackhoe for drainage stone placement. Minimum 3' thick road maintained for trucks to drive on.

4. Do protective cover soils and LCS materials (trench backfill, leachate collection layer soil; drainage, filter, or cushion geosynthetics; collector pipes) meet the required specifications? Yes.

5. Attach results of any required permeability, grain size, and calcium carbonate content tests on soil drainage and protective cover materials by suppliers and independent laboratory. For geosynthetic materials attach roll delivery documentation, suppliers' certifications and test results, and results of any conformance tests required by the SLQCP. Submit Geosynthetics Inventory form (attached) if the roll information is not provided elsewhere.

000025

6. Attach survey documentation for thickness verification of LCS and protective cover. Also attach sketch(es) showing liner/LCS/protective cover cross section.

7. Was the liner system (including LCS/protective cover placement) completed prior to your final visit? Yes

PART H. UPLIFT STABILITY

Does this liner system require any ballast to overcome hydrostatic pressure? No
If yes, submit Ballast Evaluation Report (BER) upon completion (or at end of interim period if required by the SLQCP) of ballast placement (if operating under mid-1995 revision of 30 TAC 330.203) or documentation of ballast placement with this GLER (if operating under pre-1995 rules). If waste is to be used as ballast and BER is to be submitted later, include demonstration of stability during construction (or post-construction BER if desired) with this GLER. If no ballast is required, submit documentation to substantiate that ballast is not needed. This documentation must include: (1) the seasonal high water table and how it was derived (a table showing the groundwater elevations from monitoring wells or piezometers is sufficient); (2) the depth of the excavation (Part C.2.c above); and (3) a narrative explaining why ballasting is not required with respect to the depth of excavation and the seasonal high water table elevation.

PART I. PLANS CONCERNING FUTURE EVALUATIONS

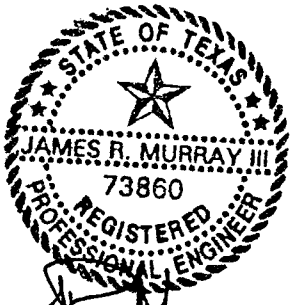
1. On what date do you anticipate the GLER for the next trench or area will be submitted? June 2003.

2. Provide an interim status report within 6 months completion of the protective cover as stated in Part E.3 above and each 6 months thereafter until the entire liner system is covered by municipal solid waste. This report should be developed by a qualified independent consultant and submitted to the TNRCC. No formal report form exists for this purpose. The integrity and required thickness of the protective cover must be verified. If erosion of the protective cover has occurred, then it must be replaced and reported as such and verified by the consultant that it meets the thickness requirement. If repairs are necessary on the synthetic liner, then these repairs must be completed in accordance with the approved SLQCP and reported to the TNRCC in a supplemental GLER.

****
****

PART J. SIGNATURE OF THE PROFESSIONAL OF RECORD

AFFIX PROFESSIONAL ENGINEER'S SEAL BELOW



(Signature)

James R. Murray, P.E.

(Typed or printed name)

7/10/01

(Date signed)

Professional of Record

(Title)

281 397 6747

(Phone number)

RJR Engineering Ltd., L.L.P.

(Company or business name)

281 293 7878

(FAX number)

12651 Briar Forest Suite 205
Houston, TX 77077

(Address, city, zip code)

Note: The professional engineer must be registered in Texas.

000027

****
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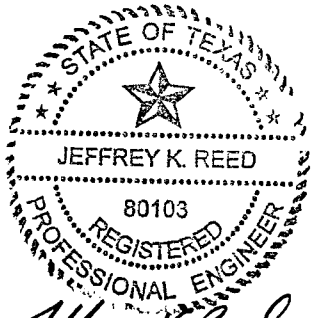
PART J. SIGNATURE OF THE PROFESSIONAL OF RECORD

AFFIX PROFESSIONAL ENGINEER'S SEAL BELOW



(Signature)

Jeffrey K. Reed
(Typed or printed name)

7/6/01
(Date signed)

President
(Title)

281/397-6747
(Phone number)

RJR Engineering, Ltd., L.L.P.
(Company or business name)

281/293-7878
(FAX number)

12651 Briar Forest Drive, Suite 205
Houston, Texas 77077
(Address, city, zip code)

Note: The professional engineer must be registered in Texas.

000028

Part K. SIGNATURE OF PERMITTEE

By signing this document you are agreeing to the following regulatory requirements and policies.

1. I have read and fully understand the findings of this GLER submittal.

2. Any trench or area not covered by a previously accepted SLER document and this GLER or any prior accepted SLER and GLER documents will not be used for the receipt of solid waste.

3. The trench or area covered by this GLER document will not be used for the receipt of solid waste until written acceptance of this GLER document is received or 14 days have elapsed from the date of receipt of this GLER by TNRCC and you or your designated representative have notified the Groundwater Protection Team of the TNRCC Municipal Solid Waste (MSW) Division by telephone of your intent of usage. In this manner you will be able to determine the date of arrival of the GLER in question. To obtain a status report on this GLER submittal please call 512/239-6732.

4. The acceptance of this GLER document does not grant its usage for the receipt of solid waste without acceptance, where required, of the LCS, protective cover, and soil ballast "as built" documentation.

If the landfill operator places waste after 14 days without formal authorization or has not notified the TNRCC MSW Groundwater Protection Team of this intent and the GLER is found to be unacceptable for any reason, the operator will then be required to remove such waste and place it in an approved area until the liner is found acceptable by TNRCC.

Note: If you include your fax number along with your telephone number, we will notify you or your designated representative as soon as GLER acceptance has been determined. Verbal and/or faxed notification will be followed by written acceptance.

Rusty Fusilier
(Signature)

Rusty Fusilier
(Typed or printed name)

District Engineer
(Title)

7/16/01
(Date signed)

WM Austin Community RDF
(Company or business name)

9900 Giles Rd.
Austin, TX 78754
(Address, city, zip code)

512 272-6221
(Phone number)

512 272-9370
(FAX number)

(Phone number and FAX number if you wish preliminary notification in this manner)

IMPORTANT: Three signed, sealed, and dated copies of this form which includes 1 original copy and all attachments (drawings, comments, etc) must be provided to the TNRCC.

000029

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
MUNICIPAL SOLID WASTE LANDFILL SITE
GEOSYNTHETIC CLAY LINER EVALUATION REPORT

***** *READ THESE INSTRUCTIONS BEFORE COMPLETING THIS FORM* *****

This form is to be completed by a knowledgeable professional experienced in geotechnical engineering and is experienced in geosynthetic clay liner testing, the interpretation of these test results, and the proper methods of constructing impermeable geosynthetic clay liners that meet the requirements of the Texas Natural Resource Conservation Commission (TNRCC) rules.

The purpose of the geosynthetic clay liner evaluation requirement is to assure that ground water, as defined in the TNRCC rules, is protected from contamination resulting from the land disposal or storage of municipal solid waste. This geosynthetic clay liner evaluation report is required to provide an opportunity for a professional, geotechnically qualified individual to inspect the trench or area and to document that the geosynthetic clay liner meets the TNRCC's regulatory requirements prior to filling operations.

Data and information required in this questionnaire are to provide the basis of the evaluation made by the Professional of Record (POR). This report is to be supplemented with those quality-assurance/quality-control (QA/QC) tests as detailed in the permit's Soils and Liner Quality Control Plan (SLQCP) and shall be the basis of documentation of the quality control and acceptance of a constructed liner.

The term "GCL" as used in this report form refers to geosynthetic clay liner. The term "GCLER" refers to this report form and is synonymous with the term "SLER" as described in the TNRCC rules when GCL is used to replace or supplement a soil liner as part of an alternate liner design.

Attach additional sheets as needed, and on each sheet identify the appropriate Part and Paragraph number for each reference.

If the geosynthetic clay liner is to be covered by a geomembrane, Parts F, G, and H.2 of this form do not need to be completed if the information in these parts is to be provided in the Geomembrane Liner Evaluation Report (GLER).

****

PART A. SITE IDENTIFICATION

Permittee Austin Community Recycling & Disposal Facility

Permit No. 249-C Operational Classification Type I

County Travis

(SUBMIT THIS REPORT TO TNRCC IN TRIPLICATE)

000031

PART B. GENERAL INFORMATION

1. What type of liner system is required by the Permit and is detailed in the Site Development Plan? (SDP) Subtitle D - Composite liner system

2. Is this the first liner element of a composite liner system? Yes

3. Does the SDP require a leachate collection system (LCS) for this liner system? Yes

4. What are the dates of the most recent SLER/GCLER/GLER submittals prior to this document's submission? GCLER/GLER April 2001

5. Date of the current SLQCP that was used to develop this GCLER Rev 2b 11/97
Does it follow the latest TNRCC Municipal Solid Waste (MSW) Division guidelines? Yes
a. Was this plan followed? Yes
b. If not followed, why not?

PART C. LOCATIONS AND/OR DESCRIPTION OF AREAS CURRENTLY BEING EVALUATED

1. Attach to this report a copy of the original sectorized fill layout plan showing the areas or sectors of the landfill site currently under evaluation and noting areas previously filled. If a copy of the original site plan is not available or is determined to be inaccurate, then prepare and attach an updated site layout that identifies the areas already filled, those currently receiving waste material, the area or areas now being evaluated, and the location designation and approval dates of prior liner evaluations. The required grid system must be shown on this drawing.

2. On a sketch(es) or drawing(s) of the area or areas under evaluation, indicate the following:

   a. Boundary lines distinguishing the bottom and sidewall areas of the trenches or fill areas being evaluated and SLER/GCLER/GLER boundary markers.

   b. GCL panel layout with number designation and location of all repairs.

   c. As-built elevations of subgrade or liner.

3. Are boundary markers in place at the time of this submittal? Yes
(See 30TAC 330.55(b)(10)(A)(v) and (B)(v))

4. Present evaluation location and area of coverage:

a. Trench, sector, or area identification or number (include SLER/GCLER/GLER boundary coordinates) of this evaluation: N95584.39/E151401.44,N95091.85/E151145.43, N95442.12/E150491.26, N95559.25/E150487.60/E150487.60,N95865.93/E150860.36

b. Excavation depth 87 ft.; Actual elevation of trench at: top 667 ft.; bottom 580 ft.; Length of excavation at: top 550 ft.; bottom 360 ft.; Width of excavation at: top 790 ft.; bottom 325 ft.; and ratio of side slopes 3 H: 1 V.

c. Total square footage of liner constructed for the floor 100,883 ft^2 and for each individual side slope: (1) W 60,855 ft^2 (2) E 87,780 ft^2; (3) S 131,040 ft^2; (4) N/A ft^2 (if evaluated area has more than four sides, list all others below) W crest 20,650

PART D. GCL MATERIALS

1. Indicate type of GCL used on floor and sidewalls:

X Needle-punched geotextile-encased GCL placed with nonwoven side up and woven side down.

_____ Needle-punched geotextile-encased GCL placed with woven side up and nonwoven side down.

_____ Needle-punched GCL with nonwoven geotextile on both sides.

_____ Adhesive-bonded GCL with woven geotextile on both sides.

_____ Stitch-bonded GCL with woven geotextile on both sides.

_____ Geomembrane-backed adhesive-bonded GCL placed with geomembrane side down.

_____ Geomembrane-backed adhesive-bonded GCL placed with geomembrane side up.

_____ Other (describe) _____

2. GCL roll dimensions 15 X 150

3. Does the GCL material meet the specifications and the requirements given in the SDP and SLQCP? Yes If not, please explain _____

Attach roll delivery documentation and manufacturer's certification and test results. Provide information on Geosynthetics Inventory form (attached) if not provided elsewhere.

PART E. INSTALLATION OF THE GEOSYNTHETIC CLAY LINER

A professional engineer geotechnical experience or a member of his or her staff qualified by training and experience shall monitor liner construction, but the final evaluation must be made by the aforementioned engineer.

Describe concisely on attached sheets the field and laboratory activities performed by yourself and/or your staff to accomplish this evaluation. Please indicate the methods used to determine testing locations, actual testing procedures, and field and laboratory methods that were followed.

1. Dates geosynthetic clay liner was installed June 5,6,7,10,11,12,& 13, 2001

2. Dates the POR actually visited the site Jeff Reed May 30, June 6 & 20, 2001 Jroy Murray June 15 & 29, 2001
Date of last site visit by POR June 29, 2001

3. Dates that the GCL cover (geomembrane or protective cover) was installed HDPE June 5,6,7,10,11,12,& 13, 2001 (Also see PART H.2. below.)

4. Name(s) of the POR's technician and dates on site Jean Wilson May 17,18,21-25,29-31, June 1,4-23,25-29, 2001 Bob Wilson June 6,13,16, 2001 Joe Garza June 11-15, 2001

5. Was the subgrade rolled with a smooth-wheel roller prior to GCL placement? Yes
Was the subgrade maintained in a suitable condition as described in the SLQCP prior to GCL placement? Yes Submit subgrade acceptance certificates (attached).

6. How much overlap was provided at the edges of the GCL panels? Min 6 in at edges and min 3 ft on slope cross seams
Was granular bentonite placed in the overlaps? Yes If so, describe the placement procedure, the rate of bentonite placement, and the procedure used to verify the amount of bentonite placed min 1/4 lb. Per linear foot with spreader weighed at six separate times and locations

7. Were the GCL panels placed by unrolling or by dragging the rolls across the subgrade? Unrolled from a spreader bar attached to a front end loader

8. Provide the information indicated on the GCL panel deployment summary table (attached) for each GCL panel shown on the panel layout drawing (see C.2.b above).

9. Did any GCL hydrate prematurely prior to covering with geomembrane or protective cover? No If so, were the hydrated areas removed and replaced? N/A
If not, please explain.

10. Were anchor trenches properly prepared? Yes

11. Were anchor trenches backfilled? Yes

12. How was the GCL tied into existing liner from any adjacent lined areas? 3 ft min overlap onto recompacted clay liner

Attach sketch showing tie-in if necessary.

13. Attach independent laboratory conformance test results for GCL. These data must include copies of all laboratory permeability test data sheets. Also include any miscellaneous tests such as any required field density tests on subgrade. Do the conformance test results indicate that all measured GCL properties are in accordance with the SDP/SLQCP requirements? Yes If not, please explain

If the results of the direct shear tests indicate strength parameters less than the strength parameters used in the original stability analyses in the SDP, conduct additional stability analyses using the measured strength parameters to verify adequate stability and attach the results.

PART F. LEACHATE COLLECTION SYSTEM/PROTECTIVE COVER

1. Gradient of bottom of evaluated area Min 2%

2. Gradient of leachate collection lines Min 1%

3. What method of placement was used for the LCS and/or protective cover over the GCL? LGP dozer placed material over textile, articulated trucks delivered to area. Min 3 ft thick road for trucks to operate on. Trackhoe placed drainage stone in LCT from articulated truck

4. Was the liner system (including LCS/protective cover placement) completed prior to your final field visit? Yes

5. Do protective cover soil and leachate collection system materials (trench backfill; leachate collection layer soil; drainage, filter, or cushion geosynthetics; collector pipes) meet the required specifications? Yes

6. Attach results of any required permeability, grain size, and calcium carbonate content tests on soil drainage and protective cover materials by suppliers and independent laboratory. For geosynthetic materials, attach roll delivery documentation, suppliers' certifications and test results, and results of any conformance tests required by the SLQCP.

7. Attach survey documentation from registered surveyor for thickness verification of LCS and protective cover. Also attach sketch(es) showing liner/LCS/protective cover cross-section.

PART G. BALLAST

Does this liner system require any ballast to overcome hydrostatic pressure? N/A
If yes, submit Ballast Evaluation Report (BER) upon completion (or at end of interim period if required by the SLQCP) of ballast placement (if operating under mid-1995 revision of 30 TAC 330.203) or documentation of ballast placement with this GCLER (if operating under pre-1995 rules). If waste is to be used as ballast and BER is to be submitted later, include demonstration of stability during construction (or post-construction BER if desired) with this GCLER. If no ballast is required, submit documentation to substantiate that ballast is not needed. This documentation must include: (1) the seasonal high water table and how it was derived (a table showing the groundwater elevations from monitor wells or piezometers is sufficient); (2) the depth of the excavation (Part C.2.c above); and (3) a narrative explaining why ballasting is not required with respect to the depth of excavation and the seasonal high water table elevation.

PART H. PLANS CONCERNING FUTURE EVALUATIONS

1. When do you estimate the GCLER for the next trench or area will be submitted?
June 2003

2. Provide an interim status report within 6 months completion of the protective cover as stated in Part E.3 above and each 6 months thereafter until the entire liner system is covered by municipal solid waste. This report should be developed by a qualified independent consultant and submitted to the TNRCC. No formal report form exists for this purpose. The integrity and required thickness of the protective cover must be verified. If erosion of the protective cover has occurred, then it must be replaced and reported as such and verified by the consultant that it meets the thickness requirement. If repairs are necessary on the synthetic liner, then these repairs must be completed in accordance with the approved SLQCP and reported to the TNRCC in a supplemental GCLER.

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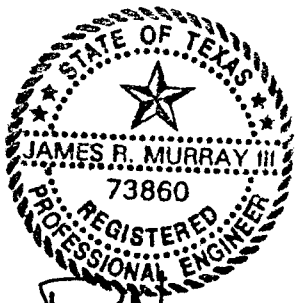
PART I. SIGNATURE OF THE PROFESSIONAL OF RECORD

AFFIX PROFESSIONAL ENGINEER'S SEAL BELOW



(Signature)

James R. Murray, P.E.
(Typed or printed name)

Professional of Record
(Title)

RJR Engineering, Ltd, L. L. P.
(Company or business name)

12651 Briar Forest Suite 205

Houston, TX 77077
(Address, city, zip code)

7/10/01
(Date signed)

281 397-6747
Phone number

281 293-7878
FAX number

Note: A professional engineer must be registered in Texas.

****
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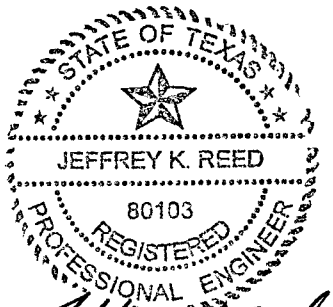
PART J. SIGNATURE OF THE PROFESSIONAL OF RECORD

AFFIX PROFESSIONAL ENGINEER'S SEAL BELOW



(Signature)

Jeffrey K. Reed
(Typed or printed name)

7/6/01
(Date signed)

President
(Title)

281/397-6747
(Phone number)

RJR Engineering, Ltd., L.L.P.
(Company or business name)

281/293-7878
(FAX number)

12651 Briar Forest Drive, Suite 205
Houston, Texas 77077
(Address, city, zip code)

Note: The professional engineer must be registered in Texas.

000038

Part J. SIGNATURE OF PERMITTEE

By signing this document you are agreeing to the following regulatory requirements and policies.

1. I have read and fully understand the findings of this GCLER submittal.
2. Any trench or area not covered by this GCLER document or any previously accepted GCLER document will not be used for the receipt of solid waste.
3. The trench or area covered by this GCLER document will not be used for the receipt of solid waste until written acceptance of this GCLER document is received or 14 days have elapsed from the date of receipt of this GCLER by TNRCC and you or your designated representative have notified the Groundwater Protection Team of the TNRCC MSW Division by telephone of your intent of usage. In this manner you will be able to determine the date of arrival of the GCLER in question.
4. If the trench or area covered by this GCLER document is to be covered by a geomembrane as part of the liner system, then acceptance of this GCLER document does not grant its usage for the receipt of solid waste without acceptance of the GLER and, where required, the BER.

If the landfill operator places waste after 14 days without formal authorization or has not notified the TNRCC MSW Groundwater Protection Team of this intent and the GCLER is found to be unacceptable for any reason, the operator will then be required to remove such waste and place it in an approved area until the liner is found acceptable by TNRCC.

Note: If you include your fax number along with your telephone number, we will notify you or your designated representative as soon as GCLER acceptance has been determined. Verbal and/or faxed notification will be followed by written acceptance.

Rusty Fusilier
(Signature)

Rusty Fusilier
(Typed or printed name)

District Engineer
(Title)

7/16/01
(Date signed)

WM Austin Community RDF
(Company or business name)

9900 Giles Rd

Austin, TX 78754
(Address, city, zip code)

512 272-6221
(Phone number)

512 272-9370
(FAX number)

(Phone number and FAX number if you wish preliminary notification in this manner.)
IMPORTANT: Three signed, sealed, and dated copies of this form which includes 1 original copy and all attachments (drawings, comments, etc.) must be provided to the TNRCC.

RJR staff evaluated the geologic and groundwater conditions at the site in accordance with the SLQCP and determined that a dewatering system was required for a portion of the WD-5 cell.

In accordance with Section 6.6.2 of the SLQCP, RJR staff monitored the excavation area of WD-5 for several months prior to the construction of the GCL/HDPE liner for indications of ground water. These observations were made to determine the uplift potential and the need for ballast or a dewatering system. Upon early excavation of the WD-5 area, ground water seepage was observed coming from the formation along the south sideslope. The seepage was observed and continued for a period of less than one week. Based on the formations and the seasonal high groundwater table, it is expected that the groundwater located in the weathered formation fracture zones was allowed to discharge upon excavation. No groundwater or seepage was observed during the entire excavation period along the west, or east sideslopes or the floor. No softening of the excavation surface was noted. And, no softness or sheen were noticed within the secondary features of either the weathered or unweathered zones. Therefore based on these observations as well as review of the seasonal high water table, it is concluded that no underdrain is required for the floor or the west and east sideslopes. However, an underdrain system in accordance with the SLQCP was installed along the south sideslope.

Regarding the potential for uplift to affect the excavation, soil liner, flexible membrane liner, and/or the leachate collection system. The natural stratigraphy of the Austin Community Recycling and Disposal Facility was composed of an upper layer of weathered claystone overlying an unweathered claystone. The cell bottom is constructed within the unweathered unit which has been found to be too poorly permeable to develop hydrostatic uplift and is not considered a hydrogeologic unit of concern (see page 38 of the SLQCP). The groundwater has been identified as perched within the weathered clay stratum on its fairly sharp contact with the unweathered claystone. Historic groundwater data, including the most recent groundwater monitoring event dated March 14, 2001 is provided in Table 1 and reflected on the attached figure. As stated in the SLQCP, the ground water volumes in the weathered clay units are very limited and extremely localized and that as a result of landfill development, local ground water recharge areas are significantly limited and reduced in cell construction areas.

As the excavation progresses, the unweathered layer soils are removed and any stored groundwater encountered in upgradient areas is discharged as surface water, evaporated, or is removed during excavation of soils used for site operations. Pressure on the liner would be limited to the upgradient liner sections above the weathered/unweathered interface, if water exists, as observed along the south sideslope. Lateral flow or flow away from the liner will not exert an uplift force on the liner. Also, since this water zone sits atop the weathered/unweathered interface, no upward force would be exerted on the liner beneath this interface. The cell is bounded to the west by landfill and the water, when it exists, drains away from the cell on the north and east perimeters. Therefore, no water pressure is exerted from this perched zone on any of the liner components along the floor, west or east sideslopes.

Therefore, in regards to the potential for uplift to affect the excavation, soil liner, flexible membrane liner,

STATE OF TEXAS
JAMES R. MURRAY III
73860
REGISTERED
PROFESSIONAL ENGINEER
7/6/01

000541

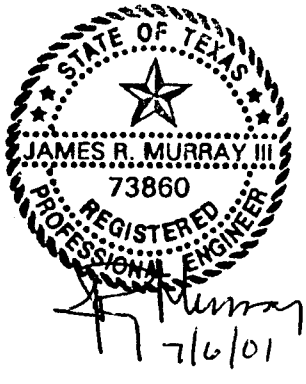
and/or the leachate collection system, RJR concludes that based on site observations, hydrogeology, geology, site excavation activities and in accordance with the site's SLQCP, waste ballast will be required for this cell over the south sideslope only. A Ballast Evaluation Report (BER) will be completed after the waste reaches the required height.

000042

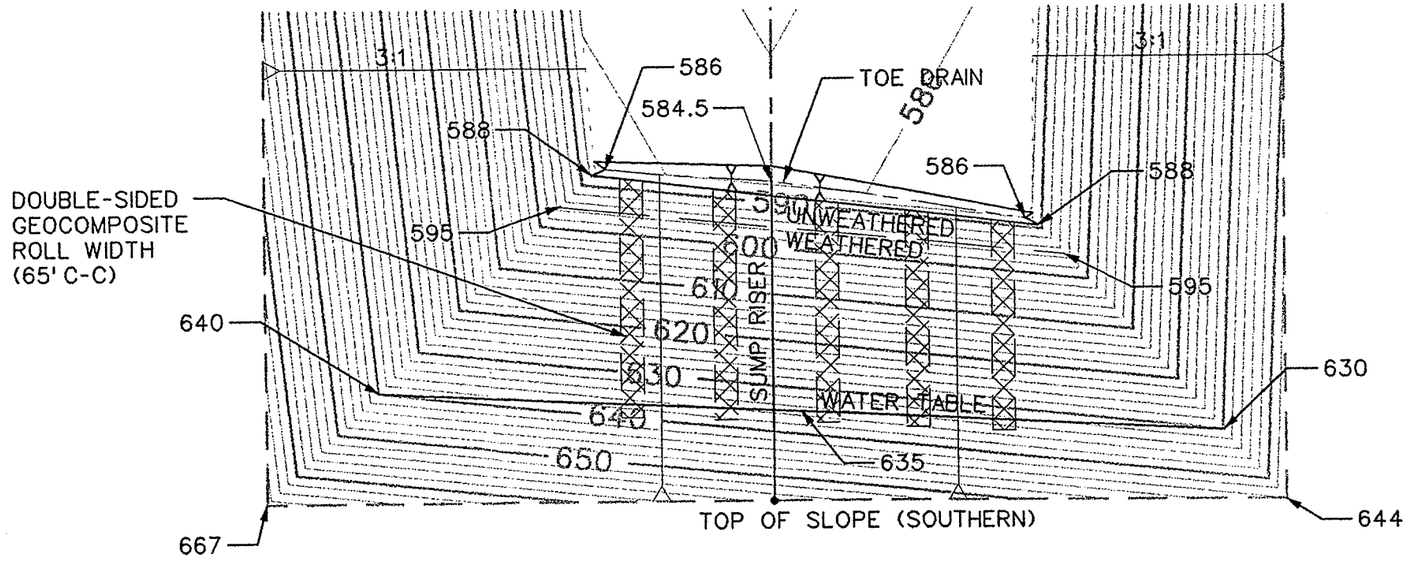
RJR reviewed the latest groundwater monitoring water level readings to determine whether the groundwater table has risen above the seasonal high groundwater table potentiometric map used to calculate the dewatering and ballast design, as depicted in the SLQCP. Below are the seasonal high water level readings for all piezometers and monitoring wells (Active and Decommissioned) through the current monitoring event dated March 14, 2001.

TABLE 1

Piezometer or Monitoring Well	Seasonal High Potentiometric Water Level Elevations	Date of Seasonal High Water Level Reading
MW-2C	618.91	3/14/01
MW-5A	628.02	3/14/01
MW-11	571.45	3/14/01
MW-12	643.44	3/14/01
MW-13	608.25	3/14/01
MW-15	622.48	3/14/01
MW-20	627.40	3/14/01
MW-21	595.69	3/14/01
MW-2B	620.20	2/3/95
PZ-8	604.86	2/3/95
PZ-9	608.36	2/3/95
PZ-10	608.62	2/3/95
PZ-11	DRY	Decom. 6/21/96
PZ-23	DRY	Decom. 6/21/96
PZ-25	613.11	3/11/98
MW-1B	611.13	12/18/97
MW-1A	611.85	12/18/97
MW-2A	614.15	12/18/97



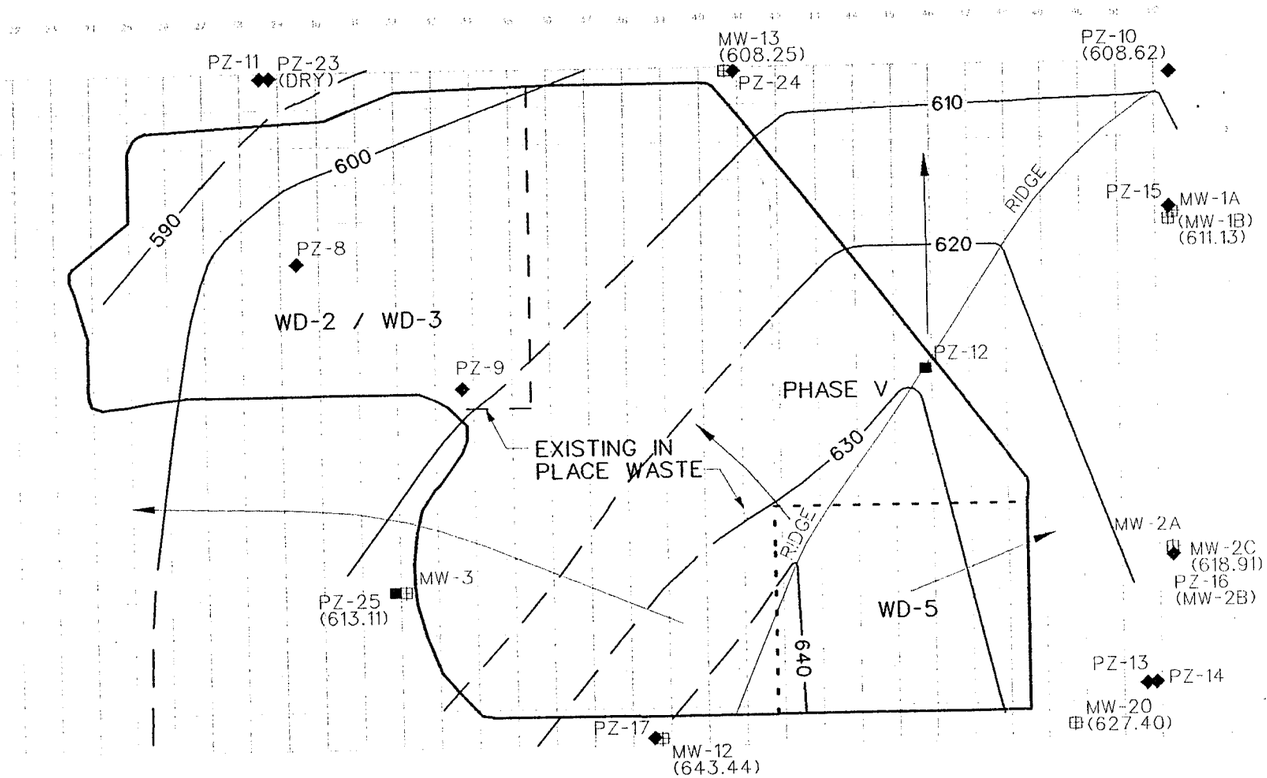
000043



1/6 UNDERDRAIN PLAN

SCALE: 1"=100'

000045



LEGEND

- ■ DECOMISSIONED MONITORING WELL
- ◆ DECOMISSIONED PIEZOMETER
- ⊞ CURRENT MONITORING WELL LABEL AND WATER ELEVATION
- —— 620 —— POTENTIOMETRIC SURFACE ELEVATION CONTOUR (in feet msl)
- — — — POTENTIOMETRIC SURFACE ELEVATION CONTOUR (Dash due to lack of control points and intersection with waste unit boundary)
- ←—— GROUND WATER FLOW DIRECTION
- — — — PHASE LIMITS
- ——— LANDFILL LIMTS (EAST HILL)

NOTES

1. THE SEASONAL HIGH WATER WILL BE REVIEWED AT THE TIME OF EACH CONSTRUCTION.
2. SEASONAL HIGH WATER TABLE FROM THE SLQCP WAS ADJUSTED UPWARD BASED ON THE MARCH 14, 2001 MONITORING WELL WATER LEVAL DATA.

400 0 400 800

Scale 1 : 400

000041

FOR PERMIT PURPOSES

STATE OF TEXAS
JEFFREY K. REED
80103
REGISTERED
PROFESSIONAL ENGINEER
PE STAMP 6/22/01

6154 S. FRY ROAD #407
PMB 407
HOUSTON, TEXAS 77450

DRN JMG
DES JRM
CHK BW
APP JKR

WASTE MANAGEMENT

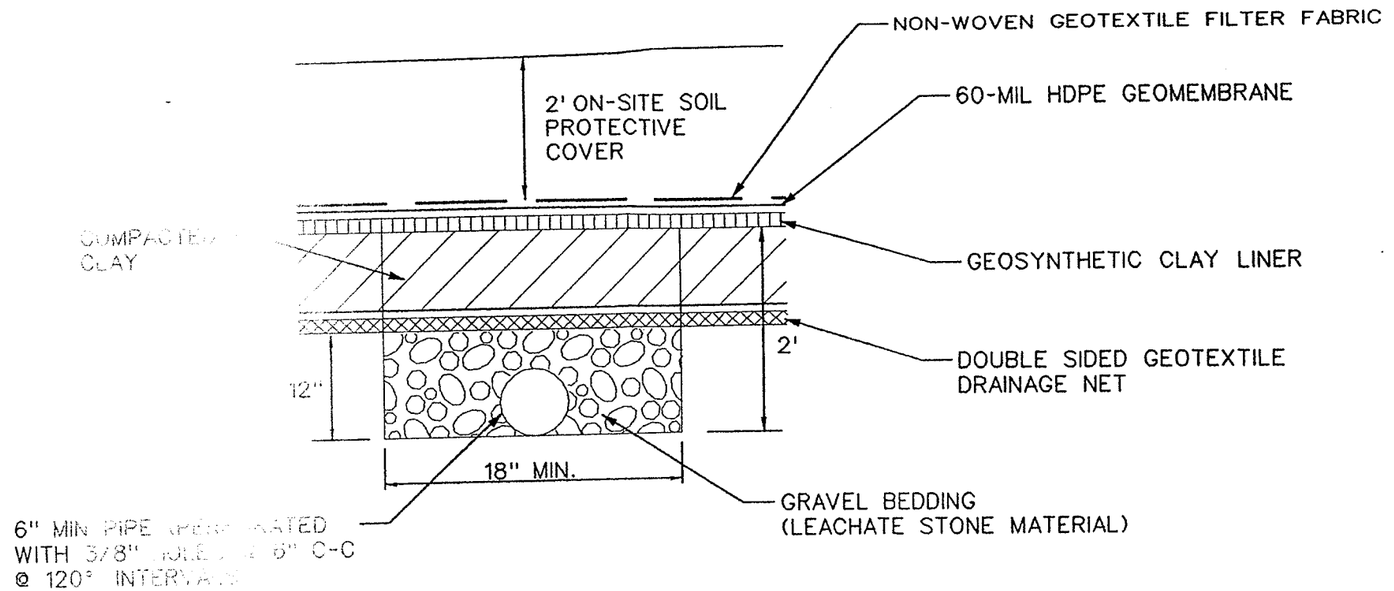
ENGINEERING

AUSTIN COMMUNITY R.D.F
WD-5 SLER REPORT
PERMIT NO. MSW-249C
AUSTIN, TEXAS

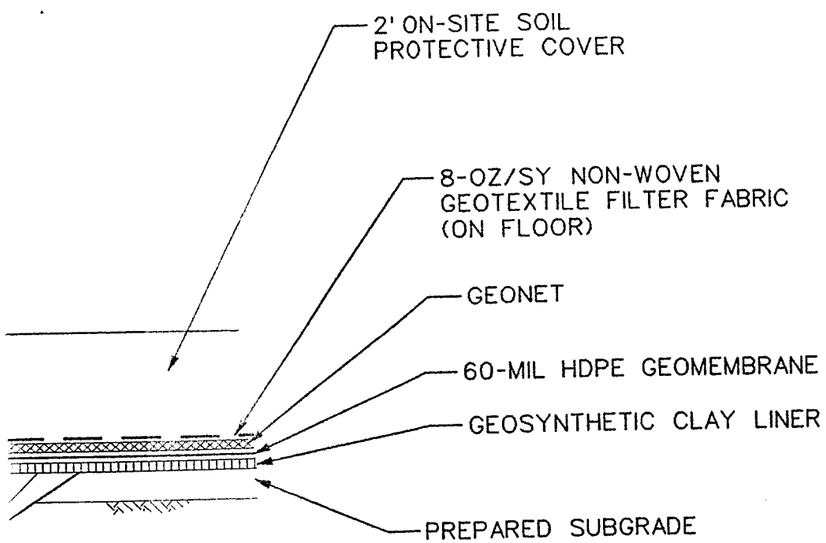
SEASONAL HIGH WATER TABLE

DATE MARCH 2001
PROJECT NO 080.10201
FILENAME WELLS.D
SHEET NO
DRAWING NO

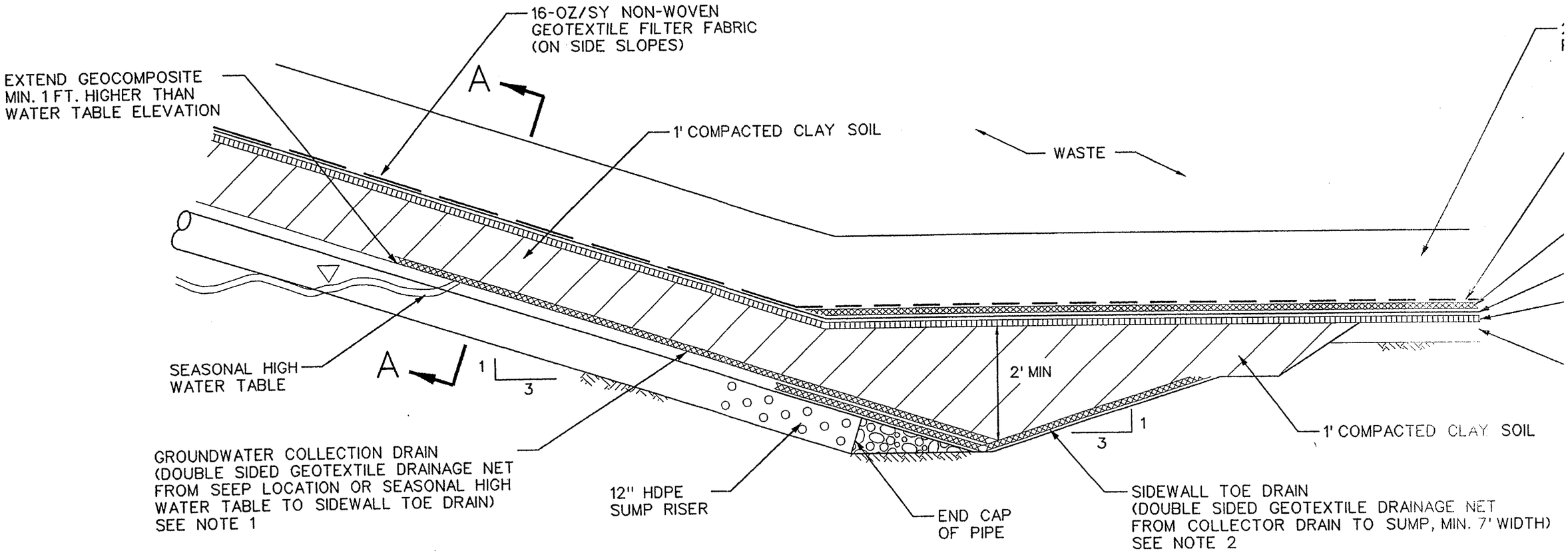
4



3/6 SECTION A-A'
(NOT TO SCALE)



- 1' COMPACTED CLAY SOIL



2/6 UNDERDRAIN (RISER SECTION)

(NOT TO SCALE)

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...\acl\cadd\wd5\const\under.dgn Apr. 18, 2001 11:32:27

RJR ENGINEERING, Ltd., L.L.P.

Certificate of Completion

Status of Certificate: **Partial**_____ **Final** V

Client: ACRDF Project Name: WD-5

Date: _____ Project No. 10204

Description of Work: Installation of protective cover and leachate collection system

I hereby state the the above identified work is complete and has been installed as per the contract documents and/or the approved CQA plan.

CONTRACTOR REPRESENTATIVE

Signature: John Camazos Date: 6/29/01

Name (print) John Camazos

Title: Superintendant

Representing: Lonestar Excavators

I hereby state that the above identified work has been inspected and that it is has been installed as per the contract documents and or/the approved CQA plan. I further state that all required field and laboratory testing has been completed and the results have been deemed acceptable by the CQA Firm. The work described above is suitable for its intended use.

CQA REPRESENTATIVE

Signature: Jean Wilson Date: 6/29/01

Name (print) Jean Wilson

Title: CQA

Representing: RJR Engineering

000040

RJR ENGINEERING, Ltd., L.L.P.

Certificate of Completion

Status of Certificate: **Partial**_____ **Final** X

Client: ACEDF Project Name: WD-5

Date: _____ Project No. 10204

Description of Work: Installation of GCL; 60mil; geonet & 8oz textile on floor; and 16oz textile on slopes. ~9 Acres

I hereby state the the above identified work is complete and has been installed as per the contract documents and/or the approved CQA plan.

CONTRACTOR REPRESENTATIVE

Signature: Randy Story Date: 6-20-01

Name (print) Randy Story

Title: Field Supervisor

Representing: Environmental Specialties International

I hereby state that the above identified work has been inspected and that it is has been installed as per the contract documents and or/the approved CQA plan. I further state that all required field and laboratory testing has been completed and the results have been deemed acceptable by the CQA Firm. The work described above is suitable for its intended use.

CQA REPRESENTATIVE

Signature: Jean Wilson Date: 6/20/01

Name (print) Jean Wilson

Title: CQA

Representing: RJR Engineering

000050

RJR ENGINEERING, Ltd., L.L.P.

Certificate of Acceptance of Soil Subgrade by Installer

Client: ACRDF

Project Name: WD-5

Installer: ESI

Project No. 10204

INSTALLER

I, the undersigned, a duly authorized representative of ESI do hereby accept the Soil Subgrade surface covered by panel(s) GCL 1-28 HDPE 1-8 as an acceptable surface on which to install.

Randy Story — Signature — Field Supv.

Name (print) Signature Title

6-5-01

Date

CQA FIRM

Certificate accepted by RJR Engineering, Ltd., L.L.P.

Jean Wilson — Signature — CQA

Name (print) Signature Title

6-5-01

Date

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3/01

cqa.014

TJFA 455
PAGE 051

RJR ENGINEERING, Ltd., L.L.P.

Certificate of Acceptance of Soil Subgrade by Installer

Client: ACRDF

Project Name: WD-5

Installer: ESI

Project No. 10204

INSTALLER

I, the undersigned, a duly authorized representative of ESI do hereby accept the Soil Subgrade surface covered by panel(s) GCL-29-73 HDPE 9-30 as an acceptable surface on which to install.

Randy Story — Name (print)

Signature

Field Supv. — Title

6-6-01 — Date

CQA FIRM

Certificate accepted by RJR Engineering, Ltd., L.L.P.

Jean Wilson — Name (print)

Signature

CQA — Title

6/6/01 — Date

000052

RJR ENGINEERING, Ltd., L.L.P.

Certificate of Acceptance of
Soil Subgrade by Installer

Client: ACRDF

Project Name: WD-5

Installer: ESI

Project No. 10204

INSTALLER

I, the undersigned, a duly authorized representative of ESI do hereby accept the Soil Subgrade surface covered by panel(s) GCL 74-116 HDPE 31-45 as an acceptable surface on which to install.

Randy Story	Randy Story	Field Supv.
Name (print)	Signature	Title

6-7-01
Date

CQA FIRM

Certificate accepted by RJR Engineering, Ltd., L.L.P.

Jean Wilson	Jean Wilson	CQA
Name (print)	Signature	Title

6/7/01
Date

000053

RJR ENGINEERING, Ltd., L.L.P.

Certificate of Acceptance of Soil Subgrade by Installer

Client: ACRDF

Project Name: WD-5

Installer: ESI

Project No. 10204

INSTALLER

I, the undersigned, a duly authorized representative of ESI do hereby accept the Soil Subgrade surface covered by panel(s) GCL 117-129 HDPE 46-49 as an acceptable surface on which to install.

Randy Stacy — Name (print)

Signature

Field Supv. — Title

6-10-01 — Date

CQA FIRM

Certificate accepted by RJR Engineering, Ltd., L.L.P.

Jean Wilson — Name (print)

Signature

CQA — Title

6/10/01 — Date

000054

RJR ENGINEERING, Ltd., L.L.P.

Certificate of Acceptance of
Soil Subgrade by Installer

Client: ACRDF

Project Name: WD-5

Installer: ESI

Project No. 10204

INSTALLER

I, the undersigned, a duly authorized representative of ESI do hereby accept the Soil Subgrade surface covered by panel(s) GCL 130-182 HDPE 50-77 as an acceptable surface on which to install.

Randy Story — Name (print)

Signature

Field Sup. — Title

6-11-01 — Date

CQA FIRM

Certificate accepted by RJR Engineering, Ltd., L.L.P.

Jean Wilson — Name (print)

Signature

CQA — Title

6/11/01 — Date

000055

RJR ENGINEERING, Ltd., L.L.P.

Certificate of Acceptance of Soil Subgrade by Installer

Client: ACRDF Project Name: WD-5

Installer: ESI Project No. 10204

INSTALLER

I, the undersigned, a duly authorized representative of ESI do hereby accept the Soil Subgrade surface covered by panel(s) GCL 183-230 HDPE 78-95 as an acceptable surface on which to install.

Randy Story — Name (print)
Signature
Field Supv. — Title

6-12-01 — Date

CQA FIRM

Certificate accepted by RJR Engineering, Ltd., L.L.P.

Jean Wilson — Name (print)
Signature
CQA — Title

6/12/01 — Date

000056

RJR ENGINEERING, Ltd., L.L.P.

Certificate of Acceptance of Soil Subgrade by Installer

Client: ALRDF Project Name: WD-5

Installer: ESI Project No. 10204

INSTALLER

I, the undersigned, a duly authorized representative of ESI do hereby accept the Soil Subgrade surface covered by panel(s) GCL 231-298 HDPE 96-120 as an acceptable surface on which to install.

Randy Story — Signature — Field Supv.
Name (print) Title

6-13-01
Date

CQA FIRM

Certificate accepted by RJR Engineering, Ltd., L.L.P.

Jean Wilson — Signature — CQA
Name (print) Title

6/13/01
Date

000057

RJR ENGINEERING, Ltd., L.L.P.

Certificate of Completion

Status of Certificate: **Partial**_____ **Final** X

Client: ACRDF Project Name: WD-5

Date: 6/5/01 Project No. 10204

Description of Work: Prepare subgrade, install underdrain, and excavate anchor trench.

I hereby state the the above identified work is complete and has been installed as per the contract documents and/or the approved CQA plan.

CONTRACTOR REPRESENTATIVE

Signature: [signature] Date: 6/5/01

Name (print) JOHN CAVAZOS

Title: SUPERINTENDANT

Representing: LONGHORN EXCAVATORS

I hereby state that the above identified work has been inspected and that it is has been installed as per the contract documents and or/the approved CQA plan. I further state that all required field and laboratory testing has been completed and the results have been deemed acceptable by the CQA Firm. The work described above is suitable for its intended use.

CQA REPRESENTATIVE

Signature: [signature] Date: 6/5/01

Name (print) Jean Wilson

Title: CQA

Representing: RJR Engineering

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