Charleston Office
300 Summers Street
Suite 1100
Charleston, West Virginia 25301

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December 3, 2019

Project C130109.10.003

Mr. Keith J. Burger, P.E.
Project Manager
American Electric Power
One Riverside Plaza
Columbus, Ohio 43215

Sequence 4 Liner System Certification
Sequence 4 Landfill Construction
John E. Amos FGD Landfill
John E. Amos Plant
Winfield, West Virginia

Dear Mr. Burger:

GAI Consultants, Inc. (GAI) has prepared the compiled certification for the construction of the Sequence 4 liner system at the John E. Amos Flue Gas Desulfurization Landfill (FGD Landfill). The compiled certification presents the signed and sealed Liner System Certification Statement, and the following individual liner system component certification reports (submitted separately).

- Groundwater Control and Subgrade -September 2019 (Attachment 1);
- Compacted Clay Liner - September 2019 (Attachment 2);
- PVC Geomembrane - November 2019 (Attachment 3); and
- Leachate Collection System and Protective Cover –November 2019 (Attachment 4).

The certification reports for the individual components each contain a narrative describing the construction, the parties and their respective responsibilities, and the applicable design documents; a certification statement signed and sealed by the Quality Assurance Officer/Certifying Engineer; and appendices pertinent to the specific liner construction component, which typically include:

- Record Certification Drawings;
- Typical Construction Photographs;
- Laboratory Conformance and Performance Testing;
- Field Performance Testing; and
- Material Certifications.

The certification reports for the individual components have been submitted to the West Virginia Department of Environmental Protection, as required by regulation 33CSR1-4.5.d.7.

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<u>**Closure.**</u> This letter report compiles the documentation for certification of the 2018-2019 Sequence 4 landfill liner system construction. The report contains each of the previously-prepared and submitted certification reports for the individual liner system components, and the Liner System Certification Statement.

Sincerely,

GAI Consultants, Inc.

Chales F. Straley Digitally signed by Chales F. Straley
DN: C=US, E=c.straley@gaiconsultants.com, O="GAI Consultants, Inc.", CN=Chales F. Straley
Date: 2019.12.04 08:15:03-05'00'

Charles F. Straley, P.E., P.L.S.
Quality Assurance Officer
Certifying Engineer

Mark R. Lehner Digitally signed by Mark R. Lehner
Date: 2019.12.04 09:20:59-05'00'

Mark L. Lehner, P.E.
Project Manager

Attachments: GAI Consultants, Inc. Certification (with Drawing C130109-10-003-00-B2-008)
Attachment 1 – Groundwater Control and Subgrade Certification
Attachment 2 – Compacted Clay Liner Certification
Attachment 3 – PVC Geomembrane Certification
Attachment 4 – Leachate Collection System and Protective Cover Certification

cc: Mr. Brian G. Palmer, P.E. – AEP
Mr. Gary L. Lewis – AEP
Mr. Ben E. Kepchar – AEP
Mr. Brandon P. Schmader – AEP
Ms. Marie C. Gildow – AEP
Mr. Rich L. Fuller - AEP

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December 3, 2019
Project C130109.10.003

GAI Consultants, Inc. Certification

Based on the construction testing and observations performed by American Electric Power (AEP) and GAI Consultants, Inc. (GAI) personnel, I hereby certify that the Liner System installation within Sequence 4 at the Appalachian Power Company's John E. Amos Flue Gas Desulfurization (FGD) Landfill near Winfield, West Virginia (WV), as shown on Drawing C130109-10-003-00-B2-008, has been installed in substantial compliance with the material specifications and construction requirements listed in the WV National Pollutant Discharge Elimination System/Solid Waste Permit (NPDES WV0116254) documents; 40 Code of Federal Regulations Part 257 (the CCR Rule); and the "2018-2020 Site Work Construction, Sequence 4" construction documents. This Liner System Certification encompasses the following components of the liner system:

- Groundwater Control and Subgrade;
- Compacted Clay Liner;
- PVC Geomembrane Liner; and
- Leachate Collection System and Protective Cover.

AEP personnel provided survey data used to develop the Record Drawings and to verify that the liner system installation met the permit requirements.

This document clarifies "certification" for the installation of the liner system components within Sequence 4 at the Amos FGD Landfill.

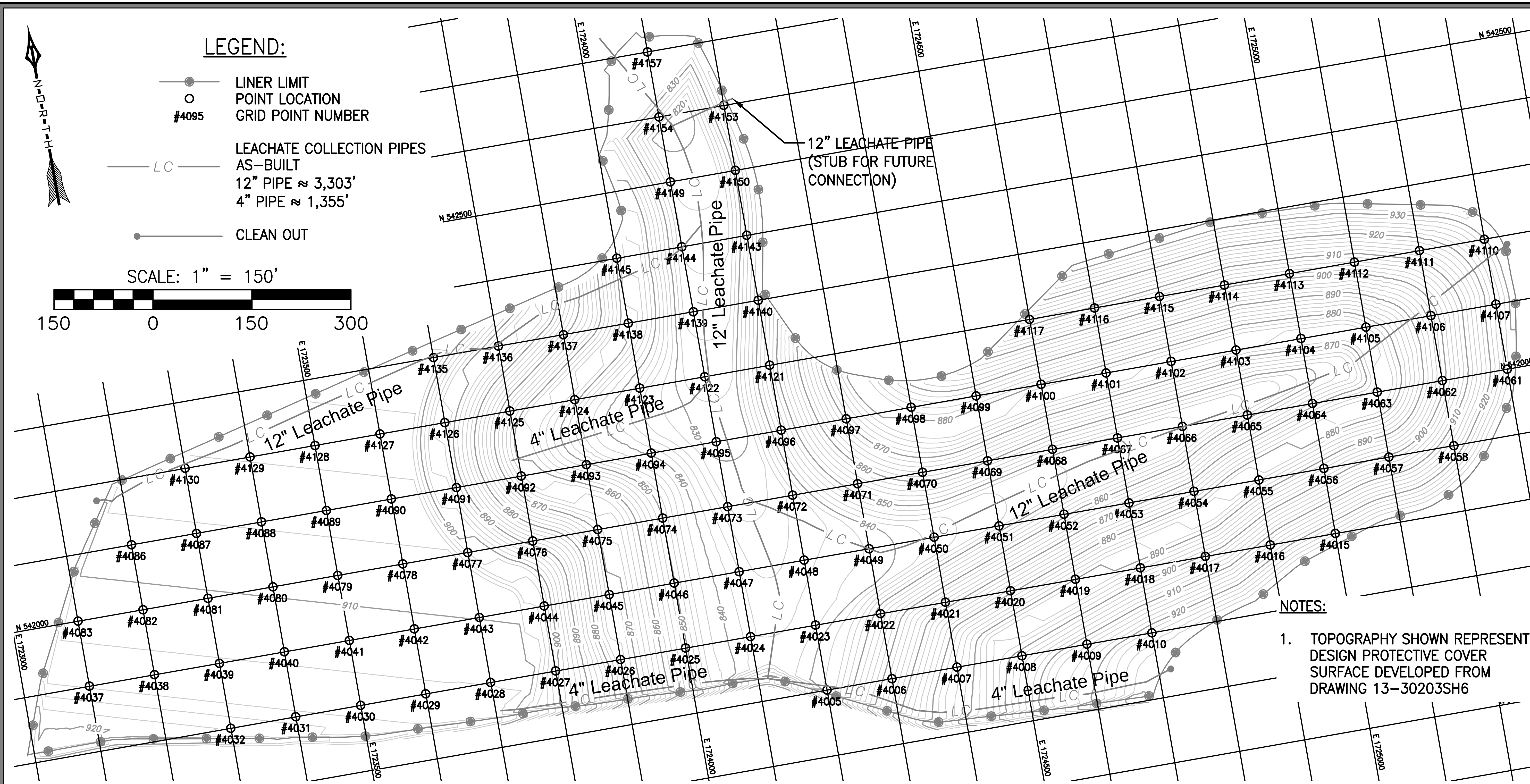
The definition of certify as used herein is: Certify means to state or declare a professional opinion of conditions whose true properties cannot be known at the time such certification was made, despite appropriate professional evaluation. A design professional's certification in no way relieves any other party from meeting requirements imposed by contract or other means, including commonly-accepted industry practices.

Bearing the above in mind and based on the results of: (1) Certification from the material manufacturers and installation meeting the requirements of the Specifications, the CCR Rule, and the WV Department of Environmental Protection (WVDEP) permit; (2) results of field and laboratory testing; and (3) monitoring of construction efforts during the project; GAI's professional opinion is that the installations of the liner system within Sequence 4 of the Amos FGD Landfill meet the requirements as set forth by the permit documents and the CCR Rule.

Charles F. Straley, PE, PLS
Certifying Engineer and Quality Assurance Officer
PE #11842
PLS #1888

CHARLES F. STRALEY
REGISTERED
11842
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
12-4-19

CHARLES F. STRALEY
LICENSED
No. 1888
STATE OF
WEST VIRGINIA
PROFESSIONAL SURVEYOR
12-4-19



NO.:	DATE:	DWN:	CHK:	APV:	DESCRIPTION:
0	12/03/2019	MAYHOEJ	STRALCF	STRALCF	AS-BUILT

REVISION RECORD

DRAWING TITLE

PROJECT		CLIENT
JOHN E. AMOS LANDFILL SEQUENCE 4 LINER OVERALL CERTIFICATION PLAN	gai consultants	APPALACHIAN POWER COMPANY 1 RIVERSIDE PLAZA COLUMBUS, OHIO

DRAWN BY:	CHECKED BY:	APPROVED BY:
MAYHOEJ	STRALCF	STRALCF
REVISION	SCALE:	ISSUE DATE:
0	1" = 150'	12/03/2019
	SHEET NO.:	
	1 OF 1	

GAI FILE NUMBER:
C130109-10-003-00-B2-008
GAI DRAWING NUMBER:

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GAI CAD FILE PATH: Z:\Energy\2013\C130109.10 – AEP Seq 4 2018–2020 QAQC\CAD\Production DWGs\C130109-10-003-00-B2-008.dwg

PLOTTED ON: 12/3/2019 10:35:46 AM PLOTTED BY: Ed Mayhood PLOT FILE: GAI.stb

ATTACHMENT 1

GROUNDWATER CONTROL AND SUBGRADE CERTIFICATION

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gai consultants

Sequence 4 Groundwater Control and Subgrade Certification

American Electric Power
John E. Amos Landfill
John E. Amos Power Plant
Winfield, West Virginia

GAI Project Number: C130109.10, Task 003
September 2019

AEP AMERICAN® ELECTRIC POWER

Prepared by: GAI Consultants, Inc.
Charleston Office
300 Summers Street, Suite 1100
Charleston, West Virginia 25301-1631

Prepared for: American Electric Power
1 Riverside Plaza
Columbus, Ohio 43215

Sequence 4 Groundwater Control and Subgrade Certification

American Electric Power
John E. Amos Landfill
John E. Amos Power Plant
Winfield, West Virginia

GAI Project Number: C130109.10, Task 003

September 2019

Prepared for:
American Electric Power
1 Riverside Plaza
Columbus, Ohio 43215

Prepared by:
GAI Consultants, Inc.
Charleston Office, Suite 1100
Charleston, West Virginia 25301-1631

Report Authors:

Charles F. Straley, PE, PLS (West Virginia)
Quality Assurance Officer
Senior Engineering Manager

Mark R. Lehner, PE (Pennsylvania)
Senior Engineering Manager

Table of Contents

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GAI Consultants, Inc. Certification

Based on the construction testing and observations performed by American Electric Power (AEP) and GAI Consultants, Inc. (GAI) personnel, I hereby certify that the groundwater control and subgrade preparation within Sequence 4 at the Appalachian Power Company's John E. Amos Flue Gas Desulfurization (FGD) Landfill near Winfield, West Virginia (WV), as shown on Drawing C130109-10-003-00-B2-003, has been installed in substantial compliance with the material specifications and construction requirements listed in the WV National Pollutant Discharge Elimination System/Solid Waste Permit (NPDES WV0116254) documents, 40CFR257.70 (CCR Rule), and the 2018-2020 Site Work Construction Sequence 4 construction documents. AEP survey personnel provided survey data used to develop the Record Drawings, verify that the subgrade elevations met the permit requirements, and establish the locations of the groundwater control pipes.

This document clarifies "certification" for the groundwater control and subgrade preparation construction within Sequence 4 at the Amos FGD Landfill.

The definition of certify as used herein is: Certify means to state or declare a professional opinion of conditions whose true properties cannot be known at the time such certification was made, despite appropriate professional evaluation. A design professional's certification in no way relieves any other party from meeting requirements imposed by contract or other means, including commonly-accepted industry practices.

Bearing the above in mind and based on the results of: (1) Certification from the material manufacturers and installation meeting the requirements of the specifications, the CCR Rule, and the WV Department of Environmental Protection (WVDEP) permit; (2) results of field testing; and (3) monitoring of construction efforts during the project; GAI's professional opinion is that the groundwater control and subgrade preparation construction within Sequence 4 of the Amos FGD Landfill meets the requirements as set forth by the permit documents and the CCR Rule.

Charles Straley

Charles F. Straley, PE, PLS
Certifying Engineer and Quality Assurance Officer
PE #11842
PLS #1888

CHARLES F. STRALEY
REGISTERED
11842
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER

CHARLES F. STRALEY
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No. 1888
STATE OF
WEST VIRGINIA
PROFESSIONAL SURVEYOR

1.0 Introduction

1.1 Project Description

This Groundwater Control and Subgrade Construction Certification Report documents the observations performed during the groundwater control drain installation and subgrade preparation in Sequence 4 at American Electric Power's (AEP's) John E. Amos FGD Landfill (Landfill) in Winfield, West Virginia (WV). The location of Sequence 4 at the Amos Landfill is shown on Figure 1. Appendix A contains the Record Drawings for the construction. Appendix B contains typical construction photographs included in the daily reports. Construction of the Sequence 4 site described in this certification report consists of the following:

- Preparation of the foundation and installation of the groundwater control drains.
- Placement and compaction of the soil structural fill to meet compacted clay liner subgrade elevations.

Construction of the subgrade in Sequence 4 began in April 2018 and was completed in July 2019. The area was constructed in accordance with the approved Quality Assurance/Quality Control (QA/QC) Plan; the Landfill's Solid Waste/National Pollutant Discharge Elimination System (NPDES) permit (Permit No. WV0116254); WV Department of Environmental Protection (WVDEP) Title 33, Series 1, Solid Waste Management rule; the Coal Combustion Residuals (CCR) Rule; and AEP's Civil Engineering Division Technical Specifications for Material Construction. Included in this report are the field information and the applicable Record Drawings in accordance with the WVDEP requirements. The construction QA (CQA) services performed by GAI are discussed in the following sections.

1.2 Companies and Personnel

The key companies and personnel involved with the groundwater control and subgrade construction of Sequence 4 are listed below.

AEP - Owner
Appalachian Power Company - Operator
Keith Burger, Project Manager
John Massey-Norton, Senior Geologist
Brian Palmer, Principal Civil Engineer
Carl Skidmore, Regional Construction Manager
Brandon Schmader, Lead Construction Coordinator
T. Coty Sheppard, Survey Coordinator

GAI Consultants Inc. (GAI) – CQA/Soil Testing
Charles Straley, P.E., P.S., Certifying Engineering, QA Officer (QAO) and Senior Engineering Manager
Mark Lehner, P.E., Project Manager
Terry Queen, Lead QC Inspector (QCI)

R.B. Jergens, Inc. (RBJ) - Earthwork Contractor
Jake Warner, Project Manager
Mike Davis, Superintendent

1.3 Scope of Services

1.3.1 Preconstruction Activities

Preconstruction activities conducted by GAI personnel consisted of the following:

1. Attended a preconstruction meeting;
2. Inspected material to be used for groundwater control;

3. Reviewing manufacturer's/supplier's information that materials met project and permit specifications; and
4. Collected soil samples for laboratory analysis.

1.3.2 Construction Documentation Activities

Construction documentation activities performed by GAI personnel included the following:

1. Observed and documented the installation of the groundwater control drain components;
2. Observed and documented the structural fill soil material;
3. Observed and documented the subgrade surface conditions prior to the placement of the compacted clay liner;
4. Prepared daily field reports and documented construction activities. GAI also attended daily health and safety meetings, weekly project update meetings, and monthly contractor's meetings, as well as other supplemental meetings, when needed; and
5. Provided photo documentation throughout the construction showing typical construction procedures (see Appendix B).

1.3.3 Record Drawings and Certification Report

Documentation and certification activities performed by the QA/QC team included the following:

1. AEP provided surveying services for the Record Drawings (see Appendix A). Record Drawing C130109-10-003-00-B2-002 "Sequence 4 Subgrade Certification Plan" depicts the base of compacted clay liner (subgrade) grades. Record Drawing C130109-10-003-00-B2-003 "Sequence 4 Subgrade Certification Table" presents a tabulation of the subgrade design and as-built certification point elevations.
2. GAI personnel performed the construction documentation activities discussed in Sections 1.3.1 and 1.3.2 of this report.
3. Project personnel observed the construction activities and provided the enclosed information documenting that the construction activities were performed consistent with the design and permit requirements.

1.4 Construction Schedule

Site clearing, grubbing and excavation were performed prior to groundwater control and fill placement. Final subgrade preparation began in the Spring of 2018 and was completed in July 2019.

1.5 Reference Documents

The plans, specifications, and QA requirements for the construction activities and materials used by GAI personnel for this project are as follows:

1. Solid Waste/NPDES Permit No. WV0116254.
2. AEP Civil Engineering Division, Technical Specifications for Material and Construction (prepared by AEP), and Addenda to the Technical Specifications (prepared by GAI).
3. "Quality Assurance and Quality Control Plan, John E. Amos Landfill" for the Appalachian Power Company John E. Amos Plant's Amos FGD Landfill (March 2006 and revised October 2017, prepared by GAI).
4. Amos FGD Landfill Sequence 4 Construction Drawings (issued for construction August 2017 and re-issued January 2018, prepared by GAI)

2.0 Foundation Preparation/Groundwater Control

Foundation preparation for the Landfill facility included installation of permanent groundwater control pipes and subgrade preparation for the compacted clay liner. Activities were monitored daily by the QCI Team and AEP field personnel.

2.1 Groundwater Control

The groundwater controls were installed per the drawings. Additional controls, consisting of pipes and rock blankets, were installed to collect seeps encountered during construction. The groundwater control components are shown on Drawing C130109-10-003-00-B2-002, “Sequence 4 Subgrade Certification Points Plan” drawing in Appendix A.

QA documentation for the groundwater control drain installation included the following:

1. Reviewed manufacturer's certification of material properties for the perforated pipes (Appendix C-I).
2. Reviewed contractor's/supplier’s test results that demonstrate that the granular drainage aggregate meets contract specifications (Appendix C-II).
3. Reviewed manufacturer’s certification of material properties for the geotextile wrap (Appendix C-III).
4. Observations and surveys to document that the pipe was bedded, placed, and backfilled per specifications (observed by GAI and AEP, surveyed by AEP).

The groundwater control piping network consists of six-inch-diameter and 12-inch-diameter perforated C900 PVC header pipes that are generally oriented along the center of the valley floor, and four-inch-diameter C900 PVC pipe laterals, as needed, connected to the header pipes. The pipes were embedded in an envelope of AASHTO #57 non-calcareous stone, per the construction documents.

The groundwater control pipes and aggregate were wrapped with non-woven geotextile to minimize fine-grained soils from infiltrating and clogging the drainage system. An approximate one-foot thick layer of compacted soil fill was placed directly over the drain to provide a stable surface for the overlying compacted clay liner.

In areas of large seeps, a rock drainage blanket was placed to collect and convey seepage to the groundwater collection system with pipes. The rock drainage blankets consisted of non-calcareous AASHTO #1 rock.

The groundwater controls installed for Sequence 4 connect to the existing underdrain trunk system for the North Valley (Sequences 4-9).

2.2 Compacted Clay Liner Subgrade

The subgrade was visually observed and inspected to demonstrate that the subgrade was structurally stable for subsequent placement of the overlying compacted clay liner. Field personnel observed the area after excavation and prior to placement of the compacted clay liner. Where soft or excessively wet foundation material was observed, the subgrade was over-excavated to a firm competent elevation and the surface was cleaned to allow the area to be backfilled with acceptable material.

Structural fill was used to shape the subgrade to grade lines, per the plan, by a series of vertical lifts of 18-inch thickness. The structural fill primarily consisted of a “rock soil”, particularly a non-cohesive heterogenous sandstone mixed with sandy/clay materials. This structural fill material was placed in accordance with the Construction Documents and AEP standard technical specifications CE-005 and CE-006. Per these specifications, the soil characteristic of the rocky soil prevented the use of a nuclear density gauge to determine in-situ compaction. The construction was therefore visually observed and inspected to demonstrate that the subgrade was structurally stable.

gai consultants
transforming ideas into reality.

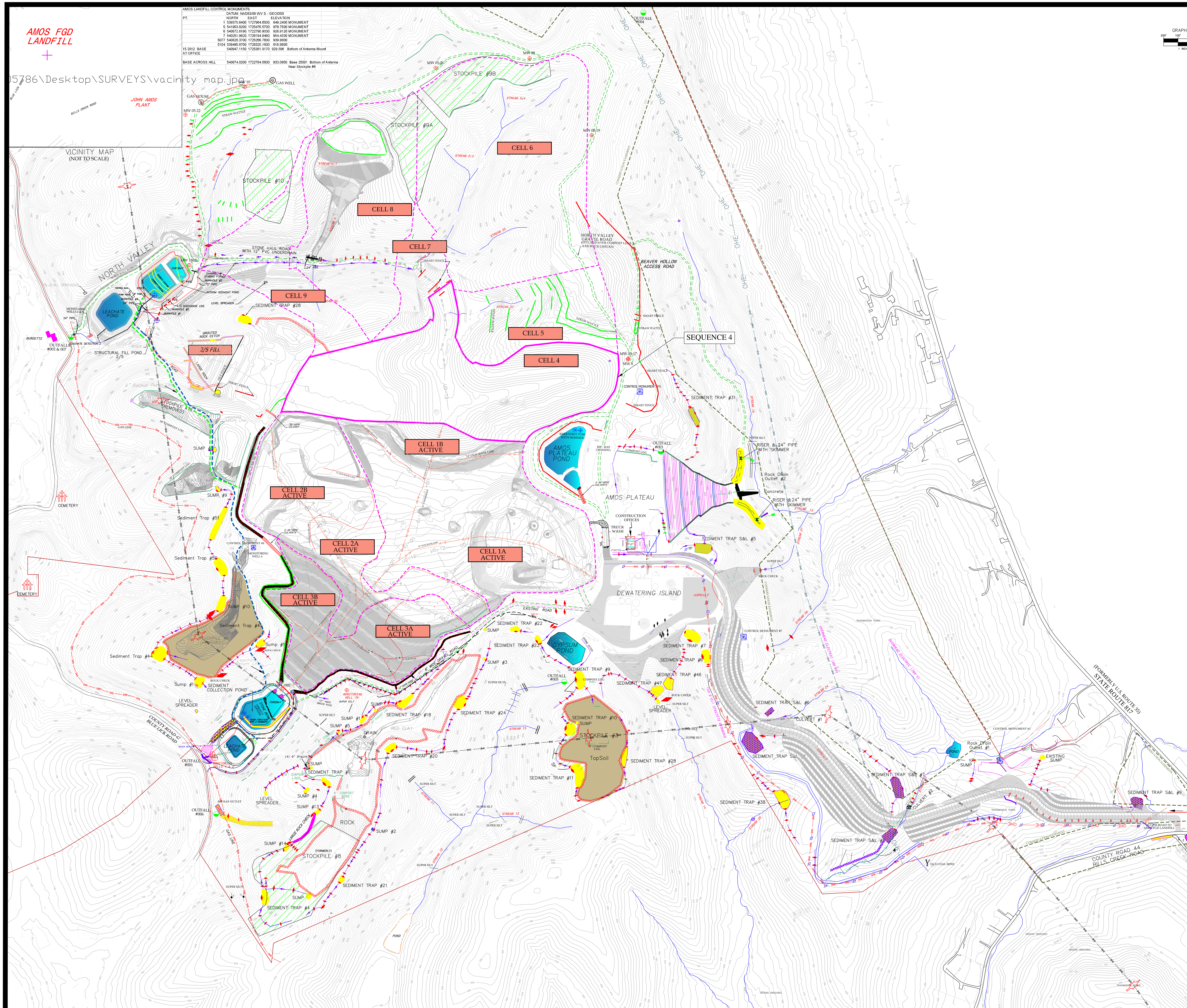
When rocky materials were not encountered during the subgrade buildup, nuclear gauge test(s) were used to confirm that the lift compaction conformed to specifications. All compacted lifts received a passing test result. The laboratory test results and summary of compaction tests are included in Appendix D.

RBJ and AEP performed surveys to establish that the as-built subgrade (i.e., base of compacted clay liner) elevations was within the specified tolerance to the design subgrade elevations within the Sequence 4 limits. Appendix A contains the Record Drawings for the subgrade surface ("Sequence 4 Subgrade Certification Points Plan" and "Sequence 4 Subgrade Certification Points Table").

3.0 Summary

The construction work documented in this report was completed in accordance with the design and specifications presented in the applicable WVDEP Solid Waste/NPDES Permit (No. WV0116254), the CCR Rule, and the construction documents listed in this report. The field activities documented in this report represent the CQA services provided for the groundwater control drain installation and subgrade preparation for construction of Sequence 4 at the Landfill.

FIGURE



AMOS LANDFILL CONTROL MONUMENTS

PT.	NORTH	EAST	ELEVATION	
	DATUM: NAD83/88 WV S - GEOID03			
1	539375.6400	1727964.6500	649.2400	MONUMENT
5	541953.8200	1725476.5700	979.7500	MONUMENT
6	540872.8190	1722790.9030	926.9120	MONUMENT
7	540251.9820	1726194.8480	954.4330	MONUMENT
5077	540828.3700	1725266.7600	939.8800	
5104	539495.8700	1728325.1600	618.8800	
15 2012 BASE AT OFFICE	540947.1150	1725381.9170	929.596	Bottom of Antenna Mount
BASE ACROSS HILL	540874.0200	1722784.0800	933.0950	Base 25001 Bottom of Antenna Near Stockpile #6

FIGURE 1
SITE PLAN
SEQUENCE 4 LANDFILL
CONSTRUCTION

LEGEND

- EXISTING 4" UNDERDRAIN
- EXISTING 12" UNDERDRAIN
- OVERHEAD ELECTRIC
- SURVEYED PROPERTY LINES
- DIVERSION DITCHES
- EXISTING SEDIMENT TRAPS
- STONE FILTERS
- SILT FENCE
- CELL 3 CAP LIMITS
- EXISTING SEDIMENT TRAPS, DITCHES OR SPILLWAYS WITH STONE BOTTOM
- LIVING WEIRS
- FLOC LOG
- FLOW CHECK
- COMPOST LOG
- straw wattle
- 765kv location
- smart fence

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APPALACHIAN POWER CO.

JOHN E. AMOS PLANT

WINFIELD WEST VIRGINIA

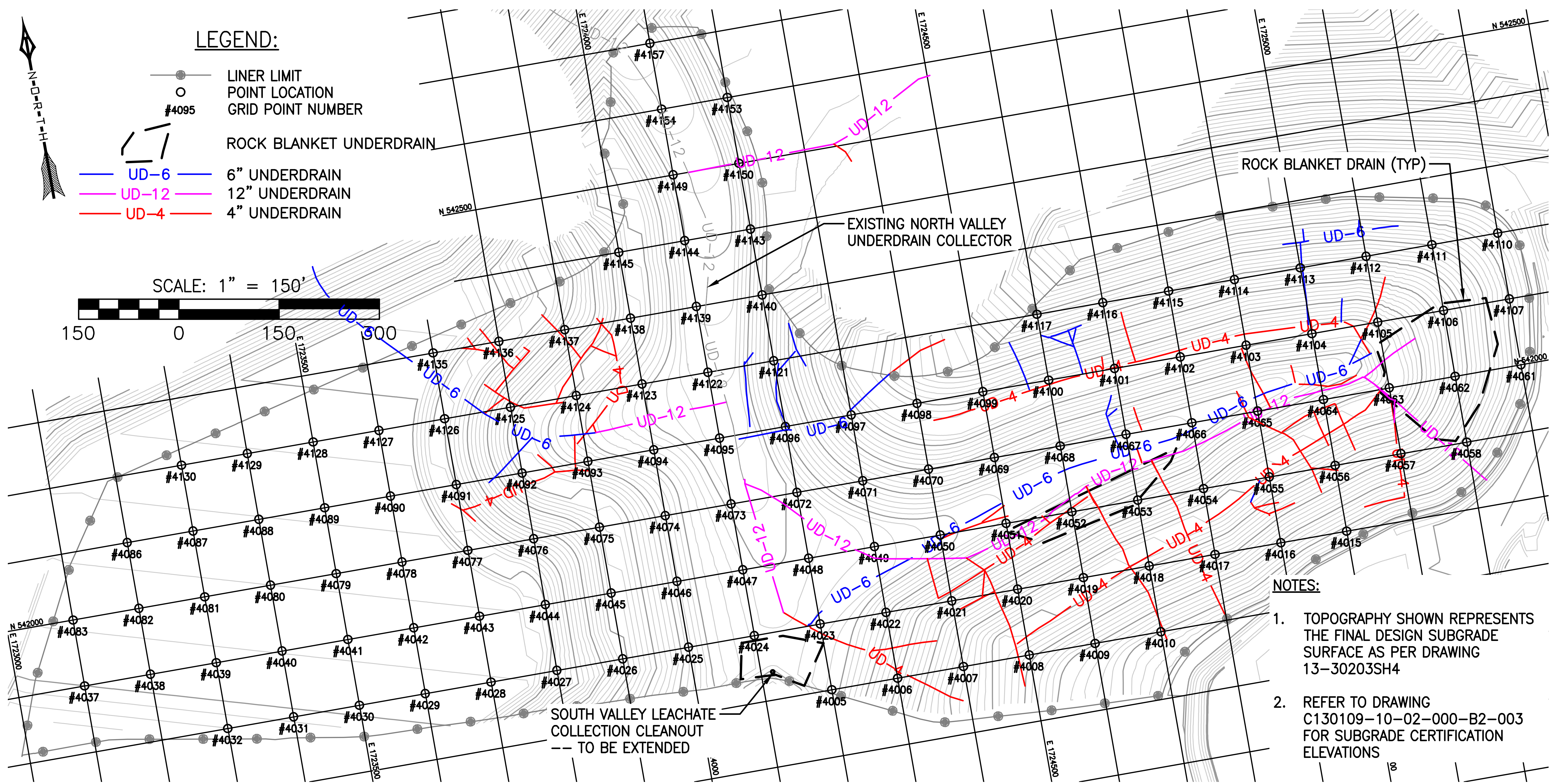
JOHN E. AMOS FGD LANDFILL
EROSION & SEDIMENT CONTROL
DETAILS

NAD 83/NAVD 88 W.V. SOUTH

Drawing Name: Amos Asbuilt
SCALE: 1"=200'
Revision Date: JULY 10, 2019
Surveyed By: C.Sheppard
Drawn By: C.Sheppard

AMERICAN ELECTRIC POWER
1 RIVERSIDE PLAZA
COLUMBUS, OH 43215

APPENDIX A
Record Drawings



NOTES:

1. TOPOGRAPHY SHOWN REPRESENTS THE FINAL DESIGN SUBGRADE SURFACE AS PER DRAWING 13-30203SH4
2. REFER TO DRAWING C130109-10-02-000-B2-003 FOR SUBGRADE CERTIFICATION ELEVATIONS

NO.:	DATE:	DWN:	CHK:	APV:	DESCRIPTION:
0	08/20/2019	MAYHOEJ	FRECHKL	LEHNEMR	AS-BUILT W/UNDERDRAINS

REVISION RECORD

DRAWING TITLE

PROJECT

JOHN E. AMOS LANDFILL

SEQUENCE 4

SUBGRADE CERTIFICATION PLAN

gai consultants

CLIENT

APPALACHIAN POWER COMPANY

1 RIVERSIDE PLAZA

COLUMBUS, OHIO

DRAWN BY:	CHECKED BY:	APPROVED BY:
MAYHOEJ	FRECHKL	STRALCF
REVISION	SCALE: 1" = 150'	ISSUE DATE: 08/20/2019
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GAI FILE NUMBER: C130109-10-003-00-B2-002

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Point	Northing	Easting	Subgrade Elevation (feet) Design	Subgrade Elevation (feet) Asbuilt	"Difference (- = Below Design)"
4005	541700.0	1724200.0	838.86	---	---
4006	541700.0	1724300.0	859.58	859.74	0.16
4007	541700.0	1724400.0	881.31	881.44	0.13
4008	541700.0	1724500.0	898.25	898.19	-0.06
4009	541700.0	1724600.0	909.67	909.53	-0.14
4010	541700.0	1724700.0	920.00	919.96	-0.04
4015	541800.0	1725000.0	922.16	922.14	-0.02
4016	541800.0	1724900.0	910.45	910.33	-0.12
4017	541800.0	1724800.0	897.16	896.98	-0.18
4018	541800.0	1724700.0	889.75	889.63	-0.12
4019	541800.0	1724600.0	886.39	886.23	-0.16
4020	541800.0	1724500.0	875.11	875.07	-0.04
4021	541800.0	1724400.0	863.50	863.52	0.02
4022	541800.0	1724300.0	848.33	848.28	-0.05
4023	541800.0	1724200.0	834.23	834.18	-0.05
4024	541800.0	1724100.0	833.41	833.36	-0.05
4025	541799.9	1723999.9	846.98	846.82	-0.16
4026	541799.8	1723899.9	871.32	871.32	0.00
4027	541800.3	1723800.0	897.11	897.25	0.14
4028	541800.1	1723700.0	908.17	907.97	-0.20
4029	541799.8	1723600.0	908.73	908.57	-0.16
4040	541800.0	1723500.0	909.29	909.14	-0.15
4031	541800.1	1723400.0	911.24	911.13	-0.11
4032	541800.2	1723300.0	914.06	914.20	0.14
4037	541900.0	1723100.0	910.03	909.83	-0.20
4038	541900.0	1723200.0	909.05	908.91	-0.14
4039	541900.0	1723300.0	908.49	908.51	0.02
4040	541900.0	1723400.0	907.93	907.85	-0.08
4041	541900.1	1723500.0	907.37	907.18	-0.19
4042	541899.9	1723600.0	906.81	906.67	-0.14
4043	541900.0	1723700.0	906.25	906.30	0.05
4044	541900.0	1723800.0	899.76	899.66	-0.10
4045	541900.0	1723900.0	867.67	867.50	-0.17
4046	541900.0	1723999.0	846.63	846.43	-0.20
4047	541900.0	1724100.0	832.38	832.24	-0.14
4048	541900.0	1724200.0	831.63	831.62	-0.01
4049	541900.0	1724300.0	834.68	834.60	-0.08
4050	541900.0	1724400.0	839.08	839.24	0.16
4051	541900.0	1724500.0	843.70	843.57	-0.13
4052	541900.0	1724600.0	854.96	854.78	-0.18
4053	541900.0	1724700.0	863.77	863.76	-0.01
4054	541900.0	1724800.0	871.51	871.47	-0.04

Point	Northing	Easting	Subgrade Elevation (feet) Design	Subgrade Elevation (feet) Asbuilt	"Difference (- = Below Design)"
4055	541900.0	1724900.0	880.15	880.29	0.14
4056	541900.0	1725000.0	890.45	890.46	0.01
4057	541900.0	1725100.0	897.39	897.31	-0.08
4058	541900.0	1725200.0	912.28	912.37	0.09
4061	542000.0	1725300.0	923.91	923.92	0.01
4062	542000.0	1725200.0	894.92	895.02	0.10
4063	542000.0	1725100.0	871.64	871.55	-0.09
4064	542000.0	1725000.0	864.94	864.95	0.01
4065	542000.0	1724900.0	854.62	854.62	0.00
4066	542000.0	1724800.0	848.11	848.22	0.11
4067	542000.0	1724700.0	846.40	846.32	-0.08
4068	542000.0	1724600.0	849.36	849.46	0.10
4069	542000.0	1724500.0	856.61	856.46	-0.15
4070	542000.0	1724400.0	860.07	860.19	0.12
4071	542000.0	1724300.0	849.76	849.66	-0.10
4072	542000.0	1724200.0	831.18	831.11	-0.07
4073	541999.7	1724099.7	828.65	828.83	0.18
4074	542000.0	1723999.9	846.11	845.95	-0.16
4075	541999.9	1723899.8	865.43	865.28	-0.15
4076	542000.0	1723800.0	884.21	884.35	0.14
4077	542000.0	1723700.0	898.33	898.37	0.04
4078	542000.1	1723600.0	904.89	904.70	-0.19
4079	542000.1	1723500.0	905.45	905.27	-0.18
4080	542000.4	1723400.0	906.01	905.87	-0.14
4081	541999.9	1723300.0	906.57	906.43	-0.14
4082	541999.9	1723200.0	907.13	906.93	-0.20
4083	542000.0	1723100.0	907.68	907.57	-0.11
4086	542099.9	1723200.0	905.20	905.12	-0.08
4087	542099.7	1723300.0	904.64	904.51	-0.13
4088	542099.9	1723400.0	904.09	903.91	-0.18
4089	542100.0	1723500.0	903.53	903.40	-0.13
4090	542099.9	1723600.0	902.97	902.91	-0.06
4091	542100.0	1723700.0	889.76	889.57	-0.19
4092	542100.0	1723800.0	859.21	859.02	-0.19
4093	542099.7	1723899.6	847.41	847.32	-0.09
4094	542099.8	1724000.0	835.65	835.53	-0.12
4095	542100.0	1724100.0	825.75	825.56	-0.19
4096	542100.0	1724200.0	840.46	840.24	-0.22
4097	542100.0	1724300.0	866.62	866.58	-0.04
4098	542100.0	1724400.0	879.42	879.37	-0.05
4099	542100.0	1724500.0	881.73	881.79	0.06
4100	542100.0	1724600.0	876.00	875.89	-0.11

Point	Northing	Easting	Subgrade Elevation (feet) Design	Subgrade Elevation (feet) Asbuilt	"Difference (- = Below Design)"
4101	542100.0	1724700.0	873.03	873.00	-0.03
4102	542100.0	1724800.0	871.87	871.75	-0.12
4103	542100.0	1724900.0	870.71	870.63	-0.08
4104	542100.0	1725000.0	869.81	869.69	-0.12
4105	542100.0	1725100.0	872.33	872.25	-0.08
4106	542100.0	1725200.0	893.85	893.78	-0.07
4107	542100.0	1725300.0	920.75	920.61	-0.14
4110	542200.0	1725300.0	926.20	926.17	-0.03
4111	542200.0	1725200.0	910.62	910.47	-0.15
4112	542200.0	1725100.0	901.79	901.86	0.07
4113	542200.0	1725000.0	898.81	898.85	0.04
4114	542200.0	1724900.0	898.03	898.07	0.04
4115	542200.0	1724800.0	901.72	901.57	-0.15
4116	542200.0	1724700.0	905.41	905.54	0.13
4117	542200.0	1724600.0	909.21	909.11	-0.10
4121	542200.0	1724200.0	842.70	842.74	0.04
4122	542200.0	1724100.0	823.57	823.47	-0.10
4123	542200.0	1724000.0	832.85	832.90	0.05
4124	542200.0	1723900.0	847.43	847.43	0.00
4125	542200.0	1723800.0	861.99	861.88	-0.11
4126	542200.0	1723700.0	889.15	889.29	0.14
4127	542199.8	1723600.0	901.05	901.01	-0.04
4128	542199.9	1723500.0	901.61	901.51	-0.10
4129	542199.8	1723400.0	902.17	901.98	-0.19
4130	542199.9	1723300.0	902.72	902.73	0.01
4135	542300.0	1723700.0	898.57	898.38	-0.19
4136	542300.0	1723800.0	883.68	883.54	-0.14
4137	542300.0	1723900.0	867.45	867.31	-0.14
4138	542300.0	1724000.0	845.37	845.19	-0.18
4139	542300.0	1724100.0	821.74	821.59	-0.15
4140	542300.0	1724200.0	836.40	836.48	0.08
4143	542400.0	1724200.0	829.45	829.43	-0.02
4144	542400.0	1724100.0	820.15	820.27	0.12
4145	542400.0	1724000.0	845.82	845.93	0.11
4149	542500.0	1724100.0	818.21	818.38	0.17
4150	542500.0	1724200.0	827.29	827.25	-0.04
4153	542600.0	1724200.0	833.21	833.10	-0.11
4154	542600.0	1724100.0	815.29	815.12	-0.17
4157	542700.0	1724100.0	813.90	813.73	-0.17

REVISION RECORD

NO.:	DATE:	DWN:	CHK:	APV:	DESCRIPTION:
0	08/20/2019	MAYHOEJ	FRECHKL	LEHNEMR	AS-BUILT

DRAWING TITLE

PROJECT: JOHN E. AMOS LANDFILL
SEQUENCE 4
SUBGRADE CERTIFICATION POINTS TABLE

gai consultants

CLIENT: APPALACHIAN POWER COMPANY
1 RIVERSIDE PLAZA
COLUMBUS, OHIO

DRAWN BY:	CHECKED BY:	APPROVED BY:
MAYHOEJ	FRECHKL	STRALCF

REVISION: 0

SCALE:	ISSUE DATE:
N.T.S	08/20/2019

SHEET NO.: 1 OF 1

GAI FILE NUMBER: C130109-10-003-00-B2-003

GAI DRAWING NUMBER:

This drawing was produced with computer aided drafting technology and is supported by electronic drawing files. Do not revise this drawing via manual drafting methods.

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ISSUING OFFICE: Murrysville | 4200 Triangle Lane, Export, PA 15632-1358

GAI CAD FILE PATH: Z:\Energy\2013\C130109.10 – AEP Seq 4 2018–2020 QAQC\CAD\Production DWGs\C130109-10-003-00-B2-003.dwg

PLOTTED ON: 9/18/2019 7:55:05 AM PLOTTED BY: Ed Mayhood PLOT FILE: GAI.stb

APPENDIX B
Photographs of Construction Activities

Photograph 1. Topsoil Removal

Photograph 2. Topsoil Removal

Photograph 3. Excavation with Construction Equipment

Photograph 4. Structural Fill

Photograph 5. Moisture Addition

Photograph 6. Moisture Addition

Photograph 7. Underdrain

Photograph 8. Underdrain

Photograph 9. Proof Rolling Subgrade

Photograph 10. Proof Rolling Subgrade

Appendix C
Groundwater Control Materials

gai consultants
transforming ideas into reality.

Appendix C-I
PVC Pipe

Product Description:

AWWA C900-07
Municipal Water Pipe

North American Pipe's AWWA C900-07 PVC product line is manufactured to meet the needs of modern municipal water distribution systems. With top quality raw materials and modern processing technology North American Pipe's C900-07 pipe meets all industry standards in addition to our own rigorous quality control standards. North American Pipe's C900-07 pipe utilizes Reiber style gaskets throughout the entire product offering. North American Pipe produces a full range of CIOD pipe in DR-14, DR-18, and DR-25 classifications. Whether specifying or installing our pipe you can be assured that North American Pipe will provide the pipe "Right, On Time, All the Time".

This product is made in accordance with the following specifications:

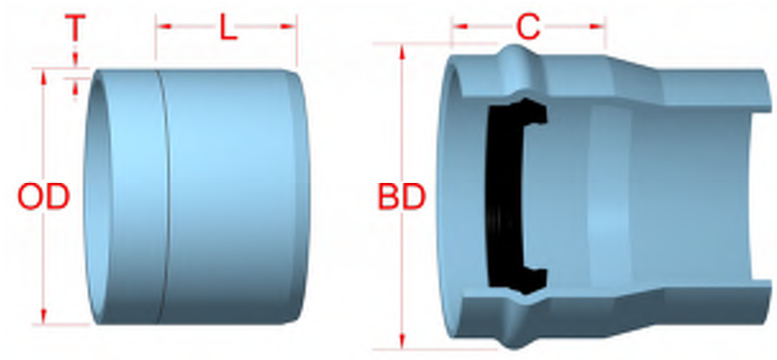
AWWA C900-07	ASTM D1784	ASTM D3139
ASTM F477	ANSI/NSF 14	ANSI/NSF 61
PPI TR-3	UL 1285	FM 1612

Short Form Specification for North American Pipe Corporation
AWWA C900-07 Municipal Water Pipe

Water main distribution pipe shall be made in accordance with AWWA C900-07 from a compound conforming to a cell classification of 12454 as defined by ASTM D1784. Integral bells shall incorporate gaskets meeting the requirements of ASTM F477 and be locked into the bell. The assembled joint shall meet the requirements of ASTM D3139. The laying length of the pipe shall be 20 feet. The pipe and gasket must be tested and approved for contact with potable water in accordance with ANSI/NSF 61. The pipe and gasket shall be listed by Underwriters Laboratory and approved by Factory Mutual.

Rev: 02/2011

AWWA C900-07 Municipal Water Pipe



NOMINAL PIPE SIZE	OUTSIDE DIA. – NOM. (OD)	*APPROX. BELL DIA. (BD)	**APPROX. BELL DEPTH (C)	INSERT MARK (L)
4”	4.80	6.50	5.00	3.88
6”	6.90	9.25	5.75	5.13
8”	9.05	11.75	7.00	6.13
10”	11.10	14.25	7.25	6.63
12”	13.20	16.75	8.00	7.38

NOMINAL PIPE SIZE	PC 165 DR 25 (T)	PC 235 DR 18 (T)	PC 305 DR 14 (T)
4”	.192	.267	.343
6”	.276	.383	.493
8”	.362	.503	.646
10”	.444	.617	.793
12”	.528	.733	.943

Underdrain piping is to be PVC C900, 12" diameter and 4" diameter, as indicated on Detail 2, SH8.
4-17-2018 GAI (KLF)

Note: These dimensions are for estimating purposes only * Dimension given for Approx. Bell Diameter (BD) is for highest pressure class ** Nominal depth, depth will vary by pressure class

Rev: 02/2011

DURA-BLUE®

NATIONAL PIPE & PLASTICS, INC.

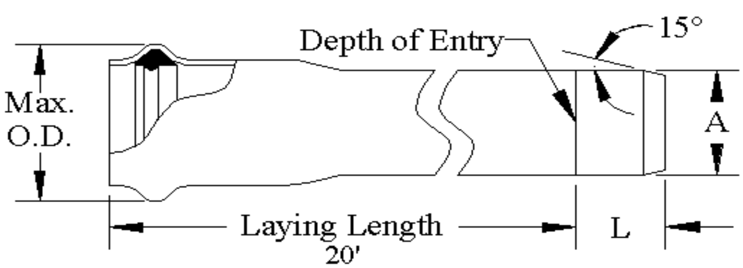
American-made products since 1970

Corporate Offices
New York Plant
3421 Old Vestal Road, Vestal, NY 13850
800.836.4350 607.729.9381 Fax: 607.729.6130

PVC MUNICIPAL WATER DISTRIBUTION PIPE (4 - 12”)

Scope: This submittal designates the general requirements for Unplasticized Polyvinyl Chloride Municipal Water Pipe from compound with a cell classification 12454 as defined in ASTM Standard D-1784.

Pipe: All pipe shall meet the requirements of AWWA C900, UL 1285, FM 1612, CSA B137.3 and BNQ NQ3624-250 Standards, as indicated in the table below, for potable water transmission mains, fire protection systems and nonpotable water applications. Our pipe meets National Sanitation Foundation Standards NSF® 61–G, NSF® 14, NSF® pw-G (Potable Water), and NSF® fs (Underground Fire Service per UL1285 Standard). The gasketed joint shall meet the requirements of ASTM D-3139, and the joint gasket shall conform to ASTM F-477. Pipe shall be furnished in laying lengths of 20’ (+/- 1”). Other lengths may be available upon request.



This product is manufactured in alternative colors for specific applications. **Purple** for Reclaimed Water application. Print legend will include the marking “Reclaimed Water”. **Green** for Sanitary Sewer Force Main applications. Print legend will include “Force Main”. Although manufactured in accordance with the same industrial standards and testing requirements, these products do not bear the NSF, CSA & BNQ Listing Mark, as they are used for different applications.

C-900 Water Pipe Size and Dimensions

Nominal Size (in)	Metric (mm)	Dimension Ratio (DR)	Approvals	Pressure Class (psi)	“A” Average (OD) Outside Diameter	Minimum Wall	Max OD Reference	“L” Dimension (Min/Max)
		25	NSF, CSA	165		0.192	5.920	
4	100	18	NSF, CSA, BNQ, *FM	235	4.800	0.267	6.055	4.375 - 4.625
		14	NSF, CSA, BNQ, *FM	305		0.343	6.220	
		25	NSF, CSA	165		0.276	8.300	
6	150	18	NSF, CSA, BNQ, *FM	235	6.900	0.383	8.450	5.375 - 5.875
		14	NSF, CSA, BNQ, *FM	305		0.493	8.560	
		25	NSF, CSA	165		0.362	10.730	
8	200	18	NSF, CSA, BNQ, *FM	235	9.050	0.503	10.920	6.375 - 6.875
		14	NSF, CSA, BNQ, *FM	305		0.646	11.110	
		25	NSF, CSA	165		0.444	13.105	
10	250	18	NSF, CSA, BNQ, *FM	235	11.100	0.617	13.360	7.375 - 7.875
		14	NSF, CSA, BNQ, *FM	305		0.793	13.510	
		25	NSF, CSA	165		0.528	15.465	
12	300	18	NSF, CSA, BNQ, *FM	235	13.200	0.733	15.790	7.375 - 7.875
		14	NSF, CSA, BNQ, *FM	305		0.943	16.010	

* Per FM 1612 DR-18 is PC-150 and DR-14 is PC-200.

UL1285

CORE & MAIN™ SUBMITTAL

2528 Fairlawn Ave
Dunbar, West Virginia 25064
(304) 768-0086
DUNBAR@COREandMAIN.COM

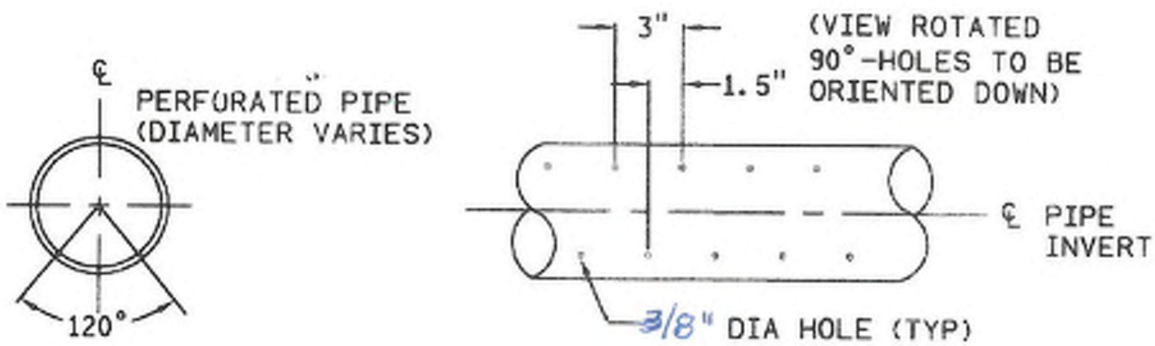
The proposed 3/8" diameter perforation schedule for 12" and 4" C900 DR 14 PVC pipe is accepted, in conformance with Note 4, SH8.
4-17-2018 GAI (KLF)

April 10, 2018

Project: John Amos Landfill

Material: 12" & 4" C900 DR14 PVC PERFORATION SPECIFICATION

This letter is to inform the 12" and 4" C900 PVC PIPE will be perforated as followed with the exception of drilling 3/8" Diameter Holes in reference to Note #4 - THE PERFORATION HOLE FOR THE GROUNDWATER UNDERDRAINS SHALL HAVE A MAXIMUM DIAMETER OF 3/8".



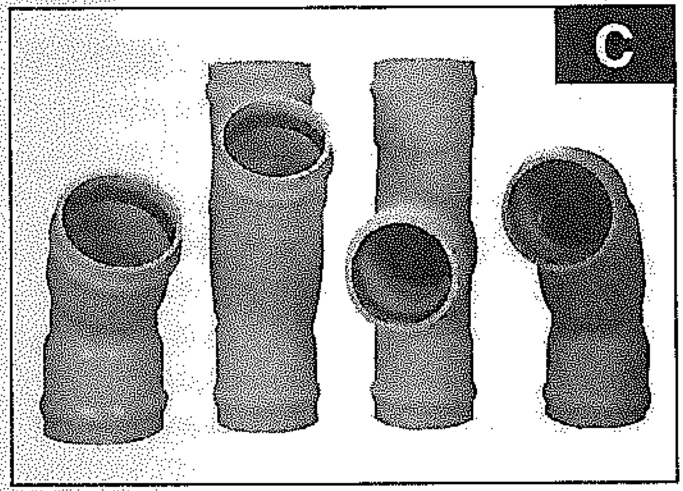
If you have any questions, please feel free to contact me at this office.

Sincerely,

RICHARD COREY
District Manager
Core and Main Waterworks
richard.corey@COREandMAIN.com

C.I.O.D. Gasketed Pressure Fittings

DR 25 (Class 100)
Fabricated in Sizes 10" – 36"



Applications
C.I.O.D. DR 25 PVC Gasketed Pressure fittings are thermoformed, glued and fiberglass reinforced. This eliminates the threat of rust or corrosion, providing better flow and cleaner water quality. C900 PVC pressure fittings can be used in both higher pressure water systems and low pressure sewer force main systems.

Royal offers a standard bell OD to facilitate joint restraint installation, while allowing all fittings to have fiberglass reinforced plastic where required. Bends of 45 degrees or less, are manufactured of one-piece construction where possible. This provides a lightweight, compact fitting, which can be easily handled in the field.

Royal Building Products C900 PVC fittings are designed to be used with engineered joint restraints or concrete thrust blocking. C900 PVC fittings are a tough alternative to cast iron fittings offering the added benefit of corrosion resistance.

ATTENTION: Royal Building Products fittings are not to be used with compressed air or gases. Royal does not recommend that piping systems that include its products be tested with compressed air or gases.

Short Specs
Fabricated fittings 10" and greater shall conform to the requirements of AWWA C900 and C905. Fabricated fittings shall have a dimensional ratio equal to that of the pipe they are being installed on. All PVC CIOD fittings shall incorporate integral elastomeric gasket bell joints. Materials used in the manufacture of PVC fittings shall equal or exceed cell class 12454 (ASTM D1784) with a hydrostatic design basis of 27.58 Mpa at 23°C as outlined in AWWA C900 and C905. The compound shall be listed with the National Sanitation Foundation. Fabricated fittings shall be manufactured from segments of PVC pipe bonded together and over wrapped with fiberglass-reinforced polyester, where required, to the requirements of AWWA C900 and C905. All bends, up to and including 45°, shall be constructed from a single section of PVC pipe, without joints, bonding or fiberglass-reinforced polyester wrapping, where available.

Note: Where the bends 45° or less are one piece, fiberglassing is redundant and can be eliminated. The pressure rating of the fittings shall be equal to the pressure rating of the pipe they are being installed on. All fittings shall be marked with the following identifications: Nominal size, CIOD, Manufacturers name or trademark, AWWA pressure rating, pressure class and standard number to which the fitting is made, and an indication of potable water use, potable, P, PW and proper handling label.

Certification
Fittings conform to AWWA C905.

Royal Building Products
(formerly Plastic Trends)
56400 Mound Road
Shelby Twp., MI 48316
Toll Free: 800.232.5690
Fax: 586.781.0888
www.royalbuildingproducts.com

APPENDIX C-II
Granular Drainage Aggregate

LETART
CORPORATION
SAND & GRAVEL

PO Box 69, 10298 Huntington Road, Gallipolis Ferry, WV 25515-0069 email-sandandgravel@zoomnet.net
Phone-(304) 675-7516 Fax-(304) 675-5388

January 2, 2018

Mr. Jack Conner
Shamblin Stone
PO Box 510
Dunbar, WV 25064

Dear Jack:

This letter is written as confirmation that the #57 Gravel purchased from Letart Corporation by Shamblin Stone conforms to the specifications set forth in West Virginia Division of Highways, Standard Specifications, Roads and Bridges, Section 703. Our West Virginia Source Code for coarse aggregate is 1236856.

If I can be of further assistance, please do not hesitate to contact me at (304) 675-7516.

Sincerely,

Jon P. Thompson

LETART CORPORATION SAND & GRAVEL

#57 WASHED GRAVEL SIEVE ANALYSIS - CUMULATIVE METHOD

Sampled from: Loading Face [ ] Production Pile [x]

Date 6/11/2017 Techician Jon P. Thompson

Sieve Size		Spec. Limits Upper	Spec. Limits Lower	Cum. Mass Passing Orig.	Cum. Mass Passing Corr.	% Passing	
1-1/2"	mm (3/8")	100%	100%	11.4	11.4	100.0%	**Pass**
1"	mm (#4)	95%	100%	11.2	11.2	98.2%	**Pass**
1/2"	mm (#8)	25%	60%	4.1	4.1	36.0%	**Pass**
#4	mm (#16)	0%	10%	0.1	0.1	0.9%	**Pass**
#8	mm (#30)	0%	5%	0.0	0.0	0.1%	**Pass**

Fineness Modulus: 4.65

Weight Before Drying	11.7
Weight After Drying	11.4
Loss in Drying	0.3
% of Moisture	2.56%
Material Loss During Wash Test	0

Percentage Loss: 0.00%

Specific Gravity Calculations

Weight of Dry Sample	1048.2
Weight of Pychnometer & Water	2156.6
Weight of Pychnometer, Water & Sample	2786.4
Apparent Specific Gravity	2.505258126

LETART CORPORATION

SAND & GRAVEL

MATERIAL SAFETY DATA SHEET

Identity: Natural Sand & Gravel

SECTION I

Manufacturer's Name
Letart Corporation Sand & Gravel

Emergency Phone Number
1-304-675-7516

Address
PO Box 69
Gallipolis Ferry, WV 25515

Telephone Number for Information
1-304-675-7516

Date of Preparation
05/05/99

SECTION II – HAZARDOUS INGREDIENTS / IDENTITY INFORMATION

HAZARDOUS COMPONENTS
Silica, Crystalline Quartz (respirable)

SPECIFIC CHEMICAL IDENTITY: Silicon Dioxide SIO_2 (CAS 14808-60-7)

COMMON NAMES: Silica, Flint, Sand, Gravel, Crystalline Free Silica, Quartz, Gravel

OSHA PEL: Exposure to airborne crystalline silica shall not exceed an 8-hour time weighed average limit As stated in 29 CFR 1910.1000 Table Z-1-A, Air Contaminants, specifically:

Silica, Crystalline Quartz (respirable) 0.1 mg/M^3

ACGIH TLV: Crystalline Quartz
TLV-TWA = 0.1 mg/M^3 (Respirable Dust)
See Threshold Limit Value and Biological Exposure Indices for 1991-1992
American Conference of Governmental Industrial Hygienists.

OTHER LIMITS RECOMMENDED: National Institute for Occupational Safety and Health (NIOSH). Recommended standard maximum permissible concentration = 0.05 mg/cubic Meter (respirable free silica) as determined by a full shift sample up to 10-hour working day, 40-hour work week. See NIOSH Criteria for a Recommended Standard Occupational Exposure to Crystalline Silica.

SECTION III – PHYSICAL / CHEMICAL CHARACTERISTICS

Boiling Point:	4046 ^{o}F	**Specific Gravity**	2.65 $_0$
Vapor Pressure (mm HG)	None	**Melting Point**	3050 F
Vapor Density (Air = 1)	None	**Evaporation Rate**	None

Solubility in Water; Insoluble in water.
Appearance and Odor: White, tan, black or multi-colored sand and gravel, granular, round or crushed- no odor or taste.

SECTION IV – REACTIVITY DATA

Stability: Stable

Incompatibility: Contact with powerful oxidizing agents such as fluorine, chorine trifluoride, manganese trioxide, oxygen difluoride may cause fires.

Hazardous Decomposition or Byproducts: Silica will dissolve in Hydrofluoric Acid and produce a corrosive gas – silicon tetrafluoride

Hazardous Polymerization: Will not occur.

SECTION V – HEALTH HAZARD DATA

Route of Entry: Inhalation

Health Hazards (Acute and Chronic): Prolonged exposure to crystalline quartz may cause delayed (chronic) lung injury (silicosis). Acute or rapidly developing silicosis may occur in a short period of time in certain occupations such as sandblasters. Silicosis is a form of disabling pulmonary fibrosis which can be progressive and may lead to death.

Carcinogenicity:

NTP? Yes

The national Toxicology Program (NTP) published its Sixth Annual Report of Carcinogens which concludes that "silica, crystalline (respirable)" may reasonably be anticipated to be a carcinogen. The NTP conclusion is based on sufficient evidence for the carcinogenicity of respirable crystalline silica in experimental animals and limited evidence in humans.

IARC Monographs? Yes

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans (volume 42, 1987) concludes that there is sufficient evidence for the carcinogenity of crystalline silica to experimental animals, and that there is limited evidence of the carcinogenicity of crystalline silica to humans. IARC Class 2A.

Signs and Symptoms of Exposure: Undue breathlessness, wheezing, cough and sputum production.

Medical Conditions Generally Aggravated by Exposure: Pulmonary function may be reduced by inhalation of respirable crystalline silica. Also lung scarring produced by such inhalation may lead to a progressive massive fibrosis of the lung which may aggravate other pulmonary conditions and diseases and which increases susceptibility to pulmonary tuberculosis. Progressive massive fibrosis may be accompanied by right heart enlargement, heart failure, and pulmonary failure. Smoking aggravates the effects of exposure.

Emergency and First Aid Procedures: For sand in eyes, wash immediately with water. If irritation persists, seek medical attention. For gross inhalation, remove person immediately to fresh air, give artificial respiration as needed, seek medical attention as needed.

SECTION VI – PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be taken in Case Material is Released or Spilled:

Spills: Use dustless methods and place into closable container for disposal, or flush with water. Do not dry sweep. Wear protective equipment specified below.

Waste Disposal Method: Dispose in accordance with Federal, State, and Local regulations.

Other Precautions: Use dustless systems for storage handling and clean up so that airborne dust does not exceed the PEL. Use adequate ventilation and dust collection. Practice good housekeeping. Do not permit dust to collect on sills, ledges, walls, floors, machinery or equipment. Maintain, clean, and test fit respirators in accordance with OSHA regulations. Maintain and test ventilation and dust collection equipment. Wash or vacuum clothing that has become dusty. See also control measures in Section VII.

See OSHA Hazard Communication Rule 29 CFR Sections 1910.1200, 1915.99, 1917.28, 1918.90, 1926.59 and 1928.21, and state and local worker or community "right to know" laws and regulations. We recommend that smoking be prohibited in all areas where respirators must be used. WARN YOUR EMPLOYEES (AND YOUR CUSTOMERS-USERS IN CASE OF RESALE) BY POSTING AND OTHER MEANS OF THE HAZARD AND OSHA PRECAUTIONS TO BE USED. PROVIDE TRAINING FOR YOUR EMPLOYEES ABOUT OSHA PRECAUTIONS.

See also American Society for Testing and Materials (ASTM) standard practice E 1132-86, "Standard Practice for Health Requirements Relating to Occupational Exposure to Quartz Dust".

SECTION VII – CONTROL MEASURES

Respiratory Protection: The following chart specifies the types of respirators that may provide respiratory protection for crystalline silica.

RESPIRATORY PROTECTION FOR CRYSTALLINE SILICA

MINIMUM RESPIRATORY PROTECTION

CONDITION Particulate Concentration	
Up to 5 X PEL	Any dust respirator
Up to 10 X PEL	Any dust respirator, except single-use or quarter-mask respirator. Any fume respirator or high efficiency particulate filter respirator. Any supplied-air respirator. Any self-contained breathing apparatus.
Up to 50 X PEL	A high efficiency particulate filter respirator with a full facepiece. Any supplied-air respirator operated in pressure-demand or other Positive pressure or continuous-flow mode.
Up to 500 X PEL	A powered air-purifying respirator with a high efficiency particulate filter.

500 X PEL (Cont.)	A type C supplied-air respirator operated in pressure-demand or other positive pressure or continuous-flow mode.
Greater than 500 X PEL	Self-contained breathing apparatus with a full facepiece operated in pressure demand or other positive pressure mode. A combination respirator that includes a Type C supplied air respirator with a full facepiece operated in pressure-demand or other positive pressure continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.

*Only NIOSH-approved or MSHA approved equipment should be used. (See 29 CFR 1910.134)
See also ANSI standard Z88.2-1980 "Practices for respiratory Protection."

Ventilation: Use sufficient local exhaust to reduce the level of respirable dust to the PEL.

Protective Gloves: Optional

Eye Protection: Wear protective shield (safety glasses) when exposed to dust particles.

Work/Hygienic Practices: Avoid creating and breathing dust.

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, express or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects that may be caused by purchase, resale, use or exposure to our sand and gravel. Customers-users of sand and gravel containing silica must comply with all applicable health and safety laws, regulations and orders.

New Amsterdam

2105

Mulzer Crushed Stone, Inc.
Loadout Form for Visual Inspection Material

Date Loaded : 3/29/2018

Stone : 301

Shipped To : Shamblin Stone-Scary

Stone Name : AASHTO 1

The testing requirements on this material is a visual inspection. The following percents passing are an indication of what should be expected if a gradation test was performed.

Sieve Size:	Percent Passing
4	100
3 1/2	97
2 1/2	52
1 1/2	8
3/4	4
Decant	
Pan	
Valid	

Barge Number(s)

C489
C571

Return

Search

APPENDIX C-III
Geotextile

GEOSYNTHETICS

N080

TECHNICAL DATA SHEET NONWOVEN GEOTEXTILE

N080 is a polypropylene, needle punched nonwoven geotextile for use in drainage and separation applications. It has been stabilized to resist degradation due to ultraviolet exposure and is resistant to commonly encountered mildew, insects and soil chemicals, and is non-biodegradable.

SPECIFICATIONS:

The N080 polypropylene nonwoven fabric will utilize the following characteristics:

PROPERTY	TEST METHOD	MIN. AVG. ROLL VALUE
Grab Tensile Strength[1]	ASTM D4632	205 lbs
Grab Tensile Elongation	ASTM D4632	50%
CBR Puncture	ASTM D6241	525 lbs
Trapezoid Tear Strength	ASTM D4533	80 lbs
UV Resistance @ 500 hrs	ASTMD4355	70%
Apparent Opening Size (AOS)	ASTM D4751	80 US Sieve
Permittivity (sec^{-1})	ASTM D4491	1.4 (sec^{-1})
Flow Rate	ASTM D4491	90 gpm/ft^2

Values quoted above are the result of multiple tests conducted at an independent testing facility. N080 meets or exceeds values listed.

[1] Values apply to both machine and cross-machine directions

PACKAGING:

Roll Width	12.5 ft.	15 ft.
Roll Length	360 ft.	300 ft.
Roll Area	500 yd^2	500 yd^2

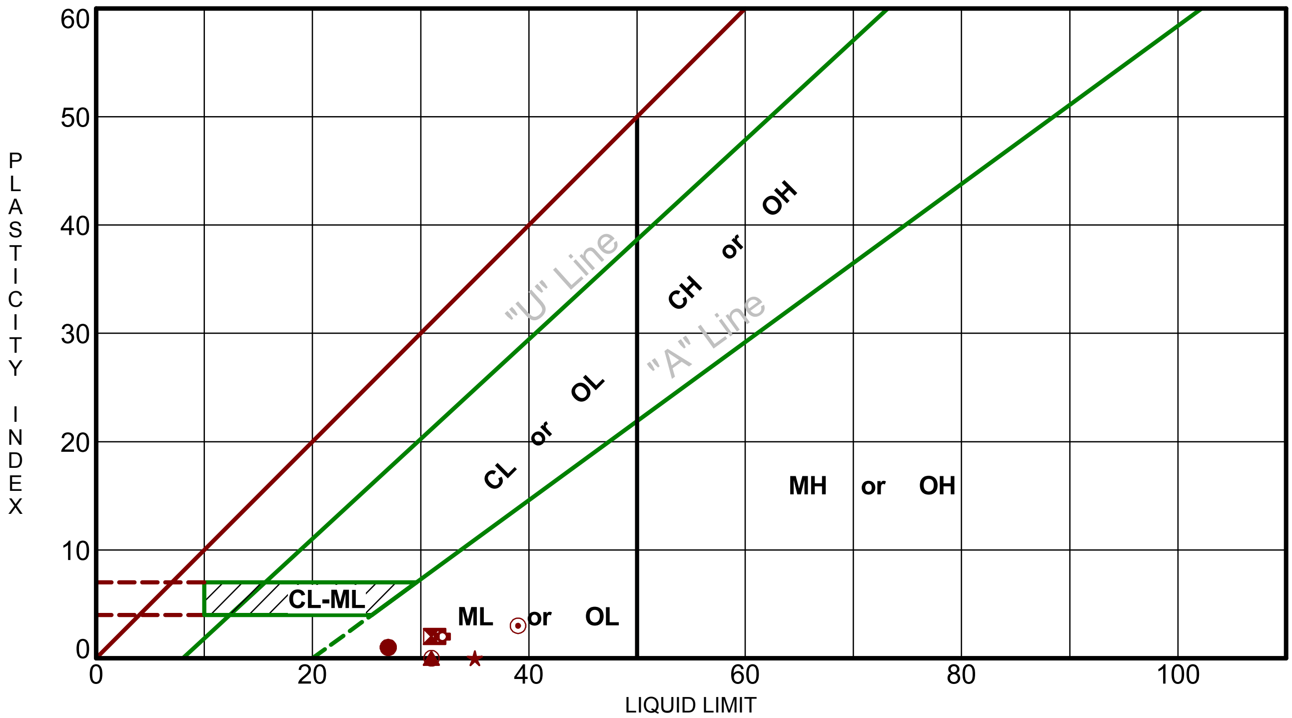
Disclaimer: ACF Environmental assumes no liability for the completeness or accuracy of this information or the ultimate use of this information. This document should not be construed as engineering advice. Always consult the project engineer for project specific requirements. The end user assumes sole responsibility for the use of this information and product.

Appendix D
Compaction Records

Appendix D-I
Laboratory Test Results

ATTERBERG LIMITS RESULTS

ASTM D4318



	Boring ID	Depth	LL	PL	PI	Fines	USCS	Description
●	Sample 1	0	27	26	1	50	ML	SANDY SILT
⊠	Sample 2	0	31	29	2	32	SM	SILTY SAND with GRAVEL
▲	Sample 3	0	31	31	NP	44	SM	SILTY SAND with GRAVEL
★	Sample 4	0	35	35	NP	73	ML	SILT with SAND
⊙	Sample 5	0	39	36	3	62	ML	SANDY SILT
✿	Sample 6	0	32	30	2	81	ML	SILT with SAND
○	Sample 7	0	31	31	NP	60	ML	SANDY SILT

PROJECT: John Amos C130109.10

SITE: Winfield, WV
Charleston, WV

Terracon
912 Morris St
Charleston, WV

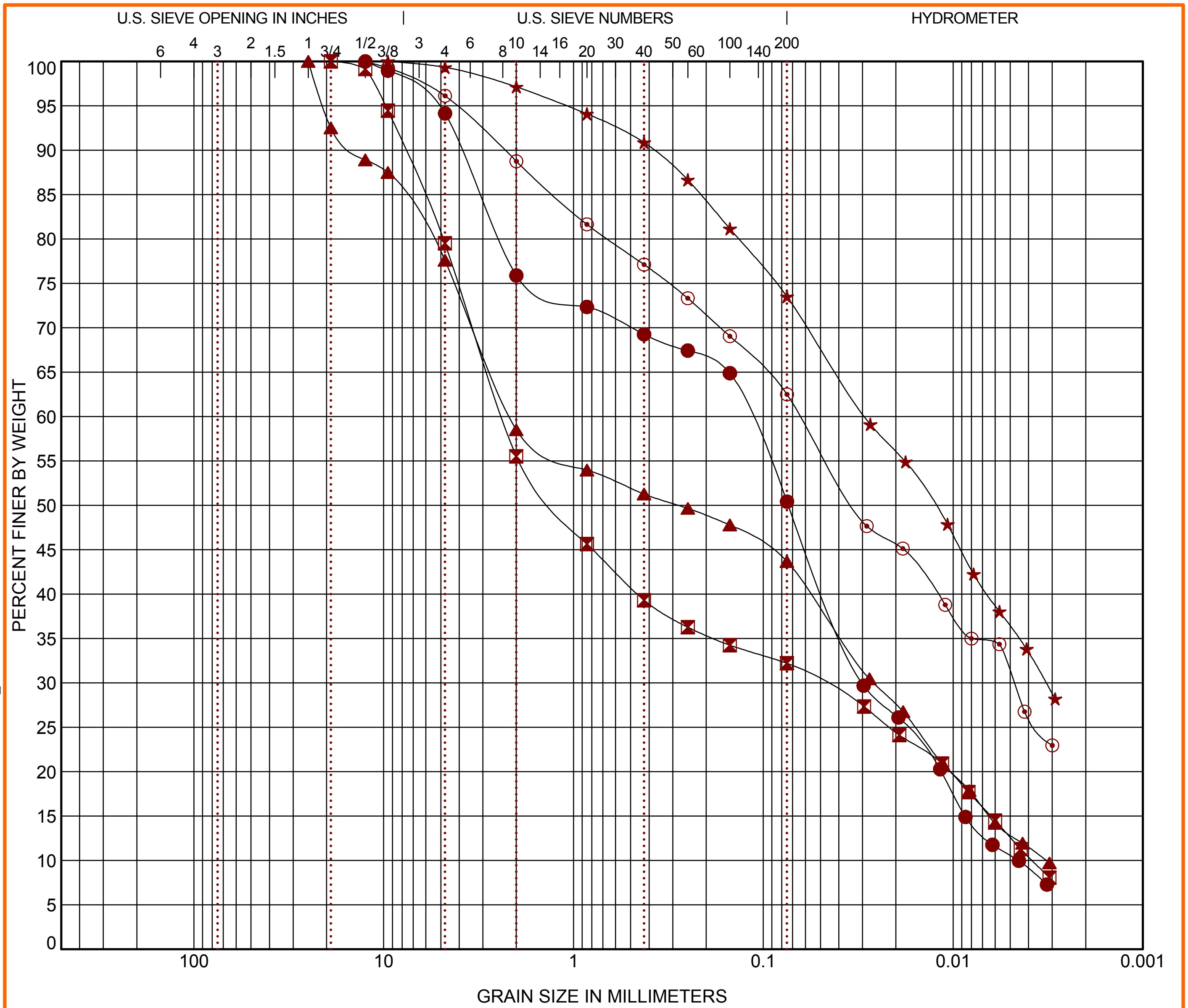
PROJECT NUMBER: N2181067

CLIENT: GAI Consultants, Inc.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS N2181067 LABORATORY.GPJ TERRACON_DATATEMPLATE.GDT 5/10/18

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
● Sample 1	0	SANDY SILT (ML)		27	26	1	1.68	26.22
⊠ Sample 2	0	SILTY SAND with GRAVEL (SM)		31	29	2	0.27	614.61
▲ Sample 3	0	SILTY SAND with GRAVEL (SM)		31	31	NP	0.10	662.41
★ Sample 4	0	SILT with SAND (ML)		35	35	NP		
⊙ Sample 5	0	SANDY SILT (ML)		39	36	3		

Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Fines	%Clay
● Sample 1	0	12.5	0.119	0.03	0.005	5.9	43.7	39.9		10.6
⊠ Sample 2	0	19	2.351	0.049	0.004	20.5	47.3	19.6		12.6
▲ Sample 3	0	25	2.141	0.026	0.003	22.4	33.9	30.7		12.9
★ Sample 4	0	9.5	0.029	0.003		0.7	25.8	37.1		36.4
⊙ Sample 5	0	12.5	0.064	0.005		3.9	33.6	31.4		31.1

PROJECT: John Amos C130109.10

PROJECT NUMBER: N2181067

SITE: Winfield, WV
Charleston, WV

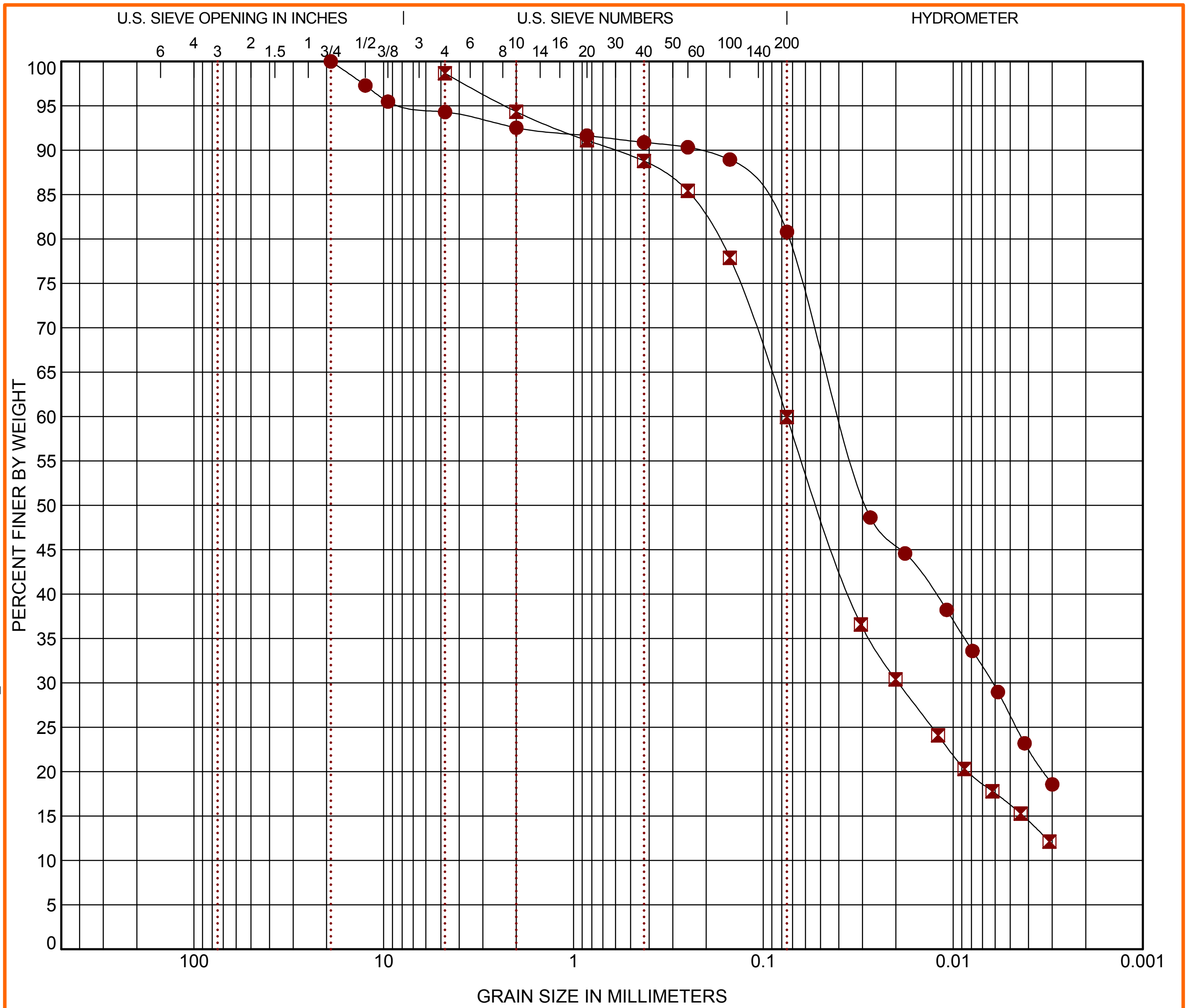
Terracon
912 Morris St
Charleston, WV

CLIENT: GAI Consultants, Inc.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 N2181067 LABORATORY.GPJ TERRACON_DATATEMPLATE.GDT 5/10/18

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	Sample 6	0	SILT with SAND (ML)		32	30	2		
☒	Sample 7	0	SANDY SILT (ML)		31	31	NP		

	Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Fines	%Clay
●	Sample 6	0	19	0.039	0.006		5.7	13.5	54.5		26.3
☒	Sample 7	0	4.75	0.075	0.019		0.0	38.7	43.7		16.2

PROJECT: John Amos C130109.10

PROJECT NUMBER: N2181067

SITE: Winfield, WV
Charleston, WV

Terracon
912 Morris St
Charleston, WV

CLIENT: GAI Consultants, Inc.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 N2181067 LABORATORY.GPJ TERRACON_DATATEMPLATE.GDT 5/10/18

LABORATORY COMPACTION CHARACTERISTICS OF SOIL REPORT

Report Number: N2181067.0001
Service Date: 04/27/18
Report Date: 04/27/18

Terracon
912 Morris St
Charleston, WV 25301-1425
304-344-0821

Client

GAI Consultants, Inc.
Attn: Charles Straley
300 Summers St Ste 1100
Charleston, WV 25301-1631

Project

C130109.10 John Amos
912 Morris Street
Charleston, WV 25301

Project Number: N2181067

Material Information

Source of Material:
Proposed Use:

Sample Information

Sample Date:
Sampled By:
Sample Location: Sample #1

Sample Description: Sandy Silt

Laboratory Test Data

Test Procedure: ASTM D698
Test Method: Method C
Sample Preparation: Dry
Rammer Type: Mechanical

	Result	Specifications
Liquid Limit:		
Plastic Limit:		
Plasticity Index:		
In-Place Moisture (%):		

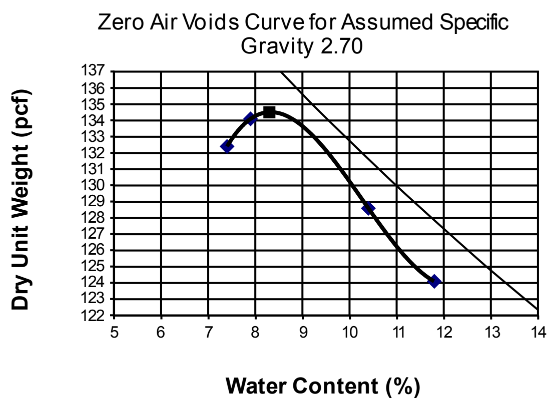
USCS:

Oversized Particles (%): 11.1
Moisture (%): 0.1
Sieve for Oversize Fraction: 3/4

Assumed Bulk Specific Gravity of Oversized Particles: 2.7

<u>**Corrected for Oversized Particles (ASTM D4718)**</u>
Maximum Dry Unit Weight (pcf): 134.5
Optimum Water Content (%): 8.3

<u>**Uncorrected Values**</u>
Maximum Dry Unit Weight (pcf): 131.2
Optimum Water Content (%): 9.4



Comments:

Services:

Terracon Rep.:
Reported To:
Contractor:
Report Distribution:
(1) GAI Consultants, Inc., Charles Straley

Reviewed By:
James L. Smith
Laboratory & CMET Project Manager

Test Methods:
The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

LABORATORY COMPACTION CHARACTERISTICS OF SOIL REPORT

Report Number: N2181067.0002
Service Date: 04/27/18
Report Date: 04/27/18

Terracon
912 Morris St
Charleston, WV 25301-1425
304-344-0821

Client

GAI Consultants, Inc.
Attn: Charles Straley
300 Summers St Ste 1100
Charleston, WV 25301-1631

Project

C130109.10 John Amos
912 Morris Street
Charleston, WV 25301

Project Number: N2181067

Material Information

Source of Material:
Proposed Use:

Sample Information

Sample Date:
Sampled By:
Sample Location: Sample #2

Sample Description: Silty Sand with Gravel

Laboratory Test Data

Test Procedure: ASTM D698
Test Method: Method A
Sample Preparation: Dry
Rammer Type: Mechanical

	Result	Specifications
Liquid Limit:		
Plastic Limit:		
Plasticity Index:		
In-Place Moisture (%):		

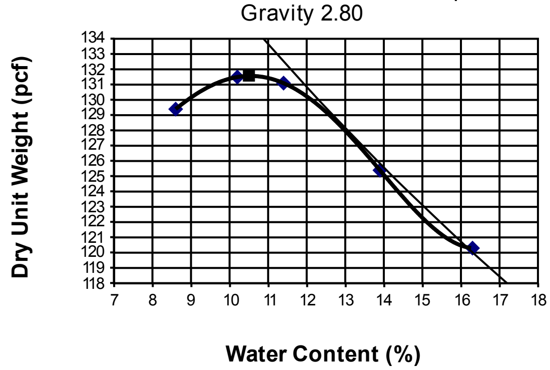
USCS:

Oversized Particles (%): 16.0
Moisture (%): 0.1
Sieve for Oversize Fraction: 4

Assumed Bulk Specific Gravity of Oversized Particles: 2.7

Corrected for Oversized Particles (ASTM D4718)
Maximum Dry Unit Weight (pcf): **131.6**
Optimum Water Content (%): **10.5**

Uncorrected Values
Maximum Dry Unit Weight (pcf): **126.3**
Optimum Water Content (%): **12.6**



Comments:

Services:

Terracon Rep.:
Reported To:
Contractor:
Report Distribution:
(1) GAI Consultants, Inc., Charles Straley

Reviewed By:
James L. Smith
Laboratory & CMET Project Manager

Test Methods:

The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

LABORATORY COMPACTION CHARACTERISTICS OF SOIL REPORT

Report Number: N2181067.0003
Service Date: 04/27/18
Report Date: 04/27/18

Terracon
912 Morris St
Charleston, WV 25301-1425
304-344-0821

Client
GAI Consultants, Inc.
Attn: Charles Straley
300 Summers St Ste 1100
Charleston, WV 25301-1631

Project
C130109.10 John Amos
912 Morris Street
Charleston, WV 25301

Project Number: N2181067

Material Information
Source of Material:
Proposed Use:

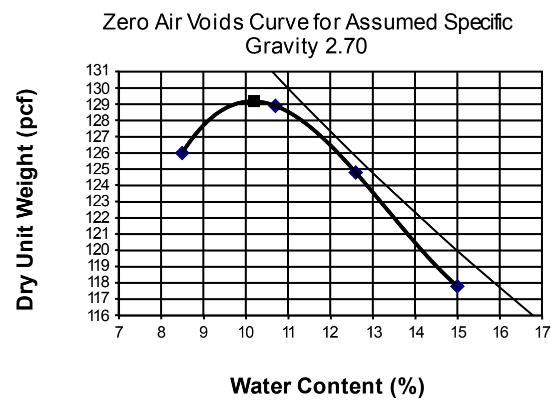
Sample Information
Sample Date:
Sampled By:
Sample Location: Sample #3

Sample Description: Silty Sand with Gravel

Laboratory Test Data
Test Procedure: ASTM D698
Test Method: Method A
Sample Preparation: Dry
Rammer Type: Mechanical
Maximum Dry Unit Weight (pcf): **129.2**
Optimum Water Content (%): **10.2**

	Result	Specifications
Liquid Limit:		
Plastic Limit:		
Plasticity Index:		
In-Place Moisture (%):		

USCS:



Comments:

Services:

Terracon Rep.:
Reported To:
Contractor:
Report Distribution:
(1) GAI Consultants, Inc., Charles Straley

Reviewed By:
James L. Smith
Laboratory & CMET Project Manager

Test Methods:
The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

LABORATORY COMPACTION CHARACTERISTICS OF SOIL REPORT

Report Number: N2181067.0007
Service Date: 04/27/18
Report Date: 04/27/18

Terracon
912 Morris St
Charleston, WV 25301-1425
304-344-0821

Client
GAI Consultants, Inc.
Attn: Charles Straley
300 Summers St Ste 1100
Charleston, WV 25301-1631

Project
C130109.10 John Amos
912 Morris Street
Charleston, WV 25301

Project Number: N2181067

Material Information
Source of Material:
Proposed Use:

Sample Information
Sample Date:
Sampled By:
Sample Location: Sample #4

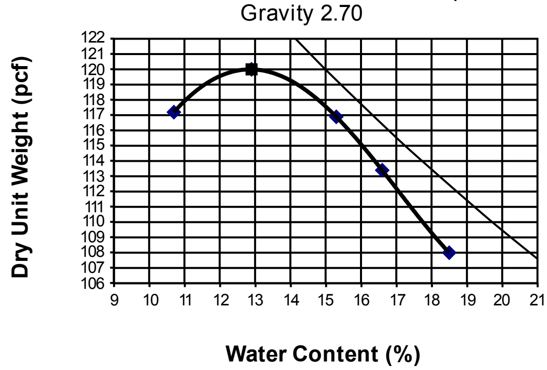
Sample Description: Silt with Sand

Laboratory Test Data
Test Procedure: ASTM D698
Test Method: Method A
Sample Preparation: Dry
Rammer Type: Mechanical
Maximum Dry Unit Weight (pcf): 120.0
Optimum Water Content (%): 12.9

	Result	Specifications
Liquid Limit:		
Plastic Limit:		
Plasticity Index:		
In-Place Moisture (%):		

USCS: ML

Zero Air Voids Curve for Assumed Specific Gravity 2.70



Comments:

Services:

Terracon Rep.:
Reported To:
Contractor:
Report Distribution:
(1) GAI Consultants, Inc., Charles Straley

Reviewed By:
James L. Smith
Laboratory & CMET Project Manager

Test Methods:
The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

LABORATORY COMPACTION CHARACTERISTICS OF SOIL REPORT

Report Number: N2181067.0004
Service Date: 04/27/18
Report Date: 04/27/18

912 Morris St
Charleston, WV 25301-1425
304-344-0821

Client

GAI Consultants, Inc.
Attn: Charles Straley
300 Summers St Ste 1100
Charleston, WV 25301-1631

Project

C130109.10 John Amos
912 Morris Street
Charleston, WV 25301

Project Number: N2181067

Material Information

Source of Material:
Proposed Use:

Sample Information

Sample Date:
Sampled By:
Sample Location: Sample #5

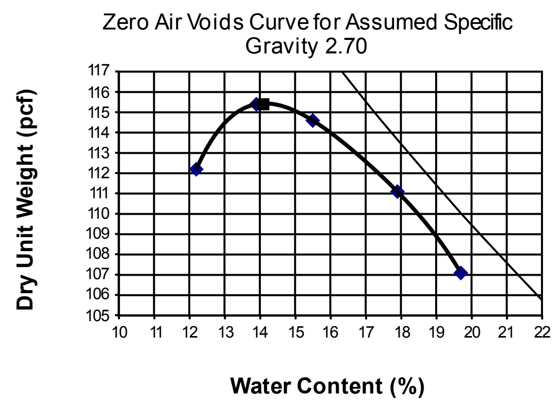
Sample Description: Sandy Silt

Laboratory Test Data

Test Procedure: ASTM D698
Test Method: Method A
Sample Preparation: Dry
Rammer Type: Mechanical
Maximum Dry Unit Weight (pcf): **115.4**
Optimum Water Content (%): **14.1**

	Result	Specifications
Liquid Limit:		
Plastic Limit:		
Plasticity Index:		
In-Place Moisture (%):		

USCS:



Comments:

Services:

Terracon Rep.:
Reported To:
Contractor:
Report Distribution:

(1) GAI Consultants, Inc., Charles Straley

Reviewed By:

James L. Smith
Laboratory & CMET Project Manager

Test Methods:

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LABORATORY COMPACTION CHARACTERISTICS OF SOIL REPORT

Report Number: N2181067.0005
Service Date: 04/27/18
Report Date: 04/27/18

Terracon
912 Morris St
Charleston, WV 25301-1425
304-344-0821

Client

GAI Consultants, Inc.
Attn: Charles Straley
300 Summers St Ste 1100
Charleston, WV 25301-1631

Project

C130109.10 John Amos
912 Morris Street
Charleston, WV 25301

Project Number: N2181067

Material Information

Source of Material:
Proposed Use:

Sample Information

Sample Date:
Sampled By:
Sample Location: Sample #6

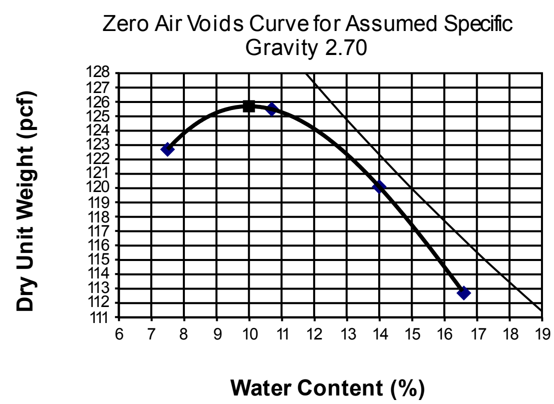
Sample Description: Silt with Sand

Laboratory Test Data

Test Procedure: ASTM D698
Test Method: Method A
Sample Preparation: Dry
Rammer Type: Mechanical
Maximum Dry Unit Weight (pcf): **125.7**
Optimum Water Content (%): **10.0**

	Result	Specifications
Liquid Limit:		
Plastic Limit:		
Plasticity Index:		
In-Place Moisture (%):		

USCS:



Comments:

Services:

Terracon Rep.:
Reported To:
Contractor:
Report Distribution:

(1) GAI Consultants, Inc., Charles Straley

Reviewed By:

James L. Smith
Laboratory & CMET Project Manager

Test Methods:

The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

LABORATORY COMPACTION CHARACTERISTICS OF SOIL REPORT

Report Number: N2181067.0006
Service Date: 04/27/18
Report Date: 05/03/18

Terracon
912 Morris St
Charleston, WV 25301-1425
304-344-0821

Client

GAI Consultants, Inc.
Attn: Charles Straley
300 Summers St Ste 1100
Charleston, WV 25301-1631

Project

C130109.10 John Amos
912 Morris Street
Charleston, WV 25301

Project Number: N2181067

Material Information

Source of Material:
Proposed Use:

Sample Information

Sample Date:
Sampled By:
Sample Location: Sample #7

Sample Description: Sandy Silt

Laboratory Test Data

Test Procedure: ASTM D698
Test Method: Method A
Sample Preparation: Wet
Rammer Type: Mechanical

	Result	Specifications
Liquid Limit:		
Plastic Limit:		
Plasticity Index:		
In-Place Moisture (%):		

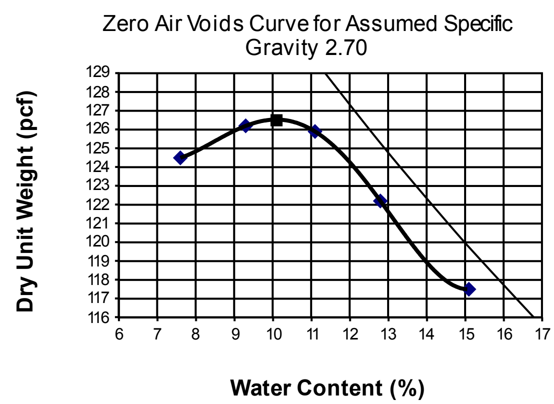
USCS:

Oversized Particles (%): 15.2
Moisture (%): 0.1
Sieve for Oversize Fraction: 4

Assumed Bulk Specific Gravity of Oversized Particles: 2.7

Corrected for Oversized Particles (ASTM D4718)
Maximum Dry Unit Weight (pcf): 126.5
Optimum Water Content (%): 10.1

Uncorrected Values
Maximum Dry Unit Weight (pcf): 121.1
Optimum Water Content (%): 11.8



Comments:

Services:

Terracon Rep.:
Reported To:
Contractor:
Report Distribution:
(1) GAI Consultants, Inc., Charles Straley

Reviewed By:

James L. Smith
Laboratory & CMET Project Manager

Test Methods: ASTM D698

The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

September 18, 2018

Project No. 2018-381-003

Ms. Nina Balsamo
GAI Consultants, Inc.
385 East Waterfront Drive
Homestead, PA 15120

Transmittal
Laboratory Test Results
John E. Amos LF FCS C130109.11

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens that were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectfully submitted,
Geotechnics, Inc.

David R. Backstrom
Laboratory Director

We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.

DCN: Data Transmittal Letter Date: 1/28/05 Rev.: 1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

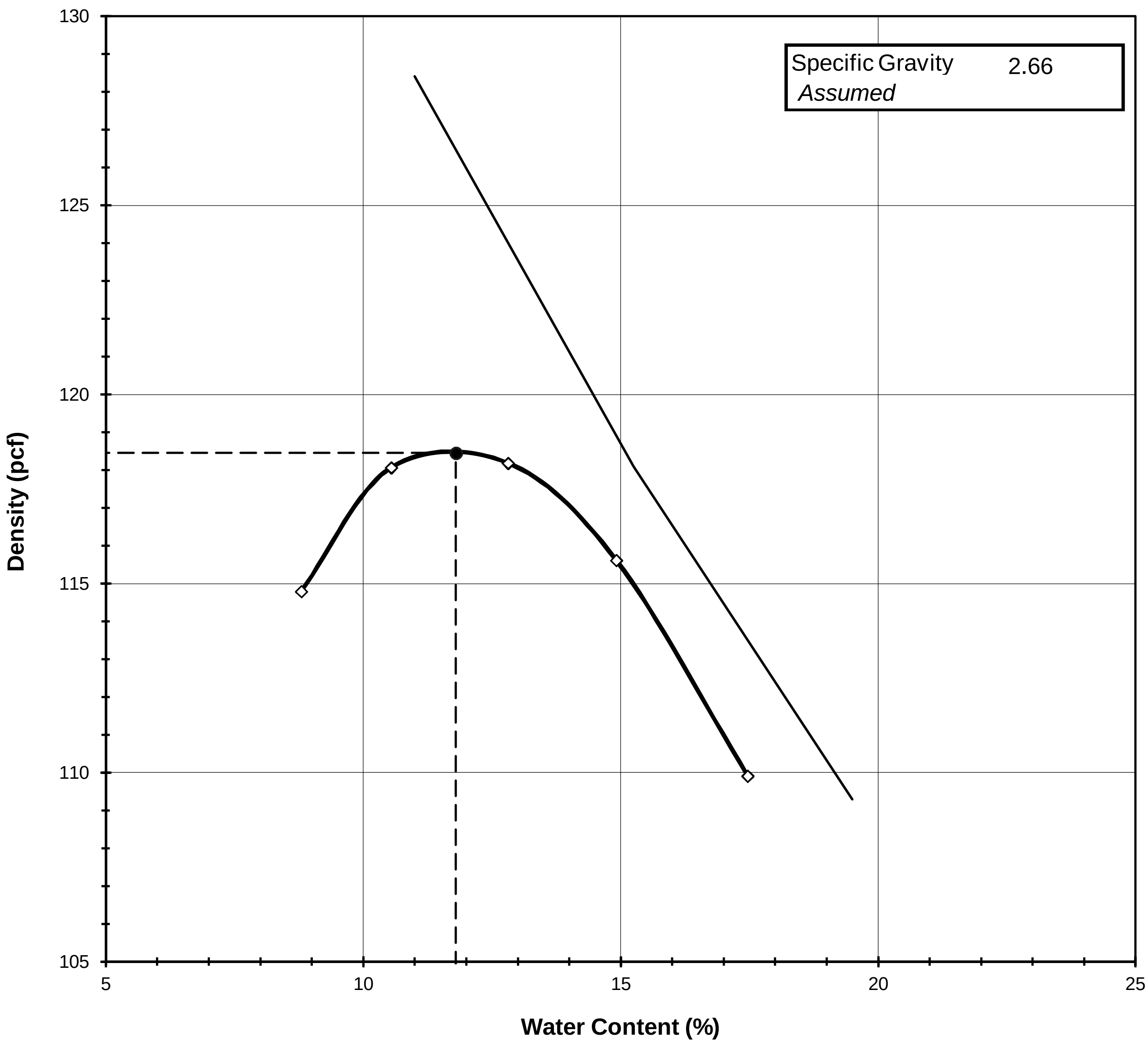
MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	GAI Consultants, Inc.	Boring No.:	NA
Client Reference:	John E. Amos LF FCS C130109.11	Depth (ft):	NA
Project No.:	2018-381-003	Sample No.:	No. 8
Lab ID:	2018-381-003-001	Test Method	**STANDARD**

Visual Description: Brown Clay with Some Rock

Optimum Water Content	**11.8**
Maximum Dry Density	**118.5**



Tested By	*MF*	*Date*	*9/17/18*	*Checked By*	*TMP*	*Date*	9/18/18

page 1 of 2 *DCN:CT-S12 DATE:5/1/13 REVISION: 14*

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	GAI Consultants, Inc.	Boring No.:	NA
Client Reference:	John E. Amos LF FCS C130109.11	Depth (ft):	NA
Project No.:	2018-381-003	Sample No.:	No. 8
Lab ID:	2018-381-003-001		

Visual Description: Brown Clay with Some Rock

Total Weight of the Sample (g):	NA
As Received Water Content (%):	NA
Assumed Specific Gravity:	2.66
Percent Retained on 3/4":	NA
Percent Retained on 3/8":	NA
Percent Retained on #4:	NA
Oversize Material:	Not included
Procedure Used:	C

Test Type:		**STANDARD**
Rammer Weight (lb):		5.5
Rammer Drop (in):		12
Rammer Type:		MECHANICAL
Machine ID:	G	774
Mold ID:	G	1775
Mold diameter:		6"
Weight of the Mold (g):		5719
Volume of the Mold (cm^3):		2130

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Weight of Mold & Wet Sample (g):	9982	10174	10270	10254	10126
Weight of Mold (g):	5719	5719	5719	5719	5719
Weight of Wet Sample (g):	4263	4455	4551	4535	4407
Mold Volume (cm^3):	2130	2130	2130	2130	2130

Moisture Content / Density

Tare Number:	875	569	882	580	623
Weight of Tare & Wet Sample (g):	414.26	450.06	452.42	434.07	460.07
Weight of Tare & Dry Sample (g):	389.68	415.05	413.56	388.67	404.04
Weight of Tare (g):	110.22	82.98	110.24	84.26	83.22
Weight of Water (g):	24.58	35.01	38.86	45.40	56.03
Weight of Dry Sample (g):	279.46	332.07	303.32	304.41	320.82

Wet Density (g/cm^3):	2.00	2.09	2.14	2.13	2.07
Wet Density (pcf):	124.9	130.5	133.3	132.9	129.1
Moisture Content (%):	**8.8**	**10.5**	**12.8**	**14.9**	**17.5**
Dry Density (pcf):	**114.8**	**118.1**	**118.2**	**115.6**	**109.9**

Zero Air Voids

Moisture Content (%):	11.0	15.3	19.5
Dry Unit Weight (pcf):	128.4	118.1	109.3

Tested By MF *Date* 9/17/18 *Checked By* TMP *Date* 9/18/18

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APPENDIX D-II
Compaction Test Results

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transforming ideas into reality.

FIELD DENSITY TESTING RECORD (NUCLEAR METHOD)

PROJECT:	Amos Landfill - Sequence 4	PROJECT NO.:	C130109.10	TECHNICIAN:	Terry Queen

DATE	TEST NO.	LIFT / ELEV.	LOCATION	SOIL DESCRIPTION (COLOR & TYPE, LIFT THICKNESS, ETC)	FIELD DENSITY g_{wet} (pcf)	w (%)	g_{dry} (pcf)	PROCTOR DENSITY Proctor Name	MAX. g_{dry} (pcf)	OPT. w (%)	OPT. w, + (%)	OPT. w, - (%)	COMPACTION FIELD (%)	REQ. (%)	P / F	COMMENTS
5/21/2018	1	1st	Structural Fill	Brown Silty Clay	140.8	13.9	123.6	18- Samp	120.0	12.9	3.0	3.0	103.0	95.0	PASS	
5/21/2018	2	1st	Structural Fill	Red Clay Rock	139.9	8.8	128.6	18- Samp	126.5	10.1	3.0	3.0	101.6	95.0	PASS	
5/22/2018	3	2nd	Structural Fill	Red Clay Rock	137.9	8.8	126.7	18- Samp	126.5	10.1	3.0	3.0	100.2	95.0	PASS	
5/23/2018	4	3rd	Structural Fill	Brown Silty Clay	138.4	12.3	123.2	18- Samp	120.0	12.9	3.0	3.0	102.7	95.0	PASS	
5/23/2018	5	4th	Structural Fill	Red & Gray Rock	141.1	8.8	129.7	18- Samp	126.5	10.1	3.0	3.0	102.5	95.0	PASS	
2/24/2018	6	5th	Structural Fill	Red & Gray Rock	144.4	8.9	132.6	18- Samp	126.5	10.1	3.0	3.0	104.8	95.0	PASS	
5/29/2018	7	6th	Structural Fill	Red Clay Rock	141.7	10.7	128.0	18- Samp	126.5	10.1	3.0	3.0	101.2	95.0	PASS	
5/30/2018	8	7th	Structural Fill	Gray & Lt. Brown Shale	140.2	9.3	128.3	18- Samp	125.7	10.0	3.0	3.0	102.0	95.0	PASS	
5/31/2018	9	8th	Structural Fill	Lt Brown Clay	139.7	12.9	123.7	18- Samp	120.0	12.9	3.0	3.0	103.1	95.0	PASS	
5/31/2018	10	8th	Structural Fill	Lt Brown Shale	138.3	10.0	125.7	18- Samp	125.7	10.0	3.0	3.0	100.0	95.0	PASS	
6/4/2018	11	9th	Structural Fill	Lt Brown Clay	139.5	11.5	125.1	18- Samp	120.0	12.9	3.0	3.0	104.3	95.0	PASS	
6/5/2018	12	9th	Structural Fill	Red & Gray Clay Shale	140.6	7.8	130.4	18- Samp	125.7	10.0	3.0	3.0	103.8	95.0	PASS	
6/5/2018	13	10th	Structural Fill	Lt Brown Clay	137.8	13.3	121.6	18- Samp	120.0	12.9	3.0	3.0	101.4	95.0	PASS	
6/5/2018	14	10th	Structural Fill	Lt Brown Clay	138.5	10.4	125.5	18- Samp	120.0	12.9	3.0	3.0	104.5	95.0	PASS	
6/6/2018	15	10th	Structural Fill	Lt Brown Shale	137.8	8.0	127.6	18- Samp	125.7	10.0	3.0	3.0	101.5	95.0	PASS	
6/6/2018	16	10th	Structural Fill	Lt Brown Shale	144.7	12.3	128.9	18- Samp	125.7	10.0	3.0	3.0	102.5	95.0	PASS	
6/7/2018	17	10th	Structural Fill	Lt Brown Shale	141.9	9.9	129.1	18- Samp	125.7	10.0	3.0	3.0	102.7	95.0	PASS	
6/8/2018	18	11th	Structural Fill	Lt Brown Shale	143.8	10.7	129.9	18- Samp	125.7	10.0	3.0	3.0	103.3	95.0	PASS	
6/8/2018	19	11th	Structural Fill	Lt Brown Shale	136.2	8.1	126.0	18- Samp	125.7	10.0	3.0	3.0	100.2	95.0	PASS	
6/8/2018	20	11th	Structural Fill	Lt Brown Clay	139.0	12.4	123.7	18- Samp	120.0	12.9	3.0	3.0	103.1	95.0	PASS	
6/11/2018	21	11th	Structural Fill	Lt Brown Shale	136.4	8.1	126.2	18- Samp	125.7	10.0	3.0	3.0	100.4	95.0	PASS	
6/11/2018	22	12th	Structural Fill	Lt Brown Shale	138.5	9.4	126.6	18- Samp	125.7	10.0	3.0	3.0	100.7	95.0	PASS	
6/12/2018	23	12th	Structural Fill	Lt Brown Clay	139.3	11.3	125.2	18- Samp	120.0	12.9	3.0	3.0	104.3	95.0	PASS	
6/12/2018	24	12th	Structural Fill	Lt Brown Shale	138.5	9.9	126.0	18- Samp	125.7	10.0	3.0	3.0	100.3	95.0	PASS	
6/12/2018	25	12th	Structural Fill	Lt Brown Clay	133.7	11.0	120.5	18- Samp	120.0	12.9	3.0	3.0	100.4	95.0	PASS	
6/13/2018	26	12th	Structural Fill	Lt Brown Clay	136.2	13.6	119.9	18- Samp	120.0	12.9	3.0	3.0	99.9	95.0	PASS	
6/13/2018	27	12th	Structural Fill	Lt Brown Clay	140.7	11.9	125.7	18- Samp	120.0	12.9	3.0	3.0	104.8	95.0	PASS	
6/13/2018	28	13th	Structural Fill	Lt Brown Shale	141.3	9.0	129.6	18- Samp	125.7	10.0	3.0	3.0	103.1	95.0	PASS	
6/13/2018	29	13th	Structural Fill	Lt Brown Shale	140.5	9.4	128.4	18- Samp	125.7	10.0	3.0	3.0	102.2	95.0	PASS	
6/14/2018	30	13th	Structural Fill	Lt Brown Shale	139.3	10.3	126.3	18- Samp	125.7	10.0	3.0	3.0	100.5	95.0	PASS	
6/14/2018	31	13th	Structural Fill	Lt Brown Shale	137.9	8.3	127.3	18- Samp	125.7	10.0	3.0	3.0	101.3	95.0	PASS	
6/14/2018	32	13th	Structural Fill	Lt Brown Shale	139.3	10.6	125.9	18- Samp	125.7	10.0	3.0	3.0	100.2	95.0	PASS	
6/15/2018	33	14th	Structural Fill	Lt Brown Clay	139.6	11.6	125.1	18- Samp	120.0	12.9	3.0	3.0	104.2	95.0	PASS	
6/15/2018	34	14th	Structural Fill	Lt Brown Clay	135.0	11.0	121.6	18- Samp	120.0	12.9	3.0	3.0	101.4	95.0	PASS	
6/18/2018	35	14th	Structural Fill	Lt Brown Shale	138.5	8.1	128.1	18- Samp	125.7	10.0	3.0	3.0	101.9	95.0	PASS	
6/18/2018	36	14th	Structural Fill	Lt Brown Shale	137.7	8.4	127.0	18- Samp	125.7	10.0	3.0	3.0	101.1	95.0	PASS	
6/18/2018	37	14th	Structural Fill	Lt Brown Shale	138.8	9.9	126.3	18- Samp	125.7	10.0	3.0	3.0	100.5	95.0	PASS	
6/19/2018	38	15th	Structural Fill	Gray & Lt Brown Shale	139.6	8.8	128.3	18- Samp	125.7	10.0	3.0	3.0	102.1	95.0	PASS	
6/19/2018	39	15th	Structural Fill	Gray & Lt Brown Shale	141.6	12.6	125.8	18- Samp	125.7	10.0	3.0	3.0	100.0	95.0	PASS	
6/19/2018	40	15th	Structural Fill	Lt Brown Shale	142.0	11.3	127.6	18- Samp	125.7	10.0	3.0	3.0	101.5	95.0	PASS	
6/19/2018	41	15th	Structural Fill	Lt Brown Clay	138.1	12.2	123.1	18- Samp	120.0	12.9	3.0	3.0	102.6	95.0	PASS	
6/20/2018	42	16th	Structural Fill	Lt Brown Clay	140.7	15.1	122.2	18- Samp	120.0	12.9	3.0	3.0	101.9	95.0	PASS	
6/20/2018	43	16th	Structural Fill	Lt Brown Clay	139.9	10.5	126.6	18- Samp	120.0	12.9	3.0	3.0	105.5	95.0	PASS	
6/20/2018	44	16th	Structural Fill	Lt Brown Shale	141.6	10.3	128.4	18- Samp	125.7	10.0	3.0	3.0	102.1	95.0	PASS	
6/20/2018	45	16th	Structural Fill	Lt Brown Clay	141.3	12.7	125.4	18- Samp	120.0	12.9	3.0	3.0	104.5	95.0	PASS	
6/26/2018	46	17th	Structural Fill	Lt Brown Shale	142.3	10.1	129.2	18- Samp	125.7	10.0	3.0	3.0	102.8	95.0	PASS	
6/26/2018	47	17th	Structural Fill	Lt Brown Shale	145.8	11.2	131.1	18- Samp	125.7	10.0	3.0	3.0	104.3	95.0	PASS	
6/26/2018	48	17th	Structural Fill	Lt Brown Shale	137.2	8.6	126.3	18- Samp	125.7	10.0	3.0	3.0	100.5	95.0	PASS	

FIELD DENSITY TESTING RECORD (NUCLEAR METHOD)

PROJECT:	Amos Landfill - Sequence 4	PROJECT NO.:	C130109.10	TECHNICIAN:	Terry Queen

DATE	TEST NO.	LIFT / ELEV.	LOCATION	SOIL DESCRIPTION (COLOR & TYPE, LIFT THICKNESS, ETC)	FIELD DENSITY g_{wet} (pcf)	w (%)	g_{dry} (pcf)	PROCTOR DENSITY Proctor Name	MAX. g_{dry} (pcf)	OPT. w (%)	OPT. w, + (%)	OPT. w, - (%)	COMPACTION FIELD (%)	REQ. (%)	P / F	COMMENTS
6/27/2018	49	17th	Structural Fill	Lt Brown Clay	139.8	13.7	123.0	/ 18- Samp	120.0	12.9	3.0	3.0	102.5	95.0	PASS	
6/28/2018	50	17th	Structural Fill	Reddish Brown Shale	144.1	9.2	132.0	/ 18- Samp	131.6	10.5	3.0	3.0	100.3	95.0	PASS	
6/29/2018	51	18th	Structural Fill	Gray & Lt Brown Shale	137.6	8.0	127.4	/ 18- Samp	125.7	10.0	3.0	3.0	101.4	95.0	PASS	
6/29/2018	52	18th	Structural Fill	Red Clay Rock	142.1	9.9	129.3	/ 18- Samp	126.5	10.1	3.0	3.0	102.2	95.0	PASS	
7/2/2018	53	18th	Structural Fill	Gray & Lt Brown Shale	137.5	8.4	126.8	/ 18- Samp	125.7	10.0	3.0	3.0	100.9	95.0	PASS	
7/2/2018	54	18th	Structural Fill	Gray Shale	142.9	7.8	132.6	/ 18- Samp	125.7	10.0	3.0	3.0	105.5	95.0	PASS	
7/3/2018	55	19th	Structural Fill	Gray & Lt Brown Shale	140.8	7.8	130.6	/ 18- Samp	125.7	10.0	3.0	3.0	103.9	95.0	PASS	
7/3/2018	56	19th	Structural Fill	Lt Brown Shale	141.7	7.4	131.9	/ 18- Samp	125.7	10.0	3.0	3.0	105.0	95.0	PASS	
7/10/2018	57	20th	Structural Fill	Lt Brown Shale	145.0	9.0	133.0	/ 18- Samp	125.7	10.0	3.0	3.0	105.8	95.0	PASS	
7/10/2018	58	20th	Structural Fill	Lt Brown Clay	137.5	13.7	120.9	/ 18- Samp	120.0	12.9	3.0	3.0	100.8	95.0	PASS	
7/10/2018	59	21st	Structural Fill	Gray Shale	141.2	7.3	131.6	/ 18- Samp	129.2	10.2	3.0	3.0	101.9	95.0	PASS	
7/10/2018	60	21st	Structural Fill	Gray Shale	142.1	9.0	130.4	/ 18- Samp	129.2	10.2	3.0	3.0	100.9	95.0	PASS	
7/11/2018	61	20th	Structural Fill	Lt Brown Clay	139.4	13.1	123.3	/ 18- Samp	120.0	12.9	3.0	3.0	102.7	95.0	PASS	
7/11/2018	62	20th	Structural Fill	Gray Shale	139.9	7.5	130.1	/ 18- Samp	129.2	10.2	3.0	3.0	100.7	95.0	PASS	
7/11/2018	63	Stream	Structural Fill	Gray Shale	143.1	9.3	130.9	/ 18- Samp	129.2	10.2	3.0	3.0	101.3	95.0	PASS	
7/12/2018	64	22nd	Structural Fill	Gray Shale	146.7	12.2	130.7	/ 18- Samp	129.2	10.2	3.0	3.0	101.2	95.0	PASS	
7/13/2018	65	Stream	Structural Fill	Red Brown Shale	142.4	7.7	132.2	/ 18- Samp	131.6	10.5	3.0	3.0	100.5	95.0	PASS	
7/13/2018	66	Stream	Structural Fill	Gray & Lt Brown Shale	142.0	7.3	132.3	/ 18- Samp	125.7	10.0	3.0	3.0	105.3	95.0	PASS	
7/13/2018	67	Stream	Structural Fill	Gray & Lt Brown Shale	139.1	9.7	126.8	/ 18- Samp	125.7	10.0	3.0	3.0	100.9	95.0	PASS	
7/13/2018	68	Stream	Structural Fill	Gray & Lt Brown Shale	138.6	8.5	127.7	/ 18- Samp	125.7	10.0	3.0	3.0	101.6	95.0	PASS	
7/16/2018	69	Stream	Structural Fill	Lt Brown Clay	137.8	13.2	121.7	/ 18- Samp	120.0	12.9	3.0	3.0	101.4	95.0	PASS	
7/18/2018	70	Stream	Structural Fill	Lt Brown Clay	134.7	11.3	121.0	/ 18- Samp	120.0	12.9	3.0	3.0	100.9	95.0	PASS	
7/18/2018	71	Stream	Structural Fill	Lt Brown Clay	137.5	10.4	124.5	/ 18- Samp	120.0	12.9	3.0	3.0	103.8	95.0	PASS	
7/18/2018	72	West Toe	Structural Fill	Gray & Lt Brown Shale	142.1	10.4	128.7	/ 18- Samp	125.7	10.0	3.0	3.0	102.4	95.0	PASS	
7/26/2018	73	East Toe	Structural Fill	Lt Brown Clay	138.9	12.1	123.9	/ 18- Samp	120.0	12.9	3.0	3.0	103.3	95.0	PASS	
7/26/2018	74	East Toe	Structural Fill	Lt Brown Clay	135.3	11.3	121.6	/ 18- Samp	120.0	12.9	3.0	3.0	101.3	95.0	PASS	
7/26/2018	75	East Toe	Structural Fill	Red Clay Rock	129.9	12.5	115.5	/ 18- Samp	115.4	14.1	3.0	3.0	100.1	95.0	PASS	
7/30/2018	76	East Toe	Structural Fill	Lt Brown Clay	136.4	12.9	120.8	/ 18- Samp	120.0	12.9	3.0	3.0	100.7	95.0	PASS	
7/30/2018	77	East Toe	Structural Fill	Lt Brown Clay	136.3	12.1	121.6	/ 18- Samp	120.0	12.9	3.0	3.0	101.3	95.0	PASS	
7/30/2018	78	East Toe	Structural Fill	Lt Brown Clay	140.7	11.8	125.8	/ 18- Samp	120.0	12.9	3.0	3.0	104.9	95.0	PASS	
7/31/2018	79	East Toe	Structural Fill	Lt Brown Clay	138.7	11.4	124.5	/ 18- Samp	120.0	12.9	3.0	3.0	103.8	95.0	PASS	
7/31/2018	80	West Toe	Structural Fill	Red Clay	132.8	14.1	116.4	/ 18- Samp	115.4	14.1	3.0	3.0	100.9	95.0	PASS	
7/31/2018	81	West Toe	Structural Fill	Red Clay	137.0	13.6	120.6	/ 18- Samp	115.4	14.1	3.0	3.0	104.5	95.0	PASS	
7/31/2018	82	West Toe	Structural Fill	Red Clay	133.7	13.5	117.8	/ 18- Samp	115.4	14.1	3.0	3.0	102.1	95.0	PASS	
7/31/2018	83	East Toe	Structural Fill	Lt Brown Shale	140.9	11.7	126.1	/ 18- Samp	125.7	10.0	3.0	3.0	100.4	95.0	PASS	
7/31/2018	84	East Toe	Structural Fill	Lt Brown Clay	135.3	12.8	119.9	/ 18- Samp	120.0	12.9	3.0	3.0	100.0	95.0	PASS	
7/31/2018	85	East Toe	Structural Fill	Red Clay	130.5	12.4	116.1	/ 18- Samp	115.4	14.1	3.0	3.0	100.6	95.0	PASS	
7/31/2018	86	East Toe	Structural Fill	Lt Brown Clay	138.5	12.3	123.3	/ 18- Samp	120.0	12.9	3.0	3.0	102.8	95.0	PASS	
7/31/2018	87	West Toe	Structural Fill	Red Clay	132.4	12.8	117.4	/ 18- Samp	115.4	14.1	3.0	3.0	101.7	95.0	PASS	
7/31/2018	88	Pipe Barrell	Structural Fill	Lt Brown Clay	135.5	11.1	122.0	/ 18- Samp	120.0	12.9	3.0	3.0	101.6	95.0	PASS	
8/6/2018	89	Pipe Barrell	Structural Fill	Lt Brown Clay	137.4	10.6	124.2	/ 18- Samp	120.0	12.9	3.0	3.0	103.5	95.0	PASS	
8/6/2018	90	Pipe Barrell	Structural Fill	Gray & Lt Brown Shale	136.5	8.3	126.0	/ 18- Samp	125.7	10.0	3.0	3.0	100.3	95.0	PASS	
8/6/2018	91	Pipe Barrell	Structural Fill	Gray & Lt Brown Shale	143.5	10.9	129.4	/ 18- Samp	125.7	10.0	3.0	3.0	102.9	95.0	PASS	
8/6/2018	92	Pipe Barrell	Structural Fill	Gray & Lt Brown Shale	138.8	10.1	126.1	/ 18- Samp	125.7	10.0	3.0	3.0	100.3	95.0	PASS	
8/7/2018	93	Pipe Barrell	Structural Fill	Red Clay	132.6	13.5	116.8	/ 18- Samp	115.4	14.1	3.0	3.0	101.2	95.0	PASS	
8/7/2018	94	Pipe Barrell	Structural Fill	Red Clay	136.8	11.9	122.3	/ 18- Samp	115.4	14.1	3.0	3.0	105.9	95.0	PASS	
8/7/2018	95	Pipe Barrell	Structural Fill	Red Clay	132.1	14.5	115.4	/ 18- Samp	115.4	14.1	3.0	3.0	100.0	95.0	PASS	
8/7/2018	96	Pipe Barrell	Structural Fill	Gray & Lt Brown Shale	139.1	8.2	128.6	/ 18- Samp	125.7	10.0	3.0	3.0	102.3	95.0	PASS	

FIELD DENSITY TESTING RECORD (NUCLEAR METHOD)

PROJECT:	Amos Landfill - Sequence 4	PROJECT NO.:	C130109.10	TECHNICIAN:	Terry Queen

DATE	TEST NO.	LIFT / ELEV.	LOCATION	SOIL DESCRIPTION (COLOR & TYPE, LIFT THICKNESS, ETC)	FIELD DENSITY			PROCTOR DENSITY					COMPACTION			COMMENTS
					g_{wet} (pcf)	w (%)	g_{dry} (pcf)	Proctor Name	MAX. g_{dry} (pcf)	OPT. w (%)	OPT. w, + (%)	OPT. w, - (%)	FIELD (%)	REQ. (%)	P / F	
8/8/2018	97	Pipe Barrell	Structural Fill	Red & Gray Clay Rock	136.9	7.6	127.2	18- Samp	126.5	10.1	3.0	3.0	100.6	95.0	PASS	
8/8/2018	98	Pipe Barrell	Structural Fill	Red & Gray Clay Rock	136.7	7.8	126.8	18- Samp	126.5	10.1	3.0	3.0	100.2	95.0	PASS	
8/18/2018	99	Pipe Barrell	Structural Fill	Red & Gray Clay Rock	141.2	11.6	126.5	18- Samp	126.5	10.1	3.0	3.0	100.0	95.0	PASS	
8/9/2018	100	Pipe Barrell	Structural Fill	Red & Gray Clay Rock	141.8	8.1	131.2	18- Samp	126.5	10.1	3.0	3.0	103.7	95.0	PASS	
8/9/2018	101	Pipe Barrell	Structural Fill	Lt Brown Clay	139.8	13.7	123.0	18- Samp	120.0	12.9	3.0	3.0	102.5	95.0	PASS	
8/9/2018	102	Pipe Barrell	Structural Fill	Red & Gray Clay Rock	139.2	10.0	126.5	18- Samp	126.5	10.1	3.0	3.0	100.0	95.0	PASS	
8/9/2018	103	Stream	Structural Fill	Red & Gray Clay Rock	141.6	11.7	126.8	18- Samp	126.5	10.1	3.0	3.0	100.2	95.0	PASS	
8/13/2018	104	Stream	Structural Fill	Red Clay	133.5	13.9	117.2	18- Samp	115.4	14.1	3.0	3.0	101.6	95.0	PASS	
8/13/2018	105	Stream	Structural Fill	Red Clay	133.5	12.8	118.4	18- Samp	115.4	14.1	3.0	3.0	102.6	95.0	PASS	
8/13/2018	106	Stream	Structural Fill	Red Clay	130.8	11.1	117.7	18- Samp	115.4	14.1	3.0	3.0	102.0	95.0	PASS	
8/13/2018	107	West Slope Toe	Structural Fill	Red & Gray Clay Rock	138.6	8.3	128.0	18- Samp	126.5	10.1	3.0	3.0	101.2	95.0	PASS	
8/14/2018	108	Stream	Structural Fill	Red Clay	134.6	12.2	120.0	18- Samp	115.4	14.1	3.0	3.0	104.0	95.0	PASS	
8/14/2018	109	Stream	Structural Fill	Red Clay	132.5	13.4	116.8	18- Samp	115.4	14.1	3.0	3.0	101.3	95.0	PASS	
8/14/2018	110	Stream	Structural Fill	Red Clay	135.5	14.8	118.0	18- Samp	115.4	14.1	3.0	3.0	102.3	95.0	PASS	
8/15/2018	111	Stream	Structural Fill	Red Clay	135.2	11.9	120.8	18- Samp	115.4	14.1	3.0	3.0	104.7	95.0	PASS	
8/20/2018	112	East Slope Toe	Structural Fill	Red Clay	139.1	15.1	120.9	18- Samp	115.4	14.1	3.0	3.0	104.7	95.0	PASS	
8/20/2018	113	Stream	Structural Fill	Red Clay	135.2	15.7	116.9	18- Samp	115.4	14.1	3.0	3.0	101.3	95.0	PASS	
8/21/2018	114	East Slope Toe	Structural Fill	Lt Brown Clay	134.5	11.8	120.3	18- Samp	120.0	12.9	3.0	3.0	100.3	95.0	PASS	
8/23/2018	115	Stream	Structural Fill	Lt Brown Shale	141.5	10.3	128.3	18- Samp	125.7	10.0	3.0	3.0	102.1	95.0	PASS	
9/5/2018	116	Stream	Structural Fill	Red Clay	130.8	15.4	113.3	18- Samp	115.4	14.1	3.0	3.0	98.2	95.0	PASS	
9/5/2018	117	Stream	Structural Fill	Yellowish Brown Claystone	139.9	13.8	122.9	18- Samp	120.0	12.9	3.0	3.0	102.4	95.0	PASS	
9/5/2018	118	Stream	Structural Fill	Yellowish Brown Claystone	137.7	13.6	121.2	18- Samp	120.0	12.9	3.0	3.0	101.0	95.0	PASS	
9/5/2018	119	Stream	Structural Fill	Yellowish Brown Claystone	139.1	12.8	123.3	18- Samp	125.7	10.0	3.0	3.0	98.1	95.0	PASS	
9/5/2018	120	Stream	Structural Fill	Yellowish Brown Claystone	138.2	11.4	124.1	18- Samp	125.7	10.0	3.0	3.0	98.7	95.0	PASS	
9/6/2018	121	Stream	Structural Fill	Light Brown Clay	134.5	11.8	120.3	18- Samp	120.0	12.9	3.0	3.0	100.3	95.0	PASS	
9/6/2018	122	Stream	Structural Fill	Light Brown Clay	134.4	12.4	119.6	18- Samp	120.0	12.9	3.0	3.0	99.6	95.0	PASS	
9/6/2018	123	Stream	Structural Fill	Light Brown Clay	134.7	14.0	118.2	18- Samp	120.0	12.9	3.0	3.0	98.5	95.0	PASS	
9/6/2018	124	Stream	Structural Fill	Light Brown Clay	134.0	13.6	118.0	18- Samp	120.0	12.9	3.0	3.0	98.3	95.0	PASS	
9/6/2018	125	Stream	Structural Fill	Light Brown Clay	133.6	14.1	117.1	18- Samp	120.0	12.9	3.0	3.0	97.6	95.0	PASS	
9/13/2018	126	West Slope Toe	Structural Fill	Light Brown Clay	132.2	14.3	115.7	18- Samp	120.0	12.9	3.0	3.0	96.4	95.0	PASS	
9/19/2018	127	East Slope Toe	Structural Fill	Brown Clay with Dry Shale	130.1	14.4	113.7	13 - Samp	118.5	11.8	3.0	3.0	96.0	95.0	PASS	
9/21/2018	128	East Slope Toe	Structural Fill	Brown Sandy Clay	134.2	14.4	117.3	13 - Samp	118.5	11.8	3.0	3.0	99.0	95.0	PASS	
9/21/2018	129	East Slope Toe	Structural Fill	Brown Sandy Clay	136.5	12.5	121.3	13 - Samp	118.5	11.8	3.0	3.0	102.4	95.0	PASS	
9/21/2018	130	East Slope Toe	Structural Fill	Brown Sandy Clay	129.6	12.0	115.7	13 - Samp	118.5	11.8	3.0	3.0	97.6	95.0	PASS	
9/21/2018	131	East Slope Toe	Structural Fill	Brown Sandy Clay	136.0	11.1	122.4	13 - Samp	118.5	11.8	3.0	3.0	103.3	95.0	PASS	
9/21/2018	132	East Slope Toe	Structural Fill	Brown Sandy Clay	131.7	13.2	116.3	13 - Samp	118.5	11.8	3.0	3.0	98.2	95.0	PASS	
10/3/2018	133	NV Underdrain	Structural Fill	Red Clay	125.1	13.7	110.0	18- Samp	115.4	14.1	3.0	3.0	95.3	95.0	PASS	

FIELD DENSITY TESTING RECORD (NUCLEAR METHOD)

PROJECT:	Amos Landfill - Sequence 4	PROJECT NO.:	C130109.10	TECHNICIAN:	Terry Queen

DATE	TEST NO.	LIFT / ELEV.	LOCATION	SOIL DESCRIPTION (COLOR & TYPE, LIFT THICKNESS, ETC)	FIELD DENSITY			PROCTOR DENSITY					COMPACTION			COMMENTS
					g_{wet} (pcf)	w (%)	g_{dry} (pcf)	Proctor Name	MAX. g_{dry} (pcf)	OPT. w (%)	OPT. w, + (%)	OPT. w, - (%)	FIELD (%)	REQ. (%)	P / F	
10/3/2018	134	NV Underdrain	Structural Fill	Red Clay	126.9	13.5	111.8	y 18- Samp	115.4	14.1	3.0	3.0	96.9	95.0	PASS	
10/3/2018	135	NV Underdrain	Structural Fill	Red Clay	128.8	13.5	113.5	y 18- Samp	115.4	14.1	3.0	3.0	98.3	95.0	PASS	
10/4/2018	136	NV Underdrain	Structural Fill	Red Clay	127.3	14.2	111.5	y 18- Samp	115.4	14.1	3.0	3.0	96.6	95.0	PASS	
10/4/2018	137	NV Underdrain	Structural Fill	Red Clay	124.9	13.3	110.2	y 18- Samp	115.4	14.1	3.0	3.0	95.5	95.0	PASS	
11/19/2018	138	NE Toe	Structural Fill	Brown Sandy Clay w/ Sanstone Frags	139.7	10.5	126.4	t 13 - Samp	118.5	11.8	3.0	3.0	106.7	95.0	PASS	
11/19/2018	139	NE Toe	Structural Fill	Brown Sandy Clay w/ Sanstone Frags	138.4	10.9	124.8	t 13 - Samp	118.5	11.8	3.0	3.0	105.3	95.0	PASS	
12/3/2018	140	NE Toe	Structural Fill	Brown Sandy Clay w/ Sanstone Frags	136.6	12.3	121.6	t 13 - Samp	118.5	11.8	3.0	3.0	102.6	95.0	PASS	
12/4/2018	141A	NE Toe	Structural Fill	Brown Sandy Clay w/ Sanstone Frags	137.4	8.5	126.6	t 13 - Samp	118.5	11.8	3.0	3.0	106.9	95.0	FAIL	
12/4/2018	141B	NE Toe	Structural Fill	Brown Sandy Clay w/ Sanstone Frags	137.4	8.9	126.2	t 13 - Samp	118.5	11.8	3.0	3.0	106.5	95.0	PASS	
1/8/2019	142	East Area	Structural Fill	Brown Sandy Clay w/ Sanstone Frags	128.0	12.8	113.5	t 13 - Samp	118.5	11.8	3.0	3.0	95.8	95.0	PASS	
1/9/2019	143	East Area	Structural Fill	Gray Sandy Shale	140.0	8.0	129.6	y 18- Samp	134.5	8.3	3.0	3.0	96.4	95.0	PASS	
1/11/2019	144	East Area	Structural Fill	Brown Sandy Clay w/ Sanstone Frags	130.9	12.8	116.0	t 13 - Samp	118.5	11.8	3.0	3.0	97.9	95.0	PASS	

ATTACHMENT 2

COMPACTED CLAY LINER CERTIFICATION

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Sequence 4
Compacted Clay Liner Certification

American Electric Power
John E. Amos Landfill
John E. Amos Power Plant
Winfield, West Virginia

GAI Project Number: C130109.10, Task 003

September 2019

Prepared by: GAI Consultants, Inc.
Charleston Office
300 Summers Street, Suite 1100
Charleston, West Virginia 25301-1631

Prepared for: American Electric Power
One Riverside Plaza
Columbus, Ohio 43215

Sequence 4
Compacted Clay Liner Certification

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Table of Contents

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GAI Consultants, Inc. Certification

Based on the construction testing and observations performed by American Electric Power (AEP) and GAI Consultants, Inc. (GAI) personnel, I hereby certify that the compacted clay liner construction within Sequence 4 at the Appalachian Power Company's John E. Amos Flue Gas Desulfurization (FGD) Landfill near Winfield, West Virginia (WV), as shown on Drawing C130109-10-003-00-B2-001, has been installed in substantial compliance with the material specifications and construction requirements listed in the WV National Pollutant Discharge Elimination System/Solid Waste Permit WV0116254) documents; the "2018-2020 Site Work Construction, Sequence 4" construction documents; and the Federal Coal Combustion Residuals (CCR) Rule. AEP survey personnel provided survey data used to develop the Record Drawings and verify that the compacted clay liner met the permit requirements.

This document clarifies "certification" for the compacted clay liner construction within Sequence 4 at the Amos FGD Landfill.

The definition of certify as used herein is: Certify means to state or declare a professional opinion of conditions whose true properties cannot be known at the time such certification was made, despite appropriate professional evaluation. A design professional's certification in no way relieves any other party from meeting requirements imposed by contract or other means, including commonly-accepted industry practices.

Bearing the above in mind and based on the results of: (1) Certification from the material manufacturers and installation meeting the requirements of the Specifications, the CCR Rule, and the WV Department of Environmental Protection permit; (2) results of field and laboratory testing; and (3) monitoring of construction efforts during the project; GAI's professional opinion is that the compacted clay liner construction within Sequence 4 of the Amos FGD Landfill meets the requirements as set forth by the permit documents and the CCR Rule.

Charles Straley

Charles F. Straley, PE, PLS
Certifying Engineer and Quality Assurance Officer
PE #11842
PLS #1888

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PROFESSIONAL SURVEYOR
9-30-19

1.0 Introduction

1.1 Project Description

This Compacted Clay Liner Certification Report documents the testing and observations performed during the compacted clay liner installation in Sequence 4 at American Electric Power's (AEP's) John E. Amos FGD Landfill (Landfill) in Winfield, West Virginia (WV). The location of Sequence 4 at the Amos Landfill is shown on Figure 1. Appendix A contains the Record Drawings for the compacted clay liner construction. Appendix B contains typical construction photographs included in the daily reports. Construction of the Sequence 4 site described in this certification report consists of the following:

- Construction activities associated with the placement and compaction of the two-foot thick compacted clay liner

Construction of the groundwater control and subgrade preparation, including placement of structural fill to meet the compacted clay liner subgrade elevations, begin in April 2018 and was documented in the Sequence 4 Groundwater Control and Subgrade Certification Report (September 2019).

Construction of the compacted clay liner in Sequence 4 began in April 2019 and was completed in August 2019. The area was constructed in accordance with the approved Quality Assurance/Quality Control (QA/QC) Plan; the Landfill's Solid Waste/National Pollutant Discharge Elimination System (NPDES) permit (Permit No. WV0116254); WV Department of Environmental Protection (WVDEP) Title 33, Series 1, Solid Waste Management Rule; the Coal Combustion Residuals (CCR) Rule; and AEP's Civil Engineering Division Technical Specifications for Material Construction and associated Project Addenda to the Specifications. Included in this report are the field information and the applicable Record Drawings in accordance with the WVDEP requirements. The construction QA (CQA) services performed by GAI are discussed in the following sections.

1.2 Companies and Personnel

The key companies and personnel involved with the compacted clay liner construction of Sequence 4 are listed below.

AEP - Owner
Appalachian Power Company - Operator
Keith Burger, Project Manager
John Massey-Norton, Senior Geologist
Brian Palmer, Principal Civil Engineer
Carl Skidmore, Regional Construction Manager
Brandon Schmader, Lead Construction Coordinator
T. Coty Sheppard, Survey Coordinator

GAI Consultants Inc. (GAI) – CQA/Soil Testing
Charles Straley, P.E., P.S., Certifying Engineer, QA Officer and Senior Engineering Manager
Mark Lehner, P.E., Project Manager
Terry Queen, Lead QC Inspector

R.B. Jergens, Inc. (RBJ) - Earthwork Contractor
Jake Warner, Project Manager
Mike Davis, Superintendent

1.3 Scope of Services

1.3.1 Preconstruction Activities

Preconstruction activities conducted by GAI personnel consisted of the following:

1. Review of information for the soils that were used during Sequence 4 compacted clay liner construction; and
2. Collecting additional soil samples and conducting laboratory testing to characterize soils to be used during construction.

1.3.2 Construction Documentation Activities

Construction documentation activities performed by GAI personnel included the following:

1. Observed, documented and tested the placement and compaction of the two-foot thick compacted clay liner;
2. Prepared daily field reports and documented construction activities. GAI also attended daily health and safety meetings, weekly project update meetings, and monthly contractor's meetings, as well as other supplemental meetings when needed; and
3. Provided photo documentation throughout the construction showing typical construction procedures (see Appendix B).

1.3.3 Record Drawings and Certification Report

Documentation and certification activities performed by the QA/QC team included the following:

1. AEP provided surveying services for the Record Drawings presented in Appendix A). Record Drawing C130109-10-003-00-B2-001 "Sequence 4 Liner, Compacted Clay Liner Certification Points Plan" depicts the design top surface of the compacted clay liner. Record Drawing C130109-10-003-00-B2-004 "Sequence 4 Liner, Compacted Clay Liner Certification Points Table" presents a tabulation of the as-built subgrade and the design and as-built certification point elevations of the compacted clay liner.
2. GAI personnel performed the construction documentation activities discussed in Sections 1.3.1 and 1.3.2 of this report.
3. Project personnel observed the construction activities and provided the enclosed information documenting that the construction activities were performed consistent with the design and permit requirements.

1.4 Construction Schedule

Site clearing and grubbing, excavation and fill placement for subgrade, and the installation of groundwater controls were performed prior to construction of the compacted clay liner. The compacted clay liner was then constructed upon the finished subgrade. Clay liner construction was completed in August 2019.

1.5 Reference Documents

The plans, specifications, and QA requirements for the construction activities and materials used by GAI personnel for this project are as follows:

1. Solid Waste/NPDES Permit No. WV0116254.
2. AEP Civil Engineering Division, Technical Specifications for Material and Construction (prepared by AEP), and the Addenda to the Technical Specifications (prepared by GAI).

3. "Quality Assurance and Quality Control Plan, John E. Amos Landfill" for the Appalachian Power Company John E. Amos Plant's Amos FGD Landfill (March 2006 and revised October 2017, prepared by GAI).
4. Amos FGD Landfill Sequence 4 Construction Drawings (issued for construction August 2017 and re-issued January 2018, prepared by GAI)

2.0 Soil Prequalification

Soil pre-qualifications for compacted clay liner construction included the historic soils data in the original (2006) permit application, and soils data that was developed for compacted clay liner construction for the previous Sequences 1 through 3 construction at the Landfill. In addition, supplemental preconstruction soil evaluations were performed on soils to be used for the Sequence 4 compacted clay liner construction.

2.1 Soil Prequalification Requirements

The soil prequalification requirement, as outlined in WVDEP 33CSR1-3.8.b, require that a sample be collected and tested at the following minimum frequencies:

1. Four samples for the first 10 or less acres and one additional sample for each additional 10 acres, for water content testing.
2. Four samples for the first 10 or less acres and one additional sample for each additional 10 acres, for Proctor moisture/density relationship testing.
3. 20 percent of the samples used to develop the Proctor curves must be used to evaluate the soil permeability for each prominent soil type.
4. One sample for each predominant soil type for grain-size distribution testing.
5. One sample for each predominant soil type for Atterberg limit testing.

The testing performed for the permit application process and previous landfill development construction exceeded the above minimum frequencies. Supplemental preconstruction evaluations are detailed in Section 2.2.

2.2 2018 and 2019 Sampling

Supplemental sampling of clayey soil materials was conducted in 2018 and 2019 to evaluate potential borrow areas and stockpiles at various locations across the site and to confirm the consistency of the soils to be used in the Sequence 4 liner construction. A total of three additional samples were collected for laboratory analyses. The level of sampling was appropriate to verify the consistency of the borrow area soils. The laboratory testing program focused on the soil's physical characteristics (i.e., grain-size distribution, maximum dry density, and optimum moisture content).

Based on the evaluation of the samples collected, two predominant soil types were encountered: a red lean clay and a brown clay with rock fragments. The samples consist of clayey soil with a Unified Soil Classification System (USCS) classification of CL. The brown clay had varying amounts of shale fragments. The material was wetted down prior to being placed as compacted clay liner. Laboratory results are included in Appendix C.

3.0 Compacted Clay Liner

As installed, the compacted clay liner forms a homogenous barrier of recompacted clayey soils in Sequence 4. The soil was placed and compacted to provide an in-place hydraulic conductivity of $1X10^{-7}$ cm/sec or less. A minimum thickness of two feet of compacted clay liner (measured perpendicular to the subgrade) was placed and compacted, as verified by survey. The material used to construct the liner consisted of predominantly the red lean clay with some minor amounts of the brown clay with rock (shale) fragments, as discussed in Section 2.2.

3.1 USCS Classification and Standard Proctor Analyses

The soils used for the compacted clay liner were pre-characterized for grain-size distribution (ASTM D 422), Atterberg limits (ASTM D 4318) and maximum dry density/optimum moisture content (ASTM D 698). The soil placed had a USCS designation of CL. A total of 50 quality control Standard Proctors and USCS soil classifications for the soils used for the compacted clay liner were completed. 48 of these tests were obtained from soil prequalification from previous landfill development construction and the remaining two tests as part of Sequence 4. The Standard Proctor and USCS classification test results for the Sequence 4 samples are included in Appendix C. The soil samples tested as part of the prequalification are considered representative of the soils used to construct the compacted clay liner in Sequence 4.

3.2 Quality Control/Remolded Permeability Results

The results of the two permeability analyses completed for remolded samples from the pre-qualification of the Sequence 4 materials were reviewed. The testing was performed in accordance with ASTM D 5084. The test results are included in Appendix C.

The results ranged from $5.2X10^{-9}$ to $7.5X10^{-9}$ cm/sec for the samples that were moisture conditioned and compacted in general accordance with the minimum compaction criteria listed in Section 3.3. The test results confirmed that the compaction requirements were appropriate to meet the permeability requirement of $1X10^{-7}$ cm/sec or less.

3.3 Compacted Clay Liner Construction

The clayey soil used for construction of the Sequence 4 compacted clay liner was a lean clay (USCS CL). The clayey soil was generally obtained from Stockpile 2/5.

In general, the clay was removed from the borrow site with excavators, wetted and transported to the work area using articulated trucks. The soil was spread in maximum eight-inch loose lifts with a dozer. Visual observation of lift placement thickness was the primary means of quality assurance. Water was added, if needed, using a water truck. Rocks greater than two inches in size were removed from the soil when encountered. The lift was compacted using a tow behind sheepsfoot roller to meet the minimum specifications of 95 percent of the maximum dry density and within three-percent of the optimum moisture content.

The soil placement operation was reviewed by the GAI Quality Assurance Inspectors and AEP personnel. Unacceptable material was removed prior to compaction. If an area did not meet compaction specifications based on the described data evaluation methods, then the area represented by the test was reworked by making additional passes with the compactor or modifying the moisture of the soil as needed (by watering to add more moisture or scarifying and allowing the soil to dry to reduce moisture), and recompacting until a passing test was achieved. Retests were taken within the area represented by the original test.

3.4 Compacted Clay Liner Compaction Control

Density tests were performed using a nuclear densometer to compare the in-place density with the minimum compaction requirements. The density tests were performed for each lift of the compacted clay liner. A total of 178 passing tests were performed. The results of the density tests are presented in Appendix D.

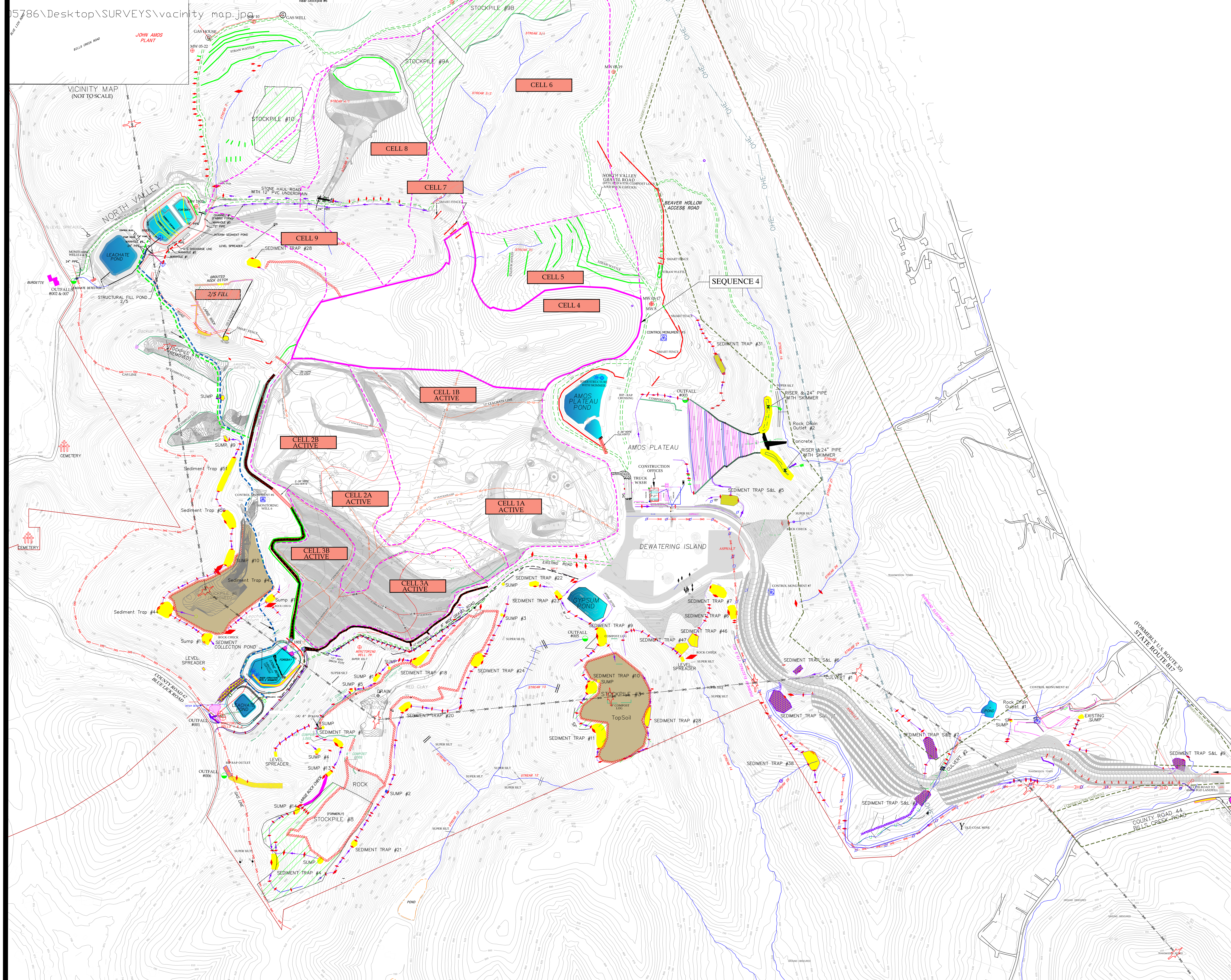
3.5 Grade/Thickness Verification

A grid system was developed to measure the elevation at the top and bottom of the compacted clay liner by survey. These values were utilized to confirm that the thickness of the compacted clay liner was equal to or greater than two feet. The grid system and measured thicknesses are shown on Drawings C130109-10-003-00-B2-001 ("Sequence 4 Liner, Compacted Clay Liner Certification Points Plan") and C130109-10-003-00-B2-004 ("Sequence 4 Liner, Compacted Clay Liner Certification Points Table") in Appendix A. GAI also observed that the general nominal thickness of each lift and number of lifts constructed would provide the required minimum two-foot thick compacted clay liner.

4.0 Summary

The construction work documented in this report was completed in accordance with the design and specifications presented in the applicable WVDEP Solid Waste/NPDES Permit (No. WV0116254), the CCR Rule, and the construction documents listed in this report. The field activities documented in this report represent the CQA services provided for the compacted clay liner for construction of Sequence 4 at the Landfill.

FIGURE



AMOS LANDFILL CONTROL MONUMENTS				
	DATUM: NAD83/88 WV S - GEOID03			
PT.	NORTH	EAST	ELEVATION	
1	539375.6400	1727964.6500	649.2400	MONUMENT
5	541953.8200	1725476.5700	979.7500	MONUMENT
6	540872.8190	1722790.9030	926.9120	MONUMENT
7	540251.9820	1726194.8480	954.4330	MONUMENT
5077	540828.3700	1725266.7600	939.8800	
5104	539495.8700	1728325.1600	618.8800	
15 2012 BASE AT OFFICE	540947.1150	1725381.9170	929.596	Bottom of Antenna Mount
BASE ACROSS HILL	540874.0200	1722784.0800	933.0950	Base 25001 Bottom of Antenna Near Stockpile #6

FIGURE 1
SITE PLAN
SEQUENCE 4 LANDFILL CONSTRUCTION

LEGEND

- EXISTING 4" UNDERDRAIN
- EXISTING 12" UNDERDRAIN
- OVERHEAD ELECTRIC
- SURVEYED PROPERTY LINES
- DIVERSION DITCHES
- EXISTING SEDIMENT TRAPS
- STONE FILTERS
- SILT FENCE
- CELL 3 CAP LIMITS
- EXISTING SEDIMENT TRAPS, DITCHES OR SPILLWAYS WITH STONE BOTTOM
- LIVING WEIRS
- FLOC LOG
- FLOW CHECK
- COMPOST LOG
- straw wattle
- 765kv location
- smart fence

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APPALACHIAN POWER CO.

JOHN E. AMOS PLANT

WINFIELD WEST VIRGINIA

JOHN E. AMOS FGD LANDFILL
EROSION & SEDIMENT CONTROL
DETAILS

NAD 83/NAVD 88 W.V. SOUTH

Drawing Name: Amos Asbuilt

SCALE: 1"=200'

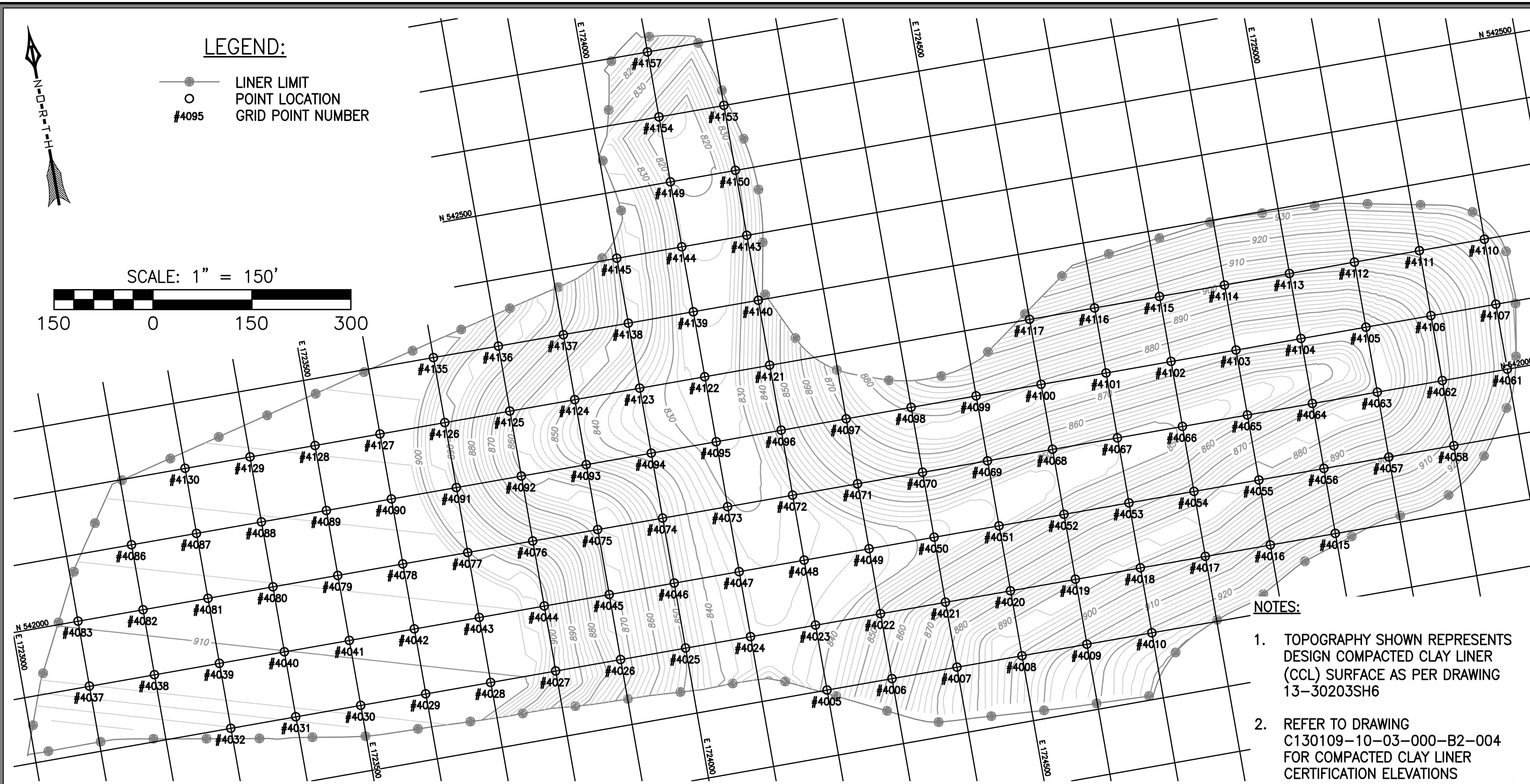
Revision Date: JULY 10, 2019

Surveyed By: C.Sheppard

Drawn By: C.Sheppard

AMERICAN ELECTRIC POWER
1 RIVERSIDE PLAZA
COLUMBUS, OH 43215

APPENDIX A
Record Drawings



NOTES:

1. TOPOGRAPHY SHOWN REPRESENTS DESIGN COMPACTED CLAY LINER (CCL) SURFACE AS PER DRAWING 13-30203SH6
2. REFER TO DRAWING C130109-10-03-000-B2-004 FOR COMPACTED CLAY LINER CERTIFICATION ELEVATIONS

REVISION RECORD

NO.:	DATE:	DWN:	CHK:	APV:	DESCRIPTION:
1	09/05/2019	MAYHOEJ	FRECHKL		AS-BUILT

DRAWING TITLE

PROJECT: JOHN E. AMOS LANDFILL
SEQUENCE 4 LINER
COMPACTED CLAY LINER
CERTIFICATION POINTS PLAN

gai consultants

CLIENT: APPALACHIAN POWER COMPANY
1 RIVERSIDE PLAZA
COLUMBUS, OHIO

DRAWN BY:	CHECKED BY:	APPROVED BY:
SLODOJD	FRECHKL	STRALCF

REVISION: 1

SCALE:	ISSUE DATE:
1" = 150'	06/27/2018

SHEET NO.: 1 OF 1

GAI FILE NUMBER: C130109-10-003-00-B2-001

GAI DRAWING NUMBER:

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PLOTTED ON: 9/16/2019 2:11:55 PM PLOTTED BY: Ed Mayhood PLOT FILE: GAI.stb

Point	Subgrade Elevation (ft) As-Built	Top of Clay (CCL) Elevation (ft) Design	Top of Clay (CCL) Elevation (ft) As-Built	Difference, As-Built - Design (ft) (- = Below Design)	Thickness (ft)
4006	859.74	861.58	861.76	0.18	2.02
4007	881.44	883.31	883.51	0.20	2.08
4008	898.19	900.26	900.38	0.12	2.19
4009	909.53	911.67	911.73	0.06	2.20
4010	919.96	922.00	922.17	0.17	2.21
4015	922.14	924.17	924.18	0.01	2.04
4016	910.33	912.45	912.53	0.08	2.20
4017	896.98	899.16	899.21	0.05	2.23
4018	889.63	891.75	891.80	0.05	2.17
4019	886.23	888.39	888.41	0.02	2.18
4020	875.07	877.11	877.20	0.09	2.13
4021	863.52	865.50	865.55	0.05	2.03
4022	848.28	850.33	850.37	0.04	2.09
4023	834.18	836.23	836.22	-0.01	2.04
4024	833.36	835.41	835.36	-0.05	2.00
4025	846.82	848.98	848.99	0.01	2.17
4026	871.32	873.32	873.49	0.17	2.17
4027	897.25	899.11	899.33	0.22	2.08
4028	907.97	910.17	910.26	0.09	2.29
4029	908.57	910.73	910.78	0.05	2.21
4030	909.14	911.29	911.37	0.08	2.23
4031	911.13	913.24	913.36	0.12	2.23
4032	914.20	916.06	916.50	0.44	2.30
4037	909.83	912.03	912.15	0.12	2.33
4038	908.91	911.05	911.12	0.07	2.21
4039	908.51	910.49	910.65	0.16	2.14
4040	907.85	909.93	910.01	0.08	2.16
4041	907.18	909.37	909.43	0.06	2.25
4042	906.67	908.81	908.84	0.03	2.17
4043	906.30	908.25	908.50	0.25	2.20
4044	899.66	901.76	901.67	-0.09	2.01
4045	867.50	869.67	869.52	-0.15	2.02
4046	846.43	848.63	848.69	0.06	2.26

Point	Subgrade Elevation (ft) As-Built	Top of Clay (CCL) Elevation (ft) Design	Top of Clay (CCL) Elevation (ft) As-Built	Difference, As-Built - Design (ft) (- = Below Design)	Thickness (ft)
4047	832.24	834.38	834.34	-0.04	2.10
4048	831.62	833.63	833.83	0.20	2.21
4049	834.60	836.68	836.68	0.00	2.08
4050	839.24	841.08	841.27	0.19	2.03
4051	843.57	845.70	845.70	0.00	2.13
4052	854.78	856.96	856.85	-0.11	2.07
4053	863.76	865.77	865.91	0.14	2.15
4054	871.47	873.51	873.49	-0.02	2.02
4055	880.29	882.15	882.32	0.17	2.03
4056	890.46	892.45	892.47	0.02	2.01
4057	897.31	899.39	899.32	-0.07	2.01
4058	912.37	914.28	914.39	0.11	2.02
4061	923.92	925.91	925.95	0.04	2.03
4062	895.02	896.93	897.06	0.13	2.04
4063	871.55	873.64	873.72	0.08	2.17
4064	864.95	866.94	867.12	0.18	2.17
4065	854.62	856.62	856.66	0.04	2.04
4066	848.22	850.11	850.28	0.17	2.06
4067	846.32	848.40	848.52	0.12	2.20
4068	849.46	851.36	851.50	0.14	2.04
4069	856.46	858.61	858.63	0.02	2.17
4070	860.19	862.07	862.35	0.28	2.16
4071	849.66	851.76	851.84	0.08	2.18
4072	831.11	833.19	833.22	0.03	2.11
4073	828.83	830.65	830.96	0.31	2.13
4074	845.95	848.11	848.15	0.04	2.20
4075	865.28	867.43	867.46	0.03	2.18
4076	884.35	886.21	886.38	0.17	2.03
4077	898.37	900.34	900.41	0.07	2.04
4078	904.70	906.89	906.93	0.04	2.23
4079	905.27	907.45	907.49	0.04	2.22
4080	905.87	908.01	908.06	0.05	2.19
4081	906.43	908.57	908.72	0.15	2.29
4082	906.93	909.13	909.26	0.13	2.33
4083	907.57	909.68	909.72	0.04	2.15

Point	Subgrade Elevation (ft) As-Built	Top of Clay (CCL) Elevation (ft) Design	Top of Clay (CCL) Elevation (ft) As-Built	Difference, As-Built - Design (ft) (- = Below Design)	Thickness (ft)
4086	905.12	907.21	907.38	0.17	2.26
4087	904.51	906.65	906.78	0.13	2.27
4088	903.91	906.09	906.30	0.21	2.39
4089	903.40	905.53	905.62	0.09	2.22
4090	902.91	904.97	905.22	0.25	2.31
4091	889.57	891.76	891.73	-0.03	2.16
4092	859.02	861.21	861.22	0.01	2.20
4093	847.32	849.41	849.35	-0.06	2.03
4094	835.53	837.65	837.53	-0.12	2.00
4095	825.56	827.75	827.72	-0.03	2.16
4096	840.24	842.46	842.51	0.05	2.27
4097	866.58	868.62	868.79	0.17	2.21
4098	879.37	881.42	881.41	-0.01	2.04
4099	881.79	883.73	883.81	0.08	2.02
4100	875.89	878.00	878.11	0.11	2.22
4101	873.00	875.03	875.08	0.05	2.08
4102	871.75	873.87	873.97	0.10	2.22
4103	870.63	872.71	872.69	-0.02	2.06
4104	869.69	871.81	871.88	0.07	2.19
4105	872.25	874.33	874.47	0.14	2.22
4106	893.78	895.86	895.96	0.10	2.18
4107	920.61	922.75	922.75	0.00	2.14
4110	926.17	928.20	928.22	0.02	2.05
4111	910.47	912.62	912.62	0.00	2.15
4112	901.86	903.79	903.97	0.18	2.11
4113	898.85	900.81	900.90	0.09	2.05
4114	898.07	900.03	900.12	0.09	2.05
4115	901.57	903.72	903.78	0.06	2.21
4116	905.54	907.41	907.56	0.15	2.02
4117	909.11	911.21	911.17	-0.04	2.06
4121	842.74	844.70	844.80	0.10	2.06

Point	Subgrade Elevation (ft) As-Built	Top of Clay (CCL) Elevation (ft) Design	Top of Clay (CCL) Elevation (ft) As-Built	Difference, As-Built - Design (ft) (- = Below Design)	Thickness (ft)
4122	823.47	825.57	825.58	0.01	2.11
4123	832.90	834.85	834.97	0.12	2.07
4224	847.43	849.43	849.57	0.14	2.14
4125	861.88	864.00	864.02	0.02	2.14
4126	889.29	891.15	891.29	0.14	2.00
4127	901.01	903.05	903.30	0.25	2.29
4128	901.51	903.61	903.76	0.15	2.25
4129	901.98	904.17	904.26	0.09	2.28
4130	902.73	904.72	904.95	0.23	2.22
4135	898.38	900.57	900.55	-0.02	2.17
4136	883.54	885.68	885.55	-0.13	2.01
4137	867.31	869.45	869.46	0.01	2.15
4138	845.19	847.37	847.34	-0.03	2.15
4139	821.59	823.74	823.67	-0.07	2.08
4140	836.48	838.40	838.53	0.13	2.05
4143	829.43	831.45	831.49	0.04	2.06
4144	820.27	822.15	822.32	0.17	2.05
4145	845.93	847.82	849.68	1.86	3.75
4149	818.38	820.21	820.38	0.17	2.00
4150	827.25	829.29	829.31	0.02	2.06
4153	833.10	835.21	835.29	0.08	2.19
4154	815.12	823.23	817.19	-6.04	2.07
4157	813.73	820.34	816.00	-4.34	2.27

SEE DRAWING C130109-10-003-00-B2-001 FOR PLAN OF CERTIFICATION POINTS.

NO.:	DATE:	DWN:	CHK:	APV:	DESCRIPTION:
0	09/05/2019	MAYHOEJ	FRECHKL		AS-BUILT

REVISION RECORD

DRAWING TITLE

PROJECT: JOHN E. AMOS LANDFILL
SEQUENCE 4 LINER
COMPACTED CLAY LINER
CERTIFICATION POINTS TABLE

gai consultants

CLIENT: APPALACHIAN POWER COMPANY
1 RIVERSIDE PLAZA
COLUMBUS, OHIO

DRAWN BY:	CHECKED BY:	APPROVED BY:
MAYHOEJ	FRECHKL	STRALCF

REVISION 0

SCALE:	ISSUE DATE:
N.T.S	09/05/2019

SHEET NO.: 1 OF 1

GAI FILE NUMBER: C130109-10-003-00-B2-004

GAI DRAWING NUMBER:

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GAI CAD FILE PATH: Z:\Energy\2013\C130109.10 – AEP Seq 4 2018–2020 QAQC\CAD\Production DWGs\C130109-10-003-00-B2-004.dwg

PLOTTED ON: 9/30/2019 7:54:54 AM PLOTTED BY: Ed Mayhood PLOT FILE: GAI.stb

APPENDIX B
Photographs of Construction Activities

Photograph 1. Stockpile Excavation

Photograph 2. Clay Placement

Photograph 3. Clay Placement

Photograph 4. Watering

Photograph 5. Compaction

Photograph 6. Compaction

Appendix C
Laboratory Test Data

May 13, 2019

Project No. 2019-139-001

Mr. Charles Straley
GAI Consultants, Inc.
300 Summers St., Suite 1100
Charleston, WV 25301

Transmittal
Laboratory Test Results
John E. Amos LF Seq. 4 130109.10

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens that were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectfully submitted,
Geotechnics, Inc.

David R. Backstrom
Laboratory Director

We understand that you have a choice in your laboratory services
and we thank you for choosing Geotechnics.

DCN: Data Transmittal Letter Date: 1/28/05 Rev.: 1

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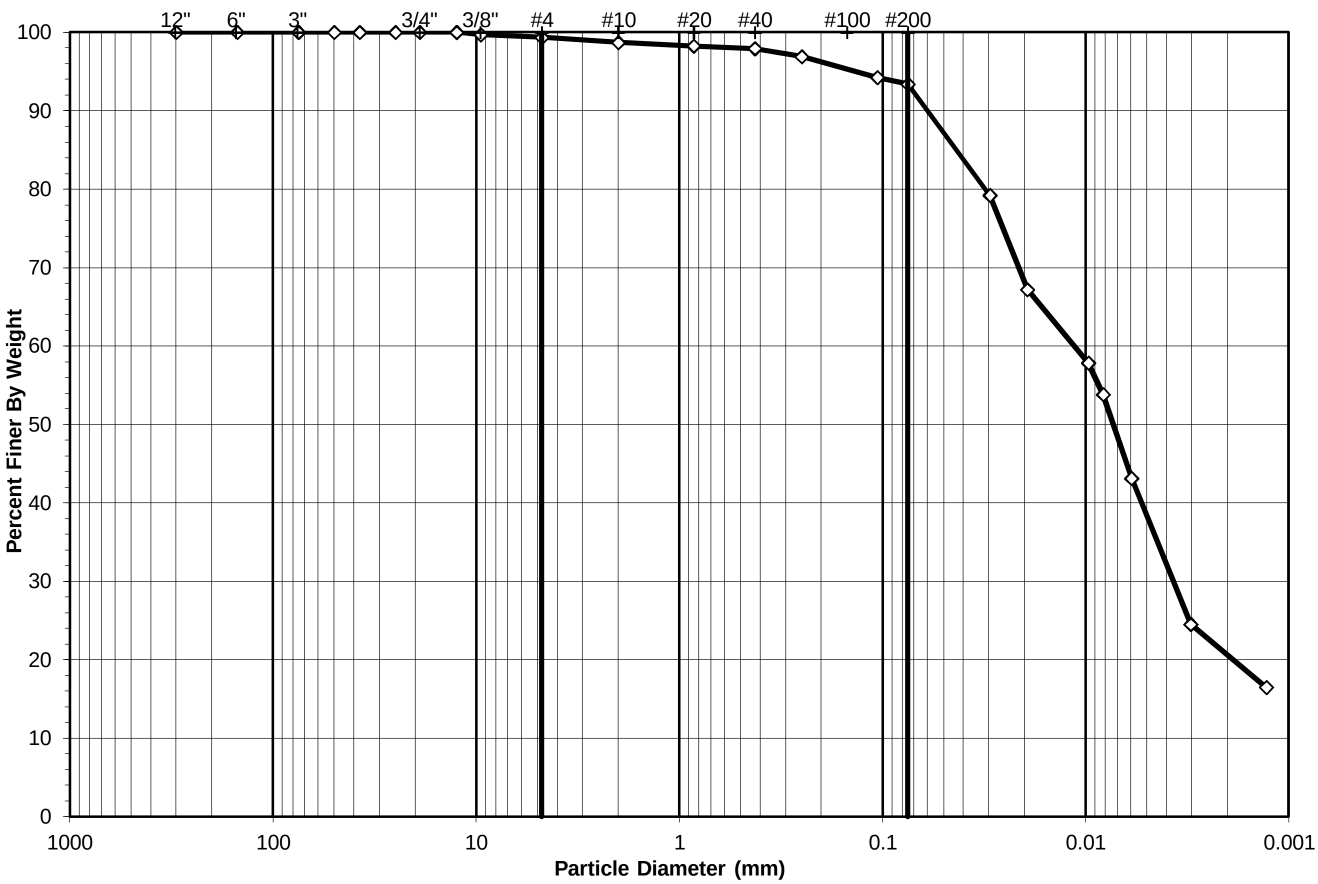
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (2007)

Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Reference:	John E Amos LF Seq. 4 130109.10	Depth (ft):	NA
Project No.:	2019-139-001	Sample No.:	Red Clay #001
Lab ID:	2019-139-001-001	Soil Color:	Red

	SIEVE ANALYSIS			HYDROMETER	
USCS	**cobbles**	**gravel**	**sand**	**silt and clay fraction**	
USDA	**cobbles**	**gravel**	**sand**	**silt**	**clay**



Sieve Sizes (mm)	**USCS Summary**	**Percentage**
Greater Than #4	*Gravel*	0.64
#4 To #200	*Sand*	5.96
Finer Than #200	*Silt & Clay*	93.40

USCS Symbol:
CL, TESTED

USCS Classification:
LEAN CLAY

DCN: CT-S3B DATE:7/17/17 REVISION: 9e
S:Excel\Excel QA\Spreadsheets\SieveHydJ.xls

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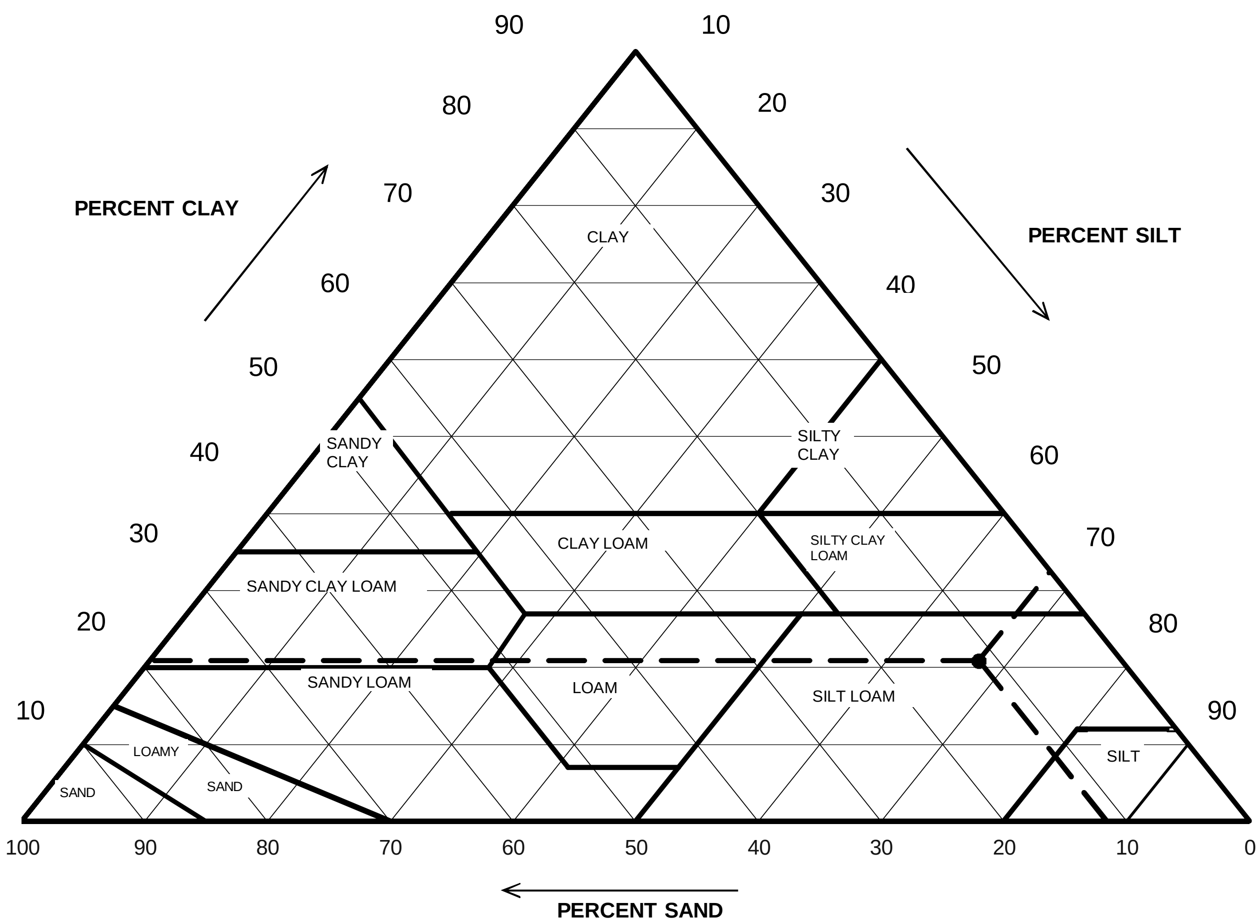
USDA CLASSIFICATION CHART

Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Reference:	John E Amos LF Seq. 4 130109.10	Depth (ft):	NA
Project No.:	2019-139-001	Sample No.:	Red Clay #001
Lab ID:	2019-139-001-001	Soil Color:	Red



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.30	**0.00**
2	98.70	*Sand*	11.48	**11.63**
0.05	87.23	*Silt*	66.64	**67.52**
0.002	20.58	*Clay*	20.58	**20.85**

USDA Classification: ***SILT LOAM***

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

geotechnics
geotechnical & geosynthetic testing

Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Reference:	John E Amos LF Seq. 4 130109.10	Depth (ft):	NA
Project No.:	2019-139-001	Sample No.:	Red Clay #001
Lab ID:	2019-139-001-001	Soil Color:	Red

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	1617	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1010.62	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	971.65	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	148.08	Weight of Tare (g):	NA
Weight of Water (g):	38.97	Weight of Water (g):	NA
Weight of Dry Soil (g):	823.57	Weight of Dry Soil (g):	NA
Moisture Content (%):	**4.7**	**Moisture Content (%):**	**0.0**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	823.57
Dry Weight of - 3/4" Sample (g):	823.6	Weight of Minus #200 Material (g):	769.23
Wet Weight of +3/4" Sample (g):	0.00	Weight of Plus #200 Material (g):	54.34
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	823.6		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	0.00		0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00		0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00		0.00	0.00	100.00	**100.00**
3/8"	9.50	2.38		0.29	0.29	99.71	**99.71**
#4	4.75	2.91		0.35	0.64	99.36	**99.36**
#10	2.00	5.39		0.65	1.30	98.70	**98.70**
#20	0.85	3.53	(**)	0.43	1.73	98.27	**98.27**
#40	0.425	2.75		0.33	2.06	97.94	**97.94**
#60	0.250	8.55		1.04	3.10	96.90	**96.90**
#140	0.106	21.79		2.65	5.74	94.26	**94.26**
#200	0.075	7.04		0.85	6.60	93.40	**93.40**
Pan	-	769.23		93.40	100.00	-	**-**

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

Tested By	HL	Date	3/21/19	Checked By	KC	Date	3/26/19

DCN: CT-S3B DATE:7/17/17 REVISION: 9e

S:\Excel\Excel QA\Spreadsheets\SieveHydJ.xls

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Reference:	John E Amos LF Seq. 4 130109.10	Depth (ft):	NA
Project No.:	2019-139-001	Sample No.:	Red Clay #001
Lab ID:	2019-139-001-001	Soil Color:	Red

Elapsed Time		R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)			(°C)			(%)		(mm)	(%)
0		NA	NA	NA	NA	NA	NA	NA	NA
2		36.0	23	6.37	29.6	84.8	0.01297	0.0296	**79.2**
5		31.5	23	6.37	25.1	71.9	0.01297	0.0194	**67.2**
21		28.0	23	6.37	21.6	61.9	0.01297	0.0097	**57.8**
30		26.5	23	6.37	20.1	57.6	0.01297	0.0082	**53.8**
60		22.5	23	6.37	16.1	46.2	0.01297	0.0059	**43.1**
250		15.5	23.1	6.34	9.2	26.2	0.01296	0.0030	**24.5**
1440		12.5	23.1	6.34	6.2	17.6	0.01296	0.0013	**16.5**

Soil Specimen Data		Other Corrections	
Tare No.:	952		
Wt. of Tare & Dry Material (g):	140.6	a - Factor:	0.99
Weight of Tare (g):	101.02		
Weight of Deflocculant (g):	5.0	Percent Finer than # 200:	93.40
Weight of Dry Material (g):	34.58		
		Specific Gravity:	2.7 Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Tested By	TO	Date	3/20/19	Checked By	KC	Date	3/26/19

DCN: CT-S3B DATE:7/17/17 REVISION: 9e

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Reference:	John E Amos LF Seq. 4 130109.10	Depth (ft):	NA
Project No.:	2019-139-001	Sample No.:	Red Clay #001
Lab ID:	2019-139-001-001	Soil Description:	RED LEAN CLAY

***Note: The* USCS *symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description*.** (Minus No. 40 sieve material, Air dried)

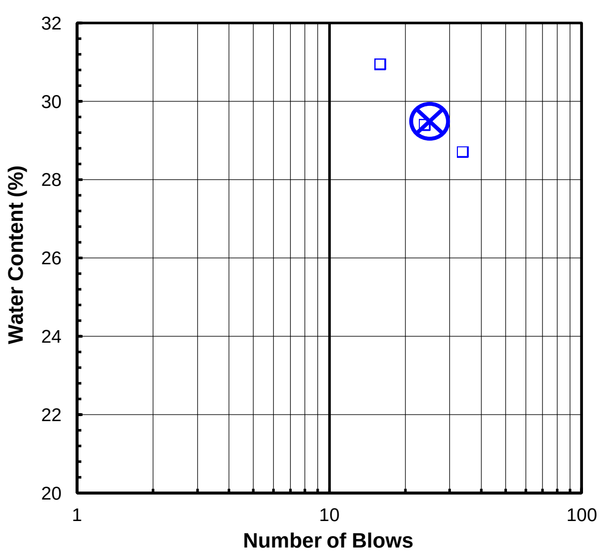
As Received Moisture Content ASTM D2216-10		Liquid Limit Test 1	2	3	M
Tare Number:	3223	324	247	304	U
Wt. of Tare & Wet Sample (g):	297.55	39.73	39.76	39.64	L
Wt. of Tare & Dry Sample (g):	264.10	34.89	35.08	35.09	T
Weight of Tare (g):	8.20	19.24	19.15	19.23	I
Weight of Water (g):	33.5	4.8	4.7	4.6	P
Weight of Dry Sample (g):	255.9	15.7	15.9	15.9	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**13.1**	**30.9**	**29.4**	**28.7**	N
Number of Blows:		**16**	**24**	**34**	T

Plastic Limit Test	1	2	Range
Tare Number:	124	236	
Wt. of Tare & Wet Sample (g):	24.76	24.89	
Wt. of Tare & Dry Sample (g):	23.73	23.84	
Weight of Tare (g):	18.51	18.50	
Weight of Water (g):	1.0	1.1	
Weight of Dry Sample (g):	5.2	5.3	
Moisture Content (%):	**19.7**	**19.7**	**0.1**

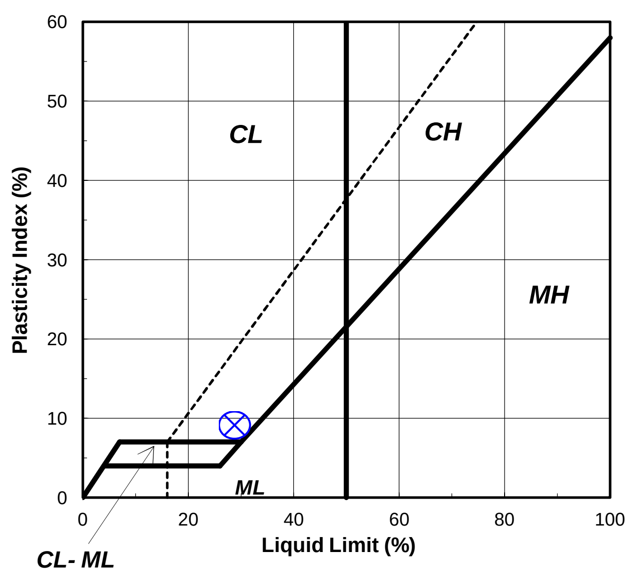
Note: The acceptable range of the two Moisture Contents is ± 1.12

Test Results	
Liquid Limit (%):	**29**
Plastic Limit (%):	**20**
Plasticity Index (%):	**9**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By	*RAL*	*Date*	*3/25/19*	*Checked By*	*KC*	*Date*	3/26/19

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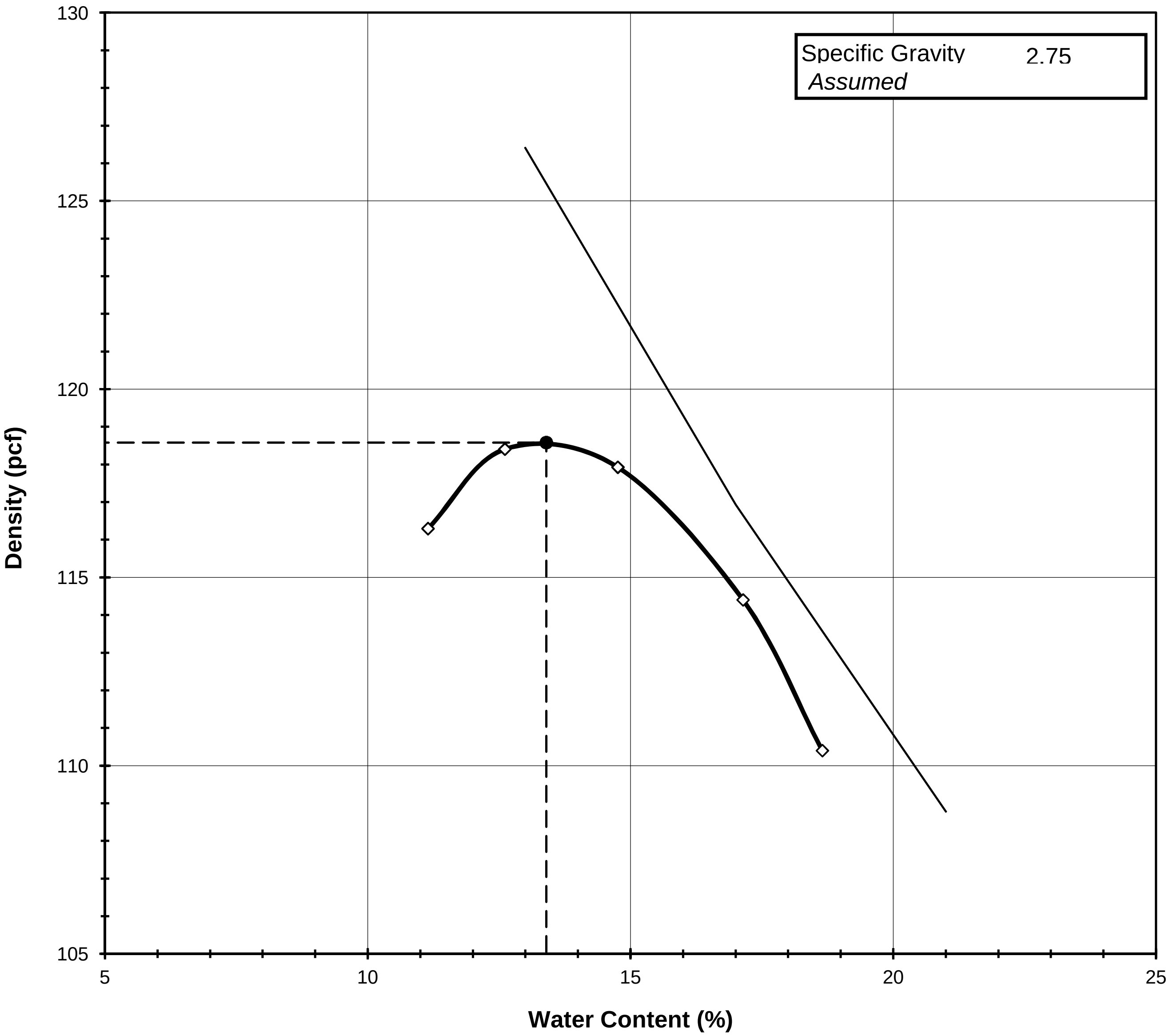
MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Reference:	John E Amos LF Seq. 4 130109.10	Depth (ft):	NA
Project No.:	2019-139-001	Sample No.:	Red Clay #001
Lab ID:	2019-139-001-001	Test Method	**STANDARD**

Visual Description: Red Clay with Claystone

Optimum Water Content (%): 13.4
Maximum Dry Density (pcf): 118.6



Tested By	*MF*	*Date*	*3/19/19*	*Checked By*	*KC*	*Date*	3/20/19

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Reference:	John E Amos LF Seq. 4 130109.10	Depth (ft):	NA
Project No.:	2019-139-001	Sample No.:	Red Clay #001
Lab ID:	2019-139-001-001		

Visual Description: Red Clay with Claystone

Total Weight of the Sample (g):	NA
As Received Water Content (%):	NA
Assumed Specific Gravity:	2.75
Percent Retained on 3/4":	NA
Percent Retained on 3/8":	NA
Percent Retained on #4:	NA
Oversize Material:	Not included
Procedure Used:	C

Test Type:	**STANDARD**
Rammer Weight (lb):	5.5
Rammer Drop (in):	12
Rammer Type:	MECHANICAL
Machine ID:	G774
Mold ID:	G1776
Mold diameter:	6"
Weight of the Mold (g):	5674
Volume of the Mold (cm^3):	2127

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Weight of Mold & Wet Sample (g):	10080	10219	10287	10242	10139
Weight of Mold (g):	5674	5674	5674	5674	5674
Weight of Wet Sample (g):	4406	4545	4613	4568	4465
Mold Volume (cm^3):	2127	2127	2127	2127	2127

Moisture Content / Density

Tare Number:	1701	615	552	589	1706
Weight of Tare & Wet Sample (g):	424.21	423.61	437.88	425.29	407.22
Weight of Tare & Dry Sample (g):	389.76	385.56	391.98	375.14	356.19
Weight of Tare (g):	80.65	83.77	80.94	82.55	82.55
Weight of Water (g):	34.45	38.05	45.90	50.15	51.03
Weight of Dry Sample (g):	309.11	301.79	311.04	292.59	273.64

Wet Density (g/cm^3):	2.07	2.14	2.17	2.15	2.10
Wet Density (pcf):	129.3	133.3	135.3	134.0	131.0
Moisture Content (%):	**11.1**	**12.6**	**14.8**	**17.1**	**18.6**
Dry Density (pcf):	**116.3**	**118.4**	**117.9**	**114.4**	**110.4**

Zero Air Voids

Moisture Content (%):	13.0	17.0	21.0
Dry Unit Weight (pcf):	126.4	116.9	108.8

Tested By MF *Date* 3/19/19 *Checked By* KC *Date* 3/20/19

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PERMEABILITY TEST

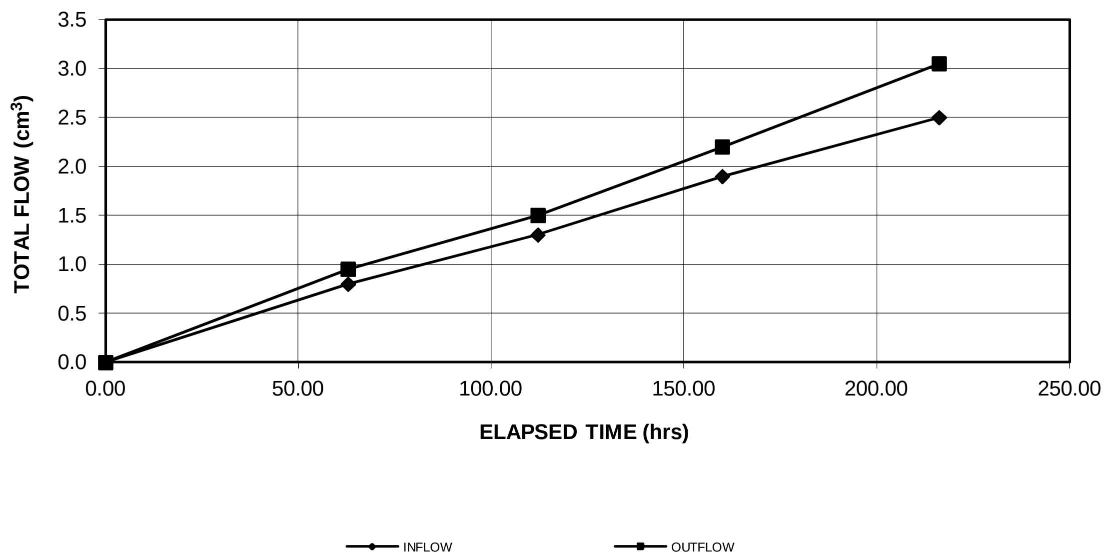
ASTM D 5084-16a

Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Project:	John E Amos LF Seq. 4 130109.10	Depth (ft):	N/A
Project No.:	2019-139-001	Sample No.:	Red Clay #001
Lab ID No.:	2019-139-001-001	Avg. Conf. Pressure (psi):	210

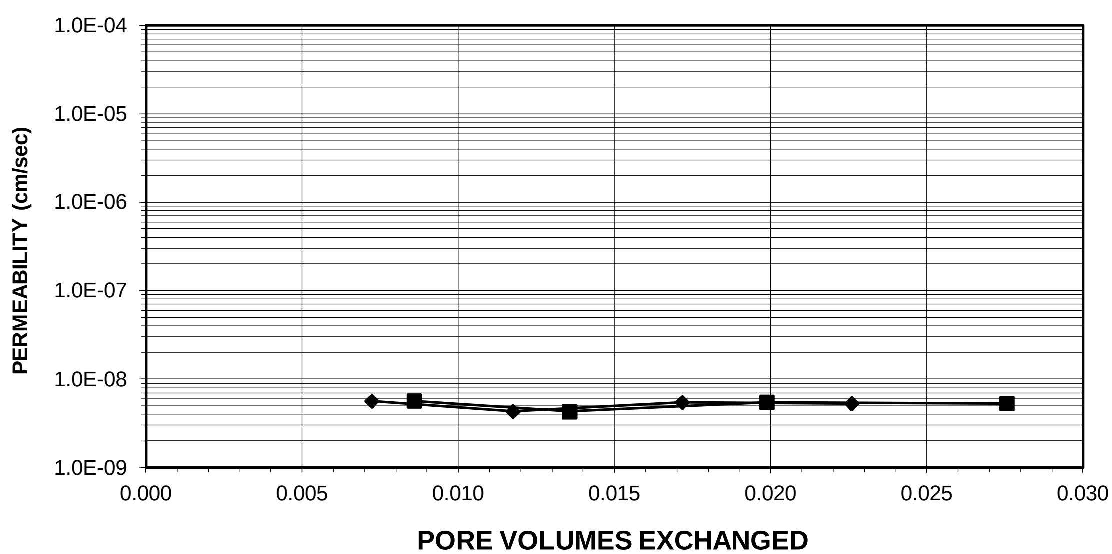
AVERAGE PERMEABILITY = 5.2E-09 cm/sec @ 20^{o}C

AVERAGE PERMEABILITY = 5.2E-11 m/sec @ 20^{o}C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By:	JAB	Date:	4/10/19	Checked By:	NJM	Date:	5/7/19

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PERMEABILITY TEST

ASTM D 5084-16a

Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Project:	John E Amos LF Seq. 4 130109.10	Depth (ft):	N/A
Project No.:	2019-139-001	Sample No.:	Red Clay #001
Lab ID No.:	2019-139-001-001	Avg. Conf. Pressure (psi):	210

Specific Gravity:	2.70	Assumed
Sample Condition:		Remolded

Visual Description: Red Clay

Permeant Type: Deaired Water

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	886	909
Weight of Tare & Wet Sample (g)	314.98	973.31
Weight of Tare & Dry Sample (g)	291.18	809.50
Weight of Tare (g)	109.70	109.04
Weight of Water (g)	23.80	163.81
Weight of Dry Sample (g)	181.48	700.46
Moisture Content (%)	**13.1**	**23.4**

SPECIMEN:	BEFORE TEST	AFTER TEST
Weight of Tube & Wet Sample (g)	2188.20	NA
Weight of Tube (g)	1323.90	NA
Weight of Wet Sample (g)	864.30	942.79
Length 1 (in)	3.973	3.880
Length 2 (in)	3.973	3.866
Length 3 (in)	3.973	3.873
Top Diameter (in)	2.877	2.844
Middle Diameter (in)	2.877	2.776
Bottom Diameter (in)	2.877	2.811
Average Length (in)	3.97	3.87
Average Area (in^2)	6.50	6.20
Sample Volume (cm^3)	423.24	393.69
Unit Wet Weight (g/cm^3)	2.04	2.39
Unit Wet Weight (pcf)	127.5	149.5
Unit Dry Weight (pcf)	112.7	121.2
Unit Dry Weight (g/cm^3)	1.81	1.94
Void Ratio, e	0.50	0.39
Porosity, n	0.33	0.28
Pore Volume (cm^3)	140.2	110.7
Total Weight of Sample After Test (g)		865.08

Tested By: JAB Date: 4/10/19 Checked By: NJM Date: 5/7/19

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PERMEABILITY TEST

ASTM D 5084-16a

Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Project:	John E Amos LF Seq. 4 130109.10	Depth (ft):	N/A
Project No.:	2019-139-001	Sample No.:	Red Clay #001
Lab ID No.:	2019-139-001-001	Avg. Conf. Pressure (psi):	210

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	58.0	Sample Length (cm), L	9.84
Bottom Cap (psi)	60.0	Sample Diameter (cm)	7.14
Cell (psi)	269.0	Sample Area (cm^2), A	40.02
Total Pressure Head (cm)	140.6	Inflow Burette Area (cm^2), a-in	0.912
Hydraulic Gradient	14.29	Outflow Burette Area (cm^2), a-out	0.861
		B Parameter (%)	99

AVERAGE PERMEABILITY = 5.2E-09 cm/sec @ 20°C

AVERAGE PERMEABILITY = 5.2E-11 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
4/26/19	15	59	0.000	0.0	0.0	167.4	0	21.9	NA
4/29/19	6	52	62.883	0.8	0.9	165.4	0	20.1	5.7E-09
5/01/19	8	4	112.083	1.3	1.5	164.2	0	21.1	4.3E-09
5/03/19	7	54	159.917	1.9	2.2	162.8	0	21.3	5.5E-09
5/05/19	16	8	216.150	2.5	3.1	161.1	1	21.0	5.3E-09

Tested By: JAB Date: 4/10/19 Checked By: NJM Date: 5/7/19

DCN: CT-22 DATE: 1/1/17 REVISION: 11

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SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

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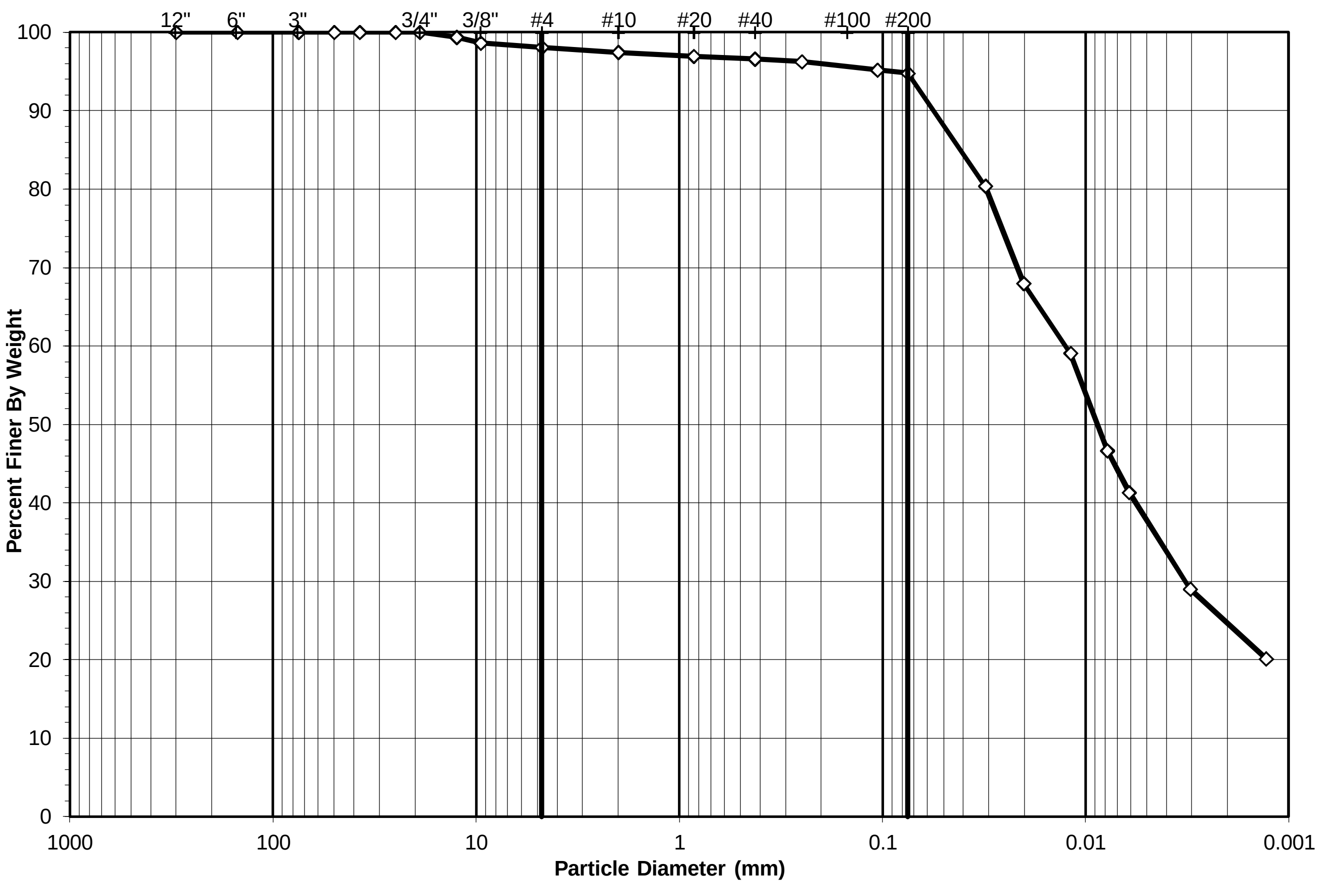
Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Reference:	John E Amos LF Seq. 4 130109.10	Depth (ft):	NA
Project No.:	2019-139-001	Sample No.:	Red Clay #002
Lab ID:	2019-139-001-002	Soil Color:	Red

	SIEVE ANALYSIS			HYDROMETER	
USCS	**cobbles**	**gravel**	**sand**	**silt and clay fraction**	
USDA	**cobbles**	**gravel**	**sand**	**silt**	**clay**



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	1.89
#4 To #200	*Sand*	3.32
Finer Than #200	*Silt & Clay*	94.79

USCS Symbol:

CL, TESTED

USCS Classification:

LEAN CLAY

DCN: CT-S3B DATE:7/17/17 REVISION: 9e

S:Excel\Excel QA\Spreadsheets\SieveHydJ.xls

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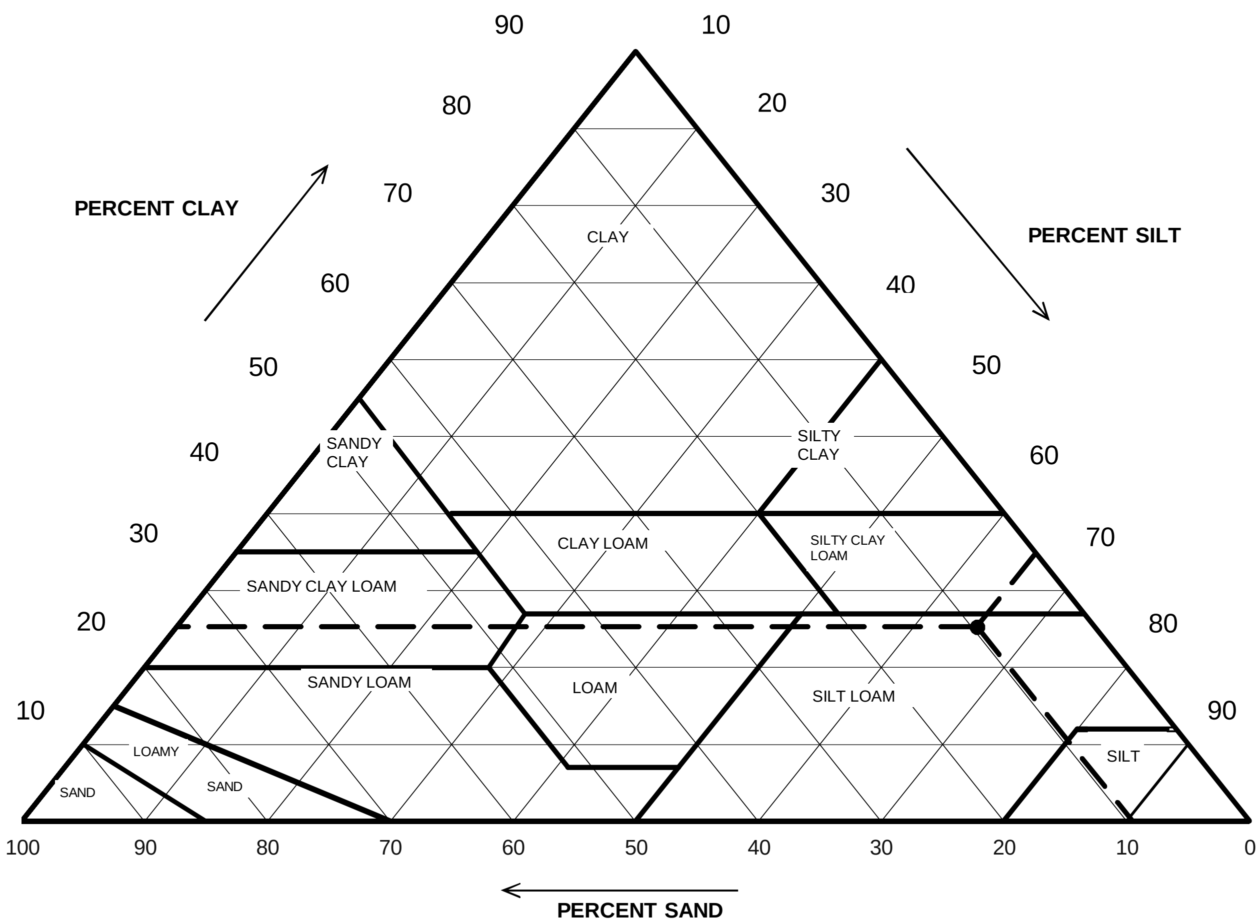
USDA CLASSIFICATION CHART

Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Reference:	John E Amos LF Seq. 4 130109.10	Depth (ft):	NA
Project No.:	2019-139-001	Sample No.:	Red Clay #002
Lab ID:	2019-139-001-002	Soil Color:	Red



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	2.53	**0.00**
2	97.47	*Sand*	9.32	**9.56**
0.05	88.15	*Silt*	63.53	**65.18**
0.002	24.62	*Clay*	24.62	**25.26**

USDA Classification: ***SILT LOAM***

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Reference:	John E Amos LF Seq. 4 130109.10	Depth (ft):	NA
Project No.:	2019-139-001	Sample No.:	Red Clay #002
Lab ID:	2019-139-001-002	Soil Color:	Red

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	1444	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1057.00	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	1015.83	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	145.64	Weight of Tare (g):	NA
Weight of Water (g):	41.17	Weight of Water (g):	NA
Weight of Dry Soil (g):	870.19	Weight of Dry Soil (g):	NA
Moisture Content (%):	**4.7**	**Moisture Content (%):**	**0.0**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	870.19
Dry Weight of - 3/4" Sample (g):	870.2	Weight of Minus #200 Material (g):	824.88
Wet Weight of +3/4" Sample (g):	0.00	Weight of Plus #200 Material (g):	45.31
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	870.2		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	0.00		0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00		0.00	0.00	100.00	**100.00**
1/2"	12.5	5.34		0.61	0.61	99.39	**99.39**
3/8"	9.50	6.42		0.74	1.35	98.65	**98.65**
#4	4.75	4.65		0.53	1.89	98.11	**98.11**
#10	2.00	5.63		0.65	2.53	97.47	**97.47**
#20	0.85	4.30	(**)	0.49	3.03	96.97	**96.97**
#40	0.425	3.10		0.36	3.38	96.62	**96.62**
#60	0.250	3.10		0.36	3.74	96.26	**96.26**
#140	0.106	9.22		1.06	4.80	95.20	**95.20**
#200	0.075	3.55		0.41	5.21	94.79	**94.79**
Pan	-	824.88		94.79	100.00	-	**-**

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

Tested By	HL	Date	3/21/19	Checked By	KC	Date	3/26/19

DCN: CT-S3B DATE:7/17/17 REVISION: 9e
S:Excel\Excel QA\Spreadsheets\SieveHydJ.xls

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Reference:	John E Amos LF Seq. 4 130109.10	Depth (ft):	NA
Project No.:	2019-139-001	Sample No.:	Red Clay #002
Lab ID:	2019-139-001-002	Soil Color:	Red

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0		NA	NA	NA	NA	NA	NA	NA	NA
2		29.0	23	6.37	22.6	84.8	0.01297	0.0312	**80.4**
5		25.5	23	6.37	19.1	71.7	0.01297	0.0202	**68.0**
15		23.0	23	6.37	16.6	62.3	0.01297	0.0119	**59.1**
36		19.5	23	6.37	13.1	49.2	0.01297	0.0078	**46.6**
60		18.0	23	6.37	11.6	43.6	0.01297	0.0061	**41.3**
250		14.5	23.1	6.34	8.2	30.6	0.01296	0.0031	**29.0**
1440		12.0	23.1	6.34	5.7	21.2	0.01296	0.0013	**20.1**

Soil Specimen Data		**Other Corrections**	
Tare No.:	685		
Wt. of Tare & Dry Material (g):	127.96	a - Factor:	0.99
Weight of Tare (g):	96.55		
Weight of Deflocculant (g):	5.0	Percent Finer than # 200:	94.79
Weight of Dry Material (g):	26.41		
		Specific Gravity:	2.7 Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Tested By	TO	Date	3/20/19	Checked By	KC	Date	3/26/19

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Reference:	John E Amos LF Seq. 4 130109.10	Depth (ft):	NA
Project No.:	2019-139-001	Sample No.:	Red Clay #002
Lab ID:	2019-139-001-002	Soil Description:	RED LEAN CLAY

***Note: The* USCS *symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description*.** (Minus No. 40 sieve material, Air dried)

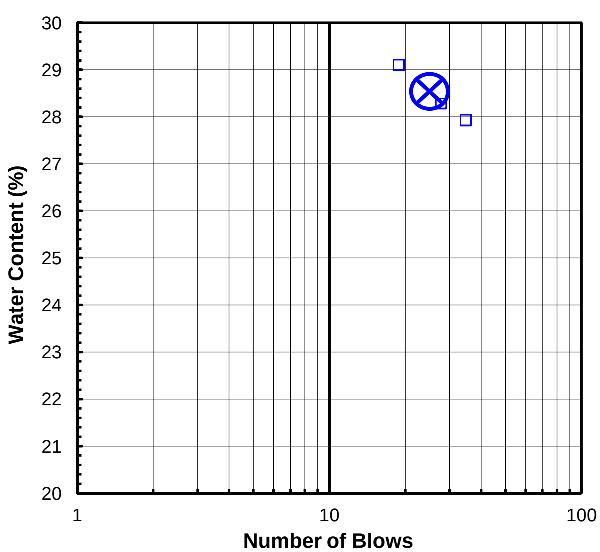
As Received Moisture Content ASTM D2216-10		Liquid Limit Test 1	2	3	
Tare Number:	3062	235	536	533	**M U L T I P O I N T**
Wt. of Tare & Wet Sample (g):	381.27	46.44	45.52	47.29	
Wt. of Tare & Dry Sample (g):	332.26	40.40	39.94	41.22	
Weight of Tare (g):	8.18	18.76	20.20	20.35	
Weight of Water (g):	49.0	6.0	5.6	6.1	
Weight of Dry Sample (g):	324.1	21.6	19.7	20.9	
Was As Received MC Preserved:	**Yes**				
Moisture Content (%):	**15.1**	**27.9**	**28.3**	**29.1**	
Number of Blows:		**35**	**28**	**19**	

Plastic Limit Test	1	2	Range
Tare Number:	131	268	
Wt. of Tare & Wet Sample (g):	26.02	22.76	
Wt. of Tare & Dry Sample (g):	25.00	21.73	
Weight of Tare (g):	19.69	16.37	
Weight of Water (g):	1.0	1.0	
Weight of Dry Sample (g):	5.3	5.4	
Moisture Content (%):	**19.2**	**19.2**	**0.0**

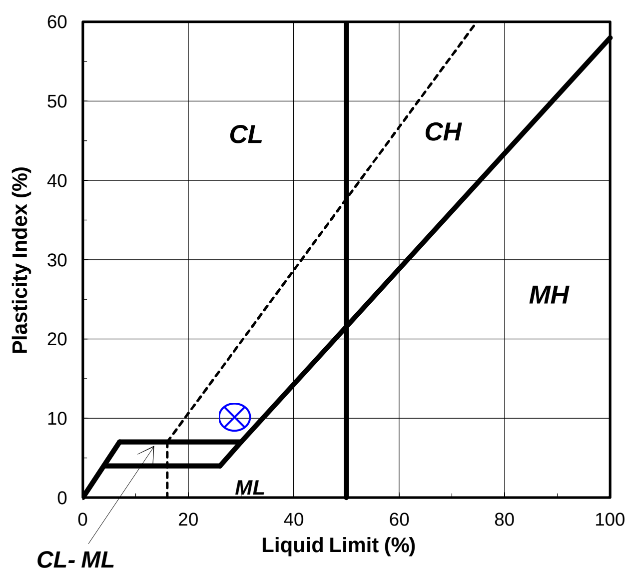
Note: The acceptable range of the two Moisture Contents is ± 1.12

Test Results	
Liquid Limit (%):	**29**
Plastic Limit (%):	**19**
Plasticity Index (%):	**10**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By	*TO*	*Date*	*3/25/19*	*Checked By*	*KC*	*Date*	3/26/19

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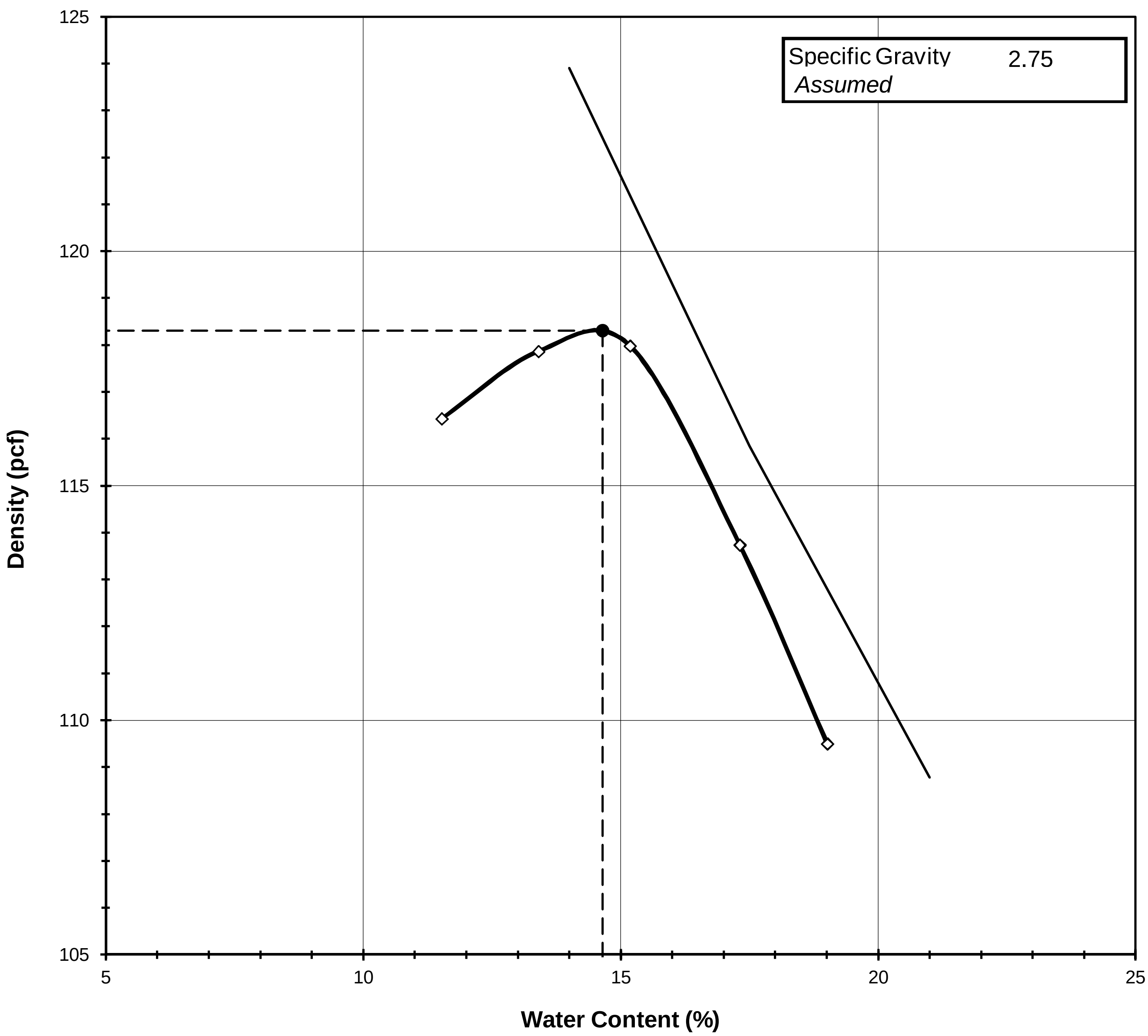
MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Reference:	John E Amos LF Seq. 4 130109.10	Depth (ft):	NA
Project No.:	2019-139-001	Sample No.:	Red Clay #002
Lab ID:	2019-139-001-002	Test Method	**STANDARD**

Visual Description: Red Clay with Claystone

Optimum Water Content (%): **14.7**
Maximum Dry Density (pcf): **118.3**



Tested By	*MF*	*Date*	*3/19/19*	*Checked By*	*KC*	*Date*	3/20/19

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Reference:	John E Amos LF Seq. 4 130109.10	Depth (ft):	NA
Project No.:	2019-139-001	Sample No.:	Red Clay #002
Lab ID:	2019-139-001-002		

Visual Description: Red Clay with Claystone

Total Weight of the Sample (g):	NA
As Received Water Content (%):	NA
Assumed Specific Gravity:	2.75
Percent Retained on 3/4":	NA
Percent Retained on 3/8":	NA
Percent Retained on #4:	NA
Oversize Material:	Not included
Procedure Used:	C

Test Type:	**STANDARD**
Rammer Weight (lb):	5.5
Rammer Drop (in):	12
Rammer Type:	MECHANICAL
Machine ID:	G774
Mold ID:	G1776
Mold diameter:	6"
Weight of the Mold (g):	5674
Volume of the Mold (cm^3):	2127

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Weight of Mold & Wet Sample (g):	10100	10230	10306	10222	10116
Weight of Mold (g):	5674	5674	5674	5674	5674
Weight of Wet Sample (g):	4426	4556	4632	4548	4442
Mold Volume (cm^3):	2127	2127	2127	2127	2127

Moisture Content / Density

Tare Number:	569	629	870	1696	1713
Weight of Tare & Wet Sample (g):	410.95	417.96	405.35	419.60	408.89
Weight of Tare & Dry Sample (g):	377.06	378.72	366.37	369.90	356.76
Weight of Tare (g):	82.99	85.95	109.56	82.79	82.57
Weight of Water (g):	33.89	39.24	38.98	49.70	52.13
Weight of Dry Sample (g):	294.07	292.77	256.81	287.11	274.19

Wet Density (g/cm^3):	2.08	2.14	2.18	2.14	2.09
Wet Density (pcf):	129.8	133.7	135.9	133.4	130.3
Moisture Content (%):	**11.5**	**13.4**	**15.2**	**17.3**	**19.0**
Dry Density (pcf):	**116.4**	**117.9**	**118.0**	**113.7**	**109.5**

Zero Air Voids

Moisture Content (%):	14.0	17.5	21.0
Dry Unit Weight (pcf):	123.9	115.8	108.8

Tested By MF *Date* 3/19/19 *Checked By* KC *Date* 3/20/19

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PERMEABILITY TEST

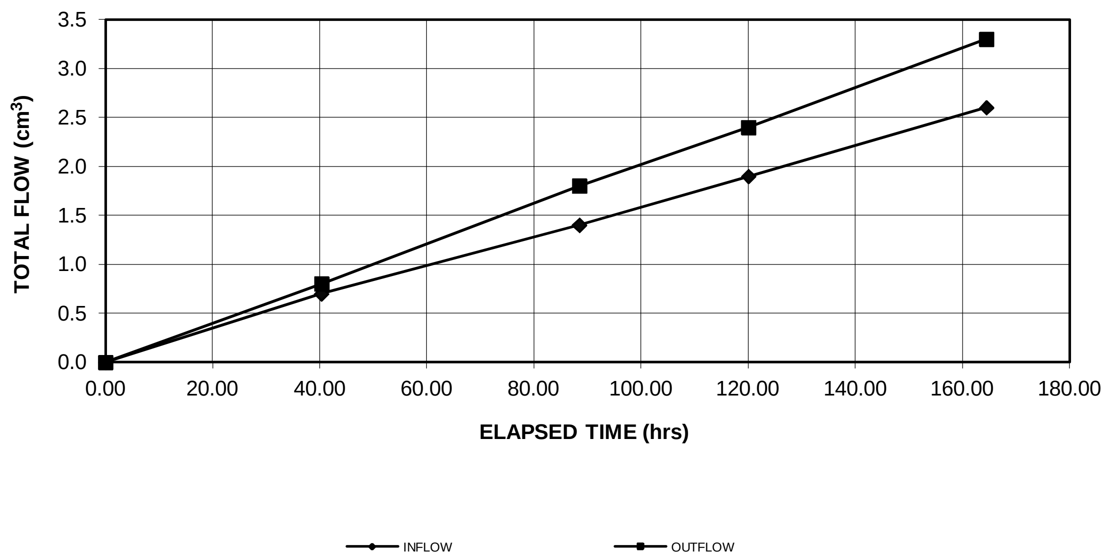
ASTM D 5084-16a

Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Project:	John E Amos LF Seq. 4 130109.10	Depth (ft):	N/A
Project No.:	2019-139-001	Sample No.:	Red Clay #002
Lab ID No.:	2019-139-001-002	Avg. Conf. Pressure (psi):	210

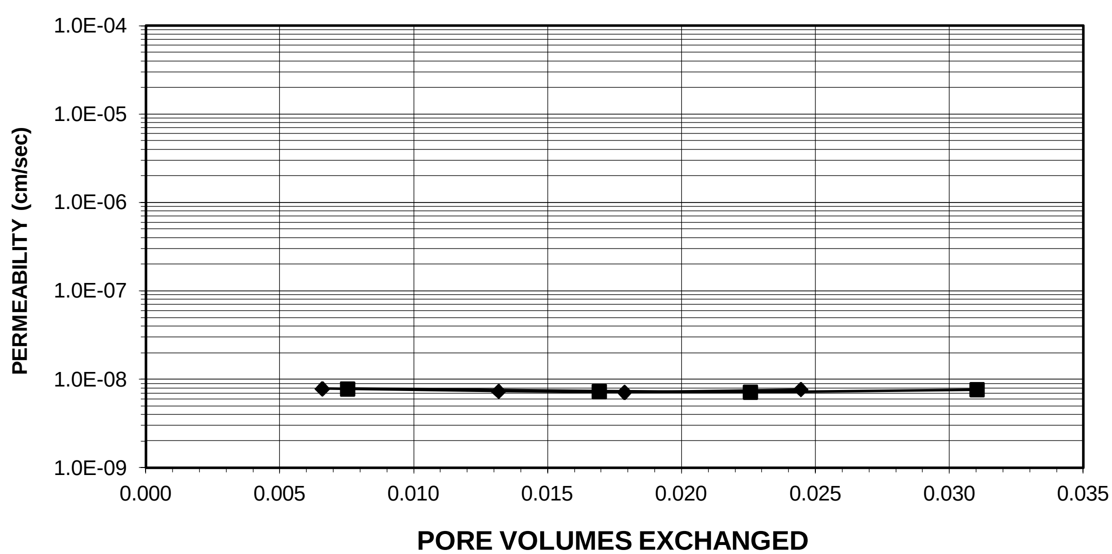
AVERAGE PERMEABILITY = 7.5E-09 cm/sec @ 20^{o}C

AVERAGE PERMEABILITY = 7.5E-11 m/sec @ 20^{o}C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By:	JAB	Date:	4/09/19	Checked By:	KC	Date:	4/23/19

DCN: CT-22 DATE: 1/1/17 REVISION: 11

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PERMEABILITY TEST

ASTM D 5084-16a

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Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Project:	John E Amos LF Seq. 4 130109.10	Depth (ft):	N/A
Project No.:	2019-139-001	Sample No.:	Red Clay #002
Lab ID No.:	2019-139-001-002	Avg. Conf. Pressure (psi):	210

Specific Gravity:	2.70	Assumed
Sample Condition:		Remolded

Visual Description: Red Clay

Permeant Type: Deaired Water

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	891	7
Weight of Tare & Wet Sample (g)	283.86	939.42
Weight of Tare & Dry Sample (g)	261.53	834.45
Weight of Tare (g)	110.20	74.43
Weight of Water (g)	22.33	104.97
Weight of Dry Sample (g)	151.33	760.02
Moisture Content (%)	**14.8**	**13.8**

SPECIMEN:	BEFORE TEST	AFTER TEST
Weight of Tube & Wet Sample (g)	2198.40	NA
Weight of Tube (g)	1323.90	NA
Weight of Wet Sample (g)	874.50	867.30
Length 1 (in)	3.973	3.887
Length 2 (in)	3.973	3.895
Length 3 (in)	3.973	3.885
Top Diameter (in)	2.877	2.784
Middle Diameter (in)	2.877	2.775
Bottom Diameter (in)	2.877	2.800
Average Length (in)	3.97	3.89
Average Area (in^2)	6.50	6.10
Sample Volume (cm^3)	423.24	388.59
Unit Wet Weight (g/cm^3)	2.07	2.23
Unit Wet Weight (pcf)	129.0	139.3
Unit Dry Weight (pcf)	112.4	122.4
Unit Dry Weight (g/cm^3)	1.80	1.96
Void Ratio, e	0.50	0.38
Porosity, n	0.33	0.27
Pore Volume (cm^3)	141.0	106.4
Total Weight of Sample After Test (g)		866.41

Tested By: JAB Date: 4/9/19 Checked By: KC Date: 4/23/19

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PERMEABILITY TEST

ASTM D 5084-16a

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Client:	GAI Consultants, Inc.	Boring No.:	3/7/19
Client Project:	John E Amos LF Seq. 4 130109.10	Depth (ft):	N/A
Project No.:	2019-139-001	Sample No.:	Red Clay #002
Lab ID No.:	2019-139-001-002	Avg. Conf. Pressure (psi):	210

Pressure Heads (Constant)		**Final Sample Dimensions**	
Top Cap (psi)	78.0	Sample Length (cm), L	9.88
Bottom Cap (psi)	80.0	Sample Diameter (cm)	7.08
Cell (psi)	289.0	Sample Area (cm^2), A	39.34
Total Pressure Head (cm)	140.6	Inflow Burette Area (cm^2), a-in	0.900
Hydraulic Gradient	14.23	Outflow Burette Area (cm^2), a-out	0.868
		B Parameter (%)	96

AVERAGE PERMEABILITY = 7.5E-09 cm/sec @ 20°C

AVERAGE PERMEABILITY = 7.5E-11 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
4/14/19	15	29	0.000	0.0	0.0	166.3	0	21.0	NA
4/16/19	7	47	40.300	0.7	0.8	164.6	0	20.1	7.8E-09
4/18/19	7	56	88.450	1.4	1.8	162.6	0	21.2	7.3E-09
4/19/19	15	33	120.067	1.9	2.4	161.4	0	21.8	7.2E-09
4/21/19	11	59	164.500	2.6	3.3	159.6	1	20.8	7.7E-09

Tested By: JAB Date: 4/09/19 Checked By: KC Date: 4/23/19

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September 18, 2018

Project No. 2018-381-003

Ms. Nina Balsamo
GAI Consultants, Inc.
385 East Waterfront Drive
Homestead, PA 15120

Transmittal
Laboratory Test Results
John E. Amos LF FCS C130109.11

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens that were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectfully submitted,
***Geotechnics, Inc*.**

David R. Backstrom
Laboratory Director

We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.

DCN: Data Transmittal Letter Date: 1/28/05 Rev.: 1

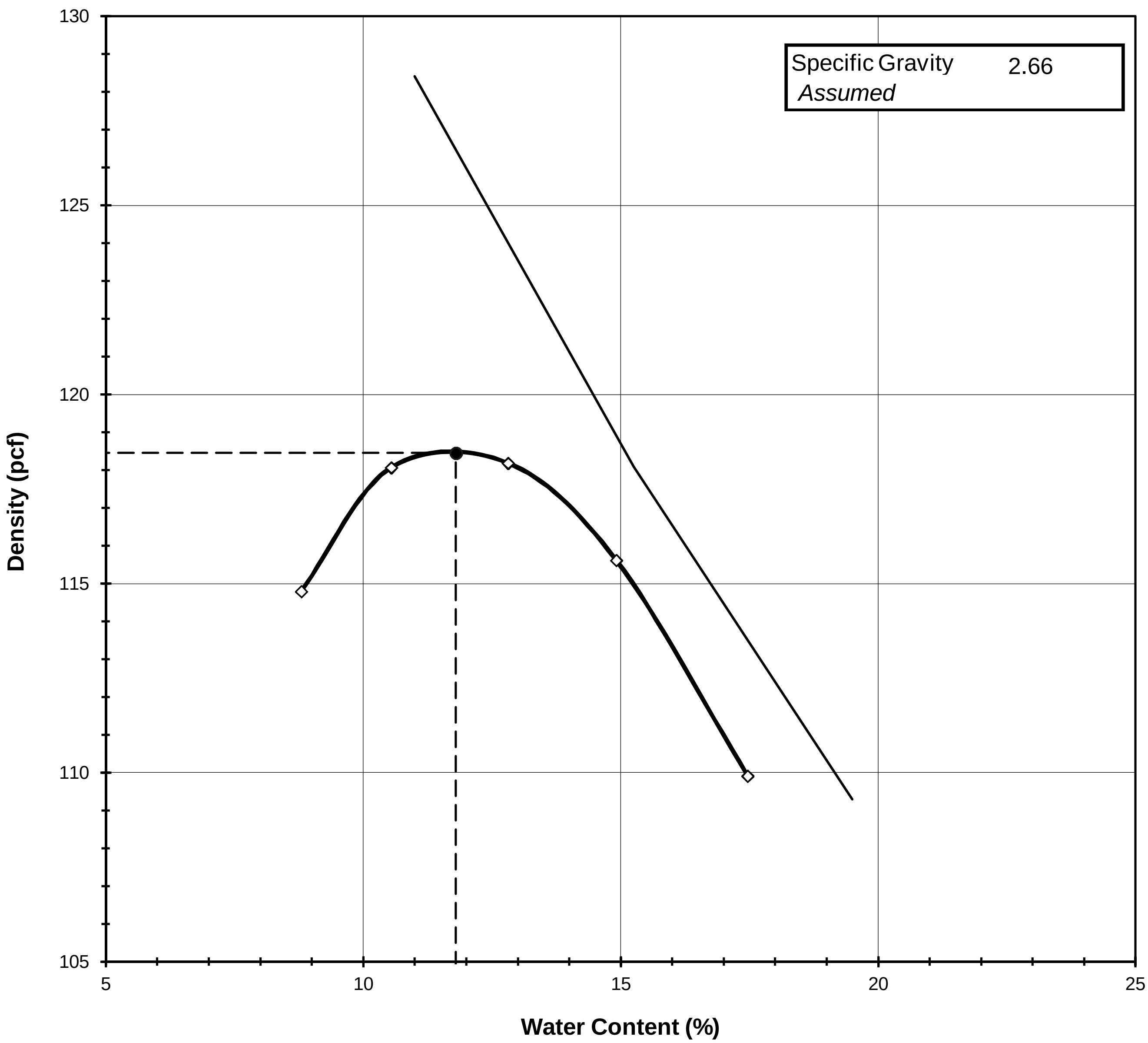
MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	GAI Consultants, Inc.	Boring No.:	NA
Client Reference:	John E. Amos LF FCS C130109.11	Depth (ft):	NA
Project No.:	2018-381-003	Sample No.:	No. 8
Lab ID:	2018-381-003-001	Test Method	**STANDARD**

Visual Description: Brown Clay with Some Rock

Optimum Water Content **11.8**
Maximum Dry Density **118.5**



Tested By *MF* *Date* *9/17/18* *Checked By* *TMP* *Date* 9/18/18

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	GAI Consultants, Inc.	Boring No.:	NA
Client Reference:	John E. Amos LF FCS C130109.11	Depth (ft):	NA
Project No.:	2018-381-003	Sample No.:	No. 8
Lab ID:	2018-381-003-001		

Visual Description: Brown Clay with Some Rock

Total Weight of the Sample (g):	NA
As Received Water Content (%):	NA
Assumed Specific Gravity:	2.66
Percent Retained on 3/4":	NA
Percent Retained on 3/8":	NA
Percent Retained on #4:	NA
Oversize Material:	Not included
Procedure Used:	C

Test Type:		**STANDARD**
Rammer Weight (lb):		5.5
Rammer Drop (in):		12
Rammer Type:		MECHANICAL
Machine ID:	G	774
Mold ID:	G	1775
Mold diameter:		6"
Weight of the Mold (g):		5719
Volume of the Mold (cm^3):		2130

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Weight of Mold & Wet Sample (g):	9982	10174	10270	10254	10126
Weight of Mold (g):	5719	5719	5719	5719	5719
Weight of Wet Sample (g):	4263	4455	4551	4535	4407
Mold Volume (cm^3):	2130	2130	2130	2130	2130

Moisture Content / Density

Tare Number:	875	569	882	580	623
Weight of Tare & Wet Sample (g):	414.26	450.06	452.42	434.07	460.07
Weight of Tare & Dry Sample (g):	389.68	415.05	413.56	388.67	404.04
Weight of Tare (g):	110.22	82.98	110.24	84.26	83.22
Weight of Water (g):	24.58	35.01	38.86	45.40	56.03
Weight of Dry Sample (g):	279.46	332.07	303.32	304.41	320.82

Wet Density (g/cm^3):	2.00	2.09	2.14	2.13	2.07
Wet Density (pcf):	124.9	130.5	133.3	132.9	129.1
Moisture Content (%):	**8.8**	**10.5**	**12.8**	**14.9**	**17.5**
Dry Density (pcf):	**114.8**	**118.1**	**118.2**	**115.6**	**109.9**

Zero Air Voids

Moisture Content (%):		11.0	15.3	19.5	
Dry Unit Weight (pcf):		128.4	118.1	109.3	

Tested By MF *Date* 9/17/18 *Checked By* TMP *Date* 9/18/18

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Appendix D
Compaction Records

FIELD DENSITY TESTING RECORD (NUCLEAR METHOD)

PROJECT:	Amos Landfill - Sequence 4	PROJECT NO.:	C130109.10	TECHNICIAN:	Terry Queen, Kaleb Acree, Levi Filsinger, Joe Rose

					FIELD DENSITY			PROCTOR DENSITY					COMPACTION			
DATE	TEST NO.	LIFT / ELEV.	LOCATION	SOIL DESCRIPTION (COLOR & TYPE, LIFT THICKNESS, ETC)	g_{wet} (pcf)	w (%)	g_{dry} (pcf)	Proctor Name	MAX. g_{dry} (pcf)	OPT. w (%)	OPT. w, + (%)	OPT. w, - (%)	FIELD (%)	REQ. (%)	P / F	COMMENTS
4/23/2019	CCL-1	1st	Top of 4 West	Red Clay	132.6	12.8	117.6	RC1	118.6	13.4	3.0	3.0	99.1	95.0	PASS	
4/23/2019	CCL-2	1st and 2nd	Top of 4 West	Red Clay	141.6	14.6	123.6	RC1	118.6	13.4	3.0	3.0	104.2	95.0	PASS	
4/23/2019	CCL-3	2nd and 2nd	Top of 4 West	Red Clay	143.4	13.5	126.3	RC1	118.6	13.4	3.0	3.0	106.5	95.0	PASS	
4/23/2019	CCL-4	3rd and 2nd	Top of 4 West	Red Clay	130.3	11.2	117.2	RC1	118.6	13.4	3.0	3.0	98.8	95.0	PASS	
4/23/2019	CCL-5	3rd	Top of 4 West	Red Clay	131.2	11.3	117.9	RC1	118.6	13.4	3.0	3.0	99.4	95.0	PASS	
4/23/2019	CCL-6	3rd	Top of 4 West	Red Clay	129.8	11.4	116.5	RC1	118.6	13.4	3.0	3.0	98.2	95.0	PASS	
4/23/2019	CCL-7	1st and 2nd	Top of 4 West	Red Clay	128.1	10.8	115.6	RC1	118.6	13.4	3.0	3.0	97.5	95.0	PASS	
4/24/2019	CCL-8	1st and 2nd		Red Clay	145.0	12.9	128.4	RC1	118.6	13.4	3.0	3.0	108.3	95.0	PASS	
4/24/2019	CCL-9	1st and 2nd		Red Clay	141.0	13.1	124.7	RC1	118.6	13.4	3.0	3.0	105.1	95.0	PASS	
4/24/2019	CCL-10	1st and 2nd		Red Clay	142.4	13.4	125.6	RC1	118.6	13.4	3.0	3.0	105.9	95.0	PASS	
4/24/2019	CCL-11	3rd		Red Clay	135.2	14.6	118.0	RC1	118.6	13.4	3.0	3.0	99.5	95.0	PASS	
4/24/2019	CCL-12	3rd		Red Clay	133.5	14.3	116.8	RC1	118.6	13.4	3.0	3.0	98.5	95.0	PASS	
4/24/2019	CCL-13	2nd		Red Clay	143.1	13.4	126.2	RC1	118.6	13.4	3.0	3.0	106.4	95.0	PASS	
4/24/2019	CCL-14	2nd		Red Clay	136.4	15.2	118.4	RC1	118.6	13.4	3.0	3.0	99.8	95.0	PASS	
4/24/2019	CCL-15	2nd		Red Clay	139.7	15.6	120.8	RC1	118.6	13.4	3.0	3.0	101.9	95.0	PASS	
4/24/2019	CCL-16	2nd		Red Clay	144.6	14.0	126.8	RC1	118.6	13.4	3.0	3.0	106.9	95.0	PASS	
4/24/2019	CCL-17	2nd		Red Clay	138.1	13.1	122.1	RC1	118.6	13.4	3.0	3.0	103.0	95.0	PASS	
4/24/2019	CCL-18	2nd		Red Clay	137.0	12.6	121.7	RC1	118.6	13.4	3.0	3.0	102.6	95.0	PASS	
4/24/2019	CCL-19	2nd		Red Clay	137.2	14.9	119.4	RC1	118.6	13.4	3.0	3.0	100.7	95.0	PASS	
4/24/2019	CCL-20	3rd		Red Clay	132.9	16.2	114.4	RC1	118.6	13.4	3.0	3.0	96.4	95.0	PASS	
4/24/2019	CCL-21	3rd		Red Clay	139.3	12.6	123.7	RC1	118.6	13.4	3.0	3.0	104.3	95.0	PASS	
4/24/2019	CCL-22	3rd		Red Clay	130.6	13.4	115.2	RC1	118.6	13.4	3.0	3.0	97.1	95.0	PASS	
4/24/2019	CCL-23	3rd		Red Clay	129.5	11.3	116.4	RC1	118.6	13.4	3.0	3.0	98.1	95.0	PASS	
4/24/2019	CCL-24	3rd		Red Clay	134.5	11.9	120.2	RC1	118.6	13.4	3.0	3.0	101.3	95.0	PASS	
4/24/2019	CCL-25	3rd		Red Clay	138.7	13.9	121.8	RC1	118.6	13.4	3.0	3.0	102.7	95.0	PASS	

FIELD DENSITY TESTING RECORD (NUCLEAR METHOD)

PROJECT:	Amos Landfill - Sequence 4	PROJECT NO.:	C130109.10	TECHNICIAN:	Terry Queen, Kaleb Acree, Levi Filsinger, Joe Rose

DATE	TEST NO.	LIFT / ELEV.	LOCATION	SOIL DESCRIPTION (COLOR & TYPE, LIFT THICKNESS, ETC)	FIELD DENSITY g_{wet} (pcf)	FIELD DENSITY w (%)	FIELD DENSITY g_{dry} (pcf)	PROCTOR DENSITY Proctor Name	PROCTOR DENSITY MAX. g_{dry} (pcf)	PROCTOR DENSITY OPT. w (%)	PROCTOR DENSITY OPT. w, + (%)	PROCTOR DENSITY OPT. w, - (%)	COMPACTION FIELD (%)	COMPACTION REQ. (%)	COMPACTION P / F	COMMENTS
4/24/2019	CCL-26	3rd		Red Clay	136.8	15.7	118.2	RC1	118.6	13.4	3.0	3.0	99.7	95.0	PASS	
4/24/2019	CCL-27	3rd		Red Clay	136.5	12.3	121.5	RC1	118.6	13.4	3.0	3.0	102.5	95.0	PASS	
4/25/2019	CCL-28	4th		Red Clay	132.6	10.4	120.1	RC1	118.6	13.4	3.0	3.0	101.3	95.0	PASS	
4/25/2019	CCL-29	4th		Red Clay	137.4	13.5	121.1	RC1	118.6	13.4	3.0	3.0	102.1	95.0	PASS	
4/25/2019	CCL-30	4th		Red Clay	140.2	14.0	123.0	RC1	118.6	13.4	3.0	3.0	103.7	95.0	PASS	
4/25/2019	CCL-31	4th		Red Clay	141.3	13.5	124.5	RC1	118.6	13.4	3.0	3.0	105.0	95.0	PASS	
4/25/2019	CCL-32	4th		Red Clay	139.1	15.7	120.2	RC1	118.6	13.4	3.0	3.0	101.4	95.0	PASS	
4/25/2019	CCL-33	4th		Red Clay	138.7	11.7	124.2	RC1	118.6	13.4	3.0	3.0	104.7	95.0	PASS	
4/25/2019	CCL-34	4th		Red Clay	134.7	12.3	119.9	RC1	118.6	13.4	3.0	3.0	101.1	95.0	PASS	
4/25/2019	CCL-35	4th		Red Clay	128.2	12.3	114.2	RC1	118.6	13.4	3.0	3.0	96.3	95.0	PASS	
4/25/2019	CCL-36	4th		Red Clay	132.6	11.6	118.8	RC1	118.6	13.4	3.0	3.0	100.2	95.0	PASS	
4/25/2019	CCL-37	Berm		Red Clay	132.9	13.6	117.0	RC1	118.6	13.4	3.0	3.0	98.6	95.0	PASS	
4/25/2019	CCL-38	Berm 2nd		Red Clay	131.7	11.1	118.5	RC1	118.6	13.4	3.0	3.0	100.0	95.0	PASS	
4/25/2019	CCL-39	Berm 3rd		Red Clay	132.1	11.5	118.5	RC1	118.6	13.4	3.0	3.0	99.9	95.0	PASS	
4/25/2019	CCL-40	4th		Red Clay	133.6	10.4	121.0	RC1	118.6	13.4	3.0	3.0	102.0	95.0	PASS	
4/25/2019	CCL-41	4th		Red Clay	137.1	12.9	121.4	RC1	118.6	13.4	3.0	3.0	102.4	95.0	PASS	
4/25/2019	CCL-42	4th		Red Clay	128.6	12.4	114.4	RC1	118.6	13.4	3.0	3.0	96.5	95.0	PASS	
4/29/2019	CCL-43	1st		Red Clay	135.4	12.0	120.9	RC1	118.6	13.4	3.0	3.0	101.9	95.0	PASS	
4/29/2019	CCL-44	4th		Red Clay	133.9	16.4	115.0	RC1	118.6	13.4	3.0	3.0	97.0	95.0	PASS	
4/29/2019	CCL-45	4th		Red Clay	128.9	14.3	112.8	RC1	118.6	13.4	3.0	3.0	95.1	95.0	PASS	
4/29/2019	CCL-46	4th		Red Clay	138.7	14.5	121.1	RC1	118.6	13.4	3.0	3.0	102.1	95.0	PASS	
4/29/2019	CCL-47	4th		Red Clay	141.3	11.4	126.8	RC1	118.6	13.4	3.0	3.0	106.9	95.0	PASS	
4/29/2019	CCL-48	1st		Red Clay	132.4	12.8	117.4	RC1	118.6	13.4	3.0	3.0	99.0	95.0	PASS	
4/29/2019	CCL-49	1st and 2nd		Red Clay	138.0	10.9	124.4	RC1	118.6	13.4	3.0	3.0	104.9	95.0	PASS	
4/29/2019	CCL-50	1st and 2nd		Red Clay	137.6	10.4	124.6	RC1	118.6	13.4	3.0	3.0	105.1	95.0	PASS	

FIELD DENSITY TESTING RECORD (NUCLEAR METHOD)

PROJECT:	Amos Landfill - Sequence 4	PROJECT NO.:	C130109.10	TECHNICIAN:	Terry Queen, Kaleb Acree, Levi Filsinger, Joe Rose

					FIELD DENSITY			PROCTOR DENSITY					COMPACTION			
DATE	TEST NO.	LIFT / ELEV.	LOCATION	SOIL DESCRIPTION (COLOR & TYPE, LIFT THICKNESS, ETC)	g_{wet} (pcf)	w (%)	g_{dry} (pcf)	Proctor Name	MAX. g_{dry} (pcf)	OPT. w (%)	OPT. w, + (%)	OPT. w, - (%)	FIELD (%)	REQ. (%)	P / F	COMMENTS
4/29/2019	CCL-51	1st and 2nd		Red Clay	137.9	11.4	123.8	RC1	118.6	13.4	3.0	3.0	104.4	95.0	PASS	
4/29/2019	CCL-52	1st and 2nd		Red Clay	136.1	12.0	121.5	RC1	118.6	13.4	3.0	3.0	102.5	95.0	PASS	
4/30/2019	CCL-53	3rd		Red Clay	136.2	10.4	123.4	RC1	118.6	13.4	3.0	3.0	104.0	95.0	PASS	
4/30/2019	CCL-54	3rd		Red Clay	129.0	11.4	115.8	RC1	118.6	13.4	3.0	3.0	97.6	95.0	PASS	
5/1/2019	CCL-55	3rd & 4th		Red Clay	134.4	13.1	118.8	RC1	118.6	13.4	3.0	3.0	100.2	95.0	PASS	Changed Gauge
5/1/2019	CCL-56	3rd & 4th		Red Clay	135.7	12.0	121.2	RC1	118.6	13.4	3.0	3.0	102.2	95.0	PASS	
5/1/2019	CCL-57	3rd & 4th		Red Clay	138.2	13.0	122.3	RC1	118.6	13.4	3.0	3.0	103.1	95.0	PASS	
5/1/2019	CCL-58	3rd & 4th		Red Clay	140.8	11.4	126.4	RC1	118.6	13.4	3.0	3.0	106.6	95.0	PASS	
5/1/2019	CCL-59	3rd & 4th		Red Clay	130.7	11.5	117.2	RC1	118.6	13.4	3.0	3.0	98.8	95.0	PASS	
5/1/2019	CCL-60	3rd & 4th		Red Clay	135.6	12.5	120.5	RC1	118.6	13.4	3.0	3.0	101.6	95.0	PASS	
5/1/2019	CCL-61	1st & 2nd		Red Clay	130.1	14.5	113.6	RC1	118.6	13.4	3.0	3.0	95.8	95.0	PASS	
5/1/2019	CCL-62	1st & 2nd		Red Clay	132.2	10.5	119.6	RC1	118.6	13.4	3.0	3.0	100.9	95.0	PASS	
5/1/2019	CCL-63	3rd		Red Clay	134.2	12.7	119.1	RC1	118.6	13.4	3.0	3.0	100.4	95.0	PASS	
5/1/2019	CCL-64	3rd		Red Clay	131.1	13.2	115.8	RC1	118.6	13.4	3.0	3.0	97.6	95.0	PASS	
5/7/2019	CCL-65	1st		Red Clay	129.4	10.4	117.2	RC1	118.6	13.4	3.0	3.0	98.8	95.0	PASS	
5/7/2019	CCL-66	1st		Red Clay	129.9	11.3	116.7	RC1	118.6	13.4	3.0	3.0	98.4	95.0	PASS	
5/7/2019	CCL-67	2nd		Brown Clay with Rock Frags	127.1	10.9	114.6	t 13 - Samp	118.5	11.8	3.0	3.0	96.7	95.0	PASS	
5/7/2019	CCL-68	2nd		Brown Clay with Rock Frags	133.9	13.9	117.6	t 13 - Samp	118.5	11.8	3.0	3.0	99.2	95.0	PASS	
5/7/2019	CCL-69	3rd		Brown Clay with Rock Frags	130.3	11.6	116.8	t 13 - Samp	118.5	11.8	3.0	3.0	98.5	95.0	PASS	
5/7/2019	CCL-70	3rd		Brown Clay with Rock Frags	132.3	11.8	118.3	t 13 - Samp	118.5	11.8	3.0	3.0	99.9	95.0	PASS	
5/7/2019	CCL-71	4th		Brown Clay with Rock Frags	132.2	11.5	118.6	t 13 - Samp	118.5	11.8	3.0	3.0	100.1	95.0	PASS	
5/7/2019	CCL-72	4th		Brown Clay with Rock Frags	131.1	11.2	117.9	t 13 - Samp	118.5	11.8	3.0	3.0	99.5	95.0	PASS	
5/7/2019	CCL-73	4th		Red Clay	132.6	13.4	116.9	RC1	118.6	13.4	3.0	3.0	98.6	95.0	PASS	
5/7/2019	CCL-74	4th		Red Clay	126.6	11.1	114.0	RC1	118.6	13.4	3.0	3.0	96.1	95.0	PASS	
5/7/2019	CCL-75	4th		Red Clay	134.2	10.8	121.1	RC1	118.6	13.4	3.0	3.0	102.1	95.0	PASS	

FIELD DENSITY TESTING RECORD (NUCLEAR METHOD)

PROJECT:	Amos Landfill - Sequence 4	PROJECT NO.:	C130109.10	TECHNICIAN:	Terry Queen, Kaleb Acree, Levi Filsinger, Joe Rose

DATE	TEST NO.	LIFT / ELEV.	LOCATION	SOIL DESCRIPTION (COLOR & TYPE, LIFT THICKNESS, ETC)	FIELD DENSITY g_{wet} (pcf)	w (%)	g_{dry} (pcf)	PROCTOR DENSITY Proctor Name	MAX. g_{dry} (pcf)	OPT. w (%)	OPT. w, + (%)	OPT. w, - (%)	COMPACTION FIELD (%)	REQ. (%)	P / F	COMMENTS
5/7/2019	CCL-76	4th		Red Clay	131.0	11.8	117.2	RC1	118.6	13.4	3.0	3.0	98.8	95.0	PASS	
5/7/2019	CCL-77	4th		Red Clay	132.7	11.7	118.8	RC1	118.6	13.4	3.0	3.0	100.2	95.0	PASS	
5/7/2019	CCL-78	1st & 2nd		Red Clay	130.5	12.9	115.6	RC1	118.6	13.4	3.0	3.0	97.5	95.0	PASS	
5/8/2019	CCL-79	1st & 2nd		Red Clay	131.1	12.0	117.1	RC1	118.6	13.4	3.0	3.0	98.7	95.0	PASS	
5/8/2019	CCL-80	1st & 2nd		Red Clay	132.0	12.7	117.1	RC1	118.6	13.4	3.0	3.0	98.8	95.0	PASS	
5/8/2019	CCL-81	3rd & 4th		Red Clay	136.8	10.4	123.9	RC1	118.6	13.4	3.0	3.0	104.5	95.0	PASS	
5/8/2019	CCL-82	Subgrade		Brown Clay with Rock Frags	133.3	14.3	116.6	t 13 - Samp	118.5	11.8	3.0	3.0	98.4	95.0	PASS	
5/8/2019	CCL-83	Subgrade		Brown Clay with Rock Frags	137.5	12.1	122.7	t 13 - Samp	118.5	11.8	3.0	3.0	103.5	95.0	PASS	
5/8/2019	CCL-84	Subgrade		Brown Clay with Rock Frags	135.6	13.8	119.2	t 13 - Samp	118.5	11.8	3.0	3.0	100.6	95.0	PASS	
5/8/2019	CCL-85	Subgrade		Brown Clay with Rock Frags	134.7	12.5	119.7	t 13 - Samp	118.5	11.8	3.0	3.0	101.0	95.0	PASS	
5/8/2019	CCL-86	Subgrade		Brown Clay with Rock Frags	138.0	12.3	122.9	t 13 - Samp	118.5	11.8	3.0	3.0	103.7	95.0	PASS	
5/8/2019	CCL-87	1st & 2nd		Red Clay	132.4	13.4	116.8	RC1	118.6	13.4	3.0	3.0	98.4	95.0	PASS	
5/8/2019	CCL-88	2nd & 3rd		Red Clay	129.3	13.2	114.2	RC1	118.6	13.4	3.0	3.0	96.3	95.0	PASS	
5/8/2019	CCL-89	3rd		Red Clay	130.2	14.9	113.3	RC1	118.6	13.4	3.0	3.0	95.5	95.0	PASS	
5/8/2019	CCL-90	4th		Red Clay	129.2	12.5	114.8	RC1	118.6	13.4	3.0	3.0	96.8	95.0	PASS	
5/8/2019	CCL-91	Upper Slope	West Central	Red Clay	131.4	12.0	117.3	RC1	118.6	13.4	3.0	3.0	98.9	95.0	PASS	
5/8/2019	CCL-92	Upper Slope	West Central	Red Clay	137.4	10.6	124.2	RC1	118.6	13.4	3.0	3.0	104.7	95.0	PASS	
5/8/2019	CCL-93	4th		Red Clay	132.2	12.1	117.9	RC1	118.6	13.4	3.0	3.0	99.4	95.0	PASS	
5/8/2019	CCL-94	4th		Red Clay	135.6	11.6	121.5	RC1	118.6	13.4	3.0	3.0	102.4	95.0	PASS	
5/8/2019	CCL-95	Top	North Side Berm	Red Clay	128.8	11.6	115.4	RC1	118.6	13.4	3.0	3.0	97.3	95.0	PASS	
5/8/2019	CCL-96	Top	North Side Berm	Red Clay	141.6	10.5	128.1	RC1	118.6	13.4	3.0	3.0	108.0	95.0	PASS	
5/8/2019	CCL-97	1st		Red Clay	132.6	11.5	118.9	RC1	118.6	13.4	3.0	3.0	100.3	95.0	PASS	
5/9/2019	CCL-98	Subgrade	West Area - North Slope	Brown Clay with Rock Frags	125.5	13.8	110.3	t 13 - Samp	118.5	11.8	3.0	3.0	93.1			Subgrade Test - No Criteria for Acceptance
5/9/2019	CCL-99	Subgrade	West Area - North Slope	Brown Clay with Rock Frags	118.8	14.8	103.5	t 13 - Samp	118.5	11.8	3.0	3.0	87.3			Subgrade Test - No Criteria for Acceptance
5/9/2019	CCL-100	1st & 2nd		Red Clay	134.8	11.7	120.7	RC1	118.6	13.4	3.0	3.0	101.8	95.0	PASS	

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FIELD DENSITY TESTING RECORD (NUCLEAR METHOD)

PROJECT:	Amos Landfill - Sequence 4	PROJECT NO.:	C130109.10	TECHNICIAN:	Terry Queen, Kaleb Acree, Levi Filsinger, Joe Rose

DATE	TEST NO.	LIFT / ELEV.	LOCATION	SOIL DESCRIPTION (COLOR & TYPE, LIFT THICKNESS, ETC)	FIELD DENSITY g_{wet} (pcf)	w (%)	g_{dry} (pcf)	PROCTOR DENSITY Proctor Name	MAX. g_{dry} (pcf)	OPT. w (%)	OPT. w, + (%)	OPT. w, - (%)	COMPACTION FIELD (%)	REQ. (%)	P / F	COMMENTS
5/9/2019	CCL-101	3rd		Red Clay	128.7	12.4	114.5	RC1	118.6	13.4	3.0	3.0	96.5	95.0	PASS	
5/9/2019	CCL-102	No Test														
5/9/2019	CCL-103	Subgrade	West Area - Top Section	Brown Clay with Rock Frags	128.0	11.2	115.1	t 13 - Samp	118.5	11.8	3.0	3.0	97.1			Subgrade Test - No Criteria for Acceptance
5/10/2019	CCL-104	1st & 2nd		Red Clay	130.3	12.4	115.9	RC1	118.6	13.4	3.0	3.0	97.7	95.0	PASS	
5/10/2019	CCL-105	1st & 2nd		Red Clay	130.1	13.0	115.1	RC1	118.6	13.4	3.0	3.0	97.1	95.0	PASS	
5/10/2019	CCL-106	3rd		Red Clay	129.1	13.8	113.4	RC1	118.6	13.4	3.0	3.0	95.7	95.0	PASS	
5/10/2019	CCL-107	3rd		Red Clay	136.1	13.5	119.9	RC1	118.6	13.4	3.0	3.0	101.1	95.0	PASS	
5/10/2019	CCL-108	4th		Red Clay	130.7	15.9	112.8	RC1	118.6	13.4	3.0	3.0	95.1	95.0	PASS	
5/14/2019	CCL-109	3rd		Red Clay	131.6	15.5	113.9	RC1	118.6	13.4	3.0	3.0	96.1	95.0	PASS	
5/14/2019	CCL-110	Subgrade	West Area - North Slope	Brown Clay with Rock Frags	129.1	13.7	113.5	t 13 - Samp	118.5	11.8	3.0	3.0	95.8			Subgrade Test - No Criteria for Acceptance
5/14/2019	CCL-111	4th		Red Clay	135.8	14.5	118.6	RC1	118.6	13.4	3.0	3.0	100.0	95.0	PASS	
5/14/2019	CCL-112	Subgrade	West Area - North Slope	Brown Clay with Rock Frags	126.4	11.7	113.2	t 13 - Samp	118.5	11.8	3.0	3.0	95.5			Subgrade Test - No Criteria for Acceptance
5/14/2019	CCL-113	Subgrade	West Area - North Slope	Brown Clay with Rock Frags	135.6	10.4	122.8	t 13 - Samp	118.5	11.8	3.0	3.0	103.7			Subgrade Test - No Criteria for Acceptance
5/14/2019	CCL-114	1st		Red Clay	133.2	14.2	116.6	RC1	118.6	13.4	3.0	3.0	98.3	95.0	PASS	
5/14/2019	CCL-115	1st		Red Clay	132.7	12.4	118.1	RC1	118.6	13.4	3.0	3.0	99.5	95.0	PASS	
5/14/2019	CCL-116	2nd		Red Clay	136.2	15.0	118.4	RC1	118.6	13.4	3.0	3.0	99.9	95.0	PASS	
5/14/2019	CCL-117	2nd		Red Clay	131.5	12.9	116.5	RC1	118.6	13.4	3.0	3.0	98.2	95.0	PASS	
5/14/2019	CCL-118	4th		Red Clay	135.1	15.3	117.2	RC1	118.6	13.4	3.0	3.0	98.8	95.0	PASS	
5/14/2019	CCL-119	2nd		Red Clay	130.2	11.3	117.0	RC1	118.6	13.4	3.0	3.0	98.6	95.0	PASS	
5/14/2019	CCL-120	3rd		Red Clay	131.3	13.6	115.6	RC1	118.6	13.4	3.0	3.0	97.5	95.0	PASS	
5/14/2019	CCL-121	3rd		Red Clay	130.8	12.8	116.0	RC1	118.6	13.4	3.0	3.0	97.8	95.0	PASS	
5/14/2019	CCL-122	4th		Red Clay	132.7	12.4	118.1	RC1	118.6	13.4	3.0	3.0	99.5	95.0	PASS	
5/15/2019	CCL-123	4th		Red Clay	129.1	11.8	115.5	RC1	118.6	13.4	3.0	3.0	97.4	95.0	PASS	
5/15/2019	CCL-124	4th		Red Clay	131.8	16.1	113.5	RC1	118.6	13.4	3.0	3.0	95.7	95.0	PASS	
5/24/2019	CCL-125	1st		Red Clay	133.7	12.9	118.4	RC1	118.6	13.4	3.0	3.0	99.9	95.0	PASS	

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DATE	TEST NO.	LIFT / ELEV.	LOCATION	SOIL DESCRIPTION (COLOR & TYPE, LIFT THICKNESS, ETC)	FIELD DENSITY g_{wet} (pcf)	w (%)	g_{dry} (pcf)	PROCTOR DENSITY Proctor Name	MAX. g_{dry} (pcf)	OPT. w (%)	OPT. w, + (%)	OPT. w, - (%)	COMPACTION FIELD (%)	REQ. (%)	P / F	COMMENTS
5/24/2019	CCL-126	2nd		Red Clay	130.5	14.5	114.0	RC1	118.6	13.4	3.0	3.0	96.1	95.0	PASS	
5/24/2019	CCL-127	2nd		Red Clay	139.9	13.7	123.0	RC1	118.6	13.4	3.0	3.0	103.7	95.0	PASS	
5/24/2019	CCL-128	2nd		Red Clay	131.1	14.6	114.4	RC1	118.6	13.4	3.0	3.0	96.5	95.0	PASS	
5/24/2019	CCL-129	3rd		Red Clay	131.7	15.7	113.8	RC1	118.6	13.4	3.0	3.0	96.0	95.0	PASS	
5/24/2019	CCL-130	3rd		Red Clay	131.9	14.3	115.4	RC1	118.6	13.4	3.0	3.0	97.3	95.0	PASS	
5/24/2019	CCL-131	3rd		Red Clay	137.9	13.2	121.8	RC1	118.6	13.4	3.0	3.0	102.7	95.0	PASS	
5/28/2019	CCL-132	4th		Red Clay	131.0	16.1	112.8	RC1	118.6	13.4	3.0	3.0	95.1	95.0	PASS	
5/28/2019	CCL-133	4th		Red Clay	135.7	12.7	120.4	RC1	118.6	13.4	3.0	3.0	101.5	95.0	PASS	
5/28/2019	CCL-134	4th		Red Clay	134.6	16.0	116.0	RC1	118.6	13.4	3.0	3.0	97.8	95.0	PASS	Sand Cone 001
5/28/2019	CCL-135	1st		Red Clay	127.4	11.9	113.9	RC1	118.6	13.4	3.0	3.0	96.0	95.0	PASS	
5/28/2019	CCL-136	2nd		Red Clay	135.8	11.9	121.4	RC1	118.6	13.4	3.0	3.0	102.3	95.0	PASS	
5/28/2019	CCL-137	Subgrade	East Area - South Slope	Brown Clay with Rock Frags	141.2	9.6	128.8	t 13 - Samp	118.5	11.8	3.0	3.0	108.7			Subgrade Test - No Criteria for Acceptance
5/28/2019	CCL-138	2nd		Red Clay	130.3	11.3	117.1	RC1	118.6	13.4	3.0	3.0	98.7	95.0	PASS	
5/29/2019	CCL-139	Subgrade	East Area - South Slope	Brown Clay with Rock Frags	129.9	13.9	114.0	t 13 - Samp	118.5	11.8	3.0	3.0	96.2			Subgrade Test - No Criteria for Acceptance
5/29/2019	CCL-140	4th		Red Clay	135.9	14.9	118.3	RC1	118.6	13.4	3.0	3.0	99.7	95.0	PASS	
5/29/2019	CCL-141	4th		Red Clay	137.5	15.9	118.6	RC1	118.6	13.4	3.0	3.0	100.0	95.0	PASS	
5/30/2019	CCL-142	1st		Red Clay	134.6	13.3	118.8	RC1	118.6	13.4	3.0	3.0	100.2	95.0	PASS	
6/14/2019	CCL-143	4th		Red Clay	134.1	13.0	118.7	RC1	118.6	13.4	3.0	3.0	100.1	95.0	PASS	
6/14/2019	CCL-144	2nd		Red Clay	130.0	11.5	116.6	RC1	118.6	13.4	3.0	3.0	98.3	95.0	PASS	Sand Cone 002
6/14/2019	CCL-145	2nd		Red Clay	131.3	15.9	113.3	RC1	118.6	13.4	3.0	3.0	95.5	95.0	PASS	
6/15/2019	CCL-146	2nd		Red Clay	128.1	13.4	113.0	RC1	118.6	13.4	3.0	3.0	95.2	95.0	PASS	
6/15/2019	CCL-147	3rd		Red Clay	134.0	14.0	117.5	RC1	118.6	13.4	3.0	3.0	99.1	95.0	PASS	
6/15/2019	CCL-148	3rd		Red Clay	134.4	14.1	117.8	RC1	118.6	13.4	3.0	3.0	99.3	95.0	PASS	
6/26/2019	CCL-149	2nd	North Top Slope	Red Clay	128.9	12.8	114.3	RC1	118.6	13.4	3.0	3.0	96.4	95.0	PASS	
6/26/2019	CCL-150	3rd	North Top Slope	Red Clay	129.3	14.7	112.7	RC1	118.6	13.4	3.0	3.0	95.0	95.0	PASS	

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DATE	TEST NO.	LIFT / ELEV.	LOCATION	SOIL DESCRIPTION (COLOR & TYPE, LIFT THICKNESS, ETC)	FIELD DENSITY g_{wet} (pcf)	w (%)	g_{dry} (pcf)	PROCTOR DENSITY Proctor Name	MAX. g_{dry} (pcf)	OPT. w (%)	OPT. w, + (%)	OPT. w, - (%)	COMPACTION FIELD (%)	REQ. (%)	P / F	COMMENTS
6/26/2019	CCL-151	4th	South Slope Bottom	Red Clay	135.2	15.5	117.1	RC1	118.6	13.4	3.0	3.0	98.7	95.0	PASS	
6/27/2019	CCL-152	1st	South Slope Bowl	Red Clay	130.9	15.4	113.4	RC1	118.6	13.4	3.0	3.0	95.6	95.0	PASS	
6/27/2019	CCL-153	2nd	South Slope Bowl	Red Clay	132.3	14.8	115.2	RC1	118.6	13.4	3.0	3.0	97.2	95.0	PASS	
6/27/2019	CCL-154	3rd	South Slope Bowl	Red Clay	134.1	15.4	116.2	RC1	118.6	13.4	3.0	3.0	98.0	95.0	PASS	
6/28/2019	CCL-155	1st	North Slope Middle	Red Clay	130.0	15.2	112.8	RC1	118.6	13.4	3.0	3.0	95.1	95.0	PASS	
6/28/2019	CCL-156	2nd	North Slope Top	Red Clay	133.0	15.3	115.4	RC1	118.6	13.4	3.0	3.0	97.3	95.0	PASS	
6/28/2019	CCL-157	4th	South Slope Bottom	Red Clay	136.3	15.7	117.8	RC1	118.6	13.4	3.0	3.0	99.3	95.0	PASS	
6/28/2019	CCL-158	4th	North Slope Top	Red Clay	129.9	14.2	113.7	RC1	118.6	13.4	3.0	3.0	95.9	95.0	PASS	
6/28/2019	CCL-159	3rd	North Slope Bowl	Red Clay	132.5	14.2	116.0	RC1	118.6	13.4	3.0	3.0	97.8	95.0	PASS	Sand Cone 003
6/29/2019	CCL-160	4th	North Slope Bottom	Red Clay	135.1	15.3	117.2	RC1	118.6	13.4	3.0	3.0	98.8	95.0	PASS	
6/29/2019	CCL-161	1st	North Slope Bottom	Red Clay	131.9	16.0	113.7	RC1	118.6	13.4	3.0	3.0	95.9	95.0	PASS	
6/29/2019	CCL-162	2nd	North Slope Bottom	Red Clay	127.3	13.0	112.7	RC1	118.6	13.4	3.0	3.0	95.0	95.0	PASS	
7/1/2019	CCL-163	3rd	North Slope Bottom	Red Clay	131.1	15.0	114.0	RC1	118.6	13.4	3.0	3.0	96.1	95.0	PASS	
7/1/2019	CCL-164	4th	North Slope Bowl	Red Clay	132.8	14.9	115.6	RC1	118.6	13.4	3.0	3.0	97.5	95.0	PASS	
7/2/2019	CCL-165	2nd	East Area North Slope	Red Clay	127.4	12.5	113.2	RC1	118.6	13.4	3.0	3.0	95.5	95.0	PASS	
7/2/2019	CCL-166	3rd	East Area North Slope	Red Clay	126.0	11.1	113.4	RC1	118.6	13.4	3.0	3.0	95.6	95.0	PASS	
7/9/2019	CCL Repair		West Area North Slope Top	Red Clay	143.5	14.2	125.7	RC1	118.6	13.4	3.0	3.0	106.0	95.0	PASS	
7/9/2019	CCL Repair		West Area North Slope Mid	Red Clay	140.7	15.4	121.9	RC1	118.6	13.4	3.0	3.0	102.8	95.0	PASS	
7/9/2019	CCL Repair		West Area North Slope Bottom	Red Clay	141.8	15.8	122.5	RC1	118.6	13.4	3.0	3.0	103.2	95.0	PASS	
7/9/2019	CCL-167	1st	East Area North Slope Bottom	Red Clay	133.9	16.0	115.4	RC1	118.6	13.4	3.0	3.0	97.3	95.0	PASS	
7/9/2019	CCL-168	2nd	East Area North Slope Bottom	Red Clay	132.2	13.8	116.2	RC1	118.6	13.4	3.0	3.0	98.0	95.0	PASS	
7/9/2019	CCL-169	3rd	Central Area North Slope Btm	Red Clay	129.5	13.1	114.5	RC1	118.6	13.4	3.0	3.0	96.5	95.0	PASS	
7/10/2019	CCL-170	4th	Central Area North Slope Btm	Red Clay	130.1	15.2	112.9	RC1	118.6	13.4	3.0	3.0	95.2	95.0	PASS	
7/12/2019	CCL-171	1st	Central Area North Slope	Red Clay	131.7	15.5	114.0	RC1	118.6	13.4	3.0	3.0	96.1	95.0	PASS	
7/12/2019	CCL Repair		East Area Bowl	Red Clay	134.7	11.7	120.6	RC1	118.6	13.4	3.0	3.0	101.7	95.0	PASS	

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PROJECT:	Amos Landfill - Sequence 4	PROJECT NO.:	C130109.10	TECHNICIAN:	Terry Queen, Kaleb Acree, Levi Filsinger, Joe Rose

DATE	TEST NO.	LIFT / ELEV.	LOCATION	SOIL DESCRIPTION (COLOR & TYPE, LIFT THICKNESS, ETC)	FIELD DENSITY			PROCTOR DENSITY					COMPACTION			COMMENTS
					g_{wet} (pcf)	w (%)	g_{dry} (pcf)	Proctor Name	MAX. g_{dry} (pcf)	OPT. w (%)	OPT. w, + (%)	OPT. w, - (%)	FIELD (%)	REQ. (%)	P / F	
7/12/2019	CCL-172	2nd	Central Area NE Slope	Red Clay	137.4	14.1	120.4	RC1	118.6	13.4	3.0	3.0	101.5	95.0	PASS	
7/15/2019	CCL-173	3rd	Central Area NE Slope	Red Clay	134.2	13.5	118.2	RC1	118.6	13.4	3.0	3.0	99.7	95.0	PASS	
7/15/2019	CCL-174	4th	Central Area NE Slope	Red Clay	131.9	15.8	113.9	RC1	118.6	13.4	3.0	3.0	96.0	95.0	PASS	

ATTACHMENT 3

PVC GEOMEMBRANE CERTIFICATION

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Sequence 4 PVC Geomembrane Certification

American Electric Power
John E. Amos Landfill
John E. Amos Power Plant
Winfield, West Virginia

GAI Project Number: C130109.10, Task 003
November 2019

Prepared by: GAI Consultants, Inc.
Charleston Office
300 Summers Street, Suite 1100
Charleston, West Virginia 25301-1631

Prepared for: American Electric Power
1 Riverside Plaza
Columbus, Ohio 43215

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Senior Engineering Manager

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GAI Consultants, Inc. Certification

Based on the construction testing and observations performed by American Electric Power (AEP) and GAI Consultants, Inc. (GAI) personnel, I hereby certify that the PVC Geomembrane within Sequence 4 at the Appalachian Power Company's John E. Amos Flue Gas Desulfurization (FGD) Landfill near Winfield, West Virginia (WV), as shown on Drawing C130109-10-003-00-E2-001 "Sequence 4 PVC Geomembrane Liner Panel Layout" (Appendix C-I) and Drawing C130109-10-003-00-E2-002 "Sequence 4 PVC Geomembrane Liner Repairs" (Appendix C-III), has been installed in substantial compliance with the material specifications and construction requirements listed in the WV National Pollutant Discharge Elimination System/Solid Waste Permit (NPDES WV0116254) documents; 40 Code of Federal Regulations Part 257 (the CCR Rule); and the "2018-2020 Site Work Construction, Sequence 4" construction documents. AEP survey personnel provided survey data used to develop the Record Drawings and verify that the PVC Geomembrane installation met the permit requirements.

This document clarifies "certification" for the PVC Geomembrane installation within Sequence 4 at the Amos FGD Landfill.

The definition of certify as used herein is: Certify means to state or declare a professional opinion of conditions whose true properties cannot be known at the time such certification was made, despite appropriate professional evaluation. A design professional's certification in no way relieves any other party from meeting requirements imposed by contract or other means, including commonly-accepted industry practices.

Bearing the above in mind and based on the results of: (1) Certification from the material manufacturers and installation meeting the requirements of the Specifications, the CCR Rule, and the WV Department of Environmental Protection (WVDEP) permit; (2) results of field and laboratory testing; and (3) monitoring of construction efforts during the project; GAI's professional opinion is that the PVC Geomembrane installation within Sequence 4 of the Amos FGD Landfill meets the requirements as set forth by the permit documents and the CCR Rule.

Charles Straley

Charles F. Straley, PE, PLS
Certifying Engineer and Quality Assurance Officer
PE #11842
PLS #1888

CHARLES F. STRALEY
REGISTERED
11842
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
11-11-19

CHARLES F. STRALEY
LICENSED
No. 1888
STATE OF
WEST VIRGINIA
PROFESSIONAL SURVEYOR
11-11-19

1.0 Introduction

1.1 Project Description

This PVC Geomembrane Certification documents the testing and observations performed during the installation of the 30 mil polyvinyl chloride (PVC) geomembrane liner in Sequence 4 at American Electric Power's (AEP's) John E. Amos FGD Landfill (Landfill) in Winfield, West Virginia (WV). The location of Sequence 4 at the Amos Landfill is shown on Figure 1. Appendix A contains typical construction photographs included in the daily reports. Construction of the Sequence 4 site described in this certification report consists of the following:

- Construction activities associated with the installation of the 30 mil PVC geomembrane.

1.2 Associated Landfill Construction

Construction of the groundwater control and subgrade preparation, including placement of structural fill to meet the compacted clay liner (CCL) subgrade elevations, begin in April 2018 and is documented in the "Sequence 4 Groundwater Control and Subgrade Certification Report", September 2019.

Construction of the CCL in Sequence 4 began in April 2019 and was completed in August 2019 and is documented in the "Sequence 4 Compacted Clay Liner Certification Report", September 2019.

Installation of the PVC geomembrane began in May 2019. Installation was in accordance with the approved Quality Assurance/Quality Control (QA/QC) Plan; the Landfill's Solid Waste/National Pollutant Discharge Elimination System (NPDES) permit (Permit No. WV0116254); WV Department of Environmental Protection (WVDEP) Title 33, Series 1, Solid Waste Management Rule; 40 Code of Federal Regulations Part 257 [the Coal Combustion Residuals (CCR) Rule]; and AEP's Civil Engineering Division Technical Specifications for Material Construction; and associated Project Addenda to the Specifications. Included in this report are the field information and the applicable Record Drawings in accordance with the WVDEP requirements. The construction QA (CQA) services performed by GAI are discussed in the following sections.

1.3 Companies and Personnel

The key companies and personnel involved with the construction of Sequence 4 are listed below.

AEP - Owner
Appalachian Power Company - Operator
Keith Burger, Project Manager
John Massey-Norton, Senior Geologist
Brian Palmer, Principal Civil Engineer
Carl Skidmore, Regional Construction Manager
Brandon Schmader, Lead Construction Coordinator
T. Coty Sheppard, Survey Coordinator

GAI Consultants, Inc. (GAI) - CQA/Soil Testing
Charles F. Straley, PE, PLS, Certifying Engineer and QA Officer (QAO)
Mark R. Lehner, PE, Project Manager
Terry W. Queen, Lead QC Inspector (QCI)

R. B. Jergens, Inc. (RBJ) - General Contractor
Jake Warner, Project Manager
Mike Davis, Superintendent

1.4 Scope of Services

1.4.1 Preconstruction Activities

Preconstruction activities conducted by GAI personnel consisted of the following:

1. conducting inventory of on-site PVC geomembrane materials;
2. review of PVC geomembrane manufacturer's submittals for compliance with project and permit specifications; and
3. collecting compliance samples for laboratory testing and review of results for compliance with project and permit specifications.

1.4.2 Construction Documentation Activities

Construction documentation activities performed by GAI personnel included the following:

1. documenting and observing the CCL surface prior to the placement of PVC geomembrane;
2. observing and documenting the installation and field testing of the PVC geomembrane;
3. preparing daily field reports and documenting construction activities; GAI also attended daily health and safety meetings, weekly project update meetings, and monthly contractor's meetings, as well as other supplemental meetings when needed; and
4. providing photo documentation throughout construction showing typical construction procedures (see Appendix A).

1.4.3 Record Drawings and Certification Report

Documentation and certification activities performed by the QA/QC team included the following:

1. AEP provided surveying services for the Record Drawings presented in Appendix C. The panel layout is presented on Drawing C130109-10-003-00-E2-001 "Sequence 4 PVC Geomembrane Liner Panel Layout" (Appendix C-I). Repairs made to the PVC geomembrane liner are shown on Drawing C130109-10-003-00-E2-002 "Sequence 4 PVC Geomembrane Liner Repairs" (Appendix C-III).
2. GAI personnel performed the construction documentation activities discussed in Sections 1.4.1 and 1.4.2 of this report.
3. Project personnel observed the construction activities and provided the enclosed information documenting that the construction activities were performed consistent with the design and permit requirements.

1.5 Construction Schedule

Site clearing and grubbing, excavation and fill placement for subgrade, the installation of groundwater controls and subgrade, and construction of the CCL were performed prior to installation of the PVC geomembrane. Construction of the PVC geomembrane in Sequence 4 began in May 2019 and was completed in August 2019.

1.6 Reference Documents

The plans, specifications, and QA requirements for the construction activities and materials used by GAI personnel for this project are as follows:

1. Solid Waste/NPDES Permit No. WV0116254.
2. AEP Civil Engineering Division, Technical Specifications for Material and Construction (prepared by AEP), and the Addenda to the Technical Specifications (prepared by GAI).
3. "Quality Assurance and Quality Control Plan, John E. Amos Landfill" for the Appalachian Power Company John E. Amos Plant's Amos FGD Landfill (March 2006 and revised October 2017, prepared by GAI).
4. Amos FGD Landfill Sequence 4 Construction Drawings (issued for construction August 2017 and re-issued January 2018, prepared by GAI)

2.0 PVC Geomembrane Liner

The 30 mil PVC geomembrane will serve as the primary containment mechanism for FGD material and the leachate generated. The geomembrane was deployed over the Sequence 4 compacted clay liner.

The PVC geomembrane material was manufactured by Plastatech Engineering, Ltd. (Plastatech) of Saginaw, Michigan. The geomembrane material was fabricated into the installation panels by Titan Environmental USA of Houston, Texas. Hallaton Environmental Linings was the installer of the geomembrane. QA observation was provided by AEP and GAI representatives. The geomembrane was tested and installed in accordance with the requirements of the Landfill's approved QA/QC plan and the manufacturer's recommended procedures.

The PVC geomembrane panels were delivered to the site beginning in May 2019. The manufacturing QC testing and installer's QA/QC manual were reviewed at the beginning of Sequence 4 construction, and QA conformance testing was performed once production of the liner material started.

2.1 Manufacturing QC

To monitor the quality of the geomembrane produced, Plastatech performed QC testing on selected rolls of geomembrane. Appendix B-I contains QC test data from Plastatech for the geomembrane material used in the construction of Sequence 4. The test data indicated that the geomembrane meets permit and project specifications.

2.2 Conformance Testing

As part of GAI's QA documentation, 22 30 mil PVC geomembrane samples were collected from the material to be used for the construction of Sequence 4. The samples were collected at the manufacturing facility by Geotechnics, Inc, an independent geotechnical and geosynthetics testing laboratory, and submitted to Geotechnics' laboratory for analyses. Conformance test data for the material is included in Appendix B-II, which confirmed that the PVC geomembrane material was acceptable.

2.3 Geomembrane Installation

The geomembrane material was fabricated into panels by Titan Environmental, in accordance with the proposed panel layout. Prior to geomembrane placement, the surface of the compacted clay liner was inspected by GAI representatives to determine that the clay liner was free of objects that might cause damage to the geomembrane (e.g., sharp gravel, etc.). As each panel section of the PVC geomembrane was placed, it was assigned a field panel number. The field panel numbers were assigned generally according to their order of deployment. The panel layout drawing C130109-10-003-00-E2-001 "Sequence 4 PVC Geomembrane Liner Panel Layout", located in Appendix C-I, was prepared by Hallaton from field notes and field survey information obtained by AEP surveying. A table that cross-references panel numbers to the PVC manufacturer's roll numbers is included with the panel layout drawing in Appendix C-I.

2.4 Pre-Weld QC

Trial welds were performed for the fusion welds to verify that the PVC geomembrane and fusion welder provided an adequate weld. The test seams were cut into test strips (coupons) and destructive tests were performed in the field to assess whether the seam welds were adequate for the weather conditions, sheet temperature, etc. These tests were performed under the observation of GAI representatives. Adjustments to seaming operations were made, as needed, to demonstrate compliance with the project specifications. Documentation of the trial welds is provided in Appendix C-II.

2.5 Production Seam QC

As part of the QA/QC program, destructive samples were collected and tested at a minimum frequency of one per every 1,000 lineal feet of total seam length per day. The following information was recorded for each destructive sample:

1. Destructive test number;
2. Seam identification and location;
3. Seamer's initials; and
4. Date on which it was seamed.

A total of 32 QA/QC destructive test locations were sampled by GAI representatives for the certified area. The test coupons were tested in the laboratory by Geotechnics. A portion of each destructive sample was archived for future reference. A summary table with the destructive sample locations, seaming information, and average QA laboratory test results is presented in Appendix B-III. Geotechnics' laboratory data sheets for the destructive tests are also located in Appendix B-III. A passing destructive sample is defined as: (1) a sample in which at least four out of the five test coupons pass the project specifications [minimum required values of 18 pounds per inch (ppi) for peel strength and 58.4 ppi for shear strength], and (2) the average for all five test coupons of a sample must be greater than the minimum required value.

Destruct samples were field tested by the installer and submitted for laboratory testing. The field testing generally consisted of 5 coupons tested for peel strength and 5 coupons tested for shear strength. All destruct samples produced passing test results except for four (4) tests.

In accordance with the QA/QC Manual, offset samples on both sides of the four (4) failing tests were collected to be tested All of the offset samples passed the testing. The area between the offset samples was then cap seamed over the failing test area.

2.6 Non-Destructive Seam Testing

The single-track fusion welded seams were inspected by Hallaton and GAI representatives and non-destructively tested for continuity by air lance testing. A representative from GAI was present to observe the air lance testing and record the results. Documentation of the air lance results is in Appendix C-IV.

During air lance testing, a seam was determined to have failed if a hole, gap or flap was exposed by the compressed air. Repairs were made by either heat sealing the area or placing a patch. The repair was then air lanced to ensure an air-tight bond.

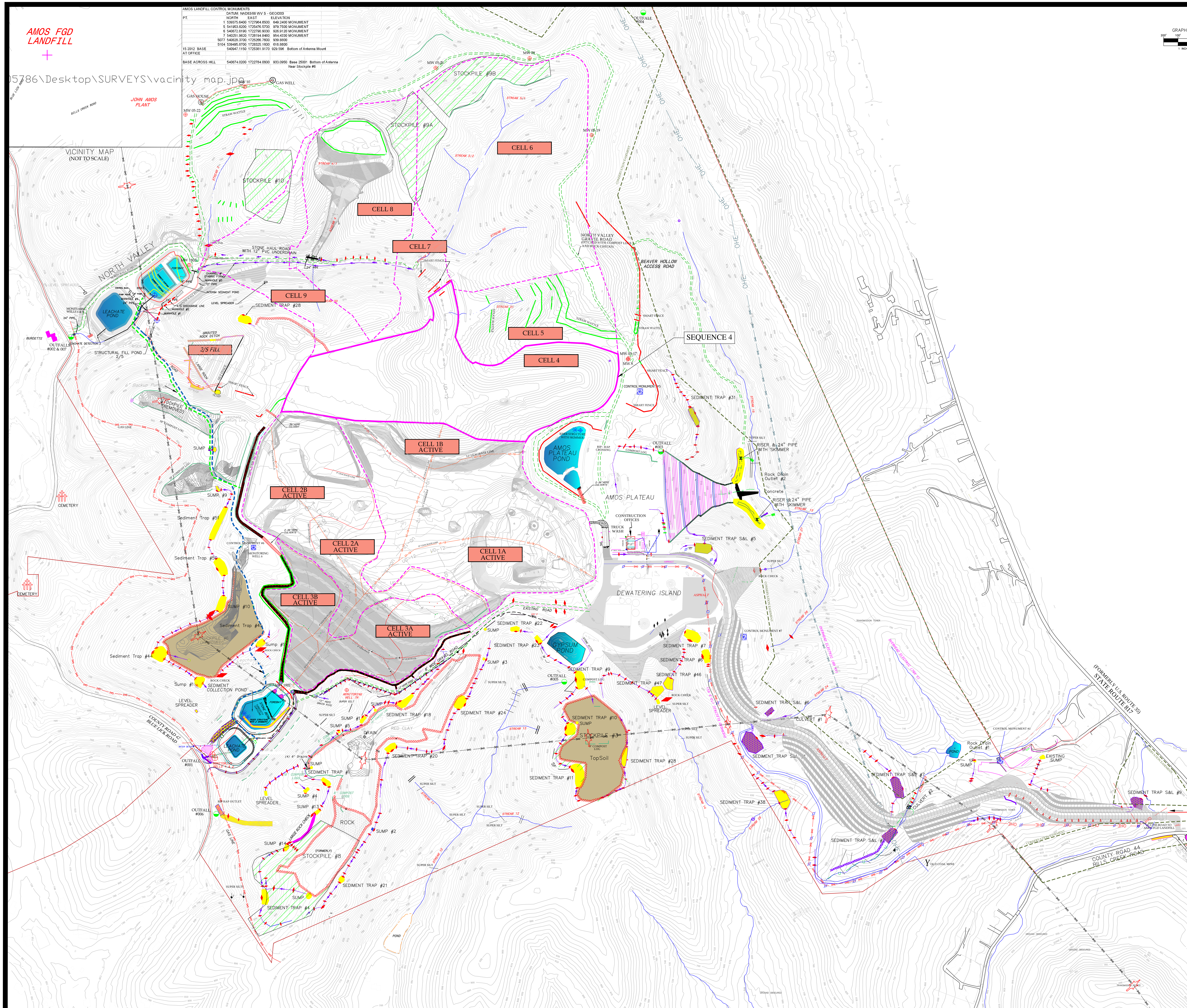
2.7 Repairs and Air Lance Testing

QC testing was completed by air lance as described in Section 2.6. Any necessary repairs were completed in accordance with the manufacturer's recommendations. Repair locations are shown on Drawing C130109-10-003-00-E2-002 "Sequence 4 PVC Geomembrane Liner Repairs" in Appendix C-III. Results of the air lance testing on the repairs are also provided in Appendix C-III.

3.0 Summary

The construction work documented in this report was completed in accordance with the design and specifications presented in the applicable WVDEP Solid Waste/NPDES Permit (No. WV0116254), the CCR Rule, and the construction documents listed in this report. The field activities documented in this report represent the CQA services provided for the PVC Geomembrane installation within Sequence 4 at the Landfill.

FIGURE



AMOS LANDFILL CONTROL MONUMENTS				
	DATUM: NAD83/88 WV S - GEOID03			
PT.	NORTH	EAST	ELEVATION	
1	539375.6400	1727964.6500	649.2400	MONUMENT
5	541953.8200	1725476.5700	979.7500	MONUMENT
6	540872.8190	1722790.9030	926.9120	MONUMENT
7	540251.9820	1726194.8480	954.4330	MONUMENT
5077	540828.3700	1725266.7600	939.8800	
5104	539495.8700	1728325.1600	618.8800	
15 2012 BASE AT OFFICE	540947.1150	1725381.9170	929.596	Bottom of Antenna Mount
BASE ACROSS HILL	540874.0200	1722784.0800	933.0950	Base 25001 Bottom of Antenna Near Stockpile #6

FIGURE 1
SITE PLAN
SEQUENCE 4 LANDFILL CONSTRUCTION

LEGEND

- EXISTING 4" UNDERDRAIN
- EXISTING 12" UNDERDRAIN
- OVERHEAD ELECTRIC
- SURVEYED PROPERTY LINES
- DIVERSION DITCHES
- EXISTING SEDIMENT TRAPS
- STONE FILTERS
- SILT FENCE
- CELL 3 CAP LIMITS
- EXISTING SEDIMENT TRAPS, DITCHES OR SPILLWAYS WITH STONE BOTTOM
- LIVING WEIRS
- FLOC LOG
- FLOW CHECK
- COMPOST LOG
- straw wattle
- 765kv location
- smart fence

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APPALACHIAN POWER CO.

JOHN E. AMOS PLANT

WINFIELD WEST VIRGINIA

JOHN E. AMOS FGD LANDFILL
EROSION & SEDIMENT CONTROL
DETAILS

NAD 83/NAVD 88 W.V. SOUTH

Drawing Name: Amos Asbuilt
SCALE: 1"=200'
Revision Date: JULY 10, 2019
Surveyed By: C.Sheppard
Drawn By: C.Sheppard

AMERICAN ELECTRIC POWER
1 RIVERSIDE PLAZA
COLUMBUS, OH 43215

APPENDIX A
Photographs of Construction Activities

Photograph 1. PVC Deployed on West flat area

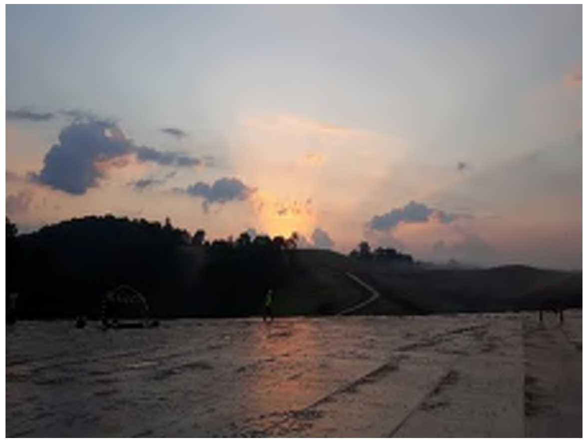
Photograph 2. West area slope covered with PVC

Photograph 3. West slope covered with PVC

Photograph 4. Preparing to seam

Photograph 5. Cleaning prior to seaming

Photograph 6. Tensiometer testing



Photograph 7. Early morning start on PVC installation

Photograph 8. Air Testing denoted with "ATOK"

Photograph 9. Air Testing in progress

Photograph 10. Repair marked with date, time, initials of repairer

Photograph 11. Seaming in progress

Photograph 12. Rock Hounding, Smooth drumming CCL

Photograph 13. Rock Picking CCL, preparing for PVC

Appendix B

PVC Geomembrane Laboratory Quality assurance/Quality Control Data

gai consultants
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Appendix B - I

Manufacturing Quality Control Data

1883-35317
AEP JOHN E. AMOS LANDFILL
SITE WORK CONSTRUCTION SEQUENCE 4
WINFIELD, WV

Submittal # 6a

Polyvinyl Chloride Geomembrane (PVC)

TITAN Geomembrane Submittals

- Manufacturer Quality Control - Plastatech
- Fabricated Cetifications - Titan
  - Truck 1 (Revised)
  - Truck 2 (Revised)
  - Truck 3 (Revised)
  - Truck 4 (Revised)
  - Truck 5 (Revised)
  - Truck 6 (Revised)
  - Truck 7 (Revised)
  - Truck 8 (Revised)

PREPARED BY:

HALLATON
ENVIRONMENTAL LININGS
1206 Sparks Road | Sparks, MD 21152 | 410-583-7700

March 5, 2019

Certificate of Analysis

November 8, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	11/06/18
Lot Number	7546
Lot Quantity	121 Rolls

Certified Properties	**Test Method**	**Specification**	**Avg**	**Stdev**
Thickness	ASTM D5199	30.0 ± 5% mil	30.1	0.5771
MD Breaking Strength	ASTM D882	Min 73 lbf	88.1	3.4863
CMD Breaking Strength	ASTM D882	Min 73 lbf	81.7	3.6581
MD Elongation	ASTM D882	Min 380%	435.4	20.8052
CMD Elongation	ASTM D882	Min 380%	439.6	22.7378
MD 100% Modulus	ASTM D882	Min 30 lbf	39.9	1.9595
CMD 100% Modulus	ASTM D882	Min 30 lbf	37.4	1.9538
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	12.5	0.6755
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	11.8	0.7917
Low Temperature Impact	ASTM D1790	Pass % -20°F (-29°C)	94.4	7.2744
Dimensional Stability	ASTM D1204	Max. 3%	-0.39%	0.20%
Hydrostatic Resistance	D751	100 psi	113.4	4.7324

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC

Plastatech Engineering Ltd. (989) 754-6500 www.plastatech.com
725 Morley Drive (800) 892-9358 jhickey@duro-last.com
Saginaw, MI 48601 Fax (989) 754-1624

Certificate of Analysis
November 26, 2018
The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	11/20/18
Lot Number	7577
Lot Quantity	104 Rolls

Certified Properties	Test Method	Specification	Avg	Stdev
Thickness	ASTM D5199	30.0 ± 5% mil	30.3	0.6283
MD Breaking Strength	ASTM D882	Min 73 lbf	81.8	4.7070
CMD Breaking Strength	ASTM D882	Min 73 lbf	78.5	3.3670
MD Elongation	ASTM D882	Min 380%	413.6	28.0415
CMD Elongation	ASTM D882	Min 380%	425.1	26.9319
MD 100% Modulus	ASTM D882	Min 30 lbf	36.6	2.0031
CMD 100% Modulus	ASTM D882	Min 30 lbf	35.1	1.9862
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	12.0	0.8111
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	11.4	0.6292
Low Temperature Impact	ASTM D1790	Pass % -20°F (-29°C)	88.7	13.0201
Dimensional Stability	ASTM D1204	Max. 3%	-0.29%	0.13%
Hydrostatic Resistance	D751	100 psi	115.0	4.8038

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC
Plastatech Engineering Ltd. (989) 754-6500 www.plastatech.com
725 Morley Drive (800) 892-9358 jhickey@duro-last.com
Saginaw, MI 48601 Fax (989) 754-1624

Certificate of Analysis
December 6, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	12/04/18
Lot Number	7594
Lot Quantity	150 Rolls

Certified Properties	Test Method	Specification	Avg	Stdev
Thickness	ASTM D5199	30.0 ± 5% mil	30.4	0.6429
MD Breaking Strength	ASTM D882	Min 73 lbf	81.9	4.0296
CMD Breaking Strength	ASTM D882	Min 73 lbf	79.1	2.1895
MD Elongation	ASTM D882	Min 380%	396.8	19.7687
CMD Elongation	ASTM D882	Min 380%	409.0	17.1113
MD 100% Modulus	ASTM D882	Min 30 lbf	38.6	2.7626
CMD 100% Modulus	ASTM D882	Min 30 lbf	37.5	1.9319
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	9.5	0.6877
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	8.8	0.6158
Low Temperature Impact	ASTM D1790	Pass 50% min -20°F (-29°C)	80.0	21.2132
Dimensional Stability	ASTM D1204	Max. 3%	-0.23%	0.13%
Hydrostatic Resistance	D751	100 psi	110.0	2.8868

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC
Plastatech Engineering Ltd. (989) 754-6500 www.plastatech.com
725 Morley Drive (800) 892-9358 jhickey@duro-last.com
Saginaw, MI 48601 Fax (989) 754-1624

TITAN
ENVIRONMENTAL USA

AEP JOHN AMOS
WINFIELD, WV

PROJECT CERTIFICATIONS

TRUCK 1

15847 Kimberlee Street
Houston TX 77049

TITAN
ENVIRONMENTAL USA

QC Report

Date: 12/13/2018

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 1 of 14 Truck 1

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	29	29	68	74
40	29	28	70	68
43	28	21	73	68
45	23	22	70	68

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	33	CS		13
2	276	7594	33	TF	P1	43
3	276	7594	33	OT	CS	40
4	50/226	7594	32/33	NR	P1	45
5	276	7594	32	CS		13
6	276	7594	32	TF		43
7	276	7594	32	NR	CS/P1	40
8	114/162	7594	26/32	DN	P1	45
9	276	7594	26			
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Certified by: [signature]

TITAN
ENVIRONMENTAL USA

QC Report

Date: 12/13/2018

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 2 of 14 Truck 1

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	29	28	63	65
40	28	27	72	72
43	23	20	64	70
45	28	30	68	70

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	26	CS		13
2	276	7594	26	TF	CS	43
3	114/162	7594	26/27	NR		40
4	276	7594	27	DN		45
5	276	7594	27	CS		13
6	276	7594	27	TF	CS	43
7	38/238	7594	27/20	NR		40
8	276	7594	20	DN		45
9	276	7594	20			
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Certified by: A. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 12/13/2018

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 3 of 14 Truck 1

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	28	32	74	74
40	34	31	69	74
43	32	30	72	73
45	28	32	73	72

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	21	CS	CS	13
2	14/262	7594	21/20	TF		43
3	276	7594	21	NR		40
4	276	7594	21	DN	CS	45
5	62/214	7594	71/21	CS		13
6	276	7594	71	TF	P1	43
7	276	7594	71	NR	CS	40
8	124/152	7594	72/71	DN		45
9	276	7594	71			
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Certified by: F. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date:	12/14/2018
Order #	387
Customer:	Hallaton
Job Name:	AEP John Amos
Product:	PVC 30
Panel #:	4 of 14 Truck 1
# of Sheets	9 sheets x 275

Machine	Peel		Sheer	
13	27	29	69	73
40	29	32	78	77
43	25	29	66	62
45	28	23	74	62

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	71	OT		13
2	276	7594	71	TF		43
3	276	7594	71	NR		40
4	84/192	7594	71/24	DN		45
5	276	7594	24	CS		13
6	276	7594	24	TF		43
7	276	7594	24	NR	CS	45
8	34/242	7594	24/25	DN	P1	40
9	276	7594	25			
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Certified by: T. Swtalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 12/14/2018

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 5 of 14 Truck 1

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	29	30	73	70
40	29	31	76	75
43	25	30	71	71
45	27	28	68	71

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	12	DH		13
2	276	7594	12	TF		43
3	276	7594	12	NR	CS	40
4	15/251	7594	12/25	DN		45
5	276	7594	25	CS	CS	13
6	72/206	7594	13/25	TF	P1	43
7	276	7594	13	NR		40
8	276	7594	13	DN		45
9	276	7594	13			
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Certified by: A. Sw...

TITAN
ENVIRONMENTAL USA

QC Report

Date: 12/14/2018

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 6 of 14 Truck 1

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	32	33	63	68
40	30	32	70	72
43	28	24	68	67
45	31	29	67	66

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	19	CS		13
2	276	7594	19	TF		43
3	276	7594	19	NR	CS	40
4	54/228	7594	18/19	DN	CS/P1	45
5	125/151	7594	18/13	OT		13
6	276	7594	18	TF		43
7	276	7594	18	NR		40
8	34/242	7594	18/22	DN		45
9	276	7594	18			
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Certified by: T. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 12/14/2018

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 7 of 14 Truck 1

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	29	29	73	70
40	31	29	65	67
43	27	21	69	68
45	27	25	73	71

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	22	CS		13
2	276	7594	22	TF	CS	43
3	13/263	7594	23/22	NR		40
4	276	7594	23	DN		45
5	276	7594	23	CS		13
6	276	7594	23	TF	CS	43
7	74/202	7594	17/23	OT		45
8	276	7594	17	DN		40
9	276	7594	17			
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Certified by: A. Sw,talski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 12/14/2018

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 8 of 14 Truck 1

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	21	28	68	73
40	28	29	73	68
43	29	30	67	64
45	29	32	64	72

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	17	DH	CS	13
2	133/143	7594	16/17	TF		43
3	276	7594	16	OT		45
4	276	7594	16	DN		40
5	276	7594	16	DH	CS/P1	13
6	74/202	7594	16/36	TF		43
7	276	7594	36	NR		45
8	276	7594	36	DN		40
9	276	7594	36			
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Certified by: P. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 12/17/2018

Order #: 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 9 of 14 Truck 1

# of Sheets: 9 sheets x 275

Machine	Peel		Sheer	
13	27	28	68	64
40	25	27	70	71
43	27	24	71	60
45	26	25	74	69

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	42	OT	CS	13
2	10/266	7594	42/37	TF	CS	43
3	266/10	7594	37/42	NR	CS/CS	45
4	10/15/251	7594	42/36/37	DN		40
5	276	7594	42	OT	CS	13
6	25/251	7594	42/37	TF		43
7	276	7594	42	NR	CS/P1	45
8	117/159	7594	43/42	DN		40
9	276	7594	43			
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Certified by: L. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 12/17/2018

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 10 of 14 Truck 1

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	26	30	66	65
40	32	29	72	71
43	28	29	73	72
44	26	28	68	72

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	43	OT		13
2	276	7594	43	TF	CS	43
3	100/176	7594	43/34	NR		44
4	276	7594	34	DN		40
5	276	7594	34	DH		13
6	276	7594	34	TF	CS	43
7	48/228	7594	34/35	NR		44
8	276	7594	35	DN		40
9	276	7594	35			
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Certified by: [signature]

TITAN

ENVIRONMENTAL USA

QC Report

Date: 12/17/2018

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 11 of 14 Truck 1

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	30	28	67	64
40	31	30	67	70
43	32	25	67	65
44	29	34	70	68

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	15	OT		13
2	276	7594	15	TF		43
3	276	7594	15	NR	CS	44
4	10/266	7594	15/35	DN	CS	40
5	65/211	7594	14/15	OT		13
6	276	7594	14	TF		43
7	276	7594	14	BM	CS/P1	40
8	149/127	7594	14/31	DN		44
9	276	7594	14			
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Certified by:

TITAN
ENVIRONMENTAL USA

QC Report

Date: 12/17/2018

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 12 of 14 Truck 1

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	30	30	79	73
40	29	30	73	70
43	28	27	67	72
44	33	29	69	66

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	30	OT		13
2	276	7594	31	TF		43
3	276	7594	31	BM		44
4	276	7594	31	DN	CS	40
5	85/191	7594	31/30	OT		13
6	276	7594	30	TF		43
7	276	7594	30	BM	CS	40
8	35/241	7594	30/39	DN		44
9	276	7594	39			
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Certified by: F. Switalski

TITAN ENVIRONMENTAL USA

QC Report

Date: 12/18/2018

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 13 of 14 Truck 1

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	27	27	71	64
40	28	26	70	67
43	29	29	67	63
44	28	31	75	77

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	38	OT	CS	13
2	25/252	7594	38/39	TF		43
3	276	7594	38	BM		40
4	276	7594	38	DN		44
5	276	7594	39	OT	CS	13
6	74/202	7594	29/38	TF		43
7	276	7594	29	BM		40
8	276	7594	29	DN		44
9	276	7594	29			
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Certified by: P. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 12/18/2018

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 14 of 14 Truck 1

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	27	30	68	68
40	27	29	69	65
43	23	29	62	60
44	25	27	68	70

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	28	OT		13
2	276	7594	28	TF		43
3	276	7594	28	BM	CS/P1	40
4	36/24	7594	46/29	DN	CS	44
5	144/132	7594	46/28	OT		13
6	276	7594	46	TF		43
7	276	7594	46	BM	CS	40
8	36/240	7594	46/47	DN		44
9	276	7594	47			
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Certified by:

Plastatech®
Film, Fabrics, and Laminate Solutions

Certificate of Analysis

December 6, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	12/04/18
Lot Number	7594
Lot Quantity	150 Rolls

Certified Properties	**Test Method**	**Specification**	**Avg**	**Stdev**
Thickness	ASTM D5199	30.0 ± 5% mil	30.4	0.6429
MD Breaking Strength	ASTM D882	Min 73 lbf	81.9	4.0296
CMD Breaking Strength	ASTM D882	Min 73 lbf	79.1	2.1895
MD Elongation	ASTM D882	Min 380%	396.8	19.7687
CMD Elongation	ASTM D882	Min 380%	409.0	17.1113
MD 100% Modulus	ASTM D882	Min 30 lbf	38.6	2.7626
CMD 100% Modulus	ASTM D882	Min 30 lbf	37.5	1.9319
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	9.5	0.6877
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	8.8	0.6158
Low Temperature Impact	ASTM D1790	Pass 50% min -20°F (-29°C)	80.0	21.2132
Dimensional Stability	ASTM D1204	Max. 3%	-0.23%	0.13%
Hydrostatic Resistance	D751	100 psi	110.0	2.8868

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC
Plastatech Engineering Ltd.
725 Morley Drive
Saginaw, MI 48601

(989) 754-6500
(800) 892-9358
Fax (989) 754-1624

www.plastatech.com
jhickey@duro-last.com

TITAN
ENVIRONMENTAL USA

AEP JOHN AMOS
WINFIELD, WV

PROJECT CERTIFICATIONS

TRUCK 2

15847 Kimberlee Street
Houston TX 77049

TITAN
ENVIRONMENTAL USA

QC Report

Date: 12/19/2018

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 1 of 14 - Truck 2

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	29	29	68	74
40	29	28	70	68
43	28	21	73	68
44	23	22	70	68

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	47	BM	P1	13
2	276	7594	47	TF	CS	43
3	15/271	7594	40/47	NR		40
4	276	7594	40	DN		44
5	276	7594	40	OT		13
6	276	7594	40	TF	CS	43
7	71/205	7594	41/40	NR		40
8	276	7594	41	DN		44
9	276	7594	41			
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Certified by: P. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 12/19/2018

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 2 of 14 - Truck 2

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	29	28	63	65
40	28	27	72	72
43	23	20	64	70
44	28	30	68	70

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	41	BM	CS	13
2	130/146	7594	63/41	TF	CS	43
3	146/130	7594	63/63	NR		40
4	276	7594	63	DN		14
5	276	7594	63	BM	CS	13
6	74/202	7594	63/64	TF		43
7	276	7594	64	NR		40
8	276	7594	64	DN		44
9	276	7594	64			
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Certified by: T. Switalski

TITAN

ENVIRONMENTAL USA

QC Report

Date: 12/19/2018

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 3 of 14 - Truck 2

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	28	32	74	74
40	34	31	69	74
43	32	30	72	73
44	28	32	73	72

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	52	OT		13
2	276	7594	52	TF	CS2	43
3	25/36/315	7594	64/51/52	NR		44
4	276	7594	52	DN		40
5	276	7594	51	OT		13
6	276	7594	51	TF		43
7	276	7594	51	NR	CS	44
8	87/189	7594	55/51	DN	P1	40
9	276	7594	55			
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Certified by: T. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 12/19/2018

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 4 of 14 - Truck 2

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	27	29	69	73
40	29	32	78	77
43	25	29	66	62
44	28	23	74	62

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	55	OT		13
2	276	7594	55	TF	CS/2P	43
3	115/161	7594	55/56	NR		44
4	276	7594	56	DN		40
5	276	7594	56	OT		13
6	276	7594	56	TF	CS	43
7	55/221	7594	56/48	NR		44
8	276	7594	48	DN		40
9	276	7594	48			
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Certified by: [signature]

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/2/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 5 of 14 - Truck 2

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	29	30	73	70
40	29	31	76	75
43	25	30	71	71
44	27	28	68	71

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	62	OT		13
2	276	7594	62	TF		43
3	276	7594	62	BM	CS	44
4	55/221	7594	48/62	DN	CS	40
5	77/199	7594	61/48	OT		43
6	276	7594	61	NR	P1	13
7	276	7594	61	BM	CS	44
8	115/161	7594	61/50	DN		40
9	276	7594	61			
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Certified by: [signature]

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/2/2019

Order #: 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 6 of 14 - Truck 2

# of Sheets: 9 sheets x 275

Machine	Peel		Sheer	
13	32	33	63	68
40	30	32	70	72
43	28	24	68	67
44	31	29	67	66

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	50	OT		13
2	276	7594	50	BM		43
3	276	7594	50	NR	CS/P1	40
4	59/217	7594/7577	50/83	DN		44
5	276	7577	83	OT		13
6	276	7577	83	TF		43
7	276	7577	83	NR		40
8	276	7577	82	DN		44
9	276	7577	82			
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Certified by: T. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/3/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 7 of 14 - Truck 2

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	32	33	74	78
40	30	31	68	77
43	27	21	78	78
44	32	33	74	81

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	82	OT	CS	13
2	80/196	7594/7577	99/82	TF		43
3	276	7594	99	NR		40
4	276	7594	99	DN		44
5	276	7594	99	OT	CS	13
6	114/162	7594	99/100	TF		43
7	276	7594	100	NR		40
8	276	7594	100	DN		44
9	276	7594	100			
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Certified by: [signature]

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/3/2019

Order #: 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 8 of 14 - Truck 2

# of Sheets: 9 sheets x 275

Machine	Peel		Sheer	
13	21	28	68	73
40	28	29	73	68
43	29	30	67	64
44	29	32	64	72

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	97	OT	CS	13
2	52/224	7594	100/97	TF		43
3	276	7594	97	NR	CS	40
4	10/266	7594	98/97	DN		44
5	276	7594	98	OT		13
6	276	7594	98	TF		43
7	276	7594	98	NR	CS	40
8	66/210	7594	122/98	DN		44
9	276	7594	122			
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Certified by: [signature]

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/3/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 9 of 14 - Truck 2

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	27	28	68	64
40	25	27	70	71
43	27	24	71	60
44	26	25	74	69

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	122	OT	CS	13
2	105/171	7594	122/124	TF		43
3	276	7594	124	NR		40
4	276	7594	124	DN		44
5	276	7594	124	OT	CS	13
6	48/228	7594	124/101	TF		43
7	276	7594	101	NR	CS	44
8	10/266	7594	102/101	DN		40
9	276	7594	101			
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Certified by: [signature]

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/3/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 10 of 14 - Truck 2

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	26	30	66	65
40	32	29	72	71
43	28	29	73	72
44	26	28	68	72

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	102	OT		13
2	276	7594	102	TF		43
3	276	7594	102	NR	CS	40
4	86/190	7594	108/102	DN		44
5	276	7594	108	OT		13
6	276	7594	108	TF		43
7	276	7594	108	DN	CS	44
8	118/158	7594	108/107	DN		40
9	276	7594	107			
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Certified by: T. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/4/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 11 of 14 - Truck 2

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	30	28	67	64
40	31	30	67	70
43	32	25	67	65
44	29	34	70	68

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	107	OT		13
2	276	7594	107	TF	CS	43
3	65/211	7594	107/88	NR		40
4	276	7594	8	DN		44
5	276	7594	88	OT		13
6	276	7594	88	TF		43
7	276	7594	87	NR		40
8	276	7594	87	DN		44
9	276	7594	87			
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Certified by: T. Swtalski

TITAN

ENVIRONMENTAL

QC Report

Date: 1/4/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 12 of 14 - Truck 2

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	30	30	79	73
40	29	30	73	70
43	28	27	67	72
44	33	29	69	66

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	112	OT	CS	13
2	55/221	7594	87/112	TF		43
3	276	7594	112	NR		40
4	276	7594	112	DN	CS	44
5	156/120	7594	112/113	OT		13
6	276	7594	113	TF		43
7	276	7594	113	NR	CS	40
8	105/171	7594	113/73	DN		44
9	276	7594	113			
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Certified by: A. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/7/2019

Order #: 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 13 of 14 - Truck 2

# of Sheets: 9 sheets x 275

Machine	Peel		Sheer	
13	27	27	71	64
40	28	26	70	67
43	29	29	67	63
44	28	31	75	77

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	73	OT		13
2	276	7594	73	TF		43
3	276	7594	73	NR	CS	40
4	50/226	7594	73/74	DN		44
5	276	7594	74	OT		13
6	276	7594	74	TF	CS	43
7	10/266	7594	77/74	NR		44
8	276	7594	77	DN		40
9	276	7594	77			
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Certified by: T. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/7/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 14 of 14 - Truck 2

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	27	30	68	68
40	27	29	69	65
43	23	29	62	60
44	25	27	68	70

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	77	OT	CS	13
2	72/204	7594	78/77	TF		43
3	276	7594	78	NR		44
4	276	7594	78	DN		40
5	276	7594	78	OT	CS	13
6	141/135	7594	91/78	TF		43
7	276	7594	91	NR		44
8	276	7594	91	DN		40
9	276	7594	91			
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Certified by: [signature]

Plastatech®

Films, Fabrics, and Laminate Solutions

Certificate of Analysis

December 6, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	12/04/18
Lot Number	7594
Lot Quantity	150 Rolls

Certified Properties	Test Method	Specification	Avg	Stdev
Thickness	ASTM D5199	30.0 ± 5% mil	30.4	0.6429
MD Breaking Strength	ASTM D882	Min 73 lbf	81.9	4.0296
CMD Breaking Strength	ASTM D882	Min 73 lbf	79.1	2.1895
MD Elongation	ASTM D882	Min 380%	396.8	19.7687
CMD Elongation	ASTM D882	Min 380%	409.0	17.1113
MD 100% Modulus	ASTM D882	Min 30 lbf	38.6	2.7626
CMD 100% Modulus	ASTM D882	Min 30 lbf	37.5	1.9319
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	9.5	0.6877
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	8.8	0.6158
Low Temperature Impact	ASTM D1790	Pass 50% min -20°F (-29°C)	80.0	21.2132
Dimensional Stability	ASTM D1204	Max. 3%	-0.23%	0.13%
Hydrostatic Resistance	D751	100 psi	110.0	2.8868

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC

Plastatech Engineering Ltd.
725 Morley Drive
Saginaw, MI 48601

(989) 754-6500
(800) 892-9358
Fax (989) 754-1624

www.plastatech.com
jhickey@duro-last.com

Plastatech®

Certificate of Analysis
November 26, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	11/20/18
Lot Number	7577
Lot Quantity	104 Rolls

Certified Properties	Test Method	Specification	Avg	Stdev
Thickness	ASTM D5199	30.0 ± 5% mil	30.3	0.6283
MD Breaking Strength	ASTM D882	Min 73 lbf	81.8	4.7070
CMD Breaking Strength	ASTM D882	Min 73 lbf	78.5	3.3670
MD Elongation	ASTM D882	Min 380%	413.6	28.0415
CMD Elongation	ASTM D882	Min 380%	425.1	26.9319
MD 100% Modulus	ASTM D882	Min 30 lbf	36.6	2.0031
CMD 100% Modulus	ASTM D882	Min 30 lbf	35.1	1.9862
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	12.0	0.8111
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	11.4	0.6292
Low Temperature Impact	ASTM D1790	Pass % -20°F (-29°C)	88.7	13.0201
Dimensional Stability	ASTM D1204	Max. 3%	-0.29%	0.13%
Hydrostatic Resistance	D751	100 psi	115.0	4.8038

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC
Plastatech Engineering Ltd.
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Saginaw, MI 48601

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Fax (989) 754-1624

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jhickey@duro-last.com

TITAN

ENVIRONMENTAL USA

AEP JOHN AMOS
WINFIELD, WV

PROJECT CERTIFICATIONS

TRUCK 3

15847 Kimberlee Street
Houston TX 77049

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/7/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 1 of 14 Truck 3

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	26	28	67	67
40	30	29	69	68
43	22	24	69	65
44	31	27	66	67

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	92	OT		13
2	276	7594	92	TF	CS	43
3	72/204	7594	91/92	NR		44
4	276	7594	92	DN	CS	40
5	10/266	7594	92/84	CS		13
6	276	7594	84	TF		43
7	276	7594	84	NR	CS	44
8	42/234	7594	83/84	DN		40
9	276	7594	83			
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Certified by: [signature]

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/7/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 2 of 14 Truck 3

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	27	27	67	67
40	27	29	72	69
43	27	28	68	72
44	29	27	72	70

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	83	OT		13
2	276	7594	83	TF	CS	43
3	96/180	7594	79/83	BM		44
4	276	7594	79	DN		40
5	276	7594	79	OT		13
6	276	7594	79	TF	CS	43
7	112/164	7594	79/80	BM		44
8	276	7594	80	DN		40
9	276	7594	80			
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Certified by: [signature]

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/8/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 3 of 14 Truck 3

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	27	30	68	67
40	27	27	72	68
43	29	29	66	70
44	28	27	70	71

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	80	OT	CS	13
2	40/236	7594	80/89	TF		43
3	276	7594	89	BM		44
4	276	7594	89	DN	CS	40
5	10/266	7594	90/89	OT	P1	13
6	276	7594	90	TF		43
7	276	7594	90	BM	CS	44
8	72/204	7594	109/90	DN		40
9	276	7594	90			
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Certified by: T. Swiatalski

QC Report

TITAN ENVIRONMENTAL USA

Date: 1/8/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 4 of 14 Truck 3

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	24	22	63	69
40	28	29	73	70
43	28	25	64	68
44	31	28	69	67

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	109	OT		13
2	276	7594	109	TF		43
3	276	7594	109	BM	CS/P1	44
4	130/146	7594	109/111	DN		40
5	276	7594	111	OT		13
6	276	7594	111	TF		43
7	276	7594	111	BM	CS	44
8	84/192	7594	111/76	DN		40
9	276	7594	76			
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Certified by: T. Santarelli

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/8/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 5 of 14 Truck 3

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	28	30	72	71
40	29	27	71	68
43	19	18	72	74
44	28	24	68	73

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	76	OT		13
2	276	7594	76	TF	CS	43
3	24/252	7594	76/75	BM		44
4	276	7594	75	DN		40
5	276	7594	75	OT		13
6	26/250	7594	114/75	TF		43
7	276	7594	114	BM		44
8	276	7594	114	DN		40
9	276	7594	114			
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Certified by: L. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/8/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 6 of 14 Truck 3

# of Sheets 9 sheets x 275

Machine	Peel		Shear	
13	29	29	73	70
40	25	23	71	71
43	29	28	70	69
44	28	27	68	69

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	115	OT		13
2	276	7594	115	TF		43
3	276	7594	115	BM	CS	44
4	72/204	7594	115/114	DN	CS	40
5	155/121	7594	115/106	NR		13
6	276	7594	106	TF		43
7	276	7594	106	OT	CS	44
8	96/180	7594	106/105	DN		40
9	276	7594	106			
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Certified by: [signature]

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/9/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 7 of 14 Truck 3

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	28	29	69	66
40	30	29	71	73
43	27	28	64	64
44	29	26	74	68

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	105	OT		13
2	276	7594	105	NR		43
3	276	7594	105	BM	CS	44
4	40/236	7594	105/82	DN		40
5	276	7594	82	NR		13
6	276	7594	82	OT	CS	43
7	13/263	7594	81/82	BM	P1	44
8	276	7594	81	DN		40
9	276	7594	81			
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Certified by: [signature]

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/9/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 8 of 14 Truck 3

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	26	21	70	66
40	28	28	70	68
43	25	26	70	64
44	25	23	73	67

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	81	NR	CS	13
2	72/204	7577/7594	15/81	OT		43
3	276	7577	15	BM		44
4	276	7577	15	DN		40
5	276	7577	15	OT	CS	13
6	136/140	7577	15/16	TF		43
7	276	7577	16	BM		44
8	276	7577	16	DN		40
9	276	7577	16			
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Certified by: T. Switalski

TITAN ENVIRONMENTAL USA

QC Report

Date: 1/9/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 9 of 14 Truck 3

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	23	20	71	68
40	29	31	69	65
43	28	29	64	70
44	31	28	73	72

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	103	NR	CS	13
2	72/204	7577/7594	16/103	TF		43
3	276	7594	103	BM		44
4	276	7594	103	DN	CS	40
5	18/258	7594	103/104	NR		13
6	276	7594	104	TF		43
7	276	7594	104	BM	CS	44
8	36/240	7577/7594	95/104	DN		40
9	276	7577	95			
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Certified by: T. Swartzlski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/9/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 10 of 14 Truck 3

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	32	29	67	66
40	31	27	75	69
43	29	30	66	71
44	27	28	69	70

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	95	NR		13
2	276	7577	95	TF	CS	43
3	87/189	7577	96/95	BM		44
4	276	7577	96	DN		40
5	276	7577	96	NR		13
6	276	7577	96	OT	CS	43
7	112/164	7577/7594	96/95	BM	P1	44
8	276	7594	95	DN		40
9	276	7594	95			
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Certified by: [signature]

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/9/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 11 of 14 Truck 3

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	29	29	70	74
40	22	31	69	62
43	29	31	73	69
44	28	29	70	73
45	30	29	69	68

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	95	NR	CS	13
2	52/224	7594	95/96	TF		43
3	276	7594	96	BM		44
4	276	7594	96	DN		40
5	276	7594	96	OT		45
6	276	7594	96	NR		43
7	276	7594	94	BM	CS	44
8	52/224	7594	93/94	CS		40
9	276	7594	94			
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Certified by: A. Swietalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/15/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 12 of 14 Truck 3

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
44	27	23	70	72
42	31	31	68	65
40	28	29	75	66

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	117	TF	CS/P1	44
2	55/221	7594	117/93	OT		42
3	276	7594	117	TF		40
4	276	7594	117	OT	CS	42
5	168/108	7594	116/117	TF		44
6	276	7594	116	OT		42
7	276	7594	116	NR	CS	40
8	112/164	7594	116/86	OT		42
9	276	7594	116			
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Certified by: [signature]

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/15/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 13 of 14 Truck 3

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
42	30	30	70	72
43	28	30	61	64
44	30	26	63	62

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	86	TF		43
2	276	7594	86	OT		42
3	276	7594	86	NR	CS	44
4	48/228	7594	86/85	NR		44
5	276	7594	85	OT		42
6	276	7594	85	TF	CS	43
7	10/266	7594	119/85	NR		44
8	276	7594	119	CS		40
9	276	7594	119			
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Certified by: T. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/15/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 14 of 14 Truck 3

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	33	29	73	72
42	20	20	60	74
43	27	30	69	68
44	25	29	72	68

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	120	OT	CS	42
2	72/204	7594	118/120	TF		43
3	276	7594	120	NR		44
4	276	7594	120	CS	CS	40
5	27/249	7594	120/121	OT		42
6	276	7594	121	TF		43
7	276	7594	121	NR	CS	44
8	24/252	755/7594	117/121	CS		40
9	276	7577	117			
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Certified by: [signature]

Plastatech®

Films, Fabrics and Laminate Solutions

Certificate of Analysis

November 26, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	11/20/18
Lot Number	7577
Lot Quantity	104 Rolls

Certified Properties	**Test Method**	**Specification**	**Avg**	**Stdev**
Thickness	ASTM D5199	30.0 ± 5% mil	30.3	0.6283
MD Breaking Strength	ASTM D882	Min 73 lbf	81.8	4.7070
CMD Breaking Strength	ASTM D882	Min 73 lbf	78.5	3.3670
MD Elongation	ASTM D882	Min 380%	413.6	28.0415
CMD Elongation	ASTM D882	Min 380%	425.1	26.9319
MD 100% Modulus	ASTM D882	Min 30 lbf	36.6	2.0031
CMD 100% Modulus	ASTM D882	Min 30 lbf	35.1	1.9862
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	12.0	0.8111
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	11.4	0.6292
Low Temperature Impact	ASTM D1790	Pass % -20°F (-29°C)	88.7	13.0201
Dimensional Stability	ASTM D1204	Max. 3%	-0.29%	0.13%
Hydrostatic Resistance	D751	100 psi	115.0	4.8038

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC
Plastatech Engineering Ltd.
725 Morley Drive
Saginaw, MI 48601

(989) 754-6500
(800) 892-9358
Fax (989) 754-1624

www.plastatech.com
jhickey@duro-last.com

Certificate of Analysis

December 6, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	12/04/18
Lot Number	7594
Lot Quantity	150 Rolls

Certified Properties	Test Method	Specification	Avg	Stdev
Thickness	ASTM D5199	30.0 ± 5% mil	30.4	0.6429
MD Breaking Strength	ASTM D882	Min 73 lbf	81.9	4.0296
CMD Breaking Strength	ASTM D882	Min 73 lbf	79.1	2.1895
MD Elongation	ASTM D882	Min 380%	396.8	19.7687
CMD Elongation	ASTM D882	Min 380%	409.0	17.1113
MD 100% Modulus	ASTM D882	Min 30 lbf	38.6	2.7626
CMD 100% Modulus	ASTM D882	Min 30 lbf	37.5	1.9319
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	9.5	0.6877
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	8.8	0.6158
Low Temperature Impact	ASTM D1790	Pass 50% min -20°F (-29°C)	80.0	21.2132
Dimensional Stability	ASTM D1204	Max. 3%	-0.23%	0.13%
Hydrostatic Resistance	D751	100 psi	110.0	2.8868

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC

Plastatech Engineering Ltd.
725 Morley Drive
Saginaw, MI 48601

(989) 754-6500
(800) 892-9358
Fax (989) 754-1624

www.plastatech.com
jhickey@duro-last.com

TITAN
ENVIRONMENTAL USA

AEP JOHN AMOS
WINFIELD, WV

PROJECT CERTIFICATIONS

TRUCK 4

15847 Kimberlee Street
Houston TX 77049

TITAN ENVIRONMENTAL USA

QC Report

Date: 1/15/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 1 of 14 Truck 4

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
42	27	29	66	70
43	29	29	72	66
44	22	32	64	69

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7546	92	CS	CS	43
2	10/266	7546/7577	92/118	OT		42
3	276	7546	92	NR		44
4	276	7546	92	OT	CS	42
5	72/204	7546	93/92	CS		43
6	276	7546	93	OT		42
7	276	7546	93	NR	CS	44
8	132/144	7546	93/77	OT		42
9	276	7546	93			
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Certified by: C. Switalski

TITAN

QC Report

Date: 1/15/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 2 of 14 Truck 4

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
42	25	25	63	68
43	25	28	65	70
44	30	29	63	69

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7546	77	CS	P1	43
2	276	7546	77	OT		42
3	276	7546	77	NR	CS	44
4	66/210	7546	77/76	CS		43
5	276	7546	76	CS		43
6	276	7546	76	OT		42
7	276	7546	76	NR		44
8	276	7577	18	CS		43
9	276	7577	18			
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Certified by:

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/15/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 3 of 14 Truck 4

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	29	31	72	65
42	32	28	69	75
43	31	30	68	72
44	26	27	71	66

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	18	CS	CS	42
2	55/221	7577	17/18	TF		43
3	276	7577	17	NR		44
4	276	7577	17	OT		40
5	276	7577	17	CS	CS	43
6	112/164	7546/7577	100/17	TF		42
7	276	7546	100	NR		44
8	276	7546	100	OT		40
9	276	7546	100			
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Certified by: F. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/16/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 4 of 14 Truck 4

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	31	28	71	64
42	29	30	70	66
43	29	27	70	74
44	28	29	69	66

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7546	98	CS	CS	43
2	112/164	7546	100/98	TF		42
3	276	7546	98	NR		44
4	276	7546	98	OT	CS	40
5	36/240	7546	98/83	CS		43
6	276	7546	83	TF		42
7	276	7546	83	NR	CS	44
8	23/253	7546	82/83	OT		40
9	276	7546	82			
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Certified by: T. Swtaclli

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/17/2019

Order #: 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 5 of 14 Truck 4

# of Sheets: 9 sheets x 275

Machine	Peel		Sheer	
40	30	31	65	67
42	25	26	65	64
43	29	32	60	67
44	29	27	61	68

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7546	82	CS		43
2	276	7546	82	TF	CS	42
3	76/200	7577/7546	113/82	NR		44
4	276	7577	113	OT		40
5	276	7577	113	CS		43
6	276	7577	113	TF	CS	42
7	126/150	7577	114/113	NR		44
8	276	7577	114	OT		40
9	276	7577	114			
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Certified by: [signature]

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/17/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 6 of 14 Truck 4

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	29	27	74	72
42	27	27	71	71
43	26	28	75	76
44	26	29	69	70

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	114	CS	CS	43
2	97/179	7577/7546	114/79	TF		42
3	276	7546	79	NR		44
4	276	7546	79	OT		40
5	276	7546	79	CS		43
6	34/242	7546	79/78	TF		42
7	276	7546	78	NR	CS	44
8	20/256	7546	80/78	OT		40
9	276	7546	78			
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Certified by: T. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/17/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 7 of 14 Truck 4

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	29	30	71	77
42	28	29	71	73
43	29	26	68	63
44	31	32	70	72

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7546	80	CS		43
2	276	7546	80	TF		42
3	276	7546	80	NR	CS	44
4	84/192	7546	81/80	OT		40
5	276	7546	81	CS		43
6	276	7546	81	TF		42
7	276	7546	81	OT	CS	44
8	120/156	7546	86/81	OT		44
9	276	7546	86			
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Certified by: T. Switalski

TITAN

ENVIRONMENTAL USA

QC Report

Machine	Peel		Sheer	
40	28	29	66	68
42	29	28	68	74
43	27	29	69	71
44	29	25	69	71

Date: 1/17/2019

Order #: 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 8 of 14 Truck 4

# of Sheets: 9 sheets x 275

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7546	86	CS		43
2	276	7546	86	TF	C	42
3	60/216	7546	86/87	NR		44
4	276	7546	87	OT		40
5	276	7546	87	CS		43
6	276	7546	87	TF		42
7	276	7546	90	NR		44
8	276	7546	90	OT		40
9	276	7546	90			
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Certified by: L. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/18/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 9 of 14 Truck 4

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	28	24	67	64
42	27	26	69	66
43	26	27	71	69
44	27	27	63	64

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7546	91	CS		42
2	60/216	7546	91/90	TF	C	43
3	276	7546	91	NR		44
4	276	7546	91	OT		40
5	120/156	7546	94/91	CS		42
6	276	7546	94	TF		43
7	276	7546	94	NR		44
8	84/192	7546	94/95	OT		40
9	276	7546	94			
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Certified by: L. Szostalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/18/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 10 of 14 Truck 4

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	25	28	72	71
42	23	28	73	68
43	26	29	65	65
44	28	31	67	67

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7546	95	CS		42
2	276	7546	95	TF		43
3	276	7546	95	NR	CS	44
4	24/252	7546	95/101	OT		40
5	276	7546	101	CS		42
6	276	7546	101	TF	CS	43
7	34/242	7546	102/101	NR		44
8	276	7546	102	OT		40
9	276	7546	102			
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Certified by: T. Switalski

TITAN

QC Report

Date: 1/24/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 11 of 14 Truck 4

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	22	26	63	61
42	26	27	68	64
43	19	21	64	67
44	25	26	67	67

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7546	102	CS	CS	42
2	92/184	7546	89/102	TF		43
3	276	7546	89	NR		44
4	276	7546	89	OT		40
5	276	7546	89	CS	CS	42
6	112/168	7546	89/88	TF		43
7	276	7546	88	NR		44
8	276	7546	88	OT		40
9	276	7546	88			
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Certified by: T. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/24/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 12 of 14 Truck 4

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	27	30	68	62
42	27	29	64	67
43	25	27	67	64
44	30	30	66	70

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	20	CS	CS	42
2	54/222	7546/7577	88/20	TF		43
3	276	7577	20	NR		44
4	276	7577	20	OT		40
5	276	7577	19	CS		42
6	27	7577	19	TF		43
7	276	7577	19	NR	CS	44
8	52/224	7577	21/19	OT		40
9	276	7577	21			
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Certified by: L. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/25/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 13 of 14 Truck 4

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	30	30	65	66
42	31	29	73	74
43	27	27	70	72
44	25	30	72	69

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	21	CS		42
2	276	7546/7577	21	TF	CS	43
3	115/161	7577	22/21	NR		44
4	276	7577	22	OT		40
5	276	7577	22	CS		42
6	276	7577	22	TF	CS	43
7	96/180	7577/7546	22/96	NR		44
8	276	7546	96	OT		40
9	276	7546	96			
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Certified by: L. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/25/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 14 of 14 Truck 4

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	30	27	64	66
42	27	30	69	69
43	27	32	73	70
44	26	30	70	67

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7546	97	CS		42
2	276	7546	96	TF	CS	43
3	36/240	7546	96/97	NR		44
4	276	7546	97	OT	CS	40
5	24/252	7594/7546	44/97	CS		42
6	276	7594	44	TF		43
7	276	7594	44	NR	CS	44
8	90/186	7594	45/44	OT		40
9	276	7594	44			
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Certified by: [signature]

Plastatech®

Certificate of Analysis
November 8, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	11/06/18
Lot Number	7546
Lot Quantity	121 Rolls

Certified Properties	Test Method	Specification	Avg	Stdev
Thickness	ASTM D5199	30.0 ± 5% mil	30.1	0.5771
MD Breaking Strength	ASTM D882	Min 73 lbf	88.1	3.4863
CMD Breaking Strength	ASTM D882	Min 73 lbf	81.7	3.6581
MD Elongation	ASTM D882	Min 380%	435.4	20.8052
CMD Elongation	ASTM D882	Min 380%	439.6	22.7378
MD 100% Modulus	ASTM D882	Min 30 lbf	39.9	1.9595
CMD 100% Modulus	ASTM D882	Min 30 lbf	37.4	1.9538
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	12.5	0.6755
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	11.8	0.7917
Low Temperature Impact	ASTM D1790	Pass % -20°F (-29°C)	94.4	7.2744
Dimensional Stability	ASTM D1204	Max. 3%	-0.39%	0.20%
Hydrostatic Resistance	D751	100 psi	113.4	4.7324

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC
Plastatech Engineering Ltd.
725 Morley Drive
Saginaw, MI 48601

(989) 754-6500
(800) 892-9358
Fax (989) 754-1624

www.plastatech.com
jhickey@duro-last.com

Plastatech®

Certificate of Analysis

December 6, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	12/04/18
Lot Number	7594
Lot Quantity	150 Rolls

Certified Properties	Test Method	Specification	Avg	Stdev
Thickness	ASTM D5199	30.0 ± 5% mil	30.4	0.6429
MD Breaking Strength	ASTM D882	Min 73 lbf	81.9	4.0296
CMD Breaking Strength	ASTM D882	Min 73 lbf	79.1	2.1895
MD Elongation	ASTM D882	Min 380%	396.8	19.7687
CMD Elongation	ASTM D882	Min 380%	409.0	17.1113
MD 100% Modulus	ASTM D882	Min 30 lbf	38.6	2.7626
CMD 100% Modulus	ASTM D882	Min 30 lbf	37.5	1.9319
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	9.5	0.6877
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	8.8	0.6158
Low Temperature Impact	ASTM D1790	Pass 50% min -20°F (-29°C)	80.0	21.2132
Dimensional Stability	ASTM D1204	Max. 3%	-0.23%	0.13%
Hydrostatic Resistance	D751	100 psi	110.0	2.8868

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC
Plastatech Engineering Ltd.
725 Morley Drive
Saginaw, MI 48601

(989) 754-6500
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jhickey@duro-last.com

TITAN
ENVIRONMENTAL USA

AEP JOHN AMOS
WINFIELD, WV

PROJECT CERTIFICATIONS

TRUCK 5

15847 Kimberlee Street
Houston TX 77049

TITAN

QC Report

Date: 1/28/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 1 of 14 Truck 5

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	28	30	69	68
42	29	30	69	70
43	20	32	70	66
44	27	20	63	69

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	45	CS	P1	42
2	276	7594	45	TF		43
3	276	7594	45	NR	CS	44
4	116/160	7594/7577	45/101	OT		40
5	276	7577	101	CS		42
6	276	7577	101	TF		43
7	276	7577	101	NR	CS	44
8	60/211	7577	101/102	OT		40
9	276	7577	102			
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Certified by: T. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/28/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 2 of 14 Truck 5

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	28	26	65	60
42	30	25	67	65
43	20	20	63	69
44	30	27	66	66

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	102	CS	P1	42
2	276	7577	102	TF		43
3	15/261	7577	102/106	NR	CS	44
4	276	7577	106	OT		40
5	276	7577	106	CS		42
6	27/249	7577	105/106	TF		43
7	276	7577	105	NR	CS	44
8	276	7577	105	OT		40
9	276	7577	105			
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Certified by: T. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/28/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 3 of 14 Truck 5

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	28	27	72	74
42	29	29	68	64
43	21	23	69	68

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	26	CS	CS	42
2	75/202	7577	26/105	CS		42
3	276	7577	26	TF		43
4	276	7577	26	TF	CS/P1	43
5	130/146	7577	25/26	OT		40
6	276	7577	25	CS		42
7	276	7577	25	TF	CS	43
8	84/192	7577	25/7	OT		40
9	276	7577	25			
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Certified by: T. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/28/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 4 of 14 Truck 5

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	30	30	65	71
42	29	21	72	70
43	31	29	70	67
44	30	29	73	69

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	7	TF		42
2	276	7577	7	TF		43
3	276	7577	7	NR	CS	44
4	14/262	7577	7/8	OT	P1	40
5	276	7577	8	TF		42
6	276	7577	8	TF	CS	43
7	46/230	7577	8/99	NR		44
8	276	7577	99	OT		40
9	276	7577	99			
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Certified by: T. Switalski

TITAN

QC Report

Date: 1/31/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 5 of 14 Truck 5

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	29	31	73	73
42	22	21	76	71
43	22	31	71	73
44	20	33	70	68

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	99	CS	CS	42
2	96/180	7577	100/99	TF		43
3	276	7577	100	NR		44
4	276	7577	100	OT		40
5	276	7577	100	CS	CS	42
6	132/144	7577	100/23	TF		43
7	276	7577	23	NR		44
8	276	7577	23	OT		40
9	276	7577	23			
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Certified by: T. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/31/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 6 of 14 Truck 5

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	31	30	71	70
42	25	31	67	70
43	32	31	64	66
44	28	26	69	64

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	24	CS	CS	42
2	72/206	7577	23/24	TF		43
3	276	7577	24	NR		44
4	276	7577	24	OT	CS	40
5	15/261	7577	24/111	CS		42
6	276	7577	111	TF		43
7	276	7577	111	NR	CS	44
8	24/252	7577	112/111	OT		40
9	276	7577	112			
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Certified by: A. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 1/31/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 7 of 14 Truck 5

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	20	31	70	70
42	30	28	66	69
43	30	31	68	63
44	29	32	69	71

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	112	TF		42
2	276	7577	112	TF	CS	43
3	72/204	7577	107/112	NR		44
4	276	7577	107	OT		40
5	276	7577	107	CS		42
6	276	7577	107	TF	CS	43
7	120/156	7577	108/107	NR		44
8	276	7577	108	OT		40
9	276	7577	108			
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Certified by: C. Swatalski

TITAN

QC Report

Date: 1/31/2019

Order #: 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 8 of 14 Truck 5

# of Sheets: 9 sheets x 275

Machine	Peel		Sheer	
40	30	31	66	67
42	20	21	71	62
43	27	29	72	70
44	31	29	70	68

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	108	CS	CS	42
2	163/113	7577	10/108	TF	P1	43
3	276	7577	10	NR		44
4	276	7577	10	OT		40
5	276	7577	10	CS	CS	42
6	52/224	7577	10/9	TF		43
7	276	7577	9	NR	CS	44
8	10/266	7577	81/9	OT	P1	40
9	276	7577	9			
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Certified by: T. Swistalski

TITAN

QC Report

Date: 2/1/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 9 of 14 Truck 5

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	29	27	70	71
42	20	28	73	74
43	30	28	70	73
44	31	22	68	69

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	81	CS		42
2	276	7577	81	TF		43
3	276	7577	81	NR	CS	44
4	65/211	7577	80/81	OT		40
5	276	7577	80	CS		42
6	276	7577	80	TF		43
7	276	7577	80	NR	CS	44
8	124/152	7594/7577	143/80	OT		40
9	276	7594	143			
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Certified by: L. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/1/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 10 of 14 Truck 5

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
42	25	32	64	66
43	31	29	69	70
44	29	31	60	65
45	33	30	66	62

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	143	CS		42
2	276	7594	143	TF	CS	43
3	90/186	7594/7577	143/110	NR		44
4	276	7577	110	OT		40
5	276	7577	110	CS		42
6	276	7577	110	TF	CS	43
7	48/228	7577	110/109	NR		44
8	276	7577	109	OT		40
9	276	7577	109			
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Certified by: T. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/11/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 11 of 14 Truck 5

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
42	30	25	67	77
43	31	28	71	74
44	33	34	69	72
45	31	32	78	70

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	142	CS		42
2	276	7594	142	TF		43
3	276	7594	142	NR	CS	44
4	40/236	7594	141/142	OT		40
5	276	7594	141	CS		42
6	276	7594	141	TF		43
7	276	7594	141	DN	CS	44
8	88/188	7594	140/141	OT		40
9	276	7594	140			
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Certified by: T. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/11/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 12 of 14 Truck 5

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
42	34	32	69	74
43	32	33	78	77
44	31	30	77	76
45	30	33	71	61

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	140	CS	P1	42
2	276	7594	140	TF	CS	43
3	136/140	7594/7577	140/109	NR	CS	44
4	126/150	7577	109/27	OT		40
5	276	7577	27	CS		42
6	276	7577	27	TF		43
7	276	7577	27	DN	CS	44
8	72/204	7577	27/28	OT		40
9	276	7577	28			
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Certified by: [signature]

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/11/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 13 of 14 Truck 5

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
42	32	30	68	64
43	25	28	60	66
44	32	20	71	73
45	27	21	70	70

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	28	CS	CS	42
2	20/256	7577	28/14	TF		43
3	276	7577	14	NR		44
4	276	7577	14	OT		40
5	276	7577	14	CS	CS	42
6	29/245	7577	13/14	TF		43
7	276	7577	13	DN		44
8	276	7577	13	OT		40
9	276	7577	13			
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Certified by: F. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/11/2019

Order #: 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 14 of 14 Truck 5

# of Sheets: 9 sheets x 275

Machine	Peel		Sheer	
42	30	31	80	79
43	17	32	67	74
44	28	26	71	70
45	30	26	76	77

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	137	CS	CS	42
2	104/172	7594/7577	137/13	TF		43
3	276	7594	137	NR	CS	44
4	276	7594	137	OT		40
5	120/156	7594	137/136	CS		42
6	276	7594	136	TF	CS/P1	43
7	276	7594	136	DN		44
8	75/201	7594	136/135	OT		40
9	276	7594	136			
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Certified by: [signature]

Plastatech®

Certificate of Analysis

December 6, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	12/04/18
Lot Number	7594
Lot Quantity	150 Rolls

Certified Properties	Test Method	Specification	Avg	Stdev
Thickness	ASTM D5199	30.0 ± 5% mil	30.4	0.6429
MD Breaking Strength	ASTM D882	Min 73 lbf	81.9	4.0296
CMD Breaking Strength	ASTM D882	Min 73 lbf	79.1	2.1895
MD Elongation	ASTM D882	Min 380%	396.8	19.7687
CMD Elongation	ASTM D882	Min 380%	409.0	17.1113
MD 100% Modulus	ASTM D882	Min 30 lbf	38.6	2.7626
CMD 100% Modulus	ASTM D882	Min 30 lbf	37.5	1.9319
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	9.5	0.6877
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	8.8	0.6158
Low Temperature Impact	ASTM D1790	Pass 50% min -20°F (-29°C)	80.0	21.2132
Dimensional Stability	ASTM D1204	Max. 3%	-0.23%	0.13%
Hydrostatic Resistance	D751	100 psi	110.0	2.8868

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC

Plastatech Engineering Ltd.
725 Morley Drive
Saginaw, MI 48601

(989) 754-6500
(800) 892-9358
Fax (989) 754-1624

www.plastatech.com
jhickey@duro-last.com

Plastatech®

Certificate of Analysis
November 26, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	11/20/18
Lot Number	7577
Lot Quantity	104 Rolls

Certified Properties	Test Method	Specification	Avg	Stdev
Thickness	ASTM D5199	30.0 ± 5% mil	30.3	0.6283
MD Breaking Strength	ASTM D882	Min 73 lbf	81.8	4.7070
CMD Breaking Strength	ASTM D882	Min 73 lbf	78.5	3.3670
MD Elongation	ASTM D882	Min 380%	413.6	28.0415
CMD Elongation	ASTM D882	Min 380%	425.1	26.9319
MD 100% Modulus	ASTM D882	Min 30 lbf	36.6	2.0031
CMD 100% Modulus	ASTM D882	Min 30 lbf	35.1	1.9862
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	12.0	0.8111
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	11.4	0.6292
Low Temperature Impact	ASTM D1790	Pass % -20°F (-29°C)	88.7	13.0201
Dimensional Stability	ASTM D1204	Max. 3%	-0.29%	0.13%
Hydrostatic Resistance	D751	100 psi	115.0	4.8038

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC
Plastatech Engineering Ltd.
725 Morley Drive
Saginaw, MI 48601

(989) 754-6500
(800) 892-9358
Fax (989) 754-1624

www.plastatech.com
jhickey@duro-last.com

Certificate of Analysis

November 8, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	11/06/18
Lot Number	7546
Lot Quantity	121 Rolls

Certified Properties	Test Method	Specification	Avg	Stdev
Thickness	ASTM D5199	30.0 ± 5% mil	30.1	0.5771
MD Breaking Strength	ASTM D882	Min 73 lbf	88.1	3.4863
CMD Breaking Strength	ASTM D882	Min 73 lbf	81.7	3.6581
MD Elongation	ASTM D882	Min 380%	435.4	20.8052
CMD Elongation	ASTM D882	Min 380%	439.6	22.7378
MD 100% Modulus	ASTM D882	Min 30 lbf	39.9	1.9595
CMD 100% Modulus	ASTM D882	Min 30 lbf	37.4	1.9538
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	12.5	0.6755
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	11.8	0.7917
Low Temperature Impact	ASTM D1790	Pass % -20°F (-29°C)	94.4	7.2744
Dimensional Stability	ASTM D1204	Max. 3%	-0.39%	0.20%
Hydrostatic Resistance	D751	100 psi	113.4	4.7324

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC
Plastatech Engineering Ltd.
725 Morley Drive
Saginaw, MI 48601
(989) 754-6500
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Fax (989) 754-1624
www.plastatech.com
jhickey@duro-last.com

TITAN
ENVIRONMENTAL USA

AEP JOHN AMOS
WINFIELD, WV

PROJECT CERTIFICATIONS

TRUCK 6

15847 Kimberlee Street
Houston TX 77049

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/12/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 1 of 14 Truck 6

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	30	30	71	71
42	31	28	73	63
44	33	30	70	73
45	30	31	70	70

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	135	CS		42
2	276	7594	135	TF		13
3	276	7594	135	DN	CS	44
4	27/249	7594	135/134	OT		45
5	276	7594	134	CS		42
6	276	7594	134	TF	CS	13
7	15/261	7594	151/134	DN		44
8	276	7594	151	OT		45
9	276	7594	151			
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Certified by: T. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/12/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 2 of 14 Truck 6

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	31	31	69	70
42	31	32	73	72
44	31	28	70	73
45	30	33	74	72

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	151	CS	CS	42
2	63/213	7594	150/151	TF		13
3	276	7594	150	DN		44
4	276	7594	150	OT		45
5	276	7594	150	CS	CS	42
6	152/124	7594	150/128	TF		13
7	276	7594	128	DN		44
8	276	7594	128	OT		45
9	276	7594	128			
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Certified by: T. Switalski

TITAN

ENVIRONMENTAL USA

QC Report

Date: 2/13/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 3 of 14 Truck 6

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	32	33	68	71
42	32	34	73	63
44	28	26	72	68
45	32	32	71	74

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	127	CS	CS	42
2	108/168	7594	128/127	TF		13
3	276	7594	127	NR		44
4	276	7594	127	DN	CS/P1	45
5	60/216	7594/7577	127/95	CS	P1	42
6	276	7577	95	TF		13
7	276	7577	95	NR		44
8	276	7577	959	DN		45
9	276	7577	94			
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Certified by: [illegible]

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/13/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 4 of 14 Truck 6

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	32	33	72	71
42	31	30	75	74
44	31	28	70	73
45	32	31	72	76

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	94	CS		42
2	276	7577	94	TF	CS	13
3	53/223	7577/7594	94/149	NR		44
4	276	7594	149	DN		45
5	276	7594	149	CS		42
6	276	7594	149	TF	CS	13
7	105/171	7594	148/149	NR		44
8	276	7594	148	DN		45
9	276	7594	148			
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Certified by: A. Santalolli

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/13/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 5 of 14 Truck 6

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	29	29	65	71
42	31	30	75	73
44	32	32	74	69
45	24	29	70	72

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	148	CS	CS	42
2	121/155	7594/7577	148/104	TF		13
3	276	7577	104	NR		44
4	276	7577	104	DN		45
5	276	7577	104	CS	CS	42
6	68/208	7577	104/103	OT		44
7	276	7577	103	DN		45
8	276	7577	103	DN		45
9	276	7577	103			
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Certified by: A. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/13/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 6 of 14 Truck 6

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	31	31	73	69
42	23	31	72	72
44	28	29	72	71
45	28	31	72	65

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	133	CS	CS	42
2	20/256	7577/7594	103/133	NR		13
3	276	7594	133	DN	CS	44
4	20/256	7594	132/133	OT		45
5	276	7594	132	CS		42
6	276	7594	132	NR		13
7	276	7594	132	DN	CS	44
8	60/216	7594	138/132	OT		45
9	276	7594	138			
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Certified by: T. Swatoski

TITAN

QC Report

Date: 2/13/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 7 of 14 Truck 6

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
13	23	23	72	74
42	31	32	70	71
44	32	33	71	78
45	32	33	74	76

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	138	CS		42
2	276	7594	138	NR	CS/P1	13
3	116/160	7594	139/138	DN		44
4	276	7594	139	OT		45
5	276	7594	139	CS		42
6	276	7594	139	TF	CS	43
7	112/164	7594	139/155	NR		13
8	276	7594	155	DN		45
9	276	7594	155			
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Certified by: [signature]

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/13/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 8 of 14 Truck 6

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	32	33	68	75
42	27	28	72	72
44	26	27	69	67
45	31	28	75	73

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	155	CS	CS	42
2	60/216	7594	155/154	TF		43
3	276	7594	154	NR		40
4	276	7594	154	DN		45
5	276	7594	154	CS	CS	42
6	15/265	7594	154/130	TF		43
7	276	7594	130	NR	CS	40
8	25/251	7594	129/130	DN		45
9	276	7594	130			
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Certified by: R. Swietalski

TITAN

QC Report

Date: 2/13/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 9 of 14 Truck 6

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	31	32	74	68
42	32	34	68	70
43	29	30	68	70
45	30	32	73	70

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	129	CS	P1	42
2	276	7594	129	TF	CS/P1	43
3	276	7594	129	NR	P1	40
4	78/198	7594	126/129	DN		45
5	276	7594	126	TF		42
6	276	7594	126	TF	CS	43
7	276	7594	126	NR		40
8	147/129	7594	126/125	DN		45
9	276	7594	125			
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Certified by: T. Swtalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/13/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 10 of 14 Truck 6

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	33	32	68	71
42	31	34	70	69
43	33	33	70	62
45	32	32	66	69

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	125	TF	CS	42
2	276	7594	125	TF		43
3	102/174	7594	125/145	NR		40
4	276	7594	145	DN		45
5	276	7594	145	OT	CS	42
6	276	7594	145	TF		45
7	54/222	7594	145/144	DN		40
8	276	7594	144	DN		40
9	276	7594	144			
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Certified by: T. Swintalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/16/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 11 of 14 Truck 6

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	30	34	73	71
42	24	30	72	71
45	30	31	75	70

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	144	OT		42
2	276	7594	147	TF		45
3	276	7594	147	DN	CS	40
4	276	7594	147	DN		40
5	45/231	7594	146/147	OT		42
6	276	7594	146	TF	CS	45
7	276	7594	146	DN		40
8	96/180	7594	153/146	DN		40
9	276	7594	146			
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Certified by: [signature]

TITAN

ENVIRONMENTAL USA

QC Report

Date: 2/16/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 12 of 14 Truck 6

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	25	32	70	70
42	32	33	74	73
43	30	34	72	71
45	30	31	68	68

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	153	OT		42
2	276	7594	153	TF		13
3	276	7594	153	NR	CS	40
4	120/156	7594	153/152	DN		45
5	276	7594	152	OT		42
6	276	7594	152	TF		13
7	276	7594	152	NR		40
8	58/218	7594	152/75	DN		45
9	276	7594	75			
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Certified by: [signature]

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/18/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 13 of 14 Truck 6

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	31	33	67	68
42	27	31	76	73
43	28	28	71	69
45	28	34	76	77

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	75	OT		42
2	276	7577	75	TF		43
3	276	7577	74	NR		40
4	276	7577	74	DN		45
5	276	7577	74	OT		42
6	51/225	7577	74/62	TF	CS/P1	43
7	276	7577	62	NR		40
8	276	7577	62	DN	P1	45
9	276	7577	62			
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Certified by: K. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/18/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 14 of 14 Truck 6

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	26	31	67	60
42	27	32	73	66
43	29	27	68	67
45	27	30	72	70

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	63	CS	CS	42
2	172/204	7577/7594	62/63	OT		43
3	276	7594	63	NR		40
4	276	7594	63	DN	CS	45
5	100/176	7594/7577	63/66	CS		42
6	276	7577	66	OT		43
7	276	7577	66	NR	CS	40
8	30/246	7577	66/67	DN		45
9	276	7577	66			
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Certified by: A. Switalski

Certificate of Analysis
November 8, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	11/06/18
Lot Number	7546
Lot Quantity	121 Rolls

Certified Properties	**Test Method**	**Specification**	**Avg**	**Stdev**
Thickness	ASTM D5199	30.0 ± 5% mil	30.1	0.5771
MD Breaking Strength	ASTM D882	Min 73 lbf	88.1	3.4863
CMD Breaking Strength	ASTM D882	Min 73 lbf	81.7	3.6581
MD Elongation	ASTM D882	Min 380%	435.4	20.8052
CMD Elongation	ASTM D882	Min 380%	439.6	22.7378
MD 100% Modulus	ASTM D882	Min 30 lbf	39.9	1.9595
CMD 100% Modulus	ASTM D882	Min 30 lbf	37.4	1.9538
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	12.5	0.6755
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	11.8	0.7917
Low Temperature Impact	ASTM D1790	Pass % -20°F (-29°C)	94.4	7.2744
Dimensional Stability	ASTM D1204	Max. 3%	-0.39%	0.20%
Hydrostatic Resistance	D751	100 psi	113.4	4.7324

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC

Plastatech Engineering Ltd.
725 Morley Drive
Saginaw, MI 48601

(989) 754-6500
(800) 892-9358
Fax (989) 754-1624

www.plastatech.com
jhickey@duro-last.com

Certificate of Analysis

November 26, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	11/20/18
Lot Number	7577
Lot Quantity	104 Rolls

Certified Properties	**Test Method**	**Specification**	**Avg**	**Stdev**
Thickness	ASTM D5199	30.0 ± 5% mil	30.3	0.6283
MD Breaking Strength	ASTM D882	Min 73 lbf	81.8	4.7070
CMD Breaking Strength	ASTM D882	Min 73 lbf	78.5	3.3670
MD Elongation	ASTM D882	Min 380%	413.6	28.0415
CMD Elongation	ASTM D882	Min 380%	425.1	26.9319
MD 100% Modulus	ASTM D882	Min 30 lbf	36.6	2.0031
CMD 100% Modulus	ASTM D882	Min 30 lbf	35.1	1.9862
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	12.0	0.8111
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	11.4	0.6292
Low Temperature Impact	ASTM D1790	Pass % -20°F (-29°C)	88.7	13.0201
Dimensional Stability	ASTM D1204	Max. 3%	-0.29%	0.13%
Hydrostatic Resistance	D751	100 psi	115.0	4.8038

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC
Plastatech Engineering Ltd.
725 Morley Drive
Saginaw, MI 48601

(989) 754-6500
(800) 892-9358
Fax (989) 754-1624

www.plastatech.com
jhickey@duro-last.com

Plastatech®

Certificate of Analysis

December 6, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	12/04/18
Lot Number	7594
Lot Quantity	150 Rolls

Certified Properties	**Test Method**	**Specification**	**Avg**	**Stdev**
Thickness	ASTM D5199	30.0 ± 5% mil	30.4	0.6429
MD Breaking Strength	ASTM D882	Min 73 lbf	81.9	4.0296
CMD Breaking Strength	ASTM D882	Min 73 lbf	79.1	2.1895
MD Elongation	ASTM D882	Min 380%	396.8	19.7687
CMD Elongation	ASTM D882	Min 380%	409.0	17.1113
MD 100% Modulus	ASTM D882	Min 30 lbf	38.6	2.7626
CMD 100% Modulus	ASTM D882	Min 30 lbf	37.5	1.9319
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	9.5	0.6877
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	8.8	0.6158
Low Temperature Impact	ASTM D1790	Pass 50% min -20°F (-29°C)	80.0	21.2132
Dimensional Stability	ASTM D1204	Max. 3%	-0.23%	0.13%
Hydrostatic Resistance	D751	100 psi	110.0	2.8868

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC

Plastatech Engineering Ltd.
725 Morley Drive
Saginaw, MI 48601

(989) 754-6500
(800) 892-9358
Fax (989) 754-1624

www.plastatech.com
jhickey@duro-last.com

TITAN
ENVIRONMENTAL USA

AEP JOHN AMOS
WINFIELD, WV

PROJECT CERTIFICATIONS

TRUCK 7

15847 Kimberlee Street
Houston TX 77049

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/24/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 1 of 14 Truck 7

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
42	26	29	71	69
43	24	29	66	63
44	30	28	70	68
45	31	30	71	71

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	67	CS		42
2	276	7594	67	TF	CS	43
3	26/250	7577/7594	54/67	DN		45
4	276	7577	54	BS		44
5	276	7577	54	CS		42
6	276	7577	54	TF	CS	43
7	95/181	7577	53/54	DN		45
8	276	7577	53	BS		44
9	276	7577	53			
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Certified by: T. Switalski

TITAN

QC Report

Date: 2/24/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 2 of 14 Truck 7

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
42	29	28	72	65
43	31	30	71	65
44	29	30	69	61
45	29	33	67	61

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	53	CS	CS	42
2	146/130	7594/7577	156/53	TF	CS	43
3	130/146	7594	156/156	DN		45
4	276	7594	156	BS		44
5	276	7594	156	KS		42
6	80/196	7594	156/157	NR		43
7	276	7594	157	OT		45
8	276	7594	157	JT		44
9	276	7594	157			
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Certified by: T. Swatalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/25/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 3 of 14 Truck 7

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
42	29	28	71	69
43	28	32	70	69
44	30	29	69	71
45	25	29	77	76

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	72	KS	CS	42
2	20/256	7577/7594	157/72	NR		43
3	276	7577	72	JT	P1	45
4	244/32	7577	72/73	JT		44
5	276	7577	737	KS		42
6	276	7577	73	NR		43
7	276	7577	73	OT	CS	45
8	180/96	7577	73/58	JT		44
9	276	7577	58			
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Certified by: A. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/25/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 4 of 14 Truck 7

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
42	29	32	71	72
43	29	30	71	63
44	26	30	72	71
45	26	32	74	72

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	58	KS		42
2	276	7577	58	NR	CS	43
3	132/144	7577	58/57	OT		45
4	276	7577	57	JT		44
5	276	7577	57	KS		42
6	276	7577	57	NR		43
7	132/144	7577/7594	57/159	OT		45
8	276	7577	57	JT		44
9	276	7577	57			
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Certified by: T. Switalski

TITAN

QC Report

Date: 2/25/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 5 of 14 Truck 7

\# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
42	26	30	69	72
43	30	29	67	65
44	30	27	62	73
45	31	33	69	73

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7594	159	KS		42
2	276	7594	158	NR		43
3	276	7594	158	OT		45
4	276	7594	158	JT	CS	44
5	234/42	7594/7577	158/56	KS		42
6	276	7577	6	NR		43
7	276	7577	56	OT	CS	45
8	168/108	7577	56/55	JT		44
9	276	7577	56			
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Certified by:

TITAN

ENVIRONMENTAL USA

QC Report

Date:	2/25/2019
Order #	387
Customer:	Hallaton
Job Name:	AEP John Amos
Product:	PVC 30
Panel #:	6 of 14 Truck 7
# of Sheets	9 sheets x 275

Machine	Peel		Sheer	
42	27	25	73	69
43	28	28	70	73
44	26	25	70	75
45	29	29	68	68

Sheet #	Pull Length	Lot #	Roll #
1	276	7577	55
2	276	7577	55
3	276	7577	55
4	110/166	7577	55/61
5	276	7577	61
6	276	7577	61
7	276	7577	61
8	50/226	7577	61/59
9	276	7577	59
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Employee	Patch (P) or Cross Seam (CS)?	Machine
CS		42
TF	P1	43
DN	CS	45
BS	P1	44
CS		42
TF		43
DN	CS	45
BS		44

Certified by:

TITAN

ENVIRONMENTAL USA

QC Report

Date: 2/25/2019

Order #: 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 7 of 14 Truck 7

# of Sheets: 9 sheets x 275

Machine	Peel		Sheer	
42	32	30	70	72
43	29	29	67	69
44	25	31	72	69
45	25	28	71	71

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	59	CS	CS	42
2	10/266	7577	64/59	TF		43
3	276	7577	64	DN		45
4	276	7577	64	BS		44
5	276	7577	64	CS	CS	42
6	68/208	7577	65/65	TF		43
7	276	7577	65	DN		45
8	276	7577	65	BS		44
9	276	7577	65			
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Certified by: A. Swital[illegible]

TITAN

QC Report

Date: 2/25/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 8 of 14 Truck 7

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
42	28	30	70	68
43	32	29	67	62
44	28	25	72	69
45	32	27	64	67

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	78	CS	CS	42
2	125/151	7577	78/65	TF	P1	43
3	276	7577	78	DN		45
4	276	7577	78	BS	CS/P1	44
5	95/181	7577	78/79	CS		42
6	276	7577	79	TF		43
7	276	7577	79	DN	CS	45
8	40/236	7577	79/37	BS		44
9	276	7577	79			
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Certified by: [signature]

TITAN

QC Report

Date: 2/26/2019

Order #: 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 9 of 14 Truck 7

# of Sheets: 9 sheets x 275

Machine	Peel		Sheer	
42	30	30	66	70
43	31	32	71	70
44	29	29	71	66
45	26	26	68	68

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	38	KS		42
2	276	7577	38	NR	CS	43
3	262/14	7577	38/37	OT		45
4	276	7577	37	JT		44
5	276	7577	37	KS		42
6	276	7577	37	OT	CS	43
7	204/72	7577	37/35	BM		45
8	276	7577	35	NR		44
9	276	7577	35			
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Certified by:

TITAN

ENVIRONMENTAL INC

QC Report

Date:	2/26/2019
Order #	387
Customer:	Hallaton
Job Name:	AEP John Amos
Product:	PVC 30
Panel #:	10 of 14 Truck 7
# of Sheets	9 sheets x 275

Machine	Peel		Sheer	
42	27	28	67	67
43	30	28	68	70
44	28	27	73	70
45	29	30	68	67

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	35	KS		42
2	156/120	7577	35/36	NR		43
3	276	7577	36	BM		45
4	276	7577	36	JT		44
5	276	7577	36	KS		42
6	84/192	7577	36/34	KS	P1	43
7	276	7577	34	OT		45
8	276	7577	34	JT		44
9	276	7577	34			
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Certified by: [signature]

TITAN

ENVIRONMENTAL USA

QC Report

Date: 2/26/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 11 of 14 Truck 7

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
42	29	31	73	68
43	29	31	65	73
44	30	29	71	73
45	29	29	73	73

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	34	KS	CS	42
2	42/234	7577	33/34	KS		42
3	276	7577	34	JT	CS	45
4	252/15	7577	34/71	OT		44
5	276	7577	71	KS		42
6	276	7577	71	KS		42
7	276	7577	71	JT	CS/P1	45
8	204/72	7577	71/70	BM		44
9	276	7577	70			
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Certified by: [signature]

TITAN

QC Report

Date: 2/26/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 12 of 14 Truck 7

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
42	32	28	68	70
43	27	31	68	71
44	32	27	69	72
45	29	30	74	72

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	70	CS		42
2	276	7577	70	TF	CS	43
3	139/136	7577	92/70	DN		45
4	276	7577	92	BS		44
5	276	7577	92	CS		42
6	276	7577	92	TF	CS	43
7	72/204	7577	92/93	DN		45
8	276	7577	93	BS		44
9	276	7577	93			
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Certified by: T. Switalski

TITAN

QC Report

Date: 2/26/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 13 of 14 Truck 7

# of Sheets 9 sheets x 275

Machine	Peel		Shear	
42	26	31	69	70
43	28	29	68	69
44	32	27	72	69
45	25	32	67	71

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	93	CS	CS	42
2	17/259	7577	93/52	TF		43
3	276	7577	52	DN		45
4	276	7577	52	BS		44
5	38/238	7577	51/52	CS		42
6	27	7577	51	TF		43
7	27	7577	51	DN	CS	45
8	104/172	7577	77/51	BS		44
9	276	7577	51			
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Certified by: A. Switalski

TITAN
ENVIRONMENTAL USA

QC Report

Date: 2/26/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 14 of 14 Truck 7

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
42	21	29	67	69
43	28	31	61	75
44	25	30	74	72
45	27	27	68	70

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	77	CS		42
2	276	7577	77	TF		43
3	276	7577	77	DN	CS	45
4	108/168	7577	77/76	BS		44
5	276	7577	76	CS		42
6	276	7577	76	TF		43
7	276	7577	76	DN	CS	45
8	48/228	7577	76/39	BS		44
9	276	7577	39			
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Certified by: T. Switeski

Plastatech®

Certificate of Analysis
November 8, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	11/06/18
Lot Number	7546
Lot Quantity	121 Rolls

Certified Properties	**Test Method**	**Specification**	**Avg**	**Stdev**
Thickness	ASTM D5199	30.0 ± 5% mil	30.1	0.5771
MD Breaking Strength	ASTM D882	Min 73 lbf	88.1	3.4863
CMD Breaking Strength	ASTM D882	Min 73 lbf	81.7	3.6581
MD Elongation	ASTM D882	Min 380%	435.4	20.8052
CMD Elongation	ASTM D882	Min 380%	439.6	22.7378
MD 100% Modulus	ASTM D882	Min 30 lbf	39.9	1.9595
CMD 100% Modulus	ASTM D882	Min 30 lbf	37.4	1.9538
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	12.5	0.6755
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	11.8	0.7917
Low Temperature Impact	ASTM D1790	Pass % -20°F (-29°C)	94.4	7.2744
Dimensional Stability	ASTM D1204	Max. 3%	-0.39%	0.20%
Hydrostatic Resistance	D751	100 psi	113.4	4.7324

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC

Plastatech Engineering Ltd.
725 Morley Drive
Saginaw, MI 48601

(989) 754-6500
(800) 892-9358
Fax (989) 754-1624

www.plastatech.com
jhickey@duro-last.com

Certificate of Analysis

November 26, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	11/20/18
Lot Number	7577
Lot Quantity	104 Rolls

Certified Properties	Test Method	Specification	Avg	Stdev
Thickness	ASTM D5199	30.0 ± 5% mil	30.3	0.6283
MD Breaking Strength	ASTM D882	Min 73 lbf	81.8	4.7070
CMD Breaking Strength	ASTM D882	Min 73 lbf	78.5	3.3670
MD Elongation	ASTM D882	Min 380%	413.6	28.0415
CMD Elongation	ASTM D882	Min 380%	425.1	26.9319
MD 100% Modulus	ASTM D882	Min 30 lbf	36.6	2.0031
CMD 100% Modulus	ASTM D882	Min 30 lbf	35.1	1.9862
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	12.0	0.8111
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	11.4	0.6292
Low Temperature Impact	ASTM D1790	Pass % -20°F (-29°C)	88.7	13.0201
Dimensional Stability	ASTM D1204	Max. 3%	-0.29%	0.13%
Hydrostatic Resistance	D751	100 psi	115.0	4.8038

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC

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Certificate of Analysis
December 6, 2018
The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	12/04/18
Lot Number	7594
Lot Quantity	150 Rolls

Certified Properties	Test Method	Specification	Avg	Stdev
Thickness	ASTM D5199	30.0 ± 5% mil	30.4	0.6429
MD Breaking Strength	ASTM D882	Min 73 lbf	81.9	4.0296
CMD Breaking Strength	ASTM D882	Min 73 lbf	79.1	2.1895
MD Elongation	ASTM D882	Min 380%	396.8	19.7687
CMD Elongation	ASTM D882	Min 380%	409.0	17.1113
MD 100% Modulus	ASTM D882	Min 30 lbf	38.6	2.7626
CMD 100% Modulus	ASTM D882	Min 30 lbf	37.5	1.9319
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	9.5	0.6877
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	8.8	0.6158
Low Temperature Impact	ASTM D1790	Pass 50% min -20°F (-29°C)	80.0	21.2132
Dimensional Stability	ASTM D1204	Max. 3%	-0.23%	0.13%
Hydrostatic Resistance	D751	100 psi	110.0	2.8868

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC
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TITAN
ENVIRONMENTAL USA

AEP JOHN AMOS
WINFIELD, WV

PROJECT CERTIFICATIONS

TRUCK 8

15847 Kimberlee Street
Houston TX 77049

TITAN

QC Report

Date: 2/27/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 1 of 6 Truck 8

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
42	26	28	73	67
43	30	26	69	70
44	29	32	74	73
45	25	29	70	71

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	39	KS		42
2	276	7577	39	BM		43
3	276	7577	40	OT		45
4	276	7577	40	JT	P1	44
5	276	7577	40	KS	CS	42
6	228/48	7577	40/49	KS		42
7	276	7577	49	OT		45
8	276	7577	49	JT		44
9	276	7577	49			
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Certified by: [signature]

TITAN

QC Report

Date: 2/27/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 2 of 6 Truck 8

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	31	29	68	69
42	30	28	67	74
44	20	25	70	68
45	30	29	69	68
43	22	25	69	71

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	49	KS	CS	42
2	168/108	7577	49/50	NR		43
3	276	7577	50	OT		45
4	276	7577	50	JT	CS	44
5	96/180	7577	50/29	KS		42
6	276	7577	29	NR		40
7	276	7577	29	OT	CS	45
8	36/240	7577	29/30	BM		44
9	276	7577	29			
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Certified by: T. Switalski

TITAN

QC Report

Date: 2/27/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 3 of 6 Truck 8

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	28	25	68	72
42	29	24	72	73
44	29	32	69	69
45	29	28	65	70

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	30	KS		42
2	276	7577	30	NR	CS	40
3	264/12	7577	30/86	OT		45
4	276	7577	86	BM		44
5	276	7577	86	KS		42
6	276	7577	86	NR	CS	40
7	216/60	7577	86/91	OT		45
8	276	7577	91	BM		44
9	276	7577	91			
10						
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16						
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Certified by: [signature]

TITAN

QC Report

Date: 2/27/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 4 of 6 Truck 8

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	24	24	65	70
42	20	20	75	71
44	28	26	71	71
45	29	29	73	74

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	91	KS	CS	42
2	123/153	7577	31/91	NR		40
3	276	7577	31	OT		45
4	276	7577	31	JT		44
5	276	7577	31	KS	CS	42
6	96/180	7577	31/32	NR		40
7	276	7577	32	OT		45
8	276	7577	32	JT		44
9	276	7577	32			
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Certified by:

TITAN

QC Report

Date: 2/28/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 5 of 6 Truck 8

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	31	31	68	70
42	20	31	69	65
44	26	27	68	70
45	20	20	68	67

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	43	KS	CS/P1	42
2	36/240	7577	32/43	NR		40
3	276	7577	43	BM	CS	45
4	264/12	7577	43/44	JT		44
5	276	7577	44	KS	P1	42
6	276	7577	44	NR		40
7	276	7577	44	BM	CS	45
8	216/60	7577	44/84	JF		44
9	276	7577	84			
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19						
20						

Certified by: P. Switalski

TITAN

QC Report

Date: 2/28/2019

Order # 387

Customer: Hallaton

Job Name: AEP John Amos

Product: PVC 30

Panel #: 6 of 6 Truck 8

# of Sheets 9 sheets x 275

Machine	Peel		Sheer	
40	28	30	75	72
42	30	31	70	64
44	26	30	73	72
45	30	33	74	69

Sheet #	Pull Length	Lot #	Roll #	Employee	Patch (P) or Cross Seam (CS)?	Machine
1	276	7577	84	KS		42
2	276	7577	84	NR	CS	40
3	156/120	7577	84/85	BM		45
4	276	7577	85	JT		44
5	276	7577	85	KS		42
6	276	7577	85	NR	CS	40
7	84/192	7577	85/41	BM		45
8	276	7577	41	JF		44
9	276	7577	41			
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Certified by: [signature]

Plastatech®

Certificate of Analysis
November 8, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	11/06/18
Lot Number	7546
Lot Quantity	121 Rolls

Certified Properties	Test Method	Specification	Avg	Stdev
Thickness	ASTM D5199	30.0 ± 5% mil	30.1	0.5771
MD Breaking Strength	ASTM D882	Min 73 lbf	88.1	3.4863
CMD Breaking Strength	ASTM D882	Min 73 lbf	81.7	3.6581
MD Elongation	ASTM D882	Min 380%	435.4	20.8052
CMD Elongation	ASTM D882	Min 380%	439.6	22.7378
MD 100% Modulus	ASTM D882	Min 30 lbf	39.9	1.9595
CMD 100% Modulus	ASTM D882	Min 30 lbf	37.4	1.9538
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	12.5	0.6755
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	11.8	0.7917
Low Temperature Impact	ASTM D1790	Pass % -20°F (-29°C)	94.4	7.2744
Dimensional Stability	ASTM D1204	Max. 3%	-0.39%	0.20%
Hydrostatic Resistance	D751	100 psi	113.4	4.7324

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC
Plastatech Engineering Ltd.
725 Morley Drive
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(800) 892-9358
Fax (989) 754-1624

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Certificate of Analysis
November 26, 2018
The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	11/20/18
Lot Number	7577
Lot Quantity	104 Rolls

Certified Properties	Test Method	Specification	Avg	Stdev
Thickness	ASTM D5199	30.0 ± 5% mil	30.3	0.6283
MD Breaking Strength	ASTM D882	Min 73 lbf	81.8	4.7070
CMD Breaking Strength	ASTM D882	Min 73 lbf	78.5	3.3670
MD Elongation	ASTM D882	Min 380%	413.6	28.0415
CMD Elongation	ASTM D882	Min 380%	425.1	26.9319
MD 100% Modulus	ASTM D882	Min 30 lbf	36.6	2.0031
CMD 100% Modulus	ASTM D882	Min 30 lbf	35.1	1.9862
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	12.0	0.8111
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	11.4	0.6292
Low Temperature Impact	ASTM D1790	Pass % -20°F (-29°C)	88.7	13.0201
Dimensional Stability	ASTM D1204	Max. 3%	-0.29%	0.13%
Hydrostatic Resistance	D751	100 psi	115.0	4.8038

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

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Certificate of Analysis

December 6, 2018

The following test data was gathered on the shipment below.

Product Description	Plastatech IG® 30 mil Emboss 350 Yards
Plastatech Product Code	57106
Manufacturing Date	12/04/18
Lot Number	7594
Lot Quantity	150 Rolls

Certified Properties	Test Method	Specification	Avg	Stdev
Thickness	ASTM D5199	30.0 ± 5% mil	30.4	0.6429
MD Breaking Strength	ASTM D882	Min 73 lbf	81.9	4.0296
CMD Breaking Strength	ASTM D882	Min 73 lbf	79.1	2.1895
MD Elongation	ASTM D882	Min 380%	396.8	19.7687
CMD Elongation	ASTM D882	Min 380%	409.0	17.1113
MD 100% Modulus	ASTM D882	Min 30 lbf	38.6	2.7626
CMD 100% Modulus	ASTM D882	Min 30 lbf	37.5	1.9319
MD Tear Resistance	ASTM D1004	Min 8.0 lbf	9.5	0.6877
CMD Tear Resistance	ASTM D1004	Min 8.0 lbf	8.8	0.6158
Low Temperature Impact	ASTM D1790	Pass 50% min -20°F (-29°C)	80.0	21.2132
Dimensional Stability	ASTM D1204	Max. 3%	-0.23%	0.13%
Hydrostatic Resistance	D751	100 psi	110.0	2.8868

Every 8th roll of this production lot was tested and adheres to the physically properties specified above. This product meets or exceeds the Manufacturer's Index Properties in accordance with ASTM-D7176. This product contains no recycled materials.

Mitch Gilbert

Director R&D/QC

Plastatech Engineering Ltd. (989) 754-6500 www.plastatech.com

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Appendix B - II
Quality Assurance Conformance Test Results

PVC Conformance Test Results

Property	Required Value		Sample	Roll No. 6 L18089-17-01				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		30.0	30.0	30.0	31.0	30.0	
	Low Ind - 28.5 mil		30.0	31.0	30.0	30.0	30.0	30.2
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	83.2	80.3	87.4	83.3	80.1	82.9
		CD	82.1	76.0	80.7	85.5	78.7	80.6
2. Break Elongation (%)	380 (min)	MD	404.8	420.8	462.8	412.3	370.4	414.2
		CD	403.2	394.9	394.9	428.4	391.3	402.5
3. Modulus @100% (lb/in)	30 (min)	MD	47.1	44.1	46.8	47.5	48.0	46.7
		CD	47.7	44.6	48.6	49.7	49.4	48.0
Tear Resistance (lb)	8 (min)	MD	12.7	12.2	14.2	13.5	14.0	
			13.0	12.8	12.6	13.1	12.7	13.1
		CD	12.5	12.0	14.3	14.6	12.5	
			14.3	11.8	13.6	12.3	12.0	13.0
Interface Shear Strength								

Property	Required Value		Sample	Roll No. 15 L18089-17-02				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		31.0	30.0	30.0	31.0	30.0	
	Low Ind - 28.5 mil		30.0	30.0	30.0	30.0	30.0	30.2
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	80.7	82.0	78.1	84.7	83.7	81.8
		CD	77.7	76.5	80.1	80.3	80.5	79.0
2. Break Elongation (%)	380 (min)	MD	388.1	438.8	388.1	421.7	413.3	410.0
		CD	403.5	429.1	440.2	412.4	412.4	419.5
3. Modulus @100% (lb/in)	30 (min)	MD	45.0	43.5	45.5	47.1	47.0	45.6
		CD	42.9	41.2	41.7	45.9	46.1	43.6
Tear Resistance (lb)	8 (min)	MD	12.3	13.0	12.4	11.2	14.0	
			12.9	11.6	11.7	13.0	14.5	12.7
		CD	13.6	12.9	13.6	14.6	14.5	
			11.6	12.1	12.0	12.5	11.6	12.9
Interface Shear Strength								

Property	Required Value		Sample	Roll No. 30 L18089-17-03				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		30.0	31.0	30.0	30.0	30.0	
	Low Ind - 28.5 mil		30.0	30.0	31.0	30.0	30.0	30.2
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	80.8	79.7	78.8	85.8	80.7	81.2
		CD	79.9	77.2	80.7	82.4	77.6	79.6
2. Break Elongation (%)	380 (min)	MD	420.9	437.6	420.9	437.7	395.2	422.5
		CD	395.1	454.6	446.2	437.7	403.8	427.5
3. Modulus @100% (lb/in)	30 (min)	MD	43.4	42.0	43.0	45.2	45.4	43.8
		CD	43.6	39.4	42.4	45.2	44.4	43.0
Tear Resistance (lb)	8 (min)	MD	13.6	12.5	12.3	13.0	12.6	
			13.5	11.6	13.3	14.0	12.4	12.9
		CD	11.0	12.0	11.3	11.5	12.7	
			11.7	11.6	12.1	12.0	11.1	11.7
Interface Shear Strength								

Property	Required Value		Sample	Roll No. 45 L18089-17-04				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		31.0	30.0	30.0	31.0	30.0	
	Low Ind - 28.5 mil		32.0	31.0	31.0	30.0	30.0	30.6
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	80.0	79.3	80.9	82.6	80.9	80.7
		CD	78.9	80.4	79.8	79.5	74.6	78.6
2. Break Elongation (%)	380 (min)	MD	389.5	412.9	429.9	413.0	389.5	407.0
		CD	407.0	466.0	432.2	407.0	391.4	420.7
3. Modulus @100% (lb/in)	30 (min)	MD	45.0	42.9	43.5	46.3	47.0	44.9
		CD	43.9	42.2	44.6	46.2	44.5	44.3
Tear Resistance (lb)	8 (min)	MD	15.0	12.3	12.5	13.8	14.1	
			14.0	12.0	14.1	13.4	14.3	13.6
		CD	13.1	11.6	12.3	14.3	14.0	
			13.6	11.8	11.5	13.4	13.9	13.0
Interface Shear Strength								

PVC Conformance Test Results

Property	Required Value		Sample	Roll No. 60 L18089-17-05				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		31.0	30.0	30.0	31.0	30.0	
	Low Ind - 28.5 mil		30.0	31.0	30.0	30.0	30.0	30.3
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	78.1	78.2	86.4	84.0	78.7	81.1
		CD	78.1	79.6	84.1	80.7	78.3	80.2
2. Break Elongation (%)	380 (min)	MD	398.4	411.8	445.6	395.2	389.9	408.2
		CD	413.0	454.6	463.2	438.1	396.2	433.0
3. Modulus @100% (lb/in)	30 (min)	MD	43.4	43.1	47.4	48.4	45.6	45.6
		CD	42.0	41.5	44.7	43.8	44.5	43.3
Tear Resistance (lb)	8 (min)	MD	14.0	13.2	12.8	12.9	13.7	
			12.1	12.8	12.7	12.1	11.5	12.8
		CD	11.4	11.5	11.6	12.6	13.7	
			12.9	11.5	11.5	12.2	12.1	12.1
Interface Shear Strength								

Property	Required Value		Sample	Roll No. 75 L18089-17-06				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		31.0	30.0	32.0	31.0	30.0	
	Low Ind - 28.5 mil		30.0	31.0	30.0	30.0	30.0	30.5
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	80.9	82.1	81.1	81.6	80.9	81.3
		CD	79.8	77.6	82.5	82.5	78.7	80.2
2. Break Elongation (%)	380 (min)	MD	395.4	445.7	420.6	412.0	390.0	412.7
		CD	406.8	449.0	457.3	432.1	423.7	433.8
3. Modulus @100% (lb/in)	30 (min)	MD	44.6	42.7	45.1	45.4	47.9	45.1
		CD	43.8	41.2	44.3	45.3	43.6	43.6
Tear Resistance (lb)	8 (min)	MD	13.5	13.1	12.5	13.6	14.5	
			13.4	12.8	13.9	13.1	13.9	13.4
		CD	12.1	11.8	11.7	11.8	12.1	
			12.0	12.6	12.7	13.0	12.2	12.2
Interface Shear Strength								

Property	Required Value		Sample	Roll No. 90 L18089-17-07				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		30.0	30.0	31.0	31.0	30.0	
	Low Ind - 28.5 mil		30.0	31.0	30.0	31.0	30.0	30.4
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	86.9	82.1	81.4	79.6	76.5	81.3
		CD	84.3	78.9	74.6	77.5	81.1	79.3
2. Break Elongation (%)	380 (min)	MD	419.7	444.9	444.9	385.8	390.7	417.2
		CD	436.9	462.3	394.7	403.3	419.8	423.4
3. Modulus @100% (lb/in)	30 (min)	MD	43.6	44.1	42.0	44.7	43.4	43.6
		CD	44.4	40.7	42.9	44.2	45.5	43.5
Tear Resistance (lb)	8 (min)	MD	14.0	13.4	11.5	13.9	11.8	
			12.7	11.6	12.7	11.5	12.3	12.5
		CD	12.1	14.1	11.7	11.9	11.0	
			14.1	14.8	11.8	11.8	13.7	12.7
Interface Shear Strength								

Property	Required Value		Sample	Roll No.105 L18089-17-08				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		31.0	31.0	30.0	32.0	30.0	
	Low Ind - 28.5 mil		30.0	30.0	30.0	30.0	30.0	30.4
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	82.3	78.9	78.8	78.9	83.7	80.5
		CD	78.7	76.5	78.2	80.9	77.4	78.3
2. Break Elongation (%)	380 (min)	MD	404.3	421.1	395.9	387.6	412.6	404.3
		CD	402.8	436.3	427.9	427.9	394.5	417.9
3. Modulus @100% (lb/in)	30 (min)	MD	43.9	41.5	44.1	44.3	46.0	44.0
		CD	43.6	40.6	43.2	44.6	44.0	43.2
Tear Resistance (lb)	8 (min)	MD	13.9	12.3	12.2	14.0	12.6	
			11.9	12.6	11.9	13.2	14.4	12.9
		CD	12.3	12.2	11.9	12.7	14.6	
			12.1	11.0	13.3	12.8	11.3	12.4
Interface Shear Strength								

Property	Required Value		Sample	Roll No.120 L18089-17-09				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		30.0	31.0	31.0	30.0	30.0	
	Low Ind - 28.5 mil		30.0	30.0	30.0	31.0	30.0	30.3
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	81.5	78.0	83.1	85.1	75.2	80.6
		CD	75.6	74.6	81.4	79.0	77.4	77.6
2. Break Elongation (%)	380 (min)	MD	412.8	421.3	446.5	421.3	396.3	419.6
		CD	396.1	422.1	447.5	422.1	430.4	423.6
3. Modulus @100% (lb/in)	30 (min)	MD	44.1	42.0	44.3	46.0	45.4	44.4
		CD	41.1	40.2	44.3	43.1	42.4	42.2
Tear Resistance (lb)	8 (min)	MD	12.6	12.6	11.6	13.3	13.9	
			13.0	12.7	11.7	13.5	14.3	12.9
		CD	13.8	12.5	12.5	11.1	11.8	
			12.3	11.4	11.6	11.8	10.9	12.0
Interface Shear Strength								

Property	Required Value		Sample	Roll No.135 L18089-17-10				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		31.0	32.0	30.0	30.0	30.0	
	Low Ind - 28.5 mil		30.0	30.0	31.0	30.0	30.0	30.4
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	79.2	83.3	81.0	80.4	80.6	80.9
		CD	80.4	79.6	76.5	79.6	79.5	79.1
2. Break Elongation (%)	380 (min)	MD	385.7	444.6	419.5	393.9	393.9	407.5
		CD	420.8	454.5	412.0	403.6	420.7	422.3
3. Modulus @100% (lb/in)	30 (min)	MD	43.4	42.6	44.0	44.8	45.5	44.1
		CD	43.5	41.7	42.7	45.8	44.0	43.5
Tear Resistance (lb)	8 (min)	MD	12.7	14.1	13.1	14.6	14.9	
			11.9	11.7	11.9	13.8	14.9	13.4
		CD	11.9	11.9	12.3	11.8	13.4	
			13.3	11.8	12.5	12.6	12.0	12.4
Interface Shear Strength								

Property	Required Value		Sample	Roll No.150 L18089-17-11				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		30.0	30.0	30.0	31.0	30.0	
	Low Ind - 28.5 mil		30.0	31.0	30.0	30.0	31.0	30.3
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	81.2	78.9	75.9	77.7	78.9	78.5
		CD	74.7	75.1	75.9	73.5	76.5	75.1
2. Break Elongation (%)	380 (min)	MD	412.7	429.3	387.5	399.2	404.3	406.6
		CD	387.6	429.3	429.3	387.6	420.9	410.9
3. Modulus @100% (lb/in)	30 (min)	MD	43.8	41.9	43.2	44.7	43.8	43.5
		CD	41.7	39.6	41.6	42.4	42.8	41.6
Tear Resistance (lb)	8 (min)	MD	13.8	11.8	13.0	12.9	12.7	
			12.7	12.2	11.2	12.6	12.4	12.5
		CD	11.6	11.2	11.5	11.3	13.5	
			11.8	12.1	11.5	11.2	11.0	11.7
Interface Shear Strength								

Property	Required Value		Sample	Roll No.159 L18089-17-12				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		31.0	30.0	31.0	30.0	31.0	
	Low Ind - 28.5 mil		30.0	30.0	30.0	31.0	30.0	30.4
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	80.7	83.0	82.1	79.7	81.0	81.3
		CD	77.3	74.8	75.3	74.3	78.9	76.1
2. Break Elongation (%)	380 (min)	MD	403.9	454.3	428.8	412.2	403.9	420.6
		CD	396.0	430.1	396.0	404.4	421.7	409.6
3. Modulus @100% (lb/in)	30 (min)	MD	42.8	41.4	43.9	42.8	44.7	43.1
		CD	42.9	40.0	43.0	41.6	44.0	42.3
Tear Resistance (lb)	8 (min)	MD	12.3	12.4	12.6	12.4	13.2	
			13.5	11.5	11.8	11.3	12.7	12.4
		CD	12.4	11.3	11.4	13.8	13.9	
			11.6	11.4	11.4	11.7	11.7	12.1
Interface Shear Strength								

Property	Required Value		Sample	Roll No. 77 L18089-18-01				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		30.0	31.0	30.0	30.0	30.0	
	Low Ind - 28.5 mil		30.0	31.0	30.0	31.0	30.0	30.3
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	79.3	85.9	86.3	89.1	84.2	85.0
		CD	85.1	79.3	79.3	80.6	80.6	81.0
2. Break Elongation (%)	380 (min)	MD	391.3	462.4	462.4	445.7	437.2	439.8
		CD	462.1	470.7	445.1	419.9	436.6	446.9
3. Modulus @100% (lb/in)	30 (min)	MD	46.7	47.0	47.1	50.3	46.9	47.6
		CD	44.7	42.8	45.2	47.0	46.3	45.2
Tear Resistance (lb)	8 (min)	MD	16.4	12.2	12	12.7	17.1	
			14.1	14.1	13.8	18.0	18.4	14.9
		CD	12.3	11.4	15.1	14.3	14.9	
			13.5	11.4	13.0	15.4	16.0	13.7
Interface Shear Strength								

Property	Required Value		Sample	Roll No. 92 L18089-18-02				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		30.0	30.0	31.0	31.0	30.0	
	Low Ind - 28.5 mil		31.0	30.0	30.0	30.0	30.0	30.3
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	89.2	84.1	89.7	85.3	88.9	87.4
		CD	79.6	79.3	80.1	84.6	84.6	81.6
2. Break Elongation (%)	380 (min)	MD	444.2	435.6	469.1	427.5	477.9	450.9
		CD	412.7	470.9	444.2	445.8	479.3	450.6
3. Modulus @100% (lb/in)	30 (min)	MD	47.0	46.0	48.3	48.3	47.2	47.4
		CD	44.5	41.7	44.3	46.1	45.6	44.4
Tear Resistance (lb)	8 (min)	MD	15.7	14.5	12.5	15.6	15.6	
			13.2	13.2	16.0	15.4	18.0	15.0
		CD	13.5	11.2	13.1	11.4	12.0	
			13.4	11.9	12.2	13.0	11.6	12.3
Interface Shear Strength								

Property	Required Value		Sample	Roll No. 7 L18089-18-03				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		30.0	31.0	31.0	30.0	30.0	
	Low Ind - 28.5 mil		30.0	31.0	30.0	30.0	30.0	30.3
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	85.1	79.7	82.7	82.9	87.0	83.5
		CD	77.5	77.5	77.1	75.5	77.6	77.0
2. Break Elongation (%)	380 (min)	MD	404.9	421.8	447.0	438.6	463.8	435.2
		CD	402.2	435.6	443.4	427.6	443.1	430.4
3. Modulus @100% (lb/in)	30 (min)	MD	47.1	44.3	45.2	45.3	46.9	45.8
		CD	42.1	42.4	43.2	43.0	43.7	42.9
Tear Resistance (lb)	8 (min)	MD	14.0	12.7	13.2	14.1	14.0	
			12.0	11.7	12.4	14.4	16.0	13.5
		CD	13.0	12.3	11.8	14.0	16.4	
			12.3	12.0	12.0	12.6	13.2	13.0
Interface Shear Strength								

Property	Required Value		Sample	Roll No. 22 L18089-18-04				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		31.0	30.0	31.0	30.0	30.0	
	Low Ind - 28.5 mil		31.0	30.0	31.0	31.0	30.0	30.5
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	84.3	79.6	88.5	86.9	83.7	84.6
		CD	80.2	81.2	82.1	80.9	80.4	81.0
2. Break Elongation (%)	380 (min)	MD	396.8	420.5	462.1	428.8	403.6	422.4
		CD	437.6	478.9	470.6	428.5	445.5	452.2
3. Modulus @100% (lb/in)	30 (min)	MD	47.1	43.1	47.4	48.2	48.8	46.9
		CD	41.2	42.0	43.7	45.2	44.1	43.2
Tear Resistance (lb)	8 (min)	MD	14.4	13.0	14.7	13.3	12.3	
			14.0	12.8	14.3	15.0	16.0	14.0
		CD	13.6	12.0	13.5	11.4	12.4	
			12.4	12.0	12.8	10.8	15.6	12.7
Interface Shear Strength								

Property	Required Value		Sample	Roll No.34 L18089-18-05				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		31.0	30.0	30.0	30.0	31.0	
	Low Ind - 28.5 mil		30.0	31.0	30.0	31.0	30.0	30.4
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	83.1	84.4	86.0	90.1	78.6	84.4
		CD	80.7	81.4	78.7	83.0	77.1	80.2
2. Break Elongation (%)	380 (min)	MD	395.6	437.5	454.2	437.5	396.9	424.3
		CD	428.6	461.6	453.3	436.7	419.9	440.0
3. Modulus @100% (lb/in)	30 (min)	MD	46.0	46.0	46.3	49.6	45.5	46.7
		CD	44.0	43.4	43.3	46.8	44.1	44.3
Tear Resistance (lb)	8 (min)	MD	15.0	13.0	17.0	14.1	17.0	
			12.6	13.4	13.0	12.9	15.4	14.3
		CD	13.1	11.5	11.1	15.0	15.3	
			14.0	11.5	13.5	15.5	14.0	13.5
Interface Shear Strength								

Property	Required Value		Sample	Roll No. 52 L18089-18-06				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		31.0	31.0	30.0	30.0	31.0	
	Low Ind - 28.5 mil		30.0	30.0	30.0	31.0	30.0	30.4
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	78.8	83.0	84.6	86.0	82.7	83.0
		CD	78.4	78.9	77.4	79.6	78.7	78.6
2. Break Elongation (%)	380 (min)	MD	420.1	455.6	438.6	430.3	413.5	431.6
		CD	412.7	408.9	446.1	429.3	421.0	423.6
3. Modulus @100% (lb/in)	30 (min)	MD	45.6	44.1	47.0	47.9	46.9	46.3
		CD	42.3	42.1	42.9	43.9	44.4	43.1
Tear Resistance (lb)	8 (min)	MD	13.2	13.0	14.0	12.5	12.0	
			12.2	12.0	12.1	12.6	12.1	12.6
		CD	11.7	11.5	14.0	11.3	11.4	
			12.9	12.0	12.5	13.5	11.2	12.2
Interface Shear Strength								

Property	Required Value		Sample	Roll No. 67 L18089-18-07				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		31.0	30.0	30.0	30.0	30.0	
	Low Ind - 28.5 mil		31.0	30.0	31.0	30.0	30.0	30.3
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	81.3	83.1	83.0	86.9	78.5	82.6
		CD	79.8	77.9	76.1	77.1	76.5	77.5
2. Break Elongation (%)	380 (min)	MD	396.0	445.0	419.7	428.1	402.0	418.2
		CD	420.7	445.8	404.1	403.9	403.9	415.7
3. Modulus @100% (lb/in)	30 (min)	MD	45.9	44.9	46.4	47.5	48.1	46.6
		CD	42.4	41.7	42.5	44.0	45.0	43.1
Tear Resistance (lb)	8 (min)	MD	13.2	13.0	13.5	13.5	12.2	
			13.8	12.5	13.0	14.0	15.3	13.4
		CD	14.2	12.0	11.9	12.0	11.8	
			13.1	11.9	11.0	13.0	14.0	12.5
Interface Shear Strength								

Property	Required Value		Sample	Roll No. 82 L18089-18-08				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		31.0	30.0	30.0	30.0	31.0	
	Low Ind - 28.5 mil		30.0	30.0	31.0	30.0	30.0	30.3
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	90.1	83.4	89.6	83.6	88.2	87.0
		CD	81.0	79.4	80.2	79.6	82.1	80.5
2. Break Elongation (%)	380 (min)	MD	412.8	429.0	470.7	412.2	437.8	432.5
		CD	411.6	453.7	436.8	444.9	403.6	430.1
3. Modulus @100% (lb/in)	30 (min)	MD	48.6	45.2	46.4	46.9	48.2	47.1
		CD	43.7	41.8	43.9	43.6	45.1	43.6
Tear Resistance (lb)	8 (min)	MD	13.4	13.2	13.3	16.0	14.1	
			14.5	11.8	13.7	13.3	12.1	13.5
		CD	14.0	13.2	13.3	11.5	15.4	
			13.0	11.3	11.5	14.0	12.2	12.9
Interface Shear Strength								

Property	Required Value		Sample	Roll No. 98 L18089-18-09				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		30.0	30.0	30.0	30.0	31.0	
	Low Ind - 28.5 mil		31.0	30.0	31.0	30.0	30.0	30.3
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	88.4	87.8	84.9	84.4	83.3	85.8
		CD	79.7	78.4	84.4	76.0	80.1	79.7
2. Break Elongation (%)	380 (min)	MD	429.2	462.7	429.2	395.6	429.2	429.2
		CD	412.0	454.6	496.1	442.3	420.8	445.2
3. Modulus @100% (lb/in)	30 (min)	MD	48.6	47.0	47.8	49.6	46.6	47.9
		CD	44.4	42.8	44.2	42.7	45.5	43.9
Tear Resistance (lb)	8 (min)	MD	13.0	11.8	12.8	14.9	16.1	
			12.9	12.4	12.6	12.6	13.9	13.3
		CD	13.6	11.9	11.0	13.7	12.8	
			13.4	12.0	11.7	12.0	11.1	12.3
Interface Shear Strength								

Property	Required Value		Sample	Roll No. 113 L18089-18-10				
			1	2	3	4	5	AVE
Thickness	30 +/- 5%		30.0	30.0	31.0	30.0	30.0	
	Low Ind - 28.5 mil		31.0	31.0	30.0	30.0	30.0	30.3
Tensile Properties								
1. Break Strength (lb/in)	73 (min)	MD	84.7	85.6	87.6	85.0	88.5	86.3
		CD	84.9	80.4	83.3	77.7	78.0	80.9
2. Break Elongation (%)	380 (min)	MD	411.7	437.8	454.0	420.1	428.6	430.4
		CD	453.0	478.1	486.2	420.8	444.6	456.5
3. Modulus @100% (lb/in)	30 (min)	MD	46.8	47.8	49.0	48.8	51.0	48.7
		CD	44.8	43.4	43.4	44.5	43.6	43.9
Tear Resistance (lb)	8 (min)	MD	14.3	14.8	13.5	15.6	15.0	
			15.7	15.1	14.9	16.6	13.9	14.9
		CD	12.3	12.0	11.8	11.4	12.8	
			13.3	11.0	12.0	13.4	14.6	12.5
Interface Shear Strength								

CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-17
LAB ID NO.: L18089-17-01
MATERIAL: Plastatech IG 30 mil PVC
SAMPLE I.D. NA
ROLL NO: 6

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	30.0	30.0	30.0	31.0	30.0		
			30.0	31.0	30.0	30.0	30.0	**30.2**	0.40
TEAR RESISTANCE	D 1004	MD-lbs	12.7	12.2	14.2	13.5	14.0		
			13.0	12.8	12.6	13.1	12.7	**13.1**	0.60
		CD-lbs	12.5	12.0	14.3	14.6	12.5		
			14.3	11.8	13.6	12.3	12.0	**13.0**	1.04
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	83.2	80.3	87.4	83.3	80.1	**82.9**	2.96
		CD-ppi	82.1	76.0	80.7	85.5	78.7	**80.6**	3.57
BREAK ELONGATION		MD%	404.8	420.8	462.8	412.3	370.4	**414.2**	33.23
Lo = 2.0"		CD%	403.2	394.9	394.9	428.4	391.3	**402.5**	15.10
100% SECANT MODULUS	D 882	MD-ppi	47.1	44.1	46.8	47.5	48.0	**46.7**	1
		CD-ppi	47.7	44.6	48.6	49.7	49.4	**48.0**	2

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-17
LAB ID NO.: L18089-17-02
MATERIAL: Plastatech IG 30 mil PVC
SAMPLE I.D. NA
ROLL NO: 15

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	31.0	30.0	30.0	31.0	30.0		
			30.0	30.0	30.0	30.0	30.0	**30.2**	0.40
TEAR RESISTANCE	D 1004	MD-lbs	12.3	13.0	12.4	11.2	14.0		
			12.9	11.6	11.7	13.0	14.5	**12.7**	0.99
		CD-lbs	13.6	12.9	13.6	14.6	14.5		
			11.6	12.1	12.0	12.5	11.6	**12.9**	1.07
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	80.7	82.0	78.1	84.7	83.7	**81.8**	2.60
		CD-ppi	77.7	76.5	80.1	80.3	80.5	**79.0**	1.81
BREAK ELONGATION		MD%	388.1	438.8	388.1	421.7	413.3	**410.0**	22.00
Lo = 2.0"		CD%	403.5	429.1	440.2	412.4	412.4	**419.5**	14.81
100% SECANT	D 882	MD-ppi	45.0	43.5	45.5	47.1	47.0	**45.6**	1
MODULUS		CD-ppi	42.9	41.2	41.7	45.9	46.1	**43.6**	2

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-17
LAB ID NO.: L18089-17-03
MATERIAL: Plastatech IG 30 mil PVC
SAMPLE I.D. NA
ROLL NO: 30

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	30.0	31.0	30.0	30.0	30.0		
			30.0	30.0	31.0	30.0	30.0	**30.2**	0.40
TEAR RESISTANCE	D 1004	MD-lbs	13.6	12.5	12.3	13.0	12.6		
			13.5	11.6	13.3	14.0	12.4	**12.9**	0.69
		CD-lbs	11.0	12.0	11.3	11.5	12.7		
			11.7	11.6	12.1	12.0	11.1	**11.7**	0.49
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	80.8	79.7	78.8	85.8	80.7	**81.2**	2.72
		CD-ppi	79.9	77.2	80.7	82.4	77.6	**79.6**	2.17
BREAK ELONGATION		MD%	420.9	437.6	420.9	437.7	395.2	**422.5**	17.39
Lo = 2.0"		CD%	395.1	454.6	446.2	437.7	403.8	**427.5**	26.46
100% SECANT	D 882	MD-ppi	43.4	42.0	43.0	45.2	45.4	**43.8**	1
MODULUS		CD-ppi	43.6	39.4	42.4	45.2	44.4	**43.0**	2

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-17
LAB ID NO.: L18089-17-04
MATERIAL: Plastatech IG 30 mil PVC
SAMPLE I.D. NA
ROLL NO: 45

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	31.0	30.0	30.0	31.0	30.0		
			32.0	31.0	31.0	30.0	30.0	**30.6**	0.66
TEAR RESISTANCE	D 1004	MD-lbs	15.0	12.3	12.5	13.8	14.1		
			14.0	12.0	14.1	13.4	14.3	**13.6**	0.93
		CD-lbs	13.1	11.6	12.3	14.3	14.0		
			13.6	11.8	11.5	13.4	13.9	**13.0**	1.01
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	80.0	79.3	80.9	82.6	80.9	**80.7**	1.24
		CD-ppi	78.9	80.4	79.8	79.5	74.6	**78.6**	2.32
BREAK ELONGATION		MD%	389.5	412.9	429.9	413.0	389.5	**407.0**	17.38
Lo = 2.0"		CD%	407.0	466.0	432.2	407.0	391.4	**420.7**	29.23
100% SECANT MODULUS	D 882	MD-ppi	45.0	42.9	43.5	46.3	47.0	**44.9**	2
		CD-ppi	43.9	42.2	44.6	46.2	44.5	**44.3**	1

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-17
LAB ID NO.: L18089-17-05
MATERIAL: Plastatech IG 30 mil PVC
SAMPLE I.D. NA
ROLL NO: 60

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	31.0	30.0	30.0	31.0	30.0		
			30.0	31.0	30.0	30.0	30.0	**30.3**	0.46
TEAR RESISTANCE	D 1004	MD-lbs	14.0	13.2	12.8	12.9	13.7		
			12.1	12.8	12.7	12.1	11.5	**12.8**	0.71
		CD-lbs	11.4	11.5	11.6	12.6	13.7		
			12.9	11.5	11.5	12.2	12.1	**12.1**	0.73
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	78.1	78.2	86.4	84.0	78.7	**81.1**	3.86
		CD-ppi	78.1	79.6	84.1	80.7	78.3	**80.2**	2.44
BREAK ELONGATION		MD%	398.4	411.8	445.6	395.2	389.9	**408.2**	22.43
Lo = 2.0"		CD%	413.0	454.6	463.2	438.1	396.2	**433.0**	28.10
100% SECANT MODULUS	D 882	MD-ppi	43.4	43.1	47.4	48.4	45.6	**45.6**	2
		CD-ppi	42.0	41.5	44.7	43.8	44.5	**43.3**	1

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-17
LAB ID NO.: L18089-17-06
MATERIAL: Plastatech IG 30 mil PVC
SAMPLE I.D. NA
ROLL NO: 75

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	31.0	30.0	32.0	31.0	30.0		
			30.0	31.0	30.0	30.0	30.0	**30.5**	0.67
TEAR RESISTANCE	D 1004	MD-lbs	13.5	13.1	12.5	13.6	14.5		
			13.4	12.8	13.9	13.1	13.9	**13.4**	0.56
		CD-lbs	12.1	11.8	11.7	11.8	12.1		
			12.0	12.6	12.7	13.0	12.2	**12.2**	0.41
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	80.9	82.1	81.1	81.6	80.9	**81.3**	0.52
		CD-ppi	79.8	77.6	82.5	82.5	78.7	**80.2**	2.22
BREAK ELONGATION		MD%	395.4	445.7	420.6	412.0	390.0	**412.7**	22.17
Lo = 2.0"		CD%	406.8	449.0	457.3	432.1	423.7	**433.8**	20.11
100% SECANT MODULUS	D 882	MD-ppi	44.6	42.7	45.1	45.4	47.9	**45.1**	2
		CD-ppi	43.8	41.2	44.3	45.3	43.6	**43.6**	1

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-17
LAB ID NO.: L18089-17-07
MATERIAL: Plastatech IG 30 mil PVC
SAMPLE I.D. NA
ROLL NO: 90

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	30.0	30.0	31.0	31.0	30.0		
			30.0	31.0	30.0	31.0	30.0	**30.4**	0.49
TEAR RESISTANCE	D 1004	MD-lbs	14.0	13.4	11.5	13.9	11.8		
			12.7	11.6	12.7	11.5	12.3	**12.5**	0.92
		CD-lbs	12.1	14.1	11.7	11.9	11.0		
			14.1	14.8	11.8	11.8	13.7	**12.7**	1.26
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	86.9	82.1	81.4	79.6	76.5	**81.3**	3.81
		CD-ppi	84.3	78.9	74.6	77.5	81.1	**79.3**	3.66
BREAK ELONGATION		MD%	419.7	444.9	444.9	385.8	390.7	**417.2**	28.41
Lo = 2.0"		CD%	436.9	462.3	394.7	403.3	419.8	**423.4**	27.09
100% SECANT	D 882	MD-ppi	43.6	44.1	42.0	44.7	43.4	**43.6**	1
MODULUS		CD-ppi	44.4	40.7	42.9	44.2	45.5	**43.5**	2

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CONFORMANCE TEST RESULTS

Geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-17
LAB ID NO.: L18089-17-08
MATERIAL: Plastatech IG 30 mil PVC
SAMPLE I.D. NA
ROLL NO: 105

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	31.0	31.0	30.0	32.0	30.0		
			30.0	30.0	30.0	30.0	30.0	**30.4**	0.66
TEAR RESISTANCE	D 1004	MD-lbs	13.9	12.3	12.2	14.0	12.6		
			11.9	12.6	11.9	13.2	14.4	**12.9**	0.87
		CD-lbs	12.3	12.2	11.9	12.7	14.6		
			12.1	11.0	13.3	12.8	11.3	**12.4**	0.97
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	82.3	78.9	78.8	78.9	83.7	**80.5**	2.32
		CD-ppi	78.7	76.5	78.2	80.9	77.4	**78.3**	1.66
BREAK ELONGATION		MD%	404.3	421.1	395.9	387.6	412.6	**404.3**	13.23
Lo = 2.0"		CD%	402.8	436.3	427.9	427.9	394.5	**417.9**	18.13
100% SECANT MODULUS	D 882	MD-ppi	43.9	41.5	44.1	44.3	46.0	**44.0**	1
		CD-ppi	43.6	40.6	43.2	44.6	44.0	**43.2**	1

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-17
LAB ID NO.: L18089-17-09
MATERIAL: Plastatech IG 30 mil PVC
SAMPLE I.D. NA
ROLL NO: 120

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	30.0	31.0	31.0	30.0	30.0		
			30.0	30.0	30.0	31.0	30.0	**30.3**	0.46
TEAR RESISTANCE	D 1004	MD-lbs	12.6	12.6	11.6	13.3	13.9		
			13.0	12.7	11.7	13.5	14.3	**12.9**	0.83
		CD-lbs	13.8	12.5	12.5	11.1	11.8		
			12.3	11.4	11.6	11.8	10.9	**12.0**	0.80
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	81.5	78.0	83.1	85.1	75.2	**80.6**	3.98
		CD-ppi	75.6	74.6	81.4	79.0	77.4	**77.6**	2.71
BREAK ELONGATION		MD%	412.8	421.3	446.5	421.3	396.3	**419.6**	18.16
Lo = 2.0"		CD%	396.1	422.1	447.5	422.1	430.4	**423.6**	18.56
100% SECANT MODULUS	D 882	MD-ppi	44.1	42.0	44.3	46.0	45.4	**44.4**	1
		CD-ppi	41.1	40.2	44.3	43.1	42.4	**42.2**	1

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-17
LAB ID NO.: L18089-17-10
MATERIAL: Plastatech IG 30 mil PVC
SAMPLE I.D. NA
ROLL NO: 135

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	31.0	32.0	30.0	30.0	30.0		
			30.0	30.0	31.0	30.0	30.0	**30.4**	0.66
TEAR RESISTANCE	D 1004	MD-lbs	12.7	14.1	13.1	14.6	14.9		
			11.9	11.7	11.9	13.8	14.9	**13.4**	1.21
		CD-lbs	11.9	11.9	12.3	11.8	13.4		
			13.3	11.8	12.5	12.6	12.0	**12.4**	0.57
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	79.2	83.3	81.0	80.4	80.6	**80.9**	1.50
		CD-ppi	80.4	79.6	76.5	79.6	79.5	**79.1**	1.51
BREAK ELONGATION		MD%	385.7	444.6	419.5	393.9	393.9	**407.5**	24.32
Lo = 2.0"		CD%	420.8	454.5	412.0	403.6	420.7	**422.3**	19.35
100% SECANT MODULUS	D 882	MD-ppi	43.4	42.6	44.0	44.8	45.5	**44.1**	1
		CD-ppi	43.5	41.7	42.7	45.8	44.0	**43.5**	1

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-17
LAB ID NO.: L18089-17-11
MATERIAL: Plastatech IG 30 mil PVC
SAMPLE I.D. NA
ROLL NO: 150

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	30.0	30.0	30.0	31.0	30.0		
			30.0	31.0	30.0	30.0	31.0	**30.3**	0.46
TEAR RESISTANCE	D 1004	MD-lbs	13.8	11.8	13.0	12.9	12.7		
			12.7	12.2	11.2	12.6	12.4	**12.5**	0.67
		CD-lbs	11.6	11.2	11.5	11.3	13.5		
			11.8	12.1	11.5	11.2	11.0	**11.7**	0.68
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	81.2	78.9	75.9	77.7	78.9	**78.5**	1.94
		CD-ppi	74.7	75.1	75.9	73.5	76.5	**75.1**	1.15
BREAK ELONGATION		MD%	412.7	429.3	387.5	399.2	404.3	**406.6**	15.63
Lo = 2.0"		CD%	387.6	429.3	429.3	387.6	420.9	**410.9**	21.58
100% SECANT MODULUS	D 882	MD-ppi	43.8	41.9	43.2	44.7	43.8	**43.5**	1
		CD-ppi	41.7	39.6	41.6	42.4	42.8	**41.6**	1

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CONFORMANCE TEST RESULTS

geotechnics INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-17
LAB ID NO.: L18089-17-12
MATERIAL: Plastatech IG 30 mil PVC
SAMPLE I.D. NA
ROLL NO: 159

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	31.0	30.0	31.0	30.0	31.0		
			30.0	30.0	30.0	31.0	30.0	**30.4**	0.49
TEAR RESISTANCE	D 1004	MD-lbs	12.3	12.4	12.6	12.4	13.2		
			13.5	11.5	11.8	11.3	12.7	**12.4**	0.66
		CD-lbs	12.4	11.3	11.4	13.8	13.9		
			11.6	11.4	11.4	11.7	11.7	**12.1**	0.94
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	80.7	83.0	82.1	79.7	81.0	**81.3**	1.28
		CD-ppi	77.3	74.8	75.3	74.3	78.9	**76.1**	1.93
BREAK ELONGATION		MD%	403.9	454.3	428.8	412.2	403.9	**420.6**	21.40
Lo = 2.0"		CD%	396.0	430.1	396.0	404.4	421.7	**409.6**	15.52
100% SECANT	D 882	MD-ppi	42.8	41.4	43.9	42.8	44.7	**43.1**	1
MODULUS		CD-ppi	42.9	40.0	43.0	41.6	44.0	**42.3**	1

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-18
LAB ID NO.: L18089-18-01
MATERIAL: Plastatech IG 30 mil PVC
LOT NO.: 7546
ROLL NO: 77

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	30.0	31.0	30.0	30.0	30.0		
			30.0	31.0	30.0	31.0	30.0	**30.3**	0.46
TEAR RESISTANCE	D 1004	MD-lbs	16.4	12.2	12.0	12.7	17.1		
			14.1	14.1	13.8	18.0	18.4	**14.9**	2.28
		CD-lbs	12.3	11.4	15.1	14.3	14.9		
			13.5	11.4	13.0	15.4	16.0	**13.7**	1.58
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	79.3	85.9	86.3	89.1	84.2	**85.0**	3.62
		CD-ppi	85.1	79.3	79.3	80.6	80.6	**81.0**	2.39
BREAK ELONGATION		MD%	391.3	462.4	462.4	445.7	437.2	**439.8**	29.22
Lo = 2.0"		CD%	462.1	470.7	445.1	419.9	436.6	**446.9**	20.22
100% SECANT MODULUS	D 882	MD-ppi	46.7	47.0	47.1	50.3	46.9	**47.6**	1
		CD-ppi	44.7	42.8	45.2	47.0	46.3	**45.2**	1

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CONFORMANCE TEST RESULTS

Geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-18
LAB ID NO.: L18089-18-02
MATERIAL: Plastatech IG 30 mil PVC
LOT NO.: 7546
ROLL NO: 92

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	30.0	30.0	31.0	31.0	30.0		
			31.0	30.0	30.0	30.0	30.0	**30.3**	0.46
TEAR RESISTANCE	D 1004	MD-lbs	15.7	14.5	12.5	15.6	15.6		
			13.2	13.2	16.0	15.4	18.0	**15.0**	1.56
		CD-lbs	13.5	11.2	13.1	11.4	12.0		
			13.4	11.9	12.2	13.0	11.6	**12.3**	0.81
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	89.2	84.1	89.7	85.3	88.9	**87.4**	2.55
		CD-ppi	79.6	79.3	80.1	84.6	84.6	**81.6**	2.72
BREAK ELONGATION		MD%	444.2	435.6	469.1	427.5	477.9	**450.9**	21.72
Lo = 2.0"		CD%	412.7	470.9	444.2	445.8	479.3	**450.6**	26.15
100% SECANT MODULUS	D 882	MD-ppi	47.0	46.0	48.3	48.3	47.2	**47.4**	1
		CD-ppi	44.5	41.7	44.3	46.1	45.6	**44.4**	2

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-18
LAB ID NO.: L18089-18-03
MATERIAL: Plastatech IG 30 mil PVC
LOT NO.: 7577
ROLL NO: 7

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	30.0	31.0	31.0	30.0	30.0		
			30.0	31.0	30.0	30.0	30.0	**30.3**	0.46
TEAR RESISTANCE	D 1004	MD-lbs	14.0	12.7	13.2	14.1	14.0		
			12.0	11.7	12.4	14.4	16.0	**13.5**	1.24
		CD-lbs	13.0	12.3	11.8	14.0	16.4		
			12.3	12.0	12.0	12.6	13.2	**13.0**	1.31
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	85.1	79.7	82.7	82.9	87.0	**83.5**	2.75
		CD-ppi	77.5	77.5	77.1	75.5	77.6	**77.0**	0.88
BREAK ELONGATION		MD%	404.9	421.8	447.0	438.6	463.8	**435.2**	22.73
Lo = 2.0"		CD%	402.2	435.6	443.4	427.6	443.1	**430.4**	17.03
100% SECANT MODULUS	D 882	MD-ppi	47.1	44.3	45.2	45.3	46.9	**45.8**	1
		CD-ppi	42.1	42.4	43.2	43.0	43.7	**42.9**	1

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-18
LAB ID NO.: L18089-18-04
MATERIAL: Plastatech IG 30 mil PVC
LOT NO.: 7577
ROLL NO: 22

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	31.0	30.0	31.0	30.0	30.0		
			31.0	30.0	31.0	31.0	30.0	**30.5**	0.50
TEAR	D 1004	MD-lbs	14.4	13.0	14.7	13.3	12.3		
RESISTANCE			14.0	12.8	14.3	15.0	16.0	**14.0**	1.07
		CD-lbs	13.6	12.0	13.5	11.4	12.4		
			12.4	12.0	12.8	10.8	15.6	**12.7**	1.28
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	84.3	79.6	88.5	86.9	83.7	**84.6**	3.41
		CD-ppi	80.2	81.2	82.1	80.9	80.4	**81.0**	0.75
BREAK ELONGATION		MD%	396.8	420.5	462.1	428.8	403.6	**422.4**	25.64
Lo = 2.0"		CD%	437.6	478.9	470.6	428.5	445.5	**452.2**	21.63
100% SECANT	D 882	MD-ppi	47.1	43.1	47.4	48.2	48.8	**46.9**	2
MODULUS		CD-ppi	41.2	42.0	43.7	45.2	44.1	**43.2**	1

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-18
LAB ID NO.: L18089-18-05
MATERIAL: Plastatech IG 30 mil PVC
LOT NO.: 7577
ROLL NO: 34

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	31.0	30.0	30.0	30.0	31.0		
			30.0	31.0	30.0	31.0	30.0	**30.4**	0.49
TEAR RESISTANCE	D 1004	MD-lbs	15.0	13.0	17.0	14.1	17.0		
			12.6	13.4	13.0	12.9	15.4	**14.3**	1.59
		CD-lbs	13.1	11.5	11.1	15.0	15.3		
			14.0	11.5	13.5	15.5	14.0	**13.5**	1.55
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	83.1	84.4	86.0	90.1	78.6	**84.4**	4.19
		CD-ppi	80.7	81.4	78.7	83.0	77.1	**80.2**	2.31
BREAK ELONGATION		MD%	395.6	437.5	454.2	437.5	396.9	**424.3**	26.54
Lo = 2.0"		CD%	428.6	461.6	453.3	436.7	419.9	**440.0**	17.24
100% SECANT	D 882	MD-ppi	46.0	46.0	46.3	49.6	45.5	**46.7**	1
MODULUS		CD-ppi	44.0	43.4	43.3	46.8	44.1	**44.3**	1

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CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-18
LAB ID NO.: L18089-18-06
MATERIAL: Plastatech IG 30 mil PVC
LOT NO.: 7577
ROLL NO: 52

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	31.0	31.0	30.0	30.0	31.0		
			30.0	30.0	30.0	31.0	30.0	**30.4**	0.49
TEAR RESISTANCE	D 1004	MD-lbs	13.2	13.0	14.0	12.5	12.0		
			12.2	12.0	12.1	12.6	12.1	**12.6**	0.62
		CD-lbs	11.7	11.5	14.0	11.3	11.4		
			12.9	12.0	12.5	13.5	11.2	**12.2**	0.93
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	78.8	83.0	84.6	86.0	82.7	**83.0**	2.71
		CD-ppi	78.4	78.9	77.4	79.6	78.7	**78.6**	0.80
BREAK ELONGATION		MD%	420.1	455.6	438.6	430.3	413.5	**431.6**	16.48
Lo = 2.0"		CD%	412.7	408.9	446.1	429.3	421.0	**423.6**	14.84
100% SECANT MODULUS	D 882	MD-ppi	45.6	44.1	47.0	47.9	46.9	**46.3**	1
		CD-ppi	42.3	42.1	42.9	43.9	44.4	**43.1**	1

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-18
LAB ID NO.: L18089-18-07
MATERIAL: Plastatech IG 30 mil PVC
LOT NO.: 7577
ROLL NO: 67

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	31.0	30.0	30.0	30.0	30.0		
			31.0	30.0	31.0	30.0	30.0	**30.3**	0.46
TEAR RESISTANCE	D 1004	MD-lbs	13.2	13.0	13.5	13.5	12.2		
			13.8	12.5	13.0	14.0	15.3	**13.4**	0.82
		CD-lbs	14.2	12.0	11.9	12.0	11.8		
			13.1	11.9	11.0	13.0	14.0	**12.5**	0.99
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	81.3	83.1	83.0	86.9	78.5	**82.6**	3.06
		CD-ppi	79.8	77.9	76.1	77.1	76.5	**77.5**	1.46
BREAK ELONGATION		MD%	396.0	445.0	419.7	428.1	402.0	**418.2**	19.84
Lo = 2.0"		CD%	420.7	445.8	404.1	403.9	403.9	**415.7**	18.33
100% SECANT MODULUS	D 882	MD-ppi	45.9	44.9	46.4	47.5	48.1	**46.6**	1
		CD-ppi	42.4	41.7	42.5	44.0	45.0	**43.1**	1

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-18
LAB ID NO.: L18089-18-08
MATERIAL: Plastatech IG 30 mil PVC
LOT NO.: 7577
ROLL NO: 82

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	31.0	30.0	30.0	30.0	31.0		
			30.0	30.0	31.0	30.0	30.0	**30.3**	0.46
TEAR	D 1004	MD-lbs	13.4	13.2	13.3	16.0	14.1		
RESISTANCE			14.5	11.8	13.7	13.3	12.1	**13.5**	1.13
		CD-lbs	14.0	13.2	13.3	11.5	15.4		
			13.0	11.3	11.5	14.0	12.2	**12.9**	1.26
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	90.1	83.4	89.6	83.6	88.2	**87.0**	3.25
		CD-ppi	81.0	79.4	80.2	79.6	82.1	**80.5**	1.11
BREAK ELONGATION		MD%	412.8	429.0	470.7	412.2	437.8	**432.5**	23.98
Lo = 2.0"		CD%	411.6	453.7	436.8	444.9	403.6	**430.1**	21.60
100% SECANT	D 882	MD-ppi	48.6	45.2	46.4	46.9	48.2	**47.1**	1
MODULUS		CD-ppi	43.7	41.8	43.9	43.6	45.1	**43.6**	1

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-18
LAB ID NO.: L18089-18-09
MATERIAL: Plastatech IG 30 mil PVC
LOT NO.: 7577
ROLL NO: 98

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	30.0	30.0	30.0	30.0	31.0		
			31.0	30.0	31.0	30.0	30.0	**30.3**	0.46
TEAR RESISTANCE	D 1004	MD-lbs	13.0	11.8	12.8	14.9	16.1		
			12.9	12.4	12.6	12.6	13.9	**13.3**	1.24
		CD-lbs	13.6	11.9	11.0	13.7	12.8		
			13.4	12.0	11.7	12.0	11.1	**12.3**	0.95
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	88.4	87.8	84.9	84.4	83.3	**85.8**	2.22
		CD-ppi	79.7	78.4	84.4	76.0	80.1	**79.7**	3.07
BREAK ELONGATION		MD%	429.2	462.7	429.2	395.6	429.2	**429.2**	23.72
Lo = 2.0"		CD%	412.0	454.6	496.1	442.3	420.8	**445.2**	33.11
100% SECANT MODULUS	D 882	MD-ppi	48.6	47.0	47.8	49.6	46.6	**47.9**	1
		CD-ppi	44.4	42.8	44.2	42.7	45.5	**43.9**	1

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos Landfill Closure
PROJECT NO.: L18089-18
LAB ID NO.: L18089-18-10
MATERIAL: Plastatech IG 30 mil PVC
LOT NO.: 7577
ROLL NO: 113

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	30.0	30.0	31.0	30.0	30.0		
			31.0	31.0	30.0	30.0	30.0	**30.3**	0.46
TEAR RESISTANCE	D 1004	MD-lbs	14.3	14.8	13.5	15.6	15.0		
			15.7	15.1	14.9	16.6	13.9	**14.9**	0.86
		CD-lbs	12.3	12.0	11.8	11.4	12.8		
			13.3	11.0	12.0	13.4	14.6	**12.5**	1.02
TENSILE PROPERTIES	D 882								
STRENGTH AT BREAK		MD-ppi	84.7	85.6	87.6	85.0	88.5	**86.3**	1.68
		CD-ppi	84.9	80.4	83.3	77.7	78.0	**80.9**	3.19
BREAK ELONGATION		MD%	411.7	437.8	454.0	420.1	428.6	**430.4**	16.36
Lo = 2.0"		CD%	453.0	478.1	486.2	420.8	444.6	**456.5**	26.35
100% SECANT MODULUS	D 882	MD-ppi	46.8	47.8	49.0	48.8	51.0	**48.7**	1
		CD-ppi	44.8	43.4	43.4	44.5	43.6	**43.9**	1

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Appendix B - III
Destructive Sample Test Results

GAI Consultants, Inc.

Geomembrane Seam Destructive Log - Lab

Material: PVC

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

30 mil Thickness

Project Seam Requirements

	Fusion:	Extrusion:	
Peel:	18	Peel:	Peel Incursion:
Shear:	58.4	Shear:	NA

4 out of 5
Average greater than the strength

Break Code "SIP" = Failure

DS #	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Peel Incursion					Pass Fail
			Machine	Operator	Temp/ Speed F/fpm	Barrel/ Preheat F/F	Peel (ppi) In/Out					Shear (ppi)					(%)					
							1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	
1	P-4-5	9/28/19	M9	RM	860/800		33.5	32.4	33.6	32.5	30.3	67.4	72.5	73.7	73.9	74	<10	<10	<10	<10	<10	Pass
2	P-9-8	9/28/19	M9	RM	860/800		35.6	32.7	33.9	29.6	30.4	74.9	69.9	75.5	76.2	74.6	<10	<10	<10	<10	<10	Pass
3	P-20-21	9/28/19	M9	RM	860/800		29.8	29.4	31.4	28.2	31.5	71.5	76	72.1	73.7	69.4	<10	<10	<10	<10	<10	Pass
4	P-23-26	9/28/19	M9	RM	860/800		29.3	31.4	29.4	30.7	29.0	69.5	72.3	72.6	71.6	68.7	<10	<10	<10	<10	<10	Pass
5	P-28-29	9/28/19	M9	RM	860/800		32.3	31.9	33.6	30.3	31.0	68.4	65.6	69.1	71.3	69.8	<10	<10	<10	<10	<10	Pass
6	P-13-Ti-in	5/24/19	M9	RM	860/800		34.5	33.4	33.4	33.8	35.0	70.8	71	70.1	69.1	67.6	<10	<10	<10	<10	<10	Pass
7	P-22-36	6/4/19	M9	RM	860/800		24.8	27.8	25.0	23.3	27.7	63	59.2	66.3	69	57	100	100	100	100	100	Pass
8	P-42-43	6/4/19	M47	AK	860/800		34.9	32.3	33.3	32.7	33.8	73.0	70.1	74.0	67.4	67.4	<10	<10	<10	<10	<10	Pass
9	P-48-51	/64	M47	AK	860/600		35.1	36.0	38.8	40.1	36.2	74.0	68.4	63.4	65.7	65.9	<10	<10	<10	<10	<10	Pass
10	P-48-51	6/5/19	M9	RM	860/800		30.3	33.0	31.0	32.9	33.2	70.0	66.2	67.5	63.0	67.0	<10	<10	<10	<10	<10	Pass
11	P-54-55	6/14/19	M9	RM	860/800		33.3	30.6	35.5	31.1	34.2	64.0	70.0	71.4	65.0	60.0	<10	<10	<10	<10	<10	Pass
12	P-57-32	6/14/19	M9	RM	860/800		35.7	33.0	36.2	32.9	35.5	70.5	67.0	72.0	59.7	61.2	<10	<10	<10	<10	<10	Pass
13	P-56-R-227	6/27/19	M9	RM	860/800		31.9	33.7	34.8	33.4	34.7	72.6	70.0	74.1	73.4	75.5	<10	<10	<10	<10	<10	Pass
14	P-65-66	7/1/19	M9	RM	860/800		33.3	34.0	35.0	34.2	34.4	71.6	61.4	68.1	73.0	59.6	<10	<10	<10	<10	<10	Pass
15	P-70-71	7/1/19	M9	RM	860/800		35.2	34.5	35.0	35.1	32.7	70.1	72.6	69.0	70.0	57.2	<10	<10	<10	<10	<10	Pass
16	P-76-77	7/16/19	M9	RM	860/800		33.0	31.9	36.0	31.6	31.8	57.1	68.1	69.0	60.1	70.2	<10	<10	<10	<10	<10	Pass
17	P-63-72	7/16/19	M9	RM	860/800		31.4	32.0	33.5	33.0	31.2	59.9	68.3	66.0	70.7	70.4	<10	<10	<10	<10	<10	Pass

GAI Consultants, Inc.

Geomembrane Seam Destructive Log - Lab

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC
30 mil Thickness

Project Seam Requirements
Fusion: Peel: 18 Shear: 58.4
Extrusion: Peel: Shear:
Peel Incursion: NA
4 out of 5
Average greater than the strength
Break Code "SIP" = Failure

DS #	Location	Date Removed	Welder ID Machine	Welder ID Operator	Wedge Temp/ Speed F/fpm	Extruder Barrel/ Preheat F/F	Seam Strength Peel (ppi) In/Out 1	2	3	4	5	Shear (ppi) 1	2	3	4	5	Peel Incursion (%) 1	2	3	4	5	Pass Fail
18	P-84-85	7/16/19	M42	HG	860/350		33.7	29.0	32.3	31.9	33.3	64.4	53.1	68.8	64.6	61.0	100	100	100	100	100	Pass
19	P-82-83	7/16/19	M9	RM	860/800		28.0	33.3	33.1	35.4	32.0	57.1	66.2	71.2	64.0	59.6	<10	<10	100	<10	<10	Pass
19A	P-82-83	7/16/19	M9	RM	860/800		31.0	27.2	27.1	28.1	28.9	67.0	60.1	71.2	64.6	53.5	<10	<10	100	<10	<10	Pass
19B	P-82-83	7/16/19	M9	RM	860/800		31.0	28.6	34.1	24.5	28.0	57.1	59.3	73.0	72.3	67.2	<10	<10	<10	100	100	Pass
20	P-90-94	7/16/19	M9	RM	860/800		30.0	30.4	34.4	30.0	32.0	68.4	71.1	71.1	63.5	61.6	100	100	100	<10	100	Pass
20A	P-90-94	7/16/19	M9	RM	860/800		33.0	34.5	28.5	27.9	28.2	55.2	69.2	66.1	62.6	58.6	<10	<10	<10	100	<10	Pass
20B	P-90-94	7/16/19	M9	RM	860/800		33.0	34.2	34.6	35.0	33.0	63.2	68.9	69.5	63.7	56.0	<10	<10	<10	<10	<10	Pass
21	P-92-98	7/16/19	M9	RM	860/800		34.3	33.0	34.0	34.0	31.7	63.1	60.4	64.4	67.0	58.1	<10	<10	<10	<10	<10	Pass
22	P-101-102	7/16/19	M9	RM	860/800		29.0	28.3	29.2	28.1	25.5	58.1	67.8	72.0	62.1	61.4	<10	<10	<10	100	<10	Pass
23	P-88-89	7/17/19	M9	RM	860/800		32.2	34.8	37.0	32.5	35.2	67.0	67.5	65.5	69.0	58.5	<10	<10	<10	<10	<10	Pass
24	P-98-99	7/17/19	M9	RM	860/800		25.4	30.6	35.5	31.5	29.7	65.0	59.9	71.3	72.1	64.6	100	<10	<10	<10	<10	Pass
25	P-102-106	8/2/19	M9	JS	860/800		30.3	31.1	33.0	31.1	32.4	64.9	62.4	61.9	63.1	59.9	<10	<10	<10	<10	<10	Pass
26	P-111-112	8/2/19	M9	JS	860/800		27.1	30.6	30.0	32.4	32.0	63.1	60.6	61.8	56.0	48.4	<10	<10	<10	<10	<10	Fail
26A	P-111-112	8/6/2019	M9	JS	860/800		33.0	35.7	31.8	32.5	33.0	63.9	71.3	73.3	72.0	63.5	<10	<10	<10	<10	<10	Pass
26B	P-111-112	8/6/2019	M9	JS	860/800		35.0	32.0	35.5	32.3	34.0	69.4	69.0	74.5	68.0	69.6	<10	<10	<10	<10	<10	Pass
27	P-129-130	8/2/19	M9	JS	860/800		29.6	32.1	32.0	30.0	30.5	55.5	55.2	58.4	58.3	53.5	<10	<10	<10	<10	<10	Fail
27A	P-129-130	8/6/2019	M9	JS	860/800		32.6	35.2	32.6	31.9	32.0	69.3	72.5	73.6	70.0	72.5	<10	<10	<10	<10	<10	Pass

GAI Consultants, Inc.

Geomembrane Seam Destructive Log - Lab

Material: PVC

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

30 mil Thickness

Project Seam Requirements

	Fusion:	Extrusion:	
Peel:	18		Peel Incursion:
Shear:	58.4		NA

4 out of 5
Average greater than the strength

Break Code "SIP" = Failure

DS #	Location	Date Removed	Welder ID Machine	Welder ID Operator	Wedge Temp/ Speed F/fpm	Extruder Barrel/ Preheat F/F	Seam Strength Peel (ppi) In/Out 1	Peel 2	Peel 3	Peel 4	Peel 5	Shear (ppi) 1	Shear 2	Shear 3	Shear 4	Shear 5	Peel Incursion (%) 1	Peel Incursion 2	Peel Incursion 3	Peel Incursion 4	Peel Incursion 5	Pass Fail
27B	P-129-130	8/6/2019	M9	JS	860/800		30.9	34.9	32.4	31.7	31.7	67.0	75.1	76.3	72.0	68.0	<10	<10	<10	<10	<10	Pass
28	P-121-65	8/2/19	M9	JS	860/800		31.0	30.0	29.0	29.0	29.7	63.2	64.3	59.5	62.3	53.4	<10	<10	<10	<10	<10	Pass
29	P-115-R-415	8/2/19	M42	RM	860/800		28.5	29.0	33.0	30.3	30.0	58.9	55.1	56.0	67.3	51.7	<10	<10	<10	<10	<10	Fail
29A	P-115-R-415	8/8/19	M42	RM	860/800		34.0	32.3	35.9	31.0	34.0	62.0	67.3	68.5	69.7	67.7	<10	<10	<10	<10	<10	Pass
29B	P-115-R-415	8/8/19	M42	RM	860/800		33.6	30.3	33.9	34.2	36.4	63.3	66.0	72.0	68.4	72.8	<10	<10	<10	<10	<10	Pass
30	P-160-162	8/2/19	M9	JS	860/800		29.0	24.8	25.0	33.5	28.7	55.0	63.4	61.0	59.5	53.4	<10	<10	<10	<10	<10	Fail
30A	P-160-162	8/8/19	M9	JS	860/800		30.7	31.1	33.0	33.3	31.8	72.7	73.1	73.6	66.4	67.0	<10	<10	<10	<10	<10	Pass
30B	P-160-162	8/8/19	M9	JS	860/800		32.0	30.9	32.3	34.0	32.3	66.0	63.3	67.0	64.4	64.1	<10	<10	<10	<10	<10	Pass
31	P-157-158	8/2/19	M9	JS	860/800		28.0	30.5	28.5	30.9	30.0	64.1	62.6	63.9	61.1	62.4	<10	<10	<10	<10	<10	Pass
32	P-1/CAP-6	8/22/19	M9	HG	860/600		16.4	20.9	23.4	24.3	21.1	66.5	58.1	66.1	66.8	61.2	100	100	100	100	100	Pass

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 7408

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-003
LAB ID NO.: L19-030-003-001
MATERIAL: 30 MIL PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-1

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	33.5	SE1	<10
2	32.4	SE1	<10
3	33.6	SE1	<10
4	32.5	SE1	<10
5	30.3	SE1	<10
AVERAGE	**32.5**		
STD. DEV.	1.19		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	67.4	SE1
2	72.5	SE1
3	73.7	SE1
4	73.9	SE1
5	74.0	SE1
AVERAGE	**72.3**	
STD. DEV.	2.51	

CHECKED BY: JO DATE: 5-24-19

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 7408

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-003
LAB ID NO.: L19-030-003-002
MATERIAL: 30 MIL PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-2

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	35.6	SE1	<10
2	32.7	SE1	<10
3	33.9	SE1	<10
4	29.6	SE1	<10
5	30.4	SE1	<10
AVERAGE	**32.4**		
STD. DEV.	2.21		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	74.9	SE1
2	69.9	SE1
3	75.5	SE1
4	76.2	SE1
5	74.6	SE1
AVERAGE	**74.2**	
STD. DEV.	2.23	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 7408

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-003
LAB ID NO.: L19-030-003-003
MATERIAL: 30 MIL PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-3

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	29.8	SE1	<10
2	29.4	SE1	<10
3	31.4	SE1	<10
4	28.2	SE1	<10
5	31.5	SE1	<10
AVERAGE	**30.1**		
STD. DEV.	1.25		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	71.5	SE1
2	76.0	SE1
3	72.1	SE1
4	73.7	SE1
5	69.4	SE1
AVERAGE	**72.5**	
STD. DEV.	2.21	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 7408

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-003
LAB ID NO.: L19-030-003-004
MATERIAL: 30 MIL PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-4

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	29.3	SE1	<10
2	31.4	SE1	<10
3	29.4	SE1	<10
4	30.7	SE1	<10
5	29.0	SE1	<10
AVERAGE	**30.0**		
STD. DEV.	0.93		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	69.5	SE1
2	72.3	SE1
3	72.6	SE1
4	71.6	SE1
5	68.7	SE1
AVERAGE	**70.9**	
STD. DEV.	1.56	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 7408

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-003
LAB ID NO.: L19-030-003-005
MATERIAL: 30 MIL PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-5

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	32.3	SE1	<10
2	31.9	SE1	<10
3	33.6	SE1	<10
4	30.3	SE1	<10
5	31.0	SE1	<10
AVERAGE	**31.8**		
STD. DEV.	1.13		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	68.4	SE1
2	65.6	SE1
3	69.1	SE1
4	71.3	SE1
5	69.8	SE1
AVERAGE	**68.8**	
STD. DEV.	1.88	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

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INTEGRITY IN TESTING

CLIENT:	GAI Consultants, Inc.
CLIENT PROJEC	John E. Amos LF
PROJECT NO.:	L19-030-004
LAB ID NO.:	L19-030-004-001
MATERIAL:	30 mil PVC
SEAM TYPE:	Single Fusion

SAMPLE I.D.: DS-6

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	34.5	SE1	<10
2	33.4	SE1	<10
3	33.4	SE1	<10
4	33.8	SE1	<10
5	35.0	SE1	<10
AVERAGE	**34.0**		
STD. DEV.	0.63		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	70.8	SE1
2	71.0	SE1
3	70.1	SE1
4	69.1	SE1
5	67.6	SE1
AVERAGE	**69.7**	
STD. DEV.	1.25	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJEC John E. Amos LF
PROJECT NO.: L19-030-005
LAB ID NO.: L19-030-005-001
MATERIAL: 30 mil PVC
SEAM TYPE: Single Fusion

SAMPLE I.D.: DS-7

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	24.8	AD	100
2	27.8	AD	100
3	25.0	AD	100
4	23.3	AD	100
5	27.7	AD	100
AVERAGE	**25.7**		
STD. DEV.	1.76		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	63.0	SE1
2	59.2	SE1
3	66.3	SE1
4	69.0	SE1
5	57.0	SE1
AVERAGE	**62.9**	
STD. DEV.	4.41	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

geotechnics INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJEC' John E. Amos LF
PROJECT NO.: L19-030-005
LAB ID NO.: L19-030-005-002
MATERIAL: 30 mil PVC
SEAM TYPE: Single Fusion

SAMPLE I.D.: DS-8

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	34.9	SE1	<10
2	32.3	SE1	<10
3	33.3	SE1	<10
4	32.7	SE1	<10
5	33.8	SE1	<10
AVERAGE	**33.4**		
STD. DEV.	0.91		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	73.0	SE1
2	70.1	SE1
3	74.0	SE1
4	67.4	SE1
5	67.4	SE1
AVERAGE	**70.4**	
STD. DEV.	2.75	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

geotechnics INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJEC John E. Amos LF
PROJECT NO.: L19-030-005
LAB ID NO.: L19-030-005-003
MATERIAL: 30 mil PVC
SEAM TYPE: Single Fusion

SAMPLE I.D.: DS-9

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	35.1	SE1	<10
2	36.0	SE1	<10
3	38.8	SE1	<10
4	40.1	SE1	<10
5	36.2	SE1	<10
AVERAGE	**37.2**		
STD. DEV.	1.89		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	74.0	SE1
2	68.4	SE1
3	63.4	SE1
4	65.7	SE1
5	65.9	SE1
AVERAGE	**67.5**	
STD. DEV.	3.62	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

geotechnics INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-006
LAB ID NO.: L19-030-006-001
MATERIAL: 30 mil PVC
SEAM TYPE: Single Fusion

SAMPLE I.D.: DS-10

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	30.3	SE1	<10
2	33.0	SE1	<10
3	31.0	SE1	<10
4	32.9	SE1	<10
5	33.2	SE1	<10
AVERAGE	**32.1**		
STD. DEV.	1.19		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	70.0	SE1
2	66.2	SE1
3	67.5	SE1
4	63.0	SE1
5	67.0	SE1
AVERAGE	**66.7**	
STD. DEV.	2.26	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 7408

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-007
LAB ID NO.: L19-030-007-001
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-11

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	33.3	SE1	<10
2	30.6	SE1	<10
3	35.5	SE1	<10
4	31.1	SE1	<10
5	34.2	SE1	<10
AVERAGE	**32.9**		
STD. DEV.	1.85		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	64.0	SE1
2	70.0	SE1
3	71.4	SE1
4	65.0	SE1
5	60.0	SE1
AVERAGE	**66.1**	
STD. DEV.	4.15	

CHECKED BY: BRB DATE: 6/17/19

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 7408

geotechnics INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-007
LAB ID NO.: L19-030-007-002
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-12

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	35.7	SE1	<10
2	33.0	SE1	<10
3	36.2	SE1	<10
4	32.9	SE1	<10
5	35.5	SE1	<10
AVERAGE	**34.7**		
STD. DEV.	1.42		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	70.5	SE1
2	67.0	SE1
3	72.0	SE1
4	59.7	SE1
5	61.2	SE1
AVERAGE	**66.1**	
STD. DEV.	4.90	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-008
LAB ID NO.: L19-030-008-001
MATERIAL: 30 mil PVC
SEAM TYPE: Single Fusion

SAMPLE I.D.: DS-13

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	31.9	SE1	<10
2	33.7	SE1	<10
3	34.8	SE1	<10
4	33.4	SE1	<10
5	34.7	SE1	<10
AVERAGE	**33.7**		
STD. DEV.	1.06		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	72.6	SE1
2	70.0	SE1
3	74.1	SE1
4	73.4	SE1
5	75.5	SE1
AVERAGE	**73.1**	
STD. DEV.	1.83	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-009
LAB ID NO.: L19-030-009-001
MATERIAL: 30 mil PVC
SEAM TYPE: Single Fusion

SAMPLE I.D.: DS-14

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	33.3	SE1	<10
2	34.0	SE1	<10
3	35.0	SE1	<10
4	34.2	SE1	<10
5	34.4	SE1	<10
AVERAGE	**34.2**		
STD. DEV.	0.55		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	71.6	SE1
2	61.4	SE1
3	68.1	SE1
4	73.0	SE1
5	59.6	SE1
AVERAGE	**66.7**	
STD. DEV.	5.37	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-009
LAB ID NO.: L19-030-009-002
MATERIAL: 30 mil PVC
SEAM TYPE: Single Fusion

SAMPLE I.D.: DS-15

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	35.2	SE1	<10
2	34.5	SE1	<10
3	35.0	SE1	<10
4	35.1	SE1	<10
5	32.7	SE1	<10
AVERAGE	**34.5**		
STD. DEV.	0.93		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	70.1	SE1
2	72.6	SE1
3	69.0	SE1
4	70.0	SE1
5	57.2	SE1
AVERAGE	**67.8**	
STD. DEV.	5.42	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

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CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-010
LAB ID NO.: L19-030-010-001
MATERIAL: 30 mil PVC
SEAM TYPE: Single Fusion

SAMPLE I.D.: DS-16

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	33.0	SE1	<10
2	31.9	SE1	<10
3	36.0	SE1	<10
4	31.6	SE1	<10
5	31.8	SE1	<10
AVERAGE	**32.9**		
STD. DEV.	1.64		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	57.1	SE1
2	68.1	SE1
3	69.0	SE1
4	60.1	SE1
5	70.2	SE1
AVERAGE	**64.9**	
STD. DEV.	5.27	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-010
LAB ID NO.: L19-030-010-002
MATERIAL: 30 mil PVC
SEAM TYPE: Single Fusion

SAMPLE I.D.: DS-17

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	31.4	SE1	<10
2	32.0	SE1	<10
3	33.5	SE1	<10
4	33.0	SE1	<10
5	31.2	SE1	<10
AVERAGE	**32.2**		
STD. DEV.	0.90		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	59.9	SE1
2	68.3	SE1
3	66.0	SE1
4	70.7	SE1
5	70.4	SE1
AVERAGE	**67.1**	
STD. DEV.	3.96	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-010
LAB ID NO.: L19-030-010-003
MATERIAL: 30 mil PVC
SEAM TYPE: Single Fusion

SAMPLE I.D.: DS-18

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	33.7	AD	100
2	29.0	AD	100
3	32.3	AD	100
4	31.9	AD	100
5	33.3	AD	100
AVERAGE	**32.0**		
STD. DEV.	1.65		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	64.4	SE1
2	53.1	SE1
3	68.8	SE1
4	64.6	SE1
5	61.0	SE1
AVERAGE	**62.4**	
STD. DEV.	5.26	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

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CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-010
LAB ID NO.: L19-030-010-004
MATERIAL: 30 mil PVC
SEAM TYPE: Single Fusion

SAMPLE I.D.: DS-19

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	28.0	SE1	<10
2	33.3	SE1	<10
3	33.1	AD	100
4	35.4	SE1	<10
5	32.0	SE1	<10
AVERAGE	**32.4**		
STD. DEV.	2.44		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	57.1	SE1
2	66.2	SE1
3	71.2	SE1
4	64.0	SE1
5	59.6	SE1
AVERAGE	**63.6**	
STD. DEV.	4.96	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
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CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-010
LAB ID NO.: L19-030-010-005
MATERIAL: 30 mil PVC
SEAM TYPE: Single Fusion

SAMPLE I.D.: DS-20

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	30.0	AD	100
2	30.4	AD	100
3	34.4	AD	100
4	30.0	SE1	<10
5	32.0	AD	100
AVERAGE	**31.4**		
STD. DEV.	1.69		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	68.4	SE1
2	71.1	SE1
3	71.1	SE1
4	63.5	SE1
5	61.6	SE1
AVERAGE	**67.1**	
STD. DEV.	3.92	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

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CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-010
LAB ID NO.: L19-030-010-006
MATERIAL: 30 mil PVC
SEAM TYPE: Single Fusion

SAMPLE I.D.: DS-21

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	34.3	SE1	<10
2	33.0	SE1	<10
3	34.0	SE1	<10
4	34.0	SE1	<10
5	31.7	SE1	<10
AVERAGE	**33.4**		
STD. DEV.	0.96		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	63.1	SE1
2	60.4	SE1
3	64.4	SE1
4	67.0	SE1
5	58.1	SE1
AVERAGE	**62.6**	
STD. DEV.	3.10	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-010
LAB ID NO.: L19-030-010-007
MATERIAL: 30 mil PVC
SEAM TYPE: Single Fusion

SAMPLE I.D.: DS-22

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	29.0	SE1	<10
2	28.3	SE1	<10
3	29.2	SE1	<10
4	28.1	AD	100
5	25.5	SE1	<10
AVERAGE	**28.0**		
STD. DEV.	1.33		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	58.1	SE1
2	67.8	SE1
3	72.0	SE1
4	62.1	SE1
5	61.4	SE1
AVERAGE	**64.3**	
STD. DEV.	4.96	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

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CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-011
LAB ID NO.: L19-030-011-001
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-19A

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	31.0	SE1	<10
2	27.2	SE1	<10
3	27.1	AD	100
4	28.1	SE1	<10
5	28.9	SE1	<10
AVERAGE	**28.5**		
STD. DEV.	1.43		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	67.0	SE1
2	60.1	SE1
3	71.2	SE1
4	64.6	SE1
5	53.5	SE1
AVERAGE	**63.3**	
STD. DEV.	6.07	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392

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CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-011
LAB ID NO.: L19-030-011-002
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-19B

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	31.0	SE1	<10
2	28.6	SE1	<10
3	34.1	SE1	<10
4	24.5	AD	100
5	28.0	AD	100
AVERAGE	**29.2**		
STD. DEV.	3.20		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	57.1	SE1
2	59.3	SE1
3	73.0	SE1
4	72.3	SE1
5	67.2	SE1
AVERAGE	**65.8**	
STD. DEV.	6.54	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-011
LAB ID NO.: L19-030-011-003
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-20A

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	33.0	SE1	<10
2	34.5	SE1	<10
3	28.5	SE1	<10
4	27.9	AD	100
5	28.2	SE1	<10
AVERAGE	**30.4**		
STD. DEV.	2.77		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	55.2	SE1
2	69.2	SE1
3	66.1	SE1
4	62.6	SE1
5	58.6	SE1
AVERAGE	**62.3**	
STD. DEV.	5.02	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-011
LAB ID NO.: L19-030-011-004
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-20B

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	33.0	SE1	<10
2	34.2	SE1	<10
3	34.6	SE1	<10
4	35.0	SE1	<10
5	33.0	SE1	<10
AVERAGE	**34.0**		
STD. DEV.	0.82		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	63.2	SE1
2	68.9	SE1
3	69.5	SE1
4	63.7	SE1
5	56.0	SE1
AVERAGE	**64.3**	
STD. DEV.	4.87	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-011
LAB ID NO.: L19-030-011-005
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-23

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	32.2	SE1	<10
2	34.8	SE1	<10
3	37.0	SE1	<10
4	32.5	SE1	<10
5	35.2	SE1	<10
AVERAGE	**34.3**		
STD. DEV.	1.79		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	67.0	SE1
2	67.5	SE1
3	65.5	SE1
4	69.0	SE1
5	58.5	SE1
AVERAGE	**65.5**	
STD. DEV.	3.67	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-011
LAB ID NO.: L19-030-011-006
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-24

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	25.4	AD	100
2	30.6	SE1	<10
3	35.5	SE1	<10
4	31.5	SE1	<10
5	29.7	AD	100
AVERAGE	**30.5**		
STD. DEV.	3.25		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	65.0	SE1
2	59.9	SE1
3	71.3	SE1
4	72.1	SE1
5	64.6	SE1
AVERAGE	**66.6**	
STD. DEV.	4.56	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-012
LAB ID NO.: L19-030-012-001
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-25

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	30.3	SE1	<10
2	31.1	SE1	<10
3	33.0	SE1	<10
4	31.1	SE1	<10
5	32.4	SE1	<10
AVERAGE	**31.6**		
STD. DEV.	0.98		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	64.9	SE1
2	62.4	SE1
3	61.9	SE1
4	63.1	SE1
5	59.9	SE1
AVERAGE	**62.4**	
STD. DEV.	1.63	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392

geotechnics INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-012
LAB ID NO.: L19-030-012-002
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-26

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	27.1	SE1	<10
2	30.6	SE1	<10
3	30.0	SE1	<10
4	32.4	SE1	<10
5	32.0	SE1	<10
AVERAGE	**30.4**		
STD. DEV.	1.88		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	63.1	SE1
2	60.6	SE1
3	61.8	SE1
4	56.0	SE1
5	48.4	SE1
AVERAGE	**58.0**	
STD. DEV.	5.35	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-012
LAB ID NO.: L19-030-012-003
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-27

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	29.6	SE1	<10
2	32.1	SE1	<10
3	32.0	SE1	<10
4	30.0	SE1	<10
5	30.5	SE1	<10
AVERAGE	**30.8**		
STD. DEV.	1.03		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	55.5	SE1
2	55.2	SE1
3	58.4	SE1
4	58.3	SE1
5	53.5	SE1
AVERAGE	**56.2**	
STD. DEV.	1.90	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-012
LAB ID NO.: L19-030-012-004
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-28

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	31.0	SE1	<10
2	30.0	SE1	<10
3	29.0	SE1	<10
4	29.0	SE1	<10
5	29.7	SE1	<10
AVERAGE	**29.7**		
STD. DEV.	0.74		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	63.2	SE1
2	64.3	SE1
3	59.5	SE1
4	62.3	SE1
5	53.4	SE1
AVERAGE	**60.5**	
STD. DEV.	3.91	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-012
LAB ID NO.: L19-030-012-005
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-29

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	28.5	SE1	<10
2	29.0	SE1	<10
3	33.0	SE1	<10
4	30.3	SE1	<10
5	30.0	SE1	<10
AVERAGE	**30.2**		
STD. DEV.	1.56		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	58.9	SE1
2	55.1	SE1
3	56.0	SE1
4	67.3	SE1
5	51.9	SE1
AVERAGE	**57.8**	
STD. DEV.	5.23	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-012
LAB ID NO.: L19-030-012-006
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-30

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	29.0	SE1	<10
2	24.8	SE1	<10
3	25.0	SE1	<10
4	33.5	SE1	<10
5	28.7	SE1	<10
AVERAGE	**28.2**		
STD. DEV.	3.19		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	55.0	SE1
2	63.4	SE1
3	61.0	SE1
4	59.5	SE1
5	53.4	SE1
AVERAGE	**58.5**	
STD. DEV.	3.73	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-012
LAB ID NO.: L19-030-012-007
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-31

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	28.0	SE1	<10
2	30.5	SE1	<10
3	28.5	SE1	<10
4	30.9	SE1	<10
5	30.0	SE1	<10
AVERAGE	**29.6**		
STD. DEV.	1.13		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	64.1	SE1
2	62.6	SE1
3	63.9	SE1
4	61.1	SE1
5	62.4	SE1
AVERAGE	**62.8**	
STD. DEV.	1.09	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-013
LAB ID NO.: L19-030-013-001
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-26A

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	33.0	SE1	<10
2	35.7	SE1	<10
3	31.8	SE1	<10
4	32.5	SE1	<10
5	33.0	SE1	<10
AVERAGE	**33.2**		
STD. DEV.	1.33		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	63.9	SE1
2	71.3	SE1
3	73.3	SE1
4	72.0	SE1
5	63.5	SE1
AVERAGE	**68.8**	
STD. DEV.	4.22	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-013
LAB ID NO.: L19-030-013-002
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-26B

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	35.0	SE1	<10
2	32.0	SE1	<10
3	35.5	SE1	<10
4	32.3	SE1	<10
5	34.0	SE1	<10
AVERAGE	**33.8**		
STD. DEV.	1.40		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	69.4	SE1
2	69.0	SE1
3	74.5	SE1
4	68.0	SE1
5	69.6	SE1
AVERAGE	**70.1**	
STD. DEV.	2.27	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

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ASTM D 6392

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-013
LAB ID NO.: L19-030-013-003
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-27A

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	32.6	SE1	<10
2	35.2	SE1	<10
3	32.6	SE1	<10
4	31.9	SE1	<10
5	32.0	SE1	<10
AVERAGE	**32.9**		
STD. DEV.	1.21		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	69.3	SE1
2	72.5	SE1
3	73.6	SE1
4	70.0	SE1
5	72.5	SE1
AVERAGE	**71.6**	
STD. DEV.	1.64	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-013
LAB ID NO.: L19-030-013-004
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-27B

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	30.9	SE1	<10
2	34.9	SE1	<10
3	32.4	SE1	<10
4	31.7	SE1	<10
5	31.7	SE1	<10
AVERAGE	**32.3**		
STD. DEV.	1.37		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	67.0	SE1
2	75.1	SE1
3	76.3	SE1
4	72.0	SE1
5	68.0	SE1
AVERAGE	**71.7**	
STD. DEV.	3.70	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-014
LAB ID NO.: L19-030-014-001
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-29A

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	34.0	SE1	<10
2	32.3	SE1	<10
3	35.9	SE1	<10
4	31.0	SE1	<10
5	34.0	SE1	<10
AVERAGE	**33.4**		
STD. DEV.	1.67		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	62.0	SE1
2	67.3	SE1
3	68.5	SE1
4	69.7	SE1
5	67.7	SE1
AVERAGE	**67.0**	
STD. DEV.	2.65	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-014
LAB ID NO.: L19-030-014-002
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-29B

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	33.6	SE1	<10
2	30.3	SE1	<10
3	33.9	SE1	<10
4	34.2	SE1	<10
5	36.4	SE1	<10
AVERAGE	**33.7**		
STD. DEV.	1.96		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	63.3	SE1
2	66.0	SE1
3	72.0	SE1
4	68.4	SE1
5	72.8	SE1
AVERAGE	**68.5**	
STD. DEV.	3.58	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-014
LAB ID NO.: L19-030-014-003
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-30A

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	30.7	SE1	<10
2	31.1	SE1	<10
3	33.0	SE1	<10
4	33.3	SE1	<10
5	31.8	SE1	<10
AVERAGE	**32.0**		
STD. DEV.	1.02		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	72.7	SE1
2	73.1	SE1
3	73.6	SE1
4	66.4	SE1
5	67.0	SE1
AVERAGE	**70.6**	
STD. DEV.	3.17	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-014
LAB ID NO.: L19-030-014-004
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-30B

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	32.0	SE1	<10
2	30.9	SE1	<10
3	32.3	SE1	<10
4	34.0	SE1	<10
5	32.3	SE1	<10
AVERAGE	**32.3**		
STD. DEV.	0.99		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	66.0	SE1
2	63.3	SE1
3	67.0	SE1
4	64.4	SE1
5	64.1	SE1
AVERAGE	**65.0**	
STD. DEV.	1.35	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392

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INTEGRITY IN TESTING

CLIENT: GAI Consultants, Inc.
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-015
LAB ID NO.: L19-030-015-001
MATERIAL: 30 mil PVC
SEAM TYPE: SINGLE FUSION

SAMPLE I.D.: DS-32

PEEL ADHESION (2"/ MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	16.4	AD	100
2	20.9	AD	100
3	23.4	AD	100
4	24.3	AD	100
5	21.1	AD	100
AVERAGE	**21.2**		
STD. DEV.	2.74		

BONDED SEAM (SHEAR) STRENGTH (20"/MINUTE)

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	66.5	SE1
2	58.1	SE1
3	66.1	SE1
4	66.8	SE1
5	61.2	SE1
AVERAGE	**63.7**	
STD. DEV.	3.49	

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Appendix C

PVC Geomembrane Field Quality Assurance/ Quality Control Data and Drawings

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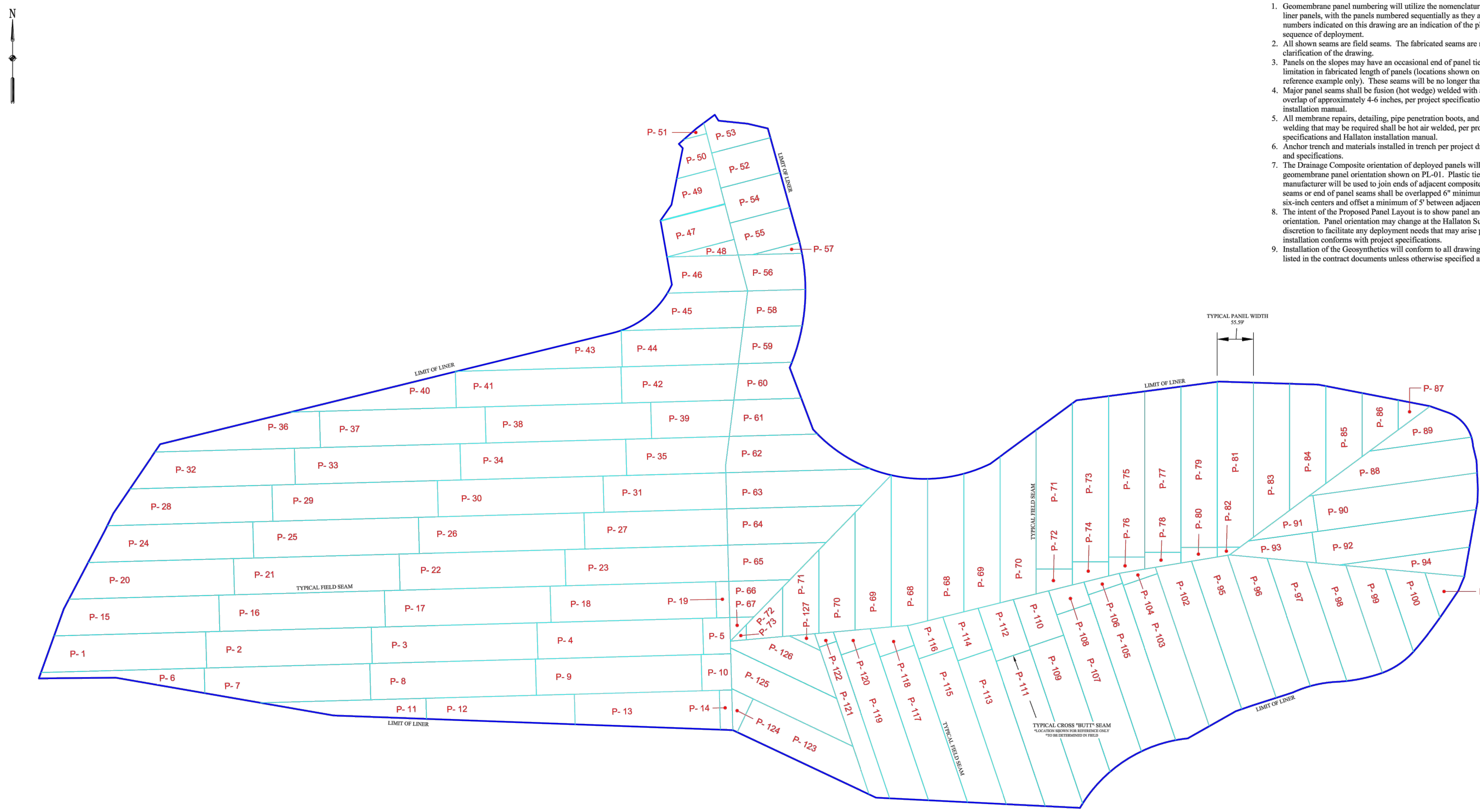
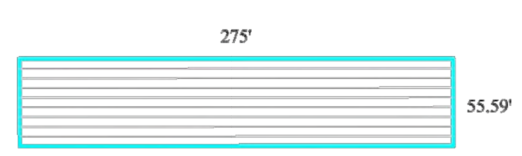
Appendix C - I
Sequence 4 PVC Geomembrane Liner
Panel Layout Drawing

NOTES:

1. Geomembrane panel numbering will utilize the nomenclature "P#" for the liner panels, with the panels numbered sequentially as they are placed. Panel numbers indicated on this drawing are an indication of the placement and sequence of deployment.
2. All shown seams are field seams. The fabricated seams are not shown for clarification of the drawing.
3. Panels on the slopes may have an occasional end of panel tie-in seam, due to limitation in fabricated length of panels (locations shown on drawing are for reference example only). These seams will be no longer than 59'
4. Major panel seams shall be fusion (hot wedge) welded with a minimum panel overlap of approximately 4-6 inches, per project specifications and Hallaton installation manual.
5. All membrane repairs, detailing, pipe penetration boots, and drainage flap welding that may be required shall be hot air welded, per project specifications and Hallaton installation manual.
6. Anchor trench and materials installed in trench per project drawings/details and specifications.
7. The Drainage Composite orientation of deployed panels will follow the geomembrane panel orientation shown on PL-01. Plastic ties supplied by the manufacturer will be used to join ends of adjacent composite strips. Cross seams or end of panel seams shall be overlapped 6" minimum and tied on six-inch centers and offset a minimum of 5' between adjacent roll ends.
8. The intent of the Proposed Panel Layout is to show panel and seam orientation. Panel orientation may change at the Hallaton Supervisor's discretion to facilitate any deployment needs that may arise pending that the installation conforms with project specifications.
9. Installation of the Geosynthetics will conform to all drawings and details as listed in the contract documents unless otherwise specified and approved.



TYPICAL FABRICATED PANEL DIMENSIONS



* Panels will be cut to fit on place where necessary

GRAPHIC SCALE IN FEET

NO.	Date.	By.	Description.

REVISIONS

AEP JOHN AMOS SEQUENCE 4 LANDFILL EXPANSION CONSTRUCTION
WINFIELD, WV

PROPOSED PANEL LAYOUT - PVC GEOMEMBRANE

HALLATON ENVIRONMENTAL LININGS
Hallaton Inc / 1206 Sparks Road / MD 21152 / USA
www.hallaton.com

Drawn by: AS
Date: 1/17/19
Scale: 1" = 80'
Job Number: 1883-35317
Drawing Number: PL-01

DRAWING REFERENCES:

- "PROPOSED PANEL LAYOUT - PVC GEOMEMBRANE", DRAWING PL-01, AEP JOHN AMOS SEQUENCE 4 LANDFILL EXPANSION CONSTRUCTION, HALLATON, INC., PROJECT 1883-35317, 1/17/2019.

RECORD DRAWING
SCALE: 1" = 80'
80 0 80 160

REVISION RECORD

NO.	DATE	DRAWN BY:	CHECKED BY:	APPROVED BY:	DESCRIPTION:

This drawing was produced with computer aided drafting technology and is supported by electronic drawing files. Do not revise this drawing via manual drafting methods.

DRAWING TITLE: PVC GEOMEMBRANE LINER PANEL LAYOUT

CLIENT: APPALACHIAN POWER CO. JOHN E. AMOS PLANT WINFIELD, WEST VIRGINIA

PROJECT: JOHN E. AMOS LANDFILL SEQUENCE 4 LINER

gai consultants

ISSUING OFFICE: Murrysville | 4200 Triangle Lane, Export, PA 15632-1358

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GAI FILE NUMBER: C130109-10-003-00-E2-001
ALT./CLIENT DRAWING NUMBER:
GAI DRAWING NUMBER: E2-001

ISSUE DATE:	DRAWN BY:
10/20/2019	EMAYHOOD
SCALE:	CHECKED BY:
AS SHOWN	KFRECH
DWG TYPE:	APPROVED BY:
CIVIL	CSTRALEY
REVISION	SHEET NO.:
0	1 OF -

Panel Placement Log

Material: PVC

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

30 mil

Date Deployed	Panel No.	Time Deployed	Panel Locations	Roll No.	Width (ft)	Length (ft)	Area (sq ft)
5/16/19	P1	12:40	FLOOR	12 OF 14/T-6	55.5	275	15262.5
5/16/19	P2	1:00	FLOOR	2 of 14/T-6	55.5	275	15262.5
5/16/19	P3	1:40	FLOOR	10 OF 14/T-6	55.5	275	15262.5
5/16/19	P4	2:30	FLOOR	8 OF 14/T-6	55.5	275	15262.5
5/16/19	P5	3:10	FLOOR	4 OF 14/T-6	55.5	275	15262.5
5/16/19	P6	4:00	FLOOR	7 OF 14/T-6	55.5	275	15262.5
5/20/19	P7	1:10	WEST SLOPE	13 OF 14/T-6	55.5	268	14874
5/20/19	P8	1:30	WEST SLOPE	3 of 14/T-6	55.5	268	14874
5/20/19	P9	2:15	WEST SLOPE	14 OF 14/T-6	55.5	249	13819.5
5/20/19	P10	2:39	SOUTH SLOPE	14 OF 14/T-6	55.5	27	1498.5
5/20/19	P11	3:17	WEST SLOPE	9 OF 14/T-6	55.5	232	12876
5/20/19	P12	3:36	SOUTH SLOPE	9 OF 14/T-6	55.5	25	1387.5
5/21/19	P13	4:00	SOUTH SLOPE	11 OF 14/T-6	55.5	215	11932.5
5/21/19	P14	9:30	FLOOR	11 OF 14/T-6	55.5	58	3219
5/21/19	P15	10:05	FLOOR	5 OF 14/T-6	55.5	164	9102
5/21/19	P16	10:38	FLOOR	5 OF 14/T-6	55.5	111	6160.5
5/21/19	P17	10:53	FLOOR	12 OF 14/T-5	55.5	115	6382.5
5/21/19	P18	11:04	FLOOR	12 OF 14/T-5	55.5	160	8880
5/21/19	P19	2:19	WEST SLOPE	1 of 14/T-6	55.5	275	15262.5
5/21/19	P20	3:15	WEST SLOPE	11 OF 14/T-5	55.5	275	15262.5
5/21/19	P21	4:30	WEST SLOPE	14 OF 14/T-5	55.5	275	15262.5
5/21/19	P22	5:20	WEST SLOPE	6 OF 14/T-6	55.5	275	15262.5
5/22/19	P23	8:30	WEST SLOPE	10 OF 14/T-5	55.5	275	15262.5
5/22/19	P24	8:55	FLOOR	3 OF 14 T-5	55.5	108	5994
5/22/19	P25	9:14	FLOOR	3 OF 14 T-5	55.5	77	4273.5
5/22/19	P26	10:28	WEST SLOPE	7 OF 14 T-5	55.5	275	15262.5
5/22/19	P27	12:10	FLOOR	14 OF 14/T-7	55.5	275	15262.5
5/23/19	P28	7:00	WEST SLOPE	4 OF 14/T-5	55.5	275	15262.5
5/23/19	P29	8:15	WEST SLOPE	2 of 14/T-7	55.5	275	15262.5
5/23/19	P30	9:00	FLOOR	2 of 14/T-5	55.5	275	15262.5
5/29/19	P31	7:11	WEST SLOPE	4 OF 14/T-7	55.5	107	5938.5
5/29/19	P32	7:22	WEST SLOPE	4 OF 14/T-7	55.5	113	6271.5
5/29/19	P33	7:30	WEST SLOPE	3 of 14/T-5	55.5	87	4828.5
5/29/19	P34	7:50	WEST SLOPE	3 of 14/T-7	55.5	195	10822.5
5/29/19	P35	8:00	WEST SLOPE	5 OF 14/T-5	55.5	142	7881
6/4/19	P36	8:30	WEST SLOPE	5 OF 14/T-5	55.5	138	7659
6/4/19	P37	8:50	WEST SLOPE	3 of 14/T-7	55.5	75	4162.5
6/4/19	P38	9:30	WEST SLOPE	13 OF 14/T-4	55.5	153	8491.5
6/4/19	P39	9:40	WEST SLOPE	13 OF 14/T-4	55.5	137	7603.5
6/4/19	P40	10:00	WEST SLOPE	12 OF 14/T-4	55.5	92	5106
6/4/19	P41	10:12	WEST SLOPE	12 OF 14/T-4	55.5	79	4384.5

Panel Placement Log

Material: PVC

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

30 mil

Date Deployed	Panel No.	Time Deployed	Panel Locations	Roll No.	Width (ft)	Length (ft)	Area (sq ft)
6/4/19	P42	10:22	WEST SLOPE	12 OF 14/T-4	50	48	2400
6/4/19	P43	10:30	WEST SLOPE	12 OF 14/T-4	55.5	58	3219
6/4/19	P44	1:40	WEST SLOPE	14 OF 14/T-4	55.5	213	11821.5
6/4/19	P45	2:18	WEST SLOPE	1 of 14/T-5	55.5	191	10600.5
6/4/19	P46	2:30	WEST SLOPE	1 of 14/T-5	55.5	70	3885
6/4/19	P47	3:00	WEST SLOPE	8 OF 14/T-7	55.5	106	5883
6/4/19	P48	4:35	FLOOR	6 OF 14/T-7	55.5	275	15262.5
6/4/19	P49	5:00	WEST SLOPE	8 OF 14/T-7	42	100	4200
6/4/19	P50	5:10	WEST SLOPE	8 OF 14/T-7	16	35	560
6/4/19	P51	5:20	FLOOR	9 OF 14/T-7	55.5	275	15262.5
6/4/19	P52	5:30	NORTH SLOPE	9 OF 14/T-7	11	46	506
6/4/19	P53	2:00	FLOOR	1 of 14/T-5	55.5	10	555
6/12/19	P54	1:00	NORTH SLOPE	12 OF 14/T-7	55.5	265	14707.5
6/12/19	P55	3:11	NORTH SLOPE	8 OF 14/T-5	55.5	265	14707.5
6/12/19	P56	3:50	NORTH SLOPE	11 OF 14/T-7	55.5	265	14707.5
6/12/19	P57	4:00	NORTH SLOPE	11 OF 14/T-7	32	30	960
6/12/19	P58	4:20	NORTH SLOPE	10 OF 14/T-7	55.5	131	7270.5
6/12/19	P59	4:40	NORTH SLOPE	10 OF 14/T-7	55.5	130	7215
6/12/19	P60	5:30	FLOOR	9 OF 14/T-5	55.5	198	10989
6/12/19	P61	5:35	NORTH SLOPE	10 OF 14/T-7	15	30	450
6/12/19	P62	5:30	FLOOR	10 OF 14/T-7	13	13	169
6/29/19	P63	8:10	SOUTH SLOPE	10 OF 14/T-4	55.5	275	15262.5
6/29/19	P64	8:35	SOUTH SLOPE	11 OF 14/T-4	55.5	275	15262.5
6/29/19	P65	9:00	SOUTH SLOPE	7 OF 14/T-4	55.5	275	15262.5
6/29/19	P66	10:15	SOUTH SLOPE	8 OF 14/T-4	55.5	275	15262.5
6/29/19	P67	11:30	SOUTH SLOPE	9 OF 14/T-4	55.5	275	15262.5
6/29/19	P68	12:00	SOUTH SLOPE	6 OF 14/T-4	55.5	165	9157.5
6/29/19	P69	12:40	SOUTH SLOPE	6 OF 14/T-4	55.5	110	6105
6/29/19	P70	2:14	EAST SLOPE	4 OF 14/T-4	55.5	275	15262.5
6/29/19	P71	2:35	EAST SLOPE	5 OF 14/T-4	55.5	275	15262.5
7/10/19	P72	8:20	SOUTH SLOPE	5 OF 6/T-8	55.5	275	15262.5
7/10/19	P73	8:56	SOUTH SLOPE	6 OF 6/T-8	55.5	275	15262.5
7/10/19	P74	10:00	SOUTH SLOPE	4 OF 6/T-8	55.5	275	15262.5
7/10/19	P75	11:20	SOUTH SLOPE	1 of 6/T-8	55.5	275	15262.5
7/10/19	P76	11:40	SOUTH SLOPE	3 of 6/T-8	55.5	275	15262.5
7/10/19	P77	1:30	SOUTH SLOPE	2 of 6/T-8	55.5	275	15262.5
7/10/19	P78	2:00	SOUTH SLOPE	3 of 14/T-4	55.5	275	15262.5
7/11/19	P79	11:00	SOUTH SLOPE	3 of 14/ T-2	55.5		
7/13/19	P80	7:00	SOUTH SLOPE	13 OF 14/T-2	55.5		
7/13/19	P81	7:30	SOUTH SLOPE	13 OF 14/T-2	55.5		
7/13/19	P82	8:00	EAST SLOPE	7 OF 14/T-3	55.5		

Panel Placement Log

Material: PVC

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

30 mil

Date Deployed	Panel No.	Time Deployed	Panel Locations	Roll No.	Width (ft)	Length (ft)	Area (sq ft)
7/13/19	P83	8:15	EAST SLOPE	11 OF 14/T-3	55.5		
7/13/19	P84	8:40	EAST SLOPE	8 OF 14/T-3	55.5		
7/13/19	P85	8:50	EAST SLOPE	8 OF 14/T-3	55.5		
7/13/19	P86	9:00	EAST SLOPE	8 OF 14/T-3	20	25	500
7/13/19	P87	10:00	EAST SLOPE	4 OF 14/T-3	55.5	211	11710.5
7/13/19	P88	10:40	EAST SLOPE	8 OF 14/T-2	55.5	160	8880
7/13/19	P89	1:00	EAST SLOPE	8 OF 14/T-2	55.5	64	3552
7/13/19	P90	1:20	EAST SLOPE	8 OF 14/T-2	55.5	34	1887
7/13/19	P91	1:40	EAST SLOPE	4 OF 14/T-3	55.5	20	1110
7/13/19	P92	2:24	NORTH SLOPE	1 of 14/T-3	55.5	250	13875
7/13/19	P93	3:10	NORTH SLOPE	5 OF 14/T-3	55.5	188	10434
7/13/19	P94	3:50	NORTH SLOPE	6 OF 14/T-3	55.5	128	7104
7/13/19	P95	4:40	NORTH SLOPE	6 OF 14/T-3	55.5	47	2608.5
7/13/19	P96	5:00	NORTH SLOPE	6 OF 14/T-3	55.5	30	1665
7/13/19	P97	5:15	NORTH SLOPE	5 OF 14/T-3	10	15	150
7/13/19	P98	5:20	NORTH SLOPE	9 OF 14/T-3	55.5	255	14152.5
7/13/19	P99	5:40	NORTH SLOPE	3 of 14/T-1	55.5	255	14152.5
7/13/19	P100	5:30	NORTH SLOPE	1 of 14/T-1	55.5	254	14097
7/13/19	P101	6:00	NORTH SLOPE	1 of 14/T-3	55.5	255	14152.5
7/13/19	P102	7:00	NORTH SLOPE	1 of 14/T-2	55.5	255	14152.5
7/13/19	P103	8:00	FLOOR	10 OF 14/T-2	55.5	195	10822.5
7/13/19	P104	8:15	FLOOR	10 OF 14/T-2	55.5	80	4440
7/15/19	P105	8:30	SOUTH SLOPE	3 of 14/T-2	20	20	400
7/26/19	P106	8:10	NORTH SLOPE	1 of 14/T-4	55.9	275	15372.5
7/26/19	P107	9:30	NORTH SLOPE	1 of 14/T-2	55.9	250	13975
7/26/19	P108	9:40	NORTH SLOPE	6 OF 14/T-2	55.9	275	15372.5
7/26/19	P109	10:00	NORTH SLOPE	2 of 14/T-4	55.9	275	15372.5
7/26/19	P110	10:30	NORTH SLOPE	5 OF 14/T-2	55.9	275	15372.5
7/26/19	P111	1:30	NORTH SLOPE	12 OF 14/T-3	55.9	250	13975
7/26/19	P112	2:20	NORTH SLOPE	4 OF 14/T-2	55.9	230	12857
7/26/19	P113	3:00	NORTH SLOPE	2 of 14/T-2	55.9	235	13136.5
7/26/19	P114	4:00	NORTH SLOPE	2 of 14/T-3	55.9	230	12857
7/27/19	P115	8:00	NORTH SLOPE	13 OF 14/T-5	44	128	5632
7/27/19	P116	9:20	FLOOR	13 OF 14/T-5	55.9	139	7770.1
7/27/19	P117	9:30	SOUTH SLOPE	4 OF 14/T-2	55.9	55	3074.5
7/27/19	P118	10:00	SOUTH SLOPE	5 OF 14/T-7	55.9	112	6260.8
7/27/19	P119	10:43	FLOOR	5 OF 14/T-7	44	167	7348
7/27/19	P120	9:40	FLOOR	1 of 14/T-4	23	140	3220
7/27/19	P121	11:50	FLOOR	7 OF 14/T-7	55.9	158	8832.2
7/27/19	P122	12:00	FLOOR	5 OF 14/T-7	20	167	3340
7/28/19	P123	7:00	EAST SLOPE	1 of 14/T-7	55.9	87	4863.3

Panel Placement Log

Material: PVC

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

30 mil

Date Deployed	Panel No.	Time Deployed	Panel Locations	Roll No.	Width (ft)	Length (ft)	Area (sq ft)
7/28/19	P124	7:25	EAST SLOPE	2 of 14/T-2	55.9	54	3018.6
7/28/19	P125	7:40	EAST SLOPE	8 OF 14/T-1	55.9	213	11906.7
7/28/19	P126	8:20	EAST SLOPE	13 OF 14/T-3	55.9	169	9447.1
7/28/19	P127	1:20	EAST SLOPE	14 OF 14/T-3	55.9	158	8832.2
7/28/19	P128	2:00	EAST SLOPE	6 OF 14/T-5	55.9	158	8832.2
7/28/19	P129	3:21	EAST SLOPE	13 OF 14/T-7	55.9	200	11180
7/28/19	P130	4:20	EAST SLOPE	1 of 14/T-7	55.9	192	10732.8
7/28/19	P131	4:40	EAST SLOPE	3 of 14/T-3	55.9	147	8217.3
7/28/19	P132	5:00	EAST SLOPE	3 of 14/T-3	55.9	110	6149
7/28/19	P133	5:10	EAST SLOPE	3 of 14/T-3	38	15	570
7/29/19	P134	1:00	FLOOR	6 OF 14/T-5	55.9	93	5198.7
7/29/19	P135	1:20	FLOOR	8 OF 14/T-1	55.9	44	2459.6
7/29/19	P136	1:40	FLOOR	13 OF 14/T-3	24	64	1536
7/29/19	P137	2:00	FLOOR	13 OF 14/T-3	30	64	1920
7/29/19	P138	4:00	FLOOR	8 OF 14/T-1	13	20	260
7/29/19	P139	3:00	FLOOR	14 of 14/T-3	55.9	108	6037.2
7/29/19	P140	3:12	FLOOR	1 of 14/T-7	55.9	37	2068.3
7/29/19	P141	4:16	FLOOR	11 9f 14/T-1	55.9	145	8105.5
7/30/19	P142	7:35	FLOOR	2 of 14/T-1	55.5	135	7492.5
7/30/19	P143	7:40	FLOOR	14 OF 14/T-2	55.5	130	7215
7/30/19	P144	7:45	FLOOR	2 of 14/T-2	15	22	330
7/30/19	P145	9:20	FLOOR	14 OF 14/T-2	55.5	122	6771
7/30/19	P146	9:50	FLOOR	11 OF 14/T-1	55.5	124	6882
7/30/19	P147	10:00	FLOOR	14 OF 14/T-2	15	28	420
7/30/19	P148	10:55	FLOOR	2 of 14/T-1	55.5	104	5772
7/30/19	P149	11:59	FLOOR	7 OF 14/T-2	55.5	133	7381.5
7/30/19	P150	2:00	EAST SLOPE	9 OF 14/T-1	55.5	184	10212
7/30/19	P151	2:45	EAST SLOPE	5 OF 14/T-1	55.5	149	8269.5
7/30/19	P152	4:15	EAST SLOPE	4 0f 14/T-1	55.5	125	6937.5
7/30/19	P153	4:50	EAST SLOPE	4 OF 14/T-1	55.5	91	5050.5
7/31/19	P154	7:40	EAST SLOPE	7 OF 14/T-2	55.5	83	4606.5
7/31/19	P155	8:09	EAST SLOPE	12 OF 14/T-2	55.5	83	4606.5
7/31/19	P156	8:30	EAST SLOPE	12 OF 14/T-2	55.5	80	4440
7/31/19	P157	8:50	EAST SLOPE	12 OF 14/T-2	55.5	81	4495.5
7/31/19	P158	9:24	EAST SLOPE	5 OF 14/T-1	55.5	86	4773
7/31/19	P159	11:20	WEST SLOPE	14 OF 14/T-1	55.5	258	14319
7/31/19	P160	2:00	WEST SLOPE	9 OF 14/T-2	55.5	208	11544
7/31/19	P161	3:00	WEST SLOPE	7 OF 14/T-1	55.5	141	7825.5
7/31/19	P162	3:10	WEST SLOPE	7 OF 14/T-1	55.5	46	2553
7/31/19	P163	4:45	WEST SLOPE	12 OF 14/T-1	55.5	119	6604.5
7/31/19	P164	3:50	FLOOR	13 OF 14/T-7	55.5	46	2553

Panel Placement Log

Material: PVC

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

30 mil

Date Deployed	Panel No.	Time Deployed	Panel Locations	Roll No.	Width (ft)	Length (ft)	Area (sq ft)
7/31/19	P165	5:00	WEST SLOPE	12 OF 14/T-1	55.5	109	6049.5
7/31/19	P166	5:25	WEST SLOPE	9 0f 14/T-2	32	35	1120
7/31/19	P167	5:00	EAST SLOPE	14 OF 14/T-1	9	26	234
8/1/19	P168	8:07	WEST SLOPE	10 OF 14/T-1	55.5	96	5328
8/1/19	P169	8:20	WEST SLOPE	10 OF 14/T-1	55.5	86	4773
8/1/19	P170	8:40	WEST SLOPE	10 OF 14/T-1	55.5	69	3829.5
8/1/19	P171	9:00	WEST SLOPE	7 OF 14/T-2	55.5	70	3885
8/1/19	P172	10:20	EAST SLOPE	13 OF 14/T-1	55.5	75	4162.5
8/1/19	P173	3:00	FLOOR	6 OF 14/T-1	55.5	274	15207
8/3/19	P174	7:00	FLOOR	8 OF 14/T-7	55.5	65	3607.5
8/3/19	P175	10:40	FLOOR	7 OF 14/T-1	55.5	50	2775
8/3/19	P176	10:50	EAST SLOPE	13 OF 14/T-1	25	40	1000
8/3/19	P177	11:00	WEST SLOPE	13 OF 14/T-1	25	55	1375
8/3/19	P178	11:17	FLOOR	9 OF 14/T-1	55.5	30	1665
8/3/19	P179	11:28	FLOOR	7 OF 14/T-2	23	29	667
8/3/19	P180	1:00	FLOOR	12 OF 14/T-2	23	55	1265
8/16/19	P181	10:20	BERM	3 of 14/ T-2	62	55	3410
8/16/19	P182	10:50	BERM	11 OF 14/T-3	41	55	2255
8/16/19	P183	11:00	BERM	4 OF 14/T-3	26	30	780
8/16/19	P184	11:20	BERM	9 OF 14/T-3	24	37	888
8/16/19	P185	1:00	BERM	3 of 14/T-1	34	38	1292

Appendix C - II

Sequence 4 PVC Geomembrane Trial Weld Test Results

LEGEND

DEFECT CODES & REPAIR NOTATIONS

AT	AIR TEST	MD	MATERIAL DAMAGE
BO	BURN OUT	WR	WRINKLE
CR	CREASE	WS	WELDER RESTART
DS	DESTRUCTIVE TEST NUMBER	FD	FACTORY DEFECT/DAMAGE
EE	EARTHWORK EQUIP. DAMAGE	EXT	PANEL EXTENSION (SHORT PANEL)
FM	FISHMOUTH	TRH	TRENCH
FT	PRESSURE TEST CUT	TI	TIE-IN
T	SEAM JOINT	C	CAPSTRIP
SI	SOIL SURFACE IRREGULARITY	B	EXTRUSION BEAD
DD	DEPLOYMENT DAMAGE	BT	PENETRATION BOOT

LOCATION NOTATIONS

BOS	BEGINNING OF SEAM	TOS	TOP OF SLOPE
EOS	EOS OF SEAM	N	NORTH
--	TO AN AREA	S	SOUTH
>	FROM AN AREA	W	WEST
NOAT	NO AIR TEST	E	EAST
@	"AT" SPECIFIC LOCATION		

TEST RESULTS

P	PASS	S	Spark Test
F	FAIL		

GAI Consultants, Inc.

Geomembrane Field Trial Seam Log

Material: PVC

Project Name: Amos LF - Sequence 3 Cap
Start Date: 13-May-19
Project Location: Putnam County, WV

30 mil Thickness

Project Seam Requirements			
Fusion:		Extrusion:	
Peel:	18	Peel:	
Shear:	59	Shear:	
Tensiometer #:	T-4		

Sample #	Date	Time	Ambient Temp.	Welder ID: Machine	Welder ID: Operator	Wedge Temp/ Speed F/fpm	Extruder Barrel/ Preheat F/F	Seam Strength: Peel (ppi) In/Out 1	2	3	4	5	Seam Strength: Shear (ppi) 1	2	3	4	5	Pass Fail	Tech ID	Remarks
1	5/16/19	1:20	75	M9	RM	800/900		27	27	27	29	23	62	61	65	65	60	P	MH	SM/SM
								25	24	29	18	23								
2	5/20/19	1:20	65	M9	RM	860/800		22	26	23	19	27	63	59	54	61	60	P	MH	SM/SM
								32	32	30	31	30								
3	5/21/19	9:02	55	M9	RM	860/800		35	35	34	31	34	66	69	64	64	67	P	PL	SM/SM
								30	36	35	34	35								
4	5/21/19	12:25	70	M9	RM	860/800		32	30	31	33	31	67	72	69	69	60	P	PL	SM/SM
								30	65	32	32	31								
5	5/22/19	8:22	80	M9	RM	860/800		28	30	29	30	29	60	63	68	63	69	P	PL	SM/SM
								28	30	30	30	27								
6	5/22/19	1:00	89	M9	RM	860/800		29	29	28	29	27	58	61	63	60	63	P	PL	SM/SM
								29	26	30	28	27								
7	5/23/19	7:30	60	M9	RM	860/800		31	26	30	31	27	65	61	60	54	64	P	MH	SM/SM
								30	29	30	29	32								
8	5/24/19	7:00	60	M9	RM	860/800		20	25	30	19	22	59	60	64	61	59	P	MH	SM/SM
								20	22	25	26	18								
9	5/24/19	12:50	60	M9	RM	86P/800		28	24	24	24	30	59	60	63	66	63	P	MH	SM/SM
								31	27	21	25	28								
10	6/4/19	8:00	45	M9	RM	860/800		36	35	37	33	32	69	69	66	54	80	P	PL	SM/SM
								35	25	37	36	34								
11	6/4/19	1:52	77	M9	RM	860/800		30	40	32	32	34	72	68	67	73	64	P	PL	SM/SM
								32	27	31	32	28								
12	6/11/19	1:02	75	M9	RM	860/800		33	34	30	33	32	74	64	78	65	77	P	MH	SM/SM
								31	33	29	37	32								
13	6/12/19	2:22	80	M9	RM	860/800		32	31	31	31	30	64	65	68	69	56	P	PL	SM/SM
								29	31	31	32	31								
14	6/14/19	1:30	80	M9	RM	860/800		31	32	21	20	18	63	59	64	54	62	P	MH	SM/SM
								32	28	32	18	30								

GAI Consultants, Inc.

Geomembrane Field Trial Seam Log

Material: PVC

Project Name: Amos LF - Sequence 3 Cap
Start Date: 13-May-19
Project Location: Putnam County, WV

30 mil Thickness

Project Seam Requirements

	Fusion:		Extrusion:
Peel:	18	Peel:	
Shear:	59	Shear:	
Tensiometer #:	T-4		

Sample #	Date	Time	Ambient Temp.	Welder ID: Machine	Welder ID: Operator	Wedge Temp/ Speed F/fpm	Extruder Barrel/ Preheat F/F	Seam Strength: Peel (ppi) In/Out 1	2	3	4	5	Seam Strength: Shear (ppi) 1	2	3	4	5	Pass Fail	Tech ID	Remarks
15	6/24/19	9:13	70	M9	RM	860/600		30	30	32	32	32	44	60	59	70	64	P	MH	SM/SM
								33	31	31	32	32								
16	6/25/19	11:00	70	M9	RM	860/800		31	33	32	30	30	68	53	65	64	62	P	MH	SM/SM
								21	29	30	33	29								
17	6/27/19	7:00	70	M9	RM	860/800		29	29	30	26	32	66	63	64	64	55	P	MH	SM/SM
								28	27	29	32	30								
18	6/27/19	7:50	70	M47	KK	800/500		26	28	25	25	20	67	66	71	66	63	P	MH	SM/SM
								19	23	28	21	21								
19	6/29/19	9:26	70	M9	RM	860/800		32	31	29	30	33	78	72	81	79	74	P	MH	SM/SM
								31	31	31	32	36								
20	6/29/19	9:34	70	M47	HG	860/650		30	29	26	27	24	70	71	68	67	57	P	MH	SM/SM
								15	32	30	26	22								
21	6/29/19	10:50	70	M47	HG	860/650		29	30	26	34	31	59	60	61	61	60	P	MH	SM/SM
								27	31	26	34	29								
22	6/29/19	4:00	70	M9	RM	860/800		29	29	22	23	23	59	61	60	59	60	P	MH	SM/SM
								29	26	27	29	25								
23	7/9/19	12:42	75	M9	RM	860/800		28	30	29	29	23	64	65	77	67	65	P	MH	SM/SM
								32	32	29	31	30								
24	7/10/19	7:30	75	M9	RM	860/800		34	28	33	35	30	67	73	62	70	69	P	MH	SM/SM
								32	33	36	31	26								
25	7/10/19	1:15	87	M9	RM	860/800		26	30	38	31	29	57	59	61	59	65	P	MH	SM/SM
								30	27	31	31	29								
26	7/13/19	6:57	78	M9	RM	860/800		32	33	31	31	31	73	76	70	63	69	P	MH	SM/SM
								31	32	30	32	29								
27	7/13/19	8:00	78	M42	HG	860/800		31	35	31	31	32	63	66	63	64	65	P	MH	SM/SM
								31	7	33	28	26								
28	7/13/19	1:20	78	M9	RM	860/800		31	29	28	34	25	66	59	64	64	67	P	MH	SM/SM
								28	27	32	29	32								

GAI Consultants, Inc.

Geomembrane Field Trial Seam Log

Project Name: Amos LF - Sequence 3 Cap
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC
30 mil Thickness

Project Seam Requirements

	Fusion:	Extrusion:
Peel:	18	
Shear:	59	
Tensiometer #:	T-4	

Sample #	Date	Time	Ambient Temp.	Welder ID Machine	Welder ID Operator	Wedge Temp/ Speed F/fpm	Extruder Barrel/ Preheat F/F	Peel (ppi) In/Out 1	Peel 2	Peel 3	Peel 4	Peel 5	Shear (ppi) 1	Shear 2	Shear 3	Shear 4	Shear 5	Pass Fail	Tech ID	Remarks
29	7/13/19	4:50	78	M42	HG	860/800		28	29	34	32	31	60	60	63	68	57	P	MH	SM/SM
								29	24	33	34	30								
30	7/14/19	7:25	79	M9	RM	860/800		33	29	33	29	31	65	68	62	58	62	P	MH	SM/SM
								33	31	29	31	21								
31	7/15/19	8:00	78	M9	RM	860/800		20	29	24	20	20	59	75	63	53	64	P	MH	SM/SM
								30	16	20	27	19								
32	7/24/19	2:00	78	M9	RM	860/800		22	21	26	29	30	60	62	63	60	61	P	MH	SM/SM
								20	19	22	30	31								
33	7/26/19	8:40	65	M9	RM	860/800		24	20	28	25	29	64	65	61	66	72	P	MH	SM/SM
								29	29	31	35	30								
34	7/26/19	2:30	75	M9	RM	860/800		26	27	26	25	27	66	65	63	61	61	P	MH	SM/SM
								28	27	27	26	25								
35	7/27/19	9:00	75	M9	RM	860/800		27	25	30	25	26	64	68	63	66	66	P	MH	SM/SM
								29	27	30	29	22								
36	7/27/19	10:00	75	M9	JS	860/800		34	34	30	31	30	66	63	67	74	68	P	MH	SM/SM
								31	31	32	31	33								
37	7/27/19	3:00	75	M9	RM	860/800		33	29	28	29	30	58	55	69	68	66	P	MH	SM/SM
								34	29	28	28	32								
38	7/28/19	7:30	70	M9	JS	860/800		27	22	26	30	26	50	68	67	68	64	P	MH	SM/SM
								23	27	32	26	27								
39	7/28/19	7:40	75	M9	RM	860/800		23	30	30	28	30	66	61	58	64	72	P	MH	SM/SM
								23	30	25	29	27								
40	7/28/19	1:04	76	M42	RM	860/800		31	32	32	30	29	61	55	64	67	63	P	MH	SM/SM
								30	27	31	26	29								
41	7/28/19	1:50	76	M9	JS	860/800		25	29	26	29	26	60	57	59	58	63	P	MH	SM/SM
								23	28	24	25	26								
42	7/29/19	9:03	75	M9	JS	860/800		29	30	29	29	28	58	60	57	59	60	P	MH	SM/SM
								27	31	29	28	28								

GAI Consultants, Inc.

Geomembrane Field Trial Seam Log

Project Name: Amos LF - Sequence 3 Cap
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC
30 mil Thickness

Project Seam Requirements

Fusion:		Extrusion:	
Peel:	18	Peel:	
Shear:	59	Shear:	
Tensiometer #:	T-4		

Sample #	Date	Time	Ambient Temp.	Welder ID Machine	Welder ID Operator	Wedge Temp/ Speed F/fpm	Extruder Barrel/ Preheat F/F	Seam Strength Peel (ppi) In/Out 1	2	3	4	5	Shear (ppi) 1	2	3	4	5	Pass Fail	Tech ID	Remarks
43	7/30/19	7:00	70	M9	JS	860/800		30	26	30	31	28	60	62	57	61	53	F	MH	SM/SM
								23	29	28	27	26								
44	7/30/19	7:12	70	M9	JS	860/800		30	33	29	32	30	62	63	67	54	68	P	MH	SM/SM
								29	29	31	31	24								
45	7/30/19	1:22	70	M9	JS	860/800		26	25	24	24	23	61	55	53	54		F	MH	SM/SM
								26	15	28	19	27								
46	7/30/19	1:30	70	M9	JS	860/800		30	31	30	30	28	64	58	64	58	62	P	MH	SM/SM
								26	26	26	27	24								
47	7/31/19	7:30	70	M9	JS	860/800		32	31	30	29	30	54	64	65	58	64	P	MH	SM/SM
								29	30	29	31	28								
48	7/31/19	1:12	70	M9	JS	860/800		27	28	27	29	28	51	61	59	61	61	P	MH	SM/SM
								28	30	28	28	29								
49	8/1/19	7:00	65	M9	JS	860/800		28	29	29	31	31	60	64	64	57	58	P	MH	SM/SM
								29	29	28	23-	30								
50	8/1/19	1:20	65	M9	JS	860/800		25	26	27	27	26	59	50	49			F	MH	SM/SM
								25	25	23	25	21								
51	8/1/19	1:20	80	M9	JS	860/800		29	30	36	31	32	66	65	56	62	60	P	MH	SM/SM
								31	30	28	24	30								
52	8/2/19	7:40	70	M9	JS	860/800		29	32	27	31	28	56	58	61	63	62	P	MH	SM/SM
								32	31	28	27	31								
53	8/3/19	10:30	70	M9	JS	860/800		32	32	33	30	31	55	60	69	59	59	P	MH	SM/SM
								29	31	30	31	28								
54	8/25/19	7:20	70	M9	JS	860/800		21	28	24	29	27	56	64				F	MH	SM/SM
								23	29	22	28	28								
55	8/25/19	7:51	70	M9	JS	860/800		32	32	30	29	34	74	72	63	63	63	P	MH	SM/SM
								30	33	35	34	30								
56	8/25/19	1:00	70	M9	JS	860/750		29	24	29	29	31	78	58	66	63	70	P	MH	SM/SM
								32	32	31	32	31								

GAI Consultants, Inc.

Geomembrane Field Trial Seam Log

Material: PVC

Project Name: Amos LF - Sequence 3 Cap
Start Date: 13-May-19
Project Location: Putnam County, WV

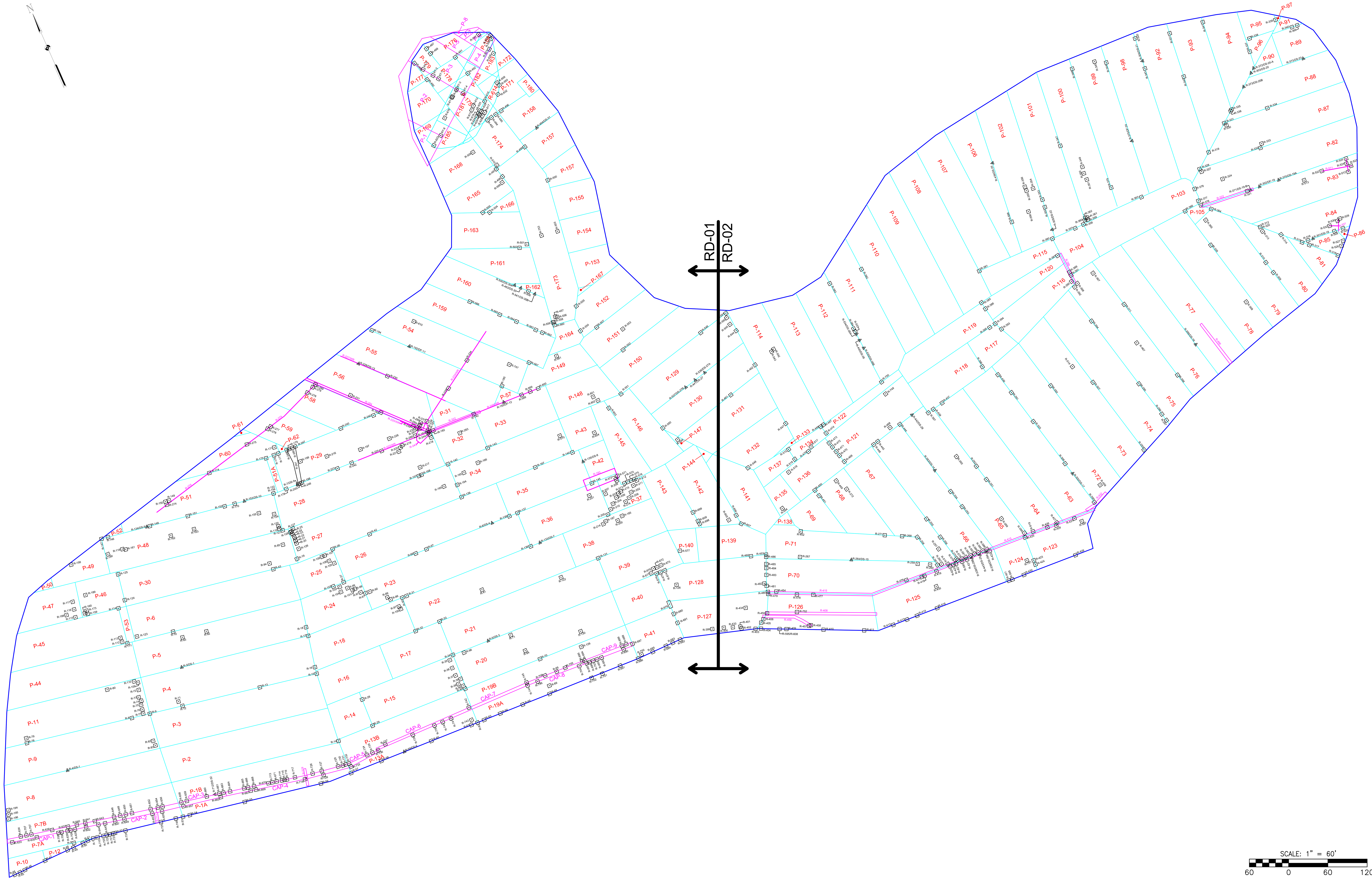
30 mil Thickness

Project Seam Requirements			
Fusion:		Extrusion:	
Peel:	18	Peel:	
Shear:	59	Shear:	
Tensiometer #:	T-4		

Sample #	Date	Time	Ambient Temp.	Welder ID Machine	Welder ID Operator	Wedge Temp/ Speed F/fpm	Extruder Barrel/ Preheat F/F	Seam Strength Peel (ppi) In/Out 1	2	3	4	5	Shear (ppi) 1	2	3	4	5	Pass Fail	Tech ID	Remarks
57	8/16/19	10:20	75	M9	JS	860/700		31	30	28	28	28	66	65	70	61	64	P	MH	SM/SM
								24	28	28	32	33								
58	8/19/19	10:20	80	M9	HG	860/600		30	23	29	26	24	61	61	65	65	63	P	AA	SM/SM
								29	30	29	26	26								
59	8/19/19	3:50	82	M9	HG	860/600		30	30	29	26	26	63	61	60	60	62	P	AA	SM/SM
								31	29	30	33	35								
60	8/20/19	11:30	80	M9	HG	860/600		26	26	26	33	26	62	64	61	60	63	P	AA	SM/SM
								29	22	30	26	30								
61	8/20/19	5:34	82	M9	HG	860/600		26	30	33	30	32	64	60	65	61	61	P	AA	SM/SM
								23	26	29	23	22								
62	8/21/19	8:45	80	M9	HG	860/600		23	30	28	33	30	61	59	60	61	63	P	AA	SM/SM
								26	23	30	29	23								

Appendix C - III

Sequence 4 PVC Geomembrane Liner Repairs Drawing and Repair Reports



SCALE: 1" = 60'

60 0 60 120

DRAWING REFERENCE :
LINER PANEL AND REPAIRS PROVIDED BY HALLATON ENVIRONMENTAL LINING GEOMEMBRANE RECORD DRAWINGS RD-01 AND RD-02 DATED 09/10/19. HALLATON ENVIRONMENTAL LINING DRAWINGS RD-01 AND RD-02 HAVE BEEN SPLICED TO CREATE THIS DRAWING. SURVEY INFORMATION BY AEP.

(blue line)	= Limit of Liner
(cyan line)	= Liner Panel Seams
P-xx	= Liner Panel Numbers
R-00/DS-00	= Destructive Test Location
R-00	= Liner Repair Location

REVISION RECORD

NO.:	DATE:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DESCRIPTION:

This drawing was produced with computer aided drafting technology and is supported by electronic drawing files. Do not revise this drawing via manual drafting methods.

DRAWING TITLE

PVC GEOMEMBRANE LINER PANEL REPAIR

PROJECT

JOHN E. AMOS LANDFILL

SEQUENCE 4 LINER

gai consultants

CLIENT

APPALACHIAN POWER CO.

JOHN E. AMOS PLANT

WINFIELD, WEST VIRGINIA

ISSUING OFFICE: Murrysville | 4200 Triangle Lane, Export, PA 15632-1358

PLOTTED ON: 11/7/2019 3:31:59 PM PLOTTED BY: Ed Mayhood PLOT FILE: GAI.stb

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GAI FILE NUMBER:	C130109-10-003-00-E2-002
ALT./CLIENT DRAWING NUMBER:	
GAI DRAWING NUMBER:	E2-002
ISSUE DATE: 10/20/2019	DRAWN BY: EMAYHOOD
SCALE: AS SHOWN	CHECKED BY: KFRECH
DWG TYPE: CIVIL	APPROVED BY: CSTRALEY
REVISION: 0	SHEET NO.: 1 OF -

GAI CAD FILE PATH: Z:\Energy\2013\C130109.10 - AEP Seq 4 2018-2020 QAQC\CAD\Production DWGs\C130109-10-003-00-E2-002.dwg

GAI Consultants, Inc.

Repair Log

Project Name: Amos LF - Sequence 4
Start Date
Project Location: Putnam County, WV

Material: PVC
Thickness: 30 mil

Repair #	Defect Code	Defect Location / Seam #	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test[1] P/F	Vacuum Test[1] Date
1	EXT	P-7-12-old liner	5/20/19	4:02	4x28	M9	RM	P	5/24/19
2	BO	P-7-12/10'>eos	5/22/19	7:40	2x2	N/A	BS	P	5/24/19
3	DS-1	P-4-5/90'>bos	5/22/19	1:58	3x7	N/A	BS	P	5/24/19
4	DS-2	P-8-9/110'>bos	5/22/19	8:40	3x8	N/A	BS	P	5/24/19
5	DS-3	P-20-21/58'>bos	5/23/19	11:00	2x7	N/A	DK	P	5/24/19
6	DS-4	P-23-26/23'>eos	5/24/19	11:45	3x10	N/A	SS	P	5/24/19
7	DS-5	P-28-29/36'>bos	5/24/19	7:55	1x7	N/A	DK	P	5/24/19
8	BO	P-9-11/11'>eos	5/22/19	5:20	3x5	N/A	BS	P	5/24/19
9	BO	P-3-4-11	5/28/19	6:44	2x2	N/A	PS	P	5/24/19
10	BO	P-5-6/90'>bos	5/22/19	2:00	2x2	N/A	BS	P	5/24/19
11	DD	P-5/8'>P-4/70'>bos	5/22/19	2:01	2x2	N/A	BS	P	5/24/19
12	BO	P-4-5/75'>bos	5/22/19	2:18	2x2	N/A	BS	P	5/24/19
13	BO	P-4-5/108'>BOS	5/22/19	2:30	2x2	N/A	BS	P	5/24/19
14	TI	P-13-14-1-2	5/23/19	7:40	3x5	N/A	DK	P	5/24/19
15	TI	P-4-3-16	5/23/19	2:54	2x2	N/A	DK	P	5/24/19
16	BO	P-18-4/7'>eos	5/23/19	3:34	2x2	N/A	DK	P	5/24/19
17	CAP	P-5-18-24	5/23/19	4:06	2x4	N/A	DK	P	5/24/19
18	WR	P-5-24/15'>eos	5/28/19	7:40	2x2	N/A	BS	P	5/24/19
19	TI	P-27-30/15'>bos	5/27/19	7:50	2x2	N/A	BS	P	5/24/19
20	DD	P-27/37'>P-25/6'>P-30	5/24/19	8:09	1x1	N/A	DK	P	5/24/19
21	DD	P-27/40'>P-25/6'>P-30	5/24/19	8:25	1x1	N/A	DK	P	5/24/19
22	DD	P-27/44'>P-25/6'>P-30	5/24/19	8:30	1x1	N/A	DK	P	5/24/19
23	DD	P-27/46'>P-25/6'>P-30	5/24/19	8:10	1x1	N/A	SS	P	5/24/19
24	DD	P-27/50'>P-25/6'>P-30	5/24/19	7:47	1x1	N/A	SS	P	5/24/19
25	DD	P-27/54'>P-25/6'>P-30	5/24/19	6:50	1x1	N/A	SS	P	5/24/19
26	WS	P-25-27-26	5/24/19	9:25	4x4	N/A	SS	P	5/24/19
27	BO	P-24-25/4'>eos	5/24/19	9:17	2x2	N/A	DK	P	5/24/19
28	BO	P-14-15/13'>bos	5/23/19	8:29	2x2	N/A	DK	P	5/24/19
29	TI	P-13-14-15	5/23/19	8:09	2x2	N/A	DK	P	5/24/19
30	WS	P-18-22-23	5/24/19	10:55	2x2	N/A	DK	P	5/24/19
31	BO	P-22-23/4'>BOS	5/24/19	10:35	2x4	N/A	SS	P	5/24/19
32	WS	P-17-18-22	5/24/19	10:11	2x2	N/A	DK	P	5/24/19
33	WS	P-17-21-22	5/24/19	11:39	2x2	N/A	DK	P	5/24/19
34	WS	P-15-17-20-21	5/25/19	9:00	2x2	N/A	RM	P	5/24/19
35	DD	P-15/12'>P-20/7'>P-17	5/24/19	2:35	3x2	N/A	DK	P	5/24/19
36	DD	P-15/12'>P-20/22'>P-17	5/24/19	2:15	3x2	N/A	DK	P	5/24/19
37	DD	P-15/12'>P-20/34'>P-17	5/24/19	1:41	2x3	N/A	DK	P	5/24/19
38	DD	P-15/12'>P-20/46'>P-17	5/24/19	12:45	2x3	N/A	DK	P	5/24/19
39	DD	P-15/6'>P-20/43'>P-17	5/24/19	1:01	2x2	N/A	DK	P	5/24/19
40	CAP	P-13-19-20	5/23/19	10:23	3x8	N/A	DK	P	5/24/19
41	FD	P-22/21'>P-21/118'>P-18	5/24/19	11:15	2x2	N/A	DK	P	5/24/19
42	BO	P-26-27/64'>bos	5/24/19	1:10	2x2	N/A	SS	P	5/24/19

GAI Consultants, Inc.

Repair Log

Project Name: Amos LF - Sequence 4
Start Date
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test(1)	
		Seam #						P/F	Date
43	BO	P-6-30/237'>bos	5/24/19	1:00	2x2	N/A	SS	P	5/30/19
44	TI	P-10-Ti-in/6'>bos	5/25/19	8:55	4x12	N/A	SS	P	5/30/19
45	SI	Ti-in/3'>P-10/16'>bos	5/24/19	7:18	2x2	N/A	DK	P	5/30/19
46	SI	Ti-in/3'>P-10/22'>bos	5/24/19	7:55	2x2	N/A	DK	P	5/30/19
47	BO	P-10-12/Ti-in	5/25/19	9:08	2x2	N/A	SS	P	5/30/19
48	BO	P-12-Ti-in/40'>bos	5/25/19	9:15	2x4	N/A	SS	P	5/30/19
49	BO	P-12-Ti-in/49'>bos	5/25/19	9:30	2x4	N/A	SS	P	5/30/19
50	BO	P-7-Ti-in/18'>bos	5/25/19	9:00	2x3	N/A	DK	P	5/30/19
51	BO	P-7-Ti-in/24'>bos	5/25/19	9:05	2x3	N/A	BS	P	5/30/19
52	BO	P-7-Ti-in/63'>bos	5/25/19	9:03	2x2	N/A	PS	P	5/30/19
53	TI	P-7-1-Ti-in	5/25/19	9:15	3x3	N/A	PS	P	5/30/19
54	BO	P-1-Ti-in/12'>bos	5/25/19	9:25	1x1	N/A	PS	P	5/30/19
55	WS	P-1-TI-IN/86'>BOS	5/25/19	9:45	3x4	N/A	PS	P	5/30/19
56	BO	P-1-TI-IN/204'>BOS	5/28/19	7:00	1x1	N/A	PS	P	5/30/19
57	TI	P-1-13-Ti-in	5/28/19	7:07	2x2	N/A	PS	P	5/30/19
58	BO	P-13-Ti-in/53'>bos	5/28/19	7:15	2x3	N/A	PS	P	5/30/19
59	DS-6	P-13-Ti-in/93'>bos	5/28/19	8:00	2x7	N/A	PS	P	5/30/19
60	WR	P-13-Ti-in/135'>bos	5/28/19	8:20	2x4	N/A	PS	P	5/30/19
61	SI	P-13/208'>bos/3'>Ti-in	5/28/19	8:30	1x1	N/A	PS	P	5/30/19
62	TI	P-13-19-Ti-in	5/28/19	8:55	3x3	N/A	PS	P	5/30/19
63	TI	P-19-Ti-in/10'>bos	5/28/19	9:05	2x2	N/A	DP	P	5/30/19
64	SI	P-19-Ti-in/64'>bos	5/28/19	9:15	1x1	N/A	DP	P	5/30/19
65	BO	P-19-Ti-in/76'>bos	5/28/19	9:45	2x3	N/A	DP	P	5/30/19
66	BO	P-23-26/120'>bos	5/28/19	8:00	2x2	N/A	BS	P	5/30/19
67	BO	P-23-26/140'>bos	5/28/19	8:15	2x2	N/A	BS	P	5/30/19
68	BO	P-19-Ti-in/140'>bos	5/28/19	10:00	2x2	N/A	DP	P	5/30/19
69	SI	P-19/150'>bos/13'>Ti-in	5/28/19	10:32	2x2	N/A	PS	P	5/30/19
70	SI	P-19-20/145'>bos	5/28/19	10:20	2x2	N/A	PS	P	5/30/19
71	SI	P-20/130'>bos/5'>P-21	5/28/19	10:49	2x2	N/A	JS	P	5/30/19
72	SI	P-11/6'>P-4/40'>P-9	5/20/19	11:15	2x2	N/A	BS	P	5/30/19
73	SI	P-11/6'>P-4/28'>P-9	5/20/19	11:00	2x2	N/A	BS	P	5/30/19
74	SI	P-11/6'>P-4/22'>P-9	5/20/19	10:55	2x2	N/A	BS	P	5/30/19
75	SI	P-11/6'>P-4/14'>P-9	5/20/19	10:40	2x2	N/A	BS	P	5/30/19
76	SI	P-11/6'>P-4/8'>P-9	5/20/19	10:30	2x2	N/A	BS	P	5/30/19
77	SI	P-11/6'>P-4/1'>P-9	5/20/19	10:20	2x2	N/A	BS	P	5/30/19
78	BO	P-9-11/28'>bos	5/20/19	9:05	3x5	N/A	BS	P	5/30/19
79	SI	P-11/28'>bos/6'>P-9	5/20/19	8:50	2x2	N/A	BS	P	5/30/19
80	SI	P-11/50'>eos/4'>edge	5/28/19	1:20	2x2	N/A	BS	P	5/30/19
81	SI	P-9/9'>P-8/3'>P-3	5/28/19	1:30	2x2	N/A	BS	P	5/30/19
82	SI	P-9/5'>P-8/3'>P-3	5/28/19	1:40	2x2	N/A	BS	P	5/30/19
83	SI	P-9/1'>P-8/3'>P-3	5/28/19	1:45	2x2	N/A	BS	P	6/1/19
84	SI	P-30/60'>Ti-in/14'>P-6	6/3/19	9:00	2x2	N/A	PS	P	6/3/19

GAI Consultants, Inc.

Repair Log

Project Name: Amos LF - Sequence 4
Start Date
Project Location: Putnam County, WV

Material: PVC
Thickness: 30 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test[1]	
		Seam #						P/F	Date
85	SI	P-30/15'>Ti-in/34'>P-6	6/3/19	9:05	2x2	N/A	PS	P	6/3/19
86	SI	P-15/2'>Ti-in/2'>R-40	6/3/19	10:00	2x2	N/A	PS	P	6/3/19
87	SI	P-18/13'>P-22/10'>P-23	6/3/19	10:05	2x2	N/A	PS	P	6/3/19
88	SI	P-23/5'>P-18/20'>P-24	6/3/19	10:10	2x2	N/A	PS	P	6/3/19
89	SI	P-23/10'>P-18/17'>P-24	6/3/19	10:15	2x2	N/A	PS	P	6/3/19
90	SI	P-23/5'>P-24/25'>P-18	6/3/19	10:20	2x2	N/A	PS	P	6/3/19
91	SI	P-23-24/26'>Bos	6/3/19	10:25	2x2	N/A	PS	P	6/3/19
92	SI	P-5/136'bos/9'>P-6	6/3/19	9:00	2x2	N/A	PS	P	6/3/19
93	SI	P-5/110'>bos/7'>P-6	6/3/19	8:55	2x2	N/A	PS	P	6/3/19
94	SI	P-20/100'>Bos/23'>P-19	6/3/19	10:40	2x2	N/A	PS	P	6/3/19
95	SI	P-19/159'>bos/25'>P-20	5/28/19	10:09	2x2	N/A	PS	P	5/28/19
96	SI	P-20/6'>P-21/15'>P-15	6/3/19	10:30	2x2	N/A	PL	P	6/3/19
97	SI	P-24/7'>P-23/18-P-26	6/3/19	10:35	2x2	N/A	PL	P	6/3/19
98	SI	P-24/11'>P-23/15'>P-26	6/3/19	10:50	2x2	N/A	PL	P	6/3/19
99	SI	P-24/9'>P-25/8'>eos	6/3/19	10:55	2x2	N/A	PL	P	6/3/19
100	SI	P-80/14'>P-23/12'>P-22	6/3/19	12:30	2x2	N/A	PL	P	6/3/19
101	SI	P-18/14'>P-26/14'>P-23	6/3/19	12:35	2x2	N/A	PL	P	6/3/19
102	SI	P-24/3'>P-25/15'>eos	6/3/19	12:40	3x5	N/A	PL	P	6/3/19
103	SI	P-24/P-25/25'>eos	6/3/19	12:50	2x2	N/A	PL	P	6/3/19
104	SI	P-24/9'>P-25/20'>eos	6/3/19	1:00	2x2	N/A	PL	P	6/3/19
105	SI	P-25/9'>P-26/30'>P-24	6/3/19	1:10	2x2	N/A	PL	P	6/3/19
106	SI	P-25/12'>P-26/35'>P-24	6/3/19	1:30	2x2	N/A	PL	P	6/6/19
107	SI	P-25/12'>P-26/12'>P-27	6/3/19	1:40	2x2	N/A	PL	P	6/6/19
108	SI	P-25/15'>P-26/11'>P-27	6/3/19	1:45	2x2	N/A	PL	P	6/6/19
109	SI	P-11-3'>P-3/6'>P-44	6/5/19	7:30	2x2	N/A	PL	P	6/6/19
110	SI	P-11-9'>P-3/4'>P-44	6/5/19	7:35	2x2	N/A	PL	P	6/6/19
111	TI	P-44-45-53	6/5/19	7:40	2x2	N/A	PL	P	6/6/19
112	SI	P-45/7'>P-53/4'>P-44	6/5/19	7:50	3x4	N/A	JS	P	6/6/19
113	SI	P-45/7'>P-53/14'>P-44	6/5/19	7:44	3x4	N/A	JS	P	6/6/19
114	SI	P-45-46-53	6/5/19	6:49	3x3	N/A	JS	P	6/6/19
115	SI	P-47/15'>P-46/6'>P-45	6/5/19	7:20	2x3	N/A	JS	P	6/6/19
116	SI	P-47/15'>P-46/18'>P-45	6/5/19	8:12	2x3	N/A	JS	P	6/6/19
117	SI	P-47/15'>P-46/33'>P-45	6/5/19	8:20	2x3	N/A	JS	P	6/6/19
118	FD	P-48/22'>P-51/25'>P-49	6/5/19	9:00	2x3	N/A	JS	P	6/6/19
119	DD	P-48/6'>P-28/4'>P-30	6/6/19	8:16	2x2	N/A	JS	P	6/6/19
120	SI	P-48/6'>P-28/7'>P-30	6/5/19	8:20	2x2	N/A	JS	P	6/6/19
121	TI	P-30/48-28	6/6/19	8:23	3x4	N/A	JS	P	6/6/19
122	TI	P-28-51-48	6/6/19	8:25	3x3	N/A	JS	P	6/6/19
123	SI	P-6/6'>P-5/2'>P-53	6/5/19	8:00	2x4	N/A	JS	P	6/6/19
124	SI	P-30-46/40'>bos	6/5/19	9:00	3x3	N/A	JS	P	6/6/19
125	SI	P-46-30/2'>bos	6/5/19	8:44	2x2	N/A	JS	P	6/6/19
126	SI	p-27/6'>P-30/25'>P-25	6/3/19	4:00	2x4	N/A	PL	P	6/6/19

GAI Consultants, Inc.

Repair Log

Project Name: Amos LF - Sequence 4
Start Date
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Repair #	Defect Code	Defect Location / Seam #	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test[1] P/F	Vacuum Test[1] Date
127	SI	P-27/3'>P-28/6'>P-30	6/5/19	7:56	2x2	N/A	JS	P	6/6/19
128	TI	P-27-30/12'>P-48	6/5/19	7:55	2x3	N/A	JS	P	6/6/19
129	SI	P-19/215'>bos/6'>p-20	6/6/19	11:00	2x2	N/A	JS	P	6/6/19
130	SI	P-20/229'>bos/17'>bos	6/6/19	11:05	2x2	N/A	JS	P	6/6/19
131	TI	P-21-38-39	6/6/19	9:45	2x3	N/A	JS	P	6/6/19
132	SI	P-21/28'>eos/6'>P-22	6/6/19	10:12	2x2	N/A	JS	P	6/6/19
133	DS-7	P-22-36/16'>bos	6/6/19	1:40	3x8	N/A	JS	P	6/6/19
134	DS-9	P-48-51/63'>bos	6/6/19	3:13	3x7	N/A	JS	P	6/6/19
135	DS-8	P-42-43/9'>bos	6/6/19	2:10	3x9	N/A	JS	P	6/6/19
136	TI	P-22-36/5'>P-23	6/6/19	12:52	3x3	N/A	JS	P	6/6/19
137	TI	P-23-35-36	6/6/19	10:40	2x2	N/A	JS	P	6/6/19
138	TI	P-23-26-35	6/6/19	10:38	3x3	N/A	JS	P	6/6/19
139	TI	P-26-27-34	6/6/19	11:18	3x3	N/A	JS	P	6/6/19
140	TI	P-27-32-34	6/6/19	10:55	3x3	N/A	JS	P	6/6/19
141	TI	P-28-29-31	6/6/19	11:04	3x3	N/A	JS	P	6/6/19
142	TI	P-31-32-33	6/6/19	11:45	2x2	N/A	JS	P	6/6/19
143	WS	P-32-33-34	6/6/19	11:32	2x2	N/A	JS	P	6/6/19
144	BO	P-34-35-43	6/6/19	10:09	2x2	N/A	JS	P	6/6/19
145	WS	P-35-36-42	6/6/19	10:01	3x3	N/A	JS	P	6/6/19
146	BO	P-51-52/4'>eos	6/11/19	3:00	2x2	N/A	JS	P	6/11/19
147	WS	P-51-52-48	6/11/19	3:06	2x2	N/A	JS	P	6/11/19
148	BO	P-48-51/66'>bos	6/11/19	1:50	2x2	N/A	PL	P	6/11/19
149	SI	P-51/105'>bos/34'>P-48	6/11/19	2:00	3x4	N/A	PL	P	6/11/19
150	SI	P-51/99'>bos/34'>P-48	6/11/19	2:05	3x7	N/A	PL	P	6/11/19
151	BO	P-48-51/124'>bos	6/11/19	2:20	2x2	N/A	PL	P	6/12/19
152	BO	P-48-51/184'>bos	6/11/19	2:46	2x2	N/A	JS	P	6/12/19
153	DS-10	P-48-51/220'>bos	6/11/19	2:25	3x8	N/A	JS	P	6/12/19
154	SI	P-48/8'>P-28/25'>P-51	6/11/19	2:30	2x2	N/A	PL	P	6/12/19
155	SI	P-48/30'>P-28/19'>P-51	6/11/19	2:14	2x2	N/A	JS	P	6/12/19
156	T	P-28-48-51	6/11/19	2:37	3x8	N/A	JS	P	6/12/19
157	SI	P-27-28/33'>EOS	5/28/19	9:15	2x2	N/A	SS	P	6/12/19
158	SI	P-49/3'>anchor/40'>P-48	6/12/19	7:50	1x1	N/A	SS	P	6/12/19
159	SI	P-46/7'>P-47/5'>P-45	6/12/19	7:55	2x2	N/A	BS	P	6/12/19
160	SI	P-46/3'>P-47/5'>P-45	6/12/19	8:00	2x2	N/A	BS	P	6/13/19
161	SI	P-48/22'>P-51/30'>P-49	6/12/19	9:12	2x2	N/A	AK	P	6/13/19
162	SI	P-48/86'>P-49/18'>P-51	6/12/19	8:25	3x3	N/A	SS	P	6/13/19
163	SI	P-48/130'>P-49/18'>P-51	6/12/19	9:30	2x2	N/A	AK	P	6/13/19
164	SI	P-34/6'>P-27/15'>P-35	6/12/19	7:30	1x1	N/A	AK	P	6/13/19
165	SI	P-34/12'>P-32/18'>P-27	6/12/19	7:35	1x1	N/A	AK	P	6/13/19
166	SI	P-34/5'>P-32/48'>P-27	6/12/19	7:40	1x1	N/A	AK	P	6/13/19
167	BO	P-35-34/65'>bos	6/6/19	10:15	1x1	N/A	JS	P	6/13/19
168	SI	P-27-28/33'>eos	6/12/19	2:20	9x14	N/A	TF	P	6/13/19

GAI Consultants, Inc.

Repair Log

Project Name: Amos LF - Sequence 4
Start Date
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test[1]	
		Seam #						P/F	Date
169	SI	P-27/7'>P-34/28'>p-28	6/12/19	5:00	6x6	N/A	TF	P	6/13/19
170	SI	P-48-51/205'>bos	6/12/19	6:02	8x8	N/A	BS	P	6/13/19
171	FD	P-60/7'>P-59/12'>P-29	6/12/19	6:12	3x4	N/A	BS	P	6/13/19
172	SI	P-47/9'>P-46/6'>P-45	6/12/19	3:00	6x6	N/A	BS	P	6/13/19
173	SI	P-46/4'>P-47/6'>P-45	6/12/19	4:40	3x5	N/A	BS	P	6/13/19
174	BO	P-51-60/67'>bos	6/13/19	9:15	2x2	N/A	CS	P	6/13/19
175	BO	P-51A-29-60	6/13/19	8:57	2x2	N/A	CS	P	6/13/19
176	BO	P-29-60/16'>BOS	6/13/19	8:50	2x2	N/A	CS	P	6/13/19
177	SI	P-29-60/22'>BOS	6/13/19	8:32	2x2	N/A	CS	P	6/13/19
178	FD	P-29/28'>P-51/12'>p-60	6/13/19	8:00	2x2	N/A	PS	P	6/13/19
179	WS	P-29-59-62	6/13/19	8:24	2x3	N/A	CS	P	6/13/19
180	TI	P-56-58-29	6/12/19	7:41	4x4	N/A	BS	P	6/13/19
181	BO	P-28-56/4'>P-29	6/12/19	7:45	2x3	N/A	BS	P	6/13/19
182	CAP	P-32-56/14'>P-28	6/12/19	7:53	10x2	N/A	BS	P	6/13/19
183	SI	P-36-37-35-42	6/12/19	8:08	9x35	N/A	TS	P	6/13/19
184	BO	P-54-55/12'>bos	6/13/19	3:46	2x2	N/A	CS	P	6/13/19
185	BO	P-54-55-57	6/12/19	11:45	2x5	N/A	PS	P	6/13/19
186	SI	P-37/4'>P-38/15'>P-36	6/14/19	11:27	1x1	N/A	CS	P/JS	6/14/19
187	SI	P-36/4'>P-38/15'>eos	6/14/19	11:20	1x1	N/A	CS	P/JS	6/14/19
188	SI	P-47/16'>P-45/20'>P-46	6/14/19	6:43	1x1	N/A	CS	P	6/14/19
189	SI	P-46/15'>P-49/9'>P-47	6/14/19	6:50	1x1	N/A	CS	P	6/14/19
190	SI	P-48/20'>P-52/7'>P-49	6/14/19	7:00	1x1	N/A	CS	P	6/14/19
191	SI	P-48/22'>P-51/20'>P-49	6/12/19	10:01	1x1	N/A	SS	P/JS	6/14/19
192	DF-11	P-54-55/80'>bos	6/14/19	10:30	3x8	N/A	CS	P/JS	6/14/19
193	DF-12	P-33-57/33'>bos	6/14/19	10:19	3x8	N/A	CS	P/JS	6/14/19
194	EE	P-8/4'>anchor/8'>P-7	6/14/19	9:00	1x1	N/A	TS	P/JS	6/14/19
195	EE	P-8/4'>anchor/3'>P-7	6/14/19	9:10	1x1	N/A	TS	P/JS	6/14/19
196	EE	P-7/4'>anchor/2'>P-8	6/14/19	9:20	1x1	N/A	TS	P/JS	6/14/19
197	SI	P-29/165'>bos/25'>P-28	6/14/19	10:41	1x1	N/A	CS	P/JS	6/14/19
198	SI	P-29-28/36'>bos	6/14/19	3:40	3x18	N/A	CS	P/JS	6/14/19
199	SI	P-29-/40'>P-51A/14'>P-59	6/14/19	3:24	2x14	N/A	JS	P/JS	6/14/19
200	SI	P-38/9'>bos/5'>P-37	6/15/19	8:20	1x1	N/A	JS	P/RM	6/15/19
201	SI	R-183/3'>P-36/6'>P-35	6/15/19	8:25	1x1	N/A	JS	P/JS	6/15/19
202	SI	P-37/40'>P-36/24'>R-183	6/15/19	8:30	1x1	N/A	CS	P/JS	6/15/19
203	SI	P-37/21'>P-36/8'>R-183	6/15/19	8:32	1x1	N/A	JS	P/JS	6/15/19
204	SI	P-37/12'>P-36/25'>P-38	6/15/19	8:43	1x2	N/A	JS	P/JS	6/15/19
205	SI	P-36/8'>P-37/7'>P-38	6/15/19	8:50	1x2	N/A	JS	P/JS	6/15/19
206	SI	P-37/17'>P-36/14'>R-183	6/15/19	9:17	1x2	N/A	TS	P/JS	6/15/19
207	SI	P-37/3'>P-36/7'>R-183	6/15/19	9:11	1x1	N/A	JS	P/JS	6/15/19
208	SI	P-37/3'>R-183/5'>EOS	6/15/19	9:19	1x2	N/A	JS	P/JS	6/15/19
209	SI	P-37/33'>P-36/25'>P-38	6/15/19	9:28	1x1	N/A	TS	P/JS	6/15/19
210	SI	P-37/3'P-36/18'>P-38	6/15/19	9:03	1X2	N/A	TS	P/RM	6/15/19

GAI Consultants, Inc.

Repair Log

Project Name: Amos LF - Sequence 4

Start Date

Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test[1]	
		Seam #						P/F	Date
211	SI	P-37/49'>P-36/13'>edge liner	6/15/19	9:32	1x2	N/A	CS	P/JS	6/15/19
212	SI	P-37/57'>P-36/7'>edge liner	6/15/19	9:38	1x2	N/A	CS	P/JS	6/15/19
213	SI	P-37/23'>P-36/15'>P-38	6/15/19	9:24	1x1	N/A	CS	P/JS	6/15/19
214	SI	P-38/8'>P-36/21'>eos	6/15/19	9:24	1x1	N/A	CS	P/JS	6/15/19
215	SI	P-37/24'>P-36/8'>R-183	6/15/19	9:22	1x1	N/A	TS	P/JS	6/15/19
216	WR	P-29/130'>P-51A/18'>P-59	6/24/19	8:50	2x24	N/A	SS	P/JS	6/24/19
217	WR	P-28/32'>P-32/12'>P-27	6/24/19	8:25	4x18	N/A	CS	P/JS	6/24/19
218	SI	P-28/21'>P-32/12'>P-58	6/24/19	8:28	2x2	N/A	JS	P/JS	6/24/19
219	SI	P-29/20'>eos/1'>P-28	6/24/19	8:38	2x2	N/A	JS	P/JS	6/24/19
220	SI	P-28/25'>eos/2'>P-29	6/24/19	8:38	2x2	N/A	CC	P/JS	6/24/19
221	SI	P-28/30'>eos/4'>P-29	6/26/19	8:25	3x3	N/A	RM	P/PL	6/26/19
222	WR	P-28-29/115'>bos	6/25/19	11:30	113'	M9	RM	P/DP	6/25/19
223	WR	P-28-29/115'>bos	6/26/19	9:50	5x5	N/A	AK	P/DP	6/25/19
224	BO	R-222/40'>eos	6/26/19	8:48	1x1	N/A	JS	P/MH	6/27/19
225	WR	P-29/9'>P-58/20'>P-28	6/25/19	3:00	35'	M9	RM	P/DP	6/25/19
226	WS	P-29/14'>P-56/22'>P-28	6/26/19	7:33	2x2	N/A	RM	P/MH	6/27/19
227	WR	P-55-56	6/25/19	4:20	174'	M9	RM	P/DP	6/25/19
228	DS-13	P-56/R-227/45'>TOS	6/26/19	9:25	2x7	N/A	SS	P/MH	6/27/19
229	EXT	P-56-R-233/4'>P-55	6/25/19	3:30	15x3	M9	RM	P/MH	6/27/19
230	WS	P-56-R-227/95'>tos	6/26/19	8:25	1x1	N/A	JS	P/PL	6/26/19
231	SI	P-56/110'>boz/18'>P-58	6/27/19	3:30	2x4	N/A	JS	P/MH	6/27/19
232	WS	P-56/15'>R-233/5'>P-55	6/26/19	7:55	2x2	N/A	JS	P/MH	6/27/19
233	WR	P-54-55-56	6/25/19	3:52	183'	M9	RM	P/PL	6/26/19
234	BO	P-54-R-233/24'>bos	6/26/19	8:10	1x1	N/A	JS	P/JS	7/2/19
235	BO	P-55-R-233/73'>bos	6/26/19	8:03	1x1	N/A	JS	P/PL	6/26/19
236	BO	P-56-R-233/18'>P-55	6/26/19	7:46	1x1	N/A	JS	P/MH	6/27/19
237	BO	P-56-R-233/4'>eos	6/27/19	7:25	1x1	N/A	JS	P/JS	7/2/19
238	BO	P-56-R-243-29	6/27/19	9:49	1x1	N/A	JS	P/MH	6/27/19
239	BO	P-29-56-R-225/cut it out	6/27/19	10:18	1x2	N/A	JS	P/MH	6/27/19
240	SI	P-29-58/5'>P-56	6/27/19	1:40	10x10	N/A	JA	P/JS	7/2/19
241	SI	P-29--59-28/36'P-51A	6/17/19	11:20	52x10	M9	RM	P/JS	7/2/19
242	BO	P-28-R-222/34'>eos	6/27/19	11:44	2x2	N/A	RM	P/JS	7/2/19
243	CAP	P-28-29-56	6/27/19	8:51	18x25	M9	RM	P/DP	9/18/01
244	T	P-28-R-243/9'>P-56	6/26/19	9:41	1x1	N/A	JS	P/MH	6/27/19
245	BO	P-29-R-241/49'>bos	6/27/19	11:30	1x1	N/A	KK	P/JS	6/27/19
246	WS	P-28-R-241/6'>P-29	6/27/19	11:30	1x1	N/A	SS	P/	6/27/19
247	WS	P-29-59-R-241	6/27/19	12:00	4x7	N/A	JS	P/JS	7/2/19
248	WS	P-29-62-R-241	6/27/19	11:21	2x2	N/A	JS	P/KK	6/27/19
249	WR	P-28-32-33	6/27/19	9:03	180'	M9	RM	P/PL	6/27/19
250		Number Not Used							
251	WS	P-64-65/111'>bos	7/1/19	7:01	1x1	N/A	JS	P/JS	7/2/19
252	WS	P-64-65/117'>bos	7/1/19	6:47	1x1	N/A	JS	P/JS	7/2/19

GAI Consultants, Inc.

Repair Log

Project Name: Amos LF - Sequence 4
Start Date
Project Location: Putnam County, WV

Material: PVC
Thickness: 30 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test[1]	
		Seam #						P/F	Date
253	WS	P-65-66/89'>tos	7/1/19	6:52	1x1	N/A	RM	P/JS	7/2/19
254	WS	P-65-66/119'>Tos	7/1/19	7:23	2x2	N/A	RM	P/JS	7/2/19
255	WS	P-66-67/89'>tos	7/1/19	7:38	2x3	N/A	JS	P/JS	7/2/19
256	WS	P-66-67/56'>tos	7/1/19	7:39	1x1	N/A	RM	P/JS	7/2/19
257	SI	P-67/38'>bos/13'>P-66	7/1/19	8:20	1x1	N/A	CS	P/JS	7/2/19
258	WS	P-67-71/33'>bos	7/1/19	7:48	1x1	N/A	JS	P/JS	7/2/19
259	BO	P-70-71/6'>bos	7/1/19	7:58	1x3	N/A	RM	P/JS	7/2/19
260	BO	P-70-71/6'>bos	7/1/19	8:09	1x1	N/A	CS	P/JS	7/2/19
261	BO	P-67-70-71	7/1/19	8:25	2x1	N/A	JS	P/JS	7/2/19
262	SI	P-67/10'>tos/6'>P-70	7/1/19	8:06	1x1	N/A	JS	P/JS	7/2/19
263	DF-14	P-66-65/41'>eos	7/1/19	8:50	2x7	N/A	CS	P/JS	7/2/19
264	DF-15	P-70-71/131'>bos	7/1/19	9:30	2x8	N/A	CS	P/JS	7/2/19
265	SI	P-65/34'>R-252/16'>P-64	7/1/19	10:30	1x1	N/A	CS	P/JS	7/2/19
266	SI	P-65/3'>P-64/12'>bos	7/1/19	9:05	1x1	N/A	JS	P/JS	7/2/19
267	BO	P-70-71/221'>bos	7/1/19	10:52	1x1	N/A	JS	P/JS	7/2/19
268	SI	P-67-71/5'>bos	7/1/19	10:52	1x1	N/A	JS	P/JS	7/2/19
269	SI	P-65/43'>tos/15'>P-64	7/1/19	8:48	1x1	N/A	JS	P/JS	7/2/19
270	BO	P-66-57/3'>bos	7/1/19	8:36	1x1	N/A	JS	P/JS	7/2/19
271	BO	P-68-71/17'>eos	7/1/19	11:05	1x1	N/A	JS	P/JS	7/2/19
272	SI	P-69/45'>bos/14'>P-67	7/1/19	11:22	1x1	N/A	JS	P/JS	7/3/19
273	SI	P-51-60-59-68	6/29/19	6:24	344'	M9	RM	P/DP	7/2/19
274	BO	P-51-R-273/44'>bos	7/2/19	7:15	1x1	N/A	CS	P/JS	7/2/19
275	BO	P-60-R-273/195'>bos	7/2/19	7:26	1x1	N/A	CS	P/JS	7/2/19
276	BO	P-60-R-273/235'>bos	7/2/19	8:00	1x1	N/A	CS	P/JS	7/2/19
277	BO	P-60-R-273/243'>bos	7/2/19	8:05	1x2	N/A	CS	P/JS	7/2/19
278	BO	P-58-R-273/24'>eos	7/2/19	8:07	1x1	N/A	CS	P/DP	7/2/19
279	BO	P-58-R-273/7'>eos	7/2/19	8:12	1x1	N/A	CS	P/DP	7/2/19
280	SI	P-55-56-32	7/9/19	6:15	132x6	M9	RM	P/CS	7/10/19
281	WS	P-32-56-R-280	7/10/19	9:26	2x2	N/A	CS	P/CS	7/10/19
282	BO	P-32-R-280/12'>eos	7/10/19	9:36	1x1	N/A	CS	P/CS	7/10/19
283	BO	P-32-R-280/23'>eos	7/10/19	9:45	1x1	N/A	CS	P/CS	7/10/19
284	CAP	P-56-32/20'>P-58	7/9/19	5:09	223x3	M9	RM	P/CS	7/10/19
285	WS	P-56--284-287	7/10/19	9:10	1x1	N/A	CS	P/CS	7/10/19
286	BO	P-56-R-284/12'>R-285	7/10/19	8:56	2x1	N/A	CS	P/CS	7/10/19
287	EXT	P-56-R-284-285	7/9/19	3:00	4x19	M9	RM	P/CS	7/10/19
288	WS	P-56-R-233/6'>R-243	7/10/19	8:15	2x2	N/A	CS	P/CS	7/10/19
289	SI	P-56-58-R-279	7/10/19	7:40	5x5	N/A	CS	P/CS	7/10/19
290	EXT	P-63-72/3'>tos	7/10/19	4:49	12x5	N/A	AL	P/CS	7/10/19
291	BO	P-63-72/223'>tos	7/10/19	3:30	1x1	N/A	CS	P/JS	7/15/19
292	BO	P-72-73/85'>bos	7/10/19	3:36	1x1	N/A	CS	P/JS	7/15/19
293	BO	P-73-74/5'>tos	7/15/19	2:28	1x1	N/A	JM	P/JS	7/15/19
294	BO	P-74-75/59'>bos	7/10/19	3:48	1x2	N/A	CS	P/JS	7/15/19

GAI Consultants, Inc.

Repair Log

Project Name: Amos LF - Sequence 4
Start Date
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Repair #	Defect Code	Defect Location Seam #	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test(1) P/F	Vacuum Test(1) Date
295	BO	P-74-75/184'>bos	7/10/19	5:50	1x2	N/A	JS	P/JS	7/15/19
296	BO	P-74-75/249'>bos	7/10/19	5:38	1x2	N/A	CS	P/JS	7/15/19
297	BO	P-74-75/265'>bos	7/10/19	5:20	1x1	N/A	AL	P/JS	7/15/19
298	BO	P-75-76/43'>tos	7/10/19	5:50	2x5	N/A	CS	P/JS	7/15/19
299	DS-16	P-76-77/50'>tos	7/10/19	4:00	3x8	N/A	JM	P/JS	7/15/19
300	DS-17	P-63-72	7/10/19	4:30	3x8	N/A	JM	P/JS	7/15/19
301	DS-18	P-84-85/22'>bos	7/15/19	4:35	2x6	N/A	JM	P/JM	7/10/19
302	DS-19	P-82-83/101'>bos	7/15/19	4:38	3x7	N/A	JM	P/SS	7/18/19
303	DS-20	P-90-94/15'>bos	7/16/19	7:10	3x6	N/A	CS	P/CS	7/18/19
304	DS-21	P-92-98/40'>tos	7/16/19	8:40	3x8	N/A	CS	P/JM	7/27/19
305	DS-22	P-101-102/17'>eos	7/16/19	1:00	3x7	N/A	CS	P/JM	7/27/19
306	SI	P-72-63/110'>tos	7/18/19	1:44	1x1	N/A	JM	P/CS	7/27/19
307	SI	P-73-74/130'>tos	7/18/19	2:00	1x1	N/A	JM	P/CS	7/27/19
308	SI	P-77/60'>tos/3'>P-78	7/18/19	1:44	1x1	N/A	JM	P/CS	7/27/19
309	BO	P-79-80/80'>tos	7/15/19	3:41	2x3	N/A	JM	P/CS	7/27/19
310	BO	P-79-80/100'>tos	7/16/19	9:42	1x1	N/A	CS	P/CS	7/27/19
311	BO	P-75-76/110'>P-104	7/15/19	3:08	1x1	N/A	JM	P/CS	7/17/19
312	BO	P-84-80/20'>bos	7/15/19	8:45	1x1	N/A	CS	P/JS	7/15/19
313	BO	P-80/29'>bos/3'>P-84	7/15/19	8:52	1x1	N/A	CS	P/JS	7/15/19
314	BO	P-80-84/20'>eos	7/15/19	8:52	1x1	N/A	CS	P/JS	7/15/19
315	BO	P-81-84-85	7/15/19	9:00	2x4	N/A	CS	P/JS	7/15/19
316	BO	P-84-85/12'>bos	7/13/19	1:30	2x4	N/A	SS	P/JS	7/15/19
317	BO	P-81-85/15'>bos	7/15/19	9:40	1x1	N/A	CS	P/JS	7/15/19
318	BO	P-81-85/8'>tos	7/15/19	10:30	1x2	N/A	CS	P/JS	7/15/19
319	BO	P-84-86/6'>tos	7/15/19	4:52	1x1	N/A	JM	P/SS	7/18/19
320	SI	P-80-84/20'>bos	7/16/19	10:50	1x1	N/A	MH	P/SS	7/18/19
321	BO	P-82-83/82'>bos	7/13/19	10:30	2x2	N/A	CS	P/JS	7/15/19
322	WR	P-82/83'>bos/21'>P-83	7/15/19	1:48	2x2	N/A	CS	P/JS	7/15/19
323	WR	P-82-83/40'>bos/12'>P-83	12/15/01	10:05	81'	M9	RM	P/JS	7/15/19
324	FD	P-82/50'>P-103/24'>P-83	7/15/19	1:00	2x2	N/A	CS	P/JS	7/15/19
325	BO	P-82/50'>P-103/24'>P-83	7/15/19	1:32	1x1	N/A	JM	P/SS	7/18/19
326	BO	P-78-79/45'>bos	7/15/19	3:15	2x2	N/A	CS	P/SS	7/18/19
327	SI	P-82/12'>bos/1'>P-92	7/15/19	7:20	1x1	N/A	CS	P/JS	7/15/19
328	BO	P-82-87-92	7/15/19	7:15	2x2	N/A	CS	P/JS	2/13/21
329	BO	P-87-92-93	7/15/19	7:00	1x1	N/A	CS	P/CS	7/18/19
330	BO	P93-87/9'>BOS	7/14/19	11:30	2x3	N/A	SS	P/JS	7/15/19
331	BO	P-87-88-93	7/15/19	6:40	3x3	N/A	CS	P/JS	7/15/19
332	BO	P-82-86/90'>eos	7/16/19	1:36	1x3	N/A	CS	P/SS	7/18/19
333	SI	P-87/95'>eos/5'>P-82	7/16/19	1:48	1x1	N/A	CS	P/SS	7/18/19
334	BO	P-87-88/68'>P-93	7/15/19	4:54	1x1	N/A	RM	P/SS	7/18/19
335	BO	P-93-94-88	7/14/19	7:00	1x1	N/A	CS	P/JS	7/15/19
336	BO	P-93-88/3'>bos	7/14/19	7:10	1x2	N/A	CS	P/JS	7/14/19

GAI Consultants, Inc.

Repair Log

Project Name: Amos LF - Sequence 4
Start Date
Project Location: Putnam County, WV

Material: PVC
Thickness: 30 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test[1]	
		Seam #						P/F	Date
337	SI	P-96-94/30'>bos	7/15/19	4:50	1x1	N/A	CS	P/CS	7/18/19
338	SI	P-95-95/8'>EOS	7/15/19	4:45	1x1	N/A	CS	P/JS	7/15/19
339	BO	P-95-97/9'>bos	7/15/19	4:10	1x1	N/A	CS	P/JS	7/15/19
340	BO	P-89-91/11'>bos	7/15/19	5:10	1x1	N/A	CS	P/CS	7/18/19
341	SI	P-93-94/6'>bos	7/16/19	8:19	1x1	N/A	CS	P/JM	7/27/19
342	BO	P-92-93/95'>tos	7/15/19	10:02	1x2	N/A	JM	P/JM	7/27/19
343	BO	P-92-98/60'>tos	7/15/19	10:17	2x2	N/A	JM	P/JM	7/27/19
344	BO	P-98-99/26'>tos	7/15/19	10:38	1x1	N/A	JM	P/JM	7/27/19
345	SI	P-99/18'>tos/18'>P-98	7/15/19	10:49	1x1	N/A	JM	P/JM	7/27/19
346	BO	P-99-100/17'>tos	7/15/19	11:20	2x2	N/A	JM	P/JM	7/27/19
347	BO	P-101-102/116'>tos	7/15/19	11:30	1x1	N/A	JM	P/JM	7/27/19
348	FD	P-100/96'>EOS/24'>P-99	7/15/19	8:10	1x1	N/A	KK	P/JM	7/27/19
349	FD	P-100/86'>EOS/24'>P-99	7/15/19	7:50	1x1	N/A	KK	P/JM	7/27/19
350	FD	P-100/77'>EOS/24'>P-99	7/15/19	7:40	1x1	N/A	KK	P/JM	7/27/19
351	FD	P-100/65'>EOS/24'>P-99	7/15/19	7:30	1x1	N/A	KK	P/JM	7/27/19
352	BO	P-101-102/50'>EOS	7/15/19	8:20	1x1	N/A	KK	P/JM	7/27/19
353	BO	P-101-102/64'>EOS	7/15/19	9:33	2x3	N/A	FL	P/JM	7/27/19
354	SI	P-102/86'>eos/6'>P-101	7/15/19	10:05	1x1	N/A	FL	P/JM	7/27/19
355	DD	P-102/87'>eos/18'>P-101	7/15/19	11:07	1x9	N/A	FL	P/JM	7/27/19
356	DD	P-102/96'>eos/18'>P-101	7/15/19	11:22	1x1	N/A	FL	P/JM	7/27/19
357	BO	P-101-104/10'>bos	7/15/19	1:07	1x1	N/A	FL	P/JM	7/27/19
358	BO	P-101-103-104	7/15/19	7:00	1x1	N/A	KK	P/JM	7/27/19
359	DD	P-100/3'>P-101/2'>P-103	7/15/19	7:15	1x1	N/A	KK	P/JM	7/27/19
360	DD	P-101-100/6'>eos	7/15/19	2:00	3x3	N/A	FL	P/JM	7/27/19
361	DD	P-100/8'>eos/6'>P-101	7/15/19	2:31	1x1	N/A	FL	P/JM	7/27/19
362	SI	P-100/10'>eos/6'>P-101	15-Jul	223	1x1	N/A	CS	P/JM	7/27/19
363	SI	P-93-103/12'>bos	7/16/19	2:00	1x1	N/A	CS	P/JM	7/27/19
364	WS	P-80-83-105	7/15/19	2:40	2x3	N/A	CS	P/JS	7/15/19
365	SI	P-79/18'>P-78/7'>P-105	7/15/19	2:50	1x1	N/A	CS	P/JM	7/27/19
366	BO	P-78-103-105	7/15/19	3:40	1x2	N/A	CS	P/JM	7/27/19
367	SI	P-75/6'>bos/6'>P-76	7/15/19	2:46	1x1	N/A	FL	P/JM	7/27/19
368	SI	P-75/8'>bos/30'>P-76	7/15/19	2:54	1x1	N/A	FL	P/JM	8/2/19
369	BO	P-89-91/5'>bos	7/15/19	5:15	1x1	N/A	CS	P/CS	7/18/19
370	DS-19A	P-82-83/111'>bos	7/17/19	1:00	3x8	N/A	JS	P/JM	7/27/19
371	DS-19B	P-82-83/90'>bos	7/17/19	11:00	3x8	N/A	JS	P/JM	7/27/19
372	DS-20A	P-90-94/10'>DS-20	7/18/19	2:06	3x10	N/A	JS	P/CS	7/18/19
373	DS-20B	P-90-94/25'>bos	7/18/19	11:10	3x9	N/A	JS	P/CS	7/18/19
374	DS-23	P-88-89/36'>bos	7/18/19	9:37	3x8	N/A	JS	P/CS	7/18/19
375	DS-24	P-98-99/85'>eos	7/18/19	11:20	3x8	N/A	CS	P/JM	7/27/19
376	BO	P-83-105/8'>bos	7/27/19	4:20	1x1	N/A	AL	P/JM	7/27/19
377	SI	P-83-103-/4'>P-105	7/27/19	4:00	1x1	N/A	AL	P/JM	7/27/19
378	SI	P-82-103/16'>P-105	7/27/19	3:31	1x1	N/A	AL	P/JM	7/27/19

GAI Consultants, Inc.

Repair Log

Project Name: Amos LF - Sequence 4
Start Date
Project Location: Putnam County, WV

Material: PVC
Thickness: 30 mil

Repair #	Defect Code	Defect Location / Seam #	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test[1] P/F	Vacuum Test[1] Date
379	AT	P-99-100/30'>eos	7/27/19	5:00	1x1	N/A	RO	P/JM	7/27/19
380	WS	P-102-104-115	7/27/19	5:38	2x2	N/A	RO	P/JM	7/27/19
381	WS	P-107-108-115	7/27/19	5:15	1x1	N/A	HG	P/JM	7/27/19
382	FD	P-111/55'>tos/6'>P-110	7/27/19	4:45	1x2	N/A	FL	P/JM	7/27/19
383	SI	P-111-112/18'>TOS	7/27/19	4:51	1x1	N/A	FL	P/JM	7/27/19
384	BO	P-111-112/100'>tos	7/27/19	5:00	1x1	N/A	FL	P/JM	7/27/19
385	WS	P-108-119-120	7/27/19	5:11	1x2	N/A	AA	P/JM	8/3/19
386	BO	P-119-120/13'>R-385	8/3/19	7:23	1x1	N/A	CS	P/JM	8/3/19
387	BO	P-104-120/3'>P-115	8/2/19	8:00	1x1	N/A	MS	P/JM	8/3/19
388	EXT	P-116-104-120	7/27/19	5:00	4x45	M9	RM	P/JM	8/3/19
389	BO	P-104-116/3'>bos	7/27/19	4:33	1x1	N/A	FL	P/JM	8/3/19
390	WS	P-116-R-388/3'>P-104	8/2/19	10:00	1x1	N/A	UG	P/JM	8/3/19
391	AT	P-75-104-116	8/2/19	7:42	1x1	N/A	UG	P/JM	8/3/19
392	AT	P-75-116/15'>eos	8/2/19	8:05	1x1	N/A	HG	P/JM	8/3/19
393	BO	P-116-117/15'>bos	8/2/19	2:58	1x1	N/A	HG	P/JM	8/3/19
394	BO	P-116-117-119	8/2/19	2:50	1x1	N/A	MS	P/JM	8/3/19
395	BO	P-117-119/8'>eos	7/27/19	5:46	1x1	N/A	JM	P/JM	8/3/19
396	BO	P-117-118/9'>bos	7/27/19	5:45	1x1	N/A	HG	P/JM	8/3/19
397	BO	P-65-118/15'>bos	7/27/19	6:09	1x1	N/A	FL	P/JM	8/3/19
398	TI	P-127-old liner/TP-ANCHOR TRENCH	7/28/19	4:30	2x2	N/A	AL	P/AL	7/28/19
399	SI	Old liner/2'>P-127/73'>eos	7/28/19	4:41	2x3	N/A	AL	P/JM	8/3/19
400	BO	P-127-old liner/53'>	7/29/19	4:41	2x3	N/A	AL	P/JM	8/3/19
401	BO	P-127-old liner/33'>eos	7/28/19	4:49	1x1	N/A	AL	P/JM	8/3/19
402	SI	P-127-old liner/30'>eos	7/28/19	5:02	1x2	N/A	AL	P/JM	8/3/19
403	BO	P-127-old liner	7/28/19	5:46	1x1	N/A	AL	P/JM	8/3/19
404	SI	Old liner/2'>P-126	7/28/19	5:22	1x1	N/A	CS	P/JM	8/3/19
405	BO	P-126-127/8'>bos	7/29/19	8:00	1x3	N/A	UG	P/JM	8/3/19
406	BO	P-126-127/12'>bos	7/28/19	5:33	1x1	N/A	AL	P/JM	8/3/19
407	SI	P-128/14'>39/15'>40	7/29/19	4:55	1x1	N/A	AL	UG	8/16/19
408	FD	P-125	7/28/19	1:00	177'	M9	JS	P/JM	8/3/19
409	BO	P-126-old liner/46'>bos	7/28/19	5:36	1x1	N/A	AL	P/JM	8/3/19
410	SI	P-126-old liner/86'>bos	7/28/19	6:38	3x4	N/A	AL	P/JM	8/3/19
411	BO	P-126-old liner/166'>bos	7/28/19	7:20	3x5	N/A	CS	P/JM	8/3/19
412	BO	P-125-old liner/28'>bos	7/29/19	8:30	1x1	N/A	CS	P/JM	8/3/19
413	BO	P-125-old liner/50'>bos	7/28/19	7:55	2x2	N/A	CL	P/JM	8/3/19
414	BO	P-125-old liner/65'>bos	7/28/19	7:50	1x2	N/A	AL	P/JM	8/3/19
415	EXT	P-123-124-126	7/28/19	7:00	4X650	M9	JS	P/JM	8/3/19
416	BO	P-125-old liner/96'>bos	7/28/19	7:33	1x1	N/A	MS	P/JM	8/3/19
417	AT	P-125-R-415/123'>eos	7/28/19	7:13	1x1	N/A	MS	P/JM	8/3/19
418	BO	P-125-R-415/118'>eos	7/28/19	7:07	1x1	N/A	MS	P/JM	8/3/19
419	SI	P-125-R-415/98'>eos	7/28/19	6:45	1x1	N/A	MS	P/JM	8/3/19
420	BO	P-125-R-415/60'>eos	7/28/19	6:40	1x1	N/A	AA	P/JM	8/3/19

GAI Consultants, Inc.

Repair Log

Project Name: Amos LF - Sequence 4
Start Date
Project Location: Putnam County, WV

Material: PVC
Thickness: 30 mil

Repair #	Defect Code	Defect Location / Seam #	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test[(1)] P/F	Vacuum Test[(1)] Date
421	BO	P-125-R-415/46'>eos	7/28/19	6:28	1x1	N/A	MS	P/JM	8/3/19
422	BO	P-125-R-415/3'>eos	7/28/19	6:17	1x1	N/A	AA	P/JM	8/3/19
423	SI	P-123-124/19'>bos	7/28/19	5:57	1x1	N/A	AA	P/JM	8/3/19
424	SI	P-123-124/15'>bos	7/29/19	9:07	1x1	N/A	MS	P/JM	8/3/19
425	BO	P-123-124-R-415	7/28/19	6:07	1x1	N/A	MS	P/JM	8/3/19
426	SI	P-123-64/28'>eos	7/28/19	9:00	1x1	N/A	FL	P/JM	8/3/19
427	BO	P-64-R-415/50'>TOS	7/29/19	8:30	1x1	N/A	MS	P/JM	8/3/19
428	BO	P-123-R-415/51'>tos	7/29/19	8:24	1x1	N/A	FL	P/JM	8/3/19
429	WS	P-123-old liner/4'>tos	7/29/19	8:06	1x3	N/A	FL	P/JM	8/3/19
430	SI	old liner/20'>eos/2'>P-124	7/29/19	9:18	2x2	N/A	FL	P/JM	8/3/19
431	BO	P-123/-R-415/18'>tow	7/29/19	8:33	1x1	N/A	MS	P/JM	8/3/19
432	EXT	P-72-63/5'>tos	7/28/19	7:30	43'	M9	RM	P/JM	8/3/19
433		Number Not Used							
434		Number Not Used							
435	SI	P-125/106'>bos/36'>old liner	7/29/19	9:44	1x1	N/A	FL	P/JM	8/3/19
436	WR	P-63-73/23'>bos	7/27/19	6:09	1x2	N/A	AA	P/JM	8/3/19
437	BO	P-64-118/39'>eos	8/2/19	1:28	1x1	N/A	HG	P/JM	8/3/19
438	AT	P-64-65-118	8/2/19	1:34	1x1	N/A	MS	P/JM	8/3/19
439	DS-25	P-102-106	8/2/19	1:08	3x8	N/A	MS	P/JM	8/3/19
440	DS-26	P-111-112	8/2/19	2:28	3x8	N/A	HG	P/JS	8/13/19
441	DS-27	P-129-130	8/6/19	5:23	3x8	N/A	JM	P/JS	8/13/19
442	DS-28	P-121-65/24'>eos	8/2/19	2:07	3x6	N/A	MS	P/JM	8/3/19
443	DS-29	P-125-R-415/28'>eos	8/2/19	3:45	2x6	N/A	MS	P/JM	8/3/19
444	BO	P-65-66-121	7/27/19	5:56	3x3	N/A	FL	P/JM	8/3/19
445	BO	P-66-121/10'>bos	7/28/19	8:43	1x1	N/A	JS	P/JM	8/3/19
446	AT	P-66-121/6'>bos	7/28/19	8:50	1x1	N/A	JS	P/JM	8/3/19
447	AT	P-113-122/9'>eos	7/29/19	8:57	1x1	N/A	JS	P/JM	8/3/19
448	AT	P-114-122-134	7/29/19	6:17	2x2	N/A	FL	P/JM	8/3/19
449	SI	P-68/14'>P-134/21'>P-67	7/29/19	6:20	1x1	N/A	MS	P/JM	8/3/19
450	EXT	P-68-69/6'>P-134	7/29/19	1:23	2x10	M9	JS	P/JM	8/3/19
451	BO	P-68-69-R-450	7/29/19	6:07	2x2	N/A	MS	P/JM	8/3/19
452	AT	P-69-71-15'>bos	7/30/19	8:51	1x1	N/A	UG	P/JM	8/3/19
453	AT	P-128-70/15'>eos	7/29/19	8:38	1x1	N/A	MS	P/JM	8/3/19
454	BO	P-70-R-415/15'>bos	7/29/19	5:23	1x1	N/A	MS	P/JM	8/3/19
455	WS	P-126-127-r-456	7/29/19	5:07	1x1	N/A	MS	P/UG	8/16/19
456	WR	P-126/18'>old liner	7/28/19	3:00	79'	M9	JS	P/UG	8/16/19
457	BO	P-126/98'>eos/10'>old liner	7/29/19	5:10	1x1	N/A	MS	P/UG	8/16/19
458	BO	P-126/96'>eos/9'>old liner	7/29/19	5:08	1x1	N/A	MS	P/UG	8/16/19
459	SI	P-72/26'>P-73/9'>tos	8/3/19	10:00	1x1	N/A	FL	P/RM	8/14/19
460	BO	P-128-139/22'>bos	8/3/19	10:16	1x1	N/A	FL	P/RM	8/14/19
461	BO	P-130-131/50'>BOS	8/6/19	5:31	1x1	N/A	MS	P/RM	8/14/19
462	BO	P-114-130/14'>P-131	7/29/19	7:50	1x1	N/A	JS	P/RM	8/14/19

GAI Consultants, Inc.

Repair Log

Project Name: Amos LF - Sequence 4
Start Date
Project Location: Putnam County, WV

Material: PVC
Thickness: 30 mil

Repair #	Defect Code	Defect Location / Seam #	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test(1) P/F	Vacuum Test(1) Date
463	DS-30	P-160-162/32'>bos	8/3/19	12:26	3x8	N/A	FL	P/RM	8/3/19
464	DS-31	P-157-158/39'>bos	8/3/19	12:42	3x8	N/A	MS	P/JM	8/3/19
465	SI	P-77/45'>tos/25'>P-76	7/30/19	8:05	90'	M9	RM	P/JM	7/30/19
466	AT	P-77/90'>TOS/25'>P-76	7/30/19	8:43	1x1	N/A	JM	P/JM	7/30/19
467	SI	P-75-117'>tos/15'-74	8/2/19	11:40	1x1	N/A	JM	P/JM	8/2/19
468	SI	P-121/15'>eos/6'>P-66	8/3/19	7:30	1x1	N/A	FL	P/JM	8/3/19
469	AT	P-121-134/5'>BOS	8/3/19	7:30	1x1	N/A	FL	P/JM	8/3/19
470	AT	P-121-134/19'>BOS	8/3/19	7:45	1x1	N/A	FL	P/JM	8/3/19
471	AT	P-121-134/24'>BOS	8/3/19	7:52	1x1	N/A	FL	P/JM	8/3/19
472	AT	P-121-134/30'>bos	8/3/19	7:55	1x1	N/A	FL	P/JM	8/3/19
473	AT	P-121-134/36'>bos	8/3/19	8:00	1x1	N/A	FL	P/JM	8/3/19
474	AT	P-121-134/18'>eos	8/3/19	8:05	1x1	N/A	FL	P/JM	8/3/19
475	BO	P-134-136/35'>bos	7/29/19	6:21	1x1	N/A	JS	P/CS	8/8/19
476	AT	P-70-R-415/146'>eos	8/3/19	9:21	1x1	N/A	CS	P/JM	8/3/19
477	AT	P-126-70/97'>eos	8/3/19	8:58	1x1	N/A	CS	P/JM	8/3/19
478	AT	P-126/R-415/70	8/3/19	9:23	1x1	N/A	FL	P/JM	8/3/19
479	AT	P-127-126-R-415	8/3/19	9:04	1x1	N/A	FL	P/OO	8/21/19
480	AT	P-70-127-R-415	8/3/19	9:13	1x1	N/A	FL	P/OO	8/21/19
481	AT	P-128-70/10'>P-127	8/3/19	9:54	1x1	N/A	FL	P/OO	8/21/19
482	SI	P-128/12'>P-127/3'>70	8/3/19	9:38	1x1	N/A	FL	P/OO	8/21/19
483	AT	P-128-70/24'>eos	8/.3	10:00	1x1	N/A	FL	P/OO	8/21/19
484	AT	P-128-70/36'>eos	8/3/19	10:05	1x1	N/A	FL	P/OO	8/21/19
485	AT	P-70-128/3'>bos	8/3/19	10:10	1x1	N/A	FL	P/OO	8/21/19
486	AT	P-71-128/6'>eos	8/3/19	10:13	1x1	N/A	FL	P/OO	8/21/19
487	SI	P-176/4'>P-179/12'>anchor	8/5/19	8:23	1x2	N/A	FL	P/JM	8/5/19
488	SI	P-176-179/17'>BOS	8/5/19	8:08	1x1	N/A	FL	P/JM	8/5/19
489	BO	P-179-177/3'>bos	8/5/19	8:36	1x1	N/A	FL	P/JM	8/5/19
490	AT	P-170-177-178	8/5/19	10:11	1x1	N/A	FL	P/JM	8/5/19
491	WS	P-172-176-178	8/3/19	1:05	1x1	N/A	MS	P/JM	8/5/19
492	AT	P-172-175-178	8/3/19	1:43	1x1	N/A	MS	P/JM	8/5/19
493	BO	P-174-175/17'>bos	8/5/19	10:35	1x1	N/A	FL	P/JM	8/5/19
494	AT	P-174-175/15'>eos	8/5/19	10:25	1x1	N/A	FL	P/JM	8/5/19
495	AT	P-174-175/6'>eos	8/5/19	10:02	1x1	N/A	FL	P/JM	8/5/19
496	SI	P-158-171/3'>P-174	8/5/19	10:30	3X3	N/A	FL	P/JM	8/5/19
497	AT	P-165-173-174	8/3/19	2:00	2x2	N/A	FL	P/JM	8/5/19
498	AT	P-165-173/12'>bos	8/3/19	2:17	1x1	N/A	CS	P/JM	8/5/19
499	AT	P-157-174-173	8/3/19	1:18	1x1	N/A	FL	P/JM	8/5/19
500	BO	P-157-173/14'>bos	8/3/19	1:09	1x1	N/A	FL	P/JM	8/5/19
501	SI	P-163/5'>P-173/3'>P-161	8/5/19	9:25	1x1	N/A	FL	P/JM	8/5/19
502	SI	P161-163/15'>EOS	8/5/19	11:00	1x1	N/A	FL	P/JM	8/5/19
503	SI	P-173/5'>P-154/13'>P-155	8/2/19	8:40	1x1	N/A	CS	P/JM	8/5/19
504	AT	P-163-166/7'>BOS	8/5/19	11:17	1x1	N/A	FL	P/JM	8/5/19

GAI Consultants, Inc.

Repair Log

Project Name: Amos LF - Sequence 4
Start Date
Project Location: Putnam County, WV

Material: PVC
Thickness: 30 mil

Repair #	Defect Code	Defect Location / Seam #	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test(1) P/F	Vacuum Test(1) Date
505	AT	P-163-165-166	8/5/19	11:10	1x1	N/A	FL	P/JM	8/5/19
506	SI	P-160-162/9'>R-463	8/2/19	8:30	1x1	N/A	CS	P/JM	8/5/19
507	BO	P-151-152/23'>bos	8/5/19	8:57	1x1	N/A	FL	P/JM	8/5/19
508	SI	P-168/30'>P-165/20'>TI-IN	8/5/19	1:20	1x1	N/A	CS	P/CS	8/5/19
509	DD	P-171/40'>TI-IN/18->P172	8/5/19	2:52	1x1	N/A	CS	P/CS	8/5/19
510	SI	P-174/1'>P-165/4'>P-173	8/5/19	3:05	1x1	N/A	CS	P/CS	8/5/19
511	SI	P-83/17'>P-82	5/29/00	1:50	90'	M9	RM	P/JM	8/9/19
512	AT	P-83-R-511/15'>tos	8/6/19	4:05	2x2	N/A	CS	P/JM	8/9/19
513	SI	P-83/85'>tos/19'>P-82	8/10/19	8:30	1x1	N/A	CS	P/CS	8/10/19
514	SI	P-73/6'>P-74/88'>P-116	8/9/19	8:10	1x1	N/A	JS	P/MS	8/8/19
515	SI	P-133-136-137	8/3/19	10:20	1x1	N/A	FL	P/CS	8/8/19
516	AT	P-67-R-415/15'>P-70	8/3/19	10:10	1x1	N/A	CS	P/JM	8/3/19
517	SI	P-136/27'>P-121/4'>P-134	8/8/19	4:06	1x1	N/A	CS	P/CS	8/8/19
518	SI	P-134-137/3'>bos	8/8/19	4:20	1x1	N/A	CS	P/CS	8/8/19
519	SI	P-134/4'>P-137/18'>bos	8/3/19	8:29	1x1	N/A	FL	P/CS	8/8/19
520	SI	P-92-98/9'>tos	7/27/19	2:05	1x1	N/A	AL	P/JM	7/27/19
521	SI	P-92-93/12'>tos	7/27/19	1:57	1x1	N/A	AL	P/JM	7/27/19
522	AT	P-83-R-511/65'>tos	8/6/19	5:30	2x2	N/A	CS	P/JM	8/9/19
523	AT	P-83-R-511/12'>tos	8/6/19	5:16	2x3	N/A	CS	P/JM	8/9/19
524	BO	P-83-R-511/15'>tos	8/6/19	5:00	2x2	N/A	CS	P/JM	8/9/19
525	BO	P-83-R-511/15'>tos	8/6/19	4:30	2x2	N/A	CS	P/JM	8/9/19
526	ED	P-85/7'>P-84/3'>tos	8/9/19	7:40	1x1	N/A	CS	P/JM	8/9/19
527	ED	P-85/5'>P-84/3'>tos	8/9/19	7:50	1x1	N/A	CS	P/JM	8/9/19
528	BO	P-84-85/18'>tos	8/6/19	3:00	2x3	N/A	CS	P/JM	8/9/19
529	BO	P-84-R-531/20'>tos	8/6/19	3:34	1x1	N/A	CS	P/JM	8/9/19
530	BO	P-84-R-531/22'>tos	8/6/19	3:49	1x1	N/A	CS	P/JM	8/9/19
531	SI	P-84-86/28'>tos	8/6/19	2:10	1x1	M9	RM	P/JM	8/9/19
532	BO	P-84-R-531/35'>tos	8/6/19	3:16	1x1	N/A	CS	P/JM	8/9/19
533	DD	P-111-112/86'>tos	8/6/19	2:45	2x2	N/A	FL	P/RM	8/14/19
534	DS-26A	P-111-112/10'>R-440	8/6/19	4:08	3x8	N/A	FL	P/RM	8/14/19
535	DS-26B	P-111-112/10'>R-440	8/6/19	4:30	3x8	N/A	FL	P/RM	8/14/19
536	DS-27A	P-129-130/15'>R-441	8/6/19	5:16	3x8	N/A	FL	P/RM	8/14/19
537	DS-27B	P-129-130/16'>R-441	8/6/19	5:40	3x8	N/A	JS	P/RM	8/14/19
538	DS-29A	P-125-R-415/18'>R-443	8/8/19	4:35	3x8	N/A	UG	P-UG	8/16/19
539	DS-29B	P-125-R-415/11'>R-443	8/8/19	4:12	3x8	N/A	FL	P/AA	8/28/19
540	DS-30A	P-160-162/16'>R-463	8/8/19	5:40	3x8	N/A	UG	P-UG	8/16/19
541	DS-30B	P-160-162/17'>R-463	8/8/19	5:28	3x8	N/A	FL	P-UG	8/16/19
542	SI	P-114/69'>tos/13'>P-113	8/6/19	4:40	1x1	N/A	FL	P/RM	8/14/19
543	SI	P-114/72'>tos/15'>P-113	8/6/19	4:49	1x1	N/A	FL	P/RM	8/14/19
544	BO	P-129-114/33'>bos	7/29/19	8:10	1x1	N/A	JS	P/RM	8/14/19
545	SI	P-129/18'>BOS/3'>P-114	7/29/19	8:19	1x1	N/A	JS	P/RM	8/14/19
546	BO	P-129-150/54'>tos	8/10/19	11:05	1x1	N/A	1x1	P/RM	8/14/19

GAI Consultants, Inc.

Repair Log

Project Name: Amos LF - Sequence 4

Start Date

Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Repair #	Defect Code	Defect Location / Seam #	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test(1) P/F	Vacuum Test(1) Date
547	BO	P-114-132/28'>bos	7/29/19	7:45	1x1	N/A	JS	P/RM	8/14/19
548	AT	P-132-141/9'>BOS	8/3/19	8:42	1x1	N/A	FL	P/RM	8/14/19
549	SI	P-146/18'>P-142/6'>P-147	8/3/19	11:17	1x1	N/A	FL	P/RM	8/14/19
550	BO	P-130-146/3'>bos	8/3/19	11:25	1x1	N/A	FL	P/RM	8/14/19
551	AT	P-146-148-150	8/3/19	11:49	1x1	N/A	FL	P/RM	8/14/19
552	BO	P-150-151/48'>bos	8/6/19	5:41	1x1	N/A	MS	P/RM	8/14/19
553	SI	P-151/56'>bos/27'>P-150	8/6/19	5:47	1x1	N/A	MS	P/RM	8/14/19
554	AT	P-152-164/8'>bos	8/5/19	11:32	1x1	N/A	FL	P/JM	8/5/19
555	AT	P-152-173/14'>bos	8/5/19	11:30	1x1	N/A	UG	P/JM	8/5/19
556	SI	P-173/7'>P-160/9'>P-164	8/2/19	8:48	1x1	N/A	CS	P/JM	8/2/19
557	SI	P-173/4'>P-160/9'>P-164	8/2/19	8:58	1x1	N/A	CS	P/JM	8/2/19
558	SI	P-173/7'>P-160/3'>P-164	8/2/19	7:00	1x1	N/A	CS	P/JM	8/2/19
559	SI	P-173/4'>P-160/3'>P-164	8/2/19	6:50	1x1	N/A	CS	P/JM	8/2/19
560	BO	P-173/7'>P-160/3'>P-164	8/2/19	7:06	1x1	N/A	CS	P/JM	8/2/19
561	SI	P-159-164/12'>eos	8/3/19	7:00	2x2	N/A	JS	P/JM	8/5/19
562	DD	P-159-160/39'>eos	8/5/19	9:11	1x1	N/A	FL	P/JM	8/5/19
563	DD	P-159-160/49'>eos	8/5/19	9:04	1x1	N/A	FL	P/JM	8/5/19
564	DD	P-159-160/82'>eos	8/2/19	7:28	1x1	N/A	CS	P/JM	8/5/19
565	DD	P-159-160/102'>eos	8/2/19	8:10	1x1	N/A	CS	P/JM	8/5/19
566	DD	P-159-160/79'>tos	8/2/19	8:20	1x1	N/A	CS	P/JM	8/5/19
567	WS	P-54-159-149	8/3/19	7:12	1x1	N/A	JS	P/JG	8/16/19
568	BO	P-33-57-149	8/3/19	7:30	2x2	N/A	JS	P/JG	8/16/19
569	BO	P-33-149/12'>bos	8/3/19	7:37	1x2	N/A	JS	P/JG	8/16/19
570	BO	P-34-148/3'>bos	8/3/19	7:42	1x2	N/A	JS	P/JG	8/16/19
571	BO	P-145-R-183/10'>bos	8/3/19	7:53	2x2	N/A	JS	P/JG	8/16/19
572	SI	R-183/2'>P-145/3'>R-571	8/3/19	8:03	1x1	N/A	JS	P/JG	8/16/19
573	BO	P-37-145/7'>R-571	8/3/19	8:12	1x1	N/A	JS	P/JG	8/16/19
574	BO	P-37-145/8'>R-573	8/3/19	8:22	1x1	N/A	JS	P/JG	8/16/19
575	BO	P-37-145/6'>R-574	8/3/19	8:30	1x1	N/A	JS	P/JG	8/16/19
576	BO	P-37-145/7'>R-575	8/3/19	4:10	2x2	N/A	CS	P/JG	8/16/19
577	SI	P-140/6'>P-39/26'>P-128	8/3/19	11:09	1x1	N/A	FL	P/JG	8/16/19
578	AT	P-66-67-R-415	8/10/19	9:04	1x1	N/A	JG	P/AA	8/28/19
579	AT	P-66-R-415/6'>bos	8/10/19	4:49	1x1	N/A	FL	P-UG	8/16/19
580	AT	P-125-R-415/3'>R-579	8/10/19	8:54	1x1	N/A	FL	P-UG	8/16/19
581	AT	P-66-R-415/15'>bos	8/10/19	4:33	1x1	N/A	FL	P-UG	8/16/19
582	AT	P-66-R-415/21'>bos	8/8/19	4:25	1x1	N/A	FL	P-UG	8/16/19
583	AT	P-66-R-415/27'>bos	8/8/19	4:19	1x1	N/A	FL	P/AA	8/28/19
584	AT	P-66-R-415/33'>bos	8/8/19	4:55	1x1	N/A	UG	P-UG	8/16/19
585	AT	P-66-R-415/39'>bos	8/8/19	4:45	1x1	N/A	UG	P/AA	8/28/19
586	AT	P-66-R-415/45'>bos	8/10/19	8:40	1x1	N/A	JG	P/AA	8/28/19
587	SI	P-123/6'>R-415/3'>tos	8/10/19	8:22	2x2	N/A	FL	P/UG	8/16/19
588	WS	P-102-106/47'>eos	8/6/19	2:05	1x2	N/A	FL	P/JS	8/10/19

GAI Consultants, Inc.

Repair Log

Project Name: Amos LF - Sequence 4
Start Date
Project Location: Putnam County, WV

Material: PVC
Thickness: 30 mil

Repair #	Defect Code	Defect Location / Seam #	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test(1) P/F	Vacuum Test(1) Date
589	WR	P-102-106-101-	8/6/19	11:00	152'	M9	JS	P/JS	8/10/19
590	BO	P-102-R-589/30'>bos	8/6/19	1:45	1x1	N/A	FL	P/JS	8/10/19
591	SI	P-129-150/4'>tos	8/14/19	8:05	1x1	N/A	FL	P/JS	8/10/19
592	SI	P-129/7'>P-114/8'>tos	7/29/19	8:25	1x1	N/A	JS	P/JS	8/10/19
593	DD	P-171/42>TI-IN/20->P172	8/16/19	8:34	1x1	N/A	HG	P/JS	8/16/19
594	SI	P-135/15'>P-138/12'>P-141	8/10/19	11:25	1x1	N/A	FL	P/JS	8/16/19
595	SI	P-126/4'>old liner/31'>P-127	8/16/19	2:10	1x1	N/A	UG	P/UG	8/16/19
596	BO	P-124-old liner/15'>P-125	7/29/19	9:24	1x1	N/A	JM	P/UG	8/16/19
597	ED	P-176/4'>tos/8'>P-172	8/16/19	10:00	2x2	N/A	JS	P/UG	8/16/19
598	ED	P-172/6'>tos/8'>P-176	8/16/19	9:34	1x1	N/A	JS	P/UG	8/16/19
599	SI	P-165/10'>P-173/26'>p-166	8/16/19	8:03	1x1	N/A	FL	P/UG	8/16/19
600	SI	P-148-33/10'>R-569	8/16/19	9:21	1x1	N/A	FL	P/UG	8/16/19
601	SI	P-148/30'>P-149/35'>P-150	8/16/19	10:20	1x1	N/A	FL	P/JG	8/16/19
602	SI	P-148/42'>P-149/35'>P-150	8/16/19	10:11	1x2	N/A	FL	P/UG	8/16/19
603	SI	P-148/11'>P-146/30'>P-150	8/16/19	9:51	1x1	N/A	FL	P/UG	8/16/19
604	SI	P-33/9->P-146/15'>P-148	8/16/19	9:38	1x1	N/A	FL	P/UG	8/16/19
605	SI	P-142/8'>P-139/13'>P-140	8/16/19	1:18	1x1	N/A	JG	P/UG	8/16/19
606	AT	P-142-141/13'>eos	7/30/19	9:47	1x1	N/A	JG	P/RM	8/10/19
607	AT	P-139-141-142	7/30/19	9:40	2x2	N/A	CS	P/RM	8/10/19
608	SI	P-126/4'>old liner/31'>P-127	8/16/19	2:10	1x1	N/A	UG	P/UG	8/16/19
609	AT	P-143-142/12'>eos	3/13/02	10:56	1x1	N/A	FL	P/RM	3/20/02
610	SI	P-54/22'>tos/1'>P-159	8/16/19	10:46	1x1	N/A	UG	P/UG	8/16/19
611	DD	P-181/5'>anchor/18'>P-182	8/16/19	5:30	1x1	N/A	JM	P/UG	8/16/19
612	DD	P-181/15'>P-182/12'>P-186	8/16/19	5:33	1x1	N/A	JM	P/UG	8/16/19
613	DD	P-181/119'>P-182/12'>P-186	8/16/19	5:32	1x1	N/A	JM	P/UG	8/16/19
614	EXT	P-181-182-183-185	8/16/19	2:20	13x119	M9	JS	P/UG	8/16/19
615	BO	P-181-182-R-614	8/16/19	5:50	1x1	N/A	CL	P/UG	8/16/19
616	SI	P-181/4'>anchor/8'>P-185	8/16/19	5:10	1x1	N/A	HG	P/UG	8/16/19
617	DD	R-614/4'>P-181/15'>P-182	8/16/19	3:50	1x1	N/A	JM	P/UG	8/16/19
618	BT	P-181-R-614/20'>bos	8/16/19	3:30	12x12	N/A	JM	P/UG	8/16/19
619	AT	P-64-R-415/9'>bos	8/28/19	11:15	1x1	N/A	CL	P/OO	8/28/19
620	AT	P-67-R-415/14'>eos	8/28/19	1:01	1x1	N/A	CL	P/AA	8/28/19
621	AT	P-67-R-415/7'>eos	8/28/19	12:52	1x1	N/A	CL	P/AA	8/28/19
622	SI	P-185/2'>P-169/15'>anchor	8/16/19	5:14	1x1	N/A	JM	P/UG	8/16/19
623	SI	P-181/5'>anchor/18'>P-182	8/16/19	5:21	1x1	N/A	JM	P/UG	8/16/19
624	BO	P-181-R-618/4'>R-614	8/16/19	5:38	1x1	N/A	JM	P/UG	8/16/19
625	BO	P-18-R-614/17'>P-182	8/16/19	3:35	1x1	N/A	JM	P/UG	8/16/19
626	BO	P-172-183/33'>bos	8/16/19	5:42	1x1	N/A	CL	P/UG	8/16/19
627	BO	P-172-184/4'>tos	8/16/19	5:50	1x1	N/A	FL	P/UG	8/16/19
628	BO	R-618-R-614	8/16/19	5:55	1x1	N/A	JS	P/UG	8/16/19
629	BO	R-618-R-614	8/16/19	6:00	1x1	N/A	JS	P/UG	8/16/19
630	BO	R-618-R-614	8/16/19	5:58	1x1	N/A	JS	P/UG	8/16/19

GAI Consultants, Inc.

Repair Log

Project Name: Amos LF - Sequence 4
Start Date
Project Location: Putnam County, WV

Material: PVC
Thickness: 30 mil

Repair #	Defect Code	Defect Location / Seam #	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test(1) P/F	Vacuum Test(1) Date
631	AT	P-183-184/20'>bos	8/16/19	6:10	1x1	N/A	JS	P/UG	8/16/19
632	BO	P-171-R-614/23'>P-183	8/16/19	6:00	1x1	N/A	RM	P/UG	8/16/19
633	BO	P-7A 7'>BOS	8/19/19	2:40	1x2	N/A	OO	P/OO	8/27/19
634	BO	P-7B 17'>BOS	8/19/19	3:38	1x7	N/A	OO	P/OO	8/27/19
635	BO	P-7A 45'>BOS	8/19/19	2:40	1x1	N/A	CEO	P/OO	8/27/19
636	BO	P-7B 57'>BOS	8/19/19	4:20	1x8	N/A	CE	P/OO	8/27/19
637	BO	P-7B 77'>BOS	8/19/19	4:05	1x2	N/A	OO	P/OO	8/27/19
638	BO	P-7A 77'BOS	8/19/19	4:10	1x1	N/A	OO	P/OO	8/27/19
639	BO	P-7A 80'>BOS	8/19/19	4:32	1x2	N/A	OO	P/OO	8/27/19
640	BO	P-7B 89'>BOS	8/19/19	4:35	1x1	N/A	CE	P/OO	8/27/19
641	BO	P-7B 99'>BOS	8/19/19	5:20	1x3	N/A	CE	P/OO	8/27/19
642	BO	P-7A 98'>BOS	8/19/19	4:50	1x1	N/A	CE	P/OO	8/27/19
643	BO	P-7B 111'>BOS	8/19/19	5:00	1X1	N/A	OO	P/OO	8/27/19
644	BO	P-7A 116'>BOS	8/19/19	5:06	1X1	N/A	OO	P/OO	8/27/19
645	BO	P-7A 122'>BOS	8/19/19	6:32	2x7	N/A	AL	P/OO	8/27/19
646	BO	P-7B 131'>BOS	8/19/19	6:03	1x1	N/A	CE	P/OO	8/27/19
647	BO	P-7A 133'>BOS	8/20/19	2:40	1x1	N/A	CE	P/OO	8/27/19
648	BO	P-7B 142'>BOS	8/20/19	2:30	1x6	N/A	CE	P/OO	8/27/19
649	BO	P-7A 143'>BOS	8/20/19	2:35	1X1	N/A	DS	P/OO	8/27/19
650	BO	P-7B 148'>BOS	8/20/19	2:55	1X4	N/A	JL	P/OO	8/27/19
651	BO	P-7B 154'>BOS	8/20/19	3:14	1x2	N/A	AA	P/OO	8/27/19
652	BO	P-7B 178'>BOS	8/20/19	4:12	2x6	N/A	JL	P/OO	8/27/19
653	BO	P-7A 177'>BOS	8/20/19	3:15	1x1	N/A	DS	P/OO	8/27/19
654	BO	P-7B 184'>BOS	8/20/19	3:35	1x1	N/A	AA	P/OO	8/27/19
655	BO	P-7A 186'>BOS	8/20/19	3:07	1x1	N/A	AL	P/OO	8/27/19
656	BO	P-7B 189'>BOS	8/20/19	3:29	1x2	N/A	AL	P/OO	8/27/19
657	BO	P-1A 215'>BOS	8/20/19	3:40	1x1	N/A	AL	P/OO	8/27/19
658	BO	P-1B 211'>BOS	8/20/19	4:00	1x2	N/A	CL	P/OO	8/27/19
659	BO	P-1B 218'>BOS	8/20/19	4:13	1x1	N/A	AA	P/OO	8/27/19
660	BO	P-1B 235'>BOS	8/20/19	4:11	1x1	N/A	CL	P/OO	8/27/19
661	BO	P-1B 252'>BOS	8/20/19	4:31	1x1	N/A	CL	P/OO	8/27/19
662	BO	P-1A 258'>BOS	8/20/19	6:24	2x4	N/A	DS	P/OO	8/27/19
663	BO	P-1B 259'>BOS	8/20/19	4:44	1x2	N/A	DS	P/OO	8/27/19
664	BO	P-1B 265'>BOS	8/20/19	6:02	2x6	N/A	CL	P/OO	8/27/19
665	BO	P-1B 283'>BOS	8/20/19	6:14	1x1	N/A	AA	P/OO	8/27/19
666	BO	P-1B 287'>BOS	8/20/19	5:50	2x3	N/A	AA	P/OO	8/27/19
667	BO	P-1A 295'>BOS	8/20/19	6:30	1x1	N/A	AA	P/OO	8/27/19
668	BO	P-1B 295'>BOS	8/20/19	6:31	1x1	N/A	CL	P/OO	8/27/19
669	BO	P-1A 301'>BOS	8/20/19	7:03	1x1	N/A	AA	P/OO	8/27/19
670	BO	P-1B 308'>BOS	8/20/19	7:03	1x2	N/A	DS	P/OO	8/27/19
671	BO	CAP-4 3'>P-1A	8/20/19	6:58	1x2	N/A	CL	P/OO	8/27/19
672	AT	P-39 5'>R-677	8/21/19	10:16	1x1	N/A	AL	P/OO	8/21/19

GAI Consultants, Inc.

Repair Log

Project Name: Amos LF - Sequence 4
Start Date
Project Location: Putnam County, WV

Material: PVC
Thickness: 30 mil

Repair #	Defect Code	Defect Location / Seam #	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test(1) P/F	Vacuum Test(1) Date
673	AT	P-39 9'>R-672	8/21/19	10:37	1x1	N/A	AL	P/OO	8/21/19
674	AT	P-39/40/cap	8/21/19	11:27	3x3	N/A	AA	P/OO	8/21/19
675	BO	P-39/40/CAP	8/21/19	10:42	1x2	N/A	AA	P/OO	8/21/19
676	AT	P-39/40/CAP	8/21/19	10:14	1x2	N/A	AA	P/OO	8/21/19
677	MD	P-39 4'>R-678	8/21/19	10:04	1x2	N/A	AL	P/OO	8/21/19
678	MD	P-39 4'>R-677	8/21/19	9:45	1x1	N/A	AL	P/OO	8/21/19
679	AT	P-40/41/127/128	8/21/19	11:47	3x9	N/A	AL	P/OO	8/21/19
680	AT	P-41/127/TIE IN	8/21/19	11:18	2x2	N/A	CE	P/OO	8/21/19
681	AT	P-41/127/TIE IN	8/21/19	1:00	2x5	N/A	CL	P/OO	8/21/19
682	BO	P-41/TIE IN 136'>BOS	8/21/19	12:57	1x2	N/A	JL	P/OO	8/21/19
683	BO	P-41/TIE IN 146'>BOS	8/21/19	11:30	1x1	N/A	JL	P/OO	8/21/19
684	BO	P-41/TIE IN155'>BOS	8/21/19	11:50	1x1	N/A	CE	P/OO	8/21/19
685	BO	P-41/TIE IN 179'>BOS	8/21/19	11:55	1x1	N/A	AL	P/OO	8/21/19
686	AT	P-19/41/TIE IN	8/21/19	1:40	1x2	N/A	CE	P/OO	8/21/19
687	AT	P-19B/41/CAP-9	8/21/19	1:28	2x4	N/A	AL	P/OO	8/21/19
688	MD	P-19B 2'>CAP-9	8/21/19	1:19	1x1	N/A	CL	P/OO	8/21/19
689	BO	P-19B 13'>BOS	8/21/19	1:42	1x2	N/A	CL	P/OO	8/21/19
690	BO	P-19A 14'>BOS	8/21/19	1:57	1x1	N/A	CL	P/OO	8/21/19
691	MD	P-19 4'>TIE IN	8/21/19	2:27	1x1	N/A	JL	P/OO	8/21/19
692	BO	P-19A/CAP-9 53'>BOS	8/21/19	3:32	1x1	N/A	FA	P/OO	8/21/19
693	BO	P-19A 62'>BOS	8/21/19	2:34	1x4	N/A	CL	P/OO	8/21/19
694	BO	P-19B/CAP-9 82'>BOS	8/21/19	1:57	1x1	N/A	AL	P/OO	8/21/19
695	AT	P-19/CAP-8/9	8/21/19	2:42	2x6	N/A	AL	P/OO	8/21/19
696	MD	P-19 5'>CAP-9	8/21/19	3:23	1x1	N/A	AL	P/OO	8/21/19
697	MD	P-19 3'>R-696	8/21/19	3:12	1x1	N/A	AL	P/OO	8/21/19
698	MD	P-142/143 10'>P-139	8/21/19	3:40	1x2	N/A	DS	P/OO	8/21/19
699	MD	P-142/143 14'>R-698	8/21/19	3:44	1x2	N/A	HG	P/OO	8/21/19
700	BO	P-41 199'>BOS	8/21/19	3:49	1x1	N/A	JL	P/OO	8/21/19
701	MD	OLD LINER 2'>P-19	8/21/19	3:17	2x2	N/A	JL	P/OO	8/21/19
702	MD	OLD LINER/TIE IN 2'>P-19	8/21/19	3:20	2x2	N/A	CL	P/OO	8/21/19
703	MD	P-19 13'>CAP-9	8/21/19	3:36	1x1	N/A	AL	P/OO	8/21/19
704	BO	P-19A/CAP-8 5'>BOS	8/21/19	2:57	1x1	N/A	AL	P/OO	8/21/19
705	MD	P-19 5'>CAP-8	8/21/19	3:56	1x1	N/A	AL	P/OO	8/21/19
706	BO	P-19B/CAP-8 61'>BOS	8/21/19	2:54	1x1	N/A	CL	P/OO	8/21/19
707	BO	P-7B/CAP1 32'>BOS	8/22/19	6:15	1x1	N/A	CL	P/OO	8/27/19
708	MD	CAP-1 2'>P-7A	826/19	3:30	1x1	N/A	CL	P/OO	8/27/19
709	BO	P-7A/CAP-1 72'>BOS	8/22/19	6:01	1x1	N/A	CL	P/OO	8/27/19
710	MD	OLD LINER 12'>P-7	8/26/19	7:55	1x1	N/A	CL	P/OO	8/27/19
711	CAP	P-7/TIE IN/ CAP-3	8/20/19	3:15	1x16	N/A	DS	P/OO	8/27/19
712	DS-32	P-1/CAP-3 246'>BOS	8/21/19	4:35	2x7	N/A	CL	P/OO	8/27/19
713	BO	P-1B/CAP-4 313'>BOS	8/22/19	5:17	1x1	N/A	CL	P/OO	8/27/19
714	BO	P-1B/CAP-4 326'>BOS	8/22/19	5:05	1x1	N/A	CL	P/OO	8/27/19

GAI Consultants, Inc.

Repair Log

Project Name: Amos LF - Sequence 4
Start Date
Project Location: Putnam County, WV

Material: PVC
Thickness: 30 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test[1]	
		Seam #						P/F	Date
715	BO	P-1B/CAP-4 332'>BOS	8/22/19	4:42	1x1	N/A	CL	P/OO	8/27/19
716	BO	P-1B/CAP-4 335'>BOS	8/22/19	4:35	1x1	N/A	CL	P/OO	8/27/19
717	BO	P-1B/CAP-4 349'>BOS	8/22/19	4:30	1x1	N/A	CL	P/OO	8/27/19
718	BO	P-1A/CAP-4 374'>BOS	8/26/19	2:25	1x1	N/A	CL	P/OO	8/27/19
719	CAP	P-1/CAP-4/CAP-5	8/22/19	2:22	1x1	N/A	CL	P/OO	8/27/19
720	MD	OLD LINER 2'>TIE IN	8/26/19	7:37	1x1	N/A	CL	P/OO	8/27/19
721	MD	OLD LINER/ TIE IN/ P-7	8/26/19	7:20	1x1	N/A	CL	P/OO	8/27/19
722	MD	OLD LINER/ 1'>TIE IN	8/26/19	7:10	1x1	N/A	CL	P/OO	8/27/19
723	MD	OLD LINER 11'>R-722	8/22/19	6:54	1x1	N/A	CL	P/OO	8/27/19
724	MD	OLD LINER1'TIE IN/P-7	8/22/19	6:45	1x1	N/A	CL	P/OO	8/27/19
725	MD	P-7 4'>OLD LINER	8/26/19	11:47	1x1	N/A	CL	P/OO	8/27/19
726	BO	P-1B/CAP-5 8'>BOS	8/22/19	1:26	1x1	N/A	CL	P/OO	8/27/19
727	BO	P-1B/CAP-5 22'>BOS	8/22/19	1:00	1x1	N/A	CL	P/OO	8/27/19
728	BO	P-1A/CAP-5 21'>BOS	8/26/19	2:37	1x1	N/A	CL	P/OO	8/27/19
729	BO	P-1B/CAP-5 48'>BOS	8/22/19	12:30	1x1	N/A	CL	P/OO	8/27/19
730	BO	P-1B/CAP-5 52'>BOS	8/22/19	12:00	2x4	N/A	CL	P/OO	8/27/19
731	BO	P-1B/CAP-5 59'>BOS	8/22/19	11:13	2x4	N/A	CL	P/OO	8/27/19
732	BO	P-13B/CAP-5 64'>BOS	8/22/19	10:33	1x3	N/A	CL	P/OO	8/27/19
733	BO	P-13A/CAP-5 67'>BOS	8/22/19	9:52	1x1	N/A	CL	P/OO	8/27/19
734	BO	P-13B/CAP-5 86'>BOS	8/27/19	7:34	1x3	N/A	CL	P/OO	8/27/19
735	BO	P-13B/CAP-5 111'>BOS	8/22/19	9:30	1x2	N/A	CL	P/OO	8/27/19
736	AT	P-13/CAP-4/5	8/22/19	9:35	2x5	N/A	CL	P/OO	8/27/19
737	BO	P-13B/CAP'6 16'>BOS	8/22/19	8:03	2x5	N/A	CL	P/OO	8/27/19
738	MD	CAP-6 2'>P-13A	8/21/19	5:45	1x1	N/A	CL	P/OO	8/27/19
739	BO	CAP-6 2'>P-13A	8/21/19	5:59	1x1	N/A	CL	P/OO	8/27/19
740	BO	P-13A/CAP-6 110'>BOS	8/22/19	4:55	1x1	N/A	HG	P/OO	8/27/19
741	AT	P-13/CAP-6/ CAP-7	8/22/19	4:40	4x3	N/A	HG	P/OO	8/27/19
742	BO	P-13B/CAP-7 93'>BOS	8/26/19	9:32	1x1	N/A	HG	P/OO	8/27/19
743	MD	P-13 4'>P-19	8/27/19	11:55	1x1	N/A	OO	P/OO	8/27/19
744	AT	P-19A/CAP-7/8	8/27/19	8:27	1x2	N/A	CL	P/OO	8/27/19
745	AT	P-19B/CAP-7/8	8/27/19	8:51	1x2	N/A	CL	P/OO	8/27/19
746	BO	P-19A/CAP-8 75'>BOS	8/27/19	7:50	1x1	N/A	CL	P/OO	8/27/19
747	MD	P-54 4'>P-159	8/22/19	11:23	1x1	N/A	HG	P/HG	8/22/19
748	C	P-7/OLD LINER/TIE IN	8/27/19	2:20	2x29	N/A	CL	P/AA	8/27/19
749	BO	P-121 12'>TIE IN/P-112	7/29/19	8:33	2x2	N/A	JS	P/MS	7/29/19
750	AT	P-111/112/TIE IN	7/27/19	5:32	2x4	N/A	FL	P/MS	7/29/19
751	MD	P-124 10'>P-123	8/28/19	12:30	1x1	N/A	CL	P/AA	8/28/19
752	BO	P-126 4'>R-408	8/28/19	2:23	1x1	N/A	CL	P/CL	8/28/19

Appendix C - IV

Sequence 4 PVC Geomembrane Liner Air Lance Test Reports

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box (1)					
										PSI		Time		Tech	Date (2)
										Start	Finish	Start	Finish		
5/16/19	P-1-2	1:00	RM	M9	800	900	W-bos	11'>bos	11					MH	5/16/19
5/16/19	P-1-2	1:00	RM	M9	800	900	11	EOS	264					MH	5/16/19
5/16/19	P-2-3	2:09	RM	M9	800	900	W-bos	EOS	275					MH	5/16/19
5/16/19	P-3-4	3:09	RM	M9	800	900	W-bos	EOS	275					MH	5/16/19
5/16/19	P-4-5	4:02	RM	M9	800	900	W-bos	EOS	275					MH	5/16/19
5/16/19	P-5-6	4:40	RM	M9	800	900	W-bos	EOS	275					MH	5/16/19
5/20/19	P-7-8	1:52	RM	M9	800	900	W-bos	EOS	265					JS	5/20/19
5/20/19	P-8-9	2:26	RM	M9	800	900	W-bos	EOS	247					JS	5/20/19
5/20/19	P-9-11	3:12	RM	M9	800	900	W-bos	35'>bos	35					JS	5/20/19
5/20/19	P-9-11	3:16	RM	M9	800	900	35'>bos	206'>bos	171					JS	5/20/19
5/20/19	P-9-11	3:30	RM	M9	800	900	206'>bos	EOS	18					JS	5/20/19
5/20/19	P-7-10	4:21	RM	M9	800	900	W-bos	EOS	54					JS	5/20/19
5/20/19	P-10-12	3:50	RM	M9	800	900	S-bos	9'>bps	9					JS	5/20/19
5/20/19	P-10-12	3:51	RM	M9	800	900	9'>bps	EOS	11					JS	5/20/19
5/20/19	P-7-12	4:30	RM	M9	800	900	W-bos	55'>bps	55					JS	5/20/19
5/20/19	P-7-12	4:45	RM	M9	800	900	55'>bos	EOS	10					JS	5/20/19
5/20/19	P-7-R-1	4:02	RM	M9	800	900	W-bos	EOS	45					JS	5/20/19
5/20/19	P-12-R-1	4:49	RM	M9	800	900	S-bos	EOS	9					JS	5/20/19
5/21/19	P-13-14	10:30	RM	M9	800	900	W-bos	EOS	56					JS	5/22/19
5/21/19	P-13-15	10:40	RM	M9	800	900	W-bos	EOS	152					JS	5/22/19
5/21/19	P-14-15	10:20	RM	M9	800	900	BOS	EOS	55.5					JS	5/22/19
5/21/19	P-14-16	11:20	RM	M9	800	900	W-bos	EOS	56					JS	5/22/19
5/21/19	P-15-16	11:28	RM	M9	800	900	W-bos	EOS	56					JS	5/22/19
5/21/19	P-15-17	11:40	RM	M9	800	900	W-bos	EOS	99					JS	5/22/19
5/21/19	P-16-17	11:11	RM	M9	800	900	BOS	EOS	55.5					JS	5/22/19
5/21/19	P-16-18	12:27	RM	M9	800	900	W-bos	EOS	105					JS	5/22/19
5/21/19	P-17-18	12:40	RM	M9	800	900	W-bos	EOS	66					JS	5/22/19
5/20/19	P-4-11	5:34	RM	M9	800	900	BOS	EOS	52					JS	5/22/19
5/20/19	P-3-11	5:40	RM	M9	800	900	BOS	EOS	3					JS	5/22/19
5/20/19	P-3-9	5:41	RM	M9	800	900	BOS	EOS	52					JS	5/22/19
5/20/19	P-3-8	5:50	RM	M9	800	900	BOS	EOS	3					JS	5/22/19
5/20/19	P-2-8	5:51	RM	M9	800	900	BOS	EOS	52					JS	5/22/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box (1)					
										PSI		Time		Tech	Date (2)
										Start	Finish	Start	Finish		
5/20/19	P-1-8	6:00	RM	M9	800	900	BOS	EOS	3					JS	5/22/19
5/20/19	P-1-7	6:01	RM	M9	800	900	BOS	EOS	52					JS	5/22/19
5/21/19	P-4-18	12:58	RM	M9	800	900	BOS	EOS	50					JS	5/22/19
5/21/19	P-4-16	12:59	RM	M9	800	900	BOS	EOS	3					JS	5/22/19
5/21/19	P-3-16	1:00	RM	M9	800	900	BOS	EOS	52					JS	5/22/19
5/21/19	P-3-14	1:10	RM	M9	800	900	BOS	EOS	3					JS	5/22/19
5/21/19	P-2-14	1:11	RM	M9	800	900	BOS	EOS	52					JS	5/22/19
5/21/19	P-2-13	1:18	RM	M9	800	900	BOS	EOS	3					JS	5/22/19
5/21/19	P-1-13	1:19	RM	M9	800	900	BOS	EOS	52					JS	5/22/19
5/21/19	P-19-20	3:22	RM	M9	800	900	W-bos	EOS	265					JS	5/22/19
5/21/19	P-20-21	4:45	RM	M9	800	900	W-bos	EOS	265					JS	5/22/19
5/21/19	P-21-22	5:53	RM	M9	800	900	W-bos	EOS	265					JS	5/22/19
5/22/19	P-22-23	9:00	RM	M9	860	800	W-bos	4'>bos	4					JS	5/22/19
5/22/19	P-22-23	9:00	RM	M9	860	800	4'>bos	EOS	226					JS	5/22/19
5/22/19	P-18-24	9:43	RM	M9	860	800	W-bos	EOS	108					JS	5/24/19
5/22/19	P-18-23	10:15	RM	M9	860	800	W-bos	EOS	48					JS	5/24/19
5/22/19	P-22-23	5:30	RM	M9	860	800	BOS	EOS	55.5					JS	5/24/19
5/22/19	P-23-24	9:00	RM	M9	860	800	BOS	EOS	55.5					JS	5/24/19
5/22/19	P-24-25	9:15	RM	M9	860	800	W-bos	EOS	78					JS	5/24/19
5/22/19	P-24-26	10:49	RM	M9	860	800	W-bos	EOS	21					JS	5/24/19
5/22/19	P-23-26	10:58	RM	M9	860	800	W-bos	EOS	250					JS	5/24/19
5/22/19	P-25-26	10:33	RM	M9	860	800	BOS	EOS	55.5					JS	5/24/19
5/22/19	P-25-27	12:52	RM	M9	860	800	W-bos	EOS	62					JS	5/24/19
5/22/19	P-26-27	1:02	RM	M9	860	800	W-bos	64'>bos	64					JS	5/24/19
5/22/19	P-26-27	1:10	RM	M9	860	800	64'>bos	EOS	149					JS	5/24/19
5/22/19	P-17-22	5:41	RM	M9	860	800	BOS	EOS	38					JS	5/24/19
5/21/19	P-17-21	4:26	RM	M9	860	800	BOS	EOS	55.5					JS	5/24/19
5/21/19	P-15-20	3:09	RM	M9	860	800	BOS	EOS	55.5					JS	5/24/19
5/21/19	P-15-19	2:20	RM	M9	860	800	W-bos	EOS	4					JS	5/24/19
5/21/19	P-13-19	2:15	RM	M9	860	800	BOS	EOS	55.5					JS	5/24/19
5/23/19	P-27-28	7:30	RM	M9	860	800	W-bos	EOS	258					JS	5/24/19
5/23/19	P-28-29	8:15	RM	M9	860	800	W-bos	EOS	52					JS	5/24/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box [1]					
										PSI		Time		Tech	Date [2]
										Start	Finish	Start	Finish		
5/23/19	P-24-5	8:20	RM	M9	860	800	BOS	EOS	3					JS	5/24/19
5/23/19	P-24-6	8:21	RM	M9	860	800	BOS	EOS	52					JS	5/24/19
5/23/19	P-25-6	8:27	RM	M9	860	800	BOS	EOS	3					JS	5/24/19
5/23/19	P-25-30	8:31	RM	M9	860	800	BOS	EOS	14					JS	5/24/19
5/24/19	P-27-30	10:00	RM	M9	860	800	BOS	EOS	52					JS	5/24/19
5/23/19	P-6-30	10:29	RM	M9	860	800	W-bos	EOS	237					JS	5/24/19
5/23/19	P-6-30	10:29	RM	M9	860	800	237'>bos	EOS	24					JS	5/24/19
5/24/19	P-10-Ti-in	9:13	RM	M9	860	800	W-bos	EOS	57					RM	5/25/19
5/24/19	P-12-Ti-in	9:13	RM	M9	860	800	W-bos	40'>bos	40					RM	5/25/19
5/24/19	P-12-Ti-in	9:13	RM	M9	860	800	40'>bos	48'>bos	8					RM	5/25/19
5/24/19	P-12-Ti-in	9:13	RM	M9	860	800	48'>bos	EOS	9					RM	5/25/19
5/24/19	P-7-Ti-in	9:13	RM	M9	860	800	W-bos	18'>bos	18					RM	5/25/19
5/24/19	P-7-Ti-in	9:13	RM	M9	860	800	18'ibos	24'>bos	6					RM	5/25/19
5/24/19	P-7-Ti-in	9:13	RM	M9	860	800	24'>bos	63'>bos	39					RM	5/25/19
5/24/19	P-7-Ti-in	9:13	RM	M9	860	800	63'>bos	EOS	105					RM	5/25/19
5/24/19	P-1-Ti-in	10:15	RM	M9	860	800	W-bos	12'>bos	12					RM	5/25/19
5/24/19	P-1-Ti-in	11:00	RM	M9	860	800	12'>bos	88'>bos	86					RM	5/25/19
5/24/19	P-1-Ti-in	11:24	RM	M9	860	800	88'>bos	212'ibos	124					RM	5/25/19
5/24/19	P-13-Ti-in	11:35	RM	M9	860	800	212'>bos	EOS	45					RM	5/25/19
5/24/19	P-13-Ti-in	11:44	RM	M9	860	800	W-bos	55'>bps	55					RM	5/25/19
5/24/19	P-13-Ti-in	11:50	RM	M9	860	800	55'>bos	136'>bod	81					RM	5/25/19
5/24/19	P-13-Ti-in	12:30	RM	M9	860	800	136'>bos	EOS	81					RM	5/25/19
5/24/19	P-19-Ti-in	1:00	RM	M9	860	800	W-bos	70'>bos	70					RM	5/25/19
5/24/19	P-19-Ti-in	1:00	RM	M9	860	800	70'>bos	EOS	203					RM	5/25/19
5/29/19	P-31-32	9:59	RM	M9	860	800	W-bos	EOS	100					RM	6/6/19
5/29/19	P-31-33	10:00	RM	M9	860	800	W-bos	EOS	67					RM	6/6/19
5/29/19	P-32-33	8:53	RM	M9	860	800	W-bos	EOS	55.5					RM	6/6/19
5/29/19	P-32-34	10:09	RM	M9	860	800	W-bos	EOS	111					RM	6/6/19
5/29/19	P-34-35	11:40	RM	M9	860	800	W-bos	EOS	126					RM	6/6/19
5/29/19	P-29-31	8:35	RM	M9	860	800	BOS	EOS	55					RM	6/6/19
5/29/19	P-29-32	9:47	RM	M9	860	800	BOS	EOS	12					RM	6/6/19
5/29/19	P-28-32	9:26	RM	M9	860	800	BOS	EOS	55					RM	6/6/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box [1]					
										PSI		Time		Tech	Date [2]
										Start	Finish	Start	Finish		
5/29/19	P-27-34	10:32	RM	M9	860	800	BOS	EOS	55					RM	6/6/19
5/29/19	P-26-35	11:33	RM	M9	860	800	BOS	EOS	67					RM	6/6/19
5/29/19	P-26-35	11:50	RM	M9	860	800	BOS	EOS	54					RM	6/6/19
6/4/19	P-35-42-43	12:15	AK	M47	850	650	BOS	EOS	56					RM	6/6/19
6/4/19	42-47	11:28	AK	M47	850	650	BOS	EOS	30					RM	6/6/19
6/4/19	P-35-36	9:21	RM	M9	860	800	BOS	EOS	122					RM	6/6/19
6/4/19	P-36-37	10:18	RM	M9	860	800	BOS	EOS	136					RM	6/6/19
6/4/19	P-37-38	10:25	RM	M9	860	800	BOS	EOS	69					RM	6/6/19
6/4/19	P-38-39	10:43	RM	M9	860	800	BOS	EOS	112					RM	6/6/19
6/4/19	P-39-40	10:58	RM	M9	860	800	BOS	EOS	84					RM	6/6/19
6/4/19	P-40-41	11:05	RM	M9	860	800	W-bos	EOS	74					RM	6/6/19
6/4/19	P-42-43	9:15	AK	M47	860	800	W-bos	EOS	42					RM	6/6/19
6/4/19	P-42-36	9:30	AK	M47	860	800	W-bos	EOS	14					RM	6/6/19
6/4/19	P-42-37	9:35	AK	M47	860	800	W-bos	EOS	28					RM	6/6/19
6/4/19	P-11-44	3:03	RM	M9	860	800	W-bos	203'>bos	203					RM	6/6/19
6/4/19	P-11-44	3:03	RM	M9	860	800	203'>bos	EOS	7					RM	6/6/19
6/4/19	P-44-45	3:23	RM	M9	860	800	W-bos	82'>bos	82					RM	6/6/19
6/4/19	P-44-45	3:23	RM	M9	860	800	82'>bos	EOS	107					RM	6/6/19
6/4/19	P-45-47	4:02	RM	M9	860	800	W-bos	EOS	106					RM	6/6/19
6/4/19	P-45-46	4:20	RM	M9	860	800	W-bos	EOS	57					RM	6/6/19
6/4/19	P-45-53	2:45	RM	M9	860	800	BOS	EOS	53					RM	6/6/19
6/4/19	P-46-53	4:28	RM	M9	860	800	W-bos	EOS	8					RM	6/6/19
6/4/19	P-46-47	3:54	RM	M9	860	800	BOS	EOS	53					RM	6/6/19
6/4/19	P-50-47	5:39	RM	M9	860	800	W-bos	EOS	30					RM	6/6/19
6/4/19	P-47-49	5:41	RM	M9	860	800	W-bos	EOS	41					RM	6/6/19
6/4/19	P-46-49	5:50	RM	M9	860	800	W-bos	EOS	55					RM	6/6/19
6/4/19	P-46-48	5:55	RM	M9	860	800	W-bos	EOS	15					RM	6/6/19
6/4/19	P-49-50	5:30	AK	M47	80	600	BOS	EOS	14					RM	6/6/19
6/4/19	P-30-46	4:39	RM	M9	860	800	BOS	EOS	52					RM	6/6/19
6/4/19	P-6-46	4:43	RM	M9	860	800	BOS	EOS	3					RM	6/6/19
6/4/19	P-6-53	4:45	RM	M9	860	800	BOS	EOS	50					RM	6/6/19
6/4/19	P-5-53	4:49	RM	M9	860	800	BOS	EOS	3					RM	6/6/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box (1)					
										PSI		Time		Tech	Date (2)
										Start	Finish	Start	Finish		
6/4/19	P-5-44	4:50	RM	M9	860	800	BOS	EOS	52					RM	6/6/19
6/4/19	P-4-44	4:55	RM	M9	860	800	BOS	EOS	5					RM	6/6/19
6/4/19	P-48-49	5:14	RM	M9	860	800	BOS	EOS	51					RM	6/6/19
6/4/19	P-30-48	6:00	RM	M9	860	800	W-bos	EOS	122					RM	6/6/19
6/4/19	P-28-48	6:54	RM	M9	860	800	BOS	EOS	3					RM	6/6/19
6/4/19	P-29-48	6:48	RM	M9	860	800	BOS	EOS	48					RM	6/6/19
6/4/19	P-28-51	6:47	RM	M9	860	800	BOS	EOS	6					RM	6/6/19
6/4/19	P-29-51	6:41	RM	M9	860	800	BOS	EOS	49					RM	6/6/19
6/4/19	P-48-51	6:43	AK	M47	80	600	W-bos	EOS	275					RM	6/6/19
6/4/19	P-49-52	6:39	AK	M47	80	600	W-bos	EOS	18					RM	6/6/19
6/4/19	P-51-52	6:30	AK	M47	80	600	BOS	EOS	14					RM	6/6/19
6/4/19	P-34-43	10:00	AK	M47	800	600	BOS	EOS	52					RM	6/6/19
6/4/19	P-35-43	10:05	AK	M47	80	600	W-bos	EOS	12					RM	6/6/19
6/4/19	P-35/42	10:07	AK	M47	80	600	BOS	EOS	46					RM	6/6/19
6/4/19	P-23-36	8:49	RM	M9	860	600	BOS	EOS	49					RM	6/6/19
6/4/19	P-22-36	8:53	RM	M9	860	600	BOS	EOS	6					RM	6/6/19
6/4/19	P-22-36	10:18	RM	M9	860	600	W-bos	EOS	54					RM	6/6/19
6/4/19	P-22-38	10:30	RM	M9	860	600	BOS	EOS	48					RM	6/6/19
6/4/19	P-21-38	10:33	RM	M9	860	600	W-bos	EOS	42					RM	6/6/19
6/4/19	P-21-39	11:45	RM	M9	860	600	BOS	EOS	48					RM	6/6/19
6/4/19	P-20-39	11:50	RM	M9	860	600	BOS	EOS	7					RM	6/6/19
6/4/19	P-20-40	11:52	RM	M9	860	600	BOS	EOS	49					RM	6/6/19
6/4/19	P-19-40	11:55	RM	M9	860	600	BOS	EOS	3					RM	6/6/19
6/4/19	P-19-41	11:56	RM	M9	860	600	BOS	EOS	51					RM	6/6/19
6/11/19	P-51A-51	1:58	RM	M9	860	600	BOS	EOS	53					RM	6/12/19
6/11/19	P-52-49	1:10	RM	M9	860	600	W-bos	EOS	25					RM	6/12/19
6/11/19	P-52-48	1:12	RM	M9	860	600	BOS	EOS	11					RM	6/12/19
6/11/19	P-48-51	1:15	RM	M9	860	600	W-bos	63'>bos	63					RM	6/12/19
6/11/19	P-48-51	1:15	RM	M9	860	600	63'>bos	125'>bos	62					RM	6/12/19
6/11/19	P-48-51	1:15	RM	M9	860	600	125'>bos	185'>bos	60					RM	6/12/19
6/11/19	P-48-51	1:15	RM	M9	860	600	185'>bos	EOS	70					RM	6/12/19
6/12/19	P-54-55	3:26	RM	M9	860	800	N-BOS	10'>bos	10					RM	6/13/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box (1)					
										PSI		Time		Tech	Date (2)
										Start	Finish	Start	Finish		
6/12/19	P-54-55	3:28	RM	M9	860	800	10'>bos	EOS	241					RM	6/13/19
6/12/19	P-55-57	4:03	RM	M9	860	800	BOS	EOS	32					RM	6/13/19
6/12/19	P-54-57	3:50	RM	M9	860	800	N-BOS	EOS	30					RM	6/13/19
6/12/19	P-55-57	4:20	RM	M9	860	800	N-BOS	EOS	249					RM	6/13/19
6/12/19	P-56-58	4:59	RM	M9	860	800	N-BOS	EOS	128					RM	6/13/19
6/12/19	P-58-59	5:10	RM	M9	860	800	N-BOS	EOS	102					RM	6/13/19
6/12/19	P-59-61	5:57	RM	M9	860	800	N-BOS	EOS	12					RM	6/13/19
6/12/19	P-60-59	6:00	RM	M9	860	800	N-BOS	EOS	59					RM	6/13/19
6/12/19	P-60-61	5:47	RM	M9	860	800	W-bos	EOS	29					RM	6/13/19
6/12/19	P-59-62	5:45	RM	M9	860	800	N-BOS	EOS	13					RM	6/13/19
6/12/19	P-60-62	5:40	RM	M9	860	800	N-BOS	EOS	13					RM	6/13/19
6/12/19	P-51-60	7:59	RM	M9	860	800	W-bos	71'>bos	71					RM	6/13/19
6/12/19	P-51-60	8:09	RM	M9	860	800	71'>bos	EOS	86					RM	6/13/19
6/12/19	P-60-51A	8:15	RM	M9	860	800	W-bos	EOS	7					RM	6/13/19
6/12/19	P-29-60	8:16	RM	M9	860	800	W-bos	14'>bos	14					RM	6/13/19
6/12/19	P-29-60	8:16	RM	M9	860	800	14'>bos	EOS	13					RM	6/13/19
6/12/19	P-29-62	8:18	RM	M9	860	800	W-bos	EOS	9					RM	6/13/19
6/12/19	P-33-57	6:37	RM	M9	860	800	S-BOS	EOS	44					RM	6/13/19
6/12/19	P-32-57	6:41	RM	M9	860	800	S-BOS	EOS	13					RM	6/13/19
6/12/19	P-55'32	6:45	RM	M9	860	800	S-BOS	EOS	29					RM	6/13/19
6/12/19	P-56-32	6:50	RM	M9	860	800	S-BOS	EOS	69					RM	6/13/19
6/12/19	P-28-56	7:00	RM	M9	860	800	S-BOS	EOS	22					RM	6/13/19
6/12/19	P-56-29	7:08	RM	M9	860	800	S-BOS	EOS	78					RM	6/13/19
6/12/19	P-29-58	7:22	RM	M9	860	800	S-BOS	EOS	74					RM	6/13/19
6/12/19	P-29-59	7:35	RM	M9	860	800	S-BOS	EOS	69					RM	6/13/19
6/29/19	P-63-64	9:35	RM	M9	860	800	S-BOS	EOS	265					DP	7/1/19
6/29/19	P-64-65	10:12	RM	M9	860	800	N-BOS	117'>bos	117					DP	7/1/19
6/29/19	P-64-65	10:20	RM	M9	860	800	117'>bos	EOS	25					DP	7/1/19
6/29/19	P-64-65	10:48	RM	M9	860	800	S-BOS	EOS	111					DP	7/1/19
6/29/19	P-65-66	11:22	RM	M9	860	800	S-BOS	EOS	89					DP	7/1/19
6/29/19	P-65-66	11:30	RM	M9	860	800	N-BOS	EOS	30					DP	7/1/19
6/29/19	P-65-66	11:40	RM	M9	860	800	S-BOS	EOS	138					DP	7/1/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box [1]					
										PSI		Time		Tech	Date [2]
										Start	Finish	Start	Finish		
6/29/19	P-66-67	12:40	RM	M9	860	800	S-BOS	EOS	163					DP	7/1/19
6/29/19	P-66-67	2:12	RM	M9	860	800	N-BOS	EOS	33					DP	7/1/19
6/29/19	P-66-67	2:22	RM	M9	860	800	S-BOS	EOS	56					DP	7/1/19
6/29/19	P-67-68	1:21	RM	M9	860	800	S-BOS	EOS	154					DP	7/1/19
6/29/19	P-68-69	3:00	RM	M9	860	800	S-BOS	EOS	94					DP	7/1/19
6/29/19	P-70-71	4:00	RM	M9	860	800	E-BOS	22'>bos	22					DP	7/1/19
6/29/19	P-70-71	4:03	RM	M9	860	800	22'>bos	EOS	244					DP	7/1/19
6/29/19	P-71-69	5:28	RM	M9	860	800	W-BOS	EOS	76					DP	7/1/19
6/29/19	P-71-68	5:35	RM	M9	860	800	W-bos	EOS	74					DP	7/1/19
6/29/19	P-71-67	5:43	RM	M9	860	800	W-bos	EOS	33					DP	7/1/19
6/29/19	P-71-67	5:15	RM	M9	860	800	S-BOS	EOS	44					DP	7/1/19
6/29/19	P-70-67	5:11	RM	M9	860	800	S-BOS	EOS	20					DP	7/1/19
7/10/19	P-63-72	8:20	RM	M9	860	800	N-BOS	39'>bos	39					JS	7/15/19
7/10/19	P-63-72	8:25	RM	M9	860	800	39'>bos	EOS	223					JS	7/15/19
7/10/19	P-72-73	9:15	RM	M9	860	800	N-BOS	85'>bos	85					JS	7/15/19
7/10/19	P-72-73	9:22	RM	M9	860	800	85'>bos	EOS	183					JS	7/15/19
7/10/19	P-73-74	10:05	RM	M9	860	800	N-BOS	EOS	271					JS	7/15/19
7/10/19	P-74-75	11:20	RM	M9	860	800	N-BOS	59'>bos	59					JS	7/15/19
7/10/19	P-74-75	11:28	RM	M9	860	800	59'>bos	184'>boa	125					JS	7/15/19
7/10/19	P-74-75	11:40	RM	M9	860	800	184'>boa	248'>bos	64					JS	7/15/19
7/10/19	P-74-75	11:48	RM	M9	860	800	248'>bos	EOS	19					JS	7/15/19
7/10/19	P-75-76	1:05	RM	M9	860	800	N-BOS	225'>bos	225					JS	7/15/19
7/10/19	P-75-76	1:30	RM	M9	860	800	225'>bos	EOS	47					JS	7/15/19
7/10/19	P-76-77	4:00	RM	M9	860	800	N-BOS	EOS	260					JS	7/15/19
7/10/19	P-77-78	5:04	RM	M9	860	800	N-BOS	EOS	255					JS	7/15/19
7/13/19	P-78-79	10:13	RM	M9	860	800	N-BOS	EOS	207					JS	7/15/19
7/13/19	P-79-80	10:52	RM	M9	860	800	N-BOS	80'>bos	80					JS	7/15/19
7/13/19	P-79-80	10:57	RM	M9	860	800	80'>bos	101'>bos	21					JS	7/15/19
7/13/19	P-79-80	11:02	RM	M9	860	800	101'ibos	EOS	80					JS	7/15/19
7/13/19	P-80-81	7:45	RM	M9	860	800	S-BOS	EOS	101					JS	7/15/19
7/13/19	P-85-86	10:00	RM	M9	860	800	S-BOS	EOS	19					JS	7/15/19
7/13/19	P-86-84	10:02	HG	M42	860	450	W-bos	EOS	23					JS	7/15/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box (1)					
										PSI		Time		Tech	Date (2)
										Start	Finish	Start	Finish		
7/13/19	P-84-86	9:58	HG	M42	860	450	W-bos	11'>boa	11					JS	7/15/19
7/13/19	P-84-86	9:59	HG	M42	860	450	11'>bos	EOS	50					JS	7/15/19
7/13/19	P-83-84	10:20	RM	M9	860	800	W-bos	EOS	188					JS	7/15/19
7/13/19	P-82-83	8:57	RM	M9	860	800	W-BOS	82'>bos	82					JS	7/15/19
7/13/19	P-82-83	9:06	RM	M9	860	800	82'>bos	EOS	181					JS	7/15/19
7/14/19	P-79-83	12:57	RM	M9	860	800	N-BOS	EOS	37					JS	7/15/19
7/14/19	P-80-83	1:02	RM	M9	860	800	N-BOS	EOS	24					JS	7/15/19
7/14/19	P-80-84	1:06	RM	M9	860	800	N-BOS	20'>bos	20					JS	7/15/19
7/14/19	P-80-84	1:09	RM	M9	860	800	20'>bos	EOS	49					JS	7/15/19
7/14/19	P-81-84	1:13	RM	M9	860	800	N-BOS	EOS	24					JS	7/15/19
7/14/19	P-81-85	1:15	RM	M9	860	800	N-BOS	12'>bps	12					JS	7/15/19
7/14/19	P-81-85	1:17	RM	M9	860	800	12'>bos	65'>bos	53					JS	7/15/19
7/14/19	P-81-85	1:22	RM	M9	860	800	65'>bos	EOS	8					JS	7/15/19
7/13/19	P-82-87	11:31	RM	M9	860	800	E-BOS	151'>bos	151					JS	7/15/19
7/13/19	P-82-87	11:45	RM	M9	860	800	151'>bos	EOS	89					JS	7/15/19
7/13/19	P-87-88	1:00	RM	M9	860	800	E-BOS	64'>bps	64					JS	7/15/19
7/13/19	P-87-88	1:12	RM	M9	860	800	64'>bos	EOS	123					JS	7/15/19
7/13/19	P-88-89	2:06	RM	M9	860	800	E-BOS	EOS	65					JS	7/15/19
7/13/19	P-88-90	2:16	RM	M9	860	800	E-BOS	EOS	53					JS	7/15/19
7/13/19	P-89-90	1:35	RM	M9	860	800	BOS	EOS	49					JS	7/15/19
7/13/19	P-89-91	1:52	RM	M9	860	800	E-BOS	EOS	43					JS	7/15/19
7/13/19	P-95-97	5:20	RM	M9	860	800	N-BOS	9'>bos	9					JS	7/15/19
7/13/19	P-95-97	5:22	RM	M9	860	800	9'ibos	EOS	7					JS	7/15/19
7/13/19	P-91-97	5:27	RM	M9	860	800	N-BOS	EOS	13					JS	7/15/19
7/13/19	P-91-95	5:29	RM	M9	860	800	N-BOS	EOS	12					JS	7/15/19
7/13/19	P-89-96	5:32	RM	M9	860	800	N-BOS	EOS	9					JS	7/15/19
7/13/19	P-90-96	5:32	RM	M9	860	800	N-BOS	EOS	59					JS	7/15/19
7/13/19	P-90-94	5:39	RM	M9	860	800	N-BOS	EOS	13					JS	7/15/19
7/13/19	P-88-94	5:41	RM	M9	860	800	N-BOS	EOS	65					JS	7/15/19
7/13/19	P-88-93	5:50	RM	M9	860	800	N-BOS	EOS	16					JS	7/15/19
7/13/19	P-87-93	5:53	RM	M9	860	800	N-bos	8'>bos	8					JS	7/15/19
7/13/19	P-87-93	5:57	RM	M9	860	800	8'>bos	EOS	54					JS	7/15/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box (1)					
										PSI		Time		Tech	Date (2)
										Start	Finish	Start	Finish		
7/13/19	P-87-92	6:09	RM	M9	860	800	N-BOS	17'>bos	17					JS	7/15/19
7/13/19	P-87-92	6:15	RM	M9	860	800	17'>bos	EOS	37					JS	7/15/19
7/13/19	P-94-96	4:57	RM	M9	860	800	S-BOS	EOS	48					JM	7/27/19
7/13/19	P-94-95	5:09	RM	M9	860	800	S-BOS	EOS	47					JM	7/27/19
7/13/19	P-95-96	4:44	RM	M9	860	800	BOS	EOS	50					JM	7/27/19
7/13/19	P-93-94	4:14	RM	M9	860	800	S-bos	EOS	114					JM	7/27/19
7/13/19	P-92-93	3:12	RM	M9	860	800	N-BOS	82'>bos	82					JM	7/27/19
7/13/19	P-92-93	3:25	RM	M9	860	800	82'>bos	EOS	130					JM	7/27/19
7/13/19	P-92-98	6:28	RM	M9	860	800	N-BOS	EOS	249					JM	7/27/19
7/13/19	P-98-99	7:04	RM	M9	860	800	N-BOS	21'>bos	21					JM	7/27/19
7/13/19	P-98-99	7:08	RM	M9	860	800	21'>bos	EOS	228					JM	7/27/19
7/13/19	P-99-100	7:40	RM	M9	860	800	N-BOS	15'>bos	15					JM	7/27/19
7/13/19	P-99-100	7:42	RM	M9	860	800	15'>bos	EOS	248					JM	7/27/19
7/13/19	P-100-101	8:16	RM	M9	860	800	N-BOS	EOS	248					JM	7/27/19
7/14/19	P-101-102	10:28	RM	M9	860	800	N-BOS	181'>bos	181					JM	7/27/19
7/14/19	P-101-102	10:28	RM	M9	860	800	181'>bos	194'>bos	13					JM	7/27/19
7/14/19	P-101-102	10:28	RM	M9	860	800	194'>bos	EOS	52					JM	7/27/19
7/15/19	P-103-104	11:00	RM	M9	860	800	S-BOS	EOS	64					JM	7/27/19
7/15/19	P-75-104	10:40	RM	M9	860	800	W-bos	EOS	33					JM	7/27/19
7/15/19	P-76-104	10:48	RM	M9	860	800	W-bos	EOS	15					JM	7/27/19
7/15/19	P-76-103	10:55	RM	M9	860	800	W-bos	16'>bos	16					JM	7/27/19
7/15/19	P-76-103	11:01	RM	M9	860	800	16'>bos	EOS	37					JM	7/27/19
7/15/19	P-77-103	11:20	RM	M9	860	800	W-bos	EOS	55					JM	7/27/19
7/15/19	P-78-105	11:32	RM	M9	860	800	W-bos	EOS	55					JM	7/27/19
7/15/19	P-103-105	11:40	RM	M9	860	800	W-bos	EOS	19					JM	7/27/19
7/15/19	P-78-105	8:29	RM	M9	860	800	N-BOS	EOS	33					JM	7/27/19
7/15/19	P-79-105	8:15	RM	M9	860	800	W-bos	EOS	30					JM	7/27/19
7/15/19	P-105-83	12:00	RM	M9	860	800	N-BOS	EOS	27					JM	7/27/19
7/14/19	P-82-103	10:00	RM	M9	860	800	S-BOS	EOS	32					JM	7/27/19
7/14/19	P-92-103	10:15	RM	M9	860	800	E-BOS	EOS	24					JM	7/27/19
7/14/19	P-98-103	10:20	RM	M9	860	800	E-BOS	EOS	55					JM	7/27/19
7/14/19	P-99-103	10:30	RM	M9	860	800	E-BOS	EOS	55					JM	7/27/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box (1)					
										PSI		Time		Tech	Date (2)
										Start	Finish	Start	Finish		
7/14/19	P-100-103	10:39	RM	M9	860	800	E-BOS	EOS	55					JM	7/27/19
7/14/19	P-101-103	10:48	RM	M9	860	800	E-BOS	EOS	5					JM	7/27/19
7/14/19	P-101-104	10:58	RM	M9	860	800	E-BOS	EOS	50					JM	7/27/19
7/26/19	P-102-106	5:39	RM	M9	860	800	N-BOS	EOS	230					JM	7/27/19
7/26/19	P-106-107	9:53	RM	M9	860	800	N-BOS	EOS	225					JM	7/27/19
7/26/19	P-107-108	10:29	RM	M9	860	800	N-BOS	EOS	224					JM	7/27/19
7/26/19	P-108-109	11:28	RM	M9	860	800	N-BOS	EOS	230					JM	7/27/19
7/26/19	P-109-110	12:23	RM	M9	860	800	N-BOS	EOS	222					JM	7/27/19
7/26/19	P-110-111	1:48	RM	M9	860	800	N-BOS	EOS	196					JM	7/27/19
7/26/19	P-111-112	2:43	RM	M9	860	800	N-BOS	EOS	188					JM	7/27/19
7/26/19	P-112-113	3:29	RM	M9	860	800	N-BOS	EOS	190					JM	7/27/19
7/26/19	P-113-114	4:37	RM	M9	860	800	N-BOS	EOS	208					JM	7/27/19
7/27/19	P-115-120	11:30	JS	M9	860	800	E-BOS	EOS	122					JM	7/27/19
7/27/19	P-116-120	12:30	JS	M9	860	800	E-BOS	EOS	151					JM	7/27/19
7/27/19	P-119-120	12:15	JS	M9	860	800	BOS	EOS	22					JM	7/27/19
7/27/19	P-119-116	1:20	JS	M9	860	800	BOS	EOS	11					JM	7/27/19
7/27/19	P-116-117	1:05	JS	M9	860	800	BOS	19'>bos	19					JM	7/27/19
7/27/19	P-116-117	1:08	JS	M9	860	800	19'>bos	EOS	29					JM	7/27/19
7/27/19	P-117-119	1:10	JS	M9	860	800	W-bos	EOS	53					JM	7/27/19
7/27/19	P-117-118	10:35	JS	M9	860	800	BOS	9'>bos	9					JM	7/27/19
7/27/19	P-117-118	10:36	JS	M9	860	800	9'>bos	EOS	43					JM	7/27/19
7/27/19	P-118-119	10:58	JS	M9	860	800	W-bos	EOS	107					JM	7/27/19
7/27/19	P-119-122	2:18	JS	M9	860	800	BOS	EOS	12					JM	7/27/19
7/27/19	P-119-121	2:20	JS	M9	860	800	BOS	EOS	13					JM	7/27/19
7/27/19	P-118-121	2:22	JS	M9	860	800	BOS	EOS	43					JM	7/27/19
7/27/19	P-67-121	1:53	RM	M9	860	800	W-bos	EOS	46					JM	7/27/19
7/27/19	P-66-121	1:59	RM	M9	860	800	W-bos	10'>bos	10					JM	7/27/19
7/27/19	P-66-121	2:01	RM	M9	860	800	10'>bps	EOS	45					JM	7/27/19
7/27/19	P-65-121	2:05	RM	M9	860	800	W-bos	EOS	48					JM	7/27/19
7/27/19	P-65-118	2:12	RM	M9	860	800	S-BOS	14'>bos	14					JM	7/27/19
7/27/19	P-65-118	3:00	RM	M9	860	800	14'>bos	EOS	8					JM	7/27/19
7/27/19	P-64-118	3:05	RM	M9	860	800	W-bos	16'>bos	16					JM	7/27/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box [1]					
										PSI		Time		Tech	Date [2]
										Start	Finish	Start	Finish		
7/27/19	P-64-118	3:07	RM	M9	860	800	16'>bos	EOS	40					JM	7/27/19
7/27/19	P-63-118	3:15	RM	M9	860	800	W-bos	EOS	45					JM	7/27/19
7/27/19	P-63-117	3:24	RM	M9	860	800	W-bos	EOS	9					JM	7/27/19
7/27/19	P-72--117	3:26	RM	M9	860	800	W-bos	EOS	54					JM	7/27/19
7/27/19	P-73-117	3:38	RM	M9	860	800	W-bos	EOS	6					JM	7/27/19
7/27/19	P-73-116	1:05	RM	M9	860	800	W-bos	EOS	53					JM	7/27/19
7/27/19	P-74-116	1:19	RM	M9	860	800	W-bos	EOS	54					JM	7/27/19
7/27/19	P-75-116	1:32	RM	M9	860	800	W-bos	EOS	27					JM	7/27/19
7/27/19	P-104-116	1:40	RM	M9	860	800	BOS	EOS	32					JM	7/27/19
7/27/19	P-104-120	1:45	RM	M9	860	800	BOS	EOS	16					JM	7/27/19
7/27/19	P-104-115	1:47	RM	M9	860	800	BOS	EOS	27					JM	7/27/19
7/27/19	P-102-115	9:37	RM	M9	860	800	E-BOS	EOS	25					JM	7/27/19
7/27/19	P-107-115	9:40	RM	M9	860	800	E-BOS	EOS	100					JM	7/27/19
7/27/19	P-108-115	9:54	RM	M9	860	800	N-BOS	EOS	43					JM	7/27/19
7/27/19	P-120-108	11:40	RM	M9	860	800	E-BOS	EOS	19					JM	7/27/19
7/27/19	P-119-108	3:49	RM	M9	860	800	E-BOS	EOS	36					JM	7/27/19
7/27/19	P-119-109	3:54	RM	M9	860	800	E-BOS	EOS	55					JM	7/27/19
7/27/19	P-119-110	4:10	RM	M9	860	800	E-BOS	EOS	53					JM	7/27/19
7/27/19	P-119-111	4:23	RM	M9	860	800	E-BOS	EOS	25					JM	7/27/19
7/27/19	P-122-111	4:28	RM	M9	860	800	E-BOS	EOS	36					JM	7/27/19
7/27/19	P-122-112	4:36	RM	M9	860	800	E-BOS	EOS	57					JM	7/27/19
7/27/19	P-122-113	4:46	RM	M9	860	800	E-BOS	EOS	59					JM	7/27/19
7/27/19	P-127-old liner	10:00	RM	M9	860	800	W-bos	68'>bos	68					JM	8/3/19
7/27/19	P-127-old liner	11:00	RM	M9	860	800	68'>bos	EOS	54					JM	8/3/19
7/27/19	P-126-old liner	11:20	RM	M9	860	800	W-bos	46'>bos	46					JM	8/3/19
7/27/19	P-126-old liner	11:40	RM	M9	860	800	46'>bos	91'>bos	45					JM	8/3/19
7/27/19	P-126-old liner	11:55	RM	M9	860	800	91'>bos	170'>bos	79					JM	8/3/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box [1]					
										PSI		Time		Tech	Date [2]
										Start	Finish	Start	Finish		
7/27/19	P-126-old liner	12:05	RM	M9	860	800	170'>bos	EOS	22					JM	8/3/19
7/27/19	P-125 old liner	12:30	RM	M9	860	800	W-bos	28'>bos	28					JM	8/3/19
7/27/19	P-125 old liner	12:33	RM	M9	860	800	28'>bos	47'>bos	19					JM	8/3/19
7/27/19	P-125 old liner	12:36	RM	M9	860	800	47'>bos	63'>bos	16					JM	8/3/19
7/27/19	P-125 old liner	12:40	RM	M9	860	800	63'>bos	95'>bos	32					JM	8/3/19
7/27/19	P-125 old liner	12:45	RM	M9	860	800	95'>bos	EOS	118					JM	8/3/19
7/27/19	P-124- old liner	12:50	RM	M9	860	800	W-bos	10'>bos	10					JM	8/3/19
7/27/19	P-124- old liner	12:52	RM	M9	860	800	10'>bos	EOS	41					JM	8/3/19
7/27/19	P-123-old liner	1:00	RM	M9	860	800	W-bos	EOS	68					JM	8/3/19
7/27/19	P-123-R-415	11:20	RM	M42	860	800	W-bos	52'>bos	52					JM	8/3/19
7/27/19	P-123-R-415	11:08	RM	M42	860	800	52'>bos	31'>bos	31					JM	8/3/19
7/27/19	P-123-R-415	11:00	RM	M42	860	800	31'>bos	EOS	14					JM	8/3/19
7/28/19	P-124-R-415	10:55	RM	M42	860	800	W-bos	EOS	54					UG	8/16/19
7/28/19	P-125-R-415	10:48	RM	M42	860	800	W-bos	EOS	47					UG	8/16/19
7/28/19	P-125-R-415	11:38	JS	M9	860	800	W-bos	82'>bos	82					UG	8/16/19
7/28/19	P-125-R-415	11:30	JS	M9	860	800	82'>bos	97'>bos	25					UG	8/16/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box (1)					
										PSI		Time		Tech	Date (2)
										Start	Finish	Start	Finish		
7/28/19	P-125-R-415	11:25	JS	M9	860	800	97'>bos	135'>bos	38					UG	8/16/19
7/28/19	P-125-R-415	11:20	JS	M9	860	800	135'>bos	EOS	13					UG	8/16/19
7/28/19	P-126-r-415	10:50	JS	M9	860	800	W-bos	EOS	169					UG	8/16/19
7/28/19	P-70-R-415	6:45	RM	M9	860	800	W-bos	11'>bos	11					UG	8/16/19
7/28/19	P-70-R-415	6:47	RM	M9	860	800	11'>bos	EOS	264					UG	8/16/19
7/28/19	P-67-R-415	7:20	RM	M9	860	800	W-bos	EOS	32					UG	8/16/19
7/28/19	P-66-R-415	7:30	RM	M9	860	800	W-bos	EOS	59					UG	8/16/19
7/28/19	P-65-R-415	7:46	RM	M9	860	800	W-bos	EOS	59					UG	8/16/19
7/28/19	P-64-R-415	7:56	RM	M9	860	800	W-bos	EOS	59					UG	8/16/19
7/28/19	P-63-R-415	8:10	RM	M9	860	800	W-bos	EOS	44					UG	8/16/19
7/28/19	P-127-128	2:00	JS	M9	860	800	W-bos	EOS	152					UG	8/16/19
7/28/19	P-70-128	5:10	JS	M9	860	800	N-BOS	EOS	55					UG	8/16/19
7/28/19	P-70-127	5:15	JS	M9	860	800	N-BOS	EOS	5					UG	8/16/19
7/28/19	P-127-R-415	5:16	JS	M9	860	800	N-BOS	EOS	12					UG	8/16/19
7/28/19	P-127-126	5:18	JS	M9	860	800	N-BOS	EOS	42					UG	8/16/19
7/28/19	P-129-130	4:15	JS	M9	860	800	E-BOS	EOS	179					P/RM	8/14/19
7/28/19	P-130-131	4:47	JS	M9	860	800	E-BOS	EOS	149					P/RM	8/14/19
7/28/19	P-131-132	5:16	JS	M9	860	800	E-BOS	EOS	107					P/RM	8/14/19
7/28/19	P-132-133	5:42	JS	M9	860	800	E-BOS	EOS	37					P/RM	8/14/19
7/28/19	P-114-129	6:00	JS	M9	860	800	N-BOS	EOS	56					P/RM	8/14/19
7/28/19	P-114-130	6:10	JS	M9	860	800	N-BOS	EOS	57					P/RM	8/14/19
7/28/19	P-114-131	6:18	JS	M9	860	800	N-BOS	EOS	56					P/RM	8/14/19
7/28/19	P-114-132	6:27	JS	M9	860	800	N-BOS	EOS	58					P/RM	8/14/19
7/28/19	P-114-133	6:35	JS	M9	860	800	N-BOS	EOS	58					P/RM	8/14/19
7/28/19	P-134-121	8:00	JS	M9	860	800	S-BOS	17'>bos	17					P/CS	8/8/19
7/28/19	P-134-121	8:05	JS	M9	860	800	17'>bos	23'>bos	6					P/CS	8/8/19
7/28/19	P-134-121	8:06	JS	M9	860	800	23'>bos	29'>bos	6					P/CS	8/8/19
7/28/19	P-134-121	8:10	JS	M9	860	800	29'>bos	35'>bos	6					P/CS	8/8/19
7/28/19	P-134-121	8:14	JS	M9	860	800	35'>bos	EOS	18					P/CS	8/8/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box (1)					
										PSI		Time		Tech	Date (2)
										Start	Finish	Start	Finish		
7/28/19	P-121-136	8:17	JS	M9	860	800	S-BOS	EOS	10					P/CS	8/8/19
7/28/19	P-122-136	8:20	JS	M9	860	800	S-BOS	EOS	18					P/CS	8/8/19
7/28/19	P-134-136	2:31	JS	M9	860	800	E-BOS	35'>bos	35					P/CS	8/8/19
7/28/19	P-134-136	2:36	JS	M9	860	800	35'>bos	EOS	25					P/CS	8/8/19
7/28/19	P-136-137	2:20	JS	M9	860	800	BOS	EOS	24					P/CS	8/8/19
7/28/19	P-134-137	2:40	JS	M9	860	800	E-BOS	EOS	31					P/CS	8/8/19
7/28/19	P-134-135	1:38	JS	M9	860	800	BOS	EOS	49					P/CS	8/8/19
7/29/19	P-135-137	2:50	JS	M9	860	800	E-BOS	EOS	33					P/CS	8/8/19
7/29/19	P-67-134	1:24	JS	M9	860	800	W-bos	EOS	10					P/JM	8/5/19
7/29/19	P-68-134	1:18	JS	M9	860	800	W-bos	EOS	55					P/JM	8/5/19
7/29/19	P-69-134	1:10	JS	M9	860	800	W-bos	EOS	23					P/JM	8/5/19
7/29/19	P-69-135	1:00	JS	M9	860	800	W-bos	EOS	31					P/JM	8/5/19
7/29/19	P-69-138	1:20	JS	M9	860	800	S-BOS	EOS	23					P/JM	8/5/19
7/29/19	P-71-138	1:30	JS	M9	860	800	N-BOS	EOS	27					P/JM	8/5/19
7/29/19	P-135-138	5:10	JS	M9	860	800	W-bos	EOS	12					P/JM	8/5/19
7/29/19	P-138-141	5:13	JS	M9	860	800	W-bos	EOS	12					P/RM	8/14/19
7/29/19	P-71-141	5:16	JS	M9	860	800	W-bos	EOS	24					P/RM	8/14/19
7/29/19	P-71-139	5:18	JS	M9	860	800	W-bos	EOS	30					P/RM	8/14/19
7/29/19	P-128-139	3:10	JS	M9	860	800	W-bos	79'>bos	79					P/RM	8/14/19
7/29/19	P-128-139	3:13	JS	M9	860	800	79'>bos	EOS	22					P/RM	8/14/19
7/29/19	P-139-140	3:20	JS	M9	860	800	BOS	EOS	55					P/RM	8/14/19
7/29/19	P-128-140	3:40	JS	M9	860	800	W-bos	EOS	33					P/RM	8/14/19
7/29/19	P-139-141	4:00	JS	M9	860	800	S-BOS	EOS	43					P/RM	8/14/19
7/29/19	P-175-141	4:10	JS	M9	860	800	BOS	EOS	49					P/CS	8/8/19
7/29/19	P-137-141	4:12	JS	M9	860	800	BOS	EOS	26					P/CS	8/8/19
7/30/19	P-139-142	4:30	JS	M9	860	800	E-BOS	EOS	59					P/RM	8/14/19
7/30/19	P-139-143	4:45	JS	M9	860	800	E-BOS	EOS	13					P/RM	8/14/19
7/30/19	P-140-143	4:50	JS	M9	860	800	E-BOS	EOS	46					P/RM	8/14/19
7/30/19	P-141-142	8:10	JS	M9	860	800	N-BOS	12'>bos	12					P/RM	8/14/19
7/30/19	P-141-142	8:11	JS	M9	860	800	12'>bos	EOS	92					P/RM	8/14/19
7/30/19	P-141-144	8:00	JS	M9	860	800	W-bos	EOS	19					P/RM	8/14/19
7/30/19	P-142-144	8:20	JS	M9	860	800	S-BOS	EOS	31					P/RM	8/14/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box (1)					
										PSI		Time		Tech	Date (2)
										Start	Finish	Start	Finish		
7/30/19	P-142-143	8:35	JS	M9	860	800	S-BOS	EOS	115					P/RM	8/14/19
7/30/19	P-142-147	8:40	JS	M9	860	800	E-BOS	EOS	19					P/RM	8/14/19
7/30/19	P-146-147	10:04	JS	M9	860	800	E-BOS	EOS	45					P/RM	8/14/19
7/30/19	P-142-146	10:58	JS	M9	860	800	W-bos	EOS	32					P/RM	8/14/19
7/30/19	P-143-146	10:54	JS	M9	860	800	W-bos	EOS	23					P/RM	8/14/19
7/30/19	P-143-145	10:51	JS	M9	860	800	W-bos	EOS	25					P/RM	8/14/19
7/30/19	P-145-146	10:13	JS	M9	860	800	S-BOS	EOS	109					P/RM	8/14/19
7/30/19	P-145-148	11:55	JS	M9	860	800	W-bos	EOS	24					P/RM	8/14/19
7/30/19	P-146-148	11:58	JS	M9	860	800	W-bos	EOS	38					P/RM	8/14/19
7/30/19	P-148-149	1:20	JS	M9	860	800	W-bos	EOS	90					P/RM	8/14/19
7/30/19	P-129-150	12:10	JS	M9	860	800	W-bos	EOS	200					P/RM	8/14/19
7/30/19	P-146-150	12:08	JS	M9	860	800	W-bos	EOS	15					JM	8/5/19
7/30/19	P-150-151	3:46	JS	M9	860	800	W-bos	47'>bos	47					JM	8/5/19
7/30/19	P-150-151	3:51	JS	M9	860	800	47'>bos	EOS	108					JM	8/5/19
7/30/19	P-151-152	4:10	JS	M9	860	800	W-bos	EOS	129					JM	8/5/19
7/30/19	P-152-153	5:13	JS	M9	860	800	W-bos	EOS	85					JM	8/5/19
7/31/19	P-153-154	8:02	JS	M9	860	800	W-bos	EOS	70					JM	8/5/19
7/31/19	P-154-155	8:20	JS	M9	860	800	W-bos	EOS	71					JM	8/5/19
7/31/19	P-155-156	8:47	JS	M9	860	800	W-bos	EOS	74					JM	8/5/19
7/31/19	P-156-157	9:00	JS	M9	860	800	W-bos	EOS	75					JM	8/5/19
7/31/19	P-157-158	9:20	JS	M9	860	800	W-bos	EOS	80					JM	8/5/19
7/31/19	P-54-159	1:30	JS	M9	860	800	N-BOS	EOS	250					JM	8/5/19
7/31/19	P-159-160	2:15	JS	M9	860	800	N-BOS	77'>bos	77					JM	8/5/19
7/31/19	P-159-160	2:15	JS	M9	860	800	77'>bos	124'>bos	52					JM	8/5/19
7/31/19	P-159-160	2:15	JS	M9	860	800	124'>bos	142'>bos	29					JM	8/5/19
7/31/19	P-159-160	2:15	JS	M9	860	800	143'>bos	EOS	79					JM	8/5/19
7/31/19	P-160-161	4:03	JS	M9	860	800	W-bos	EOS	85					JM	8/5/19
7/31/19	P-160-162	4:20	JS	M9	860	800	W-bos	60'>bos	60					JM	8/5/19
7/31/19	P-160-162	4:26	JS	M9	860	800	60'>bos	EOS	36					JM	8/5/19
7/31/19	P-161-162	3:25	JS	M9	860	800	W-bos	EOS	97					JM	8/5/19
7/31/19	P-161-163	4:56	JS	M9	860	800	N-BOS	EOS	124					JM	8/5/19
7/31/19	P-163-165	6:00	JS	M9	860	800	N-BOS	EOS	50					JM	8/5/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box [1]					
										PSI		Time		Tech	Date [2]
										Start	Finish	Start	Finish		
7/31/19	P-163-166	6:15	JS	M9	860	800	W-bos	EOS	51					JM	8/5/19
7/31/19	P-165-166	5:30	JS	M9	860	800	W-bos	EOS	56					JM	8/5/19
8/1/19	P-165-168	8:18	JS	M9	860	800	W-bos	EOS	95					JM	8/5/19
8/1/19	P-168-169	8:42	JS	M9	860	800	W-bos	EOS	91					JM	8/5/19
8/1/19	P-169-170	8:58	JS	M9	860	800	W-bos	EOS	77					JM	8/5/19
8/3/19	P-158-171	12:20	JS	M9	860	800	W-bos	EOS	57					JM	8/5/19
8/1/19	P-171-172	10:25	JS	M9	860	800	W-bos	EOS	80					JM	8/5/19
7/29/19	P-122-114	7:00	JS	M9	860	800	E-BOS	EOS	5					JM	8/5/19
7/29/19	P-114-136	7:05	JS	M9	860	800	E-BOS	EOS	46					JM	8/5/19
7/29/19	P-136-133	7:10	JS	M9	860	800	E-BOS	EOS	12					JM	8/5/19
7/29/19	P-133-137	7:12	JS	M9	860	800	E-BOS	EOS	25					JM	8/5/19
7/29/19	P-132-137	7:15	JS	M9	860	800	E-BOS	EOS	37					JM	8/5/19
7/29/19	P-132-141	7:18	JS	M9	860	800	E-BOS	EOS	55					JM	8/5/19
7/29/19	P-131-141	7:20	JS	M9	860	800	E-BOS	EOS	14					JM	8/5/19
7/29/19	P-131-144	7:22	JS	M9	860	800	S-BOS	EOS	29					JM	8/5/19
7/29/19	P-131-142	7:25	JS	M9	860	800	S-BOS	EOS	8					JM	8/5/19
7/29/19	P-131-147	7:29	JS	M9	860	800	S-BOS	EOS	14					JM	8/5/19
7/29/19	P-130-146	7:35	JS	M9	860	800	S-BOS	EOS	58					JM	8/5/19
7/29/19	P-129-146	7:40	JS	M9	860	800	S-BOS	EOS	55					JM	8/5/19
7/29/19	P-148-150	7:44	JS	M9	860	800	S-BOS	EOS	44					JM	8/5/19
7/29/19	P-149-150	7:50	JS	M9	860	800	S-BOS	EOS	13					JM	8/5/19
7/29/19	P-149-151	7:51	JS	M9	860	800	S-BOS	EOS	42					JM	8/5/19
8/1/19	P-149-164	2:05	JS	M9	860	800	W-bos	53'>bos	53					JM	8/5/19
8/1/19	P-151-164	2:14	JS	M9	860	800	53'>bos	71'>bos	18					JM	8/5/19
8/1/19	P-152-164	2:19	JS	M9	860	800	71'>bos	104'>bos	33					JM	8/5/19
8/1/19	P-164-173	1:20	JS	M9	860	800	BOS	EOS	35					JM	8/5/19
8/1/19	P-152-173	2:23	JS	M9	860	800	S-BOS	EOS	33					JM	8/5/19
8/1/19	P-167-173	2:29	JS	M9	860	800	S-BOS	EOS	9					JM	8/5/19
8/1/19	P-153-173	2:30	JS	M9	860	800	S-BOS	EOS	55					JM	8/5/19
8/1/19	P-154-173	2:40	JS	M9	860	800	S-BOS	EOS	53					JM	8/5/19
8/1/19	P-155-173	2:48	JS	M9	860	800	S-BOS	EOS	55					JM	8/5/19
8/1/19	P-156-173	2:57	JS	M9	860	800	S-BOS	15'>bos	15					JM	8/5/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box (1)					
										PSI		Time		Tech	Date (2)
										Start	Finish	Start	Finish		
8/2/19	P-156-173	12:46	JS	M9	860	800	15'>bos	EOS	23					JM	8/5/19
8/2/19	P-157-173	12:50	JS	M9	860	800	S-BOS	EOS	38					JM	8/5/19
8/3/19	P-173-174	10:00	JS	M9	860	800	BOS	EOS	45					JM	8/5/19
8/2/19	P-157-174	10:05	JS	M9	860	800	S-BOS	EOS	18					JM	8/5/19
8/2/19	P-158-174	10:07	JS	M9	860	800	S-BOS	EOS	53					JM	8/5/19
8/3/19	P-171-174	10:08	JS	M9	860	800	S-BOS	EOS	5					JM	8/5/19
8/3/19	P-174-175	11:57	JS	M9	860	800	BOS	EOS	46					JM	8/5/19
8/3/19	P-171-175	12:35	JS	M9	860	800	S-BOS	EOS	44					JM	8/5/19
8/3/19	P-172-175	12:42	JS	M9	860	800	S-BOS	EOS	21					JM	8/5/19
8/3/19	P-175-178	12:12	JS	M9	860	800	BOS	EOS	47					JM	8/5/19
8/3/19	P-172-178	12:49	JS	M9	860	800	S-BOS	EOS	34					JM	8/5/19
8/3/19	P-172-176	11:06	JS	M9	860	800	W-bos	EOS	76					JM	8/5/19
8/3/19	P-176-178	1:15	JS	M9	860	800	W-bos	EOS	31					JM	8/5/19
8/3/19	P-176-179	11:10	JS	M9	860	800	S-BOS	EOS	33					JM	8/5/19
8/3/19	P-178-179	1:10	JS	M9	860	800	W-bos	EOS	29					JM	8/5/19
8/3/19	P-177-179	1:30	JS	M9	860	800	S-BOS	EOS	28					JM	8/5/19
8/3/19	P-177-178	1:38	JS	M9	860	800	S-BOS	EOS	10					JM	8/5/19
8/3/19	P-170-177	11:21	JS	M9	860	800	W-bos	EOS	35					JM	8/5/19
8/3/19	P-170-178	1:40	JS	M9	860	800	N-BOS	EOS	35					JM	8/5/19
8/3/19	P-170-175	1:44	JS	M9	860	800	N-BOS	EOS	25					JM	8/5/19
8/3/19	P-169-175	1:49	JS	M9	860	800	N-BOS	EOS	44					JM	8/5/19
8/3/19	P-169-174	1:52	JS	M9	860	800	N-BOS	EOS	12					JM	8/5/19
8/3/19	P-168-174	1:53	JS	M9	860	800	N-BOS	EOS	55					JM	8/5/19
8/3/19	P-165-174	2:00	JS	M9	860	800	N-BOS	EOS	14					JM	8/5/19
8/2/19	P-165-173	10:50	JS	M9	860	800	N-BOS	EOS	37					JM	8/5/19
8/2/19	P-166-173	10:55	JS	M9	860	800	N-BOS	EOS	33					JM	8/5/19
8/2/19	P-163-173	11:01	JS	M9	860	800	N-BOS	EOS	58					JM	8/5/19
8/2/19	P-161-173	11:13	JS	M9	860	800	N-BOS	EOS	53					JM	8/5/19
8/2/19	P-162-173	11:22	JS	M9	860	800	N-BOS	EOS	44					JM	8/5/19
8/2/19	P-160-173	11:29	JS	M9	860	800	N-BOS	EOS	28					JM	8/5/19
8/2/19	160-164	11:35	JS	M9	860	800	N-BOS	EOS	43					JM	8/5/19
8/2/19	P-159-164	11:41	JS	M9	860	800	N-BOS	EOS	18					JM	8/5/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box (1)					
										PSI		Time		Tech	Date (2)
										Start	Finish	Start	Finish		
8/2/19	P-159-149	11:43	JS	M9	860	800	N-BOS	EOS	41					JM	8/5/19
8/5/19	P-54-149	9:00	JS	M9	860	800	E-BOS	EOS	48					JG	8/16/19
8/5/19	P-57-149	9:05	JS	M9	860	800	E-BOS	EOS	10					JG	8/16/19
8/5/19	P-33-149	9:08	JS	M9	860	800	W-bos	17'>bos	17					JG	8/16/19
8/5/19	P-33-149	9:09	JS	M9	860	800	17'>bos	EOS	31					JG	8/16/19
8/5/19	P-33-148	9:10	JS	M9	860	800	N-BOS	EOS	47					JG	8/16/19
8/5/19	P-34-148	9:15	JS	M9	860	800	W-bos	EOS	8					JG	8/16/19
8/5/19	P-43-148	9:16	JS	M9	860	800	W-bos	EOS	55					JG	8/16/19
8/5/19	P-43-145	9:20	JS	M9	860	800	N-BOS	EOS	51					JG	8/16/19
8/5/19	P-42-145	9:22	JS	M9	860	800	N-BOS	EOS	37					JG	8/16/19
8/5/19	P-145-R-183	9:24	JS	M9	860	800	N-BOS	EOS	14					JG	8/16/19
8/5/19	P-37-145	9:26	JS	M9	860	800	W-bos	5'>bos	5					JG	8/16/19
8/5/19	P-37-145	9:26	JS	M9	860	800	5'>bos	11'>bos	6					JG	8/16/19
8/5/19	P-37-145	9:28	JS	M9	860	800	17'>bos	23'>bos	6					JG	8/16/19
8/5/19	P-37-145	9:29	JS	M9	860	800	23'>bos	29'>bos	6					JG	8/16/19
8/5/19	P-37-145	9:30	JS	M9	860	800	29'>bos	EOS	7					JG	8/16/19
8/5/19	P-37-142	9:50	JS	M9	860	800	N-BOS	EOS	50					JG	8/16/19
8/5/19	P-38-143	9:55	JS	M9	860	800	N-BOS	EOS	47					JG	8/16/19
8/5/19	P-38-140	10:00	JS	M9	860	800	N-BOS	EOS	7					JG	8/16/19
8/5/19	P-39-140	10:01	JS	M9	860	800	N-BOS	EOS	52					JG	8/16/19
8/5/19	P-39-128	10:09	JS	M9	860	800	E-BOS	EOS	28					JG	8/16/19
8/16/19	P-181-182	11:06	JS	M9	860	800	S-BOS	EOS	55					UG	8/16/19
8/16/19	P-182-183	1:05	JS	M9	860	800	S-BOS	EOS	28					UG	8/16/19
8/16/19	P-182-184	1:08	JS	M9	860	800	S-BOS	EOS	19					UG	8/16/19
8/16/19	P-183-184	1:00	JS	M9	860	800	BOS	EOS	35					UG	8/16/19
8/16/19	P-181-185	2:00	JS	M9	860	800	S-BOS	EOS	53					UG	8/16/19
8/16/19	P-185-R-614	2:10	JS	M9	860	800	BOS	EOS	13					UG	8/16/19
8/16/19	P-181-R-614	2:12	JS	M9	860	800	BOS	EOS	62					UG	8/16/19
8/16/19	P-182-R-614	2:22	JS	M9	860	800	BOS	EOS	43					UG	8/16/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box (1)					
										PSI		Time		Tech	Date (2)
										Start	Finish	Start	Finish		
8/19/19	P-7A/CAP-1	1:35	HG	M9	860	600	BOS	7'>BOS	7					OO	8/27/19
8/19/19	P-7A/CAP-1	1:45	HG	M9	860	600	7'>BOS	45'>BOS	45					OO	8/27/19
8/19/19	P-7A/CAP-1	1:50	HG	M9	860	600	45'>BOS	77'>BOS	77					OO	8/27/19
8/19/19	P-7A/CAP-1	1:51	HG	M9	860	600	77'>BOS	80'>BOS	80					OO	8/27/19
8/19/19	P-7A/CAP-1	1:58	HG	M9	860	600	80'>BOS	98'>BOS	98					OO	8/27/19
8/19/19	P-7B/CAP-1	10:56	HG	M9	860	600	BOS	17'>BOS	17					OO	8/27/19
8/19/19	P-7B/CAP-1	10:59	HG	M9	860	600	17'>BOS	57'>BOS	57					OO	8/27/19
8/19/19	P-7B/CAP-1	11:15	HG	M9	860	600	57'>BOS	77'>BOS	77					OO	8/27/19
8/19/19	P-7B/CAP-1	11:22	HG	M9	860	600	77'>BOS	89'>BOS	89					OO	8/27/19
8/19/19	P-7B/CAP-1	11:25	HG	M9	860	600	89'>BOS	99'>BOS	99					OO	8/27/19
8/21/19	P-39/TIE IN	9:50	HG	M9	860	600	BOS	EOS	14					OO	8/21/19
8/21/19	P-39/TIE IN	9:58	HG	M9	860	600	BOS	EOS	14					OO	8/21/19
8/21/19	P-40/128	10:09	HG	M9	860	600	BOS	EOS	79					OO	8/21/19
8/21/19	P-40/128	10:16	HG	M9	860	600	BOS	EOS	91					OO	8/21/19
8/21/19	P-41/127	10:22	HG	M9	860	600	BOS	EOS	107					OO	8/21/19
8/21/19	P-41/127/TIE IN	10:37	HG	M9	860	600	BOS	136'>BOS	136					OO	8/21/19
8/21/19	P-41/TIE IN	10:42	HG	M9	860	600	136'>BOS	146'>BOS	146					OO	8/21/19
8/21/19	P-41/TIE IN	10:45	HG	M9	860	600	146'>BOS	155'>BOS	155					OO	8/21/19
8/21/19	P-41/TIE IN	11:00	HG	M9	860	600	155'>BOS	179'>BOS	179					OO	8/21/19
8/21/19	P-41/TIE IN	11:15	HG	M9	860	600	179'>BOS	EOS	207					OO	8/21/19
8/20/19	P-19/41	5:05	HG	M9	860	600	BOS	EOS	24					OO	8/21/19
8/20/19	P-19B/CAP-9	5:30	HG	M9	860	600	BOS	13'>BOS	13					OO	8/21/19
8/20/19	P-19B/CAP-9	5:37	HG	M9	860	600	13'>BOS	82'>BOS	82					OO	8/21/19
8/20/19	P-19B/CAP-9	5:39	HG	M9	860	600	82'>BOS	EOS	85					OO	8/21/19
8/20/19	P-19A/CAP-9	6:01	HG	M9	860	600	BOS	14'>BOS	14					OO	8/21/19
8/20/19	P-19A/CAP-9	6:11	HG	M9	860	600	14'>BOS	53'>BOS	53					OO	8/21/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box (1)					
										PSI		Time		Tech	Date (2)
										Start	Finish	Start	Finish		
8/20/19	P-19A/CAP-9	6:28	HG	M9	860	600	53'>BOS	62'>BOS	62					OO	8/21/19
8/20/19	P-19A/CAP-9	6:32	HG	M9	860	600	62'>BOS	EOS	84					OO	8/21/19
8/20/19	P-19B/CAP-8	2:43	HG	M9	860	600	BOS	61'>BOS	61					OO	8/21/19
8/20/19	P-19B/CAP-8	2:54	HG	M9	860	600	61'>BOS	EOS	93					OO	8/21/19
8/20/19	P-19B/CAP-7	3:02	HG	M9	860	600	BOS	93'>BOS	93					OO	8/21/19
8/20/19	P-19B/CAP-7	3:25	HG	M9	860	600	93'>BOS	EOS	128					OO	8/21/19
8/20/19	P-19A/CAP-8	3:38	HG	M9	860	600	BOS	5'>BOS	5					OO	8/21/19
8/20/19	P-19A/CAP-8	3:49	HG	M9	860	600	5'>BOS	75'>BOS	75					OO	8/21/19
8/20/19	P-19A/CAP-8	3:54	HG	M9	860	600	75'>BOS	EOS	93					OO	8/21/19
8/20/19	P-19A/CAP-7	3:55	HG	M9	860	600	BOS	EOS	130					OO	8/21/19
8/19/19	P-7B/CAP-2	11:25	HG	M9	860	600	BOS	111'>BOS	111					OO	8/27/19
8/19/19	P-7B/CAP-2	11:28	HG	M9	860	600	111'>BOS	131'>BOS	131					OO	8/27/19
8/19/19	P-7B/CAP-2	11:31	HG	M9	860	600	131'>BOS	142'>BOS	142					OO	8/27/19
8/19/19	P-7B/CAP-2	11:35	HG	M9	860	600	142'>BOS	148'>BOS	148					OO	8/27/19
8/19/19	P-7B/CAP-2	11:38	HG	M9	860	600	148'>BOS	154'>BOS	154					OO	8/27/19
8/19/19	P-7B/CAP-2	11:41	HG	M9	860	600	154'>BOS	EOS	178					OO	8/27/19
8/19/19	P-7A/CAP-2	1:58	HG	M9	860	600	BOS	98'>BOS	98					OO	8/27/19
8/19/19	P-7A/CAP-2	2:12	HG	M9	860	600	98'>BOS	116'>BOS	116					OO	8/27/19
8/19/19	P-1A/CAP-2	2:15	HG	M9	860	600	116'>BOS	122'>BOS	122					OO	8/27/19
8/19/19	P-1A/CAP-2	2:19	HG	M9	860	600	122'>BOS	133'>BOS	133					OO	8/27/19
8/19/19	P-1A/CAP-2	2:21	HG	M9	860	600	133'>BOS	146'>BOS	146					OO	8/27/19
8/19/19	P-1A/CAP-2	2:32	HG	M9	860	600	146'>BOS	EOS	177					OO	8/27/19
8/19/19	P-1A/CAP-3	3:55	HG	M9	860	600	BOS	190'>BOS	190					OO	8/27/19
8/19/19	P-1A/CAP-3	3:59	HG	M9	860	600	190'>BOS	212'>BOS	212					OO	8/27/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box (1)					
										PSI		Time		Tech	Date (2)
										Start	Finish	Start	Finish		
8/19/19	P-1A/CAP-3	4:02	HG	M9	860	600	212'>BOS	215'>BOS	215					OO	8/27/19
8/19/19	P-1A/CAP-3	4:12	HG	M9	860	600	215'>BOS	EOS	266					OO	8/27/19
8/19/19	P-1B/CAP-3	4:20	HG	M9	860	600	BOS	185'>BOS	185					OO	8/27/19
8/19/19	P-1B/CAP-3	4:22	HG	M9	860	600	185'>BOS	189'>BOS	189					OO	8/27/19
8/19/19	P-1B/CAP-3	4:24	HG	M9	860	600	189'>BOS	212>BOS	212					OO	8/27/19
8/19/19	P-1B/CAP-3	4:34	HG	M9	860	600	212>BOS	218'>BOS	218					OO	8/27/19
8/19/19	P-1B/CAP-3	4:36	HG	M9	860	600	218'>BOS	235'>BOS	235					OO	8/27/19
8/19/19	P-1B/CAP-3	4:40	HG	M9	860	600	235'>BOS	246'>BOS	246					OO	8/27/19
8/19/19	P-1B/CAP-3	4:43	HG	M9	860	600	246'>BOS	252'>BOS	252					OO	8/27/19
8/19/19	P-1B/CAP-4	4:55	HG	M9	860	600	252'>BOS	259'>BOS	259					OO	8/27/19
8/19/19	P-1B/CAP-4	4:57	HG	M9	860	600	259'>BOS	265'>BOS	265					OO	8/27/19
8/19/19	P-1B/CAP-4	5:15	HG	M9	860	600	265'>BOS	283'>BOS	283					OO	8/27/19
8/19/19	P-1B/CAP-4	5:20	HG	M9	860	600	283'>BOS	287'>BOS	287					OO	8/27/19
8/19/19	P-1B/CAP-4	5:22	HG	M9	860	600	287'>BOS	295'>BOS	295					OO	8/27/19
8/19/19	P-1B/CAP-4	5:25	HG	M9	860	600	295'>BOS	308'>BOS	308					OO	8/27/19
8/19/19	P-1B/CAP-4	5:27	HG	M9	860	600	308'>BOS	313'>BOS	313					OO	8/27/19
8/19/19	P-1B/CAP-4	5:31	HG	M9	860	600	313'>BOS	326'>BOS	326					OO	8/27/19
8/19/19	P-1B/CAP-4	5:56	HG	M9	860	600	326'>BOS	332'>BOS	332					OO	8/27/19
8/19/19	P-1B/CAP-4	5:57	HG	M9	860	600	332'>BOS	335'>BOS	335					OO	8/27/19
8/19/19	P-1B/CAP-4	5:58	HG	M9	860	600	335'>BOS	349'>BOS	349					OO	8/27/19
8/19/19	P-1B/CAP-4	6:17	HG	M9	860	600	349'>BOS	EOS	367					OO	8/27/19
8/19/19	P-1A/CAP-4	6:23	HG	M9	860	600	BOS	295'>BOS	295					OO	8/27/19
8/19/19	P-1A/CAP-4	6:29	HG	M9	860	600	295'>BOS	301'>BOS	301					OO	8/27/19
8/19/19	P-1A/CAP-4	6:30	HG	M9	860	600	301'>BOS	373'>BOS	337					OO	8/27/19
8/19/19	P-1A/CAP-4	6:41	HG	M9	860	600	373'>BOS	EOS	376					OO	8/27/19
8/20/19	P-1B/CA-5	11:46	HG	M9	860	600	BOS	8'>BOS	8					OO	8/27/19
8/20/19	P-1B/CA-5	11:49	HG	M9	860	600	8'>BOS	22'>BOS	22					OO	8/27/19
8/20/19	P-1B/CA-5	11:51	HG	M9	860	600	22'>BOS	48'>BOS	48					OO	8/27/19
8/20/19	P-1B/CA-5	11:56	HG	M9	860	600	48'>BOS	52'>BOS	52					OO	8/27/19
8/20/19	P-1B/CA-5	11:58	HG	M9	860	600	52'>BOS	59'>BOS	59					OO	8/27/19
8/20/19	P-1B/CA-5	12:00	HG	M9	860	600	59'>BOS	64'>BOS	64					OO	8/27/19

GAI Consultants, Inc.

Seaming and Non Destructive Test Log

Project Name: Amos LF - Sequence 4
Start Date: 13-May-19
Project Location: Putnam County, WV

Material: PVC

Thickness: 30 mil

Weld Date	Seam # (P#/P#)	Weld Time	Tech ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (feet)	Air Pressure Test or V-Box (1)					
										PSI		Time		Tech	Date (2)
										Start	Finish	Start	Finish		
8/20/19	P-13B/CAP-5	12:02	HG	M9	860	600	64'>BOS	86'>BOS	86					OO	8/27/19
8/20/19	P-13B/CAP-5	12:53	HG	M9	860	600	86'>BOS	EOS	111					OO	8/27/19
8/20/19	P-1A/CAP-5	1:11	HG	M9	860	600	BOS	25'>BOS	25					OO	8/27/19
8/20/19	P-1A/CAP-5	1:14	HG	M9	860	600	25'>BOS	67'>BOS	67					OO	8/27/19
8/20/19	P-13A/CAP-5	1:25	HG	M9	860	600	67'>BOS	EOS	110					OO	8/27/19
8/20/19	P-13B/CAP-6	1:30	HG	M9	860	600	BOS	16'>BOS	16					OO	8/27/19
8/20/19	P-13B/CAP-6	1:34	HG	M9	860	600	16'>BOS	EOS	125					OO	8/27/19
8/20/19	P-13A/CAP-6	2:20	HG	M9	860	600	BOS	EOS	123					OO	8/27/19

ATTACHMENT 4

LEACHATE COLLECTION SYSTEM AND PROTECTIVE COVER CERTIFICATION

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Sequence 4
Leachate Collection System and Protective Cover Certification

American Electric Power
John E. Amos Landfill
John E. Amos Power Plant
Winfield, West Virginia

GAI Project Number: C130109.10, Task 003
November 2019

Prepared by: GAI Consultants, Inc.
Charleston Office
300 Summers Street, Suite 1100
Charleston, West Virginia 25301-1631

Prepared for: American Electric Power
1 Riverside Plaza
Columbus, Ohio 43215

Sequence 4
Leachate Collection System and Protective Cover Certification

American Electric Power
John E. Amos Landfill
John E. Amos Power Plant
Winfield, West Virginia

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Columbus, Ohio 43215

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Project Manager
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Table of Contents

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GAI Consultants, Inc. Certification

Based on the construction testing and observations performed by American Electric Power (AEP) and GAI Consultants, Inc. (GAI) personnel, I hereby certify that Leachate Collection System and Protective Cover installations within Sequence 4 at the Appalachian Power Company's John E. Amos Flue Gas Desulfurization (FGD) Landfill near Winfield, West Virginia (WV), as shown on Drawing C130109-10-003-00-B2-005, have been installed in substantial compliance with the material specifications and construction requirements listed in the WV National Pollutant Discharge Elimination System/Solid Waste Permit (NPDES WV0116254) documents; 40 Code of Federal Regulations Part 257 (the CCR Rule); and the "2018-2020 Site Work Construction, Sequence 4" construction documents. AEP personnel provided survey data used to develop the Record Drawings and to verify that the leachate collection system and protective cover installations met the permit requirements.

This document clarifies "certification" for the installations of the leachate collection system and the protective cover within Sequence 4 at the Amos FGD Landfill.

The definition of certify as used herein is: Certify means to state or declare a professional opinion of conditions whose true properties cannot be known at the time such certification was made, despite appropriate professional evaluation. A design professional's certification in no way relieves any other party from meeting requirements imposed by contract or other means, including commonly-accepted industry practices.

Bearing the above in mind and based on the results of: (1) Certification from the material manufacturers and installation meeting the requirements of the Specifications, the CCR Rule, and the WV Department of Environmental Protection (WVDEP) permit; (2) results of field and laboratory testing; and (3) monitoring of construction efforts during the project; GAI's professional opinion is that the installations of the leachate collection system and the protective cover within Sequence 4 of the Amos FGD Landfill meet the requirements as set forth by the permit documents and the CCR Rule.

Charles Straley

Charles F. Straley, PE, PLS
Certifying Engineer and Quality Assurance Officer
PE #11842
PLS #1888

CHARLES F. STRALEY
LICENSED
No. 1888
STATE OF WEST VIRGINIA
PROFESSIONAL SURVEYOR
11-25-19

CHARLES F. STRALEY
REGISTERED
11842
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER
11-25-19

1.0 Introduction

1.1 Project Description

This “Leachate Collection System and Protective Cover Certification” report documents the testing and observations performed for the leachate collection system and protective cover installations in Sequence 4 at American Electric Power’s (AEP’s) John E. Amos FGD Landfill (Landfill) in Winfield, West Virginia (WV). The location of Sequence 4 at the Amos Landfill is shown on Figure 1. Appendix A contains typical construction photographs included in the daily reports. Construction of the Sequence 4 site described in this certification report consists of the following:

- Construction activities associated with the installations of the leachate collection system and the protective cover.

Construction of the groundwater control and subgrade preparation, including placement of structural fill to meet the compacted clay liner subgrade elevations, began in April 2018 and was completed July 18, 2019. The groundwater control and subgrade preparation are documented in the “Sequence 4 Groundwater Control and Subgrade Certification” (September 2019).

Construction of the compacted clay liner (CCL) in Sequence 4 began in April 2019 and was completed August 2, 2019. The CCL construction is documented in the “Sequence 4 Compacted Clay Liner Certification” (October 2019).

Installation of the 30 mil polyvinyl chloride (PVC) geomembrane liner began in May 2019 and was completed August 23, 2019. The geomembrane installation is documented in the “Sequence 4 PVC Geomembrane Liner Certification Report” (November 2019).

Installations of the leachate collection system and the protective cover were performed in accordance with the approved Quality Assurance/Quality Control (QA/QC) Plan; the Landfill’s Solid Waste/National Pollutant Discharge Elimination System (NPDES) permit (Permit No. WV0116254); the West Virginia Department of Environmental Protection (WVDEP) Title 33, Series 1, Solid Waste Management Rule; 40 CFR 257; and AEP’s Civil Engineering Division Technical Specifications for Material Construction and associated Project Addenda to the Specifications. Included in this report are the field information and the applicable Record Drawings in accordance with the WVDEP requirements. The construction QA (CQA) services performed by GAI are discussed in the following sections.

1.2 Companies and Personnel

The key companies and personnel involved with the leachate collection system and protective cover installations of Sequence 4 are listed below.

AEP - Owner
Appalachian Power Company - Operator
Keith Burger, Project Manager
John Massey-Norton, Senior Geologist
Brian Palmer, Principal Civil Engineer
Carl Skidmore, Regional Construction Manager
Brandon Schmader, Lead Construction Coordinator
T. Coty Sheppard, Survey Coordinator

GAI Consultants Inc. (GAI) - CQA/Soil Testing
Charles Straley, PE, PLS, Certifying Engineer, and Quality Assurance Officer (QAO)
Mark Lehner, PE, Project Manager
Terry Queen, Lead Quality Control Inspector (QCI)

R.B. Jergens, Inc. (RBJ) - Earthwork Contractor
Jake Warner, Project Manager
Mike Davis, Superintendent

1.3 Scope of Services

1.3.1 Preconstruction Activities

Preconstruction activities conducted by GAI personnel consisted of the following:

1. conducting inventory of on-site geocomposite drainage net and other leachate collection system materials;
2. review of manufacturer's submittals of the geocomposite drainage net and other leachate collection system materials for compliance with project and permit specifications; and
3. collecting conformance samples of the geocomposite drainage net for laboratory testing and review of results for compliance with project and permit specifications.

1.3.2 Construction Documentation Activities

Construction documentation activities performed by GAI personnel included the following:

1. documenting and observing the PVC geomembrane conditions prior to the installations of the leachate collection system and protective cover;
2. observing and documenting the installation and field testing of the leachate collection system and protective cover;
3. preparing daily field reports and documenting construction activities. GAI also attended daily health and safety meetings, weekly project update meetings, and monthly contractor's meetings, as well as other supplemental meetings when needed; and
4. providing photo documentation throughout the construction showing typical construction procedures (see Appendix A).

1.3.3 Record Drawings and Certification Report

Documentation and certification activities performed by the QA/QC team included the following:

1. AEP provided surveying services for the Record Drawings presented in Appendix E). Drawing C130109-10-003-00-C-B2-05 "Sequence 4 Liner Leachate Collection System and Protective Cover Certification Plan" shows the installation of the leachate collection system piping, and the design top surface contours of the protective cover. Drawing C130109-10-003-00-C-B2-006 (2 sheets) "Sequence 4 Liner Protective Cover Certification Points Table" presents a tabulation of the as-built subgrade and CCL, elevations, and the design and as-built certification point elevations of the protective cover.
2. GAI personnel performed the construction documentation activities discussed in Sections 1.3.1 and 1.3.2 of this report.
3. Project personnel observed the construction activities and provided the enclosed information documenting that the construction activities were performed consistent with the design and permit requirements.

1.4 Construction Schedule

Site clearing and grubbing, excavation and fill placement for subgrade, and the installation of groundwater controls were performed prior to construction of the compacted clay liner. The compacted clay liner was then constructed upon the finished subgrade. Installation of the leachate collection system and placement of protective cover started in June 2019 and was completed October 16, 2019.

1.5 Reference Documents

The plans, specifications, and QA requirements for the construction activities and materials used by GAI personnel for this project are as follows:

1. Solid Waste/NPDES Permit No. WV0116254.
2. AEP Civil Engineering Division, Technical Specifications for Material and Construction (prepared by AEP), and the Addenda to the Technical Specifications (prepared by GAI).
3. "Quality Assurance and Quality Control Plan, John E. Amos Landfill" for the Appalachian Power Company John E. Amos Plant's Amos FGD Landfill (March 2006 and revised October 2017, prepared by GAI).
4. Amos FGD Landfill "Sequence 4 2018-2019 Site Work Construction Drawings" (issued for construction August 2017 and re-issued January 2018, prepared by GAI)

2.0 Leachate Collection System

The leachate collection system (LCS) consists of: a 330-mil thick double-sided geocomposite drainage net (GDN) installed on the valley floor and side slopes, and perforated poly vinyl chloride (PVC) piping installed in specific locations. The GDN is a high-density polyethylene (HDPE) geonet surrounded by non-woven geotextiles. The PVC piping system consists of 12-inch and 4-inch diameter perforated PVC pipes placed in the floor of the central area, in the east area valley, and locations in the west area of Sequence 4.

The GDN was installed in accordance with the manufacturer's recommendations. 12-inch diameter perforated leachate collection pipe was installed in the floor of the central Sequence 4 area, in the east area valley floor, and along the north edge of the west area. 4-inch perforated collection lateral pipes were installed in the west area near the interface with Sequence 2B and in the small valley near the center of Sequence 4, connecting to the 12-inch diameter pipes. For the installation of the leachate collection pipes, a 6-ounce non-woven geotextile was placed over the GDN, a two-inch (minimum) bedding layer of coarse aggregate was placed on the geotextile, and the collection pipe was placed on top of the aggregate. Aggregate was placed over top of the pipes (minimum 12 inches thickness for the 4-inch diameter pipes, minimum 15-inches thickness for the 12-inch diameter pipes), and the aggregate was then wrapped with the 6-ounce non-woven geotextile to protect the gravel from the intrusion of fines.

The locations of the leachate collection pipes were surveyed, and the as-built locations of the LCS pipes are shown on Drawing C130109-10-003-00-B2-005 in Appendix E.

2.1 Manufacturing Quality Control - GDN

The Manufacturer's Quality Control (MQC) certifications were submitted (Appendix B-I) for review. To monitor the quality of the GDN to be used, SKAPS Industries (GDN manufacturer) performed the quality control testing on selected rolls of the GDN. Appendix B-I contains the quality control test data from the manufacturer for the GDN material used in the construction of Sequence 4. The MQC test data indicated that the GDN meets permit and project specifications.

In addition to the GDN material, the following quality assurance information for the other leachate collection materials were reviewed by GAI to document compliance with the design and permit requirements:

1. Manufacturer's certification of material properties for the perforated pipes (Appendix C-I).
2. Contractor's/supplier's test results for the granular drainage aggregate (Appendix C-II).
3. Manufacturer's certification of material properties for the geotextile wrap (Appendix C-III).

2.2 Manufacturing Quality Control - PVC Piping

The results of the manufacturing quality control testing by IPEX, Inc., manufacturer of the Xirtec 140 PVC Schedule 80 pipe used in the LCS, is provided in Appendix C-I.

2.3 Supplier's Certification - Aggregate Drainage Material

The quality control testing documentation for the non-calcareous AASHTO No. 8 aggregate drainage material used in the LCS is provided in Appendix C-II.

2.4 Manufacturing Quality Control - Geotextile Wrap

The results of the manufacturing quality control testing by ACF Environmental on the N080 non-woven geotextile used in the LCS is provided in Appendix C-III.

2.5 Conformance Testing

As part of GAI's quality assurance documentation, conformance testing was performed on the GDN by Geotechnics, Inc., an independent geotechnical and geosynthetic testing laboratory. Several GDN samples were collected from the material that was used during the construction of Sequence 4. The samples were collected at the manufacturing facility by Geotechnics and submitted to their laboratory for analyses. Conformance test data for the material is included in Appendix B-II, which demonstrated that the GDN material was acceptable.

3.0 Protective Cover

The protective cover placed within Sequence 4 consists of a minimum 18-inch thick layer of bottom ash and/or flue gas desulfurization (FDG) material placed on the GDN. The bottom ash and FGD were provided by John E. Amos Power Plant operations. Laboratory test results for the bottom ash are provided in Appendix D-I. On the slope benches, an 18-inch thick layer of non-calcareous AASHTO No. 8 stone was placed directly on the GDN, and then covered by a minimum 12-inch thick layer of protective cover. The AASHTO No. 8 stone material properties are provided in Appendix D-II.

The protective cover material was placed over the leachate collection system using a low ground pressure dozer. The protective cover was placed from the valley floor up the sideslopes to minimize stresses placed on the underlying PVC geomembrane and GDN. In select locations, a minimum three-foot-thick haul road was constructed using bottom ash to facilitate delivery of the material to the working area. GAI's QC inspector observed the protective cover material placement.

The top of protective cover elevations at select points were determined by field survey. Drawing C130109-10-003-00-B2-005 in Appendix E is a plan of Sequence 4 showing the design protective cover contours and as-built locations of the LCS piping. Drawing C130109-10-003-00-B2-006 (2 sheets) in Appendix E contains the summary table for the Sequence 4 liner construction. These drawings present the as-built elevations for subgrade, the design and as-built elevations for the CCL and for the protective cover, comparisons of the design and as-built elevations for the CCL and the protective cover, and the computed as-built thicknesses for the CCL and the protective cover.

3.1 Bottom Ash

The results of gradation (sieve and wash sieve) and permeability testing on the bottom ash used in the protective cover is provided in Appendix D-I.

3.2 Subgrade Bench Stone

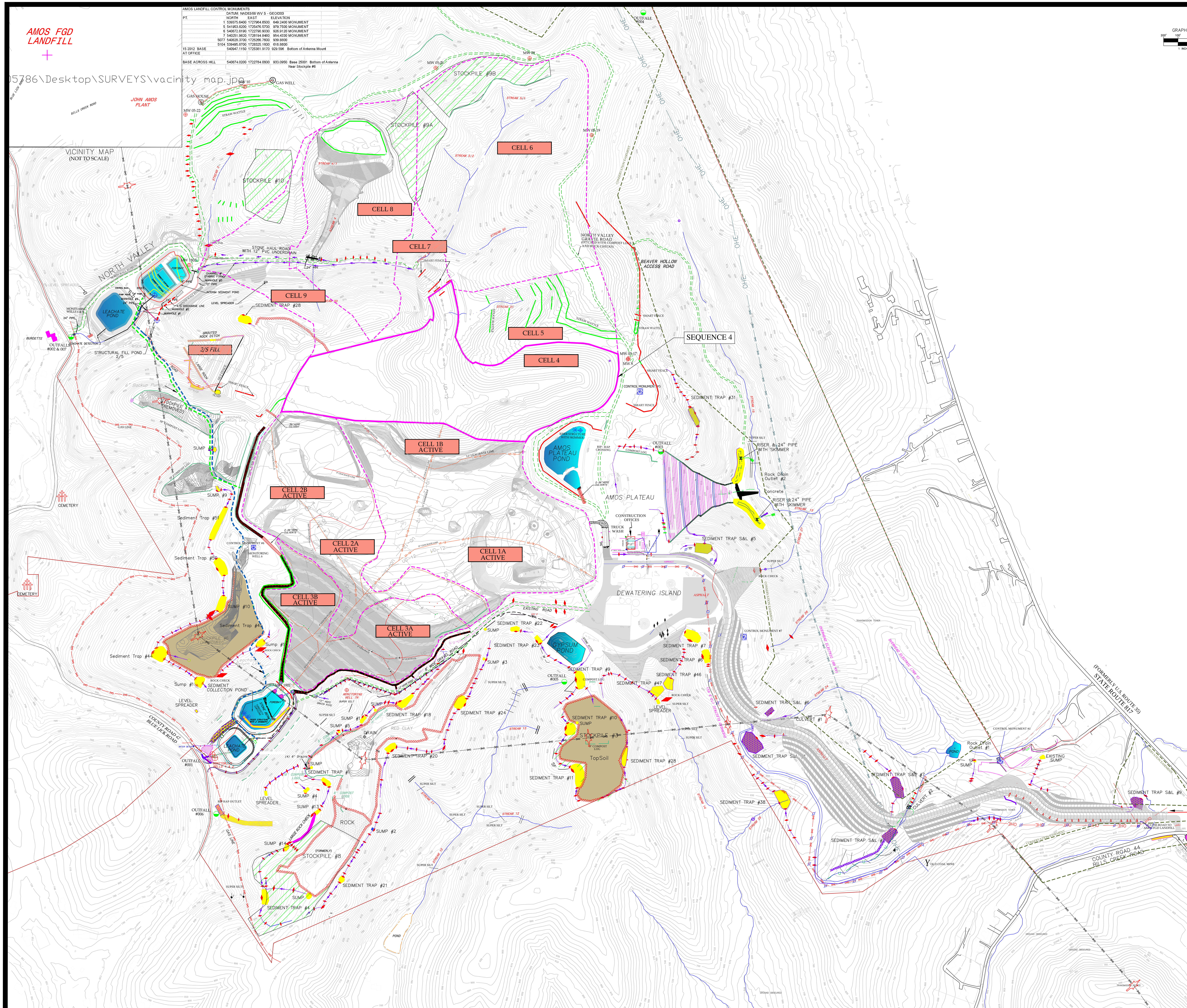
The quality control testing of the AASHTO No. 8 non-calcareous stone placed on the GDN on the subgrade benches is documented in Appendix D-II.

4.0 Summary

The construction work documented in this report was completed in accordance with the design and specifications presented in the applicable WVDEP Solid Waste/NPDES Permit (No. WV0116254), the CCR Rule, and the construction documents listed in this report. The field activities documented in this report represent the CQA services provided for the installations of the leachate collection system and protective cover in Sequence 4 at the Amos Landfill

FIGURE

gai consultants
transforming ideas into reality.



AMOS LANDFILL CONTROL MONUMENTS				
	DATUM: NAD83/88 WV S - GEOID03			
PT.	NORTH	EAST	ELEVATION	
1	539375.6400	1727964.6500	649.2400	MONUMENT
5	541953.8200	1725476.5700	979.7500	MONUMENT
6	540872.8190	1722790.9030	926.9120	MONUMENT
7	540251.9820	1726194.8480	954.4330	MONUMENT
5077	540828.3700	1725266.7600	939.8800	
5104	539495.8700	1728325.1600	618.8800	
15 2012 BASE AT OFFICE	540947.1150	1725381.9170	929.596	Bottom of Antenna Mount
BASE ACROSS HILL	540874.0200	1722784.0800	933.0950	Base 25001 Bottom of Antenna Near Stockpile #6

FIGURE 1
SITE PLAN
SEQUENCE 4 LANDFILL
CONSTRUCTION

LEGEND

- EXISTING 4" UNDERDRAIN
- EXISTING 12" UNDERDRAIN
- OVERHEAD ELECTRIC
- SURVEYED PROPERTY LINES
- DIVERSION DITCHES
- EXISTING SEDIMENT TRAPS
- STONE FILTERS
- SILT FENCE
- CELL 3 CAP LIMITS
- EXISTING SEDIMENT TRAPS, DITCHES OR SPILLWAYS WITH STONE BOTTOM
- LIVING WEIRS
- FLOC LOG
- FLOW CHECK
- COMPOST LOG
- straw wattle
- 765kv location
- smart fence

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APPALACHIAN POWER CO.

JOHN E. AMOS PLANT

WINFIELD WEST VIRGINIA

JOHN E. AMOS FGD LANDFILL
EROSION & SEDIMENT CONTROL
DETAILS

NAD 83/NAVD 88 W.V. SOUTH

Drawing Name: Amos Asbuilt

SCALE: 1"=200'

Revision Date: JULY 10, 2019

Surveyed By: C.Sheppard

Drawn By: C.Sheppard

AMERICAN ELECTRIC POWER
1 RIVERSIDE PLAZA
COLUMBUS, OH 43215

APPENDIX A
Photographs

Photograph 1. Placing the Geocomposite Drainage Net.

Photograph 2. Zip-tying Geocomposite Drainage Net.

Photograph 3. Sewing Fabric Seam of the Geocomposite Drainage Net.

Photograph 4. Butt Seam Zip-Tied

Photograph 5. Protective Cover being placed over the Geocomposite Drainage Net.

Photograph 6. Non-Calcarious Aggregate being placed around 12-inch Leachate Collection Pipe.

Photograph 7. Leachate Collection Pipe and Aggregate wrapped with 6-oz Geotextile

Photograph 8. No. 8 Stone Placement on B

Photograph 9. Lower Slope covered with Protective Cover - East Area

APPENDIX B
Geocomposite Drainage Net Quality Control/Quality Assurance Data

Appendix B-I
Geocomposite Drainage Net Submittal

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R. B. JERGENS CONTRACTORS, INC. VANDALIA, OHIO

11418 N. Dixie Drive P.O. Box 309
Vandalia, OH 45377
Phone: (937) 669-9799
Fax: (937) 669-0301

LETTER OF TRANSMITTAL

DATE: 20-Dec-18	JOB NO.: 18-003
ATTENTION: Brandon Schmader	
Submittal No. 14b	
Amos Landfill Sequence 4 Expansion	
Geocomposite Material Manufacturing	

TO **American Electric Power**
1 Riverside Plaza
Columbus, OH 43215

WE ARE SENDING YOU [X] Attached [ ] Under separate cover via ____________ the following items

- [ ] Shop drawings
- [ ] Copy of letter
- [ ] Prints
- [ ] Change Order
- [ ] Plans
- [ ] Test Results
- [ ] Samples
- [X] Specifications

COPIES	DATE	NO.	DESCRIPTION
1 electronic	20-Dec	1	Geocomposite Material Manufacturing

THESE ARE TRANSMITTED as checked below:

- [X] For Approval
- [ ] For your use
- [ ] As requested
- [ ] For review
- [ ] Approved as submitted
- [ ] Approved as noted
- [ ] Returned for corrections
- [ ] ________________
- [ ] Resubmit______copies for approval
- [ ] Submit_____copies for distribution
- [ ] Return _____ corrected prints
- [ ]

REMARKS:
Per document 13010903T004-GDN Spec-CRM section 1.01.5.B.1 & 3
Per document 13010903T004-GDN Spec-CRM section 1.02.1-4

Kevin Harshberger, RBJ
Mike Davis, RBJ
Izaac Harshberger, RBJ
Ash Hutsonpillar, RBJ

SIGNED: *Jacob Warner* (signed)

Jacob Warner

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571 Industrial Parkway
Commerce, GA 30529
Ph: (706) 336-7000
Fax: (706) 336-7007

December 20, 2018

Chad Smithson
Hallaton Environmental Linings

Ref: AEP John Amos Power Plant Cell, WV, PO #1883

This is in reference to comments on submittal No. 014. SKAPS Industries will test and certify:

- CBR Puncture Strength (450 lb MARV) as per ASTM D 6241 in lieu of (Mullen Burst Strength (189 psi MARV) as per ASTM D 3786. ASTM D 3786 is no longer relevant testing method for geotextile and no longer recognized by ASTM D 35 committee and AASHTO M288. ASTM D 6241 is the standard Manufacture Quality Control (MQC) test method for determining CBR Puncture Strength of geotextile
- Transmissivity of geonet with a gradient of 1.0.
- Transmissivity of geocomposite with a gradient of 0.3.
- Transmissivity of geonet and geocomposite every 200,000 sq. ft.
- Permittivity and Apparent Opening Size (AOS) of geotextile every 500,000 sq. ft.
- Ply adhesion of geocomposite every 15,000 sq. ft. Please note that additional 68 Ply Adhesion tests will be needed and SKAPS will charge $50 per each additional test.

If you have any question/concern, please feel free to contact.

Rajesh Patel

SKAPS Industries

1883-35317
AEP JOHN E. AMOS LANDFILL
SITE WORK CONSTRUCTION SEQUENCE 4
WINFIELD, WV

Submittal # 3

Section Geocomposite Drainage Net

SKAPS Geocomposite Submittals

- Proposed Seaming Method- Thermal Welding
- Material Product Data Sheet:
  - Transnet 330-2-6 Geocomposite
- Manufacturer Approved Installer Letter - SKAPS Industries
- Manufacturer's QA/QC Manual
- Manufacturer's Installation Manual
- Manufacturer's Qualifications

PREPARED BY:

HALLATON
ENVIRONMENTAL LININGS

1206 Sparks Road | Sparks, MD 21152 | 410-583-7700

October 29, 2018

HALLATON, INC.

1206 Sparks Road • Sparks, MD 21152
410 583 7700 • Fax: 410 583 7720

Geotextile Proposed Seaming Method

Field Seaming & Seam Preparation

Hallaton proposes using a thermal fusion welder ("wedge welder") to seam the non woven Geotextile and Geotextile component of the Geocomposite. Fusion welding is a heat bonded weld, fusing the two Geotextile panels together. It allows durability as well as a flat surface on the Geotextile. This method is widely accepted as an industry standard practice and has been approved by the manufacturer of the Geocomposite and Geotextile for this project.

The deployment procedures will remain the same as listed in the project specifications. Geotextile panels will be deployed in the same orientation as the liner panels. On side slopes, seams shall be oriented in the general direction of maximum slope, i.e., oriented down, not across the slope. Each panel will overlap the adjacent panel by 4-6 inches to allow for enough room for the wedge welder to get a proper seam. The seam will be heated and welded using a standard 2" copper split track shoe leaving behind 2 welds approximately a ½" wide.

Prior to seaming, the Welding Technician will inspect the wedge and insure the machine has been setup correctly for the material. As the machine begins to weld the first few feet of Geotextile the technician will visually inspect the seam and will check the strength of the weld by hand to ensure a proper bond has been made.

On panel cross seams (where two panel ends are adjoined), repairs, and in areas where the geotextile does not allow room for a wedge welder to pass through a handheld hot air gun will be utilized to heat seam the Geotextile panels together. Where necessary, an additional piece of Geotextile will be used to capstrip the cross seams to ensure panels have been adjoined properly.

Seaming Equipment and Accessories

Seaming will be performed using a Demtech VM-20 Fusion "Wedge" Welder.

-Each crew will carry two Wedge Welding Machines designated for Geotextile only. The machines shall not be interchanged between HDPE and Geotextile so that malfunctions can be avoided when seaming the HDPE Geomembrane.

Capstripping, Patching, and Repairs will be performed using a Leister Triac-S Hot Air Gun.

-The leister will be used to capstrip cross seams and place repair patches on damaged areas.

Leister Triac-S Hot Air Gun

Demtech VM-20 Wedge Welder

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529 (U.S.A.)
Phone (706) 336-7000 Fax (706) 336-7007
e-mail: info@skaps.com

SKAPS TRANSNET™ (TN)
HDPE GEOCOMPOSITE 330

SKAPS TRANSNET™ geocomposite consists of SKAPS GeoNet made from HDPE resin with non-woven polypropylene geotextile fabric heat bonded on both sides of the the geonet.

Property	Test Method	Unit	Required Value		Qualifier
			With 6 oz.	With 8 oz.	
Geonet					
Thickness	ASTM D 5199	mil.	330±30	330±30	Range
Carbon Black	ASTM D 4218	%	2 to 3	2 to 3	Range
Tensile Strength	ASTM D 5035	lb/in	95	95	Minimum
Melt Flow	ASTM D 1238[3]	g/10 min.	1	1	Maximum
Density	ASTM D 1505	g/cm^3	0.94	0.94	Minimum
Transmissivity[1]	ASTM D 4716	m^2/sec.	$8x10^{-3}$	$8x10^{-3}$	MARV[2]
Composite					
Ply Adhesion (Minimum)	ASTM D 7005	lb/in	0.5	0.5	MARV
Ply Adhesion (Average)	ASTM D 7005	lb/in	1	1	MARV
Transmissivity[1]	ASTM D 4716	m^2/sec	$9x10^{-4}$	$9x10^{-4}$	MARV
Geotextile					
Fabric Weight	ASTM D 5261	oz/yd^2	6	8	MARV
Grab Strength	ASTM D 4632	lbs	160	225	MARV
Grab Elongation	ASTM D 4632	%	50	50	MARV
Tear Strength	ASTM D 4533	lbs	65	90	MARV
Puncture Resistance	ASTM D 4833	lbs	95	130	MARV
CBR Puncture	ASTM D 6241	lbs	475	650	MARV
Water Flow Rate	ASTM D 4491	gpm/ft^2	125	100	MARV
Permittivity	ASTM D 4491	sec^{-1}	1.63	1.26	MARV
Permeability	ASTM D 4491	cm/sec	0.3	0.3	MARV
AOS	ASTM D 4751	US Sieve	70	80	MARV

Notes:
1. Transmissivity measured using water at 21 ± 2°C (70 ± 4°F) with a gradient ~~of 0.1~~ 1.0 and a confining pressure of 10000 psf between stainless steel plates after 15 minutes. Values may vary between individual labs.
2. MARV is statistically defined as mean minus two standard deviations and it is the value which is exceeded by 97.5% of all the test data.
3. Condition 190/2.16

This information is provided for reference purposes only and is not intended as a warranty or guarantee. SKAPS assumes no liability in connection with the use of this information.

Skaps Industries, Inc.
571 Industrial Drive
Commerce, GA 30529

Hallaton Inc.
1206 Sparks Road
Sparks, MD 21152

March 14, 2015

RE: Approved Installer

To Whom It May Concern:

This letter is to affirm that Hallaton, Inc. of Sparks Maryland is an authorized installer of SKAPS Industries geonets and geocomposites, as well as woven and nonwoven geotextiles. Hallaton, Inc. has been installing these materials since 2002.

Sincerely,

Greg Scott

Greg Scott
Skaps Industries

Engineered Synthetic Products, Inc.
212 North Way
Birmingham, AL 35242
(205)981-1900; FAX (205)981-1901
email: g_kscott@bellsouth.net

Mr. Charles Smithson
Hallaton, Inc.
1206 Sparks Road
Sparks, MD 21152

Re: Rubber Tired Equipment Use on Geocomposites

Dear Mr. Smithson:

It has been demonstrated through successful practice in the geosynthetic industry that Rubber Tired Equipment or other low ground pressure equipment has been used directly on the geocomposites during material deployment. As the manufacturer's representative, we approve of the use of this equipment on our geocomposite as long as you minimize sudden stops or sharp, pivoting turns. The use of rubber tired equipment or other low ground pressure equipment during installation will not change or alter the manufacturer's material warranties.

Sincerely,

Greg Scott

Greg Scott
Engineered Synthetic Products, Inc.

SKAPS INDUSTRIES, INC.

HISTORY

SKAPS Industries began producing geonets and geocomposites in February 1997 in Commerce, Georgia. Geonet thicknesses range from 160 mils to 330 mils. Geocomposites are laminated either single or double sided.

SKAPS Industries operates two state-of-the-art Geonet Extrusion Lines. This ensures that our customers who have special project-specific requirements are serviced without interfering with standard daily production.

The quality control testing laboratory is equipped with the most up-to-date equipment and operates six days per week. SKAPS maintains a strict QA/QC program designed around GRI and ASTM procedures and standards.

SKAPS Industries is committed to manufacturing the highest quality drainage nets and geocomposites as well as exceptional service before and after the sale.

SKAPS INDUSTRIES, INC.
Engineered Synthetic Products, Inc.

GEONET / GEOCOMPOSITE TESTING PROCEDURES

QC Sampling Schedule

All tests are performed every 35,000 square feet of production except for compressibility and melt index, which are tested once per shift (approximately every 250,000 square feet of production). Transmissivity is done on a requested basis.

Weight / Area (ASTM D 5261)

The width is determined by measuring the sample in three places--once across each cut end and once across the center. The three measurements are then averaged and reported in inches. The length is also determined by measuring three places--along both edges and along the center. These values are averaged and reported in inches. Samples are then taken and weighed to the nearest .001 lb/sf. The weight is divided by the average width to obtain a weight per length value. The weight/length number is divided by the average width value to obtain weight per area. The value is reported in lbs/sf.

Thickness (ASTM D 5199)

Five specimens are cut from across the width of the lab sample. A thickness gauge with a ¾ inch presser foot is used to measure the thickness of each specimen. The values are recorded and reported as an average in inches.

Tensile Strength (ASTM D 5035)

Five specimens are cut from across the width of the lab sample. They are then placed in the jaws of the Instron Machine and a load is applied at a constant strain of 12 in/min until yield. The results of the tensile test are then averaged and recorded.

% Carbon Black (ASTM D 4218)

The carbon black test determines the percent by weight of the product that is carbon black. The percent of carbon black is the ratio of the residue weight after pyrolysis in a muffle furnace compared to the weight of input specimen. Two grams of the net are cut and placed in aluminum dishes. The samples are then placed in a muffle furnace for ten minutes at 600 degrees centigrade. The samples are removed and allowed to cool. The carbon black percentage is calculated and recorded.

Ply Adhesion (ASTM F 904)
Five specimens are cut from across the entire width of the composite sample, each measuring one inch wide by ten inches long. The strain rate for the test is 10 in/min. The fabric is clamped in one jaw of the Instron machine while the net is clamped in the other. The fabric is pulled away from the net to test the adhesion of the fabric to the net.

Transmissivity (ASTM D 4716)
The transmissivity test for the composite is identical to the test for the geonet.

Melt Index (ASTM D 1238)
The melt index determines the rate of the extrusion of the molten resin through a die of specified length and diameter at a temperature of 190 degrees centigrade under a load of 2.16 kg and is measured in g/10min. A sample of approximately 2.5 grams of geonet is then put through the melt plastometer to verify flow rates.

Density of Polymer (ASTM D 1505)
Taking samples from the melt index test, small strands are cut and measured in a density column. A mixture of distilled water and isopropyl alcohol is used as the suspension fluid.

Transmissivity (ASTM D 4716)
The transmissivity test measures the inplane flow of water across the net sample. In the standard test, the sample is placed between two steel plates with the water temperature at 20 degrees centigrade. Different gradients and loads are applied to the sample. The values are then calculated and converted to gallons per min/ft, or meters^2/sec. Transmissivity is not a standard manufacturing quality control test but rather a design indicator and is tested on a per project request basis.

SKAPS INDUSTRIES
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E-Mail: contact@skaps.com

GEONETS AND GEOCOMPOSITES: QUALITY MANUAL

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Table of Content

1. Quality Manifest

SKAPS Industries is committed to providing the highest level of quality products and services to our customers. Each employee of SKAPS is committed to highest quality that we will only supply products that meet or exceed the requirements and specifications of SKAPS and our customers. To do right for our customers we at SKAPS are committed to continual quality improvements in everything we do, dedicating ourselves to meeting the needs of our customers.

2. Quality Objective and Scope

The objective of this manual is to define and implement basic Manufacturing Quality Assurance (MQA) procedures necessary to ensure consistent quality production supply to customers. This manual applies to all operations at SKAPS; manufacturing, purchasing raw material, and shipping. This manual serves as the primary reference document within the company for all quality assurance related activities. It provides an overview of the Quality Assurance requirements and guide to other applicable documents.

3. Quality Assurance Management System

Quality Assurance Management System comprise of company President, Quality Department Manager, Quality Assurance Lab as well as manufacturing personnel. The combination of expertise and experience from these groups provides proper tools to maintain the highest level of quality and customer service in the industry.

- The President has executive responsibility for the Quality System and is responsible for creating an atmosphere where quality is the highest priority.
- The Quality Department has responsibility for ensuring that quality requirements are effectively established and maintained in accordance with appropriate regulations and for reporting to upper management.
- Each manager and supervisor is responsible for assuring that Quality Systems are followed in his or her area.
- Each employee is responsible for the quality of his or her work.

Two groups are dedicated to Quality System:

I. **The Quality Assurance** assists operating departments in the development of quality systems and implementing it faithfully and effectively. Quality Assurance has the responsibility to:
   - Identify and evaluate quality related issues.
   - Recommend solutions to quality issues and verify that all issues have been resolved (corrective actions).

- Initiate action to prevent the occurrence of quality issues (preventive actions).
- Control non-conforming products until acceptable corrective action has been taken.
- Report to upper management on quality related issues.

II. **The Quality Control** inspects and test products at all stages of the manufacturing process, from raw materials to finished products. Quality Control functions are distributed throughout the company to ensure that testing and inspection are done effectively.

4. Product Identification and Documentation

A. Roll Labeling

Each roll of geonet and geocomposite is identified with roll labels, which include unique roll number, type of product, and size of roll (length, width and weight of roll). Quality Assurance maintains records of raw material and finished products.

B. Approval Procedure

Samples are collected per customer specifications for testing. The Quality Assurance Lab tests these samples for SKAPS requirements and customer specifications for compliance. The Quality Assurance Lab approves these materials that they comply both requirements prior to shipment and maintain test records.

C. Non-Conformance

Finished product that does not meet SKAPS standard requirements is given a roll number but is rejected and not placed into inventory. The material is marked as scrap and will not be utilized.

Finished product that meets SKAPS standard requirements but does not meet customer specification is not allocated to that customer but is placed into inventory as SKAPS standard finished product.

D. Documentation

Test records are generated for each tested roll of geonet and geocomposite product. As per customer's requirement, individual certificates are generated certifying that each roll meets and or exceeds their specification. Copies of these certificates are kept in record system.

5. Records Retention

SKAPS maintains reports and/or samples for all finished products. Records and/or samples are maintained according to SKAPS retention policy.

Material	Item	Years
Raw Materials	Resin Supplier Test Reports and Certifications	2
	SKAPS Resin Test Reports	2
Geonet & Geocomposite	Raw Test Data (in computer database)	5
	Quality Control Certificates (in computer database)	5
	Sample	5

6. Testing Capabilities

SKAPS maintains state of the art laboratory equipment suitable to perform tests listed in Appendix “A”, “B”, “C” and “D”.

SKAPS has developed a strict and thorough Quality Assurance program that exceeds the majority of customer specifications. The testing program covers raw materials and finished goods. The laboratory equipment used by SKAPS is most modern equipment available and meets or exceeds the requirements of all the test standards used. Test frequencies and number of test specimen per sample are established based on statistical analysis and complexity of procedures.

In addition to routine testing, SKAPS laboratories are equipped to perform a wide variety of other tests as required for specific requests. Although the SKAPS laboratories are fully equipped and able to perform most routine tests, there are some tests that are more economically and efficiently performed by a dedicated testing facilities.

7. Material Quality Assurance

SKAPS has established strict specifications for all raw materials and finished products. Test results must fall within the acceptable limits of SKAPS and customer specifications.

A. Raw Material

SKAPS mainly uses two types of raw materials; Natural Resin and Masterbatch in manufacturing of geonet products. Natural resin is the base material used to make geonet. It may contain stabilizers to prevent degradation from occurring during and after extrusion. Masterbatch is concentrated carbon black material used with the natural resin to produce geonet products. The natural resin and masterbatch are blended at the appropriate ratio at the manufacturing stage. The masterbatch may contain other additives depending upon the geonet product. SKAPS verifies the properties of each lot of raw material prior to their utilization.

When a Lot of Natural Resin is received, samples are taken and tested as outlined in Appendix "A". All test data are entered into computer database and checked for accuracy, consistency and compliance with SKAPS specifications. Test results for any Lot of Natural Resin do not meet SKAPS standard requirements are rejected and not used for production.

Copies of the supplier's Certificate of Analysis (COA) for each Lot of Natural Resin obtained and kept as a record.

B. Geonet Products

SKAPS Geonets products are produced from High Density Polyethylene (HDPE) for the purpose of environmental drainage control. The biaxial grid design of geonet provides high flow characteristics in both directions. All geonet rolls produced are subjected to test methods, and frequencies outlined in Appendix "B".

I. Sampling

A one foot by roll width sample is cut for quality assurance testing from each roll to be tested. An archive sample is cut from each tested roll then labeled and stored for future reference. Test frequencies and number of test specimen per sample are established based on statistical analysis of the available data and complexity of the test procedures.

II. Evaluation of Results

All data are entered into a computer database for calculation and comparison with order specifications. If finished roll does not meet the SKAPS standards and/or the customers' specifications, the manufacturing personnel are immediately notified in order for the appropriate adjustment to be made. Only finished roll meeting SKAPS standards and customer specifications will be approved for shipment.

III. Reporting

A Quality Assurance Certificate is issued for every roll of finished product. This report identifies the standards on which the SKAPS approval is based along with the actual test results demonstrated by the product.

C. Geotextile Products

SKAPS Nonwoven division produces Civil and Environmental nonwoven geotextile that is needle-punched and made of 100% polypropylene staple fibers, which are formed into a random network for dimensional stability. All SKAPS geotextile products resist ultraviolet deterioration, rotting, biological degradation, naturally encountered basics and acids. Polypropylene is stable within a pH range of 2 to 13. Sampling, evaluation of results and reporting practices are same as for geonet products. For test methods and frequencies for geotextile products, please refer Appendix “C”.

D. Geocomposite Products

Geocomposite products are produced by heat bonding a geotextile to one or both sides of the geonet product. Sampling, evaluation of results and reporting practices are same as for geonet products. For test methods and frequencies for geocomposite products, please refer Appendix “D”.

E. Third Party Conformance Sampling

Some specifications require independent Quality Assurance and/or conformance testing. SKAPS can provide assistance with sampling of products and shipping to third party lab during production. By taking samples during production rather than on site, the customer can be assured that the samples are clean and available for conformance testing in a timely manner.

8. Amendments and Revisions

This Manual will be revised by Quality Assurance as required. Whenever revisions occur, all holders of controlled copies will be distributed applicable revised pages, describing the changes.

Management reviews of operations are continuous and any problems indicated with the Quality Program or its implementation will be addressed and corrected as directed by Management.

Appendix "A" – Testing Methods and Frequencies for Raw Materials

Property	Test Method	Frequency of Test[1]
Density	ASTM D 1505	Once per rail car compartment
Melt Flow Index	ASTM D 1238 (190° C, 2.16 kg)	Once per rail car compartment
Carbon Black Content	ASTM D 4218	N/A
Carbon Black Dispersion	ASTM D 5596	N/A

Appendix "B" – Testing Methods and Frequencies for Geonet Products

Property	Test Method	Frequency of Test[1]
Thickness	ASTM D 5199	Per 50,000 sq. ft.
Carbon Black Content	ASTM D 4218	Per 50,000 sq. ft.
Tensile Strength	ASTM D 7179	Per 50,000 sq. ft.
~~Density~~	~~ASTM D 1505~~	~~Per Resin Lot~~
~~Transmissivity[2]~~	~~ASTM D 4716~~	~~Per 540,000 sq. ft.~~

See Page 1 for Revised Testing Frequency

Notes:

(1) These test frequencies represent the minimum testing performed. Test frequencies may be changed for project based on project specifications.

(2) Transmissivity measured using water at 21 ± 2°C (70 ± 4°F) with a gradient of ~~0.1~~ 1.0 and a confining pressure of 10,000 psf between stainless steel plates after 15 minutes.

Appendix "C" – Testing Methods and Frequencies for Geotextile Products

Property	Test Method	Frequency of Test[1]
Mass per Unit Area (Weight)	ASTM D 5261	Per 100,000 sq. ft.
Grab Tensile Strength	ASTM D 4632	Per 100,000 sq. ft.
Grab Elongation	ASTM D 4632	Per 100,000 sq. ft.
Tear Strength	ASTM D 3786	Per 100,000 sq. ft.
Puncture Resistance	ASTM D 4833	Per 100,000 sq. ft.
CBR Puncture	ASTM D 6241	Per 100,000 sq. ft.
Water Flow Rate	ASTM D 4491	Per 540,000 sq. ft.
~~Permittivity~~	~~ASTM D 4491~~	~~Per 540,000 sq. ft.~~
~~Apparent Opening Size (AOS)~~	~~ASTM D 4751~~	~~Per 540,000 sq. ft.~~

See page 1 for revised testing frequency

Appendix "D" – Testing Methods and Frequencies for Geocomposite Products

~~Property~~	~~Test Method~~	~~Frequency of Test[1]~~
~~Ply Adhesion~~	~~ASTM D 7005~~	~~Per 50,000 sq. ft.~~
~~Transmissivity[2]~~	~~ASTM D 4716~~	~~Per 540,000 sq. ft.~~

See page 1 for revised testing frequency

Notes:

(1) These test frequencies represent the minimum testing performed. Test frequencies may be changed on project based on project specifications.

(2) Transmissivity measured using water at 21 ± 2°C (70 ± 4°F) with a gradient of ~~0.1~~ 0.3 and a confining pressure of 10,000 psf between stainless steel plates after 15 minutes.

TRANSNET

DRAINAGE NET

GEOCOMPOSITE

HANDLING AND INSTALLATION MANUAL

10/2003

SKAPS INDUSTRIES, INC.

Engineered Synthetic Products, Inc.

Phone (770) 564-1857

Fax (770) 564-1818

Introduction

Geocomposites provide a solution to various drainage problems. As with any synthetic product, the quality assurance and quality control does not stop once the product is shipped from the factory. Whether the product has been specified for vertical wall hydrostatic relief or horizontal flow zones for landfill cells/closure and roadways, care in handling and installation is critical to the future functioning of the product.

TRANSNET is manufactured utilizing high quality HDPE resin and lamination of high strength to weight ratio nonwoven geotextiles. The lamination process is completed at the same location where the net is manufactured, minimizing additional handling and allowing for supply of custom lengths. TRANSNET can have one or both sides laminated in order to meet the design specification.

Manufacturing

TRANSNET is manufactured utilizing state-of-the-art counter rotating dies and the highest quality resin. TRANSNET is manufactured with the addition of carbon black to stabilize against degradation from UV exposure.

Packaging

Upon completion of the lamination process, the geocomposite will be wrapped in an opaque wrap to prevent exposure to UV and for protection from the weather, dust, etc. In the event only TRANSNET is required, shipping in a wrapper is not necessary.

Each roll will be stickered or tagged so that the following information is available at all times from the manufacturer:

- Manufacturer's Name
- Product Identification
- Lot Number
- Roll Dimensions

SKAPS INDUSTRIES, INC.
Engineered Synthetic Products, Inc.

Shipping and Storage

Geocomposite rolls will be shipped in original packaging. In the event the packaging is damaged during shipment, repairs should be made to ensure protection against UV and weather. Care should be used during the off loading to ensure that the machinery used does not penetrate packaging.

Storage of the rolls prior to installation should be in an area where they are not in standing water. For storage longer than 30 days, rolls should be elevated off the ground with tires, pallets or 2x4's to prevent water from saturating the bottom row. The stack should then be covered with a material that will give additional protection from the elements. Should the product be exposed to excessive dust, the product should be washed prior to installation.

Site Preparation

The design engineer will determine how and where the geocomposite is to be utilized. With any application, care should be used in placing net or composite so that it is not damaged by stones or other protrusions that may compromise the functionality of the product.

Installation

TRANSNET should be installed by hand. Once the roll is delivered to the installation location via rubber-tired loader or other appropriate machinery, the rolls should be inspected for any damage from shipping or handling. Once the rolls are positioned, they should be unrolled by hand. For slope applications, the rolls should be rolled from top to bottom and hand tightened to remove any wrinkles. The TRANSNET portion of adjacent rolls shall be overlapped two to four inches or according to the Engineer's recommendation. When placing TRANSNET end to end, overlap in shingle placement fashion a minimum of one foot. For end-to-end placement, the top layer of geotextile shall be peeled back and excess TRANSNET will be trimmed so that the top layer of geotextile covers the attachment of the two layers of geocomposite. The TRANSNET will be attached to adjacent rolls utilizing plastic wire ties. These ties will be placed at a maximum spacing of 5 feet along the sides of the rolls and a maximum of 2 feet for end to end attachment, or according to the Engineer's specification.

Metal ties or hog rings are not to be used.

10/2003

Anchoring

For slope applications, TRANSNET should be placed in a trench so that pull out or slippage is prevented. The trench should be in accordance with the Design Engineer's requirements. Sand bags should be on hand at all times and placed on edges not seamed to prevent uplift from the wind. Welding of the TRANSNET to HDPE liner or any other geomembrane is not recommended.

SKAPS INDUSTRIES

INSTALLATION GUIDELINES

Nonwoven Geotextile, Nets and Composites

Heat Seaming

Nonwoven B Separate or Laminated

Nonwoven geotextiles can be joined together by using fusion seaming methods. The minimum overlap for this type of welding is four inches. Prior to fusion seaming the geotextile together, the installer must demonstrate to the Field Engineer the ability to perform this type of installation method. Areas burned through that are damaged by fusion welding shall be properly repaired. Care should be taken during installation to prevent damage to the geotextile. Torn or punctured material shall be patched with sufficient overlap to prevent separation.

Sewing Procedure

Nonwoven B Separate or Laminated

Fabric layers should be placed on the ground (preferably firm ground) so that the edges to be sewn are parallel and overlapping. The sewing operation typically requires three men--a machine operator and a man on each side of the machine. The lead man should hold the fabric edges evenly together and feed the fabric into the sewing machine head or folder. The man behind the machine should hold tension on the fabric so the machine operator has a taut and straight edge to sew across. If the machine misses a stictch or runs off the fabric, terminate the seam by cutting and tying the thread. Begin a new seam approximately one foot behind the broken seam.

Overlapping

Nonwoven-Separate or Laminated Separate

Roll goods form of geotextile should be overlapped a minimum of 12”. Care should be taken that roll goods remain parallel to each other. Extreme care should be taken to assure that soil does not intrude into the composite structure thus clogging the drainage net.

Sales Office:
Engineered Synthetic Products, Inc.
Phone (770) 564-1857
Fax (770) 564-1818
www.espgeosynthetics.com

SKAPS INDUSTRIES, INC.
Engineered Synthetic Products, Inc.

PROJECT LIST

1. Angelina County Landfill
   Lufkin, TX
   - Purpose: Landfill
   - Installation Date: 2015
   - Installer: Texas Environmental Plastics, Inc.
   - Product: 220-1-10; 220-2-10
   - Quantity: 290,000 ft^2; 145,000 ft^2

2. Chenango County Landfill
   Norwich, NY
   - Purpose: Landfill
   - Installation Date: 2015
   - Installer: Chenango Contracting, Inc.
   - Product: 270-2-6
   - Quantity: 302,400 ft^2

3. Marion County Landfill Cap
   Fairmont, WV
   - Purpose: Landfill Closure
   - Installation Date: 2015 and 2016
   - Installer: Environmental Construction, Inc.
   - Product: 220-2-6
   - Quantity: 2,950,750 ft^2

4. Trans Jordan Landfill Cap
   South Jordan, UT
   - Purpose: Landfill Cap
   - Installation Date: 2013
   - Installer: Texas Environmental Plastics, Inc.
   - Product: 270-2-8
   - Quantity: 688,800 ft2

5. International Paper Landfill
Corinth, NY

Purpose:	Landfill
Installation Date:	2014
Installer :	Antana Linings, Inc.
Product:	330-2-8; GE-180
Quantity:	189,000 ft^2; 320,850 ft^2

6. Maxey Flats Landfill Cap
Morehead, KY

Purpose:	Landfill Cap
Installation Date:	2015 and 2016
Installer:	Environmental Construction, Inc.
Product:	300-2-6; 350-2-6
Quantity:	2,385,600 ft^2 ; 441,000 ft^2

7. Springfield Road Landfill Cap
Glen Allen, VA

Purpose:	Landfill Closure
Installation Date:	2015
Installer:	Hallaton, Inc.
Product:	220-2-6
Quantity:	1,192,625 ft^2

8. Mount Storm Power Station
Mount Storm, WV

Purpose:	Landfill
Installation Date:	2014
Installer:	Hallaton, Inc.
Product:	270-2-10; GE-112
Quantity:	575,750 ft^2; 648,000 ft^2

9. Winnebago County Landfill Closure
Oshkosh, WI

Purpose:	Landfill Closure
Installation Date:	2013
Installer:	Clean Air & Water Systems, Inc.
Product:	270-2-6
Quantity:	1,168,800 ft^2

10. Flying Cloud Landfill
Eden Prairie, MN

Purpose:	Landfill
Installation Date:	2013
Installer:	Clean Air & Water Systems, Inc.
Product:	270-2-8
Quantity:	2,310,000 ft^2

11. Glatfelter Zone 5 Landfill Cap
Spring Grove, PA

Purpose:	Landfill Closure
Installation Date:	2015
Installer:	Hallaton, Inc.
Product:	270-2-6; 350-2-6
Quantity:	999,600 ft^2 ; 56,000 ft^2

12. Kent County Landfill
Byron Center, MI

Purpose:	Landfill Cell
Installation Date:	2015
Installer:	Texas Environmental Plastics, Inc.
Product:	270-1-6; 270-2-6
Quantity:	251,251 ft^2 ; 33,600 ft^2

13. DCSWA Rolling Hills Landfill
Boyertown, PA

Purpose:	Landfill
Installation Date:	2013
Installer:	Chenango Contracting, Inc.
Product:	270-2-10; GE-116
Quantity:	504,700 ft^2 ; 491,400 ft^2

14. Old Beulah LandfillCap
Hurlock, MD

Purpose:	Landfill Closure
Installation Date:	2015
Installer:	Hallaton, Inc.
Product:	270-2-6
Quantity:	2,027,200 ft^2

15. Corsicana Landfill
Corsicana, TX

Purpose:	Landfill Cell
Installation Date:	2014
Installer :	Texas Environmental Plastics, Inc.
Product:	220-2-6
Quantity:	300,875 ft^2

SKAPS Industries
571 Industrial Pkwy
Commerce, GA 30529
Phone: (706) 336-7000 Fax: (706) 336-7007

"SAMPLE"
Five Year Material Warranty
MATERIAL: _"SAMPLE"_

SKAPS Industries hereby warrants that, at the time of manufacturer, all SKAPS Industries manufactured materials will conform to the respective SKAPS Industries published material specifications for such materials. Excluded from the warranty given herein shall be any damage to or failure of the material caused by, but not limited to: acts of God; casualty; catastrophe or severe weather conditions, such as earthquakes, tornadoes, hurricanes, floods, high winds, piercing hail, lightening and fire; the exposure of the material to sharp objects, chemicals acids, gases or vapors, either known or unknown, or combinations, or specified by the manufacturer as being harmful thereto; physical abuse to the material caused by vandalism, sabotage, machinery, equipment, people and animals; damage to the material during the transportation, unloading, handling, storage or installation thereof by parties other than SKAPS Industries; excessive pressure or stress from any source, both above and below the material; after installation; subsidence or subgrade settlement; improper site preparation and engineering, and any use of the material which the manufacturer never intended. As used throughout this warranty, the term "sale" shall mean the date on which the material is shipped from SKAPS Industries manufacturing facility.

Should any significant deterioration or premature loss in use of the material occur during the term hereof which is believed to be covered by this warranty, then SKAPS Industries shall be given prompt written notice of the alleged claim within 30 days after such facts are first observed. Said notice shall be sent by registered or certified mail, return receipt requested, and addressed to SKAPS Industries, 571 Industrial Drive, Commerce, Georgia 30529, Attention: Contracts Administrator.

The warranty described above is strictly limited to sales of the material for commercial or industrial uses only in accordance with SKAPS Industries published material specifications. Said warranty also is the sole and exclusive warranty given for such material and all other warranties; either express or implied, including but not limited to any warranty of merchantability or fitness for a particular purpose, are hereby disclaimed. In no event shall SKAPS Industries be liable for any direct, indirect, incidental, specific or consequential damages of any kind or any loss or profits resulting from failure of the material or the breach of this warranty; it being further understood that should said warranty fail in its essential propose, and in that event only, SKAPS Industries liability hereunder shall in no event exceed the sales price of the material actually received from SKAPS by the Original Purchaser thereof.

Said warranty is not effective until all payments due to SKAPS Industries, for materials shipped, are paid in full.

Perry Vyas - President
SKAPS Industries

Appendix B-II
Manufacturing Quality Control Data

R. B. JERGENS CONTRACTORS, INC. VANDALIA, OHIO

11418 N. Dixie Drive P.O. Box 309
Vandalia, OH 45377
Phone: (937) 669-9799
Fax: (937) 669-0301

LETTER OF TRANSMITTAL

DATE: 11-Mar-19	JOB NO.: 18-003
ATTENTION: Brandon Schmader	
Submittal No. 25	
Amos Landfill Sequence 4 Expansion	
Composite Drainage Layer Manufacturer Quality Control Certifications	

TO **American Electric Power**
1 Riverside Plaza
Columbus, OH 43215

WE ARE SENDING YOU [X] Attached [ ] Under separate cover via ____________ the following items

[ ] Shop drawings [ ] Prints [ ] Plans [ ] Samples [ ] Specifications
[ ] Copy of letter [ ] Change Order [X] Test Results

COPIES	DATE	NO.	DESCRIPTION
1 electronic	11-Mar	1	Composite Drainage Layer Manufacturer Quality Control Certifications

THESE ARE TRANSMITTED as checked below:

[X] For Approval [ ] Approved as submitted [ ] Resubmit______copies for approval
[ ] For your use [ ] Approved as noted [ ] Submit_____copies for distribution
[ ] As requested [ ] Returned for corrections [ ] Return _____ corrected prints
[ ] For review [ ]
[ ]

REMARKS:
Submittal to complete 13010903T004-GDN SPEC-CRM.1.01.5.B.1.a-b
Submittal to complete 13010903T004-GDN SPEC-CRM.1.01.5.C.1.a.1-4

Kevin Harshberger, RBJ
Mike Davis, RBJ
Izaac Harshberger, RBJ
Ash Hutsonpillar, RBJ

SIGNED: Jacob Warner (signed)

Jacob Warner

1883-35317
AEP JOHN E. AMOS LANDFILL
SITE WORK CONSTRUCTION SEQUENCE 4
WINFIELD, WV

Submittal # 7

Geocomposite Drainage Net

SKAPS Geocomposite Submittals

- Manufacturer Quality Control - Skaps Industries
  - Transnet 330-2-6 Geocomposite (Rolls 1 to 264)
  - Transnet 330-2-6 Geocomposite (Rolls 265 to 572)

PREPARED BY:

HALLATON
ENVIRONMENTAL LININGS

1206 Sparks Road | Sparks, MD 21152 | 410-583-7700

March 8, 2019

February 28, 2019
Hallaton, Inc.
1206 Sparks Rd.
Sparks, MD, 21152

Ref. : AEP John Amos Power Plant Cell, WV
Customer P.O. # 1883
Product : TN 330-2-6

We hereby certify that the TN 330-2-6 drainage geocomposite, meets or exceeds the project requirements as stated in the specifications. The properties listed in this section are:

Property	Test Method	Unit	Value	Qualifier
Geonet[3]				
Thickness	ASTM D 5199	mil	300	MAV[6]
Carbon Black	ASTM D 4218	%	2.0 - 3.0	Range
Melt Flow	ASTM D 1238[2]	g/10 min	1.0	Maximum
Density	ASTM D 1505	g/cm^3	0.94	MAV
Transmissivity[1a]	ASTM D 4716	m^2/sec	3.0×10^{-3}	MAV
Composite				
Ply Adhesion	ASTM D 7005	lb/in	1.0	MAV
Transmissivity[1b]	ASTM D 4716	m^2/sec	1.5×10^{-4}	MAV
Geotextile[3 & 4]				
Fabric Weight	ASTM D 5261	oz/yd^2	6.0	MARV[5]
Grab Strength	ASTM D 4632	lbs	160	MARV
Grab Elongation	ASTM D 4632	%	50	MARV
Trap Tear Strength	ASTM D 4533	lbs	65	MARV
CBR Puncture	ASTM D 6241	lbs	450	MARV
Mullen Burst	ASTM D 3786	psi	189	MARV
Permittivity	ASTM D 4491	sec^{-1}	0.20	MARV
AOS	ASTM D 4751	US Sieve	70	MaxARV
UV Resistance	ASTM D 4355	%/hrs	70/500	MARV

Notes:

1a. *Transmissivity measured using water at 21 $\pm$ 2 ^oC (70 $\pm$ 4 ^oF) with a gradient of 1.0 and a confining pressure of 10,000 psf between steel plates after 15 minutes.*
1b. *Transmissivity measured using water at 21 $\pm$ 2 ^oC (70 $\pm$ 4 ^oF) with a gradient of 0.3 and a confining pressure of 25,000 psf between ash & geomembrane after 48 hours.*
2. *Condition 190/2.16*
3. *Geotextile and Geonet properties are prior to lamination.*
4. *Geotextile data is provided by the supplier.*
5. *MARV is statistically defined as mean minus two standard deviations and it is the value which is exceeded by 97.5% of all the test data.*
6. *Minium average value*

Sincerely,
Rajesh Patel
Rajesh Patel
QA Manager

APPROVED 5 QA

SKAPS

Product: TN 330-2-6
Project : AEP John Amos Power Plant Cell, WV

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

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010001	2.71	2.98	7.2×10^{-4}	CPCX 815404	0.9587	331	2.67	3.83×10^{-3}
85881010002				CPCX 815404	0.9587			
85881010003				CPCX 815404	0.9587			
85881010004				CPCX 815404	0.9587			
85881010005	2.27	2.05		CPCX 815404	0.9587			
85881010006				CPCX 815404	0.9587			
85881010007				CPCX 815404	0.9587			
85881010008				CPCX 815404	0.9587			
85881010009				CPCX 815404	0.9587			
85881010010	2.04	2.51		CPCX 815404	0.9587			
85881010011				CPCX 815404	0.9587			
85881010012				CPCX 815404	0.9587			
85881010013				CPCX 815404	0.9587			
85881010014				CPCX 815404	0.9587			
85881010015	2.91	2.66		CPCX 815404	0.9584	333	2.26	
85881010016				CPCX 815404	0.9584			
85881010017				CPCX 815404	0.9584			
85881010018				CPCX 815404	0.9584			
85881010019				CPCX 815404	0.9584			
85881010020	3.29	4.39		CPCX 815404	0.9584			
85881010021				CPCX 815404	0.9584			
85881010022				CPCX 815404	0.9584			
85881010023				CPCX 815404	0.9584			
85881010024				CPCX 815404	0.9584			

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Product: TN 330-2-6
Project : AEP John Amos Power Plant Cell, WV

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

Geocomposite				Geonet				
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010025	2.03	2.36		CPCX 815404	0.9584			
85881010026				CPCX 815404	0.9584			
85881010027				CPCX 815404	0.9584			
85881010028				CPCX 815404	0.9584			
85881010029				CPCX 815404	0.9584			
85881010030	3.51	3.28		CPCX 815404	0.9586	338	2.54	
85881010031				CPCX 815404	0.9586			
85881010032				CPCX 815404	0.9586			
85881010033				CPCX 815404	0.9586			
85881010034				CPCX 815404	0.9586			
85881010035	3.34	2.16		CPCX 815404	0.9586			
85881010036				CPCX 815404	0.9586			
85881010037				CPCX 815404	0.9586			
85881010038				CPCX 815404	0.9586			
85881010039				CPCX 815404	0.9586			
85881010040	2.48	3.06		CPCX 815404	0.9586			
85881010041				CPCX 815404	0.9586			
85881010042				CPCX 815404	0.9586			
85881010043				CPCX 815404	0.9586			
85881010044				CPCX 815404	0.9586			
85881010045	2.38	3.66		CPCX 815404	0.9581	330	2.45	
85881010046				CPCX 815404	0.9581			
85881010047				CPCX 815404	0.9581			
85881010048				CPCX 815404	0.9581			

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Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010049				CPCX 815404	0.9581			
85881010050	3.38	3.14		CPCX 815404	0.9581			
85881010051				CPCX 815404	0.9581			
85881010052				CPCX 815404	0.9581			
85881010053				CPCX 815404	0.9581			
85881010054				CPCX 815404	0.9581			
85881010055	3.15	2.73		CPCX 815404	0.9581			
85881010056				CPCX 815404	0.9581			
85881010057				CPCX 815404	0.9581			
85881010058				CPCX 815404	0.9581			
85881010059				CPCX 815404	0.9581			
85881010060	2.80	3.22		CPCX 815404	0.9589	334	2.37	
85881010061				CPCX 815404	0.9589			
85881010062				CPCX 815404	0.9589			
85881010063				CPCX 815404	0.9589			
85881010064				CPCX 815404	0.9589			
85881010065	4.27	3.03		CPCX 815404	0.9589			
85881010066				CPCX 815404	0.9589			
85881010067				CPCX 815404	0.9589			
85881010068				CPCX 815404	0.9589			
85881010069				CPCX 815404	0.9589			
85881010070	3.76	2.90		CPCX 815404	0.9589			
85881010071				CPCX 815404	0.9589			
85881010072				CPCX 815404	0.9589			

Product: TN 330-2-6
Project : AEP John Amos Power Plant Cell, WV

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

Geocomposite				Geonet				
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010073				CPCX 815404	0.9589			
85881010074				CPCX 815404	0.9589			
85881010075	2.33	4.43	7.11×10^{-4}	CPCX 815404	0.9585	336	2.69	3.7×10^{-3}
85881010076				CPCX 815404	0.9585			
85881010077				CPCX 815404	0.9585			
85881010078				CPCX 815404	0.9585			
85881010079				CPCX 815404	0.9585			
85881010080	3.05	3.97		CPCX 815404	0.9585			
85881010081				CPCX 815404	0.9585			
85881010082				CPCX 815404	0.9585			
85881010083				CPCX 815404	0.9585			
85881010084				CPCX 815404	0.9585			
85881010085	2.88	2.71		CPCX 815404	0.9585			
85881010086				CPCX 815404	0.9585			
85881010087				CPCX 815404	0.9585			
85881010088				CPCX 815404	0.9585			
85881010089				CPCX 815404	0.9585			
85881010090	4.36	2.25		CPCX 815404	0.9582	338	2.35	
85881010091				CPCX 815404	0.9582			
85881010092				CPCX 815404	0.9582			
85881010093				CPCX 815404	0.9582			
85881010094				CPCX 815404	0.9582			
85881010095	4.25	2.58		CPCX 815404	0.9582			
85881010096				CPCX 815404	0.9582			

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Product: TN 330-2-6
Project : AEP John Amos Power Plant Cell, WV

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

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010097				CPCX 815404	0.9582			
85881010098				CPCX 815404	0.9582			
85881010099				CPCX 815404	0.9582			
85881010100	3.98	3.30		CPCX 815404	0.9582			
85881010101				CPCX 815404	0.9582			
85881010102				CPCX 815404	0.9582			
85881010103				CPCX 815404	0.9582			
85881010104				CPCX 815404	0.9582			
85881010105	2.10	2.43		CPCX 815404	0.9588	330	2.43	
85881010106				CPCX 815404	0.9588			
85881010107				CPCX 815404	0.9588			
85881010108				CPCX 815404	0.9588			
85881010109				CPCX 815404	0.9588			
85881010110	2.73	3.76		CPCX 815404	0.9588			
85881010111				CPCX 815404	0.9588			
85881010112				CPCX 815404	0.9588			
85881010113				CPCX 815404	0.9588			
85881010114				CPCX 815404	0.9588			
85881010115	3.03	3.89		CPCX 815404	0.9588			
85881010116				CPCX 815404	0.9588			
85881010117				CPCX 815404	0.9588			
85881010118				CPCX 815404	0.9588			
85881010119				CPCX 815404	0.9588			
85881010120	2.58	2.75		CPCX 815404	0.9590	335	2.47	

Product: TN 330-2-6
Project : AEP John Amos Power Plant Cell, WV

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Geocomposite				Geonet				
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010121				CPCX 815404	0.9590			
85881010122				CPCX 815404	0.9590			
85881010123				CPCX 815404	0.9590			
85881010124				CPCX 815404	0.9590			
85881010125	3.85	4.26		CPCX 815404	0.9590			
85881010126				CPCX 815404	0.9590			
85881010127				CPCX 815404	0.9590			
85881010128				CPCX 815404	0.9590			
85881010129				CPCX 815404	0.9590			
85881010130	4.15	3.39		CPCX 815404	0.9590			
85881010131				CPCX 815404	0.9590			
85881010132				CPCX 815404	0.9590			
85881010133				CPCX 815404	0.9590			
85881010134				CPCX 815404	0.9590			
85881010135	2.08	3.88		CPCX 815404	0.9583	332	2.39	
85881010136				CPCX 815404	0.9583			
85881010137				CPCX 815404	0.9583			
85881010138				CPCX 815404	0.9583			
85881010139				CPCX 815404	0.9583			
85881010140	3.66	4.16		CPCX 815404	0.9583			
85881010141				CPCX 815404	0.9583			
85881010142				CPCX 815404	0.9583			
85881010143				CPCX 815404	0.9583			
85881010144				CPCX 815404	0.9583			

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Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010145	3.24	3.70		CPCX 815404	0.9583			
85881010146				CPCX 815404	0.9583			
85881010147				CPCX 815404	0.9583			
85881010148				CPCX 815404	0.9583			
85881010149				CPCX 815404	0.9583			
85881010150	4.43	3.93	7.14×10^{-4}	CPCX 815404	0.9586	337	2.63	3.88×10^{-3}
85881010151				CPCX 815404	0.9586			
85881010152				CPCX 815404	0.9586			
85881010153				CPCX 815404	0.9586			
85881010154				CPCX 815404	0.9586			
85881010155	2.34	3.53		CPCX 815404	0.9586			
85881010156				CPCX 815404	0.9586			
85881010157				CPCX 815404	0.9586			
85881010158				CPCX 815404	0.9586			
85881010159				CPCX 815404	0.9586			
85881010160	3.04	3.64		CPCX 815404	0.9586			
85881010161				CPCX 815404	0.9586			
85881010162				CPCX 815404	0.9586			
85881010163				CPCX 815404	0.9586			
85881010164				CPCX 815404	0.9586			
85881010165	3.18	4.14		CPCX 815404	0.9589	339	2.59	
85881010166				CPCX 815404	0.9589			
85881010167				CPCX 815404	0.9589			
85881010168				CHVX 890516	0.9502			

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SKAPS

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Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010169				CHVX 890516	0.9502			
85881010170	2.86	4.13		CHVX 890516	0.9502			
85881010171				CHVX 890516	0.9502			
85881010172				CHVX 890516	0.9502			
85881010173				CHVX 890516	0.9502			
85881010174				CHVX 890516	0.9502			
85881010175	3.40	3.98		CHVX 890516	0.9502			
85881010176				CHVX 890516	0.9502			
85881010177				CHVX 890516	0.9502			
85881010178				CHVX 890516	0.9502			
85881010179				CHVX 890516	0.9502			
85881010180	4.13	3.63		CHVX 890516	0.9500	332	2.25	
85881010181				CHVX 890516	0.9500			
85881010182				CHVX 890516	0.9500			
85881010183				CHVX 890516	0.9500			
85881010184				CHVX 890516	0.9500			
85881010185	3.61	3.94		CHVX 890516	0.9500			
85881010186				CHVX 890516	0.9500			
85881010187				CHVX 890516	0.9500			
85881010188				CHVX 890516	0.9500			
85881010189				CHVX 890516	0.9500			
85881010190	3.59	3.36		CHVX 890516	0.9500			
85881010191				CHVX 890516	0.9500			
85881010192				CHVX 890516	0.9500			

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Product: TN 330-2-6
Project : AEP John Amos Power Plant Cell, WV

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

Geocomposite				Geonet				
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010193				CHVX 890516	0.9500			
85881010194				CHVX 890516	0.9500			
85881010195	4.52	2.18		CHVX 890516	0.9505	335	2.49	
85881010196				CHVX 890516	0.9505			
85881010197				CHVX 890516	0.9505			
85881010198				CHVX 890516	0.9505			
85881010199				CHVX 890516	0.9505			
85881010200	4.04	3.09		CHVX 890516	0.9505			
85881010201				CHVX 890516	0.9505			
85881010202				CHVX 890516	0.9505			
85881010203				CHVX 890516	0.9505			
85881010204				CHVX 890516	0.9505			
85881010205	4.07	2.23		CHVX 890516	0.9505			
85881010206				CHVX 890516	0.9505			
85881010207				CHVX 890516	0.9505			
85881010208				CHVX 890516	0.9505			
85881010209				CHVX 890516	0.9505			
85881010210	2.29	3.29		CHVX 890516	0.9507	333	2.52	
85881010211				CHVX 890516	0.9507			
85881010212				CHVX 890516	0.9507			
85881010213				CHVX 890516	0.9507			
85881010214				CHVX 890516	0.9507			
85881010215	3.10	2.50		CHVX 890516	0.9507			
85881010216				CHVX 890516	0.9507			

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Product: TN 330-2-6
Project : AEP John Amos Power Plant Cell, WV

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

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010217				CHVX 890516	0.9507			
85881010218				CHVX 890516	0.9507			
85881010219				CHVX 890516	0.9507			
85881010220	2.28	3.51		CHVX 890516	0.9507			
85881010221				CHVX 890516	0.9507			
85881010222				CHVX 890516	0.9507			
85881010223				CHVX 890516	0.9507			
85881010224				CHVX 890516	0.9507			
85881010225	3.09	3.47	7.26×10^{-4}	CHVX 890516	0.9499	337	2.73	3.79×10^{-3}
85881010226				CHVX 890516	0.9499			
85881010227				CHVX 890516	0.9499			
85881010228				CHVX 890516	0.9499			
85881010229				CHVX 890516	0.9499			
85881010230	3.22	2.84		CHVX 890516	0.9499			
85881010231				CHVX 890516	0.9499			
85881010232				CHVX 890516	0.9499			
85881010233				CHVX 890516	0.9499			
85881010234				CHVX 890516	0.9499			
85881010235	4.28	3.34		CHVX 890516	0.9499			
85881010236				CHVX 890516	0.9499			
85881010237				CHVX 890516	0.9499			
85881010238				CHVX 890516	0.9499			
85881010239				CHVX 890516	0.9499			
85881010240	4.54	2.04		CHVX 890516	0.9503	331	2.57	

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Product: TN 330-2-6
Project : AEP John Amos Power Plant Cell, WV

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

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010241				CHVX 890516	0.9503			
85881010242				CHVX 890516	0.9503			
85881010243				CHVX 890516	0.9503			
85881010244				CHVX 890516	0.9503			
85881010245	3.39	2.22		CHVX 890516	0.9503			
85881010246				CHVX 890516	0.9503			
85881010247				CHVX 890516	0.9503			
85881010248				CHVX 890516	0.9503			
85881010249				CHVX 890516	0.9503			
85881010250	2.36	2.69		CHVX 890516	0.9503			
85881010251				CHVX 890516	0.9503			
85881010252				CHVX 890516	0.9503			
85881010253				CHVX 890516	0.9503			
85881010254				CHVX 890516	0.9503			
85881010255	4.56	2.99		CHVX 890516	0.9506	332	2.24	
85881010256				CHVX 890516	0.9506			
85881010257				CHVX 890516	0.9506			
85881010258				CHVX 890516	0.9506			
85881010259				CHVX 890516	0.9506			
85881010260	2.75	3.49		CHVX 890516	0.9506			
85881010261				CHVX 890516	0.9506			
85881010262				CHVX 890516	0.9506			
85881010263				CHVX 890516	0.9506			
85881010264				CHVX 890516	0.9506			

POLYETHYLENE RESIN CERTIFICATION

Customer Name : Hallaton, Inc.
Project Name : AEP John Amos Power Plant Cell, WV
Geocomposite Manufacturer : SKAPS Industries
Geocomposite Production Plant : Commerce, GA
Geocomposite Brand Name : TN 330-2-6

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

Resin Manufacturer	Resin Lot Number	Property	Test Method	Units	Resin Manufacturer Value	Tested Value*
Chevron Phillips Chemical Company	CPCX 815404	Density	ASTM D1505	g/cm^3	0.9540	0.9536
		Melt flow Index	ASTM D1238[(a)]	g/10 min	0.38	0.35
Chevron Phillips Chemical Company	CHVX 890516	Density	ASTM D1505	g/cm^3	0.9450	0.9453
		Melt flow Index	ASTM D1238[(a)]	g/10 min	0.17	0.19

* No post consumer recycled polymer is added to the resin during the manufacture of the geonet components assigned to this project.

(a) Condition 190/2.16

* Data from SKAPS Quality Control

*571 Industrial Parkway, Commerce, GA 30529 * Ph : 706-336-7000 * Fax : 706-336-7007 * Email : contact@skaps.com*

Geotextile Certification

Product: TN 330-2-6
Project : AEP John Amos Power Plant Cell, WV

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

GEOCOMP ROLL#	FABRIC SIDE	WEIGHT oz/yd^2	GRAB lbs. (MD)	GRAB ELG % (MD)	GRAB lbs. (XMD)	GRAB ELG % (XMD)	TRAP lbs. (MD)	TRAP lbs. (XMD)	CBR PUNCTURE lbs	AOS us sieve	PERM-ITY sec^{-1}
85881010001	Side A	6.21	161	73	174	81	70	82	495	70	1.82
	Side B	6.47	170	69	173	82	77	86	490	70	1.77
85881010035	Side A	6.61	160	65	173	75	76	89	453	70	1.75
	Side B	6.34	162	74	174	81	80	85	452	70	1.79
85881010070	Side A	6.63	163	75	179	83	74	88	500	70	1.78
	Side B	6.37	168	65	180	80	71	85	472	70	1.80
85881010105	Side A	6.22	162	67	171	76	73	83	476	70	1.76
	Side B	6.23	164	71	170	83	75	89	483	70	1.77
85881010140	Side A	6.46	163	67	180	78	71	83	498	70	1.77
	Side B	6.70	167	68	179	75	75	82	459	70	1.76
85881010175	Side A	6.26	169	70	177	85	73	82	468	70	1.75
	Side B	6.68	160	71	174	75	77	87	471	70	1.82
85881010210	Side A	6.26	169	70	177	85	73	82	468	70	1.75
	Side B	6.27	168	69	179	84	74	87	463	70	1.75
85881010245	Side A	6.67	165	73	171	79	78	84	497	70	1.75
	Side B	6.44	162	67	175	75	76	88	493	70	1.80

* Metal detectors are positioned on the production line to detect needles or other contaminates.

* Nonwoven geotextiles used to manufacture the geocomposite are needle free

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SKAPS

March 7, 2019
Hallaton, Inc.
1206 Sparks Rd.
Sparks, MD, 21152

Ref. : AEP John Amos Power Plant Cell, WV
Customer P.O. # 1883
Product : TN 330-2-6

We hereby certify that the TN 330-2-6 drainage geocomposite, meets or exceeds the project requirements as stated in the specifications. The properties listed in this section are:

Property	Test Method	Unit	Value	Qualifier
Geonet[3]				
Thickness	ASTM D 5199	mil	300	MAV[6]
Carbon Black	ASTM D 4218	%	2.0 - 3.0	Range
Melt Flow	ASTM D 1238[2]	g/10 min	1.0	Maximum
Density	ASTM D 1505	g/cm^3	0.94	MAV
Transmissivity[1a]	ASTM D 4716	m^2/sec	3.0×10^{-3}	MAV
Composite				
Ply Adhesion	ASTM D 7005	lb/in	1.0	MAV
Transmissivity[1b]	ASTM D 4716	m^2/sec	1.5×10^{-4}	MAV
Geotextile[3 & 4]				
Fabric Weight	ASTM D 5261	oz/yd^2	6.0	MARV[5]
Grab Strength	ASTM D 4632	lbs	160	MARV
Grab Elongation	ASTM D 4632	%	50	MARV
Trap Tear Strength	ASTM D 4533	lbs	65	MARV
CBR Puncture	ASTM D 6241	lbs	450	MARV
Mullen Burst	ASTM D 3786	psi	189	MARV
Permittivity	ASTM D 4491	sec^{-1}	0.20	MARV
AOS	ASTM D 4751	US Sieve	70	MaxARV
UV Resistance	ASTM D 4355	%/hrs	70/500	MARV

Notes:

1a. *Transmissivity measured using water at 21 $\pm$ 2 ^{o} C (70 $\pm$ 4 ^{o} F) with a gradient of 1.0 and a confining pressure of 10,000 psf between steel plates after 15 minutes.*
1b. *Transmissivity measured using water at 21 $\pm$ 2 ^{o} C (70 $\pm$ 4 ^{o} F) with a gradient of 0.3 and a confining pressure of 25,000 psf between ash & geomembrane after 48 hours.*
2. *Condition 190/2.16*
3. *Geotextile and Geonet properties are prior to lamination.*
4. *Geotextile data is provided by the supplier.*
5. *MARV is statistically defined as mean minus two standard deviations and it is the value which is exceeded by 97.5% of all the test data.*
6. *Minium average value*

Sincerely,

Rajesh Patel

Rajesh Patel
QA Manager

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 * Ph : 706-336-7000 * Fax : 706-336-7007 * Email : contact@skaps.com

Product: TN 330-2-6
Project : AEP John Amos Power Plant Cell, WV

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

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010265	2.40	2.73		CHVX 890516	0.9506			
85881010266				CHVX 890516	0.9506			
85881010267				CHVX 890516	0.9506			
85881010268				CHVX 890516	0.9506			
85881010269				CHVX 890516	0.9506			
85881010270	4.32	4.54		CHVX 890516	0.9504	339	2.76	
85881010271				CHVX 890516	0.9504			
85881010272				CHVX 890516	0.9504			
85881010273				CHVX 890516	0.9504			
85881010274				CHVX 890516	0.9504			
85881010275	4.42	2.36		CHVX 890516	0.9504			
85881010276				CHVX 890516	0.9504			
85881010277				CHVX 890516	0.9504			
85881010278				CHVX 890516	0.9504			
85881010279				CHVX 890516	0.9504			
85881010280	2.52	4.42		CHVX 890516	0.9504			
85881010281				CHVX 890516	0.9504			
85881010282				CHVX 890516	0.9504			
85881010283				CHVX 890516	0.9504			
85881010284				CHVX 890516	0.9504			
85881010285	2.74	2.43		CHVX 890516	0.9498	334	2.23	
85881010286				CHVX 890516	0.9498			
85881010287				CHVX 890516	0.9498			
85881010288				CHVX 890516	0.9498			

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Product: TN 330-2-6
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We hereby certify the following test results for the above referenced product/project :

Geocomposite				Geonet				
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010289				CHVX 890516	0.9498			
85881010290	2.93	2.25		CHVX 890516	0.9498			
85881010291				CHVX 890516	0.9498			
85881010292				CHVX 890516	0.9498			
85881010293				CHVX 890516	0.9498			
85881010294				CHVX 890516	0.9498			
85881010295	4.55	2.96		CHVX 890516	0.9498			
85881010296				CHVX 890516	0.9498			
85881010297				CHVX 890516	0.9498			
85881010298				CHVX 890516	0.9498			
85881010299				CHVX 890516	0.9498			
85881010300	3.25	3.58	7.08×10^{-4}	CHVX 890516	0.9501	332	2.27	3.85×10^{-3}
85881010301				CHVX 890516	0.9501			
85881010302				CHVX 890516	0.9501			
85881010303				CHVX 890516	0.9501			
85881010304				CHVX 890516	0.9501			
85881010305	2.13	2.60		CHVX 890516	0.9501			
85881010306				CHVX 890516	0.9501			
85881010307				CHVX 890516	0.9501			
85881010308				CHVX 890516	0.9501			
85881010309				CHVX 890516	0.9501			
85881010310	3.47	2.80		CHVX 890516	0.9501			
85881010311				CHVX 890516	0.9501			
85881010312				CHVX 890516	0.9501			

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

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010313				CHVX 890516	0.9501			
85881010314				CHVX 890516	0.9501			
85881010315	3.14	4.50		CHVX 890516	0.9501	331	2.78	
85881010316				CHVX 890516	0.9501			
85881010317				CHVX 890516	0.9501			
85881010318				CHVX 890516	0.9501			
85881010319				CHVX 890516	0.9501			
85881010320	4.41	3.40		CHVX 890516	0.9501			
85881010321				CHVX 890516	0.9501			
85881010322				CHVX 890516	0.9501			
85881010323				CHVX 890516	0.9501			
85881010324				CHVX 890516	0.9501			
85881010325	4.44	4.20		CHVX 890516	0.9501			
85881010326				CHVX 890516	0.9501			
85881010327				CHVX 890516	0.9501			
85881010328				CHVX 890516	0.9501			
85881010329				CHVX 890516	0.9501			
85881010330	4.31	3.45		CHVX 890516	0.9504	336	2.72	
85881010331				CHVX 890516	0.9504			
85881010332				CHVX 890516	0.9504			
85881010333				CHVX 890516	0.9504			
85881010334				CHVX 890516	0.9504			
85881010335	4.34	3.16		CHVX 890516	0.9504			
85881010336				CHVX 890516	0.9504			

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Project : AEP John Amos Power Plant Cell, WV

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

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010337				CHVX 890516	0.9504			
85881010338				CHVX 890516	0.9504			
85881010339				CHVX 890516	0.9504			
85881010340	4.45	2.27		CHVX 890516	0.9504			
85881010341				CHVX 890516	0.9504			
85881010342				CHVX 890516	0.9504			
85881010343				CHVX 890516	0.9504			
85881010344				CHVX 890516	0.9504			
85881010345	2.78	4.05		CHVX 890516	0.9506	330	2.29	
85881010346				CHVX 890516	0.9506			
85881010347				CHVX 890516	0.9506			
85881010348				CHVX 890516	0.9506			
85881010349				CHVX 890516	0.9506			
85881010350	3.53	2.53		CHVX 890516	0.9506			
85881010351				CHVX 890516	0.9506			
85881010352				CHVX 890516	0.9506			
85881010353				CHVX 890516	0.9506			
85881010354				CHVX 890516	0.9506			
85881010355	2.54	3.83		CHVX 890516	0.9506			
85881010356				CHVX 890516	0.9506			
85881010357				CHVX 890516	0.9506			
85881010358				CHVX 890516	0.9506			
85881010359				CHVX 890516	0.9506			
85881010360	4.24	4.57		CHVX 890516	0.9500	333	2.75	

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Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010361				CHVX 890516	0.9500			
85881010362				CHVX 890516	0.9500			
85881010363				CHVX 890516	0.9500			
85881010364				CHVX 890516	0.9500			
85881010365	2.90	2.10		CHVX 890516	0.9500			
85881010366				CHVX 890516	0.9500			
85881010367				CHVX 890516	0.9500			
85881010368				CHVX 890516	0.9500			
85881010369				CHVX 890516	0.9500			
85881010370	3.74	2.19		CHVX 890516	0.9500			
85881010371				CHVX 890516	0.9500			
85881010372				CHVX 890516	0.9500			
85881010373				CHVX 890516	0.9500			
85881010374				CHVX 890516	0.9500			
85881010375	3.88	3.60	7.15×10^{-4}	CHVX 890516	0.9498	337	2.51	3.72×10^{-3}
85881010376				CHVX 890516	0.9498			
85881010377				CHVX 890516	0.9498			
85881010378				CHVX 890516	0.9498			
85881010379				CHVX 890516	0.9498			
85881010380	3.45	2.11		CHVX 890516	0.9498			
85881010381				ECUX 882429	0.9533			
85881010382				ECUX 882429	0.9533			
85881010383				ECUX 882429	0.9533			
85881010384				ECUX 882429	0.9533			

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Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010385	2.95	2.07		ECUX 882429	0.9533			
85881010386				ECUX 882429	0.9533			
85881010387				ECUX 882429	0.9533			
85881010388				ECUX 882429	0.9533			
85881010389				ECUX 882429	0.9533			
85881010390	2.09	2.63		ECUX 882429	0.9531	334	2.74	
85881010391				ECUX 882429	0.9531			
85881010392				ECUX 882429	0.9531			
85881010393				ECUX 882429	0.9531			
85881010394				ECUX 882429	0.9531			
85881010395	4.10	3.86		ECUX 882429	0.9531			
85881010396				ECUX 882429	0.9531			
85881010397				ECUX 882429	0.9531			
85881010398				ECUX 882429	0.9531			
85881010399				ECUX 882429	0.9531			
85881010400	2.24	2.57		ECUX 882429	0.9531			
85881010401				ECUX 882429	0.9531			
85881010402				ECUX 882429	0.9531			
85881010403				ECUX 882429	0.9531			
85881010404				ECUX 882429	0.9531			
85881010405	2.49	3.92		ECUX 882429	0.9536	333	2.65	
85881010406				ECUX 882429	0.9536			
85881010407				ECUX 882429	0.9536			
85881010408				ECUX 882429	0.9536			

*571 Industrial Parkway, Commerce, GA 30529 * Ph : 706-336-7000 * Fax : 706-336-7007 * Email : contact@skaps.com*

Product: TN 330-2-6
Project : AEP John Amos Power Plant Cell, WV

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

Geocomposite				Geonet				
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010409				ECUX 882429	0.9536			
85881010410	4.39	2.15		ECUX 882429	0.9536			
85881010411				ECUX 882429	0.9536			
85881010412				ECUX 882429	0.9536			
85881010413				ECUX 882429	0.9536			
85881010414				ECUX 882429	0.9536			
85881010415	2.57	3.74		ECUX 882429	0.9536			
85881010416				ECUX 882429	0.9536			
85881010417				ECUX 882429	0.9536			
85881010418				ECUX 882429	0.9536			
85881010419				ECUX 882429	0.9536			
85881010420	3.43	1.99		ECUX 882429	0.9532	336	2.60	
85881010421				ECUX 882429	0.9532			
85881010422				ECUX 882429	0.9532			
85881010423				ECUX 882429	0.9532			
85881010424				ECUX 882429	0.9532			
85881010425	3.54	3.10		ECUX 882429	0.9532			
85881010426				ECUX 882429	0.9532			
85881010427				ECUX 882429	0.9532			
85881010428				ECUX 882429	0.9532			
85881010429				ECUX 882429	0.9532			
85881010430	3.26	4.48		ECUX 882429	0.9532			
85881010431				ECUX 882429	0.9532			
85881010432				ECUX 882429	0.9532			

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Product: TN 330-2-6
Project : AEP John Amos Power Plant Cell, WV

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

Geocomposite				Geonet				
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010433				ECUX 882429	0.9532			
85881010434				ECUX 882429	0.9532			
85881010435	3.36	3.15		ECUX 882429	0.9530	338	2.44	
85881010436				ECUX 882429	0.9530			
85881010437				ECUX 882429	0.9530			
85881010438				ECUX 882429	0.9530			
85881010439				ECUX 882429	0.9530			
85881010440	3.27	2.94		ECUX 882429	0.9530			
85881010441				ECUX 882429	0.9530			
85881010442				ECUX 882429	0.9530			
85881010443				ECUX 882429	0.9530			
85881010444				ECUX 882429	0.9530			
85881010445	2.61	2.99		ECUX 882429	0.9530			
85881010446				ECUX 882429	0.9530			
85881010447				ECUX 882429	0.9530			
85881010448				ECUX 882429	0.9530			
85881010449				ECUX 882429	0.9530			
85881010450	2.81	4.10	7.07×10^{-4}	ECUX 882429	0.9534	333	2.50	3.76×10^{-3}
85881010451				ECUX 882429	0.9534			
85881010452				ECUX 882429	0.9534			
85881010453				ECUX 882429	0.9534			
85881010454				ECUX 882429	0.9534			
85881010455	2.94	3.55		ECUX 882429	0.9534			
85881010456				ECUX 882429	0.9534			

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Product: TN 330-2-6
Project : AEP John Amos Power Plant Cell, WV

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

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010457				ECUX 882429	0.9534			
85881010458				ECUX 882429	0.9534			
85881010459				ECUX 882429	0.9534			
85881010460	3.81	4.15		ECUX 882429	0.9534			
85881010461				ECUX 882429	0.9534			
85881010462				ECUX 882429	0.9534			
85881010463				ECUX 882429	0.9534			
85881010464				ECUX 882429	0.9534			
85881010465	2.96	4.19		ECUX 882429	0.9528	339	2.77	
85881010466				ECUX 882429	0.9528			
85881010467				ECUX 882429	0.9528			
85881010468				ECUX 882429	0.9528			
85881010469				ECUX 882429	0.9528			
85881010470	2.21	3.99		ECUX 882429	0.9528			
85881010471				ECUX 882429	0.9528			
85881010472				ECUX 882429	0.9528			
85881010473				ECUX 882429	0.9528			
85881010474				ECUX 882429	0.9528			
85881010475	2.22	5.10		ECUX 882429	0.9528			
85881010476				ECUX 882429	0.9528			
85881010477				ECUX 882429	0.9528			
85881010478				ECUX 882429	0.9528			
85881010479				ECUX 882429	0.9528			
85881010480	4.06	4.49		ECUX 882429	0.9535	331	2.48	

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Product: TN 330-2-6
Project : AEP John Amos Power Plant Cell, WV

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

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010481				ECUX 882429	0.9535			
85881010482				ECUX 882429	0.9535			
85881010483				ECUX 882429	0.9535			
85881010484				ECUX 882429	0.9535			
85881010485	3.55	5.15		ECUX 882429	0.9535			
85881010486				ECUX 882429	0.9535			
85881010487				ECUX 882429	0.9535			
85881010488				ECUX 882429	0.9535			
85881010489				ECUX 882429	0.9535			
85881010490	3.02	2.21		ECUX 882429	0.9535			
85881010491				ECUX 882429	0.9535			
85881010492				ECUX 882429	0.9535			
85881010493				ECUX 882429	0.9535			
85881010494				ECUX 882429	0.9535			
85881010495	2.46	4.99		ECUX 882429	0.9529	337	2.31	
85881010496				ECUX 882429	0.9529			
85881010497				ECUX 882429	0.9529			
85881010498				ECUX 882429	0.9529			
85881010499				ECUX 882429	0.9529			
85881010500	3.92	6.10		ECUX 882429	0.9529			
85881010501				ECUX 882429	0.9529			
85881010502				ECUX 882429	0.9529			
85881010503				ECUX 882429	0.9529			
85881010504				ECUX 882429	0.9529			

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Product: TN 330-2-6
Project : AEP John Amos Power Plant Cell, WV

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

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010505	3.12	3.91		ECUX 882429	0.9529			
85881010506				ECUX 882429	0.9529			
85881010507				ECUX 882429	0.9529			
85881010508				ECUX 882429	0.9529			
85881010509				ECUX 882429	0.9529			
85881010510	2.83	6.15		ECUX 882429	0.9527	334	2.30	
85881010511				ECUX 882429	0.9527			
85881010512				ECUX 882429	0.9527			
85881010513				ECUX 882429	0.9527			
85881010514				ECUX 882429	0.9527			
85881010515	3.72	4.29		ECUX 882429	0.9527			
85881010516				ECUX 882429	0.9527			
85881010517				ECUX 882429	0.9527			
85881010518				ECUX 882429	0.9527			
85881010519				ECUX 882429	0.9527			
85881010520	2.19	5.99		ECUX 882429	0.9527			
85881010521				ECUX 882429	0.9527			
85881010522				ECUX 882429	0.9527			
85881010523				ECUX 882429	0.9527			
85881010524				ECUX 882429	0.9527			
85881010525	3.28	7.10	7.22×10^{-4}	ECUX 882429	0.9530	330	2.40	3.8×10^{-3}
85881010526				ECUX 882429	0.9530			
85881010527				ECUX 882429	0.9530			
85881010528				ECUX 882429	0.9530			

Product: TN 330-2-6
Project : AEP John Amos Power Plant Cell, WV

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

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010529				ECUX 882429	0.9530			
85881010530	4.09	4.53		ECUX 882429	0.9530			
85881010531				ECUX 882429	0.9530			
85881010532				ECUX 882429	0.9530			
85881010533				ECUX 882429	0.9530			
85881010534				ECUX 882429	0.9530			
85881010535	3.87	7.15		ECUX 882429	0.9530			
85881010536				ECUX 882429	0.9530			
85881010537				ECUX 882429	0.9530			
85881010538				ECUX 882429	0.9530			
85881010539				ECUX 882429	0.9530			
85881010540	3.48	3.99		ECUX 882429	0.9528	333	2.56	
85881010541				ECUX 882429	0.9528			
85881010542				ECUX 882429	0.9528			
85881010543				ECUX 882429	0.9528			
85881010544				ECUX 882429	0.9528			
85881010545	4.29	6.99		ECUX 882429	0.9528			
85881010546				ECUX 882429	0.9528			
85881010547				ECUX 882429	0.9528			
85881010548				ECUX 882429	0.9528			
85881010549				ECUX 882429	0.9528			
85881010550	3.07	8.10		ECUX 882429	0.9528			
85881010551				ECUX 882429	0.9528			
85881010552				ECUX 882429	0.9528			

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Product: TN 330-2-6
Project : AEP John Amos Power Plant Cell, WV

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

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Transmissivity (m^2/sec)
	Side "A"	Side "B"						
85881010553				ECUX 882429	0.9528			
85881010554				ECUX 882429	0.9528			
85881010555	3.50	3.79		ECUX 882429	0.9536	338	2.64	
85881010556				ECUX 882429	0.9536			
85881010557				ECUX 882429	0.9536			
85881010558				ECUX 882429	0.9536			
85881010559				ECUX 882429	0.9536			
85881010560	2.68	8.15		ECUX 882429	0.9536			
85881010561				ECUX 882429	0.9536			
85881010562				ECUX 882429	0.9536			
85881010563				ECUX 882429	0.9536			
85881010564				ECUX 882429	0.9536			
85881010565	2.89	4.02		ECUX 882429	0.9536			
85881010566				ECUX 882429	0.9536			
85881010567				ECUX 882429	0.9536			
85881010568				ECUX 882429	0.9536			
85881010569				ECUX 882429	0.9536			
85881010570	4.12	7.99		ECUX 882429	0.9531	335	2.32	
85881010571				ECUX 882429	0.9531			
85881010572				ECUX 882429	0.9531			

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POLYETHYLENE RESIN CERTIFICATION

Customer Name : Hallaton, Inc.
Project Name : AEP John Amos Power Plant Cell, WV
Geocomposite Manufacturer : SKAPS Industries
Geocomposite Production Plant : Commerce, GA
Geocomposite Brand Name : TN 330-2-6

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

Resin Manufacturer	Resin Lot Number	Property	Test Method	Units	Resin Manufacturer Value	Tested Value*
Chevron Phillips Chemical Company	CHVX 890516	Density	ASTM D1505	g/cm^3	0.9450	0.9453
		Melt flow Index	ASTM D1238[(a)]	g/10 min	0.17	0.19
ExxonMobil Chemical	ECUX 882429	Density	ASTM D1505	g/cm^3	0.9480	0.9482
		Melt flow Index	ASTM D1238[(a)]	g/10 min	0.12	0.15

* No post consumer recycled polymer is added to the resin during the manufacture of the geonet components assigned to this project.

(a) Condition 190/2.16

* Data from SKAPS Quality Control

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Geotextile Certification

Product: TN 330-2-6
Project : AEP John Amos Power Plant Cell, WV

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

GEOCOMP ROLL#	FABRIC SIDE	WEIGHT oz/yd^2	GRAB lbs. (MD)	GRAB ELG % (MD)	GRAB lbs. (XMD)	GRAB ELG % (XMD)	TRAP lbs. (MD)	TRAP lbs. (XMD)	CBR PUNCTURE lbs	AOS us sieve	PERM-ITY sec^{-1}
85881010280	Side A	6.25	167	66	178	76	79	81	457	70	1.77
	Side B	6.52	165	65	172	79	79	84	482	70	1.76
85881010315	Side A	6.35	168	74	180	77	75	89	467	70	1.82
	Side B	6.30	164	65	173	78	80	85	450	70	1.76
85881010350	Side A	6.70	167	68	179	75	75	82	459	70	1.76
	Side B	6.47	170	69	173	82	77	86	490	70	1.77
85881010385	Side A	6.55	161	68	178	80	79	88	454	70	1.79
	Side B	6.23	164	71	170	83	75	89	483	70	1.77
85881010420	Side A	6.20	169	72	175	82	71	86	487	70	1.76
	Side B	6.24	164	72	176	77	75	81	486	70	1.79
85881010455	Side A	6.63	163	75	179	83	74	88	500	70	1.78
	Side B	6.47	170	69	173	82	77	86	490	70	1.77
85881010490	Side A	6.27	168	69	179	84	74	87	463	70	1.75
	Side B	6.51	166	72	171	79	72	84	484	70	1.82
85881010525	Side A	6.68	160	71	174	75	77	87	471	70	1.82
	Side B	6.44	162	67	175	75	76	88	493	70	1.80
85881010560	Side A	6.59	170	71	170	76	77	80	477	70	1.79
	Side B	6.50	160	70	172	85	80	90	462	70	1.80

* Metal detectors are positioned on the production line to detect needles or other contaminates.

* Nonwoven geotextiles used to manufacture the geocomposite are needle free

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Appendix B-III
Quality Assurance Conformance Testing Results

CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-001
LAB ID NO.: L19-030-001-001
MATERIAL: SKAPS TN 330-2-6 Geocomposite
ROLL NO: 85881010001

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
Geonet THICKNESS	D 5199	inches	0.3645	0.3555	0.3395	0.3490	0.3465		
			0.3415	0.3470	0.3565	0.3450	0.3555	**0.3501**	0.0074
Geocomposite PLY ADHESION	D 7005								
	SIDE "A"	MD-lb/in	9.8	6.2	8.3	10.2	9.5	**8.80**	1.445
	SIDE"B"	MD-lb/in	6.3	4.0	13.3	12.6	10.4	**9.31**	3.602

CHECKED BY: J.O DATE: 3-4-19

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-001
LAB ID NO.: L19-030-001-002
MATERIAL: SKAPS TN 330-2-6 Geocomposite
ROLL NO: 85881010032

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
Geonet THICKNESS	D 5199	inches	0.3530	0.3525	0.3450	0.3520	0.3405		
			0.3410	0.3400	0.3460	0.3515	0.3480	**0.3470**	0.0049
Geocomposite PLY ADHESION	D 7005								
	SIDE "A"	MD-lb/in	11.9	10.1	7.8	14.3	11.8	**11.15**	2.152
	SIDE"B"	MD-lb/in	4.3	7.1	1.3	3.4	9.6	**5.12**	2.907

CHECKED BY: J.O DATE: 3-4-19

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CONFORMANCE TEST RESULTS

geotechnics INTEGRITY IN TESTING

CLIENT: GAI Consultants
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-001
LAB ID NO.: L19-030-001-003
MATERIAL: SKAPS TN 330-2-6 Geocomposite
ROLL NO: 85881010062

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
Geonet THICKNESS	D 5199	inches	0.3545	0.3395	0.3500	0.3485	0.3445		
			0.3560	0.3455	0.3380	0.3415	0.3435	**0.3462**	0.0057
Geocomposite PLY ADHESION	D 7005								
	SIDE "A"	MD-lb/in	5.2	9.8	10.8	10.1	9.6	**9.08**	1.968
	SIDE"B"	MD-lb/in	4.5	2.9	13.0	5.9	9.1	**7.08**	3.591

CHECKED BY: J.O DATE: 3-4-19

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-001
LAB ID NO.: L19-030-001-004
MATERIAL: SKAPS TN 330-2-6 Geocomposite
ROLL NO: 85881010093

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
Geonet THICKNESS	D 5199	inches	0.3610	0.3575	0.3425	0.3465	0.3390		
			0.3530	0.3630	0.3560	0.3505	0.3530	**0.3522**	0.0074
Geocomposite PLY ADHESION	D 7005								
	SIDE "A"	MD-lb/in	8.8	13.7	11.5	11.8	7.8	**10.71**	2.129
	SIDE"B"	MD-lb/in	5.4	12.5	7.2	9.9	3.1	**7.60**	3.308

CHECKED BY: JO DATE: 3-4-19

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geotechnics
INTEGRITY IN TESTING

CONFORMANCE TEST RESULTS

CLIENT: GAI Consultants
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-001
LAB ID NO.: L19-030-001-005
MATERIAL: SKAPS TN 330-2-6 Geocomposite
ROLL NO: 85881010123

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
Geonet THICKNESS	D 5199	inches	0.3485	0.3445	0.3495	0.3455	0.3485		
			0.3455	0.3570	0.3590	0.3400	0.3415	**0.3480**	0.0058
Geocomposite PLY ADHESION	D 7005								
	SIDE "A"	MD-lb/in	12.0	6.8	11.8	6.8	7.2	**8.89**	2.421
	SIDE"B"	MD-lb/in	10.0	12.0	8.0	6.0	5.1	**8.22**	2.548

CHECKED BY: JO DATE: 3-4-19

Z:\Synthetics\2019 Synthetics\030 - GAI Consultants, Inc. - John E. Amos LF\[L19-030-001-005 Geocomposite.xls]Sheet1 L19-030-001-005 3/4/19

CONFORMANCE TEST RESULTS

geotechnics INTEGRITY IN TESTING

CLIENT: GAI Consultants
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-001
LAB ID NO.: L19-030-001-006
MATERIAL: SKAPS TN 330-2-6 Geocomposite
ROLL NO: 85881010154

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
Geonet THICKNESS	D 5199	inches	0.3460	0.3445	0.3445	0.3495	0.3540		
			0.3545	0.3435	0.3360	0.3335	0.3415	**0.3448**	0.0065
Geocomposite PLY ADHESION	D 7005								
	SIDE "A"	MD-lb/in	8.6	10.0	9.5	16.0	10.5	**10.92**	2.617
	SIDE"B"	MD-lb/in	4.8	8.4	4.0	6.5	13.5	**7.43**	3.388

CHECKED BY: JO DATE: 3-4-19

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-001
LAB ID NO.: L19-030-001-007
MATERIAL: SKAPS TN 330-2-6 Geocomposite
ROLL NO: 85881010185

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
Geonet									
THICKNESS	D 5199	inches	0.3385	0.3445	0.3395	0.3405	0.3465		
			0.3515	0.3520	0.3495	0.3595	0.3565	**0.3479**	0.0068
Geocomposite									
PLY ADHESION	D 7005								
	SIDE "A"	MD-lb/in	11.9	12.1	7.6	11.4	9.7	**10.51**	1.707
	SIDE"B"	MD-lb/in	7.6	6.0	3.6	11.0	7.4	**7.12**	2.415

CHECKED BY: JO DATE: 5-4-19

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-001
LAB ID NO.: L19-030-001-008
MATERIAL: SKAPS TN 330-2-6 Geocomposite
ROLL NO: 85881010215

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
Geonet THICKNESS	D 5199	inches	0.3575	0.3620	0.3445	0.3490	0.3400		
			0.3425	0.3410	0.3375	0.3415	0.3400	**0.3456**	0.0077
Geocomposite PLY ADHESION	D 7005								
	SIDE "A"	MD-lb/in	14.8	5.1	11.2	8.5	5.4	**8.99**	3.651
	SIDE"B"	MD-lb/in	11.3	10.6	2.5	6.6	4.2	**7.02**	3.452

CHECKED BY: JO DATE: 3-4-19

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: GAI Consultants
CLIENT PROJECT: John E. Amos LF
PROJECT NO.: L19-030-001
LAB ID NO.: L19-030-001-009
MATERIAL: SKAPS TN 330-2-6 Geocomposite
ROLL NO: 85881010246

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
Geonet									
THICKNESS	D 5199	inches	0.3405	0.3325	0.3340	0.3360	0.3375		
			0.3395	0.3455	0.3445	0.3545	0.3520	**0.3417**	0.0070
Geocomposite									
PLY ADHESION	D 7005								
	SIDE "A"	MD-lb/in	4.0	10.8	8.7	10.6	7.2	**8.26**	2.503
	SIDE"B"	MD-lb/in	1.9	6.5	12.9	4.6	8.8	**6.94**	3.738

CHECKED BY: TO DATE: 3-4-19

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Appendix C

Quality Control Data for Leachate Collection System Materials

gai consultants
transforming ideas into reality.

Appendix C-I
PVC Pipe

IPEX

Xirtec 140™
PVC PROCESS PIPING SYSTEM

PVC SCHEDULE 80 IPS SOLVENT WELD PLAIN END/BELLED END PRESSURE PIPE

LETTER OF COMPLIANCE

Scope:

This letter of compliance covers IPEX Inc. requirements for ¼" through 24" (6mm – 600 mm) PVC **Schedule 80** Solvent Weld Plain End/Belled End Pressure Pipe made to Iron Pipe Sizes (IPS). These products meet or exceed performance standards set by the American National Standards Institute (ANSI), the American Society of Testing and Materials (ASTM), CSA International (CSA) and NSF International (NSF).

Material:

Rigid PVC Poly(Vinyl Chloride) used in the manufacturing of IPEX Inc. **Schedule 80** Solvent Weld Plain End/Belled End Pressure Pipe complies with the material requirements of ASTM D 1784, *Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds*, having a cell classification of 12454 or 14333-D. The compound is listed with NSF for potable water service.

Extruded Pipe:

Extruded **Schedule 80** Solvent Weld Plain End/Belled End Pressure Pipes conforms to the following standards:
ANSI/NSF 61 *"Drinking Water System Components – Health Effects"*
ASTM D 1785 *"Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120"*
CSA B137.3 *"Rigid Poly(Vinyl Chloride) (PVC) Pipe for Pressure Applications."*

Markings:

Schedule 80 Solvent Weld Plain End/Belled End Pressure Pipes are marked as prescribed in the above applicable standards to indicate size of the pipe, material designation, compliance to standard, and manufacturer's name or trademark.

Color Coding:

Schedule 80 Solvent Weld Plain End/Belled End Pressure Pipe is color-coded grey.

Yours truly,

Frank Yorio
Senior Vice President, Operations

Issue Date: 2007-07-20

IPEX Inc. 3 Place du Commerce, Suite101, Île-des-Soeurs, Verdun, PQ, Canada H3E 1H7 ☎ (514) 769-2200 FAX (514) 769-1672

SUBMITTAL

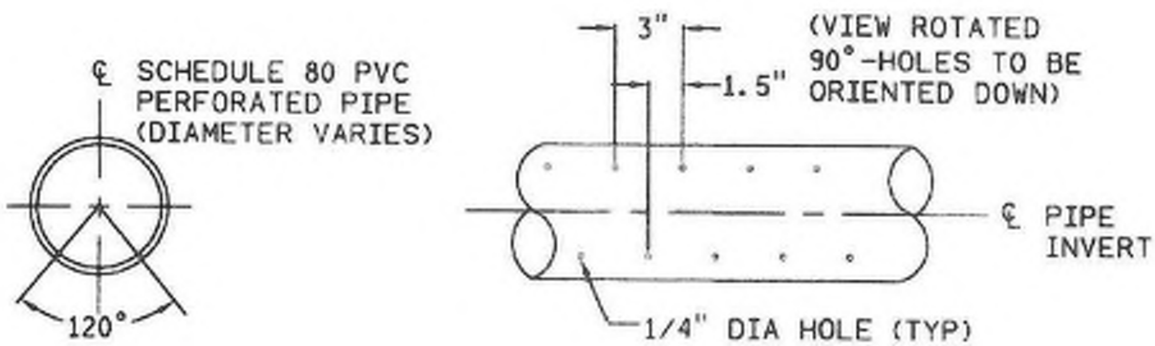
2528 Fairlawn Ave
Dunbar, West Virginia 25064
(304) 768-0086
DUNBAR@COREandMAIN.COM

April 10, 2018

Project: John Amos Landfill

Material: 12" & 6" SCH80 PVC PERFORATION SPECIFICATION

This letter is to inform the 12" and 6" SCH80 PVC PIPE will be perforated as follows:



If you have any questions, please feel free to contact me at this office.

Sincerely,

RICHARD COREY
District Manager
Core and Main Waterworks
richard.corey@COREandMAIN.com

IPEX
Committed to Excellence

Port of Montreal Building
First Floor, Wing 3
Montreal, Quebec
H3C 3R5

Xirtec 140
PVC PROCESS PIPING SYSTEM

PVC SCHEDULE 80
IPS SOLVENT WELD PRESSURE FITTINGS

LETTER OF COMPLIANCE

Scope:
This letter of compliance covers IPEX Inc. requirements for PVC **Schedule 80** Solvent Weld Pressure Fittings made to Iron Pipe Sizes (IPS). These products meet or exceed performance standards set by the American National Standards Institute (ANSI), the American Society of Testing and Materials (ASTM), CSA International (CSA) and NSF International (NSF).

Material:
Rigid PVC Poly(Vinyl Chloride) used in the manufacturing of IPEX Inc. **Schedule 80** Solvent Weld Pressure Fittings complies with the material requirements of ASTM D 1784, *Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds*, having a cell classification of 12454. The compound is listed with NSF for potable water service.

Molded Fittings:
Molded **Schedule 80** Solvent Weld Pressure Fittings conform to the following standards:
ANSI/NSF 14 *"Plastic Piping System Components and Related Materials"*
ANSI/NSF 61 *"Drinking Water System Components – Health Effects"*
ASTM D 1599 *"Standard Test Method for Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing and Fittings"*
ASTM D 2467 *"Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80"*

Fabricated Fittings:
Fabricated **Schedule 80** Solvent Weld Pressure Fittings are made from segments of pipe conforming to the following standards:
ANSI/NSF 61 *"Drinking Water System Components – Health Effects"*
ASTM D 1785 *"Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120"*
CSA B137.3 *"Rigid Poly(Vinyl Chloride) (PVC) Pipe for Pressure Applications."*

IPEX

Corzan™ CPVC SCHEDULE 80
Pressure Fittings

LETTER OF COMPLIANCE

Scope:
This letter of compliance covers IPEX Inc. requirements for ½" through 12" (12 mm – 300 mm) **CPVC Schedule 80** Pressure Fittings. These products meet or exceed performance standards set by the American National Standards Institute (ANSI), the American Society for Testing and Materials (ASTM), NSF International (NSF), and Underwriters' Laboratories of Canada.

Material:
Corzan™ CPVC compound used in the manufacturing of **CPVC Schedule 80** Pressure Fittings is made by Noveon Inc. and complies with the material requirements of ASTM D 1784, *Standard Specification for Rigid Polyvinyl Chloride (PVC) and Chlorinated Polyvinyl Chloride (CPVC) Compounds"*, having a cell classification of 23447 or 23448. The compound is listed with NSF for potable water service under ANSI/NSF 61 *"Drinking Water System Components – Health Effects"*

Molded Fittings:
Molded **CPVC Schedule 80** Pressure Fittings conform to the following standards:
ASTM F 437 *"Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80"*
ASTM F 439 *"Standard Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80."*
ASTM F 1970 *"Standard Specification for Special Engineered Fittings, Appurtenances or Valves for use in Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Systems"*

Markings:
CPVC Schedule 80 Pressure Fittings are marked as prescribed in the above applicable standards to indicate size of pipes, material designation, compliance to standard, and manufacturer's name or trademark.

Color Coding:
CPVC Schedule 80 Pressure Fittings are color-coded light grey.

Yours truly,

Frank Yorio

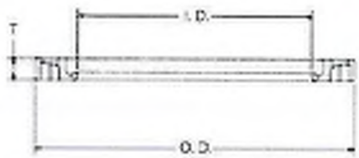
Frank Yorio
Senior Vice President, Operations

Issue Date: 2008-01-30

IPEX Inc. 3 Place du Commerce, Suite101, Île-des-Soeurs, Verdun, PQ, Canada H3E 1H7 ☎ (514) 769-2200 FAX (514) 769-1672

IntegriFuse™

SDR 7 - SDR 9 Epoxy Coated Backup Rings

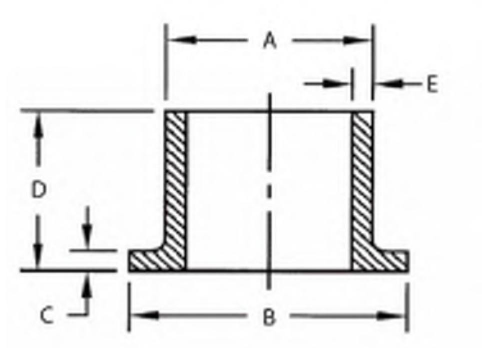


SDR 7 (Standard Dimension Ratio) 335 PSI
SDR 9 (Standard Dimension Ratio) 255 PSI

Nominal IPS PipeSize	Pressure Class	OD inches	ID inches	Bolt Holes	Thickness Inches	Weight lbs.	Item Code
2"	SDR 7	6.00	2.46	4	0.70	2.5	BUR-2IPSDI-7
3"	SDR 7	7.50	3.60	4	0.82	4.5	BUR-3IPSDI-7
4"	SDR 7	9.00	4.60	8	0.82	6.0	BUR-4IPSDI-7
6"	SDR 7	11.00	6.75	8	0.85	8.3	BUR-6IPSDI-7
8"	SDR 7	13.50	8.75	8	0.93	12.5	BUR-8IPSDI-7
10"	SDR 7	16.00	10.92	12	0.97	16.2	BUR-10IPSDI-7
12"	SDR 7	19.00	12.92	12	1.02	22.7	BUR-12IPSDI-7
14"	SDR 7	21.00	14.18	12	1.35	44.0	BUR-14IPSDI-7
16"	SDR 7	23.50	16.19	16	1.40	54.0	BUR-16IPSDI-7
18"	SDR 7	25.00	18.20	16	1.53	50.0	BUR-18IPSDI-7
20"	SDR 9	27.50	20.38	20	1.83	70.0	BUR-20IPSDI-9
24"	SDR 9	32.00	24.38	20	1.71	90.0	BUR-24IPSDI-9

INTEGRITY Fusion Products, Inc.

Molded Butt Fusion Flange Adapter - IPS



SDR 17 (Standard Dimension Ratio) 125 PSI (Working Pressure at 73.4˚ F)

Nominal IPS Pipe Size	A (OD) inches	B inches	C inches	D (length) inches	E (wall) inches	Weight lbs.	Item Code
2″ IPS	2.375″	3.94	0.55	6.10	0.140″	0.42 lbs.	100401
3″ IPS	3.500″	5.00	0.67	6.10	0.206″	0.79 lbs.	100405
4″ IPS	4.500″	6.61	0.79	6.10	0.265″	1.58 lbs.	100409
6″ IPS	6.625″	8.50	1.02	8.07	0.390″	3.36 lbs.	100413
8″ IPS	8.625″	10.632″	1.02	10.67	0.507″	6.44 lbs.	100417
10″ IPS	10.750″	12.99	1.18	11.50	0.632″	10.06 lbs.	100421
12″ IPS	12.750″	15.75	1.38	10.83	0.750″	14.60 lbs.	100424
14″ IPS	14.000″	17.50	1.62	12.00	0.82	26.00 lbs.	100427
16″ IPS	16.000″	20.00	1.85	12.00	0.94	37.00 lbs.	100429
18″ IPS	18.000″	21.12	2.08	12.00	1.06	43.00 lbs.	100431
20″ IPS	20.000″	23.500	2.31	12.00	1.18	56.00 lbs.	100433
24″ IPS	24.000″	28.00	2.77	14.00	1.41	79.00 lbs.	100437
28″ IPS	28.000″	32.30	3.23	14.00	1.65	84.00 lbs.	100439
30″ IPS	30.000″	34.30	3.46	14.00	1.77	87.00 lbs.	100441
32″ IPS	32.000″	34.30	3.69	14.00	1.88	106.00 lbs.	100443
36″ IPS	36.000″	40.80	4.16	14.00	2.12	141.00 lbs.	100445

IntegriFuse™

HDPE Fittings Specifications

IntegriFuse fittings are manufactured from 0% recycled materials with black high density bimodal polyethylene copolymer designed for use in, but not limited to, potable water, natural gas, industrial, landfill, oil & gas, and mining applications.

Fittings meet AWWA and ASTM-D2513 & ASTM-D3261 requirements. IntegriFuse fittings are manufactured with resin having a material designation code of PE 3408, PE3608, PE 4710, and PE 100.

Physical Properties	Metric	English	Comments
Density	.959 g/cm^3	0.0346 lb/in	Black: ASTM D4883
Environmental Stress Crack Resistance	>= 5000 hour	>= 5000 hour	Condition C; ASTM D1693
Carbon Black Loading	2.30%	2.30%	ASTM D1603
Melt Flow	8.00 g/10 min @Load 21.6 kg, Temperature 190 °C	8.00 g/10 min @Load 47.6 lb, Temperature 374 °F	ASTM D1238
Mechanical Properties	**Metric**	**English**	**Comments**
PENT	>= 10000 hour	>= 10000 hour	Notched Tensile; ASTM F1473
Hardness, Shore D	66.0	66.0	ASTM D2240
Tensile Strength at Break	37.9 MPa	5500 PSI	2 in/min; ASTM D638
Tensile Strength Yield	24.99 MPa	3625 PSI	2 in/min; ASTM D638
Elongation at Break	>= 600%	>= 600%	2 in/min; ASTM D638
Flexural Modulus	1.03 GPa	150 KSI	2% Secant-Method; ASTM D790
Izod Impact, Notched	4.81 J/cm	9.00 ft-lb/in	ASTM D256
Hydrostatic Design Basis	6.89 MPa	1000 PSI	At 60 °C; ASTM D2837
	11.0 MPa	1600 PSI	Room Temp; ASTM D2837
Thermal Properties	**Metric**	**English**	**Comments**
Vicat Softening Point	126 °C	259 °F	ASTM D1525
Brittleness Temperature	,= -118 °C	<= -180 °F	ASTM D746
Decomposition Temperature	>= 220 °C	>= 428 °F	Thermal Stability; ASTM D2513
Descriptive Properties	**Metric**	**English**	**Comments**
Cell Classification		445574C	ASTM D3350
Process		Injection Molding	

SIGMA™

Quality – Service – Commitment – Delivered.

FLANGE PAK™ Flange Accessories

PRODUCT SPECIFICATIONS

GASKET

- 1/8” thick either Ring or Full Face per ANSI/AWWA C110/A21.10 and ANSI/AWWA C111/A21.11
- Material: Red Synthetic Rubber
- Other material gasket (EPDM, Nitrile, Neoprene & FKM) are available on request

HEX BOLTS & NUTS

- Bolts & Nuts are as per ANSI/AWWA C110/A21.10 and ANSI/AWWA C111/A21.11
- Hex Bolts: Per ASME/ ANSI B18.2.1 Material per ASTM A307 Grade B, Zinc Plated
- Hex Nuts: Per ASME/ ANSI B18.2.2 Material per ASTM A563 Grade A or B, Zinc Plated
- Bolts & Nuts are threaded in accordance with ASME/ANSI B1.1
- Other Material Hex Bolts & Nuts are available on request.

FLANGE PAK			
Size	**Bolts**	**Qty**	**Wt (lbs)***
2	5/8” x 2-1/2”	4	1.25
3	5/8” x 2-1/2”	4	1.50
4	5/8” x 3”	8	3.00
6	3/4” x 3-1/2”	8	5.20
8	3/4” x 3-1/2”	8	5.20
10	7/8” x 4”	12	12
12	7/8” x 4”	12	12
14	1” x 4-1/2”	12	18.00
16	1” x 4-1/2”	16	24.00
18	1-1/8” x 5”	16	37.00
20	1-1/8” x 5”	20	47.00
24	1-1/4” x 5-1/2”	20	53.00
30	1-1/4” x 6-1/2”	28	82.00
36	1-1/2” x 7”	32	200.00
42	1-1/2” x 7-1/2”	36	225.00
48	1-1/2” x 8-1/2”	44	278.00
54	1-3/4” x 8-1/2”	44	400.00
60	1-3/4” x 9”	52	475.00
64	1-3/4” x 9”	52	475.00

**Weight includes gasket, nuts and bolts*

PRODUCT DATA SHEET

P-68™

LOW VOC PRIMER FOR PVC AND CPVC PIPES

GENERAL DESCRIPTION:
Weld-On® P-68™ Primer is a low VOC emission, non-bodied, fast acting, primer. The strong action of P-68 primer rapidly softens and dissolves the joining surfaces of PVC and CPVC pipe and fittings. Available in clear and purple; the latter allows easy identification when used on the joining surfaces.

APPLICATION:
Weld-On P-68 Primer, when used in conjunction with appropriate WELD-ON solvent cements, will make consistently strong, well-fused joints. It is essential that the joining surfaces of pipe and fittings be softened and remains softened prior to assembly. The main function of the primer is to expedite the penetration and softening of the surfaces. Its rate of penetration into the joining surfaces is more rapid than that of solvent cement alone. P-68 primer is suitable for use with all types, classes and schedules of PVC and CPVC pipe and fittings.

AVAILABILITY:
Both Weld-On P-68 Primer, clear and purple colors, are available in ¼ pint (118 ml), ½ pint (237 ml), pint (473 ml), quart (946 ml) and gallon (3.785 l) metal cans. For detailed information on containers and applicators, see our current Price List.

STANDARDS AND CERTIFICATION LISTINGS:

PW-G/ DWV/ SW

Purple Only

- Meets ASTM F 656 Standard
- Meets SCAQMD Rule 1168/316A
- Compliant with LEED® (Leadership in Energy and Environmental Design). When using this Weld-On low VOC product, credit can be claimed for LEED Green Building Rating System - Indoor Environmental Quality.
- Listed by NSF International for compliance with ASTM F 656, NSF/ANSI Standard 14, and NSF/ANSI Standard 61 for use on potable water, drain, waste, vent and sewer applications.
- Weld-On P-68 Primer, purple color only, is listed by IAPMO for compliance with ASTM F 656 and applicable sections of the latest edition of the Uniform Plumbing Code®.

SPECIFICATIONS:

COLOR:	Clear or Purple
SPECIFIC GRAVITY:	0.842 ± 0.04
BROOKFIELD VISCOSITY:	Water Thin

SHELF LIFE:
3 years in tightly sealed containers. The date code of manufacture is stamped on the bottom of the container. Stability of the product is limited by the evaporation of the solvent when the container is opened. Adding of solvents is not recommended and may significantly change the properties of the primer.

QUALITY ASSURANCE:
Weld-On P-68 Primer is carefully evaluated to assure that consistent high quality is maintained. Fourier transform infrared spectroscopy, gas chromatography, and additional in depth testing ensures each batch is manufactured to exacting standards. A batch identification code is stamped on each can and assures traceability of all materials and processes used in manufacturing this product.

SPECIAL PRECAUTION:
Weld-On solvent cements must never be used in PVC piping system using or being tested by compressed air or gases; including air-over-water booster. If using in conjunction with flue gas ventilation systems, review the recommendations of the HVAC manufacturer's equipment related to installation and venting. Note that such recommendations may only refer to ASTM standards addressing installation of PVC pipe and fittings, and not to the use of PVC pipe and fittings in flue gas ventilation systems. Also review the technical information available from manufacturers of PVC pipe and fittings concerning the use of their products in flue gas ventilation systems.

Do not use a dry granular calcium hypochlorite as a disinfecting material for water purification in potable water piping systems. The introduction of granules or pellets of calcium hypochlorite with PVC solvent cements and primers (including their vapors) may result in a violent chemical reaction if a water solution is not used. It is advisable to purify lines by pumping chlorinated water into the piping system – this solution will be nonvolatile. Furthermore, dry granular calcium hypochlorite should not be stored or used near solvent cements and primers.

Weld-On Adhesives, Inc., a division of IPS Corporation
455 W. Victoria Street, Compton, CA 90220, U.S.A.
Tel: 310.898.3300 • Fax: 310.898.3392 • Customer Service: 800.888.8312
www.weldon.com

This product is intended for use by skilled individuals at their own risk. Installers should verify for themselves that they can make satisfactory joints under varying conditions. Detailed directions on making solvent cemented joints are printed on the container label. It is highly recommended that the installer review the instructions supplied by the pipe and fitting manufacturer.

Refer to the current Weld-On P-68 Primer Safety Data Sheet for additional safety precautions, first-aid, storage, handling, transportation and disposal information.

WARRANTY:
Weld-On Adhesives, Inc., warrants to all original purchasers of Weld-On products that all new Weld-On products shall be of good quality and free from defects in material and workmanship for the product's shelf life. If any Weld-On product becomes defective, or fails to conform to this written limited warranty under normal use and storage conditions, and if the original purchaser complies with the terms of this limited warranty, then Weld-On will, without charge, replace the nonconforming product.

This limited warranty shall extend to all products manufactured and sold by Weld-On. However, this limited warranty shall not extend to, nor shall Weld-On be responsible for, damages or loss resulting from accident, misuse, negligent use, improper application, or incorporation of Weld-On products into other products. In addition, any repackaging of Weld-On products also shall void the limited warranty provided herein.

Any defective Weld-On products shall be replaced pursuant to the terms of this limited warranty by returning the defective product, with transportation charges prepaid, to Weld-On at the following address:

Weld-On Adhesives, Inc.
Attn: Customer Service
455 West Victoria Street
Compton, CA 90220

Any implied warranty in connection with any Weld-On product hereby is limited in duration to the period of this limited warranty. Weld-On shall not be responsible for, nor does this limited warranty extend to, consequential damage, or incidental damage or expense, including without limitation, injury to persons or property or loss of use. This limited warranty is in lieu of all other express warranties of Weld-On, and Weld-On does not assume, nor does it authorize any person to assume on its behalf, any other obligation or liability.

Weld-On Adhesives, Inc., a division of IPS Corporation
455 W. Victoria Street, Compton, CA 90220, U.S.A.
Tel: 310.898.3300 • Fax: 310.898.3392 • Customer Service: 800.888.8312
www.weldon.com

WELD-ON®
IPS CORPORATION

PRODUCT BULLETIN

717™

LOW VOC PVC SOLVENT CEMENT

GENERAL DESCRIPTION:

WELD-ON® 717™ is a clear or gray, low VOC emission, heavy bodied, medium setting, high strength PVC solvent cement for all classes and schedules of pipe and fittings, including Schedule 80, with interference fit through 12 inch (315 mm) diameter. It has good gap filling properties and is recommended for solvent cementing joints where a sizable gap exists between pipe and fitting – e.g. large pipe sizes – and when more working time is required in warm weather.

APPLICATION:

WELD-ON 717 is for use on all types of PVC plastic pipe applications, Type I and Type II. It is suitable for use with potable water pressure systems, irrigation, turf, conduit, industrial pipe applications, sewer, drain, waste and vent systems.

Detailed directions on making solvent cemented joints are printed on the container label. An installation DVD/CD covering solvent cementing is available. It not only describes the basic principles of solvent cementing, but also covers the handling, storage and use of our products. It is highly recommended that the installer review the instructions supplied by the pipe and fitting manufacturer. **NOTE:** WELD-ON solvent cements must never be used in a PVC system using or being tested by compressed air or gases; including air-over-water booster.

AVAILABILITY:

Gray cement is available in ½ pint (237 ml), pint (473 ml), quart (946 ml) and gallon (3.785 l) metal cans. Clear cement is available in ¼ pint (118 ml), ½ pint (237 ml), pint (473 ml), quart (946 ml) and gallon (3.785 l) metal cans. For detailed information on containers and applicators, see our current Price List.

STANDARDS AND CERTIFICATION LISTINGS:

PW / DWV / SW

PW / DWV / SW
Gray Only

- Meets ASTM D 2564 Standard.
- Meets SCAQMD Rule 1168/316A.
- Compliant with LEED® (Leadership in Energy and Environmental Design). When using this WELD-ON Low VOC product, credit can be claimed for LEED Green Building Rating System - Indoor Environmental Quality.
- Listed by NSF International for compliance with ASTM D 2564, NSF/ANSI Standard 14 and NSF/ANSI Standard 61 for use in potable water, drain, waste, vent and sewer applications.
- **Gray Cement Only** - Meets CSA standards B137.3 and B181.2 for use in pressure and non-pressure potable water, drain, waste, and vent applications.
- Listed by IAPMO for compliance with ASTM D 2564 and applicable sections of the latest edition of the Uniform Plumbing Code®.

SPECIFICATIONS:

COLOR:	Clear or Gray
RESIN:	PVC
SPECIFIC GRAVITY:	0.963 ± 0.04
BROOKFIELD VISCOSITY:	Minimum 1,600 cP @ 73 °± 2°F (23° ± 1°C)

SHELF LIFE:

3 years in tightly sealed containers. The date code of manufacture is stamped on the bottom of the container. Stability of the product is limited by the evaporation of the solvent when the container is opened. Evaporation of solvent will cause the cement to thicken and reduce its effectiveness. Adding of thinners to change viscosity is not recommended and may significantly change the properties of the cement.

QUALITY ASSURANCE:

WELD-ON 717 is carefully evaluated to assure that consistent high quality is maintained. Fourier transform infrared spectroscopy, gas chromatography, and additional in depth testing ensures each batch is manufactured to exacting standards. A batch identification code is stamped on each can and assures traceability of all materials and processes used in manufacturing this solvent cement.

SHIPPING:

For One Liter and Above
Proper Shipping Name: Adhesive
Hazard Class: 3
Identification Number: UN 1133
Packing Group: II
Label Required: Flammable Liquid

For Less than One Liter
Proper Shipping Name: Consumer Commodity
Hazard Class: ORM-D

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SAFETY AND ENVIRONMENTAL PRECAUTIONS:

This product is flammable and considered a hazardous material. In conformance with the Federal Hazardous Substances Labeling Act, the following hazards and precautions are given. Purchasers who repackage this product must also conform to all local, state and federal labeling, safety and other regulations. VOC emissions do not exceed 510 grams per liter.

DANGER: EXTREMELY FLAMMABLE. VAPOR HARMFUL.
MAY BE HARMFUL IF SWALLOWED. MAY IRRITATE SKIN OR EYES.

Keep out of reach of children. Do not take internally. Keep away from heat, spark, open flame and other sources of ignition. Vapors may ignite explosively. Solvent cement vapors are heavier than air and may travel to source(s) of ignition at or near ground or lower level(s) and flash back. Keep container closed when not in use. Store between 40°F (5°C) and 110°F (44°C). Avoid breathing of vapors. Use only in well-ventilated area. If confined or partially enclosed, use forced ventilation. When necessary, use local exhaust ventilation to remove harmful airborne contaminants from employee breathing zone and to keep contaminates below 25 ppm TWA. Atmospheric levels must be maintained below established exposure limits contained in Section II of the Material Safety Data Sheet (MSDS). If airborne concentrations exceed those limits, use of a NIOSH approved organic vapor cartridge respirator with full face-piece is recommended. The effectiveness of an air-purifying respirator is limited. Use it only for a single short-term exposure. For emergency and other conditions where short-term exposure guidelines may be exceeded, use an approved positive pressure self-contained breathing apparatus. Do not smoke, eat or drink while working with this product. Avoid contact with skin, eyes and clothing. May cause eye injury. Protective equipment such as gloves, goggles and impervious apron should be used. Carefully read Material Safety Data Sheet and follow all precautions. Do not use this product for other than intended use.

"SARA Title III Section 313 Supplier Notification": This product contains toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 and of 40CFR372. This information must be included in all MSDS that are copied and distributed for this material.

FIRST AID:

Inhalation:	If overcome with vapors, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call physician.
Eye Contact:	Flush with plenty of water for 15 minutes and call a physician.
Skin Contact:	Wash skin with plenty of soap and water for at least 15 minutes. If irritation develops, get medical attention.
Ingestion:	If swallowed, give 1 or 2 glasses of water or milk. Do not induce vomiting. Contact physician or poison control center immediately.

SPECIAL PRECAUTION:

Do not use a dry granular calcium hypochlorite as a disinfecting material for water purification in potable water piping systems. The introduction of granules or pellets of calcium hypochlorite with PVC and CPVC solvent cements and primers (including their vapors) may result in a violent chemical reaction if a water solution is not used. It is advisable to purify lines by pumping chlorinated water into the piping system – this solution will be nonvolatile. Furthermore, dry granular calcium hypochlorite should not be stored or used near solvent cements and primers.

IMPORTANT NOTE:

This product is intended for use by skilled individuals at their own risk. These suggestions and data are based on information we believe to be reliable. Installers should verify for themselves that they can make satisfactory joints under varying conditions. Toward this end, it is highly desirable that they receive personal instruction from trained instructors or competent, experienced installers. Contact IPS® Corporation or your supplier for additional information or instructions.

WARRANTY:

IPS® Corporation ("IPS Corp.") warrants that all new IPS Corp. products shall be of good quality and free from defects in material and workmanship for the shelf life as indicated on the product. If any IPS Corp. product becomes defective, or fails to conform to our written limited warranty under normal use and storage conditions, then IPS Corp. will, without charge, replace the nonconforming product. However, this limited warranty shall not extend to, nor shall IPS Corp. be responsible for, damages or loss resulting from accident, misuse, negligent use, improper application, or incorporation of IPS Corp. products into other products. In addition, any repackaging of IPS Corp. products also shall void the limited warranty. IPS Corp. shall not be responsible for, nor does this limited warranty extend to, consequential damage, or incidental damage or expense, including without limitation, injury to persons or property or loss of use. Please refer to our standard IPS Corp. Limited Warranty for additional provisions.

IPS® CORPORATION

455 W. Victoria Street
Compton, CA 90220 U.S.A.
Tel: 310.898.3300
Fax: 310.898.3392

500 Distribution Parkway
Collierville, TN 38017 U.S.A.
Tel: 901.853.5001
Fax: 901.853.5008

Customer Service: 800.888.8312
www.ipscorp.com

CERTIFIED QUALITY MANAGEMENT SYSTEM ISO 9001 2000

Appendix C-II
Granular Drainage Aggregate

R. B. JERGENS CONTRACTORS, INC. VANDALIA, OHIO

11418 N. Dixie Drive P.O. Box 309
Vandalia, OH 45377
Phone: (937) 669-9799
Fax: (937) 669-0301

LETTER OF TRANSMITTAL

DATE: 14-May-19	JOB NO.: 18-003
ATTENTION: Brandon Schmader	
Submittal No. 27	
Amos Landfill Sequence 4 Expansion	
#8 Non-Calcareous for Leachate Collection	

TO
American Electric Power
1 Riverside Plaza
Columbus, OH 43215

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via __________ the following items

- ☐ Shop drawings
- ☐ Copy of letter
- ☐ Prints
- ☐ Change Order
- ☐ Plans
- ☐ Test Results
- ☐ Samples
- ☒ Specifications

COPIES	DATE	NO.	DESCRIPTION
1 electronic	14-May	1	#8 Non-Calcareous for Leachate Collection

THESE ARE TRANSMITTED as checked below:

- ☒ For Approval
- ☐ For your use
- ☐ As requested
- ☐ For review
- ☐ Approved as submitted
- ☐ Approved as noted
- ☐ Returned for corrections
- ☐ ____________________
- ☐ Resubmit______copies for approval
- ☐ Submit_____copies for distribution
- ☐ Return _____ corrected prints
- ☐

REMARKS:
Compliant with drawing number 30203SH8 detail 1

Kevin Harshberger, RBJ
Mike Davis, RBJ
Izaac Harshberger, RBJ
Ash Hutsonpillar, RBJ

SIGNED: Jacob Warner (signed)

Jacob Warner

AGGREGATE GRADATION WORKSHEET

AGGREGATE SIZE: Size No. 8's   SOURCE: River Sand & Gravel

INSPECTOR : Melinda Gibbs   DATE : June 18, 2018

Sieve Sizes	Grams Retained	Percent Retained	Percent Passing	Spec. Limits	Sieve Sizes	Grams Retained	Percent Retained	Percent Passing	Spec. Limits
4"					4"				
3 1/2"					3 1/2"				
3"					3"				
2 1/2"					2 1/2"				
2"					2"				
1 1/2"					1 1/2"				
1"					1"				
3/4"					3/4"				
1/2"	0	0.0	100.0	100	1/2"				100
3/8"	11.3	2.0	98.0	85-100	3/8"				85-100
1/4"					1/4"				
# 4	385.7	68.1	*31.9	10-30	# 4				10-30
# 8	553.1	97.7	2.3	0-10	# 8				0-10
# 16	562.1	99.3	0.7	0-5	# 16				0-5
# 30	563.9	99.6	0.4		# 30				
# 50	565	99.8	0.2		# 50				
# 100	565.4	99.9	0.1		# 100				
# 200	565.8	100.0	0.0		# 200				
Pan	566	100.0			Pan				
Total	566				Total				

-#200 Wash Test				SHALE	
W1=		W1=	0	UNIT WEIGHT:	
WBW=		W2=		SPECIFIC GRAVITY:	
% MINUS #200	#DIV/0!			INSPECTOR:	Melinda Gibbs
REMARKS:				CERTIFICATION #	mgibbs1

Calcium Carbonate ($CaCO_3$) Laboratory Analysis Form

KENVIRONS

Prepared For: Red River Ranch LLC
1499 Mabple Street
Stanton, KY 40380

Sample Source: Red River Ranch
Vanceburg, KY Quarry

Sample Identification: No. 8's

Prepared By: Kenvirons, Inc.
452 Versaillies Road
Frankfort, KY 40601
Phone: (502) 695-4357
Fax: (502) 695-4363

Sampled By: Scott Ferguson - Red River Ranch

Analysis Data

Project No.: 2015083
Laboratory No.: 2015083-02
Date Received: Monday, June 01, 2015
Date Sampled: Monday, June 01, 2015
Date Dried: 6/2/15 - 6/4/15
Acid Concentration: pH 4 (0.0001N) HCl

Initial Weight Date/Time: Thursday, June 04, 2015 / 10:20 AM

1st Acid Bath Start Time: 10:35 AM End Time: 11:40 AM
Notes: Very Miniscule Bubbling

2nd Acid Bath Start Time: 11:50 AM End Time: 1:05 PM
Notes: No Reaction

3rd Acid Bath Start Time: 1:20 PM End Time: 2:35 PM
Notes: No Reaction

Sample No.	Initial Weight (g)	Final Weight (g)	Rock Recovered %	$CaCO_3$ %
1	178.3745	178.0439	99.81	0.2
2	177.6712	177.475	99.89	0.1
3	176.5086	176.0125	99.72	0.3

Average $CaCO_3$ Content: 0.19%

Method Used: ASTM D3042 (Modified)

Performed By: Benjamin T. Bray

Signature: B.T. Bray

Appendix C-III
Geotextile

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transforming ideas into reality.

GEOSYNTHETICS

N080
TECHNICAL DATA SHEET NONWOVEN GEOTEXTILE

N080 is a polypropylene, needle punched nonwoven geotextile for use in drainage and separation applications. It has been stabilized to resist degradation due to ultraviolet exposure and is resistant to commonly encountered mildew, insects and soil chemicals, and is non-biodegradable.

SPECIFICATIONS:

The N080 polypropylene nonwoven fabric will utilize the following characteristics:

PROPERTY	TEST METHOD	MIN. AVG. ROLL VALUE
Grab Tensile Strength[1]	ASTM D4632	205 lbs
Grab Tensile Elongation	ASTM D4632	50%
CBR Puncture	ASTM D6241	525 lbs
Trapezoid Tear Strength	ASTM D4533	80 lbs
UV Resistance @ 500 hrs	ASTMD4355	70%
Apparent Opening Size (AOS)	ASTM D4751	80 US Sieve
Permittivity (sec^{-1})	ASTM D4491	1.4 (sec^{-1})
Flow Rate	ASTM D4491	90 gpm/ft^2

Values quoted above are the result of multiple tests conducted at an independent testing facility. N080 meets or exceeds values listed.

[1] Values apply to both machine and cross-machine directions

PACKAGING:

Roll Width	12.5 ft.	15 ft.
Roll Length	360 ft.	300 ft.
Roll Area	500 yd^2	500 yd^2

Disclaimer: ACF Environmental assumes no liability for the completeness or accuracy of this information or the ultimate use of this information. This document should not be construed as engineering advice. Always consult the project engineer for project specific requirements. The end user assumes sole responsibility for the use of this information and product.

Appendix D
Protective Cover Quality Control Data

Appendix D-I
Bottom Ash

gai consultants
transforming ideas into reality.

April 11, 2019

Project No. 2019-168-001

Mr. Charles Straley
GAI Consultants, Inc.
300 Summers St., Suite 1100
Charleston, WV 25301

Transmittal
Laboratory Test Results
John E. Amos LF Seq. 3 C130109.13

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens that were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectfully submitted,
Geotechnics, Inc.

David R. Backstrom
Laboratory Director

We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.

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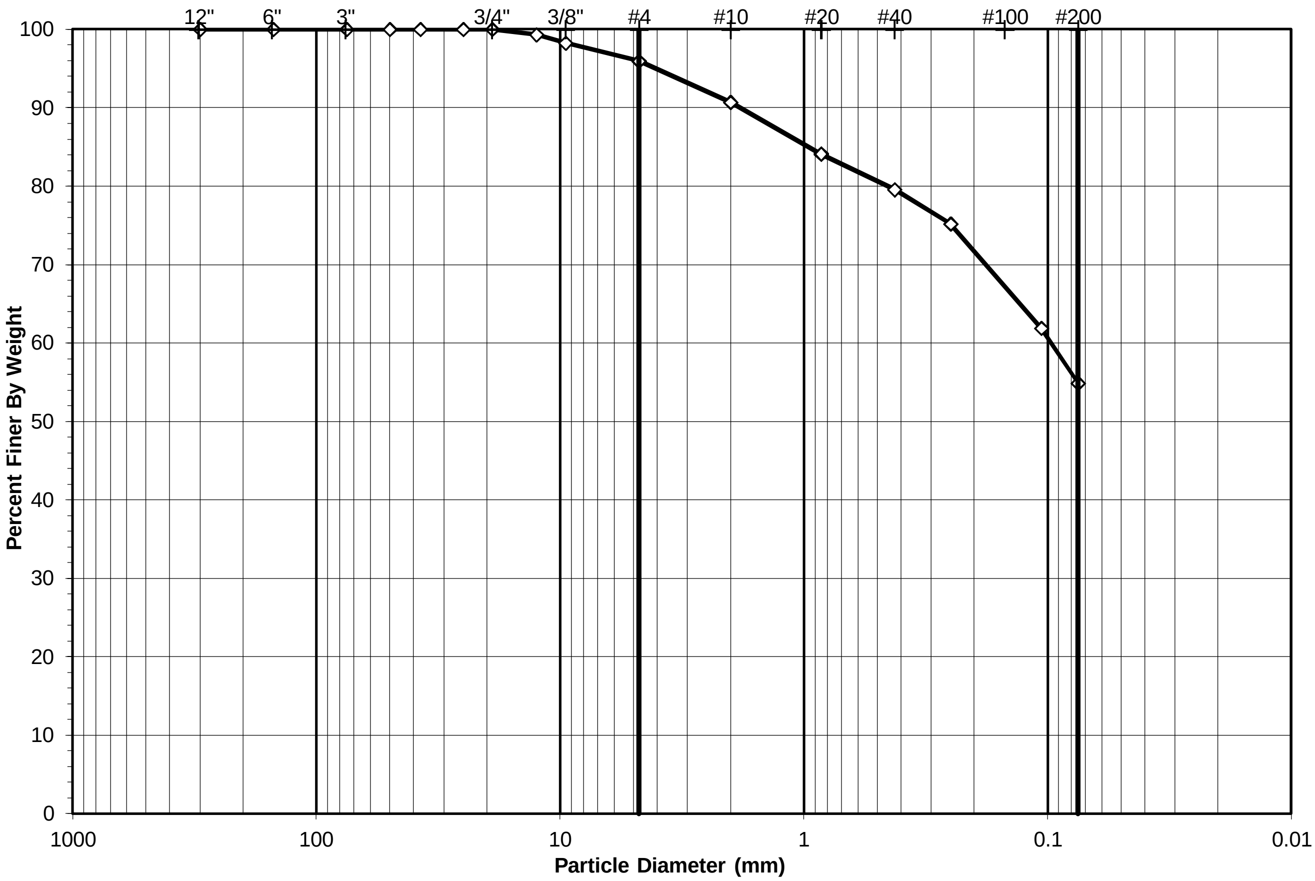
SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	GAI Consultants, Inc.	Boring No.:	3/1/19
Client Reference:	John E Amos LF Seq. 3 C130109.13	Depth (ft):	Bottom Ash
Project No.:	2019-168-001	Sample No.:	Sample 002
Lab ID:	2019-168-001-001	Soil Color:	Gray

	SIEVE ANALYSIS			*HYDROMETER*	
USCS	**cobbles**	**gravel**	**sand**	**silt and clay fraction**	
USDA	**cobbles**	**gravel**	**sand**	**silt**	**clay**



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	4.04
#4 To #200	*Sand*	41.08
Finer Than #200	*Silt & Clay*	54.89

USCS Symbol:

ml, ASSUMED

USCS Classification:

SANDY SILT

DCN: CT-S3B, DATE: 7/17/17, REVISION: 9e

S:Excel\Excel QA\Spreadsheets\SieveHydJ.xls

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

geotechnics
geotechnical & geosynthetic testing

Client:	GAI Consultants, Inc.	Boring No.:	3/1/19
Client Reference:	John E Amos LF Seq. 3 C130109.13	Depth (ft):	Bottom Ash
Project No.:	2019-168-001	Sample No.:	Sample 002
Lab ID:	2019-168-001-001	Soil Color:	Gray

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	62	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	817.49	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	719.58	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	202.10	Weight of Tare (g):	NA
Weight of Water (g):	97.91	Weight of Water (g):	NA
Weight of Dry Soil (g):	517.48	Weight of Dry Soil (g):	NA
Moisture Content (%):	**18.9**	**Moisture Content (%):**	**0.0**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	517.48
Dry Weight of - 3/4" Sample (g):	517.5	Weight of Minus #200 Material (g):	284.02
Wet Weight of +3/4" Sample (g):	0.00	Weight of Plus #200 Material (g):	233.46
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	517.5		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	0.00		0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00		0.00	0.00	100.00	**100.00**
1/2"	12.5	3.55		0.69	0.69	99.31	**99.31**
3/8"	9.50	5.43		1.05	1.74	98.26	**98.26**
#4	4.75	11.91		2.30	4.04	95.96	**95.96**
#10	2.00	27.27		5.27	9.31	90.69	**90.69**
#20	0.85	34.02	(**)	6.57	15.88	84.12	**84.12**
#40	0.425	23.60		4.56	20.44	79.56	**79.56**
#60	0.250	22.62		4.37	24.81	75.19	**75.19**
#140	0.106	68.81		13.30	38.11	61.89	**61.89**
#200	0.075	36.25		7.01	45.11	54.89	**54.89**
Pan	-	284.02		54.89	100.00	-	**-**

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

Tested By	HL	Date	3/26/19	Checked By	KC	Date	3/26/19

DCN: CT-S3B, DATE: 7/17/17, REVISION: 9e

S:Excel\Excel QA\Spreadsheets\SieveHydJ.xls

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PERMEABILITY TEST

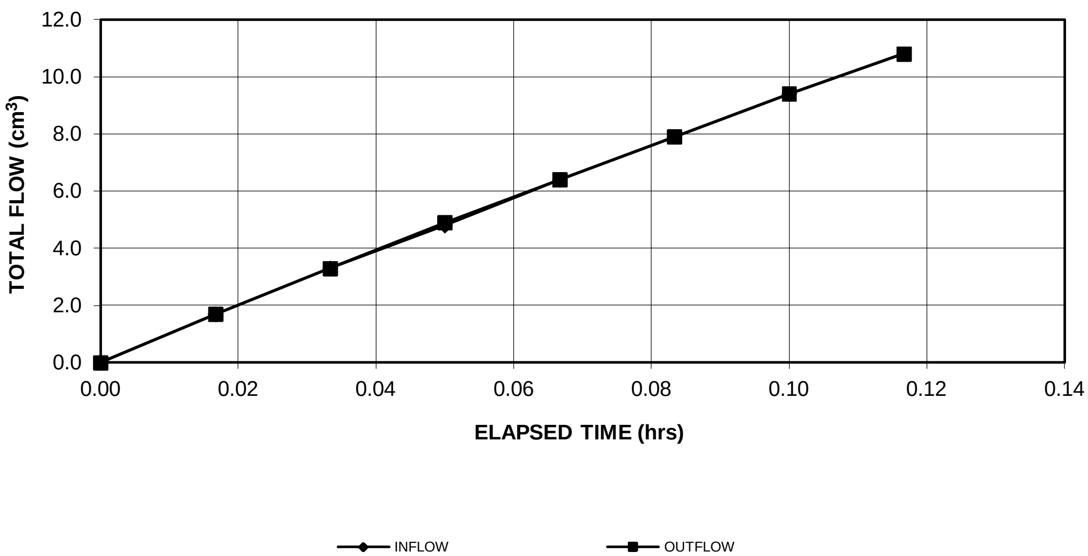
ASTM D 5084-16a

Client:	GAI Consultants, Inc.	Boring No.:	3/1/19
Client Project:	John E. Amos LF Seq. 3 C130109.13	Depth (ft):	Bottom Ash
Project No.:	2019-168-001	Sample No.:	Sample 002
Lab ID No.:	2019-168-001-001	Avg. Conf. Pressure (psi):	210

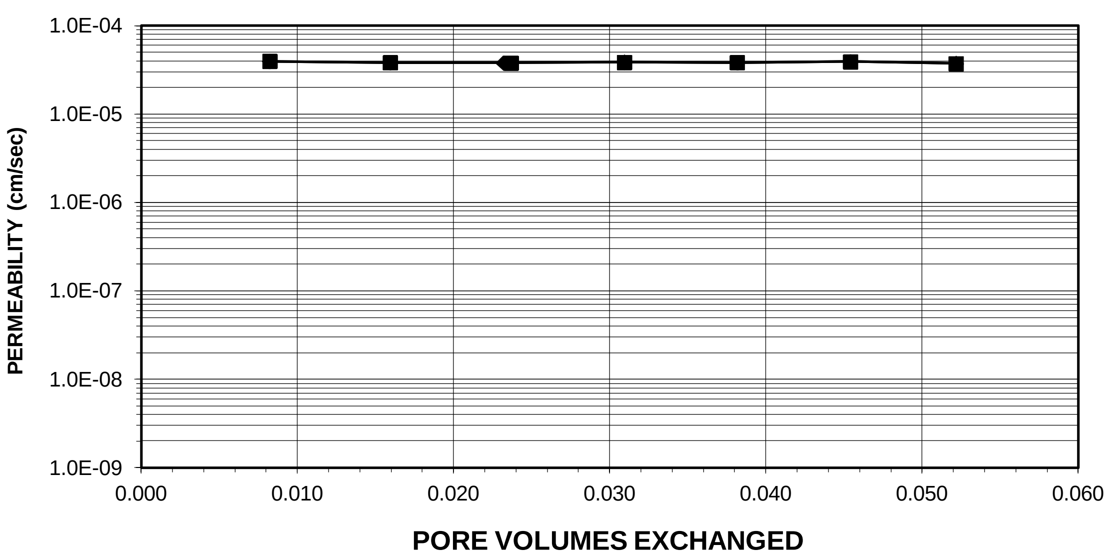
AVERAGE PERMEABILITY = 3.8E-05 cm/sec @ 20^{o}C

AVERAGE PERMEABILITY = 3.8E-07 m/sec @ 20^{o}C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By:	RPE	Date:	4/08/19	Checked By:	KC	Date:	4/11/19

DCN: CT-22 DATE: 1/1/17 REVISION: 11

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PERMEABILITY TEST

ASTM D 5084-16a

Client:	GAI Consultants, Inc.	Boring No.:	3/1/19
Client Project:	John E. Amos LF Seq. 3 C130109.13	Depth (ft):	Bottom Ash
Project No.:	2019-168-001	Sample No.:	Sample 002
Lab ID No.:	2019-168-001-001	Avg. Conf. Pressure (psi):	210

Specific Gravity:	2.70	Assumed
Sample Condition:		Remolded

Visual Description: Gray Bottom Ash

Permeant Type: Deaired Water

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	629	1720
Weight of Tare & Wet Sample (g)	229.35	831.91
Weight of Tare & Dry Sample (g)	206.92	670.81
Weight of Tare (g)	85.95	81.48
Weight of Water (g)	22.43	161.10
Weight of Dry Sample (g)	120.97	589.33
Moisture Content (%)	**18.5**	**27.3**

SPECIMEN:	BEFORE TEST	AFTER TEST
Weight of Tube & Wet Sample (g)	2023.20	NA
Weight of Tube (g)	1323.90	NA
Weight of Wet Sample (g)	699.30	751.18
Length 1 (in)	3.973	3.974
Length 2 (in)	3.973	3.982
Length 3 (in)	3.973	3.996
Top Diameter (in)	2.877	2.880
Middle Diameter (in)	2.877	2.883
Bottom Diameter (in)	2.877	2.879
Average Length (in)	3.97	3.98
Average Area (in^2)	6.50	6.52
Sample Volume (cm^3)	423.24	425.50
Unit Wet Weight (g/cm^3)	1.65	1.77
Unit Wet Weight (pcf)	103.1	110.2
Unit Dry Weight (pcf)	87.0	86.5
Unit Dry Weight (g/cm^3)	1.39	1.39
Void Ratio, e	0.94	0.95
Porosity, n	0.48	0.49
Pore Volume (cm^3)	204.8	207.0
Total Weight of Sample After Test (g)		750.89

Tested By: RPE Date: 4/8/19 Checked By: KC Date: 4/11/19

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PERMEABILITY TEST

ASTM D 5084-16a

Client:	GAI Consultants, Inc.	Boring No.:	3/1/19
Client Project:	John E. Amos LF Seq. 3 C130109.13	Depth (ft):	Bottom Ash
Project No.:	2019-168-001	Sample No.:	Sample 002
Lab ID No.:	2019-168-001-001	Avg. Conf. Pressure (psi):	210

Pressure Heads (Constant)		**Final Sample Dimensions**	
Top Cap (psi)	98.0	Sample Length (cm), L	10.12
Bottom Cap (psi)	100.0	Sample Diameter (cm)	7.32
Cell (psi)	309.0	Sample Area (cm^2), A	42.05
Total Pressure Head (cm)	140.6	Inflow Burette Area (cm^2), a-in	0.900
Hydraulic Gradient	13.89	Outflow Burette Area (cm^2), a-out	0.868
		B Parameter (%)	95

AVERAGE PERMEABILITY = 3.8E-05 cm/sec @ 20^{o}C

AVERAGE PERMEABILITY = 3.8E-07 m/sec @ 20^{o}C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (^{o}C)	INCREMENTAL PERMEABILITY @ 20^{o}C (cm/sec)
4/10/19	10	50	0.000	0.0	0.0	167.4	0	21.6	NA
4/10/19	10	51	0.017	1.7	1.7	163.6	0	21.6	4.0E-05
4/10/19	10	52	0.033	3.3	3.3	159.9	0	21.6	3.8E-05
4/10/19	10	53	0.050	4.8	4.9	156.4	0	21.6	3.8E-05
4/10/19	10	54	0.067	6.4	6.4	152.9	0	21.6	3.9E-05
4/10/19	10	55	0.083	7.9	7.9	149.5	0	21.6	3.8E-05
4/10/19	10	56	0.100	9.4	9.4	146.1	0	21.6	3.9E-05
4/10/19	10	57	0.117	10.8	10.8	143.0	1	21.6	3.7E-05

Tested By: RPE Date: 4/08/19 Checked By: KC Date: 4/11/19

DCN: CT-22 DATE: 1/1/17 REVISION: 11

544 Braddock Avenue Ł East Pittsburgh, PA 15112 Ł Phone (412) 823-7600 Ł Fax (412) 823-8999 Ł www.geotechnics.net

May 13, 2019

Project No. 2019-168-002

Mr. Charles Straley
GAI Consultants, Inc.
300 Summers St., Suite 1100
Charleston, WV 25301

Transmittal
Laboratory Test Results
John E. Amos LF Seq. 3 C130109.13

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens that were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectfully submitted,
***Geotechnics, Inc*.**

David R. Backstrom
Laboratory Director

We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.

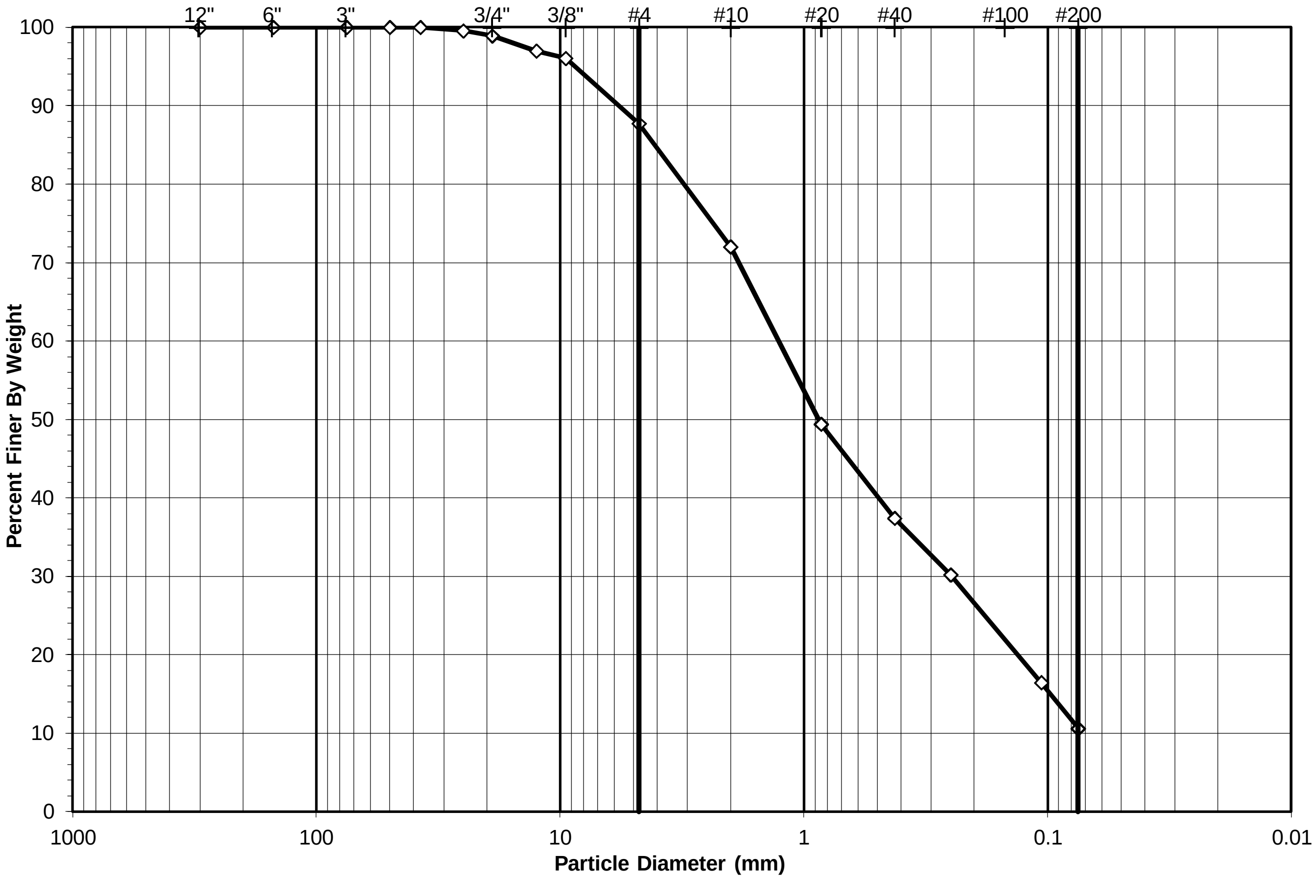
DCN: Data Transmittal Letter Date: 1/28/05 Rev.: 1

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	GAI Consultants, Inc.	Boring No.:	4/8/19
Client Reference:	John E Amos LF Seq. 3 C130109.13	Depth (ft):	Bottom Ash
Project No.:	2019-168-002	Sample No.:	Sample 003
Lab ID:	2019-168-002-001	Soil Color:	Gray

	SIEVE ANALYSIS			***HYDROMETER***	
USCS	**cobbles**	**gravel**	**sand**	**silt and clay fraction**	
USDA	**cobbles**	**gravel**	**sand**	**silt**	**clay**



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	12.28
#4 To #200	*Sand*	77.14
Finer Than #200	*Silt & Clay*	10.58

USCS Symbol:
sp-sm, ASSUMED

USCS Classification:
POORLY GRADED SAND WITH SILT

D60 =	**1.27**		
D30 =	**0.25**	**CC =**	**0.82**
D10 =	**0.06**	**CU =**	**21.69**

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

geotechnics
geotechnical & geosynthetic testing

Client:	GAI Consultants, Inc.	Boring No.:	4/8/19
Client Reference:	John E Amos LF Seq. 3 C130109.13	Depth (ft):	Bottom Ash
Project No.:	2019-168-002	Sample No.:	Sample 003
Lab ID:	2019-168-002-001	Soil Color:	Gray

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	9	Tare No.:	35
Wt. of Tare & Wet Sample (g):	986.34	Weight of Tare & Wet Sample (g):	190.07
Wt. of Tare & Dry Sample (g):	884.11	Weight of Tare & Dry Sample (g):	180.10
Weight of Tare (g):	202.50	Weight of Tare (g):	8.30
Weight of Water (g):	102.23	Weight of Water (g):	9.97
Weight of Dry Soil (g):	681.61	Weight of Dry Soil (g):	171.80
Moisture Content (%):	**15.0**	**Moisture Content (%):**	**5.8**

Wet Weight of -3/4" Sample (g):	18176	Weight of the Dry Sample (g):	681.61
Dry Weight of - 3/4" Sample (g):	15805.4	Weight of Minus #200 Material (g):	72.91
Wet Weight of +3/4" Sample (g):	181.77	Weight of Plus #200 Material (g):	608.70
Dry Weight of + 3/4" Sample (g):	171.80		
Total Dry Weight of Sample (g):	15977.2		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	72.41		0.43	0.43	99.57	**99.57**
3/4"	19.0	109.36		0.65	1.08	98.92	**98.92**
1/2"	12.5	13.24		1.94	1.94	98.06	**97.00**
3/8"	9.50	6.52		0.96	2.90	97.10	**96.06**
#4	4.75	57.42		8.42	11.32	88.68	**87.72**
#10	2.00	108.15		15.87	27.19	72.81	**72.03**
#20	0.85	155.90	(**)	22.87	50.06	49.94	**49.40**
#40	0.425	82.70		12.13	62.20	37.80	**37.40**
#60	0.250	49.73		7.30	69.49	30.51	**30.18**
#140	0.106	94.65		13.89	83.38	16.62	**16.44**
#200	0.075	40.39		5.93	89.30	10.70	**10.58**
Pan	-	72.91		10.70	100.00	-	**-**

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

Tested By	MLF	Date	4/12/19	Checked By	KC	Date	4/13/19

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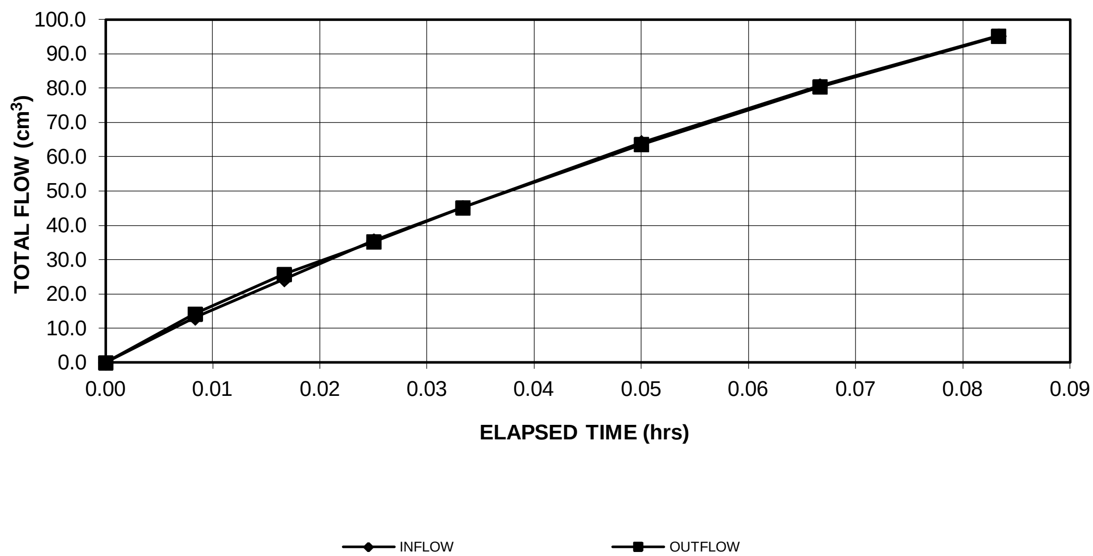
PERMEABILITY TEST

ASTM D 5084-16a

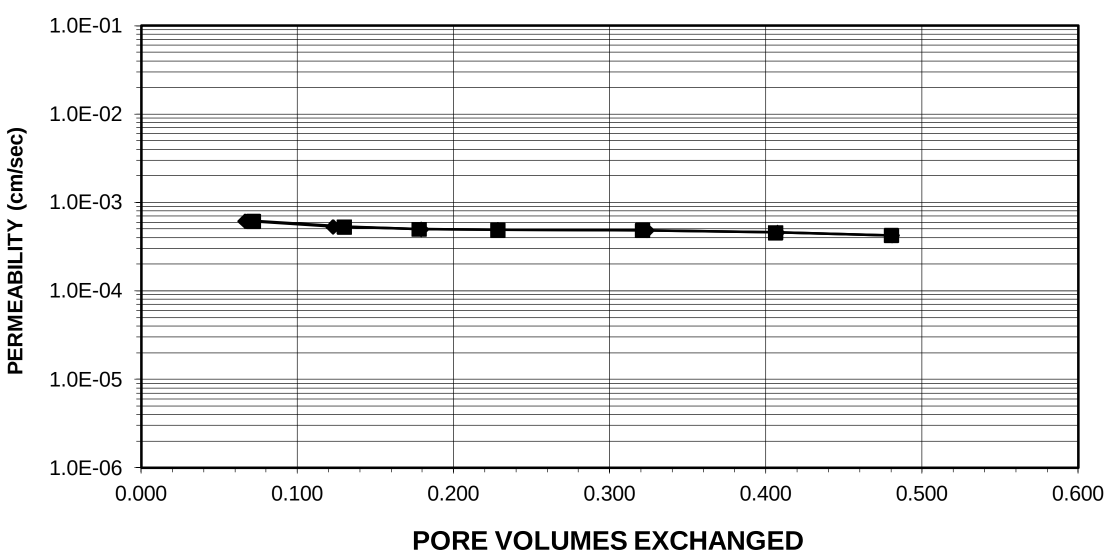
Client:	GAI Consultants, Inc.	Boring No.:	4/8/19
Client Project:	John E Amos LF Seq. 3 C130109.13	Depth (ft):	Bottom Ash
Project No.:	2019-168-002	Sample No.:	Sample 003
Lab ID No.:	2019-168-002-001	Avg. Conf. Pressure (psi):	210

AVERAGE PERMEABILITY = 4.7E-04 cm/sec @ 20^{o}C
AVERAGE PERMEABILITY = 4.7E-06 m/sec @ 20^{o}C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: RPE Date: 5/06/19 Checked By: KC Date: 5/13/19

DCN: CT-22 DATE: 1/1/17 REVISION: 11

544 Braddock Avenue East Pittsburgh, PA 15112 Phone (412) 823-7600 Fax (412) 823-8999 www.geotechnics.net

PERMEABILITY TEST

ASTM D 5084-16a

Client:	GAI Consultants, Inc.	Boring No.:	4/8/19
Client Project:	John E Amos LF Seq. 3 C130109.13	Depth (ft):	Bottom Ash
Project No.:	2019-168-002	Sample No.:	Sample 003
Lab ID No.:	2019-168-002-001	Avg. Conf. Pressure (psi):	210

Specific Gravity:	2.70	Assumed
Sample Condition:		Remolded

Visual Description: Gray Bottom Ash

Permeant Type: Deaired Water

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	42	586
Weight of Tare & Wet Sample (g)	134.86	855.24
Weight of Tare & Dry Sample (g)	118.72	689.94
Weight of Tare (g)	8.20	81.97
Weight of Water (g)	16.14	165.30
Weight of Dry Sample (g)	110.52	607.97
Moisture Content (%)	**14.6**	**27.2**

SPECIMEN:	BEFORE TEST	AFTER TEST
Weight of Tube & Wet Sample (g)	2020.90	NA
Weight of Tube (g)	1323.90	NA
Weight of Wet Sample (g)	697.00	773.54
Length 1 (in)	3.973	3.940
Length 2 (in)	3.973	3.944
Length 3 (in)	3.973	3.931
Top Diameter (in)	2.877	2.890
Middle Diameter (in)	2.877	2.889
Bottom Diameter (in)	2.877	2.891
Average Length (in)	3.97	3.94
Average Area (in^2)	6.50	6.56
Sample Volume (cm^3)	423.24	423.35
Unit Wet Weight (g/cm^3)	1.65	1.83
Unit Wet Weight (pcf)	102.8	114.1
Unit Dry Weight (pcf)	89.7	89.7
Unit Dry Weight (g/cm^3)	1.44	1.44
Void Ratio, e	0.88	0.88
Porosity, n	0.47	0.47
Pore Volume (cm^3)	198.0	198.1
Total Weight of Sample After Test (g)		773.88

Tested By: RPE Date: 5/6/19 Checked By: KC Date: 5/13/19

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PERMEABILITY TEST

ASTM D 5084-16a

Client:	GAI Consultants, Inc.	Boring No.:	4/8/19
Client Project:	John E Amos LF Seq. 3 C130109.13	Depth (ft):	Bottom Ash
Project No.:	2019-168-002	Sample No.:	Sample 003
Lab ID No.:	2019-168-002-001	Avg. Conf. Pressure (psi):	210

Pressure Heads (Constant)		**Final Sample Dimensions**	
Top Cap (psi)	98.0	Sample Length (cm), L	10.00
Bottom Cap (psi)	100.0	Sample Diameter (cm)	7.34
Cell (psi)	309.0	Sample Area (cm^2), A	42.32
Total Pressure Head (cm)	140.6	Inflow Burette Area (cm^2), a-in	4.384
Hydraulic Gradient	14.06	Outflow Burette Area (cm^2), a-out	4.553

AVERAGE PERMEABILITY = 4.7E-04 cm/sec @ 20°C

AVERAGE PERMEABILITY = 4.7E-06 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
5/10/19	7	31	0.000	0.0	0.0	167.4	0	22.4	NA
5/10/19	7	32	0.008	13.1	14.2	161.3	0	22.4	6.2E-04
5/10/19	7	32	0.017	24.3	25.7	156.2	0	22.4	5.3E-04
5/10/19	7	33	0.025	35.5	35.2	151.6	0	22.4	5.0E-04
5/10/19	7	33	0.033	45.2	45.2	147.2	0	22.4	4.9E-04
5/10/19	7	34	0.050	64.1	63.6	138.8	0	22.4	4.9E-04
5/10/19	7	35	0.067	80.7	80.4	131.3	0	22.4	4.6E-04
5/10/19	7	36	0.083	95.2	95.1	124.8	1	22.4	4.3E-04

Tested By: RPE Date: 5/06/19 Checked By: KC Date: 5/13/19

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Appendix D-II
Bench Stone Aggregate

R. B. JERGENS CONTRACTORS, INC. VANDALIA, OHIO
11418 N. Dixie Drive P.O. Box 309
Vandalia, OH 45377
Phone: (937) 669-9799
Fax: (937) 669-0301

LETTER OF TRANSMITTAL

DATE: 14-May-19	JOB NO.: 18-003
ATTENTION: Brandon Schmader	
Submittal No. 28	
Amos Landfill Sequence 4 Expansion	
#8 Non-Calcareous for Subgrade Benches	

TO **American Electric Power**
1 Riverside Plaza
Columbus, OH 43215

WE ARE SENDING YOU [X] Attached [ ] Under separate cover via ____________ the following items

[ ] Shop drawings [ ] Prints [ ] Plans [ ] Samples [X] Specifications
[ ] Copy of letter [ ] Change Order [ ] Test Results

COPIES	DATE	NO.	DESCRIPTION
1 electronic	14-May	1	#8 Non-Calcareous for Subgrade Benches

THESE ARE TRANSMITTED as checked below:

[X] For Approval [ ] Approved as submitted [ ] Resubmit______copies for approval
[ ] For your use [ ] Approved as noted [ ] Submit_____copies for distribution
[ ] As requested [ ] Returned for corrections [ ] Return _____ corrected prints
[ ] For review [ ]

[ ]

REMARKS:
Compliant with drawing number 30203SH13 detail 4

Kevin Harshberger, RBJ
Mike Davis, RBJ
Izaac Harshberger, RBJ
Ash Hutsonpillar, RBJ

SIGNED: Jacob Warner (signed)

Jacob Warner

RIVER SAND & GRAVEL

AGGREGATE GRADATION WORKSHEET

AGGREGATE SIZE: Size No. 8's

SOURCE: River Sand & Gravel

INSPECTOR: Melinda Gibbs

DATE: June 18, 2018

Sieve Sizes	Grams Retained	Percent Retained	Percent Passing	Spec. Limits	Sieve Sizes	Grams Retained	Percent Retained	Percent Passing	Spec. Limits
4"					4"				
3 1/2"					3 1/2"				
3"					3"				
2 1/2"					2 1/2"				
2"					2"				
1 1/2"					1 1/2"				
1"					1"				
3/4"					3/4"				
1/2"	0	0.0	100.0	100	1/2"				100
3/8"	11.3	2.0	98.0	85-100	3/8"				85-100
1/4"					1/4"				
# 4	385.7	68.1	*31.9	10-30	# 4				10-30
# 8	553.1	97.7	2.3	0-10	# 8				0-10
# 16	562.1	99.3	0.7	0-5	# 16				0-5
# 30	563.9	99.6	0.4		# 30				
# 50	565	99.8	0.2		# 50				
# 100	565.4	99.9	0.1		# 100				
# 200	565.8	100.0	0.0		# 200				
Pan	566	100.0			Pan				
Total	566				Total				

-#200 Wash Test					
W1=		W1=	0	UNIT WEIGHT:	
WBW=		W2=		SPECIFIC GRAVITY:	
% MINUS #200		#DIV/0!		INSPECTOR:	Melinda Gibbs
				SHALE	
				CERTIFICATION #	mgibbs1

REMARKS:

Calcium Carbonate ($CaCO_3$) Laboratory Analysis Form

KENVIRONS

Prepared For: Red River Ranch LLC
1499 Mabple Street
Stanton, KY 40380

Sample Source: Red River Ranch
Vanceburg, KY Quarry

Sample Identification: No. 8's

Prepared By: Kenvirons, Inc.
452 Versaillies Road
Frankfort, KY 40601
Phone: (502) 695-4357
Fax: (502) 695-4363

Sampled By: Scott Ferguson - Red River Ranch

Analysis Data

Project No.: 2015083
Laboratory No.: 2015083-02
Date Received: Monday, June 01, 2015
Date Sampled: Monday, June 01, 2015
Date Dried: 6/2/15 - 6/4/15
Acid Concentration: pH 4 (0.0001N) HCl

Initial Weight Date/Time: Thursday, June 04, 2015 / 10:20 AM

1st Acid Bath Start Time: 10:35 AM End Time: 11:40 AM
Notes: Very Miniscule Bubbling

2nd Acid Bath Start Time: 11:50 AM End Time: 1:05 PM
Notes: No Reaction

3rd Acid Bath Start Time: 1:20 PM End Time: 2:35 PM
Notes: No Reaction

Sample No.	Initial Weight (g)	Final Weight (g)	Rock Recovered %	$CaCO_3$ %
1	178.3745	178.0439	99.81	0.2
2	177.6712	177.475	99.89	0.1
3	176.5086	176.0125	99.72	0.3

Average $CaCO_3$ Content: 0.19%

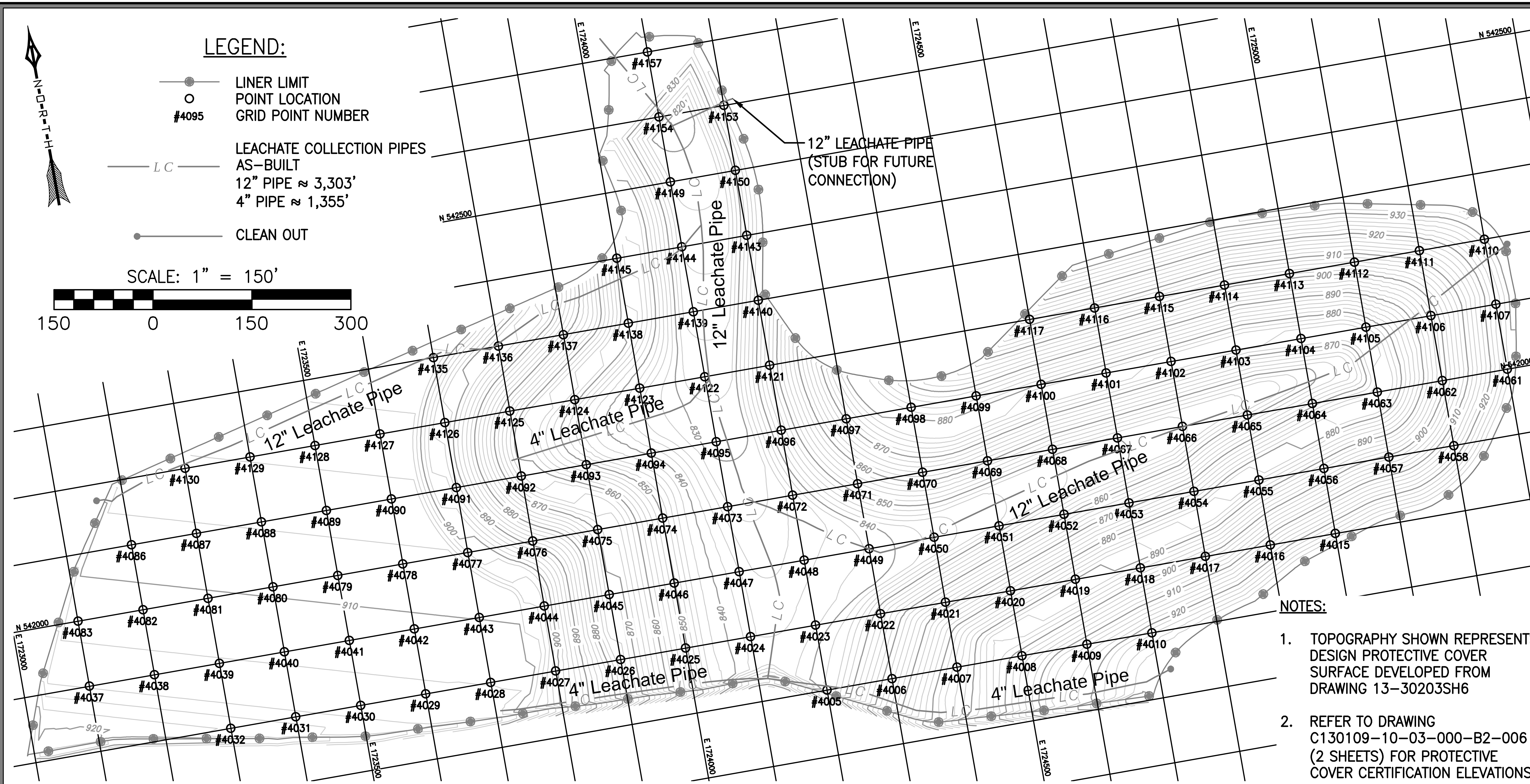
Method Used: ASTM D3042 (Modified)

Performed By: Benjamin T. Bray

Signature: B.T.B

Appendix E

Sequence 4 Leachate Collection System and Protective Cover Certification Drawings



NOTES:

1. TOPOGRAPHY SHOWN REPRESENTS DESIGN PROTECTIVE COVER SURFACE DEVELOPED FROM DRAWING 13-30203SH6
2. REFER TO DRAWING C130109-10-03-000-B2-006 (2 SHEETS) FOR PROTECTIVE COVER CERTIFICATION ELEVATIONS

NO.:	DATE:	DWN:	CHK:	APV:	DESCRIPTION:
0	11/05/2019	MAYHOEJ	FRECHKL	LEHNEMR	AS-BUILT

REVISION RECORD

DRAWING TITLE

PROJECT: JOHN E. AMOS LANDFILL
SEQUENCE 4 LINER
LEACHATE COLLECTION SYSTEM AND
PROTECTIVE COVER CERTIFICATION PLAN

gai consultants

CLIENT: APPALACHIAN POWER COMPANY
1 RIVERSIDE PLAZA
COLUMBUS, OHIO

DRAWN BY:	CHECKED BY:	APPROVED BY:
MAYHOEJ	FRECHKL	STRALCF
REVISION	SCALE:	ISSUE DATE:
0	1" = 150'	10/30/2019
	SHEET NO.: 1 OF 1	

GAI FILE NUMBER: C130109-10-003-00-B2-005

GAI DRAWING NUMBER:

This drawing was produced with computer aided drafting technology and is supported by electronic drawing files. Do not revise this drawing via manual drafting methods.

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ISSUING OFFICE: Murrysville | 4200 Triangle Lane, Export, PA 15632-1358

GAI CAD FILE PATH: Z:\Energy\2013\C130109.10 – AEP Seq 4 2018–2020 QAQC\CAD\Production DWGs\C130109-10-003-00-B2-005.dwg

PLOTTED ON: 11/25/2019 10:41:33 AM PLOTTED BY: Ed Mayhood PLOT FILE: GAI.stb

Point	Northing	Easting	Subgrade	Top of Clay (CCL)				Top of Protective Cover			
			Elevation (ft)	Elevation (ft)		Difference, As-Built - Design (ft)	Thickness (ft)	Elevation (ft)		Difference, As-Built - Design (ft)	Thickness (ft)
			As-Built	Design	As-Built	(- = Below Design)		Design	As-Built	(- = Below Design)	
4006	541700	1724300	859.74	861.58	861.76	0.18	2.02	863.26	863.32	0.06	1.56
4007	541700	1724400	881.44	883.31	883.51	0.19	2.07	885.00	885.11	0.12	1.61
4008	541700	1724500	898.19	900.26	900.38	0.12	2.18	901.94	902.08	0.14	1.70
4009	541700	1724600	909.53	911.67	911.73	0.06	2.20	913.35	913.41	0.06	1.68
4010	541700	1724700	919.96	922.00	922.17	0.17	2.21	923.68	923.82	0.14	1.65
4015	541800	1724000	922.14	924.17	924.18	0.01	2.04	925.85	925.79	-0.06	1.61
4016	541800	1724900	910.33	912.45	912.53	0.07	2.20	914.14	914.13	0.00	1.60
4017	541800	1724800	896.98	899.16	899.21	0.05	2.23	900.84	900.89	0.05	1.68
4018	541800	1724700	889.63	891.75	891.80	0.06	2.18	893.43	893.53	0.10	1.73
4019	541800	1724600	886.23	888.39	888.41	0.02	2.18	890.07	890.12	0.05	1.71
4020	541800	1724500	875.07	877.11	877.20	0.09	2.13	878.79	878.72	-0.07	1.52
4021	541800	1724400	863.52	865.50	865.55	0.05	2.03	867.18	867.12	-0.06	1.57
4022	541800	1724300	848.28	850.33	850.37	0.04	2.09	852.01	851.91	-0.10	1.54
4023	541800	1724200	834.18	836.23	836.22	-0.01	2.04	837.91	839.46	1.55	3.24
4024	541800	1724100	833.36	835.41	835.36	-0.05	2.00	837.09	838.44	1.35	3.08
4025	541800	1724000	846.82	848.98	848.99	0.00	2.17	850.66	850.68	0.02	1.69
4026	541800	1723900	871.32	873.32	873.49	0.17	2.17	875.00	876.56	1.56	3.07
4027	541800	1723800	897.25	899.11	899.33	0.22	2.07	900.86	901.62	0.76	2.29
4028	541800	1723700	907.97	910.17	910.26	0.09	2.29	911.92	911.95	0.03	1.69
4029	541800	1723600	908.57	910.73	910.78	0.05	2.21	912.41	912.51	0.10	1.73
4030	541800	1723500	909.14	911.29	911.37	0.08	2.23	912.97	912.94	-0.03	1.57
4031	541800	1723400	911.13	913.24	913.36	0.13	2.23	914.92	915.65	0.73	2.29
4032	541800	1723300	914.20	916.06	916.50	0.44	2.30	918.00	918.48	0.48	1.98
4037	541900	1723100	909.83	912.03	912.15	0.13	2.32	913.71	913.73	0.02	1.58
4038	541900	1723200	908.91	911.05	911.12	0.08	2.21	912.73	912.82	0.09	1.70
4039	541900	1723300	908.51	910.49	910.65	0.16	2.14	912.17	912.25	0.08	1.60
4040	541900	1723400	907.85	909.93	910.01	0.08	2.16	911.61	911.72	0.11	1.71
4041	541900	1723500	907.18	909.37	909.43	0.06	2.25	911.05	910.99	-0.06	1.56
4042	541900	1723600	906.67	908.81	908.84	0.03	2.17	910.49	910.59	0.10	1.75
4043	541900	1723700	906.30	908.25	908.50	0.25	2.20	909.95	910.08	0.13	1.58
4044	541900	1723800	899.66	901.76	901.67	-0.09	2.01	903.44	903.42	-0.02	1.75
4045	541900	1723900	867.50	869.67	869.52	-0.15	2.02	871.35	873.15	1.80	3.63

Point	Northing	Easting	Subgrade	Top of Clay (CCL)				Top of Protective Cover			
			Elevation (ft)	Elevation (ft)		Difference, As-Built - Design (ft)	Thickness (ft)	Elevation (ft)		Difference, As-Built - Design (ft)	Thickness (ft)
			As-Built	Design	As-Built	(- = Below Design)		Design	As-Built	(- = Below Design)	
4046	541900	1724000	846.43	848.63	848.69	0.07	2.26	850.31	850.31	0.00	1.62
4047	541900	1724100	832.24	834.38	834.34	-0.05	2.10	836.06	837.28	1.22	2.94
4048	541900	1724200	831.62	833.63	833.83	0.20	2.21	835.40	836.77	1.37	2.94
4049	541900	1724300	834.60	836.68	836.68	0.00	2.08	838.34	839.79	1.45	3.11
4050	541900	1724400	839.24	841.08	841.27	0.19	2.03	842.81	844.74	1.93	3.47
4051	541900	1724500	843.57	845.70	845.70	0.00	2.13	847.38	848.03	0.65	2.33
4052	541900	1724600	854.78	856.96	856.85	-0.10	2.07	858.64	858.61	-0.03	1.76
4053	541900	1724700	863.76	865.77	865.91	0.13	2.15	867.46	867.43	-0.03	1.52
4054	541900	1724800	871.47	873.51	873.49	-0.03	2.02	875.19	875.25	0.06	1.76
4055	541900	1724900	880.29	882.15	882.32	0.17	2.03	883.83	884.95	1.12	2.63
4056	541900	1725000	890.46	892.45	892.47	0.02	2.01	894.13	894.13	0.00	1.66
4057	541900	1725100	897.31	899.39	899.32	-0.08	2.00	901.07	901.05	-0.02	1.73
4058	541900	1725200	912.37	914.28	914.39	0.12	2.02	915.96	916.10	0.14	1.71
4061	542000	1725300	923.92	925.91	925.95	0.04	2.04	927.59	-*	-	-
4062	542000	1725200	895.02	896.93	897.06	0.13	2.04	898.61	898.69	0.08	1.63
4063	542000	1725100	871.55	873.64	873.72	0.08	2.16	875.32	877.37	2.05	3.65
4064	542000	1725000	864.95	866.94	867.12	0.18	2.17	868.62	868.65	0.03	1.53
4065	542000	1724900	854.62	856.62	856.66	0.04	2.04	858.30	858.19	-0.11	1.53
4066	542000	1724800	848.22	850.11	850.28	0.17	2.06	851.81	853.86	2.05	3.58
4067	542000	1724700	846.32	848.40	848.52	0.12	2.20	850.08	852.18	2.10	3.66
4068	542000	1724600	849.46	851.36	851.50	0.15	2.04	853.04	853.00	-0.04	1.50
4069	542000	1724500	856.46	858.61	858.63	0.02	2.17	860.29	860.25	-0.04	1.62
4070	542000	1724400	860.19	862.07	862.35	0.27	2.16	863.75	863.86	0.11	1.51
4071	542000	1724300	849.66	851.76	851.84	0.08	2.18	853.44	853.45	0.01	1.61
4072	542000	1724200	831.11	833.19	833.22	0.04	2.12	834.87	837.27	2.40	4.05
4073	542000	1724100	828.83	830.65	830.96	0.31	2.13	832.33	833.76	1.43	2.80
4074	542000	1724000	845.95	848.11	848.15	0.04	2.20	849.80	849.85	0.05	1.70
4075	542000	1723900	865.28	867.43	867.46	0.02	2.18	869.11	869.12	0.01	1.66
4076	542000	1723800	884.35	886.21	886.38	0.17	2.03	887.89	887.99	0.10	1.61
4077	542000	1723700	898.37	900.34	900.41	0.07	2.04	902.02	902.48	0.46	2.07
4078	542000	1723600	904.70	906.89	906.93	0.04	2.23	908.57	908.71	0.14	1.78
4079	542000	1723500	905.27	907.45	907.49	0.04	2.22	909.13	909.18	0.05	1.69
4080	542000	1723400	905.87	908.01	908.06	0.05	2.19	909.69	909.73	0.04	1.67
4081	542000	1723300	906.43	908.57	908.72	0.16	2.29	910.25	910.25	0.00	1.53

* THIS POINT IS LOCATED ALONG THE PERIMETER OF SEQUENCE 4 OF THE LANDFILL BUT WITHIN THE AREA COVERED BY A TEMPORARY OR A PERMANENT PERIMETER BERM, AND THEREFORE NO PROTECTIVE COVER WAS PLACED AT THIS POINT. THE LINER SYSTEM AT THIS POINT HAS A MINIMUM 2-FOOT THICK COMPACTED CLAY LINER UNDER THE PVC GEOMEMBRANE.

SEE DRAWING C130109-10-003-00-B2-005 FOR PLAN OF CERTIFICATION POINTS.

NO.:	DATE:	DWN:	CHK:	APV:	DESCRIPTION:
0	11/05/2019	MAYHOEJ	FRECHKL	STRALCF	AS-BUILT

REVISION RECORD

DRAWING TITLE

PROJECT: JOHN E. AMOS LANDFILL SEQUENCE 4 LINER PROTECTIVE COVER CERTIFICATION POINTS TABLE

gai consultants

CLIENT: APPALACHIAN POWER COMPANY 1 RIVERSIDE PLAZA COLUMBUS, OHIO

DRAWN BY:	CHECKED BY:	APPROVED BY:
MAYHOEJ	FRECHKL	STRALCF

REVISION: 0

SCALE: N.T.S

ISSUE DATE: 11/05/2019

SHEET NO.: 1 OF 2

GAI FILE NUMBER: C130109-10-003-00-B2-006

GAI DRAWING NUMBER:

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PLOTTED ON: 11/25/2019 11:32:53 AM PLOTTED BY: Ed Mayhood PLOT FILE: GAI.stb

Point	Northing	Easting	Subgrade	Top of Clay (CCL)				Top of Protective Cover			
			Elevation (ft)	Elevation (ft)		Difference, As-Built - Design (ft)	Thickness (ft)	Elevation (ft)		Difference, As-Built - Design (ft)	Thickness (ft)
			As-Built	Design	As-Built	(- = Below Design)		Design	As-Built	(- = Below Design)	
4082	542000	723200	906.93	909.13	909.26	0.14	2.33	910.81	910.85	0.04	1.59
4083	542000	1723100	907.57	909.68	909.72	0.03	2.15	911.37	911.44	0.08	1.72
4086	542100	1723200	905.12	907.21	907.38	0.17	2.26	908.89	908.97	0.08	1.59
4087	542100	1723300	904.51	906.65	906.78	0.13	2.27	908.33	908.43	0.10	1.65
4088	542100	1723400	903.91	906.09	906.30	0.22	2.39	907.77	907.86	0.09	1.56
4089	542100	1723500	903.40	905.53	905.62	0.09	2.22	907.21	907.23	0.02	1.61
4090	542100	1723600	902.91	904.97	905.22	0.25	2.32	906.65	906.85	0.20	1.63
4091	542100	1723700	889.57	891.76	891.73	-0.03	2.15	893.46	893.48	0.02	1.75
4092	542100	1723800	859.02	861.21	861.22	0.00	2.19	862.91	863.07	0.16	1.85
4093	542100	1723900	847.32	849.41	849.35	-0.06	2.03	851.10	851.03	-0.07	1.68
4094	542100	1724000	835.53	837.65	837.53	-0.12	2.00	839.32	839.24	-0.08	1.71
4095	542100	1724100	825.56	827.75	827.72	-0.03	2.16	829.32	830.76	1.44	3.04
4096	542100	1724200	840.24	842.46	842.51	0.06	2.27	844.14	844.15	0.01	1.64
4097	542100	1724300	866.58	868.62	868.79	0.17	2.21	870.30	870.44	0.14	1.65
4098	542100	1724400	879.37	881.42	881.41	-0.01	2.05	883.10	883.11	0.01	1.70
4099	542100	1724500	881.79	883.73	883.81	0.08	2.01	885.41	885.47	0.06	1.66
4100	542100	1724600	875.89	878.00	878.11	0.11	2.22	879.68	879.61	-0.07	1.50
4101	542100	1724700	873.00	875.03	875.08	0.05	2.08	876.71	878.22	1.51	3.14
4102	542100	1724800	871.75	873.87	873.97	0.10	2.23	875.55	876.84	1.29	2.87
4103	542100	1724900	870.63	872.71	872.69	-0.02	2.06	874.39	875.69	1.30	3.00
4104	542100	1725000	869.69	871.81	871.88	0.07	2.19	873.49	874.77	1.28	2.89
4105	542100	1725100	872.25	874.33	874.47	0.14	2.22	876.01	877.45	1.44	2.98
4106	542100	1725200	893.78	895.86	895.96	0.11	2.18	897.54	897.68	0.14	1.72
4107	542100	1725300	920.61	922.75	922.75	0.00	2.14	924.43	-*	-	-
4110	542200	1725300	926.17	928.20	928.22	0.02	2.05	929.90	-*	-	-
4111	542200	1725200	910.47	912.62	912.62	0.00	2.15	914.30	914.33	0.03	1.71
4112	542200	1725100	901.86	903.79	903.97	0.19	2.12	905.47	905.65	0.18	1.68
4113	542200	1725000	898.85	900.81	900.90	0.09	2.04	902.49	902.49	0.00	1.59
4114	542200	1724900	898.07	900.03	900.12	0.09	2.04	901.71	901.81	0.10	1.69
4115	542200	1724800	901.57	903.72	903.78	0.06	2.21	905.40	905.44	0.04	1.67
4116	542200	1724700	905.54	907.41	907.56	0.15	2.02	909.09	909.14	0.05	1.59
4117	542200	1724600	909.11	911.21	911.17	-0.04	2.06	912.89	-*	-	-

Point	Northing	Easting	Subgrade	Top of Clay (CCL)				Top of Protective Cover			
			Elevation (ft)	Elevation (ft)		Difference, As-Built - Design (ft)	Thickness (ft)	Elevation (ft)		Difference, As-Built - Design (ft)	Thickness (ft)
			As-Built	Design	As-Built	(- = Below Design)		Design	As-Built	(- = Below Design)	
4121	542200	1724200	842.74	844.70	844.80	0.10	2.06	846.38	846.49	0.11	1.69
4122	542200	1724100	823.47	825.57	825.58	0.01	2.11	827.13	828.62	1.49	3.04
4123	542200	1724000	832.90	834.85	834.97	0.12	2.07	836.53	836.50	-0.03	1.53
4224	542200	1723900	847.43	849.43	849.57	0.14	2.13	851.13	851.24	0.11	1.67
4125	542200	1723800	861.88	864.00	864.02	0.02	2.14	865.68	865.73	0.05	1.71
4126	542200	1723700	889.29	891.15	891.29	0.14	2.00	892.83	894.30	1.47	3.01
4127	542200	1723600	901.01	903.05	903.30	0.25	2.29	904.73	904.88	0.15	1.58
4128	542200	1723500	901.51	903.61	903.76	0.15	2.25	905.29	905.33	0.04	1.58
4129	542200	1723400	901.98	904.17	904.26	0.10	2.28	905.85	906.00	0.15	1.74
4130	542200	1723300	902.73	904.72	904.95	0.22	2.22	906.41	906.55	0.14	1.60
4135	542300	1723700	898.38	900.57	900.55	-0.02	2.18	902.26	-*	-	-
4136	542300	1723800	883.54	885.68	885.55	-0.13	2.01	887.36	889.14	1.78	3.60
4137	542300	1723900	867.31	869.45	869.46	0.01	2.15	871.12	871.10	-0.02	1.64
4138	542300	1724000	845.19	847.37	847.34	-0.03	2.15	849.05	850.64	1.59	3.30
4139	542300	1724100	821.59	823.74	823.67	-0.07	2.08	825.28	826.67	1.39	3.00
4140	542300	1724200	836.48	838.40	838.53	0.13	2.05	840.08	840.27	0.19	1.74
4143	542400	1724200	829.43	831.45	831.49	0.04	2.06	833.13	833.13	0.00	1.64
4144	542400	1724100	820.27	822.15	822.32	0.16	2.05	823.83	826.43	2.60	4.11
4145	542400	1724000	845.93	847.82	849.68	1.86	3.75	849.50	-*	-	-
4149	542500	1724100	818.38	820.21	820.38	0.17	2.00	821.89	822.10	0.21	1.72
4150	542500	1724200	827.25	829.29	829.31	0.02	2.07	830.97	830.97	0.00	1.66
4153	542600	1724200	833.10	835.21	835.29	0.08	2.20	836.53	-*	-	-
4154	542600	1724100	815.12	823.23	817.19	-6.03	2.07	824.81	825.05	0.24	7.86
4157	542700	1724100	813.73	820.34	816.00	-4.34	2.27	820.34	-*	-	-

* THIS POINT IS LOCATED ALONG THE PERIMETER OF SEQUENCE 4 OF THE LANDFILL BUT WITHIN THE AREA COVERED BY A TEMPORARY OR A PERMANENT PERIMETER BERM, AND THEREFORE NO PROTECTIVE COVER WAS PLACED AT THIS POINT. THE LINER SYSTEM AT THIS POINT HAS A MINIMUM 2-FOOT THICK COMPACTED CLAY LINER UNDER THE PVC GEOMEMBRANE.

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NO.:	DATE:	DWN:	CHK:	APV:	DESCRIPTION:
0	11/05/2019	MAYHOEJ	FRECHKL	STRALCF	AS-BUILT

REVISION RECORD

DRAWING TITLE

PROJECT

JOHN E. AMOS LANDFILL
SEQUENCE 4 LINER
PROTECTIVE COVER
CERTIFICATION POINTS TABLE

gai consultants

CLIENT

APPALACHIAN POWER COMPANY
1 RIVERSIDE PLAZA
COLUMBUS, OHIO

DRAWN BY:	CHECKED BY:	APPROVED BY:
MAYHOEJ	FRECHKL	STRALCF
REVISION	SCALE:	ISSUE DATE:
0	N.T.S	11/05/2019

SHEET NO.: 2 OF 2

GAI FILE NUMBER: C130109-10-003-00-B2-006

GAI DRAWING NUMBER:

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PLOTTED ON: 11/25/2019 10:46:56 AM PLOTTED BY: Ed Mayhood PLOT FILE: GAI.stb