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February 9, 2023

Ms. Ann Bekta
Wisconsin Department of Natural Resources
2514 Morse Street
Janesville, WI 53545

Subject: **Phase 2, Modules 10 and 11 Liner Construction Documentation Report**
Dry Ash Disposal Facility (WDNR License #3025)
Wisconsin Power and Light Company – Columbia Energy Center
Portage, Wisconsin

Dear Ms. Bekta,

On behalf of Wisconsin Power and Light Company (WPL), Alliant Energy is submitting one hard copy of the Phase 2, Modules 10 and 11 Liner Construction Documentation Report, prepared by SCS Engineers.

We appreciate your review of the enclosed report. Please call me at (608) 458-3853 if you have any questions or need additional information prior to approval.

Sincerely,

Jeff Maxted
Manager – Environmental Services
Alliant Energy

Enclosures

Cc: Tyler Sullivan – Wisconsin Department of Natural Resources
Brian Clepper – Columbia Energy Center
Phil Gearing – SCS Engineers

Construction Documentation Report

2022 Modules 10 and 11 Liner Construction
Columbia Dry Ash Disposal Facility
Pardeeville, Wisconsin

Prepared for:

Wisconsin Power and Light Company
Columbia Energy Center
W8375 Murray Road
Pardeeville, Wisconsin 53954

SCS ENGINEERS

25222157.00 | February 2023

2830 Dairy Drive
Madison, WI 53718-6751
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CERTIFICATION PAGE

A. The following certification statements are provided for all registered professional engineers who performed quality assurance work on the project or supervised qualified technicians who did so (NR 500.05(4) and NR 516.04(3)(a)).

I, Phillip E. Gearing, hereby certify that I am a licensed professional engineer in the State of Wisconsin in accordance with the requirements of ch. A-E4, Wis. Adm. Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. A-E8, Wis. Adm. Code; and that to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 500 to 538, Wis. Adm. Code.

Phillip Gearing

Signature

Project Manager / E-45115

Title and PE Number

February 8, 2023

Date

WISCONSIN
PHILLIP E. GEARING
E-45115
SUN PRAIRIE, WIS.
PROFESSIONAL ENGINEER

Phillip Gearing

2/8/23

B. Table 1 lists the personnel who performed the field construction quality control tasks and supervising professional engineers for the field staff (NR 516.04(3)(b)). Table 2 lists the personnel who prepared this report (NR 516.04(3)(c)).

C. The following construction certification statements are provided for the professional engineers responsible for quality assurance on the project (NR 516.04(3)(d)).

I, Phillip E. Gearing, certify to the best of my knowledge, information, and belief that construction of the Module 10 and Module 11 liner at the Wisconsin Power and Light Company Columbia Energy Center Dry Ash Disposal Facility has been completed in substantial conformance with the applicable portions of the Wisconsin Administrative Code, Chapters NR 500 through 520; the 2010 Plan of Operation; and the corresponding WDNR approvals, with all observed deviations discussed in this construction documentation report. The construction of each item identified in the following subdivisions of NR 516.04 (3)(d), with the observed deviations noted/discussed below, was accomplished in conformance with the above requirements:

NR 516.04(3)(d) 1. The clay component of the liner:

a. The quality of the clay material and the methods utilized in its placement.
b. Connections with previously placed clay layers.
c. Preparation of leachate collection trenches and sumps.

d. Preparation of the upper portions of the clay component of the composite–lined Ash Disposal Facility for installation of the geosynthetic clay liner (GCL) and geomembrane, including smoothness of the surface, removal of rocks and other foreign objects, and repair of the clay layer surface due to rain, rutting, or other damage.

e. Placement of leachate drainage layer material over the composite liner.

NR 516.04(3)(d) 2. Geosynthetics and appurtenances:

a. Connections with all previously placed geosynthetics.
b. Placement of geomembrane in collection trenches, sumps and other irregularly shaped areas.
c. NOT APPLICABLE
d. NOT APPLICABLE.

NR 516.04(3)(d) 3. Elements of leachate or storm water routing, collection, storage, and transportation:

a. Construction of leachate collection and transfer lines – Minor deviations from the material and installation specifications contained in the Construction Quality Assurance/Quality Control Plan that do not impact performance.
b. Leachate headwell construction.

This certification is based on my personal observations during Module 10 and Module 11 liner construction and my review/discussion of field observation and reports prepared by SCS Engineers personnel during construction, record survey data, and the results of material testing.

Signature

Project Manager / E-45115
Title and PE Number

February 8, 2023
Date

WISCONSIN
PHILLIP E. GEARING
E-45115
SUN PRAIRIE, WIS.
PROFESSIONAL ENGINEER

2/8/23

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

This Construction Documentation Report for the construction of the Phase 1, Module 10 and Module 11 liner at the Columbia Dry Ash Disposal Facility (Ash Disposal Facility) has been prepared by SCS Engineers (SCS), Madison, Wisconsin, on behalf of Wisconsin Power and Light Company (WPL). This Construction Documentation Report has been prepared to record observations, test results, and documentation survey data relating to activities for construction of the Module 10 and Module 11 liner and supporting infrastructure. The report has been prepared in accordance with applicable portions of the Wisconsin Department of Natural Resources (WDNR) approvals summarized in **Appendix A.**

Plan Sheets 1 through **13** accompany this report to document record conditions. **Appendices A** through **R** include supporting information such as correspondence, soil testing results, geosynthetic testing results, and field observations. Copies of construction-related correspondence and approval letters are presented in **Appendix A.** Photographs of various construction activities are included in **Appendix B.**

The WDNR periodically performed construction inspections during the construction of Module 10 and Module 11 liner. WDNR performed these inspections during the following phases and on the following dates:

- Compacted Clay Liner Placement – October 4, 2022
- Geosynthetics Installation – November 8, 2022
- Leachate Drainage Layer and Leachate Collection System Installation – December 1, 2022

1.2 BACKGROUND

The Ash Disposal Facility (License #3025) is located in Section 27, Township 12 North, Range 9 East, Town of Pacific, Columbia County, Wisconsin. The location of the facility is shown on a U.S. Geological Survey (USGS) topographic map base on **Figure 1** and **Plan Sheet 1.** Pre-construction site conditions in the area of construction are shown on **Plan Sheet 2.** A post-construction overall site plan is provided on **Plan Sheet 3.**

Several parties were involved with construction of the Module 10 and Module 11 liner. Company information and work performed are described below:

- **Ames Construction (Ames) of Burnsville, Minnesota**: General contractor for Module 10 and Module 11. Performed mass excavation, filling, grading, clay placement, drainage layer placement, leachate pipe placement and stone bedding/filter aggregate, perimeter road and swale construction, storm water features, and restoration.
- **Geo-Synthetics Systems (GSI), of Waukesha, Wisconsin**: Installation of the Module 10 and Module 11 cell geosynthetic clay liner (GCL), geomembrane, and geotextile cushion.

- **Highway Landscapers of Little Chute, Wisconsin**: Landscaping services. Installed erosion control measures and performed restoration and seeding activities throughout the project.

- **Badger Daylighting of Milwaukee, Wisconsin:** Non-destructive hydro-excavation services. Cleaning sediment washout on top of geosynthetic liner.

- **James Peterson Sons, Inc. of Medford, Wisconsin**: Civil engineering and environmental contractor. Performed on-site screening of drainage layer material.

- **Meister's K and M Tree of Lodi, Wisconsin**: Landscaping service. Performed grubbing and stump removal in preparation for topsoil stripping activities.

Module 10 and Module 11 construction activities at the Ash Disposal Facility started on May 2, 2022, and were substantially completed on December 14, 2022 (including the mass subbase excavation and filling, clay liner placement, the geosynthetic installation, the leachate collection system, drainage layer placement, roads, storm water features, and restoration).

SCS was the primary party responsible for providing construction documentation, including field-testing of soils, surveying, photographic documentation, and on-site observation during construction. Kenzie Ostien, Erin Heaster, and Jordan Main of SCS provided the majority of construction documentation and oversight throughout the project. During geosynthetics installation, Zana Bajalan, Niko Villanueva, Madison Thompson, Colin Gloede, and Phillip Gearing of SCS provided assistance as needed. This combination of personnel provided full-time, on-site construction observation.

Earthwork survey, pipe survey control, survey documentation, and supplemental surveying were primarily performed by Kenzie Ostien and Jordan Main. Certification of construction quality control personnel is included in **Table 1**. A list of report preparation personnel is included in **Table 2**.

Subcontractors and sub-consultants assisting SCS with construction documentation included the following:

- **TRI Environmental, Inc. (TRI) of Austin, Texas**: Geosynthetic laboratory testing
- **CQM, Inc. of Green Bay, Wisconsin**: Geomembrane electrical leak location testing
- **CGC, Inc. of Madison, Wisconsin**: Geotechnical laboratory testing
- **Ground Penetrating Radar Systems (GRPS) of Madison, Wisconsin**: Screening for utilities

2.0 DEVIATIONS FROM APPROVED PLAN

Minor deviation from the project requirements as defined by the Construction Quality Assurance/Quality Control (CQA) Plan and project documents and its impact on the construction of the Module 10 and Module 11 liner is discussed in the following section.

2.1 LEACHATE PIPE BEDDING STONE GRADATIONS

Per the CQA Plan, leachate pipe bedding material is required to have a maximum particle diameter of a 1-1/2 inch. The placed leachate pipe bedding material contained a small percentage of material greater than 1-1/2 inch. Stockpile and in-place samples confirmed the percentage of material greater than 1-1/2 inch ranged from 0.1 percent to 3.9 percent. The leachate pipe bedding gradations can be found in **Appendix M** and are summarized in **Table 7**. Locations of the collected samples of pipe bedding material are found on **Figure 4**.

Due to the low percentage of material greater than 1-1/2 inch it is not believed the material will have an impact on the performance of the drainage system or the composite liner system. This material is considered by SCS to be substantially conforming.

3.0 ASH DISPOSAL FACILITY PRECONSTRUCTION ACTIVITIES

3.1 PERMITS AND APPROVALS

WPL obtained permits or approvals to facilitate the construction at the Ash Disposal Facility. The following permits and documents were in place by WPL for this phase of landfill construction (Included in Appendix A.):

- Tier 2 Stormwater Permit – WPDES Permit No. WI-S067857-4
- Wetland 1 Exemption

WPL also completed the following:

- Renewed an endangered resource review (ER Log#20-878) before construction activities began to ensure that any work complied with the review requirements.
- Submitted an application to amend the Title V permit for onsite sand drainage layer material processing.

3.2 EROSION CONTROL INSTALLATION

On May 11 and May 12, 2022, Highway Landscapers (subcontractor) began erosion control installation. Silt fence was installed on the north, east, and south slopes of the surface water and leachate pond area, and on the west and south perimeter of the proposed overburden stockpile and along the eastern chain-link fence. A sediment log was placed across the leachate pond access road. Ames installed additional erosion controls on June 8, 2022, and June 16, 2022, due to storm events and Highway Landscapers returned June 9, 2022, to complete erosion control installation. Highway Landscapers returned June 27, 2022, to hydroseed the closed topsoil stockpile south of the ash expansion area and repair erosion controls. Erosion controls installed at the site were inspected weekly throughout construction. Areas of concern were repaired after each inspection.

3.3 CLEARING AND GRUBBING

Meister's K and M Tree (subcontractor) cut and cleared trees in the temporary stockpile areas and Module 10 and 11 in winter 2022 during frozen ground conditions, which was in line with requirements from the Endangered Resource Review. Additional grubbing and stump removal in the Module 10 and Module 11 area was performed by May 31, 2022. This work was performed prior to the start of mass excavation in Module 10 and Module 11.

3.4 TOPSOIL STRIPPING

Topsoil was stripped from the Module 10 and Module 11 construction limits and adjacent areas starting on June 2, 2022. The topsoil material was temporarily stockpiled along the perimeter of the proposed overburden stockpile area and south of the Ash Expansion Area for future restoration use. Topsoil stripping was completed on June 14, 2022. Topsoil stockpiling was completed on June 15, 2022.

3.5 PERIMETER ACCESS ROAD CONSTRUCTION

A perimeter access road was constructed to support construction activities in addition to the haul paths used by equipment. The location of the access road is shown on Plan Sheet 3. The access road was constructed by installing a TerraTex HPG-16 geotextile separator and 1-foot of breaker run material. The final 6 inches of dense aggregate base material will be placed in 2023 to complete the planned access road cross section. A detail of the perimeter access road cross section is shown on Detail 1, Plan Sheet 13. Construction of access roads was done largely in two sections that were connected in the portion east of Module 10, occurring on September 23, 2022, resuming December 5, 2022, and was complete by December 12, 2022. Locations of the access roads are shown on Plan Sheet 3.

4.0 LINER SYSTEM CONSTRUCTION

The Module 10 and Module 11 liner system includes a composite liner that is constructed of a 2-foot-thick clay layer below a GCL and 60-mil textured high density polyethylene (HDPE) geomembrane. In the leachate trenches and sumps, the composite liner is overlain by a leachate collection system that includes a geotextile cushion, pipe bedding, leachate piping, filter material, and drainage layer. Construction of the liner involved establishing subbase grades (bottom of clay liner), clay liner placement (top of clay/GCL subgrade), geosynthetic liner placement (installation of the GCL and geomembrane), and installation of the leachate collection system. The composite liner system is shown on Detail 1, Plan Sheet 11 and leachate collection system is shown on Detail 3, Plan Sheet 11.

4.1 SHEAR TEST RESULTS

The same clay source and manufactured geosynthetics materials were used for Modules 5 and 6 construction and the current Module 10 and 11 construction; therefore, interface friction testing did not need to be replicated for the following interfaces, per NR 516:

- Sand Drainage Material vs. Solmax 60-mil HDPE Textured Geomembrane
- BentoLiner CAR-NWL 35 GCL vs. Solmax (formerly GSE) 60-mil HDPE Textured Geomembrane
- Internal Shear of BentoLiner CAR-NWL 35 GCL
- BentoLiner CAR-NWL 35 GCL vs. Remolded Clay

The Clay vs. GSE CAR-NWL35 GCL interface, GSE CAR NWL35 GCL vs. GSE 60-mil HDPE interface, and the internal shear testing of the GCL were all performed previously during Module 3 construction in 2016. The leachate drainage material for Modules 5 and 6 was an imported sand material that was further used in 10 and 11; therefore, the leachate drainage material to geomembrane interface test (Sand Drainage Material vs. Solmax 60-mil HDPE Textured Geomembrane) that was performed in 2021 did not need to be repeated.

The previously performed interface friction results for the construction interfaces are provided in Appendix N. The interface friction results met the project requirements.

4.2 SUBBASE PREPARATION

Subbase grades within Module 10 and Module 11 were established by excavating into the existing soil formation. Excavation occurred after clearing and stripping of vegetation and topsoil was completed. Excavation to subbase grades began on June 2, 2022, starting with topsoil removal.

Mass excavation started on June 13, 2022, and was substantially completed by September 19, 2022. During subbase excavation "Wetland 1" was removed as shown in the artificial wetland exemption determination found in **Appendix A.** The wetland was found to be exempt from state wetland regulations.

4.2.1 Subbase Survey

Subbase grades were established as the excavation proceeded across Module 10 and Module 11. Subbase grades were monitored primarily through the use of global positioning system (GPS) equipment mounted on the construction equipment. Once the subbase grades were established, the surface was surveyed to document the bottom of clay liner. The entire subbase surface was surveyed on a 50-foot grid and at breaks in grade to document the bottom of clay elevation. Documented subbase grades are summarized in **Tables 3A**, **3B**, and **3C** and shown on **Plan Sheet 4**.

4.2.2 Overburden Stockpile

The material excavated above subbase grades was stockpiled south of the surface water and leachate pond. The total volume of material moved to the overburden stockpile was approximately 102,000 cubic yards. The overburden stockpile (location is shown on **Plan Sheet 3**), was graded for positive drainage and seeded. The northwest corner of the stockpile was left open for intermediate cover use in the active landfill areas. Excess overburden material excavated during subbase excavation was hauled to the Secondary Ash Pond area and used as backfill during pond closure activities.

4.3 COMPACTED CLAY LINER

Construction of the clay liner was performed in accordance with the CQA Plan. The clay used during construction meets the requirements of NR 500 for use as clay liner material. The clay material for the Module 10 and Module 11 liner was obtained from the approved New Haven clay borrow site and stockpiled onsite in 2021 during Module 5 and Module 6 construction.

4.3.1 Clay Liner Placement

Clay material was loaded from the clay borrow site by using an excavator and hauled using quad axle dump trucks to an on-site stockpile. Clay was loaded from the on-site stockpile into off-road haul trucks and placed in Module 10 and Module 11. The clay was spread and graded by a GPS-equipped bulldozers (CAT-D6 and CAT-D6T). The clay liner was compacted using a sheepsfoot compactor (Hammtronic H16iP). The H16iP compactor weighed approximately 42,800 pounds. The weight of the compactor meets the minimum compactor static weight required by NR 500. The compactor had 4-inch footpad length. Clay placement started on September 9, 2022, and was substantially completed by October 28, 2022. Modules 10 and 11 clay was tied into the existing Modules 3 and 4 clay as shown on **Detail 6, Plan Sheet 11**.

Clay was placed loose in an initial, 6-inch lift due to the sandy nature of the subbase. Subsequent lifts were 4-inch loose lifts to reach a final 2-foot thickness. The clay was compacted between each lift. Passing field moisture and density test results were obtained with a nuclear density gauge (NDG) at a 1-foot and 2-foot thickness. If the clay was too moist, it was disturbed with equipment and left to air dry. If the clay was too dry, water was applied to the surface. If the clay was not compacted then additional compaction was performed until required compaction was achieved. After final grading with a motor grader (CAT-160M2 AWD), the clay surface was smoothed with the smooth-drum roller.

4.3.2 Clay Sampling and Testing

During clay liner construction, bulk and undisturbed clay samples were collected for laboratory analysis. A total of six bulk samples and 16 undisturbed samples were collected from Module 10 and Module 11. Three-inch-diameter Shelby tubes were used to obtain undisturbed clay samples. Holes created by obtaining undisturbed clay samples were backfilled with granular bentonite. Results of laboratory testing of material properties (Atterberg limits, grain-size distribution, dry density, moisture content, and permeability/hydraulic conductivity) are contained in **Appendix C** and are summarized in **Table 6**. Testing was performed based on ASTM D4318 for Atterberg limits (liquid limit and plasticity index), ASTM D2216 for moisture content, ASTM D422 for grain-size distribution, and ASTM D5084 for hydraulic conductivity (permeability).

Test results summarized in **Table 6** indicate that the clay liner materials are classified in accordance with the Unified Soil Classification System (USCS) as "CL" soils. The P200 content, liquid limit, plasticity index, and permeability (hydraulic conductivity) values meet the requirements of the CQA Plan. Locations where testing was performed are shown on **Figure 2** and **Figure 3**.

4.3.3 Nuclear Moisture and Density Testing

A total of 73 field moisture and density tests were performed during construction to document the degree of compaction of the clay liner material. Density tests were performed at a minimum frequency of one test per 100-foot grid per foot of clay thickness. Test locations are shown on **Figure 2** and **Figure 3**. A summary of the clay liner moisture/density test results is contained in **Table 5**. Percent compaction of the Module 10 and Module 11 clay liner materials ranged from 90.0 percent to 98.0 percent. Based on these test results, the compaction of the clay liner meets the compaction requirement of 90 percent or greater of the Modified Proctor maximum dry density. The degree of compaction was determined using a calibrated Troxler nuclear meter to obtain wet density and moisture content. Proctor curves used for evaluating the field NDG tests on the clay are contained in **Appendix C**.

The average moisture content determined from field NDG testing for the clay liner was 21.5 percent, and laboratory moisture testing was approximately 23.9 percent. The field and laboratory testing meet the CQA Plan requirement of a compaction moisture content of at least 2 percent wet of optimum for the Modified Proctor method used.

4.3.4 Clay Liner Thickness Documentation

The thickness of the clay liner was monitored during placement primarily through the use of GPS equipment mounted on the construction equipment. Upon completion of clay placement, the surface was finish-graded and smooth-drum rolled. The entire clay surface was surveyed on a 50-foot grid and at breaks in grade to document the top of clay elevation. The final clay elevations are shown on **Plan Sheet 5**. Surveyed elevations were compared to the documented subbase grade to determine the thickness of clay at each documentation point. Clay thickness measurements are summarized in **Table 3A** and **Table 3B**. The clay liner thickness meets the minimum required thickness of 2 feet at all the documentation points. Cross-sections of the completed liner construction are shown on **Plan Sheets 9** and **10**.

4.3.5 Surplus Clay Stockpile

After grading the placed clay material to base grades, the remaining clay material was graded into the stockpile location shown on **Plan Sheet 3**. The clay stockpile was graded to shed water. The remaining volume of clay in the stockpile is approximately 22,500 cubic yards.

4.4 GEOSYNTHETIC CLAY LINER

A GCL was installed over the clay liner by GSI. Resumes for the geosynthetics installation personnel are provided in **Appendix D**. The GCL used for the project was Bentoliner CAR, 0.75 lb./ft^2 manufactured by Solmax. The GCL product is the same product installed for previous modules and was previously tested for compatibility with site-specific leachate. A total of approximately 305,500 square feet of GCL was installed October 29 through November 10, 2022.

4.4.1 GCL Quality Control and Conformance Testing

GCL quality control and conformance testing was performed prior to GCL installation in accordance with the CQA Plan requirements. Quality control testing was completed by Solmax and conformance testing was completed for SCS by TRI. Quality control and conformance testing results are contained in **Appendix E** and **Appendix F**, and were previously submitted in a preconstruction report. GCL materials used in the construction of the Module 10 and Module 11 liner meet or exceed the project requirements.

4.4.2 Clay Surface Preparation

Prior to installation of the GCL, the clay surface was smooth-drum rolled using a Hammtronic H16iP roller and inspected for the presence of irregularities, angular stones, wet areas, and excessively soft areas. Granular sodium bentonite was spread to fill small surface voids not removed by smoothing. Stones larger than 2 inches, stones with sharp or angular edges, and other debris were removed. Subgrade was inspected by GSI and SCS prior to GCL deployment. Subgrade acceptance forms for the installation of all geosynthetics are included in **Appendix G**.

4.4.3 GCL Deployment

Rolls of GCL were staged next to and within to Module 10 and Module 11 with a Takeuhci-TL12V2 skid steer with a forklift and support pipe set up such that the roll of GCL was supported across its length. A spreader bar was used to prevent the lifting slings from damaging the GCL. The panels were pulled off the roll by the liner crew and placed with the non-woven geotextile side facing upwards or were rolled out mechanically using a Takeuhci-TL12V2 skid steer. Adjustments to the panel alignment were performed manually. All GCL panels were covered with geomembrane on the same day they were deployed.

4.4.4 GCL Seaming

Adjoining GCL panels were installed with a minimum 6-inch overlap on longitudinal seams and 20 inches on the panel end seams. Dirt, gravel, or other debris was removed from the overlap area of the GCL. Seam overlaps were shingled in the direction of flow from the top panel to the underlying panel. The overlapping panel edges were pulled back and granular sodium bentonite was poured continuously along all seams at a minimum application rate of ¼ pound per linear foot. The seams were heat tacked with a hand torch or leister to prevent movement of panels during geomembrane deployment.

4.5 GEOMEMBRANE INSTALLATION

Installation of the geomembrane in Module 10 and Module 11 was performed in accordance with the manufacturer's recommendations and the CQA Plan. A Solmax HDPE 60 mil textured geomembrane was installed over the GCL by GSI. A total of approximately 304,500 square feet of geomembrane was installed in Module 10 and 11. Geomembrane deployment began on October 29, 2022, and was completed on November 10, 2022. Additional repairs were performed by GSI on December 13, 2022, detailed in the following section. Installation of the north berm to Module 11 will be completed in 2023, after submission of this documentation report.

4.5.1 Geomembrane Quality Control and Conformance Testing

Geomembrane quality control and conformance testing was performed in accordance with CQA Plan. Geomembrane was tested for tensile properties, density, melt index, and thickness. Quality control testing was performed by GSI and conformance testing was performed by TRI. Quality control and conformance testing results are contained in **Appendix E** and **Appendix F**, and previously submitted in a preconstruction report. Geomembrane materials used in the construction of the Module 10 and Module 11 liner meet or exceed the project requirements.

4.5.2 Geomembrane Development

Geomembrane panels were placed in the numerical order shown on the panel layout diagram located on **Plan Sheet 6.** The geomembrane was staged within Module 10 and Module 11 next to previously deployed GCL area using a Takeuhci-TL12V2 skid steer with rubber tracks. A majority of the geomembrane was installed by rolling out the rolls to prevent combing, or disturbance of the exposed geotextile of the underlying GCL due to the geomembrane texture. Final adjustments to the position of geomembrane panels were made manually by GSI laborers. The geomembrane was anchored at the outer limits using an anchor trench and ballasted with sand bags. Geomembrane was secured in perimeter anchor trenches as shown on **Detail 2**, **Plan Sheet 11**. Daily field reports prepared by SCS discussing geomembrane placement, seaming, testing, and repair are contained in **Appendix H.** Panel placement information is included in **Appendix J.** Photographs showing geomembrane deployment are provided in **Appendix B.**

4.5.3 Geomembrane Seaming

GSI used a dual hot wedge weld (fusion weld) as a primary seaming method. GSI utilized extrusion welding equipment for repairs and other locations not suitable for fusion welding. The types of seaming methods used are shown on **Details 1** and **2, Plan Sheet 6.** Geomembrane panel and seam locations were surveyed by SCS. Field seaming information is contained in **Appendix J.**

GSI welding technicians performed trial welds at the beginning of the seaming period each day. Trial welds were performed by GSI welding technicians at a maximum 5-hour interval.

All trial welds collected were tested by GSI with a field tensiometer and each determined to pass prior to any production welding. SCS observed all trial weld testing performed. Trial weld test results are contained in **Appendix J.** Multiple tensiometer load cells were used throughout the geomembrane installation, and all GSI field tensiometer calibration certifications were within 90 days of calibration when each tensiometer was used. The calibration certifications are presented in **Appendix K.**

4.5.4 Non-destructive Seam Testing

GSI conducted non-destructive tests on each geomembrane seam in the field. SCS documented all non-destructive seam testing, and test data are contained in **Appendix J**. A description of the non-destructive testing methods used by GSI is provided in the following discussion.

Dual hot wedge weld seams were air tested by GSI after seaming. Air testing involved sealing both ends of a seam and pressurizing the air channel between the two hot wedge weld tracks to a pressure of at least 30 pounds per square inch (psi). After a 2-minute stabilization period, the pressure was monitored for 5 minutes. A pressure drop of 3 psi or less after 5 minutes was considered acceptable. After successful pressure testing, the end of the seam opposite the pressure gauge was cut to release the air used to pressurize the seam and ensure that the air channel was unobstructed along the entire seam.

Extrusion welded seams and repairs were tested by GSI with a vacuum box. Vacuum box testing involved wetting the seam area with a soapy water solution and placing the vacuum box over a portion of the seam. A vacuum was applied to the box to verify the integrity of the area. The geomembrane surface within the vacuum box was visually monitored for the formation of air bubbles, which indicate that air was moving through the membrane or the seam, and that a hole was present. All extrusion seams were non-destructively tested in this manner.

Seams that did not pass the non-destructive air tests were capped by GSI with a piece of geomembrane extending a minimum of 6 inches on each side of the seam. The cap was extrusion welded to the geomembrane and non-destructively tested as previously described. If a non-destructive vacuum box test failed, the area where a leak was found was re-extrusion welded. The repaired leak was then retested by GSI.

4.5.5 Destructive Seam Testing

GSI collected end of seam samples for field testing from seams over 100 feet. One sample was tested in shear and one in peel. SCS observed end of seam field testing, and test results are provided on panel seaming summary forms in **Appendix J**. All end of seam testing met the project requirements.

Destructive samples were taken for laboratory testing every 1,000 feet of seaming in accordance with the requirements of the CQA Plan. The geomembrane was leak location tested after the placement of leachate drainage layer allowing the destructive testing to be extended from 500 feet to 1,000 feet. Destructive seam lab test locations are shown on **Plan Sheet 6**.

After confirmation of passing seam tests, the destructive test locations were repaired and non-destructively tested by GSI. Field destructive test logs and seam repair logs prepared by SCS are contained in **Appendix J**. Laboratory destructive test results provided by TRI are also contained in **Appendix I**. Testing methodology included ASTM D 6392 and GRI GM19 for shear and peel laboratory analysis. Three of the initial extrusion destructive seam samples failed to meet the minimum project requirements and are described in the sections below.

4.5.5.1 Destructive Seam Test DS-1

DS-1 was collected on November 1, 2022, from seam P-12/P-13 performed by welder AF with the fusion machine #131, and capped with repair R-33. DS-1 passed during field testing and failed during lab testing by TRI. To track the failing destructive sample DS-1, GSI cut destruct DS-1A and

DS-1B on November 7, 2022, located on seam done by AF before and after DS-1. Both DS-1A and DS-1B failed field test requirements, prompting DS-1C and DS-1D (tracking further from DS-1A and DS-1B) to be cut and capped on November 8, 2022. Both DS-1C and DS-1D passed field and lab requirements. GSI capped corresponding seams with repairs R-234, R-233, R-257, and R-256 respectively. No additional destructs were taken and no additional seams were capped to address the failure of DS-1.

4.5.5.2 Destructive Seam Test DS-9

DS-9 was collected on November 7, 2022, from the seam P-36/P-35 performed by welder CV with the fusion machine #127, capped with repair R-235. DS-9 passed during field testing and failed during lab testing by TRI. To track the failing destructive sample DS 9, GSI cut destruct DS-9A and DS-9B on November 8, 2022, located on seams done by CV before and after DS-9 the previous day. GSI capped corresponding seams with repairs R-260 and R-262. Both DS-9A and DS-9B passed field test requirements lab test requirements. No additional destructs were taken and no additional seams were capped to address the failure of DS-9.

4.5.5.3 Destructive Seam Test DS-14

DS-14 was collected on November 7, 2022, from the seam P-60/P-50 performed by welder AF with the fusion machine #115, capped with repair R-240. DS-14 failed during lab testing. To track the failing destructive sample DS-14, all welding before DS-14 by welder AF and fusion machine #115 was capped. The welding performed by BL was further tracked forward using weld time stamps. DS-14B was cut and capped with repair R-263 on November 8, 2022. DS-14B passed in field and failed lab testing. Failure of destruct DS-14B from November 8, 2022, prompted SCS and GSI to cut destruct DS-14C and cap corresponding seams with repair R-271. DS-14C passed field and lab test requirements. No additional destructs or repairs were needed to address the failure of DS-1.

4.5.6 Geomembrane Repair

SCS observed the geomembrane for defects immediately following placement of the panels, during seaming, and periodically after seaming until the geomembrane installation was completed. Intersection points between panels and defects found on seams and within panels were cut out by GSI and addressed with cap or bead style repairs. GCL material below the damaged geomembrane was also inspected and repaired, as necessary. SCS marked areas on the panels and seams that required repair, and GSI completed and retested all repairs. Repair and test documentation is contained in **Appendix J**.

Repair of the geomembrane was completed by tack welding a piece of geomembrane to the repair area with a leister. The geomembrane patch was ground using a grinder and then welded with an extrusion welder. Trial welds were tested before extrusion welding was performed as described previously. The repairs were non-destructively tested as described previously.

4.5.7 Module 4 Anchor Trench Repair

Repairs to the Module 4 anchor trench area occurred before Module 10 and 11 geomembrane work began. Geomembrane material was damaged during the construction of the haul road in-between Module 4 and 5 at the northwest anchor trench. The location was discussed with the WDNR when the damage was discovered. Locations were surveyed for repair at the time the damage occurred.Tear was documented by SCS and covered with plastic rain cover material on June 6, 2022. On October 27, 2022, Ames re-exposed the damaged area and GSI performed the repair to GCL and geomembrane in this location. Repairs were completed with the same equipment and testing methods as the Module 10 and 11 geomembrane installation that followed. Records of these repairs including a photo log, geomembrane forms, and a figure for repair location are provided in Appendix R.

4.5.8 Sediment Removal

On November 8, 2022, Badger Daylighting was hired by Ames to perform surface hydro-excavation services on the northeast corner of the liner where washout of overburden sediment migrated from the unfinished perimeter swale onto the top of the placed geomembrane. Badger Daylighting used water, vacuum hoses, and brooms to remove sediment. Ames laborers supplemented this removal with plastic shovels and brooms.

4.5.9 Survey Documentation

Geomembrane panel, seam, destructive sample, and repair locations were surveyed by SCS prior to geotextile and drainage layer placement. The geomembrane documentation survey is provided on Plan Sheet 6.

4.6 GEOTEXTILE INSTALLATION

One layer of a 32 oz./yd^2 needle-punched nonwoven geotextile Mirafi S3200 (manufactured by Tencate Geosynthetics) was installed over the geomembrane in the leachate collection trenches and sumps. Sufficient material was placed to have a minimum 5-foot runout beyond the shoulders of the trench, shown in Detail 3 of Plan Sheet 11. The geotextile was overlapped 4 to 6 inches and leistered to prevent aggregate migration.

4.6.1 Geotextile Quality Control

Geotextile quality control testing was performed in accordance with the CQA Plan. Quality control testing was performed by Tencate Geosynthetics. Quality control testing results are contained in Appendix E. The geotextile roll test results met the project requirements.

4.7 LEACHATE DRAINAGE LAYER

After deployment of geomembrane and geotextile in Module 10 and Module 11, a leachate drainage layer was installed above the geomembrane. The drainage layer was constructed of imported sand produced by COVIA and screened on-site by James Peterson Sons, Inc. The drainage layer was installed across the entirety of the two Modules according to the methods required by the CQA Plan Section 10. Throughout drainage layer placement, a minimum 2-foot-thick haul road was maintained underneath tracked, non-low-ground pressure equipment and a minimum 1-foot-thick cushion was maintained under all other low-ground pressure tracked equipment.

4.7.1 Leachate Drainage Layer Placement

Initial placement of the leachate drainage layer material occurred in a 2-foot-thick layer to create a haul road on either side of the leachate collection trenches in both Modules. A GPS-enabled low ground-pressure bulldozer (CAT-D6T LGP) graded haul paths as a tracked truck (Prinoth Panther-T14R) brought drainage material from the screened stockpile. After sufficient material had been placed, the CAT-D6T LGP bulldozer spread the haul road into a 1-foot-thick layer over all remaining areas and up all slopes.

Leachate drainage layer elevations were surveyed on a 50-foot grid as summarized in **Table 3A** and **Table 3B**, which show that the minimum 1-foot thickness was placed over the Modules 10 and 11 area. Cross sections of the documented grades are shown on **Plan Sheet 9** and **Plan Sheet 10.** Placement of the leachate drainage layer started on November 12, 2022, and final grading of the material was substantially completed by December 14, 2022.

4.7.2 Leachate Drainage Layer Sample Collection and Testing

One sample of leachate drainage layer material was collected per 1,000 cubic yards placed. Samples were analyzed for grain-size distribution (ASTM D422). One sample was also collected per 2,500 cubic yards placed and analyzed for remolded hydraulic conductivity (ASTM 2434). Sample locations for the granular drainage layer are shown on **Figure 4**. All sample results met the project specifications. Results of laboratory testing are contained in **Appendix O** and summarized in **Table 9.**

4.8 LEACHATE COLLECTION SYSTEM

A leachate collection system consisting of HDPE pipe, filter material, and coarse aggregate bedding was installed in the leachate collection trenches. The leachate drainage layer was installed over the leachate collection system. Similar to drainage layer placement, throughout the installation a minimum 2-foot-thick haul path was maintained underneath tracked, non-low-ground pressure equipment and a minimum 1-foot-thick cushion was maintained under all other low-ground pressure tracked equipment.

4.8.1 Leachate Collection Piping Installation

The Modules 10 and 11 leachate collection piping consists of 6-inch-diameter, perforated, SDR 11 HDPE piping. Piping locations are shown on **Plan Sheet 7.** The pipe is perforated with ½-inch diameter holes as shown on **Detail 3**, **Plan Sheet 11.** Prior to installation of the leachate collection piping, one layer of 32 oz./yd^2 geotextile was placed in the leachate collection trench. Attention was paid to the edges so no materials were inadvertently trapped beneath the geotextile. After the geotextile was installed, a minimum of 6 inches of coarse aggregate bedding was placed using a mini-excavator (CAT-308E2CR) scooping material from the bed of a tracked truck (Prinoth Panther-T14R). Stone bedding was graded using a plastic hand shovel and laser level, confirmed by GPS survey.

Pipe sections were fusion welded together in-field using heat fusion and electrofusion methods. Pipe was either fused outside of the leachate trenches and then installed manually or welded in-place within the leachate trenches. Once pipe was installed in the leachate trench, the pipe was adjusted horizontally and vertically by hand. Piping was surveyed as summarized in **Table 3B.** At the locations shown on **Plan Sheet 7**, perforated leachate collection piping was fitted with a 6-inch-diameter, non-perforated, SDR 11 HDPE cleanout risers. A threaded HDPE cap was installed at the exposed end of each cleanout riser. The threaded caps provide access to the leachate collection pipes for televising/jetting. Leachate collection pipe cleanouts were constructed as shown on **Detail 2, Plan Sheet 12.**

After the leachate collection piping was installed, 1 foot of coarse aggregate bedding was placed over the top of the pipe. Above the coarse aggregate, 1 foot of drainage filter material was installed. The placement of the majority of the leachate collection piping, coarse aggregate bedding, and filter material occurred on November 28, 2022, through December 10, 2022. The Module 3/Module 10 tie-in connection and Module 4/11 tie-in connection at the western limits of the west/east leachate collection line will be completed after submission of this documentation report and approval by WDNR.

4.8.2 Leachate Collection Sump Piping Installation

The west/east leachate collection pipe for both Modules extends into a leachate collection sump at the east limit of the trench. The design of this sump is described on **Plan Sheet 12.** Prior to installation of pipe bedding, one layer of 32 oz./yd^2 geotextile was placed in the leachate collection sump to the same 5-foot runout limit as the leachate collection trenches and approximately halfway up the eastern slope of the Module. Next, an HDPE plate with rounded edge was placed in sump underneath an 18-inch-diameter SDPE SDR 17 perforated sump pipe. The sump pipe is perforated to the specifications shown in **Detail 1, Plan Sheet 12.** The perforated section was electrofused to a solid riser and lowered into the sump with an excavator.

After placement of leachate collection sump pipe and riser, pipe bedding, filter material, and drainage layer were placed and graded within the sump. Top of bedding, top of filter, and top of drainage layer were surveyed within the sump and are summarized in **Table 3C.**

4.8.3 Pipe Bedding and Drainage Filter Material Sample Collection and Testing

Four samples of the leachate collection line pipe bedding material were collected and tested in the laboratory for grain-size distribution (ASTM D422), which meets the CQA Plan requirement of a minimum of three grain size analysis for trench lengths less than 3,000 feet. Results of the grain-size analyses are contained in **Appendix M** and summarized in **Table 7.**

Four samples of the filter material were collected and tested in the laboratory for grain-size distribution (ASTM D422), which meets the CQA Plan requirement of a minimum of three grain size analysis for trench lengths less than 3,000 feet. Results of the grain-size analyses are contained in **Appendix M** and summarized in **Table 8.**

Prior to the installation of the pipe bedding and filter material, a filter calculation was performed by SCS to determine a specification for the filter material based on the leachate drainage layer material and the pipe bedding material proposed by the contractor. A calculation for the filter specification of the filter material is provided in **Appendix N.**

The specification, updated from that provided in the CQA Plan, used to select and evaluate proposed filter materials is below:

Sieve Size	% Passing by Weight
1-inch	100
3/4-inch	100
1/2-inch	100
3/8-inch	65-100
#4	30-100
#8	15-70
#16	0-20
#30	0-10

Ultimately, the filter specification is determined based on the D15, D50, and D85 for the filter material with respect to the drainage material and coarse aggregate bedding. The requirements for each of the D15, D50, and D85 values for the filter material based on the conformance testing of the drainage material and coarse aggregate bedding are listed below:

Filter Material Specification (D15, D50, and D85)

D15	D50	D85
0.81 – 2.92	0.92 to 11.4	>3.25

The gradation results provided by CGC for the in-place filter material samples each met the filter material specification for D15, D50, and D85 as shown in **Table 8.**

4.8.4 Electrical Leak Location Testing

An electrical resistivity geomembrane leak location test was performed by CQM, Inc. on the completed Modules 10 and 11 liner on December 8, 2022, through December 10, 2022, after the leachate collection system components were installed. Limited final grading of drainage layer was performed after testing to close open perimeter on all edges required to perform leak location. Prior to the leak location test, SCS documented three defects in the liner present after geosynthetics installation and before drainage layer placement. These included an area of creased liner that was cut and repaired with a patch (capped by R-279), a very small hole (capped by R-276), and punctures from improper equipment placement (capped by R-290).

CQM's leak location identified 14 defects (LT1 through LT14) on the liner floor and slopes requiring repair. GSI returned to the site to cap the defect locations on December 13, 2022, including the three previously marked repair locations. A report documenting the electrical leak location procedures and findings is included in **Appendix P.**

Four of the total 14 leak located defects (LT-1, LT-2, LT-6, and LT-8) appeared to be attributed to installation of the geomembrane material and not placement of the leachate drainage layer material.

Ten of the total 14 leak detected defects (LT-3 through LT-5, LT-7, LT-9, and LT-10 through LT-14) were tears or punctures and appeared to be attributed to installation of the leachate drainage layer materials or other construction activities within the Modules, and were focused on the south and east slopes. Some tears were potentially due to GPS malfunction on the dozer when grading on the slopes, which was rectified.

4.8.5 Leachate Collection Pipe Jetting and Televising

The Module 3/Module 10 tie-in connection and Module 4/11 tie-in connection at the western limits of the west/east leachate collection line will be completed after approval by WDNR. For this reason, the leachate collection pipe has not been jetted and remains unconnected.

4.8.6 Leachate Headwell Installation

Four, 3-inch-diameter, schedule 80 PVC leachate headwells were installed on either side of the Modules 10 and 11 sumps. The headwells have a 10-foot, 10-slot screened section at the end. The headwells were installed at the following average invert elevations:

Headwell Location	Invert Elevation
North Mod 11	803.3
South Mod 11	803.4
North Mod 10	802.0
South Mod 10	802.0

The headwells were installed directly on the geomembrane. The PVC pipe was connected to a 3-inch-diameter solid SDR 11 HDPE riser pipe by a 22½-degree elbow and HDPE-to-PVC transition fitting. A cleanout access was installed end of the riser pipe. The leachate headwells were installed at the locations shown on **Plan Sheet 8**, and was constructed as shown on **Detail 5, Plan Sheet 11.**

Leachate headwell transducers will be installed in the headwells at a later date to measure the leachate level in Modules 10 and 11. The transducer equipment will be manufactured by EPG Companies, Inc. The equipment will consist of an EPG standalone breakout box enclosure, which includes a junction box for a level sensor with a receptacle for the level sensor plug. The breakout box will also include a desiccant dryer, bellow, and connection terminals. A submersible level sensor will be connected to the junction box and installed inside the leachate headwell. The documentation of the installation will be submitted as an addendum.

5.0 RUN-ON/-OFF CONTROL FEATURES

5.1 PERIMETER SWALE

A perimeter swale was constructed along the north, east, and south boundaries of Modules 10 and 11. The swale location and final grades of the swale are shown on **Plan Sheet 3.** The swale was constructed as shown on **Detail 2**, **Plan Sheet 13.** In addition, along the perimeter swale south of culvert C5, rock checks were installed to control sediment migration.

5.2 CULVERT INSTALLATION

A culvert was installed at one location during construction activities. Two 24-inch-diameter corrugated high-density polyethylene (CPEP) culverts (C5) were installed beneath a swale crossing to convey storm water and have access to the leachate/surface water pond. The installed culverts were positioned and bedded as shown on **Details 3** and **4**, **Plan Sheet 13.** The location of the culverts are shown on **Plan Sheet 3.**

Two additional culverts (C3 and C4) will be installed underneath both planned leachate vault pads east of each sump in Modules 10 and 11. This will happen in the 2023 construction season when the vaults are installed.

6.0 ASH DISPOSAL FACILITY RESTORATION

6.1 FINAL RESTORATION

Disturbed areas and remaining unused material stockpiles were seeded and mulched or covered with erosion control blanket by Highway Landscapers in stages. Construction storm water inspections will continue until vegetation is established. Restoration material documentation provided in **Appendix Q.**

6.1.1 Seeding

Disturbed areas were seeded at various times with WisDOT #20 seed mix at a rate of 3 pounds per 1,000 square feet. Seeding was performed by a tractor-mounded spreader. The clay stockpile was seeded with a temporary seed consisting of winter wheat and treated with CF 2000 soil stabilizer Type B (approved on the WisDOT PAL list) on December 19, 2022.

6.1.2 Erosion Mat and Mulch

ErosionTech Erosion Control Blanket ETRS-2 was installed on the perimeter swale south of Module 10, south of culvert C5, and east of the perimeter swale in the areas east of Modules 10 and 11.

7.0 PLANNED 2023 CONSTRUCTION ACTIVITIES

Construction activities on the Modules 10 and 11 Liner system at the Columbia Dry Ash Disposal Facility will resume in spring of 2023. The remaining work includes the following:

7.1 LANDFILL MODULES

- Install an electrical transformer and underground utility east of Module 10 to power the leachate pumps. This is to be completed by Alliant Energy.
- Install leachate collection pump system, including force main piping, vaults, and electrical components.
- Install telemetry and transducers to leachate headwells for Modules 10 and 11.
- Complete leachate collection system connection at western limit of leachate collection trenches in Modules 10 and 11, including placing additional pipe bedding, filter material, and drainage material to make connection.
- Remove the existing berm geomembrane between Modules 3/4 and 10/11.
- Create berm north of Module 11 and install geomembrane.
- Create connecting areas in southwest corner of Module 10 and northwest corner of Module 11 and install connection for geomembrane flap to east flap in Modules 2 and 5.
- Abandon Modules 3 and Module 4 leachate head wells and cleanout piping.
- Add plug in Module 3 to force leachate to Module 10.

7.2 PERIMETER WORK

- Place the remaining breaker run and dense aggregate base for perimeter roads.
- Finish grade swales and add remaining culverts (described in Run-on/-off Features section of this report).
- Install all final erosion control features (ditch checks, filter socks, riprap, etc.).
- Complete remaining restoration activities (Seed, mulch, fertilizer, etc.).

Tables

Table 1. Field Construction Quality Control Personnel
2022 Modules 10 and 11 Liner Construction
Columbia Dry Ash Disposal Facility / SCS Engineers Project #25222157.00

Construction Phase	Construction Quality Assurance Personnel	No. of Days On Site	No. of Hours On Site	Project Manager/ Certifying Professional
Phase 1 Module 10 & 11 Liner Construction				
Subbase Excavation and Grading [1.]	K. Ostien	47	517	P. Gearing, PE
	E. Heaster	35	385	P. Gearing, PE
	Z. Bajalan	12	60	P. Gearing, PE
Clay Liner Construction	J. Main	23	230	P. Gearing, PE
	K. Ostien	20	220	P. Gearing, PE
	Z. Bajalan	10	110	P. Gearing, PE
	P. Gearing	2	10	P. Gearing, PE
Geosynthetics Installation	Z. Bajalan	12	144	P. Gearing, PE
	J. Main	11	132	P. Gearing, PE
	N. Villanueva	5	60	P. Gearing, PE
	P. Gearing	3	36	P. Gearing, PE
	M. Thompson	3	36	P. Gearing, PE
	C. Gloede	3	36	P. Gearing, PE
Leachate Piping and Drainage Layer Installation	J. Main	25	250	P. Gearing, PE
	Z. Bajalan	3	30	P. Gearing, PE
	X. Smith	2	12	P. Gearing, PE

Notes:

1) Includes perimeter access, drainage features, and restoration.

Quality Assurance Personnel

SCS Engineers:
Jordan Main, Resident Project Representative (RPR)
Kenzie Ostien, RPR
Erin Heaster, RPR
Niko Villanueva, Project Professional (Assistance during the geosynthetics installation)
Madison Thompson, Project Professional (Assistance during the geosynthetics installation)
Collin Gloede, Field Technician (Assistance during the geosynthetics installation)
Zana Bajalan, Project Engineer, Engineer / RPR
Phil Gearing, PE, Certifying Professional Engineer

CQA Solutions:
Xavier Smith, RPR

Updated by: JMM, 12/22/22
Checked/Revised by: ZB, 1/6/23

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Table 2. Report Preparation Personnel
2022 Modules 10 and 11 Liner Construction
Columbia Dry Ash Disposal Facility / SCS Engineers Project #25222157.00

Report Section	Prepared By	Reviewed By	PE Certification
Report Section No. 1	KLO/JMM	ZB/MH	PEG
Report Section No. 2	KLO/JMM	MH	PEG
Report Section No. 3	KLO/JMM	MH	PEG
Report Section No. 4	JMM	MH	PEG
Report Section No. 5	JMM	MH	PEG
Report Section No. 6	JMM	MH	PEG
Report Section No. 7	JMM	MH	PEG
Table No. 1	JMM	ZB	PEG
Table No. 2	JMM	PEG	PEG
Table No. 3 (A, B, C, and D)	KLO/JMM	ZB	PEG
Table No. 4	KLO	PEG	PEG
Table No. 5	JMM	ZB	PEG
Table No. 6	JMM	ZB	PEG
Table No. 7	JMM	ZB	PEG
Table No. 8	JMM	ZB	PEG
Table No. 9	JMM	ZB	PEG
Figure No. 1	ZB	PEG	PEG
Figure No. 2	ZB	PEG	PEG
Figure No. 3	ZB	PEG	PEG
Figure No. 4	ZB	PEG	PEG
Appendix A	PEG	PEG	PEG
Appendix B	KLO/JMM	ZB	PEG
Appendix C	JMM	ZB	PEG
Appendix D	ZB	PEG	PEG
Appendix E	ZB	PEG	PEG
Appendix F	ZB	PEG	PEG
Appendix G	ZB	PEG	PEG
Appendix H	JMM	ZB	PEG
Appendix I	JMM	ZB	PEG
Appendix J	ZB/JMM	PEG	PEG
Appendix K	JMM	ZB	PEG
Appendix L	ZB	PEG	PEG
Appendix M	ZB	PEG	PEG
Appendix N	ZB	PEG	PEG
Appendix O	ZB	PEG	PEG
Appendix P	ZB	PEG	PEG
Appendix Q	ZB	PEG	PEG

Table 2. Report Preparation Personnel
2022 Modules 10 and 11 Liner Construction
Columbia Dry Ash Disposal Facility / SCS Engineers Project #25222157.00

Report Section	Prepared By	Reviewed By	PE Certification
Appendix R	JMM/ZB	PEG	PEG
Plan Sheet No. 1	KP	ZB	PEG
Plan Sheet No. 2	KP	ZB	PEG
Plan Sheet No. 3	KP	ZB	PEG
Plan Sheet No. 4	KP	ZB	PEG
Plan Sheet No. 5	KP	ZB	PEG
Plan Sheet No. 6	KP	ZB	PEG
Plan Sheet No. 7	KP	ZB	PEG
Plan Sheet No. 8	KP	ZB	PEG
Plan Sheet No. 9	KP	ZB	PEG
Plan Sheet No. 10	KP	ZB	PEG
Plan Sheet No. 11	KP	ZB	PEG
Plan Sheet No. 12	KP	ZB	PEG
Plan Sheet No. 13	KP	ZB	PEG

SCS Engineers Report Preparation Personnel:
- Kenzie Ostien, Resident Project Representative (KLO)
- Jordan Main, Resident Project Representative (JMM)
- Zana Bajalan, Project Engineer (ZB)
- Kirk Peterson, Senior Draftsperson (KP)
- Mark Huber, PE, Project Director (MH)
- Phillip Gearing, PE, Certifying Engineer (PEG) - All documents reviewed.

Checked/Revised by: JMM, 1/25/23

Personnel_NEEDS TO BE UPDATED.xls]rp personnel

Table 3a - Clay Liner Subbase, Base, and Leachate Drainage Layer Grades
Modules 10 and 11 Liner Construction
Columbia Dry Ash Disposal Facility

Documentation Point Number	Location		Subbase Elevation			Base Grade Elevation			Clay Liner Thickness			Leachate Drainage Layer Elevation				Leachate Drainage Layer Thickness			Comments
	Northing	Easting	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Adjusted Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	
1001	542,363.0	2,124,558.0	801.93	801.93	-0.01	805.08	805.10	0.02	3.15	3.17	0.02	806.08	806.10	806.19	0.09	1.00	1.09	0.09	Top of Slope
1002	542,364.7	2,124,585.5	812.15	812.07	-0.09	814.15	814.17	0.02	2.00	2.11	0.11	815.15	815.17	815.20	0.03	1.00	1.03	0.03	Top of Slope
1003	542,365.8	2,124,603.6	812.06	811.97	-0.09	814.06	814.10	0.04	2.00	2.14	0.14	815.06	815.10	815.13	0.03	1.00	1.03	0.03	Top of Slope
1004	542,368.9	2,124,653.5	811.80	811.72	-0.08	813.80	813.83	0.03	2.00	2.11	0.11	814.80	814.83	814.84	0.01	1.00	1.01	0.01	Top of Slope
1005	542,372.0	2,124,703.5	811.54	811.47	-0.07	813.54	813.55	0.01	2.00	2.08	0.08	814.54	814.55	814.59	0.04	1.00	1.04	0.04	Top of Slope
1006	542,375.0	2,124,753.4	811.28	811.22	-0.07	813.28	813.33	0.05	2.00	2.12	0.12	814.28	814.33	814.41	0.08	1.00	1.08	0.08	Top of Slope
1007	542,378.1	2,124,803.3	811.02	810.96	-0.06	813.02	813.05	0.03	2.00	2.09	0.09	814.02	814.05	814.07	0.02	1.00	1.02	0.02	Top of Slope
1008	542,381.1	2,124,853.2	810.76	810.67	-0.10	812.76	812.77	0.01	2.00	2.11	0.11	813.76	813.77	813.87	0.10	1.00	1.10	0.10	Top of Slope
1009	542,384.2	2,124,903.1	810.50	810.43	-0.08	812.50	812.52	0.02	2.00	2.09	0.09	813.50	813.52	813.61	0.09	1.00	1.09	0.09	Top of Slope
1010	542,387.2	2,124,953.0	810.24	810.22	-0.02	812.24	812.27	0.02	2.00	2.05	0.05	813.24	813.27	813.33	0.06	1.00	1.06	0.06	Top of Slope
1011	542,390.3	2,125,002.9	809.98	809.97	-0.01	811.98	811.99	0.00	2.00	2.01	0.01	812.98	812.99	813.00	0.02	1.00	1.02	0.02	Top of Slope
1012	542,393.4	2,125,052.8	809.72	809.69	-0.03	811.72	811.75	0.02	2.00	2.06	0.06	812.72	812.75	812.77	0.02	1.00	1.02	0.02	Top of Slope
1013	542,396.2	2,125,099.2	809.48	809.39	-0.09	811.48	811.51	0.02	2.00	2.11	0.11	812.48	812.51	812.57	0.06	1.00	1.06	0.06	Top of Slope
1014	542,389.9	2,124,556.0	803.32	803.26	-0.06	805.32	805.33	0.02	2.00	2.08	0.08	806.32	806.33	806.38	0.05	1.00	1.05	0.05	Toe of Slope
1015	542,392.6	2,124,602.1	803.11	803.08	-0.03	805.11	805.16	0.05	2.00	2.08	0.08	806.11	806.16	806.25	0.09	1.00	1.09	0.09	Toe of Slope
1016	542,395.6	2,124,652.0	802.89	802.85	-0.04	804.89	804.96	0.06	2.00	2.10	0.10	805.89	805.96	806.05	0.10	1.00	1.10	0.10	Toe of Slope
1017	542,398.5	2,124,701.9	802.67	802.65	-0.02	804.67	804.74	0.07	2.00	2.09	0.09	805.67	805.74	805.83	0.09	1.00	1.09	0.09	Toe of Slope
1018	542,401.5	2,124,751.8	802.45	802.44	-0.01	804.45	804.51	0.07	2.00	2.08	0.08	805.45	805.51	805.59	0.08	1.00	1.08	0.08	Toe of Slope
1019	542,404.4	2,124,801.7	802.22	802.18	-0.05	804.22	804.30	0.07	2.00	2.12	0.12	805.22	805.30	805.37	0.07	1.00	1.07	0.07	Toe of Slope
1020	542,407.4	2,124,851.6	802.00	801.95	-0.05	804.00	804.08	0.08	2.00	2.13	0.13	805.00	805.08	805.17	0.09	1.00	1.09	0.09	Toe of Slope
1021	542,410.3	2,124,901.5	801.78	801.70	-0.08	803.78	803.81	0.03	2.00	2.12	0.12	804.78	804.81	804.91	0.10	1.00	1.10	0.10	Toe of Slope
1022	542,413.3	2,124,951.5	801.56	801.53	-0.03	803.56	803.61	0.06	2.00	2.09	0.09	804.56	804.61	804.71	0.09	1.00	1.09	0.09	Toe of Slope
1023	542,416.2	2,125,001.4	801.33	801.25	-0.08	803.33	803.37	0.04	2.00	2.12	0.12	804.33	804.37	804.47	0.10	1.00	1.10	0.10	Toe of Slope
1024	542,419.1	2,125,051.3	801.11	801.07	-0.04	803.11	803.17	0.06	2.00	2.10	0.10	804.11	804.17	804.25	0.08	1.00	1.08	0.08	Toe of Slope
1025	542,420.4	2,125,073.1	801.01	800.94	-0.08	803.01	803.11	0.10	2.00	2.18	0.18	804.01	804.11	804.21	0.09	1.00	1.09	0.09	Toe of Slope
1026	542,421.9	2,125,098.8	809.62	809.40	-0.22	811.62	811.63	0.01	2.00	2.22	0.22	812.62	812.63	812.67	0.05	1.00	1.05	0.05	Top of Slope
1027	542,427.3	2,124,553.4	802.57	802.51	-0.05	804.57	804.58	0.01	2.00	2.07	0.07	805.57	805.58	805.61	0.03	1.00	1.03	0.03	Grid
1028	542,430.1	2,124,599.9	802.36	802.26	-0.10	804.36	804.40	0.04	2.00	2.14	0.14	805.36	805.40	805.43	0.03	1.00	1.03	0.03	Grid
1029	542,433.0	2,124,649.8	802.14	802.07	-0.07	804.14	804.19	0.05	2.00	2.13	0.13	805.14	805.19	805.21	0.02	1.00	1.02	0.02	Grid
1030	542,436.0	2,124,699.7	801.91	801.89	-0.03	803.91	803.97	0.05	2.00	2.08	0.08	804.91	804.97	804.98	0.01	1.00	1.01	0.01	Grid
1031	542,438.9	2,124,749.6	801.69	801.63	-0.07	803.69	803.72	0.03	2.00	2.10	0.10	804.69	804.72	804.74	0.02	1.00	1.02	0.02	Grid
1032	542,441.9	2,124,799.5	801.47	801.45	-0.02	803.47	803.55	0.08	2.00	2.10	0.10	804.47	804.55	804.58	0.03	1.00	1.03	0.03	Grid
1033	542,444.8	2,124,849.4	801.25	801.24	-0.01	803.25	803.32	0.08	2.00	2.08	0.08	804.25	804.32	804.33	0.01	1.00	1.01	0.01	Grid
1034	542,447.7	2,124,899.3	801.02	801.01	-0.01	803.02	803.09	0.07	2.00	2.08	0.08	804.02	804.09	804.14	0.04	1.00	1.04	0.04	Grid
1035	542,450.7	2,124,949.2	800.80	800.80	0.00	802.80	802.86	0.05	2.00	2.05	0.05	803.80	803.86	803.89	0.03	1.00	1.03	0.03	Grid
1036	542,453.6	2,124,999.2	800.58	800.53	-0.05	802.58	802.58	0.00	2.00	2.05	0.05	803.58	803.58	803.64	0.06	1.00	1.06	0.06	Grid
1037	542,456.6	2,125,049.1	800.36	800.35	-0.01	802.36	802.37	0.01	2.00	2.02	0.02	803.36	803.37	803.40	0.02	1.00	1.02	0.02	Grid
1038	542,457.8	2,125,069.7	800.27	800.26	0.00	802.27	802.29	0.03	2.00	2.03	0.03	803.27	803.29	803.34	0.05	1.00	1.05	0.05	Toe of Slope
1039	542,459.5	2,125,098.4	809.82	809.65	-0.17	811.82	811.84	0.02	2.00	2.19	0.19	812.82	812.84	812.90	0.06	1.00	1.06	0.06	Top of Slope
1040	542,464.7	2,124,550.7	801.81	801.74	-0.08	803.81	803.84	0.02	2.00	2.10	0.10	804.81	804.84	804.84	0.00	1.00	1.00	0.00	Grid
1041	542,467.5	2,124,597.6	801.60	801.56	-0.05	803.60	803.65	0.04	2.00	2.09	0.09	804.60	804.65	804.67	0.02	1.00	1.02	0.02	Grid
1042	542,470.5	2,124,647.6	801.38	801.30	-0.09	803.38	803.43	0.04	2.00	2.13	0.13	804.38	804.43	804.44	0.01	1.00	1.01	0.01	Grid
1043	542,473.4	2,124,697.5	801.16	801.16	0.00	803.16	803.25	0.09	2.00	2.09	0.09	804.16	804.25	804.26	0.01	1.00	1.01	0.01	Grid
1044	542,476.3	2,124,747.4	800.94	800.89	-0.05	802.94	803.01	0.08	2.00	2.12	0.12	803.94	804.01	804.03	0.01	1.00	1.01	0.01	Grid
1045	542,479.3	2,124,797.3	800.71	800.71	-0.01	802.71	802.81	0.10	2.00	2.10	0.10	803.71	803.81	803.82	0.01	1.00	1.01	0.01	Grid
1046	542,482.2	2,124,847.2	800.49	800.49	0.00	802.49	802.57	0.08	2.00	2.08	0.08	803.49	803.57	803.58	0.01	1.00	1.01	0.01	Grid
1047	542,485.2	2,124,897.1	800.27	800.26	-0.01	802.27	802.33	0.06	2.00	2.07	0.07	803.27	803.33	803.34	0.01	1.00	1.01	0.01	Grid
1048	542,488.1	2,124,947.0	800.05	800.03	-0.02	802.05	802.14	0.10	2.00	2.11	0.11	803.05	803.14	803.15	0.01	1.00	1.01	0.01	Grid
1049	542,491.1	2,124,996.9	799.83	799.77	-0.06	801.83	801.89	0.06	2.00	2.12	0.12	802.83	802.89	802.89	0.01	1.00	1.01	0.01	Grid
1050	542,494.0	2,125,046.9	799.60	799.60	0.00	801.60	801.70	0.09	2.00	2.10	0.10	802.60	802.70	802.71	0.01	1.00	1.01	0.01	Grid
1051	542,495.2	2,125,066.4	799.52	799.49	-0.03	801.52	801.59	0.07	2.00	2.10	0.10	802.52	802.59	802.63	0.04	1.00	1.04	0.04	Toe of Slope
1052	542,497.0	2,125,097.9	810.02	809.88	-0.14	812.02	812.03	0.01	2.00	2.16	0.16	813.02	813.03	813.13	0.10	1.00	1.10	0.10	Top of Slope
1053	542,509.0	2,125,019.3	799.39	799.29	-0.10	801.39	801.40	0.01	2.00	2.11	0.11	802.39	802.40	802.41	0.02	1.00	1.02	0.02	Leachate Sump
1054	542,513.6	2,125,064.8	799.15	799.06	-0.09	801.15	801.24	0.09	2.00	2.18	0.18	802.15	802.24	802.28	0.04	1.00	1.04	0.04	Toe of Slope and Sump

Table 3a - Clay Liner Subbase, Base, and Leachate Drainage Layer Grades
Modules 10 and 11 Liner Construction
Columbia Dry Ash Disposal Facility

Documentation Point Number	Location		Subbase Elevation			Base Grade Elevation			Clay Liner Thickness			Leachate Drainage Layer Elevation				Leachate Drainage Layer Thickness			Comments
	Northing	Easting	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Adjusted Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	
1055	542,526.5	2,125,034.0	794.00	793.99	-0.01	796.00	796.08	0.08	2.00	2.09	0.09	797.00	797.08			1.00			Leachate Sump
1056	542,527.7	2,125,049.0	794.00	793.91	-0.09	796.00	796.10	0.10	2.00	2.19	0.19	797.00	797.10			1.00			Leachate Sump
1057	542,490.3	2,124,548.9	801.30	801.26	-0.04	803.30	803.34	0.04	2.00	2.08	0.08	804.30	804.34	804.41	0.08	1.00	1.08	0.08	Leachate Trench - Top
1058	542,494.3	2,124,596.1	801.06	801.04	-0.03	803.06	803.09	0.02	2.00	2.05	0.05	804.06	804.09	804.15	0.06	1.00	1.06	0.06	Leachate Trench - Top
1059	542,498.6	2,124,645.9	800.82	800.74	-0.08	802.82	802.82	0.00	2.00	2.08	0.08	803.82	803.82	803.88	0.06	1.00	1.06	0.06	Leachate Trench - Top
1060	542,502.8	2,124,695.7	800.57	800.49	-0.07	802.57	802.60	0.03	2.00	2.10	0.10	803.57	803.60	803.69	0.09	1.00	1.09	0.09	Leachate Trench - Top
1061	542,507.1	2,124,745.6	800.32	800.22	-0.09	802.32	802.36	0.05	2.00	2.14	0.14	803.32	803.36	803.43	0.06	1.00	1.06	0.06	Leachate Trench - Top
1062	542,511.3	2,124,795.4	800.07	799.97	-0.10	802.07	802.16	0.09	2.00	2.18	0.18	803.07	803.16	803.25	0.09	1.00	1.09	0.09	Leachate Trench - Top
1063	542,515.6	2,124,845.2	799.82	799.75	-0.07	801.82	801.88	0.06	2.00	2.13	0.13	802.82	802.88	802.98	0.10	1.00	1.10	0.10	Leachate Trench - Top
1064	542,519.8	2,124,895.1	799.57	799.50	-0.07	801.57	801.66	0.09	2.00	2.16	0.16	802.57	802.66	802.74	0.07	1.00	1.07	0.07	Leachate Trench - Top
1065	542,524.1	2,124,944.9	799.32	799.22	-0.10	801.32	801.39	0.06	2.00	2.16	0.16	802.32	802.39	802.48	0.09	1.00	1.09	0.09	Leachate Trench - Top
1066	542,528.3	2,124,994.7	799.07	799.03	-0.04	801.07	801.08	0.00	2.00	2.04	0.04	802.07	802.08	802.17	0.09	1.00	1.09	0.09	Leachate Trench - Top
1067	542,530.4	2,125,018.8	798.95	798.87	-0.08	800.95	800.99	0.04	2.00	2.12	0.12	801.95	801.99	803.02	1.03	1.00	2.03	1.03	Leachate Trench - Top
1068	542,538.9	2,125,062.6	798.64	798.59	-0.05	800.64	800.70	0.06	2.00	2.11	0.11	801.64	801.70	805.69	3.99	1.00	4.99	3.99	Leachate Sump
1069	542,536.2	2,125,097.4	810.23	810.21	-0.02	812.23	812.23	0.00	2.00	2.02	0.02	813.23	813.23	814.94	1.71	1.00	2.71	1.71	Top of Slope
1070	542,499.8	2,124,548.1	801.30	801.23	-0.07	803.30	803.30	0.00	2.00	2.07	0.07	804.30	804.30	804.35	0.05	1.00	1.05	0.05	Leachate Trench - Top
1071	542,503.9	2,124,595.5	801.06	800.99	-0.07	803.06	803.11	0.04	2.00	2.11	0.11	804.06	804.11	804.20	0.10	1.00	1.10	0.10	Leachate Trench - Top
1072	542,508.1	2,124,645.3	800.81	800.77	-0.04	802.81	802.86	0.05	2.00	2.09	0.09	803.81	803.86	803.88	0.02	1.00	1.02	0.02	Leachate Trench - Top
1073	542,512.4	2,124,695.2	800.57	800.57	0.00	802.57	802.63	0.07	2.00	2.07	0.07	803.57	803.63	803.69	0.05	1.00	1.05	0.05	Leachate Trench - Top
1074	542,516.6	2,124,745.0	800.32	800.24	-0.08	802.32	802.41	0.10	2.00	2.17	0.17	803.32	803.41	803.50	0.09	1.00	1.09	0.09	Leachate Trench - Top
1075	542,520.9	2,124,794.8	800.07	800.00	-0.07	802.07	802.12	0.05	2.00	2.11	0.11	803.07	803.12	803.21	0.09	1.00	1.09	0.09	Leachate Trench - Top
1076	542,525.1	2,124,844.7	799.82	799.81	-0.01	801.82	801.88	0.06	2.00	2.07	0.07	802.82	802.88	802.95	0.08	1.00	1.08	0.08	Leachate Trench - Top
1077	542,529.4	2,124,894.5	799.57	799.53	-0.04	801.57	801.64	0.07	2.00	2.12	0.12	802.57	802.64	802.71	0.07	1.00	1.07	0.07	Leachate Trench - Top
1078	542,533.6	2,124,944.3	799.32	799.22	-0.10	801.32	801.38	0.05	2.00	2.15	0.15	802.32	802.38	802.47	0.09	1.00	1.09	0.09	Leachate Trench - Top
1079	542,537.9	2,124,994.2	799.07	799.06	-0.02	801.07	801.10	0.02	2.00	2.04	0.04	802.07	802.10	802.19	0.09	1.00	1.09	0.09	Leachate Trench - Top
1080	542,539.9	2,125,018.0	798.95	798.91	-0.04	800.95	801.00	0.04	2.00	2.08	0.08	801.95	802.00	803.08	1.08	1.00	2.08	1.08	Leachate Trench - Top
1081	542,541.4	2,125,032.7	794.00	793.99	-0.01	796.00	796.09	0.09	2.00	2.11	0.11	797.00	797.09			1.00			Leachate Sump
1082	542,542.7	2,125,048.5	794.00	793.95	-0.05	796.00	796.10	0.10	2.00	2.14	0.14	797.00	797.10			1.00			Leachate Sump
1083	542,555.8	2,125,015.6	799.28	799.18	-0.10	801.28	801.29	0.01	2.00	2.11	0.11	802.28	802.29	802.38	0.09	1.00	1.09	0.09	Leachate Sump
1084	542,559.1	2,125,063.2	799.03	798.96	-0.07	801.03	801.13	0.10	2.00	2.17	0.17	802.03	802.13	802.20	0.07	1.00	1.07	0.07	Toe of Slope and Sump
1085	542,543.7	2,124,545.0	802.18	802.08	-0.10	804.18	804.22	0.05	2.00	2.14	0.14	805.18	805.22	805.29	0.06	1.00	1.06	0.06	Grid
1086	542,546.5	2,124,593.0	801.91	801.84	-0.07	803.91	803.95	0.04	2.00	2.11	0.11	804.91	804.95	805.04	0.09	1.00	1.09	0.09	Grid
1087	542,549.5	2,124,642.9	801.64	801.63	-0.01	803.64	803.73	0.09	2.00	2.10	0.10	804.64	804.73	804.83	0.10	1.00	1.10	0.10	Grid
1088	542,552.4	2,124,692.8	801.36	801.35	-0.01	803.36	803.46	0.09	2.00	2.11	0.11	804.36	804.46	804.48	0.02	1.00	1.02	0.02	Grid
1089	542,555.4	2,124,742.7	801.09	801.08	-0.01	803.09	803.17	0.09	2.00	2.09	0.09	804.09	804.17	804.21	0.03	1.00	1.03	0.03	Grid
1090	542,558.3	2,124,792.6	800.81	800.78	-0.03	802.81	802.90	0.09	2.00	2.13	0.13	803.81	803.90	803.91	0.00	1.00	1.00	0.00	Grid
1091	542,561.2	2,124,842.5	800.54	800.52	-0.02	802.54	802.61	0.07	2.00	2.09	0.09	803.54	803.61	803.62	0.01	1.00	1.01	0.01	Grid
1092	542,564.2	2,124,892.5	800.26	800.22	-0.04	802.26	802.35	0.09	2.00	2.13	0.13	803.26	803.35	803.36	0.00	1.00	1.00	0.00	Grid
1093	542,567.1	2,124,942.4	799.99	799.97	-0.02	801.99	802.06	0.07	2.00	2.09	0.09	802.99	803.06	803.07	0.01	1.00	1.01	0.01	Grid
1094	542,570.1	2,124,992.3	799.71	799.65	-0.07	801.71	801.78	0.06	2.00	2.13	0.13	802.71	802.78	802.79	0.02	1.00	1.02	0.02	Grid
1095	542,573.0	2,125,042.2	799.44	799.34	-0.10	801.44	801.46	0.02	2.00	2.12	0.12	802.44	802.46	802.49	0.03	1.00	1.03	0.03	Grid
1096	542,574.3	2,125,063.6	799.32	799.26	-0.06	801.32	801.34	0.02	2.00	2.08	0.08	802.32	802.34	802.44	0.10	1.00	1.10	0.10	Toe of Slope
1097	542,576.3	2,125,096.9	810.44	810.35	-0.09	812.44	812.46	0.02	2.00	2.11	0.11	813.44	813.46	813.55	0.09	1.00	1.09	0.09	Top of Slope
1098	542,583.6	2,124,542.1	802.97	802.93	-0.04	804.97	805.03	0.06	2.00	2.10	0.10	805.97	806.03	806.08	0.04	1.00	1.04	0.04	Grid
1099	542,586.5	2,124,590.6	802.71	802.66	-0.04	804.71	804.79	0.09	2.00	2.13	0.13	805.71	805.79	805.82	0.02	1.00	1.02	0.02	Grid
1100	542,589.4	2,124,640.5	802.43	802.41	-0.02	804.43	804.49	0.05	2.00	2.07	0.07	805.43	805.49	805.49	0.00	1.00	1.01	0.00	Grid
1101	542,592.3	2,124,690.4	802.16	802.14	-0.01	804.16	804.23	0.08	2.00	2.09	0.09	805.16	805.23	805.24	0.01	1.00	1.01	0.01	Grid
1102	542,595.3	2,124,740.4	801.88	801.86	-0.02	803.88	803.94	0.06	2.00	2.08	0.08	804.88	804.94	804.94	0.01	1.00	1.01	0.01	Grid
1103	542,598.2	2,124,790.3	801.61	801.59	-0.01	803.61	803.66	0.05	2.00	2.06	0.06	804.61	804.66	804.68	0.02	1.00	1.02	0.02	Grid
1104	542,601.2	2,124,840.2	801.33	801.32	-0.01	803.33	803.40	0.06	2.00	2.08	0.08	804.33	804.40	804.45	0.05	1.00	1.05	0.05	Grid
1105	542,604.1	2,124,890.1	801.06	801.02	-0.04	803.06	803.09	0.04	2.00	2.08	0.08	804.06	804.09	804.19	0.10	1.00	1.10	0.10	Grid
1106	542,607.1	2,124,940.0	800.78	800.77	-0.01	802.78	802.83	0.04	2.00	2.06	0.06	803.78	803.83	803.86	0.04	1.00	1.04	0.04	Grid
1107	542,610.0	2,124,989.9	800.51	800.48	-0.02	802.51	802.59	0.08	2.00	2.11	0.11	803.51	803.59	803.61	0.02	1.00	1.02	0.02	Grid
1108	542,613.0	2,125,039.8	800.23	800.14	-0.10	802.23	802.26	0.03	2.00	2.13	0.13	803.23	803.26	803.36	0.10	1.00	1.10	0.10	Grid

Table 3a - Clay Liner Subbase, Base, and Leachate Drainage Layer Grades
Modules 10 and 11 Liner Construction
Columbia Dry Ash Disposal Facility

Documentation Point Number	Location		Subbase Elevation			Base Grade Elevation			Clay Liner Thickness			Leachate Drainage Layer Elevation				Leachate Drainage Layer Thickness			Comments
	Northing	Easting	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Adjusted Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	
1109	542,614.4	2,125,064.8	800.10	800.02	-0.08	802.10	802.13	0.03	2.00	2.11	0.11	803.10	803.13	803.21	0.09	1.00	1.09	0.09	Toe of Slope
1110	542,616.3	2,125,096.4	810.65	810.57	-0.08	812.65	812.68	0.02	2.00	2.10	0.10	813.65	813.68	813.70	0.03	1.00	1.03	0.03	Top of Slope
1111	542,619.2	2,124,539.6	803.68	803.66	-0.03	805.68	805.76	0.08	2.00	2.11	0.11	806.68	806.76	806.86	0.10	1.00	1.10	0.10	Mod 10-11 Berm
1112	542,622.1	2,124,588.5	803.42	803.36	-0.05	805.42	805.46	0.04	2.00	2.10	0.10	806.42	806.46	806.54	0.08	1.00	1.08	0.08	Mod 10-11 Berm
1113	542,625.0	2,124,638.4	803.14	803.09	-0.05	805.14	805.19	0.05	2.00	2.10	0.10	806.14	806.19	806.24	0.05	1.00	1.05	0.05	Mod 10-11 Berm
1114	542,628.0	2,124,688.3	802.87	802.85	-0.02	804.87	804.89	0.02	2.00	2.04	0.04	805.87	805.89	805.98	0.09	1.00	1.09	0.09	Mod 10-11 Berm
1115	542,630.9	2,124,738.3	802.59	802.56	-0.03	804.59	804.64	0.04	2.00	2.08	0.08	805.59	805.64	805.68	0.04	1.00	1.04	0.04	Mod 10-11 Berm
1116	542,633.9	2,124,788.2	802.32	802.24	-0.08	804.32	804.40	0.09	2.00	2.16	0.16	805.32	805.40	805.46	0.05	1.00	1.05	0.05	Mod 10-11 Berm
1117	542,636.8	2,124,838.1	802.04	801.99	-0.05	804.04	804.13	0.09	2.00	2.14	0.14	805.04	805.13	805.22	0.09	1.00	1.09	0.09	Mod 10-11 Berm
1118	542,639.8	2,124,888.0	801.77	801.74	-0.03	803.77	803.84	0.08	2.00	2.10	0.10	804.77	804.84	804.90	0.06	1.00	1.06	0.06	Mod 10-11 Berm
1119	542,642.7	2,124,937.9	801.49	801.47	-0.02	803.49	803.56	0.06	2.00	2.08	0.08	804.49	804.56	804.62	0.06	1.00	1.06	0.06	Mod 10-11 Berm
1120	542,645.7	2,124,987.8	801.22	801.19	-0.03	803.22	803.26	0.04	2.00	2.06	0.06	804.22	804.26	804.31	0.05	1.00	1.05	0.05	Mod 10-11 Berm
1121	542,648.6	2,125,037.7	800.94	800.87	-0.08	802.94	802.99	0.05	2.00	2.13	0.13	803.94	803.99	804.05	0.06	1.00	1.06	0.06	Mod 10-11 Berm
1122	542,650.3	2,125,065.9	800.79	800.76	-0.03	802.79	802.89	0.10	2.00	2.13	0.13	803.79	803.89	803.96	0.07	1.00	1.07	0.07	Mod 10-11 Berm/Toe of Slope
1123	542,651.7	2,125,096.0	810.84	810.74	-0.10	812.84	812.86	0.01	2.00	2.11	0.11	813.84	813.86	813.91	0.06	1.00	1.06	0.06	Top of Slope
1124	542,623.6	2,124,539.2	805.17	805.09	-0.08	807.17	807.22	0.04	2.00	2.13	0.13	808.17	808.22	808.26	0.05	1.00	1.05	0.05	Mod 10-11 Berm
1125	542,626.6	2,124,588.3	804.93	804.88	-0.04	806.93	806.93	0.00	2.00	2.05	0.05	807.93	807.93	808.02	0.09	1.00	1.09	0.09	Mod 10-11 Berm
1126	542,629.6	2,124,638.2	804.68	804.63	-0.05	806.68	806.71	0.03	2.00	2.08	0.08	807.68	807.71	807.72	0.01	1.00	1.01	0.01	Mod 10-11 Berm
1127	542,632.7	2,124,688.1	804.43	804.37	-0.05	806.43	806.48	0.05	2.00	2.10	0.10	807.43	807.48	807.52	0.04	1.00	1.04	0.04	Mod 10-11 Berm
1128	542,635.7	2,124,738.0	804.18	804.09	-0.09	806.18	806.18	0.00	2.00	2.09	0.09	807.18	807.18	807.23	0.05	1.00	1.05	0.05	Mod 10-11 Berm
1129	542,638.7	2,124,787.9	803.93	803.86	-0.07	805.93	805.94	0.02	2.00	2.09	0.09	806.93	806.94	806.97	0.03	1.00	1.03	0.03	Mod 10-11 Berm
1130	542,641.7	2,124,837.8	803.68	803.63	-0.05	805.68	805.68	0.00	2.00	2.06	0.06	806.68	806.68	806.72	0.04	1.00	1.04	0.04	Mod 10-11 Berm
1131	542,644.8	2,124,887.7	803.43	803.34	-0.09	805.43	805.45	0.02	2.00	2.11	0.11	806.43	806.45	806.50	0.06	1.00	1.06	0.06	Mod 10-11 Berm
1132	542,647.8	2,124,937.6	803.18	803.10	-0.08	805.18	805.20	0.03	2.00	2.10	0.10	806.18	806.20	806.23	0.03	1.00	1.03	0.03	Mod 10-11 Berm
1133	542,650.8	2,124,987.5	802.93	802.86	-0.07	804.93	804.95	0.02	2.00	2.09	0.09	805.93	805.95	806.03	0.08	1.00	1.08	0.08	Mod 10-11 Berm
1134	542,653.8	2,125,037.4	802.68	802.63	-0.05	804.68	804.72	0.04	2.00	2.09	0.09	805.68	805.72	805.73	0.01	1.00	1.01	0.01	Mod 10-11 Berm
1135	542,655.9	2,125,070.9	802.51	802.43	-0.08	804.51	804.60	0.08	2.00	2.17	0.17	805.51	805.60	805.70	0.10	1.00	1.10	0.10	Mod 10-11 Berm/Toe of Slope
1136	542,657.0	2,125,095.9	810.87	810.80	-0.07	812.87	812.89	0.02	2.00	2.10	0.10	813.87	813.89	813.99	0.10	1.00	1.10	0.10	Top of Slope
1137	542,665.1	2,124,536.6	804.34	804.27	-0.07	806.34	806.43	0.08	2.00	2.16	0.16	807.34	807.43	807.45	0.02	1.00	1.02	0.02	Grid
1138	542,668.0	2,124,585.8	804.10	804.00	-0.09	806.10	806.16	0.06	2.00	2.16	0.16	807.10	807.16	807.22	0.06	1.00	1.06	0.06	Grid
1139	542,671.0	2,124,635.7	803.85	803.78	-0.07	805.85	805.93	0.08	2.00	2.15	0.15	806.85	806.93	806.97	0.04	1.00	1.04	0.04	Grid
1140	542,673.9	2,124,685.6	803.60	803.51	-0.09	805.60	805.65	0.04	2.00	2.14	0.14	806.60	806.65	806.69	0.04	1.00	1.04	0.04	Grid
1141	542,676.8	2,124,735.6	803.35	803.30	-0.06	805.35	805.37	0.02	2.00	2.08	0.08	806.35	806.37	806.41	0.04	1.00	1.04	0.04	Grid
1142	542,679.8	2,124,785.5	803.10	803.05	-0.05	805.10	805.18	0.07	2.00	2.12	0.12	806.10	806.18	806.19	0.02	1.00	1.02	0.02	Grid
1143	542,682.7	2,124,835.4	802.86	802.82	-0.04	804.86	804.93	0.07	2.00	2.11	0.11	805.86	805.93	805.96	0.03	1.00	1.03	0.03	Grid
1144	542,685.7	2,124,885.3	802.61	802.59	-0.02	804.61	804.69	0.08	2.00	2.10	0.10	805.61	805.69	805.75	0.05	1.00	1.05	0.05	Grid
1145	542,688.6	2,124,935.2	802.36	802.29	-0.07	804.36	804.36	0.00	2.00	2.08	0.08	805.36	805.36	805.42	0.06	1.00	1.06	0.06	Grid
1146	542,691.6	2,124,985.1	802.11	802.01	-0.10	804.11	804.12	0.01	2.00	2.11	0.11	805.11	805.12	805.22	0.09	1.00	1.09	0.09	Grid
1147	542,694.5	2,125,035.0	801.86	801.77	-0.09	803.86	803.87	0.01	2.00	2.10	0.10	804.86	804.87	804.90	0.03	1.00	1.03	0.03	Grid
1148	542,696.4	2,125,067.3	801.70	801.62	-0.08	803.70	803.80	0.10	2.00	2.17	0.17	804.70	804.80	804.90	0.10	1.00	1.10	0.10	Toe of Slope
1149	542,698.1	2,125,095.4	811.09	811.06	-0.03	813.09	813.09	0.00	2.00	2.03	0.03	814.09	814.09	814.18	0.09	1.00	1.09	0.09	Top of Slope
1150	542,706.0	2,124,534.1	803.52	803.50	-0.03	805.52	805.53	0.00	2.00	2.03	0.03	806.52	806.53	806.60	0.08	1.00	1.08	0.08	Grid
1151	542,708.9	2,124,583.4	803.28	803.22	-0.06	805.28	805.31	0.03	2.00	2.09	0.09	806.28	806.31	806.40	0.09	1.00	1.09	0.09	Grid
1152	542,711.9	2,124,633.3	803.03	802.96	-0.07	805.03	805.09	0.06	2.00	2.13	0.13	806.03	806.09	806.14	0.05	1.00	1.05	0.05	Grid
1153	542,714.8	2,124,683.2	802.78	802.70	-0.08	804.78	804.87	0.09	2.00	2.17	0.17	805.78	805.87	805.88	0.01	1.00	1.01	0.01	Grid
1154	542,717.8	2,124,733.1	802.53	802.49	-0.04	804.53	804.56	0.03	2.00	2.07	0.07	805.53	805.56	805.59	0.03	1.00	1.03	0.03	Grid
1155	542,720.7	2,124,783.0	802.28	802.23	-0.05	804.28	804.37	0.09	2.00	2.14	0.14	805.28	805.37	805.40	0.03	1.00	1.03	0.03	Grid
1156	542,723.7	2,124,833.0	802.04	801.98	-0.05	804.04	804.12	0.08	2.00	2.13	0.13	805.04	805.12	805.15	0.03	1.00	1.03	0.03	Grid
1157	542,726.6	2,124,882.9	801.79	801.73	-0.06	803.79	803.83	0.05	2.00	2.10	0.10	804.79	804.83	804.87	0.04	1.00	1.04	0.04	Grid
1158	542,729.6	2,124,932.8	801.54	801.53	-0.01	803.54	803.62	0.08	2.00	2.09	0.09	804.54	804.62	804.66	0.04	1.00	1.04	0.04	Grid
1159	542,732.5	2,124,982.7	801.29	801.21	-0.09	803.29	803.35	0.06	2.00	2.14	0.14	804.29	804.35	804.40	0.05	1.00	1.05	0.05	Grid
1160	542,735.4	2,125,032.6	801.04	800.98	-0.06	803.04	803.10	0.06	2.00	2.12	0.12	804.04	804.10	804.18	0.08	1.00	1.08	0.08	Grid
1161	542,737.3	2,125,063.7	800.89	800.79	-0.10	802.89	802.98	0.09	2.00	2.19	0.19	803.89	803.98	804.05	0.07	1.00	1.07	0.07	Toe of Slope
1162	542,739.1	2,125,094.9	811.31	811.21	-0.09	813.31	813.35	0.04	2.00	2.14	0.14	814.31	814.35	814.35	0.00	1.00	1.00	0.00	Top of Slope

Table 3a - Clay Liner Subbase, Base, and Leachate Drainage Layer Grades
Modules 10 and 11 Liner Construction
Columbia Dry Ash Disposal Facility

Documentation Point Number	Location		Subbase Elevation			Base Grade Elevation			Clay Liner Thickness			Leachate Drainage Layer Elevation				Leachate Drainage Layer Thickness			Comments
	Northing	Easting	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Adjusted Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	
1163	542,758.5	2,125,020.0	800.62	800.61	-0.01	802.62	802.66	0.04	2.00	2.05	0.05	803.62	803.66	803.68	0.02	1.00	1.02	0.02	Leachate Sump
1164	542,761.8	2,125,061.6	800.40	800.38	-0.02	802.40	802.50	0.10	2.00	2.12	0.12	803.40	803.50	803.59	0.10	1.00	1.10	0.10	Toe of Slope and Sump
1165	542,747.6	2,124,531.5	802.69	802.64	-0.05	804.69	804.77	0.08	2.00	2.12	0.12	805.69	805.77	805.84	0.07	1.00	1.07	0.07	Leachate Trench - Top
1166	542,750.6	2,124,580.9	802.44	802.35	-0.10	804.44	804.47	0.03	2.00	2.12	0.12	805.44	805.47	805.56	0.09	1.00	1.09	0.09	Leachate Trench - Top
1167	542,753.7	2,124,630.8	802.19	802.19	0.00	804.19	804.22	0.03	2.00	2.03	0.03	805.19	805.22	805.31	0.10	1.00	1.10	0.10	Leachate Trench - Top
1168	542,756.8	2,124,680.7	801.94	801.91	-0.03	803.94	803.99	0.05	2.00	2.08	0.08	804.94	804.99	805.09	0.10	1.00	1.10	0.10	Leachate Trench - Top
1169	542,759.8	2,124,730.7	801.69	801.65	-0.03	803.69	803.70	0.02	2.00	2.05	0.05	804.69	804.70	804.80	0.09	1.00	1.09	0.09	Leachate Trench - Top
1170	542,762.9	2,124,780.6	801.44	801.39	-0.05	803.44	803.45	0.02	2.00	2.07	0.07	804.44	804.45	804.52	0.07	1.00	1.07	0.07	Leachate Trench - Top
1171	542,766.0	2,124,830.5	801.19	801.13	-0.06	803.19	803.21	0.02	2.00	2.08	0.08	804.19	804.21	804.27	0.06	1.00	1.06	0.06	Leachate Trench - Top
1172	542,769.1	2,124,880.4	800.94	800.84	-0.10	802.94	802.94	0.01	2.00	2.10	0.10	803.94	803.94	803.99	0.05	1.00	1.05	0.05	Leachate Trench - Top
1173	542,772.1	2,124,930.3	800.69	800.67	-0.02	802.69	802.72	0.03	2.00	2.05	0.05	803.69	803.72	803.79	0.07	1.00	1.07	0.07	Leachate Trench - Top
1174	542,775.2	2,124,980.2	800.43	800.36	-0.07	802.43	802.48	0.04	2.00	2.11	0.11	803.43	803.48	803.57	0.09	1.00	1.09	0.09	Leachate Trench - Top
1175	542,777.7	2,125,020.0	800.23	800.18	-0.06	802.23	802.28	0.05	2.00	2.11	0.11	803.23	803.28	803.38	0.10	1.00	1.10	0.10	Leachate Trench - Top
1176	542,773.2	2,125,033.0	796.00	796.00	0.00	798.00	798.05	0.05	2.00	2.05	0.05	799.00	799.05			1.00			Leachate Sump
1177	542,774.2	2,125,048.0	796.00	795.98	-0.02	798.00	798.02	0.02	2.00	2.04	0.04	799.00	799.02			1.00			Leachate Sump
1178	542,784.9	2,125,059.5	799.94	799.92	-0.02	801.94	801.96	0.02	2.00	2.04	0.04	802.94	802.96	806.00	3.04	1.00	4.04	3.04	Leachate Sump
1179	542,786.5	2,125,094.3	811.56	811.52	-0.04	813.56	813.59	0.03	2.00	2.07	0.07	814.56	814.59	814.68	0.09	1.00	1.09	0.09	Top of Slope
1180	542,757.1	2,124,530.9	802.69	802.69	0.00	804.69	804.72	0.03	2.00	2.04	0.04	805.69	805.72	805.81	0.09	1.00	1.09	0.09	Leachate Trench - Top
1181	542,760.2	2,124,580.4	802.44	802.35	-0.09	804.44	804.49	0.05	2.00	2.14	0.14	805.44	805.49	805.59	0.10	1.00	1.10	0.10	Leachate Trench - Top
1182	542,763.3	2,124,630.3	802.19	802.14	-0.05	804.19	804.19	0.00	2.00	2.05	0.05	805.19	805.19	805.22	0.03	1.00	1.03	0.03	Leachate Trench - Top
1183	542,766.3	2,124,680.2	801.94	801.91	-0.03	803.94	803.96	0.02	2.00	2.05	0.05	804.94	804.96	805.04	0.08	1.00	1.08	0.08	Leachate Trench - Top
1184	542,769.4	2,124,730.1	801.69	801.67	-0.02	803.69	803.72	0.03	2.00	2.05	0.05	804.69	804.72	804.81	0.09	1.00	1.09	0.09	Leachate Trench - Top
1185	542,772.5	2,124,780.0	801.44	801.37	-0.06	803.44	803.44	0.01	2.00	2.07	0.07	804.44	804.44	804.47	0.03	1.00	1.03	0.03	Leachate Trench - Top
1186	542,775.5	2,124,829.9	801.19	801.12	-0.07	803.19	803.20	0.01	2.00	2.08	0.08	804.19	804.20	804.27	0.07	1.00	1.07	0.07	Leachate Trench - Top
1187	542,778.6	2,124,879.8	800.94	800.90	-0.03	802.94	802.95	0.02	2.00	2.05	0.05	803.94	803.95	803.98	0.03	1.00	1.03	0.03	Leachate Trench - Top
1188	542,781.7	2,124,929.7	800.69	800.60	-0.08	802.69	802.69	0.01	2.00	2.09	0.09	803.69	803.69	803.77	0.08	1.00	1.08	0.08	Leachate Trench - Top
1189	542,784.8	2,124,979.6	800.43	800.36	-0.07	802.43	802.45	0.02	2.00	2.09	0.09	803.43	803.45	803.52	0.07	1.00	1.07	0.07	Leachate Trench - Top
1190	542,787.2	2,125,019.4	800.23	800.20	-0.03	802.23	802.26	0.02	2.00	2.05	0.05	803.23	803.26	803.35	0.09	1.00	1.09	0.09	Leachate Trench - Top
1191	542,788.2	2,125,032.1	796.00	795.99	-0.01	798.00	798.01	0.01	2.00	2.01	0.01	799.00	799.01			1.00			Leachate Sump
1192	542,789.2	2,125,047.6	796.00	795.97	-0.03	798.00	798.08	0.08	2.00	2.11	0.11	799.00	799.08			1.00			Leachate Sump
1193	542,800.9	2,125,017.8	800.51	800.48	-0.03	802.51	802.53	0.02	2.00	2.05	0.05	803.51	803.53	803.61	0.08	1.00	1.08	0.08	Leachate Sump
1194	542,802.8	2,125,060.1	800.29	800.25	-0.04	802.29	802.38	0.10	2.00	2.13	0.13	803.29	803.38	803.47	0.09	1.00	1.09	0.09	Toe of Slope and Sump
1195	542,794.2	2,124,528.6	803.42	803.38	-0.04	805.42	805.43	0.01	2.00	2.05	0.05	806.42	806.43	806.52	0.09	1.00	1.09	0.09	Grid
1196	542,797.1	2,124,578.2	803.18	803.16	-0.02	805.18	805.22	0.03	2.00	2.05	0.05	806.18	806.22	806.31	0.09	1.00	1.09	0.09	Grid
1197	542,800.1	2,124,628.1	802.93	802.85	-0.08	804.93	804.94	0.01	2.00	2.09	0.09	805.93	805.94	806.01	0.07	1.00	1.07	0.07	Grid
1198	542,803.0	2,124,678.0	802.67	802.58	-0.09	804.67	804.76	0.08	2.00	2.17	0.17	805.67	805.76	805.80	0.04	1.00	1.04	0.04	Grid
1199	542,806.0	2,124,727.9	802.42	802.33	-0.09	804.42	804.43	0.01	2.00	2.11	0.11	805.42	805.43	805.50	0.07	1.00	1.07	0.07	Grid
1200	542,808.9	2,124,777.8	802.17	802.10	-0.07	804.17	804.25	0.08	2.00	2.15	0.15	805.17	805.25	805.26	0.01	1.00	1.01	0.01	Grid
1201	542,811.9	2,124,827.8	801.91	801.84	-0.07	803.91	803.94	0.03	2.00	2.10	0.10	804.91	804.94	805.01	0.07	1.00	1.07	0.07	Grid
1202	542,814.8	2,124,877.7	801.66	801.58	-0.08	803.66	803.71	0.05	2.00	2.13	0.13	804.66	804.71	804.75	0.04	1.00	1.04	0.04	Grid
1203	542,817.8	2,124,927.6	801.41	801.39	-0.02	803.41	803.51	0.10	2.00	2.12	0.12	804.41	804.51	804.54	0.03	1.00	1.03	0.03	Grid
1204	542,820.7	2,124,977.5	801.15	801.12	-0.03	803.15	803.17	0.01	2.00	2.05	0.05	804.15	804.17	804.18	0.01	1.00	1.01	0.01	Grid
1205	542,823.6	2,125,027.4	800.90	800.89	-0.02	802.90	802.93	0.02	2.00	2.04	0.04	803.90	803.93	803.96	0.04	1.00	1.04	0.04	Grid
1206	542,825.6	2,125,060.7	800.73	800.70	-0.03	802.73	802.77	0.04	2.00	2.07	0.07	803.73	803.77	803.87	0.09	1.00	1.09	0.09	Toe of Slope
1207	542,827.6	2,125,093.8	811.78	811.72	-0.06	813.78	813.81	0.03	2.00	2.09	0.09	814.78	814.81	814.89	0.08	1.00	1.08	0.08	Top of Slope
1208	542,835.1	2,124,526.1	804.22	804.16	-0.06	806.22	806.22	0.01	2.00	2.07	0.07	807.22	807.22	807.27	0.04	1.00	1.04	0.04	Grid
1209	542,838.1	2,124,575.8	804.00	803.95	-0.05	806.00	806.03	0.03	2.00	2.08	0.08	807.00	807.03	807.10	0.07	1.00	1.07	0.07	Grid
1210	542,841.0	2,124,625.7	803.75	803.67	-0.08	805.75	805.78	0.03	2.00	2.11	0.11	806.75	806.78	806.80	0.02	1.00	1.02	0.02	Grid
1211	542,844.0	2,124,675.6	803.49	803.40	-0.09	805.49	805.52	0.03	2.00	2.12	0.12	806.49	806.52	806.55	0.02	1.00	1.02	0.02	Grid
1212	542,846.9	2,124,725.5	803.24	803.17	-0.07	805.24	805.26	0.02	2.00	2.09	0.09	806.24	806.26	806.36	0.10	1.00	1.10	0.10	Grid
1213	542,849.8	2,124,775.4	802.99	802.94	-0.05	804.99	805.03	0.04	2.00	2.09	0.09	805.99	806.03	806.11	0.09	1.00	1.09	0.09	Grid
1214	542,852.8	2,124,825.3	802.73	802.68	-0.06	804.73	804.79	0.06	2.00	2.12	0.12	805.73	805.79	805.82	0.03	1.00	1.03	0.03	Grid
1215	542,855.7	2,124,875.3	802.48	802.42	-0.06	804.48	804.58	0.10	2.00	2.16	0.16	805.48	805.58	805.60	0.02	1.00	1.02	0.02	Grid
1216	542,858.7	2,124,925.2	802.23	802.16	-0.07	804.23	804.26	0.03	2.00	2.11	0.11	805.23	805.26	805.29	0.03	1.00	1.03	0.03	Grid

Table 3a - Clay Liner Subbase, Base, and Leachate Drainage Layer Grades
Modules 10 and 11 Liner Construction
Columbia Dry Ash Disposal Facility

Documentation Point Number	Location		Subbase Elevation			Base Grade Elevation			Clay Liner Thickness			Leachate Drainage Layer Elevation				Leachate Drainage Layer Thickness			Comments
	Northing	Easting	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Adjusted Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	
1217	542,861.6	2,124,975.1	801.97	801.96	-0.02	803.97	804.02	0.04	2.00	2.06	0.06	804.97	805.02	805.03	0.01	1.00	1.01	0.01	Grid
1218	542,864.6	2,125,025.0	801.72	801.66	-0.06	803.72	803.74	0.01	2.00	2.08	0.08	804.72	804.74	804.82	0.09	1.00	1.09	0.09	Grid
1219	542,866.8	2,125,062.0	801.53	801.53	0.00	803.53	803.63	0.10	2.00	2.10	0.10	804.53	804.63	804.70	0.07	1.00	1.07	0.07	Toe of Slope
1220	542,868.6	2,125,093.3	812.00	811.94	-0.06	814.00	814.02	0.02	2.00	2.08	0.08	815.00	815.02	815.11	0.10	1.00	1.10	0.10	Top of Slope
1221	542,880.0	2,124,523.4	805.15	805.10	-0.05	807.15	807.24	0.08	2.00	2.13	0.13	808.15	808.24	808.25	0.02	1.00	1.02	0.02	Toe of Slope
1222	542,882.7	2,124,573.1	804.89	804.84	-0.05	806.89	806.92	0.02	2.00	2.08	0.08	807.89	807.92	807.98	0.06	1.00	1.06	0.06	Toe of Slope
1223	542,885.5	2,124,623.1	804.64	804.60	-0.04	806.64	806.68	0.04	2.00	2.08	0.08	807.64	807.68	807.77	0.09	1.00	1.09	0.09	Toe of Slope
1224	542,888.2	2,124,673.0	804.38	804.33	-0.05	806.38	806.43	0.05	2.00	2.10	0.10	807.38	807.43	807.51	0.08	1.00	1.08	0.08	Toe of Slope
1225	542,890.9	2,124,722.9	804.12	804.06	-0.06	806.12	806.16	0.03	2.00	2.09	0.09	807.12	807.16	807.25	0.10	1.00	1.10	0.10	Toe of Slope
1226	542,893.7	2,124,772.8	803.86	803.77	-0.09	805.86	805.93	0.07	2.00	2.16	0.16	806.86	806.93	807.02	0.09	1.00	1.09	0.09	Toe of Slope
1227	542,896.4	2,124,822.8	803.61	803.54	-0.07	805.61	805.64	0.04	2.00	2.10	0.10	806.61	806.64	806.74	0.09	1.00	1.09	0.09	Toe of Slope
1228	542,899.1	2,124,872.7	803.35	803.26	-0.09	805.35	805.38	0.03	2.00	2.12	0.12	806.35	806.38	806.47	0.10	1.00	1.10	0.10	Toe of Slope
1229	542,901.9	2,124,922.6	803.09	803.00	-0.09	805.09	805.15	0.06	2.00	2.15	0.15	806.09	806.15	806.21	0.06	1.00	1.06	0.06	Toe of Slope
1230	542,904.6	2,124,972.5	802.83	802.76	-0.07	804.83	804.84	0.01	2.00	2.08	0.08	805.83	805.84	805.92	0.08	1.00	1.08	0.08	Toe of Slope
1231	542,907.3	2,125,022.5	802.58	802.51	-0.06	804.58	804.67	0.09	2.00	2.16	0.16	805.58	805.67	805.69	0.02	1.00	1.02	0.02	Toe of Slope
1232	542,909.6	2,125,063.3	802.37	802.31	-0.06	804.37	804.39	0.02	2.00	2.08	0.08	805.37	805.39	805.48	0.09	1.00	1.09	0.09	Toe of Slope
1233	542,912.1	2,125,092.8	812.23	812.21	-0.01	814.23	814.23	0.01	2.00	2.02	0.02	815.23	815.23	815.25	0.01	1.00	1.01	0.01	Top of Slope
1234	542,887.5	2,124,522.9	805.29	805.22	-0.07	807.29	807.35	0.06	2.00	2.13	0.13	808.29	808.35	808.41	0.06	1.00	1.06	0.06	Mod 12 Runout
1235	542,887.9	2,124,529.9	807.62	807.55	-0.07	809.62	809.71	0.09	2.00	2.16	0.16	810.62	810.71	810.78	0.07	1.00	1.07	0.07	Top of Slope
1236	542,890.2	2,124,572.7	807.40	807.35	-0.05	809.40	809.42	0.02	2.00	2.07	0.07	810.40	810.42	810.47	0.05	1.00	1.05	0.05	Top of Slope
1237	542,893.0	2,124,622.6	807.14	807.10	-0.04	809.14	809.14	0.01	2.00	2.04	0.04	810.14	810.14	810.22	0.07	1.00	1.07	0.07	Top of Slope
1238	542,895.7	2,124,672.5	806.88	806.88	0.00	808.88	808.93	0.05	2.00	2.05	0.05	809.88	809.93	810.01	0.08	1.00	1.08	0.08	Top of Slope
1239	542,898.4	2,124,722.5	806.62	806.53	-0.09	808.62	808.65	0.03	2.00	2.12	0.12	809.62	809.65	809.66	0.01	1.00	1.01	0.01	Top of Slope
1240	542,901.2	2,124,772.4	806.36	806.28	-0.09	808.36	808.38	0.01	2.00	2.10	0.10	809.36	809.38	809.42	0.04	1.00	1.04	0.04	Top of Slope
1241	542,903.9	2,124,822.3	806.11	806.01	-0.10	808.11	808.12	0.01	2.00	2.11	0.11	809.11	809.12	809.19	0.07	1.00	1.07	0.07	Top of Slope
1242	542,906.6	2,124,872.3	805.85	805.80	-0.05	807.85	807.86	0.01	2.00	2.06	0.06	808.85	808.86	808.89	0.03	1.00	1.03	0.03	Top of Slope
1243	542,909.4	2,124,922.2	805.59	805.57	-0.02	807.59	807.60	0.01	2.00	2.03	0.03	808.59	808.60	808.61	0.01	1.00	1.01	0.01	Top of Slope
1244	542,912.1	2,124,972.1	805.33	805.31	-0.02	807.33	807.35	0.01	2.00	2.04	0.04	808.33	808.35	808.35	0.01	1.00	1.01	0.01	Top of Slope
1245	542,914.8	2,125,022.0	805.08	805.01	-0.07	807.08	807.11	0.03	2.00	2.10	0.10	808.08	808.11	808.15	0.04	1.00	1.04	0.04	Top of Slope
1246	542,917.5	2,125,070.4	804.83	804.80	-0.03	806.83	806.91	0.08	2.00	2.11	0.11	807.83	807.91	808.00	0.09	1.00	1.09	0.09	Top of Slope
1247	542,918.7	2,125,092.7	812.26	812.25	-0.01	814.26	814.33	0.07	2.00	2.07	0.07	815.26	815.33	815.36	0.03	1.00	1.03	0.03	Top of Slope
1248	542,892.5	2,124,522.6	805.38	805.36	-0.02	807.38	807.47	0.09	2.00	2.11	0.11	808.38	808.47			1.00			Geomembrane Limit
1249	542,892.8	2,124,528.4	807.52	807.44	-0.08	809.52	809.61	0.09	2.00	2.17	0.17	810.52	810.61			1.00			Geomembrane Limit
1250	542,895.2	2,124,572.4	807.30	807.25	-0.05	809.30	809.38	0.08	2.00	2.13	0.13	810.30	810.38			1.00			Geomembrane Limit
1251	542,898.0	2,124,622.3	807.04	807.00	-0.04	809.04	809.11	0.07	2.00	2.11	0.11	810.04	810.11			1.00			Geomembrane Limit
1252	542,900.7	2,124,672.3	806.78	806.74	-0.04	808.78	808.82	0.04	2.00	2.09	0.09	809.78	809.82			1.00			Geomembrane Limit
1253	542,903.4	2,124,722.2	806.52	806.45	-0.07	808.52	808.53	0.01	2.00	2.08	0.08	809.52	809.53			1.00			Geomembrane Limit
1254	542,906.2	2,124,772.1	806.26	806.19	-0.08	808.26	808.29	0.03	2.00	2.10	0.10	809.26	809.29			1.00			Geomembrane Limit
1255	542,908.9	2,124,822.0	806.01	805.96	-0.05	808.01	808.02	0.01	2.00	2.06	0.06	809.01	809.02			1.00			Geomembrane Limit
1256	542,911.6	2,124,872.0	805.75	805.68	-0.07	807.75	807.76	0.01	2.00	2.08	0.08	808.75	808.76			1.00			Geomembrane Limit
1257	542,914.4	2,124,921.9	805.49	805.39	-0.10	807.49	807.50	0.00	2.00	2.10	0.10	808.49	808.50			1.00			Geomembrane Limit
1258	542,917.1	2,124,971.8	805.23	805.20	-0.04	807.23	807.27	0.03	2.00	2.07	0.07	808.23	808.27			1.00			Geomembrane Limit
1259	542,919.8	2,125,021.7	804.98	804.89	-0.09	806.98	806.99	0.01	2.00	2.10	0.10	807.98	807.99			1.00			Geomembrane Limit
1260	542,922.5	2,125,070.0	804.73	804.66	-0.07	806.73	806.83	0.10	2.00	2.17	0.17	807.73	807.83			1.00			Geomembrane Limit
1261	542,923.7	2,125,092.7	812.29	812.29	0.00	814.29	814.31	0.02	2.00	2.03	0.03	815.29	815.31			1.00			Geomembrane Limit
1262	542,900.0	2,124,522.1	806.08	806.02	-0.06	808.08	808.16	0.08	2.00	2.14	0.14	809.08	809.16			1.00			Mod 12 Clay Runout
1263	542,900.2	2,124,526.2	807.38	807.31	-0.07	809.38	809.42	0.04	2.00	2.12	0.12	810.38	810.42			1.00			Mod 12 Clay Runout
1264	542,902.7	2,124,572.0	807.15	807.11	-0.03	809.15	809.16	0.01	2.00	2.04	0.04	810.15	810.16			1.00			Mod 12 Clay Runout
1265	542,905.4	2,124,621.9	806.89	806.88	-0.01	808.89	808.91	0.02	2.00	2.03	0.03	809.89	809.91			1.00			Mod 12 Clay Runout
1266	542,908.2	2,124,671.8	806.63	806.60	-0.03	808.63	808.71	0.08	2.00	2.11	0.11	809.63	809.71			1.00			Mod 12 Clay Runout
1267	542,910.9	2,124,721.7	806.37	806.34	-0.03	808.37	808.41	0.03	2.00	2.06	0.06	809.37	809.41			1.00			Mod 12 Clay Runout
1268	542,913.6	2,124,771.7	806.12	806.07	-0.04	808.12	808.13	0.02	2.00	2.06	0.06	809.12	809.13			1.00			Mod 12 Clay Runout
1269	542,916.4	2,124,821.6	805.86	805.81	-0.05	807.86	807.96	0.10	2.00	2.15	0.15	808.86	808.96			1.00			Mod 12 Clay Runout
1270	542,919.1	2,124,871.5	805.60	805.57	-0.03	807.60	807.64	0.04	2.00	2.07	0.07	808.60	808.64			1.00			Mod 12 Clay Runout

Table 3a - Clay Liner Subbase, Base, and Leachate Drainage Layer Grades
Modules 10 and 11 Liner Construction
Columbia Dry Ash Disposal Facility

Documentation Point Number	Location		Subbase Elevation			Base Grade Elevation			Clay Liner Thickness			Leachate Drainage Layer Elevation				Leachate Drainage Layer Thickness			Comments
	Northing	Easting	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Adjusted Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	
1271	542,921.8	2,124,921.4	805.34	805.29	-0.05	807.34	807.38	0.03	2.00	2.08	0.08	808.34	808.38			1.00			Mod 12 Clay Runout
1272	542,924.6	2,124,971.4	805.08	805.08	-0.01	807.08	807.13	0.05	2.00	2.05	0.05	808.08	808.13			1.00			Mod 12 Clay Runout
1273	542,927.3	2,125,021.3	804.83	804.73	-0.10	806.83	806.87	0.04	2.00	2.14	0.14	807.83	807.87			1.00			Mod 12 Clay Runout
1274	542,929.9	2,125,069.3	804.58	804.50	-0.08	806.58	806.67	0.09	2.00	2.17	0.17	807.58	807.67			1.00			Mod 12 Clay Runout
1275	542,931.2	2,125,092.6	812.33	812.28	-0.05	814.33	814.35	0.02	2.00	2.07	0.07	815.33	815.35			1.00			Top of Slope
1276	542,396.4	2,125,102.1	809.48	809.35	-0.13	811.48	811.49	0.00	2.00	2.14	0.14								3 ft. Clay Runout
1277	542,422.1	2,125,101.8	809.62	809.46	-0.16	811.62	811.65	0.02	2.00	2.19	0.19								3 ft. Clay Runout
1278	542,459.7	2,125,101.4	809.82	809.75	-0.07	811.82	811.83	0.01	2.00	2.08	0.08								3 ft. Clay Runout
1279	542,497.2	2,125,100.9	810.02	809.95	-0.07	812.02	812.06	0.04	2.00	2.11	0.11								3 ft. Clay Runout
1280	542,536.4	2,125,100.4	810.23	810.21	-0.02	812.23	812.25	0.03	2.00	2.05	0.05								3 ft. Clay Runout
1281	542,576.4	2,125,099.9	810.44	810.41	-0.03	812.44	812.45	0.01	2.00	2.04	0.04								3 ft. Clay Runout
1282	542,616.5	2,125,099.4	810.65	810.58	-0.08	812.65	812.67	0.02	2.00	2.10	0.10								3 ft. Clay Runout
1283	542,651.9	2,125,099.0	810.84	810.78	-0.07	812.84	812.88	0.04	2.00	2.11	0.11								3 ft. Clay Runout
1284	542,657.2	2,125,098.9	810.87	810.79	-0.08	812.87	812.90	0.03	2.00	2.11	0.11								3 ft. Clay Runout
1285	542,698.3	2,125,098.4	811.09	811.05	-0.04	813.09	813.10	0.01	2.00	2.04	0.04								3 ft. Clay Runout
1286	542,739.3	2,125,097.9	811.31	811.21	-0.09	813.31	813.34	0.03	2.00	2.13	0.13								3 ft. Clay Runout
1287	542,786.7	2,125,097.3	811.56	811.50	-0.06	813.56	813.57	0.01	2.00	2.07	0.07								3 ft. Clay Runout
1288	542,827.7	2,125,096.8	811.78	811.76	-0.01	813.78	813.78	0.00	2.00	2.02	0.02								3 ft. Clay Runout
1289	542,868.8	2,125,096.3	812.00	811.99	-0.01	814.00	814.02	0.02	2.00	2.03	0.03								3 ft. Clay Runout
1290	542,912.3	2,125,095.8	812.23	812.17	-0.06	814.23	814.23	0.00	2.00	2.06	0.06								3 ft. Clay Runout
1291	542,918.9	2,125,095.7	812.26	812.18	-0.08	814.26	814.27	0.00	2.00	2.09	0.09								3 ft. Clay Runout
1292	542,923.9	2,125,095.7	812.29	812.29	0.00	814.29	814.29	0.00	2.00	2.01	0.01								3 ft. Clay Runout
1293	542,931.4	2,125,095.6	812.33	812.31	-0.02	814.33	814.35	0.02	2.00	2.04	0.04								3 ft. Clay Runout
1294	542,373.2	2,124,557.2	803.62	803.59	-0.03	805.62	805.64	0.02	2.00	2.05	0.05								3 ft. Clay Runout
1295	542,360.1	2,124,558.2	802.05	802.00	-0.05	804.92	804.94	0.01	2.88	2.94	0.06								3 ft. Clay Runout
1296	542,361.8	2,124,586.2	812.15	812.13	-0.03	814.15	814.16	0.01	2.00	2.03	0.03								3 ft. Clay Runout
1297	542,362.8	2,124,603.8	812.06	811.98	-0.08	814.06	814.15	0.09	2.00	2.17	0.17								3 ft. Clay Runout
1298	542,365.9	2,124,653.7	811.80	811.71	-0.09	813.80	813.84	0.04	2.00	2.13	0.13								3 ft. Clay Runout
1299	542,369.0	2,124,703.6	811.54	811.49	-0.06	813.54	813.58	0.04	2.00	2.09	0.09								3 ft. Clay Runout
1300	542,372.0	2,124,753.5	811.28	811.21	-0.07	813.28	813.30	0.02	2.00	2.09	0.09								3 ft. Clay Runout
1301	542,375.1	2,124,803.4	811.02	810.97	-0.05	813.02	813.07	0.05	2.00	2.09	0.09								3 ft. Clay Runout
1302	542,378.1	2,124,853.3	810.76	810.75	-0.01	812.76	812.78	0.02	2.00	2.03	0.03								3 ft. Clay Runout
1303	542,381.2	2,124,903.3	810.50	810.45	-0.05	812.50	812.51	0.01	2.00	2.06	0.06								3 ft. Clay Runout
1304	542,384.2	2,124,953.2	810.24	810.22	-0.02	812.24	812.32	0.08	2.00	2.10	0.10								3 ft. Clay Runout
1305	542,387.3	2,125,003.1	809.98	809.95	-0.03	811.98	812.08	0.09	2.00	2.13	0.13								3 ft. Clay Runout
1306	542,390.4	2,125,053.0	809.72	809.68	-0.05	811.72	811.81	0.08	2.00	2.13	0.13								3 ft. Clay Runout
1307	542,393.2	2,125,099.3	809.48	809.44	-0.04	811.48	811.56	0.08	2.00	2.12	0.12								3 ft. Clay Runout
1308	542,393.4	2,125,102.2	809.48	809.34	-0.15	811.48	811.54	0.06	2.00	2.20	0.20								3 ft. Clay Runout

Created by: ZB
Updated by: ZB, 12/19/22
Checked /Revised by: PEG, 1/10/23

Table 3b - Leachate Collection System Grades
Modules 10 and 11 Liner Construction
Columbia Dry Ash Disposal Facility

Documentation Point No.	Location		Subbase Elevation			Base Grade Elevation			Clay Liner Thickness			Leachate Collection Pipe Top of Pipe Elevation				Leachate Collection Pipe Bottom of Pipe Elevation			Bedding Below Pipe Thickness		
	Northing	Easting	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Adjusted Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Adjusted Design (ft)	Actual (ft)	Design (ft)	Actual (ft)	Delta (ft)
Mod 10 Leachate Collection Line East-West (South)																					
2001	542,495.0	2,124,548.5	799.70	799.68	-0.03	801.70	801.76	0.05	2.00	2.08	0.08	802.76	802.81	802.84	0.03	802.20	802.26	802.29	0.50	0.53	0.03
2002	542,497.0	2,124,570.9	799.59	799.51	-0.08	801.59	801.69	0.09	2.00	2.18	0.18	802.64	802.74	802.76	0.02	802.09	802.19	802.21	0.50	0.52	0.02
2003	542,499.1	2,124,595.8	799.47	799.44	-0.03	801.47	801.56	0.10	2.00	2.12	0.12	802.52	802.62	802.63	0.01	801.97	802.06	802.07	0.50	0.51	0.01
2004	542,501.2	2,124,620.7	799.34	799.33	-0.02	801.34	801.43	0.08	2.00	2.10	0.10	802.40	802.48	802.43	-0.05	801.84	801.93	801.88	0.50	0.45	-0.05
2005	542,503.3	2,124,645.6	799.22	799.13	-0.09	801.22	801.31	0.09	2.00	2.18	0.18	802.27	802.37	802.33	-0.04	801.72	801.81	801.77	0.50	0.46	-0.04
2006	542,505.5	2,124,670.5	799.09	799.04	-0.05	801.09	801.19	0.10	2.00	2.15	0.15	802.15	802.25	802.26	0.02	801.59	801.69	801.71	0.50	0.52	0.02
2007	542,507.6	2,124,695.5	798.97	798.92	-0.05	800.97	801.05	0.07	2.00	2.12	0.12	802.02	802.10	802.14	0.04	801.47	801.55	801.58	0.50	0.54	0.04
2008	542,509.7	2,124,720.4	798.85	798.78	-0.06	800.85	800.95	0.10	2.00	2.16	0.16	801.90	802.00	802.04	0.04	801.35	801.45	801.48	0.50	0.54	0.04
2009	542,511.8	2,124,745.3	798.72	798.72	0.00	800.72	800.79	0.07	2.00	2.07	0.07	801.77	801.84	801.89	0.05	801.22	801.29	801.34	0.50	0.55	0.05
2010	542,514.0	2,124,770.2	798.60	798.58	-0.02	800.60	800.68	0.09	2.00	2.11	0.11	801.65	801.74	801.75	0.01	801.10	801.18	801.20	0.50	0.51	0.01
2011	542,516.1	2,124,795.1	798.47	798.44	-0.04	800.47	800.57	0.10	2.00	2.13	0.13	801.52	801.62	801.64	0.02	800.97	801.07	801.08	0.50	0.52	0.02
2012	542,518.2	2,124,820.0	798.35	798.32	-0.03	800.35	800.45	0.10	2.00	2.12	0.12	801.40	801.50	801.51	0.01	800.85	800.95	800.96	0.50	0.51	0.01
2013	542,520.3	2,124,845.0	798.22	798.18	-0.05	800.22	800.32	0.09	2.00	2.14	0.14	801.28	801.37	801.41	0.04	800.72	800.82	800.86	0.50	0.54	0.04
2014	542,522.5	2,124,869.9	798.10	798.01	-0.09	800.10	800.20	0.10	2.00	2.19	0.19	801.15	801.25	801.24	-0.01	800.60	800.70	800.69	0.50	0.49	-0.01
2015	542,524.6	2,124,894.8	797.98	797.95	-0.03	799.98	800.02	0.05	2.00	2.08	0.08	801.03	801.08	801.10	0.03	800.48	800.52	800.55	0.50	0.53	0.03
2016	542,526.7	2,124,919.7	797.85	797.81	-0.04	799.85	799.94	0.09	2.00	2.14	0.14	800.90	800.99	801.01	0.01	800.35	800.44	800.45	0.50	0.51	0.01
2017	542,528.9	2,124,944.6	797.73	797.65	-0.07	799.73	799.82	0.10	2.00	2.17	0.17	800.78	800.88	800.90	0.02	800.23	800.32	800.35	0.50	0.52	0.02
2018	542,531.0	2,124,969.5	797.60	797.59	-0.01	799.60	799.67	0.07	2.00	2.09	0.09	800.65	800.73	800.73	0.00	800.10	800.17	800.18	0.50	0.50	0.00
2019	542,533.1	2,124,994.5	797.48	797.42	-0.05	799.48	799.57	0.09	2.00	2.14	0.14	800.53	800.62	800.66	0.04	799.98	800.07	800.11	0.50	0.54	0.04
2020	542,535.2	2,125,019.4	797.35	797.32	-0.03	799.35	799.45	0.09	2.00	2.12	0.12	800.41	800.50	800.55	0.05	799.85	799.95	799.99	0.50	0.55	0.05
2021	542,535.6	2,125,023.2	797.33	797.24	-0.09	799.33	799.35	0.02	2.00	2.11	0.11	800.39	800.40	800.45	0.05	799.83	799.85	799.90	0.50	0.55	0.05
Mod 11 Leachate Collection Line East-West (North)																					
2022	542,752.4	2,124,531.2	801.09	801.03	-0.07	803.09	803.17	0.08	2.00	2.15	0.15	804.15	804.23	804.26	0.04	803.59	803.67	803.71	0.50	0.54	0.04
2023	542,753.9	2,124,555.7	800.97	800.96	-0.01	802.97	803.06	0.09	2.00	2.10	0.10	804.02	804.11	804.08	-0.04	803.47	803.56	803.52	0.50	0.46	-0.04
2024	542,755.4	2,124,580.7	800.85	800.78	-0.06	802.85	802.87	0.03	2.00	2.09	0.09	803.90	803.93	803.95	0.02	803.35	803.37	803.39	0.50	0.52	0.02
2025	542,756.9	2,124,605.6	800.72	800.70	-0.02	802.72	802.81	0.09	2.00	2.12	0.12	803.77	803.87	803.82	-0.05	803.22	803.31	803.27	0.50	0.45	-0.05
2026	542,758.5	2,124,630.6	800.59	800.58	-0.02	802.59	802.66	0.06	2.00	2.08	0.08	803.65	803.71	803.66	-0.05	803.09	803.16	803.11	0.50	0.45	-0.05
2027	542,760.0	2,124,655.5	800.47	800.46	-0.01	802.47	802.55	0.08	2.00	2.09	0.09	803.52	803.60	803.60	-0.01	802.97	803.05	803.04	0.50	0.49	-0.01
2028	542,761.6	2,124,680.5	800.34	800.34	-0.01	802.34	802.42	0.08	2.00	2.08	0.08	803.40	803.47	803.51	0.03	802.84	802.92	802.95	0.50	0.53	0.03
2029	542,763.1	2,124,705.4	800.22	800.15	-0.06	802.22	802.30	0.08	2.00	2.15	0.15	803.27	803.35	803.35	0.00	802.72	802.80	802.80	0.50	0.50	0.00
2030	542,764.6	2,124,730.4	800.09	800.03	-0.06	802.09	802.18	0.09	2.00	2.15	0.15	803.14	803.23	803.27	0.03	802.59	802.68	802.71	0.50	0.53	0.03
2031	542,766.2	2,124,755.3	799.97	799.94	-0.03	801.97	802.07	0.10	2.00	2.13	0.13	803.02	803.12	803.13	0.01	802.47	802.57	802.57	0.50	0.51	0.01
2032	542,767.7	2,124,780.3	799.84	799.76	-0.08	801.84	801.93	0.08	2.00	2.17	0.17	802.89	802.98	802.97	-0.01	802.34	802.43	802.42	0.50	0.49	-0.01
2033	542,769.2	2,124,805.2	799.72	799.67	-0.05	801.72	801.79	0.07	2.00	2.12	0.12	802.77	802.84	802.80	-0.05	802.22	802.29	802.24	0.50	0.45	-0.05
2034	542,770.8	2,124,830.2	799.59	799.56	-0.03	801.59	801.66	0.07	2.00	2.11	0.11	802.64	802.72	802.72	0.00	802.09	802.16	802.16	0.50	0.50	0.00
2035	542,772.3	2,124,855.1	799.47	799.45	-0.02	801.47	801.56	0.09	2.00	2.11	0.11	802.52	802.61	802.65	0.03	801.97	802.06	802.09	0.50	0.53	0.03
2036	542,773.8	2,124,880.1	799.34	799.28	-0.06	801.34	801.44	0.10	2.00	2.16	0.16	802.39	802.49	802.52	0.03	801.84	801.94	801.97	0.50	0.53	0.03
2037	542,775.4	2,124,905.0	799.22	799.17	-0.04	801.22	801.31	0.09	2.00	2.13	0.13	802.27	802.36	802.37	0.01	801.72	801.81	801.82	0.50	0.51	0.01
2038	542,776.9	2,124,930.0	799.09	799.06	-0.03	801.09	801.19	0.10	2.00	2.13	0.13	802.14	802.24	802.22	-0.02	801.59	801.69	801.67	0.50	0.48	-0.02
2039	542,778.4	2,124,954.9	798.96	798.94	-0.02	800.96	801.06	0.09	2.00	2.12	0.12	802.02	802.11	802.12	0.01	801.46	801.56	801.57	0.50	0.51	0.01
2040	542,780.0	2,124,979.9	798.84	798.83	-0.01	800.84	800.86	0.02	2.00	2.03	0.03	801.89	801.91	801.93	0.01	801.34	801.36	801.37	0.50	0.51	0.01
2041	542,781.5	2,125,004.9	798.71	798.69	-0.02	800.71	800.80	0.09	2.00	2.11	0.11	801.77	801.86	801.85	0.00	801.21	801.30	801.30	0.50	0.50	0.00
2042	542,782.7	2,125,024.6	798.61	798.60	-0.01	800.61	800.63	0.02	2.00	2.03	0.03	801.67	801.68	801.73	0.05	801.11	801.13	801.18	0.50	0.55	0.05

Documentation Point No.	Top of Coarse Aggregate Bedding Elevation				Bedding Above Pipe Thickness			Drainage Filter Layer Elevation			Drainage Filter Thickness			Top of Leachate Drainage Layer Elevation			Leachate Drainage Layer Thickness			Comments
	Design (ft)	Adjusted Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Adjusted Design (ft)	Actual (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Adjusted Design (ft)	Actual (ft)	Design (ft)	Actual (ft)	Delta (ft)	
Mod 10 Leachate Collection Line East-West (South)																				
2001	803.76	803.84	803.94	0.09	1.00	1.09	0.09	804.76	804.94	804.98	1.00	1.05	0.05	805.76	805.98	805.99	1.00	1.01	0.01	Leachate Trench - Bottom
2002	803.64	803.76	803.84	0.07	1.00	1.07	0.07	804.64	804.84	804.87	1.00	1.03	0.03	805.64	805.87	805.95	1.00	1.08	0.08	Leachate Trench - Bottom
2003	803.52	803.63	803.66	0.03	1.00	1.03	0.03	804.52	804.66	804.67	1.00	1.01	0.01	805.52	805.67	805.76	1.00	1.10	0.10	Leachate Trench - Bottom
2004	803.40	803.43	803.51	0.08	1.00	1.08	0.08	804.40	804.51	804.58	1.00	1.07	0.07	805.40	805.58	805.65	1.00	1.07	0.07	Leachate Trench - Bottom
2005	803.27	803.33	803.37	0.04	1.00	1.04	0.04	804.27	804.37	804.42	1.00	1.05	0.05	805.27	805.42	805.46	1.00	1.04	0.04	Leachate Trench - Bottom
2006	803.15	803.26	803.28	0.02	1.00	1.02	0.02	804.15	804.28	804.30	1.00	1.02	0.02	805.15	805.30	805.39	1.00	1.09	0.09	Leachate Trench - Bottom
2007	803.02	803.14	803.20	0.06	1.00	1.06	0.06	804.02	804.20	804.22	1.00	1.02	0.02	805.02	805.22	805.23	1.00	1.01	0.01	Leachate Trench - Bottom
2008	802.90	803.04	803.04	0.00	1.00	1.00	0.00	803.90	804.04	804.09	1.00	1.05	0.05	804.90	805.09	805.11	1.00	1.02	0.02	Leachate Trench - Bottom
2009	802.77	802.89	802.94	0.05	1.00	1.05	0.05	803.77	803.94	803.99	1.00	1.05	0.05	804.77	804.99	805.03	1.00	1.03	0.03	Leachate Trench - Bottom
2010	802.65	802.75	802.78	0.03	1.00	1.03	0.03	803.65	803.78	803.83	1.00	1.05	0.05	804.65	804.83	804.93	1.00	1.10	0.10	Leachate Trench - Bottom
2011	802.52	802.64	802.65	0.01	1.00	1.01	0.01	803.52	803.65	803.71	1.00	1.06	0.06	804.52	804.71	804.79	1.00	1.08	0.08	Leachate Trench - Bottom
2012	802.40	802.51	802.51	0.00	1.00	1.00	0.00	803.40	803.51	803.59	1.00	1.08	0.08	804.40	804.59	804.69	1.00	1.09	0.09	Leachate Trench - Bottom
2013	802.28	802.41	802.43	0.01	1.00	1.01	0.01	803.28	803.43	803.49	1.00	1.07	0.07	804.28	804.49	804.55	1.00	1.06	0.06	Leachate Trench - Bottom
2014	802.15	802.24	802.27	0.03	1.00	1.03	0.03	803.15	803.27	803.28	1.00	1.01	0.01	804.15	804.28	804.33	1.00	1.05	0.05	Leachate Trench - Bottom
2015	802.03	802.10	802.20	0.10	1.00	1.10	0.10	803.03	803.20	803.26	1.00	1.05	0.05	804.03	804.26	804.28	1.00	1.03	0.03	Leachate Trench - Bottom
2016	801.90	802.01	802.06	0.05	1.00	1.05	0.05	802.90	803.06	803.08	1.00	1.02	0.02	803.90	804.08	804.11	1.00	1.04	0.04	Leachate Trench - Bottom
2017	801.78	801.90	801.93	0.03	1.00	1.03	0.03	802.78	802.93	802.98	1.00	1.05	0.05	803.78	803.98	804.06	1.00	1.09	0.09	Leachate Trench - Bottom
2018	801.65	801.73	801.76	0.03	1.00	1.03	0.03	802.65	802.76	802.78	1.00	1.02	0.02	803.65	803.78	803.85	1.00	1.07	0.07	Leachate Trench - Bottom
2019	801.53	801.66	801.75	0.09	1.00	1.09	0.09	802.53	802.75	802.81	1.00	1.06	0.06	803.53	803.81	803.83	1.00	1.02	0.02	Leachate Trench - Bottom
2020	801.41	801.55	801.55	0.01	1.00	1.01	0.01	802.41	802.55	802.63	1.00	1.08	0.08	803.41	803.63	803.72	1.00	1.10	0.10	Leachate Trench - Bottom
2021	801.39	801.45	801.55	0.10	1.00	1.10	0.10	802.39	802.55	802.64	1.00	1.09	0.09	803.39	803.64	803.71	1.00	1.07	0.07	Leachate Trench - Bottom
Mod 11 Leachate Collection Line East-West (North)																				
2022	805.15	805.26	805.30	0.03	1.00	1.03	0.03	806.15	806.30	806.36	1.00	1.07	0.07	807.15	807.36	807.38	1.00	1.01	0.01	Leachate Trench - Bottom
2023	805.02	805.08	805.09	0.01	1.00	1.01	0.01	806.02	806.09	806.13	1.00	1.05	0.05	807.02	807.13	807.22	1.00	1.08	0.08	Leachate Trench - Bottom
2024	804.90	804.95	805.03	0.09	1.00	1.09	0.09	805.90	806.03	806.09	1.00	1.06	0.06	806.90	807.09	807.12	1.00	1.03	0.03	Leachate Trench - Bottom
2025	804.77	804.82	804.85	0.03	1.00	1.03	0.03	805.77	805.85	805.93	1.00	1.07	0.07	806.77	806.93	806.98	1.00	1.05	0.05	Leachate Trench - Bottom
2026	804.65	804.66	804.70	0.04	1.00	1.04	0.04	805.65	805.70	805.80	1.00	1.10	0.10	806.65	806.80	806.83	1.00	1.04	0.04	Leachate Trench - Bottom
2027	804.52	804.60	804.66	0.06	1.00	1.06	0.06	805.52	805.66	805.73	1.00	1.07	0.07	806.52	806.73	806.73	1.00	1.01	0.01	Leachate Trench - Bottom
2028	804.40	804.51	804.55	0.04	1.00	1.04	0.04	805.40	805.55	805.64	1.00	1.09	0.09	806.40	806.64	806.66	1.00	1.01	0.01	Leachate Trench - Bottom
2029	804.27	804.35	804.42	0.07	1.00	1.07	0.07	805.27	805.42	805.46	1.00	1.04	0.04	806.27	806.46	806.48	1.00	1.01	0.01	Leachate Trench - Bottom
2030	804.14	804.27	804.29	0.03	1.00	1.03	0.03	805.14	805.29	805.30	1.00	1.01	0.01	806.14	806.30	806.32	1.00	1.01	0.01	Leachate Trench - Bottom
2031	804.02	804.13	804.21	0.08	1.00	1.08	0.08	805.02	805.21	805.29	1.00	1.08	0.08	806.02	806.29	806.32	1.00	1.03	0.03	Leachate Trench - Bottom
2032	803.89	803.97	804.05	0.08	1.00	1.08	0.08	804.89	805.05	805.09	1.00	1.04	0.04	805.89	806.09	806.14	1.00	1.05	0.05	Leachate Trench - Bottom
2033	803.77	803.80	803.81	0.01	1.00	1.01	0.01	804.77	804.81	804.86	1.00	1.05	0.05	805.77	805.86	805.89	1.00	1.03	0.03	Leachate Trench - Bottom
2034	803.64	803.72	803.76	0.04	1.00	1.04	0.04	804.64	804.76	804.84	1.00	1.08	0.08	805.64	805.84	805.92	1.00	1.09	0.09	Leachate Trench - Bottom
2035	803.52	803.65	803.71	0.06	1.00	1.06	0.06	804.52	804.71	804.75	1.00	1.04	0.04	805.52	805.75	805.77	1.00	1.02	0.02	Leachate Trench - Bottom
2036	803.39	803.52	803.53	0.01	1.00	1.01	0.01	804.39	804.53	804.56	1.00	1.02	0.02	805.39	805.56	805.61	1.00	1.06	0.06	Leachate Trench - Bottom
2037	803.27	803.37	803.38	0.01	1.00	1.01	0.01	804.27	804.38	804.41	1.00	1.03	0.03	805.27	805.41	805.50	1.00	1.09	0.09	Leachate Trench - Bottom
2038	803.14	803.22	803.23	0.01	1.00	1.01	0.01	804.14	804.23	804.31	1.00	1.07	0.07	805.14	805.31	805.36	1.00	1.05	0.05	Leachate Trench - Bottom
2039	803.02	803.12	803.19	0.06	1.00	1.06	0.06	804.02	804.19	804.24	1.00	1.05	0.05	805.02	805.24	805.26	1.00	1.02	0.02	Leachate Trench - Bottom
2040	802.89	802.93	803.00	0.08	1.00	1.08	0.08	803.89	804.00	804.10	1.00	1.09	0.09	804.89	805.10	805.19	1.00	1.09	0.09	Leachate Trench - Bottom
2041	802.77	802.85	802.94	0.08	1.00	1.08	0.08	803.77	803.94	804.02	1.00	1.08	0.08	804.77	805.02	805.05	1.00	1.02	0.02	Leachate Trench - Bottom
2042	802.67	802.73	802.75	0.02	1.00	1.02	0.02	803.67	803.75	803.81	1.00	1.06	0.06	804.67	804.81	804.81	1.00	1.01	0.01	Leachate Trench - Bottom

Created by: ZB
Updated by: ZB, 12/19/22
Checked /Revised by: PEG, 1/10/23

Table 3c - Leachate Collection Sumps Grades
Modules 10 and 11 Liner Construction
Columbia Dry Ash Disposal Facility

Documentation Point No.	Location		Subbase Elevation			Base Grade Elevation			Clay Liner Thickness			Leachate Collection Pipe Top of Pipe Elevation				Leachate Collection Pipe Bottom of Pipe Elevation			Bedding Below Pipe Thickness			Top of Coarse Aggregate Bedding Elevation				Bedding Above Pipe Thickness			Drainage Filter Layer Elevation			Drainage Filter Thickness			Top of Leachate Drainage Layer Elevation			Leachate Drainage Layer Thickness			Comments
	Northing	Easting	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Adjusted Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Adjusted Design (ft)	Actual (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Adjusted Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Adjusted Design (ft)	Actual (ft)	Design (ft)	Actual (ft)	Delta (ft)	Design (ft)	Adjusted Design (ft)	Actual (ft)	Design (ft)	Actual (ft)	Delta (ft)	
Module 10 and 11 Sump Locations																																									
1309	542,526.5	2,125,034.0	794.00	793.99	-0.01	796.00	796.08	0.08	2.00	2.09	0.09											801.39		801.43	0.05		5.35		802.39	802.43	802.53	1.00	1.10	0.10	803.39	803.53	803.60	1.00	1.07	0.07	Leachate Sump-Module 10
1310	542,527.7	2,125,049.0	794.00	793.91	-0.09	796.00	796.10	0.10	2.00	2.19	0.19											801.39		801.44	0.05		5.34		802.39	802.44	802.51	1.00	1.07	0.07	803.39	803.51	803.58	1.00	1.07	0.07	Leachate Sump-Module 10
1311	542,541.4	2,125,032.7	794.00	793.99	-0.01	796.00	796.09	0.09	2.00	2.11	0.11											801.39		801.43	0.04		5.34		802.39	802.43	802.53	1.00	1.10	0.10	803.39	803.53	803.60	1.00	1.07	0.07	Leachate Sump-Module 10
1312	542,542.7	2,125,048.5	794.00	793.95	-0.05	796.00	796.10	0.10	2.00	2.14	0.14											801.39		801.40	0.01		5.30		802.39	802.40	802.47	1.00	1.08	0.08	803.39	803.47	803.57	1.00	1.10	0.10	Leachate Sump-Module 10
1313	542,773.2	2,125,033.0	796.00	796.00	0.00	798.00	798.05	0.05	2.00	2.05	0.05											802.67		802.69	0.02		4.64		803.67	803.69	803.77	1.00	1.08	0.08	804.67	804.77	804.86	1.00	1.09	0.09	Leachate Sump-Module 11
1314	542,774.2	2,125,048.0	796.00	795.98	-0.02	798.00	798.02	0.02	2.00	2.04	0.04											802.67		802.68	0.01		4.66		803.67	803.68	803.77	1.00	1.09	0.09	804.67	804.77	804.87	1.00	1.09	0.09	Leachate Sump-Module 11
1315	542,788.2	2,125,032.1	796.00	795.99	-0.01	798.00	798.01	0.01	2.00	2.01	0.01											802.67		802.76	0.10		4.76		803.67	803.76	803.77	1.00	1.01	0.01	804.67	804.77	804.85	1.00	1.09	0.09	Leachate Sump-Module 11
1316	542,789.2	2,125,047.6	796.00	795.97	-0.03	798.00	798.08	0.08	2.00	2.11	0.11											802.67		802.71	0.04		4.63		803.67	803.71	803.74	1.00	1.03	0.03	804.67	804.74	804.78	1.00	1.04	0.04	Leachate Sump-Module 11

Created by: ZB
Updated by: ZB, 12/19/22
Checked /Revised by: PEG, 1/10/23

Table 3d - HDPE Culverts Grades
Modules 10 and 11 Liner Construction
Columbia Dry Ash Disposal Facility

Documentation Point Number	Actual Location		Final Grade Elevation			Comments
	Northing	Easting	Design (ft)	Actual (ft)	Delta (ft)	
Culverts - Ash Disposal Facility						
ADF C5-Upstream-East	542,102.2	2,125,133.0	807.57	807.56	-0.01	
ADF C5-Downstream-East	542,052.2	2,125,133.7	807.15	807.19	0.03	
ADF C5-Upstream-West	542,102.0	2,125,128.0	807.57	807.54	-0.03	
ADF C5-Downstream-West	542,052.3	2,125,128.9	807.15	807.12	-0.03	

Created by: ZB
Updated by: KLO, 9/30/22
Checked by: ZB, 10/6/22

Table 4. Testing Frequency Summary
Modules 10 and 11 Liner Construction
Columbia Dry Ash Disposal Facility / SCS Engineers Project #25222157.00

Soil Type	Quantity		Test	Testing Frequency		Required No. of Tests	Actual No. of Tests	Comments
Select Clay Fill								
2-Foot Clay Liner	7.4	acre						See Plan Sheet Set for Limits of 2-Foot Clay Liner.
Field Density and Moisture Content	14.8	acre-ft	In-place Density and Water Content by Nuclear Methods (ASTM D6938)	100-foot grid/foot		65	66	
Representative Samples	23,900	cy	Modified Proctor (ASTM D1557)	1/ 5,000	cy	5	7	See Note 1.
	23,900	cy	Grain-Size (ASTM D6913/D7928)	1/ 5,000	cy	5	6	
	23,900	cy	Atterberg Limits (ASTM D4318)	1/ 5,000	cy	5	6	
Undisturbed Samples	14.8	acre-ft	Moisture content/Dry density (ASTM D2216 and D7263	1/ 1	acre-ft	15	16	
	14.8	acre-ft	Atterberg Limits (ASTM D4318)	1/ 1	acre-ft	15	16	
	14.8	acre-ft	Grain-Size (ASTM D6913/D7928)	1/ 1	acre-ft	15	16	
	14.8	acre-ft	Undisturbed Hydraulic Conductivity (ASTM D5084 or SW 846 EPA Method 9100)	1/ 3	acre-ft	5	6	
60-mil HDPE Geomembrane								
Conformance Samples	37	rolls	Thickness (ASTM D5994)	5 locations/roll (min.)		185	185	
	445,554	sf	Tensile Properties (ASTM D6693)	1/ 100,000	sf	5	5	
	445,554	sf	Melt Flow Index (ASTM D1238)	1/ 100,000	sf	5	5	
	445,554	sf	Sheet Density (ASTM 1505)	1/ 100,000	sf	5	5	
Destructive Seam Samples (Fusion)	15,213	feet	Shear and Peel Tests (ASTM D6392)	1/ 1,000	ft	16	18	See Note 2.
Destructive Seam Samples (Extrusion)	3,994	feet	Shear and Peel Tests (ASTM D6392)	1/ 1,000	ft	4	8	See Note 3.
Geosynthetic Clay Liner								
Conformance Samples	451,050	sf	Bentonite Mass/Unit Area (ASTM D5993)	1/ 40,000	sf	12	12	See Note 4
	451,050	sf	Tensile Properties (ASTM D6768 & D6496)	1/ 100,000	sf	5	12	
	451,050	sf	Index Flux (ASTM D5887)	1/ 100,000	sf	5	5	
	451,050	sf	Free Swell (ASTM D5890)	1/ 100,000	sf	5	7	
Leachate Drainage Layer	7.4	acre						See Note 5.
	12,000	cy	Grain-Size (ASTM D422)	1/ 1,000	cy	12	12	
	12,000	cy	Remolded hydraulic conductivity (ASTM D2434)	1/ 2,500	cy	5	5	
Drainage Filter	1,068	ft	Grain-Size (ASTM D422)	1/1,000 lf (Min. of 3)		3	3	
Coarse Aggregate Bedding (Pipe)	1,068	ft	Grain-Size (ASTM D422)	1/1,000 lf (Min. of 3)		3	3	
Coarse Aggregate Bedding (Sump)	200	cy	Grain-Size (ASTM D422)	1/500 cy		1	1	

Notes:
1) Actual number of representative clay samples reflects samples collected from the Modules 10 & 11 liner construction area. An additional representative sample was collected from the clay stockpile before the start of the clay material placement.
2) 18 sets of destructive fusion seam samples (DS-1 to DS-6, DS-9 to DS-14, DS-17 to DS-22) were collected and field/laboratory tested. Tracked destructs are not included in the total count. A minimum of one destruct was taken from each combination welder/machine.
3) 8 sets of destructive extrusion repair samples (DS-7, DS-8, DS-15, DS-16, DS-23 to DS-26) were collected and field/laboratory tested. A minimum of one destruct was taken from each extrusion welder/machine.
4) Manufacturing and conformance sample results met or exceeded required frequencies.
5) Leachate Drainage Layer quantity based on the limits of clay liner on the floor.

Revised by: KLO, 8/9/22
Checked/Revised by: PEG, 11/22/22

I:\25222157.00\Deliverables\Modules 10 and 11 Construction Documentation Report\Tables\[Table 4 - Testing Frequency Summary_CHECKED.xls]Testing Summary

Table 5. Clay Liner Field Moisture and Density Test Results Summary
Modules 10 and 11 Liner Construction
Columbia Dry Ash Disposal Facility / SCS Engineers Project #25222157.00

Field Sample ID	Module	Layer	Date	Northing	Easting	Wet Density from NDG (lb/ft^3)	Water Weight (pcf)	Moisture Content	Dry Density Of Sample (lb/ft^3)	Modified Proctor Density (lb/ft^3)	% Compaction	Optimum Moisture Content	Pass/Fail
Modules 10 and 11 Liner													
1	11	1' thickness	10/20/22	542,900	2,124,600	122.9	21.9	21.7%	101.0	111.2	90.8%	16.0%	PASS
2	11	1' thickness	10/20/22	542,900	2,124,700	124.0	21.1	20.5%	102.9	111.2	92.5%	16.0%	PASS
3	11	1' thickness	10/20/22	542,900	2,124,800	124.9	21.9	21.3%	103.0	111.2	92.6%	16.0%	PASS
4	11	1' thickness	10/20/22	542,900	2,124,900	123.9	22.8	22.6%	101.1	111.2	90.9%	16.0%	PASS
5	11	1' thickness	10/20/22	542,900	2,125,000	125.3	22.9	22.4%	102.4	111.2	92.1%	16.0%	PASS
6	11	1' thickness	10/20/22	542,900	2,125,075	125.0	23.9	23.6%	101.1	111.2	90.9%	16.0%	PASS
7	11	1' thickness	10/19/22	542,800	2,124,600	127.9	21.4	20.1%	106.5	111.2	95.8%	16.0%	PASS
8	11	1' thickness	10/03/22	542,800	2,124,700	124.5	24.5	24.5%	100.0	109.0	91.7%	18.0%	PASS
9	11	1' thickness	09/29/22	542,800	2,124,800	126.8	22.3	21.3%	104.5	114.2	91.5%	14.0%	PASS
10	11	1' thickness	09/29/22	542,800	2,124,900	126.5	23.5	22.8%	103.0	114.2	90.2%	14.0%	PASS
11	11	1' thickness	09/29/22	542,800	2,124,900	125.5	22.8	22.1%	102.7	114.2	90.0%	14.0%	PASS
12	11	1' thickness	10/21/22	542,800	2,125,075	126.4	21.7	20.7%	104.7	111.2	94.2%	16.0%	PASS
13	11	1' thickness	10/19/22	542,700	2,124,600	123.7	19.3	18.5%	104.4	111.2	93.9%	16.0%	PASS
14	11	1' thickness	09/29/22	542,700	2,124,700	127.7	23.3	22.3%	104.4	114.2	91.4%	14.0%	PASS
15	11	1' thickness	09/29/22	542,700	2,124,800	125.8	23.0	22.4%	102.8	114.2	90.0%	14.0%	PASS
16	11	1' thickness	09/29/22	542,700	2,124,800	125.8	23.0	22.4%	102.8	114.2	90.0%	14.0%	PASS
17	11	1' thickness	09/30/22	542,700	2,125,000	126.8	22.2	21.2%	104.6	114.2	91.6%	14.0%	PASS
18	11	1' thickness	10/21/22	542,700	2,125,075	124.9	23.2	22.8%	101.7	111.2	91.5%	16.0%	PASS
Sump-11-1A	11	1' thickness	10/21/22	542,790	2,125,045	125.0	22.6	22.1%	102.4	111.2	92.1%	16.0%	PASS
Sump-11-1B	11	1' thickness	10/21/22	542,770	2,125,035	123.6	20.7	20.1%	102.9	111.2	92.5%	16.0%	PASS
19	10	1' thickness	10/19/22	542,600	2,124,600	127.8	22.8	21.7%	105.0	111.2	94.4%	16.0%	PASS
20	10	1' thickness	09/29/22	542,600	2,124,700	127.8	22.0	20.8%	105.8	115.5	91.6%	15.0%	PASS
21	10	1' thickness	09/29/22	542,600	2,124,800	125.6	21.4	20.5%	104.2	115.5	90.2%	15.0%	PASS
22	10	1' thickness	09/29/22	542,600	2,124,900	124.5	20.1	19.3%	104.4	115.5	90.4%	15.0%	PASS
23	10	1' thickness	09/30/22	542,600	2,125,000	127.2	21.9	20.8%	105.3	114.2	92.2%	14.0%	PASS
24	10	1' thickness	10/21/22	542,600	2,125,075	120.6	20.4	20.4%	100.2	111.2	90.1%	16.0%	PASS
25	10	1' thickness	10/20/22	542,500	2,124,600	127.5	22.5	21.4%	105.0	111.2	94.4%	16.0%	PASS
26	10	1' thickness	09/29/22	542,500	2,124,750	128.6	22.9	21.7%	105.7	115.5	91.5%	15.0%	PASS
27	10	1' thickness	09/29/22	542,500	2,124,800	127.7	23.0	22.0%	104.7	115.5	90.6%	15.0%	PASS
28	10	1' thickness	09/29/22	542,500	2,124,900	127.8	22.1	20.9%	105.7	115.5	91.5%	15.0%	PASS
29	10	1' thickness	09/30/22	542,500	2,125,000	125.9	23.2	22.6%	102.7	114.2	90.0%	14.0%	PASS
30	10	1' thickness	10/21/22	542,500	2,125,075	123.5	21.8	21.4%	101.7	111.2	91.5%	16.0%	PASS
31	10	1' thickness	10/19/22	542,400	2,124,600	126.1	22.6	21.8%	103.5	111.2	93.1%	16.0%	PASS
32	10	1' thickness	09/30/22	542,400	2,124,700	128.4	22.9	21.7%	105.5	114.2	92.4%	14.0%	PASS
33	10	1' thickness	09/30/22	542,400	2,124,800	127.8	22.4	21.3%	105.4	114.2	92.3%	14.0%	PASS
34	10	1' thickness	09/30/22	542,400	2,124,900	125.9	22.9	22.2%	103.0	114.2	90.2%	14.0%	PASS
35	10	1' thickness	09/30/22	542,400	2,125,000	128.7	23.0	21.8%	105.7	114.2	92.6%	14.0%	PASS
36	10	1' thickness	10/21/22	542,400	2,125,075	127.6	23.6	22.7%	104.0	111.2	93.5%	16.0%	PASS
Sump-10-1A	10	1' thickness	10/21/22	542,040	2,125,030	126.5	21.2	20.1%	105.3	111.2	94.7%	16.0%	PASS
Sump-10-1B	10	1' thickness	10/21/22	542,525	2,125,050	126.0	21.4	20.5%	104.6	111.2	94.1%	16.0%	PASS
37	11	2' thickness	10/03/22	542,850	2,124,550	123.6	21.8	21.4%	101.8	109.0	93.4%	18.0%	PASS
38	11	2' thickness	10/03/22	542,850	2,124,650	124.2	22.7	22.4%	101.5	109.0	93.1%	18.0%	PASS
39	11	2' thickness	10/03/22	542,850	2,124,750	127.5	22.2	21.1%	105.3	109.0	96.6%	18.0%	PASS
40	11	2' thickness	10/03/22	542,850	2,124,850	127.3	22.0	20.9%	105.3	109.0	96.6%	18.0%	PASS
41	11	2' thickness	10/03/22	542,850	2,124,950	124.6	22.4	21.9%	102.2	109.0	93.8%	18.0%	PASS

Table 5. Clay Liner Field Moisture and Density Test Results Summary
Modules 10 and 11 Liner Construction
Columbia Dry Ash Disposal Facility / SCS Engineers Project #25222157.00

Field Sample ID	Module	Layer	Date	Northing	Easting	Wet Density from NDG (lb/ft^3)	Water Weight (pcf)	Moisture Content	Dry Density Of Sample (lb/ft^3)	Modified Proctor Density (lb/ft^3)	% Compaction	Optimum Moisture Content	Pass/Fail
Modules 10 and 11 Liner													
42	11	2' thickness	10/03/22	542,850	2,125,050	122.8	22.1	21.9%	100.7	109.0	92.4%	18.0%	PASS
43	11	2' thickness	10/21/22	542,750	2,124,550	123.9	20.0	19.2%	103.9	111.2	93.4%	16.0%	PASS
44	11	2' thickness	10/06/22	542,750	2,124,650	125.7	21.7	20.9%	104.0	109.0	95.4%	18.0%	PASS
45	11	2' thickness	10/06/22	542,750	2,124,750	125.3	22.5	21.9%	102.8	109.0	94.3%	18.0%	PASS
46	11	2' thickness	10/06/22	542,750	2,124,850	125.5	21.2	20.3%	104.3	109.0	95.7%	18.0%	PASS
47	11	2' thickness	10/06/22	542,750	2,124,950	124.3	23.0	22.7%	101.3	109.0	92.9%	18.0%	PASS
48	11	2' thickness	10/19/22	542,750	2,125,050	124.6	20.8	20.0%	103.8	114.3	90.8%	16.0%	PASS
49	11	2' thickness	10/20/22	542,650	2,124,550	127.2	21.6	20.5%	105.6	111.2	95.0%	16.0%	PASS
50	11	2' thickness	10/07/22	542,650	2,124,650	125.5	22.0	21.3%	103.5	109.0	95.0%	18.0%	PASS
51	11	2' thickness	10/07/22	542,650	2,124,750	127.0	22.4	21.4%	104.6	109.0	96.0%	18.0%	PASS
52	11	2' thickness	10/19/22	542,650	2,124,850	129.1	22.0	20.5%	107.1	114.3	93.7%	16.0%	PASS
53	11	2' thickness	10/19/22	542,650	2,124,950	125.3	21.5	20.7%	103.8	114.3	90.8%	16.0%	PASS
Sump-11-2A	11	2' thickness	10/21/22	542,790	2,125,035	125.0	22.6	22.1%	102.4	111.2	92.1%	16.0%	PASS
Sump-11-2B	11	2' thickness	10/21/22	542,775	2,125,050	126.7	22.8	21.9%	103.9	111.2	93.4%	16.0%	PASS
54	10	2' thickness	10/19/22	542,650	2,125,050	128.4	22.0	20.7%	106.4	116.0	91.7%	16.0%	PASS
55	10	2' thickness	10/19/22	542,550	2,124,550	126.4	22.7	21.9%	103.7	111.2	93.3%	16.0%	PASS
56	10	2' thickness	10/07/22	542,550	2,124,650	128.4	22.5	21.2%	105.9	109.0	97.2%	18.0%	PASS
57	10	2' thickness	10/07/22	542,550	2,124,750	126.4	23.2	22.5%	103.2	109.0	94.7%	18.0%	PASS
58	10	2' thickness	10/07/22	542,550	2,124,850	127.1	23.6	22.8%	103.5	109.0	95.0%	18.0%	PASS
59	10	2' thickness	10/07/22	542,550	2,124,950	123.7	21.2	20.7%	102.5	109.0	94.0%	18.0%	PASS
60	10	2' thickness	10/21/22	542,550	2,125,050	127.3	22.7	21.7%	104.6	111.2	94.1%	16.0%	PASS
61	10	2' thickness	10/19/22	542,450	2,124,550	124.8	22.0	21.4%	102.8	111.2	92.4%	16.0%	PASS
62	10	2' thickness	10/05/22	542,450	2,124,650	126.6	22.2	21.3%	104.4	109.0	95.8%	18.0%	PASS
63	10	2' thickness	10/05/22	542,450	2,124,750	129.3	22.5	21.1%	106.8	109.0	98.0%	18.0%	PASS
64	10	2' thickness	10/05/22	542,450	2,124,850	128.5	22.1	20.8%	106.4	109.0	97.6%	18.0%	PASS
65	10	2' thickness	10/05/22	542,450	2,124,950	123.4	22.8	22.7%	100.6	109.0	92.3%	18.0%	PASS
66	10	2' thickness	10/05/22	542,450	2,125,050	126.8	22.1	21.1%	104.7	109.0	96.1%	18.0%	PASS
Sump-10-2B	10	2' thickness	10/21/22	542,525	2,125,030	123.7	22.6	22.4%	101.1	111.2	90.9%	16.0%	PASS

Updated By: JMM, 10/21/22
Checked By: ZB, 10/24/22

I:\25222157.00\Deliverables\Modules 10 and 11 Construction Documentation Report\Tables\[Table 5 - Clay Liner Field Moisture and Density Test Results Summary_CHECKED.xls]FieldSheet

Table 6. Clay Liner Laboratory Test Results
Module 10&11 Liner Construction
Columbia Dry Ash Disposal Facility / SCS Engineers Project #25222157.00

				Location		ASTM D6913/D7928 Grain Size Analysis		ASTM D4318 Atterberg Limits (%)			ASTM D2216 and D7263		ASTM D5084	ASTM D1557 Modified Proctor		
Date Sampled	Sample Number	Sample Type	Lift No.	Northing	Easting	% Fines <#200	% Clay <.005 mm	Liquid Limit	Plastic Limit	Plasticity Index	Dry Density (pcf)	Water Content (%)	Permeability (cm/sec)	Max. Dry Density (pcf)	Opt. Moisture (%)	U.S.C.S.
Pre-construction samples																
8/2/2022	COL-CL-BS1	B	--	--	--	--	--	--	--	--	--	--	--	115.5	15.0	CL
In-place bulk samples																
9/19/2022	COL-CL-B1	B	1-foot	542,450	2,125,100	91.7	91.7	43.0	17.0	26.0	--	--	--	114.2	14.0	CL
9/23/2022	COL-CL-B2	B	1-foot	542,850	2,124,650	83.7	83.7	47.0	20.0	27.0	--	--	--	109.0	18.0	CL
9/28/2022	COL-CL-B3	B	1-foot	542,650	2,124,850	74.0	49.6	47.0	17.0	30.0	--	--	--	111.2	16.0	CL
10/4/2022	COL-CL-B4	B	2-foot	542,800	2,124,850	87.3	56.2	51.0	23.0	28.0	--	--	--	114.3	16.0	CH
10/5/2022	COL-CL-B5	B	2-foot	542,700	2,124,700	88.6	47.0	46.0	16.0	30.0	--	--	--	116.0	16.0	CL
10/17/2022	COL-CL-B6	B	1-foot	542,500	2,124,600	89.6	48.4	49.0	19.0	30.0	--	--	--	114.6	16.0	CL
Requirements						≥50	--	≥25	--	>12	--	--	--	--	--	CL/CH
Average						85.8	62.8	47.2	18.7	28.5	--	--	--	113.5	15.9	--
Standard Deviation						6.4	19.7	2.7	2.6	1.8	--	--	--	2.5	1.2	--
High						91.7	91.7	51.0	23.0	30.0	--	--	--	116.0	18.0	--
Low						74.0	47.0	43.0	16.0	26.0	--	--	--	109.0	14.0	--
In-place undisturbed samples (Shelby tubes)																
10/3/2022	COL-CL-T1(K)	T	1	542,800	2,124,700	98.6	72.5	48.0	19.0	29.0	99.3	26.2	2.03E-08	--	--	CL
9/29/2022	COL-CL-T2	T	1	542,800	2,124,900	98.8	43.8	47.0	19.0	29.0	104.0	25.3	--	--	--	CL
10/19/2022	COL-CL-T3	T	1	542,700	2,124,600	90.0	47.5	46.0	19.0	30.0	104.5	23.0	--	--	--	CL
9/29/2022	COL-CL-T4	T	1	542,700	2,124,800	98.8	43.6	47.0	16.0	31.0	99.2	25.7	--	--	--	CL
10/21/2022	COL-CL-T5	T	1	542,600	2,125,075	81.3	38.0	47.0	21.0	26.0	104.6	22.4	--	--	--	CL
9/29/2022	COL-CL-T6(K)	T	1	542,500	2,124,750	97.2	68.6	47.0	18.0	29.0	101.3	24.7	1.65E-08	--	--	CL
9/30/2022	COL-CL-T7	T	1	542,500	2,125,000	99.2	44.0	47.0	16.0	31.0	100.0	25.0	--	--	--	CL
9/30/2022	COL-CL-T8(K)	T	1	542,400	2,125,000	98.3	72.9	46.0	19.0	27.0	102.1	24.0	9.58E-08	--	--	CL
10/3/2022	COL-CL-T9	T	2	542,850	2,124,750	99.1	46.1	48.0	17.0	31.0	105.2	23.4	--	--	--	CL
10/21/2022	COL-CL-T10	T	2	542,750	2,124,550	84.6	42.4	48.0	17.0	31.0	102.9	24.4	--	--	--	CL
10/6/2022	COL-CL-T11(K)	T	2	542,750	2,124,950	98.0	74.0	46.0	18.0	28.0	101.2	24.2	9.18E-08	--	--	CL
10/7/2022	COL-CL-T12(K)	T	2	542,650	2,124,650	98.9	75.3	47.0	17.0	30.0	104.6	21.0	4.06E-08	--	--	CL
10/19/2022	COL-CL-T13	T	2	542,550	2,124,550	64.7	40.9	46.0	20.0	26.0	98.4	23.2	--	--	--	CL
10/7/2022	COL-CL-T14(K)	T	2	542,550	2,124,850	98.3	73.5	48.0	18.0	30.0	105.8	23.7	6.91E-09	--	--	CL
10/5/2022	COL-CL-T15	T	2	542,450	2,124,750	98.9	46.0	45.0	17.0	28.0	106.0	23.0	--	--	--	CL
10/5/2022	COL-CL-T16	T	2	542,450	2,124,950	99.1	43.8	45.0	18.0	27.0	105.3	23.6	--	--	--	CL
Requirements						≥50	--	≥25	--	>12	--	--	≤1E-07	--	--	CL/CH
Average						94.0	54.6	46.8	18.1	28.9	102.8	23.9	4.5E-08	--	--	--
Standard Deviation						9.6	14.8	1.0	1.4	1.8	2.6	1.3	0.0	--	--	--
High						99.2	75.3	48.0	21.0	31.0	106.0	26.2	9.6E-08	--	--	--
Low						64.7	38.0	45.0	16.0	26.0	98.4	21.0	6.9E-09	--	--	--

Note:
(1) Sample Type: B = Bulk, T = Shelby Tube
(2) (K) = Permeability test to be included
(3) Bulk samples were collected every ~5,000 CY of material imported.

Updated By: JMM, 12/8/22
Checked By: ZB, 12/9/22

I:\25222157.00\Deliverables\Modules 10 and 11 Construction Documentation Report\Tables\[Table 6 - Clay Liner Laboratory Test Results_CHECKED.xls]Clay Liner

Table 7. Leachate Pipe Bedding Stone Laboratory Test Results
2022 Modules 10 and 11 Liner Construction
Columbia Dry Ash Disposal Facility / SCS Engineers Project #25222157.00

Sample	Location		Date Sampled	Sieve Size			Uniformity Coefficient
	Northing	Easting		1 1/2" (% Finer)	#4 (% Finer)	#200 (% Finer)	
Preconstruction Sample							
COL-PB-BS1	Yahara Materials		9/28/2022	100.0	2.0	1.0	1.60
Construction Samples							
COL-PB-B1	Onsite Stockpile		11/22/2022	96.1	1.7	0.9	1.60
COL-PB-B2	542,500	2,124,650	12/3/2022	99.4	1.0	0.7	1.61
COL-PB-B3	542,500	2,124,900	12/3/2022	99.2	1.0	0.7	1.59
COL-PB-B4 (sump)	542,800	2,125,050	12/6/2022	100.0	2.6	1.3	1.66
Requirements				100.0	≤5	-	<4
Average				98.7	1.2	0.9	1.6
Standard Deviation				1.5	0.7	0.2	0.0
High				100.0	2.0	1.0	1.6
Low				96.1	1.0	0.7	1.6

Updated By: JMM, 1/13/23
Revised/Checked By: ZB, 12/9/22

I:\25222157.00\Deliverables\Modules 10 and 11 Construction Documentation Report\Tables\[Table 7 - Leachate Pipe Bedding Stone Laboratory Test Results_CHECKED.xls]Bedding Stone

Table 8. Filter Material Laboratory Test Results
Modules 10&11 Liner Construction
Columbia Dry Ash Disposal Facility / SCS Engineers Project #25222157.00

Sample	Location		Date	Sieve Size								Filter Spec		
	Northing	Easting	Sampled	1-Inch (% Finer)	3/4-Inch (% Finer)	1/2-Inch (% Finer)	3/8-Inch (% Finer)	#4 (% Finer)	#8 (% Finer)	#16 (% Finer)	#30 (% Finer)	D85 (mm)	D50 (mm)	D15 (mm)
COL-FS-BS1	Milestone Materials		10/11/2022	100.0	100.0	100.0	100.0	70.0	21.8	8.2	3.3	6.26	3.64	1.80
COL-FS-B1	Milestone Materials		11/17/2022	100.0	100.0	100.0	100.0	72.5	26.7	12.7	6.7	6.04	3.47	1.38
COL-FS-B2	Milestone Materials		11/17/2022	100.0	100.0	100.0	99.6	79.5	37.0	20.1	12.0	5.29	3.01	0.82
COL-FS-B3	Milestone Materials		11/17/2022	100.0	100.0	99.4	98.8	72.7	29.5	15.0	8.3	5.93	3.41	1.18
Adjusted Specifications Based on Updated Filter Calculation				100	100	100	65-100	30-100	15-70	0-20	0-10	>3.25	0.92-11.4	0.81-2.92

Updated By: JMM, 11/22/22
Revised/Checked By: ZB, 11/28/22

I:\25222157.00\Deliverables\Modules 10 and 11 Construction Documentation Report\Tables\[Table 8 - Filter Material Laboratory Test Results_CHECKED.xls]Filter Material

Table 9. Drainage Layer Material Laboratory Test Results
Modules 10&11 Liner Construction
Columbia Dry Ash Disposal Facility / SCS Engineers Project #25222157.00

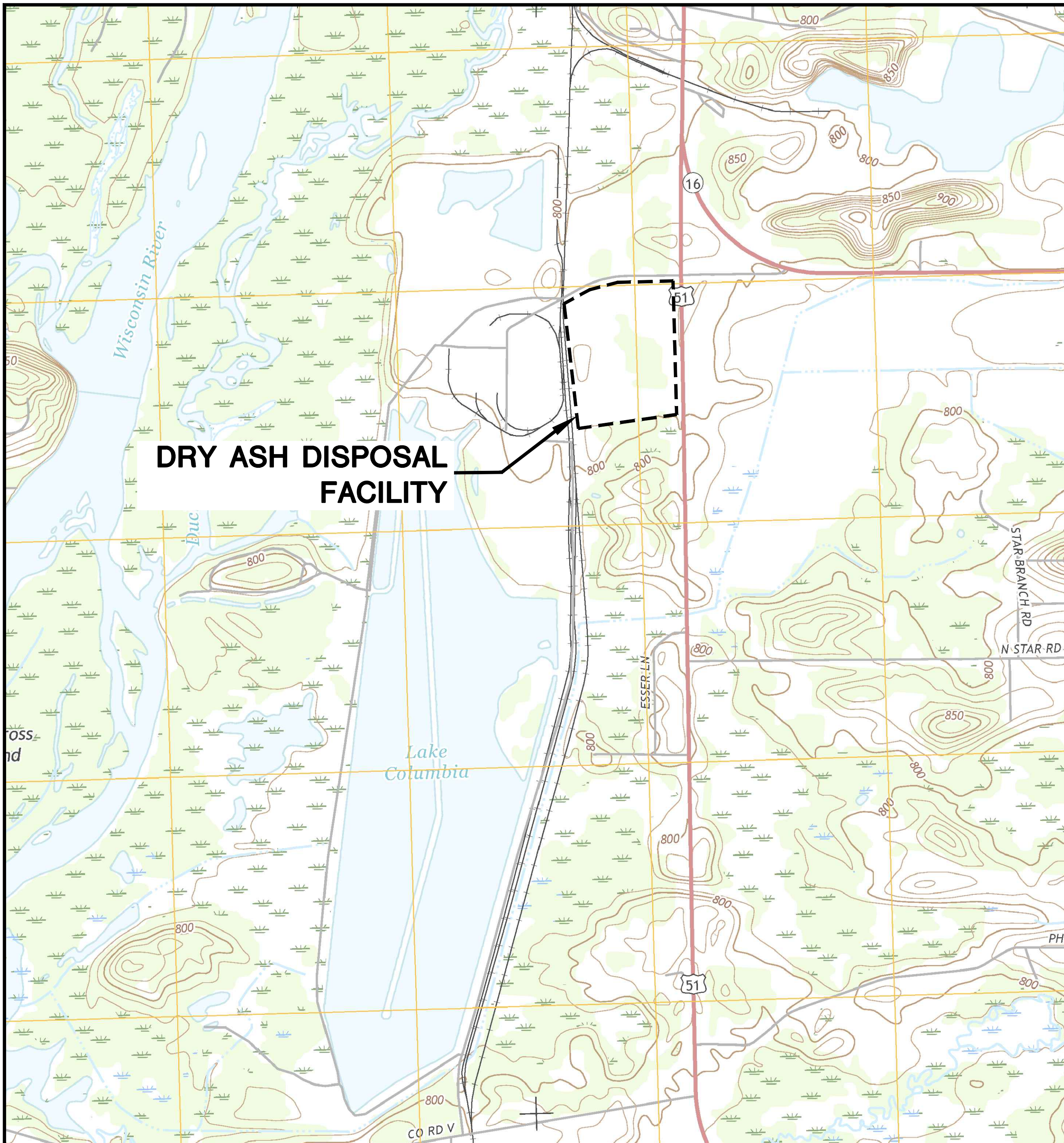
Sample	Location		Date	3/8-inch	1/4 -inch	P200 Content	Remolded
	Northing	Easting	Sampled			(%)	Conductivity (cm/sec)
In-Place Samples							
COL-DL-B1	542,850	2,124,600	10/27/2022	100.0	100.0	0.1	--
COL-DL-B2(K)	542,850	2,124,800	10/27/2022	100.0	100.0	0.1	5.03E-02
COL-DL-B3	542,850	2,125,000	11/15/2022	100.0	100.0	0.5	--
COL-DL-B4(K)	542,700	2,124,550	11/15/2022	100.0	100.0	0.4	3.78E-02
COL-DL-B5	542,700	2,124,750	11/14/2022	100.0	100.0	0.4	--
COL-DL-B6(K)	542,700	2,124,950	11/14/2022	100.0	100.0	0.6	3.10E-02
COL-DL-B7(K)	542,550	2,124,650	11/14/2022	100.0	100.0	0.3	3.60E-02
COL-DL-B8	542,550	2,124,850	12/3/2022	100.0	100.0	0.2	--
COL-DL-B9	542,550	2,125,050	12/3/2022	100.0	100.0	0.1	--
COL-DL-B10	542,450	2,124,550	11/11/2022	100.0	100.0	0.2	--
COL-DL-B11(K)	542,450	2,124,750	11/11/2022	100.0	100.0	0.6	1.54E-02
COL-DL-B12	542,450	2,124,950	11/11/2022	100.0	100.0	1.9	--
CQA Requirements					100.0	≤5	≥1E-02
Average					100.0	0.5	3.4E-02
Standard Deviation					0.0	0.5	1.3E-02
High					100.0	1.9	5.0E-02
Low					100.0	0.1	1.5E-02

Note: All in-place drainage layer material was sourced from the Covia Quarry.

Updated By: JMM, 12/7/22
Revised/Checked By: ZB, 12/9/22

I:\25222157.00\Deliverables\Modules 10 and 11 Construction Documentation Report\Tables\[Table 9 - Drainage Layer Material Laboratory Test Results_CHECKED.xlsx]Drainage Layer

Figures



POYNETTE QUADRANGLE
WISCONSIN–COLUMBIA CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
2016
SCALE: 1" = 2,000'

CLIENT	SITE	
WISCONSIN POWER AND LIGHT COLUMBIA ENERGY CENTER W8375 MURRAY ROAD PARDEEVILLE, WISCONSIN 53954	MODULES 10 AND 11 LINER CONSTRUCTION COLUMBIA DRY ASH DISPOSAL FACILITY TOWN OF PACIFIC, WISCONSIN	SITE LOCATION MAP

				ENGINEER	
PROJECT NO.	25222157.00	DRAWN BY:	ZB	SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	FIGURE
DRAWN:	08/01/2018	CHECKED BY:	PEG		1
REVISED:	01/06/2023	APPROVED BY:	PEG 2/8/2023		

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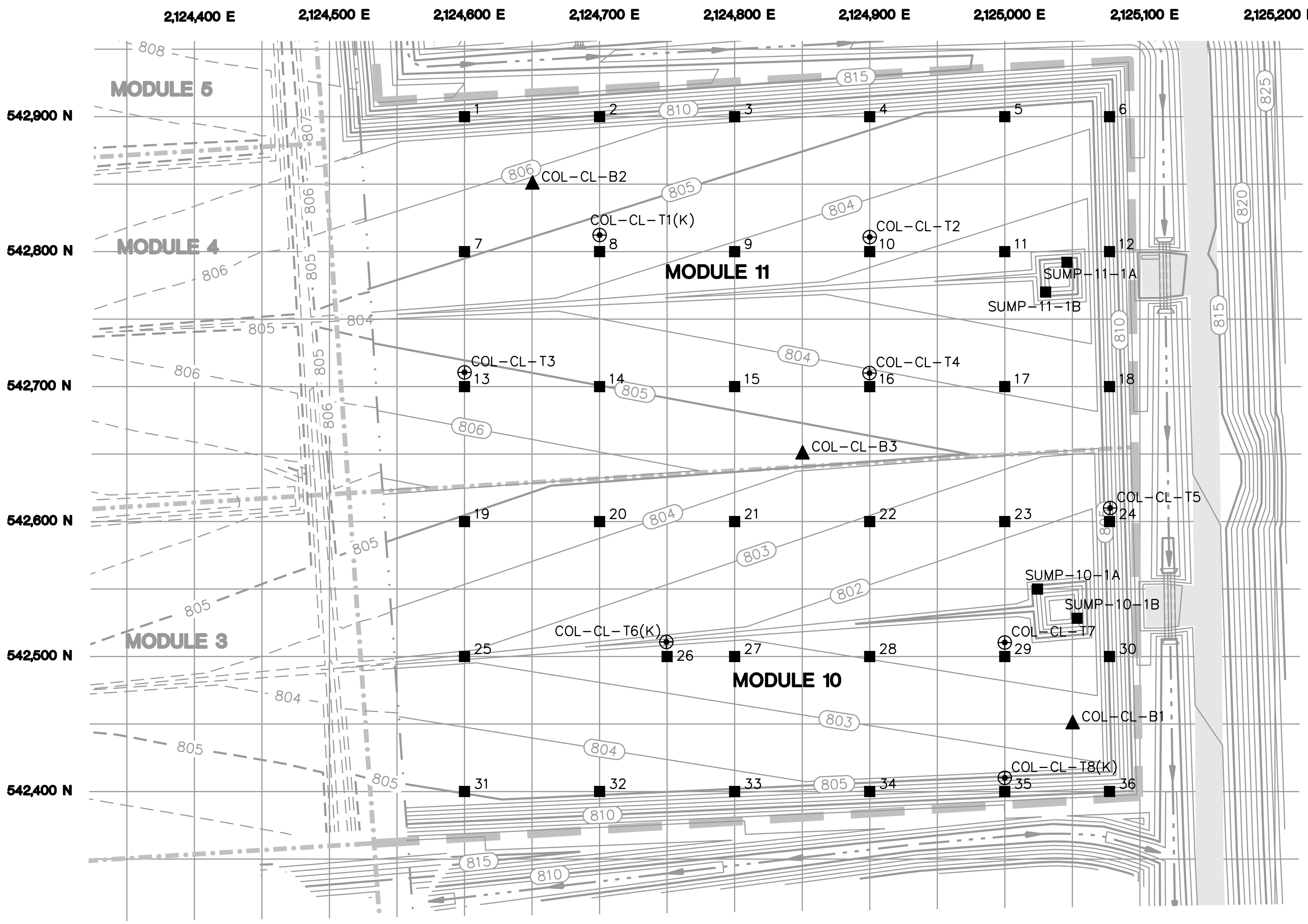

LEGEND

MODULE LIMIT

ASH FILL LIMIT

CLAY LIMIT

1 CLAY LINER FIELD MOISTURE/DENSITY TEST LOCATION

COL-CL-B1 CLAY SAMPLE LOCATION (BULK SAMPLE)

COL-CL-T2 CLAY SAMPLE LOCATION (SHELBY TUBE)

COL-CL-T6(K) CLAY SAMPLE LOCATION (SHELBY TUBE WITH PERMEABILITY)

NOTES:

1. CONTOURS REPRESENT PROPOSED MODULE 10/11 BASE GRADES AND PERIMETER GRADES.
2. DASHED CONTOURS REPRESENT DOCUMENTED BASE GRADES IN MODULES 3, 4, AND 5.
3. SHELBY TUBE SAMPLES COLLECTED FROM THE ADJACENT (PASSED) FIELD MOISTURE/DENSITY TEST LOCATION.
4. BULK SAMPLES TO BE COLLECTED APPROXIMATELY EVERY 5,000 CY OF SELECT CLAY FILL DELIVERED.

N

100 0 100

SCALE: 1" = 100'

PROJECT NO.	25222157.01	DRAWN BY:	ZB
DRAWN:	06/17/2022	CHECKED BY:	PEG
REVISED:	01/18/2023	APPROVED BY:	PEG 2/8/2023

ENGINEER: SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
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CLIENT: WISCONSIN POWER AND LIGHT
COLUMBIA ENERGY CENTER
W8375 MURRAY ROAD
PARDEEVILLE, WISCONSIN 53954

SITE: MODULES 10 AND 11 LINER CONSTRUCTION
COLUMBIA DRY ASH DISPOSAL FACILITY
TOWN OF PACIFIC, WISCONSIN

CLAY MOISTURE/DENSITY TEST AND SAMPLE LOCATIONS (1ST FT THICKNESS)

FIGURE 2

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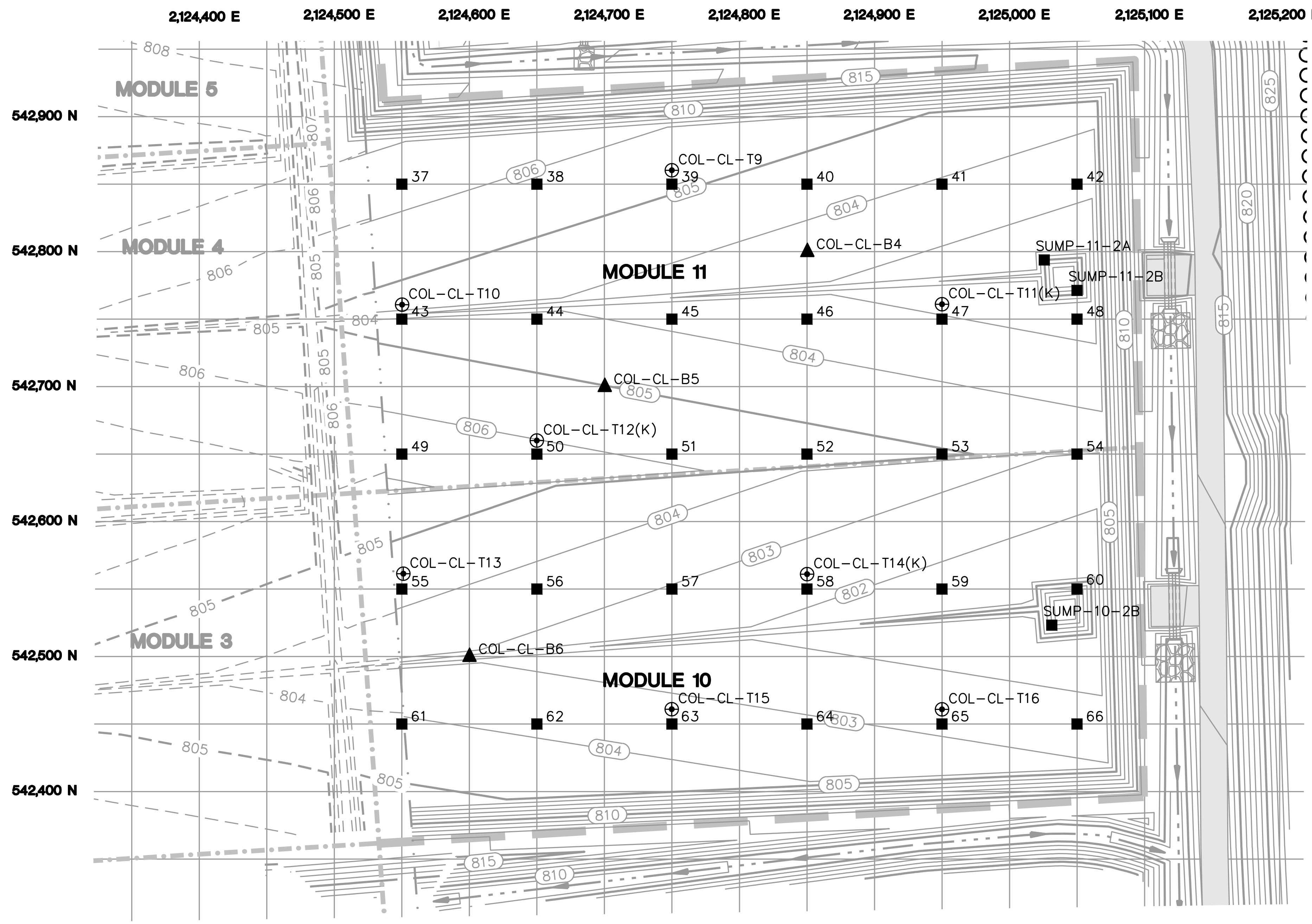


LEGEND

MODULE LIMIT

ASH FILL LIMIT

CLAY LIMIT

51 CLAY LINER FIELD MOISTURE/DENSITY TEST LOCATION

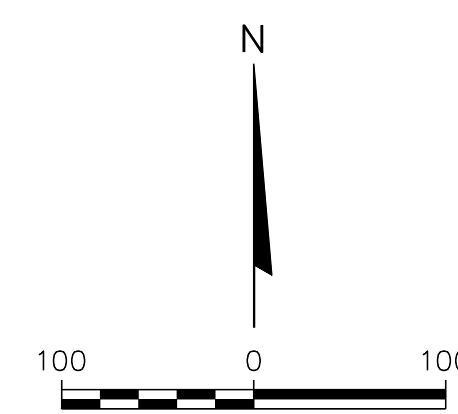
COL-CL-B6 CLAY SAMPLE LOCATION (BULK SAMPLE)

COL-CL-T9 CLAY SAMPLE LOCATION (SHELBY TUBE)

COL-CL-T11(K) CLAY SAMPLE LOCATION (SHELBY TUBE WITH PERMEABILITY)

NOTES:

1. CONTOURS REPRESENT PROPOSED MODULE 10/11 BASE GRADES AND PERIMETER GRADES.
2. DASHED CONTOURS REPRESENT DOCUMENTED BASE GRADES IN MODULES 3, 4, AND 5.
3. SHELBY TUBE SAMPLES COLLECTED FROM THE ADJACENT (PASSED) FIELD MOISTURE/DENSITY TEST LOCATION.
4. BULK SAMPLES TO BE COLLECTED APPROXIMATELY EVERY 5,000 CY OF SELECT CLAY FILL DELIVERED.



SCALE: 1" = 100'

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DRAWN:	06/17/2022	CHECKED BY:	PEG
REVISED:	01/18/2023	APPROVED BY:	PEG 2/8/2023

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CLIENT: WISCONSIN POWER AND LIGHT
COLUMBIA ENERGY CENTER
W8375 MURRAY ROAD
PARDEEVILLE, WISCONSIN 53954

SITE: MODULES 10 AND 11 LINER CONSTRUCTION
COLUMBIA DRY ASH DISPOSAL FACILITY
TOWN OF PACIFIC, WISCONSIN

CLAY MOISTURE/DENSITY TEST AND SAMPLE LOCATIONS (2ND FT THICKNESS)

FIGURE 3

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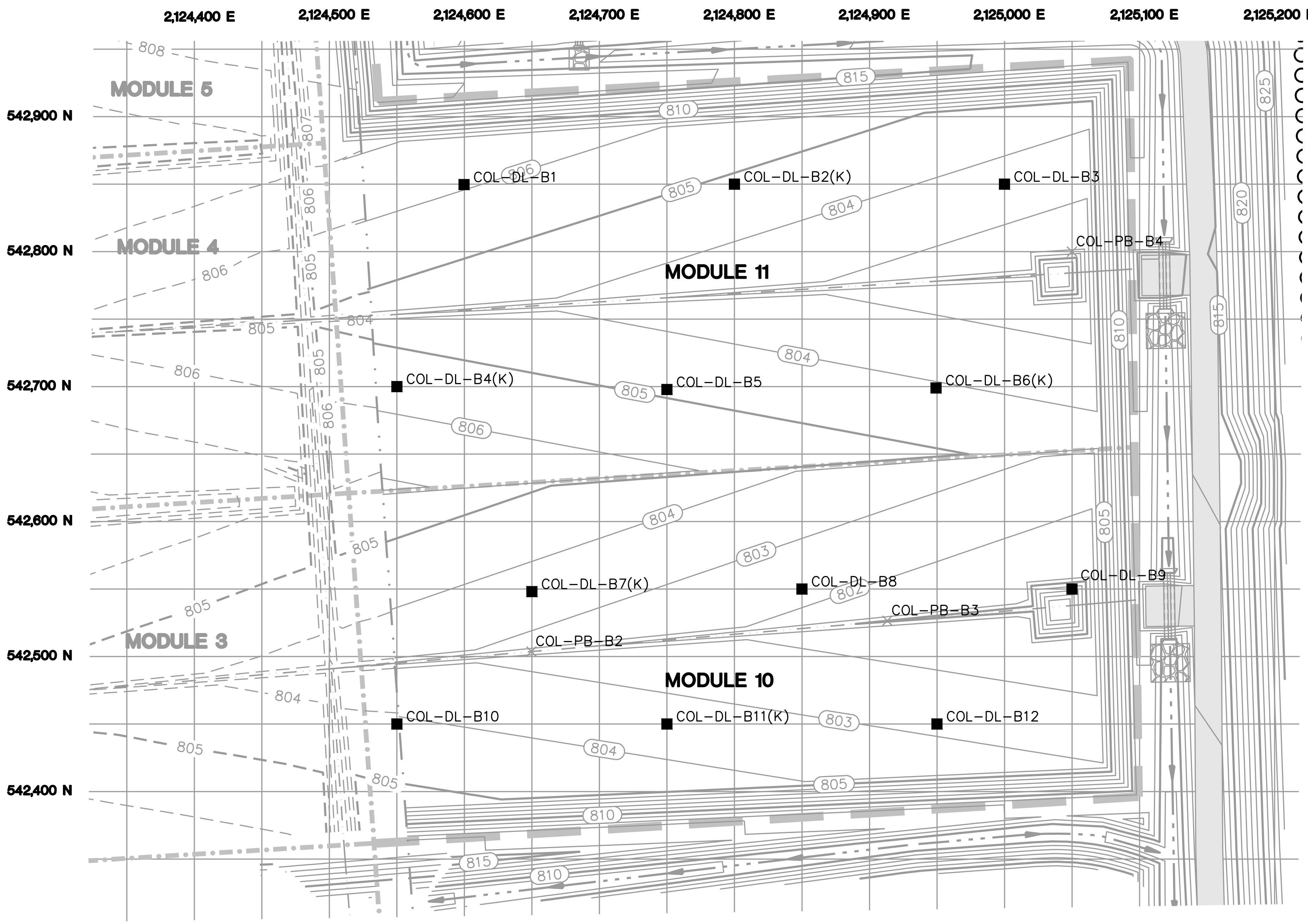
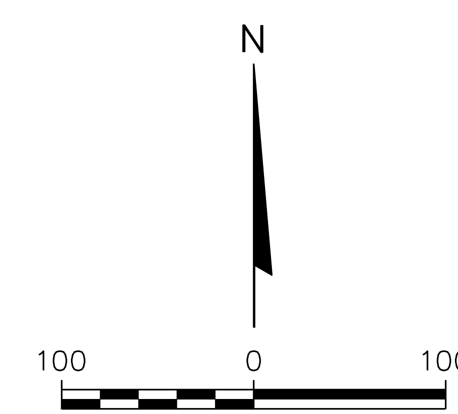


LEGEND

	MODULE LIMIT
	ASH FILL LIMIT
	CLAY LIMIT
	LEACHATE COLLECTION PIPE
COL-DL-B2(K)	LEACHATE DRAINAGE LAYER SAMPLE WITH PERMEABILITY
COL-DL-B5	LEACHATE DRAINAGE LAYER SAMPLE
COL-PB-B1	LEACHATE PIPE BEDDING SAMPLE

NOTES:

1. CONTOURS REPRESENT PROPOSED MODULE 10/11 BASE GRADES AND PERIMETER GRADES.
2. DASHED CONTOURS REPRESENT DOCUMENTED BASE GRADES IN MODULES 3, 4, AND 5.
3. PIPE BEDDING SAMPLE COL-PB-B1 WAS COLLECTED FROM THE ONSITE STOCKPILE BEFORE PLACING THE MATERIAL IN THE LEACHATE COLLECTION TRENCHES.
4. ALL THREE FILTER MATERIAL SAMPLES WERE COLLECTED FROM MILESTONE QUARRY.



SCALE: 1" = 100'

PROJECT NO.	25222157.01	DRAWN BY:	ZB
DRAWN:	06/17/2022	CHECKED BY:	PEG
REVISED:	01/18/2023	APPROVED BY:	PEG 2/8/2023

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2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

CLIENT: WISCONSIN POWER AND LIGHT
COLUMBIA ENERGY CENTER
W8375 MURRAY ROAD
PARDEEVILLE, WISCONSIN 53954

SITE: MODULES 10 AND 11 LINER CONSTRUCTION
COLUMBIA DRY ASH DISPOSAL FACILITY
TOWN OF PACIFIC, WISCONSIN

LEACHATE DRAINAGE LAYER SAMPLING

FIGURE
4

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Appendix A

Correspondence and Permits

Appendix A-1
Summary of WDNR Approvals

Date	Item	Description
September 3, 1980	Feasibility Report Approval	Self-explanatory.
June 30, 1983	Plan of Operation Approval	Self-explanatory.
October 8, 1984	Plan of Operation Addendum Approval	Modified some of the conditions of approval included in the June 30, 1983 approval.
February 26, 1985	Phase I, Module 1 North Construction Documentation Approval	Approved construction of Phase I, Module 1 North liner.
February 11, 1987	Plan Modification Approval	Approved modifications to groundwater quality standards and reporting requirements.
February 19, 1987	Plan Modification Approval	Follow-up letter clarifying conditions modified by February 11, 1987 approval.
July 10, 1987	Plan Modification Approval	Approved modifications to ash volume and earth work quantities for Phase I, Module 5 and modifications to drainage features.
December 21, 1988	Plan Modification Approval	Approved modifications to construction sequence and to groundwater monitoring wells.
July 13, 1990	Phase I, Module 3 South Construction Documentation Approval	Approved construction of Phase I, Module 3 South site preparation.
January 11, 1991	Plan Modification Approval	Approved modifications to the types of coal ash approved for disposal in the landfill.
August 16, 1994	Plan Modification Approval	Approved modifications to liner system in Phase I, Module 1 South.
March 11, 1996	Plan Modification Approval	Approved environmental monitoring changes and required an upgraded liner and leachate collection for future landfill construction.
March 29, 1996	Phase I, Module 1 South Construction Documentation Approval	Approved construction of Phase I, Module 1 South liner.
January 19, 2000	Expedited Plan Modification	Modified groundwater monitoring program and extended Plan of Operation Update (POU) due date.

Appendix A-1 (Continued)
Summary of WDNR Approvals

Date	Item	Description
November 2, 2000	POU Approval	Approved the POU and the proposed modifications to the liner, final cover, and leachate collection systems; storm water management features; and phasing and filling sequence.
September 11, 2008	Revised Long Term Care Costs Plan Operation Modification	Modified the plan of operation to update long term care costs per NR 520.07(1m)(a).
March 29, 2010	Final Cover Construction Documentation Approval	Approved construction of 3.1 acres of final cover construction in Phase I, Module 1.
January 28, 2011	Plan of Operation Update (POU) Approval	Approved the POU and proposed modifications in the November 12, 2010 POU and December 23, 2010 Addendum No. 1 to the 2010 POU.
September 14, 2011	Plan of Operation Modification Approval	Approved addition of 2 feet of clay to the approved composite liner system and two commercial clay borrow sites.
February 13, 2012	Liner Construction Documentation Approval	Approved construction documentation for approximately 4.0 acres of liner for Phase 1, Module 2.
December 16, 2014	Plan of Operation Approval Modification	Acceptance of Spray Dryer Adsorber (SDA) in Module 2/Composite Lined Areas.
February 20, 2015	Expedited Plan Modification for SDA Byproduct	Acceptance of SDA material in Module 1.
November 13, 2015	Plan of Operation Approval Modification	New Haven Clay Borrow Source.
July 1, 2016	Plan of Operation Approval Modification	Rain Cover System.
August 22, 2016	Phase 1, Module 3 Liner Construction Documentation Approval	Approved construction documentation for approximately 4.0 acres of liner of Phase 1, Module 3. Also included the abandonment of TW-4 and MW-4.
January 25, 2017	Final Cover Construction Documentation Approval	Approved construction of 2.8 acres of final cover in Phase 1, Module 1 and 2.
June 6, 2018	Plan of Operation Approval Modification – Site Wide - Rain Cover System Approval	Approved installation and operation of a rain cover system above completed liner and leachate collection system.

Appendix A-1 (Continued)

Summary of WDNR Approvals

Date	Item	Description
July 13, 2018	New Haven Clay Borrow Monitoring Well Abandonment Exemption	Approved exemption for use of bentonite chips for abandonment of MW-26P.
September 14, 2018	Phase 1, Module 4 Liner Construction Documentation Approval	Approved construction documentation for approximately 4.2 acres of liner for Phase 1, Module 4. Also included installation of three CCR groundwater monitoring wells, restoration of Phase 1 excavation at New Haven clay borrow source per the nonmetallic mining reclamation permit from Adams County, and abandonment of MW-26 and MW-26P.
March 14, 2020	No Objection to the Expedited Plan Modification, 10-Year Plan of Operation Update Extension	A one-year extension to Condition 1 of the department's January 28, 2011 Plan of Operation Approval Modification.
March 19, 2021	No Objection to the Expedited Plan Modification, Disposal of Filter Bags and Plan of Operation	Approval to dispose Pulse Jet Fabric Filter (PJFF) bags in the landfill during an upcoming maintenance outage at the plant. A 2-year extension to Condition #1 of the Plan of Operations Modification approval issued on January 28, 2011 and amended on March 13, 2020.
November 30, 2021	Conditional Plan of Operation Approval Modification for Updated Closure and Long-Term Care Costs	Approved the requested modification to the plan of operation for updated closure and long-term care costs at the Dry Ash Disposal Facility.
December 10, 2021	Phase 1, Module 5 and 6 Liner Construction Documentation Approval	Approved the construction of approximately 8.1 acres of liner for Phase 1, Modules 5 and 6 composite liner for the Columbia Energy Center Dry Ash Disposal Facility.
July 28, 2022	Conditional Plan of Operation Approval Modification for the 10-year Update	Approved the requested modification to the plan of operation for the Columbia Energy Center (COL) Ash Disposal Facility (ADF) and fulfilled the 10-year update requirement.

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WISCONSIN
DEPT. OF NATURAL RESOURCES

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

GENERAL PERMIT TO DISCHARGE UNDER THE WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM WPDES PERMIT NO. WI-S067857-5

TIER 2 INDUSTRIAL FACILITIES

In compliance with the provisions of ch. 283, Wis. Stats., and ch. NR 216, Wis. Adm. Code, any **Tier 2** facility as defined in ch. NR 216, Wis. Adm. Code, and located in the State of Wisconsin, excluding section 2.5.1, that discharges

STORM WATER ASSOCIATED WITH INDUSTRIAL ACTIVITY

and meeting the applicability criteria in section 2 of this permit and that receives a letter from the Wisconsin Department of Natural Resources (Department) granting coverage under this permit, is authorized to discharge storm water to waters of the state provided that the discharge is in accordance with the conditions set forth in this permit.

This permit is issued by the Department and covers storm water discharges from the facility as of the **Start Date** of permit coverage to the permittee. For initial permit coverage, the Department will transmit a cover letter to the permittee stating that the facility is covered under this permit. Initial coverage under this permit will become effective at a facility beginning upon the **Start Date** specified by the Department in the cover letter. For an existing facility with permit coverage under a previously issued version of the Tier 2 general permit, coverage under this permit will become effective at the facility beginning upon the **Effective Date** below. For these facilities, the **Effective Date** is the **Start Date.**

State of Wisconsin Department of Natural Resources
For the Secretary

By ______________________________ May 14, 2021
Brian Weigel, Director — Date
Bureau of Watershed Management

PERMIT EFFECTIVE DATE: May 31, 2021 **PERMIT EXPIRATION DATE:** June 2, 2025

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Note: Information about the Department of Natural Resources' storm water program, this general permit, forms, and other helpful resources is available at https://dnr.wisconsin.gov/topic/Stormwater.

1. APPLICATION REQUIREMENTS

1.1 Initial Permit Coverage The owner or operator of a Tier 2 industrial facility type listed in s. NR 216.21(2)(b), Wis. Adm. Code, and not previously covered under the Tier 2 general permit shall submit a complete Notice of Intent (NOI) to the Department to apply for coverage under an industrial storm water discharge permit in accordance with the time frames in s. NR 216.22(2), Wis. Adm. Code. Within 30 calendar days of receipt of the NOI, the Department will evaluate the information submitted in the NOI to determine whether the NOI is complete, whether additional information is needed for review, whether the facility will be covered under this permit or an individual permit, or whether coverage under a permit will be denied. Based upon this evaluation, unless notified to the contrary by the Department, within 30 calendar days of receipt of the NOI, the Department will transmit a cover letter to the owner or operator indicating the **Start Date** upon which permit coverage becomes effective at the facility with instructions on where to download the permit from the Department website. In the alternative, a hard copy of the permit will be mailed to the owner or operator of the facility upon request.

Note: The NOI form (Form 3400-163), information about submitting via the Department's Water ePermitting System, and general permit are available for download from the Department website at: https://dnr.wi.gov/topic/stormwater/industrial/forms.html. The Notice of Intent requires applicants to provide information on the applicant, facility location, applicability and operations information, storm water discharge information, and non-storm water discharge information.

1.2 Existing Permit Coverage Unless the Department makes a determination for an individual WPDES permit under section 2.5.7, a Tier 2 industrial facility type listed in s. NR 216.21(2)(b), Wis. Adm. Code, with existing Tier 2 general permit coverage prior to the **Effective Date** of this permit is automatically covered under this permit as of the **Effective Date**. For these permittees, the **Effective Date** is the permittee's **Start Date.** The Department will notify the owner or operator of the facility's continued coverage under this permit with instructions on where to download the permit from the Department website. In the alternative, a hard copy of the permit will be mailed to the owner or operator of the facility upon request.

Note: The general permit is available on the Department website at: https://dnr.wi.gov/topic/stormwater/industrial/forms.html.

1.3 No Exposure Certification The owner or operator of a facility not currently covered under this permit that has submitted a Conditional No Exposure Certification to the Department in accordance with s. NR 216.21(3), Wis. Adm. Code, but that has been denied a No Exposure Exclusion by the Department shall apply for permit coverage in accordance with section 1.1 of this permit within 14-working days of being notified by the Department of the denial. The owner or operator of a facility that has previously been granted a No Exposure Exclusion by the Department but that has had that exclusion revoked shall apply for permit coverage in accordance with section 1.1 of this permit within 14-working days of being notified by the Department of the revocation.

1.4 Permit Coverage Transfers A permittee who will no longer control the permitted industrial facility may request that permit coverage be transferred to the person who will control the industrial facility. The transfer request shall be signed by both the permittee and the new owner or operator and sent electronically through the Department's Water ePermitting System. The Department may require additional information including an NOI to be filed prior to transferring permit coverage. Coverage is not transferred until the Department sends notification of transfer approval to the new owner or operator. The transfer request shall contain the following information:

1.4.1 The name and address of the facility.

1.4.2 The Facility Identification Number.

1.4.3 The names of the persons involved in the transfer, their signatures, and date of signatures.

1.4.4 A description of any significant changes in the operation of the facility.

1.4.5 A statement of acknowledgement by the transferee that it will be the permittee of record and is responsible for compliance with the permit.

Note: The Transfer of Coverage form (Form 3400-222) and information about submitting via the Department's Water ePermitting System are available on the Department website at: https://dnr.wi.gov/topic/stormwater/industrial/forms.html.

1.5 Permit Coverage Terminations

If the permittee no longer claims coverage under this permit, the permittee shall submit a signed Notice of Termination (NOT) to the Department in accordance with s. NR 216.32, Wis. Adm. Code.

Note: The NOT form (Form 3400-170) and information about submitting via the Department's Water ePermitting System are available on the Department website at: https://dnr.wi.gov/topic/stormwater/industrial/forms.html.

2. PERMIT APPLICABILITY CRITERIA

2.1 Applicability This permit applies to point sources at facilities which discharge contaminated storm water associated with industrial activity to waters of the state, either directly or via a separate storm sewer system, originating from industrial facilities belonging to:

2.1.1 Manufacturing facilities described by the following SIC codes:

SIC	Description
20--	Food & Kindred Products
21--	Tobacco Products
22--	Textile Mill Products
23--	Apparel & Other Textile Products
2434	Wood Kitchen Cabinets
25--	Furniture & Fixtures
265-	Paperboard Containers & Boxes
267-	Misc. Converted Paper Products
27--	Printing, Publishing, & Allied Industries
283-	Drugs
285-	Paints & Allied Products
30--	Rubber & Misc. Plastics Products
31--	Leather & Leather Products
323-	Products of Purchased Glass
34--	Fabricated Metal Products
35--	Industrial & Commercial Machinery & Computer Equipment
36--	Electronic & Other Electrical Equipment & Components
37--	Transportation Equipment
38--	Instruments & Related Products
39--	Misc. Manufacturing Industries
4221	Farm Product Warehousing & Storage
4222	Refrigerated Warehousing & Storage
4225	General Warehousing & Storage

Note: Facilities in SIC codes 311-, 3441 and 373- are included in s. NR 216.21(2)(a) 1. as Tier 1 facilities.

2.1.2 Transportation facilities described by the following SIC codes that have vehicle maintenance shops, equipment cleaning operations, or airport de-icing operations. This only applies to those portions of these facilities that are either involved in vehicle maintenance including rehabilitation, mechanical repairs, painting, fueling, lubrication, and associated parking areas, or involved in cleaning operations, or de-icing operations, or that are listed as a pollution source area under s. NR 216.27(3)(e):

SIC	Description
40--	Railroad Transportation
41--	Local & Interurban Passenger Transit
42--	Trucking & Warehousing
43--	U.S. Postal Service
44--	Water Transportation

45--	Transportation by Air
5171	Petroleum Bulk Stations & Terminals

2.1.3 Facilities described by the following SIC codes, including active and inactive mining operations. This permit only applies where storm water runoff has come into contact with any overburden, raw material, intermediate product, finished product, by-product, or waste material.

SIC	Description
10--	Metal Mining
12--	Coal Mining
13--	Oil & Gas Extraction
14--	Non-metallic Minerals, except fuels

Note: An industry-specific general permit has been developed by the Department that regulates both process and storm water discharges associated non-metallic mining operations, SIC code 14--. While the Department intends to cover non-metallic mining operations under the industry-specific general permit, it may alternatively cover storm water discharges associated with non-metallic mining operations under this Tier 2 general permit. This permit does not apply to non-coal mining operations which have been released from applicable state or federal reclamation requirements after December 17, 1990; nor to coal mining operations released from the performance bond issued to the facility by the appropriate Surface Mining Control and Reclamation Act authority under 30 USC 1201 et seq. and 16 USC 470 et seq. Production, processing, or treatment operations or transmission facilities associated with oil and gas extraction are included only if there has been a discharge of storm water after November 16, 1987 containing a reportable quantity of a pollutant, or if a storm water discharge contributed to a violation of a water quality standard.

2.1.4 Facilities subject to storm water effluent limitation guidelines, new or existing source performance standards, or toxic pollutant effluent standards under 33 USC 1251, 1311, 1314 (b) and (c), 1316 (b) and (c), 1317 (b) and (c), 1326 (c), except for those facilities identified in paragraph A.(1) that do not have contaminated storm water.

2.1.5 Treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge that are located within the confines of the facility, with a design flow of one million gallons per day or more, or required to have an approved pretreatment program. Not included are farm lands, domestic gardens or lands used for sludge management where sludge is beneficially reused and which are not physically located in the confines of the facility, or areas that are in compliance with Section 405 of the Clean Water Act under 33 USC s. 1345.

2.1.6 Hazardous waste treatment, storage, and disposal facilities, including those operating under interim status or a permit under Subtitle C of the Resource Conservation and Recovery Act (RCRA), 42 USC 6901 et seq.

2.1.7 Landfills, land application sites, and open dumps that receive or have received any industrial waste from any of the facilities identified in this section 2.1 of this permit, including those subject to regulation under subtitle D of RCRA, 42 USC 6901 et seq., or ch. 289, Wis. Stats. For purposes of this section, landfills include those landfills for construction and demolition waste disposal.

2.1.8 Steam electric power generating facilities, including coal handling sites but not including offsite transformer or electric substations.

2.1.9 Facilities described in SIC code 2951 for asphalt paving mixes and block, and facilities described in SIC codes 3271, 3272 and 3273 for cement products.

Note: In 1997, the North American Industry Classification System (NAICS) was developed as the standard for use by Federal agencies in classifying business establishments and has been adopted by Federal agencies to replace the SIC Code system. As a result, an industrial facility identified in sections 2.1.1 through 2.1.9 of this permit may have an NAICS Code assigned to it by a Federal agency, trade association, or other organization. If needed, the Department may use Federal data to convert the NAICS Code to the corresponding SIC Code for purposes of determining the applicability of this permit to the facility.

2.1.10 Facilities originally covered under a Tier 1 general permit, but subsequently covered under a Tier 2 general permit pursuant to s. NR 216.23(3), Wis. Adm. Code.

2.2 Authorized Discharges This permit authorizes storm water point source discharges to waters of the State from industrial activities identified in section 2.1 of this permit. This permit also authorizes the discharge of storm water commingled with flows contributed by process and non-process wastewater, provided those flows are regulated by other WPDES permits, if required.

2.3 Movement to Tier One Coverage In accordance with s. NR 216.23(4), Wis. Adm. Code, the Department may revoke coverage under this permit. In this case, the permittee shall reapply for Tier 1 general permit coverage.

2.4 Exclusions This permit does not apply to any of the following:

2.4.1 Diffused surface drainage or agricultural storm water discharges.

2.4.2 Non−storm water discharges.

2.4.3 Non−storm water discharges for which coverage under an individual or general WPDES permit is not required, including landscape irrigation, diverted stream flows, uncontaminated groundwater infiltration, uncontaminated pumped groundwater, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, lawn watering, individual residential car washing, flows from riparian habitats and wetlands and fire fighting.

2.4.4 Inactive, closed or capped landfills that have no potential for contamination of storm water. The Department shall make a determination of contamination potential on a case−by−case basis.

2.4.5 Remedial action discharges or discharges authorized by a WPDES permit for discharging contaminated or uncontaminated groundwater.

2.4.6 Areas located on plant lands that are segregated from the industrial activities of the plant, such as office buildings and accompanying parking lots, if the drainage from the segregated areas is not mixed with contaminated storm water drainage.

2.4.7 Storm water discharges into a municipal combined sewer system.

Note: Areas where this exclusion may apply include portions of the City of Milwaukee, the City of Superior, and the Village of Shorewood.

2.4.8 Storm water discharges from an industrial facility for which the owner or operator has submitted a Conditional No Exposure Certification to the Department in accordance with s. NR 216.21(3), Wis. Adm. Code, provided that the Department concurs with the no exposure certification and the conditions under which a No Exposure Exclusion was granted remain in effect.

2.5 Discharges Not Covered by this Permit The following are not authorized under this permit:

2.5.1 Storm water discharges within Indian Country.

Note: Indian County is defined under 18 USC §1151 and includes all lands within the exterior boundaries of federally recognized Indian reservations and on lands held in federal trust status. Facilities that currently do not have storm water discharge permit coverage and are located within Indian Country should contact the United States Environmental Protection Agency (USEPA) to apply. For existing discharges covered under a National Pollution Discharge Elimination System (NPDES) permit from USEPA, discharges will continue to be covered by a NPDES permit. Dischargers that previously held permit coverage under previous versions of this permit after September 30, 2001, are no longer eligible for coverage under this permit and must contact USEPA to apply.

USEPA's website contains information on the Multi-Sector General Permit: https://www.epa.gov/npdes/stormwater-discharges-industrial-activities. Facilities should verify eligibility for coverage under the general permit or determine if an individual permit is needed. Information on how to apply for the Multi-Sector General Permit can be accessed here: https://epanet.zendesk.com/hc/en-us/articles/360001508168-How-to-Create-a-NOI-for-MSGP-PPT-.

2.5.2 Discharges of hazardous substances that are required to be reported under ch. NR 706, Wis. Adm. Code.

2.5.3 Storm water discharges that affect wetlands, unless the Department determines that the storm water discharges comply with the wetland water quality standards provisions in ch. NR 103, Wis. Adm. Code.

2.5.4 Storm water discharges that affect endangered and threatened resources, unless the Department determines that the storm water discharges comply with the endangered and threatened resource protection requirements of s. 29.604, Wis. Stats., and ch. NR 27, Wis. Adm. Code.

2.5.5 Storm water discharges that affect any historic property that is listed property, or on the inventory or on the list of locally designated historic places under s. 44.45, Wis. Stats., unless the Department determines that the storm water discharges will not have an adverse effect on any historic property pursuant to s. 44.40(3), Wis. Stats.

2.5.6 Storm water discharges from land disturbing construction activity affecting one acre or more of land that require storm water permit coverage under subch. III of NR 216, Wis. Adm. Code, for new construction, reconstruction, or expansion of an industrial facility.

Note: Storm water discharges from areas of bare soil due to the normal industrial operation of the facility are covered under this permit provided those areas are managed in accordance with section 3.3.2.8.2.

2.5.7 Facilities where the Department makes a determination, pursuant to s. 283.35(3), Wis. Stats. or

s. NR 216.25(3), Wis. Adm. Code, that a storm water discharge is more appropriately covered under an individual WPDES permit. The Department may make this determination if one or more of the following conditions are met:

2.5.7.1 The storm water discharge is potentially a significant source of pollution and more appropriately regulated by an individual WPDES storm water discharge permit.

2.5.7.2 The facility is not in compliance with the terms and condition of this permit or Subchapter II of ch. NR 216, Wis. Adm. Code.

2.5.7.3 Numeric effluent limitations or standards are promulgated for a storm water discharge covered by this permit.

2.5.7.4 Storm water discharges that are regulated by permits containing storm water effluent limitations.

2.5.8 Storm water discharges in violation of the regulation of injection wells under ch. NR 815, Wis. Adm. Code.

Note: Information about the Department's injection well program may be found at: https://dnr.wi.gov/topic/wells/uiw.html.

2.5.9 Discharges associated with activities subject to any of the federal effluent limitation guidelines listed in Table 1 below:

Table 1.

Regulated Activity	**40 CFR Part/Subpart**
Discharges resulting from spray down or intentional wetting of logs at wet deck storage areas	Part 429, Subpart I
Runoff from phosphate fertilizer manufacturing facilities that comes into contact with any raw materials, finished product, by-products or waste products (SIC 2874)	Part 418, Subpart A
Runoff from asphalt emulsion facilities	Part 443, Subpart A
Runoff from material storage piles at cement manufacturing facilities	Part 411, Subpart C
Mine dewatering discharges at crushed stone, construction sand and gravel, or industrial sand mining facilities	Part 436, Subparts B, C, and D
Runoff from hazardous waste landfills	Part 445, Subpart A
Runoff from non-hazardous waste landfills	Part 445, Subpart B
Runoff from coal storage piles at steam electric generating facilities	Part 423
Runoff containing urea from airfield pavement deicing at existing and new primary airports with 1,000 or more annual non-propeller aircraft departures	Part 449

Note: The federal effluent limitations guidelines are available at the following website: https://www.epa.gov/eg/industrial-effluent-guidelines. Discharges associated with activities subject to any of the federal effluent limitation guidelines listed in Table 1 require coverage under a separate WPDES general permit or individual permit. However, these industrial facilities still require coverage under this permit for discharges not subject to the federal effluent limitation guidelines listed in Table 1.

2.6 Water Quality Standards

2.6.1 This permit specifies the conditions under which storm water may be discharged to waters of the state for the purpose of achieving water quality standards contained in chs. NR 102 through 105, NR 140, and NR 207, Wis. Adm. Code. For the term of this permit, compliance with water quality standards will be addressed by adherence to general narrative-type storm water discharge limitations and implementation of a storm water pollution prevention plan.

2.6.2 This permit does not authorize storm water discharges that the Department, prior to authorization of coverage under this permit, determines will cause or have reasonable potential to cause or contribute to an excursion above any applicable water quality standard. Where such determinations have been made prior to authorization, the Department may notify the applicant that an individual permit application is necessary. However, the Department may authorize coverage under this permit where the storm water pollution prevention plan required under this permit will include appropriate controls and implementation procedures designed to bring the storm water discharge into compliance with water quality standards.

2.7 Outstanding and Exceptional Resource Waters

2.7.1 Storm water discharges from industrial facilities covered under a previously issued version of this permit shall comply with sections 2.7.2 through 2.7.5 as of the **Effective Date**. Storm water discharges from industrial facilities covered under this permit after the **Effective Date** shall comply with sections 2.7.2 through 2.7.5 as of the **Start Date** of coverage under this permit.

2.7.2 The permittee shall determine whether any part of its facility discharges storm water to an outstanding resource water (ORW) or exceptional resource water (ERW). ORWs and ERWs are listed in ss. NR 102.10 and 102.11, Wis. Adm. Code, respectively.

Note: A list of ORWs and ERWs may be found on the Department website at: https://dnr.wi.gov/topic/surfacewater/orwerw.html.

2.7.3 The permittee may not establish a new storm water discharge of pollutants directly to an ORW or an ERW unless the discharge of pollutants is equal to or less than existing levels of pollutants immediately upstream of the discharge site. The storm water pollution prevention plan required under section 3 of this permit shall include practices designed to meet this requirement for new discharges.

2.7.3.1 "New storm water discharge" or "new discharge" means a storm water discharge that would first occur after the permittee's **Start Date** of coverage under this permit to a surface water to which the facility did not previously discharge storm water, and does not include an increase in a storm water discharge to a surface water to which the facility discharged on or before coverage under this permit.

2.7.4 The permittee may increase an existing storm water discharge directly to an ERW only if the increased discharge will not cause a significant lowering of water quality and the discharge is to accommodate to important economic or social development.

2.7.5 The permittee may increase an existing storm water discharge to an ORW only if the increased discharge of pollutants is equal to or less than the background levels of the pollutant upstream of the discharge and the discharge is to accommodate to important economic or social development.

2.8 Impaired Water Bodies and Total Maximum Daily Load Requirements

2.8.1 "Pollutant(s) of concern" means a pollutant that is contributing to the impairment of a water body.

2.8.2 By February 15th of each calendar year, the permittee shall perform an annual check to determine whether its facility discharges a pollutant of concern via storm water to an impaired water body listed in accordance with Section 303 (d) (1) of the Federal Clean Water Act, 33 USC §1313 (d) (1) (C), and the implementing regulation of the U.S. Environmental Protection Agency (USEPA), 40 CFR §130.7 (c) (1). Impaired waters are those listed as not meeting applicable surface water quality standards. The results of the annual check shall be documented with the Annual Facility Site Compliance Inspection required under section 4.3.1 of this permit.

Note: The Department updates the list approximately every two years. The updated list is effective upon approval by the USEPA. The current list may be found on the Department website at: https://dnr.wi.gov/topic/impairedwaters/.

2.8.3 A permittee that discharges a pollutant of concern via storm water to an impaired water body shall, within 180 days of the annual check that determines the facility discharges to an impaired water body, include a written section in the storm water pollution prevention plan that specifically identifies source area pollution prevention controls and storm water best management practices that will collectively be used to reduce, with the goal of eliminating, the storm water discharge of pollutant(s) of concern that contribute to the impairment of the water body and explain why these controls and practices were chosen as opposed to other alternatives. Changes identified in the storm water pollution prevention plan shall be implemented with the 180-day timeframe.

Note: For a permittee that discharges a pollutant of concern via storm water to an impaired water body, amending the storm water pollution prevention plan will be required after the initial annual check and if subsequent annual checks indicate additional pollutants of concern have been added, additional water bodies have been designated as impaired, or other relevant changes to the designation have occurred.

2.8.4 The permittee may not establish a new storm water discharge of a pollutant of concern to an impaired water body or significantly increase an existing discharge of a pollutant of concern to an impaired water body unless the new or increased discharge does not contribute to the receiving water impairment, or the discharge is consistent with a State and Federal approved total maximum daily load (TMDL) allocation for the impaired water body.

2.8.4.1 "New storm water discharge" or "new discharge" has the meaning given in section 2.7.3.1 of this permit.

2.8.5 By February 15th each calendar year, the permittee shall perform an annual check to determine whether its facility discharges a pollutant of concern via storm water to a water body included in a State and Federal approved TMDL. If so, the permittee shall assess whether any TMDL wasteload allocation for the facility's discharge is being met through the existing pollution prevention controls and storm water best management practices or whether additional controls or treatment are necessary and feasible. The assessment of the feasibility of additional controls or treatment shall focus on the ability to improve pollution prevention and treatment system effectiveness and the adequacy of implementation and maintenance of the additional controls or treatment. The results of the annual check shall be documented with the Annual Facility Site Compliance Inspection required under section 4.3.1 of this permit.

Note: The current State and Federal approved TMDLs may be found on the Department website at: https://dnr.wi.gov/topic/tmdls/.

2.8.6 Within 180 days of the annual check that determines the facility discharges to a TMDL allocated water body, a permittee that is included in a State and Federal approved TMDL shall submit to the Department a proposed implementation plan for the storm water discharge that meets the requirements of the State and Federal approved TMDL wasteload allocation for the facility. The proposed TMDL implementation plan shall specify any feasible pollution prevention and treatment improvements that could be made and specify any revisions or redesigns that could be implemented to increase the effectiveness of the permittee's storm water pollution prevention controls and treatment practices. The TMDL implementation plan shall also specify a time schedule for implementation of the improvements, revisions or redesigns necessary to meet the wasteload allocation for the facility. If a specific wasteload allocation has not been assigned to the facility under a TMDL, compliance with this permit shall be deemed to be in compliance with the TMDL.

2.9 Fish and Aquatic Life Waters

2.9.1 The permittee shall determine whether it will have a storm water discharge to a fish and aquatic life water as defined in s. NR 102.13, Wis. Adm. Code.

Note: Most receiving waters of the state are classified as a fish and aquatic life waters and this classification includes all surface waters of the state except ORWs, ERWs, Great Lakes system waters and variance water identified within ss. NR 104.05 through 104.10, Wis. Adm. Code. The Department may be consulted if the permittee is not certain of the classification.

2.9.2 The permittee may not establish a new storm water discharge of pollutants to a fish and aquatic life water if the discharge will result in the significant lowering of water quality of the fish and aquatic life water. Significant lowering of water quality is defined within ch. NR 207, Wis. Adm. Code.

2.9.2.1 "New storm water discharge" or "new discharge" has the meaning given in section 2.7.3.1 of this permit.

2.9.3 If the permittee's facility has an existing storm water discharge to a fish and aquatic life water, it may not increase the discharge of pollutants if the increased discharge would result in a significant lowering of water quality.

2.9.4 Any increased or new discharge of storm water authorized under this permit shall be to accommodate to important economic or social development.

2.10 Toxic Pollutants In accordance with s. NR 102.12 Wis. Adm. Code, a new discharge and increased discharge as defined in ch. NR 207, Wis. Adm. Code, of persistent, bioaccumulating toxic substances to the Great Lakes waters or their tributaries shall be avoided or limited to the maximum extent practicable. Any new or increased discharge of these substances is prohibited unless the permittee certifies that the new or increased discharge is necessary after utilization of best technology in process or control using waste minimization, pollution prevention, municipal pretreatment programs, material substitution or other means of commercially available technologies which have demonstrated capability for similar applications.

2.11 Minimum Source Area Control Requirements All permittees shall comply with the following minimum source area control requirements. The Storm Water Pollution Prevention Plan required under section 3 shall identify how each source area control requirement will be met. Source area controls shall be utilized to prevent storm water from becoming contaminated at the facility. Structural source area controls that are either proposed or in place at the facility shall be indicated on the facility drainage base map described in section 3.3.2.2 of this permit. The permittee shall:

2.11.1 Minimize exposure of pollutants associated with the potential sources of storm water contamination identified in section 3.3.2.4 of this permit.

2.11.2 Use good house-keeping measures such as sweeping, appropriate storage, and proper management of waste materials and dumpsters/compactors.

2.11.3 Maintain both structural and non-structural control measures, institute preventive maintenance for vehicles and equipment, and perform routine visual inspections.

2.11.4 Minimize the potential for leaks, spills, and other releases that may contaminate storm water, and institute spill prevention and response measures, including spill reporting described in section 6.5 of this permit.

2.11.5 Stabilize areas of bare soil with vegetation or through permanent land cover to control soil erosion, or when that is not possible, implement best management practices to meet the requirements of section 3.3.2.8.2 of this permit.

2.11.6 Construct and maintain salt storage facilities so that neither precipitation nor storm water runoff can come into contact with the stored salt in order to minimize pollutant discharges.

2.11.6.1 Salt storage piles shall be constructed on an impervious, curbed surface to prevent salt or brine from passing through the base and reaching waters of the state. Salt storage piles shall be enclosed by a building or structure with walls and a cover sufficient to prevent contact between precipitation and the salt and to prevent wind from eroding the salt or carrying any amount of the substance into potential contact with the waters of the state. Alternatively, for permittees that use brine and have salt storage piles on impervious curbed surfaces, install a means of diverting contaminated storm water to a brine treatment system for process use.

2.11.6.2 Any salt spillage resulting from activities such as loading or unloading, shall be immediately cleaned up to minimize contact with storm water.

2.11.7 Train and raise awareness of employees as appropriate on storm water pollution prevention, the requirements of this permit, and their specific responsibilities in implementing any of the requirements, practices, or activities of this permit or the Storm Water Pollution Prevention Plan.

2.11.8 Evaluate the facility for the presence of non-storm water discharges as specified in section 4.2. of this permit.

Note: This permit does not cover non-storm water discharges. See section 2.3.
2.11.9 Minimize dust and off-site tracking of soil, raw materials, intermediate products, final products, or waste materials.

2.11.10 If applicable, use a combination of storm water contact control or containment, drainage controls, or diversions to control SARA Title III Section 313 "Water Priority Chemicals" (42 USC s. 11023 (c)) potentially discharged through the action of storm water runoff, leaching, or wind.

2.12 Compliance with Runoff Management Performance Standards The owner or operator of a facility subject to the performance standards in s. NR 151.12 or ss. NR 151.121 to 151.128, Wis. Adm. Code, shall describe in the Storm Water Pollution Prevention Plan the best management practices necessary to maintain compliance with the applicable performance standards in s. NR 151.12 or ss. NR 151.121 to 151.128, Wis. Adm. Code, for those areas that are described in s. NR 151.12(2) or s. NR 151.121(2), Wis. Adm. Code, respectively. Best management practices installed to meet the performance standards in s. NR 151.12 or s. NR 151.121 to 151.128, Wis. Adm. Code, shall be maintained to meet the treatment capability as originally designed.

2.13 Post-Construction Performance Standards for Landfills For landfills, post-construction storm water best management practices constructed after the effective date of this permit shall be in compliance with the performance standards in ss. NR 151.122 and NR 151.123, Wis. Adm. Code.

Note: The infiltration performance standard in s. NR 151.124, Wis. Adm. Code, does not apply to landfills.

3. STORM WATER POLLUTION PREVENTION PLAN

3.1 Storm Water Pollution Prevention Plan Required In accordance with s. NR 216.27, Wis. Adm. Code, and section 3.3 of this permit, the owner or operator of a facility requiring coverage under this permit shall prepare a Storm Water Pollution Prevention Plan (SWPPP) prior to applying for permit coverage under s. NR 216.22, Wis. Adm. Code.

3.2 Incorporation by Reference When plans are developed or activities conducted in accordance with other federal, state or local regulatory programs that meet the requirements of section 3.3.2 of this permit, the plans may be incorporated by the permittee into the SWPPP by reference.

3.3 Purpose and Content of a Storm Water Pollution Plan

3.3.1 Purpose of the Plan Any SWPPP prepared to comply with this permit shall do all of the following:

3.3.1.1 Identify sources of storm water and non-storm water contamination to the storm water drainage system.

3.3.1.2 Identify and prescribe appropriate "source area control" type best management practices designed to prevent storm water contamination from occurring.

3.3.1.3 Identify and prescribe "storm water treatment" type best management practices to reduce pollutants in contaminated storm water prior to discharge.

3.3.1.4 Prescribe actions needed either to bring non-storm water discharges under an appropriate WPDES permit or to remove these discharges from the storm drainage system.

3.3.1.5 Prescribe an implementation schedule so as to ensure that the storm water management actions prescribed in the SWPPP are carried out in a timely manner and evaluated on a regular basis.

3.3.2 Required Plan Content The SWPPP shall contain, at a minimum, the following items and provisions:

3.3.2.1 Pollution Prevention Individual The SWPPP shall identify by job title the specific individual who has primary responsibility for all aspects of SWPPP development and implementation and identify any other individuals concerned with SWPPP development or implementation, and their respective roles. The specific individual who has primary responsibility shall develop, evaluate, maintain and revise the SWPPP, and carry out the specific management actions identified in the SWPPP, including maintenance practices, monitoring activities, preparing and submitting reports, recordkeeping, and serving as facility contact for the Department.

3.3.2.2 Facility Site Description and Drainage Base Map The SWPPP shall contain a short summary of the major activities conducted at various locations throughout the facility. The SWPPP shall also include a facility drainage base map depicting all of the following:

3.3.2.2.1 How storm water drains on, through and from the facility to groundwater, surface water, or wetlands.

3.3.2.2.2 The facility property boundaries.

3.3.2.2.3 The storm drainage collection and disposal system including all surface and subsurface conveyances.

3.3.2.2.4 Any secondary containment structures.

3.3.2.2.5 The location of all outfalls that discharge channelized flow to groundwater, surface water or wetlands, including outfalls recognized as permitted outfalls under another WPDES permit, numbered for reference.

3.3.2.2.6 The drainage area boundary for each outfall.

3.3.2.2.7 The surface area in acres draining to each outfall, including the percentage that is impervious such as paved, roofed or highly compacted soil, and the percentage that is pervious such as grassy areas and woods.

3.3.2.2.8 Existing structural storm water controls.

3.3.2.2.9 The name and location of receiving waters.

3.3.2.2.10 The location of activities and materials that have the potential to contaminate storm water.

3.3.2.3 Summary of Existing Sampling Data or Observations The SWPPP shall summarize any results of available storm water sampling data or other observations that characterize the quality of storm water discharges or identifying sources of storm water contamination. Available data that characterizes the quality of storm water discharges under dry weather flow conditions shall also be included, except when such data has been or will be reported to the Department under another WPDES permit.

3.3.2.4 Potential Sources of Storm Water Contamination The SWPPP shall identify any significant pollutants or activities associated with the storm water pollution source areas identified in this permit. When possible, specific pollutants likely to be present in storm water as a result of contact with specific materials shall also be listed. The SWPPP shall identify all potential source areas of storm water contamination, including but not limited to:

3.3.2.4.1 Outdoor manufacturing areas.

3.3.2.4.2 Rooftops contaminated by industrial activity, exhaust vents, or a pollution control device.

3.3.2.4.3 Industrial plant yards.

3.3.2.4.4 Storage and maintenance areas for material handling equipment.

3.3.2.4.5 Immediate access roads and rail lines owned or operated by the permittee.

3.3.2.4.6 Material handling sites including storage, loading, unloading, transportation, or conveyance of any raw material, finished product, intermediate product and by-product or waste areas.

3.3.2.4.7 Storage areas (including tank farms) for raw materials, finished and intermediate products.

3.3.2.4.8 Disposal or application of wastewater.

3.3.2.4.9 Areas containing residual pollutants from past industrial activity.

3.3.2.4.10 Areas of significant soil erosion, including areas of bare soil.

3.3.2.4.11 Refuse sites.

3.3.2.4.12 Vehicle maintenance and cleaning areas.

3.3.2.4.13 Washing areas for equipment, vehicles, containers, or other items.

3.3.2.4.14 Shipping and receiving areas.

3.3.2.4.15 Manufacturing buildings.

3.3.2.4.16 Residual treatment, storage, and disposal sites.

3.3.2.4.17 Any other areas capable of contaminating storm water runoff.

3.3.2.5 Status of Non-Storm Water Discharges to the Storm Sewer The SWPPP shall identify all known contaminated and uncontaminated sources of non-storm water discharges to the storm sewer system or waters of the state and indicate which are covered by WPDES permits. The SWPPP shall contain the results of the non-storm water discharge monitoring required by s. NR 216.28, Wis. Adm. Code. If monitoring is not feasible due to the lack of suitable access to an appropriate monitoring location, the SWPPP shall include a statement that the monitoring could not be conducted and an explanation of the reasons why.

3.3.2.6 Source Area Control Best Management Practices The SWPPP shall rely, to the maximum extent practicable, on the use of source area control best management practices designed to prevent storm water from becoming contaminated at the facility. Source area control best management practices that are either proposed or in place at the facility shall be indicated on the facility drainage base map described in section 3.3.2.2 of this permit. The SWPPP shall provide for the use of the following source area control best management practices:

3.3.2.6.1 Activities to stabilize areas of bare soil with vegetation or through permanent land cover to control soil erosion.

3.3.2.6.2 Good house-keeping measures, preventive maintenance measures, visual inspections, spill prevention and response measures, and employee training and awareness.

3.3.2.6.3 Manage salt storage facilities so that neither precipitation nor storm water runoff can come into contact with the stored salt in order to minimize pollutant discharges. Alternatively, for permittees that use brine and have salt storage piles on impervious curbed surfaces, install and maintain a means of diverting contaminated storm water to a brine treatment system for process use.

3.3.2.6.4 Use of a combination of storm water contact control or containment, drainage controls, or diversions to control SARA Title III Section 313 "Water Priority Chemicals" (42 USC s. 11023 (c)) potentially discharged through the action of storm water runoff, leaching, or wind.

3.3.2.7 Residual Pollutants The SWPPP shall identify pollutants that are likely to contaminate storm water discharges to waters of the state following implementation of source area control best management practices. Past sampling data collected at the facility or at sufficiently similar outfalls at other facilities may be used in making this determination. At a minimum, the following pollutants shall be considered for their potential to contaminate storm water:

3.3.2.7.1 Any pollutant for which an effluent limitation is contained in any discharge permit issued to the permittee, for this facility, by the Department.

3.3.2.7.2 Any pollutant contained in a categorical effluent limitation or pre-treatment standard to which the facility is subject.

3.3.2.7.3 Any SARA Title III Section 313 "Water Priority Chemical" (42 USC s. 11023 (c)) for which the permittee, for this facility, has reporting requirements and which has the potential for contaminating storm water.

3.3.2.7.4 Any other toxic or hazardous pollutants from present or past activity at the site that remain in contact with precipitation or storm water and which could be discharged to the waters of the state, and which are not regulated by another environmental program.

3.3.2.7.5 Any of the following parameters which might be present in significant concentrations: Oil and grease, pH, total suspended solids, 5-day biological oxygen demand, and chemical oxygen demand.

3.3.2.8 Storm Water Treatment Best Management Practices When source area control best management practices are not practicable or are inadequate to control storm water pollution, or when the Department determines source area control best management practices are inadequate to achieve a water quality standard, the SWPPP shall prescribe appropriate storm water treatment practices as needed to reduce the pollutants in contaminated storm water prior to discharge to waters of the state. Proposed or existing storm water treatment practices shall be shown on the facility drainage basin map described in section 3.3.2.2 of this permit. The SWPPP shall provide for the following types of storm water treatment practices:

3.3.2.8.1 Storm water significantly contaminated with petroleum products shall be treated for oil and grease removal by an adequately sized, designed, and functioning wastewater treatment device. Coverage under a separate individual or general permit is required for discharges of storm water from oil/water treatment devices. Under s. 281.41, Wis. Stats., prior Department approval of plans for oil and grease removal devices may be required.

3.3.2.8.2 Storm water discharges contaminated by sediment eroding from areas of bare soil that cannot be stabilized by pavement, gravel, vegetation, or other permanent land cover shall be treated by best management practices designed, installed and maintained to achieve compliance with the construction site performance standards in s. NR 151.11(6m), Wis. Adm. Code, and in accordance with the Department's Construction Site Erosion and Sediment Control Technical Standards.

Note: The Construction Site Erosion and Sediment Control Technical Standards are available at the following Department website: https://dnr.wi.gov/topic/stormwater/standards/const_standards.html.

3.3.2.9 Facility Monitoring The SWPPP shall include provisions for complying with the monitoring requirements specified in s. NR 216.28, Wis. Adm. Code, and section 4 of this permit. The SWPPP shall include a checklist of inspections to be made during the annual facility site inspection required by s. NR 216.28(2), Wis. Adm. Code. The SWPPP shall also identify for each outfall the type of monitoring that will be conducted, such as non-storm discharge monitoring and storm water discharge quality inspections.

3.3.2.10 SWPPP Implementation Schedule The SWPPP shall include an implementation schedule for the requirements of this permit that meet the compliance timeframes set forth in this permit.

3.3.2.11 Certification and Signature The SWPPP shall be signed in accordance with s. NR 216.22(7), Wis. Adm. Code, and contain the following statement:

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

3.4 Amending a SWPPP Unless an alternative timeframe is specified by the Department, the permittee shall amend and submit the SWPPP to the department within 30 days of the occurrence of any of the following circumstances:

3.4.1 When expansion, production increases, process modifications, changes in material handling or storage, or other activities are planned which will result in significant increases in the exposure of pollutants to storm water discharged either to waters of the state or to storm water treatment devices. The amendment shall contain a description of the new activities that contribute to the increased pollutant loading, planned source control activities that will be used to control pollutant loads, an estimate of the new or increased discharge of pollutants following treatment, and when appropriate, a description of the effect of the new or increased discharge on existing storm water treatment facilities.

3.4.2 The comprehensive annual facility site compliance inspection, quarterly visual inspection of storm water quality, or other information reveals that the provisions of the SWPPP are ineffective in controlling storm water pollutants discharged to waters of the state.

3.4.3 Upon written notice that the Department finds the SWPPP to be ineffective in achieving the conditions of this permit.

3.5 Storm Water Discharges to Outstanding and Exceptional Resource Waters If the permittee's industrial storm water will discharge to an outstanding resource water or exceptional resource water, the permittee shall include a written section in the SWPPP that discusses and identifies the management practices and control measures the permittee will implement to prevent the discharge of any pollutant(s) in excess of the background level within the water body. This section of the permittee's plan shall specifically identify control measures and practices that will collectively be used to prevent the discharge of pollutants in excess of the background level within the water body.

4. MONITORING REQUIREMENTS

4.1 Purpose Monitoring includes site inspections and non-storm water discharge assessments. The purpose of monitoring is to evaluate storm water outfalls for the presence of non-storm water discharges, and to evaluate the effectiveness of the permittee's pollution prevention activities in controlling contamination of storm water discharges.

4.2 Evaluation of Non-Storm Water Discharges

4.2.1 The permittee shall evaluate all storm water outfalls for non-storm water contributions to the storm drainage system for the duration of this permit. Any monitoring shall be representative of non-storm water discharges from the facility. Evaluations shall take place during dry periods, and may include either end of pipe screening or detailed testing of the storm sewer collection system. Either of the following monitoring procedures is acceptable:

4.2.1.1 A detailed testing of the storm sewer collection system may be performed. Acceptable testing methods include dye testing, smoke testing, or video camera observation. The Department may require a re-test after 5 years or a lesser period as deemed necessary by the Department.

4.2.1.2 End of pipe screening shall consist of visual observations made at least twice per year at each outfall of the storm sewer collection system. Instances of dry weather flow, stains, sludge, color, odor, or other indications of a non-storm water discharge shall be recorded.

Note: The department recommends compiling photographic documentation of visual observations made during non-storm water discharge evaluations.

4.2.2 In addition to maintaining results on-site at the facility, results of the non-storm water evaluations shall be included in the SWPPP required in section 3.3.2.5 of this permit and the Annual Facility Site Compliance Inspection report required in section 5.2 of this permit. Information reported shall include the date of testing, test method, outfall location, testing results, and potential significant sources of non-storm water discovered through testing. Upon discovering non-storm water flows that are not covered under another WPDES permit, the permittee shall either immediately seek coverage under another permit from the Department or eliminate the non-storm water flow.

4.2.3 Any permittee unable to evaluate an outfall for non-storm water discharges shall sign a statement certifying that this requirement could not be complied with, and include a copy of the statement in the SWPPP and the Annual Facility Site Compliance Inspection report. The statement shall be submitted to the Department within 30 days after the permittee determines that it is unable to evaluate an outfall.

4.3 Evaluation of Storm Water Discharges The permittee shall evaluate storm water outfalls for storm water contributions to the storm drainage system. Any monitoring shall be representative of storm water discharges from the facility.

4.3.1 Annual Facility Site Compliance Inspection Permittees shall perform and document the results of an Annual Facility Site Compliance Inspection (AFSCI). The AFSCI shall be adequate to verify that the site drainage conditions and potential pollution sources identified in the SWPPP remain accurate, and that the best management practices prescribed in the SWPPP are being implemented, properly operated and adequately maintained. Information reported shall include the inspection date, inspection personnel, scope of the inspection, major observations, and revisions needed in the SWPPP.

The AFCSI Report Form can be accessed at the following website:
https://dnr.wi.gov/files/PDF/forms/3400/3400-176.pdf

4.3.2 Quarterly Visual Monitoring Permittees shall perform and document quarterly visual inspections of storm water discharge quality at each storm water discharge outfall. Inspections shall be conducted within the first 30 minutes of discharge or as soon thereafter as practical, but not exceeding 60 minutes. The inspections shall include any observations of color, odor, turbidity, floating solids, foam, oil sheen, or other obvious indicators of storm water pollution. Information reported shall include the inspection date, inspection personnel, visual quality of the storm water discharge, and probable sources of any observed storm water contamination.

The Quarterly Visual Inspection Form can be accessed at the following website:
https://dnr.wi.gov/files/PDF/forms/3400/3400-176a.pdf

4.3.3 Monitoring Waivers The Department may waive specific monitoring requirements for the following reasons:

4.3.3.1 The permittee indicates that either an employee could not reasonably be present at the facility at the time of the snowmelt or runoff event, or that attempts to meet the monitoring requirement would endanger employee safety or well-being.

4.3.3.2 The permittee indicates that there were no snow melt or runoff events large enough to conduct a quarterly visual inspection at an outfall. A waiver is automatically granted for a quarter where the permittee sufficiently documents and retains records demonstrating that there were no snow melt or runoff events large enough to conduct a quarterly visual inspection at the facility during that quarter. Documentation and records used to qualify for an automatic waiver shall be submitted to the Department upon request.

4.3.3.3 The facility is inactive or remote facility (such as an inactive mining operation) where the permittee demonstrates that monitoring and inspection activities are impractical or unnecessary. At a minimum, the Department shall establish an alternative requirement that the permittee make site inspections by a qualified individual at least once in every 3-year period.

4.3.3.4 The permittee demonstrates to the Department's satisfaction that the sources of storm water contamination are outside of the permittee's property boundary and are not associated with the permittee's activities. The demonstration shall be presented in the SWPPP or AFSCI report and submitted to the Department for evaluation.

5. COMPLIANCE AND REPORTING REQUIREMENTS

5.1 SWPPP Compliance and Reporting Requirements

5.1.1 An owner or operator of a facility requiring coverage under this permit shall prepare a Storm Water Pollution Prevention Plan (SWPPP) prior to applying for permit coverage under s. NR 216.22, Wis. Adm. Code, and shall submit the SWPPP summary to the Department when applying for coverage under this permit. For existing facilities that previously operated without required permit coverage and without a SWPPP as required, the owner or operator shall immediately develop a SWPPP, submit the SWPPP summary to the Department when applying for coverage under this permit, and implement the SWPPP to achieve compliance with this permit in the shortest practicable time. A facility has the option to submit their full SWPPP in lieu of the SWPPP summary when applying for coverage.

5.1.2 The SWPPP shall conform to the requirements specified in s. NR 216.27 (3), Wis. Adm. Code, and section 3.3 of this permit.

5.1.3 The SWPPP shall be kept at the facility and made available to the Department for inspection and copying upon request. If storm water discharges from the facility enter a municipal separate storm sewer system covered under a storm water permit pursuant to Subchapter I of ch. NR 216, Wis. Adm. Code, the SWPPP shall be made available to the owner or operator of the municipal separate storm sewer system for inspection and copying upon request.

5.1.4 Unless an alternate implementation schedule is specified by the Department, the SWPPP shall be implemented in accordance with the implementation schedule developed under section 3.3.2.10 of this permit.

5.1.5 The permittee shall keep the SWPPP current and amend it as necessary to correct deficiencies in the SWPPP as they are identified. The permittee shall amend the SWPPP and submit it to the Department in the event of any facility operational changes that may result in additional significant storm water contamination.

5.2 Monitoring Compliance and Reporting Requirements

5.2.1 The permittee shall conduct the first Annual Facility Site Compliance Inspection (AFSCI) within 12 months of the **Start Date** of coverage under this general permit. Subsequent AFSCIs shall be conducted and AFSCI reports prepared by the permittee by the anniversary of the **Start Date** for each year of coverage under this permit. Reports shall be written on forms available from the Department and shall contain information from the AFSCI, the quarterly visual inspection, and the non-storm water evaluation. Copies of all AFSCI reports, quarterly visual inspections and nonstorm water monitoring reports shall be maintained on site at the facility and made available to the Department for inspection and copying upon request for the duration of permit coverage.

Note: The AFSCI Report form, Quarterly Visual Inspection form, and Storm Water Chemical Analysis Report form are available on the Department website at: https://dnr.wi.gov/topic/stormwater/industrial/forms.html.

5.2.2 Quarterly visual inspections of storm water discharge quality shall be conducted by the permittee four times annually by the anniversary date of **Start Date** of coverage under the permit.

5.3 Discharges to Regulated Municipal Separate Storm Sewer Systems

5.3.1 Permittees regulated under this permit with storm water discharges and non-storm water discharges entering a municipal separate storm sewer system covered under a storm water permit pursuant to Subchapter I of ch. NR 216, Wis. Adm. Code, shall provide information on these discharges to the owner or operator of the municipal separate storm sewer system upon request. Information the permittee shall provide includes the area or sub-areas of the facility draining to the municipal separate storm sewer system, the nature of industrial activity and potential storm water contamination sources in the areas draining to the system, the nature and number of non-storm water discharges to the system, storm water best management practices employed at the facility and their effectiveness at pollutant removal, storm water monitoring data, and copies of the SWPPP and AFSCI reports.

5.3.2 Upon discovering a previously unknown non-storm water discharge to the municipal separate storm sewer system that is not authorized to discharge under a required WPDES permit or that is an illicit discharge as defined by s. NR 216.002(11), Wis. Adm. Code, the permittee shall immediately report the discharge to the owner or operator of the municipal separate storm sewer system.

5.3.3 The permittee shall immediately report spills or dumping of materials that enter the municipal separate storm sewer system to the owner or operator of the system.

5.3.4 In accordance with the owner or operator’s established authority to control discharges to its municipal separate storm sewer system, the permittee shall assist the owner or operator of the system with detecting and eliminating illicit discharges to the system to the maximum extent practicable if the owner or operator finds that the source of an illicit discharge may originate from the permittee’s facility.

6. GENERAL CONDITIONS The general conditions in s. NR 205.07(1), (3), and (5), Wis. Adm. Code, are hereby incorporated by reference into this permit, except for s. NR 205.07(1)(n) and(3)(b), Wis. Adm. Code. Under s. NR 205.08(9), Wis. Adm. Code, dischargers covered under a storm water general permit are not required to submit an application for reissuance unless directed to do so by the Department under s. NR 216.22(9), Wis. Adm. Code. The requirements for spill reporting are in section 6.5 below.

Note: Chapter NR 205 is available at the following website: https://docs.legis.wisconsin.gov/code/admin_code/nr/200.

6.1 Work near Surface Waters and Wetlands Activities performed in wetland areas, in floodplains, or near shorelands may require permits or approvals through applicable state law, state regulations, or county or local ordinances. Additionally, state permits or contracts required by chs. 30, 31 and 87, Wis. Stats. and s. 281.36, Wis. Stats. (or Wisconsin Administrative Code promulgated under these laws), and federal permits may be applicable.

6.2 Continuation of the Expired General Permit As provided in s. NR 205.08(9), Wis. Adm. Code, and s. 227.51, Wis. Stat., the terms and conditions of this general permit shall continue to apply until this general permit is reissued or revoked or until an individual permit is issued for the discharge to which the general permit applied.

6.3 Petition to Move to Individual Permit Coverage Any person may submit a written request to the department to withdraw coverage under this general permit and to replace it with an individual storm water permit under s. NR 216.25(4), Wis. Adm. Code.

6.4 Liabilities under Other Laws Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the federal Clean Water Act (33 USC s. 1321), any applicable federal, state, or local law or regulation under authority preserved by Section 510 of the Clean Water Act (33 USC s. 1370).

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

6.6 Spill Reporting The permittee shall notify the Department immediately of any release or spill of a hazardous substance to the environment in accordance with s. 292.11, Wis. Stats., and ch. NR 706, Wis. Adm. Code.

Note: The 24-hour toll free spills hotline number is (800) 943-0003. Information about hazardous substance spills is available from the Department's website at: https://dnr.wi.gov/topic/Spills/.

6.7 Submitting Records Any forms or reports submitted to the Department of Natural Resources in accordance with this permit shall be submitted via the Department's Water ePermitting System available at: https://dnr.wi.gov/topic/stormwater/industrial/forms.html.

6.8 Enforcement Any violation of s. 283.33, Wis. Stats., ch. NR 216, Wis. Adm. Code, or this permit is enforceable under s. 283.89, Wis. Stats.

6.9 Permit Fee A storm water discharge permit fee shall be paid annually for each industrial facility covered under this permit. The permittee will be billed by the Department annually in May of each year and the fee is due by June 30 of each year in accordance with s. NR 216.30, Wis. Adm. Code. A permittee may be referred to the Wisconsin Department of Revenue for the collection of any unpaid storm water fee.

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
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TTY Access via relay - 711

03/15/2022

Jeff Maxted
4902 N Biltmore Lane
Madison, WI 53718

EXE-SC-2022-11-00802

RE: Artificial Wetland Exemption Determination for an area described as Wetlands 1, 2, and active coal combustion residual surface impoundments (purple colored on map) located at T12N R9E S27 in the Town of PACIFIC, Columbia County.

Dear Mr. Maxted:

This letter is in response to your request for an artificial wetland exemption determination for the above mentioned wetlands.

According to 281.36 (4n), State Statutes, a landscape feature where hydrophytic vegetation may be present as a result of human modification to the landscape or hydrology and for which no definitive evidence exists showing a prior wetland or stream history before August 1, 1991, may be exempt from state wetland regulations. The following types of artificial wetlands cannot be exempted from state wetland regulation: 1) a wetland that serves as a fish spawning area or that is passage to a fish spawning area and 2) a wetland created as a result of a wetland mitigation requirement. In addition, DNR must also consider whether the artificial wetland is providing significant flood protection to adjacent or downstream properties and infrastructure, and/or significant water quality functions to adjacent or downstream water bodies.

The Department reviewed the following materials to aid in our exemption determination:
The request narrative.
Historic Maps, including the Original Land Survey Plat, Bordner Survey, the USGS topographic Quad map from 1962 and 1984, and soil mapping.
Aerial photographs, including the 1937/8 era photograph, a pre-construction aerial photograph, and a post-construction photograph.
Site photographs that show different angles and views of the wetland.

Below is a summary of our findings:

Request Narrative
According to the request narrative the basis for a determination of artificial wetlands is that wetland characteristics formed within areas lacking a history of wetland land cover. This is due to the construction of CCRSIs in the CCRSI area, and the excavation/construction of a PVC-lined leachate and stormwater runoff collection basin and grading in the landfill area.

Historic Map Review
Original Land Survey Plat. The original land survey indicates inconclusive maps and notes along the WI River.
The Bordner survey indicates cropland including oak, hickory woodland.
The 1962 and 1984 USGS Quad map indicates no wetlands.
The 1913 soil survey maps indicate no wetlands.

Aerial Photograph Review
The 1937/38 aerial photograph shows farm field.
The 1972-74 aerial photographs show mass grading.

Site Photographs

The site photographs show the ponds and conveyance features.

Conclusion:

Based upon the information provided above, the wetland identified as Wetlands 1, 2 and active coal combustion residual surface impoundments (purple colored on map) lacked a wetland history prior to August 1, 1991, and fulfills all artificial wetland exemption standards. Therefore, Wetlands 1, 2, and active coal combustion residual surface impoundments (purple colored) are exempt from state wetland regulations.

This letter describes DNR's decision regarding the jurisdictional status of Wetlands 1, 2, and active coal combustion residual surface impoundments (purple colored on map) and are only valid for state jurisdictional purposes. For decisions regarding the federal jurisdictional status of Wetlands 1 and 2, you will need to contact the U.S. Army Corps of Engineers.

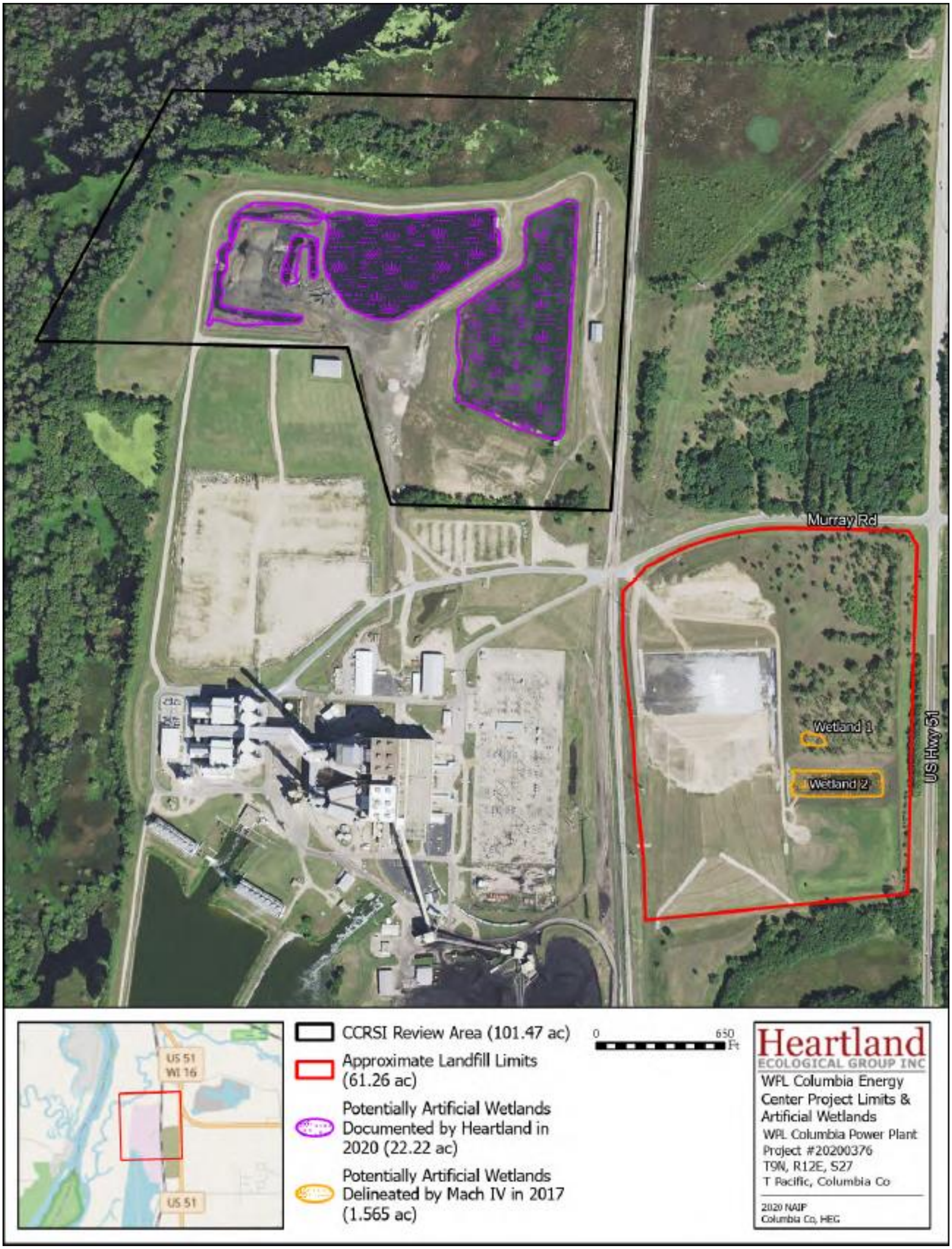
If you have any questions, please call me at (608) 228-4067 or email Allen.Ramminger@wisconsin.gov

Sincerely,

Allen Ramminger
Water Management Specialist

Copy to:

USACE Project Manager
Water Management Specialist
County Zoning Administrator
Consultant


Murray Rd
Wetland 1
Wetland 2
US Hwy 51
US 51
WI 16
US 51
CCRSI Review Area (101.47 ac)
Approximate Landfill Limits
(61.26 ac)
Potentially Artificial Wetlands
Documented by Heartland in
2020 (22.22 ac)
Potentially Artificial Wetlands
Delineated by Mach IV in 2017
(1.565 ac)
0
650
Ft
Heartland
ECOLOGICAL GROUP INC
WPL Columbia Energy
Center Project Limits &
Artificial Wetlands
WPL Columbia Power Plant
Project #20200376
T9N, R12E, S27
T Pacific, Columbia Co
2020 NAIP
Columbia Co, HEG

From: Gearing, Phillip
Sent: Tuesday, September 27, 2022 8:35 AM
To: Bekta, Ann M - DNR
Cc: Sullivan, Tyler J - DNR; Clepper, Brian; Pedretti, Scott; Nelson, Debra; Maxted, Jeffrey
Subject: RE: Columbia (#3025) Modules 10&11 Geosynthetics Preconstruction Report

Categories: Filed by Newforma

Makes sense. We will request the updated panel layout from the installer and add to the addendum submission.

Thanks!

Phil Gearing
SCS Engineers
Madison, WI
608-216-7324 (W)
608-316-5452 (C)
pgearing@scsengineers.com

www.scsengineers.com

From: Maxted, Jeffrey <JeffreyMaxted@alliantenergy.com>
Sent: Tuesday, September 27, 2022 8:22 AM
To: Bekta, Ann M - DNR <ann.bekta@wisconsin.gov>
Cc: Sullivan, Tyler J - DNR <tyler.sullivan@wisconsin.gov>; Clepper, Brian <BrianClepper@alliantenergy.com>; Pedretti, Scott <ScottPedretti@alliantenergy.com>; Gearing, Phillip <PGearing@scsengineers.com>; Nelson, Debra <DNelson@scsengineers.com>
Subject: Re: Columbia (#3025) Modules 10&11 Geosynthetics Preconstruction Report

Roger that, Ann. Thanks for the quick look and initial comment. We will circle back if there are any questions and please let us know if you see anything else that warrants discussion.

Get Outlook for iOS

From: Bekta, Ann M - DNR <Ann.Bekta@wisconsin.gov>
Sent: Tuesday, September 27, 2022 7:28:14 AM
To: Maxted, Jeffrey <JeffreyMaxted@alliantenergy.com>
Cc: Sullivan, Tyler J - DNR <tyler.sullivan@wisconsin.gov>; Clepper, Brian <BrianClepper@alliantenergy.com>; Pedretti, Scott <ScottPedretti@alliantenergy.com>; Gearing, Phillip <pgearing@scsengineers.com>; Nelson, Debra <DNelson@scsengineers.com>
Subject: [EXTERNAL] RE: Columbia (#3025) Modules 10&11 Geosynthetics Preconstruction Report

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Attachments – If this email contains attachments, are you expecting them? Is it the type of thing this sender would share with you?

Links – If this message contains links, type in the website's address directly in your browser rather than clicking the link in the email.

Hi Jeff,

Thank you for submitting the preconstruction report. I was doing a very quick scan of the report and noticed on the panel layout (electronic page 208) that the geomembrane panels are running perpendicular to the leachate collection lines. The layout will need to be revised so the panels run parallel to the leachate lines to reduce the number of seams running through the leachate collection trench. Let me know if you would like to discuss. Thank you

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Ann Bekta
Cell Phone: (608) 287-4492 New phone number
ann.bekta@wisconsin.gov

From: Maxted, Jeffrey <JeffreyMaxted@alliantenergy.com>
Sent: Tuesday, September 27, 2022 7:05 AM
To: Bekta, Ann M - DNR <Ann.Bekta@wisconsin.gov>
Cc: Sullivan, Tyler J - DNR <tyler.sullivan@wisconsin.gov>; Clepper, Brian <BrianClepper@alliantenergy.com>; Pedretti, Scott <ScottPedretti@alliantenergy.com>; Gearing, Phillip <pgearing@scsengineers.com>; Nelson, Debra <DNelson@scsengineers.com>
Subject: Columbia (#3025) Modules 10&11 Geosynthetics Preconstruction Report

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

Hi Ann,

Please see the attached geosynthetics preconstruction report for your review. Please contact me or Phil Gearing to identify appropriate times for a preconstruction meeting.

Thank you,
Jeff

Jeff Maxted | Manager – Environmental Services, Generation Operations Support
Pronouns: He/him/his

Alliant Energy
4902 N Biltmore Lane | Madison, WI 53718
Office: (608) 458-3853
alliantenergy.com I jeffreymaxted@alliantenergy.com

From:	Maxted, Jeffrey <JeffreyMaxted@alliantenergy.com>
Sent:	Thursday, October 20, 2022 12:20 PM
To:	Ann Bekta
Cc:	Sullivan, Tyler J - DNR; Clepper, Brian; Pedretti, Scott; Gearing, Phillip; Bajalan, Zana
Subject:	Columbia (#3025) Geosynthetics Precon Report - Addendum #1
Attachments:	221020_Bekta_Columbia_2022_Geosynthetics Precon_Rpt_Addendum No.1_FINAL.pdf

Hi Ann,

Please see the attached addendum to the Geosynthetics Preconstruction report for Modules 10 and 11. This addendum contains all remaining required information. Please let me know if you have any questions or concerns.

Regards,
Jeff

Jeff Maxted | Manager – Environmental Services, Generation Operations Support
Pronouns: He/him/his

Alliant Energy
4902 N Biltmore Lane | Madison, WI 53718
Office: (608) 458-3853
alliantenergy.com I jeffreymaxted@alliantenergy.com

From: Maxted, Jeffrey <JeffreyMaxted@alliantenergy.com>
Sent: Friday, August 12, 2022 6:05 AM
To: Bekta, Ann M - DNR
Cc: Sullivan, Tyler J - DNR; Clepper, Brian; Pedretti, Scott; Gearing, Phillip; Coughlin, Jenny
Subject: Columbia (#3025) Modules 10-11 Construction Notification
Attachments: WDNR_ConNotification_P2M10_Liner_081222.pdf

Hi Ann,

Please see the attached construction notification for sub-base grades and clay placement within Columbia Modules 10-11. We are working to get an updated schedule from the contractor and will provide that as soon as it becomes available. Please contact me if you would like to schedule any inspections.

Thank you,
Jeff

Jeff Maxted | Manager – Environmental Services, Generation Operations Support
Pronouns: He/him/his

Alliant Energy
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Alliant Energy
4902 North Biltmore Lane
P.O. Box 77007
Madison, WI 53707-1007

1-800-ALLIANT (800-255-4268)
alliantenergy.com

August 12, 2022

Ms. Ann Bekta
Wisconsin Department of Natural Resources
2514 Morse Street
Janesville, WI 53545

Sent via electronic mail

Subject: **Construction Notification – Phase 2, Modules 10 and 11**
Wisconsin Power and Light Company – Columbia Energy Center
Dry Ash Disposal Facility (WDNR License #3025)
Portage, Wisconsin

Dear Ms. Bekta,

On behalf of Wisconsin Power and Light Company (WPL), Alliant Energy is providing this construction notification for Phase 2, Modules 10 and 11 of the Dry Ash Disposal Facility. This notification is required by Condition #9 of the July 28, 2022 Plan of Operation Update Approval from the Wisconsin Department of Natural Resources (WDNR).

The contractor at Columbia is nearing Module 10 and 11 subbase grades and would like to start placing clay within the next few weeks. Therefore, WPL is providing the notifications for sub-base grades and storm water controls (Condition #9a) and clay placement (Condition #9b) at this time. An updated schedule will be provided to you as soon as additional construction milestones have been determined by the contractor.

Please call me at (608) 458-3853 if you would like to schedule inspections related to these liner construction events or if you have any questions.

Sincerely,

Jeff Maxted
Manager – Environmental Services
Alliant Energy

Cc: Tyler Sullivan – Wisconsin Department of Natural Resources
Brian Clepper – Columbia Energy Center
Phil Gearing, Eric Nelson – SCS Engineers

From: Maxted, Jeffrey <JeffreyMaxted@alliantenergy.com>
Sent: Monday, October 17, 2022 7:01 AM
To: Bekta, Ann M - DNR
Cc: Sullivan, Tyler J - DNR; Clepper, Brian; Nelson, Eric; Gearing, Phillip
Subject: Columbia (#3025) Modules 10 and 11 Liner Construction Notifications
Attachments: WDNR_ConNotification_P2M10_Liner2_101722.pdf

Hi Ann,

Please see the attached notification related to construction of the liner for Modules 10 and 11 at Columbia. Please let me know if you have any questions, and please continue to coordinate with me and Phil on scheduling inspection events.

Thank you,
Jeff

Jeff Maxted | Manager – Environmental Services, Generation Operations Support
Pronouns: He/him/his

Alliant Energy
4902 N Biltmore Lane | Madison, WI 53718
Office: (608) 458-3853
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P.O. Box 77007
Madison, WI 53707-1007

1-800-ALLIANT (800-255-4268)
alliantenergy.com

October 17, 2022

Ms. Ann Bekta
Wisconsin Department of Natural Resources
2514 Morse Street
Janesville, WI 53545

Sent via electronic mail

Subject: **Construction Notification – Phase 2, Modules 10 and 11**
Wisconsin Power and Light Company – Columbia Energy Center
Dry Ash Disposal Facility (WDNR License #3025)
Portage, Wisconsin

Dear Ms. Bekta,

On behalf of Wisconsin Power and Light Company (WPL), Alliant Energy is providing this construction notification for Phase 2, Modules 10 and 11 of the Dry Ash Disposal Facility. This notification is required by Condition #9 of the July 28, 2022 Plan of Operation Update Approval from the Wisconsin Department of Natural Resources (WDNR).

The contractor at Columbia will be installing geosynthetics and the leachate collection system in the coming weeks, with the intent of completing construction of the new cell this year. Therefore, WPL is providing the remaining notifications for Modules 10 and 11 at this time, as required by Conditions #9c-f. An inspection of the geomembrane is currently scheduled for October 27th, and we will coordinate with you on additional inspections as the work progresses.

Please call me at (608) 458-3853 if you would like to schedule inspections related to these construction events or if you have any questions.

Sincerely,

Jeff Maxted
Manager – Environmental Services
Alliant Energy

Cc: Tyler Sullivan – Wisconsin Department of Natural Resources
Brian Clepper – Columbia Energy Center
Phil Gearing, Eric Nelson – SCS Engineers

Appendix B

Construction Photographs

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 1: Highway Landscapers installed a sediment log across the leachate/surface water pond access road, and silt fence around the leachate/surface water pond (Looking northeast, 5/11/22).

Photo 2: Highway Landscapers installed silt fence south of the proposed location of the overburden stockpile along the chain-link fence (Looking east, 5/12/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 3: Removal of tree stumps from Modules 10 and 11 area. (Looking northwest, 5/31/22).

Photo 4: Stripping topsoil on the east berm, south of the leachate/surface water pond. (Looking southeast, 6/2/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 5: Excavating overburden material from the east berm, south of the leachate/surface water pond. (Looking southeast, 6/2/22).

Photo 6: Stripping and stockpiling topsoil at the proposed stockpile area. (Looking south, 6/3/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
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Photo 7: Completed tracking pad at the north entrance of the laydown area. (Looking southeast, 6/8/22)

Photo 8: Highway landscapers installed silt fence around the topsoil stockpile area, south of the ash expansion area. (Looking northwest, 6/9/22).

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SCS Engineers Project #25222157.00

Photo 9: Adding sediment logs to the east swale, next to the leachate/surface water pond. (Looking north, 6/9/22).

Photo 10: Adding stone check at the southwest corner of the proposed stockpile area. (Looking southwest, 6/9/22).

Appendix B – Construction Photographs
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SCS Engineers Project #25222157.00

Photo 11: Stripping and hauling topsoil from Module 11 area. (Looking northwest, 6/9/22).

Photo 12: Excavating overburden material from Module 10. (Looking east, 6/15/22).

Appendix B – Construction Photographs
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W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 13: Grading the topsoil stockpile south of the ash expansion area. (Looking northeast, 6/21/22).

Photo 14: Stockpiling excavated overburden material and topsoil. (Looking southeast, 6/23/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
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Photo 15: Ames watering seeded area. (Looking northeast, 6/23/22).

Photo 16: Using water truck for dust control onsite. (Looking northwest, 6/24/22).

Appendix B – Construction Photographs
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SCS Engineers Project #25222157.00

Photo 17: Placing topsoil in the swale east of the overburden material stockpile. (Looking southwest, 6/24/22).

Photo 18: Highway Landscapers hydro seeding topsoil stockpiles. (Looking southeast, 6/28/22).

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Modules 10 and 11 Liner Construction
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SCS Engineers Project #25222157.00

Photo 19: Geomembrane rolls delivered to the site. (Looking northeast, 8/10/22).

Photo 20: Grading the subbase at the southwest area of Module 10. (Looking east, 8/13/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 21: Excavating overburden material from the west side of Module 10. Checking subbase grades. (Looking north, 8/15/22).

Photo 22: Smoothing subbase in the south area of Module 10. (Looking west, 8/18/22).

Appendix B – Construction Photographs
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Photo 23: GCL rolls delivered to the site. (Looking southwest, 8/23/22).

Photo 24: GCL rolls covered with rain cover (tarp) material. (Looking northwest, 8/23/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
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Photo 25: SCS surveying subbase documentation points in Module 10. (Looking north, 8/23/22).

Photo 26: View of Module 10 subbase and excavation process of the overburden material in Module 11. (Looking east, 08/30/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
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Photo 27: Excavating overburden material from Module 11. (Looking west, 09/06/22).

Photo 28: Geotextile seperator rolls delivered to the site. (Looking north, 09/06/22).

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Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 29: Placing topsoil at the east slope, east of Modules 10 and 11. (Looking north, 09/16/22).

Photo 30: Final grading of subbase in Module 10. (Looking east, 09/19/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
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Photo 31: Placing clay in Module 10. (Looking southeast, 09/20/22).

Photo 32: Excavating and grading the subgrade for the leachate collection sump in Module 10. (Looking west, 09/21/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
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Photo 33: Excavating clay from the onsite clay stockpile. (Looking north, 09/21/22).

Photo 34: Spreading and grading the clay in Module 10. (Looking northeast, 09/21/22).

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Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
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Photo 35: Compacting the clay material in Module 10 using the sheepsfoot compactor. (Looking southwest, 09/21/22).

Photo 36: Progress of clay placement in Modules 10 and 11 (Looking southeast, 09/22/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 37: Removing clay mixed with sand from the first lift. (Looking northeast, 09/22/22).

Photo 38: Grading and compacting subbase in Module 11. Background: excavating clay from the onsite stockpile. (Looking north, 09/22/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
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Photo 39: Placing geotextile separator and breaker run for the access road north of the overburden stockpile (Looking west, 09/22/22).

Photo 40: Stripping topsoil from the swale west of Modules 10 and 11. (Looking south, 09/26/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 41: SCS conducting moisture/density tests on first foot of clay in Modules 10 and 11 (Looking west, 09/29/22).

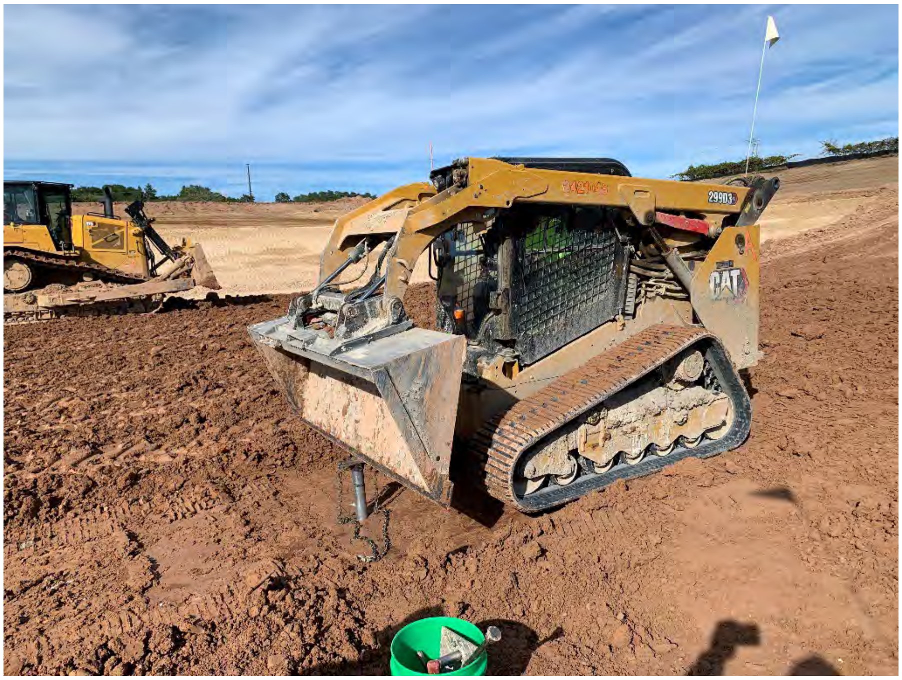

Photo 42: Collecting undisturbed clay samples (Shelby tubes) in Modules 10 and 11. (Looking northeast, 09/29/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
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Photo 43: Excavating overburden material to expose the tie-in to Modules 3 and 4 on west end of Module 10. (Looking northwest, 09/30/22).

Photo 44: Installing 30-inch HDPE culverts southeast of Module 10. (Looking southwest, 09/30/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
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Photo 45: Filling holes created in the clay (due to the moisture/density tests and collecting Shelby tube) with granular bentonite. (Looking west, 10/03/22).

Photo 46: WDNR site visit and inspection. (Looking north, 10/04/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
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SCS Engineers Project #25222157.00

Photo 47: Exposing the existing clay liner of Modules 3 and 4 for tie-in. (Looking north, 10/04/22).

Photo 48: Compacting and sealing clay at the north half of Module 11. (Looking east, 10/05/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
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Photo 49: Exposing and creating clay step into existing clay from Modules 3 and 4. (Looking north, 10/08/22).

Photo 50: Highway Landscapers placing erosion mat on berm north of the leachate/surface water pond and on east perimeter slopes. (Looking east, 10/10/22).

Appendix B – Construction Photographs
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SCS Engineers Project #25222157.00

Photo 51: Excavating subbase and surveying documentation points in southwest corner of Module 10. (Looking south, 10/13/22).

Photo 52: Placing, grading, and compacting lift of clay step at the west end of Modules 10 and 11. (Looking southeast, 10/17/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 53: Compacting clay lift in Module 10 sump. (Looking northwest, 10/20/22).

Photo 54: Grading base grade in Module 11. (Looking west, 10/27/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 55: James Peterson Sons, Inc. screening drainage material (from COVIA quarry) onsite. (Looking northeast, 10/28/22).

Photo 56: Excavating south anchor trench. (Looking northeast, 10/28/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
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Photo 57: Smooth drum rolling the clay surface of Module 10, and GSI staging sandbags for geosynthetics. (Looking east, 10/28/22).

Photo 58: First day of geosynthetics. GSI placing GCL material south of Module 10 (Looking west, 10/29/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
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Photo 59: Placing bentonite for the overlap edges of the GCL material. (Looking northwest, 10/29/22).

Photo 60: Placing geomembrane panels south of Module 10. (Looking southeast, 10/29/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 61: Testing geomemebrane trial welds using the field tensiometer. (Looking southeast, 10/29/22).

Photo 62: Ames clearing drainage material from the tie-in area west of Module 10. (Looking north, 10/30/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
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SCS Engineers Project #25222157.00

Photo 63: Fusion welding of the geomembrane seams. (Looking east, 10/30/22).

Photo 64: Air testing of the geomembrane fusion seams. (Looking southwest, 10/30/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
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Photo 65: Grading base grade for Module 11 sump. (Looking west, 10/31/22).

Photo 66: SCS surveying documentation points in Module 11 leachate collection trench. (Looking west, 10/31/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
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Photo 67: Final clay grading at Module 11 north berm. (Looking northeast, 11/01/22).

Photo 68: Performing extrusion welding for the geomembrane repairs. (Looking south, 11/01/22).

Appendix B – Construction Photographs
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Photo 69: Exposing the existing Module 3 GCL material for tie-in with Module 10 material. (Looking north, 11/01/22).

Photo 70: Tie-in the GCL in Module 10. (Looking north, 11/01/22).

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Photo 71: Placing additional bentonite to smooth Module 10 leachate collection trench. (Looking east, 11/01/22).

Photo 72: Placing GCL panels south of Module 11 (Looking west, 11/02/22).

Photo 73: Smoothing the clay surface in Module 11 before geosynthetcs installation. (Looking west, 11/02/22).

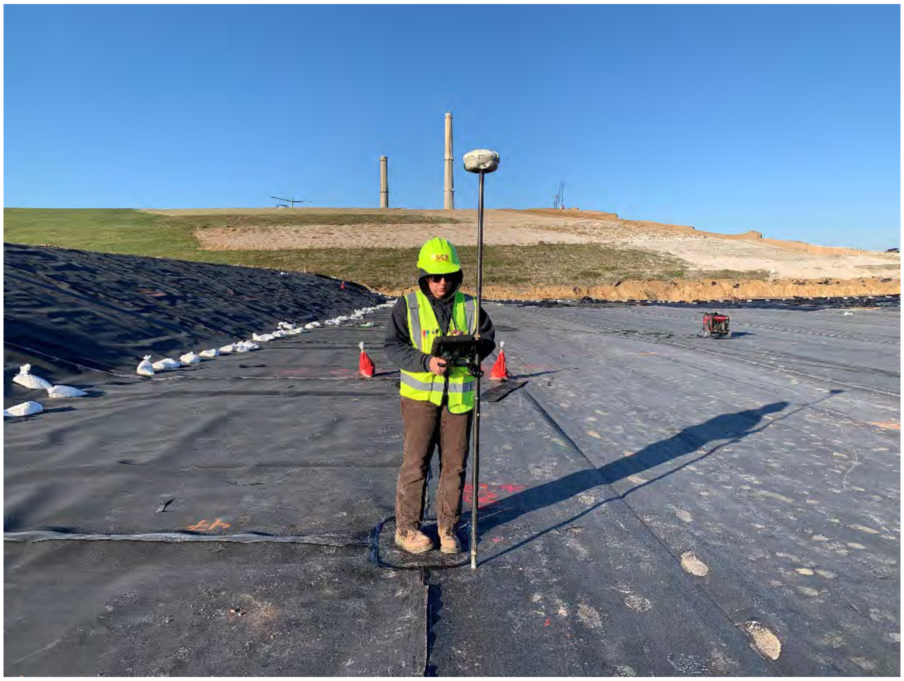


Photo 74: SCS surveying geomembrane repairs. (Looking west, 11/02/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 75: Extrusion welding for the geomembrane tie-in between Module 10 and Module 3. (Looking northwest, 11/02/22).

Photo 76: Marked destructive test location for fusion welds. (Looking down, 11/07/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 77: GSI performing vacuum box tests for extrusion seams. (Looking west, 11/07/22).

Photo 78: Repairing the location of destructive geomembrane sample. (Looking east, 11/08/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 79: Badger Daylighting using water and a vacuum hose to clean up sediment on geomembrane liner from rain event. (Looking northeast, 11/08/22).

Photo 80: Placing geotextile cushion for the leachate collection trenches. (Looking west, 11/09/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 81: Tracked haul trucks placing drainage material to form 2' thick ramp into Module 10. (Looking southeast, 11/10/22).

Photo 82: Tracked trucks placing and low-pressure dozer grading drainage material into Module 10 using haul road. (Looking west, 11/11/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 83: Placing drainage layer material in Module 10. (Looking west, 11/13/22).

Photo 84: Low-ground-pressure bulldozer (CAT-D6T LGP) grading drainage layer into 1' thickness in Module 11. (Looking northeast, 11/16/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 85: Coarse aggregate pipe bedding delivered to the site. (Looking west, 11/22/22).

Photo 86: Fusing 18" leachate collection pipe. (Looking west, 11/28/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 87: Grading the remaining clay on the onsite clay stockpile (Looking east, 11/29/22).

Photo 88: Fusing 6” HDPE leachate collection pipes. (Looking east, 11/29/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 89: Ames laborers using plastic shovels to remove blown-in sand from geotextile cushion surface in sump area. (Looking west, 11/30/22).

Photo 90: Placing 18” HDPE leachate collection piping sump pipe in Module 10. (Looking southeast, 11/30/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 91: Placing coarse aggregate pipe bedding in Module 10 sump. (Looking west, 11/30/22).

Photo 92: Grading pipe bedding material into the Module 10 sump area. (Looking northwest, 11/30/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 93: Cleaning sand off of the leachate collection trenches before placing coarse aggregate pipe bedding. (Looking west, 12/01/22).

Photo 94: Placing coarse aggregate pipe bedding in the leachate collection trenches. (Looking southeast, 12/01/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 95: Fusing 6” HDPE leachate collection pipes. (Looking southwest, 12/01/22).

Photo 96: Placing coarse aggregate pipe bedding using haul roads adjacent to the leachate collection trench in Module 10. (Looking west, 12/02/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 97: Leachate headwell pipe placed south of Module 11. (Looking down, 12/05/22).

Photo 98: Ames fusing final section of 6” leachate collection pipe in Module 10 sump. (Looking west, 12/06/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 99: Placing filter material in Module 10 trench. (Looking south, 12/06/22).

Photo 100: Leveling filter material in Module 10 leachate collection trench. (Looking southwest, 12/06/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 101: Grading filter material in Module 11 sump. (Looking southeast, 12/07/22).

Photo 102: CQM conducting electrical leak location testing for Modules 10 and 11 geomembrane. (Looking east, 12/08/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 103: Grading drainage layer material in Modules 10 and 11 (Looking west, 12/08/22).

Photo 104: Extent of drainage layer coverage in Modules 10 and 11. (Looking east, 12/08/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 105: Leachate head well placed south of Module 10. (Looking east, 12/10/22).

Photo 106: Geomembrane damage located by CQM on south slope of Module 10. (Looking south, 12/10/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 107: Placing and grading breaker run on perimeter access road. (Looking south, 12/12/22).

Photo 108: Performing extrusion trial welds for the geomembrane before completing the repairs that were located by the leak location test. (Looking northeast, 12/13/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 109: Testing geomembrane trial welds using the field tensiometer. (Looking northeast, 12/13/22).

Photo 110: GSI fixing GCL locations at the geomembrane repair areas. (Looking south, 12/13/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 111: GSI performing extrusion geomembrane seaming for the repairs. (Looking east, 12/13/22).

Photo 112: Vacuum box testing for the geomembrane repairs. (Looking down, 12/13/22).

Appendix B – Construction Photographs
Modules 10 and 11 Liner Construction
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

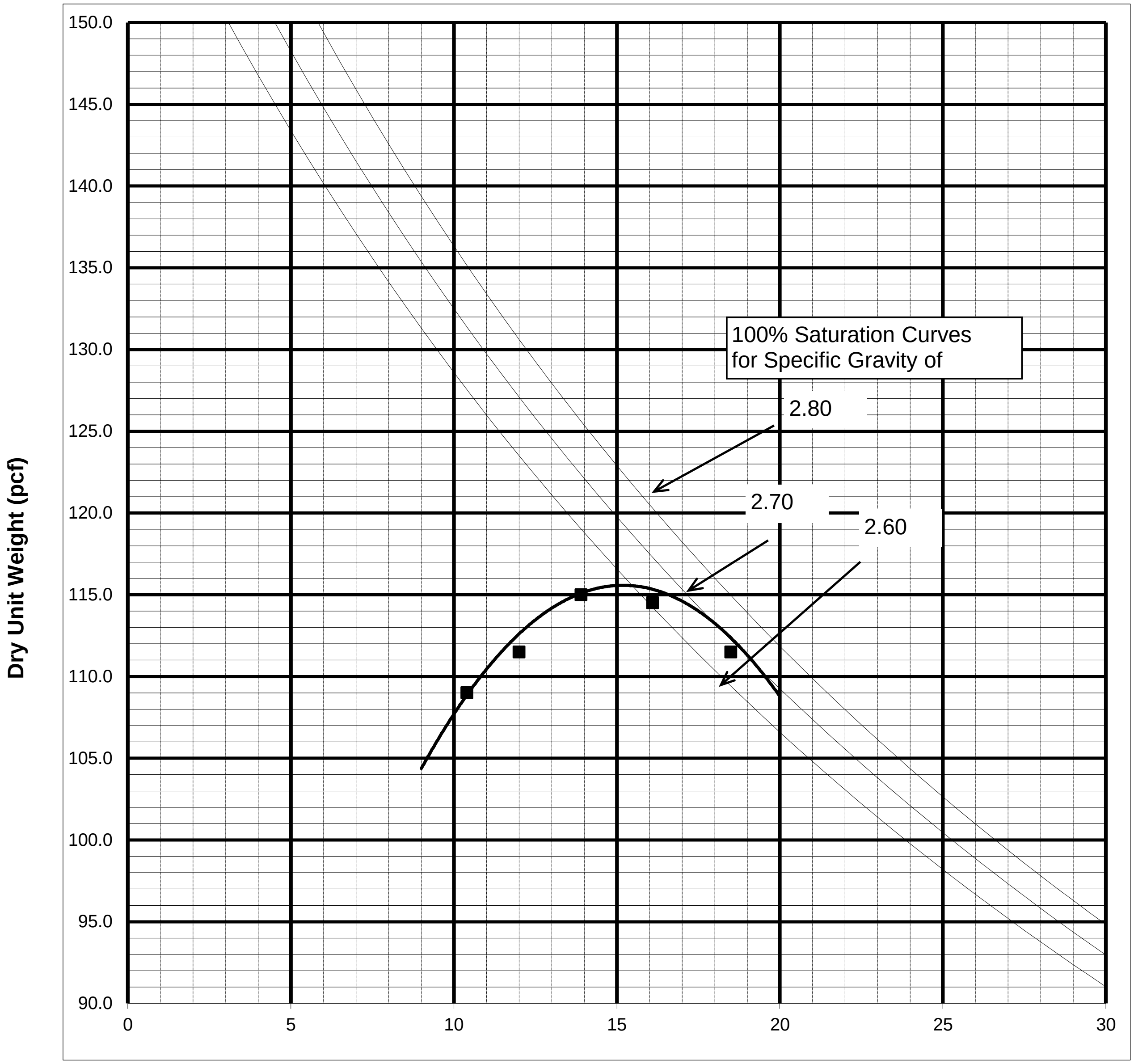
Photo 113: SCS surveying the locations of the geomembrane repairs. (Looking north, 12/13/22).

Photo 114: Connecting drainage layers between Modules 11 and 4. (Looking south, 12/13/22).

Appendix C

Clay Laboratory Test Results

TEST REPORT



Specimen No.		Maximum Dry Unit Weight, pcf		Optimum Water Content, %	
COL-CL-BS1		115.5		15.0	
Specimen Description					
Brown Lean Clay					
Corrected Maximum Dry Unit Weight, pcf		Corrected Optimum Water Content, %			
See above		See above			
Test Method		Liquid Limit	Plastic Limit	Plasticity Index	Specific Gravity
ASTM D1557, Method A		-	-	-	2.7 (est.)
Preparation Method	USCS	% Gravel	% Sand	% Fines	% Oversize
Dry	CL	-	-	-	-

PROJECT: Columbia - Modules 10 and 11
Pardeeville, Wis

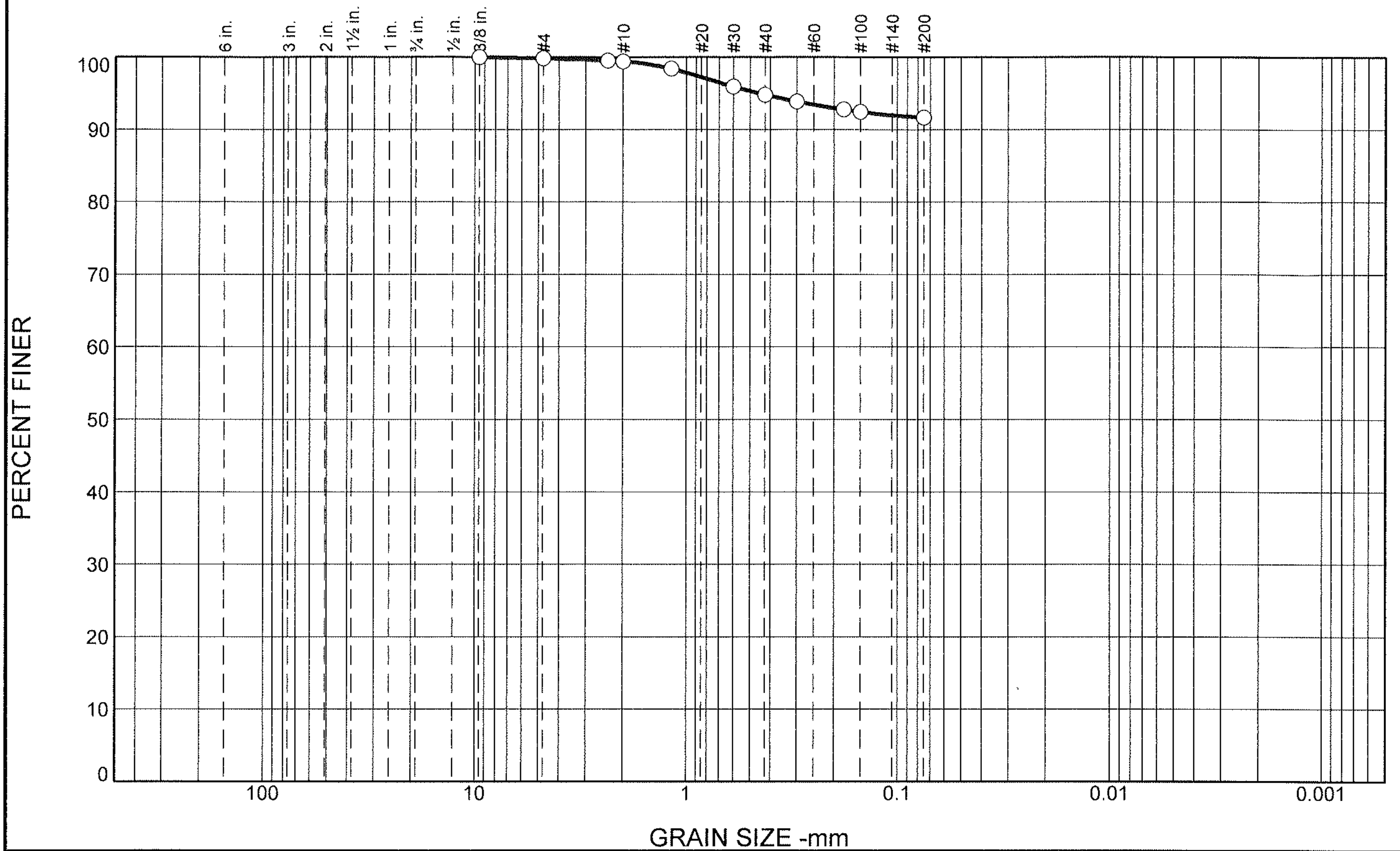
PROJECT NUMBER: C220011-2

LABORATORY COMPACTION TEST

CGC, Inc.	CHECKED BY: JSG	REVIEWED BY: FHC	9-Aug-22

File:22011-2.pc1

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.4	4.6	3.1	91.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	99.8		
#8	99.5		
#10	99.4		
#16	98.4		
#30	95.9		
#40	94.8		
#50	93.8		
#80	92.8		
#100	92.4		
#200	91.7		

* (no specification provided)

Material Description

Brown Lean Clay, Little Sand, Trace Gravel

Atterberg Limits

PL= 17 LL= 43 PI= 26

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(25)

Remarks

Sample Number: COL-CL-B1

Date: 9/26/22

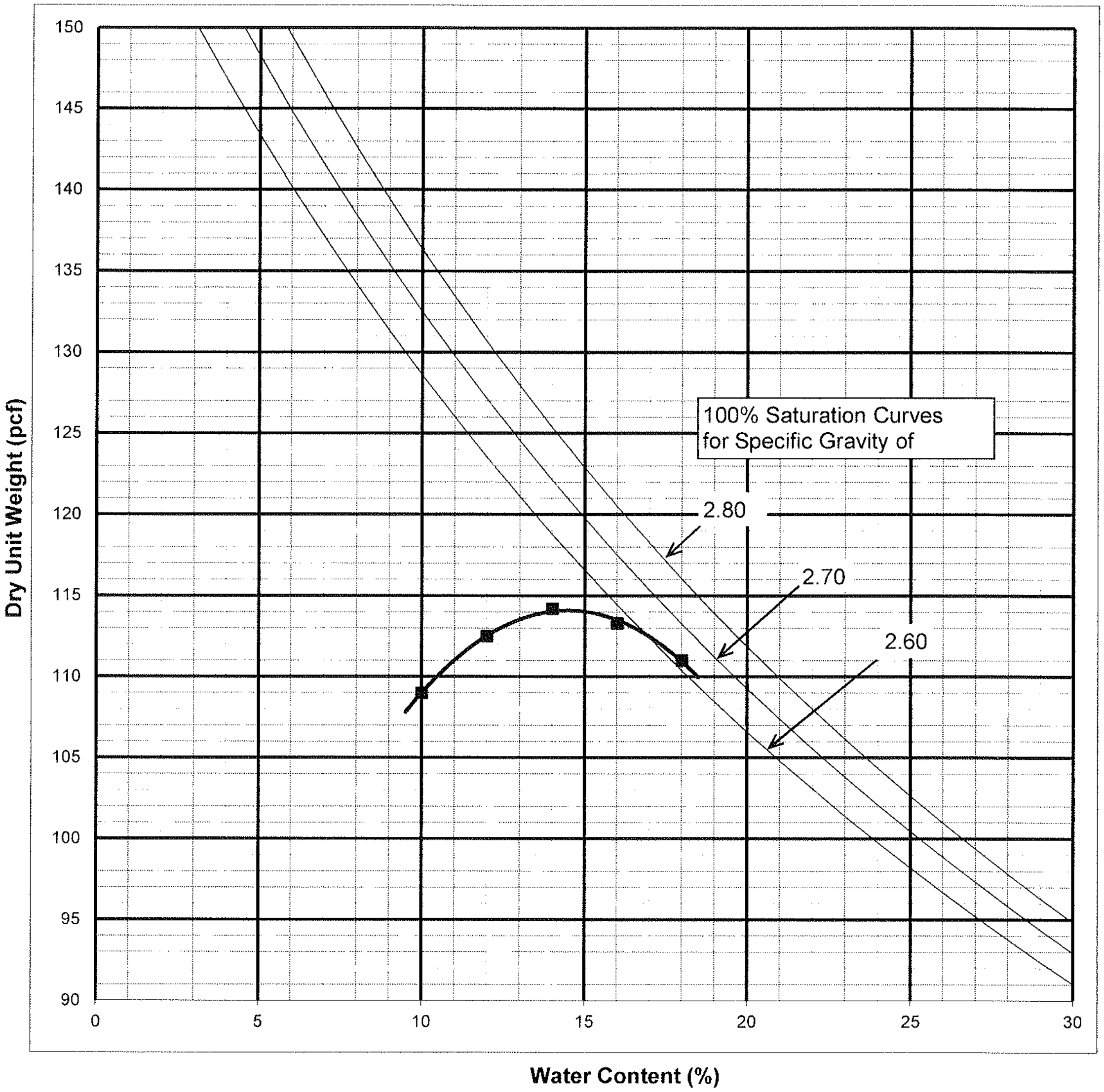
CGC,Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00

Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

TEST REPORT



Specimen No.	Maximum Dry Unit Weight, pcf	Optimum Water Content, %
COL - CL - B1	114.2	14.0

Specimen Description
Brown Lean Clay, Little Sand, Trace Gravel

Corrected Maximum Dry Unit Weight, pcf	Corrected Optimum Water Content, %	
See Above	See Above	

Test Method	Liquid Limit	Plastic Limit	Plasticity Index	Specific Gravity
ASTM D1557, Method A	43	17	26	2.7 (est.)

Preparation Method	USCS	% Gravel	% Sand	% Fines	% Oversize
Dry	CL	0.2	8.1	-	-

PROJECT: Columbia - Modules 10 and 11 Liner
Pradeeville, Wi

PROJECT NUMBER: C22011-2
TEST NUMBER: 7859

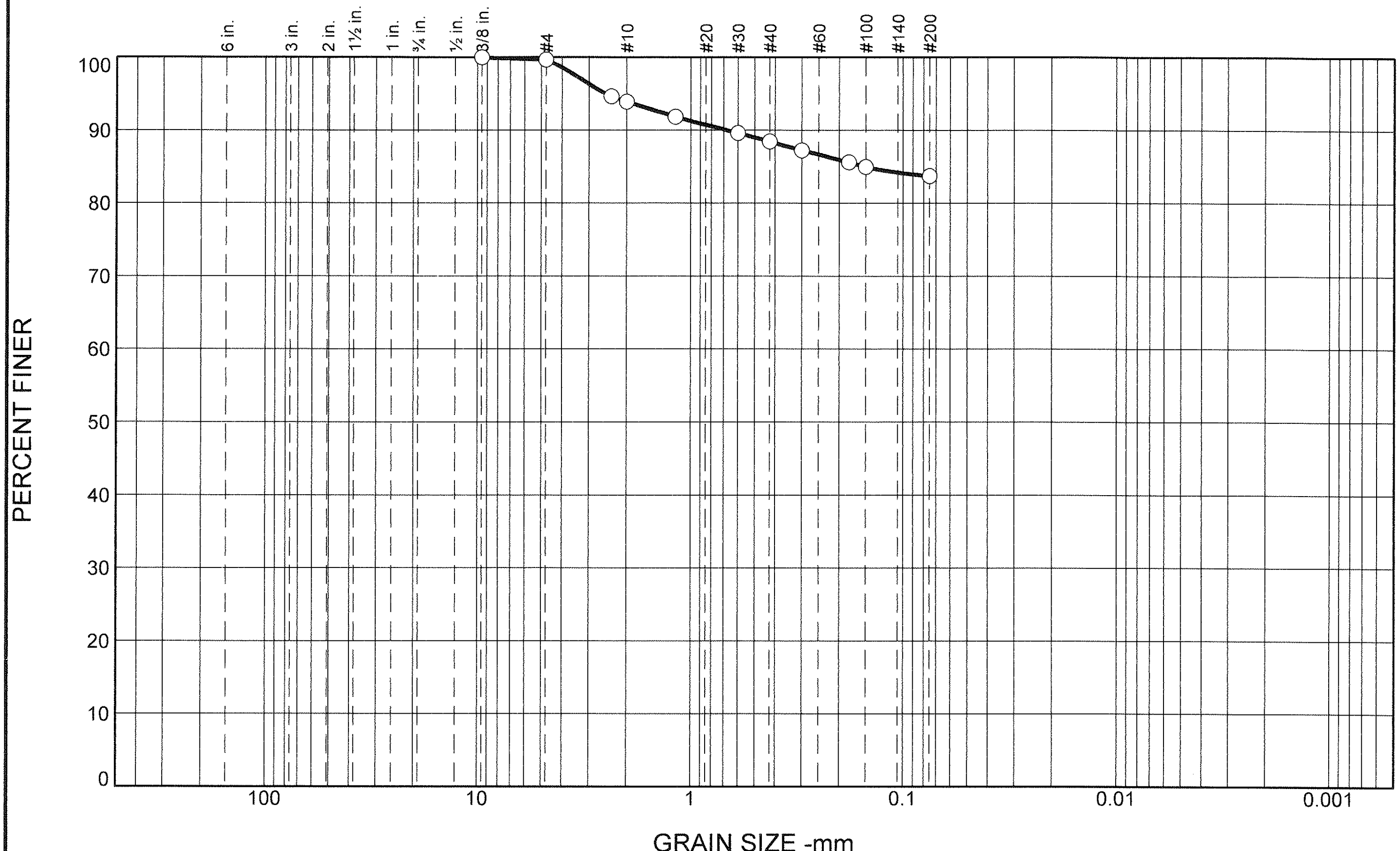
LABORATORY COMPACTION TEST

CGC, Inc.

CHECKED BY: KJS | REVIEWED BY: KJS | 20-Sep-22

File:22011-2.pc2

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.3	5.8	5.5	4.7	83.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	99.7		
#8	94.6		
#10	93.9		
#16	91.8		
#30	89.6		
#40	88.4		
#50	87.2		
#80	85.6		
#100	85.0		
#200	83.7		

* (no specification provided)

Material Description

Brown Lean Clay, Some Sand, Trace Gravel

Atterberg Limits

PL= 20 LL= 47 PI= 27

Coefficients

D_{90}= 0.6775 D_{85}= 0.1511 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(23)

Remarks

Sample Number: COL-CL-B2

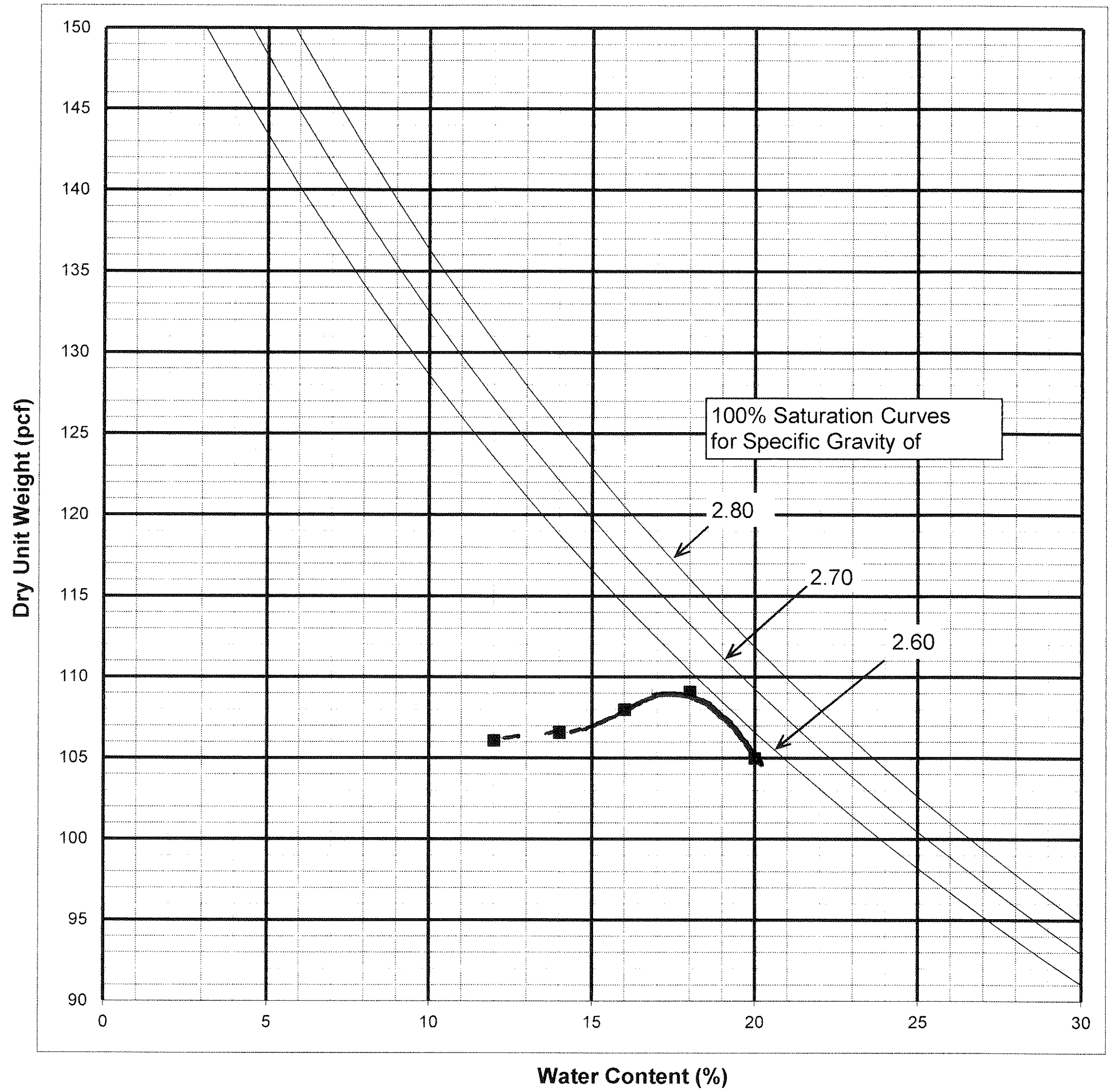
Date: 9/29/22

CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

TEST REPORT



Specimen No.		Maximum Dry Unit Weight, pcf	Optimum Water Content, %
3	COL-CL-B2	109.0	18.0

Specimen Description
Brown Lean Clay, Some Sand, Trace Gravel

Corrected Maximum Dry Unit Weight, pcf	Corrected Optimum Water Content, %	
See Above	See Above	

Test Method	Liquid Limit	Plastic Limit	Plasticity Index	Specific Gravity
ASTM D1557, Method A	47	20	27	2.7 (est.)

Preparation Method	USCS	% Gravel	% Sand	% Fines	% Oversize
Dry	CL	0.3	16.0	83.7	-

PROJECT: Columbia - Modules 10 and 11 Liner
Pradeeville, Wi

PROJECT NUMBER: C22011-2

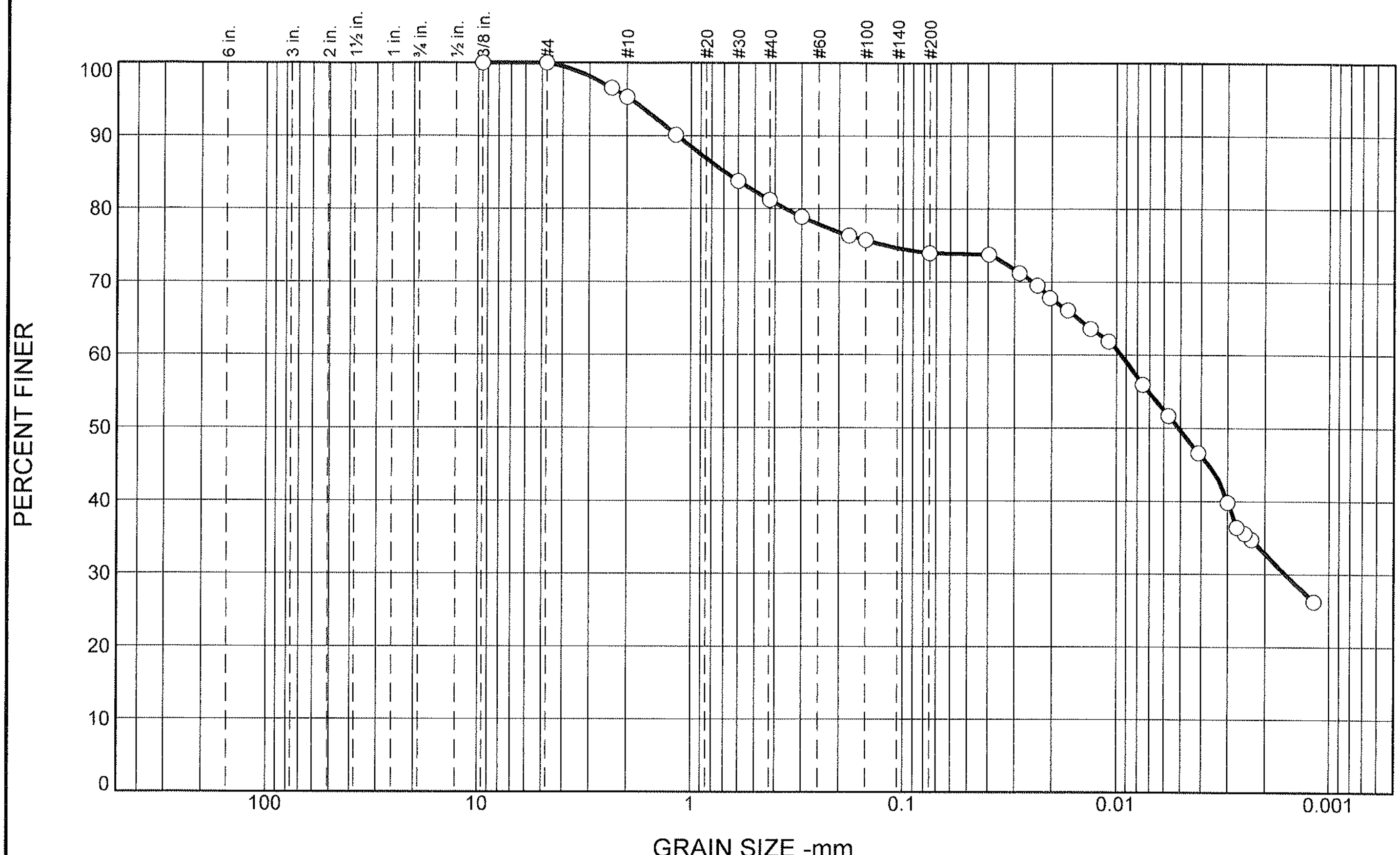
TEST NUMBER: 7930

LABORATORY COMPACTION TEST

CGC, Inc. CHECKED BY: KJS REVIEWED BY: KJS 26-Sep-22

File:22011-2.pc3

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	4.7	14.1	7.2	24.4	49.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	100.0		
#8	96.6		
#10	95.3		
#16	90.1		
#30	83.8		
#40	81.2		
#50	78.9		
#80	76.3		
#100	75.7		
#200	74.0		

* (no specification provided)

Material Description

Brown Lean Clay, Some Sand

Atterberg Limits

PL= 17 LL= 47 PI= 30

Coefficients

D_{90}= 1.1648 D_{85}= 0.6916 D_{60}= 0.0095
D_{50}= 0.0051 D_{30}= 0.0016 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(21)

Remarks

Location: N542,650 E2,124,850
Sample Number: COL-CL-B3

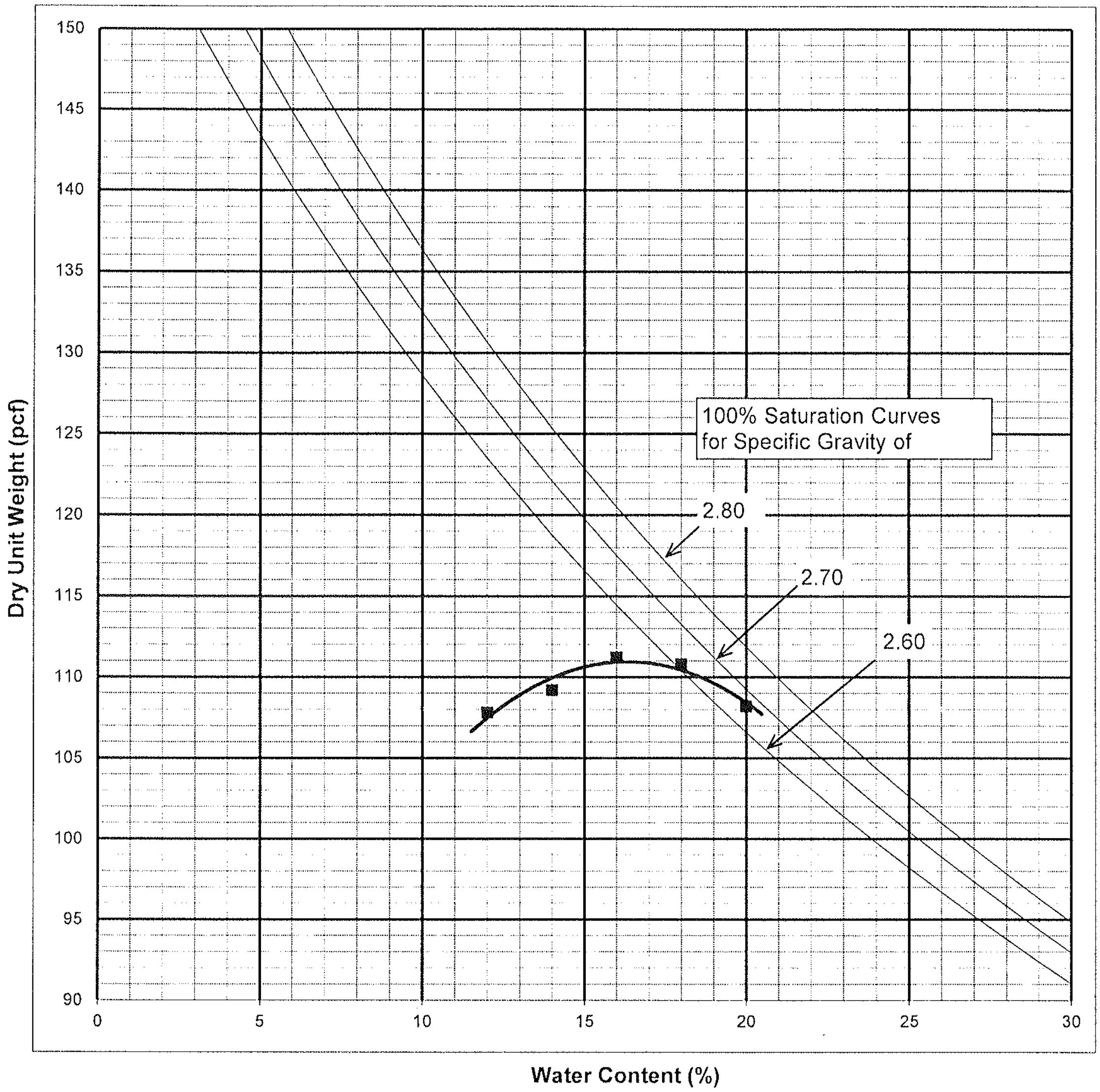
Date: 10/11/22

CGC,Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

TEST REPORT



Specimen No.	Maximum Dry Unit Weight, pcf	Optimum Water Content, %
COL - CL - B3	111.2	16.0

Specimen Description
Brown Lean Clay, Some Sand

Corrected Maximum Dry Unit Weight, pcf	Corrected Optimum Water Content, %	
See Above	See Above	

Test Method	Liquid Limit	Plastic Limit	Plasticity Index	Specific Gravity
ASTM D1557, Method A	47	17	30	2.7 (est.)

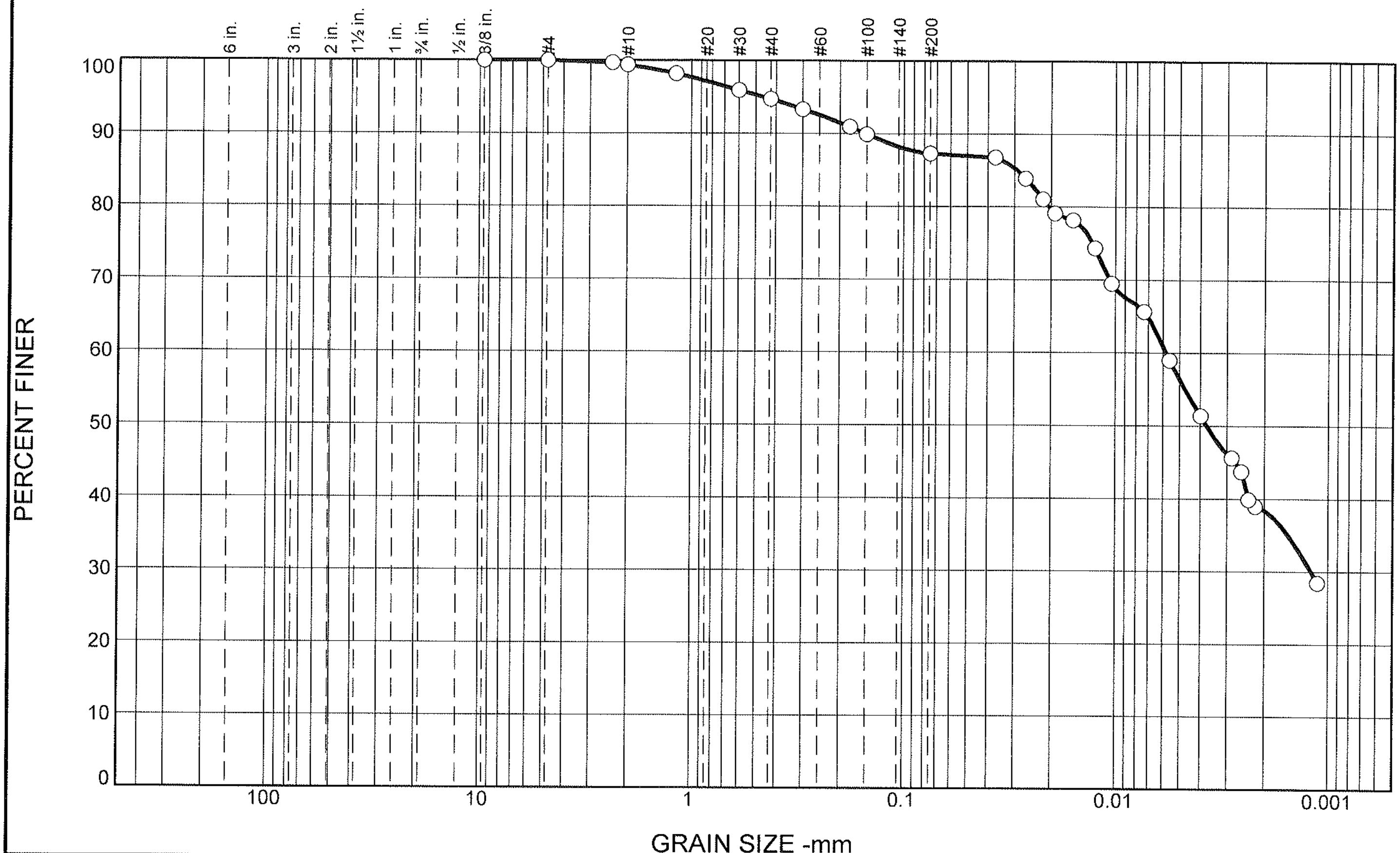
Preparation Method	USCS	% Gravel	% Sand	% Fines	% Oversize
Dry	CL	-	26.0	74.0	-

PROJECT: Columbia - Modules 10 and 11 Liner Pradeeville, Wi PROJECT NUMBER: C22011-2 TEST NUMBER: 8341	**LABORATORY COMPACTION TEST**

CGC, Inc.	CHECKED BY: KJS	REVIEWED BY: KJS	5-Oct-22

File:22011-2.pc4

Particle Size Distribution Report



% +3"	% Gravel Coarse	% Gravel Fine	% Sand Coarse	% Sand Medium	% Sand Fine	% Fines Silt	% Fines Clay
0.0	0.0	0.0	0.6	4.7	7.4	31.1	56.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	100.0		
#8	99.7		
#10	99.4		
#16	98.2		
#30	95.9		
#40	94.7		
#50	93.3		
#80	90.9		
#100	89.9		
#200	87.3		

* (no specification provided)

Material Description

Brown Fat Clay, Some Sand

Atterberg Limits

PL= 23 LL= 51 PI= 28

Coefficients

D_{90}= 0.1521 D_{85}= 0.0291 D_{60}= 0.0058
D_{50}= 0.0037 D_{30}= 0.0012 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(26)

Remarks

Location: N542,800 E2,124,850
Sample Number: COL-CL-B4

Date: 10/18/11

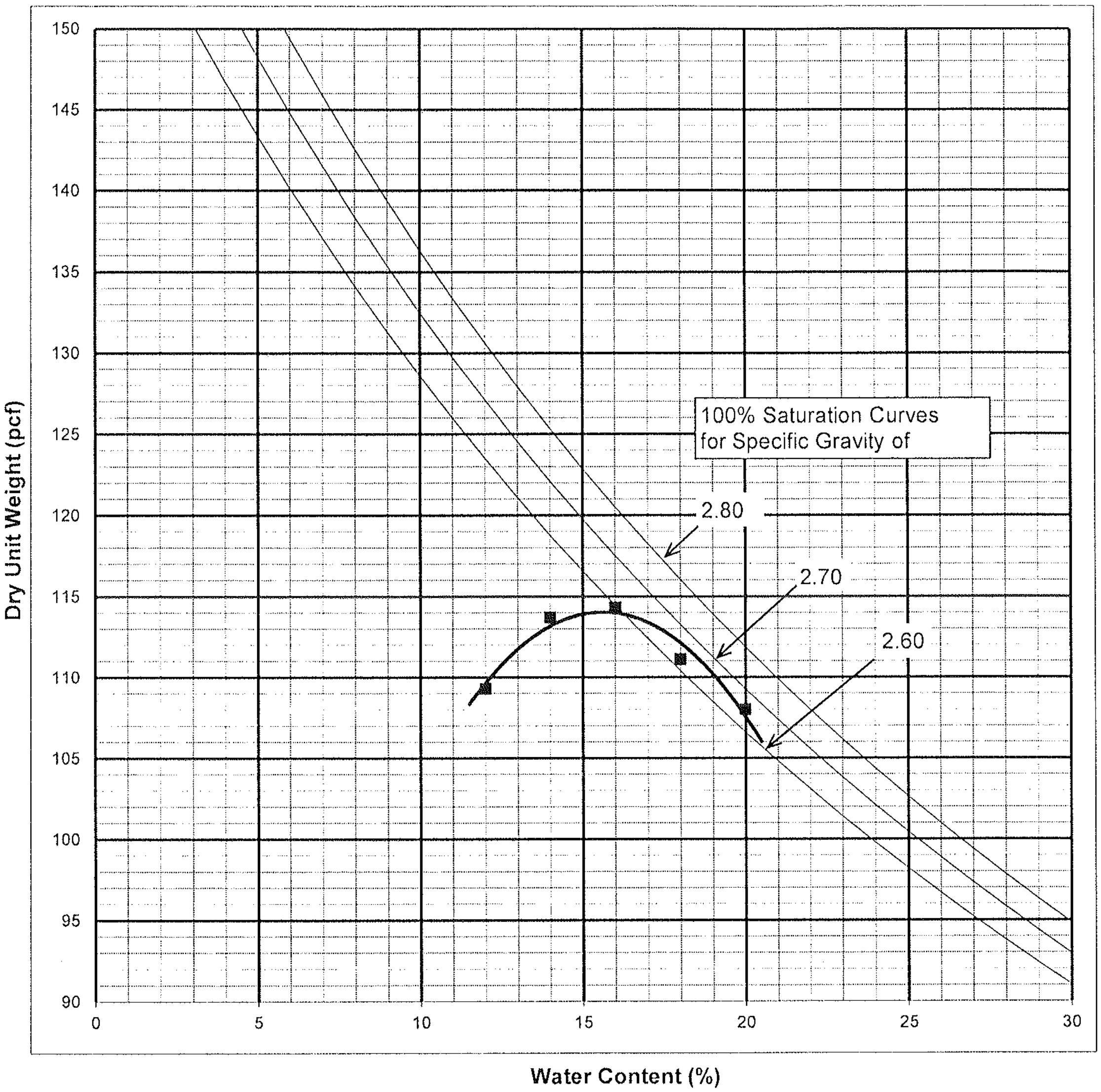
CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00

Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

TEST REPORT



Specimen No.	Maximum Dry Unit Weight, pcf	Optimum Water Content, %
COL - CL - B4	114.3	16.0

Specimen Description
Brown Fat Clay, Some Sand

Corrected Maximum Dry Unit Weight, pcf	Corrected Optimum Water Content, %	
See Above	See Above	

Test Method		Liquid Limit	Plastic Limit	Plasticity Index	Specific Gravity
ASTM D1557, Method A		51	23	28	2.7 (est.)
Preparation Method	USCS	% Gravel	% Sand	% Fines	% Oversize
Dry	CH	-	12.7	87.5	-

PROJECT: Columbia - Modules 10 and 11 Liner
Pradeeville, Wi

PROJECT NUMBER: C22011-2
TEST NUMBER: 8349

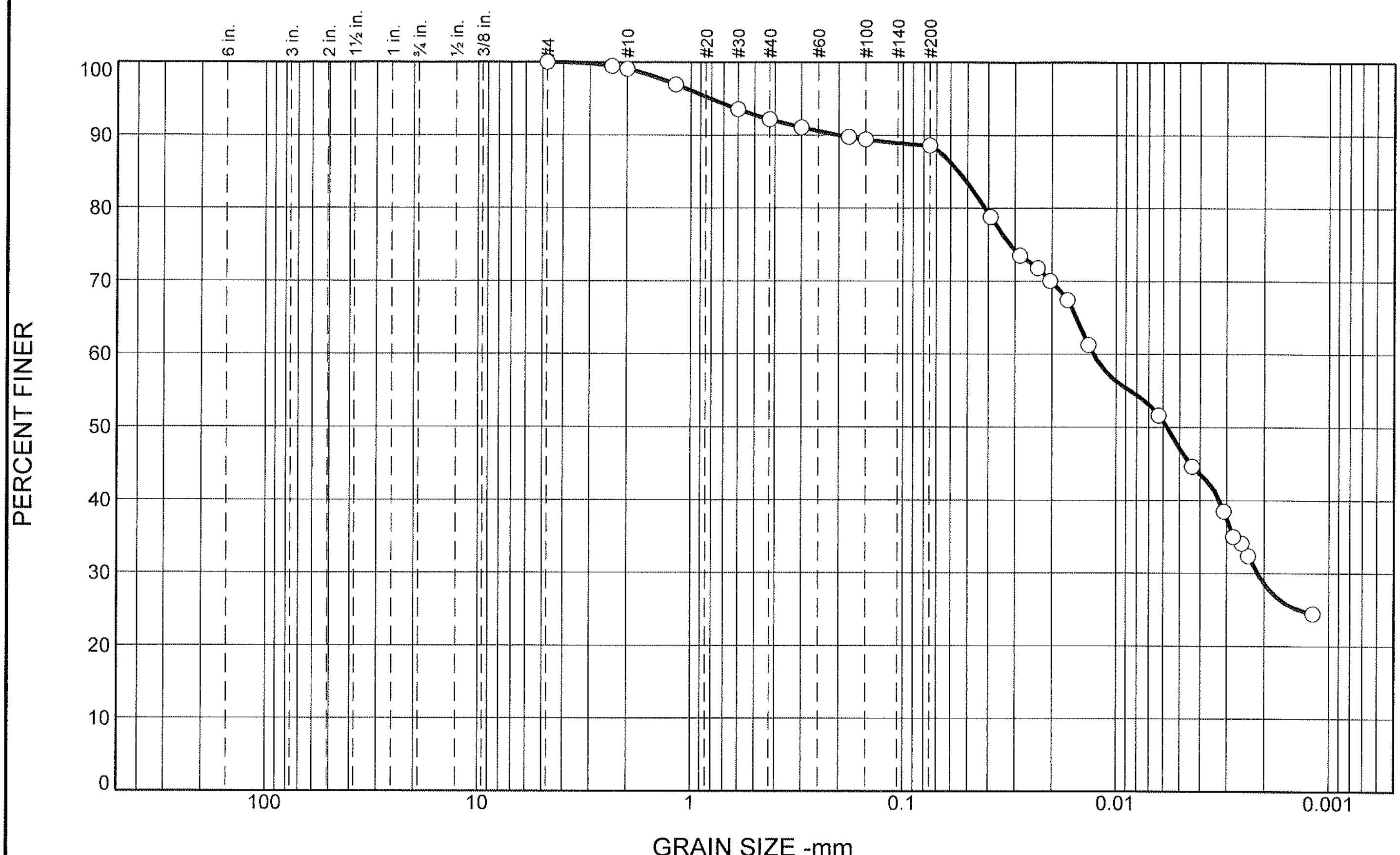
LABORATORY COMPACTION TEST

CGC, Inc.

CHECKED BY: KJS | REVIEWED BY: KJS | 10-Oct-22

File:22011-2.pc5

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.9	6.9	3.6	41.6	47.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.5		
#10	99.1		
#16	96.9		
#30	93.6		
#40	92.2		
#50	91.1		
#80	89.8		
#100	89.4		
#200	88.6		

* (no specification provided)

Material Description

Brown Lean Clay, Little Sand

Atterberg Limits

PL= 16 LL= 46 PI= 30

Coefficients

D_{90}= 0.1991 D_{85}= 0.0552 D_{60}= 0.0128
D_{50}= 0.0058 D_{30}= 0.0022 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(27)

Remarks

Location: N542,700 E2,124,700
Sample Number: COL-CL-B5

Date: 10/18/22

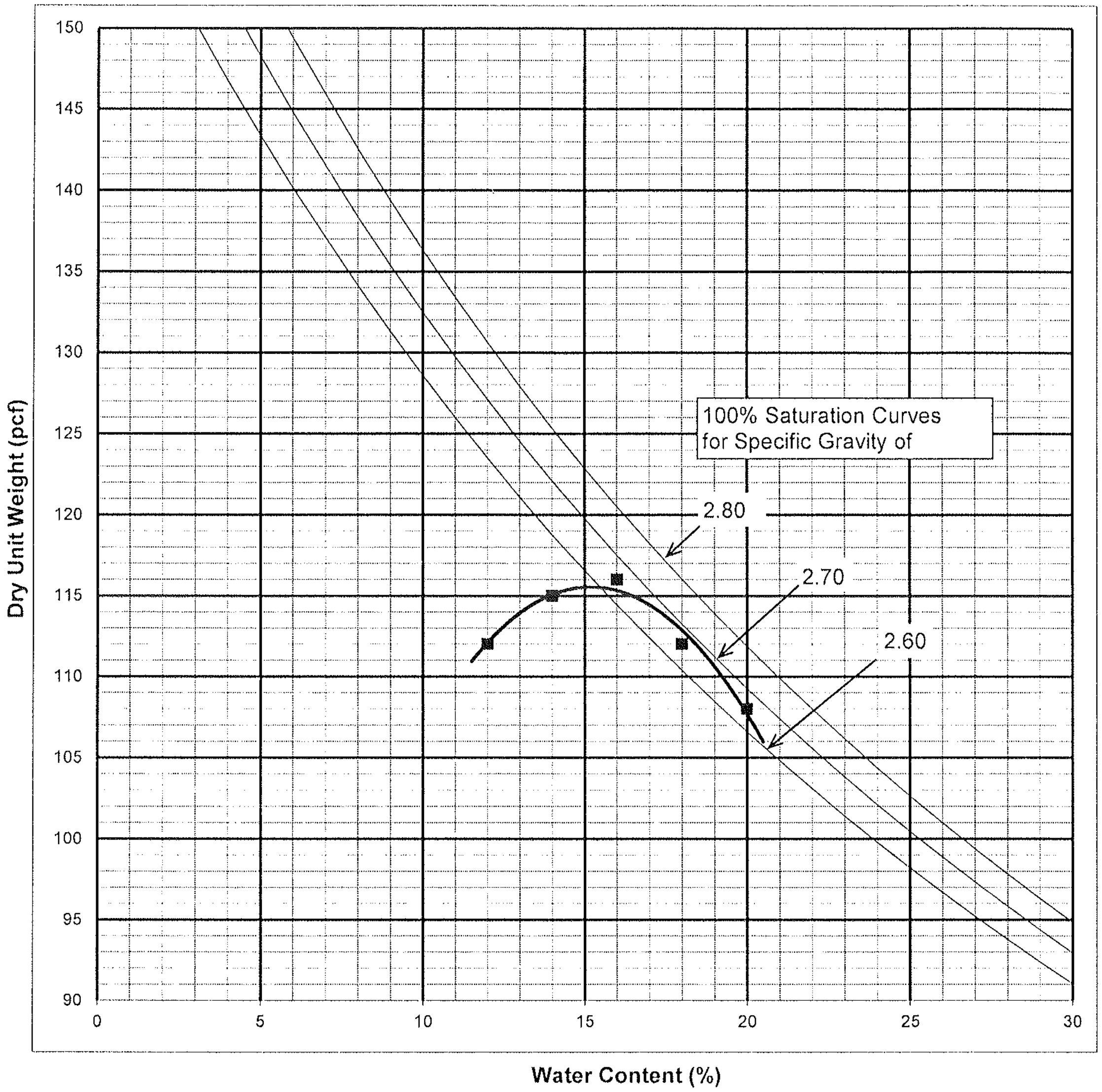
CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00

Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

TEST REPORT



Specimen No.		Maximum Dry Unit Weight, pcf		Optimum Water Content, %	
COL - CL - B5		116.0		16.0	
Specimen Description					
Brown Lean Clay, Little Sand					
Corrected Maximum Dry Unit Weight, pcf		Corrected Optimum Water Content, %			
See Above		See Above			
Test Method		Liquid Limit	Plastic Limit	Plasticity Index	Specific Gravity
ASTM D1557		46	16	30	2.7 (est.)
Preparation Method	USCS	% Gravel	% Sand	% Fines	% Oversize
Dry	CL	-	11.4	88.6	-

PROJECT: Columbia - Modules 10 and 11 Liner
Pradeeville, Wi

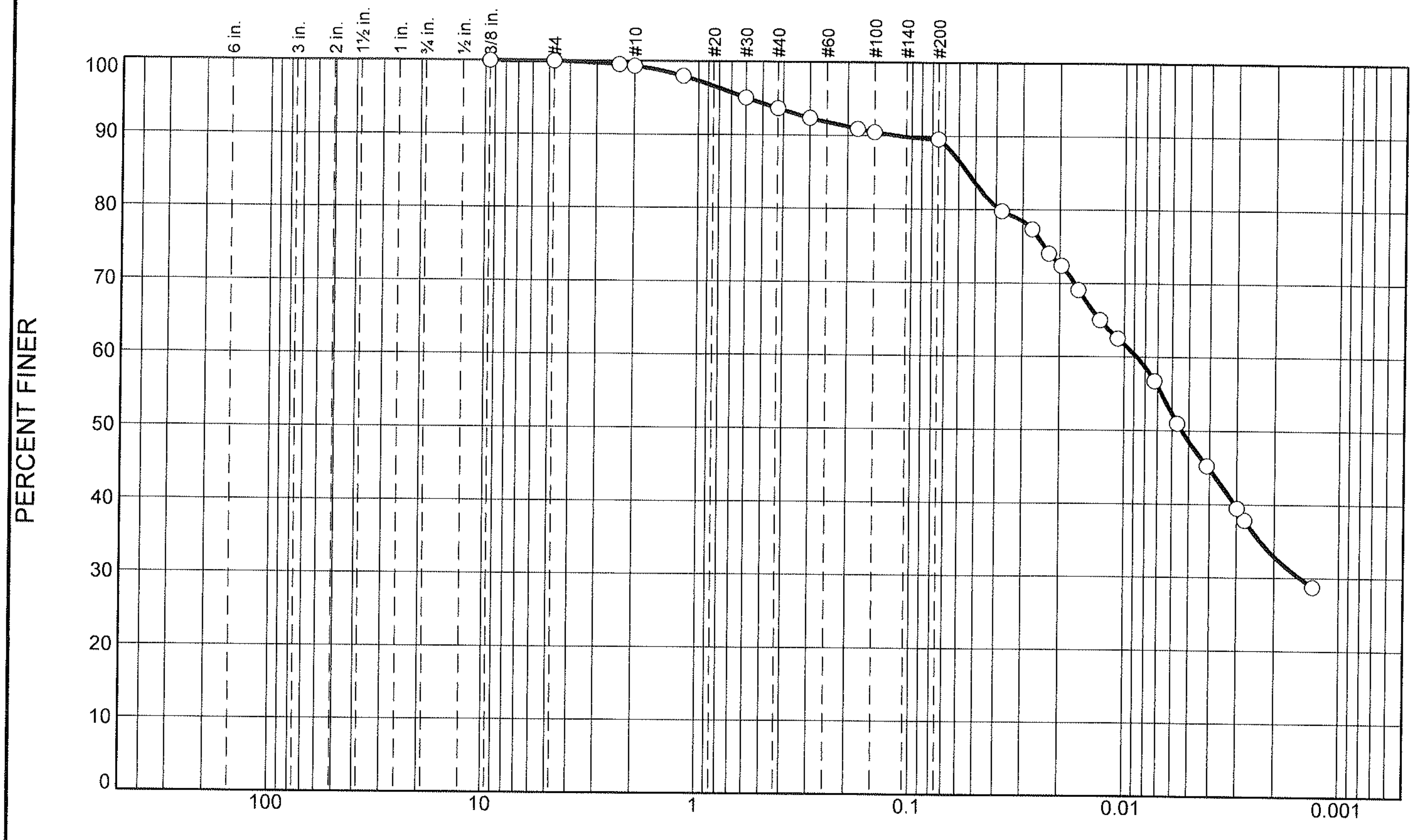
PROJECT NUMBER: C22011-2
TEST NUMBER: -

LABORATORY COMPACTION TEST

CGC, Inc.	CHECKED BY:	REVIEWED BY: KJS	10-Oct-22

File:22011-2.pc6

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.7	5.7	4.0	41.2	48.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	100.0		
#8	99.5		
#10	99.3		
#16	98.0		
#30	95.1		
#40	93.6		
#50	92.3		
#80	90.9		
#100	90.5		
#200	89.6		

* (no specification provided)

Material Description

Brown Lean Clay, Little Sand

Atterberg Limits

PL= 19 LL= 49 PI= 30

Coefficients

D_{90}= 0.1163 D_{85}= 0.0546 D_{60}= 0.0087
D_{50}= 0.0054 D_{30}= 0.0015 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(28)

Remarks

Sample Number: COL-CL-B6

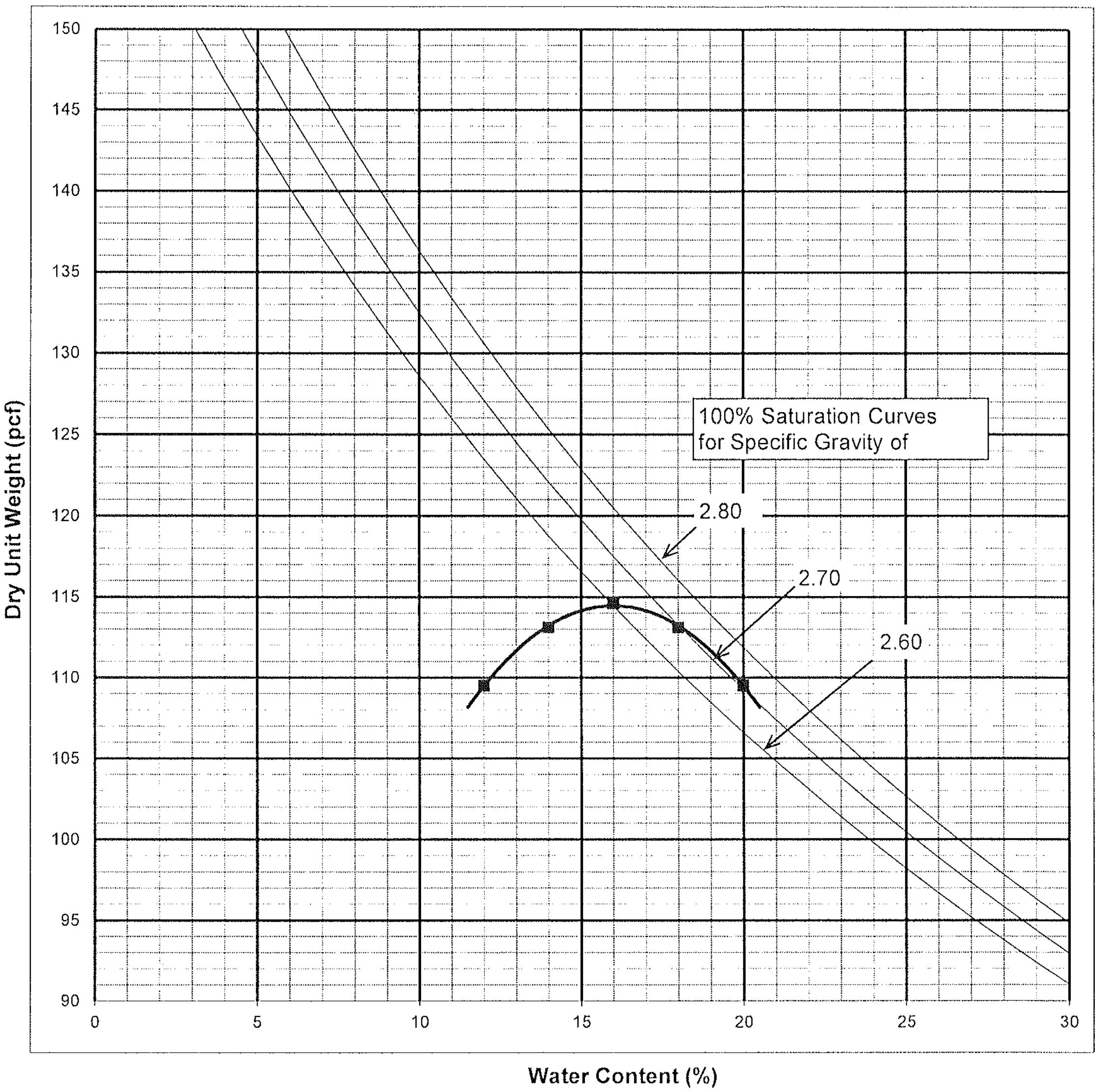
Date: 11/7/22

CGC,Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

TEST REPORT



Specimen No.	Maximum Dry Unit Weight, pcf	Optimum Water Content, %
COL - CL - B6	114.6	16.0

Specimen Description

Brown Lean Clay, Little Sand

Corrected Maximum Dry Unit Weight, pcf	Corrected Optimum Water Content, %	
See Above	See Above	

Test Method		Liquid Limit	Plastic Limit	Plasticity Index	Specific Gravity
ASTM D1557, Method A		49	19	30	2.7 (est.)
Preparation Method	USCS	% Gravel	% Sand	% Fines	% Oversize
Dry	CL	-	10.4	89.6	-

PROJECT: Columbia - Modules 10 and 11 Liner
Pradeeville, Wi

PROJECT NUMBER: C22011-2
TEST NUMBER: -

LABORATORY COMPACTION TEST

CGC, Inc.

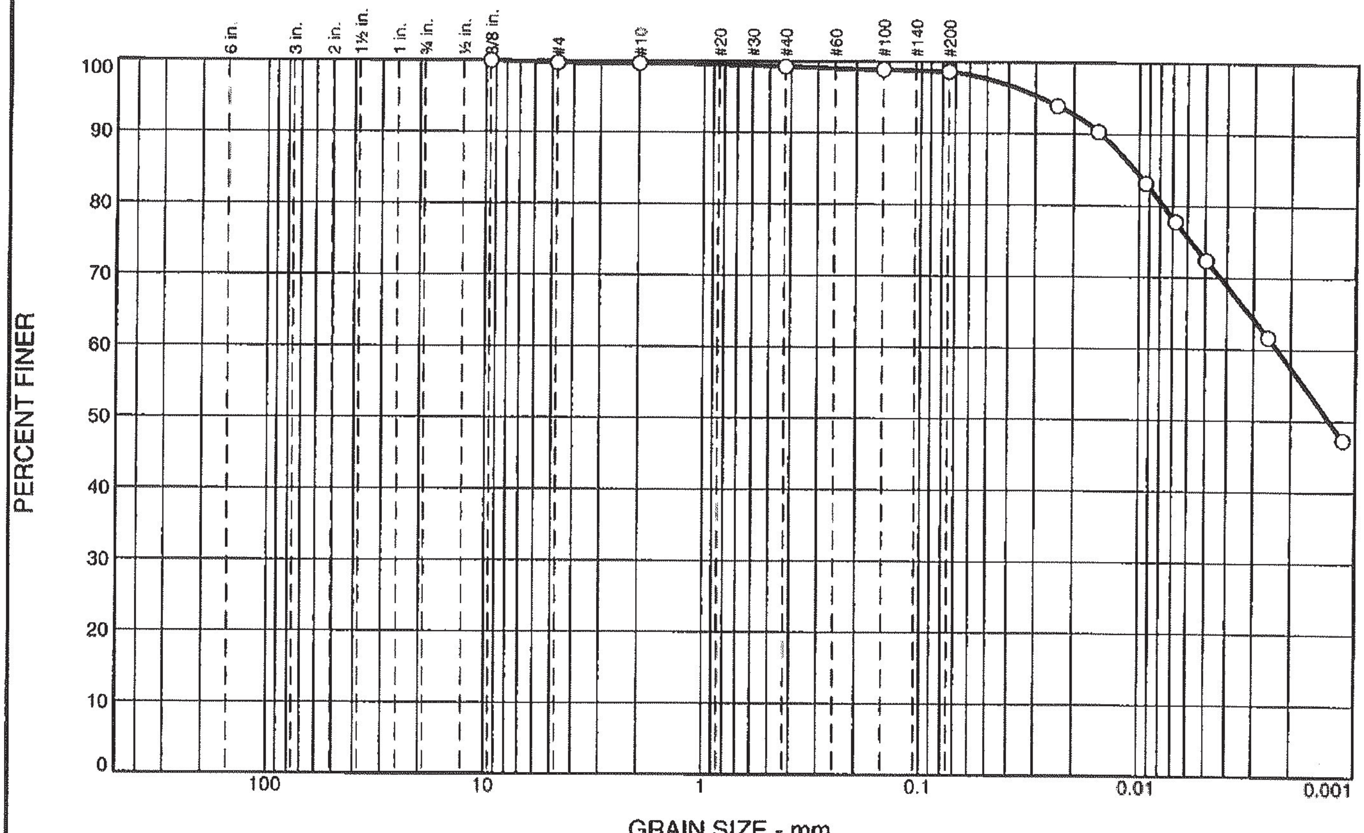
CHECKED BY:

REVIEWED BY: KJS

18-Oct-22

File:22011-2.pc7

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.3	0.1	0.3	0.7	26.1	72.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	99.7		
#10	99.6		
#40	99.3		
#100	98.9		
#200	98.6		

* (no specification provided)

Material Description

LEAN CLAY, yellowish red

Atterberg Limits

PL= 19 LL= 48 PI= 29

Coefficients

D_{90}= 0.0150 D_{85}= 0.0105 D_{60}= 0.0023
D_{50}= 0.0013 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(31)

Remarks

Munsell Color Code: 5YR 5/6
Location: N542800 E2124700

Source of Sample: ST-In Place
Sample Number: COL-CL-T1(K)

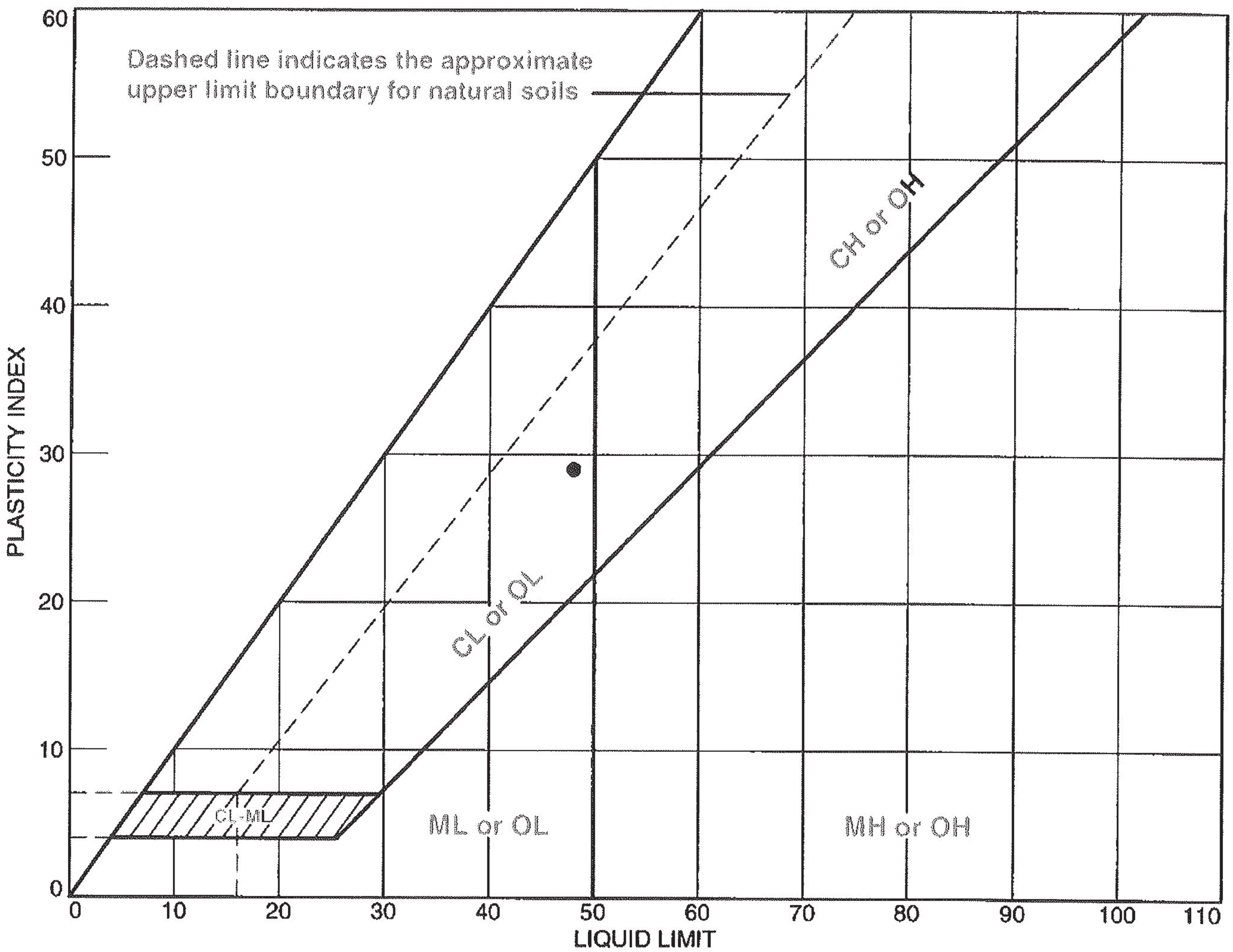
Date: 10/03/2022

Tetra Tech
2679 Continental Drive
Green Bay, WI 54311

Client: CGC, Inc.
Project: Columbia - Modules 10 & 11 Liner
Project No: C22011-2 **Figure**

Tested By: MAB **Checked By:** JJN

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	ST-In Place	COL-CL-T1(K)		26.5	19	48	29	CL

Tetra Tech
2679 Continental Drive
Green Bay, WI 54311

Client: CGC, Inc.
Project: Columbia - Modules 10 & 11 Liner

Project No.: C22011-2 **Figure**

Tested By: MLW **Checked By:** JJN

TETRA TECH
2679 Continental Drive
Green Bay, WI 54311
(920) 465-3911

Client: CGC, Inc.
Project: Columbia Modules 10&11 (C22011-2)
Prepared by: Justin J. Naumann **Date:** 11/4/22
Checked by: Robert A Rouse **Date:** 12/1/22

REPORT OF:

FALLING HEAD PERMEABILITY TEST

ASTM: D5084

GENERAL DATA:

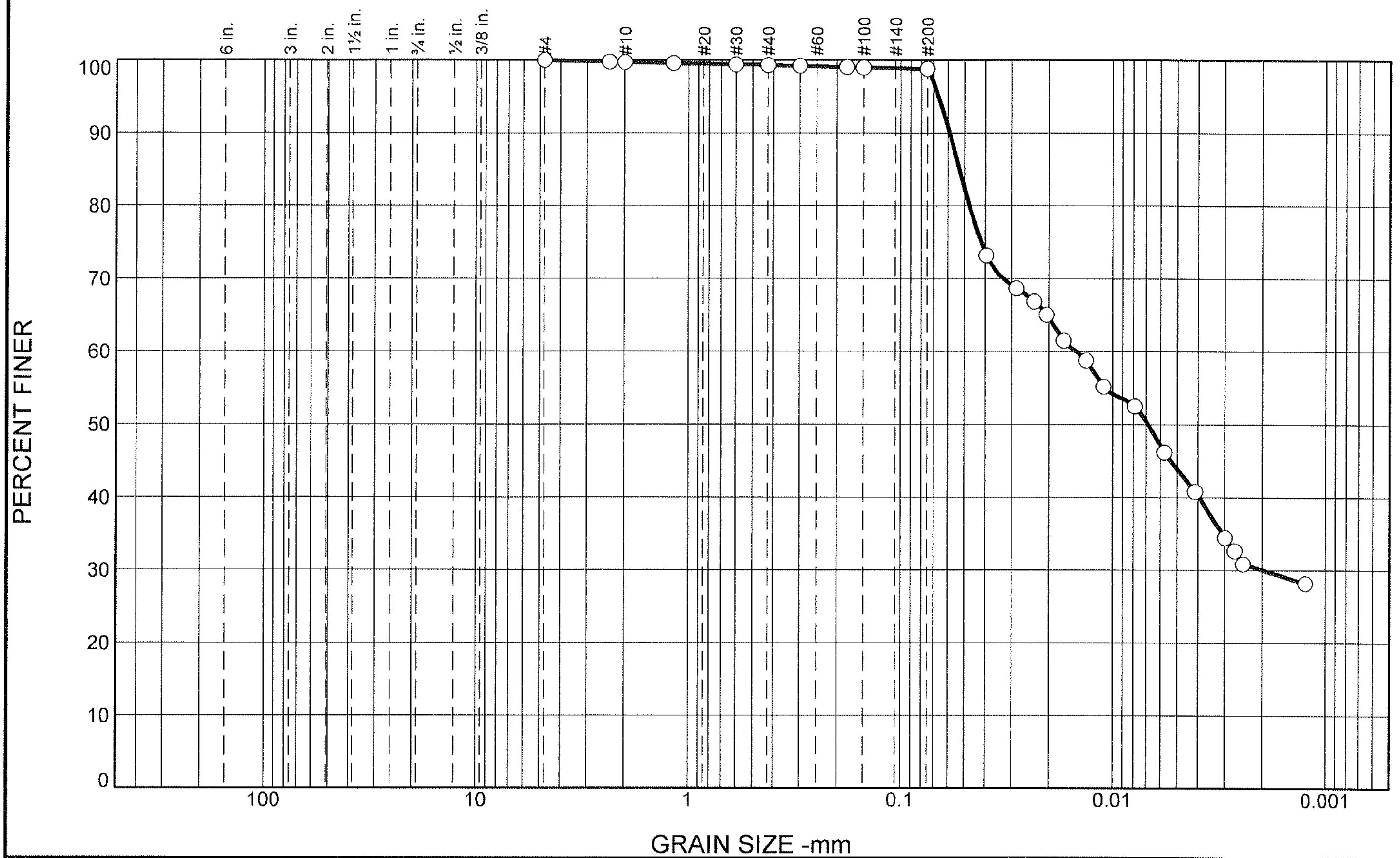
Sample Location:	N542800 E2124700
Sample Number:	COL-CL-T1(K)
Date Sampled:	10/3/22
Date Received:	10/10/22

LABORATORY DATA:

		PROJECT SPECIFICATIONS
Method of Test:	Flex Wall - Undisturbed	
Length of Sample (inches):	3.364	
Diameter of Sample (inches):	2.846	
Dates Tested:	October 11-26, 2022	
Moisture Content (%)	26.2	
Dry Density (pcf):	99.3	
% Compaction:		
Soil Classification:	LEAN CLAY, yellowish red (CL)	
Max. Head Differential (ft.)	6.0	
Confining Pressure (Effective psi):	2.0	
Hydraulic Gradient:	17-19	
Trial No.:	5-8	
Water Temperature:	21°C	
Coefficient of Permeability (cm/sec):	2.03E-08	1.0E-07 or slower

REMARKS:

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	0.4	0.5	55.0	43.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.8		
#10	99.7		
#16	99.6		
#30	99.4		
#40	99.3		
#50	99.2		
#80	99.0		
#100	99.0		
#200	98.8		

* (no specification provided)

Material Description

Brown Lean Clay. Trace Sand

Atterberg Limits

PL= 19 LL= 47 PI= 29

Coefficients

D_{90}= 0.0590 D_{85}= 0.0530 D_{60}= 0.0148
D_{50}= 0.0068 D_{30}= 0.0020 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(30)

Remarks

Natural Moisture = 25.3%
Dry Unit Weight = 104.0 pcf

Sample Number: COL-CL-T2

Date: 10/26/22

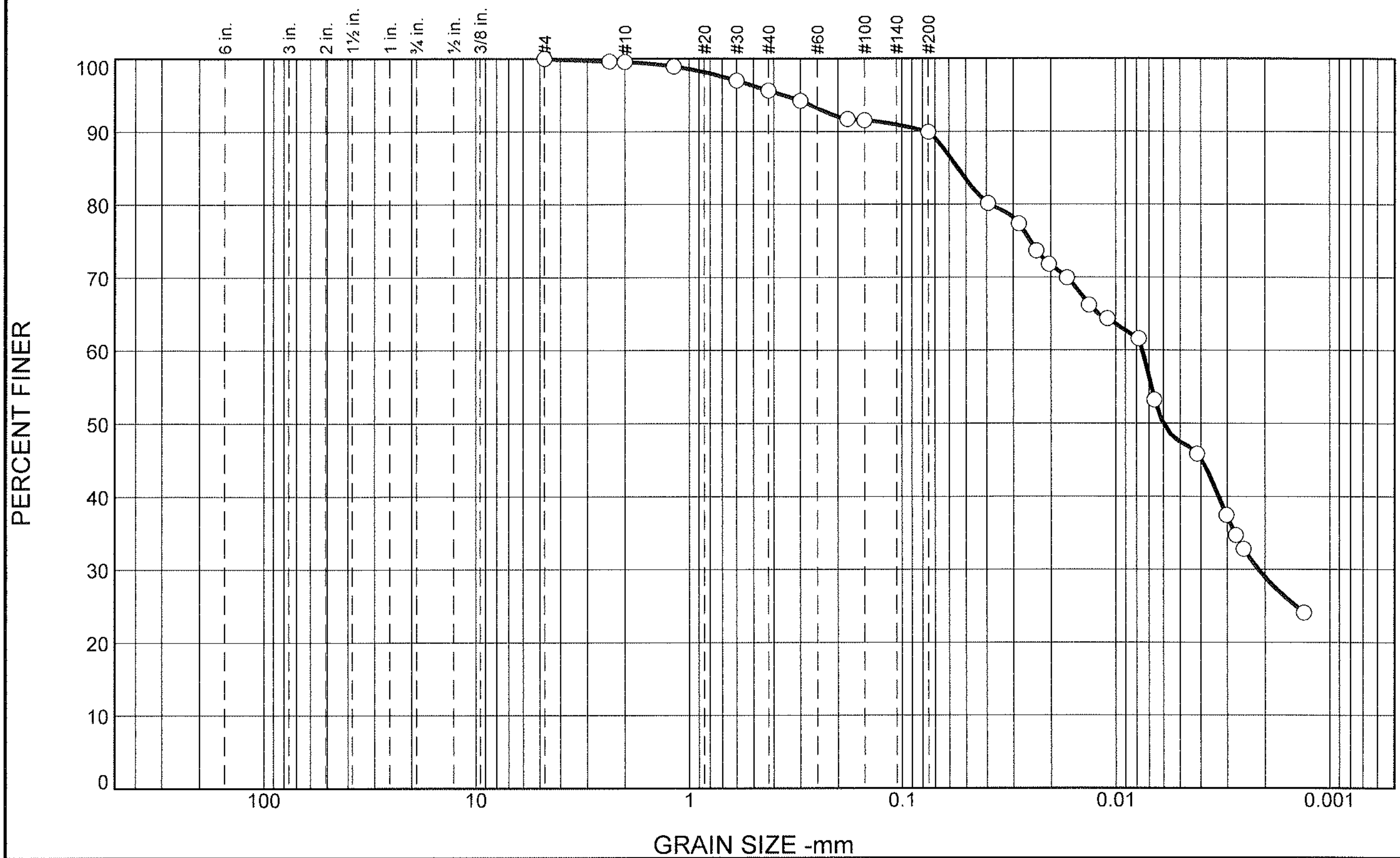
CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00

Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.4	4.0	5.6	42.5	47.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.7		
#10	99.6		
#16	98.9		
#30	97.0		
#40	95.6		
#50	94.2		
#80	91.7		
#100	91.6		
#200	90.0		

* (no specification provided)

Material Description

Brown Lean Clay, Little Sand

Atterberg Limits

PL= 19 LL= 46 PI= 30

Coefficients

D_{90}= 0.0761 D_{85}= 0.0548 D_{60}= 0.0075
D_{50}= 0.0060 D_{30}= 0.0021 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(25)

Remarks

Natural Moisture = 23.0%
Dry Unit Weight = 104.5 pcf

Sample Number: COL-CL-T3

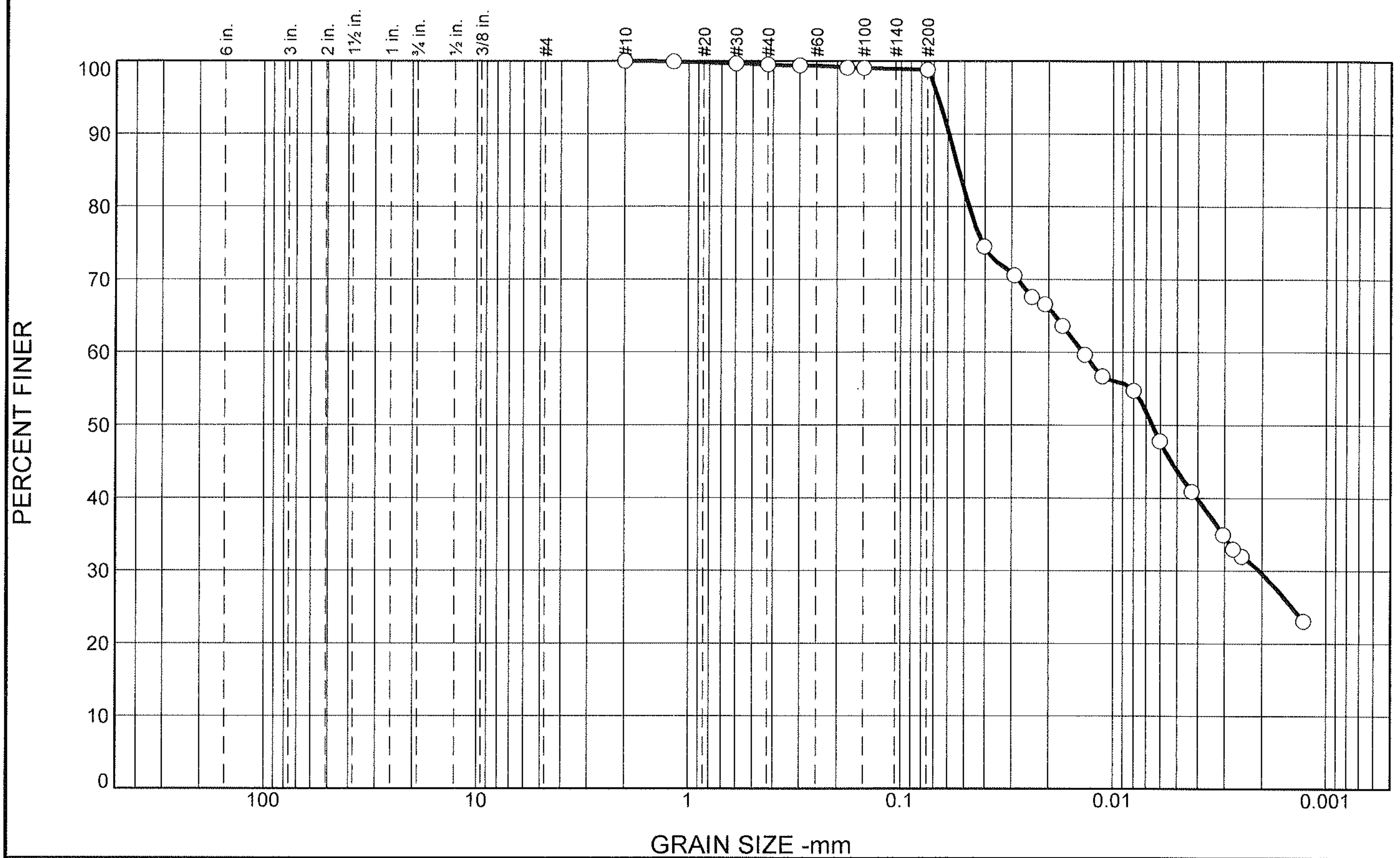
Date: 11/2/22

CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.5	0.7	55.2	43.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#16	99.9		
#30	99.7		
#40	99.5		
#50	99.4		
#80	99.1		
#100	99.1		
#200	98.8		

* (no specification provided)

Material Description

Brown Lean Clay, Trace Sand

Atterberg Limits

PL= 16 LL= 47 PI= 31

Coefficients

D_{90}= 0.0594 D_{85}= 0.0534 D_{60}= 0.0138
D_{50}= 0.0065 D_{30}= 0.0021 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(33)

Remarks

Natural Moisture = 25.7%
Dry Unit Weight = 99.2 pcf

Sample Number: COL-CL-T4

Date: 10/26/22

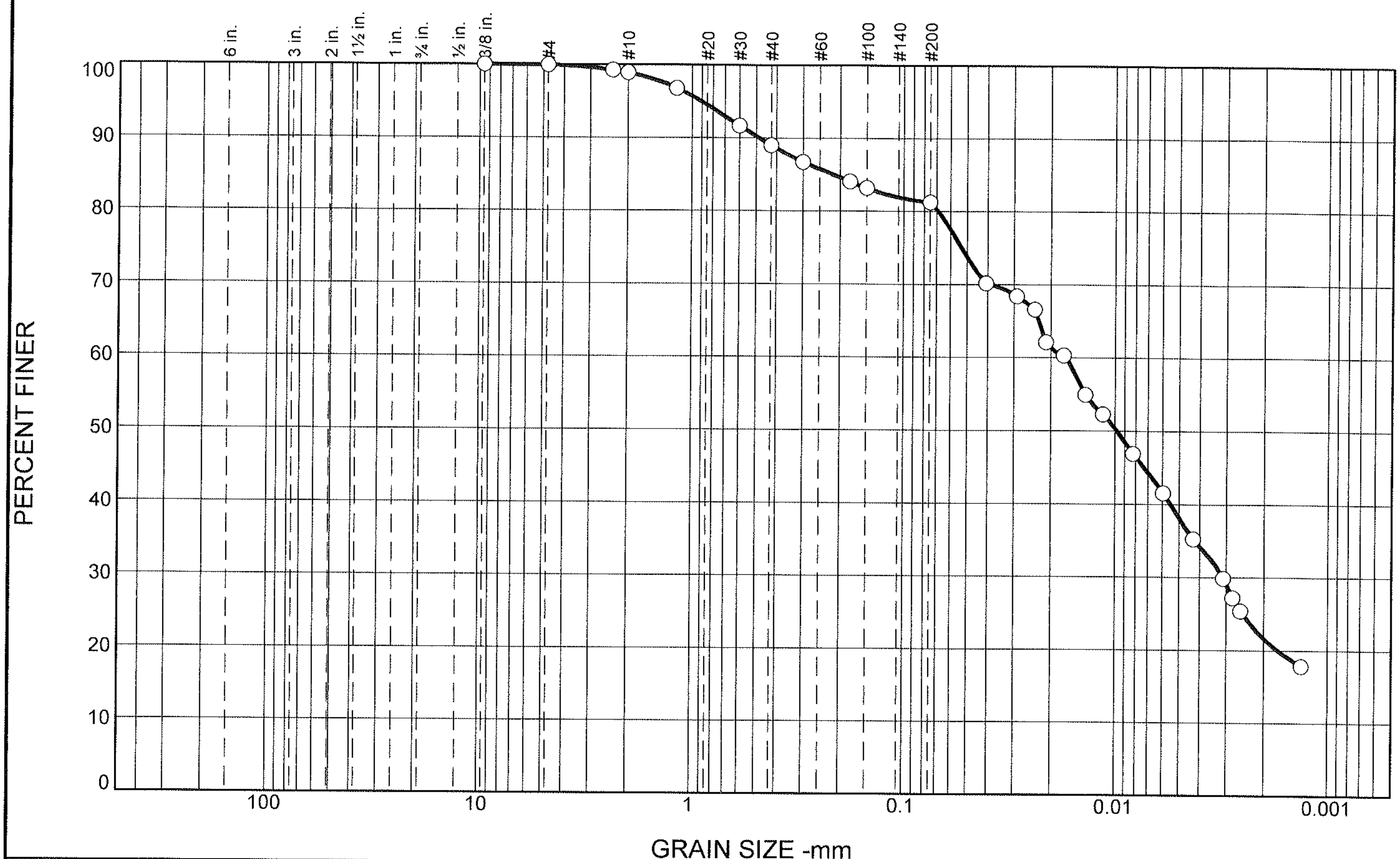
CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00

Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel Coarse	% Gravel Fine	% Sand Coarse	% Sand Medium	% Sand Fine	% Fines Silt	% Fines Clay
0.0	0.0	0.0	1.1	9.9	7.7	43.3	38.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	100.0		
#8	99.3		
#10	98.9		
#16	96.8		
#30	91.7		
#40	89.0		
#50	86.7		
#80	84.1		
#100	83.2		
#200	81.3		

* (no specification provided)

Material Description

Brown Lean Clay, Some Sand

Atterberg Limits

PL= 21 LL= 47 PI= 26

Coefficients

D_{90}= 0.4850 D_{85}= 0.2154 D_{60}= 0.0170
D_{50}= 0.0098 D_{30}= 0.0031 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(21)

Remarks

Natural Moisture - 22.4%
Dry Uniy Weight = 104.6 pcf

Sample Number: COL-CL T5

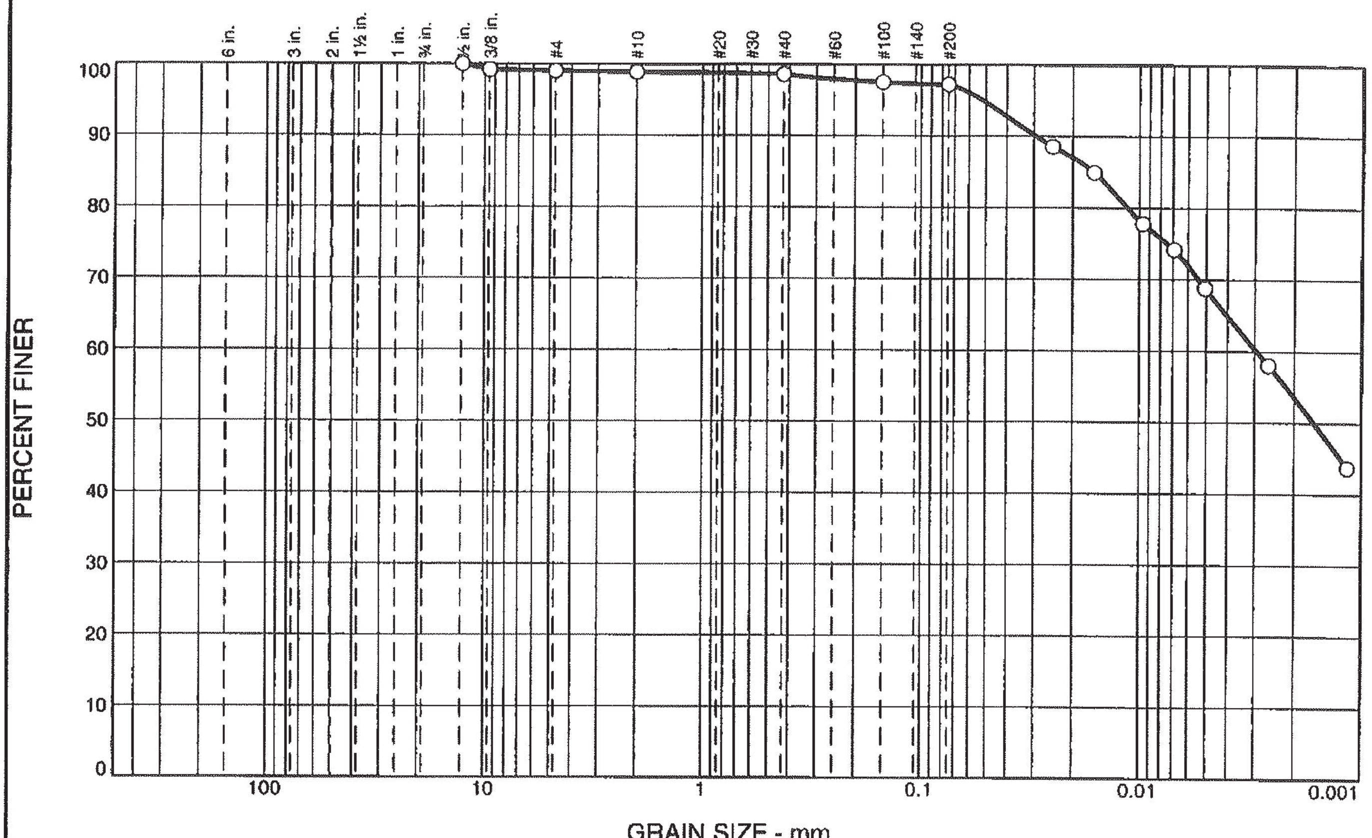
Date: 11/2/22

CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.0	0.1	0.3	1.4	28.6	68.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.5	100.0		
0.375	99.2		
#4	99.0		
#10	98.9		
#40	98.6		
#100	97.5		
#200	97.2		

* (no specification provided)

Material Description

LEAN CLAY, yellowish red

Atterberg Limits

PL= 18 LL= 47 PI= 29

Coefficients

D_{90}= 0.0296 D_{85}= 0.0161 D_{60}= 0.0029
D_{50}= 0.0016 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(30)

Remarks

Munsell Color Code: 5YR 5/6
Location: N542500 E2124750

Source of Sample: ST-In Place
Sample Number: COL-CL-T6(K)

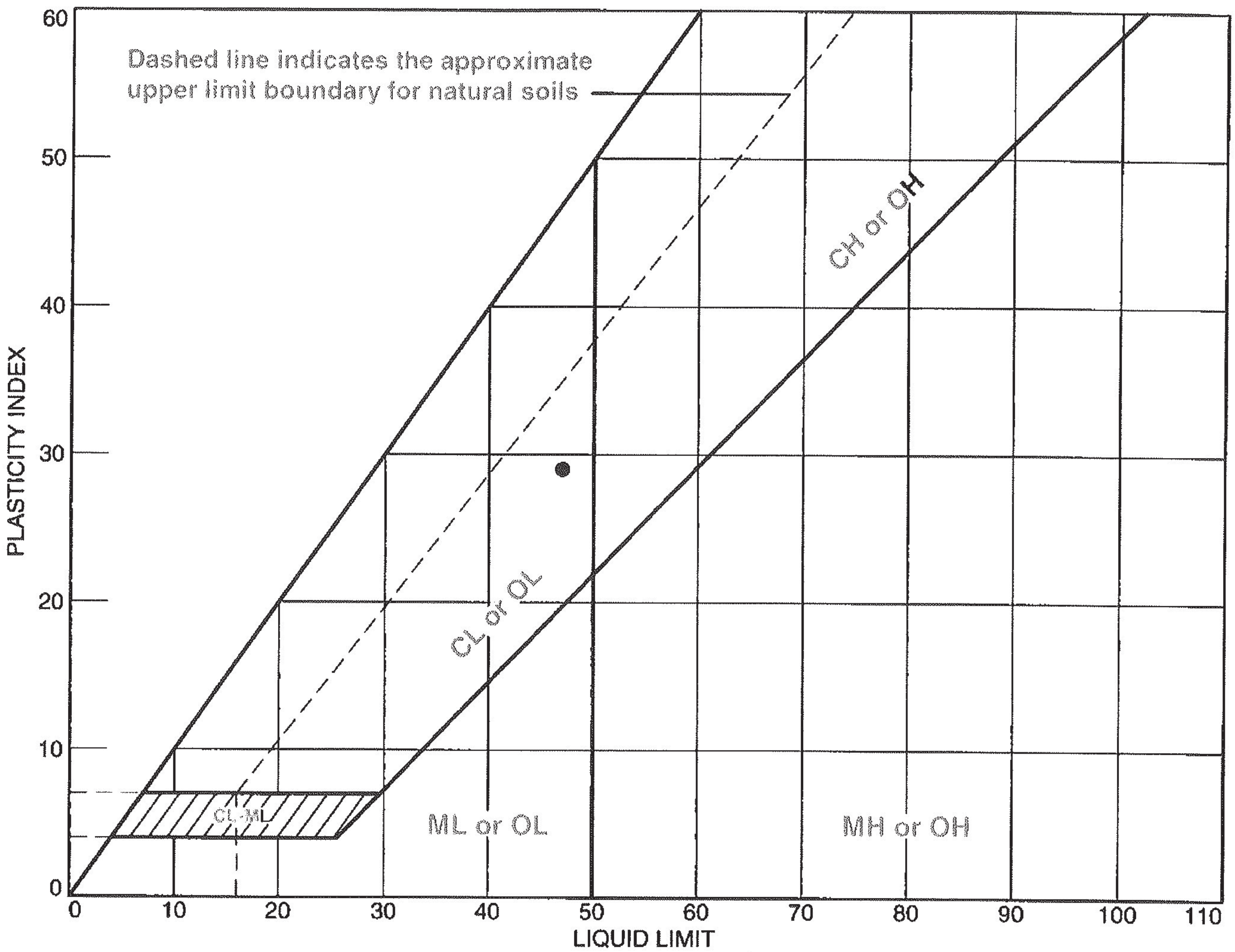
Date: 9/29/2022

Tetra Tech
2679 Continental Drive
Green Bay, WI 54311

Client: CGC, Inc.
Project: Columbia - Modules 10 & 11 Liner
Project No: C22011-2 **Figure**

Tested By: MAB **Checked By:** JJN

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	ST-In Place	COL-CL-T6(K)		22.8	18	47	29	CL

Tetra Tech **2679 Continental Drive** **Green Bay, WI 54311**	**Client:** CGC, Inc. **Project:** Columbia - Modules 10 & 11 Liner **Project No.:** C22011-2 **Figure**

Tested By: MLW **Checked By:** JJN

TETRA TECH 2679 Continental Drive Green Bay, WI 54311 (920) 465-3911	**Client:** CGC, Inc. **Project:** Columbia Modules 10&11 (C22011-2) **Prepared by:** Justin J Naumann **Date:** 11/4/22 **Checked by:** Robert R Rrause **Date:** 12/8/22

REPORT OF:

FALLING HEAD PERMEABILITY TEST

ASTM: D5084

GENERAL DATA:

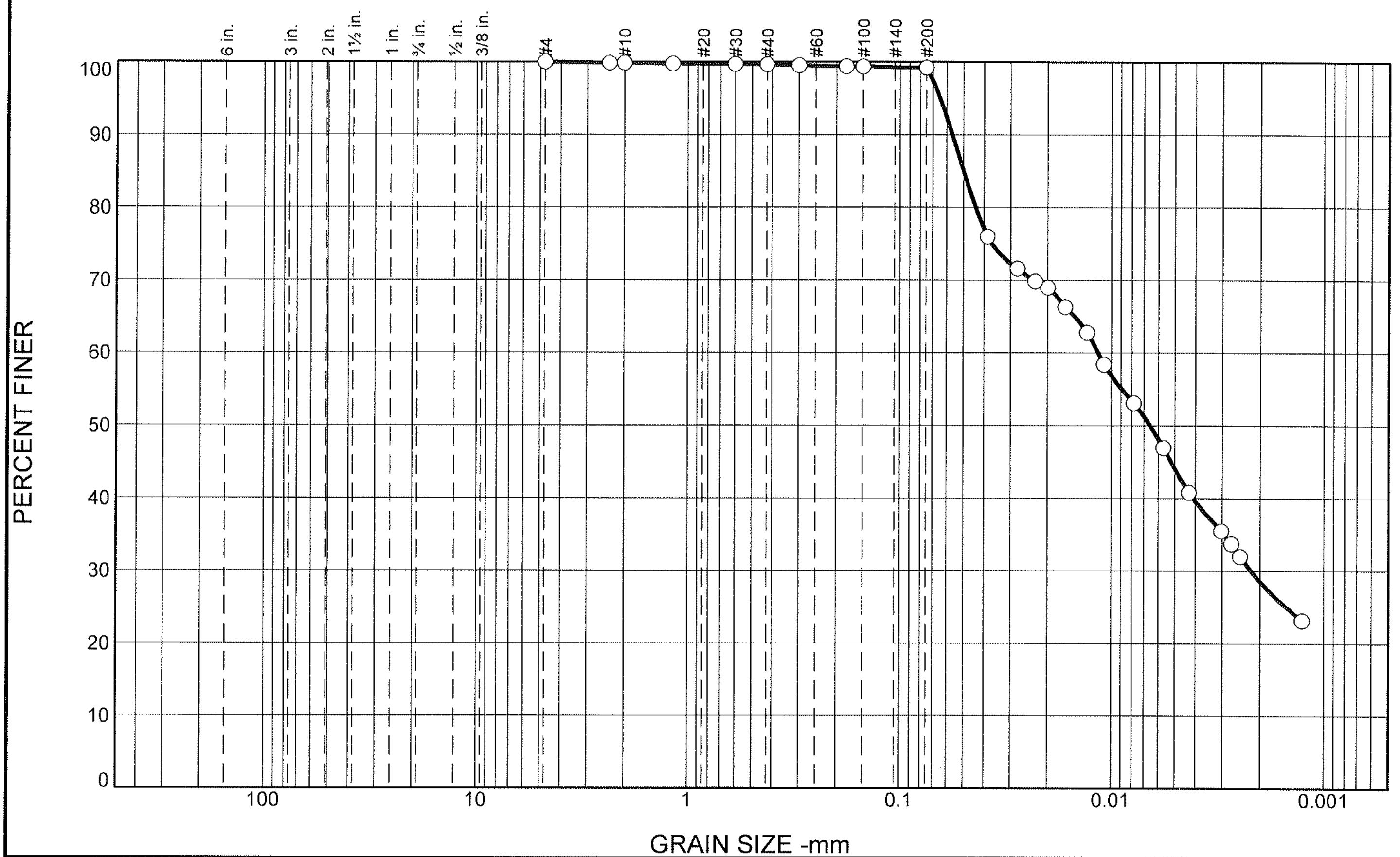
Sample Location:	N542500 E2124750	
Sample Number:	COL-CL-T6(K)	
Date Sampled:	9/29/22	
Date Received:	10/10/22	

LABORATORY DATA:

		PROJECT SPECIFICATIONS
Method of Test:	Flex Wall - Undisturbed	
Length of Sample (inches):	3.364	
Diameter of Sample (inches):	2.822	
Dates Tested:	October 11-26, 2022	
Moisture Content (%)	24.7	
Dry Density (pcf):	101.3	
% Compaction:		
Soil Classification:	LEAN CLAY, yellowish red (CL)	
Max. Head Differential (ft.)	6.0	
Confining Pressure (Effective psi):	2.0	
Hydraulic Gradient:	19-20	
Trial No.:	6-9	
Water Temperature:	21°C	
Coefficient of Permeability (cm/sec):	1.65E-08	1.0E-07 or slower

REMARKS:

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	0.3	0.4	55.2	44.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.9		
#10	99.9		
#16	99.8		
#30	99.7		
#40	99.6		
#50	99.5		
#80	99.4		
#100	99.4		
#200	99.2		

* (no specification provided)

Material Description

Brown Lean Clay, Trace Sand

Atterberg Limits

PL= 16 LL= 47 PI= 31

Coefficients

D_{90}= 0.0567 D_{85}= 0.0501 D_{60}= 0.0116
D_{50}= 0.0066 D_{30}= 0.0022 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(33)

Remarks

Natural Moisture = 25.0%
Dry Unit Weight = 100.0 pcf

Sample Number: COL-CL-T7

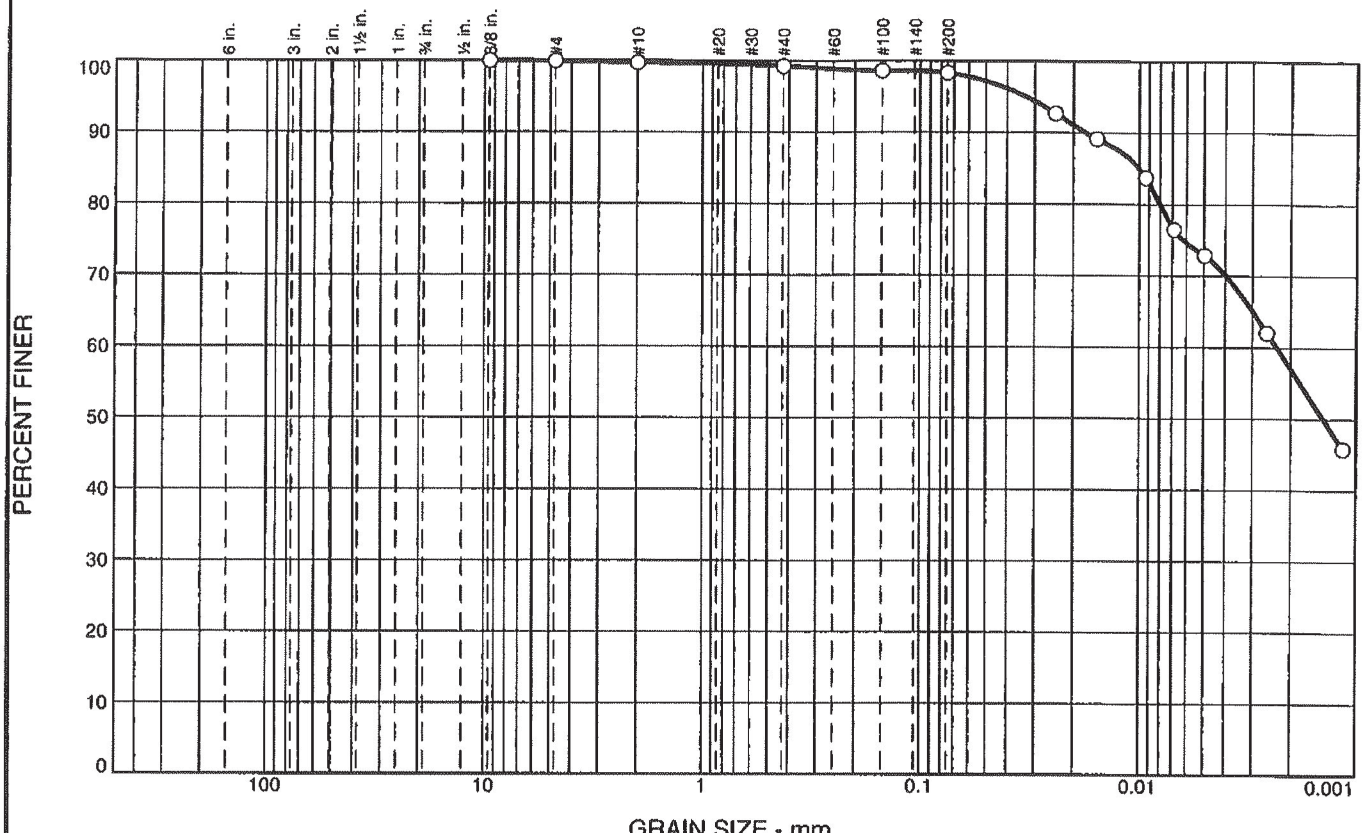
Date: 10/26/22

CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.2	0.4	1.0	25.4	72.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	99.9		
#10	99.7		
#40	99.3		
#100	98.6		
#200	98.3		

* (no specification provided)

Material Description

LEAN CLAY, yellowish red

Atterberg Limits

PL= 19 LL= 46 PI= 27

Coefficients

D_{90}= 0.0176 D_{85}= 0.0100 D_{60}= 0.0023
D_{50}= 0.0014 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(29)

Remarks

Munsell Color Code: 5YR 5/6
Location: N542400 E2125000

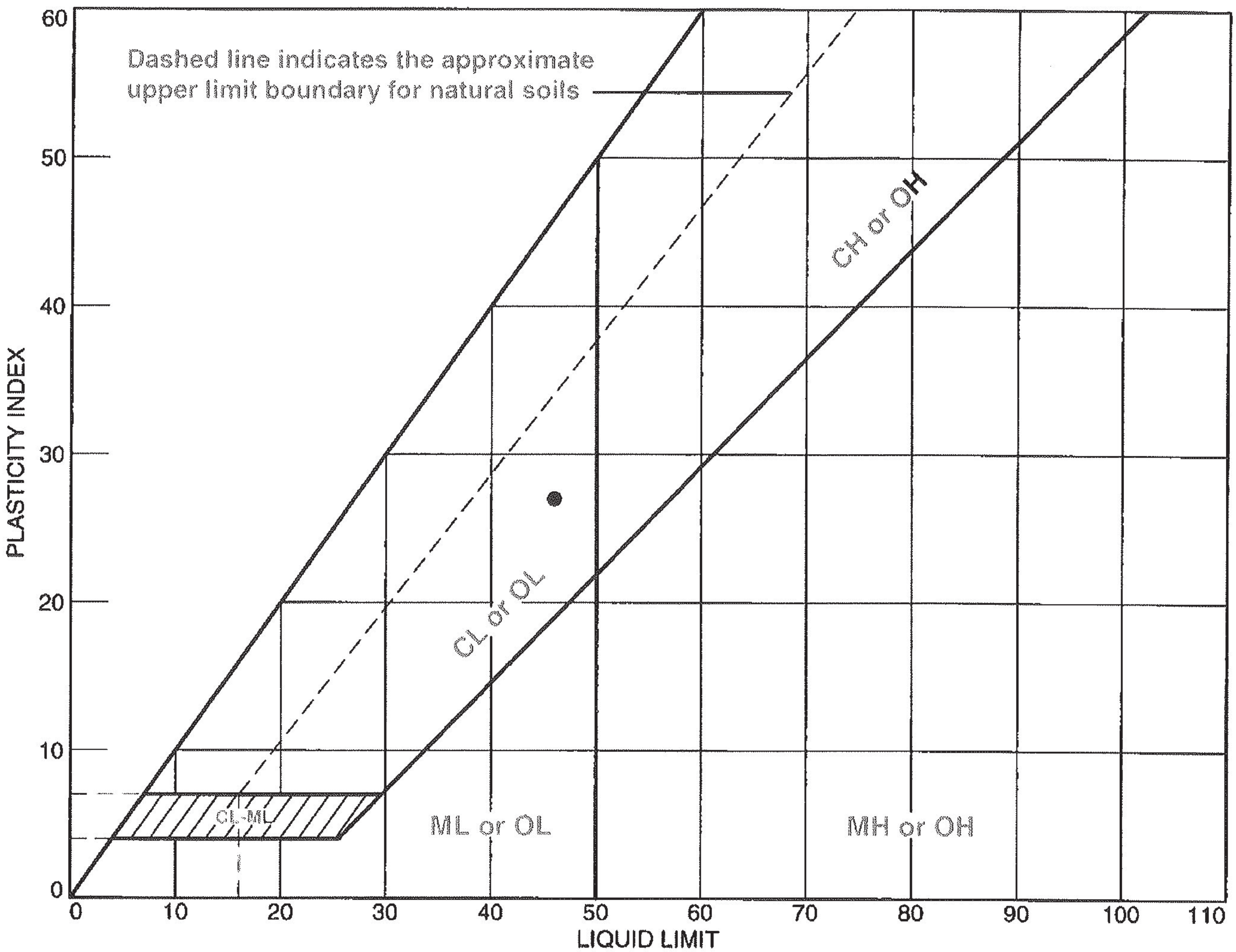
Source of Sample: ST-In Place
Sample Number: COL-CL-T8(K)

Date: 9/30/2022

Tetra Tech **2679 Continental Drive** **Green Bay, WI 54311**	**Client:** CGC, Inc. **Project:** Columbia - Modules 10 & 11 Liner **Project No:** C22011-2 **Figure**

Tested By: MAB **Checked By:** JJN

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	ST-In Place	COL-CL-T8(K)		26.0	19	46	27	CL

Tetra Tech **2679 Continental Drive** **Green Bay, WI 54311**	**Client:** CGC, Inc. **Project:** Columbia - Modules 10 & 11 Liner **Project No.:** C22011-2 **Figure**

Tested By: MLW **Checked By:** JJN

TETRA TECH 2679 Continental Drive Green Bay, WI 54311 (920) 465-3911	**Client:** CGC, Inc. **Project:** Columbia Modules 10&11 (C22011-2) **Prepared by:** Justin J. Naumann **Date:** 11/4/22 **Checked by:** Robert R Rouse **Date:** 12/1/22

REPORT OF:

FALLING HEAD PERMEABILITY TEST

ASTM: D5084

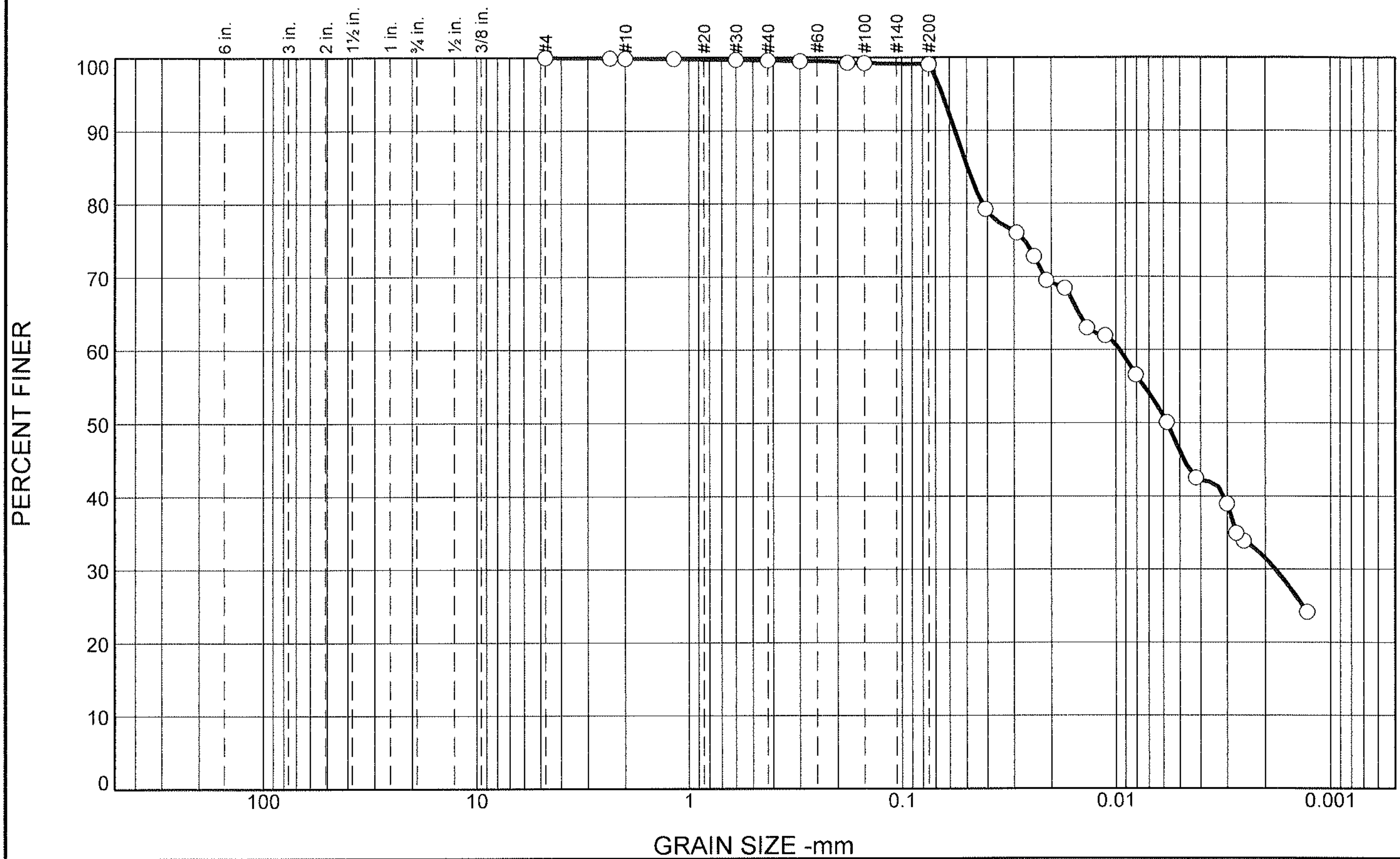
GENERAL DATA:

Sample Location:	N542400 E2125000	
Sample Number:	COL-CL-T8(K)	
Date Sampled:	9/30/22	
Date Received:	10/10/22	

LABORATORY DATA:		**PROJECT SPECIFICATIONS**
Method of Test:	Flex Wall - Undisturbed	
Length of Sample (inches):	3.422	
Diameter of Sample (inches):	2.855	
Dates Tested:	October 11-27, 2022	
Moisture Content (%)	24.0	
Dry Density (pcf):	102.1	
% Compaction:		
Soil Classification:	LEAN CLAY, yellowish red (CL)	
Max. Head Differential (ft.)	6.0	
Confining Pressure (Effective psi):	2.0	
Hydraulic Gradient:	17-19	
Trial No.:	8-11	
Water Temperature:	21°C	
Coefficient of Permeability (cm/sec):	9.58E-08	1.0E-07 or slower

REMARKS:

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	0.3	0.5	53.0	46.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.9		
#10	99.9		
#16	99.8		
#30	99.7		
#40	99.6		
#50	99.5		
#80	99.3		
#100	99.3		
#200	99.1		

* (no specification provided)

Material Description

Brown Lean Clay, Trace Sand

Atterberg Limits

PL= 17 LL= 48 PI= 31

Coefficients

D_{90}= 0.0567 D_{85}= 0.0497 D_{60}= 0.0096
D_{50}= 0.0058 D_{30}= 0.0018 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(33)

Remarks

Natural Moisture = 23.4%
Dry Unit Weight = 105.2 pcf

Sample Number: COL-CL-T9

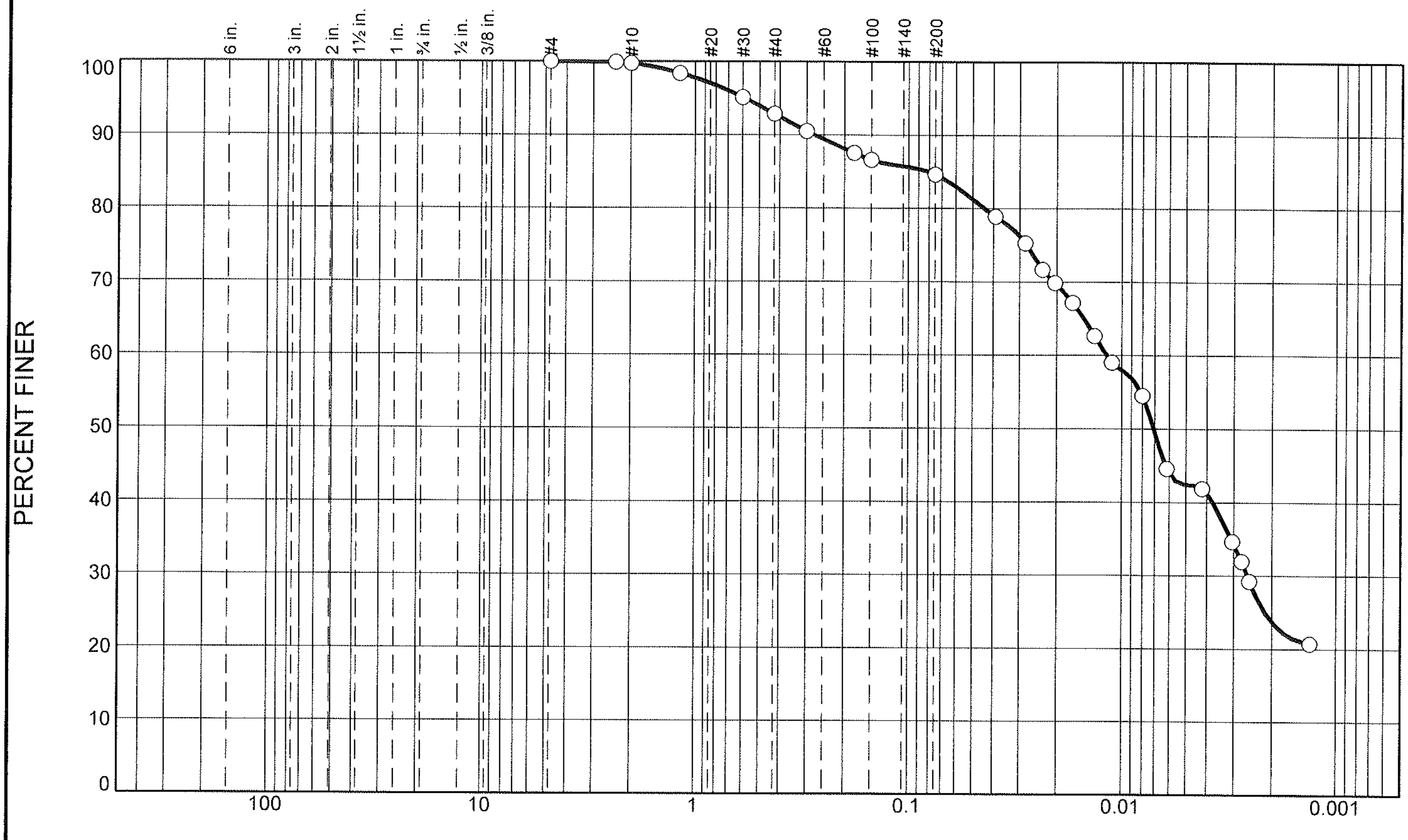
Date: 10/26/22

CGC,Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel Coarse	% Gravel Fine	% Sand Coarse	% Sand Medium	% Sand Fine	% Fines Silt	% Fines Clay
0.0	0.0	0.0	0.3	6.8	8.3	42.2	42.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.9		
#10	99.7		
#16	98.4		
#30	95.1		
#40	92.9		
#50	90.5		
#80	87.5		
#100	86.6		
#200	84.6		

* (no specification provided)

Material Description

Brown Lean Clay, Some Sand

Atterberg Limits

PL= 17 LL= 48 PI= 31

Coefficients

D_{90}= 0.2762 D_{85}= 0.0809 D_{60}= 0.0118
D_{50}= 0.0071 D_{30}= 0.0026 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(27)

Remarks

Natural Moisture = 24.4%
Dry Unit Weight = 102.9 pcf

Sample Number: COL-CL-T10

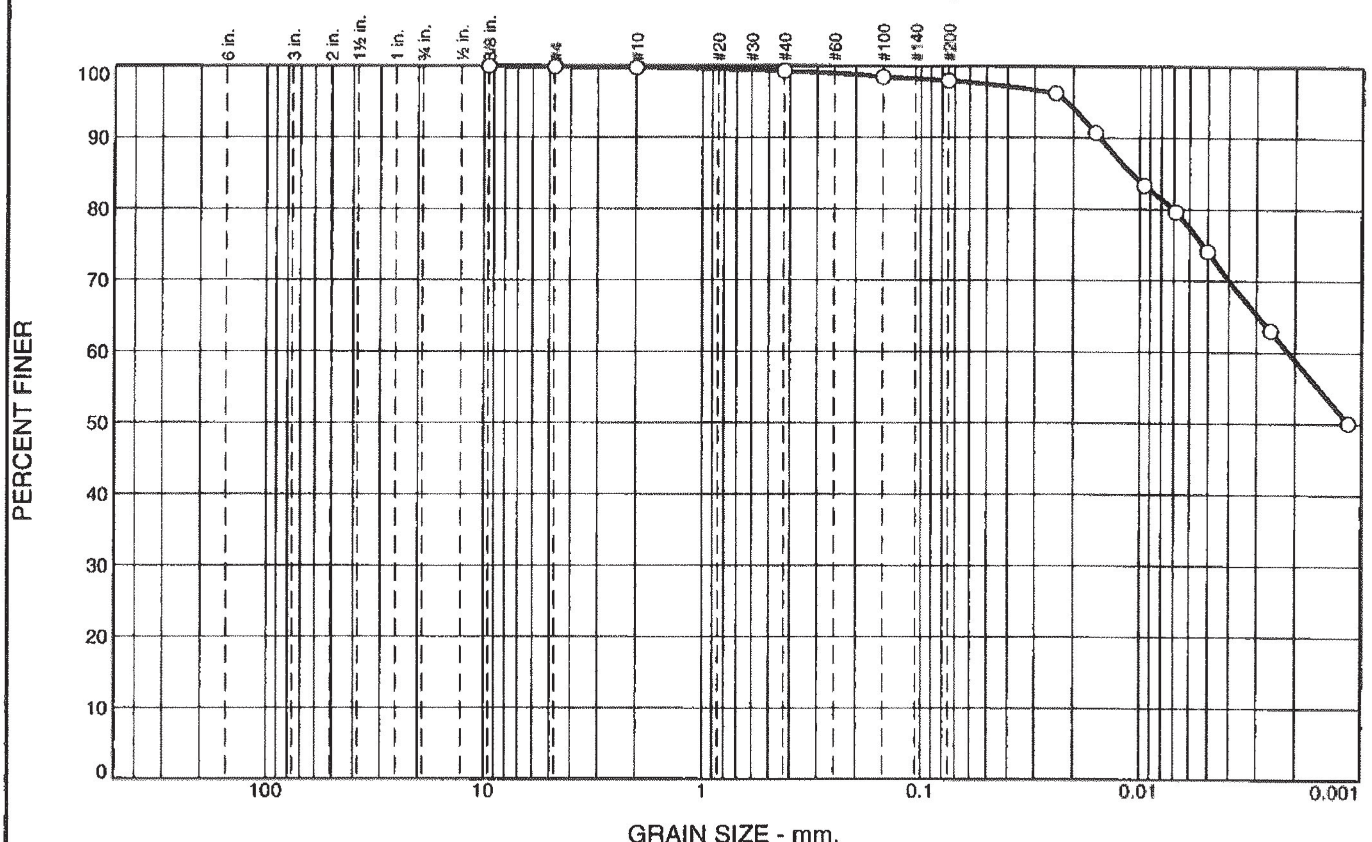
Date: 11/2/22

CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.1	0.5	1.3	24.0	74.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	99.9		
#10	99.8		
#40	99.3		
#100	98.5		
#200	98.0		

* (no specification provided)

Material Description

LEAN CLAY, reddish brown

Atterberg Limits

PL= 18 LL= 46 PI= 28

Coefficients

D_{90}= 0.0151 D_{85}= 0.0109 D_{60}= 0.0021
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(29)

Remarks

Munsell Color Code: 5YR 5/4
Location: N542750 E2124950

Source of Sample: ST-In Place
Sample Number: COL-CL-T11(K)

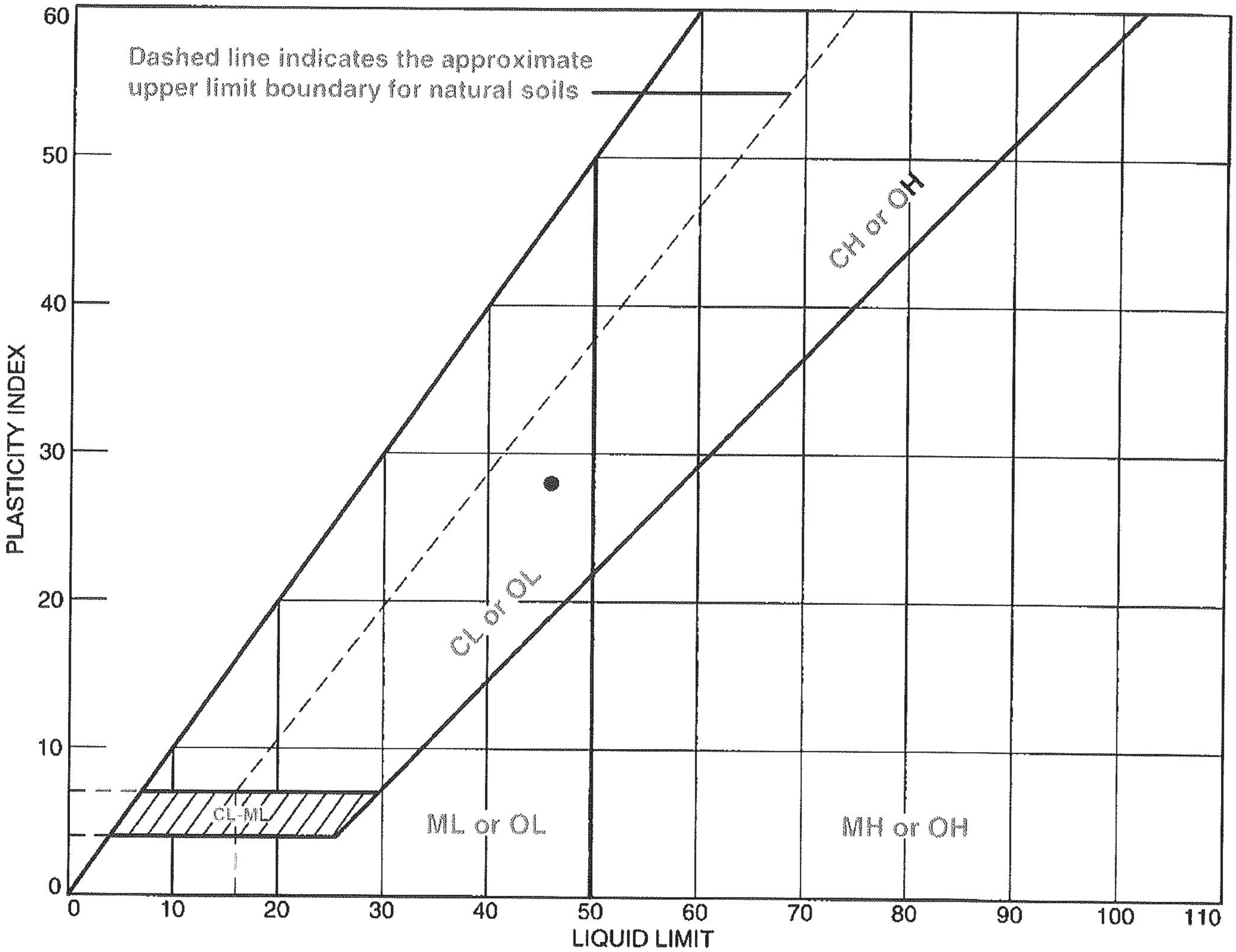
Date: 10/06/2022

Tetra Tech
2679 Continental Drive
Green Bay, WI 54311

Client: CGC, Inc.
Project: Columbia - Modules 10 & 11 Liner
Project No: C22011-2 **Figure**

Tested By: MAB **Checked By:** JJN

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	ST-In Place	COL-CL-T11(K)		25.2	18	46	28	CL

Tetra Tech **2679 Continental Drive** **Green Bay, WI 54311**	**Client:** CGC, Inc. **Project:** Columbia - Modules 10 & 11 Liner **Project No.:** C22011-2 **Figure**

Tested By: MLW **Checked By:** JJN

TETRA TECH
2679 Continental Drive
Green Bay, WI 54311
(920) 465-3911

Client: CGC, Inc.
Project: Columbia Modules 10&11 (C22011-2)
Prepared by: Justin J. Naumann **Date:** 11/28/22
Checked by: Robert R Rouse **Date:** 12/1/22

REPORT OF:

FALLING HEAD PERMEABILITY TEST

ASTM: D5084

GENERAL DATA:

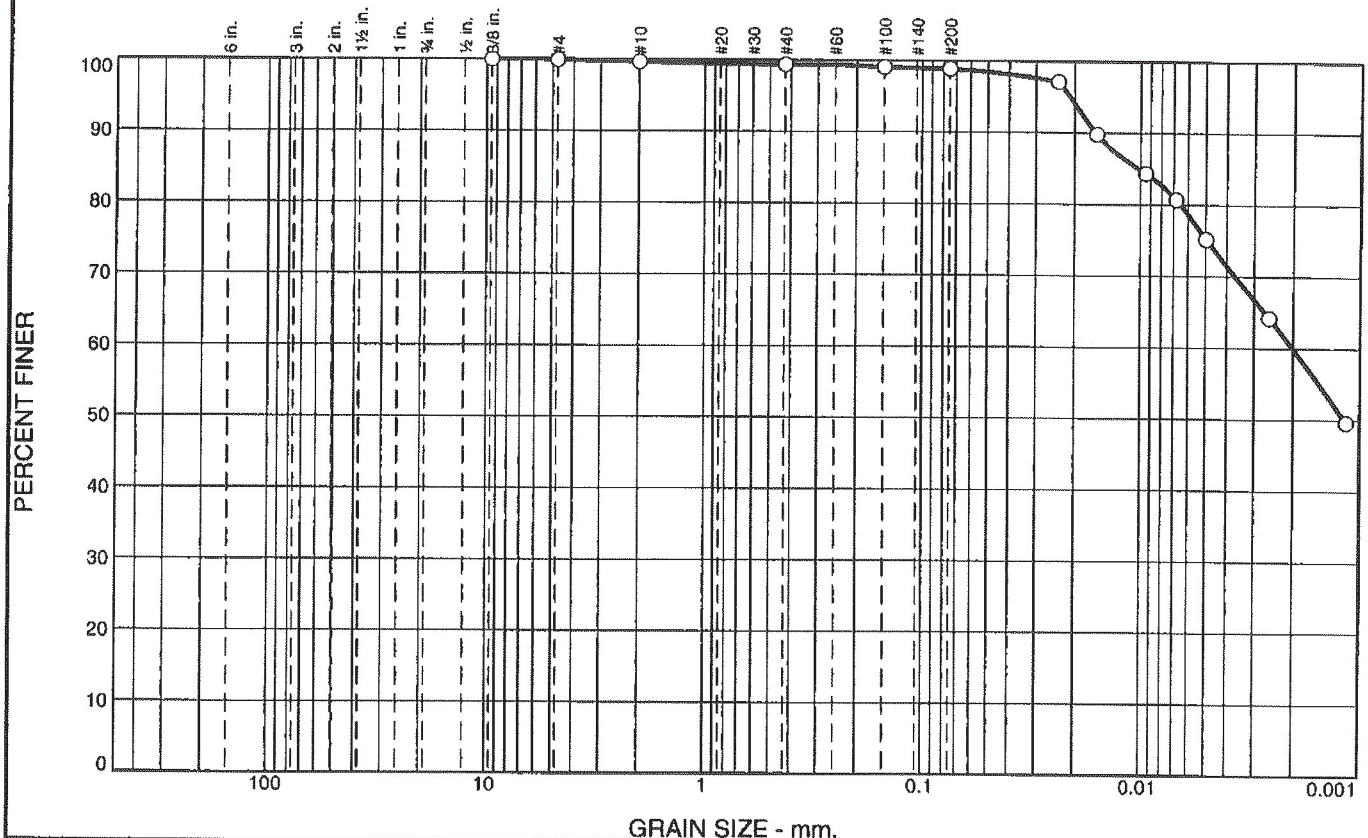
Sample Location:	N542750 E2124950
Sample Number:	COL-CL-T11(K)
Date Sampled:	10/6/22
Date Received:	10/12/22

LABORATORY DATA:

		PROJECT SPECIFICATIONS
Method of Test:	Flex Wall - Undisturbed	
Length of Sample (inches):	3.125	
Diameter of Sample (inches):	2.866	
Dates Tested:	November 3-22, 2022	
Moisture Content (%)	24.2	
Dry Density (pcf):	101.2	
% Compaction:		
Soil Classification:	LEAN CLAY, reddish brown (CL)	
Max. Head Differential (ft.)	6.0	
Confining Pressure (Effective psi):	2.0	
Hydraulic Gradient:	17-19	
Trial No.:	10-13	
Water Temperature:	21°C	
Coefficient of Permeability (cm/sec):	9.18E-08	1.0×10^{-7} or slower

REMARKS:

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	0.3	0.5	23.6	75.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	100.0		
#10	99.7		
#40	99.4		
#100	99.0		
#200	98.9		

* (no specification provided)

Material Description

LEAN CLAY, reddish brown

Atterberg Limits

PL= 17 LL= 47 PI= 30

Coefficients

D_{90}= 0.0160 D_{85}= 0.0102 D_{60}= 0.0020
D_{50}= 0.0012 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(32)

Remarks

Munsell Color Code: 5YR 5/4
Location: N542650 E2124650

Source of Sample: ST-In Place
Sample Number: COL-CL-T12(K)

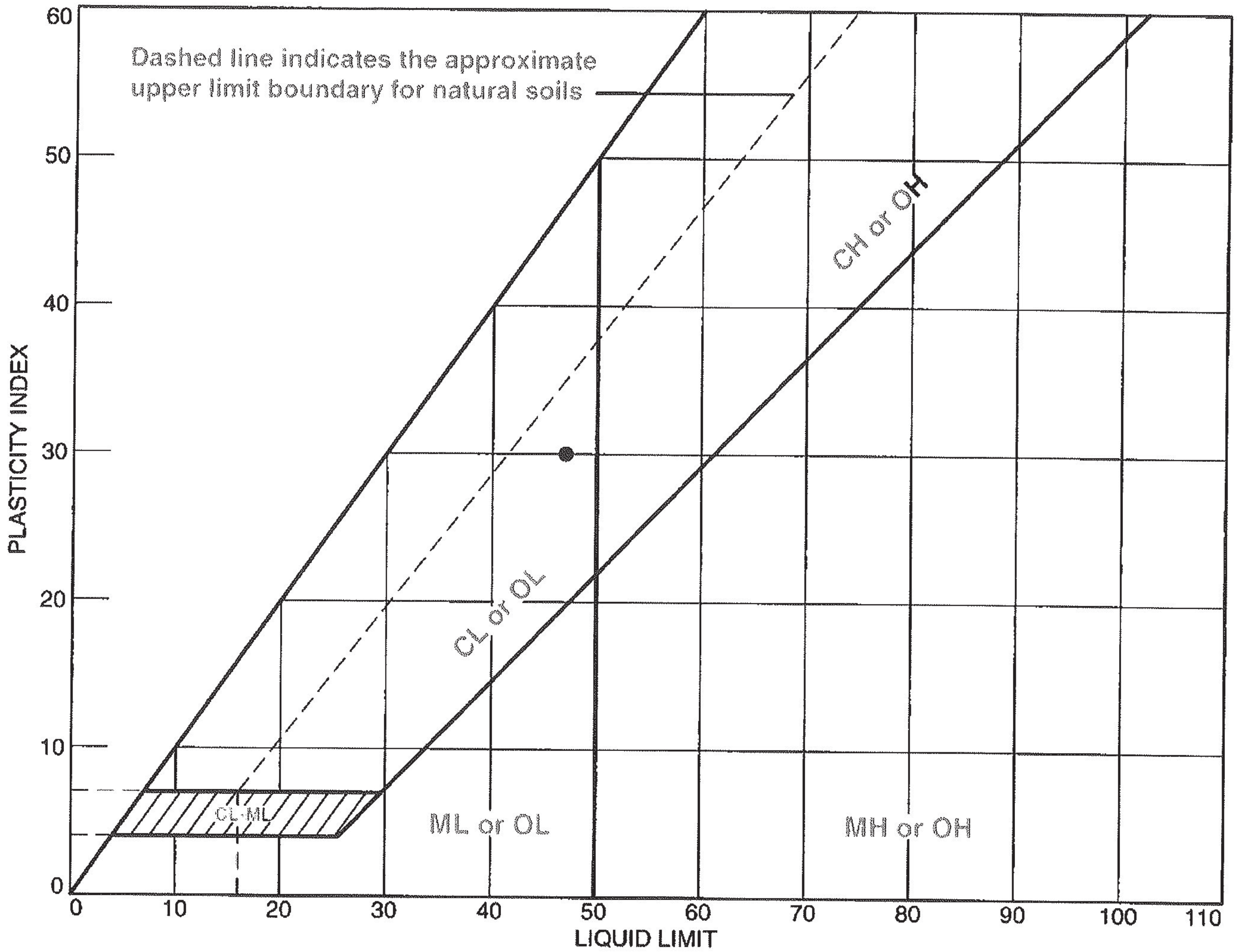
Date: 10/07/2022

Tetra Tech
2679 Continental Drive
Green Bay, WI 54311

Client: CGC, Inc.
Project: Columbia - Modules 10 & 11 Liner
Project No: C22011-2 **Figure**

Tested By: MAB **Checked By:** JJN

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	ST-In Place	COL-CL-T12(K)		16.5	17	47	30	CL

Tetra Tech **2679 Continental Drive** **Green Bay, WI 54311**	**Client:** CGC, Inc. **Project:** Columbia - Modules 10 & 11 Liner **Project No.:** C22011-2 **Figure**

Tested By: MLW **Checked By:** JJN

TETRA TECH
2679 Continental Drive
Green Bay, WI 54311
(920) 465-3911

Client: CGC, Inc.
Project: Columbia Modules 10&11 (C22011-2)
Prepared by: Justin J. Naumann **Date:** 11/4/22
Checked by: Robert R Rouse **Date:** 12/1/22

REPORT OF:

FALLING HEAD PERMEABILITY TEST

ASTM: D5084

GENERAL DATA:

Sample Location:	N542650 E2124650
Sample Number:	COL-CL-T12(K)
Date Sampled:	10/7/22
Date Received:	10/12/22

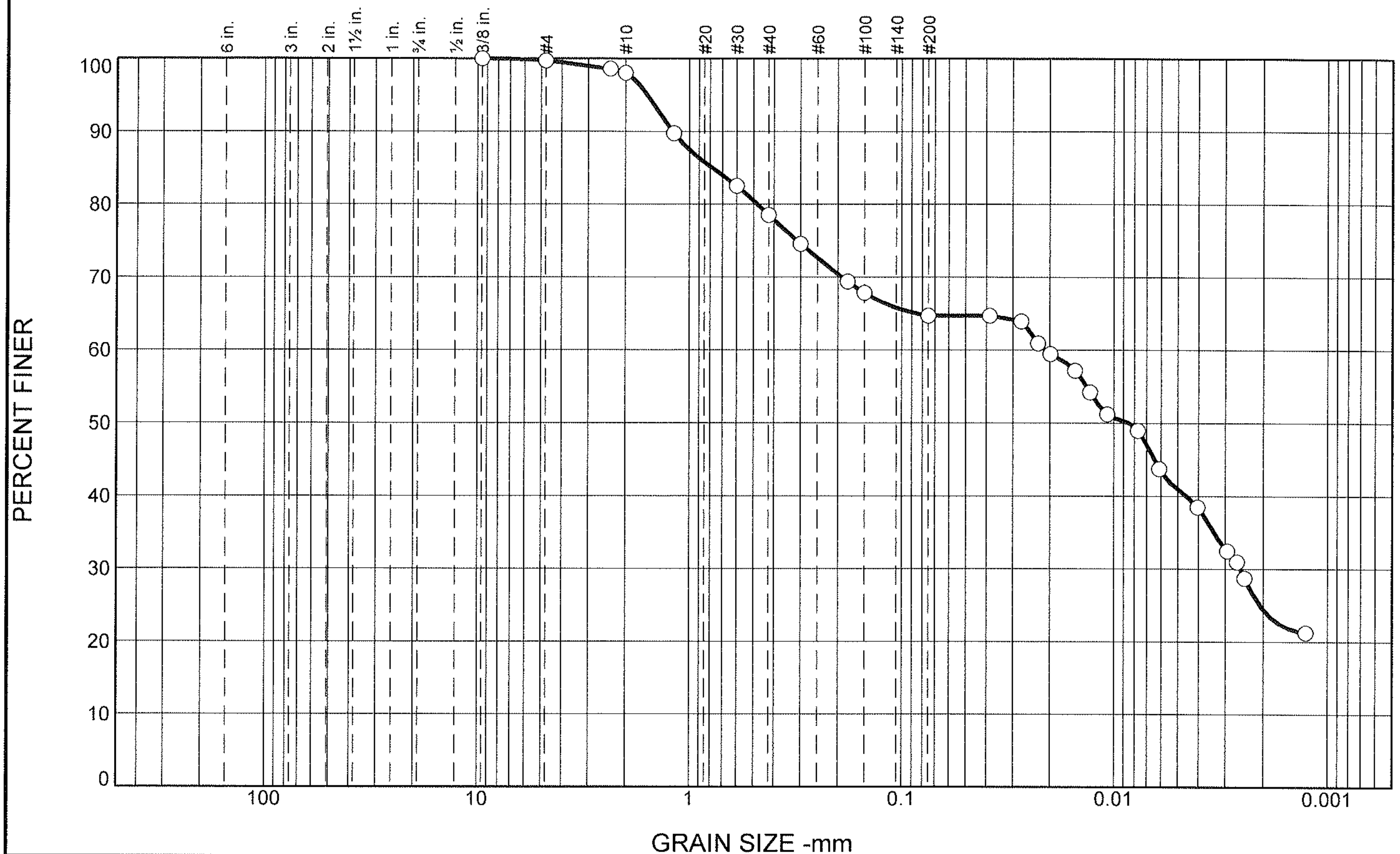
LABORATORY DATA:

		PROJECT SPECIFICATIONS
Method of Test:	Flex Wall - Undisturbed	
Length of Sample (inches):	3.327	
Diameter of Sample (inches):	2.861	
Dates Tested:	October 17-31, 2022	
Moisture Content (%)	21.0	
Dry Density (pcf):	104.6	
% Compaction:		
Soil Classification:	LEAN CLAY, reddish brown (CL)	
Max. Head Differential (ft.)	6.0	
Confining Pressure (Effective psi):	2.0	
Hydraulic Gradient:	19-20	
Trial No.:	5-8	
Water Temperature:	21°C	
Coefficient of Permeability (cm/sec):	4.06E-08	1.0E-07 or slower

REMARKS:

12/1/2022 TLS F-ST-5.xls

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.3	1.6	19.6	13.8	23.8	40.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	99.7		
#8	98.6		
#10	98.1		
#16	89.7		
#30	82.5		
#40	78.5		
#50	74.6		
#80	69.4		
#100	67.8		
#200	64.7		

* (no specification provided)

Material Description

Brown Sandy Lean Clay, Trace Gravel

Atterberg Limits

PL= 20 LL= 46 PI= 26

Coefficients

D_{90}= 1.1995 D_{85}= 0.7869 D_{60}= 0.0211
D_{50}= 0.0085 D_{30}= 0.0025 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(15)

Remarks

Natural Moisture = 23.2%
Dry Unit Weight = 98.4 pcf

Sample Number: COL-CL-T13

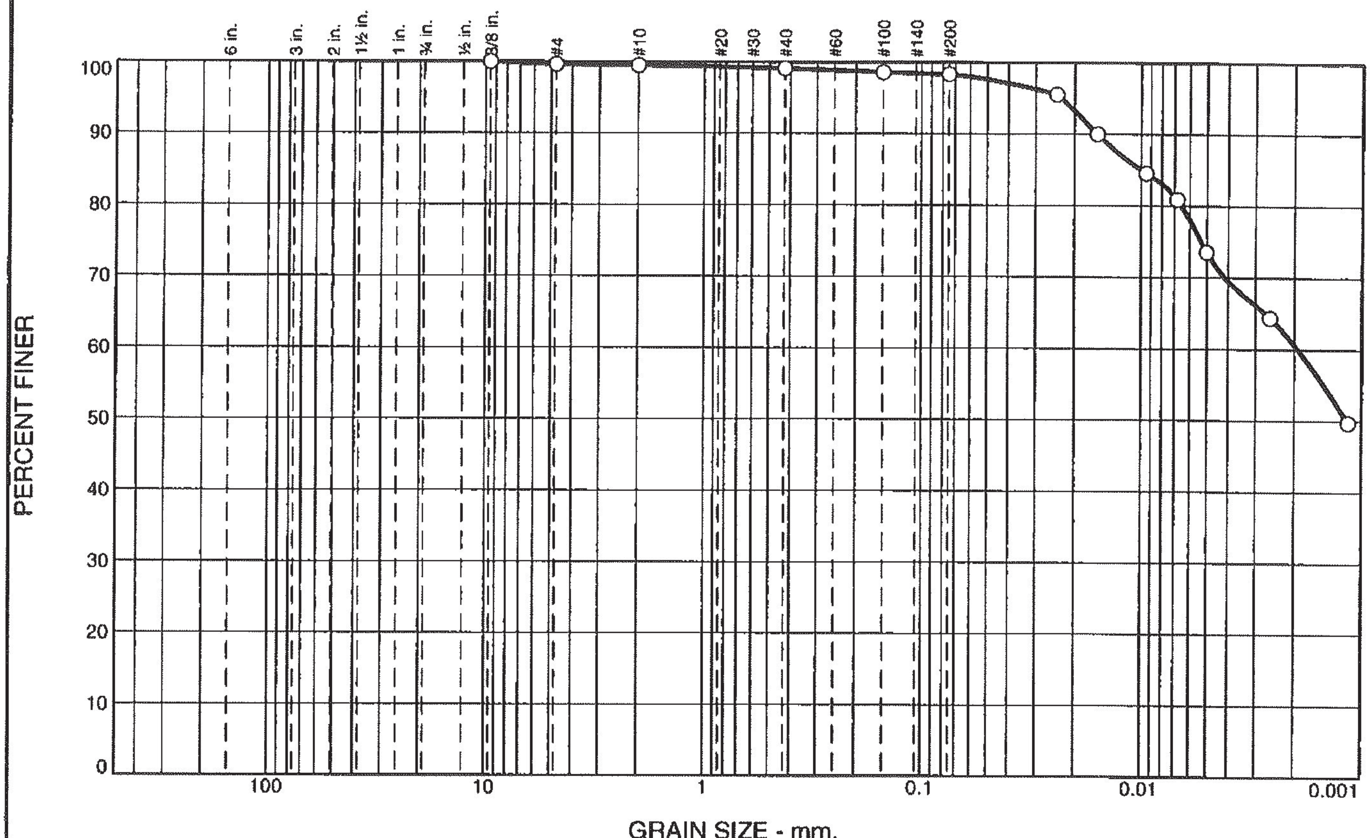
Date: 11/2/22

CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.4	0.1	0.4	0.8	24.8	73.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	99.6		
#10	99.5		
#40	99.1		
#100	98.6		
#200	98.3		

* (no specification provided)

Material Description

LEAN CLAY, reddish brown

Atterberg Limits

PL= 18 LL= 48 PI= 30

Coefficients

D_{90}= 0.0158 D_{85}= 0.0100 D_{60}= 0.0019
D_{50}= 0.0012 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(32)

Remarks

Munsell Color Code: 5YR 5/4
Location: N542550 E2124850

Source of Sample: ST-In Place
Sample Number: COL-CL-T14(K)

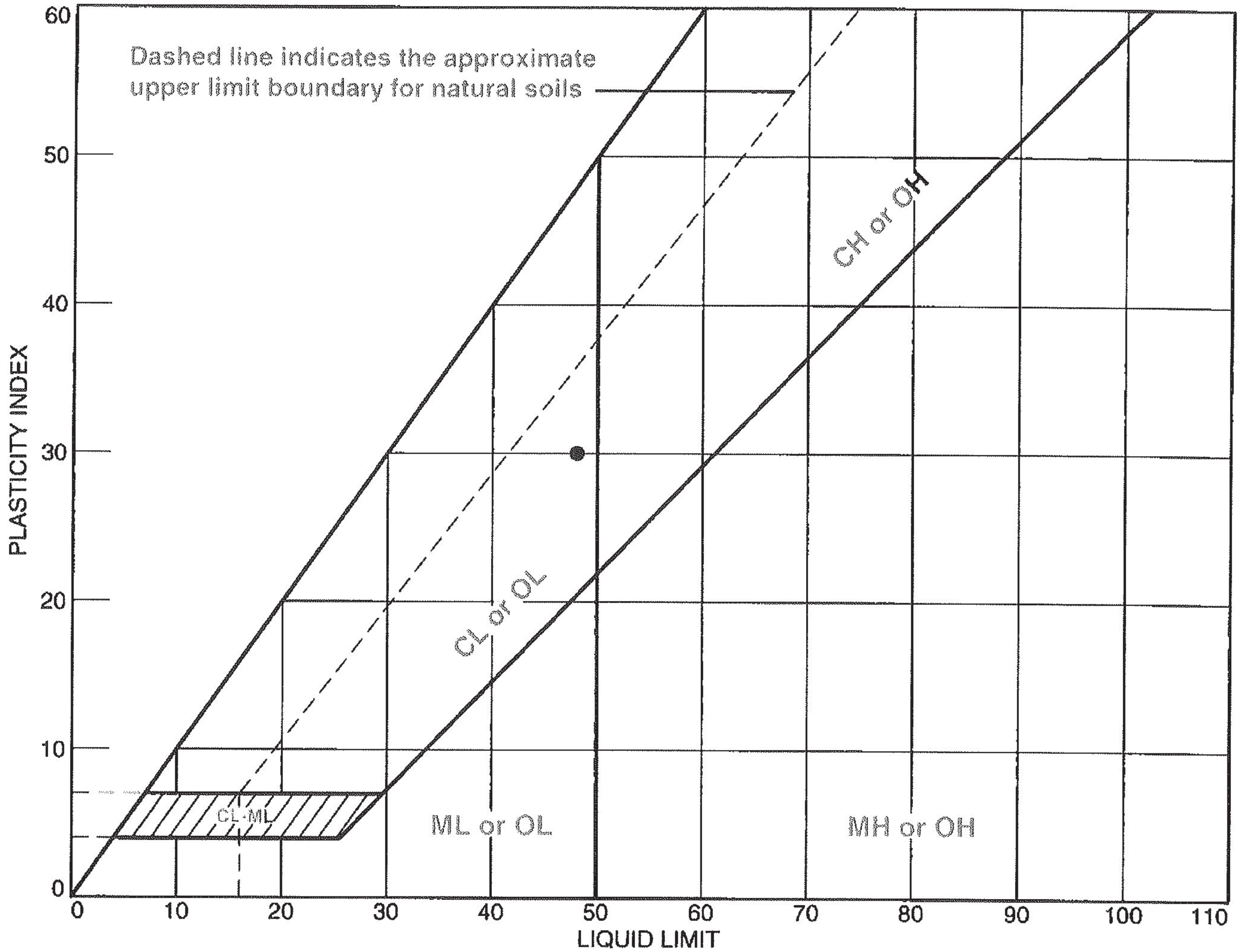
Date: 10/07/2022

Tetra Tech
2679 Continental Drive
Green Bay, WI 54311

Client: CGC, Inc.
Project: Columbia - Modules 10 & 11 Liner
Project No: C22011-2 **Figure**

Tested By: MAB **Checked By:** JJN

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	ST-In Place	COL-CL-T14(K)		24.8	18	48	30	CL

Tetra Tech **2679 Continental Drive** **Green Bay, WI 54311**	**Client:** CGC, Inc. **Project:** Columbia - Modules 10 & 11 Liner **Project No.:** C22011-2 **Figure**

Tested By: MLW **Checked By:** JJN

HYDRAULIC CONDUCTIVITY DETERMINATION
Rising tailwater method in a triaxial permeameter
ASTM D 5084, Method C (EM-1110-2-1906 7)

Tetra Tech
2679 Continental Dr.
Green Bay, WI. 54311

Project No. :	C22011-2		
Client:	CGC, Inc.		
Project:	Columbia Modules 10&11 Liner		
Sampled Date:	10/7/2022	Date Received:	10/12/2022

SUMMARY OF TEST RESULTS

Sample No.:	COL-CL-T14(K)
Location:	N542550 E2124850
Soil Classification:	LEAN CLAY, reddish brown (CL)
Munsell Color Code:	5YR 5/4

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	105.8	105.8
WATER CONTENT (%)	22.2	23.7
DIAMETER (cm)	7.26	7.26
LENGTH (cm)	8.44	8.44
HYDRAULIC GRADIENT (MAXIMUM)		19.5
PERCENT SATURATION	101.85631	108.94654
HYDRAULIC CONDUCTIVITY k (cm/sec)		6.91E-09

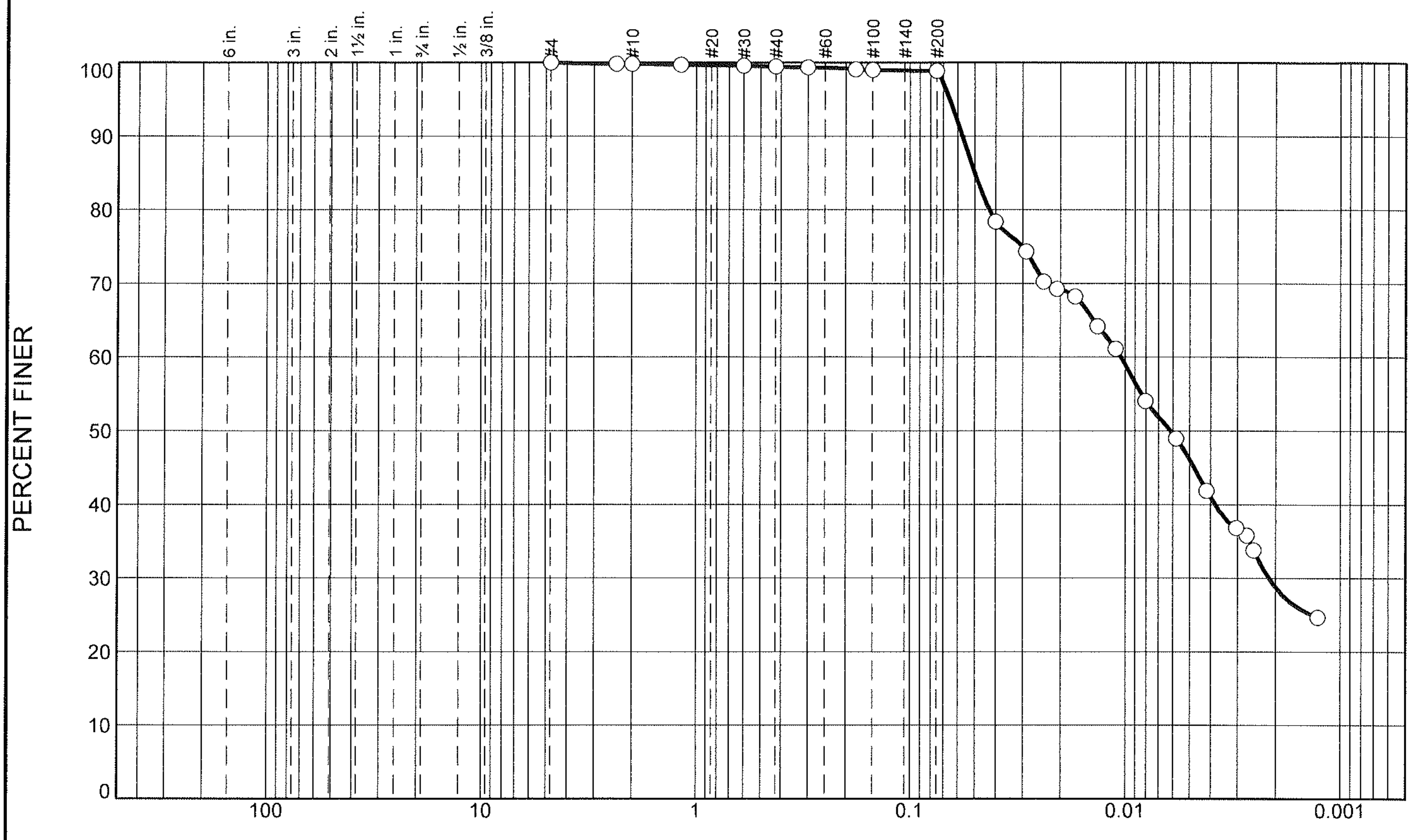
Tested By: Justin J. Naumann

Reviewed By: Robert A Rouse

Date Reviewed: 12/1/22

TRI-ST-6.xls

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	0.3	0.6	52.9	46.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.8		
#10	99.8		
#16	99.7		
#30	99.6		
#40	99.5		
#50	99.4		
#80	99.1		
#100	99.0		
#200	98.9		

* (no specification provided)

Material Description

Brown Lean Clay, Trace Sand

Atterberg Limits

PL= 17 LL= 45 PI= 28

Coefficients

D_{90}= 0.0571 D_{85}= 0.0501 D_{60}= 0.0105
D_{50}= 0.0062 D_{30}= 0.0022 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(30)

Remarks

Natural Moisture = 23.0%
Dry Unit Weight = 106.0 pcf

Sample Number: COL-CL-T15

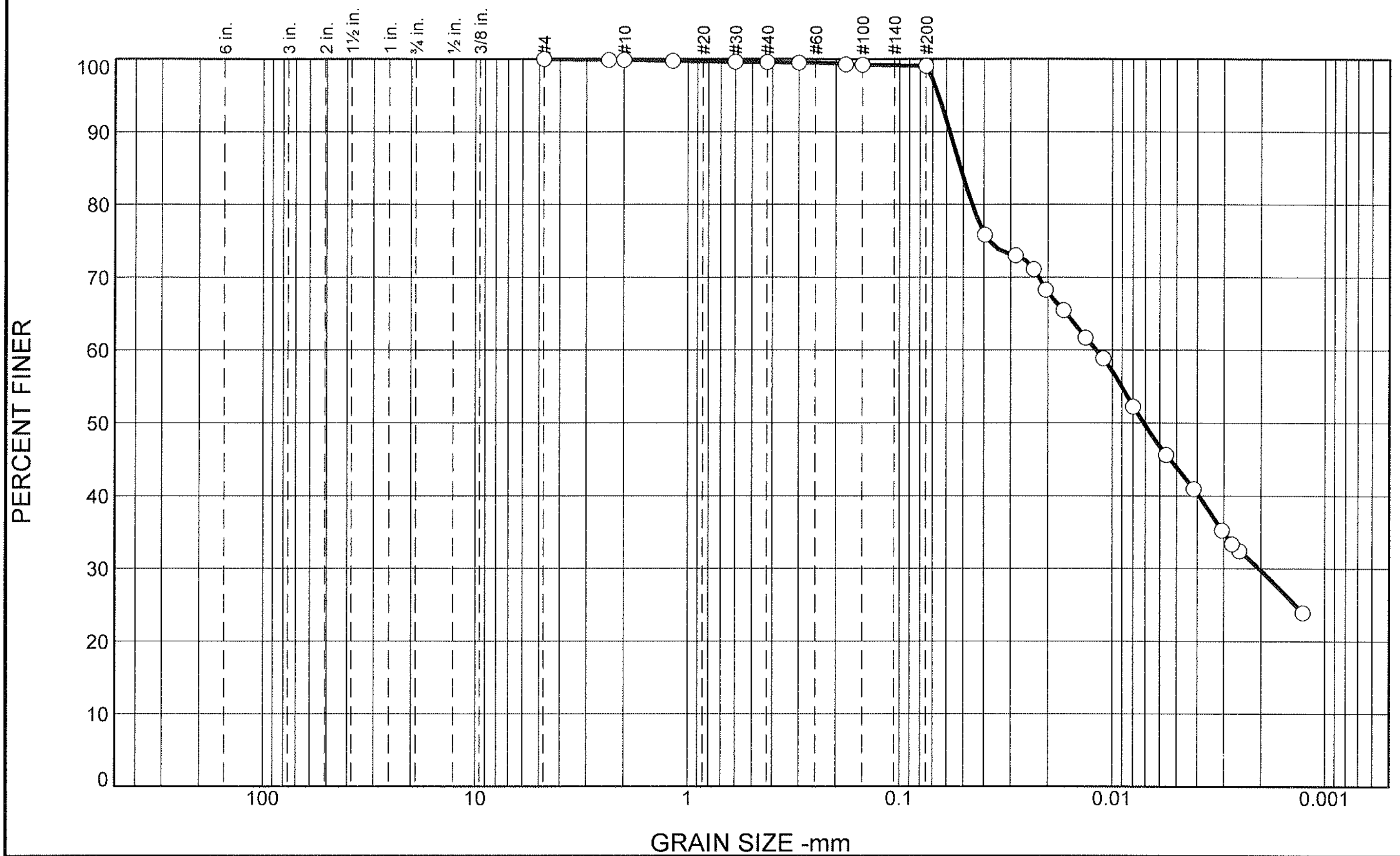
Date: 10/26/22

CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	0.3	0.5	55.3	43.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.9		
#10	99.9		
#16	99.7		
#30	99.6		
#40	99.6		
#50	99.5		
#80	99.3		
#100	99.2		
#200	99.1		

* (no specification provided)

Material Description

Brown Lean Clay, Trace Sand

Atterberg Limits

PL= 18 LL= 45 PI= 27

Coefficients

D_{90}= 0.0580 D_{85}= 0.0516 D_{60}= 0.0118
D_{50}= 0.0071 D_{30}= 0.0020 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(29)

Remarks

Natural Moisture = 23.6%
Dry Unit Weight = 105.3 pcf

Sample Number: COL-CL-T16

Date: 10/26/22

CGC,Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

Appendix D

Geosynthetic Personnel Resumes

a Babcock Power Inc. company

FIELD RESUME FOR: Robert Chandler

Robert started with Geo-Synthetics, Inc. on September 27th, 2021. Robert's main duty for Geo-Synthetics, Inc. is as a Superintendent and has been in the Flexible Membrane Liner industry for 22 years.

EXPERIENCE: Combined Square Footage: 110 million

LININGS INSTALLED: HDPE, LLPE, GCL, PVC, Wind Defender, XR-5, RPP, Geocomposite and Geotextile

TYPES OF PROJECTS: Landfills, Landfill Caps, Wastewater Lagoons, Processing Plants, Chemical Plants and Containment Structures

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- Wedge welder
- Extrusion welder
- Sewing Machine
- Tensiometer
- Leister
- ATV/UTV
- Wheel & Tracker Loader
- Telescopic Forklift
- Generator
- Grinder
- V-Box

TRAINING:

- In-Field Training
- 40HR. OSHA
- MSHA
- Heavy Equipment Operator
- IAGI Certification

FIELD RESUME FOR: Raul Nieves

Raul started with Geo-Synthetics, Inc. on October 2nd, 2017. Raul's main duty for Geo-Synthetics, Inc. is as a Superintendent and has been in the Flexible Membrane Liner industry for 12 years.

EXPERIENCE: Combined Square Footage: 60 million

LININGS INSTALLED: HDPE, LLPE, GCL, PVC Geocomposite and Geotextile

TYPES OF PROJECTS: Landfills, Landfill Caps, Wastewater Lagoons, Ponds and Secondary Containment Structures

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- Wedge welder
- Extrusion welder
- Sewing Machine
- Tensiometer
- Leister

TRAINING:

- In-Field Training
- OSHA-10hr
- MSHA
- 8hr Hazwopper

FIELD RESUME FOR: Cayetano Coello Hernandez

Cayetano started with Geo-Synthetics, Inc. on August 9th, 2022. Cayetano's main duty for Geo-Synthetics, Inc. is as a Master Seamer and has been in the Flexible Membrane Liner industry for 8 years.

EXPERIENCE: Combined Square Footage: 40 million

LININGS INSTALLED: HDPE, LLPE, PVC, RPP, GCL, Geocomposite and Geotextile

TYPES OF PROJECTS: Landfills, Landfill Caps, Pipe Boots and Containment Structures

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- Wedge welder
- Extrusion welder
- Tensiometer
- Air Testing
- ATV/UTV

TRAINING:

- In-Field Training
- OSHA-10hr

a Babcock Power Inc. company

FIELD RESUME FOR: Juan Balderas

Juan started with Geo-Synthetics, Inc. on August 15th, 2021. Juan's main duty for Geo-Synthetics, Inc. is as a Technician and has been in the Flexible Membrane Liner industry for 10 years.

EXPERIENCE: Combined Square Footage: 50 million

LININGS INSTALLED: HDPE, LLPE, GCL, Geocomposite and Geotextile

TYPES OF PROJECTS: Landfills and Landfill Caps, Lagoons, Secondary Containment

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- Extrusion welder
- Sewing Machine
- V-Box
- Wedge Welder
- Leister
- Generator
- Grinder

TRAINING:

- In-Field Training
- MSHA
- HazWop
- OSHA 10hr

a Babcock Power Inc. company

FIELD RESUME FOR: Cristo Hernandez

Cristo started with Geo-Synthetics, Inc. on October 20th, 2021. Cristo's main duty for Geo-Synthetics, Inc. is as a Technician and has been in the Flexible Membrane Liner industry for 5 years.

EXPERIENCE: Combined Square Footage: 20 million

LININGS INSTALLED: HDPE, LLPE, GCL, PVC, Geocomposite and Geotextile

TYPES OF PROJECTS: Landfills, Landfill Caps, Wastewater Lagoons and Containment Structures, Methane Barriers

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- Wedge welder
- Extrusion welder
- Sewing Machine
- Leister

TRAINING:

- In-Field Training
- 8hr HazWop
- 40HR. OSHA
- MSHA

FIELD RESUME FOR: Jesus Hernandez

Jesus started with Geo-Synthetics, Inc. on October 20th, 2021. Jesus' main duty for Geo-Synthetics, Inc. is as a Technician and has been in the Flexible Membrane Liner industry for 2 years.

EXPERIENCE: Combined Square Footage: 10 million

LININGS INSTALLED: HDPE, LLPE, GCL, PVC, Geocomposite and Geotextile

TYPES OF PROJECTS: Landfills, Landfill Caps, Wastewater Lagoons and Containment Structures

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- Wedge welder
- Extrusion welder
- Sewing Machine
- Leister

TRAINING:

- In-Field Training
- 40HR. OSHA
- MSHA

FIELD RESUME FOR: Miguel A. Calderon Bonilla

Miguel started with Geo-Synthetics, Inc. on August 9th, 2022. Miguel's main duty for Geo-Synthetics, Inc. is as a Technician and has been in the Flexible Membrane Liner industry for 2 years.

EXPERIENCE: Combined Square Footage: 10 million

LININGS INSTALLED: Geocomposite, Geotextile, HDPE, LLPE

TYPES OF PROJECTS: Methane Barriers, Wastewater Lagoons and Containment Structures

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- Extrusion welder
- Tensiometer

TRAINING:

- In-Field Training

FIELD RESUME FOR: Donnell Hughes

Donnell started with Geo-Synthetics, Inc. on March 19th, 2021. Donnell's main duty for Geo-Synthetics, Inc. is as a Laborer. Donnell has been in the liner industry for 2 years and is very eager to learn.

EXPERIENCE: Combined Square Footage: 10 million

LININGS INSTALLED: HDPE, LLPE, PVC, Geocomposite and Geotextile

TYPES OF PROJECTS: Landfills and Landfill Caps

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- Grinder
- Sewing Machine

TRAINING:

- In-Field Training
- MSHA

FIELD RESUME FOR: Danny Rodriguez

Danny started with Geo-Synthetics, Inc. on August 1st, 2022. Danny's main duty for Geo-Synthetics, Inc. is as a Superintendent and has been in the Flexible Membrane Liner industry for 15 years.

EXPERIENCE: Combined Square Footage: 75 million

LININGS INSTALLED: HDPE, LLPE, PVC, Geocomposite, Geotextile, XR-5, RPP, EPDEM, GCL

TYPES OF PROJECTS: Landfills and Landfill Caps, Secondary Containment Structures, Wastewater Lagoons, Methane Barriers

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- Wedge welder
- Extrusion welder
- Sewing Machines
- Tensiometer
- Leister
- Generator
- V-Box
- Grinder
- UTV/ATV
- Telescopic Lifts
- Tracked Skidsteers
- Wheel & Track Loaders

TRAINING:

- In-Field Training
- 10HR. OSHA Refresher
- MSHA
- 8hr-HazWop
- CAT Certified Telescopic Forklift Operator
- CAT Certified Tracked Skidsteer Operator

FIELD RESUME FOR: Bryan Lagunas

Bryan started with Geo-Synthetics, Inc. on October 20th, 2022. Bryan's main duty for Geo-Synthetics, Inc. is as a Master Seam. He has been in the liner industry for 15 years and is very eager to learn.

EXPERIENCE: Combined Square Footage: 75 million

LININGS INSTALLED: HDPE, LLPE, PVC, RPP, GCL, XR-5, Gundseal, Scrim, Wind Defender, Geocomposite and Geotextile

TYPES OF PROJECTS: Landfills and Landfill Caps, Containment Structures, Methane Barriers

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- Grinder
- Wedge welder
- Extrusion welder
- Tensiometer
- Sewing Machine
- ATV/UTV

TRAINING:

- In-Field Training
- OSHA-10hr

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a Babcock Power Inc. company

FIELD RESUME FOR: Milian Leon Alvarez

Milian started with Geo-Synthetics, Inc. on August 22nd, 2022. Milian's main duty for Geo-Synthetics, Inc. is as a Master Technician. He has been in the liner industry for 7 years and is very eager to learn.

EXPERIENCE: Combined Square Footage: 35 million

LININGS INSTALLED: HDPE, LLPE, PVC, Geocomposite and Geotextile

TYPES OF PROJECTS: Landfills and Landfill Caps, Containment Structures, Methane Barriers

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- Grinder
- Wedge welder
- Extrusion welder
- Tensiometer
- Sewing Machine
- ATV/UTV

TRAINING:

- In-Field Training
- OSHA-40hr

FIELD RESUME FOR: Adrian Flores

Adrian started with Geo-Synthetics, Inc. on August 25th, 2022. Adrian's main duty for Geo-Synthetics, Inc. is as a Laborer. Adrian has been in the liner industry for 1 year and is very eager to learn.

EXPERIENCE: Combined Square Footage: 5 million

LININGS INSTALLED: HDPE, LLPE, Geocomposite and Geotextile

TYPES OF PROJECTS: Landfills and Landfill Caps

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- ATV/UTV
- Welding
- Sewing Machine
- Grinding

TRAINING:

- In-Field Training

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FIELD RESUME FOR: Bertoldo Gutierrez Salgado

Bertoldo started with Geo-Synthetics, Inc. on September 18th, 2022. Bertoldo's main duty for Geo-Synthetics, Inc. is as a Laborer. He has been in the liner industry for 1 year and is very eager to learn.

EXPERIENCE: Combined Square Footage: 5 million

LININGS INSTALLED: HDPE, LLPE, PVC, Geocomposite and Geotextile

TYPES OF PROJECTS: Landfills and Landfill Caps

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- Grinder
- Sewing Machine

TRAINING:

- In-Field Training

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FIELD RESUME FOR: Crecensio Velasquez

Crecensio started with Geo-Synthetics, Inc. on August 25th, 2022. Crecensio's main duty for Geo-Synthetics, Inc. is as a Laborer. He has been in the liner industry for 1 year and is very eager to learn.

EXPERIENCE: Combined Square Footage: 5 million

LININGS INSTALLED: HDPE, LLPE, Geocomposite and Geotextile

TYPES OF PROJECTS: Landfills and Landfill Caps

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- Grinder
- ATV/UTV
- Sewing machine
- Welding

TRAINING:

- In-Field Training

a Babcock Power Inc. company

FIELD RESUME FOR: Viruth Long

Viruth started with Geo-Synthetics, Inc. on September 15th, 2006. Viruth's main duty for Geo-Synthetics, Inc. is as a Superintendent and has been in the Flexible Membrane Liner industry for 15 years.

EXPERIENCE: Combined Square Footage: 75 million

LININGS INSTALLED: HDPE, LLPE, PVC, Geocomposite and Geotextile

TYPES OF PROJECTS: Landfills and Landfill Caps, Secondary Containment Structures, Wastewater Lagoons

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- Wedge welder
- Extrusion welder
- Sewing Machines
- Tensiometer
- Leister
- Generator
- V-Box
- Grinder
- UTV
- Telescopic Lifts
- Tracked Skidsteers
- Wheel & Track Loaders

TRAINING:

- In-Field Training
- 10HR. OSHA Refresher
- MSHA
- 8hr-HazWop
- CAT Certified Telescopic Forklift Operator
- CAT Certified Tracked Skidsteer Operator
- WATVA Certified ATV Operator
- WCTC Defensive Driving Certification
- IAGI Certification

FIELD RESUME FOR: Robare Long

Robare started with Geo-Synthetics, Inc. on October 21st, 2010. Robare's main duty for Geo-Synthetics, Inc. is as a Quality Control Technician and has been in the Flexible Membrane Liner industry for 11 years.

EXPERIENCE: Combined Square Footage: 55 million

LININGS INSTALLED: HDPE, LLPE, PVC, GCL, Geocomposite and Geotextile

TYPES OF PROJECTS: Landfills and Landfill Caps, Secondary Containment Structures, Wastewater Lagoons

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- Wedge welder
- Extrusion welder
- Sewing Machines
- Tensiometer
- Leister
- Generator
- V-Box
- Grinder
- UTV
- Telescopic Lifts
- Tracked Skidsteers
- Wheel & Track Loaders

TRAINING:

- In-Field Training
- 10HR. OSHA Refresher
- MSHA
- 8hr HazWop

a Babcock Power Inc. company

FIELD RESUME FOR: Juan Santana

Juan started with Geo-Synthetics, Inc. on July 31st, 2003. Juan's main duty for Geo-Synthetics, Inc. is as a Master Technician and has been in the Flexible Membrane Liner industry for 32 years.

EXPERIENCE: Combined Square Footage: 160 million

LININGS INSTALLED: HDPE, LLPE, PVC, Polypropylene, Geonet, Geocomposite and Geotextile

TYPES OF PROJECTS: Landfills and Landfill Caps, Secondary Containment Structures, Wastewater Lagoons

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- Wedge welder
- Extrusion welder
- Sewing Machines
- UTV
- Generator
- Leister
- Grinder
- Telescopic Forklift
- Tracked Skidsteer
- Wheel & Tracked Load

TRAINING:

- In-Field Training
- 10HR. OSHA Refresher
- MSHA
- 8hr HazWop

FIELD RESUME FOR: Rafael Hernandez

Rafael started with Geo-Synthetics, Inc. on May 20th, 2018. Rafael's main duty for Geo-Synthetics, Inc. is as a Technician and has been in the Flexible Membrane Liner industry for 20 years.

EXPERIENCE: Combined Square Footage: 100 million

LININGS INSTALLED: HDPE, LLPE, GCL, PVC, Geocomposite, Geotextile, RPP, XR-5, EPDM

TYPES OF PROJECTS: Landfills and Landfill Caps, Secondary Containment Structures, Methane Barriers

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- Wedge welder
- Extrusion welder
- Tensiometer
- Other

TRAINING:

- In-Field Training
- 10HR. OSHA Refresher
- MSHA
- 8hr HazWop

FIELD RESUME FOR: Luis Delgado

Luis started with Geo-Synthetics, Inc. on May 6th, 2016. Luis' main duty for Geo-Synthetics, Inc. is as a Technician and has been in the Flexible Membrane Liner industry for 15 years.

EXPERIENCE: Combined Square Footage: 75 million

LININGS INSTALLED: HDPE, LLPE, GCL, Geocomposite and Geotextile

TYPES OF PROJECTS: Landfills and Landfill Caps, Secondary Containment Structures, Wastewater Lagoons

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- Wedge welder
- Extrusion welder
- Sewing Machines
- Leister
- Tensiometer

TRAINING:

- In-Field Training
- 10HR. OSHA Refresher
- MSHA
- 8hr. HazWop

FIELD RESUME FOR: Manuel Muniz

Manuel started with Geo-Synthetics, Inc. on May 8th, 2022. Manuel's main duty for Geo-Synthetics, Inc. is as a Technician and has been in the Flexible Membrane Liner industry for 1 year.

EXPERIENCE: Combined Square Footage: 5 million

LININGS INSTALLED: HDPE, LLPE, PVC, Geocomposite and Geotextile

TYPES OF PROJECTS: Landfills and Landfill Caps, Secondary Containment Structures, Wastewater Lagoons

EQUIPMENT KNOWLEDGE: Has extensive knowledge in maintaining and/or operating the following equipment:

- ATV/UTV
- Leister
- Generator
- Grinder
- Liner deployment

TRAINING:

- In-Field Training

Appendix E

Geosynthetic Quality Control Data

MANUFACTURING QUALITY CONTROL

SOLMAX
Charles Taylor
APPROVED
QUALITY ASSURANCE

PROJECT NUMBER:	G722011.02
SALES ORDER:	SO-093353
PACKING SLIP NUMBER:	Pre-SO-093353-1

PROJECT NAME : ALLIANT COLUMBIA

ROLL NUMBER	MANUFACT. DATE	BENTONITE LOT NUMBER	TOP LAYER 1	BOTTOM LAYER 1	CONFORMANCE
Product Code : 1100869 **Bentoliner CAR, 0.75 lbs/ft² - 3.66 kg/m², NW, 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**					
0242-379755	2022-06-15	1060822B	2027131510	2027127368	N/A
0242-379756	2022-06-15	1060822B	2027131510	2027127368	N/A
0242-379757	2022-06-15	1060822B	2027131510	2027127368	N/A
0242-379758	2022-06-15	1060822B	2027145889	2027127368	N/A
0242-379759	2022-06-15	1060822B	2027145889	2027127368	Conformance
0242-379760	2022-06-15	1060822B	2027145889	2027127368	N/A
0242-379761	2022-06-15	1060822B	2027145889	2027127368	N/A
0242-379762	2022-06-15	1060822B	2027145889	2027127368	N/A
0242-379763	2022-06-15	1060822B	2027145889	2027127368	Interface
0242-379764	2022-06-15	1060822B	2027145889	2027127368	N/A
0242-379765	2022-06-15	1060822B	2027145889	2027127368	N/A
0242-379766	2022-06-15	1060822C	2027145889	2027127368	N/A
0242-379767	2022-06-15	1060822C	2027145889	2027127368	N/A
0242-379768	2022-06-15	1060822C	2027145879	2027110286	N/A
0242-379769	2022-06-15	1060822C	2027145879	2027110286	N/A
0242-379770	2022-06-15	1060822C	2027145879	2027110286	N/A
0242-379771	2022-06-15	1060822C	2027145879	2027110286	N/A
0242-379772	2022-06-15	1060822C	2027145879	2027110286	N/A
0242-379773	2022-06-15	1060822C	2027145879	2027110286	N/A
0242-379774	2022-06-15	1060822C	2027145879	2027110286	N/A

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

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MANUFACTURING QUALITY CONTROL

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QUALITY ASSURANCE

PROJECT NUMBER: G722011.02
SALES ORDER: SO-093353
PACKING SLIP NUMBER: Pre-SO-093353-1

PROJECT NAME : ALLIANT COLUMBIA

0242-379775	2022-06-15	1060822C	2027145879	2027110286	N/A
0242-379776	2022-06-15	1060822C	2027145879	2027110286	N/A
0242-379777	2022-06-15	1060822C	2027145879	2027110286	N/A
0242-379778	2022-06-15	1060822C	2027145879	2027110286	N/A
0242-379779	2022-06-15	1060822C	2027145878	2027110286	N/A
0242-379780	2022-06-15	1060822C	2027145878	2027110286	N/A
0242-379781	2022-06-15	1060822C	2027145878	2027110286	N/A
0242-379782	2022-06-15	1060822C	2027145878	2027110286	N/A
0242-379783	2022-06-15	1060822C	2027145878	2027110286	N/A
0242-379784	2022-06-15	1060822C	2027145878	2027133279	N/A
0242-379785	2022-06-15	1060822C	2027145878	2027133279	N/A
0242-379786	2022-06-15	1060822C	2027145878	2027133279	N/A
0242-379787	2022-06-15	1060822C	2027145878	2027133279	N/A
0242-379788	2022-06-15	1060822C	2027145878	2027133279	N/A
0242-379789	2022-06-15	1060822C	2027145901	2027133279	N/A
0242-379790	2022-06-15	1060822C	2027145901	2027133279	N/A
0242-379791	2022-06-15	1060822C	2027145901	2027142620	N/A
0242-379792	2022-06-15	1060822C	2027145901	2027142620	N/A
0242-379793	2022-06-15	1060822C	2027145901	2027142620	N/A
0242-379794	2022-06-15	1060822C	2027145901	2027142620	N/A
0242-379795	2022-06-15	1060822C	2027145901	2027142620	N/A
0242-379796	2022-06-15	1060822C	2027145901	2027142620	N/A
0242-379797	2022-06-15	1060822D	2027145901	2027142620	N/A
0242-379798	2022-06-15	1060822D	2027145901	2027142620	N/A
0242-379799	2022-06-15	1060822D	2027145886	2027142620	N/A
0242-379800	2022-06-15	1060822D	2027145886	2027142620	N/A
0242-379801	2022-06-15	1060822D	2027145886	2027142620	N/A
0242-379802	2022-06-15	1060822D	2027145886	2027142620	N/A
0242-379803	2022-06-15	1060822D	2027145886	2027142620	Conformance

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MANUFACTURING QUALITY CONTROL

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PROJECT NUMBER: G722011.02
SALES ORDER: SO-093353
PACKING SLIP NUMBER: Pre-SO-093353-1

PROJECT NAME : ALLIANT COLUMBIA

0242-379804	2022-06-15	1060822D	2027145886	2027142620	N/A
0242-379805	2022-06-15	1060822D	2027145886	2027142620	N/A
0242-379806	2022-06-15	1060822D	2027145886	2027142620	N/A
0242-379807	2022-06-15	1060822D	2027145886	2027144633	N/A
0242-379808	2022-06-15	1060822D	2027145886	2027144633	N/A
0242-379809	2022-06-15	1060822D	2027145886	2027144633	N/A
0242-379810	2022-06-16	1060822D	2027131513	2027144633	N/A
0242-379811	2022-06-16	1060822D	2027131513	2027144633	N/A
0242-379812	2022-06-16	1060822D	2027131513	2027144633	N/A
0242-379813	2022-06-16	1060822D	2027131513	2027144633	N/A
0242-379814	2022-06-16	1060822D	2027131513	2027144633	N/A
0242-379815	2022-06-16	1060822D	2027131513	2027144633	N/A
0242-379816	2022-06-16	1060822D	2027131513	2027144633	N/A
0242-379817	2022-06-16	1060822D	2027131513	2027144633	N/A
0242-379818	2022-06-16	1060822D	2027131513	2027144633	N/A
0242-379819	2022-06-16	1060822D	2027131513	2027144633	N/A
0242-379820	2022-06-16	1060822D	2027131522	2027144633	N/A
0242-379821	2022-06-16	1060822D	2027131522	2027144633	N/A
0242-379822	2022-06-16	1060822D	2027131522	2027142498	N/A
0242-379823	2022-06-16	1060822D	2027131522	2027142498	N/A
0242-379824	2022-06-16	1060822D	2027131522	2027142498	N/A
0242-379825	2022-06-16	1060822D	2027131522	2027142498	N/A
0242-379826	2022-06-16	1060822D	2027131522	2027142498	N/A
0242-379827	2022-06-16	1060822D	2027131522	2027142498	N/A
0242-379828	2022-06-16	1061022A	2027131522	2027142498	N/A
0242-379829	2022-06-16	1061022A	2027131522	2027142498	N/A
0242-379830	2022-06-16	1061022A	2027131505	2027142498	N/A
0242-379831	2022-06-16	1061022A	2027131505	2027142498	N/A
0242-379832	2022-06-16	1061022A	2027131505	2027142498	N/A

MANUFACTURING QUALITY CONTROL

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PROJECT NUMBER: G722011.02
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PACKING SLIP NUMBER: Pre-SO-093353-1

PROJECT NAME : ALLIANT COLUMBIA

0242-379833	2022-06-16	1061022A	2027131505	2027142498	N/A
0242-379834	2022-06-16	1061022A	2027131505	2027142498	N/A
0242-379835	2022-06-16	1061022A	2027131505	2027142498	N/A
0242-379836	2022-06-16	1061022A	2027131505	2027144632	N/A
0242-379837	2022-06-16	1061022A	2027131505	2027144632	N/A
0242-379838	2022-06-16	1061022A	2027131505	2027144632	N/A
0242-379839	2022-06-16	1061022A	2027131505	2027144632	N/A
0242-379840	2022-06-16	1061022A	2027131505	2027144632	N/A
0242-379841	2022-06-16	1061022A	2027131521	2027144632	N/A
0242-379842	2022-06-16	1061022A	2027131521	2027144632	N/A
0242-379843	2022-06-16	1061022A	2027131521	2027144632	N/A
0242-379844	2022-06-16	1061022A	2027131521	2027144632	N/A
0242-379845	2022-06-16	1061022A	2027131521	2027144632	N/A
0242-379846	2022-06-16	1061022A	2027131521	2027144632	N/A
0242-379847	2022-06-16	1061022A	2027131521	2027144632	N/A
0242-379848	2022-06-16	1061022A	2027131521	2027144632	N/A
0242-379849	2022-06-16	1061022A	2027131521	2027144632	N/A
0242-379850	2022-06-16	1061022A	2027131521	2027144632	N/A
0242-379851	2022-06-16	1061022A	2027120222	2027144632	Conformance
0242-379852	2022-06-16	1061022A	2027120222	2027127357	N/A
0242-379853	2022-06-16	1061022A	2027120222	2027127357	N/A
0242-379854	2022-06-16	1061022A	2027120222	2027127357	N/A
0242-379855	2022-06-16	1061022A	2027120222	2027127357	N/A
0242-379856	2022-06-16	1061022B	2027120222	2027127357	N/A
0242-379857	2022-06-16	1061022B	2027120222	2027127357	N/A
0242-379858	2022-06-16	1061022B	2027120222	2027127357	N/A
0242-379859	2022-06-16	1061022B	2027120222	2027127357	N/A
0242-379860	2022-06-16	1061022B	2027120222	2027127357	N/A
0242-379861	2022-06-16	1061022B	2027120225	2027127357	N/A

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PROJECT NUMBER: G722011.02
SALES ORDER: SO-093353
PACKING SLIP NUMBER: Pre-SO-093353-1

PROJECT NAME : ALLIANT COLUMBIA

0242-379862	2022-06-16	1061022B	2027120225	2027127357	N/A
0242-379863	2022-06-16	1061022B	2027120225	2027127357	N/A
0242-379864	2022-06-16	1061022B	2027120225	2027127357	N/A
0242-379865	2022-06-16	1061022B	2027120225	2027127357	N/A
0242-379866	2022-06-16	1061022B	2027120225	2027127357	N/A
0242-379867	2022-06-16	1061022B	2027120225	2027127357	N/A
0242-379868	2022-06-16	1061022B	2027120225	2027119204	N/A
0242-379869	2022-06-16	1061022B	2027120225	2027119204	N/A
0242-379870	2022-06-16	1061022B	2027120225	2027119204	N/A
0242-379871	2022-06-16	1061022B	2027145880	2027119204	N/A
0242-379872	2022-06-16	1061022B	2027145880	2027119204	N/A
0242-379873	2022-06-16	1061022B	2027145880	2027119204	N/A
0242-379874	2022-06-16	1061022B	2027145880	2027119204	N/A
0242-379875	2022-06-16	1061022B	2027145880	2027119204	N/A
0242-379876	2022-06-16	1061022B	2027145880	2027119204	N/A
0242-379877	2022-06-16	1061022B	2027145880	2027142497	N/A
0242-379878	2022-06-16	1061022B	2027145880	2027142497	N/A
0242-379879	2022-06-16	1061022B	2027145880	2027142497	N/A
0242-379880	2022-06-16	1061022B	2027145880	2027142497	N/A
0242-379881	2022-06-16	1061022B	2027145880	2027142497	N/A
0242-379882	2022-06-16	1061022B	2027145896	2027142497	N/A
0242-379883	2022-06-16	1061022B	2027145896	2027142497	N/A
0242-379884	2022-06-16	1061022B	2027145896	2027142497	N/A
0242-379885	2022-06-16	1061022B	2027145896	2027142497	N/A
0242-379886	2022-06-16	1061022B	2027145896	2027142497	N/A
0242-379887	2022-06-16	1061022B	2027145896	2027142497	N/A
0242-379888	2022-06-16	1061022B	2027145896	2027142497	N/A
0242-379889	2022-06-17	1061022C	2027145896	2027142497	N/A
0242-379890	2022-06-17	1061022C	2027145896	2027142497	N/A

MANUFACTURING QUALITY CONTROL

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PROJECT NUMBER: G722011.02

SALES ORDER: SO-093353

PACKING SLIP NUMBER: Pre-SO-093353-1

PROJECT NAME : ALLIANT COLUMBIA

0242-379891	2022-06-17	1061022C	2027145896	2027142497	N/A
0242-379892	2022-06-17	1061022C	2027131514	2027127359	N/A
0242-379893	2022-06-17	1061022C	2027131514	2027127359	N/A
0242-379894	2022-06-17	1061022C	2027131514	2027127359	N/A
0242-379895	2022-06-17	1061022C	2027131514	2027127359	Conformance
0242-379896	2022-06-17	1061022C	2027131514	2027127359	N/A
0242-379897	2022-06-17	1061022C	2027131514	2027127359	N/A
0242-379898	2022-06-17	1061022C	2027131514	2027127359	N/A
0242-379899	2022-06-17	1061022C	2027131514	2027127359	N/A
0242-379900	2022-06-17	1061022C	2027131514	2027127359	N/A
0242-379901	2022-06-17	1061022C	2027131514	2027127359	N/A
0242-379902	2022-06-17	1061022C	2027145894	2027127359	N/A
0242-379903	2022-06-17	1061022C	2027145894	2027127359	N/A
0242-379904	2022-06-17	1061022C	2027145894	2027127359	N/A
0242-379905	2022-06-17	1061022C	2027145894	2027127359	N/A
0242-379906	2022-06-17	1061022C	2027145894	2027127359	N/A
0242-379907	2022-06-17	1061022C	2027145894	2027142603	N/A
0242-379908	2022-06-17	1061022C	2027145894	2027142603	N/A
0242-379909	2022-06-17	1061022C	2027145894	2027142603	N/A
0242-379910	2022-06-17	1061022C	2027145894	2027142603	N/A
0242-379911	2022-06-17	1061022C	2027145894	2027142603	N/A
0242-379912	2022-06-17	1061022C	2027145883	2027142603	N/A
0242-379913	2022-06-17	1061022C	2027145883	2027130475	N/A
0242-379914	2022-06-17	1061022C	2027145883	2027130475	N/A
0242-379915	2022-06-17	1061022C	2027145883	2027130475	N/A
0242-379916	2022-06-17	1061022C	2027145883	2027130475	N/A
0242-379917	2022-06-17	1061022C	2027145883	2027130475	N/A
0242-379918	2022-06-17	1061022C	2027145883	2027130475	N/A
0242-379919	2022-06-17	1061022C	2027145883	2027130475	N/A

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MANUFACTURING QUALITY CONTROL

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QUALITY ASSURANCE

PROJECT NUMBER: G722011.02
SALES ORDER: SO-093353
PACKING SLIP NUMBER: Pre-SO-093353-1

PROJECT NAME : ALLIANT COLUMBIA

0242-379920	2022-06-17	1061022D	2027145883	2027133281	N/A
0242-379921	2022-06-17	1061022D	2027145883	2027133281	N/A
0242-379922	2022-06-17	1061022D	2027131507	2027133281	N/A
0242-379923	2022-06-17	1061022D	2027131507	2027133281	N/A
0242-379924	2022-06-17	1061022D	2027131507	2027133281	N/A
0242-379925	2022-06-17	1061022D	2027131507	2027133281	N/A
0242-379926	2022-06-17	1061022D	2027131507	2027133281	N/A
0242-379927	2022-06-17	1061022D	2027131507	2027133281	N/A
0242-379928	2022-06-17	1061022D	2027131507	2027127355	N/A
0242-379929	2022-06-17	1061022D	2027131507	2027127355	N/A
0242-379930	2022-06-17	1061022D	2027131507	2027127355	N/A
0242-379931	2022-06-17	1061022D	2027131507	2027127355	N/A
0242-379932	2022-06-17	1061022D	2027131507	2027127355	N/A
0242-379933	2022-06-17	1061022D	2027131528	2027127355	N/A
0242-379934	2022-06-17	1061022D	2027131528	2027127355	N/A
0242-379935	2022-06-17	1061022D	2027131528	2027127355	N/A
0242-379936	2022-06-17	1061022D	2027131528	2027127355	N/A
0242-379937	2022-06-17	1061022D	2027131528	2027127355	N/A
0242-379938	2022-06-17	1061022D	2027131528	2027127355	N/A
0242-379939	2022-06-17	1061022D	2027131528	2027127355	Conformance
0242-379940	2022-06-17	1061022D	2027131528	2027127355	N/A
0242-379941	2022-06-17	1061022D	2027131528	2027127355	N/A
0242-379942	2022-06-17	1061022D	2027131528	2027127355	N/A
0242-379943	2022-06-17	1061022D	2027131528	2027071108	N/A
0242-379944	2022-06-17	1061022D	2027131512	2027071108	N/A
0242-379945	2022-06-17	1061022D	2027131512	2027071108	N/A
0242-379946	2022-06-17	1061022D	2027131512	2027071108	N/A
0242-379947	2022-06-17	1061022D	2027131512	2027071108	N/A
0242-379948	2022-06-17	1061022D	2027131512	2027071108	N/A

MANUFACTURING QUALITY CONTROL

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APPROVED
QUALITY ASSURANCE

PROJECT NUMBER: G722011.02
SALES ORDER: SO-093353
PACKING SLIP NUMBER: Pre-SO-093353-1

PROJECT NAME : ALLIANT COLUMBIA

QUANTITY (ROLLS): 194

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

MANUFACTURING QUALITY CONTROL

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TEST RESULTS - ROLLS

PROJECT NUMBER: G722011.02

SALES ORDER: SO-093353

PACKING SLIP NUMBER: Pre-SO-093353-1

PROJECT NAME : ALLIANT COLUMBIA

PRODUCT: 1100869
Bentoliner CAR, 0.75 lbs/ft² - 3.66 kg/m², NW, Peel 35

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

Test	1	2	3	4
SPECIFICATIONS	**0.75**	**35**	**5.3**	**45**
0242-379755	0.80	76.0	16.0	57
0242-379756	0.80	76.0	16.0	57
0242-379757	0.80	76.0	16.0	57
0242-379758	0.80	76.0	16.0	57
0242-379759	0.80	76.0	16.0	57
0242-379760	0.80	76.0	16.0	57
0242-379761	0.80	76.0	16.0	57
0242-379762	0.80	76.0	16.0	57
0242-379763	0.80	76.0	16.0	57
0242-379764	0.80	76.0	16.0	57
0242-379765	0.80	76.0	16.0	57
0242-379766	0.80	76.0	16.0	57
0242-379767	0.80	76.0	16.0	57
0242-379768	0.80	76.0	16.0	57
0242-379769	0.80	76.0	16.0	57
0242-379770	0.80	76.0	16.0	57
0242-379771	0.82	57.0	12.0	66
0242-379772	0.82	57.0	12.0	66
0242-379773	0.82	57.0	12.0	66
0242-379774	0.82	57.0	12.0	66
0242-379775	0.82	57.0	12.0	66
0242-379776	0.82	57.0	12.0	66
0242-379777	0.82	57.0	12.0	66
0242-379778	0.82	57.0	12.0	66
0242-379779	0.82	57.0	12.0	66
0242-379780	0.82	57.0	12.0	66
0242-379781	0.82	57.0	12.0	66

MANUFACTURING QUALITY CONTROL

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TEST RESULTS - ROLLS

PROJECT NUMBER: G722011.02

SALES ORDER: SO-093353

PACKING SLIP NUMBER: Pre-SO-093353-1

PROJECT NAME : ALLIANT COLUMBIA

Test	1	2	3	4
0242-379782	0.82	57.0	12.0	66
0242-379783	0.82	57.0	12.0	66
0242-379784	0.82	57.0	12.0	66
0242-379785	0.82	57.0	12.0	66
0242-379786	0.82	57.0	12.0	66
0242-379787	0.80	57.0	12.0	64
0242-379788	0.80	57.0	12.0	64
0242-379789	0.80	57.0	12.0	64
0242-379790	0.80	57.0	12.0	64
0242-379791	0.80	57.0	12.0	64
0242-379792	0.80	57.0	12.0	64
0242-379793	0.80	57.0	12.0	64
0242-379794	0.80	57.0	12.0	64
0242-379795	0.80	57.0	12.0	64
0242-379796	0.80	57.0	12.0	64
0242-379797	0.80	57.0	12.0	64
0242-379798	0.80	57.0	12.0	64
0242-379799	0.80	57.0	12.0	64
0242-379800	0.80	57.0	12.0	64
0242-379801	0.80	57.0	12.0	64
0242-379802	0.80	57.0	12.0	64
0242-379803	0.82	53.0	11.0	57
0242-379804	0.82	53.0	11.0	57
0242-379805	0.82	53.0	11.0	57
0242-379806	0.82	53.0	11.0	57
0242-379807	0.82	53.0	11.0	57
0242-379808	0.82	53.0	11.0	57
0242-379809	0.82	53.0	11.0	57
0242-379810	0.82	53.0	11.0	57
0242-379811	0.82	53.0	11.0	57
0242-379812	0.82	53.0	11.0	57
0242-379813	0.82	53.0	11.0	57
0242-379814	0.82	53.0	11.0	57
0242-379815	0.82	53.0	11.0	57
0242-379816	0.82	53.0	11.0	57
0242-379817	0.82	53.0	11.0	57

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MANUFACTURING QUALITY CONTROL

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TEST RESULTS - ROLLS

PROJECT NUMBER: G722011.02
SALES ORDER: SO-093353
PACKING SLIP NUMBER: Pre-SO-093353-1

PROJECT NAME : ALLIANT COLUMBIA

Test	1	2	3	4
0242-379818	0.82	53.0	11.0	57
0242-379819	0.82	56.0	12.0	57
0242-379820	0.82	56.0	12.0	57
0242-379821	0.82	56.0	12.0	57
0242-379822	0.82	56.0	12.0	57
0242-379823	0.82	56.0	12.0	57
0242-379824	0.82	56.0	12.0	57
0242-379825	0.82	56.0	12.0	57
0242-379826	0.82	56.0	12.0	57
0242-379827	0.82	56.0	12.0	57
0242-379828	0.82	56.0	12.0	57
0242-379829	0.82	56.0	12.0	57
0242-379830	0.82	56.0	12.0	57
0242-379831	0.82	56.0	12.0	57
0242-379832	0.82	56.0	12.0	57
0242-379833	0.82	56.0	12.0	57
0242-379834	0.82	56.0	12.0	57
0242-379835	0.82	53.0	11.0	51
0242-379836	0.82	53.0	11.0	51
0242-379837	0.82	53.0	11.0	51
0242-379838	0.82	53.0	11.0	51
0242-379839	0.82	53.0	11.0	51
0242-379840	0.82	53.0	11.0	51
0242-379841	0.82	53.0	11.0	51
0242-379842	0.82	53.0	11.0	51
0242-379843	0.82	53.0	11.0	51
0242-379844	0.82	53.0	11.0	51
0242-379845	0.82	53.0	11.0	51
0242-379846	0.82	53.0	11.0	51
0242-379847	0.82	53.0	11.0	51
0242-379848	0.82	53.0	11.0	51
0242-379849	0.82	53.0	11.0	51
0242-379850	0.82	53.0	11.0	51
0242-379851	0.84	82.0	15.0	55
0242-379852	0.84	82.0	15.0	55
0242-379853	0.84	82.0	15.0	55

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MANUFACTURING QUALITY CONTROL

SOLMAX Charles Taylor APPROVED QUALITY ASSURANCE

TEST RESULTS - ROLLS

PROJECT NUMBER: G722011.02

SALES ORDER: SO-093353

PACKING SLIP NUMBER: Pre-SO-093353-1

PROJECT NAME : ALLIANT COLUMBIA

Test	1	2	3	4
0242-379854	0.84	82.0	15.0	55
0242-379855	0.84	82.0	15.0	55
0242-379856	0.84	82.0	15.0	55
0242-379857	0.84	82.0	15.0	55
0242-379858	0.84	82.0	15.0	55
0242-379859	0.84	82.0	15.0	55
0242-379860	0.84	82.0	15.0	55
0242-379861	0.84	82.0	15.0	55
0242-379862	0.84	82.0	15.0	55
0242-379863	0.84	82.0	15.0	55
0242-379864	0.84	82.0	15.0	55
0242-379865	0.84	82.0	15.0	55
0242-379866	0.84	82.0	15.0	55
0242-379867	0.83	98.0	21.0	55
0242-379868	0.83	98.0	21.0	55
0242-379869	0.83	98.0	21.0	55
0242-379870	0.83	98.0	21.0	55
0242-379871	0.83	98.0	21.0	55
0242-379872	0.83	98.0	21.0	55
0242-379873	0.83	98.0	21.0	55
0242-379874	0.83	98.0	21.0	55
0242-379875	0.83	98.0	21.0	55
0242-379876	0.83	98.0	21.0	55
0242-379877	0.83	98.0	21.0	55
0242-379878	0.83	98.0	21.0	55
0242-379879	0.83	98.0	21.0	55
0242-379880	0.83	98.0	21.0	55
0242-379881	0.83	98.0	21.0	55
0242-379882	0.83	98.0	21.0	55
0242-379883	0.89	58.0	13.0	50
0242-379884	0.89	58.0	13.0	50
0242-379885	0.89	58.0	13.0	50
0242-379886	0.89	58.0	13.0	50
0242-379887	0.89	58.0	13.0	50
0242-379888	0.89	58.0	13.0	50
0242-379889	0.89	58.0	13.0	50

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TEST RESULTS - ROLLS

PROJECT NUMBER: G722011.02

SALES ORDER: SO-093353

PACKING SLIP NUMBER: Pre-SO-093353-1

PROJECT NAME : ALLIANT COLUMBIA

Test	1	2	3	4
0242-379890	0.89	58.0	13.0	50
0242-379891	0.89	58.0	13.0	50
0242-379892	0.89	58.0	13.0	50
0242-379893	0.89	58.0	13.0	50
0242-379894	0.89	58.0	13.0	50
0242-379895	0.89	58.0	13.0	50
0242-379896	0.89	58.0	13.0	50
0242-379897	0.89	58.0	13.0	50
0242-379898	0.89	58.0	13.0	50
0242-379899	0.83	63.0	13.0	54
0242-379900	0.83	63.0	13.0	54
0242-379901	0.83	63.0	13.0	54
0242-379902	0.83	63.0	13.0	54
0242-379903	0.83	63.0	13.0	54
0242-379904	0.83	63.0	13.0	54
0242-379905	0.83	63.0	13.0	54
0242-379906	0.83	63.0	13.0	54
0242-379907	0.83	63.0	13.0	54
0242-379908	0.83	63.0	13.0	54
0242-379909	0.83	63.0	13.0	54
0242-379910	0.83	63.0	13.0	54
0242-379911	0.83	63.0	13.0	54
0242-379912	0.83	63.0	13.0	54
0242-379913	0.83	63.0	13.0	54
0242-379914	0.83	63.0	13.0	54
0242-379915	0.83	48.0	10.0	57
0242-379916	0.83	48.0	10.0	57
0242-379917	0.83	48.0	10.0	57
0242-379918	0.83	48.0	10.0	57
0242-379919	0.83	48.0	10.0	57
0242-379920	0.83	48.0	10.0	57
0242-379921	0.83	48.0	10.0	57
0242-379922	0.83	48.0	10.0	57
0242-379923	0.83	48.0	10.0	57
0242-379924	0.83	48.0	10.0	57
0242-379925	0.83	48.0	10.0	57

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TEST RESULTS - ROLLS

PROJECT NUMBER: G722011.02

SALES ORDER: SO-093353

PACKING SLIP NUMBER: Pre-SO-093353-1

PROJECT NAME : ALLIANT COLUMBIA

Test	1	2	3	4
0242-379926	0.83	48.0	10.0	57
0242-379927	0.83	48.0	10.0	57
0242-379928	0.83	48.0	10.0	57
0242-379929	0.83	48.0	10.0	57
0242-379930	0.83	48.0	10.0	57
0242-379931	0.82	51.0	11.0	63
0242-379932	0.82	51.0	11.0	63
0242-379933	0.82	51.0	11.0	63
0242-379934	0.82	51.0	11.0	63
0242-379935	0.82	51.0	11.0	63
0242-379936	0.82	51.0	11.0	63
0242-379937	0.82	51.0	11.0	63
0242-379938	0.82	51.0	11.0	63
0242-379939	0.82	51.0	11.0	63
0242-379940	0.82	51.0	11.0	63
0242-379941	0.82	51.0	11.0	63
0242-379942	0.82	51.0	11.0	63
0242-379943	0.82	51.0	11.0	63
0242-379944	0.82	51.0	11.0	63
0242-379945	0.82	51.0	11.0	63
0242-379946	0.82	51.0	11.0	63
0242-379947	0.82	41.0	9.0	54
0242-379948	0.82	41.0	9.0	54

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TEST RESULTS - ROLLS

PROJECT NUMBER:	G722011.02
SALES ORDER:	SO-093353
PACKING SLIP NUMBER:	Pre-SO-093353-1

PROJECT NAME : ALLIANT COLUMBIA

PRODUCT: 1100869
Bentoliner CAR, 0.75 lbs/ft² - 3.66 kg/m², NW, Peel 35

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

Test	1	2	3
Specification	**24**	**12**	**18**
1060822B	30.0	9.1	13
1060822C	31.0	9.7	12
1060822D	29.0	8.9	14
1061022A	31.0	10.5	14
1061022B	30.0	9.6	12
1061022C	28.0	10.2	14
1061022D	32.0	9.9	13

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TEST RESULTS - ROLLS

PROJECT NUMBER:	G722011.02
SALES ORDER:	SO-093353
PACKING SLIP NUMBER:	Pre-SO-093353-1

PROJECT NAME : ALLIANT COLUMBIA

Test	Property	Direction	Test Method	Frequency	Unit
1	Mass per Unit Area (min. avg.)		ASTM D5261	1/200,000 ft^2	oz/yd^2
	Grab Tensile Properties (min. avg)		ASTM D4632	1/200,000 ft^2	
2	Strength (MD)				lbf
3	Strength (TD)				lbf
4	Elongation (MD)				%
5	Elongation (TD)				%

Test	1	2	3	4	5
Specification	**6**	**90**	**100**	**10**	**10**
2027071108	6.6	112	143	25	17
2027110286	6.5	119	141	32	33
2027119204	6.8	119	136	23	14
2027127355	6.6	132	152	28	21
2027127357	6.6	115	135	22	16
2027127359	6.6	115	135	22	16
2027127368	6.5	117	148	21	15
2027130475	6.2	137	113	17	11
2027133279	6.2	144	102	20	12
2027133281	6.6	143	101	17	11
2027142497	8.1	136	153	13	19
2027142498	7.5	128	143	13	17
2027142603	6.9	142	144	14	10
2027142620	6.1	138	135	13	10
2027144632	7.0	139	149	14	10
2027144633	7.0	139	149	14	10

MANUFACTURING QUALITY CONTROL

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TEST RESULTS - ROLLS

SOLMAX Charles Taylor APPROVED QUALITY ASSURANCE

PROJECT NUMBER:	G722011.02
SALES ORDER:	SO-093353
PACKING SLIP NUMBER:	Pre-SO-093353-1

PROJECT NAME : ALLIANT COLUMBIA

Test	Property	Direction	Test Method	Frequency	Unit
1	Mass per Unit Area (min. avg.)		ASTM D5261	1/200,000 ft^2	oz/yd^2
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**
2027120222	7.5	153	272	171	132
2027120225	8.0	143	270	173	145
2027131505	8.2	137	284	159	129
2027131507	8.2	137	284	159	129
2027131510	7.1	92	223	159	147
2027131512	6.8	109	244	150	142
2027131513	6.8	109	244	150	142
2027131514	6.8	104	230	146	137
2027131521	7.2	111	209	140	132
2027131522	7.2	111	209	140	132
2027131528	7.5	118	216	174	150
2027145878	7.2	140	254	161	156
2027145879	7.2	140	254	161	156
2027145880	7.8	151	244	175	152
2027145883	7.6	136	238	176	161
2027145886	6.9	131	258	164	163
2027145889	7.6	132	238	174	158
2027145894	7.0	122	241	169	164
2027145896	7.2	140	238	175	155
2027145901	7.1	140	248	167	162

GSE BENTOLINER

CERTIFICATE OF ANALYSIS 2022

PRODUCT : NATIONAL® 30

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

BOL #	LOAD DATE	**LOT CODE**	% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC MEQ **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
B0004723949	**06-09-22**	**1060822B**	**8.1**	**0.24**	**4.01**	**13.4**	**116**	**31**	**922**

JUNE		% 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 06-*
No. of CARS	M AVG	**8.76**	**0.27**	**3.46**	**12.51**	**111.37**	**30.84**	**913.26**	
19	STD DEV	**0.45**	**0.13**	**0.94**	**0.74**	**3.84**	**1.76**	**78.75**	

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	**8.81**	**0.24**	**3.30**	**13.73**	**112.33**	**30.56**	**944.86**
221	STD DEV	**0.60**	**0.48**	**1.44**	**1.02**	**3.02**	**1.44**	**58.95**

SOLD TO: Solmax
19103 Gundle RD
Houston, TX 77073

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

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

SHIPPED TO: Solmax
3150 FIRST AVENUE
SPEARFISH, SD 57783

Prepared by: TO
06/09/22

CC: Jason Tawse
File

GSE BENTOLINER

CERTIFICATE OF ANALYSIS 2022

PRODUCT : NATIONAL® 30

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

BOL #	LOAD DATE	**LOT CODE**	% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC MEQ **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
B0004723950	**06-09-22**	**1060822C**	**8.1**	**0.39**	**1.32**	**13.2**	**114**	**32**	**907**

JUNE		% 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 06-*
No. of CARS	M AVG	**8.73**	**0.27**	**3.35**	**12.54**	**111.50**	**30.90**	**912.95**	
20	STD DEV	**0.47**	**0.13**	**1.03**	**0.74**	**3.79**	**1.73**	**76.77**	

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	**8.81**	**0.24**	**3.29**	**13.73**	**112.34**	**30.56**	**944.68**
222	STD DEV	**0.60**	**0.47**	**1.44**	**1.02**	**3.01**	**1.44**	**58.88**

SOLD TO: Solmax
19103 Gundle RD
Houston, TX 77073

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

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

SHIPPED TO: Solmax
3150 FIRST AVENUE
SPEARFISH, SD 57783

Prepared by: TO
06/10/22

CC: Jason Tawse
File

GSE BENTOLINER

CERTIFICATE OF ANALYSIS 2022

PRODUCT : NATIONAL® 30

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

BOL #	LOAD DATE	**LOT CODE**	% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC MEQ **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
B0004723951	**06-09-22**	**1060822D**	**8.0**	**0.05**	**6.26**	**13.8**	**110**	**27**	**836**

JUNE No. of CARS		% 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 06-*
CARS	M AVG	**8.70**	**0.26**	**3.49**	**12.60**	**111.43**	**30.71**	**909.29**	
21	STD DEV	**0.48**	**0.14**	**1.18**	**0.77**	**3.71**	**1.88**	**76.69**	

YTD No. of CARS		% 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**
CARS	M AVG	**8.80**	**0.24**	**3.30**	**13.73**	**112.33**	**30.55**	**944.20**
223	STD DEV	**0.61**	**0.47**	**1.45**	**1.02**	**3.01**	**1.46**	**59.19**

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File

GSE BENTOLINER

CERTIFICATE OF ANALYSIS 2022

PRODUCT : NATIONAL® 30

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

BOL #	LOAD DATE	**LOT CODE**	% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC MEQ **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
B0004728466	**06-10-22**	**1061022A**	**9.2**	**0.05**	**3.99**	**13.6**	**112**	**29**	**897**

JUNE No. of CARS		% 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 06-*
	M AVG	**8.72**	**0.25**	**3.51**	**12.65**	**111.45**	**30.64**	**908.73**	
22	STD DEV	**0.48**	**0.14**	**1.16**	**0.78**	**3.63**	**1.87**	**74.97**	

YTD No. of CARS		% 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**
	M AVG	**8.80**	**0.24**	**3.31**	**13.73**	**112.33**	**30.54**	**943.99**
224	STD DEV	**0.60**	**0.47**	**1.45**	**1.01**	**3.00**	**1.46**	**59.14**

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3150 FIRST AVENUE
SPEARFISH, SD 57783

Prepared by: TO
06/10/22

CC: Jason Tawse
File

GSE BENTOLINER

CERTIFICATE OF ANALYSIS 2022

PRODUCT : NATIONAL® 30

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

BOL #	LOAD DATE	**LOT CODE**	% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC MEQ **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
B0004728466	**06-10-22**	**1061022A**	**9.2**	**0.38**	**3.99**	**13.6**	**112**	**29**	**897**
B0004728467	**06-10-22**	**1061022B**	**8.7**	**0.81**	**1.57**	**15.0**	**108**	**31**	**964**
B0004728468	**06-12-22**	**1061022C**	**9.0**	**0.14**	**3.98**	**14.6**	**110**	**29**	**941**

JUNE No. of CARS		% 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 06-*
	M AVG	**8.73**	**0.29**	**3.45**	**12.83**	**111.25**	**30.58**	**912.38**	
24	STD DEV	**0.46**	**0.17**	**1.18**	**0.96**	**3.55**	**1.82**	**72.87**	

YTD No. of CARS		% 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**
	M AVG	**8.80**	**0.24**	**3.30**	**13.74**	**112.30**	**30.54**	**944.06**
226	STD DEV	**0.60**	**0.47**	**1.44**	**1.01**	**3.01**	**1.45**	**58.89**

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3150 FIRST AVENUE
SPEARFISH, SD 57783

Prepared by: TO
06/13/22

CC: Jason Tawse
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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
B0004728466	06-10-22	1061022A	9.2	0.38	3.99	13.6	112	29	897
B0004728467	06-10-22	1061022B	8.7	0.81	1.57	15.0	108	31	964
B0004728468	06-12-22	1061022C	9.0	0.14	3.98	14.6	110	29	941

JUNE		% 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 06-*
No. of CARS	M AVG	8.73	0.29	3.45	12.83	111.25	30.58	912.38	
24	STD DEV	0.46	0.17	1.18	0.96	3.55	1.82	72.87	

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	8.80	0.24	3.30	13.74	112.30	30.54	944.06
226	STD DEV	0.60	0.47	1.44	1.01	3.01	1.45	58.89

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Prepared by: TO
06/13/22

CC: Jason Tawse
File

GSE BENTOLINER

CERTIFICATE OF ANALYSIS 2022

PRODUCT : NATIONAL® 30

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

BOL #	LOAD DATE	**LOT CODE**	% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC MEQ **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
B0004728469	**06-13-22**	**1061022D**	**8.8**	**0.25**	**2.83**	**13.2**	**112**	**28**	**882**

JUNE		% 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
No. of									06-*
CARS	M AVG	**8.73**	**0.28**	**3.43**	**12.84**	**111.28**	**30.48**	**911.16**	
25	STD DEV	**0.45**	**0.17**	**1.16**	**0.94**	**3.48**	**1.86**	**71.65**	

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	**8.80**	**0.24**	**3.30**	**13.74**	**112.30**	**30.52**	**943.79**
227	STD DEV	**0.60**	**0.47**	**1.44**	**1.01**	**3.00**	**1.46**	**58.91**

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SPEARFISH, SD 57783

Prepared by: TO
06/13/22

CC: Jason Tawse
File

SOLMAX

6-16-2022

Fann Model 35A Viscometer readings for SO-093353 Alliant Columbia

Item number: 1100869

Product name: Bentoliner CAR, 0.75 lbs/ft^2, NW, Peel 35

Roll Number	600 rpm	
Base bentonite no polymer	14	
0242-379846	41	

* bentonite samples were obtained by shaking bentonite out of manufactured roll retained archives.

Chuck Taylor
Lab Technician

Loss on Ignition for SO-093353 Alliant Columbia

Item number: 1100869

Product name: Bentoliner CAR, 0.75 lbs/ft², NW, Peel 35

Roll #	LOI (%)
0242-379759	3.9
0242-379803	3.0
0242-379851	2.4
0242-379895	4.6
0242-379939	2.6

Thomas Harrelson
Lab Technician

Report Date
7/18/2022

Quality Assurance Laboratory Test Results

Index Flux - Hydraulic Conductivity report

MF-LAB-52

Revision:01

Date: 2021-09-09

Project:	ALLIANT COLUMBIA
Sales Order:	SO-093353
Product:	Bentoliner CAR, 0.75 lbs/ft² - 3.66 kg/m², NW, 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/Week
Effective Stress:	5 psi

Roll Number	Production Date	Index Flux ($m^3/m^2/sec$)	Hydraulic Conductivity (cm/sec)
0242-379759	6/15/2022	1.15E-09	6.37E-10

Approved By:	Chuck Taylor
Date Approved:	07/18/22

SOLMAX

LIST OF GEOMEMBRANE ROLLS

SOLMAX
APPROVED
QUALITY ASSURANCE

PROJECT NUMBER:	G722011.01
SALES ORDER:	SO-002087
PACKING SLIP NUMBER:	Pre-SO-002087-1

PROJECT NAME : ALLIANT BUNDLE COLUMBIA ALTERNATE

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 : 1042790							
HDPE 60 mils / 1.50 mm Black Textured			**1.0**	**> 0.932**	**100**		**500**
1005-063591	PPE821140	2022-07-02	0.08	0.937	120		>500 Certified 1005-063547
1005-063592	PPE821140	2022-07-02	0.08	0.937	120		>500 Certified 1005-063547
1005-063593	PPE821140	2022-07-02	0.08	0.937	120		>500 Certified 1005-063547
1005-063594	PPE821140	2022-07-02	0.08	0.937	120		>500 Certified 1005-063547
1005-063595	PPE821140	2022-07-02	0.08	0.937	120		>500 Certified 1005-063547
1005-063596	PPE821140	2022-07-02	0.08	0.937	120		>500 Certified 1005-063547
1005-063597	PPE821140	2022-07-02	0.08	0.937	120		>500 Certified 1005-063547
1005-063598	PPE821140	2022-07-02	0.08	0.937	120		>500 Certified 1005-063547
1005-063599	PPE821140	2022-07-02	0.08	0.937	120		>500 Certified 1005-063547
1005-063600	PPE821140	2022-07-02	0.08	0.937	120		>500 Certified 1005-063547
1005-063601	PPE821140	2022-07-02	0.08	0.937	120		>500 Certified 1005-063547
1005-063602	PPE821140	2022-07-03	0.08	0.937	120		>500 Certified 1005-063547
1005-063603	PPE821140	2022-07-03	0.08	0.937	120		>500 Certified 1005-063547
1005-063604	PPE821140	2022-07-03	0.08	0.937	120		>500 Certified 1005-063547
1005-063605	PPE820850	2022-07-03	0.09	0.937	120		>500 Certified 1005-063605

Solmax International Inc.
2801 MARIE-VICTORIN,, VARENNES, QC, CANADA, J3X 0J4

SOLMAX

LIST OF GEOMEMBRANE ROLLS

SOLMAX
APPROVED
QUALITY ASSURANCE

PROJECT NUMBER: G722011.01
SALES ORDER: SO-002087
PACKING SLIP NUMBER: Pre-SO-002087-1

PROJECT NAME : ALLIANT BUNDLE COLUMBIA ALTERNATE

1005-063606	PPE820850	2022-07-03	0.09	0.937	120		>500 Certified 1005-063605
1005-063607	PPE820850	2022-07-03	0.09	0.937	120		>500 Certified 1005-063605
1005-063608	PPE820850	2022-07-03	0.09	0.937	120		>500 Certified 1005-063605
1005-063609	PPE820850	2022-07-03	0.09	0.937	120		>500 Certified 1005-063605
1005-063610	PPE820850	2022-07-03	0.09	0.937	120		>500 Certified 1005-063605
1005-063611	PPE820850	2022-07-03	0.09	0.937	120		>500 Certified 1005-063605
1005-063612	PPE820850	2022-07-03	0.09	0.937	120		>500 Certified 1005-063605
1005-063613	PPE820850	2022-07-03	0.09	0.937	120		>500 Certified 1005-063605
1005-063614	PPE820850	2022-07-03	0.09	0.937	120		>500 Certified 1005-063605
1005-063615	PPE820850	2022-07-03	0.09	0.937	120		>500 Certified 1005-063605
1005-063616	PPE820850	2022-07-03	0.09	0.937	120		>500 Certified 1005-063605
1005-063617	PPE820850	2022-07-03	0.09	0.937	120		>500 Certified 1005-063605
1005-063618	PPE820850	2022-07-03	0.09	0.937	120		>500 Certified 1005-063605
1005-063619	PPE820850	2022-07-03	0.09	0.937	120		>500 Certified 1005-063605
1005-063620	PPE820850	2022-07-04	0.09	0.937	120		>500 Certified 1005-063605
1005-063621	PPE820850	2022-07-04	0.09	0.937	120		>500 Certified 1005-063605
1005-063623	PPE820850	2022-07-04	0.09	0.937	120		>500 Certified 1005-063605
1005-063625	PPE820850	2022-07-04	0.09	0.937	120		>500 Certified 1005-063605
1005-063626	PPE820850	2022-07-04	0.09	0.937	120		>500 Certified 1005-063605
1005-063627	PPE820850	2022-07-04	0.09	0.937	120		>500 Certified 1005-063605

LIST OF GEOMEMBRANE ROLLS

SOLMAX
Kevants
APPROVED
QUALITY ASSURANCE

PROJECT NUMBER: G722011.01
SALES ORDER: SO-002087
PACKING SLIP NUMBER: Pre-SO-002087-1

PROJECT NAME : ALLIANT BUNDLE COLUMBIA ALTERNATE

1005-063628	PPE820850	2022-07-04	0.09	0.937	120		>500 Certified 1005-063605
1005-063629	PPE820850	2022-07-04	0.09	0.937	120		>500 Certified 1005-063605

QUANTITY (ROLLS): 37

Solmax International Inc.
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SOLMAX.COM

MANUFACTURING QUALITY CONTROL

SOLMAX

APPROVED

QUALITY ASSURANCE

TEST RESULTS - ROLLS

PROJECT NUMBER: G722011.01

SALES ORDER: SO-002087

PACKING SLIP NUMBER: Pre-SO-002087-1

PROJECT NAME : ALLIANT BUNDLE COLUMBIA ALTERNATE

PRODUCT: 1042790
HDPE 60 mils / 1.50 mm Black Textured

CE Certificate = HD-60-TT-BB

Properties		Thickness ave/min.	GeoM Density	Carbon Black Content	Carbon Black Dispersion	Tensile Yield Strength	Tensile Yield Elong.	Tensile Break Strength	Tensile Break Elong.	Tear Resist.	Puncture Resist.	Dimension Stability	Asperity Height In/Out
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		16 / 16
1005-063591	MD	58.0 / 55.2	0.946	2.32	10/10 views	157.8	17.7	237	595	53	148		18.5 / 18.6
	XD					163.5	15.2	202	544	57			
1005-063592	MD	57.7 / 55.1	0.946	2.45	10/10 views	155.3	17.0	218	570	53	148		18.2 / 18.6
	XD					159.0	15.6	182	493	57			
1005-063593	MD	58.1 / 53.5	0.944	2.45	10/10 views	155.3	17.0	218	570	51	141		18.2 / 18.9
	XD					159.0	15.6	182	493	56			
1005-063594	MD	58.0 / 55.1	0.944	2.44	10/10 views	149.6	17.0	215	562	51	141		18.4 / 18.5
	XD					160.1	15.6	197	552	56			
1005-063595	MD	57.3 / 54.5	0.944	2.44	10/10 views	149.6	17.0	215	562	51	141		17.8 / 18.8
	XD					160.1	15.6	197	552	56			
1005-063596	MD	58.0 / 55.4	0.944	2.37	10/10 views	156.5	15.5	203	524	51	141		17.5 / 18.9
	XD					159.3	15.0	183	510	56			
1005-063597	MD	57.1 / 52.6	0.944	2.37	10/10 views	156.5	15.5	203	524	51	141		18.4 / 18.6
	XD					159.3	15.0	183	510	56			
1005-063598	MD	57.7 / 54.8	0.945	2.36	10/10 views	150.9	16.3	209	558	53	147		18.5 / 18.7
	XD					158.2	14.1	173	485	56			
1005-063599	MD	57.0 / 52.0	0.945	2.36	10/10 views	150.9	16.3	209	558	53	147		18.8 / 18.9
	XD					158.2	14.1	173	485	56			
1005-063600	MD	57.4 / 54.5	0.945	2.60	10/10 views	154.1	16.9	200	531	53	147		19.0 / 18.9
	XD					154.4	16.2	162	444	56			
1005-063601	MD	57.4 / 54.0	0.945	2.60	10/10 views	154.1	16.9	200	531	53	147		19.3 / 18.8
	XD					154.4	16.2	162	444	56			
1005-063602	MD	57.5 / 55.6	0.945	2.52	10/10 views	156.2	17.6	213	553	53	147		19.5 / 18.8
	XD					159.1	15.1	173	503	56			
1005-063603	MD	57.5 / 52.8	0.945	2.52	10/10 views	156.2	17.6	213	553	52	145		18.4 / 19.4
	XD					159.1	15.1	173	503	56			
1005-063604	MD	57.3 / 54.1	0.945	2.28	10/10 views	149.9	16.9	209	553	52	145		18.7 / 18.2
	XD					156.4	15.2	182	517	56			

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 International Inc.
2801 MARIE-VICTORIN,, VARENNES, QC, CANADA, J3X 0J4

SOLMAX.COM

SOLMAX

MANUFACTURING QUALITY CONTROL

TEST RESULTS - ROLLS

SOLMAX Kevants APPROVED QUALITY ASSURANCE

PROJECT NUMBER:	G722011.01
SALES ORDER:	SO-002087
PACKING SLIP NUMBER:	Pre-SO-002087-1

PROJECT NAME : ALLIANT BUNDLE COLUMBIA ALTERNATE

1005-063605 MD **XD**	57.3 / 53.1	0.945	2.28	10/10 views	149.9 156.4	16.9 15.2	209 182	553 517	52 56	145		18.4 / 18.1
1005-063606 MD **XD**	57.1 / 54.5	0.945	2.50	10/10 views	149.8 153.4	17.0 15.6	220 184	574 531	52 56	145		18.9 / 18.2
1005-063607 MD **XD**	57.0 / 52.8	0.945	2.50	10/10 views	149.8 153.4	17.0 15.6	220 184	574 531	52 56	145		18.9 / 18.9
1005-063608 MD **XD**	57.1 / 53.7	0.944	2.38	10/10 views	149.7 158.0	17.6 15.6	209 188	550 539	53 58	149		18.3 / 18.2
1005-063609 MD **XD**	57.4 / 52.7	0.944	2.38	10/10 views	149.7 158.0	17.6 15.6	209 188	550 539	53 58	149		19.1 / 17.6
1005-063610 MD **XD**	58.3 / 54.2	0.944	2.48	10/10 views	157.6 160.1	16.3 15.0	223 200	588 558	53 58	149		18.6 / 19.0
1005-063611 MD **XD**	57.4 / 54.7	0.944	2.48	10/10 views	157.6 160.1	16.3 15.0	223 200	588 558	53 58	149		18.3 / 19.0
1005-063612 MD **XD**	57.2 / 52.3	0.944	2.48	10/10 views	151.2 156.6	17.6 16.3	205 186	554 533	53 58	149		18.7 / 19.8
1005-063613 MD **XD**	57.0 / 53.6	0.944	2.48	10/10 views	151.2 156.6	17.6 16.3	205 186	554 533	53 58	143		18.2 / 19.8
1005-063614 MD **XD**	57.6 / 54.7	0.944	2.56	10/10 views	154.2 160.3	17.6 16.3	217 180	570 500	53 58	143		18.1 / 17.9
1005-063615 MD **XD**	57.4 / 54.2	0.945	2.34	10/10 views	152.6 159.3	16.9 14.9	227 193	599 549	53 58	143		18.7 / 18.7
1005-063616 MD **XD**	57.0 / 52.4	0.945	2.34	10/10 views	152.6 159.3	16.9 14.9	227 193	599 549	53 58	143		18.6 / 18.0
1005-063617 MD **XD**	57.2 / 53.8	0.945	2.35	10/10 views	156.7 163.3	17.0 15.0	182 191	568 531	53 58	143		20.2 / 18.6
1005-063618 MD **XD**	57.0 / 55.0	0.945	2.35	10/10 views	156.7 163.3	17.0 15.0	182 191	568 531	53 58	143		19.5 / 18.8
1005-063619 MD **XD**	57.6 / 53.7	0.945	2.49	10/10 views	150.5 157.7	17.8 14.3	228 190	590 527	53 58	143		18.2 / 17.8
1005-063620 MD **XD**	57.4 / 51.3	0.945	2.49	10/10 views	150.5 157.7	17.8 14.3	228 190	590 527	53 57	142		18.5 / 17.7
1005-063621 MD **XD**	57.3 / 54.0	0.945	2.57	10/10 views	149.5 154.9	17.7 15.6	210 200	561 574	53 57	142		17.6 / 17.5
1005-063623 MD **XD**	57.2 / 54.8	0.945	2.57	10/10 views	149.5 154.9	17.7 15.6	210 200	561 574	53 57	142		19.9 / 19.2
1005-063625 MD **XD**	57.8 / 53.4	0.945	2.28	10/10 views	153.8 158.3	16.3 14.9	228 187	589 513	53 57	142		19.3 / 17.9
1005-063626 MD **XD**	57.9 / 54.2	0.945	2.28	10/10 views	153.8 158.3	16.3 14.9	228 187	589 513	53 57	142		18.0 / 18.5
1005-063627 MD	57.9 / 54.7	0.943	2.54	10/10 views	152.2	17.7	223	569	54	150		19.1 / 18.4

SOLMAX Kevants APPROVED QUALITY ASSURANCE

PROJECT NUMBER: G722011.01

SALES ORDER: SO-002087

PACKING SLIP NUMBER: Pre-SO-002087-1

PROJECT NAME : ALLIANT BUNDLE COLUMBIA ALTERNATE

XD					160.9	15.1	193	534	57			
1005-063628 MD **XD**	59.6 / 56.3	0.943	2.54	10/10 views	152.2 160.9	17.7 15.1	223 193	569 534	54 57	150		17.7 / 19.8
1005-063629 MD **XD**	59.8 / 58.1	0.943	2.61	10/10 views	151.6 155.0	17.7 15.1	206 200	522 560	54 57	150		21.2 / 17.5

CoA Date: 05/27/2022

Certificate of Analysis

Shipped To: SOLMAX
2801 BOUL MARIE-VICTORIN
VARENNES QC J3X 1P7
CANADA

Recipient: Marcotte
Fax:

Delivery #: 80682396
PO #: 2629
Weight: 171600.000 LB
Ship Date: 05/27/2022
Package: BULK
Mode: Hopper Car
Car #: SHQX041594
Seal No: 290732

Product:
MARLEX K306 POLYETHYLENE in Bulk
Additive levels have been tested and meet minimum the specification for this lot.
As a result, Standard OIT (by ASTM D 3895) is greater than 120 minutes (nominal value, not tested on every lot).
As a result, High Pressure OIT (by ASTM D 5885) is greater than 1000 minutes (nominal value, not tested on every lot).

Lot Number: PPE821140

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.080	g/10min
HLMI Flow Rate	ASTM D1238	12.70	g/10min
Density	D1505 or D4883	0.9370	g/cm3
Production Date		05/23/2022	

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.

Erin Xiao
Quality Systems Coordinator

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

CPChem

CoA Date: 05/24/2022

Certificate of Analysis

Shipped To: SOLMAX 2801 BOUL MARIE-VICTORIN VARENNES QC J3X 1P7 CANADA Recipient: Marcotte Fax:	Delivery #: 80680606 PO #: 2629 Weight: 184700.000 LB Ship Date: 05/24/2022 Package: BULK Mode: Hopper Car Car #: CITX703259 Seal No: 286994

Product:
MARLEX K306 POLYETHYLENE in Bulk
Additive levels have been tested and meet minimum the specification for this lot.
As a result, Standard OIT (by ASTM D 3895) is greater than 120 minutes (nominal value, not tested on every lot).
As a result, High Pressure OIT (by ASTM D 5885) is greater than 1000 minutes (nominal value, not tested on every lot).

Lot Number: PPE820850

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.090	g/10min
HLMI Flow Rate	ASTM D1238	10.90	g/10min
Density	D1505 or D4883	0.9370	g/cm3
Production Date		05/19/2022	

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.

Erin Xiao
Quality Systems Coordinator

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

SKAPS Industries (Nonwoven Division)
335 Athena Drive
Athens, GA 30601 (U.S.A.)
Phone (706) 354-3700 Fax (706) 354-3737
E-mail: contact@skaps.com

October 14, 2022
Geo-Synthetics Systems LLC.
2401 Pewaukee Rd.
Waukesha, WI 53188
PO : G722011.03

Dear Sir/Madam:

This is to certify that SKAPS GE320 is a high quality needle-punched nonwoven geotextile made of 100% polypropylene staple fibers, randomly networked to form a high strength dimensionally stable fabric.SKAPS GE320 resists ultraviolet deterioration, rotting, biological degradation. The fabric is inert to commonly encountered soil chemicals. Polypropylene is stable within a pH range of 2 to 13. SKAPS GE320 conforms to the property values listed below:

PROPERTY	TEST METHOD	UNITS	M.A.R.V. Minimum Average Roll Value
Weight	ASTM D 5261	oz/sy (g/m^2)	32.00 (1085)
Grab Tensile	ASTM D 4632	lbs (kN)	500 (2.22)
Grab Elongation	ASTM D 4632	%	50
Trapezoidal Tear	ASTM D 4533	lbs (kN)	215 (0.96)
CBR Puncture	ASTM D 6241	lbs (kN)	1700 (7.56)
UV Resistance	ASTM D 4355	%/hrs	70/500

Notes:
* At the time of manufacturing. Handling may change these properties.

KOUROSH SABZEVARI
QUALITY CONTROL MANAGER

www.skaps.com

Product : GE320-180

ROLL #	WEIGHT	MD TENSILE	MD ELONG	XMD TENSILE	XMD ELONG	MD TRAP	XMD TRAP	CBR PUNCTURE
ASTM METHOD	D5261	D4632	D4632	D4632	D4632	D4533	D4533	D6241
UNITS	oz/sq yd	lbs.	%	lbs	%	lbs.	lbs	lbs.
TARGET	32.00	500	50	500	50	215	215	1700
73547.1	32.69	641	95	650	110	285	295	1840
73547.2	32.69	641	95	650	110	285	295	1840
73547.3	32.69	641	95	650	110	285	295	1840
73547.4	32.69	641	95	650	110	285	295	1840
73547.5	32.39	630	86	683	107	285	295	1840
73547.6	32.39	630	86	683	107	285	295	1840
73547.7	32.39	630	86	683	107	285	295	1840
73547.8	32.39	630	86	683	107	285	295	1840
73547.9	32.39	630	86	683	107	285	295	1840
73547.10	32.75	635	83	652	96	280	290	1839
73547.11	32.75	635	83	652	96	280	290	1839
73547.12	32.75	635	83	652	96	280	290	1839
73547.13	32.75	635	83	652	96	280	290	1839
73547.14	32.75	635	83	652	96	280	290	1839
73547.15	32.68	627	96	667	111	280	290	1839
73547.16	32.68	627	96	667	111	280	290	1839
73547.17	32.68	627	96	667	111	280	290	1839
73547.18	32.68	627	96	667	111	280	290	1839
73547.19	32.68	627	96	667	111	280	290	1839
73547.20	32.90	632	86	665	116	283	288	1855
73547.21	32.90	632	86	665	116	283	288	1855
73547.22	32.90	632	86	665	116	283	288	1855
73547.23	32.90	632	86	665	116	283	288	1855
73547.24	32.90	632	86	665	116	283	288	1855
73547.25	32.88	640	92	664	116	283	288	1855
73547.26	32.88	640	92	664	116	283	288	1855
73547.27	32.88	640	92	664	116	283	288	1855
73547.28	32.88	640	92	664	116	283	288	1855
73547.29	32.88	640	92	664	116	283	288	1855
73547.30	32.25	625	83	681	110	276	286	1846
73547.31	32.25	625	83	681	110	276	286	1846
73547.32	32.25	625	83	681	110	276	286	1846
73547.33	32.25	625	83	681	110	276	286	1846
73547.34	32.25	625	83	681	110	276	286	1846
73547.35	32.55	633	82	645	108	276	286	1846
73547.36	32.55	633	82	645	108	276	286	1846

*All Values are MARV

Appendix F

Geosynthetics Conformance Test Results

August 1, 2022

Mail To: **Bill To:**

Debra Nelson
SCS Engineers
2830 Dairy Drive
Madison WI 53718

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email: dnelson@scsengineers.com
cc email: zbajalan@scsengineers.com
cc email: pgearing@scsengineers.com

Greetings,

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

Project:	**Columbia Liner Construction 2022**
TRI Job Reference Number:	72839
Material(s) Tested:	Three Solmax Bentoliner CAR NW 35 GCL(s)
Test(s) Requested:	Mass Per Unit Area (ASTM D5993) Bentonite - Swell Index (ASTM D5890) Tensile Strength (ASTM D6768) Peel Strength (ASTM D6496) Index Flux (ASTM D5887)

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

Sincerely,

Mansukh Patel, Ph.D.

Geosynthetic Services Division

GCL TEST RESULTS
TRI Client: SCS Engineers
Project: Columbia Liner Construction 2022

Material: Solnax Bentoliner CAR NW 35 GCL
Sample Identification: 0242-379851
TRI Log #: 72839

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	MEAN	STD. DEV.	PROJ. SPEC.
Bentonite - Mass/Unit Area (ASTM D5993, result @ 0% M.C.)								
Mass/unit area (lbs/ft^2)								
GCL (ω = 0%)	0.97	0.99	1.04	0.94	0.95	0.98	0.04	
Non-Bentonite Components	0.063	(Assumed Material-Specific Value)						
Bentonite (ω = 0%)	0.91	0.93	0.98	0.87	0.88	0.91	0.04	0.75 MIN
Moisture Content (%)	10.6	10.7	10.9	11.0	10.8	10.8	0.1	-
Bentonite - Swell Index (ASTM D5890)								
Swell index (mL/2g)		42				42		24 MIN
Note: Bentonite sample tested is taken from finished GCL product.								
Tensile Strength (ASTM D6768)								
MD - Tensile Strength (lbs/in)	57.8	58.6	56.7	63.8	68.8	61.1	5.1	23 MIN AVE
TD - Tensile Strength (lbs/in)	71.9	69.1	70.6	81.8	74.5	73.6	5.0	23 MIN AVE
Peel Strength (ASTM D6496)								
MD - Peel Strength (lbs/in)	15.5	18.2	17.1	11.5	16.0	15.7	2.6	2.1 MIN
TD - Peel Strength (lbs/in)	19.5	18.6	19.5	18.3	18.0	18.8	0.7	2.1 MIN
Index Flux (ASTM D5887)								
Index Flux (m^3/m^2/sec)		1.9E-09				1.9E-09		1.0E-08 MAX
Hydraulic Conductivity (cm/sec)		7.7E-10				7.7E-10		5.0E-09 MAX

MD Machine Direction TD Transverse Direction

TRI ENVIRONMENTAL, INC.
9063 BEE CAVES ROAD – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

GCL TEST RESULTS
TRI Client: SCS Engineers
Project: Columbia Liner Construction 2022

Material: Solnax Bentoliner CAR NW 35 GCL
Sample Identification: 0242-379895
TRI Log #: 72839

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	MEAN	STD. DEV.	PROJ. SPEC.
Bentonite - Mass/Unit Area (ASTM D5993, result @ 0% M.C.)								
Mass/unit area (lbs/ft^2)								
GCL (ω = 0%)	0.91	0.94	0.91	0.91	0.91	0.91	0.01	
Non-Bentonite Components	0.063	(Assumed Material-Specific Value)						
Bentonite (ω = 0%)	0.84	0.88	0.84	0.85	0.84	0.85	0.01	0.75 MIN
Moisture Content (%)	12.5	11.6	11.5	11.5	12.1	11.8	0.4	-
Bentonite - Swell Index (ASTM D5890)								
Swell index (mL/2g)		40				40		24 MIN
Note: Bentonite sample tested is taken from finished GCL product.								
Tensile Strength (ASTM D6768)								
MD - Tensile Strength (lbs/in)	62.5	60.7	57.0	63.9	62.2	61.3	2.6	23 MIN AVE
TD - Tensile Strength (lbs/in)	67.1	70.7	61.8	64.3	61.2	65.0	3.9	23 MIN AVE
Peel Strength (ASTM D6496)								
MD - Peel Strength (lbs/in)	13.7	13.7	16.0	11.2	13.2	13.5	1.7	2.1 MIN
TD - Peel Strength (lbs/in)	15.3	14.2	15.1	17.2	11.1	14.6	2.2	2.1 MIN
Index Flux (ASTM D5887)								
Index Flux (m^3/m^2/sec)		1.0E-09				1.0E-09		1.0E-08 MAX
Hydraulic Conductivity (cm/sec)		3.7E-10				3.7E-10		5.0E-09 MAX

MD Machine Direction TD Transverse Direction

TRI ENVIRONMENTAL, INC.
9063 BEE CAVES ROAD – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

GCL TEST RESULTS
TRI Client: SCS Engineers
Project: Columbia Liner Construction 2022

Material: Solnax Bentoliner CAR NW 35 GCL
Sample Identification: 0242-379939
TRI Log #: 72839

PARAMETER	TEST REPLICATE NUMBER					MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5			
Bentonite - Mass/Unit Area (ASTM D5993, result @ 0% M.C.)								
Mass/unit area (lbs/ft^2)								
GCL (ω = 0%)	1.01	0.91	0.95	0.96	0.97	**0.96**	0.03	
Non-Bentonite Components	0.063	(Assumed Material-Specific Value)						
Bentonite (ω = 0%)	0.95	0.85	0.89	0.89	0.90	**0.90**	0.03	0.75 MIN
Moisture Content (%)	11.8	11.1	13.1	12.0	11.6	**11.9**	0.7	-

TRI ENVIRONMENTAL, INC.
9063 Bee Caves Road – Austin, TX 78733 – USA | Ph: 800.880.TEST or 512.263.2101

August 9, 2022

Mail To: **Bill To:**

Debra Nelson
SCS Engineers
2830 Dairy Drive
Madison WI 53718

email: dnelson@scsengineers.com
cc email: zbajalan@scsengineers.com
cc email: pgearing@scsengineers.com

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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:	**Columbia Liner Construction 2022**
TRI Job Reference Number:	72780
Material(s) Tested:	Two Solmax Bentoliner CAR NW 35 GCL(s)
Test(s) Requested:	Mass Per Unit Area (ASTM D5993) Bentonite - Swell Index (ASTM D5890) Tensile Strength (ASTM D6768) Peel Strength (ASTM D6496) Index Flux (ASTM D5887) Viscosity testing ISO 1628-3) Loss on Ignition

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

Sincerely,

Jeffrey A. Kuhn, Ph.D., P.E.
Geosynthetic Services Division

GCL TEST RESULTS
TRI Client: SCS Engineers
Project: Columbia Liner Construction 2022

Material: Solmax Bentoliner CAR NW 35 GCL
Sample Identification: 0242-379759
TRI Log #: 72780

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	MEAN	STD. DEV.	PROJ. SPEC.
Bentonite - Mass/Unit Area (ASTM D5993, result @ 0% M.C.)								
Mass/unit area (lbs/ft^2)								
GCL (ω = 0%)	1.02	0.97	1.01	0.92	0.95	**0.97**	0.04	
Non-Bentonite Components	0.063	(Assumed Material-Specific Value)						
Bentonite (ω = 0%)	0.95	0.90	0.95	0.86	0.89	**0.91**	0.04	0.75 MIN
Moisture Content (%)	9.5	9.6	9.6	9.6	9.5	**9.6**	0.1	-
Bentonite - Swell Index (ASTM D5890)								
Swell index (mL/2g)		42				**42**		24 MIN
Note: Bentonite sample tested is taken from finished GCL product.								
Tensile Strength (ASTM D6768)								
MD - Tensile Strength (lbs/in)	61.4	62.3	60.3	63.8	63.4	**62.2**	1.4	23 MIN AVE
TD - Tensile Strength (lbs/in)	71.6	68.7	69.6	73.3	65.9	**69.8**	2.8	23 MIN AVE
Peel Strength (ASTM D6496)								
MD - Peel Strength (lbs/in)	12.7	13.4	12.9	12.1	13.0	**12.8**	0.5	2.1 MIN
TD - Peel Strength (lbs/in)	13.0	15.5	13.1	12.2	13.8	**13.5**	1.2	2.1 MIN
Index Flux (ASTM D5887)								
Index Flux ($m^3/m^2/sec$)		1.5E-09				**1.5E-09**		1.0E-08 MAX
Hydraulic Conductivity (cm/sec)		6.8E-10				**6.8E-10**		5.0E-09 MAX
Fann Viscosity (API 13A Section 9, Modified)								
Frequency of Rotation (RPM)	300	600						
Shear Rate (S^{-1})	511	1021						
Shear Stress (Pa)	9.5	11.5						
Viscosity (mPa•s, cP)	18.6	11.2						
Temperature (°C)	-	25.1						
Bingham Plastic Model								
Yield Point, YP (Pa)	7.6					**7.6**		
Plastic Viscosity, PV (mPa•s / cP)	3.8					**3.8**		
Loss on Ignition (ASTM D7626, Modified)								
Sample Heated for a minimum of 16 hours at 105 °C and 4 hours at 550 °C								
Loss on Ignition (%)*:	11.4	8.9				**10.2**		

*Performed twice for verification/repeatability purposes

MD Machine Direction TD Transverse Direction

TRI ENVIRONMENTAL, INC.
9063 BEE CAVES ROAD – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

GCL TEST RESULTS
TRI Client: SCS Engineers
Project: Columbia Liner Construction 2022

Material: Solmax Bentoliner CAR NW 35 GCL
Sample Identification: 0242-379803
TRI Log #: 72780

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	MEAN	STD. DEV.	PROJ. SPEC.
Bentonite - Mass/Unit Area (ASTM D5993, result @ 0% M.C.)								
Mass/unit area (lbs/ft^2)								
GCL (ω = 0%)	1.00	0.98	0.95	1.02	0.99	**0.99**	0.02	
Non-Bentonite Components	0.063	(Assumed Material-Specific Value)						
Bentonite (ω = 0%)	0.93	0.91	0.89	0.95	0.93	**0.92**	0.02	0.75 MIN
Moisture Content (%)	9.4	9.5	9.4	9.6	9.3	**9.4**	0.1	-
Bentonite - Swell Index (ASTM D5890)								
Swell index (mL/2g)		41				**41**		24 MIN
Note: Bentonite sample tested is taken from finished GCL product.								
Tensile Strength (ASTM D6768)								
MD - Tensile Strength (lbs/in)	67.0	63.1	58.8	65.9	64.7	**63.9**	3.2	23 MIN AVE
TD - Tensile Strength (lbs/in)	66.0	60.1	65.1	64.8	64.1	**64.0**	2.3	23 MIN AVE
Peel Strength (ASTM D6496)								
MD - Peel Strength (lbs/in)	13.1	12.0	12.7	12.9	11.9	**12.5**	0.5	2.1 MIN
TD - Peel Strength (lbs/in)	15.0	12.7	13.8	14.2	12.7	**13.7**	1.0	2.1 MIN
Index Flux (ASTM D5887)								
Index Flux (m^3/m^2/sec)		3.2E-09				**3.2E-09**		1.0E-08 MAX
Hydraulic Conductivity (cm/sec)		1.6E-09				**1.6E-09**		5.0E-09 MAX

MD Machine Direction TD Transverse Direction

TRI ENVIRONMENTAL, INC.
9063 BEE CAVES ROAD – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

July 15, 2022

Mail To: **Bill To:**

Debra Nelson **<= Same**
SCS Engineers
2830 Dairy Drive
Madison WI 53718

email: dnelson@scsengineers.com

Dear Mrs. Nelson:

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:	**Columbia Liner Construction 2022**
TRI Job Reference Number:	73248
Material(s) Tested:	One Solmax 60 MIL HDPE Textured Geomembrane(s)
Test(s) Requested:	Thickness (ASTM D5994) Density (ASTM D1505) Melt Flow Index (ASTM D1238, Method A, 190°C / 2.16 kg) Tensile Properties (ASTM D6693)

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

Sincerely,

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division

GEOMEMBRANE TEST RESULTS
TRI Client: SCS Engineers
Project: Columbia Liner Construction 2022

Material: Solmax 60 MIL HDPE Textured Geomembrane
Sample Identification: 1005-063602
TRI Log #: 73248

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	61	62	65	65	61	61	61	64	62	63	2	57 min ave
											61	<< min	
Density (ASTM D1505)													
Density (g/cm3)	0.944	0.944	0.945								0.944	0.001	0.940 min
Melt Flow Index (ASTM D1238, Method A, 190°C / 2.16 kg)													
Melt Flow Index (g/10 min)	0.1501	0.1506									0.1504		1.0 max
Tensile Properties (ASTM D6693, 2 ipm strain rate)													
MD Yield Strength (ppi)	158	156	160	159	146						156	6	126 min ave
TD Yield Strength (ppi)	155	158	158	167	162						160	5	126 min ave
MD Break Strength (ppi)	208	191	205	207	203						203	7	90 min ave
TD Break Strength (ppi)	172	167	186	193	188						181	11	90 min ave
MD Yield Elongation (%)	18	21	20	18	21						20	2	12 min ave
TD Yield Elongation (%)	17	20	17	20	20						19	2	12 min ave
MD Break Elongation (%)	560	528	549	523	577						547	22	100 min ave
TD Break Elongation (%)	507	490	551	550	535						527	27	100 min ave

MD Machine Direction TD Transverse Direction

July 28, 2022
August 2, 2022 Updated with Added Thickness

Mail To: **Bill To:**

Debra Nelson **<= Same**
SCS Engineers
2830 Dairy Dr
Madison, WI 53718

email: dnelson@scsengineers.com

Dear Ms. Nelson:

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:	**Columbia Liner Construction 2022**
TRI Job Reference Number:	73304
Material(s) Tested:	Six, Solmax 60 mil HDPE Textured Geomembrane(s)
Test(s) Requested:	Thickness (ASTM D5994) Density (ASTM D1505) Melt Flow Index (ASTM D1238, Method A, 190°C / 2.16 kg) Tensile Properties (ASTM D6693)

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

Sincerely,

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division

GEOMEMBRANE TEST RESULTS
TRI Client: SCS Engineers
Project: Columbia Liner Construction 2022

Material: Solmax 60 mil HDPE Textured Geomembrane
Sample Identification: 1005-063591
TRI Log #: 73304

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D5994)												
Thickness (mils)	60	62	60	62	61	61	60	61	60	61	61	1
											60	<< min
Density (ASTM D1505)												
Density (g/cm3)	0.946	0.946	0.946								0.946	0.000
Melt Flow Index (ASTM D1238, Method A, 190°C / 2.16 kg)												
Melt Flow Index (g/10 min)	0.14	0.14									0.14	
Tensile Properties (ASTM D6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	151	164	162	163	149						158	7
TD Yield Strength (ppi)	169	173	172	174	161						170	5
MD Break Strength (ppi)	194	249	210	205	210						214	21
TD Break Strength (ppi)	181	169	192	196	190						186	11
MD Yield Elongation (%)	18	21	21	18	21						20	2
TD Yield Elongation (%)	16	19	17	19	18						18	1
MD Break Elongation (%)	526	631	531	520	574						556	47
TD Break Elongation (%)	491	437	521	528	537						503	41

MD Machine Direction TD Transverse Direction

GEOMEMBRANE TEST RESULTS
TRI Client: SCS Engineers
Project: Columbia Liner Construction 2022

Material: Solmax 60 mil HDPE Textured Geomembrane
Test Parameter: Thickness (ASATM D5994)
TRI Log #: 73304

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Sample Identification: 1005-063592												
Thickness (mils)	61	60	60	61	60	61	61	60	61	60	60	1
											60	<< min
Sample Identification: 1005-063593												
Thickness (mils)	61	61	60	61	60	60	60	61	61	61	61	1
											60	<< min
Sample Identification: 1005-063611												
Thickness (mils)	60	61	61	62	61	61	60	60	60	60	61	1
											60	<< min
Sample Identification: 1005-063612												
Thickness (mils)	60	61	61	61	62	60	60	61	61	60	61	1
											60	<< min
Sample Identification: 1005-063621												
Thickness (mils)	60	61	60	60	61	60	61	63	61	60	61	1
											60	<< min
Sample Identification: 1005-063623												
Thickness (mils)	60	61	61	62	62	62	60	60	61	61	61	1
											60	<< min

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

GEOMEMBRANE TEST RESULTS
TRI Client: SCS Engineers
Project: Columbia Liner Construction 2022

Material: Solmax 60 mil HDPE Textured Geomembrane
Sample Identification: 1005-063603
TRI Log #: 73304

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D5994)												
Thickness (mils)	61	60	60	61	61	61	61	60	60	61	60	1
											60	<< min
Density (ASTM D1505)												
Density (g/cm3)	0.947	0.947	0.947								0.947	0.000
Melt Flow Index (ASTM D1238, Method A, 190°C / 2.16 kg)												
Melt Flow Index (g/10 min)	0.15	0.15									0.15	
Tensile Properties (ASTM D6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	153	148	146	155	155						151	4
TD Yield Strength (ppi)	161	155	157	161	160						159	3
MD Break Strength (ppi)	196	215	206	206	222						209	10
TD Break Strength (ppi)	180	204	189	200	172						189	13
MD Yield Elongation (%)	20	18	18	20	20						19	1
TD Yield Elongation (%)	16	17	17	19	19						18	1
MD Break Elongation (%)	542	618	593	563	597						583	30
TD Break Elongation (%)	499	614	554	580	481						546	55

MD Machine Direction TD Transverse Direction

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

GEOMEMBRANE TEST RESULTS
TRI Client: SCS Engineers
Project: Columbia Liner Construction 2022

Material: Solmax 60 mil HDPE Textured Geomembrane
Sample Identification:1005-063613
TRI Log #: 73304

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D5994)												
Thickness (mils)	61	60	61	60	61	60	60	62	63	60	61	1
											60	<< min
Density (ASTM D1505)												
Density (g/cm3)	0.947	0.947	0.947								0.947	0.000
Melt Flow Index (ASTM D1238, Method A, 190°C / 2.16 kg)												
Melt Flow Index (g/10 min)	0.15	0.15									0.15	
Tensile Properties (ASTM D6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	146	150	146	160	154						151	6
TD Yield Strength (ppi)	159	156	161	172	167						163	6
MD Break Strength (ppi)	202	210	188	195	196						198	8
TD Break Strength (ppi)	203	175	171	220	186						191	20
MD Yield Elongation (%)	19	18	17	19	19						18	1
TD Yield Elongation (%)	18	18	17	18	20						18	1
MD Break Elongation (%)	565	577	514	494	500						530	38
TD Break Elongation (%)	595	517	470	597	519						540	55

MD Machine Direction TD Transverse Direction

GEOMEMBRANE TEST RESULTS
TRI Client: SCS Engineers
Project: Columbia Liner Construction 2022

Material: Solmax 60 mil HDPE Textured Geomembrane
Sample Identification: 1005-063625
TRI Log #: 73304

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D5994)												
Thickness (mils)	60	61	60	61	61	61	62	61	61	61	61	1
											60	<< min
Density (ASTM D1505)												
Density (g/cm3)	0.946	0.946	0.946								0.946	0.000
Melt Flow Index (ASTM D1238, Method A, 190°C / 2.16 kg)												
Melt Flow Index (g/10 min)	0.15	0.16									0.15	
Tensile Properties (ASTM D6693, 2 ipm strain rate)												
MD Yield Strength (ppi)	162	156	155	163	159						159	4
TD Yield Strength (ppi)	169	168	166	178	169						170	5
MD Break Strength (ppi)	233	204	221	227	230						223	12
TD Break Strength (ppi)	198	203	184	192	208						197	9
MD Yield Elongation (%)	20	20	21	20	19						20	1
TD Yield Elongation (%)	17	18	17	17	19						18	1
MD Break Elongation (%)	594	536	581	559	584						571	23
TD Break Elongation (%)	558	594	525	511	589						555	37

MD Machine Direction TD Transverse Direction

July 29, 2022

Mail To:	**Bill To:**
Debra Nelson	**<= Same**

SCS Engineers
2830 Dairy Drive
Madison, WI 53718

email: dnelson@scsengineers.com

Dear Ms. Nelson:

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:	**Columbia Liner Construction 2022**
TRI Job Reference Number:	73689
Material(s) Tested:	Twenty Five, Solmax 60 mil Textured HDPE Geomembrane(s)
Test(s) Requested:	Thickness (ASTM D5994)

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

Sincerely,

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division

GEOMEMBRANE TEST RESULTS
TRI Client: SCS Engineers
Project: Columbia Liner Construction 2022

Material: Solmax 60 mil Textured HDPE Geomembrane
Test Parameter: Thickness (ASTM D5994)
TRI Log #: 73689

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.
Sample Identification: 1005-063594												
Thickness (mils)	61	61	61	61	62	62	62	60	62	60	61	1
											60	<< min
Sample Identification: 1005-063595												
Thickness (mils)	60	62	61	62	60	61	60	61	63	62	61	1
											60	<< min
Sample Identification: 1005-063596												
Thickness (mils)	61	62	61	60	61	61	61	62	62	61	61	1
											60	<< min
Sample Identification: 1005-063597												
Thickness (mils)	61	60	61	60	62	61	62	61	62	61	61	1
											60	<< min
Sample Identification: 1005-063598												
Thickness (mils)	62	60	61	61	60	62	61	60	61	60	61	1
											60	<< min
Sample Identification: 1005-063599												
Thickness (mils)	60	62	60	61	60	61	61	61	60	61	61	1
											60	<< min
Sample Identification: 1005-063600												
Thickness (mils)	61	61	61	60	61	61	61	62	61	62	61	1
											60	<< min
Sample Identification: 1005-063604												
Thickness (mils)	61	62	62	60	61	63	61	61	62	60	61	1
											60	<< min
Sample Identification: 1005-063605												
Thickness (mils)	61	60	63	62	61	62	61	61	61	61	61	1
											60	<< min
Sample Identification: 1005-063606												
Thickness (mils)	61	61	61	60	61	61	61	62	61	61	61	0
											60	<< min

GEOMEMBRANE TEST RESULTS
TRI Client: SCS Engineers
Project: Columbia Liner Construction 2022

Material: Solmax 60 mil Textured HDPE Geomembrane
Test Parameter: Thickness (ASTM D5994)
TRI Log #: 73689

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Sample Identification: 1005-063607												
Thickness (mils)	61	62	61	60	61	61	61	60	60	62	61	1
											60	<< min
Sample Identification: 1005-063608												
Thickness (mils)	60	61	60	61	62	61	61	60	60	61	61	1
											60	<< min
Sample Identification: 1005-063609												
Thickness (mils)	61	61	61	62	60	60	61	62	61	60	61	1
											60	<< min
Sample Identification: 1005-063610												
Thickness (mils)	60	61	62	62	60	62	60	62	61	61	61	1
											60	<< min
Sample Identification: 1005-063614												
Thickness (mils)	61	61	61	62	63	63	61	60	60	61	61	1
											60	<< min
Sample Identification: 1005-063615												
Thickness (mils)	60	62	62	62	60	61	61	61	61	61	61	1
											60	<< min
Sample Identification: 1005-063616												
Thickness (mils)	62	60	60	61	60	62	60	60	61	61	61	1
											60	<< min
Sample Identification: 1005-063617												
Thickness (mils)	61	61	61	62	61	62	61	61	61	61	61	0
											61	<< min
Sample Identification: 1005-063618												
Thickness (mils)	62	61	60	61	60	62	61	63	61	61	61	1
											60	<< min
Sample Identification: 1005-063619												
Thickness (mils)	63	62	60	60	61	61	60	62	62	60	61	1
											60	<< min

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

GEOMEMBRANE TEST RESULTS
TRI Client: SCS Engineers
Project: Columbia Liner Construction 2022

Material: Solmax 60 mil Textured HDPE Geomembrane
Test Parameter: Thickness (ASTM D5994)
TRI Log #: 73689

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Sample Identification: 1005-063620												
Thickness (mils)	61	62	61	63	62	61	62	60	61	61	61	1
											60	<< min
Sample Identification: 1005-063626												
Thickness (mils)	60	61	62	60	62	60	60	61	62	62	61	1
											60	<< min
Sample Identification: 1005-063627												
Thickness (mils)	62	60	61	60	62	62	62	61	60	61	61	1
											60	<< min
Sample Identification: 1005-063628												
Thickness (mils)	61	61	63	60	61	61	62	61	61	60	61	1
											60	<< min
Sample Identification: 1005-063629												
Thickness (mils)	61	60	60	62	60	63	62	62	62	61	61	1
											60	<< min

August 2, 2022

Mail To:	**Bill To:**
Debra Nelson **SCS Engineers** 2830 Dairy Drive Madison WI 53718	**<= Same**

email: dnelson@scsengineers.com

Dear Mrs. Nelson:

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:	**Columbia Liner Construction 2022**
TRI Job Reference Number:	73393
Material(s) Tested:	One Solmax 60 MIL HDPE Textured Geomembrane(s)
Test(s) Requested:	Thickness (ASTM D5994)

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

Sincerely,

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division

GEOMEMBRANE TEST RESULTS
TRI Client: SCS Engineers
Project: Columbia Liner Construction 2022

Material: Solmax 60 MIL HDPE Textured Geomembrane
Sample Identification: 1005-063601
TRI Log #: 73393

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Thickness (ASTM D5994)													
													57 min ave
Thickness (mils)	61	65	61	63	66	62	65	66	63	65	64	2	54 8 of 10
											61	<< min	51 min

Appendix G

Subgrade Acceptance Forms

Construction Services Group

a Babcock Power Inc. company

CERTIFICATE OF ACCEPTANCE OF SUBGRADE SURFACE PREPARATION FOR GEOSYNTHETIC INSTALLATION

2401 Pewaukee Road
Waukesha, WI 53188
(800)444-5523
Fax:(262)542-8306

PROJECT NAME: Alliant Columbia Mod 10/11

LOCATION: Portage, WI

JOB NO.: 722014

PROJECT OWNER: ______

PRIME CONTRACTOR: Ames Construction
(If GSI is not contracted with the Owner)

AREA ACCEPTED:

P-1 to P-28

The undersigned authorized representative of Geo-Synthetics Systems, LLC (GSI) certifies that he or she has visually inspected the subgrade surface of the area described above and has found the surface to be acceptable for installation of the geosynthetic materials.

This certification is based on observations of the subgrade surface conditions only. GSI has made no sub-terrain inspections or tests and makes no representations or warranties as to the conditions that may exist below the surface of the subgrade. Nor does GSI take responsibility that the subgrade is within the project specifications.

I, the undersigned, a duly appointed representative of the Owner and/or Contractor, do hereby acknowledge and accept Geo-Synthetics Systems, LL terms for Certification of Acceptance of Subgrade Surface Preparation for Geosynthetic Installation.

CERTIFICATE APPROVED AND ACCEPTED BY:

[signature] 10/29/22
Owner / CQA Representative Signature — Date

Zana Bajalan (Project Eng.)
Representative Name and Title

[signature] 10/29/22
Contractor Representative Signature — Date

Ryan Sykanski Ames Const.
Representative Name and Title

[signature] 10/29/22
Geo-Synthetics Systems, LLC Representative Signature — Date

Dan Rodriguez, Supervisor
Representative Name and Title

Construction Services Group

a Babcock Power Inc. company

CERTIFICATE OF ACCEPTANCE OF SUBGRADE SURFACE PREPARATION FOR GEOSYNTHETIC INSTALLATION

2401 Pewaukee Road
Waukesha, WI 53188
(800)444-5523
Fax(262)542-8306

PROJECT NAME: Alliant Columbia Mod 10|11

LOCATION: Pardeeville, WI JOB NO.: 72204

PROJECT OWNER: ______ PRIME CONTRACTOR: Ames Construction
(If GSI is not contracted with the Owner)

AREA ACCEPTED:

P-29 to P-37

The undersigned authorized representative of Geo-Synthetics Systems, LLC (GSI) certifies that he or she has visually inspected the subgrade surface of the area described above and has found the surface to be acceptable for installation of the geosynthetic materials.

This certification is based on observations of the subgrade surface conditions only. GSI has made no sub-terrain inspections or tests and makes no representations or warranties as to the conditions that may exist below the surface of the subgrade. Nor does GSI take responsibility that the subgrade is within the project specifications.

I, the undersigned, a duly appointed representative of the Owner and/or Contractor, do hereby acknowledge and accept Geo-Synthetics Systems, LL terms for Certification of Acceptance of Subgrade Surface Preparation for Geosynthetic Installation.

CERTIFICATE APPROVED AND ACCEPTED BY:

[signature] 10/30/22
Owner / CQA Representative Signature Date

Zana Bajalan (Project Engineer)
Representative Name and Title

[signature] 10/30/22
Contractor Representative Signature Date

Ryan Sfraw Ames
Representative Name and Title

[signature] 10/30/22
Geo-Synthetics Systems, LLC Representative Signature Date

Dan Rodriguez, Supervisor
Representative Name and Title

Construction Services Group

a Babcock Power Inc. company

CERTIFICATE OF ACCEPTANCE OF SUBGRADE SURFACE PREPARATION FOR GEOSYNTHETIC INSTALLATION

2401 Pewaukee Road
Waukesha, WI 53188
(800)444-5523
Fax:(262)542-8306

PROJECT NAME: Alliant Columbia Mod 10/11

LOCATION: Pardeeville, WI **JOB NO.:** 722011

PROJECT OWNER: ______ **PRIME CONTRACTOR:** Ames Construction
(If GSI is not contracted with the Owner)

AREA ACCEPTED:

P37 - P50

The undersigned authorized representative of Geo-Synthetics Systems, LLC (GSI) certifies that he or she has visually inspected the subgrade surface of the area described above and has found the surface to be acceptable for installation of the geosynthetic materials.

This certification is based on observations of the subgrade surface conditions only. GSI has made no sub-terrain inspections or tests and makes no representations or warranties as to the conditions that may exist below the surface of the subgrade. Nor does GSI take responsibility that the subgrade is within the project specifications.

I, the undersigned, a duly appointed representative of the Owner and/or Contractor, do hereby acknowledge and accept Geo-Synthetics Systems, LL terms for Certification of Acceptance of Subgrade Surface Preparation for Geosynthetic Installation.

CERTIFICATE APPROVED AND ACCEPTED BY:

[signature] 11/1/22
Owner / CQA Representative Signature Date

Lana Bajalan (SCS Project Engineer)
Representative Name and Title

[signature] 11/1/22
Contractor Representative Signature Date

[signature]
Representative Name and Title

[signature] 11/1/22
Geo-Synthetics Systems, LLC Representative Signature Date

Dan Rodriguez, Supervisor
Representative Name and Title

Construction Services Group

a Babcock Power Inc. company

CERTIFICATE OF ACCEPTANCE OF SUBGRADE SURFACE PREPARATION FOR GEOSYNTHETIC INSTALLATION

2401 Pewaukee Road
Waukesha, WI 53188
(800)444-5523
Fax:(262)542-8306

PROJECT NAME: Alliant Columbia Mod 10/11

LOCATION: Pardeeville, WI JOB NO.: 72204

PROJECT OWNER: ______ PRIME CONTRACTOR: ______
(If GSI is not contracted with the Owner)

AREA ACCEPTED:

P51-68

The undersigned authorized representative of Geo-Synthetics Systems, LLC (GSI) certifies that he or she has visually inspected the subgrade surface of the area described above and has found the surface to be acceptable for installation of the geosynthetic materials.

This certification is based on observations of the subgrade surface conditions only. GSI has made no sub-terrain inspections or tests and makes no representations or warranties as to the conditions that may exist below the surface of the subgrade. Nor does GSI take responsibility that the subgrade is within the project specifications.

I, the undersigned, a duly appointed representative of the Owner and/or Contractor, do hereby acknowledge and accept Geo-Synthetics Systems, LL terms for Certification of Acceptance of Subgrade Surface Preparation for Geosynthetic Installation.

CERTIFICATE APPROVED AND ACCEPTED BY:

[signature] 11/2/22
Owner / CQA Representative Signature Date

Zana Bajalan (Project Engineer)
Representative Name and Title

[signature] 11/2/22
Contractor Representative Signature Date

Ryan Sprand ; Ams
Representative Name and Title

[signature] 11/2/22
Geo-Synthetics Systems, LLC Representative Signature Date

Dan Rodriguez, Supervisor
Representative Name and Title

Construction Services Group

a Babcock Power Inc. company

CERTIFICATE OF ACCEPTANCE OF SUBGRADE SURFACE PREPARATION FOR GEOSYNTHETIC INSTALLATION

2401 Pewaukee Road
Waukesha, WI 53188
(800)444-5523
Fax:(262)542-8306

PROJECT NAME: Alliant Columbia Mod 10/11

LOCATION: Pardeeville, WI   JOB NO.: 722011

PROJECT OWNER: ____   PRIME CONTRACTOR: Ames Construction
(If GSI is not contracted with the Owner)

AREA ACCEPTED:

P69- P81

The undersigned authorized representative of Geo-Synthetics Systems, LLC (GSI) certifies that he or she has visually inspected the subgrade surface of the area described above and has found the surface to be acceptable for installation of the geosynthetic materials.

This certification is based on observations of the subgrade surface conditions only. GSI has made no sub-terrain inspections or tests and makes no representations or warranties as to the conditions that may exist below the surface of the subgrade. Nor does GSI take responsibility that the subgrade is within the project specifications.

I, the undersigned, a duly appointed representative of the Owner and/or Contractor, do hereby acknowledge and accept Geo-Synthetics Systems, LL terms for Certification of Acceptance of Subgrade Surface Preparation for Geosynthetic Installation.

CERTIFICATE APPROVED AND ACCEPTED BY:

[signature] 11/3/22
Owner / CQA Representative Signature   Date

Lana Bajglam (Project Engineer)
Representative Name and Title

[signature] 11/3/22
Contractor Representative Signature   Date

Ryan Sorenson
Representative Name and Title

[signature] 11/3/22
Geo-Synthetics Systems, LLC Representative Signature   Date

Dan Rodriguez Supervisor
Representative Name and Title

Appendix H

Geosynthetics Installation Daily Field Reports

SCS ENGINEERS

DAILY FIELD ACTIVITIES REPORT

Owner Name:	*Wisconsin Power and Light Company*	**Report No.**	*142*
Project Name:	*Ash Ponds Closure and Modules 10 and 11 Liner Construction*	**Date:**	October 28, 2022
Design Engineer:	*SCS Engineers*	**Work Start Time**	*7:00*
SCS Project Number:	*25222157.00*	**Work Stop Time:**	*18:30*
Installation Contractor:	*Ames Construction, Inc.*	**SCS Arrival Time:**	*7:00*
Project Location:	*W8375 Murray Road, Pardeeville, WI 53954*	**SCS Departure Time:**	*17:00*

Today's Task(s): *Final grading clay*

Weather Conditions:
a.m. Sunny, 34°F, Wind: 0 mph/SE
p.m. Sunny, 56°F, 4 mph/NNE

Contractors and Personnel On Site:

Ryan Safranski - Superintendent (Ames)	*Zana Bajalan - Project Engineer (SCS Engineers)*	*GSI Crew*
Clinton Berning - Project Engineer (Ames)	*Kenzie Ostien - Field Engineer (SCS Engineers)*	*Griffin Crew*
Conor O'Dea - Project Safety Manager (Ames)	*Jordan Main - Field Engineer (SCS Engineers)*	*James-Peterson Crew*
1 Laborer (Ames)	*Adam Watson - Geologist (SCS Engineers)*	
1 Mechanics (Ames)	*Ethan Schaefer - Field Technician (SCS Engineers)*	
13 Operators (Ames)	*Brian Clepper - Lead Env. Specialist (Alliant)*	

Equipment On Site

Wheel Loader - DEERE - 744L	*Excavators - CAT-336F and CAT-336E*	*Tractor - Challenger - MT685D*
(5) Bulldozers - CAT - (2) D6T & (3) D6	*Drilling Rig - (MAiT-HR 40)*	*RTV - Kubota - X1140*
Bulldozer - CAT - D8T	*Scraper - CAT - 627G*	*Smooth Drum Roller - Hammtronic - H12i*
Skid Steer - CAT - 299D3(XE)	*Fuel Truck - Mack - 5991002*	*Sheep foot soil compactor - CAT - 815*
Water Truck - Freightliner - FL70	*(4) Off road haul trucks - CAT - 740(GC)*	*Skid Steer-Takeuchi-TL12V2*
Drilling Rig-SoilMec -R312/200	*Road Reclaimer (CAT-RM500B)*	*Cement Pig*
Motor Grader - CAT-160M2 AWD	*(2) Off road haul truck - CAT - 745*	*Excavator - DEERE 470G*
Excavator - KOMATSU - PC800LC	*Mini excavator - KOBELCO-SK85CS*	

Work Performed/Boundaries (Landfill Area and Modules 10 and 11 Liner Construction)

- Motor grader (CAT-160M2) graded the base grade in floor of Modules 10 and 11. SCS surveyed top of clay documentation points. Smooth drum roller (Hamm - H12i) smoothed the surface of the south slope and the floor of Module 10.
- Mini excavator (KOBELCO-SK85CS) excavated the anchor trench south of Module 10.
- GSI repaired the tears in east anchor trench of Module 4/5 with one large patch. SCS documented the repair.
- GSI was off-site at 14:00. The clay was too wet to deploy geosynthetics for Modules 10 and 11 today.
- James-Peterson screened COVIA sand for drainage material south of clay stockpile.
- Tractor (MT685D) with box blade attachment smoothed haul roads.

Pond Closure and Existing Landfill Work Activities are not included in this report

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

N/A

Field Tests Completed/Observed and Samples Collected

SCS geology/science team on site for groundwater sampling.

Lab Test Results

N/A

Material(s) Delivered to Site

0 truckloads of FGD from Edgewater Generating Station. COVIA sand.

Jordan Main/Kenzie Ostien	Phillip Gearing
Resident Project Representative	**Project Manager**

SCS ENGINEERS

DAILY FIELD ACTIVITIES REPORT

Owner Name:	*Wisconsin Power and Light Company*	**Report No.**	*143*
Project Name:	*Ash Ponds Closure and Modules 10 and 11 Liner Construction*	**Date:**	October 29, 2022
Design Engineer:	*SCS Engineers*	**Work Start Time**	*6:00*
SCS Project Number:	*25222157.00*	**Work Stop Time:**	*19:30*
Installation Contractor:	*Ames Construction, Inc.*	**SCS Arrival Time:**	*6:45*
Project Location:	*W8375 Murray Road, Pardeeville, WI 53954*	**SCS Departure Time:**	*19:30*
Today's Task(s):	*1st day of geosynthetics, grading clay*		

Weather Conditions:	***a.m.***	Sunny, 31°F, Wind: 0 mph/N
	p.m.	Sunny, 56°F, 6 mph/NE

Contractors and Personnel On Site:

Ryan Safranski - Superintendent (Ames)	*Jordan Main - Field Engineer (SCS Engineers)*	
1 Laborer (Ames)	*GSI Crew*	
1 Mechanics (Ames)	*Griffin Crew*	
13 Operators (Ames)		
Zana Bajalan - Project Engineer (SCS Engineers)		
Phil Gearing - Project Manager (SCS Engineers)		

Equipment On Site

Wheel Loader - DEERE - 744L	*Excavators - CAT-336F and CAT-336E*	*Tractor - Challenger - MT685D*
(5) Bulldozers - CAT - (2) D6T & (3) D6	*Drilling Rig - (MAiT-HR 40)*	*RTV - Kubota - X1140*
Bulldozer - CAT - D8T	*Scraper - CAT - 627G*	*Smooth Drum Roller - Hammtronic - H12i*
Skid Steer - CAT - 299D3(XE)	*Fuel Truck - Mack - 5991002*	*Sheep foot soil compactor - CAT - 815*
Water Truck - Freightliner - FL70	*(4) Off road haul trucks - CAT - 740(GC)*	*Skid Steer-Takeuchi-TL12V2*
Drilling Rig-SoilMec -R312/200	*Road Reclaimer (CAT-RM500B)*	*Cement Pig*
Motor Grader - CAT-160M2 AWD	*(2) Off road haul truck - CAT - 745*	*Excavator - DEERE 470G*
Excavator - KOMATSU - PC800LC	*Mini excavator - KOBELCO-SK85CS*	

Work Performed/Boundaries (Landfill Area and Modules 10 and 11 Liner Construction)

- Motor grader (CAT-160M2) graded the base grade in floor and east slope of Modules 10 and 11. SCS surveyed top of clay documentation points. Smooth drum roller (Hamm-H12i) smoothed the surface after grading.
- Mini excavator (KOBELCO-SK85CS) assisted by a laborer and skid steer (CAT - 299D3(XE)) graded the sump of Module 10 and continued excavating the anchor trench.
- Tractor (MT685D) with box blade attachment smoothed haul roads.
- GSI started mobilizing GCL rolls to Modules 10 and 11 using a skit steer (Takeuhci-TL12V2).
- (10:00) GSI started deploying GCL material at the south side of Module 10 moving west. GCL panels were overlapped 6 inches along the length of the panels.
- Geomembrane was deployed above the GCL deployed. 28 geomembrane panels were installed (P-1 and P-28). The seams were fusion welded. Trial welds (1 and 2) were taken and tested before the welders could start seaming the geomembrane. The trial welds met the CQA requirements.
- No geomembrane destructs were collected today.

Pond Closure and Existing Landfill Work Activities are not included in this report

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer (Tensiometer calibration documents provided).

Field Tests Completed/Observed and Samples Collected

N/A

Lab Test Results

N/A

Material(s) Delivered to Site

N/A

Jordan Main/Zana Bajalan	Phillip Gearing
Resident Project Representative	**Project Manager**

SCS ENGINEERS

DAILY FIELD ACTIVITIES REPORT

Owner Name:	*Wisconsin Power and Light Company*	**Report No.**	*144*
Project Name:	*Ash Ponds Closure and Modules 10 and 11 Liner Construction*	**Date:**	October 30, 2022
Design Engineer:	*SCS Engineers*	**Work Start Time**	*7:00*
SCS Project Number:	*25222157.00*	**Work Stop Time:**	*19:00*
Installation Contractor:	*Ames Construction, Inc.*	**SCS Arrival Time:**	*6:45*
Project Location:	*W8375 Murray Road, Pardeeville, WI 53954*	**SCS Departure Time:**	*18:30*

Today's Task(s): *2nd day of geosynthetics*

Weather Conditions:
a.m. Partly Cloudy, 39°F, Wind: 3 mph/N
p.m. Partly Cloudy, 64°F, 6 mph/SE

Contractors and Personnel On Site:

Ryan Safranski - Superintendent (Ames)
1 Operator (Ames)
Zana Bajalan - Project Engineer (SCS Engineers)
Phil Gearing - Project Manager (SCS Engineers)
GSI Crew

Equipment On Site

Wheel Loader - DEERE - 744L	*Excavators - CAT-336F and CAT-336E*	*Tractor - Challenger - MT685D*
(5) Bulldozers - CAT - (2) D6T & (3) D6	*Drilling Rig - (MAiT-HR 40)*	*RTV - Kubota - X1140*
Bulldozer - CAT - D8T	*Scraper - CAT - 627G*	*Smooth Drum Roller - Hammtronic - H12i*
Skid Steer - CAT - 299D3(XE)	*Fuel Truck - Mack - 5991002*	*Sheep foot soil compactor - CAT - 815*
Water Truck - Freightliner - FL70	*(4) Off road haul trucks - CAT - 740(GC)*	*Skid Steer-Takeuchi-TL12V2*
Drilling Rig-SoilMec -R312/200	*Road Reclaimer (CAT-RM500B)*	*Cement Pig*
Motor Grader - CAT-160M2 AWD	*(2) Off road haul truck - CAT - 745*	*Excavator - DEERE 470G*
Excavator - KOMATSU - PC800LC	*Mini excavator - KOBELCO-SK85CS*	

Work Performed/Boundaries (Landfill Area and Modules 10 and 11 Liner Construction)

- GSI crew continued the geosynthetics installation today. The crew started placing GCL and geomembrane panels in Module 10, moving west.
- Approximately, 30% of the area in Modules 10 and 11 is covered with geosynthetics. Ames continued smooth drum rolling the clay subgrade before the placement of the geosynthetics material. GCL panels were overlapped 6 inches along the length of the panels and 20 inches at the end of the seams. Geomembrane was deployed above the GCL panels. 4 geomembrane panels were installed today (P-29 and P-32). Seams were fusion welded. Trial welds (3 through 7) were taken and tested before the welders could start seaming the geomembrane. The trial weld met the CQA requirements.
- Three geomembrane destructs (DS-1 through DS-4) were marked by SCS to be collected on a later date by GSI.
- Ames continued exposing the plywood (using excavator (KOBELCO-SK85CS) in preparation for the geosynthetics tie-in west of Modules 10 and 11.
- GSI performed air tests for the fusion geomembrane seams in Module 10. The majority of the seams passed the air test. Seams that did not pass the air test were marked to be patched with geomembrane repairs.
- Ames pumped water from the E-W leachate collection trench in Module 10.

Pond Closure and Existing Landfill Work Activities are not included in this report

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer (Tensiometer calibration documents provided).

Field Tests Completed/Observed and Samples Collected

N/A

Lab Test Results

N/A

Material(s) Delivered to Site

N/A

Zana Bajalan	Phillip Gearing
Resident Project Representative	**Project Manager**

SCS ENGINEERS

DAILY FIELD ACTIVITIES REPORT

Owner Name:	*Wisconsin Power and Light Company*	**Report No.**	*145*
Project Name:	*Ash Ponds Closure and Modules 10 and 11 Liner Construction*	**Date:**	October 31, 2022
Design Engineer:	*SCS Engineers*	**Work Start Time**	*7:00*
SCS Project Number:	*25222157.00*	**Work Stop Time:**	*19:00*
Installation Contractor:	*Ames Construction, Inc.*	**SCS Arrival Time:**	*6:45*
Project Location:	*W8375 Murray Road, Pardeeville, WI 53954*	**SCS Departure Time:**	*18:30*

Today's Task(s): *3rd day of geosynthetics*

Weather Conditions:
a.m. Sunny, 39°F, Wind: 3 mph/N
p.m. Sunny, 63°F, Wind 1 mph/NW

Contractors and Personnel On Site:

Clinton Berning - Project Engineer (Ames)	*13 Operators (Ames)*	*Griffin Crew*
Conor O'Dea - Project Safety Manager (Ames)	*1 Mechanics (Ames)*	*James-Peterson Crew*
Ryan Safranski - Superintendent (Ames)	*Zana Bajalan - Project Engineer (SCS Engineers)*	
Brian Clepper - Lead Env. Specialist (Alliant)	*Niko Villanueva - Project Engineer (SCS Engineers)*	
1 Laborer (Ames)	*Jordan Main - Field Engineer (SCS Engineers)*	
1 Mechanics (Ames)	*GSI Crew*	

Equipment On Site

Wheel Loader - DEERE - 744L	*Excavators - CAT-336F and CAT-336E*	*Tractor - Challenger - MT685D*
(5) Bulldozers - CAT - (2) D6T & (3) D6	*Drilling Rig - (MAiT-HR 40)*	*RTV - Kubota - X1140*
Bulldozer - CAT - D8T	*Scraper - CAT - 627G*	*Smooth Drum Roller - Hammtronic - H12i*
Skid Steer - CAT - 299D3(XE)	*Fuel Truck - Mack - 5991002*	*Sheep foot soil compactor - CAT - 815*
Water Truck - Freightliner - FL70	*(4) Off road haul trucks - CAT - 740(GC)*	*Skid Steer-Takeuchi-TL12V2*
Drilling Rig-SoilMec -R312/200	*Road Reclaimer (CAT-RM500B)*	*Cement Pig*
Motor Grader - CAT-160M2 AWD	*(2) Off road haul truck - CAT - 745*	*Excavator - DEERE 470G*
Excavator - KOMATSU - PC800LC	*Mini excavator - KOBELCO-SK85CS*	

Work Performed/Boundaries (Landfill Area and Modules 10 and 11 Liner Construction)

- GSI crew continued the geosynthetics installation today. The crew placed GCL and geomembrane panels in Module 10, moving west.
- Approximately, 50% of the area in Modules 10 and 11 is covered with geosynthetics. Ames continued smooth drum rolling the clay subgrade before the placement of the geosynthetics material. GCL panels were overlapped 6 inches along the length of the panels and 20 inches at the end of the seams. Geomembrane was deployed above the GCL panels. 5 geomembrane panels were installed today (P-33 and P-37). Seams were fusion welded. Trial welds (8 through 10) were taken and tested before the welders could start seaming the geomembrane. The trial weld met the CQA requirements.
- Three geomembrane destructs (DS-1 through DS-3) were marked by SCS to be collected on a later date by GSI.
- Ames continued exposing the plywood (using excavator (KOBELCO-SK85CS) in preparation for the geosynthetics tie-in west of Modules 10 and 11.
- GSI performed air tests for the fusion geomembrane seams in Module 10. The majority of the seams passed the air test. Seams that did not pass the air test were marked to be patched with geomembrane repairs.
- Ames graded Module 11 sump with a mini excavator (KOBELCO-SK85CS) assisted by 1 laborer and skid steer (CAT-299D3(XE)).
- Motor grader (CAT-160M2 AWD) graded north berm of Module 11, adding excess clay taken from the sump where needed with skid steer (CAT-299D3(XE)). Smooth drum roller (H12i) was used to smooth clay surface upon final grading.
- SCS completed surveying top-of-clay documentation points in Module 11 leachate trench and sump.
- Ames continued to excavate eastern Mod 10/11 anchor trench.
- James-Peterson screened COVIA sand for drainage material south of the clay stockpile.

Pond Closure and Existing Landfill Work Activities are not included in this report

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer (Tensiometer calibration documents provided).

Field Tests Completed/Observed and Samples Collected

N/A

Lab Test Results

N/A

Material(s) Delivered to Site

Additional GSL rolls. Truckloads of COVIA sand for filtering.

Jordan Main/Zana Bajalan	Phillip Gearing
Resident Project Representative	**Project Manager**

SCS ENGINEERS

DAILY FIELD ACTIVITIES REPORT

Owner Name:	*Wisconsin Power and Light Company*	**Report No.**	*146*
Project Name:	*Ash Ponds Closure and Modules 10 and 11 Liner Construction*	**Date:**	*November 1, 2022*
Design Engineer:	*SCS Engineers*	**Work Start Time**	*7:00*
SCS Project Number:	*25222157.00*	**Work Stop Time:**	*19:00*
Installation Contractor:	*Ames Construction, Inc.*	**SCS Arrival Time:**	*6:45*
Project Location:	*W8375 Murray Road, Pardeeville, WI 53954*	**SCS Departure Time:**	*19:00*

Today's Task(s): *4th day of geosynthetics*

Weather Conditions:
- ***a.m.*** Sunny, 36°F, Wind: 3 mph/N
- ***p.m.*** Sunny, 69°F, Wind 8 mph/NE

Contractors and Personnel On Site:

Clinton Berning - Project Engineer (Ames)	*1 Laborer (Ames)*	*Phil Gearing - Project Manager (SCS Engineers)*
Conor O'Dea - Project Safety Manager (Ames)	*Brian Clepper - Lead Env. Specialist (Alliant)*	*James-Peterson Crew*
Ryan Safranski - Superintendent (Ames)	*Scott Pedretti - Project Manager (Alliant)*	*GSI Crew*
Brad Folcyzk - Project Manager (Ames)	*Zana Bajalan - Project Engineer (SCS Engineers)*	*Highway Landscapers Crew*
13 Operators (Ames)	*Niko Villanueva - Project Engineer (SCS Engineers)*	
1 Mechanics (Ames)	*Jordan Main - Field Engineer (SCS Engineers)*	

Equipment On Site

Wheel Loader - DEERE - 744L	*Excavators - CAT-336F and CAT-336E*	*Tractor - Challenger - MT685D*
(5) Bulldozers - CAT - (2) D6T & (3) D6	*Drilling Rig - (MAiT-HR 40)*	*RTV - Kubota - X1140*
Bulldozer - CAT - D8T	*Scraper - CAT - 627G*	*Smooth Drum Roller - Hammtronic - H12i*
Skid Steer - CAT - 299D3(XE)	*Fuel Truck - Mack - 5991002*	*Sheep foot soil compactor - CAT - 815*
Water Truck - Freightliner - FL70	*(4) Off road haul trucks - CAT - 740(GC)*	*Skid Steer-Takeuchi-TL12V2*
Drilling Rig-SoilMec -R312/200	*Road Reclaimer (CAT-RM500B)*	*Cement Pig*
Motor Grader - CAT-160M2 AWD	*(2) Off road haul truck - CAT - 745*	*Excavator - DEERE 470G*
Excavator - KOMATSU - PC800LC	*Mini excavator - KOBELCO-SK85CS*	

Work Performed/Boundaries (Landfill Area and Modules 10 and 11 Liner Construction)

- GSI crew continued the geosynthetics installation today. The crew started with performing the repairs for the geomembrane panels and seams. 76 repairs were completed today (R1 through R76). Geomembrane repairs were performed by tack welding a piece of geomembrane to the repair area by a leister. The patch was ground using a grinder before being welded with an extrusion weld machine. Trial welds were tested before extrusion welding was performed.
- GSI continued placing GCL and geomembrane panels at the west side half of Module 10. GCL panels were overlapped 6 inches along the length of the panels and 20 inches at the end of the seams. Geomembrane was deployed above the GCL panels. 8 geomembrane panels were installed today (P-38 and P-45). Seams were fusion welded. Trial welds (11 through 19) were taken and tested before the welders could start seaming the geomembrane. The trial weld met the CQA requirements. Approximately, the entire area of Module 10 is covered with geosynthetics.
- Eight geomembrane destructs (DS-1 through DS-8) were collected and tested by GSI in the field. The field test results met the CQA requirements. Portions from the same eight destructs were sent to the lab for conformance testing.
- Ames graded the west end of Module 11 leachate collection trench with a mini excavator (KOBELCO-SK85CS) assisted by 1 laborer and skid steer (CAT-299D3(XE)).
- North berm of Module 11 required 0.5" of clay to achieve 2' grade.
- The motor grader (CAT-160M2) scarified the surface of the clay of Module 11 north berm. Then, an excavator (CAT-336E) loaded one off-road haul truck (CAT-740GC) with clay from the stockpile to be hauled to the north berm.
- Bulldozer (CAT-D6) spread and rough-graded the new clay lift. The pull-behind sheepsfoot roller was used to knead in the added clay. Then, the motor grader (CAT-160M2) performed final grading and a smooth drum roller (H12i) smoothed the surface. SCS surveyed top-of-clay documentation points.
- Ames began backfilling anchor trench on east and south slopes where geomembrane has already been placed.
- Ames used excavator (CAT-336E) and mini excavator (KOBELCO-SK85CS) to relocate a portion of the Modules 3/4 anchor trench to further expose the geosynthetics tie-in.
- James-Peterson screened COVIA sand for drainage material south of the clay stockpile.
- Water truck used to control dust on site.

Pond Closure and Existing Landfill Work Activities are not included in this report

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer (Tensiometer calibration documents provided).

Field Tests Completed/Observed and Samples Collected

N/A

Lab Test Results

N/A

Material(s) Delivered to Site

4 truckloads of FGD from Edgewater Generating Station. Additional GSL rolls. Truckloads of COVIA sand for filtering.

Jordan Main/Zana Bajalan	Phillip Gearing
Resident Project Representative	**Project Manager**

SCS ENGINEERS

DAILY FIELD ACTIVITIES REPORT

Owner Name:	*Wisconsin Power and Light Company*	**Report No.**	*147*
Project Name:	*Ash Ponds Closure and Modules 10 and 11 Liner Construction*	**Date:**	*November 2, 2022*
Design Engineer:	*SCS Engineers*	**Work Start Time**	*7:00*
SCS Project Number:	*25222157.00*	**Work Stop Time:**	*19:00*
Installation Contractor:	*Ames Construction, Inc.*	**SCS Arrival Time:**	*6:45*
Project Location:	*W8375 Murray Road, Pardeeville, WI 53954*	**SCS Departure Time:**	*19:30*

Today's Task(s): *5th day of geosynthetics*

Weather Conditions:

a.m.	Sunny, 46°F, Wind: 6 mph/S
p.m.	Sunny, 71°F, Wind 12 mph/S

Contractors and Personnel On Site:

Clinton Berning - Project Engineer (Ames)	*Brian Clepper - Lead Env. Specialist (Alliant)*	*Highway Landscapers Crew*
Ryan Safranski - Superintendent (Ames)	*Zana Bajalan - Project Engineer (SCS Engineers)*	
Brad Folcyzk - Project Manager (Ames)	*Niko Villanueva - Project Engineer (SCS Engineers)*	
14 Operators (Ames)	*Jordan Main - Field Engineer (SCS Engineers)*	
1 Mechanics (Ames)	*James-Peterson Crew*	
1 Laborer (Ames)	*GSI Crew*	

Equipment On Site

Wheel Loader - DEERE - 744L	*Excavators - CAT-336F and CAT-336E*	*Tractor - Challenger - MT685D*
(5) Bulldozers - CAT - (2) D6T & (3) D6	*Drilling Rig - (MAiT-HR 40)*	*RTV - Kubota - X1140*
Bulldozer - CAT - D8T	*Scraper - CAT - 627G*	*Smooth Drum Roller - Hammtronic - H12i*
Skid Steer - CAT - 299D3(XE)	*Fuel Truck - Mack - 5991002*	*Sheep foot soil compactor - CAT - 815*
Water Truck - Freightliner - FL70	*(4) Off road haul trucks - CAT - 740(GC)*	*Skid Steer-Takeuchi-TL12V2*
Drilling Rig-SoilMec -R312/200	*Road Reclaimer (CAT-RM500B)*	*Cement Pig*
Motor Grader - CAT-160M2 AWD	*(2) Off road haul truck - CAT - 745*	*Excavator - DEERE 470G*
Excavator - KOMATSU - PC800LC	*Mini excavator - KOBELCO-SK85CS*	

Work Performed/Boundaries (Landfill Area and Modules 10 and 11 Liner Construction)

- GSI crew continued the geosynthetics installation today. The crew placed GCL and geomembrane panels for Module 11. GCL panels were overlapped 6 inches along the length of the panels and 20 inches at the end of the seams.
- Approximately, 80% of the area in Modules 10 and 11 is covered with geosynthetics. Ames continued smooth drum rolling the clay subgrade before the placement of the geosynthetics material. The crew continued performing the repairs for the geomembrane panels and seams. Geomembrane repairs were performed by tack welding a piece of geomembrane to the repair area by a leister. The patch was ground using a grinder before being welded with an extrusion weld machine. Trial welds (20 through 32) were taken and tested before the welders could start seaming the geomembrane. The trial weld met the CQA requirements.
- Geomembrane was deployed above the GCL panels. 17 geomembrane panels were placed today. Seams were fusion welded.
- Geomembrane destructs were marked by SCS to be collected by GSI at a later date.

- Ames graded the west end of Module 11 leachate collection trench with a mini excavator (KOBELCO-SK85CS) assisted by 1 laborer and skid steer (CAT-299D3(XE)).
- SCS surveyed documentation points on the north berm of Module 11.
- Ames continued excavating the anchor trench on east and north slopes of Module 11.
- James-Peterson screened COVIA sand for drainage material south of the clay stockpile.
- CAT-336E excavator and dozer (CAT-D6T) worked on grading top of clay stockpile for drainage. Ames mobilized Additional light poles for night work.

Pond Closure and Existing Landfill Work Activities are not included in this report

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer (Tensiometer calibration documents provided).

Field Tests Completed/Observed and Samples Collected

N/A

Lab Test Results

N/A

Material(s) Delivered to Site

4 truckloads of FGD from Edgewater Generating Station.

Jordan Main/Zana Bajalan	Phillip Gearing
Resident Project Representative	**Project Manager**

SCS ENGINEERS

DAILY FIELD ACTIVITIES REPORT

Owner Name:	*Wisconsin Power and Light Company*	**Report No.**	*148*
Project Name:	*Ash Ponds Closure and Modules 10 and 11 Liner Construction*	**Date:**	*November 3, 2022*
Design Engineer:	*SCS Engineers*	**Work Start Time**	*6:30*
SCS Project Number:	*25222157.00*	**Work Stop Time:**	*19:00*
Installation Contractor:	*Ames Construction, Inc.*	**SCS Arrival Time:**	*6:35*
Project Location:	*W8375 Murray Road, Pardeeville, WI 53954*	**SCS Departure Time:**	*19:00*

Today's Task(s): *6th day of geosynthetics*

Weather Conditions:
a.m. Sunny, 53°F, Wind: 8 mph/S
p.m. Partly Cloudy, 70°F, Wind 23 mph/S

Contractors and Personnel On Site:

Clinton Berning - Project Engineer (Ames)	*Zana Bajalan - Project Engineer (SCS Engineers)*	
Ryan Safranski - Superintendent (Ames)	*Niko Villanueva - Project Engineer (SCS Engineers)*	
Brad Folcyzk - Project Manager (Ames)	*Jordan Main - Field Engineer (SCS Engineers)*	
14 Operators (Ames)	*James-Peterson Crew*	
1 Mechanics (Ames)	*GSI Crew*	
1 Laborer (Ames)	*Highway Landscapers Crew*	

Equipment On Site

Wheel Loader - DEERE - 744L	*Excavators - CAT-336F and CAT-336E*	*Tractor - Challenger - MT685D*
(5) Bulldozers - CAT - (2) D6T & (3) D6	*Drilling Rig - (MAiT-HR 40)*	*RTV - Kubota - X1140*
Bulldozer - CAT - D8T	*Scraper - CAT - 627G*	*Smooth Drum Roller - Hammtronic - H12i*
Skid Steer - CAT - 299D3(XE)	*Fuel Truck - Mack - 5991002*	*Sheep foot soil compactor - CAT - 815*
Water Truck - Freightliner - FL70	*(4) Off road haul trucks - CAT - 740(GC)*	*Skid Steer-Takeuchi-TL12V2*
Drilling Rig-SoilMec -R312/200	*Road Reclaimer (CAT-RM500B)*	*Cement Pig*
Motor Grader - CAT-160M2 AWD	*(2) Off road haul truck - CAT - 745*	*Excavator - DEERE 470G*
Excavator - KOMATSU - PC800LC	*Mini excavator - KOBELCO-SK85CS*	

Work Performed/Boundaries (Landfill Area and Modules 10 and 11 Liner Construction)

- GSI crew continued the geosynthetics installation today. The crew placed GCL and geomembrane panels for Module 11. GCL panels were overlapped 6 inches along the length of the panels and 20 inches at the end of the seams.
- The entire area of Modules 10 and 11 is covered with geosynthetics. Ames continued smooth drum rolling the clay subgrade before the placement of the geosynthetics material. The crew continued performing the repairs for the geomembrane panels and seams. Geomembrane repairs were performed by tack welding a piece of geomembrane to the repair area by a leister. The patch was ground using a grinder before being welded with an extrusion weld machine. Trial welds were tested (for both fusion and extrusion welds) before welding was performed.

- Ames graded the west end of Module 11 north berm with a mini excavator (KOBELCO-SK85CS) assisted by 1 laborer and skid steer (CAT-299D3(XE)). SCS completed documenting top of clay documentation points.
- Ames completed excavating the anchor trench and began backfilling the completed edges (with geosynthetics) of Modules 10 and 11.
- James-Peterson screened COVIA sand for drainage material south of the clay stockpile.

Pond Closure and Existing Landfill Work Activities are not included in this report

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer (Tensiometer calibration documents provided).

Field Tests Completed/Observed and Samples Collected

N/A

Lab Test Results

N/A

Material(s) Delivered to Site

N/A

Jordan Main/Zana Bajalan	Phillip Gearing
Resident Project Representative	**Project Manager**

SCS ENGINEERS

DAILY FIELD ACTIVITIES REPORT

Owner Name:	*Wisconsin Power and Light Company*	**Report No.**	*149*
Project Name:	*Ash Ponds Closure and Modules 10 and 11 Liner Construction*	**Date:**	*November 4, 2022*
Design Engineer:	*SCS Engineers*	**Work Start Time**	*7:00*
SCS Project Number:	*25222157.00*	**Work Stop Time:**	*12:00*
Installation Contractor:	*Ames Construction, Inc.*	**SCS Arrival Time:**	*7:00*
Project Location:	*W8375 Murray Road, Pardeeville, WI 53954*	**SCS Departure Time:**	*12:00*

Today's Task(s): *Excavating perimeter road*

Weather Conditions:

a.m.	Cloudy, 62°F, Wind: 10 mph/S
p.m.	Raining, 59°F, Wind 0 mph/N

Contractors and Personnel On Site:

Clinton Berning - Project Engineer (Ames)	*Zana Bajalan - Project Engineer (SCS Engineers)*	
Ryan Safranski - Superintendent (Ames)	*Niko Villanueva - Project Engineer (SCS Engineers)*	
Conor O'Dea - Project Safety Manager (Ames)	*Jordan Main - Field Engineer (SCS Engineers)*	
14 Operators (Ames)	*James-Peterson Crew*	
1 Mechanics (Ames)		
Griffin Crew		

Equipment On Site

Wheel Loader - DEERE - 744L	*Excavators - CAT-336F and CAT-336E*	*Tractor - Challenger - MT685D*
(5) Bulldozers - CAT - (2) D6T & (3) D6	*Drilling Rig - (MAiT-HR 40)*	*RTV - Kubota - X1140*
Bulldozer - CAT - D8T	*Scraper - CAT - 627G*	*Smooth Drum Roller - Hammtronic - H12i*
Skid Steer - CAT - 299D3(XE)	*Fuel Truck - Mack - 5991002*	*Sheep foot soil compactor - CAT - 815*
Water Truck - Freightliner - FL70	*(4) Off road haul trucks - CAT - 740(GC)*	*Skid Steer-Takeuchi-TL12V2*
Drilling Rig-SoilMec -R312/200	*Road Reclaimer (CAT-RM500B)*	*Cement Pig*
Motor Grader - CAT-160M2 AWD	*(2) Off road haul truck - CAT - 745*	*Excavator - DEERE 470G*
Excavator - KOMATSU - PC800LC	*Mini excavator - KOBELCO-SK85CS*	

Work Performed/Boundaries (Landfill Area and Modules 10 and 11 Liner Construction)

- GSI crew was not on site today due to impending rain through Sunday.
- 100% of the area in Modules 10 and 11 is covered with geosynthetics.
- SCS continued to mark, document, and survey the geosynthetics details onsite.

- Ames began excavating and grading the perimeter road around Module 10 and 11 at the east side with a mini excavator (KOBELCO-SK85CS) assisted by 1 laborer in addition to a bulldozer (CAT-D6T). Excavated clay (mixed with sand and native material) was hauled to overburden stockpile in the secondary ash pond by one off road haul truck (CAT-740GC).
- James-Peterson screened COVIA sand for drainage material south of the clay stockpile.
- Excavator (KOMATSU-PC800LC) worked removing additional intermediate cover on Module 4 in order to continue reclaiming FGD/CCR. The material was loaded into three off-road haul trucks (2 CAT-740GC and 1 CAT-745) and placed in Modules 5 and 6. Two dozers (CAT-D6) assisted with grading in Modules 4, 5, and 6.

Pond Closure and Existing Landfill Work Activities are not included in this report

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

N/A

Field Tests Completed/Observed and Samples Collected

N/A

Lab Test Results

N/A

Material(s) Delivered to Site

N/A

Jordan Main/Zana Bajalan	Phillip Gearing
Resident Project Representative	**Project Manager**

SCS ENGINEERS

DAILY FIELD ACTIVITIES REPORT

Owner Name:	*Wisconsin Power and Light Company*	**Report No.**	*150*
Project Name:	*Ash Ponds Closure and Modules 10 and 11 Liner Construction*	**Date:**	*November 7, 2022*
Design Engineer:	*SCS Engineers*	**Work Start Time**	*7:00*
SCS Project Number:	*25222157.00*	**Work Stop Time:**	*19:00*
Installation Contractor:	*Ames Construction, Inc.*	**SCS Arrival Time:**	*6:45*
Project Location:	*W8375 Murray Road, Pardeeville, WI 53954*	**SCS Departure Time:**	*17:30*

Today's Task(s): *7th day of geosynthetic liner, Excavating perimeter road*

Weather Conditions:
a.m. Sunny, 36°F, Wind: 6 mph/W
p.m. Sunny, 44°F, Wind 5 mph/S

Contractors and Personnel On Site:

Clinton Berning - Project Engineer (Ames)	*Zana Bajalan - Project Engineer (SCS Engineers)*	*Griffin Crew*
Ryan Safranski - Superintendent (Ames)	*Madison Thompson - Project Engineer (SCS Engineers)*	
Conor O'Dea - Project Safety Manager (Ames)	*Jordan Main - Field Engineer (SCS Engineers)*	
15 Operators (Ames)	*Phil Gearing - Project Manager (SCS Engineers)*	
2 Mechanics (Ames)	*Colin Gloede - Field Engineer (SCS Engineers)*	
GSI Crew	*James-Peterson Crew*	

Equipment On Site

Wheel Loader - DEERE - 744L	*Excavators - CAT-336F and CAT-336E*	*Tractor - Challenger - MT685D*
(5) Bulldozers - CAT - (2) D6T & (3) D6	*Drilling Rig - (MAiT-HR 40)*	*RTV - Kubota - X1140*
Bulldozer - CAT - D8T	*Scraper - CAT - 627G*	*Smooth Drum Roller - Hammtronic - H12i*
Skid Steer - CAT - 299D3(XE)	*Fuel Truck - Mack - 5991002*	*Sheep foot soil compactor - CAT - 815*
Water Truck - Freightliner - FL70	*(4) Off road haul trucks - CAT - 740(GC)*	*Skid Steer-Takeuchi-TL12V2*
Drilling Rig-SoilMec -R312/200	*Road Reclaimer (CAT-RM500B)*	*Cement Pig*
Motor Grader - CAT-160M2 AWD	*(2) Off road haul truck - CAT - 745*	*Excavator - DEERE 470G*
Excavator - KOMATSU - PC800LC	*Mini excavator - KOBELCO-SK85CS*	*Excavator - DEERE 870G*

Work Performed/Boundaries (Landfill Area and Modules 10 and 11 Liner Construction)

- GSI started with performing the non-destructive tests (vacuum box tests) for the extrusion welds of the geomembrane seams and repairs. SCS checked testing process.
- The majority of the vacuum box tests passed, few test failed and GSI re-welded the affected the seams and used the vacuum box tests again.
- GSI continued collecting and testing the geomembrane destruct samples (marked by SCS) from Modules 10 and 11.
- 15 geomembrane destructs (DS-9 through DS-23) were collected and tested by GSI in the field. The field test results met the CQA requirements. Portions from the same destructs were sent to the lab for conformance testing.
- SCS continued to mark, document, and survey the geosynthetics details onsite.

- Ames continued excavating and grading the perimeter swale east of Modules 10 and 11 using an excavator (CAT-336F) in addition to a bulldozer (CAT-D6T). Excavated clay (mixed with sand and native material) was hauled to the overburden stockpile in the secondary ash pond by two off road haul trucks (CAT-740GC).
- Ames continued grading the clay stockpile for proper drainage with an excavator (CAT-336F) and dozer (CAT-D6T).
- James-Peterson screened COVIA sand for drainage material south of the clay stockpile. .- SCS conducted the weekly SWPPP inspection and communicated suggested repairs to erosion management methods to Ames.
- Tractor (Challenger - MT685D) with box blade attachment smoothed haul roads.

Pond Closure and Existing Landfill Work Activities are not included in this report

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer, Vacuum Box

Field Tests Completed/Observed and Samples Collected

DS-9 through 23, Vacuum Box tests

Lab Test Results

Proctor results, Atterberg Limits, and Grain size for Bulk clay sample (COL-CL-B6).

Material(s) Delivered to Site

COVIA sand for screening.

Jordan Main/Zana Bajalan	Phillip Gearing
Resident Project Representative	**Project Manager**

SCS ENGINEERS

DAILY FIELD ACTIVITIES REPORT

Owner Name:	*Wisconsin Power and Light Company*	**Report No.**	*151*
Project Name:	*Ash Ponds Closure and Modules 10 and 11 Liner Construction*	**Date:**	*November 8, 2022*
Design Engineer:	*SCS Engineers*	**Work Start Time**	*7:00*
SCS Project Number:	*25222157.00*	**Work Stop Time:**	*19:00*
Installation Contractor:	*Ames Construction, Inc.*	**SCS Arrival Time:**	*6:45*
Project Location:	*W8375 Murray Road, Pardeeville, WI 53954*	**SCS Departure Time:**	*17:30*

Today's Task(s): *8th day of geosynthetic liner*

Weather Conditions:
a.m. Sunny, 37°F, Wind: 5 mph/ENE
p.m. Sunny, 49°F, Wind 5 mph/N

Contractors and Personnel On Site: WDNR

Clinton Berning - Project Engineer (Ames)	*Mike Jungers - H&S Specialist (Alliant)*	*Phil Gearing - Project Manager (SCS Engineers)*
Ryan Safranski - Superintendent (Ames)	*Brian Clepper - Lead Env. Specialist (Alliant)*	*Colin Gloede - Field Engineer (SCS Engineers)*
Conor O'Dea - Project Safety Manager (Ames)	*Scott Pedretti - Project Manager (Alliant)*	*Badger Daylighting Crew*
15 Operators (Ames)	*Zana Bajalan - Project Engineer (SCS Engineers)*	*James-Peterson Crew*
2 Mechanics (Ames)	*Madison Thompson - Project Engineer (SCS Engineers)*	*GSI Crew*
1 Laborer (Ames)	*Jordan Main - Field Engineer (SCS Engineers)*	*Griffin Crew*

Equipment On Site

Wheel Loader - DEERE - 744L	*Excavators - CAT-336F and CAT-336E*	*Tractor - Challenger - MT685D*
(5) Bulldozers - CAT - (2) D6T & (3) D6	*Drilling Rig - (MAiT-HR 40)*	*RTV - Kubota - X1140*
Bulldozer - CAT - D8T	*Scraper - CAT - 627G*	*Smooth Drum Roller - Hammtronic - H12i*
Skid Steer - CAT - 299D3(XE)	*Fuel Truck - Mack - 5991002*	*Sheep foot soil compactor - CAT - 815*
Water Truck - Freightliner - FL70	*(4) Off road haul trucks - CAT - 740(GC)*	*Skid Steer-Takeuchi-TL12V2*
Drilling Rig-SoilMec -R312/200	*Road Reclaimer (CAT-RM500B)*	*Cement Pig*
Motor Grader - CAT-160M2 AWD	*(2) Off road haul truck - CAT - 745*	*Excavator - DEERE 470G*
Excavator - KOMATSU - PC800LC	*Mini excavator - KOBELCO-SK85CS*	*Excavator - DEERE 870G*

Work Performed/Boundaries (Landfill Area and Modules 10 and 11 Liner Construction)

- GSI started with performing the non-destructive tests (vacuum box tests) for the extrusion welds of the geomembrane seams and repairs. SCS documented testing process.
- The majority of the vacuum box tests passed, few test failed and GSI re-welded the affected the seams and used the vacuum box tests again. There are 16 vacuum tests remaining.
- GSI continued collecting and testing the geomembrane destruct samples (marked by SCS) from Modules 10 and 11.
- 7 geomembrane destructs were collected and tested by GSI in the field. The field test results met the CQA requirements. Portions from the same destructs were sent to the lab for conformance testing.
- Failure of destruct DS-9 and DS-14 from 11/7 prompted SCS and GSI to cut destruct DS-9a, DS-9b, DS-14a, and DS-14b. GSI capped corresponding seams. Both passed field test requirements and were sent to lab.
- GSI capped the area of between destructs DS-1A through DS-1D.
- SCS continued to mark, document, and survey the geosynthetics details onsite.
- Badger Daylighting was on site this afternoon to clean up washout of sand and mud on the liner in northeast corner. and sump of Module 11. They used a combination of water, vacuum, and bristled brooms to carefully remove the sediment from on top of the liner.
- GSI stopped work by 17:00

- Ames continued grading the clay stockpile for proper drainage with an excavator (CAT-336F) and dozer (CAT-D6T).
- James-Peterson screened COVIA sand for drainage material south of the clay stockpile. Approximately 6000 cy of material is ready for hauling into Mod 10/11.
- Tractor (Challenger - MT685D) with box blade attachment smoothed haul roads.

Pond Closure and Existing Landfill Work Activities are not included in this report

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer, Vacuum Box

Field Tests Completed/Observed and Samples Collected

DS-1C, 1D, 9A, 9B, 14B, 24 and 25, Vacuum Box tests

Lab Test Results

Destructive test results for DS-9 through DS-23

Material(s) Delivered to Site

COVIA sand for screening.

Jordan Main/Zana Bajalan — **Resident Project Representative**

Phillip Gearing — **Project Manager**

SCS ENGINEERS

DAILY FIELD ACTIVITIES REPORT

Owner Name:	Wisconsin Power and Light Company	**Report No.**	152
Project Name:	Ash Ponds Closure and Modules 10 and 11 Liner Construction	**Date:**	November 9, 2022
Design Engineer:	SCS Engineers	**Work Start Time**	7:00
SCS Project Number:	25222157.00	**Work Stop Time:**	19:00
Installation Contractor:	Ames Construction, Inc.	**SCS Arrival Time:**	6:45
Project Location:	W8375 Murray Road, Pardeeville, WI 53954	**SCS Departure Time:**	19:00

Today's Task(s): 9th day of geosynthetic liner

Weather Conditions:
a.m. Cloudy, 52°F, Wind: 13 mph/S
p.m. Mostly Sunny, 69°F, Wind 11 mph/N

Contractors and Personnel On Site:

Clinton Berning - Project Engineer (Ames)	1 Laborer (Ames)	James-Peterson Crew
Ryan Safranski - Superintendent (Ames)	Brian Clepper - Lead Env. Specialist (Alliant)	GSI Crew
Conor O'Dea - Project Safety Manager (Ames)	Zana Bajalan - Project Engineer (SCS Engineers)	Griffin Crew
Brad Folcyzk - Project Manager (Ames)	Madison Thompson - Project Engineer (SCS Engineers)	
16 Operators (Ames)	Jordan Main - Field Engineer (SCS Engineers)	
2 Mechanics (Ames)	Colin Gloede - Field Engineer (SCS Engineers)	

Equipment On Site

Wheel Loader - DEERE - 744L	Drilling Rig - (MAiT-HR 40)	RTV - Kubota - X1140
(6) Bulldozers - CAT - (2) D6T, (3) D6, (1) D8T	Scraper - CAT - 627G	Smooth Drum Roller - Hammtronic - H12i
Skid Steer - CAT - 299D3(XE)	Fuel Truck - Mack - 5991002	Sheep foot soil compactor - CAT - 815
Water Truck - Freightliner - FL70	(4) Off road haul trucks - CAT - 740(GC)	Skid Steer-Takeuchi-TL12V2
Drilling Rig-SoilMec -R312/200	Road Reclaimer (CAT-RM500B)	Cement Pig
Motor Grader - CAT-160M2 AWD	(2) Off road haul truck - CAT - 745	(2) Excavator - DEERE (1) 470G & (1) 870G
Excavator - KOMATSU - PC800LC	Mini excavator - KOBELCO-SK85CS	Prinoth Tracked Truck (PANTHER T14R)
Excavators - CAT-336F and CAT-336E	Tractor - Challenger - MT685D	Morooka Tracked Truck (MST2200VD)

Work Performed/Boundaries (Landfill Area and Modules 10 and 11 Liner Construction)

- GSI started with performing the non-destructive (vacuum box) tests for the extrusion welds of the geomembrane seams and repairs. SCS documented testing process.
- All vacuum box tests performed have passed. There are 8 vacuum box tests remaining.
- GSI continued collecting and testing the geomembrane destruct samples (marked by SCS) from Modules 10 and 11.
- 2 geomembrane destructs (DS-14c, DS-26) were collected and tested by GSI in the field. The field test results met the CQA requirements. Portions from the same destructs were sent to the lab for conformance testing.
- Failure of destruct DS-14B from 11/8 prompted SCS and GSI to cut destruct DS-14C and cap corresponding seams. DS-14C passed in field test and has was sent to lab. SCS continued to mark, document, and survey the geosynthetics details onsite.

- Two tracked haul trucks (PANTHER-T14R and MST2200VD) intended for bringing drainage material into Modules 10/11 were mobilized to the site.
- Ames continued grading the clay stockpile for proper drainage with an excavator (CAT-336F) and a bulldozer (CAT-D6T).
- James-Peterson screened COVIA sand for drainage material south of the clay stockpile. ~6000 cy of material is ready for hauling into Mod 10/11.
- Water truck was used to transport water from leachate/surface water pond south of Module 10 to plant outfall.
- Motor grader (CAT-160M2 AWD) was used to smooth some haul roads on site.

Pond Closure and Existing Landfill Work Activities are not included in this report

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Tensiometer, Vacuum Box

Field Tests Completed/Observed and Samples Collected

DS-14C, DS-26, Vacuum Box tests. Ames provided filter sample COL-FS-BS2 from Kinas and Kopplin for grain size conformance testing.

Lab Test Results

Destructive test results for DS-1C, 1D, 9A, 9B, 14B, 24 and 25

Material(s) Delivered to Site

COVIA sand for screening.

Jordan Main/Zana Bajalan	Phillip Gearing
Resident Project Representative	**Project Manager**

SCS ENGINEERS

DAILY FIELD ACTIVITIES REPORT

Owner Name:	*Wisconsin Power and Light Company*	**Report No.**	*153*
Project Name:	*Ash Ponds Closure and Modules 10 and 11 Liner Construction*	**Date:**	*November 10, 2022*
Design Engineer:	*SCS Engineers*	**Work Start Time**	*7:00*
SCS Project Number:	*25222157.00*	**Work Stop Time:**	*17:30*
Installation Contractor:	*Ames Construction, Inc.*	**SCS Arrival Time:**	*7:00*
Project Location:	*W8375 Murray Road, Pardeeville, WI 53954*	**SCS Departure Time:**	*18:00*

Today's Task(s): *10th day of geosynthetic liner, placing drainage layer*

Weather Conditions:		
	a.m.	Sunny, 62°F, Wind: 5 mph/S
	p.m.	Cloudy, 69°F, Wind 9 mph/N

Contractors and Personnel On Site:

Clinton Berning - Project Engineer (Ames)	*Brian Clepper - Lead Env. Specialist (Alliant)*	
Ryan Safranski - Superintendent (Ames)	*Zana Bajalan - Project Engineer (SCS Engineers)*	
Conor O'Dea - Project Safety Manager (Ames)	*Jordan Main - Field Engineer (SCS Engineers)*	
16 Operators (Ames)	*James-Peterson Crew*	
2 Mechanics (Ames)	*GSI Crew*	
1 Laborer (Ames)	*Griffin Crew*	

Equipment On Site

Wheel Loader - DEERE - 744L	*Drilling Rig - (MAiT-HR 40)*	*RTV - Kubota - X1140*
(6) Bulldozers - CAT - (2) D6T, (3) D6, (1) D8T	*Scraper - CAT - 627G*	*Smooth Drum Roller - Hammtronic - H12i*
Skid Steer - CAT - 299D3(XE)	*Fuel Truck - Mack - 5991002*	*Sheep foot soil compactor - CAT - 815*
Water Truck - Freightliner - FL70	*(4) Off road haul trucks - CAT - 740(GC)*	*Skid Steer-Takeuchi-TL12V2*
Drilling Rig-SoilMec -R312/200	*Road Reclaimer (CAT-RM500B)*	*Cement Pig*
Motor Grader - CAT-160M2 AWD	*(2) Off road haul truck - CAT - 745*	*(2) Excavator - DEERE (1) 470G & (1) 870G*
Excavator - KOMATSU - PC800LC	*Mini excavator - KOBELCO-SK85CS*	*Prinoth Tracked Truck (PANTHER T14R)*
Excavators - CAT-336F and CAT-336E	*Tractor - Challenger - MT685D*	*Morooka Tracked Truck (MST2200VD)*

Work Performed/Boundaries (Landfill Area and Modules 10 and 11 Liner Construction)

- GSI arrived on site ~10:00am in anticipation of destructive test results. GSI continued performing the non-destructive (vacuum box) tests for the extrusion welds of the geomembrane seams and repairs. SCS documented the testing process. All vacuum box tests are complete and passed.
- The final pending destructive test results came back from the lab, passing all CQA requirements. GSI offsite by ~14:00.

- An additional tracked haul truck (PANTHER-T14R) intended for bringing drainage layer material into Modules 10/11 was mobilized to the site.
- James-Peterson screened COVIA sand for drainage layer material south of the clay stockpile. ~11,000 cy of material is ready for hauling into Mod 10/11. Today was the final day for sand deliveries from COVIA.
- In the afternoon, two tracked haul trucks (PANTHER-T14R) were loaded by the wheel loader (DEERE-744L) with screened sand. First, a layer of sand was placed on the perimeter access road between the screened sand stockpile and Modules 10 and 11 to prevent clay or overburden material from being tracked into the Modules.
- Next, the tracked haul trucks placed the sand (drainage layer material) and a low-ground pressure bulldozer (CAT-D6T) graded the material into a 2' minimum depth haul road into Module 10. SCS discussed with Ames that the tracked trucks need 2' minimum of sand to drive on the liner, and the LGP dozer only needs 1' minimum.

Pond Closure and Existing Landfill Work Activities are not included in this report

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Vacuum Box

Field Tests Completed/Observed and Samples Collected

Vacuum Box tests

Lab Test Results

Destructive test results for DS-14C, DS-26

Material(s) Delivered to Site

COVIA sand for screening. HDPE pipe for sumps.

Jordan Main/Zana Bajalan	Phillip Gearing
Resident Project Representative	**Project Manager**

SCS ENGINEERS

DAILY FIELD ACTIVITIES REPORT

Owner Name:	*Wisconsin Power and Light Company*	**Report No.**	*179*
Project Name:	*Ash Ponds Closure and Modules 10 and 11 Liner Construction*	**Date:**	*December 13, 2022*
Design Engineer:	*SCS Engineers*	**Work Start Time**	*7:00*
SCS Project Number:	*25222157.00*	**Work Stop Time:**	*18:00*
Installation Contractor:	*Ames Construction, Inc.*	**SCS Arrival Time:**	*7:00*
Project Location:	*W8375 Murray Road, Pardeeville, WI 53954*	**SCS Departure Time:**	*17:45*

Today's Task(s): *Geosynthetics repairs, grading drainage layer*

Weather Conditions:
a.m. Cloudy, 34°F, Wind: 14 mph/SE
p.m. Light Showers, 34°F, Wind: 17 mph/W

Contractors and Personnel On Site:

Ryan Safranski - Superintendent (Ames)	*1 Laborers (Ames)*	*Griffin Crew*
Clinton Berning - Project Engineer (Ames)	*Jordan Main - Field Engineer (SCS Engineers)*	*Westphal Crew*
Conor O'Dea - Project Safety Manager (Ames)	*Phil Gearing - Project Manager (SCS Engineers)*	*GSI Crew*
Jason Klocke - Foreman (Ames)	*Zana Bajalan - Project Engineer (SCS Engineers)*	
16 Operators (Ames)	*Brian Clepper - Lead Env. Specialist (Alliant)*	
2 Mechanics (Ames)	*Scott Pedretti - Project Manager (Alliant)*	

Equipment On Site

(5) Bulldozers - CAT - (1) D6T LGP, (3) D6, (1) D8T	*Tractor - Challenger - MT685D*	*Wheel Loader - DEERE - 744L*
(2) Excavator - (1) CAT-336F & (1) CAT-336E	*RTV - Kubota - X1140*	*(1) Tracked Haul Truck (PANTHER T14R)*
Excavator - KOMATSU - PC800LC	*Smooth Drum Roller - Hammtronic - H12i*	*(2) Off-road haul truck (CAT-740)*
(2) Excavator - DEERE (1) 470G & (1) 870G	*Sheep foot soil compactor - CAT - 815*	*Excavator - CAT - 349F(L)*
(2) Off road haul truck - CAT - 745	*Road Reclaimer (CAT-RM500B)*	*McElroy TracStar Pipe Fusion Rig*
(2) Off road haul truck - CAT - 740(GC)	*Cement Pig*	*McElroy Pitbull 26 Manual Pipe Fuser*
Motor Grader - CAT-160M2 AWD	*Fuel Truck - Mack - 5991002*	*Mini Excavator (CAT-308E2CR)*
(2) Skid Steer - CAT - 299D3(XE)	*Water Truck - Freightliner - FL70*	*(2) Off-road haul truck (DEERE-410E)*

Work Performed/Boundaries (Landfill Area and Modules 10 and 11 Liner Construction)

- GSI was on site to perform repairs for the geosynthetic liner spots damaged during the drainage material placement and detected by the leak location test (performed by CQM). Ames exposed areas requiring repairs with plastic shovels. GSI performed a total of 16 repairs (R276 through R291).
- Geomembrane repairs were performed by tack welding a piece of geomembrane to the repair area by a leister. The patch was ground using a grinder before being welded with an extrusion weld machine. Trial welds (#52 and #53) were performed and tested before welding was performed. In addition, GSI repaired and replaced the affected GCL under the geomembrane repair areas. New pieces of GCL (and bentonite) was used. Each repair location was surveyed by SCS.
- Ames continued excavating CCR from the northwest portion of the primary ash pond. The CCR was hauled to the area between Modules 4 and 5 and graded by two bulldozers (CAT-D6 and CAT-D8T) and an excavator (CAT-336F).
- Tractor (MT685D) with box-blade attachment and motor grader (CAT-160M2 AWD) smoothed haul roads throughout the site.
- SCS continued surveying documentation points for top of drainage layer material in Modules 10 and 11. Low-ground pressure bulldozer (CAT-D6T) and skid steer (CAT-299D3(XE)) were used to continue carefully grading drainage layer to close the 3' perimeter space around Modules 10 and 11. SCS discussed the highly sensitive nature of grading after leak location, specifically advising to leave some areas of the layer higher to prevent unnecessary traffic over the liner.

Pond Closure and Existing Landfill Work Activities are not included in this report

Testing Equipment Used/Observed and Calibration/Re-Calibration Documentation

Vacuum Box, Tensiometer

Field Tests Completed/Observed and Samples Collected

16 vacuum box tests on repairs R276 through R291, all passed.

Lab Test Results

N/A

Material(s) Delivered to Site

FGD from Edgewater Generating Station

Jordan Main — **Resident Project Representative**

Phillip Gearing — **Project Manager**

Appendix I

Geomembrane Destructive Testing Results

Date: 2022-11-02

Mail To:	**Bill To:**
Phil Gearing	
SCS Engineers	**SCS Engineers**
2830 Dairy Dr.	**25222157.01**
Madison , WI , 53718	

e-mail:
pgearing@scsengineers.com zbajalan@scsengineers.com jmain@scsengineers.com dnelson@scsengineers.com

Dear Mr. Gearing,

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:	**COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER**
TRI Job Reference Number:	**76305**
Material(s) Tested:	(6) Heat Fusion Weld Seam(s) (2) Single Extrusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

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

Mansukh Patel
Sr. Laboratory Coordinator
Geosynthetic Services Division
http://www.geosynthetictestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: SCS Engineers
Project: COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76305

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-1 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	91	125	103	110	111	**108**
Peel Incursion (%)	10	15	25	100	10	
Peel Locus Of Failure Code	AD-BRK	AD-BRK	AD-BRK	AD	AD-BRK	
Peel NSF Failure Code	FTB	FTB	FTB	NON-FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	122	123	122	124	128	**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	
Shear						**Shear**
Shear Strength (ppi)	169	165	163	166	172	**167**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Sample ID: DS-2 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	110	103	112	110	114	**110**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	129	124	129	123	121	**125**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	170	165	161	164	168	**166**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: SCS Engineers
Project: COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76305

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-3 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	155	160	139	151	139	**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	
Side: B						**Peel B**
Peel Strength (ppi)	143	148	144	143	137	**143**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	171	169	162	164	168	**167**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-4 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	134	133	132	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	
Side: B						**Peel B**
Peel Strength (ppi)	117	125	114	119	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)	161	165	160	162	164	**162**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

TRI ENVIRONMENTAL, INC.
9063 BEE CAVES RD. – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: SCS Engineers
Project: COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76305

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-5 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	133	135	130	130	136	**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)	128	137	135	134	141	**135**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	164	167	161	165	165	**164**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-6 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	117	119	121	124	121	**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	
Side: B						**Peel B**
Peel Strength (ppi)	114	116	115	119	119	**117**
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	159	157	162	167	**162**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS - SINGLE TRACK
TRI Client: SCS Engineers
Project: COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76305

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-7 | Weld: Single Extrusion						
Side: Peel						**Peel**
Peel Strength (ppi)	114	122	114	102	100	**110**
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	166	157	165	159	**162**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-8 | Weld: Single Extrusion						
Side: Peel						**Peel**
Peel Strength (ppi)	129	90	104	107	123	**111**
Peel Incursion (%)	<5	15	<5	<5	<5	
Peel Locus Of Failure Code	SE	AD-BRK	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	165	168	162	166	162	**165**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2022-11-08

Mail To:	**Bill To:**
Phil Gearing	
SCS Engineers	**SCS Engineers**
2830 Dairy Dr.	**25222157.01**
Madison , WI , 53718	

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Dear Mr. Gearing,

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:	**COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER**
TRI Job Reference Number:	**76446**
Material(s) Tested:	(12) Heat Fusion Weld Seam(s) (3) Single Extrusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

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

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

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: SCS Engineers
Project: COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76446

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-9 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	126	122	119	119	113	**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	
Side: B						**Peel B**
Peel Strength (ppi)	137	129	108	94	119	**117**
Peel Incursion (%)	100	<5	55	<5	100	
Peel Locus Of Failure Code	AD	SE	AD-BRK	SE	AD	
Peel NSF Failure Code	NON-FTB	FTB	FTB	FTB	NON-FTB	
Shear						**Shear**
Shear Strength (ppi)	161	160	161	167	165	**163**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Sample ID: DS-10 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	135	137	131	131	141	**135**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	129	128	130	129	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	
Shear						**Shear**
Shear Strength (ppi)	164	162	158	164	159	**161**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: SCS Engineers
Project: COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76446

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-11 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	127	126	124	131	126	**127**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	119	120	123	121	139	**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	
Shear						**Shear**
Shear Strength (ppi)	163	166	165	173	168	**167**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Sample ID: DS-12 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	116	120	135	111	125	**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)	125	139	133	133	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	
Shear						**Shear**
Shear Strength (ppi)	158	160	164	165	162	**162**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: SCS Engineers
Project: COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76446

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-13 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	115	108	117	115	114	**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	
Side: B						**Peel B**
Peel Strength (ppi)	116	117	111	113	120	**115**
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	162	166	164	**163**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Sample ID: DS-14 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	119	139	122	132	125	**127**
Peel Incursion (%)	40	<5	50	25	40	
Peel Locus Of Failure Code	AD-BRK	SE	AD-BRK	AD-BRK	AD-BRK	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	128	120	126	129	134	**127**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	161	164	161	162	168	**163**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS - SINGLE TRACK
TRI Client: SCS Engineers
Project: COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76446

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-15 | Weld: Single Extrusion						
Side: Peel						**Peel**
Peel Strength (ppi)	152	146	137	123	145	**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)	163	158	159	155	170	**161**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-16 | Weld: Single Extrusion						
Side: Peel						**Peel**
Peel Strength (ppi)	130	131	109	120	132	**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	
Shear						**Shear**
Shear Strength (ppi)	158	160	163	167	158	**161**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-23 | Weld: Single Extrusion						
Side: Peel						**Peel**
Peel Strength (ppi)	130	123	128	130	145	**131**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	156	158	158	165	164	**160**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: SCS Engineers
Project: COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76446

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-17 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	134	111	110	107	109	**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	
Side: B						**Peel B**
Peel Strength (ppi)	132	124	125	122	128	**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)	164	162	165	167	164	**164**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Sample ID: DS-18 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	119	120	113	114	119	**117**
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	120	122	111	114	**116**
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	158	157	158	**159**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: SCS Engineers
Project: COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76446

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-19 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	119	123	138	123	123	**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)	121	125	124	126	133	**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	158	159	158	167	**161**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Sample ID: DS-20 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	134	131	135	134	134	**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)	126	122	130	119	133	**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)	168	164	163	161	169	**165**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: SCS Engineers
Project: COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76446

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-21 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	129	132	139	132	126	**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)	140	146	140	140	137	**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)	164	162	161	169	162	**164**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-22 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	115	117	111	114	117	**115**
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	136	135	134	139	**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)	159	158	161	162	164	**161**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS - SINGLE TRACK
TRI Client: SCS Engineers
Project: COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76478

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-24 | Weld: Single Extrusion						
Side: Peel						**Peel**
Peel Strength (ppi)	106	97	116	93	120	**106**
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	172	164	165	168	**168**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-25 | Weld: Single Extrusion						
Side: Peel						**Peel**
Peel Strength (ppi)	94	94	91	85	95	**92**
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	159	159	159	168	**163**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS - SINGLE TRACK
TRI Client: SCS Engineers
Project: COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76517

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-26 | Weld: Single Extrusion						
Side: Peel						**Peel**
Peel Strength (ppi)	114	110	107	129	120	**116**
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	167	170	163	171	**167**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2022-11-09

Mail To:	**Bill To:**
Phil Gearing	
SCS Engineers	**SCS Engineers**
2830 Dairy Dr.	**25222157.01**
Madison , WI , 53718	

e-mail:
pgearing@scsengineers.com zbajalan@scsengineers.com jmain@scsengineers.com dnelson@scsengineers.com

Dear Mr. Gearing,

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:	**COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER**
TRI Job Reference Number:	**76478**
Material(s) Tested:	(5) Heat Fusion Weld Seam(s) (2) Single Extrusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

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

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

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: SCS Engineers
Project: COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76478

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-1C | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	123	118	117	125	125	**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)	128	114	105	131	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)	158	166	164	159	162	**162**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Sample ID: DS-1D | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	123	129	117	123	120	**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)	124	121	133	130	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)	159	164	164	160	160	**161**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: SCS Engineers
Project: COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76478

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-9A | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	121	121	116	113	108	**116**
Peel Incursion (%)	<5	<5	<5	<5	25	
Peel Locus Of Failure Code	SE	SE	SE	SE	AD-BRK	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	122	130	137	129	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	
Shear						**Shear**
Shear Strength (ppi)	167	172	170	167	166	**168**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-9B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	122	127	121	121	133	**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)	136	122	133	132	129	**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)	161	162	165	149	156	**159**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: SCS Engineers
Project: COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76478

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-14B | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	118	108	126	107	121	**116**
Peel Incursion (%)	50	75	50	100	15	
Peel Locus Of Failure Code	AD-BRK	AD-BRK	AD-BRK	AD	AD-BRK	
Peel NSF Failure Code	FTB	FTB	FTB	NON-FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	130	133	122	128	126	**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)	172	168	173	167	169	**170**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2022-11-10

Mail To:
Phil Gearing
SCS Engineers
2830 Dairy Dr.
Madison , WI , 53718

Bill To:

SCS Engineers
25222157.01

e-mail:
pgearing@scsengineers.com zbajalan@scsengineers.com jmain@scsengineers.com dnelson@scsengineers.com

Dear Mr. Gearing,

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:	**COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER**
TRI Job Reference Number:	**76517**
Material(s) Tested:	(1) Heat Fusion Weld Seam(s) (1) Single Extrusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

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

Nicole Saucedo

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

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: SCS Engineers
Project: COLUMBIA DRY ASH DISPOSAL FACILITY MOD. 10 and 11 LINER

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76517

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-14C | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	121	142	119	128	124	**127**
Peel Incursion (%)	<5	20	20	15	<5	
Peel Locus Of Failure Code	SE	AD-BRK	AD-BRK	AD-BRK	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	142	138	135	137	147	**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)	159	163	161	166	160	**162**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Appendix J

Geomembrane Installation Forms

GEOSYNTHETIC PANEL PLACEMENT RECORD

SCS Engineers CQA Technician: *Zana Bajalan*
Jordan Main, et al.

Client Name: *Wisconsin Power and Light (WPL)*
Project Location: *Columbia Dry Ash Disposal Facility*
Town of Pacific, Wisconsin 53954

SCS Engineers Project Name: *Modules 10 and 11 Liner Construction*

SCS Engineers Project Number: *25222157.01*

Date dd-mmm-yy	Time hhmm (24)	Panel Number	Roll Number	Panel Length (feet)	Panel Width (feet)	Panel Location/Comments
29-Oct-22	1530	1	1005-063603	540	22.3	N of P-2, N of P-3, N of P-7 thru P-28, S of P-29, E of P-41
29-Oct-22	1535	2	1005-063593	45	22.3	S of P-1, N of P-5, E of P-3, S of P-1
29-Oct-22	1538	3	1005-063593	52	22.3	E of P-7, W of P-4, W of P-2
29-Oct-22	1541	4	1005-063593	29	22.3	S of P-5, W of P-6, E of P-3
29-Oct-22	1544	5	1005-063593	31	22.3	S of P-2, N of P-6, E of P-3/4
29-Oct-22	1546	6	1005-063593	14	8	S of P-5, E of P-4
29-Oct-22	1548	7	1005-063593	52	22.3	W of P-3, E of P-8, S of P-1
29-Oct-22	1550	8	1005-063593	52	22.3	W of P-7, S of P-1, E of P-9
29-Oct-22	1553	9	1005-063593	51	22.3	W of P-8, S of P-1, E of P-10
29-Oct-22	1555	10	1005-063593	51	22.3	W of P-9, S of P-1, E of P-11
29-Oct-22	1600	11	1005-063593	51	22.3	W of P-10, S of P-1, E of P-12
29-Oct-22	1605	12	1005-063593	50	22.3	W of P-11, S of P-1, E of P-13
29-Oct-22	1610	13	1005-063627	50	22.3	W of P-12, S of P-1, E of p-14
29-Oct-22	1614	14	1005-063627	50	22.3	W of P-13, S of P-1, E of P-15
29-Oct-22	1617	15	1005-063627	49	22.3	W of P-14, S of P-1, E of P-16
29-Oct-22	1619	16	1005-063627	49	22.3	W of P-15, S of P-1, E of p-17
29-Oct-22	1624	17	1005-063627	48	22.3	W of P-16, S of P-1, E of P-18
29-Oct-22	1627	18	1005-063627	48	22.3	W of P-17, S of P-1, E of P-19
29-Oct-22	1631	19	1005-063627	48	22.3	W of P-18, S of P-1, E of P-20

GEOSYNTHETIC PANEL PLACEMENT RECORD

SCS Engineers CQA Technician: *Zana Bajalan*
Jordan Main, et al.

Client Name: *Wisconsin Power and Light (WPL)*
Project Location: *Columbia Dry Ash Disposal Facility*
Town of Pacific, Wisconsin 53954

SCS Engineers Project Name: *Modules 10 and 11 Liner Construction*

SCS Engineers Project Number: *25222157.01*

Date dd-mmm-yy	Time hhmm (24)	Panel Number	Roll Number	Panel Length (feet)	Panel Width (feet)	Panel Location/Comments
29-Oct-22	1635	20	1005-063627	47	22.3	W of P-19, S of P-1, E of P-21
29-Oct-22	1640	21	1005-063627	47	22.3	W of P-20, S of P-1, E of P-22
29-Oct-22	1652	22	1005-063628	46	22.3	W of P-21, S of P-1, E of P-23
29-Oct-22	1655	23	1005-063628	45	22.3	W of P-22, S of P-1, E of P-24
29-Oct-22	1659	24	1005-063628	45	22.3	W of P-23, S of P-1, E of P-25
29-Oct-22	1703	25	1005-063628	44	22.3	W of P-24, S of P-1, E of P-26
29-Oct-22	1707	26	1005-063628	44	22.3	W of P-25, S of P-1, E of P-27
29-Oct-22	1710	27	1005-063628	43	22.3	W of P-26, S of P-1, E of P-28
29-Oct-22	1737	28	1005-063628	43	22.3	W of P-27, S of P-1, E of P-38
30-Oct-22	1510	29	1005-063604	503	22.3	N of P-1, S of P-30, E of P-42
30-Oct-22	1525	30	1005-063614	544	22.3	N of P-29, S of P-31, E of P-43
30-Oct-22	1532	31	1005-063613	496	22.3	N of P-30, S of P-32, E of P-44
30-Oct-22	1557	32	1005-063605	496	22.3	N of P-31, S of P-33, E of P-45
31-Oct-22	1320	33	1005-063611	540	22.3	N of P-32, S of P-34, E of P-46
31-Oct-22	1345	34	1005-063612	537	22.3	N of P-33, S of P-35, E of P-47
31-Oct-22	1420	35	1005-063606	541	22.3	N of P-34, S of P-36, E of P-48
31-Oct-22	1530	36	1005-063591	541	22.3	N of P-35, S of P-37, E of P-49
31-Oct-22	1545	37	1005-063595	540	22.3	N of P-36, S of P-51, S of P-53, E of P-50
01-Nov-22	1600	38	1005-063628	34	18	N of P-40, W of P-28, E of P-39, S of P-41

GEOSYNTHETIC PANEL PLACEMENT RECORD

SCS Engineers CQA Technician: *Zana Bajalan*
Jordan Main, et al.

Client Name: *Wisconsin Power and Light (WPL)*
Project Location: *Columbia Dry Ash Disposal Facility*
Town of Pacific, Wisconsin 53954

SCS Engineers Project Name: *Modules 10 and 11 Liner Construction*

SCS Engineers Project Number: *25222157.01*

Date dd-mmm-yy	Time hhmm (24)	Panel Number	Roll Number	Panel Length (feet)	Panel Width (feet)	Panel Location/Comments
01-Nov-22	1620	39	1005-063628	24	21	N of P-40, W of P-38, S of P-41, E of Ex
01-Nov-22	1630	40	1005-063609	40	22.3	S of P-39, W of P-38, E of Ex
01-Nov-22	1650	41	1005-063609	27	22.3	N of P-38, N of P-39, W of P-1, S of P-42, E of Ex
01-Nov-22	1705	42	1005-063609	60	22.3	N of P-41, W of P-29, S of P-43, E of Ex
01-Nov-22	1715	43	1005-063613	34	22.3	N of P-42, W of P-30, S of P-44, E of Ex
01-Nov-22	1730	44	1005-063609	84	22.3	N of P-43, W of P-31, S of P-45, E of Ex
01-Nov-22	1740	45	1005-063609	84	22.3	N of P-44, W of P-32, S of P-46, E of Ex
01-Nov-22	1745	46	1005-063609	38	22.3	N of P-45, W of P-33, S of P-47, E of Ex
01-Nov-22	1755	47	1005-063609	40	22.3	N of P-46, W of P-34, S of P-48, E of Ex
01-Nov-22	1800	48	1005-063609	38	22.3	N of P-47, W of P-35, S of P-49, E of Ex
01-Nov-22	1805	49	1005-063609	38	22.3	N of P-48, W of P-36, S of P-50, E of Ex
01-Nov-22	1810	50	1005-063609	38	22.3	N of P-49, W of P-37, S of P-60, E of Ex
02-Nov-22	1040	51	1005-063594	299	22.3	N of P-37, S of P-52, E of P-53
02-Nov-22	1052	52	1005-063596	502	22.3	N of P-51, N of P-53, S of P-54, E of P-61
02-Nov-22	1130	54	1005-063599	542	22.3	N of P-52, S of P-55, E of P-62
02-Nov-22	1100	53	1005-063594	245	22.3	N of P-37, S of P-52, E of P-60
02-Nov-22	1510	60	1005-063608	37	22.3	N of P-50, S of P-61, W of P-53, E of Ex
02-Nov-22	1711	61	1005-063608	38	22.3	N of P-60, S of P-62, W of P-52, E of Ex
02-Nov-22	1712	62	1005-063608	49	22.3	N of P-61, S of P-63, W of P-54, E of Ex

GEOSYNTHETIC PANEL PLACEMENT RECORD

SCS Engineers CQA Technician: *Zana Bajalan*
Jordan Main, et al.

Client Name: *Wisconsin Power and Light (WPL)*
Project Location: *Columbia Dry Ash Disposal Facility*
Town of Pacific, Wisconsin 53954

SCS Engineers Project Name: *Modules 10 and 11 Liner Construction*

SCS Engineers Project Number: *25222157.01*

Date dd-mmm-yy	Time hhmm (24)	Panel Number	Roll Number	Panel Length (feet)	Panel Width (feet)	Panel Location/Comments
02-Nov-22	1715	63	1005-063608	49	22.3	N of P-62, S of P-64, W of P-55, E of Ex
02-Nov-22	1720	64	1005-063608	52	22.3	N of P-63, S of P-65, W 56, E of Ex
02-Nov-22	1726	65	1005-063608	50	22.3	N of P-64, S of P-66, W 57, E of Ex
02-Nov-22	1320	55	1005-063610	534	22.3	N of P-54, S of P-56, E of P-63
02-Nov-22	1345	56	1005-063621	543	22.3	N of P-55, S of P-57, E of P-64
02-Nov-22	1542	57	1005-063598	543	22.3	N of P-56, S of P-58, E of P-65
02-Nov-22	1608	58	1005-063607	543	22.3	N of P-57, S of P-59, E of P-66
02-Nov-22	1645	59	1005-063592	555	22.3	N of P-58, S of P-69, E of P-68
03-Nov-22	0835	69	1005-063600	555	22.3	N of P-59, S of P-70, E of P-75
03-Nov-22	0850	70	1005-063597	552	22.3	N of P-69, S of P-71, E of P-76
03-Nov-22	0917	71	1005-063620	550	22.3	N of P-70, S of P-72, S of P-73, E of P-77
03-Nov-22	1006	72	1005-063602	257	13	N of P-71, S of P-74, E of P-73
03-Nov-22	1020	73	1005-063602	286	13	N of P-71, S of P-74, W of P-72, E of P-78
03-Nov-22	1035	74	1005-063623	546	22.3	N of P-72, N of P-73, E of P-79
03-Nov-22	1115	75	1005-063608	50	22.3	N of P-68, S of P-76, W of P-69, E of Ex
03-Nov-22	1122	76	1005-063608	50	22.3	N of P-75, S of P-77, W of P-70, E of Ex
03-Nov-22	1129	77	1005-063617	52	22.3	N of P-76, S of P-78, W of P-71, E of Ex
03-Nov-22	1133	78	1005-063617	52	22.3	N of P-77, S of P-79, S of P-80, S of P-81, W of P-73, E of Ex
02-Nov-22	1755	66	1005-063608	40	22.3	N of P-65, S of P-68, W of P-58, E of Ex

GEOSYNTHETIC PANEL PLACEMENT RECORD

SCS Engineers CQA Technician: *Zana Bajalan*
Jordan Main, et al.

Client Name: *Wisconsin Power and Light (WPL)*
Project Location: *Columbia Dry Ash Disposal Facility*
Town of Pacific, Wisconsin 53954

SCS Engineers Project Name: *Modules 10 and 11 Liner Construction*
SCS Engineers Project Number: *25222157.01*

Date dd-mmm-yy	Time hhmm (24)	Panel Number	Roll Number	Panel Length (feet)	Panel Width (feet)	Panel Location/Comments
02-Nov-22	1758	67	1005-063608	8	22.3	N of P-65, S of P-68, W of P-58, E of P-66
02-Nov-22	1800	68	1005-063608	48	22.3	N of P-66, S of P-75, W of P-59, E of Ex
03-Nov-22	1656	79	1005-063617	19	22.3	N of P-78, W of P-74, E of P-80
03-Nov-22	1700	80	1005-063617	19	22.3	N of P-78, W of P-79, E of P-81
03-Nov-22	1705	81	1005-063617	19	6	N of P-78, W of P-80, E of Ex

TRIAL WELD RECORD

SCS Engineers

Client Name:	*Wisconsin Power and Light (WPL)*	**Specifications:**	60 mil
SCS Engineers Project Name:	*Modules 10 and 11 Liner Construction*	**Material Type:**	HDPE
SCS Engineers Project Number:	*25222157.01*	**CQA Technician:**	*Zana Bajalan*
Project Location:	*Columbia Dry Ash Disposal Facility*		*Jordan Main, et al.*
	Town of Pacific, Wisconsin 53954		

	Fusion	Extrusion
Peel (P)	≥ 91 lb/in	≥ 78 lb/in
Shear (S)	≥ 120 lb/in	≥ 120 lb/in

Max # of Failing Tests Allowed per P/S Set: 0 ea

Trial Weld Number	Date dd-mmm-yy	Time hhmm (24)	Ambient Temp (F°)	Installer QC	Seamers Initials	Machine Number	Machine Properties	Weld Type		Test Values (lbs/in) Coupon 1		Coupon 2		Coupon 3		Coupon 4		Coupon 5		Pass/ Fail	Material (Top 1st)	Comments
1	29-Oct-22	1650	64	DR	AF	131	860/480	Fusion	P	102	134	121	117	97	118	101	134	133	100	Pass	S/S	
									S	164		152		159		133		142				
2	29-Oct-22	1655	64	DR	CV	118	820/550	Fusion	P	120	113	107	123	115	111	116	110	108	114	Pass	S/S	
									S	150		164		127		137		138				
3	30-Oct-22	1021	49	DR	AF	118	860/300	Fusion	P	127	121	120	129	111	135	117	135	123	129	Pass	T/T	
									S	159		147		161		162		165				
4	30-Oct-22	1353	64	DR	AF	118	860/300	Fusion	P	136	135	136	133	141	141	136	139	140	137	Pass	T/T	
									S	146		138		150		148		142				
5	30-Oct-22	1400	64	DR	CV	127	860/500	Fusion	P	104	107	102	99	97	105	99	98	100	112	Pass	S/S	
									S	136		134		137		127		134				
6	30-Oct-22	1605	63	CV	AF	118	860/520	Fusion	P	110	112	110	101	114	107	113	108	108	111	Pass	S/S	
									S	154		147		147		155		151				
7	30-Oct-22	1630	61	DR	JH	131	860/500	Fusion	P	113	110	123	105	117	104	120	108	120	111	Pass	S/S	
									S	146		149		158		150						
8	31-Oct-22	1320	61	DR	CV	127	860/550	Fusion	P	118	108	106	104	113	108	102	110	118	96	Pass	S/S	
									S	134		134		137		135		131				
9	31-Oct-22	1353	62	DR	AF	118	860/550	Fusion	P	109	105	111	109	116	107	108	112	101	107	Pass	S/S	
									S	145		130		131		139		131				
10	31-Oct-22	1420	63	DR	JH	131	860/410	Fusion	P	91	104	98	105	98	95	103	101	100	99	Pass	S/S	
									S	139		138		145		130		135				
11	01-Nov-22	0809	37	DR	BL	88	550/520	Extrusion	P	79		100		148		141		100		Pass	S/S	
									S	166		181		181		178		178				
12	01-Nov-22	0819	37	DR	JH	95	500/500	Extrusion	P	122		101		124		116		131		Pass	S/S	
									S	163		185		181		185		196				
13	01-Nov-22	1330	66	DR	JH	95	500/500	Extrusion	P	109		112		99		95		91		Pass	S/S	
									S	140		146		149		150		152				
14	01-Nov-22	1530	70	BL	BL	88	550/520	Extrusion	P	136		128		130		133		134		Pass	S/S	
									S	158		155		153		155		159				
15	01-Nov-22	1613	70	BL	CV	127	860/550	Fusion	P	117	111	131	115	115	131	112	122	120	116	Pass	T/T	
									S	139		148		157		155		153				
16	01-Nov-22	1700	65	BL	CV	127	860/350	Fusion	P	138	139	134	140	145	130	150	141	146	145	Pass	S/S	
									S	169		164		172		165		162				
17	01-Nov-22	1749	63	DR	JH	131	860/520	Fusion	P	103	119	123	122	130	98	112	118	124	105	Pass	S/S	
									S	147		155		145		156		153				
18	01-Nov-22	1802	61	DR	AF	118	860/350	Fusion	P	117	107	101	104	117	131	135	123	112	98	Pass	T/T	
									S	171		167		167		167		165				
19	01-Nov-22	1747	60	DR	AF	118	860/540	Fusion	P	108	128	103	111	112	105	109	119	117	112	Pass	S/S	
									S	144		156		157		154		156				
20	02-Nov-22	1028	57	DR	AF	118	860/550	Fusion	P	114	109	122	108	107	105	120	111	128	109	Pass	S/S	
									S	162		172		156		161		166				
21	02-Nov-22	1040	57	DR	JH	131	860/420	Fusion	P	106	105	114	116	102	102	120	107	123	107	Pass	S/S	
									S	153		152		147		152		149				
22	02-Nov-22	1105	57	DR	CV	127	860/520	Fusion	P	121	114	102	99	102	125	113	106	114	105	Pass	S/S	
									S	146		153		148		151		144				
23	02-Nov-22	1211	64	DR	JH	131	860/400	Fusion	P	129	118	128	126	137	125	132	115	124	130	Pass	T/T	
									S	155		150		155		153		156				

TRIAL WELD RECORD

SCS Engineers

Client Name: *Wisconsin Power and Light (WPL)*
SCS Engineers Project Name: *Modules 10 and 11 Liner Construction*

SCS Engineers Project Number: *25222157.01*
Project Location: *Columbia Dry Ash Disposal Facility*
Town of Pacific, Wisconsin 53954

Specifications: 60 **mil**
Material Type: HDPE

	Fusion	**Extrusion**
Peel (P)	≥ 91 lb/in	≥ 78 lb/in
Shear (S)	≥ 120 lb/in	≥ 120 lb/in

Max # of Failing Tests Allowed per P/S Set: 0 ea

CQA Technician: *Zana Bajalan*
Jordan Main, et al.

Trial Weld Number	Date dd-mmm-yy	Time hhmm (24)	Ambient Temp (F°)	Installer QC	Seamers Initials	Machine Number	Machine Properties	Weld Type		Test Values (lbs/in) Coupon 1	Coupon 2	Coupon 3	Coupon 4	Coupon 5	Pass/ Fail	Material (Top 1st)	Comments
24	02-Nov-22	1330	68	DR	JH	131	860/420	Fusion	P	109, 118	104, 112	113, 122	110, 112	115, 108	Pass	S/S	
									S	131	139	143	138	139			
25	02-Nov-22	1335	68	DR	CV	127	860/520	Fusion	P	124, 124	125, 123	110, 121	124, 120	113, 126	Pass	S/S	
									S	147	137	143	146	145			
26	02-Nov-22	1330	68	DR	CV	127	860/350	Fusion	P	123, 115	115, 119	109, 120	114, 112	112, 104	Pass	T/T	
									S	139	153	154	157	153			
27	02-Nov-22	1430	70	RL	JH	131	860/420	Fusion	P	99, 117	107, 104	104, 112	107, 102	91, 107	Pass	S/S	
									S	143	143	134	143	145			
28	02-Nov-22	1500	70	RL	LD	95	495/510	Extrusion	P	134	132	129	134	124	Pass	T/T	
									S	141	144	148	143	147			
29	02-Nov-22	1500	70	RL	VL	92	550/550	Extrusion	P	133	134	134	129	133	Pass	T/T	
									S	141	137	135	135	144			
30	02-Nov-22	1700	67	DR	AF	115	860/500	Fusion	P	108, 113	112, 114	105, 115	110, 109	100, 111	Pass	S/S	
									S	147	149	142	148	146			
31	02-Nov-22	1800	63	DR	CV	127	860/300	Fusion	P	124, 154	121, 134	130, 133	135, 138	119, 119	Pass	T/T	
									S	150	160	155	150	155			
32	02-Nov-22	1810	63	DR	CV	127	860/500	Fusion	P	105, 97	109, 106	107, 105	99, 113	107, 116	Pass	S/S	
									S	144	147	139	136	150			
33	03-Nov-22	0720	52	DR	VL	92	550/550	Extrusion	P	116	124	150	125	135	Pass	T/T	
									S	166	160	164	164	169			
34	03-Nov-22	0730	52	DR	LD	94	540/500	Extrusion	P	139	135	100	120	126	Pass	T/T	
									S	157	156	146	161	163			
35	03-Nov-22	0726	52	DR	AF	115	860/500	Fusion	P	124, 143	121, 113	113, 130	125, 138	123, 108	Pass	S/S	
									S	168	170	163	164	172			
36	03-Nov-22	1000	61	DR	CV	127	860/500	Fusion	P	108, 118	103, 120	102, 119	113, 113	108, 115	Pass	S/S	
									S	153	135	140	140	152			
37	03-Nov-22	0827	52	DR	JH	131	860/420	Fusion	P	114, 100	114, 98	113, 114	103, 106	106, 95	Pass	S/S	
									S	170	145	132	156	152			
38	03-Nov-22	1024	61	DR	JH	131	860/380	Fusion	P	98, 102	101, 109	107, 97	105, 107	108, 114	Pass	S/T	
									S	153	150	147	149	158			
39	03-Nov-22	1045	61	DR	AF	115	860/300	Fusion	P	92, 93	104, 101	117, 110	100, 119	113, 119	Pass	S/T	
									S	150	159	161	156	159			
40	03-Nov-22	1330	69	DR	VL	92	550/550	Extrusion	P	114	110	116	114	121	Pass	T/T	
									S	125	129	157	128	139			
41	03-Nov-22	1400	69	DR	LD	94	540/500	Extrusion	P	128	135	138	130	130	Pass	T/T	
									S	135	128	144	140	138			
42	03-Nov-22	1354	69	DR	JH	131	860/350	Fusion	P	123, 115	109, 101	116, 122	102, 108	111, 107	Pass	S/T	
									S	139	147	134	141	144			
43	03-Nov-22	1406	69	DR	AF	115	860/500	Fusion	P	107, 114	108, 113	119, 110	98, 93	98, 96	Pass	S/S	
									S	152	138	143	146	146			
44	03-Nov-22	1412	69	DR	CV	127	860/340	Fusion	P	108, 127	134, 128	140, 134	130, 128	138, 112	Pass	T/T	
									S	141	134	143	165	139			
45	03-Nov-22	1530	69	DR	JH	95	545/500	Extrusion	P	124	111	127	126	139	Pass	T/T	
									S	142	144	151	138	140			
46	07-Nov-22	0910	32	BL	LD	94	550/500	Extrusion	P	121	109	119	124	132	Pass	T/T	
									S	154	168	161	166	170			

TRIAL WELD RECORD

SCS Engineers

Client Name: *Wisconsin Power and Light (WPL)*
SCS Engineers Project Name: *Modules 10 and 11 Liner Construction*
SCS Engineers Project Number: *25222157.01*
Project Location: *Columbia Dry Ash Disposal Facility*
Town of Pacific, Wisconsin 53954

Specifications: 60 **mil**
Material Type: HDPE

	Fusion	Extrusion
Peel (P)	≥ 91 lb/in	≥ 78 lb/in
Shear (S)	≥ 120 lb/in	≥ 120 lb/in

Max # of Failing Tests Allowed per P/S Set: 0 ea

CQA Technician: *Zana Bajalan*
Jordan Main, et al.

Trial Weld Number	Date dd-mmm-yy	Time hhmm (24)	Ambient Temp (F°)	Installer QC	Seamers Initials	Machine Number	Machine Properties	Weld Type		Test Values (lbs/in) Coupon 1	Coupon 2	Coupon 3	Coupon 4	Coupon 5	Pass/ Fail	Material (Top 1st)	Comments
47	07-Nov-22	1310	45	BL	LD	94	550/500	Extrusion	P	119	121	101	143	80	Pass	T/T	
									S	156	185	174	177	167			
48	08-Nov-22	0800	35	BL	LD	94	550/500	Extrusion	P	119	121	101	143	80	Pass	T/T	
									S	156	185	174	177	167			
49	08-Nov-22	1424	50	DR	CV	88	550/550	Extrusion	P	97	145	112	127	143	Pass	T/T	
									S	159	153	166	153	153			
50	09-Nov-22	0939	55	DR	CV	88	550/550	Extrusion	P	112	106	113	111	109	Pass	T/T	
									S	139	156	152	163	156			
51	09-Nov-22	1400	62	DR	CV	88	550/550	Extrusion	P	103	132	131	80	124	Pass	T/T	
									S	128	148	127	146	142			
52	13-Dec-22	0945	34	RC	BL	104	550/550	Extrusion	P	134	98	140	109	125	Pass	T/T	
									S	129	232	226	143	151			
53	13-Dec-22	1030	34	RC	JH	97	550/550	Extrusion	P	114	133	111	122	100	Pass	T/T	
									S	235	220	228	232	234			
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100 ft <-- See' Project Information' Worksheet Cell 'G45'

SEAM/NON-DESTRUCTIVE TEST RECORD and END OF SEAM FIELD DESTRUCT TEST RECORD

SCS Engineers CQA Technician: Zana Bajalan
Jordan Main, et al.

Client Name: Wisconsin Power and Light (WPL)
Project Location: Columbia Dry Ash Disposal Facility
Town of Pacific, Wisconsin 53954

SCS Engineers Project Name: ...les 10 and 11 Liner Constru...
SCS Engineers Project Number: 25222157.01

Specifications:	60 mil
Material Type:	HDPE
	Fusion
Peel (P)	≥ 91
Shear (S)	≥ 120

27 = No of Passed Tests
0 = No of Failed Tests

Date of Interest
dd-mmm-yy
Note if blank will consider all dates.

Max Pressure Drop = 3.00 psi
Elapsed Test Interval= 5.0 min

Seaming Information											End of Seam Field DESTRUCT TESTS Req'd (Wisconsin Only)				Non-Destructive Testing Information										
											Minimum Seam Length > 100 ft.							Pressure			Time [hhmm (24)]				
Date dd-mmm-yy	Time hhmm (24)	Seam Numbers		Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Destruct Number	Material (Top 1st)	Shear	Peel		P/F	Date Tested dd-mmm-yy	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
29-Oct-22	1721	P-3	P-7	52 ft	AF	131	1	SOUTH		S/S					30-Oct-22		LM	30	30	0	948	0953	Pass		STA 0+00 to STA 0+52
29-Oct-22	1731	P-7	P-8	52 ft	AF	131	1	SOUTH		S/S					30-Oct-22		LM	30	29	1	948	0953	Pass		STA 0+00 to STA 0+52
29-Oct-22	1742	P-8	P-9	51 ft	AF	131	1	SOUTH		S/S					30-Oct-22		LM	30	30	0	959	1004	Pass		STA 0+00 to STA 0+51
29-Oct-22	1755	P-15	P-16	49 ft	CV	118	2	SOUTH		S/S					30-Oct-22		LM	30	30	0	1047	1052	Pass		STA 0+00 to STA 0+49
29-Oct-22	1756	P-9	P-10	50 ft	AF	131	1	SOUTH		S/S					30-Oct-22		LM	30	29	1	1007	1012	Pass		STA 0+00 to STA 0+50
29-Oct-22	1800	P-16	P-17	48 ft	CV	118	2	SOUTH		S/S					30-Oct-22		LM	30	28	2	1105	1110	Pass		STA 0+00 to STA 0+48
29-Oct-22	1812	P-17	P-18	48 ft	CV	118	2	SOUTH		S/S					30-Oct-22		LM	30	30	0	1112	1117	Pass		STA 0+00 to STA 0+48
29-Oct-22	1816	P-1	P-2	45 ft	AF	131	1	EAST		S/S					30-Oct-22		LM	30	29	1	1445	1450	Pass		STA 0+00 to STA 0+45
29-Oct-22	1818	P-18	P-19	47 ft	CV	118	2	SOUTH		S/S					30-Oct-22		LM	30	30	0	1121	1126	Pass		STA 0+00 to STA 0+47
29-Oct-22	1820	P-2	P-5	31 ft	AF	131	1	EAST		S/S					30-Oct-22		LM	30	29	1	1424	1429	Pass		STA 0+00 to STA 0+31
29-Oct-22	1826	P-19	P-20	47 ft	CV	118	2	SOUTH		S/S					30-Oct-22		LM	30	29	1	1130	1135	Pass		STA 0+00 to STA 0+47
29-Oct-22	1830	P-5	P-6	14 ft	AF	131	1	EAST		S/S					30-Oct-22		LM	30	30	0	1429	1434	Pass		STA 0+00 to STA 0+14
29-Oct-22	1835	P-20	P-21	47 ft	CV	118	2	SOUTH		S/S					30-Oct-22		LM	30	29	1	1140	1145	Pass		STA 0+00 to STA 0+47
29-Oct-22	1838	P-21	P-22	46 ft	CV	118	2	SOUTH		S/S					30-Oct-22		LM	30	30	0	1047	1052	Pass		STA 0+00 to STA 0+46
29-Oct-22	1843	P-3	P-4	29 ft	AF	131	1	SOUTH		S/S					30-Oct-22		LM	30	29	1	1414	1419	Pass		STA 0+00 to STA 0+29
29-Oct-22	1844	P-10	P-11	51 ft	AF	131	1	SOUTH		S/S					30-Oct-22		LM	30	29	1	1017	1022	Pass		STA 0+00 to STA 0+51
29-Oct-22	1847	P-22	P-23	45 ft	CV	118	2	SOUTH		S/S					30-Oct-22		LM	30	29	1	1156	1201	Pass		STA 0+00 to STA 0+45
29-Oct-22	1853	P-11	P-12	50 ft	AF	131	1	SOUTH		S/S					30-Oct-22		LM	30	28	2	1020	1025	Pass		STA 0+00 to STA 0+50
29-Oct-22	1856	P-23	P-24	45 ft	CV	118	2	SOUTH		S/S					30-Oct-22		LM	30	29	1	1208	1213	Pass		STA 0+00 to STA 0+45
29-Oct-22	1902	P-24	P-25	44 ft	CV	118	2	SOUTH		S/S					30-Oct-22		LM	30	30	0	1220	1225	Pass		STA 0+00 to STA 0+44
29-Oct-22	1903	P-12	P-13	50 ft	AF	131	1	SOUTH	DS-1	S/S					30-Oct-22		LM	30	29	1	1027	1032	Pass		STA 0+00 to STA 0+50
29-Oct-22	1910	P-13	P-14	50 ft	AF	131	1	SOUTH		S/S					30-Oct-22		LM	30	29	1	1033	1038	Pass		STA 0+00 to STA 0+50
29-Oct-22	1911	P-25	P-26	44 ft	CV	118	2	SOUTH		S/S					30-Oct-22		LM	30	30	0	1136	1141	Pass		STA 0+00 to STA 0+44
29-Oct-22	1920	P-14	P-15	50 ft	AF	131	1	SOUTH		S/S					30-Oct-22		LM	30	29	1	1059	1104	Pass		STA 0+00 to STA 0+50
29-Oct-22	1924	P-26	P-27	43 ft	CV	118	2	SOUTH	DS-2	S/S					30-Oct-22		LM	30	30	0	1140	1145	Pass		STA 0+00 to STA 0+43
29-Oct-22	1930	P-27	P-28	43 ft	CV	118	2	SOUTH		S/S					30-Oct-22		LM	30	30	0	1148	1153	Pass		STA 0+00 to STA 0+43
30-Oct-22	1120	P-4	P-6	10 ft	AF	118	3	NW		T/T					30-Oct-22		LM	30	29	1	1429	1434	Pass		STA 0+00 to STA 0+10
30-Oct-22	1125	P-4	P-5	26 ft	AF	118	3	NW		T/T					30-Oct-22		LM	30	29	1	1419	1424	Pass		STA 0+00 to STA 0+26
30-Oct-22	1130	P-2	P-3	29 ft	AF	118	3	NW		T/T					30-Oct-22		LM	30	30	0	1507	1512	Pass		STA 0+00 to STA 0+29
30-Oct-22	1156	P-1	P-13	21 ft	AF	118	3	EAST		T/T					30-Oct-22		LM	30	30	0	1559	1604	Pass		STA 0+00 to STA 0+21
30-Oct-22	1200	P-1	P-12	21 ft	AF	118	3	EAST		T/T					30-Oct-22		LM	30	30	0	1542	1547	Pass		STA 0+00 to STA 0+21
30-Oct-22	1204	P-1	P-11	21 ft	AF	118	3	EAST		T/T					30-Oct-22		LM	30	30	0	1542	1547	Pass		STA 0+00 to STA 0+21
30-Oct-22	1207	P-1	P-10	21 ft	AF	118	3	EAST		T/T					30-Oct-22		LM	30	30	0	1542	1547	Pass		STA 0+00 to STA 0+21
30-Oct-22	1212	P-1	P-9	21 ft	AF	118	3	EAST		T/T					30-Oct-22		LM	30	29	1	1519	1524	Pass		STA 0+00 to STA 0+21
30-Oct-22	1216	P-1	P-8	21 ft	AF	118	3	EAST		T/T					30-Oct-22		LM	30	30	0	1519	1524	Pass		STA 0+00 to STA 0+21

Y

100 ft <-- See 'Project Information' Worksheet Cell 'G45'

SEAM/NON-DESTRUCTIVE TEST RECORD and END OF SEAM FIELD DESTRUCT TEST RECORD

SCS Engineers CQA Technician: Zana Bajalan
Jordan Main, et al.

Client Name: Wisconsin Power and Light (WPL)
Project Location: Columbia Dry Ash Disposal Facility
Town of Pacific, Wisconsin 53954

SCS Engineers Project Name: ules 10 and 11 Liner Constru
SCS Engineers Project Number: 25222157.01

Specifications:	60 mil
Material Type:	HDPE
	Fusion
Peel (P)	≥ 91
Shear (S)	≥ 120

27 = No of Passed Tests
0 = No of Failed Tests

Date of Interest
dd-mmm-yy

Note if blank will consider all dates.

Max Pressure Drop = 3.00 psi
Elapsed Test Interval= 5.0 min

Seaming Information										End of Seam Field DESTRUCT TESTS Req'd (Wisconsin Only)				Non-Destructive Testing Information										
										Minimum Seam Length > 100 ft.														
Date dd-mmm-yy	Time hhmm (24)	Seam Numbers		Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Destruct Number	Material (Top 1st)	Shear	Peel		P/F	Date Tested dd-mmm-yy	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time [hhmm (24)] Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
30-Oct-22	1221	P-1	P-7	21 ft	AF	118	3	EAST		T/T					30-Oct-22		LM	30	30	0	1519	1524	Pass		STA 0+00 to STA 0+21
30-Oct-22	1438	P-1	P-28	21 ft	AF	118	4	EAST		T/T					30-Oct-22		LM	30	30	0	1745	1750	Pass		STA 0+00 to STA 0+21
30-Oct-22	1445	P-1	P-27	21 ft	AF	118	4	EAST		T/T					30-Oct-22		LM	30	30	0	1738	1743	Pass		STA 0+00 to STA 0+21
30-Oct-22	1451	P-1	P-26	21 ft	AF	118	4	EAST		T/T					30-Oct-22		LM	30	30	0	1738	1743	Pass		STA 0+00 to STA 0+21
30-Oct-22	1454	P-1	P-25	21 ft	AF	118	4	EAST		T/T					30-Oct-22		LM	30	30	0	1710	1715	Pass		STA 0+00 to STA 0+21
30-Oct-22	1458	P-1	P-24	21 ft	AF	118	4	EAST		T/T					30-Oct-22		LM	30	30	0	1710	1715	Pass		STA 0+00 to STA 0+21
30-Oct-22	1500	P-1	P-23	21 ft	AF	118	4	EAST		T/T					30-Oct-22		LM	30	30	0	1654	1659	Pass		STA 0+00 to STA 0+21
30-Oct-22	1505	P-1	P-22	21 ft	AF	118	4	EAST		T/T					30-Oct-22		LM	30	30	0	1654	1659	Pass		STA 0+00 to STA 0+21
30-Oct-22	1510	P-1	P-21	21 ft	AF	118	4	EAST		T/T					30-Oct-22		LM	30	30	0	1654	1659	Pass		STA 0+00 to STA 0+21
30-Oct-22	1516	P-1	P-20	21 ft	AF	118	4	EAST	DS-3	T/T					30-Oct-22		LM	30	30	0	1633	1638	Pass		STA 0+00 to STA 0+21
30-Oct-22	1521	P-1	P-19	21 ft	AF	118	4	EAST		T/T					30-Oct-22		LM	30	30	0	1633	1638	Pass		STA 0+00 to STA 0+21
30-Oct-22	1525	P-1	P-18	21 ft	AF	118	4	EAST		T/T					30-Oct-22		LM	30	30	0	1640	1645	Pass		STA 0+00 to STA 0+21
30-Oct-22	1529	P-1	P-17	21 ft	AF	118	4	EAST		T/T					30-Oct-22		LM	30	30	0	1615	1620	Pass		STA 0+00 to STA 0+21
30-Oct-22	1530	P-1	P-16	21 ft	AF	118	4	EAST		T/T					30-Oct-22		LM	30	30	0	1615	1620	Pass		STA 0+00 to STA 0+21
30-Oct-22	1536	P-1	P-15	21 ft	AF	118	4	EAST		T/T					30-Oct-22		LM	30	29	1	1615	1620	Pass		STA 0+00 to STA 0+21
30-Oct-22	1542	P-1	P-14	21 ft	AF	118	4	EAST		T/T					30-Oct-22		LM	30	30	0	1559	1604	Pass		STA 0+00 to STA 0+21
30-Oct-22	1625	P-1	P-29	503 ft	AF	118	5	EAST	DS-4	S/S	167 ppi	106 ppi	116 ppi	Pass	31-Oct-22	1,2	LM	30	29	1	932	0937	Pass		STA 0+00 to STA 1+81
30-Oct-22	1632	P-29	P-30	505 ft	JH	131	7	EAST		S/S	168 ppi	141 ppi	125 ppi	Pass	31-Oct-22	3	LM	30	29	1	920	0925	Pass		STA 0+00 to STA 1+50
30-Oct-22	1636	P-30	P-31	498 ft	CV	127	6	EAST	DS-5	S/S	160 ppi	140 ppi	114 ppi	Pass	31-Oct-22	4,5	LM	30	30	0	1021	1026	Pass		STA 4+23 to STA 4+93
30-Oct-22	1735	P-31	P-32	498 ft	JH	131	7	EAST	DS-6	S/S	181 ppi	105 ppi	124 ppi	Pass	31-Oct-22	6,7,8	LM	30	30	0	1134	1139	Pass		STA 0+00 to STA 2+46
31-Oct-22	1430	P-32	P-33	495 ft	CV	127	8	WEST		S/S	172 ppi	116 ppi	128 ppi	Pass	31-Oct-22	10	LM	30	30	0	1518	1523	Pass		STA 0+00 to STA 0+52
31-Oct-22	1440	P-34	P-35	536 ft	JH	131	10	WEST		S/S	182 ppi	125 ppi	128 ppi	Pass	31-Oct-22	9	LM	30	30	0	1536	1541	Pass		STA 0+00 to STA 2+62
31-Oct-22	1450	P-33	P-34	538 ft	AF	118	9	WEST		S/S	169 ppi	137 ppi	132 ppi	Pass	31-Oct-22	11	LM	30	30	0	1518	1523	Pass		STA 0+00 to STA 0+56
31-Oct-22	1600	P-35	P-36	546 ft	CV	127	8	WEST	DS-9	S/S	128 ppi	127 ppi	114 ppi	Pass	31-Oct-22		LM	30	30	0	1657	1702	Pass		STA 0+00 to STA 5+45
31-Oct-22		P-36	P-37	546 ft	JH	131	10	WEST	DS-10	S/S	168 ppi	100 ppi	126 ppi	Pass	31-Oct-22		LM	30	30	0	1504	1509	Pass		STA 0+00 to STA 5+45
01-Nov-22	0815	P-42	P-43	32 ft	JH	131	17	EAST		S/S					2-Nov-22		LM	30	29	1	1415	1420	Pass		STA 0+00 to STA 0+32
01-Nov-22	1627	P-44	P-31	22 ft	AF	118	16	SOUTH		S/S					2-Nov-22		LM	30		30	1457	1502	Fail		Capped with R-104
01-Nov-22	1637	P-39	P-40	24 ft	CV	127	16	EAST		S/S					2-Nov-22		LM	30	30	0	1145	1150	Pass		STA 0+00 to STA 0+24
01-Nov-22	1643	P-28	P-38	33 ft	CV	127	16	SOUTH		S/S					2-Nov-22		LM	30	30	0	1145	1150	Pass		STA 0+00 to STA 0+33
01-Nov-22	1716	P-39	P-38	24 ft	CV	127	15	SE		T/T					2-Nov-22		LM	30	30	0	1130	1135	Pass		STA 0+00 to STA 0+24
01-Nov-22	1720	P-38	P-28	34 ft	CV	127	15	SE		T/T					2-Nov-22		LM	30	30	0	1200	1205	Pass		STA 0+00 to STA 0+34
01-Nov-22	1729	P-41	P-1	20 ft	CV	127	15	SOUTH		T/T					2-Nov-22		LM	30	30	0	1226	1231	Pass		STA 0+00 to STA 0+20
01-Nov-22	1737	P-39	P-41	10 ft	CV	127	15	EAST		T/T					2-Nov-22		LM	30	30	0	1220	1225	Pass		STA 0+00 to STA 0+10
01-Nov-22	1740	P-38	P-41	17 ft	CV	127	15	EAST		T/T					2-Nov-22		LM	30	30	0	1209	1214	Pass		STA 0+00 to STA 0+17
01-Nov-22	1745	P-38	P-1	4 ft	CV	127	15	EAST		T/T					2-Nov-22		LM	30	30	0	1220	1225	Pass		STA 0+00 to STA 0+4

SEAM/NON-DESTRUCTIVE TEST RECORD and END OF SEAM FIELD DESTRUCT TEST RECORD

Y
100 ft <-- See 'Project Information' Worksheet Cell 'G45'

SCS Engineers CQA Technician: Zana Bajalan
Jordan Main, et al.

Client Name: Wisconsin Power and Light (WPL)
Project Location: Columbia Dry Ash Disposal Facility
Town of Pacific, Wisconsin 53954

SCS Engineers Project Name: les 10 and 11 Liner Constru
SCS Engineers Project Number: 25222157.01

Specifications:	60 mil
Material Type:	HDPE
	Fusion
Peel (P)	≥ 91
Shear (S)	≥ 120

27 = No of Passed Tests
0 = No of Failed Tests

Date of Interest
dd-mmm-yy
Note if blank will consider all dates.

Max Pressure Drop = 3.00 psi
Elapsed Test Interval= 5.0 min

Seaming Information												End of Seam Field DESTRUCT TESTS Req'd (Wisconsin Only)				Non-Destructive Testing Information										
												Minimum Seam Length > 100 ft.														
Date dd-mmm-yy	Time hhmm (24)	Seam Numbers			Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Destruct Number	Material (Top 1st)	Shear	Peel		P/F	Date Tested dd-mmm-yy	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time [hhmm (24)] Start	Time [hhmm (24)] End	P/F	Vacuum Box P/F	Location/ Comments
01-Nov-22	1755	P-42	P-29		21 ft	AF	118	18	SOUTH		T/T					2-Nov-22		LM	30	30	0	1133	1138	Pass		STA 0+00 to STA 0+21
01-Nov-22	1800	P-30	P-43		21 ft	AF	118	18	EAST		T/T					2-Nov-22		LM	30	29	1	1440	1445	Pass		STA 0+00 to STA 0+21
01-Nov-22	1806	P-1	P-41		22 ft	JH	131	17	EAST		S/S					2-Nov-22		LM	30	30	0	1225	1230	Pass		STA 0+00 to STA 0+22
01-Nov-22	1810	P-45	P-32		22 ft	AF	118	16	SOUTH		S/S					2-Nov-22		LM	30	30	0	1457	1502	Pass		STA 0+00 to STA 0+22
01-Nov-22	1820	P-45	P-46		37 ft	JH	131	17	WEST		S/S					2-Nov-22		LM	30	30	0	1506	1511	Pass		STA 0+00 to STA 0+37
01-Nov-22	1820	P-48	P-47		37 ft	AF	118	19	WEST		S/S					2-Nov-22		LM	30	30	0	1642	1647	Pass		STA 0+00 to STA 0+37
01-Nov-22	1820	P-49	P-50		37 ft	AF	118	19	WEST		S/S					2-Nov-02		LM	30	29	1	1530	1535	Pass		STA 0+00 to STA 0+37
01-Nov-22	1825	P-45	P-33		45 ft	JH	131	17	WEST		S/S					2-Nov-22		LM	30	30	0	1506	1511	Pass		STA 0+00 to STA 0+45
01-Nov-22	1825	P-46	P-33		21 ft	AF	118	18	SOUTH		T/T					2-Nov-22		LM	30	28	2	1511	1516	Pass		STA 0+00 to STA 0+18
01-Nov-22	1828	P-43	P-44		35 ft	JH	131	17	EAST		S/S					2-Nov-22		LM	30	30	0	1458	1503	Pass		STA 0+00 to STA 0+35
01-Nov-22	1830	P-47	P-34		21 ft	AF	118	18	SOUTH		T/T					2-Nov-22		LM	30	30	0	1517	1522	Pass		STA 0+00 to STA 0+21
01-Nov-22	1831	P-44	P-45		82 ft	JH	131	17	EAST		S/S					2-Nov-22		LM	30	29	1	1456	1501	Pass		STA 0+00 to STA 0+82
01-Nov-22	1838	P-48	P-49		37 ft	AF	118	19	WEST		S/S					2-Nov-22		LM	30	30	0	1530	1535	Pass		STA 0+00 to STA 0+37
01-Nov-22	1838	P-30	P-44		39 ft	JH	131	17	EAST		S/S					2-Nov-22		LM	30	28	2	1428	1433	Pass		STA 0+00 to STA 0+39
01-Nov-22	1849	P-37	P-50		22 ft	AF	118	18	SOUTH		T/T					2-Nov-22		LM	30		30	1630	1635	Fail		Capped with R-119
01-Nov-22	1852	P-46	P-47		37 ft	JH	131	17	WEST		S/S					2-Nov-22		LM	30	30	0	1517	1522	Pass		STA 0+00 to STA 0+37
01-Nov-22	1854	P-49	P-36		22 ft	AF	118	18	SOUTH		T/T					2-Nov-22		LM	30	30	0	1609	1614	Pass		STA 0+00 to STA 0+22
01-Nov-22	1859	P-48	P-35		22 ft	AF	118	18	SOUTH		T/T					2-Nov-22		LM	30	30	0	1548	1553	Pass		STA 0+00 to STA 0+22
02-Nov-22	1053	P-37	P-51		299 ft	JH	131	21	WEST	DS-12	S/S	179 ppi	136 ppi	120 ppi	Pass	3-Nov-22	27,28	RL	35	35	0	922	0927	Pass		STA 0+00 to STA 0+30
02-Nov-22	1115	P-37	P-53		238 ft	JH	131	21	WEST		S/S	176 ppi	130 ppi	94 ppi	Pass	3-Nov-22	12,13,56-58	RL	34	32	2	905	0910	Pass		STA 0+00 to STA 1+55
02-Nov-22	1133	P-51	P-53		22 ft	JH	131	23	SOUTH		T/T					3-Nov-22		RL	34	32	2	905	0910	Pass		STA 0+00 to STA 0+77
02-Nov-22	1145	P-54	P-55		542 ft	JH	131	21	EAST	DS-13	S/S	175 ppi	108 ppi	128 ppi	Pass	3-Nov-22	46	RL	30	30	0	834	0839	Pass		STA 0+00 to STA 3+95
02-Nov-22	1150	P-51	P-52		305 ft	AF	118	20	EAST	DS-11	S/S	174 ppi	114 ppi	131 ppi	Pass	3-Nov-22		RL	30	30	0	930	0935	Pass		STA 0+00 to STA 3+05
02-Nov-22	1215	P-52	P-53		238 ft	AF	118	20	EAST		S/S	167 ppi	116 ppi	123 ppi	Pass	3-Nov-22		RL	30	30	0	815	0820	Pass		STA 0+00 to STA 0+80
02-Nov-22	1220	P-52	P-54		503 ft	JH	131	21	EAST		S/S	181 ppi	119 ppi	115 ppi	Pass	3-Nov-22		RL	30	30	0	815	0820	Pass		STA 0+00 to STA 5+03
02-Nov-22	1400	P-55	P-56		546 ft	AF	118	20	EAST		S/S	171 ppi	116 ppi	127 ppi	Pass	3-Nov-22		RL	30	30	0	835	0840	Pass		STA 0+00 to STA 5+46
02-Nov-22	1430	P-56	P-57		543 ft	JH	131	24	EAST	DS-18	S/S	175 ppi	138 ppi	120 ppi	Pass	3-Nov-22	14, 47-49	RL	32	32	0	949	0954	Pass		STA 0+00 to STA 4+22
02-Nov-22	1510	P-40	Ex		19 ft	VL	92	29	NORTH		T/T														Pass	
02-Nov-22	1521	P-39	Ex		22 ft	VL	92	29	NORTH		T/T														Pass	
02-Nov-22	1550	P-41	Ex		20 ft	VL	92	29	NORTH		T/T														Pass	
02-Nov-22	1600	P-42	Ex		22 ft	VL	92	29	NORTH		T/T														Pass	
02-Nov-22	1611	P-43	Ex		22 ft	VL	92	29	NORTH		T/T														Pass	
02-Nov-22	1623	P-44	Ex		22 ft	VL	92	29	NORTH		T/T														Pass	
02-Nov-22	1623	P-57	P-58		308 ft	CV	127	25	EAST	DS-19	S/S	178 ppi	124 ppi	139 ppi	Pass	3-Nov-22	21, 42-45	LM	30	30	0	917	0922	Pass		STA 0+00 to STA 1+05
02-Nov-22	1653	P-59	P-58		555 ft	JH	131	27	WEST		S/S	171 ppi	108 ppi	135 ppi	Pass	3-Nov-22	50-52	RL	35	35	0	1029	1034	Pass		STA 0+0 - 0+53 (0+53-0+87 Capped w R-172 and R-173)

Y

100 ft <-- See' Project Information' Worksheet Cell 'G45'

SEAM/NON-DESTRUCTIVE TEST RECORD and END OF SEAM FIELD DESTRUCT TEST RECORD

Client Name: Wisconsin Power and Light (WPL)
Project Location: Columbia Dry Ash Disposal Facility
Town of Pacific, Wisconsin 53954

SCS Engineers CQA Technician: Zana Bajalan
Jordan Main, et al.
SCS Engineers Project Name: ules 10 and 11 Liner Constru
SCS Engineers Project Number: 25222157.01

Specifications:	60 mil
Material Type:	HDPE
	Fusion
Peel (P)	≥ 91
Shear (S)	≥ 120

27 = No of Passed Tests
0 = No of Failed Tests

Date of Interest
dd-mmm-yy
Note if blank will consider all dates.

Max Pressure Drop = 3.00 psi
Elapsed Test Interval= 5.0 min

Date dd-mmm-yy	Time hhmm (24)	Seam Numbers		Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Destruct Number	Material (Top 1st)	Shear	Peel	Peel	P/F	Date Tested dd-mmm-yy	Addn'l Test #'s	Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time [hhmm (24)] Start	Time End	P/F	Vacuum Box P/F	Location/ Comments
											End of Seam Field DESTRUCT TESTS Req'd (Wisconsin Only) — Minimum Seam Length > 100 ft.														
02-Nov-22	1700	P-45	Ex	22 ft	VL	92	29	NORTH		T/T														Pass	
02-Nov-22	1710	P-66	P-67	22 ft	CV	127	31	SOUTH		T/T					3-Nov-22	55	RL	30	30	0	1230	1235	Pass		STA 0+00 to STA 0+22
02-Nov-22	1715	P-50	P-60	38 ft	AF	115	30	WEST	DS-14	S/S					3-Nov-22		RL	30	30	0	706	0711	Pass		STA 0+00 to STA 0+38
02-Nov-22	1715	P-57	P-58	235 ft	CV	127	25	WEST		S/S	147 ppi	91 ppi	107 ppi	Pass	3-Nov-22		RL	35	35	0	1011	1016	Pass		STA 0+00 to STA 0+16 (West)
02-Nov-22	1715	P-58	P-67	22 ft	CV	127	31	SOUTH		T/T					3-Nov-22	58	RL	30	30	0	905	0910	Pass		STA 0+00 to STA 0+22
02-Nov-22	1720	P-57	P-65	22 ft	CV	127	31	SOUTH		T/T					3-Nov-22		RL	30	30	0	857	0902	Pass		STA 0+00 to STA 0+22
02-Nov-22	1725	P-56	P-64	22 ft	CV	127	31	SOUTH		T/T					3-Nov-22		RL	30	30	0	841	0846	Pass		STA 0+00 to STA 0+22
02-Nov-22	1730	P-55	P-63	22 ft	CV	127	31	SOUTH		T/T					3-Nov-22		RL	35	34	1	750	0755	Pass		STA 0+00 to STA 0+22
02-Nov-22	1735	P-54	P-62	22 ft	CV	127	31	SOUTH		T/T					3-Nov-22		RL	31	31	0	751	0756	Pass		STA 0+00 to STA 0+22
02-Nov-22	1738	P-46	Ex	22 ft	VL	92	29	NORTH		T/T														Pass	
02-Nov-22	1745	P-53	P-60	22 ft	CV	127	31	SOUTH		T/T					3-Nov-22		RL	34	34	0	707	0712	Pass		STA 0+00 to STA 0+22
02-Nov-22	1750	P-60	P-61	36 ft	AF	115	30	EAST		S/S					3-Nov-22		RL	31	31	0	714	0719	Pass		STA 0+00 to STA 0+36
02-Nov-22	1800	P-50	Ex	12 ft	LD	95	28	SOUTH		T/T														Pass	LD seamed STA 0+10 to STA 0+22 (total seam length is 22ft)
02-Nov-22	1800	P-61	P-62	38 ft	AF	115	30	EAST		S/S					3-Nov-22	53	RL	32	32	0	722	0727	Pass		STA 0+00 to STA 0+21
02-Nov-22	1806	P-62	P-63	52 ft	AF	115	30	EAST		S/S					3-Nov-22		RL	34	32	2	739	0744	Pass		STA 0+00 to STA 0+52
02-Nov-22	1810	P-63	P-64	52 ft	AF	115	30	EAST		S/S					3-Nov-22		RL	34	31	3	742	0747	Pass		STA 0+00 to STA 0+52
02-Nov-22	1810	P-64	P-65	50 ft	CV	127	25	EAST		S/S					3-Nov-22		LM	30	30	0	840	0845	Pass		STA 0+00 to STA 0+50
02-Nov-22	1810	P-52	P-62	12 ft	AF	115	30	EAST		S/S					3-Nov-22		RL	33	33	0	758	0803	Pass		STA 0+00 to STA 0+12
02-Nov-22	1810	P-52	P-61	22 ft	CV	127	31	SOUTH		T/T					3-Nov-22		RL	31	31	0	732	0737	Pass		STA 0+00 to STA 0+22
02-Nov-22	1812	P-81	Ex	19 ft	VL	92	40	NORTH		T/T														Pass	
02-Nov-22	1815	P-49	Ex	22 ft	LD	95	28	SOUTH		T/T														Pass	
02-Nov-22	1840	P-48	Ex	22 ft	LD	95	28	SOUTH		T/T														Pass	
02-Nov-22	1840	P-65	P-66	40 ft	AF	115	30	EAST		S/S					3-Nov-22		LM	30	30	0	855	0900	Pass		STA 0+00 to STA 0+40
02-Nov-22	1847	P-47	Ex	22 ft	VL	92	29	NORTH		T/T														Pass	
02-Nov-22	1850	P-65	P-67	8 ft	AF	115	30	EAST		S/S					3-Nov-22		LM	30	30	0	920	0925	Pass		STA 0+00 to STA 0+08
02-Nov-22	1905	P-66	P-68	40 ft	AF	115	30	WEST		S/S					3-Nov-22		LM	30	30	0	935	0940	Pass		STA 0+00 to STA 0+40
02-Nov-22	1915	P-67	P-68	8 ft	AF	115	30	WEST		S/S					3-Nov-22		LM	30	30	0	948	0953	Pass		STA 0+00 to STA 0+08
03-Nov-22	0902	P-59	P-69	553 ft	JH	131	37	WEST	DS-20	S/S	146 ppi	115 ppi	130 ppi	Pass	3-Nov-22	15-20	RL	31	30	1	1035	1040	Pass		STA 0+00 to 0+10 Capped. STA 2+56 to 2+77 Capped
03-Nov-22	0913	P-69	P-70	550 ft	AF	115	35	WEST		S/S	163 ppi	119 ppi	116 ppi	Pass	3-Nov-22		LM	30	29	1	1155	1200	Pass		STA 0+00 to STA 5+50
03-Nov-22	0917	P-62	Ex	22 ft	VL	92	33	NORTH		T/T														Pass	
03-Nov-22	0923	P-63	Ex	22 ft	VL	92	33	NORTH		T/T														Pass	
03-Nov-22	0931	P-64	Ex	22 ft	VL	92	33	NORTH		T/T														Pass	
03-Nov-22	1035	P-70	P-71	550 ft	JH	131	37	WEST		S/S	159 ppi	136 ppi	116 ppi	Pass	3-Nov-22	29-31	LM	30	30	0	1212	1217	Pass		STA 4+27 to STA 5+550
03-Nov-22	1100	P-61	Ex	23 ft	VL	92	33	SOUTH		T/T														Pass	
03-Nov-22	1120	P-71	P-72	255 ft	CV	127	36	WEST		S/S	161 ppi	140 ppi	133 ppi	Pass	3-Nov-22	34-37	LM	30	30	0	1527	1532	Pass		STA 2+34 to STA 2+57

SEAM/NON-DESTRUCTIVE TEST RECORD and END OF SEAM FIELD DESTRUCT TEST RECORD

Y
100 ft <-- See' Project Information' Worksheet Cell 'G45'

SCS Engineers CQA Technician: Zana Bajalan
Jordan Main, et al.

Client Name: Wisconsin Power and Light (WPL)
Project Location: Columbia Dry Ash Disposal Facility
Town of Pacific, Wisconsin 53954

SCS Engineers Project Name: ules 10 and 11 Liner Constru
SCS Engineers Project Number: 25222157.01

Specifications:	60 mil
Material Type:	HDPE
	Fusion
Peel (P)	≥ 91
Shear (S)	≥ 120

27 = No of Passed Tests
0 = No of Failed Tests

Date of Interest
dd-mmm-yy
Note if blank will consider all dates.

Max Pressure Drop = 3.00 psi
Elapsed Test Interval= 5.0 min

Seaming Information												End of Seam Field DESTRUCT TESTS Req'd (Wisconsin Only)				Non-Destructive Testing Information										
												Minimum Seam Length > 100 ft.							Pressure			Time [hhmm (24)]				
Date dd-mmm-yy	Time hhmm (24)	Seam Numbers			Seam Length	Seamer Initials	Machine Number	Trial Weld #	Direction Seamed	Destruct Number	Material (Top 1st)	Shear	Peel		P/F	Date Tested dd-mmm-yy	Addn'l Test #'s	Tester Initials	Start	End	+/-	Start	End	P/F	Vacuum Box P/F	Location/ Comments
03-Nov-22	1135	P-60	Ex		22 ft	VL	92	33	SOUTH		T/T														Pass	
03-Nov-22	1135	P-71	P-73		287 ft	CV	127	36	WEST	DS-21	S/S	163 ppi	118 ppi	112 ppi	Pass	3-Nov-22	22-26	LM	30	30	0	1527	1532	Pass		STA 0+10 to STA 0+86
03-Nov-22	1146	P-50	Ex		10 ft	VL	92	33	SOUTH		T/T														Pass	VL seamed STA 0+00 to STA 0+10
03-Nov-22	1209	P-72	P-74		257 ft	JH	131	37	WEST	DS-22	S/S	166 ppi	108 ppi	117 ppi	Pass	3-Nov-22	38-41	LM	30	30	0	1639	1644	Pass		STA 0+00 to STA 0+16
03-Nov-22	1230	P-73	P-74		286 ft	JH	131	37	WEST		S/S	155 ppi	129 ppi	126 ppi	Pass	3-Nov-22	32,33	LM	30	30	0	1502	1507	Pass		STA 2+04 to STA 2+86
03-Nov-22	1240	P-75	P-76		50 ft	AF	115	35	WEST	DS-17	S/S					3-Nov-22		LM	30	30	0	1336	1341	Pass		STA 0+00 to STA 0+50
03-Nov-22	1342	P-65	Ex		22 ft	VL	92	40	NORTH		T/T														Pass	
03-Nov-22	1355	P-66	Ex		22 ft	VL	92	40	NORTH		T/T														Pass	Seamed STA 0+00 to STA 0+10
03-Nov-22	1410	P-76	P-77		51 ft	AF	115	43	WEST		S/S					3-Nov-22		LM	30	30	0	1445	1450	Pass		STA 0+00 to STA 0+51
03-Nov-22	1430	P-72	P-73		13 ft	CV	127	44	SOUTH		T/T					3-Nov-22		LM	30	30	0	1720	1725	Pass		STA 0+00 to STA 0+13
03-Nov-22	1440	P-59	P-68		19 ft	AF	115	43	SOUTH		S/S					3-Nov-22		LM	30	30	0	935	0940	Pass		STA 0+00 to STA 0+19
03-Nov-22	1440	P-68	P-75		48 ft	AF	115	43	WEST		S/S					3-Nov-22		LM	30	30	0	1450	1455	Pass		STA 0+00 to STA 0+48
03-Nov-22	1445	P-66	Ex		22 ft	VL	92	40	NORTH		T/T														Pass	Seamed STA 0+10 to STA 0+22 (total seam length is 22ft)
03-Nov-22	1453	P-68	Ex		22 ft	VL	92	40	NORTH		T/T														Pass	
03-Nov-22	1503	P-75	Ex		20 ft	VL	92	40	NORTH		T/T														Pass	
03-Nov-22	1505	P-77	P-78		52 ft	AF	115	43	WEST		S/S					3-Nov-22		LM	30	30	0	1500	1505	Pass		STA 0+00 to STA 0+52
03-Nov-22	1510	P-76	Ex		22 ft	VL	92	40	NORTH		T/T														Pass	
03-Nov-22	1515	P-70	P-76		22 ft	CV	127	44	SOUTH		T/T					3-Nov-22		LM	30	30	0	1540	1545	Pass		STA 0+00 to STA 0+22
03-Nov-22	1515	P-71	P-77		22 ft	CV	127	44	SOUTH		T/T					3-Nov-22		LM	30	30	0	1552	1557	Pass		STA 0+00 to STA 0+22
03-Nov-22	1515	P-73	P-78		22 ft	CV	127	44	SOUTH		T/T					3-Nov-22		LM	30	30	0	1552	1557	Pass		STA 0+00 to STA 0+22
03-Nov-22	1515	P-75	P-69		22 ft	CV	127	44	SOUTH		T/T					3-Nov-22		LM	30	30	0	1540	1545	Pass		STA 0+00 to STA 0+22
03-Nov-22	1517	P-77	Ex		22 ft	VL	92	40	NORTH		T/T														Pass	
03-Nov-22	1707	P-79	P-80		19 ft	AF	115	43	SOUTH		S/S					3-Nov-22		LM	30	30	0	1715	1720	Pass		STA 0+00 to STA 0+19
03-Nov-22	1712	P-80	P-81		19 ft	AF	115	43	SOUTH		S/S					3-Nov-22		LM	30	30	0	1720	1725	Pass		STA 0+00 to STA 0+19
03-Nov-22	1717	P-78	P-79		23 ft	CV	127	44	WEST		T/T					3-Nov-22		LM	30	30	0	1745	1750	Pass		STA 0+00 to STA 0+23
03-Nov-22	1717	P-78	P-80		22 ft	CV	127	44	WEST		T/T					3-Nov-22		LM	30	30	0	1713	1718	Pass		STA 0+00 to STA 0+22
03-Nov-22	1717	P-78	P-81		6 ft	CV	127	44	WEST		T/T					3-Nov-22		LM	30	30	0	1720	1725	Pass		STA 0+00 to STA 0+06
03-Nov-22	1719	P-79	P-74		18 ft	CV	127	44	SOUTH		T/T					3-Nov-22		LM	30	30	0	1745	1750	Pass		STA 0+00 to STA 0+18
03-Nov-22	1803	P-78	Ex		22 ft	VL	92	40	NORTH		T/T														Pass	

ADDITIONAL NON-DESTRUCTIVE TEST RECORD

SCS Engineers CQA Technician: *Zana Bajalan*
Jordan Main, et al.

Client Name: *Wisconsin Power and Light (WPL)*
SCS Engineers Project Name: *Modules 10 and 11 Liner Construction*
Project Location: *Columbia Dry Ash Disposal Facility*
Town of Pacific, Wisconsin 53954
SCS Engineers Project Number: *25222157.01*

Max Pressure Drop: *3.0 psi*
Test Standard Elapsed Time: *5 min*

Test Number	Test Date dd-mm-yy	Seam Number				Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time (hhmm 0 to 24 hr) Start	Time End	Pressure Test P/F	Vacuum Box P/F	Location/Comments
1	31-10-22	P-1	P-29			LM	30 psi	30 psi	0 psi	0930	0935	Pass		STA 1+81 to STA 2+11
2	31-10-22	P-1	P-29			LM	30 psi	28 psi	2 psi	0955	1000	Pass		STA 2+11 to STA 5+02
3	31-10-22	P-29	P-30			LM	30 psi	30 psi	0 psi	1012	1017	Pass		STA 1+50 to STA 5+05
4	31-10-22	P-30	P-31			LM	30 psi	29 psi	1 psi	1101	1106	Pass		STA 2+36 to STA 4+18
5	31-10-22	P-30	P-31			LM	30 psi	30 psi	0 psi	1126	1131	Pass		STA 0+00 to STA 2+36
6	31-10-22	P-31	P-32			LM	30 psi	30 psi	0 psi	1112	1117	Pass		STA 2+46 to STA 3+92
7	31-10-22	P-31	P-32			LM	30 psi	29 psi	1 psi	1108	1113	Pass		STA 3+92 to STA 4+05
8	31-10-22	P-31	P-32			LM	30 psi	30 psi	0 psi	1335	1340	Pass		STA 4+05 to STA 4+95
9	31-10-22	P-34	P-35			LM	30 psi	30 psi	0 psi	1548	1553	Pass		STA 2+62 to STA 5+38
10	31-10-22	P-32	P-33			LM	30 psi	30 psi	0 psi	1548	1553	Pass		STA 0+52 to STA 4+94
11	31-10-22	P-33	P-34			LM	30 psi	30 psi	0 psi	1608	1613	Pass		STA 0+56 to STA 5+38
12	2-Nov-22	P-37	P-53			LM	30 psi	30 psi	0 psi	1816	1821	Pass		STA 1+55 to STA 2+06
13	2-Nov-22	P-37	P-53			LM	30 psi	30 psi	0 psi	1806	1811	Pass		STA 2+06 to STA 2+45
14	3-Nov-22	P-56	P-57			RL	32 psi	30 psi	2 psi	0957	1002	Pass		STA 4+64 to STA 4+78
15	3-Nov-22	P-59	P-69			LM	30 psi	30 psi	0 psi	1010	1015	Pass		STA 2+44 to STA 4+67
16	3-Nov-22	P-59	P-69			LM	30 psi	30 psi	0 psi	1120	1125	Pass		STA 2+22 to STA 2+44
17	3-Nov-22	P-59	P-69			LM	30 psi	30 psi	0 psi	1128	1133	Pass		STA 1+19 to STA 2+22
18	3-Nov-22	P-59	P-69			RL	32 psi	32 psi	0 psi	1045	1050	Pass		STA 0+45 to STA 1+19
19	3-Nov-22	P-59	P-69			RL	34 psi	34 psi	0 psi	1038	1043	Pass		STA 0+11 to STA 0+45
20	3-Nov-22	P-59	P-69			RL	31 psi	30 psi	1 psi	1035	1040	Pass		STA 0+00 to STA 0+11
														Not Used
22	3-Nov-22	P-71	P-73			LM	30 psi	30 psi	0 psi	1520	1525	Pass		STA 0+86 to STA 1+00
23	3-Nov-22	P-71	P-73			LM	30 psi	30 psi	0 psi	1520	1525	Pass		STA 1+00 to STA 1+28
24	3-Nov-22	P-71	P-73			LM	30 psi	30 psi	0 psi	1510	1515	Pass		STA 1+28 to STA 2+26

ADDITIONAL NON-DESTRUCTIVE TEST RECORD

SCS Engineers CQA Technician: Zana Bajalan
Jordan Main, et al.

Client Name: Wisconsin Power and Light (WPL)
SCS Engineers Project Name: Modules 10 and 11 Liner Construction

Project Location: Columbia Dry Ash Disposal Facility
Town of Pacific, Wisconsin 53954
SCS Engineers Project Number: 25222157.01

Max Pressure Drop: 3.0 psi
Test Standard Elapsed Time: 5 min

Test Number	Test Date dd-mm-yy	Seam Number				Tester Initials	Pressure			Time (hhmm 0 to 24 hr)		Pressure Test P/F	Vacuum Box P/F	Location/Comments
							Start	End	+/-	Start	End			
25	3-Nov-22	P-71	P-73			LM	30 psi	30 psi	0 psi	1455	1500	Pass		STA 2+26 to STA 2+56
26	3-Nov-22	P-71	P-73			LM	30 psi	30 psi	0 psi	1346	1351	Pass		STA 2+77 to STA 2+87
27	3-Nov-22	P-37	P-51			RL	34 psi	34 psi	0 psi	0915	0920	Pass		STA 0+30 to STA 1+43
28	3-Nov-22	P-37	P-51			RL	32 psi	32 psi	0 psi	0914	0919	Pass		STA 1+43 to STA 2+99
29	3-Nov-22	P-70	P-71			LM	30 psi	30 psi	0 psi	1227	1232	Pass		STA 1+07 to STA 4+27
30	3-Nov-22	P-70	P-71			LM	30 psi	30 psi	0 psi	1230	1235	Pass		STA 0+81 to STA 1+07
31	3-Nov-22	P-70	P-71			LM	30 psi	30 psi	0 psi	1241	1246	Pass		STA 0+00 to STA 0+81
32	3-Nov-22	P-73	P-74			LM	30 psi	30 psi	0 psi	1740	1745	Pass		STA 0+59 to STA 2+04
33	3-Nov-22	P-73	P-74			LM	30 psi	30 psi	0 psi	1740	1745	Pass		STA 0+00 to STA 0+59
34	3-Nov-22	P-71	P-72			LM	30 psi	30 psi	0 psi	1620	1625	Pass		STA 1+85 to STA 2+34
35	3-Nov-22	P-71	P-72			LM	30 psi	30 psi	0 psi	1620	1625	Pass		STA 1+00 to STA 1+85
36	3-Nov-22	P-71	P-72			LM	30 psi	30 psi	0 psi	1627	1632	Pass		STA 0+37 to STA 1+00
37	3-Nov-22	P-71	P-72			LM	30 psi	30 psi	0 psi	1632	1637	Pass		STA 0+00 to STA 0+37
38	3-Nov-22	P-72	P-74			LM	30 psi	30 psi	0 psi	1643	1648	Pass		STA 0+16 to STA 0+65
39	3-Nov-22	P-72	P-74			LM	30 psi	30 psi	0 psi	1644	1649	Pass		STA 0+65 to STA 0+90
40	3-Nov-22	P-72	P-74			LM	30 psi	30 psi	0 psi	1714	1719	Pass		STA 0+90 to STA 2+10
41	3-Nov-22	P-72	P-74			LM	30 psi	30 psi	0 psi	1722	1727	Pass		STA 2+10 to STA 2+57
42	3-Nov-22	P-57	P-58			RL	32 psi	32 psi	0 psi	1021	1026	Pass		STA 0+20 to STA 2+35 (West)
43	3-Nov-22	P-57	P-58			LM	30 psi	30 psi	0 psi	1032	1037	Pass		STA 2+39 to STA 3+08 (East)
44	3-Nov-22	P-57	P-58			LM	30 psi	30 psi	0 psi	1020	1025	Pass		STA 1+71 to STA 2+39 (East)
45	3-Nov-22	P-57	P-58			LM	30 psi	30 psi	0 psi	1009	1014	Pass		STA 1+05 to STA 1+71 (East)
46	3-Nov-22	P-54	P-55			RL	34 psi	33 psi	1 psi	0940	0945	Pass		STA 3+95 to STA 5+42
47	3-Nov-22	P-56	P-57			RL	32 psi	32 psi	0 psi	0949	0954	Pass		STA 4+22 to STA 4+64
48	3-Nov-22	P-56	P-57			RL	34 psi	31 psi	3 psi	0956	1001	Pass		STA 4+78 to STA 5+00

ADDITIONAL NON-DESTRUCTIVE TEST RECORD

SCS Engineers CQA Technician: Zana Bajalan
Jordan Main, et al.

Client Name: Wisconsin Power and Light (WPL)
SCS Engineers Project Name: Modules 10 and 11 Liner Construction
Project Location: Columbia Dry Ash Disposal Facility
Town of Pacific, Wisconsin 53954
SCS Engineers Project Number: 25222157.01
Max Pressure Drop: 3.0 psi
Test Standard Elapsed Time: 5 min

Test Number	Test Date dd-mm-yy	Seam Number				Tester Initials	Pressure Start	Pressure End	Pressure +/-	Time (hhmm 0 to 24 hr) Start	Time End	Pressure Test P/F	Vacuum Box P/F	Location/Comments
49	3-Nov-22	P-56	P-57			RL	31 psi	30 psi	1 psi	1008	1013	Pass		STA 5+00 to STA 5+43
50	3-Nov-22	P-58	P-59			RL	30 psi	30 psi	0 psi	1047	1052	Pass		STA 0+87 to STA 0+92
51	3-Nov-22	P-58	P-59			RL	30 psi	30 psi	0 psi	1043	1048	Pass		STA 0+92 to STA 2+75
52	3-Nov-22	P-58	P-59			RL	30 psi	30 psi	0 psi	0943	0948	Pass		STA 2+75 to STA 5+55
53	3-Nov-22	P-61	P-62			RL	34 psi	32 psi	2 psi	0729	0734	Pass		STA 0+21 to STA 0+32 (STA 0+32 to STA 0+38 patched with R-132 and R-133)
54	3-Nov-22	P-58	P-67			RL	30 psi	30 psi	0 psi	0930	0935	Pass		STA 0+00 to STA 0+11
55	3-Nov-22	P-66	P-67			RL	30 psi	30 psi	0 psi	0905	0910	Pass		STA 0+20 to STA 0+22
56	3-Nov-22	P-37	P-53			RL	30 psi	30 psi	0 psi	0855	0900	Pass		STA 0+80 to STA 0+95
57	3-Nov-22	P-37	P-53			RL	31 psi	31 psi	0 psi	0855	0900	Pass		STA 0+95 to STA 1+10
58	3-Nov-22	P-37	P-53			RL	31 psi	30 psi	1 psi	0903	0908	Pass		STA 1+10 to STA 1+55

DESTRUCTIVE TEST RECORD

Client Name: Wisconsin Power and Light (WPL)
SCS Engineers Project Name: Modules 10 and 11 Liner Construction
SCS Engineers Project Number: 25222157.01
Project Location: Columbia Dry Ash Disposal Facility
Town of Pacific, Wisconsin 53954

Specifications: 60 **mil**
Material Type: HDPE

	Fusion	Extrusion	
Peel (P)	≥ 91	≥ 78	lb/in
Shear (S)	≥ 120	≥ 120	lb/in

SCS Engineers CQA Technician: Zana Bajalan
Jordan Main, et al.

Number of Passing Destruct Tests				Min Req'd Destruct Tests	Net # of Test above Req'd	# of Tests OK
Field	Lab	Total	w EOS Field			
32 Tests	27 Tests	59 Tests	86 Tests	8 Tests	78 Tests	

Max # of Failing Tests Allowed per P/S Set: 0 ea Set on Trial Weld Worksheet

NOTE: ALWAYS CHECK FAILURE CODES ON LAB TEST TOO

Sample ID	Date dd-mmm-yy	Time hhmm (24)	Installer's QC	Seam Number		Seamers Initials	Machine Number	Weld Type		Coupon 1		Coupon 2		Coupon 3		Coupon 4		Coupon 5		Field Pass/Fail	Lab Pass/Fail	Repair Number	Location
DS-1	01-Nov-22	1001	DR	P-12	P-13	AF	131	Fusion	P	111	107	119	100	107	99	120	104	104	118	Pass	Fail	R-33	STA 0+09 (Capped with R-233)
									S	159		161		167		157		152					
DS-2	01-Nov-22	1011	DR	P-26	P-27	CV	118	Fusion	P	111	104	133	107	115	124	134	131	121	109	Pass	Pass	R-73	STA 0+25
									S	167		160		169		164		156					
DS-3	01-Nov-22	1022	DR	P-1	P-20	AF	118	Fusion	P	138	160	111	142	144	132	117	155	129	160	Pass	Pass	R-14	STA 1+63
									S	162		166		171		167		174					
DS-4	01-Nov-22	1042	DR	P-1	P-29	AF	118	Fusion	P	121	118	117	122	102	106	96	109	116	115	Pass	Pass	R-17	STA 3+80
									S	151		156		149		151		152					
DS-5	01-Nov-22	1114	DR	P-30	P-31	CV	127	Fusion	P	125	135	128	135	121	130	119	128	119	128	Pass	Pass	R-18	STA 2+57
									S	139		149		154		144		148					
DS-6	01-Nov-22	1128	DR	P-31	P-32	JH	131	Fusion	P	119	107	119	106	99	118	103	118	109	103	Pass	Pass	R-29	STA 0+76
									S	149		141		141		153		156					
DS-7	01-Nov-22	1419	DR	R-18	P-31	JH	95	Extrusion	P	109		93		103		106		101		Pass	Pass	R-75	STA 2+58
									S	140		143		144		139		144					
DS-8	01-Nov-22	1427	DR	R-14	P-1	BL	88	Extrusion	P	92		107		93		95		88		Pass	Pass	R-76	STA 1+63
									S	143		133		136		143		140					
DS-9	07-Nov-22	0758	BL	P-36	P-35	CV	127	Fusion	P	129	104	119	124	114	136	141	131	130	130	Pass	Fail	R-235	STA 3+05 (Capped with R-235)
									S	195		193		175		193		189					
DS-10	07-Nov-22	0735	BL	P-37	P-36	JH	131	Fusion	P	112	127	141	130	119	127	130	125	129	120	Pass	Pass	R-237	STA 2+39
									S	185		189		191		187		187					
DS-11	07-Nov-22	0818	BL	P-51	P-52	AF	118	Fusion	P	108	120	113	139	109	117	125	132	112	117	Pass	Pass	R-238	STA 2+10
									S	189		190		185		194		187					
DS-12	07-Nov-22	0835	BL	P-51	P-37	JH	131	Fusion	P	130	121	117	111	127	118	136	139	127	133	Pass	Pass	R-236	STA 2+ 39
									S	178		181		170		192		162					
DS-13	07-Nov-22	0850	BL	P-54	P-55	JH	131	Fusion	P	116	110	116	125	108	100	114	112	107	117	Pass	Pass	R-239	STA 0+56
									S	187		178		180		181		180					
DS-14	07-Nov-22	0906	BL	P-60	P-50	AF	115	Fusion	P	123	100	127	103	128	102	127	115	145	119	Pass	Fail	R-240	STA 0+16. Abn. overlap, transition smooth to tex
									S	186		180		164		178		170					
DS-15	07-Nov-22	1059	BL	R-94	P-38	LD	95	Extrusion	P	141		131		125		129		141		Pass	Pass	R-241	STA 0+00
									S	176		181		166		167		177					
DS-16	07-Nov-22	1112	BL	R-132	P-61	VL	92	Extrusion	P	130		128		124		128		124		Pass	Pass	R-242	STA 0+05
									S	192		173		167		171		175					
DS-17	07-Nov-22	0925	BL	P-76	P-75	AF	115	Fusion	P	121	101	111	132	104	120	123	125	114	122	Pass	Pass	R-252	STA 0+43 (beyond trial weld time limit)
									S	178		181		178		168		181					
DS-18	07-Nov-22	0953	BL	P-56	P-57	JH	131	Fusion	P	112	115	125	110	116	115	124	115	106	126	Pass	Pass	R-243	STA 0+85
									S	168		175		170		179		169					
DS-19	07-Nov-22	1010	BL	P-57	P-58	CV	127	Fusion	P	133	135	120	122	138	146	128	119	128	123	Pass	Pass	R-244	STA 1+53
									S	170		177		170		176		180					
DS-20	07-Nov-22	1257	BL	P-59	P-69	JH	131	Fusion	P	123	116	119	118	107	118	118	120	119	105	Pass	Pass	R-247	STA 2+27
									S	159		168		150		171		157					
DS-21	07-Nov-22	1042	BL	P-71	P-73	CV	127	Fusion	P	122	100	135	118	149	136	114	135	116	118	Pass	Pass	R-250	STA 2+89
									S	169		175		167		175		168					

DESTRUCTIVE TEST RECORD

Client Name: Wisconsin Power and Light (WPL)
SCS Engineers Project Name: Modules 10 and 11 Liner Construction
SCS Engineers Project Number: 25222157.01
Project Location: Columbia Dry Ash Disposal Facility
Town of Pacific, Wisconsin 53954

Specifications: 60 **mil**
Material Type: HDPE

	Fusion	Extrusion	
Peel (P)	≥ 91	≥ 78	lb/in
Shear (S)	≥ 120	≥ 120	lb/in

SCS Engineers CQA Technician: Zana Bajalan
Jordan Main, et al.

Number of Passing Destruct Tests				Min Req'd Destruct Tests	Net # of Test above Req'd	# of Tests OK
Field	Lab	Total	w EOS Field			
32 Tests	27 Tests	59 Tests	86 Tests	8 Tests	78 Tests	

Max # of Failing Tests Allowed per P/S Set: 0 ea Set on Trial Weld Worksheet

NOTE: ALWAYS CHECK FAILURE CODES ON LAB TEST TOO

Sample ID	Date dd-mmm-yy	Time hhmm (24)	Installer's QC	Seam Number		Seamers Initials	Machine Number	Weld Type		Field Test Values (lbs/in) Coupon 1		Coupon 2		Coupon 3		Coupon 4		Coupon 5		Field Pass/Fail	Lab Pass/Fail	Repair Number	Location
DS-22	07-Nov-22	1026	BL	P-72	P-74	JH	131	Fusion	P	149	118	119	110	114	133	102	109	120	117	Pass	Pass	R-249	STA 1+33
									S	181		184		179		191		169					
DS-23	07-Nov-22	0941	BL	R-182	P-71	LD	94	Extrusion	P	125		144		130		128		119		Pass	Pass	R-251	STA 2+56
									S	173		187		189		176		183					
DS-1A	07-Nov-22	1310	BL	P-11	P-12	AF	131	Fusion	P	50	95									Fail		R-234	STA 0+42. Capped with R-234
									S	120													
DS-1B	07-Nov-22	1315	BL	P-12	P-13	AF	131	Fusion	P	50	95									Fail		R-233	STA 0+22. Capped with R-233
									S	120													
DS-1C	08-Nov-22	0753	BL	P-11	P-12	AF	131	Fusion	P	106	103	121	118	116	111	119	120	125	114	Pass	Pass	R-257	STA 0+29. Capped with R-257
									S	169		172		172		183		183					
DS-1D	08-Nov-22	0735	BL	P-12	P-13	AF	131	Fusion	P	120	116	131	115	117	131	129	131	124	112	Pass	Pass	R-256	STA 0+38. Capped with R-256.
									S	176		189		182		174		182					
DS-24	08-Nov-22	1000	BL	R-256	P-12	LD	94	Extrusion	P	106		90		92		85		120		Pass	Pass	R-258	STA 0+31
									S	166		175		164		173		174					
DS-9-A	08-Nov-22	1612	DR	P-36	P-35	CV	127	Fusion	P	108	115	116	118	118	108	113	135	112	127	Pass	Fail	R-260	STA 2+66 (Capped with R-260)
									S	158		167		155		173		159					
DS-9-B	08-Nov-22	1602	DR	P-36	P-35	CV	127	Fusion	P	105	124	122	111	127	112	116	96	110	121	Pass	Pass	R-262	STA 3+69 (Capped with R-262)
									S	145		157		155		158		162					
DS-14-B	08-Nov-22	1552	DR	P-60	P-61	AF	115	Fusion	P	95	104	108	103	108	97	103	110	106	103	Pass	Fail	R-263	STA 0+08 (Capped with R-263) (Abnormal overlap, tra
									S	156		170		165		166		161					
DS-25	08-Nov-22	1425	DR	R-260	P-35	CV	88	Extrusion	P	84		95		95		91		104		Pass	Pass	R-261	STA 3+13
									S	161		168		165		172		162					
DS-14-C	09-Nov-22	1335	BL	P-62	P-52	AF	115	Fusion	P	122	97	121	104	123	112	122	127	109	106	Pass	Pass	R-271	STA 0+5
									S	144		149		155		145		147					
DS-26	09-Nov-22	1443	DR	R-268	P-60	CV	88	Extrusion	P	125		127		125		127		121		Pass	Pass	R-274	STA 0+15
									S	146		149		150		153		153					
									P														
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REPAIR RECORD

Client Name: Wisconsin Power and Light (WPL)
Project Location: Columbia Dry Ash Disposal Facility
Town of Pacific, Wisconsin 53954
SCS Engineers Project Name: Modules 10 and 11 Liner Construction
SCS Engineers Project Number: 25222157.01

SCS Engineers CQA Technician: Zana Bajalan
Jordan Main, et al.

Date of Interest
enter mm-dd-yy
Note if blank will consider all dates.

"x" indicates criteria applies to this project		x	x
Population:	Total Seam	Machine	Welder
Destruct Test Frequency (1 per)	1000 ft	1000 ft	1000 ft
Number of Required Destructs	0 ea	8 ea	6 ea

Minimum # of Destructs Required
8 ea
For Project Period

Repair Number	Panel/ Seam				Repairer Initials	Machine Number	Repair Type	Repair size Length (ft)		Width (ft)	Trial Weld Number	Test Date dd-mm-yy	Tester Initials	Test P/F	Location/Comments
R-1	P-28				BL	88	Patch	1.0 ft	x	1.0 ft	11	7-Nov-22	BG	Pass	INTERSECTION
R-2	P-27	P-28	P-1		BL	88	Patch	2.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	INTERSECTION
R-3	P-26	P-27	P-1		BL	88	Patch	2.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	INTERSECTION
R-4	P-25	P-26	P-1		BL	88	Patch	2.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	INTERSECTION
R-5	P-24	P-25	P-1		BL	88	Patch	2.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	INTERSECTION
R-6	P-23	P-24	P-1		BL	88	Patch	2.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	INTERSECTION
R-7	P-22	P-23	P-1		BL	88	Patch	2.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	INTERSECTION
R-8	P-22				BL	88	Bead	0.5 ft	x		11	7-Nov-22	BG	Pass	STA 0+02
R-9	P-22				BL	88	Bead	0.5 ft	x		11	7-Nov-22	BG	Pass	STA 0+05
R-10	P-22				BL	88	Bead	0.5 ft	x		11	7-Nov-22	BG	Pass	STA 0+09
R-11	P-22				BL	88	Bead	0.5 ft	x		11	7-Nov-22	BG	Pass	STA 0+03
R-12	P-21	P-22	P-1		BL	88	Patch	2.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	INTERSECTION
R-13	P-20	P-21	P-1		BL	88	Patch	2.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	INTERSECTION
R-14	P-19	P-20	P-1		BL	88	Patch	6.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	INTERSECTION (DS-3)
R-15	P-18	P-19	P-1		BL	88	Patch	2.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	INTERSECTION
R-16	P-1				JH	95	Patch	2.0 ft	x	2.0 ft	11	8-Nov-22	BG	Pass	STA 2+87
R-17	P-1	P-29			JH	95	Patch	5.0 ft	x	2.0 ft	12	7-Nov-22	BG	Pass	STA 3+80 (DS-4)
R-18	P-30	P-31			JH	95	Patch	5.0 ft	x	2.0 ft	12	7-Nov-22	BG	Pass	STA 2+57 (DS-5)
R-19	P-30	P-31			JH	95	Patch	2.0 ft	x	2.0 ft	12	7-Nov-22	BG	Pass	STA 2+36
R-20	P-1	P-29			JH	95	Patch	3.0 ft	x	2.0 ft	12	7-Nov-22	BG	Pass	STA 2+11
R-21	P-1	P-29			JH	95	Patch	2.0 ft	x	2.0 ft	12	7-Nov-22	BG	Pass	STA 1+83
R-22	P-17	P-18	P-1		BL	88	Patch	2.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	INTERSECTION
R-23	P-17				BL	88	Bead	0.5 ft	x		11	7-Nov-22	BG	Pass	STA 0+03
R-24	P-17				BL	88	Bead	0.5 ft	x		11	7-Nov-22	BG	Pass	STA 0+03
R-25	P-17				BL	88	Bead	0.5 ft	x		11	7-Nov-22	BG	Pass	STA 0+09
R-26	P-17				BL	88	Bead	0.5 ft	x		11	7-Nov-22	BG	Pass	STA 0+09
R-27	P-16	P-17	P-1		BL	88	Patch	2.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	INTERSECTION
R-28	P-29	P-30			JH	95	Patch	2.0 ft	x	2.0 ft	12	7-Nov-22	BG	Pass	STA 1+50

REPAIR RECORD

Client Name: Wisconsin Power and Light (WPL)
Project Location: Columbia Dry Ash Disposal Facility
Town of Pacific, Wisconsin 53954
SCS Engineers Project Name: Modules 10 and 11 Liner Construction

SCS Engineers Project Number: 25222157.01

SCS Engineers CQA Technician: Zana Bajalan
Jordan Main, et al.

"x" indicates criteria applies to this project		x	x
Population:	Total Seam	Machine	Welder
Destruct Test Frequency (1 per)	1000 ft	1000 ft	1000 ft
Number of Required Destructs	0 ea	8 ea	6 ea

Date of Interest
enter mm-dd-yy
Note if blank will consider all dates.

Minimum # of Destructs Required
8 ea
For Project Period

Repair Number	Panel/ Seam				Repairer Initials	Machine Number	Repair Type	Repair size Length (ft)		Width (ft)	Trial Weld Number	Test Date dd-mm-yy	Tester Initials	Test P/F	Location/Comments
R-29	P-31	P-32			JH	95	Patch	4.5 ft	x	2.0 ft	12	7-Nov-22	BG	Pass	STA 0+76 (DS-6)
R-30	P-15	P-16	P-1		BL	88	Patch	2.0 ft	x	2.0 ft	11	8-Nov-22	BG	Pass	INTERSECTION
R-31	P-14	P-15	P-1		BL	88	Patch	2.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	INTERSECTION
R-32	P-13	P-14	P-1		BL	88	Patch	2.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	INTERSECTION
R-33	P-12	P-13			BL	88	Patch	5.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	STA 0+11 (DS-1)
R-34	P-31				JH	95	Patch	8.0 ft	x	2.0 ft	12	7-Nov-22	BG	Pass	STA 2+28
R-35	P-31	P-32			JH	95	Patch	2.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	STA 2+46
R-36	P-13				BL	88	Patch	2.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	STA 0+01
R-37	P-13				BL	88	Bead	0.5 ft	x		11	7-Nov-22	BG	Pass	STA 0+09
R-38	P-12	P-13	P-1		BL	88	Patch	2.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	INTERSECTION
R-39	P-11	P-12	P-1		BL	88	Patch	2.0 ft	x	2.0 ft	11	8-Nov-22	BG	Pass	INTERSECTION
R-40	P-10	P-11	P-1		BL	88	Patch	2.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	INTERSECTION
R-41	P-9	P-10	P-1		BL	88	Patch	5.0 ft	x	2.5 ft	11	7-Nov-22	BG	Pass	INTERSECTION
R-42	P-8	P-9	P-1		BL	88	Patch	2.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	INTERSECTION
R-43	P-7	P-8	P-1		BL	88	Patch	2.5 ft	x	2.0 ft	11	8-Nov-22	BG	Pass	INTERSECTION
R-44	P-2	P-3	P-7	P-1	BL	88	Patch	5.5 ft	x	2.0 ft	11	8-Nov-22	BG	Pass	INTERSECTION
R-45	P-3				BL	88	Patch	2.0 ft	x	2.0 ft	11	8-Nov-22	BG	Pass	STA 0+14
R-46	P-2	P-3	P-4	P-5	BL	88	Patch	2.0 ft	x	2.0 ft	11	8-Nov-22	BG	Pass	INTERSECTION
R-47	P-2	P-5			BL	88	Patch	9.0 ft	x	2.0 ft	11	8-Nov-22	BG	Pass	STA 0+15
R-48	P-4	P-5	P-6		BL	88	Patch	2.0 ft	x	1.5 ft	11	8-Nov-22	BG	Pass	INTERSECTION
R-49	P-30	P-31			JH	95	Patch	8.0 ft	x	2.0 ft	12	7-Nov-22	BG	Pass	STA 4+20
R-50	P-31				JH	95	Patch	16.0 ft	x	2.0 ft	12	7-Nov-22	BG	Pass	STA 4+20
R-51	P-31	P-32			JH	95	Patch	3.5 ft	x	2.0 ft	12	7-Nov-22	BG	Pass	STA 4+07
R-52	P-31	P-32			JH	95	Patch	2.0 ft	x	2.0 ft	12	7-Nov-22	BG	Pass	STA 3+92
R-53	P-31				JH	95	Patch	1.5 ft	x	2.0 ft	12	7-Nov-22	BG	Pass	STA 3+85
R-54	P-32				JH	95	Patch	6.0 ft	x	2.0 ft	12	8-Nov-22	BG	Pass	STA 0+64
R-55	P-31	P-32			JH	95	Patch	9.0 ft	x	2.0 ft	12	8-Nov-22	BG	Pass	STA 0+67
R-56					JH	95	Patch	18.0 ft	x	4.0 ft	12	8-Nov-22	BG	Pass	STA 0+60

REPAIR RECORD

Client Name:	Wisconsin Power and Light (WPL)	**SCS Engineers CQA Technician:**	Zana Bajalan	Date of Interest	Note if blank will consider all dates.
Project Location:	Columbia Dry Ash Disposal Facility		Jordan Main, et al.	enter mm-dd-yy	
	Town of Pacific, Wisconsin 53954				
SCS Engineers Project Name:	Modules 10 and 11 Liner Construction				
SCS Engineers Project Number:	25222157.01				

"x" indicates criteria applies to this project		x	x	
Population:	Total Seam	Machine	Welder	**Minimum # of Destructs Required**
Destruct Test Frequency (1 per)	1000 ft	1000 ft	1000 ft	
Number of Required Destructs	0 ea	8 ea	6 ea	**8 ea**
				For Project Period

Repair Number	Panel/ Seam				Repairer Initials	Machine Number	Repair Type	Repair size Length (ft)		Width (ft)	Trial Weld Number	Test Date dd-mm-yy	Tester Initials	Test P/F	Location/Comments
R-57	P-33				JH	95	Patch	13.5 ft	x	2.0 ft	12	8-Nov-22	BG	Pass	STA 0+57
R-58	P-33	P-34			JH	95	Patch	4.5 ft	x	2.0 ft	12	8-Nov-22	BG	Pass	STA 0+56
R-59	P-35	P-34			JH	95	Patch	2.0 ft	x	2.0 ft	12	8-Nov-22	BG	Pass	STA 2+63
R-60	P-14	P-15			BL	88	Patch	5.0 ft	x	2.0 ft	11	7-Nov-22	BG	Pass	STA 0+41
R-61	P-35				JH	95	Patch	2.0 ft	x	1.0 ft	13	8-Nov-22	BG	Pass	STA 0+39
R-62	P-35				JH	95	Patch	2.0 ft	x	2.5 ft	13	8-Nov-22	BG	Pass	STA 0+31
R-63	P-35				JH	95	Patch	2.0 ft	x	2.0 ft	13	8-Nov-22	BG	Pass	STA 0+24
R-64	P-35				JH	95	Patch	2.0 ft	x	2.0 ft	13	8-Nov-22	BG	Pass	STA 0+17
R-65	P-35				JH	95	Patch	2.0 ft	x	2.0 ft	13	8-Nov-22	BG	Pass	STA 0+11
R-66	P-36				JH	95	Patch	2.0 ft	x	2.0 ft	13	8-Nov-22	BG	Pass	STA 0+16
R-67	P-35				JH	95	Patch	2.0 ft	x	2.0 ft	13	8-Nov-22	BG	Pass	STA 0+02
R-68	P-35				JH	95	Patch	2.0 ft	x	2.0 ft	13	8-Nov-22	BG	Pass	STA 0+02
R-69	P-32	P-33			JH	95	Patch	3.0 ft	x	2.0 ft	13	8-Nov-22	BG	Pass	STA 0+03
R-70	P-1	P-29			JH	95	Patch	2.0 ft	x	2.0 ft	13	9-Nov-22	BG	Pass	STA 0+01
R-71	P-3				BL	88	Bead	0.5 ft	x		11	8-Nov-22	BG	Pass	STA 0+26
R-72	P-3				BL	88	Bead	0.5 ft	x		11	8-Nov-22	BG	Pass	STA 0+43
R-73	P-26	P-27			BL	88	Patch	5.0 ft	x	2.0 ft	14	7-Nov-22	BG	Pass	STA 0+26 (DS-2)
R-74	P-25	P-26			BL	88	Patch	1.5 ft	x	1.5 ft	14	7-Nov-22	BG	Pass	STA 0+40
R-75	R-18	P-31			JH	95	Patch	4.0 ft	x	2.0 ft	13	7-Nov-22	BG	Pass	STA 2+57 (DS-7)
R-76	R-14	P-1			JH	95	Patch	4.0 ft	x	2.0 ft	13	7-Nov-22	BG	Pass	STA 1+63 (DS-8)
R-77	P-31	P-32			JH	95	Bead	0.5 ft	x		12	9-Nov-22	BG	Pass	STA 1+41
R-78	P-28	P-40			LD	95	Patch	3.0 ft	x	2.0 ft	28	7-Nov-22	BG	Pass	STA 0+08
R-79	P-28	P-38	P-39	P-40	LD	95	Patch	19.0 ft	x	2.0 ft	28	7-Nov-22	BG	Pass	INTERSECTION
R-80	P-38	P-39	P-41		LD	95	Patch	2.5 ft	x	2.0 ft	28	7-Nov-22	BG	Pass	INTERSECTION
R-81	P-40	EX			VL	92	Patch	1.0 ft	x	1.0 ft	29	7-Nov-22	BG	Pass	STA 0+04
R-82	P-40	EX			VL	92	Patch	1.0 ft	x	1.0 ft	29	7-Nov-22	BG	Pass	STA 0+03
R-83	P-39	P-40	EX		VL	92	Patch	2.0 ft	x	2.0 ft	29	7-Nov-22	BG	Pass	INTERSECTION
R-84	P-39	EX			VL	92	Patch	1.5 ft	x	1.5 ft	29	7-Nov-22	BG	Pass	STA 0+11

REPAIR RECORD

Client Name: *Wisconsin Power and Light (WPL)*
Project Location: *Columbia Dry Ash Disposal Facility*
Town of Pacific, Wisconsin 53954
SCS Engineers Project Name: *Modules 10 and 11 Liner Construction*

SCS Engineers Project Number: *25222157.01*

SCS Engineers CQA Technician: *Zana Bajalan*
Jordan Main, et al.

Date of Interest
enter mm-dd-yy
Note if blank will consider all dates.

"x" indicates criteria applies to this project		x	x
Population:	Total Seam	Machine	Welder
Destruct Test Frequency (1 per)	1000 ft	1000 ft	1000 ft
Number of Required Destructs	0 ea	8 ea	6 ea

Minimum # of Destructs Required
8 ea
For Project Period

Repair Number	Panel/ Seam				Repairer Initials	Machine Number	Repair Type	Repair size Length (ft)		Width (ft)	Trial Weld Number	Test Date dd-mm-yy	Tester Initials	Test P/F	Location/Comments
R-85	P-39	P-41	EX		VL	92	Patch	1.0 ft	x	1.0 ft	29	7-Nov-22	BG	Pass	INTERSECTION
R-86	P-41	EX			VL	92	Patch	1.5 ft	x	1.5 ft	29	7-Nov-22	BG	Pass	STA 0+11
R-87	P-41	P42			VL	92	Patch	1.5 ft	x	1.5 ft	29	7-Nov-22	BG	Pass	INTERSECTION
R-88	P-42	EX			VL	92	Patch	1.0 ft	x	1.0 ft	29	7-Nov-22	BG	Pass	STA 0+12
R-89	P-42	P-43	EX		VL	92	Patch	1.0 ft	x	1.5 ft	29	7-Nov-22	BG	Pass	INTERSECTION
R-90	P-43	EX			VL	92	Patch	1.0 ft	x	1.0 ft	29	7-Nov-22	BG	Pass	STA 0+13
R-91	P-43	P-44	EX		VL	92	Patch	1.5 ft	x	1.5 ft	29	7-Nov-22	BG	Pass	INTERSECTION
R-92	P-44	EX			VL	92	Patch	1.0 ft	x	1.0 ft	29	7-Nov-22	BG	Pass	STA 0+13
R-93	P-44	P-45	EX		VL	92	Patch	2.5 ft	x	2.0 ft	29	7-Nov-22	BG	Pass	INTERSECTION
R-94	P-28	P-38	P-1	P-41	LD	95	Patch	6.0 ft	x	3.0 ft	28	7-Nov-22	BG	Pass	INTERSECTION
R-95	P-28	P-38			LD	95	Patch	2.0 ft	x	2.0 ft	28	7-Nov-22	BG	Pass	STA 0+06
R-96	P-1	P-29	P-41	P-42	LD	95	Patch	2.5 ft	x	2.0 ft	28	7-Nov-22	BG	Pass	STA 0+25
R-97	P-1	P-29			LD	95	Patch	3.0 ft	x	2.0 ft	28	7-Nov-22	BG	Pass	INTERSECTION
R-98	P-29	P-42	P-30		LD	95	Patch	3.5 ft	x	2.0 ft	28	7-Nov-22	BG	Pass	INTERSECTION
R-99	P-30	P-42	P-43		LD	95	Patch	5.0 ft	x	3.5 ft	28	7-Nov-22	BG	Pass	INTERSECTION
R-100	P-30	P-43			LD	95	Patch	3.0 ft	x	2.0 ft	28	7-Nov-22	BG	Pass	STA 0+08
R-101	P-30	P-43			LD	95	Patch	6.0 ft	x	2.0 ft	28	7-Nov-22	BG	Pass	STA 0+04
R-102	P-30	P-43	P-44		LD	95	Patch	4.0 ft	x	2.0 ft	28	7-Nov-22	BG	Pass	INTERSECTION
R-103	P-30	P-31	P-44		LD	95	Patch	13.0 ft	x	3.0 ft	28	7-Nov-22	BG	Pass	INTERSECTION
R-104	P-31	P-32	P-44	P-45	LD	95	Patch	22.5 ft	x	2.0 ft	28	7-Nov-22	BG	Pass	INTERSECTION
R-105	P-32	P-33	P-45		LD	95	Patch	4.0 ft	x	2.0 ft	28	8-Nov-22	BG	Pass	INTERSECTION
R-106	P-33	P-45	P-46		LD	95	Patch	1.0 ft	x	1.5 ft	28	8-Nov-22	BG	Pass	INTERSECTION
R-107	P-33	P-34	P-46	P-47	LD	95	Patch	4.0 ft	x	2.0 ft	28	8-Nov-22	BG	Pass	INTERSECTION
R-108	P-46	EX			VL	92	Patch	1.0 ft	x	1.0 ft	29	8-Nov-22	BG	Pass	STA 0+12
R-109	P-46	P-47	EX		VL	92	Patch	1.0 ft	x	1.0 ft	29	8-Nov-22	BG	Pass	INTERSECTION
R-110	P-47	EX			LD	95	Patch	1.5 ft	x	1.5 ft	28	8-Nov-22	BG	Pass	STA 0+13
R-111	P-47	P-48	EX		LD	95	Patch	2.0 ft	x	2.0 ft	28	8-Nov-22	BG	Pass	INTERSECTION
R-112	P-48	EX			LD	95	Patch	1.5 ft	x	1.5 ft	28	8-Nov-22	BG	Pass	STA 0+13

REPAIR RECORD

Client Name: Wisconsin Power and Light (WPL)
Project Location: Columbia Dry Ash Disposal Facility
Town of Pacific, Wisconsin 53954
SCS Engineers Project Name: Modules 10 and 11 Liner Construction
SCS Engineers Project Number: 25222157.01

SCS Engineers CQA Technician: Zana Bajalan
Jordan Main, et al.

Date of Interest
enter mm-dd-yy
Note if blank will consider all dates.

"x" indicates criteria applies to this project		x	x
Population:	Total Seam	Machine	Welder
Destruct Test Frequency (1 per)	1000 ft	1000 ft	1000 ft
Number of Required Destructs	0 ea	8 ea	6 ea

Minimum # of Destructs Required
8 ea
For Project Period

Repair Number	Panel/ Seam				Repairer Initials	Machine Number	Repair Type	Repair size Length (ft)		Width (ft)	Trial Weld Number	Test Date dd-mm-yy	Tester Initials	Test P/F	Location/Comments
R-113	P-48	P-49	EX		LD	95	Patch	1.5 ft	x	1.5 ft	28	8-Nov-22	BG	Pass	INTERSECTION
R-114	P-49	EX			LD	95	Patch	1.5 ft	x	1.5 ft	28	8-Nov-22	BG	Pass	STA 0+13
R-115	P-49	P-50	EX		LD	95	Patch	1.5 ft	x	1.5 ft	28	8-Nov-22	BG	Pass	INTERSECTION
R-116	P-34	P-35	P-47	P-48	LD	95	Patch	14.0 ft	x	2.0 ft	28	8-Nov-22	BG	Pass	INTERSECTION
R-117	P-35	P-36	P-48	P-49	LD	95	Patch	2.0 ft	x	2.0 ft	28	8-Nov-22	BG	Pass	INTERSECTION
R-118	P-52	P-53	P-60	P-61	LD	94	Patch	6.0 ft	x	2.0 ft	34	7-Nov-22	CH	Pass	INTERSECTION
R-119	P-37	P-50	P-36	P-49	LD	94	Patch	22.0 ft	x	2.0 ft	34	8-Nov-22	BG	Pass	INTERSECTION
R-120	R119				LD	94	Bead	0.4 ft	x		34	8-Nov-22	BG	Pass	STA 0+11
R-121	P-37	P-50	P-53	P-60	LD	94	Patch	2.0 ft	x	2.0 ft	34	8-Nov-22	BG	Pass	INTERSECTION
R-122	P-37	P-53			LD	94	Patch	4.5 ft	x	2.0 ft	34	7-Nov-22	DH	Pass	STA 2+10
R-123	P-37				LD	94	Patch	1.5 ft	x	1.5 ft	34	7-Nov-22	DH	Pass	STA 2+08
R-124	P-37	P-53			LD	94	Patch	3.0 ft	x	2.0 ft	34	7-Nov-22	CH	Pass	STA 1+56
R-125	P-37	P-53			LD	94	Patch	2.0 ft	x	2.0 ft	34	7-Nov-22	CH	Pass	STA 0+90
R-126	P-37	P-53			LD	94	Patch	3.0 ft	x	2.0 ft	34	7-Nov-22	DH	Pass	STA 0+77
R-127	P-37				LD	94	Patch	1.0 ft	x	1.0 ft	34	7-Nov-22	DH	Pass	STA 0+73
R-128	P-37				LD	94	Bead	5.0 ft	x		34	7-Nov-22	DH	Pass	STA 0+74
R-129	P-52	P-54	P-61	P-62	LD	94	Patch	3.0 ft	x	4.0 ft	34	7-Nov-22	DH	Pass	INTERSECTION
R-130	P-52	P-54	P-62		LD	94	Patch	2.5 ft	x	2.5 ft	34	7-Nov-22	DH	Pass	INTERSECTION
R-131	P-61	P-62			VL	92	Patch	2.0 ft	x	2.0 ft	34	7-Nov-22	DH	Pass	STA 0+20
R-132	P-61	P-62			LD	94	Bead	5.0 ft	x	2.0 ft	33	8-Nov-22	BG	Pass	INTERSECTION
R-133	P-61	P-62	EX		VL	92	Patch	4.0 ft	x	2.0 ft	33	8-Nov-22	BG	Pass	STA 0+07
R-137	P-37				LD	94	BEAD	5.0 ft	x		34	7-Nov-22	DH	Pass	STA 2+08
R-138	P-37	P-53			LD	94	PATCH	3.0 ft	x	2.0 ft	34	7-Nov-22	CH	Pass	STA 1+14
R-139	P-53				LD	94	BEAD	0.2 ft	x		34	7-Nov-22	DH	Pass	STA 0+53
R-140	P-52				LD	94	BEAD	0.2 ft	x		34	7-Nov-22	DH	Pass	STA 0+48
R-141	P-52				LD	94	BEAD	0.2 ft	x		34	7-Nov-22	DH	Pass	STA 0+47
R-142	P-52	P-63	EX		VL	92	PATCH	4.0 ft	x	2.0 ft	33	8-Nov-22	BG	Pass	INTERSECTION
R-143	P-63	P-64	EX		VL	92	PATCH	4.0 ft	x	2.0 ft	33	8-Nov-22	BG	Pass	INTERSECTION

REPAIR RECORD

Client Name: Wisconsin Power and Light (WPL)
Project Location: Columbia Dry Ash Disposal Facility
Town of Pacific, Wisconsin 53954
SCS Engineers Project Name: Modules 10 and 11 Liner Construction

SCS Engineers Project Number: 25222157.01

SCS Engineers CQA Technician: Zana Bajalan
Jordan Main, et al.

Date of Interest
enter mm-dd-yy

Note if blank will consider all dates.

"x" indicates criteria applies to this project		x	x
Population:	Total Seam	Machine	Welder
Destruct Test Frequency (1 per)	1000 ft	1000 ft	1000 ft
Number of Required Destructs	0 ea	8 ea	6 ea

Minimum # of Destructs Required
8 ea
For Project Period

Repair Number	Panel/ Seam				Repairer Initials	Machine Number	Repair Type	Repair size Length (ft)		Width (ft)	Trial Weld Number	Test Date dd-mm-yy	Tester Initials	Test P/F	Location/Comments
R-144	P-64	P-65	EX		VL	92	Patch	2.0 ft	x	2.0 ft	33	8-Nov-22	BG	Pass	INTERSECTION
R-145	P-65	P-66	EX		VL	92	Patch	3.5 ft	x	4.0 ft	33	8-Nov-22	BG	Pass	INTERSECTION
R-146	P-66	P-68	EX		VL	92	Patch	3.0 ft	x	2.0 ft	33	7-Nov-22	CH	Pass	INTERSECTION
R-147	P-68	P-75	EX		VL	92	Patch	3.0 ft	x	1.0 ft	33	7-Nov-22	CH	Pass	INTERSECTION
R-148	P-54	P-55	P-63	P-62	LD	94	Patch	3.0 ft	x	3.0 ft	34	7-Nov-22	CH	Pass	INTERSECTION
R-149	P-55	P-56	P-64	P-63	LD	94	Patch	3.0 ft	x	2.0 ft	34	7-Nov-22	CH	Pass	INTERSECTION
R-150	P-64				LD	94	Patch	3.0 ft	x	2.0 ft	34	8-Nov-22	BG	Pass	STA 0+09 ON SEAM P-56/P-64
R-151	P-64	P-65	P-57	P-56	LD	94	Patch	3.0 ft	x	2.0 ft	34	8-Nov-22	BG	Pass	INTERSECTION
R-152	P-57	P-58	P-65	P-67	LD	94	Patch	6.0 ft	x	2.0 ft	34	8-Nov-22	BG	Pass	INTERSECTION
R-153	P-58	P-65	P-66		LD	94	Patch	3.0 ft	x	2.0 ft	34	8-Nov-22	BG	Pass	INTERSECTION
R-154	P-58	P-67			LD	94	Patch	2.0 ft	x	2.0 ft	34	8-Nov-22	BG	Pass	STA 0+15
R-155	P-66	P-65	P-67		LD	94	Patch	4.5 ft	x	2.0 ft	34	7-Nov-22	CH	Pass	INTERSECTION
R-156	P-58	P-59	P-67	P-68	LD	94	Patch	4.0 ft	x	2.0 ft	34	7-Nov-22	CH	Pass	INTERSECTION
R-157	P-50	EX			VL	92	Patch	1.5 ft	x	1.0 ft	33	8-Nov-22	BG	Pass	STA 0+13
R-158	P-50	P-60	EX		VL	92	Patch	1.5 ft	x	1.5 ft	33	8-Nov-22	BG	Pass	INTERSECTION
R-159	P-60	EX			VL	92	Patch	1.5 ft	x	1.5 ft	33	8-Nov-22	BG	Pass	STA 0+11
R-160	P-60	P-61	EX		VL	92	Patch	5.0 ft	x	2.0 ft	33	8-Nov-22	BG	Pass	INTERSECTION
R-161	P-51	P-37			LD	94	Patch	3.0 ft	x	2.0 ft	34	7-Nov-22	CH	Pass	STA 0+34
R-162	P-37				LD	94	Patch	1.0 ft	x	1.0 ft	34	7-Nov-22	CH	Pass	STA 0+34
R-163	P-37				LD	94	Bead	5.0 ft	x		34	7-Nov-22	CH	Pass	STA 0+34
R-164	P-51	P-37			LD	94	Patch	2.0 ft	x	3.0 ft	34	7-Nov-22	CH	Pass	STA 1+43
R-165	P-56	P-57			JH	95	Patch	3.0 ft	x	2.0 ft	45	8-Nov-22	BG	Pass	STA 4+66
R-166	P-56	P-57			JH	95	Patch	3.5 ft	x	6.5 ft	45	9-Nov-22	BG	Pass	STA 4+86
R-167	P-56	P-57			JH	95	Patch	5.0 ft	x	2.0 ft	45	8-Nov-22	BG	Pass	STA 5+00
R-168	P-36				JH	95	Bead	0.1 ft	x		45	8-Nov-22	BG	Pass	STA 0+00
R-169	P-52	P-54			JH	95	Patch	1.0 ft	x	1.0 ft	45	7-Nov-22	CH	Pass	STA 5+00
R-170	P-58	P-57			JH	95	Patch	5.5 ft	x	2.0 ft	45	8-Nov-22	BG	Pass	STA 0+67
R-171	P-58	P-57			JH	95	Patch	2.0 ft	x	2.0 ft	45	8-Nov-22	BG	Pass	STA 0+73

REPAIR RECORD

Client Name: Wisconsin Power and Light (WPL)
Project Location: Columbia Dry Ash Disposal Facility
Town of Pacific, Wisconsin 53954
SCS Engineers Project Name: Modules 10 and 11 Liner Construction
SCS Engineers Project Number: 25222157.01

SCS Engineers CQA Technician: Zana Bajalan
Jordan Main, et al.

"x" indicates criteria applies to this project		x	x
Population:	Total Seam	Machine	Welder
Destruct Test Frequency (1 per)	1000 ft	1000 ft	1000 ft
Number of Required Destructs	0 ea	8 ea	6 ea

Date of Interest
enter mm-dd-yy
Note if blank will consider all dates.

Minimum # of Destructs Required
8 ea
For Project Period

Repair Number	Panel/ Seam				Repairer Initials	Machine Number	Repair Type	Repair size Length (ft)		Width (ft)	Trial Weld Number	Test Date dd-mm-yy	Tester Initials	Test P/F	Location/Comments
R-172	P-59	P-58			JH	95	Patch	14.0 ft	x	2.0 ft	45	8-Nov-22	BG	Pass	STA 0+60
R-173	P-59	P-58			JH	95	Patch	20.0 ft	x	2.0 ft	45	7-Nov-22	CH	Pass	STA 0+75
R-174	P-59	P-69			JH	95	Patch	3.5 ft	x	2.0 ft	45	8-Nov-22	BG	Pass	STA 0+44
R-175	P-58	P-59			JH	95	Patch	3.0 ft	x	2.0 ft	45	7-Nov-22	CH	Pass	STA 0+92
R-176	P-59	P-69			JH	95	Patch	3.0 ft	x	2.0 ft	45	7-Nov-22	CH	Pass	STA 0+13
R-177	P-59	P-69			JH	95	Patch	2.0 ft	x	1.0 ft	45	7-Nov-22	CH	Pass	STA 0+00
R-178	P-68	P-75	P-69	P-59	LD	94	Patch	5.0 ft	x	2.0 ft	41	7-Nov-22	CH	Pass	INTERSECTION
R-179	P-69	P-70	P-75	P-76	LD	94	Patch	4.0 ft	x	4.0 ft	41	7-Nov-22	CH	Pass	INTERSECTION
R-180	P-76	P-77	P-70	P-71	LD	94	Patch	4.0 ft	x	5.0 ft	41	7-Nov-22	CH	Pass	INTERSECTION
R-181	P-71	P-73	P-77	P-78	LD	94	Patch	5.0 ft	x	2.0 ft	41	7-Nov-22	CH	Pass	INTERSECTION
R-182	P-71	P-73			LD	94	Patch	22.0 ft	x	2.0 ft	41	7-Nov-22	DH	Pass	STA 2+63
R-183	P-71	P-73			LD	94	Patch	2.0 ft	x	2.0 ft	41	7-Nov-22	DH	Pass	STA 2+26
R-184	P-73	P-74			LD	94	Patch	2.0 ft	x	2.0 ft	41	7-Nov-22	CH	Pass	STA 4+61
R-185	P-71	P-73			LD	94	Patch	5.0 ft	x	2.0 ft	41	7-Nov-22	CH	Pass	STA 1+28
R-186	P-71	R185			LD	94	Bead	1.5 ft	x		41	7-Nov-22	CH	Pass	STA 1+28
R-187	P-71	P-73			LD	94	Patch	5.0 ft	x	2.0 ft	41	7-Nov-22	CH	Pass	STA 1+00
R-188	P-71	P-73			LD	94	Patch	2.0 ft	x	2.0 ft	41	8-Nov-22	BG	Pass	STA 0+86
R-189	P-71	P-72			JH	95	Patch	2.0 ft	x	2.0 ft	45	7-Nov-22	CH	Pass	STA 0+00
R-190	P-72	P-74			JH	95	PATCH	0.5 ft	x	1.5 ft	45	7-Nov-22	DH	Pass	STA 0+00
R-191	P-72	P-74			JH	95	PATCH	7.0 ft	x	2.0 ft	45	7-Nov-22	DH	Pass	STA 0+16
R-192	P-71	P-72			JH	95	PATCH	6.0 ft	x	3.0 ft	45	8-Nov-22	BG	Pass	STA 0+35
R-193	P-71	P-72			JH	95	PATCH	2.0 ft	x	2.0 ft	45	8-Nov-22	BG	Pass	STA 0+35
R-194	P-71	P-70			JH	95	Patch	3.0 ft	x	2.0 ft	45	7-Nov-22	DH	Pass	STA 0+78
R-195	P-70	P-71			JH	95	Patch	3.0 ft	x	2.0 ft	45	7-Nov-22	DH	Pass	STA 1+07
R-196	P-75	P-76	EX		VL	92	Patch	4.0 ft	x	2.0 ft	40	7-Nov-22	CH	Pass	INTERSECTION
R-197	P-76	P-77	EX		VL	92	Patch	4.0 ft	x	2.0 ft	40	7-Nov-22	CH	Pass	INTERSECTION
R-198	P-77	EX			VL	92	Patch	1.5 ft	x	1.0 ft	40	7-Nov-22	CH	Pass	STA 0+09
R-199	P-77	EX			VL	92	Bead	0.2 ft	x		40	7-Nov-22	CH	Pass	STA 0+01

REPAIR RECORD

Client Name:	Wisconsin Power and Light (WPL)	**SCS Engineers CQA Technician:**	Zana Bajalan
Project Location:	Columbia Dry Ash Disposal Facility		Jordan Main, et al.
	Town of Pacific, Wisconsin 53954		
SCS Engineers Project Name:	Modules 10 and 11 Liner Construction		
SCS Engineers Project Number:	25222157.01		

Date of Interest
enter mm-dd-yy

Note if blank will consider all dates.

"x" indicates criteria applies to this project		x	x
Population:	Total Seam	Machine	Welder
Destruct Test Frequency (1 per)	1000 ft	1000 ft	1000 ft
Number of Required Destructs	0 ea	8 ea	6 ea

Minimum # of Destructs Required
8 ea
For Project Period

Repair Number	Panel/ Seam				Repairer Initials	Machine Number	Repair Type	Repair size Length (ft)		Width (ft)	Trial Weld Number	Test Date dd-mm-yy	Tester Initials	Test P/F	Location/Comments
R-200	P-77	EX			VL	92	Patch	2.0 ft	x	2.0 ft	40	7-Nov-22	CH	Pass	STA 0+08
R-201	P-77	P-78	EX		VL	92	Patch	2.0 ft	x	2.0 ft	40	7-Nov-22	CH	Pass	STA 0+03
R-202	P-78	EX			VL	92	Patch	1.0 ft	x	1.0 ft	40	7-Nov-22	CH	Pass	STA 0+09
R-203	P-78	P-81	EX		VL	92	Patch	1.0 ft	x	1.0 ft	40	7-Nov-22	CH	Pass	INTERSECTION
R-204	P-81	EX			VL	92	Patch	1.0 ft	x	1.0 ft	40	7-Nov-22	CH	Pass	STA 0+08
R-205	P-78	P-80	P-81		VL	92	Patch	1.0 ft	x	1.0 ft	40	9-Nov-22	BG	Pass	INTERSECTION
R-206	P-78	P-79	P-80		VL	92	Patch	1.0 ft	x	1.0 ft	40	7-Nov-22	DH	Pass	INTERSECTION
R-207	P-73	P-78	P-74	P-79	LD	94	Patch	6.0 ft	x	3.5 ft	41	7-Nov-22	DH	Pass	INTERSECTION
R-208	P-73	P-74			LD	94	Patch	2.0 ft	x	2.0 ft	41	7-Nov-22	DH	Pass	STA 3+17
R-209	P-72	P-73	P-74		LD	94	Patch	5.5 ft	x	2.0 ft	41	7-Nov-22	DH	Pass	INTERSECTION
R-210	P-73	P-72	P-71		LD	94	Patch	14.0 ft	x	2.0 ft	41	7-Nov-22	DH	Pass	INTERSECTION
R-211	P-71	P-72			JH	95	Patch	2.0 ft	x	2.0 ft	45	7-Nov-22	DH	Pass	STA 2+35
R-212	P-72	P-74			JH	95	Patch	2.0 ft	x	1.0 ft	45	7-Nov-22	DH	Pass	STA 2+10
R-213	P-71	P-72			JH	95	Patch	4.0 ft	x	2.0 ft	45	7-Nov-22	CH	Pass	STA 1+85
R-214	P-71	P-72			JH	95	Patch	9.0 ft	x	2.0 ft	45	7-Nov-22	CH	Pass	STA 1+00
R-215	P-72	P-74			JH	95	Patch	2.0 ft	x	2.0 ft	45	7-Nov-22	CH	Pass	STA 0+90
R-216	P-72	P-74			JH	95	Patch	3.5 ft	x	2.0 ft	45	7-Nov-22	DH	Pass	STA 0+67
R-217	P-56	P-57			JH	95	Patch	3.0 ft	x	2.0 ft	45	7-Nov-22	CH	Pass	STA 4+22
R-218	P-54	P-55			LD	94	Patch	2.0 ft	x	2.0 ft	41	7-Nov-22	DH	Pass	STA 3+94
R-219	P-67	P-58			LD	94	Patch	2.0 ft	x	2.0 ft	34	8-Nov-22	BG	Pass	STA 0+11
R-220	P-37	P-51	P-53		LD	94	Patch	4.0 ft	x	2.0 ft	34	7-Nov-22	DH	Pass	INTERSECTION
R-221	P-51	P-52	P-53		LD	94	Patch	6.0 ft	x	2.0 ft	34	7-Nov-22	DH	Pass	INTERSECTION
R-222	P-57				LD	94	Bead	6.0 ft	x		41	7-Nov-22	DH	Pass	STA 0+88 ON SEAM P57-P58
R-223	P-57	P-58			LD	94	Patch	2.0 ft	x	2.0 ft	41	7-Nov-22	DH	Pass	STA 1+05
R-224	P-57	P-58			LD	94	Patch	2.0 ft	x	2.0 ft	41	7-Nov-22	CH	Pass	STA 1+71
R-225	P-57	P-58			LD	94	Patch	3.0 ft	x	2.0 ft	41	8-Nov-22	BG	Pass	STA 2+38
R-226	P-57	P-58			LD	94	Patch	3.0 ft	x	2.0 ft	41	8-Nov-22	BG	Pass	STA 3+08
R-227	P-59	P-69			JH	95	Patch	2.0 ft	x	2.0 ft	45	7-Nov-22	CH	Pass	STA 1+19

REPAIR RECORD

Client Name: Wisconsin Power and Light (WPL)
Project Location: Columbia Dry Ash Disposal Facility
Town of Pacific, Wisconsin 53954
SCS Engineers Project Name: Modules 10 and 11 Liner Construction
SCS Engineers Project Number: 25222157.01

SCS Engineers CQA Technician: Zana Bajalan
Jordan Main, et al.

"x" indicates criteria applies to this project		x	x
Population:	Total Seam	Machine	Welder
Destruct Test Frequency (1 per)	1000 ft	1000 ft	1000 ft
Number of Required Destructs	0 ea	8 ea	6 ea

Date of Interest
enter mm-dd-yy
Note if blank will consider all dates.

Minimum # of Destructs Required
8 ea
For Project Period

Repair Number	Panel/Seam				Repairer Initials	Machine Number	Repair Type	Repair size Length (ft)		Width (ft)	Trial Weld Number	Test Date dd-mm-yy	Tester Initials	Test P/F	Location/Comments
R-228	P-59	P-69			JH	95	Bead	1.0 ft	x		45	8-Nov-22	BG	Pass	STA 0+93
R-229	P-70	P-71			LD	94	Patch	2.0 ft	x	2.0 ft	41	7-Nov-22	CH	Pass	STA 4+18
R-230	P-74	P-79			JH	95	Patch	2.0 ft	x	0.5 ft	45	9-Nov-22	BG	Pass	ANCHOR TRENCH
R-231	P-45	EX			VL	92	Patch	2.0 ft	x	1.5 ft	29	8-Nov-22	BG	Pass	STA 0+11
R-232	P-29	P-30			LD	95	Patch	1.5 ft	x	1.0 ft	28	7-Nov-22	BG	Pass	STA 0+07
R-233	P-12	P-13			LD	94	Patch	25.0 ft	x	2.0 ft	46	7-Nov-22	BG	Pass	DS-1B
R-234	P-11	P-12			LD	94	Patch	5.0 ft	x	2.0 ft	46	7-Nov-22	BG	Pass	DS-1A
R-235	P-36	P-35			LD	94	Patch	4.0 ft	x	2.0 ft	46	8-Nov-22	BG	Pass	STA 3+05 (DS-9)
R-236	P-51	P-37			LD	94	Patch	3.5 ft	x	2.0 ft	46	7-Nov-22	DH	Pass	STA 2+39 (DS-12)
R-237	P-37	P-36			LD	94	Patch	3.5 ft	x	2.0 ft	46	8-Nov-22	BG	Pass	STA 0+70 (DS-10)
R-238	P-51	P-52			LD	94	Patch	4.0 ft	x	2.0 ft	46	7-Nov-22	CH	Pass	STA 2+10 (DS-11)
R-239	P-54	P-55			LD	94	Patch	4.0 ft	x	2.0 ft	46	7-Nov-22	DH	Pass	STA 0+56 (DS-13)
R-240	P-60	P-50			LD	94	Patch	4.0 ft	x	2.0 ft	46	8-Nov-22	BG	Pass	STA 0+16 (DS-14)
R-241	R-94	P-38			LD	94	Patch	4.0 ft	x	2.0 ft	46	7-Nov-22	BG	Pass	DS-15
R-242	R-132	P-61			LD	94	Patch	4.0 ft	x	2.0 ft	46	8-Nov-22	BG	Pass	DS-16
R-243	P-56	P-57			LD	94	Patch	4.0 ft	x	2.0 ft	46	7-Nov-22	DH	Pass	STA 0+85 (DS-18)
R-244	P-57	P-58			LD	94	Patch	4.0 ft	x	2.0 ft	46	7-Nov-22	CH	Pass	STA 1+53 (DS-19)
R-245	P-59	P-69			JH	95	Patch	1.0 ft	x	1.0 ft	45	7-Nov-22	CH	Pass	STA 2+22
R-246	P-59	P-69			JH	95	Patch	1.0 ft	x	1.0 ft	45	7-Nov-22	CH	Pass	STA 2+44
R-247	P-59	P-69			LD	94	Patch	4.0 ft	x	2.0 ft	46	7-Nov-22	DH	Pass	STA 2+27 (DS-20)
R-248	P-69				LD	94	Patch	2.0 ft	x	2.0 ft	46	7-Nov-22	DH	Pass	STA 2+29
R-249	P-72	P-74			LD	94	Patch	4.0 ft	x	2.0 ft	46	7-Nov-22	DH	Pass	STA 1+33 (DS-22)
R-250	P-71	P-73			LD	94	Patch	4.0 ft	x	2.0 ft	46	7-Nov-22	DH	Pass	STA 2+89 (DS-21)
R-251	R-182	P-71			LD	94	Patch	4.0 ft	x	2.0 ft	46	9-Nov-22	BG	Pass	DS-23
R-252	P-76	P-75			LD	94	Patch	4.0 ft	x	2.0 ft	46	8-Nov-22	BG	Pass	STA 0+43 (DS-17)
R-253	P-45				LD	94	Patch	19.0 ft	x	2.0 ft	47	8-Nov-22	BG	Pass	STA 0+19 on seam P-44 - P45
R-254	P-59	P-69			LD	94	Patch	2.0 ft	x	2.0 ft	41	7-Nov-22	CH	Pass	STA 4+67
R-255	P-58	P-59			JH	95	Patch	3.0 ft	x	2.0 ft	45	8-Nov-22	BG	Pass	STA 2+75

REPAIR RECORD

Client Name: Wisconsin Power and Light (WPL)
Project Location: Columbia Dry Ash Disposal Facility
Town of Pacific, Wisconsin 53954
SCS Engineers Project Name: Modules 10 and 11 Liner Construction
SCS Engineers Project Number: 25222157.01

SCS Engineers CQA Technician: Zana Bajalan
Jordan Main, et al.

Date of Interest
enter mm-dd-yy
Note if blank will consider all dates.

"x" indicates criteria applies to this project		x	x
Population:	Total Seam	Machine	Welder
Destruct Test Frequency (1 per)	1000 ft	1000 ft	1000 ft
Number of Required Destructs	0 ea	8 ea	6 ea

Minimum # of Destructs Required
8 ea
For Project Period

Repair Number	Panel/ Seam				Repairer Initials	Machine Number	Repair Type	Repair size Length (ft)		Width (ft)	Trial Weld Number	Test Date dd-mm-yy	Tester Initials	Test P/F	Location/Comments
R-256	P-12	P-13			LD	94	Patch	21.0 ft	x	2.5 ft	48	8-Nov-22	BG	Pass	STA 0+31
R-257	P-11	P-12			LD	94	Patch	16.0 ft	x	2.0 ft	48	8-Nov-22	BG	Pass	STA 0+35
R-258	R-256	P-12			LD	94	Patch	5.0 ft	x	2.0 ft	48	8-Nov-22	BG	Pass	STA 0+31
R-259	P-50				LD	94	Bead	1.0 ft	x		34	8-Nov-22	BG	Pass	STA 0+06
R-260	P-36	P-25			CV	88	Patch	34.0 ft	x	2.0 ft	34	9-Nov-22	BG	Pass	STA 2+80
R-261	R-262	P-35			CV	88	Patch	4.0 ft	x	1.0 ft	49	9-Nov-22	BG	Pass	STA 3+13
R-262	P-36	P-35			CV	88	Patch	56.0 ft	x	2.0 ft	34	9-Nov-22	BG	Pass	STA 3+30
R-263	P-60	P-61			CV	88	Patch	6.0 ft	x	2.0 ft	34	9-Nov-22	BG	Pass	STA 0+08
R-264	P-46	P-45	Ex		VL	92	Patch	2.0 ft	x	2.0 ft	29	8-Nov-22	BG	Pass	Intersection
R-265	P-60	P-50			CV	88	Patch	16.0 ft	x	2.0 ft	50	9-Nov-22	CV	Pass	STA 0+08
R-266	P-60	P-50			CV	88	Patch	16.0 ft	x	2.0 ft	50	9-Nov-22	CV	Pass	STA 0+25
R-267	P-60	P-61			CV	88	Patch	4.0 ft	x	2.5 ft	50	9-Nov-22	CV	Pass	STA 0+03
R-268	P-60	P-61			CV	88	Patch	23.0 ft	x	2.0 ft	50	10-Nov-22	CV	Pass	STA 0+20
R-269	P-61	P-62			CV	88	Patch	13.0 ft	x	2.0 ft	50	10-Nov-22	CV	Pass	STA 0+13
R-270	P-61	P-62			CV	88	Patch	20.0 ft	x	2.0 ft	51	10-Nov-22	CV	Pass	STA 0+29
R-271	P-52	P-62			CV	88	Patch	9.0 ft	x	2.0 ft	51	10-Nov-22	CV	Pass	STA 0+05
R-272	P-62	P-63			CV	88	Patch	40.0 ft	x	2.0 ft	51	10-Nov-22	CV	Pass	STA 0+20
R-273	P-63	P-64			CV	88	Patch	40.0 ft	x	2.0 ft	51	10-Nov-22	CV	Pass	STA 0+20
R-274	P-68	P-66			CV	88	Patch	5.0 ft	x	2.0 ft	51	10-Nov-22	CV	Pass	STA 0+15
R-275	P-68	P-66			CV	88	Patch	2.0 ft	x	2.0 ft	51	10-Nov-22	CV	Pass	STA 0+39
R-276	P-74	R-215			BL	104	Patch	1.5 ft	x	1.0 ft	52	13-Dec-22	CC	Pass	INTERSECTION
R-277	P-71				BL	104	Patch	4.0 ft	x	1.5 ft	52	13-Dec-22	CC	Pass	STA 0+30 ON SEAM P71-P72 (LT-10, LT-12)
R-278	P-69				BL	104	Patch	8.0 ft	x	2.0 ft	52	13-Dec-22	CV	Pass	STA 0+29 ON SEAM P69-P70 (LT-9)
R-279	P-71	R-214			BL	104	Patch	4.0 ft	x	1.5 ft	52	13-Dec-22	CC	Pass	INTERSECTION
R-280	P-9	P-1	R-41		JH	97	Patch	1.0 ft	x	1.0 ft	53	13-Dec-22	MC	Pass	INTERSECTION (LT-6)
R-281	P-11				JH	97	Patch	1.5 ft	x	1.0 ft	53	13-Dec-22	MC	Pass	STA 0+20 ON SEAM P11-P12 (LT-11)
R-282	P-11				JH	97	Patch	7.5 ft	x	5.0 ft	53	13-Dec-22	MC	Pass	STA 0+20 ON SEAM P11-P12 (LT-5)
R-283	P-13				JH	97	Patch	2.0 ft	x	2.0 ft	53	13-Dec-22	MC	Pass	STA 0+22 ON SEAM P12-P-13 (LT-4)

REPAIR RECORD

Client Name: Wisconsin Power and Light (WPL)
Project Location: Columbia Dry Ash Disposal Facility
Town of Pacific, Wisconsin 53954
SCS Engineers Project Name: Modules 10 and 11 Liner Construction
SCS Engineers Project Number: 25222157.01

SCS Engineers CQA Technician: Zana Bajalan
Jordan Main, et al.

Date of Interest
enter mm-dd-yy
Note if blank will consider all dates.

"x" indicates criteria applies to this project		x	x
Population:	Total Seam	Machine	Welder
Destruct Test Frequency (1 per)	1000 ft	1000 ft	1000 ft
Number of Required Destructs	0 ea	8 ea	6 ea

Minimum # of Destructs Required
8 ea
For Project Period

Repair Number	Panel/ Seam				Repairer Initials	Machine Number	Repair Type	Repair size Length (ft)		Width (ft)	Trial Weld Number	Test Date dd-mm-yy	Tester Initials	Test P/F	Location/Comments
R-284	P-55				BL	104	Patch	2.0 ft	x	1.5 ft	52	13-Dec-22	CV	Pass	STA 4+55 ON SEAM P55-P56 (LT-8)
R-285	P-17				JH	97	Patch	4.0 ft	x	2.5 ft	53	13-Dec-22	MC	Pass	STA 0+20 ON SEAM P16-P17 (LT-3)
R-286	P-52				BL	104	Patch	6.0 ft	x	3.0 ft	52	13-Dec-22	CV	Pass	STA 2+80 ON SEAM P51-52 (LT-7)
R-287	P-52				BL	104	Patch	6.0 ft	x	3.0 ft	52	13-Dec-22	CC	Pass	ANCHOR TRENCH (LT-13)
R-288	P-61	R-270			JH	97	Patch	1.0 ft	x	1.0 ft	53	13-Dec-22	CV	Pass	INTERSECTION (LT-2)
R-289	P-56				JH	97	Patch	1.0 ft	x	1.0 ft	53	13-Dec-22	MC	Pass	STA 0+10 ON SEAM P55-P56 (LT-1)
R-290	P-58				BL	104	Patch	1.0 ft	x	1.0 ft	52	13-Dec-22	CV	Pass	STA 0+02
R-291	P-29				JH	97	Patch	1.0 ft	x	1.0 ft	52	13-Dec-22	MC	Pass	ANCHOR TRENCH (LT-14)
									x						
									x						
									x						
									x						
									x						
									x						
									x						
									x						
									x						

Appendix K

Tensiometer Calibration Certifications

DEMTECH Services Inc.

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester [T-0100/A or T-0100SE/A]
Device Calibrated: S-Type load cell
Range: 0 - 750 lbs. Tension
Model No: M2405-750#
Serial No: 8671

Calibration Apparatus:

Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029
A/D Module Serial No: 3106208671
Channel No: N/A

Dead Weight:		Reference Cell:	
W1	2	R1	2
W2	152	R2	152
W3	302	R3	302

Indicator reading with no load: 0

Offse 6.198789 Scale: 4.782764

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F
Exitation 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: Marc Scott
Signature: Marc Scott

Date: 09/08/22

DEMTECH Services Inc.®

CALIBRATION CERTIFICATE

Tensiometer Model:	Pro-Tester [T-0100/A or T-0100SE/A]
Device Calibrated:	S-Type load cell
Range:	0 - 750 lbs. Tension
Model No:	M2405-750#
Serial No:	9342

Calibration Apparatus:

Pro-Cal unit, model TC-0100/A

A/D Module Model No:	T-029
A/D Module Serial No:	3106209342
Channel No:	N/A

Dead Weight:		Reference Cell:	
W1	2	R1	2
W2	152	R2	152
W3	302	R3	302

Indicator reading with no load: 0

Offse -9.653869 Scale: 3.636350

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F

Exitation 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: Marc Scott

Signature: Marc Scott

Date: 09/08/22

DEMTECH Services Inc.®

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester [T-0100/A or T-0100SE/A]

Device Calibrated: S-Type load cell

Range: 0 - 750 lbs. Tension

Model No: M2405-750#

Serial No: **39503**

Calibration Apparatus:

Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029

A/D Module Serial No: **2209239503**

Channel No: N/A

Dead Weight:		Reference Cell:	
W1	2	R1	2
W2	152	R2	152
W3	302	R3	302

Indicator reading with no load: 0

Offse **3.692474** Scale: **4.991028**

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F

Exitation 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: Marc Scott

Signature: Marc Scott

Date: 11/16/22

DEMTECH Services Inc.®

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester [T-0100/A or T-0100SE/A]

Device Calibrated: S-Type load cell

Range: 0 - 750 lbs. Tension

Model No: M2405-750#

Serial No: **21180**

Calibration Apparatus:

Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029

A/D Module Serial No: **2207221180**

Channel No: N/A

Dead Weight:		Reference Cell:	
W1	2	R1	2
W2	152	R2	152
W3	302	R3	302

Indicator reading with no load: 0

Offset: **-4.407117** Scale: **4.752159**

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F

Exitation 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: Marc Scott

Signature: Marc Scott

Date: 11/16/22

Appendix L

Interface Friction Tests

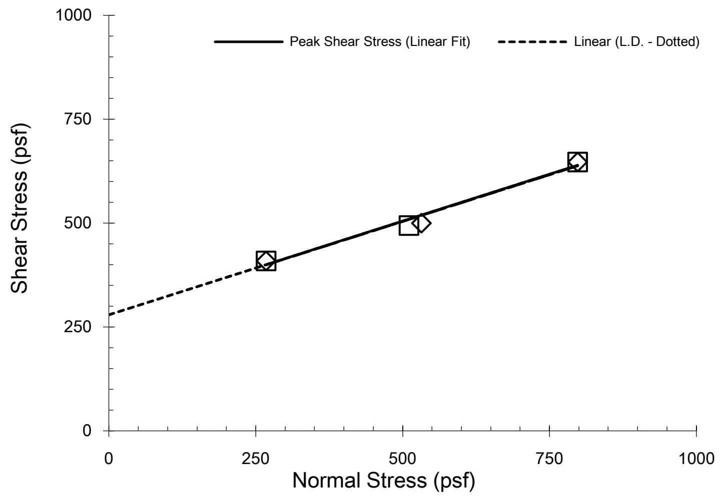
Interface Friction Test Report

Client: **SCS Engineers**
Project: **Columbia Energy - Dry Ash Facility Module 3**
Date: 03-31-2016 to 04-05-2016

TRI Log#: 19681
Test Method: ASTM D6243

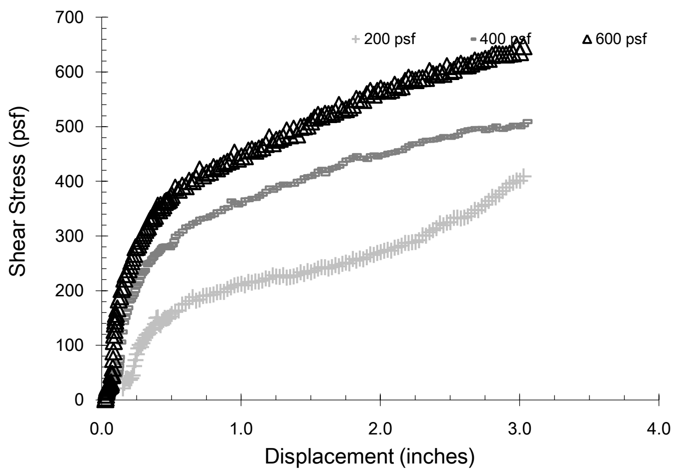
John M. Allen, P.E., 04/14/2016
Quality Review/Date

Tested Interface: BentoLiner NWL-35 GCL (135044621) vs. Remolded Clay



Test Results		
	Peak	Large Displacement (@ 3.0 in.)
Friction Angle (degrees):	24.3	24.2
Y-intercept or Adhesion (psf):	280	280

Shearing occurred at the interface.



Test Conditions	
Upper Box &	BentoLiner NWL-35 GCL (non-woven side)
Lower Box	Remolded Clay to 112.5 pcf at 17.0% moisture content
Box Dimensions: 12"x12"x4"	
Interface Conditioning:	Interface soaked and loading applied for a minimum of 48 hours prior to shear.
Test Condition: Wet	
Shearing Rate: 0.004 inches/minute	

Test Data			
Specimen No.	1	2	3
Bearing Slide Resistance (lbs)	3	3	14
Area Corrected Normal Stress (psf)	268	511	798
Area Corrected Peak Shear Stress (psf)	409	494	647
Area Corrected Large Displacement Normal Stress (psf)	268	532	798
Area Corrected Large Displacement Shear Stress (psf)	409	500	647
Peak Secant Angle (degrees)	56.8	44.1	39.0
Large Displacement Secant Angle (degrees)	56.8	43.2	39.0
Asperity (mils)	- -	- -	- -

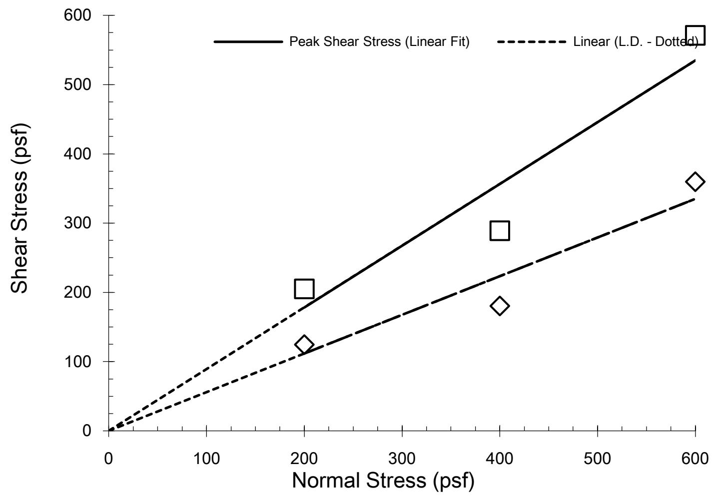
Interface Friction Test Report

Client: **SCS Engineers**
Project: **Columbia Energy - Dry Ash Facility Module 3**
Date: 03-29-2016 to 03-31-2016

TRI Log#: 19681
Test Method: ASTM D6243

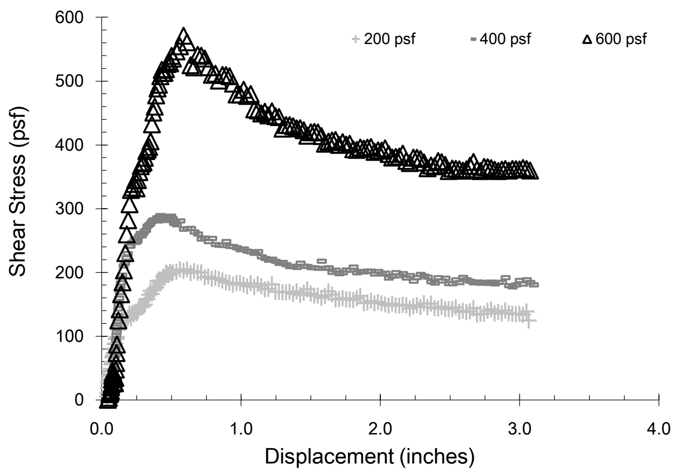
John M. Allen, P.E., 03/31/2016
Quality Review/Date

Tested Interface: BentoLiner NWL-35 GCL (135044621) vs. GSE 60 mil HDPE Textured Geomembrane (102179437)



Test Results		
	Peak	Large Displacement (@ 3.0 in.)
Friction Angle (degrees):	41.7	29.2
Y-intercept or Adhesion (psf):	0	0

Shearing occurred at the interface. Peak & large displacement friction angle regression analyses were adjusted to fit a zero y-intercept.



Test Conditions	
Upper Box &	BentoLiner NWL-35 GCL (non-woven side)
Lower Box	GSE 60 mil HDPE textured geomembrane
Box Dimensions: 12"x12"x4"	
Interface Conditioning:	Interface soaked and loading applied for a minimum of 48 hours prior to shear.
Test Condition: Wet	
Shearing Rate: 0.04 inches/minute	

Test Data			
Specimen No.	1	2	3
Bearing Slide Resistance (lbs)	3	3	14
Normal Stress (psf)	200	400	600
Corrected Peak Shear Stress (psf)	205	289	571
Corrected Large Displacement Shear Stress (psf)	125	180	360
Peak Secant Angle (degrees)	45.7	35.8	43.6
Large Displacement Secant Angle (degrees)	31.9	24.3	30.9
Asperity (mils)	20.2	19.4	19.2

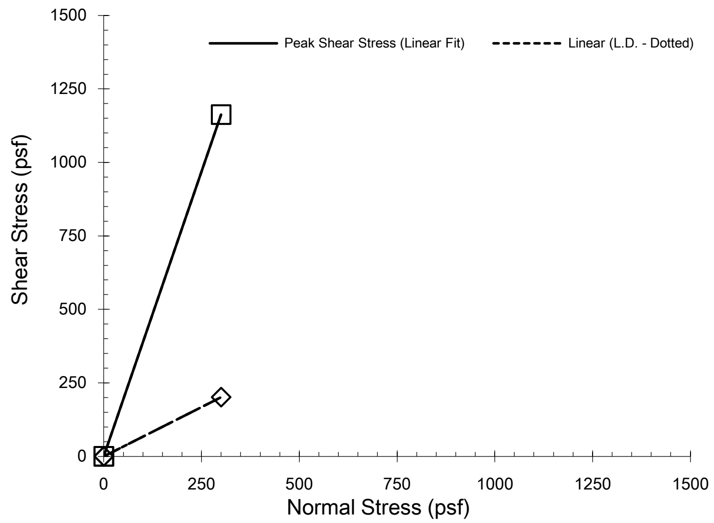
Interface Friction Test Report

Client: **SCS Engineers**
Project: **Columbia Energy - Dry Ash Facility Module 3**
Date: 03-28-2016 to 04-01-2016

TRI Log#: 19681
Test Method: ASTM D6243

John M. Allen, P.E., 04/01/2016
Quality Review/Date

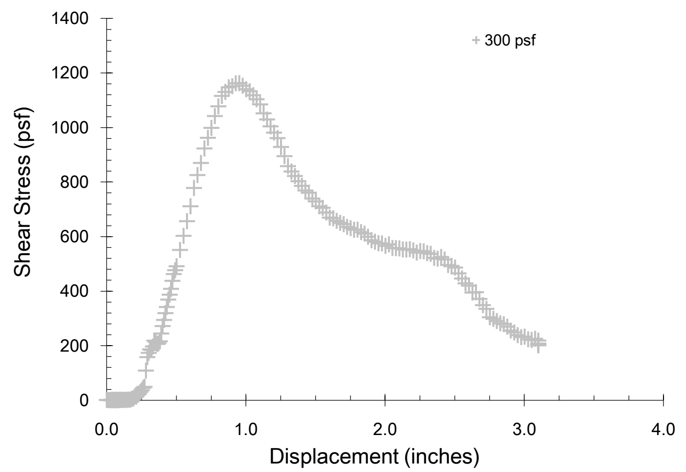
Internal Shear of the BentoLiner NWL-35 GCL (135044621)



Test Results

	Peak	Large Displacement (@ 3.0 in.)
Friction Angle (degrees):	75.5	33.9
Y-intercept or Adhesion (psf):	0	0

The GCL sheared internally.



Test Conditions

Upper Box & Lower Box: BentoLiner NWL-35 GCL

Box Dimensions: 12"x12"x4"

Interface Conditioning: Interface soaked and loading applied for a minimum of 48 hours prior to shear.

Test Condition: Wet

Shearing Rate: 0.004 inches/minute

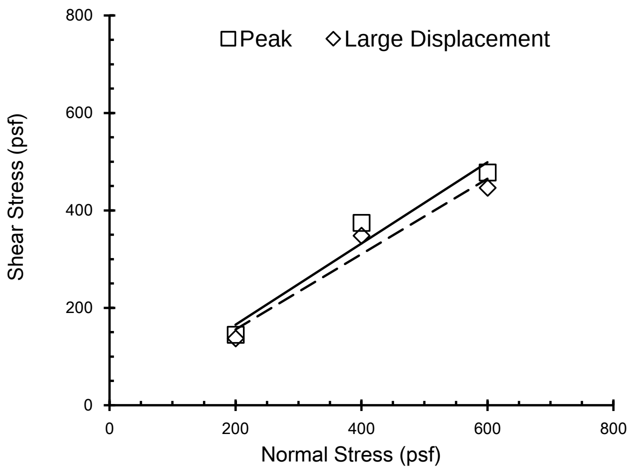
Test Data

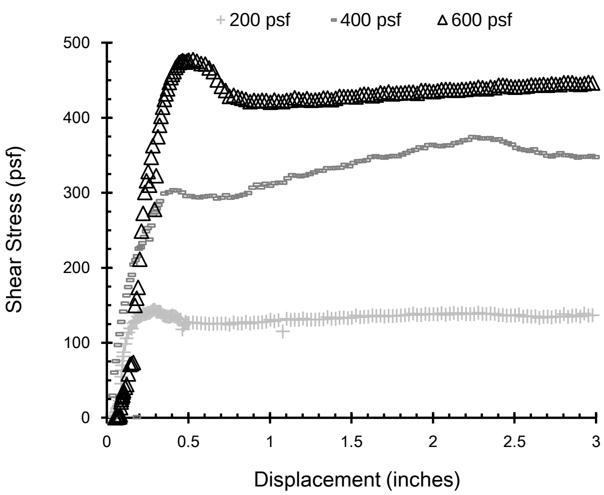
Specimen No.	1
Bearing Slide Resistance (lbs)	3
Normal Stress (psf)	300
Corrected Peak Shear Stress (psf)	1163
Corrected Large Displacement Shear Stress (psf)	201
Peak Secant Angle (degrees)	75.5
Large Displacement Secant Angle (degrees)	33.9
Asperity (mils)	- -

Shear Strength of Soil-Geosynthetic Interface by Direct Shear (ASTM D5321)

Client:	SCS Engineers	TRI Log #:	66443-1
Project:	Columbia Liner Construction	Richard S. Lacey, P.E. 10/5/2021	
		Analysis & Quality Review/Date	

Sand vs.
Solmax TXGM 60 mil HDPE (1005-057990)





Test Results, Linear Regression			
Mohr-Coulomb Parameters		Peak	Large Displacement
Friction Angle	Degrees	39.8	37.7
Y-intercept or Adhesion	psf	0	1
Minimum Secant Angle	Degrees	35.8	34.4

Note - Large Displacement Values Reported for 3.0 inches of Displacement

Test Conditions		
Upper Box	Sand Tamped in place.	
Lower Box	Solmax TXGM 60 mil HDPE (1005-057990)	
Conditioning	Wet - Loading applied and Interface flooded for a minimum of 24 hours prior to shear.	
Shearing Rate	inches/minute	0.004

Test Notes
Shearing occurred at the interface at all stresses.

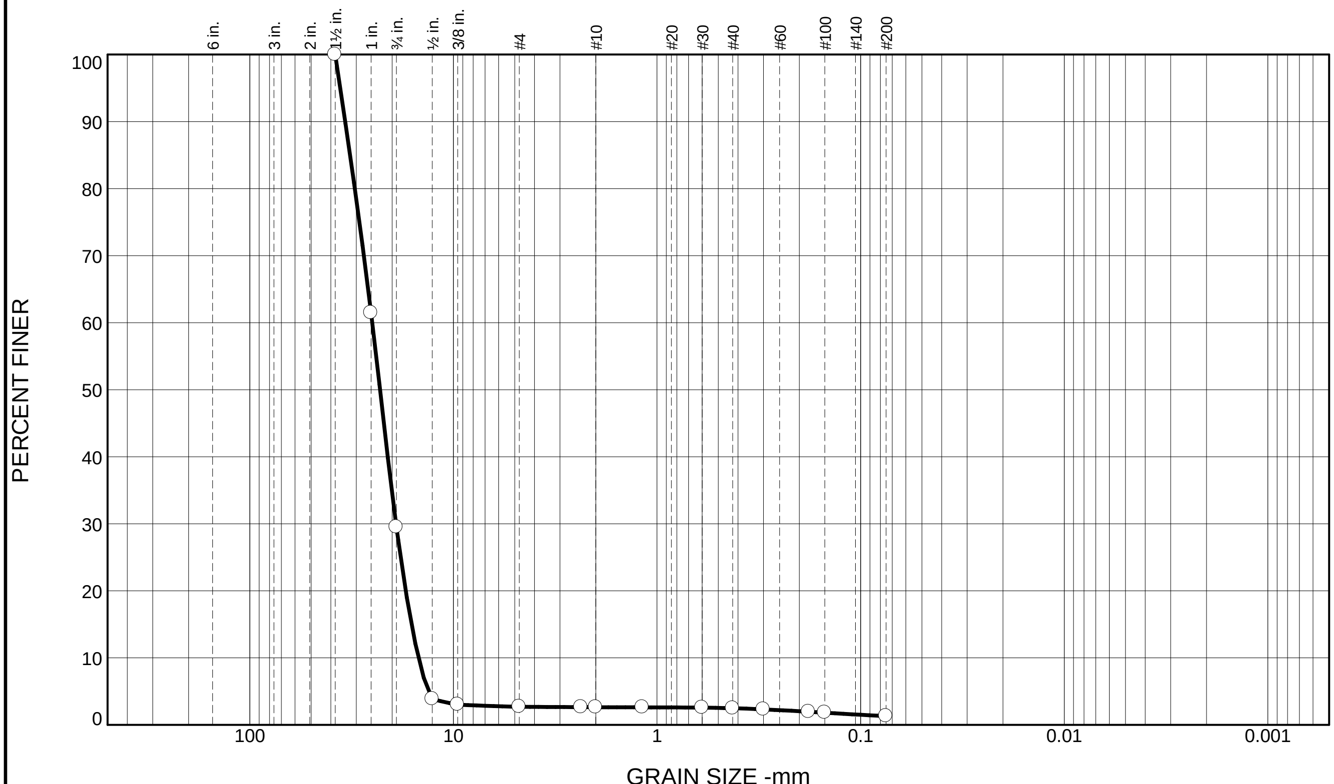
Specimen No.		-	1	2	3
Normal Stress		psf	200	400	600
Box Edge Dimension		in	12	12	12
Bearing Slide Resistance		lbs	10	12	14
Peak	Shear Stress	psf	144	374	478
	Secant Angle	deg.	35.8	43.1	38.5
Large Displacement	Shear Stress	psf	137	348	446
	Secant Angle	deg.	34.4	41.0	36.6
Asperity Height, Avg. of 5 Meas.		mils	25	26	41

TRI ENVIRONMENTAL, INC.
9063 Bee Caves Rd. Austin, TX 78733 – USA | Ph: 800.880.TEST or 512.263.2101

Appendix M

Aggregate Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	70.5	26.8	0.1	0.1	1.2	1.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	61.4		
3/4"	29.5		
1/2"	3.9		
3/8"	3.0		
#4	2.7		
#8	2.6		
#10	2.6		
#16	2.6		
#30	2.6		
#40	2.5		
#50	2.3		
#80	2.0		
#100	1.8		
#200	1.3		

* (no specification provided)

Material Description

Brown Fine to Coarse Gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 34.0364 D_{85}= 32.2100 D_{60}= 25.0668
D_{50}= 22.9450 D_{30}= 19.1420 D_{15}= 16.0816
D_{10}= 14.8535 C_u= 1.69 C_c= 0.98

Classification

USCS= GP AASHTO=

Remarks

Test# 5108

Location: COL-CAB-BS1
Sample Number: 5-24-22

Date: 5-26-22

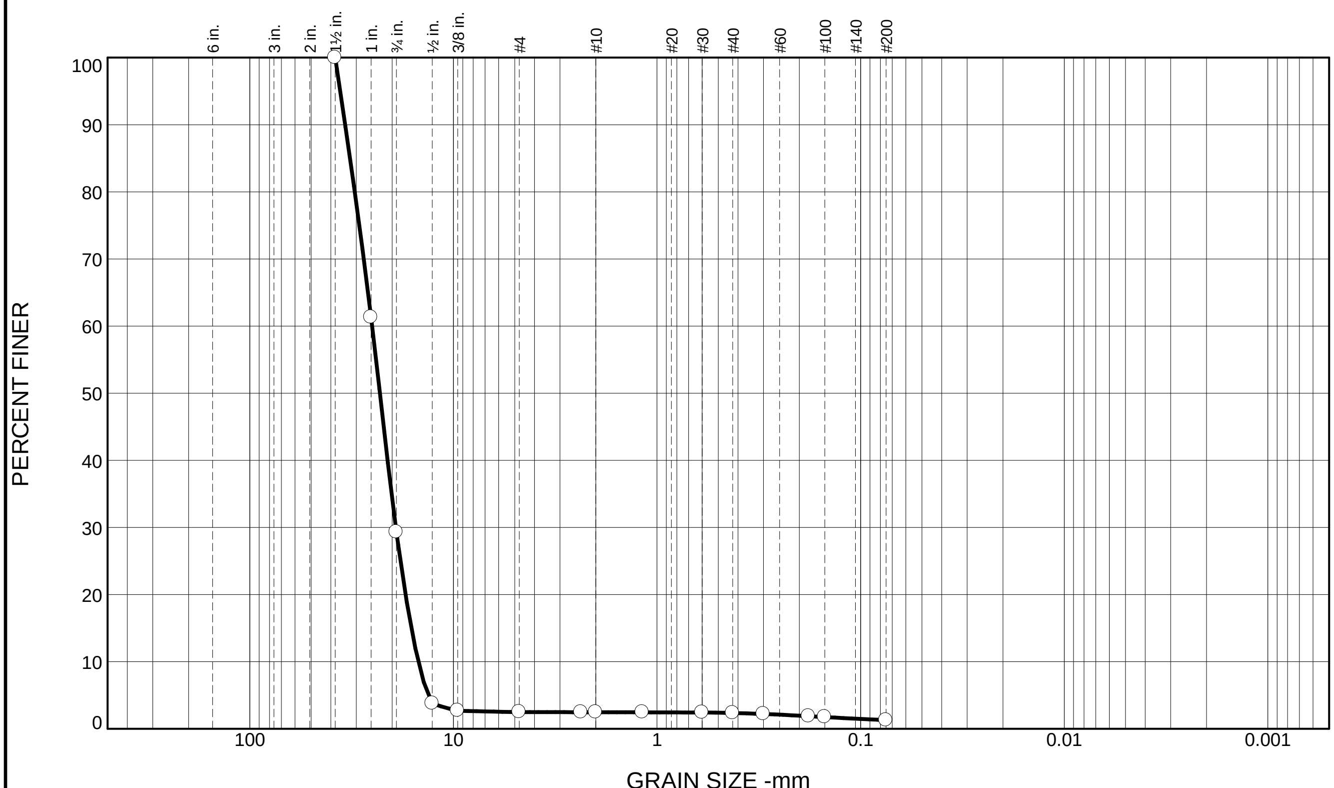
CGC,Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00

Project No: C22011-2 **Figure**

Tested By: MAS **Checked By:** MAS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	70.7	26.8	0.0	0.2	1.0	1.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	61.3		
3/4"	29.3		
1/2"	3.8		
3/8"	2.7		
#4	2.5		
#8	2.5		
#10	2.5		
#16	2.5		
#30	2.4		
#40	2.3		
#50	2.2		
#80	1.9		
#100	1.7		
#200	1.3		

* (no specification provided)

Material Description

Brown Fine to Coarse Gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 34.0499 D_{85}= 32.2289 D_{60}= 25.0996
D_{50}= 22.9809 D_{30}= 19.1812 D_{15}= 16.1130
D_{10}= 14.8806 C_u= 1.69 C_c= 0.99

Classification

USCS= GP AASHTO=

Remarks

Test# 5109

Location: COL-CAB-BS2
Sample Number: 5-24-22

Date: 5-26-22

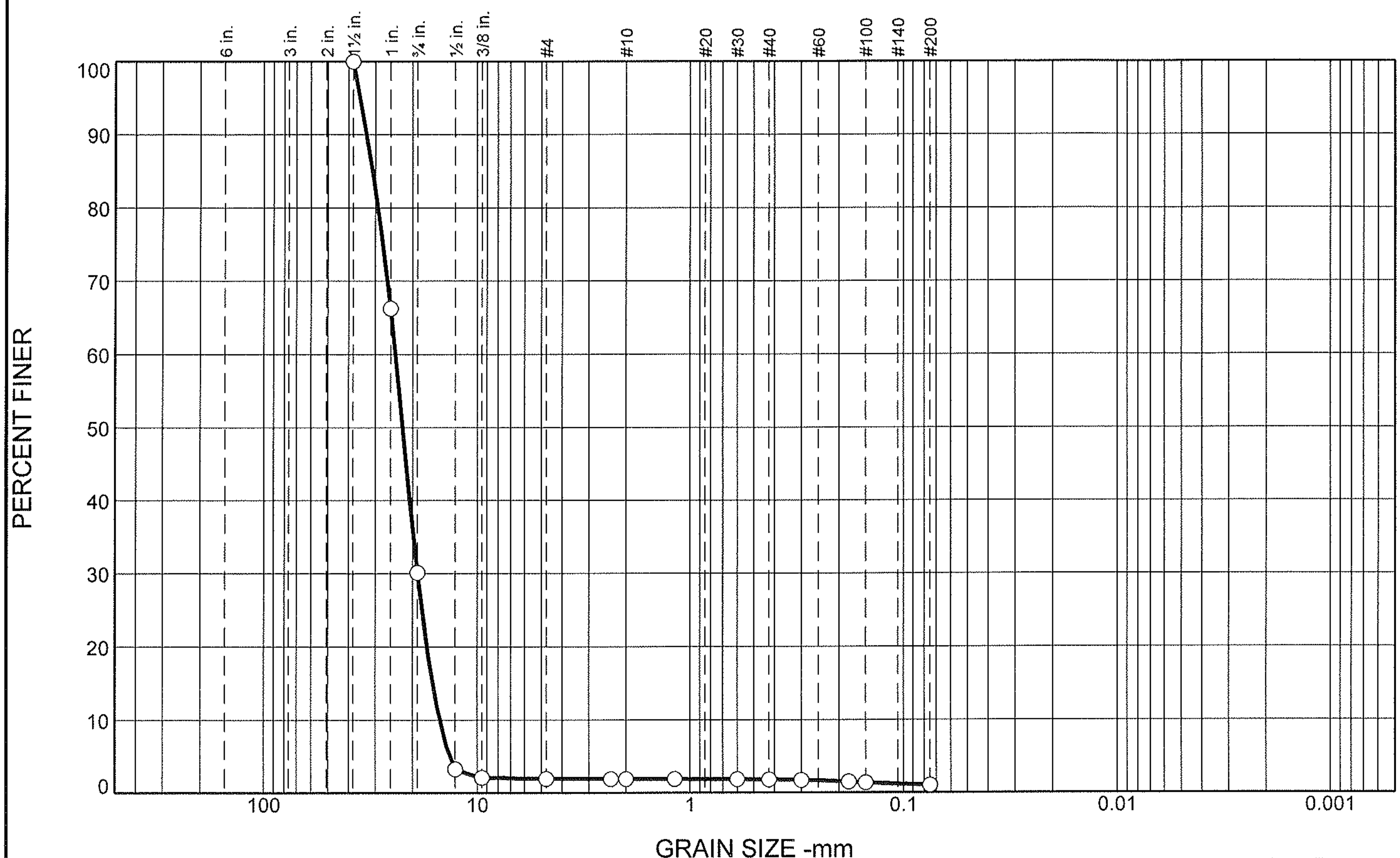
CGC,Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00

Project No: C22011-2 **Figure**

Tested By: MAS **Checked By:** MAS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	69.9	28.1	0.1	0.1	0.8	1.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	66.3		
3/4"	30.1		
1/2"	3.3		
3/8"	2.1		
#4	2.0		
#8	1.9		
#10	1.9		
#16	1.9		
#30	1.8		
#40	1.8		
#50	1.7		
#80	1.5		
#100	1.4		
#200	1.0		

* (no specification provided)

Material Description

Brown Fine to Coarse Gravel

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 32.9779 D_{85}= 30.8901 D_{60}= 24.1074
D_{50}= 22.3093 D_{30}= 19.0274 D_{15}= 16.2102
D_{10}= 15.0320 C_u= 1.60 C_c= 1.00

Classification

USCS= GP AASHTO= A-1-a

Remarks

Test# 7966

Sample Number: COL-PB-BS1

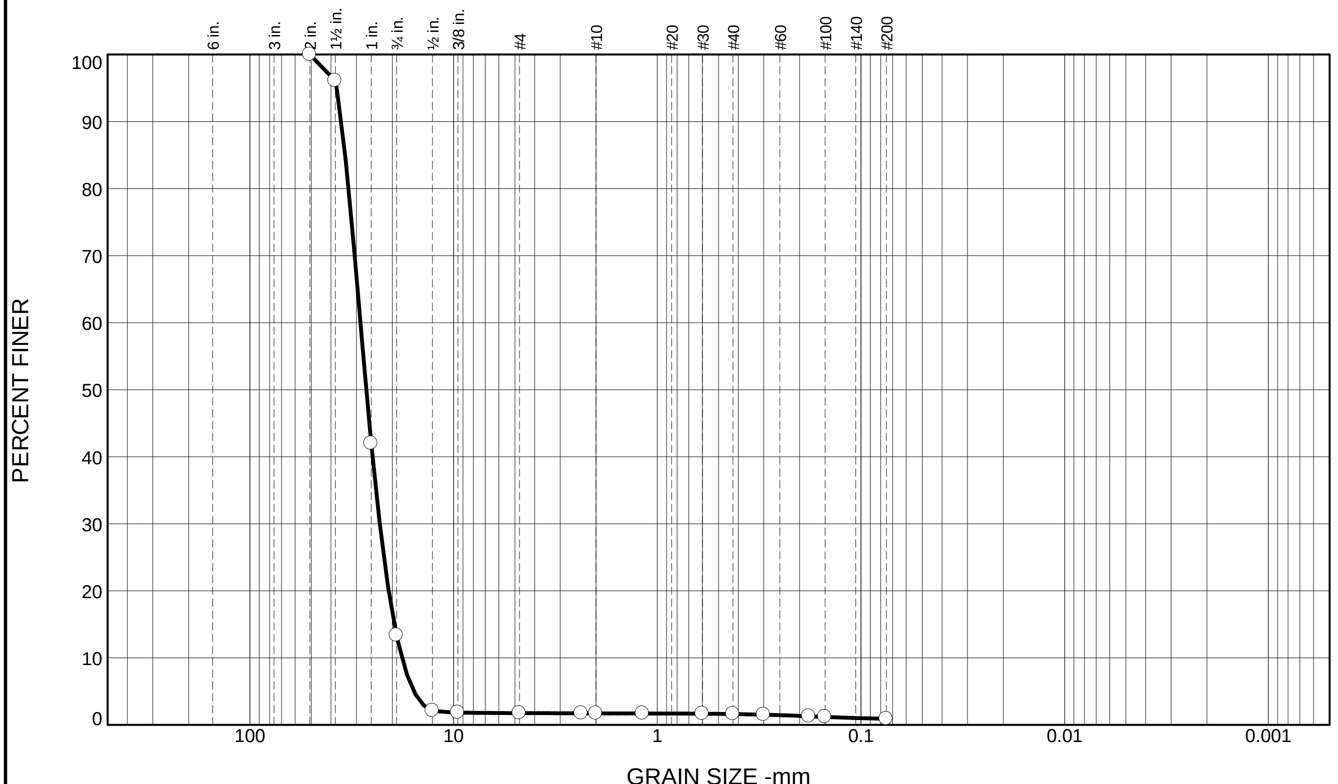
Date: 10-3-22

CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: MAS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	86.6	11.7	0.0	0.1	0.7	0.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2	100.0		
1.5	96.1		
1	42.0		
3/4	13.4		
1/2	2.1		
3/8	1.8		
#4	1.7		
#8	1.7		
#10	1.7		
#16	1.7		
#30	1.7		
#40	1.6		
#50	1.5		
#80	1.3		
#100	1.2		
#200	0.9		

* (no specification provided)

Material Description

Brown Fine to Coarse Gravel

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 35.6005 D_{85}= 34.0953 D_{60}= 28.6814
D_{50}= 26.8597 D_{30}= 23.0632 D_{15}= 19.5252
D_{10}= 17.9487 C_u= 1.60 C_c= 1.03

Classification

USCS= GP AASHTO= A-1-a

Remarks

Test# 9148

Location: Coarse Aggregate Bedding
Sample Number: COL-PB-B1

Date: 11-28-22

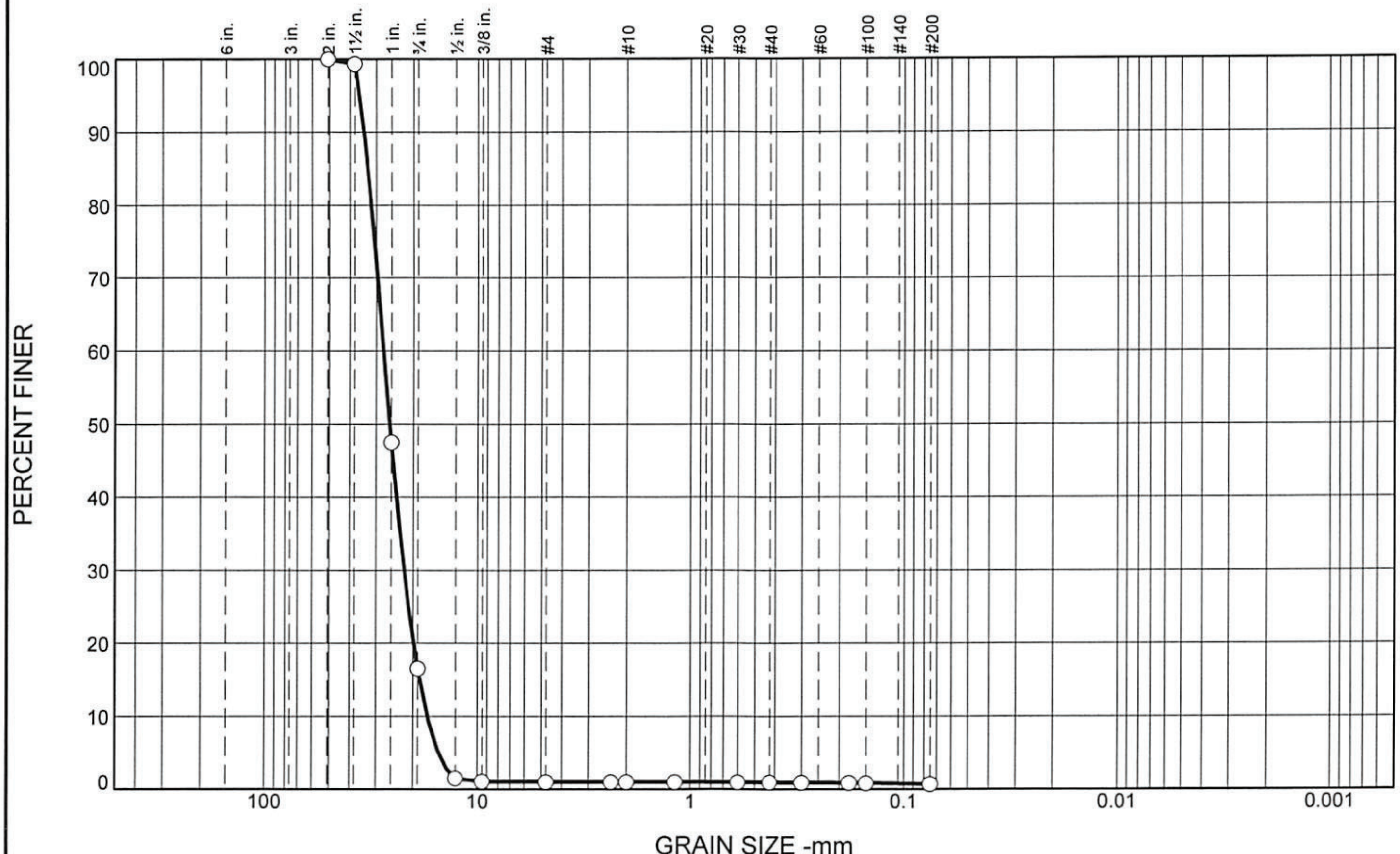
CGC,Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00

Project No: C22011-2 **Figure**

Tested By: MAS **Checked By:** MAS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	83.5	15.5	0.0	0.1	0.2	0.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2	100.0		
1.5	99.4		
1	47.5		
3/4	16.5		
1/2	1.5		
3/8	1.1		
#4	1.0		
#8	1.0		
#10	1.0		
#16	1.0		
#30	1.0		
#40	0.9		
#50	0.9		
#80	0.9		
#100	0.8		
#200	0.7		

* (no specification provided)

Material Description

Brown Fine to Coarse Gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 34.2746 D_{85}= 32.8856 D_{60}= 27.6579
D_{50}= 25.8488 D_{30}= 22.0624 D_{15}= 18.6538
D_{10}= 17.1825 C_u= 1.61 C_c= 1.02

Classification

USCS= GP AASHTO=

Remarks

Test# 9300

Location: Coarse Aggregate Bedding
Sample Number: COL-PB-B2

Date: 12-7-22

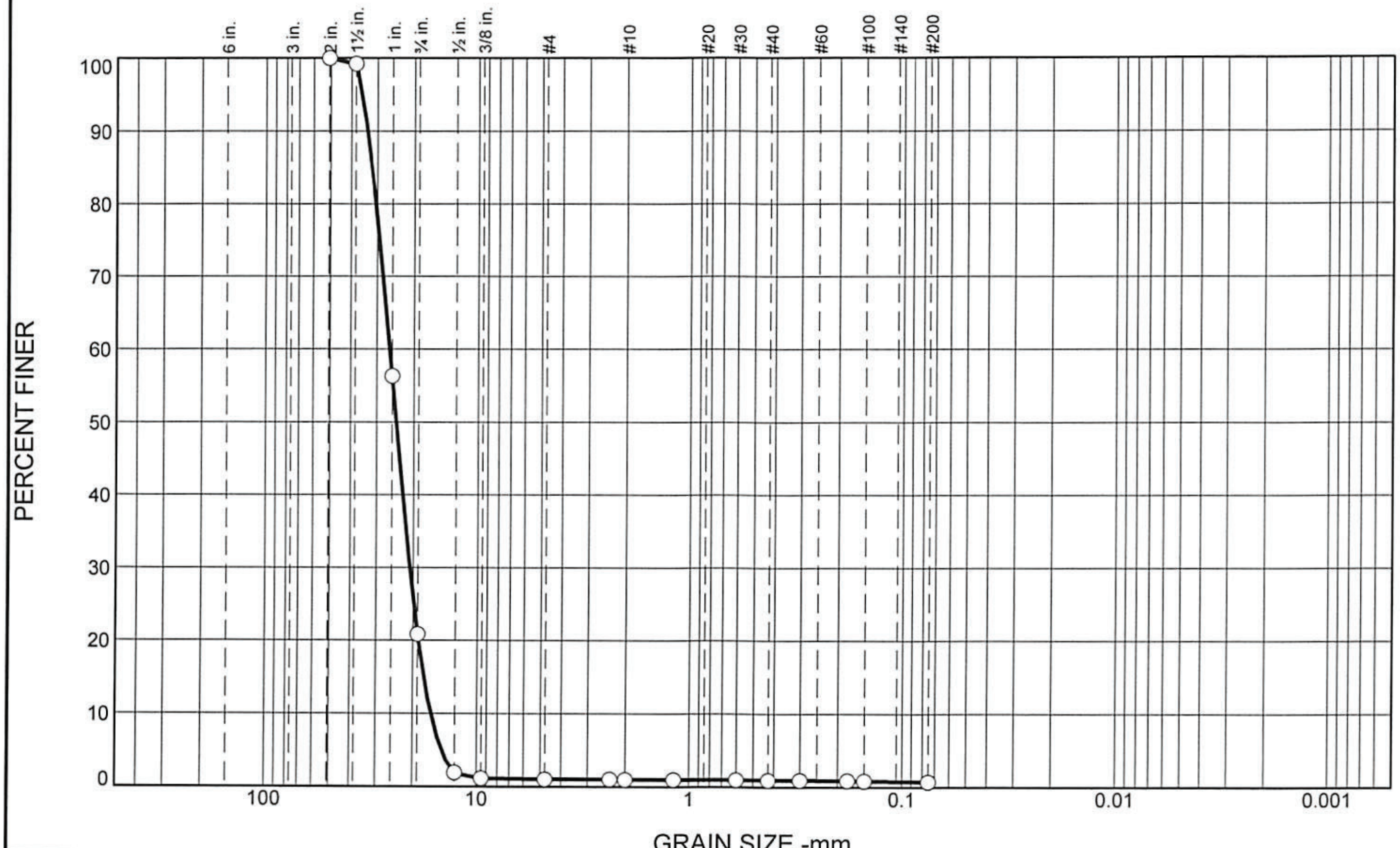
CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00

Project No: C22011-2 **Figure**

Tested By: MAS **Checked By:** MAS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	79.1	19.9	0.0	0.0	0.3	0.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2	100.0		
1.5	99.2		
1	56.3		
3/4	20.9		
1/2	2.0		
3/8	1.2		
#4	1.0		
#8	1.0		
#10	1.0		
#16	1.0		
#30	1.0		
#40	1.0		
#50	0.9		
#80	0.9		
#100	0.9		
#200	0.7		

* (no specification provided)

Material Description

Brown Fine to Coarse Gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 33.4611 D_{85}= 31.8440 D_{60}= 26.0932
D_{50}= 24.2530 D_{30}= 20.7591 D_{15}= 17.7703
D_{10}= 16.4510 C_u= 1.59 C_c= 1.00

Classification

USCS= GP AASHTO=

Remarks

Test# 9300

Location: Coarse Aggregate Bedding
Sample Number: COL-PB-B3

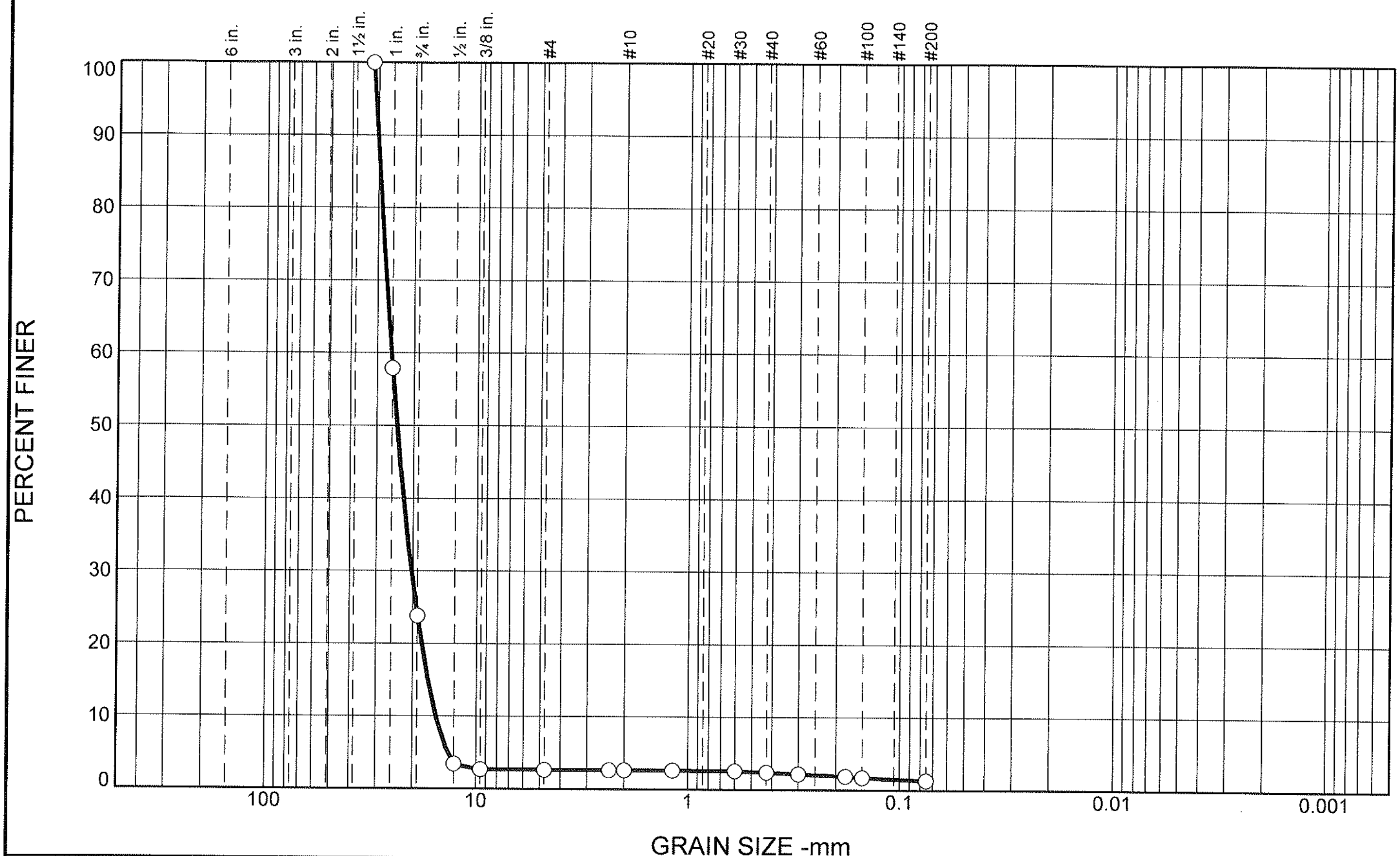
Date: 12-7-22

CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: MAS **Checked By:** MAS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	76.2	21.2				2.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/4	100.0		
1	57.9		
3/4	23.8		
1/2	3.4		
3/8	2.7		
#4	2.6		
#8	2.6		
#10	2.6		
#16	2.6		
#30	2.6		
#40	2.4		
#50	2.2		
#80	1.9		
#100	1.7		
#200	1.3		

* (no specification provided)

Material Description

Fine to Coarse Gravel, Trace Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 30.2115 D_{85}= 29.4612 D_{60}= 25.7232
D_{50}= 24.1135 D_{30}= 20.3916 D_{15}= 16.9227
D_{10}= 15.4972 C_u= 1.66 C_c= 1.04

Classification

USCS= GP AASHTO=

Remarks

Sample Number: COL-PB-B4

Date: 12/8/22

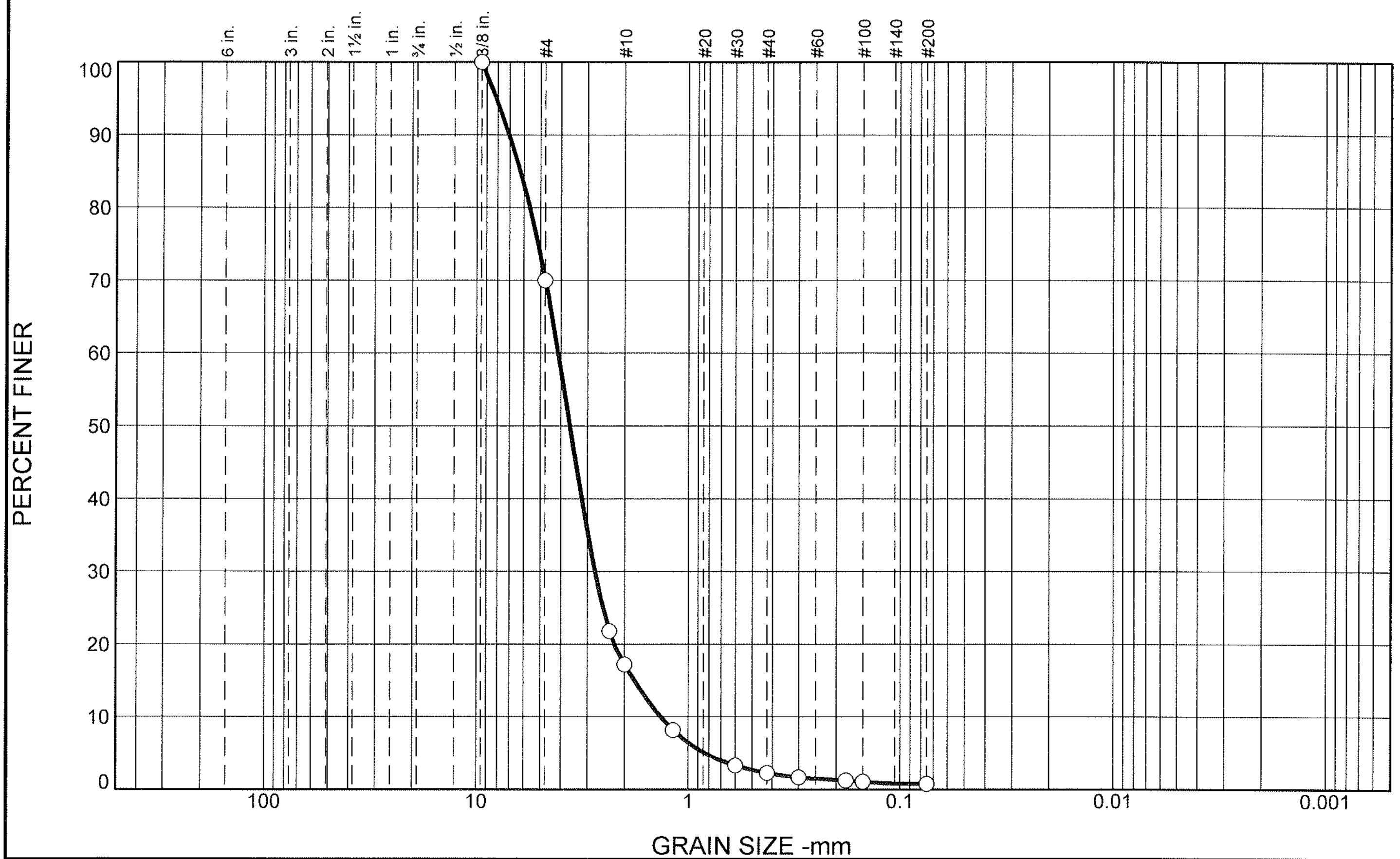
CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00

Project No: C22011-2 **Figure**

Tested By: MAS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	30.0	52.8	14.9	1.5	0.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	70.0		
#8	21.8		
#10	17.2		
#16	8.2		
#30	3.3		
#40	2.3		
#50	1.7		
#80	1.3		
#100	1.1		
#200	0.8		

* (no specification provided)

Material Description

Brown Medium to Coarse Sand, Some Gravel, Trace Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 7.0721 D_{85}= 6.2579 D_{60}= 4.1372
D_{50}= 3.6420 D_{30}= 2.7714 D_{15}= 1.8017
D_{10}= 1.3513 C_u= 3.06 C_c= 1.37

Classification

USCS= SP AASHTO=

Remarks

Sample Number: COL-FS-BS1

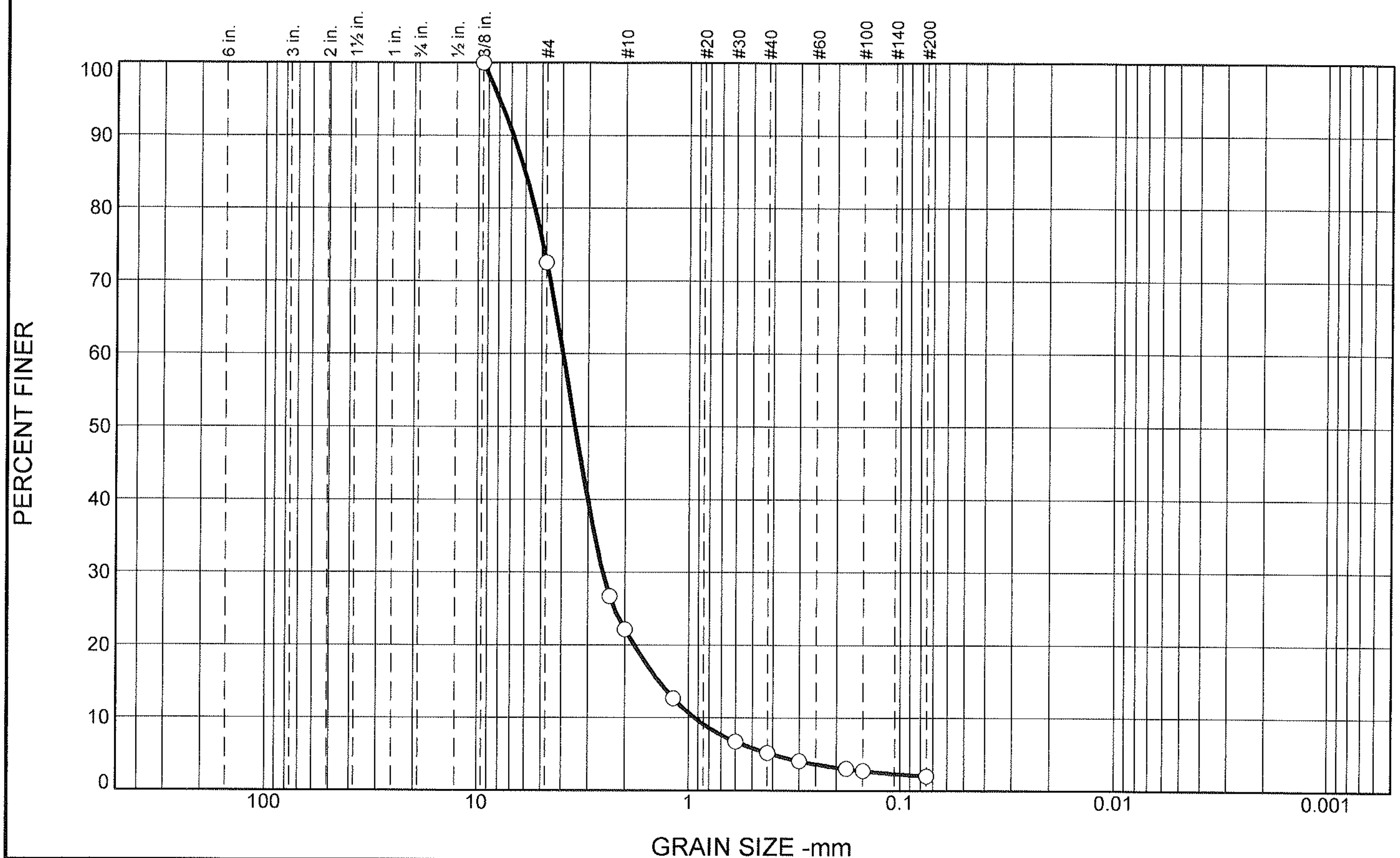
Date: 10/14/22

CGC,Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: MAS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	27.5	50.4	16.9	3.2	2.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	72.5		
#8	26.7		
#10	22.1		
#16	12.7		
#30	6.7		
#40	5.2		
#50	4.1		
#80	3.0		
#100	2.7		
#200	2.0		

* (no specification provided)

Material Description

Red-Brown Fine Coarse Sand, Some Gravel, Trace Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 6.8689 D_{85}= 6.0424 D_{60}= 3.9644
D_{50}= 3.4679 D_{30}= 2.5477 D_{15}= 1.3798
D_{10}= 0.9376 C_u= 4.23 C_c= 1.75

Classification

USCS= SP AASHTO=

Remarks

Sample Number: COL-FS-B1

Date: 11/22/22

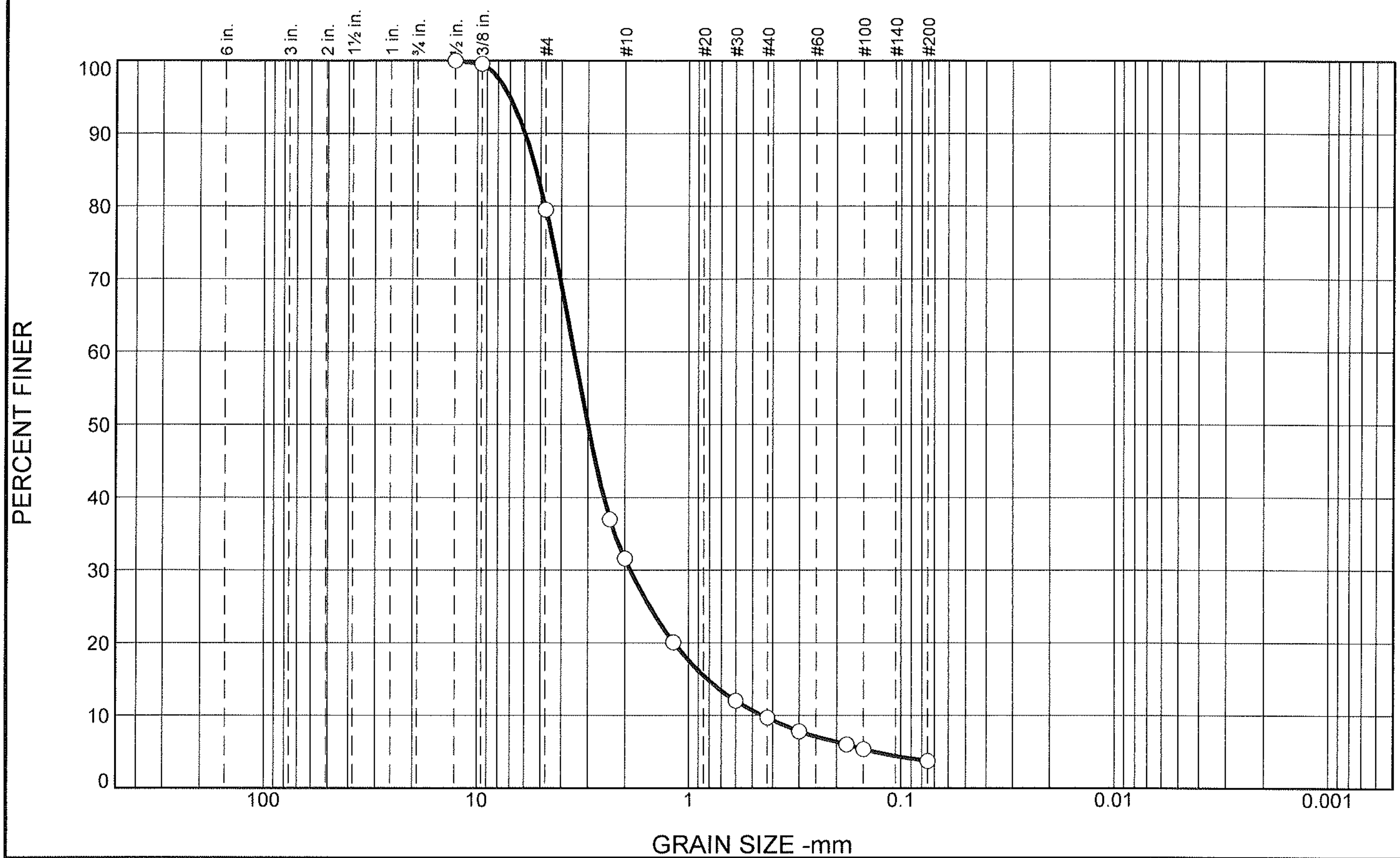
CGC,Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00

Project No: C22011-2 **Figure**

Tested By: MAS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	20.5	47.9	21.9	6.0	3.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2	100.0		
3/8	99.6		
#4	79.5		
#8	37.0		
#10	31.6		
#16	20.1		
#30	12.0		
#40	9.7		
#50	7.8		
#80	6.0		
#100	5.4		
#200	3.7		

* (no specification provided)

Material Description

Red-Brown Fine to Coarse Sand, Some Gravel, Trace Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 5.9734 D_{85}= 5.2919 D_{60}= 3.5037
D_{50}= 3.0122 D_{30}= 1.8851 D_{15}= 0.8180
D_{10}= 0.4474 C_u= 7.83 C_c= 2.27

Classification

USCS= SW AASHTO=

Remarks

Sample Number: COL-FS-B2

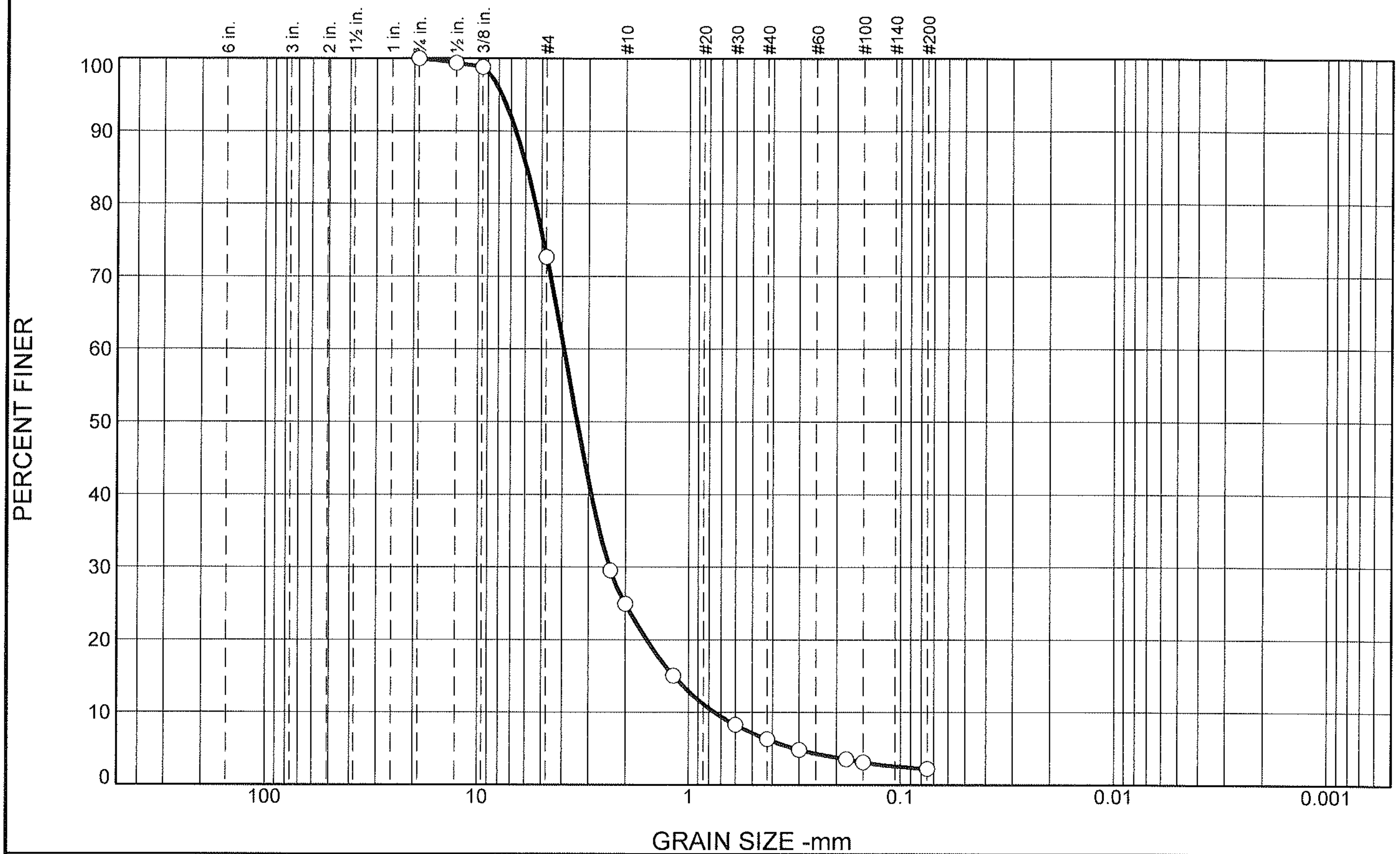
Date: 11/22/22

CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: MAS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	27.3	47.8	18.6	4.1	2.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	99.4		
3/8	98.8		
#4	72.7		
#8	29.5		
#10	24.9		
#16	15.0		
#30	8.3		
#40	6.3		
#50	4.9		
#80	3.5		
#100	3.1		
#200	2.2		

* (no specification provided)

Material Description

Red- Brown Fine to Coarse Sand, Some Grave, Trace Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 6.6615 D_{85}= 5.9346 D_{60}= 3.9353
D_{50}= 3.4093 D_{30}= 2.3897 D_{15}= 1.1778
D_{10}= 0.7551 C_u= 5.21 C_c= 1.92

Classification

USCS= SP AASHTO=

Remarks

Sample Number: COL-FS-B3

Date: 11/22/22

CGC, Inc.

Client: SCS Engineers

Project: Modules 10 and 11 Liner Construction SCS #25222157.00

Project No: C22011-2 **Figure**

Tested By: MAS **Checked By:** KJS

Appendix N

Filter Material Calculation

SCS ENGINEERS

		Sheet No.	1 of 3
		Calc. No.	1
		Rev. No.	1
Job No. 25222157.01	Job: Mod 10/11 Columbia Ash Disposal Facility	By: PEG	Date: 9/27/2022
Client: Wisconsin Power and Light	Subject: Filter Calculation	Chk'd: DLN	Date: 9/27/2022

Purpose: To evaluate the proposed drainage material and the proposed pipe bedding material in the leachate collection system to determine the range of D15, D50 and D85 values for the filter material.

Approach: The calculations were performed using the "piping relationship" comparing the particle sizes of each given material

Reference: **1.** Naval Facilities Engineering Command (NAVFAC) Design Manual, Figure 4 (US Navy, 1986)
2. Covia Sand (Drainage Material, COL-DL-BS1) tested by CGC, Inc. on 7/7/2022
3. Yahara (Coarse Aggregate, COL-CAB-BS1) tested by CGC, Inc on 5/24/2022

Calculation: **Piping Relationship** (to avoid movement of particles) - From NAVFAC Design Manual

$D15_F/D85_B < 5$

$D50_F/D50_B < 25$

$D15_F/D15_B < 20$

where:
D15 = Particle size at which 15 percent of the given material passes
D50 = Particle size at which 50 percent of the given material passes
D85 = Particle size at which 85 percent of the given material passes

F = Filter material
B = Base material

Use Gradation Analysis Data for Covia Sand = Base Material and Filter Material = Filter Material (Design)

Filter Material (mm)		Base Material (mm) (Imported Sand-Covia)	
D15=	2.92	D15=	0.25
D50=	11.4	D50=	0.46
D85=	-	D85=	0.58

Piping Relationship Evaluation:

$$\frac{D15_F}{D85_B} = 5.0 \quad (< 5) \quad \checkmark$$

$$\frac{D50_F}{D50_B} = 24.8 \quad (< 25) \quad \checkmark$$

$$\frac{D15_F}{D15_B} = 11.7 \quad (< 20) \quad \checkmark$$

SCS ENGINEERS

		Sheet No.	2 of 3
		Calc. No.	1
		Rev. No.	1
Job No. 25222157.01	Job: Mod 10/11 Columbia Ash Disposal Facility	By: PEG	Date: 9/27/2022
Client: Wisconsin Power and Light	Subject: Filter Calculation	Chk'd: DLN	Date: 9/27/2022

Calculation:

(cont.) Use Gradation Analysis Data for Filter Material (Design) = Base Material and

Pipe Bedding (Coarse Aggregate) = Filter Material

(Pipe Bedding)	Filter Material (mm)		Base Material (mm)		(Filter Material)
		High		High	
	D15 =	16.08	D15 =	0.81	
	D50 =	22.95	D50 =	0.92	
	D85 =	32.21	D85 =	3.25	

Piping Relationship Evaluation:

High

$\frac{D15_F}{D85_B}$ = 4.9 (< 5) ✓

$\frac{D50_F}{D50_B}$ = 24.9 (< 25) ✓

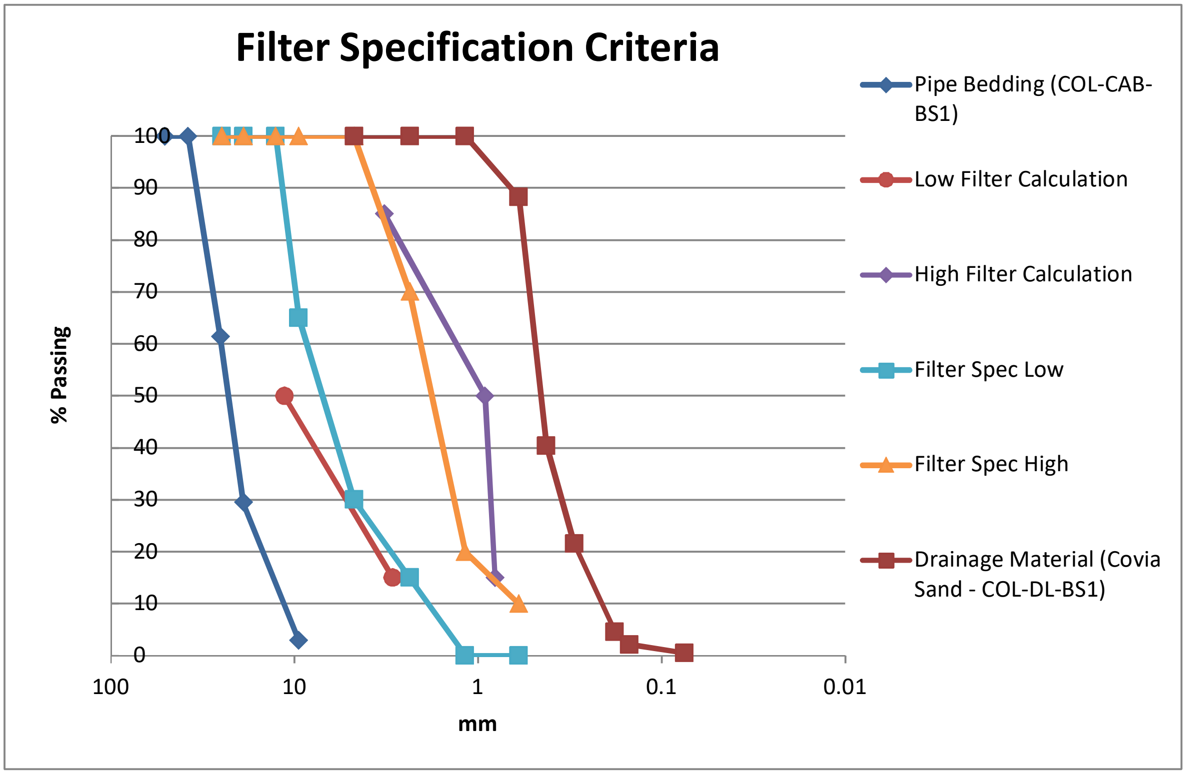
$\frac{D15_F}{D15_B}$ = 19.9 (< 20) ✓

Conclusion: Based on the filter evaluation the updated filter specification is found on Page 3 of this calculation.

SCS ENGINEERS

Sheet No.	3 of 3
Calc. No.	1
Rev. No.	1

Job No. 25222157.01	Job: Mod 10/11 Columbia Ash Disposal Facility	By: PEG	Date: 9/27/2022
Client: Wisconsin Power and Light	Subject: Filter Calculation	Chk'd: DLN	Date: 9/27/2022



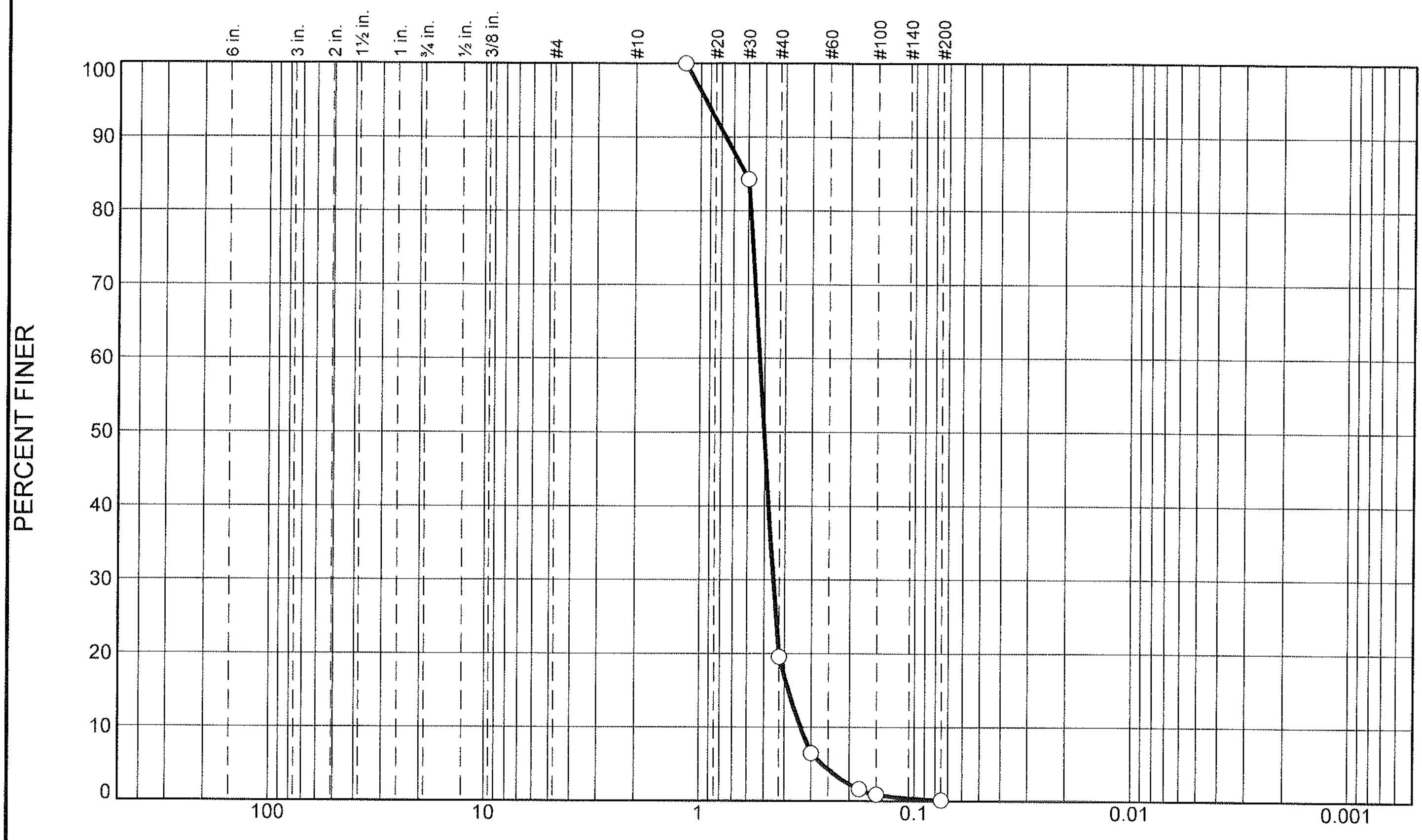
Updated Filter Material Specification

Sieve Size	mm	% Passing Low	% Passing High
1	25	100	100
0.75	19	100	100
0.5	12.7	100	100
0.375	9.5	65	100
#4	4.75	30	100
#8	2.36	15	70
#16	1.18	0	20
#30	0.6	0	10

Appendix O

Leachate Drainage Layer Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel Coarse	% Gravel Fine	% Sand Coarse	% Sand Medium	% Sand Fine	% Fines Silt	% Fines Clay
0.0	0.0	0.0	0.0	80.5	19.4	0.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#16	100.0		
#30	84.3		
#40	19.5		
#50	6.5		
#80	1.6		
#100	0.9		
#200	0.1		

* (no specification provided)

Material Description

Tan Fine to Medium Sand, Trace Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.7678 D_{85}= 0.6194 D_{60}= 0.5287
D_{50}= 0.5040 D_{30}= 0.4550 D_{15}= 0.3847
D_{10}= 0.3374 C_u= 1.57 C_c= 1.16

Classification

USCS= SP AASHTO=

Remarks

Sample Number: COL-DL-B1

Date: 11/3/22

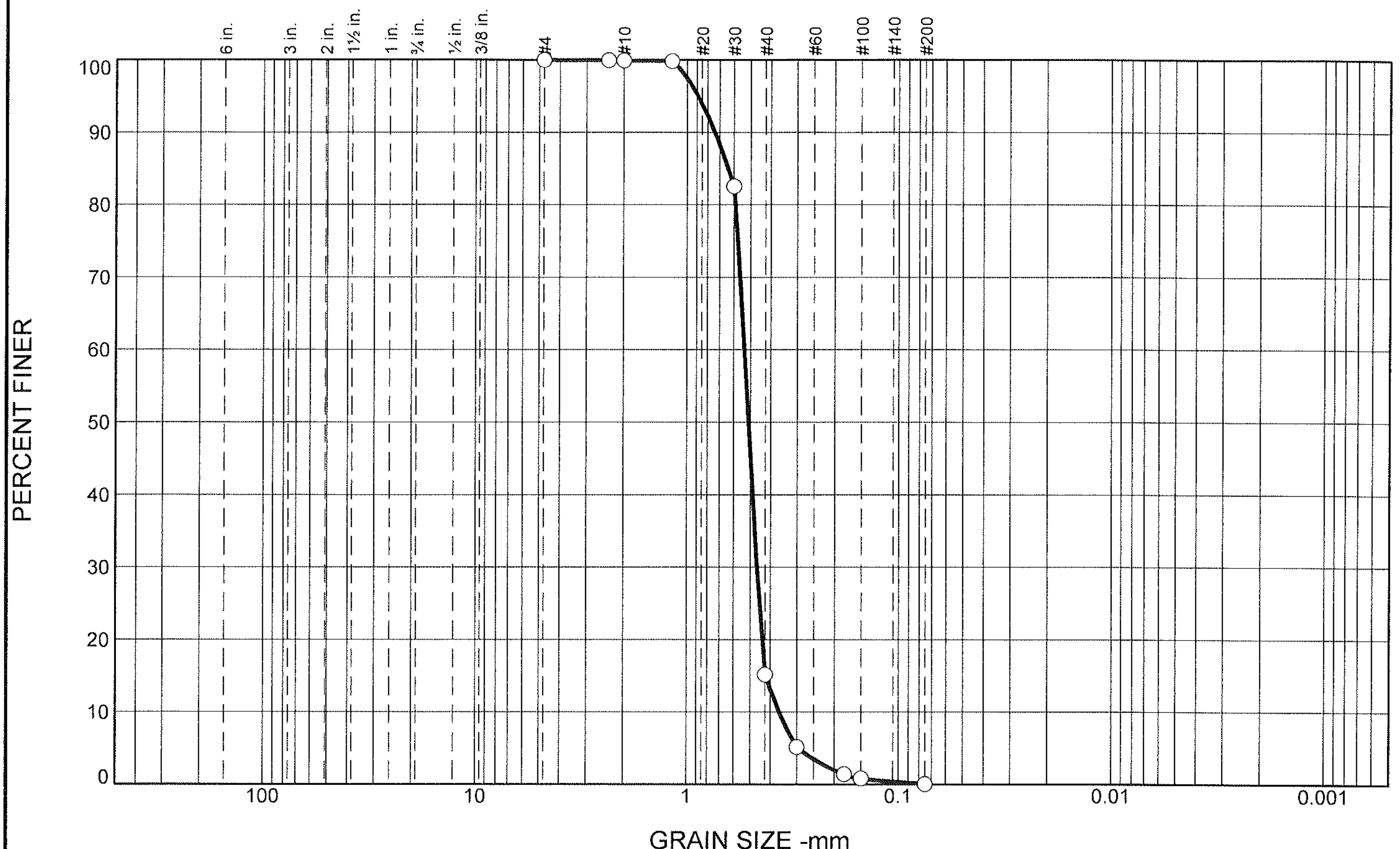
CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00

Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	84.7	15.1	0.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	100.0		
#10	99.9		
#16	99.8		
#30	82.6		
#40	15.2		
#50	5.2		
#80	1.4		
#100	0.8		
#200	0.1		

* (no specification provided)

Material Description

Tan Fine to Medium Sand, Trace Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.7402 D_{85}= 0.6391 D_{60}= 0.5353
D_{50}= 0.5115 D_{30}= 0.4651 D_{15}= 0.4231
D_{10}= 0.3644 C_u= 1.47 C_c= 1.11

Classification

USCS= SP AASHTO=

Remarks

Sample Number: COL-DL-B2

Date: 11/3/22

CGC,Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

CGC, Inc.

Job No.	C22011-2
Date:	8/16/2022

CONSTANT HEAD PERMEABILITY TEST (ASTM D2434-94)

CGC, Inc., 2921 Perry Street, Madison, WI (608) 288-4100; Fax: (608) 288-7887

PROJECT:	Columbia Modules 10 & 11 Liner Construction
LOCATION:	
SAMPLE:	COL-DL-B2
DEPTH (ft):	-
SOIL DESCRIPTION:	Tan Fine to Medium Sand, Trace Silt

	INITIAL	FINAL
SAMPLE DIAMETER (cm)	10.16	10.16
SAMPLE LENGTH (cm)	11.65	11.65
MOISTURE CONTENT (%)	2.0	15.6
DRY DENSITY (lb/ft^3)	108.2	108.2
COMPACTION (%)	-	-

RUN	COEFFICIENT OF PERMEABILITY, k (cm/sec)
1	2.17E-02
2	5.41E-02
3	5.34E-02
4	5.14E-02
5	5.03E-02
6	4.31E-02
7	4.93E-02

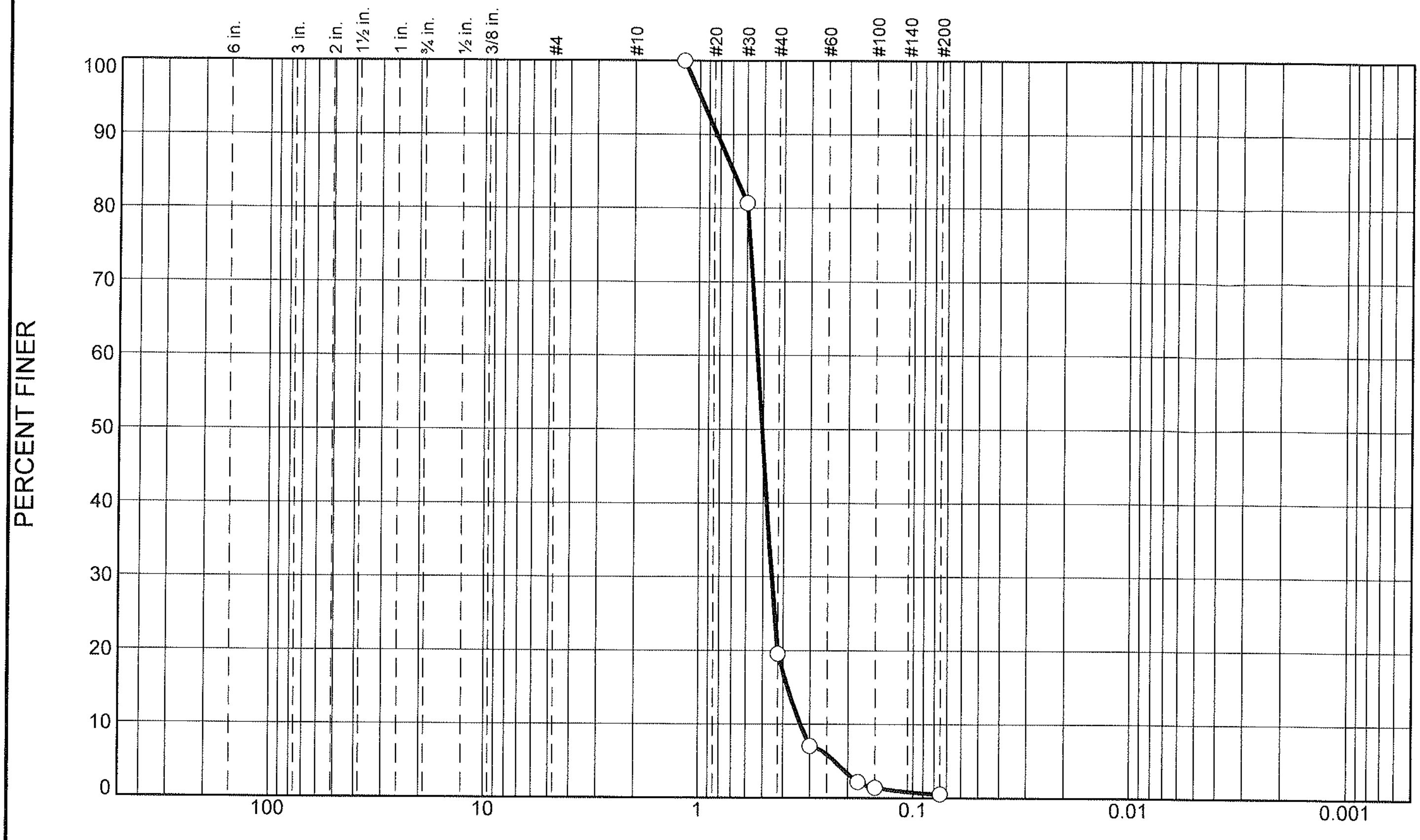
AVERAGE COEFFICIENT OF PERMEABILITY = 5.03E-02 cm/sec
(Based on run numbers 2 through 7)

FORMULA: $$k = \frac{Q \cdot L \cdot R_T}{h \cdot A \cdot t}$$

REMARKS: Sample lightly tamped into 4"-diameter permeameter in three lifts.

TESTED BY: KJS **CHECKED BY:** AJB **DATE:** 11/3/2022

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	80.4	19.1	0.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#16	100.0		
#30	80.7		
#40	19.6		
#50	7.0		
#80	2.2		
#100	1.4		
#200	0.5		

* (no specification provided)

Material Description

Tan Fine to Medium Sand, Trace Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.8312 D_{85}= 0.6976 D_{60}= 0.5350
D_{50}= 0.5086 D_{30}= 0.4566 D_{15}= 0.3827
D_{10}= 0.3330 C_u= 1.61 C_c= 1.17

Classification

USCS= SP AASHTO=

Remarks

Sample Number: COL-DL-B3

Date: 11/18/22

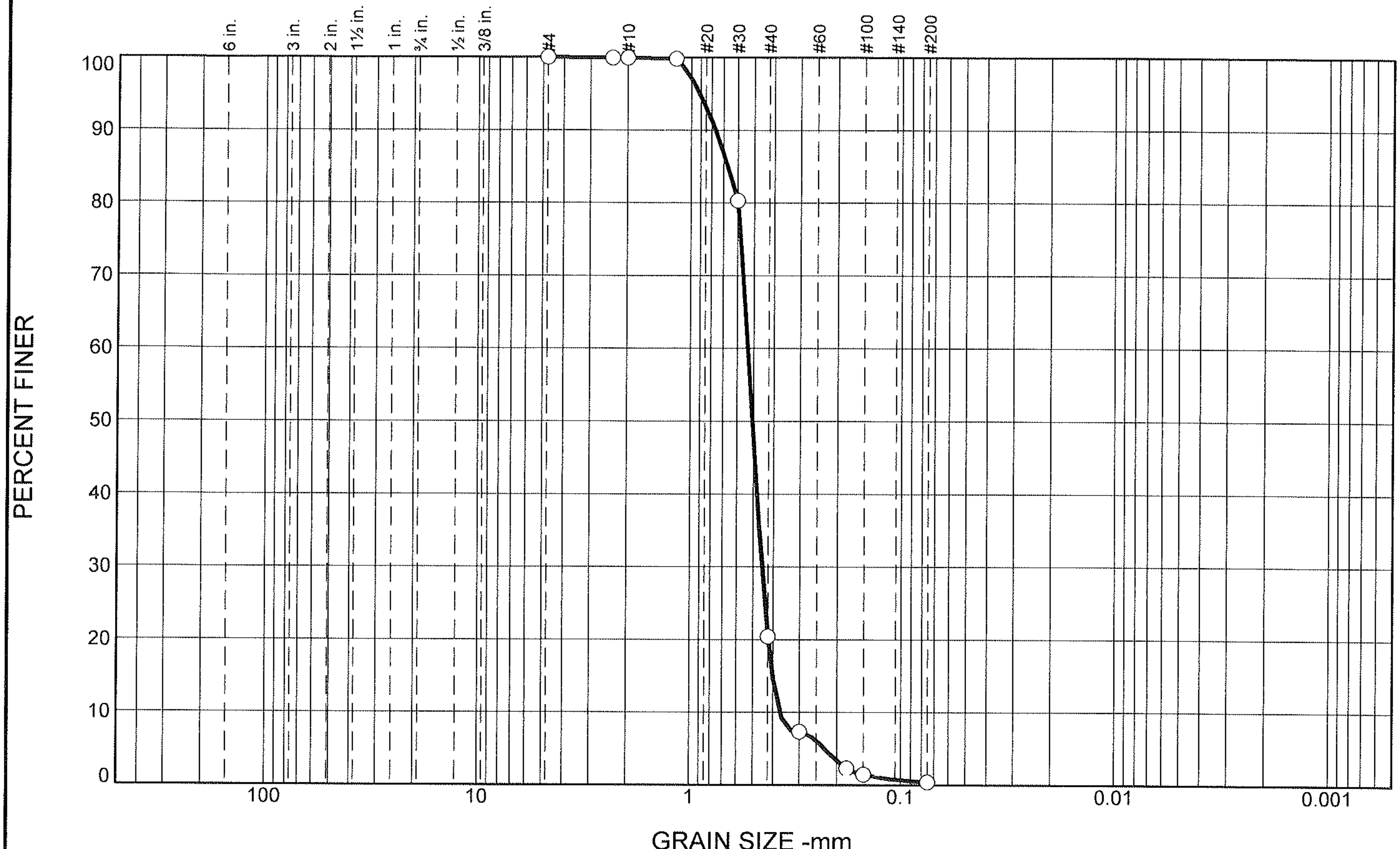
CGC,Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00

Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	79.6	20.0	0.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	100.0		
#10	100.0		
#16	99.9		
#30	80.3		
#40	20.4		
#50	7.4		
#80	2.3		
#100	1.5		
#200	0.4		

* (no specification provided)

Material Description

Tan Fine to Medium Sand, Trace Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.7685 D_{85}= 0.6701 D_{60}= 0.5342
D_{50}= 0.5073 D_{30}= 0.4544 D_{15}= 0.4030
D_{10}= 0.3714 C_u= 1.44 C_c= 1.04

Classification

USCS= SP AASHTO=

Remarks

Constant Head Permeabilty Result: 3.78 x 10 exp -2

Sample Number: COL-DL-B4 (k)

Date: 11/18/22

CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

CGC, Inc.

Job No.: C22011-2
Date: 11/22/2022

CONSTANT HEAD PERMEABILITY TEST (ASTM D2434-94)

CGC, Inc., 2921 Perry Street, Madison, WI (608) 288-4100; Fax: (608) 288-7887

PROJECT: Columbia Modules 10 & 11 Liner Construction
LOCATION:
SAMPLE: COL-DL-B4
DEPTH (ft): -
SOIL DESCRIPTION: Tan Fine to Medium Sand, Trace Silt

	INITIAL	FINAL
SAMPLE DIAMETER (cm)	10.16	10.16
SAMPLE LENGTH (cm)	11.65	11.65
MOISTURE CONTENT (%)	2.7	13.8
DRY DENSITY (lb/ft^3)	104.9	105.2
COMPACTION (%)	-	-

RUN	COEFFICIENT OF PERMEABILITY, k (cm/sec)
1	4.19E-02
2	4.01E-02
3	3.86E-02
4	3.76E-02
5	3.57E-02
6	3.75E-02
7	3.91E-02
8	3.83E-02

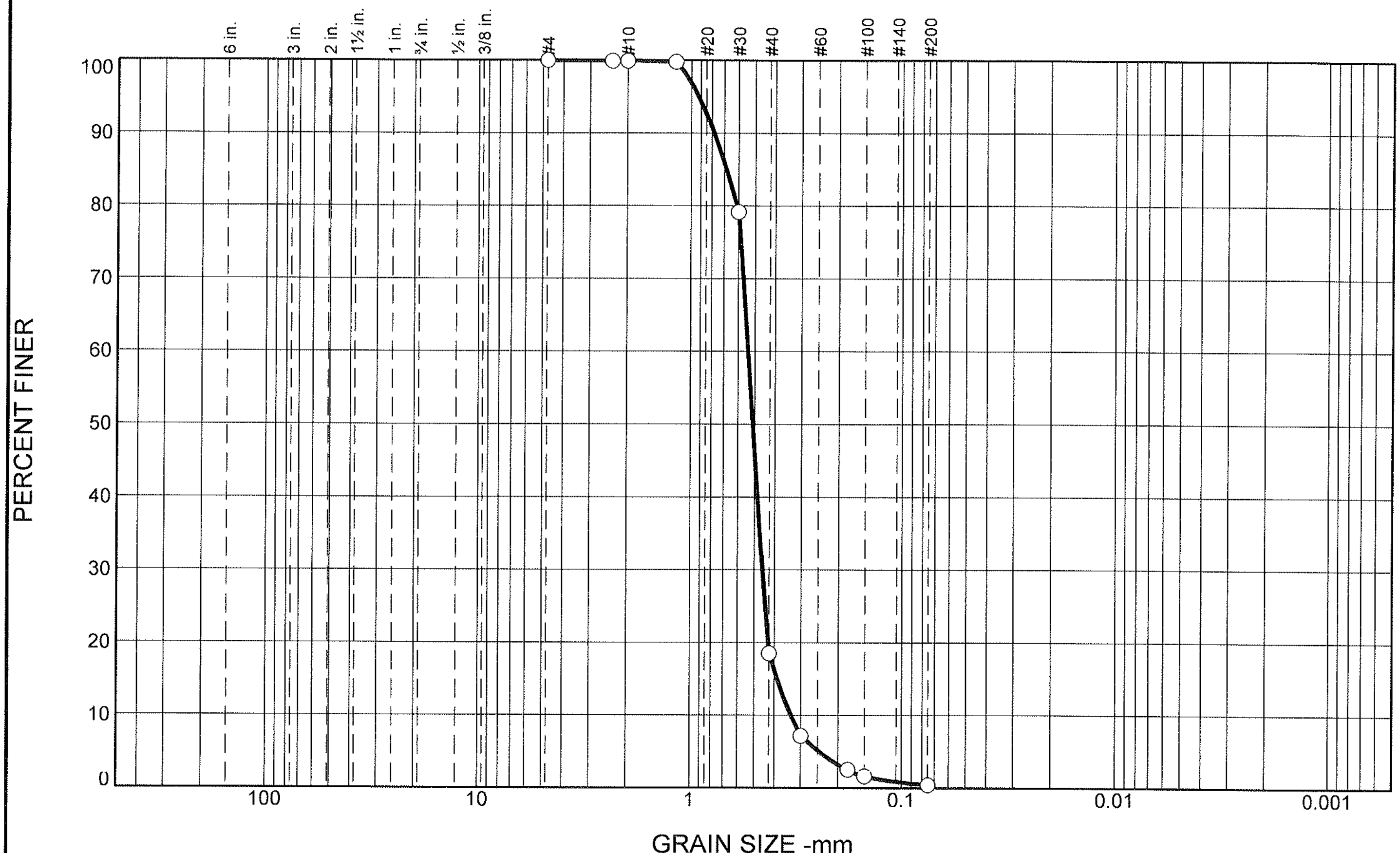
AVERAGE COEFFICIENT OF PERMEABILITY = 3.78E-02 cm/sec
(Based on run numbers 3 through 8)

FORMULA: $$k = \frac{Q \cdot L \cdot R_T}{h \cdot A \cdot t}$$

REMARKS: Sample lightly tamped into 4"-diameter permeameter in three lifts.

TESTED BY: KJS **CHECKED BY:** AJB **DATE:** 11/22/2022

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	81.4	18.1	0.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.9		
#10	99.9		
#16	99.8		
#30	79.1		
#40	18.5		
#50	7.2		
#80	2.5		
#100	1.6		
#200	0.4		

* (no specification provided)

Material Description

Tan Fine to Medium Sand, Trace Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.7825 D_{85}= 0.6849 D_{60}= 0.5386
D_{50}= 0.5118 D_{30}= 0.4597 D_{15}= 0.3887
D_{10}= 0.3343 C_u= 1.61 C_c= 1.17

Classification

USCS= SP AASHTO=

Remarks

Sample Number: COL-DL-B5

Date: 11/18/22

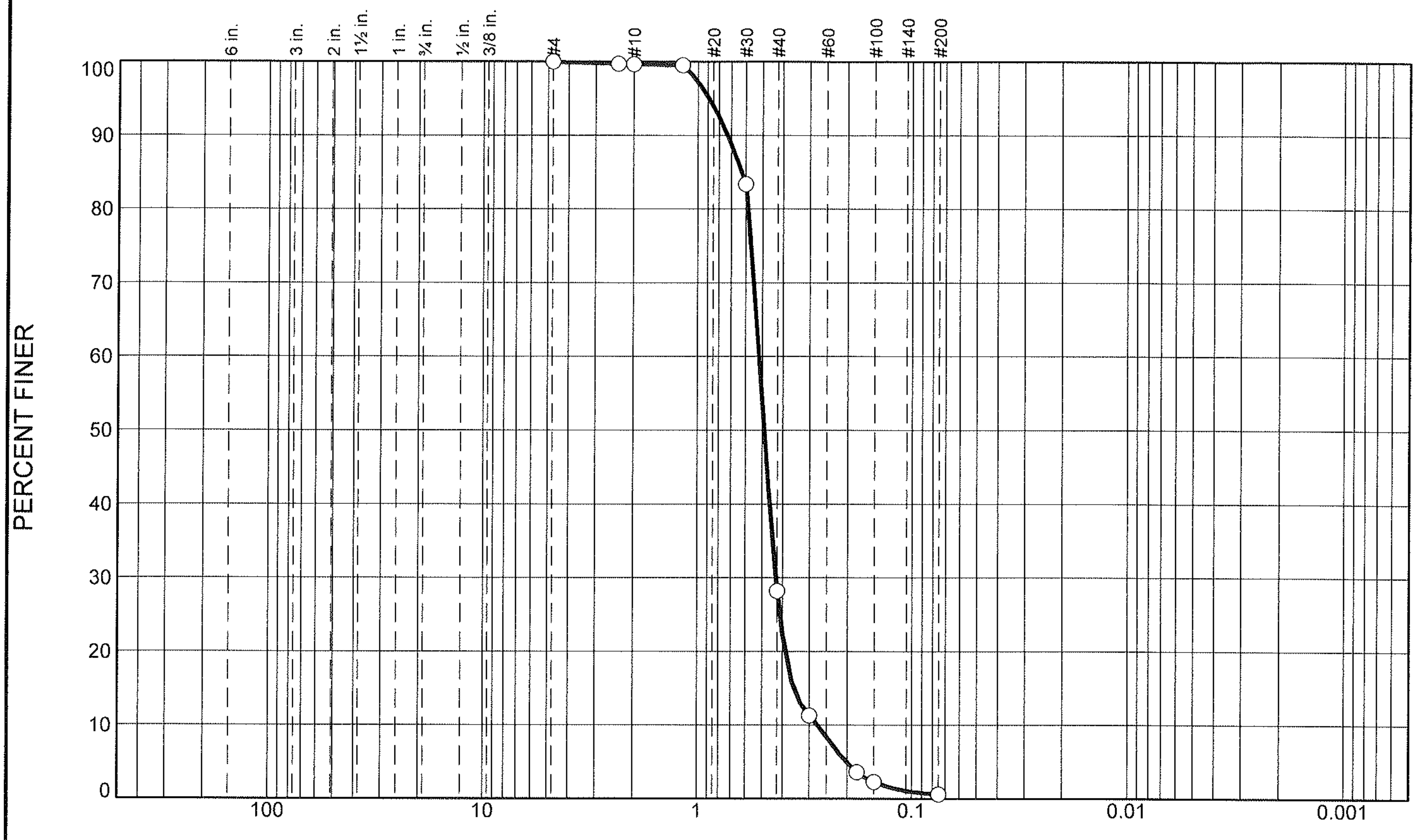
CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00

Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	71.5	27.6	0.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.7		
#10	99.7		
#16	99.5		
#30	83.4		
#40	28.2		
#50	11.3		
#80	3.6		
#100	2.3		
#200	0.6		

* (no specification provided)

Material Description

Tan Fine to Medium Sand, Trace Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.7323 D_{85}= 0.6274 D_{60}= 0.5190
D_{50}= 0.4903 D_{30}= 0.4312 D_{15}= 0.3553
D_{10}= 0.2759 C_u= 1.88 C_c= 1.30

Classification

USCS= SP AASHTO=

Remarks

Constant Head Permeability Result: 3.10 x 10 exp -2

Sample Number: COL-DL-B6 (k)

Date: 11/18/22

CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00

Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

CGC, Inc.

Job No. C22011-2
Date: 11/22/2022

CONSTANT HEAD PERMEABILITY TEST (ASTM D2434-94)

CGC, Inc., 2921 Perry Street, Madison, WI (608) 288-4100; Fax: (608) 288-7887

PROJECT: Columbia Modules 10 & 11 Liner Construction
LOCATION:
SAMPLE: COL-DL-B6
DEPTH (ft): -
SOIL DESCRIPTION: Tan Fine to Medium Sand, Trace Silt

	INITIAL	FINAL
SAMPLE DIAMETER (cm)	10.16	10.16
SAMPLE LENGTH (cm)	11.65	11.65
MOISTURE CONTENT (%)	2.8	13.7
DRY DENSITY (lb/ft^3)	105.6	106.0
COMPACTION (%)	-	-

RUN	COEFFICIENT OF PERMEABILITY, k (cm/sec)
1	3.68E-02
2	3.08E-02
3	3.05E-02
4	3.23E-02
5	2.42E-02
6	3.52E-02
7	3.18E-02
8	2.63E-02

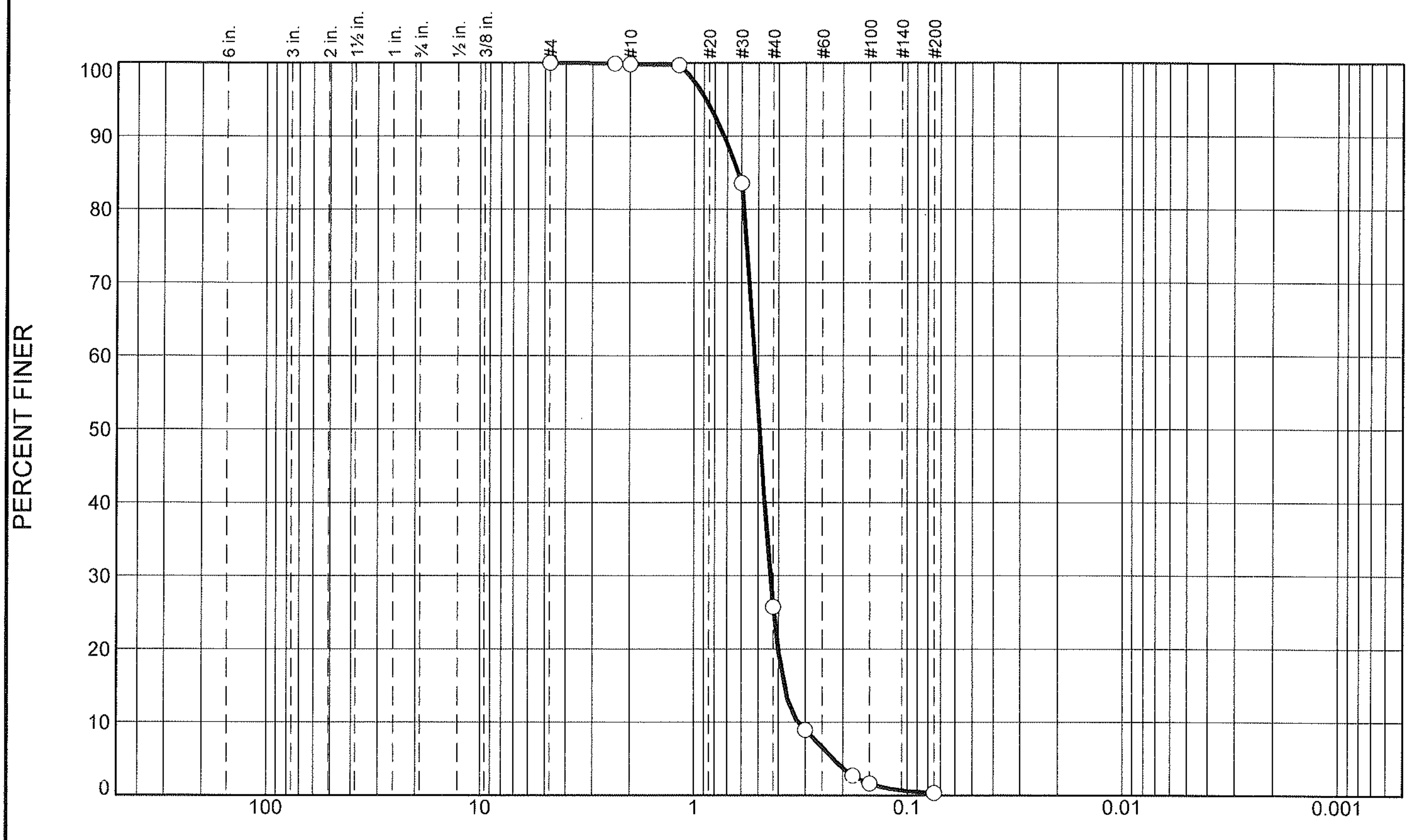
AVERAGE COEFFICIENT OF PERMEABILITY = 3.10E-02 cm/sec
(Based on run numbers 1 through 8)

FORMULA: $$k = \frac{Q \cdot L \cdot R_T}{h \cdot A \cdot t}$$

REMARKS: Sample lightly tamped into 4"-diameter permeameter in three lifts.

TESTED BY: KJS **CHECKED BY:** AJB **DATE:** 11/22/2022

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	74.2	25.4	0.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.9		
#10	99.9		
#16	99.7		
#30	83.6		
#40	25.7		
#50	9.0		
#80	2.7		
#100	1.6		
#200	0.3		

* (no specification provided)

Material Description

Tan Fine to Medium Sand, Trace Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.7274 D_{85}= 0.6239 D_{60}= 0.5216
D_{50}= 0.4942 D_{30}= 0.4387 D_{15}= 0.3766
D_{10}= 0.3248 C_u= 1.61 C_c= 1.14

Classification

USCS= SP AASHTO=

Remarks

Constant Head Permeability Result: 3.6 x 10 exp -2

Sample Number: COL-DL-B7 (k)

Date: 11/18/22

CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

CGC, Inc.

Job No.	C22011-2
Date:	11/22/2022

CONSTANT HEAD PERMEABILITY TEST (ASTM D2434-94)

CGC, Inc., 2921 Perry Street, Madison, WI (608) 288-4100; Fax: (608) 288-7887

PROJECT:	Columbia Modules 10 & 11 Liner Construction
LOCATION:	
SAMPLE:	COL-DL-B7
DEPTH (ft):	-
SOIL DESCRIPTION:	Tan Fine to Medium Sand, Trace Silt

	INITIAL	FINAL
SAMPLE DIAMETER (cm)	10.16	10.16
SAMPLE LENGTH (cm)	11.65	11.65
MOISTURE CONTENT (%)	2.0	14.3
DRY DENSITY (lb/ft^3)	105.6	105.0
COMPACTION (%)	-	-

RUN	COEFFICIENT OF PERMEABILITY, k (cm/sec)
1	4.03E-02
2	3.94E-02
3	4.36E-02
4	3.44E-02
5	2.25E-02

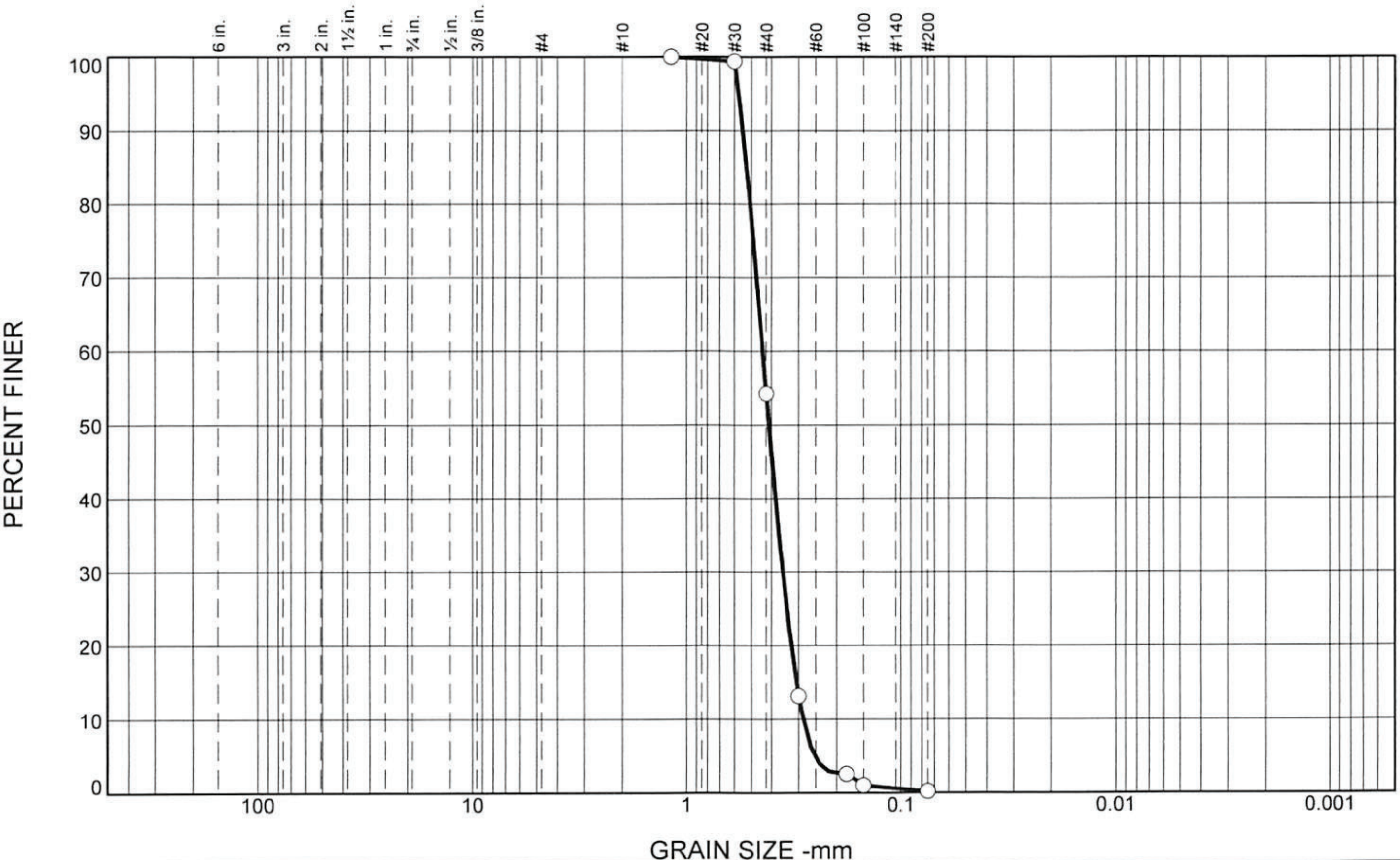
AVERAGE COEFFICIENT OF PERMEABILITY = 3.60E-02 cm/sec
(Based on run numbers 1 through 5)

FORMULA: $$k = \frac{Q \cdot L \cdot R_T}{h \cdot A \cdot t}$$

REMARKS: Sample lightly tamped into 4"-diameter permeameter in three lifts.

TESTED BY: KJS **CHECKED BY:** AJB **DATE:** 11/22/2022

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	45.7	54.1	0.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#16	100.0		
#30	99.4		
#40	54.3		
#50	13.2		
#80	2.6		
#100	1.0		
#200	0.2		

* (no specification provided)

Material Description

Tan to White Fine to Medium Sand, Trace Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.5488 D_{85}= 0.5272 D_{60}= 0.4419
D_{50}= 0.4127 D_{30}= 0.3554 D_{15}= 0.3072
D_{10}= 0.2858 C_u= 1.55 C_c= 1.00

Classification

USCS= SP AASHTO=

Remarks

Sample Number: COL-DL-B8

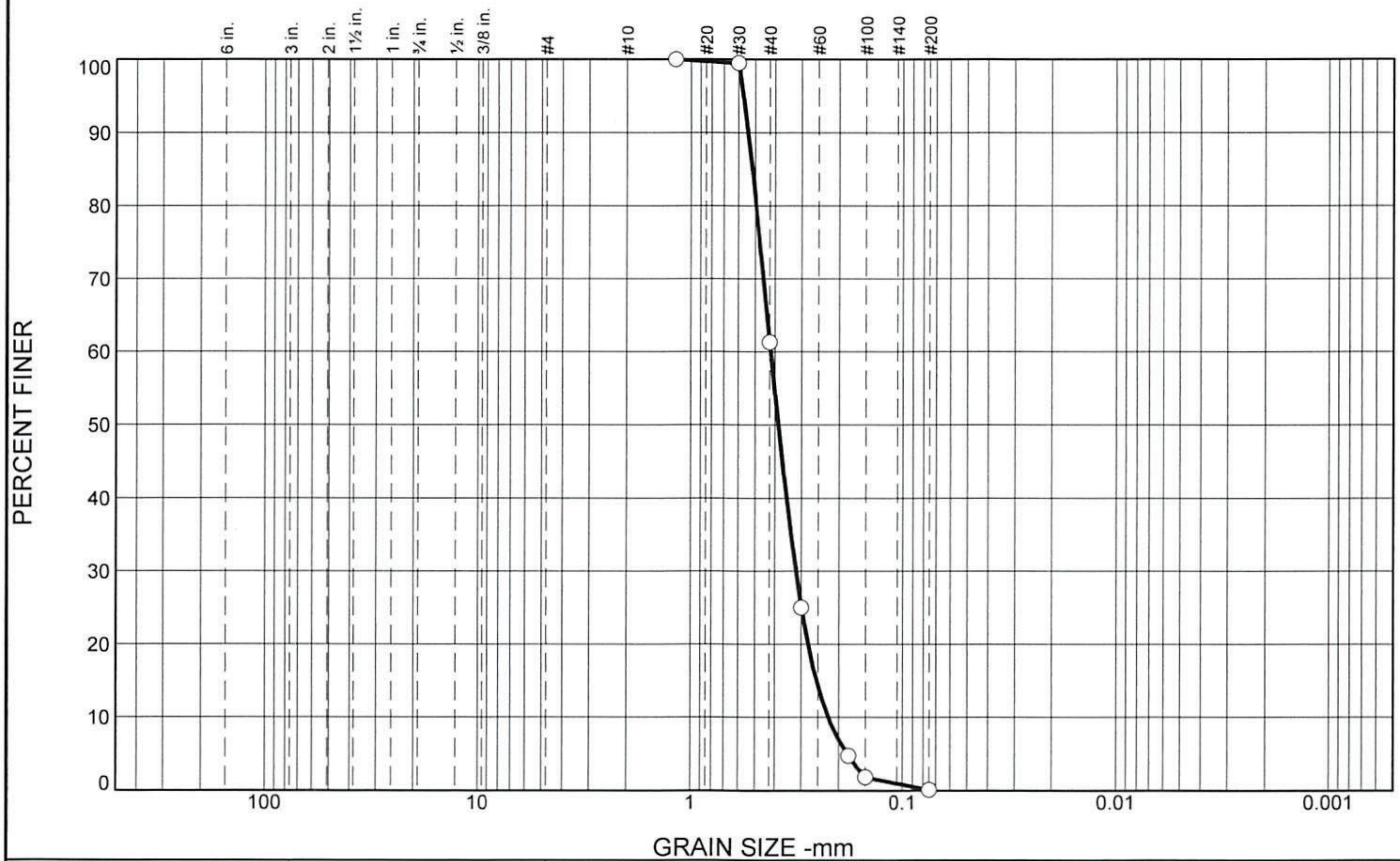
Date: 12/6/22

CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: AJG **Checked By:** MAS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	38.7	61.2	0.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#16	100.0		
#30	99.5		
#40	61.3		
#50	25.0		
#80	4.8		
#100	1.8		
#200	0.1		

* (no specification provided)

Material Description

Tan to White Fine to Medium Sand, Trace Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.5407 D_{85}= 0.5164 D_{60}= 0.4205
D_{50}= 0.3866 D_{30}= 0.3187 D_{15}= 0.2549
D_{10}= 0.2245 C_u= 1.87 C_c= 1.08

Classification

USCS= SP AASHTO=

Remarks

Sample Number: COL-DL-B9

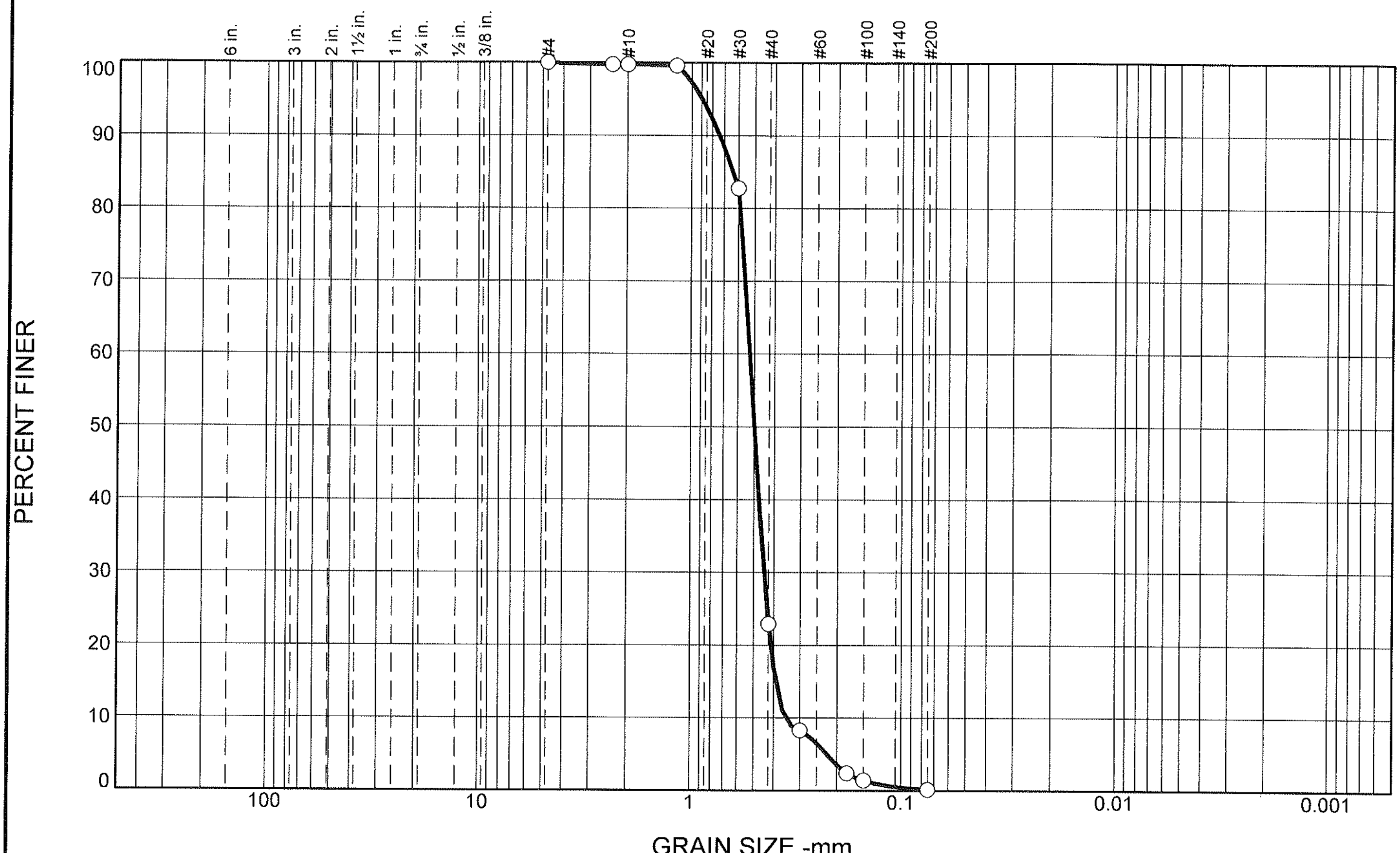
Date: 12/6/22

CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: AJG **Checked By:** MAS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	76.8	22.7	0.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.7		
#10	99.7		
#16	99.6		
#30	82.7		
#40	22.9		
#50	8.3		
#80	2.4		
#100	1.4		
#200	0.2		

* (no specification provided)

Material Description

Tan Fine to Medium Sand, Trace Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.7400 D_{85}= 0.6370 D_{60}= 0.5268
D_{50}= 0.5002 D_{30}= 0.4470 D_{15}= 0.3916
D_{10}= 0.3514 C_u= 1.50 C_c= 1.08

Classification

USCS= SP AASHTO=

Remarks

Sample Number: COL-DL-B10

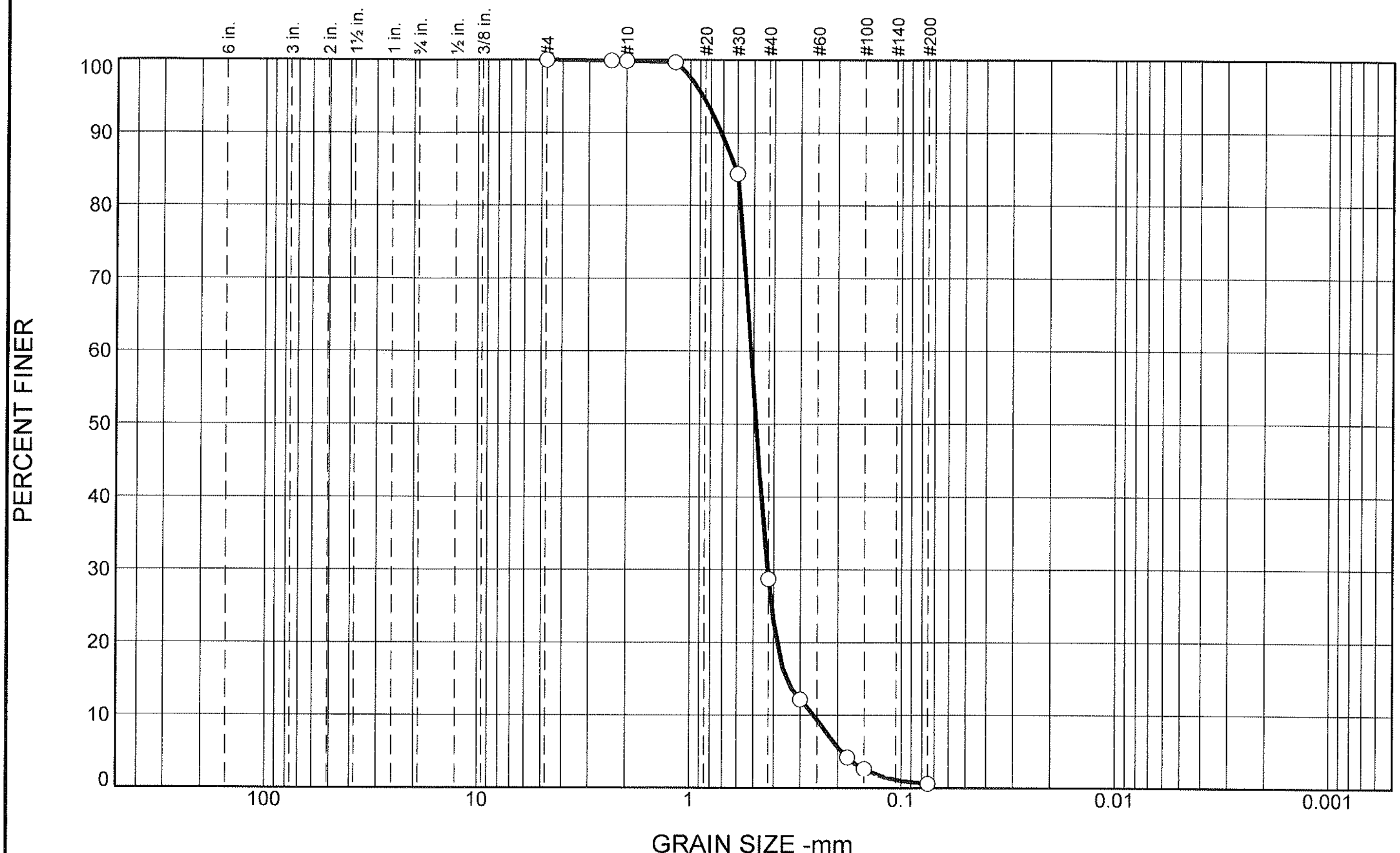
Date: 11/18/22

CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	71.2	28.1	0.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.9		
#10	99.9		
#16	99.7		
#30	84.3		
#40	28.7		
#50	12.2		
#80	4.2		
#100	2.6		
#200	0.6		

* (no specification provided)

Material Description

Tan Fine to Medium Sand, Trace Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.7165 D_{85}= 0.6114 D_{60}= 0.5167
D_{50}= 0.4885 D_{30}= 0.4295 D_{15}= 0.3485
D_{10}= 0.2608 C_u= 1.98 C_c= 1.37

Classification

USCS= SP AASHTO=

Remarks

Constant Head Permeability Result: 1.54 x 10 exp -2

Sample Number: COL-DL-B11 (k)

Date: 11/18/22

CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00
Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

03/09/2023 - Classification: Internal - ECRM13010958

CGC, Inc.

Job No. C22011-2
Date: 11/22/2022

CONSTANT HEAD PERMEABILITY TEST (ASTM D2434-94)

CGC, Inc., 2921 Perry Street, Madison, WI (608) 288-4100; Fax: (608) 288-7887

PROJECT: Columbia Modules 10 & 11 Liner Construction
LOCATION:
SAMPLE: COL-DL-B11
DEPTH (ft): -
SOIL DESCRIPTION: Tan Fine to Medium Sand, Trace Silt

	INITIAL	FINAL
SAMPLE DIAMETER (cm)	10.16	10.16
SAMPLE LENGTH (cm)	11.65	11.65
MOISTURE CONTENT (%)	2.3	12.9
DRY DENSITY (lb/ft^3)	105.3	107.3
COMPACTION (%)	-	-

RUN	COEFFICIENT OF PERMEABILITY, k (cm/sec)
1	2.21E-02
2	2.43E-02
3	1.39E-02
4	1.29E-02
5	1.34E-02
6	1.20E-02
7	1.27E-02
8	1.19E-02

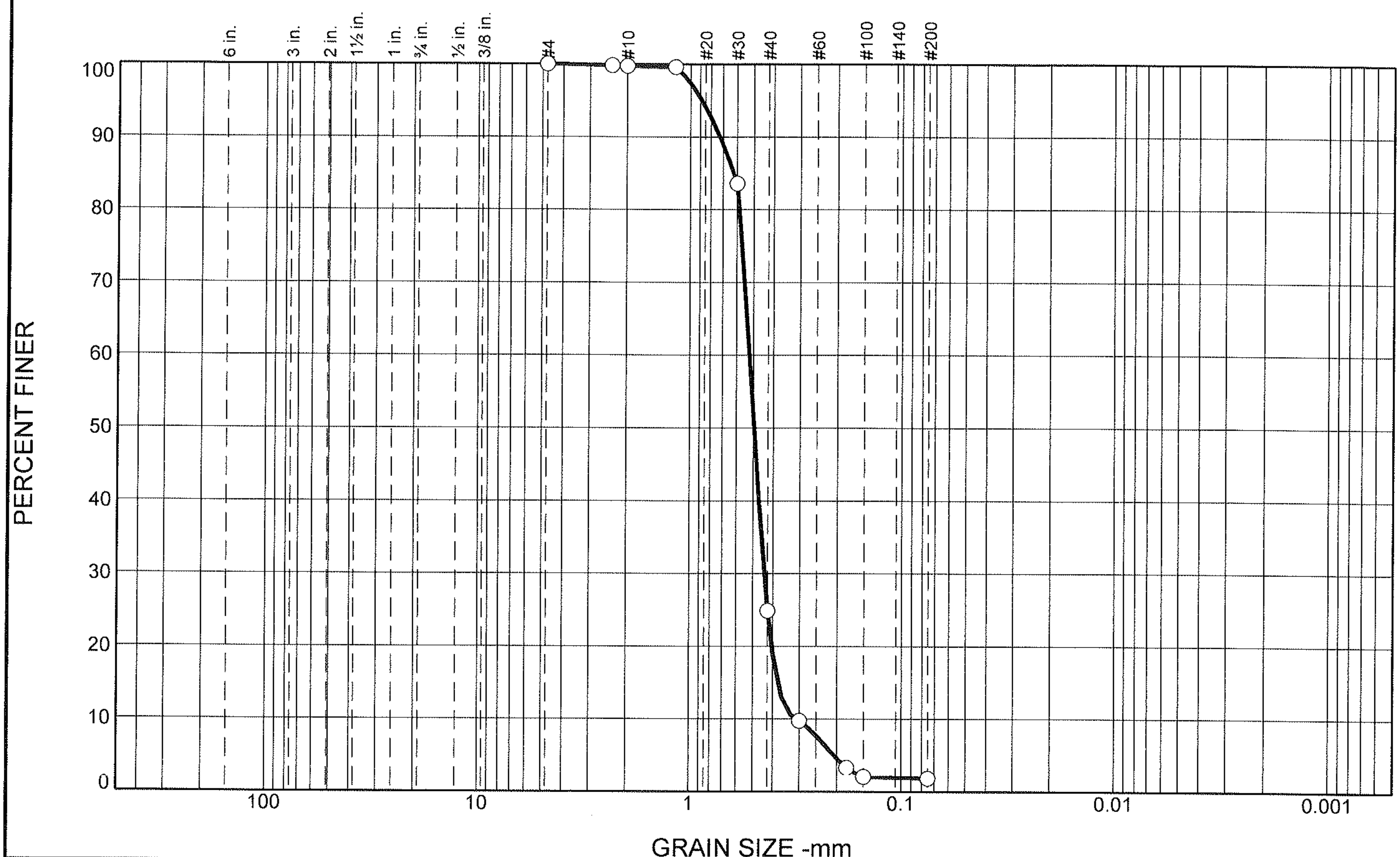
AVERAGE COEFFICIENT OF PERMEABILITY = 1.54E-02 cm/sec
(Based on run numbers 1 through 8)

FORMULA: $$k = \frac{Q \cdot L \cdot R_T}{h \cdot A \cdot t}$$

REMARKS: Sample lightly tamped into 4"-diameter permeameter in three lifts.

TESTED BY: KJS **CHECKED BY:** AJB **DATE:** 11/22/2022

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	74.9	23.0	1.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.8		
#10	99.8		
#16	99.6		
#30	83.6		
#40	24.9		
#50	9.7		
#80	3.3		
#100	2.1		
#200	1.9		

* (no specification provided)

Material Description

Tan Fine to Medium Sand, Trace Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.7282 D_{85}= 0.6237 D_{60}= 0.5230
D_{50}= 0.4960 D_{30}= 0.4413 D_{15}= 0.3795
D_{10}= 0.3101 C_u= 1.69 C_c= 1.20

Classification

USCS= SP AASHTO=

Remarks

Sample Number: COL-DL-B12

Date: 11/18/22

CGC, Inc.

Client: SCS Engineers
Project: Modules 10 and 11 Liner Construction SCS #25222157.00

Project No: C22011-2 **Figure**

Tested By: JFS **Checked By:** KJS

Appendix P

Leak Location Test Report

SCS ENGINEERS
Environmental Consultants and Contractors

COMPLETION REPORT FOR THE MODULES 10 AND 11 LINER SYSTEM ELECTRICAL LEAK LOCATION TESTING

Wisconsin Power and Light
Columbia Generating Station
Ash Disposal Facility
Pardeeville, Wisconsin

December 2022

Prepared For:
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718-6751

Prepared By:
CQM, INC.
2297 Tiger Court
Green Bay, Wisconsin 54311
(920) 362-3800

CQM, INC.

Engineering – Surveying – Material Testing
2297 Tiger Court   Green Bay, Wisconsin 54311
Phone: (920) 362-3800

December 19, 2022

Zana Bajalan
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718-6751

RE: Electrical Leak Location Testing Completion Report
Wisconsin Power and Light - Columbia Generating Station
Ash Disposal Facility - Modules 10 and 11

Dear Mr. Bajalan:

The attached Completion Report discusses and documents the findings of the electrical leak location testing performed on December 8, 9, and 10, 2022, for the Modules 10 and 11 Liner at the Wisconsin Power and Light - Columbia Generating Station Ash Disposal Facility.

The electrical leak location test procedure was completed in accordance with ASTM D7007, "Standard Practices for Electrical Methods for Locating Leaks in Geomembranes Covered with Water or Earth materials."

Should questions arise, feel free to contact this office.

Sincerely,

CQM, INC.

Frank R. (Nick) Sturzl, P.E.

Enclosure

TABLE OF CONTENTS

LIST OF APPENDICES

1. INTRODUCTION

CQM, INC. has prepared this report to document the completion of an electrical leak location test recently completed for the Modules 10 and 11 Geomembrane Liner System at the Wisconsin Power and Light – Columbia Generating Station Ash Disposal Facility, Pardeeville, Wisconsin. The electrical leak location test described in this report consists of a nondestructive test method utilized to locate leaks in the geomembrane liner following the placement of the drainage layer material. The test was performed on December 8, 9, and 10, 2022. The test was performed by Mr. Frank R. Sturzl, P.E.

2. SITE DESCRIPTION

The Modules 10 and 11 Geomembrane Liner test area was approximately 8.0 acres in size. The composite liner system consisted of a clay liner, a GCL, a 60-mil HDPE geomembrane, and a 1-foot thick leachate drainage layer.

The phase perimeters consisted of either sideslopes with the geomembrane buried within an anchor trench or with a geomembrane runout for connection to future geomembrane construction. At all perimeters, an electrical separation was maintained between the Modules 10 and 11 drainage layer material and the soils/waste located outside the Modules 10 and 11 test area.

3. TEST METHODOLOGY

The test procedure utilized was based on ASTM D7007, "Standard Practices for Electrical Methods for Locating Leaks in Geomembranes Covered with Water or Earth Materials." The procedure consists of applying an electric potential across the geomembrane liner between a current injector electrode placed within the drainage layer above the geomembrane, and a current return electrode placed in the clay liner below the geomembrane at the edge. Since the geomembrane acts as an insulator, a leak (hole) through the geomembrane must be present to allow an electric current to flow through it. A handheld test probe is then used to measure the potential gradients on the surface of the drainage layer on a grid pattern. During the test procedure, any points of anomalous potential distribution will identify the locations of leaks (holes) within the geomembrane.

4. LEAK DETECTION DISTANCE TEST

Prior to the start of the electrical leak location testing each day, a leak detection distance test was conducted. The leak detection distance test was used to verify that a proper test response would be obtained at leaks in the geomembrane, and to determine the proper grid spacing for performing the testing. The leak detection distance test was completed by placing an “artificial leak” above the geomembrane. The artificial leak consisted of a copper wire extending from above the drainage layer to the base of the drainage layer, just above the geomembrane. The end of the wire placed on the geomembrane was stripped for a distance of approximately 0.25 inches to simulate a leak of this size. The other end was connected by a wire to a ground electrode located within the clay liner but outside the geomembrane liner limits.

With the artificial leak in place, a series of tests with the handheld probe were completed along parallel lines adjacent to the artificial leak. The tests were completed at varying distances from the artificial leak. The testing indicated that the required test response for a leak was identified at a minimum distance of five feet parallel from the artificial leak. Therefore, a maximum test grid spacing of 10 feet for this project was appropriate. The testing for this project was performed along parallel lines on a maximum 10’ x 5’ grid.

During the testing, periodic leak detection distance tests were completed to verify adequate sensitivity of the test procedure. All of the periodic leak detection distance tests conducted during the testing confirmed adequate test procedures were maintained.

5. PRODUCTION TESTING

The production testing began on the north edge of the test area and proceeded in a sequential pattern until the entire test area was tested.

The electrical leak location test method requires that adequate moisture within the drainage layer material be maintained throughout the test. Rainfall events prior to and during testing provided sufficient moisture to the drainage layer material, as needed. To verify if the drainage layer material contained adequate moisture for testing, small test holes were hand excavated through the drainage layer. In all cases, the drainage material contained adequate moisture.

6. TEST RESULTS

During the testing, 14 locations were identified which exhibited characteristics of a geomembrane leak. The locations were marked with a surveyor's pin flag. The locations were then uncovered by CQM, INC. to expose the geomembrane liner. At each location, a leak in the geomembrane was identified. Once the leaks were uncovered and allowed to dry, the drainage layer was then re-tested around the leaks within a minimum 50-foot radius to confirm that no additional leaks were present. The leak locations were marked and surveyed for repair by others. The following are the surveyed coordinates of the five leaks located:

Leak No.	Site Coordinates	Description
LT-1	542715N, 2124582E	Small Hole
LT-2	542659N, 2124555E	Bad Extrusion Weld
LT-3	542400N, 2124285E	Equipment Damage
LT-4	542406N, 2124920E	Equipment Damage
LT-5	542410N, 2124950E	Equipment Damage
LT-6	542436N, 2124987E	Bad Extrusion Weld
LT-7	542686N, 2125065E	Equipment Damage
LT-8	542736N, 2125013E	Scrape
LT-9	542852N, 2125069E	Equipment Damage
LT-10	542891N, 2125071E	Puncture
LT-11	542409N, 2124957E	Puncture
LT-12	542983N, 2125071E	Puncture
LT-13	542691N, 2125097E	Equipment Damage
LT-14	542484N, 2125100E	Equipment Damage

7. CONCLUSIONS

An electrical leak location test was performed on the Modules 10 and 11 geomembrane liner at the Wisconsin Power and Light Columbia Generating Station Ash Disposal Facility on December 8, 9, and 10, 2022. The testing was completed in accordance with ASTM D7007. The testing resulted in the identification of 14 geomembrane leaks, as discussed in this report. The leak locations were identified by CQM, INC. for repair and documentation by others.

Appendix A

Photograph Documentation

Photograph No. 1
Leak location No. LT-1, a small hole.

Photograph No. 2
Leak location No. LT-2, a bad extrusion weld.

Photograph No. 3
Leak location No. LT-3, equipment damage.

Photograph No. 4
Leak location No. LT-4, equipment damage.

Photograph No. 5
Leak location No. LT-5, equipment damage.

Photograph No. 6
Leak location No. LT-6, a bad extrusion weld.

Photograph No. 7

Leak location No. LT-7, equipment damage.

Photograph No. 8

Leak location No. LT-8, a scrape.

Photograph No. 9
Leak location No. LT-9, equipment damage.

Photograph No. 10
Leak location No. LT-10, a puncture.

Photograph No. 11
Leak location No. LT-11, a puncture.

Photograph No. 12
Leak location No. LT-6, a puncture.

Photograph No. 13
Leak location No. LT-13, equipment damage.

Photograph No. 14
Leak location No. LT-14, equipment damage.

Appendix Q

Restoration Materials

ErosionTech

ETRS-2

Double Net Straw

8' x 112.5'

MT-9

For more information, contact:
Water Wind & Soil
791 Georgia Pacific Rd
Monticello, GA 31064
(404) 308-1914

RUSHMORE OATS

Lot # ROC 22

Cert # SD21-12156

UNAUTHORIZED PROPAGATION PHOHIBITED—U.S. VARIETY PROTECTION APPLIED FOR, PVP 94

SEED OF THIS VARIETY MAY BE SOLD ONLY AS A CLASS OF CERTIFIED SEED

The container bearing this label when properly tagged under the regulations of the SD Crop Improvement Association contains the class of SD Certified Seed shown on this label.

MEMBER OF ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES

SEED OATS
CERTIFIED RUSHMORE

PURE SEED	99.50%	GERMINATION	85%
OTHER CROP SEED	0.03%	ORIGIN	SD
INERT MATTER	0.46%	TESTED	01/22
WEED SEED	0.01%	NET WEIGHT	50#
NOXIOUS WEED SEED PR/LB	NONE FOUND	LOT NUMBER	ROC22
		AMS#	8218

La Crosse Seed
2541 Commerce Street
La Crosse, WI 54603

WI HIWAY 20 MIX

Questions?
lacrosseseed.com

CONTENTS:	%	GERM:	ORIGIN:
TALL FESCUE**	39.61%	85%	OR
PERENNIAL RYEGRASS**	24.50%	85%	OR
HARD FESCUE**	23.65%	85%	WA
KENTUCKY BLUEGRASS**	5.89%	85%	WA
CREEPING RED FESCUE**	4.88%	85%	CAN

**VARIETY NOT STATED

OTHER CROP SEED: 0.28%
WEED SEED: 0.01%
INERT MATTER: 1.18%
NOXIOUS WEED SEED PR/LB: NONE FOUND
AMS# 2352

TEST DATE: DEC
NET WT. 50 LBS (22.

LA CROSSE SEED
2541 COMMERCE STREET
LA CROSSE WI, 54603

LOT: L22-

TAG CODE: P

Mat-Blend® is a wood fiber and paper mulch product developed specifically for hydraulic planting erosion control and related applications. Non-toxic, non-staining dye added for visual metering during application.
CAUTION: DO NOT ATTEMPT TO FORCE ANY MATERIAL INTO OPERATING MACHINE. REDUCE SIZE (BREAK APART) AND LOAD ONLY THROUGH MANUFACTURER-INSTALLED SAFETY HATCH OR GRATE OPENING.
Manufactured at one of two locations for Mat, Inc. at:
Mat, Inc.
12402 Hwy.2
Floodwood, MN 55738
Mat, NuWood LLC.
747 Harrisburg Drive SW
Lenoir, NC 28645
For questions or comments call: 1-218-476-2033 1-888-477-3028
PRODUCT DATA: Wood Fiber 70% ± 10%, Paper Mulch 30% ± 10%, Moisture Content 12% ± 3%, Organic Matter, min: 97%, Inorganic Ash, max. 3%, pH of 3% Water Slurry, average. 7.5, Water Holding Capacity, min 1.2 gal/lb.
Mat, Inc.
Quality Erosion Control Products
Mat-Blend
50 lbs.
22.6kg.


CAUTION:
Mat, Inc.
Quality Erosion Control Products
Mat-Blend®
Wood Fiber and Paper Mulch
For Hydraulic Planting.
Net Wt. 50 lbs. 22.6 kg.
Net Dry Wt. 44 lbs. 19.9 kg.
Mat-Blend®


GUARANTEED ANALYSIS
TOTAL NITROGEN.......... (N)......
AVAILABLE PHOSPHATE . . (P_2O_5) . .
SOLUBLE POTASH .... (K_2O). . .
16%
10%
24%
3% SULFUR
FERTILIZER


Country
VISIONS
COOPERATIVE
QUALITY
FERTILIZER
NET WT. 50 LBS. (22.68 Kg)
Manufactured By
Country Visions Cooperative
Manitowoc, WI 54220

628.6510 Soil Stabilizer Type B

CFM • 608-839-8031 • Fax 608-839-4031

CF2000

POLYMER

SLOPE EROSION CONTROL

20 Lbs/1 Acre

DRY APPLICATION RECOMMENDATIONS:

- Dry applications are not recommended in windy conditions.
- All product mixed on site must be applied the same day it is mixed
- A tracer agent should be used to help ensure uniform application
    - Wood Fiber
    - Paper Mulch
    - Calcium
    - Gypsum

DRY APPLICATION INSTRUCTIONS:

- Mix 10 pounds of CF2000 with 100 pounds of your tracer agent
- Distribute mixture using a pull behind spreader or household fertilizer spreader.

WET APPLICATION INSTRUCTIONS:

- For hydroseeder, add water and then SLOWLY add CF2000 at a rate of 1 lb to 100 gallons (to the total amount of water in tank)
- Example: SLOWLY add 10 lbs (1 container) of CF2000 to 1000 gallons of water.

CONSTRUCTION FABRICS & MATERIALS CORPORATION • 2525 PEIPER ROAD • COTTAGE GROVE, WI 53527

Soil Stabilizer Type B
Material Safety Data Sheet
4 Sheets

MSDS No: 2725

cfm **MATERIAL SAFETY DATA SHEET**

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	CF2000
SYNONYMS:	CFM 2000
CHEMICAL FAMILY:	Polymer
MOLECULAR FORMULA:	Polymer
MOLECULAR WGT:	Polymer

Construction Fabrics & Materials Corp.
2525 Peiper Rd.
Cottage Grove, WI 53527
608-839-8031

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

APPEARANCE AND ODOR:	Off-white granular solid; odorless
STATEMENTS OF HAZARD:	IMPORTANT! Spills of this product are very slippery when wet

POTENTIAL HEALTH EFFECTS

EFFECTS OF OVEREXPOSURE:

Signs and symptoms of Exposure: Eye contact may product slight irritation and/or redness. Inhaled dust may cause some respiratory irritation.

Carcinogenicity: Not listed as a carcinogen by IARC, NTP, OSHA, or ACGIH

Medical Conditions Aggravated by Exposure: Existing respiratory conditions.

Target Organ(s): NA

3. COMPOSITION/INFORMATION ON INGREDIENTS

OSHA REGULATED COMPONENTS

COMPONENT	CAS. NO.	%	TWA/CEILING	REFERENCE

No permissible Exposure Limits (PEL/TLV) have been established by OSHA or ACGIH

4. FIRST AID MEASURES

Ingestion: Do not give emetic unless directed by a physician. Never give anything by mouth to an unconscious person.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT:	Not applicable
FLAMMABLE LIMITS: (% BY VOL)	Not applicable
AUTOIGINITION TEMP:	Not applicable
DECOMPOSITION TEMP:	Not applicable

EXTINGUISHING MEDIA AND FIRE FIGHTING INSTRUCTIONS

As with many solids, any dust that is generated may be explosive if mixed with air in critical proportions and in the presence of a source of ignition. Use water, carbon dioxide or dry chemical to extinguish fires. Wear self-contained, positive pressure breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Spilled material becomes very slippery when wet. Sweep up spills and place in a waste disposal container. Flush the area thoroughly with water and scrub to remove residue. If slipperiness remains, apply more dry-sweeping compound. Do not flush large quantities of the material to sewer.

7. HANDLING AND STORAGE

Spills should be scooped up or wiped up immediately, and the spill area flushed with water.
Maintain good housekeeping to control dust accumulations.
To avoid product degradation and equipment corrosion, do not use iron, copper or aluminum containers or equipment.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT (PPE)
Engineering controls are not usually necessary if good hygiene practices are followed. Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water. Avoid unnecessary skin contact. Impervious gloves are recommended to prevent prolonged skin contact. For operations where eye or face contact can occur, eye protection is recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOR:	Off-white granular solid; odorless
BOILING POINT:	Not applicable
MELTING POINT:	Not applicable
VAPOR PRESSURE:	Not applicable
SPECIFIC GRAVITY:	48-55;ft3
VAPOR DENSITY:	Not applicable
% VOLATILE (BY WT):	8-12; (water)
Ph:	7-9; (aqueous solution)
SATURATION IN AIR (5 BY VOL):	Not applicable
EVAPORTATION RATE:	Not applicable
SOLUBILITY IN WATER:	Limited by viscosity

10. STABILITY AND REACTIVITY

STABILITY:	Stable
CONDITIONS TO AVOID:	None known
POLYMERIZATION:	Will Not Occur
CONDITIONS TO AVOID:	None known
INCOMPATIBLE MATERIALS:	Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition or combustion may produce carbon monoxide, carbon dioxide, ammonia, and/or oxides of nitrogen.

11. TOXICOLOGICAL INFORMATION

Toxicological information for the product is found under Section 3. HAZARDS IDENTIFICATION.
Toxicological information on the OSHA regulated components of this product is as follows: This product contains no OSHA regulated (hazardous) components.

12. ECOLOGICAL INFORMATION

LC50

BLUEGILL, 96 HOUR:	180 mg/L
TROUT 96 HOUR:	130 mg/L
DAPHNIA 48 HOUR:	> 1000 mg/L

OCTANOL/H2O PARTITION COEF: Not available

13. DISPOSAL CONSIDERATIONS

Disposal must be made in accordance wit applicable governmental regulations.

14. TRANSPORT INFORMATION

This section provides basic shipping classification information. Refer to appropriate transportation regulations for specific requirements.

	D.O.T. SHIPPING INFORMATION	IMO SHIPPING INFORMATION
SHIPPING NAME:	NOT APPLICABLE /NOT REGULATED	NOT APPLICABLE/ NOT REGULATED
HAZARD CLASS/PACKING GROUP:	Not Applicable	Not Applicable
UN NUMBER:	Not Applicable	Not Applicable
IMDG PAGE:	Not Applicable	Not Applicable
D.O.T. HAZARDOUS SUBSTANCES:	Not Applicable	Not Applicable
TRANSPORT LABEL REQUIRED:	None Required	None Required
	ICAO/IATA	**TRANSPORT CANADA**
SHIPPING NAME:	NOT APPLICABLE /NOT REGULATED	NOT APPLICABLE/ NOT REGULATED
HAZARD CLASS:	Not Applicable	Not Applicable
SUBSIDIARY CLASS:	Not Applicable	Not Applicable
UN/ID NUMBER:	Not Applicable	Not Applicable
PACKING GROUP:	Not Applicable	Not Applicable
TRANSPORT LABEL REQUIRED:	None Required	None Required
PACKING INSTR:	Passenger: Not Applicable Cargo: Not Applicable	Not Applicable
MAX NET QTY:	Passenger: Not Applicable Cargo: Not Applicable	Not Applicable
	ADDITIONAL TRANSPORT INFORMATION	
TECHNICAL NAME (N.O.S.):	Not Applicable	

15. REGULATORY INFORMATION

INVENTORY INFORMATION

US TSCA:	This product is manufactured in compliance with all provisions of the Toxic Substances Control Act, 15 u.s.c.2601 et. Seq.
CANADA DSL:	Components of this product have been reported to Environment Canada in accordance with subsection 25 of the Canadian Environmental Protection Act and are included on the Domestic Substances List.
EEC EINECS:	All components of this product are included on the European Inventory of Existing Chemical Substances [EINECS] in compliance with Council Directive 67/548/EEC, Amended 79/831/EEC.

OTHER ENVIRONMENTAL INFORMATION

The following components are defined as toxic chemicals subject to reporting requirements of Section 313 of Title III and of 40 CFR 372 of subject to other EPA regulations.

COMPONENT	CAS. NO.	%	TPQ(lbs)	RQ(lbs)	S313	RCRA	TSCA	12B
This product does not contain any components regulated under these sections of the EPA								

PRODUCT CLASSIFICATION UNDER SECTION 311 OF SRA

Not Applicable under SARA TITLE III

16. OTHER INFORMATION

NFPA HAZARD RATING (National Fire Protection Association)

Fire
1
Health 0 0 Reactivity

Special

FIRE: Materials that must be preheated before ignition can occur.
HEALTH: Materials which on exposure under fire conditions would offer no hazard beyond that of ordinary combustible material.
REACTIVITY: Materials which in themselves are normally stable, even under fire exposure conditions, and which are not reactive with water.

REASON FOR ISSUE:

Revised Section 3

Marvin A. Friedman, Ph.D., Director of Toxicology and Product Stewardship

This information is given without any warranty or representation. We do not assume any legal responsibility for same, nor do we give permission, inducement, or recommendation to practice invention without a license. It is offered solely for your consideration, investigation and verification. Before using any product, read its label.

Appendix R

Module 4 Anchor Trench Repair

Module 4 Geosynthetics Repair
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 1: Observed tear in the geosynthetic liner at the northwest corner of Module 4. (Looking south, 6/2/22).

Photo 2: Placing a (~18'x~25') section of rain cover material to prevent water from migrating under the geomembrane liner. (Looking south, 6/2/22).

Module 4 Geosynthetics Repair
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 3: Adding general fill material to the west end of Mod 4-5 haul road to protect the liner. (Looking south, 6/11/22).

Photo 4: GSI cutting out damaged geomembrane on west anchor trench of Modules 4/5. (Looking south, 10/28/22).

Module 4 Geosynthetics Repair
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 5: Testing the trial weld for the geommebrane. (Looking west, 10/28/22).

Photo 6: GSI placing granular bentoite before installation of new GCL. (Looking northwest, 10/28/22).

Photo 7: GSI removing sediment from welding area. (Looking north, 10/28/22).

Photo 8: GSI grinding and extrusion welding geomembrane. (Looking northwest, 10/28/22).

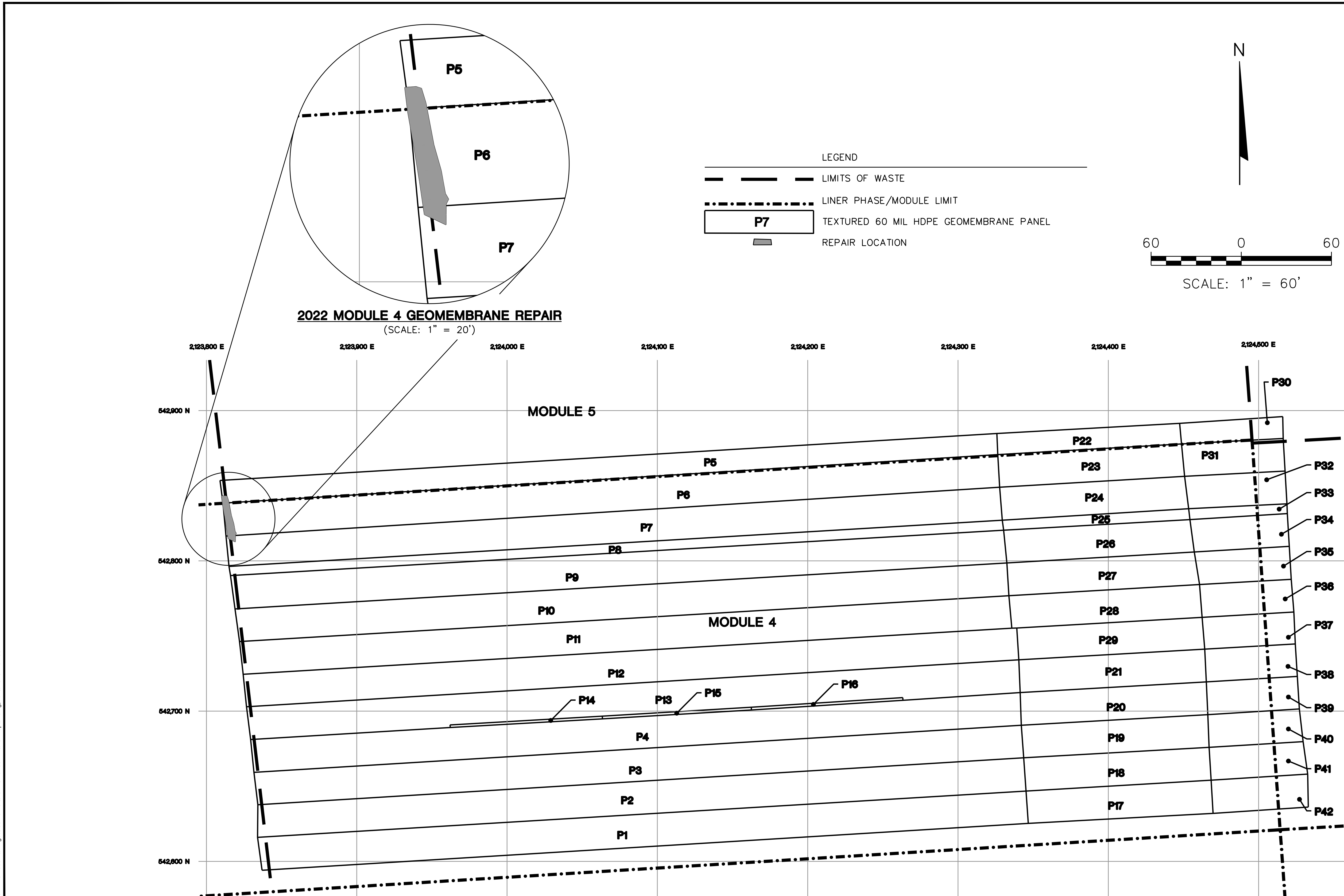
Photo 9: GSI recording the welder and machine information after completing the extrusion weld. (Looking down, 10/28/22).

Photo 10: View of the repair after completion. West portion of the repair was placed in the anchor trench. (Looking northwest, 10/28/22).

Module 4 Geosynthetics Repair
W8375 Murray Road, Pardeeville, WI 53954
SCS Engineers Project #25222157.00

Photo 11: GSI vacuum box testing extrusion weld. (Looking northwest, 10/28/22).

Photo 12: Repair area covered with 1 foot of COVIA sand drainage material and backfilled with clean general fill. (Looking north, 11/02/22).



2022 MODULE 4 GEOMEMBRANE REPAIR

FIGURE 1

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

ENGINEER

CONSTRUCTION DOCUMENTATION
2022 MODULE 10/11 LINER CONSTRUCTION
COLUMBIA DRY ASH DISPOSAL FACILITY
TOWN OF PACIFIC, WISCONSIN

SITE

DRAWN BY: KP
CHECKED BY: PEG
APPROVED BY:

WISCONSIN POWER AND LIGHT COMPANY
COLUMBIA ENERGY CENTER
W8375 MURRAY ROAD
PARDEEVILLE, WI 53954

CLIENT

PROJECT NO. 25222157.01
DRAWN: 11/17/2022
REVISED: 11/17/2022

I:\25222157.00\Drawings\Geomembrane Work\Mod 4 Panel Repair.dwg, 1/19/2023 7:31:38 AM

REPAIR RECORD

Client Name: Wisconsin Power and Light (WPL)
Project Location: Columbia Dry Ash Disposal Facility
Town of Pacific, Wisconsin 53954
SCS Engineers Project Name: Mod 4 anchor trench memebrane repair
SCS Engineers Project Number: 25222157.01

SCS Engineers CQA Technician: Zana Bajalan, Jordan Main, et al.

enter mm-dd-yy

"x" indicates criteria applies to this project		x	x
Population:	Total Seam	Machine	Welder
Destruct Test Frequency (1 per)	1000 ft	1000 ft	1000 ft
Number of Required Destructs	0 ea	1 ea	1 ea

Minimum # of Destructs Required

For Project Period

Repair Number	Panel/ Seam				Repairer Initials	Machine Number	Repair Type	Repair size Length (ft)		Width (ft)	Trial Weld Number	Test Date dd-mm-yy	Tester Initials	Test P/F	Location/Comments	Time hhmm (24)
R-Mod4 AT	5	6	7		BL	88	Patch	2.5 ft	x	38.0 ft	1	28-Oct-22	CV	Pass	NW corner of Mod 4 (near anchor trench)	1015

TRIAL WELD RECORD

Client Name: *Wisconsin Power and Light (WPL)*
SCS Engineers Project Name: *Mod 4 anchor trench memebrane repair*

SCS Engineers Project Number: *25222157.01*
Project Location: *Columbia Dry Ash Disposal Facility*
Town of Pacific, Wisconsin 53954

Specifications: 60 **mil**
Material Type: HDPE

	Fusion	Extrusion
Peel (P)	≥ 91 lb/in	≥ 78 lb/in
Shear (S)	≥ 120 lb/in	≥ 120 lb/in

Max # of Failing Tests Allowed per P/S Set: 0 ea

SCS Engineers
CQA Technician: *Zana Bajalan,*
Jordan Main, et al.

Trial Weld Number	Date dd-mmm-yy	Time hhmm (24)	Ambient Temp (F°)	Installer QC	Seamers Initials	Machine Number	Machine Properties	Weld Type		Test Values (lbs/in) Coupon 1	Coupon 2	Coupon 3	Coupon 4	Coupon 5	Pass/ Fail	Material (Top 1st)	Comments
1	28-Oct-22	0742	34	DR	BL	88	550/550	Extrusion	P						Pass	T/T	
									S								

Note: Trial Weld was created before welding of the repair and trial weld testing was observed by field staff. Trial weld values observed in the field sufficiently met CQA requirements before allowing welding to begin. Documented trial weld values were misplaced after being recorded in the field and could not be located for input to this record form.

Plan Sheets (Bound Separately)

1	Title Sheet
2	Pre-Construction Conditions
3	Post Construction Overall Site Layout
4	Subbase Grades – Modules 10 and 11
5	Base Grades – Modules 10 and 11
6	Geomembrane Panel Layout
7	Leachate Collection System – Modules 10 and 11
8	Leachate Drainage Layer – Modules 10 and 11
9	Cross Sections – 542450 North and 542700 North
10	Cross Sections – 2124750 East and 2125000 East
11	Details
12	Details
13	Details