

February 12, 2025

Ms. Leigh Barr
Environmental Bureau Chief
Oil Conservation Division
NM Energy, Minerals and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Re: OWL Landfill Services, LLC Engineering Certification Report:

Landfill Cell 1A & 2AB Construction

Dear Ms. Barr:

This submittal is provided as engineering certification for the construction of Landfill Cell 1A & 2 A/B at OWL Landfill Services, LLC (OWL), located in Lea County, New Mexico. Specifically, this Certification Report demonstrates the double containment liner and leak detection system for Cell 1A & 2 A/B have been installed in compliance with the following applicable documents and regulatory requirements:

Approved Construction Quality Assurance (CQA) Plan October 2016.

Construction Plans and Project Technical Specifications (November 2017) for Landfill Cell 2 A/B Construction, OWL Landfill Services, LLC.

New Mexico Energy, Minerals and Natural Resources Department Regulations (19.15.36.1-19.15.36.20).

Approved Permit and Permit Conditions (August 2017).

Geosynthetic Research Institute (GRI) and American Society of Testing Materials (ASTM) and Industry Standards.

We appreciate the opportunity to work with the OCD regarding the construction quality assurance for the construction of Cell 1A & 2 A/B at OWL Landfill Services, LLC. Please contact us with your questions and comments regarding this Engineering Certification Report. (tkrueger@parkhill.com; 806-473-3656)

Sincerely,

**PARKHILL** 

Tyler & Krueger, PE

Project Manager | Associate

TSK/sw Enclosures

cc: Zach Ramos - OWL Landfill Services, LLC





# ENGINEERING CERTIFICATION REPORT LANDFILL CELL 1 A AND 2 A/B TIE-IN CONSTRUCTION

OWL Landfill Services, LLC Lea County, New Mexico



Submitted to: New Mexico Oil Conservation Division Environmental Bureau 1220 South St. Francis Dr. #3 Santa Fe, New Mexico 87505

Prepared for: OWL Landfill Services, LLC Lea County, New Mexico

February | 2025 Parkhill Project # 01705322





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#### 1.0 INTRODUCTION

This Engineering Certification Report describes the Construction Quality Assurance (CQA) activities and procedures applied during the construction of Landfill Cell 1 A and 2 A/B Tie-In at OWL Landfill Services, LLC (OWL) located in Lea County, New Mexico. The CQA activities performed document shows Cell 1 A and 2 A/B Tie-In was constructed in accordance with the approved Construction Plans, Project Technical Specifications, 2016 CQA Plan, Geosynthetic Research Institute (GRI) and American Society of Testing Materials (ASTM) Industry Standards, and New Mexico Energy, Minerals, and Natural Resources Department (EMNRD), Oil Conservation Division (OCD) regulatory standards.

This report documents the repair of Cell 1A and the tie into the previously constructed Cell 2AB. On August 4, 2022, Parkhill and OWL notified OCD about completing the tie in between Cell 1A and Cell 2AB. As a part of this letter we proposed completing the following items:

- 1. We will excavate back to the nearest geomembrane seam that is east (to the inside of the cell) of the observed tear.
- 2. We will inspect the seam to assure integrity between the two adjacent sheets of HDPE geomembrane.
- 3. We will use a micrometer measuring device to sample the exposed edge of the 60 mil HDPE geomembrane for thickness. The micrometer we have is a dial caliper style and is accurate to 1 mil. We will measure and record the thickness at least every ten feet along the exposed edge of the geomembrane. We will also measure any areas that visually appear to be damaged in any way. Our goal here is to assure that the 60 mil HDPE geomembrane has not stretched and become thinner indicating additional possibilities for tears.

All items described above was completed during the construction project. All liner that was tied into was inspected and in good condition before the liner was tied into. All measurements was above 60 mil through the entire tie in.

#### 1.1 EMNRD OCD Notification

The EMNRD OCD was notified prior to Cell 1 A and 2 A/B Tie-In construction. Notification is included in this Report in **Appendix E**. Tie-In liner deployment initially began on May 25, 2022, continuing into January 2023. This Engineering Certification Report satisfies the requirements of the applicable Permit Conditions.

#### 1.2 Project Description

The OWL Landfill is located approximately 1.5 miles east of the intersection of Delaware Basin Road and NM Highway 128 at mile marker 31, as shown on the Site Location Map (Figure 1). Mass excavation was performed by Enviroworks with the excavation of soils, placement, and compaction of perimeter berm soils and subgrade fine grading and compaction, and anchor trench excavation, backfill, and compaction performed from March 4, 2022, through May 13, 2022. Geosynthetic Clay Liner (GCL), Secondary Flexible Membrane Liner (FML), geonet, leak detection system, primary FML, and geosynthetic cushion/drainage layer installation activities were performed by Mustang Extreme Environmental Services (MEES) and Southwest Liner Systems (SLS) from May 25, 2022 through January 13, 2023 protective soil layer (PSL) placement were performed by Enviroworks from May 30, 2022, through January 15, 2023.



#### 1.3 Project Overview

Landfill Cell 1 A and 2 A/B Tie-In was constructed at Oilfield Water Logistics Services, LLC, (OWL), located in Lea County, New Mexico. Parkhill developed Cell 1 A and 2 A/B Tie-In, Project Technical Specifications, and the CQA Plan (October 2016); and performed on-site CQA activities. Primary construction activities for Cell 1 A and 2 A/B Tie-In are as listed in **Table 1**.

**TABLE 1 - Primary Construction Activities** 

Activity #	Construction Activity	
1	Removal of overburden.	
2	Fine grading.	
3	Compaction of subgrade.	
4	Installation of Geosynthetic Clay Liner (GCL).	
5	Installation of the Secondary Flexible Membrane Liner (FML).	
6	Installation of geonet and geocomposite leak detection system.	
7	Installation of primary Flexible Membrane Liner (FML).	
8	Installation of geocomposite cushion/drainage layer.	
9	Installation of Protective Soil Layer (PSL).	

Overburden removal to reach existing liner was performed by Enviroworks under observation of Parkhill. Upon review and approval of the subgrade by the Parkhill Site CQA Engineer and the geosynthetic installation contractor, the Parkhill Site CQA Engineer or manager was on-site during geosynthetics installation to observe, inspect, and record GCL, secondary FML (HDPE), geosynthetic leak detection (geonet and geocomposite), primary FML (HDPE), and geosynthetic cushion/drainage (geocomposite) installation procedures. The purpose of the CQA work is to document that construction activities performed at OWL comply with the Cell 1 A and 2 A/B Tie-In Construction Plans, Project Technical Specifications, 2016 CQA Plan, Geosynthetic Research Institute (GRI) and American Society of Testing Materials (ASTM) Industry Standards, and EMNRD OCD regulatory requirements. The OWL Cell 1 A and 2 A/B Tie-In Construction Plans, Project Technical Specifications, 2016 CQA Plan, field observations, and tests were used to provide quantitative criteria with which to evaluate construction.

Parkhill personnel were responsible for the full range of CQA activities as listed in Table 2.

TABLE 2 – Parkhill CQA Activities		
Activity # Parkhill CQA Activity		
1	Review surveying results to confirm that the subgrade met design elevations and slope.	
2	Provide field density testing of subgrade.	
3	Review the manufacturer's quality assurance and manufacturer's quality control testing results for geosynthetics.	
4	Inspect FML, GCL, Geonet, and Geocomposite before deployment.	
5	Observe GCL, secondary FML, Leak Detection Layer, Primary FML, and Geocomposite installation procedures.	
6	Review Documentation, including laboratory and field test results.	
7	Complete and submit this engineering certification report of completed construction to OCD.	



#### 1.4 Report Organization

This Certification Report describes the CQA activities and procedures performed during the construction of Cell 1 A and 2 A/B Tie-In at OWL. The attached figures, appendices, photographs, and daily logs provide appropriate quantitative and qualitative documentation. Cross-reference to the figures and attachments are in **bold** type to facilitate the Division's review.

#### 1.5 Qualifications

Mr. Tyler S. Krueger, PE, Engineer of Record, Site CQA Engineer/Manager

Mr. Tyler Krueger serves as the Site CQA Engineer/Manager for Parkhill, and is trained and certified on field instrumentation, industry standards, health and safety, etc. Krueger is a Professional Engineer and has served as Site CQA Engineer/Manager at various Subtitle D municipal solid waste landfills. Mr. Krueger's duties include assessment and equivalency evaluation and calculations for liner and leak detection system components in compliance with Construction Plans, CQA Plan, and Project Technical Specifications. The current resumé for Mr. Krueger is included in the **Resumés** section (**Appendix F**).

Mr. Matt Kinsley, PE, Principal, Senior Project Manager

Mr. Matt Kinsley is a Professional Engineer with Parkhill's Environmental Sector. His focus is on landfill operations, design, and construction. He has developed, expanded, and operated over 25 landfills from Phoenix to Philadelphia. Through Mr. Kinsley's diverse engineering design and operational experience, he has provided valuable insight. Mr. Kinsley's current resumé for is included in the **Resumés** section (**Appendix F**).

Mr. Nathan Morrow, RPR, Construction Phase Services, Site CQA Manager

Mr. Max White serves as the Site CQA Manager for Parkhill, and is trained and certified on field instrumentation, industry standards, health and safety, etc. His primary duties are field CQA for cell subgrade soil testing and certification, observation and documentation for geosynthetics installation, leachate collection system installation, and PSL testing and installation. View Mr. White's resumé in the **Resumés** section (**Appendix F**).

Mr. Dos Landsheft, RPR, Construction Phase Services, Site CQA Manager

Mr. Max White serves as the Site CQA Manager for Parkhill, and is trained and certified on field instrumentation, industry standards, health and safety, etc. His primary duties are field CQA for cell subgrade soil testing and certification, observation and documentation for geosynthetics installation, leachate collection system installation, and PSL testing and installation. View Mr. White's resumé in the **Resumés** section (**Appendix F**).

#### 2.0 LANDFILL CELL 1 A AND 2 A/B TIE-IN CONSTRUCTION

### 2.1 Summary

The OWL Landfill is an existing facility located in Lea County, New Mexico, and is complemented with process equipment, administrative offices, drying pads, evaporation ponds, and additional landfill cells. The total double lined project area of Cell 1 A and 2 A/B Tie-In, is approximately 2.07 acres in size as shown on the Subgrade Design Grades (**Figure 2**).

Removal of overburden conducted by Enviroworks; and MEES and SLS performed the installation of the GCL, Secondary FML, leak detection system, primary FML, and a geocomposite cushion/drainage. Conformance testing of geosynthetics was performed by TRI Environmental, while documentation and quality assurance were performed by Parkhill. **Tables 3** and **4** summarize these construction activities.

Enviroworks of Edgewood, New Mexico, performed the construction activities listed in Table 3.



TABLE 3 – Enviroworks Construction Activities			
Activity #	Activity # Enviroworks Construction Activity		
1	Removal of overburden.		
2	Installation of protective soil layer.		

Mustang Extreme Environmental Services (MEES) of Midland, Texas and Southwest Lining Systems (SLS) of Bernalillo, New Mexico, performed the construction activities listed in **Table 4**.

TABLE 4 – Liner Construction Activities		
Activity # MEES/SLS Construction Activity		
1	Installation of Geosynthetic Clay Liner (GCL).	
2	Installation of 60-mil secondary HDPE FML.	
3	Installation of HDPE geonet and geocomposite material (leak detection layer).	
4	Installation of 60-mil primary HDPE FML.	
5	Installation of the geocomposite material (geosynthetic cushion/drainage layer).	

#### 2.2 Subgrade Preparation

The following sections describe the activities performed during mass excavation, compacted berm soil fill placement, subgrade preparation, and CQA soil testing.

#### 2.2.1 Removal of Overburden

Enviroworks performed removal of overburden activities to design grades shown on Construction Plans. Once design grades and exiting liner were identified, liner operations began.

#### 2.2.2 Subgrade

After mass excavation, and fine grading to the elevations shown on **Figure 2** were completed, floor soils were compacted using a vibratory roller. The in-place density was measured at a minimum frequency of 4 tests per acre, using a InstroTek 3500 Xplorer®, requiring 9 tests for the 2.07-acre footprint of Cell 1 A and 2 A/B Tie-In. All results passed the required specification of 90%, or higher, of the reference standard proctor. The results for the standard proctor laboratory tests used as references are provided in **Appendix A.1**, and field compaction testing results are tabulated in **Appendix A.2** for Cell 1 A and 2 A/B Tie-In floor and north sidewall. Moisture/density relationships are given in **Appendix A**. The maximum density references are labeled in **Appendix A.2**.

#### 2.2.3 Subgrade Acceptance

Parkhill Site CQA Engineer/Manager and MEES/SLS Field Installation Superintendent (FIS) conducted daily inspections of the subgrade surface prior to liner installation activities for the anticipated liner deployment area. The subgrade surface was found to be in good condition and free from sticks, sharp stones, vegetation, and other deleterious material after each daily inspection. Parkhill CQA Engineer/Manager and FIS continued to inspect the subgrade surface during liner installation in areas immediately ahead of deployment to identify and remove any large or angular particles, sharp objects, etc. Enviroworks provided continual moisture conditioning and rolling of the subgrade ahead of the liner installation as requested by MEES/SLS' FIS and Parkhill Site CQA Engineer/Manager. Subgrade acceptance forms are included in the daily logs.

#### 2.3 Geosynthetic Clay Liner

In accordance with the Construction Plans, Project Technical Specifications, and 2016 CQA Plan, the Geosynthetic Clay Liner (GCL) was placed in direct contact with the prepared subgrade. The following sections describe the procedures and activities performed during the GCL installation, observation, and CQA testing to confirm compliance with the Project Specifications.

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#### 2.3.1 Geosynthetic Clay Liner Product

Approximately 102,930 ft² of GCL material manufactured by Solmax, was used in the construction of Cell 1 A and 2 A/B Tie-In. Per Project Technical Specifications, granular bentonite was required to be placed between horizontal and longitudinal seams of deployed GCL panels. Copies of the manufacturer's quality assurance (MQA) and manufacturer's quality control (MQC) test results and certifications are included in **Appendix B.1** for the delivered Solmax Bentoliner NSL GCL.

#### 2.3.2 Geosynthetic Clay Liner Installation

The guidelines specified in the Project Technical Specifications, 2016 CQA Plan, Construction Plans, and industry standards for GCL installation procedures were strictly followed during lining of Cell 1 A and 2 A/B Tie-In. Each roll of GCL was carefully transported from the contractor's staging area to Cell 1 A and 2 A/B Tie-In using a rubber-tired forklift, as verified by the Parkhill Site CQA Engineer/Manager. As each roll was moved, the manufacturer's identification label was removed and submitted to the Parkhill Site CQA Engineer/Manager for documentation in the *GCL Deployment Log* (**Appendix C.5**) and the GCL Layout Drawing (**Figure 4**). Each GCL roll was placed in direct contact with the prepared subgrade with the nonwoven geotextile facing upward. GCL was not placed in standing water or deployed during rainfall.

After each roll had been deployed, adjoining rolls were positioned maintaining the minimum overlap used for the on-site GCL of nine inches on the longitudinal seams and twelve inches on the end seams as specified in the Project Technical Specifications and 2016 CQA Plan. Free bentonite was applied on each longitudinal and perpendicular seam at a minimum of 0.25-pounds per linear foot of seam. Material placement was observed by the Parkhill Site CQA Engineer/Manager and FIS for potential damage due to handling or installation.

#### 2.3.3 Geosynthetic Clay Liner Testing

GCL testing included manufacturing quality control (MQC), manufacturing quality assurance (MQA), third-party conformance testing, construction quality control (CQC), and construction quality assurance (CQA). Each type of testing is described in the following sections.

2.3.3.1 Geosynthetic Clay Liner Manufacturing Quality Control (MQC) and Manufacturing Quality Assurance (MQA) MQC and MQA testing of the bentonite and geotextile components, as well as the finished GCL, were performed by the manufacturer prior to shipment of the GCL to OWL.

TABLE 5 – Solmax Bentoliner NSL GCL - MQC/MQA Testing		
Bentoliner NSL GCL Property ASTM Method		
Free swell	ASTM D5890	
Fluid loss	ASTM D5891	
Mass per unit area	ASTM D5993	
Grab strength	ASTM D6768 and ASTM D4632, Modified	
Peel strength	ASTM D6496 and ASTM D4632, Modified	
Moisture content	ASTM D4643	
Nonwoven and Woven Geotextile Encapsulating Bentonite	ASTM Method	
Grab strength	ASTM D4632	
Mass per unit area	ASTM D5261	

GCL quality control certification and GCL property values and testing frequencies for the on-site material delivered to OWL are provided in **Appendix B.1**.

2.3.3.2 Conformance Testing

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Conformance sampling for GCL material was performed by TRI/Environmental, Inc. (TRI), Austin, Texas. TRI or Parkhill collected samples approximately two feet long from the entire roll width and performed conformance testing at the TRI laboratory in Austin, Texas. Conformance samples were collected at a frequency of at least one per 100,000 ft² of GCL installed to verify that the GCL delivered to OWL met the minimum properties listed in the Project Technical Specifications and 2016 CQA Plan. Samples were tested by TRI for the properties listed in **Table 7**; as specified in the Project Technical Specifications and 2016 CQA Plan.

TABLE 6 - Solmax Bentoliner NSL GCL - Conformance Testing	
Bentoliner NSL GCL Property	ASTM Method
Mass per unit area	ASTM D5993
Index Flux	ASTM D5887
Bentonite- Fluid Loss	ASTM D5891
Bentonite - Swell Index	ASTM D5890

Conformance test results were reviewed by the Parkhill CQA Engineer and accepted in accordance with Project Technical Specifications and 2016 CQA Plan. The conformance test results indicate that the GCL meets the minimum property requirements specified in the Project Technical Specifications and 2016 CQA Plan. The conformance test results for the samples are included in **Appendix B.2**.

#### 2.3.3.3 Construction Quality Control (CQC) for Geosynthetic Clay Liner

CQC procedures specified in the Project Technical Specifications and 2016 CQA Plan were strictly followed to provide a method to measure and regulate the quality of GCL installation. Parkhill Site CQA Engineer/Manager and FIS observed and documented GCL panel placement activities to verify that the deployment and seaming procedures were performed in accordance with Project Technical Specifications and 2016 CQA Plan, including subgrade inspection, seam overlap, application of free bentonite, and precautions against potential GCL damage.

#### 2.3.3.4 Construction Quality Assurance (CQA) for Geosynthetic Clay Liner

Parkhill Site CQA Engineer/Manager and the FIS inspected each roll of GCL transported to Cell 1 A and 2 A/B Tie-In from the staging area. GCL was inspected for potential damage and uniformity.

Parkhill Site CQA Engineer/Manager and the FIS visually inspected GCL rolls for potential damage during deployment. Any damaged portions of the GCL deployed were repaired by covering the defect with a GCL patch that provided a minimum twelve-inch overlap on all sides of the defect with bentonite powder applied to the edges of the patch as specified in the Project Technical Specifications and 2016 CQA Plan.

#### 2.3.4 Geosynthetic Clay Liner Deployment Records

Documentation of the GCL deployment and inspection of each panel for damage was required prior to approval and acceptance. GCL installation was not accepted until the deployment records (**Appendix C.5**), manufacturer's certification reports (**Appendix B.1**), and conformance test results (**Appendix B.2**) were submitted to and approved by Parkhill Site CQA Engineer. Cell 1 A and 2 A/B Tie-In GCL Layout is shown on **Figure 4**. Daily Summary Reports and documentation of GCL panel placement were recorded throughout each construction day. Copies of daily summary reports, the day's GCL panel deployment approval, and photographs documenting GCL panel placement activities are provided in the **Field Logs** and **Photographs** section of this Report.



#### 2.4 60-MIL SECONDARY FLEXIBLE MEMBRANE LINER

Secondary FML was installed in direct contact above the GCL in accordance with the Engineering Design Drawings, Project Specifications, and 2016 CQA Plan. The following sections describe the procedures and activities performed during FML installation, observation, and CQA testing.

#### 2.4.1 Flexible Membrane Liner Product

FML utilized in Cell 1 A and 2A/B Tie-In construction was 60-mil, high-density polyethylene (HDPE), manufactured by Solmax. Textured FML was designated for the berm/side slopes and smooth FML was designated for the cell floor lining of Cell 1 A and 2 A/B Tie-In and was delivered to OWL in rolls 22.5-feet wide by 560-feet long and 520-feet long for smooth and textured liner, respectively. FML was stored in the contractor's staging area and in accordance with the Project Technical Specifications and the 2016 CQA Plan. The stored FML was not stacked more than 2 rolls high.

#### 2.4.2 Flexible Membrane Liner Installation

FML installation activities were performed in accordance with the guidelines specified in the Construction Plans, Project Technical Specifications and 2016 CQA Plan; and industry standards for FML handling, placement, and testing. Each roll of FML was carefully moved from the contractor's staging area southwest of Cell 1 A and 2 A/B Tie-In using a rubber-tired forklift and FML was not placed in standing water or deployed during rainfall. Upon deployment, each roll identification label was removed and submitted to Parkhill Site CQA Engineer/Manager. FML being deployed was documented in the Secondary FML Deployment Log (Appendix C.6) and the Secondary 60-Mil Liner Panel Layout Drawing (Figure 5).

After each FML panel had been deployed, adjoining panels were positioned with a four- to six-inch longitudinal overlap required for hot-wedge fusion welding. The overlap distance is required for proper seaming, and to allow peel and shear tests to be performed on the seams. Seams were oriented at approximately 45 degrees to the line of prevailing base grade slope on the Cell 1 A and 2 A/B Tie-In floor, and parallel to the Cell 1 A and 2 A/B Tie-In side slopes, per Project Technical Specifications and 2016 CQA Plan (see Secondary 60-Mil Liner Panel Layout, **Figure 5**).

#### 2.4.3 Flexible Membrane Liner Testing

FML testing included manufacturer's quality control (MQC) and manufacturer's quality assurance (MQA), conformance testing, construction quality control (CQC), CQA, and seam testing. Each type of testing methodology is discussed in the following sections.

#### 2.4.3.1 Manufacturer's Quality Control (MQC)

Formosa Plastics Corporation, Texas, performed resin testing on the raw materials used in the manufacturing of the FML. These test results and written certifications verified that FML delivered to OWL has been extruded from an acceptable resin meeting the properties specified in GRI-GM 13, "Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes," are included in Appendix B.3.

#### 2.4.3.2 Manufacturer's Quality Assurance (MQA)

As a part of MQA testing, specific performance and characterization properties were evaluated on random samples collected from the manufactured FML rolls prior to their delivery to OWL as listed in **Table 7**.



TABLE 7 - Solmax HDPE FML - MQA Testing		
60-mil HDPE Smooth/Textured HDPE FML Property	ASTM Method	
Thickness	ASTM D5994	
Asperity Height (Textured)	ASTM D7466	
Density	ASTM D1505	
Melt Flow Index	ASTM D1238, Condition E	
Tensile Properties	ASTM D6693 and ASTM D 6693, Modified	
Tear Resistance	ASTM D1004, Modified	
Puncture Resistance	ASTM D4833, Modified	
Carbon Black Content	ASTM D4218	
Carbon Black Dispersion	ASTM D5596	
Environmental Stress Crack Resistance using Notched Constant Tensile Load	ASTM D5397	

MQA test results are included in **Appendix B.3**. These results were reviewed by Parkhill Site CQA Engineer and confirmed against Project Technical Specifications and 2016 CQA Plan requirements. MQA testing results met the requirements set forth in Project Technical Specifications and 2016 CQA Plan.

#### 2.4.3.3 Conformance Testing

Conformance sampling for FML material was performed by TRI, Austin, Texas. TRI or Parkhill collected samples approximately two feet long from the entire roll width and performed conformance testing at the TRI laboratory in Austin, Texas. Conformance samples were collected at a frequency of at least one per 100,000 ft² of FML installed to verify that the FML delivered to OWL met the minimum properties listed in Project Technical Specifications and 2016 CQA Plan. Conformance test results are included in the appendices.

TRI tested the eighteen FML samples for the properties listed in **Table 8**; as specified in Project Technical Specifications and 2016 CQA Plan.

TABLE 8 - Solmax HDPE FML - Conformance Testing	
60-mil HDPE (Smooth/Textured) FML Property	ASTM Method
Thickness	ASTM D5994
Density	ASTM D1505
Tensile Properties	ASTM D6693 and ASTM D 6693, Modified
Tear Resistance	ASTM D1004, Modified
Carbon Black Content	ASTM D6693, Modified 4218
Carbon Black Dispersion	ASTM D5596
Puncture Strength	ASTM D4833

Conformance test results were reviewed by Parkhill Site CQA Engineer and accepted in accordance with Project Technical Specifications and 2016 CQA Plan. Conformance test results indicated that the FML met the minimum property requirements specified in Project Technical Specifications and 2016 CQA Plan. Conformance testing results are included in **Appendix B.4**.

#### 2.4.3.4 Construction Quality Control (CQC)

Quality control procedures specified in Project Technical Specifications, 2016 CQA Plan, and

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industry standards were strictly followed to provide a method to measure and regulate the quality of secondary FML installation. These procedures included such activities as start-up trial welds, destructive and non-destructive seam testing, and verification that the deployment and seaming procedures were performed in accordance with Project Technical Specifications, 2016 CQA Plan, and industry standards.

Trial welds were performed at the start and midpoint of each workday, after each break in seaming of one hour or more, and after any equipment shutdown. Trial welds were a minimum of ten feet in length for fusion welders and a minimum of three feet in length for extrusion fillet welders. One-inchwide cutouts of the trial welds were field-tested for shear and peel strength using an on-site tensiometer (tensiometer calibration certificate is provided in **Appendix C.17**) and testing was performed in the presence of Parkhill Site CQA Engineer/Manager. If the results of the trial weld testing did not comply with Project Technical Specifications and 2016 CQA Plan, the welder was not permitted to continue seaming until the deficiencies were corrected and an additional trial weld was performed which passed the field-testing requirements. Trial weld documentation is included in **Appendix C.7**.

Seam testing protocol for Cell 1 A and 2 A/B Tie-In deployed FML included peel and shear testing on mathematically random samples cut from the installed FML (destructive samples) and non-destructive testing (air pressure and/or vacuum box testing) on field seams. The seam-testing program is detailed in Section 2.4.3.5 of this Report.

Parkhill Site CQA Engineer/Manager and FIS observed FML placement activities to verify that the deployment and seaming procedures were performed in accordance with Project Technical Specifications and 2016 CQA Plan, which included the underlying GCL inspection and approval, seam cleaning, and precautions against potential FML damage during deployment and seaming.

#### 2.4.3.5 Construction Quality Assurance (CQA)

Parkhill Site CQA Engineer/Manager and FIS visually inspected FML material for manufacturing and installation defects as the FML was deployed. No manufacturing flaws were observed in the deployed FML. Parkhill Site CQA Engineer/Manager inspected seamed and non-seamed areas of the FML for wrinkles, defects, holes, blisters, etc. After each panel was deployed, Parkhill Site CQA Engineer/Manager and FIS walked the length of each panel and identified any suspect areas (e.g., defects or blemishes) by marking these areas for repair with a highly visible paint.

#### 2.4.3.6 Seam Testing

In accordance with Project Technical Specifications and 2016 CQA Plan, the field seam verification program consisted of both destructive and non-destructive testing. Sampling and field-testing were performed by FML installer in the presence of Parkhill Site CQA Engineer/Manager. In addition to field-testing, destructive samples were sent to an independent quality assurance laboratory (TRI/Environmental, Inc., Austin, Texas) for peel and shear strength testing.

#### A. Destructive Seam Testing

In accordance with Project Technical Specifications and 2016 CQA Plan, a minimum of one destructive test for every 500 linear feet of welded seam (an average taken throughout the entire project) was performed on the FML. There were approximately 5,845 lineal feet of welded seam during installation of the secondary liner, TRI DT test results are included in the appendices.



Each destructive test sample was divided into three segments. The first segment was tested in the field for peel and shear strength by the installer using an on-site tensiometer. The second segment was shipped to an independent quality assurance laboratory for laboratory testing. The third sample segment was retained by Parkhill Site CQA Engineer/Manager and delivered to OWL to be archived in the facility operating record. Results of the field destructive tests are provided in **Appendix C.10**; and the independent quality assurance laboratory test results are included in **Appendix D.1**. The field destructive test results, and the independent quality assurance laboratory test results were reviewed by Parkhill Site CQA Engineer/Manager for conformance with Project Technical Specifications and 2016 CQA Plan. All peel and shear test results met the requirements of Project Technical Specifications and 2016 CQA Plan.

#### B. Non-Destructive Seam Testing

Air pressure testing was performed on double-wedge fusion welded seams except where a channel blockage occurred. Where channel blockages occurred, the seam was air tested on either side of the area that was extrusion-welded and vacuum box tested. An additional patch was extrusion welded over the repaired area and vacuum box tested. Vacuum box testing was performed on all extrusion-welded portions of seams and patches. Test results are documented on the Secondary FML Seam Pressure Test Log (Appendix C.9) and FML Seam Vacuum Test and Defect-Repair Log (Appendix C.15). Seams and repairs were required to pass the non-destructive testing specifications outlined in Project Technical Specifications, GRI test method GM-6, and 2016 CQA Plan before being accepted by the Parkhill Site CQA Engineer/Manager.

#### 2.4.4 FML Deployment Records

Documentation for Secondary FML deployment and testing for each panel deployed was required prior to FML approval and acceptance. CQA documentation for FML deployed in Cell 1 A and 2 A/B Tie-In is listed in **Table 9**.

TABLE 9 - HDPE FML Deployment CQA Documentation	
HDPE FML Deployment CQA Documentation	Certification Report Appendix Location
Secondary FML Deployment Log	Appendix C.7
Secondary and Primary FML Pre-Weld Qualification Test Record	Appendix C.8
Secondary FML Seaming Log	Appendix C.9
Secondary FML Seam Pressure Test Log	Appendix C.10
FML Seam Field Destructive Test Log	Appendix C.11
FML Seam Vacuum Test and Defect-Repair Log	Appendix C.16
Demtech Tensiometer Calibration Certification	Appendix C.17

FML installation was accepted after the data listed in **Table 9** was submitted to, reviewed by, and approved by Parkhill Site CQA Engineer. Cell 1 A and 2 A/B Tie-In As-Built Secondary FML Panel Layout is included as **Figure 5**. Daily Summary Reports were completed after each construction day, and photo documentation recorded FML placement activity on landfill floor and side slopes. Daily Summary Reports and forms indicating approval of the previous day's FML installation and project photographs are provided in the **Field Logs** and **Photographs Section**.

#### 2.5 LEAK-DETECTION ZONE

Leak-detection zone material was installed directly above the Secondary FML in accordance with the engineering design Drawings, Project Specifications, and 2016 CQA Plan. This zone consists of a double-sided geocomposite for side slopes and a geonet for the floor. The following sections describe the procedures and activities performed during the drainage layer installation, observation, and CQA testing.

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#### 2.5.1 Leak-Detection Zone Product

Geocomposite utilized in Cell 1 A and 2 A/B Tie-In construction is a 200-mil, high-density polyethylene (HDPE) encapsulated by nonwoven geotextile manufactured by Solmax. Geonet utilized in Cell 1A and 2 A/B Tie-In construction is a 200-mil high-density polyethylene (HDPE) manufactured by Solmax. The leak-detection zone is specified to encompass the entire double lined system and materials were delivered on-site in rolls 15 feet wide by 288 feet long for geocomposite and 15 feet wide by 290 feet long for geonet. Rolls were staged along the western perimeter of Cell 1 A and 2 A/B Tie-In to provide easy access, and to minimize handling of the material. In accordance with CQA Plan and Project Specifications, material was not stacked more than two rolls high. The material was inspected for damage during off-loading and staging.

#### 2.5.2 Leak-Detection Zone Material Installation

Leak detection zone material installation activities were performed in accordance with guidelines stipulated in 2016 CQA Plan, Project Specifications, the engineering design Drawings, and industry standards for handling and placement. Each roll was carefully moved from staging area to Cell 1 A and 2 A/B Tie-In using a rubber-tired extendable forklift. The forklift was not permitted on Secondary FML, and the material was placed by hand. Upon deployment, each roll label was removed and submitted to Parkhill Site CQA Engineer/Manager and panel location documented (see **Figure 6**).

After each panel had been placed, adjoining panels were positioned with a four- to six-inch overlap. The overlap distance is required for proper attachment using zip ties placed at five feet six inches longitudinally and end-to-end seams respectively. Geotextile encapsulating the geonet core of the geocomposite was then fused together from panel to panel using industry standard heat tacking methods. Seams were oriented at approximately 45 degrees to the line of prevailing base grade slope and perpendicular to the side slopes.

#### 2.5.3 Leak-Detection Zone Testing

Material testing included manufacturer's quality control (MQC) and quality assurance (MQA), conformance testing, construction quality control (CQC), CQA, and seam testing. Each type of testing is discussed in the following sections.

#### 2.5.3.1 Manufacturer's Quality Control (MQC)

Formosa Plastics Corporation, Texas performed resin testing on the raw materials used in the manufacturing of the geocomposite and geonet. These test results and written certifications that the product delivered has been extruded from an acceptable resin are included in **Appendices B.5** and **B.7**.

#### 2.5.3.2 Manufacturer's Quality Assurance (MQA)

As required by Project Technical Specifications and 2016 CQA Plan, the manufacturer (GSE) performed the geocomposite and geonet property testing listed in Table 10 prior to delivery of the materials to the Site.

TABLE 10 – Solmax Geocomposite and Geonet – MQC Testing			
Geocomposite Geonet Test Property ASTM		ASTM Method	
✓	<b>√</b>	Thickness	ASTM D5199
✓	✓	Density	ASTM D1505
	✓	Melt Index	ASTM D1238
✓	✓	Carbon Black Content	ASTM D4218
✓	✓	Tensile Strength	ASTM D7179
✓		Peel Strength	ASTM D7005
✓		Mass Per Unit Area	ASTM D5261
✓	✓	Transmissivity (loaded)	ASTM D4716



Geocomposite and geonet quality control certifications, property values, and testing frequencies for the on-site material delivered to OWL are provided in **Appendix B.5** and **B.7**.

#### 2.5.3.3 Conformance Testing

Conformance sampling for the geocomposite and geonet material was performed by TRI, Austin, Texas. TRI or Parkhill collected a sample approximately two feet long from the entire roll width and performed conformance testing at the TRI laboratory in Austin, Texas. Conformance samples were collected at a frequency of at least one per 100,000 ft<sup>2</sup> of material installed to verify that the geocomposite and geonet delivered to the OWL met the minimum properties listed in the Project Technical Specifications and 2016 CQA Plan. TRI tested conformances samples for the properties listed in **Table 11**, as specified in Project Technical Specifications and 2016 CQA Plan.

Table 11 – Solmax Geocomposite and Geonet – Conformance Testing			
Geocomposite Geonet Test Property AS		ASTM Method	
	✓	Thickness	ASTM D1777
✓	✓	Density	ASTM D1505
	✓	Wide Width Tensile Properties	ASTM D4595
	✓	Mass Per Unit Area	ASTM D3776
	✓	Carbon Black	ASTM D1603
✓		Melt Index	ASTM D1238
<b>√</b>		Transmissivity	ASTM D4716
<b>√</b>		Peel Strength	ASTM D7005
<b>√</b>		Tensile Strength	ASTM D7179

**Appendix B.6** and **B.8** provides the independent quality assurance laboratory test results. The results were reviewed by Parkhill CQA Engineer and compared with Project Technical Specifications and 2016 CQA Plan for geonet. The properties of the geocomposite and geonet meet or exceed Project Technical Specifications and 2016 CQA Plan requirements.

#### 2.5.3.4 Construction Quality Control (CQC)

Quality control procedures specified in the project documents were strictly followed to provide a method to measure and regulate the quality of geocomposite and geonet installation. These procedures included such activities as proper overlap and correct zip-tie spacing on the floor and slopes.

Both Parkhill Site CQA Engineer/Manager and FIS observed placement activities to verify that deployment and seaming procedures were performed in accordance with CQA Plan and Project Specifications.

#### 2.5.3.5 Construction Quality Assurance (CQA)

Parkhill Site CQA Engineer/Manager and FIM visually inspected all material for manufacturing and installation defects. No manufacturing flaws were observed in the installed geocomposite and geonet. Parkhill Site CQA Engineer/Manager inspected all seamed and non-seamed areas of the material for wrinkles, defects, etc. After each panel was deployed, Parkhill Site CQA Engineer/Manager and FIS walked the length of each panel to identify any suspect areas (e.g., defects or tears) by marking these areas for repair with a highly visible paint. No suspect areas were found.



#### 2.5.4 Leak Detection Zone Deployment Records

Documentation for leak detection zone material deployment was required before approval and acceptance. Deployment documentation for the materials deployed in Cell 1A and 2 A/B Tie-In are provided in **Appendices C.11** and **C.16**.

Leak detection zone material installation was accepted after the above-listed data was submitted to, reviewed, and approved by Parkhill CQA Engineer. Leak Detection Zone Panel As-Built for Cell 1A and 2 A/B Tie-In is included as **Figure 6.** Daily Summary Reports were logged during each construction day and photographs were taken showing the panel placement activity. Daily Summary Reports and project photographs are provided in the **Field Logs** and **Photographs** Section.

#### 2.6 60-MIL PRIMARY FLEXIBLE MEMBRANE LINER

Primary FML was installed in direct contact above leak detection zone materials in accordance with the Construction Plans, Project Technical Specifications, and 2016 CQA Plan. The following sections describe the procedures and activities performed during primary FML installation, observation, and CQA testing.

#### 2.6.1 Flexible Membrane Liner Product

Primary FML utilized in Cell 1 A and 2 A/B Tie-In construction was 60-mil high-density polyethylene (HDPE) manufactured by Solmax. Smooth FML was designated for the floor and textured FML was designated for the side slopes of Cell 1 A and 2 A/B Tie-In. The material was delivered to OWL in rolls 22.5-feet wide with by 560-feet long for the smooth and 520-feet long for the textured FML. FML was stored in contractor's staging area and in accordance with Project Technical Specifications and 2016 CQA Plan. The stored FML was not stacked more than two rolls high. Parkhill Site CQA Engineer/Manager compared roll identification labels with shipping invoices to verify that the FML delivered to OWL corresponded with FML subjected to manufacturer's quality control and quality assurance testing (Section 2.6.3).

#### 2.6.2 Flexible Membrane Liner Installation

FML installation activities were performed in accordance with the guidelines specified in Construction Plans, Project Technical Specifications, and 2016 CQA Plan; and industry standards for FML handling, placement, and testing. Each roll of FML was carefully moved from contractor's staging area at the west end of OWL using a rubber-tired forklift; and FML was not placed in standing water or deployed during rainfall. The forklift was not allowed on leak detection zone materials, the primary HDPE liner was placed by hand and aided with the use of wire rope and pulling equipment. Upon deployment, each role identification label was removed and submitted to Parkhill Site CQA Engineer/Manager. FML being deployed was documented in Primary FML Deployment Log (Appendix C.12) and Cell 1 A and 2 A/B Tie-In 60-Mil Primary Liner Panel Layout Drawing (Figure 7). After each FML panel had been deployed, adjoining panels were positioned with a four- to six-inch longitudinal overlap required for hot-wedge fusion welding. The overlap distance is required for proper seaming, and to allow peel and shear tests to be performed on the seams. Seams were oriented at approximately 45 degrees to the line of prevailing base grade slope on the Cell 1 A and 2 A/B Tie-In floor, and parallel to the Cell 1 A and 2 A/B Tie-In side slopes, per the Project Technical Specifications and 2016 CQA Plan (see 60-Mil Primary Liner Panel Layout, Figure 7).

#### 2.6.3 Flexible Membrane Liner Testing

FML testing included manufacturer's quality control (MQC) and manufacturer's quality assurance (MQA), conformance testing, construction quality control (CQC), CQA, and seam testing. Each type of testing methodology is discussed in the following sections.



#### 2.6.3.1 Manufacturer's Quality Control (MQC)

Formosa Plastics Corp, Texas performed resin testing on the raw materials used in the manufacturing of the smooth and textured FML. These test results and written certifications verified that the FML delivered to OWL has been extruded from an acceptable resin meeting the properties specified in GRI-GM 13, "Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes," are included in **Appendix B.4**.

#### 2.6.3.2 Manufacturer's Quality Assurance (MQA)

As a part of the MQA testing, specific performance and characterization properties were evaluated on random samples collected from the manufactured FML rolls prior to their delivery to OWL as listed in **Table 12**.

TABLE 12 - Solmax HDPE FML - MQA Testing		
60-mil HDPE Double-Sided Textured and Smooth HDPE FML Property	ASTM Method	
Thickness	ASTM D5994	
Asperity Height (Textured)	ASTM D7466	
Density	ASTM D1505	
Melt Flow Index	ASTM D1238, Condition E	
Tensile Properties	ASTM D6693 and ASTM D 6693, Modified	
Tear Resistance	ASTM D1004, Modified	
Puncture Resistance	ASTM D4833, Modified	
Carbon Black Content	ASTM D4218	
Carbon Black Dispersion	ASTM D5596	
Environmental Stress Crack Resistance using Notched Constant Tensile Load	ASTM D5397	

MQA test results are included in **Appendix B.3**. These results were reviewed by Parkhill Site CQA Engineer and confirmed against Project Technical Specifications and 2016 CQA Plan requirements. MQA testing results met the requirements set forth in Project Technical Specifications and 2016 CQA Plan.

#### 2.6.3.3 Conformance Testing

Conformance sampling for FML material was performed by TRI, Austin, Texas. TRI or Parkhill collected samples approximately two feet long from the entire roll width and performed conformance testing at the TRI laboratory in Austin, Texas. Conformance samples were collected at a frequency of at least one per 100,000 ft² of FML installed to verify that the FML delivered to the OWL met the minimum properties listed in Project Technical Specifications and 2016 CQA Plan. TRI conformance test results are included in the appendices.

TRI tested the FML samples for the properties listed in **Table 13**, as specified in Project Technical Specifications and 2016 CQA Plan.



TABLE 13 – Solmax HDPE FML – Conformance Testing	
60-mil HDPE Smooth and Double-sided Textured FML Property	ASTM Method
Thickness	ASTM D5994
Density	ASTM D1505
Mass per unit area	ASTM D5993
Tensile Properties	ASTM D6693 and ASTM D 6693, Modified
Tear Resistance	ASTM D1004, Modified
Carbon Black Content	ASTM D4218
Carbon Black Dispersion	ASTM D5596
Puncture Strength	ASTM D4833

Conformance test results were reviewed by Parkhill Site CQA Engineer and accepted in accordance with Project Technical Specifications and 2016 CQA Plan. Conformance test results indicated that the FML met the minimum property requirements specified in Project Technical Specifications and 2016 CQA Plan. Conformance testing results are included in **Appendix B.4**.

#### 2.6.3.4 Construction Quality Control (CQC)

Quality control procedures specified in Project Technical Specifications, 2016 CQA Plan; and industry standards were strictly followed to provide a method to measure and regulate the quality of FML installation. These procedures included such activities as start-up trial welds, destructive and non-destructive seam testing, and verification that deployment and seaming procedures were performed in accordance with Project Technical Specifications, 2016 CQA Plan, and industry standards.

Trial welds were performed at the start and midpoint of each workday, after each break in seaming of one hour or more, and after any equipment shutdown. Trial welds were a minimum of ten feet in length for fusion welders; and a minimum of three feet in length for extrusion fillet welders. One-inch-wide cutouts of the trial welds were field-tested for shear and peel strength using an on-site tensiometer (tensiometer calibration certificate is provided in **Appendix C.17**) and testing was performed in the presence of Parkhill Site CQA Engineer/Manager. If results of trial weld testing did not comply with Project Technical Specifications and 2016 CQA Plan, the welder was not permitted to continue seaming until the deficiencies were corrected and an additional trial weld was performed which passed the field-testing requirements. Primary trial weld documentation is included in **Appendix C.7**.

Seam testing protocol for the deployed FML included peel and shear testing on mathematically random samples cut from the installed FML (destructive samples) and non-destructive testing (air pressure and/or vacuum box testing) on field seams. The seam-testing program is detailed in Section 2.7.3.6 of this Report.

Parkhill Site CQA Engineer/Manager and FIS observed FML placement activities to verify that deployment and seaming procedures were performed in accordance with Project Technical Specifications and 2016 CQA Plan, which included the underlying leak detection zone materials inspection and approval, seam cleaning, and precautions against potential FML damage during deployment and seaming.



#### 2.6.3.5. Construction Quality Assurance (CQA)

Parkhill Site CQA Engineer/Manager and FIS visually inspected FML material for manufacturing and installation defects as the FML was deployed. No manufacturing flaws were observed in the deployed FML. Parkhill Site CQA Engineer/Manager inspected seamed and non-seamed areas of the FML for wrinkles, defects, holes, blisters, etc. After each panel was deployed, Parkhill Site CQA Engineer/Manager and FIS walked the length of each panel and identified any suspect areas (e.g., defects or blemishes) by marking these areas for repair with a highly visible paint.

#### 2.6.3.6 Seam Testing

In accordance with Project Technical Specifications and 2016 CQA Plan, the field seam verification program consisted of both destructive and non-destructive testing. Sampling and field-testing were performed by the FML installer in the presence of Parkhill Site CQA Engineer/Manager. In addition to field-testing, destructive samples were sent to an independent quality assurance laboratory for peel and shear strength testing.

#### A. <u>Destructive Seam Testing</u>

In accordance with Project Technical Specifications and 2016 CQA Plan, a minimum of one destructive test for every 500 linear feet of welded seam (an average taken throughout the entire project) was performed on the FML. There were approximately 5,987 lineal feet of welded seam in the primary liner. TRI DT test results are included in the appendices.

Each destructive test sample was divided into three segments. The first segment was tested in the field for peel and shear strength by the installer using an on-site tensiometer. The second segment was shipped to an independent quality assurance laboratory for laboratory testing. The third sample segment was retained by Parkhill Site CQA Engineer/Manager and delivered to OWL to be 10 in the facility operating record. Results of the field destructive tests are provided in **Appendix C.10**; and the independent quality assurance laboratory test results are included in **Appendix D.2**. The field destructive test results and the independent quality assurance laboratory test results were reviewed by Parkhill Site CQA Engineer/Manager for conformance with Project Technical Specifications and 2016 CQA Plan. All peel and shear test results met the requirements of Project Technical Specifications and 2016 CQA Plan.

#### B. Non-Destructive Seam Testing

Air pressure testing was performed on all double-wedge fusion welded seams in accordance with GRI GM6 "Practice for Pressurized Air Channel Test for Dual Seamed Geomembranes," except where a channel blockage occurred. Where channel blockages occurred, the seam was air tested on either side of the area was extrusion-welded and vacuum box tested. An additional patch was extrusion welded over the repaired area and vacuum box tested. Vacuum box testing was performed on all extrusion-welded portions of seams and patches. Test results are documented on the Primary FML Seam Pressure Test Log (Appendix C.14) and the FML Seam Vacuum Test and Defect-Repair Log (Appendix C.15). Seams and repairs were required to pass the non-destructive testing specifications outlined in Project Technical Specifications, GRI Test Method GM-6, and 2016 CQA Plan before being accepted by Parkhill Site CQA Engineer/Manager.

#### 2.6.4 FML Deployment Records

Documentation for FML deployment and testing for each panel deployed was required prior to FML approval and acceptance. CQA documentation for the FML deployed in Cell 1 A and 2 A/B Tie-In are listed in **Table 14**.



TABLE 14 - HDPE Primary FML Deployment CQA Documentation	
HDPE FML Deployment CQA Documentation	Certification Report Appendix Location
Secondary and Primary FML Pre-Weld Qualification Test Log	Appendix C.8
Primary FML Deployment Log	Appendix C.13
Primary FML Seaming Log	Appendix C.14
Primary FML Seam Pressure Test Log	Appendix C.15
FML Seam Vacuum Test and Defect-Repair Log	Appendix C.16
Demtech Tensiometer Calibration Certification	Appendix C.18

FML installation was accepted after the data listed in **Table 14** was submitted to, reviewed by, and approved by Parkhill Site CQA Engineer. Cell 1 A and 2 A/B Tie-In as-built FML panel layout is included as **Figure 7**. Daily summary reports were completed after each construction day, and photo documentation recorded the FML placement activity on Cell 1 A and 2 A/B Tie-In floor and side slopes.

#### 2.7 GEOSYNTHETIC CUSHION/DRAINAGE LAYER

Geosynthetic Cushion/Drainage Layer was installed directly above the primary FML in accordance with engineering design Drawings, Project Specifications, and 2016 CQA Plan. This layer consists of a double-sided geocomposite for the side slopes and a single-sided geocomposite for the floor. The following sections describe the procedures and activities performed during the drainage layer installation, observation, and CQA testing.

#### 2.7.1 Geosynthetic Cushion/Drainage Layer Product

Geocomposite utilized in Cell 1 A and 2 A/B Tie-In construction is a 200-mil high-density polyethylene (HDPE) encapsulated on both sides for double-sided and one side for a single-sided geocomposite manufactured by Solmax. Cushion/drainage layer material is specified to encompass the entire double-lined system and was delivered on-site in rolls 15 feet wide by 288 feet long for single-sided geocomposite and 15 feet wide by 200 feet long for double-sided geocomposite. Rolls were staged along the western perimeter of Cell 1 A and 2 A/B Tie-In to provide easy access and to minimize handling of the material. In accordance with CQA Plan and Project Specifications, material was not stacked more than two rolls high. The material was inspected for damage during off-loading and staging.

#### 2.7.2 Geosynthetic Cushion/Drainage Layer Material Installation

Cushion/Drainage Layer material installation activities were performed in accordance with the guidelines stipulated in 2016 CQA Plan, Project Specifications, the engineering design Drawings, and industry standards for handling, and placement. Each roll was carefully moved from the staging area to Cell 1 A and 2 A/B Tie-In using a rubber-tired extendable forklift. The forklift was not permitted on primary FML, and the material was placed by hand. Upon deployment, each roll label was removed and submitted to Parkhill Site CQA Engineer/Manager and panel location documented (see **Figure 8**).

After each panel had been placed, adjoining panels were positioned with a four- to six-inch overlap. The overlap distance is required for proper attachment using zip ties placed at five feet six inches longitudinally and end-to-end seams respectively. The geotextile encapsulating the geonet core of the geocomposite were then fused together using industry standard heat tacking methods. Seams were oriented at approximately 45 degrees to the line of prevailing base grade slope and perpendicular to the side slopes.



#### 2.7.3 Geosynthetic Cushion/Drainage Layer Testing

Geocomposite testing included manufacturer's quality control (MQC) and quality assurance (MQA), conformance testing, construction quality control (CQC), CQA, and seam testing. Each type of testing is discussed in the following sections.

#### 2.7.3.1 Manufacturer's Quality Control (MQC)

Formosa Plastics Corp, Texas performed resin testing on the raw materials used in the manufacturing of the Geocomposite. These test results and written certifications that the product delivered has been extruded from an acceptable resin are included in **Appendix B.7**.

#### 2.7.3.2 Manufacturer's Quality Assurance (MQA)

As required by Project Technical Specifications and 2016 CQA Plan, the manufacturer performed the Geocomposite property testing listed in **Table 15** prior to delivery of the materials to the Site.

TABLE 15 – Solmax Geocomposite - MQC Testing	
Geocomposite Property	ASTM Method
Thickness	ASTM D5199
Density	ASTM D792
Carbon Black Content	ASTM D4218
Tensile Strength	ASTM D7179
Peel Strength	ASTM D7005
Mass Per Unit Area	ASTM D5261
Transmissivity (loaded)	ASTM D4716

Geocomposite quality control certifications, property values, and testing frequencies for on-site material delivered to OWL are provided in **Appendix B.8**.

#### 2.7.3.3 Conformance Testing

Conformance sampling for the geocomposite material was performed by TRI, Austin, Texas. TRI or Parkhill collected a sample approximately two-feet long from the entire roll width and performed conformance testing at the TRI laboratory in Austin, Texas. Conformance samples were collected at a frequency of at least one per 100,000 ft² installed to verify that the geocomposite delivered to the OWL met the minimum properties listed in the Project Technical Specifications and 2016 CQA Plan. TRI tested conformance samples for the properties listed in **Table 16**; as specified in Project Technical Specifications and 2016 CQA Plan.

TABLE 16 - GSE Environmental Geocomposite - Conformance Testing	
Geocomposite Property	ASTM Method
Density	ASTM D1505
Transmissivity	ASTM D4716
Peel Strength	ASTM D7005
Tensile Strength	ASTM D7179

**Appendix B.8.** provides independent quality assurance laboratory test results. The results were reviewed by Parkhill CQA Engineer and compared with Project Technical Specifications and 2016 CQA Plan for Geocomposite. The properties of the geocomposite meet or exceed Project Technical Specifications and 2016 CQA Plan requirements.



#### 2.7.3.4 Construction Quality Control (CQC)

Quality control procedures specified in the project documents were strictly followed to provide a method to measure and regulate the quality of geocomposite installation. These procedures included such activities as proper overlap and correct zip-tie spacing on the floor and side slopes.

Both the Parkhill Site CQA Engineer/Manager and FIS observed placement activities to verify that deployment and seaming procedures were performed in accordance with the CQA Plan and Project Specifications.

#### 2.7.3.5 Construction Quality Assurance (CQA)

Parkhill Site CQA Engineer/Manager and FIM visually inspected all material for manufacturing and installation defects. No manufacturing flaws were observed in the installed geocomposite. Parkhill Site CQA Engineer/Manager inspected all seamed and non-seamed areas of the geocomposite for wrinkles, defects, etc. After each panel was deployed, Parkhill Site CQA Engineer/Manager and FIS walked the length of each panel to identify any suspect areas (e.g., defects or tears) by marking these areas for repair with a highly visible paint. No suspect areas were found.

#### 2.7.4 Geosynthetic Cushion/Drainage Layer Deployment Records

Documentation for cushion/drainage layer material deployment was required prior to approval and acceptance. CQA documentation for geocomposite deployed in Cell 1 A and 2 A/B Tie-In is provided in **Appendix C.16.** 

Drainage/cushion layer material installation was accepted after above-listed data was submitted to, reviewed, and approved by Parkhill CQA Officer. Geosynthetic cushion/drainage layer panel as-built for Cell 1 A and 2 A/B Tie-In is included as **Figure 8**. Daily summary reports were logged during each construction day and photographs were taken showing geocomposite placement activity. Daily summary reports and project photographs are provided in **Field Logs** and **Photographs** Section. Upon installation of Drainage/cushion layer, anchor trench was backfilled and compacted to Design Specifications (**Appendix A.3**).

#### 2.8 PROTECTIVE SOIL LAYER

Upon completion of liner system installation, and after confirming that all repairs were adequately addressed, Enviroworks began placing a minimum two-foot thickness of PSL on the cell floor and side slope. Material for the PSL is comprised of on-site soil material pre-qualified by Parkhill Site CQA Engineer/Manager.

Parkhill observed placement of the PSL to ensure that the methods and material used during construction did not damage the installed liner system. The thickness of the PSL was verified by survey (Figure 10 – OPS As-Built Thickness and field measurements taken by Parkhill Site CQA. The Site CQA manager performed protective cover thickness measurements via depth probe. Using a blunt instrument and a frequency of 1 per 100 feet, the site CQA manager measured the thickness of protective cover. All measurements were greater than the required 2-foot thickness.

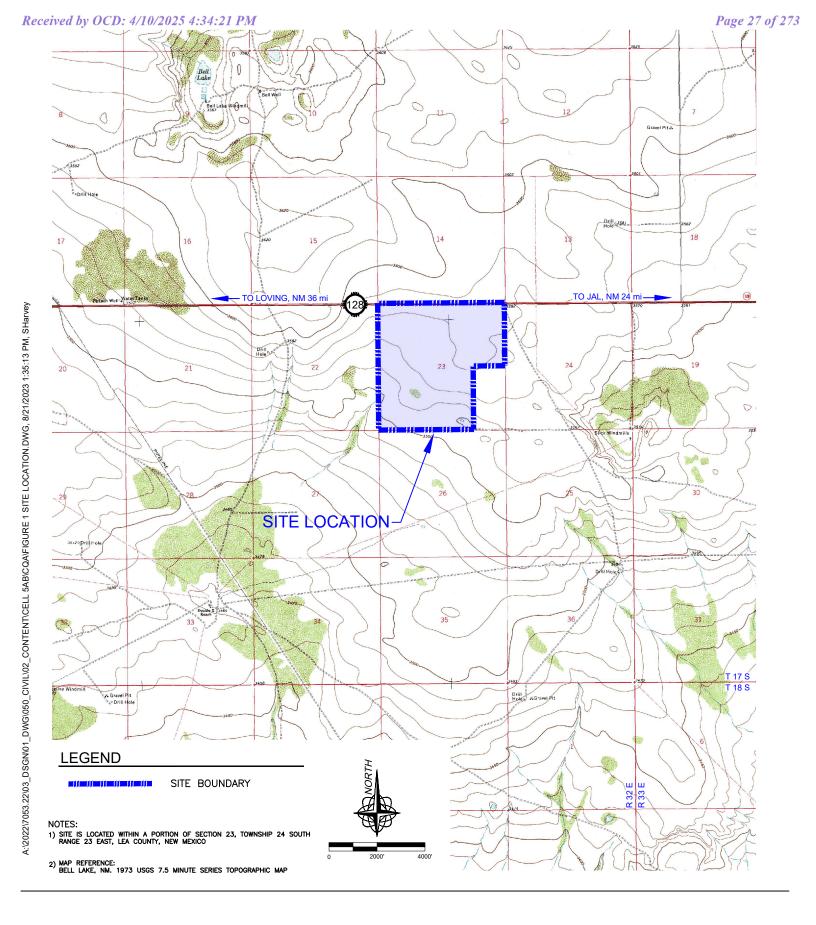
#### 3.0 ENGINEERING CERTIFICATION

This Engineering Certification Report demonstrates that the composite liner and leak detection system for Cell 1 A and 2 A/B Tie-In has been installed in accordance with New Mexico Energy, Minerals, and Natural Resources Department Regulations (19.15.36.11 – 19.15.36.112 NMAC). This Certification is sealed by Tyler S. Krueger, a New Mexico Professional Engineer with extensive applicable experience with waste engineering and geosynthetic liner systems (**Appendix F**).



# **FIGURES**

Figure 1	OWL Landfill Services – Site Location Map
Figure 2	OWL Landfill Services – Subgrade Design Grades
Figure 3	OWL Landfill Services – Field Density Test Locations
Figure 4	OWL Landfill Services – GCL Panel Layout
Figure 5	OWL Landfill Services – Secondary Liner Panel Layout
Figure 6	OWL Landfill Services – Geosynthetic Leak Detection Layer
Figure 7	OWL Landfill Services – Primary Liner Panel Layout
Figure 8	OWL Landfill Services – Geocomposite Panel Layout
Figure 9	OWL Landfill Services – Subgrade As-Built Exhibit
Figure 10	OWL Landfill Services – OPS As-Built Thickness



# OWL LANDFILL SERVICES ENGINEERING CERTIFICATION REPORT

OILFIELD WATER LOGISTICS JAL, NEW MEXICO



Parkhill.com

#### **SITE LOCATION MAP**

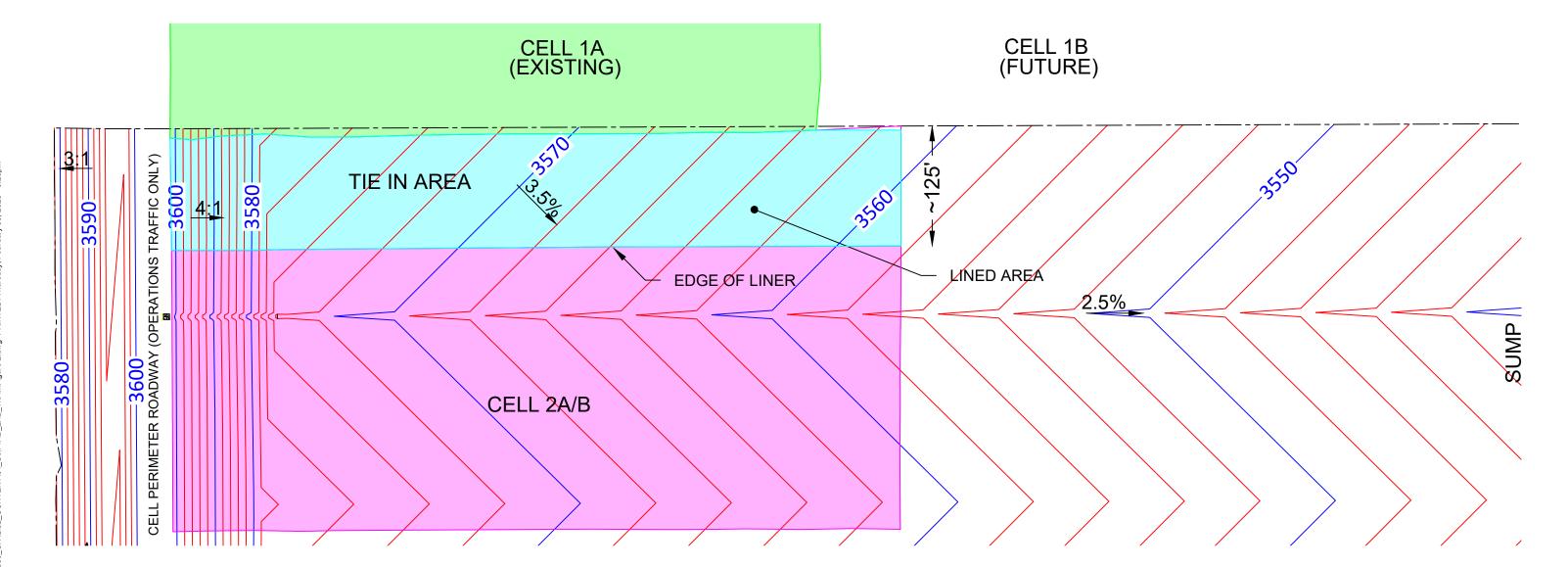
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 08/28/2023

 Project No:
 7053.22

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 FIGURE 1

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# **OWL LANDFILL SERVICES**

**OILFIELD WATER LOGISTICS** JAL, NEW MEXICO LEA COUNTY, NEW MEXICO



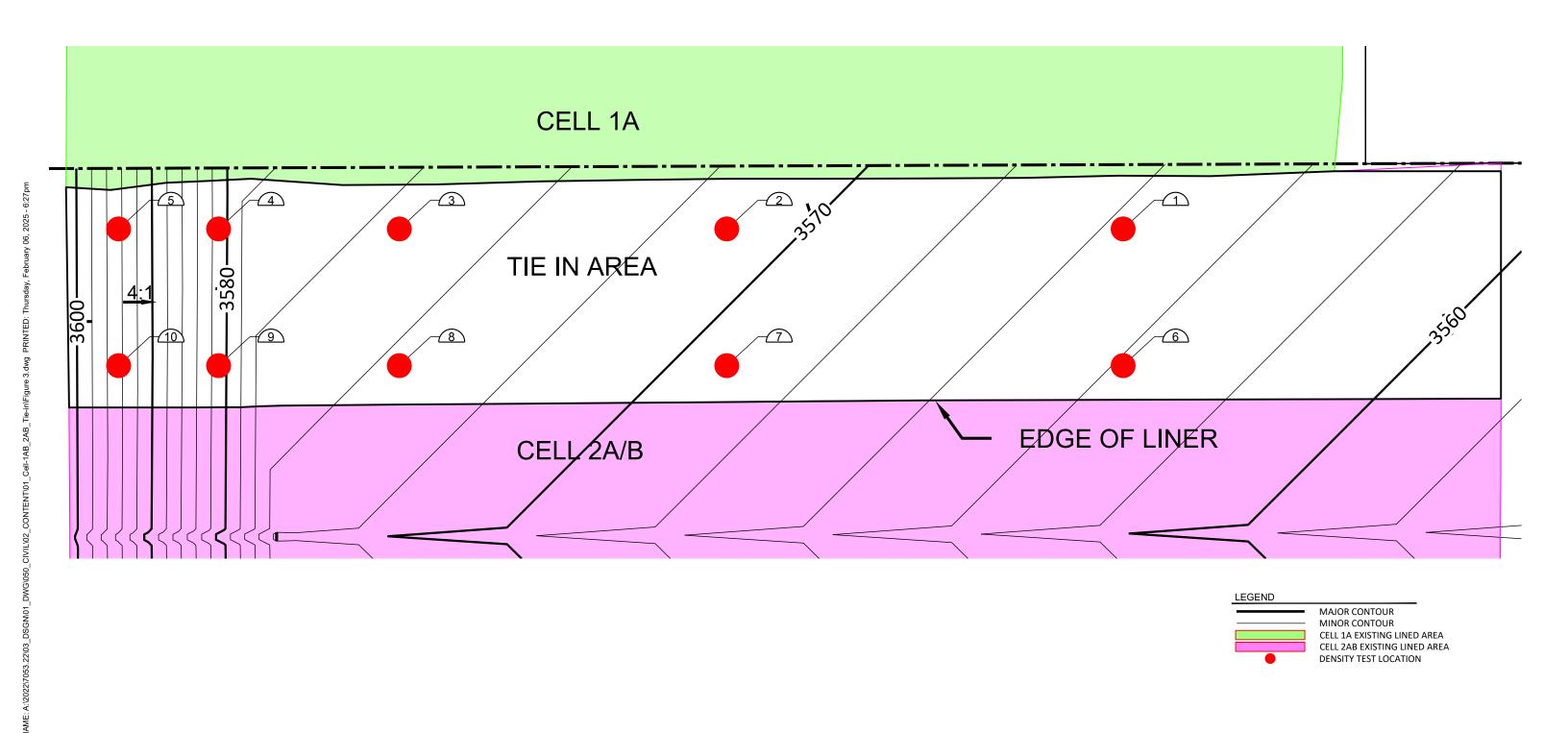
**SUBGRADE DESIGN PLAN** 

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Page 29 of 273 Received by OCD: 4/10/2025 4:34:21 PM





# **OWL LANDFILL SERVICES**

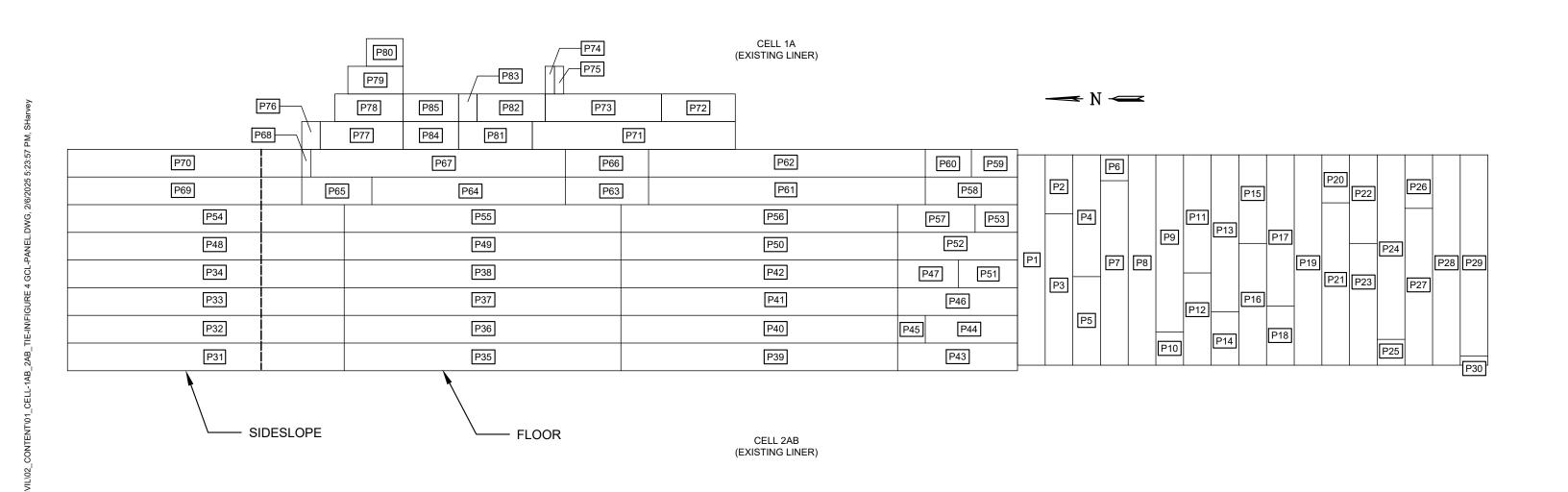


**OILFIELD WATER LOGISTICS** JAL, NEW MEXICO Released to Imaging: 4/23/2025 9:36:05 AM COUNTY, NEW MEXICO



# **FIELD DENSITY TEST LOCATIONS**

Issue: FINAL 7/29/2024 Date: 6759.21 Project No: Sheet: FIGURE 3



OWL LANDFILL SERVICES CELL 1AB/2AB TIE-IN CQA REPORT

Oilfield Water Logistics Jal, New Mexico

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# **GCL PANEL LAYOUT**

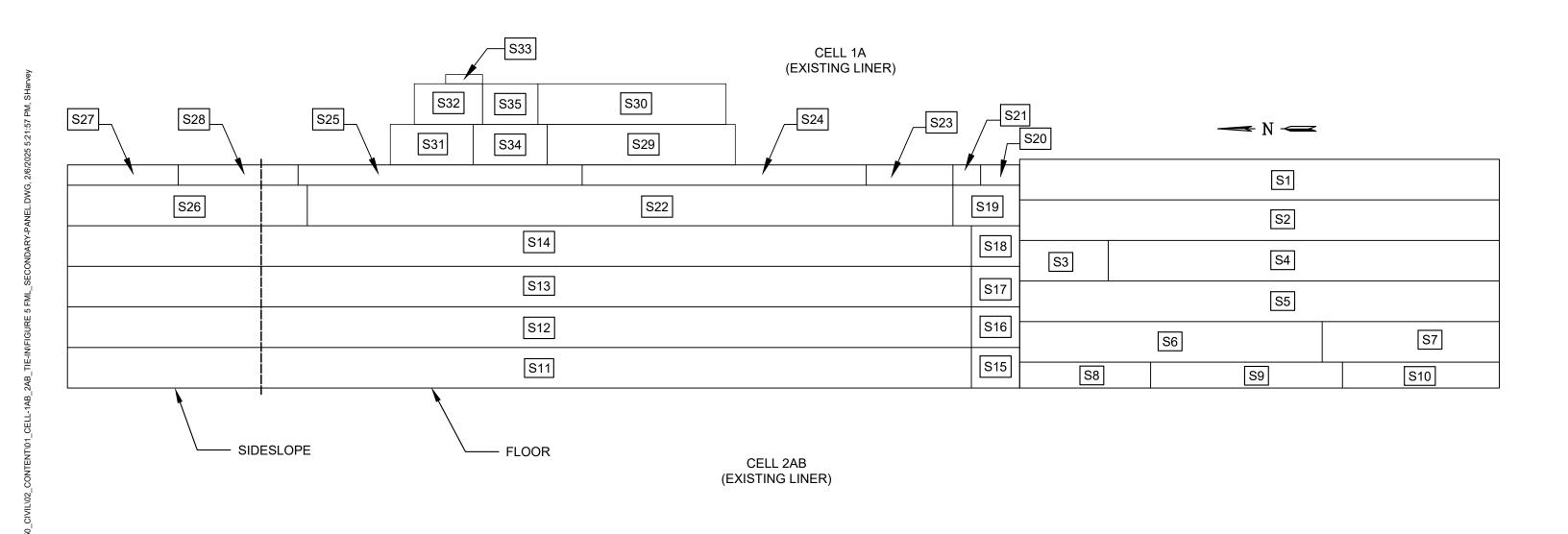
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 Date:
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 7053.22

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 FIGURE 4

Page 31 of 273 Received by OCD: 4/10/2025 4:34:21 PM



**OWL LANDFILL SERVICES CELL 1AB/2AB TIE-IN CQA REPORT** 

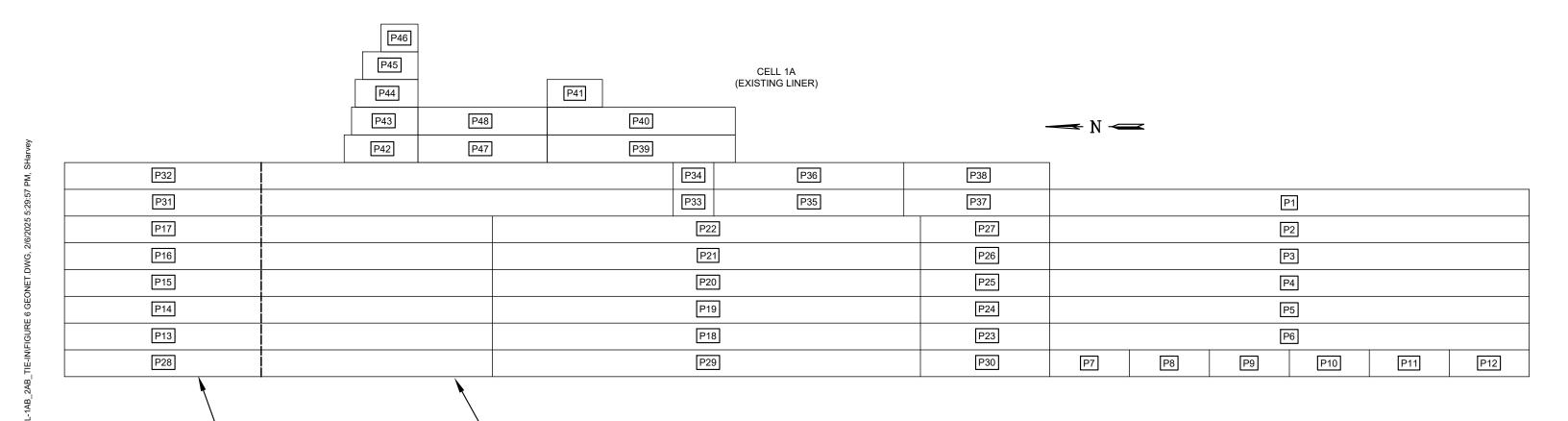
Oilfield Water Logistics Jal, New Mexico

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## **SECONDARY LINER PANEL LAYOUT**

02/07/2025 Project No: 7053.22 Sheet: FIGURE 5



CELL 2AB (EXISTING LINER)

**FLOOR** 

OWL LANDFILL SERVICES CELL 1AB/2AB TIE-IN CQA REPORT

- SIDESLOPE

Oilfield Water Logistics Jal, New Mexico

Jal, New Mexico
Lea County New Mexico
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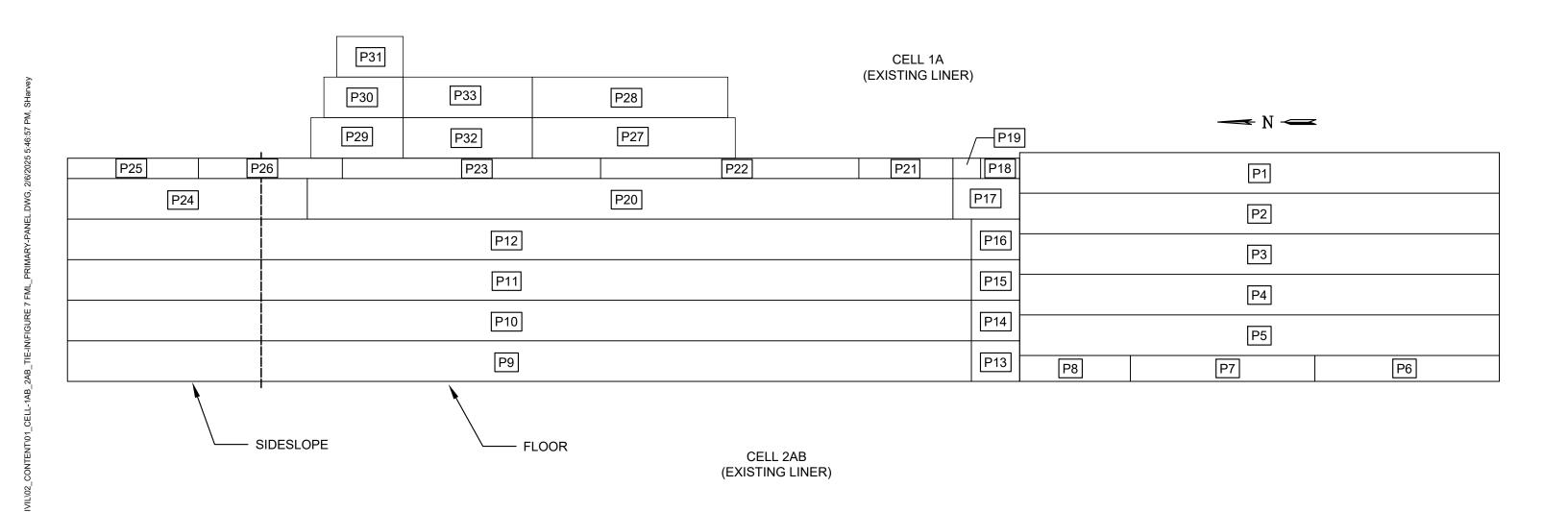
# GEOSYNTHETIC LEAK DETECTION LAYER

 Issue:
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 Date:
 02/07/2025

 Project No:
 7053.22

Sheet: FIGURE 6



OWL LANDFILL SERVICES CELL 1AB/2AB TIE-IN CQA REPORT

Oilfield Water Logistics Jal, New Mexico

Jal, New Mexico
Lea County New Mexico
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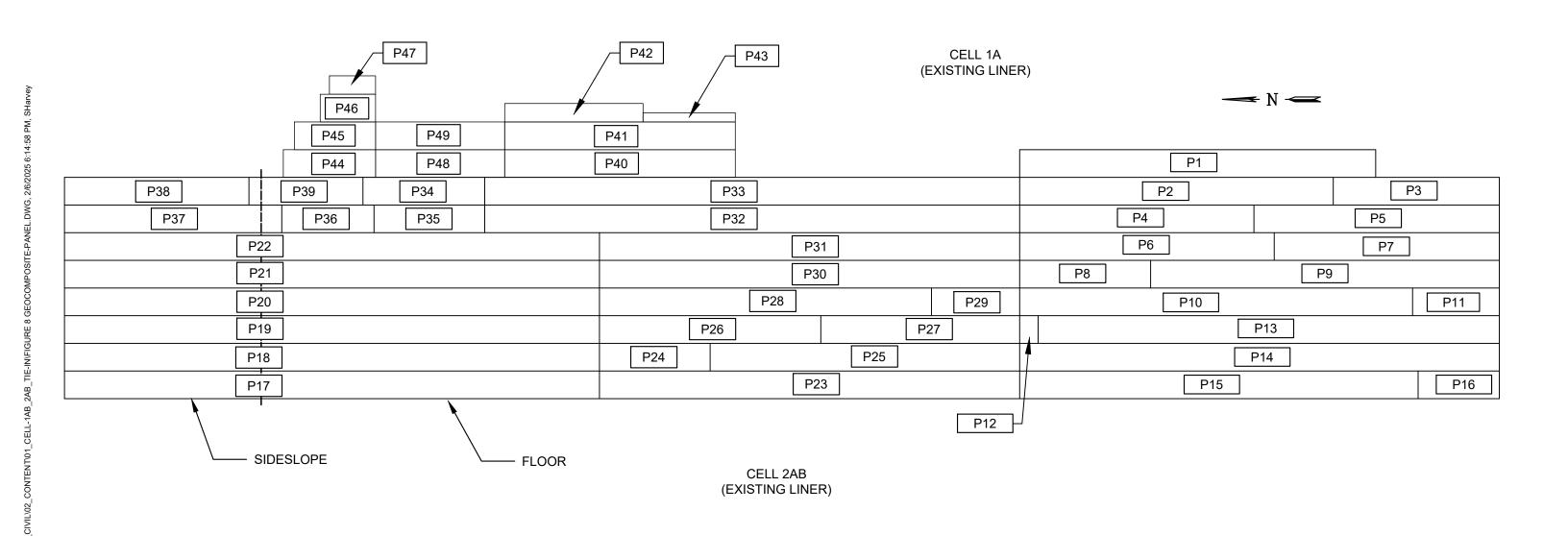
## PRIMARY LINER PANEL LAYOUT

 Issue:
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 Date:
 02/07/2025

 Project No:
 7053.22

 Sheet:
 FIGURE 7



NOTES:

\*ROLLS ALREADY ON SITE WITHOUT LABELS, ORDERED BUT NOT INSTALLED DURING PREVIOUS LINING OPERATIONS.

# OWL LANDFILL SERVICES CELL 1AB/2AB TIE-IN CQA REPORT

**Oilfield Water Logistics** 

Jal, New Mexico

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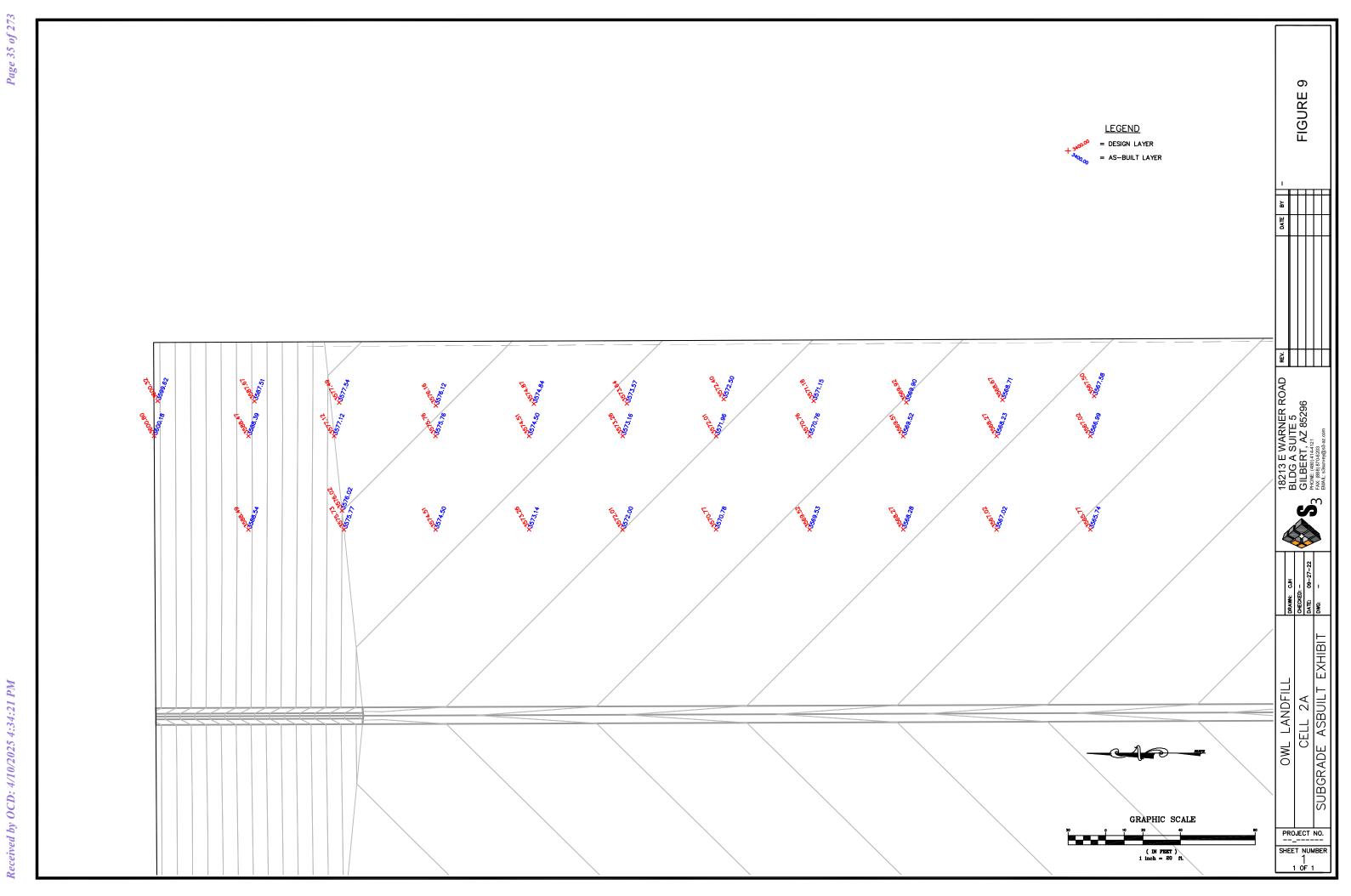
# GEOCOMPOSITE PANEL LAYOUT

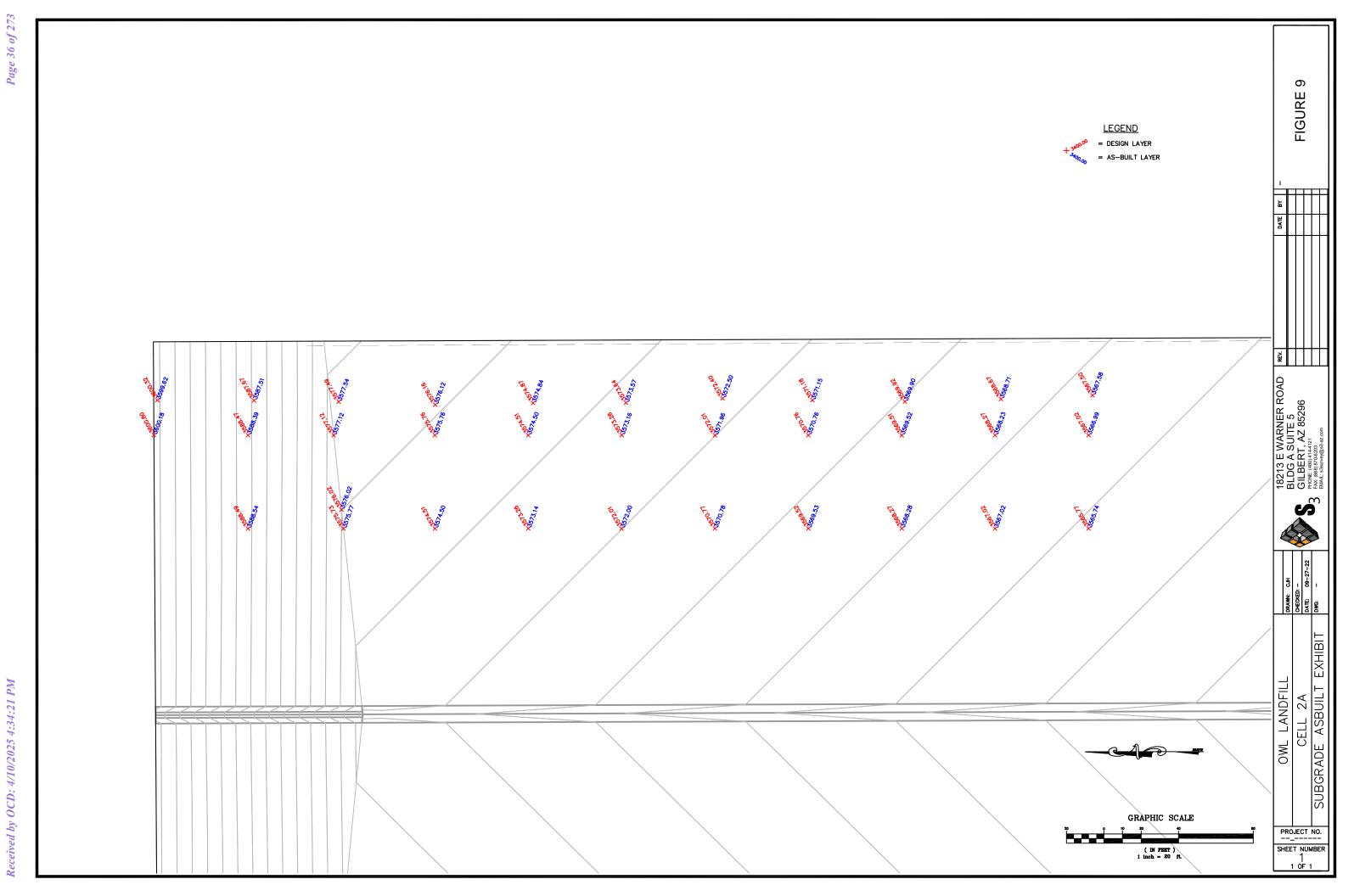
 Issue:
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 Date:
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 Project No:
 7053.22

 Sheet:
 FIGURE 8







## FIELD LOGS AND PHOTOGRAPHS

**Daily Summary Reports** 

FIELD					
<b>OBSERVATION</b>	PREPARED BY: Richard "Dos" Landsheft  PROJECT NAME: OWL Cell 1AB & 2 AB Tie-In  PROJECT NO.: 7053.22				
REPORT					
KEPOKI					
DATE: 05/24/2022 TIME: 7:00 AM					
Weather   X Clear Snow Warm   Overcast Foggy Hot   Rain Cold □	Site Conditions ☐ Clear 🛣 Dusty ☐ Muddy ☐ Temperature Range	<u>Day</u> ☐ Monday ☐ Thursday <b>∑</b> Tuesday ☐ Friday ☐ Wednesday ☐	_		
Persons Contacted/Present at Site:					
Southwest Lining Systems					
Work Observed/In-Progress:					
Site preparation for GCL deployment to	morrow				
Items Discussed/Observations: Plans and start time for tomorrow.					
Materials Delivered to Site:					
Requested Revisions or Interpretations:					
No items requested for revision.					
Items to Verify:					
Information or Action Required:					
Attachments					
Copies: Owner A/E Co	ontractor		e		



FIELD					
<b>OBSERVATION</b>	PREPARED BY: Richard "Dos" Landsheft				
REPORT	DDO IFOT NAME, OWI, O. II 4AD G. AD T'. II				
	PROJECT NO.: 7053.22				
<b>DATE</b> : 05/25/2022 <b>TIME</b> : 7	7:00 AM				
Weather         X Clear       Snow       Warm         Overcast       Foggy       Hot         Rain       Cold       □	Site Conditions  Clear X Dusty  Muddy  Temperature Range	 Monday			
Persons Contacted/Present at Site: Southwest Lining Systems					
Work Observed/In-Progress:					
Deployment of GCL and Secondary FM end of day with pressure testing and de		ved FML deployment. Welds were tested by			
Items Discussed/Observations:					
Materials Delivered to Site:					
No material delivered to site.					
Requested Revisions or Interpretations:					
No items requested for revision.					
Items to Verify:					
Information or Action Required:					
Attachments					
Copies: Owner A/E Co	ontractor				

APPRO	VAL/	TO:
	DIZATION	FROM:
AUINC	RIZATION	PROJECT NAME: OWL NOBL CELL ZAB
TO PRO	JOLLD	PROJECT NO.:
		DATE: 05/25/2022
he following liner s		ceptable on a visual inspection by Liner Contractor Representative:
LAYER:	1. Subgrade	FROE
	2. Geosynthetic Clay Liner	The vector
	3. HDPE Geomembrane (F	ML)
	4. Protective Soil Layer (PS	
LOCATION:	STA 15+4	to CEU3 EAST TO WEST
LOOK HOIL.	CELLI	to CEU3 EAST TOWEST
REMARKS:	SUBGRADE PA GCL	BSET FIL PEDLOYMENT OF
REMARKS:	SUBGRADE PA GCL	BSET FOR PEDICYMENT OF
REMARKS:	SUBGRADE PA	Ahmed Ali
REMARKS:	GC L	
REMARKS:	GC L	Ahmed Ali
REMARKS:	GC L	(Line) Oontractor Representative)  (Authorized Signature)
REMARKS:	GC L	(Line) Contractor Representative)  (Authorized Signature)  0425/2022 (Date)  (Date)
REMARKS:	Authorized By:	(CQA Manager)
REMARKS:	Authorized By:	(Line) Contractor Representative)  (Authorized Signature)  0425/2022 (Date)  (Date)
REMARKS:	Authorized By:	(COA Manager)  (Authorized Signature)  (COA Manager)  (Authorized Signature)  (COA Manager)  (Authorized Signature)  (Authorized Signature)

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Abilene

Albuquerque

Amarillo

Arlington

Austin

El Paso

Frisco

Las Cruces

Lubbock

Midland

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FIELD				
<b>OBSERVATION</b>	PREPARED BY: Richard "Dos" Landsheft PROJECT NAME: OWL Cell 1AB & 2 AB Tie-In			
REPORT				
REPORT	PROJECT NO.: 7053.22			
<b>DATE</b> : 05/26/2022 <b>TIME</b> : 7	7:00 AM			
Weather         ☐ Clear       ☐ Snow       ☐ Warm         X Overcast       ☐ Foggy       ☐ Hot         ☐ Rain       ☐ Cold       ☐	Site Conditions  ☐ Muddy ☐ Muddy ☐ Tuesday ☐ Wednesday ☐ Wednesday ☐ Wednesday ☐ Day ☐ Monday ☐ Thursday ☐ Triday ☐ Tuesday ☐ Friday ☐ Wednesday ☐ Muddy ☐ Mu			
Persons Contacted/Present at Site: Southwest Lining Systems				
Work Observed/In-Progress:				
tested by end of day with pressure testi	loyment. Welding operations followed FML deployment. Welds were ting and destructive samples pulled.			
Items Discussed/Observations:				
Materials Delivered to Site:				
No material delivered to site.				
Requested Revisions or Interpretations:	); ;;			
No items requested for revision.				
Items to Verify:				
Information or Action Required:				
Attachments				
Copies: Owner A/E Co	Contractor Consultants C File			

FIELD					
<b>OBSERVATION</b>	PREPARED BY: Richard "Dos" Landsheft				
	PROJECT NAME: OWL Cell 1AB & 2 AB Tie-In PROJECT NO.: 7053.22				
REPORT					
DATE: 05/27/2022 TIME: 7:00 AM					
Weather  X Clear	Site Conditions  Clear Dusty Muddy Temperature Range				
Persons Contacted/Present at Site: Southwest Lining Systems					
Work Observed/In-Progress:					
Testing/Repair operations for FML					
Items Discussed/Observations:					
Materials Delivered to Site:					
No material delivered to site.					
Requested Revisions or Interpretations:					
No items requested for revision.					
Items to Verify:					
Information or Action Required:					
☐ Attachments					
Copies: Owner A/E Co	ontractor				

FIELD				
<b>OBSERVATION</b>	PREPARED BY: Richard "Dos" Landsheft  PROJECT NAME: OWL Cell 1AB & 2 AB Tie-In  PROJECT NO.: 7053.22			
REPORT				
KLFOKI				
<b>DATE</b> : 05/28/2022 <b>TIME</b> : 7	:00 AM			
Weather         X Clear       Snow       Warm         Overcast       Foggy       Hot         Rain       Cold       □	Site Conditions ☐ Clear X Dusty ☐ Muddy ☐ Temperature Range	<u>Day</u> ☐ Monday ☐ Thursday ☐ Tuesday ☐ Friday ☐ Wednesday 🗶 Saturday		
Persons Contacted/Present at Site: Southwest Lining Systems				
Work Observed/In-Progress:				
Deployment of geocomposite.				
Items Discussed/Observations:				
Materials Delivered to Site:				
No material delivered to site.				
Requested Revisions or Interpretations:				
No items requested for revision.				
Items to Verify:				
Information or Action Required:				
Attachments				
Copies: Owner A/E Co	ontractor			



FIELD				
<b>OBSERVATION</b>	PREPARED BY: Matt Kingsley PROJECT NAME: OWL Cell 1AB & 2 AB Tie-In			
REPORT				
	PROJECT NO.: 7053.22			
<b>DATE</b> : 08/24/2022 <b>TIME</b> : 8	8:00 AM			
Weather         ☐ Clear       ☐ Snow       ☐ Warm         ☒ Overcast       ☐ Foggy       ☐ Hot         ☐ Rain       ☐ Cold       ☐	Site Conditions       Day         ☐ Clear       X Dusty       ☐ Monday       ☐ Thursday         ☐ Muddy       ☐ Tuesday       ☐ Friday         Temperature Range       X Wednesday       ☐			
Persons Contacted/Present at Site: Mustang Extreme onsite				
Work Observed/In-Progress:				
Deployment of GCL and Secondary FM end of day with pressure testing and delems Discussed/Observations:	ML. Welding operations followed FML deployment. Welds were tested be estructive samples pulled.			
Materials Delivered to Site:				
No material delivered to site.				
Requested Revisions or Interpretations:				
No items requested for revision.				
Items to Verify:				
Information or Action Required:				
Attachments				
Copies: Owner A/E C	Contractor Consultants File			

## APPROVAL/ AUTHORIZATION TO PROCEED

FROM:

PROJECT NAME: OWL NDBL Cell ZAB

PROJECT NO.: 70532Z

DATE: 82422

TO PRO	DCEED PROJECT NO.: 705322_ DATE: 82422
The following liner s	ystem surface is deemed acceptable on a visual inspection by Liner Contractor Representative:
LAYER:	1. Subgrade  2. Geosynthetic Clay Liner (GCL)  3. HDPE Geomembrane (FML)  4. Protective Soil Layer (PSL)
LOCATION:	Entire Project Area Approximately 70,000 fx2
REMARKS:	
	Authorized By:    Hech Graves  Authorized By:    Hech Harring   He
	(Authorized Signature) $3 - 24 - 22$ (Date)
	Accepted By:  Matt Kingsley  (COA Manager)  (Authorized Signature)  August 24, 2022
☐ Attachments	(Date))
Copies: Owner	□A/E □Contractor □ Consultants □ □ □ □ □ □ File

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FIELD				
<b>OBSERVATION</b>	PREPARED BY: Matt Kingsley  PROJECT NAME: OWL Cell 1AB & 2 AB Tie-In  PROJECT NO.: 7053.22			
REPORT				
KLFOKI				
<b>DATE</b> : 08/25/2022 <b>TIME</b> : 8	3:00 AM			
Weather         ☐ Clear       ☐ Snow       ☐ Warm         X Overcast       ☐ Foggy       ☐ Hot         ☐ Rain       ☐ Cold       ☐	Site Conditions       Day         X Clear       □ Dusty       □ Monday       X Thursday         □ Muddy       □ Tuesday       □ Friday         Temperature Range       □ Wednesday       □			
Persons Contacted/Present at Site: Mustang Extreme onsite				
Work Observed/In-Progress:				
tested by end of day with pressure testi Items Discussed/Observations:	ng and destructive samples pulled.			
Materials Delivered to Site:				
No material delivered to site.				
Requested Revisions or Interpretations:				
No items requested for revision.				
Items to Verify:				
Information or Action Required:				
Attachments				
Copies: Owner A/E C	ontractor			



FIELD				
<b>OBSERVATION</b>	PREPARED BY: Matt Kingsley PROJECT NAME: OWL Cell 1AB & 2 AB Tie-In			
REPORT				
	PROJECT NO.: 7053.22			
<b>DATE</b> : 08/26/2022 <b>TIME</b> : 8	3:00 AM			
Weather  X Clear ☐ Snow ☐ Warm ☐ Overcast ☐ Foggy ☐ Hot ☐ Rain ☐ Cold ☐	Site Conditions Clear X Dusty Muddy Temperature Range	<u>Day</u> ☐ Monday ☐ Thursday ☐ Tuesday <b>X</b> Friday ☐ Wednesday ☐		
Persons Contacted/Present at Site: Mustang Extreme onsite				
Work Observed/In-Progress:				
Primary FML deployment. Welding open with pressure testing and destructive saltems Discussed/Observations:		ment. Welds were tested by end of day		
Materials Delivered to Site:				
No material delivered to site.				
Requested Revisions or Interpretations:				
No items requested for revision.				
Items to Verify:				
Information or Action Required:				
☐ Attachments				
Copies: Owner A/E Co	ontractor			

FIELD					
<b>OBSERVATION</b>	PREPARED BY: Matt Kingsley PROJECT NAME: OWL Cell 1AB & 2 AB Tie-In				
REPORT					
KLFOKI	PROJECT	NO.: 7053.22			
<b>DATE</b> : 08/27/2022 <b>TIME</b> : 8	:00 AM				
Weather  X Clear ☐ Snow ☐ Warm ☐ Overcast ☐ Foggy ☐ Hot ☐ Rain ☐ Cold ☐	Site Cond Clear Muddy Tempera	X Dusty	<u>Day</u> ☐ Monda ☐ Tuesd ☐ Wedn		
Persons Contacted/Present at Site:					
Mustang Extreme onsite					
Work Observed/In-Progress:					
Deployment of geocomposite.					
Items Discussed/Observations:					
Materials Delivered to Site:					
No material delivered to site.					
Requested Revisions or Interpretations:					
No items requested for revision.					
Items to Verify:					
Information or Action Required:					
Attachments					
Copies: Owner A/E Co	ontractor [	Consultants			



FIELD				
<b>OBSERVATION</b>	PREPARED BY: Tyler Krueger PROJECT NAME: OWL Cell 1AB & 2 AB Tie-In			
REPORT				
KLFOKI	PROJECT NO.: 7053.22	2		
<b>DATE:</b> 10/12/2022 <b>TIME:</b> 8	::00 AM			
Weather   ☐ Clear ☐ Snow ☐ Warm   ☒ Overcast ☐ Foggy ☐ Hot   ☐ Rain ☐ Cold ☐	Site Conditions  Clear X Dusty Muddy Temperature Range	Tuesday 🔲 Frid	ırsday ay	
Persons Contacted/Present at Site:				
Southwest Liner Systems on site				
Work Observed/In-Progress:				
end of day with pressure testing and des Items Discussed/Observations:	structive samples pulled.			
Materials Delivered to Site:				
No material delivered to site.				
Requested Revisions or Interpretations:				
No items requested for revision.				
Items to Verify:				
Information or Action Required:				
☐ Attachments				
Copies: Owner A/E Co	ontractor		File	

APPRO	ΝΔΙ/	TO:
		FROM:
AUTHO	PRIZATION	PROJECT NAME: OUR Cell ZAB
TO PR	OCEED	PROJECT NO.: 7053-72
	JOLLD	DATE: 10/12/2022
The following liner	system surface is deemed a	cceptable on a visual inspection by Liner Contractor Representative:
LAYER:	1. Subgrade	Good
	2. Geosynthetic Clay Line	r (GCL)
	3. HDPE Geomembrane (	FML)
	4. Protective Soil Layer (F	SL)
LOCATION:	2XB/1A +21-	to
LOCATION.	PI	to P3
	1)	
REMARKS:		
		<del></del>
· ·		C1 14 2 11
	Authorized B	y: Chris Zacke (Liner Contractor Representative)
		1
		(Authorized Signature)
		(Date)
	Accepted B	y: ///
		(CQA Manager)
		(Authorized Signature)
		(Authorized Signature)
		(Date)

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FIELD				
<b>OBSERVATION</b>	PREPARED BY: Tyler Krueger PROJECT NAME: OWL Cell 1AB & 2 AB Tie-In			
REPORT				
KLFOKI	PROJECT NO.: 7053.22			
<b>DATE:</b> 10/13/2022 <b>TIME:</b> 8	3:00 AM			
Weather         X Clear       Snow       Warm         ○ Overcast       Foggy       Hot         Rain       Cold	Site Conditions  X Clear ☐ Dusty ☐ Monday X Thursday ☐ Muddy ☐ ☐ Tuesday ☐ Friday Temperature Range ☐ Wednesday ☐ ☐			
Persons Contacted/Present at Site:				
Southwest Liner Systems on site				
Work Observed/In-Progress:				
tested by end of day with pressure testi Items Discussed/Observations:	ng ana assure samples pansa.			
Materials Delivered to Site:				
No material delivered to site.				
Requested Revisions or Interpretations:				
No items requested for revision.				
Items to Verify:				
Information or Action Required:				
☐ Attachments				
Copies: Owner A/E C	ontractor			

FIELD				
<b>OBSERVATION</b>	PREPARED BY: Nathan Morrow PROJECT NAME: OWL Cell 1AB & 2 AB Tie-In			
REPORT				
INEFORT	PROJECT NO.: 7053.22			
<b>DATE</b> : 10/14/2022 <b>TIME</b> : 8	8:00 AM			
Weather         ☐ Clear       ☐ Snow       ☐ Warm         X Overcast       ☐ Foggy       ☐ Hot         ☐ Rain       ☐ Cold       ☐	Site Conditions  ☐ Clear ☐ Dusty ☐ Monday ☐ Tuesday Temperature Range ☐ Wednesday	☐ Thursday <b>X</b> Friday y ☐		
Persons Contacted/Present at Site:				
Southwest Liner Systems on site				
Work Observed/In-Progress:				
Geonet deployment. Primary FML deplotested by end of day with pressure testilitems Discussed/Observations:	oyment. Welding operations followed FML deploy ing and destructive samples pulled.	ment. Welds were		
Materials Delivered to Site:				
No material delivered to site.				
Requested Revisions or Interpretations:	:			
No items requested for revision.				
Items to Verify:				
Information or Action Required:				
Attachments				
Copies: Owner A/E Co	Contractor Consultants	File		



FIELD				
<b>OBSERVATION</b>	PREPARED BY: Nathan Morrow PROJECT NAME: OWL Cell 1AB & 2 AB Tie-In			
REPORT				
KLFOKI	PROJECT NO.: 7053.22			
<b>DATE</b> : 10/15/2022 <b>TIME</b> : 8	3:00 AM			
Weather         X Clear       Snow       Warm         Overcast       Foggy       Hot         Rain       Cold       □	Site Conditions       Day         ☐ Clear       X Dusty       ☐ Monday       ☐ Thursday         ☐ Muddy       ☐ Tuesday       ☐ Friday         Temperature Range       ☐ Wednesday       X Saturday			
Persons Contacted/Present at Site:				
Southwest Liner Systems on site				
Work Observed/In-Progress:				
Items Discussed/Observations:	e testing and destructive samples pulled.			
Materials Delivered to Site:				
No material delivered to site.				
Requested Revisions or Interpretations:				
No items requested for revision.				
Items to Verify:				
Information or Action Required:				
Attachments				
Copies: Owner A/E C	ontractor			

## APPROVAL/ **AUTHORIZATION** TO PROCEED

TO: FROM: PROJECT NAME: OWL NOBL ZAB 7053.22 PROJECT NO.: 10-15-2022 DATE: The following liner system surface is deemed acceptable on a visual inspection by Liner Contractor Representative: LAYER: 1. Subgrade 2. Geosynthetic Clay Liner (GCL) 3. HDPE Geomembrane (FML) 4. Protective Soil Layer (PSL) LOCATION: Cell /A +ZABTiein **Authorized By:** (Liner Contractor Representative) (Authorized Signature) (Date) Accepted By: (Authorized Signature) 10.15.22 Attachments □Contractor ☐ Consultants Copies: Owner □A/E

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Albuquerque

Amarillo

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Austin

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FIELD				
<b>OBSERVATION</b>	PREPARED BY: Nathan Morrow			
REPORT	PROJECT NAME: OWL Cell 1AB & 2 AB Tie-In			
INLF OINT	PROJECT NO.: 7053.22			
<b>DATE</b> : 10/16/2022 <b>TIME</b> : 8	0:00 AM			
Weather         X Clear       □ Snow       □ Warm         □ Overcast       □ Foggy       □ Hot         □ Rain       □ Cold       □	Site Conditions Day   ☐ Clear X Dusty ☐ Monday ☐ Thursday   ☐ Muddy ☐ Tuesday ☐ Friday   Temperature Range ☐ Wednesday X Sunday			
Persons Contacted/Present at Site:				
Southwest Liner Systems on site				
Work Observed/In-Progress:				
Welds were tested by end of day with p Items Discussed/Observations:	ressure testing and destructive samples pulled.			
Materials Delivered to Site:				
No material delivered to site.				
Requested Revisions or Interpretations:				
No items requested for revision.				
Items to Verify:				
Information or Action Required:				
☐ Attachments				
Copies: Owner A/E C	ontractor			

FIELD				
<b>OBSERVATION</b>	PREPARED BY: Matt Kingsley PROJECT NAME: OWL Cell 1AB & 2 AB Tie-In			
REPORT				
	PROJECT NO.: 7053.22			
<b>DATE</b> : 11/22/2022 <b>TIME</b> : 8	3:00 AM			
Weather         ☐ Clear       ☐ Snow       ☐ Warm         X Overcast       ☐ Foggy       ☐ Hot         ☐ Rain       ☐ Cold       ☐	Site Conditions Day   ☐ Clear X Dusty   ☐ Muddy ☐ Thursday   Temperature Range Wednesday    Temperature  Wednesday			
Persons Contacted/Present at Site:				
Mustang Extreme on site				
Work Observed/In-Progress:				
	Geonet and Primary FML deployment on slope. Welding operations followe y end of day with pressure testing and destructive samples pulled.			
Materials Delivered to Site:				
No material delivered to site.				
Requested Revisions or Interpretations:	:			
No items requested for revision.				
Items to Verify:				
Information or Action Required:				
☐ Attachments				
Copies: Owner A/E Co	contractor Consultants C File			

## APPROVAL/ AUTHORIZATION TO PROCEED

FROM:

PROJECT NAME: OWL NDBL Cell 2AB

PROJECT NO.: 705322

DATE: 11/22/22

The following liner s	system surface is deemed acceptable	on a visual inspection by Liner Contracto	r Representative
LAYER:	<ol> <li>Subgrade</li> <li>Geosynthetic Clay Liner (GCL)</li> <li>HDPE Geomembrane (FML)</li> <li>Protective Soil Layer (PSL)</li> </ol>		- - -
LOCATION:	Cell 14-24B Ticin	toto	- -
REMARKS:			-
	Authorized By:	Chris Zarle (Liner Contractor Representative)	
		(Authorized Signature) (Date)	
	Accepted By:	Matt Kingsley (CQA Manager)  (Authorized Signature)  11 (22 / 22 (Date)	
☐ Attachments			

\\Data1\Projects3\2021\6759 21\05\_CONSTR\08\_CQA AuthorizationProceedForm 4 docm

Released to Imaging: 4/23/2025 9:36:05 AM



FIELD				
<b>OBSERVATION</b>	PREPARED BY: Matt Kingsley PROJECT NAME: OWL Cell 1AB & 2 AB Tie-In			
REPORT				
NLFOR I	PROJECT NO	.: 7053.22		
<b>DATE:</b> 11/23/2022 <b>TIME:</b> 8	:00 AM			
Weather         ☐ Clear       ☐ Snow       ☐ Warm         X Overcast       ☐ Foggy       ☐ Hot         ☐ Rain       ☐ Cold       ☐	Site Condition Clear Muddy Temperature	X Dusty ☐	<u>Day</u> ☐ Monday <b>X</b> Tuesday ☐ Wednesda	☐ Thursday ☐ Friday ay ☐
Persons Contacted/Present at Site:				
Mustang Extreme on site				
Work Observed/In-Progress:				
Deployment Primary FML deployment of by end of day with pressure testing and Items Discussed/Observations:				
Materials Delivered to Site:				
No material delivered to site.				
Requested Revisions or Interpretations:				
No items requested for revision.				
Items to Verify:				
Information or Action Required:				
Attachments				
Copies: Owner A/E Co	ontractor 🔲 Co	nsultants		File



FIELD				
<b>OBSERVATION</b>	PREPARED BY: Tyler Krueger PROJECT NAME: OWL Cell 1AB & 2 AB Tie-In			
REPORT				
	PROJECT NO.: 7053.22			
<b>DATE:</b> 01/13/2023 <b>TIME:</b> 8	3:00 AM			
Weather         X Clear       □ Snow       □ Warm         □ Overcast       □ Foggy       □ Hot         □ Rain       □ Cold       □	Site Conditions       Day         X Clear       Dusty       Monday       Thursday         Muddy       Tuesday       Triday         Temperature Range       Wednesday       Wednesday			
Persons Contacted/Present at Site:				
Mustang Extreme on site				
Work Observed/In-Progress:				
	Geonet and Primary FML deployment on slope. Welding operations follow by end of day with pressure testing. Repairs and Vacuum testing was			
Items Discussed/Observations:				
Materials Delivered to Site:				
No material delivered to site.				
Requested Revisions or Interpretations:				
No items requested for revision.				
Items to Verify:				
Information or Action Required:				
☐ Attachments				
Copies: Owner A/E Co	Contractor Consultants C File			

# Received by OCD: 4/10/2025 4:34:21 PM

# **Parkhill**

APPRO	DVAL/	TO:			
• • • • • • •		FROM:			
AUTHORIZATION TO PROCEED		PROJECT NAME: OWLNDBL (1)12AB PROJECT NO.: 705322			
The following liner	system surface is deemed a	cceptable on a visual inspection by Liner Contractor Representative:			
LAYER:	<ol> <li>Subgrade</li> <li>Geosynthetic Clay Line</li> <li>HDPE Geomembrane (</li> </ol>				
	4. Protective Soil Layer (F				
LOCATION	Cell 1A 2 2Aptie	to			
REMARKS:					
	Authorized B	y: 1-lector (noverical (noverica)			
		(Authorized Signature)			
		1-13-23 (Date)			
	Accepted B	y: Gler Krueger			
		(COA Manager)			
		(Authorized Signature)			
☐ Attachments		(Date) '			
Copies: Owner	□A/E □Contractor □	Consultants File			

\\Data1\Projects3\2021\6759.21\05 CONSTR\06 CQA AuthorizationProceedForm 4.docm

Abilene

Albuquerque

Amarillo

Arlington

Austin

El Paso

Frisco

Las Cruces

Lubbock

Midland

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## FIELD LOGS AND PHOTOGRAPHS

Project Photograph



2022-05-22: Preparing Subgrade for liner



2022-05-24: Nuclear Density Testing.

7053.22 I OWL Landfill - Cell 1AB & 2 AB Tie-In Construction



2022-08-24: GCL Deployment



2022-08-24: Geomembrane Deployment



2022-08-24: Anchor Trench



2022-08-24: Western Tie-in to Existing Cell 2AB

7053.22 I OWL Landfill - Cell 1AB & 2 AB Tie-In Construction



2022-10-12: GCL Deployment



2022-10-12: Secondary Geomembrane Deployment



2022-10-13: Leak Detection Layer Deployment



2022-10-14: Primary Geomembrane Deployment



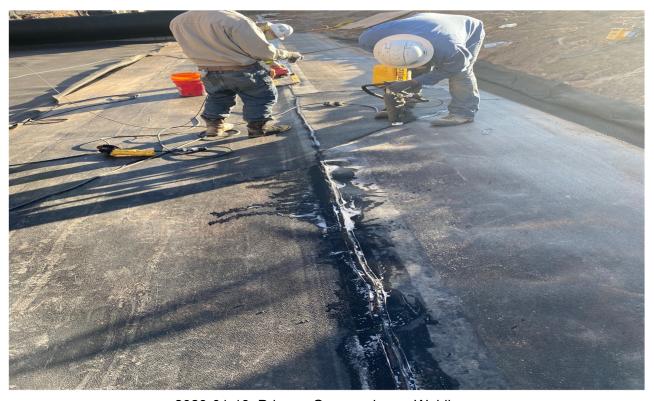
2022-10-14: Measurement of FML HDPE Liner Tie In



2022-10-14: Measurement of FML HDPE Liner Tie In



2023-01-13: Secondary Geomembrane Deployment



2023-01-13: Primary Geomembrane Welding



APPENDIX A: GEOTECHNICAL SOILS TESTING

A.1 Moisture/Density Relationships

## Soils / Aggregates

Report Date: April 23, 2019

Client

Name: ParkHill Smith & Cooper

Address: 4222 85th Street Lubbock, TX 79423

Attention:

PO Number:

Sample Date: 4/17/2019 by Client

Source: Onsite native, blend of -5' and -8' over-ex **Project** 

Name: (19-519-02232) OWL PSC #56018

Address: Jal, NM Phase: Task:

Roberto Balderrama Manager:

Lab/Ref. #: 2232-02L

Description: Field description: Tan/white silty sand with caliche

ASTM D2487 lab description: Poorly graded gravel

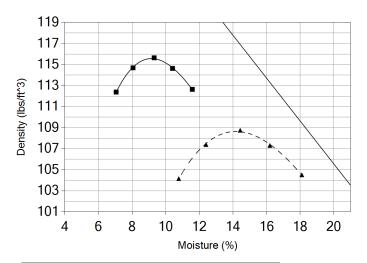
with silt and sand, Coarse to Fine grain, No PI

Type of Specification: No project specification was provided.

Sieve Analysis: (ASTM C117-13/C136-14)

	200 Wash Proce	<u>Specification</u>		
Coarse	Sieve Size	<u>Passing</u>	<u>Min</u>	<u>Max</u>
Portion:	4in.	100%		
	3in.	98%		
	2in.	90%		
	1 1/2in.	83%		
	1in.	70%		
	3/4in.	62%		
	1/2in.	50%		
	3/8in.	44%		
	#4	32%		
Fine	Sieve Size	<u>Passing</u>	Min	Max
Portion:	#8	25%		

3/0111.	44 /0		
#4	32%		
Sieve Size	<u>Passing</u>	<u>Min</u>	<u>Max</u>
#8	25%		
#10	23%		
#16	20%		
#30	17%		
#40	16%		
#50	14%		
#100	9%		
#200	5.3%		
	#8 #10 #16 #30 #40 #50 #100	#4 32%  Sieve Size Passing  #8 25%  #10 23%  #16 20%  #30 17%  #40 16%  #50 14%  #100 9%	#4 32%  Sieve Size Passing Min  #8 25%  #10 23%  #16 20%  #30 17%  #40 16%  #50 14%  #100 9%



**Rock Correction** ---- No Rock Correction

Plasticity Index (ASTM D4318-10) Pl Air Dried.

**Preparation Method: Dry** Liquid Limit Method: A

Soil Classification (ASTM D2487-11) GP-GM

Specification

<u>Min</u> <u>Max</u>

**Liquid Limit:** NV Plastic Limit: NV NP

**Plasticity Index:** 

Correction Soil Containing Oversize Particles (ASTM D4718-15)

Moisture Density Relationship: (ASTM D698-12) Method: C **Preparation Method: Dry** Rammer Type: Mechanical

Specific Gravity: 2.551 Assumed

Coarse Specific Gravity: 2.065

Maximum Density (lbs/ft^3): 108.6 Rock Corrected: 115.6

Optimum Moisture (%): 14.2 Rock Corrected: 9.2

Remarks:

Distribution: Carl King, Don Gray Reviewed By: Roberto Balderrama

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Wood Environment & Infrastructure Solutions, Inc. - 1104 Main Street Eunice, NM 88231 phone: (575) 394-0424 fax: (505) 821-7371

Report ID: Sieve, PI and Proctor Rev 0 2018/07/21 Released to Imaging: 4/23/2025 9:36:05 AM

## Soils / Aggregates

Report Date: October 11, 2019

Client

Name: ParkHill Smith & Cooper

Address: 4222 85th Street Lubbock, TX 79423

Attention: Carl King P.E. PO Number: 560.19.001.01

Sample Date: 10/4/2019 by Client / Contractor (Constructor's

Inc.)

Source: Landfill berm material (current processed) **Project** 

Name: (19-519-02368) Owl Landfill Services

Address: Hobbs, NM Phase: Task: Manager: Hugo Carreon

Lab/Ref. #: 2368-01L

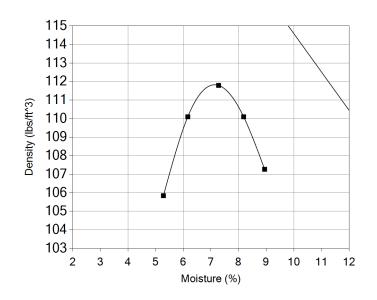
Description: Tan Poorly Graded Gravel (durable caliche) w/Silt

and Sand (Job 560-19), No PI

Type of Specification: No project specification was provided.

Sieve Analysis: (ASTM C117-13/C136-14)

	Sieve Analysis: (ASTM C117-13/C136-14)			
	200 Wash Procedure: A		<b>Specification</b>	
Coarse	Sieve Size	<u>Passing</u>	<u>Min</u>	<u>Max</u>
Portion:	4in.	100%		
	3in.	96%		
	2in.	84%		
	1 1/2in.	73%		
	1in.	56%		
	3/4in.	49%		
	1/2in.	41%		
	3/8in.	36%		
	#4	28%		
Fine Portion:	Sieve Size	<u>Passing</u>	<u>Min</u>	<u>Max</u>
	#8	24%		
	#10	24%		
	#16	22%		
	#30	20%		
	#40	19%		
	#50	17%		
	#100	11%		



Plasticity Index (ASTM D4318-10) Pl Air Dried.

#200

Preparation Method: Dry Liquid Limit Method: A

Soil Classification (ASTM D2487-11) GP-GM

**Specification** 

Min Max

**Liquid Limit:** 31 Plastic Limit: NV **Plasticity Index:** NP

Remarks: Material would not roll, flattens. Sandy non-plastic.

6.8%

Distribution: Don Gray, Carl King P.E.

Reviewed By: Hugo Carreon

**Correction Soil Containing Oversize Particles (ASTM D4718-15)** 

Moisture Density Relationship: (ASTM D698-12) Method: C

Preparation Method: Moist Rammer Type: Manual

Specific Gravity: 2.251 Coarse Specific Gravity: 1.973

Rock Corrected Maximum Density (lbs/ft^3): 111.8

Rock Corrected Optimum Moisture (%): 7.1

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Wood Environment & Infrastructure Solutions, Inc. - 1104 Main Street Eunice, NM 88231 phone: (575) 394-0424 fax: (505) 821-7371

Report ID: Sieve, PI and Proctor Rev 0 2018/07/21 Released to Imaging: 4/23/2025 9:36:05 AM

## Soils / Aggregates

Report Date: April 18, 2019

Client

Name: ParkHill Smith & Cooper

Address: 4222 85th Street Lubbock, TX 79423

Attention: Don Gray

PO Number:

Sample Date: 4/17/2019 by Client

Source: Onsite native

**Project** 

Name: (19-519-02232) OWL PSC #56018

Address: Jal, NM Phase: Task:

Manager: Roberto Balderrama

Lab/Ref. #: 2232-01L

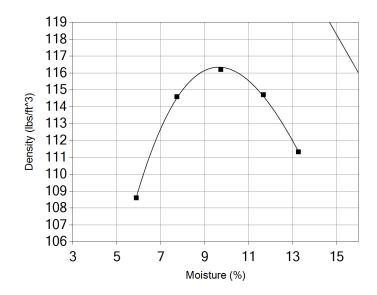
**Description:** Field description: Red silty sand ASTM D2487 lab

description: Silty sand, Fine grain, No PI

Type of Specification: No project specification was provided.

Sieve Analysis: (ASTM C117-13/C136-14)

200 Wash Proc	<b>Specification</b>		
Sieve Size	<u>Passing</u>	<u>Min</u>	<u>Max</u>
#4	100%		
#8	100%		
#10	100%		
#16	100%		
#30	100%		
#40	98%		
#50	88%		
#100	42%		
#200	15%		



Plasticity Index (ASTM D4318-10) Pl Air Dried.

Preparation Method: Dry Liquid Limit Method: A

Soil Classification (ASTM D2487-11) SM

Specification

Min Max

Liquid Limit: NV
Plastic Limit: NV

Plasticity Index: NP

Moisture Density Relationship: (ASTM D698-12) Method: A

Preparation Method: Dry Rammer Type: Mechanical

Specific Gravity: 2.651

Assumed

Maximum Density (lbs/ft^3): 116.3

Optimum Moisture (%): 9.6

Remarks:

Distribution: Wood

Reviewed By: Roberto Balderrama

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Wood Environment & Infrastructure Solutions, Inc. - 1104 Main Street Eunice, NM 88231 phone: (575) 394-0424 fax: (505) 821-7371

WOOD.



APPENDIX A: GEOTECHNICAL SOILS TESTING

A.2 Subgrade Test Results



#### FIELD COMPACTION TESTING FORM

PROJECT NAME:	OWL Landfill Cell 1A/ 2AB Tie In	LOCATION:	Landfill Subgrade
OWNER:	Oilfield Water Logistics	PROJECT NO.:	7053.22
PROJECT LOCATION:	Lea County, New Mexico	PAGE NO.:	1
	·		

TESTING INSTRUMENT: IntroTek 3500 Xplorer® TECHNICIAN: Matt Kingsley

I	SOIL	. CLASSIFICATION	DESCRIPTION	REF STD PR	OCTOR	90% (PCF)	OPTIMAL MOISTURE
ſ	Α	GP-GM	Caliche	108.6 pcf	90% optimum	97.7	14.2 % Moisture
I	В	GP-GM	Poorly Graded Gravel w/ Silt and Sand	111.8 pcf	90% optimum	100.6	7.1 % Moisture
I	С	SM	Silty Sand	116.3 pcf	90% optimum	104.7	9.6 % Moisture

Soil Type	TEST NUMBER	% RSP	DRY DENSGITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
Α	1	99.4%	108.0	13.9%	8/16/2022	Subgrade
С	2	102.9%	119.7	10.7%	8/16/2022	Subgrade
С	3	100.7%	117.1	9.1%	8/16/2022	Subgrade
С	4	98.1%	114.1	7.3%	8/16/2022	Subgrade
Α	5	97.4%	105.8	7.0%	8/16/2022	Subgrade
Α	6	100.8%	109.5	14.1%	8/16/2022	Subgrade
В	7	101.3%	113.3	7.4%	8/16/2022	Subgrade
В	8	101.5%	113.5	8.1%	8/16/2022	Subgrade
В	9	100.8%	112.7	5.2%	8/16/2022	Subgrade
В	10	99.1%	110.8	7.0%	8/16/2022	Subgrade
						<u> </u>
						<del> </del>
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						<u> </u>
						<del> </del>
Uprojecto	Helprojecte\2022\7052-22\05004	USTRIO1 REPTIO2 CALL 1.2 Tia	in\01 Working Conico\02 Annon	decise\01 Ann A Costock S	oil_Test\1AB-2AB_Tie-in_Field_Densi	itv



APPENDIX A: GEOTECHNICAL SOILS TESTING

A.3 Anchor Trench Density Test Results



#### FIELD COMPACTION TESTING FORM

PROJECT NAME: OWNER: PROJECT LOCATION:	OWL Landfill Cell 1A/ 2AB Tie In Oilfield Water Logistics Lea County, New Mexico	LOCATION: PROJECT NO.: PAGE NO.:	Landfill Anchor Trench 7053.22
TESTING INSTRUMENT:	IntroTek 3500 Xplorer®	TECHNICIAN:	Matt Kingsley

SOIL	. CLASSIFICATION	DESCRIPTION	REF STD PRO	OCTOR	90% (PCF)	OPTIMAL MOISTURE
Α	GP-GM	Caliche	108.6 pcf	90% optimum	97.7	14.2 % Moisture
В	GP-GM	Poorly Graded Gravel w/ Silt and Sand	111.8 pcf	90% optimum	100.6	7.1 % Moisture
С	SM	Silty Sand	116.3 pcf	90% optimum	104.7	9.6 % Moisture

Soil Type	TEST NUMBER	% RSP	DRY DENSGITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
Α	1	92.4%	100.3	15.1%	9/1/2022	Anchor Trench
Α	2	91.4%	99.3	10.3%	9/1/2022	Anchor Trench
Α	3	95.9%	104.2	8.0%	9/1/2022	Anchor Trench
Α	4	92.0%	99.9	7.7%	9/1/2022	Anchor Trench
Α	5	94.4%	102.5	13.7%	9/2/2022	Anchor Trench
Α	6	94.0%	102.1	16.9%	9/2/2022	Anchor Trench
-						
-						



APPENDIX A: GEOTECHNICAL SOILS TESTING

A.4 PSL Hydraulic Conductivity

#### Rigid Wall Falling-Head Remold Permeability



Project: Owl NDBL Landfill

Job #: 3-21116 Lab #: 5102

Location: Owl 6, Sample A

Soil Description: Sand

Remolded to: Remolded to Approximately 85%

Aparatus Weight Empty: 252.2 grams
Aparartus Weight + Soil: 652.0 grams

Mold Diameter: 6.395 cm

Pipe Diameter: 1.27 cm

Length of Sample 6.84 cm

Pressure Head Applied: 0 cm

Wet Weight: 325.3 grams
Dry Weight: 296.3 grams

Weight of Sample: 399.8 grams Weight of Sample: 0.881393 lb

Mold Area: 32.11966 cm<sup>2</sup>
Pipe Area: 1.266769 cm<sup>2</sup>
Area Factor: 0.039439

Volume of Sample: 219.6985 cm<sup>3</sup>
Volume of Sample: 0.007759 ft<sup>3</sup>

Unit Weight: 113.6 lb/ft<sup>3</sup>
Moisture Content: 9.8 %

Dry Unit Weight: 103.5 lb/ft<sup>3</sup>

Time Hour Minute Second Total (hr)	Trial 1  0  1  16  0.021111	Trial 2  0  1  16  0.021111	Trial 3  0  1  17  0.021389
h <sub>0</sub> h <sub>1</sub>	65 cm 10 cm	65 cm 10 cm	65 cm 10 cm
Head <sub>0</sub>	71.84 cm	71.84 cm	71.84 cm
Head <sub>1</sub>	16.84 cm	16.84 cm	16.84 cm
Ks (cm/hour)	18.54 cm/hr	18.54 cm/hr	18.30 cm/hr
Ks (cm/sec)	5.15E-03 cm/s	5.15E-03 cm/s	5.08E-03 cm/s

Saturated Hydraulic Conductivity, K<sub>s:</sub> 18.46 cm/hr

Saturated Hydraulic Conductivity, K<sub>s</sub>: **5.13E-03 cm/s** 

## Rigid Wall Falling-Head Remold Permeability



Project: Owl NDBL Landfill

Job #: <u>3-21116</u> Lab #: 5099

Location: Owl 5, Sample A

Soil Description: Sand

Remolded to: Remolded to Approximately 85%

Aparatus Weight Empty: 245.9 grams Weight of Sample: 404.6 grams Aparartus Weight + Soil: 650.5 grams Weight of Sample: 0.891975 lb Mold Area: 32.30073 cm<sup>2</sup> Mold Diameter: 6.413 cm Pipe Area: 1.266769 cm<sup>2</sup> Pipe Diameter: 1.27 cm 6.99 cm Area Factor: 0.039218 Length of Sample Volume of Sample: 225.7821 cm<sup>3</sup> Pressure Head Applied: 0 cm 0.007973 ft<sup>3</sup> Can #: Volume of Sample: 111.9 lb/ft<sup>3</sup> Wet Weight: 307.9 grams **Unit Weight:** Dry Weight: 282.7 grams **Moisture Content:** 8.9 %

Dry Unit Weight: 102.7 lb/ft<sup>3</sup>

Time Hour Minute Second Total (hr)	Trial 1  0  1  29  0.024722	Trial 2  0  1  29  0.024722	Trial 3  0  1  30  0.025
h <sub>0</sub> h <sub>1</sub>	65 cm 10 cm	65 cm 10 cm	65 cm 10 cm
Head <sub>0</sub> Head <sub>1</sub>	71.99 cm 16.99 cm	71.99 cm 16.99 cm	71.99 cm 16.99 cm
Ks (cm/hour)	16.01 cm/hr	16.01 cm/hr	15.83 cm/hr
Ks (cm/sec)	4.45E-03 cm/s	4.45E-03 cm/s	4.40E-03 cm/s

Saturated Hydraulic Conductivity, K<sub>s:</sub> 15.95 cm/hr

Saturated Hydraulic Conductivity, K<sub>s</sub>: **4.43E-03 cm/s** 



APPENDIX A: GEOTECHNICAL SOILS TESTING

A.5 PSL Grain Size Distribution Test Results



Parkhill 333 Rio Rancho Blvd NE Suite 400 Rio Rancho, NM 87124

Job No.:3-21116 Lab No.: 5087

PROJECT: OWL NDBL Landfill

LOCATION OF SAMPLE: OWL 1, Sample A

DATE SAMPLED: November 11, 2022

SAMPLE: Delivered by Client

SIEVE ANALYSIS				
Sieve Size	Percent			
	Passing			
No. 10	100			
No. 40	97			
No. 80	40			
No. 200	17.3			

Submitted by:

GEO-TEST, INC.

Tim Byres, SET

cc: <u>Tzack@parkhill.com</u>

GEO-TEST, INC. 3204 RICHARDS LANE SANTA FE, NEW MEXICO 87507 (505) 471-1101 FAX (505) 471-2245

8528 CALLE ALAMEDA ALBUQUERQUE, NEW MEXICO 87113 (505) 857-0933 FAX (505) 857-0803



Parkhill 333 Rio Rancho Blvd NE Suite 400 Rio Rancho, NM 87124

Job No.:3-21116 Lab No.: 5088

PROJECT: OWL NDBL Landfill

LOCATION OF SAMPLE: OWL 1, Sample B

DATE SAMPLED: November 11, 2022

SAMPLE: Delivered by Client

SIEVE ANALYSIS				
Sieve Size	Percent			
	Passing			
No. 10	100			
No. 40	97			
No. 80	40			
No. 200	14.7			

Submitted by:

GEO-TEST, INC.

Tim Byres, SET

cc: <u>Tzack@parkhill.com</u>

GEO-TEST, INC. 3204 RICHARDS LANE SANTA FE, NEW MEXICO 87507 (505) 471-1101 FAX (505) 471-2245

8528 CALLE ALAMEDA ALBUQUERQUE, NEW MEXICO 87113 (505) 857-0933 FAX (505) 857-0803



Parkhill 333 Rio Rancho Blvd NE Suite 400 Rio Rancho, NM 87124

Job No.:3-21116 Lab No.: 5089

PROJECT: OWL NDBL Landfill

LOCATION OF SAMPLE: OWL 1, Sample C

DATE SAMPLED: November 11, 2022

SAMPLE: Delivered by Client

SIEVE ANALYSIS				
Sieve Size	Percent Passing			
	rassing			
No. 10	100			
No. 40	97			
No. 80	41			
No. 200	17.5			

Submitted by:

GEO-TEST, INC.

Tim Byres, SET

cc: Tzack@parkhill.com

GEO-TEST, INC. 3204 RICHARDS LANE SANTA FE, NEW MEXICO 87507 (505) 471-1101 FAX (505) 471-2245

8528 CALLE ALAMEDA ALBUQUERQUE, NEW MEXICO 87113 (505) 857-0933 FAX (505) 857-0803

2805-A LAS VEGAS CT LAS CRUCES, NEW MEXICO 88007 (575) 526-6260 FAX (575) 526-1660

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Parkhill 333 Rio Rancho Blvd NE Suite 400 Rio Rancho, NM 87124

Job No.:3-21116 Lab No.: 5090

PROJECT: OWL NDBL Landfill

LOCATION OF SAMPLE: OWL 2, Sample A

DATE SAMPLED: November 11, 2022

SAMPLE: Delivered by Client

SIEVE ANALYSIS				
Sieve Size	Percent			
	Passing			
No. 10	100			
No. 40	97			
No. 80	41			
No. 200	15.7			

Submitted by:

**GEO-TEST, INC.** 

Tim Byres, SET

cc: Tzack@parkhill.com

GEO-TEST, INC. 3204 RICHARDS LANE SANTA FE, NEW MEXICO 87507 (505) 471-1101 FAX (505) 471-2245

8528 CALLE ALAMEDA ALBUQUERQUE, NEW MEXICO 87113 (505) 857-0933 FAX (505) 857-0803

2805-A LAS VEGAS CT LAS CRUCES, NEW MEXICO 88007 (575) 526-6260 FAX (575) 526-1660

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Parkhill 333 Rio Rancho Blvd NE Suite 400 Rio Rancho, NM 87124

Job No.:3-21116 Lab No.: 5091

PROJECT: OWL NDBL Landfill

LOCATION OF SAMPLE: OWL 2, Sample B

DATE SAMPLED: November 11, 2022

SAMPLE: Delivered by Client

SIEVE ANALYSIS	
Sieve Size	Percent
	Passing
No. 10	100
No. 40	97
No. 80	42
No. 200	17.9

Submitted by:

GEO-TEST, INC.

Tim Byres, SET

cc: Tzack@parkhill.com

GEO-TEST, INC. 3204 RICHARDS LANE SANTA FE, NEW MEXICO 87507 (505) 471-1101 FAX (505) 471-2245

8528 CALLE ALAMEDA ALBUQUERQUE, NEW MEXICO 87113 (505) 857-0933 FAX (505) 857-0803



Parkhill 333 Rio Rancho Blvd NE Suite 400 Rio Rancho, NM 87124

Job No.:3-21116 Lab No.: 5092

PROJECT: OWL NDBL Landfill

LOCATION OF SAMPLE: OWL 2, Sample C

DATE SAMPLED: November 11, 2022

SAMPLE: Delivered by Client

SIEVE ANALYSIS	
Sieve Size	Percent Passing
No. 10	100
No. 40	97
No. 80	42
No. 200	15.4

Submitted by:

GEO-TEST, INC.

Tim Byres, SET

cc: <u>Tzack@parkhill.com</u>

GEO-TEST, INC. 3204 RICHARDS LANE SANTA FE, NEW MEXICO 87507 (505) 471-1101 FAX (505) 471-2245

8528 CALLE ALAMEDA ALBUQUERQUE, NEW MEXICO 87113 (505) 857-0933 FAX (505) 857-0803



Parkhill 333 Rio Rancho Blvd NE Suite 400 Rio Rancho, NM 87124

Job No.:3-21116 Lab No.: 5093

PROJECT: OWL NDBL Landfill

LOCATION OF SAMPLE: OWL 3, Sample A

DATE SAMPLED: November 11, 2022

SAMPLE: Delivered by Client

SIEVE ANALYSIS	
Sieve Size	Percent Passing
	rassiliy
No. 10	100
No. 40	97
No. 80	42
No. 200	18.0

Submitted by:

GEO-TEST, INC.

Tim Byres, SET

cc: <u>Tzack@parkhill.com</u>

GEO-TEST, INC. 3204 RICHARDS LANE SANTA FE, NEW MEXICO 87507 (505) 471-1101 FAX (505) 471-2245

8528 CALLE ALAMEDA ALBUQUERQUE, NEW MEXICO 87113 (505) 857-0933 FAX (505) 857-0803



Parkhill 333 Rio Rancho Blvd NE Suite 400 Rio Rancho, NM 87124

Job No.:3-21116 Lab No.: 5094

PROJECT: OWL NDBL Landfill

LOCATION OF SAMPLE: OWL 3, Sample B

DATE SAMPLED: November 11, 2022

SAMPLE: Delivered by Client

SIEVE ANALYSIS	
Sieve Size	Percent
	Passing
No. 10	100
No. 40	97
No. 80	42
No. 200	17.0

Submitted by:

**GEO-TEST, INC.** 

Tim Byres, SET

cc: <u>Tzack@parkhill.com</u>

GEO-TEST, INC. 3204 RICHARDS LANE SANTA FE, NEW MEXICO 87507 (505) 471-1101 FAX (505) 471-2245

8528 CALLE ALAMEDA ALBUQUERQUE, NEW MEXICO 87113 (505) 857-0933 FAX (505) 857-0803

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Parkhill 333 Rio Rancho Blvd NE Suite 400 Rio Rancho, NM 87124

Job No.:3-21116 Lab No.: 5095

PROJECT: OWL NDBL Landfill

LOCATION OF SAMPLE: OWL 3, Sample C

DATE SAMPLED: November 11, 2022

SAMPLE: Delivered by Client

SIEVE ANALYSIS	
Sieve Size	Percent Passing
No. 10	100
No. 40	97
No. 80	41
No. 200	16.3

Submitted by:

GEO-TEST, INC.

Tim Byres, SET

cc: <u>Tzack@parkhill.com</u>

GEO-TEST, INC. 3204 RICHARDS LANE SANTA FE, NEW MEXICO 87507 (505) 471-1101 FAX (505) 471-2245

8528 CALLE ALAMEDA ALBUQUERQUE, NEW MEXICO 87113 (505) 857-0933 FAX (505) 857-0803



Parkhill 333 Rio Rancho Blvd NE Suite 400 Rio Rancho, NM 87124

Job No.:3-21116 Lab No.: 5097

PROJECT: OWL NDBL Landfill

LOCATION OF SAMPLE: OWL 4, Sample B

DATE SAMPLED: November 11, 2022

SAMPLE: Delivered by Client

SIEVE ANALYSIS	
Sieve Size	Percent
	Passing
No. 10	100
No. 40	97
No. 80	45
No. 200	15.9

Submitted by:

GEO-TEST, INC.

Tim Byres, SET

cc: <u>Tzack@parkhill.com</u>

GEO-TEST, INC. 3204 RICHARDS LANE SANTA FE, NEW MEXICO 87507 (505) 471-1101 FAX (505) 471-2245

8528 CALLE ALAMEDA ALBUQUERQUE, NEW MEXICO 87113 (505) 857-0933 FAX (505) 857-0803



Parkhill 333 Rio Rancho Blvd NE Suite 400 Rio Rancho, NM 87124

Job No.:3-21116 Lab No.: 5098

PROJECT: OWL NDBL Landfill

LOCATION OF SAMPLE: OWL 4, Sample C

DATE SAMPLED: November 11, 2022

SAMPLE: Delivered by Client

SIEVE ANALYSIS	
Sieve Size	Percent
	Passing
No. 10	100
No. 40	97
No. 80	40
No. 200	15.9

Submitted by:

**GEO-TEST, INC.** 

Tim Byres, SET

cc: <u>Tzack@parkhill.com</u>

GEO-TEST, INC. 3204 RICHARDS LANE SANTA FE, NEW MEXICO 87507 (505) 471-1101 FAX (505) 471-2245

8528 CALLE ALAMEDA ALBUQUERQUE, NEW MEXICO 87113 (505) 857-0933 FAX (505) 857-0803



Parkhill 333 Rio Rancho Blvd NE Suite 400 Rio Rancho, NM 87124

Job No.:3-21116 Lab No.: 5099

PROJECT: OWL NDBL Landfill

LOCATION OF SAMPLE: OWL 5, Sample A

DATE SAMPLED: November 11, 2022

SAMPLE: Delivered by Client

SIEVE ANALYSIS	
Sieve Size	Percent Passing
3/4"	100
1/2"	99
3/8"	99
No. 4	99
No. 10	99
No. 40	96
No. 80	41
No. 200	16.2

Submitted by:

GEO-TEST, INC.

Tim Byres, SET

cc: Tzack@parkhill.com

GEO-TEST, INC. 3204 RICHARDS LANE SANTA FE, NEW MEXICO 87507 (505) 471-1101 FAX (505) 471-2245

8528 CALLE ALAMEDA ALBUQUERQUE, NEW MEXICO 87113 (505) 857-0933 FAX (505) 857-0803

2805-A LAS VEGAS CT LAS CRUCES, NEW MEXICO 88007 (575) 526-6260 FAX (575) 526-1660

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Parkhill 333 Rio Rancho Blvd NE Suite 400 Rio Rancho, NM 87124

Job No.:3-21116 Lab No.: 5100

PROJECT: OWL NDBL Landfill

LOCATION OF SAMPLE: OWL 5, Sample B

DATE SAMPLED: November 11, 2022

SAMPLE: Delivered by Client

SIEVE ANALYSIS	
Sieve Size	Percent Passing
No. 10	100
No. 40	97
No. 80	41
No. 200	16.5

Submitted by:

GEO-TEST, INC.

Tim Byres, SET

cc: <u>Tzack@parkhill.com</u>

GEO-TEST, INC. 3204 RICHARDS LANE SANTA FE, NEW MEXICO 87507 (505) 471-1101 FAX (505) 471-2245

8528 CALLE ALAMEDA ALBUQUERQUE, NEW MEXICO 87113 (505) 857-0933 FAX (505) 857-0803



Parkhill 333 Rio Rancho Blvd NE Suite 400 Rio Rancho, NM 87124

Job No.:3-21116 Lab No.: 5101

PROJECT: OWL NDBL Landfill

LOCATION OF SAMPLE: OWL 5, Sample C

DATE SAMPLED: November 11, 2022

SAMPLE: Delivered by Client

SIEVE ANALYSIS	
Sieve Size	Percent Passing
No. 10	100
No. 40	97
No. 80	41
No. 200	15.9

Submitted by:

GEO-TEST, INC.

Tim Byres, SET

cc: Tzack@parkhill.com

GEO-TEST, INC. 3204 RICHARDS LANE SANTA FE, NEW MEXICO 87507 (505) 471-1101 FAX (505) 471-2245

8528 CALLE ALAMEDA ALBUQUERQUE, NEW MEXICO 87113 (505) 857-0933 FAX (505) 857-0803



Parkhill 333 Rio Rancho Blvd NE Suite 400 Rio Rancho, NM 87124

Job No.:3-21116 Lab No.: 5102

PROJECT: OWL NDBL Landfill

LOCATION OF SAMPLE: OWL 6, Sample A

DATE SAMPLED: November 11, 2022

SAMPLE: Delivered by Client

SIEVE ANALYSIS	
Sieve Size	Percent
	Passing
No. 10	100
No. 40	97
No. 80	41
No. 200	16.3

Submitted by:

GEO-TEST, INC.

Tim Byres, SET

cc: Tzack@parkhill.com

GEO-TEST, INC. 3204 RICHARDS LANE SANTA FE, NEW MEXICO 87507 (505) 471-1101 FAX (505) 471-2245

8528 CALLE ALAMEDA ALBUQUERQUE, NEW MEXICO 87113 (505) 857-0933 FAX (505) 857-0803

2805-A LAS VEGAS CT LAS CRUCES, NEW MEXICO 88007 (575) 526-6260 FAX (575) 526-1660

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Parkhill 333 Rio Rancho Blvd NE Suite 400 Rio Rancho, NM 87124

Job No.:3-21116 Lab No.: 5103

PROJECT: OWL NDBL Landfill

LOCATION OF SAMPLE: OWL 6, Sample B

DATE SAMPLED: November 11, 2022

SAMPLE: Delivered by Client

SIEVE ANALYSIS	
Sieve Size	Percent Passing
No. 10	100
No. 40	97
No. 80	41
No. 200	16.7

Submitted by:

GEO-TEST, INC.

Tim Byres, SET

cc: <u>Tzack@parkhill.com</u>

GEO-TEST, INC. 3204 RICHARDS LANE SANTA FE, NEW MEXICO 87507 (505) 471-1101 FAX (505) 471-2245

8528 CALLE ALAMEDA ALBUQUERQUE, NEW MEXICO 87113 (505) 857-0933 FAX (505) 857-0803

2805-A LAS VEGAS CT LAS CRUCES, NEW MEXICO 88007 (575) 526-6260 FAX (575) 526-1660

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Parkhill 333 Rio Rancho Blvd NE Suite 400 Rio Rancho, NM 87124

Job No.:3-21116 Lab No.: 5104

PROJECT: OWL NDBL Landfill

LOCATION OF SAMPLE: OWL 6, Sample C

DATE SAMPLED: November 11, 2022

SAMPLE: Delivered by Client

SIEVE ANALYSIS											
Sieve Size	Percent Passing										
No. 10	100										
No. 40	97										
No. 80	41										
No. 200	16.1										

Submitted by:

GEO-TEST, INC.

Tim Byres, SET

cc: <u>Tzack@parkhill.com</u>

GEO-TEST, INC. 3204 RICHARDS LANE SANTA FE, NEW MEXICO 87507 (505) 471-1101 FAX (505) 471-2245

8528 CALLE ALAMEDA ALBUQUERQUE, NEW MEXICO 87113 (505) 857-0933 FAX (505) 857-0803



# APPENDIX B: MATERIAL MANUFACTURER CERTIFICATION AND COMFORMANCE TESTING RESULTS

**B.1 GCL Certifications** 





PROJECT NUMBER: SW2205

SALES ORDER: SO-093540

PACKING SLIP NUMBER: Pre-SO-093540-2

PROJECT NAME: OWL LF NDBL CELL 1A2A TIE-IN

ROLL NUMBER	MANUFACT. DATE	BENTONITE LOT NUMBER	TOP LAYER 1	BOTTOM LAYER 1	CONFORMANCE
Product Code 29708-1	e : 1109263-				
Bentoliner 0. Peel 35	75 lbs/ft² - 3.66	kg/m², NS,			
	tup - Patricia Zaba 00,000 sf, min 1/L				
0242-380690	2022-07-01	1061722B	2027198285	2012798649	N/A
0242-380691	2022-07-01	1061722B	2027198285	2012798649	N/A
0242-380692	2022-07-01	1061722C	2027198285	2012798649	N/A
0242-380693	2022-07-01	1061722C	2027198285	2012798654	N/A
0242-380694	2022-07-01	1061722C	2027198285	2012798654	N/A
0242-380695	2022-07-01	1061722C	2027198285	2012798654	N/A
0242-380696	2022-07-01	1061722C	2027198285	2012798654	N/A
0242-380697	2022-07-01	1061722C	2027198285	2012798654	N/A
0242-380698	2022-07-01	1061722C	2027198285	2012798654	Confomance
0242-380699	2022-07-01	1061722C	2027145893	2012798654	N/A
0242-380700	2022-07-01	1061722C	2027145893	2012798654	N/A
0242-380701	2022-07-01	1061722C	2027145893	2012798654	N/A
0242-380702	2022-07-01	1061722C	2027145893	2012798654	N/A
0242-380703	2022-07-01	1061722C	2027145893	2012798654	N/A
0242-380704	2022-07-01	1061722C	2027145893	2012798654	N/A
0242-380705	2022-07-01	1061722C	2027145893	2012798654	N/A
0242-380706	2022-07-01	1061722C	2027198299	2012798654	N/A
0242-380707	2022-07-01	1061722C	2027198299	2012798654	N/A
0242-380708	2022-07-01	1061722C	2027198299	2012798654	N/A
0242-380709	2022-07-01	1061722C	2027198299	2012798654	N/A

 $The \ GCL \ supplied \ to \ this \ project \ has \ been \ continuously \ inspected \ for \ the \ presence \ of \ needles \ and \ is \ certified \ to \ be \ needle \ free.$ 

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Solmax Geosynthetics LLC

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073





PROJECT NUMBER: SW2205

SALES ORDER: SO-093540

PACKING SLIP NUMBER: Pre-SO-093540-2

PROJECT NAME: OWL LF NDBL CELL 1A2A TIE-IN

0242-380710	2022-07-01	1061722C	2027198299	2012798654	N/A
0242-380711	2022-07-01	1061722C	2027198299	2012798654	N/A
0242-380712	2022-07-01	1061722C	2027198299	2012798654	N/A
0242-380713	2022-07-01	1061722C	2027198299	2012798654	N/A
0242-380714	2022-07-01	1061722C	2027198299	2012798651	N/A
0242-380715	2022-07-01	1061722C	2027198299	2012798651	N/A
0242-380716	2022-07-01	1061722C	2027198301	2012798651	N/A
0242-380717	2022-07-01	1061722C	2027198301	2012798651	N/A
0242-380718	2022-07-01	1061722C	2027198301	2012798651	N/A
0242-380719	2022-07-01	1062022D	2027198301	2012798651	N/A
0242-380720	2022-07-02	1062022D	2027198301	2012798651	N/A
0242-380721	2022-07-02	1062022D	2027198301	2012798651	N/A
0242-380722	2022-07-02	1062022D	2027198301	2012798651	N/A
0242-380723	2022-07-05	1062022D	2027198301	2012798651	N/A
0242-380724	2022-07-05	1062022D	2027198301	2012798651	N/A
0242-380725	2022-07-05	1062022D	2027198301	2012798651	N/A
0242-380726	2022-07-05	1062022D	2027145902	2012798651	N/A

**QUANTITY (ROLLS): 37** 

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**Solmax Geosynthetics LLC** 

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073

SOLMAX.COM

5 Jul 2022



**TEST RESULTS - ROLLS** 

PROJECT NUMBER:

SW2205

SALES ORDER:

SO-093540

PACKING SLIP NUMBER:

Pre-SO-093540-2

PROJECT NAME: OWL LF NDBL CELL 1A2A TIE-IN

**PRODUCT:** 1109263-29708-1

Bentoliner 0.75 lbs/ft<sup>2</sup> - 3.66 kg/m<sup>2</sup>, NS, Peel 35

Test	Prop	erty				Direction	Tes	t Method	Frequency	Unit
	1 Bento	onite Mass	(0% mois	ture)			AST	TM D5993	1/40,000 ft <sup>2</sup>	lbs/ft²
	2 Peel	Strength (r	min.avg.)			MD	AST	TM D4632	1/40,000 ft <sup>2</sup>	lbf
	3 Peel	Strength (r	min.avg.)			MD	AST	TM D6496	1/40,000 ft <sup>2</sup>	lbf/in
	4 Tensi	ile Strengtl	n MD (min	n. avg.)		MD	AST	TM D6768	1/40,000 ft <sup>2</sup>	lbf/in
	5 Grab	Strength (	min. avg)			MD	AST	TM D4632	1/40,000 ft <sup>2</sup>	lbf
	6 Punc	ture Resist	ance (min	. avg.)			AST	TM D4833	1/200,000 ft <sup>2</sup>	lbf
	7 Mois	ture Conte	nt (max)				AST	TM D5993	1/40,000 ft <sup>2</sup>	%
	8 Finisl	ned Good	Mass (0%	moisture)			AST	TM D5993	1/40,000 ft <sup>2</sup>	lbs/ft²
Test	1	2	3	4	5	6	7	8		
SPECIFICATIONS	0.75	35	5.3	30	90	90	12	0.81		
0242-380690	0.86	49.0	9.9	35	157	112	10.9	0.93		
0242-380691	0.86	49.0	9.9	35	157	112	10.9	0.93		
0242-380692	0.86	49.0	9.9	35	157	112	10.9	0.93		
0242-380693	0.86	49.0	9.9	35	157	112	10.9	0.93		
0242-380694	0.86	49.0	9.9	35	157	112	10.9	0.93		
0242-380695	0.86	49.0	9.9	35	157	112	10.9	0.93		
0242-380696	0.86	49.0	9.9	35	157	112	10.9	0.93		
0242-380697	0.86	49.0	9.9	35	157	112	10.9	0.93		
0242-380698	0.86	49.0	9.9	35	157	112	10.9	0.93		
0242-380699	0.86	49.0	9.9	35	157	112	10.9	0.93		
0242-380700	0.86	49.0	9.9	35	157	112	10.9	0.93		
0242-380701	0.86	49.0	9.9	35	157	112	10.9	0.93		
0242-380702	0.86	49.0	9.9	35	157	112	10.9	0.93		
0242-380703	0.86	49.0	9.9	35	157	112	10.9	0.93		
0242-380704	0.86	49.0	9.9	35	157	112	10.9	0.93		
0242-380705	0.86	49.0	9.9	35	157	112	10.9	0.93		
0242-380706	0.84	52.0	11.0	42	150	110	10.6	0.91		
0242-380707	0.84	52.0	11.0	42	150	110	10.6	0.91		
0242-380708	0.84	52.0	11.0	42	150	110	10.6	0.91		
0242-380709	0.84	52.0	11.0	42	150	110	10.6	0.91		
0242-380710	0.84	52.0	11.0	42	150	110	10.6	0.91		
0242-380711	0.84	52.0	11.0	42	150	110	10.6	0.91		
0242-380712	0.84	52.0	11.0	42	150	110	10.6	0.91		

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Solmax Geosynthetics LLC

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073



**TEST RESULTS - ROLLS** 

PROJECT NUMBER:

SW2205

SALES ORDER:

SO-093540

PACKING SLIP NUMBER:

Pre-SO-093540-2

#### PROJECT NAME: OWL LF NDBL CELL 1A2A TIE-IN

	Test	1	2	3	4	5	6	7	8
0242-380	0713	0.84	52.0	11.0	42	150	110	10.6	0.91
0242-380	0714	0.84	52.0	11.0	42	150	110	10.6	0.91
0242-380	0715	0.84	52.0	11.0	42	150	110	10.6	0.91
0242-380	0716	0.84	52.0	11.0	42	150	110	10.6	0.91
0242-380	0717	0.84	52.0	11.0	42	150	110	10.6	0.91
0242-380	0718	0.84	52.0	11.0	42	150	110	10.6	0.91
0242-380	0719	0.84	52.0	11.0	42	150	110	10.6	0.91
0242-380	0720	0.84	52.0	11.0	42	150	110	10.6	0.91
0242-380	0721	0.84	52.0	11.0	42	150	110	10.6	0.91
0242-380	0722	0.79	72.0	15.0	40	174	114	10.4	0.86
0242-380	0723	0.79	72.0	15.0	40	174	114	10.4	0.86
0242-380	0724	0.79	72.0	15.0	40	174	114	10.4	0.86
0242-380	0725	0.79	72.0	15.0	40	174	114	10.4	0.86
0242-380	0726	0.79	72.0	15.0	40	174	114	10.4	0.86

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**Solmax Geosynthetics LLC** 

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073



SOLMAX

PLANTY ASSURANT

**TEST RESULTS - ROLLS** 

PROJECT NUMBER:

SW2205

SALES ORDER:

SO-093540

PACKING SLIP NUMBER:

Pre-SO-093540-2

PROJECT NAME: OWL LF NDBL CELL 1A2A TIE-IN

PRODUCT: 1109263-29708-1

Bentoliner 0.75 lbs/ft<sup>2</sup> - 3.66 kg/m<sup>2</sup>, NS, Peel 35

Test	Property	Direction	Test Method	Frequency	Unit
1	Swell Index (min.)		ASTM D5890		ml/2 g
2	Moisture Content (max.)		ASTM D4643		%
3	Fluid Loss (max.)		ASTM D5891		ml

Test	1	2	3
Specification	24	12	18
1061722B	32.0	10.5	13
1061722C	32.5	10.0	13
1062022D	31.5	9.7	14

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Solmax Geosynthetics LLC

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073

SW2205

SO-093540

Pre-SO-093540-2



## **MANUFACTURING QUALITY CONTROL**

**TEST RESULTS - ROLLS** PROJECT NUMBER: SALES ORDER:

PACKING SLIP NUMBER:



PROJECT NAME: OWL LF NDBL CELL 1A2A TIE-IN

			· · · · · · ·		, , , , , _ , , , , , , , , , , , , , ,				
Test	Property				Dire	ection	Test Method	Frequency	Unit
1	Mass per Ui	nit Area	(min. avg.)	)			ASTM D5261	1/200,000 ft <sup>2</sup>	oz/yd²
2	Strength (M	1D)							lbf
3	Strength (TI	D)							lbf
4	Elongation	(MD)							%
5	Elongation	(TD)							%
	Test	1	2	3	4	5			
S	Specification	6	22	22	100	100			
	2027145893	7.0	122	241	169	164			
	2027145902	7.1	140	248	167	162			
	2027198285	7.1	133	241	175	158			
	2027198299	7.2	133	244	181	166			
	2027198301	7.2	133	244	181	166			

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**Solmax Geosynthetics LLC** 

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073



SOLMAX

Q APPROVED CA

**TEST RESULTS - ROLLS** 

PROJECT NUMBER:

SW2205

SALES ORDER:

SO-093540

PACKING SLIP NUMBER:

Pre-SO-093540-2

PROJECT NAME: OWL LF NDBL CELL 1A2A TIE-IN

Test	Property				Dire	ection	Test Method	Frequency	Unit
1	Mass per Ui	nit Area	(min. avg.)	)			ASTM D5261		oz/yd²
	Grab Tensile	e Proper	rties (min.	avg)			ASTM D4632	1/200,000 ft <sup>2</sup>	
2	Strength (M	1D)							lbf
3	Strength (TI	D)							lbf
4	Elongation	(MD)							%
5	Elongation	(TD)							%
	Test	1	2	3	4	5			
	Specification	3	135	100	10	10			
	2012798649	3.4	179	164	26	21			
	2012798651	3.3	197	163	28	25			
	2012798654	3.3	197	163	28	25			

Solmax is not a design professional and has not performed any design services to determine if Solmax's goods comply with any project plans or specifications, or with the application or use of Solmax's goods to any particular system, project, purpose, installation or specification.

Solmax Geosynthetics LLC

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073

#### **GSE BENTOLINER**

CERTIFICATE OF ANALYSIS 2022

PRODUCT: NATIONAL® 30

SHIPPED FRO BENTONITE PERFORMANCE MINERALS LLC 554 US HWY 212 COLONY PLANT BELLE FOURCHE, S.D. 57717

			%	Mesh	Mesh		MBC	SWELL	PWA			%	Mesh	Mesh	0	MBC	SWELL	PWA	
	LOAD	LOT	MOIST	% + 20	% - 200	FL	MEQ	INDEX	750			MOIST	% + 20	% - 200	FL	meq	INDEX	750	
BOL #	DATE	CODE	12 MAX	15 MAX	10 MAX	18 MAX	70 MIN	25 MIN	MIN	JUNE		12 MAX	15 MAX	10 MAX	18 MAX	70 MIN	25 MIN	MIN	DATE
										No. of									06-*
B0004730546	06-17-22	1061722A	9.1	0.24	4.88	13.0	106	32	859	CARS	M AVG	8.70	0.31	3.81	12.98	110.28	30.40	893.72	
B0004730549	06-18-22	1061722B	8.9	0.23	3.94	12.4	110	31	848	43	STD DEV	0.44	0.22	1.26	0.86	3.72	1.56	67.38	
												%	Mesh	Mesh	0	MBC	SWELL	PWA	
												MOIST	% + 20	% - 200	FL	meq	INDEX	750	
										YTD		12 MAX	15 MAX	10 MAX	18 MAX	70 MIN	25 MIN	MIN	
										No. of									
										CARS	M AVG	8.79	0.25	3.38	13.70	112.05	30.51	938.33	
										245	STD DEV	0.59	0.46	1.45	1.00	3.18	1.43	61.56	
										SOLD TO	· Salmay					For a	av questions o	ontact	

SOLD TO: Solmax

19103 Gundle RD Houston, TX 77073 For any questions contact. Q.A. SUPERVISOR Tucker Goodvin

Attn: Bob Stadler (rstadler@gseworld.com) Chuck Taylor (ctaylor@gseworld.com) Cheryl Hofer (chofer@gseworld.com)

SHIPPED TO: Solmax

3150 FIRST AVENUE SPEARFISH, SD 57783

CC: Jason Tawse File

Prepared by: TO 06/20/22

#### **GSE BENTOLINER**

CERTIFICATE OF ANALYSIS 2022

PRODUCT: NATIONAL® 30

SHIPPED FRO BENTONITE PERFORMANCE MINERALS LLC 554 US HWY 212 COLONY PLANT BELLE FOURCHE, S.D. 57717

	BOL#	LOAD DATE	LOT CODE	% MOIST 12 MAX	Mesh % + 20 15 MAX	Mesh % - 200 <b>10 MAX</b>	FL 18 MAX	MBC MEQ 70 MIN	SWELL INDEX 25 MIN	PWA 750 MIN	JUNE		% MOIST 12 MAX	Mesh % + 20 15 MAX	Mesh % - 200 <b>10 MAX</b>	0 FL 18 MAX	MBC meq 70 MIN	SWELL INDEX 25 MIN	PWA 750 MIN	DATE
П	B0004730551	06-19-22	1061722C	9.0	0.25	4.71	12.6	110	30	922	No. of CARS 44	M AVG STD DEV	8.70 0.43	0.31 0.22	3.83 1.25	12.97 0.86	110.27 3.68	30.39 1.54	894.36 66.74	06-*
													% MOIST	Mesh % + 20	Mesh % - 200	0 FL	MBC meq	SWELL INDEX	PWA 750	
											YTD No. of		12 MAX	15 MAX	10 MAX	18 MAX	70 MIN	25 MIN	MIN	
											CARS 246	M AVG STD DEV	8.79 0.59	0.25 0.46	3.38 1.45	13.69 1.00	112.04 3.17	30.50 1.43	938.26 61.44	

SOLD TO: Solmax

19103 Gundle RD Houston, TX 77073 For any questions contact. Q.A. SUPERVISOR Tucker Goodvin

Attn: Bob Stadler (rstadler@gseworld.com) Chuck Taylor (ctaylor@gseworld.com) Cheryl Hofer (chofer@gseworld.com)

SHIPPED TO: Solmax

3150 FIRST AVENUE SPEARFISH, SD 57783

CC: Jason Tawse File

Prepared by: TO 06/20/22

#### **GSE BENTOLINER**

CERTIFICATE OF ANALYSIS 2022

PRODUCT: NATIONAL® 30

SHIPPED FRO BENTONITE PERFORMANCE MINERALS LLC 554 US HWY 212 COLONY PLANT BELLE FOURCHE, S.D. 57717

BOL#	LOAD DATE	LOT CODE	% MOIST 12 MAX	Mesh % + 20 15 MAX	Mesh % - 200 10 MAX	FL 18 MAX	MBC MEQ 70 MIN	SWELL INDEX 25 MIN	PWA 750 MIN	JUNE No. of		% MOIST 12 MAX	Mesh % + 20 15 MAX	Mesh % - 200 <b>10 MAX</b>	0 FL 18 MAX	MBC meq 70 MIN	SWELL INDEX 25 MIN	PWA 750 MIN	DATE 06-*
B0004730556 B0004730557	06-20-22 06-21-22	1062022C 1062022D	8.4 8.5	0.15 0.21	4.56 3.77	13.2 13.4	112 108	31 33	933 932	CARS 47	M AVG STD DEV	8.70 0.42	0.30 0.21	3.84 1.21	12.96 0.84	110.43 3.71	30.36 1.51	896.26 65.15	00-
										YTD		% MOIST 12 MAX	Mesh % + 20 15 MAX	Mesh % - 200 <b>10 MAX</b>	0 FL 18 MAX	MBC meq 70 MIN	SWELL INDEX 25 MIN	PWA 750 MIN	
										No. of CARS 249	M AVG STD DEV	8.79 0.59	0.25 0.46	3.39 1.44	13.68 1.00	112.05 3.18	30.50 1.43	938.09 61.13	

SOLD TO: Solmax

19103 Gundle RD Houston, TX 77073 For any questions contact. Q.A. SUPERVISOR Tucker Goodvin

Attn: Bob Stadler (rstadler@gseworld.com) Chuck Taylor (ctaylor@gseworld.com) Cheryl Hofer (chofer@gseworld.com)

SHIPPED TO: Solmax

3150 FIRST AVENUE SPEARFISH, SD 57783

CC: Jason Tawse File

Prepared by: TO 06/21/22



NUMBER: SF-062567

DATE: 05-Aug-2022

**SOLD TO:** 

Southwest Liner Systems, Inc.

PO Box 1972 Bernalillo,NM,87004 USA

**CONTACT:** JUAN ZAZPE

TELEPHONE: EMAIL: **SHIP TO:** 

**NORTHERN DELAWARE BASIN LANDFILL** 

2029 W. NM HWY128 Jal,NM,88252 USA

**CONTACT:** JUAN ZAZPE **TELEPHONE:** (505)771-9122

**EMAIL:** 

CUSTOMER REFERENCE	SOLMAX ORDER	PROJECT NAME	FREIGHT MODE
SW2205	SO-093540	OWL LF NDBL CELL 1A2A TIE-IN	2 AXLES

			DIMENS	SIONS	SURFACE	U/M	WEIGHT	WEIGHT
PART DESCRIPTION	ROLL NUMBER	CONTAINER	WIDTH	LENGTH	QUANTITY		(LBS)	(KG)
1109263-29708-1, Be	entoliner 0.75 lbs/	ft² - 3.66 kg/m², NS, I	Peel 35					
	0242-380698	N/A	15.50	150.00	2,325.00	SQFT	2,435.00	1,104.50
	0242-380700	N/A	15.50	150.00	2,325.00	SQFT	2,360.00	1,070.48
	0242-380701	N/A	15.50	150.00	2,325.00	SQFT	2,410.00	1,093.16
	0242-380702	N/A	15.50	150.00	2,325.00	SQFT	2,365.00	1,072.75
	0242-380708	N/A	15.50	150.00	2,325.00	SQFT	2,425.00	1,099.96
	0242-380712	N/A	15.50	150.00	2,325.00	SQFT	2,410.00	1,093.16
	0242-380714	N/A	15.50	150.00	2,325.00	SQFT	2,370.00	1,075.01
	0242-380715	N/A	15.50	150.00	2,325.00	SQFT	2,355.00	1,068.21
	0242-380716	N/A	15.50	150.00	2,325.00	SQFT	2,375.00	1,077.28
	0242-380717	N/A	15.50	150.00	2,325.00	SQFT	2,305.00	1,045.53
	0242-380718	N/A	15.50	150.00	2,325.00	SQFT	2,245.00	1,018.32
	0242-380719	N/A	15.50	150.00	2,325.00	SQFT	2,475.00	1,122.64
	0242-380720	N/A	15.50	150.00	2,325.00	SQFT	2,370.00	1,075.01
	0242-380721	N/A	15.50	150.00	2,325.00	SQFT	2,335.00	1,059.14
	0242-380722	N/A	15.50	150.00	2,325.00	SQFT	2,600.00	1,179.34
	0242-380723	N/A	15.50	150.00	2,325.00	SQFT	2,445.00	1,109.03
	0242-380724	N/A	15.50	150.00	2,325.00	SQFT	2,615.00	1,186.14
	0242-380725	N/A	15.50	150.00	2,325.00	SQFT	2,630.00	1,192.95
	0242-380726	N/A	15.50	150.00	2,325.00	SQFT	2,750.00	1,247.38
		TOTAL PART CODE:	19	Pieces	44,175.00	SQFT	46,275.00	20,989.99
					Net \	Weight	45,553.00	20,662.47

#### SOLMAX GEOSYNTHETICS LLC

3150 1ST AVENUE SPEARFISH, SOUTH DAKOTA, 57783, UNITED STATES MF-LOG-02 REV.03/2007-06-01

Page 1of 2



NUMBER: SF-062567

DATE: 05-Aug-2022

#### **SOLD TO:**

Southwest Liner Systems, Inc.

PO Box 1972 Bernalillo,NM,87004 USA

**CONTACT:** JUAN ZAZPE

TELEPHONE: EMAIL:



**NORTHERN DELAWARE BASIN LANDFILL** 

2029 W. NM HWY128 Jal,NM,88252 USA

**CONTACT:** JUAN ZAZPE **TELEPHONE:** (505)771-9122

**EMAIL:** 



NOTICE: Every roll must be individually unloaded with two (2) slings to prevent any risk of injury to the operator or equipment.

Dimensions May Vary +/- 1%

	PIECES	WEIGHT (LBS)	WEIGHT (KG)
Gross of Material	19	46,275.00	20,989.99
Gross		46,275.00	20,989.99

#### SOLMAX GEOSYNTHETICS LLC

REV.03/2007-06-01

3150 1ST AVENUE SPEARFISH, SOUTH DAKOTA, 57783, UNITED STATES MF-LOG-02

Page 2of 2 SOLMAX.COM



NUMBER: SF-062566

DATE: 05-Aug-2022

**SOLD TO:** 

Southwest Liner Systems, Inc.

PO Box 1972 Bernalillo,NM,87004 USA

**CONTACT:** JUAN ZAZPE

TELEPHONE: EMAIL:

**SHIP TO:** 

**NORTHERN DELAWARE BASIN LANDFILL** 

2029 W. NM HWY128 Jal,NM,88252 USA

**CONTACT:** JUAN ZAZPE **TELEPHONE:** (505)771-9122

**EMAIL:** 

CUSTOMER REFERENCE	SOLMAX ORDER	PROJECT NAME	FREIGHT MODE
SW2205	SO-093540	OWL LF NDBL CELL 1A2A TIE-IN	2 AXLES

			DIMENS	SIONS	SURFACE	U/M	WEIGHT	WEIGHT
PART DESCRIPTION	ROLL NUMBER	CONTAINER	WIDTH	LENGTH	QUANTITY		(LBS)	(KG)
1109263-29708-1, Be	entoliner 0.75 lbs/	/ft² - 3.66 kg/m², NS,	Peel 35					
	0242-380690	N/A	15.50	150.00	2,325.00	SQFT	2,385.00	1,081.82
	0242-380691	N/A	15.50	150.00	2,325.00	SQFT	2,405.00	1,090.89
	0242-380692	N/A	15.50	150.00	2,325.00	SQFT	2,395.00	1,086.35
	0242-380693	N/A	15.50	150.00	2,325.00	SQFT	2,395.00	1,086.35
	0242-380694	N/A	15.50	150.00	2,325.00	SQFT	2,320.00	1,052.33
	0242-380695	N/A	15.50	150.00	2,325.00	SQFT	2,330.00	1,056.87
	0242-380696	N/A	15.50	150.00	2,325.00	SQFT	2,310.00	1,047.80
	0242-380697	N/A	15.50	150.00	2,325.00	SQFT	2,350.00	1,065.94
	0242-380699	N/A	15.50	150.00	2,325.00	SQFT	2,410.00	1,093.16
	0242-380703	N/A	15.50	150.00	2,325.00	SQFT	2,425.00	1,099.96
	0242-380704	N/A	15.50	150.00	2,325.00	SQFT	2,340.00	1,061.41
	0242-380705	N/A	15.50	150.00	2,325.00	SQFT	2,360.00	1,070.48
	0242-380706	N/A	15.50	150.00	2,325.00	SQFT	2,450.00	1,111.30
	0242-380707	N/A	15.50	150.00	2,325.00	SQFT	2,430.00	1,102.23
	0242-380709	N/A	15.50	150.00	2,325.00	SQFT	2,350.00	1,065.94
	0242-380710	N/A	15.50	150.00	2,325.00	SQFT	2,400.00	1,088.62
	0242-380711	N/A	15.50	150.00	2,325.00	SQFT	2,475.00	1,122.64
	0242-380713	N/A	15.50	150.00	2,325.00	SQFT	2,410.00	1,093.16
		TOTAL PART CODE:	18	Pieces	41,850.00	SQFT	42,940.00	19,477.25
					Net \	Weight	42,256.00	19,166.98

#### SOLMAX GEOSYNTHETICS LLC

3150 1ST AVENUE SPEARFISH, SOUTH DAKOTA, 57783, UNITED STATES MF-LOG-02 REV.03/2007-06-01

Page 1of 2



NUMBER: SF-062566

DATE: 05-Aug-2022

#### **SOLD TO:**

#### Southwest Liner Systems, Inc.

PO Box 1972 Bernalillo,NM,87004 USA

**CONTACT:** JUAN ZAZPE

TELEPHONE: EMAIL:

#### **SHIP TO:**

#### NORTHERN DELAWARE BASIN LANDFILL

2029 W. NM HWY128 Jal,NM,88252 USA

**CONTACT:** JUAN ZAZPE **TELEPHONE:** (505)771-9122

**EMAIL:** 



NOTICE: Every roll must be individually unloaded with two (2) slings to prevent any risk of injury to the operator or equipment.

Dimensions May Vary +/- 1%

	PIECES	WEIGHT (LBS)	WEIGHT (KG)
Gross of Material	18	42,940.00	19,477.25
Gross		42,940.00	19,477.25

#### SOLMAX GEOSYNTHETICS LLC

REV.03/2007-06-01

3150 1ST AVENUE SPEARFISH, SOUTH DAKOTA, 57783, UNITED STATES MF-LOG-02

Page 2of 2





PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-4

PROJECT NAME: OWL LF CELLS 4A 4B

ROLL NUMBER	MANUFACT. DATE	BENTONITE LOT NUMBER	TOP LAYER 1	BOTTOM LAYER 1	
Product Code 35011-6	: 1109263-				
Bentoliner 0.	75 lbs/ft² - 3.66	kg/m², NS,			
<u>Peel 35</u>					
TRI Austin Pickup - Patricia Zabaleta 1 ft x RW, 1/100,000 sf, min 1/Lot One additional 2 ft x RW sample for interface testing.					
0242-387065	2022-10-28	1102122D	2027262853	FJWE08948-005	
0242-387066	2022-10-28	1102122D	2027262853	FJWE08948-005	
0242-387067	2022-10-28	1102122D	2027262853	FJWE08948-005	
0242-387068	2022-10-28	1102122D	2027262853	FJWE08948-005	
0242-387069	2022-10-28	1102122D	2027278325	FJWE08948-005	interface shear
0242-387070	2022-10-28	1102122D	2027278325	FJWE08948-005	
0242-387071	2022-10-28	1102122D	2027278325	FJWE08948-005	
0242-387072	2022-10-28	1102122D	2027278325	FJWE08948-005	
0242-387073	2022-10-28	1102122D	2027278325	FJWE08948-005	conformance
0242-387074	2022-10-28	1102122D	2027278325	FJWE08948-005	
0242-387075	2022-10-28	1102122D	2027278325	FJWE08948-005	
0242-387076	2022-10-28	1102122D	2027278325	FJWE08948-005	
0242-387077	2022-10-28	1102122D	2027278325	FJWE08948-005	
0242-387078	2022-10-28	1102122D	2027278325	FJWE08948-005	
0242-387079	2022-10-28	1102122D	2027262829	FJWE08948-005	
0242-387080	2022-10-28	1102122D	2027262829	FJWE08948-005	

The GCL supplied to this project has been continuously inspected for the presence of needles and is certified to be needle free.

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Solmax Geosynthetics LLC

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073

SOLMAX.COM





PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-4

PROJECT NAME: OWL LE CELLS 4A 4B

PROJECT NA	AIVIE: OW	L LF CELLS 4A 4	4B		
0242-387081	2022-10-28	1102122D	2027262829	FJWE08948-005	
0242-387082	2022-10-28	1102122D	2027262829	FJWE08948-005	
0242-387083	2022-10-28	1102522A	2027262829	FJWE08948-005	
0242-387084	2022-10-28	1102522A	2027262829	FJWE08948-005	
0242-387085	2022-10-28	1102522A	2027262829	FJWE08948-005	
0242-387086	2022-10-28	1102522A	2027262829	FJWE08948-005	
0242-387087	2022-10-28	1102522A	2027262829	F3WE00889-006	
0242-387088	2022-10-28	1102522A	2027262829	F3WE00889-006	
0242-387089	2022-10-28	1102522A	2027278342	F3WE00889-006	
0242-387090	2022-10-28	1102522A	2027278342	F3WE00889-006	
0242-387091	2022-10-28	1102522A	2027278342	F3WE00889-006	
0242-387092	2022-10-28	1102522A	2027278342	F3WE00889-006	
0242-387093	2022-10-28	1102522A	2027278342	F3WE00889-006	
0242-387094	2022-10-28	1102522A	2027278342	F3WE00889-006	
0242-387095	2022-10-28	1102522A	2027278342	F3WE00889-006	
0242-387096	2022-10-28	1102522A	2027278342	F3WE00889-006	
0242-387097	2022-10-28	1102522A	2027278342	F3WE00889-006	
0242-387098	2022-10-28	1102522A	2027278342	F3WE00889-006	
0242-387099	2022-10-28	1102522A	2027262831	F3WE00889-006	
0242-387100	2022-10-28	1102522A	2027262831	F3WE00889-006	
0242-387101	2022-10-28	1102522A	2027262831	F3WE00889-006	
0242-387102	2022-10-28	1102522A	2027262831	F3WE00889-006	
0242-387103	2022-10-28	1102522A	2027262831	F3WE00889-006	
0242-387104	2022-10-28	1102522A	2027262831	F3WE00889-006	
0242-387105	2022-10-28	1102522A	2027262831	F3WE00889-006	
0242-387106	2022-10-28	1102522A	2027262831	F3WE00889-006	
0242-387107	2022-10-28	1102522A	2027262831	F3WE00889-006	

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**Solmax Geosynthetics LLC** 

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073

SOLMAX.COM





PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-4

PROJECT NAME: OWL LF CELLS 4A 4B

PROJECT NA	AME: OW	L LF CELLS 4A 4	4B		
0242-387108	2022-10-28	1102522A	2027262831	F3WE00889-006	
0242-387109	2022-10-28	1102522A	2027278307	F3WE00889-006	
0242-387110	2022-10-28	1102522A	2027278307	F3WE00889-006	
0242-387111	2022-10-28	1102522A	2027278307	F3WE00889-006	
0242-387112	2022-10-28	1102522A	2027278307	F3WE00889-006	
0242-387113	2022-10-28	1102522A	2027278307	F3WE00905-002	
0242-387114	2022-10-28	1102522B	2027278307	F3WE00905-002	
0242-387115	2022-10-28	1102522B	2027278307	F3WE00905-002	
0242-387116	2022-10-28	1102522B	2027278307	F3WE00905-002	
0242-387117	2022-10-28	1102522B	2027278307	F3WE00905-002	conformance
0242-387118	2022-10-28	1102522B	2027278307	F3WE00905-002	
0242-387119	2022-10-28	1102522B	2027278324	F3WE00905-002	
0242-387120	2022-10-28	1102522B	2027278324	F3WE00905-002	
0242-387121	2022-10-28	1102522B	2027278324	F3WE00905-002	
0242-387122	2022-10-28	1102522B	2027278324	F3WE00905-002	
0242-387123	2022-10-28	1102522B	2027278324	F3WE00905-002	
0242-387124	2022-10-28	1102522B	2027278324	F3WE00905-002	
0242-387125	2022-10-28	1102522B	2027278324	F3WE00905-002	
0242-387126	2022-10-28	1102522B	2027278324	F3WE00905-002	
0242-387127	2022-10-28	1102522B	2027278324	F3WE00905-002	
0242-387128	2022-10-28	1102522B	2027278324	F3WE00905-002	
0242-387129	2022-10-28	1102522B	2027262825	F3WE00905-002	
0242-387130	2022-10-28	1102522B	2027262825	F3WE00905-002	
0242-387131	2022-10-28	1102522B	2027262825	F3WE00905-002	
0242-387132	2022-10-28	1102522B	2027262825	F3WE00905-002	
0242-387133	2022-10-28	1102522B	2027262825	F3WE00905-002	
0242-387134	2022-10-28	1102522B	2027262825	F3WE00905-002	

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Solmax Geosynthetics LLC

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073

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PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-4

PROJECT NAME: OWL LF CELLS 4A 4B

PROJECT NA	AIVIE: OWI	L LF CELLS 4A 4	†R		
0242-387135	2022-10-28	1102522B	2027262825	F3WE00905-002	
0242-387136	2022-10-29	1102522B	2027262825	F3WE00905-002	
0242-387137	2022-10-29	1102522B	2027262825	F3WE00905-002	
0242-387138	2022-10-29	1102522B	2027262825	F3WE00905-002	
0242-387139	2022-10-31	1102522B	2027262781	F3WE00910-008	
0242-387140	2022-10-31	1102522B	2027262781	F3WE00910-008	
0242-387141	2022-10-31	1102522B	2027262781	F3WE00910-008	
0242-387142	2022-10-31	1102522B	2027262781	F3WE00910-008	
0242-387143	2022-10-31	1102522B	2027262781	F3WE00910-008	
0242-387144	2022-10-31	1102522C	2027262781	F3WE00910-008	
0242-387145	2022-10-31	1102522C	2027262781	F3WE00910-008	
0242-387146	2022-10-31	1102522C	2027262781	F3WE00910-008	
0242-387147	2022-10-31	1102522C	2027262781	F3WE00910-008	
0242-387148	2022-10-31	1102522C	2027262781	F3WE00910-008	
0242-387149	2022-10-31	1102522C	2027278327	F3WE00910-008	
0242-387150	2022-10-31	1102522C	2027278327	F3WE00910-008	
0242-387151	2022-10-31	1102522C	2027278327	F3WE00910-008	
0242-387152	2022-10-31	1102522C	2027278327	F3WE00910-008	
0242-387153	2022-10-31	1102522C	2027278327	F3WE00910-008	
0242-387154	2022-10-31	1102522C	2027278327	F3WE00910-008	
0242-387155	2022-10-31	1102522C	2027278327	F3WE00910-008	
0242-387156	2022-10-31	1102522C	2027278327	F3WE00910-008	
0242-387157	2022-10-31	1102522C	2027278327	F3WE00910-008	
0242-387158	2022-10-31	1102522C	2027278327	F3WE00910-008	
0242-387159	2022-10-31	1102522C	2027262772	F3WE00910-008	
0242-387160	2022-10-31	1102522C	2027262772	F3WE00910-008	
0242-387161	2022-10-31	1102522C	2027262772	F3WE00910-008	conformance

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**Solmax Geosynthetics LLC** 

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PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-4

PROJECT NAME: OWL LF CELLS 4A 4B

PROJECT NA	AME: OW	L LF CELLS 4A 4	4B		
0242-387162	2022-10-31	1102522C	2027262772	F3WE00910-008	
0242-387163	2022-10-31	1102522C	2027262772	F3WE00910-008	
0242-387164	2022-10-31	1102522C	2027262772	F3WE00910-008	
0242-387165	2022-10-31	1102522C	2027262772	FJWE08948-012	
0242-387166	2022-10-31	1102522C	2027262772	FJWE08948-012	
0242-387167	2022-10-31	1102522C	2027262772	FJWE08948-012	
0242-387168	2022-10-31	1102522C	2027262772	FJWE08948-012	
0242-387169	2022-10-31	1102522C	2027262822	FJWE08948-012	
0242-387170	2022-10-31	1102522C	2027262822	FJWE08948-012	
0242-387171	2022-10-31	1102522C	2027262822	FJWE08948-012	
0242-387172	2022-10-31	1102522C	2027262822	FJWE08948-012	
0242-387173	2022-10-31	1102522C	2027262822	FJWE08948-012	
0242-387174	2022-10-31	1102522D	2027262822	FJWE08948-012	
0242-387175	2022-10-31	1102522D	2027262822	FJWE08948-012	
0242-387176	2022-10-31	1102522D	2027262822	FJWE08948-012	
0242-387177	2022-10-31	1102522D	2027262822	FJWE08948-012	
0242-387178	2022-10-31	1102522D	2027262822	FJWE08948-012	
0242-387179	2022-10-31	1102522D	2027262827	FJWE08948-012	
0242-387180	2022-10-31	1102522D	2027262827	FJWE08948-012	
0242-387181	2022-10-31	1102522D	2027262827	FJWE08948-012	
0242-387182	2022-10-31	1102522D	2027262827	FJWE08948-012	
0242-387183	2022-10-31	1102522D	2027262827	FJWE08948-012	
0242-387184	2022-10-31	1102522D	2027262827	FJWE08948-012	
0242-387185	2022-10-31	1102522D	2027262827	FJWE08948-012	
0242-387186	2022-10-31	1102522D	2027262827	FJWE08948-012	
0242-387187	2022-10-31	1102522D	2027262827	FJWE08948-012	
0242-387188	2022-10-31	1102522D	2027262827	FJWE08948-012	

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19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073

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PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-4

PROJECT NAME: OWL LF CELLS 4A 4B

0242-387189	2022-10-31	1102522D	2027262769	FJWE08948-012	
0242-387190	2022-10-31	1102522D	2027262769	F3WE00905-001	
0242-387191	2022-10-31	1102522D	2027262769	F3WE00905-001	
0242-387192	2022-10-31	1102522D	2027262769	F3WE00905-001	
0242-387193	2022-10-31	1102522D	2027262769	F3WE00905-001	conformance
0242-387194	2022-10-31	1102522D	2027262769	F3WE00905-001	
0242-387195	2022-10-31	1102522D	2027262769	F3WE00905-001	
0242-387196	2022-10-31	1102522D	2027262769	F3WE00905-001	
0242-387197	2022-10-31	1102522D	2027262769	F3WE00905-001	
0242-387198	2022-10-31	1102522D	2027262769	F3WE00905-001	
0242-387199	2022-10-31	1102522D	2027262774	F3WE00905-001	

**QUANTITY (ROLLS): 135** 

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**Solmax Geosynthetics LLC** 

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073

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SOLMAX
Charles Taylor
Per APPROVED

Direction

**Test Method** 

**TEST RESULTS** 

PROJECT NUMBER:

SW2211

SALES ORDER:

Frequency

SO-094167

PACKING SLIP NUMBER:

Pre-SO-094167-4

Rolls

Unit
Ibs/ft²
Ibf
Ibf/in
Ibf/in
%
Ibs/ft²

PROJECT NAME: OWL LF CELLS 4A 4B

**Property** 

**PRODUCT:** 1109263-35011-6

Test

Bentoliner 0.75 lbs/ft<sup>2</sup> - 3.66 kg/m<sup>2</sup>, NS, Peel 35

	1 Ben	tonite Mas	s (0% mois	sture)			ASTM D5993	1/40,000 ft <sup>2</sup>
	2 Pee	l Strength	(min.avg.)			MD	ASTM D4632	1/40,000 ft <sup>2</sup>
	3 Pee	l Strength	(min.avg.)			MD	ASTM D6496	1/40,000 ft <sup>2</sup>
	4 Ten	sile Streng	th MD (mir	n. avg.)		MD	ASTM D6768	1/40,000 ft <sup>2</sup>
	5 Moi	sture Cont	ent (max)				ASTM D5993	1/40,000 ft <sup>2</sup>
	6 Finis	shed Good	Mass (0%	moisture)	)		ASTM D5993	1/40,000 ft <sup>2</sup>
Test	1	2	3	4	5	6		
SPECIFICATIONS	0.75	35	5.3	30	12	0.81		
0242-387065	0.81	45.0	9.2	46	11.7	0.89		
0242-387066	0.81	45.0	9.2	46	11.7	0.89		
0242-387067	0.81	45.0	9.2	46	11.7	0.89		
0242-387068	0.81	45.0	9.2	46	11.7	0.89		
0242-387069	0.81	45.0	9.2	46	11.7	0.89		
0242-387070	0.81	45.0	9.2	46	11.7	0.89		
0242-387071	0.81	45.0	9.2	46	11.7	0.89		
0242-387072	0.81	45.0	9.2	46	11.7	0.89		
0242-387073	0.81	45.0	9.2	46	11.7	0.89		
0242-387074	0.81	45.0	9.2	46	11.7	0.89		
0242-387075	0.81	45.0	9.2	46	11.7	0.89		
0242-387076	0.81	45.0	9.2	46	11.7	0.89		
0242-387077	0.81	45.0	9.2	46	11.7	0.89		
0242-387078	0.81	45.0	9.2	46	11.7	0.89		
0242-387079	0.81	45.0	9.2	46	11.7	0.89		
0242-387080	0.81	45.0	9.2	46	11.7	0.89		
0242-387081	0.83	59.0	12.0	39	11.7	0.90		
0242-387082	0.83	59.0	12.0	39	11.7	0.90		

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0.90

0.90

0.90

0.90

**Solmax Geosynthetics LLC** 

0.83

0.83

0.83

0.83

0242-387083

0242-387084

0242-387085

0242-387086

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073

59.0

59.0

59.0

59.0

12.0

12.0

12.0

12.0

39

39

39

39

11.7

11.7

11.7

11.7



**TEST RESULTS** 

PROJECT NUMBER:

SW2211

SALES ORDER:

SO-094167

PACKING SLIP NUMBER:

Pre-SO-094167-4

PROJECT NAME: OWL LF CELLS 4A 4B

Test	1	2	3	4	5	6
0242-387087	0.83	59.0	12.0	39	11.7	0.90
0242-387088	0.83	59.0	12.0	39	11.7	0.90
0242-387089	0.83	59.0	12.0	39	11.7	0.90
0242-387090	0.83	59.0	12.0	39	11.7	0.90
0242-387091	0.83	59.0	12.0	39	11.7	0.90
0242-387092	0.83	59.0	12.0	39	11.7	0.90
0242-387093	0.83	59.0	12.0	39	11.7	0.90
0242-387094	0.83	59.0	12.0	39	11.7	0.90
0242-387095	0.83	59.0	12.0	39	11.7	0.90
0242-387096	0.83	59.0	12.0	39	11.7	0.90
0242-387097	0.86	57.0	12.0	43	11.6	0.94
0242-387098	0.86	57.0	12.0	43	11.6	0.94
0242-387099	0.86	57.0	12.0	43	11.6	0.94
0242-387100	0.86	57.0	12.0	43	11.6	0.94
0242-387101	0.86	57.0	12.0	43	11.6	0.94
0242-387102	0.86	57.0	12.0	43	11.6	0.94
0242-387103			12.0	43	11.6	0.94
0242-387104	0.86	57.0	12.0	43	11.6	0.94
0242-387105	0.86	57.0	12.0	43	11.6	0.94
0242-387106	0.86	57.0	12.0	43	11.6	0.94
0242-387107	0.86	57.0	12.0	43	11.6	0.94
0242-387108	0.86	57.0	12.0	43	11.6	0.94
0242-387109	0.86	57.0	12.0	43	11.6	0.94
0242-387110	0.86	57.0	12.0	43	11.6	0.94
0242-387111	0.86	57.0	12.0	43	11.6	0.94
0242-387112	0.86	57.0	12.0	43	11.6	0.94
0242-387113	0.83	40.0	8.0	46	11.4	0.91
0242-387114	0.83	40.0	8.0	46	11.4	0.91
0242-387115	0.83	40.0	8.0	46	11.4	0.91
0242-387116	0.83	40.0	8.0	46	11.4	0.91
0242-387117	0.83	40.0	8.0	46	11.4	0.91
0242-387118	0.83	40.0	8.0	46	11.4	0.91
0242-387119	0.83	40.0	8.0	46	11.4	0.91
0242-387120	0.83	40.0	8.0	46	11.4	0.91
0242-387121	0.83	40.0	8.0	46	11.4	0.91

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**Solmax Geosynthetics LLC** 

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073



**TEST RESULTS** 

PROJECT NUMBER:

SW2211

SALES ORDER:

SO-094167

PACKING SLIP NUMBER:

Pre-SO-094167-4

PROJECT NAME: OWL LF CELLS 4A 4B

Test	: 1	2	3	4	5	6
0242-387122	0.83	40.0	8.0	46	11.4	0.91
0242-387123	0.83	40.0	8.0	46	11.4	0.91
0242-387124	0.83	40.0	8.0	46	11.4	0.91
0242-387125	0.83	40.0	8.0	46	11.4	0.91
0242-387126	0.83	40.0	8.0	46	11.4	0.91
0242-387127	0.83	40.0	8.0	46	11.4	0.91
0242-387128	0.83	40.0	8.0	46	11.4	0.91
0242-387129	0.80	65.0	10.0	48	10.4	0.88
0242-387130	0.80	65.0	10.0	48	10.4	0.88
0242-387131	0.80	65.0	10.0	48	10.4	0.88
0242-387132	0.80	65.0	10.0	48	10.4	0.88
0242-387133	0.80	65.0	10.0	48	10.4	0.88
0242-387134	0.80	65.0	10.0	48	10.4	0.88
0242-387135	0.80	65.0	10.0	48	10.4	0.88
0242-387136	0.80	65.0	10.0	48	10.4	0.88
0242-387137	0.80	65.0	10.0	48	10.4	0.88
0242-387138	0.80	65.0	10.0	48	10.4	0.88
0242-387139	0.80	65.0	10.0	48	10.4	0.88
0242-387140	0.80	65.0	10.0	48	10.4	0.88
0242-387141	0.80	65.0	10.0	48	10.4	0.88
0242-387142	0.80	65.0	10.0	48	10.4	0.88
0242-387143	0.80	65.0	10.0	48	10.4	0.88
0242-387144	0.80	65.0	10.0	48	10.4	0.88
0242-387145	0.81	61.0	13.0	56	10.3	0.89
0242-387146	0.81	61.0	13.0	56	10.3	0.89
0242-387147	0.81	61.0	13.0	56	10.3	0.89
0242-387148	0.81	61.0	13.0	56	10.3	0.89
0242-387149	0.81	61.0	13.0	56	10.3	0.89
0242-387150	0.81	61.0	13.0	56	10.3	0.89
0242-387151	0.81	61.0	13.0	56	10.3	0.89
0242-387152	0.81	61.0	13.0	56	10.3	0.89
0242-387153	0.81	61.0	13.0	56	10.3	0.89
0242-387154	0.81	61.0	13.0	56	10.3	0.89
0242-387155	0.81	61.0	13.0	56	10.3	0.89
0242-387156	0.81	61.0	13.0	56	10.3	0.89

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**Solmax Geosynthetics LLC** 

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073



**TEST RESULTS** 

PROJECT NUMBER:

SW2211

SALES ORDER:

SO-094167

PACKING SLIP NUMBER:

Pre-SO-094167-4

PROJECT NAME: OWL LF CELLS 4A 4B

Test	1	2	3	4	5	6
0242-387157	0.81	61.0	13.0	56	10.3	0.89
0242-387158	0.81	61.0	13.0	56	10.3	0.89
0242-387159	0.81	61.0	13.0	56	10.3	0.89
0242-387160	0.81	61.0	13.0	56	10.3	0.89
0242-387161	0.83	56.0	10.0	49	10.5	0.90
0242-387162	0.83	56.0	10.0	49	10.5	0.90
0242-387163	0.83	56.0	10.0	49	10.5	0.90
0242-387164	0.83	56.0	10.0	49	10.5	0.90
0242-387165	0.83	56.0	10.0	49	10.5	0.90
0242-387166	0.83	56.0	10.0	49	10.5	0.90
0242-387167	0.83	56.0	10.0	49	10.5	0.90
0242-387168	0.83	56.0	10.0	49	10.5	0.90
0242-387169	0.83	56.0	10.0	49	10.5	0.90
0242-387170	0.83	56.0	10.0	49	10.5	0.90
0242-387171	0.83	56.0	10.0	49	10.5	0.90
0242-387172	0.83	56.0	10.0	49	10.5	0.90
0242-387173	0.83	56.0	10.0	49	10.5	0.90
0242-387174	0.83	56.0	10.0	49	10.5	0.90
0242-387175	0.83	56.0	10.0	49	10.5	0.90
0242-387176	0.83	56.0	10.0	49	10.5	0.90
0242-387177	0.82	59.0	13.0	47	10.3	0.90
0242-387178	0.82	59.0	13.0	47	10.3	0.90
0242-387179	0.82	59.0	13.0	47	10.3	0.90
0242-387180	0.82	59.0	13.0	47	10.3	0.90
0242-387181	0.82	59.0	13.0	47	10.3	0.90
0242-387182	0.82	59.0	13.0	47	10.3	0.90
0242-387183	0.82	59.0	13.0	47	10.3	0.90
0242-387184	0.82	59.0	13.0	47	10.3	0.90
0242-387185	0.82	59.0	13.0	47	10.3	0.90
0242-387186	0.82	59.0	13.0	47	10.3	0.90
0242-387187	0.82	59.0	13.0	47	10.3	0.90
0242-387188	0.82	59.0	13.0	47	10.3	0.90
0242-387189	0.82	59.0	13.0	47	10.3	0.90
0242-387190	0.82	59.0	13.0	47	10.3	0.90
0242-387191	0.82	59.0	13.0	47	10.3	0.90

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**Solmax Geosynthetics LLC** 

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073



SOLMAX
Charles Taylor

Re APPROVED MARKET

ASSURANT

**TEST RESULTS** 

PROJECT NUMBER:

SW2211

SALES ORDER:

SO-094167

PACKING SLIP NUMBER:

Pre-SO-094167-4

PROJECT NAME: OWL LF CELLS 4A 4B

-	Test 1	2	3	4	5	6
0242-387192	0.82	59.0	13.0	47	10.3	0.90
0242-387193	0.81	71.0	13.0	39	10.5	0.89
0242-387194	0.81	71.0	13.0	39	10.5	0.89
0242-387195	0.81	71.0	13.0	39	10.5	0.89
0242-387196	0.81	71.0	13.0	39	10.5	0.89
0242-387197	0.81	71.0	13.0	39	10.5	0.89
0242-387198	0.81	71.0	13.0	39	10.5	0.89
0242-387199	0.81	71.0	13.0	39	10.5	0.89

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**Solmax Geosynthetics LLC** 

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073





**TEST RESULTS** 

PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-4

PROJECT NAME: OWL LF CELLS 4A 4B

**PRODUCT:** 1109263-35011-6

Bentoliner 0.75 lbs/ft<sup>2</sup> - 3.66 kg/m<sup>2</sup>, NS, Peel 35

Test	Property	Direction	Test Method	Frequency	Unit
1	Swell Index (min.)		ASTM D5890	1 / 100,000 lb	ml/2 g
2	Moisture Content (max.)		ASTM D4643	1 / 100,000 lb	%
3	Fluid Loss (max.)		ASTM D5891	1 / 100,000 lb	ml
	Test 1 2 3				

Test	1	2	3
Specification	24	12	18
1102122D	28.0	10.3	13
1102522A	28.0	10.1	14
1102522B	32.0	10.2	13
1102522C	30.0	11.1	13
1102522D	33.0	10.7	13

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Solmax Geosynthetics LLC

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**TEST RESULTS** 

PROJECT NUMBER:

SW2211

SALES ORDER:

SO-094167

PACKING SLIP NUMBER:

Pre-SO-094167-4

PROJECT NAME: OWL LF CELLS 4A 4B

Test	Property				Dire	ection	Tost M	ethod	ethod Frequency	athod Frequency	athod Frequency	ethod Frequency	ethod Frequency	ethod Frequency Uni	ethod Frequency Unit	athod Fraguency Unit	ethod Frequency Unit	othod Fraguency Unit	othod Fraguency Unit	ethod Frequency Unit	othod Fraguency Unit
	Mass per U	nit Area	(min_avg.)	١	Dire	ction	Test Method ASTM D5261		· · · · · ·	•	• •	· · · · · ·	• •	• •	• •	• •		• •	• •	• •	• •
	Strength (M		(IIIII. avg.)	,			ASTIVI DS201		1/200,000 10	1/200,000 10	1/200,000 11	1/200,000 10		1/200,000 it 02/	•	ŕ	ŕ		ŕ	•	· ·
<u>.</u>	Strength (T													lbf							
ļ	Elongation													%							
;	Elongation													%	%	%	%	%	%	%	%
	Test	1	2	3	4	5															
	Specification	6	22	22	100	100															
	2027262769	7.8	152	281	148	144															
	2027262772	7.1	138	223	144	141															
	2027262774	7.6	173	266	134	134															
	2027262781	7.5	216	246	131	127															
	2027262822	7.9	112	247	152	143															
	2027262825	7.8	116	227	161	143															
	2027262827	7.8	116	227	161	143															
	2027262829	7.8	117	253	160	151															
	2027262831	7.8	94	232	146	151															
	2027262853	8.0	134	256	157	146															
	2027278307	7.7	98	208	152	138															
	2027278324	7.7	129	205	132	118															
	2027278325	7.7	129	205	132	118															
	2027278327	7.0	86	180	138	135															

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**TEST RESULTS** 

PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-4

PROJECT NAME: OWL LF CELLS 4A 4B

Test	Property				Dire	ection	Test Method	Test Method Frequency
1	Mass per Ur	nit Area	(min. avg.)	)			ASTM D5261	. ,
	Grab Tensile	e Proper	ties (min. a	avg)			ASTM D4632	ASTM D4632 1/200,000 ft <sup>2</sup>
2	Strength (M	1D)						
3	Strength (TI	D)						
4	Elongation (	(MD)						
5	Elongation (	(TD)						
	Test	1	2	3	4	5		
Spe	cification	3	135	100	10	10		
F3WE0	0889-006	3.3	177	100	23	12		
F3WE0	0905-001	3.3	181	120	20	12		
F3WE0	0905-002	3.3	181	120	20	12		
F3WE0	0910-008	3.3	173	100	23	13		
FJWE0	8948-005	3.4	174	110	20	12		
FJWE0	8948-012	3.3	172	109	20	11		

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Solmax Geosynthetics LLC

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073

CERTIFICATE OF ANALYSIS 2022

PRODUCT: NATIONAL® 30

SHIPPED FRO BENTONITE PERFORMANCE MINERALS LLC 554 US HWY 212 COLONY PLANT BELLE FOURCHE, S.D. 57717

	BOL#	LOAD DATE	LOT CODE	% MOIST 12 MAX	Mesh % + 20 <b>15 MAX</b>	Mesh % - 200 <b>10 MAX</b>	FL 18 MAX	MBC MEQ 70 MIN	SWELL INDEX 25 MIN	PWA 750 MIN	OCTOBER No. of		% MOIST 12 MAX	Mesh % + 20 <b>15 MAX</b>	Mesh % - 200 <b>10 MAX</b>	0 FL 18 MAX	MBC meq 70 MIN	SWELL INDEX 25 MIN	PWA 750 MIN	DATE 10-*
П	B0004786471 B0004786482	10-24-22 10-24-22	1102122C 1102122D	9.6 9.2	0.42 0.07	3.26 2.52	12.2 13.0	112 112	30 31	798 810	CARS 36	M AVG STD DEV	9.62 0.52	0.19 0.60	2.05 1.08	12.91 0.94	112.43 3.02	29.86 1.28	854.65 50.63	10-^
											YTD		% MOIST 12 MAX	Mesh % + 20 15 MAX	Mesh % - 200 10 MAX	0 FL 18 MAX	MBC meq 70 MIN	SWELL INDEX 25 MIN	PWA 750 MIN	
											No. of CARS 464	M AVG STD DEV	8.99 0.62	0.20 0.43	3.15 1.42	13.63 1.12	112.41 3.78	30.14 1.59	909.56 67.07	
											SOLD TO:	Solmax					For an	ny questions o	ontact.	

19103 Gundle RD Houston, TX 77073 Q.A. SUPERVISOR Tucker Goodvin

Attn: Bob Stadler (rstadler@gseworld.com) Chuck Taylor (ctaylor@gseworld.com) Cheryl Hofer (chofer@gseworld.com)

SHIPPED TO: Solmax

3150 FIRST AVENUE SPEARFISH, SD 57783

CC: Jason Tawse File

Prepared by: TO 10/25/22

CERTIFICATE OF ANALYSIS 2022

PRODUCT: NATIONAL® 30

SHIPPED FRO BENTONITE PERFORMANCE MINERALS LLC 554 US HWY 212 COLONY PLANT BELLE FOURCHE, S.D. 57717

BOL#	LOAD DATE	LOT CODE	% MOIST 12 MAX	Mesh % + 20 <b>15 MAX</b>	Mesh % - 200 10 MAX	FL 18 MAX	MBC MEQ 70 MIN	SWELL INDEX 25 MIN	PWA 750 MIN	OCTOBER No. of		% MOIST 12 MAX	Mesh % + 20 <b>15 MAX</b>	Mesh % - 200 10 MAX	0 FL 18 MAX	MBC meq 70 MIN	SWELL INDEX 25 MIN	PWA 750 MIN	DATE 10-*
B0004786483	10-25-22	1102522A	9.0	0.04	3.32	12.6	110	29	849	CARS 37	M AVG STD DEV	9.60 0.52	0.18 0.59	2.08 1.09	12.91 0.92	112.37 3.00	29.84 1.27	854.50 49.97	10
										YTD		% MOIST 12 MAX	Mesh % + 20 15 MAX	Mesh % - 200 <b>10 MAX</b>	0 FL 18 MAX	MBC meq 70 MIN	SWELL INDEX 25 MIN	PWA 750 MIN	
										No. of CARS 465	M AVG STD DEV	8.99 0.62	0.20 0.43	3.15 1.42	13.62 1.12	112.41 3.78	30.14 1.59	909.43 67.06	

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SHIPPED TO: Solmax

3150 FIRST AVENUE SPEARFISH, SD 57783

CC: Jason Tawse File

Prepared by: TO 10/25/22

CERTIFICATE OF ANALYSIS 2022

PRODUCT: NATIONAL® 30

SHIPPED FRO BENTONITE PERFORMANCE MINERALS LLC 554 US HWY 212 COLONY PLANT BELLE FOURCHE, S.D. 57717

BOL#	LOAD DATE	LOT CODE	% MOIST 12 MAX	Mesh % + 20 15 MAX	Mesh % - 200 10 MAX	FL 18 MAX	MBC MEQ 70 MIN	SWELL INDEX 25 MIN	PWA 750 MIN	OCTOBER No. of		% MOIST 12 MAX	Mesh % + 20 15 MAX	Mesh % - 200 <b>10 MAX</b>	0 FL 18 MAX	MBC meq 70 MIN	SWELL INDEX 25 MIN	PWA 750 MIN	DATE 10-*
B0004786484 B0004786486	10-25-22 10-25-22	1102522B 1102522C	9.2 10.8	0.08 0.05	1.42 1.72	12.8 12.8	114 112	30 31	883 876	CARS 39	M AVG STD DEV	9.62 0.54	0.18 0.58	2.06 1.07	12.90 0.90	112.40 2.94	29.88 1.25	855.75 49.01	10
										YTD		% MOIST 12 MAX	Mesh % + 20 <b>15 MAX</b>	Mesh % - 200 10 MAX	0 FL 18 MAX	MBC meq 70 MIN	SWELL INDEX 25 MIN	PWA 750 MIN	
										No. of CARS 467	M AVG STD DEV	8.99 0.63	0.20 0.43	3.14 1.42	13.62 1.12	112.41 3.77	30.14 1.58	909.30 66.95	

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SHIPPED TO: Solmax

3150 FIRST AVENUE SPEARFISH, SD 57783

CC: Jason Tawse File

Prepared by: TO 10/26/22

CERTIFICATE OF ANALYSIS 2022

PRODUCT: NATIONAL® 30

SHIPPED FRO BENTONITE PERFORMANCE MINERALS LLC 554 US HWY 212 COLONY PLANT BELLE FOURCHE, S.D. 57717

meq INDEX 750 AX 70 MIN 25 MIN MIN	N DATE
0 112.40 29.88 855.7 0 2.94 1.25 49.01	
MBC SWELL PWA meq INDEX 750 AX 70 MIN 25 MIN MIN	
2 112.41 30.14 909.3 2 3.77 1.58 66.95	
AX 0 0 AX 2	70 MIN 25 MIN MII  112.40 29.88 855.7 2.94 1.25 49.0  MBC SWELL PW. meq INDEX 750 70 MIN 25 MIN MII  112.41 30.14 909.3

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3150 FIRST AVENUE SPEARFISH, SD 57783

CC: Jason Tawse File

Prepared by: TO 10/26/22

CERTIFICATE OF ANALYSIS 2022

PRODUCT: NATIONAL® 30

SHIPPED FRO BENTONITE PERFORMANCE MINERALS LLC 554 US HWY 212 COLONY PLANT BELLE FOURCHE, S.D. 57717

BOL#	LOAD DATE	LOT CODE	% MOIST 12 MAX	Mesh % + 20 15 MAX	Mesh % - 200 10 MAX	FL 18 MAX	MBC MEQ 70 MIN	SWELL INDEX 25 MIN	PWA 750 MIN	OCTOBER No. of		% MOIST 12 MAX	Mesh % + 20 <b>15 MAX</b>	Mesh % - 200 <b>10 MAX</b>	0 FL 18 MAX	MBC meq 70 MIN	SWELL INDEX 25 MIN	PWA 750 MIN	DATE 10-*
B0004786487	10-27-22	1102522D	9.7	1.26	2.90	13.0	112	30	761	CARS 40	M AVG STD DEV	9.62 0.54	0.20 0.60	2.08 1.06	12.90 0.89	112.39 2.90	29.88 1.23	853.44 50.57	10
												%	Mesh	Mesh	0	MBC	SWELL	PWA	
										YTD No. of		MOIST 12 MAX	% + 20 15 MAX	% - 200 10 MAX	FL 18 MAX	meq 70 MIN	INDEX 25 MIN	750 MIN	
										CARS 468	M AVG STD DEV	8.99 0.63	0.20 0.43	3.14 1.42	13.62 1.12	112.41 3.77	30.14 1.58	908.99 67.22	

SOLD TO: Solmax

19103 Gundle RD Houston, TX 77073 For any questions contact. Q.A. SUPERVISOR Tucker Goodvin

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SHIPPED TO: Solmax

3150 FIRST AVENUE SPEARFISH, SD 57783

CC: Jason Tawse File

Prepared by: TO 10/27/22



Austin, TX - USA | Anaheim, CA - USA | Anderson, SC - USA | Gold Coast - Australia | Suzhou - China | Cullinan, South Africa

TRI Log #:

## GCL Compatibility Test (ASTM D6766 Scenario I Method C)

Client: Solmax

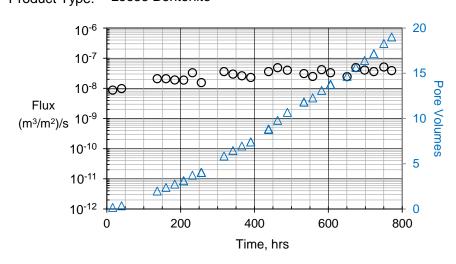
Project:

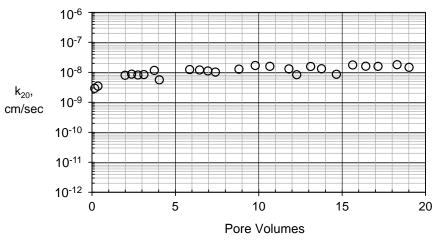
Sample ID:

Yearly Testing

1081321B

Product Type: Loose Bentonite





#### **Initial Conditions**

Sample Diameter (in)	3.99
Sample Height (in)	0.20
Moisture Content (%)	10.0

70542.1

#### **Final Conditions**

Sample Diameter (in)	3.99
Sample Height (in)	0.22
Moisture Content (%)	128.2
G <sub>s</sub> (assumed)	2.65
Porosity, n	0.77
1 Pore Volume (cc)	34.8
Effective Confining Stress at the Effluent End (psi)	5.0

## Description of test liquid:

GRI-GCL3, Revision #4 0.1 M CaCl2

#### Termination Criteria:

GRI-GCL3, Revision #4 5 psi (35 kPa): k <1x10-6 cm/s

## Results<sup>(1)</sup>

Flux, q <sub>t</sub> (m³/m²)/s	3.1E-08
Hydraulic Conductivity, k <sub>20</sub> <sup>(2)</sup> (cm/s)	1.2E-08
Hydraulic Gradient, i (m/m)	413.8

- (1): Average values obtained from the last 3 readings.
- (2): Hydraulic Conductivity, k, corrected to 20°C

Jeffrey A. Kuhn, Ph.D., P.E., 10/21/2022 Quality Review / Date



Austin, TX - USA | Anaheim, CA - USA | Anderson, SC - USA | Gold Coast - Australia | Suzhou - China | Cullinan, South Africa

Time	Pore	Gradient, i	Flux	<b>k</b> <sub>20</sub>	Q <sub>in</sub> /
(hr)	Volumes	(m/m)	(m/s)	(cm/s)	Q <sub>out</sub>
16.1	0.17	508.3	8.75E-09	2.92E-09	2.75
40.1	0.36	500.1	9.77E-09	3.45E-09	0.92
136.5	1.99	431.6	2.08E-08	7.96E-09	0.95
160.3	2.38	414.6	2.09E-08	8.67E-09	0.89
184.1	2.76	399.3	1.89E-08	8.13E-09	1.00
208.2	3.12	383.9	1.87E-08	8.39E-09	0.92
232.0	3.74	486.1	3.31E-08	1.15E-08	0.91
256.1	4.04	473.3	1.56E-08	5.57E-09	0.90
317.7	5.86	437.4	3.61E-08	1.24E-08	0.96
341.8	6.45	412.8	2.96E-08	1.20E-08	1.00
365.8	6.96	391.4	2.62E-08	1.11E-08	0.91
389.9	7.41	372.5	2.29E-08	1.02E-08	0.97
438.1	8.82	454.1	3.58E-08	1.27E-08	0.96
462.6	9.79	472.7	4.83E-08	1.69E-08	0.97
489.1	10.67	436.3	4.00E-08	1.58E-08	0.98
534.0	11.81	389.0	3.09E-08	1.30E-08	0.97
557.7	12.28	493.2	2.46E-08	8.27E-09	0.94
581.8	13.11	458.7	4.16E-08	1.57E-08	0.98
605.8	13.77	431.8	3.28E-08	1.32E-08	1.00
650.8	14.66	475.5	2.44E-08	8.55E-09	0.95
674.7	15.64	436.1	4.86E-08	1.75E-08	1.00
698.4	16.42	403.3	4.03E-08	1.60E-08	0.96
723.3	17.16	372.8	3.59E-08	1.58E-08	0.98
750.3	18.30	465.6	5.13E-08	1.80E-08	0.97
771.3	19.02	437.8	3.89E-08	1.47E-08	1.12



Austin, TX - USA | Anaheim, CA - USA | Anderson, SC - USA | Gold Coast - Australia | Suzhou - China | Cullinan, South Africa

TRI Log #:

## GCL Compatibility Test (ASTM D6766 Scenario I Method C)

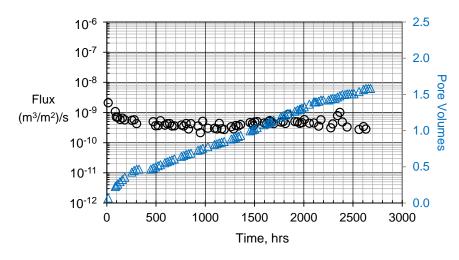
Client: Solmax

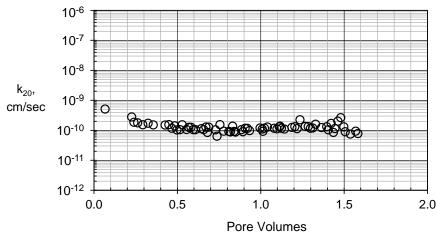
Project:

Yearly Testing

Sample ID: 1081321B

Product Type: Loose Bentonite





#### **Initial Conditions**

Sample Diameter (in)	3.99
Sample Height (in)	0.20
Moisture Content (%)	10.0

70542.1

#### **Final Conditions**

Sample Diameter (in)	3.99
Sample Height (in)	0.16
Moisture Content (%)	56.3
G <sub>s</sub> (assumed)	2.65
Porosity, n	0.69
1 Pore Volume (cc)	22.5
Effective Confining Stress at the Effluent End (psi)	72.5

Description of test liquid:

GRI-GCL3, Revision #4 0.1 M CaCl2

Termination Criteria:

GRI-GCL3, Revision #4 72.5 psi (500 kPa): k < 5x10-8 cm/s

Flux, q <sub>t</sub> (m <sup>3</sup> /m <sup>2</sup> )/s	4.8E-10
Hydraulic Conductivity, k <sub>20</sub> <sup>(2)</sup> (cm/s)	1.3E-10

Results(1)

(1): Average values obtained from the last 3 readings.

(2): Hydraulic Conductivity, k, corrected to 20°C

Hydraulic Gradient, i (m/m)

Jeffrey A. Kuhn, Ph.D., P.E., 10/21/2022

Quality Review / Date

872.1



Austin, TX - USA | Anaheim, CA - USA | Anderson, SC - USA | Gold Coast - Australia | Suzhou - China | Cullinan, South Africa

Time (hr)         Pore (with)         Gradient, i (m/m)         Flux (m/s)         K <sub>20</sub> (cm/s)         Q <sub>out</sub> 14.7         0.07         959.1         2.11E-09         5.13E-10         5.00           86.7         0.23         931.5         1.08E-09         2.79E-10         4.00           96.3         0.24         929.2         7.12E-10         1.86E-10         3.00           111.2         0.26         925.8         6.96E-10         1.77E-10         5.00           134.7         0.29         920.8         5.86E-10         1.53E-10         7.00           158.4         0.32         915.3         6.53E-10         1.72E-10         3.50           182.6         0.36         910.4         5.70E-10         1.52E-10         7.00           254.7         0.43         896.4         5.49E-10         1.49E-10         2.29           278.6         0.45         891.8         5.76E-10         1.5E-10         1.67           302.7         0.47         888.1         4.29E-10         1.16E-10         2.00           470.9         0.48         859.6         4.97E-10         1.40E-10         1.33           494.6         0.50         856.6					_	0 /
14.7         0.07         959.1         2.11E-09         5.13E-10         5.00           86.7         0.23         931.5         1.08E-09         2.79E-10         4.00           96.3         0.24         929.2         7.12E-10         1.86E-10         3.00           111.2         0.26         925.8         6.96E-10         1.77E-10         5.00           134.7         0.29         920.8         5.86E-10         1.53E-10         7.00           158.4         0.32         915.3         6.53E-10         1.72E-10         3.50           182.6         0.36         910.4         5.70E-10         1.52E-10         7.00           254.7         0.43         896.4         5.49E-10         1.49E-10         2.29           278.6         0.45         891.8         5.76E-10         1.54E-10         1.67           302.7         0.47         888.1         4.29E-10         1.16E-10         2.00           470.9         0.48         859.6         4.97E-10         1.40E-10         1.33           494.6         0.50         856.6         3.64E-10         1.0E-10         1.50           522.6         0.52         852.9         3.69E-10         1	Time	Pore	Gradient, i	Flux	k <sub>20</sub>	Q <sub>in</sub> /
86.7         0.23         931.5         1.08E-09         2.79E-10         4.00           96.3         0.24         929.2         7.12E-10         1.86E-10         3.00           111.2         0.26         925.8         6.96E-10         1.77E-10         5.00           134.7         0.29         920.8         5.86E-10         1.53E-10         7.00           158.4         0.32         915.3         6.53E-10         1.72E-10         3.50           182.6         0.36         910.4         5.70E-10         1.52E-10         7.00           254.7         0.43         896.4         5.49E-10         1.49E-10         2.29           278.6         0.45         891.8         5.76E-10         1.54E-10         1.67           302.7         0.47         888.1         4.29E-10         1.16E-10         2.00           470.9         0.48         859.6         4.97E-10         1.40E-10         1.33           494.6         0.50         856.6         3.64E-10         1.02E-10         1.50           522.6         0.52         852.9         3.69E-10         1.5E-10         2.00           545.3         0.53         848.6         5.32E-10	-		· · · · ·	` ′	, ,	
96.3         0.24         929.2         7.12E-10         1.86E-10         3.00           111.2         0.26         925.8         6.96E-10         1.77E-10         5.00           134.7         0.29         920.8         5.86E-10         1.53E-10         7.00           158.4         0.32         915.3         6.53E-10         1.72E-10         3.50           182.6         0.36         910.4         5.70E-10         1.52E-10         7.00           254.7         0.43         896.4         5.49E-10         1.49E-10         2.29           278.6         0.45         891.8         5.76E-10         1.54E-10         1.67           302.7         0.47         888.1         4.29E-10         1.16E-10         2.00           470.9         0.48         859.6         4.97E-10         1.40E-10         1.33           494.6         0.50         856.6         3.64E-10         1.02E-10         1.50           522.6         0.52         852.9         3.69E-10         1.52E-10         0.75           590.6         0.56         842.8         3.80E-10         1.05E-10         1.50           614.7         0.57         838.9         4.29E-10 <t< td=""><td>_</td><td></td><td></td><td></td><td></td><td></td></t<>	_					
111.2         0.26         925.8         6.96E-10         1.77E-10         5.00           134.7         0.29         920.8         5.86E-10         1.53E-10         7.00           158.4         0.32         915.3         6.53E-10         1.72E-10         3.50           182.6         0.36         910.4         5.70E-10         1.52E-10         7.00           254.7         0.43         896.4         5.49E-10         1.49E-10         2.29           278.6         0.45         891.8         5.76E-10         1.54E-10         1.67           302.7         0.47         888.1         4.29E-10         1.16E-10         2.00           470.9         0.48         859.6         4.97E-10         1.40E-10         1.33           494.6         0.50         856.6         3.64E-10         1.02E-10         1.50           522.6         0.52         852.9         3.69E-10         1.05E-10         2.00           545.3         0.53         848.6         5.32E-10         1.52E-10         0.75           590.6         0.56         842.8         3.80E-10         1.06E-10         1.50           614.7         0.57         838.9         4.29E-10         <						
134.7         0.29         920.8         5.86E-10         1.53E-10         7.00           158.4         0.32         915.3         6.53E-10         1.72E-10         3.50           182.6         0.36         910.4         5.70E-10         1.52E-10         7.00           254.7         0.43         896.4         5.49E-10         1.49E-10         2.29           278.6         0.45         891.8         5.76E-10         1.54E-10         1.67           302.7         0.47         888.1         4.29E-10         1.16E-10         2.00           470.9         0.48         859.6         4.97E-10         1.40E-10         1.33           494.6         0.50         856.6         3.64E-10         1.02E-10         1.50           522.6         0.52         852.9         3.69E-10         1.05E-10         2.00           545.3         0.53         848.6         5.32E-10         1.52E-10         0.75           590.6         0.56         842.8         3.80E-10         1.26E-10         1.00           638.6         0.58         835.3         4.32E-10         1.26E-10         1.0           662.7         0.60         832.3         3.57E-10 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td></t<>						
158.4         0.32         915.3         6.53E-10         1.72E-10         3.50           182.6         0.36         910.4         5.70E-10         1.52E-10         7.00           254.7         0.43         896.4         5.49E-10         1.49E-10         2.29           278.6         0.45         891.8         5.76E-10         1.54E-10         1.67           302.7         0.47         888.1         4.29E-10         1.16E-10         2.00           470.9         0.48         859.6         4.97E-10         1.40E-10         1.33           494.6         0.50         856.6         3.64E-10         1.02E-10         1.50           522.6         0.52         852.9         3.69E-10         1.05E-10         2.00           545.3         0.53         848.6         5.32E-10         1.52E-10         0.75           590.6         0.56         842.8         3.80E-10         1.26E-10         1.00           638.6         0.58         835.3         4.32E-10         1.26E-10         1.00           662.7         0.60         832.3         3.57E-10         1.05E-10         1.50           758.7         0.64         819.6         3.83E-10         <						
182.6         0.36         910.4         5.70E-10         1.52E-10         7.00           254.7         0.43         896.4         5.49E-10         1.49E-10         2.29           278.6         0.45         891.8         5.76E-10         1.54E-10         1.67           302.7         0.47         888.1         4.29E-10         1.16E-10         2.00           470.9         0.48         859.6         4.97E-10         1.40E-10         1.33           494.6         0.50         856.6         3.64E-10         1.02E-10         1.50           522.6         0.52         852.9         3.69E-10         1.05E-10         2.00           545.3         0.53         848.6         5.32E-10         1.52E-10         0.75           590.6         0.56         842.8         3.80E-10         1.06E-10         1.50           614.7         0.57         838.9         4.29E-10         1.26E-10         1.00           638.6         0.58         835.3         4.32E-10         1.26E-10         1.00           662.7         0.60         832.3         3.57E-10         1.05E-10         1.50           758.7         0.64         819.6         3.83E-10         <	_					
254.7         0.43         896.4         5.49E-10         1.49E-10         2.29           278.6         0.45         891.8         5.76E-10         1.54E-10         1.67           302.7         0.47         888.1         4.29E-10         1.16E-10         2.00           470.9         0.48         859.6         4.97E-10         1.40E-10         1.33           494.6         0.50         856.6         3.64E-10         1.02E-10         1.50           522.6         0.52         852.9         3.69E-10         1.05E-10         2.00           545.3         0.53         848.6         5.32E-10         1.52E-10         0.75           590.6         0.56         842.8         3.80E-10         1.06E-10         1.50           614.7         0.57         838.9         4.29E-10         1.26E-10         1.00           638.6         0.58         835.3         4.32E-10         1.26E-10         1.00           662.7         0.60         832.3         3.57E-10         1.05E-10         1.50           758.7         0.64         819.6         3.83E-10         1.13E-10         1.00           782.7         0.66         816.6         3.57E-10         <						
278.6         0.45         891.8         5.76E-10         1.54E-10         1.67           302.7         0.47         888.1         4.29E-10         1.16E-10         2.00           470.9         0.48         859.6         4.97E-10         1.40E-10         1.33           494.6         0.50         856.6         3.64E-10         1.02E-10         1.50           522.6         0.52         852.9         3.69E-10         1.05E-10         2.00           545.3         0.53         848.6         5.32E-10         1.52E-10         0.75           590.6         0.56         842.8         3.80E-10         1.06E-10         1.50           614.7         0.57         838.9         4.29E-10         1.26E-10         1.00           638.6         0.58         835.3         4.32E-10         1.26E-10         1.00           662.7         0.60         832.3         3.57E-10         1.05E-10         1.50           758.7         0.64         819.6         3.83E-10         1.13E-10         1.00           782.7         0.66         816.6         3.57E-10         1.05E-10         1.50           806.7         0.67         812.9         4.32E-10         <						
302.7         0.47         888.1         4.29E-10         1.16E-10         2.00           470.9         0.48         859.6         4.97E-10         1.40E-10         1.33           494.6         0.50         856.6         3.64E-10         1.02E-10         1.50           522.6         0.52         852.9         3.69E-10         1.05E-10         2.00           545.3         0.53         848.6         5.32E-10         1.52E-10         0.75           590.6         0.56         842.8         3.80E-10         1.06E-10         1.50           614.7         0.57         838.9         4.29E-10         1.26E-10         1.00           638.6         0.58         835.3         4.32E-10         1.26E-10         1.00           662.7         0.60         832.3         3.57E-10         1.05E-10         1.50           758.7         0.64         819.6         3.83E-10         1.13E-10         1.00           782.7         0.66         816.6         3.57E-10         1.05E-10         1.50           806.7         0.67         812.9         4.32E-10         1.29E-10         1.00           854.8         0.69         807.0         4.29E-10         <	_					
470.9         0.48         859.6         4.97E-10         1.40E-10         1.33           494.6         0.50         856.6         3.64E-10         1.02E-10         1.50           522.6         0.52         852.9         3.69E-10         1.05E-10         2.00           545.3         0.53         848.6         5.32E-10         1.52E-10         0.75           590.6         0.56         842.8         3.80E-10         1.06E-10         1.50           614.7         0.57         838.9         4.29E-10         1.26E-10         1.00           638.6         0.58         835.3         4.32E-10         1.26E-10         1.00           662.7         0.60         832.3         3.57E-10         1.05E-10         1.50           686.7         0.61         829.3         3.59E-10         1.05E-10         1.50           758.7         0.64         819.6         3.83E-10         1.05E-10         1.50           758.7         0.66         816.6         3.57E-10         1.05E-10         1.50           806.7         0.67         812.9         4.32E-10         1.29E-10         1.00           830.7         0.68         810.6         2.86E-10         <						
494.6         0.50         856.6         3.64E-10         1.02E-10         1.50           522.6         0.52         852.9         3.69E-10         1.05E-10         2.00           545.3         0.53         848.6         5.32E-10         1.52E-10         0.75           590.6         0.56         842.8         3.80E-10         1.06E-10         1.50           614.7         0.57         838.9         4.29E-10         1.26E-10         1.00           638.6         0.58         835.3         4.32E-10         1.26E-10         1.00           662.7         0.60         832.3         3.57E-10         1.05E-10         1.50           686.7         0.61         829.3         3.59E-10         1.05E-10         1.50           758.7         0.64         819.6         3.83E-10         1.13E-10         1.00           782.7         0.66         816.6         3.57E-10         1.05E-10         1.50           806.7         0.67         812.9         4.32E-10         1.29E-10         1.00           854.8         0.69         807.0         4.29E-10         1.27E-10         0.50           926.9         0.73         798.1         3.58E-10         <						
522.6         0.52         852.9         3.69E-10         1.05E-10         2.00           545.3         0.53         848.6         5.32E-10         1.52E-10         0.75           590.6         0.56         842.8         3.80E-10         1.06E-10         1.50           614.7         0.57         838.9         4.29E-10         1.26E-10         1.00           638.6         0.58         835.3         4.32E-10         1.26E-10         1.00           662.7         0.60         832.3         3.57E-10         1.05E-10         1.50           686.7         0.61         829.3         3.59E-10         1.05E-10         1.50           758.7         0.64         819.6         3.83E-10         1.13E-10         1.00           782.7         0.66         816.6         3.57E-10         1.05E-10         1.50           806.7         0.67         812.9         4.32E-10         1.29E-10         1.00           854.8         0.69         807.0         4.29E-10         1.27E-10         0.50           926.9         0.73         798.1         3.58E-10         1.04E-10         1.50           951.1         0.74         796.2         2.14E-10         <						
545.3         0.53         848.6         5.32E-10         1.52E-10         0.75           590.6         0.56         842.8         3.80E-10         1.06E-10         1.50           614.7         0.57         838.9         4.29E-10         1.26E-10         1.00           638.6         0.58         835.3         4.32E-10         1.26E-10         1.00           662.7         0.60         832.3         3.57E-10         1.05E-10         1.50           686.7         0.61         829.3         3.59E-10         1.05E-10         1.50           758.7         0.64         819.6         3.83E-10         1.13E-10         1.00           782.7         0.66         816.6         3.57E-10         1.05E-10         1.50           806.7         0.67         812.9         4.32E-10         1.29E-10         1.00           830.7         0.68         810.6         2.86E-10         8.46E-11         1.00           854.8         0.69         807.0         4.29E-10         1.27E-10         0.50           926.9         0.73         798.1         3.58E-10         1.04E-10         1.50           974.7         0.76         791.8         5.09E-10         <			856.6			
590.6         0.56         842.8         3.80E-10         1.06E-10         1.50           614.7         0.57         838.9         4.29E-10         1.26E-10         1.00           638.6         0.58         835.3         4.32E-10         1.26E-10         1.00           662.7         0.60         832.3         3.57E-10         1.05E-10         1.50           686.7         0.61         829.3         3.59E-10         1.05E-10         1.50           758.7         0.64         819.6         3.83E-10         1.13E-10         1.00           782.7         0.66         816.6         3.57E-10         1.05E-10         1.50           806.7         0.67         812.9         4.32E-10         1.29E-10         1.00           830.7         0.68         810.6         2.86E-10         8.46E-11         1.00           854.8         0.69         807.0         4.29E-10         1.27E-10         0.50           926.9         0.73         798.1         3.58E-10         1.04E-10         1.50           951.1         0.74         796.2         2.14E-10         6.33E-11         2.00           974.7         0.76         791.8         5.09E-10         <	522.6	0.52	852.9	3.69E-10	1.05E-10	2.00
614.7         0.57         838.9         4.29E-10         1.26E-10         1.00           638.6         0.58         835.3         4.32E-10         1.26E-10         1.00           662.7         0.60         832.3         3.57E-10         1.05E-10         1.50           686.7         0.61         829.3         3.59E-10         1.05E-10         1.50           758.7         0.64         819.6         3.83E-10         1.13E-10         1.00           782.7         0.66         816.6         3.57E-10         1.05E-10         1.50           806.7         0.67         812.9         4.32E-10         1.29E-10         1.00           830.7         0.68         810.6         2.86E-10         8.46E-11         1.00           854.8         0.69         807.0         4.29E-10         1.27E-10         0.50           926.9         0.73         798.1         3.58E-10         1.04E-10         1.50           951.1         0.74         796.2         2.14E-10         6.33E-11         2.00           974.7         0.76         791.8         5.09E-10         1.55E-10         1.33           1026.2         0.78         786.3         3.01E-10	545.3	0.53	848.6	5.32E-10	1.52E-10	0.75
638.6         0.58         835.3         4.32E-10         1.26E-10         1.00           662.7         0.60         832.3         3.57E-10         1.05E-10         1.50           686.7         0.61         829.3         3.59E-10         1.05E-10         1.50           758.7         0.64         819.6         3.83E-10         1.13E-10         1.00           782.7         0.66         816.6         3.57E-10         1.05E-10         1.50           806.7         0.67         812.9         4.32E-10         1.29E-10         1.00           830.7         0.68         810.6         2.86E-10         8.46E-11         1.00           854.8         0.69         807.0         4.29E-10         1.27E-10         0.50           926.9         0.73         798.1         3.58E-10         1.04E-10         1.50           951.1         0.74         796.2         2.14E-10         6.33E-11         2.00           974.7         0.76         791.8         5.09E-10         1.55E-10         1.33           1026.2         0.78         786.3         3.01E-10         9.29E-11         1.40           1119.2         0.82         776.7         2.85E-10	590.6	0.56	842.8	3.80E-10	1.06E-10	1.50
662.7         0.60         832.3         3.57E-10         1.05E-10         1.50           686.7         0.61         829.3         3.59E-10         1.05E-10         1.50           758.7         0.64         819.6         3.83E-10         1.13E-10         1.00           782.7         0.66         816.6         3.57E-10         1.05E-10         1.50           806.7         0.67         812.9         4.32E-10         1.29E-10         1.00           830.7         0.68         810.6         2.86E-10         8.46E-11         1.00           854.8         0.69         807.0         4.29E-10         1.27E-10         0.50           926.9         0.73         798.1         3.58E-10         1.04E-10         1.50           951.1         0.74         796.2         2.14E-10         6.33E-11         2.00           974.7         0.76         791.8         5.09E-10         1.55E-10         1.33           1026.2         0.78         786.3         3.01E-10         9.29E-11         1.25           1095.1         0.81         779.2         3.00E-10         9.09E-11         1.40           1119.2         0.82         776.7         2.85E-10	614.7	0.57	838.9	4.29E-10	1.26E-10	1.00
686.7         0.61         829.3         3.59E-10         1.05E-10         1.50           758.7         0.64         819.6         3.83E-10         1.13E-10         1.00           782.7         0.66         816.6         3.57E-10         1.05E-10         1.50           806.7         0.67         812.9         4.32E-10         1.29E-10         1.00           830.7         0.68         810.6         2.86E-10         8.46E-11         1.00           854.8         0.69         807.0         4.29E-10         1.27E-10         0.50           926.9         0.73         798.1         3.58E-10         1.04E-10         1.50           951.1         0.74         796.2         2.14E-10         6.33E-11         2.00           974.7         0.76         791.8         5.09E-10         1.55E-10         1.33           1026.2         0.78         786.3         3.01E-10         9.29E-11         1.25           1095.1         0.81         779.2         3.00E-10         9.09E-11         1.40           1119.2         0.82         776.7         2.85E-10         8.80E-11         1.00           1142.8         0.83         772.9         4.38E-10	638.6	0.58	835.3	4.32E-10	1.26E-10	1.00
758.7         0.64         819.6         3.83E-10         1.13E-10         1.00           782.7         0.66         816.6         3.57E-10         1.05E-10         1.50           806.7         0.67         812.9         4.32E-10         1.29E-10         1.00           830.7         0.68         810.6         2.86E-10         8.46E-11         1.00           854.8         0.69         807.0         4.29E-10         1.27E-10         0.50           926.9         0.73         798.1         3.58E-10         1.04E-10         1.50           951.1         0.74         796.2         2.14E-10         6.33E-11         2.00           974.7         0.76         791.8         5.09E-10         1.55E-10         1.33           1026.2         0.78         786.3         3.01E-10         9.29E-11         1.25           1095.1         0.81         779.2         3.00E-10         9.09E-11         1.40           1119.2         0.82         776.7         2.85E-10         8.80E-11         1.00           142.8         0.83         772.9         4.38E-10         1.38E-10         1.00           1191.9         0.85         768.1         2.75E-10	662.7	0.60	832.3	3.57E-10	1.05E-10	1.50
782.7         0.66         816.6         3.57E-10         1.05E-10         1.50           806.7         0.67         812.9         4.32E-10         1.29E-10         1.00           830.7         0.68         810.6         2.86E-10         8.46E-11         1.00           854.8         0.69         807.0         4.29E-10         1.27E-10         0.50           926.9         0.73         798.1         3.58E-10         1.04E-10         1.50           951.1         0.74         796.2         2.14E-10         6.33E-11         2.00           974.7         0.76         791.8         5.09E-10         1.55E-10         1.33           1026.2         0.78         786.3         3.01E-10         9.29E-11         1.25           1095.1         0.81         779.2         3.00E-10         9.09E-11         1.40           1119.2         0.82         776.7         2.85E-10         8.80E-11         1.00           1142.8         0.83         772.9         4.38E-10         1.38E-10         1.00           1191.9         0.85         768.1         2.75E-10         8.72E-11         1.00           1263.6         0.88         759.8         3.36E-10	686.7	0.61	829.3	3.59E-10	1.05E-10	1.50
806.7         0.67         812.9         4.32E-10         1.29E-10         1.00           830.7         0.68         810.6         2.86E-10         8.46E-11         1.00           854.8         0.69         807.0         4.29E-10         1.27E-10         0.50           926.9         0.73         798.1         3.58E-10         1.04E-10         1.50           951.1         0.74         796.2         2.14E-10         6.33E-11         2.00           974.7         0.76         791.8         5.09E-10         1.55E-10         1.33           1026.2         0.78         786.3         3.01E-10         9.29E-11         1.25           1095.1         0.81         779.2         3.00E-10         9.09E-11         1.40           1119.2         0.82         776.7         2.85E-10         8.80E-11         1.00           1142.8         0.83         772.9         4.38E-10         1.38E-10         1.00           1191.9         0.85         768.1         2.75E-10         8.72E-11         1.00           1263.6         0.88         759.8         3.36E-10         1.05E-10         1.33           1287.8         0.89         757.3         2.85E-10	758.7	0.64	819.6	3.83E-10	1.13E-10	1.00
830.7         0.68         810.6         2.86E-10         8.46E-11         1.00           854.8         0.69         807.0         4.29E-10         1.27E-10         0.50           926.9         0.73         798.1         3.58E-10         1.04E-10         1.50           951.1         0.74         796.2         2.14E-10         6.33E-11         2.00           974.7         0.76         791.8         5.09E-10         1.55E-10         1.33           1026.2         0.78         786.3         3.01E-10         9.29E-11         1.25           1095.1         0.81         779.2         3.00E-10         9.09E-11         1.40           119.2         0.82         776.7         2.85E-10         8.80E-11         1.00           142.8         0.83         772.9         4.38E-10         1.38E-10         1.00           1191.9         0.85         768.1         2.75E-10         8.72E-11         1.00           1263.6         0.88         759.8         3.36E-10         1.05E-10         1.33           1287.8         0.89         757.3         2.85E-10         8.98E-11         1.00           1310.8         0.91         754.4         3.73E-10	782.7	0.66	816.6	3.57E-10	1.05E-10	1.50
854.8         0.69         807.0         4.29E-10         1.27E-10         0.50           926.9         0.73         798.1         3.58E-10         1.04E-10         1.50           951.1         0.74         796.2         2.14E-10         6.33E-11         2.00           974.7         0.76         791.8         5.09E-10         1.55E-10         1.33           1026.2         0.78         786.3         3.01E-10         9.29E-11         1.25           1095.1         0.81         779.2         3.00E-10         9.09E-11         1.40           1119.2         0.82         776.7         2.85E-10         8.80E-11         1.00           1142.8         0.83         772.9         4.38E-10         1.38E-10         1.00           1166.8         0.84         770.5         2.87E-10         9.11E-11         1.00           1263.6         0.88         759.8         3.36E-10         1.05E-10         1.33           1287.8         0.89         757.3         2.85E-10         8.98E-11         1.00           1310.8         0.91         754.4         3.73E-10         1.17E-10         1.50           1334.9         0.92         751.1         3.57E-10	806.7	0.67	812.9	4.32E-10	1.29E-10	1.00
926.9         0.73         798.1         3.58E-10         1.04E-10         1.50           951.1         0.74         796.2         2.14E-10         6.33E-11         2.00           974.7         0.76         791.8         5.09E-10         1.55E-10         1.33           1026.2         0.78         786.3         3.01E-10         9.29E-11         1.25           1095.1         0.81         779.2         3.00E-10         9.09E-11         1.40           1119.2         0.82         776.7         2.85E-10         8.80E-11         1.00           1142.8         0.83         772.9         4.38E-10         1.38E-10         1.00           1166.8         0.84         770.5         2.87E-10         9.11E-11         1.00           1191.9         0.85         768.1         2.75E-10         8.72E-11         1.00           1263.6         0.88         759.8         3.36E-10         1.05E-10         1.33           1287.8         0.89         757.3         2.85E-10         8.98E-11         1.00           1310.8         0.91         754.4         3.73E-10         1.16E-10         1.50           1334.9         0.92         751.1         3.57E-10	830.7	0.68	810.6	2.86E-10	8.46E-11	1.00
951.1         0.74         796.2         2.14E-10         6.33E-11         2.00           974.7         0.76         791.8         5.09E-10         1.55E-10         1.33           1026.2         0.78         786.3         3.01E-10         9.29E-11         1.25           1095.1         0.81         779.2         3.00E-10         9.09E-11         1.40           1119.2         0.82         776.7         2.85E-10         8.80E-11         1.00           1142.8         0.83         772.9         4.38E-10         1.38E-10         1.00           1166.8         0.84         770.5         2.87E-10         9.11E-11         1.00           1191.9         0.85         768.1         2.75E-10         8.72E-11         1.00           1263.6         0.88         759.8         3.36E-10         1.05E-10         1.33           1287.8         0.89         757.3         2.85E-10         8.98E-11         1.00           1310.8         0.91         754.4         3.73E-10         1.17E-10         1.50           1334.9         0.92         751.1         3.57E-10         1.16E-10         1.50	854.8	0.69	807.0	4.29E-10	1.27E-10	0.50
974.7         0.76         791.8         5.09E-10         1.55E-10         1.33           1026.2         0.78         786.3         3.01E-10         9.29E-11         1.25           1095.1         0.81         779.2         3.00E-10         9.09E-11         1.40           1119.2         0.82         776.7         2.85E-10         8.80E-11         1.00           1142.8         0.83         772.9         4.38E-10         1.38E-10         1.00           1166.8         0.84         770.5         2.87E-10         9.11E-11         1.00           1191.9         0.85         768.1         2.75E-10         8.72E-11         1.00           1263.6         0.88         759.8         3.36E-10         1.05E-10         1.33           1287.8         0.89         757.3         2.85E-10         8.98E-11         1.00           1310.8         0.91         754.4         3.73E-10         1.17E-10         1.50           1334.9         0.92         751.1         3.57E-10         1.16E-10         1.50	926.9	0.73	798.1	3.58E-10	1.04E-10	1.50
1026.2         0.78         786.3         3.01E-10         9.29E-11         1.25           1095.1         0.81         779.2         3.00E-10         9.09E-11         1.40           1119.2         0.82         776.7         2.85E-10         8.80E-11         1.00           1142.8         0.83         772.9         4.38E-10         1.38E-10         1.00           1166.8         0.84         770.5         2.87E-10         9.11E-11         1.00           1191.9         0.85         768.1         2.75E-10         8.72E-11         1.00           1263.6         0.88         759.8         3.36E-10         1.05E-10         1.33           1287.8         0.89         757.3         2.85E-10         8.98E-11         1.00           1310.8         0.91         754.4         3.73E-10         1.17E-10         1.50           1334.9         0.92         751.1         3.57E-10         1.16E-10         1.50	951.1	0.74	796.2	2.14E-10	6.33E-11	2.00
1095.1         0.81         779.2         3.00E-10         9.09E-11         1.40           1119.2         0.82         776.7         2.85E-10         8.80E-11         1.00           1142.8         0.83         772.9         4.38E-10         1.38E-10         1.00           1166.8         0.84         770.5         2.87E-10         9.11E-11         1.00           1191.9         0.85         768.1         2.75E-10         8.72E-11         1.00           1263.6         0.88         759.8         3.36E-10         1.05E-10         1.33           1287.8         0.89         757.3         2.85E-10         8.98E-11         1.00           1310.8         0.91         754.4         3.73E-10         1.17E-10         1.50           1334.9         0.92         751.1         3.57E-10         1.16E-10         1.50	974.7	0.76	791.8	5.09E-10	1.55E-10	1.33
1119.2         0.82         776.7         2.85E-10         8.80E-11         1.00           1142.8         0.83         772.9         4.38E-10         1.38E-10         1.00           1166.8         0.84         770.5         2.87E-10         9.11E-11         1.00           1191.9         0.85         768.1         2.75E-10         8.72E-11         1.00           1263.6         0.88         759.8         3.36E-10         1.05E-10         1.33           1287.8         0.89         757.3         2.85E-10         8.98E-11         1.00           1310.8         0.91         754.4         3.73E-10         1.17E-10         1.50           1334.9         0.92         751.1         3.57E-10         1.16E-10         1.50	1026.2	0.78	786.3	3.01E-10	9.29E-11	1.25
1142.8       0.83       772.9       4.38E-10       1.38E-10       1.00         1166.8       0.84       770.5       2.87E-10       9.11E-11       1.00         1191.9       0.85       768.1       2.75E-10       8.72E-11       1.00         1263.6       0.88       759.8       3.36E-10       1.05E-10       1.33         1287.8       0.89       757.3       2.85E-10       8.98E-11       1.00         1310.8       0.91       754.4       3.73E-10       1.17E-10       1.50         1334.9       0.92       751.1       3.57E-10       1.16E-10       1.50	1095.1	0.81	779.2	3.00E-10	9.09E-11	1.40
1166.8         0.84         770.5         2.87E-10         9.11E-11         1.00           1191.9         0.85         768.1         2.75E-10         8.72E-11         1.00           1263.6         0.88         759.8         3.36E-10         1.05E-10         1.33           1287.8         0.89         757.3         2.85E-10         8.98E-11         1.00           1310.8         0.91         754.4         3.73E-10         1.17E-10         1.50           1334.9         0.92         751.1         3.57E-10         1.16E-10         1.50	1119.2	0.82	776.7	2.85E-10	8.80E-11	1.00
1191.9     0.85     768.1     2.75E-10     8.72E-11     1.00       1263.6     0.88     759.8     3.36E-10     1.05E-10     1.33       1287.8     0.89     757.3     2.85E-10     8.98E-11     1.00       1310.8     0.91     754.4     3.73E-10     1.17E-10     1.50       1334.9     0.92     751.1     3.57E-10     1.16E-10     1.50	1142.8	0.83	772.9	4.38E-10	1.38E-10	1.00
1263.6     0.88     759.8     3.36E-10     1.05E-10     1.33       1287.8     0.89     757.3     2.85E-10     8.98E-11     1.00       1310.8     0.91     754.4     3.73E-10     1.17E-10     1.50       1334.9     0.92     751.1     3.57E-10     1.16E-10     1.50	1166.8	0.84	770.5	2.87E-10	9.11E-11	1.00
1263.6     0.88     759.8     3.36E-10     1.05E-10     1.33       1287.8     0.89     757.3     2.85E-10     8.98E-11     1.00       1310.8     0.91     754.4     3.73E-10     1.17E-10     1.50       1334.9     0.92     751.1     3.57E-10     1.16E-10     1.50	1191.9	0.85	768.1	2.75E-10	8.72E-11	1.00
1287.8     0.89     757.3     2.85E-10     8.98E-11     1.00       1310.8     0.91     754.4     3.73E-10     1.17E-10     1.50       1334.9     0.92     751.1     3.57E-10     1.16E-10     1.50		0.88	759.8		1.05E-10	
1310.8     0.91     754.4     3.73E-10     1.17E-10     1.50       1334.9     0.92     751.1     3.57E-10     1.16E-10     1.50						
1334.9 0.92 751.1 3.57E-10 1.16E-10 1.50						
	_					
1454.9 1.00 950.9 4.65E-10 1.19E-10 1.17						

Page 2 of 3



Austin, TX - USA | Anaheim, CA - USA | Anderson, SC - USA | Gold Coast - Australia | Suzhou - China | Cullinan, South Africa

Time (hr)	Pore Volumes	Gradient, i (m/m)	Flux (m/s)	k <sub>20</sub> (cm/s)	Q <sub>in</sub> / Q <sub>out</sub>
1478.9	1.01	947.4	4.30E-10	1.09E-10	1.00
1488.4	1.01	946.2	3.62E-10	9.22E-11	1.00
1502.7	1.02	944.1	4.83E-10	1.18E-10	1.00
1526.7	1.04	939.5	5.00E-10	1.28E-10	1.33
1599.0	1.08	928.0	4.53E-10	1.17E-10	0.90
1623.0	1.10	924.4	4.30E-10	1.11E-10	2.00
1646.7	1.11	920.3	5.07E-10	1.30E-10	0.75
1656.3	1.12	918.6	5.39E-10	1.37E-10	0.50
1670.7	1.12	916.5	4.78E-10	1.17E-10	1.00
1694.8	1.14	912.5	4.29E-10	1.10E-10	2.00
1766.7	1.19	900.4	4.79E-10	1.24E-10	1.00
1790.8	1.20	896.1	5.00E-10	1.31E-10	1.33
1814.7	1.22	892.5	4.32E-10	1.13E-10	1.00
1838.8	1.24	885.3	8.58E-10	2.25E-10	0.50
1910.9	1.27	876.1	5.00E-10	1.34E-10	1.00
1935.4	1.28	871.9	4.92E-10	1.33E-10	1.33



Date: 1/1/2022

## **Geotextile Durability GRI-GCL3**

**Project: Yearly Durability Testing** 

Item #	(Nonwoven 6oz)					
Roll#	23	330-541630				
	ASTM D 6	6768 - MD				
	Unexposed 50 Days @ 60°C					
	(lb/in)	(lb/in)				
1	75	83				
2	63	64				
3	76 73					
4	76	75				
5	66	70				
Avg.	71	73				
SD	6.2 7.0					
Streng	th Retained (%)	102.5				

Item #	1106269(Nonwoven 6oz)							
Roll#	2330-541630							
	ASTM D 6768 - TD							
	Unexposed	50 Days @ 60°C						
	(lb/in)	(lb/in)						
1	78	75						
2	90	93						
3	65	71						
4	69	70						
5	68	64						
Avg.	74	75						
SD	10.2 11.0							
Strength Retained (%) 100.8								



Date: 1/1/2022

## **Geotextile Durability GRI-GCL3**

**Project: Yearly Durability Testing** 

Item#	TEX-W3							
Roll#	3021110198							
	ASTM D 6768 - MD							
	Unexposed	50 Days @ 60°C						
	(lb/in)	(lb/in)						
1	168	150						
2	170	148						
3	162	152						
4	170	157						
5	173	158						
Avg.	169	153						
SD	4.1 4.4							
Strength Retained (%) 90.7								

Item #	TEX-W3							
Roll#	3021110198							
	ASTM D 6768 - TD							
	Unexposed	50 Days @ 60°C						
	(lb/in)	(lb/in)						
1	157	139						
2	162	146						
3	165	142						
4	168	149						
5	164	146						
Avg.	163	144						
SD	4.1 3.9							
Strength Retained (%) 88.5								

Report Date 11/7/2022



## **Quality Assurance Laboratory Test Results**

Index Flux - Hydraulic Conductivity report

MF-LAB-52

Revision:01

Date: 2021-09-09

Project: OWL LF CELLS 4A 4B

Sales Order: SO-094167

**Product:** Bentoliner 0.75 lbs/ft² - 3.66 kg/m², NS, Peel 35

Required Testing: ASTM D5887 - Standard Test Method for Measurement of Index Flux Through

Saturated Geosynthetic Clay Liner Specimens Using a Flexible Wall Permeameter

**Frequency:** 1/270,000 sf

Effective Stress: 5 psi

		Index Flux	Hydraulic Conductivity
Roll Number	Production Date	(m³/m²/sec)	(cm/sec)
0242-387073	10/28/2022	2.45E-09	1.05E-09
0242-387185	10/31/2022	2.59E-09	1.11E-09

Approved By:	Chuck Taylor
Date Approved:	11/07/22



# APPENDIX B: MATERIAL MANUFACTURER CERTIFICATION AND COMFORMANCE TESTING RESULTS

**B.2 GCL Conformance Testing Results** 



Austin, TX - USA | CA - USA | SC - USA | Gold Coast - Australia | Suzhou - China | Sao Paulo, Brazil | Johannesburg - Africa

November 21, 2022

Mail To: Bill To:

Juan Zazpe <= Same
Southwest Liner Systems Inc

301 Calle Industrial Bernalillo, NM 87004

juan@slsliner.com

Greetings,

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project: Owl Landfill Cell 4A and 4B

TRI Job Reference Number: 76337

Material(s) Tested: Four, Solmax Bentoliner NS GCLs

Test(s) Requested:

Mass Per Unit Area (ASTM D5993) Bentonite - Fluid Loss (ASTM D5891) Bentonite - Swell Index (ASTM D5890)

Index Flux (ASTM D5887)

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Mansukh Patel, Ph.D.

Geosynthetic Services Division



# TESTING, RESEARCH, CONSULTING AND FIELD SERVICES Austin, TX - USA | CA - USA | SC - USA | Gold Coast - Australia | Suzhou - China | Sao Paulo, Brazil | Johannesburg - Africa

#### **GCL TEST RESULTS**

TRI Client: Southwest Liner Systems Inc Project: Owl Landfill Cell 4A and 4B

Material: Solmax Bentoliner NS GCL Sample Identification: 0242-387073

TRI Log #: 76337

							STD.
PARAMETER	TEST RE	PLICATE I	NUMBER			MEAN	DEV.
	1	2	3	4	5		
Bentonite - Mass/Unit Area (ASTM D	5993, result	: @ 0% M.C	;.)				
Mass/unit area (lbs/ft²)							
GCL (ω = 0%)	0.89	0.88	0.88	0.98	0.97	0.92	0.05
Non-Bentonite Components	0.063	(Assume	d Material-	Specific Va	ilue)	<u> </u>	_
Bentonite ( $\omega = 0\%$ )	0.83	0.81	0.82	0.92	0.91	0.86	0.05
Moisture Content (%)	10.7	11.2	11.1	11.1	11.2	11.1	0.2
Bentonite - Fluid Loss (ASTM D5891	)						
Slurry temperature at test intiation:		23.0	° C		Slurry temperature at test completion: 21.0 ° C	l	
Fluid Loss (mL)		12.2				12.2	
Note: Bentonite sample tested is take	n from finish	ed GCL pro	duct.				
Bentonite - Swell Index (ASTM D589	0)						
Swell index (mL/2g)		34				34	]
Note: Bentonite sample tested is take	n from finish	ed GCL pro	duct.				
Index Flux (ASTM D5887)						1	
Index Flux (m³/m²/sec)		2.1E-09				2.1E-09	]
Hydraulic Conductivity (cm/sec)		7.9E-10				7.9E-10	]



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#### **GCL TEST RESULTS**

TRI Client: Southwest Liner Systems Inc Project: Owl Landfill Cell 4A and 4B

Material: Solmax Bentoliner NS GCL Sample Identification: 0242-387117

TRI Log #: 76337

							STD.
PARAMETER	TEST RE	PLICATE	NUMBER			MEAN	DEV.
	1	2	3	4	5		
Bentonite - Mass/Unit Area (ASTM D	05993, result	@ 0% M.	C.)				
Mass/unit area (lbs/ft²)						I	<b>-</b>
GCL ( $\omega = 0\%$ )	0.76	0.80	0.94	0.89	0.83	0.85	0.07
Non-Bentonite Components	0.063	•	ed Material-S	•	•		_
Bentonite ( $\omega = 0\%$ )	0.70	0.74	0.88	0.82	0.77	0.78	0.07
Moisture Content (%)	10.2	10.7	10.7	10.7	10.5	10.6	0.2
Bentonite - Fluid Loss (ASTM D589	1)						
Slurry temperature at test intiation:		23.0	° C		Slurry temperature at test completion: 21.0 ° C		
Fluid Loss (mL)		11.2				11.2	
Note: Bentonite sample tested is take	en from finishe	ed GCL pr	oduct.				
Bentonite - Swell Index (ASTM D589	90)						
Swell index (mL/2g)		34				34	
Note: Bentonite sample tested is take	en from finishe	ed GCL pr	oduct.				
Index Flux (ASTM D5887)							
Index Flux (m³/m²/sec)		3.9E-09	)			3.9E-09	
Hydraulic Conductivity (cm/sec)		1.3E-09				1.3E-09	



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#### **GCL TEST RESULTS**

TRI Client: Southwest Liner Systems Inc Project: Owl Landfill Cell 4A and 4B

Material: Solmax Bentoliner NS GCL Sample Identification: 0242-387161

TRI Log #: 76337

							STD.
PARAMETER	TEST RE	PLICATE I	NUMBER			MEAN	DEV.
	1	2	3	4	5		
Bentonite - Mass/Unit Area (ASTM D	5993, result	t @ 0% M.C	;.)				
Mass/unit area (lbs/ft²)							_
GCL ( $\omega = 0\%$ )	0.92	0.96	0.88	0.88	0.96	0.92	0.04
Non-Bentonite Components	0.063	(Assume	d Material-	Specific Va	ilue)		_
Bentonite ( $\omega = 0\%$ )	0.85	0.89	0.82	0.82	0.89	0.86	0.04
Moisture Content (%)	10.2	10.2	10.3	10.2	10.1	10.2	0.1
Bentonite - Fluid Loss (ASTM D5891	)						
Slurry temperature at test intiation:		23.0	° C		Slurry temperature at test completion: 21.0 ° C		_
Fluid Loss (mL)		13.0				13.0	
Note: Bentonite sample tested is take	n from finish	ed GCL pro	duct.				
Bentonite - Swell Index (ASTM D589	0)						
Swell index (mL/2g)		36				36	
Note: Bentonite sample tested is take	n from finish	ed GCL pro	duct.				
Index Flux (ASTM D5887)							
Index Flux (m³/m²/sec)		2.8E-09				2.8E-09	
Hydraulic Conductivity (cm/sec)		1.2E-09				1.2E-09	
						1	



### **GCL TEST RESULTS**

TRI Client: Southwest Liner Systems Inc Project: Owl Landfill Cell 4A and 4B

Material: Solmax Bentoliner NS GCL Sample Identification: 0242-387193

TRI Log #: 76337

							STD.
PARAMETER	TEST RE	PLICATE I	NUMBER			MEAN	DEV.
	1	2	3	4	5		
Bentonite - Mass/Unit Area (ASTM D	5993, result	e @ 0% M.C	C.)				
Mass/unit area (lbs/ft²)							_
GCL ( $\omega = 0\%$ )	0.92	0.89	0.94	0.97	0.86	0.92	0.04
Non-Bentonite Components	0.063		d Material-S	-		<u>-</u>	_
Bentonite ( $\omega = 0\%$ )	0.85	0.83	0.88	0.91	0.79	0.85	0.04
Moisture Content (%)	10.7	11.1	10.8	11.1	11.3	11.0	0.2
Bentonite - Fluid Loss (ASTM D5891	1)						
Slurry temperature at test intiation:		23.0	° C		Slurry temperature at test completion: 21.0 ° C		
Fluid Loss (mL)		11.8				11.8	
Note: Bentonite sample tested is take	n from finish	ed GCL pro	oduct.				
Bentonite - Swell Index (ASTM D589	00)						
Swell index (mL/2g)		32				32	]
Note: Bentonite sample tested is take	n from finish	ed GCL pro	oduct.				
Index Flux (ASTM D5887)							
Index Flux (m³/m²/sec)		1.9E-09				1.9E-09	
Hydraulic Conductivity (cm/sec)		7.6E-10				7.6E-10	



# APPENDIX B: MATERIAL MANUFACTURER CERTIFICATION AND COMFORMANCE TESTING RESULTS

**B.3 FML Certifications** 



### LIST OF GEOMEMBRANE ROLLS



PROJECT NUMBER: SW2211
SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-7

PROJECT NAME: OWL LF CELLS 4A 4B

ROLL NUMBER	RESIN LOT NUMBER	MANUFACT. DATE	RESIN MELT INDEX 190/2.16	RESIN DENSITY	OIT	HPOIT	ESCR SP-NCTL
			g/10 min	g/cc	min	min	hours
			D1238	D1505	D8117	D5885	D5397
Product Cod	le : 1101438						
HDPI	E 60 mils / 1.50 mm Bla	ck Smooth	1.0	> 0.932	100		500
0101-206717	22H1158	2022-10-20	0.07	0.938	120		>500 Certified 0104-206392
0101-206718	22H1158	2022-10-20	0.07	0.938	120		>500 Certified 0104-206392
0101-206720	22H1158	2022-10-20	0.07	0.938	120		>500 Certified 0104-206392
0101-206721	22H1158	2022-10-20	0.07	0.938	120		>500 Certified 0104-206392
0101-206722	22H1158	2022-10-20	0.07	0.938	120		>500 Certified 0104-206392
0101-206723	22H1158	2022-10-20	0.07	0.938	120		>500 Certified 0104-206392
0101-206724	22H1158	2022-10-20	0.07	0.938	120		>500 Certified 0104-206392
0101-206725	22H1158	2022-10-21	0.07	0.938	120		>500 Certified 0104-206392
0101-206726	22 1134	2022-10-21	0.06	0.938	120		>500 Certified 0101-206728
0101-206727	2211134	2022-10-21	0.06	0.938	120		>500 Certified 0101-206728
0101-206728	2211134	2022-10-21	0.06	0.938	120		>500 Certified 0101-206728
0101-206729	2211134	2022-10-21	0.06	0.938	120		>500 Certified 0101-206728
0101-206730	2211134	2022-10-21	0.06	0.938	120		>500 Certified 0101-206728
0101-206731	22 1134	2022-10-21	0.06	0.938	120		>500 Certified 0101-206728

Solmax is not a design professional and has not performed any design services to determine if Solmax's goods comply with any project plans or specifications, or with the application or use of Solmax's goods to any particular system, project, purpose, installation or specification.

**Solmax Geosynthetics LLC** 

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073



### LIST OF GEOMEMBRANE ROLLS

MAX Flanson PROJECT NUMBER: SW2211
SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-7

PROJECT NAME: OWL LF CELLS 4A 4B

0101-206732	2211134	2022-10-21	0.06	0.938	120	>500 Certified 0101-206728
0101-206733	2211134	2022-10-21	0.06	0.938	120	>500 Certified 0101-206728
0101-206734	2211134	2022-10-21	0.06	0.938	120	>500 Certified 0101-206728
0101-206735	2211134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206736	2211134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206737	2211134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206738	22 1134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206739	22 1134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206740	2211134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206741	22 1134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206742	2211134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206743	22 1134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206744	22 1134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206745	22 1134	2022-10-23	0.06	0.938	120	>500 Certified 0101-206728
0101-206746	2211134	2022-10-23	0.06	0.938	120	>500 Certified 0101-206728
0101-206747	2211134	2022-10-23	0.06	0.938	120	>500 Certified 0101-206728
0101-206748	2211134	2022-10-23	0.06	0.938	120	>500 Certified 0101-206728
0101-206749	2211134	2022-10-23	0.06	0.938	120	>500 Certified 0101-206728

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### LIST OF GEOMEMBRANE ROLLS

SOLMAX

SOLMAX

PLANTA ACGURANT

PLANTA ACGURANT

PROJECT NUMBER: SW2211
SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-7

PROJECT NAME: OWL LF CELLS 4A 4B

0101-206750	22 1134	2022-10-23	0.06	0.938	120	>500 Certified 0101-206728
0101-206753	22 1134	2022-10-23	0.06	0.938	120	>500 Certified 0101-206728
0101-206754	22 1134	2022-10-23	0.06	0.938	120	>500 Certified 0101-206728
0101-206755	22 1134	2022-10-23	0.06	0.938	120	>500 Certified 0101-206728
0101-206756	22 1134	2022-10-24	0.06	0.938	120	>500 Certified 0101-206728
0101-206757	22 1134	2022-10-24	0.06	0.938	120	>500 Certified 0101-206728
0101-206758	22 1134	2022-10-24	0.06	0.938	120	>500 Certified 0101-206728
0101-206760	22 1134	2022-10-24	0.06	0.938	120	>500 Certified 0101-206728
0101-206761	22 1134	2022-10-24	0.06	0.938	120	>500 Certified 0101-206728
0101-206762	22 1134	2022-10-24	0.06	0.938	120	>500 Certified 0101-206728

**QUANTITY (ROLLS): 42** 

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**TEST RESULTS** 

PROJECT NUMBER:

SW2211

SALES ORDER:

SO-094167

PACKING SLIP NUMBER:

Pre-SO-094167-7

PROJECT NAME: OWL LF CELLS 4A 4B

**PRODUCT:** 1101438

HDPE 60 mils / 1.50 mm Black Smooth

Properties	Thickness ave/min.	GeoM Density	Carbon Black	Carbon Black	Yie	Tensile Yield Break			Tear Resist.	Puncture Resist.	Dimension Stability	Asperity Height
			Content	Dispersion	Strength	Elong.	Strength	Elong.				In/Out
Unit	mils	g/cc	%	Cat 1 and 2	ppi	%	ppi	%	lbs	lbs	%	mils
Test Method	D5199	D792	D4218	D5596		D6	693		D1004	D4833	D1204	
Frequency	Each roll	Every 10	Every 2	Every 10		Every	2 rolls		Every 5	Every 5		
		rolls	rolls	rolls					rolls	rolls		
Specification	60.0 / 54.0	≥ 0.940	2.0 - 3.0	Cat. 1 & Cat. 2	132	13	243	700	42	120		
0101-206717 MD	60.1 / 55.5	0.949	2.51	10/10 views	151.7	19.6	279	723	50	158		
XD					158.3	16.4	327	875	52			
0101-206718 MD	61.0 / 54.5	0.949	2.51	10/10 views	151.7	19.6	279	723	50	158		
XD					158.3	16.4	327	875	52			
0101-206720 MD	62.4 / 58.0	0.949	2.55	10/10 views	161.6	19.6	288	754	50	158		
XD					159.9	17.1	333	875	52			
0101-206721 MD XD	65.7 / 62.0	0.949	2.49	10/10 views	155.7 162.6	17.6 17.3	329 320	869 821	50 52	158		
0101-206722 MD	64.0 / 62.5	0.949	2.40	10/10 views	155.7	17.6		869	46	143		
0101-206722 MD	64.0 / 62.5	0.949	2.49	10/10 views	162.6	17.6	329 320	869 821	50	143		
0101-206723 MD	67.0 / 64.0	0.949	2.46	10/10 views	164.3	17.7	340	885	46	143		
XD XD	07.07 04.0	0.545	2.40	10, 10 VICW3	156.5	18.2	299	769	50	143		
0101-206724 MD	64.0 / 61.0	0.949	2.46	10/10 views	148.7	19.6	283	720	46	143		
XD					152.1	18.2	316	845	50			
0101-206725 MD	62.7 / 58.0	0.949	2.40	10/10 views	154.8	19.6	291	737	46	143		
XD					166.4	18.4	299	795	50			
0101-206726 MD	62.3 / 57.5	0.949	2.40	10/10 views	154.8	19.6	291	737	46	143		
XD					166.4	18.4	299	795	50			
0101-206727 MD	62.3 / 58.0	0.944	2.41	10/10 views	153.6	19.4	291	721	46	141		
XD					158.6	18.0	325	843	48			
0101-206728 MD	62.7 / 60.0	0.944	2.41	10/10 views	153.6	19.4	291	721	46	141		
XD					158.6	18.0	325	843	48			
0101-206729 MD XD	64.2 / 58.0	0.944	2.42	10/10 views	151.0 161.1	19.6 20.1	286 329	744 887	46 48	141		
0101-206730 MD	63.7 / 59.0	0.944	2.42	10/10 views	151.0	19.6	286	744	46	141		
0101-206/30 MD XD	03.7 / 39.0	0.944	2.42	TO/ TO VIEWS	161.1	20.1	329	744 887	46 48	141		
					101.1	20.1	323	007	40			

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**TEST RESULTS** 

PROJECT NUMBER:

SW2211

SALES ORDER:

SO-094167

PACKING SLIP NUMBER:

Pre-SO-094167-7

PROJECT NAME: OWL LF CELLS 4A 4B

_												
0101-206731	MD	62.5 / 57.0	0.944	2.51	10/10 views	145.9	20.3	282	710	46	141	
	XD					159.9	17.5	340	879	48		
0101-206732	MD	63.5 / 60.0	0.944	2.51	10/10 views	145.9	20.3	282	710	48	143	
	XD					159.9	17.5	340	879	50		
0101-206733	MD	61.7 / 60.0	0.944	2.46	10/10 views	146.8	20.9	291	714	48	143	
	XD					161.0	18.4	248	883	50		
0101-206734	MD	61.2 / 57.5	0.944	2.46	10/10 views	146.8	20.9	291	714	48	143	
	XD					161.0	18.4	248	883	50		
0101-206735	MD	61.5 / 56.0	0.944	2.54	10/10 views	152.1	19.8	287	729	48	143	
	XD					156.5	19.0	321	874	50		
0101-206736	MD	63.7 / 60.0	0.944	2.54	10/10 views	152.1	19.8	287	729	48	143	
	XD					156.5	19.0	321	874	50		
0101-206737	MD	62.0 / 59.0	0.946	2.56	10/10 views	154.8	18.9	297	765	48	142	
	XD					164.7	18.7	345	905	49		
0101-206738	MD	61.9 / 58.5	0.946	2.56	10/10 views	154.8	18.9	297	765	48	142	
	XD					164.7	18.7	345	905	49		
0101-206739	- 1	62.3 / 60.0	0.946	2.53	10/10 views	156.4	18.9	299	755	48	142	
	XD					165.8	18.8	329	867	49		
0101-206740	- 1	62.4 / 57.5	0.946	2.53	10/10 views	156.4	18.9	299	755	48	142	
	XD					165.8	18.8	329	867	49		
0101-206741	- 1	62.9 / 59.0	0.946	2.51	10/10 views	150.3	19.7	310	772	48	142	
	XD					166.0	17.5	323	864	49		
0101-206742	- 1	63.4 / 59.5	0.946	2.51	10/10 views	150.3	19.7	310	772	47	142	
	XD					166.0	17.5	323	864	48		
0101-206743	- 1	64.9 / 60.0	0.946	2.59	10/10 views		19.2	308	763	47	142	
	XD					202.2	18.2	332	875	48		
0101-206744	- 1	67.4 / 63.0	0.946	2.59	10/10 views		19.2	308	763	47	142	
	XD					202.2	18.2	332	875	48		
0101-206745	- 1	62.5 / 59.0	0.946	2.58	10/10 views		19.9	322	818	47	142	
	XD					156.7	16.5	345	878	48		
0101-206746	- 1	62.4 / 58.0	0.946	2.58	10/10 views	153.1	19.9	322	818	47	142	
	XD				<u> </u>	156.7	16.5	345	878	48		
0101-206747	- 1	62.4 / 59.0	0.946	2.58	10/10 views		19.1	338	821	49	145	
	XD					161.1	16.6	352	890	51		
0101-206748	- 1	62.8 / 59.0	0.946	2.58	10/10 views	158.6	19.1	338	821	49	145	
	XD					161.1	16.6	352	890	51		
0101-206749	- 1	62.2 / 58.0	0.946	2.69	10/10 views	160.6	19.0	335	836	49	145	
	XD					164.3	16.5	355	891	51		

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**TEST RESULTS** 

PROJECT NUMBER:

SW2211

SALES ORDER:

SO-094167

PACKING SLIP NUMBER:

Pre-SO-094167-7

PROJECT NAME: OWL LF CELLS 4A 4B

0101-206750	MD	64.0 / 60.0	0.946	2.69	10/10 views	160.6	19.0	335	836	49	145	
	XD					164.3	16.5	355	891	51		
0101-206753	MD	65.2 / 58.5	0.946	2.58	10/10 views	152.0	19.7	322	811	49	145	
	XD					204.5	16.9	340	916	50		
0101-206754	MD	62.3 / 58.0	0.946	2.58	10/10 views	152.0	19.7	322	811	49	145	
	XD					204.5	16.9	340	916	50		
0101-206755	MD	64.0 / 60.0	0.946	2.49	10/10 views	153.7	21.1	304	736	49	145	
	XD					143.9	16.6	319	843	50		
0101-206756	MD	62.8 / 59.5	0.946	2.49	10/10 views	153.7	21.1	304	736	49	145	
	XD					143.9	16.6	319	843	50		
0101-206757	MD	62.7 / 58.0	0.943	2.09	10/10 views	166.1	22.0	318	742	49	150	
	XD					155.4	16.7	332	856	51		
0101-206758	MD	62.7 / 59.5	0.943	2.09	10/10 views	166.1	22.0	318	742	49	150	
	XD					155.4	16.7	332	856	51		
0101-206760	MD	61.7 / 58.0	0.943	2.67	10/10 views	169.7	19.0	316	777	49	150	
	XD					167.1	16.5	299	794	51		
0101-206761	MD	65.2 / 59.0	0.943	2.82	10/10 views	154.9	20.6	308	791	49	150	
	XD					191.2	19.4	317	836	51		
0101-206762	MD	63.7 / 61.0	0.943	2.82	10/10 views	154.9	20.6	308	791	47	146	
	XD					191.2	19.4	317	836	51		

Solmax is not a design professional and has not performed any design services to determine if Solmax's goods comply with any project plans or specifications, or with the  $application\ or\ use\ of\ Solmax's\ goods\ to\ any\ particular\ system,\ project,\ purpose,\ installation\ or\ specification.$ 

**Solmax Geosynthetics LLC** 

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073

SOLMAX.COM

Page 3 of 3 2 Nov 2022



FORMOSA PLASTICS CORPORATION, TEXAS

201 FORMOSA DRIVE

PO BOX 700

TX 77978 POINT COMFORT

PHONE: (888) FPCUSA3

### Certificate of Analysis

(CONFIDENTIAL)

CUSTOMER: SOLMAX GEOSYNTHETICS LLC

19103 GUNDLE ROAD

S/O NO CUSTOMER PO: PO-605934

: E29A012

DATE SHIPPED: 9/09/22

HOUSTON

TX 77073

LOT NO : 22H1158

PRODUCT :HL3812

WEIGHT (LB): 194,300.00

RAILCAR

FPAX200265

CUSTID: FT05970

SPIDM6

CLEANING/INSPECTION NO: 200265081622

TEST ITEM - - - - - - - -

REFERENCE METHOD -----

TEST VALUE - - - - - - - - -

Melt Index, g/10min HLMI, g/10 min.

ASTM D1238 **ASTM D1238** 

.071 10.2

Density, g/cm3

**ASTM D1505** 

.9378

Additive levels were tested and meet the min specification for this lo t. As a result Standard OIT (by ASTM D3895) is greater than 120 mins ( nominal values not tested on every lot). As a result, High Pressure OI T (by ASTM D5885) is greater than 1000 mins.

QC SUPERVISOR: LINDA KAO

Linda Kas

FORMOSA PLASTICS CORPORATION, TEXAS

201 FORMOSA DRIVE

PO BOX 700 POINT COMFORT

TX 77978

PHONE: (888) FPCUSA3

### Certificate of Analysis

(CONFIDENTIAL)

CUSTOMER: SOLMAX GEOSYNTHETICS LLC

19103 GUNDLE ROAD

S/O NO : E29A731

CUSTOMER PO: PO-606100

DATE SHIPPED: 9/30/22

HOUSTON

TX 77073

LOT NO : 22I1134

PRODUCT :HL3812

WEIGHT (LB): 184,850.00

RAILCAR

FPAX890363

CUSTID: FT05970

SPIDM6

CLEANING/INSPECTION NO: 890363091622

TEST ITEM

REFERENCE METHOD -----

TEST VALUE

- - - - - - - -Melt Index, g/10min

ASTM D1238

- - - - - - - - -.064

HLMI, g/10 min. Density, g/cm3

**ASTM D1238 ASTM D1505**  10.4

.9384

Additive levels were tested and meet the min specification for this lo t. As a result Standard OIT (by ASTM D3895) is greater than 120 mins ( nominal values not tested on every lot). As a result, High Pressure OI T (by ASTM D5885) is greater than 1000 mins.

QC SUPERVISOR: LINDA KAO

Linda Kas



# APPENDIX B: MATERIAL MANUFACTURER CERTIFICATION AND COMFORMANCE TESTING RESULTS

B.4 FML Conformance Testing Results

### TESTING, RESEARCH, CONSULTING AND FIELD SERVICES

Austin, TX - USA | CA - USA | SC - USA | Gold Coast - Australia | Suzhou - China | Sao Paulo, Brazil | Johannesburg - Africa

<= Same

October 6, 2022

Mail To: Bill To:

Juan Zazpe Southwest Liner Systems 301 Calle Industrial Bernalillo, NM 87004

email: juan@slsliner.com

Dear Mr. Zazpe:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project: Owl Landfill Cell 4A and 4B

TRI Job Reference Number: 75418

Material(s) Tested: Two, Solmax 60 mil Textured HDPE Geomembrane(s)

Test(s) Requested: Thickness (ASTM D5994)

Density (ASTM D1505)

Carbon Black Content (ASTM D4218) Carbon Dispersion (ASTM D5596) Tensile Properties (ASTM D6693) Puncture Strength (ASTM D4833) Tear Resistance (ASTM D1004)

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Mansukh Patel Laboratory Manager

Geosynthetic Services Division



GEOMEMBRANE TEST RESULTS TRI Client: Southwest Liner Systems Project: Owl Landfill Cell 4A and 4B

Material: Solmax 60 mil Textured HDPE Geomembrane Sample Identification: 0104-206293 TRI Log #: 75418

PARAMETER	TEST RE	PLICATE I	NUMBER								MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Thickness (ASTM D5994)													
													57 min av
Thickness (mils)	61	61	60	61	61	60	61	60	61	61	61	1 .	54, 8 of 10
											60	<< min	51 min ind
Density (ASTM D1505)													
Density (g/cm3)	0.944	0.944	0.944								0.944	0.000	0.940 mir
Carbon Black Content (AST	/I D4218)												
% Carbon Black	2.41	2.44									2.43	0.02	2.0 - 3.0
Carbon Black Dispersion (A	STM D5596)												
Rating - 1st field view	1	1	1	1	1								9 Cat 1 or 2
Rating - 2nd field view	1	1	1	1	1								1 Cat 3
Tensile Properties (ASTM De	6693, 2 ipm s	train rate)											
MD Yield Strength (ppi)	156	174	164	154	158						161	8	126 min
TD Yield Strength (ppi)	161	170	174	162	160						165	6	126 min
MD Break Strength (ppi)	190	195	187	184	199						191	6	90 min
TD Break Strength (ppi)	182	191	192	173	204						188	12	90 min
. = =:-a a.a ga. (FF.)													
MD Yield Elongation (%)	19	19	19	22	22						20	2	12 min
TD Yield Elongation (%)	18	18	18	20	19						19	1	12 min
MD Break Elongation (%)	509	459	479	494	529						494	27	100 min
TD Break Elongation (%)	509 521	459 524	479 495	494 478	529 584						520	40	100 min
TD Broak Elongation (70)	021	021	100	110	001						020	10	100 111111
Puncture Resistance (ASTM	D4833)												
Puncture Strength (lbs)	164	164	165	159	162						163	3	90 min
Tear Resistance (ASTM D10	04)												
MD Tear Strength (lbs)	54	56	56	55	53	55	59	57	59	54	56	2	42 min
TD Tear Strength (lbs)	56	64	62	57	58	56	58	60	66	57	60	4	42 min



GEOMEMBRANE TEST RESULTS TRI Client: Southwest Liner Systems Project: Owl Landfill Cell 4A and 4B

Material: Solmax 60 mil Textured HDPE Geomembrane Sample Identification: 0104-206294 TRI Log #: 75418

PARAMETER	TEST RE	PLICATE I	NUMBER								MEAN	STD. DEV	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Thickness (ASTM D5994)													
Thickness (mils)	62	63	61	61	62	61	61	61	61	60	61	1	57 min ave 54, 8 of 10
mickness (mils)	62	63	01	01	02	01	01	01	01	60	60	<< min	54, 6 01 10 51 min ind
												~~ 111111	31 min ma
Density (ASTM D1505)													
Density (g/cm3)	0.944	0.944	0.944								0.944	0.000	0.940 min
Carbon Black Content (AST	W D4218)												
% Carbon Black	2.39	2.38									2.39	0.01	2.0 - 3.0
Carbon Black Dispersion (A	STM D5596)												
Rating - 1st field view	1	1	1	1	1								9 Cat 1 or 2
Rating - 2nd field view	1	1	1	1	1								1 Cat 3
Tensile Properties (ASTM D	6693, 2 ipm s	train rate)											
MD Yield Strength (ppi)	160	159	162	181	162						165	9	126 min
TD Yield Strength (ppi)	162	161	166	175	156						164	7	126 min
MD Break Strength (ppi)	212	209	196	224	221						212	11	90 min
TD Break Strength (ppi)	188	180	196	148	175						177	18	90 min
MD Yield Elongation (%)	17	21	19	22	22						20	2	12 min
TD Yield Elongation (%)	19	21	19	18	19						19	1	12 min
MD Break Elongation (%)	558	556	510	551	588						553	28	100 min
TD Break Elongation (%)	523	513	539	410	484						494	51	100 min
Puncture Resistance (ASTM	D4833)												
Puncture Strength (lbs)	167	161	159	159	162						162	3	90 min
Tear Resistance (ASTM D10	04)												
MD Tear Strength (lbs)	57	56	54	55	57	57	57	57	58	62	57	2	42 min
	61	64	61	61	59	58	57	59	60	58	60	2	42 min



# APPENDIX B: MATERIAL MANUFACTURER CERTIFICATION AND COMFORMANCE TESTING RESULTS

**B.5 Geonet Certifications** 



## **MANUFACTURING QUALITY CONTROL**



PROJECT NUMBER: SW2205

SALES ORDER: SO-093540

PACKING SLIP NUMBER: Pre-SO-093540-1

PROJECT NAME: OWL LENDBL CELL 1A2A TIF-IN

ROLL MANUFACT. RESIN LOT NUMBER DATE NUMBER

Product Code: 1106474-

29708-2

HyperNet 200 mils / 5.00 mm

TRI Austin Pickup - Patricia Zabaleta 2 ft x RW, 1/100,000 sf, min 1/Lot

2 ft x RW, 1/100	2 ft x RW, 1/100,000 sf, min 1/Lot											
0116-017376	2022-05-12	DPC611480										
0116-017377	2022-05-12	DPC611480										
0116-017381	2022-05-12	DPC611480										
0116-017382	2022-05-12	DPC611480										
0116-017383	2022-05-12	DPC611480										
0116-017384	2022-05-12	DPC611480										
0116-017385	2022-05-12	DPC611480										
0116-017386	2022-05-12	DPC611480										
0116-017388	2022-05-13	DPC611480										
0116-017389	2022-05-13	DPC611480										
0116-017390	2022-05-13	DPC611480										
0116-017391	2022-05-13	DPC611480										
0116-017393	2022-05-13	DPC611480										

**QUANTITY (ROLLS): 13** 

Solmax is not a design professional and has not performed any design services to determine if Solmax's goods comply with any project plans or specifications, or with the application or use of Solmax's goods to any particular system, project, purpose, installation or specification.

**Solmax Geosynthetics LLC** 

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073

SOLMAX.COM

13 May 2022



### **MANUFACTURING QUALITY CONTROL**

**TEST RESULTS - ROLLS** 

SOLMAX

OLIVERATION OF THE PROPERTY OF THE PRO

PROJECT NUMBER: SW2205

SALES ORDER: SO-093540

PACKING SLIP NUMBER: Pre-SO-093540-1

PROJECT NAME: OWL LF NDBL CELL 1A2A TIE-IN

**PRODUCT:** 1106474-29708-2

HyperNet 200 mils / 5.00 mm

Test	Duan					Direction	Test Method	
rest		perty				Direction		F
	1 Thicl	kness (mir	n. avg.)				ASTM D5199	1/
	2 Carb	on Black	Content				ASTM D4218	1/5
	3 Dens	sity (min.)					ASTM D792	1/50,
	4 Tens	ile Stengt	:h (MD)			MD	ASTM D7179	1/50,0
	5 Mass	s avg.					ASTM D5261	1/50,00
	6 Tran	smissivity	$(x10^{-3})$				ASTM D4716	1/500,00
Test	1	2	3	4	5	6		
CIFICATIONS	200	2.0	0.94	45	0.160	2		
017376	244.67	2.66	0.954	75	0.179	6.23		
-017377	244.67	2.66	0.954	75	0.179	6.23		
017381	219.33	2.53	0.953	70	0.155	2.68		
-017382	219.33	2.53	0.953	70	0.155	2.68		
-017383	219.33	2.53	0.953	70	0.155	2.68		
017384	219.33	2.53	0.953	70	0.155	2.68		
-017385	219.33	2.53	0.953	70	0.155	2.68		
017386	229.00	2.77	0.953	70	0.155	5.8		
017388	229.00	2.77	0.953	70	0.155	5.8		
017389	229.00	2.77	0.953	70	0.155	5.8		
017390	229.00	2.77	0.953	70	0.155	5.8		
-017391	229.00	2.77	0.953	70	0.155	5.8		
5-017393	210.20	2.66	0.953	62	0.146	5.8		

Solmax is not a design professional and has not performed any design services to determine if Solmax's goods comply with any project plans or specifications, or with the application or use of Solmax's goods to any particular system, project, purpose, installation or specification.

**Solmax Geosynthetics LLC** 

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073



## **MANUFACTURING QUALITY CONTROL**

**TEST RESULTS - ROLLS** 

PROJECT NUMBER:

SW2205

SALES ORDER:

SO-093540

PACKING SLIP NUMBER:

Pre-SO-093540-1

PROJECT NAME: OWL LF NDBL CELL 1A2A TIE-IN

Solmax is not a design professional and has not performed any design services to determine if Solmax's goods comply with any project plans or specifications, or with the application or use of Solmax's goods to any particular system, project, purpose, installation or specification.

Solmax Geosynthetics LLC

19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073



CoA Date: 04/06/2022

### **Certificate of Analysis**

Shipped To: SOLMAX GEOSYNTHETICS, LLC

19103 GUNDLE ROAD HOUSTON TX 77073

USA

Recipient: Hickman

Fax:

Delivery #: 80650300

PO #: 604930

Weight: 206050.000 LB Ship Date: 04/06/2022

Package: BULK Mode: Hopper Car Car #: HLTX006129

Seal No: 285330

Product:

MARLEX HHM 5502BN POLYETHYLENE in Bulk

Lot Number: DPC611480

Property	Test Method	Value	Unit
Melt Index Density Production date	ASTM D1238 D1505	0.35 0.9538 20220401	g/10min g/cm3

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem). However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.

**AMANDA ROBY** 

an M

QUALITY ASSURANCE SUPERINTENDENT

For CoA questions contact Leslie Dziamara at +1-832-813-4806



### **PACKING LIST**

NUMBER:

RR-080434

DATE:

05-Aug-2022

SOLD TO:

Southwest Liner Systems, Inc.

PO Box 1972 Bernalillo,NM,87004 USA

**CONTACT:** JUAN ZAZPE

TELEPHONE: EMAIL:

SHIP TO:

NORTHERN DELAWARE BASIN LANDFILL

2029 W. NM HWY128 Jal,NM,88252 USA

CONTACT: JUAN ZAZPE
TELEPHONE: (505)771-9122

**EMAIL:** 

CUSTOMER REFERENCE SOLMAX ORDER PROJECT NAME FREIGHT MODE

SW2205 SO-093540 OWL LF NDBL CELL 1A2A TIE-IN 2 AXLES

3002203		SO-093540		OWL LF N	DBL CELL 1A2A T	IE-IN	2 AXLES	
			DIMEN	SIONS	SURFACE	U/M	WEIGHT	WEIGHT
PART DESCRIPTION	ROLL NUMBER	CONTAINER	WIDTH	LENGTH	QUANTITY		(LBS)	(KG)
1106474-29708-2, Hy	perNet 200 mils	/ 5.00 mm					(100)	(KG)
	0116-017376	N/A	15.00	330.00	4,950.00	SQFT	950.00	430.91
	0116-017377	N/A	15.00	330.00	4,950.00	SQFT	917.00	415.94
	0116-017381	N/A	15.00	330.00	4,950.00	SQFT	800.00	362.87
	0116-017382	N/A	15.00	330.00	4,950.00	SQFT	950.00	430.91
	0116-017383	N/A	15.00	330.00	4,950.00	SQFT	844.00	382.83
	0116-017384	N/A	15.00	330.00	4,950.00	SQFT	840.00	381.02
	0116-017385	N/A	15.00	330.00	4,950.00	SQFT	847.00	384.19
	0116-017386	N/A	15.00	330.00	4,950.00	SQFT	840.00	381.02
	0116-017388	N/A	15.00	330.00	4,950.00	SQFT	848.00	384.65
	0116-017389	N/A	15.00	330.00	4,950.00	SQFT	872.00	395.53
	0116-017390	N/A	15.00	330.00	4,950.00	SQFT	830.00	376.48
	0116-017391	N/A	15.00	330.00	4,950.00	SQFT	757.00	343.37
	0116-017393	N/A	15.00	330.00	4,950.00	SQFT	760.00	344.73
		TOTAL PART CODE:	13	Pieces	64,350.00	SQFT	11,055.00	5,014.45
					Net V	Veight	10,990.00	4,984.96

19103 GUNDLE ROAD HOUSTON, TEXAS, 77073, UNITED STATES MF-LOG-02

REV.03/2007-06-01

Page 1of 2



**PACKING LIST** 

NUMBER:

RR-080434

DATE:

05-Aug-2022

SOLD TO:

Southwest Liner Systems, Inc.

PO Box 1972 Bernalillo,NM,87004 USA

**CONTACT:** JUAN ZAZPE

TELEPHONE: EMAIL:

SHIP TO:

NORTHERN DELAWARE BASIN LANDFILL

2029 W. NM HWY128 Jal,NM,88252 USA

CONTACT: JUAN ZAZPE
TELEPHONE: (505)771-9122

**EMAIL:** 

NOTICE: Every roll must be individually unloaded with two (2) slings to prevent any risk of injury to the operator or equipment.

Dimensions May Vary +/- 1%

	PIECES	WEIGHT (LBS)	WEIGHT (KG)
Gross of Material	13	11,055.00	5,014.45
Gross		11,055.00	5,014.45

SOLMAX GEOSYNTHETICS LLC

19103 GUNDLE ROAD HOUSTON, TEXAS, 77073, UNITED STATES

MF-LOG-02

REV.03/2007-06-01

Page 2of 2

Received by OCD: 4/10/2025 4:34:21 PM



SOLMAX GEOSYNTHETICS LLC

19103 GUNDLE ROAD HOUSTON, TX, UNITED STATES 77073 +1 281-443-8564

**BILL OF LADING** 

LOAD ID: RR-080434

Received at Houston, TX, USA from Solmax Geosynthetics, LLC the property described below, in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated below, which said Carrier agreed to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any said property, over all or any portion of said route to destination, so the carrier of all or any said property, over all or any portion of said route to destination, so that Geosynthetics, LLC's obligation to pay freight charges for the shipment is conditioned to (1) the existence of a separate written contract with the Carrier transporting the freight and the (2) the Carrier's name appearing on this Bill of Lading, and other carriers must look solely to a party other than Solmax Geosynthetics, LLC for payment.

SHIP TO:

NORTHERN DELAWARE BASIN LANDFILL

08/05/2022

2029 W. NM HWY128 JAL,NM,88252

POINT OF ORIGINE:

SHIP DATE:

SALES ORDER:

HOUSTON, TX, UNITED STATES

SO-093540

USA

CONTACT:

JUAN ZAZPE

TEL:

(505)771-9122

	SHIPPING	INSTRU	CTIONS:
--	----------	--------	---------

LINE NO.	QUANTITY	DESCRIPTION OF GOODS	GROSS	WEIGHT	PROJECT:			
			LBS	KGS	OWL LF NDBL CELL 1A2A TIE-IN			
1	13.00	HyperNet 200 mils / 5.00 mm	11,055.00	5,014.45				
					<b>DECLARED VALUATION:</b> Maximum liability of 4,41\$ per kilogramme (\$2.00 per pound).			
					Freight charges are prepaid unless marked collect. Check box if collect			
				Customer PO number: SW2205				
					If this shiment is to be delivered to consignee, consignor shall sign the following statement. Carrier may decline to deliver this shipment without payment of freight and all other lawful charge.  X Signature of Consignor			
					Local Verificalion Signed.			
					Number of Slings: 0			
TAL QUAI	NTITY: 13.00	TOTAL WEIGHT:	11,055.00	5,014.45	Truckers P.O. #			
UTING:								

VESSEL NAME:	TRIP NUMBER:	PORT OF DISCHARGE:	CONTAINER:	SEAL:	BOOKING:
					RR-080434
DRIVER REQUIREMEN	NTS:			CARRIED MARAE	
1) Driver must pre cal	l 24 hrs prior to delivery an	d on Friday for Monday deliver	ry. CA	CARRIER NAME:	
	t on cs@solmax.com when			DATE:	

3) Driver must call and advise any delay in transit.

4) A copy of this bill of lading must accompany Freight Invoice.

**DESTINATION CONSIGNEE SIGNATURE:** 

ORIGINAL

DATE: \_



# APPENDIX B: MATERIAL MANUFACTURER CERTIFICATION AND COMFORMANCE TESTING RESULTS

**B.6 Geonet Conformance Testing Results** 



### TESTING, RESEARCH, CONSULTING AND FIELD SERVICES

Austin, TX - USA | CA - USA | SC - USA | Gold Coast - Australia | Suzhou - China | Sao Paulo, Brazil | Johannesburg - Africa

<= Same

September 28, 2022

Mail To: Bill To:

Juan Zazpe Southwest Liner Systems 301 Calle Industrial Bernalillo NM 87004

email: juan@slsliner.com

Dear Mr. Zazpe:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Owl Landfill Cell 4A & 4B

TRI Job Reference Number: 75069

Material(s) Tested: One Solmax Geonet(s)

Test(s) Requested: Transmissivity (ASTM D4716) - GN

Thickness (ASTM D5199) - GN Density (ASTM D1505) - GN

Carbon Black Content (ASTM D1603, mod.) - GN

Tensile Properties (ASTM D7179, 12 ipm strain rate) - GN Mass/Unit Area (ASTM D3776) - GN Melt Flow Index (ASTM D1238, Method A, 190°C / 2.16 kg) - GN

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Mansukh Patel Laboratory Manager

Geosynthetic Services Division



GEOCOMPOSITE TEST RESULTS TRI Client: Southwest Liner Systems Project: Owl Landfill Cell 4A & 4B

Material: Solmax Geonet Sample Identification: 0116-022641 TRI Log #: 75069

PARAMETI	ER	TEST RE	PLICATE NU	IMBER								MEAN	STD. DEV.	PROJ. SPEC.
		1	2	3	4	5	6	7	8	9	10			
Hydraulic	Transmissivity (ASTM D	04716)					122	793						
Direction Te Normal Loa Hydraulic G Test Length Test Width	6radient: 0.1 n (in) 12			<u>Inflow</u> →	Plate	XXXX	с <b>ХХХХ</b>	eonet	utflow					
DI / / 0		<u> </u>						Plate						
Plate / Sam	ipie / Plate													
Seat Time														
(hours)	\( \langle \)	Specimen		1	0000	4054	2	4057						
	Volume (cc) Time (s)		6000 24.96	6000 24.98	6000 24.99	1954 10.40	1957 10.44	1957 10.48						
	Flow Rate (GPM/ft wid	lth)	3.82	3.82	3.82	2.99	2.98	2.97				3.40	0.46	
0.25	Transmissivity (m^2/s)	,	7.92E-03	7.91E-03	7.91E-03	6.19E-03	6.17E-03	6.15E-03				7.04E-03	9.54E-04	2.00E-03
	Test Temp (C)			20.0			20.0							
	Temp. Corr. Factor			1.004			1.004							
Mass/Unit	Area (ASTM D3776)													
5" diameter	Circle - Mass (g)	10.06	11.46	9.45	11.04	9.75	9.68	9.43	10.70	11.11	11.48			
	area (lbs./sq.ft)	0.16	0.19	0.15	0.18	0.16	0.16	0.15	0.17	0.18	0.19	0.17	0.01	0.16 min
Thickness	(ASTM D5199)													
Thickness (	(mile)	234	231	221	218	227	248	248	225	238	229	232	10	200 min
THICKHESS (	(IIIIIS)	234	231	221	210	221	240	240	223	230	229	218	<< min	200 111111
Density (AS	STM D1505)													
Density (g/c	cm3)	0.954	0.954	0.954								0.954	0.000	0.940 min
	ack Content (ASTM D16	03. mod.)												
	2011 2011 (7.101111 2.10													
% Carbon E	Black	2.84	2.82									2.83	0.01	2.0 - 3.0
Melt Flow I	Index (ASTM D1238, Me	thod A, 190	°C / 2.16 kg)	1										
Melt Flow Ir	ndex (g/10 min)	0.43	0.43									0.43		1.0 max
Tensile Pro	operties (ASTM D7179,	12 ipm strai	n rate)											
MD Max. St	trength (ppi)	70	80	64	73	57						69	9	45 min
MD Elong.	@ Max. Strength (%)	16	18	18	17	20						18	2	
MD Machine	e Direction													



# APPENDIX B: MATERIAL MANUFACTURER CERTIFICATION AND COMFORMANCE TESTING RESULTS

**B.7** Geocomposite Certifications



December 6, 2022

**Customer:** Southwest Liner Systems Inc.

Customer P.O.#: SW2216

Project: Northern Delaware Basin Landfill, NM

**Product: TN 220-2-10** 

We hereby certify that the TN 220-2-10 drainage geocomposite, meets or exceeds the project requirements as stated in the specifications. The properties listed in this section are:

Property	Test Method	Unit	Value	Qualifier
Geonet <sup>3</sup>				
Thickness	ASTM D 5199	mil	200	MAV <sup>6</sup>
Carbon Black	ASTM D 4218	%	2.0	MAV
Tensile Strength	ASTM D 7179	lbs/in	45	MAV
Melt Flow	ASTM D 1238 <sup>2</sup>	g/10 min	1.0	Maximum
Density	ASTM D 1505	g/cm <sup>3</sup>	0.94	MAV
Transmissivity <sup>1a</sup>	ASTM D 4716	m <sup>2</sup> /sec	2.0 x 10 <sup>-3</sup>	MAV
Composite				
Ply Adhesion	ASTM D 7005	lb/in	1.0	MAV
Transmissivity <sup>1b</sup>	ASTM D 4716	m²/sec	9.0 x 10⁻⁵	MAV
Geotextile <sup>3 &amp; 4</sup>				
Fabric Weight	ASTM D 5261	oz/yd <sup>2</sup>	10.0	MARV <sup>5</sup>
Grab Strength	ASTM D 4632	lbs	270	MARV
Grab Elongation	ASTM D 4632	%	50	MARV
Trap Tear Strength	ASTM D 4533	lbs	100	MARV
CBR Puncture	ASTM D 6241	lbs	725	MARV
Water Flow Rate	ASTM D 4491	gpm/ft <sup>2</sup>	75	MARV
Permittivity	ASTM D 4491	sec <sup>-1</sup>	0.94	MARV
Permeability	ASTM D 4491	cm/sec	0.3	MARV
AOS	ASTM D 4751	US Sieve	100	MaxARV
UV Resistance (Certify Only)	ASTM D 4355	%/hrs	70/500	MARV

### **Notes:**

- 1a. Transmissivity measured using water at  $21 \pm 2$  °C ( $70 \pm 4$  °F) with a gradient of 0.1 and a confining pressure of 10,000 psf between steel plates after 15 minutes.
- 1b. Transmissivity measured using water at  $21 \pm 2$  °C ( $70 \pm 4$  °F) with a gradient of 0.1 and a confining pressure of 10,000 psf between steel plates after 15 minutes.
- 2. Condition 190/2.16
- 3. Geotextile and Geonet properties are prior to lamination.
- 4. Geotextile data is provided by the supplier.
- 5. MARV is statistically defined as mean minus two standard deviations and it is the value which is exceeded by 97.5% of all the test data.
- 6. Minium average value

Quality Approval
Malkesh Parel





**Product: TN 220-2-10** 

**Project: Northern Delaware Basin Landfill, NM** 

We hereby certify the following test results for the above referenced product/project :

	Geoco	mposite				Ge	onet		
Roll Number	(ID/IN)		Transmissivity (m²/sec)	Resin Lot Number	Density (g/cm³)	Thickness (mils)	Carbon Black	Tensile Strength MD	Transmissivity (m²/sec)
	Side "A"	Side "B"	( /555)		(9/ 0 )	()	(%)	(lb/in)	( 7566)
121501010001	1.83	2.16	1.78 x 10 <sup>-4</sup>	HCBX001295	0.9550	221	2.48	58	3.04 x 10 <sup>-3</sup>
121501010002				HCBX001295	0.9550				
121501010003				HCBX001295	0.9550				
121501010004				HCBX001295	0.9550				
121501010005				HCBX001295	0.9550				
121501010006				HCBX001295	0.9550				
121501010007				HCBX001295	0.9550				
121501010008				HCBX001295	0.9550				
121501010009				HCBX001295	0.9550				
121501010010				HCBX001295	0.9550				
121501010011				HCBX001295	0.9550				
121501010012				HCBX001295	0.9550				
121501010013				HCBX001295	0.9550				
121501010014				HCBX001295	0.9550				
121501010015	3.25	3.59		HCBX001295	0.9552	217	2.40	60	
121501010016				HCBX001295	0.9552				
121501010017				HCBX001295	0.9552				
121501010018				HCBX001295	0.9552				



### POLYETHYLENE RESIN CERTIFICATION

**Customer Name:** Southwest Liner Systems Inc.

**Project Name:** Northern Delaware Basin Landfill, NM

**Geocomposite Manufacturer: SKAPS Industries Geocomposite Production Plant:** Commerce, GA **Geocomposite Brand Name:** TN 220-2-10

We hereby certify the following test results for the above referenced product/project:

Resin Manufacturer	Resin Lot Number	Property	Test Method	Units	Resin Manufacturer Value	Tested Value*
Chevron Phillips	HCBX001295	Density	ASTM D1505	g/cm <sup>3</sup>	0.9501	0.9505
Chemical Company	HCBX001293	Melt flow Index	ASTM D1238 <sup>(a)</sup>	g/10 min	0.16	0.15

(a) Condition 190/2.16

<sup>\*</sup> Data from SKAPS Quality Control



### **Geotextile Certification**

**Product:** TN 220-2-10

**Project:** Northern Delaware Basin Landfill, NM

We hereby certify the following test results for the above referenced product/project :

GEOCOMP ROLL#		WEIGHT oz/yd²	lhc	GRAB ELG % (MD)	GRAB Ibs. (XMD)	GRAB ELG % (XMD)	TRAP Ibs. (MD)	TRAP lbs. (XMD)	CBR PUNCTURE Ibs	AOS us sieve	WATER- FLOW gpm/ft <sup>2</sup>	PERM- ABL cm/sec	ITY
121501010001	Side A	10.46	276	72	295	83	106	131	832	100	75	0.31	1.00
121501010001	Side B	10.64	281	70	285	85	114	135	866	100	75	0.31	1.00



# APPENDIX B: MATERIAL MANUFACTURER CERTIFICATION AND COMFORMANCE TESTING RESULTS

B.8 Geocomposite Test Results



### TESTING, RESEARCH, CONSULTING AND FIELD SERVICES

Austin, TX - USA | CA - USA | SC - USA | Gold Coast - Australia | Suzhou - China | Sao Paulo, Brazil | Johannesburg - Africa

<= Same (P.O. # 2211)

November 11, 2022

Mail To: Bill To:

Juan Zazpe Southwest Liner Systems 301 Calle Industrial Bernalillo, NM 87004

email: juan@slsliner.com

Dear Mr. Zazpe:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project: Owl Landfill Cell 4A & 4B

TRI Job Reference Number: 75958

Material(s) Tested: Three, Solmax FS1-200E-10-10-FA-00 Single Sided Geocomposite(s)

Test(s) Requested: Transmissivity (ASTM D4716) - GC

Peel Strength (ASTM D7005) - GC Thickness (ASTM D5199) - GN Mass/Unit Area (ASTM D 3776, Option C)

Melt Flow Index (ASTM D1238, Method Å,  $190^{\circ}$ C / 2.16 kg) - GN

Density (ASTM D1505) - GN

Carbon Black Content (ASTM D1603, mod.) - GN Tensile Properties (ASTM D7179, 12 ipm strain rate) - GN

Mass/Unit Area (ASTM D5261) - GT Grab Tensile (ASTM D4632) - GT Puncture Strength (ASTM D4833) - GT Trapezoidal Tear (ASTM D4533) - GT

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Mansukh Patel Laboratory Manager

Geosynthetic Services Division



GEOCOMPOSITE TEST RESULTS TRI Client: Southwest Liner Systems Project: Owl Landfill Cell 4A & 4B

Material: Solmax FS1-200E-10-10-FA-00 Single Sided Geocomposite Sample Identification: 0116-023819 TRI Log #: 75958

PARAMET	ER	TEST REF	LICATE NU	MBER								MEAN	STD. DEV.	PROJ. SPEC.
		1	2	3	4	5	6	7	8	9	10			
Hydraulic	Transmissivity (ASTM D4	716)				Sam	ple							
Direction T	ested: Machine Direction	_		Plate	)									
Normal Lo	" '							_						
Hydraulic ( Test Lengt	h (in) 12		Inf	low 🄀	XXXX	XXXX	XXXX	Q Ou <u>tflov</u>	V <sub>*</sub>					
Test Width	n (in) 12													
Plate / Sar	nple / Plate						Plat	е						
Seat Time														
(hours)		Specimen		1			2							
	Volume (cc)		646	645	647	808	807	807						
	Time (s)		5.43	5.43	5.48	5.40	5.45	5.46						
0.25	Flow Rate (GPM/ft widtl	n)	1.87	1.87	1.85	2.35	2.33	2.32				2.10	0.26	0.5 min
0.23	Transmissivity (m^2/s)		3.86E-03	3.86E-03	3.84E-03	4.86E-03	4.81E-03	4.80E-03				4.34E-03	5.32E-04	1.00E-04
	Test Temp (C)			20.6			20.6							
	Temp. Corr. Factor			0.990			0.990							
Peel Strer	ngth (ASTM D7005)													
A - MD Av	erage Peel Strength (ppi)	2.25	2.13	2.69	1.32	2.86						2.25	0.60	1.0 min
A - MD Av	erage Peel Strength (g/in)	1022	967	1221	599	1298						1022	273	



GEOCOMPOSITE TEST RESULTS TRI Client: Southwest Liner Systems Project: Owl Landfill Cell 4A & 4B

Material: Solmax FS1-200E-10-10-FA-00 Single Sided Geocomposite Sample Identification: 0116-023819 TRI Log #: 75958

GEONET COMPONENT

PARAMETER	TEST REF	PLICATE NU	MBER								MEAN	STD. DEV.	PROJ. SPEC.
Hudroulia Transmissivity (ACTM D4	1	2	3	4	5	6	7	8	9	10			
Hydraulic Transmissivity (ASTM D4	/16)					Con	anla						
Direction Tested: Machine Direction	Ī			Plate		San	ipie						
Normal Load (psf): 10,000  Hydraulic Gradient: 0.1				late									
Test Length (in) 12			Inflow	W	(XXX	<b>~~~</b>	$\sim$	w.	Outflow				
Test Width (in) 12				• <u>~~</u>	<b>~~~</b>	<b>~~</b>	<b>////</b>	<u>~~</u>	• utilow				
Plate / Sample / Plate							Р	late					
Seat Time													
(hours)	Specimen		1			2							
Volume (cc)		1971	1984	1991	6000	6000	6000						
Time (s) Flow Rate (GPM/ft width	.,	10.32 3.01	10.36 3.02	10.39 3.02	22.42 4.21	22.44 4.21	22.45 4.20				3.61	0.65	0.5 min
0.25 Transmissivity (m^2/s)	1)	6.23E-03	6.25E-03	6.25E-03	8.71E-03	8.71E-03	8.70E-03				7.48E-03	1.35E-03	1.00E-04
Test Temp (C)			20.4			20.5							
Temp. Corr. Factor			0.995			0.992							
Thickness (ASTM D5199)													
Thickness (mils)	232	233	232	230	256	255	242	238	234	234	239	10	200 min
····/											230	<< min	
Density (ASTM D1505)													
Density (g/cm3)	0.948	0.948	0.948								0.948	0.000	0.940 min
Carbon Black Content (ASTM D1603	3 mod )												
Our Don Black Content (ACTIN D1000	o,ou.,												
% Carbon Black	2.31	2.28									2.30	0.02	2.0 - 3.0
Melt Flow Index (ASTM D1238, Meth	nod A, 190	°C / 2.16 kg)											
Melt Flow Index (g/10 min)	0.44	0.46									0.45		1.0 max
Mass/Unit Area (ASTM D 3776, Option	on C)												
5 in diameter Circle - Mass (grams)	10.28	10.34	10.67	10.77	12.47	12.68	10.40	10.37	10.47	10.47			
Mass/unit area (lbs./sq.ft)	0.17	0.17	0.17	0.17	0.20	0.21	0.17	0.17	0.17	0.17	0.18	0.01	0.16 min
Tensile Properties (ASTM D7179, 12	ipm strai	n rate)											
MD Max. Strength (ppi)	65	64	83	80	65						71	10	45 min
MD Elong. @ Max. Strength (%)	21	22	22	20	21						21	1	
MD Machine Direction											<u> </u>		



GEOCOMPOSITE TEST RESULTS TRI Client: Southwest Liner Systems Project: Owl Landfill Cell 4A & 4B

Material: Solmax FS1-200E-10-10-FA-00 Single Sided Geocomposite Sample Identification: 0116-023819 TRI Log #: 75958

GEOTEXTILE COMPONENT

PARAMETER	TEST REF	LICATE NU	IMBER								MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			0. 20.
Mass/Unit Area (ASTM D5261)													
5" diameter Circle - Mass (g)	4.24	4.04	4.27	4.91	4.68	4.87	4.38	4.72	5.02	4.75	4.59	0.33	
Mass/Unit Area (oz/sq.yd)	9.86	9.40	9.93	11.42	10.89	11.33	10.19	10.98	11.68	11.05	10.67	0.77	9.1 min
Grab Tensile Properties (ASTM I	D4632)												
MD - Tensile Strength (lbs)	453	344	368	415	404	363	329	334	463	456	393	52	230 min
TD - Tensile Strength (lbs)	356	378	489	493	500	410	380	320	487	580	439	82	230 min
MD - Elong. @ Max. Load (%)	88	81	88	78	89	83	81	82	83	87	84	4	50 min
TD - Elong. @ Max. Load (%)	89	82	81	93	87	98	97	95	86	97	90	6	50 min
Puncture Resistance (ASTM D48	833)												
Puncture Strength (lbs)	205	193	230	225	213						213	15	120 min
Trapezoidal Tear (ASTM D4533)													
MD - Tear Strength (lbs)	136	152	186	128	155	109	150	139	117	144	142	22	90 min
TD - Tear Strength (lbs)	212	186	246	117	136	210	201	154	201	188	185	39	90 min
Apparent Opening Size (ASTM D	04751)												
Opening Size Diameter (mm)	0.137	0.147	0.120	0.129	0.136						0.134	0.010	
Sieve No.	100	100	100	100	100						100		80 min
Permittivity (ASTM D4491,Metho	od C)												
Thickness (mil)	112	129	133	126	118	110	112	123	103	122	119	9	
Thickness (mm)	2.84	3.28	3.38	3.20	3.00	2.79	2.84	3.12	2.62	3.10	3.02	0.24	
Permittivity (Sec-1)	0.80	1.23	0.73	0.89	1.07	1.36	1.18	0.98	1.54	0.94	1.07	0.26	0.9 min
Permittivity (GPM/ft2)	59.8	92.0	54.6	66.6	80.0	101.7	88.3	73.3	115.2	70.3	80.2	19.1	
Flow rate (LPM/m2)	2438	3749	2225	2712	3261	4145	3596	2987	4693	2865	3267	779	
Permittivity (cm/sec)	0.228	0.403	0.247	0.285	0.321	0.380	0.336	0.306	0.403	0.291	0.320	0.061	
MD Machine Direction	TD Transv	erse Direction	on								<u> </u>		



GEOCOMPOSITE TEST RESULTS TRI Client: Southwest Liner Systems Project: Owl Landfill Cell 4A & 4B

Material: Solmax FS1-200E-10-10-FA-00 Single Sided Geocomposite Sample Identification: 0116-023865 TRI Log #: 75958

CATE NUN	MDED				I ME		DEV.	PROJ.
TEST REPLICATE NUMBER								SPEC.
2	3	4	5					
1.92	2.69	3.40	3.99		3.	01	0.78	1.0 mii
872	1221	1544	1811		13	67	352	

MD Machine Direction



GEOCOMPOSITE TEST RESULTS TRI Client: Southwest Liner Systems Project: Owl Landfill Cell 4A & 4B

Material: Solmax FS1-200E-10-10-FA-00 Single Sided Geocomposite Sample Identification: 0116-023865

TRI Log #: 75958

GEONET COMPONENT

PARAMETER	TEST REP	LICATE NU	MBER								MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Thickness (ASTM D5199)													
Thickness (mils)	225	224	244	242	238	239	236	233	232	231	234 224	7 << min	200 min
Density (ASTM D1505)													
Density (g/cm3)	0.953	0.953	0.953								0.953	0.000	0.940 min
Carbon Black Content (ASTM D160	03, mod.)												
% Carbon Black	2.55	2.55									2.55	0.00	2.0 - 3.0
Melt Flow Index (ASTM D1238, Me	thod A, 190°	C / 2.16 kg)											
Melt Flow Index (g/10 min)	0.43	0.44									0.43		1.0 max
Mass/Unit Area (ASTM D 3776, Opt	tion C)												
5 in diameter Circle - Mass (grams)	10.92	10.96	11.01	11.03	11.01	10.94	11.59	11.70	10.06	10.05			
Mass/unit area (lbs./sq.ft)	0.18	0.18	0.18	0.18	0.18	0.18	0.19	0.19	0.16	0.16	0.18	0.01	0.16 min
Tensile Properties (ASTM D7179, 1	12 ipm strair	n rate)											
MD Max. Strength (ppi)	67	82	73	73	70						73	6	45 min
MD Elong. @ Max. Strength (%)	21	20	22	18	22						20	2	
MD Machine Direction											1		



GEOCOMPOSITE TEST RESULTS TRI Client: Southwest Liner Systems Project: Owl Landfill Cell 4A & 4B

Material: Solmax FS1-200E-10-10-FA-00 Single Sided Geocomposite Sample Identification: 0116-023865 TRI Log #: 75958

GEOTEXTILE COMPONENT

												STD.	PROJ.
PARAMETER	TEST REP	LICATE NU	MBER								MEAN	DEV.	SPEC.
	1	2	3	4	5	6	7	8	9	10			
Mass/Unit Area (ASTM D5261)													
5" diameter Circle - Mass (g)	4.52	4.54	4.12	4.07	4.89	4.08	4.19	3.97	3.93	4.76	4.31	0.34	
Mass/Unit Area (oz/sq.yd)	10.51	10.56	9.58	9.47	11.37	9.49	9.75	9.23	9.14	11.07	10.02	0.80	9.1 min
Grab Tensile Properties (ASTM	D4632)												
MD - Tensile Strength (lbs)	360	318	288	371	420	305	324	288	371	420	347	49	230 min
TD - Tensile Strength (lbs)	370	515	476	455	453	440	437	459	439	440	448	36	230 min
MD - Elong. @ Max. Load (%)	79	83	75	80	91	79	81	75	69	79	79	6	50 min
TD - Elong. @ Max. Load (%)	78	79	79	80	81	85	79	77	81	82	80	2	50 min
Puncture Resistance (ASTM D48	833)												
Puncture Strength (lbs)	219	166	166	206	177						187	24	120 min
Trapezoidal Tear (ASTM D4533)													
MD - Tear Strength (lbs)	129	131	124	121	127	119	148	136	128	104	127	11	90 min
TD - Tear Strength (lbs)	176	177	214	181	175	185	162	169	151	189	178	17	90 min

MD Machine Direction TD Transverse Direction



GEOCOMPOSITE TEST RESULTS TRI Client: Southwest Liner Systems Project: Owl Landfill Cell 4A & 4B

Material: Solmax FS1-200E-10-10-FA-00 Single Sided Geocomposite Sample Identification: 0116-023894 TRI Log #: 75958

ARAMETER	TEST REP	LICATE NU	JMBER				MEAN
	1	2	3	4	5		
Strength (ASTM D7005)							
verage Peel Strength (ppi)	1.74	1.42	1.92	1.68	1.41		1.63
Average Peel Strength (g/in)	790	645	872	763	640		742

MD Machine Direction



GEOCOMPOSITE TEST RESULTS TRI Client: Southwest Liner Systems Project: Owl Landfill Cell 4A & 4B

Material: Solmax FS1-200E-10-10-FA-00 Single Sided Geocomposite Sample Identification: 0116-023894

TRI Log #: 75958

GEONET COMPONENT

PARAMETER	TEST REP	LICATE NU	MBER								MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Thickness (ASTM D5199)													
Thickness (mils)	232	232	235	236	239	240	245	246	233	234	237 232	5 << min	200 min
Density (ASTM D1505)													
Density (g/cm3)	0.953	0.953	0.953								0.953	0.000	0.940 min
Carbon Black Content (ASTM D160	03, mod.)												
% Carbon Black	2.59	2.59									2.59	0.00	2.0 - 3.0
Melt Flow Index (ASTM D1238, Me	thod A, 190°	°C / 2.16 kg)											
Melt Flow Index (g/10 min)	0.41	0.43									0.42		1.0 max
Mass/Unit Area (ASTM D 3776, Opt	tion C)												
5 in diameter Circle - Mass (grams)	10.84	10.81	11.98	11.90	10.77	10.92	11.32	11.33	10.62	10.76			
Mass/unit area (lbs./sq.ft)	0.18	0.18	0.19	0.19	0.17	0.18	0.18	0.18	0.17	0.17	0.18	0.01	0.16 min
Tensile Properties (ASTM D7179, 1	2 ipm strair	rate)											
MD Max. Strength (ppi)	77	71	86	69	76						76	6	45 min
MD Elong. @ Max. Strength (%)	19	22	21	20	19						20	1	
MD Machine Direction													



GEOCOMPOSITE TEST RESULTS TRI Client: Southwest Liner Systems Project: Owl Landfill Cell 4A & 4B

Material: Solmax FS1-200E-10-10-FA-00 Single Sided Geocomposite Sample Identification: 0116-023894 TRI Log #: 75958

GEOTEXTILE COMPONENT

												STD.	PROJ.
PARAMETER	TEST REP	LICATE NU	MBER								MEAN	DEV.	SPEC.
	1	2	3	4	5	6	7	8	9	10			
Mass/Unit Area (ASTM D5261)													
5" diameter Circle - Mass (g)	4.90	4.70	4.77	5.12	5.52	4.17	3.87	3.99	4.24	4.25	4.55	0.53	
Mass/Unit Area (oz/sq.yd)	11.40	10.93	11.10	11.91	12.84	9.70	9.00	9.28	9.86	9.89	10.59	1.24	9.1 min
Grab Tensile Properties (ASTM I	D4632)												
MD - Tensile Strength (lbs)	380	299	315	323	370	361	360	354	358	482	360	50	230 min
TD - Tensile Strength (lbs)	457	485	515	476	447	514	535	508	577	619	513	53	230 min
MD - Elong. @ Max. Load (%)	82	75	89	85	96	84	87	86	84	84	85	5	50 min
TD - Elong. @ Max. Load (%)	89	77	75	84	85	83	87	76	80	89	83	5	50 min
Puncture Resistance (ASTM D48	333)												
Puncture Strength (lbs)	209	195	185	179	165						187	17	120 min
Trapezoidal Tear (ASTM D4533)													
MD - Tear Strength (lbs)	139	167	168	132	99	125	119	124	107	105	129	24	90 min
TD - Tear Strength (lbs)	190	224	223	186	206	169	161	210	201	166	194	23	90 min

MD Machine Direction TD Transverse Direction



C.1 GCL Inventory Control Log



#### **GCL INVENTORY CONTROL LOG**

PROJECT NAME:OWL LandfillPROJECT NUMBER:7053.22

 CLIENT:
 Oilfield Water Logistics
 CONTRACTOR:
 Mustang Extreme/ SLS

 PROJECT LOCATION:
 Lea County, New Mexico
 SHEET NUMBER:
 1

MATERIAL TYPE: GCL DATE OF INVENTORY: See Below

 MATERIAL IDENTIFICATION:
 1109263-35011-6, Bentoliner 0.75lbs/ft², NS,

 Peel 35
 INVENTORY MONITOR:

MATERIAL MANUFACTURER: Solmax/GSE UNLOADING METHOD: Forklift and Sling

		MA	TERIAL DIMENS	IONS	MANUF. QC	CONFORMANCE	
ROLL NUMBER	MATERIAL ID NO.	LENGTH (FT)	WIDTH (FT)	Area (FT <sup>2</sup> )	CERT. (Y/N)	SAMPLE (Y/N)	DATE OF INVENTORY
0242-380690	1061722B	150	15	2,325	Υ		5/25/2022
0242-380691	1061722B	150	15	2,325	Y		5/25/2022
0242-380692	1061722C	150	15	2,325	Y		5/25/2022
0242-380693	1061722C	150	15	2,325	Y		5/25/2022
0242-380694	1061722C	150	15	2,325	Y		5/25/2022
0242-380695	1061722C	150	15	2,325	Y		5/25/2022
0242-380696	1061722C	150	15	2,325	Y		5/25/2022
0242-380697	1061722C	150	15	2,325	Y		5/25/2022
0242-380698	1061722C	150	15	2,325	Y	Y	5/25/2022
0242-380699	1061722C	150	15	2,325	Y		5/25/2022
0242-380700	1061722C	150	15	2,325	Y		5/25/2022
0242-380701	1061722C	150	15	2,325	Υ		5/25/2022
0242-380702	1061722C	150	15	2,325	Y		5/25/2022
0242-380703	1061722C	150	15	2,325	Y		5/25/2022
0242-380704	1061722C	150	15	2,325	Υ		5/25/2022
0242-380705	1061722C	150	15	2,325	Y		5/25/2022
0242-380706	1061722C	150	15	2,325	Υ		5/25/2022
0242-380707	1061722C	150	15	2,325	Υ		5/25/2022
0242-380708	1061722C	150	15	2,325	Υ		5/25/2022
0242-380709	1061722C	150	15	2,325	Υ		5/25/2022
0242-380710	1061722C	150	15	2,325	Υ		5/25/2022
0242-380711	1061722C	150	15	2,325	Υ		5/25/2022
0242-380712	1061722C	150	15	2,325	Υ		5/25/2022
0242-380713	1061722C	150	15	2,325	Y		5/25/2022
0242-380714	1061722C	150	15	2,325	Y		5/25/2022
0242-380715	1061722C	150	15	2,325	Y		5/25/2022
0242-380716	1061722C	150	15	2,325	Y		5/25/2022
0242-380717	1061722C	150	15	2,325	Y		5/25/2022
0242-380718	1061722C	150	15	2,325	Y		5/25/2022
0242-380719	1062022D	150	15	2,325	Y		5/25/2022
0242-380720	1062022D	150	15	2,325	Y		5/25/2022
0242-380721	1062022D	150	15	2,325	Y		5/25/2022
0242-380722	1062022D	150	15	2,325	Y		5/25/2022
0242-380723	1062022D	150	15	2,325	Y		5/25/2022
0242-380724	1062022D	150	15	2,325	Y		5/25/2022
0242-380725	1062022D	150	15	2,325	Y		5/25/2022
0242-380726	1062022D	150	15	2,325	Y		5/25/2022
0242-356916	1092320B	150	15	2,325	Y		5/25/2022
2335-092581	30929202B	150	15	2,325	Y		5/25/2022
2335-092583	30929202B	150	15	2,325	Y		5/25/2022



#### **GCL INVENTORY CONTROL LOG**

 PROJECT NAME:
 OWL Landfill
 PROJECT NUMBER:
 7053.22

 CLIENT:
 Oilfield Water Logistics
 CONTRACTOR:
 Mustang Extreme/ SLS

 PROJECT LOCATION:
 Lea County, New Mexico
 SHEET NUMBER:
 2

MATERIAL TYPE: GCL DATE OF INVENTORY: See Below

 MATERIAL IDENTIFICATION:
 1109263-35011-6, Bentoliner 0.75lbs/ft², NS,

 Peel 35
 INVENTORY MONITOR:

MATERIAL MANUFACTURER: Solmax/GSE UNLOADING METHOD: Forklift and Sling

Ī			MA	TERIAL DIMENS	IONS	MANUF. QC	CONFORMANCE	
	ROLL NUMBER	MATERIAL ID NO.	LENGTH (FT)	WIDTH (FT)	Area (FT²)	CERT. (Y/N)	SAMPLE (Y/N)	DATE OF INVENTORY
41	2335-092585	30929202B	150	15	2,325	Y		5/25/2022
42	0242-387109	1102522A	150	15	2,325	Y		5/25/2022
43	0242-387152	1102522C	150	15	2,325	Y		5/25/2022
44	0242-387155	1102522C	150	15	2,325	Y		5/25/2022
45	502339797	1100919C	150	15	2,325	Y		5/25/2022
46	502339799	1100919C	150	15	2,325	Y		5/25/2022
47								
48								
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C.2 Geonet Inventory Control Log



#### **GEONET INVENTORY CONTROL LOG**

PROJECT NAME:OWL LandfillPROJECT NUMBER:7053.22

 CLIENT:
 Oilfield Water Logistics
 CONTRACTOR:
 Mustang Extreme

 PROJECT LOCATION:
 Lea County, New Mexico
 SHEET NUMBER:
 1

MATERIAL TYPE: Geonet DATE OF INVENTORY: See Below

 MATERIAL IDENTIFICATION:
 1106474-10668-4, HyperNet 200 mil
 INVENTORY MONITOR:
 TSK

 MATERIAL MANUFACTURER:
 Solmax/GSE
 UNLOADING METHOD:
 Forklift and Sling

Ī			MA	TERIAL DIMENS	IONS	MANUF. QC	CONFORMANCE	
	ROLL NUMBER	MATERIAL ID NO.	LENGTH (FT)	WIDTH (FT)	THICKNESS OF WEIGHT	CERT. (Y/N)	SAMPLE (Y/N)	DATE OF INVENTORY
1	0116-017376	DPC611480	15	330.0	5.0	Υ		8/5/2022
2	0116-017377	DPC611480	15	330.0	5.0	Υ		8/5/2022
3	0116-017381	DPC611480	15	330.0	5.0	Υ		8/5/2022
4	0116-017382	DPC611480	15	330.0	5.0	Υ		8/5/2022
5	0116-017383	DPC611480	15	330.0	5.0	Υ		8/5/2022
6	0116-017384	DPC611480	15	330.0	5.0	Υ		8/5/2022
7	0116-017385	DPC611480	15	330.0	5.0	Υ		8/5/2022
8	0116-017386	DPC611480	15	330.0	5.0	Υ		8/5/2022
9	0116-017388	DPC611480	15	330.0	5.0	Υ		8/5/2022
10	0116-017389	DPC611480	15	330.0	5.0	Υ		8/5/2022
11	0116-017390	DPC611480	15	330.0	5.0	Υ		8/5/2022
12	0116-017391	DPC611480	15	330.0	5.0	Υ		8/5/2022
13	0116-017393	DPC611480	15	330.0	5.0	Υ		8/5/2022
14	0116-022641	DPF611332	330	15.0	5.0	Υ	Y	10/28/2022
15	0116-022642	DPF611332	330	15.0	5.0	Υ		10/28/2022
16	0116-022643	DPF611332	330	15.0	5.0	Υ		10/28/2022
17	0116-022644	DPF611332	330	15.0	5.0	Υ		10/28/2022
18	0116-022645	DPF611332	330	15.0	5.0	Υ		10/28/2022
19	0116-022646	DPF611332	330	15.0	5.0	Υ		10/28/2022
20	0116-022647	DPF611332	330	15.0	5.0	Υ		10/28/2022
21	0116-022648	DPF611332	330	15.0	5.0	Υ		10/28/2022
22	0116-022649	DPF611332	330	15.0	5.0	Υ		10/28/2022
23	0116-022650	DPF611332	330	15.0	5.0	Υ		10/28/2022
24	0116-022651	DPF611332	330	15.0	5.0	Υ		10/28/2022
25	0116-022652	DPF611332	330	15.0	5.0	Υ		10/28/2022
26	0116-022653	DPF611332	330	15.0	5.0	Υ		10/28/2022
27	0116-022654	DPF611332	330	15.0	5.0	Υ		10/28/2022
28	0116-022655	DPF611332	330	15.0	5.0	Υ		10/28/2022
29	0116-022656	DPF611332	330	15.0	5.0	Y		10/28/2022
30	0116-022793	DPF611332	330	15.0	5.0	Υ		10/28/2022
31	0116-022794	DPF611332	330	15.0	5.0	Υ		10/28/2022
32	0116-022795	DPF611332	330	15.0	5.0	Υ		10/28/2022
33	0116-022796	DPF611332	330	15.0	5.0	Υ		10/28/2022
34	0116-022797	DPF611332	330	15.0	5.0	Υ		10/28/2022
35	0116-022798	DPF611332	330	15.0	5.0	Υ		10/28/2022
36	0116-022799	DPF611332	330	15.0	5.0	Υ		10/28/2022
37	0116-022800	DPF611332	330	15.0	5.0	Υ		10/28/2022
38	0116-022801	DPF611332	330	15.0	5.0	Υ		10/28/2022
39	0116-022802	DPF611332	330	15.0	5.0	Υ		10/28/2022
40	0116-022803	DPF611332	330	15.0	5.0	Υ		10/28/2022



#### **GEONET INVENTORY CONTROL LOG**

PROJECT NAME:OWL LandfillPROJECT NUMBER:7053.22

 CLIENT:
 Oilfield Water Logistics
 CONTRACTOR:
 Mustang Extreme

 PROJECT LOCATION:
 Lea County, New Mexico
 SHEET NUMBER:
 1

MATERIAL TYPE: Geonet DATE OF INVENTORY: See Below

MATERIAL IDENTIFICATION: 1106474-10668-4, HyperNet 200 mil INVENTORY MONITOR: TSK

MATERIAL MANUFACTURER: Solmax/GSE UNLOADING METHOD: Forklift and Sling

		MA <sup>*</sup>	TERIAL DIMENS	SIONS	MANUF. QC	CONFORMANCE	
ROLL NUMBER	MATERIAL ID NO.	LENGTH (FT)	WIDTH (FT)	THICKNESS OF WEIGHT	CERT. (Y/N)	SAMPLE (Y/N)	DATE OF INVENTORY
0116-022804	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-022805	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-022806	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-022807	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-022809	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-022810	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023308	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023310	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023311	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023327	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023328	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023329	DPF610442	330	15.0	5.0	Υ	1	10/28/2022
0116-023330	DPF610442	330	15.0	5.0	Y		10/28/2022
0116-023331	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023332	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023333	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023334	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023335	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023336	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023337	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023338	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023339	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023340	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023341	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023342	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023343	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023344	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023345	DPF610442	330	15.0	5.0	Υ	1	10/28/2022
0116-023346	DPF610442	330	15.0	5.0	Y		10/28/2022
0116-023347	DPF610442	330	15.0	5.0	Y		10/28/2022
0116-023348	DPF610442	330	15.0	5.0	Y		10/28/2022
0116-023349	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023350	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023351	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023353	DPF610442	330	15.0	5.0	Υ		10/28/2022
0116-023354	DPF610442	330	15.0	5.0	Y		10/28/2022
0116-023368	DPF610442	330	15.0	5.0	Υ		10/28/2022



C.3 FML Inventory Control Log



#### **FML INVENTORY CONTROL LOG**

PROJECT NAME:OWL LandfillPROJECT NUMBER:7053.22

 CLIENT:
 Oilfield Water Logistics
 CONTRACTOR:
 Mustang Extreme

 PROJECT LOCATION:
 Lea County, New Mexico
 SHEET NUMBER:
 1

 MATERIAL TYPE:
 Smooth FML
 DATE OF INVENTORY:
 See Below

 MATERIAL IDENTIFICATION:
 1101438, HDPE, 60 mil, Black Smooth
 INVENTORY MONITOR:
 TBA

MATERIAL MANUFACTURER: Solmax/GSE UNLOADING METHOD: Forklift and Sling

		MA	TERIAL DIMENS	SIONS	MANUF. QC	CONFORMANCE	
ROLL NUMBER	MATERIAL ID NO.	LENGTH (FT)	WIDTH (FT)	THICKNESS OF WEIGHT	CERT. (Y/N)	SAMPLE (Y/N)	DATE OF INVENTORY
102194234	PKC810880	576	22.5	60mil	Υ		5/25/2022
102195332	PKC810880	576	22.5	60mil	Υ		5/25/2022
102195333	PKC810880	576	22.5	60mil	Υ		5/25/2022
0101-206717	22H1158	576	22.5	60mil	Υ		5/25/2022
0101-206718	22H1158	576	22.5	60mil	Υ		5/25/2022
0101-206720	22H1158	576	22.5	60mil	Υ		5/25/2022
0101-206721	22H1158	576	22.5	60mil	Υ		5/25/2022
0101-206722	22H1158	576	22.5	60mil	Υ		5/25/2022
0101-206723	22H1158	576	22.5	60mil	Υ		5/25/2022
0101-206724	22H1158	576	22.5	60mil	Υ		5/25/2022
0101-206725	22H1158	576	22.5	60mil	Υ		5/25/2022
0101-206726	22H1158	576	22.5	60mil	Υ		5/25/2022
0101-206727	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206728	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206729	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206730	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206731	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206732	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206733	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206734	2211134	576	22.5	60mil	Υ		5/25/2022
0101-206735	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206736	2211134	576	22.5	60mil	Υ		5/25/2022
0101-206737	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206738	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206739	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206740	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206741	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206742	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206743	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206744	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206745	22 1134	576	22.5	60mil	Y		5/25/2022
0101-206746	2211134	576	22.5	60mil	Υ		5/25/2022
0101-206747	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206748	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206749	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206750	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206753	22 1134	576	22.5	60mil	Y		5/25/2022
0101-206754	22 1134	576	22.5	60mil	Y		5/25/2022
0101-206755	22 1134	576	22.5	60mil	Υ		5/25/2022
0101-206756	22 1134	576	22.5	60mil	Υ		5/25/2022



#### **FML INVENTORY CONTROL LOG**

PROJECT NAME: OWL Landfill PROJECT NUMBER: 7053.22

 CLIENT:
 Oilfield Water Logistics
 CONTRACTOR:
 Mustang Extreme

 PROJECT LOCATION:
 Lea County, New Mexico
 SHEET NUMBER:
 1

 MATERIAL TYPE:
 Smooth FML
 DATE OF INVENTORY:
 See Below

 MATERIAL IDENTIFICATION:
 1101438, HDPE, 60 mil, Black Smooth
 INVENTORY MONITOR:
 TBA

MATERIAL MANUFACTURER: Solmax/GSE UNLOADING METHOD: Forklift and Sling

		MA	TERIAL DIMENS	SIONS	MANUF. QC	CONFORMANCE	<b>=</b>	
ROLL NUMBER	MATERIAL ID NO.	LENGTH (FT)	WIDTH (FT)	THICKNESS OF WEIGHT	CERT. (Y/N)	SAMPLE (Y/N)	DATE OF INVENTORY	
0101-206757	2211134	576	22.5	60mil	Υ		5/25/2022	
0101-206758	22 1134	576	22.5	60mil	Υ		5/25/2022	
0101-206760	22 1134	576	22.5	60mil	Υ		5/25/2022	
0101-206761	22 1134	576	22.5	60mil	Υ		5/25/2022	
0101-206762	22 1134	576	22.5	60mil	Υ		5/25/2022	
0102-198485	22 1292	576	22.5	60mil	Υ		5/25/2022	
0102-198486	22 1292	576	22.5	60mil	Υ		5/25/2022	
0102-198487	2211292	576	22.5	60mil	Υ		5/25/2022	
0102-198488	2211292	576	22.5	60mil	Υ		5/25/2022	
0102-198489	2211292	576	22.5	60mil	Υ		5/25/2022	
0102-198490	2211292	576	22.5	60mil	Υ		5/25/2022	
0102-198492	2211292	576	22.5	60mil	Υ		5/25/2022	
0102-198493	2211292	576	22.5	60mil	Υ		5/25/2022	
0102-198494	2211292	576	22.5	60mil	Υ		5/25/2022	
0102-198495	2211292	576	22.5	60mil	Υ		5/25/2022	
0102-198496	2211292	576	22.5	60mil	Υ		5/25/2022	
0102-198497	2211292	576	22.5	60mil	Υ		5/25/2022	
0102-198498	2211292	576	22.5	60mil	Υ		5/25/2022	
0102-198499	2211292	576	22.5	60mil	Υ		5/25/2022	
0102-198500	2211292	576	22.5	60mil	Υ		5/25/2022	
0102-198501	2211292	576	22.5	60mil	Υ		5/25/2022	
0102-198502	2211292	576	22.5	60mil	Υ		5/25/2022	
0102-198503	2211292	576	22.5	60mil	Υ		5/25/2022	
0102-198504	2211292	576	22.5	60mil	Υ		5/25/2022	
0102-198505	2211292	576	22.5	60mil	Υ		5/25/2022	
0104-199893	2011064	576	22.5	60mil	Υ		5/25/2022	
0104-199894	2011064	576	22.5	60mil	Υ		5/25/2022	
0104-199895	2011064	576	22.5	60mil	Υ		5/25/2022	
0104-199896	2011064	576	22.5	60mil	Υ		5/25/2022	
0104-199897	2011064	576	22.5	60mil	Υ		5/25/2022	
0104-199898	2011064	576	22.5	60mil	Υ		5/25/2022	
0104-199899	2011064	576	22.5	60mil	Υ		5/25/2022	
0104-199900	2011064	576	22.5	60mil	Υ		5/25/2022	
0105-201689	2010945	576	22.5	60mil	Υ		5/25/2022	
0105-201689	2010945	576	22.5	60mil	Υ		5/25/2022	
0104-206293	2011064	576	22.5	60mil	Υ	Y	5/25/2022	
0104-206294	2011064	576	22.5	60mil	Υ	Y	5/25/2022	



C.4 Geocomposite Inventory Control Log



#### **GEOCOMPOSITE INVENTORY CONTROL LOG**

PROJECT NAME: OWL Landfill PROJECT NUMBER: 7053.22 CONTRACTOR: CLIENT:

Oilfield Water Logistics Mustang Extreme PROJECT LOCATION: Lea County, New Mexico SHEET NUMBER:

**MATERIAL TYPE:** Geocomposite Double-Sided DATE OF INVENTORY: See Below

1114746-35011-3, FabriNet 225 mil, Double-MATERIAL IDENTIFICATION: Sided, 10oz/yd<sup>2</sup>, Nonwoven Cal. **INVENTORY MONITOR:** TBA

MATERIAL MANUFACTURER: Solmax/GSE **UNLOADING METHOD:** Forklift and Sling

		MA	TERIAL DIMENS	SIONS	MANUF. QC	CONFORMANCE		
ROLL NUMBER	MATERIAL ID NO.	LENGTH (FT)	WIDTH (FT)	THICKNESS OF WEIGHT	CERT. (Y/N)	SAMPLE (Y/N)	DATE OF INVENTORY	
121501010001	HCBX001295	290	15.0	10oz	Y	Y	5/25/2022	
121501010002	HCBX001295	290	15.0	10oz	Υ		5/25/2022	
121501010003	HCBX001295	290	15.0	10oz	Υ		5/25/2022	
121501010004	HCBX001295	290	15.0	10oz	Υ		5/25/2022	
121501010005	HCBX001295	290	15.0	10oz	Υ		5/25/2022	
121501010006	HCBX001295	290	15.0	10oz	Υ		5/25/2022	
121501010007	HCBX001295	290	15.0	10oz	Υ		5/25/2022	
121501010008	HCBX001295	290	15.0	10oz	Υ		5/25/2022	
121501010009	HCBX001295	290	15.0	10oz	Υ		5/25/2022	
121501010010	HCBX001295	290	15.0	10oz	Υ		5/25/2022	
121501010011	HCBX001295	290	15.0	10oz	Υ		5/25/2022	
121501010012	HCBX001295	290	15.0	10oz	Υ		5/25/2022	
121501010013	HCBX001295	290	15.0	10oz	Υ		5/25/2022	
121501010014	HCBX001295	290	15.0	10oz	Υ		5/25/2022	
121501010015	HCBX001295	290	15.0	10oz	Υ		5/25/2022	
121501010016	HCBX001295	290	15.0	10oz	Υ		5/25/2022	
121501010017	HCBX001295	290	15.0	10oz	Υ		5/25/2022	
121501010018	HCBX001295	290	15.0	10oz	Υ		5/25/2022	



C.5 GCL Deployment Log



333 Rio Rancho Blvd. NE, Suite 400 Rio Rancho, New Mexico 87124 505.867.6990

## **GCL DEPLOYMENT LOG**

PROJECT NAME: OWL Landfill PROJECT NUMBER: 7053.22

CLIENT: Oilfield Water Logistics CONTRACTOR: Mustang Extreme/ SLS PROJECT LOCATION: SHEET NUMBER:

**DEPLOYMENT LOCATION:** MONITOR: MWK Cell 1A & 2AB

Lea County, New Mexico

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT <sup>2</sup> )	DATE INSTALLED
P1	502325631	114	15.0	1,710	5/25/22
P2	502325651	32	15.0	480	5/25/22
P3	502325632	82	15.0	1,230	5/25/22
P4	502325632	66	15.0	990	5/25/22
P5	1109263	48	15.0	720	5/25/22
P6	50232563	14	15.0	210	5/25/22
P7	1109263	101	15.0	1,515	5/25/22
P8	502325653	113	15.0	1,695	5/25/22
P9	502325633	96	15.0	1,440	5/25/22
P10	502325653	20	15.0	300	5/25/22
P11	502325633	64	15.0	960	5/25/22
P12	2335-092583	53	15.0	795	5/25/22
P13	0242-356916	85	15.0	1,275	5/25/22
P14	2335-092583	30	15.0	450	5/25/22
P15	2335-092583	48	15.0	720	5/25/22
P16	0242-356916	68	15.0	1,020	5/25/22
P17	092584	82	15.0	1,230	5/25/22
P18	2335-092585	35	15.0	525	5/25/22
P19	2335-092585	114	15.0	1,710	5/25/22
P20	502336392	26	15.0	390	5/25/22
P21	502339797	90	15.0	1,350	5/25/22
P22	2335-092581	98	15.0	1,470	5/25/22
P23	502339797	70	15.0	1,050	5/25/22
P24	2335-092581	100	15.0	1,500	5/25/22
P25	502339799	14	15.0	210	5/25/22
P26	502336389	29	15.0	435	5/25/22
P27	502339799	86	15.0	1,290	5/25/22
P28	502336389	114	15.0	1,710	5/25/22
P29	502325652	109	15.0	1,635	5/25/22
P30	502336389	5	15.0	75	5/25/22
P31	0242-380706	150	15.0	2,250	8/24/22
P32	0242-380721	150	15.0	2,250	8/24/22
P33	0242-380710	150	15.0	2,250	8/24/22
P34	0242-380699	150	15.0	2,250	8/24/22
P35	0242-380722	150	15.0	2,250	8/24/22
P36	0242-380713	150	15.0	2,250	8/24/22
P37	0242-380709	150	15.0	2,250	8/24/22
P38	0242-380694	150	15.0	2,250	8/24/22
P39	0242-380703	150	15.0	2,250	8/24/22
P40	0242-380718	150	15.0	2,250	8/24/22



PROJECT LOCATION:

333 Rio Rancho Blvd. NE, Suite 400 Rio Rancho, New Mexico 87124 505.867.6990

SHEET NUMBER:

2

## **GCL DEPLOYMENT LOG**

**PROJECT NAME:** OWL Landfill **PROJECT NUMBER:** 7053.22

 CLIENT:
 Oilfield Water Logistics
 CONTRACTOR:
 Mustang Extreme/ SLS

**DEPLOYMENT LOCATION:** Cell 1A & 2AB **MONITOR:** MWK

Lea County, New Mexico

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT²)	DATE INSTALLED
P41	0242-380726	150	15.0	2,250	8/24/22
P42	0242-380720	150	15.0	2,250	8/24/22
P43	0242-380692	65	15.0	975	8/24/22
P44	0242-380692	81	15.0	1,215	8/24/22
P45	0242-380707	15	15.0	225	8/24/22
P46	0242-380707	77	15.0	1,155	8/24/22
P47	0242-380707	58	15.0	870	8/24/22
P48	0242-380715	150	15.0	2,250	8/24/22
P49	0242-380698	150	15.0	2,250	8/24/22
P50	0242-380708	150	15.0	2,250	8/24/22
P51	0242-380717	32	15.0	480	8/24/22
P52	0242-380717	88	15.0	1,320	8/24/22
P53	0242-380717	29	15.0	435	8/24/22
P54	0242-380719	150	15.0	2,250	8/24/22
P55	0242-380700	150	15.0	2,250	8/24/22
P56	0242-380693	150	15.0	2,250	8/24/22
P57	0242-380695	58	15.0	870	8/24/22
P58	0242-380695	58	15.0	870	8/24/22
P59	0242-380695	31	15.0	465	8/24/22
P60	0242-380705	27	15.0	405	8/24/22
P61	0242-380716	150	15.0	2,250	10/12/22
P62	0242-380725	150	15.0	2,250	10/12/22
P63	0242-380714	45	15.0	675	10/12/22
P64	0242-380714	125	15.0	1,875	10/12/22
P65	0242-380712	97	15.0	1,455	10/12/22
P66	0242-380712	47	15.0	705	10/12/22
P67	0242-380697	150	15.0	2,250	10/12/22
P68	0242-380714	4	15.0	60	10/12/22
P69	0242-380696	127	15.0	1,905	10/15/22
P70	0242-380691	127	15.0	1,905	10/15/22
P71	0242-387109	110	15.0	1,650	11/22/22
P72	0242-387109	40	15.0	600	11/22/22
P73	0242-387155	63	15.0	945	11/22/22
P74	0242-387155	5	15.0	75	11/22/22
P75	0242-387155	5	15.0	75	11/22/22
P76	0242-387155	10	15.0	150	11/22/22
P77	0242-387152	45	15.0	675	11/22/22
P78	0242-387155	37	15.0	555	11/22/22
P79	0242-387155	30	15.0	450	11/22/22
P80	0242-387152	20	15.0	300	11/22/22



PROJECT LOCATION:

333 Rio Rancho Blvd. NE, Suite 400 Rio Rancho, New Mexico 87124 505.867.6990

3

SHEET NUMBER:

## **GCL DEPLOYMENT LOG**

PROJECT NAME: OWL Landfill PROJECT NUMBER: 7053.22

 CLIENT:
 Oilfield Water Logistics
 CONTRACTOR:
 Mustang Extreme/ SLS

DEPLOYMENT LOCATION: Cell 1A & 2AB MONITOR: MWK

Lea County, New Mexico

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT²)	DATE INSTALLED
P81	0001	40	15.0	600	1/13/23
P82	0001	37	15.0	600	1/13/23
P83	0242-387152	3	15.0	555	1/13/23
P84	0242-387152	30	15.0	45	1/13/23
P85	0242-387152	30	15.0	450	1/13/23
-					
_					
			PLACED (FT <sup>2</sup> ):	2,250	

Roll 0001 was from a previous onsite liner project. The roll number tag could not be located. Roll 0001 was inspected by the CQA manager before installation.



C.6 Secondary FML Deployment Log



333 Rio Rancho Blvd. NE, Suite 400 Rio Rancho, New Mexico 87124 505.867.6990

## **FML DEPLOYMENT LOG**

PROJECT NAME: OWL Landfill Cell 4AB PROJECT NUMBER: 7053.22

 CLIENT:
 Oilfield Water Logistics
 CONTRACTOR:
 Mustang Extreme/SLS

 PROJECT LOCATION:
 Lea County, New Mexico
 SHEET NUMBER:
 1

DEPLOYMENT LOCATION: Secondary MONITOR: MWK/TSK/DL/NM

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT²)	DATE INSTALLE
S1	205066	260	22.5	5,850	5/25/2022
S2	205066	260	22.5	5,850	5/25/2022
S3	205066	48	22.5	1,080	5/25/2022
S4	205071	211	22.5	4,748	5/25/2022
S5	205071	260	22.5	5,850	5/25/2022
S6	198487	164	22.5	3,690	5/25/2022
S7	205071	96	22.5	2,160	5/25/2022
S8	1101438	71	4	284	5/25/2022
S9	1101438	104	4	416	5/25/2022
S10	1101438	95	4	380	5/25/2022
S11	0317	490	22	10,780	8/24/2024
S12	0318	490	22	10,780	8/24/2024
S13	0301	490	22	10,780	8/24/2024
S14	0305	490	22	10,780	8/24/2024
S15	0297	50	22	1,100	8/24/2024
S16	0297	50	22	1,100	8/24/2024
S17	0297	50	22	1,100	8/24/2024
S18	0297	50	22	1,100	8/24/2024
S19	0297	60	22	1,320	8/26/2024
S20	0297	33	14	462	8/26/2024
S21	0297	27	14	378	8/26/2024
S22	0105-205065	350	22.5	7,875	10/13/222
S23	0105-205065	47	20	940	10/13/222
S24	0105-205065	154	11	1,694	10/13/222
S25	0105-205065	154	11	1,694	10/13/222
S26	0001	130	22.5	2,925	10/15/222
S27	0001	65	5	325	10/15/222
S28	0001	65	5	325	10/15/222
S29	6738	102	22	2,244	11/22/2022
S30	6738	102	22	2,244	11/22/2022
S31	6738	45	22	990	11/22/2022
S32	6738	37	22	814	11/22/2022
S33	6738	20	5	100	11/22/2022
S34	6292	40	22.5	900	1/13/223
S35	6292	30	22.5	675	1/13/223
			PLACED (FT <sup>2</sup> ):	103,733	

Roll 0001 was from a previous onsite liner project. The roll number tag could not be located. Roll 0001 was inspected by the CQA manager before installation.



C.7 Secondary and Primary FML Pre-Weld Qualification Test Logs



## **FML TRIAL SEAMING TEST LOG**

#### **PROJECT SPECIFICATIONS**

**PROJECT NAME:** OWL Landfill Cell 1A&2AB OWNER: Oilfield Water Logistics PROJECT LOCATION: Lea County, New Mexico

PROJECT NUMBER: CONTRACTOR: SHEET NUMBER:

7053.22 Mustang Extreme/ SLS

**FUSION** 

TEXTURED: PEEL TEXTURED: PEEL lbs/in lbs/in

SHEAR 120 lbs/in 120 lbs/in SHEAR SHEAR

333 Rio Rancho Blvd., Suite 400

Rio Rancho, New Mexico 87124

Received by OCD: 4/10/2025 4:34:21 PM

TEXTURED: PEEL 78 lbs/in lbs/in **EXTRUSION** TEXTURED: PEEL 78 lbs/in SHEAR lbs/in

90

			WELDER'S	MACHINE	WEDGE	WELDS	EXTRUSI	ON WELDS			FIEL	D TES	T RESU	JLTS			
DATE	TIME	QC INITIALS	INITIALS	NUMBER	Temperature	Speed	Barrel Temp	Pre-Heat Temp	PEE	L #1		L #2		EL #3	SHE	EAR	COMMENTS
5/25/22	7:35	DL	AA	38	805	7	_	_	141	136	120	134	133	130	165	156	
5/25/22	12:48	DL	AA	38	805	8.5	_	_	126	131	133	128	141	136	122	155	
5/25/22	1:01	DL	PO	07	0	0	500	400		127		139		146	155	161	
5/26/22	6:20	DL	PO	07	-	-	500	400		110		110		121	159	172	
5/26/22	12:19	DL	AA	38	805	8.5	-	-	121	100	114	110	118	109	152	142	
5/26/22	1:15	DL	PO	07			500	400		107		110		107	146	161	
5/27/22	8:59	DL	AA	35	805	8.5	-	-	124	120	126	130	121	127	151	149	
5/27/22	9:40	DL	PO	07	-	-	500	400		103		107		103	141	139	
5/27/22	1:15	DL	PO	07	-	-	500	400		102		110		106	152	143	
8/24/22	1:00	MWK	SL	904	805	5	-	-	142	130	125	120	130	120	130	138	
8/24/22	1:00	MWK	SL	68	805	5	-	-	127	120	127	120	127	121	127	133	
8/24/22	4:50	MWK	AD	68	805	5	-	-	137	164	134	125	137	127	184	124	
8/25/22	8:50	MWK	SP	398	-	-	550	500		110		105		106	158	186	
8/25/22	9:12	MWK	AD	59	-	-	550	500		142		142		114	175	168	
8/25/22	1:00	MWK	SP	398	-	-	550	500		131		122		132	166	157	
8/25/22	1:27	MWK	AD	59	-	-	550	500		132		141		135	165	169	
8/26/22	9:15	MWK	AD	904	850	5	-	-	137	136	121	140	136	131	187	190	
8/26/22	9:10	MWK	AD	904	850	5	-	-	140	131	137	125	130	130	190	188	
8/26/22	10:10	MWK	AD	59	-	-	550	500		174		150		122	182	170	
8/26/22	1:00	MWK	NS	68	850	5			138	142	135	133	154	152	184	177	
10/13/22	7:45	MWK	IB	67	805	6.5	-	-	144	130	152	121	137	140	163	172	
10/13/22	7:45	MWK	AL	79	805	6.5	-	-	132	125	132	143	134	136	180	195	
10/13/22	7:50	MWK	IB	67	805	6.5	-	-	143	136	152	143	143	146	182	181	
10/13/22	7:50	MWK	AL	79	805	6.5	-	-	134	138	142	152	141	138	172	176	
10/13/22	7:50	MWK	TD	10	-	-	410	510		112		106		126	155	165	
10/13/22	7:55	MWK	TD	10	-	-	410	510		108		115		111	168	159	
10/13/22	8:11	MWK	IB	18	805	6	-	-	121	132	120	142	134	122	172	182	
10/14/22	8:15	MWK	IB	18	805	6.5	-	-	142	161	161	131	121	155	164	166	
10/14/22	8:22	MWK	IB	18	805	6.5	-	-	138	135	133	135	131	137	165	158	
10/14/22	8:30	MWK	AL	79	805	6.5	-	-	131	136	145	141	122	119	179	198	
10/14/22	8:57	MWK	AL	79	805	6.5	-	-	160	156	159	148	161	155	174	198	
10/14/22	8:43	MWK	TD	10	-	-	495	395		91		125		105	157	159	
10/14/22	8:52	MWK	TD	10	-	-	495	395		119		123		119	151	168	
10/14/22	12:45	MWK	IB	18	805	7	-	-	137	135	153	149	145	128	192	189	
10/14/22	12:52	MWK	AL	79	805	7	-	-	138	131	134	151	138	152	170	176	
10/15/22	8:00	MWK	IB	18	805	6	-	-	135	138	146	140	152	147	188	186	
10/15/22	8:07	MWK	AL	79	805	6.5	-	-	140	159	166	150	149	147	209	202	
10/15/22	8:15	MWK	TD	10	-	-	495	395		124	117	40-	4	138	197	179	
10/15/22	12:30	MWK	IB	18	805	6.5	-		140	140	129	132	135	134	179	181	
10/15/22	12:40	MWK	AL	79	805	6.5	-	-	110	133	126	121	127	143	162	172	
10/15/22	12:50	MWK	TD	10	-	-	495	395	100	128	100	132	101	125	189	190	
11/22/22	10:30	MWK	CK	464	805	4.0	500	100	132	135	139	143	131	133	156	164	
11/22/22	10:00	MWK	SP	398			500	400		121		118		115	145	152	
11/22/22	8:00	MWK	IM	18	1		500	400		114		123		132	144	148	
11/22/22	12:00	MWK	CK	01	050	2.5	500	400	1.45	125	1.42	121	120	134	150	142	
11/23/22	8:3	MWK	LP	464	850	3.5	520	520	145	154	143	142	138	149	172	176	
1/13/23	1:00	TK	MD	319	-	-	520	520		125		119		127	165	163	



C.8 Secondary FML Seaming Log

333 Rio Rancho Blvd. NE, Suite 400 Rio Rancho, New Mexico 87124 505.867.6990

### **FML SEAMING LOG**

PROJECT NAME: OWL Landfill Cell 1A & 2AB PROJECT NUMBER: 7053.22 OWNER: Oilfield Water Logistics **CONTRACTOR:** Mustang Extreme/SLS PROJECT LOCATION: Lea County, New Mexico SHEET NUMBER: 1

SEAMING LOCATION: Secondary

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
1	5/25/2022	S1/S2	250	10:44	AA	38	805	7.00	DT-1	DL
2	5/25/2022	S2/S3	48	12:30	AA	38	805	7.00		DL
3	5/25/2022	S2/S4	202	12:01	AA	38	805	7.00	DT-2	DL
4	5/25/2022	S3/S4	22	11:45	AA	38	805	7.00		DL
5	5/25/2022	S3/S5	48	1:38	AA	38	805	8.00		DL
6	5/25/2022	S4/S5	202	1:13	AA	38	805	8.00	DT-3	DL
7	5/25/2022	S6/S7	22	1:25	AA	38	805	8.00	DT-4	DL
8	5/25/2022	S5/S7	96	1:51	AA	38	805	8.00		DL
9	5/25/2022	S5/S6	154	2:02	PO	7	500/400	8.00		DL
10	5/25/2022	S7/S10	85	2:32	AA	38	805	8.00		DL
11	5/25/2022	S6/S9	104	2:41	AA	38	805	8.00		DL
12	5/25/2022	S6/S8	61	3:00	AA	38	805	8.00		DL
13	5/25/2022	S8/S9	4	3:10	AA	38	805	8.00		DL
14	5/25/2022	S9/S10	4	3:15	AA	38	805	8.00		DL
15	5/25/2022	S10/EX-Cell 2AB	28	3:30	AA	38	805	8.00		DL
16	5/25/2022	S10/EX-Cell 2AB	14	3:40	AA	38	805	8.00		DL
17	5/25/2022	S10/EX-Cell 2AB	16	3:42	AA	38	805	8.00		DL
18	5/25/2022	S10/EX-Cell 2AB	11	3:55	AA	38	805	8.00		DL
19	5/25/2022	S9/EX-Cell 2AB	22	3:56	AA	38	805	8.00		DL
20	5/25/2022	S9/EX-Cell 2AB	22	3:59	AA	38	805	8.00		DL
21	5/25/2022	S9/EX-Cell 2AB	22	4:02	AA	38	805	8.00		DL
22	5/25/2022	S8/EX-Cell 2AB	22	4:10	AA	38	805	8.00		DL
23	5/25/2022	S8/EX-Cell 2AB	22	4:13	AA	38	805	8.00		DL
24	5/25/2022	S1/EX-Cell 1A	22	4:57	AA	38	805	8.00		DL
25	5/25/2022	S1/EX-Cell 1A	22	5:00	AA	38	805	8.00		DL
26	5/25/2022	S1/EX-Cell 1A	22	5:03	AA	38	805	8.00		DL
27	5/25/2022	S1/EX-Cell 1A	22	5:15	AA	38	805	8.00		DL
28	8/24/2022	S11/S12	460	4:00	AD	904	805	5.00	DT-01	MWK
29	8/24/2022	S12/S13	460	4:50	SL	68	805	5.00		MWK
30	8/24/2022	S13/S14	460	5:45	AD	904	805	5.00	DT-02	MWK

Received by OCD: 4/10/2025 4:34:21 PM

**Parkhill** 

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## **FML SEAMING LOG**

PROJECT NAME: OWL Landfill Cell 1A & 2AB PROJECT NAME: OWL Landfill Cell 1A & 2AB

OWNER: Oilfield Water Logistics

PROJECT LOCATION: Lea County, New Mexico

SEAMING LOCATION: Secondary

PROJECT NUMBER:	7053.22
CONTRACTOR:	Mustang Extreme/SLS
SHEET NUMBER:	2

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
31	8/24/2022	S14/S16	50	6:06	SL	68	805	5.00		MWK
35	8/24/2022	S16/S17	50	6:16	SL	68	805	5.00		MWK
36	8/24/2022	S17/S18	50	6:22	SL	68	805	5.00		MWK
37	8/24/2022	S14/S18	22	6:37	SL	68	805	5.00		MWK
38	8/24/2022	S13/S17	22	6:40	SL	68	805	5.00		MWK
39	8/24/2022	S12/S16	22	6:42	SL	68	805	5.00	DT-03	MWK
10	8/24/2022	S11/S15	22	6:44	SL	68	805	5.00		MWK
<b>1</b> 1	8/24/2022	S18/S3	22	11:10	AD	59	550/550	NA		MWK
12	8/24/2022	S19/S2	22	11:11	AD	59	550/550	NA		MWK
13	8/24/2022	S20/S1	22	11:12	AD	59	550/550	NA		MWK
14	8/25/2022	S17, S16, S15/S5,S6,S8	66	11:40	AD	59	550/550	NA		MWK
15	8/25/2022	S11/Ex-Cell 2AB	460	9:00	SL	398	550/550	NA	DT-04	MWK
16	8/25/2022	S5/Ex-Cell 2AB	50	1:05	AD	59	550/550	NA		MWK
17	8/26/2022	S18/S19	60	9:15	AD	904	805	5.00		MWK
18	8/26/2022	S19/S20	33	9:26	AD	904	805	5.00		MWK
19	8/26/2022	S20/S21	14	9:20	AD	904	805	5.00	DT-05	MWK
50	8/26/2022	S19/S21	27	9:30	AD	904	805	5.00		MWK
51	10/13/2022	S22/S14	340	8:40	IB	18	805	6.5		NLM
52	10/13/2022	S22/S19	22	9:35	AL	79	805	6.5		NLM
53	10/13/2022	S23/S24	11	10:05	AL	79	805	6.5		NLM
54	10/13/2022	S22/S23	47	10:08	IB	18	805	6.5		NLM
55	10/13/2022	S22/S24	154	10:08	IB	18	805	6.5	DTS-2	NLM
56	10/13/2022	S24/S25	9	10:17	IB	79	805	6.50		NLM
57	10/13/2022	S25/S22	151	10:15	IB	18	805	6.50		NLM
58	10/13/2022	S23/S21	18	10:40	AL	79	805	6.50		NLM
59	10/13/2022	S23/Ex-Cell 1A	39	10:55	AL	79	805	6.50		NLM
50	10/15/2022	S26/S14	130	8:55	AL	79	805	6.50		NLM

**Parkhill** 

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### **FML SEAMING LOG**

PROJECT NAME: OWL Landfill Cell 1A & 2AB PROJECT NUMBER: 7053.22

OWNER: Oilfield Water Logistics CONTRACTOR: Mustang Extreme/SLS

PROJECT LOCATION: Lea County, New Mexico SHEET NUMBER: 3

SEAMING LOCATION: Secondary

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
60	10/15/2022	S26/S27	65	9:30	AL	79	805	6.50		NLM
61	10/15/2022	S26/S22	22	9:54	IB	18	805	6.00		NLM
62	10/15/2022	S26/S25	9	9:54	IB	18	805	6.00		NLM
63	10/15/2022	S25/Ex-Cell 1A	40	9:45	AL	79	805	6.50		NLM
64	10/15/2022	S24/Ex-Cell 1A	55	10:10	AL	79	805	6.50		NLM
65	10/15/2022	S23/Ex-Cell 1A	40	10:30	AL	79	805	6.50		NLM
66	10/15/2022	S21/Ex-Cell 1A	10	10:40	AL	79	805	6.50		NLM
67	10/15/2022	S20/Ex-Cell 1A	20	10:50	Al	79	805	6.50		NLM
68	10/15/2022	S27/Ex-Cell 1A	50	9:55	AL	79	805	6.50		NLM
69	10/15/2022	S26/S28	55	9:35	AL	79	805	6.50		NLM
70	10/15/2022	S27/S28	5	9:18	IB	18	805	6.00		NLM
71	10/15/2022	S28/S25	5	9:25	AL	79	805	6.5		NLM
72	10/15/2022	S30/S35	22	9:25	MD	319	520/520	-		NLM
73	11/22/2022	S29/S24	90	11:50	CK	464	805	4.00	DT-32	MWK
74	11/22/2022	S29/S30	90	12:10	CK	464	805	4.00	DT-33	MWK
75	11/22/2022	S31/S25	45	1:40	CK	464	805	4.00		MWK
76	11/22/2022	S31/S32	37	2:00	CK	464	805	4.00		MWK
77	11/22/2022	S32/S33	20	2:15	СК	464	805	4.00		MWK
78	11/22/2022	S30/Ex-Cell 1A	116	12:10	SP	394	500/400	-		MWK
79	11/22/2022	S31/Ex-Cell 1A	40	1:00	SP	395	500/400	-		MWK
80	11/22/2022	S32/Ex-Cell 1A	50	1:45	SP	396	500/400	-		MWK
81	11/22/2022	S33/Ex-Cell 1A	25	2:15	SP	397	500/400	-		MWK
82	11/22/2022	S29/Ex-Cell 1A	24	11:50	SP	398	500/400	-		MWK
83	1/13/2023	S34/S25	40	1:15	MD	319	520/520	-		TSK
84	1/13/2023	S34S31	22	1:00	MD	319	520/520	-		TSK
85	1/13/2023	S34/S35	22	2:04	MD	319	520/520	-		TSK
86	1/13/2023	S35/Ex-Cell 1A	30	2:15	MD	319	520/520	-		TSK
87	1/13/2023	S32/S35	22	2:20	MD	319	520/520	-		TSK
88	1/13/2023	S29/S34	30	2:30	MD	319	520/520	-		TSK
89										
90										



C.9 Secondary FML Seam Pressure Test Log



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### FML SEAMING PRESSURE TEST LOG

PROJECT SPECIFICATIONS 30 PROJECT NAME: OWL Landfill Cell 1A&2AB PROJECT NUMBER: 7053.22 MIN START PSI: Oilfield Water Logistics 5 minutes OWNER: CONTRACTOR: Mustang Extreme/SLS TEST DURATION: PROJECT LOCATION: Lea County, New Mexico SHEET NUMBER: MAX PSI DROP: 30

PRESSURE TEST LOCATION: Secondary

DATE   25/2022	\$1-\$2 \$1-\$2 \$1-\$2 \$2-\$3 \$2-\$3 \$2-\$4 \$3-\$4 \$3-\$5 \$4-\$5 \$6-\$7 \$5-\$7 \$5-\$6 \$7-\$10 \$6-\$9 \$6-\$8 \$8-\$9 \$9-\$10 \$10-EX-Cell 2AB	AA	START  11:58  12:11  12:41  12:41  7:35  6:06  6:05  6:45  6:08  6:08  6:14  6:14  7:57	FINISH  12:03  12:16  12:46  12:46  7:40  6:11  6:10  6:50  6:13  6:13  6:13  6:19  6:19	30 30 30 30 30 30 30 30 30 30 30 30 30 3	### FINAL  30 30 30 30 30 30 30 30 30 30 30 30 30	BY DL	PASS/FAIL  PASS PASS PASS PASS PASS PASS PASS PA
25 2022	\$1-\$2 \$2-\$3 \$2-\$4 \$3-\$4 \$3-\$5 \$4-\$5 \$6-\$7 \$5-\$7 \$5-\$6 \$7-\$10 \$6-\$9 \$6-\$8 \$8-\$9 \$9-\$10 \$10-EX-Cell 2AB	AA AA AA AA AA AA AA	12:11 12:41 12:41 7:35 6:06 6:05 6:45 6:08 6:08 6:08 6:14	12:16 12:46 12:46 7:40 6:11 6:10 6:50 6:13 6:13 6:13 6:19	30 30 30 30 30 30 30 30 30 30 30	30 30 30 30 30 30 30 30 30 30 30	DL	PASS PASS PASS PASS PASS PASS PASS PASS
25/2022	\$2-\$3 \$2-\$4 \$3-\$4 \$3-\$5 \$4-\$5 \$6-\$7 \$5-\$7 \$5-\$6 \$7-\$10 \$6-\$9 \$6-\$8 \$8-\$9 \$9-\$10 \$10-EX-Cell 2AB	AA AA AA AA AA	12:41 12:41 7:35 6:06 6:05 6:45 6:08 6:08 6:08 6:14	12:46 12:46 7:40 6:11 6:10 6:50 6:13 6:13 6:13	30 30 30 30 30 30 30 30 30 30	30 30 30 30 30 30 30 30 30 30	DL	PASS PASS PASS PASS PASS PASS PASS PASS
25/2022	\$2-\$4 \$3-\$4 \$3-\$5 \$4-\$5 \$6-\$7 \$5-\$7 \$5-\$6 \$7-\$10 \$6-\$9 \$6-\$8 \$8-\$9 \$9-\$10 \$10-EX-Cell 2AB	AA AA AA AA AA	12:41 7:35 6:06 6:05 6:45 6:08 6:08 6:08 6:14	12:46 7:40 6:11 6:10 6:50 6:13 6:13 6:13	30 30 30 30 30 30 30 30 30	30 30 30 30 30 30 30 30 30	DL DL DL DL DL DL DL DL DL	PASS PASS PASS PASS PASS PASS PASS PASS
25/2022	\$3-\$4 \$3-\$5 \$4-\$5 \$6-\$7 \$5-\$7 \$5-\$6 \$7-\$10 \$6-\$9 \$6-\$8 \$8-\$9 \$9-\$10 \$10-EX-Cell 2AB	AA AA AA AA AA	7:35 6:06 6:05 6:45 6:08 6:08 6:08 6:14	7:40 6:11 6:10 6:50 6:13 6:13 6:13 6:19	30 30 30 30 30 30 30 30	30 30 30 30 30 30 30 30	DL DL DL DL DL DL	PASS PASS PASS PASS PASS PASS PASS
25/2022	\$3-\$5 \$4-\$5 \$6-\$7 \$5-\$7 \$5-\$6 \$7-\$10 \$6-\$9 \$6-\$8 \$8-\$9 \$9-\$10 \$10-EX-Cell 2AB	AA AA AA AA	6:06 6:05 6:45 6:08 6:08 6:08 6:14	6:11 6:10 6:50 6:13 6:13 6:13 6:19	30 30 30 30 30 30 30	30 30 30 30 30 30 30	DL DL DL DL DL	PASS PASS PASS PASS PASS
25/2022	\$4-\$5 \$6-\$7 \$5-\$7 \$5-\$6 \$7-\$10 \$6-\$9 \$6-\$8 \$8-\$9 \$9-\$10 \$10-EX-Cell 2AB	AA AA AA AA	6:05 6:45 6:08 6:08 6:08 6:14	6:10 6:50 6:13 6:13 6:13 6:19	30 30 30 30 30 30	30 30 30 30 30	DL DL DL DL	PASS PASS PASS PASS
25/2022	\$6-\$7 \$5-\$7 \$5-\$6 \$7-\$10 \$6-\$9 \$6-\$8 \$8-\$9 \$9-\$10 \$10-EX-Cell 2AB	AA AA AA AA	6:45 6:08 6:08 6:08 6:14 6:14	6:50 6:13 6:13 6:13 6:19	30 30 30 30	30 30 30 30	DL DL DL	PASS PASS PASS
25/2022	\$5-\$7 \$5-\$6 \$7-\$10 \$6-\$9 \$6-\$8 \$8-\$9 \$9-\$10 \$10-EX-Cell 2AB \$10-EX-Cell 2AB	AA AA AA AA AA	6:08 6:08 6:08 6:14 6:14	6:13 6:13 6:13 6:19	30 30 30	30 30 30	DL DL	PASS PASS
25/2022	\$5-\$6 \$7-\$10 \$6-\$9 \$6-\$8 \$8-\$9 \$9-\$10 \$10-EX-Cell 2AB \$10-EX-Cell 2AB	AA AA AA AA	6:08 6:08 6:14 6:14	6:13 6:13 6:19	30 30	30 30	DL	PASS
25/2022	\$7-\$10 \$6-\$9 \$6-\$8 \$8-\$9 \$9-\$10 \$10-EX-Cell 2AB \$10-EX-Cell 2AB	AA AA AA	6:08 6:14 6:14	6:13 6:19	30	30		
25 2022  25 2022	\$6-\$9 \$6-\$8 \$8-\$9 \$9-\$10 \$10-EX-Cell 2AB \$10-EX-Cell 2AB	AA AA AA	6:14 6:14	6:19			DL	PASS
25/2022	\$6-\$8 \$8-\$9 \$9-\$10 \$10-EX-Cell 2AB \$10-EX-Cell 2AB	AA AA	6:14		30	00		
25/2022  25/2022  25/2022  25/2022  25/2022  25/2022  25/2022	\$8-\$9 \$9-\$10 \$10-EX-Cell 2AB \$10-EX-Cell 2AB	AA		6:19		30	DL	PASS
/25/2022 /25/2022 /25/2022 /25/2022 /25/2022 /25/2022	S9-S10 S10-EX-Cell 2AB S10-EX-Cell 2AB		7:57	0	30	30	DL	PASS
/25/2022 /25/2022 /25/2022 /25/2022 /25/2022	S10-EX-Cell 2AB S10-EX-Cell 2AB	AA		8:02	30	30	DL	PASS
/25/2022 /25/2022 /25/2022 /25/2022	S10-EX-Cell 2AB		7:43	7:48	30	30	DL	PASS
/25/2022 /25/2022 /25/2022		AA	7:43	7:48	30	30	DL	PASS
/25/2022 /25/2022		AA	7:43	7:48	30	30	DL	PASS
/25/2022	S10-EX-Cell 2AB	AA	7:43	7:48	30	30	DL	PASS
	S10-EX-Cell 2AB	AA	7:43	7:48	30	30	DL	PASS
	S10-EX-Cell 2AB	AA	7:49	7:54	30	30	DL	PASS
/25/2022	S10-EX-Cell 2AB	AA	7:49	7:54	30	30	DL	PASS
/25/2022	S10-EX-Cell 2AB	AA	7:01	7:06	30	30	DL	PASS
/25/2022	S10-EX-Cell 2AB						DL	PASS
/25/2022							-	PASS
	S10-EX-Cell 2AB						DL	PASS
								PASS
	S10-EX-Cell 2AB						DL	PASS
	S10-EX-Cell 2AB						DL	PASS
/25/2022	S1-EX-Cell 1A						DL	PASS
							-	PASS
								PASS
							-	PASS
								PASS
							-	PASS
								PASS
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		SL						PASS
/25/2022							-	PASS
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	25/2022 25/2022	25/2022 S10-EX-Cell 2AB 25/2022 S1-EX-Cell 1A 25/2022 S11/S12 25/2022 S11/S12 25/2022 S13/S14 25/2022 S13/S14 25/2022 S13/S17 25/2022 S13/S17 25/2022 S15/S16 25/2022 S15/S16 25/2022 S15/S16 25/2022 S15/S16 25/2022 S18/S19 26/2022 S19/S21 26/2022 S19/S21 26/2022 S19/S21	25/2022	25/2022       \$10-EX-Cell 2AB       AA       7:52         25/2022       \$1-EX-Cell 1A       AA       6:55         25/2022       \$1/S12       \$1       8:35         25/2022       \$1/S13       \$1       8:35         25/2022       \$1/S14       \$1	25/2022 S10-EX-Cell 2AB AA 7:52 7:57 25/2022 S1-EX-Cell 1A AA 6:55 7:00 25/2022 S11/S12 SL 6:03 6:08 25/2022 S11/S13 SL 8:35 8:40 25/2022 S11/S14 SL 8:25 8:30 25/2022 S13/S14 SL 8:25 8:30 25/2022 S13/S14 SL 8:25 8:30 25/2022 S13/S17 SL 8:30 8:35 25/2022 S13/S17 SL 8:45 8:50 25/2022 S15/S16 SL 8:47 8:42 25/2022 S15/S16 SL 8:42 8:47 25/2022 S15/S16 SL 8:40 8:45 25/2022 S15/S16 SL 8:40 8:45 25/2022 S19/S20 SL 10:05 10:10 26/2022 S19/S20 SL 10:05 10:10 26/2022 S19/S20 SL 10:05 10:10 26/2022 S19/S21 SL 10:20 10:25 26/2022 S19/S21 SL 10:10 10:15	25/2022 S10-EX-Cell 2AB AA 7:52 7:57 30 25/2022 S10-EX-Cell 1A AA 6:55 7:00 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 25/2022 S11/S12 SL 6:03 6:08 30 25/2022 S11/S13 SL 8:35 8:40 30 25/2022 S13/S14 SL 8:25 8:30 30 25/2022 S13/S14 SL 8:25 8:30 30 25/2022 S13/S14 SL 8:55 30 25/2022 S13/S17 SL 8:05 8:10 30 25/2022 S13/S17 SL 8:30 8:35 30 25/2022 S13/S17 SL 8:42 8:47 30 25/2022 S15/S16 SL 8:42 8:47 30 25/2022 S15/S16 SL 8:42 8:47 30 25/2022 S11/S15 SL 8:40 8:45	25/2022 S10-EX-Cell 2AB AA 7:52 7:57 30 30 25/2022 S10-EX-Cell 2AB AA 7:52 7:57 30 30 30 25/2022 S10-EX-Cell 2AB AA 7:52 7:57 30 30 30 25/2022 S10-EX-Cell 2AB AA 7:52 7:57 30 30 30 25/2022 S10-EX-Cell 2AB AA 7:52 7:57 30 30 30 25/2022 S10-EX-Cell 2AB AA 7:52 7:57 30 30 30 25/2022 S10-EX-Cell 2AB AA 7:52 7:57 30 30 30 30 25/2022 S10-EX-Cell 1A AA 6:55 7:00 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 30 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 30 30 30 30 30 30 30 30 30 30 3	25/2022 S10-EX-Cell 2AB AA 7:52 7:57 30 30 DL 25/2022 S10-EX-Cell 2AB AA 7:52 7:57 30 30 DL 25/2022 S10-EX-Cell 2AB AA 7:52 7:57 30 30 DL 25/2022 S10-EX-Cell 2AB AA 7:52 7:57 30 30 DL 25/2022 S10-EX-Cell 2AB AA 7:52 7:57 30 30 DL 25/2022 S10-EX-Cell 2AB AA 7:52 7:57 30 30 DL 25/2022 S10-EX-Cell 2AB AA 7:52 7:57 30 30 DL 25/2022 S1-EX-Cell 1A AA 6:55 7:00 30 30 DL 30 D



333 Rio Rancho Blvd., Suite 400 Rio Rancho, New Mexico 87124 505.867.6990

### **FML SEAMING PRESSURE TEST LOG**

				PROJECT SPECI	FICATIONS
PROJECT NAME:	OWL Landfill Cell 1A&2AB	PROJECT NUMBER:	7053.22	MIN START PSI:	30
OWNER:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme/SLS	TEST DURATION:	5 minutes
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	2	MAX PSI DROP:	30

PRESSURE TEST LOCATION: Secondary

DATE	DANIEL AUDANIEL A	TEATER	TI	ME	PRES	SURE	MONITORED	DACC/EAU
DATE	PANEL #/PANEL #	TESTER	START	FINISH	INITIAL	FINAL	BY	PASS/FAIL
10/13/2022	S22/S14	CZ	9:25	9:30	40	40	NLM	PASS
10/13/2022	S22/S21	CZ	9:49	9:54	40	39	NLM	PASS
10/13/2022	S23/S24	CZ	10:41	10:46	40	39	NLM	PASS
10/13/2022	S24/S25	CZ	10:50	10:55	40	40	NLM	PASS
10/13/2022	S22/S24	CZ	10:45	10:50	40	39	NLM	PASS
10/13/2022	S22/S19	CZ	10:28	10:33	40	39	NLM	PASS
10/13/2022	S22/S23	CZ	10:05	10:10	40	40	NLM	PASS
10/13/2022	S23/S21	CZ	11:00	11:05	39	39	NLM	PASS
10/13/2022	S23/Ex-Cell 1A	CZ	11:10	11:15	39	38	NLM	PASS
10/15/2022	S26/S14	CZ	9:35	9:40	40	40	NLM	PASS
10/15/2022	S26/S27, S26/S28	CZ	10:00	10:05	40	40	NLM	PASS
10/15/2022	S26/S22	CZ	10:10	10:15	40	40	NLM	PASS
10/15/2022	S28/S25	CZ	10:10	10:15	40	40	NLM	PASS
10/15/2022	S27/Ex Cell 1A	CZ	10:17	10:22	40	39	NLM	PASS
10/15/2022	S28/Ex-Cell 1A	CZ	10:17	10:22	40	39	NLM	PASS
10/15/2022	S27/S28	CZ	9:47	9:52	40	40	NLM	PASS
11/22/2022	S29/S24	TK	2:25	2:30	30	29	MWK	PASS
11/22/2022	S29/S30	TK	2:07	2:12	30	30	MWK	PASS
11/22/2022	S31/S25	TK	2:35	2:40	30	30	MWK	PASS
11/22/2022	S31/S32	TK	1:34	1:39	30	30	MWK	PASS
11/22/2022	S32/S33	TK	1:40	1:45	30	30	MWK	PASS
							<del>                                     </del>	
			-	-		-		



C.10 FML Seam Field Destructive Test Records

## FML DESTRUCTIVE FIELD TEST RECORD

						1	PROJECT	SPECIFICATIONS	<u>3</u>
PROJECT NAME:	OWL Landfill Cell 1A & 2AB	PROJECT NUMBER:	7053.22	- FUSION	TEXTURED: PEE	_ 90	lbs/in	SHEAR 120	lbs/in
OWNER:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme/SLS	FUSION	TEXTURED: PEE	90	lbs/in	SHEAR 120	lbs/in
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:		- EXTRUSION	TEXTURED: PEE	78	lbs/in	SHEAR	lbs/in
				LXIIIOOIOII	TEXTURED: DEE	78	lhe/in	SHEAD	lhe/in

0.44DI E NO	0544	SEAM DATE OC INITIALS WELDER'S MACHINE				WEDGE WELDS FIELD TEST RESULTS											00111151150						
SAMPLE NO.	SEAM	DATE	QC INITIALS	INITIALS	NUMBER	Temperature	Speed	PEE	L #1	PEE	L #2	PEE	PEEL #3 PEEL #4		PEEL #4 PEEL #5		SHEAR				COMMENTS		
Sec. DT-1	S1/S2	5/25/22	DL	AA	38	805	7	136	143	153	132	142	150	141	143	136	141	162	168	165	171	166	
Sec. DT-2	S2/S4	5/25/22	DL	AA	38	805	7.0	142	138	141	113	134	140	133	139	136	144	150	167	159	171	164	
Sec. DT-3	S4/S5	5/25/22	DL	AA	38	805	8.0	154	133	163	145	153	146	144	152	160	155	169	173	166	174	176	
Sec. DT-4	S6/S7	5/25/22	DL	AA	38	805	8.0	139	128	135	133	134	139	140	128	133	144	138	143	149	152	144	
Sec. DT-1	S11/S12	8/25/22	MWK	AD	904	805	5.0	141	144	136	138	142	157	142	136	141	136	173	175	175	170	175	
Sec. DT-2	S13/S14	8/25/22	MWK	SL	68	805	5.0	126	124	140	141	122	109	144	140	130	124	183	1178	180	179	180	
Sec. DT-3	S12/S16	8/25/22	MWK	AD	904	805	5.0	130	128	139	138	129	138	135	141	138	138	187	126	187	183	187	•
Sec. DT-4	S15/S16	8/25/22	MWK	SL	68	805	5.0	132	138	105	125	129	134	132	129	125	125	188	176	180	187	188	•
Sec. DT-5	S6/S16	8/25/22	MWK	SP	398	550/500	-		132		122		132		141		132	166	173	167	169	169	•
Sec. DTS-2	S22/S24	10/13/22	NM	IB	18	805	6.5	128	133	128	129	121	130	128	121	124	117	162	172	159	163	160	
Sec. DT-32	S24/S29	11/22/22	MWK	CK	464	805	4.0	127	130	125	128	118	121	126	127	129	124	158	162	157	157	159	
Sec. DT-33	S29/S30	11/22/22	MWK	CK	464	805	3.5	138	142	126	128	130	127	124	127	132	131	171	168	173	170	162	
Pri. PDT-1	P1/P2	5/27/22	DL	AA	38	805	8.5	121	124	112	125	136	127	130	131	126	113	148	150	149	147	151	
Pri. PDT-2	P2/P3	5/27/22	DL	AA	38	805	8.5	118	120	188	121	136	127	126	126	130	127	156	152	155	160	152	
Pri.PDT-3	P3/P4	5/27/22	DL	AA	38	805	8.5	133	131	121	138	131	123	139	122	129	121	157	157	149	151	152	
Pri. PDT-4	P4/P5	5/27/22	DL	AA	38	800	8.5	127	122	122	133	120	131	123	125	131	129	150	151	150	150	150	
Pri. PDT-1	P10/P11	8/26/22	MWK	AD	904	805	5.0	121	124	112	125	136	127	130	131	126	113	148	150	149	147	151	
Pri. PDT-2	P11/P12	8/26/22	MWK	AD	904	805	5.0	118	120	188	121	136	127	126	126	130	127	156	152	155	160	152	
Pri.PDT-3	P14/P15	8/26/22	MWK	AD	904	805	5.0	133	131	121	138	131	123	139	122	129	121	157	157	149	151	152	
Pri. PDT-4	P18/P19	8/26/22	MWK	AD	904	805	5.0	127	122	122	133	120	131	123	125	131	129	150	151	150	150	150	
Pri. PDT-5	P10/Ex-Cell 1A	8/26/22	MWK	AD	59	550/500	-		124		125		127		131		113	148	150	149	147	151	
Pri. PDT-1	P24/P25	10/15/22	NM	IB	18	800	8.5	118	120	188	121	136	127	126	126	130	127	156	152	155	160	152	
Pri.PDT-2	P24/P26	10/15/22	NM	AL	79	805	8.5	133	131	121	138	131	123	139	122	129	121	157	157	149	151	152	
Pri. DS-6	P30/P31	11/23/22	MWK	LP	464	800	8.5	127	122	122	133	120	131	123	125	131	129	150	151	150	150	150	



C.11 Leak Detection Deployment Log



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## **LEAK DETECTION DEPLOYMENT LOG**

PROJECT NAME: OWL Landfill Cell 1A & 2AB PROJECT NUMBER: 7053.22

 CLIENT:
 Oilfield Water Logistics
 CONTRACTOR:
 Mustang Extreme/SLS

 PROJECT LOCATION:
 Lea County, New Mexico
 SHEET NUMBER:
 1

**DEPLOYMENT LOCATION:** Cell 1A & 2AB **MONITOR:** DL/MWK/NM/TSK

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT²)	DATE INSTALLED		
P1	1020210000236	260	14.5	3,770	5/26/2022		
P2	006071	260	14.5	3,770	5/26/2022		
Р3	10202100002269	260	14.5	3,770	5/26/2022		
P4	10202100001390	260	14.5	3,770	5/26/2022		
P5	10202100000945	260	14.5	3,770	5/26/2022		
P6	10202100002329	260	14.5	3,770	5/26/2022		
P7	10202100002366	40	14.5	580	5/26/2022		
P8	006071	40	14.5	580	5/26/2022		
P9	10202100002269	40	14.5	580	5/26/2022		
P10	10202100001390	40	14.5	580	5/26/2022		
P11	10202100000945	40	14.5	580	5/26/2022		
P12	10202100002379	40	14.5	580	5/26/2022		
P13	4311	232	14.5	3,364	8/25/2022		
P14	4167	232	14.5	3,364	8/25/2022		
P15	4171	232	14.5	3,364	8/25/2022		
P16	4227	232	14.5	3,364	8/25/2022		
P17	4224	232	14.5	3,364	8/25/2022		
P18	4304	232	14.5	3,364	8/25/2022		
P19	4173	232	14.5	3,364	8/25/2022		
P20	4229	232	14.5	3,364	8/25/2022		
P21	4209	232	14.5	3,364	8/25/2022		
P22	4178	232	14.5	3,364	8/25/2022		
P23	4226	70	14.5	1,015	8/25/2022		
P24	4226	70	14.5	1,015	8/25/2022		
P25	4226	70	14.5	1,015	8/25/2022		
P26	4303	70	14.5	1,015	8/25/2022		
P27	4303	70	14.5	1,015	8/25/2022		
P28	4310	232	14.5	3,364	8/25/2022		
P29	4302	232	14.5	3,364	8/25/2022		
P30	4303	70	14.5	1,015	8/25/2022		
P31	0001	330	14.5	4,785	10/13/2022		
P32	0002	330	14.5	4,785	10/13/2022		
P33	2255	22	14.5	319	10/13/2022		
P34	2255	23	14.5	334	10/13/2022		
P35	2255	51	14.5	740	10/13/2022		
P36	2255	103	4.5	464	10/13/2022		
P37	2255	103	4.5	464	10/13/2022		
P38	2255	103	4.5	464	10/13/2022		
P39	7376	102	14.5	1,479	11/22/2022		
P40	7377	102	14.5	1,479	11/22/2022		



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### **LEAK DETECTION DEPLOYMENT LOG**

PROJECT NAME: OWL Landfill Cell 1A & 2AB PROJECT NUMBER: 7053.22

 CLIENT:
 Oilfield Water Logistics
 CONTRACTOR:
 Mustang Extreme/SLS

 PROJECT LOCATION:
 Lea County, New Mexico
 SHEET NUMBER:
 2

DEPLOYMENT LOCATION: Cell 1A & 2AB MONITOR: DL/MWK/NM/TSK

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT²)	DATE INSTALLED
P41	7386	30	14.5	435	11/22/2022
P42	7391	40	14.5	580	11/22/2022
P43	7393	36	14.5	522	11/22/2022
P44	2798	34	14.5	493	11/22/2022
P45	2798	30	14.5	435	11/22/2022
P46	2798	20	14.5	290	11/22/2022
P47	3336	70	14.5	1,015	1/15/2023
P48	3336	70	14.5	1,015	1/15/2023
				4,785	



APPENDIX C: CELL LINER INSTALLATION DOCUMENTATION

C.12 Primary FML Deployment Log



# **FML DEPLOYMENT LOG**

PROJECT NAME:OWL Landfill Cell 1A & 2ABPROJECT NUMBER:7053.22

 CLIENT:
 Oilfield Water Logistics
 CONTRACTOR:
 Mustang Extreme/SLS

 PROJECT LOCATION:
 Lea County, New Mexico
 SHEET NUMBER:
 1

DEPLOYMENT LOCATION: Primary MONITOR: DL/MWK/NM/TSK

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT²)	DATE INSTALLED
P1	092548	260	22.5	5,850	5/26/2022
P2	012198487	260	22.5	5,850	5/26/2022
P3	012198487	260	22.5	5,850	5/26/2022
P4	1101438	260	22.5	5,850	5/26/2022
P5	1101438	260	22.5	5,850	5/26/2022
P6	092548	100	4	400	5/26/2022
P7	092548	100	4	400	5/26/2022
P8	092548	60	4	240	5/26/2022
P9	0289	486	22	10,692	8/26/2022
P10	0290	486	22	10,692	8/26/2022
P11	291	494	22	10,868	8/26/2022
P12	0296	490	22	10,780	8/26/2022
P13	0297	55	22	1,210	8/26/2022
P14	0297	55	22	1,210	8/26/2022
P15	0302	55	22	1,210	8/26/2022
P16	0302	63	22	1,386	8/26/2022
P17	0302	63	22	1,386	8/26/2022
P18	0302	32	11	352	8/26/2022
P19	0302	31	11	341	8/26/2022
P20	5064	356	22	7,832	10/14/2022
P21	5064	51	17	867	10/14/2022
P22	5064	140	11.25	1,575	10/14/2022
P23	5064	140	11.25	1,575	10/14/2022
P24	0001	132	22	2,904	10/15/2022
P25	0001	78	22	1,716	10/15/2022
P26	0001	78	22	1,716	10/15/2022
P27	6738	110	22	2,420	11/22/2022
P28	6738	106	8	848	11/22/2022
P29	6738	50	22	1,100	11/22/2022
P30	6738	43	22	946	11/22/2022
P31	6738	36	22	792	11/22/2022
P32	6292	40	22	880	1/13/2023
P33	6292	30	22	660	1/13/2023
		TOTAL LINER	PLACED (FT <sup>2</sup> ):	106,248	



APPENDIX C: CELL LINER INSTALLATION DOCUMENTATION

C.13 Primary FML Seaming Log

#### **FML SEAMING LOG**

PROJECT NAME: OWL Landfill Cell 1A & 2AB PROJECT NUMBER: 7053.22

OWNER: Oilfield Water Logistics CONTRACTOR: Mustang Extreme/SLS

PROJECT LOCATION: Lea County, New Mexico SHEET NUMBER: 1

SEAMING LOCATION: Primary - Seam Log

**Parkhill** 

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
1	5/26/2022	P1/Ex-Cell 1A	5	1:46	AA	38	805	8.5		DL
2	5/26/2022	P1/Ex-Cell 1A	21	1:47	AA	38	805	8.5		DL
3	5/26/2022	P1/Ex-Cell 1A	21	1:55	AA	38	805	8.5		DL
4	5/26/2022	P1/Ex-Cell 1A	21	1:59	AA	38	805	8.5		DL
5	5/26/2022	P1/Ex-Cell 1A	21	2:03	AA	38	805	8.5		DL
6	5/26/2022	P1/Ex-Cell 1A	21	2:06	AA	38	805	8.5		DL
7	5/26/2022	P1/Ex-Cell 1A	21	2:09	AA	38	805	8.5		DL
8	5/26/2022	P1/Ex-Cell 1A	21	2:12	AA	38	805	8.5		DL
9	5/26/2022	P1/Ex-Cell 1A	21	2:15	AA	38	805	8.5		DL
0	5/26/2022	P1/P2	250	2:23	AA	38	805	8.5	DT-1	DL
1	5/26/2022	P2/P3	250	2:49	PO	7	800	8.5	DT-2	DL
2	5/26/2022	P3/P4	250	3:39	AA	38	805	8.5	DT-3	DL
3	5/26/2022	P4/P5	250	4:02	PO	7	800	8.5	DT-4	DL
4	5/26/2022	P5/P8	58	4:47	AA	38	805	8.5		DL
5	5/26/2022	P5/P7	74	5:59	AA	38	805	8.5		DL
6	5/26/2022	P5/P6	74	5:00	AA	38	805	8.5		DL
7	5/26/2022	P8/Ex-Cell 2AB	10	5:27	AA	38	805	8.5		DL
8	5/26/2022	P8/Ex-Cell 2AB	21	5:28	AA	38	805	8.5		DL
9	5/26/2022	P8/Ex-Cell 2AB	21	5:30	AA	38	805	8.5		DL
20	5/26/2022	P8/Ex-Cell 2AB	15	5:32	AA	38	805	8.5		DL
1	5/26/2022	P8/Ex-Cell 2AB	15	5:37	AA	38	805	8.5		DL
2	5/26/2022	P7/Ex-Cell 2AB	21	5:39	AA	38	805	8.5		DL
3	5/26/2022	P7/Ex-Cell 2AB	5	5:41	AA	38	805	8.5		DL
4	5/26/2022	P6/Ex-Cell 2AB	15	5:42	AA	38	805	8.5		DL
5	5/26/2022	P6/Ex-Cell 2AB	20	5:44	AA	38	805	8.5		DL
6	5/26/2022	P6/Ex-Cell 2AB	71	5:46	AA	38	805	8.5		DL
7	5/26/2022	P6/Ex-Cell 2AB	13	5:48	AA	38	805	8.5		DL
8	8/26/2022	P9/P10	460	2:35	AD	904	850	5.0		MWK
9	8/26/2022	P10/P11	460	3:00	NS	68	850	5.0	DT-1	MWK
0	8/26/2022	P11/P12	460	3:32	AD	904	850	5.0	DT-2	MWK

Received by OCD: 4/10/2025 4:34:21 PM

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#### **FML SEAMING LOG**

PROJECT NAME: OWL Landfill Cell 1A & 2AB PROJECT NUMBER: 7053.22

OWNER: Oilfield Water Logistics CONTRACTOR: Mustang Extreme/SLS PROJECT LOCATION: Lea County, New Mexico SHEET NUMBER: 2

SEAMING LOCATION: Primary - Seam Log

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
31	8/26/2022	P13/P14	55	4:05	NS	68	850	5.0		MWK
32	8/26/2022	P14/P15	55	4:37	NS	68	850	5.0	DT-3	MWK
33	8/26/2022	P16/P17	63	4:42	NS	68	850	5.0		MWK
34	8/26/2022	P17/P18	63	5:21	AD	904	850	5.0		MWK
35	8/26/2022	P17/P19	63	5:33	AD	904	850	5.0		MWK
36	8/26/2022	P18/P19	11	5:25	AD	904	850	5.0	DT-4	MWK
37	8/26/2022	P18/Ex-Cell 1A	65	5:42	AD	59	550/500	-	DT-5	MWK
38	8/26/2022	P13/Ex-Cell 2AB	55	1:00	AD	904	850	5.0		MWK
39	8/26/2022	P9/Ex-Cell 2AB	460	1:20	AD	904	850	5.0		MWK
40	8/26/2022	P1/P18	22	1:25	AD	904	850	5.0		MWK
41	8/26/2022	P2/P17	22	1:30	AD	904	850	5.0		MWK
42	8/26/2022	P3/P16	22	1:38	AD	904	850	5.0		MWK
43	8/26/2022	P4/P15	22	1:43	AD	904	850	5.0		MWK
44	8/26/2022	P5/P14	22	1:55	AD	904	850	5.0		MWK
45	8/26/2022	P8/P13	22	2:00	AD	904	850	5.0		MWK
46	8/26/2022	P12/P16	22	2:07	AD	904	850	5.0		MWK
47	8/26/2022	P11/P15	22	2:14	AD	904	850	5.0		MWK
48	8/26/2022	P10/P14	22	2:20	AD	904	850	5.0		MWK
49	8/26/2022	P9/P13	22	2:30	AD	904	850	5.0		MWK
50	10/14/2022	P12/P20	340	8:23	IB	18	805	6.5		NM
51	10/14/2022	P23/P29	30	8:30	IB	18	805	6.5		NM
52	10/14/2022	P26/P29	20	8:40	IB	18	805	6.5		NM
53	10/14/2022	P19/Ex-Cell 1A	31	8:48	IB	18	805	6.5		NM
54	10/14/2022	P20/P21	51	9:08	AL	79	805	6.5		NM
55	10/14/2022	P21/P22	11	9:30	IB	18	805	6.5		NM
56	10/14/2022	P20/P22	130	9:44	IB	18	805	6.5		NM
57	10/14/2022	P21/P19	8	9:52	AL	79	805	6.5		NM
58	10/14/2022	P20/P17	21	9:52	AL	79	805	6.5		NM
59	10/14/2022	P22/P23	11	10:04	IB	79	805	6.5		NM
60	10/14/2022	P22/Ex-Cell 1A	70	10:30	IB	79	805	6.5		NM

Received by OCD: 4/10/2025 4:34:21 PM

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#### **FML SEAMING LOG**

PROJECT NAME: OWL Landfill Cell 1A & 2AB PROJECT NUMBER: 7053.22

**OWNER:** Oilfield Water Logistics **CONTRACTOR:** Mustang Extreme/SLS PROJECT LOCATION: Lea County, New Mexico SHEET NUMBER: 3

SEAMING LOCATION: Primary - Seam Log

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
61	10/14/2022	P20/P23	130	10:20	IB	79	805	6.5		NM
62	10/14/2022	P21/Ex-Cell 1A	26	10:11	AL	18	805	6.5		NM
63	10/15/2022	P24/P12	130	3:06	IB	77	805	6.5		NM
64	10/15/2022	P24/P26	23	3:15	IB	79	805	6.5	DTP 2	NM
65	10/15/2022	P25/P24	55	3:19	IB	79	805	6.5	DTP 1	NM
66	10/15/2022	P25/Ex-Cell 1A	23	3:32	AL	18	805	6.5		NM
67	10/15/2022	P26/Ex-Cell 1A	55	3:36	AL	18	805	6.5		NM
68	10/15/2022	P26/P23	22	3:52	IB	79	805	6.5		NM
69	10/15/2022	P26/P20	22	3:56	IB	79	805	6.5		NM
70	10/15/2022	P24/P20	22	4:02	IB	79	805	6.5		NM
71	11/22/2022	P27/P22,P23	100	3:05	CK	464	850	4.0		MWK
72	11/22/2022	P27/P28	100	3:25	CK	464	850	4.0		MWK
73	11/23/2022	P29/P30	45	8:55	LP	464	850	3.5		MWK
74	11/23/2022	P30/P31	30	9:15	LP	464	850	3.5	DS -6	MWK
75	11/23/2022	P27/Ex-Cell 1A	22	9:20	SP	398	500/400	-		MWK
76	11/23/2022	P28/Ex-Cell 1A	115	9:25	SP	398	500/400	-		MWK
77	11/23/2022	P29/Ex-Cell 1A	22	9:40	SP	398	500/400	-		MWK
78	11/23/2022	P30/Ex-Cell 1A	22	9:45	SP	398	500/400	-		MWK
79	11/23/2022	P31/Ex-Cell 1A	94	9:55	SP	398	500/400	-		MWK
80	1/13/2023	P32/P23	22	2:40	MD	319	520/520	-		TSK
81	1/13/2023	P32/P33	70	3:00	MD	319	520/520	-		TSK
82	1/13/2023	P33/Ex-Cell 1A	70	3:20	MD	319	520/520	-		TSK
83	1/13/2023	P32/P27	22	3:40	MD	319	520/520	-		TSK
84	1/13/2023	P29/P32	22	3:50	MD	319	520/520	-		TSK
85	1/13/2023	P33/P30	22	3:52	MD	319	520/520	-		TSK
86	1/13/2023	P28/P33	22	4:01	MD	319	520/520	-		TSK
87										
88										
89										
90										

Received by OCD: 4/10/2025 4:34:21 PM



APPENDIX C: CELL LINER INSTALLATION DOCUMENTATION

C.14 Primary FML Seam Pressure Test Log



#### FML SEAMING PRESSURE TEST LOG

PROJECT SPECIFICATIONS 30 PROJECT NAME: OWL Landfill Cell 1A&2AB PROJECT NUMBER: 7053.22 MIN START PSI: Oilfield Water Logistics 5 minutes OWNER: CONTRACTOR: Mustang Extreme/SLS TEST DURATION: PROJECT LOCATION: Lea County, New Mexico SHEET NUMBER: MAX PSI DROP: 30 1

PRESSURE TEST LOCATION: Primary

Γ				TII	ME	PRES	SURE	MONITORED	
	DATE	PANEL #/PANEL #	TESTER	START	FINISH	INITIAL	FINAL	BY	PASS/FAIL
1	5/26/2022	P1-Ex Cell 1A	AA	8:04	8:09	30	30	DL	PASS
2	5/26/2022	P1-Ex Cell 1A	AA	8:04	8:09	30	30	DL	PASS
3	5/26/2022	P1-Ex Cell 1A	AA	8:10	8:15	30	30	DL	PASS
4	5/26/2022	P1-Ex Cell 1A	AA	8:10	8:15	30	30	DL	PASS
5	5/26/2022	P1-Ex Cell 1A	AA	8:10	8:15	30	30	DL	PASS
6	5/26/2022	P1-Ex Cell 1A	AA	8:10	8:15	30	30	DL	PASS
7	5/26/2022	P1-Ex Cell 1A	AA	8:10	8:15	30	30	DL	PASS
8	5/26/2022	P1-Ex Cell 1A	AA	8:10	8:15	30	30	DL	PASS
9	5/26/2022	P1-P2	AA	8:10	8:15	30	30	DL	PASS
10	5/26/2022	P2-P3	AA	8:00	8:05	30	30	DL	PASS
11	5/26/2022	P3-P4	AA	7:55	8:00	30	30	DL	PASS
12	5/26/2022	P4-P5	AA	7:55	8:00	30	30	DL	PASS
13	5/26/2022	P5-P8	AA	7:55	8:00	30	30	DL	PASS
14	5/26/2022	P5-P7	AA	8:33	8:38	30	30	DL	PASS
15	5/26/2022	P5-P6	AA	8:33	8:38	30	30	DL	PASS
16	5/26/2022	P8-Ex Cell 2AB	AA	8:53	8:58	30	30	DL	PASS
17	5/26/2022	P8-Ex Cell 2AB	AA	8:33	8:38	30	30	DL	PASS
18	5/26/2022	P8-Ex Cell 2AB	AA	8:34	8:39	30	30	DL	PASS
19	5/26/2022	P8-Ex Cell 2AB	AA	8:35	8:40	30	30	DL	PASS
20	5/26/2022	P8-Ex Cell 2AB	AA	8:35	8:40	30	30	DL	PASS
21	5/26/2022	P8-Ex Cell 2AB	AA	8:35	8:40	30	30	DL	PASS
22	5/26/2022	P8-Ex Cell 2AB	AA	8:53	8:58	30	30	DL	PASS
23	5/26/2022	P8-Ex Cell 2AB	AA	8:53	8:58	30	30	DL	PASS
24	5/26/2022	P8-Ex Cell 2AB	AA	8:53	8:58	30	30	DL	PASS
25	5/26/2022	P8-Ex Cell 2AB	AA	8:53	8:58	30	30	DL	PASS
26	8/27/2022	P14/P10	NS	8:00	8:05	30	30	MA	PASS
27	8/27/2022	P10-P11	NS	8:03	8:08	30	30	MA	PASS
28	8/27/2022	P9-P13	NS	8:10	8:15	30	30	MA	PASS
29	8/27/2022	P9-P10	NS	8:10	8:15	30	30	MA	PASS
30	8/27/2022	P13-P14	NS	8:12	8:17	30	30	MA	PASS
31	8/27/2022	P11-P12	NS	8:16	8:21	30	30	MA	PASS
32	8/27/2022	P14-P15	NS	8:20	8:25	30	30	MA	PASS
33	8/27/2022	P15-P16	NS	8:22	8:27	30	30	MA	PASS
34	8/27/2022	P16-P17	NS	8:18	8:23	30	30	MA	PASS
35	8/27/2022	P17-P19	NS	8:25	8:30	30	30	MA	PASS
36	8/27/2022	P17-P18	NS	8:27	8:32	30	30	MA	PASS
37	8/27/2022	P18-P19	NS	8:32	8:37	30	30	MA	PASS
38	8/27/2022	P19-P1	NS	8:13	8:18	30	30	MA	PASS
39	8/27/2022	P17-P2	NS	8:15	8:20	30	30	MA	PASS
40	8/27/2022	P16-P3	NS	8:40	8:45	30	30	MA	PASS
41	8/27/2022	P15-P4	NS	8:45	8:50	30	30	MA	PASS
42	8/27/2022	P14-P5	NS	8:48	8:53	30	30	MA	PASS
43	8/27/2022	P13-P6	NS	8:50	8:55	30	30	MA	PASS
44	8/27/2022	P9-Ex Cell 2AB	NS	8:52	8:57	30	30	MA	PASS
45	8/27/2022	P9-Ex Cell 2AB	NS	8:53	8:58	30	30	MA	PASS
46	8/27/2022	P9-Ex Cell 2AB	NS	9:00	9:05	30	30	MA	PASS
47	8/27/2022	P9-Ex Cell 2AB	NS	9:02	9:07	30	30	MA	PASS
48	8/27/2022	P9-Ex Cell 2AB	NS	9:09	9:14	30	30	MA	PASS
49	8/27/2022	P9-Ex Cell 2AB	NS	9:10	9:15	30	30	MA	PASS
50	8/27/2022	P9-Ex Cell 2AB	NS	9:15	9:20	30	30	MA	PASS



#### **FML SEAMING PRESSURE TEST LOG**

				PROJECT SPECI	FICATIONS
PROJECT NAME:	OWL Landfill Cell 1A&2AB	PROJECT NUMBER:	7053.22	MIN START PSI:	30
OWNER:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme/SLS	TEST DURATION:	5 minutes
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	2	MAX PSI DROP:	30

PRESSURE TEST LOCATION: Primary

Γ	DATE	DANEL MOANEL M	TEOTED	TI	ME	PRES	SURE	MONITORED	D400/E411
	DATE	PANEL #/PANEL #	TESTER	START	FINISH	INITIAL	FINAL	BY	PASS/FAIL
	8/27/2022	P9-Ex Cell 2AB	NS	9:17	9:22	30	30	MA	PASS
	8/27/2022	P9-Ex Cell 2AB	NS	9:20	9:25	30	30	MA	PASS
Ł	8/27/2022	P9-Ex Cell 2AB	NS	9:21	9:26	30	30	MA	PASS
إ⊦	8/27/2022	P9-Ex Cell 2AB	NS	9:26	9:31	30	30	MA	PASS
Ļ	8/27/2022	P9-Ex Cell 2AB	NS	9:31	9:36	30	30	MA	PASS
Ļ	10/14/2022	P20-P12	CZ	9:36	9:41	40	40	NLM	PASS
L	10/14/2022	P20-P21	CZ	9:45	9:50	40	40	NLM	PASS
L	10/14/2022	P21-P22	CZ	9:51	9:56	35	35	NLM	PASS
L	10/14/2022	P20-P17	CZ	10:00	10:05	35	35	NLM	PASS
L	10/14/2022	P21-P18	CZ	10:00	10:05	35	35	NLM	PASS
L	10/14/2022	P20-P22	CZ	10:25	10:30	40	40	NLM	PASS
L	10/14/2022	P20-P23	CZ	10:50	10:55	40	40	NLM	PASS
	10/14/2022	P22-P23	CZ	11:00	11:05	35	35	NLM	PASS
Г	10/15/2022	P22-P23	CZ	8:30	8:35	40	40	NLM	PASS
Γ	10/15/2022	P24-P12	CZ	8:33	8:38	40	40	NLM	PASS
Γ	10/15/2022	P24-P25	CZ	8:36	8:41	40	40	NLM	PASS
Ī	10/15/2022	P24-P26	CZ	8:43	8:48	40	40	NLM	PASS
	10/15/2022	P25-Ex Cell 1A	CZ	8:53	8:58	40	40	NLM	PASS
r	10/15/2022	P26-Ex Cell 1A	CZ	9:02	9:07	40	40	NLM	PASS
Ī	10/15/2022	P26-P23	CZ	9:05	9:10	40	40	NLM	PASS
r	10/15/2022	P25-P26	CZ	9:08	9:13	40	40	NLM	PASS
F	11/22/2022	P24-P20	TK	3:45	3:50	30	30	MWK	PASS
r	11/22/2022	P27,P22	TK	3:55	4:00	30	30	MWK	PASS
r	11/22/2022	P27-P23	TK	9:30	9:35	30	30	MWK	PASS
r	11/22/2022	P27-P28	TK	9:36	9:41	30	30	MWK	PASS
r	11/22/2022	P29-P30	TK	9:40	9:45	30	30	MWK	PASS
ľ	11/22/2022	P30-P31	TK	9:45	9:50	30	30	MWK	PASS
r	11/22/2022	P31-Ex Cell 1A	TK	9:50	9:55	30	30	MWK	PASS
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APPENDIX C: CELL LINER INSTALLATION DOCUMENTATION

C.15 FML Seam Vacuum Test and Defect-Repair Log



#### FML SEAM VACUUM TEST/REPAIR LOG

 PROJECT NAME:
 OWL Landfill Cell 1A & 2AB
 PROJECT NUMBER:
 7053.22

 OWNER:
 Olifield Water Logistics
 CONTRACTOR:
 Mustang Extreme/SLS

 PROJECT LOCATION:
 Lea County, New Mexico
 SHEET NUMBER:
 1

TEST/REPAIR LOCATION: Secondary MONITOR: MWK/TSK/NM/DL

REPAIR NUMBER	PANEL	TYPE OF REPAIR	REPAIR TECH	NUMBER OF LEAKS	TESTING TECH ID	DATE ACCEPTED	COMMENTS
R-S-1	S1/Ex-Cell 1A/Ex-Cell 1A	Extrusion	DO	0	AA	5/26/2022	1x1
R-S-2	S1/Ex-Cell 1A/Ex-Cell 1A	Extrusion	DO	0	AA	5/26/2022	1x1
R-S-3	S1/Ex-Cell 1A/Ex-Cell 1A	Extrusion	DO	0	AA	5/26/2022	1x1
R-S-4	S2/S3/S4	Extrusion	DO	0	AA	5/26/2022	1x1
R-S-5	S1/Ex-Cell 1A/Ex-Cell 1A	Extrusion	DO	0	AA	5/26/2022	1x1
R-S-6	S1/Ex-Cell 1A/Ex-Cell 1A	Extrusion	DO	0	AA	5/26/2022	1x1
R-S-7	S1/Ex-Cell 1A/Ex-Cell 1A	Extrusion	DO	0	AA	5/26/2022	1x1
R-S-8	S1/Ex-Cell 1A/Ex-Cell 1A	Extrusion	DO	0	AA	5/26/2022	2x7
R-S-9	S1/S2	Extrusion	DO	0	AA	5/26/2022	2x6
R-S-10	S1/S2	Extrusion	DO	0	AA	5/26/2022	2x3
R-S-11	S2/S4	Extrusion	DO	0	AA	5/26/2022	2x6
R-S-12	S1/Ex-Cell 1A/Ex-Cell 1A	Extrusion	DO	0	AA	5/26/2022	1x1
R-S-13	S1/Ex-Cell 1A/Ex-Cell 1A	Extrusion	DO	0	AA	5/26/2022	1x1
R-S-14	S4/S5	Extrusion	DO	0	AA	5/26/2022	2x6
R-S-15	S3/S4/S5	Extrusion	DO	0	AA	5/26/2022	1x1
R-S-16	S5/S6/S7	Extrusion	DO	0	AA	5/26/2022	1x1
R-S-17	S6/S7	Extrusion	DO	0	AA	5/26/2022	2x6
R-S-18	S8/Ex-Cell 2AB/Ex-Cell 2AB	Extrusion	DO	0	AA	5/26/2022	1x1
R-S-19	S8/Ex-Cell 2AB/Ex-Cell 2AB	Extrusion	DO	0	AA	5/26/2022	1x1
R-S-20	S8/Ex-Cell 2AB/Ex-Cell 2AB	Extrusion	DO	0	AA	5/26/2022	1x1
R-S-21	S6/S8/S9	Extrusion	DO	0	AA	5/26/2022	2x4
R-S-22	S9/Ex-Cell 2AB/Ex-Cell 2AB	Extrusion	DO	0	AA	5/26/2022	2x2
R-S-23	S9/Ex-Cell 2AB/Ex-Cell 2AB	Extrusion	DO	0	AA	5/26/2022	2x2
R-S-24	S9/Ex-Cell 2AB	Extrusion	DO	0	AA	5/26/2022	2x2
R-S-25	S9/Ex-Cell 2AB/Ex-Cell 2AB	Extrusion	DO	0	AA	5/26/2022	2x2
R-S-26	S9/Ex-Cell 2AB/Ex-Cell 2AB	Extrusion	DO	0	AA	5/26/2022	1x1
R-S-27	S6/S7/S9/S10	Extrusion	DO	0	AA	5/26/2022	2x3
R-S-28	S10/Ex-Cell 2AB/Ex-Cell 2AB	Extrusion	DO	0	AA	5/26/2022	3x4
R-S-29	S10/Ex-Cell 2AB	Extrusion	DO	0	AA	5/26/2022	2x3
R-S-30	S/10Ex-Cell 2AB/Ex-Cell 2AB	Extrusion	DO	0	AA	5/26/2022	2x4
R-S-31	S10/Ex-Cell 2AB	Extrusion	DO	0	AA	5/26/2022	1x1
R-S-32	S10/Ex-Cell 2AB	Extrusion	DO	0	AA	5/26/2022	2x5
R-S-33	S10/Ex-Cell 2AB	Extrusion	DO	0	AA	5/26/2022	2x3
R-S-34	S11/S15/Ex-Cell 1AB	Extrusion	DO	0	AA	8/26/2022	2x2
R-S-35	S11/S12/S15/S16	Extrusion	DO	0	AA	8/26/2022	2x2
R-S-36	S12/S13/S16/S27	Extrusion	DO	0	AA	8/26/2022	2x2
R-S-37	S13/S14/S17/S18	Extrusion	DO	0	AA	8/26/2022	2x6
R-S-38	S14/S15/S18/S19	Extrusion	DO	0	AA	8/26/2022	2x6
R-S-39	S19/S20/S21	Extrusion	DO	0	AA	8/26/2022	2x2
R-S-40	S20/S21/Ex Cell 1A	Extrusion	DO	0	AA	8/26/2022	2x2



#### FML SEAM VACUUM TEST/REPAIR LOG

 PROJECT NAME:
 OWL Landfill Cell 1A & 2AB
 PROJECT NUMBER:
 7053.22

 OWNER:
 Oilfield Water Logistics
 CONTRACTOR:
 Mustang Extreme/SLS

 PROJECT LOCATION:
 Lea County, New Mexico
 SHEET NUMBER:
 1

TEST/REPAIR LOCATION: Secondary MONITOR: MWK/TSK/NM/DL

REPAIR NUMBER	PANEL	TYPE OF REPAIR	REPAIR TECH	NUMBER OF LEAKS	TESTING TECH ID	DATE ACCEPTED	COMMENTS
R-P-41	S15/S8/Ex-Cell 2AB	Extrusion	DO	0	AA	8/26/2022	2x2
R-P-42	\$15/\$16/\$8/\$6	Extrusion	DO	0	AA	8/26/2022	2x6
R-P-43	S16/S6/S5/S17	Extrusion	DO	0	NS	8/26/2022	2x2
R-P-44	S17/S5/S4/S18	Extrusion	DO	0	NS	8/26/2022	2x2
R-P-45	S18/S19/S3/S2	Extrusion	DO	0	NS	8/26/2022	2x2
R-P-46	\$19//\$2/\$1/\$20	Extrusion	DO	0	NS	8/26/2022	2x2
R-P-47	S20/S1/Ex Cell 1A	Extrusion	DO	0	NS	8/26/2022	2x2
R-P-48	S11/Ex Cell 2AB	Extrusion	TH	0	TH	8/26/2022	1x1
R-P-49	S11/Ex Cell 2AB	Extrusion	TH	0	TH	8/26/2022	1x1
R-P-50	S11/Ex Cell 2AB	Extrusion	TH	0	TH	8/26/2022	1x1
R-P-51	S11/Ex Cell 2AB	Extrusion	TH	0	TH	8/26/2022	1x1
R-P-52	S11/Ex Cell 2AB	Extrusion	TH	0	TH	8/26/2022	1x1
R-P-53	S11/Ex Cell 2AB	Extrusion	TH	0	TH	8/26/2022	1x1
R-P-54	S11/Ex Cell 2AB	Extrusion	TH	0	TH	8/26/2022	1x1
R-P-55	S11/Ex Cell 2AB	Extrusion	TH	0	TH	8/26/2022	2x6
R-P-56	S22/S23/S21	Extrusion	TH	0	TH	10/13/2022	1.5x9
R-P-57	S23/S21/Ex Cell 1A	Extrusion	TH	0	TH	10/13/2022	2x2
R-P-58	S23/S24/Ex Cell 1A	Extrusion	TH	0	TH	10/13/2022	2x3
R-P-59	S23/S24/S22	Extrusion	TH	0	TH	10/13/2022	1x1
R-P-60	S24/S25/S22	Extrusion	TH	0	TH	10/13/2022	2x2
R-P-61	S24/S25/Ex Cell 1A	Extrusion	TH	0	TH	10/13/2022	2x1
R-P-62	S22/S26/S14	Extrusion	TH	0	TH	10/13/2022	4x2
R-P-63	S22/S25/S26	Extrusion	TH	0	TH	10/13/2022	2x2
R-P-64	S26/S28/S25	Extrusion	TH	0	TH	10/13/2022	.5x1
R-P-65	S25/S28/Ex Cell 1A	Extrusion	TH	0	TH	10/13/2022	2x1
R-P-66	S26/S27/S28	Extrusion	TH	0	TH	10/13/2022	3x1
R-P-67	S27/S28/Ex Cell 1A	Extrusion	TH	0	TH	10/13/2022	1x1
R-P-68	S22/S14/S19	Extrusion	TH	0	TH	10/13/2022	2x6
R-P-69	S31/S25/Ex-Cell 1A	Extrusion	IM	0	IM	11/22/2022	2x2
R-P-70	S31/S32/Ex-Cell 1A	Extrusion	IM	0	IM	11/22/2022	2x2
R-P-71	S32/S33/Ex-Cell 1A	Extrusion	IM	0	IM	11/22/2022	2x2
R-P-72	S33/Ex-Cell 1A	Extrusion	IM	0	IM	11/22/2022	2x2
R-P-73	S29/S30/Ex-Cell 1A	Extrusion	СК	0	СК	11/22/2022	2x2
R-P-74	S30/Ex-Cell 1A	Extrusion	СК	0	СК	11/22/2022	2x2
R-P-75	S34/S31/S25	Extrusion	MD	0	HG	1/13/2023	2x2
R-P-76	S34/S31/S32	Extrusion	MD	0	HG	1/13/2023	2x2
R-P-77	S35/S32/S33/Ex Cell 1A	Extrusion	MD	0	HG	1/13/2023	2x2
R-P-78	S34/S35/S29	Extrusion	MD	0	HG	1/13/2023	2x2
R-P-79	S34/S35/S29/S30	Extrusion	MD	0	HG	1/13/2023	2x2
R-P-80	S35/S30/Ex Cell 1A	Extrusion	MD	0	HG	1/13/2023	2x2



#### FML SEAM VACUUM TEST/REPAIR LOG

 PROJECT NAME:
 OWL Landfill Cell 1A & 2AB
 PROJECT NUMBER:
 7053.22

 OWNER:
 Oilfield Water Logistics
 CONTRACTOR:
 Mustang Extreme/SLS

 PROJECT LOCATION:
 Lea County, New Mexico
 SHEET NUMBER:
 1

TEST/REPAIR LOCATION: Primary MONITOR: MWK/TSK/NM/DL

	REPAIR NUMBER	PANEL	TYPE OF REPAIR	REPAIR TECH	NUMBER OF LEAKS	TESTING TECH ID
1	R-P-1	P7/P5/P8	Extrusion	DO	0	AA
2	R-P-2	P7/P8/Ex Cell 2AB	Extrusion	DO	0	AA
3	R-P-3	P5/P6/P7	Extrusion	DO	0	AA
4	R-P-4	P6/P7/Ex Cell 2AB	Extrusion	DO	0	AA
5	R-P-5	P2/Ex Cell 2AB/Ex Cell 2AB	Extrusion	DO	0	AA
6	R-P-6	P6/P5	Extrusion	DO	0	AA
7	R-P-7	P7/Ex Cell 2AB	Extrusion	DO	0	AA
8	R-P-8	P7/Ex Cell 2AB	Extrusion	DO	0	AA
9	R-P-9	P7/Ex Cell 2AB	Extrusion	DO	0	AA
10	R-P-10	P7/Ex Cell 2AB	Extrusion	DO	0	AA
11	R-P-11	Ex-Cell 2AB/Ex-Cell 2AB/P6/P7	Extrusion	DO	0	AA
12	R-P-12	Ex-Cell 2AB/Ex-Cell 2AB/P6	Extrusion	DO	0	AA
13	R-P-13	Ex-Cell 2AB/Ex-Cell 2AB/P6	Extrusion	DO	0	AA
14	R-P-14	Ex-Cell 2AB/Ex-Cell 2AB/P6	Extrusion	DO	0	AA
15	R-P-15	Ex-Cell 2AB/Ex-Cell 2AB/P5/P6	Extrusion	DO	0	AA
16	R-P-16	Ex-Cell 2AB/Ex-Cell 2AB/P8/P7	Extrusion	DO	0	AA
17	R-P-17	Ex-Cell 2AB/Ex-Cell 2AB/P8	Extrusion	DO	0	AA
18	R-P-18	Ex-Cell 2AB/Ex-Cell 2AB/P8	Extrusion	DO	0	AA
19	R-P-19	Ex-Cell 2AB/Ex-Cell 2AB/P8	Extrusion	DO	0	AA
20	R-P-20	Ex-Cell 2AB/Ex-Cell 2AB/P13/P8	Extrusion	DO	0	AA
21	R-P-21	P4/P5	Extrusion	DO	0	AA
22	R-P-22	P3/P4	Extrusion	DO	0	AA
23	R-P-23	P3/P2	Extrusion	DO	0	AA
24	R-P-24	Ex-Cell 1A/Ex-Cell 1A/P1	Extrusion	DO	0	AA
25	R-P-25	Ex-Cell 1A/Ex-Cell 1A/P1	Extrusion	DO	0	AA
26	R-P-26	Ex-Cell 1A/Ex-Cell 1A/P1	Extrusion	DO	0	AA
27	R-P-27	Ex-Cell 1A/Ex-Cell 1A/P1	Extrusion	DO	0	AA
28	R-P-28	Ex-Cell 1A/Ex-Cell 1A/P1	Extrusion	DO	0	AA
29	R-P-29	Ex-Cell 1A/Ex-Cell 1A/P1	Extrusion	DO	0	AA
30	R-P-30	Ex-Cell 1A/Ex-Cell 1A/P1	Extrusion	DO	0	AA
31	R-P-31	Ex-Cell 1A/Ex-Cell 1A/P1	Extrusion	DO	0	AA
32	R-P-32	Ex-Cell 1A/P1	Extrusion	DO	0	AA
33	R-P-33	Ex-Cell 1A/Ex-Cell 1A/P1	Extrusion	DO	0	AA
34	R-P-34	Ex-Cell 1A/P1	Extrusion	DO	0	AA
35	R-P-35	Ex-Cell 1A/P1	Extrusion	DO	0	AA
36	R-P-36	P1/P2	Extrusion	DO	0	AA
37	R-P-37	P9/P10	Extrusion	DO	0	AA
38	R-P-38	P9/P10/P13/P14	Extrusion	DO	0	AA
39	R-P-39	P9/P13/Ex Cell 2AB	Extrusion	DO	0	AA
40	R-P-40	P10/P11/P14/P15	Extrusion	DO	0	AA

NM/DL
COMMENTS
6x6
1x2
1x1
2x9
1x1
4x4
1x1
1x1
1x1
1x1
2x7
2x3
1x1
1x1
2x3
2x7
2x3
1x1
1x1
2x3
2x6
2x6
2x6
1x1
1x3
1x1
2x6
1x1
2x2
2x6
2x6
2x2
2x2
2x2



#### FML SEAM VACUUM TEST/REPAIR LOG

 PROJECT NAME:
 OWL Landfill Cell 1A & 2AB
 PROJECT NUMBER:
 7053.22

 OWNER:
 Oilfield Water Logistics
 CONTRACTOR:
 Mustang Extreme/SLS

 PROJECT LOCATION:
 Lea County, New Mexico
 SHEET NUMBER:
 1

TEST/REPAIR LOCATION: Primary MONITOR: MWK/TSK/NM/DL

	REPAIR NUMBER	PANEL	TYPE OF REPAIR	REPAIR TECH	NUMBER OF LEAKS	TESTING TECH ID	DATE ACCEPTED	COMMENTS
41	R-P-41	P11/P12/P15/P16	Extrusion	DO	0	AA	8/27/2022	2x6
42	R-P-42	P12/P16/P17	Extrusion	DO	0	AA	8/27/2022	2x6
43	R-P-43	P17/P18/P19	Extrusion	DO	0	AA	8/27/2022	2x2
44	R-P-44	P18/P19/Ex Cell 1A	Extrusion	DO	0	AA	8/27/2022	2x2
45	R-P-45	P1/P18/Ex Cell 1A	Extrusion	DO	0	AA	8/27/2022	2x2
46	R-P-46	P9/Ex Cell 2AB	Extrusion	DO	0	AA	8/27/2022	2x2
47	R-P-47	P9/Ex Cell 2AB	Extrusion	DO	0	AA	8/27/2022	2x2
48	R-P-48	P9/Ex Cell 2AB	Extrusion	DO	0	AA	8/27/2022	2x2
49	R-P-49	P9/Ex Cell 2AB	Extrusion	DO	0	AA	8/27/2022	2x2
50	R-P-50	P9/Ex Cell 2AB	Extrusion	DO	0	AA	8/27/2022	2x2
51	R-P-51	P9/Ex Cell 2AB	Extrusion	DO	0	AA	8/27/2022	2x2
52	R-P-52	P13/P6/Ex Cell 2AB	Extrusion	DO	0	AA	8/27/2022	2x2
53	R-P-53	P13/P14/P5	Extrusion	DO	0	AA	8/27/2022	2x2
54	R-P-54	P14/P15/P4	Extrusion	DO	0	AA	8/27/2022	2x2
55	R-P-55	P15/P16/P3	Extrusion	DO	0	AA	8/27/2022	2x2
56	R-P-56	P16/P17/P2	Extrusion	DO	0	AA	8/27/2022	2x2
57	R-P-57	P17/P19/P1	Extrusion	DO	0	AA	8/27/2022	2x2
58	R-P-58	P20/P17/P12	Extrusion	TH	0	TH	10/14/2022	4x3
59	R-P-59	P21/P20/P17/P18	Extrusion	TH	0	TH	10/14/2022	3x8
60	R-P-60	P21/P20/P22	Extrusion	TH	0	TH	10/14/2022	2x2
61	R-P-61	P20/P22	Extrusion	TH	0	TH	10/14/2022	3x1.5
62	R-P-62	P22/P21/Ex Cell1A	Extrusion	TH	0	TH	10/14/2022	1x1
63	R-P-63	P20/P23/P22	Extrusion	TH	0	TH	10/14/2022	1x3 DT-2
64	R-P-64	P20/P22/P26	Extrusion	TH	0	TH	10/14/2022	2x2
65	R-P-65	P20/P12/P24	Extrusion	TH	0	TH	10/14/2022	.5x10
66	R-P-66	P20/P26/P24	Extrusion	TH	0	TH	10/14/2022	2x2
67	R-P-67	P24/P25/P26	Extrusion	TH	0	TH	10/14/2022	2x2
68	R-P-68	P25/P26/Ex Cell 1A	Extrusion	TH	0	TH	10/15/2022	2x2
69	R-P-69	P22/P27/Ex-Cell 1A	Extrusion	IM	0	IM	11/22/2022	2x2
70	R-P-70	P27/P28/Ex-Cell 1A	Extrusion	IM	0	IM	11/22/2022	2x2
71	R-P-71	P29/P26/Ex-Cell 1A	Extrusion	IM	0	IM	11/22/2022	2x2
72	R-P-72	P29/P30/Ex-Cell 1A	Extrusion	IM	0	IM	11/22/2022	2x2
73	R-P-73	P30/P31/Ex-Cell 1A	Extrusion	CK	0	CK	11/22/2022	2x2
74	R-P-74	S31/Ex-Cell 1A	Extrusion	CK	0	CK	11/22/2022	2x2
75	R-P-75	P32/P29/P23	Extrusion	CK	0	CK	1/13/2023	2x2
76	R-P-76	P32/P27/P23	Extrusion	CK	0	CK	1/13/2023	2x2
77	R-P-77	P32/P29/P30/P33	Extrusion	CK	0	СК	1/13/2023	2x2
78	R-P-78	P33/P28/Ex Cell 1A	Extrusion	CK	0	СК	1/13/2023	2x2
79	R-P-79	P33/P30/P31/Ex Cell 1A	Extrusion	CK	0	СК	1/13/2023	2x2
80	R-P-80	P32/P27/P28/P33	Extrusion	CK	0	CK	1/13/2023	2x2



APPENDIX C: CELL LINER INSTALLATION DOCUMENTATION

C.16 Geocomposite Deployment Log



# **GEOCOMPOSITE DEPLOYMENT LOG**

**PROJECT NAME:** OWL Landfill Cell 1A & 2AB **PROJECT NUMBER:** 7053.22

 CLIENT:
 Oilfield Water Logistics
 CONTRACTOR:
 Mustang Extreme/SLS

 PROJECT LOCATION:
 Lea County, New Mexico
 SHEET NUMBER:
 1

**DEPLOYMENT LOCATION:** Cell 1A & 2AB **MONITOR:** MWK/TSK/NM/DL

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT²)	DATE INSTALLED
P1	0047	193	15	2,895	5/28/22
P2	0054	170	15	2,550	5/28/22
P3	0047	90	15	1,350	5/28/22
P4	9896	127	15	1,905	5/28/22
P5	0054	138	15	2,070	5/28/22
P6	9896	138	15	2,070	5/28/22
P7	9681	122	15	1,830	5/28/22
P8	9681	71	15	1,065	5/28/22
P9	9690	189	15	2,835	5/28/22
P10	9681	213	15	3,195	5/28/22
P11	9710	47	15	705	5/28/22
P12	9687	8	15	120	5/28/22
P13	9710	254	15	3,810	5/28/22
P14	9687	260	15	3,900	5/28/22
P15	9685	216	15	3,240	5/28/22
P16	9687	44	15	660	5/28/22
P17	A-001	290	15	4,350	8/27/22
P18	A-002	290	15	4,350	8/27/22
P19	A-003	290	15	4,350	8/27/22
P20	A-004	290	15	4,350	8/27/22
P21	A-005	290	15	4,350	8/27/22
P22	A-006	290	15	4,350	8/27/22
P23	A-007	230	15	3,450	8/27/22
P24	A-007	60	15	900	8/27/22
P25	A-008	170	15	2,550	8/27/22
P26	A-008	120	15	1,800	8/27/22
P27	A-009	110	15	1,650	8/27/22
P28	A-009	180	15	2,700	8/27/22
P29	A-010	50	15	750	8/27/22
P30	A-010	230	15	3,450	8/27/22
P31	A-011	230	15	3,450	8/27/22
P32	4099	290	15	4,350	8/27/22
		TOTAL LINER	PLACED (FT <sup>2</sup> ):	85,350	

Rolls A-001 - A-013 were rolls from previous liner projects. The roll number tag for these rolls could not be located. All rolls were inspected by the CQA manager before installation.



# **GEOCOMPOSITE DEPLOYMENT LOG**

PROJECT NAME: OWL Landfill Cell 1A & 2AB PROJECT NUMBER: 7053.22

 CLIENT:
 Oilfield Water Logistics
 CONTRACTOR:
 Mustang Extreme/SLS

 PROJECT LOCATION:
 Lea County, New Mexico
 SHEET NUMBER:
 1

**DEPLOYMENT LOCATION:** Cell 1A & 2AB **MONITOR:** MWK/TSK/NM/DL

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT²)	DATE INSTALLED
P33	9682	290	15	4,350	10/15/22
P34	A-012	66	15	990	10/15/22
P35	A-012	60	15	900	10/15/22
P36	A-012	49	15	735	10/15/22
P37	4151	130	15	1,950	10/15/22
P38	4151	99	15	1,485	10/15/22
P39	A-012	31	15	465	10/15/22
P40	3817	125	15	1,875	11/23/22
P41	3817	125	15	1,875	11/23/22
P42	3817	75	10	750	11/23/22
P43	3817	50	5	250	11/23/22
P44	3817	50	15	750	11/23/22
P45	3817	44	15	660	11/23/22
P46	3817	30	15	450	11/23/22
P47	3817	25	10	250	11/23/22
P48	A-013	70	15	1,050	1/13/23
P49	A-013	70	15	1,050	1/13/23
		TOTALLINED	PLACED (FT <sup>2</sup> ):	19,835	

Rolls A-001 - A-013 were rolls from previous liner projects. The roll number tag for these rolls could not be located. All rolls were inspected by the CQA manager before installation.



APPENDIX C: CELL LINER INSTALLATION DOCUMENTATION

C.17 Demtech Tensionmeter Calibration Certificate



# CALIBRATION CERTIFICATE

Pro-Tester [T-0100/A or T-0		ion Annorst
S-Type load cell	Calibra	ion Apparatus:
The state of the s	D 0	l de la constant de l
N A A A A A A A A A A A A A A A A A A A	Pro-Ca	l unit, model TC-0100/A
622265901	D 1144	
	/	Reference Cell:
		R1 2
265901	W2 152	R2 15
N/A	W3 302	R3 30
0 .		
Offse 4.677861	Scale: 3.329184	
Cell Response:	Deviation Error:	
2	0.00	
52	0.00	
102	0.00	
Lear Assemble	0.00	
The state of the s	0.00	
	0.00	
1006		
302	0.00	
T-1-1 D :-1: F (0()	0.00%	
그리다 하시네요 아이지는 그리는 그래요?	0.00%	
5 V DC		
	0 - 750 lbs. Tension  M2405-750# 622265901  T-029 265901  N/A  0  Offse 4.677861  Cell Response:  2 52 102 152 202 252 302  Total Deviation Error (%): 73 degrees F	0 - 750 lbs. Tension  M2405-750# 622265901  Dead Weight:  T-029 W1 2 V2 152 W3 302  Offse 4.677861  Scale: 3.329184  Cell Response:  2 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0



# APPENDIX D: INDEPENDENT QUALITY ASSURANCE LABORATORY FML DESTRUCTIVE TESTING RESULTS

D.1 Secondary Liner Destructive Test

Date: 2022-05-26

Mail To: **Mark Decarlo** Southwest Liner Systems, Inc. 301 Calle Industrial Bernalillo, NM, 87004

Bill To:

Southwest Liner Systems, Inc

e-mail:

swls.md@gmail.com jzazpe.sls@gmail.com bigz6990@gmail.com

Dear Decarlo,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

**Project: OWL Landfill 2A Secondary** 

TRI Job Reference Number: 72287

Material(s) Tested: (4) Heat Fusion Weld Seam(s)

SAME DAY Peel and Shear Test(s) Requested:

(ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

AD Adhesion Failure (100% Peel)

Break in sheeting away from Seam edge. BRK SE Break in sheeting at edge of seam.

AD-BRK Break in sheeting after some adhesion failure - partial peel. SIP Separation in the plane of the sheet (leaving the bond intact).

FTB Film tearing bond (all non "AD" failures).

100% peel. NON-FTB

anett A. Nelson

If you have any questions or require any additional information, please call us at 1-800-880-8378. Sincerely,

Jarret Nelson Project Manager

Geosynthetic Services Division

http://www.geosyntheticstestinc.com

# **DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS**

TRI Client: Southwest Liner Systems, Inc **Project: OWL Landfill 2A Secondary** 

Material: 60 mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 72287

TFST	RFE	או וכ	ΛTF	MII	<b>MBER</b>	
IESI	NEI	LIC	AIE	IVU	MDEK	

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-1   Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	151	149	150	149	152	150
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	140	139	135	137	137	138
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	179	176	187	179	183	181
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	l.
Sample ID: DS-2   Weld: Heat Fusion Side: A						Peel A
Peel Strength (ppi)	147	153	146	141	144	146
Peel Incursion (%)	<5	<5	<b>&lt;</b> 5	<b>&lt;</b> 5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	D I D.
Side: B						Peel B
Peel Strength (ppi)	147	134	157	134	138	142
Peel Incursion (%)	<5	<5	<5	<b>&lt;</b> 5	<b>&lt;</b> 5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	182	178	177	182	179	180
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

# **DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS** TRI Client: Southwest Liner Systems, Inc **Project: OWL Landfill 2A Secondary**

Material: 60 mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 72287

TEST	RF	DΙ	ICAT	CE M	MI II	MR	FR

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-3   Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	152	161	155	151	152	154
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	144	149	146	147	155	148
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	178	180	182	188	183	182
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-4   Weld: Heat Fusion Side: A						Peel A
Peel Strength (ppi)	130	134	136	135	140	135
Peel Incursion (%)	<5	<5	<b>&lt;</b> 5	<b>&lt;</b> 5	<b>&lt;</b> 5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	126	128	128	130	138	130
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	146	148	148	155	152	150
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2022-08-26

Mail To: Bill To:

Tyler Krueger Parkhill, Smith, Cooper

Parkhill, Smith, Cooper

e-mail:

tkrueger@parkhill.com mkingsley@parkhill.com

Dear Mr. Krueger,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

**Project: OWL LF Cell 2AB NE** 

TRI Job Reference Number: 74570

(4) Heat Fusion Weld Seam(s) Material(s) Tested:

(1) Single Extrusion Weld Seam(s)

SAME DAY Peel and Shear Test(s) Requested:

(ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

ΑD Adhesion Failure (100% Peel)

BRK Break in sheeting away from Seam edge. SE Break in sheeting at edge of seam.

AD-BRK Break in sheeting after some adhesion failure - partial peel. SIP Separation in the plane of the sheet (leaving the bond intact).

FTB Film tearing bond (all non "AD" failures).

**NON-FTB** 100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378. Sincerely,

sigfile

geolab

Geosynthetic Services Division http://www.geosyntheticstestinc.com

### **DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS** TRI Client: Parkhill, Smith, Cooper

**Project: OWL LF Cell 2AB NE** 

Material: 60 mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 74570

TEST	REPL	ICATE	NUM	1BER
------	------	-------	-----	------

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-1   Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	156	162	162	173	170	165
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	141	140	144	146	143	143
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	202	200	196	198	195	198
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-2   Weld: Heat Fusion Side: A						Peel A
	146	150	1.46	1.40	122	144
Peel Strength (ppi) Peel Incursion (%)	146 <5	153 <5	146 <5	140 <5	133 <5	144
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
reel Locus Of Fallure Code	30	3E	3E	3E	3E	
Pool NSE Failure Code	FTR	FTR	FTR	FTR	FTR	
	FTB	FTB	FTB	FTB	FTB	Peel R
Side: B						Peel B
Side: B Peel Strength (ppi)	152	151	153	167	147	Peel B
Side: B Peel Strength (ppi) Peel Incursion (%)	152 <5	151 <5	153 <5	167 <5	147 <5	
Side: B Peel Strength (ppi) Peel Incursion (%) Peel Locus Of Failure Code	152 <5 SE	151 <5 SE	153 <5 SE	167 <5 SE	147 <5 SE	
Side: B  Peel Strength (ppi)  Peel Incursion (%)  Peel Locus Of Failure Code  Peel NSF Failure Code	152 <5	151 <5	153 <5	167 <5	147 <5	154
Peel NSF Failure Code  Side: B  Peel Strength (ppi)  Peel Incursion (%)  Peel Locus Of Failure Code  Peel NSF Failure Code  Shear  Shear Strength (ppi)	152 <5 SE	151 <5 SE	153 <5 SE	167 <5 SE	147 <5 SE	

### **DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS** TRI Client: Parkhill, Smith, Cooper

**Project: OWL LF Cell 2AB NE** 

Material: 60 mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 74570

TEST	REPL	<b>ICATE</b>	NUMBER
------	------	--------------	--------

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-3   Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	143	151	159	155	156	153
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	145	163	163	136	149	151
eel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
hear						Shear
hear Strength (ppi)	203	206	206	208	202	205
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-4   Weld: Heat Fusion						
Sample ID: DS-4   Weld: Heat Fusion						Peel A
iide: A	162	150	169	163	178	Peel A
eel Strength (ppi)	162 <5	150 <5	169 <5	163 <5	178 <5	
Peel Incursion (%)						
ide: A Peel Strength (ppi) Peel Incursion (%) Peel Locus Of Failure Code	<5	<5	<5	<5	<5	
Peel Strength (ppi) Peel Incursion (%) Peel Locus Of Failure Code Peel NSF Failure Code	<5 SE	<5 SE	<5 SE	<5 SE	<5 SE	
·	<5 SE	<5 SE	<5 SE	<5 SE	<5 SE	164
Peel Strength (ppi) Peel Incursion (%) Peel Locus Of Failure Code Peel NSF Failure Code Bide: B Peel Strength (ppi)	<5 SE FTB	<5 SE FTB	<5 SE FTB	<5 SE FTB	<5 SE FTB	164 Peel B
Peel Strength (ppi) Peel Locus Of Failure Code Peel NSF Failure Code Bide: B Peel Strength (ppi) Peel Incursion (%)	<5 SE FTB	<5 SE FTB	<5 SE FTB	<5 SE FTB	<5 SE FTB	164 Peel B
ide: A  Peel Strength (ppi) Peel Incursion (%) Peel Locus Of Failure Code Peel NSF Failure Code Peel Strength (ppi) Peel Incursion (%) Peel Locus Of Failure Code	<5 SE FTB 153 <5	<5 SE FTB 161 <5	<5 SE FTB 168 <5	<5 SE FTB 153 <5	<5 SE FTB 150 <5	164 Peel B
ide: A  leel Strength (ppi)  leel Incursion (%)  leel Locus Of Failure Code  leel NSF Failure Code  leel Strength (ppi)  leel Incursion (%)  leel Locus Of Failure Code  leel NSF Failure Code	<5 SE FTB 153 <5 SE	<5 SE FTB 161 <5 SE	<5 SE FTB 168 <5 SE	<5 SE FTB 153 <5 SE	<5 SE FTB 150 <5 SE	164 Peel B
Peel Strength (ppi) Peel Incursion (%) Peel Locus Of Failure Code Peel NSF Failure Code	<5 SE FTB 153 <5 SE	<5 SE FTB 161 <5 SE	<5 SE FTB 168 <5 SE	<5 SE FTB 153 <5 SE	<5 SE FTB 150 <5 SE	Peel B 157

# **DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS - SINGLE TRACK**

TRI Client: Parkhill, Smith, Cooper **Project: OWL LF Cell 2AB NE** 

Material: 60 mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 74570

#### **TEST REPLICATE NUMBER**

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-5   Weld: Single Extrusion	l					
Side: Peel						Peel
Peel Strength (ppi)	160	158	149	152	177	159
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	190	187	181	182	181	184
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

AUSTIN, TX - USA | ANAHEIM, CA - USA | ANDERSON, SC - USA | GOLD COAST - AUSTRALIA | SUZHOU - CHINA

Date: 2022-10-18

Mail To: Bill To:

Mark DeCarlo

Southwest Liner Systems, Inc

Southwest Liner Systems, Inc

, ,

e-mail:

mark@slsliner.com jr@slsliner.com juan@slsliner.com gabe@slsliner.com

Dear DeCarlo,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project: Owl LF Cell 1A 2A Tie in Repair Secondary

TRI Job Reference Number: **75850** 

Material(s) Tested: (1) Heat Fusion Weld Seam(s)

Test(s) Requested: SAME DAY Peel and Shear

(ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

AD Adhesion Failure (100% Peel)

BRK Break in sheeting away from Seam edge.
SE Break in sheeting at edge of seam.

AD-BRK Break in sheeting after some adhesion failure - partial peel.

SIP Separation in the plane of the sheet (leaving the bond intact).

FTB Film tearing bond (all non "AD" failures).

NON-FTB 100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378. Sincerely,

Jennifer Tenney Project Manager

Sensip T. Tenney

Geosynthetic Services Division

http://www.geosyntheticstestinc.com

# **DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS** TRI Client: Southwest Liner Systems, Inc Project: Owl LF Cell 1A 2A Tie in Repair Secondary

Material: 60 mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 75850

#### **TEST REPLICATE NUMBER**

PARAMETER	TEST REFERENCE NOTIFIER						
	1	2	3	4	5	MEAN	
Sample ID: DTS-2   Weld: Heat Fusion							
Side: A						Peel A	
Peel Strength (ppi)	152	162	159	154	153	156	
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						Peel B	
Peel Strength (ppi)	140	136	132	141	123	134	
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						Shear	
Shear Strength (ppi)	206	200	203	206	206	204	
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

AUSTIN, TX - USA | ANAHEIM, CA - USA | ANDERSON, SC - USA | GOLD COAST - AUSTRALIA | SUZHOU - CHINA

Bill To:

Date: 2022-11-28

Mail To: Tyler Krueger Parkhill, Smith, Cooper 4222 85th Street Lubbock , TX , 79424

Parkhill, Smith, Cooper

e-mail:

tkrueger@parkhill.com accountspayable@parkhill.com mkingsley@parkhill.com

Dear Mr. Krueger,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project: Owl LF Cell 1A/2AB Tie in

TRI Job Reference Number: 76878

Material(s) Tested: (2) Heat Fusion Weld Seam(s)

Test(s) Requested: SAME DAY Peel and Shear

(ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

AD Adhesion Failure (100% Peel)

BRK Break in sheeting away from Seam edge.
SE Break in sheeting at edge of seam.

AD-BRK Break in sheeting after some adhesion failure - partial peel.

SIP Separation in the plane of the sheet (leaving the bond intact).

FTB Film tearing bond (all non "AD" failures).

NON-FTB 100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378. Sincerely,

Mansukh Patel

Sr. Laboratory Coordinator Geosynthetic Services Division

http://www.geosyntheticstestinc.com

AUSTIN, TX - USA | ANAHEIM, CA - USA | ANDERSON, SC - USA | GOLD COAST - AUSTRALIA | SUZHOU - CHINA

# **DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS**

TRI Client: Parkhill, Smith, Cooper Project: Owl LF Cell 1A/2AB Tie in

Material: 60 mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 76878

TEST REPLICATE NUI	MBER
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		TO THE LOCAL NOTIFIE					
PARAMETER	1	2	3	4	5	MEAN	
Sample ID: DS-32   Weld: Heat Fusion	Ì						
Side: A						Peel A	
Peel Strength (ppi)	124	124	131	136	122	127	
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						Peel B	
Peel Strength (ppi)	126	120	114	123	111	119	
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Shear						Shear	
Shear Strength (ppi)	153	155	154	162	162	157	
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID: DS-33   Weld: Heat Fusion Side: A	1					Peel A	
Peel Strength (ppi)	141	135	138	132	141	137	
Peel Incursion (%)	<5	<5	<5	<5	<b>&lt;</b> 5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side: B						Peel B	
Peel Strength (ppi)	120	124	136	127	120	125	
Peel Incursion (%)	<5	<5	<5	<5	<5		
Peel Locus Of Failure Code	SE	SE	SE	SE	SE		
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
						Shear	
Shear						Jiicui	
Shear Shear Strength (ppi)	150	157	156	148	153	153	



# APPENDIX D: INDEPENDENT QUALITY ASSURANCE LABORATORY FML DESTRUCTIVE TESTING RESULTS

D.2 Primary Liner Destructive Test

AUSTIN, TX - USA | ANAHEIM, CA - USA | ANDERSON, SC - USA | GOLD COAST - AUSTRALIA | SUZHOU - CHINA

Bill To:

Date: 2022-05-28

Mail To: Mark Decarlo Southwest Liner Systems, Inc 301 Calle Industrial Bernalillo , NM , 87004

Southwest Liner Systems, Inc

e-mail:

swls.md@gmail.com jzazpe.sls@gmail.com bigz6990@gmail.com

Dear Decarlo,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project: Owl Landfill 2A Primary

TRI Job Reference Number: **72368** 

Material(s) Tested: (4) Heat Fusion Weld Seam(s)

Test(s) Requested: SAME DAY Peel and Shear

(ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

AD Adhesion Failure (100% Peel)

BRK Break in sheeting away from Seam edge.
SE Break in sheeting at edge of seam.

AD-BRK Break in sheeting after some adhesion failure - partial peel.

SIP Separation in the plane of the sheet (leaving the bond intact).

FTB Film tearing bond (all non "AD" failures).

NON-FTB 100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378. Sincerely,

Mansukh Patel

Sr. Laboratory Coordinator Geosynthetic Services Division

http://www.geosyntheticstestinc.com

# **DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS** TRI Client: Southwest Liner Systems, Inc **Project: Owl Landfill 2A Primary**

Material: 60 mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 72368

PARAMETER	TEST REPLICATE NUMBER					
	1	2	3	4	5	MEAN
Sample ID: PDT-1   Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	162	162	139	150	152	153
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	137	135	142	141	140	139
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	182	182	189	183	190	185
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: PDT-2   Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	152	143	150	145	151	148
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	142	140	138	152	138	142
Peel Incursion (%)	<5	<5	<5	<5	<5	•
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	185	180	183	182	190	184
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	•

AUSTIN, TX - USA | ANAHEIM, CA - USA | ANDERSON, SC - USA | GOLD COAST - AUSTRALIA | SUZHOU - CHINA

# DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS TRI Client: Southwest Liner Systems, Inc Project: Owl Landfill 2A Primary

Material: 60 mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 72368

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: PDT-3   Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	140	157	159	144	148	150
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	132	134	136	134	141	135
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	187	183	183	182	185	184
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: PDT-4   Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	141	138	136	139	141	139
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	144	148	138	146	153	146
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	186	179	181	181	186	183
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

AUSTIN, TX - USA ANAHEIM, CA - USA ANDERSON, SC - USA GOLD COAST - AUSTRALIA SUZHOU - CHINA

Date: 2025-01-30

Mail To: Bill To:

Tyler Krueger Parkhill, Smith, Cooper

Parkhill, Smith, Cooper

, ,

e-mail:

tkrueger@parkhill.com mkingsley@parkhill.com

Dear Mr. Krueger,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project: OWL LF Cell 2AB NE

TRI Job Reference Number: 74676

Material(s) Tested: (4) Heat Fusion Weld Seam(s)

(1) Single Extrusion Weld Seam(s)

Test(s) Requested: SAME DAY Peel and Shear

(ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

AD Adhesion Failure (100% Peel)

BRK Break in sheeting away from Seam edge. SE Break in sheeting at edge of seam.

AD-BRK Break in sheeting after some adhesion failure - partial peel.

SIP Separation in the plane of the sheet (leaving the bond intact).

FTB Film tearing bond (all non "AD" failures).

NON-FTB 100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378. Sincerely,

Kendall Villarreal Project Manager

Geosynthetic Services Division

http://www.geosyntheticstestinc.com

AUSTIN, TX - USA | ANAHEIM, CA - USA | ANDERSON, SC - USA | GOLD COAST - AUSTRALIA | SUZHOU - CHINA

## DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS TRI Client: Parkhill, Smith, Cooper

Project: OWL LF Cell 2AB NE

Material: 60 mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 74676

П	EST	REPLI	CATE	NUM	BEK
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				0		
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-1   Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	138	137	147	143	166	146
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	139	148	138	156	147	146
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	201	203	201	210	206	204
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-2   Weld: Heat Fusion Side: A						Peel A
Peel Strength (ppi)	150	143	147	134	161	147
Peel Incursion (%)	<b>&lt;</b> 5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	168	174	173	168	139	164
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	208	208	208	213	216	211

## **DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS** TRI Client: Parkhill, Smith, Cooper

**Project: OWL LF Cell 2AB NE** 

Material: 60 mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 74676

## **TEST REPLICATE NUMBER**

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-3   Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	145	148	135	133	143	141
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	171	153	135	151	146	151
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	211	200	201	201	213	205
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-4   Weld: Heat Fusion Side: A						Peel A
Peel Strength (ppi)	161	162	154	164	176	163
Peel Incursion (%)	<5	<5 65	<b>&lt;</b> 5	<5 65	<5 CF	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code Side: B	FTB	FTB	FTB	FTB	FTB	Deel D
	177	170	174	166	150	Peel B
Peel Strength (ppi)	177	170	174	166	156	169
Peel Incursion (%)	<5	<5 65	<5 65	<5 65	<b>&lt;</b> 5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	<b>Cl</b>
Shear						Shear
Shear Strength (ppi)	200	201	203	210	212	205
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

## **DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS - SINGLE TRACK** TRI Client: Parkhill, Smith, Cooper

**Project: OWL LF Cell 2AB NE** 

Material: 60 mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 74676

## **TEST REPLICATE NUMBER**

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-5   Weld: Single Extrusion						
Side: Peel						Peel
Peel Strength (ppi)	166	172	175	172	176	172
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	196	190	193	202	207	198
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2022-10-18

Mail To: Bill To:

**Mark DeCarlo** 

Southwest Liner Systems, Inc Southwest Liner Systems, Inc

e-mail:

mark@slsliner.com jr@slsliner.com juan@slsliner.com gabe@slsliner.com

Dear DeCarlo,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

**Project:** Owl LF Cell 1A 2A Tie in Repair Primary

TRI Job Reference Number: 75849

Material(s) Tested: (2) Heat Fusion Weld Seam(s)

SAME DAY Peel and Shear Test(s) Requested:

(ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

AD Adhesion Failure (100% Peel)

Break in sheeting away from Seam edge. BRK SE Break in sheeting at edge of seam.

AD-BRK Break in sheeting after some adhesion failure - partial peel.

SIP Separation in the plane of the sheet (leaving the bond intact).

FTB Film tearing bond (all non "AD" failures).

100% peel. NON-FTB

If you have any questions or require any additional information, please call us at 1-800-880-8378. Sincerely,

Jennifer Tenney Project Manager

Sensip T. Tenney

Geosynthetic Services Division

http://www.geosyntheticstestinc.com

## **DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS** TRI Client: Southwest Liner Systems, Inc **Project: Owl LF Cell 1A 2A Tie in Repair Primary**

Material: 60 mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 75849

## **TEST REPLICATE NUMBER**

		1231	REPLICATE N	OFFIDER		
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DTP-1   Weld: Heat Fusion	1					
Side: A						Peel A
Peel Strength (ppi)	133	132	126	126	128	129
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	129	130	127	132	139	131
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	176	178	177	184	184	180
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DTP-2   Weld: Heat Fusion						
Side: A	<u> </u>					Peel A
Peel Strength (ppi)	148	156	146	153	156	152
Peel Incursion (%)	<5	<5	<5	<5	<5	132
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B	115	115	115	115	115	Peel B
Peel Strength (ppi)	149	157	145	144	137	146
Peel Incursion (%)	<5	<5	<5	<5	<5	140
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear	110	טוו	טוו	טוו	טוו	Shear
Shear Strength (ppi)	199	200	200	207	208	203
						203
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2025-01-30

Mail To: Bill To:

Tyler Krueger Parkhill, Smith, Cooper

Parkhill, Smith, Cooper

e-mail:

tkrueger@parkhill.com mkingsley@parkhill.com

Dear Mr. Krueger,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

**Project: OWL LF Cell 2AB NE** 

TRI Job Reference Number: 74681

Material(s) Tested: (1) Heat Fusion Weld Seam(s)

SAME DAY Peel and Shear Test(s) Requested:

(ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

AD Adhesion Failure (100% Peel)

Break in sheeting away from Seam edge. BRK SE Break in sheeting at edge of seam.

AD-BRK Break in sheeting after some adhesion failure - partial peel. SIP Separation in the plane of the sheet (leaving the bond intact).

FTB Film tearing bond (all non "AD" failures).

NON-FTB 100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378. Sincerely,

Kendall Villarreal Project Manager

Geosynthetic Services Division

http://www.geosyntheticstestinc.com

**DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS** 

TRI Client: Parkhill, Smith, Cooper **Project: OWL LF Cell 2AB NE** 

Material: 60 mil. HDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

TRI Log#: 74681

## **TEST REPLICATE NUMBER**

ARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-6   Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	174	168	158	153	170	165
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	160	158	161	158	151	158
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	194	194	196	195	194	195
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	•



## APPENDIX E: EMNRD CORRESPONDENCE

E.1 Conformation of Compliance: OWL Landfill Services, Inc. Surface Waste Management Facility; Construction Update.

## **Tyler Krueger**

From: Charles Fiedler

Sent: Wednesday, May 5, 2021 6:10 PM

To: Griswold, Jim, EMNRD

Subject: FW: OWL Cell 2A&B Review

Attachments: OWL Cell 2AB OCD Review.pdf

## Good Afternoon Jim,

Not to bother you while you are away, I wanted you to have something regarding this in your inbox when you return.

Based on the feedback below, Clint will complete his review of the design next week.

Attached is a copy of the Construction Plans for your file.

As we discussed last Friday, we are continuing on the schedule we originally discussed, with liner deliveries and placement starting next week (5/10).

I hope you found your grandbaby and family well and will look forward to hearing from you when you return.

**Thanks** 

## Charles Fiedler, PE, LEED AP

Civil Engineer Principal

## Parkhill

505.504.7751 | CField ler@Perkhill.com

Please note that our email domain and website have changed to Parkhill.com.

From: Richardson, Clinton < Clinton. Richardson@nmt.edu>

**Sent:** Wednesday, May 5, 2021 8:57 AM **To:** Charles Fiedler < CFiedler @ Parkhill.com >

Subject: Re: OWL Cell 2A&B Review

### Charles:

I did take a look at the plans last week; nothing red flag; this week is finals; Saturday is commencement; will try and get a final look-see this weekend. Busy as heck. Will send Jim Griswold something ASAP.

Clint

-----

On Wed, May 5, 2021 at 7:58 AM Charles Fiedler < CFiedler@parkhill.com > wrote:

## Good Morning Clint,

I wanted to follow-up with you to see if you have had a chance to look at OWL Cell 2A&B for conformance with the permitted design.

As you did with Cell 1B, we would appreciate your communication with Jim Griswold confirming substantial compliance with the engineering design provided in the application.

This cell is on the same major milestone development schedule as the original Cell 1B and has been excavated in anticipation of lining starting Monday.

We appreciate your help with this effort.

Charles Fiedler, PE, LEED AP Civil Engineer Principal

## Parkhill

505.504.7751 | CFiedler@Parkhill.com

Please note that our email domain and website have changed to Parkhill.com.

This email has been scanned for spam and viruses by Proofpoint Essentials. Click here to report this email as spam.

## **Tyler Krueger**

From: Charles Fiedler

**Sent:** Monday, May 3, 2021 8:27 AM

To: Hernandez, Emily, EMNRD; Griswold, Jim, EMNRD

**Cc:** Timothy Shreve; Matthew Kingsley; Tyler Krueger; Carl King

**Subject:** OWL Cell Construction

**Importance:** High

## Good Morning,

Thank you again for the opportunity to meet with both of you on Friday.

As discussed at that time, our goal is to keep you informed of OWL's progress with cell development and to discuss the transition from the development of Cell 1B to Cell 2AB.

We remain on schedule for liner installation in Cell 2AB starting May 10th.

We will keep you informed of our progress, as well as plans for future cell development.

Please let us know if you have any questions.

Charles Fiedler, PE, LEED AP

Senior Practice Leader

## **Parkhill**

505.504.7751 | CFiedler@Parkhill.com

Please note that our email domain and website have changed to Parkhill.com.

NM1 - \_\_\_\_63\_\_\_\_

## Cell 1

Movement of Oil Field Waste and Discovery of Tear in Liner System

## Jones, Brad A., EMNRD

**From:** Jones, Brad A., EMNRD

Sent: Wednesday, August 10, 2022 9:23 AM

**To:** tshreve@ndblandfill.com; mkingsley@Parkhill.com

Cc: Barr, Leigh P EMNRD

**Subject:** RE: [EXTERNAL] OWL NDBL Cell 1 and 2 Tie-In

Tim and Matt,

Thank you for notifying OCD of the shifting oil field waste event and informing the agency of the discovered tear to the liner system in Cell 1. OCD has determined that the event in Cell 1 needs to be documented in the administrative record for reference and in case liquids begin to appear to the leak detection sump of Cell 1 in the future.

Please submit a report that documents when and where the movement of oil field waste has occurred in Cell 1, provides photo documentation of the tear(s) discovered in the liner system (including GPS coordinates), provides written and photo documentation of the repair(s), including any associated QA/QC testing results (if applicable), and provides a written summary of the work performed to investigate the liner system and to assess it for further damage. The report should be updated periodically until the investigation and the repairs of the liner system have been completed.

OCD is also requesting the submittal of a surface waste management facility landfill cell development and construction plan that will specify a waste height and slope limit that must not be exceeded prior to completing the tie-in to the next landfill cell. It should include a protocol to immediately notify OCD when OWL personnel discover any signs of shifting oil field waste. Please submit the surface waste management facility landfill cell development and construction plan for review and consideration of approval within 30 days of this request.

If you have any questions regarding this matter, please do not hesitate to contact me.

Sincerely,

**Brad Jones** 

Brad A. Jones ● Environmental Scientist Specialist - Advanced Environmental Bureau
EMNRD - Oil Conservation Division
1220 S. Saint Francis Drive | Santa Fe, New Mexico 87505
(505) 469-7486 | brad.a.jones@state.nm.us
www.emnrd.nm.gov

From: Matt Kingsley < <a href="mkingsley@Parkhill.com">mkingsley@Parkhill.com</a>>
Sent: Thursday, August 4, 2022 3:47 PM

To: Barr, Leigh P EMNRD < <a href="mailto:leighp.barr@state.nm.us">leighp.barr@state.nm.us</a> Cc: Timothy Shreve <a href="mailto:tshreve@ndblandfill.com">tshreve@ndblandfill.com</a> Subject: [EXTERNAL] OWL NDBL Cell 1 and 2 Tie-In

CAUTION: This email originated outside of our organization. Exercise caution prior to clicking on links or opening attachments.

Leigh,

As discussed this morning, we have been working towards completing the tie-in between Cells 1 and 2 at the OWL NDBL Surface Waste Management Facility. In July of last year we completed construction of approximately five of the eight acres that comprise Cell 2. We stopped short along the east side of Cell 2 at that time as the adjacent Cell 1 slope had slid out to the edge of the lined area of Cell 1. This had prevented us from bringing the two geosynthetic liner systems together at that time. We also held a meeting with Jim Griswold and Emily Hernandez of the OCD and Tim Shreve of OWL via video call to inform them of these conditions. No waste materials were outside the liner system or outside the containment of Cell 1.

Since this time OWL continued development by constructing Cell 3 in the fall of 2021. However, OWL has continuously worked to remove material from the Cell 1 area to expose liner material as their work forces had availability. OWL then proceeded in January 2022 to hire an outside contractor to expedite removal of the overburden from the west edge of the Cell 1 geosynthetic liner system. OWL has successfully exposed 80% of the west edge of Cell 1 at this time. I have inspected the exposed geosynthetic liner over the last several months and have found everything intact and in the correct location according to the as-builts recorded at the time of construction.

Today as we exposed the very center of the Cell 1 west slope a tear was observed in the geosynthetics. We have removed the waste materials in and around this area and continue to investigate the remaining geosynthetics in this vicinity. The waste material lying directly on top of the liner system is very soil like and has no free liquids.

In order to assure that we expose fully competent liner in this area we are proposing to complete the following:

- 1. We will excavate back to the nearest geomembrane seam that is east (to the inside of the cell) of the observed tear.
- 2. We will inspect the seam to assure integrity between the two adjacent sheets of HDPE geomembrane.
- 3. We will use a micrometer measuring device to sample the exposed edge of the 60 mil HDPE geomembrane for thickness. The micrometer we have is a dial caliper style and is accurate to 1 mil. We will measure and record the thickness at least every ten feet along the exposed edge of the geomembrane. We will also measure any areas that visually appear to be damaged in any way. Our goal here is to assure that the 60 mil HDPE geomembrane has not stretched and become thinner indicating additional possibilities for tears.

It is OWL's desire to be transparent regarding these events and to communicate corrective action plans to the department in a timely manner. We would appreciate your feedback and advice on the proper reporting method for this event.

Much appreciated,

Matt Kingsley, P.E. Principal Parkhill (980) 525-9426 Cell mkingsley@parkhill.com

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720 District II

811 S. First St., Artesia, NM 88210 Phone:(575) 748-1283 Fax:(575) 748-9720 District III

1000 Rio Brazos Rd., Aztec, NM 87410 Phone:(505) 334-6178 Fax:(505) 334-6170

1220 S. St Francis Dr., Santa Fe, NM 87505 Phone:(505) 476-3470 Fax:(505) 476-3462

**State of New Mexico Energy, Minerals and Natural Resources Oil Conservation Division** 1220 S. St Francis Dr. **Santa Fe, NM 87505** 

CONDITIONS

Action 132674

## **CONDITIONS**

Operator:	OGRID:
OWL LANDFILL SERVICES, LLC	371820
8214 Westchester Drive	Action Number:
Dallas, TX 75225	132674
	Action Type:
	[C-137] Non-Fee SWMF Submittal (SWMF NON-FEE SUBMITTAL)

### CONDITIONS

Created By		Condition Date
bjones	None	8/10/2022

**Parkhill** 

APPENDIX F: RESUMÉS



tkrueger@parkhill.com 806.473.3656

## **EDUCATION**

## **Texas Tech University**

Bachelor of Science, Civil Engineering

## **LICENSES**

## Registered Professional Engineer

New Mexico No. 24922 Texas No. 130015

## **EXPERIENCE**

11 Years in Industry

## Tyler Krueger PE

Tyler Krueger, PE, is an Associate and Civil Engineer in Parkhill's Environmental Sector. His experience includes engineering design as well as construction and permitting services on municipal solid waste (MSW) landfills in Texas. Many of his projects have included groundwater compliance, annual volume, NMOC reporting, permit modifications, and permit applications for landfills. Additionally, he has experience in liner installation for multiple MSW landfills in Texas. He has also developed Site Operating Plans, Landfill Gas Management Plans, and Erosion Stability Plans. He is also a licensed Class A MSW Operator.

- Brownfield MSWLF cell 2 Bidding, Construction Admin., Testing, RPR and Liner Evaluation Reporting
- | Brownfield Landfill Cell 2 Expansion
- | Denton Municipal Solid Waste Engineering Services Landfill Permit Amendment
- | Denton Landfill On-Call Engineering Project
- Post Landfill Site Layout Revision
- | C.K. Disposal E&P Landfill
- Delaware Basin E&P Landfill
- | Levelland Landfill Type IV Cell 2
- | Pecos City Landfill Site Life Evaluation
- | Pecos City Landfill ADC Authorization
- | Post Landfill Initial Development
- | Plainview Landfill Tier 2 Testing
- | City of Lamesa Landfill Cell 5 DBC
- Plainview Landfill Sector 2A-2B Expansion
- | Levelland Landfill Type 4 Cell 3
- Town of Pecos City Landfill Trench 6 & 7 DBC
- | Big Spring Big Sandy Draw Landfill Litter Fence
- Lamesa Landfill Permit Amendment



980.525.9426

## **EDUCATION**

## Valparaiso University

Bachelor of Science, Civil Engineering

## **LICENSES**

## Registered Professional Engineer

New Mexico No. 25906 Texas No. 135539

## **EXPERIENCE**

33 Years in Industry

## Matt Kingsley PE

Matt Kingsley, PE, Senior Civil Engineer with Parkhill's Environmental Sector. He is an professional in landfill and transfer station operations, design, and construction. He has operated and developed over 10 Transfer Stations across the United States, in both arid and sub-tropical climates. He has also developed, expanded, and operated over 25 landfills from Phoenix to Philadelphia. Through Matt's diverse engineering design and operational experience, he has provided valuable insight for many of our clients. This has recently included operations consulting to both Sandoval County and the City of Albuquerque, two of the largest waste generators in New Mexico. Matt conducted a multiple-week assessment of operations for the City of Albuquerque, including their landfill and three transfer stations. After preparing an extensive report and summary of key safety and operational findings, Matt was asked to present this to the City's public works director and his staff.

- | Estancia Valley Solid Waste Authority Septage Lagoon with Liner
- Albuquerque MSW Landfill Services
- | EVRLF-Landfill Engineering Services
- Lea Land Landfill
- Tucumcari-Landfill-Cell 4 design bid
- | Town of Clayton Landfill Monitoring
- De Baca County Landfill Monitoring
- Deming Butterfield Trail Landfill Monitoring
- Deming Landfill Monitoring
- Paseo de Vista Landfill
- Lea County Landfill Environmental Compliance Services
- Lea County SWA Cell 6 Landfill
- Lea County Landfill Pavement Design
- Raton Landfill Monitoring
- T or C Landfill
- Old Tucumcari Landfill Monitoring
- City of Tucumcari Landfill Monitoring
- Raton Landfill Monitoring
- Lea County Landfill Tier 2 Testing
- Santa Rosa Landfill Monitoring
- WM Rio Rancho Landfill Groundwater Monitoring



nmorrow@parkhill.com 806.473.3699

## **EDUCATION**

## **North American University**

Bachelor of Science, Construction Management

## **LICENSES**

NSPS Certified Survey Technician July 28, 2017

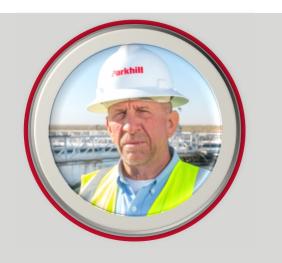
## **EXPERIENCE**

9 Years in Industry

## **Nathan Morrow**

Max White is a member of Parkhill's CPS/CM Sector. He joined Parkhill in 2017 as a Resident Project Representative (RPR). Since joining Parkhill, Nathan has provided on-site inspection services for all kinds of projects, including water and wastewater treatment plants, solid waste landfills, and streets and drainage improvements.

- | OWL NDBL Cell 2AB Construction
- OWL NDBL Cell 3AB Construction
- | Big Spring / Howard County Big Sandy MSW Landfil Ph 1 Planning Engineering and Construction
- | Big Spring-Howard County Big Sandy Draw Landfill Groundwater background Monitoring
- | Levelland Landfill Type IV Cell 2
- | Greater El Paso Landfill Cells 11-14 Bid and Construction Administration
- | Plainview Landfill Miscellaneous Services
- | Brownfield Landfill Miscellaneous Services
- Amarillo MSW Miscellaneous Services
- Dumas MSW Miscellaneous Services
- | City of Lubbock MSW Miscellaneous Services



<u>rlandsheft@parkhill.com</u> 915.478.2270

## **EXPERIENCE**

**40 Years in Industry** 

## **Dos Landsheft**

Dos Landsheft is a member of Parkhill's CPS/CM Sector. He joined Parkhill in 2013 as a Resident Project Representative (RPR). Since joining Parkhill, Dos has extensive experience including construction project management, heavy highway concrete and asphalt paving production, infrastructure construction, solid waste landfills, heavy equipment operation, and field inspection.

- OWL NDBL Cell 3AB Construction
- | Diamond Back Landfill Cell 1 Construction
- OWL NDBL Cell 4AB Construction
- | Greater El Paso Landfill Cells 11-14 Construction
- | Greater El Paso Landfill Cells Phase 1 Closure
- | Greater El Paso Landfill Miscellaneous Services

Sante Fe Main Office Phone: (505) 476-3441

General Information Phone: (505) 629-6116

Online Phone Directory https://www.emnrd.nm.gov/ocd/contact-us

# State of New Mexico Energy, Minerals and Natural Resources Oil Conservation Division 1220 S. St Francis Dr. Santa Fe, NM 87505

CONDITIONS

Action 451019

## **CONDITIONS**

Operator:	OGRID:
OWL LANDFILL SERVICES, LLC	371820
3889 Maple Avenue	Action Number:
Dallas, TX 75219	451019
	Action Type:
	[C-137] Non-Fee SWMF Submittal (SWMF NON-FEE SUBMITTAL)

## CONDITIONS

Created By		Condition Date
joseph.kennedy	None	4/23/2025