



September 6, 2024

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 4 A/B Construction (01705322)

Dear Ms. Barr:

This submittal is provided as engineering certification for the construction of Landfill Cell 4 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 4 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 for Landfill Cell 4 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 4 A/B at OWL Landfill Services, LLC. Please contact us with your questions and comments regarding this Engineering Certification Report. (tkrueger@parkhill.com; 325.227.0111)

Sincerely,

PARKHILL

By

A handwritten signature in black ink, appearing to read "TSK", written over a horizontal line.

Tyler S. Krueger, PE
Project Engineer

TSK/sw/pp
Enclosures

cc: Zach Ramos - OWL Landfill Services, LLC

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ENGINEERING CERTIFICATION REPORT LANDFILL CELL 4 A/B CONSTRUCTION

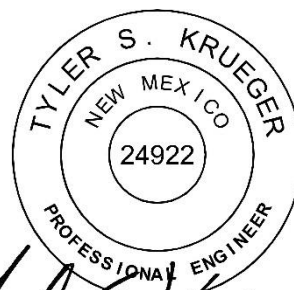
OWL Landfill Services, LLC
Lea County, New Mexico



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

June | 2024
Parkhill Project # 01705322



[Handwritten Signature]
09/06/2024

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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 4 A/B at OWL Landfill Services, LLC (OWL) located in Lea County, New Mexico. The CQA activities performed document shows Cell 4 A/B 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.

1.1 EMNRD OCD Notification

The EMNRD OCD was notified prior to Cell 4 A/B construction included in this Report in **Appendix F.1**. Site development activities and landfill clearing initially began on August 2022 with initial landfill perimeter berm construction continuing into October 2022. 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 October 2022 through November 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) from November 2022 through December 2022. Leachate system installation and protective soil layer (PSL) placement were performed by Enviroworks from December 2022 through January 2023.

1.3 Project Overview

Landfill Cell 4 A/B was constructed at Oilfield Water Logistics Services, LLC, (OWL), located in Lea County, New Mexico. Parkhill developed Cell 4 A/B, Project Technical Specifications, and the CQA Plan (October 2016); and performed on-site CQA activities. Primary construction activities for Cell 4 A/B are as listed in **Table 1**.

TABLE 1 - Primary Construction Activities

Activity #	Construction Activity
1	Mass Excavation.
2	Construction of perimeter berm.
3	Fine grading.
4	Compaction.
5	Installation of Geosynthetic Clay Liner (GCL).
6	Installation of the Secondary Flexible Membrane Liner (FML).
7	Installation of geonet and geocomposite leak detection system.
8	Installation of primary Flexible Membrane Liner (FML).
9	Installation of geocomposite cushion/drainage layer.
10	Installation of leachate collection system.
11	Installation of Protective Soil Layer (PSL).
12	Construction of landfill stormwater management system.

Mass excavation, placement and compaction of structural fill soils for the perimeter berm, and fine grading and compaction to the design base grades were completed by Enviroworks under observation and soil density testing of Parkhill, Site CQA Engineer, (**Figure 2**). 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), geosynthetic cushion/drainage (geocomposite), leachate collection system, protective soils (PSL), and rain flap stormwater management system (HDPE) installation procedures. The purpose of the CQA work is to document that construction activities performed at OWL comply with the Cell 4 A/B 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 4 A/B 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	Collect select on-site soils to perform laboratory moisture/density tests, hydraulic conductivity tests, and grain size analyses.
2	Review surveying results to confirm that the subgrade met design elevations and slope.
3	Provide field density testing of compacted berm soil fill and subgrade soils.
4	Review manufacturer's quality assurance and manufacturer's quality control testing results for geosynthetics.
5	Review conformance testing results for FML, GCL, geonet, and geocomposite.
6	Inspect delivered FML, GCL, geonet, geocomposite, and leachate collection pipe.
7	Observe GCL, secondary FML, leak detection system, primary FML, and geocomposite installation procedures.
8	Observe GCL, secondary FML, leak detection system, primary FML, and geocomposite material seaming and testing procedures.
9	Review documentation, including laboratory and field test results.
10	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 4 A/B 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, P.E., Engineer of Record, Site CQA Engineer/ Manager

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

Mr. Matt Kingsley, PE, Senior Project Manager

Mr. Matt Kingsley is a Senior Civil Engineer with Parkhill's Environmental Sector. He is a professional in landfill operations, design, and construction. He has 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. The current resumé for Mr. Kingsley is included in the **Resumés** section (**Appendix G**).

Mr. Max White, 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. The current resumé for Mr. White is included in the **Resumés** section (**Appendix G**).

2.0 LANDFILL CELL 4 A/B 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 4 A/B, is approximately 7.38 acres in size as shown on the Subgrade Design Grades (**Figure 2**).

Mass excavation, berm construction, and fine-grading were conducted by Enviroworks; and MEES 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 #	Enviroworks Construction Activity
1	Mass excavation to overall design grades.
2	Installation of perimeter berm.
3	Fine grading of the cell floor, transition zone, and berm.
4	Compaction of the landfill cell, surrounding areas, and berm.
5	Construction of the Site stormwater management system and Site protection berm.
6	Installation of leachate collection system (HDPE pipe, drainage aggregate, and geocomposite).
7	Installation of protective soil layer.
8	Excavation, backfill, and compaction of liner anchor trenches.

Mustang Extreme Environmental Services of Midland, Texas, performed the construction activities listed in **Table 4**.

TABLE 4 – MEES Construction Activities	
Activity #	MEES 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).
6	Installation of 40-mil smooth HDPE FML stormwater flap.

Surveying services for the Contractor, as defined in the Contract Documents, were provided by S3 Surveying (S3). S3 is a licensed land surveyor in the State of New Mexico, and survey support activities are listed in **Table 5**.

TABLE 5 - Surveying Support Activities	
Licensed Land Surveyor	Support Activity
S3 Surveying	Final grades of the Landfill Cell 4 A/B. Top of all berm surrounding the project. Leachate extraction line. Edge of liner system. Thickness conformation of PSL (Protective Soil 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 Clearing, Grubbing and Mass Excavation

Enviroworks performed the clearing and grubbing, mass excavation, subgrade fine grading and compaction, in addition to placing and compacting perimeter berm soils using select materials from excavation activities. Perimeter berm located on the north was constructed to the design grades shown

on the Construction Plans. Once design grades were attained and density testing was complete, S3 performed record certification surveys to document that the subgrade, berm elevations, and slopes met design requirements shown on the Construction Plans and as set forth in the Project Technical Specifications and 2016 CQA Plan.

2.2.2 Coordinate System

Project area was surveyed in a grid pattern so that the locations of sample and testing points used during construction were readily discernible by the Site CQA Engineer/Manager. The survey grid, shown on **Figure 3**, was established by S3 for use during construction and testing.

2.2.3 Subgrade and Berm Compaction

During excavation, a perimeter berm was constructed to contain Cell 4 A/B on the permanent north perimeter using excavated soils. Soils were placed in maximum one-foot thick lifts and compacted to 90% of standard proctor dry density as verified by field density tests. After berm construction, 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 27 tests for the ±7.38-acre footprint of Cell 4 A/B, and approximately five tests for berm construction (**Figure 4**). 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 4 A/B floor and north sidewall, and **Appendix A.3** for Cell 4 A/B perimeter berm. Moisture/density relationships are given in **Appendix A**. The type of soil encountered and stockpiled produced a composite soil that was placed for initial berm construction. As the project continued, berm was constructed either from the stockpile composite or direct placement from subgrade excavation. The maximum density references are labeled in **Appendix A.2** and **A.3**.

2.2.4 Subgrade Acceptance

Upon completion of subgrade construction, Cell 4 A/B was surveyed by S3. The topography of the subgrade was then verified and accepted by the Parkhill CQA Engineer/Manager prior to geosynthetic liner deployment. **Figure 2** shows the design grades, and **Figure 3** provides the as-built grades for the finished subgrade surface.

Parkhill Site CQA Engineer/Manager and MEES 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' FIS and Parkhill Site CQA Engineer/Manager.

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.

2.3.1 Geosynthetic Clay Liner Product

Approximately 321,388 ft² of Bentoliner NSL, the reinforced GCL material manufactured by Solmax, was used in the construction of Cell 4 A/B. 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 4 A/B. Each roll of GCL was carefully transported from the contractor's staging area to Cell 4 A/B 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.6**) and the GCL Layout Drawing (**Figure 5**). These labels were compared with the shipping invoice to verify that the GCL delivered to OWL corresponded with GCL subjected to MQC and MQA (manufacturer) testing (see Section 2.3.3). 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 6 – 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

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. Approximately 321,388 ft² of GCL material was deployed within the Landfill Cell 4 A/B, requiring a minimum of four samples. Four samples were tested by TRI for the properties listed in **Table 7**; as specified in the Project Technical Specifications and 2016 CQA Plan.

TABLE 7 - 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 four 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 4 A/B from the staging area. GCL was inspected for potential damage and uniformity. The roll identification labels were compared with the shipping invoice to verify that the GCL delivered to OWL corresponded with GCL subjected to manufacturers' quality control and quality assurance testing (see Sections 2.3.3.1.).

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.6**), 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 4 A/B GCL Layout is shown on **Figure 5**. 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 4 A/B 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 4 A/B 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. Parkhill Site CQA Engineer/Manager compared roll identification labels with shipping invoices to verify that FML delivered to OWL corresponded with FML subjected to manufacturer's quality control and quality assurance testing (Section 2.4.3).

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 4 A/B 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 and then compared with the shipping invoices to verify that the FML delivered to OWL corresponds with FML subjected to manufacturer's quality control and quality assurance testing. FML being deployed was documented in the *Secondary FML Deployment Log* (**Appendix C.7**) and the Secondary 60-Mil Liner Panel Layout Drawing (**Figure 6**).

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 4 A/B floor, and parallel to the Cell 4 A/B side slopes, per Project Technical Specifications and 2016 CQA Plan (see Secondary 60-Mil Liner Panel Layout, **Figure 6**).

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 8**.

TABLE 8 - 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. Approximately 321,615 ft² of HDPE Secondary FML was installed in the Landfill, requiring a minimum of four conformance samples. A total of four samples of 60 mil HDPE FML were tested by TRI for conformance.

TRI tested the ten FML samples for the properties listed in **Table 9**; as specified in Project Technical Specifications and 2016 CQA Plan.

TABLE 9 - 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 for the eight samples 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 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-inch-wide cutouts of the trial welds were field-tested for shear and peel strength using an on-site tensiometer (MEES's tensiometer calibration certificate is provided in **Appendix C.18**) 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.8**.

Seam testing protocol for Cell 4 A/B 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 (MEES) 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. Records of the FML weld-seam lengths are included in Appendix C.

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.11**; 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.10**) and *FML Seam Vacuum Test and Defect-Repair Log* (**Appendix C.16**). 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 4 A/B is listed in **Table 10**.

TABLE 10 - 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.18

FML installation was accepted after the data listed in **Table 10** was submitted to, reviewed by, and approved by Parkhill Site CQA Engineer. Cell 4 A/B As-Built Secondary FML Panel Layout is included as **Figure 6**. 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.

2.5.1 Leak-Detection Zone Product

Geocomposite utilized in Cell 4 A/B construction is a 200-mil, high-density polyethylene (HDPE) encapsulated by nonwoven geotextile manufactured by Solmax. Geonet utilized in Cell 4 A/B 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 4 A/B 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. Labels were compared with shipping invoice to verify that the materials received corresponded with materials subjected to manufacturer's quality control/manufacturer's quality assurance testing (see Section 2.6.3). The material was also 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 4 A/B 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 7**).

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 11 prior to delivery of the materials to the Site.

TABLE 11 – Solmax Geocomposite and Geonet – MQC Testing			
Geocomposite	Geonet	Test Property	ASTM Method
✓	✓	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 ft² 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. 240,900 ft² of leak detection zone material was installed in Cell 4 A/B requiring a minimum of three samples. TRI tested three geonet conformance samples for the properties listed in **Table 12**, as specified in Project Technical Specifications and 2016 CQA Plan.

Table 12 – Solmax Geocomposite and Geonet – Conformance Testing			
Geocomposite	Geonet	Test Property	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
✓		Transmissivity	ASTM D4716
✓		Peel Strength	ASTM D7005
✓		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 prior to approval and acceptance. Deployment documentation for the materials deployed in Cell 4 A/B are provided in **Appendices C.12** and **C.17**.

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 4 A/B is included as **Figure 7**. 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 4 A/B 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 4 A/B. 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 roll identification label was removed and submitted to Parkhill Site CQA Engineer/Manager and were compared with the shipping invoices to verify that the FML delivered to OWL corresponded with FML subjected to manufacturer's quality control and quality assurance testing. FML being deployed was documented in Primary FML Deployment Log (**Appendix C.13**) and Cell 4 A/B 60-Mil Primary Liner Panel Layout Drawing (**Figure 8**). 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 4 A/B floor, and parallel to the Cell 4 A/B side slopes, per the Project Technical Specifications and 2016 CQA Plan (see 60-Mil Primary Liner Panel Layout, **Figure 8**).

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 13**.

TABLE 13 - 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. Approximately 352,846 ft² of primary HDPE FML were installed during Cell 4 A/B construction requiring a minimum of four HDPE FML conformance samples. Four samples of HDPE FML were tested by TRI for conformance.

TRI tested the FML samples for the properties listed in **Table 14**, as specified in Project Technical Specifications and 2016 CQA Plan.

TABLE 14 – 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 for the eight samples 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 (MEES's tensiometer calibration certificate is provided in **Appendix C.18**) 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.8**.

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 (MEES) 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. 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 13,029 lineal feet of welded seam in

the primary liner requiring a minimum of 27 destructive tests. 31 destructive test samples were collected and evaluated in accordance with Project Technical Specifications and 2016 CQA Plan.

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.11**; 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.15**) and the FML Seam Vacuum Test and Defect-Repair Log (**Appendix C.16**). 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 4 A/B are listed in **Table 15**.

TABLE 15 - 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 15** was submitted to, reviewed by, and approved by Parkhill Site CQA Engineer. Cell 4 A/B as-built FML panel layout is included as **Figure 8**. Daily summary reports were completed after each construction day, and photo documentation recorded the FML placement activity on Cell 4 A/B 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 4 A/B 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 4 A/B 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. Labels were compared with shipping invoice to verify that the materials received corresponded with materials subjected to manufactures quality control/manufactures quality assurance testing (see Section 2.7.3). The material was also 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 4 A/B 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 9**).

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 16** prior to delivery of the materials to the Site.

TABLE 16 – 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. Approximately 259,650 ft² of geocomposite was installed in Cell 4 A/B requiring a minimum of three samples. TRI tested three geocomposite conformance samples for the properties listed in **Table 17**; as specified in Project Technical Specifications and 2016 CQA Plan.

TABLE 17 - Solmax 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 4 A/B is provided in **Appendix C.17**.

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 4 A/B is included as **Figure 9**. 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.4**).

2.8 LEACHATE COLLECTION SYSTEM

Upon completion of liner system installation, and confirming that all repairs were adequately addressed, Enviroworks began installation of the leachate collection system which included placement of aggregate, pipe, and geocomposite.

Parkhill observed placement of the leachate collection system ensure the methods and material used during construction did not damage the installed liner system.

2.9 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 field survey measurements on December 12, 2022 conducted by S3 (**Figure 10**). The survey indicates that a minimum of two feet of PSL was placed over the top of the cell floor and side slope liner systems (**Figure 11**).

2.10 FUTURE LINER TIE-IN DETAILS, STORMWATER AND LINER PROTECTION BERM

Future liner tie-in will be to Cell 5 A/B directly to the west, Cell 4 B directly to the south, and Cell 3 B east of Cell 4 B. The design for the stormwater and liner protection berm constructed in the perimeter transition zones of Cell 4 A/B, as shown on **Figure 2**, serves the intended purpose to control stormwater run-on and to protect the installed liner system.

Contractor constructed the stormwater and liner protection berm by placing soil along the floor and side slope of the cell until design grades were achieved. The stormwater and liner protection berm as-built is shown on **Figure 3**.

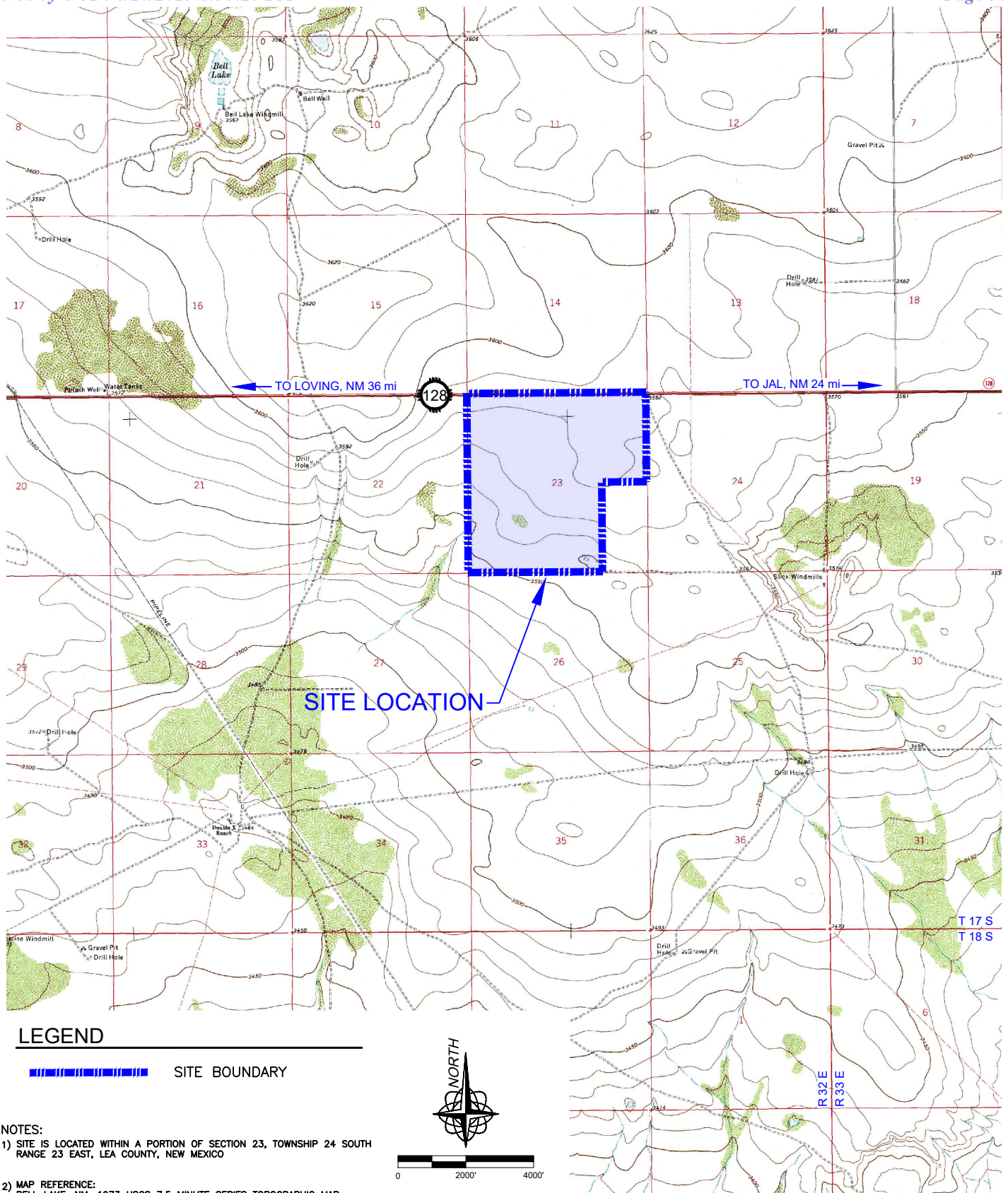
3.0 ENGINEERING CERTIFICATION

This Engineering Certification Report demonstrates that the composite liner and leak detection system for Cell 4 A/B 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 G**).

FIGURES

- Figure 1 OWL Landfill Services – Site Location Map
- Figure 2 OWL Landfill Services – Subgrade Design Grades
- Figure 3 OWL Landfill Services – Subgrade As-Built Locations
- Figure 4 OWL Landfill Services – Field Density Test Locations
- Figure 5 OWL Landfill Services – GCL Panel Layout
- Figure 6 OWL Landfill Services – Secondary Liner Panel Layout
- Figure 7 OWL Landfill Services – Geosynthetic Leak Detection Layer As-Built
- Figure 8 OWL Landfill Services – Primary Liner Panel Layout
- Figure 9 OWL Landfill Services – Geosynthetic Cushion/Drainage Panel Layout
- Figure 10 OWL Landfill Services – Top of PSL As-Built Grades
- Figure 11 OWL Landfill Services – Leachate Pipe and Edge of Liner As-Built

A:\2022\7053.22\03_DSGN\01_DWG\050_CIVIL\02_CONTENT\4AB CQA\FIGURE 1 SITE LOCATION.DWG, 8/17/2023 3:00:42 PM, SHARVEY



OWL LANDFILL SERVICES
ENGINEERING CERTIFICATION REPORT
OILFIELD WATER LOGISTICS
JAL, NEW MEXICO
LEA COUNTY, NEW MEXICO

Parkhill

Parkhill.com

SITE LOCATION MAP

Issue: 00
 Date: 08/17/2023
 Project No: 7053.22
 Sheet: FIGURE 1

CELL 3A/B
(EXISTING)

CELL 3B
(FUTURE)

2.5%

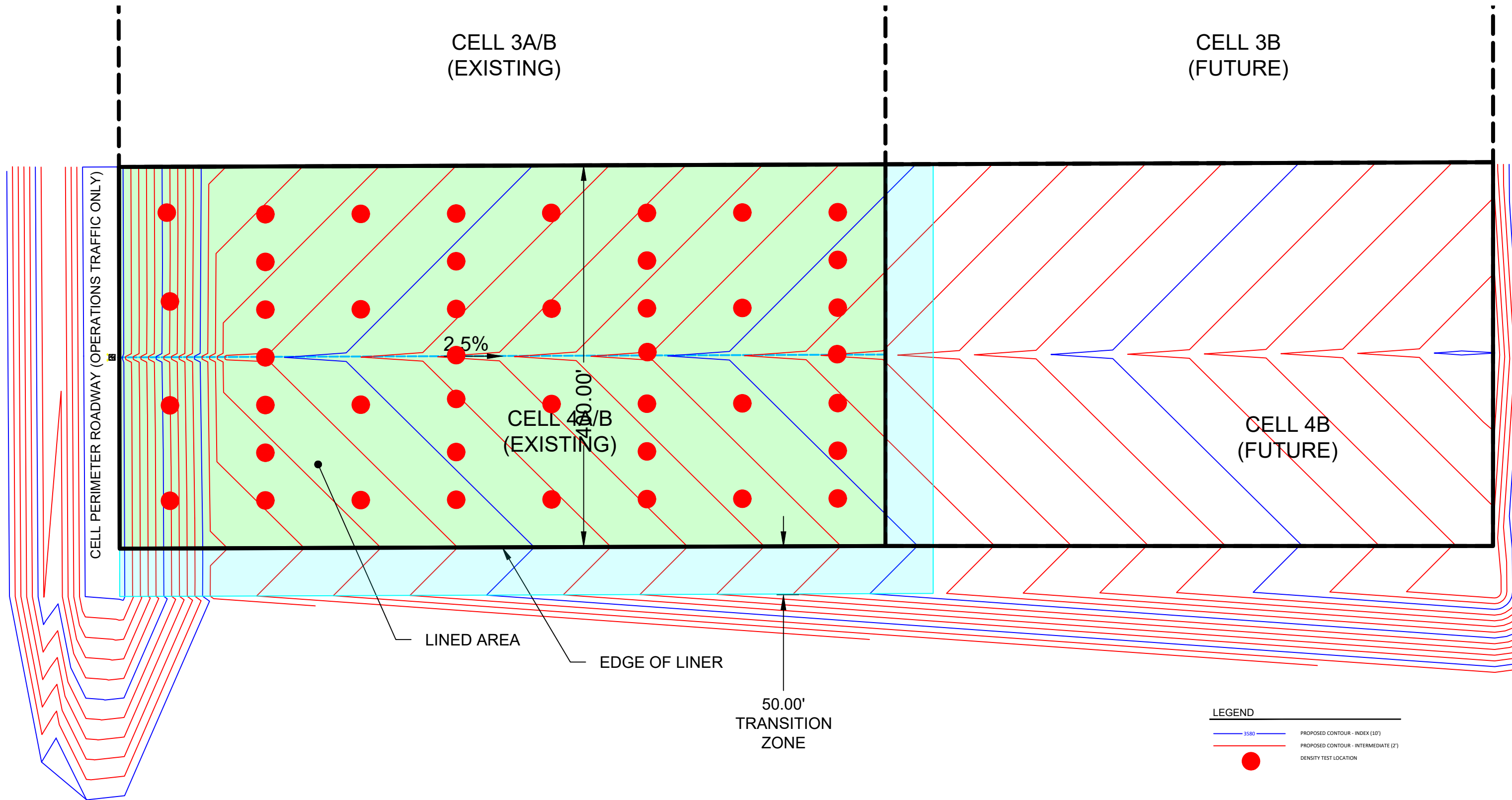
CELL 4A/B
(EXISTING)

CELL 4B
(FUTURE)

LINED AREA

EDGE OF LINER

50.00'
TRANSITION
ZONE



OWL LANDFILL SERVICES CELL 4A/B ENGINEERING CERTIFICATION REPORT

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



Parkhill

[Parkhill.com](https://www.parkhill.com)

FIELD DENSITY TEST LOCATIONS

Issue:	00
Date:	08/28/2023
Project No:	7053.22
Sheet:	FIGURE 3

[illegible]

**4615 E WARNER ROAD
BLDG A SUITE 5
GILBERT, AZ 85296**
PHONE: (480) 414-4121
FAX: (888) 870-6203
EMAIL: s3survey@s3-az.com



DRAWN: CH
CHECKED:
DATE: 12/01/2022

OWL LANDFILL
 CELL 4AB
 SUBGRADE ASBUILT EXHIBIT

PROJECT NO.
SHEET NUMBER
1
1 OF 1

LEGEND

P-10 GEOCOMPOSITE CLAY LIN



P-1			P-2				P-3				P-4			P-5			P-6	
P-7			P-8				P-9				P-10			P-11			P-12	
P-18		P-17					P-16				P-15			P-14			P-13	
P-19			P-32	P-33	P-34	P-35	P-36				P-37			P-38			P-39	
P-20		P-26	P-44				P-43				P-42			P-41			P-40	
P-21			P-45	P-46				P-47				P-48			P-49			
P-22			P-55		P-54				P-53				P-52			P-51		
P-23			P-56			P-57				P-58			P-59			P-60		
P-24			P-65				P-64				P-63			P-62			P-61	
P-25		P-66	P-67				P-68				P-69			P-70			P-71	
P-27			P-76		P-75				P-74				P-73			P-72		
P-28			P-77		P-78				P-79				P-80			P-81		
P-29		P-82	P-83				P-84				P-85			P-86			P-87	
P-30		P-100	101	P-102	P-109	P-110	P-111				P-112			P-113			P-114	
P-31		103	P-104	P-105	119	P-118				P-117			P-116			P-115		
P-88		P-106	P-107	P-108	P-120				P-121				P-122			P-123		
P-89		P-124				P-125				P-126				P-127			P-128	
P-90		P-135	P-134				P-133				P-132			P-131			P-130	P-129
P-91		P-136				P-137				P-138			P-139			P-140		
P-92		P-146	P-145				P-144				P-143			P-142			P-141	
P-93		P-147				P-148				P-149			P-150			P-151		
P-94		P-157	P-156				P-155				P-154			P-153			P-152	
P-95		P-158				P-159				P-160			P-161			P-162		
P-96		P-168	P-167				P-166				P-165			P-164			P-163	
P-97		P-169				P-170				P-171			P-172			P-173		
P-98		P-179	P-178				P-177				P-176			P-175			P-174	
P-99		P-180				P-181				P-182		P-183		P-184		P-185		

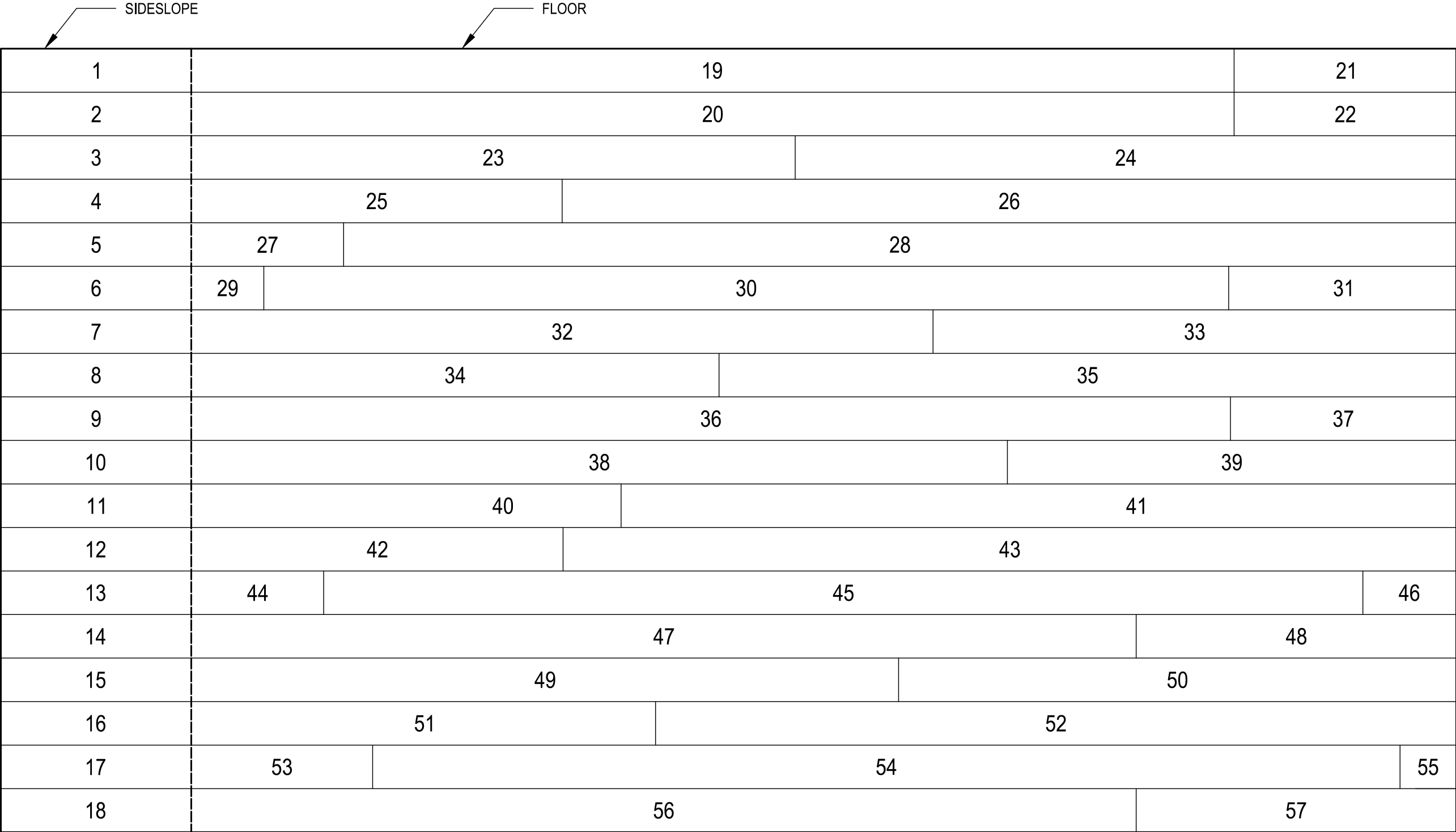
Parkhill.com

OWL NDBL SWMF
CELL 3A/B
ENGINEERING CERTIFICATION REPORT

CLIENT	
OWL LANDFILL SERVICES, LLC. 2029 W NM HWY 128 JAL, NM 88252	
PROJECT NO.	
6759.21	
#	DATE DESCRIPTION

GCL PANEL LAYOUT
FIGURE 5

A:\2022\7053.22\03_DSGN01_DWG\050_CIVIL\02_CONTENT\4AB CQA\FIGURE 6 FML_SECONDARY-PANEL.DWG, 8/23/2023 1:56:55 PM, SHarvey



LEGEND	
10	TEXTURED HDPE LINER PANEL
20	SMOOTH HDPE LINER PANEL

OWL LANDFILL SERVICES

CELL 4AB CQA REPORT

Oilfield Water Logistics
Jal, New Mexico
Lea County, New Mexico

Released to Imaging: 4/22/2025 1:46:52 PM



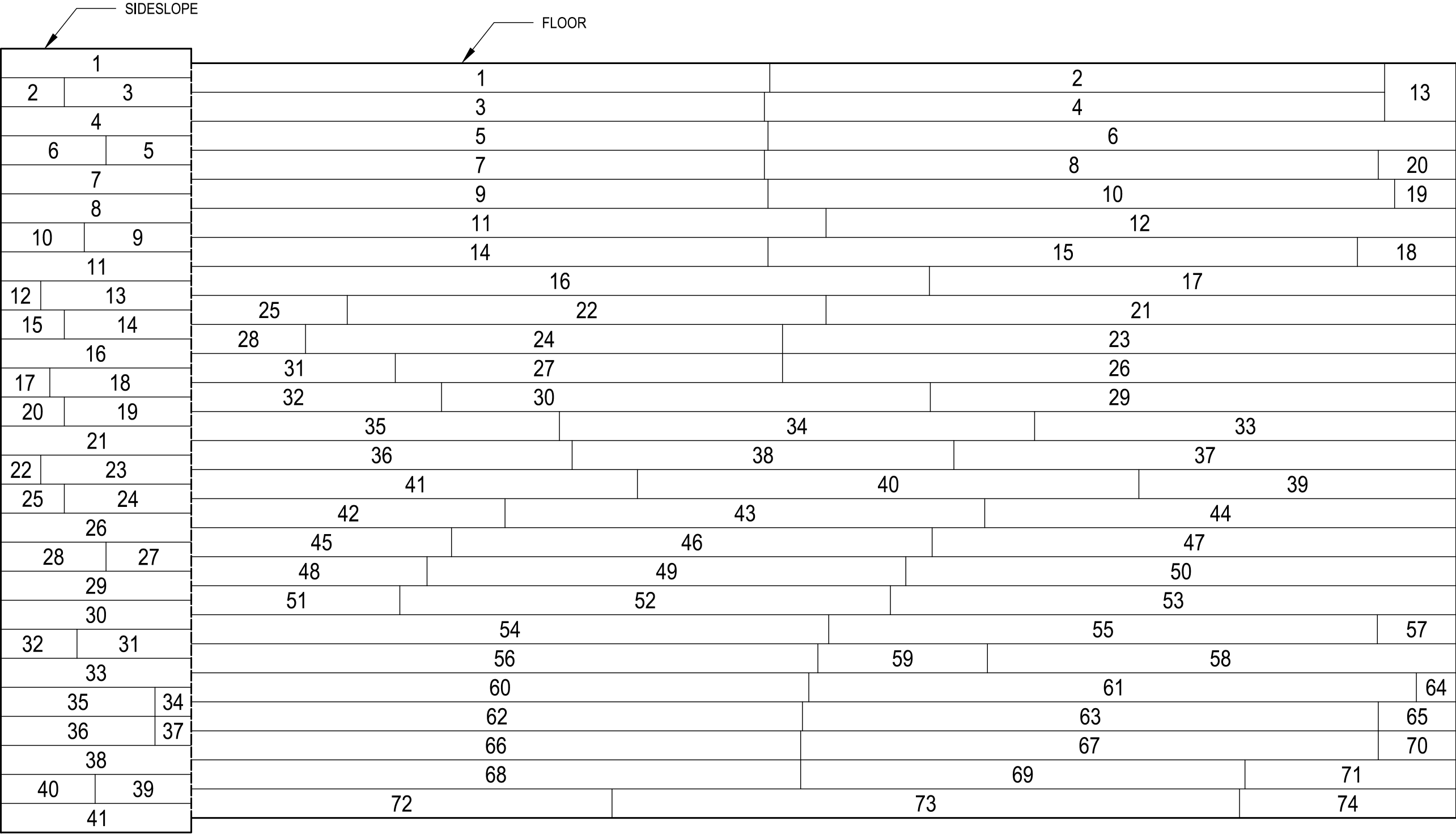
Parkhill.com

SECONDARY

HDPE LINER LAYOUT

Issue: 00
Date: 8/21/2023
Project No: 7753.22
Sheet: FIGURE 6

A:\2022\7053.22\03_DSGN\01_DWG\050_CIVIL\02_CONTENT\4AB CQA\FIGURE 7 COMPOSITE-NET_PANEL.DWG, 6/26/2023 8:11:19 AM, SHarvey



LEGEND	
10	DOUBLE-SIDE GEOCOMPOSITE LINER PANEL
10	GEONET LINER PANEL

OWL LANDFILL SERVICES
CELL 4AB CQA REPORT

Oilfield Water Logistics
Jal, New Mexico
Lea County, New Mexico

Released to Imaging: 4/22/2025 1:46:52 PM

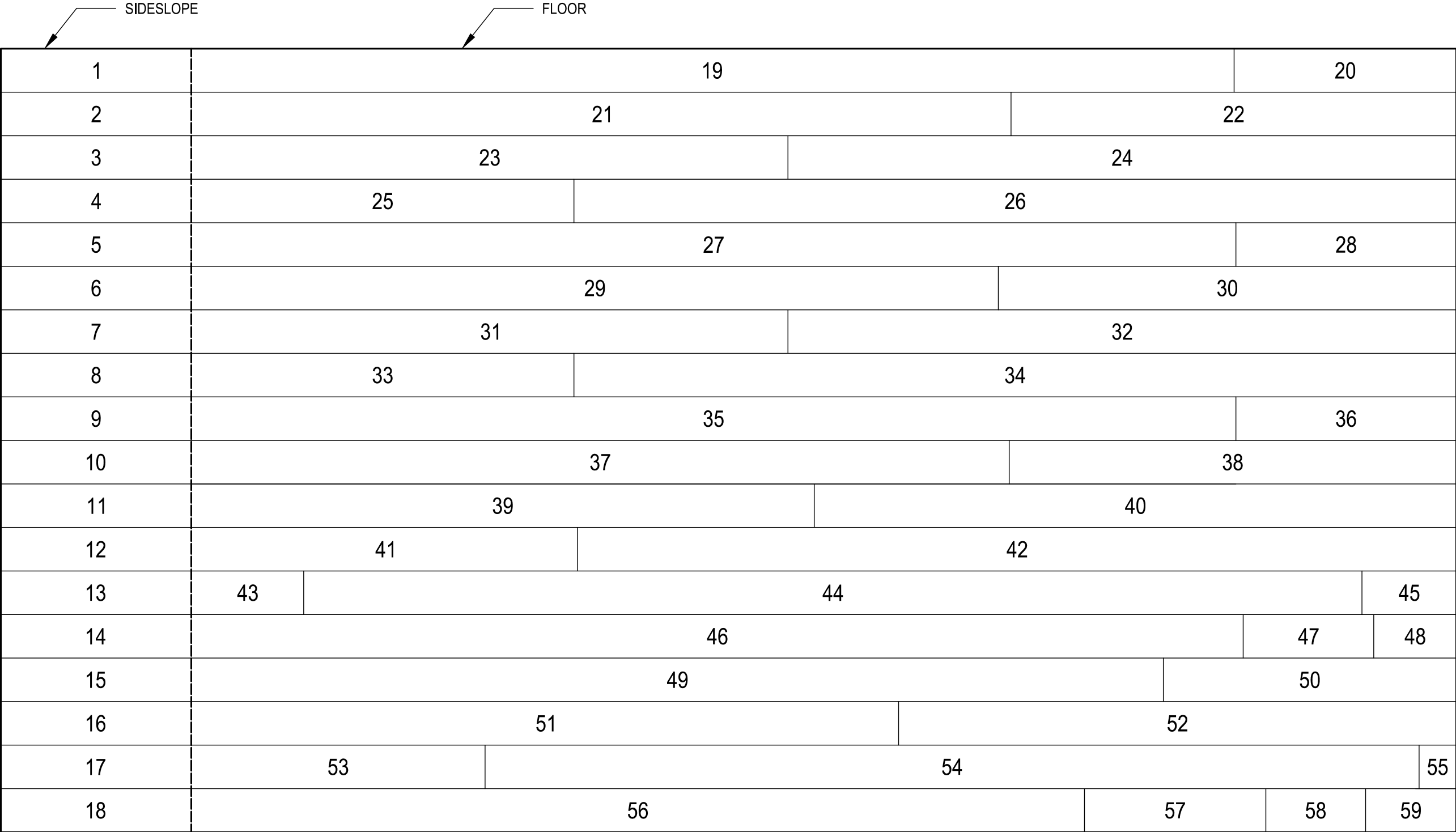


Parkhill.com

GEOSYNTHETIC LEAK
DETECTION LAYOUT

Issue: 00
Date: 8/21/2023
Project No: 7753.22
Sheet: FIGURE 7

A:\2022\7053.22\03_DSGN01_DWG\050_CIVIL\02_CONTENT\4AB CQA\FIGURE 8 FML_PRIMARY-PANEL.DWG, 8/23/2023 4:32:27 PM, Sharvey



LEGEND	
10	TEXTURED HDPE LINER PANEL
20	SMOOTH HDPE LINER PANEL

OWL LANDFILL SERVICES
CELL 4AB CQA REPORT

Oilfield Water Logistics
Jal, New Mexico
Lea County, New Mexico

Released to Imaging: 4/22/2025 1:46:52 PM

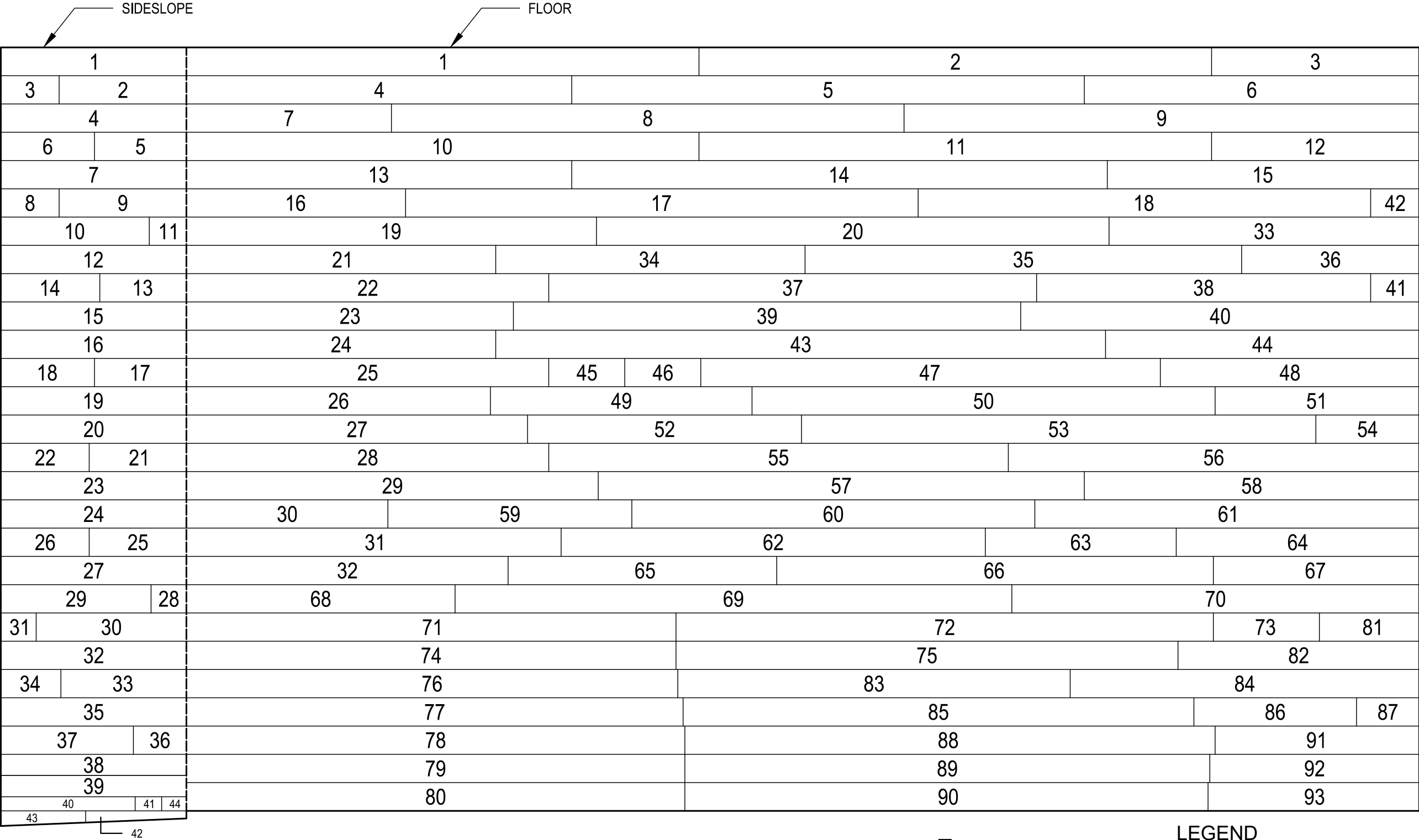


Parkhill.com

PRIMARY
HDPE LINER LAYOUT

Issue: 00
Date: 8/21/2023
Project No: 7753.22
Sheet: FIGURE 8

A:\2022\7053.22\03_DSGN\01_DWG\050_CIVIL\02_CONTENT\4AB CQA\FIGURE 9 COMPOSITE_DRAINAGE_PANEL.DWG, 8/21/2023 2:53:41 PM, SHarvey



OWL LANDFILL SERVICES
CELL 4AB CQA REPORT

Oilfield Water Logistics
Jal, New Mexico
Lea County, New Mexico

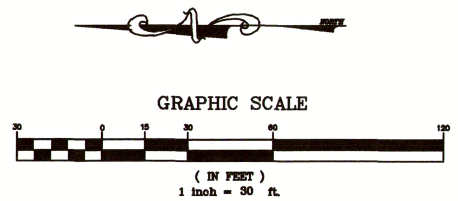
Released to Imaging: 4/22/2025 1:46:52 PM



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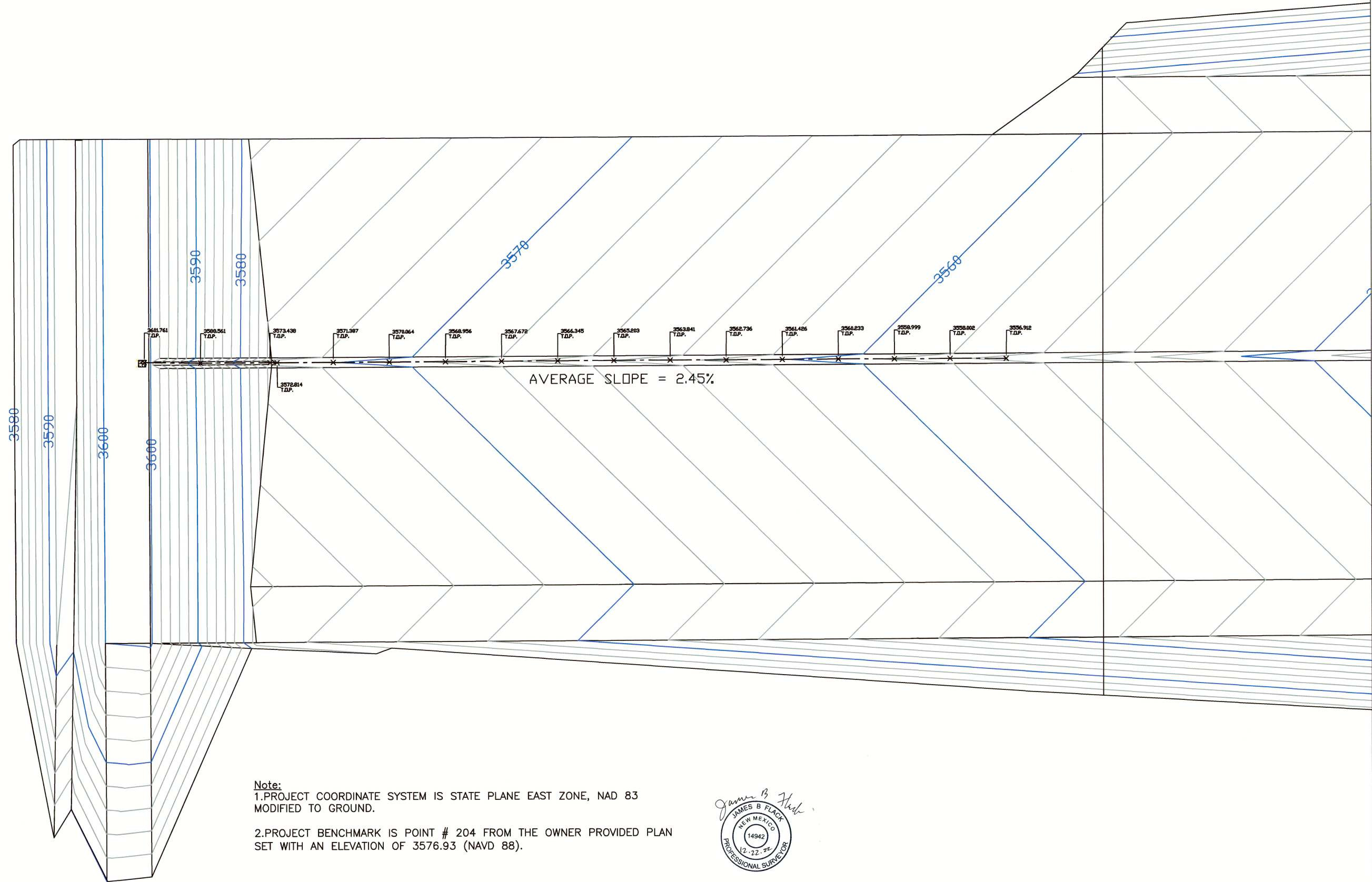
GEOSYNTHETIC
DRAINAGE LAYOUT

Issue: 00
Date: 8/21/2023
Project No: 7753.22
Sheet: FIGURE 9

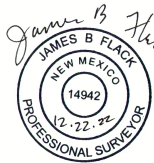


A circular professional seal for James B. Flack, a Professional Surveyor in New Mexico. The seal features concentric circles. The outermost ring contains the text "JAMES B FLACK" at the top and "PROFESSIONAL SURVEYOR" at the bottom. The inner ring contains "NEW MEXICO" at the top and "12.22.22" at the bottom. The center of the seal contains the license number "14942". Above the seal, the name "James B Flack" is handwritten in cursive.

PROJECT NO.
SHEET NUMBER
1
1 OF 1



Note:
1.PROJECT COORDINATE SYSTEM IS STATE PLANE EAST ZONE, NAD 83
MODIFIED TO GROUND.
2.PROJECT BENCHMARK IS POINT # 204 FROM THE OWNER PROVIDED PLAN
SET WITH AN ELEVATION OF 3576.93 (NAVD 88).



PROJECT NO.		OWL CELL 4AB		DRAWN: CH		CHECKED: --		DATE: 12/19/22		DWG: --		REV.		DATE		BY	
SHEET NUMBER		NEW MEXICO		4615 E WARNER ROAD		BLDG A SUITE 5		GILBERT, AZ 85296		PHONE (480) 414-4121		FAX (480) 414-4121		EMAIL: s3survey@s3-sz.com			
1 OF 1		PIPE SLOPE EXHIBIT		S3													

Parkhill

FIELD LOGS AND PHOTOGRAPHS

Daily Summary Reports



FIELD OBSERVATION REPORT

PREPARED BY: Max White

PROJECT NAME: OWL Cell 4

PROJECT NO.: 7053.22

DATE: 09/13/2022

TIME: 9:12 AM

Weather

☒ Clear ☐ Snow ☒ Warm
☐ Overcast ☐ Foggy ☐ Hot
☐ Rain ☐ Cold ☐ _____

Site Conditions

☐ Clear ☒ Dusty
☐ Muddy ☐ _____
Temperature Range _____

Day

☐ Monday ☐ Thursday
☒ Tuesday ☐ Friday
☐ Wednesday ☐ _____

Persons Contacted/Present at Site:

Enviroworks on site.

Work Observed/In-Progress:

Photos included in this report are intended to generally show the progress of the project. They are not intended to indicate the quality or deficiency of the work unless specifically noted.

Enviroworks completing upper portion of berm.

Items Discussed/Observations:

Materials Delivered to Site:

Caliche from Cell 4 excavation was used on berm.

Requested Revisions or Interpretations:

No items requested for revision.

Items to Verify:

Densities to be collected on embankment.

Information or Action Required:

☐ AttachmentsCopies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

A:\2022\7053.22\05_CONSTR\01_REPT\04_Cell 4AB Cert Report\01_Working_Copies\00-3_Feild_Obs\XX-XX-



FIELD OBSERVATION REPORT

PREPARED BY: Max White

PROJECT NAME: OWL Cell 4

PROJECT NO.: 7053.22

DATE: 09/14/2022

TIME: 8:47 AM

Weather

☒ Clear ☐ Snow ☐ Warm
☐ Overcast ☐ Foggy ☒ Hot
☐ Rain ☐ Cold ☐ _____

Site Conditions

☒ Clear ☐ Dusty
☐ Muddy ☐ _____
Temperature Range _____

Day

☐ Monday ☐ Thursday
☐ Tuesday ☐ Friday
☒ Wednesday ☐ _____

Persons Contacted/Present at Site:

Enviroworks on site.

Work Observed/In-Progress:

Photos included in this report are intended to generally show the progress of the project. They are not intended to indicate the quality or deficiency of the work unless specifically noted.

Enviroworks completing upper portion of berm. Approximately 5 feet of fill remaining.

Items Discussed/Observations:

Materials Delivered to Site:

Caliche from Cell 4 excavation was used on berm.

Requested Revisions or Interpretations:

No items requested for revision.

Items to Verify:

Densities to be collected on embankment.

Information or Action Required:

☐ AttachmentsCopies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

A:\2022\7053.22\05_CONSTR\01_REPT\04_Cell 4AB Cert Report\01_Working_Copies\00-3_Feild_Obs\XX-XX-



FIELD OBSERVATION REPORT

PREPARED BY: Max White

PROJECT NAME: OWL Cell 4

PROJECT NO.: 7053.22

DATE: 09/15/2022

TIME: 9:32 AM

Weather

☒ Clear ☐ Snow ☐ Warm
☐ Overcast ☐ Foggy ☒ Hot
☐ Rain ☐ Cold ☐ _____

Site Conditions

☒ Clear ☐ Dusty
☐ Muddy ☐ _____
Temperature Range _____

Day

☐ Monday ☒ Thursday
☐ Tuesday ☐ Friday
☐ Wednesday ☐ _____

Persons Contacted/Present at Site:

Enviroworks on site.

Work Observed/In-Progress:

Photos included in this report are intended to generally show the progress of the project. They are not intended to indicate the quality or deficiency of the work unless specifically noted.

Enviroworks completed the berm. Prep work for liner beginning. Slope being rolled and anchor trench cleaned up.Items Discussed/Observations:Materials Delivered to Site:

No material delivered.

Requested Revisions or Interpretations:

No items requested for revision.

Items to Verify:Densities to be collected on embankment.Information or Action Required:☐ AttachmentsCopies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

A:\2022\7053.22\05_CONSTR\01_REPT\04_Cell 4AB Cert Report\01_Working_Copies\00-3_Feild_Obs\XX-XX-



FIELD OBSERVATION REPORT

PREPARED BY: Max White

PROJECT NAME: OWL Cell 4

PROJECT NO.: 7053.22

DATE: 09/16/2022

TIME: 8:37 AM

Weather

☐ Clear ☐ Snow ☒ Warm
☒ Overcast ☐ Foggy ☐ Hot
☐ Rain ☐ Cold ☐ _____

Site Conditions

☐ Clear ☒ Dusty
☐ Muddy ☐ _____
Temperature Range _____

Day

☐ Monday ☐ Thursday
☐ Tuesday ☒ Friday
☐ Wednesday ☐ _____

Persons Contacted/Present at Site:

Enviroworks on site.

Work Observed/In-Progress:

Photos included in this report are intended to generally show the progress of the project. They are not intended to indicate the quality or deficiency of the work unless specifically noted.

Enviroworks completed the berm. Prep work for liner beginning. Slope being rolled and anchor trench cleaned up.Items Discussed/Observations:Materials Delivered to Site:

No material delivered.

Requested Revisions or Interpretations:

No items requested for revision.

Items to Verify:Densities to be collected on embankment.Information or Action Required:☐ AttachmentsCopies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

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FIELD OBSERVATION REPORT

PREPARED BY: Tyler Krueger

PROJECT NAME: OWL Cell 4

PROJECT NO.: 7053.22

DATE: 11/15/2022

TIME: 7:00 AM

Weather

☒ Clear ☐ Snow ☒ Warm
☐ Overcast ☐ Foggy ☐ Hot
☐ Rain ☐ Cold ☐ _____

Site Conditions

☒ Clear ☐ Dusty
☐ Muddy ☐ _____
Temperature Range _____

Day

☒ Monday ☐ Thursday
☐ Tuesday ☐ Friday
☐ Wednesday ☐ _____

Persons Contacted/Present at Site:

Enviroworks and Mustang Extreme on site.

Work Observed/In-Progress:

Photos included in this report are intended to generally show the progress of the project. They are not intended to indicate the quality or deficiency of the work unless specifically noted.

Deployment of GCL and Secondary FML. Welding operations followed FML deployment. Welds were tested by end of day with pressure testing and Destructive samples pulled.

Items Discussed/Observations:Materials Delivered to Site:

No material delivered.

Requested Revisions or Interpretations:

No items requested for revision.

Items to Verify:

FML start up weld testing to be recorded. Non destructive FML testing to be recorded. Destructive samples will be marked and recorded.

Information or Action Required:☐ AttachmentsCopies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

A:\2022\7053.22\05_CONSTR\01_REPT\04_Cell 4AB Cert Report\01_Working_Copies\00-3_Feild_Obs\XX-XX-

Parkhill

APPROVAL/ AUTHORIZATION TO PROCEED

TO: _____

FROM: _____

PROJECT NAME: _____

PROJECT NO.: _____

DATE: _____

The following liner system surface is deemed acceptable on a visual inspection by Liner Contractor Representative:

LAYER:

1. Subgrade	11/15/2022
2. Geosynthetic Clay Liner (GCL)	_____
3. HDPE Geomembrane (FML)	_____
4. Protective Soil Layer (PSL)	_____

LOCATION: _____ to _____
 _____ to _____

REMARKS: _____

Authorized By: _____

(Liner Contractor Representative)

(Authorized Signature)_____
(Date)

Accepted By: _____

Tyler Krueger
(CQA Manager)_____
(Authorized Signature)_____
(Date)☐ Attachments

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

\\Data1\Projects3\2021\6759.21\05_CONSTR\08_CQA_AuthorizationProceedForm_4.docm



FIELD OBSERVATION REPORT

PREPARED BY: Tyler Krueger

PROJECT NAME: OWL Cell 4

PROJECT NO.: 7053.22

DATE: 11/16/2022

TIME: 7:00 AM

Weather

☒ Clear ☐ Snow ☒ Warm
☐ Overcast ☐ Foggy ☐ Hot
☐ Rain ☐ Cold ☐ _____

Site Conditions

☒ Clear ☐ Dusty
☐ Muddy ☐ _____
Temperature Range _____

Day

☒ Monday ☐ Thursday
☐ Tuesday ☐ Friday
☐ Wednesday ☐ _____

Persons Contacted/Present at Site:

Enviroworks and Mustang Extreme on site.

Work Observed/In-Progress:

Photos included in this report are intended to generally show the progress of the project. They are not intended to indicate the quality or deficiency of the work unless specifically noted.

Deployment of GCL and Secondary FML. Welding operations followed FML deployment. Welds were tested by end of day with pressure testing and Destructive samples pulled.

Items Discussed/Observations:Materials Delivered to Site:

No material delivered.

Requested Revisions or Interpretations:

No items requested for revision.

Items to Verify:

FML start up weld testing to be recorded. Non destructive FML testing to be recorded. Destructive samples will be marked and recorded.

Information or Action Required:☐ AttachmentsCopies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

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Parkhill

APPROVAL/ AUTHORIZATION TO PROCEED

TO:

FROM:

PROJECT NAME: OWL Cell YAB Construction

PROJECT NO.: 7053.22

DATE: 11/16/2022

The following liner system surface is deemed acceptable on a visual inspection by Liner Contractor Representative:

- LAYER: 1. Subgrade 11/16/2022
2. Geosynthetic Clay Liner (GCL) _____
3. HDPE Geomembrane (FML) _____
4. Protective Soil Layer (PSL) _____

LOCATION: _____ to _____
_____ to _____

REMARKS: _____

Authorized By:

(Liner Contractor Representative)

(Authorized Signature)

(Date)

Accepted By:

Tyler Kruger
(CQA Manager)

Tyler Kruger
(Authorized Signature)

11/16/2022
(Date)

☐ Attachments

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

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Abilene Albuquerque Amarillo Arlington Austin El Paso Frisco Las Cruces Lubbock Midland team psc.com



FIELD OBSERVATION REPORT

PREPARED BY: Tyler Krueger

PROJECT NAME: OWL Cell 4

PROJECT NO.: 7053.22

DATE: 11/17/2022

TIME: 7:00 AM

Weather

☒ Clear ☐ Snow ☒ Warm
☐ Overcast ☐ Foggy ☐ Hot
☐ Rain ☐ Cold ☐ _____

Site Conditions

☐ Clear ☒ Dusty
☐ Muddy ☐ _____
Temperature Range _____

Day

☐ Monday ☐ Thursday
☒ Tuesday ☐ Friday
☐ Wednesday ☐ _____

Persons Contacted/Present at Site:

Enviroworks and Mustang Extreme on site.

Work Observed/In-Progress:

Photos included in this report are intended to generally show the progress of the project. They are not intended to indicate the quality or deficiency of the work unless specifically noted.

Deployment of GCL and Secondary FML. Welding operations followed FML deployment. Welds were tested by end of day with pressure testing and Destructive samples pulled.

Items Discussed/Observations:Materials Delivered to Site:

No material delivered.

Requested Revisions or Interpretations:

No items requested for revision.

Items to Verify:

FML start up weld testing to be recorded. Non destructive FML testing to be recorded. Destructive samples will be marked and recorded.

Information or Action Required:☐ AttachmentsCopies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

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APPROVAL/ AUTHORIZATION TO PROCEED

TO:

FROM:

PROJECT NAME:

PROJECT NO.:

DATE:

The following liner system surface is deemed acceptable on a visual inspection by Liner Contractor Representative:

LAYER: 1. Subgrade 11/17/22
2. Geosynthetic Clay Liner (GCL)
3. HDPE Geomembrane (FML)
4. Protective Soil Layer (PSL)

LOCATION: to
to

REMARKS:

Authorized By:

(Liner Contractor Representative)

(Authorized Signature)

(Date)

Accepted By:

(CQA Manager)

(Authorized Signature)

(Date)

☐ Attachments

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ ☐ ☐ File

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FIELD OBSERVATION REPORT

PREPARED BY: Tyler Krueger

PROJECT NAME: OWL Cell 4

PROJECT NO.: 7053.22

DATE: 11/18/2022

TIME: 7:00 AM

Weather

☐ Clear ☐ Snow ☒ Warm
☒ Overcast ☐ Foggy ☐ Hot
☐ Rain ☐ Cold ☐ _____

Site Conditions

☒ Clear ☐ Dusty
☐ Muddy ☐ _____
Temperature Range _____

Day

☐ Monday ☒ Thursday
☐ Tuesday ☐ Friday
☐ Wednesday ☐ _____

Persons Contacted/Present at Site:

Enviroworks and Mustang Extreme on site.

Work Observed/In-Progress:

Photos included in this report are intended to generally show the progress of the project. They are not intended to indicate the quality or deficiency of the work unless specifically noted.

Deployment of GCL and Secondary FML. Welding operations followed FML deployment. Welds were tested by end of day with pressure testing and Destructive samples pulled.

Items Discussed/Observations:Materials Delivered to Site:

No material delivered.

Requested Revisions or Interpretations:

No items requested for revision.

Items to Verify:

FML start up weld testing to be recorded. Non destructive FML testing to be recorded. Destructive samples will be marked and recorded.

Information or Action Required:☐ AttachmentsCopies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

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APPROVAL/ AUTHORIZATION TO PROCEED

TO:

FROM:

PROJECT NAME:

PROJECT NO.:

DATE:

The following liner system surface is deemed acceptable on a visual inspection by Liner Contractor Representative:

LAYER: 1. Subgrade 11/18/22
2. Geosynthetic Clay Liner (GCL)
3. HDPE Geomembrane (FML)
4. Protective Soil Layer (PSL)

LOCATION: _____ to _____
_____ to _____

REMARKS: _____

Authorized By:

(Liner Contractor Representative)

(Authorized Signature)

(Date)

Accepted By:

(CQA Manager)

(Authorized Signature)

(Date)

☐ Attachments

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

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FIELD OBSERVATION REPORT

PREPARED BY: Tyler Krueger

PROJECT NAME: OWL Cell 4

PROJECT NO.: 7053.22

DATE: 11/19/2022

TIME: 7:00 AM

Weather

☒ Clear ☐ Snow ☒ Warm
☐ Overcast ☐ Foggy ☐ Hot
☐ Rain ☐ Cold ☐ _____

Site Conditions

☒ Clear ☐ Dusty
☐ Muddy ☐ _____
Temperature Range _____

Day

☐ Monday ☐ Thursday
☐ Tuesday ☒ Friday
☐ Wednesday ☐ _____

Persons Contacted/Present at Site:

Enviroworks and Mustang Extreme on site.

Work Observed/In-Progress:

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Deployment of GCL and Secondary FML. Welding operations followed FML deployment. Welds were tested by end of day with pressure testing and Destructive samples pulled.

Items Discussed/Observations:Materials Delivered to Site:

No material delivered.

Requested Revisions or Interpretations:

No items requested for revision.

Items to Verify:

FML start up weld testing to be recorded. Non destructive FML testing to be recorded. Destructive samples will be marked and recorded.

Information or Action Required:☐ AttachmentsCopies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

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Page 55 of 351
Received by OGD: 4/10/2025 4:30:25 PM
Released to Imaging: 4/22/2025 1:46:52 PM

APPROVAL/ AUTHORIZATION TO PROCEED

TO:

FROM:

PROJECT NAME:

PROJECT NO.:

DATE:

The following liner system surface is deemed acceptable on a visual inspection by Liner Contractor Representative:

LAYER: 1. Subgrade 11/19/22
2. Geosynthetic Clay Liner (GCL)
3. HDPE Geomembrane (FML)
4. Protective Soil Layer (PSL)

LOCATION: to
to

REMARKS:

Authorized By:

(Liner Contractor Representative)

(Authorized Signature)

(Date)

Accepted By:

(CQA Manager)

(Authorized Signature)

(Date)

☐ Attachments

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ ☐ File

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FIELD OBSERVATION REPORT

PREPARED BY: Tyler Krueger

PROJECT NAME: OWL Cell 4

PROJECT NO.: 7053.22

DATE: 11/29/2022

TIME: 7:00 AM

Weather

☒ Clear ☐ Snow ☒ Warm
☐ Overcast ☐ Foggy ☐ Hot
☐ Rain ☐ Cold ☐ _____

Site Conditions

☒ Clear ☐ Dusty
☐ Muddy ☐ _____
Temperature Range _____

Day

☒ Monday ☐ Thursday
☐ Tuesday ☐ Friday
☐ Wednesday ☐ _____

Persons Contacted/Present at Site:

Enviroworks and Mustang Extreme on site.

Work Observed/In-Progress:

Photos included in this report are intended to generally show the progress of the project. They are not intended to indicate the quality or deficiency of the work unless specifically noted.

Geonet was deployed over secondary FML. Primary FML was deployed over Geonet. Welding operations followed FML deployment. Welds were tested by end of day with pressure testing and Destructive samples pulled.

Items Discussed/Observations:Materials Delivered to Site:

No material delivered.

Requested Revisions or Interpretations:

No items requested for revision.

Items to Verify:

FML start up weld testing to be recorded. Non destructive FML testing to be recorded. Destructive samples will be marked and recorded.

Information or Action Required:☐ AttachmentsCopies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

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FIELD OBSERVATION REPORT

PREPARED BY: Tyler Krueger

PROJECT NAME: OWL Cell 4

PROJECT NO.: 7053.22

DATE: 11/30/2022

TIME: 7:00 AM

Weather

☐ Clear ☐ Snow ☒ Warm
☒ Overcast ☐ Foggy ☐ Hot
☐ Rain ☐ Cold ☐ _____

Site Conditions

☒ Clear ☐ Dusty
☐ Muddy ☐ _____
Temperature Range _____

Day

☐ Monday ☐ Thursday
☒ Tuesday ☐ Friday
☐ Wednesday ☐ _____

Persons Contacted/Present at Site:

Enviroworks and Mustang Extreme on site.

Work Observed/In-Progress:

Photos included in this report are intended to generally show the progress of the project. They are not intended to indicate the quality or deficiency of the work unless specifically noted.

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Items Discussed/Observations:Materials Delivered to Site:

No material delivered.

Requested Revisions or Interpretations:

No items requested for revision.

Items to Verify:

FML start up weld testing to be recorded. Non destructive FML testing to be recorded. Destructive samples will be marked and recorded.

Information or Action Required:☐ AttachmentsCopies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

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FIELD OBSERVATION REPORT

PREPARED BY: Tyler Krueger

PROJECT NAME: OWL Cell 4

PROJECT NO.: 7053.22

DATE: 12/01/2022

TIME: 7:00 AM

Weather

☒ Clear ☐ Snow ☐ Warm
☐ Overcast ☐ Foggy ☒ Hot
☐ Rain ☐ Cold ☐ _____

Site Conditions

☒ Clear ☐ Dusty
☐ Muddy ☐ _____
Temperature Range _____

Day

☐ Monday ☐ Thursday
☐ Tuesday ☐ Friday
☒ Wednesday ☐ _____

Persons Contacted/Present at Site:

Enviroworks and Mustang Extreme on site.

Work Observed/In-Progress:

Photos included in this report are intended to generally show the progress of the project. They are not intended to indicate the quality or deficiency of the work unless specifically noted.

Geonet was deployed over secondary FML. Primary FML was deployed over Geonet. Welding operations followed FML deployment. Welds were tested by end of day with pressure testing and Destructive samples pulled.

Items Discussed/Observations:Materials Delivered to Site:

No material delivered.

Requested Revisions or Interpretations:

No items requested for revision.

Items to Verify:

FML start up weld testing to be recorded. Non destructive FML testing to be recorded. Destructive samples will be marked and recorded.

Information or Action Required:☐ AttachmentsCopies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

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FIELD OBSERVATION REPORT

PREPARED BY: Tyler Krueger

PROJECT NAME: OWL Cell 4

PROJECT NO.: 7053.22

DATE: 12/02/2022

TIME: 7:00 AM

Weather

☒ Clear ☐ Snow ☐ Warm
☐ Overcast ☐ Foggy ☒ Hot
☐ Rain ☐ Cold ☐ _____

Site Conditions

☒ Clear ☐ Dusty
☐ Muddy ☐ _____
Temperature Range _____

Day

☐ Monday ☒ Thursday
☐ Tuesday ☐ Friday
☐ Wednesday ☐ _____

Persons Contacted/Present at Site:

Enviroworks and Mustang Extreme on site.

Work Observed/In-Progress:

Photos included in this report are intended to generally show the progress of the project. They are not intended to indicate the quality or deficiency of the work unless specifically noted.

Geonet was deployed over secondary FML. Primary FML was deployed over Geonet. Welding operations followed FML deployment. Welds were tested by end of day with pressure testing and Destructive samples pulled.

Items Discussed/Observations:Materials Delivered to Site:

No material delivered.

Requested Revisions or Interpretations:

No items requested for revision.

Items to Verify:

FML start up weld testing to be recorded. Non destructive FML testing to be recorded. Destructive samples will be marked and recorded.

Information or Action Required:☐ AttachmentsCopies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

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FIELD OBSERVATION REPORT

PREPARED BY: Tyler Krueger

PROJECT NAME: OWL Cell 4

PROJECT NO.: 7053.22

DATE: 12/03/2022

TIME: 7:00 AM

Weather

☒ Clear ☐ Snow ☐ Warm
☐ Overcast ☐ Foggy ☒ Hot
☐ Rain ☐ Cold ☐ _____

Site Conditions

☒ Clear ☐ Dusty
☐ Muddy ☐ _____
Temperature Range _____

Day

☐ Monday ☐ Thursday
☐ Tuesday ☒ Friday
☐ Wednesday ☐ _____

Persons Contacted/Present at Site:

Enviroworks and Mustang Extreme on site.

Work Observed/In-Progress:

Photos included in this report are intended to generally show the progress of the project. They are not intended to indicate the quality or deficiency of the work unless specifically noted.

Geonet was deployed over secondary FML. Primary FML was deployed over Geonet. Welding operations followed FML deployment. Welds were tested by end of day with pressure testing and Destructive samples pulled.

Items Discussed/Observations:Materials Delivered to Site:

No material delivered.

Requested Revisions or Interpretations:

No items requested for revision.

Items to Verify:

FML start up weld testing to be recorded. Non destructive FML testing to be recorded. Destructive samples will be marked and recorded.

Information or Action Required:☐ AttachmentsCopies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

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FIELD OBSERVATION REPORT

PREPARED BY: Matt Kingsley

PROJECT NAME: OWL Cell 4

PROJECT NO.: 7053.22

DATE: 12/06/2022

TIME: 8:00 AM

Weather

☒ Clear ☐ Snow ☐ Warm
☐ Overcast ☐ Foggy ☒ Hot
☐ Rain ☐ Cold ☐ _____

Site Conditions

☒ Clear ☐ Dusty
☐ Muddy ☐ _____
Temperature Range _____

Day

☒ Monday ☐ Thursday
☐ Tuesday ☐ Friday
☐ Wednesday ☐ _____

Persons Contacted/Present at Site:

Enviroworks and Mustang Extreme on site.

Work Observed/In-Progress:

Photos included in this report are intended to generally show the progress of the project. They are not intended to indicate the quality or deficiency of the work unless specifically noted.

Geocomposite Drainage Layer Deployed.

Items Discussed/Observations:

Materials Delivered to Site:

No material delivered.

Requested Revisions or Interpretations:

No items requested for revision.

Items to Verify:

Geocomposite deployment recorded.

Information or Action Required:

☐ AttachmentsCopies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File



FIELD OBSERVATION REPORT

PREPARED BY: Matt Kingsley

PROJECT NAME: OWL Cell 4

PROJECT NO.: 7053.22

DATE: 12/07/2022

TIME: 8:00 AM

Weather

☒ Clear ☐ Snow ☐ Warm
☐ Overcast ☐ Foggy ☒ Hot
☐ Rain ☐ Cold ☐ _____

Site Conditions

☒ Clear ☐ Dusty
☐ Muddy ☐ _____
Temperature Range _____

Day

☐ Monday ☐ Thursday
☒ Tuesday ☐ Friday
☐ Wednesday ☐ _____

Persons Contacted/Present at Site:

Enviroworks and Mustang Extreme on site.

Work Observed/In-Progress:

Photos included in this report are intended to generally show the progress of the project. They are not intended to indicate the quality or deficiency of the work unless specifically noted.

Final vacuum testing on Primary FML was performed. Geocomposite Drainage Layer Deployed.

Items Discussed/Observations:Materials Delivered to Site:

No material delivered.

Requested Revisions or Interpretations:

No items requested for revision.

Items to Verify:

Vacuum sampling recorded. Geocomposite deployment recorded.

Information or Action Required:☐ AttachmentsCopies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

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FIELD OBSERVATION REPORT

PREPARED BY: Matt Kingsley

PROJECT NAME: OWL Cell 4

PROJECT NO.: 7053.22

DATE: 12/08/2022

TIME: 8:00 AM

Weather

☒ Clear ☐ Snow ☐ Warm
☐ Overcast ☐ Foggy ☒ Hot
☐ Rain ☐ Cold ☐ _____

Site Conditions

☒ Clear ☐ Dusty
☐ Muddy ☐ _____
Temperature Range _____

Day

☐ Monday ☐ Thursday
☐ Tuesday ☐ Friday
☒ Wednesday ☐ _____

Persons Contacted/Present at Site:

Enviroworks and Mustang Extreme on site.

Work Observed/In-Progress:

Photos included in this report are intended to generally show the progress of the project. They are not intended to indicate the quality or deficiency of the work unless specifically noted.

Geocomposite Drainage Layer Deployed.

Items Discussed/Observations:

Materials Delivered to Site:

No material delivered.

Requested Revisions or Interpretations:

No items requested for revision.

Items to Verify:

Geocomposite deployment recorded.

Information or Action Required:

☐ AttachmentsCopies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

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Parkhill

FIELD LOGS AND PHOTOGRAPHS

Project Photograph

Parkhill



2022-09-09 Excavation of Cell 4AB.



2022-09-15: Side Slope Berm Construction

7053.22 | OWL Landfill – Cell 4AB Construction

- 1 -

Parkhill



2022-10-11: Completed Subgrade



2022-10-11: Completed Leachate Trench

Parkhill



2022-11-15: GCL deployed on the slope



2022-11-16: GCL and FML Deployment

Parkhill

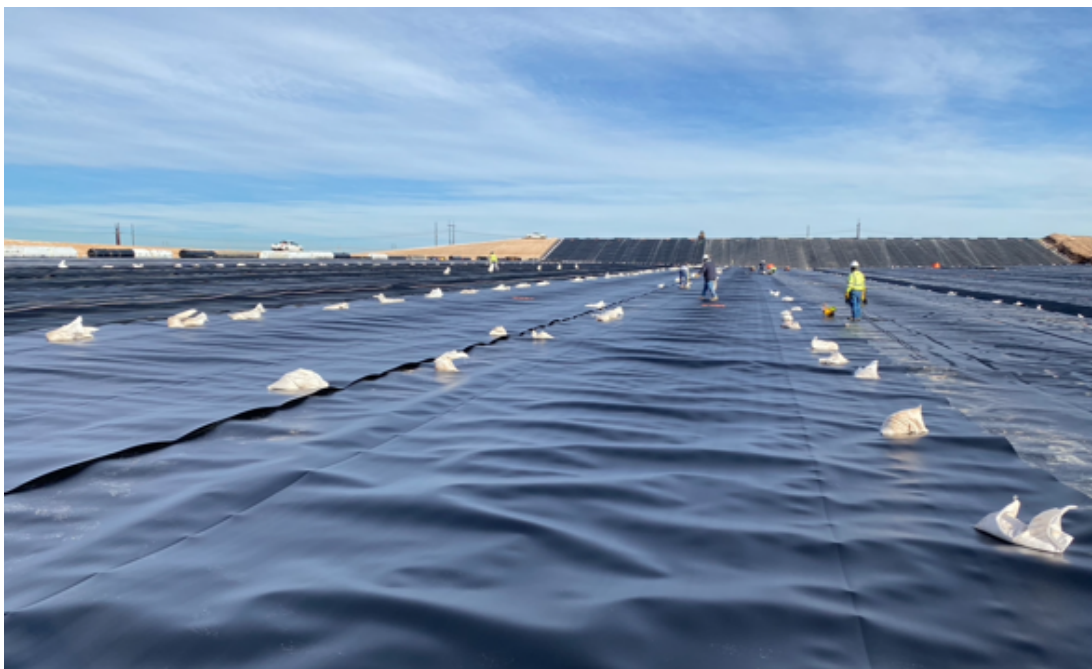


2022-11-16: FML Welding Operations



2022-11-29: Primary FML Deployment

Parkhill



2022-12-04: Primary FML Deployment



2022-12-05: Nondestructive Vacuum Testing of Repairs

Parkhill



2022-12-08: Geocomposite Deployment

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: Don Gray
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:**
Manager: Roberto Balderrama
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

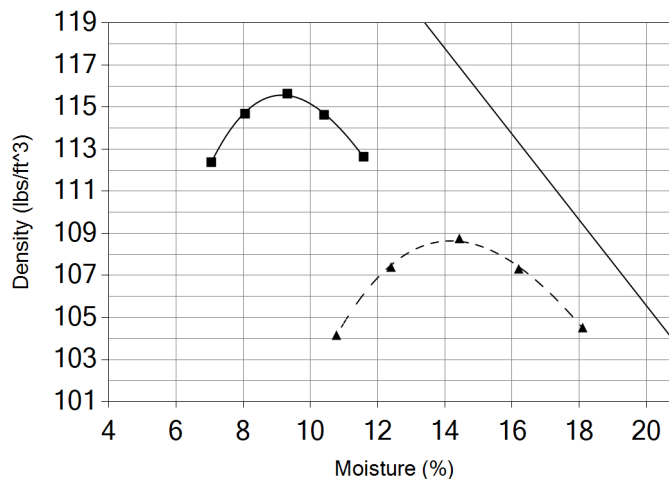
Type of Specification: No project specification was provided.

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

200 Wash Procedure: A

Specification

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



— Rock Correction - - - - - No Rock Correction

Plasticity Index (ASTM D4318-10) PI 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	
Plasticity Index:	NP	

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 Coarse Specific Gravity: 2.065
AssumedMaximum Density (lbs/ft³): 108.6 Rock Corrected: 115.6

Optimum Moisture (%): 14.2 Rock Corrected: 9.2

Remarks:

Distribution: Carl King, Don Gray

Reviewed By: Roberto Balderrama

This report relates only to the items inspected/tested and shall not be reproduced, except in full, without prior written consent

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

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

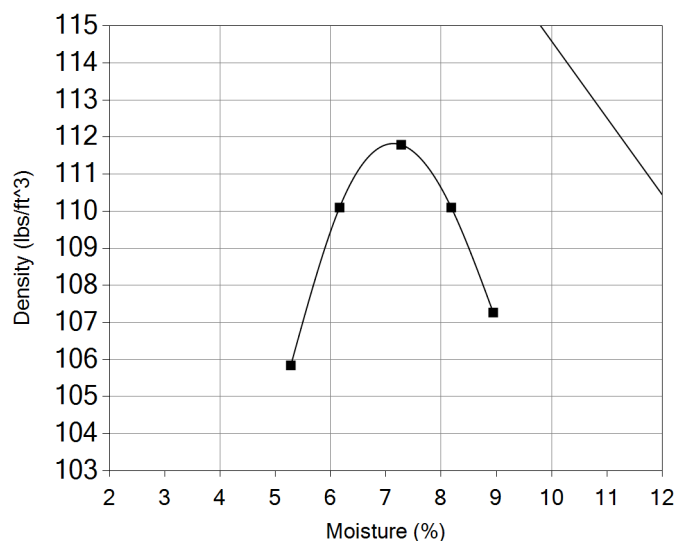
Type of Specification: No project specification was provided.

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

200 Wash Procedure: A

Specification

<u>Coarse Portion:</u>	<u>Sieve Size</u>	<u>Passing</u>	<u>Min</u>	<u>Max</u>
	4in.	100%		
	3in.	96%		
	2in.	84%		
	1 1/2in.	73%		
	1in.	56%		
	3/4in.	49%		
	1/2in.	41%		
	3/8in.	36%		
	#4	28%		
<u>Fine Portion:</u>	<u>Sieve Size</u>	<u>Passing</u>	<u>Min</u>	<u>Max</u>
	#8	24%		
	#10	24%		
	#16	22%		
	#30	20%		
	#40	19%		
	#50	17%		
	#100	11%		
	#200	6.8%		

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

Preparation Method: Dry Liquid Limit Method: A

Soil Classification (ASTM D2487-11) GP-GM

Specification

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

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/ft³): 111.8

Rock Corrected Optimum Moisture (%): 7.1

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

Distribution: Don Gray, Carl King P.E.

Reviewed By: Hugo Carreon

This report relates only to the items inspected/tested and shall not be reproduced, except in full, without prior written consent

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

Soils / Aggregates

wood.

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

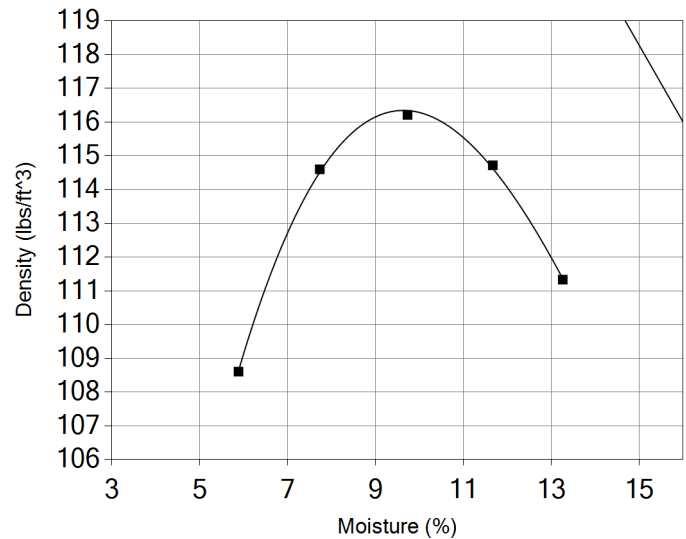
Type of Specification: No project specification was provided.

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

200 Wash Procedure: A

Specification

<u>Sieve Size</u>	<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) PI Air Dried.**

Preparation Method: Dry Liquid Limit Method: A

Soil Classification (ASTM D2487-11) SM

Specification

	<u>Min</u>	<u>Max</u>
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/ft³): 116.3

Optimum Moisture (%): 9.6

Remarks:

Distribution: Wood

Reviewed By: Roberto Balderrama

This report relates only to the items inspected/tested and shall not be reproduced, except in full, without prior written consent

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APPENDIX A: GEOTECHNICAL SOILS TESTING

A.2 Subgrade (Cell 4 A/B Floor) Test Results

Parkhill

FIELD COMPACTION TESTING FORM

PROJECT NAME: OWL Landfill Cell 4AB
OWNER: Oilfield Water Logistics
PROJECT LOCATION: Lea County, New Mexico

LOCATION: Landfill Subgrade
PROJECT NO.: 7053.22
PAGE NO.: 1

TESTING INSTRUMENT: IntroTek 3500 Xplorer®

TECHNICIAN: Matt Kingsley

SOIL CLASSIFICATION	DESCRIPTION	REF STD PROCTOR	90% (PCF)	OPTIMAL MOISTURE
A	GP-GM	Caliche	108.6 pcf 90% optimum	97.7 14.2 % Moisture
B	GP-GM	Poorly Graded Gravel w/ Silt and Sand	111.8 pcf 90% optimum	100.6 7.1 % Moisture
C	SM	Silty Sand	116.3 pcf 90% optimum	104.7 9.6 % Moisture

Soil Type	TEST NUMBER	% RSP	DRY DENS GITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
A	1	92.0%	99.9	3.3%	8/23/2022	Floor
A	2	93.3%	101.3	5.5%	8/23/2022	Floor
A	3	96.4%	104.7	3.2%	8/23/2022	Floor
A	4	93.5%	101.5	7.0%	8/23/2022	Floor
A	5	98.1%	106.5	7.6%	8/23/2022	Floor
A	6	94.4%	102.5	6.0%	8/23/2022	Floor
A	7	97.7%	106.1	4.6%	8/23/2022	Floor
A	8	99.6%	108.2	4.5%	8/23/2022	Floor
A	9	98.6%	107.1	5.5%	8/23/2022	Floor
A	10	97.4%	105.8	5.4%	8/23/2022	Floor
A	11	93.2%	101.2	7.6%	8/23/2022	Floor
A	12	91.3%	99.2	13.2%	8/23/2022	Floor
A	13	98.3%	106.8	7.8%	8/23/2022	Floor
A	14	93.2%	101.2	9.2%	8/23/2022	Floor
A	15	95.9%	104.1	6.8%	8/23/2022	Floor
A	16	99.4%	108.0	4.9%	8/23/2022	Floor
A	17	91.8%	99.7	10.5%	8/24/2022	Floor
A	18	94.5%	102.6	10.0%	8/24/2022	Floor
A	19	90.7%	98.5	8.8%	8/24/2022	Floor
A	20	96.0%	104.3	6.9%	8/24/2022	Floor
A	21	93.9%	102.0	11.8%	8/24/2022	Floor
A	22	93.3%	101.3	7.9%	8/24/2022	Floor
A	23	100.1%	108.7	9.6%	8/24/2022	Floor
A	24	101.4%	110.1	11.2%	8/24/2022	Floor
A	25	100.7%	109.4	9.8%	8/24/2022	Floor
A	26	93.6%	101.6	6.4%	8/24/2022	Floor
A	27	95.5%	103.7	7.7%	8/24/2022	Floor
A	28	98.1%	106.5	10.1%	8/26/2022	Floor
A	29	94.8%	102.9	9.3%	8/26/2022	Floor
A	30	91.9%	99.8	11.8%	8/26/2022	Floor
A	31	95.9%	104.1	10.6%	8/26/2022	Floor
A	32	96.4%	104.7	8.5%	8/26/2022	Floor
A	33	97.8%	106.2	7.2%	8/26/2022	Floor
A	34	94.5%	102.6	9.9%	8/26/2022	Floor
A	35	93.7%	101.8	11.2%	8/26/2022	Floor
A	36	98.8%	107.3	12.4%	8/26/2022	Floor
A	37	99.4%	107.9	9.7%	8/26/2022	Floor
A	38	97.1%	105.5	10.3%	8/26/2022	Floor
A	39	95.4%	103.6	6.8%	8/26/2022	Floor
A	40	97.8%	106.2	10.1%	8/29/2022	Floor
A	41	96.2%	104.5	9.8%	8/29/2022	Floor
A	42	93.8%	101.9	8.7%	8/29/2022	Floor
A	43	100.0%	108.6	11.1%	8/29/2022	Floor

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Parkhill

FIELD COMPACTION TESTING FORM

PROJECT NAME: OWL Landfill Cell 4AB
OWNER: Oilfield Water Logistics
PROJECT LOCATION: Lea County, New Mexico

LOCATION: Landfill Subgrade
PROJECT NO.: 7053.22
PAGE NO.: 2

TESTING INSTRUMENT: IntroTek 3500 Xplorer®

TECHNICIAN: Matt Kingsley

SOIL CLASSIFICATION	DESCRIPTION	REF STD PROCTOR	90% (PCF)	OPTIMAL MOISTURE
A	GP-GM	Caliche	108.6 pcf 90% optimum	97.7 14.2 % Moisture
B	GP-GM	Poorly Graded Gravel w/ Silt and Sand	111.8 pcf 90% optimum	100.6 7.1 % Moisture
C	SM	Silty Sand	116.3 pcf 90% optimum	104.7 9.6 % Moisture

Soil Type	TEST NUMBER	% RSP	DRY DENS GITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
A	45	97.3%	105.7	6.4%	8/29/2022	Floor
A	46	96.0%	104.3	7.2%	8/29/2022	Floor
A	47	92.6%	100.6	8.8%	8/29/2022	Floor
A	48	93.1%	101.1	9.1%	8/29/2022	Floor
A	49	95.6%	103.8	6.7%	8/29/2022	Floor
A	50	96.3%	104.6	7.3%	8/29/2022	Floor
A	51	95.9%	104.2	8.9%	8/29/2022	Floor
A	52	95.5%	103.7	11.7%	8/29/2022	Floor
A	53	91.9%	99.8	9.8%	8/29/2022	Slope
A	54	93.6%	101.7	9.1%	8/29/2022	Slope
A	55	95.4%	103.6	9.3%	8/29/2022	Slope
A	56	93.1%	101.1	9.7%	8/29/2022	Slope
A	57	93.8%	101.9	10.1%	8/29/2022	Slope
A	58	95.2%	103.4	11.8%	8/29/2022	Slope
A	59	100.2%	108.8	10.9%	8/29/2022	Slope
A	60	98.7%	107.2	8.1%	8/29/2022	Slope
A	61	98.0%	106.4	7.4%	8/29/2022	Slope
A	62	97.7%	106.1	7.1%	8/29/2022	Slope
A	63	91.8%	99.7	8.7%	8/29/2022	Slope
A	64	90.8%	98.6	8.1%	8/29/2022	Slope
A	65	92.9%	100.9	6.9%	8/29/2022	Slope
A	66	96.1%	104.4	7.2%	8/29/2022	Slope
A	67	97.1%	105.4	6.4%	8/29/2022	Slope
A	68	97.9%	106.3	7.9%	8/29/2022	Slope
A	69	96.0%	104.3	8.1%	8/29/2022	Slope
A	70	95.6%	103.8	8.3%	8/29/2022	Slope
A	71	99.2%	107.7	8.8%	8/29/2022	Slope
A	72	98.4%	106.9	9.1%	8/29/2022	Slope

APPENDIX A: GEOTECHNICAL SOILS TESTING

A.3 Berm Density Test Results

Parkhill

FIELD COMPACTION TESTING FORM

PROJECT NAME: OWL Landfill Cell 4AB
 OWNER: Oilfield Water Logistics
 PROJECT LOCATION: Lea County, New Mexico

LOCATION: Landfill Berm
 PROJECT NO.: 7053.22
 PAGE NO.: 1

TESTING INSTRUMENT: IntroTek 3500 Xplorer®

TECHNICIAN: Matt Kingsley

SOIL CLASSIFICATION	DESCRIPTION	REF STD PROCTOR	90% (PCF)	OPTIMAL MOISTURE
A	GP-GM	Caliche	108.6 pcf 90% optimum	97.7 14.2 % Moisture
B	GP-GM	Poorly Graded Gravel w/ Silt and Sand	111.8 pcf 90% optimum	100.6 7.1 % Moisture
C	SM	Silty Sand	116.3 pcf 90% optimum	104.7 9.6 % Moisture

Soil Type	TEST NUMBER	% RSP	DRY DENS GITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
A	1	99.6%	108.2	8.4%	8/22/2022	Slope
A	2	99.4%	107.9	8.5%	8/22/2022	Slope
A	3	91.8%	99.7	9.2%	8/22/2022	Slope
A	4	92.7%	100.7	5.6%	8/22/2022	Slope
A	5	94.8%	102.9	7.8%	8/22/2022	Slope
A	6	96.4%	104.7	10.2%	8/22/2022	Slope
A	7	98.8%	107.3	10.6%	8/22/2022	Slope
A	8	95.5%	103.7	11.6%	8/22/2022	Slope
A	9	94.8%	102.9	10.1%	8/22/2022	Slope
A	10	93.3%	101.3	10.1%	8/22/2022	Slope
A	11	95.3%	103.5	10.3%	8/22/2022	Slope
A	12	91.9%	99.8	13.2%	8/22/2022	Slope
A	13	94.4%	102.5	10.8%	8/23/2022	Slope
A	14	98.3%	106.7	9.2%	8/23/2022	Slope
A	15	97.5%	105.9	8.6%	8/23/2022	Slope
A	16	91.4%	99.3	7.7%	8/23/2022	Slope
A	17	91.7%	99.6	9.9%	8/23/2022	Slope
A	18	95.5%	103.7	9.6%	8/23/2022	Slope
A	19	96.7%	105.0	8.1%	8/23/2022	Slope
A	20	91.9%	99.8	9.9%	8/23/2022	Slope
A	21	93.6%	101.7	8.2%	8/23/2022	Slope
A	22	97.4%	105.8	7.7%	8/23/2022	Slope
A	23	93.9%	102.0	9.1%	8/23/2022	Slope
A	24	92.2%	100.1	5.9%	8/23/2022	Slope
A	25	92.0%	99.9	6.2%	8/23/2022	Slope
A	26	100.1%	108.7	6.7%	8/23/2022	Slope
A	27	98.2%	106.6	7.7%	8/23/2022	Slope
A	28	96.0%	104.3	6.9%	8/23/2022	Slope
A	29	93.0%	101.0	7.1%	8/23/2022	Slope
A	30	92.0%	99.9	6.3%	8/23/2022	Slope
A	31	95.2%	103.4	5.8%	8/23/2022	Slope
A	32	93.6%	101.6	6.5%	8/23/2022	Slope
A	33	93.1%	101.1	10.1%	8/24/2022	Slope
A	34	91.4%	99.3	9.8%	8/24/2022	Slope
A	35	90.3%	98.1	7.2%	8/24/2022	Slope
A	36	95.9%	104.2	6.6%	8/24/2022	Slope
A	37	92.1%	100.0	9.3%	8/24/2022	Slope
A	38	97.4%	105.8	6.9%	8/24/2022	Slope
A	39	91.8%	99.7	7.1%	8/24/2022	Slope
A	40	94.2%	102.3	8.8%	8/24/2022	Slope
A	41	95.6%	103.8	7.4%	8/24/2022	Slope
A	42	99.5%	108.1	9.1%	8/24/2022	Slope
A	43	99.2%	107.7	5.5%	8/24/2022	Slope
A	44	96.3%	104.6	5.9%	8/24/2022	Slope

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Parkhill

FIELD COMPACTION TESTING FORM

PROJECT NAME: OWL Landfill Cell 4AB
OWNER: Oilfield Water Logistics
PROJECT LOCATION: Lea County, New Mexico

LOCATION: Landfill Berm
PROJECT NO.: 7053.22
PAGE NO.: 2

TESTING INSTRUMENT: IntroTek 3500 Xplorer®

TECHNICIAN: Matt Kingsley

SOIL CLASSIFICATION	DESCRIPTION	REF STD PROCTOR	90% (PCF)	OPTIMAL MOISTURE
A	GP-GM	Caliche	108.6 pcf 90% optimum	97.7 14.2 % Moisture
B	GP-GM	Poorly Graded Gravel w/ Silt and Sand	111.8 pcf 90% optimum	100.6 7.1 % Moisture
C	SM	Silty Sand	116.3 pcf 90% optimum	104.7 9.6 % Moisture

Soil Type	TEST NUMBER	% RSP	DRY DENS GITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
A	45	94.1%	102.2	6.2%	8/24/2022	Slope
A	46	93.7%	101.8	11.9%	8/24/2022	Slope
A	47	99.1%	107.6	9.1%	8/24/2022	Slope
A	48	100.3%	108.9	7.6%	8/24/2022	Slope
A	49	97.8%	106.2	8.4%	8/24/2022	Slope
A	50	97.5%	105.9	9.9%	8/24/2022	Slope
A	51	97.8%	106.2	8.4%	8/24/2022	Slope
A	52	97.5%	105.9	9.9%	8/24/2022	Slope
A	53	91.3%	99.1	8.1%	8/25/2022	Slope
A	54	93.2%	101.2	8.0%	8/25/2022	Slope
A	55	94.9%	103.1	6.9%	8/25/2022	Slope
A	56	91.9%	99.8	4.2%	8/25/2022	Slope
A	57	92.8%	100.8	8.0%	8/25/2022	Slope
A	58	90.9%	98.7	7.9%	8/25/2022	Slope
A	59	92.2%	100.1	5.8%	8/25/2022	Slope
A	60	92.9%	100.9	9.2%	8/25/2022	Slope
A	61	91.2%	99.0	9.2%	8/25/2022	Slope
A	62	92.4%	100.4	9.8%	8/25/2022	Slope
A	63	91.8%	99.7	10.4%	8/25/2022	Slope
A	64	92.0%	99.9	9.2%	8/25/2022	Slope
A	65	91.6%	99.5	8.5%	8/25/2022	Slope
A	66	93.2%	101.2	6.8%	8/26/2022	Slope
A	67	99.5%	108.1	7.2%	8/26/2022	Slope
A	68	92.7%	100.7	7.8%	8/26/2022	Slope
A	69	91.7%	99.6	6.1%	8/26/2022	Slope
A	70	96.6%	104.9	5.4%	8/26/2022	Slope
A	71	100.4%	109.0	7.7%	8/26/2022	Slope
A	72	93.7%	101.8	10.1%	8/26/2022	Slope
A	73	95.2%	103.4	11.8%	8/26/2022	Slope
A	74	96.0%	104.3	9.2%	8/26/2022	Slope
A	75	93.8%	101.9	8.9%	8/26/2022	Slope
A	76	94.4%	102.5	10.7%	8/26/2022	Slope
A	77	93.9%	102.0	11.1%	8/26/2022	Slope
A	78	97.9%	106.3	7.5%	8/26/2022	Slope
A	79	95.9%	104.1	12.1%	8/26/2022	Slope
A	80	93.8%	101.9	7.9%	8/26/2022	Slope
A	81	99.4%	108.0	8.5%	8/26/2022	Slope
A	82	92.6%	100.6	6.4%	8/26/2022	Slope
A	83	99.6%	108.2	9.1%	8/26/2022	Slope

Parkhill

FIELD COMPACTION TESTING FORM

PROJECT NAME: OWL Landfill Cell 4AB
OWNER: Oilfield Water Logistics
PROJECT LOCATION: Lea County, New Mexico

LOCATION: Landfill Berm
PROJECT NO.: 7053.22
PAGE NO.: 3

TESTING INSTRUMENT: IntroTek 3500 Xplorer®

TECHNICIAN: Matt Kingsley

SOIL CLASSIFICATION	DESCRIPTION	REF STD PROCTOR	90% (PCF)	OPTIMAL MOISTURE
A	GP-GM	Caliche	108.6 pcf 90% optimum	97.7 14.2 % Moisture
B	GP-GM	Poorly Graded Gravel w/ Silt and Sand	111.8 pcf 90% optimum	100.6 7.1 % Moisture
C	SM	Silty Sand	116.3 pcf 90% optimum	104.7 9.6 % Moisture

Soil Type	TEST NUMBER	% RSP	DRY DENS GITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
A	84	96.4%	104.7	7.8%	8/26/2022	Slope
A	85	95.1%	103.3	11.2%	8/26/2022	Slope
A	86	97.2%	105.6	6.2%	9/13/2022	Slope
A	87	94.9%	103.1	9.7%	9/13/2022	Slope
A	88	92.9%	100.9	8.4%	9/13/2022	Slope
A	89	92.9%	100.9	8.4%	9/13/2022	Slope
A	90	97.8%	106.2	9.3%	9/14/2022	Slope
A	91	93.3%	101.3	9.7%	9/14/2022	Slope
A	92	90.5%	98.3	8.9%	9/14/2022	Slope
A	93	91.8%	99.7	9.4%	9/14/2022	Slope
A	94	90.8%	98.6	9.2%	9/14/2022	Slope
A	95	90.1%	97.9	11.7%	9/14/2022	Slope
A	96	93.9%	102.0	10.1%	9/14/2022	Slope
A	97	93.9%	102.0	17.8%	9/14/2022	Slope
A	98	93.1%	101.1	12.8%	9/14/2022	Slope
A	99	94.8%	102.9	10.0%	9/14/2022	Slope
A	100	90.8%	98.6	4.7%	9/15/2022	Slope
A	101	93.0%	101.0	8.3%	9/15/2022	Slope
A	102	95.0%	103.2	7.2%	9/15/2022	Slope
A	103	92.0%	99.9	5.9%	9/15/2022	Slope
A	104	93.6%	101.7	6.5%	9/15/2022	Slope
A	105	105.7%	114.8	6.4%	9/15/2022	Slope
A	106	95.4%	103.6	6.2%	9/15/2022	Slope
A	107	98.6%	107.1	7.1%	9/15/2022	Slope
A	108	96.7%	105.0	8.0%	9/15/2022	Slope
A	109	92.8%	100.8	7.2%	9/16/2022	Slope
A	110	95.3%	103.5	7.9%	9/16/2022	Slope
A	111	92%	100.0	8.9%	9/16/2022	Slope
A	112	93%	100.6	5.9%	9/16/2022	Slope
A	113	96%	103.8	10.0%	9/16/2022	Slope
A	114	99%	107.0	10.2%	9/16/2022	Slope

APPENDIX A: GEOTECHNICAL SOILS TESTING

A.4 Anchor Trench Density Test Results

Parkhill

FIELD COMPACTION TESTING FORM

PROJECT NAME: OWL Landfill Cell 4AB
OWNER: Oilfield Water Logistics
PROJECT LOCATION: Lea County, New Mexico

LOCATION: Landfill Anchor Trench
PROJECT NO.: 7053.22
PAGE NO.: 1

TESTING INSTRUMENT: IntroTek 3500 Xplorer®
TECHNICIAN: Matt Kingsley

SOIL CLASSIFICATION	DESCRIPTION	REF STD PROCTOR	90% (PCF)	OPTIMAL MOISTURE
A	GP-GM	Caliche	108.6 pcf 90% optimum	97.7 14.2 % Moisture
B	GP-GM	Poorly Graded Gravel w/ Silt and Sand	111.8 pcf 90% optimum	100.6 7.1 % Moisture
C	SM	Silty Sand	116.3 pcf 90% optimum	104.7 9.6 % Moisture

Soil Type	TEST NUMBER	% RSP	DRY DENS GITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
A	1	92.4%	100.3	15.1%	9/1/2022	North Slope
A	2	91.4%	99.3	10.3%	9/1/2022	North Slope
A	3	95.9%	104.2	8.0%	9/1/2022	North Slope
A	4	92.0%	99.9	7.7%	9/1/2022	North Slope
A	5	94.4%	102.5	13.7%	9/2/2022	North Slope
A	6	94.0%	102.1	16.9%	9/2/2022	North Slope
A	7	92.4%	100.3	9.7%	9/8/2022	North Slope
A	8	91.3%	99.1	10.1%	9/8/2022	North Slope
A	9	91.0%	98.8	12.9%	9/8/2022	North Slope
A	10	92.3%	100.2	9.8%	9/8/2022	North Slope
A	11	94.5%	102.6	6.9%	9/8/2022	North Slope
A	12	92.0%	99.9	6.9%	9/8/2022	North Slope
A	13	90.9%	98.7	9.4%	9/8/2022	North Slope
A	14	92.2%	100.1	9.4%	9/8/2022	North Slope
A	15	92.2%	100.1	14.1%	9/9/2022	North Slope
A	16	94.3%	102.4	10.9%	9/9/2022	North Slope
A	17	93.2%	101.2	10.6%	9/9/2022	North Slope
A	18	94.8%	103.0	9.5%	9/9/2022	North Slope
A	19	96.5%	104.8	9.6%	9/9/2022	North Slope
A	20	91.0%	98.8	9.6%	9/9/2022	North Slope
A	21	91.0%	98.8	11.4%	9/9/2022	North Slope
A	22	93.8%	101.9	9.0%	9/9/2022	North Slope

APPENDIX A: GEOTECHNICAL SOILS TESTING

A.5 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	Weight of Sample:	399.8	grams
Aparatus Weight + Soil:	652.0	grams	Weight of Sample:	0.881393	lb
Mold Diameter:	6.395	cm	Mold Area:	32.11966	cm ²
Pipe Diameter:	1.27	cm	Pipe Area:	1.266769	cm ²
Length of Sample	6.84	cm	Area Factor:	0.039439	
Pressure Head Applied:	0	cm	Volume of Sample:	219.6985	cm ³
Can #:			Volume of Sample:	0.007759	ft ³
Wet Weight:	325.3	grams	Unit Weight:	113.6	lb/ft³
Dry Weight:	296.3	grams	Moisture Content:	9.8	%
			Dry Unit Weight:	103.5	lb/ft³

	Trial 1	Trial 2	Trial 3
Time			
Hour	0	0	0
Minute	1	1	1
Second	16	16	17
Total (hr)	0.021111	0.021111	0.021389
h_0	65	65	65
h_1	10	10	10
$Head_0$	71.84	71.84	71.84
$Head_1$	16.84	16.84	16.84
K_s (cm/hour)	18.54	18.54	18.30
K_s (cm/sec)	5.15E-03	5.15E-03	5.08E-03

Saturated Hydraulic Conductivity, K_s : **18.46 cm/hr**

Saturated Hydraulic Conductivity, K_s : **5.13E-03 cm/s**

Rigid Wall Falling-Head Remold Permeability



Project:	Owl NDBL Landfill
Job #:	3-21116
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
Aparatus Weight + Soil:	650.5	grams	Weight of Sample:	0.891975	lb
Mold Diameter:	6.413	cm	Mold Area:	32.30073	cm ²
Pipe Diameter:	1.27	cm	Pipe Area:	1.266769	cm ²
Length of Sample	6.99	cm	Area Factor:	0.039218	
Pressure Head Applied:	0	cm	Volume of Sample:	225.7821	cm ³
Can #:			Volume of Sample:	0.007973	ft ³
Wet Weight:	307.9	grams	Unit Weight:	111.9	lb/ft³
Dry Weight:	282.7	grams	Moisture Content:	8.9	%
			Dry Unit Weight:	102.7	lb/ft³

	Trial 1	Trial 2	Trial 3
Time			
Hour	0	0	0
Minute	1	1	1
Second	29	29	30
Total (hr)	0.024722	0.024722	0.025
h_0	65 cm	65 cm	65 cm
h_1	10 cm	10 cm	10 cm
Head ₀	71.99 cm	71.99 cm	71.99 cm
Head ₁	16.99 cm	16.99 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_s : **15.95 cm/hr**

Saturated Hydraulic Conductivity, K_s : **4.43E-03 cm/s**

APPENDIX A: GEOTECHNICAL SOILS TESTING

A.6 PSL Grain Size Distribution Test Results



December 16, 2022

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: Tzack@parkhill.com

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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

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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
No. 10	100
No. 40	97
No. 80	41
No. 200	17.5

Submitted by:

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December 16, 2022

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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:

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December 16, 2022

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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:

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December 16, 2022

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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:

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December 16, 2022

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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
No. 10	100
No. 40	97
No. 80	42
No. 200	18.0

Submitted by:

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December 16, 2022

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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:

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Tim Byres, SET

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December 16, 2022

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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:

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Tim Byres, SET

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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:

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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:

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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:

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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:

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December 16, 2022

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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:

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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:

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December 16, 2022

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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:

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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:

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APPENDIX B: MATERIAL MANUFACTURER CERTIFICATION AND COMFORMANCE TESTING RESULTS

B.1 GCL Certifications



MANUFACTURING QUALITY CONTROL



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 : 1109263-35011-6 Bentoliner 0.75 lbs/ft² - 3.66 kg/m², NS, Peel 35 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
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
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

interface shear

conformance

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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31 Oct 2022



MANUFACTURING QUALITY CONTROL



PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-4

PROJECT NAME: OWL LF CELLS 4A 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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31 Oct 2022



MANUFACTURING QUALITY CONTROL



PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-4

PROJECT NAME: OWL LF CELLS 4A 4B

0242-387108	2022-10-28	1102522A	2027262831	F3WE00889-006	conformance
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	
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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31 Oct 2022



MANUFACTURING QUALITY CONTROL



PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-4

PROJECT NAME: OWL LF CELLS 4A 4B

0242-387135	2022-10-28	1102522B	2027262825	F3WE00905-002	conformance
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	

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31 Oct 2022



MANUFACTURING QUALITY CONTROL



PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-4

PROJECT NAME: OWL LF CELLS 4A 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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31 Oct 2022



MANUFACTURING QUALITY CONTROL



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	conformance
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	
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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31 Oct 2022

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MANUFACTURING QUALITY CONTROL

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/ft² - 3.66 kg/m², NS, Peel 35

						Rolls
Test	Property		Direction	Test Method	Frequency	Unit
	1 Bentonite Mass (0% moisture)			ASTM D5993	1/40,000 ft²	lbs/ft²
	2 Peel Strength (min.avg.)		MD	ASTM D4632	1/40,000 ft²	lbf
	3 Peel Strength (min.avg.)		MD	ASTM D6496	1/40,000 ft²	lbf/in
	4 Tensile Strength MD (min. avg.)		MD	ASTM D6768	1/40,000 ft²	lbf/in
	5 Moisture Content (max)			ASTM D5993	1/40,000 ft²	%
	6 Finished Good Mass (0% moisture)			ASTM D5993	1/40,000 ft²	lbs/ft²
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
0242-387083	0.83	59.0	12.0	39	11.7	0.90
0242-387084	0.83	59.0	12.0	39	11.7	0.90
0242-387085	0.83	59.0	12.0	39	11.7	0.90
0242-387086	0.83	59.0	12.0	39	11.7	0.90

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MANUFACTURING QUALITY CONTROL



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	0.86	57.0	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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MANUFACTURING QUALITY CONTROL



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

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MANUFACTURING QUALITY CONTROL



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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MANUFACTURING QUALITY CONTROL



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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MANUFACTURING QUALITY CONTROL



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/ft² - 3.66 kg/m², 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
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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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	Direction					Test Method	Frequency	Unit
1	Mass per Unit Area (min. avg.)						ASTM D5261	1/200,000 ft²	oz/yd²
2	Strength (MD)								lbf
3	Strength (TD)								lbf
4	Elongation (MD)								%
5	Elongation (TD)								%
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				
2027278342	8.0	95	233	151	143				

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MANUFACTURING QUALITY CONTROL



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	Direction	Test Method	Frequency	Unit	
1	Mass per Unit Area (min. avg.)		ASTM D5261	1/200,000 ft²	oz/yd²	
	Grab Tensile Properties (min. avg)		ASTM D4632	1/200,000 ft²		
2	Strength (MD)				lbf	
3	Strength (TD)				lbf	
4	Elongation (MD)				%	
5	Elongation (TD)				%	
	Test	1	2	3	4	5
	Specification	3	135	100	10	10
	F3WE00889-006	3.3	177	100	23	12
	F3WE00905-001	3.3	181	120	20	12
	F3WE00905-002	3.3	181	120	20	12
	F3WE00910-008	3.3	173	100	23	13
	FJWE08948-005	3.4	174	110	20	12
	FJWE08948-012	3.3	172	109	20	11

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GSE BENTOLINER

CERTIFICATE OF ANALYSIS 2022
PRODUCT : NATIONAL® 30

SHIPPED FROM 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		% 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		DATE
B0004786471	10-24-22	1102122C	9.6	0.42	3.26	12.2	112	30	798	OCTOBER									10 -*
B0004786482	10-24-22	1102122D	9.2	0.07	2.52	13.0	112	31	810	No. of CARS	M AVG	9.62	0.19	2.05	12.91	112.43	29.86	854.65	
										36	STD DEV	0.52	0.60	1.08	0.94	3.02	1.28	50.63	
										YTD									
										No. of CARS	M AVG	8.99	0.20	3.15	13.63	112.41	30.14	909.56	
										464	STD DEV	0.62	0.43	1.42	1.12	3.78	1.59	67.07	

SOLD TO: Solmax
19103 Gundle RD
Houston, TX 77073

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

For any questions contact.
Q.A. SUPERVISOR
Tucker Goodvin

SHIPPED TO: Solmax
3150 FIRST AVENUE
SPEARFISH, SD 57783

CC: Jason Tawse
File

Prepared by: TO
10/25/22

GSE BENTOLINER

CERTIFICATE OF ANALYSIS 2022
PRODUCT : NATIONAL® 30

SHIPPED FROM 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
B0004786483	10-25-22	1102522A	9.0	0.04	3.32	12.6	110	29	849

OCTOBER		% 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	DATE 10 -*
No. of CARS	M AVG	9.60	0.18	2.08	12.91	112.37	29.84	854.50	
37	STD DEV	0.52	0.59	1.09	0.92	3.00	1.27	49.97	
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	M AVG	8.99	0.20	3.15	13.62	112.41	30.14	909.43	
465	STD DEV	0.62	0.43	1.42	1.12	3.78	1.59	67.06	

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SPEARFISH, SD 57783

CC: Jason Tawse
File

Prepared by: TO
10/25/22

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PRODUCT : NATIONAL® 30

SHIPPED FROM 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 CARS	M AVG	% 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	DATE 10-*
B0004786484	10-25-22	1102522B	9.2	0.08	1.42	12.8	114	30	883	39	9.62	0.18	2.06	12.90	112.40	29.88	855.75		
B0004786486	10-25-22	1102522C	10.8	0.05	1.72	12.8	112	31	876		STD DEV	0.54	0.58	1.07	0.90	2.94	1.25	49.01	
										YTD No. of CARS	M AVG	% 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	
										467	STD DEV	8.99	0.20	3.14	13.62	112.41	30.14	909.30	
												0.63	0.43	1.42	1.12	3.77	1.58	66.95	

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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
B0004786484	10-25-22	1102522B	9.2	0.08	1.42	12.8	114	30	883
B0004786486	10-25-22	1102522C	10.8	0.05	1.72	12.8	112	31	876

OCTOBER		% 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	DATE 10 -*
No. of CARS	M AVG	9.62	0.18	2.06	12.90	112.40	29.88	855.75	
39	STD DEV	0.54	0.58	1.07	0.90	2.94	1.25	49.01	

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	M AVG	8.99	0.20	3.14	13.62	112.41	30.14	909.30
467	STD DEV	0.63	0.43	1.42	1.12	3.77	1.58	66.95

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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
B0004786487	10-27-22	1102522D	9.7	1.26	2.90	13.0	112	30	761

OCTOBER		% 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	DATE 10 -*
No. of 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	

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 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

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10/27/22



TESTING, RESEARCH, CONSULTING AND FIELD SERVICES

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

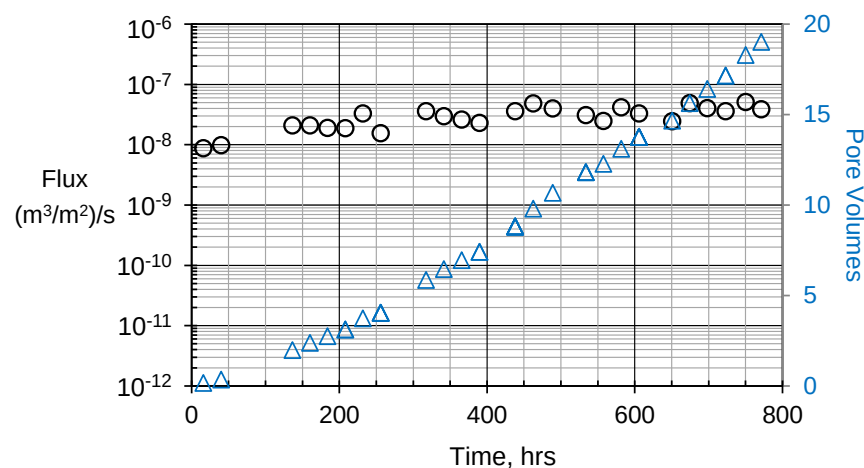
GCL Compatibility Test (ASTM D6766 Scenario I Method C)

Client: Solmax
 Project: Yearly Testing
 Sample ID: 1081321B
 Product Type: Loose Bentonite

TRI Log #: 70542.1

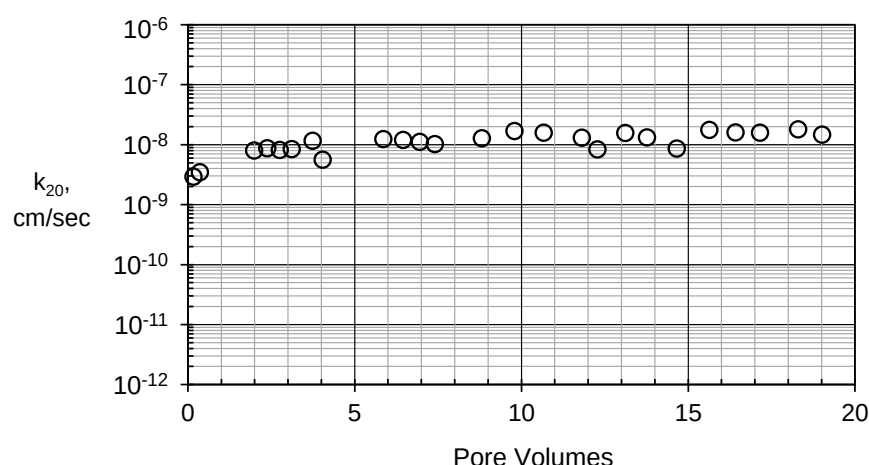
Initial Conditions

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



Final Conditions

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

Results⁽¹⁾

Flux, q _t (m³/m²)/s	3.1E-08
Hydraulic Conductivity, k ₂₀ ⁽²⁾ (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

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



TESTING, RESEARCH, CONSULTING AND FIELD SERVICES

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 ₂₀ (cm/s)	Q _{in} / Q _{out}
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



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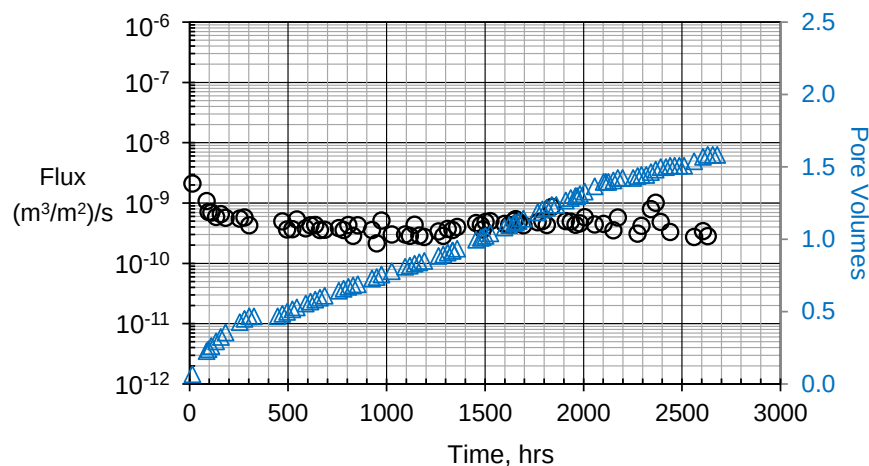
GCL Compatibility Test (ASTM D6766 Scenario I Method C)

Client: Solmax
 Project: Yearly Testing
 Sample ID: 1081321B
 Product Type: Loose Bentonite

TRI Log #: 70542.1

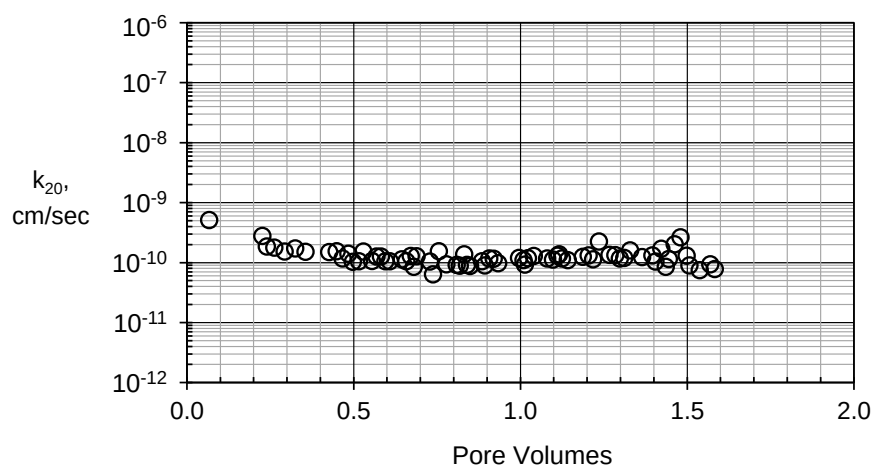
Initial Conditions

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



Final Conditions

Sample Diameter (in)	3.99
Sample Height (in)	0.16
Moisture Content (%)	56.3
G_s (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): $k < 5 \times 10^{-8}$ cm/s

Results⁽¹⁾

Flux, q_t (m³/m²/s)	4.8E-10
Hydraulic Conductivity, $k_{20}^{(2)}$ (cm/s)	1.3E-10
Hydraulic Gradient, i (m/m)	872.1

(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



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Time (hr)	Pore Volumes	Gradient, i (m/m)	Flux (m/s)	k ₂₀ (cm/s)	Q _{in} /Q _{out}
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	1.02E-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
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
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
1358.6	0.93	966.9	3.99E-10	9.73E-11	1.50
1454.9	1.00	950.9	4.65E-10	1.19E-10	1.17

Page 2 of 3

The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com



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Time (hr)	Pore Volumes	Gradient, i (m/m)	Flux (m/s)	k ₂₀ (cm/s)	Q _{in} / Q _{out}
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 # 2330-541630		
ASTM D 6768 - MD		
	Unexposed (lb/in)	50 Days @ 60°C (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
Strength Retained (%) 102.5		

Item # 1106269(Nonwoven 6oz)		
Roll # 2330-541630		
ASTM D 6768 - TD		
	Unexposed (lb/in)	50 Days @ 60°C (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 (lb/in)	50 Days @ 60°C (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 (lb/in)	50 Days @ 60°C (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

Roll Number	Production Date	Index Flux	Hydraulic Conductivity
		(m ³ /m ² /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



TESTING, RESEARCH, CONSULTING AND FIELD SERVICES

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November 21, 2022

Mail To:

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

juan@slsliner.com

Bill To:

<= Same

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,

A handwritten signature in black ink, appearing to read 'Mansukh Patel'.

Mansukh Patel, Ph.D.

Geosynthetic Services Division

page 1 of 5

The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

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9963 BEE CAVES RD. - AUSTIN, TX 78733 - USA | PH: 800.880.TEST OR 512.263.2101



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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: 0242-387073
TRI Log #: 76337

PARAMETER	TEST REPLICATE NUMBER					MEAN	STD. DEV.
	1	2	3	4	5		
Bentonite - Mass/Unit Area (ASTM D5993, result @ 0% M.C.)							
Mass/unit area (lbs/ft ²)							
GCL (ω = 0%)	0.89	0.88	0.88	0.98	0.97	0.92	0.05
Non-Bentonite Components	0.063	(Assumed Material-Specific Value)					
Bentonite (ω = 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 initiation:	23.0	° C		Slurry temperature at test completion:	21.0	° C	
Fluid Loss (mL)	12.2					12.2	
Note: Bentonite sample tested is taken from finished GCL product.							
Bentonite - Swell Index (ASTM D5890)							
Swell index (mL/2g)	34					34	
Note: Bentonite sample tested is taken from finished GCL product.							
Index Flux (ASTM D5887)							
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

PARAMETER	TEST REPLICATE NUMBER					MEAN	STD. DEV.
	1	2	3	4	5		
Bentonite - Mass/Unit Area (ASTM D5993, result @ 0% M.C.)							
Mass/unit area (lbs/ft ²)							
GCL (ω = 0%)	0.76	0.80	0.94	0.89	0.83	0.85	0.07
Non-Bentonite Components	0.063	(Assumed Material-Specific Value)					
Bentonite (ω = 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 D5891)							
Slurry temperature at test initiation:	23.0	° C		Slurry temperature at test completion:	21.0	° C	
Fluid Loss (mL)	11.2					11.2	
Note: Bentonite sample tested is taken from finished GCL product.							
Bentonite - Swell Index (ASTM D5890)							
Swell index (mL/2g)	34					34	
Note: Bentonite sample tested is taken from finished GCL product.							
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	



TESTING, RESEARCH, CONSULTING AND FIELD SERVICES

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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

PARAMETER	TEST REPLICATE NUMBER					MEAN	STD. DEV.
	1	2	3	4	5		
Bentonite - Mass/Unit Area (ASTM D5993, result @ 0% M.C.)							
Mass/unit area (lbs/ft ²)							
GCL (ω = 0%)	0.92	0.96	0.88	0.88	0.96	0.92	0.04
Non-Bentonite Components	0.063	(Assumed Material-Specific Value)					
Bentonite (ω = 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 initiation:	23.0	° C		Slurry temperature at test completion:	21.0	° C	
Fluid Loss (mL)	13.0					13.0	
Note: Bentonite sample tested is taken from finished GCL product.							
Bentonite - Swell Index (ASTM D5890)							
Swell index (mL/2g)	36					36	
Note: Bentonite sample tested is taken from finished GCL product.							
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	



TESTING, RESEARCH, CONSULTING AND FIELD SERVICES

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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: 0242-387193

TRI Log #: 76337

PARAMETER	TEST REPLICATE NUMBER					MEAN	STD. DEV.
	1	2	3	4	5		
Bentonite - Mass/Unit Area (ASTM D5993, result @ 0% M.C.)							
Mass/unit area (lbs/ft ²)							
GCL (ω = 0%)	0.92	0.89	0.94	0.97	0.86	0.92	0.04
Non-Bentonite Components	0.063	(Assumed Material-Specific Value)					
Bentonite (ω = 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)							
Slurry temperature at test initiation:	23.0		° C		Slurry temperature at test completion:	21.0 ° C	
Fluid Loss (mL)	11.8						11.8
Note: Bentonite sample tested is taken from finished GCL product.							
Bentonite - Swell Index (ASTM D5890)							
Swell index (mL/2g)	32						32
Note: Bentonite sample tested is taken from finished GCL product.							
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-094167-3

PROJECT NAME : OWL LF CELLS 4A 4B

ROLL NUMBER	RESIN LOT NUMBER	MANUFACT. DATE	RESIN MELT INDEX 190/2.16 g/10 min D1238	RESIN DENSITY g/cc D1505	OIT min D3895	HPOIT min D5885	ESCR SP-NCTL hours D5397
Product Code : 1101548							
<u>HDPE 60 mil Black Textured RT</u>			1.0	> 0.932	100		500
0104-206292	22H1144	2022-09-23	0.08	0.937	120		>500 Certified 0105-209337
0104-206293	22H1144	2022-09-23	0.08	0.937	120		>500 Certified 0105-209337
0104-206294	22H1144	2022-09-23	0.08	0.937	120		>500 Certified 0105-209337
0104-206295	22H1144	2022-09-24	0.08	0.937	120		>500 Certified 0105-209337
0104-206296	22H1144	2022-09-24	0.08	0.937	120		>500 Certified 0105-209337
0104-206297	22H1144	2022-09-24	0.08	0.937	120		>500 Certified 0105-209337
0104-206298	22H1144	2022-09-24	0.08	0.937	120		>500 Certified 0105-209337
0104-206299	22H1144	2022-09-24	0.08	0.937	120		>500 Certified 0105-209337
0104-206300	22H1144	2022-09-24	0.08	0.937	120		>500 Certified 0105-209337
0104-206301	22H1144	2022-09-24	0.08	0.937	120		>500 Certified 0105-209337

QUANTITY (ROLLS): 10

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

 SOLMAX

MANUFACTURING QUALITY CONTROL



TEST RESULTS

PROJECT NUMBER:SW2211

SALES ORDER:SO-094167

PACKING SLIP NUMBER:Pre-SO-094167-3

PROJECT NAME : OWL LF CELLS 4A 4B

PRODUCT: 1101548
HDPE 60 mil Black Textured RT

Properties	Thickness ave/min.	GeoM Density	Carbon Black Content	Carbon Black Dispersion	Tensile				Tear Resist.	Puncture Resist.	Dimension Stability	Asperity Height In/Out
					Yield Strength	Elong.	Break Strength	Elong.				
Unit	mils	g/cc	%	Cat 1 and 2	ppi	%	ppi	%	lbs	lbs	%	mils
Test Method	D5994	D792	D4218	D5596	D6693				D1004	D4833	D1204	D7466
Frequency	Each roll	Every 10 rolls	Every 2 rolls	Every 10 rolls	Every 2 rolls				Every 5 rolls	Every 5 rolls		Every roll
Specification	57.0 / 51.0	≥ 0.940	2.0 – 3.0	Cat. 1 & Cat. 2	132	13	132	150	45	120		20 / 20
0104-206292 MD XD	57.9 / 55.0	0.942	2.33	10/10 views	149.5 161.5	18.2 18.8	206 190	534 513	50 52	151		23.9 / 24.4
0104-206293 MD XD	59.2 / 56.0	0.942	2.33	10/10 views	149.5 161.5	18.2 18.8	206 190	534 513	50 52	151		23.4 / 24.2
0104-206294 MD XD	61.2 / 53.5	0.942	2.29	10/10 views	154.6 166.2	19.4 18.7	219 204	544 521	50 52	151		24.9 / 25.8
0104-206295 MD XD	61.1 / 55.0	0.942	2.29	10/10 views	154.6 166.2	19.4 18.7	219 204	544 521	51 53	153		23.2 / 24.7
0104-206296 MD XD	57.6 / 56.0	0.942	2.40	10/10 views	143.3 166.1	18.9 17.8	212 210	549 541	51 53	153		25.3 / 27.7
0104-206297 MD XD	59.4 / 56.5	0.942	2.40	10/10 views	143.3 166.1	18.9 17.8	212 210	549 541	51 53	153		25.1 / 28.4
0104-206298 MD XD	62.2 / 55.5	0.942	2.20	10/10 views	155.3 162.1	18.5 17.3	221 196	569 541	51 53	153		22.5 / 24.5
0104-206299 MD XD	61.0 / 55.5	0.942	2.20	10/10 views	155.3 162.1	18.5 17.3	221 196	569 541	51 53	153		22.7 / 24.7
0104-206300 MD XD	60.5 / 56.5	0.942	2.40	10/10 views	158.7 166.0	17.3 16.9	207 176	527 521	51 53	153		23.7 / 23.2
0104-206301 MD XD	59.5 / 57.5	0.942	2.40	10/10 views	158.7 166.0	17.3 16.9	207 176	527 521	51 53	153		23.2 / 23.7

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Solmax Geosynthetics LLC
19103 GUNDLE RD,, HOUSTON, TX, UNITED STATES, 77073

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**Formosa Plastics**

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

HOUSTON

TX 77073

PRODUCT : HL3812

RAILCAR FPAX218360

CLEANING/INSPECTION NO: 218360081522

S/O NO : E28A049

CUSTOMER PO : PO-605730

DATE SHIPPED: 8/18/22

LOT NO : 22H1144

WEIGHT (LB) : 195,450.00

CUSTID: FT05970 SPIDM6

TEST ITEM

REFERENCE METHOD

TEST VALUE

TEST ITEM	REFERENCE METHOD	TEST VALUE
Melt Index, g/10min	ASTM D1238	.079
HLMI, g/10 min.	ASTM D1238	11.6
Density, g/cm3	ASTM D1505	.9373

Notes:

Additive levels were tested and meet the min specification for this lot. 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 OIT (by ASTM D5885) is greater than 1000 mins.

QC SUPERVISOR: LINDA KAO



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 g/10 min D1238	RESIN DENSITY g/cc D1505	OIT min D8117	HPOIT min D5885	ESCR SP-NCTL hours D5397
Product Code : 1101438							
<u>HDPE 60 mils / 1.50 mm Black Smooth</u>			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	22I1134	2022-10-21	0.06	0.938	120		>500 Certified 0101-206728
0101-206727	22I1134	2022-10-21	0.06	0.938	120		>500 Certified 0101-206728
0101-206728	22I1134	2022-10-21	0.06	0.938	120		>500 Certified 0101-206728
0101-206729	22I1134	2022-10-21	0.06	0.938	120		>500 Certified 0101-206728
0101-206730	22I1134	2022-10-21	0.06	0.938	120		>500 Certified 0101-206728
0101-206731	22I1134	2022-10-21	0.06	0.938	120		>500 Certified 0101-206728

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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

0101-206732	22I1134	2022-10-21	0.06	0.938	120	>500 Certified 0101-206728
0101-206733	22I1134	2022-10-21	0.06	0.938	120	>500 Certified 0101-206728
0101-206734	22I1134	2022-10-21	0.06	0.938	120	>500 Certified 0101-206728
0101-206735	22I1134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206736	22I1134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206737	22I1134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206738	22I1134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206739	22I1134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206740	22I1134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206741	22I1134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206742	22I1134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206743	22I1134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206744	22I1134	2022-10-22	0.06	0.938	120	>500 Certified 0101-206728
0101-206745	22I1134	2022-10-23	0.06	0.938	120	>500 Certified 0101-206728
0101-206746	22I1134	2022-10-23	0.06	0.938	120	>500 Certified 0101-206728
0101-206747	22I1134	2022-10-23	0.06	0.938	120	>500 Certified 0101-206728
0101-206748	22I1134	2022-10-23	0.06	0.938	120	>500 Certified 0101-206728
0101-206749	22I1134	2022-10-23	0.06	0.938	120	>500 Certified 0101-206728

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Solmax Geosynthetics LLC

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

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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

0101-206750	22I1134	2022-10-23	0.06	0.938	120	>500 Certified 0101-206728
0101-206753	22I1134	2022-10-23	0.06	0.938	120	>500 Certified 0101-206728
0101-206754	22I1134	2022-10-23	0.06	0.938	120	>500 Certified 0101-206728
0101-206755	22I1134	2022-10-23	0.06	0.938	120	>500 Certified 0101-206728
0101-206756	22I1134	2022-10-24	0.06	0.938	120	>500 Certified 0101-206728
0101-206757	22I1134	2022-10-24	0.06	0.938	120	>500 Certified 0101-206728
0101-206758	22I1134	2022-10-24	0.06	0.938	120	>500 Certified 0101-206728
0101-206760	22I1134	2022-10-24	0.06	0.938	120	>500 Certified 0101-206728
0101-206761	22I1134	2022-10-24	0.06	0.938	120	>500 Certified 0101-206728
0101-206762	22I1134	2022-10-24	0.06	0.938	120	>500 Certified 0101-206728

QUANTITY (ROLLS): 42

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Solmax Geosynthetics LLC

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MANUFACTURING QUALITY CONTROL



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 Content	Carbon Black Dispersion	Tensile				Tear Resist.	Puncture Resist.	Dimension Stability	Asperity Height In/Out
Unit	mils	g/cc	%	Cat 1 and 2	Yield Strength	Elong.	Break Strength	Elong.	lbs	lbs	%	mils
Test Method	D5199	D792	D4218	D5596	D6693				D1004	D4833	D1204	
Frequency	Each roll	Every 10 rolls	Every 2 rolls	Every 10 rolls	Every 2 rolls				Every 5 rolls	Every 5 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 XD	60.1 / 55.5	0.949	2.51	10/10 views	151.7 158.3	19.6 16.4	279 327	723 875	50 52	158		
0101-206718 MD XD	61.0 / 54.5	0.949	2.51	10/10 views	151.7 158.3	19.6 16.4	279 327	723 875	50 52	158		
0101-206720 MD XD	62.4 / 58.0	0.949	2.55	10/10 views	161.6 159.9	19.6 17.1	288 333	754 875	50 52	158		
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 XD	64.0 / 62.5	0.949	2.49	10/10 views	155.7 162.6	17.6 17.3	329 320	869 821	46 50	143		
0101-206723 MD XD	67.0 / 64.0	0.949	2.46	10/10 views	164.3 156.5	17.7 18.2	340 299	885 769	46 50	143		
0101-206724 MD XD	64.0 / 61.0	0.949	2.46	10/10 views	148.7 152.1	19.6 18.2	283 316	720 845	46 50	143		
0101-206725 MD XD	62.7 / 58.0	0.949	2.40	10/10 views	154.8 166.4	19.6 18.4	291 299	737 795	46 50	143		
0101-206726 MD XD	62.3 / 57.5	0.949	2.40	10/10 views	154.8 166.4	19.6 18.4	291 299	737 795	46 50	143		
0101-206727 MD XD	62.3 / 58.0	0.944	2.41	10/10 views	153.6 158.6	19.4 18.0	291 325	721 843	46 48	141		
0101-206728 MD XD	62.7 / 60.0	0.944	2.41	10/10 views	153.6 158.6	19.4 18.0	291 325	721 843	46 48	141		
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 XD	63.7 / 59.0	0.944	2.42	10/10 views	151.0 161.1	19.6 20.1	286 329	744 887	46 48	141		

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MANUFACTURING QUALITY CONTROL



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	MD	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	MD	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	MD	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	MD	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	MD	64.9 / 60.0	0.946	2.59	10/10 views	160.5	19.2	308	763	47	142		
	XD					202.2	18.2	332	875	48			
0101-206744	MD	67.4 / 63.0	0.946	2.59	10/10 views	160.5	19.2	308	763	47	142		
	XD					202.2	18.2	332	875	48			
0101-206745	MD	62.5 / 59.0	0.946	2.58	10/10 views	153.1	19.9	322	818	47	142		
	XD					156.7	16.5	345	878	48			
0101-206746	MD	62.4 / 58.0	0.946	2.58	10/10 views	153.1	19.9	322	818	47	142		
	XD					156.7	16.5	345	878	48			
0101-206747	MD	62.4 / 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			
0101-206748	MD	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	MD	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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Solmax Geosynthetics LLC

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

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MANUFACTURING QUALITY CONTROL



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

**Formosa Plastics**

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

HOUSTON

TX 77073

PRODUCT : HL3812

RAILCAR FPAX200265

CLEANING/INSPECTION NO: 200265081622

S/O NO : E29A012

CUSTOMER PO : PO-605934

DATE SHIPPED: 9/09/22

LOT NO : 22H1158

WEIGHT (LB) : 194,300.00

CUSTID: FT05970 SPIDM6

TEST ITEM	REFERENCE METHOD	TEST VALUE
-----	-----	-----
Melt Index, g/10min	ASTM D1238	.071
HLMI, g/10 min.	ASTM D1238	10.2
Density, g/cm3	ASTM D1505	.9378

Notes:

Additive levels were tested and meet the min specification for this lot. 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 OIT (by ASTM D5885) is greater than 1000 mins.

QC SUPERVISOR: LINDA KAO

**Formosa Plastics**

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

HOUSTON

TX 77073

PRODUCT : HL3812

RAILCAR FPAX890363

CLEANING/INSPECTION NO: 890363091622

S/O NO : E29A731

CUSTOMER PO : PO-606100

DATE SHIPPED: 9/30/22

LOT NO : 22I1134

WEIGHT (LB) : 184,850.00

CUSTID: FT05970 SPIDM6

TEST ITEM

REFERENCE METHOD

TEST VALUE

TEST ITEM	REFERENCE METHOD	TEST VALUE
Melt Index, g/10min	ASTM D1238	.064
HLMI, g/10 min.	ASTM D1238	10.4
Density, g/cm3	ASTM D1505	.9384

Notes:

Additive levels were tested and meet the min specification for this lot. 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 OIT (by ASTM D5885) is greater than 1000 mins.

QC SUPERVISOR: LINDA KAO



LIST OF GEOMEMBRANE ROLLS



PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-1

PROJECT NAME : OWL LF CELLS 4A 4B

ROLL NUMBER	RESIN LOT NUMBER	MANUFACT. DATE	RESIN MELT INDEX 190/2.16 g/10 min D1238	RESIN DENSITY g/cc D1505	OIT min D3895	HPOIT min D5885	ESCR SP-NCTL hours D5397
Product Code : 1101437							
<u>HDPE 40 mils / 1.00 mm Black Smooth</u>			1.0	> 0.932	100		500
0101-206380	22G1286	2022-09-14	0.07	0.937	120		>500 Certified 0104-206117
0101-206381	22G1286	2022-09-14	0.07	0.937	120		>500 Certified 0104-206117

QUANTITY (ROLLS): 2

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Solmax Geosynthetics LLC

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

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MANUFACTURING QUALITY CONTROL



TEST RESULTS - ROLLS

PROJECT NUMBER:SW2211

SALES ORDER:SO-094167

PACKING SLIP NUMBER:Pre-SO-094167-1

PROJECT NAME : OWL LF CELLS 4A 4B

PRODUCT: 1101437
HDPE 40 mils / 1.00 mm Black Smooth

Properties	Thickness ave/min.	GeoM Density	Carbon Black Content	Carbon Black Dispersion	Tensile				Tear Resist.	Puncture Resist.	Dimension Stability	Asperity Height In/Out mils
					Yield Strength	Elong.	Break Strength	Elong.				
Unit	mils	g/cc	%	Cat 1 and 2	ppi	%	ppi	%	lbs	lbs	%	mils
Test Method	D5199	D792	D4218	D5596	D6693				D1004	D4833	D1204	
Frequency	Each roll	Every 10 rolls	Every 2 rolls	Every 10 rolls	Every 2 rolls				Every 5 rolls	Every 5 rolls		
Specification	40.0 / 36.0	≥ 0.940	2.0 - 3.0	Cat. 1 & Cat. 2	88	13	162	700	28	80		
0101-206380 MD XD	41.4 / 39.0	0.940	2.43	10/10 views	90.0 101.2	19.8 17.0	201 208	765 839	34 35	114		
0101-206381 MD XD	40.7 / 38.5	0.940	2.43	10/10 views	90.0 101.2	19.8 17.0	201 208	765 839	34 35	114		

**Formosa Plastics**

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

HOUSTON

TX 77073

PRODUCT : HL3812

RAILCAR UTCX051489

CLEANING/INSPECTION NO: 051489072522

S/O NO : E28A047

CUSTOMER PO : PO-605730

DATE SHIPPED: 8/15/22

LOT NO : 22G1286

WEIGHT (LB) : 195,850.00

CUSTID: FT05970 SPIDM6

TEST ITEM	REFERENCE METHOD	TEST VALUE
-----	-----	-----
Melt Index, g/10min	ASTM D1238	.070
HLMI, g/10 min.	ASTM D1238	10.6
Density, g/cm3	ASTM D1505	.9370

Notes:

Additive levels were tested and meet the min specification for this lot. 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 OIT (by ASTM D5885) is greater than 1000 mins.

QC SUPERVISOR: LINDA KAO

APPENDIX B: MATERIAL MANUFACTURER CERTIFICATION AND COMFORMANCE TESTING RESULTS

B.4 FML Conformance Testing Results



TESTING, RESEARCH, CONSULTING AND FIELD SERVICES

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November 4, 2022

Mail 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.

Bill To:

<= Same (P.O. # 2211)

Project:	Owl Landfill Cell 4A & 4B
TRI Job Reference Number:	76120
Material(s) Tested:	Five, Solmax 60 mil Smooth HDPE Geomembrane(s)
Test(s) Requested:	Thickness (ASTM D5199) 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,

A handwritten signature in black ink, appearing to read 'Mansukh Patel'.

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division



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GEOMEMBRANE TEST RESULTS

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

Material: Solmax 60 mil Smooth HDPE Geomembrane
Sample Identification: 0101-206728
TRI Log #: 76120

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Thickness (ASTM D5199)													
Thickness (mils)	63.3	65.0	66.6	63.6	60.4	60.6	61.2	64.8	61.2	64.8	63.2 60.4	2.2 << min	60 min ave 54 min ind
Density (ASTM D1505)													
Density (g/cm3)	0.945	0.945	0.945								0.945	0.000	0.940 min
Carbon Black Content (ASTM D4218)													
% Carbon Black	2.56	2.58									2.57	0.01	2.0 - 3.0
Carbon Black Dispersion (ASTM D5596)													
Rating - 1st field view	1	1	1	1	1								9 Cat 1 or 2 1 Cat 3
Rating - 2nd field view	1	1	1	1	1								
Tensile Properties (ASTM D6693, 2 ipm strain rate)													
MD Yield Strength (ppi)	145	140	148	153	166						150	10	126 min
TD Yield Strength (ppi)	148	157	148	156	166						155	7	126 min
MD Break Strength (ppi)	275	258	270	286	306						279	18	228 min
TD Break Strength (ppi)	263	300	199	281	321						273	47	228 min
MD Yield Elongation (%)	22	23	21	21	21						22	1	12 min
TD Yield Elongation (%)	21	20	19	19	19						20	1	12 min
MD Break Elongation (%)	745	740	742	766	761						751	12	700 min
TD Break Elongation (%)	768	845	594	784	853						769	105	700 min
Puncture Resistance (ASTM D4833)													
Puncture Strength (lbs)	138	137	133	131	128						133	4	108 min
Tear Resistance (ASTM D1004)													
MD Tear Strength (lbs)	53	54	54	53	55	55	54	53	49	53	53	2	42 min
TD Tear Strength (lbs)	52	59	55	56	62	53	54	53	54	57	56	3	42 min
MD Machine Direction	TD Transverse Direction												



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GEOMEMBRANE TEST RESULTS

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

Material: Solmax 60 mil Smooth HDPE Geomembrane
Sample Identification: 0101-206736
TRI Log #: 76120

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Thickness (ASTM D5199)													
Thickness (mils)	64.6	60.8	60.2	65.4	61.4	60.8	62.0	60.2	61.6	61.3	61.8 60.2	1.8 << min	60 min ave 54 min ind
Density (ASTM D1505)													
Density (g/cm3)	0.946	0.946	0.946								0.946	0.000	0.940 min
Carbon Black Content (ASTM D4218)													
% Carbon Black	2.57	2.60									2.59	0.02	2.0 - 3.0
Carbon Black Dispersion (ASTM D5596)													
Rating - 1st field view	1	1	1	1	1								9 Cat 1 or 2 1 Cat 3
Rating - 2nd field view	1	1	1	1	1								
Tensile Properties (ASTM D6693, 2 ipm strain rate)													
MD Yield Strength (ppi)	152	143	148	170	161						155	11	126 min
TD Yield Strength (ppi)	160	167	154	151	155						157	6	126 min
MD Break Strength (ppi)	301	280	299	324	293						299	16	228 min
TD Break Strength (ppi)	311	310	313	287	315						307	11	228 min
MD Yield Elongation (%)	20	21	21	21	22						21	1	12 min
TD Yield Elongation (%)	20	20	18	17	19						19	1	12 min
MD Break Elongation (%)	781	765	789	787	741						773	20	700 min
TD Break Elongation (%)	822	804	872	798	864						832	34	700 min
Puncture Resistance (ASTM D4833)													
Puncture Strength (lbs)	135	134	137	134	133						135	1	108 min
Tear Resistance (ASTM D1004)													
MD Tear Strength (lbs)	54	58	52	58	50	47	59	50	56	54	54	4	42 min
TD Tear Strength (lbs)	54	59	57	54	56	54	54	53	54	55	55	2	42 min
MD Machine Direction	TD Transverse Direction												



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GEOMEMBRANE TEST RESULTS

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

Material: Solmax 60 mil Smooth HDPE Geomembrane
Sample Identification: 0101-206744
TRI Log #: 76120

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Thickness (ASTM D5199)													
Thickness (mils)	68.8	66.3	72.3	72.0	72.6	70.6	66.5	68.0	67.6	64.0	68.9 64.0	2.9 << min	60 min ave 54 min ind
Density (ASTM D1505)													
Density (g/cm3)	0.946	0.946	0.946								0.946	0.000	0.940 min
Carbon Black Content (ASTM D4218)													
% Carbon Black	2.63	2.66									2.65	0.02	2.0 - 3.0
Carbon Black Dispersion (ASTM D5596)													
Rating - 1st field view	1	1	1	1	1								9 Cat 1 or 2 1 Cat 3
Rating - 2nd field view	1	1	1	1	1								
Tensile Properties (ASTM D6693, 2 ipm strain rate)													
MD Yield Strength (ppi)	159	160	165	158	164						161	3	126 min
TD Yield Strength (ppi)	168	166	166	168	166						167	1	126 min
MD Break Strength (ppi)	306	311	300	273	302						298	15	228 min
TD Break Strength (ppi)	351	334	334	282	339						328	27	228 min
MD Yield Elongation (%)	23	22	21	21	21						22	1	12 min
TD Yield Elongation (%)	20	21	18	21	19						20	1	12 min
MD Break Elongation (%)	763	782	740	702	750						747	30	700 min
TD Break Elongation (%)	830	830	835	719	862						815	55	700 min
Puncture Resistance (ASTM D4833)													
Puncture Strength (lbs)	135	135	136	135	136						135	0	108 min
Tear Resistance (ASTM D1004)													
MD Tear Strength (lbs)	58	59	55	54	58	60	54	57	55	57	57	2	42 min
TD Tear Strength (lbs)	56	57	56	58	57	60	60	57	56	61	58	2	42 min
MD Machine Direction	TD Transverse Direction												



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GEOMEMBRANE TEST RESULTS

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

Material: Solmax 60 mil Smooth HDPE Geomembrane
Sample Identification: 0101-206754
TRI Log #: 76120

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Thickness (ASTM D5199)													
Thickness (mils)	62.0	62.1	61.9	63.4	63.9	63.3	60.8	61.8	60.5	62.4	62.2 60.5	1.1 << min	60 min ave 54 min ind
Density (ASTM D1505)													
Density (g/cm3)	0.947	0.947	0.947								0.947	0.000	0.940 min
Carbon Black Content (ASTM D4218)													
% Carbon Black	2.77	2.77									2.77	0.00	2.0 - 3.0
Carbon Black Dispersion (ASTM D5596)													
Rating - 1st field view	1	1	1	1	1								9 Cat 1 or 2 1 Cat 3
Rating - 2nd field view	1	1	1	1	1								
Tensile Properties (ASTM D6693, 2 ipm strain rate)													
MD Yield Strength (ppi)	155	155	162	155	151						156	4	126 min
TD Yield Strength (ppi)	172	163	166	160	165						165	4	126 min
MD Break Strength (ppi)	290	279	284	272	270						279	8	228 min
TD Break Strength (ppi)	308	295	301	289	299						298	7	228 min
MD Yield Elongation (%)	21	21	20	21	21						21	0	12 min
TD Yield Elongation (%)	20	20	18	19	20						19	1	12 min
MD Break Elongation (%)	759	743	733	731	740						741	11	700 min
TD Break Elongation (%)	808	803	809	797	811						806	6	700 min
Puncture Resistance (ASTM D4833)													
Puncture Strength (lbs)	131	141	136	134	133						135	4	108 min
Tear Resistance (ASTM D1004)													
MD Tear Strength (lbs)	58	54	54	54	53	53	55	52	55	56	55	2	42 min
TD Tear Strength (lbs)	55	57	56	56	54	54	54	54	57	56	55	1	42 min
MD Machine Direction	TD Transverse Direction												



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GEOMEMBRANE TEST RESULTS

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

Material: Solmax 60 mil Smooth HDPE Geomembrane
Sample Identification: 0101-206762
TRI Log #: 76120

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Thickness (ASTM D5199)													
Thickness (mils)	67.2	64.5	65.1	65.1	61.0	60.8	60.7	63.8	62.1	60.3	63.1 60.3	2.4 << min	60 min ave 54 min ind
Density (ASTM D1505)													
Density (g/cm3)	0.947	0.947	0.947								0.947	0.000	0.940 min
Carbon Black Content (ASTM D4218)													
% Carbon Black	2.65	2.63									2.64	0.01	2.0 - 3.0
Carbon Black Dispersion (ASTM D5596)													
Rating - 1st field view	1	1	1	1	1								9 Cat 1 or 2 1 Cat 3
Rating - 2nd field view	1	1	1	1	1								
Tensile Properties (ASTM D6693, 2 ipm strain rate)													
MD Yield Strength (ppi)	142	149	155	165	169						156	11	126 min
TD Yield Strength (ppi)	167	172	167	177	180						173	6	126 min
MD Break Strength (ppi)	282	280	287	299	311						292	13	228 min
TD Break Strength (ppi)	281	288	284	310	271						287	14	228 min
MD Yield Elongation (%)	22	21	19	20	20						20	1	12 min
TD Yield Elongation (%)	19	19	19	19	20						19	0	12 min
MD Break Elongation (%)	739	732	725	725	740						732	7	700 min
TD Break Elongation (%)	789	784	795	811	713						778	38	700 min
Puncture Resistance (ASTM D4833)													
Puncture Strength (lbs)	136	135	135	134	134						135	1	108 min
Tear Resistance (ASTM D1004)													
MD Tear Strength (lbs)	55	52	54	51	54	50	55	51	49	50	52	2	42 min
TD Tear Strength (lbs)	54	54	55	56	59	54	53	54	55	59	55	2	42 min
MD Machine Direction	TD Transverse Direction												



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#####

Mail To:

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

email: juan@sllslliner.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.

Bill To:

<= Same

Project: **Owl Landfill Cell 4A and 4B**

TRI Job Reference Number: 76039

Material(s) Tested: One, Solmax 60 mil Smooth HDPE Geomembrane(s)

Test(s) Requested: Thickness (ASTM D199)
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,

A handwritten signature in black ink, appearing to read 'Mansukh Patel'.

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division



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GEOMEMBRANE TEST RESULTS

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

Material: Solmax 60 mil Smooth HDPE Geomembrane

Sample Identification: 0101-206718

TRI Log #: 76039

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Thickness (ASTM D5199)													
Thickness (mils)	69.6	63.8	65.3	63.7	60.9	62.1	60.4	62.3	60.4	62.2	63.1 60.4	2.8	60 min ave
											<< min	54 min ind	
Density (ASTM D1505)													
Density (g/cm3)	0.945	0.945	0.945								0.945	0.000	0.940 min
Carbon Black Content (ASTM D4218)													
% Carbon Black	2.58	2.56									2.57	0.01	2.0 - 3.0
Carbon Black Dispersion (ASTM 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 D6693, 2 ipm strain rate)													
MD Yield Strength (ppi)	141	141	147	158	161						150	9	126 min
TD Yield Strength (ppi)	150	151	143	167	166						155	11	126 min
MD Break Strength (ppi)	206	269	273	299	302						270	39	228 min
TD Break Strength (ppi)	289	276	256	305	324						290	26	228 min
MD Yield Elongation (%)	23	22	20	24	24						23	2	12 min
TD Yield Elongation (%)	20	20	19	21	21						20	1	12 min
MD Break Elongation (%)	592	763	749	763	755						724	74	700 min
TD Break Elongation (%)	828	780	761	795	838						800	32	700 min
Puncture Resistance (ASTM D4833)													
Puncture Strength (lbs)	141	140	140	140	139						140	1	108 min
Tear Resistance (ASTM D1004)													
MD Tear Strength (lbs)	54	54	62	54	54	49	52	53	52	54	54	3	42 min
TD Tear Strength (lbs)	55	55	57	57	57	55	51	52	52	59	55	3	42 min
MD Machine Direction	TD Transverse Direction												



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October 6, 2022

Mail To:

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

email: juan@sllsliner.com

Bill To:

<= Same

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,

A handwritten signature in black ink, appearing to read 'Mansukh Patel'.

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division



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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 REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Thickness (ASTM D5994)													
Thickness (mils)	61	61	60	61	61	60	61	60	61	61	61 60	1 << min	57 min ave 54, 8 of 10 51 min ind
Density (ASTM D1505)													
Density (g/cm3)	0.944	0.944	0.944								0.944	0.000	0.940 min
Carbon Black Content (ASTM D4218)													
% Carbon Black	2.41	2.44									2.43	0.02	2.0 - 3.0
Carbon Black Dispersion (ASTM 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 D6693, 2 ipm strain 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
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 (%)	521	524	495	478	584						520	40	100 min
Puncture Resistance (ASTM D4833)													
Puncture Strength (lbs)	164	164	165	159	162						163	3	90 min
Tear Resistance (ASTM D1004)													
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
MD Machine Direction	TD Transverse Direction												



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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 REPLICATE 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 60	1 << min	57 min ave 54, 8 of 10 51 min ind
Density (ASTM D1505)													
Density (g/cm3)	0.944	0.944	0.944								0.944	0.000	0.940 min
Carbon Black Content (ASTM D4218)													
% Carbon Black	2.39	2.38									2.39	0.01	2.0 - 3.0
Carbon Black Dispersion (ASTM 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 D6693, 2 ipm strain 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 D1004)													
MD Tear Strength (lbs)	57	56	54	55	57	57	57	57	58	62	57	2	42 min
TD Tear Strength (lbs)	61	64	61	61	59	58	57	59	60	58	60	2	42 min
MD Machine Direction	TD Transverse Direction												



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September 23, 2022

Mail To:

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

email: juan@slliner.com

Dear Mr. Zazpe:

Bill To:

<= Same

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:	75109
Material(s) Tested:	One, Solmax 40 mil Smooth HDPE Geomembrane(s)
Test(s) Requested:	Thickness (ASTM D5199) 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,

A handwritten signature in black ink, appearing to read 'Mansukh Patel'.

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division



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GEOMEMBRANE TEST RESULTS

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

Material: Solmax 40 mil Smooth HDPE Geomembrane

Sample Identification: 0101-206380

TRI Log #: 75109

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D5199)												
Thickness (mils)	40.9	42.9	42.5	44.2	40.6	40.3	40.3	43.4	43.9	40.9	42.0 40.3	1.6 << min
Density (ASTM D1505)												
Density (g/cm3)	0.944	0.944	0.944								0.944	0.000
Carbon Black Content (ASTM D4218)												
% Carbon Black	2.45	2.47									2.46	0.01
Carbon Black Dispersion (ASTM D5596)												
Rating - 1st field view	1	1	1	1	1							
Rating - 2nd field view	1	1	1	1	1							
Tensile Properties (ASTM D6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	96	100	99	95	96						97	2
TD Yield Strength (ppi)	112	107	107	102	99						105	5
MD Break Strength (ppi)	202	221	218	203	206						210	9
TD Break Strength (ppi)	212	211	207	208	167						201	19
MD Yield Elongation (%)	18	18	20	19	18						19	1
TD Yield Elongation (%)	17	16	19	19	18						18	1
MD Break Elongation (%)	764	804	803	769	772						782	19
TD Break Elongation (%)	833	855	842	872	720						824	60
Puncture Resistance (ASTM D4833)												
Puncture Strength (lbs)	106	112	114	111	113						111	3
Tear Resistance (ASTM D1004)												
MD Tear Strength (lbs)	31	39	33	30	39	31	34	33	32	36	34	3
TD Tear Strength (lbs)	33	36	35	33	38	34	37	37	34	38	36	2
MD Machine Direction	TD Transverse Direction											

APPENDIX B: MATERIAL MANUFACTURER CERTIFICATION AND COMFORMANCE TESTING RESULTS

B.5 Geonet Certifications



MANUFACTURING QUALITY CONTROL



PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-2

PROJECT NAME: OWL LF CELLS 4A 4B

ROLL NUMBER	MANUFACT. DATE	RESIN LOT NUMBER
Product Code : 1106474-35011-5 <u>HyperNet 200 mils / 5.00 mm</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.		
0116-022641	2022-09-10	DPF611332
0116-022642	2022-09-10	DPF611332
0116-022643	2022-09-10	DPF611332
0116-022644	2022-09-10	DPF611332
0116-022645	2022-09-10	DPF611332
0116-022646	2022-09-10	DPF611332
0116-022647	2022-09-10	DPF611332
0116-022648	2022-09-10	DPF611332
0116-022649	2022-09-10	DPF611332
0116-022650	2022-09-10	DPF611332
0116-022651	2022-09-10	DPF611332
0116-022652	2022-09-10	DPF611332
0116-022653	2022-09-10	DPF611332
0116-022654	2022-09-10	DPF611332
0116-022655	2022-09-10	DPF611332
0116-022656	2022-09-10	DPF611332
0116-022793	2022-09-13	DPF611332

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

7 Oct 2022

**MANUFACTURING QUALITY CONTROL**

PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-2

PROJECT NAME: OWL LF CELLS 4A 4B

0116-022794	2022-09-13	DPF611332
0116-022795	2022-09-13	DPF611332
0116-022796	2022-09-13	DPF611332
0116-022797	2022-09-13	DPF611332
0116-022798	2022-09-13	DPF611332
0116-022799	2022-09-13	DPF611332
0116-022800	2022-09-13	DPF611332
0116-022801	2022-09-13	DPF611332
0116-022802	2022-09-13	DPF611332
0116-022803	2022-09-13	DPF611332
0116-022804	2022-09-13	DPF611332
0116-022805	2022-09-13	DPF611332
0116-022806	2022-09-13	DPF611332
0116-022807	2022-09-13	DPF611332
0116-022809	2022-09-13	DPF611332
0116-022810	2022-09-13	DPF611332
0116-023308	2022-09-25	DPF610442
0116-023310	2022-09-25	DPF610442
0116-023311	2022-09-25	DPF610442
0116-023327	2022-09-25	DPF610442
0116-023328	2022-09-25	DPF610442
0116-023329	2022-09-25	DPF610442
0116-023330	2022-09-25	DPF610442
0116-023331	2022-09-25	DPF610442
0116-023332	2022-09-25	DPF610442
0116-023333	2022-09-25	DPF610442
0116-023334	2022-09-25	DPF610442

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Solmax Geosynthetics LLC

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7 Oct 2022

**MANUFACTURING QUALITY CONTROL**

PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-2

PROJECT NAME: OWL LF CELLS 4A 4B

0116-023335	2022-09-25	DPF610442
0116-023336	2022-09-25	DPF610442
0116-023337	2022-09-25	DPF610442
0116-023338	2022-09-25	DPF610442
0116-023339	2022-09-25	DPF610442
0116-023340	2022-09-25	DPF610442
0116-023341	2022-09-25	DPF610442
0116-023342	2022-09-25	DPF610442
0116-023343	2022-09-25	DPF610442
0116-023344	2022-09-25	DPF610442
0116-023345	2022-09-25	DPF610442
0116-023346	2022-09-25	DPF610442
0116-023347	2022-09-25	DPF610442
0116-023348	2022-09-25	DPF610442
0116-023349	2022-09-25	DPF610442
0116-023350	2022-09-25	DPF610442
0116-023351	2022-09-25	DPF610442
0116-023353	2022-09-26	DPF610442
0116-023354	2022-09-26	DPF610442
0116-023368	2022-09-26	DPF610442

QUANTITY (ROLLS): 64

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.

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7 Oct 2022



MANUFACTURING QUALITY CONTROL

TEST RESULTS

PROJECT NUMBER:SW2211

SALES ORDER:SO-094167

PACKING SLIP NUMBER:Pre-SO-094167-2

PROJECT NAME : OWL LF CELLS 4A 4B

PRODUCT: 1106474-35011-5
HyperNet 200 mils / 5.00 mm

					Rolls	
Test	Property	Direction	Test Method	Frequency	Unit	
	1 Thickness (min. avg.)		ASTM D5199	50,000 ft²/4,600 m²	mils	
	2 Carbon Black Content		ASTM D4218	1/50,000 ft²	%	
	3 Density (min.)		ASTM D792	50,000 ft²/4,600 m²	g/cc	
	4 Tensile Stength (MD)	MD	ASTM D7179	1/50,000 ft²	lbf/in	
	5 Melt Index - 190/2.16 (max.)		ASTM D1238	1/Batch	g/10 min	
	6 Geonet Transmissivity (x10 ⁻³)		ASTM D4716	1/Shift	m²/sec	

Test	1	2	3	4	5	6
SPECIFICATIONS	200	2.0	0.94	45	1.0	2
0116-022641	427.80	2.82	0.946	68	0.36	4.43
0116-022642	427.80	2.82	0.946	68	0.36	4.43
0116-022643	427.80	2.82	0.946	68	0.36	4.43
0116-022644	427.80	2.82	0.946	68	0.36	4.43
0116-022645	427.80	2.82	0.946	68	0.36	4.43
0116-022646	427.80	2.82	0.946	68	0.36	4.43
0116-022647	241.00	2.82	0.946	80	0.36	8
0116-022648	241.00	2.76	0.955	80	0.36	8
0116-022649	241.00	2.76	0.955	80	0.36	8
0116-022650	241.00	2.76	0.955	80	0.36	8
0116-022651	241.00	2.76	0.955	80	0.36	8
0116-022652	241.00	2.76	0.955	80	0.36	8
0116-022653	225.00	2.79	0.955	80	0.36	8
0116-022654	225.00	2.79	0.955	80	0.36	8
0116-022655	225.00	2.79	0.955	80	0.36	8
0116-022656	225.00	2.79	0.955	80	0.36	8
0116-022793	244.30	2.88	0.951	85	0.36	5.73
0116-022794	244.30	2.88	0.951	85	0.36	5.73
0116-022795	244.30	2.88	0.951	85	0.36	5.73
0116-022796	244.30	2.88	0.951	85	0.36	5.73
0116-022797	244.30	2.88	0.951	85	0.36	5.73
0116-022798	234.00	2.88	0.951	85	0.36	5.73

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.

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MANUFACTURING QUALITY CONTROL



TEST RESULTS

PROJECT NUMBER:SW2211

SALES ORDER:SO-094167

PACKING SLIP NUMBER:Pre-SO-094167-2

PROJECT NAME : OWL LF CELLS 4A 4B

Test	1	2	3	4	5	6
0116-022799	234.00	2.88	0.951	85	0.36	5.73
0116-022800	234.00	2.88	0.951	85	0.36	5.73
0116-022801	234.00	2.88	0.951	85	0.36	5.73
0116-022802	234.00	2.88	0.951	85	0.36	5.73
0116-022803	237.40	2.84	0.956	71	0.36	6.11
0116-022804	237.40	2.84	0.956	71	0.36	6.11
0116-022805	237.40	2.84	0.956	71	0.36	6.11
0116-022806	237.40	2.84	0.956	71	0.36	6.11
0116-022807	237.40	2.84	0.956	71	0.36	6.11
0116-022809	225.60	2.78	0.955	69	0.36	6.11
0116-022810	225.60	2.78	0.955	69	0.36	6.11
0116-023308	224.90	2.27	0.950	56	0.44	3.57
0116-023310	224.90	2.27	0.950	56	0.44	3.57
0116-023311	224.90	2.27	0.950	56	0.44	3.57
0116-023327	243.00	2.32	0.952	72	0.44	3.86
0116-023328	243.00	2.32	0.952	72	0.44	3.86
0116-023329	243.00	2.32	0.952	72	0.44	3.86
0116-023330	243.00	2.32	0.952	72	0.44	3.86
0116-023331	243.00	2.32	0.952	72	0.44	3.86
0116-023332	238.30	2.35	0.952	72	0.44	3.86
0116-023333	238.30	2.35	0.952	72	0.44	3.86
0116-023334	238.30	2.35	0.952	72	0.44	3.86
0116-023335	238.30	2.35	0.952	72	0.44	3.86
0116-023336	238.30	2.35	0.952	72	0.44	3.86
0116-023337	236.00	2.15	0.952	72	0.44	3.86
0116-023338	236.00	2.15	0.952	72	0.44	3.86
0116-023339	236.00	2.15	0.952	72	0.44	3.86
0116-023340	236.00	2.15	0.952	72	0.44	3.86
0116-023341	236.00	2.15	0.952	72	0.44	3.86
0116-023342	238.70	2.12	0.953	73	0.44	3.86
0116-023343	238.70	2.12	0.953	73	0.44	3.86
0116-023344	238.70	2.12	0.953	73	0.44	3.86
0116-023345	238.70	2.12	0.953	73	0.44	3.86
0116-023346	238.70	2.12	0.953	73	0.44	3.86
0116-023347	240.00	2.64	0.953	73	0.44	3.86

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

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MANUFACTURING QUALITY CONTROL



TEST RESULTS

PROJECT NUMBER:SW2211

SALES ORDER:SO-094167

PACKING SLIP NUMBER:Pre-SO-094167-2

PROJECT NAME : OWL LF CELLS 4A 4B

Test	1	2	3	4	5	6
0116-023348	240.00	2.64	0.953	73	0.44	3.86
0116-023349	240.00	2.64	0.953	73	0.44	3.86
0116-023350	240.00	2.64	0.953	73	0.44	3.86
0116-023351	240.00	2.64	0.953	73	0.44	3.86
0116-023353	234.70	2.42	0.953	73	0.44	3.86
0116-023354	234.70	2.42	0.953	73	0.44	3.86
0116-023368	237.30	2.29	0.954	66	0.44	4.58

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Solmax Geosynthetics LLC

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MANUFACTURING QUALITY CONTROL



TEST RESULTS

PROJECT NUMBER:	SW2211
SALES ORDER:	SO-094167
PACKING SLIP NUMBER:	Pre-SO-094167-2

PROJECT NAME : OWL LF CELLS 4A 4B

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



CoA Date: 06/30/2022

Certificate of Analysis

Shipped To: SOLMAX GEOSYNTHETICS, LLC
19103 GUNDLE ROAD
HOUSTON TX 77073
USA

Recipient: Hickman
Fax:

Delivery #: 80705248
PO #: 605348
Weight: 207400.000 LB
Ship Date: 06/30/2022
Package: BULK
Mode: Hopper Car
Car #: HLTX006039
Seal No: 302648

Product:
MARLEX HHM 5502BN POLYETHYLENE in Bulk

Lot Number: DPF611332

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.35	g/10min
Density	D1505	0.9535	g/cm3
Production date		20220627	

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
QUALITY ASSURANCE SUPERINTENDENT

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



CoA Date: 06/19/2022

Certificate of Analysis

Shipped To: SOLMAX GEOSYNTHETICS, LLC
19103 GUNDLE ROAD
HOUSTON TX 77073
USA

Recipient: Hickman
Fax:

Delivery #: 80697952
PO #: 605347
Weight: 204300.000 LB
Ship Date: 06/19/2022
Package: BULK
Mode: Hopper Car
Car #: HLTX006063
Seal No: 292196

Product:
MARLEX HHM 5502BN POLYETHYLENE in Bulk

Lot Number: DPF610442

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.34	g/10min
Density	D1505	0.9549	g/cm3
Production date		20220610	

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
QUALITY ASSURANCE SUPERINTENDENT

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

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

September 28, 2022

Mail 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.

Bill To:

<= Same

Project: **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,

A handwritten signature in black ink, appearing to read 'Mansukh Patel'.

Mansukh Patel
Laboratory Manager
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

GEOCOMPOSITE TEST RESULTS

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

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

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Hydraulic Transmissivity (ASTM D4716)													
Direction Tested: Machine Direction Normal Load (psf): 10,000 Hydraulic Gradient: 0.1 Test Length (in): 12 Test Width (in): 12 Plate / Sample / Plate Seat Time (hours) Specimen													
			1			2							
Volume (cc)	6000	6000	6000	1954	1957	1957							
Time (s)	24.96	24.98	24.99	10.40	10.44	10.48							
Flow Rate (GPM/ft width)	3.82	3.82	3.82	2.99	2.98	2.97							
Transmissivity (m ² /s)	7.92E-03	7.91E-03	7.91E-03	6.19E-03	6.17E-03	6.15E-03							
Test Temp (C)		20.0			20.0								
Temp. Corr. Factor		1.004			1.004								
											3.40 7.04E-03	0.46 9.54E-04	2.00E-03
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			
Mass/unit 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 (mils)	234	231	221	218	227	248	248	225	238	229	232 218	10 << min	200 min
Density (ASTM D1505)													
Density (g/cm ³)	0.954	0.954	0.954								0.954	0.000	0.940 min
Carbon Black Content (ASTM D1603, mod.)													
% Carbon Black	2.84	2.82									2.83	0.01	2.0 - 3.0
Melt Flow Index (ASTM D1238, Method A, 190°C / 2.16 kg)													
Melt Flow Index (g/10 min)	0.43	0.43									0.43		1.0 max
Tensile Properties (ASTM D7179, 12 ipm strain rate)													
MD Max. Strength (ppi)	70	80	64	73	57						69	9	45 min
MD Elong. @ Max. Strength (%)	16	18	18	17	20						18	2	
MD Machine Direction													



TESTING, RESEARCH, CONSULTING AND FIELD SERVICES

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

September 28, 2022

Mail 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.

Bill To:

<= Same

Project: **Owl Landfill Cell 4A & 4B**

TRI Job Reference Number: 75070

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,

A handwritten signature in black ink, appearing to read 'Mansukh Patel'.

Mansukh Patel
Laboratory Manager
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

GEOCOMPOSITE TEST RESULTS

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

Material: Solmax Geonet
Sample Identification: 0116-02308
TRI Log #: 75070

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Hydraulic Transmissivity (ASTM D4716)													
Direction Tested: Machine Direction Normal Load (psf): 10,000 Hydraulic Gradient: 0.1 Test Length (in): 12 Test Width (in): 12 Plate / Sample / Plate Seat Time (hours) Specimen													
		1				2							
Volume (cc)	6000	6000	6000	1954	1957	1957							
Time (s)	24.96	24.98	24.99	10.40	10.44	10.48							
Flow Rate (GPM/ft width)	3.80	3.82	3.82	2.97	2.98	2.97							
Transmissivity (m ² /s)	7.92E-03	7.91E-03	7.91E-03	6.19E-03	6.17E-03	6.15E-03							
Test Temp (C)		20.0			20.0								
Temp. Corr. Factor		1.004			1.004								
											3.39	0.46	
											7.04E-03	9.54E-04	2.00E-03
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			
Mass/unit 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 (mils)	231	232	221	220	227	240	245	225	235	229	231	10	200 min
											218	<< min	
Density (ASTM D1505)													
Density (g/cm ³)	0.954	0.954	0.954								0.954	0.000	0.940 min
Carbon Black Content (ASTM D1603, mod.)													
% Carbon Black	2.84	2.82									2.83	0.01	2.0 - 3.0
Melt Flow Index (ASTM D1238, Method A, 190°C / 2.16 kg)													
Melt Flow Index (g/10 min)	0.43	0.43									0.43		1.0 max
Tensile Properties (ASTM D7179, 12 ipm strain rate)													
MD Max. Strength (ppi)	75	85	60	73	58						70	11	45 min
MD Elong. @ Max. Strength (%)	15	18	17	15	21						17	2	
MD Machine Direction													



TESTING, RESEARCH, CONSULTING AND FIELD SERVICES

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

September 28, 2022

Mail To:

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

email: juan@slsliner.com

Bill To:

<= Same

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: 75071

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,

A handwritten signature in black ink, appearing to read 'Mansukh Patel'.

Mansukh Patel
Laboratory Manager
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

GEOCOMPOSITE TEST RESULTS

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

Material: Solmax Geonet
Sample Identification: 0116-023353
TRI Log #: 75071

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Hydraulic Transmissivity (ASTM D4716)													
Direction Tested: Machine Direction Normal Load (psf): 10,000 Hydraulic Gradient: 0.1 Test Length (in): 12 Test Width (in): 12 Plate / Sample / Plate Seat Time (hours) Specimen													
			1			2							
Volume (cc)		6000	6000	6000	1954	1957	1957						
Time (s)		24.96	24.98	24.99	10.40	10.44	10.48						
Flow Rate (GPM/ft width)		3.84	3.80	3.80	2.99	2.99	2.98						
Transmissivity (m ² /s)		7.93E-03	7.90E-03	7.90E-03	6.19E-03	6.17E-03	6.15E-03						
Test Temp (C)			20.0			20.0							
Temp. Corr. Factor			1.004			1.004							
											3.40 7.04E-03	0.45 9.54E-04	2.00E-03
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			
Mass/unit 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 (mils)	230	230	221	218	227	248	248	225	238	229	231 218	10 << min	200 min
Density (ASTM D1505)													
Density (g/cm ³)	0.954	0.954	0.954								0.954	0.000	0.940 min
Carbon Black Content (ASTM D1603, mod.)													
% Carbon Black	2.84	2.84									2.84	0.01	2.0 - 3.0
Melt Flow Index (ASTM D1238, Method A, 190°C / 2.16 kg)													
Melt Flow Index (g/10 min)	0.42	0.42									0.42		1.0 max
Tensile Properties (ASTM D7179, 12 ipm strain rate)													
MD Max. Strength (ppi)	73	78	60	75	62						70	8	45 min
MD Elong. @ Max. Strength (%)	17	18	17	17	19						18	1	
MD Machine 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
Geonet³				
Thickness	ASTM D 5199	mil	200	MAV ⁶
Carbon Black	ASTM D 4218	%	2.0	MAV
Tensile Strength	ASTM D 7179	lbs/in	45	MAV
Melt Flow	ASTM D 1238 ²	g/10 min	1.0	Maximum
Density	ASTM D 1505	g/cm ³	0.94	MAV
Transmissivity ^{1a}	ASTM D 4716	m ² /sec	2.0 x 10 ⁻³	MAV
Composite				
Ply Adhesion	ASTM D 7005	lb/in	1.0	MAV
Transmissivity ^{1b}	ASTM D 4716	m ² /sec	9.0 x 10 ⁻⁵	MAV
Geotextile^{3 & 4}				
Fabric Weight	ASTM D 5261	oz/yd ²	10.0	MARV ⁵
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 ²	75	MARV
Permittivity	ASTM D 4491	sec ⁻¹	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 $21 \pm 2^{\circ}\text{C}$ ($70 \pm 4^{\circ}\text{F}$) 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 $21 \pm 2^{\circ}\text{C}$ ($70 \pm 4^{\circ}\text{F}$) 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 Patel





Product: TN 220-2-10
Project : Northern Delaware Basin Landfill, NM

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

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m ² /sec)	Resin Lot Number	Density (g/cm ³)	Thickness (mils)	Carbon Black (%)	Tensile Strength MD (lb/in)	Transmissivity (m ² /sec)
	Side "A"	Side "B"							
121501010001	1.83	2.16	1.78 x 10 ⁻⁴	HCBX001295	0.9550	221	2.48	58	3.04 x 10 ⁻³
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 Chemical Company	HCBX001295	Density	ASTM D1505	g/cm ³	0.9501	0.9505
		Melt flow Index	ASTM D1238 ^(a)	g/10 min	0.16	0.15

(a) Condition 190/2.16

* 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#	FABRIC SIDE	WEIGHT oz/yd ²	GRAB lbs. (MD)	GRAB ELG % (MD)	GRAB lbs. (XMD)	GRAB ELG % (XMD)	TRAP lbs. (MD)	TRAP lbs. (XMD)	CBR PUNCTURE lbs	AOS us sieve	WATER- FLOW gpm/ft ²	PERM- ABL cm/sec	PERM- ITY sec ⁻¹
121501010001	Side A	10.46	276	72	295	83	106	131	832	100	75	0.31	1.00
	Side B	10.64	281	70	285	85	114	135	866	100	75	0.31	1.00



MANUFACTURING QUALITY CONTROL



PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-6

PROJECT NAME: OWL LF CELLS 4A 4B

ROLL NUMBER	MANUFACT. DATE	RESIN LOT NUMBER	TOP LAYER 1	BOTTOM LAYER 1
Product Code : 1114746-35011-3 FabriNet 225 mil, Double Sided 10 oz/yd², Nonwoven Cal. TRI Austin Pickup - Patricia Zabaleta 1/100,000 sf, min 1/Lot - Geocomposite: 2 ft x RW - Geonet: 1 ft x RW - Geotextile: 3 ft x RW One additional 2 ft x RW sample for interface testing.				
0116-023770	2022-10-13	DPF610480	2027226228	2027226225
0116-023771	2022-10-13	DPF610480	2027226228	2027226225
0116-023772	2022-10-13	DPF610480	2027226228	2027226225
0116-023793	2022-10-14	DPF610480	2027226229	2027226227
0116-023794	2022-10-14	DPF610480	2027226229	2027226227
0116-023795	2022-10-14	DPF610480	2027226229	2027226227
0116-023797	2022-10-14	DPF610480	2027226229	2027226227
0116-023798	2022-10-14	DPF610480	2027226229	2027226227
0116-023799	2022-10-14	DPF610480	2027226185	2027226224
0116-023800	2022-10-14	DPF610480	2027226185	2027226224
0116-023801	2022-10-14	DPF610480	2027226185	2027226224
0116-023802	2022-10-14	DPF610480	2027226185	2027226224
0116-023803	2022-10-14	DPF610480	2027226185	2027226224
0116-023804	2022-10-14	DPF610480	2027226185	2027226224

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

2 Nov 2022

 SOLMAX

MANUFACTURING QUALITY CONTROL



PROJECT NUMBER:SW2211

SALES ORDER:SO-094167

PACKING SLIP NUMBER:Pre-SO-094167-6

PROJECT NAME: OWL LF CELLS 4A 4B

0116-023805	2022-10-14	DPF610480	2027226195	2027226186
0116-023806	2022-10-14	DPF610480	2027226195	2027226186
0116-023807	2022-10-14	DPF610480	2027226195	2027226186
0116-023809	2022-10-14	DPF610480	2027226195	2027226186

QUANTITY (ROLLS): 18

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

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2 Nov 2022



MANUFACTURING QUALITY CONTROL

TEST RESULTS

PROJECT NUMBER:SW2211

SALES ORDER:SO-094167

PACKING SLIP NUMBER:Pre-SO-094167-6

PROJECT NAME : OWL LF CELLS 4A 4B

PRODUCT: 1114746-35011-3
FabriNet 225 mil, Double Sided 10 oz/yd², Nonwoven Cal.

						Rolls	
Test	Property	Direction	Test Method	Frequency	Unit		
	1 Thickness (min. avg.)		ASTM D5199	1/50,000 ft²	mils		
	2 Carbon Black Content		ASTM D4218	1/50,000 ft²	%		
	3 Density (min.)		ASTM D792	50,000 ft²/4,600 m²	g/cc		
	4 Tensile Stength (MD)	MD	ASTM D7179	1/50,000 ft²	lbf/in		
	5 Ply Adhesion Average (min. avg.)	Top	ASTM D7005	1/50,000 ft²	lbf/in		
	6 Ply Adhesion Average (min. avg.)	Bottom	ASTM D7005	1/50,000 ft²	lbf/in		
	7 Geocomposite Transmissivity (x10 ⁻³)		ASTM D4716	1/500,000 ft²	m²/sec		
	8 Melt Index - 190/2.16 (max.)		ASTM D1238	1/Batch	g/10 min		
	9 Geonet Transmissivity (x10 ⁻³)		ASTM D4716	1/Shift	m²/sec		

Test	1	2	3	4	5	6	7	8	9
SPECIFICATIONS	220	2.0	0.94	50	1.0	1.0	0.1	1.0	2.5
0116-023770	230.60	2.08	0.952	75	2.9	1.69	0.12	0.34	4.47
0116-023771	230.60	2.08	0.952	75	2.9	1.69	0.12	0.34	4.47
0116-023772	230.60	2.08	0.952	75	2.9	1.69	0.12	0.34	4.47
0116-023793	260.70	2.75	0.951	86	2.7	2.62	5.30	0.35	5.77
0116-023794	260.70	2.75	0.951	86	2.7	2.62	5.30	0.35	5.77
0116-023795	260.70	2.75	0.951	86	2.7	2.62	5.30	0.35	5.77
0116-023797	260.70	2.75	0.951	86	2.7	2.62	5.30	0.35	5.77
0116-023798	258.00	2.75	0.951	86	2.7	2.62	5.30	0.35	5.77
0116-023799	258.00	2.75	0.951	86	2.7	2.62	5.30	0.35	5.77
0116-023800	258.00	2.75	0.951	86	2.7	2.62	5.30	0.35	5.77
0116-023801	258.00	2.75	0.951	86	2.7	2.62	5.30	0.35	5.77
0116-023802	258.00	2.75	0.951	86	2.7	2.62	5.30	0.35	5.77
0116-023803	270.70	2.75	0.951	86	2.7	2.62	5.30	0.35	5.77
0116-023804	270.70	2.75	0.951	86	2.7	2.62	5.30	0.35	5.77
0116-023805	270.70	2.75	0.951	86	2.7	2.62	5.30	0.35	5.77
0116-023806	270.70	2.75	0.951	86	2.7	2.62	5.30	0.35	5.77
0116-023807	270.70	2.75	0.951	86	2.7	2.62	5.30	0.35	5.77
0116-023809	262.30	2.67	0.950	76	2.2	2.57	5.30	0.35	5.77

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



MANUFACTURING QUALITY CONTROL

TEST RESULTS

PROJECT NUMBER:SW2211

SALES ORDER:SO-094167

PACKING SLIP NUMBER:Pre-SO-094167-6

PROJECT NAME : OWL LF CELLS 4A 4B

PRODUCT: 1114746-35011-3
FabriNet 225 mil, Double Sided 10 oz/yd², Nonwoven Cal.

Test	Property	Direction	Test Method	Frequency	Unit
1	Mass per Unit Area (min. avg.)		ASTM D5261	1/90,000 ft²	oz/yd²
	Grab Tensile Properties (min. avg)		ASTM D4632	90,000 ft²/8,365 m²	
2	Strength (MD)				lbf
3	Strength (TD)				lbf
4	Elongation (MD)				%
5	Elongation (TD)				%
6	Trapezoidal Tear Strength	MD	ASTM D4533	1/90,000 ft²	lbf
7	Trapezoidal Tear Strength	TD	ASTM D4533	1/90,000 ft²	lbf
8	CBR Puncture Strength		ASTM D6241	1/540,000 ft²	lbf
9	Apparent Opening Size (max.)		ASTM D4751	1/540,000 ft²	mm
10	Permittivity		ASTM D4491	1/540,000 ft²	sec⁻¹

Test	1	2	3	4	5	6	7	8	9	10
Specification	10	270	270	50	50	105	105	725	0.150	1.0
2027226185	11.3	409	449	69	79	159	190	1,192	0.150	2.0
2027226195	11.3	398	461	75	82	152	200	1,118	0.150	1.8
2027226228	10.7	371	497	76	76	138	180	968	0.150	1.4
2027226229	10.7	371	497	76	76	138	180	968	0.150	1.4
Specification	10	270	270	50	50	105	105	725	0.150	1.0
2027226186	11.3	409	449	69	79	159	190	1,192	0.150	2.0
2027226224	10.5	355	446	72	72	133	165	995	0.150	1.6
2027226225	10.5	355	446	72	72	133	165	995	0.150	1.6
2027226227	10.7	371	497	76	76	138	180	968	0.150	1.4

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



CoA Date: 06/19/2022

Certificate of Analysis

Shipped To: SOLMAX GEOSYNTHETICS, LLC
19103 GUNDLE ROAD
HOUSTON TX 77073
USA

Recipient: Hickman
Fax:

Delivery #: 80697950
PO #: 605347
Weight: 203200.000 LB
Ship Date: 06/19/2022
Package: BULK
Mode: Hopper Car
Car #: HLTX007056
Seal No: 292206

Product:
MARLEX HHM 5502BN POLYETHYLENE in Bulk

Lot Number: DPF610480

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.34	g/10min
Density	D1505	0.9540	g/cm3
Production date		20220610	

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
QUALITY ASSURANCE SUPERINTENDENT

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



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
Geonet³				
Thickness	ASTM D 5199	mil	200	MAV ⁶
Carbon Black	ASTM D 4218	%	2.0	MAV
Tensile Strength	ASTM D 7179	lbs/in	45	MAV
Melt Flow	ASTM D 1238 ²	g/10 min	1.0	Maximum
Density	ASTM D 1505	g/cm ³	0.94	MAV
Transmissivity ^{1a}	ASTM D 4716	m ² /sec	2.0 x 10 ⁻³	MAV
Composite				
Ply Adhesion	ASTM D 7005	lb/in	1.0	MAV
Transmissivity ^{1b}	ASTM D 4716	m ² /sec	9.0 x 10 ⁻⁵	MAV
Geotextile^{3 & 4}				
Fabric Weight	ASTM D 5261	oz/yd ²	10.0	MARV ⁵
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 ²	75	MARV
Permittivity	ASTM D 4491	sec ⁻¹	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 $21 \pm 2^{\circ} \text{C}$ ($70 \pm 4^{\circ} \text{F}$) 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 $21 \pm 2^{\circ} \text{C}$ ($70 \pm 4^{\circ} \text{F}$) 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 Patel





Product: TN 220-2-10
Project : Northern Delaware Basin Landfill, NM

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

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m ² /sec)	Resin Lot Number	Density (g/cm ³)	Thickness (mils)	Carbon Black (%)	Tensile Strength MD (lb/in)	Transmissivity (m ² /sec)
	Side "A"	Side "B"							
121501010001	1.83	2.16	1.78 x 10 ⁻⁴	HCBX001295	0.9550	221	2.48	58	3.04 x 10 ⁻³
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 Chemical Company	HCBX001295	Density	ASTM D1505	g/cm ³	0.9501	0.9505
		Melt flow Index	ASTM D1238 ^(a)	g/10 min	0.16	0.15

(a) Condition 190/2.16

* 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#	FABRIC SIDE	WEIGHT oz/yd ²	GRAB lbs. (MD)	GRAB ELG % (MD)	GRAB lbs. (XMD)	GRAB ELG % (XMD)	TRAP lbs. (MD)	TRAP lbs. (XMD)	CBR PUNCTURE lbs	AOS us sieve	WATER- FLOW gpm/ft ²	PERM- ABL cm/sec	PERM- ITY sec ⁻¹
121501010001	Side A	10.46	276	72	295	83	106	131	832	100	75	0.31	1.00
	Side B	10.64	281	70	285	85	114	135	866	100	75	0.31	1.00



MANUFACTURING QUALITY CONTROL



PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-5

PROJECT NAME: OWL LF CELLS 4A 4B

ROLL NUMBER	MANUFACT. DATE	RESIN LOT NUMBER	TOP LAYER 1
Product Code : 1106338-35011-4 FabriNet 200 mil, Single Sided Top 10 oz/yd², Nonwoven Cal. TRI Austin Pickup - Patricia Zabaleta 1/100,000 sf, min 1/Lot - Geocomposite: 2 ft x RW - Geonet: 1 ft x RW - Geotextile: 3 ft x RW One additional 2 ft x RW sample for interface testing.			
0116-023819	2022-10-14	DPF610480	2027226194
0116-023820	2022-10-14	DPF610480	2027226191
0116-023821	2022-10-14	DPF610480	2027226191
0116-023822	2022-10-14	DPF610480	2027226191
0116-023823	2022-10-14	DPF610480	2027226191
0116-023824	2022-10-14	DPF610480	2027226191
0116-023825	2022-10-14	DPF610480	2027226191
0116-023826	2022-10-14	DPF610480	2027226191
0116-023827	2022-10-14	DPF610480	2027226191
0116-023828	2022-10-14	DPF610480	2027226191
0116-023829	2022-10-14	DPF610480	2027226191
0116-023830	2022-10-14	DPF610480	2027226191
0116-023831	2022-10-14	DPF610480	2027226191
0116-023832	2022-10-14	DPF610480	2027226191

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2 Nov 2022



MANUFACTURING QUALITY CONTROL



PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-5

PROJECT NAME: OWL LF CELLS 4A 4B

0116-023833	2022-10-14	DPF610480	2027226191
0116-023834	2022-10-14	DPF610480	2027226191
0116-023835	2022-10-14	DPF610480	2027226191
0116-023836	2022-10-14	DPF610480	2027226191
0116-023837	2022-10-14	DPF610480	2027226230
0116-023838	2022-10-14	DPF610480	2027226230
0116-023862	2022-10-15	DPF610480	2027226197
0116-023863	2022-10-15	DPF610480	2027226197
0116-023864	2022-10-15	DPF610480	2027226197
0116-023865	2022-10-15	DPF610480	2027226197
0116-023866	2022-10-15	DPF610480	2027226197
0116-023867	2022-10-15	DPF610480	2027226215
0116-023868	2022-10-15	DPF610480	2027226215
0116-023869	2022-10-15	DPF610480	2027226215
0116-023870	2022-10-15	DPF610480	2027226215
0116-023871	2022-10-15	DPF610480	2027226220
0116-023878	2022-10-15	DPF610480	2027226216
0116-023879	2022-10-15	DPF610480	2027226216
0116-023880	2022-10-15	DPF610480	2027226212
0116-023881	2022-10-15	DPF610480	2027226212
0116-023882	2022-10-15	DPF610480	2027226212
0116-023883	2022-10-15	DPF610480	2027226212
0116-023884	2022-10-15	DPF610480	2027226210
0116-023885	2022-10-15	DPF610480	2027226210
0116-023886	2022-10-15	DPF610480	2027226210
0116-023887	2022-10-15	DPF610480	2027226210
0116-023888	2022-10-15	DPF610480	2027226210

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MANUFACTURING QUALITY CONTROL



PROJECT NUMBER: SW2211

SALES ORDER: SO-094167

PACKING SLIP NUMBER: Pre-SO-094167-5

PROJECT NAME: OWL LF CELLS 4A 4B

0116-023889	2022-10-15	DPF610480	2027226211
0116-023890	2022-10-15	DPF610480	2027226211
0116-023891	2022-10-15	DPF610480	2027226211
0116-023892	2022-10-15	DPF610480	2027226211
0116-023893	2022-10-15	DPF610480	2027226217
0116-023894	2022-10-16	DPF610480	2027226217
0116-023895	2022-10-16	DPF610480	2027226217
0116-023896	2022-10-16	DPF610480	2027226217
0116-023897	2022-10-16	DPF610480	2027226209
0116-023898	2022-10-16	DPF610480	2027226205
0116-023899	2022-10-16	DPF610480	2027226205
0116-023900	2022-10-16	DPF610480	2027226205
0116-023901	2022-10-16	DPF610480	2027226205
0116-023902	2022-10-16	DPF610480	2027226218
0116-023918	2022-10-16	DPF610480	2027226218
0116-023919	2022-10-16	DPF610480	2027226218
0116-023920	2022-10-16	DPF610480	2027226218
0116-023921	2022-10-17	DPF610480	2027226203
0116-023922	2022-10-17	DPF610480	2027226203
0116-023923	2022-10-17	DPF610480	2027226203
0116-023924	2022-10-17	DPF610480	2027226203

QUANTITY (ROLLS): 62

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2 Nov 2022



MANUFACTURING QUALITY CONTROL

TEST RESULTS

PROJECT NUMBER:SW2211

SALES ORDER:SO-094167

PACKING SLIP NUMBER:Pre-SO-094167-5

PROJECT NAME : OWL LF CELLS 4A 4B

PRODUCT: 1106338-35011-4
FabriNet 200 mil, Single Sided Top 10 oz/yd², Nonwoven Cal.

					Rolls	
Test	Property	Direction	Test Method	Frequency	Unit	
	1 Thickness (min. avg.)		ASTM D5199	50,000 ft²/4,600 m²	mils	
	2 Carbon Black Content		ASTM D4218	1/50,000 ft²	%	
	3 Density (min.)		ASTM D792	50,000 ft²/4,600 m²	g/cc	
	4 Tensile Stength (MD)	MD	ASTM D7179	1/50,000 ft²	lbf/in	
	5 Ply Adhesion Average (min. avg.) Top	Top	ASTM D7005	1/50,000 ft²	lbf/in	
	6 Geocomposite Transmissivity (x10 ⁻³)		ASTM D4716	1/500,000 ft²	m²/sec	
	7 Melt Index - 190/2.16 (max.)		ASTM D1238	1/Batch	g/10 min	
	8 Geonet Transmissivity (x10 ⁻³)		ASTM D4716	1/Shift	m²/sec	

Test	1	2	3	4	5	6	7	8
SPECIFICATIONS	200	2.0	0.94	45	1.0	0.9	1.0	2
0116-023819	248.30	2.76	0.956	77	1.6	2.21	0.35	6.25
0116-023820	248.30	2.76	0.956	77	1.6	2.21	0.35	6.25
0116-023821	248.30	2.76	0.956	77	1.6	2.21	0.35	6.25
0116-023822	248.30	2.76	0.956	77	1.6	2.21	0.35	6.25
0116-023823	248.30	2.76	0.956	77	1.6	2.21	0.35	6.25
0116-023824	232.00	2.54	0.956	77	1.6	2.21	0.35	6.25
0116-023825	232.00	2.54	0.956	77	1.6	2.21	0.35	6.25
0116-023826	232.00	2.54	0.956	77	1.6	2.21	0.35	6.25
0116-023827	232.00	2.54	0.956	77	1.6	2.21	0.35	6.25
0116-023828	232.00	2.54	0.956	77	1.6	2.21	0.35	6.25
0116-023829	240.30	2.32	0.947	74	3.2	2.21	0.35	6.25
0116-023830	240.30	2.32	0.947	74	3.2	2.21	0.35	6.25
0116-023831	240.30	2.32	0.947	74	3.2	2.21	0.35	6.25
0116-023832	240.30	2.32	0.947	74	3.2	2.21	0.35	6.25
0116-023833	240.30	2.32	0.947	74	3.2	2.21	0.35	6.25
0116-023834	248.70	2.51	0.947	74	3.2	2.21	0.35	6.25
0116-023835	248.70	2.51	0.947	74	3.2	2.21	0.35	6.25
0116-023836	248.70	2.51	0.947	74	3.2	2.21	0.35	6.25
0116-023837	248.70	2.51	0.947	74	3.2	2.21	0.35	6.25
0116-023838	248.70	2.51	0.947	74	3.2	2.21	0.35	6.25

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MANUFACTURING QUALITY CONTROL



TEST RESULTS

PROJECT NUMBER:SW2211

SALES ORDER:SO-094167

PACKING SLIP NUMBER:Pre-SO-094167-5

PROJECT NAME : OWL LF CELLS 4A 4B

Test	1	2	3	4	5	6	7	8
0116-023862	260.30	2.07	0.954	83	2.3	2.32	0.35	5.79
0116-023863	260.30	2.07	0.954	83	2.3	2.32	0.35	5.79
0116-023864	260.30	2.07	0.954	83	2.3	2.32	0.35	5.79
0116-023865	260.30	2.07	0.954	83	2.3	2.32	0.35	5.79
0116-023866	260.30	2.07	0.954	83	2.3	2.32	0.35	5.79
0116-023867	258.70	2.07	0.954	83	2.3	2.32	0.35	5.79
0116-023868	258.70	2.07	0.954	83	2.3	2.32	0.35	5.79
0116-023869	258.70	2.07	0.954	83	2.3	2.32	0.35	5.79
0116-023870	258.70	2.07	0.954	83	2.3	2.32	0.35	5.79
0116-023871	258.70	2.07	0.954	83	2.3	2.32	0.35	5.79
0116-023878	240.00	2.10	0.952	81	1.4	2.32	0.35	5.79
0116-023879	240.00	2.10	0.952	81	1.4	2.32	0.35	5.79
0116-023880	240.00	2.10	0.952	81	1.4	2.32	0.35	5.79
0116-023881	240.00	2.10	0.952	81	1.4	2.32	0.35	5.79
0116-023882	241.80	2.37	0.952	73	1.3	2.32	0.35	5.79
0116-023883	241.80	2.37	0.952	73	1.3	2.32	0.35	5.79
0116-023884	241.80	2.37	0.952	73	1.3	2.32	0.35	5.79
0116-023885	241.80	2.37	0.952	73	1.3	2.32	0.35	5.79
0116-023886	241.80	2.37	0.952	73	1.3	2.32	0.35	5.79
0116-023887	242.80	2.17	0.952	73	1.3	2.32	0.35	5.79
0116-023888	242.80	2.17	0.952	73	1.3	2.32	0.35	5.79
0116-023889	242.80	2.17	0.952	73	1.3	2.32	0.35	5.79
0116-023890	242.80	2.17	0.952	73	1.3	2.32	0.35	5.79
0116-023891	242.80	2.17	0.952	73	1.3	2.32	0.35	5.79
0116-023892	230.00	2.57	0.955	74	1.5	1.59	0.35	5.78
0116-023893	230.00	2.57	0.955	74	1.5	1.59	0.35	5.78
0116-023894	230.00	2.57	0.955	74	1.5	1.59	0.35	5.78
0116-023895	230.00	2.57	0.955	74	1.5	1.59	0.35	5.78
0116-023896	230.00	2.57	0.955	74	1.5	1.59	0.35	5.78
0116-023897	236.50	2.57	0.955	74	1.5	1.59	0.35	5.78
0116-023898	236.50	2.57	0.955	74	1.5	1.59	0.35	5.78
0116-023899	236.50	2.57	0.955	74	1.5	1.59	0.35	5.78
0116-023900	236.50	2.57	0.955	74	1.5	1.59	0.35	5.78
0116-023901	236.50	2.57	0.955	74	1.5	1.59	0.35	5.78
0116-023902	231.70	2.57	0.955	74	1.5	1.59	0.35	5.78

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MANUFACTURING QUALITY CONTROL



TEST RESULTS

PROJECT NUMBER:SW2211

SALES ORDER:SO-094167

PACKING SLIP NUMBER:Pre-SO-094167-5

PROJECT NAME : OWL LF CELLS 4A 4B

Test	1	2	3	4	5	6	7	8
0116-023918	232.40	2.44	0.954	76	3.1	1.77	0.35	4.18
0116-023919	232.40	2.44	0.954	76	3.1	1.77	0.35	4.18
0116-023920	232.40	2.44	0.954	76	3.1	1.77	0.35	4.18
0116-023921	232.40	2.44	0.954	76	3.1	1.77	0.35	4.18
0116-023922	232.40	2.44	0.954	76	3.1	1.77	0.35	4.18
0116-023923	219.80	2.22	0.954	76	3.1	1.77	0.35	4.18
0116-023924	219.80	2.22	0.954	76	3.1	1.77	0.35	4.18

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MANUFACTURING QUALITY CONTROL



TEST RESULTS

PROJECT NUMBER:SW2211

SALES ORDER:SO-094167

PACKING SLIP NUMBER:Pre-SO-094167-5

PROJECT NAME : OWL LF CELLS 4A 4B

PRODUCT: 1106338-35011-4

FabriNet 200 mil, Single Sided Top 10 oz/yd², Nonwoven Cal.

Test	Property	Direction	Test Method	Frequency	Unit
1	Mass per Unit Area (min. avg.)		ASTM D5261	1/90,000 ft²	oz/yd²
	Grab Tensile Properties (min. avg)		ASTM D4632	90,000 ft²/8,365 m²	
2	Strength (MD)				lbf
3	Strength (TD)				lbf
4	Elongation (MD)				%
5	Elongation (TD)				%
6	Trapezoidal Tear Strength	MD	ASTM D4533	1/90,000 ft²	lbf
7	Trapezoidal Tear Strength	TD	ASTM D4533	1/90,000 ft²	lbf
8	CBR Puncture Strength		ASTM D6241	1/540,000 ft²	lbf
9	Apparent Opening Size (max.)		ASTM D4751	1/540,000 ft²	mm
10	Permittivity		ASTM D4491	1/540,000 ft²	sec⁻¹

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MANUFACTURING QUALITY CONTROL



TEST RESULTS

PROJECT NUMBER:SW2211

SALES ORDER:SO-094167

PACKING SLIP NUMBER:Pre-SO-094167-5

PROJECT NAME : OWL LF CELLS 4A 4B

Test	1	2	3	4	5	6	7	8	9	10
Specification	10	270	270	50	50	105	105	725	0.150	1.0
2027226191	11.6	449	502	76	79	154	194	1,048	0.150	1.7
2027226194	11.6	449	502	76	79	154	194	1,048	0.150	1.7
2027226197	11.3	398	461	75	82	152	200	1,118	0.150	1.8
2027226203	11.0	369	476	78	76	133	188	1,100	0.150	1.4
2027226205	11.0	369	476	78	76	133	188	1,100	0.150	1.4
2027226209	11.1	383	457	77	75	140	189	1,008	0.150	1.6
2027226210	11.1	383	457	77	75	140	189	1,008	0.150	1.6
2027226211	10.2	357	468	78	74	123	175	975	0.150	1.3
2027226212	10.2	357	468	78	74	123	175	975	0.150	1.3
2027226215	10.0	327	441	76	75	126	161	956	0.150	1.7
2027226216	10.0	327	441	76	75	126	161	956	0.150	1.7
2027226217	10.0	327	441	76	75	126	161	956	0.150	1.7
2027226218	10.0	327	441	76	75	126	161	956	0.150	1.7
2027226220	11.2	356	453	72	71	135	186	1,076	0.150	1.7
2027226230	10.7	371	497	76	76	138	180	968	0.150	1.4

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

SOLMAX.COM



CoA Date: 06/19/2022

Certificate of Analysis

Shipped To: SOLMAX GEOSYNTHETICS, LLC
19103 GUNDLE ROAD
HOUSTON TX 77073
USA

Recipient: Hickman
Fax:

Delivery #: 80697950
PO #: 605347
Weight: 203200.000 LB
Ship Date: 06/19/2022
Package: BULK
Mode: Hopper Car
Car #: HLTX007056
Seal No: 292206

Product:
MARLEX HHM 5502BN POLYETHYLENE in Bulk

Lot Number: DPF610480

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.34	g/10min
Density	D1505	0.9540	g/cm3
Production date		20220610	

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
QUALITY ASSURANCE SUPERINTENDENT

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

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

November 2, 2022

Mail To:

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

email: juan@sllsliner.com

Bill To:

<= Same (P.O. # 2211)

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: 75957

Material(s) Tested: One, Solmax FS2-225E-10-10-FA-00 Double 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 A, 190°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,

A handwritten signature in black ink, appearing to read 'Mansukh Patel'.

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division



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GEOCOMPOSITE TEST RESULTS

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

Material: Solmax FS2-225E-10-10-FA-00 Double Sided Geocomposite
Sample Identification: 0116-023770
TRI Log #: 75957

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Hydraulic Transmissivity (ASTM D4716)												
Direction Tested: Machine Direction Normal Load (psf):10,000 Hydraulic Gradient:0.1 Test Length (in):12 Test Width (in):12 Plate / Sample / Plate </												



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GEOCOMPOSITE TEST RESULTS

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

Material: Solmax FS2-225E-10-10-FA-00 Double Sided Geocomposite
Sample Identification: 0116-023770
TRI Log #: 75957

GEOTEXTILE - SIDE A

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Mass/Unit Area (ASTM D5261)												
5" diameter Circle - Mass (g)	5.17	4.65	5.08	4.92	4.73	4.98	4.77	4.44	4.55	4.50	4.78	0.25
Mass/Unit Area (oz/sq.yd)	12.03	10.82	11.82	11.44	11.00	11.58	11.10	10.33	10.58	10.47	11.12	0.58
Grab Tensile Properties (ASTM D4632)												
MD - Tensile Strength (lbs)	459	374	349	374	354	407	382	356	395	415	387	34
TD - Tensile Strength (lbs)	474	513	466	530	585	534	419	378	454	521	487	61
MD - Elong. @ Max. Load (%)	93	87	79	83	83	91	86	81	86	83	85	4
TD - Elong. @ Max. Load (%)	93	87	83	83	93	86	81	80	91	92	87	5
Puncture Resistance (ASTM D4833)												
Puncture Strength (lbs)	213	197	155	176	177						183	22
Trapezoidal Tear (ASTM D4533)												
MD - Tear Strength (lbs)	130	124	124	121	135	153	163	127	149	132	136	14
TD - Tear Strength (lbs)	253	211	209	199	184	199	243	202	180	179	206	25
MD Machine Direction	TD Transverse Direction											



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GEOCOMPOSITE TEST RESULTS

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

Material: Solmax FS2-225E-10-10-FA-00 Double Sided Geocomposite
Sample Identification: 0116-023770
TRI Log #: 75957

GEOTEXTILE - SIDE B

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Mass/Unit Area (ASTM D5261)												
5" diameter Circle - Mass (g)	3.75	4.39	4.35	3.67	4.71	4.86	4.67	3.99	4.50	4.33	4.32	0.40
Mass/Unit Area (oz/sq.yd)	8.72	10.21	10.12	8.54	10.96	11.30	10.86	9.28	10.47	10.07	10.05	0.94
Grab Tensile Properties (ASTM D4632)												
MD - Tensile Strength (lbs)	463	276	280	338	414	386	352	312	342	427	359	63
TD - Tensile Strength (lbs)	372	490	416	441	442	410	404	340	446	433	419	42
MD - Elong. @ Max. Load (%)	83	88	90	93	77	81	80	79	84	75	83	6
TD - Elong. @ Max. Load (%)	123	99	94	85	92	103	87	75	98	89	94	13
Puncture Resistance (ASTM D4833)												
Puncture Strength (lbs)	143	200	163	154	215						175	31
Trapezoidal Tear (ASTM D4533)												
MD - Tear Strength (lbs)	159	104	94	140	156	150	176	118	179	130	141	29
TD - Tear Strength (lbs)	187	168	161	169	168	198	223	223	203	179	188	23
MD Machine Direction	TD Transverse Direction											



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December 9, 2022

Mail To:

Mark Decarlo
Southwest Liner Systems
301 Calle Industrial
Bernalillo, NM 87004

email: swls.md@gmail.com

Dear Mr. Decarlo:

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.

Bill To:

<= Same (P.O.# 2211)

Project: **Owl Landfill Cell 4A & 4B**

TRI Job Reference Number: 76904

Material(s) Tested: One Skaps TN220-2-10 Double Sided Geocomposite(s)

Test(s) Requested: Transmissivity (ASTM D4716) - GC
Peel Strength (ASTM D7005) - GC
Transmissivity (ASTM D4716) - GN
Thickness (ASTM D5199) - GN
Density (ASTM D1505) - GN
Carbon Content (ASTM D4218) - GN
Tensile Properties (ASTM D7179, 12 ipm strain rate) - GN
Mass/Unit Area (ASTM D5261) - GT
Grab Tensile (ASTM D4632) - GT
Puncture Strength (ASTM D 4833) - GT
Trapezoidal Tear (ASTM D4533) - GT
Apparent Opening Size (ASTM D4751) - GT
Permittivity (ASTM D4491) - GT
Mass/Unit Area (ASTM 3376) - 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,

A handwritten signature in black ink, appearing to read 'Mansukh Patel'.

Mansukh Patel
Technical Director
Geosynthetic Services Division



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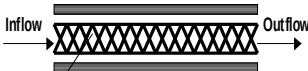
GEOCOMPOSITE TEST RESULTS

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

Material: Skaps TN220-2-10 Double Sided Geocomposite

Sample Identification: 0121501010001

TRI Log #: 76904

PARAMETER		TEST REPLICATE NUMBER							MEAN	STD. DEV.	
Hydraulic Transmissivity (ASTM D4716)											
Direction Tested: Machine Direction Normal Load (psf): 10,000 Hydraulic Gradient: 0.1 Test Length (in) 12 Test Width (in) 12											
Plate Inflow  Outflow DS GC Plate											
Plate / Sample / Plate											
Seat Time (hours)		Specimen		1		2					
0.25	Volume (cc)	772	755	748	699	692	683				
	Time (s)	25.54	25.43	25.41	15.49	15.44	15.36				
	Flow Rate (GPM/ft width)	0.48	0.47	0.47	0.71	0.71	0.70	0.59	0.13		
	Transmissivity (m^2/s)	9.88E-04	9.72E-04	9.63E-04	1.48E-03	1.47E-03	1.45E-03	1.22E-03	2.69E-04		
	Test Temp (C)		20.3			20.3					
	Temp. Corr. Factor		0.997			0.997					
Peel Strength (ASTM D7005)											
A - MD Average Peel Strength (ppi)		1.12	2.87	3.79	0.64	6.37		2.96	2.30		
A - MD Average Peel Strength (g/in)		508	1303	1721	289	2892		1343	1043		
B - MD Average Peel Strength (ppi)		5.85	2.90	4.63	0.95	5.48		3.96	2.03		
B - MD Average Peel Strength (g/in)		2656	1317	2102	433	2488		1799	922		
Note: A and B represent a randomly assigned top and bottom of the sample											



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GEOCOMPOSITE TEST RESULTS

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

Material: Skaps TN220-2-10 Double Sided Geocomposite
Sample Identification: 0121501010001
TRI Log #: 76904

GEONET COMPONENT

PARAMETER											TEST REPLICATE NUMBER											MEAN	STD. DEV.	
Hydraulic Transmissivity (ASTM D4716)																								
Direction Tested: Machine Direction																								
Normal Load (psf):		10,000																						
Hydraulic Gradient:		0.1																						
Test Length (in)		12																						
Test Width (in)		12																						
Plate / Sample / Plate Plate Geonet Plate Inflow Outflow																								
Seat Time (hours)		Specimen											1		2									
0.25	Volume (cc)		743		738		761		746		763		728											
	Time (s)		5.35		5.32		5.52		5.37		5.42		5.30											
	Flow Rate (GPM/ft width)		2.19		2.19		2.17		2.19		2.22		2.16											
	Transmissivity (m^2/s)		4.53E-03		4.53E-03		4.50E-03		4.53E-03		4.59E-03		4.48E-03											
	Test Temp (C)				20.4						20.4													
Temp. Corr. Factor				0.995						0.995														
Thickness (ASTM D5199)																								
Thickness (mils)		228		231		229		230		230		232		235		236		229		229				
231 228 3<< min																								
Density (ASTM D1505)																								
Density (g/cm3)		0.953		0.953		0.953																		
0.953 0.000																								
Carbon Black Content (ASTM D1603, mod.)																								
% Carbon Black		2.55		2.53																				
2.54 0.01																								
Tensile Properties (ASTM D7179, 12 ipm strain rate)																								
MD Max. Strength (ppi)		62		61		67		62		64														
63 3																								
MD Elong. @ Max. Strength (%)		21		21		19		18		19														
19 1																								
Mass/Unit Area (ASTM D 3776, Option C)																								
5" diameter circle (grams)		9.69		9.74		10.40		10.38		10.46		10.15		10.34		10.20		10.40		10.15				
10.19 0.27																								
Mass/Unit Area (lbs/sq.yd)		0.16		0.16		0.17		0.17		0.17		0.16		0.17		0.16		0.17		0.16				
0.16 0.00																								
Melt Flow Index (ASTM D1238, Method A, 190°C / 2.16 kg)																								
Melt Flow Index (g/10 min)		0.13		0.12																				
0.13																								
MD Machine Direction																								



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GEOCOMPOSITE TEST RESULTS

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

Material: Skaps TN220-2-10 Double Sided Geocomposite

Sample Identification: 0121501010001

TRI Log #: 76904

GEOTEXTILE - SIDE A

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Mass/Unit Area (ASTM D5261)												
5" diameter Circle - Mass (g)	4.34	4.99	5.29	5.14	4.37	5.04	4.73	4.95	4.75	4.17	4.78	0.38
Mass/Unit Area (oz/sq.yd)	10.09	11.61	12.30	11.96	10.16	11.72	11.00	11.51	11.05	9.70	11.11	0.87
Grab Tensile Properties (ASTM D4632)												
MD - Tensile Strength (lbs)	309	307	358	315	274	393	309	343	300	326	323	34
TD - Tensile Strength (lbs)	332	425	406	390	327	363	339	374	338	341	363	34
MD - Elong. @ Max. Load (%)	70	75	85	71	75	74	75	83	76	83	77	5
TD - Elong. @ Max. Load (%)	83	97	99	93	97	105	86	98	85	89	93	7
Puncture Resistance (ASTM D4833)												
Puncture Strength (lbs)	181	197	208	213	197						199	12
Trapezoidal Tear (ASTM D4533)												
MD - Tear Strength (lbs)	134	123	119	129	111	127	128	119	116	119	122	7
TD - Tear Strength (lbs)	162	139	154	155	147	167	183	148	171	158	158	13
Apparent Opening Size (ASTM D4751)												
Opening Size Diameter (mm)	0.172	0.149	0.155	0.157	0.157						0.158	0.008
Sieve No.	70	100	70	70	70						70	
Permittivity (ASTM D4491,Method C)												
Thickness (mil)	136	161	161	149	157	169	168	163	148	142	155	11
Thickness (mm)	3.45	4.09	4.09	3.78	3.98	4.29	4.27	4.14	3.77	3.61	3.95	0.28
Permittivity (Sec-1)	1.67	1.13	1.29	1.31	1.29	1.21	1.06	1.33	1.44	1.43	1.32	0.17
Permittivity (GPM/ft2)	124.9	84.5	96.5	98.0	96.5	90.5	79.3	99.5	107.7	107.0	98.4	12.9
Flow rate (LPM/m2)	5090	3444	3932	3992	3932	3688	3231	4053	4389	4358	4011	525
Permittivity (cm/sec)	0.576	0.463	0.528	0.495	0.513	0.519	0.453	0.550	0.543	0.516	0.516	0.038
MD Machine Direction	TD Transverse Direction											



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GEOCOMPOSITE TEST RESULTS

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

Material: Skaps TN220-2-10 Double Sided Geocomposite

Sample Identification: 0121501010001

TRI Log #: 76904

GEOTEXTILE - SIDE B

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Mass/Unit Area (ASTM D5261)												
5" diameter Circle - Mass (g)	4.81	4.95	4.66	4.92	5.37	4.74	4.63	4.73	4.93	4.68	4.84	0.22
Mass/Unit Area (oz/sq.yd)	11.19	11.51	10.84	11.44	12.49	11.03	10.77	11.00	11.47	10.89	11.26	0.51
Grab Tensile Properties (ASTM D4632)												
MD - Tensile Strength (lbs)	341	336	277	314	355	387	309	338	308	258	322	37
TD - Tensile Strength (lbs)	379	305	396	339	396	351	355	370	378	355	362	28
MD - Elong. @ Max. Load (%)	77	82	73	77	76	73	75	79	73	70	76	3
TD - Elong. @ Max. Load (%)	93	91	96	87	101	107	89	92	89	87	93	6
Puncture Resistance (ASTM D4833)												
Puncture Strength (lbs)	196	171	175	225	172						188	23
Trapezoidal Tear (ASTM D4533)												
MD - Tear Strength (lbs)	104	154	125	112	139	148	124	140	146	116	131	17
TD - Tear Strength (lbs)	159	170	167	135	174	156	156	157	142	184	160	15
Apparent Opening Size (ASTM D4751)												
Opening Size Diameter (mm)	0.170	0.151	0.163	0.149	0.159						0.158	0.009
Sieve No.	70	70	70	100	70						70	
Permittivity (ASTM D4491,Method C)												
Thickness (mil)	138	168	146	169	145	164	166	166	153	154	157	11
Thickness (mm)	3.52	4.26	3.70	4.29	3.69	4.16	4.21	4.21	3.88	3.90	3.98	0.28
Permittivity (Sec-1)	1.59	1.15	1.42	1.10	1.32	1.30	1.17	1.18	1.40	1.36	1.30	0.15
Permittivity (GPM/ft2)	118.9	86.0	106.2	82.3	98.7	97.2	87.5	88.3	104.7	101.7	97.2	11.3
Flow rate (LPM/m2)	4846	3505	4328	3352	4023	3962	3566	3596	4267	4145	3959	461
Permittivity (cm/sec)	0.559	0.490	0.526	0.472	0.486	0.540	0.492	0.497	0.543	0.530	0.514	0.029
MD Machine Direction	TD Transverse Direction											



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November 11, 2022

Mail To:

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

email: juan@slliner.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.

Bill To:

<= Same (P.O. # 2211)

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 A, 190°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,

A handwritten signature in black ink, appearing to read 'Mansukh Patel'.

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division



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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

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. SPEC.			
	1	2	3	4	5	6	7	8	9	10						
Hydraulic Transmissivity (ASTM D4716)																
Direction Tested: Machine Direction Normal Load (psf):10,000 Hydraulic Gradient:0.1 Test Length (in):12 Test Width (in):12 Plate / Sample / Plate Seat Time (hours) Specimen 1 2 Volume (cc) Time (s) Flow Rate (GPM/ft width) Transmissivity (m²/s) Test Temp (C) Temp. Corr. Factor 646 5.43 1.87 3.86E-03 20.6 0.990 645 5.43 1.87 3.86E-03 20.6 0.990 647 5.48 1.85 3.84E-03 4.86E-03 0.990 808 5.40 2.35 4.81E-03 20.6 0.990 807 5.45 2.33 4.80E-03 20.6 0.990 807 5.46 2.32 4.80E-03 20.6 0.990 Plate Sample Plate Inflow Outflow																
0.25											2.10	0.26	0.5 min			
											4.34E-03	5.32E-04	1.00E-04			
Peel Strength (ASTM D7005)																
A - MD Average Peel Strength (ppi)	2.25	2.13	2.69	1.32	2.86						2.25	0.60	1.0 min			
A - MD Average Peel Strength (g/in)	1022	967	1221	599	1298						1022	273				

Inflow

Sample

Outflow



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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 REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Hydraulic Transmissivity (ASTM D4716)													
Direction Tested: Machine Direction Normal Load (psf): 10,000 Hydraulic Gradient: 0.1 Test Length (in): 12 Test Width (in): 12													
Plate / Sample / Plate													
Seat Time (hours)	Specimen												
		1	2										
Volume (cc)	1971	1984	1991	6000	6000	6000							
Time (s)	10.32	10.36	10.39	22.42	22.44	22.45							
Flow Rate (GPM/ft width)	3.01	3.02	3.02	4.21	4.21	4.20							
Transmissivity (m ² /s)	6.23E-03	6.25E-03	6.25E-03	8.71E-03	8.71E-03	8.70E-03							
Test Temp (C)		20.4			20.5								
Temp. Corr. Factor		0.995			0.992								
											3.61	0.65	0.5 min
											7.48E-03	1.35E-03	1.00E-04
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/cm ³)	0.948	0.948	0.948										
											0.948	0.000	0.940 min
Carbon Black Content (ASTM D1603, mod.)													
% Carbon Black	2.31	2.28											
											2.30	0.02	2.0 - 3.0
Melt Flow Index (ASTM D1238, Method 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 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 strain 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													



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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 REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
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 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 D4833)													
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 D4751)													
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, Method 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 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: 0116-023865
TRI Log #: 75958

PARAMETER	TEST REPLICATE NUMBER					MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5			
Peel Strength (ASTM D7005)								
A - MD Average Peel Strength (ppi)	3.05	1.92	2.69	3.40	3.99	3.01	0.78	1.0 min
A - MD Average Peel Strength (g/in)	1385	872	1221	1544	1811	1367	352	
MD Machine Direction								

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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 REPLICATE NUMBER										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 D1603, mod.)													
% Carbon Black	2.55	2.55									2.55	0.00	2.0 - 3.0
Melt Flow Index (ASTM D1238, Method 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, Option 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, 12 ipm strain 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													



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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

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. 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 D4833)													
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

PARAMETER	TEST REPLICATE NUMBER					MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5			
Peel Strength (ASTM D7005)								
A - MD Average Peel Strength (ppi)	1.74	1.42	1.92	1.68	1.41	1.63	0.22	1.0 min
A - MD Average Peel Strength (g/in)	790	645	872	763	640	742	99	
MD Machine Direction								

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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 REPLICATE NUMBER										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 D1603, mod.)													
% Carbon Black	2.59	2.59									2.59	0.00	2.0 - 3.0
Melt Flow Index (ASTM D1238, Method 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, Option 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, 12 ipm strain 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													



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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

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. 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 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 D4833)													
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												

APPENDIX C: CELL 4 A/B LINER INSTALLATION DOCUMENTATION

C.1 GCL Inventory Control Log

Parkhill

GCL 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:	GCL	DATE OF INVENTORY:	See Below
MATERIAL IDENTIFICATION:	1109263-35011-6, Bentoliner 0.75lbs/ft ² , NS, Peel 35	INVENTORY MONITOR:	TBA
MATERIAL MANUFACTURER:	Solmax/GSE	UNLOADING METHOD:	Forklift and Sling

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE OF INVENTORY
			LENGTH (FT)	WIDTH (FT)	Area (FT ²)			
1	0242-387065	1109263-35011-6	150	15.5	2325	Y		10/28/2022
2	0242-387066	1109263-35011-6	150	15.5	2325	Y		10/28/2022
3	0242-387067	1109263-35011-6	150	15.5	2325	Y		10/28/2022
4	0242-387068	1109263-35011-6	150	15.5	2325	Y		10/28/2022
5	0242-387069	1109263-35011-6	150	15.5	2325	Y		10/28/2022
6	0242-387070	1109263-35011-6	150	15.5	2325	Y		10/28/2022
7	0242-387071	1109263-35011-6	150	15.5	2325	Y		10/28/2022
8	0242-387072	1109263-35011-6	150	15.5	2325	Y		10/28/2022
9	0242-387073	1109263-35011-6	150	15.5	2325	Y	Y	10/28/2022
10	0242-387074	1109263-35011-6	150	15.5	2325	Y		10/28/2022
11	0242-387075	1109263-35011-6	150	15.5	2325	Y		10/28/2022
12	0242-387076	1109263-35011-6	150	15.5	2325	Y		10/28/2022
13	0242-387077	1109263-35011-6	150	15.5	2325	Y		10/28/2022
14	0242-387078	1109263-35011-6	150	15.5	2325	Y		10/28/2022
15	0242-387079	1109263-35011-6	150	15.5	2325	Y		10/28/2022
16	0242-387080	1109263-35011-6	150	15.5	2325	Y		10/28/2022
17	0242-387081	1109263-35011-6	150	15.5	2325	Y		10/28/2022
18	0242-387082	1109263-35011-6	150	15.5	2325	Y		10/28/2022
19	0242-387083	1109263-35011-6	150	15.5	2325	Y		10/28/2022
20	0242-387084	1109263-35011-6	150	15.5	2325	Y		10/28/2022
21	0242-387085	1109263-35011-6	150	15.5	2325	Y		10/28/2022
22	0242-387086	1109263-35011-6	150	15.5	2325	Y		10/28/2022
23	0242-387087	1109263-35011-6	150	15.5	2325	Y		10/28/2022
24	0242-387088	1109263-35011-6	150	15.5	2325	Y		10/28/2022
25	0242-387089	1109263-35011-6	150	15.5	2325	Y		10/28/2022
26	0242-387090	1109263-35011-6	150	15.5	2325	Y		10/28/2022
27	0242-387091	1109263-35011-6	150	15.5	2325	Y		10/28/2022
28	0242-387092	1109263-35011-6	150	15.5	2325	Y		10/28/2022
29	0242-387093	1109263-35011-6	150	15.5	2325	Y		10/28/2022
30	0242-387094	1109263-35011-6	150	15.5	2325	Y		10/28/2022
31	0242-387095	1109263-35011-6	150	15.5	2325	Y		10/28/2022
32	0242-387096	1109263-35011-6	150	15.5	2325	Y		10/28/2022
33	0242-387097	1109263-35011-6	150	15.5	2325	Y		10/28/2022
34	0242-387098	1109263-35011-6	150	15.5	2325	Y		10/28/2022
35	0242-387099	1109263-35011-6	150	15.5	2325	Y		10/28/2022
36	0242-387100	1109263-35011-6	150	15.5	2325	Y		10/28/2022
37	0242-387101	1109263-35011-6	150	15.5	2325	Y		10/28/2022
38	0242-387102	1109263-35011-6	150	15.5	2325	Y		10/28/2022
39	0242-387103	1109263-35011-6	150	15.5	2325	Y		10/28/2022
40	0242-387104	1109263-35011-6	150	15.5	2325	Y		10/28/2022

Parkhill**GCL 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:	2
MATERIAL TYPE:	GCL	DATE OF INVENTORY:	See Below
MATERIAL IDENTIFICATION:	1109263-35011-6, Bentoliner 0.75lbs/ft ² , NS, Peel 35	INVENTORY MONITOR:	TBA
MATERIAL MANUFACTURER:	Solmax/GSE	UNLOADING METHOD:	Forklift and Sling

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE OF INVENTORY
			LENGTH (FT)	WIDTH (FT)	Area (FT ²)			
1	0242-387105	1109263-35011-6	150	15.5	2325	Y		10/28/2022
2	0242-387106	1109263-35011-6	150	15.5	2325	Y		10/28/2022
3	0242-387107	1109263-35011-6	150	15.5	2325	Y		10/28/2022
4	0242-387108	1109263-35011-6	150	15.5	2325	Y		10/28/2022
5	0242-387109	1109263-35011-6	150	15.5	2325	Y		10/28/2022
6	0242-387110	1109263-35011-6	150	15.5	2325	Y		10/28/2022
7	0242-387111	1109263-35011-6	150	15.5	2325	Y		10/28/2022
8	0242-387112	1109263-35011-6	150	15.5	2325	Y		10/28/2022
9	0242-387113	1109263-35011-6	150	15.5	2325	Y		10/28/2022
10	0242-387114	1109263-35011-6	150	15.5	2325	Y		10/28/2022
11	0242-387115	1109263-35011-6	150	15.5	2325	Y		10/28/2022
12	0242-387116	1109263-35011-6	150	15.5	2325	Y		10/28/2022
13	0242-387117	1109263-35011-6	150	15.5	2325	Y	Y	10/28/2022
14	0242-387118	1109263-35011-6	150	15.5	2325	Y		10/28/2022
15	0242-387119	1109263-35011-6	150	15.5	2325	Y		10/28/2022
16	0242-387120	1109263-35011-6	150	15.5	2325	Y		10/28/2022
17	0242-387121	1109263-35011-6	150	15.5	2325	Y		10/28/2022
18	0242-387122	1109263-35011-6	150	15.5	2325	Y		10/28/2022
19	0242-387123	1109263-35011-6	150	15.5	2325	Y		10/28/2022
20	0242-387124	1109263-35011-6	150	15.5	2325	Y		10/28/2022
21	0242-387125	1109263-35011-6	150	15.5	2325	Y		10/28/2022
22	0242-387126	1109263-35011-6	150	15.5	2325	Y		10/28/2022
23	0242-387127	1109263-35011-6	150	15.5	2325	Y		10/28/2022
24	0242-387128	1109263-35011-6	150	15.5	2325	Y		10/28/2022
25	0242-387129	1109263-35011-6	150	15.5	2325	Y		10/28/2022
26	0242-387130	1109263-35011-6	150	15.5	2325	Y		10/28/2022
27	0242-387131	1109263-35011-6	150	15.5	2325	Y		10/28/2022
28	0242-387132	1109263-35011-6	150	15.5	2325	Y		10/28/2022
29	0242-387133	1109263-35011-6	150	15.5	2325	Y		10/28/2022
30	0242-387134	1109263-35011-6	150	15.5	2325	Y		10/28/2022
31	0242-387135	1109263-35011-6	150	15.5	2325	Y		10/28/2022
32	0242-387136	1109263-35011-6	150	15.5	2325	Y		10/29/2022
33	0242-387137	1109263-35011-6	150	15.5	2325	Y		10/29/2022
34	0242-387138	1109263-35011-6	150	15.5	2325	Y		10/29/2022
35	0242-387139	1109263-35011-6	150	15.5	2325	Y		10/31/2022
36	0242-387140	1109263-35011-6	150	15.5	2325	Y		10/31/2022
37	0242-387141	1109263-35011-6	150	15.5	2325	Y		10/31/2022
38	0242-387142	1109263-35011-6	150	15.5	2325	Y		10/31/2022
39	0242-387143	1109263-35011-6	150	15.5	2325	Y		10/31/2022
40	0242-387144	1109263-35011-6	150	15.5	2325	Y		10/31/2022

Parkhill

GCL 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:	3
MATERIAL TYPE:	GCL	DATE OF INVENTORY:	See Below
MATERIAL IDENTIFICATION:	1109263-35011-6, Bentoliner 0.75lbs/ft ² , NS, Peel 35	INVENTORY MONITOR:	TBA
MATERIAL MANUFACTURER:	Solmax/GSE	UNLOADING METHOD:	Forklift and Sling

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE OF INVENTORY
			LENGTH (FT)	WIDTH (FT)	Area (FT ²)			
1	0242-387145	1109263-35011-6	150	15.5	2325	Y		10/31/2022
2	0242-387146	1109263-35011-6	150	15.5	2325	Y		10/31/2022
3	0242-387147	1109263-35011-6	150	15.5	2325	Y		10/31/2022
4	0242-387148	1109263-35011-6	150	15.5	2325	Y		10/31/2022
5	0242-387149	1109263-35011-6	150	15.5	2325	Y		10/31/2022
6	0242-387150	1109263-35011-6	150	15.5	2325	Y		10/31/2022
7	0242-387151	1109263-35011-6	150	15.5	2325	Y		10/31/2022
8	0242-387152	1109263-35011-6	150	15.5	2325	Y		10/31/2022
9	0242-387153	1109263-35011-6	150	15.5	2325	Y		10/31/2022
10	0242-387154	1109263-35011-6	150	15.5	2325	Y		10/31/2022
11	0242-387155	1109263-35011-6	150	15.5	2325	Y		10/31/2022
12	0242-387156	1109263-35011-6	150	15.5	2325	Y		10/31/2022
13	0242-387157	1109263-35011-6	150	15.5	2325	Y		10/31/2022
14	0242-387158	1109263-35011-6	150	15.5	2325	Y		10/31/2022
15	0242-387159	1109263-35011-6	150	15.5	2325	Y		10/31/2022
16	0242-387160	1109263-35011-6	150	15.5	2325	Y		10/31/2022
17	0242-387161	1109263-35011-6	150	15.5	2325	Y	Y	10/31/2022
18	0242-387162	1109263-35011-6	150	15.5	2325	Y		10/31/2022
19	0242-387163	1109263-35011-6	150	15.5	2325	Y		10/31/2022
20	0242-387164	1109263-35011-6	150	15.5	2325	Y		10/31/2022
21	0242-387165	1109263-35011-6	150	15.5	2325	Y		10/31/2022
22	0242-387166	1109263-35011-6	150	15.5	2325	Y		10/31/2022
23	0242-387167	1109263-35011-6	150	15.5	2325	Y		10/31/2022
24	0242-387168	1109263-35011-6	150	15.5	2325	Y		10/31/2022
25	0242-387169	1109263-35011-6	150	15.5	2325	Y		10/31/2022
26	0242-387170	1109263-35011-6	150	15.5	2325	Y		10/31/2022
27	0242-387171	1109263-35011-6	150	15.5	2325	Y		10/31/2022
28	0242-387172	1109263-35011-6	150	15.5	2325	Y		10/31/2022
29	0242-387173	1109263-35011-6	150	15.5	2325	Y		10/31/2022
30	0242-387174	1109263-35011-6	150	15.5	2325	Y		10/31/2022
31	0242-387175	1109263-35011-6	150	15.5	2325	Y		10/31/2022
32	0242-387176	1109263-35011-6	150	15.5	2325	Y		10/31/2022
33	0242-387177	1109263-35011-6	150	15.5	2325	Y		10/31/2022
34	0242-387178	1109263-35011-6	150	15.5	2325	Y		10/31/2022
35	0242-387179	1109263-35011-6	150	15.5	2325	Y		10/31/2022
36	0242-387180	1109263-35011-6	150	15.5	2325	Y		10/31/2022
37	0242-387181	1109263-35011-6	150	15.5	2325	Y		10/31/2022
38	0242-387182	1109263-35011-6	150	15.5	2325	Y		10/31/2022
39	0242-387183	1109263-35011-6	150	15.5	2325	Y		10/31/2022
40	0242-387184	1109263-35011-6	150	15.5	2325	Y		10/31/2022



GCL 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:	4
MATERIAL TYPE:	GCL	DATE OF INVENTORY:	See Below
MATERIAL IDENTIFICATION:	1109263-35011-6, Bentoliner 0.75lbs/ft ² , NS, Peel 35	INVENTORY MONITOR:	TBA
MATERIAL MANUFACTURER:	Solmax/GSE	UNLOADING METHOD:	Forklift and Sling

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE OF INVENTORY
			LENGTH (FT)	WIDTH (FT)	Area (FT ²)			
1	0242-387185	1109263-35011-6	150	15.5	2325	Y		10/31/2022
2	0242-387186	1109263-35011-6	150	15.5	2325	Y		10/31/2022
3	0242-387187	1109263-35011-6	150	15.5	2325	Y		10/31/2022
4	0242-387188	1109263-35011-6	150	15.5	2325	Y		10/31/2022
5	0242-387189	1109263-35011-6	150	15.5	2325	Y		10/31/2022
6	0242-387190	1109263-35011-6	150	15.5	2325	Y		10/31/2022
7	0242-387191	1109263-35011-6	150	15.5	2325	Y		10/31/2022
8	0242-387192	1109263-35011-6	150	15.5	2325	Y		10/31/2022
9	0242-387193	1109263-35011-6	150	15.5	2325	Y		10/31/2022
10	0242-387194	1109263-35011-6	150	15.5	2325	Y		10/31/2022
11	0242-387195	1109263-35011-6	150	15.5	2325	Y		10/31/2022
12	0242-387196	1109263-35011-6	150	15.5	2325	Y		10/31/2022
13	0242-387197	1109263-35011-6	150	15.5	2325	Y		10/31/2022
14	0242-387198	1109263-35011-6	150	15.5	2325	Y		10/31/2022
15	0242-387199	1109263-35011-6	150	15.5	2325	Y		10/31/2022
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APPENDIX C: CELL 4 A/B LINER INSTALLATION DOCUMENTATION

C.2 Geonet Inventory Control Log

Parkhill**GEONET 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:	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

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE OF INVENTORY
			LENGTH (FT)	WIDTH (FT)	THICKNESS OF WEIGHT			
1	0116-022641	DPF611332	330	15.0	200mil	Y	Y	10/28/2022
2	0116-022642	DPF611332	330	15.0	200mil	Y		10/28/2022
3	0116-022643	DPF611332	330	15.0	200mil	Y		10/28/2022
4	0116-022644	DPF611332	330	15.0	200mil	Y		10/28/2022
5	0116-022645	DPF611332	330	15.0	200mil	Y		10/28/2022
6	0116-022646	DPF611332	330	15.0	200mil	Y		10/28/2022
7	0116-022647	DPF611332	330	15.0	200mil	Y		10/28/2022
8	0116-022648	DPF611332	330	15.0	200mil	Y		10/28/2022
9	0116-022649	DPF611332	330	15.0	200mil	Y		10/28/2022
10	0116-022650	DPF611332	330	15.0	200mil	Y		10/28/2022
11	0116-022651	DPF611332	330	15.0	200mil	Y		10/28/2022
12	0116-022652	DPF611332	330	15.0	200mil	Y		10/28/2022
13	0116-022653	DPF611332	330	15.0	200mil	Y		10/28/2022
14	0116-022654	DPF611332	330	15.0	200mil	Y		10/28/2022
15	0116-022655	DPF611332	330	15.0	200mil	Y		10/28/2022
16	0116-022656	DPF611332	330	15.0	200mil	Y		10/28/2022
17	0116-022793	DPF611332	330	15.0	200mil	Y		10/28/2022
18	0116-022794	DPF611332	330	15.0	200mil	Y		10/28/2022
19	0116-022795	DPF611332	330	15.0	200mil	Y		10/28/2022
20	0116-022796	DPF611332	330	15.0	200mil	Y		10/28/2022
21	0116-022797	DPF611332	330	15.0	200mil	Y		10/28/2022
22	0116-022798	DPF611332	330	15.0	200mil	Y		10/28/2022
23	0116-022799	DPF611332	330	15.0	200mil	Y		10/28/2022
24	0116-022800	DPF611332	330	15.0	200mil	Y		10/28/2022
25	0116-022801	DPF611332	330	15.0	200mil	Y		10/28/2022
26	0116-022802	DPF611332	330	15.0	200mil	Y		10/28/2022
27	0116-022803	DPF611332	330	15.0	200mil	Y		10/28/2022
28	0116-022804	DPF611332	330	15.0	200mil	Y		10/28/2022
29	0116-022805	DPF611332	330	15.0	200mil	Y		10/28/2022
30	0116-022806	DPF611332	330	15.0	200mil	Y		10/28/2022
31	0116-022807	DPF611332	330	15.0	200mil	Y		10/28/2022
32	0116-022809	DPF611332	330	15.0	200mil	Y		10/28/2022
33	0116-022810	DPF611332	330	15.0	200mil	Y		10/28/2022
34	0116-023308	DPF610442	330	15.0	200mil	Y		10/28/2022
35	0116-023310	DPF610442	330	15.0	200mil	Y		10/28/2022
36	0116-023311	DPF610442	330	15.0	200mil	Y		10/28/2022
37	0116-023327	DPF610442	330	15.0	200mil	Y		10/28/2022
38	0116-023328	DPF610442	330	15.0	200mil	Y		10/28/2022
39	0116-023329	DPF610442	330	15.0	200mil	Y		10/28/2022
40	0116-023330	DPF610442	330	15.0	200mil	Y		10/28/2022

Parkhill

GEONET 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:	2
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

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE OF INVENTORY
			LENGTH (FT)	WIDTH (FT)	THICKNESS OF WEIGHT			
41	0116-023331	DPF610442	330	15.0	200mil	Y		10/28/2022
42	0116-023332	DPF610442	330	15.0	200mil	Y		10/28/2022
43	0116-023333	DPF610442	330	15.0	200mil	Y		10/28/2022
44	0116-023334	DPF610442	330	15.0	200mil	Y		10/28/2022
45	0116-023335	DPF610442	330	15.0	200mil	Y		10/28/2022
46	0116-023336	DPF610442	330	15.0	200mil	Y		10/28/2022
47	0116-023337	DPF610442	330	15.0	200mil	Y		10/28/2022
48	0116-023338	DPF610442	330	15.0	200mil	Y		10/28/2022
49	0116-023339	DPF610442	330	15.0	200mil	Y		10/28/2022
50	0116-023340	DPF610442	330	15.0	200mil	Y		10/28/2022
51	0116-023341	DPF610442	330	15.0	200mil	Y		10/28/2022
52	0116-023342	DPF610442	330	15.0	200mil	Y		10/28/2022
53	0116-023343	DPF610442	330	15.0	200mil	Y		10/28/2022
54	0116-023344	DPF610442	330	15.0	200mil	Y		10/28/2022
55	0116-023345	DPF610442	330	15.0	200mil	Y		10/28/2022
56	0116-023346	DPF610442	330	15.0	200mil	Y		10/28/2022
57	0116-023347	DPF610442	330	15.0	200mil	Y		10/28/2022
58	0116-023348	DPF610442	330	15.0	200mil	Y		10/28/2022
59	0116-023349	DPF610442	330	15.0	200mil	Y		10/28/2022
60	0116-023350	DPF610442	330	15.0	200mil	Y		10/28/2022
61	0116-023351	DPF610442	330	15.0	200mil	Y		10/28/2022
62	0116-023353	DPF610442	330	15.0	200mil	Y		10/28/2022
63	0116-023354	DPF610442	330	15.0	200mil	Y		10/28/2022
64	0116-023368	DPF610442	330	15.0	200mil	Y		10/28/2022
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APPENDIX C: CELL 4 A/B LINER INSTALLATION DOCUMENTATION

C.3 FML Inventory Control Log



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	INVENTORY MONITOR:	TBA
MATERIAL MANUFACTURER:	Solmax/GSE	UNLOADING METHOD:	Forklift and Sling

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE OF INVENTORY
			LENGTH (FT)	WIDTH (FT)	THICKNESS OF WEIGHT			
1	0101-206380	22G1286	576	22.5	60mil	Y		11/15/2022
2	0101-206381	22G1286	576	22.5	60mil	Y		11/15/2022
3	0101-206717	22H1158	576	22.5	60mil	Y		11/15/2022
4	0101-206718	22H1158	576	22.5	60mil	Y		11/15/2022
5	0101-206720	22H1158	576	22.5	60mil	Y		11/15/2022
6	0101-206721	22H1158	576	22.5	60mil	Y		11/15/2022
7	0101-206722	22H1158	576	22.5	60mil	Y		11/15/2022
8	0101-206723	22H1158	576	22.5	60mil	Y		11/15/2022
9	0101-206724	22H1158	576	22.5	60mil	Y		11/15/2022
10	0101-206725	22H1158	576	22.5	60mil	Y		11/15/2022
11	0101-206726	22I1134	576	22.5	60mil	Y		11/15/2022
12	0101-206727	22I1134	576	22.5	60mil	Y		11/15/2022
13	0101-206728	22I1134	576	22.5	60mil	Y	Y	11/15/2022
14	0101-206729	22I1134	576	22.5	60mil	Y		11/15/2022
15	0101-206730	22I1134	576	22.5	60mil	Y		11/15/2022
16	0101-206731	22I1134	576	22.5	60mil	Y		11/15/2022
17	0101-206732	22I1134	576	22.5	60mil	Y		11/15/2022
18	0101-206733	22I1134	576	22.5	60mil	Y		11/15/2022
19	0101-206734	22I1134	576	22.5	60mil	Y		11/15/2022
20	0101-206735	22I1134	576	22.5	60mil	Y		11/15/2022
21	0101-206736	22I1134	576	22.5	60mil	Y	Y	11/15/2022
22	0101-206737	22I1134	576	22.5	60mil	Y		11/15/2022
23	0101-206738	22I1134	576	22.5	60mil	Y		11/15/2022
24	0101-206739	22I1134	576	22.5	60mil	Y		11/15/2022
25	0101-206740	22I1134	576	22.5	60mil	Y		11/15/2022
26	0101-206741	22I1134	576	22.5	60mil	Y		11/15/2022
27	0101-206742	22I1134	576	22.5	60mil	Y		11/15/2022
28	0101-206743	22I1134	576	22.5	60mil	Y		11/15/2022
29	0101-206744	22I1134	576	22.5	60mil	Y	Y	11/15/2022
30	0101-206745	22I1134	576	22.5	60mil	Y		11/15/2022
31	0101-206746	22I1134	576	22.5	60mil	Y		11/15/2022
32	0101-206747	22I1134	576	22.5	60mil	Y		11/15/2022
33	0101-206748	22I1134	576	22.5	60mil	Y		11/15/2022
34	0101-206749	22I1134	576	22.5	60mil	Y		11/15/2022
35	0101-206750	22I1134	576	22.5	60mil	Y		11/15/2022
36	0101-206753	22I1134	576	22.5	60mil	Y		11/15/2022
37	0101-206754	22I1134	576	22.5	60mil	Y	Y	11/15/2022
38	0101-206755	22I1134	576	22.5	60mil	Y		11/15/2022
39	0101-206756	22I1134	576	22.5	60mil	Y		11/15/2022
40	0101-206757	22I1134	576	22.5	60mil	Y		11/15/2022

Parkhill

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:	2
MATERIAL TYPE:	Smooth FML	DATE OF INVENTORY:	See Below
MATERIAL IDENTIFICATION:	1101438, HDPE, 60 mil	INVENTORY MONITOR:	TBA
MATERIAL MANUFACTURER:	Solmax/GSE	UNLOADING METHOD:	Forklift and Sling

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE OF INVENTORY
			LENGTH (FT)	WIDTH (FT)	THICKNESS OF WEIGHT			
41	0101-206758	22I1134	576	22.5	60mil	Y		11/15/2022
42	0101-206760	22I1134	576	22.5	60mil	Y		11/15/2022
43	0101-206761	22I1134	576	22.5	60mil	Y		11/15/2022
44	0101-206762	22I1134	576	22.5	60mil	Y	Y	11/15/2022
45	0104-206292	22H1144	533	22.5	60mil	Y		11/15/2022
46	0104-206293	22H1144	533	22.5	60mil	Y	Y	11/15/2022
47	0104-206294	22H1144	533	22.5	60mil	Y	Y	11/15/2022
48	0104-206295	22H1144	533	22.5	60mil	Y		11/15/2022
49	0104-206296	22H1144	533	22.5	60mil	Y		11/15/2022
50	0104-206297	22H1144	533	22.5	60mil	Y		11/15/2022
51	0104-206298	22H1144	533	22.5	60mil	Y		11/15/2022
52	0104-206299	22H1144	533	22.5	60mil	Y		11/15/2022
53	0104-206300	22H1144	533	22.5	60mil	Y		11/15/2022
54	0104-206301	22H1144	533	22.5	60mil	Y		11/15/2022
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APPENDIX C: CELL 4 A/B LINER INSTALLATION DOCUMENTATION

C.4 Geocomposite Inventory Control Log

Parkhill

GEOCOMPOSITE 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:	Geocomposite Double-Sided	DATE OF INVENTORY:	See Below
MATERIAL IDENTIFICATION:	1114746-35011-3, FabriNet 225 mil, Double-Sided, 10oz/yd ² , Nonwoven Cal.	INVENTORY MONITOR:	TBA
MATERIAL MANUFACTURER:	Solmax/GSE	UNLOADING METHOD:	Forklift and Sling

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE OF INVENTORY
			LENGTH (FT)	WIDTH (FT)	THICKNESS OF WEIGHT			
1	0116-023770	DPF610480	232	14.75	225mil	Y	Y	11/15/2022
2	0116-023771	DPF610480	232	14.75	225mil	Y		11/15/2022
3	0116-023772	DPF610480	232	14.75	225mil	Y		11/15/2022
4	0116-023793	DPF610480	232	14.75	225mil	Y		11/15/2022
5	0116-023794	DPF610480	232	14.75	225mil	Y		11/15/2022
6	0116-023795	DPF610480	232	14.75	225mil	Y		11/15/2022
7	0116-023797	DPF610480	232	14.75	225mil	Y		11/15/2022
8	0116-023798	DPF610480	232	14.75	225mil	Y		11/15/2022
9	0116-023799	DPF610480	232	14.75	225mil	Y		11/15/2022
10	0116-023800	DPF610480	232	14.75	225mil	Y		11/15/2022
11	0116-023801	DPF610480	232	14.75	225mil	Y		11/15/2022
12	0116-023802	DPF610480	232	14.75	225mil	Y		11/15/2022
13	0116-023803	DPF610480	232	14.75	225mil	Y		11/15/2022
14	0116-023804	DPF610480	232	14.75	225mil	Y		11/15/2022
15	0116-023805	DPF610480	232	14.75	225mil	Y		11/15/2022
16	0116-023806	DPF610480	232	14.75	225mil	Y		11/15/2022
17	0116-023807	DPF610480	232	14.75	225mil	Y		11/15/2022
18	0116-023809	DPF610480	232	14.75	225mil	Y		11/15/2022
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Parkhill

GEOCOMPOSITE 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:	Geocomposite Single-Sided	DATE OF INVENTORY:	See Below
MATERIAL IDENTIFICATION:	1106338-35011-4, FabriNet 200 mil, Single-Sided, 10oz/yd ² , Nonwoven Cal.	INVENTORY MONITOR:	TBA
MATERIAL MANUFACTURER:	Solmax/GSE	UNLOADING METHOD:	Forklift and Sling

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE OF INVENTORY
			LENGTH (FT)	WIDTH (FT)	THICKNESS OF WEIGHT			
1	0116-023819	DPF610480	288	14.75	200mil	Y	Y	11/15/2022
2	0116-023820	DPF610480	288	14.75	200mil	Y		11/15/2022
3	0116-023821	DPF610480	288	14.75	200mil	Y		11/15/2022
4	0116-023822	DPF610480	288	14.75	200mil	Y		11/15/2022
5	0116-023823	DPF610480	288	14.75	200mil	Y		11/15/2022
6	0116-023824	DPF610480	288	14.75	200mil	Y		11/15/2022
7	0116-023825	DPF610480	288	14.75	200mil	Y		11/15/2022
8	0116-023826	DPF610480	288	14.75	200mil	Y		11/15/2022
9	0116-023827	DPF610480	288	14.75	200mil	Y		11/15/2022
10	0116-023828	DPF610480	288	14.75	200mil	Y		11/15/2022
11	0116-023829	DPF610480	288	14.75	200mil	Y		11/15/2022
12	0116-023830	DPF610480	288	14.75	200mil	Y		11/15/2022
13	0116-023831	DPF610480	288	14.75	200mil	Y		11/15/2022
14	0116-023832	DPF610480	288	14.75	200mil	Y		11/15/2022
15	0116-023833	DPF610480	288	14.75	200mil	Y		11/15/2022
16	0116-023834	DPF610480	288	14.75	200mil	Y		11/15/2022
17	0116-023835	DPF610480	288	14.75	200mil	Y		11/15/2022
18	0116-023836	DPF610480	288	14.75	200mil	Y		11/15/2022
19	0116-023837	DPF610480	288	14.75	200mil	Y		11/15/2022
20	0116-023838	DPF610480	288	14.75	200mil	Y		11/15/2022
21	0116-023862	DPF610480	288	14.75	200mil	Y		11/15/2022
22	0116-023863	DPF610480	288	14.75	200mil	Y		11/15/2022
23	0116-023864	DPF610480	288	14.75	200mil	Y		11/15/2022
24	0116-023865	DPF610480	288	14.75	200mil	Y	Y	11/15/2022
25	0116-023866	DPF610480	288	14.75	200mil	Y		11/15/2022
26	0116-023867	DPF610480	288	14.75	200mil	Y		11/15/2022
27	0116-023868	DPF610480	288	14.75	200mil	Y		11/15/2022
28	0116-023869	DPF610480	288	14.75	200mil	Y		11/15/2022
29	0116-023870	DPF610480	288	14.75	200mil	Y		11/15/2022
30	0116-023871	DPF610480	288	14.75	200mil	Y		11/15/2022
31	0116-023878	DPF610480	288	14.75	200mil	Y		11/15/2022
32	0116-023879	DPF610480	288	14.75	200mil	Y		11/15/2022
33	0116-023880	DPF610480	288	14.75	200mil	Y		11/15/2022
34	0116-023881	DPF610480	288	14.75	200mil	Y		11/15/2022
35	0116-023882	DPF610480	288	14.75	200mil	Y		11/15/2022
36	0116-023883	DPF610480	288	14.75	200mil	Y		11/15/2022
37	0116-023884	DPF610480	288	14.75	200mil	Y		11/15/2022
38	0116-023885	DPF610480	288	14.75	200mil	Y		11/15/2022
39	0116-023886	DPF610480	288	14.75	200mil	Y		11/15/2022
40	0116-023887	DPF610480	288	14.75	200mil	Y		11/15/2022



GEOCOMPOSITE 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:	2
MATERIAL TYPE:	Geocomposite Single-Sided	DATE OF INVENTORY:	See Below
MATERIAL IDENTIFICATION:	1106338-35011-4, FabriNet 200 mil, Single-Sided, 10oz/yd ² , Nonwoven Cal.	INVENTORY MONITOR:	TBA
MATERIAL MANUFACTURER:	Solmax/GSE	UNLOADING METHOD:	Forklift and Sling

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE OF INVENTORY
			LENGTH (FT)	WIDTH (FT)	THICKNESS OF WEIGHT			
41	0116-023888	DPF610480	288	14.75	200mil	Y		11/15/2022
42	0116-023889	DPF610480	288	14.75	200mil	Y		11/15/2022
43	0116-023890	DPF610480	288	14.75	200mil	Y		11/15/2022
44	0116-023891	DPF610480	288	14.75	200mil	Y		11/15/2022
45	0116-023892	DPF610480	288	14.75	200mil	Y		11/15/2022
46	0116-023893	DPF610480	288	14.75	200mil	Y		11/15/2022
47	0116-023894	DPF610480	288	14.75	200mil	Y	Y	11/15/2022
48	0116-023895	DPF610480	288	14.75	200mil	Y		11/15/2022
49	0116-023896	DPF610480	288	14.75	200mil	Y		11/15/2022
50	0116-023897	DPF610480	288	14.75	200mil	Y		11/15/2022
51	0116-023898	DPF610480	288	14.75	200mil	Y		11/15/2022
52	0116-023899	DPF610480	288	14.75	200mil	Y		11/15/2022
53	0116-023900	DPF610480	288	14.75	200mil	Y		11/15/2022
54	0116-023901	DPF610480	288	14.75	200mil	Y		11/15/2022
55	0116-023902	DPF610480	288	14.75	200mil	Y		11/15/2022
56	0116-023918	DPF610480	288	14.75	200mil	Y		11/15/2022
57	0116-023919	DPF610480	288	14.75	200mil	Y		11/15/2022
58	0116-023920	DPF610480	288	14.75	200mil	Y		11/15/2022
59	0116-023921	DPF610480	288	14.75	200mil	Y		11/15/2022
60	0116-023922	DPF610480	288	14.75	200mil	Y		11/15/2022
61	0116-023923	DPF610480	288	14.75	200mil	Y		11/15/2022
62	0116-023924	DPF610480	288	14.75	200mil	Y		11/15/2022
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APPENDIX C: CELL 4 A/B LINER INSTALLATION DOCUMENTATION

C.5 Leachate Pipe and Riser Pipe Inventory Control Log

LEACHATE COLLECTION AND RISER PIPE INVENTROY CONTROL LOG

PROJECT NAME:	OWL Landfill Cell 4AB	PROJECT NUMBER:	7053.22
CLIENT:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	1
MATERIAL TYPE	Pipe Inventory	DATE OF INVENTORY:	See Below
MATERIAL IDENTIFICATION:	See Below	INVENTORY MONITOR:	TBA
MATERIAL MANUFACTURER:	See Below	UNLOADING METHOD	Forklift and Sling

EQUIPMENT TYPE	QUANITY	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	TOTAL LENGTH (FT)	DATE OF INVENTORY
		LENGTH (FT)	DIAMETER (FT)	PIPE SDR			
Solid HDPE	22	40	0.5	14.0	Y	880	11/15/2022
End Cap	1	6	0.5	14.0	N	NA	11/15/2022
Tee	1	6	0.5	14.0	N	NA	11/15/2022
HDPE Blind Flange 6" Thick	1	6	0.5	14.0	N	NA	11/15/2022
Stainless Steel Rod 36"	1	NA	0.5	NA	N	3	11/15/2022
Stainless Steel Nuts	16	NA	0.5	NA	N	NA	11/15/2022
Stainless Steel Washers	16	NA	0.5	NA	N	NA	11/15/2022
Stainless Steel Backup Ring	1	NA	0.5	NA	N	NA	11/15/2022
Neoprene Gasket	1	NA	0.5	NA	N	NA	11/15/2022
6" Rubber Cap	1	NA	0.5	NA	N	NA	11/15/2022

APPENDIX C: CELL 4 A/B LINER INSTALLATION DOCUMENTATION

C.6 GCL Deployment Log

GCL DEPLOYMENT 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
DEPLOYMENT LOCATION:	Floor	MONITOR:	MWK

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT²)	DATE INSTALLED
P1	0690	110	15.5	1,705	11/15/22
P2	0690	30	15.5	465	11/15/22
P3	0701	80	15.5	1,240	11/15/22
P4	0701	70	15.5	1,085	11/15/22
P5	0723	40	15.5	620	11/15/22
P6	0723	80	15.5	1,240	11/15/22
P7	0702	30	15.5	465	11/15/22
P8	0702	110	15.5	1,705	11/15/22
P9	0724	110	15.5	1,705	11/15/22
P10	0724	30	15.5	465	11/15/22
P11	0704	80	15.5	1,240	11/15/22
P12	0704	70	15.5	1,085	11/15/22
P13	0000	40	15.5	620	11/15/22
P14	0000	80	15.5	1,240	11/15/22
P15	0711	30	15.5	465	11/15/22
P16	0711	90	15.5	1,395	11/15/22
P17	0705	20	15.5	310	11/15/22
P18	0705	80	15.5	1,240	11/16/22
P19	7143	30	15.5	465	11/16/22
P20	7143	90	15.5	1,395	11/16/22
P21	7144	20	15.5	310	11/16/22
P22	7144	100	15.5	1,550	11/16/22
P23	7141	10	15.5	155	11/16/22
P24	7141	110	15.5	1,705	11/16/22
P25	7134	110	15.5	1,705	11/16/22
P26	7134	20	15.5	310	11/16/22
P27	7183	90	15.5	1,395	11/16/22
P28	7183	30	15.5	465	11/16/22
P29	7145	80	15.5	1,240	11/16/22
P30	7145	70	15.5	1,085	11/16/22
P31	7139	40	15.5	620	11/16/22
P32	7139	80	15.5	1,240	11/16/22
P33	7135	30	15.5	465	11/16/22
P34	7135	110	15.5	1,705	11/16/22
P35	7136	110	15.5	1,705	11/16/22
P36	7136	30	15.5	465	11/16/22
P37	7138	80	15.5	1,240	11/16/22
P38	7138	40	15.5	620	11/16/22
P39	7146	70	15.5	1,085	11/16/22
P40	7146	70	15.5	1,085	11/16/22
TOTAL LINER PLACED (FT²):				40,300	



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
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	2
DEPLOYMENT LOCATION:	Floor	MONITOR:	MWK

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT ²)	DATE INSTALLED
P41	7173	40	15.5	620	11/16/22
P42	7173	110	15.5	1,705	11/16/22
P43	7147	40	15.5	620	11/16/22
P44	7147	60	15.5	930	11/16/22
P45	7133	150	15.5	2,325	11/16/22
P46	7174	150	15.5	2,325	11/16/22
P47	7195	150	15.5	2,325	11/16/22
P48	7191	150	15.5	2,325	11/16/22
P49	7189	130	15.5	2,015	11/16/22
P50	7189	20	15.5	310	11/16/22
P51	7142	150	15.5	2,325	11/16/22
P52	7148	150	15.5	2,325	11/16/22
P53	7137	150	15.5	2,325	11/16/22
P54	7140	150	15.5	2,325	11/16/22
P55	7198	75	15.5	1,163	11/16/22
P56	7198	75	15.5	1,163	11/16/22
P57	7178	150	15.5	2,325	11/16/22
P58	7176	150	15.5	2,325	11/16/22
P59	7175	150	15.5	2,325	11/16/22
P60	7172	150	15.5	2,325	11/16/22
P61	7184	20	15.5	310	11/16/22
P62	7180	20	15.5	310	11/16/22
P63	7184	130	15.5	2,015	11/16/22
P64	7179	150	15.5	2,325	11/16/22
P65	7180	150	15.5	2,325	11/16/22
P66	7182	150	15.5	2,325	11/16/22
P67	7168	100	15.5	1,550	11/16/22
P68	7168	50	15.5	775	11/16/22
P69	7187	150	15.5	2,325	11/16/22
P70	7188	150	15.5	2,325	11/16/22
P71	7186	150	15.5	2,325	11/16/22
P72	7181	150	15.5	2,325	11/16/22
P73	7185	40	15.5	620	11/16/22
P74	7185	110	15.5	1,705	11/17/22
P75	7153	150	15.5	2,325	11/17/22
P76	7176	150	15.5	2,325	11/17/22
P77	7174	150	15.5	2,325	11/17/22
P78	7150	118	15.5	1,829	11/17/22
P79	7150	32	15.5	496	11/17/22
P80	7115	150	15.5	2,325	11/17/22
TOTAL LINER PLACED (FT²):				71,610	

GCL DEPLOYMENT LOG

PROJECT NAME:	OWL Landfill	PROJECT NUMBER:	7053.22
CLIENT:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	3
DEPLOYMENT LOCATION:	Floor	MONITOR:	MWK

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT ²)	DATE INSTALLED
P81	7171	150	15.5	2,325	11/17/22
P82	7192	150	15.5	2,325	11/17/22
P83	7196	150	15.5	2,325	11/17/22
P84	7165	48	15.5	744	11/17/22
P85	7165	102	15.5	1,581	11/17/22
P86	7159	150	15.5	2,325	11/17/22
P87	7163	150	15.5	2,325	11/17/22
P88	7197	150	15.5	2,325	11/17/22
P89	7169	130	15.5	2,015	11/17/22
P90	7190	150	15.5	2,325	11/17/22
P91	7169	15	15.5	233	11/17/22
P92	7157	150	15.5	2,325	11/17/22
P93	7156	150	15.5	2,325	11/17/22
P94	7164	150	15.5	2,325	11/17/22
P95	7170	63	15.5	977	11/17/22
P96	7170	87	15.5	1,349	11/17/22
P97	7158	150	15.5	2,325	11/17/22
P98	7193	150	15.5	2,325	11/17/22
P99	7065	150	15.5	2,325	11/17/22
P100	7166	140	15.5	2,170	11/17/22
P101	7068	150	15.5	2,325	11/17/22
P102	7166	10	15.5	155	11/17/22
P103	7161	150	15.5	2,325	11/17/22
P104	7167	150	15.5	2,325	11/17/22
P105	7160	150	15.5	2,325	11/17/22
P106	7081	62	15.5	961	11/17/22
P107	7081	88	15.5	1,364	11/17/22
P108	7072	150	15.5	2,325	11/17/22
P109	7080	150	15.5	2,325	11/17/22
P110	7074	150	15.5	2,325	11/17/22
P111	7071	130	15.5	2,015	11/17/22
P112	7071	20	15.5	310	11/17/22
P113	7070	150	15.5	2,325	11/17/22
P114	7075	150	15.5	2,325	11/17/22
P115	7069	150	15.5	2,325	11/17/22
P116	7079	150	15.5	2,325	11/17/22
P117	7076	62	15.5	961	11/17/22
P118	7076	88	15.5	1,364	11/17/22
P119	7078	150	15.5	2,325	11/17/22
P120	7066	150	15.5	2,325	11/17/22
TOTAL LINER PLACED (FT ²):				76,648	

GCL DEPLOYMENT LOG

PROJECT NAME:	OWL Landfill	PROJECT NUMBER:	7053.22
CLIENT:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	4
DEPLOYMENT LOCATION:	Floor	MONITOR:	MWK

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT ²)	DATE INSTALLED
P121	7077	150	15.5	2,325	11/17/22
P122	7162	143	15.5	2,217	11/17/22
P123	7162	7	15.5	109	11/17/22
P124	7067	150	15.5	2,325	11/17/22
P125	7073	150	15.5	2,325	11/17/22
P126	7096	150	15.5	2,325	11/17/22
P127	7095	150	15.5	2,325	11/17/22
P128	7083	75	15.5	1,163	11/17/22
P129	7083	75	15.5	1,163	11/18/22
P130	7082	150	15.5	2,325	11/18/22
P131	7172	150	15.5	2,325	11/18/22
P132	7120	150	15.5	2,325	11/18/22
P133	7126	150	15.5	2,325	11/18/22
P134	7124	150	15.5	2,325	11/18/22
P135	7129	150	15.5	2,325	11/18/22
P136	7123	12	15.5	186	11/18/22
P137	7123	138	15.5	2,139	11/18/22
P138	7132	150	15.5	2,325	11/18/22
P139	7130	150	15.5	2,325	11/18/22
P140	7119	101	15.5	1,566	11/18/22
P141	7119	49	15.5	760	11/18/22
P142	7131	150	15.5	2,325	11/18/22
P143	7091	150	15.5	2,325	11/18/22
P144	7092	150	15.5	2,325	11/18/22
P145	7085	35	15.5	543	11/18/22
P146	7085	115	15.5	1,783	11/18/22
P147	7084	150	15.5	2,325	11/18/22
P148	7098	150	15.5	2,325	11/18/22
P149	7097	150	15.5	2,325	11/18/22
P150	7093	123	15.5	1,907	11/18/22
P151	7093	27	15.5	419	11/18/22
P152	7094	150	15.5	2,325	11/18/22
P153	7090	150	15.5	2,325	11/18/22
P154	7089	150	15.5	2,325	11/18/22
P155	7088	150	15.5	2,325	11/18/22
P156	7086	65	15.5	1,008	11/18/22
P157	7086	85	15.5	1,318	11/18/22
P158	7128	150	15.5	2,325	11/18/22
P159	7087	150	15.5	2,325	11/18/22
P160	7125	150	15.5	2,325	11/18/22
TOTAL LINER PLACED (FT ²):				76,725	

APPENDIX C: CELL 4 A/B LINER INSTALLATION DOCUMENTATION

C.7 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
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	1
DEPLOYMENT LOCATION:	Secondary	MONITOR:	MWK

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT ²)	DATE INSTALLED
P1	0304	116	22.5	2,610	11/16/2022
P2	0301	118	22.5	2,655	11/16/2022
P3	0304	120	22.5	2,700	11/16/2022
P4	0304	122	22.5	2,745	11/16/2022
P5	0300	125	22.5	2,813	11/16/2022
P6	0300	127	22.5	2,858	11/16/2022
P7	0300	130	22.5	2,925	11/16/2022
P8	0295	130	22.5	2,925	11/16/2022
P9	0295	127	22.5	2,858	11/16/2022
P10	0295	125	22.5	2,813	11/16/2022
P11	0313	124	22.5	2,790	11/16/2022
P12	0313	124	22.5	2,790	11/16/2022
P13	0313	124	22.5	2,790	11/16/2022
P14	0293	123	22.5	2,768	11/16/2022
P15	0293	120	22.5	2,700	11/16/2022
P16	0293	117	22.5	2,633	11/16/2022
P17	0322	116	22.5	2,610	11/16/2022
P18	0322	115	22.5	2,588	11/16/2022
P19	6731	560	22.5	12,600	11/16/2022
P20	1438	560	22.5	12,600	11/16/2022
P21	6725	7	22.5	158	11/16/2022
P22	6725	117	22.5	2,633	11/16/2022
P23	37425	326	22.5	7,335	11/16/2022
P24	6724	360	22.5	8,100	11/16/2022
P25	6724	200	22.5	4,500	11/16/2022
P26	6741	498	22.5	11,205	11/16/2022
P27	6741	82	22.5	1,845	11/16/2022
P28	6747	560	22.5	12,600	11/16/2022
P29	6753	39	22.5	878	11/16/2022
P30	6753	520	22.5	11,700	11/16/2022
P31	6730	153	22.5	3,443	11/16/2022
P32	6730	400	22.5	9,000	11/16/2022
P33	6754	275	22.5	6,188	11/16/2022
P34	6754	285	22.5	6,413	11/16/2022
P35	6717	390	22.5	8,775	11/16/2022
P36	6755	560	22.5	12,600	11/16/2022
P37	6740	120	22.5	2,700	11/16/2022
P38	6740	440	22.5	9,900	11/18/2022
P39	6750	237	22.5	5,333	11/18/2022
P40	6750	232	22.5	5,220	11/18/2022
TOTAL LINER PLACED (FT ²):				205,290	

APPENDIX C: CELL 4 A/B LINER INSTALLATION DOCUMENTATION

C.8 Secondary and Primary FML Pre-Weld Qualification Test Logs



Mustang Extreme Environmental Services Trial Weld Log

Project Name: OWD NDBL SWMF Cell 4AB

WO #: 51619

Material & Layer: HDPE 60 mil LINER SECONDARY

QC Technician: Francisco Gonzalez

Peel Test Fusion Minimum: 91 PPI

Peel Test Extrusion Minimum: 78 PPI

Shear Test Minimum: 120 PPI

Liner Types S = Smooth T = Textured SG = Super Grip

Date	Time	Air Temp °F	Liner Type	Tech	Machine			Peel 1		Peel 2		Peel 3		Peel 4		Peel 5		Shear					Pass/Fail
					No.	Temp	Speed/Preheat	In	Out	In	Out	In	Out	In	Out	In	Out						
11/15/22	9:29	40	S/S	CK	57	850	3.5	157	118	160	150	116	148	161	141	142	155	178	188	187	185	200	Pass
11/15/22	9:30	40	S/S	LP	901	850	4	156	169	149	160	161	160	149	161	147	141	187	184	193	187	186	Pass
11/15/22	9:40	40	S/T	CK	57	850	3	156	126	146	131	140	137	128	132	145	137	188	185	191	189	190	Pass
11/15/22	13:20	40	EXT	TK	1	850	550	116		141		132		115		142		218	192	195	189	201	Pass
11/16/22	8:30	41	S/S	CK	464	850	3.5	142	148	126	151	126	124	135	122	137	128	243	240	245	239	244	Pass
11/16/22	8:32	41	S/T	CK	464	850	3.5	167	170	136	176	177	129	152	154	152	162	253	250	247	245	247	Pass
11/16/22	8:34	41	S/S	LP	901	850	3.5	150	158	133	157	152	163	122	155	150	147	233	230	231	235	234	Pass
11/16/22	13:06	44	S/S	LP	901	850	3.5	165	125	122	123	133	152	162	150	145	138	219	223	227	224	231	Pass
11/16/22	13:05	44	S/T	CK	464	850	3.5	147	161	135	164	139	148	152	145	160	148	229	218	220	223	225	Pass
11/16/22	13:10	44	S/S	CK	464	850	3.5	150	167	143	167	154	150	157	158	164	152	231	200	243	227	160	Pass
11/16/22	13:40	44	S/S	NK	57	850	4	137	132	143	125	112	118	129	146	128	141	159	147	167	152	160	Pass
11/17/22	7:14	40	S/S	LP	901	850	3.5	124	120	137	126	134	130	126	141	124	138	191	201	220	196	198	Pass
11/17/22	8:00	40	S/S	CK	464	850	4	128	109	135	130	133	145	131	128	130	126	175	180	178	190	189	Pass
11/17/22	9:47	40	S/S	NK	57	850	4.5	135	121	130	140	134	124	130	126	124	120	173	178	182	180	187	Pass
11/17/22	13:10	45	S/S	LP	901	850	4	133	108	115	112	117	109	115	120	118	122	175	172	180	175	191	Pass
11/17/22	13:12	45	S/S	NK	57	850	4.5	115	114	111	114	108	106	112	116	109	112	173	174	172	174	183	Pass
11/17/22	13:15	45	S/T	CK	464	850	3.2	139	144	137	135	133	120	130	131	129	125	170	176	175	176	187	Pass
11/18/22	9:15	30	S/S	NK	57	850	4.5	135	143	130	125	137	126	135	148	135	142	196	197	204	198	207	Pass
11/18/22	10:08	30	S/S	LP	901	850	3.4	124	112	131	114	127	130	124	127	126	131	192	194	190	196	195	Pass
11/18/22	13:14	35	S/S	NK	57	850	4.5	134	141	134	121	130	128	134	127	122	131	184	181	182	187	185	Pass



Mustang Extreme Environmental Services Trial Weld Log

Project Name: OWD NDBL SWMF Cell 4AB

WO #: 51619

Material & Layer: HDPE 60 mil LINER SECONDARY

QC Technician: Francisco Gonzalez

Peel Test Fusion Minimum: 91 PPI

Peel Test Extrusion Minimum: 78 PPI

Shear Test Minimum: 120 PPI

Liner Types S = Smooth T = Textured SG = Super Grip

Date	Time	Air Temp °F	Liner Type	Tech	Machine			Peel 1		Peel 2		Peel 3		Peel 4		Peel 5		Shear					Pass/Fail
					No.	Temp	Speed/Preheat	In	Out	In	Out	In	Out	In	Out	In	Out						
11/18/22	13:16	35	S/S	LP	901	850	3.5	139	131	133	125	132	122	126	131	124	127	176	177	180	173	179	Pass
11/18/22	13:17	35	S/S	CK	464	850	4	146	119	124	160	135	127	134	140	134	138	186	183	191	188	192	Pass
11/18/22	13:19	35	S/T	CK	464	850	3.2	161	147	162	159	148	160	151	147	145	148	199	195	197	189	187	Pass
11/19/22	7:30	30	S/S	LP	901	850	3.5	151	158	140	144	156	139	150	148	152	155	204	197	199	198	202	Pass
11/19/22	7:47	30	S/S	NK	57	850	4.5	146	137	115	154	130	127	131	128	132	137	197	195	202	196	198	Pass
11/19/22	9:00	32	S/S	CK	464	850	4	147	128	152	132	128	134	154	130	134	132	187	182	185	183	188	Pass
11/21/22	9:02	32	S/T	CK	464	850	3.2	112	156	151	128	135	133	136	132	137	145	182	187	184	185	189	Pass
11/21/22	8:00	32	EXT	LP	1	550	550	126		107		105		95		110		197	198	196	194	195	Pass
11/21/22	8:00	32	EXT	CK	18	550	550	117		135		104		116		128		202	195	198	191	200	Pass
11/21/22	8:05	32	EXT	IM	44	550	500	129		114		121		116		119		210	198	195	193	207	Pass
11/21/22	13:16	40	EXT	CK	18	550	550	116		118		123		117		116		200	198	195	191	197	Pass
11/21/22	13:10	40	EXT	RM	44	550	500	115		120		117		103		110		195	198	198	185	183	Pass
11/22/22	14:00	45	S/S	TK	464	850	4	132	138	132	130	141	115	151	139	138	166	166	175	168	185	190	Pass
11/22/22	14:46	45	EXT	NK	1	550	450	98		113		117		114		116		144	143	157	160	167	Pass
11/23/22	7:44	30	EXT	LP	1	550	520	110		98		99		110		116		167	165	168	178	173	Pass
11/23/22	7:40	30	EXT	NK	18	550	520	117		117		110		121		119		176	178	171	165	165	Pass
11/23/22	8:14	30	S/S	LP	464	850	3.5	132	107	131	124	135	131	140	138	133	130	174	165	171	173	170	Pass
11/23/22	13:00	45	EXT	TK	1	550	550	140		135		122		122		125		168	165	169	164	172	Pass



Mustang Extreme Environmental Services

Trial Weld Log

Project Name: OWD NDBL SWMF CELL 4

WO #: 51619

Peel Test Fusion Minimum: 91 PPI

Material & Layer: 60 Mil HDPE LINER PRIMARY

Peel Test Extrusion Minimum: 78 PPI

QC Technician: FRANCISCO GONZALEZ

Shear Test Minimum: 121 PPI

Liner Types S = Smooth T = Textured SG = Super Grip

Date	Time	Air Temp °F	Liner Type	Tech	Machine			Peel 1		Peel 2		Peel 3		Peel 4		Peel 5		Shear					Pass/Fail
					No.	Temp	Speed	In	Out	In	Out	In	Out	In	Out	In	Out						
11/29/22	7:55	10	S/S	CK	57	850	3.5	119	141	123	137	116	137	125	135	120	119	182	185	183	184	182	Pass
11/29/22	7:53	10	T/T	LP	464	850	3.5	140	135	142	129	149	133	140	130	131	138	178	178	177	175	180	Pass
11/29/22	7:58	10	S/S	LP	464	850	3.5	113	108	135	109	123	106	108	136	119	127	163	175	168	167	165	Pass
11/30/22	7:40	3	S/S	CK	57	850	3.5	160	140	145	159	157	153	147	150	148	157	204	207	201	212	232	Pass
11/30/22	7:45	3	S/S	LP	464	850	3.5	140	165	136	145	163	137	145	149	160	153	219	220	218	124	227	Pass
11/30/22	9:35	3	S/S	NK	901	850	4.0	131	143	134	142	134	147	133	140	141	138	178	176	173	175	177	Pass
11/30/22	13:05	9	S/S	LP	464	850	3.5	127	131	106	121	130	125	114	124	131	128	185	196	188	190	193	Pass
11/30/22	13:10	9	S/S	CK	57	850	3.0	112	128	112	131	120	127	130	132	119	123	180	185	183	184	187	Pass
11/30/22	13:11	9	S/T	CK	57	850	3.0	105	123	114	140	148	135	130	127	125	130	183	186	195	187	185	Pass
11/30/22	13:10	9	S/S	NK	901	850	4.0	132	106	121	171	129	118	111	130	121	115	185	188	192	189	190	Pass
12/1/22	7:15	16	S/S	NK	901	850	4.0	136	134	116	137	134	130	134	137	137	132	169	187	189	190	185	Pass
12/1/22	7:20	16	S/S	LP	464	850	4.0	131	124	165	150	141	135	136	138	138	127	199	192	195	196	200	Pass
12/1/22	7:21	16	S/S	CK	57	850	3.0	135	152	158	139	144	138	147	138	138	136	177	185	190	189	193	Pass
12/1/22	7:22	16	S/T	CK	57	850	3.0	158	146	155	153	152	140	135	151	151	148	200	192	197	190	198	Pass
12/1/22	13:14	20	S/S	LP	464	850	4.0	113	104	115	109	118	136	119	109	109	120	168	167	165	164	167	Pass
12/2/22	7:25	10	S/S	NK	901	850	4.0	137	127	135	147	154	147	130	137	137	122	168	165	160	163	164	Pass
12/2/22	7:30	10	S/S	LP	464	850	4.0	124	132	119	132	126	120	121	118	118	122	170	163	171	165	168	Pass
12/2/22	7:31	10	S/S	CK	57	850	3.0	150	132	146	130	129	131	140	128	128	124	169	170	168	166	171	Pass
12/2/22	7:32	10	S/T	CK	57	850	3.0	135	141	128	143	130	136	122	142	130	135	176	165	172	170	175	Pass
12/2/22	13:20	16	Ext	CK	1	550	550	124	x	121	x	127	x	130	x	106	x	135	150	134	148	155	Pass
12/2/22	13:10	16	Ext	LP	18	540	550	108	x	125	x	107	x	133	x	130	x	141	139	135	142	148	Pass
12/3/22	7:37	10	Ext	IM	44	550	500	112	x	121	x	120	x	118	x	125	x	197	194	192	190	195	Pass
12/3/22	7:38	10	Ext	LP	18	550	540	118	x	112	x	108	x	111	x	104	x	180	178	179	180	181	Pass
12/3/22	7:40	10	Ext	CK	1	550	500	141	x	121	x	139	x	120	x	120	x	231	209	210	208	211	Pass



Mustang Extreme Environmental Services Trial Weld Log

Project Name: OWD NDBL SWMF CELL 4

WO #: 51619

Material & Layer: 60 Mil HDPE LINER PRIMARY

QC Technician: FRANCISCO GONZALEZ

Peel Test Fusion Minimum: 91 PPI

Peel Test Extrusion Minimum: 78 PPI

Shear Test Minimum: 121 PPI

Liner Types S = Smooth T = Textured SG = Super Grip

Date	Time	Air Temp °F	Liner Type	Tech	Machine			Peel 1		Peel 2		Peel 3		Peel 4		Peel 5		Shear					Pass/Fail
					No.	Temp	Speed	In	Out	In	Out	In	Out	In	Out	In	Out						
12/3/22	9:45	15	S/T	CK	57	850	3.0	140	137	132	149	128	124	126	134	129	131	178	183	180	182	185	Pass
12/3/22	9:50	15	S/S	LP	464	850	3.5	139	149	127	148	144	149	141	143	140	148	179	173	172	174	176	Pass
12/3/22	9:50	15	S/S	NK	901	850	4.0	132	131	152	129	126	140	132	129	142	137	164	163	165	164	162	Pass
12/3/22	10:00	15	T/T	CK	57	850	3.0	151	156	147	152	148	150	139	145	151	144	183	174	179	176	182	Pass
12/3/22	13:05	16	S/T	NK	901	850	4.0	118	120	131	122	121	137	132	125	126	130	171	172	170	173	174	Pass
12/3/22	13:04	16	T/T	LP	464	850	3.5	121	126	128	123	120	136	108	119	120	122	160	162	164	167	163	Pass
12/3/22	13:06	16	T/T	CK	57	850	3.0	137	123	121	125	130	121	124	132	135	126	179	169	173	170	174	Pass
12/6/22	13:30	22	Ext	CK	1	550	550	134	x	136	x	126	x	136	x	125	x	176	178	167	164	163	Pass
12/6/22	15:00	22	Ext	LP	18	550	550	124	x	116	x	127	x	139	x	141	x	165	167	178	156	173	Pass

APPENDIX C: CELL 4 A/B LINER INSTALLATION DOCUMENTATION

C.9 Secondary FML Seaming Log

FML SEAMING LOG

PROJECT NAME: OWL Landfill Cell 4AB
OWNER: Oilfield Water Logistics
PROJECT LOCATION: Lea County, New Mexico
SEAMING LOCATION: Secondary

PROJECT NUMBER: 7053.22
CONTRACTOR: Mustang Extreme
SHEET NUMBER: 1

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
1	11/15/2022	P1/P2	116	0950	CP	901	850	4.0		MK
2	11/15/2022	2/3	118	0959	CP	901	850	4.0		MK
3	11/15/2022	3/4	120	1030	CK	52	850	4.0		MK
4	11/15/2022	4/5	122	1040	CP	901	850	4.0		MK
5	11/15/2022	5/6	125	1055	CK	52	850	4.0	#1	MK
6	11/15/2022	6/7	127	1100	CP	901	850	4.0		MK
7	11/15/2022	7/8	130	0935	CP	901	850	4.0		MK
8	11/16/2022	8/9	130	1000	CK	464	850	3.0		MK
9	11/16/2022	9/10	130	106	CP	901	850	3.5	#2	MK
10	11/16/2022	10/11	127	1036	CP	901	850	3.5		MK
11	11/16/2022	11/12	125	1040	CK	901	850	3.0		MK
12	11/16/2022	12/13	124	1100	CK	901	850	3.0	#3	MK
13	11/16/2022	13/14	123	1320	CK	464	850	3.0		MK
14	11/16/2022	14/15	120	1326	CP	901	850	3.5		MK
15	11/16/2022	15/16	117	1345	CK	901	850	3.5		MK
16	11/16/2022	16/17	116	1405	CP	901	850	3.5	#4	MK
17	11/16/2022	17/18	115	1430	CP	901	850	3.5		MK
18	11/16/2022	19/20	560	1400	MK	57	850	4.0	#5	MK
19	11/16/2022	21/22	117	1429	CK	464	850	3.5		MK
20	11/16/2022	19/21	22	1446	CK	464	850	3.5		MK
21	11/16/2022	20/22	22	1450	CK	464	850	3.5		MK
22	11/16/2022	22/24	117	1537	MK	57	850	4.0	#6	MK
23	11/16/2022	1/19	22	1543	CK	464	850	3.5		MK
24	11/16/2022	2/20	22	1549	CK	464	850	3.5		MK
25	11/16/2022	3/23	22	1550	CK	464	850	3.5		MK
26	11/16/2022	20/23	346	1600	CK	464	850	3.5	#7	MK
27	11/16/2022	20/24	241	1552	MK	57	850	4.0		MK
28	11/16/2022	23/24	22	1629	MK	57	850	4.0		MK
29	11/17/2022	P19/EX	270	0925	CK	464	850	4.0	#16	MK
30	11/17/2022	P21/EX	117	0906	CK	464	850	4.0		MK

FML SEAMING LOG

PROJECT NAME: OWL Landfill Cell 4AB

OWNER: Oilfield Water Logistics

PROJECT LOCATION: Lea County, New Mexico

SEAMING LOCATION: Secondary

PROJECT NUMBER: 7053.22

CONTRACTOR: Mustang Extreme

SHEET NUMBER: 2

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
31	11/17/2022	P24/P26	478	1002	CP	901	850	3.5	#8	MK
32	11/17/2022	26/28	560	1035	MK	57	850	4.5	#9	MK
33	11/17/2022	23/26	321	1100	CP	901	850	3.5		MK
34	11/17/2022	P19/EX B	290	1030	CP	464	850	4.0		MK
35	11/17/2022	25/26	22	1010	MK	57	850	4.5		MK
36	11/17/2022	23/25	200	1105	CP	901	850	3.5		MK
37	11/17/2022	25/28	113	1136	MK	57	850	4.0	#10	MK
38	11/17/2022	25/27	83	1122	CK	464	850	4.0		MK
39	11/17/2022	27/28	22	1118	CK	464	850	4.0		MK
40	11/17/2022	26/29	36	1339	LP	901	850	4.0		MK
41	11/17/2022	28/29	22	1330	LP	99	850	4.0		MK
42	11/17/2022	28/30	480	1334	CK	464	850	4.0		MK
43	11/17/2022	30/31	22	1341	MK	57	850	4.5	#11	MK
44	11/17/2022	30/32	390	1354	MK	57	850	4.5	#13	MK
45	11/17/2022	31/28	112	1343	CP	901	850	4.0		MK
46	11/17/2022	29/31	40	1338	CP	901	850	4.0		MK
47	11/17/2022	31/33	153	1410	CP	901	850	4.0		MK
48	11/17/2022	30/33	120	1428	CP	901	850	4.0	#12	MK
49	11/17/2022	33/35	400	1500	CP	901	850	4.0	#14	MK
50	11/17/2022	32/33	22	1446	CP	901	850	4.0		MK
51	11/17/2022	34/35	27	1500	MK	57	850	4.5		MK
52	11/17/2022	32/24	276	1505	MK	57	850	4.5		MK
53	11/17/2022	4/5/6/7/8/25/27/30/32	88	1504	CK	464	850	3.2		MK
54	11/17/2022	27/30	75	1446	CK	464	850	4.0		MK
55	11/17/2022	24/36	310	1740	CK	464	850	4.0	#17	MK
56	11/17/2022	32/35	116	1530	CP	901	850	4.0		MK
57	11/17/2022	35/36	560	1543	CP	901	850	4.0	#15	MK
58	11/17/2022	9/36	22	1630	CK	464	850	3.2		MK
59	11/17/2022	35/37	110	1603	MK	57	850	4.5		MK
60	11/17/2022	36/37	22	1626	MK	57	850	4.5		MK

FML SEAMING LOG

PROJECT NAME: OWL Landfill Cell 4AB

OWNER: Oilfield Water Logistics

PROJECT LOCATION: Lea County, New Mexico

SEAMING LOCATION: Secondary

PROJECT NUMBER: 7053.22

CONTRACTOR: Mustang Extreme

SHEET NUMBER: 3

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
61	11/18/2022	P36/P38	440	0927	MK	57	850	4.5	#18	MK
62	11/18/2022	38/39	22	1034	MK	57	850	4.5		MK
63	11/18/2022	36/39	239	1040	MK	57	850	4.5		MK
64	11/18/2022	38/40	323	1026	CP	901	850	3.4	#20	MK
65	11/18/2022	40/41	22	1118	CP	901	850	3.4		MK
66	11/18/2022	38/41	117	1120	CP	901	850	3.4		MK
67	11/18/2022	39/41	237	1122	MK	57	850	4.5	#19	MK
68	11/18/2022	40/42	200	1327	CK	464	850	4.0		MK
69	11/18/2022	42/43	22	1400	CK	464	850	4.0		MK
70	11/18/2022	40/43	122	1345	MK	57	850	4.5		MK
71	11/18/2022	41/43	119	1402	MK	57	850	4.5	#21	MK
72	11/18/2022	P41/P43 B	230	1356	CP	901	850	3.5		MK
73	11/18/2022	42/44	70	1406	CK	464	850	4.0		MK
74	11/18/2022	44/45	22	1422	CK	464	850	4.0		MK
75	11/18/2022	43/45	430	1424	MK	57	850	4.0	#22	MK
76	11/18/2022	42/45	128	1426	CK	464	850	4.0	#23	MK
77	11/17/2022	37/39	116	1100	MK	57	850	4.5		MK
78	11/18/2022	10/38	22	1455	CK	464	850	3.2		MK
79	11/18/2022	11/40	22	1502	CK	464	850	3.2		MK
80	11/18/2022	12/42	22	1516	CK	464	850	3.2		MK
81	11/18/2022	43/46	47	1455	CP	901	850	3.5		MK
82	11/18/2022	45/46	22	1445	CP	901	850	3.5		MK
83	11/18/2022	13/44	22	1520	CK	464	850	3.2		MK
84	11/18/2022	44/47	170	1526	CK	464	850	4.0		MK
85	11/18/2022	45/47	431	1515	CP	901	850	3.5	#24	MK
86	11/18/2022	45/48	174	1548	MK	57	850	4.5		MK
87	11/18/2022	47/48	22	1542	MK	57	850	4.5		MK
88	11/18/2022	11/47	22	1545	CK	464	850	3.2		MK
89	11/18/2022	46/48	50	1610	MK	57	850	4.5		MK
90	11/19/2022	47/49	37	0810	CP	901	850	3.5	#26	MK



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FML SEAMING LOG

PROJECT NAME: OWL Landfill Cell 4AB
OWNER: Oilfield Water Logistics
PROJECT LOCATION: Lea County, New Mexico
SEAMING LOCATION: Secondary

PROJECT NUMBER: 7053.22
CONTRACTOR: Mustang Extreme
SHEET NUMBER: 4

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
91	11/19/2022	P49/P50	22	0825	MK	57	850	4.5		MK
92	11/19/2022	47/50	137	0830	MK	57	850	4.5	#25	MK
93	11/19/2022	48/50	173	0853	MK	57	850	4.5		MK
94	11/19/2022	51/52	22	0930	CP	901	850	3.5		MK
95	11/19/2022	49/52	140	0937	CP	901	850	3.5		MK
96	11/19/2022	47/49	380	0810	CP	901	850	3.5		MK
97	11/19/2022	49/51	250	1019	CK	464	850	4.0		MK
98	11/19/2022	51/53	98	1119	CK	464	850	4.0		MK
99	11/19/2022	50/52	310	0930	MK	57	850	4.5	#27	MK
100	11/19/2022	53/54	22	1027	CK	464	850	4.0		MK
101	11/19/2022	52/54	22	1040	CP	901	850	3.5		MK
102	11/19/2022	54/55	22	1035	MK	57	850	4.5		MK
103	11/19/2022	52/55	26	1040	MK	57	850	4.5		MK
104	11/19/2022	15/49	22	1056	CK	464	850	3.2		MK
105	11/19/2022	16/51	22	1059	CK	464	850	3.2		MK
106	11/19/2022	52/54	450	1040	CP	901	850	3.5	#28	MK
107	11/19/2022	51/54	150	1118	CP	901	850	3.5		MK
108	11/19/2022	54/56	525	1112	MK	57	850	3.5	#30	MK
109	11/19/2022	17/53	22	1110	CK	464	850	3.2	#29	MK
110	11/19/2022	53/56	113	1057	MK	57	850	4.5		MK
111	11/19/2022	55/57	25	1200	CP	901	850	4.5	#31	MK
112	11/19/2022	54/57	170	1120	CP	901	850	3.5		MK
	11/19/2022	56/57	22	1210	CP	901	850	3.5		MK

APPENDIX C: CELL 4 A/B LINER INSTALLATION DOCUMENTATION

C.10 Secondary FML Seam Pressure Test Log



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FML SEAMING PRESSURE TEST LOG

				PROJECT SPECIFICATIONS	
PROJECT NAME:	OWL Landfill Cell 4AB	PROJECT NUMBER:	7053.22	MIN START PSI:	30
OWNER:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme	TEST DURATION:	5 minutes
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	1	MAX PSI DROP:	30

PRESSURE TEST LOCATION: Secondary

	DATE	PANEL #/PANEL #	TESTER	TIME		PRESSURE		MONITORED BY	PASS/FAIL
				START	FINISH	INITIAL	FINAL		
1	11/16/2022	P1/P2	VS	1310	1315	30	30	MK	PASS
2	11/16/2022	2/3	VS	1312	1317	30	30	MK	PASS
3	11/16/2022	3/4	VS	1315	1320	30	30	MK	PASS
4	11/16/2022	4/5	VS	1317	1322	30	30	MK	PASS
5	11/16/2022	5/6	VS	1320	1325	30	30	MK	PASS
6	11/16/2022	6/7	VS	1325	1330	30	30	MK	PASS
7	11/16/2022	7/8	VS	1120	1125	30	30	TSK	PASS
8	11/16/2022	1/19	VS	1545	1550	30	30	TSK	PASS
9	11/16/2022	2/20	VS	1550	1555	30	30	TSK	PASS
10	11/16/2022	3/23	AT	1600	1605	30	30	TSK	PASS
11	11/16/2022	19/21	AT	1608	1613	30	30	TSK	PASS
12	11/16/2022	19/20	VS	1622	1627	30	30	TSK	PASS
13	11/16/2022	21/22	VS	1627	1632	30	30	TSK	PASS
14	11/16/2022	22/24	VS	1631	1636	30	30	TSK	PASS
15	11/16/2022	20/24	VS	1633	1638	30	30	TSK	PASS
16	11/11/2022	23/24	VS	0743	0748	30	30	TSK	PASS
17	11/11/2022	21/EX	VS	0936	0941	30	30	TSK	PASS
18	11/11/2022	20/23	VS	0728	0733	30	30	TSK	PASS
19	11/11/2022	24/26	VS	1056	1101	30	30	TSK	PASS
20	11/11/2022	25/26	VS	1030	1035	30	30	TSK	PASS
21	11/11/2022	23/26	VS	1110	1115	30	30	TSK	PASS
22	11/11/2022	23/25	VS	1130	1135	30	30	TSK	PASS
23	11/11/2022	27/28	VS	1145	1150	30	30	TSK	PASS
24	11/11/2022	26/28	VS	1152	1159	30	30	TSK	PASS
25	11/11/2022	25/28	VS	1313	1318	30	30	TSK	PASS
26	11/11/2022	25/27	VS	1143	1147	30	30	TSK	PASS
27	11/11/2022	28/29	VS	1330	1335	30	30	TSK	PASS
28	11/11/2022	26/29	VS	1336	1341	30	30	TSK	PASS
29	11/11/2022	30/31	VS	1400	1405	30	30	TSK	PASS
30	11/11/2022	29/31	VS	1347	1352	30	30	TSK	PASS
31	11/11/2022	31/33	VS	1430	1435	30	30	TSK	PASS
32	11/11/2022	32/33	VS	1459	1504	30	30	TSK	PASS
33	11/11/2022	30/33	VS	1450	1455	30	30	TSK	PASS
34	11/11/2022	27/30	VS	1505	1510	30	30	TSK	PASS
35	11/11/2022	28/30	VS	1510	1515	30	30	TSK	PASS
36	11/11/2022	30/32	VS	1520	1525	30	30	TSK	PASS
37	11/11/2022	6/30	VS	1548	1553	30	30	TSK	PASS
38	11/11/2022	5/29	VS	1538	1543	30	30	TSK	PASS
39	11/11/2022	4/25	VS	1540	1545	30	30	TSK	PASS
40	11/11/2022	7/32	VS	1603	1608	30	30	TSK	PASS
41	11/11/2022	8/34	VS	1608	1613	30	30	TSK	PASS
42	11/11/2022	34/35	VS	1620	1625	30	30	TSK	PASS
43	11/11/2022	34/32	VS	1623	1628	30	30	TSK	PASS
44	11/11/2022	35/32	VS	1627	1632	30	30	TSK	PASS
45	11/11/2022	33/35	VS	0725	0730	30	30	TSK	PASS
46	11/11/2022	35/36	VS	0805	0810	30	30	TSK	PASS
47	11/11/2022	35/36B	VS	0736	0735	30	30	TSK	PASS
48	11/11/2022	36/37	VS	0815	0820	30	30	TSK	PASS
49	11/11/2022	35/37	VS	0820	0825	30	30	TSK	PASS
50	11/11/2022	34/36	VS	0831	0836	30	30	TSK	PASS



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FML SEAMING PRESSURE TEST LOG

PROJECT NAME: OWL Landfill Cell 4AB **PROJECT NUMBER:** 7053.22
OWNER: Oilfield Water Logistics **CONTRACTOR:** Mustang Extreme
PROJECT LOCATION: Lea County, New Mexico **SHEET NUMBER:** 3

PROJECT SPECIFICATIONS	
MIN START PSI:	30
TEST DURATION:	5 minutes
MAX PSI DROP:	30

PRESSURE TEST LOCATION: Secondary

	DATE	PANEL #/PANEL #	TESTER	TIME		PRESSURE		MONITORED BY	PASS/FAIL
				START	FINISH	INITIAL	FINAL		
51	11/18/2022	P9/P36	VS	0841	0846	30	30	TSK	PASS
52	11/17/2022	9/36	VS	0830	0835	30	30	TSK	PASS
53	11/16/2022	9/10	VS	1512	1517	30	30	TSK	PASS
54	11/16/2022	8/9	VS	1505	1510	30	30	TSK	PASS
55	11/16/2022	10/11	VS	1514	1519	30	30	TSK	PASS
56	11/16/2022	11/17	VS	1516	1521	30	30	TSK	PASS
57	11/16/2022	17/13	VS	1518	1523	30	30	TSK	PASS
58	11/16/2022	13/14	VS	1523	1528	30	30	TSK	PASS
59	11/16/2022	14/15	VS	1525	1530	30	30	TSK	PASS
60	11/16/2022	15/16	VS	1528	1535	30	30	TSK	PASS
61	11/16/2022	16/17	VS	1530	1535	30	30	TSK	PASS
62	11/16/2022	17/18	VS	1532	1537	30	30	TSK	PASS
63	11/18/2022	38/39	VS	1056	1101	30	30	TSK	PASS
64	11/18/2022	36/38	VS	1104	1109	30	30	TSK	PASS
65	11/18/2022	36/38	VS	1106	1111	30	30	TSK	PASS
66	11/18/2022	38/40	VS	1120	1125	30	30	TSK	PASS
67	11/18/2022	40/41	VS	1120	1125	30	30	TSK	PASS
68	11/18/2022	40/42	VS	1420	1425	30	30	TSK	PASS
69	11/18/2022	42/43	VS	1416	1421	30	30	TSK	PASS
70	11/18/2022	41/43	VS	1456	1455	30	30	TSK	PASS
71	11/18/2022	41/43B	VS	1443	1448	30	30	TSK	PASS
72	11/18/2022	39/41	VS	1327	1332	30	30	TSK	PASS
73	11/18/2022	36/39	VS	1321	1326	30	30	TSK	PASS
74	11/18/2022	37/39	VS	1318	1323	30	30	TSK	PASS
75	11/18/2022	38/41	VS	1145	1150	30	30	TSK	PASS
76	11/18/2022	38/41B	VS	1152	1157	30	30	TSK	PASS
77	11/18/2022	40/43	VS	1425	1430	30	30	TSK	PASS
78	11/18/2022	42/44	VS	1458	1503	30	30	TSK	PASS
79	11/18/2022	42/45	VS	1556	1501	30	30	TSK	PASS
80	11/18/2022	44/45	VS	1505	1510	30	30	TSK	PASS
81	11/18/2022	11/40	VS	1519	1524	30	30	TSK	PASS
82	11/18/2022	10/38	VS	1515	1520	30	30	TSK	PASS
83	11/18/2022	12/42	VS	1530	1535	30	30	TSK	PASS
84	11/18/2022	13/44	VS	1525	1530	30	30	TSK	PASS
85	11/18/2022	44/47	VS	1537	1542	30	30	TSK	PASS
86	11/18/2022	14/47	VS	1550	1555	30	30	TSK	PASS
87	11/18/2022	47/48	VS	1605	1610	30	30	TSK	PASS
88	11/18/2022	43/45	VS	1610	1615	30	30	TSK	PASS
89	11/18/2022	45/46	VS	1620	1625	30	30	TSK	PASS
90	11/19/2022	45/47	VS	0730	0735	30	30	TSK	PASS
91	11/19/2022	45/48	VS	0733	0737	30	30	TSK	PASS
92	11/19/2022	46/48	VS	0716	0721	30	30	TSK	PASS
93	11/19/2022	49/50	VS	0855	0900	30	30	TSK	PASS
94	11/19/2022	47/49	VS	0933	0937	30	30	TSK	PASS
95	11/19/2022	47/50	VS	0925	0930	30	30	TSK	PASS
96	11/19/2022	51/52	VS	1012	1017	30	30	TSK	PASS
97	11/19/2022	48/50	VS	1030	1035	30	30	TSK	PASS
98	11/19/2022	50/52	VS	1042	1047	30	30	TSK	PASS
99	11/19/2022	49/51	VS	1056	1101	30	30	TSK	PASS
100	11/19/2022	49/52	VS	1045	1050	30	30	TSK	PASS



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FML SEAMING PRESSURE TEST LOG

PROJECT NAME:	OWL Landfill Cell 4AB	PROJECT NUMBER:	7053.22
OWNER:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	3

PROJECT SPECIFICATIONS	
MIN START PSI:	30
TEST DURATION:	5 minutes
MAX PSI DROP:	30

PRESSURE TEST LOCATION: Secondary

[illegible]

APPENDIX C: CELL 4 A/B LINER INSTALLATION DOCUMENTATION

C.11 FML Seam Field Destructive Test Records

Mustang Extreme Environmental Services Destruct Log

Project Name: OWD NDBL SWMF Cell 4

WO #: 51619

Material & Layer: HDPE 60 mil LINER SECONDARY

QC Technician: Francisco Gonzalez

Peel Test Fusion Minimum: 91 PPI

Peel Test Extrusion Minimum: 78 PPI

Shear Test Minimum: 120 PPI

Sample No.	Seam	Weld Date	Tech	Machine			Peel 1		Peel 2		Peel 3		Peel 4		Peel 5		Shear					Pass/Fail
				No.	Temp	Speed/Preheat	In	Out	In	Out	In	Out	In	Out	In	Out						
1	5/6	11/15/22	CK	57	850	3.5	140	135	146	132	145	132	141	137	144	138	250	235	238	229	237	Pass
2	9/10	11/15/22	LP	901	850	3.5	158	149	163	165	147	138	168	157	154	162	270	267	258	264	269	Pass
3	12/13	11/15/22	LP	901	850	3.5	172	144	169	150	160	154	164	139	144	146	246	243	238	241	248	Pass
4	16/17	11/15/22	LP	901	850	3.5	163	151	162	147	166	160	157	148	160	150	235	241	238	245	246	Pass
5	19/20	11/16/22	NK	57	850	4.0	129	125	127	123	125	127	123	125	130	129	210	204	208	202	205	Pass
6	20/24	11/16/22	NK	57	850	4.0	134	127	131	130	124	131	127	125	128	130	209	210	206	203	211	Pass
7	20/23	11/16/22	CK	464	850	4.0	147	139	140	125	162	152	144	148	159	145	183	204	209	200	210	Pass
8	24/26	11/17/22	LP	901	850	3.5	128	140	121	126	128	124	130	126	119	123	188	192	195	189	197	Pass
9	26/28	11/17/22	NK	57	850	4.5	128	122	119	124	128	119	123	125	120	126	204	202	201	203	206	Pass
10	25/28	11/17/22	NK	57	850	4.5	145	120	133	146	130	144	132	127	140	134	216	198	209	212	210	Pass
11	28/30	11/17/22	CK	464	850	4.0	152	147	145	138	142	140	139	136	141	146	205	197	200	199	203	Pass
12	30/33	11/17/22	LP	901	850	4.0	137	128	125	119	142	127	130	123	122	130	202	197	198	195	200	Pass
13	30/32	11/17/22	NK	57	850	4.5	140	126	123	135	130	126	127	132	124	137	211	205	204	207	210	Pass
14	33/35	11/17/22	LP	901	850	4.5	145	123	126	128	140	128	132	129	124	134	205	204	202	205	203	Pass
15	35/36	11/17/22	LP	901	850	4.0	124	122	119	137	118	120	122	117	123	126	209	195	198	204	196	Pass
16	19/Existing	11/17/22	CK	464	850	3.5	135	137	149	130	132	142	136	131	144	136	199	194	198	197	195	Pass
17	34/36	11/17/22	CK	464	850	4.0	147	142	143	130	145	140	139	148	133	137	212	214	210	215	217	Pass
18	36/38	11/18/22	NK	57	850	4.5	118	130	122	111	125	126	130	117	124	127	187	184	189	185	182	Pass
19	39/41	11/18/22	NK	57	850	4.5	129	127	125	123	128	120	121	116	124	120	173	190	189	177	192	Pass
20	38/40	11/18/22	LP	901	850	3.4	112	129	109	118	124	127	131	125	122	118	175	180	184	181	182	Pass
21	41/43	11/18/22	NK	57	850	4.5	127	117	124	117	130	105	123	120	118	122	182	184	180	183	185	Pass
22	43/45	11/18/22	NK	57	850	4.5	132	112	118	116	118	117	115	121	114	118	168	175	173	172	167	Pass

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Mustang Extreme Environmental Services Destruct Log

Project Name: OWD NDBL SWMF Cell 4

WO #: 51619

Material & Layer: HDPE 60 mil LINER SECONDARY

QC Technician: Francisco Gonzalez

Peel Test Fusion Minimum: 91 PPI

Peel Test Extrusion Minimum: 78 PPI

Shear Test Minimum: 120 PPI

Sample No.	Seam	Weld Date	Tech	Machine			Peel 1		Peel 2		Peel 3		Peel 4		Peel 5		Shear					Pass/Fail
				No.	Temp	Speed/Preheat	In	Out	In	Out	In	Out	In	Out	In	Out						
23	42/45	11/18/22	CK	464	850	4.0	129	105	123	111	130	118	127	123	126	120	169	172	181	175	178	Pass
24	45/47	11/18/22	LP	901	850	3.5	138	116	103	116	142	131	119	125	132	139	173	169	172	170	175	Pass
25	47/50	11/19/22	NK	57	850	4.5	119	123	117	122	125	116	127	120	125	119	180	177	175	179	182	Pass
26	47/49	11/19/22	LP	901	850	3.5	128	137	119	129	124	138	118	124	127	130	184	180	182	183	180	Pass
27	50/52	11/19/22	NK	57	850	4.5	133	127	129	137	128	123	138	129	130	137	171	174	172	171	170	Pass
28	52/54	11/19/22	LP	901	850	3.5	154	128	147	113	148	119	130	128	125	137	176	173	175	178	177	Pass
29	17/53	11/19/22	CK	464	850	3.2	110	126	120	123	127	125	118	134	120	126	192	178	190	189	191	Pass
30	54/56	11/19/22	NK	57	850	4.5	130	152	132	155	153	127	154	125	136	128	194	197	192	193	195	Pass
31	55/57	11/19/22	LP	901	850	3.5	128	127	130	119	129	120	125	120	124	130	178	170	166	169	168	Pass
32	Cell 1A/2AB	11/22/22	CK	464	850	4.0	145	140	136	145	152	132	136	124	126	142	198	187	175	182	199	Pass
33	Cell 1A/2AB	11/22/22	LP	464	850	3.5	135	145	124	120	118	117	121	120	125	135	192	197	192	191	195	Pass

Mustang Extreme Environmental Services Destruct Log

Project Name: OWD NDBL SWMF CELL 4

WO #: 51619

Material & Layer: 60 Mil HDPE LINER PRIMARY

QC Technician: FRANCISCO GONZALEZ

Peel Test Fusion Minimum: 91 PPI

Peel Test Extrusion Minimum: 78 PPI

Shear Test Minimum: 120 PPI

Sample No.	Seam	Weld Date	Tech	Machine			Peel 1		Peel 2		Peel 3		Peel 4		Peel 5		Shear					Pass/Fail
				No.	Temp	Speed/Preheat	In	Out	In	Out	In	Out	In	Out	In	Out						
1	4/5	11/29/22	LP	464	850	350	106	134	98	127	118	139	157	153	147	148	201	196	198	201	200	Pass
2	8/9	11/29/22	LP	464	850	350	157	131	144	166	129	170	150	147	151	147	219	200	201	199	204	Pass
3	12/13	11/30/22	CK	57	850	300	156	149	147	151	146	148	143	140	145	151	199	195	192	194	195	Pass
4	16/17	11/30/22	CK	57	850	300	142	125	133	134	136	142	122	121	130	126	180	179	174	167	168	Pass
5	19/Existing	11/30/22	CK	57	850	300	119	107	138	118	114	139	119	107	116	121	166	172	170	175	167	Pass
6	20/22	11/30/22	NK	901	850	400	129	132	129	134	132	139	138	127	129	134	174	170	173	171	172	Pass
7	19/21	11/30/22	LP	464	850	350	135	141	151	143	137	147	141	135	140	138	169	174	172	170	175	Pass
8	21/24	11/30/22	NK	901	850	400	120	119	128	153	138	119	134	118	120	132	175	180	170	172	178	Pass
9	24/26	11/30/22	NK	901	850	400	137	149	130	155	126	143	135	129	138	141	163	169	167	163	165	Pass
10	23/25	11/30/22	LP	464	850	350	130	137	147	145	137	124	132	126	135	140	173	174	178	175	180	Pass
11	26/27	11/30/22	LP	464	850	350	132	129	130	120	124	115	124	119	130	125	172	175	169	174	170	Pass
12	27/29	12/1/22	LP	464	850	400	150	132	108	118	128	147	142	131	140	130	178	174	173	174	180	Pass
13	29/31	12/1/22	CK	57	850	300	121	124	134	129	127	116	126	120	128	132	180	173	177	175	179	Pass
14	30/32	12/1/22	NK	901	850	400	157	149	137	131	149	151	145	138	140	139	186	183	181	184	180	Pass
15	32/34	12/1/22	LP	464	850	400	136	119	114	122	123	140	127	123	134	141	183	182	180	184	181	Pass
16	33/35	12/1/22	CK	57	850	300	126	146	115	128	141	113	122	140	128	130	186	181	184	182	180	Pass
17	34/36	12/1/22	NK	901	850	400	124	127	119	125	137	128	120	125	131	124	179	169	173	170	175	Pass
18	35/37	12/1/22	LP	57	850	300	129	131	145	127	122	118	130	120	125	122	161	162	167	164	165	Pass
19	37/39	12/2/22	CK	57	850	300	116	120	113	104	119	109	110	131	125	136	198	194	197	193	195	Pass
20	40/42	12/2/22	CK	57	850	300	126	111	112	110	120	118	109	122	118	120	188	182	185	181	187	Pass
21	39/42	12/2/22	LP	464	850	350	109	131	117	112	106	120	122	124	121	118	187	185	184	182	186	Pass
22	42/44	12/2/22	NK	901	850	400	125	136	124	111	128	119	151	131	150	136	186	180	178	179	180	Pass
23	45/48	12/2/22	LP	464	850	350	112	104	109	108	110	107	109	102	169	107	143	147	146	144	148	Pass
24	44/46	12/2/22	NK	901	850	400	120	114	118	112	131	123	137	123	142	128	184	179	180	183	182	Pass
25	46/49	12/3/22	CK	57	850	300	117	113	120	169	117	113	120	115	119	121	171	168	170	167	169	Pass



Mustang Extreme Environmental Services Destruct Log

Project Name: OWD NDBL SWMF CELL 4WO #: 51619Material & Layer: 60 Mil HDPE LINER PRIMARYQC Technician: FRANCISCO GONZALEZPeel Test Fusion Minimum: 91 PPIPeel Test Extrusion Minimum: 78 PPIShear Test Minimum: 120 PPI

Sample No.	Seam	Weld Date	Tech	Machine			Peel 1		Peel 2		Peel 3		Peel 4		Peel 5		Shear					Pass/Fail
				No.	Temp	Speed/Preheat	In	Out	In	Out	In	Out	In	Out	In	Out						
26	50/52	12/3/22	NK	901	850	400	156	135	137	133	135	150	131	137	140	136	180	173	176	174	179	Pass
27	49/51	12/3/22	LP	464	850	350	121	128	118	148	150	135	120	132	119	137	167	163	160	165	158	Pass
28	51/54	12/3/22	LP	464	850	350	155	119	150	114	145	109	147	142	138	149	160	162	164	161	165	Pass
29	52/54	12/3/22	NK	901	850	400	134	155	138	132	133	149	139	145	140	139	179	177	180	174	176	Pass
30	54/57	12/3/22	NK	901	850	400	141	153	140	148	145	132	140	146	139	141	187	184	182	183	185	Pass
31	54/56	12/3/22	LP	464	850	350	137	151	148	137	134	145	138	140	137	144	192	187	189	191	190	Pass

APPENDIX C: CELL 4 A/B LINER INSTALLATION DOCUMENTATION

C.12 Geonet Deployment Log



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

GEONET DEPLOYMENT LOG

PROJECT NAME:	OWL Landfill Cell 4AB	PROJECT NUMBER:	7053.22
CLIENT:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	1
DEPLOYMENT LOCATION:	Floor	MONITOR:	TSK

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT ²)	DATE INSTALLED
1	3354	290	15	4,350	11/29/2022
2	2643	290	15	4,350	11/29/2022
3	2656	290	15	4,350	11/29/2022
4	2331	290	15	4,350	11/29/2022
5	2330	290	15	4,350	11/29/2022
6	2552	290	15	4,350	11/29/2022
7	2796	290	15	4,350	11/29/2022
8	2795	290	15	4,350	11/29/2022
9	2643	290	15	4,350	11/29/2022
10	2805	290	15	4,350	11/29/2022
11	2644	290	15	4,350	11/29/2022
12	2643	290	15	4,350	11/29/2022
13	2641	30	15	450	11/29/2022
14	2653	290	15	4,350	11/29/2022
15	2646	290	15	4,350	11/29/2022
16	2651	290	15	4,350	11/29/2022
17	2797	290	15	4,350	11/29/2022
18	2642	35	15	525	11/29/2022
19	2642	20	15	300	11/29/2022
20	2642	30	15	450	11/29/2022
21	2804	290	15	4,350	11/29/2022
22	2652	290	15	4,350	11/29/2022
23	3337	290	15	4,350	11/29/2022
24	2647	290	15	4,350	12/1/2022
25	2642	80	15	1,200	12/1/2022
26	3347	290	15	4,350	12/1/2022
27	3308	290	15	4,350	12/1/2022
28	2641	70	15	1,050	12/1/2022
29	3333	290	15	4,350	12/1/2022
30	3348	290	15	4,350	12/1/2022
31	2641	70	15	1,050	12/1/2022
32	2641	100	15	1,500	12/1/2022
33	3334	290	15	4,350	12/1/2022
34	3368	290	15	4,350	12/1/2022
35	2642	110	15	1,650	12/1/2022
36	3350	290	15	4,350	12/1/2022
37	2654	290	15	4,350	12/1/2022
38	3349	290	15	4,350	12/1/2022
39	3334	145	15	2,175	12/1/2022
40	2803	290	15	4,350	12/1/2022
TOTAL LINER PLACED (FT ²):				140,850	



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Rio Rancho, New Mexico 87124
505.867.6990

GEONET DEPLOYMENT LOG

PROJECT NAME:	OWL Landfill Cell 4AB	PROJECT NUMBER:	7053.22
CLIENT:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	2
DEPLOYMENT LOCATION:	Floor	MONITOR:	TSK

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT ²)	DATE INSTALLED
41	3334	145	15	2,175	12/1/2022
42	2794	150	15	2,250	12/1/2022
43	2809	290	15	4,350	12/1/2022
44	3327	290	15	4,350	12/2/2022
45	2794	140	15	2,100	12/2/2022
46	2807	290	15	4,350	12/2/2022
47	2799	290	15	4,350	12/2/2022
48	2650	150	15	2,250	12/2/2022
49	2794	290	15	4,350	12/2/2022
50	6794	290	15	4,350	12/2/2022
51	2645	120	15	1,800	12/2/2022
52	2655	290	15	4,350	12/2/2022
53	2649	290	15	4,350	12/2/2022
54	2648	290	15	4,350	12/2/2022
55	2793	290	15	4,350	12/2/2022
56	2797	290	15	4,350	12/2/2022
57	2641	20	15	300	12/2/2022
58	3335	290	15	4,350	12/2/2022
59	3329	70	15	1,050	12/2/2022
60	2801	290	15	4,350	12/2/2022
61	3339	290	15	4,350	12/2/2022
62	2306	290	15	4,350	12/2/2022
63	3336	290	15	4,350	12/2/2022
64	2798	15	15	225	12/2/2022
65	2798	30	15	450	12/2/2022
66	2802	290	15	4,350	12/2/2022
67	3353	290	15	4,350	12/2/2022
68	2810	290	15	4,350	12/2/2022
69	3351	290	15	4,350	12/2/2022
70	2798	30	15	450	12/2/22
TOTAL LINER PLACED (FT ²):				100,050	



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Rio Rancho, New Mexico 87124
505.867.6990

GEONET DEPLOYMENT LOG

PROJECT NAME:	OWL Landfill Cell 4AB	PROJECT NUMBER:	7053.22
CLIENT:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	3
DEPLOYMENT LOCATION:	Floor	MONITOR:	TSK

[illegible]

APPENDIX C: CELL 4 A/B LINER INSTALLATION DOCUMENTATION

C.13 Primary 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
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	1
DEPLOYMENT LOCATION:	Primary	MONITOR:	MWK

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT ²)	DATE INSTALLED
P1	6299	115	22.5	2,588	11/29/2022
P2	6299	117	22.5	2,633	11/29/2022
P3	6299	119	22.5	2,678	11/29/2022
P4	6299	121	22.5	2,723	11/29/2022
P5	6298	123	22.5	2,768	11/29/2022
P6	6298	125	22.5	2,813	11/29/2022
P7	6298	127	22.5	2,858	11/29/2022
P8	6297	129	22.5	2,903	11/29/2022
P9	6297	130	22.5	2,925	11/29/2022
P10	6297	130	22.5	2,925	11/29/2022
P11	6301	129	22.5	2,903	11/29/2022
P12	6301	127	22.5	2,858	11/29/2022
P13	6301	123	22.5	2,768	11/30/2022
P14	6293	121	22.5	2,723	11/30/2022
P15	6293	119	22.5	2,678	11/30/2022
P16	6293	118	22.5	2,655	11/30/2022
P17	0322	117	22.5	2,633	11/30/2022
P18	6293	116	22.5	2,610	11/30/2022
P19	6729	560	22.5	12,600	11/30/2022
P20	6718	118	22.5	2,655	11/30/2022
P21	6718	442	22.5	9,945	11/30/2022
P22	6722	240	22.5	5,400	11/30/2022
P23	6722	320	22.5	7,200	11/30/2022
P24	6721	358	22.5	8,055	11/30/2022
P25	6721	202	22.5	4,545	11/30/2022
P26	6739	465	22.5	10,463	11/30/2022
P27	6720	560	22.5	12,600	11/30/2022
P28	6734	118	22.5	2,655	11/30/2022
P29	6734	424	22.5	9,540	12/1/2022
P30	6742	240	22.5	5,400	12/1/2022
P31	6742	320	22.5	7,200	12/1/2022
P32	6728	358	22.5	8,055	12/1/2022
P33	6728	202	22.5	4,545	12/1/2022
P34	6729	465	22.5	10,463	12/1/2022
P35	6727	560	22.5	12,600	12/1/2022
P36	6760	110	22.5	2,475	12/1/2022
P37	6760	440	22.5	9,900	12/1/2022
P38	6737	230	22.5	5,175	12/1/2022
P39	6737	330	22.5	7,425	12/2/2022
P40	6736	340	22.5	7,650	12/2/2022
TOTAL LINER PLACED (FT²):				216,180	



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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
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	1
DEPLOYMENT LOCATION:	Primary	MONITOR:	MWK

[illegible]

APPENDIX C: CELL 4 A/B LINER INSTALLATION DOCUMENTATION

C.14 Primary 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 4AB
OWNER: Oilfield Water Logistics
PROJECT LOCATION: Lea County, New Mexico
SEAMING LOCATION: Primary

PROJECT NUMBER: 7053.22
CONTRACTOR: Mustang Extreme
SHEET NUMBER:

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
1	11/29/2022	1/2	116	0801	CP	464	850	3.5		
2	11/29/2022	2/3	118	0804	CK	57	850	3.5		
3	11/29/2022	3/4	120	0820	CK	57	850	3.5		
4	11/29/2022	4/5	122	083	CP	464	850	3.5	#1	
5	11/29/2022	5/6	124	0845	CK	57	850	3.5		
6	11/29/2022	6/7	126	0900	CP	464	850	3.5		
7	11/29/2022	7/8	128	0922	CK	57	850	3.5		
8	11/29/2022	8/9	130	0930	CP	464	850	3.5	#2	
9	11/29/2022	9/10	128	0936	CK	57	850	3.5		
10	11/29/2022	10/11	128	1010	CP	464	850	3.5		
11	11/29/2022	11/12	127	1030	CK	57	850	3.5		
12	11/29/2022	P1/EX	116	1057	CP	464	850	3.5		
13	11/30/2022	12/13	125	0745	CK	57	850	3.0	#3	
14	11/30/2022	13/14	123	0752	CP	464	850	3.5		
15	11/30/2022	14/15	120	0808	CK	57	850	3.0		
16	11/30/2022	15/16	118	0820	CP	464	850	3.5		
17	11/30/2022	16/17	116	0840	CK	57	850	3.0	#4	
18	11/30/2022	17/18	116	0850	CP	464	850	3.5		
19	11/30/2022	19/20	22	0950	NK	901	850	4.0		
20	11/30/2022	22/20	118	1023	NK	901	850	4.0	#6	
21	11/30/2022	P20/EX	118	1030	CK	57	850	3.0		
22	11/30/2022	19/22	122	1038	NK	901	850	4.0		
23	11/30/2022	P19/EX	560	1100	CK	57	850	3.0	#5	
24	11/30/2022	21/22	22	1058	CK	901	850	4.0		
25	11/30/2022	19/21	422	1000	CP	464	850	3.5	#7	
26	11/30/2022	22/24	240	1348	NK	901	850	4		
27	11/30/2022	24/26	358	1437	NK	901	850	4	#9	
28	11/30/2022	26/27	560	1505	CP	464	850	3.5	#11	
29	11/30/2022	23/24	22	1347	CP	464	850	3.5		
30	11/30/2022	21/23	320	1327	CK	57	850	3		

Parkhill333 Rio Rancho Blvd. NE, Suite 400
Rio Rancho, New Mexico 87124
505.867.6990**FML SEAMING LOG**

PROJECT NAME: OWL Landfill Cell 4AB
OWNER: Oilfield Water Logistics
PROJECT LOCATION: Lea County, New Mexico
SEAMING LOCATION: Primary

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

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
31	11/30/2022	23/26	113	1427	CK	57	850	3.0		
32	11/30/2022	23/25	202	1408	CP	464	850	3.5	#10	
33	11/30/2022	25/26	22	1445	CK	57	850	3.0		
34	11/30/2022	3/23	22	1525	CK	57	850	3.0		
35	11/30/2022	5/27	22	1510	CK	57	850	3.0		
36	11/30/2022	4/56	22	1517	CK	57	850	3.0		
37	11/30/2022	2/21	22	1530	CK	57	850	3.0		
38	11/30/2022	1/19	22	1535	CK	57	850	3.0		
39	11/30/2022	26/28	118	1533	NK	901	850	4.0		
40	11/30/2022	25/27	202	1542	CK	57	850	3.0		
41	11/30/2022	27/28	22	1550	NK	901	850	4.0		
42	11/30/2022	4/24	121	0718	NK	901	850	4.0	#8	
43	11/30/2022	27/29	424	0743	CP	464	850	4.0	#12	
44	11/30/2022	28/30	118	0755	NK	901	850	4.0		
45	11/30/2022	30/32	240	0843	NK	901	850	4.0	#14	
46	11/30/2022	27/30	120	0815	NK	901	850	4.0		
47	11/30/2022	27/29	424	0843	CP	464	850	4.0		
48	12/1/2022	29/30	22	0833	NK	901	850	4.0		
49	12/1/2022	32/34	358	0930	CP	464	850	4.0	#15	
50	12/1/2022	29/32	116	0914	NK	901	850	4.0		
51	12/1/2022	31/32	22	0906	CP	464	850	4.0		
52	12/1/2022	29/31	320	0815	CK	57	850	3.0	#13	
53	12/1/2022	31/33	200	0908	CK	57	850	3.0		
54	12/1/2022	33/34	22	1000	CK	57	850	3.0		
55	12/1/2022	33/35	200	1005	CK	57	850	3.0	#16	
56	12/1/2022	34/36	110	1105	NK	901	850	4.0	#17	
57	12/1/2022	34/35	355	1000	NK	901	850	4.0		
58	12/1/2022	31/34	125	1030	CP	464	850	4.0		
59	12/1/2022	6/29	22	1056	CK	57	850	3.0		
60	12/1/2022	7/31	22	1101	CK	57	850	3.0		

Parkhill333 Rio Rancho Blvd. NE, Suite 400
Rio Rancho, New Mexico 87124
505.867.6990**FML SEAMING LOG**

PROJECT NAME: OWL Landfill Cell 4AB
OWNER: Oilfield Water Logistics
PROJECT LOCATION: Lea County, New Mexico
SEAMING LOCATION: Primary

PROJECT NUMBER: 7053.22
CONTRACTOR: Mustang Extreme
SHEET NUMBER: 3

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
61	12/1/2022	P8/P33	22	1105	CK	57	850	3.0		
62	12/1/2022	9/35	22	1112	CK	57	850	3.0		
63	12/1/2022	35/37	440	1100	CP	464	850	4.0	#18	
64	12/1/2022	16/37	22	1122	CK	57	850	3.0		
65	12/1/2022	35/36	22	1130	NK	901	850	4.0		
66	12/1/2022	35/38	120	1135	NK	901	850	4.0		
67	12/1/2022	36/38	110	1156	NK	901	850	4.0		
68	12/1/2022	37/38	22	1314	CP	464	850	4.0		
69	12/2/2022	38/46	240	0712	NK	901	850	4.0		
70	12/2/2022	37/48	100	0755	NK	901	850	4.0		
71	12/2/2022	39/46	22	0800	CP	464	850	3.5		
72	12/2/2022	40/42	340	0840	CK	57	850	3.0	#20	
73	12/2/2022	39/42	120	0910	CP	464	850	3.5	#21	
74	12/2/2022	41/42	22	0900	CP	464	850	3.5		
75	12/2/2022	42/44	500	0905	NK	901	850	4.0	#22	
76	12/2/2022	37/39	330	0748	CK	57	850	3.0	#19	
77	12/2/2022	39/41	220	0810	CP	464	850	3.5		
78	12/2/2022	41/43	60	0935	CP	464	850	3.5		
79	12/2/2022	43/44	22	0930	CP	464	850	3.5		
80	12/2/2022	41/44	160	0952	CP	464	850	3.5		
81	12/2/2022	44/45	22	0936	CK	57	850	3.0		
82	12/2/2022	42/45	50	0940	CK	57	850	3.0		
83	12/2/2022	44/46 B	235	1020	CP	464	850	3.5		
84	12/2/2022	44/46 A	250	1024	NK	901	850	4.0	#24	
85	12/2/2022	11/39	22	1010	CK	57	850	3.0		
86	12/2/2022	12/41	22	1040	CK	57	850	3.0		
87	12/2/2022	13/43	22	1052	CK	57	850	3.0		
88	12/2/2022	43/46	60	1013	NK	901	850	4.0		
89	12/2/2022	14/46	22	1100	CK	57	850	3.0		
90	12/2/2022	44/47	70	1105	CP	464	850	3.5		



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FML SEAMING LOG

PROJECT NAME: OWL Landfill Cell 4AB
OWNER: Oilfield Water Logistics
PROJECT LOCATION: Lea County, New Mexico
SEAMING LOCATION: Primary

PROJECT NUMBER: 7053.22
CONTRACTOR: Mustang Extreme
SHEET NUMBER: 4

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
91	12/2/2022	P46/P47	22	1105	NK	901	850	4.0		
92	12/2/2022	45/47	5	1116	CP	464	850	3.0		
93	12/2/2022	45/48	44	1118	CP	464	850	3.0	#23	
94	12/2/2022	47/48	22	1115	NK	901	850	4.0		
95	12/3/2022	46/49	515	1003	CK	57	850	3.0	#25	
96	12/3/2022	46/50	50	1025	NK	901	850	4.0		
97	12/3/2022	49/50	22	1020	NK	901	850	4.0		
98	12/3/2022	47/50	70	1034	NK	901	850	4.0		
99	12/3/2022	48/50	44	1045	NK	901	850	4.0		
100	12/3/2022	50/52							#26	
101	12/3/2022	49/52	165	1100	NK	901	850	4.0		
102	12/3/2022	49/51	405	1036	CO	464	850	3.5	#27	
103	12/3/2022	52/54	320	1320	NK	901	850	4.0	#29	
104	12/3/2022	51/52	22	1124	CK	57	850	3.0		
105	12/3/2022	50/52	155	1121	NK	901	850	4.0		
106	12/3/2022	51/54	200	1321	CP	464	850	3.5	#28	
107	12/3/2022	15/49	22	1322	CK	57	850	3.0		
108	12/3/2022	16/51	22	1325	CK	57	850	3.0		
109	12/3/2022	51/53	170	1330	CK	57	850	3.0		
110	12/3/2022	54/55	22	1406	NK	901	850	4.0		
111	12/3/2022	52/55	22	1410	NK	901	850	4.0		
112	12/3/2022	54/57	100	1425	NK	901	850	4.0	#30	
113	12/3/2022	53/54	22	1406	CK	57	850	3.0		
114	12/3/2022	53/56	170	1412	CK	57	850	3.0		
115	12/3/2022	54/56	320	1403	CP	464	850	3.5	#31	
116	12/3/2022	56/57	22	1420	NK	901	850	4.0		
117	12/3/2022	57/58	22	1440	NK	901	850	4.0		
118	12/3/2022	54/58	55	1445	NK	901	850	4.0		
119	12/3/2022	58/59	22	1450	NK	901	850	4.0		
120	12/3/2022	54/59	50	1505	NK	901	850	4.0		

APPENDIX C: CELL 4 A/B LINER INSTALLATION DOCUMENTATION

C.15 Primary FML Seam Pressure Test Log

FML SEAMING PRESSURE TEST LOG

PROJECT NAME:

OWL Landfill Cell 4AB

OWNER:

Oilfield Water Logistics

PROJECT LOCATION:

Lea County, New Mexico

PROJECT NUMBER:

7053.22

CONTRACTOR:

Mustang Extreme

SHEET NUMBER:

1

PROJECT SPECIFICATIONS

MIN START PSI:

30

TEST DURATION:

5 minutes

MAX PSI DROP:

30

PRESSURE TEST LOCATION:

Primary

	DATE	PANEL #/PANEL #	TESTER	TIME		PRESSURE		MONITORED BY	PASS/FAIL
				START	FINISH	INITIAL	FINAL		
1	11/29/2022	P1/P2	TK	0830	835	30	30	TSK	PASS
2	11/29/2022	2/3	TK	0840	0845	30	30	TSK	PASS
3	11/29/2022	3/4	TK	0850	0855	30	30	TSK	PASS
4	11/29/2022	4/5	TK	0900	0905	30	30	TSK	PASS
5	11/29/2022	5/6	TK	0910	0915	30	30	TSK	PASS
6	11/29/2022	6/7	TK	0925	0940	30	30	TSK	PASS
7	11/29/2022	7/8	TK	0945	0950	30	30	TSK	PASS
8	11/29/2022	8/9	TK	0955	1000	30	30	TSK	PASS
9	11/29/2022	9/10	TK	1005	1010	30	30	TSK	PASS
10	11/29/2022	10/11	TK	1038	1043	30	30	TSK	PASS
11	11/29/2022	11/12	TK	1102	1107	30	30	TSK	PASS
12	11/29/2022	1/EX	TK	1113	1118	30	30	TSK	PASS
13	11/30/2022	12/13	TK	0832	0837	30	30	TSK	PASS
14	11/30/2022	13/14	TK	08.8	08543	30	30	TSK	PASS
15	11/30/2022	14/15	TK	0835	0846	30	30	TSK	PASS
16	11/30/2022	15/16	TK	0845	0850	30	30	TSK	PASS
17	11/30/2022	16/17	TK	0909	0914	30	30	TSK	PASS
18	11/30/2022	17/18	TK	0914	0919	30	30	TSK	PASS
19	11/30/2022	15/16 B	TK	0855	0900	30	30	TSK	PASS
20	11/30/2022	19/20	TK	1008	1013	30	30	TSK	PASS
21	11/30/2022	19/22	TK	1100	1105	30	30	TSK	PASS
22	11/30/2022	21/22	TK	1107	1112	30	30	TSK	PASS
23	11/30/2022	20/EX	TK	1110	1115	30	30	TSK	PASS
24	11/30/2022	19/21	TK	1130	1135	30	30	TSK	PASS
25	11/30/2022	20/22	TK	1050	1055	30	30	TSK	PASS
26	11/30/2022	21/23	TK	1420	1425	30	30	TSK	PASS
27	11/30/2022	23/24	TK	1355	1400	30	30	TSK	PASS
28	11/30/2022	21/24	TK	1430	1435	30	30	TSK	PASS
29	11/30/2022	22/24	TK	1431	1436	30	30	TSK	PASS
30	11/30/2022	25/26	TK	1500	1505	30	30	TSK	PASS
31	11/30/2022	23/26	TK	1453	1458	30	30	TSK	PASS
32	11/30/2022	23/25	TK	1457	1452	30	30	TSK	PASS
33	11/30/2022	5/27	TK	1535	1540	30	30	TSK	PASS
34	11/30/2022	3/23	TK	1544	1549	30	30	TSK	PASS
35	11/30/2022	4/25	TK	1542	1547	30	30	TSK	PASS
36	11/30/2022	2/21	TK	1548	1553	30	30	TSK	PASS
37	11/30/2022	1/19	TK	1551	1556	30	30	TSK	PASS
38	11/30/2022	27/28	TK	1600	1605	30	30	TSK	PASS
39	11/30/2022	19/EX	TK	1325	1330	30	30	TSK	PASS
40	11/30/2022	19/EX B	TK	1315	1320	30	30	TSK	PASS
41	11/30/2022	19/EX C	TK	1305	1310	30	30	TSK	PASS
42	11/30/2022	20/EX	TK	1055	1100	30	30	TSK	PASS
43	11/30/2022	24/26	TK	1529	1534	30	30	TSK	PASS
44	11/30/2022	25/27	TK	1619	1624	30	30	TSK	PASS
45	11/30/2022	26/27	TK	1617	1622	30	30	TSK	PASS
46	12/1/2022	28/30	TK	0820	0825	30	30	TSK	PASS
47	12/1/2022	27/30	TK	0846	0851	30	30	TSK	PASS
48	12/1/2022	27/29	TK	0906	0911	30	30	TSK	PASS
49	12/1/2022	30/32	TK	0918	0923	30	30	TSK	PASS
50	12/1/2022	29/32	TK	0935	0940	30	30	TSK	PASS



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FML SEAMING PRESSURE TEST LOG

PROJECT NAME: OWL Landfill Cell 4AB
OWNER: Oilfield Water Logistics
PROJECT LOCATION: Lea County, New Mexico

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

PROJECT SPECIFICATIONS	
MIN START PSI:	30
TEST DURATION:	5 minutes
MAX PSI DROP:	30

PRESSURE TEST LOCATION: Primary

	DATE	PANEL #/PANEL #	TESTER	TIME		PRESSURE		MONITORED BY	PASS/FAIL
				START	FINISH	INITIAL	FINAL		
51	12/1/2022	P31/P32	TK	0927	0932	30	29	TSK	PASS
52	12/1/2022	29/31	TK	0921	0926	30	30	TSK	PASS
53	12/1/2022	31/33	TK	0945	0950	30	30	TSK	PASS
54	12/1/2022	33/36	TK	1015	1020	30	30	TSK	PASS
55	12/1/2022	37/34	TK	1057	1102	30	30	TSK	PASS
56	12/1/2022	34/35	TK	1103	1108	30	30	TSK	PASS
57	12/1/2022	33/35	TK	1050	1055	30	30	TSK	PASS
58	12/1/2022	27/29	TK	0942	0947	30	30	TSK	PASS
59	12/1/2022	6/29	TK	1104	1109	30	30	TSK	PASS
60	12/1/2022	7/31	TK	1112	1117	30	30	TSK	PASS
61	12/1/2022	8/37	TK	1115	1120	30	30	TSK	PASS
62	12/1/2022	9/35	TK	1123	1128	30	30	TSK	PASS
63	12/1/2022	10/37	TK	1130	1135	30	30	TSK	PASS
64	12/1/2022	34/36	TK	1141	1146	30	30	TSK	PASS
65	12/1/2022	32/34	TK	1144	1149	30	30	TSK	PASS
66	12/1/2022	35/36	TK	1151	1156	30	30	TSK	PASS
67	12/1/2022	35/38	TK	1156	1201	30	30	TSK	PASS
68	12/1/2022	36/38	TK	1707	1212	30	30	TSK	PASS
69	12/1/2022	35/37	TK	1211	1216	30	30	TSK	PASS
70	12/1/2022	37/38	TK	1305	1310	30	30	TSK	PASS
71	12/1/2022	38/40	TK	0938	0943	30	30	TSK	PASS
72	12/1/2022	40/42	TK	0940	0945	30	30	TSK	PASS
73	12/1/2022	39/40	TK	0813	0818	30	30	TSK	PASS
74	12/1/2022	37/40	TK	0924	0929	30	30	TSK	PASS
75	12/1/2022	37/39	TK	0844	0849	30	30	TSK	PASS
76	12/1/2022	39/42	TK	0930	0938	30	30	TSK	PASS
77	12/1/2022	41/42	TK	0913	0918	30	30	TSK	PASS
78	12/1/2022	39/41	TK	0851	0856	30	30	TSK	PASS
79	12/1/2022	44/45	TK	1005	1010	30	30	TSK	PASS
80	12/1/2022	42/45	TK	0955	1000	30	30	TSK	PASS
81	12/1/2022	42/44	TK	1010	1015	30	30	TSK	PASS
82	12/1/2022	41/44	TK	1028	1033	30	30	TSK	PASS
83	12/1/2022	43/44	TK	1032	1137	30	30	TSK	PASS
84	12/1/2022	41/43	TK	1022	1027	30	30	TSK	PASS
85	12/1/2022	11/39	TK	1044	1049	30	30	TSK	PASS
86	12/1/2022	12/41	TK	1053	1158	30	30	TSK	PASS
87	12/1/2022	13/43	TK	1057	1102	30	30	TSK	PASS
88	12/1/2022	43/46	TK	1037	1042	30	30	TSK	PASS
89	12/1/2022	14/46	TK	1108	1113	30	30	TSK	PASS
90	12/1/2022	44/46	TK	1113	1118	30	30	TSK	PASS
91	12/1/2022	44/46 b	TK	1117	1122	30	30	TSK	PASS
92	12/1/2022	46/47	TK	1120	1125	30	30	TSK	PASS
93	12/1/2022	44/47	TK	1123	1128	30	30	TSK	PASS
94	12/1/2022	47/48	TK	1130	1135	30	30	TSK	PASS
95	12/1/2022	45/48	TK	1131	1136	30	30	TSK	PASS
96	12/2/2022	26/28	TK	0890	0835	30	30	TSK	PASS
97	12/1/2022	25/30	TK	0912	0917	30	30	TSK	PASS
98	12/3/2022	46/50	TK	1057	1102	30	30	TSK	PASS
99	12/3/2022	49/50	TK	1042	1047	30	30	TSK	PASS
100	12/3/2022	47/50	TK	1105	1110	30	30	TSK	PASS



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FML SEAMING PRESSURE TEST LOG

PROJECT NAME:	OWL Landfill Cell 4AB	PROJECT NUMBER:	7053.22
OWNER:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	3

PROJECT SPECIFICATIONS	
MIN START PSI:	30
TEST DURATION:	5 minutes
MAX PSI DROP:	30

PRESSURE TEST LOCATION: Primary

[illegible]

APPENDIX C: CELL 4 A/B LINER INSTALLATION DOCUMENTATION

C.16 FML Seam Vacuum Test and Defect-Repair Log



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FML SEAM VACUUM TEST/REPAIR LOG

PROJECT NAME:	OWL Landfill Cell 4AB	PROJECT NUMBER:	7053.22
OWNER:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	1

TEST/REPAIR LOCATION:	Primary	MONITOR:	TSK
------------------------------	---------	-----------------	-----

	REPAIR DATE	PANEL	TYPE OF REPAIR	REPAIR TECH	NUMBER OF LEAKS	TESTING TECH ID
1	12/3/2022	P19/EXISTING	PATCH	IM	0	TK
2	12/2/2022	19/EX	PATCH	LP	0	TK
3	12/2/2022	19/20/EX	PATCH	LP	0	TK
4	12/2/2022	20/22	PATCH	LP	0	TK
5	12/2/2022	19/20/22	PATCH	LP	0	TK
6	12/3/2022	19/21/22	PATCH	IM	0	TK
7	12/3/2022	21/23/24	PATCH	IM	0	TK
8	12/3/2022	21/23	PATCH	IM	0	TK
9	12/3/2022	21/22/24	PATCH	IM	0	TK
10	12/2/2022	24/26	PATCH	LP	0	TK
11	12/3/2022	23/24/26	PATCH	IM	0	TK
12	12/3/2022	23/25/26	PATCH	IM	0	TK
13	12/3/2022	25/26/27	PATCH	IM	0	TK
14	12/2/2022	26/27	PATCH	LP	0	TK
15	12/2/2022	26/27/28	PATCH	LP	0	TK
16	12/2/2022	27/28/30	PATCH	LP	0	TK
17	12/3/2022	27/29/30	PATCH	IM	0	TK
18	12/3/2022	27/29	PATCH	IM	0	TK
19	12/3/2022	29/31/32	PATCH	IM	0	TK
20	12/3/2022	29/30/32	PATCH	IM	0	TK
21	12/2/2022	30/32	PATCH	LP	0	TK
22	12/3/2022	32/34	PATCH	IM	0	TK
23	12/3/2022	31/32/34	PATCH	IM	0	TK
24	12/3/2022	31/33/34	PATCH	IM	0	TK
25	12/3/2022	33/34/35	PATCH	IM	0	TK
26	12/2/2022	35/36/34	PATCH	LP	0	TK
27	12/2/2022	34/36	PATCH	LP	0	TK
28	12/2/2022	35/36/38	PATCH	LP	0	TK
29	12/2/2022	35/37/38	PATCH	LP	0	TK
30	12/2/2022	35/37	PATCH	LP	0	TK
31	12/3/2022	37/39	PATCH	LP	0	TK
32	12/3/2022	37/39/40	PATCH	LP	0	TK
33	12/2/2022	37/38/40	PATCH	LP	0	TK
34	12/2/2022	40/42	PATCH	LP	0	TK
35	12/3/2022	39/40/42	PATCH	LP	0	TK
36	12/3/2022	39/42	PATCH	LP	0	TK
37	12/2/2022	39/41/42	PATCH	LP	0	TK
38	12/2/2022	41/42/44	PATCH	LP	0	TK
39	12/3/2022	41/44	PATCH	LP	0	TK
40	12/2/2022	42/44/45	PATCH	LP	0	TK

DATE ACCEPTED	COMMENTS
12/3/2022	DT-5
12/3/2022	
12/3/2022	
12/3/2022	DT-6
12/3/2022	
12/3/2022	
12/3/2022	
12/3/2022	DT-8
12/3/2022	
12/3/2022	DT-9
12/3/2022	
12/3/2022	
12/3/2022	DT-11
12/3/2022	
12/3/2022	
12/3/2022	DT-12
12/3/2022	
12/3/2022	
12/3/2022	DT-14
12/3/2022	DT-15
12/3/2022	
12/3/2022	
12/3/2022	DT-17
12/3/2022	
12/3/2022	
12/3/2022	DT-18
12/3/2022	DT-19
12/3/2022	
12/3/2022	
12/3/2022	DT-20
12/3/2022	
12/3/2022	DT-21
12/3/2022	
12/3/2022	
12/3/2022	DT-22
12/3/2022	



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FML SEAM VACUUM TEST/REPAIR LOG

PROJECT NAME:	OWL Landfill Cell 4AB	PROJECT NUMBER:	7053.22
OWNER:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	2

TEST/REPAIR LOCATION: Primary MONITOR: TSK

[illegible]

APPENDIX C: CELL 4 A/B LINER INSTALLATION DOCUMENTATION

C.17 Geocomposite Deployment Log



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GEOCOMPOSITE DEPLOYMENT LOG

PROJECT NAME:	OWL Landfill Cell 4AB	PROJECT NUMBER:	7053.22
CLIENT:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	1
DEPLOYMENT LOCATION:	Double Sided Slope - 1st Layer	MONITOR:	MWK

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT ²)	DATE INSTALLED
1	0001	120	15	1,800	11/16/22
2	0002	90	15	1,350	11/16/22
3	0001	50	15	750	11/16/22
4	0002	110	15	1,650	11/16/22
5	0004	40	15	600	11/16/22
6	0008	80	15	1,200	11/16/22
7	0008	120	15	1,800	11/16/22
8	0004	130	15	1,950	11/16/22
9	0003	70	15	1,050	11/16/22
10	0005	60	15	900	11/16/22
11	0005	130	15	1,950	11/16/22
12	0007	30	15	450	11/16/22
13	0011	90	15	1,350	11/16/22
14	0011	80	15	1,200	11/16/22
15	0007	40	15	600	11/16/22
16	0003	120	15	1,800	11/16/22
17	0013	30	15	450	11/16/22
18	0009	90	15	1,350	11/16/22
19	0013	85	15	1,275	11/16/22
20	0009	35	15	525	11/16/22
21	A-0002	120	15	1,800	11/16/22
22	A-0002	20	15	300	11/16/22
23	0012	100	15	1,500	11/16/22
24	0010	80	15	1,200	11/16/22
25	0012	40	15	600	11/16/22
26	0010	120	15	1,800	11/16/22
27	0017	50	15	750	11/16/22
28	0018	80	15	1,200	11/16/22
29	0017	120	15	1,800	11/16/22
30	0018	120	15	1,800	11/16/22
31	0016	80	15	1,200	11/16/22
32	0014	40	15	600	11/16/22
TOTAL LINER PLACED (FT²):				38,550	



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GEOCOMPOSITE DEPLOYMENT LOG

PROJECT NAME:	OWL Landfill Cell 4AB	PROJECT NUMBER:	7053.22
CLIENT:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	1
DEPLOYMENT LOCATION:	Double Sided Slope - 2nd Layer	MONITOR:	MWK

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT ²)	DATE INSTALLED
1	2270	120	15	1,800	12/1/22
2	2771	60	15	900	12/1/22
3	2770	80	15	1,200	12/1/22
4	3799	120	15	1,800	12/1/22
5	2771	20	15	300	12/1/22
6	2772	60	15	900	12/1/22
7	2772	120	15	1,800	12/1/22
8	3793	30	15	450	12/1/22
9	3794	90	15	1,350	12/1/22
10	3794	55	15	825	12/1/22
11	3793	130	15	1,950	12/1/22
12	3795	10	15	150	12/1/22
13	3797	120	15	1,800	12/1/22
14	3795	110	15	1,650	12/1/22
15	3797	20	15	300	12/1/22
16	A-0003	120	15	1,800	12/1/22
17	3799	15	15	225	12/1/22
18	3798	115	15	1,725	12/1/22
19	3798	100	15	1,500	12/1/22
20	3799	30	15	450	12/1/22
21	3801	120	15	1,800	12/1/22
22	3800	20	15	300	12/1/22
23	3800	110	15	1,650	12/1/22
24	3801	90	15	1,350	12/1/22
25	3803	40	15	600	12/1/22
26	3802	120	15	1,800	12/1/22
27	3802	50	15	750	12/1/22
28	3804	80	15	1,200	12/1/22
29	3803	120	15	1,800	12/1/22
30	A-0004	120	15	1,800	12/1/22
31	3804	80	15	1,200	12/1/22
32	3804	40	15	600	12/1/22
TOTAL LINER PLACED (FT²):				37,725	



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Rio Rancho, New Mexico 87124
505.867.6990

GEOCOMPOSITE DEPLOYMENT LOG

PROJECT NAME:	OWL Landfill Cell 4AB	PROJECT NUMBER:	7053.22
CLIENT:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	1
DEPLOYMENT LOCATION:	Single Sided Geocomposite	MONITOR:	MWK

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT ²)	DATE INSTALLED
1	3833	290	15	4,350	12/5/22
2	3827	290	15	4,350	12/5/22
3	3831	50	15	750	12/5/22
4	3831	240	15	3,600	12/5/22
5	3820	290	15	4,350	12/5/22
6	3896	100	15	1,500	12/5/22
7	3896	190	15	2,850	12/5/22
8	3864	290	15	4,350	12/5/22
9	3871	150	15	2,250	12/5/22
10	3887	290	15	4,350	12/5/22
11	3899	290	15	4,350	12/5/22
12	3880	50	15	750	12/5/22
13	3880	230	15	3,450	12/5/22
14	3868	290	15	4,350	12/5/22
15	3901	100	15	1,500	12/5/22
16	3901	40	15	600	12/5/22
17	3888	290	15	4,350	12/5/22
18	3919	290	15	4,350	12/5/22
19	3863	290	15	4,350	12/5/22
20	3879	290	15	4,350	12/6/22
21	3920	60	15	900	12/6/22
22	3920	130	15	1,950	12/6/22
23	3830	120	15	1,800	12/6/22
24	3830	70	15	1,050	12/6/22
25	3890	150	15	2,250	12/6/22
26	3890	70	15	1,050	12/6/22
27	3835	100	15	1,500	12/6/22
28	3835	110	15	1,650	12/6/22
29	3923	130	15	1,950	12/6/22
30	3923	50	15	750	12/6/22
31	3865	220	15	3,300	12/6/22
32	3865	140	15	2,100	12/6/22
TOTAL LINER PLACED (FT²):				85,350	



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GEOCOMPOSITE DEPLOYMENT LOG

PROJECT NAME:	OWL Landfill Cell 4AB	PROJECT NUMBER:	7053.22
CLIENT:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	2
DEPLOYMENT LOCATION:	Single Sided Geocomposite	MONITOR:	MWK

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT ²)	DATE INSTALLED
33	3837	50	15	750	12/6/22
34	3837	230	15	3,450	12/6/22
35	3883	290	15	4,350	12/6/22
36	3921	50	15	750	12/6/22
37	3921	290	15	4,350	12/6/22
38	3829	200	15	3,000	12/6/22
39	3884	290	15	4,350	12/6/22
40	3897	220	15	3,300	12/6/22
41	3897	10	15	150	12/6/22
42	3897	10	15	150	12/6/22
43	3894	290	15	4,350	12/6/22
44	3881	270	15	4,050	12/6/22
45	3881	20	15	300	12/6/22
46	3877	20	15	300	12/6/22
47	3898	290	15	4,350	12/6/22
48	3900	150	15	2,250	12/6/22
49	3900	150	15	2,250	12/6/22
50	3886	290	15	4,350	12/6/22
51	3902	120	15	1,800	12/6/22
52	3902	550	15	8,250	12/6/22
53	3891	290	15	4,350	12/6/22
54	3882	20	15	300	12/6/22
55	3882	270	15	4,050	12/6/22
56	3922	230	15	3,450	12/6/22
57	3821	290	15	4,350	12/6/22
58	3823	210	15	3,150	12/7/22
59	3823	70	15	1,050	12/7/22
60	3832	290	15	4,350	12/7/22
61	3825	220	15	3,300	12/7/22
62	3824	290	15	4,350	12/7/22
63	3825	50	15	750	12/7/22
64	3828	70	15	1,050	12/7/22
TOTAL LINER PLACED (FT²):				91,350	



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GEOCOMPOSITE DEPLOYMENT LOG

PROJECT NAME:	OWL Landfill Cell 4AB	PROJECT NUMBER:	7053.22
CLIENT:	Oilfield Water Logistics	CONTRACTOR:	Mustang Extreme
PROJECT LOCATION:	Lea County, New Mexico	SHEET NUMBER:	3
DEPLOYMENT LOCATION:	Single Sided Geocomposite	MONITOR:	MWK

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT ²)	DATE INSTALLED
65	3828	150	15	2,250	12/7/22
66	3834	290	15	4,350	12/7/22
67	3895	50	15	750	12/7/22
68	3895	130	15	1,950	12/7/22
69	3870	290	15	4,350	12/7/22
70	3892	210	15	3,150	12/7/22
71	3867	290	15	4,350	12/7/22
72	3889	290	15	4,350	12/7/22
73	3892	30	15	450	12/7/22
74	3826	290	15	4,350	12/7/22
75	3924	290	15	4,350	12/7/22
76	3838	290	15	4,350	12/7/22
77	3836	290	15	4,350	12/7/22
78	3869	290	15	4,350	12/7/22
79	0050	290	15	4,350	12/7/22
80	0045	290	15	4,350	12/7/22
81	3794	20	15	300	12/7/22
82	3794	50	15	750	12/7/22
83	0018	190	15	2,850	12/7/22
84	0045	150	15	2,250	12/7/22
85	3894	290	15	4,350	12/7/22
86	3345	40	15	600	12/7/22
87	3794	10	15	150	12/7/22
88	3918	290	15	4,350	12/7/22
89	3978	290	15	4,350	12/7/22
90	3866	290	15	4,350	12/7/22
91	3893	50	15	750	12/7/22
92	3893	50	15	750	12/7/22
93	3893	50	15	750	12/7/22
TOTAL LINER PLACED (FT²):				82,950	

APPENDIX C: CELL 4 A/B LINER INSTALLATION DOCUMENTATION

C.18 Demtech Tensionmeter Calibration Certificate

DEMTech[®] Services Inc.

CALIBRATION CERTIFICATE

Tensiometer Model:

Device Calibrated:

Range:

Model No:

Serial No:

A/D Module Model No:

A/D Module Serial No:

Channel No:

Indicator reading with no load:

Pro-Tester [T-0100/A or T-0100SE/A]

S-Type load cell

0 - 750 lbs. Tension

M2405-750#

622265901

T-029

265901

N/A

0

Calibration Apparatus:

Pro-Cal unit, model TC-0100/A

Dead Weight:

W1

2

W2

152

W3

302

Reference Cell:

R1

2

R2

152

R3

302

Offset:

4.677861

Scale:

3.329184

Applied Force lbs.

2
52
102
152
202
252
302

Cell Response:

2
52
102
152
202
252
302

Deviation Error:

0.00
0.00
0.00
0.00
0.00
0.00
0.00

Total Deviation Error (%):

0.00%

Temperature at time of calibration:

73 degrees F

Excitation Voltage:

5

V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

Calibration Technician:

Signature:

Tahoe Taylor

Date:

03/07/22

APPENDIX D: INDEPENDENT QUALITY ASSURANCE LABORATORY FML DESTRUCTIVE TESTING RESULTS

D.1 Secondary Liner Destructive Test

**TESTING, RESEARCH, CONSULTING AND FIELD SERVICES**

AUSTIN, TX - USA | ANAHEIM, CA - USA | ANDERSON, SC - USA | GOLD COAST - AUSTRALIA | SUZHOU - CHINA

Date: 2022-11-19

Mail To:
Tyler Krueger
Parkhill, Smith, Cooper

Bill To:

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 Landfill Cell 4AB**

TRI Job Reference Number: **76742**

Material(s) Tested: (17) 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,

sigfile

a-login

Geosynthetic Services Division
<http://www.geosyntheticstestinc.com>

The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

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TESTING, RESEARCH, CONSULTING AND FIELD SERVICES

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 Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76742

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-1 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	154	158	164	164	154	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	
Side: B						Peel B
Peel Strength (ppi)	140	143	144	147	144	144
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)	210	198	206	194	205	203
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-2 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	178	153	162	159	160	162
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)	169	155	153	149	168	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)	205	204	208	196	208	204
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76742

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-3 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	152	166	158	152	162	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	
Side: B						Peel B
Peel Strength (ppi)	159	166	157	160	155	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)	211	206	220	191	200	206
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-4 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	154	150	149	155	147	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	
Side: B						Peel B
Peel Strength (ppi)	169	162	157	160	163	162
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)	209	200	202	180	200	198
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76742

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-5 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	133	129	134	132	133	132
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)	121	121	122	120	120	121
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)	166	158	166	150	164	161
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-6 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	128	124	136	139	142	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	
Side: B						Peel B
Peel Strength (ppi)	134	125	128	131	132	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)	160	167	170	154	167	164
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76742

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-7 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	148	118	120	140	124	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	
Side: B						Peel B
Peel Strength (ppi)	139	118	119	138	124	128
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)	168	160	163	157	164	162
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-8 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	113	121	147	151	139	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	
Side: B						Peel B
Peel Strength (ppi)	132	127	131	138	137	133
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)	163	160	166	151	161	160
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76742

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-9 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	127	136	133	124	132	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	
Side: B						Peel B
Peel Strength (ppi)	123	121	126	120	123	123
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)	161	162	168	144	157	158
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-10 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	142	143	147	141	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	
Side: B						Peel B
Peel Strength (ppi)	130	127	132	129	144	132
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)	166	158	173	148	157	160
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76742

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-11 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	141	135	150	144	140	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	
Side: B						Peel B
Peel Strength (ppi)	144	144	136	147	140	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)	161	159	165	147	168	160
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-12 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	128	130	122	126	136	128
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	144	130	132	147	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)	161	163	171	148	154	159
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76742

TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-13 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	142	144	127	153	143	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	
Side: B						Peel B
Peel Strength (ppi)	122	128	117	124	125	123
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)	159	163	165	144	163	159
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-14 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	122	128	125	127	122	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	
Side: B						Peel B
Peel Strength (ppi)	141	137	146	135	144	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	
Shear						Shear
Shear Strength (ppi)	174	156	167	154	166	163
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76742

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-15 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	119	107	124	117	138	121
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)	122	117	122	126	119	121
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)	168	167	164	149	166	163
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-16 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	139	139	141	134	142	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)	145	129	124	125	126	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)	163	153	166	146	155	157
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76742

PARAMETER	TEST REPLICATE NUMBER					MEAN
	1	2	3	4	5	
Sample ID: DT-17 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	119	165	152	149	112	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)	148	140	118	116	125	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	
Shear						Shear
Shear Strength (ppi)	163	165	171	159	154	162
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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Date: 2022-12-06

Mail To:
Tyler Krueger
Parkhill, Smith, Cooper

Bill To:
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 Landfill Cell 4AB**

TRI Job Reference Number: **77024**

Material(s) Tested: (13) 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,

Nicole Saucedo

Geosynthetic Services Division
<http://www.geosyntheticstestinc.com>

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 77024

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-19 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	122	122	123	127	126	124
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)	123	128	128	132	130	128
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)	162	159	158	158	157	159
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-20 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	128	130	135	130	143	133
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)	122	119	124	123	126	123
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)	168	170	164	162	160	165
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 77024

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-21 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	135	141	134	139	122	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	
Side: B						Peel B
Peel Strength (ppi)	116	138	124	129	122	126
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)	159	164	147	158	158	157
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-22 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	126	116	117	130	136	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	
Side: B						Peel B
Peel Strength (ppi)	124	127	146	150	142	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)	166	161	160	166	160	163
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 77024

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-23 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	118	121	125	121	118	121
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)	112	119	115	114	110	114
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)	164	163	154	158	158	159
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-24 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	121	128	144	131	146	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	
Side: B						Peel B
Peel Strength (ppi)	142	120	121	142	153	136
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)	158	165	159	159	158	160
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 77024

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-25 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	132	125	124	137	129	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)	119	127	123	131	132	126
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)	162	162	161	161	164	162
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-26 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	136	141	156	145	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	
Side: B						Peel B
Peel Strength (ppi)	134	141	143	136	135	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)	168	174	174	170	171	171
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 77024

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-27 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	126	126	131	124	121	126
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)	150	114	148	116	166	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)	160	166	165	169	163	165
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-28 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	153	151	160	159	156	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	146	123	133	135	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)	167	172	172	170	169	170
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 77024

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-29 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	142	128	152	154	149	145
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)	156	167	146	161	150	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	
Shear						Shear
Shear Strength (ppi)	180	190	181	192	183	185
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-30 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	141	145	141	143	141	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	
Side: B						Peel B
Peel Strength (ppi)	142	145	149	145	142	145
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)	183	185	185	193	191	187
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 77024

PARAMETER	TEST REPLICATE NUMBER					MEAN
	1	2	3	4	5	
Sample ID: DT-31 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	153	172	149	178	170	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	
Side: B						Peel B
Peel Strength (ppi)	158	155	141	153	151	152
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)	200	203	194	194	196	197
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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APPENDIX D: INDEPENDENT QUALITY ASSURANCE LABORATORY FML DESTRUCTIVE TESTING RESULTS

D.2 Primary Liner Destructive Test



Date: 2022-12-02

Mail To:
Tyler Krueger
Parkhill, Smith, Cooper

Bill To:
Parkhill, Smith, Cooper

, ,

e-mail:
 tkruieger@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 Landfill Cell 4AB**

TRI Job Reference Number: **76966**

Material(s) Tested: (18) 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,

Nicole Saucedo

Geosynthetic Services Division
<http://www.geosyntheticstestinc.com>

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76966

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-1 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	146	151	149	151	155	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)	153	158	149	164	153	155
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)	188	183	182	182	192	185
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-2 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	148	157	148	154	150	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	
Side: B						Peel B
Peel Strength (ppi)	146	143	150	140	156	147
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	189	182	182	182	184
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76966

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-3 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	153	149	157	143	146	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)	150	155	144	150	148	149
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)	183	184	178	177	178	180
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-4 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	139	144	146	137	145	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	
Side: B						Peel B
Peel Strength (ppi)	139	138	129	135	132	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)	189	192	185	185	180	186
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76966

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-5 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	131	125	133	135	129	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	
Side: B						Peel B
Peel Strength (ppi)	117	112	123	121	122	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)	162	164	158	160	159	161
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-6 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	137	135	131	134	133	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	
Side: B						Peel B
Peel Strength (ppi)	138	137	135	138	140	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)	173	176	170	170	169	172
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76966

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-7 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	139	146	139	142	146	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	
Side: B						Peel B
Peel Strength (ppi)	141	128	139	124	127	132
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)	165	164	161	162	163	163
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-8 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	126	137	124	129	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)	145	134	128	129	131	133
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)	171	168	166	165	166	167
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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**DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS****TRI Client: Parkhill, Smith, Cooper****Project: Owl Landfill Cell 4AB****Material: 60 mil. HDPE****SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)****TRI Log#: 76966****TEST REPLICATE NUMBER**

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-9 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	134	136	132	140	137	136
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)	136	136	145	135	149	140
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)	169	169	163	161	163	165
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-10 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	137	138	143	144	138	140
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)	131	136	132	124	139	132
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)	160	166	161	161	161	162
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76966

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-11 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	147	132	145	141	143	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	
Side: B						Peel B
Peel Strength (ppi)	121	138	136	143	139	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)	161	161	157	156	155	158
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-12 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	129	135	137	132	109	128
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)	135	129	140	138	134	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)	169	166	163	163	163	165
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76966

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-13 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	135	142	136	139	130	136
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)	123	115	119	118	124	120
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)	166	167	162	163	162	164
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-14 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	127	131	135	131	135	132
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)	134	134	131	137	136	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)	157	172	162	164	163	164
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76966

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-15 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	136	125	128	133	147	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	
Side: B						Peel B
Peel Strength (ppi)	134	147	138	148	140	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	
Shear						Shear
Shear Strength (ppi)	166	168	163	162	162	164
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-16 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	141	140	139	129	144	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)	125	118	133	118	119	123
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)	166	167	162	162	162	164
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76966

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-17 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	133	121	132	140	133	132
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)	131	142	128	136	138	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)	162	163	154	154	153	157
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-18 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	136	124	124	132	130	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)	140	135	133	143	142	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)	164	165	157	158	157	160
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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Date: 2022-11-22

Mail To:
Tyler Krueger
Parkhill, Smith, Cooper

Bill To:
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 Landfill Cell 4AB**

TRI Job Reference Number: **76783**

Material(s) Tested: (14) 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
 Geosynthetic Services Division
<http://www.geosyntheticstestinc.com>

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76783

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-18 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	125	125	124	129	129	126
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)	117	115	127	132	117	122
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)	157	165	160	162	165	162
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-19 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	130	134	129	132	128	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	
Side: B						Peel B
Peel Strength (ppi)	133	127	126	129	131	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	
Shear						Shear
Shear Strength (ppi)	160	170	167	162	163	164
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76783

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-20 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	102	120	108	104	112	109
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)	130	140	134	136	134	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)	155	167	165	157	158	160
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-21 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	128	114	125	118	127	122
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)	117	121	120	117	119	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)	161	164	168	164	168	165
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76783

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-22 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	119	123	120	126	128	123
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)	119	123	122	118	120	120
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)	158	168	167	161	160	163
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-23 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	127	129	131	125	127	128
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)	119	114	117	129	120	120
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)	162	170	168	165	164	166
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76783

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-24 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	124	126	109	145	112	123
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)	146	137	149	153	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)	165	167	170	171	166	168
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-25 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	125	132	129	131	130	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)	131	132	137	136	137	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)	160	166	167	161	161	163
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76783

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-26 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	128	120	122	121	137	126
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	144	140	141	139	140
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)	167	170	169	175	174	171
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-27 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	130	134	130	128	130	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	
Side: B						Peel B
Peel Strength (ppi)	133	126	134	128	126	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	
Shear						Shear
Shear Strength (ppi)	164	165	159	159	159	161
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76783

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-28 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	120	130	126	143	133	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	
Side: B						Peel B
Peel Strength (ppi)	138	135	136	130	131	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)	158	171	170	162	162	165
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-29 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	155	152	154	153	154	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)	121	121	116	117	123	120
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)	159	175	165	165	163	165
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Parkhill, Smith, Cooper

Project: Owl Landfill Cell 4AB

Material: 60 mil. HDPE

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

TRI Log#: 76783

TEST REPLICATE NUMBER

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-30 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	131	130	134	148	132	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	
Side: B						Peel B
Peel Strength (ppi)	123	126	128	124	131	126
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)	171	178	177	173	173	174
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-31 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	138	128	113	134	129	128
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)	151	151	156	146	156	152
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)	171	167	172	167	167	169
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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APPENDIX E: LEAK DETECTION SYSTEM CERTIFICATIONS

E.1 Leachate Pipe and Riser Pipe Parts Certification

WL116 WL Plastics Pipe Standards



Industry Standards for WL Plastics Pipe

WL Plastics HDPE pipe is produced to Customer Purchase Order specifications, and may be limited by industry standards and third party certifications. WL Plastics typically manufactures pipe in accordance with the API, ASTM, AWWA, FM, NSF and AASHTO standards listed below. Upon request and review by WL Plastics prior to order, pipe may be special order manufactured to other industry standards, or custom standards, or proprietary standards or specifications. Contact WL Plastics Customer Service for information, pricing, and availability. Some lower DR's are not available in larger sizes. **Related WL Plastics literature:** IPS Pipe Sizes – WL102; DIPS (DIOD) Pipe Sizes – WL104; PE Compounds – WL106; Internal, surge and external (vacuum) pressure ratings – WL118.

Industry standards are for different service applications, may or may not be compatible with each other, and differ in requirements for materials, sizes, dimensions, tolerances, performance and marking; therefore, pipe made to an industry standard for one service application may be unsuitable for a different service or application although the material and size may be the same. Regulations and Codes frequently require compliance with specific standards, and pipe not so marked may be unacceptable to the jurisdictional authority. Before placing an order, confirm that the pipe specified is acceptable to the jurisdictional authority. WL Plastics offers pre-sale specification review service without charge. Upon receipt, inspect and verify that the pipe received conforms to the Customer Purchase Order. **All sales are subject to WL125 WL Plastics Terms and Conditions of Sale.**

Industry Standard	Table Notes	Sizing System	OD Size	DR	Application
API 15LE	1	IPS	¾ – 54 in	7 – 32.5	Oil & gas gathering/distribution
ASTM D 2513	1, 2	IPS	¾ – 24 in	7 – 32.5	Jurisdictional gas gathering/distribution
ASTM F 2619	1	IPS	¾ – 54 in	7 – 32.5	Oil & gas gathering/process water
ASTM D 3035	3, 4, 7	IPS	¾ – 24 in	7 – 32.5	Pressure & non-pressure fluids; municipal & industrial water; sewer & culvert; rehabilitation; geothermal; heat transfer
		IPS	3 – 54 in	7 – 32.5	
ASTM F 714	1, 3, 4, 7	DIPS	4 – 36 in	Class 100, 150, 200, 250, 300, 350	
AWWA C901	3, 4, 7	IPS	¾ – 3 in	9 – 21	Water service & distribution
AWWA C906	3, 5, 7	IPS	4 – 54 in	7 – 32.5	Water distribution & transmission
	3, 5	DIOD (DIPS)	4 – 36 in	Class 100, 150, 200, 250	
FM1613	5, 6	IPS	4 – 36 in	Class 200, 250, 335	Underground fire main
NSF-61 & 14	1, 7		(See table notes)		Potable water
AASHTO M-326	8	IPS	12 – 54 in	26, 32.5, 41	Sewer & culvert sliplining
CSA B137.1	7	NPS	2 – 6	Series 50-200	Potable Water

1. PE pipe for non-jurisdictional oil and gas gathering may be API 15LE and ASTM F2619 and/or ASTM F714. Jurisdictional gas gathering in the US requires ASTM D2513. Jurisdictional gas gathering in Canada requires API 15LE. **ASTM D2513, API 15LE and ASTM F2619 pipe is not for potable water use that is subject to municipal code regulations. NSF potable water certification is not available for API 15LE, ASTM D2513 and ASTM F2619 pipe.**
2. WL Plastics ASTM D2513 PE pipe for gas distribution in the US is available on special order only. **Per ASTM D2513, optional yellow stripes are available; colors other than yellow are not permitted.**
3. General purpose PE pipe may be ASTM F714 and/or ASTM D3035 and/or AWWA C901 and/or AWWA C906 and/or AASHTO M-326. When produced to comply with more than one standard, compatibility is limited to the most restrictive application, material, size, DR and requirement(s) in the compatible standards. General purpose PE pipe is not allowed in jurisdictional gas gathering, gas distribution or gas transmission.
4. OD controlled sizes only. Compatible with 3-in and smaller ASTM D3035, and 4-in and larger ASTM F714.
5. PE4710 ratings now applicable.
6. By certification agreement with FM approvals, FM Approved pipe is manufactured in accordance with FM1613 and is available only in the sizes and pressure classes specified in WL130/130M. Per FM1613, WL Plastics FM Approved pipe complies with AWWA C906-15. WL Plastics FM Approved pipe complies with NFPA 24. NSF-61 certification for potable water service fire main available upon request. Underground service only.
7. Potable water and geothermal applications require NSF-61 certified PE compound. Specify NSF-61 certification when ordering. NSF-14 certified pipe available from Elizabethtown, KY, Rapid City, SD and Cedar City, UT as follows (Note special sizes and some diameters and DR's excluded. Contact Customer Service for specific listing information.) – ASTM D3035 PE4710 IPS 2-24 DR 7-32.5; ASTM F714 PE4710 IPS 3-24 DR 7.3-41; AWWA C901 PE4710 IPS 2-3 DR 7.3-21; AWWA C906 PE4710 IPS 4-24 DR 7.3-32.5; CSA B137.1 PE4710 NPS 3-6 Series 50-200.
8. AASHTO M-326 PE pipe is limited to rehabilitation lining applications; available in DR 26 and 32.5; DR 41 special order.

DISCLAIMER: WL Plastics Corp. disclaims all responsibility and liability for products that are incorrectly or incompletely specified on the Purchase Order received by WL Plastics. The Purchaser designated on the Purchase Order is solely responsible for the Purchase Order received by WL Plastics. WL Plastics liability shall in no event exceed limited liability in accordance with WL125 WL Plastics Terms and Conditions of Sale. Changes to this publication may occur from time to time without notice. Contact WL Plastics Corp. to determine if you have the most current edition.

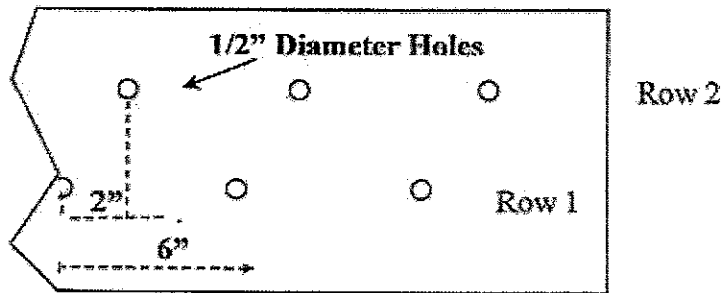
WL102 – IPS PIPE SIZES AND PRESSURE CLASS

PE4710		PC ^B , psi	335	320	250	200	160	140	125	100	80	65
IPS SIZE ^A	AVG OD, in	DR	7	7.3	9	11	13.5	15.5	17	21	26	32.5
3/4	1.050	Min wall, in	0.150	0.144	0.117	0.095						
		Avg ID ^C , in	0.732	0.745	0.803	0.848						
		Weight, lb/ft	0.187	0.177	0.148	0.124						
1	1.315	Min wall, in	0.188	0.180	0.146	0.120						
		Avg ID ^C , in	0.917	0.933	1.005	1.062						
		Weight, lb/ft	0.288	0.278	0.232	0.195						
1 1/4	1.660	Min wall, in	0.237	0.227	0.184	0.151						
		Avg ID ^C , in	1.157	1.178	1.269	1.340						
		Weight, lb/ft	0.459	0.442	0.369	0.310						
1 1/2	1.900	Min wall, in	0.271	0.260	0.211	0.173						
		Avg ID ^C , in	1.325	1.348	1.452	1.534						
		Weight, lb/ft	0.600	0.580	0.485	0.406						
2	2.375	Min wall, in	0.339	0.325	0.264	0.216	0.176	0.153	0.140			
		Avg ID ^C , in	1.656	1.685	1.816	1.917	2.002	2.050	2.079			
		Weight, lb/ft	0.939	0.906	0.758	0.634	0.526	0.462	0.425			
2 1/2	2.875	Min wall, in	0.411	0.394	0.319	0.261	0.213	0.185	0.169			
		Avg ID ^C , in	2.004	2.040	2.198	2.321	2.424	2.482	2.516			
		Weight, lb/ft	1.377	1.329	1.109	0.928	0.771	0.677	0.622			
3	3.500	Min wall, in	0.500	0.479	0.389	0.318	0.259	0.226	0.206	0.167		
		Avg ID ^C , in	2.440	2.484	2.676	2.825	2.950	3.021	3.064	3.147		
		Weight, lb/ft	2.040	1.968	1.646	1.376	1.141	1.006	0.923	0.757		
4	4.500	Min wall, in	0.643	0.616	0.500	0.409	0.333	0.290	0.265	0.214	0.173	0.138
		Avg ID ^C , in	3.137	3.193	3.440	3.633	3.793	3.885	3.939	4.046	4.133	4.206
		Weight, lb/ft	3.372	3.253	2.720	2.275	1.887	1.660	1.526	1.247	1.018	0.819
5	5.563	Min wall, in	0.795	0.762	0.618	0.506	0.412	0.359	0.327	0.265	0.214	0.171
		Avg ID ^C , in	3.878	3.947	4.253	4.491	4.689	4.802	4.869	5.001	5.109	5.200
		Weight, lb/ft	5.154	4.975	4.156	3.479	2.886	2.540	2.328	1.909	1.557	1.254
6	6.625	Min wall, in	0.946	0.908	0.736	0.602	0.491	0.427	0.390	0.315	0.255	0.204
		Avg ID ^C , in	4.619	4.701	5.064	5.348	5.585	5.719	5.799	5.956	6.085	6.193
		Weight, lb/ft	7.305	7.059	5.894	4.930	4.095	3.599	3.307	2.703	2.209	1.781
8	8.625	Min wall, in	1.232	1.182	0.958	0.784	0.639	0.556	0.507	0.411	0.332	0.265
		Avg ID ^C , in	6.013	6.120	6.593	6.963	7.271	7.445	7.549	7.754	7.922	8.062
		Weight, lb/ft	12.385	11.963	9.988	8.359	6.939	6.100	5.597	4.591	3.744	3.012
10	10.750	Min wall, in	1.536	1.473	1.194	0.977	0.796	0.694	0.632	0.512	0.413	0.331
		Avg ID ^C , in	7.494	7.628	8.218	8.678	9.062	9.280	9.409	9.665	9.873	10.049
		Weight, lb/ft	19.245	18.581	15.515	12.983	10.774	9.490	8.695	7.128	5.805	4.689
12	12.750	Min wall, in	1.821	1.747	1.417	1.159	0.944	0.823	0.750	0.607	0.490	0.392
		Avg ID ^C , in	8.889	9.047	9.747	10.293	10.748	11.006	11.160	11.463	11.710	11.918
		Weight, lb/ft	27.062	26.138	21.837	18.267	15.155	13.348	12.238	10.023	8.169	6.587
14	14.000	Min wall, in	2.000	1.918	1.556	1.273	1.037	0.903	0.824	0.667	0.538	0.431
		Avg ID ^C , in	9.760	9.934	10.702	11.302	11.801	12.085	12.254	12.587	12.858	13.087
		Weight, lb/ft	32.635	31.511	26.329	22.030	18.279	16.082	14.763	12.093	9.848	7.952

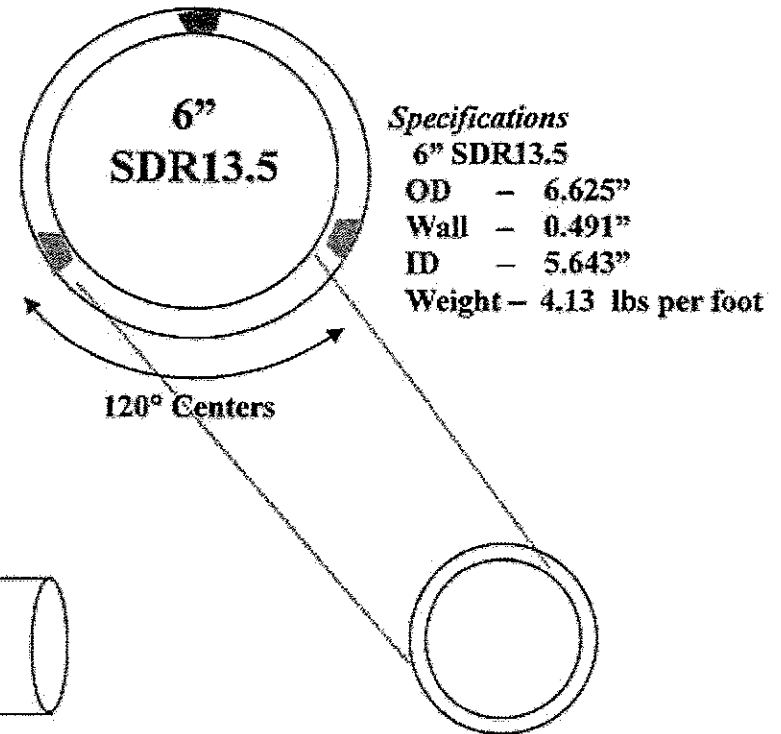
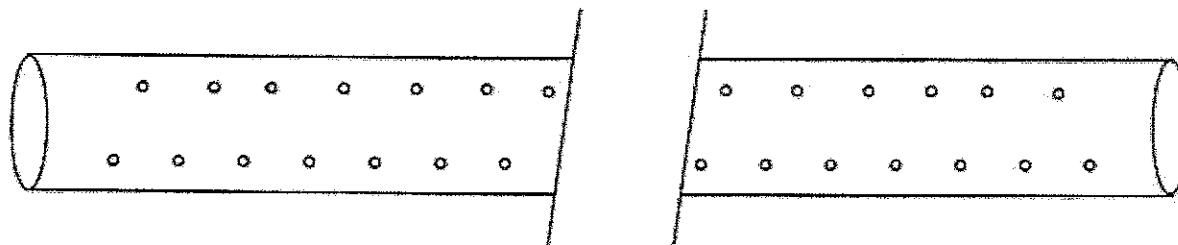
SECOR

Customer Signature Approval _____

6" SDR13.5 HDPE w/ 1/2" holes on 6" centers
in 3 rows @ 120 degrees and staggered every
2"



Row 3 is on backside of pipe also offset 2"



TITAN INDUSTRIES, INC.

East Hwy 30
Paxton, Nebraska 69155
800/658-4086

APPENDIX F: EMNRD CORRESPONDENCE

F.1 Conformation of Compliance: OWL Landfill Services, Inc. Surface Waste Management Facility; Construction Update.

From: Matt Kingsley
Sent: Tuesday, September 6, 2022 4:30 PM
To: Barr, Leigh P EMNRD <leighp.barr@state.nm.us>
Subject: OWL NDBL Notice of Construction

Good afternoon Leigh,

OWL Northern Delaware Basin Landfill is currently excavating Cell 4AB and will be lining this cell with geosynthetics in approximately 30 days. We are still trying to establish a date for geosynthetics installation as material supply from geosynthetics manufacturers are still lagging and it may be longer than 30 days.

Please let us know if you have any questions.

Much appreciated,

Matt Kingsley, PE, MOLO
Civil Engineer | Principal

Parkhill
[505.504.7758](tel:505.504.7758) | mkinsley@Parkhill.com

Please note that our email domain and website have changed to Parkhill.com.

Parkhill

APPENDIX G: RESUMÉS



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.

CONTACT

tkrueger@parkhill.com
806.473.3656

EDUCATION

Texas Tech University
Bachelor of Science,
Civil Engineering

LICENSES

Registered Professional Engineer
Texas No. 130015

EXPERIENCE

10 Years in Industry

EXPERIENCE

- | 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



CONTACT

980.525.9426

EDUCATION

Valparaiso University

Bachelor of Science,
Civil Engineering

LICENSES

Registered Professional Engineer

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.

EXPERIENCE

- | 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 bld
- | 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



Max White

Max White is a member of Parkhill's CPS/CM Sector. He joined Parkhill in 1985 as a Resident Project Representative (RPR). Prior to joining Parkhill, Max was employed by Texas Tech University in the Office of Water Management. Since joining Parkhill, Max 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.

CONTACT

mwhite@parkhill.com
806.473.3533

EDUCATION

Texas Tech University
Bachelor of Science,
Mechanized Agriculture (Business Option)

LICENSES

Registered Irrigator
Texas No. 8164

EXPERIENCE

40 Years in Industry

EXPERIENCE

- | Brownfield MSWLF cell 2 Bidding, Construction Admin., Testing, RPR and Liner Evaluation Reporting
- | Brownfield Landfill Cell 2 Expansion
- | Lea County Landfill - Tier 2 Testing
- | Levelland Landfill Type I Cell 2
- | Post Landfill Initial Development
- | Plainview Landfill Tier 2 Testing
- | City of Lamesa Landfill Cell 5 DBC
- | C.K. Disposal E&P Landfill
- | Delaware Basin E&P Landfill
- | 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
- | Plainview Paving Improvements - Reconstruction of 13th, 15th, Skate Park Parking Lot, and Landfill Road
- | Greater El Paso Landfill Cells 11-14 Bid and Construction Administration

Sante Fe Main Office
Phone: (505) 476-3441

General Information
Phone: (505) 629-6116

Online Phone Directory
<https://www.emnrd.nm.gov/oed/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 451018

CONDITIONS

Operator: OWL LANDFILL SERVICES, LLC 3889 Maple Avenue Dallas, TX 75219	OGRID: 371820
	Action Number: 451018
	Action Type: [C-137] Non-Fee SWMF Submittal (SWMF NON-FEE SUBMITTAL)

CONDITIONS

Created By	Condition	Condition Date
joseph.kennedy	None	4/22/2025