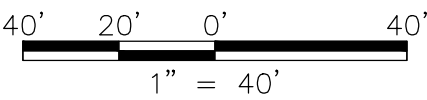
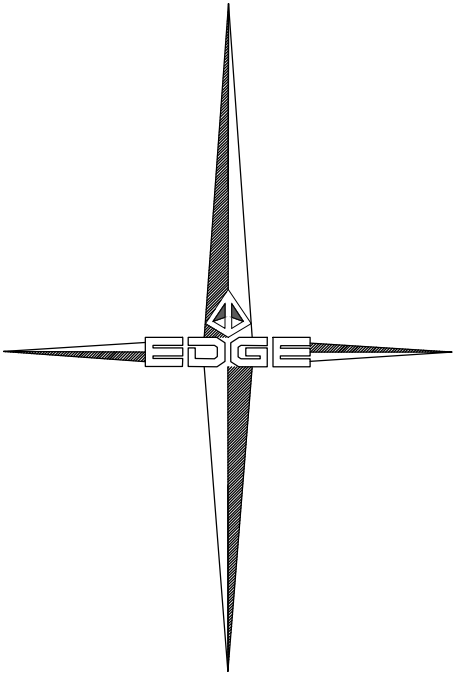


APPENDIX B – AS-BUILT DOCUMENTATION

CENTRAL LANDFILL CELL 4 EXPANSION
PROJECT NUMBER: 167550



NOTES

1. CELL 2A WORK LIMITS PROVIDED BY CONTRACTOR.

AREA

1. CELL 2A WORK AREA IS 56887.75 SQ FT, OR 1.30 ACRES.

8000 KING STREET, ANCHORAGE, ALASKA 99518
(907)344-5990 WWW.EDGESURVEY.NET AECI# 1392

CENTRAL LANDFILL
CELL 2A WORK AREA

DRAWN BY: SH	DATE: 11/5/2025	PROJECT NO.: 25-198
CHECKED BY: RS	SCALE: 1"= 40'	SHEET: 1 OF 1

CENTRAL LANDFILL CELL 4 EXPANSION
PROJECT NUMBER: 167550

CELL 2A
(CLOSED)

CELL 4
EXPANSION
BOUNDARY

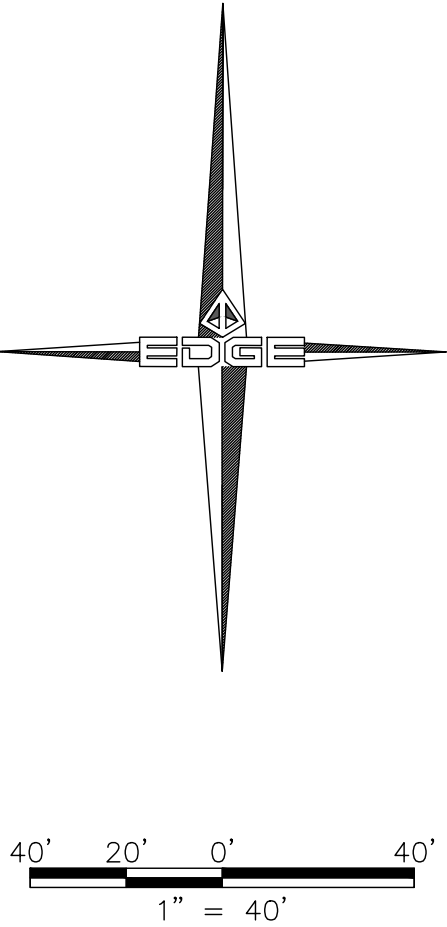
CONSTRUCTION
LIMITS

CELL 2B
(LINED)

PILE EXCAVATED

CELL 4
(LINED)

CELL 3
(LINED)



NOTES

1. ORIGINAL GROUND SURVEY SHOWN HEREON COLLECTED BY EDGE SURVEY AND DESIGN, LLC ON 8/17/2025.
2. EXCAVATION AND PILE SURFACES SHOWN HEREON PROVIDED BY SOUTHCENTRAL CONSTRUCTION.
3. ALIGNMENTS AND STATIONING SHOWN HEREON ARE ARBITRARY NON-PLAN ALIGNMENTS CREATED AND SHOWN FOR CROSS-SECTIONS AND AVERAGE END AREAS ONLY.

QUANTITIES

1. QUANTITIES SHOWN HEREON ARE TIN SURFACE TO TIN SURFACE VOLUMES COMPUTED IN AUTOCAD CIVIL 3D, 2025. FOR AVERAGE END AREAS, SEE SECTION SHEETS.

CELL 4 EXCAVATION	13,952	CY
PILE EXCAVATION	2,141	CY

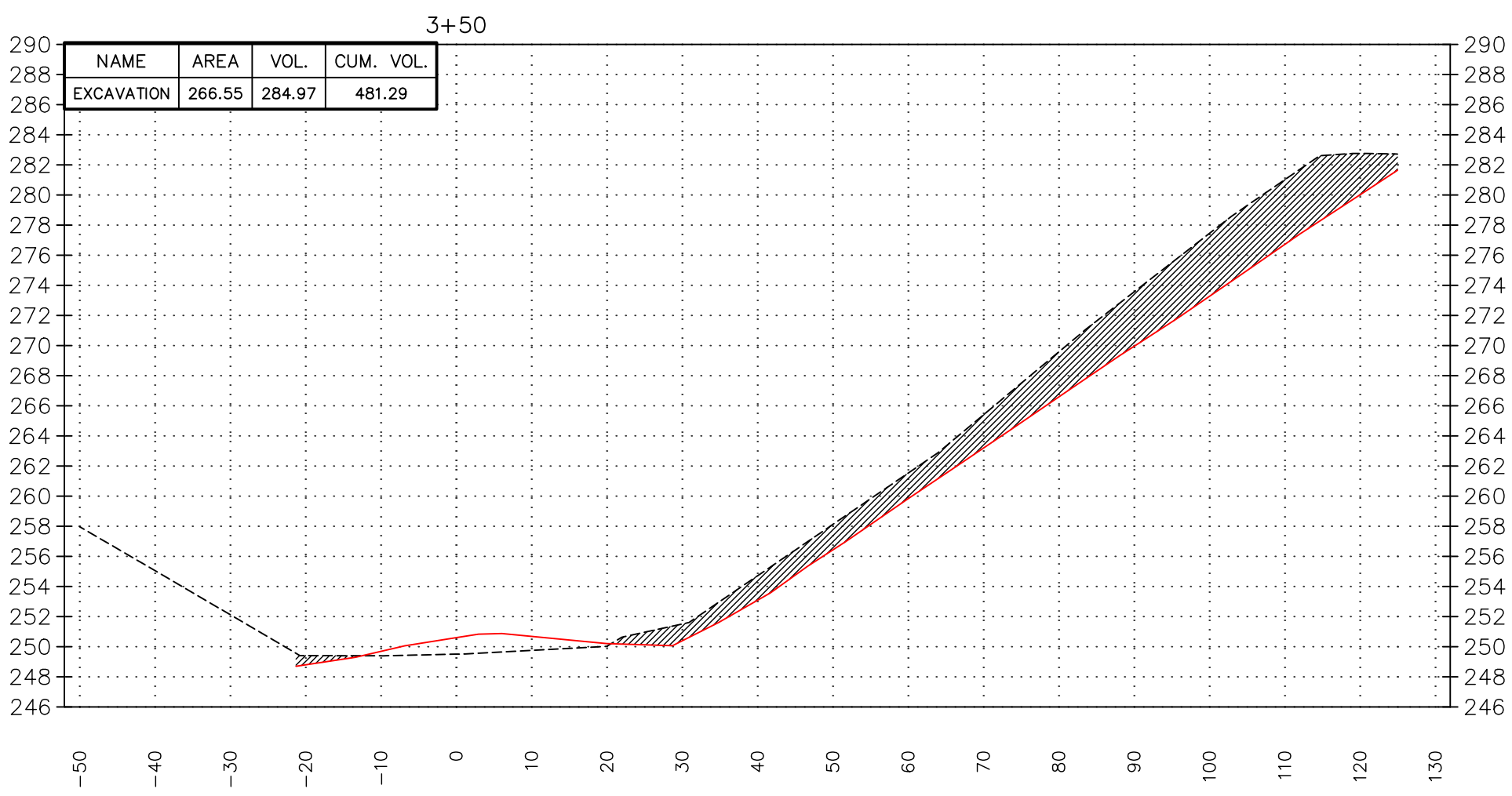
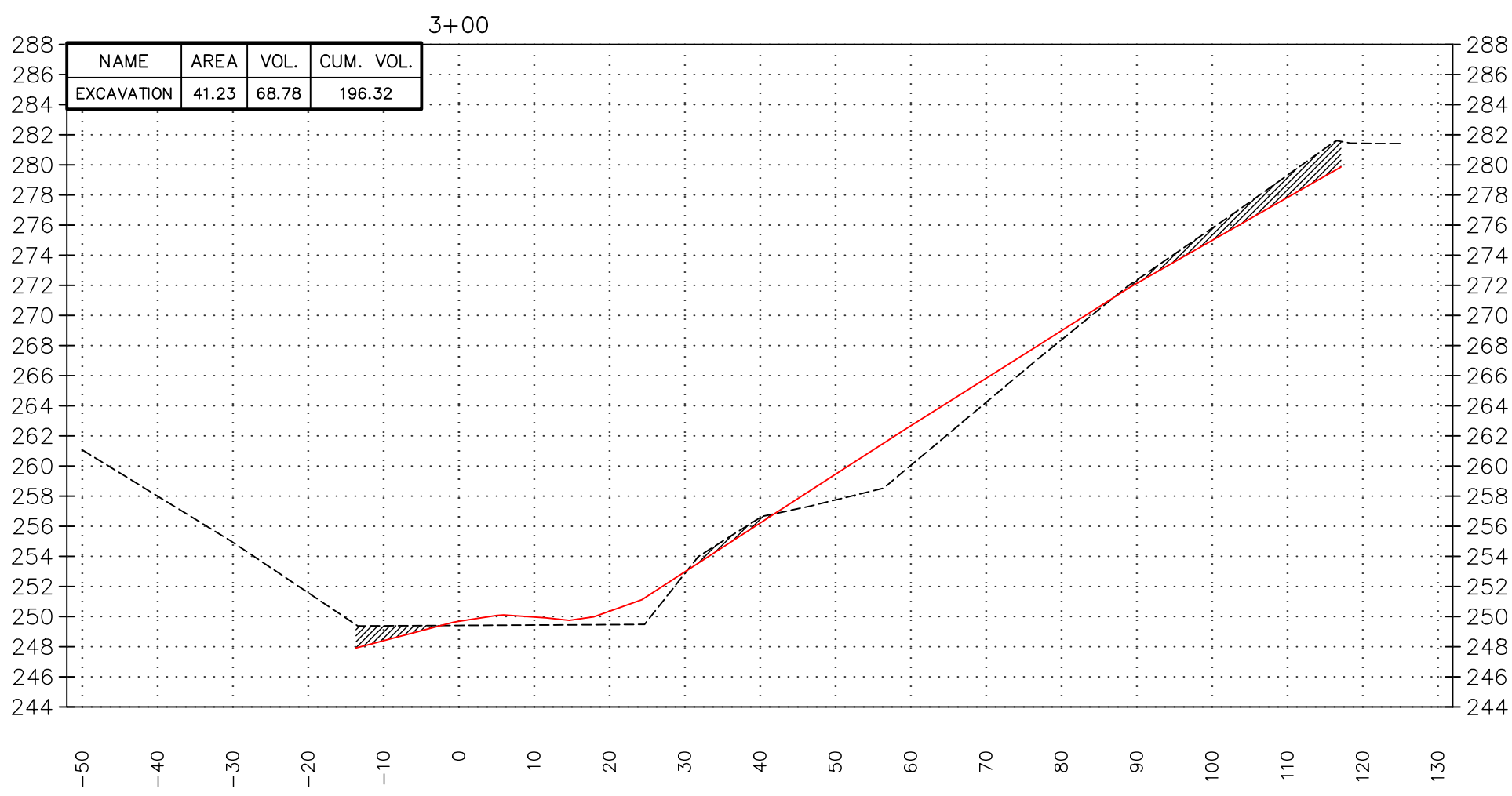
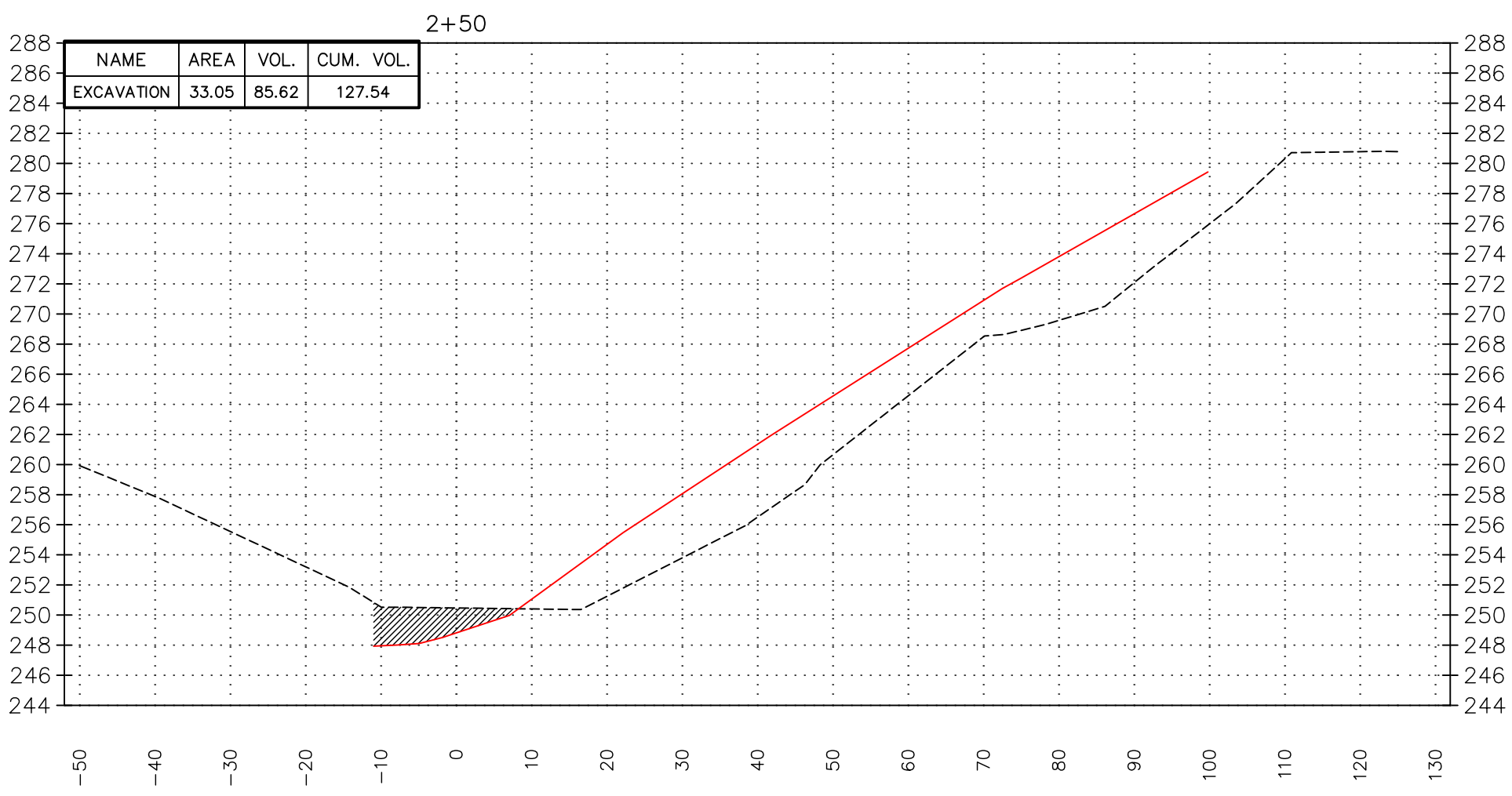
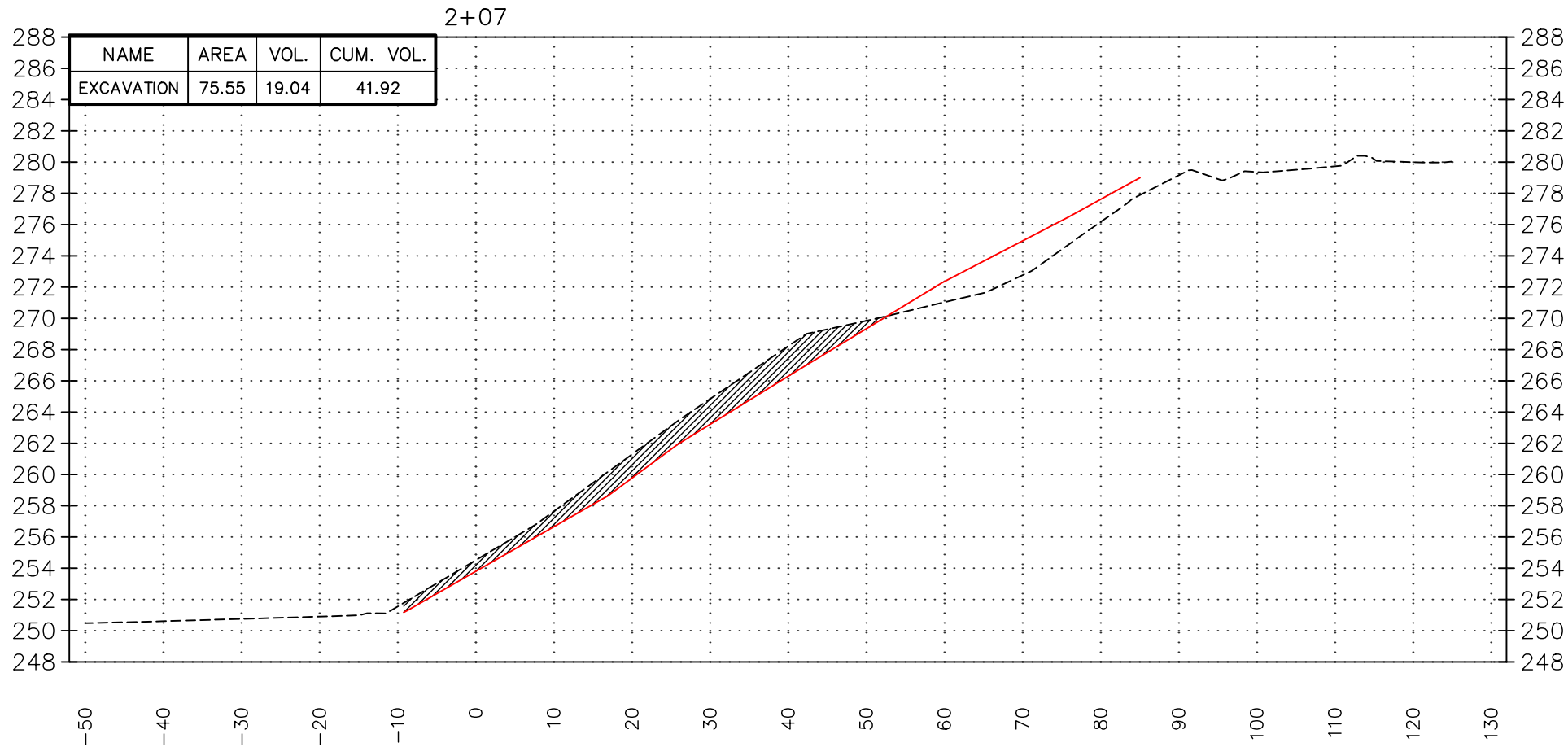
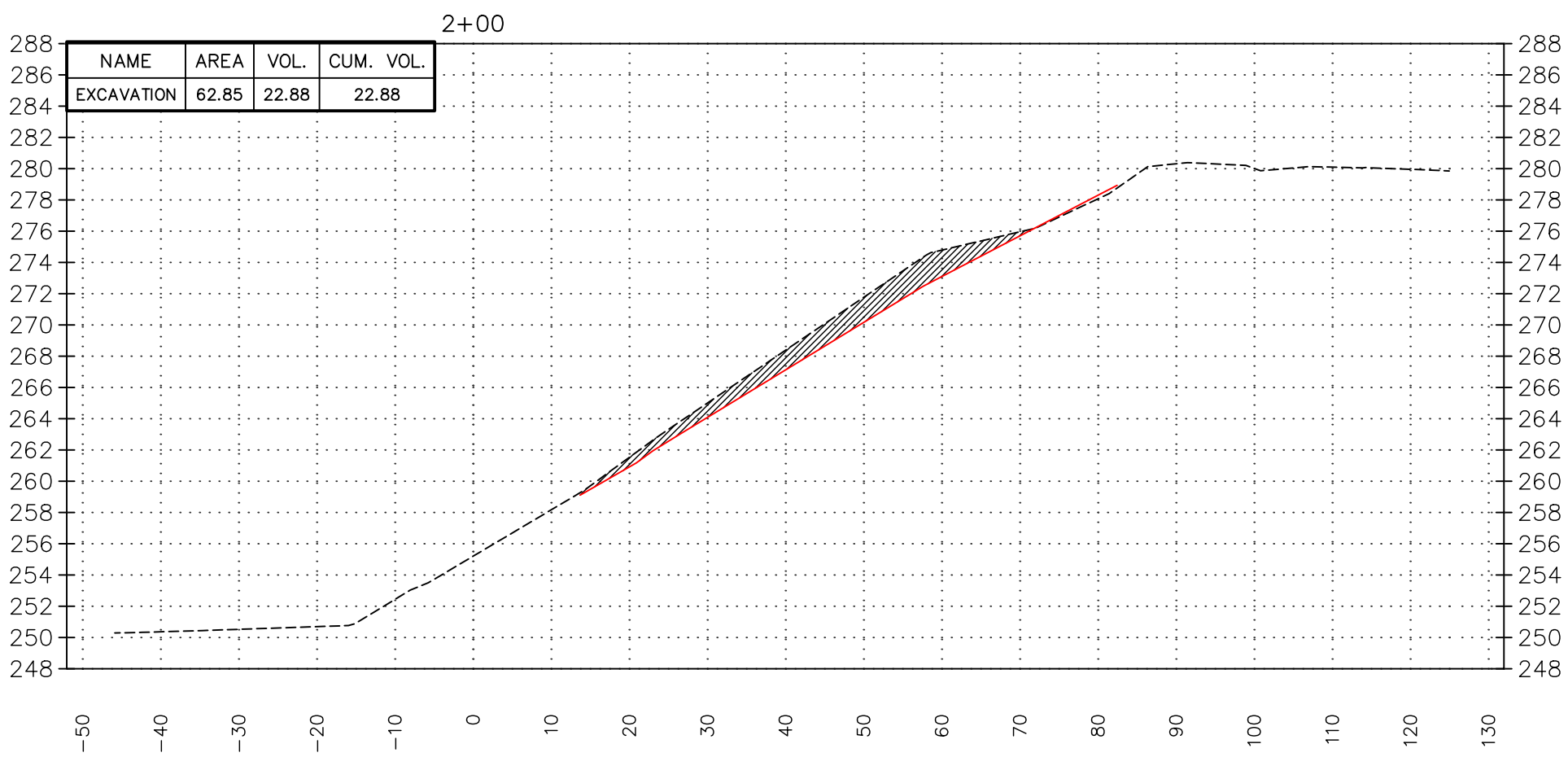


8000 KING STREET, ANCHORAGE, ALASKA 99518
(907)344-5990 WWW.EDGESURVEY.NET AECI# 1392

UNCLASSIFIED EXCAVATION QUANTITY

DRAWN BY: SH	DATE: 10/28/2025	PROJECT NO.: 25-198
CHECKED BY: RS	SCALE: 1" = 40'	SHEET: 1 OF 6

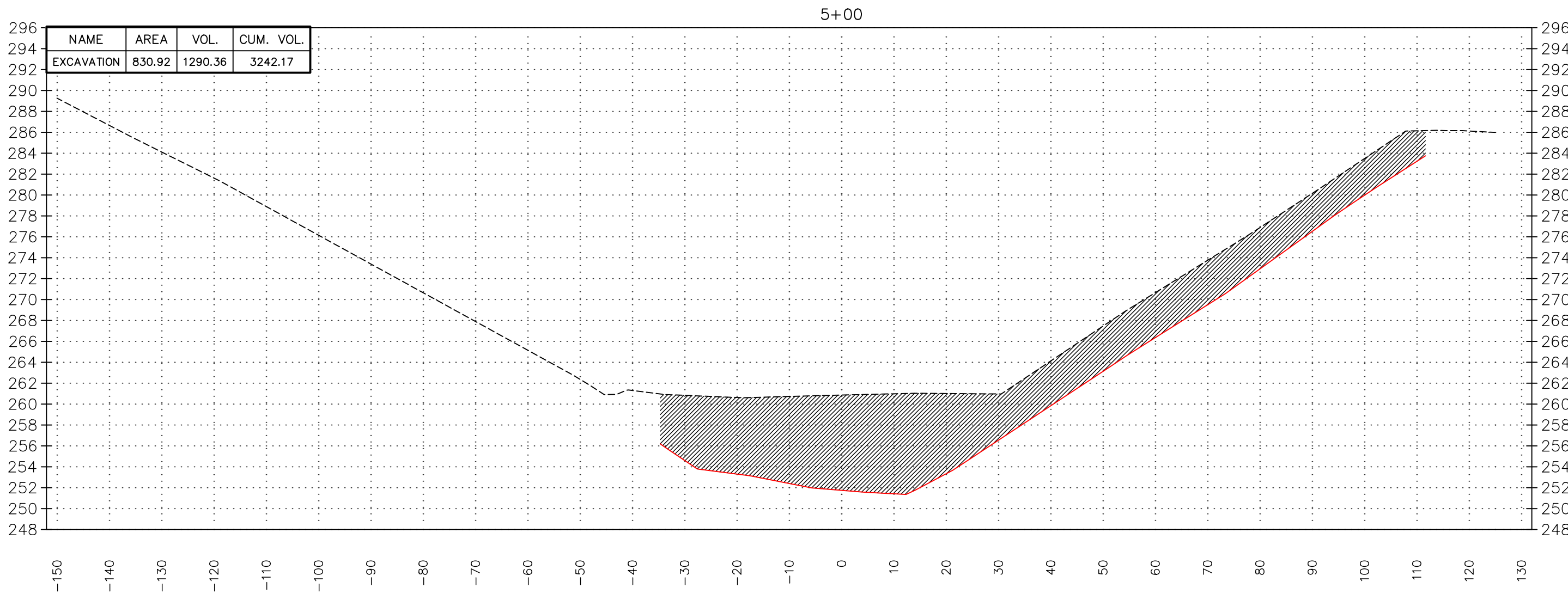
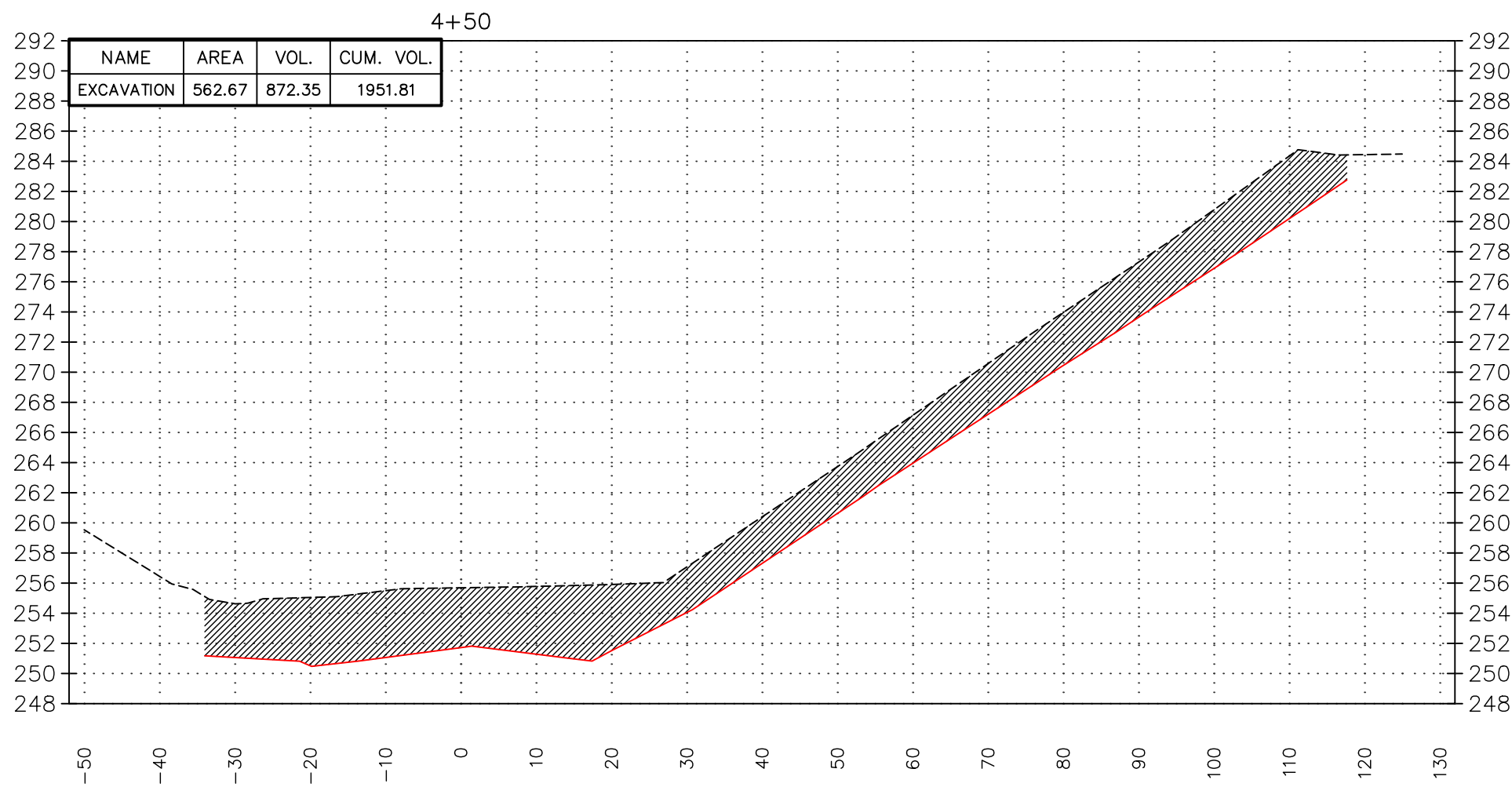
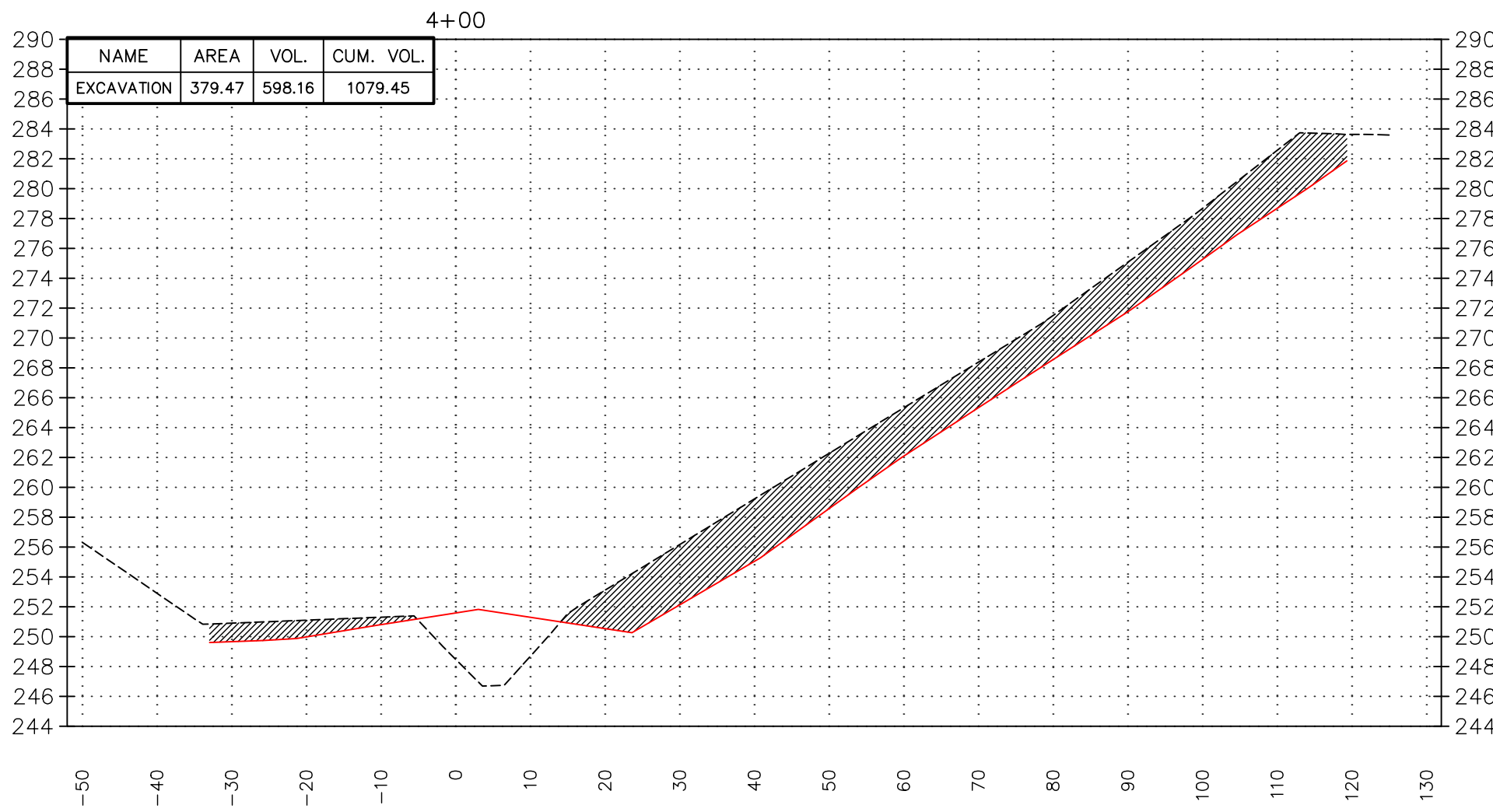
CELL 4 EXCAVATION



LEGEND

- EDGE SURVEY ORIGINAL GROUND
- CONTRACTOR EXCAVATION

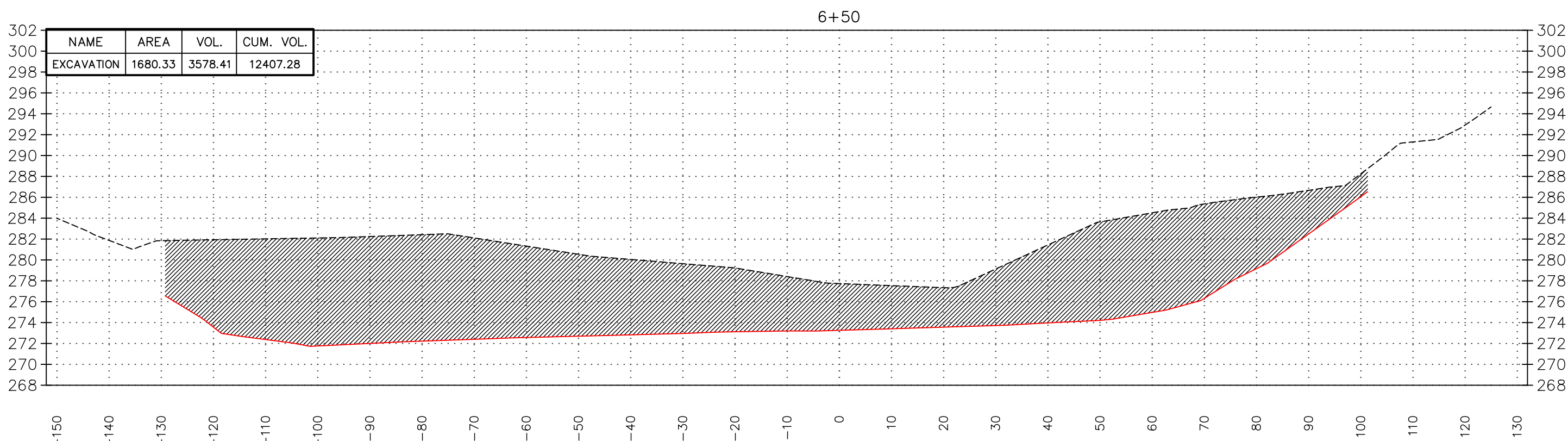
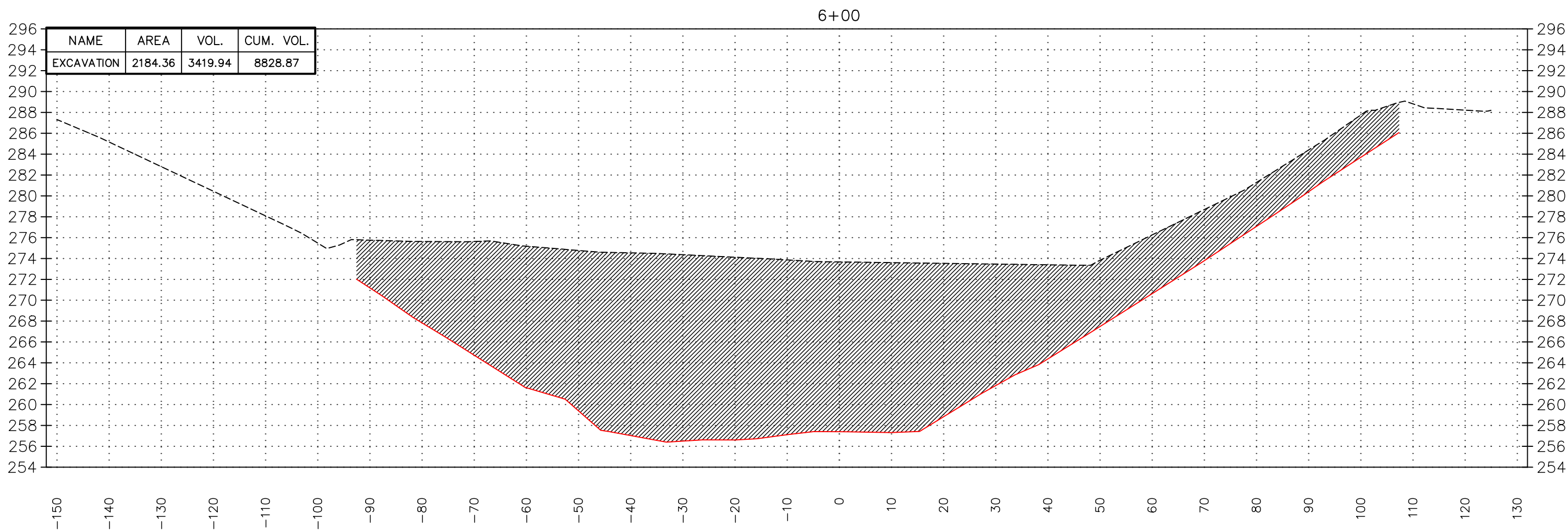
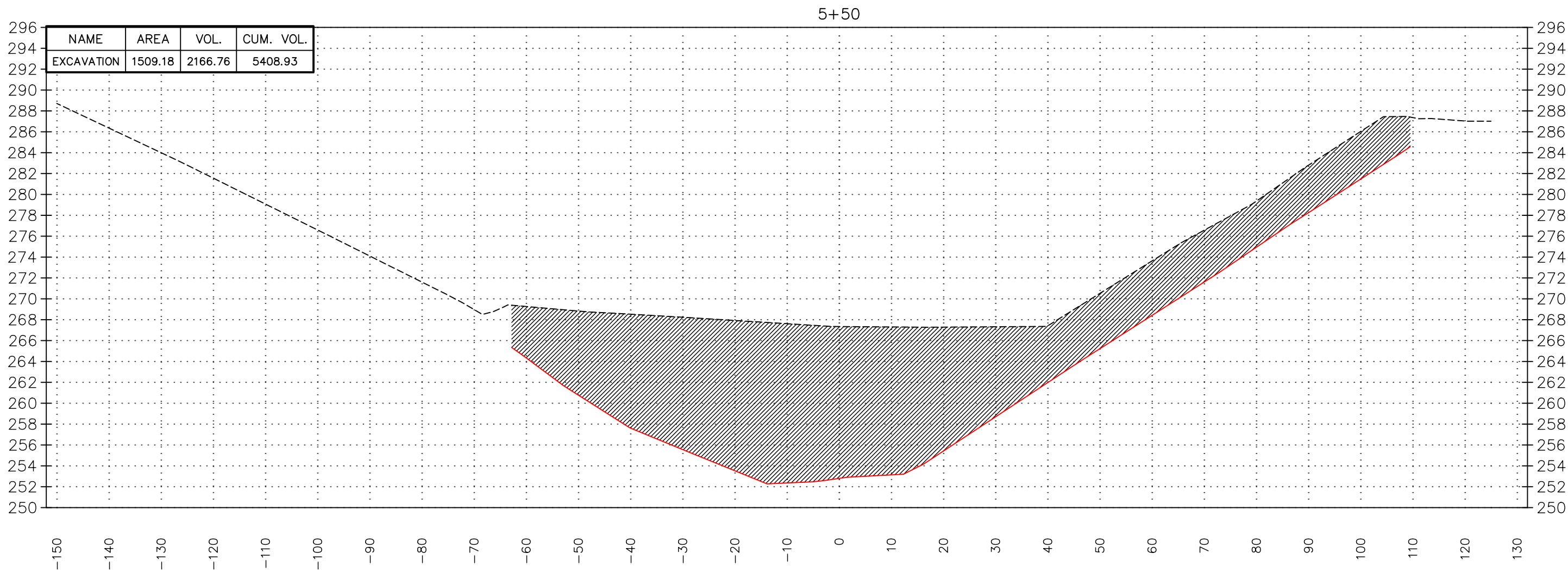
CELL 4 EXCAVATION



LEGEND

- EDGE SURVEY ORIGINAL GROUND
- CONTRACTOR EXCAVATION

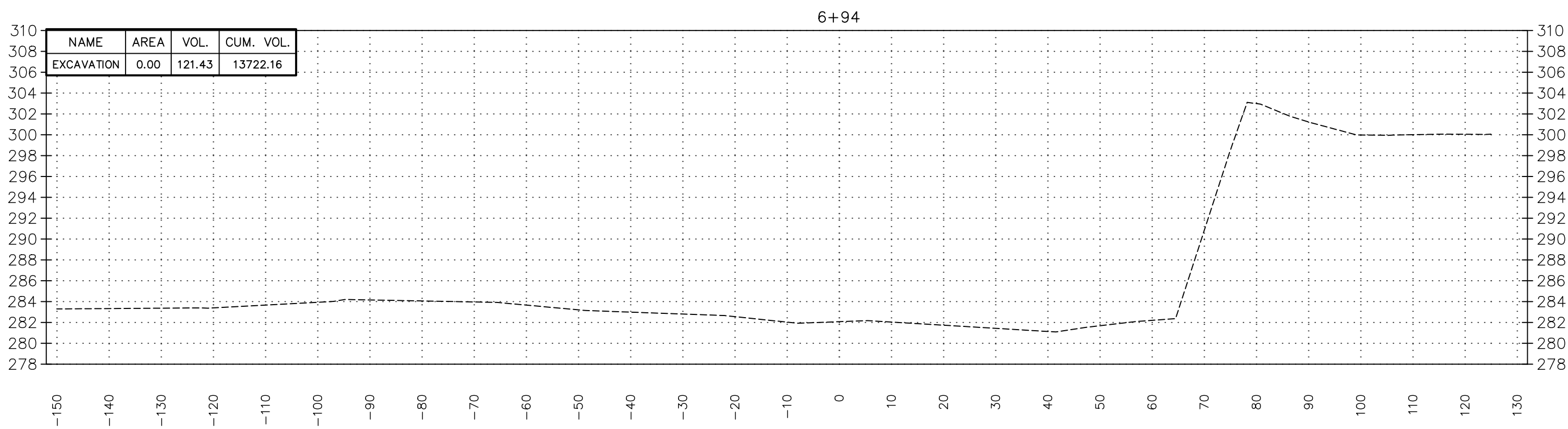
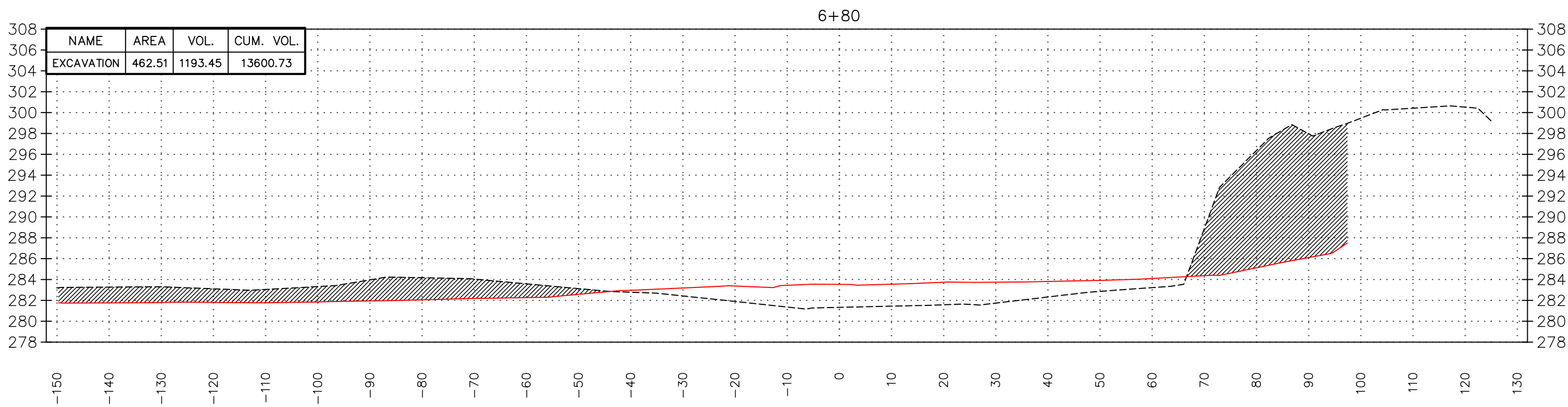
CELL 4 EXCAVATION



LEGEND

- EDGE SURVEY ORIGINAL GROUND
- CONTRACTOR EXCAVATION

CELL 4 EXCAVATION

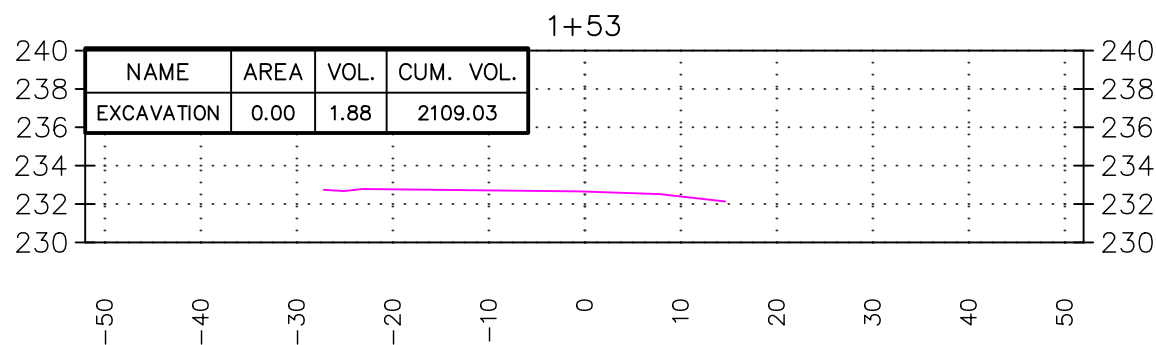
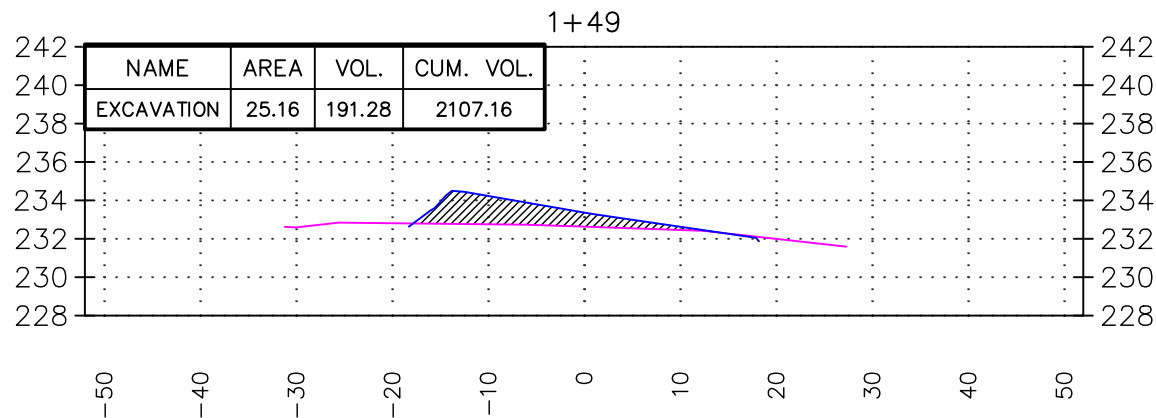
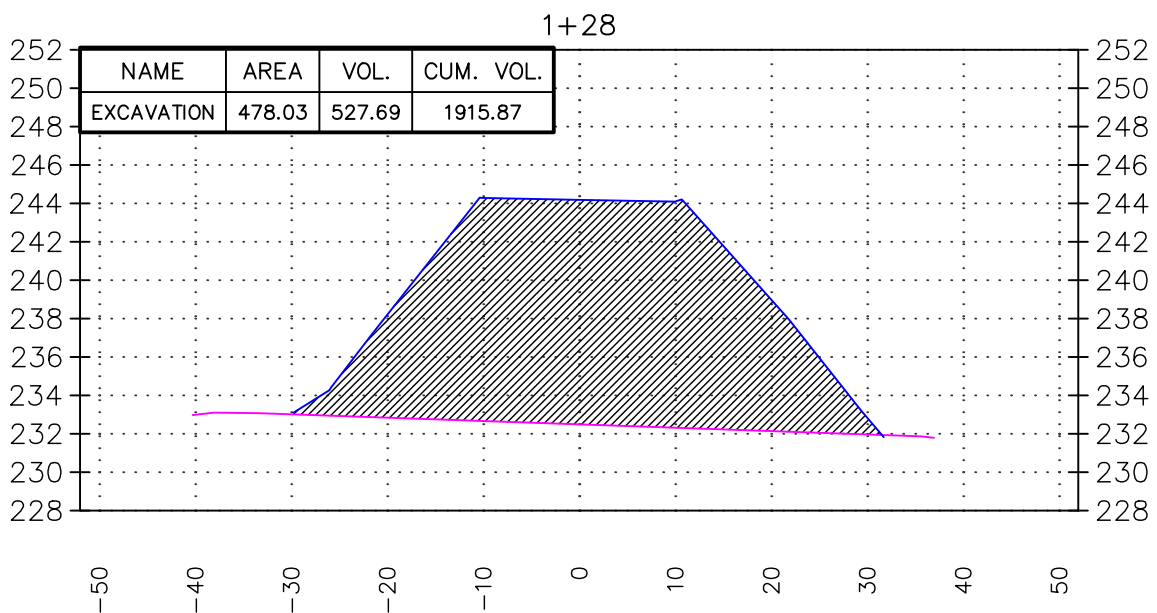
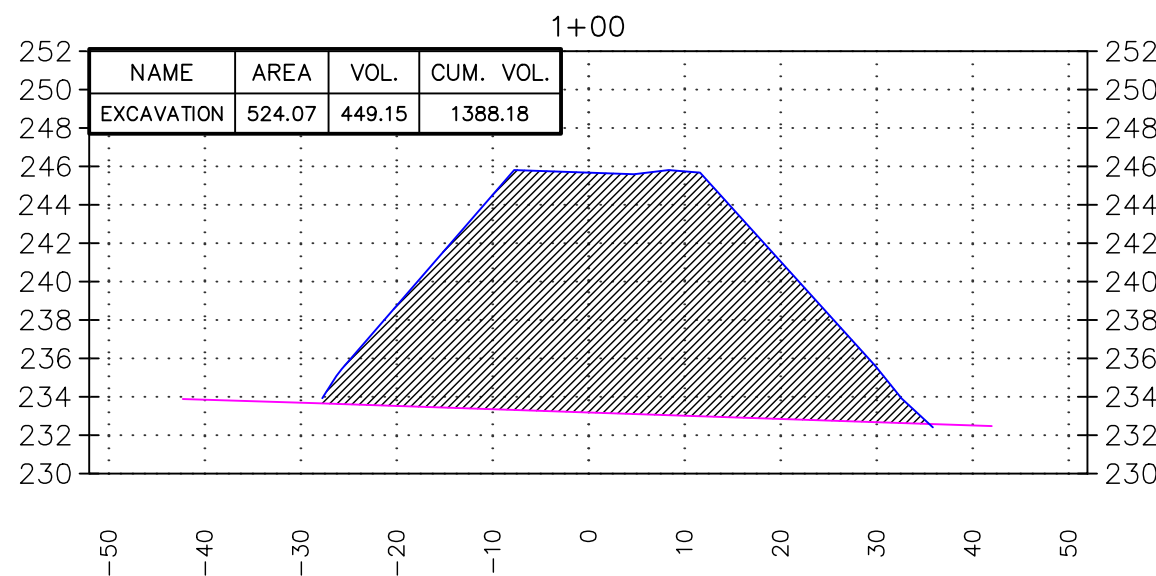
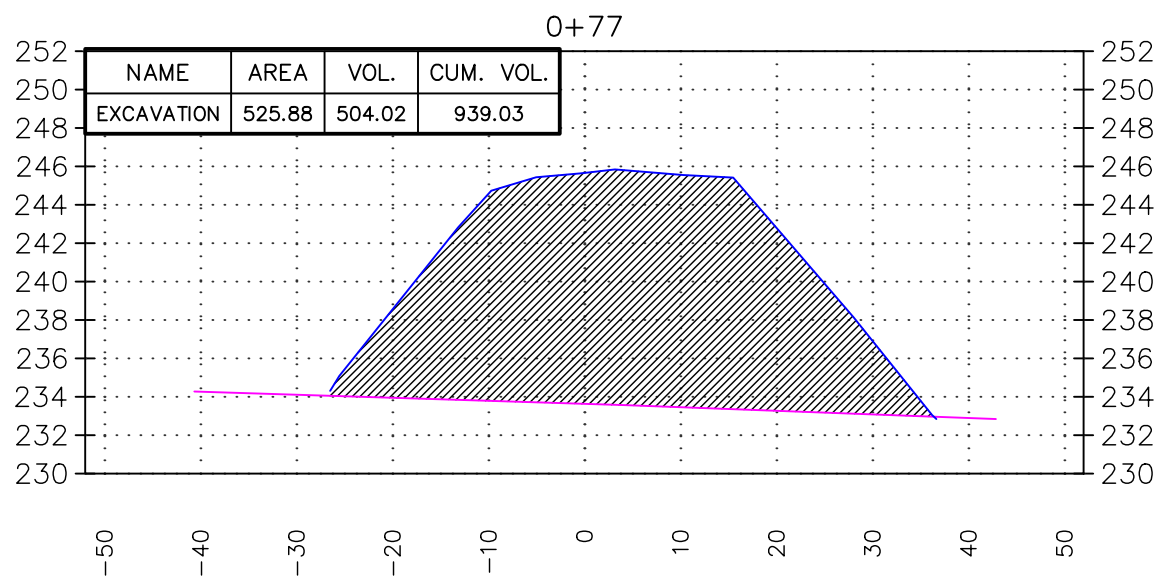
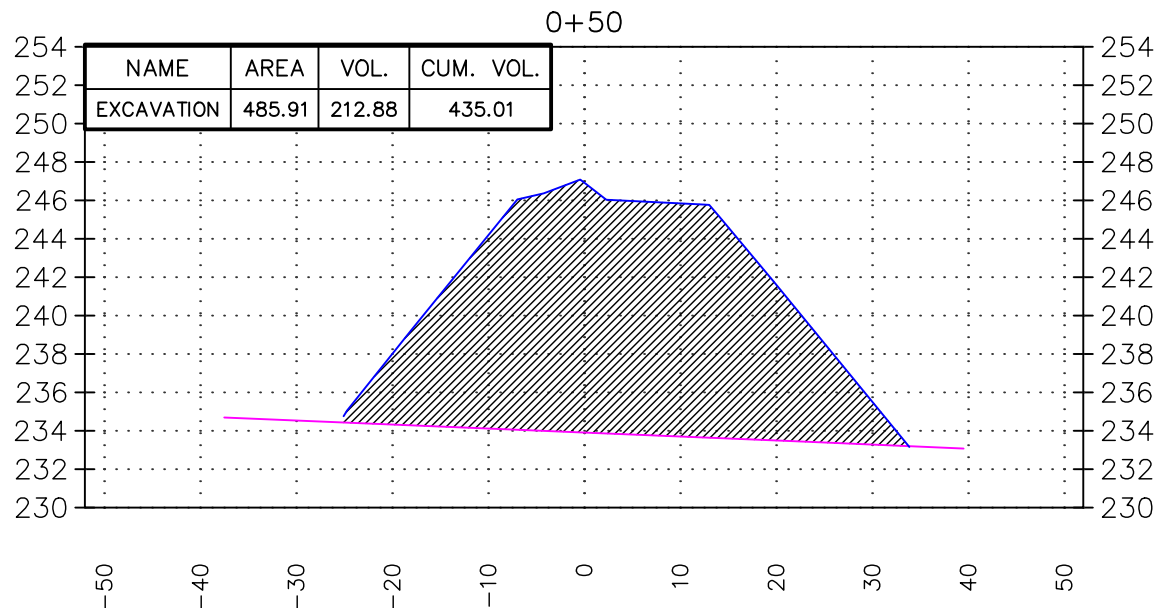
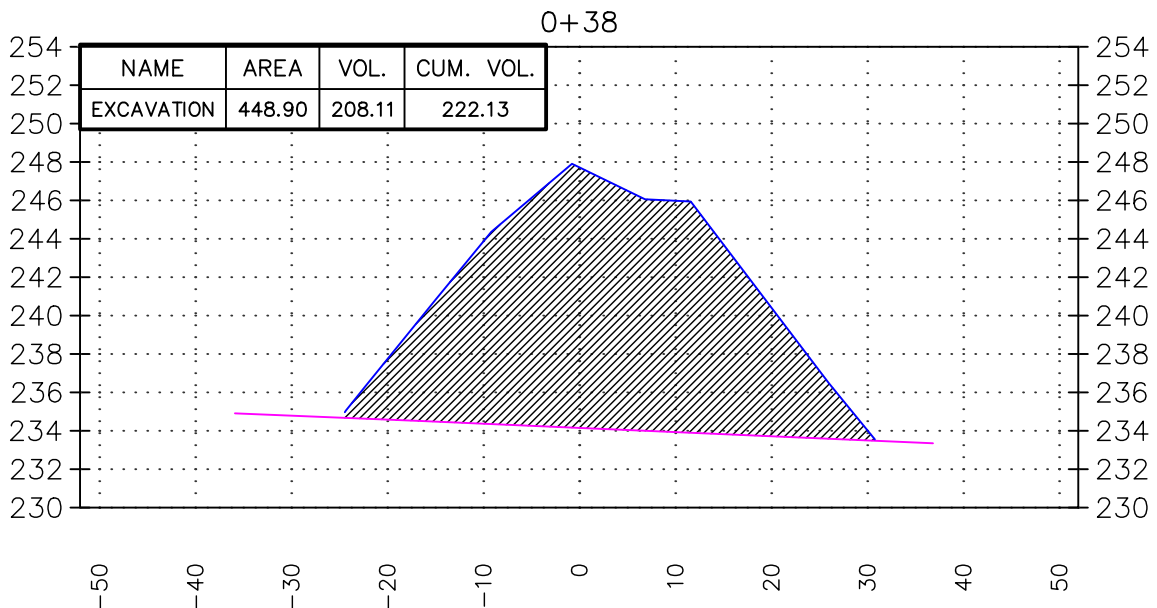
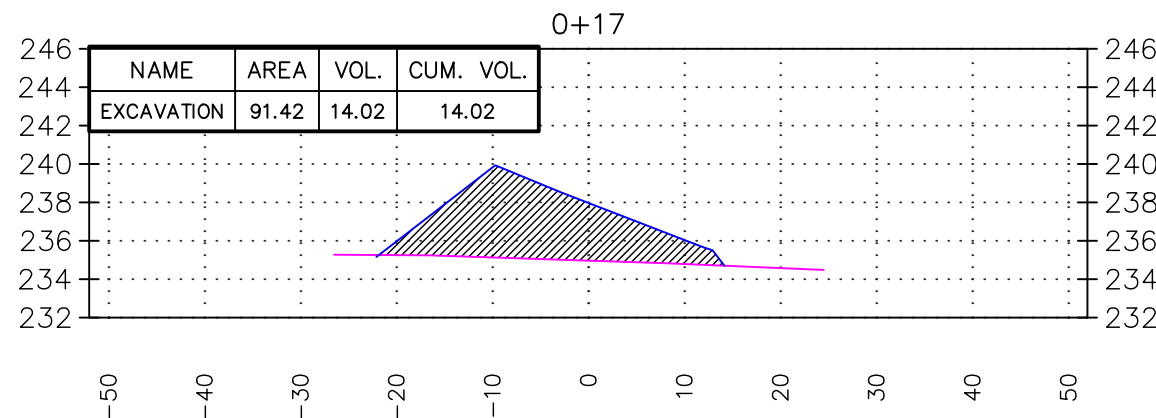
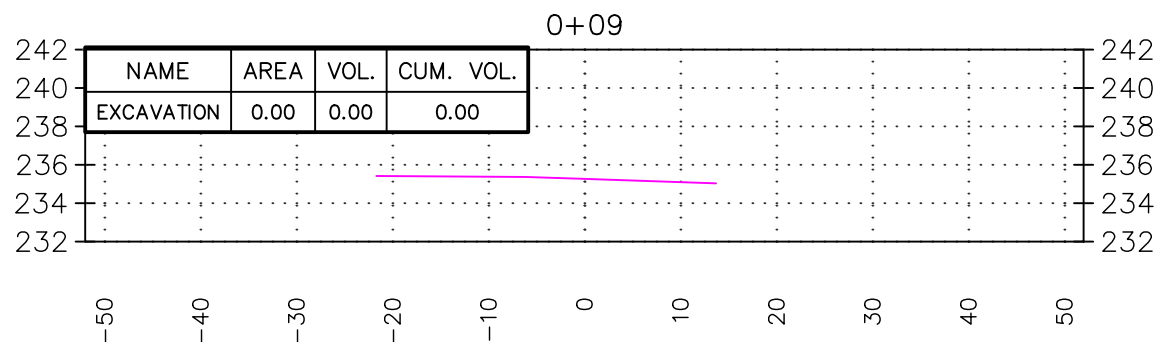


END VOLUME

LEGEND

- EDGE SURVEY ORIGINAL GROUND
- CONTRACTOR EXCAVATION

PILE EXCAVATION

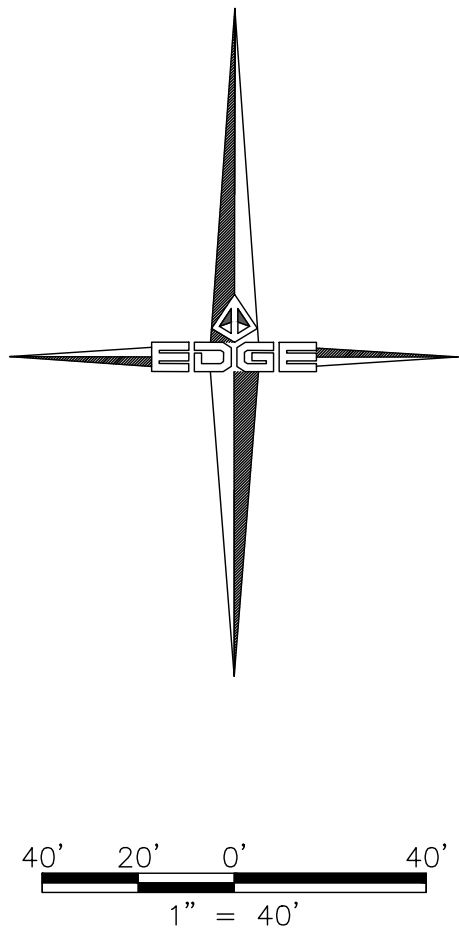


END VOLUME

LEGEND

- TOP OF PILE
- PILE BASE

CENTRAL LANDFILL CELL 4 EXPANSION
PROJECT NUMBER: 167550



- NOTES
1. ORIGINAL GROUND SURVEY SHOWN HEREON COLLECTED BY EDGE SURVEY AND DESIGN, LLC ON 8/17/2025.
 2. NEW ROAD SURFACE SHOWN HEREON PROVIDED BY SOUTHCENTRAL CONSTRUCTION.
 3. ALIGNMENTS AND STATIONING SHOWN HEREON ARE ARBITRARY NON-PLAN ALIGNMENTS CREATED AND SHOWN FOR CROSS-SECTIONS AND AVERAGE END AREAS ONLY.

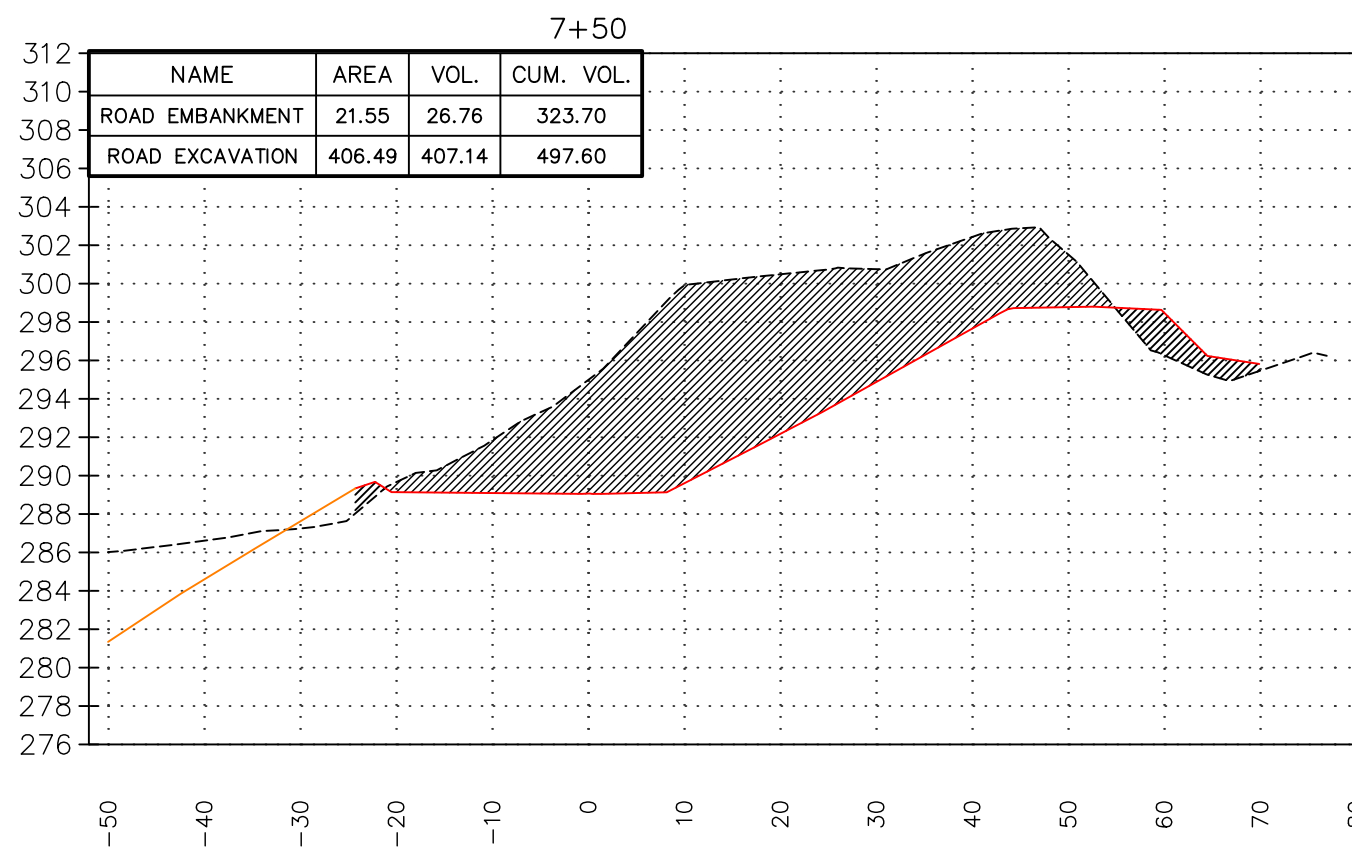
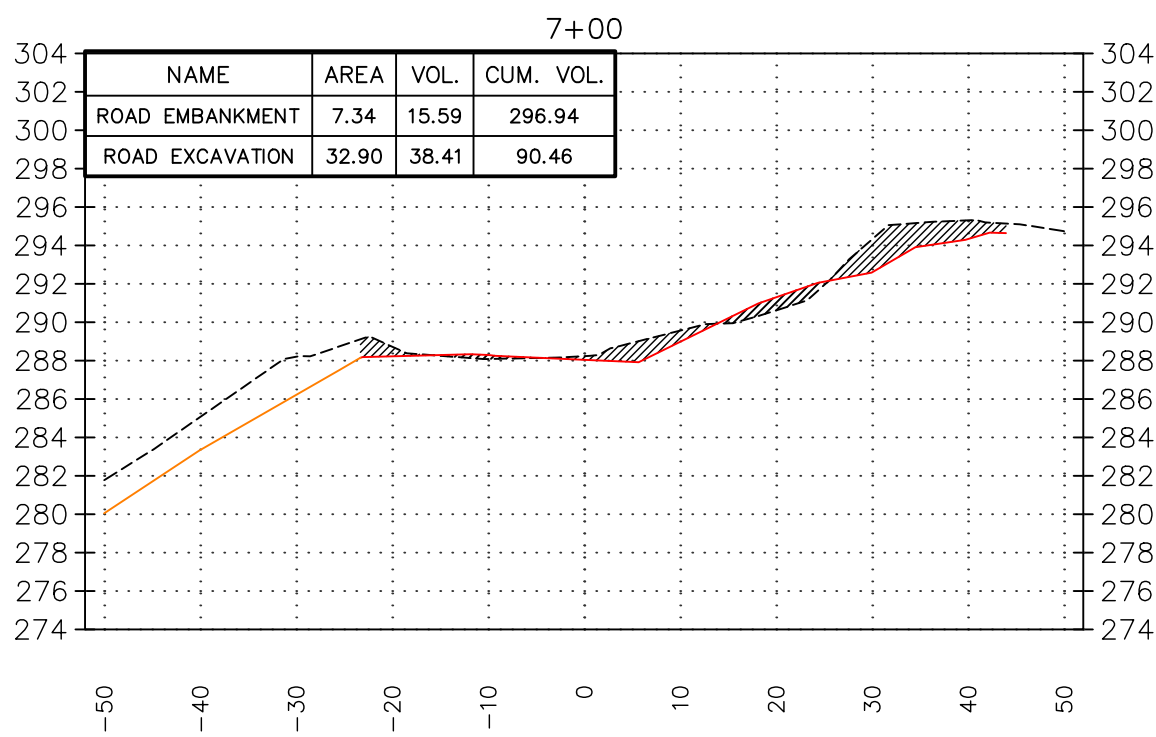
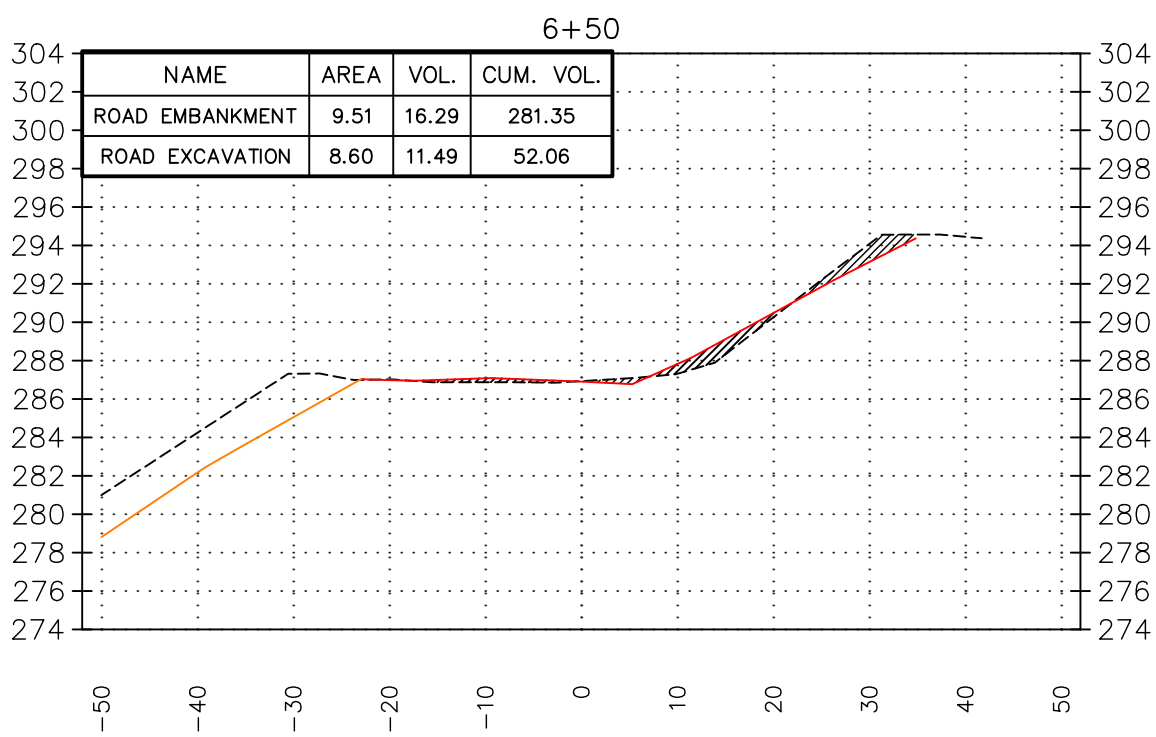
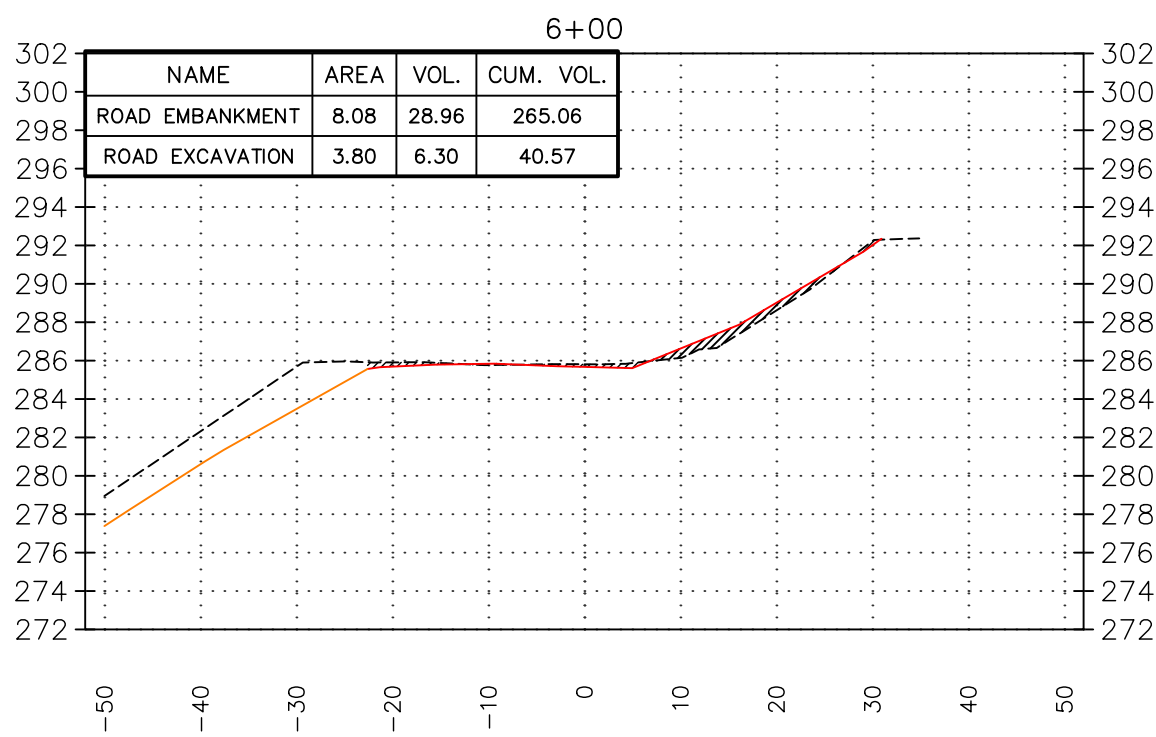
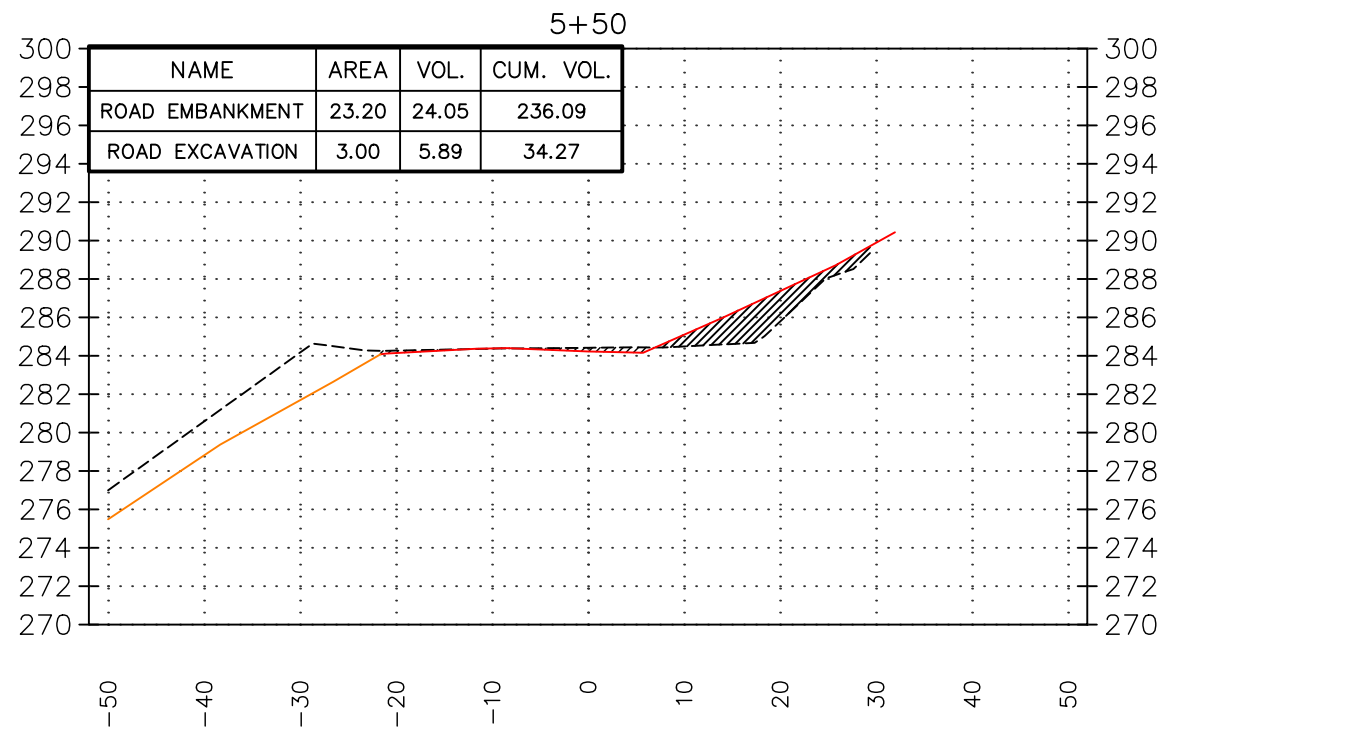
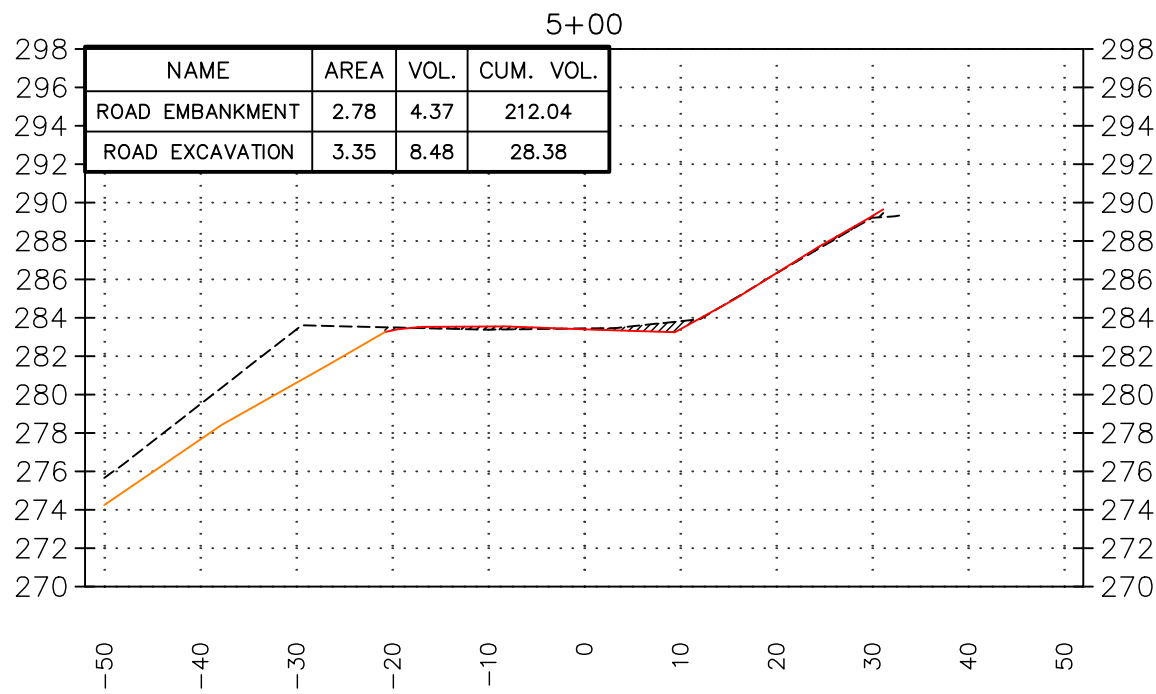
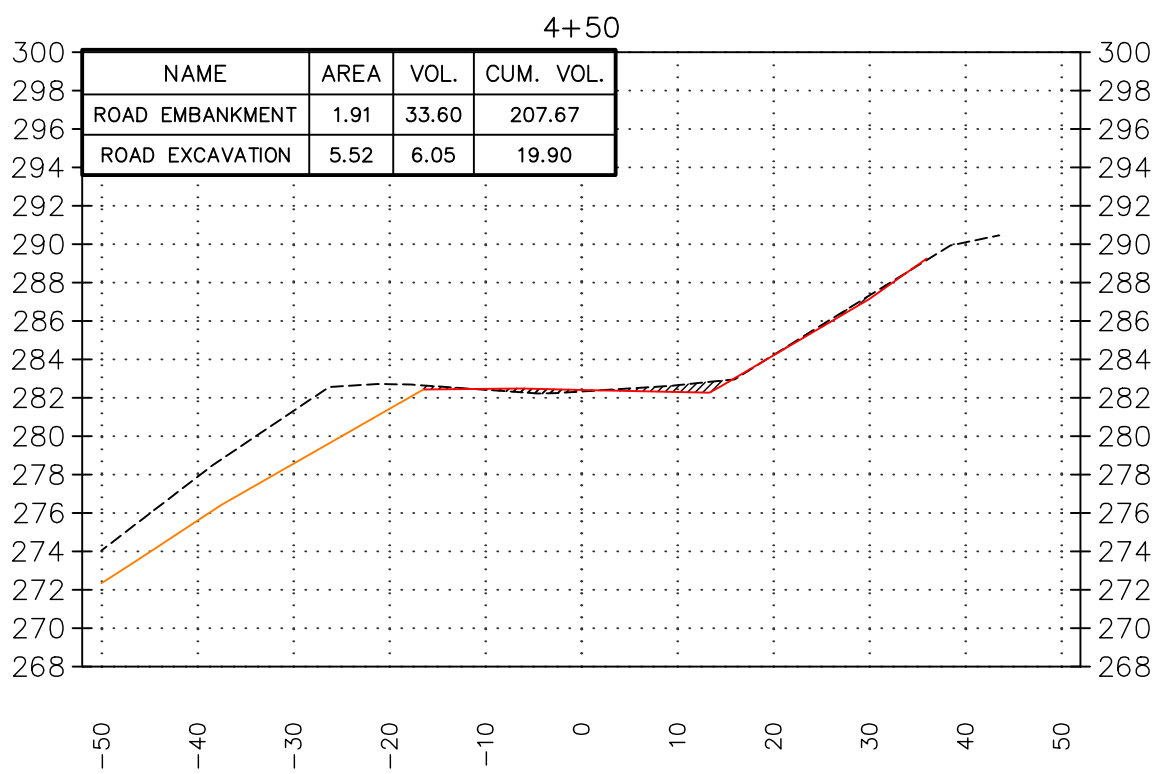
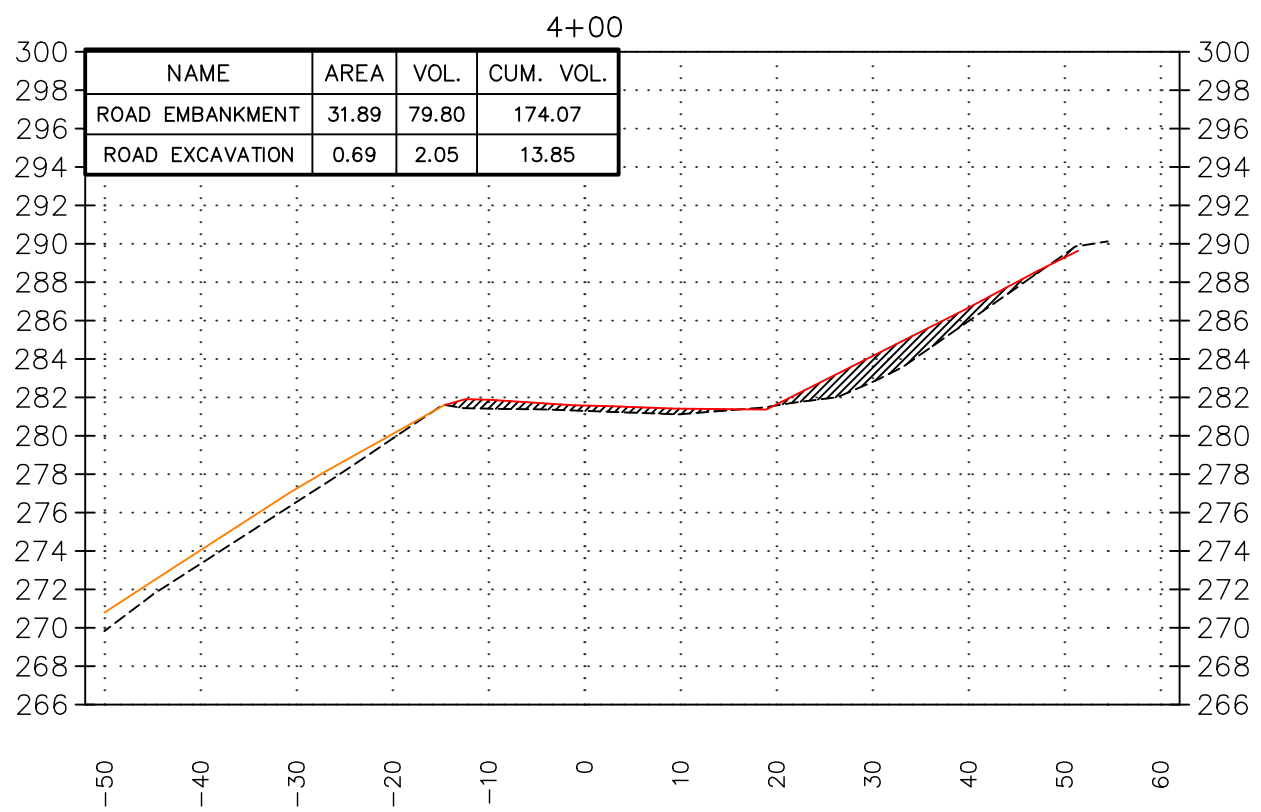
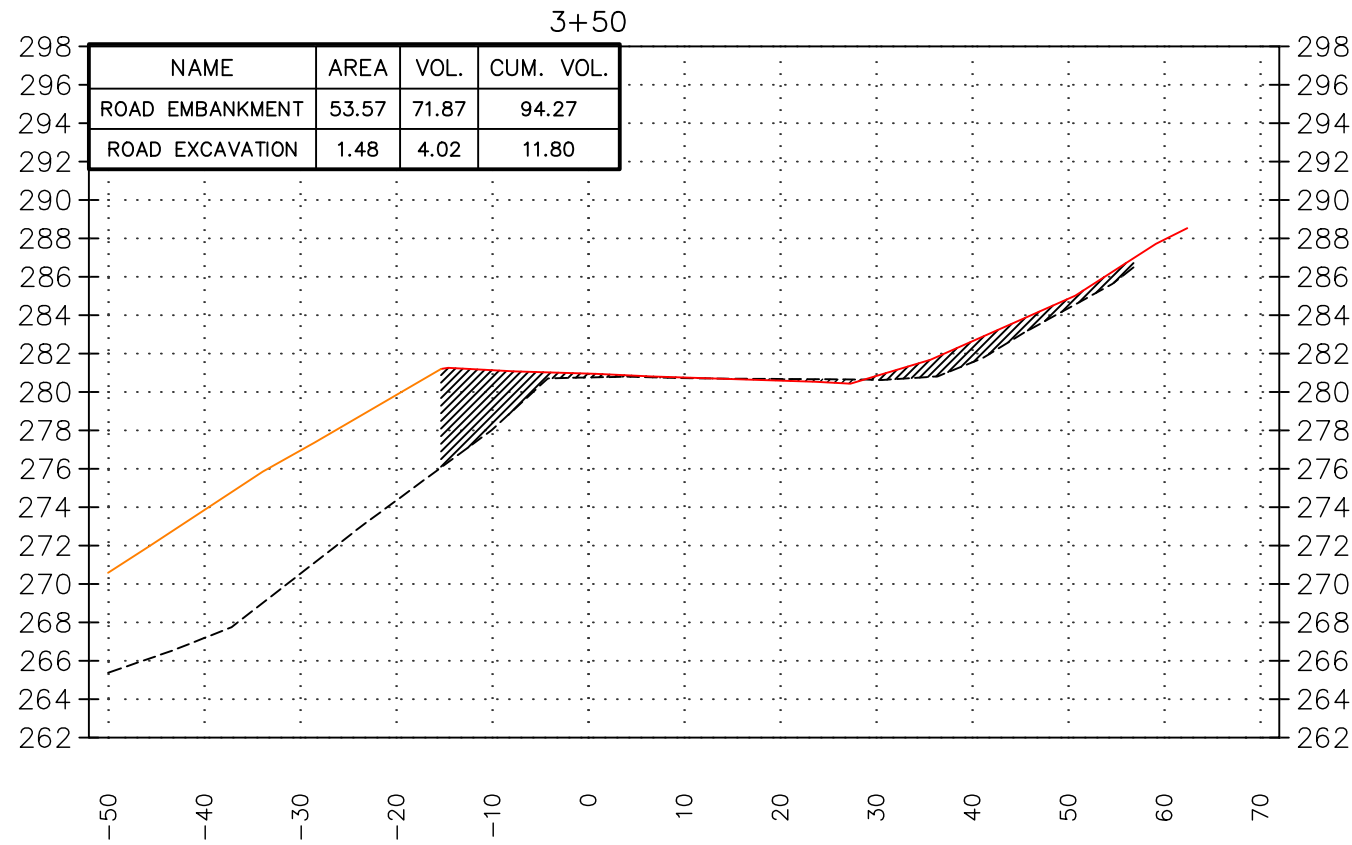
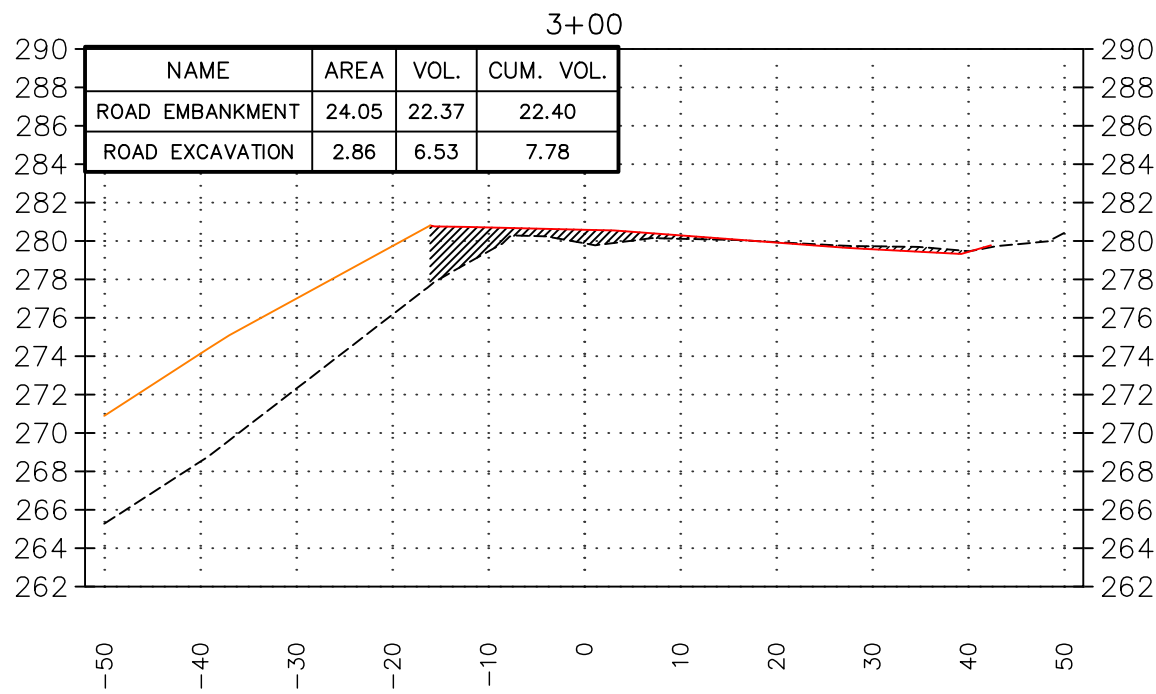
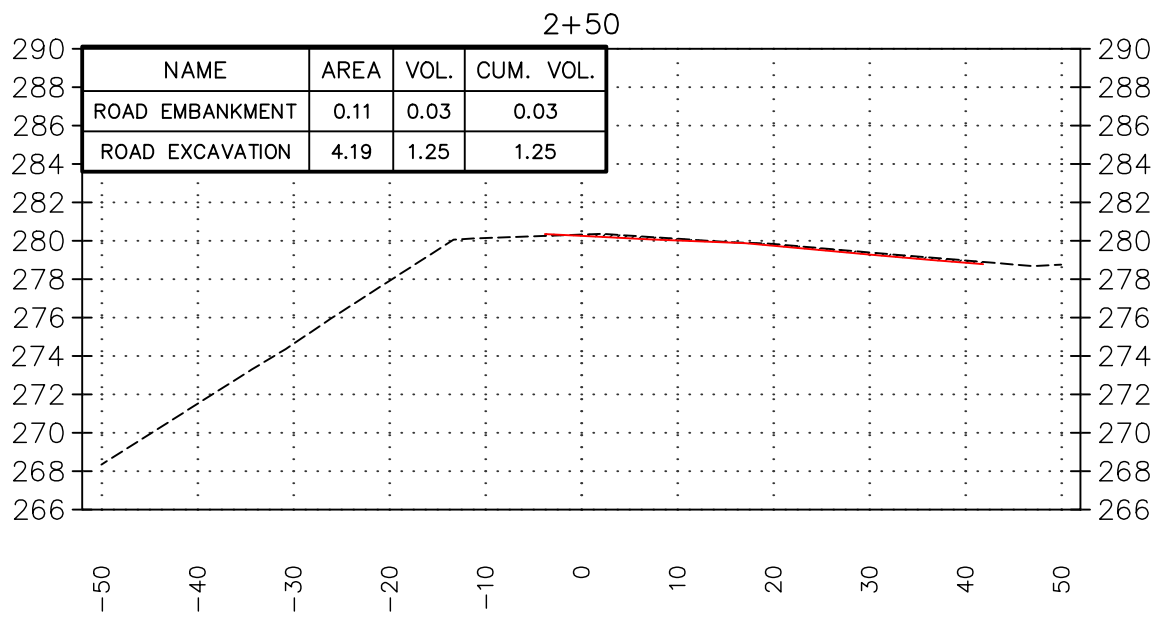
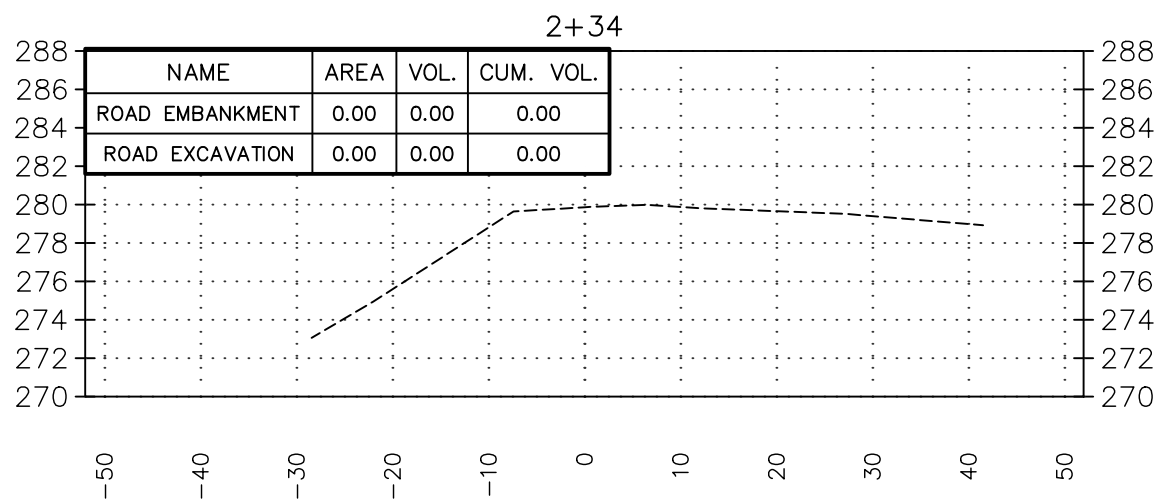
QUANTITIES

1. QUANTITIES SHOWN HEREON ARE TIN SURFACE TO TIN SURFACE VOLUMES COMPUTED IN AUTOCAD CIVIL 3D, 2025. FOR AVERAGE END AREAS, SEE SECTION SHEETS.		
ROAD EMBANKMENT	3,791	CY
ROAD EXCAVATION	2,035	CY

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(907)344-5990 WWW.EDGESURVEY.NET AECI# 1392

NEW ROAD EMBANKMENT QUANTITY		
DRAWN BY: SH	DATE: 10/29/2025	PROJECT NO.: 25-198
CHECKED BY: RS	SCALE: 1"= 40'	SHEET: 1 OF 3

NEW ROAD EMBANKMENT



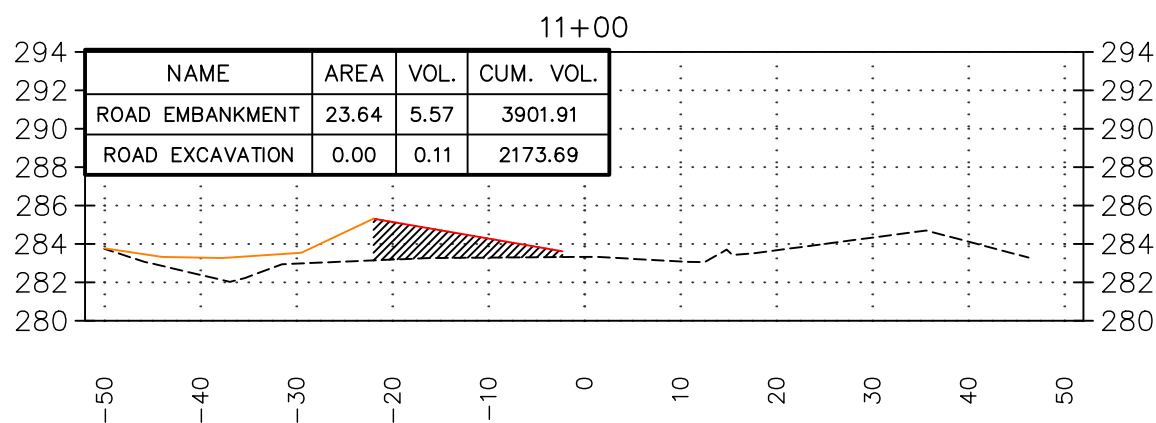
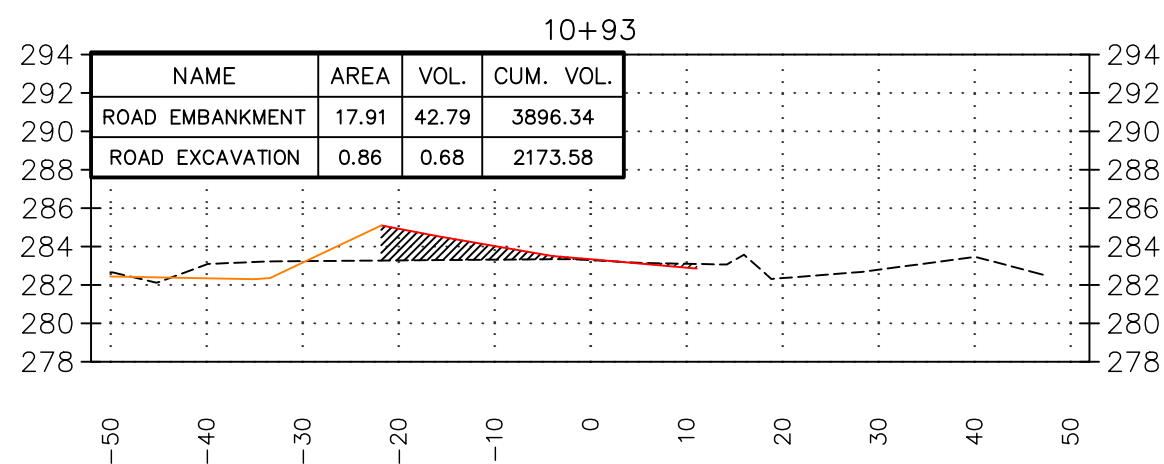
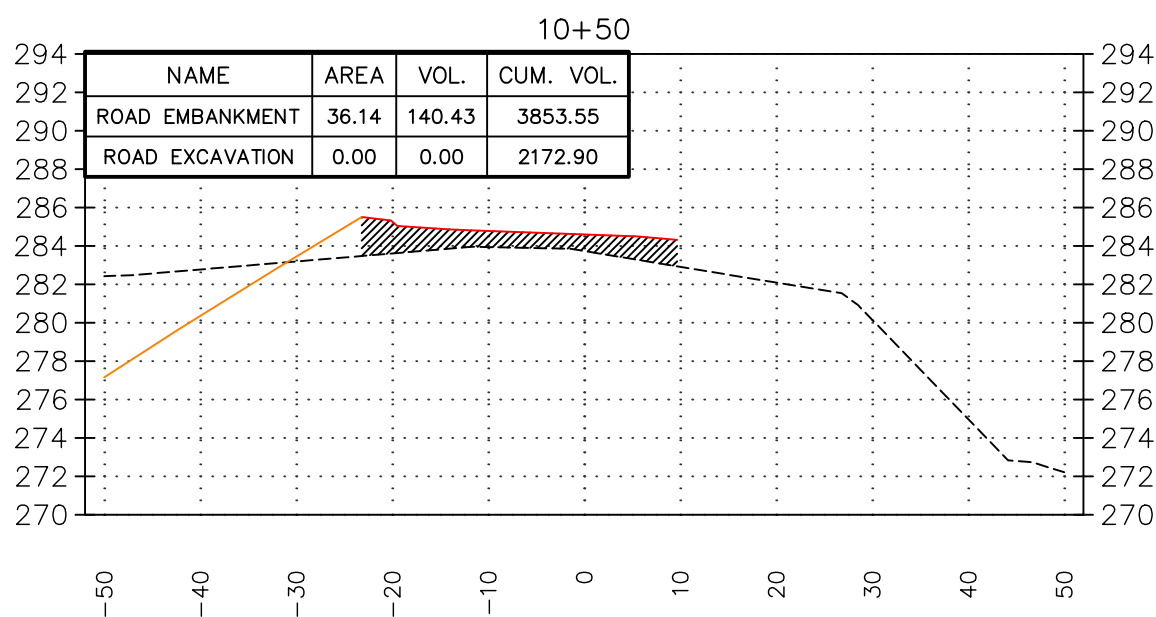
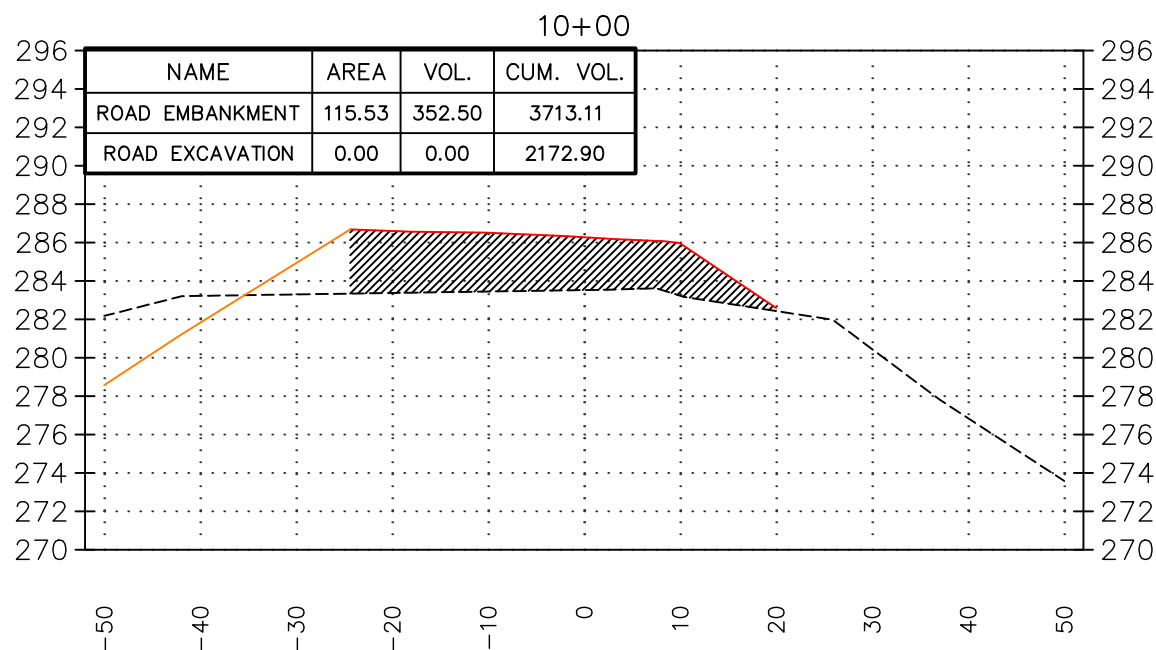
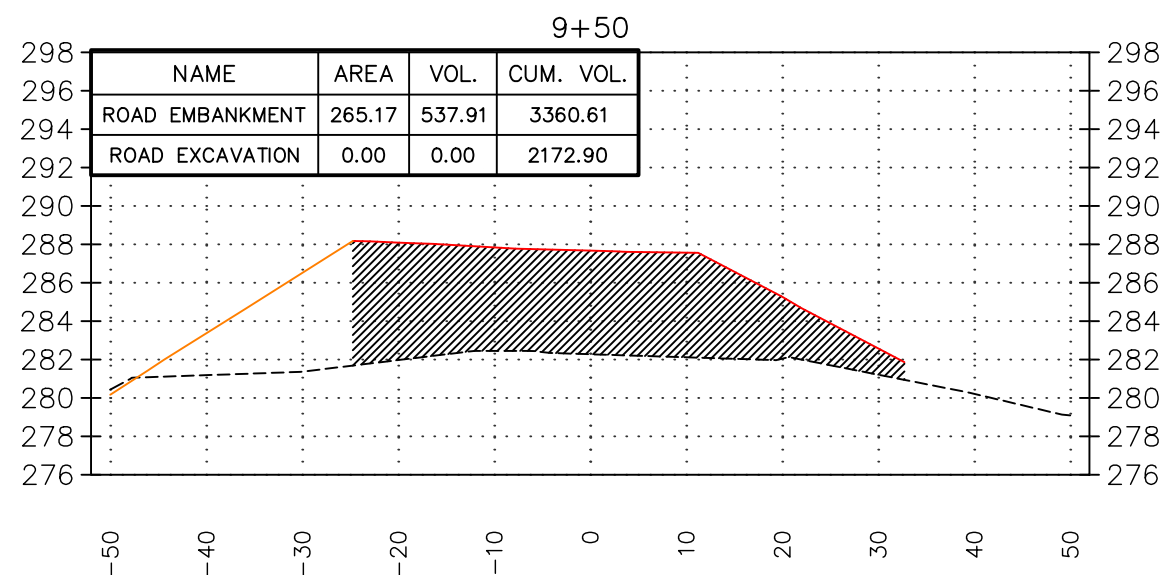
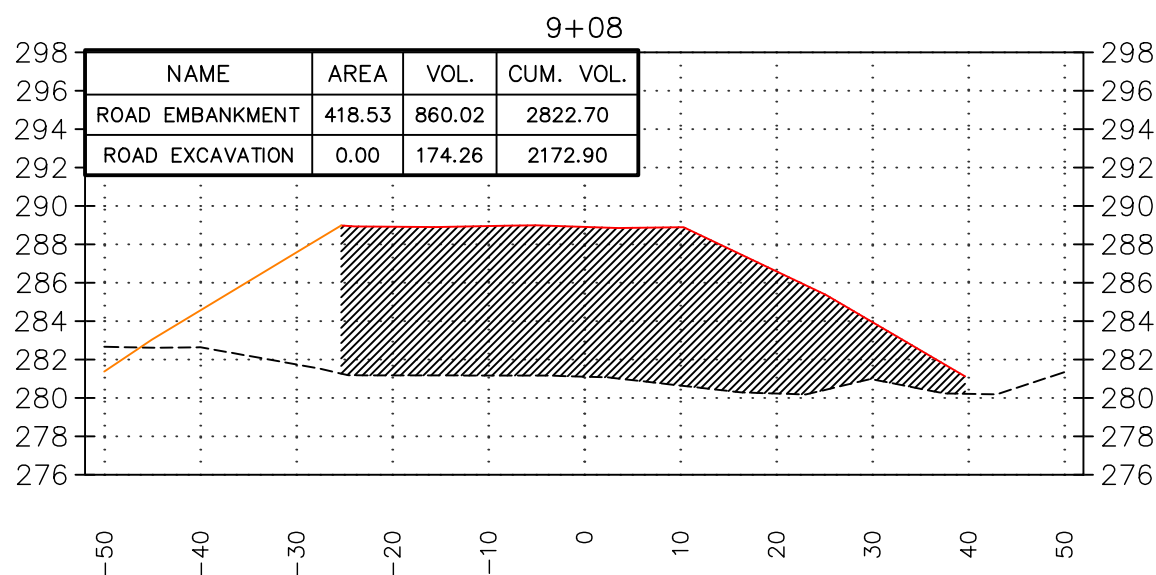
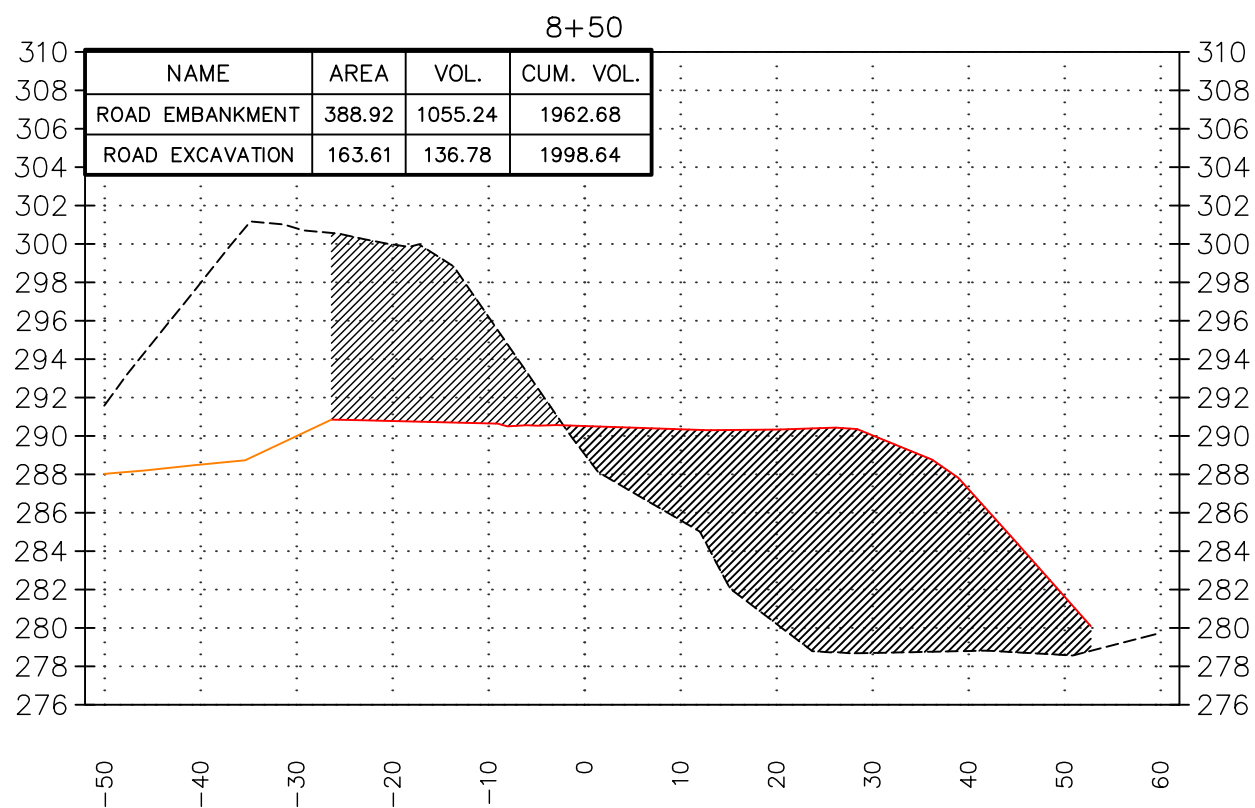
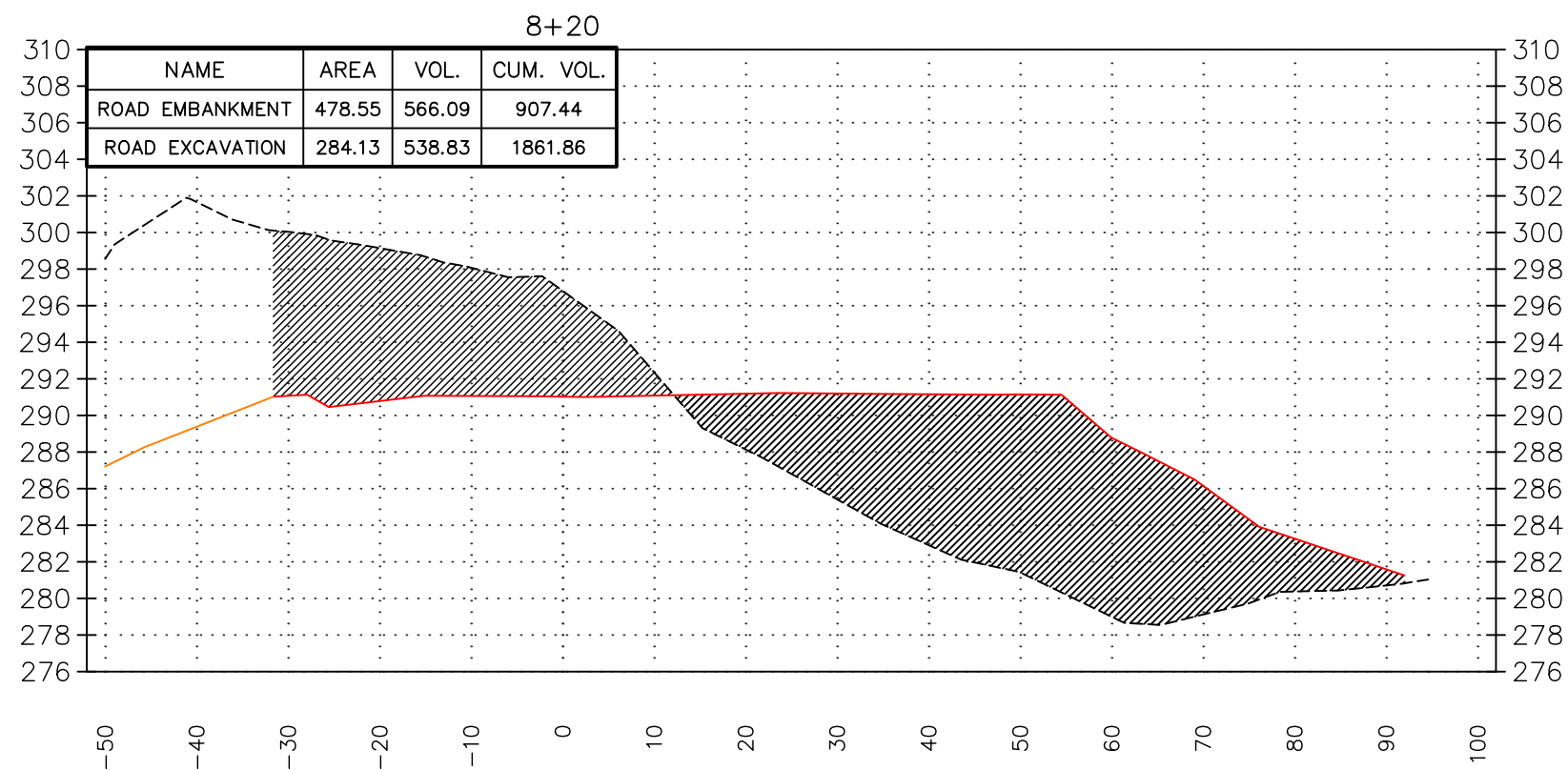
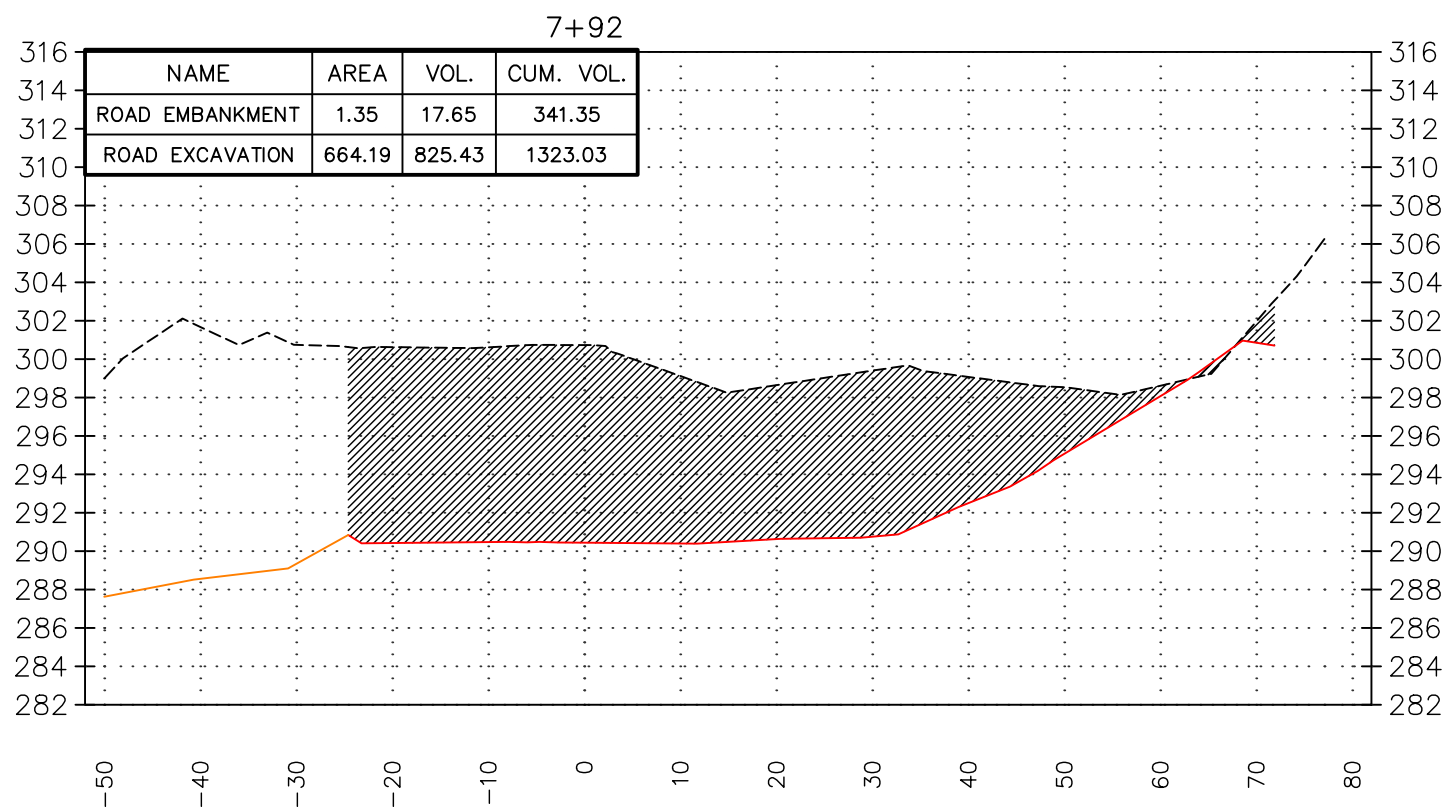
LEGEND

----- EDGE SURVEY ORIGINAL GROUND

----- CONTRACTOR ROAD SURFACE

----- GDM AS-BUILT

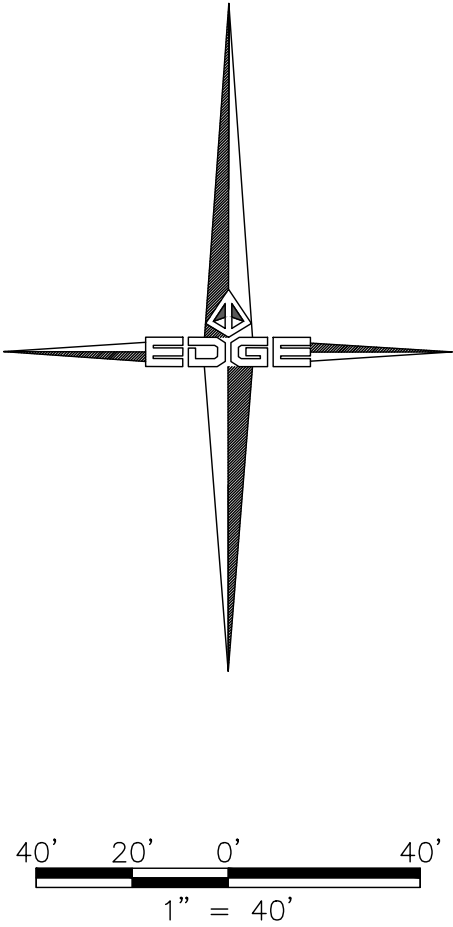
NEW ROAD EMBANKMENT



LEGEND

- EDGE SURVEY ORIGINAL GROUND
- CONTRACTOR ROAD SURFACE
- GDM AS-BUILT

CENTRAL LANDFILL CELL 4 EXPANSION
PROJECT NUMBER: 167550



CELL 2A
(CLOSED)

CELL 4
EXPANSION
BOUNDARY

CONSTRUCTION
LIMITS

CELL 2B
(LINED)

QUANTITIES

1. QUANTITIES SHOWN HEREON ARE TIN SURFACE TO TIN SURFACE VOLUMES COMPUTED IN AUTOCAD CIVIL 3D, 2025. FOR AVERAGE END AREAS, SEE SECTION SHEETS.

GDM 8,917 CY

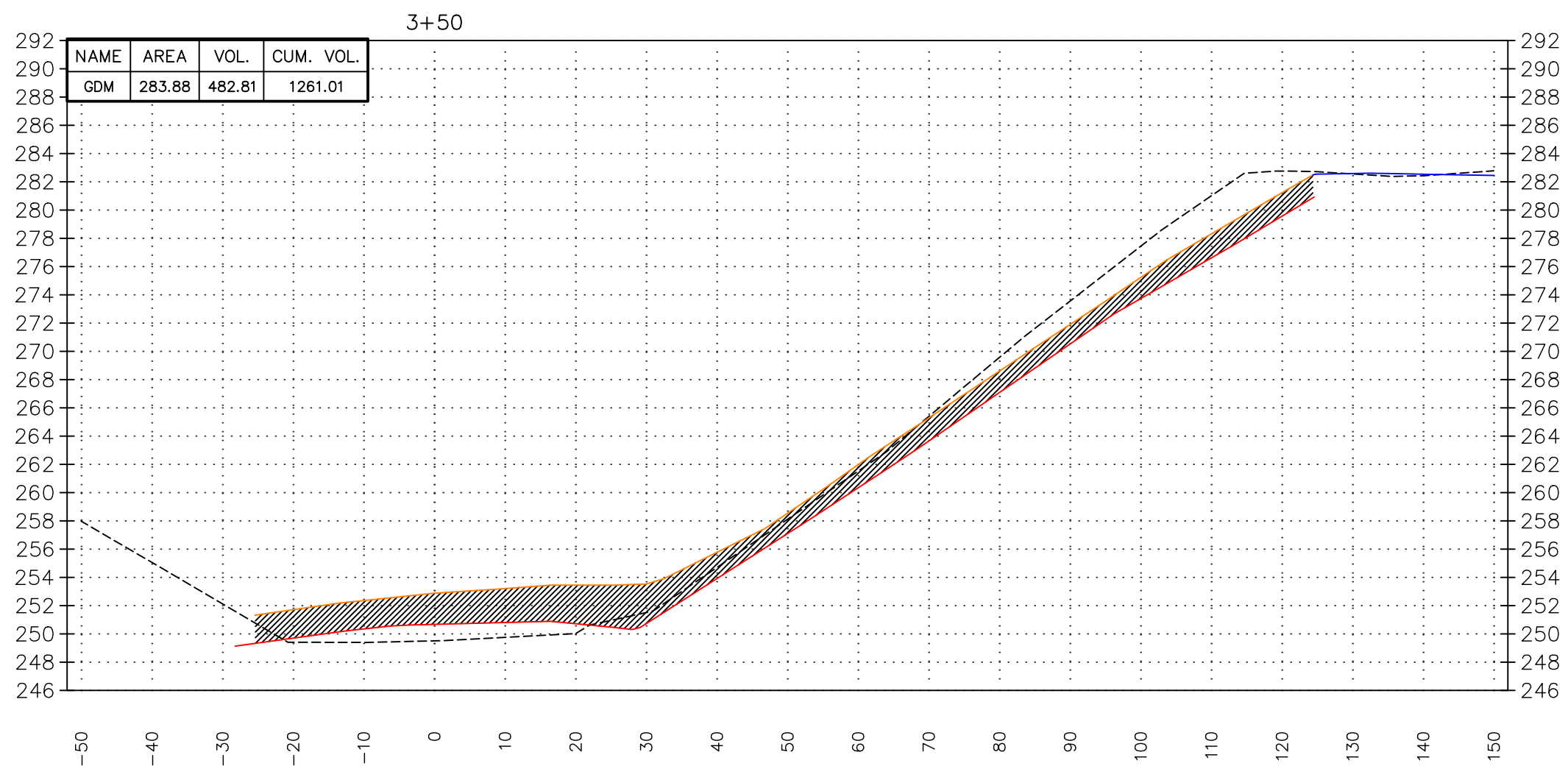
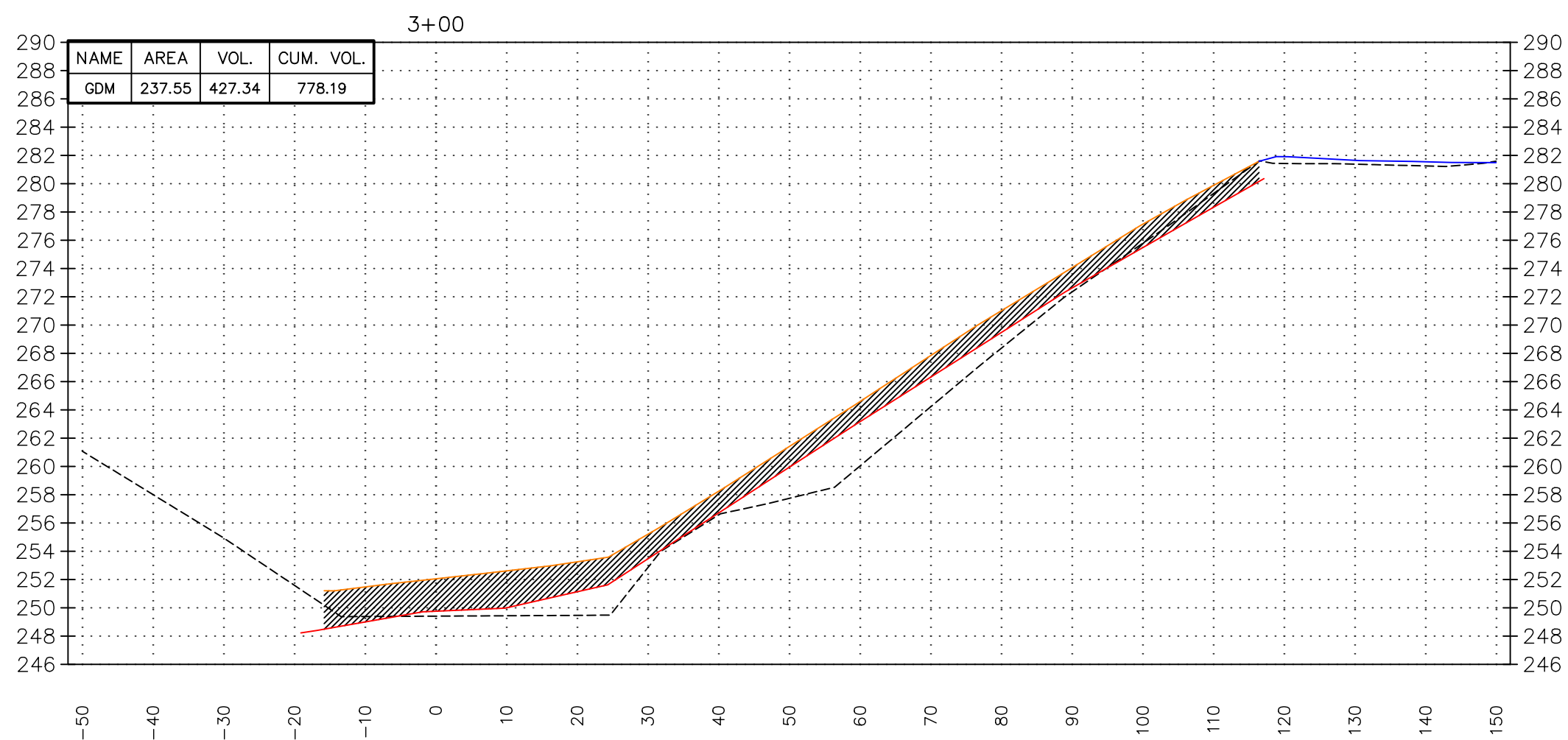
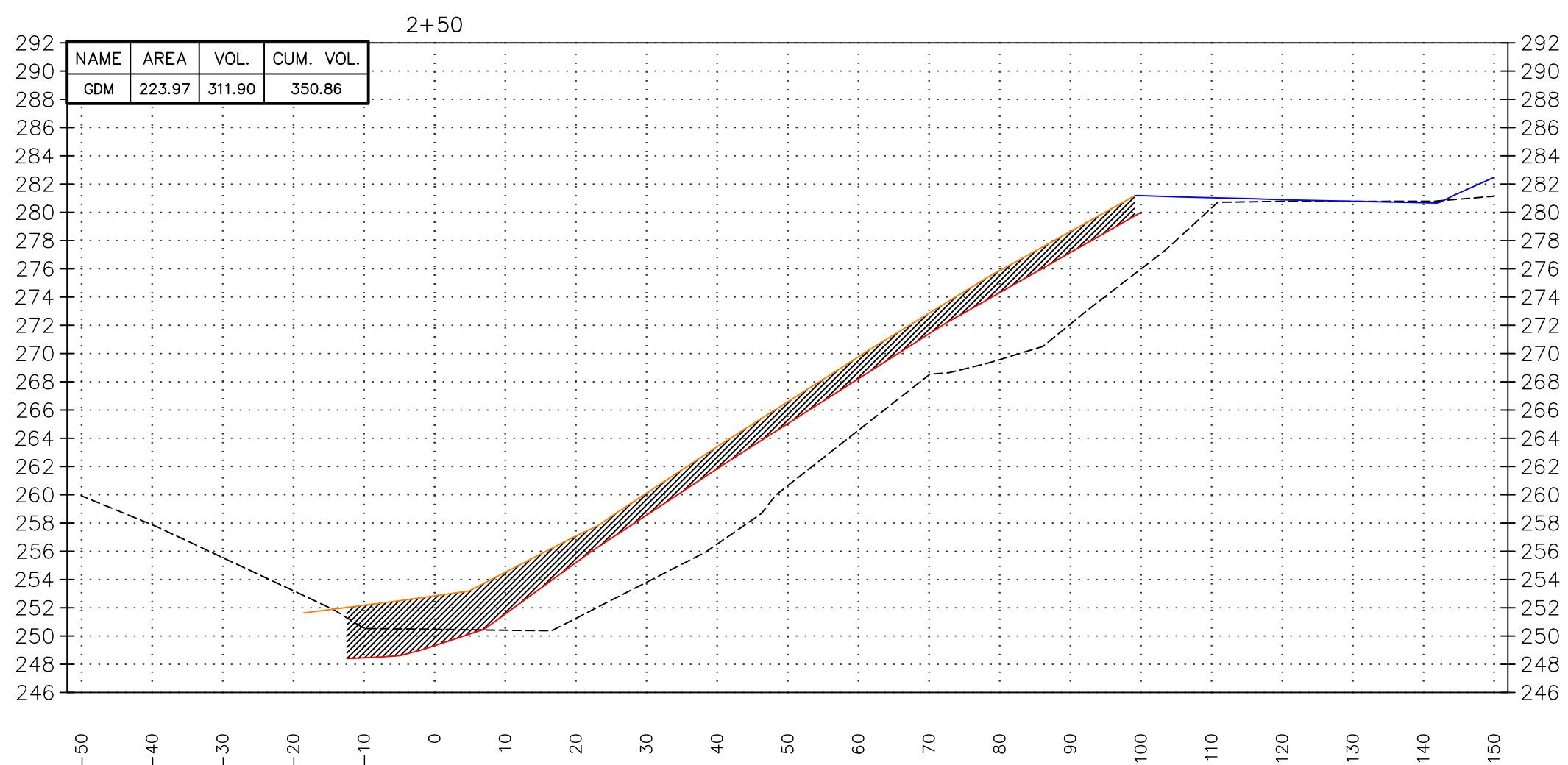
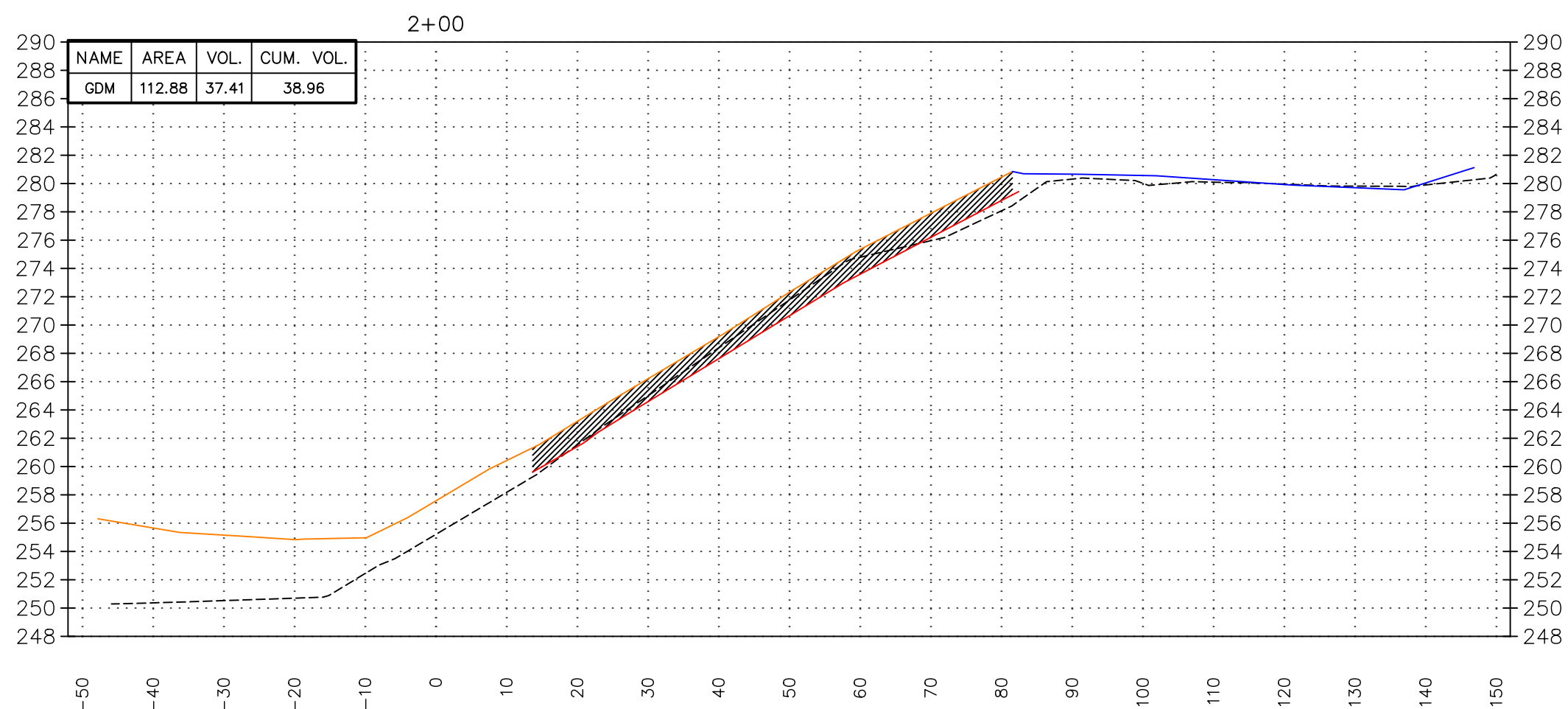
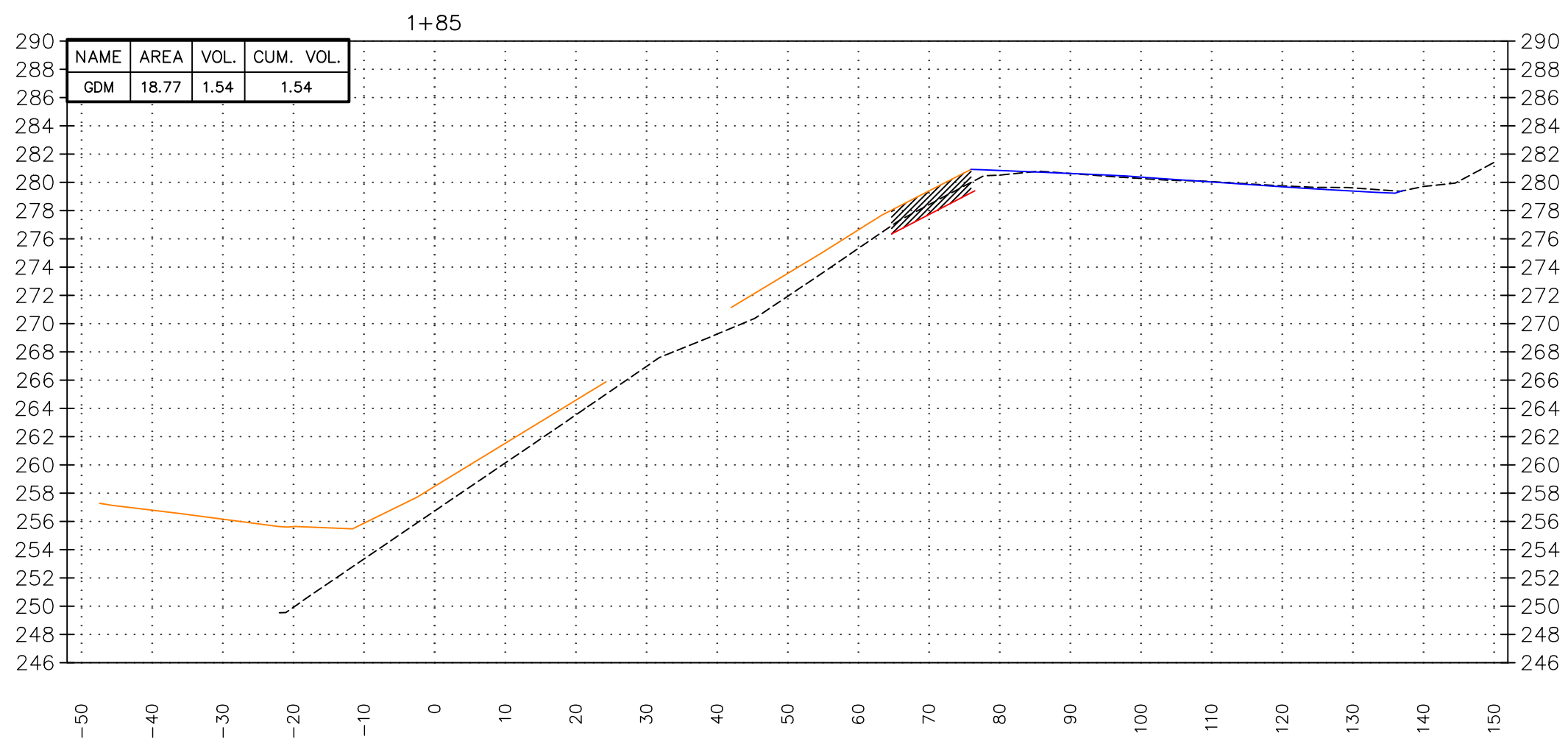
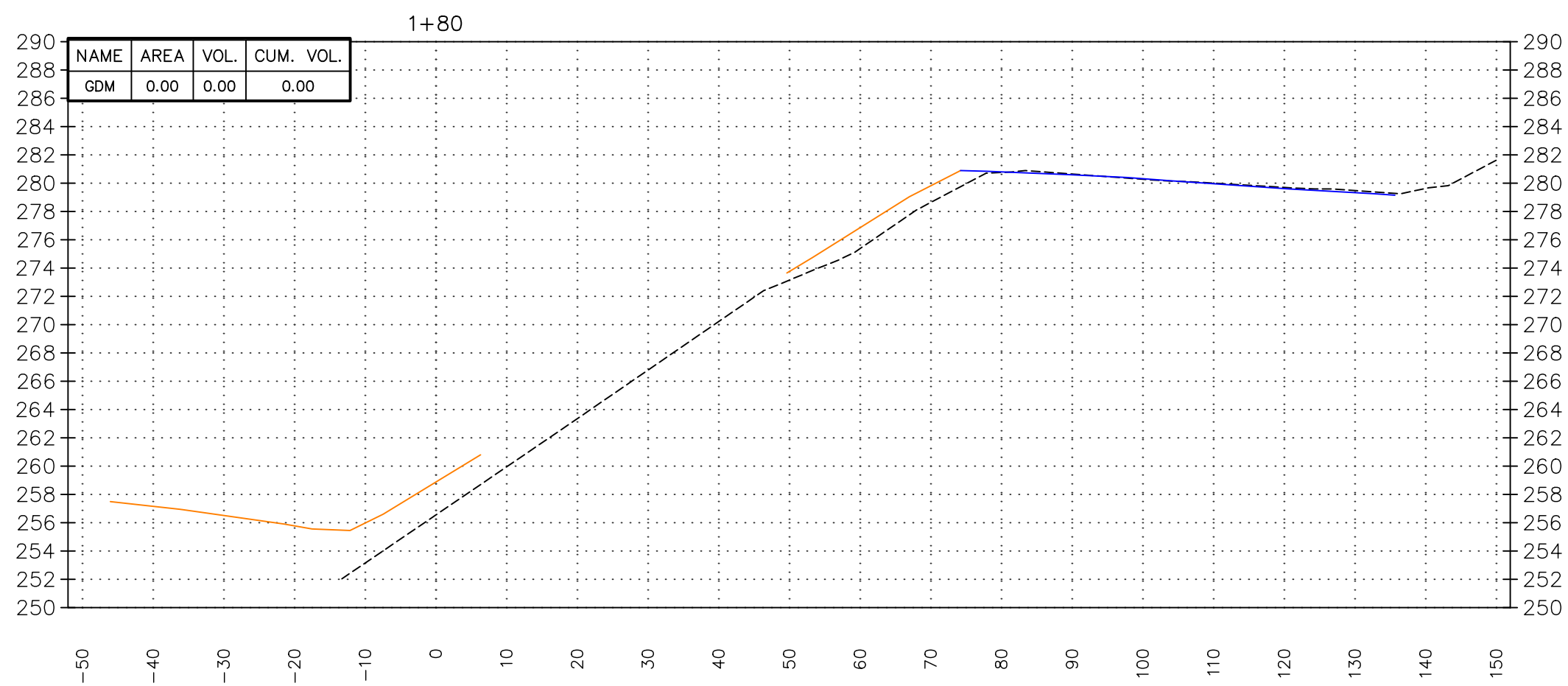
NOTES

- 1. ORIGINAL GROUND SURVEY SHOWN HEREON COLLECTED BY EDGE SURVEY AND DESIGN, LLC ON 8/17/2025.
- 2. NEW ROAD, GCL, AND GDM SURFACES SHOWN HEREON PROVIDED BY SOUTHCENTRAL CONSTRUCTION.
- 3. ALIGNMENTS AND STATIONING SHOWN HEREON ARE ARBITRARY NON-PLAN ALIGNMENTS CREATED AND SHOWN FOR CROSS-SECTIONS AND AVERAGE END AREAS ONLY.

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(907)344-5990 WWW.EDGESURVEY.NET AECI# 1392

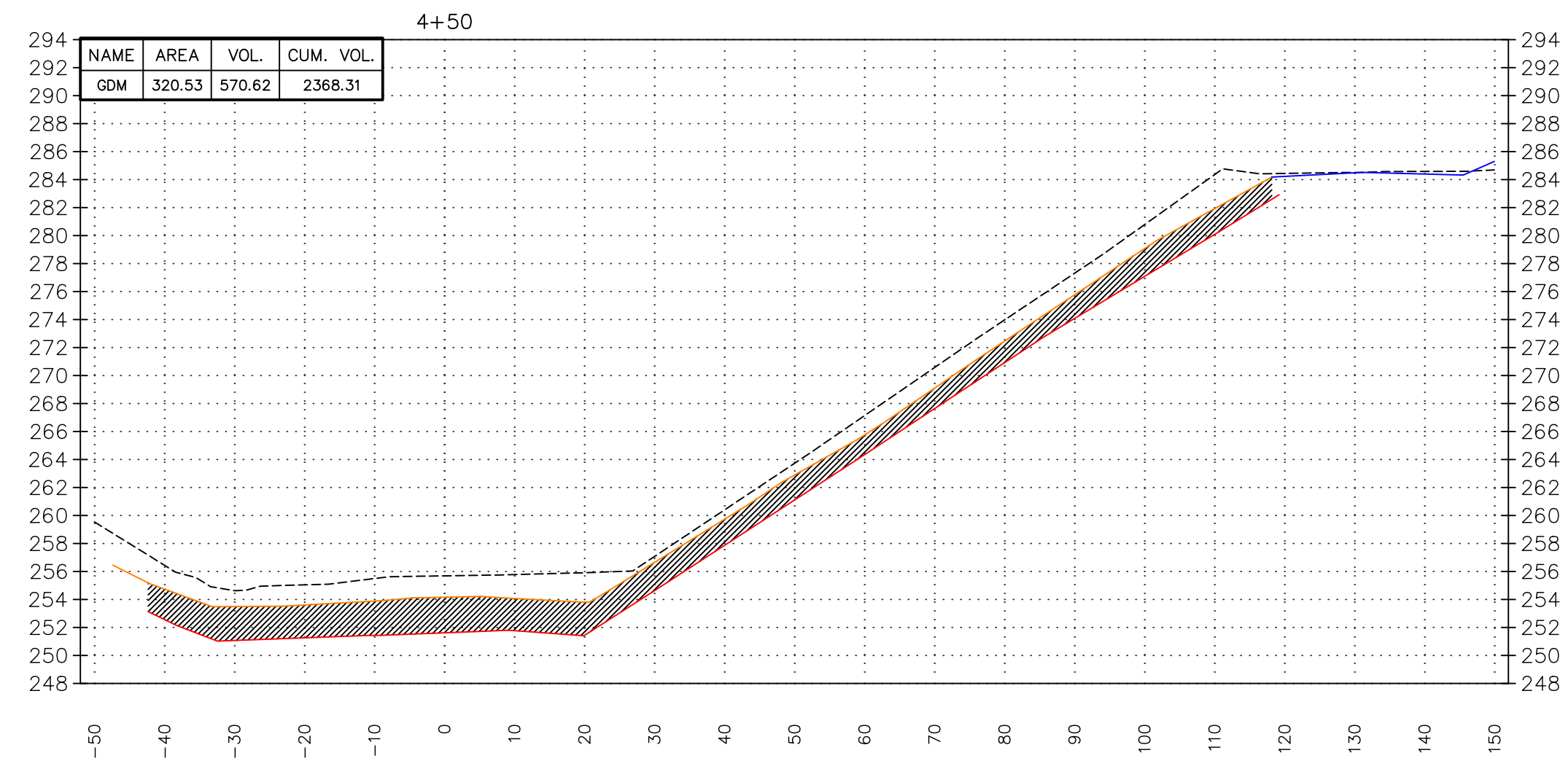
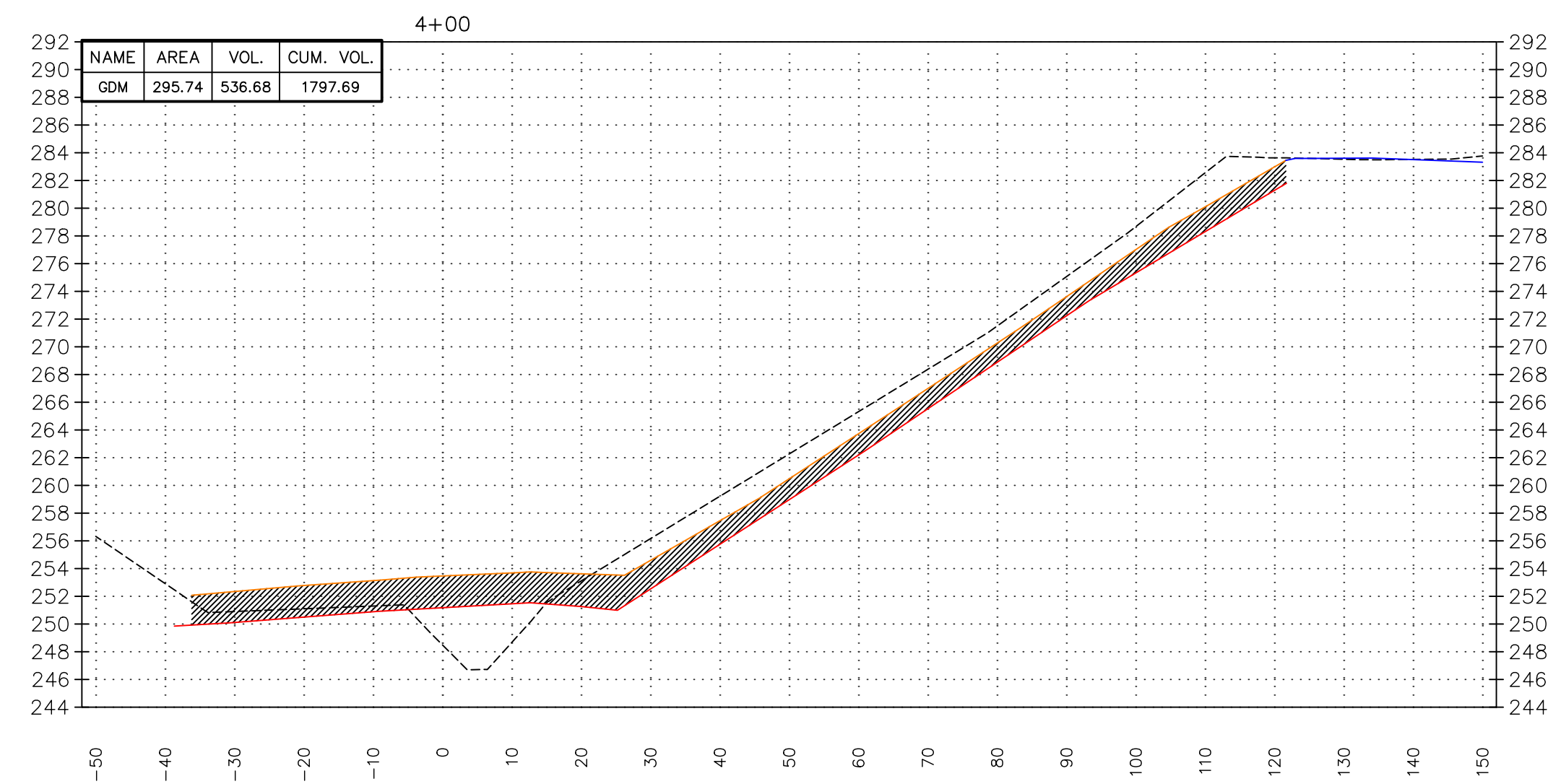
PALMER CENTRAL LANDFILL
GRANULAR DRAINAGE MATERIAL QUANTITY

DRAWN BY: SH	DATE: 11/6/2025	PROJECT NO.: 25-198
CHECKED BY: RS	SCALE: 1"= 40'	SHEET: 1 OF 8



LEGEND

- EDGE SURVEY ORIGINAL GROUND
- GCL AS-BUILT
- GDM AS-BUILT
- NEW ROAD AS-BUILT

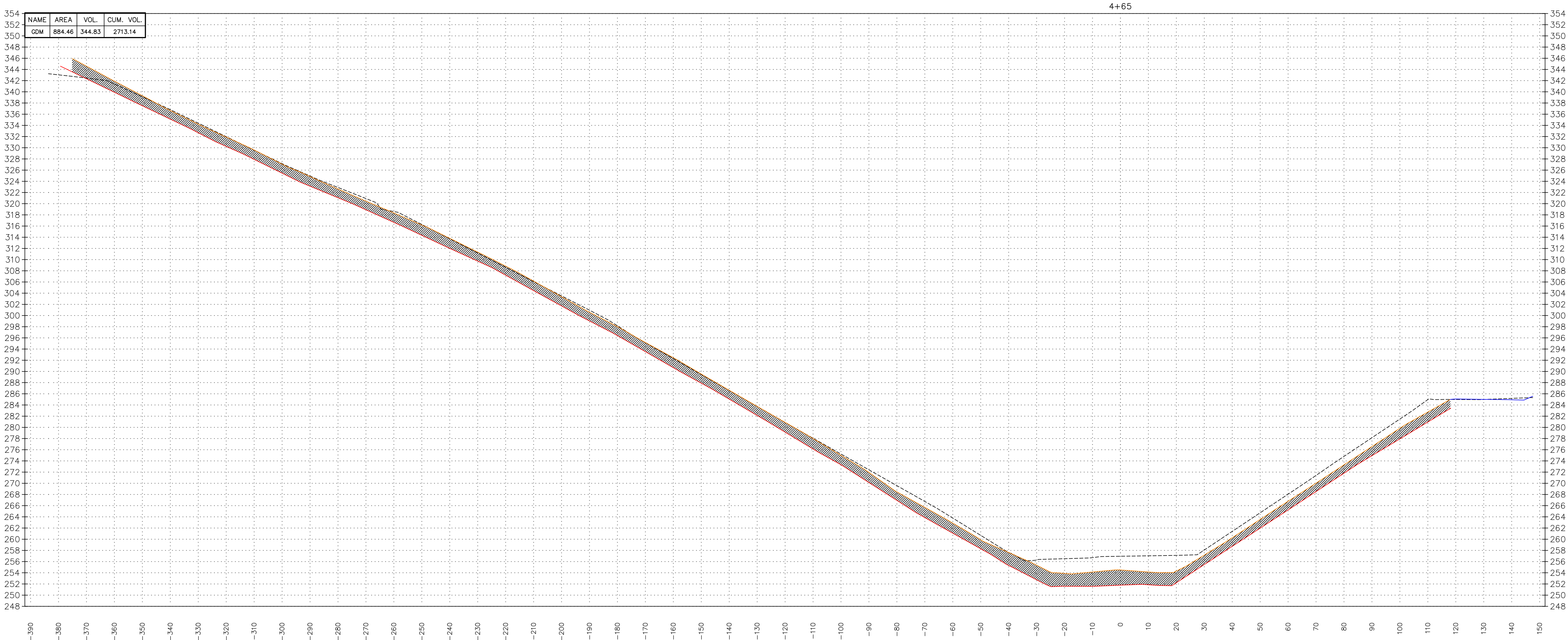


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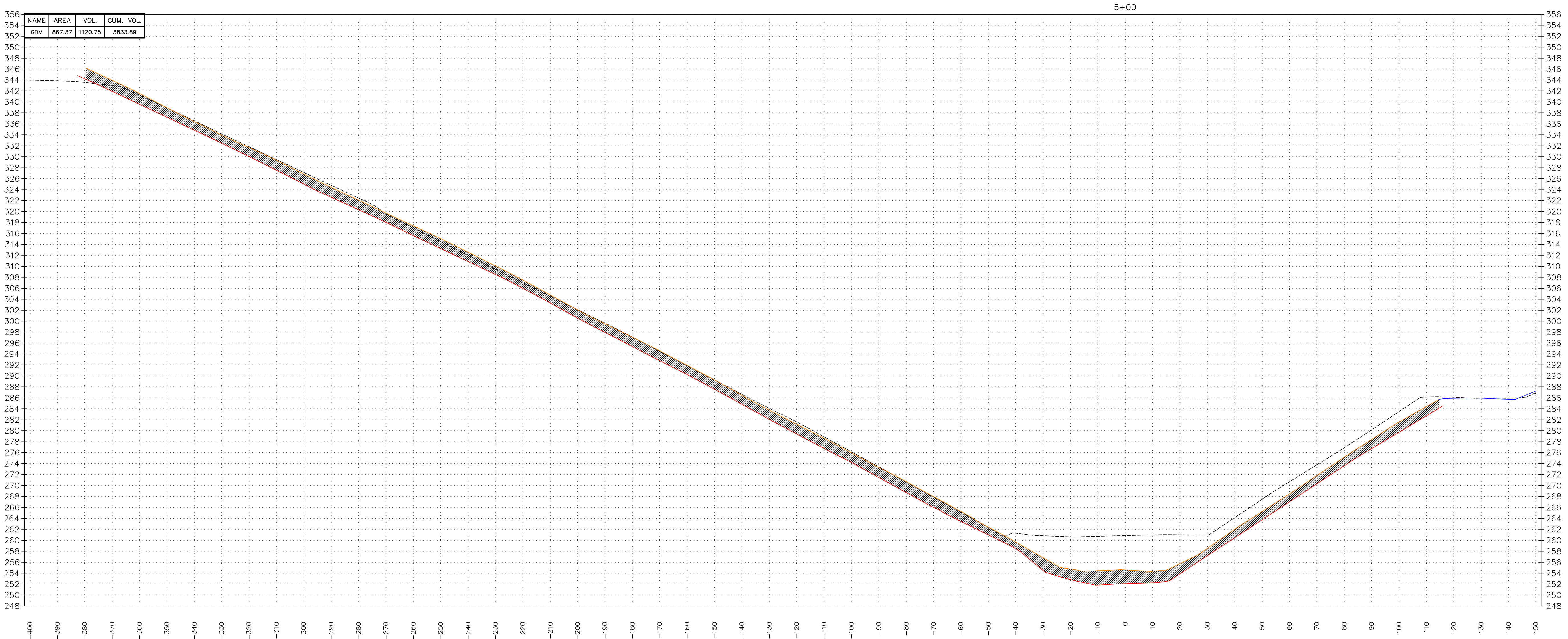
- EDGE SURVEY ORIGINAL GROUND
- GCL AS-BUILT
- GDM AS-BUILT
- NEW ROAD AS-BUILT

H SCALE: 1" = 20' V SCALE: 1" = 10'

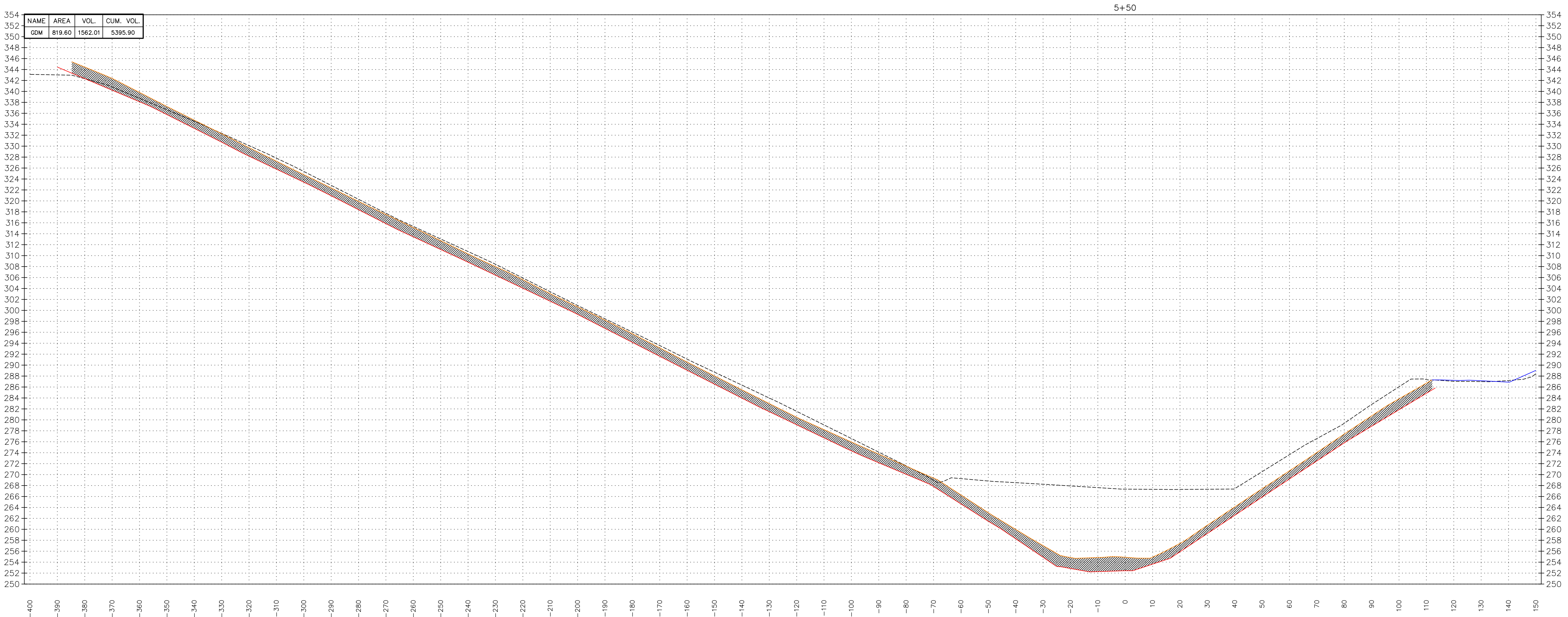
SHEET 3 OF 8



- LEGEND
- EDGE SURVEY ORIGINAL GROUND
 - GCL AS-BUILT
 - GDM AS-BUILT
 - NEW ROAD AS-BUILT

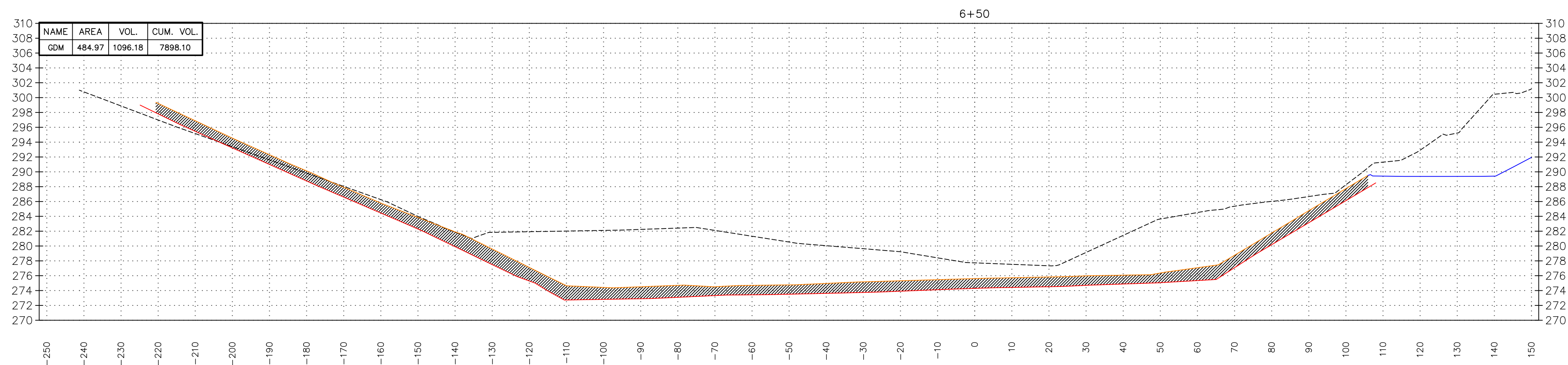
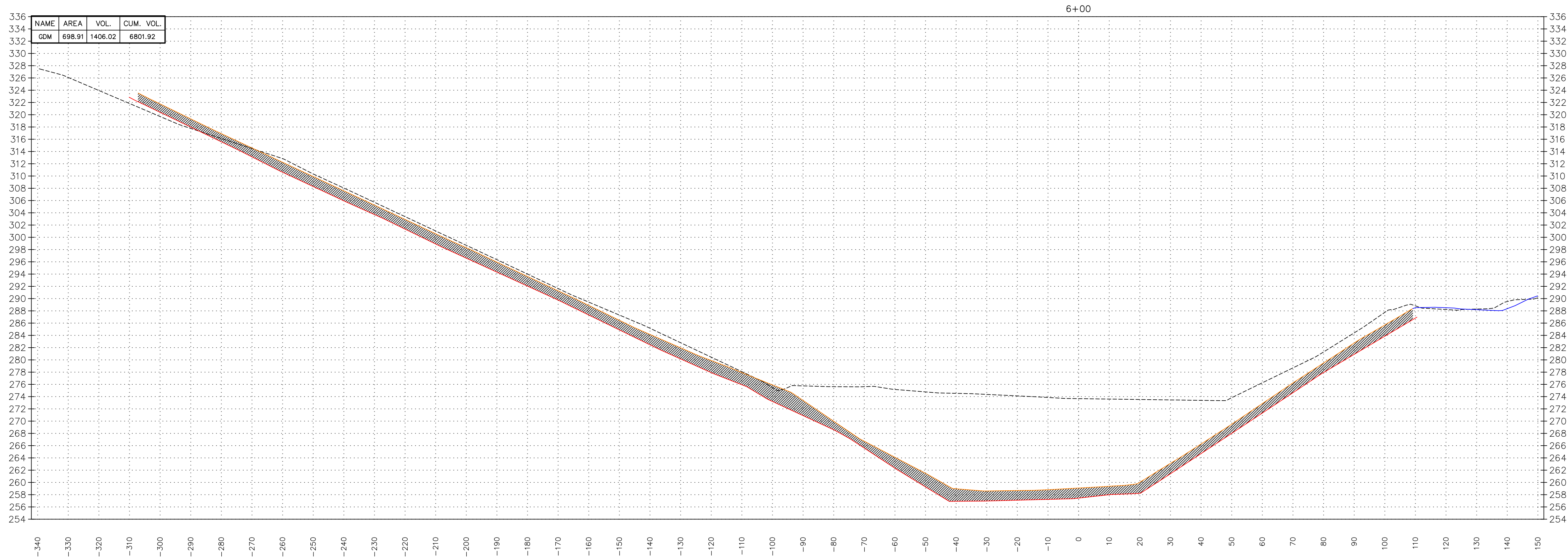


- LEGEND
- EDGE SURVEY ORIGINAL GROUND
 - GCL AS-BUILT
 - GDM AS-BUILT
 - NEW ROAD AS-BUILT



LEGEND

- EDGE SURVEY ORIGINAL GROUND
- GCL AS-BUILT
- GDM AS-BUILT
- NEW ROAD AS-BUILT



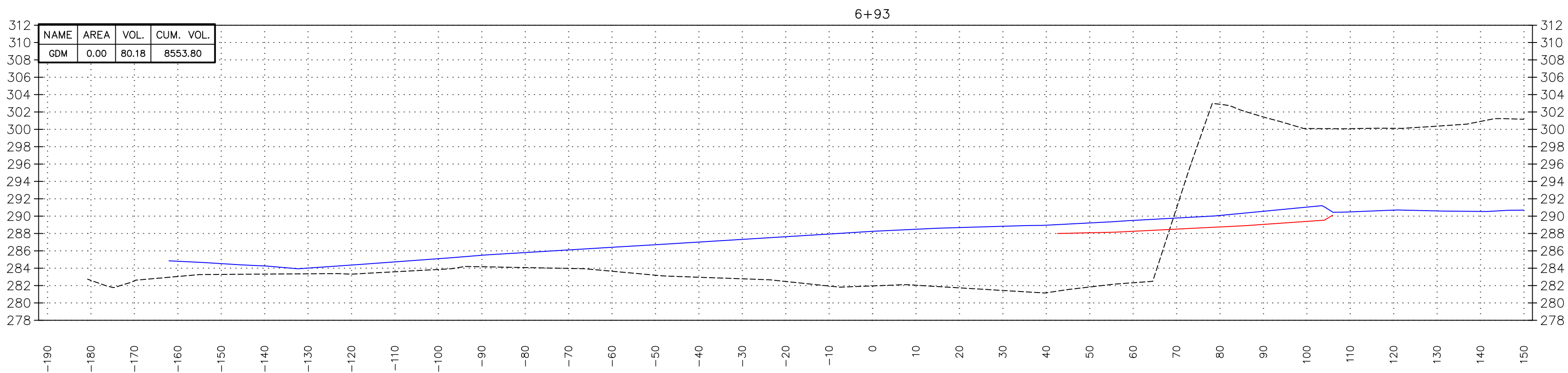
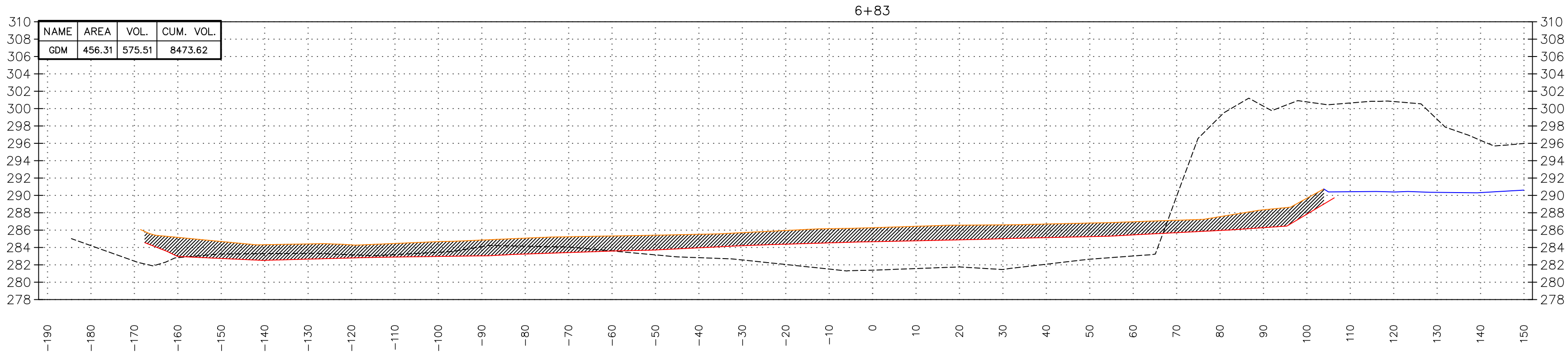
LEGEND

- EDGE SURVEY ORIGINAL GROUND
- GCL AS-BUILT
- GDM AS-BUILT
- NEW ROAD AS-BUILT

H SCALE: 1" = 20' V SCALE: 1" = 10'

SHEET 7 OF 8

P:\Projects\2025\Palmer - Cell 4 Expansion Construction (25-198)\Exhibits\GDM Quantity\Palmer Landfill GDM Quantity.dwg PLOTTED: 11/6/2025 2:51:04 PM



LEGEND

- EDGE SURVEY ORIGINAL GROUND
- GCL AS-BUILT
- GDM AS-BUILT
- NEW ROAD AS-BUILT

APPENDIX C – SUBGRADE VERIFICATION



5886 East Shop Circle
Palmer, AK 99645
Phone: 907-631-6047
www.emcalaska.com

Daily Field Report

Report No: DFR:P25-0928-01

Issue No: 1

Client: Southcentral Construction Inc.	Accreditation is granted by AAP and is limited to the standards for which the laboratory is accredited. Report approved by John Rego, P.E. Results relate only to items tested. All testing performed in accordance with approved project plans and specifications. Report shall not be reproduced, except in full, without prior written approval of EMC Engineering, LLC. Submitted By: Andrew Davenport CWI#1201085 Date: September 9, 2025
Project No: 3544	
Project: MSB Central Landfill Cell 4 Expansion	
Location: Palmer, AK	

Work Date: September 4, 2025	Weather: Partly Cloudy
Field Technician: Ethan Osborn ACI#02222213/WATC1579	
Hours: 2.00	
Contractor: South Central Construction Inc.	

Types of Testing / Observations

Nuclear Density Testing, Sample Pickup

Referenced Documents

Observations / Remarks

EMC Engineering was on site to pick up two soil samples for testing, and to perform nuclear density testing for native soil for a pipe trench.

For individual test results see test reports for details.

Ethan Osborn ACI#02222213/WATC1579

Deficiencies

No



Field Density Test Report

Report No: ND:P25-0897
Issue No: 1

Client: Southcentral Construction Inc.

Project No: 3544

Project: MSB Central Landfill Cell 4 Expansion

Location: Palmer, AK

Accreditation is granted by AAP and is limited to the standards for which the laboratory is accredited. Report approved by John Rego, P.E. Results relate only to items tested. All testing performed in accordance with approved project plans and specifications. Report shall not be reproduced, except in full, without prior written approval of EMC Engineering, LLC.

Submitted By: Andrew Davenport CWI#12010851/ICC#8003657/MOA 97 /ACI10174835, Field Manager
Date: 8/25/2025

Testing Details

Tested By: Andrew Davenport
CWI#12010851/ICC#8003657/MOA 97 /ACI10174835
Date Tested: 8/25/2025
Field Methods: ASTM D 6938
Gauge Make/Model: Troxler / 3440 Plus / Density Gauge
Test Mode: Direct Transmission
Standard Count: Density: 2419
Serial Number: 60789
Standard Count: Moisture: 654
Weather: Cloudy

Proctor Information

Sample ID	Material Description	Method	MDD (lb/ft ³)	OWC (%)
P25-0896-04	Gravel with sand	ASTM D4253	148.0	5.5

Test Results

Test No.	Field Sample ID	Method	Proctor Sample ID	Probe Depth (in.)	Wet Density (lb/ft ³)	Water Content (%)	OWC Var (%)	Dry Density (lb/ft ³)	Comp (%)	Comp Spec (%)	Results
1	1	D 6938	P25-0896-04	12	154.3	4.9	-0.6	147.1	99	≥95	
2	2	D 6938	P25-0896-04	12	155.2	4.6	-0.9	148.4	100	≥95	
3	3	D 6938	P25-0896-04	12	154.9	4.6	-0.9	148.1	100	≥95	

Location

General Location:			Cell 4		
Test No.	Field Sample ID	Location	Test Elev/Depth	Material/Layer	Lift
1	1	North side	12	Native soil	10
2	2	North side	12	Native soil	10
3	3	North floor	12	Native soil	10

Comments

Legend

OWC = Optimum Water Content
MDD = Maximum Dry Density



Field Density Test Report

Report No: ND:P25-0928
Issue No: 1

Client: Southcentral Construction Inc.

Project No: 3544

Project: MSB Central Landfill Cell 4 Expansion

Location: Palmer, AK

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Submitted By: Andrew Davenport CW#12010863/JC#8003857/MOA 97 /ACI10174835, Field Manager
Date: 9/9/2025

Testing Details

Tested By: Ethan Osborn
ACI#02222213/WATC1579
Date Tested: 9/4/2025
Field Methods: ASTM D 6938
Gauge Make/Model: Troxler / 3440 Plus / Density Gauge
Test Mode: Direct Transmission
Standard Count: Density: 2080
Serial Number: 60605
Standard Count: Moisture: 710
Weather: Partly Cloudy

Proctor Information

Sample ID	Material Description	Method	MDD (lb/ft ³)	OWC (%)
P25-0896-04	Gravel with sand	ASTM D4253	148.0	5.5

Test Results

Test No.	Method	Proctor Sample ID	Probe Depth (in.)	Wet Density (lb/ft ³)	Water Content (%)	OWC Var (%)	Dry Density (lb/ft ³)	Comp (%)	Comp Spec (%)	Results
1	D 6938	P25-0896-04	12	150.2	5.4	-0.1	142.5	96	≥95	
2	D 6938	P25-0896-04	12	150.8	5.3	-0.2	143.2	97	≥95	

Location

General Location:	GCO RGW-013 east end of pipe trench			
Test No.	Location	Test Elev/Depth	Material/Layer	
1				
2				

Comments

Legend

OWC = Optimum Water Content
MDD = Maximum Dry Density



Field Density Test Report

Report No: ND:P25-1075
Issue No: 1

Client: Southcentral Construction Inc.

Project No: 3544

Project: MSB Central Landfill Cell 4 Expansion

Location: Palmer, AK

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Submitted By: Andrew Davenport CW#12010862/IC#9003657/MOA 97 /ACI10174835, Field Manager
Date: 10/21/2025

Testing Details

Tested By: John Murphy
ICC#8857349/WAQTC#1171/MOA22
9/ACI1266616
Date Tested: 10/17/2025
Field Methods: ASTM D 6938
Gauge Make/Model: Troxler / 3440 Plus / Density Gauge
Test Mode: Direct Transmission
Standard Count: Density: 2046
Serial Number: 60556
Standard Count: Moisture: 702
Weather: Drizzle

Proctor Information

Sample ID	Material Description	Method	MDD (lb/ft ³)	OMC (%)
P25-0941-02	Borrow	AASHTO T 180 (D)	143.2	6.2

Test Results

Test No.	Method	Proctor Sample ID	Probe Depth (in.)	Wet Density (lb/ft ³)	Moisture Content (%)	OMC Var	Dry Density (lb/ft ³)	Comp (%)	Comp Spec (%)	Results
1	D 6938	P25-0941-02	8	146.5	6.6	+0.4	137.4	96	≥95	
2	D 6938	P25-0941-02	8	146.5	7.2	+1.0	136.7	95	≥95	
3	D 6938	P25-0941-02	8	147.4	6.5	+0.3	138.4	97	≥95	
4	D 6938	P25-0941-02	8	148.8	7.0	+0.8	139.1	97	≥95	

Location

General Location:		Cell 4 expansion			
Test No.	Location	Test Elev/Depth	Material/Layer		
1	25' W of NE Corner of J-Trench	Finish Grade	Gravel with sand (GW)		
2	125' W of NE Corner of J-Trench	Finish Grade	Gravel with sand (GW)		
3	50' S of NE Corner of J-Trench	Finish Grade	Gravel with sand (GW)		
4	200' S of NE Corner of J-Trench	Finish Grade	Gravel with sand (GW)		

Comments

Legend

OMC = Optimum Moisture Content
MDD = Maximum Dry Density



Proctor Report

Report No: PTR:P25-0941-02
Issue No: 1

Client: Southcentral Construction Inc.

Project No: 3544

Project: MSB Central Landfill Cell 4 Expansion

Location: Palmer, AK

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Submitted By: Candace Sakalaskas, Lab Supervisor
Date: 9/8/2025

Sample Details

Sample ID: P25-0941-02

Date Sampled: 9/4/2025

Sampling Method:

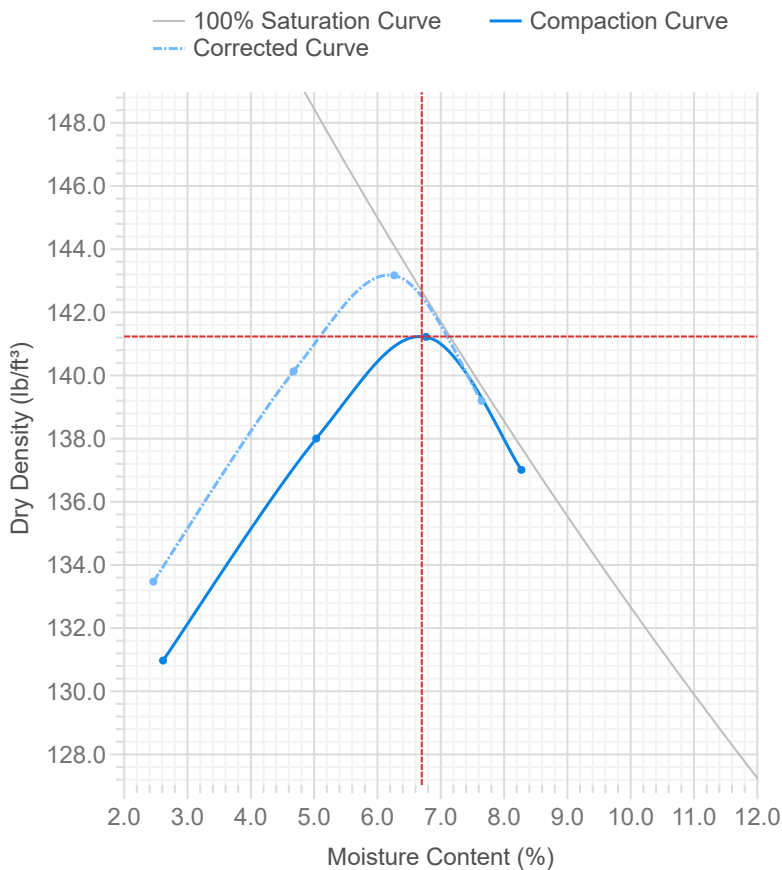
Source: MSB Central Landfill

Material: Borrow

Specification: Standard Sieve Stack

Location:

Dry Density - Moisture Content Relationship



Test Results

AASHTO T 180

Maximum Dry Density (lb/ft³): 141.2

Optimum Moisture Content (%): 6.7

Method: D

Date Tested: 9/5/2025

Results Corrected for Oversize Particles

Corrected Maximum Dry Density (lb/ft³): 143.2

Corrected Optimum Moisture Content (%): 6.2

Oversize Specific Gravity: 2.700

Oversized Particles (%): 8.4

Comments

Oversize Specific Gravity assumed to be 2.700.

Material Test Report

Report No: MAT:P25-0896-01
Issue No: 1

Client: Southcentral Construction Inc.

Project No: 3544

Project: MSB Central Landfill Cell 4 Expansion

Location: Palmer, AK

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Submitted By: Candace Sakalaskas, Lab Supervisor
Date: 8/25/2025

Sample Details

Sample ID P25-0896-01
Field Sample ID P-311-25
Date Sampled 8/21/2025
Specification Standard Sieve Stack
Location NE Corner, Cell 4, on-site borrow material.

Other Test Results

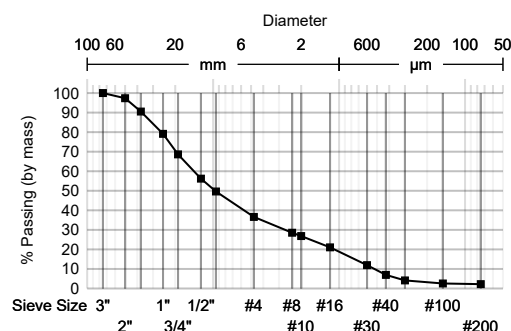
Description	Method	Result	Limits
Cu	AASHTO T 27	27.08	
Cc		0.96	
Procedure	AASHTO T 11	A	
Test Method	ASTM D4253#	2B	
Mold Volume		0.498	
Maximum Index Unit Weight (lb/ft ³)		148.0	
Date Tested		8/22/2025	

Particle Size Distribution

Method: AASHTO T 27
Drying By: Oven
Date Tested: 8/22/2025
Tested By: Candace Sakalaskas

Sieve Size	% Passing	Limits
3in	100	
2in	97	
1½in	91	
1in	79	
¾in	69	
½in	56	
3/8in	50	
No.4	37	
No.8	29	
No.10	27	
No.16	21	
No.30	12	
No.40	7	
No.50	4	
No.100	3	
No.200	2.2	

Chart



Comments

This test is not AAP accredited.

Material Test Report

Report No: MAT:P25-0941-02

Issue No: 1

Client: Southcentral Construction Inc.

Project No: 3544

Project: MSB Central Landfill Cell 4 Expansion

Location: Palmer, AK

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Submitted By: Candace Sakalaskas, Lab Supervisor
Date: 9/8/2025

Sample Details

Sample ID P25-0941-02
Field Sample ID P-343-25
Date Sampled 9/4/2025
Source MSB Central Landfill
Material Borrow/Pipe Bedding
Specification Standard Sieve Stack

Other Test Results

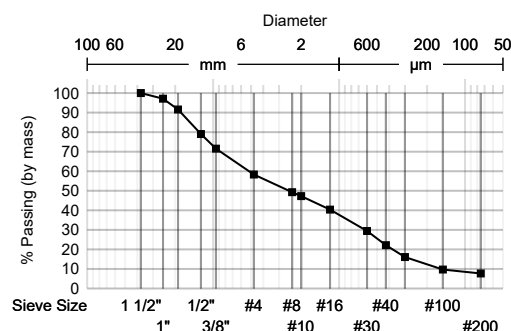
Description	Method	Result	Limits
Maximum Dry Density (lb/ft ³)	AASHTO T 180	141.2	
Optimum Moisture Content (%)		6.7	
Corrected Maximum Dry Density (lb/ft ³)		143.2	
Corrected Optimum Moisture Content (%)		6.2	
Method		D	
Oversize Specific Gravity		2.700	
Oversized Particles (%)		8.4	
Tested By	Candace Sakalaskas		
Date Tested	9/5/2025		
Cu	AASHTO T 27	33.48	
Cc		0.48	
Procedure	AASHTO T 11	A	

Particle Size Distribution

Method: AASHTO T 27
Drying By: Oven
Date Tested: 9/5/2025
Tested By: Candace Sakalaskas

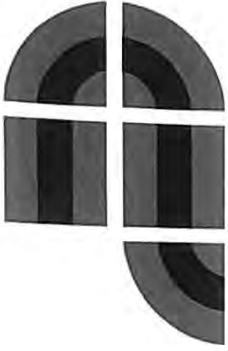
Sieve Size	% Passing	Limits
1 1/2 in	100	
1 in	97	
3/4 in	92	
1/2 in	79	
3/8 in	72	
No. 4	58	
No. 8	49	
No. 10	47	
No. 16	40	
No. 30	29	
No. 40	22	
No. 50	16	
No. 100	10	
No. 200	7.7	

Chart



Comments

Oversize Specific Gravity assumed to be 2.700.



NORTHWEST LININGS & GEOTEXTILE PRODUCTS, Inc.

21000 77th AVE. SOUTH

KENT, WA 98032

253-872-0244

FAX 253-872-0245

800-729-6954 Toll Free

E-Mail: www.northwestlinings.com

NORTHWEST LININGS & GEOTEXTILE PRODUCTS, Inc. CERTIFICATE OF ACCEPTANCE OF SOIL SUBGRADE SURFACE

PROJECT: Central Landfill Cell #4 Expansion construction.
LINER TYPE: 60 mil HDPE QTY: two Rolls S.F. 22000
OWNER: Matanucka-Susitna Borough
LOCATION: Central Landfill

I, the undersigned, a duly appointed representative of Northwest Linings & Geotextile Products, Inc. have visually observed the soil subgrade surface described below, and found it to be an acceptable surface on which to install geomembrane.

Northwest Linings & Geotextile Products, Inc. accepts no responsibility for the composition or character of the soil, nor any underlying conditions present at the sight, including, but not limited to, those arising out of improper compaction, use of improper soil materials, or the presence of underlying harmful objects of any kind. This acceptance is based solely upon a visual inspection of the completed subgrade preparation.

This acceptance is based upon the present condition of the subgrade preparation and Northwest Linings & Geotextile Products, Inc. accepts no responsibility for restoration of the subgrade preparation, upon physical harm or change, including, but not limited to, that caused by man, animal, or machinery. Neither does Northwest Linings & Geotextile Products, Inc. accept responsibility for restoration of the subgrade preparation upon the occurrence of any Act of God, including but not limited to, rain, wind, hail, snow, flood, or earthquake.

Area Being Accepted/Comments: North Slope

NORTHWEST LININGS REPRESENTATIVE:

Date: 9-28-2025

Signature: Alejandro Santana Rios
Print Name/Title: Alejandro Santana Rios / Supervisor

OWNERS REPRESENTATIVE:

Date: 9/28/25

Company: Burns & McDonnell
Signature: Rebecca Heaman
Print Name/Title: Rebecca Heaman, CQA

FAX # _____ TELEPHONE # 734-277-3342



**NORTHWEST LININGS &
GEOTEXTILE PRODUCTS, Inc.**

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**NORTHWEST LININGS & GEOTEXTILE PRODUCTS, Inc.
CERTIFICATE OF ACCEPTANCE OF SOIL SUBGRADE SURFACE**

PROJECT: Central Landfill Cell #4 Expansion Construction
LINER TYPE: 60 mil HDPE QTY: Three Rods S.F. 32000
OWNER: Mataposka-Susitna Borough
LOCATION: Central Landfill

I, the undersigned, a duly appointed representative of Northwest Linings & Geotextile Products, Inc. have visually observed the soil subgrade surface described below, and found it to be an acceptable surface on which to install geomembrane.

Northwest Linings & Geotextile Products, Inc. accepts no responsibility for the composition or character of the soil, nor any underlying conditions present at the sight, including, but not limited to, those arising out of improper compaction, use of improper soil materials, or the presence of underlying harmful objects of any kind. This acceptance is based solely upon a visual inspection of the completed subgrade preparation.

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Area Being Accepted/Comments: East Slope North to south 280'

NORTHWEST LININGS REPRESENTATIVE:

Date: 9-29-2025

Signature:

Alejandro Santana Rios

Print Name/Title:

Alejandro Santana Rios

OWNERS REPRESENTATIVE:

Date: 9/29/25

Company:

Burns & McDonnell

Signature:

Rebecca Heaman

Print Name/Title:

Rebecca Heaman

FAX #

TELEPHONE #

734-277-3342



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E-Mail: www.northwestlinings.com

NORTHWEST LININGS & GEOTEXTILE PRODUCTS, Inc. CERTIFICATE OF ACCEPTANCE OF SOIL SUBGRADE SURFACE

PROJECT: Central Landfill Cell #4 Expansion Construction
LINER TYPE: 60 mil HDPE QTY: Three Rolls S.F. 32000
OWNER: Matanaska-Susitna Borough
LOCATION: Central Landfill

I, the undersigned, a duly appointed representative of Northwest Linings & Geotextile Products, Inc. have visually observed the soil subgrade surface described below, and found it to be an acceptable surface on which to install geomembrane.

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Area Being Accepted/Comments: East Slope North to south 280'

NORTHWEST LININGS REPRESENTATIVE:

Date: 9-29-2025

Signature:

Print Name/Title:

Alejandro Santana Rios
Alejandro Santana Rios

OWNERS REPRESENTATIVE:

Date: 9/29/25

Company:

Signature:

Print Name/Title:

Burns & McDonnell

Rebecca Hearn

Rebecca Hearn

FAX #

TELEPHONE #

734-277-3342



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NORTHWEST LININGS & GEOTEXTILE PRODUCTS, Inc. CERTIFICATE OF ACCEPTANCE OF SOIL SUBGRADE SURFACE

PROJECT:

LINER TYPE

OWNER:

LOCATION:

Central Landfill Cell #4 Expansion Construction
60 mil 22 top/60 mil HDPE: 3 rolls 22 1/2 roll HDPE S.F. 3012722 / 6583
Matanuska Sustana Borough
Central Landfill

I, the undersigned, a duly appointed representative of Northwest Linings & Geotextile Products, Inc. have visually observed the soil subgrade surface described below, and found it to be an acceptable surface on which to install geomembrane.

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Area Being Accepted/Comments: West slope 36,710

NORTHWEST LININGS REPRESENTATIVE:

Date: 9-30-2025

Signature:

Print Name/Title:

Alejandro Santana Rios
Alejandro Santana Rios / Supervisor

Date: 9/30/25

OWNERS REPRESENTATIVE:

Company:

Signature:

Print Name/Title:

Burns & McDonnell

Rebecca Heaman

Rebecca Heaman

TELEPHONE #

734-277-3342

FAX #

Alaska Construction Division FIELD FORMS AND TEMPLATES QUALITY AND CONTROL FORMS AND TEMPLATES certificate of acceptance of soil subgrade construction 6-18-03.doc

rchearman@burnsmcd.com



NORTHWEST LININGS & GEOTEXTILE PRODUCTS, Inc.

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NORTHWEST LININGS & GEOTEXTILE PRODUCTS, Inc. CERTIFICATE OF ACCEPTANCE OF SOIL SUBGRADE SURFACE

PROJECT: Central Landfill Cell # 4 Expansion Construction
LINER TYPE: 60 mil HDPE QTY: 17101 S.F. _____
OWNER: Matanuska-Sustana Borough
LOCATION: Central Landfill

I, the undersigned, a duly appointed representative of Northwest Linings & Geotextile Products, Inc. have visually observed the soil subgrade surface described below, and found it to be an acceptable surface on which to install geomembrane.

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Area Being Accepted/Comments: East Slope north to South
340' to the South Cell # 4

NORTHWEST LININGS REPRESENTATIVE:

Date: 10-02-2025

Signature:

Alejandro Santana Rios
Print Name/Title: Alejandro Santana Rios / supervisor

OWNERS REPRESENTATIVE:

Date: 10/2/25

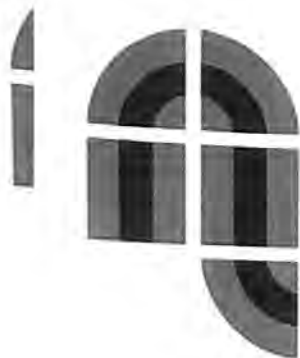
Company:

Signature:

Print Name/Title:

FAX #

TELEPHONE #



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NORTHWEST LININGS & GEOTEXTILE PRODUCTS, Inc. CERTIFICATE OF ACCEPTANCE OF SOIL SUBGRADE SURFACE

PROJECT:

LINER TYPE

OWNER:

LOCATION:

Central Landfill Cell #4 Expansion Constr.
60 mil HDPE QTY: S.F.
Matanuska-Susitna Borough
Central Landfill

I, the undersigned, a duly appointed representative of Northwest Linings & Geotextile Products, Inc. have visually observed the soil subgrade surface described below, and found it to be an acceptable surface on which to install geomembrane.

Northwest Linings & Geotextile Products, Inc. accepts no responsibility for the composition or character of the soil, nor any underlying conditions present at the sight, including, but not limited to, those arising out of improper compaction, use of improper soil materials, or the presence of underlying harmful objects of any kind. This acceptance is based solely upon a visual inspection of the completed subgrade preparation.

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Area Being Accepted/Comments:

West slope 69' And
Remainder of West leachate collection
trench

NORTHWEST LININGS REPRESENTATIVE:

Date: 10/03/2025

Signature:

Print Name/Title:

Alejandro Santana Rios
Alejandro Santana Rios/Supervisor

OWNERS REPRESENTATIVE:

Date: 10/3/28

Company:

Signature:

Print Name/Title:

Burns & McDonnell
Rebecca Hearnan
Rebecca Hearnan

FAX #

TELEPHONE #

734-277-3342



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E-Mail: www.northwestlinings.com

NORTHWEST LININGS & GEOTEXTILE PRODUCTS, Inc. CERTIFICATE OF ACCEPTANCE OF SOIL SUBGRADE SURFACE

PROJECT:

LINER TYPE

OWNER:

LOCATION:

Central Landfill Cell #4 Expansion Construction
60 mil ~~HDPE~~ LLD QTY: 11,500 S.F.
Mataruska - Sustna Borough
Central Landfill

I, the undersigned, a duly appointed representative of Northwest Linings & Geotextile Products, Inc. have visually observed the soil subgrade surface described below, and found it to be an acceptable surface on which to install geomembrane.

Northwest Linings & Geotextile Products, Inc. accepts no responsibility for the composition or character of the soil, nor any underlying conditions present at the sight, including, but not limited to, those arising out of improper compaction, use of improper soil materials, or the presence of underlying harmful objects of any kind. This acceptance is based solely upon a visual inspection of the completed subgrade preparation.

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Area Being Accepted/Comments: The entire cell #4 expansion

NORTHWEST LININGS REPRESENTATIVE:

Date: 10-06-2025

Signature:

Print Name/Title:

Alejandro Santana Rios
Alejandro Santana Rios / Supervisor

OWNERS REPRESENTATIVE:

Date: 10/6/25

Company:

Signature:

Print Name/Title:

Burns & McDonnell
Rebecca Heaman

FAX #

TELEPHONE #

734-277-334

APPENDIX D – SAND LEVELING DOCUMENTATION



Proctor Report

Report No: PTR:P25-0941-01

Issue No: 2

This report replaces all previous issues of this report signed on 09/08/2025

Client: Southcentral Construction Inc.

Project No: 3544

Project: MSB Central Landfill Cell 4 Expansion

Location: Palmer, AK

Accreditation is granted by AAP and is limited to the standards for which the laboratory is accredited. Report approved by John Rego, P.E. Results relate only to items tested. All testing performed in accordance with approved project plans and specifications. Report shall not be reproduced, except in full, without prior written approval of EMC Engineering, LLC.

Submitted By: Candace Sakalaskas, Lab Supervisor
Date: 9/8/2025

Sample Details

Sample ID: P25-0941-01

Date Sampled: 9/4/2025

Sampling Method: AASHTO Method

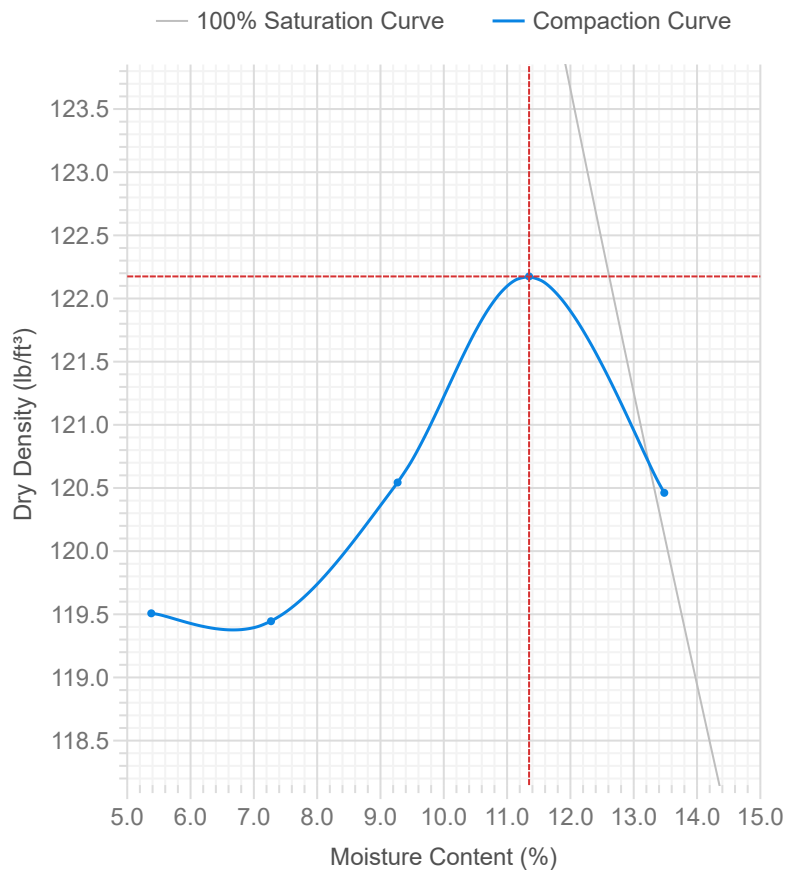
Source: MSB Central Landfill

Material: Sand

Specification: MSB Landfill-Sand Blanket

Location:

Dry Density - Moisture Content Relationship



Test Results

AASHTO T 180

Maximum Dry Density (lb/ft³): 122.2

Optimum Moisture Content (%): 11.3

Method: A

Date Tested: 9/5/2025

Comments

Material Test Report

Report No: MAT:P25-0896-02

Issue No: 3

This report replaces all previous issues of this report signed on 08/25/2025

Client: Southcentral Construction Inc.

Project No: 3544

Project: MSB Central Landfill Cell 4 Expansion

Location: Palmer, AK

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Submitted By: Candace Sakalaskas, Lab Supervisor
Date: 8/25/2025

Sample Details

Sample ID P25-0896-02
Field Sample ID P-312-25
Date Sampled 8/21/2025
Specification MSB Landfill-Sand Blanket
Location Sand Blanket, on-site stockpile from Central Gravel Products.

Other Test Results

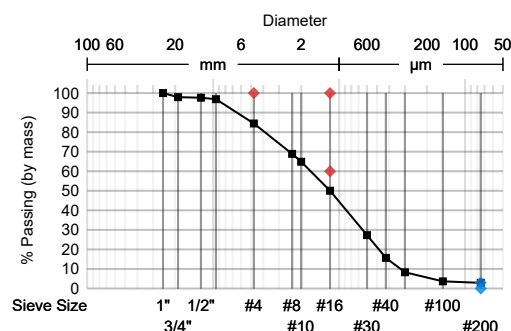
Description	Method	Result	Limits
Cu	AASHTO T 27	5.18	
Cc		0.77	
Procedure	AASHTO T 11	A	

Particle Size Distribution

Method: AASHTO T 27
Drying By: Oven
Date Tested: 8/22/2025
Tested By: Candace Sakalaskas

Sieve Size	% Passing	Limits
1in	100	
3/4in	98	
1/2in	98	
3/8in	97	
No.4	84	100
No.8	69	
No.10	65	
No.16	50	60 – 100
No.30	27	
No.40	16	
No.50	8	
No.100	4	
No.200	2.9	0 – 3

Chart



Comments

N/A

Material Test Report

Report No: MAT:P25-0896-05
Issue No: 1

Client: Southcentral Construction Inc.

Project No: 3544

Project: MSB Central Landfill Cell 4 Expansion

Location: Palmer, AK

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Submitted By: Candace Sakalaskas, Lab Supervisor
Date: 8/25/2025

Sample Details

Sample ID P25-0896-05
Field Sample ID P-314-25
Date Sampled 8/22/2025
Specification MSB Landfill-Sand Blanket
Location Imported from Central Gravel Products.

Other Test Results

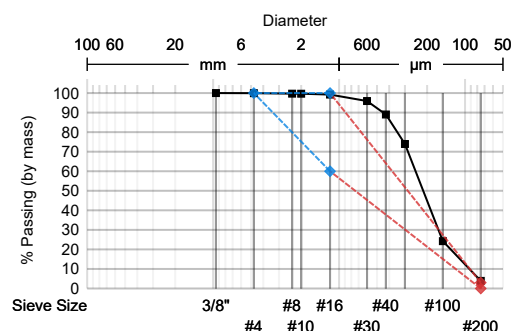
Description	Method	Result	Limits
Cu	AASHTO T 27	2.67	
Cc		1.16	
Procedure	AASHTO T 11	A	

Particle Size Distribution

Method: AASHTO T 27
Drying By: Oven
Date Tested: 8/25/2025
Tested By: Candace Sakalaskas

Sieve Size	% Passing	Limits
3/8in	100	
No.4	100	100
No.8	100	
No.10	100	
No.16	99	60 – 100
No.30	96	
No.40	89	
No.50	74	
No.100	24	
No.200	3.9	0 – 3

Chart



Comments

N/A

Material Test Report

Report No: MAT:P25-0941-01

Issue No: 2

This report replaces all previous issues of this report signed on 09/08/2025

Client: Southcentral Construction Inc.

Project No: 3544

Project: MSB Central Landfill Cell 4 Expansion

Location: Palmer, AK

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Submitted By: Candace Sakalaskas, Lab Supervisor
Date: 9/8/2025

Sample Details

Sample ID P25-0941-01
Field Sample ID P-342-25
Date Sampled 9/4/2025
Source MSB Central Landfill
Material Sand
Specification MSB Landfill-Sand Blanket Central Gravel Products
Sampling Method AASHTO Method

Other Test Results

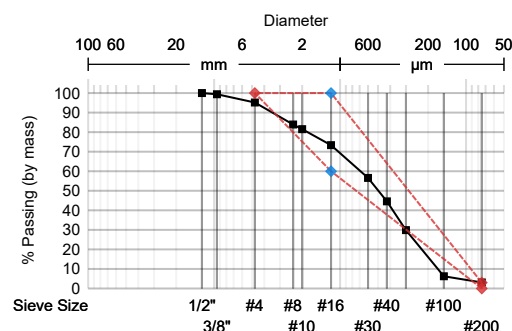
Description	Method	Result	Limits
Maximum Dry Density (lb/ft³)	AASHTO T 180	122.2	
Optimum Moisture Content (%)		11.3	
Method		A	
Hammer Face Type		Circular	
Tested By	Jesse Okakok WAQTC#1552		
Date Tested		9/5/2025	
Cu	AASHTO T 27	4.11	
Cc		0.79	
Procedure	AASHTO T 11	A	

Particle Size Distribution

Method: AASHTO T 27
Drying By: Oven
Date Tested: 9/5/2025
Tested By: Candace Sakalaskas

Sieve Size	% Passing	Limits
1/2in	100	
3/8in	99	
No.4	95	100
No.8	84	
No.10	82	
No.16	73	60 – 100
No.30	57	
No.40	45	
No.50	30	
No.100	6	
No.200	3.1	0 – 3

Chart



Comments

N/A

SECTION 1 – GENERAL

Project No.:	BMCD: 167550, Southcentral Const.: 25-179B	RFI No.:	4
Project Name:	Central Landfill Cell 4 Expansion	RFI Subject:	Sand Leveling Course
Contract No.:		Issued On:	8/25/25
Contract Name:		Need Response By:	8/26/25

SECTION 2 – QUESTION

See attached letter

Impacts: ☐ Scope ☒ Schedule ☒ Cost

RFI Originator (Name): Dane Dahlgren, Southcentral Construction	Signature:	Date:
--	------------	-------

SECTION 3 – ANSWER

The Contractor may use a Sand Leveling Course Material that has a gradation of 0-4% passing through the 200 sieve.

Answered By (Name): Fred Doran, PE, Burns & McDonnell	Signature: 	Date: 8/26/25
--	---	------------------

SECTION 4 – DISTRIBUTION

Title:	Name:	Location:
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(RFI)

PROJECT Central Landfill Cell 4 Expansion RFI NO. 004
CONTRACTOR Southcentral Construction Inc. PROJECT NO. 25-179B
ORIGINATOR Dane Dahlgren SPEC. SECTION 31 20 00 2.05 A 1
DATE SUBMITTED 8—25-2025 DRAWING NO. _____ SHEET _____ OF _____

DESCRIPTION OF RFI

SCC is requesting a change in the gradation for the Leveling Sand for the 200 Sieve from 3% to 4%. The material we want to use is slightly out of the 0-3 range at 3.9 percent, passing the 200. See attached gradation.

RESPONSE REQUESTED BY (Date) 8-26-2025

RESPONSE TO RFI

RESPONSE BY (Name/Company) _____

ROUTING	RECEIVED BY NAME / COMPANY	DATE RECEIVED	DATE FORWARDED	COMMENTS
Project Manager				
Designer				
Project Manager				
Contractor	Dane/SCC		8-26-2025	

DIRECTION

- ☐ Proceed per Engineers' Response. No change in contract price or time is recognized.
- ☐ Do not proceed until _____
- ☐ _____

Material Test Report

Report No: MAT:P25-0896-05
Issue No: 1

Client: Southcentral Construction Inc.

Project No: 3544

Project: MSB Central Landfill Cell 4 Expansion

Location: Palmer, AK

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Submitted By: Candace Sakalaskas, Lab Supervisor
Date: 8/25/2025

Sample Details

Sample ID P25-0896-05
Field Sample ID P-314-25
Date Sampled 8/22/2025
Specification MSB Landfill-Sand Blanket
Location Imported from Central Gravel Products.

Other Test Results

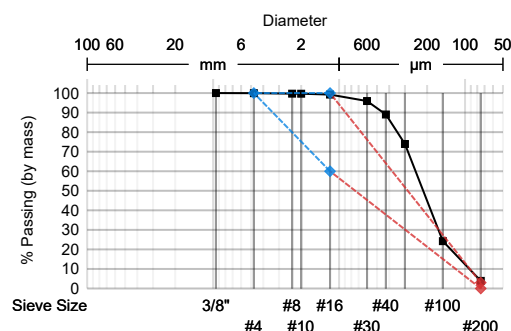
Description	Method	Result	Limits
Cu	AASHTO T 27	2.67	
Cc		1.16	
Procedure	AASHTO T 11	A	

Particle Size Distribution

Method: AASHTO T 27
Drying By: Oven
Date Tested: 8/25/2025
Tested By: Candace Sakalaskas

Sieve Size	% Passing	Limits
3/8in	100	
No.4	100	100
No.8	100	
No.10	100	
No.16	99	60 – 100
No.30	96	
No.40	89	
No.50	74	
No.100	24	
No.200	3.9	0 – 3

Chart



Comments

N/A

APPENDIX E – GCL DOCUMENTATION

BENTOMAT® DN

CERTIFIED PROPERTIES

CETCO® Bentomat® DN is a reinforced geosynthetic clay liner (GCL) consisting of a layer of sodium bentonite between two polypropylene nonwoven geotextiles, which are needle-punched together.

MATERIAL PROPERTY	TEST METHOD	TEST FREQUENCY	CERTIFIED VALUES
Nonwoven Base Geotextile Mass/Area ¹	ASTM D5261	200,000 ft ² (20,000 m ²)	6.0 oz/yd ² (203 g/m ²) min.
Nonwoven Cap Geotextile Mass/Area ¹	ASTM D5261	200,000 ft ² (20,000 m ²)	6.0 oz/yd ² (203 g/m ²) min.
Bentonite Swell Index ²	ASTM D5890	1 per 50 tonnes	24 mL/2g min.
Bentonite Fluid Loss ²	ASTM D5891	1 per 50 tonnes	18 mL max.
Bentonite Mass/Area ³	ASTM D5993	40,000 ft ² (4,000 m ²)	0.75 lb/ft ² (3.6 kg/m ²) min.
Total Mass/Area ³	ASTM D5993	40,000 ft ² (4,000 m ²)	0.83 lb/ft ² (4.1 kg/m ²) min.
GCL Moisture Content	ASTM D5993	40,000 ft ² (4,000 m ²)	35% max.
GCL Grab Strength ⁴	ASTM D6768	200,000 ft ² (20,000 m ²)	50 lbs/in (8.8 kN/m) min.
GCL Peel Strength	ASTM D6496	40,000 ft ² (4,000 m ²)	8.0 lbs/in (1401 N/m) min.
GCL Hydraulic Conductivity ⁵	ASTM D5887	250,000 ft ² (25,000 m ²)	5 x 10 ⁻¹¹ m/s max.
GCL Index Flux ⁵	ASTM D5887	250,000 ft ² (25,000 m ²)	1 x 10 ⁻⁸ m ³ /m ² /s max.
GCL Hydrated Internal Shear Strength ⁶	ASTM D6243	1,000,000 ft ² (100,000 m ²)	500 psf (24 kPa) typ.@ 200 psf (9.6 kPa)

Notes:

¹ Geotextile property tests performed on the geotextile components before they are incorporated into the finished GCL product.

² Bentonite property tests performed before the bentonite is incorporated into the finished GCL product.

³ Reported at 0% moisture content.

⁴ All tensile strength testing is performed in the machine direction using ASTM D6768.

⁵ Index flux and hydraulic conductivity testing with deaired distilled/deionized water at 80 psi (550 kPa) cell pressure, 77 psi (530 kPa) headwater pressure and 75 psi (515 kPa) tailwater pressure.

⁶ Peak values measured at 200 psf (9.6 kPa) normal stress for a specimen hydrated for 48 hours. Site-specific materials, GCL products, and test conditions must be used to verify internal and interface strength of the proposed design.



Date: 04-Sep-2025 02:38
Purchase Order: C-6315
ORDER NUMBER: 55101445

NORTHWEST LININGS
20824 77TH AVE SOUTH

KENT,WA,98032

To Whom It May Concern:

Please find the enclosed Manufacturing Quality Assurance/Manufacturing Quality Control (MQA/MQC) test data package for Geosynthetic Clay Liner (GCL) shipments to NORTHWEST LININGS .

Questions regarding this information should be directed to CETCO® Technical Services at eptechservices@cetco.com.

Sincerely,

NICHOLLS, RYAN J
Quality Assurance Coordinator
CETCO® Lovell Plant

**GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE**

PROJECT NAME:
CUSTOMER P.O.: C-6315
ORDER NUMBER: 55101445
PREPARED FOR: NORTHWEST LININGS

CONTENTS:

- Product Certifications
- GCL Order Packing List and MQA Tracking Form
- GCL Manufacturing Quality control test data
- Bentonite clay certification
- Raw Material Test results

PREPARED BY: NICHOLLS, RYAN J
Quality Assurance Coordinator
CETCO®
AMERICAN COLLOID COMPANY
92 HIGHWAY 37
LOVELL, 82431, WY
Telephone: 800-322-1159
Email: Ryan.Nicholls@mineralstech.com

PRODUCT CERTIFICATIONS

PROJECT NAME:
CUSTOMER P.O.: C-6315
ORDER NUMBER: 55101445
PREPARED FOR: NORTHWEST LININGS

The GCL Manufactured for the above-referenced order number is certified to meet the values listed in the tables below:

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT® DN-8 LB

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	50 - lbs/in
ASTM D5891	Bentonite Fluid Loss	1 per 50 Tonnes	18 - ml
ASTM D5887	GCL-Index Flux	250,000 sq ft	1x10-8 - m3/m2/s
ASTM D5887	GCL-Hydraulic Conductivity	250,000 sq ft	5x10-9 - cm/s
ASTM D5890	Bentonite Free Swell	1 per 50 Tonnes	24 - ml
ASTM D6496	GCL Peel Strength	40,000 sq ft (4,000 sq m)	8 - lbs/in
ASTM D6243	GCL Hydrated Internal Shear Strength	1,000,000 sq ft	500 - psf
ASTM D5993	Bentonite Mass/Area	40,000 sq ft (4,000 sq m)	.75 - lbs/sq ft

All tensile testing is in the machine direction using ASTM D 6768. All peel strength testing is performed using ASTM D 6496. An "*" indicates non-standard testing, frequency, or certified value .

NEEDLE DETECTION AND REMOVAL PROCEDURE

CETCO® hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO® certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively affect the performance of the final product.

Sincerely,

NICHOLLS, RYAN J
Quality Assurance Coordinator
CETCO® Lovell Plant

GCL PACKING LIST AND MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 55101445

GCL								GEOTEXTILE			CLAY
BENTOMAT® DN-8 LB								01-9514	01-8991		CG 50-BLK
Order	GCL Lot#	GCL Roll#	Length	Width	Weight	Sq. ft	Roll # Tested	Cap1 Roll #	Base1 Roll #		Clay Lot #
55101445	LL-35-2025	562	150	14.5	2850	2175	562	700496947	700500061		L-232-25-B
55101445	LL-35-2025	563	150	14.5	3105	2175	562	700496947	700500061		L-232-25-B
55101445	LL-35-2025	564	150	14.5	3020	2175	562	700496947	700500061		L-232-25-B
55101445	LL-35-2025	565	150	14.5	2960	2175	562	700496947	700500061		L-232-25-B
55101445	LL-35-2025	566	150	14.5	3005	2175	562	700496947	700500061		L-232-25-B
55101445	LL-35-2025	567	150	14.5	3070	2175	562	700496947	700500061		L-232-25-B
55101445	LL-35-2025	568	150	14.5	3010	2175	562	700496947	700500061		L-232-25-B
55101445	LL-35-2025	569	150	14.5	3050	2175	562	700497050	700500101		L-232-25-B
55101445	LL-35-2025	570	150	14.5	3045	2175	562	700497050	700500101		L-232-25-B
55101445	LL-35-2025	571	150	14.5	3020	2175	562	700497050	700500101		L-232-25-B
55101445	LL-35-2025	572	150	14.5	3030	2175	562	700497050	700500101		L-232-25-B
55101445	LL-35-2025	573	150	14.5	3090	2175	562	700497050	700500101		L-232-25-B
55101445	LL-35-2025	574	150	14.5	3020	2175	562	700497050	700500101		L-232-25-B
55101445	LL-35-2025	575	150	14.5	3100	2175	562	700497050	700500101		L-232-25-B
55101445	LL-35-2025	576	150	14.5	2975	2175	576	700496731	700500005		L-232-25-C
55101445	LL-35-2025	577	150	14.5	2960	2175	576	700496731	700500005		L-232-25-C
55101445	LL-35-2025	578	150	14.5	2965	2175	576	700496731	700500005		L-232-25-C
55101445	LL-35-2025	579	150	14.5	2965	2175	576	700496731	700500005		L-232-25-C
55101445	LL-35-2025	580	150	14.5	2955	2175	576	700496731	700500005		L-232-25-C
55101445	LL-35-2025	581	150	14.5	2975	2175	576	700496688	700500005		L-232-25-C
55101445	LL-35-2025	582	150	14.5	2980	2175	576	700496688	700500005		L-232-25-C
55101445	LL-35-2025	583	150	14.5	2975	2175	576	700496688	700500005		L-232-25-C
55101445	LL-35-2025	584	150	14.5	3015	2175	576	700496688	700500005		L-232-25-C
55101445	LL-35-2025	585	150	14.5	2965	2175	576	700496688	700500005		L-232-25-C
55101445	LL-35-2025	586	150	14.5	2990	2175	576	700496688	700500005		L-232-25-C
55101445	LL-35-2025	587	150	14.5	2990	2175	576	700496688	700500051		L-232-25-C
55101445	LL-35-2025	588	150	14.5	2965	2175	576	700496688	700500051		L-232-25-C
55101445	LL-35-2025	589	150	14.5	2970	2175	576	700496732	700500051		L-232-25-C
55101445	LL-35-2025	590	150	14.5	2925	2175	576	700496732	700500051		L-232-25-C

55101445	LL-35-2025	591	150	14.5	2950	2175	576	700496732	700500051		L-232-25-C
55101445	LL-35-2025	592	150	14.5	2910	2175	576	700496732	700500051		L-232-25-C
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55101445	LL-35-2025	599	150	14.5	2930	2175	594	700496696	700500016		L-232-25-C
55101445	LL-35-2025	600	150	14.5	2955	2175	594	700496696	700500016		L-232-25-C
55101445	LL-35-2025	601	150	14.5	2945	2175	594	700496696	700500016		L-232-25-C
55101445	LL-35-2025	602	150	14.5	2935	2175	594	700496696	700500016		L-232-25-C
55101445	LL-35-2025	603	150	14.5	2920	2175	594	700496696	700500016		L-232-25-C
55101445	LL-35-2025	604	150	14.5	2925	2175	594	700496696	700500016		L-232-25-C
55101445	LL-35-2025	605	150	14.5	2960	2175	594	700496696	700500053		L-232-25-C
55101445	LL-35-2025	606	150	14.5	2960	2175	594	700497042	700500053		L-232-25-D
55101445	LL-35-2025	607	150	14.5	2865	2175	594	700497042	700500053		L-232-25-D
55101445	LL-35-2025	608	150	14.5	2935	2175	594	700497042	700500053		L-232-25-D
55101445	LL-35-2025	609	150	14.5	2950	2175	594	700497042	700500053		L-232-25-D
55101445	LL-35-2025	610	150	14.5	2965	2175	594	700497042	700500053		L-232-25-D
55101445	LL-35-2025	611	150	14.5	2905	2175	594	700497042	700500053		L-232-25-D
55101445	LL-35-2025	612	150	14.5	2940	2175	612	700497042	700500065		L-232-25-D
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55101445	LL-35-2025	614	150	14.5	2965	2175	612	700497042	700500065		L-232-25-D
55101445	LL-35-2025	615	150	14.5	2925	2175	612	700496701	700500065		L-232-25-D
55101445	LL-35-2025	616	150	14.5	2885	2175	612	700496701	700500065		L-232-25-D
55101445	LL-35-2025	617	150	14.5	2915	2175	612	700496701	700500065		L-232-25-D
55101445	LL-35-2025	618	150	14.5	2900	2175	612	700496701	700500065		L-232-25-D
55101445	LL-35-2025	619	150	14.5	2915	2175	612	700496701	700500065		L-232-25-D
55101445	LL-35-2025	620	150	14.5	2940	2175	612	700496701	700500065		L-232-25-D
55101445	LL-35-2025	621	150	14.5	2935	2175	612	700496701	700500065		L-232-25-D
55101445	LL-35-2025	622	150	14.5	2775	2175	612	700496701	700500065		L-232-25-D
55101445	LL-35-2025	623	150	14.5	3000	2175	612	700496713	700500055		L-232-25-D
55101445	LL-35-2025	624	150	14.5	3020	2175	612	700496713	700500055		L-232-25-D
55101445	LL-35-2025	625	150	14.5	2960	2175	612	700496713	700500055		L-232-25-D
55101445	LL-35-2025	626	150	14.5	2940	2175	612	700496713	700500055		L-232-25-D
55101445	LL-35-2025	627	150	14.5	2920	2175	612	700496713	700500055		L-232-25-D
55101445	LL-35-2025	628	150	14.5	2940	2175	612	700496713	700500055		L-232-25-D
55101445	LL-35-2025	629	150	14.5	2970	2175	612	700496713	700500055		L-232-25-D
55101445	LL-36-2025	630	150	14.5	2910	2175	630	700497053	700500017		L-238-25-C

55101445	LL-36-2025	631	150	14.5	2945	2175	630	700497053	700500017		L-238-25-C
55101445	LL-36-2025	632	150	14.5	2910	2175	630	700497053	700500017		L-238-25-C
55101445	LL-36-2025	633	150	14.5	2895	2175	630	700497053	700500017		L-238-25-C
55101445	LL-36-2025	634	150	14.5	2925	2175	630	700497053	700500017		L-238-25-C
55101445	LL-36-2025	635	150	14.5	2960	2175	630	700497053	700500017		L-238-25-C
55101445	LL-36-2025	636	150	14.5	2970	2175	630	700497053	700500017		L-238-25-C
55101445	LL-36-2025	637	150	14.5	2885	2175	630	700497053	700487758		L-238-25-C
55101445	LL-36-2025	638	150	14.5	2960	2175	630	700497053	700487758		L-238-25-C
55101445	LL-36-2025	639	150	14.5	2900	2175	630	700496726	700487758		L-238-25-C
55101445	LL-36-2025	640	150	14.5	2935	2175	630	700496726	700487758		L-238-25-C
55101445	LL-36-2025	641	150	14.5	2970	2175	630	700496726	700487758		L-238-25-C
55101445	LL-36-2025	642	150	14.5	2980	2175	630	700496726	700487758		L-238-25-C
55101445	LL-36-2025	643	150	14.5	2875	2175	630	700496726	700487758		L-238-25-C
Total Sq Ft:						17835 0		Total Number of Rolls Certified: 82			

GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 55101445 have been tested in our production facility lab.

Product	Lot# Tested	Roll# Tested	Mass Area	Grab Strength	Peel Strength			
ASTM Test Method:			ASTM D5993	ASTM D6768	ASTM D6496			
Required Value:			.75 - lbs/sq ft	50 - lbs/in	8 - lbs/in			
BENTOMAT® DN-8 LB	LL-35-2025	562	.85	72.4	14.5			
BENTOMAT® DN-8 LB	LL-35-2025	576	.89	65.1	8.7			
BENTOMAT® DN-8 LB	LL-35-2025	594	.9	65.1	11.3			
BENTOMAT® DN-8 LB	LL-35-2025	612	.87	65.1	12.5			
BENTOMAT® DN-8 LB	LL-36-2025	630	.89	50	12.4			

BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 55101445 was tested in our production facility lab and yielded the following results.

Clay Lot #	Moist	Swell	Fluid Loss
ASTM Test Method:	ASTM D2216	ASTM D5890	ASTM D5891
Required Value:	12 - %	24 - ml	18 - ml
L-232-25-B	10	28	12.4
L-232-25-C	9.9	30	13
L-232-25-D	8.5	29	10.4
L-238-25-C	10.1	27	12.6

GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 55101445 was manufactured with geotextiles which were tested and yielded the following results.

BASE GEOTEXTILE			
Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
01-8991	700500061	6.19	204
01-8991	700500101	6.48	214
01-8991	700500005	6.52	176
01-8991	700500051	6.29	203
01-8991	700500016	6.25	200
01-8991	700500053	6.23	183
01-8991	700500065	6.36	201
01-8991	700500055	6.46	220
01-8991	700500017	6.27	189
01-8991	700487758	6.46	208

COVER GEOTEXTILE			
Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
01-9514	700496947	6.79	88
01-9514	700497050	6.27	94
01-9514	700496731	6.35	101
01-9514	700496688	6.87	90
01-9514	700496732	6.35	101
01-9514	700496696	6.48	89
01-9514	700497042	6.38	84
01-9514	700496701	6.36	98
01-9514	700496713	6.21	134
01-9514	700497053	6.58	151
01-9514	700496726	6.46	96

Certifications from our suppliers are on file at our production facility.



Colloid Environmental Technologies Company LLC

PRODUCT CERTIFICATIONS

PROJECT NAME:
 CUSTOMER P.O.: C-6315
 ORDER NUMBER: 55101445
 PREPARED FOR: NORTHWEST LININGS

The GCL Manufactured for the above-referenced order number is certified to meet the values listed in the tables below:

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT® DN-8 LB

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D5887	GCL-Hydraulic Conductivity	250,000 sq ft	5x10-9 - cm/s
ASTM D5887	GCL-Index Flux	250,000 sq ft	1x10-8 - m3/m2/s

Product	Lot# Tested	Roll# Tested	Index Flux	Hydraulic Conductivity				
ASTM Test Method:			ASTM D5887	ASTM D5887				
Required Value:			1x10-8 m3/m2/s	5x10-9 cm/s				
BENTOMAT® DN-8 LB	LL-21-2025	457	8.0x10-9	3.8x10-9				
BENTOMAT® DN-8 LB	LL-35-2025	571	7.3x10-9	3.0x10-9				
BENTOMAT® DN-8 LB	LL-36-2025	630	5.9x10-9	2.7x10-9				

Product : NX165-195
PO : 338226-7-4
BOL : 106142

Material
01-8991



ROLL # ASTM METHOD UNITS TARGET	ROLL WIDTH INCHES	ROLL LENGTH FEET	WEIGHT* D5261 oz/sq yd 6.00	Thickness D5199 lbs. 40	MD TENSILE D4632 lbs. 145	MD ELONG D4632 % 50	XMD TENSILE D4632 lbs 145	XMD ELONG D4632 % 50	CBR PUNCTURE D6241 lbs. 425
700487757	195	1650	6.47	44	205	58	201	74	616
700487758	195	1650	6.46	40	208	57	210	75	632
700487759	195	1650	6.46	40	208	57	210	75	632
700500003	195	1650	6.81	52	229	61	168	73	523
700500007	195	1650	6.24	51	181	74	179	73	600
700500008	195	1650	6.24	51	181	74	179	73	600
700500009	195	1650	6.36	59	193	65	171	71	494
700500010	195	1650	6.36	59	193	65	171	71	494
700500011	195	1650	6.34	50	177	71	165	70	585
700500012	195	1650	6.34	50	177	71	165	70	585
700500013	195	1650	6.16	49	204	65	183	73	532
700500015	195	1650	6.25	49	200	65	179	74	618
700500016	195	1650	6.25	49	200	65	179	74	618
700500017	195	1650	6.27	46	189	61	178	76	550
700500021	195	1650	6.13	49	205	65	178	73	510
700500022	195	1650	6.13	49	205	65	178	73	510
700500023	195	1650	6.20	48	212	64	180	72	582
700500024	195	1650	6.20	48	212	64	180	72	582
700500025	195	1650	6.59	41	214	63	193	73	634
700500026	195	1650	6.59	41	214	63	193	73	634
700500028	195	1650	6.32	40	221	63	179	70	531
700500032	195	1650	6.16	47	202	57	153	70	512
700500033	195	1650	6.66	40	215	53	176	84	584
700500034	195	1650	6.66	40	215	53	176	84	584
700500035	195	1650	6.32	49	216	57	180	87	589
700500036	195	1650	6.32	49	216	57	180	87	589
700500037	195	1650	6.20	49	209	55	163	90	458
700500038	195	1650	6.20	49	209	55	163	90	458
700500045	195	1650	6.34	41	200	56	181	87	587
700500046	195	1650	6.34	41	200	56	181	87	587
700500047	195	1650	6.35	40	195	61	190	85	492
700500048	195	1650	6.35	40	195	61	190	85	492
700500066	195	1650	6.36	46	200	59	184	89	606

Product : NX165-195

Material
01-8991



ROLL # ASTM METHOD UNITS TARGET	ROLL WIDTH INCHES	ROLL LENGTH FEET	WEIGHT* D5261 oz/sq yd 6.00	Thickness D5199 lbs. 40	MD TENSILE D4632 lbs. 145	MD ELONG D4632 % 50	XMD TENSILE D4632 lbs 145	XMD ELONG D4632 % 50	CBR PUNCTURE D6241 lbs. 425
700500005	195	1650	6.52	55	176	74	190	75	523
700500006	195	1650	6.52	55	176	74	190	75	523
700500014	195	1650	6.16	49	204	65	183	73	532
700500018	195	1650	6.27	46	189	61	178	76	550
700500019	195	1650	6.91	49	204	62	170	72	535
700500020	195	1650	6.91	49	204	62	170	72	535
700500027	195	1650	6.32	40	221	63	179	70	531
700500029	195	1650	6.22	48	201	60	181	75	510
700500030	195	1650	6.22	48	201	60	181	75	510
700500031	195	1650	6.16	47	202	57	153	70	512
700500039	195	1650	6.32	48	218	56	172	89	576
700500040	195	1650	6.32	48	218	56	172	89	576
700500041	195	1650	6.18	45	192	53	175	86	535
700500042	195	1650	6.18	45	192	53	175	86	535
700500043	195	1650	6.29	41	193	60	171	84	559
700500044	195	1650	6.29	41	193	60	171	84	559
700500050	195	1650	6.34	41	200	56	181	87	587
700500051	195	1650	6.29	49	203	57	184	88	512
700500052	195	1650	6.29	49	203	57	184	88	512
700500053	195	1650	6.23	49	183	54	175	87	503
700500054	195	1650	6.23	49	183	54	175	87	503
700500055	195	1650	6.46	48	220	55	184	83	559
700500056	195	1650	6.46	48	220	55	184	83	559
700500057	195	1650	6.78	45	193	54	157	87	499
700500058	195	1650	6.78	45	193	54	157	87	499
700500059	195	1650	6.75	44	182	61	171	81	489
700500060	195	1650	6.75	44	182	61	171	81	489
700500061	195	1650	6.19	47	204	53	180	89	508
700500062	195	1650	6.19	47	204	53	180	89	508
700500063	195	1650	6.25	49	206	55	171	83	595
700500064	195	1650	6.25	49	206	55	171	83	595
700500065	195	1650	6.36	46	201	59	184	89	606
700500101	195	1650	6.48	51	214	67	198	75	581

BOL : 106496
PO : 338226-9-16

Product : SP165CC-192

Material
01-9514



ROLL# ASTM Method Units TARGET	ROLL # WIDTH INCHES	ROLL # LENGTH FEET	Weight D5261 oz/syd 6.00	Grab Tensile MD D4632 lbs 45	Elongation MD D4632 % 90	Grab Tensile XMD D4632 lbs 45	Elongation XMD D4632 % 90	Puncture D4833 lbs 50	CBR PUNCTURE D6241 lbs. 250	Thickness D5199 (mils) 92	Weight to Thickness Ratio
700487591	192	1250	6.29	91	119	118	120	77	340	100	63
700496928	192	1250	6.18	96	149	129	147	72	331	105	60
700496930	192	1250	6.31	87	128	130	128	63	334	104	59
700496931	192	1250	6.31	87	128	130	128	63	334	104	59
700496936	192	1250	6.55	78	125	139	95	57	428	104	67
700496938	192	1250	6.55	78	125	139	95	57	428	104	67
700496940	192	1250	6.32	88	120	132	119	67	321	104	63
700496944	192	1250	6.41	88	128	115	125	58	390	99	64
700496947	192	1250	6.79	86	132	111	122	59	399	99	65
700496984	192	1250	6.20	100	125	130	120	73	306	102	61
700496985	192	1250	6.20	100	125	130	120	73	306	102	61
700496986	192	1250	6.20	100	125	130	120	73	306	102	61
700496987	192	1250	6.61	102	121	126	117	63	271	105	59
700496992	192	1250	6.47	99	120	138	126	55	385	100	66
700496993	192	1250	6.64	107	123	156	132	61	384	108	60
700496994	192	1250	6.64	107	123	156	132	61	384	108	60
700496995	192	1250	6.64	107	123	156	132	61	384	108	60
700496998	192	1250	6.88	83	121	113	120	59	365	105	63
700496999	192	1250	6.58	108	122	172	124	62	374	107	64
700497001	192	1250	6.58	108	122	172	124	62	374	107	64
700497002	192	1250	6.22	132	124	133	114	70	366	105	63
700497024	192	1250	6.44	96	115	156	131	62	321	100	63
700497044	192	1250	6.41	100	127	141	135	62	370	103	62
700497045	192	1250	6.41	100	127	141	135	62	370	103	62
700497049	192	1250	6.30	101	140	171	130	55	439	101	63
700497050	192	1250	6.27	94	124	136	129	64	386	101	62
700497051	192	1250	6.27	94	124	136	129	64	386	101	62

BOL : 106523
PO : 338226-9-18

Product : SP165CC-192

Material
01-9514



ROLL# ASTM Method Units TARGET	ROLL # WIDTH INCHES	ROLL # LENGTH FEET	Weight D5261 oz/syd 6.00	Grab Tensile MD D4632 lbs 45	Elongation MD D4632 % 90	Grab Tensile XMD D4632 lbs 45	Elongation XMD D4632 % 90	Puncture D4833 lbs 50	CBR PUNCTURE D6241 lbs. 250	Thickness D5199 (mils) 92	Weight to Thickness Ratio
700496688	192	1250	6.87	90	140	104	131	79	295	108	61
700496689	192	1250	6.63	105	122	142	124	79	380	107	64
700496693	192	1250	6.33	99	127	156	126	77	413	106	63
700496696	192	1250	6.48	89	125	153	127	77	362	93	68
700496697	192	1250	6.48	89	125	153	127	77	362	93	68
700496698	192	1250	6.24	112	117	139	134	77	333	107	61
700496701	192	1250	6.36	98	130	129	138	87	409	105	59
700496702	192	1250	6.36	98	130	129	138	87	409	105	59
700496703	192	1250	6.36	98	130	129	138	87	409	105	59
700496710	192	1250	6.26	91	114	129	121	70	354	103	60
700496712	192	1250	6.26	91	114	129	121	70	354	103	60
700496713	192	1250	6.21	134	113	174	128	80	356	106	59
700496715	192	1250	6.21	134	113	174	128	80	356	106	59
700496718	192	1250	6.44	98	124	145	114	80	377	100	62
700496720	192	1250	6.45	96	126	148	123	72	380	101	64
700496722	192	1250	6.54	90	122	130	132	80	360	102	63
700496725	192	1250	6.46	96	123	148	125	82	403	94	70
700496726	192	1250	6.46	96	123	148	125	82	403	94	70
700496727	192	1250	6.46	96	123	148	125	82	403	94	70
700496728	192	1250	6.40	83	128	124	126	75	311	92	70
700496731	192	1250	6.35	101	123	125	128	84	287	99	65
700496732	192	1250	6.35	101	123	125	128	84	287	99	65
700496733	192	1250	6.35	101	123	125	128	84	287	99	65
700496734	192	1250	6.55	104	125	158	129	87	359	95	67
700496922	192	1250	6.44	78	127	110	131	71	255	115	56
700496924	192	1250	6.33	132	130	117	126	63	298	103	63
700497042	192	1250	6.38	84	116	110	113	72	339	102	63

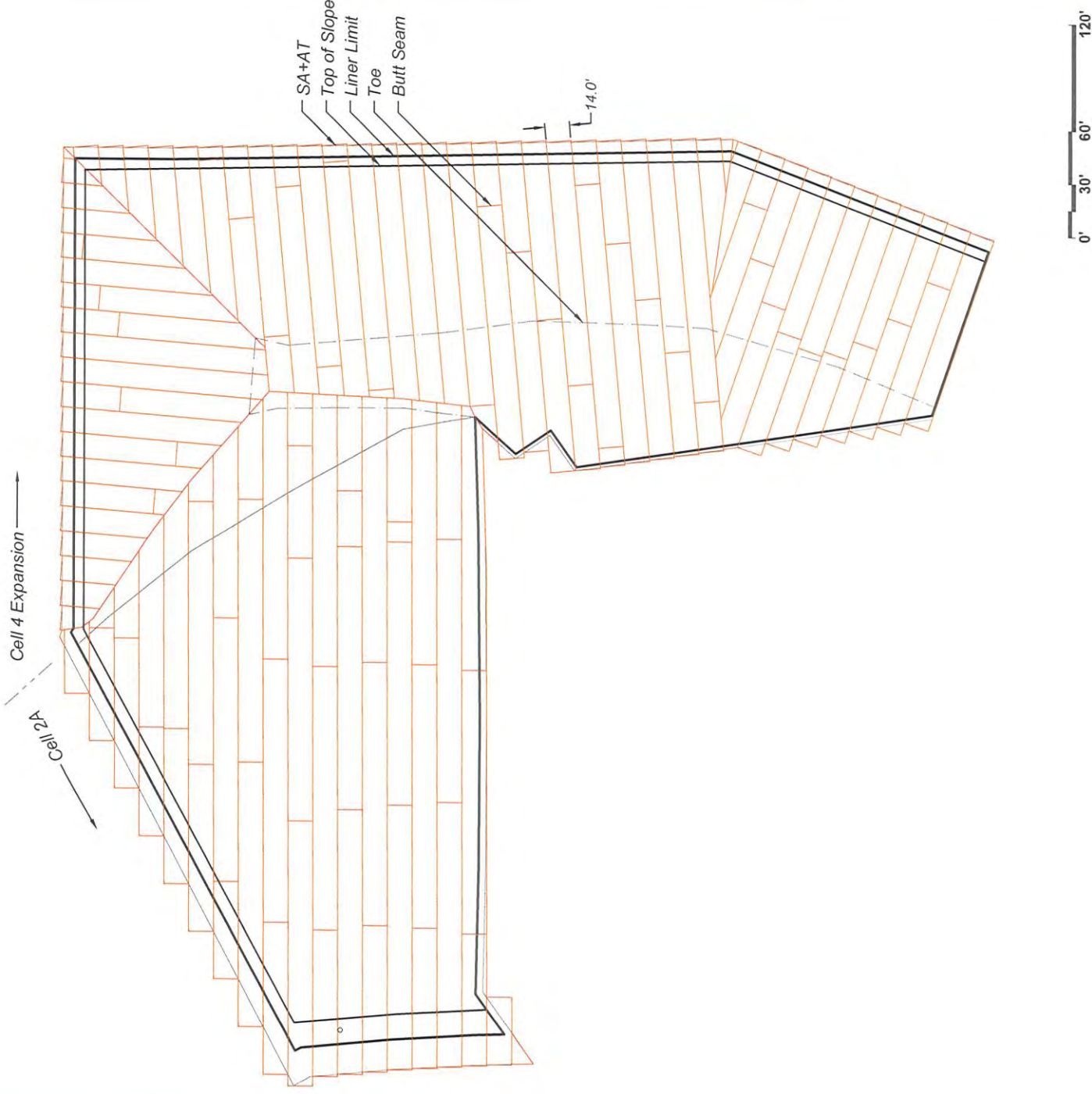
BOL : 106517
PO : 338226-9-19

Product : SP165CC-192

Material
01-9514



ROLL# ASTM Method Units TARGET	ROLL # WIDTH INCHES	ROLL # LENGTH FEET	Weight D5261 oz/syd 6.00	Grab Tensile MD D4632 lbs 45	Elongation MD D4632 % 90	Grab Tensile XMD D4632 lbs 45	Elongation XMD D4632 % 90	Puncture D4833 lbs 50	CBR PUNCTURE D6241 lbs. 250	Thickness D5199 (mils) 92	Weight to Thickness Ratio
700496706	192	1250	6.56	97	125	133	131	83	398	107	59
700496714	192	1250	6.21	134	113	174	128	80	356	106	59
700496723	192	1250	6.54	90	122	130	132	80	360	102	63
700496943	192	1250	6.41	88	128	115	125	58	390	99	64
700496945	192	1250	6.79	86	132	111	122	59	399	99	65
700496955	192	1250	6.28	88	121	123	126	68	284	104	67
700496958	192	1250	6.22	93	134	132	132	72	301	104	60
700496959	192	1250	6.22	93	134	132	132	72	301	104	60
700496962	192	1250	6.79	84	129	90	140	60	350	105	59
700496982	192	1250	6.20	93	117	128	125	63	299	102	64
700496983	192	1250	6.20	93	117	128	125	63	299	102	64
700496996	192	1250	6.88	83	121	113	120	59	365	105	63
700496997	192	1250	6.88	83	121	113	120	59	365	105	63
700497009	192	1250	6.97	85	117	137	135	72	365	108	59
700497010	192	1250	6.97	85	117	137	135	72	365	108	59
700497021	192	1250	6.30	95	100	126	126	61	340	103	66
700497022	192	1250	6.30	95	100	126	126	61	340	103	66
700497023	192	1250	6.44	96	115	156	131	62	321	100	63
700497039	192	1250	6.45	89	127	142	114	56	325	107	60
700497040	192	1250	6.45	89	127	142	114	56	325	107	60
700497041	192	1250	6.38	84	116	110	113	72	339	102	63
700497043	192	1250	6.38	84	116	110	113	72	339	102	63
700497046	192	1250	6.41	100	127	141	135	62	370	103	62
700497047	192	1250	6.30	101	140	171	130	55	439	101	63
700497048	192	1250	6.30	101	140	171	130	55	439	101	63
700497052	192	1250	6.27	94	124	136	129	64	386	101	62
700497053	192	1250	6.58	151	125	161	124	74	436	104	60



note: exact number, position and sequence of panel installation will be determined in the field by the nwl site supervisor.

Matanuska-Susitna Borough Central Landfill Cell 4 Expansion
Proposed Bentomat DN GCL Panel Layout

SHEET NO.

1 of 2

DETAIL



**NORTHWEST LININGS &
GEOTEXTILE PRODUCTS, Inc.**

www.northwestlinings.com
21000 77TH AVE. SOUTH
KENT, WA. 98032
(253) 872-0244 (253) 872-0245 FAX

JOB NAME:

Matanuska-Susitna Borough Central Landfill
Cell 4 Expansion

JOB NO.

N 2 5 2 1 1

DATE:

9 3 25
rev 9 10 25

CHECKED:

SK

BY:

TS

SCALE:

AS SHOWN



CETCO LIMITED WARRANTY

Project Name:	Mat-Su Borough Palmer Central Landfill Cell 4 Expansion
Location:	Palmer, AK
Owner:	Matanuska-Susitna Borough. 350 East Daliah Ave., Palmer, AK 99645
Certificate Number:	025011
Effective Date:	10/10/2025

LIMITED WARRANTY. Subject to the terms and conditions set forth below, Colloid Environmental Technologies Company ("CETCO") warrants to the owner of the construction project identified above (Mat-Su Borough Palmer Central Landfill Cell 4 Expansion) that the geosynthetic clay liner product supplied by CETCO (Bentomat® DN) will at the time of delivery by CETCO be free from defects in material.

CLAIMS. The foregoing warranty shall remain in effect for a period of ten (10) years from the "Effective Date" specified above. During the Warranty Period, CETCO will replace or, at its option refund the purchase price for, any Products failing to meet the foregoing warranty. Any claim by Owner for any claimed defect hereunder for any cause shall be deemed waived by Owner unless submitted to CETCO in writing within thirty (30) days from the date Owner discovers, or should have discovered any claimed breach.

EXCLUSIONS. CETCO shall have no liability for breach of the warranty caused by (A) accident, neglect, abuse or mishandling of the Product, including failure of Owner to use reasonable care in maintaining or storing the Product; or (B) natural occurrences and acts of God, including without limitation, earthquakes, floods, piercing hail, tornadoes or explosions.

LIMITATIONS. THE FOREGOING WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES NOT EXPRESSLY SET FORTH HEREIN, WHETHER EXPRESSED OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. CETCO does not authorize any person, including its representatives, to make any representations or warranty, condition or guaranty other than this warranty. Without limitation to the foregoing, any warranty concerning workmanship or non-CETCO materials provided by the installing contractor of the Product or any other subsequent contractor performing work on or to the Product is enforceable against such contractor, and is not provided by, and is not enforceable against, CETCO. Notwithstanding anything to the contrary, no requests, solicitations, or documentation submitted by owner or others, including but not limited to purchase orders, bid proposals, or specifications, may alter or take precedence over this Warranty. Any deviations from the terms of this Warranty are not effective unless separately and specifically negotiated and reduced to a writing signed by a CETCO official with authority to bind CETCO.

UNDER NO CIRCUMSTANCES SHALL CETCO BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSSES OR EXPENSES, WHETHER ARISING DIRECTLY OR INDIRECTLY FROM THE FAILURE OF ANY PRODUCT TO PERFORM AS WARRANTED OR FROM ANY OTHER CAUSE WHATSOEVER, WHETHER SUCH CLAIM IS BASED ON BREACH OF WARRANTY, BREACH OF CONTRACT, NEGLIGENCE, STRICT LIABILITY OR ANY OTHER LEGAL THEORY. **CETCO's LIABILITY HEREUNDER SHALL IN ANY CASE BE LIMITED TO THE COST OF REPLACEMENT (IN THE FORM ORIGINALLY SHIPPED) OF DEFECTIVE PRODUCTS, OR, AT CETCO'S ELECTION, THE REPAYMENT OF OR CREDITING TO OWNER OF AN AMOUNT EQUAL TO THE PURCHASE PRICE OF SUCH PRODUCTS.** The foregoing states the sole and exclusive liability of CETCO and the sole and exclusive remedy of Owner.

MISCELLANEOUS. CETCO's failure at any time to enforce or rely upon any of the terms of conditions stated herein should not be construed to be a waiver of its rights hereunder. This warranty may not be assigned without the prior written approval of CETCO. This warranty shall be interpreted in accordance with the internal laws of the State of Illinois, without regard to the provisions concerning the conflicts of laws.

BURNS & MCDONNELL ENGINEERING CO., INC.

GCL MATERIAL RECEIVED LOG

Client:	MatSu Borough Central Landfill
Project Location:	1201 N 49th State St., Palmer AK 99645
Project Number:	190062
Contractor:	Southcentral Construction, Inc.
Supplier:	CETCO Environmental Products
Installer:	Northwest Linings & Geotextile Products, Inc.
CQA Monitor:	Becca Heaman

Date Recvd.	Roll No.	Roll Size			Docs QC	Date	Material	Lot/Batch
		W (ft)	L (ft)	Sq. Ft.				
9/25/2025	562	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/29/2025	563	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/29/2025	564	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/29/2025	565	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/29/2025	566	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	567	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/29/2025	568	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/29/2025	569	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	570	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/29/2025	571	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/29/2025	572	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/29/2025	573	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/29/2025	574	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/29/2025	575	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	576	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	577	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	578	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	579	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	580	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	581	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	582	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/24/2025	583	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	584	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	585	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	586	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	587	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/24/2025	588	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	589	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/24/2025	590	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	591	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/24/2025	592	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/24/2025	593	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/24/2025	594	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	595	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	596	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/24/2025	597	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/24/2025	598	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	599	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	600	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/24/2025	601	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/24/2025	602	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/24/2025	603	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/24/2025	604	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	605	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	606	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	607	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	608	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	609	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/24/2025	610	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	611	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	612	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	613	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	614	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	615	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/24/2025	616	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	617	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	618	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	619	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	620	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	621	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	622	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	623	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	624	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	625	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	626	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	627	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/24/2025	628	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	629	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/29/2025	630	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	631	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	632	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	633	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/24/2025	634	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	635	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	636	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	637	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	638	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	639	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	640	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	641	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	642	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025
9/25/2025	643	14.5	150	2175	9/8/2025	2025	Bentomat DN-8 LB (GCL)	LL-35-2025

Client:	MatSu Borough Central Landfill
Project Location:	1201 N 49th State St., Palmer AK 99645
Project Number:	190062
Contractor:	Southcentral Construction, Inc.
Supplier:	CETCO Environmental Products
Installer:	Northwest Linings & Geotextile Products, Inc.
CQA Monitor:	Becca Heaman

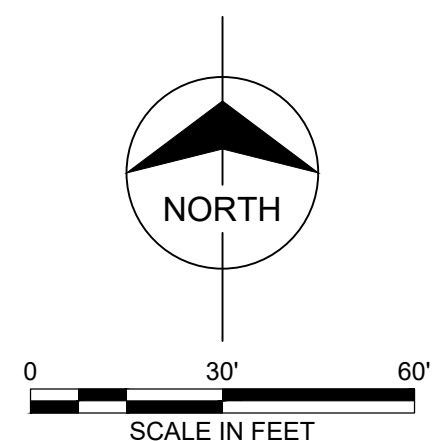
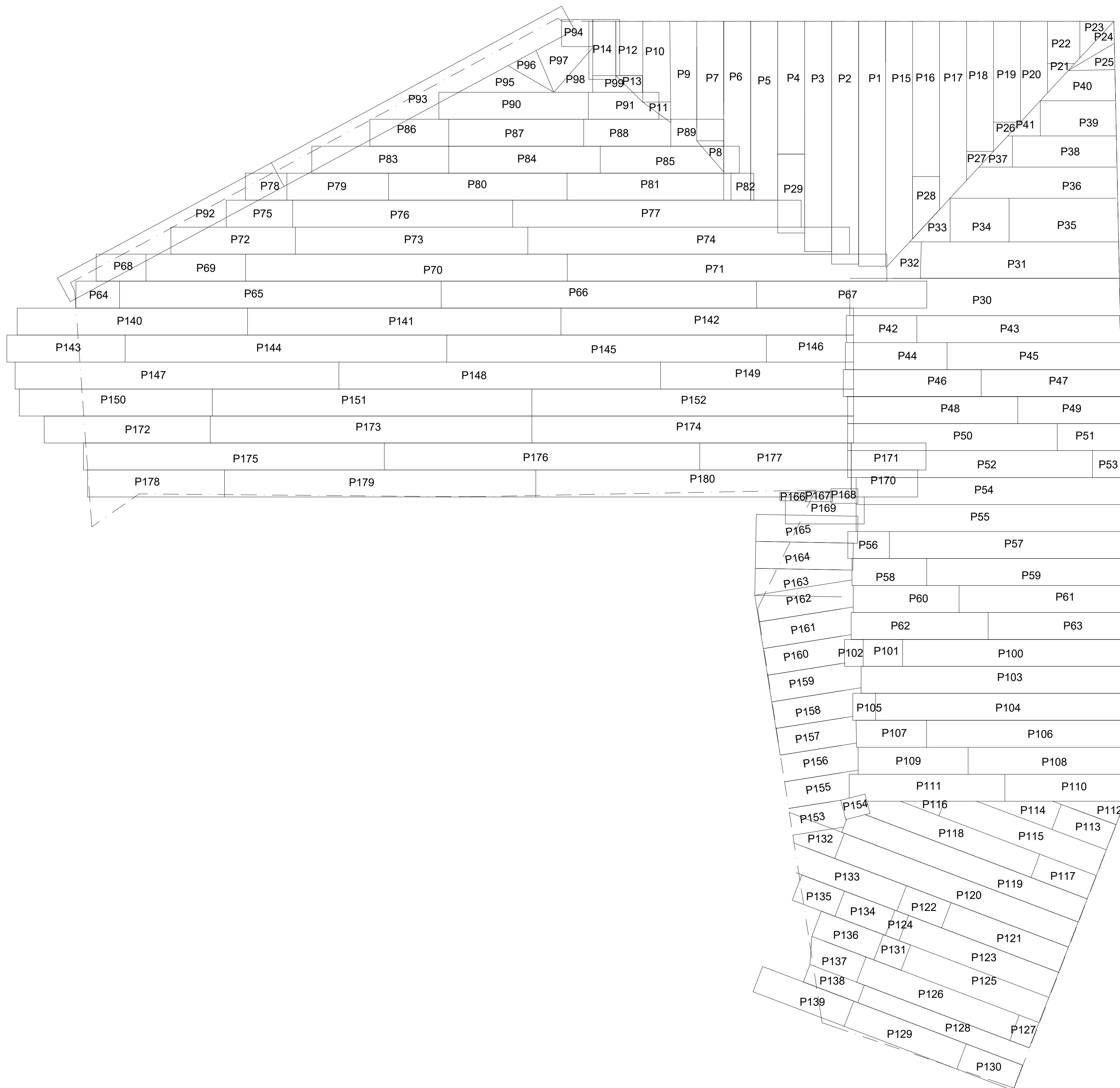
Panel #	Roll #	Date Placed	Panel W (ft)	L (ft)	Panel Area (sf)	Material Type
P001	626	9/28/2025	14.5	118	1,711.0	Bentomat DN-8 LB (GCL)
P002	633	9/28/2025	14.5	117	1,696.5	Bentomat DN-8 LB (GCL)
P003	608	9/28/2025	14.5	111	1,609.5	Bentomat DN-8 LB (GCL)
P004	567	9/28/2025	14.5	64	928.0	Bentomat DN-8 LB (GCL)
P005	567	9/28/2025	14.5	84	1,218.0	Bentomat DN-8 LB (GCL)
P006	605	9/28/2025	14.5	120	1,740.0	Bentomat DN-8 LB (GCL)
P007	579	9/28/2025	14.5	39	565.5	Bentomat DN-8 LB (GCL)
P008	605	9/28/2025	14.5	15 (triangle)	108.8	Bentomat DN-8 LB (GCL)
P009	579	9/28/2025	14.5	39	565.5	Bentomat DN-8 LB (GCL)
P010	583?590?610?	9/28/2025	14.5	30	435.0	Bentomat DN-8 LB (GCL)
P011	605	9/28/2025	14.5	18 (sub triangle)	221.0	Bentomat DN-8 LB (GCL)
P012	633	9/28/2025	14.5	33	478.5	Bentomat DN-8 LB (GCL)
P013	605	9/28/2025	8	10 (triangle)	40.0	Bentomat DN-8 LB (GCL)
P014	579	9/28/2025	14.5	28	406.0	Bentomat DN-8 LB (GCL)
P015	583?590?610?	9/28/2025	14.5	120	1,740.0	Bentomat DN-8 LB (GCL)
P016	579	9/28/2025	14.5	83	1,203.5	Bentomat DN-8 LB (GCL)
P017	577	9/28/2025	14.5	90 (sub triangle)	-116.0	Bentomat DN-8 LB (GCL)
P018	603	9/28/2025	14.5	110	1,595.0	Bentomat DN-8 LB (GCL)
P019	611	9/28/2025	14.5	80	1,160.0	Bentomat DN-8 LB (GCL)
P100	635	10/1/2025	14.5	109	1,580.5	Bentomat DN-8 LB (GCL)
P101	585	10/1/2025	14.5	19	275.5	Bentomat DN-8 LB (GCL)
P102	629	10/1/2025	14.5	9	130.5	Bentomat DN-8 LB (GCL)
P103	629	10/1/2025	14.5	129	1,870.5	Bentomat DN-8 LB (GCL)
P104	634	10/1/2025	14.5	122	1,769.0	Bentomat DN-8 LB (GCL)
P105	629	10/1/2025	14.5	11	159.5	Bentomat DN-8 LB (GCL)
P106	591	10/1/2025	14.5	98	1,421.0	Bentomat DN-8 LB (GCL)
P107	634	10/1/2025	14.5	34	493.0	Bentomat DN-8 LB (GCL)
P108	609	10/1/2025	14.5	78	1,131.0	Bentomat DN-8 LB (GCL)
P109	591	10/1/2025	14.5	53	768.5	Bentomat DN-8 LB (GCL)
P110	632	10/2/2025	14.5	58	841.0	Bentomat DN-8 LB (GCL)
P111	609	10/2/2025	14.5	75	1,087.5	Bentomat DN-8 LB (GCL)
P112	594	10/2/2025	13	23	299.0	Bentomat DN-8 LB (GCL)
P113	628	10/2/2025	14.5	28	406.0	Bentomat DN-8 LB (GCL)
P114	594	10/2/2025	14.5	24	348.0	Bentomat DN-8 LB (GCL)
P115	594	10/2/2025	14.5	81	1,174.5	Bentomat DN-8 LB (GCL)
P116	632	10/2/2025	9	12	108.0	Bentomat DN-8 LB (GCL)
P117	594	10/2/2025	14.5	29	420.5	Bentomat DN-8 LB (GCL)
P118	632	10/2/2025	14.5	87	1,261.5	Bentomat DN-8 LB (GCL)
P119	628	10/2/2025	14.5	122	1,769.0	Bentomat DN-8 LB (GCL)
P120	589	10/2/2025	14.5	121	1,754.5	Bentomat DN-8 LB (GCL)
P121	599	10/2/2025	14.5	60	870.0	Bentomat DN-8 LB (GCL)
P122	589	10/2/2025	14.5	23	333.5	Bentomat DN-8 LB (GCL)
P123	599	10/2/2025	14.5	77	1,116.5	Bentomat DN-8 LB (GCL)
P124	589	10/2/2025	14.5	7	101.5	Bentomat DN-8 LB (GCL)
P125	602	10/2/2025	14.5	71	1,029.5	Bentomat DN-8 LB (GCL)
P126	602	10/2/2025	14.5	79	1,145.5	Bentomat DN-8 LB (GCL)
P127	592	10/2/2025	14.5	10	145.0	Bentomat DN-8 LB (GCL)
P128	592	10/2/2025	9	85	765.0	Bentomat DN-8 LB (GCL)
P129	592	10/2/2025	14.5	58	841.0	Bentomat DN-8 LB (GCL)
P130	641	10/2/2025	14.5	29	420.5	Bentomat DN-8 LB (GCL)
P131	598	10/2/2025	14.5	14	203.0	Bentomat DN-8 LB (GCL)
P132	598	10/2/2025	14.5	20	290.0	Bentomat DN-8 LB (GCL)
P133	598	10/2/2025	14.5	52	754.0	Bentomat DN-8 LB (GCL)
P134	598	10/2/2025	14.5	26	377.0	Bentomat DN-8 LB (GCL)
P135	616	10/2/2025	14.5	22	319.0	Bentomat DN-8 LB (GCL)
P136	616	10/2/2025	14.5	32	464.0	Bentomat DN-8 LB (GCL)
P137	598	10/2/2025	14.5	22	319.0	Bentomat DN-8 LB (GCL)
P138	616	10/2/2025	9	28	252.0	Bentomat DN-8 LB (GCL)
P139	616	10/2/2025	14.5	47	681.5	Bentomat DN-8 LB (GCL)
P140	568	10/3/2025	14.5	111	1,609.5	Bentomat DN-8 LB (GCL)
P141	630	10/3/2025	14.5	151	2,189.5	Bentomat DN-8 LB (GCL)
P142	574	10/3/2025	14.5	141	2,044.5	Bentomat DN-8 LB (GCL)
P143	573	10/3/2025	14.5	57	826.5	Bentomat DN-8 LB (GCL)
P144	575	10/3/2025	14.5	155	2,247.5	Bentomat DN-8 LB (GCL)
P145	566	10/3/2025	14.5	154	2,233.0	Bentomat DN-8 LB (GCL)

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CQA Monitor:	Becca Heaman

Panel #	Roll #	Date Placed	Panel W (ft)	L (ft)	Panel Area (sf)	Material Type
P146	568	10/3/2025	14.5	42	609.0	Bentomat DN-8 LB (GCL)
P147	572	10/3/2025	14.5	156	2,262.0	Bentomat DN-8 LB (GCL)
P148	565	10/3/2025	14.5	155	2,247.5	Bentomat DN-8 LB (GCL)
P149	573	10/3/2025	14.5	93	1,348.5	Bentomat DN-8 LB (GCL)
P150	569	10/3/2025	14.5	93	1,348.5	Bentomat DN-8 LB (GCL)
P151	571	10/3/2025	14.5	154	2,233.0	Bentomat DN-8 LB (GCL)
P152	563	10/3/2025	14.5	155	2,247.5	Bentomat DN-8 LB (GCL)
P153	582	10/3/2025	14.5	22	319.0	Bentomat DN-8 LB (GCL)
P154	582	10/3/2025	12	6	72.0	Bentomat DN-8 LB (GCL)
P155	569	10/3/2025	14.5	28	406.0	Bentomat DN-8 LB (GCL)
P156	569	10/3/2025	14.5	30	435.0	Bentomat DN-8 LB (GCL)
P157	564	10/3/2025	14.5	33	478.5	Bentomat DN-8 LB (GCL)
P158	564	10/3/2025	14.5	35	507.5	Bentomat DN-8 LB (GCL)
P159	564	10/3/2025	14.5	36	522.0	Bentomat DN-8 LB (GCL)
P160	564	10/3/2025	14.5	38	551.0	Bentomat DN-8 LB (GCL)
P161	582	10/3/2025	14.5	40	580.0	Bentomat DN-8 LB (GCL)
P162	582	10/3/2025	14.5	42	609.0	Bentomat DN-8 LB (GCL)
P163	582	10/3/2025	14.5	42	609.0	Bentomat DN-8 LB (GCL)
P164	584	10/3/2025	14.5	47	681.5	Bentomat DN-8 LB (GCL)
P165	584	10/3/2025	14.5	49	710.5	Bentomat DN-8 LB (GCL)
P166	622	10/3/2025	14.5	4	58.0	Bentomat DN-8 LB (GCL)
P167	622	10/3/2025	14.5	5	72.5	Bentomat DN-8 LB (GCL)
P168	622	10/3/2025	14.5	7	101.5	Bentomat DN-8 LB (GCL)
P169	584	10/3/2025	14.5	38	551.0	Bentomat DN-8 LB (GCL)
P170	584	10/3/2025	14.5	32	464.0	Bentomat DN-8 LB (GCL)
P171	622	10/3/2025	14.5	36	522.0	Bentomat DN-8 LB (GCL)
P172	588	10/6/2025	14.5	80	1,160.0	Bentomat DN-8 LB (GCL)
P173	637	10/6/2025	14.5	155	2,247.5	Bentomat DN-8 LB (GCL)
P174	576	10/3/2025	14.5	155	2,247.5	Bentomat DN-8 LB (GCL)
P175	581	10/6/2025	14.5	145	2,102.5	Bentomat DN-8 LB (GCL)
P176	601	10/6/2025	14.5	152	2,204.0	Bentomat DN-8 LB (GCL)
P177	588	10/6/2025	14.5	73	1,058.5	Bentomat DN-8 LB (GCL)
P178	613	10/6/2025	14.5	66	957.0	Bentomat DN-8 LB (GCL)
P179	606	10/6/2025	14.5	150	2,175.0	Bentomat DN-8 LB (GCL)
P180	618	10/6/2025	14.5	152	2,204.0	Bentomat DN-8 LB (GCL)
P20	611	9/28/2025	14.5	68	986.0	Bentomat DN-8 LB (GCL)
P21	585	9/28/2025	14.5	19 (sub triangle)	166.8	Bentomat DN-8 LB (GCL)
P22	577	9/28/2025	14.5	46	667.0	Bentomat DN-8 LB (GCL)
P23	585	9/28/2025	14.5	36.0	522.0	Bentomat DN-8 LB (GCL)
P24	585	9/28/2025	14.5	35 (sub triangle)	362.5	Bentomat DN-8 LB (GCL)
P25	585	9/28/2025	14.5	20 (triangle)	145.0	Bentomat DN-8 LB (GCL)
P26	585	9/28/2025	14.5	15 (triangle)	108.8	Bentomat DN-8 LB (GCL)
P27	577	9/28/2025	14.5	17 (triangle)	123.3	Bentomat DN-8 LB (GCL)
P28	626	9/28/2025	14.5	30	435.0	Bentomat DN-8 LB (GCL)
P29	608	9/28/2025	14.5	38	551.0	Bentomat DN-8 LB (GCL)
P30	580	9/29/2025	14.5	129	1,870.5	Bentomat DN-8 LB (GCL)
P31	621	9/29/2025	14.5	96	1,392.0	Bentomat DN-8 LB (GCL)
P32	580	9/29/2025	14.5	19 (Triangle)	137.8	Bentomat DN-8 LB (GCL)
P33	580	9/29/2025	14.5	19 (Triangle)	137.8	Bentomat DN-8 LB (GCL)
P34	621	9/29/2025	14.5	53	768.5	Bentomat DN-8 LB (GCL)
P35	595	9/29/2025	14.5	31	449.5	Bentomat DN-8 LB (GCL)
P36	595	9/29/2025	14.5	83 (sub triangle)	1,080.3	Bentomat DN-8 LB (GCL)
P37	595	9/29/2025	14.5	17 (triangle)	123.3	Bentomat DN-8 LB (GCL)
P38	627	9/29/2025	14.5	54	783.0	Bentomat DN-8 LB (GCL)
P39	627	9/29/2025	14.5	50 (sub triangle)	601.8	Bentomat DN-8 LB (GCL)
P40	595	9/29/2025	14.5	31	449.5	Bentomat DN-8 LB (GCL)
P41	627	9/29/2025	14.5	17 (triangle)	123.3	Bentomat DN-8 LB (GCL)
P42	627	9/29/2025	14.5	34	493.0	Bentomat DN-8 LB (GCL)
P43	615	9/29/2025	14.5	98	1,421.0	Bentomat DN-8 LB (GCL)
P44	615	9/29/2025	14.5	49	710.5	Bentomat DN-8 LB (GCL)
P45	607	9/29/2025	14.5	84	1,218.0	Bentomat DN-8 LB (GCL)
P46	607	9/29/2025	14.5	66	957.0	Bentomat DN-8 LB (GCL)
P47	617	9/29/2025	14.5	68	986.0	Bentomat DN-8 LB (GCL)
P48	617	9/29/2025	14.5	82	1,189.0	Bentomat DN-8 LB (GCL)
P49	638	9/29/2025	14.5	51	739.5	Bentomat DN-8 LB (GCL)

Client:	MatSu Borough Central Landfill
Project Location:	1201 N 49th State St., Palmer AK 99645
Project Number:	190062
Contractor:	Southcentral Construction, Inc.
Supplier:	CETCO Environmental Products
Installer:	Northwest Linings & Geotextile Products, Inc.
CQA Monitor:	Becca Heaman

Panel #	Roll #	Date Placed	Panel W (ft)	L (ft)	Panel Area (sf)	Material Type
P50	638	9/29/2025	14.5	101	1,464.5	Bentomat DN-8 LB (GCL)
P51	619	9/29/2025	14.5	32	464.0	Bentomat DN-8 LB (GCL)
P52	619	9/29/2025	14.5	118	1,711.0	Bentomat DN-8 LB (GCL)
P53	639	9/29/2025	14.5	15	217.5	Bentomat DN-8 LB (GCL)
P54	639	9/29/2025	14.5	129	1,870.5	Bentomat DN-8 LB (GCL)
P55	636	9/29/2025	14.5	130	1,885.0	Bentomat DN-8 LB (GCL)
P56	636	9/29/2025	14.5	20	290.0	Bentomat DN-8 LB (GCL)
P57	625	9/29/2025	14.5	114	1,653.0	Bentomat DN-8 LB (GCL)
P58	625	9/29/2025	14.5	36	522.0	Bentomat DN-8 LB (GCL)
P59	624	9/29/2025	14.5	96	1,392.0	Bentomat DN-8 LB (GCL)
P60	624	9/29/2025	14.5	51	739.5	Bentomat DN-8 LB (GCL)
P61	612	9/29/2025	14.5	81	1,174.5	Bentomat DN-8 LB (GCL)
P62	612	9/29/2025	14.5	66	957.0	Bentomat DN-8 LB (GCL)
P63	604	9/29/2025	14.5	67	971.5	Bentomat DN-8 LB (GCL)
P64	635	9/30/2025	14.5	21	304.5	Bentomat DN-8 LB (GCL)
P65	586	9/30/2025	14.5	155	2,247.5	Bentomat DN-8 LB (GCL)
P66	600	9/30/2025	14.5	152	2,204.0	Bentomat DN-8 LB (GCL)
P67	604	9/30/2025	14.5	82	1,189.0	Bentomat DN-8 LB (GCL)
P68	635	9/30/2025	14.5	24 (triangle)	0.0	Bentomat DN-8 LB (GCL)
P69	614	9/30/2025	14.5	48	696.0	Bentomat DN-8 LB (GCL)
P70	623	9/30/2025	14.5	155	2,247.5	Bentomat DN-8 LB (GCL)
P71	562	9/30/2025	14.5	154	2,233.0	Bentomat DN-8 LB (GCL)
P72	614	9/30/2025	14.5	60	870.0	Bentomat DN-8 LB (GCL)
P73	631	9/30/2025	14.5	112	1,624.0	Bentomat DN-8 LB (GCL)
P74	578	9/30/2025	14.5	155	2,247.5	Bentomat DN-8 LB (GCL)
P75	614	9/30/2025	14.5	32	464.0	Bentomat DN-8 LB (GCL)
P76	587	9/30/2025	14.5	106	1,537.0	Bentomat DN-8 LB (GCL)
P77	596	9/30/2025	14.5	139	2,015.5	Bentomat DN-8 LB (GCL)
P78	570	9/30/2025	14.5	20	290.0	Bentomat DN-8 LB (GCL)
P96	603	9/30/2025	13	16	208.0	Bentomat DN-8 LB (GCL)
P80	597	9/30/2025	14.5	86	1,247.0	Bentomat DN-8 LB (GCL)
P81	643	9/30/2025	14.5	79	1,145.5	Bentomat DN-8 LB (GCL)
P82	596	9/30/2025	14.5	11	159.5	Bentomat DN-8 LB (GCL)
P97	603	9/30/2025	12	14	168.0	Bentomat DN-8 LB (GCL)
P84	597	9/30/2025	14.5	73	1,058.5	Bentomat DN-8 LB (GCL)
P85	643	9/30/2025	14.5	67	971.5	Bentomat DN-8 LB (GCL)
P98	603	9/30/2025	13	13	169.0	Bentomat DN-8 LB (GCL)
P87	642	9/30/2025	14.5	65	942.5	Bentomat DN-8 LB (GCL)
P88	631	9/30/2025	14.5	42	609.0	Bentomat DN-8 LB (GCL)
P89	643	9/30/2025	14.5	11	159.5	Bentomat DN-8 LB (GCL)
P90	642	9/30/2025	14.5	72	1,044.0	Bentomat DN-8 LB (GCL)
P91	587	9/30/2025	14.5	34	493.0	Bentomat DN-8 LB (GCL)
P92	570	9/30/2025	14.5	117	1,696.5	Bentomat DN-8 LB (GCL)
P93	640	9/30/2025	14.5	156	2,262.0	Bentomat DN-8 LB (GCL)
P94	642	9/30/2025	14.5	15	217.5	Bentomat DN-8 LB (GCL)
P95	642	9/30/2025	11	11	121.0	Bentomat DN-8 LB (GCL)
P79	620	9/30/2025	14.5	49	710.5	Bentomat DN-8 LB (GCL)
P83	620	9/30/2025	14.5	66	957.0	Bentomat DN-8 LB (GCL)
P86	620	9/30/2025	14.5	38	551.0	Bentomat DN-8 LB (GCL)
P99	587	9/30/2025	8	24	192.0	Bentomat DN-8 LB (GCL)



CELL 4 EXPANSION
GCL PANEL PLACEMENT
MATSU BOROUGH
CENTRAL LANDFILL
FALL 2025

APPENDIX F – GEOMEMBRANE LINER DOCUMENTATION



AGRU America, Inc.
500 Garrison Road
Georgetown, SC 29440
Phone: 1-843-546-0600

June 27, 2025

Job Name: **CENTRAL LANDFILL – CELL 4 EXPANSION LINER
PALMER, AK**

CLARIFICATIONS

DIRECT SHEAR IS A SITE-SPECIFIC DESIGN TEST. AS SUCH, IF DIRECT SHEAR TESTING IS REQUIRED, AGRU AMERICA CANNOT GUARANTEE OR CERTIFY RESULTS ON AN INDIVIDUAL PROJECT BASIS. WE CAN PROVIDE SAMPLES AT NO CHARGE FOR TESTING AT A THIRD PARTY LAB, BUT CANNOT RELEASE MATERIAL FOR SHIPMENT UNTIL TESTING IS COMPLETED AND APPROVED.

AGRU STANDARD LIMITED PRODUCT WARRANTY LANGUAGE SHALL APPLY.

AGRU IS NOT RESPONSIBLE FOR ANY COSTS RELATED TO THIRD PARTY CONFORMANCE TESTING.

GEOMEMBRANE – TECHNICAL SPECIFICATIONS SECTION 31 05 19.16 – HDPE AND LLDPE – GEOMEMBRANE LINER – APRIL 2025

60 MIL HD DS MICROSPIKE

FG-HDMSDS060BBBEV

60 MIL LLDPE DS MICROSPIKE

FG-LDMSDS060BBBEV

Part 1.03.B.2 & 3 – Agru America cannot guarantee an interface friction angle. These tests are site-specific design tests – please see note above

Part 1.04.A – Agru recommends performing third party quality assurance testing during material production. If sampling is performed after material shipment, Agru will not be responsible for any shipping costs relating to the return of material which fails to meet third party testing requirements.

Part 1.05.A.2 – AGRU cannot guarantee geomembrane will withstand maximum wind velocities encountered at the site or hazards from other Acts of God.

Part 1.06.A – Agru roll labels do not include Lot Numbers. Agru QC certificates provide date of manufacture and resin lot number for full traceability

Part 1.07.A – Agru Standard Limited Product Warranty Language Shall Apply. Warranty period will begin upon final shipment

Table 1 & 2 – Agru tests Density per ASTM D792 Method B and Standard Oxidative Induction Time (OIT) tests per ASTM D8117 per the current version of GRI-GM13 / GM17 only on formulated geomembrane sheet – Agru requests this be approved

Table 3 – Agru tests Axi-Symmetric Break Resistance once per resin formulation per the GRI-GM17 – Testing is not specific to a material type or thickness – Agru requests this be approved

Table 3 - Agru tests Standard Oxidative Induction Time (OIT) per ASTM D8117 per the current version of GRI-GM13 / GM17 – Agru requests this be approved.



AGRU America, Inc.
500 Garrison Road
Georgetown, SC 29440
Phone: 1-843-546-0600

Table 3 - Agru requests the use of our standard MQC frequencies consistent with the current version of the GRI-GM13 / GM17 –

Property	AGRU Frequency
Thickness	Every Roll
Asperity Height	Every 2 nd Roll
Tensile Properties, Carbon Black Content	20,000 lbs.
Tear Resistance, Puncture Resistance, Carbon Black Dispersion	45,000 lbs.
Oxidative Induction Time (OIT), Density, Melt Flow Index	200,000 lbs.
Oven Aging, UV Resistance	Per Formulation

GEOCLAY – TECHNICAL SPECIFICATIONS SECTION 31 05 19.23 – GEOSYNTHETIC CLAY LINER – APRIL 2025

GEOCLAY NN66

FM-GCL-NN66-7-08S

Part 1.05.B.10 – Agru America cannot guarantee an interface friction angle. These tests are site-specific design tests – please see note above

Part 1.07.B.3 – Agru roll labels do not include Lot Numbers. Agru QC certificates provide date of manufacture and resin lot number for full traceability

Part 1.08.A – Agru does not offer a 10 year GCL Warranty. Agru Standard Limited Product Warranty Language Shall Apply. Warranty period will begin upon final shipment

GEOTEXTILE – TECHNICAL SPECIFICATIONS SECTION 31 05 19.13 – GEOTEXTILE – APRIL 2025

4 oz. NONWOVEN AGRUTEX 041 (FILTER)

FT-GT15-4.0-BK-PP-180-U

16 oz. NONWOVEN AGRUTEX 161 (CUSHION)

FT-GT15-16.0-BK-PP-180-U

Part 1.03.B.5 – Agru America cannot guarantee an interface friction angle. These tests are site-specific design tests – please see note above

Part 1.04.A – Agru recommends performing third party quality assurance testing during material production. If sampling is performed after material shipment, Agru will not be responsible for any shipping costs relating to the return of material which fails to meet third party testing requirements.

Part 1.05.A – Agru roll labels do not include Lot Numbers. Agru QC certificates provide date of manufacture and resin lot number for full traceability

Part 2.01.A – Apparent Opening Size AOS shall be met as a MaxARV and Agru will use our standard MQC testing frequencies

Part 2.01.E – Agru does not test / report thickness of geotextiles and request this requirement be waived

MicroSpike® Liner

HIGH DENSITY POLYETHYLENE

AGRU America's structured geomembranes are manufactured on state-of-the-art manufacturing equipment using the flat die calender manufacturing process, a method that produces the most consistent texturing across the roll along with a more consistent core thickness than other processes, such as the blown film extrusion process. AGRU uses only the highest-grade HDPE and LLDPE resins manufactured in North America.

PRODUCT DATA

Property	Test Method	Frequency	Minimum Average Values				
Thickness (min avg), mil (mm)	ASTM D5994	Per Roll	30 (0.75)	40 (1.0)	60 (1.5)	80 (2.0)	100 (2.5)
Thickness (lowest individual), mil (mm)			29 (0.71)	38 (0.95)	57 (1.43)	76 (1.9)	95 (2.38)
Asperity Height mils, (mm)	ASTM D7466	2nd Roll	20 (0.51)	20 (0.51)	20 (0.51)	18 (0.46)	18 (0.46)
Density, g/cc, minimum	ASTM D792, Method B	200,000 lb	0.94	0.94	0.94	0.94	0.94
Tensile Properties (both directions)	ASTM D6693, Type IV 2 in/minute	20,000 lb					
Strength @ Yield, lb/in width (N/mm)			66 (11.6)	88 (15.4)	132 (23.1)	176 (30.8)	220 (38.5)
Elongation @ Yield, % (GL=1.3in)			12	12	12	12	12
Strength @ Break, lb/in width (N/mm)			66 (11.6)	88 (15.4)	132 (23.1)	176 (30.8)	220 (38.5)
Elongation @ Break, % (GL=2.0in)	ASTM D1004	45,000 lb	350	350	350	350	350
Tear Resistance, lb.s. (N)			23 (102)	30 (133)	45 (200)	60 (267)	72 (320)
Puncture Resistance, lbs. (N)			60 (267)	90 (400)	120 (534)	150 (667)	180 (801)
Carbon Black Content, % (range) ¹			2-3	2-3	2-3	2-3	2-3
Carbon Black Dispersion (Category)	ASTM D5596	45,000 lb	Only near spherical agglomerates: 10 views in Cat. 1 or 2				
Stress Crack Resistance (SP-NCTL), hrs.	ASTM D5397 Appendix	200,000 lb	500	500	500	500	500
Oxidative Induction Time, minutes	ASTM D8117, 200°C, 1 atm O ₂	200,000 lb	≥140	≥140	≥140	≥140	≥140

AGRU America's geomembranes are certified to pass Low Temp. Brittleness via ASTM D746 (-80°C), Dimensional Stability via ASTM D1204 (±2% @ 100°C). Oven Aging and UV Resistance are tested per GRI GM 13. These product specifications meet or exceed GRI's GM13.

SUPPLY INFORMATION (STANDARD ROLL DIMENSIONS)

THICKNESS		WIDTH			LENGTH		AREA (APPROX.)	
mil	mm	ft	m		ft	m	ft²	m²
30	0.75	23	7	Double-Sided	900	275	20,700	1,923
				Single-Sided	940	287	21,620	2,009
40	1.0	23	7	Double-Sided	700	213	16,100	1,496
				Single-Sided	730	223	16,790	1,560
60	1.5	23	7	Double-Sided	500	152	11,500	1,068
				Single-Sided	515	157	11,845	1,100
80	2.0	23	7	Double-Sided	385	117	8,855	823
				Single-Sided	390	119	8,970	833
100	2.5	23	7	Double-Sided	310	95	7,130	662
				Single-Sided	315	96	7,245	673

Note:

Average roll weight is 3,900 lbs (1,770 kg). All rolls are supplied with two slings. Rolls are wound on a 6" core. Special length available upon request. Roll length and width have a tolerance of ±1%. The weight and length values may change due to project specifications (i.e. average or absolute minimum thickness) or shipping requirements (i.e. international containerized shipments). All information, recommendations and suggestions appearing in this literature concerning the use of our products are based upon tests and data believed to be reliable; however, it is the users responsibility to determine the suitability for their own use of the products described herein. Since the actual use by others is beyond our control, no guarantee or warranty of any kind, expressed or implied, is made by AGRU America as to the effects of such use or the results to be obtained, nor does AGRU America assume any liability in connection herewith. Any statement made herein may not be absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations. Nothing herein is to be construed as permission or as a recommendation to infringe any patent.

AGRU America, Inc.
500 Garrison Road
Georgetown, SC 29440 USA

(843) 546-0600
info@agruamerica.com
Revision Date: October 7, 2024

This information is provided for reference purposes only and is not intended as a warranty or guarantee. AGRU America, Inc. assumes no liability in connection with the use of this information.



MicroSpike® Liner

LINEAR LOW DENSITY POLYETHYLENE

AGRU America's structured geomembranes are manufactured on state-of-the-art manufacturing equipment using the flat die calender manufacturing process, a method that produces a more consistent core thickness than other processes, such as the blown film extrusion process. AGRU uses only the highest-grade HDPE and LLDPE resins manufactured in North America.

PRODUCT DATA

Property	Test Method	Frequency	Minimum Average Values			
Thickness (min avg), mil (mm)	ASTM D5994	Per Roll	40 (1.0)	60 (1.5)	80 (2.0)	100 (2.5)
Thickness (lowest individual), mil (mm)			38 (0.95)	57 (1.43)	76 (1.9)	95 (2.38)
Asperity Height mils, (mm)	ASTM D7466	2nd Roll	20 (0.51)	20 (0.51)	18 (0.46)	18 (0.46)
Density, g/cc, maximum	ASTM D792, Method B	200,000 lb	0.939	0.939	0.939	0.939
Tensile Properties (both directions)	ASTM D6693, Type IV 2 in/minute	20,000 lb	112 (19.6) 400	168 (29.4) 400	224 (39.2) 400	280 (49) 400
Strength @ Break, lb/in width (N/mm)						
Elongation @ Break, % (GL=2.0in)						
Tear Resistance, lb.s. (N)	ASTM D1004	45,000 lb	25 (111)	36 (160)	50 (222)	60 (267)
Puncture Resistance, lbs. (N)	ASTM D4833	45,000 lb	50 (222)	70 (310)	90 (400)	115 (512)
Carbon Black Content, % (range)	ASTM D4218	20,000 lb	2-3	2-3	2-3	2-3
Carbon Black Dispersion (Category)	ASTM D5596	45,000 lb	Only near spherical agglomerates: 10 views Cat.1 or 2			
Oxidative Induction Time, minutes	ASTM D8117, 200°C, 1 atm O ₂	200,000 lb	≥140	≥140	≥140	≥140

AGRU America's geomembranes are certified to pass Low Temp. Brittleness via ASTM D746 (-80°C), Dimensional Stability via ASTM D1204 (±2% @ 100°C). Oven Aging and UV Resistance are tested per GRI GM 17. These product specifications meet or exceed GRI's GM17.

SUPPLY INFORMATION (STANDARD ROLL DIMENSIONS)

THICKNESS		WIDTH			LENGTH		AREA (APPROX.)	
mil	mm	ft	m		ft	m	ft²	m²
40	1.0	23	7	Double-Sided	700	213	16,100	1,496
				Single-Sided	730	222	16,790	1,559
60	1.5	23	7	Double-Sided	500	152	11,500	1,068
				Single-Sided	515	157	11,845	1,100
80	2.0	23	7	Double-Sided	385	117	8,855	823
				Single-Sided	390	119	8,970	833
100	2.5	23	7	Double-Sided	310	94	7,130	662
				Single-Sided	315	96	7,245	673

Note:

Average roll weight is 3,900 lbs (1,770 kg). All rolls are supplied with two slings. Rolls are wound on a 6" core. Special length available upon request. Roll length and width have a tolerance of ±1%. The weight values may change due to project specifications (i.e. average or absolute minimum thickness) or shipping requirements (i.e. international containerized shipments).

All information, recommendations and suggestions appearing in this literature concerning the use of our products are based upon tests and data believed to be reliable; however, it is the users responsibility to determine the suitability for their own use of the products described herein. Since the actual use by others is beyond our control, no guarantee or warranty of any kind, expressed or implied, is made by AGRU America as to the effects of such use or the results to be obtained, nor does AGRU America assume any liability in connection herewith. Any statement made herein may not be absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations. Nothing herein is to be construed as permission or as a recommendation to infringe any patent.

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Revision Date: October 7, 2024

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TESTING, RESEARCH, CONSULTING AND FIELD SERVICES

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

September 9, 2025

Steve Keeney
NORTHWEST LININGS
20824 77th Ave. South
KENT, WA 98302

Re: FINAL LABORATORY TEST REPORT

Dear Mr. Keeney:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the **final** laboratory report for the Conformance testing of two (2) 60mil HDPE Double Sided MicroSpike.

PROJECT NAME: Central Landfill Cell 4 Expansion

DATE REPORTED: September 9, 2025

REFERENCE TRI JOB NO.: CA250970

DATE RECEIVED: September 2, 2025

SAMPLED BY: TRI-CA at AGRU, NV.

TEST PERFORMED AT: TRI-CA Facility (see the complete contact info and address below), except otherwise noted.

SAMPLE IDENTIFICATIONS:

SAMPLE ID

R#FND0159700001 L#PDS821430

R#FND0159700009 L#PDS821430

TRI CONTROL NUMBER

192532

192533

TESTS REQUIRED / PERFORMED:

TEST METHOD

1. ASTM D1505
2. ASTM D1238
3. ASTM D5994
4. ASTM D6693
5. ASTM D1004
6. ASTM D4833
7. ASTM D4218
8. ASTM D5596
9. ASTM D7466

DESCRIPTION

Density
Melt Flow Index
Thickness
Tensile Strength
Tear Resistance
Puncture Resistance
Carbon Black Content
Carbon Black Dispersion
Asperity Height

TEST RESULTS: The test results are summarized in the attached Table 1 to 2.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of laboratory environmental conditions, i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully,
TRI Environmental, Inc. - California

Maria Espitia
Quality Assurance

Chad Blackwell
TRI-CA Director

Signatures are on file

attached laboratory test results are considered indicative only of the quality/property of samples/specimens that were actually tested. The designated test methods employed are based on the generally It shall be noted that the sample(s) tested per this report is(are) believed to be true representative(s) of the material produced under the designation stated herein. In addition, the accepted and current industry standards/practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entities duly authorized by the respective client, or the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and its corresponding electronic file for seven (7) years. **Retained conformance samples are disposed of after one (1) month.** On the other hand, should you need us to keep them for a longer period, please advise us in writing.

5 Pages Total (including this sheet)



1970 S. Santa Cruz Street, Anaheim, CA 92805, www.precisionlabs.net, Tel No.: 714-520-9631
TRI Environmental, Inc. dba Precision Geosynthetic Laboratories International, Inc



TESTING, RESEARCH, CONSULTING AND FIELD SERVICES
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TABLE 1.
MATERIAL PROPERTIES
CLIENT: Northwest Linings
PROJECT: Central Landfill Cell 4 Expansion

Date Received: 9/2/2025
Date Reported: 9/9/2025
Client Sample ID: R#FND0159700001 L#PSD821430
Material Description: 60mil Doble Sided HDPE Microspike

QC'd By: Maria Espitia
TRI Job No.: CA250970
TRI Control No.: 192532

SPECIMENS											Avg.	Std. Dev.	Min	Max	Proj. Specs.
METHOD	DESCRIPTION														
ASTM D5994	Thickness (mils) E1#846														
	Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° ± 2° to the horizontal with the tip rounded to a radius of 0.8 ± 0.1 mm (0.031 ± 0.004 in), with a specified force of 0.56 ± 0.05 N (2 ± 0.2 oz) Loading Time: 5 sec Specimen Size: 4" x 4"														
	64	62	62	61	61	61	60	62	62	63	62	1	60	64	57- 63 nominal 60 min. avg.
ASTM D7466	Asperity Height of Textured Geomembrane (mils) E1#669														
	Apparatus: Has a dial indicator that travels at least 2.5mm (0.1 in), and a depth gauge with contact point that travels up and down with in the setting block with a base dimension of 50 mm x 20 mm (2.0 in x 0.75 in) and a height of 15 mm (0.5 in). The contact point is 1.3 mm (0.051 in) in diameter with the tip tapered to a point with an extension of 17 mm (0.66 in). Sampling: Ten (10) 3" diameter specimens were cut across the width of the sample in a randomly distributed manner. The highest reading from 3 readings were taken per specimen.														
	Shiny side	32	33	33	33	33	32	32	34	33	32	1	32	34	16 min.
	Dull side	34	34	33	34	34	34	34	33	33	33	0	33	34	
ASTM D1505	Density (grams/cm. ³) E1#810										0.9409	0.0001	0.9408	0.9409	0.940 min. avg.
ASTM D6693	Tensile Properties E1#860														
Type IV	Test Specimens: Type IV, Width of narrow section 0.25in, Length of narrow section 1.3in, Width Overall 0.75in, Length Overall: 4.5in Rate of Separation: 2"/min														
	Tensile Strength at Yield (lbs/ in.-width)														
	MD	152	149	146	151	147					149	2	146	152	126 min. avg.
	TD	157	158	148	163	170					159	8	148	170	
	Tensile Strength at Break (lbs/ in.- width)														
	MD	263	232	237	245	190					233	27	190	263	90 min. avg.
	TD	180	183	189	179	201					186	9	179	201	
	Elongation at Yield (percent, %)														
	MD	22	24	23	23	21					23	1	21	24	12 min. avg.
	TD	17	15	15	16	17					16	1	15	17	
	Elongation at Break (percent, %) Gauge Length = 2.0 in.														
	MD	496	483	486	480	416					472	32	416	496	100 min. avg.
	TD	558	557	588	548	604					571	24	548	604	

Continued on next page

(Sheet 1 of 2)

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TABLE 1.
MATERIAL PROPERTIES
CLIENT: Northwest Linings
PROJECT: Central Landfill Cell 4 Expansion

Date Received: 9/2/2025
Date Reported: 9/9/2025
Client Sample ID: R#FND0159700001 L#PSD821430
Material Description: 60mil Doble Sided HDPE Microspike

QC'd By: Maria Espitia
TRI Job No.: CA250970
TRI Control No.: 192532

SPECIMENS											Avg.	Std. Dev.	Min	Max	Proj. Specs.
METHOD	DESCRIPTION	1	2	3	4	5	6	7	8	9	10				
ASTM D1004	Tear Resistance (lbs)	EI#860													
Die C	Machine: Tensile machine equipped with constant rate of extension and chart recorder.														
	MD	58.5	56.3	58.1	61.3	59.8	56.7	53.6	56.1	56.0	58.2	57.5	2.2	53.6	61.3
	TD	53.3	52.2	51.1	55.1	54.0	52.5	51.1	51.5	50.9	54.6	52.6	1.6	50.9	55.1
	Thickness (mils)														
	MD	60	61	61	62	60	60	64	60	60	63	61	1	60	64
	TD	61	63	62	64	61	63	61	63	61	63	62	1	61	64
ASTM D4833	Puncture Resistance (lbs)	EI#937													
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.														
		138	134	134	134	140	142	152	141	147	142	140	6	134	152
ASTM D5596	Carbon Black Dispersion (category rating per reference chart PCN: 12-455960-38)	EI#817													
		1	1	1	1	1	1	1	1	1	1	10	out of 10 in Category 1		
ASTM D1238	Melt Flow Index (grams/ 10 minutes)	EI#41													
Procedure A	Condition FR-190/2.16; Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190 °C and 2.16kg load.														
		0.2420	0.2423	0.2411								0.2418	0.0006	0.2411	0.2423
ASTM D4218	Carbon Content (percent)	EI#51													
	Apparatus: Muffle Furnace														
		2.50	2.45									2.47	0.04	2.45	2.50

(End of Table 1)

(Sheet 2 of 2)

By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report, and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

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TABLE 2.
MATERIAL PROPERTIES
CLIENT: Northwest Linings
PROJECT: Central Landfill Cell 4 Expansion

Date Received: 9/2/2025
Date Reported: 9/9/2025
Client Sample ID: R#FND0159700009 L#PSD821430
Material Description: 60mil Doble Sided HDPE Microspike

QC'd By: *Maria Espitia*
TRI Job No.: CA250970
TRI Control No.: 192533

Material Description: 6mil Double Sided HDPE Microspike											SPECIMENS				Proj. Specs.	
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	
METHOD	DESCRIPTION															
ASTM D5994	Thickness (mils) <i>EI#846</i> <i>Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in.) with a specified force of 0.56+/-0.05 N (2+/-0.2 oz)</i> <i>Loading Time: 5 sec Specimen Size: 4" x 4"</i>															
	62	61	61	63	61	61	60	60	62	60	61	1	60	63	57- 63 nominal 60 min. avg.	
ASTM D7466	Asperity Height of Textured Geomembrane (mils) <i>EI#669</i> <i>Apparatus: Has a dial indicator that travels at least 2.5mm (0.1 in.) and a depth gauge with contact point that travels up and down with in the setting block with a base dimension of 50 mm x 20 mm (2.0 in x 0.75 in) and a height of 15 mm (0.5 in). The contact point is 1.3 mm (0.051 in) in diameter with the tip tapered to a point with an extension of 17 mm (0.66 in)</i> <i>Sampling: Ten (10) 3" diameter specimens were cut across the width of the sample in a randomly distributed manner</i> <i>The highest reading from 3 readings were taken per specimen.</i>															
	Shiny side	34	33	32	33	33	33	32	32	32	32	32	0	32	34	16 min.
	Dull side	33	33	33	33	34	33	33	33	33	33	33	0	33	34	
ASTM D1505	Density (grams/ cm. ³) <i>EI#810</i>	0.9420	0.9419	0.9419								0.9420	0.0001	0.9419	0.9420	0.940 min. avg.
ASTM D6693	Tensile Properties: <i>EI#660</i> <i>Test Specimens: Type IV, Width of narrow section 0.25in, Length of narrow section 1.3in, Width Overall 0.75in, Length Overall: 4.5in Rate of Separation: 2"/min</i>															
Type IV	Tensile Strength at Yield (lbs/ in.-width)															
	MD	153	158	154	152	151						154	3	151	158	126 min. avg.
	TD	169	163	160	161	164						163	3	160	169	
	Tensile Strength at Break (lbs/ in.- width)															
	MD	181	228	206	177	242						207	29	177	242	90 min. avg.
	TD	203	161	174	172	181						178	15	161	203	
	Elongation at Yield (percent, %)															
	MD	21	21	21	18	19						20	2	18	21	12 min. avg.
	TD	15	15	18	17	18						17	1	15	18	
	Elongation at Break (percent, %) <i>Gauge Length = 2.0 in.</i>															
	MD	479	478	473	479	483						478	4	473	483	100 min. avg.
	TD	596	480	533	520	523						530	42	480	596	

Continued on next page

(Sheet 1 of 2)

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TABLE 2.
MATERIAL PROPERTIES
 CLIENT: Northwest Linings
 PROJECT: Central Landfill Cell 4 Expansion

Date Received: 9/2/2025
 Date Reported: 9/9/2025
 Client Sample ID: R#FND0159700009 L#PSD821430
 Material Description: 60mil Doble Sided HDPE Microspike

QC'd By: *Harin Espitia*
 TRI Job No.: CA250970
 TRI Control No.: 192533

		SPECIMENS										Avg.	Std. Dev.	Min	Max	Proj. Specs.		
METHOD	DESCRIPTION	1	2	3	4	5	6	7	8	9	10							
ASTM D1004	Tear Resistance (lbs)	EI#860																
Die C	Machine: Tensile machine equipped with constant rate of extension and chart recorder.																	
	MD	61.9	55.5	55.6	56.0	59.0	60.2	59.4	58.5	56.0	53.1	57.5	2.7	53.1	61.9	42 min. avg.		
	TD	54.0	54.2	55.2	57.7	59.2	54.7	53.3	51.4	53.6	54.1	54.8	2.2	51.4	59.2			
	Thickness (mils)																	-
	MD	64	61	60	62	62	62	60	61	62	60	62	1	60	64			
	TD	63	64	62	64	65	63	60	60	62	63	63	2	60	65			
ASTM D4833	Puncture Resistance (lbs)	EI#937																90 min. avg. 9 in Cat. 1 or 2 1 in Cat. 3
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.																	
		143	147	153	147	142	144	151	151	149	151	148	4	142	153			
ASTM D5596	Carbon Black Dispersion (category rating per reference chart PCN: 12-455960-38)	EI#B17																
		1	1	1	1	1	1	1	1	1	1	10	out of 10 in Category 1					
ASTM D1238	Melt Flow Index (grams/ 10 minutes)	EI#41																-
Procedure A	Condition FR-190/2 16; Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190 °C and 2.16kg load.																	
		0.2413	0.2427	0.2436								0.2425	0.0012	0.2413	0.2436			
ASTM D4218	Carbon Content (percent)	EI#51																2 to 3
	Apparatus: Muffle Furnace																	
		2.50	2.48									2.49	0.02	2.48	2.50			

(End of Table 2)

(Sheet 2 of 2)

By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

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MANUFACTURING QA IN-PLANT SAMPLING/INSPECTION REPORT

Project Name: Central Landfill Cell 4 Expansion
Material: 60mil HDPE Double Sided Microspike
Manufacturer: AGRU
Location: NV

TYPE OF MQA: LEVEL (2) QA by: Maria Espinoza

SAMPLING FREQUENCY: 1/100,000 sq.ft. and at least 1/lot

No.	Roll #	Lot #	Length (ft.)	Width (ft.)	Area (ft ²)	Date Manufactured	Sampled by	Date Sampled	Date Received	Reference Job No/ Control No
1	FND0159700001	PDS821430	500	23	11500	8/26/2025	TRI-CA	8/27/2025	9/2/2025	CA250970 CH192532
2	FND0159700002	PDS821430	500	23	11500	8/26/2025				
3	FND0159700003	PDS821430	500	23	11500	8/27/2025				
4	FND0159700004	PDS821430	500	23	11500	8/27/2025				
5	FND0159700005	PDS821430	500	23	11500	8/27/2025				
6	FND0159700006	PDS821430	500	23	11500	8/27/2025				
7	FND0159700007	PDS821430	500	23	11500	8/27/2025				
8	FND0159700008	PDS821430	500	23	11500	8/27/2025				
9	FND0159700009	PDS821430	500	23	11500	8/27/2025	TRI-CA	8/27/2025	9/2/2025	CA250970 CH192533
10	FND0159700010	PDS821430	500	23	11500	8/27/2025				
11	FND0159700011	PDS821430	500	23	11500	8/27/2025				
TOTAL ft ² =					126,500					



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September 9, 2025

Steve Keeney
NORTHWEST LININGS
20824 77th Ave. South
KENT, WA, 98302

Re: FINAL LABORATORY TEST REPORT

Dear Mr. Keeney:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the **final** laboratory report for the Conformance testing of one (1) 60mil LLDPE Double Sided Microspike.

PROJECT NAME: Central Landfill Cell 4 Expansion

DATE REPORTED: September 9, 2025

REFERENCE TRI JOB NO.: CA250982

DATE RECEIVED: September 3, 2025

SAMPLED BY: TRI-CA at AGRU, NV.

TEST PERFORMED AT: TRI-CA Facility (see the complete contact info and address below), except otherwise noted.

SAMPLE IDENTIFICATIONS:

SAMPLE ID

R#FND0159710002 L#DSD812520

TRI CONTROL NUMBER

192607

TESTS REQUIRED / PERFORMED:

TEST METHOD

1. ASTM D1505
2. ASTM D1238
3. ASTM D5994
4. ASTM D6693
5. ASTM D1004
6. ASTM D4833
7. ASTM D4218
8. ASTM D5596
9. ASTM D7466

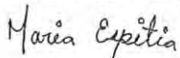
DESCRIPTION

Density
Melt Flow Index
Thickness
Tensile Strength
Tear Resistance
Puncture Resistance
Carbon Black Content
Carbon Black Dispersion
Asperity Height

TEST RESULTS: The test results are summarized in the attached Table 1.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of laboratory environmental conditions, i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully,
TRI Environmental, Inc. - California



Maria Espitia
Quality Assurance



Chad Blackwell
TRI-CA Director

Signatures are on file

attached laboratory test results are considered indicative only of the quality/property of samples/specimens that were actually tested. The designated test methods employed are based on the generally it shall be noted that the sample(s) tested per this report is(are) believed to be true representative(s) of the material produced under the designation stated herein. In addition, the accepted and current industry standards/practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entities duly authorized by the respective client, or the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and its corresponding electronic file for seven (7) years. **Retained conformance samples are disposed of after one (1) month.** On the other hand, should you need us to keep them for a longer period, please advise us in writing.

3 Pages Total (including this sheet)



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TABLE 1.

MATERIAL PROPERTIES

CLIENT: Northwest Linings

PROJECT: Central Landfill Cell 4 Expansion

Date Received: 9/3/2025

Date Reported: 9/9/2025

Client Sample ID: R#FND0159710002 L#DSD812520

Material Description: 60mil Doble Sided LLDPE Microspike

QC'd By: Maria Espinoza

TRI Job No.: CA250982

TRI Control No.: 192607

SPECIMENS											Avg.	Std. Dev.	Min	Max	Proj. Specs.
METHOD	DESCRIPTION														
ASTM D5994	Thickness (mils) E#846 Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8 +/- 0.1 mm (0.031 +/- 0.004 in), with a specified force of 0.56 +/- 0.05 N (2 +/- 0.2 oz) Loading Time: 5 sec Specimen Size: 4" x 4"														
	61	62	61	62	61	63	61	61	61	60	61	1	60	63	57-63 nominal 60 min. avg.
ASTM D7466	Asperity Height of Textured Geomembrane (mils) E#669 Apparatus: Has a dial indicator that travels at least 2.5mm (0.1 in), and a depth gauge with contact point that travels up and down with in the setting block with a base dimension of 50 mm x 20 mm (2.0 in x 0.75 in) and a height of 15 mm (0.5 in). The contact point is 1.3 mm (0.051 in) in diameter with the tip tapered to a point with an extension of 17 mm (0.66 in) Sampling: Ten (10) 3" diameter specimens were cut across the width of the sample in a randomly distributed manner The highest reading from 3 readings were taken per specimen														
	Shiny side	32	32	32	32	32	32	33	32	32	32	0	32	33	16 min.
	Dull side	34	34	34	34	34	34	34	33	34	34	0	33	34	
ASTM D1505	Density (grams/cm ³) E#810 0.9362 0.9360 0.9358										0.9360	0.0002	0.9358	0.9362	0.939 max.
ASTM D6693 Type IV	Tensile Properties: E#860 Test Specimens: Type IV, Width of narrow section 0.25in, Length of narrow section 1.3in, Width Overall 0.75in, Length Overall 4.5in Rate of Separation: 2"/min														
	Tensile Strength at Break (lbs/in - width)														
	MD	193	207	226	199	184					202	16	184	226	90 min. avg.
	TD	241	191	195	215	188					206	22	188	241	
	Elongation at Break (percent, %) Gauge Length = 2.0 in.														
	MD	546	556	528	557	542					546	12	528	557	250 min. avg.
	TD	665	585	588	625	581					609	36	581	665	
ASTM D1004 Die C	Tear Resistance (lbs) E#860 Machine: Tensile machine equipped with constant rate of extension and chart recorder														
	MD	44.8	46.9	47.1	51.6	54.4	46.6	58.7	46.0	51.7	50.4	49.8	4.4	44.8	58.7
	TD	51.2	49.1	53.4	53.7	49.2	48.1	46.8	44.8	45.4	42.4	48.4	3.7	42.4	53.7
	Thickness (mils)														
	MD	62	61	63	61	62	63	63	64	64	61	62	1	61	64
	TD	61	64	64	60	64	61	61	61	65	65	63	2	60	65
ASTM D4833	Puncture Resistance (lbs) E#937 Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.														
	149	148	145	129	127	125	132	129	127	132	134	9	125	149	66 min. avg.

Continued on next page

(Sheet 1 of 1)

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TABLE 1.

MATERIAL PROPERTIES

CLIENT: Northwest Linings

PROJECT: Central Landfill Cell 4 Expansion

Date Received: 9/3/2025

Date Reported: 9/9/2025

Client Sample ID: R#FND0159710002 L#DSD812520

Material Description: 60mil Doble Sided LLDPE Microspike

QC'd By:

Maria Cepeda

TRI Job No.: CA250982

TRI Control No.: 192607

		SPECIMENS										Avg.	Std. Dev.	Min	Max	Proj. Specs.
METHOD	DESCRIPTION	1	2	3	4	5	6	7	8	9	10					
ASTM D5596	Carbon Black Dispersion (category rating per reference chart PCN: 12-455960-38) E/#B17	1	1	1	1	1	1	1	1	1	1	10 out of 10 in Category 1				9 in Cat. 1 or 2 1 in Cat. 3
ASTM D1238 Procedure A	Melt Flow Index (grams/ 6 minutes) Condition FR-190/2.16.; Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190°C and 2.16kg load. 0.1822 0.1820 0.1815											0.1819	0.0004	0.1815	0.1822	-
ASTM D4218	Carbon Content (percent) E/#51 Apparatus: Muffle Furnace 2.41 2.39											2.40	0.02	2.39	2.41	2 to 3

(End of Table 1)

(Sheet 2 of 2)

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MANUFACTURING QA IN-PLANT SAMPLING/INSPECTION REPORT

Project Name: Central Landfill Cell 4 Expansion TYPE OF MQA: LEVEL (2) QA by: Maria Espino
Material: 60mil LLDPE Double Sided Microspike SAMPLING FREQUENCY: 1/100,000 sq.ft. and at least 1/lot
Manufacturer: AGRU
Location: NV

No.	Roll #	Lot #	Length (ft.)	Width (ft.)	Area (ft ²)	Date Manufactured	Sampled by	Date Sampled	Date Received	Reference Job No/ Control No
1	FND0159710002	DSD812520	500	23	11500	8/28/2025	TRI-CA	8/29/2025	9/3/2025	CA250982 C#192607
2	FND0159710006	DSD812520	500	23	11500	8/28/2025				
3	FND0159710007	DSD812520	500	23	11500	8/28/2025				
4	FND0159710008	DSD812520	500	23	11500	8/28/2025				
5	FND0159710009	DSD812520	500	23	11500	8/28/2025				
6	FND0159710010	DSD812520	500	23	11500	8/28/2025				
TOTAL ft ² =					69,000					



**GEOMEMBRANE
Limited Product Warranty
SO00027378**

CUSTOMER: NORTHWEST LININGS
OWNER: Matanuska-Susitna Borough
PROJECT: MAT-SU BOROUGH PALMER CENTRAL LANDFILL CELL 4
PRODUCT(S): HDPE & LLDPE Double-sided Microspike® 60MIL
LOCATION: 1201 N 49th State St, Palmer, AK 99645
EFFECTIVE DATE: 09-16-2025
WARRANTY TYPE/TERM: BURIED/ PRORATED 20 YEARS

Subject to the terms, conditions, and limitations contained herein, Agru/America, Inc. ("AGRU") warrants to the Customer/Owner ("Buyer") identified above that the Product(s) conform to the Buyer's issued specifications at time of delivery. Warranty is only valid when the product(s) is properly installed and covered following AGRU guidelines, in all respects, and used for a LANDFILL/CELL in a BURIED application. Note: Term is prorated and begins from the final project ship date, also AGRU's products may vary in details of design and construction from descriptions in any literature or from any sample, display, or other model inspected by Buyer.

AGRU or its representatives upon request may furnish or may have previously furnished technical advice or assistance regarding the Products or their uses, at AGRU's sole discretion, but it is expressly agreed that any advice or assistance furnished shall be given and accepted at Buyer's sole risk and liability. Neither any AGRU representative nor AGRU shall be responsible nor liable for any advice or assistance that is given to Buyer or any other person relating to the Products, application of products, or the results thereof.

AGRU disclaims all other representations and warranties of any kind, express or implied, in fact, or law, including, without limitation, the implied warranty of merchantability and the implied warranty of fitness for a particular purpose. Every claim under this limited warranty shall be deemed waived unless in writing and received by AGRU within 10 days of delivery if visibly damaged or defective and, otherwise, within 30 days after the defect to which each claim relates is discovered, or should have been discovered.

AGRU's warranty is voided for any of the following if the products are shipped at the request of the Buyer before completion and approval of all testing required by the project specifications, damages that AGRU, in its sole discretion, determines are due to improper site preparation, misapplication, incorrect installation (including incorrect welding of seams in the installation), and/or damages resulting from any kind of misuse or improper handling, and if the Buyer performs repairs or makes alterations without the express approval of AGRU in writing. (Buyer shall not repair, replace, remove, alter, or disturb any product before AGRU'S inspection except that the Buyer may take emergency action necessary to prevent damage to persons, property the environment.)

For Buyer to claim this warranty, Buyer agrees that it shall provide AGRU and any third-party experts appointed or approved by AGRU with clean, dry, and unobstructed access to the product(s) for AGRU and them to perform the inspections and necessary repairs. Buyer also agrees, without delay, to provide AGRU with all information and documentation requested by AGRU to make certain the cause of damages. AGRU reserves



the right to decide how damages will be settled. AGRU shall not be obligated to perform any inspection or be obligated to perform any repair or replacement under this warranty until the area is made available and free from all obstructions, water, dirt, sludge, residuals, and liquids of any kind. AGRU shall not be liable for any costs relating to providing such access to the products. If after inspection it is determined that there is no claim under this warranty, Buyer shall reimburse AGRU for its costs associated with the site inspection. Buyer's exclusive remedy and the limit of AGRU's liability under this warranty, whether based on negligence, breach of warranty, strict liability, or any other theory, at law or in equity, shall be, at AGRU's sole option: repair, replacement with a like quantity of non-defective product, or refund of the purchase price, upon the return of the products per AGRU's instructions. AGRU will not be responsible for any delays in performing approved product repairs or replacements for any reason (including, without limitation, machinery or mechanical failure) beyond AGRU's control.

AGRU's maximum liability under this warranty will not exceed the purchase price of products and will only be in force when payment has been made in full, and further claims, regardless of the legal suppositions, are not applicable. AGRU's liability under this warranty is not applicable when damage is caused by: Natural phenomena such as, but not limited to thunderstorms, floods, earthquakes, or other acts of God; and acts of war, machinery, foreign objects, or animals; and Chemicals which are not suitable for AGRU products. AGRU AMERICA SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES BASED ON NEGLIGENCE, BREACH OF WARRANTY, STRICT LIABILITY, OR ANY OTHER THEORY, FOR FAILURE TO PERFORM ITS OBLIGATIONS UNDER THIS AGREEMENT. ADDITIONALLY, INCIDENTAL, CONSEQUENTIAL, AND/OR SPECIAL DAMAGES SHALL NOT BE RECOVERABLE EVEN IF THE REPAIR, REPLACEMENT, OR REFUND REMEDY FOR AGRU AMERICA'S BREACH OF ITS LIMITED WARRANTY FAILS ITS ESSENTIAL PURPOSE OR FOR ANY OTHER REASON.

No warranty made by any representative of AGRU, or any other person, regarding the AGRU products, shall be binding upon AGRU except the warranty set forth herein. This warranty is nontransferable or assignable to another person or end-user, and any such attempt to assign or transfer shall void this warranty. All AGRU products (including liners) are sold under AGRU's General Terms and Conditions, including this Limited Product Warranty, and bar on recovery of incidental or consequential and other damages.

NORTHWEST LININGS & GEOTEXTILE PRODUCTS, INC
TWO YEAR LIMITED WARRANTY
FOR GEOSYNTHETIC PRODUCTS INSTALLATION

Warrant To: Matanuska-Susitna Borough

Project: Mat-Su Borough Palmer Central LF Cell 4 Expansion

Purchaser: Rosemarie Laker for Steve Keeney

Effective Date: October 10, 2025

Type of Material: HDPE 60T2, LLPDE60T2, GCL DN

S.F. of Material: HDPE 60T2 - 126,500 SQFT, LLDPE 60T2-69,000 SQFT
GCL DN - 178,350 SQFT

NORTHWEST LININGS & GEOTEXTILE PRODUCTS, INC., (NWL & G) hereby warrants to: (WARRANT TO) subject to the terms and conditions contained herein, and not withstanding anything to the contrary in any application or related contracts, as follows:

The fabrication of all field seams and penetrations made by NWL & G shall be free of defects and shall withstand the effects of normal weather conditions and normal wear and tear, for a period of **2 (two) years** from the above effective date. Weather which shall not be considered normal, for purposes of this Limited Warranty, shall be that which is customarily considered to be an act of God, casualty or catastrophe, including but not limited to, earthquake, flood, piercing hail, tornado or fire.

This warranty covers only those defects in workmanship. This Warranty does not cover any damage or defects to the liner found to have been a result of misuse, abuse or conditions existing after the geosynthetic installation was completed including, but not limited to, rough handling; malicious mischief; vandalism; sabotage; fire; acts of God; acts of the public enemy; acts of war or public rebellion; severe weather conditions of all types; or damage due to any of the following; ice; wind; subsidence; chemicals harmful to the Geosynthetic Material; machinery; excessive stress from any source; improper handling during transportation, unloading, storage, floating debris; foreign objects or animals. Failure to properly prepare the soil base underlying the delivered materials free from any protrusions capable of piercing the delivered materials, or relative to installed materials, in a pre-consolidated basis with due consideration for the water table and water content of said soil base. Deviation from any aforesaid conditions shall void this Limited Warranty.

In the event circumstances are found to exist which WARRANT TO believes may give rise to a claim under the Warranty, the following procedure shall be followed:

- a) WARRANT TO shall give NWL & G written notice of the facts and circumstances of said claim within 10 days of becoming aware of said facts and circumstances. Said notice shall be by registered or certified mail, return receipt requested, postage prepaid, addressed to Scott Newton, NWL & G, 20824 77th Ave. S, Kent, Washington, 98032. The words "WARRANTY CLAIM" shall be clearly marked on the face of the envelope in the lower right-hand corner. Said notice shall contain, at a minimum, the name and address of the owner, the name and address of the installation, the date upon which the installation was completed, and the facts known WARRANT TO upon which the claim is based. Failure to provide NWL & G with timely notice of the claim shall void the Warranty.
- b) Within twenty days after receipt of the notice described in paragraph a, above, NWL & G shall notify WARRANT TO either that it will send a representative to inspect the allegedly defective area, or that it does not wish to do so. WARRANT TO shall pay the expenses incurred by NWL & G in making the inspection, including current per diem rates for personnel involved in making the inspection, in the event NWL & G determines that the claim is not covered by this Warranty.
- c) WARRANT TO Shall not repair, replace, remove, alter or disturb any of the suspect area, nor shall WARRANT TO allow anyone else to repair, replace, remove, alter, or disturb any of the affected Geosynthetic area prior to such inspection, or prior to receipt of NWL & G notice that it elects not to inspect, provided WARRANT TO may take emergency action necessary to prevent damage to persons, property, or the environment. A failure to strictly comply with this paragraph shall void the warranty.

d) Any liability incurred by NWL & G pursuant to this Limited Warranty shall be and is hereby limited to repair of the specific area of the liner found to be defective and within the scope of this Warranty. In no event shall NWL & G' liability for repair exceed the value of said repair of the defective area.

e) WARRANT TO agrees that it shall provide NWL & G with clean, dry and unobstructed access to the damaged or defective area for NWL & G to perform the inspections and repairs which may be required pursuant to the Warranty. NWL & G shall not be liable for any costs relating to providing access to the suspect area.

The remedies provided to WARRANT TO herein being the exclusive remedies available under the warranty and are intended for the sole benefit of WARRANT TO. Neither the warranty nor any rights hereunder shall be assignable NWL & G shall have no liability under the warranty to third parties or strangers to this agreement. The warranty set forth above is the only warranty applicable to the installation and all other warranties, expressed or implied, including, but not limited to, any warranty of merchantability or fitness for a purpose are disclaimed. In no event shall NWL & G be liable for any direct, indirect, incidental, special, or consequential damages for, resulting from, or in the connection with, any loss resulting from the use of the Geosynthetic.

By issuance of this Warranty NWL & G assumes no responsibility whatsoever for and cannot be held liable in any way for any claim, demand, loss, damage or injury arising from, resulting from or connected with any engineering design or characteristic resulting in failure.

Except for the warranty set forth above, no representation or warranty made by any sales or other representative of NWL & G, or any other person, concerning the installation shall be binding upon NWL & G.

WARRANT TO'S failure to pay NWL & G for full contract value, retainage, change orders, or any other project specific invoices will void this warranty unless waived in writing by NWL & G company officer.

Any waiver of the terms and conditions of the Warranty shall be in writing signed by NWL & G. The failure to insist upon strict compliance with any of the terms and conditions contained herein shall not act as a waiver of strict compliance with all the remaining terms and conditions of the Warranty and shall not operate as a waiver as to any of the terms and conditions of the Warranty as to future claims under the Warranty

NORTHWEST LININGS & GEOTEXTILE PRODUCTS, INC.

BY:



Scott Newton, President

10/10/25

Date

I, a representative of (WARRANT TO), have read and agree to the terms and conditions of the Warranty.

BY:

Mat-sSu Borough Central LF

Warranty Holder

Kent Crafton

Printed Name

Title

Matanuska-Susitna Borough

Company

Signature

Date

BURNS & MCDONNELL ENGINEERING CO., INC.

MATERIAL RECEIVED LOG

Client:	MatSu Borough Central Landfill
Project Location:	1201 N 49th State St., Palmer AK 99645
Project Number:	190062
Contractor:	Southcentral Construction, Inc.
Supplier:	Agru
Installer:	Northwest Linings & Geotextile Products, Inc.
CQA Monitor:	Becca Heaman

Date	Roll	Roll Size			Date QC	Date	Panel	Resin	Material
Rcvd	No.	W (ft)	L (ft)	Sq. Ft.	Docs Rcvd	Manufactured	Number(s)	Number	Type
9/25/2025	FND0159700001	23	500	11500	9/8/2025	8/26/2025	P23-P25, P32	PSD821430	HDPE DS MicroSpike 60mil Black 5% Spec
9/25/2025	FND0159700002	23	500	11500	9/8/2025	8/26/2025	P34-P38	PSD821430	HDPE DS MicroSpike 60mil Black 5% Spec
9/25/2025	FND0159700003	23	500	11500	9/8/2025	8/27/2025	P42-P42, P46-P51	PSD821430	HDPE DS MicroSpike 60mil Black 5% Spec
9/25/2025	FND0159700004	23	500	11500	9/8/2025	8/27/2025	P16-17, P20-P22	PSD821430	HDPE DS MicroSpike 60mil Black 5% Spec
9/25/2025	FND0159700005	23	500	11500	9/8/2025	8/27/2025	P1-P4, P12, P26	PSD821430	HDPE DS MicroSpike 60mil Black 5% Spec
9/25/2025	FND0159700006	23	500	11500	9/8/2025	8/27/2025	P39-P41, P57	PSD821430	HDPE DS MicroSpike 60mil Black 5% Spec
9/25/2025	FND0159700007	23	500	11500	9/8/2025	8/27/2025	P27-P31, P33, P44-P45, P55-P56	PSD821430	HDPE DS MicroSpike 60mil Black 5% Spec
9/25/2025	FND0159700008	23	500	11500	9/8/2025	8/27/2025	P13-P15, P18-P19	PSD821430	HDPE DS MicroSpike 60mil Black 5% Spec
9/25/2025	FND0159700009	23	500	11500	9/8/2025	8/27/2025	P5-P11, P52-P54	PSD821430	HDPE DS MicroSpike 60mil Black 5% Spec
9/24/2025	FND0159700010	23	500	11500	9/8/2025	8/27/2025		PSD821430	HDPE DS MicroSpike 60mil Black 5% Spec
9/24/2025	FND0159700011	23	500	11500	9/8/2025	8/27/2025		PSD821430	HDPE DS MicroSpike 60mil Black 5% Spec

BURNS & MCDONNELL ENGINEERING CO., INC.

MATERIAL RECEIVED LOG

Client:

MatSu Borough Central Landfill

Project Location

1201 N 49th State St., Palmer AK 99645

Project Number:

190062

Contractor:

Southcentral Construction, Inc.

Supplier:

Agru

Installer:

Northwest Linings & Geotextile Products, Inc.

CQA Monitor:

Becca Heaman

Date	Roll	Roll Size			Date QC	Date	Panel	Resin	Material
Rcvd	No.	W (ft)	L (ft)	Sq. Ft.	Docs Rcvd	Manufactured	Number(s)	Number	Type
9/24/2025	FND0159710002	23	500	11500	9/8/2025	8/28/2025	SP10, SP13	DSD812520	LLDPE DS MicroSpike 60mil Black 5% Spec
9/24/2025	FND0159710006	23	500	11500	9/8/2025	8/28/2025	SP01, SP06-SP07	DSD812520	LLDPE DS MicroSpike 60mil Black 5% Spec
9/24/2025	FND0159710007	23	500	11500	9/8/2025	8/28/2025	SP02-SP05, SP11, SP14	DSD812520	LLDPE DS MicroSpike 60mil Black 5% Spec
9/24/2025	FND0159710008	23	500	11500	9/8/2025	8/28/2025	SP15, SP17-SP19	DSD812520	LLDPE DS MicroSpike 60mil Black 5% Spec
9/24/2025	FND0159710009	23	500	11500	9/8/2025	8/28/2025	SP08-SP09	DSD812520	LLDPE DS MicroSpike 60mil Black 5% Spec
9/24/2025	FND0159710010	23	500	11500	9/8/2025	8/28/2025	SP12, SP16, SP20	DSD812520	LLDPE DS MicroSpike 60mil Black 5% Spec

BURNS & MCDONNELL ENGINEERING CO., INC.

PLACEMENT LOG

Client:	MatSu Borough Central Landfill
Project Location:	1201 N 49th State St., Palmer AK 99645
Project Number:	190062
Contractor:	Southcentral Construction, Inc.
Supplier:	Agru
Installer:	Northwest Linings & Geotextile Products, Inc.
CQA Monitor:	Becca Heaman

Panel #	Roll #	Date Placed	Panel		Panel Area (sf)	Material Type
			W (ft)	L (ft)		
P01	FND0159700005	9/28/2025	23	121	2,783.0	HDPE DS MicroSpike 60mil Black 5% Spec
P02	FND0159700005	9/28/2025	23	123	2,829.0	HDPE DS MicroSpike 60mil Black 5% Spec
P03	FND0159700005	9/28/2025	23	109	2,507.0	HDPE DS MicroSpike 60mil Black 5% Spec
P04	FND0159700005	9/28/2025	23	89	2,047.0	HDPE DS MicroSpike 60mil Black 5% Spec
P05	FND0159700009	9/28/2025	23	70	1,610.0	HDPE DS MicroSpike 60mil Black 5% Spec
P06	FND0159700009	9/28/2025	23	51	1,173.0	HDPE DS MicroSpike 60mil Black 5% Spec
P07	FND0159700009	9/28/2025	23	112	2,576.0	HDPE DS MicroSpike 60mil Black 5% Spec
P08	FND0159700009	9/28/2025	23	87	2,001.0	HDPE DS MicroSpike 60mil Black 5% Spec
P09	FND0159700009	9/28/2025	23	66	1,518.0	HDPE DS MicroSpike 60mil Black 5% Spec
P10	FND0159700009	9/28/2025	23	41 (sub triangle)	701.5	HDPE DS MicroSpike 60mil Black 5% Spec
P11	FND0159700009	9/28/2025	23	21 (triangle)	241.5	HDPE DS MicroSpike 60mil Black 5% Spec
P12	FND0159700005	9/28/2025	23	32	736.0	HDPE DS MicroSpike 60mil Black 5% Spec
P13	FND0159700008	9/29/2025	23	130	2,990.0	HDPE DS MicroSpike 60mil Black 5% Spec
P14	FND0159700008	9/29/2025	23	117	2,691.0	HDPE DS MicroSpike 60mil Black 5% Spec
P15	FND0159700008	9/29/2025	23	91	2,093.0	HDPE DS MicroSpike 60mil Black 5% Spec
P16	FND0159700004	9/29/2025	23	68	1,564.0	HDPE DS MicroSpike 60mil Black 5% Spec
P17	FND0159700004	9/29/2025	23	38	874.0	HDPE DS MicroSpike 60mil Black 5% Spec
P18	FND0159700008	9/29/2025	23	19	437.0	HDPE DS MicroSpike 60mil Black 5% Spec
P19	FND0159700008	9/29/2025	23	130	2,990.0	HDPE DS MicroSpike 60mil Black 5% Spec
P20	FND0159700004	9/29/2025	23	130	2,990.0	HDPE DS MicroSpike 60mil Black 5% Spec
P21	FND0159700004	9/29/2025	23	130	2,990.0	HDPE DS MicroSpike 60mil Black 5% Spec
P22	FND0159700004	9/29/2025	23	130	2,990.0	HDPE DS MicroSpike 60mil Black 5% Spec
P23	FND0159700001	9/29/2025	23	130	2,990.0	HDPE DS MicroSpike 60mil Black 5% Spec
P24	FND0159700001	9/29/2025	23	130	2,990.0	HDPE DS MicroSpike 60mil Black 5% Spec
P25	FND0159700001	9/29/2025	23	130	2,990.0	HDPE DS MicroSpike 60mil Black 5% Spec
P26	FND0159700005	9/30/2025	18	16	288.0	HDPE DS MicroSpike 60mil Black 5% Spec
P27	FND0159700007	9/30/2025	12	10	120.0	HDPE DS MicroSpike 60mil Black 5% Spec
P28	FND0159700007	9/30/2025	23	31	713.0	HDPE DS MicroSpike 60mil Black 5% Spec
P29	FND0159700007	9/30/2025	23	37	851.0	HDPE DS MicroSpike 60mil Black 5% Spec
P30	FND0159700007	9/30/2025	23	52	1,196.0	HDPE DS MicroSpike 60mil Black 5% Spec
P31	FND0159700007	9/30/2025	23	67	1,541.0	HDPE DS MicroSpike 60mil Black 5% Spec
P32	FND0159700001	9/30/2025	23	78	1,794.0	HDPE DS MicroSpike 60mil Black 5% Spec
P33	FND0159700007	10/1/2025	23	130	2,990.0	HDPE DS MicroSpike 60mil Black 5% Spec
P34	FND0159700002	10/1/2025	23	130	2,990.0	HDPE DS MicroSpike 60mil Black 5% Spec
P35	FND0159700002	10/1/2025	23	131	3,013.0	HDPE DS MicroSpike 60mil Black 5% Spec
P36	FND0159700002	10/2/2025	23	134	3,082.0	HDPE DS MicroSpike 60mil Black 5% Spec
P37	FND0159700002	10/2/2025	20	27	540.0	HDPE DS MicroSpike 60mil Black 5% Spec
P38	FND0159700002	10/2/2025	23	101	2,323.0	HDPE DS MicroSpike 60mil Black 5% Spec
P39	FND0159700006	10/2/2025	23	120	2,760.0	HDPE DS MicroSpike 60mil Black 5% Spec
P40	FND0159700006	10/2/2025	23	130	2,990.0	HDPE DS MicroSpike 60mil Black 5% Spec
P41	FND0159700006	10/2/2025	23	121	2,783.0	HDPE DS MicroSpike 60mil Black 5% Spec

BURNS & MCDONNELL ENGINEERING CO., INC.

PLACEMENT LOG

Client:	MatSu Borough Central Landfill
Project Location:	1201 N 49th State St., Palmer AK 99645
Project Number:	190062
Contractor:	Southcentral Construction, Inc.
Supplier:	Agru
Installer:	Northwest Linings & Geotextile Products, Inc.
CQA Monitor:	Becca Heaman

Panel #	Roll #	Date Placed	Panel		Panel Area (sf)	Material Type
			W (ft)	L (ft)		
P42	FND0159700003	10/2/2025	23	109	2,507.0	HDPE DS MicroSpike 60mil Black 5% Spec
P43	FND0159700003	10/2/2025	17	134	2,278.0	HDPE DS MicroSpike 60mil Black 5% Spec
P44	FND0159700007	10/3/2025	16	22	352.0	HDPE DS MicroSpike 60mil Black 5% Spec
P45	FND0159700007	10/3/2025	23	25	575.0	HDPE DS MicroSpike 60mil Black 5% Spec
P46	FND0159700003	10/3/2025	23	32	736.0	HDPE DS MicroSpike 60mil Black 5% Spec
P47	FND0159700003	10/3/2025	23	31	713.0	HDPE DS MicroSpike 60mil Black 5% Spec
P48	FND0159700003	10/3/2025	23	41	943.0	HDPE DS MicroSpike 60mil Black 5% Spec
P49	FND0159700003	10/3/2025	23	41	943.0	HDPE DS MicroSpike 60mil Black 5% Spec
P50	FND0159700003	10/3/2025	23	43	989.0	HDPE DS MicroSpike 60mil Black 5% Spec
P51	FND0159700003	10/3/2025	23	43	989.0	HDPE DS MicroSpike 60mil Black 5% Spec
P52	FND0159700009	10/3/2025	7	21	147.0	HDPE DS MicroSpike 60mil Black 5% Spec
P53	FND0159700009	10/3/2025	7	21	147.0	HDPE DS MicroSpike 60mil Black 5% Spec
P54	FND0159700009	10/3/2025	23	32	736.0	HDPE DS MicroSpike 60mil Black 5% Spec
P55	FND0159700007	10/3/2025	23	42	966.0	HDPE DS MicroSpike 60mil Black 5% Spec
P56	FND0159700007	10/3/2025	23	52	1,196.0	HDPE DS MicroSpike 60mil Black 5% Spec
P57	FND0159700006	10/3/2025	23	63	1,449.0	HDPE DS MicroSpike 60mil Black 5% Spec
SP01	FND0159710006	9/30/2025	23	276	6,348.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP02	FND0159710010	9/30/2025	12	17	204.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP03	FND0159710010	9/30/2025	23	79	1,817.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP04	FND0159710010	9/30/2025	23	130	2,990.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP05	FND0159710010	9/30/2025	23	97	2,231.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP06	FND0159710006	9/30/2025	23	90	2,070.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP07	FND0159710006	9/30/2025	23	98	2,254.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP08	FND0159710009	9/30/2025	23	150	3,450.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP09	FND0159710009	9/30/2025	23	303	6,969.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP10	FND0159710002	10/3/2025	23	338	7,774.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP11	FND0159710007	10/3/2025	23	351	8,073.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP12	FND0159710010	10/3/2025	23	90	2,070.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP13	FND0159710002	10/3/2025	23	144	3,312.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP14	FND0159710007	10/3/2025	23	124	2,852.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP15	FND0159710008	10/6/2025	23	370	8,510.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP16	FND0159710009	10/6/2025	7	30	210.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP17	FND0159710008	10/6/2025	7	108	756.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP18	FND0159710008	10/6/2025	7	134	938.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP19	FND0159710008	10/6/2025	7	135	945.0	LLDPE DS MicroSpike 60mil Black 5% Spec
SP20	FND0159710009	10/6/2025	19	13	247.0	LLDPE DS MicroSpike 60mil Black 5% Spec

BURNS & MCDONNELL ENGINEERING CO., INC.

TRIAL WELD LOG

Client:	MatSu Borough Central Landfill
Project Location:	1201 N 49th State St., Palmer AK 99645
Project Number:	190062
Contractor:	Southcentral Construction, Inc.
Supplier:	Agru
Installer:	Northwest Linings & Geotextile Products, Inc.
CQA Monitor:	Becca Heaman

Number	Date of Trial	Time of Trial	Machine Type & Number	Machine Sequant / Speed	Machine Temp. (deg. F)	Name of Operator	Ambient Temp. (deg. F)	Peel (psi)	Shear (psi)	Type	Material	Pass / Fail	Notes
TW01	9/28/2025	13:35	5845	500	800	XX	47	117 115 121 133 103 117	171 175	Fusion	HDPE	Pass	Smooth/smooth
TW02	9/28/2025	14:50	5515	500	800	MP	50	122 120 122 111 111 128	166 184	Fusion	HDPE	Pass	Smooth/smooth
TW03	9/29/2025	13:09	5515	500	800	MP	52	124 126 115 123 108 121	169 172	Fusion	HDPE	Pass	Smooth/smooth
TW04	9/29/2025	13:15	5845	500	800	XX	52	115 115 107 104 103 112	182 180	Fusion	HDPE	Pass	Smooth/smooth
TW05	9/29/2025	13:17	5845	450	800	XX	52	136 146 139 136 154 137	164 167	Fusion	HDPE	Pass	Textured/textured
TW06	9/29/2025	16:38	5515	500	800	MP	55	152 137 134 157 153 165	190 184	Fusion	HDPE	Pass	Textured/textured
TW07	9/30/2025	8:43	5845	500	800	XX	36	129 136 135 117 138 142	207 185	Fusion	HDPE	Pass	Smooth/smooth
TW08	9/30/2025	8:50	5845	500	800	XX	36	138 139 144 152 149 152	188 202	Fusion	HDPE	Pass	Textured/textured
TW09	9/30/2025	13:53	5845	500	800	XX	53	115 112 110 109 114 118	136 135	Fusion	LLDPE	Pass	Smooth/smooth
TW10	9/30/2025	14:07	5515	500	800	MP	53	154 145 136 145 133 139	157 138	Fusion	LLDPE	Pass	Textured/textured
TW11	9/30/2025	14:08	5515	500	800	MP	55	126 114 133 112 124 116	142 143	Fusion	LLDPE	Pass	Smooth/smooth
TW12	9/30/2025	15:55	5515	500	800	MP	54	99 110 114 113 133 113	150 134	Fusion	LLDPE	Pass	Smooth/textured
TW13	9/30/2025	16:18	5845	500	800	XX	54	94 105 106 106 112 114	161 156	Fusion	HDPE	Pass	Smooth/smooth
TW14	9/30/2025	17:00	5515	500	800	MP	55	141 139 137 133 128 131	150 156	Fusion	LLDPE/HDPE	Pass	Textured/textured
TW15	9/30/2025	17:30	7223	500	500	SA	54	104 148 139 - - -	183 168	Extrusion	HDPE	Pass	Textured/textured
TW16	9/30/2025	17:43	5845	500	800	MP	54	134 125 120 123 128 114	166 122	Fusion	HDPE	Pass	Textured/textured
TW17	10/1/2025	7:39	5515	500	800	MP	39	144 129 136 133 135 135	208 164	Fusion	HDPE	Pass	Smooth/smooth
TW18	10/1/2025	7:59	5515	500	800	MP	39	140 149 164 136 132 151	188 206	Fusion	HDPE	Pass	Textured/textured
TW19	10/1/2025	8:22	5874	500	800	XX	39	123 117 120 132 126 134	202 148	Fusion	HDPE	Pass	Smooth/smooth
TW20	10/2/2025	10:46	5874	500	800	XX	44	126 139 142 145 125 117	199 193	Fusion	HDPE	Pass	Smooth/smooth
TW21	10/2/2025	10:48	5874	500	800	XX	44	150 138 143 166 144 143	165 154	Fusion	HDPE	Pass	Textured/textured
TW22	10/2/2025	11:05	5515	500	800	MP	44	123 125 127 126 117 129	185 164	Fusion	HDPE	Pass	Smooth/smooth
TW23	10/2/2025	11:55	5515	500	800	MP	45	176 144 174 158 142 159	151 156	Fusion	HDPE	Pass	New Cell 4 Exp. textured/Existing Cell 4
TW24	10/2/2025	12:45	5515	500	800	MP	46	111 112 113 105 116 111	190 188	Fusion	HDPE	Pass	Smooth/textured
TW25	10/2/2025	13:37	6985	500	500	SA	49	153 143 144 - - -	161 164	Extrusion	HDPE	Pass	Textured/textured
TW26	10/2/2025	14:50	5874	500	800	XX	50	149 119 118 117 114 127	172 165	Fusion	HDPE	Pass	Smooth/smooth
TW27	10/2/2025	14:55	5874	500	800	XX	50	144 134 142 155 116 145	166 159	Fusion	HDPE	Pass	Textured/textured
TW28	10/2/2025	15:18	5515	500	800	MP	50	119 156 179 147 151 156	144 152	Fusion	HDPE	Pass	New Cell 4 Exp. textured/Existing Cell 4
TW29	10/2/2025	15:33	6985	500	500	SA	51	127 140 126 - - -	174 176	Extrusion	HDPE	Pass	New Cell 4 Exp. textured/Existing Cell
TW30	10/2/2025	17:35	6985	500	500	SA	52	91 139 145 - - -	176 175	Extrusion	HDPE	Pass	New Cell 4 Exp. textured/Existing Cell 4
TW31	10/3/2025	10:40	5515	500	800	MP	44	125 129 136 142 138 127	136 158	Fusion	LLDPE	Pass	Smooth/smooth
TW32	10/3/2025	10:41	5515	500	800	MP	44	155 152 162 156 155 148	168 178	Fusion	LLDPE	Pass	Textured/textured
TW33	10/3/2025	10:47	5874	500	800	XX	44	124 116 125 123 138 138	153 156	Fusion	LLDPE	Pass	Smooth/smooth
TW34	10/3/2025	10:49	5874	500	800	XX	44	143 142 143 146 143 136	153 139	Fusion	LLDPE	Pass	Textured/textured
TW35	10/3/2025	11:52	5845	450	800	JS	43	141 152 167 107 112 105	187 186	Fusion	HDPE	Pass	Textured/smooth
TW36	10/3/2025	11:53	5845	500	800	JS	43	146 - - 101 - -	- -	Fusion	HDPE	Fail, weld tore	Smooth/smooth
TW37	10/3/2025	13:09	5515	500	800	XX	45	115 117 121 132 115 124	191 209	Fusion	HDPE	Pass	Smooth/smooth
TW38	10/3/2025	13:10	5515	500	800	XX	45	115 127 123 140 136 123	174 198	Fusion	LLDPE/HDPE	Pass	Textured/textured
TW39	10/3/2025	13:27	5515	500	800	MP	47	145 164 154 142 133 134	151 182	Fusion	HDPE	Pass	Textured/textured
TW40	10/3/2025	13:28	5515	500	800	MP	47	125 130 130 138 132 134	193 202	Fusion	HDPE	Pass	Smooth/smooth
TW41	10/3/2025	15:33	6985	500	500	SA	45	147 149 154 - - -	170 166	Extrusion	HDPE	Pass	Textured/textured
TW42	10/3/2025	17:04	5874	500	800	XX	49	124 113 127 123 94 108	187 177	Fusion	HDPE	Pass	Smooth/textured
TW43	10/5/2025	12:41	6985	500	500	SA	53	115 126 123 - - -	158 161	Extrusion	HDPE	Pass	Textured/textured
TW44	10/6/2025	7:42	5874	500	800	XX	43	117 122 124 123 121 139	150 150	Fusion	LLDPE	Pass	Smooth/smooth
TW45	10/6/2025	7:43	5874	500	800	XX	43	115 153 160 112 145 152	167 161	Fusion	LLDPE	Pass	Textured/textured
TW46	10/6/2025	9:00	5515	500	800	MP	44	142 138 150 152 132 152	179 166	Fusion	LLDPE/HDPE	Pass	Textured/textured
TW47	10/6/2025	9:07	5515	500	800	MP	44	149 141 147 151 155 149	176 181	Fusion	HDPE	Pass	Textured/textured
TW48	10/6/2025	10:55	5874	450	800	XX	48	122 123 123 126 126 133	154 146	Fusion	LLDPE	Pass	Smooth/textured
	10/6/2025	11:13	6985	500	500	SA	48	126 133 137 - - -	179 186	Extrusion	HDPE	Pass	

BURNS & MCDONNELL ENGINEERING CO., INC.

TRIAL WELD LOG

Client: MatSu Borough Central Landfill
Project Location: 1201 N 49th State St., Palmer AK 99645
Project Number: 190062
Contractor: Southcentral Construction, Inc.
Supplier: Agru
Installer: Northwest Linings & Geotextile Products, Inc.
CQA Monitor: Becca Heaman

Number	Date of Trial	Time of Trial	Machine Type & Number	Machine Setpoint / Speed	Machine Temp. (deg. F)	Name of Operator	Ambient Temp. (deg. F)	Peel (psi)	Shear (psi)	Type	Material	Pass / Fail	Notes
TW49								- - -	- - -				Textured/textured
TW50	10/6/2025	14:19	7355	400	500	JS	50	129 133 133 - - -	141 141	Extrusion	LLDPE	Pass	Textured/textured
TW51	10/6/2025	14:20	6985	500	500	SA	50	153 148 144 - - -	157 156	Extrusion	HDPE	Pass	Textured/textured
TW52	10/6/2025	17:50	7355	490	490	JS	50	139 144 147 - - -	147 149	Extrusion	LLDPE/HDPE	Pass	Textured/textured
TW53	10/7/2025	7:38	6985	500	500	SA	40	153 126 147 - - -	179 190	Extrusion	LLDPE/HDPE	Pass	Textured/textured
TW54	10/7/2025	10:05	6985	500	500	SA	43	124 129 141 - - -	177 173	Extrusion	HDPE	Pass	Textured/textured
TW55	10/7/2025	14:40	5515	350	800	MP	54	161 156 156 160 172 168	185 179	Fusion	HDPE NEWHDPE	Pass	New Textured/Cell 2B textured
TW56	10/7/2025	15:40	5515	500	800	MP	54	133 135 155 153 131 130	179 179	Fusion	HDPE	Pass	Textured/textured
TW57	10/7/2025	15:45	5515	500	800	MP	54	117 113 109 116 93 112	152 154	Fusion	HDPE	Pass	Smooth/textured
TW58	10/7/2025	17:35	6985	500	500	SA	52	97 121 117 - - -	171 169	Extrusion	HDPE	Pass	Textured/textured
TW59	10/8/2025	9:50	6985	550	550	SA	47	136 135 129 - - -	166 161	Extrusion	HDPE	Pass	Textured/textured
TW60	10/8/2025	11:30	7355	500	500	NM	54	125 119 133 - - -	131 134	Extrusion	LLDPE	Pass	Textured/textured
TW61	10/8/2025	15:15	6985	500	500	SA	53	105 140 150 - - -	164 155	Extrusion	HDPE	Pass	Textured/textured
TW62	10/9/2025	11:57	7355	500	500	MP	50	126 135 120 - - -	195 185	Extrusion	HDPE	Pass	New Textured/Cell 2B textured

BURNS & MCDONNELL ENGINEERING CO., INC.

FUSION SEAMING LOG

Client: MatSu Borough Central Landfill
Project Location: 1201 N 49th State St., Palmer AK 99645
Project Number: 190062
Contractor: Southcentral Construction, Inc.
Supplier: Agru
Installer: Northwest Linings & Geotextile Products, Inc.
CQA Monitor: Becca Heaman

Date	Seam No.	Start Time	Seam Length (ft)	Traveling Direction	Machine Type and Number	Name of Operator	Machine Settings	
							Temperature	Machine Speed
9/28/2025	P2/P1	14:00	121	South	5845	XX	800	500
9/28/2025	P3/P2	14:30	109	South	5845	XX	800	500
9/28/2025	P4/P3	14:50	89	South	5845	XX	800	500
9/28/2025	P5/P4	15:10	70	South	5845	XX	800	500
9/28/2025	P6/P5	15:30	51	South	5845	XX	800	500
9/28/2025	P8/P7	15:19	87	North	5515	MP	800	500
9/28/2025	P12/P6	15:35	32	South	5845	XX	800	500
9/28/2025	P9/P8	15:38	66	North	5515	MP	800	500
9/28/2025	P10/P9	16:14	41	North	5515	MP	800	500
9/28/2025	P7/P1	15:53	112	North	5515	MP	800	500
9/28/2025	P11/P10	16:24	21	North	5515	MP	800	500
9/29/2025	P13/P19	13:23	130	West	5515	MP	800	500
9/29/2025	P14/P13	14:09	117	West	5515	MP	800	500
9/29/2025	P20/P19	14:14	130	East	5845	XX	800	500
9/29/2025	P15/P14	14:33	91	West	5515	MP	800	500
9/29/2025	P16/P15	14:52	68	West	5515	MP	800	500
9/29/2025	P21/P20	14:36	130	East	5845	XX	800	500
9/29/2025	P22/P21	14:56	130	East	5845	XX	800	500
9/29/2025	P17/P16	15:06	38	West	5515	MP	800	500
9/29/2025	P18/P17	15:19	19	West	5515	MP	800	500
9/29/2025	P23/P22	15:23	130	East	5845	XX	800	500
9/29/2025	P24/P23	16:07	130	East	5845	XX	800	500
9/29/2025	P25/P24	16:27	130	East	5845	XX	800	500
9/29/2025	P14/P1	17:06	17	Northeast	5515	MP	800	500
9/29/2025	P14/P7	17:06	19	Northeast	5515	MP	800	500
9/29/2025	P15/P7	17:06	13	Northeast	5515	MP	800	500
9/29/2025	P15/P8	17:06	24	Northeast	5515	MP	800	500
9/29/2025	P16/P8	17:06	10	Northeast	5515	MP	800	500
9/29/2025	P16/P9	17:06	26	Northeast	5515	MP	800	500
9/29/2025	P17/P9	17:06	6	Northeast	5515	MP	800	500
9/29/2025	P17/P10	17:06	31	Northeast	5515	MP	800	500
9/29/2025	P18/P10	17:06	2	Northeast	5515	MP	800	500
9/29/2025	P18/P11	17:06	16	Northeast	5515	MP	800	500
9/30/2025	SP01/SP02	16:14	23	Southwest	5515	MP	800	500
9/30/2025	SP01/SP03	16:14	49	Southwest	5515	MP	800	500
9/30/2025	SP01/SP04	16:14	50	Southwest	5515	MP	800	500
9/30/2025	SP01/SP05	16:33	48	Southwest	5515	MP	800	500
9/30/2025	SP01/SP07	16:41	51	Southwest	5515	MP	800	500
9/30/2025	SP01/SP09	16:48	53	Southwest	5515	MP	800	500
9/30/2025	SP07/SP09	14:53	112	West	5845	XX	800	500
9/30/2025	SP05/SP07	15:14	69	West	5845	XX	800	500
9/30/2025	SP05/SP08	15:14	48	West	5845	XX	800	500
9/30/2025	SP06/SP08	15:14	98	West	5845	XX	800	500
9/30/2025	SP08/SP09	14:30	157	West	5845	XX	800	500
9/30/2025	SP07/SP08	15:00	22	South	5515	MP	800	500
9/30/2025	SP05/SP06	15:09	22	South	5515	MP	800	500

BURNS & MCDONNELL ENGINEERING CO., INC.

FUSION SEAMING LOG

Client: MatSu Borough Central Landfill
Project Location: 1201 N 49th State St., Palmer AK 99645
Project Number: 190062
Contractor: Southcentral Construction, Inc.
Supplier: Agru
Installer: Northwest Linings & Geotextile Products, Inc.
CQA Monitor: Becca Heaman

Date	Seam No.	Start Time	Seam Length (ft)	Traveling Direction	Machine Type and Number	Name of Operator	Machine Settings	
							Temperature	Machine Speed
9/30/2025	SP04/SP05	15:23	73	West	5515	MP	800	500
9/30/2025	SP04/SP06	15:23	84	West	5515	MP	800	500
9/30/2025	SP03/SP04	15:49	93	West	5515	MP	800	500
9/30/2025	SP02/SP03	16:04	29	West	5845	XX	800	500
9/30/2025	SP01/P26	18:00	22	Southeast	5515	MP	800	500
9/30/2025	SP02/P26	18:00	3	Southeast	5515	MP	800	500
9/30/2025	SP02/P27	18:00	10	Southeast	5515	MP	800	500
9/30/2025	SP03/P28	18:06	30	Southeast	5515	MP	800	500
9/30/2025	SP04/P29	18:11	29	Southeast	5515	MP	800	500
9/30/2025	SP06/P30	18:15	27	Southeast	5515	MP	800	500
9/30/2025	SP08/P31	18:18	26	Southeast	5515	MP	800	500
9/30/2025	SP09/P32	18:23	25	Southeast	5515	MP	800	500
9/30/2025	P26/P27	19:44	7	West	5515	MP	800	500
9/30/2025	P27/P28	17:22	19	West	5845	XX	800	500
9/30/2025	P28/P29	17:07	32	West	5845	XX	800	500
9/30/2025	P29/P30	17:07	45	West	5845	XX	800	500
9/30/2025	P30/P31	16:43	57	West	5845	XX	800	500
9/30/2025	P31/P32	16:27	59	West	5845	XX	800	500
9/30/2025	P26/P12	18:47	16	South	5845	XX	800	500
10/1/2025	P27/P12	8:22	20	Southeast	5515	PM	800	500
10/1/2025	P28/P12	8:26	7	Southeast	5515	PM	800	500
10/1/2025	P28/P06	8:29	29	Southeast	5515	PM	800	500
10/1/2025	P28/P05	8:33	6	Southeast	5515	PM	800	500
10/1/2025	P29/P05	8:35	26	Southeast	5515	PM	800	500
10/1/2025	P29/P04	8:39	15	Southeast	5515	PM	800	500
10/1/2025	P30/P04	8:42	20	Southeast	5515	PM	800	500
10/1/2025	P30/P03	8:45	18	Southeast	5515	PM	800	500
10/1/2025	P31/P03	8:50	16	Southeast	5515	PM	800	500
10/1/2025	P31/P02	8:55	15	Southeast, South	5515	PM	800	500
10/1/2025	P25/P33	8:46	130	West	5874	XX	800	500
10/1/2025	P33/P34	9:03	130	West	5874	XX	800	500
10/1/2025	P34/P35	9:00	130	West	5515	MP	800	500
10/2/2025	P35/P36	11:54	134	West	5874	XX	800	500
10/2/2025	P37/P38	12:46	46	West	5874	XX	800	500
10/2/2025	P38/P39	12:30	100	West	5874	XX	800	500
10/2/2025	P39/P40	12:22	120	West	5515	MP	800	500
10/2/2025	P36/P37	13:10	51	West	5515	MP	800	500
10/2/2025	P36/P38	13:19	60	West	5515	MP	800	500
10/2/2025	P36/P39	13:28	20	West	5515	MP	800	500
10/2/2025	P40/P41	15:30	121	West	5874	XX	800	500
10/2/2025	P41/P42	15:51	109	West	5874	XX	800	500
10/2/2025	P42/P43	16:10	112	West	5874	XX	800	500
10/2/2025	P43/Cell 4	16:21	118	West	5515	MP	800	500
10/3/2025	SP09/SP10	11:15	326	West	5515	MP	800	500
10/3/2025	SP10/SP11	11:32	351	West	5874	XX	800	500
10/3/2025	SP11/SP14	12:29	124	West	5515	MP	800	500

BURNS & MCDONNELL ENGINEERING CO., INC.

FUSION SEAMING LOG

Client: MatSu Borough Central Landfill
Project Location: 1201 N 49th State St., Palmer AK 99645
Project Number: 190062
Contractor: Southcentral Construction, Inc.
Supplier: Agru
Installer: Northwest Linings & Geotextile Products, Inc.
CQA Monitor: Becca Heaman

Date	Seam No.	Start Time	Seam Length (ft)	Traveling Direction	Machine Type and Number	Name of Operator	Machine Settings	
							Temperature	Machine Speed
10/3/2025	SP11/SP13	12:50	144	West	5515	MP	800	500
10/3/2025	SP11/SP12	12:35	91	West	5874	XX	800	500
10/3/2025	SP13/SP14	12:22	22	South	5515	MP	800	500
10/3/2025	SP12/SP13	12:25	22	South	5874	XX	800	500
10/3/2025	P57/P56	13:58	52	West	5874	XX	800	500
10/3/2025	P32/P57	13:47	63	West	5874	XX	800	500
10/3/2025	P56/P55	14:08	42	West	5874	XX	800	500
10/3/2025	P13/P32	14:48	20	North	5515	MP	800	500
10/3/2025	P2/P32	12:25	16	West	5845	JS	800	450
10/3/2025	P55/P54	16:07	32	West	5874	XX	800	500
10/3/2025	P54/P52	16:43	20	West	5874	XX	800	500
10/3/2025	P54/P53	16:43	36	West	5874	XX	800	500
10/3/2025	P53/P52	16:30	6	South	5874	XX	800	500
10/3/2025	P53/P51	16:24	19	West	5874	XX	800	500
10/3/2025	P52/P51	16:23	21	West	5874	XX	800	500
10/3/2025	P51/P50	15:19	43	West	5515	MP	800	500
10/3/2025	P50/P49	15:28	41	West	5515	MP	800	500
10/3/2025	P49/P48	15:27	41	West	5874	XX	800	500
10/3/2025	P48/P47	15:23	31	West	5874	XX	800	500
10/3/2025	P47/P46	15:16	32	West	5874	XX	800	500
10/3/2025	P46/P45	15:10	25	West	5874	XX	800	500
10/3/2025	P45/P44	14:54	22	West	5874	XX	800	500
10/3/2025	P44/P40	15:07	20	West	5874	XX	800	500
10/3/2025	P39/P44	15:50	16	North	5515	MP	800	500
10/3/2025	P36/P45	15:55	22	North	5515	MP	800	500
10/3/2025	P35/P46	16:00	22	North	5515	MP	800	500
10/3/2025	P34/P47	16:05	22	North	5515	MP	800	500
10/3/2025	P33/P48	16:10	22	North	5515	MP	800	500
10/3/2025	P25/P49	16:15	22	North	5515	MP	800	500
10/3/2025	P24/P50	16:20	22	North	5515	MP	800	500
10/3/2025	P23/P51	16:25	22	North	5515	MP	800	500
10/3/2025	P22/P52	16:30	20	North	5515	MP	800	500
10/3/2025	P22/P54	16:35	18	North	5515	MP	800	500
10/3/2025	P21/P55	16:40	22	North	5515	MP	800	500
10/3/2025	P20/P56	16:45	22	North	5515	MP	800	500
10/3/2025	P19/P57	16:50	22	North	5515	MP	800	500
10/3/2025	SP10/P57	14:32	26	Southeast	5874	XX	800	500
10/3/2025	SP11/P56	14:37	24	Southeast	5874	XX	800	500
10/6/2025	SP12/SP15	9:45	88	West	5874	XX	800	500
10/6/2025	SP12/SP13	8:30	22	South	5874	XX	800	500
10/6/2025	SP13/SP14	8:45	22	South	5874	XX	800	500
10/6/2025	SP13/SP15	9:25	144	West	5874	XX	800	500
10/6/2025	SP14/ SP15	8:58	136	West	5874	XX	800	500
10/6/2025	SP15/SP19	10:10	133	West	5874	XX	800	500
10/6/2025	SP15/SP18	10:40	131	West	5874	XX	800	500
10/6/2025	SP15/SP17	11:15	106	West	5874	XX	800	450

BURNS & MCDONNELL ENGINEERING CO., INC.

FUSION SEAMING LOG

Client: MatSu Borough Central Landfill
Project Location: 1201 N 49th State St., Palmer AK 99645
Project Number: 190062
Contractor: Southcentral Construction, Inc.
Supplier: Agro
Installer: Northwest Linings & Geotextile Products, Inc.
CQA Monitor: Becca Heaman

Date	Seam No.	Start Time	Seam Length (ft)	Traveling Direction	Machine Type and Number	Name of Operator	Machine Settings	
							Temperature	Machine Speed
10/6/2025	SP17/SP16	11:39	30	West	5874	XX	800	500
10/6/2025	SP17/SP18	10:00	7	South	5874	XX	800	500
10/6/2025	SP18/SP19	10:10	6	South	5874	XX	800	500
10/6/2025	SP14/P55	10:02	25	Southeast	5515	MP	800	500
10/6/2025	SP15/P54	10:02	22	Southeast	5515	MP	800	500
10/6/2025	SP15/P53	10:02	1	Southeast	5515	MP	800	500
10/6/2025	SP19/P53	10:02	4	Southeast	5515	MP	800	500
10/6/2025	SP20/P51	10:02	19	Southeast	5515	MP	800	500
10/6/2025	SP19/SP20	10:21	13	West	5515	MP	800	500
10/7/2025	R112/ 2B	15:16	7	NW	5515	MP	800	350
10/7/2025	R113/2B	15:16	26	East	5515	MP	800	350
10/7/2025	R114/2B	15:16	5	East	5515	MP	800	350
10/7/2025	R115/2B	15:16	6	NE	5515	MP	800	350
10/7/2025	R116/2B	15:16	12	North	5515	MP	800	350
10/7/2025	R117/2B	15:16	23	North	5515	MP	800	350
10/7/2025	R118/2B	15:16	22	North	5515	MP	800	350
10/7/2025	R112/P43	16:49	7	SE	5515	MP	800	800
10/7/2025	R113/P43	16:49	20	West	5515	MP	800	800
10/7/2025	R114/P43	16:49	6	West	5515	MP	800	800
10/7/2025	R115/P42	16:49	7	SW	5515	MP	800	800
10/7/2025	R116/P42	16:49	12	South	5515	MP	800	800
10/7/2025	R117/P42	16:49	1	South	5515	MP	800	800
10/7/2025	R117/P41	16:49	23	South	5515	MP	800	800
10/7/2025	R118/P41	16:49	3	South	5515	MP	800	800
10/7/2025	R118/P40	16:49	19	South	5515	MP	800	800
10/7/2025	R112/R113	15:07	3	East	5515	MP	800	800
10/7/2025	R114/R113	15:03	4	North	5515	MP	800	800
10/7/2025	R116/R115	15:05	3	West	5515	MP	800	800
10/7/2025	R116/R117	15:09	4	East	5515	MP	800	800
10/7/2025	R117/R118	15:10	5	East	5515	MP	800	800

BURNS & MCDONNELL ENGINEERING CO., INC.

NONDESTRUCTIVE TEST RECORD (Air Pressure Testing)

Client: MatSu Borough Central Landfill
Project Location: 1201 N 49th State St., Palmer AK 99645
Project Number: 190062
Contractor: Southcentral Construction, Inc.
Supplier: Agru
Installer: Northwest Linings & Geotextile Products, Inc.
CQA Monitor: Becca Heaman

Seam No.	Seam Length Tested (ft)	Date	Start Test Time	Start Test Pressure (psi)	End Test Time	End Test Pressure (psi)	Pass/Fail	Tester Name
P12/P6	32	09/30/25	8:29	30	8:34	30	Pass	LB
P6/P5	51	09/30/25	8:40	30	8:45	29	Pass	LB
P5/P4	70	09/30/25	8:41	30	8:46	30	Pass	LB
P4/P3	89	09/30/25	8:58	30	9:03	30	Pass	LB
P3/P2	109	09/30/25	9:02	30	9:07	30	Pass	LB
P2/P1	121	09/30/25	9:11	30	9:16	28	Pass	LB
P7/P1	112	09/30/25	9:28	30	9:33	29	Pass	LB
P8/P7	87	09/30/25	9:21	30	9:26	29	Pass	LB
P9/P8	66	09/30/25	10:09	30	10:14	29	Pass	LB
P10/P9	41	09/30/25	9:45	30	9:50	30	Pass	LB
P11/P10	21	09/30/25	9:58	30	10:03	30	Pass	LB
P18/P11	16	09/30/25	10:00	30	10:05	30	Pass	LB
P18/P17	19	09/30/25	10:13	30	10:18	28	Pass	LB
P17/P10	31	09/30/25	10:14	30	10:19	30	Pass	LB
P17/P16	38	09/30/25	10:17	30	10:22	29	Pass	LB
P17/P9	6	09/30/25	10:21	30	10:26	30	Pass	LB
P16/P9	26	09/30/25	10:22	30	10:27	30	Pass	LB
P16/P8	10	09/30/25	10:25	30	10:30	30	Pass	LB
P16/P15	68	09/30/25	10:28	30	10:33	30	Pass	LB
P15/P8	24	09/30/25	10:33	30	10:38	30	Pass	LB
P15/P7	13	09/30/25	10:34	30	10:39	30	Pass	LB
P14/P7	19	09/30/25	10:42	30	10:47	30	Pass	LB
P15/P14	91	09/30/25	10:39	30	10:44	30	Pass	LB
P14/P1	17	09/30/25	10:47	30	10:52	30	Pass	LB
P14/P13	117	09/30/25	11:15	30	11:20	30	Pass	LB
P13/P19	130	09/30/25	11:16	30	11:21	30	Pass	LB
P20/P19	130	09/30/25	11:17	30	11:22	30	Pass	LB
P21/P20	130	09/30/25	11:27	30	11:32	30	Pass	LB
P22/P21	130	09/30/25	11:28	30	11:33	30	Pass	LB
P23/P22	130	09/30/25	11:29	30	11:34	30	Pass	LB
P24/P23	130	09/30/25	11:46	30	11:51	30	Pass	LB
P25/P24	130	09/30/25	11:49	30	11:54	29	Pass	LB
P25/P33	130	10/01/25	9:27	30	9:32	30	Pass	LB
P33/P34	130	10/01/25	9:36	30	9:41	30	Pass	LB
P35/P34	130	10/01/25	9:29	30	9:34	30	Pass	LB
P35/P36	134	10/02/25	13:24	30	13:29	29	Pass	LB
P36/P37	51	10/02/25	13:31	30	13:36	30	Pass	LB
P37/P38	46	10/02/25	13:32	30	13:37	30	Pass	LB
P36/P38	60	10/02/25	13:35	30	13:40	29	Pass	LB
P38/P39	100	10/02/25	13:40	30	13:45	30	Pass	LB
P36/P39	20	10/02/25	13:39	30	13:44	30	Pass	LB
P39/P40	120	10/02/25	16:25	30	16:30	30	Pass	LB
P40/P41	131	10/02/25	4:26	30	4:31	30	Pass	LB

BURNS & MCDONNELL ENGINEERING CO., INC.

NONDESTRUCTIVE TEST RECORD (Air Pressure Testing)

Client: MatSu Borough Central Landfill
Project Location: 1201 N 49th State St., Palmer AK 99645
Project Number: 190062
Contractor: Southcentral Construction, Inc.
Supplier: Agru
Installer: Northwest Linings & Geotextile Products, Inc.
CQA Monitor: Becca Heaman

Seam No.	Seam Length Tested (ft)	Date	Start Test Time	Start Test Pressure (psi)	End Test Time	End Test Pressure (psi)	Pass/Fail	Tester Name
P41/P42	109	10/02/25	4:27	30	4:32	30	Pass	LB
P43/Cell 4	88	10/02/25	17:08	30	17:13	30	Pass	LB
P43/Cell 4	30	10/02/25	17:09	30	17:14	29	Pass	LB
P28/P12	7	10/03/25	8:33	30	8:38	28	Pass	LB
P27/P12	20	10/03/25	8:32	30	8:37	30	Pass	LB
P28/P06	29	10/03/25	8:34	30	8:39	30	Pass	LB
P29/P05	26	10/03/25	8:46	30	8:51	30	Pass	LB
P29/P04	15	10/03/25	8:47	30	8:52	30	Pass	LB
P30/P04	20	10/03/25	8:58	30	9:03	29	Pass	LB
P30/P03	18	10/03/25	9:04	30	9:09	30	Pass	LB
P31/P03	16	10/03/25	9:25	30	9:30	29	Pass	LB
P26/P12	16	10/03/25	16:05	30	16:10	30	Pass	LB
P26/P27	7	10/03/25	16:06	30	16:11	30	Pass	LB
SP01/P26	22	10/03/25	16:07	30	16:12	30	Pass	LB
SP02/P27	10	10/03/25	16:18	30	16:23	30	Pass	LB
SP03/P28	30	10/03/25	16:19	30	16:24	30	Pass	LB
SP04/P29	29	10/03/25	16:21	30	16:26	30	Pass	LB
SP06/P30	27	10/03/25	16:26	30	16:31	30	Pass	LB
SP08/P31	26	10/03/25	16:31	30	16:36	28	Pass	LB
P13/P32	30	10/03/25	15:19	30	15:24	29	Pass	LB
P2/P32	16	10/03/25	15:16	30	15:21	28	Pass	LB
P31/P32	39	10/03/25	15:34	30	15:39	30	Pass	LB
P32/P57	63	10/03/25	15:39	30	15:44	30	Pass	LB
P19/P56	22	10/03/25	15:49	30	15:54	28	Pass	LB
P21/P55	22	10/05/25	13:08	30	13:13	29	Pass	ST
P22/P54	9	10/05/25	13:45	30	13:50	30	Pass	ST
P22/P54	9	10/05/25	14:00	30	14:05	30	Pass	ST
P55/P54	32	10/05/25	13:14	30	13:19	30	Pass	ST
P54/P52	22	10/05/25	13:36	30	13:41	30	Pass	ST
P52/P51	21	10/05/25	13:54	30	13:59	30	Pass	ST
P22/P52	20	10/05/25	14:06	30	14:11	30	Pass	ST
P23/P51	22	10/05/25	14:14	30	14:19	30	Pass	ST
P51/P50	43	10/05/25	14:28	30	14:33	30	Pass	ST
P54/P53	36	10/05/25	15:15	30	15:20	30	Pass	ST
P53/P52	6	10/05/25	15:15	30	15:20	30	Pass	ST
P24/P50	22	10/05/25	15:24	30	15:29	30	Pass	ST
P53/P51	19	10/05/25	15:50	30	15:55	30	Pass	ST
P25/P49	22	10/05/25	15:22	30	15:27	30	Pass	ST
P50/P49	41	10/05/25	15:29	30	15:34	30	Pass	ST
P49/P48	41	10/05/25	15:32	30	15:37	30	Pass	ST
P33/P48	22	10/05/25	15:35	30	15:40	30	Pass	ST
P34/P47	22	10/05/25	15:41	30	15:46	29	Pass	ST
P48/P47	31	10/05/25	15:39	30	15:44	30	Pass	ST

BURNS & MCDONNELL ENGINEERING CO., INC.**NONDESTRUCTIVE TEST RECORD (Air Pressure Testing)**

Client: MatSu Borough Central Landfill
Project Location: 1201 N 49th State St., Palmer AK 99645
Project Number: 190062
Contractor: Southcentral Construction, Inc.
Supplier: Agru
Installer: Northwest Linings & Geotextile Products, Inc.
CQA Monitor: Becca Heaman

Seam No.	Seam Length Tested (ft)	Date	Start Test Time	Start Test Pressure (psi)	End Test Time	End Test Pressure (psi)	Pass/Fail	Tester Name
P47/P46	32	10/05/25	15:47	30	15:52	30	Pass	ST
P35/P46	22	10/05/25	15:47	30	15:52	30	Pass	ST
P46/P45	25	10/05/25	15:54	30	15:59	30	Pass	ST
P36/P45	22	10/05/25	15:54	30	15:59	30	Pass	ST
P45/P44	22	10/05/25	16:13	30	16:18	30	Pass	ST
P39/P44	16	10/05/25	16:05	30	16:10	30	Pass	ST
P44/P40	20	10/05/25	16:02	30	16:17	30	Pass	ST
SP02/P27	10	10/06/25	9:18	30	9:23	30	Pass	ST
SP03/P28	30	10/06/25	9:19	30	9:24	30	Pass	ST
SP04/P29	29	10/06/25	9:21	30	9:26	30	Pass	ST
SP06/P30	27	10/06/25	9:26	30	9:31	30	Pass	ST
SP08/P31	26	10/06/25	9:31	30	9:36	28	Pass	ST
SP09/P32	25	10/06/25	12:50	30	12:55	29	Pass	ST
SP10/P57	26	10/06/25	12:51	30	12:56	30	Pass	ST
SP11/P56	24	10/06/25	12:55	30	13:00	30	Pass	ST
SP14/P55	25	10/06/25	13:02	30	13:07	29	Pass	ST
SP15/P54	22	10/06/25	13:05	30	13:10	30	Pass	ST
SP19/P51	1	10/06/25	13:08	30	13:13	30	Pass	ST
SP20/P51	4	10/06/25	13:13	30	13:18	30	Pass	ST
SP19/SP20	13	10/06/25	10:27	40	10:32	30	Pass	ST
SP15/SP19	133	10/06/25	11:43	30	11:48	30	Pass	ST
SP15/SP18	131	10/06/25	11:23	30	11:28	30	Pass	ST
SP15/SP17	106	10/06/25	13:45	30	13:50	30	Pass	ST
SP18/SP19	6	10/06/25	11:44	30	11:49	30	Pass	ST
SP17/SP18	7	10/06/25	11:24	30	11:29	30	Pass	ST
SP01/SP02	23	10/06/25	10:06	30	10:11	30	Pass	ST
SP02/SP03	29	10/06/25	10:08	30	10:13	30	Pass	ST
SP01/SP03	49	10/06/25	10:09	30	10:14	30	Pass	ST
SP03/SP04	93	10/06/25	10:24	30	10:29	30	Pass	ST
SP01/SP04	50	10/06/25	10:25	30	10:30	30	Pass	ST
SP04/SP06	84	10/06/25	10:35	30	10:40	30	Pass	ST
SP05/SP06	22	10/06/25	10:39	30	10:41	30	Pass	ST
SP06/SP08	98	10/06/25	10:38	30	10:43	30	Pass	ST
SP05/SP08	48	10/06/25	10:45	30	10:50	30	Pass	ST
SP05/SP07	69	10/06/25	10:48	30	10:53	29	Pass	ST
SP07/SP08	22	10/06/25	10:47	30	10:52	30	Pass	ST
SP01/SP05	48	10/06/25	10:55	30	11:00	30	Pass	ST
SP01/SP07	51	10/06/25	10:56	30	11:01	30	Pass	ST
SP08/SP09	157	10/06/25	10:58	30	10:55	29	Pass	ST
SP07/SP09	112	10/06/25	10:53	30	10:58	30	Pass	ST
SP01/SP09	53	10/06/25	11:03	30	11:08	30	Pass	ST
SP09/SP10	326	10/06/25	11:04	30	11:09	29	Pass	ST
SP10/SP11	351	10/06/25	11:03	30	11:08	30	Pass	ST

BURNS & MCDONNELL ENGINEERING CO., INC.**NONDESTRUCTIVE TEST RECORD (Air Pressure Testing)**

Client: MatSu Borough Central Landfill
Project Location: 1201 N 49th State St., Palmer AK 99645
Project Number: 190062
Contractor: Southcentral Construction, Inc.
Supplier: Agru
Installer: Northwest Linings & Geotextile Products, Inc.
CQA Monitor: Becca Heaman

Seam No.	Seam Length Tested (ft)	Date	Start Test Time	Start Test Pressure (psi)	End Test Time	End Test Pressure (psi)	Pass/Fail	Tester Name
SP11/SP12	91	10/06/25	11:09	30	11:14	30	Pass	ST
SP11/SP13	144	10/06/25	11:10	30	11:15	30	Pass	ST
SP11/SP14	124	10/06/25	11:31	30	11:36	30	Pass	ST
SP12/SP15	88	10/06/25	11:18	30	11:23	30	Pass	ST
SP13/SP15	144	10/06/25	11:17	30	11:22	30	Pass	ST
SP14/SP15	136	10/06/25	11:34	30	11:39	29	Pass	ST
SP12/SP13	22	10/06/25	11:13	30	11:18	30	Pass	ST
SP13/SP14	22	10/06/25	11:32	30	11:37	30	Pass	ST
SP17/SP16	30	10/06/25	13:44	30	13:49	30	Pass	ST
R112/2B	7	10/07/25	17:00	30	17:05	30	Pass	MP
R113/2B	10	10/07/25	17:17	30	17:22	30	Pass	MP
R113/2B	14	10/07/25	17:30	30	17:35	30	Pass	MP
R114/2B	5	10/07/25	17:36	30	17:41	29	Pass	MP
R115/2B	6	10/07/25	18:10	30	18:15	28	Pass	MP
R116/2B	12	10/07/25	18:53	30	18:58	30	Pass	MP
R117/2B	23	10/07/25	18:54	30	18:59	29	Pass	SJ
R118/2B	6	10/07/25	19:07	30	19:12	29	Pass	SJ
R118/2B	15	10/07/25	19:20	30	19:25	30	Pass	SJ
R112/P43	7	10/07/25	17:00	30	17:05	29	Pass	MP
R113/P43	20	10/07/25	17:09	30	17:14	30	Pass	MP
R114/P43	6	10/07/25	18:12	30	18:17	30	Pass	MP
R115/P42	7	10/07/25	18:10	30	18:15	29	Pass	MP
R116/P42	12	10/07/25	18:22	30	18:27	30	Pass	MP
R117/P41	23	10/07/25	19:02	30	19:07	30	Pass	MP
R118/P41	3	10/07/25	19:13	30	19:18	29	Pass	MP
R118/P40	19	10/07/25	19:13	30	19:13	30	Pass	MP
R112/R113	3	10/07/25	17:26	30	17:31	28	Pass	MP
R114/R113	4	10/07/25	17:35	30	17:40	30	Pass	MP
R116/R115	3	10/07/25	18:21	30	18:26	29	Pass	MP
R116/R117	4	10/07/25	18:44	30	18:49	30	Pass	MP
R117/R118	5	10/07/25	19:04	30	19:09	29	Pass	SJ

BURNS & MCDONNELL ENGINEERING CO., INC.**EXTRUSION SEAMING LOG**

Client: MatSu Borough Central Landfill
Project Location: 1201 N 49th State St., Palmer AK 99645
Project Number: 190062
Contractor: Southcentral Construction, Inc.
Supplier: Agru
Installer: Northwest Linings & Geotextile Products, Inc.
CQA Monitor: Becca Heaman

Date	Seam No.	Start Time	Seam Length (ft)	Traveling Direction	Machine Type and Number	Name of Operator	Machine Settings	
							Temperature	Machine Speed
10/2/2025	P40/2B	16:38	19	Southeast	6985	SA	500	500
10/2/2025	P41/2B	16:38	25	Southeast	6985	SA	500	500
10/2/2025	P42/2B	16:38	23	Southeast	6985	SA	500	500
10/2/2025	P43/2B	16:38	37	Southwest, South, Southeast, East	6985	SA	500	500
9/30/2025	P01/P32	18:21	10	East	6985	SA	500	500
10/5/2025	P50/2B	14:00	21	South	6985	SA	500	500
10/5/2025	P49/2B	14:10	23	South	6985	SA	500	500
10/5/2025	P48/2B	14:20	10	South	6985	SA	500	500
10/5/2025	P48/2B	15:05	12	South	6985	SA	500	500
10/5/2025	P47/2B	15:11	22	South	6985	SA	500	500
10/5/2025	P46/2B	15:25	22	South	6985	SA	500	500
10/5/2025	P45/2B	15:35	22	South	6985	SA	500	500
10/5/2025	P44/2B	15:50	8	South	6985	SA	500	500
10/5/2025	P40/2B	16:00	6	South	6985	SA	500	500

BURNS & MCDONNELL ENGINEERING CO., INC.

NONDESTRUCTIVE TEST RECORD (Vacuum Testing)

Client: MatSu Borough Central Landfill
 Project Location: 1201 N 49th State St., Palmer AK 99645
 Project Number: 190062
 Contractor: Southcentral Construction, Inc.
 Supplier: Agru
 Installer: Northwest Linings & Geotextile Products, Inc.
 CQA Monitor: Becca Heaman

Repair / Seam No.	Date	Vacuum Pressure (inches Hg)	Completed	Pass/Fail	Tester Name
B01	10/06/25	2	☑	Pass	JH
P1/P32	10/06/25	2	☑	Pass	JH
P50/2B	10/07/25	2	☑	Pass	JH
P49/2B	10/07/25	2	☑	Pass	JH
P48/2B	10/08/25	2	☑	Pass	JH
P48/2B	10/08/25	2	☑	Pass	JH
P47/2B	10/08/25	2	☑	Pass	JH
P46/2B	10/08/25	2	☑	Pass	JH
P45/2B	10/08/25	2	☑	Pass	JH
P44/2B	10/08/25	2	☑	Pass	JH
P40/2B	10/08/25	2	☑	Pass	JH
R01	10/06/25	2	☑	Pass	JH
R02	10/06/25	2	☑	Pass	JH
R03	10/06/25	2	☑	Pass	JH
R04	10/06/25	2	☑	Pass	JH
R05	10/06/25	2	☑	Pass	JH
R06	10/06/25	2	☑	Pass	JH
R07	10/06/25	2	☑	Pass	JH
R08	10/06/25	2	☑	Pass	JH
R09	10/06/25	2	☑	Pass	JH
R10	10/06/25	2	☑	Pass	JH
R100	10/07/25	2	☑	Pass	JH
R101	10/08/25	2	☑	Pass	JH
R102	10/07/25	2	☑	Pass	JH
R103	10/07/25	2	☑	Fail	JH
R104	10/07/25	2	☑	Pass	JH
R105	10/07/25	2	☑	Pass	JH
R106	10/07/25	2	☑	Pass	JH
R107	10/07/25	2	☑	Pass	JH
R108	10/07/25	2	☑	Pass	JH
R109	10/07/25	2	☑	Pass	JH
R11	10/07/25	2	☑	Pass	JH
R110	10/07/25	2	☑	Pass	JH
R111	10/07/25	2	☑	Pass	JH
R119	10/08/25	2	☑	Pass	JH
R12	10/06/25	2	☑	Pass	JH
R120	10/08/25	2	☑	Pass	JH
R121	10/08/25	2	☑	Pass	JH
R122	10/08/25	2	☑	Pass	JH
R123	10/08/25	2	☑	Pass	JH
R124	10/08/25	2	☑	Pass	JH
R125	10/08/25	2	☑	Pass	JH
R126	10/08/25	2	☑	Pass	JH
R127	10/08/25	2	☑	Pass	JH
R128	10/08/25	2	☑	Pass	JH
R129	10/08/25	2	☑	Pass	JH
R13	10/07/25	2	☑	Pass	JH
R130	10/08/25	2	☑	Fail	JH
R131	10/08/25	2	☑	Pass	JH
R132	10/08/25	2	☑	Pass	JH
R133	10/08/25	2	☑	Pass	JH
R134	10/08/25	2	☑	Pass	JH

BURNS & MCDONNELL ENGINEERING CO., INC.

NONDESTRUCTIVE TEST RECORD (Vacuum Testing)

Client: MatSu Borough Central Landfill
 Project Location: 1201 N 49th State St., Palmer AK 99645
 Project Number: 190062
 Contractor: Southcentral Construction, Inc.
 Supplier: Agru
 Installer: Northwest Linings & Geotextile Products, Inc.
 CQA Monitor: Becca Heaman

Repair / Seam No.	Date	Vacuum Pressure (inches Hg)	Completed	Pass/Fail	Tester Name
R135	10/08/25	2	☑	Pass	JH
R136	10/08/25	2	☑	Pass	JH
R137	10/08/25	2	☑	Pass	JH
R138	10/08/25	2	☑	Pass	JH
R139	10/08/25	2	☑	Pass	JH
R140	10/09/25	2	☑	Pass	JH
R15	10/07/25	2	☑	Pass	JH
R16	10/06/25	2	☑	Pass	JH
R17	10/06/25	2	☑	Pass	JH
R18	10/06/25	2	☑	Pass	JH
R19	10/06/25	2	☑	Fail	JH
R20	10/06/25	2	☑	Pass	JH
R21	10/06/25	2	☑	Pass	JH
R22	10/06/25	2	☑	Fail	JH
R23	10/06/25	2	☑	Pass	JH
R24	10/06/25	2	☑	Pass	JH
R25	10/06/25	2	☑	Pass	JH
R26	10/06/25	2	☑	Pass	JH
R27	10/06/25	2	☑	Pass	JH
R28	10/06/25	2	☑	Pass	JH
R29	10/06/25	2	☑	Pass	JH
R30	10/07/25	2	☑	Pass	JH
R32	10/06/25	2	☑	Pass	JH
R33	10/06/25	2	☑	Pass	JH
R34	10/06/25	2	☑	Pass	JH
R35	10/06/26	2	☑	Pass	JH
R36	10/06/25	2	☑	Pass	JH
R37	10/06/25	2	☑	Pass	JH
R38	10/07/25	2	☑	Pass	JH
R39	10/07/25	2	☑	Pass	JH
R40	10/07/25	2	☑	Pass	JH
R41	10/07/25	2	☑	Pass	JH
R42	10/06/25	2	☑	Pass	JH
R42	10/07/25	2	☑	Pass	JH
R43	10/06/25	2	☑	Pass	JH
R44	10/06/25	2	☑	Pass	JH
R45	10/06/25	2	☑	Pass	JH
R46	10/06/25	2	☑	Pass	JH
R47	10/06/25	2	☑	Pass	JH
R48	10/06/25	2	☑	Pass	JH
R49	10/06/25	2	☑	Pass	JH
R50	10/06/25	2	☑	Pass	JH
R51	10/07/25	2	☑	Pass	JH
R52	10/06/25	2	☑	Pass	JH
R53	10/06/25	2	☑	Pass	JH
R54	10/06/25	2	☑	Pass	JH
R55	10/06/25	2	☑	Pass	JH
R56	10/06/25	2	☑	Pass	JH
R57	10/06/25	2	☑	Pass	JH
R58	10/06/25	2	☑	Pass	JH

BURNS & MCDONNELL ENGINEERING CO., INC.**NONDESTRUCTIVE TEST RECORD (Vacuum Testing)**

Client: MatSu Borough Central Landfill
Project Location: 1201 N 49th State St., Palmer AK 99645
Project Number: 190062
Contractor: Southcentral Construction, Inc.
Supplier: Agru
Installer: Northwest Linings & Geotextile Products, Inc.
CQA Monitor: Becca Heaman

Repair / Seam No.	Date	Vacuum Pressure (inches Hg)	Completed	Pass/ Fail	Tester Name
R59	10/06/25	2	☑	Pass	JH
R60	10/06/25	2	☑	Pass	JH
R61	10/06/25	2	☑	Pass	JH
R62	10/06/25	2	☑	Pass	JH
R63	10/06/25	2	☑	Pass	JH
R64	10/07/25	2	☑	Pass	JH
R65	10/07/25	2	☑	Pass	JH
R66	10/07/25	2	☑	Pass	JH
R67	10/07/25	2	☑	Pass	JH
R68	10/07/25	2	☑	Pass	JH
R69	10/07/25	2	☑	Pass	JH
R70	10/08/25	2	☑	Pass	JH
R71	10/08/25	2	☑	Pass	JH
R72	10/08/25	2	☑	Pass	JH
R73	10/08/25	2	☑	Pass	JH
R74	10/08/25	2	☑	Pass	JH
R75	10/08/25	2	☑	Pass	JH
R76	10/08/25	2	☑	Pass	JH
R77	10/08/25	2	☑	Pass	JH
R78	10/08/25	2	☑	Pass	JH
R79	10/08/25	2	☑	Pass	JH
R80	10/08/25	2	☑	Pass	JH
R81	10/08/25	2	☑	Pass	JH
R82	10/08/25	2	☑	Pass	JH
R83	10/08/25	2	☑	Pass	JH
R84	10/08/25	2	☑	Pass	JH
R85	10/07/25	2	☑	Pass	JH
R86	10/07/25	2	☑	Pass	JH
R87	10/07/25	2	☑	Pass	JH
R88	10/07/25	2	☑	Pass	JH
R89	10/08/25	2	☑	Pass	JH
R90	10/08/25	2	☑	Pass	JH
R91	10/08/25	2	☑	Pass	JH
R92	10/08/25	2	☑	Pass	JH
R93	10/08/25	2	☑	Pass	JH
R94	10/08/25	2	☑	Pass	JH
R95	10/08/25	2	☑	Pass	JH
R96	10/08/25	2	☑	Pass	JH
R97	10/08/25	2	☑	Pass	JH
R98	10/08/25	2	☑	Pass	JH
R99	10/07/25	2	☑	Pass	JH

BURNS & MCDONNELL ENGINEERING CO., INC.

REPAIR LOG

Client: MatSu Borough Central Landfill

Project 1201 N 49th State St., Palmer AK 99645

Project 190062

Contractor Southcentral Construction, Inc.

Supplier Agru

Installer Northwest Linings & Geotextile Products, Inc.

CQA Manager Becca Heaman

Weld	Date of	Time	Location	Description	Machine Number	Name of Operator	Vacuum Test	Test Date	Pass/ Fail
R01	9/30/2025	17:50	P10, P11, P17, P18 joint	Panel joint & air test patch	7223	SA	RCH	10/06/25	Pass
R02	9/30/2025	17:52	7' SW of N edge of P17	DS05 patch	7223	SA	RCH	10/06/25	Pass
R03	9/30/2025	18:00	P9, P10, P17 joint	Panel joint & air test patch	7223	SA	RCH	10/06/25	Pass
R04	9/30/2025	18:03	P09, P16, P17 joint	Panel joint & air test patch	7223	SA	RCH	10/06/25	Pass
R05	9/30/2025	18:06	P08, P09, P16 joint	Panel joint & air test patch	7223	SA	RCH	10/06/25	Pass
R06	9/30/2025	18:09	P08, P15, P16 joint	Panel joint & air test patch	7223	SA	RCH	10/06/25	Pass
R07	9/30/2025	18:11	P07, P08, P15 joint	Panel joint & air test patch	7223	SA	RCH	10/06/25	Pass
R08	9/30/2025	18:14	P07, P14, P15 joint	Panel joint & air test patch	7223	SA	RCH	10/06/25	Pass
R09	9/30/2025	18:18	P01, P07, P14	Panel joint & air test patch	7223	SA	RCH	10/06/25	Pass
R10	9/30/2025	18:21	P01, P13, P14	Panel joint & air test patch	7223	SA	RCH	10/06/25	Pass
R11	9/30/2025	18:30	P07, P01	D02 patch	7223	SA	RCH	10/07/25	Pass
R12	10/2/2025	13:59	P33, P34	DS11 patch	6985	SA	RCH	10/06/25	Pass
R13	10/2/2025	17:41	P43, Cell 4	Connection to Cell 4	6985	SA	RCH	10/07/25	Pass
R14	10/2/2025	16:37	P36, P38, P39 joint	Panel joint & air test patch	6985	SA			
R15	10/2/2005	17:45	P43, Cell 4	Air test patch	6985	SA	RCH	10/07/25	Pass
R16	10/3/2025	16:00	East edge of P31	Repair patch	6985	SA	RCH	10/06/25	Pass
R17	10/3/2025	17:40	P03, P30, P31 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R18	10/3/2025	17:37	P03, P04, P30 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R19	10/3/2025	17:27	P04, P29, P30 joint	Panel joint & air test patch	6985	SA	-	10/06/25	Fail
R20	10/3/2025	17:24	P04, P05, P29 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R21	10/3/2025	17:20	P05, P06, P28, P29	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R22	10/3/2025	17:14	P06, P12, P28 joint	Panel joint & air test patch	6985	SA	-	10/06/25	Fail
R23	10/3/2025	17:10	P12, P27, P28 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R24	10/3/2025	17:05	P26, P27, P12 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R25	10/3/2025	16:33	P01, P02, P13, P32 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R26	10/3/2025	17:46	P13, P32, P19, P57 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R27	10/5/2025	13:20	P19, P20, P56, P57 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass

BURNS & MCDONNELL ENGINEERING CO., INC.

REPAIR LOG

Client: MatSu Borough Central Landfill

Project 1201 N 49th State St., Palmer AK 99645

Project 190062

Contractor Southcentral Construction, Inc.

Supplier Agru

Installer Northwest Linings & Geotextile Products, Inc.

CQA Manager Becca Heaman

Weld	Date of	Time	Location	Description	Machine Number	Name of Operator	Vacuum Test	Test Date	Pass/ Fail
R28	10/5/2025	13:32	P20, P21, P55, P56 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R29	10/5/2025	15:50	P44, P45, 2B joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R30	10/5/2025	15:59	P41, P44, 2B joint	Panel joint & air test patch	6985	SA	RCH	10/07/25	Pass
R31	10/5/2025	16:20	5' S of P41 NW panel corner	DS13 Repair	6985	SA			OMIT
R32	10/5/2025	16:31	P25, P33, P48, P49 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R33	10/3/2025	16:58	P03, P04 N Berm	Air test patch	6985	SA	RCH	10/06/25	Pass
R34	10/3/2025	17:12	P04, P05 N Berm	Air test patch	6985	SA	RCH	10/06/25	Pass
R35	10/3/2025	17:15	P05, P06 N Berm	Air test patch	6985	SA	RCH	10/06/25	Pass
R36	10/2/2025	14:27	34' W of east berm	Destruct 03 repair	6985	SA	RCH	10/06/25	Pass
R37	10/2/2025	14:10	19'W of east berm	Destruct 04 repair	6985	SA	RCH	10/06/25	Pass
R38	10/6/2025	15:29	23' w of e termination trench	DS repair	6985	SA	RCH	10/07/25	Pass
R39	10/6/2025	15:21	P36, 37, 38 joint	Panel joint & air test patch	6985	SA	RCH	10/07/25	Pass
R40	10/6/2025	14:37	P36, 38, 39 joint	Panel joint & air test patch	6985	SA	RCH	10/07/25	Pass
R41	10/6/2025	15:13	P39, 41, 44 joint	Panel joint & air test patch	6985	SA	RCH	10/07/25	Pass
R42	10/6/2025	14:27	P44, 41	air test patch	6985	SA	RCH	10/07/25	Pass
R43	10/6/2025	14:23	P44, P45, 2B joint	Air test patch	6985	SA	RCH	10/06/25	Pass
R44	10/6/2025	14:01	P36, 39, 44, 45 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R45	10/6/2025	13:45	P35, 36, 45, 46 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R46	10/6/2025	15:38	P45, 46, 2B joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R47	10/6/2025	13:34	P46, 47, 2B joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R48	10/6/2025	16:04	P47, 48, 2B joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R49	10/6/2025	16:11	P48, 2B	Destruct repair DS20	6985	SA	RCH	10/06/25	Pass
R50	10/6/2025	16:15	P48, 49, 2B joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R51	10/6/2025	16:38	P49, 50, 2B joint	Panel joint & air test patch	6985	SA	RCH	10/07/25	Pass
R52	10/6/2025	16:22	P48, P49	Destruct repair DS16	6985	SA	RCH	10/06/25	Pass
R53	10/6/2025	13:31	P4, 35, 46, 47 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R54	10/6/2025	13:24	P24 47 48 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass

BURNS & MCDONNELL ENGINEERING CO., INC.**REPAIR LOG**

Client: MatSu Borough Central Landfill

Project 1201 N 49th State St., Palmer AK 99645

Project 190062

Contractor Southcentral Construction, Inc.

Supplier Agru

Installer Northwest Linings & Geotextile Products, Inc.

CQA Manager Becca Heaman

Weld	Date of	Time	Location	Description	Machine Number	Name of Operator	Vacuum Test	Test Date	Pass/ Fail
R55	10/6/2025	13:24	P23, 24, 48 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R56	10/6/2025	13:10	P24, 25, 49, 50 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R57	10/6/2025	13:01	P23, 24, 50, 51 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R58	10/6/2025	11:49	P22, 23, 51, 52 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R59	10/6/2025	11:45	P22, 52, 54 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R60	10/6/2025	11:39	P22, 54	Air test patch	6985	SA	RCH	10/06/25	Pass
R61	10/6/2025	11:36	P21, 22, 54, 55 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R62	10/6/2025	12:57	P51, 52, 3 joint	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R63	10/6/2025	11:54	P52, 53, 54	Panel joint & air test patch	6985	SA	RCH	10/06/25	Pass
R64	10/6/2025	18:00	SP19, P50, 51	Panel joint & air test patch, edge patch	7355	JS	RCH	10/07/25	Pass
R65	10/6/2025	18:28	SP18, 19, P51	Panel joint & air test patch	7355	JS	RCH	10/07/25	Pass
R66	10/6/2025	18:36	SP15, 18, P51, 52, 54	Panel joint & air test patch	7355	JS	RCH	10/07/25	Pass
R67	10/7/2025	11:12	SP15, P54	DS22 repair	6985	SA	RCH	10/07/25	Pass
R68	10/7/2025	11:07	SP14, 15 & P54, 55	Panel joint & air test patch	6985	SA	RCH	10/07/25	Pass
R69	10/7/2025	10:57	SP11, 15 & P55, 56	Panel joint & air test patch	6985	SA	RCH	10/07/25	Pass
R70	10/7/2025	10:51	P57, P56	Burnout repair	6985	SA	RCH	10/08/25	Pass
R71	10/7/2025	9:43	SP10, 11 & P56, 57	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R72	10/7/2025	9:36	SP10, P57	DS17 repair	6985	SA	RCH	10/08/25	Pass
R73	10/7/2025	9:10	SP09, 10 & P32, 57	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R74	10/6/2025	17:06	P31, P32	Burnout repair	6985	SA	RCH	10/08/25	Pass
R75	10/7/2025	9:00	SP08, 09 & P31, 32	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R76	10/6/2025	17:17	P30, P31	DS09 repair	6985	SA	RCH	10/08/25	Pass
R77	10/6/2025	17:23	P30, P31	Burnout repair	6985	SA	RCH	10/08/25	Pass
R78	10/7/2025	8:54	SP06, 08 & P30, 31	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R79	10/7/2025	8:49	SP04, 06 & P29, 30	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R80	10/7/2025	8:43	SP04, P29	DS08 repair	6985	SA	RCH	10/08/25	Pass
R81	10/6/2025	17:43	P28, P29	Burnout repair	6985	SA	RCH	10/08/25	Pass

BURNS & MCDONNELL ENGINEERING CO., INC.**REPAIR LOG**

Client: MatSu Borough Central Landfill

Project 1201 N 49th State St., Palmer AK 99645

Project 190062

Contractor Southcentral Construction, Inc.

Supplier Agru

Installer Northwest Linings & Geotextile Products, Inc.

CQA Manager Becca Heaman

Weld	Date of	Time	Location	Description	Machine Number	Name of Operator	Vacuum Test	Test Date	Pass/ Fail
R82	10/7/2025	8:38	SP03, 04 & P28, 29 joint	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R83	10/7/2025	8:30	SP02, 03 & P27, 28	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R84	10/7/2002	8:32	SP1, 02 & P26, 27	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R85	10/6/2025	16:00	P06, 12, 28 joint	Patch previously failed patch	6985	SA	RCH	10/07/25	Pass
R86	10/6/2025	17:37	P28, P06	DS10 repair	6985	SA	RCH	10/07/25	Pass
R87	10/6/2025	18:09	P04, 29, 30	Patch previously failed patch	6985	SA	RCH	10/07/25	Pass
R88	10/6/2025	16:56	P02, P32	DS15 repair	6985	SA	RCH	10/07/25	Pass
R89	10/6/2025	17:12	SP01, 02, 03	Panel joint & air test patch	7355	JS	RCH	10/08/25	Pass
R90	10/6/2025	17:00	Center of seam	DS06 repair	7355	JS	RCH	10/08/25	Pass
R91	10/6/2025	16:35	SP01, 03, 04	Panel joint & air test patch	7355	JS	RCH	10/08/25	Pass
R92	10/6/2025	16:04	SP01, 04, 05	Panel joint & air test patch	7355	JS	RCH	10/08/25	Pass
R93	10/6/2025	16:50	SP04, 05, 06	Panel joint & air test patch	7355	JS	RCH	10/08/25	Pass
R94	10/6/2025	16:42	SP05, 06, 08	Panel joint & air test patch	7355	JS	RCH	10/08/25	Pass
R95	10/6/2025	16:00	SP01, 05, 07	Panel joint & air test patch	7355	JS	RCH	10/08/25	Pass
R96	10/6/2025	16:30	SP05, 07, 08	Panel joint & air test patch	7355	JS	RCH	10/08/25	Pass
R97	10/6/2025	16:20	SP07, 08, 09	Panel joint & air test patch	7355	JS	RCH	10/08/25	Pass
R98	10/6/2025	15:49	SP07, SP09	DS07 repair	7355	JS	RCH	10/08/25	Pass
R99	10/6/2025	15:37	SP01, 7, 9 joint	Panel joint & air test patch	7355	JS	RCH	10/07/25	Pass
R100	10/6/2025	15:30	SP09, SP10	DS19 repair	7355	JS	RCH	10/07/25	Pass
R101	10/8/2025	13:30	SP09, SP10	Boot around RGW13	7355	NM	RCH	10/08/25	Pass
R102	10/6/2025	15:10	SP12, SP15	DS21 repair	7355	JS	RCH	10/07/25	Pass
R103	10/6/2025	14:58	SP11, 12, 13 joint	Panel joint & air test patch	7355	JS		10/07/25	FAIL
R104	10/6/2025	15:00	SP12, SP13	DS18 repair	7355	JS	RCH	10/07/25	Pass
R105	10/6/2025	14:50	SP12, 13, 15	Panel joint & air test patch	7355	JS	RCH	10/07/25	Pass
R106	10/6/2025	14:40	SP15, 17, 18	Panel joint & air test patch	7355	JS	RCH	10/07/25	Pass
R107	10/6/2025	17:15	SP11, 13, 14	Panel joint & air test patch	7355	JS	RCH	10/07/25	Pass
R108	10/6/2025	17:32	SP13, 14, 15	Panel joint & air test patch	7355	JS	RCH	10/07/25	Pass

BURNS & MCDONNELL ENGINEERING CO., INC.

REPAIR LOG

Client: MatSu Borough Central Landfill

Project 1201 N 49th State St., Palmer AK 99645

Project 190062

Contractor Southcentral Construction, Inc.

Supplier Agru

Installer Northwest Linings & Geotextile Products, Inc.

CQA Manager Becca Heaman

Weld	Date of	Time	Location	Description	Machine Number	Name of Operator	Vacuum Test	Test Date	Pass/ Fail
R109	10/6/2025	17:40	SP15, 18, 19 joint	Panel joint & air test patch	7355	JS	RCH	10/07/25	Pass
R110	10/6/2025	18:15	P04, P03	DS01 repair	6985	SA	RCH	10/07/25	Pass
R111	10/6/2025	15:39	P42, P43	DS14 repair	6985	SA	RCH	10/07/25	Pass
R112	10/7/2025	15:16	P43, 2B	Fusion weld patch over 10/2/25 extrusion weld	5515	MP	RCH	10/07/25	AT Pass
R113	10/7/2025	15:16	P43, 2B	Fusion weld patch over 10/2/25 extrusion weld	5515	MP	RCH	10/07/25	AT Pass
R114	10/7/2025	15:16	P43, 2B	Fusion weld patch over 10/2/25 extrusion weld	5515	MP	RCH	10/07/25	AT Pass
R115	10/7/2025	15:16	P42, 2B	Fusion weld patch over 10/2/25 extrusion weld	5515	MP	RCH	10/07/25	AT Pass
R116	10/7/2025	15:16	P42, 2B	Fusion weld patch over 10/2/25 extrusion weld	5515	MP	RCH	10/07/25	AT Pass
R117	10/7/2025	15:16	P42, 2B, P41	Fusion weld patch over 10/2/25 extrusion weld	5515	MP	RCH	10/07/25	AT Pass
R118	10/7/2025	15:16	P41, P40, 2B	Fusion weld patch over 10/2/25 extrusion weld	5515	MP	RCH	10/07/25	AT Pass
R119	10/7/2025	18:11	R114, P43	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R120	10/7/2025	18:11	R112, 2B	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R121	10/7/2025	18:14	R112, R113, 2B	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R122	10/7/2025	18:22	R112, R113, P43	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R123	10/7/2025	18:27	R113, 2B	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R124	10/7/2025	18:35	R113, R114, P43	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R125	10/7/2025	18:30	R113, R114, 2B	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R126	10/7/2025	20:33	R114, R115, P42, P43, 2B	Fusion patch connection through bend	6985	SA	RCH	10/08/25	Pass
R127	10/8/2025	11:32	P42, R115, R116	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R128	10/8/2025	11:32	2B, R115, R116	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R129	10/8/2025	12:11	P41, 42, R116, 117	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R130	10/8/2025	13:17	2B, R116, 117	Panel joint & air test patch	6985	SA		10/08/25	Fail
R131	10/8/2025		R117, 2B	DS24 repair	6985	SA	RCH	10/08/25	Pass
R132	10/8/2025	11:07	R117, 118, 2B	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R133	10/8/2025	11:07	R117, R118, P41	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R134	10/8/2025	11:07	R118, P41, P40	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R135	10/8/2025	10:56	R118, 2B	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass

BURNS & MCDONNELL ENGINEERING CO., INC.

REPAIR LOG

Client: MatSu Borough Central Landfill
Project 1201 N 49th State St., Palmer AK 99645
Project 190062
Contractor Southcentral Construction, Inc.
Supplier Agru
Installer Northwest Linings & Geotextile Products, Inc.
CQA Manager Becca Heaman

Weld	Date of	Time	Location	Description	Machine Number	Name of Operator	Vacuum Test	Test Date	Pass/ Fail
R136	10/8/2025	10:08	P40, R118, 2B	Panel joint & air test patch	6985	SA	RCH	10/08/25	Pass
R137	10/8/2025	14:17	R118, P40	DS23 Repair	6985	SA	RCH	10/08/25	Pass
R138	10/8/2025	14:30	SP11, 12, 13 joint	R103 patch repair	7355	NM	RCH	10/08/25	Pass
R139	10/8/2025	15:47	2B, R116, 117	R130 patch repair	6985	SA	RCH	10/08/25	Pass
R140	10/9/2025	13:00	P48, P49, 2B	DS20, 20A, 20B repair	7355	MP	RCH	10/09/25	Pass

BURNS & MCDONNELL ENGINEERING CO., INC.

DESTRUCTIVE TEST RECORD

Client:	MatSu Borough Central Landfill
Project Location:	1201 N 49th State St., Palmer AK 99645
Project Number:	190062
Contractor:	Southcentral Construction, Inc.
Supplier:	Aguu
Installer:	Northwest Linings & Geotextile Products, Inc.
CQA Monitor:	Becca Hearnan

Sample Number	Seam Number	Location	Date Seamed	Date Sampled	Oper.	Machine Number and Oper.	Field Peel (ppi)					Field Shear (ppi)					Laboratory Peel (ppi)					Laboratory Shear (ppi)					Shear Failure Type	Peel Failure Type	Pass/Fail (Field)	Pass/Fail (Lab)	
							112	105	148	104	132	175	160	167	156	165	111	118	107	114	112	172	170	170	170	172					
DS01	P04/P03	40' S of N termination trench	9/28/2025	9/30/2025	XX	5845	112	105	148	104	132	175	160	167	156	165	111	118	107	114	112	172	170	170	170	172	>50%	FTB, SE	Pass	Pass	
DS02	P07/P01	42' S of N termination trench	9/28/2025	9/30/2025	MP	5515	129	103	111	100	117	171	154	164	144	148	127	122	119	113	112	170	169	169	169	170	>50%	FTB, SE	Pass	Pass	
							128	105	123	97	123	134	129	124	139	142															
DS03	P14/P13	34' W of E termination trench	9/29/2025	9/30/2025	MP	5515	108	107	113	107	132	175	155	174	169	167	118	131	123	120	121	171	169	170	169	172	>50%	FTB, SE	Pass	Pass	
DS04	P24/P23	20' W of E termination trench	9/29/2025	9/30/2025	XX	5845	118	119	124	120	127	165	166	168	173	166	125	124	128	123	123	167	168	168	167	167	>50%	FTB, SE	Pass	Pass	
							117	118	117	113	120	131	130	116	137	118															
DS05	P17/P10	28' SW of NE termination trench corner	9/29/2025	9/30/2025	MP	5515	136	125	141	132	147	156	151	160	154	156	141	140	137	131	140	155	155	154	153	156	>50%	FTB, SE	Pass	Pass	
DS06	SP01/SP03	Center of panel overlap	9/30/2025	10/6/2025	MP	5515	127	126	129	127	131	143	136	148	153	149	131	131	129	135	135	148	146	147	146	147	>50%	FTB, SE	Pass	Pass	
							134	130	126	131	127	118	130	132	130	137															
DS07	SP07/SP05	20' S of SP01 SE edge	9/30/2025	10/6/2025	XX	5845	126	117	113	113	122	140	156	145	144	151	123	123	125	125	127	152	151	152	151	155	>50%	FTB, SE	Pass	Pass	
							120	128	124	120	114	121	122	121	122	124															
DS08	SP04/P29	Center of panel overlap	9/30/2025	10/6/2025	MP	5515	142	145	141	138	145	151	153	151	158	156	125	132	131	133	137	128	132	132	133	138	>50%	FTB, SE	Pass	Pass	
							135	143	146	140	144	123	126	123	123	124															
DS09	P30/P31	30' E of LLDPE & HDPE connection	9/30/2025	10/6/2025	XX	5845	134	149	140	146	135	180	187	190	183	183	125	122	120	126	122	170	169	169	168	167	>50%	FTB, SE	Pass	Pass	
							121	129	119	150	117	127	121	123	131	141															
DS10	P28/P6	Center of panel overlap	10/1/2025	10/6/2025	MP	5515	154	155	147	149	159	179	176	181	179	183	135	135	134	131	138	151	152	152	154	155	>50%	FTB, SE	Pass	Pass	
DS11	P33/P34	21' W of E termination trench	10/1/2025	10/2/2025	XX	5874	143	142	157	150	149	179	176	181	179	183	138	140	139	143	139	151	152	152	154	155	>50%	FTB, SE	Pass	Pass	
							117	121	119	142	129	116	123	116	121	131	168	169	170	169	171	117	119	117	118	120					
DS12	P36/P37	25' W of E termination trench	10/2/2025	10/6/2025	MP	5515	124	116	121	126	130	189	163	187	186	187	117	119	117	118	120	168	169	170	169	171	>50%	FTB, SE	Pass	Pass	
							139	130	125	129	141	201	201	206	202	202	126	125	129	126	125	161	161	161	163	165	>50%	FTB, SE	Pass	Pass	
DS14	P42/P43	22' W of E termination trench	10/2/2025	10/6/2025	XX	5874	149	128	128	143	155	201	210	213	207	211	138	135	129	134	135	168	169	169	170	172	>50%	FTB, SE	Pass	Pass	
							156	114	125	108	97	128	124	122	129	125	168	169	169	170	172	138	131	129	132	131					
DS13	P41/Cell 2B	5' S of P40 SW panel corner	10/2/2025	10/5/2025	SA	6985	144	160	144	147	139	184	183	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							106	113	92	105	114	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DS15	P2/P32	10' W of P2 SE panel corner	10/3/2025	10/6/2025	JS	5845	112	113	111	106	115	160	168	165	171	170	149	150	148	143	144	157	155	156	157	156	>50%	FTB, SE	Pass	Pass	
							145	156	156	154	170	108	107	108	109	106															
DS16	P49/P48	10' E of P48 NW panel corner	10/3/2025	10/6/2025	XX	5874	116	127	123	115	124	167	171	170	169	169	113	120	115	112	115	193	194	195	193	195	>50%	FTB, SE	Pass	Pass	
DS17	SP10/P57	Center of seam	10/3/2025	10/6/2025	XX	5874	128	114	123	121	118	125	130	128	125	127	126	130	122	131	131	130	130	130	131	131	>50%	FTB, SE	Pass	Pass	
							117	125	125	128	120	137	133	142	144	145	148	146	143	143	144	143	143	143	144						
DS18	SP12/SP13	Center of seam	10/3/2025	10/6/2025	XX	5874	123	132	125	124	115	125	130	128	125	127	138	128	124	125	127	148	146	143	143	144	>50%	FTB, SE	Pass	Pass	
							127	124	124	118	118	134	136	135	132	133	143	139	136	136	138	133	136	136	138						
DS19	SP09/SP10	25' S of RGW13 stick up	10/3/2025	10/6/2025	MP	5515	123	127	125	119	119	133	131	132	130	130	134	139	145	132	141	143	139	138	136	138	>50%	FTB, SE	Pass	Pass	
							114	119	113	126	113	114	111	113	112	114	111	112	114	118	118	114	111	112	114	118					
DS20	P48/2B	5' S of P48 NW corner	10/5/2025	10/6/2025	SA	6985	117	117	123	118	116	145	143	141	142	140	113	114	113	112	114	130	130	130	131	131	>50%	FTB, SE	Pass	Pass	
							95	127	121	128	137	116	127	125	119	119	119	113	112	114	118	118	114	111	112	114	118				
DS21	SP12/SP15	20' E of West termination trench	10/6/2025	10/6/2025	XX	5874	122	122	121	121	124	141	141	141	137	140	118	125	116	115	120	151	151	154	150	150	>50%	FTB, SE	Pass	Pass	
							125	125	126	126	119	116	127	125	119	119	119	113	112	114	118	118	114	111	112	114	118				
DS22	SP15/P54	Center of seam	10/6/2025	10/6/2025	MP	5515	144	145	140	139	138	164	160	159	156	156	138	135	134	132	127	131	131	134	131	130	>50%	FTB, SE	Pass	Pass	
							141	143	144	138	140	133	135	130	125	128	131	134	131	130											
DS13A	P40/2B	10' N of P41 NW corner	10/2/2025	10/7/2025	SA	6985	99	97	93	95	104	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DS13B	P41/2B	12' N of P41 SW corner	10/2/2025	10/7/2025	SA	6985	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DS23	R118/P40	Center of seam	10/7/2025	10/8/2025	MP	5515	112	145	151	139	117	164	146	166	155	162	157	132	158	158	158	162	161	161	162	168	>50%	FTB, SE	Pass	Pass	
DS24	R117/2B	Center of seam	10/7/2025	10/8/2025	MP	5515	137	141	136	158	138	177	156	170	153	176	140	148	147	136	141	167	166	169	164	169	>50%	FTB, SE	Pass	Pass	
							155	161	170	157	149	169	138	167	157	160	152	155	148	153	148	111	111	129	104	130					
DS20A	P49/2B	10' N of DS20	10/5/2025	10/9/2025	SA	6985	128	134	127	153	123	170	176	172	177	161	157	135	119	137	135	154	154	153	154	149	>50%	FTB, SE	Pass	Pass	
DS20B	P49/2B	10'S of DS20	10/5/2025	10/9/2025	SA	6985	138	121	138	133	141	157	147	175	179	186	152	135	119	137	135	153	155	155	153	155	>50%	FTB, SE	Pass	Pass	
							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Date: 2025-10-09

Mail To:
Steve Keeney
Northwest Linings (Seams)
20824 77th Ave South
Kent , WA , 98032

Bill To:

Northwest Linings (Seams)

e-mail:stevek@northwestlinings.com

Dear Mr. Keeney,

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

Project: **Palmer Cell 4 Expansion**

TRI Job Reference Number: **84285**

Material(s) Tested: (6) Heat Fusion Weld Seam(s)

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

Codes:

AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

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

Nicole Saucedo

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



DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Northwest Linings (Seams)

Project: Palmer Cell 4 Expansion

Material: 60 mil. LLDPE

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

TRI Log#: 84285

TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-6 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	131	131	129	135	135	132
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	118	130	132	130	137	129
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	148	146	147	146	147	147
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-7 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	123	123	125	125	127	125
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	121	122	121	122	124	122
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	152	151	152	151	155	152
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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



DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Northwest Linings (Seams)

Project: Palmer Cell 4 Expansion

Material: 60 mil. LLDPE

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

TRI Log#: 84285

PARAMETER	TEST REPLICATE NUMBER					MEAN
	1	2	3	4	5	
Sample ID: DS-16 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	113	120	115	112	115	115
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	126	130	122	131	131	128
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	193	194	195	193	195	194
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-17 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	137	133	142	144	145	140
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	138	128	124	125	127	128
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	148	146	143	143	144	145
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI ENVIRONMENTAL, INC.

9063 BEE CAVES RD. - AUSTIN, TX 78733 - USA | PH: 800.880.TEST OR 512.263.2101



DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Northwest Linings (Seams)

Project: Palmer Cell 4 Expansion

Material: 60 mil. LLDPE

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

TRI Log#: 84285

TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-18 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	134	136	135	132	133	134
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	134	139	145	132	141	138
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	143	139	138	136	138	139
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-21 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	118	125	116	115	120	119
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	116	116	120	114	115	116
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	151	151	154	150	150	151
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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

TRI ENVIRONMENTAL, INC.

9063 BEE CAVES RD. - AUSTIN, TX 78733 - USA | PH: 800.880.TEST OR 512.263.2101

**NORTHWEST LININGS & GEOTEXTILE PRODUCTS, Inc.***"Helping to Protect the Environment"*20824 77th Avenue South

Kent, WA 98032

Phone: (253) 872-0244 • (800) 729-6954

Fax: (253) 872-0245

Web: <http://www.northwestlinings.com>**SUBMITTAL INFORMATION**

Project Name:		Subcontract/P.O. Number:	
Date Sent:		Submitted By:	
		Transmittal No.:	

Submitted for: (check one)

☐ For Approval	☐ For Information	☐ Re-submittal	☐ Other
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Item	Reference	Spec/Drawing	Description

To Be Completed by Designated Reviewer

REVIEW STATUS			
REVIEWED BY:	Print Name:		☐ Approved
			☐ Approved as noted
	Signature:		☐ Revise and resubmit
			☐ Review not required
			Date:

Remarks:

--

Date: 2025-10-09

Mail To:
Steve Keeney
Northwest Linings (Seams)
20824 77th Ave South
Kent , WA , 98032

Bill To:

Northwest Linings (Seams)

e-mail:stevek@northwestlinings.com

Dear Mr. Keeney,

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

Project: **Palmer Cell 4 Expansion**

TRI Job Reference Number: **84287**

Material(s) Tested: (12) Heat Fusion Weld Seam(s)

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

Codes:

AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

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

Sincerely,



Nicole Saucedo

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



DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Northwest Linings (Seams)

Project: Palmer Cell 4 Expansion

Material: 60 mil. HDPE

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

TRI Log#: 84287

TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-1 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	123	125	122	123	122	123
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	111	118	107	114	112	112
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	172	170	170	170	172	171
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-2 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	127	122	119	113	112	119
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	134	129	124	139	142	134
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	170	169	169	169	170	169
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Northwest Linings (Seams)

Project: Palmer Cell 4 Expansion

Material: 60 mil. HDPE

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

TRI Log#: 84287

TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-3 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	118	131	123	120	121	123
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	121	115	113	115	132	119
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	171	169	170	169	172	170
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-4 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	125	124	128	123	123	125
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	131	130	116	137	118	126
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	167	168	168	167	167	167
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI ENVIRONMENTAL, INC.

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Northwest Linings (Seams)

Project: Palmer Cell 4 Expansion

Material: 60 mil. HDPE

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

TRI Log#: 84287

TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-5 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	136	137	132	141	140	137
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	141	140	137	131	140	138
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	155	155	154	153	156	155
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-9 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	125	122	120	126	122	123
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	127	121	123	131	141	129
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	170	169	169	168	167	169
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Northwest Linings (Seams)

Project: Palmer Cell 4 Expansion

Material: 60 mil. HDPE

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

TRI Log#: 84287

TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-10 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	135	135	134	131	138	135
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	138	140	139	143	139	140
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	151	152	152	154	155	153
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-11 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	116	123	116	121	131	121
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	117	119	117	118	120	118
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	168	169	170	169	171	169
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI ENVIRONMENTAL, INC.

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**DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS****TRI Client: Northwest Linings (Seams)****Project: Palmer Cell 4 Expansion****Material: 60 mil. HDPE****SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)****TRI Log#: 84287**

PARAMETER	TEST REPLICATE NUMBER					MEAN
	1	2	3	4	5	
Sample ID: DS-12 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	126	125	129	126	125	126
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	138	135	129	134	135	134
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	161	161	161	163	165	162
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-14 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	128	124	122	129	125	126
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	138	131	129	132	131	132
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	168	169	169	170	172	170
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Northwest Linings (Seams)

Project: Palmer Cell 4 Expansion

Material: 60 mil. HDPE

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

TRI Log#: 84287

PARAMETER	TEST REPLICATE NUMBER					MEAN
	1	2	3	4	5	
Sample ID: DS-15 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	149	150	148	143	144	147
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	108	107	108	109	106	108
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	157	155	156	157	156	156
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-19 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	113	114	113	112	114	113
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	114	111	112	114	118	114
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	130	130	130	131	131	130
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI ENVIRONMENTAL, INC.

9063 BEE CAVES RD. - AUSTIN, TX 78733 - USA | PH: 800.880.TEST OR 512.263.2101

Date: 2025-10-09

Mail To:
Steve Keeney
Northwest Linings (Seams)
20824 77th Ave South
Kent , WA , 98032

Bill To:
Northwest Linings (Seams)

e-mail:stevek@northwestlinings.com

Dear Mr. Keeney,

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

Project: **Palmer Cell 4 Expansion**

TRI Job Reference Number: **84288**

Material(s) Tested: (2) Heat Fusion Weld Seam(s)
 (1) Single Extrusion Weld Seam(s)

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

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

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



Nicole Saucedo

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



DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Northwest Linings (Seams)

Project: Palmer Cell 4 Expansion

Material: 60 mil. HDPE

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

TRI Log#: 84288

TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-8 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	125	132	131	133	137	132
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	123	126	123	123	124	124
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	128	132	132	133	138	133
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-22 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	138	135	134	132	127	133
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	133	135	130	125	128	130
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	131	131	134	131	130	131
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS - SINGLE TRACK

TRI Client: Northwest Linings (Seams)

Project: Palmer Cell 4 Expansion

Material: 60 mil. HDPE

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

TRI Log#: 84288

PARAMETER	TEST REPLICATE NUMBER					MEAN	
	1	2	3	4	5		
Sample ID: DS-20 Weld: Single Extrusion							
Side: Peel						Peel	
Peel Strength (ppi)	37	146	119	155	148	121	
Peel Incursion (%)	100	100	100	<5	<5		
Peel Locus Of Failure Code	AD	AD	AD	SE	SE		
Peel NSF Failure Code	NON-FTB	NON-FTB	NON-FTB	FTB	FTB		
Shear							Shear
Shear Strength (ppi)	154	155	153	155	160	155	
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

bounded by passing results of DS-20A and DS-20B



Date: 2025-10-13

Mail To:
Steve Keeney
Northwest Linings (Seams)
20824 77th Ave South
Kent , WA , 98032

Bill To:
Northwest Linings (Seams)
Steve Keeney
20824 77th Ave South
Kent , WA , 98032

e-mail:stevek@northwestlinings.com

Dear Mr. Keeney,

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

Project: **Palmer Cell 4 Expansion**

TRI Job Reference Number: **84312**

Material(s) Tested: (2) Heat Fusion Weld Seam(s)
(2) Single Extrusion Weld Seam(s)

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

Codes:

AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

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

Sincerely,

sigfile

Molly Langlotz
Project Manager
Geosynthetic Services Division
<http://www.geosyntheticstestinc.com>



DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Northwest Linings (Seams)

Project: Palmer Cell 4 Expansion

Material: 60 mil. HDPE

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

TRI Log#: 84312

TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-23 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	157	132	158	158	158	153
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	140	148	147	136	141	142
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	162	161	161	162	168	163
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-24 Weld: Heat Fusion						
Side: A						Peel A
Peel Strength (ppi)	145	150	147	159	154	151
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						Peel B
Peel Strength (ppi)	152	155	148	153	148	151
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	167	166	169	164	169	167
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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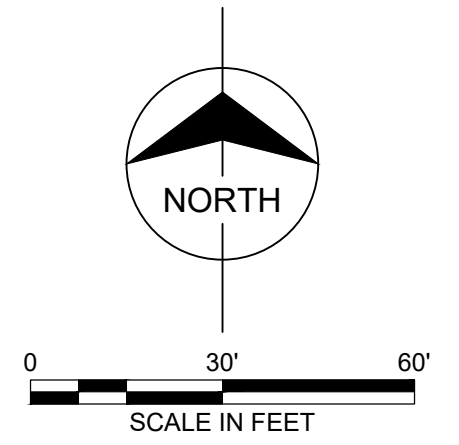
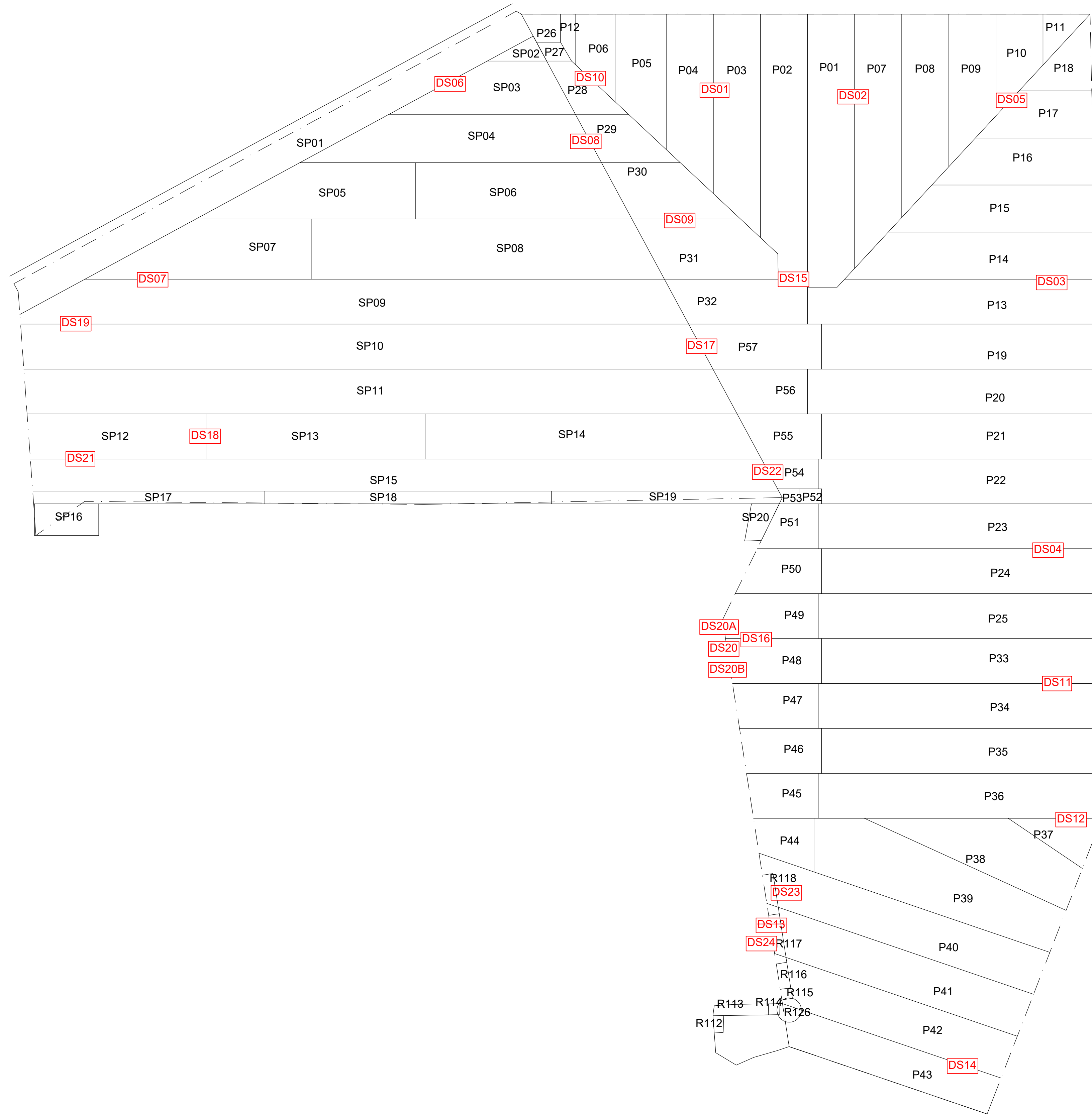
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**DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS - SINGLE TRACK****TRI Client: Northwest Linings (Seams)****Project: Palmer Cell 4 Expansion****Material: 60 mil. HDPE****SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)****TRI Log#: 84312**

TEST REPLICATE NUMBER						
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-20A Weld: Single Extrusion						
Side: Peel						Peel
Peel Strength (ppi)	111	111	129	104	130	117
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	154	154	153	154	149	153
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-20B Weld: Single Extrusion						
Side: Peel						Peel
Peel Strength (ppi)	152	135	119	137	135	136
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						Shear
Shear Strength (ppi)	153	155	155	153	155	154
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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CELL 4 EXPANSION
LINER PANEL PLACEMENT
MATSU BOROUGH
CENTRAL LANDFILL
FALL 2025

APPENDIX G – PIPING & GEOTEXTILE DOCUMENTATION

BURNS & MCDONNELL ENGINEERING CO., INC.

GEOTEXTILE MATERIAL RECEIVED LOG

Client:	MatSu Borough Central Landfill
Project Location:	1201 N 49th State St., Palmer AK 99645
Project Number:	190062
Contractor:	Southcentral Construction, Inc.
Supplier:	Skaps
Installer:	Northwest Linings & Geotextile Products, Inc.
CQA Monitor:	Becca Heaman

Date Rcvd.	Roll No.	Roll Size			Date QC Docs Rcvd	Date Manufactured	Material Type
		W (ft)	L (ft)	Sq. Ft.			
9/25/2025	87286.01	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.02	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.03	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.04	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.05	15	300	4500	9/8/2025	2025	GE116
9/24/2025	87286.06	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.07	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.08	15	300	4500	9/8/2025	2025	GE116
9/24/2025	87286.09	15	300	4500	9/8/2025	2025	GE116
9/24/2025	87286.10	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.11	15	300	4500	9/8/2025	2025	GE116
9/24/2025	87286.12	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.13	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.14	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.15	15	300	4500	9/8/2025	2025	GE116
9/24/2025	87286.16	15	300	4500	9/8/2025	2025	GE116
9/24/2025	87286.17	15	300	4500	9/8/2025	2025	GE116
9/24/2025	87286.18	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.19	15	300	4500	9/8/2025	2025	GE116
9/24/2025	87286.20	15	300	4500	9/8/2025	2025	GE116
9/24/2025	87286.21	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.22	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.23	15	300	4500	9/8/2025	2025	GE116
9/24/2025	87286.24	15	300	4500	9/8/2025	2025	GE116
9/24/2025	87286.25	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.26	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.27	15	300	4500	9/8/2025	2025	GE116
9/24/2025	87286.28	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.29	15	300	4500	9/8/2025	2025	GE116
9/24/2025	87286.30	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.31	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.32	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.33	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.34	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.35	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.36	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.37	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.38	15	300	4500	9/8/2025	2025	GE116
9/25/2025	87286.39	15	300	4500	9/8/2025	2025	GE116

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Installer:	Northwest Linings & Geotextile Products, Inc.
CQA Monitor:	Becca Heaman

Qty	Date	Placement	Material Type
Rolls	Placed	Area (sf)	
19	10/7/2025	85,500	GE116
20	10/8/2025	90,000	GE116



SUBMITTAL REVIEW 04

To	<u>Southcentral Construction Inc.</u>	Date	<u>August 18, 2025</u>	Page 1 of 3
	<u>205 E. Dimond Blvd., PMB 555</u>	Client	<u>Matanuska-Susitna Borough, Alaska</u>	
	<u>Anchorage, AK 99515</u>	Project Name	<u>Central Landfill Cell 4 Expansion Construction</u>	
		Project No.	<u>BMCD 167550</u>	
Attention	<u>Dane Dahlgren</u>	Via	<u>Email</u>	

Regarding the following technical submittals:

Dwg. No./Spec	Description	Action Taken	Comments
33 00 00 1.04B(1)&(2)	Manufacturer's Product Data / Scaled Shop Drawings	C	Contractor to review Construction Plans and Specifications and provide manufacturer's product data and scaled shop drawings for all HDPE pipes and fitting included the design documents.
33 00 00 1.04B(1)&(2)	6" ADS Single Wall Pipe Perf Pipe w/sock	A	
33 00 00 1.04B(1)&(2)	4", 6", 8" DR 11 HDPE Pipe, 6" 8" DR 11 Perf Pipe	A	
33 00 00 1.04B(1)&(2)	Molded Butt Fusion Wye Drisco Plex 8100	A	
33 00 00 1.04B(1)&(2)	4" DR 17, 6" 8" DR 11 IPS Flange Adapters	C	Per 33 00 00, Part 2.04(A) all fittings shall match the size and SDR rating of the receiving pipe.
33 00 00 1.04B(1)&(2)	4", 6", 45 degree Elbows DR 11	C	Per the Construction Plans (detail 3, C012), 45-deg elbows must be sweep.
33 00 00 1.04B(1)&(2)	8" Butt Tee DR 11, DR 17	B	Other dimensions of tees are needed for the completion of the Project and are not included in this submittal. Per 33 00 00, Part 2.04(A) all fittings shall match the size and SDR rating of the receiving pipe.
33 00 00 1.04B(1)&(2)	4" Butt Reducer DR 11, 6" Butt Reducer DR 11	B	Other dimensions of reducers are needed for the completion of the Project and are not included in this submittal. Per 33 00 00, Part 2.04(A) all fittings shall match the size and SDR rating of the receiving pipe.

EXPLANATION OF ENGINEER'S ACTION (See Contract Documents for additional explanation.)

- A - SUBMITTAL ACCEPTED.
- B - SUBMITTAL ACCEPTABLE AS NOTED.
- C - SUBMITTAL RETURNED FOR REVISION.
- D - SUBMITTAL NOT ACCEPTABLE.
- E - PRELIMINARY SUBMITTAL.
- F - FOR REFERENCE; NO ACCEPTANCE REQUIRED.
- G - DISTRIBUTION COPY.

ADDITIONAL SUBMITTALS REQUIRED

Action	Copies	Reproducible



010515 Form GCO-12

To	<u>Southcentral Construction Inc.</u>	Date	<u>August 18, 2025</u>	Page 2 of 3
	<u>205 E. Dimond Blvd., PMB 555</u>	Client	<u>Matanuska-Susitna Borough, Alaska</u>	
	<u>Anchorage, AK 99515</u>	Project Name	<u>Central Landfill Cell 4 Expansion Construction</u>	
		Project No.	<u>BMcD 167550</u>	
Attention	<u>Dane Dahlgren</u>	Via	<u>Email</u>	

33 00 00 1.04B(1)&(2)	8" But End Cap DR 11	B	Other dimensions of caps are needed for the completion of the Project and are not included in this submittal. Per 33 00 00, Part 2.04(A) all fittings shall match the size and SDR rating of the receiving pipe.
33 00 00 1.04B(1)&(2)	4", 6" 8" 22.5 Elbow DR 11	A	
33 00 00 1.04B(1)&(2)	Poly Cam Male ThredHDPE Transition Fitting	A	
33 00 00 1.04B(1)&(2)	4", 6". 8" Transition With Male NTP	A	
33 00 00 1.04B(1)&(2)	8" 316 SS Camlock Fittings	A	
33 00 00 1.04B(1)&(2)	3", 6", 8" 316 SS Backing Rings/Bolts and Nuts	B	Per 33 00 00, Part 2.09(A), flange back-up rings may be ductile iron. Per 33 00 00, Part 2.13(A), all above grade fasteners shall be Grade 2 zinc plated carbon steel and permanent underground fasteners shall be 304 SST.
33 00 00 1.04B(1)&(2)	6", 8" SS 150 LB Blind Flanges	C	Blind flanges should be HDPE.
33 00 00 1.04B(1)&(2)	6", 8" Fluoroelastomer Gaskets	C	Per 33 00 00, Part 2.09(A), all flange gaskets shall be Viton.
33 00 00 1.04C(1)	Affidavit of Compliance		To be submitted.
33 00 00 1.04C(2)	Field Testing Documentation		To be submitted.
33 00 00 1.04C(3)	Certification of Personnel's Factory Training		To be submitted.

EXPLANATION OF ENGINEER'S ACTION
(See Contract Documents for additional explanation.)

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010515 Form GCO-12

To Southcentral Construction Inc. Date August 18, 2025 Page 3 of 3
205 E. Dimond Blvd., PMB 555 Client Matanuska-Susitna Borough, Alaska
Anchorage, AK 99515 Project Name Central Landfill Cell 4 Expansion Construction
Project No. BMcD 167550
Attention Dane Dahlgren Via Email

33 00 00 1.04D	Utility Survey		To be submitted.
33 00 00 1.04E	Project Record Documents		To be submitted.

By Fred Doran, PE

EXPLANATION OF ENGINEER'S ACTION
(See Contract Documents for additional explanation.)

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ADDITIONAL SUBMITTALS REQUIRED

Action	Copies	Reproducible



Southcentral Construction Inc.
205 E. Dimond Blvd., PMB 555
Anchorage, AK 99515

Submittal Transmittal

PROJECT Central Landfill Cell 4 Expantion
CONTRACTOR Southcentral Construction Inc.
ORIGINATOR Dane Dahlgren
DATE SUBMITTED 8/7/25 DRAWING NO. _____

SUBMITTAL NO. 4
CONTRACT NO. 25-179B
SPEC. SECTION 33 00 00
SHEET OF

TO: Matanuska-Susitna Bor
350 East Dahlia Ave.
Palmer, Ak. 99645

SUBMITTED AS SPECIFIED

ATTN:

		REVIEW ACTION						
ITEM: _ HDPE Pipe & Fittings		COPIES SENT	NO EXCEPTION TAKEN	MAKE CORRECTION AS NOTED	AMEND AND RESUBMIT	REJECTED RESUBMIT	COPIES RETURNED	NOTES ATTACHED
SUPPLIER/CONTRACTOR: Ferguson Ent.								
Original Submittal 2nd 3rd 4th								
IDENT. NO.	DETAILED DESCRIPTION (Provide Itemized List of Contents of This Submittal)		A	B	C	D		
1	6" ADS Single Wall Pipe PerF Pipe W/Sock	1	●					
2	4",6",8" DR 11 HDPE Pipe, 6",8" DR 11 Perf Pip	1	●					
3	Molded Butt Fusion WYE Drisco Plex 8100	1	●					
4	4" DR17 ,6",8" DR11 IPS Flange Adapters	1			●			
5	4",6", 45 degree Elbows DR 11	1			●			
6	8" Butt Tee DR 11,DR 17	1		●				
7	4" Butt Reducer DR 11, 6" Butt Reducer DR11	1		●				
8	8" Butt End Cap DR11	1		●				
9	4",6",8" 22.5 Elbow DR11	1	●					
10	Poly Cam Male ThreadHDPE Transition Fitting	1	●					
11	4",6",8" Transition With Male NTP	1	●					
12	8" 316 SS Camlock Fittings	1	●					
13	3",6",8" 316 SS Backing Rings/ Bolts and Nuts	1		●				
14	6",8" SS 150 LB Blind Flanges	1			●			
15	6",8" Fluoroelastomer Gaskets	1			●			

Complete either (a) or (b), following:

☐

(a) We have verified that the material or equipment contained in this submittal meets all the requirements specified or shown (no exceptions).

☐

(b) We have verified that the material or equipment contained in this submittal meets all the requirements specified or shown, except the following deviations (list deviations, attach a separate sheet if necessary).

Corrections or comments made relative to submittals during this review do not relieve the Contractor from compliance with the requirements of the drawings and specifications. This submittal is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The Contractor is responsible for confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of other trades, and performing his work in a safe and satisfactory manner.

CONTRACTOR: **Dane Dahlgren**
(Signature)

ENGINEER: _____
(Signature)

ROUTING	REC'D BY NAME/COMPANY	DATE REC'D	DATE FWD	COMMENTS
Project Manager				
Designer				
Project Manager	Dane Dahlgren			
Contractor	Southcentral Construction Inc.	8/7/2025	8/7/2025	

ADS SINGLE WALL HEAVY DUTY PIPE SPECIFICATION

Scope

This specification describes 3- through 24-inch (75 to 600 mm) ADS single wall high density corrugated polyethylene heavy duty pipe for use in gravity-flow land drainage applications.

Pipe Requirements

ADS single wall high density corrugated polyethylene heavy duty pipe shall have annular interior and exterior corrugations.

- 3- through 24-inch (75 to 600 mm) pipe shall meet ASTM F667.

Joint Performance

Joints for 3- to 24- inch (75 – 600 mm) shall be made with split or snap couplings. Standard connections shall meet the requirements of the ASTM F667. Gasketed connections shall incorporate a closed-cell synthetic expanded rubber gasket meeting the requirements of ASTM D1056 Grade 2A2. Gaskets, when applicable, shall be installed by the pipe manufacturer.

Fittings

Fittings shall conform to ASTM F667.

Material Properties

Pipe and fitting material shall be high density polyethylene conforming with the minimum requirements of cell classification 323410C or 333410C as defined and described in the latest version of ASTM D3350.

Installation

Installation shall be in accordance with ASTM D2321 and ADS recommended installation guidelines, with the exception that minimum cover in trafficked areas for 3- through 24-inch (75 to 600 mm) diameters shall be one foot (0.3 m). Maximum fill heights depend on embedment material and compaction level; please refer to Technical Note 2.03. Contact your local ADS representative or visit our website at www.ads-pipe.com for a copy of the installation guidelines.

Pipe Dimensions

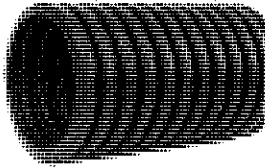


	Nominal Diameter, in (mm)									
Pipe I.D. in (mm)	3 (75)	4 (100)	5 (125)	6 (150)	8 (200)	10 (250)	12 (300)	15 (375)	18 (450)	24 (600)
Pipe O.D.** in (mm)	3.6 (91)	4.6 (117)	5.8 (147)	7.0 (178)	9.5 (241)	12.0 (305)	14.5 (368)	18.0 (457)	22.0 (559)	28.0 (711)

*Pipe O.D. values are provided for reference purposes only, values stated for 12 through 24-inch are ± 1 inch. Contact a sales representative for exact values

**All diameters available with or without perforations.

Product Details and Specifications



6 in. x 100 ft. Plain End Plastic Drainage Pipe

6X100 SGL WAL PERF HDPE PIPE W/SOCK

ALT CODE : A06730100BS

ITEM# : 3003077

DESCRIPTION

- Decrease nitrates in drinking water
- Flexible, lightweight, easy to use
- Great return on your investment
- Greater control over your crop management
- Homeowners find that this corrugated pipe is an economical, easy-to-install solution to common
- Increased crop production/yields
- More efficient fertilizer and crop protective products
- Subsurface irrigation and drainage-at your control
- The single wall corrugated HDPE pipe is ideal for drainage projects where flexibility, light weight a
- These may include downspouts run off, foundation and window well drains, driveway culverts and

SPECIFICATIONS

Application

- Downspouts
- Drainage
- Foundations
- Gravity System

ASTM Specifications

- ASTM D-1056
- ASTM D-2321
- ASTM D-3350
- ASTM F-667

BAA Compliant

Yes

Color/Finish

Black

Color/Finish Category

Blacks

End Connection 1

Plain End

End Connection 2

Plain End

End Connections

Plain End

Material

Plastic

Material Type

HDPE

Maximum Temperature

200

Origin

Domestic

Outside Diameter

7 in

Pipe Wall Type

Perforated with Sock

Pipe/Tubing Size

6 in

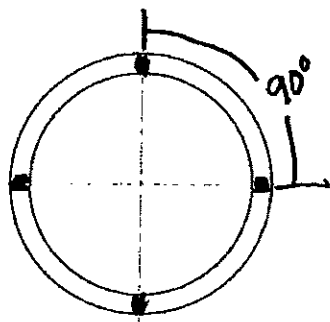
DETAILS

ALT.CODES2	A06730100
ALT.CODES3	HHYPWK060100
ALT.CODES4	HHYPW1060100
ALT.CODE	A06730100BS
DEFAULT VENDOR	VENDOR ALPHA : ADS (540)
DEPT DESC	VENDOR NAME : ADVANCED DRAINAGE SYSTEMS INC. (540)
DISC GROUP DESC	WATERWORKS - PIPE (54)
FREIGHT CODE	ADS 2-8 STD SGL WALL HDPE CORR PIPE (5867)
GLBL PROD HIER	CL100
LINEBUY DESC	018006019001
LONG DESCRIPTION	ADS CORR HDPE DRN PIPE & TUBE N/PRG (874)
MASTER PRODUCT ID	6 X 100 Single Wall Perforated HDPE Pipe with Sock
PARCEL RESTRICT FLAG	3003077
PER QTY	E
SHORT DESCRIPTION	1
UOM	6X100 SGL WAL PERF HDPE PIPE W/SOCK
UPC CODE	FT
VENDOR PROD CODE	096942632270
	06730100BS

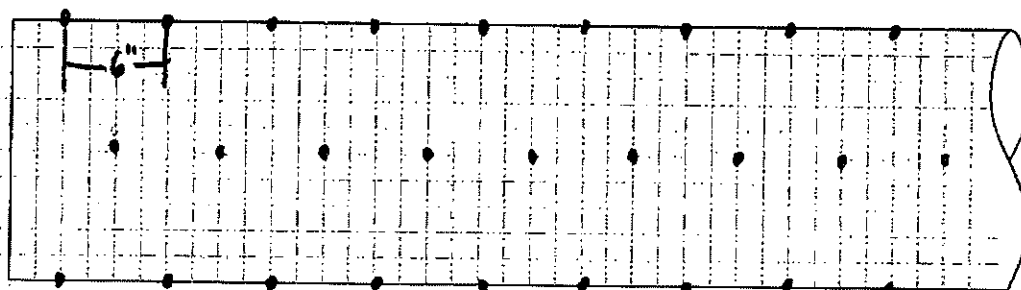
Ferguson Industrial Plastics Division

Customer: F3017
Date: 7-28-25

Production Branch: F3067
Ship Date: TBD



END VIEW
N13



ELEV. VIEW
N13

Pipe Size: 6"
HDPE/PVC: HDPE
SDR/SCH: 11
Number Of Rows: 4
Degrees Apart: 90°
Hole Diameter: 1/2"
Spacing: 6"
Staggered: YES - 3"

Pipe Length: 40'
Bell End Or Plain End: PE
Total Feet Of Pipe To Be Perforated: 580'
Additional Notes:

Customer Approval _____

SHOP USE ONLY

Start Date: _____ Finish Date: _____ # Of People: _____

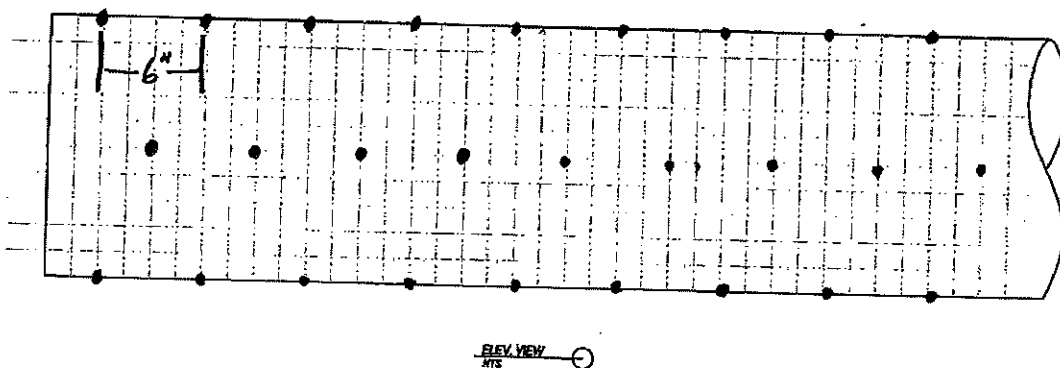
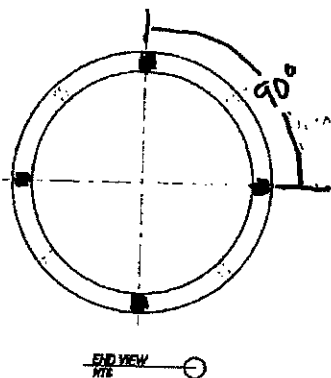
Start Time: _____ Finish Time: _____ Total Hours: _____

Total Manhours: _____ Initials: _____

Ferguson Industrial Plastics Division

Customer: F3017
 Date: 7-28-25

Production Branch: F3067
 Ship Date: TBD



Pipe Size: 8"
 HDPE/PVC: HDPE
 SDR/SCH: 11
 Number Of Rows: 4
 Degrees Apart: 90°
 Hole Diameter: 1/2"
 Spacing: 6"
 Staggered: YES - 3"

Pipe Length: 40'
 Bell End Or Plain End: PE
 Total Feet Of Pipe To Be Perforated: 860'
 Additional Notes:

Customer Approval _____

SHOP USE ONLY

Start Date: _____ Finish Date: _____ # Of People: _____

Start Time: _____ Finish Time: _____ Total Hours: _____

Total Manhours: _____ Initials: _____

WL106 PE4710 PIPE COMPOUND

Typical Physical Properties for WL Plastics PE4710 Pipe Compound

- WL Plastics PE4710 pipe is manufactured from pressure rated PE4710 polyethylene compounds that meet or exceed ASTM D 3350 requirements and Cell Classification PE445574C. WL Plastics PE4710 compound meets or exceed ASTM D3350 requirements and Cell Classification PE345464C and material code designations PE3608 and PE3408.
- WL Plastics PE4710 polyethylene pipe compounds are Listed by PPI in TR-4 and are stress rated for pressure pipe with PPI HDS ratings for water at 73°F (23°C) and PPI HDB ratings at 73°F (23°C) and 140°F (60°C).
- WL Plastics PE4710 exceeds PPI TR-3 and ASTM D3350 SCG resistance requirements per ASTM F1473 (PENT). WL Plastics PE4710 ductility is substantiated with greater than 438,300 hours (50 years) at 73°F (23°C) before the onset of SCG.
- For potable water service, WL Plastics PE4710 black polyethylene compounds are certified to NSF-61

Physical Property	Test Method	Typical Value ⁽¹⁾
Cell classification (black compound)	ASTM D3350	PE445574C
Melt Index (190/2.16)	ASTM D1238	0.1 g/10 min
High Load Melt Index ⁽²⁾ (190/21.6)	ASTM D1238	4 – 20 g/10 min
Density natural resin (73°F/23°C)	ASTM D792/D1505	0.941-0.959 g/cm ³
Density with 2% minimum carbon black (73°F/23°C)	ASTM D792/D1505	0.960 g/cm ³
Tensile strength at yield (2 in/min; 73°F/23°C)	ASTM D638	3500 – 4000 psi
Tensile elongation (2 in/min; 73°F/23°C)	ASTM D638	>400%
Flexural modulus (73°F/23°C)	ASTM D790	>120,000 psi
SCG Resistance, PENT (80°C, 2.4 MPa)	ASTM F1473	> 500 h
Thermal stability	ASTM D3350	>428°F (> 220°C)
Brittleness temperature	ASTM D746	<-103°F (<-75°C)
Thermal expansion coefficient	ASTM D696	9 x 10 ⁻⁵ in/in/°F
HDB ⁽³⁾ at 73°F (23°C)	ASTM D2837/PPI TR-3	1600 psi (11.0 MPa)
HDB ⁽³⁾ at 140°F (60°C)	ASTM D2837/PPI TR-3	1000 psi (6.9 MPa)
HDS ⁽³⁾ for water at 73°F (23°C)	ASTM D2837/PPI TR-3	1000 psi (6.9 MPa)
HDS for water at 140°F (60°C)	ASTM D2837/PPI TR-3	630 psi (4.3 MPa)
RCP Resistance, Critical Pressure at 32°F (0°C)	ISO 13477	>174 psi (>1.2 MPa) ⁽⁴⁾
RCP Resistance, Critical Temp. at 72.5 psi (0.5 MPa)	ISO 13477	<2°F (<-17°C) ⁽⁴⁾

Contact WL Plastics Customer Service for availability. (1)Typical values determined from laboratory tests of samples of compounds (resins) prepared as plaque specimens in accordance with industry standard test methods. Values determined on samples prepared from pipe may vary. The typical values presented herein are for PE4710 polyethylene pipe compounds (resins) but do not constitute engineering properties for pipe. (2)Overall range of HLMI values for all compounds from all WL Plastics compound suppliers; HLMI variation for an individual compound will be well within the overall range. (3)Listed HDB and HDS ratings in accordance with ASTM D 2837 and PPI TR-3 are published in PPI TR-4 by the compound manufacturer (independent listing) and by WL Plastics (dependent listing). WL Plastics dependent listing compounds are identified by a compound code for the supplier: C (Chevron-Phillips); D (Dow); E (Lyondell Basell); S (Ineos). (4)RCP data not available for compound code C.

This publication is intended for use as a piping system guide. It should not be used in place of a professional engineer's judgment or advice and it is not intended as installation instructions. The information in this publication does not constitute a guarantee or warranty for piping installations and cannot be guaranteed because the conditions of use are beyond our control. The user of this information assumes all risk associated with its use. WL Plastics Corporation has made every reasonable effort to ensure accuracy, but the information in this publication may not be complete, especially for special or unusual applications. Changes to this publication may occur from time to time without notice. Contact WL Plastics Corporation to determine if you have the most current edition. Publication duplication permitted.



WL106 PE4710 PIPE COMPOUND

Typical Physical Properties for WL Plastics PE4710 Pipe Compound

- WL Plastics PE4710 pipe is manufactured from pressure rated PE4710 polyethylene compounds that meet or exceed ASTM D 3350 requirements and Cell Classification PE445574C. WL Plastics PE4710 compound meets or exceed ASTM D3350 requirements and Cell Classification PE345464C and material code designations PE3608 and PE3408.
- WL Plastics PE4710 polyethylene pipe compounds are Listed by PPI in TR-4 and are stress rated for pressure pipe with PPI HDS ratings for water at 73°F (23°C) and PPI HDB ratings at 73°F (23°C) and 140°F (60°C).
- WL Plastics PE4710 exceeds PPI TR-3 and ASTM D3350 SCG resistance requirements per ASTM F1473 (PENT). WL Plastics PE4710 ductility is substantiated with greater than 438,300 hours (50 years) at 73°F (23°C) before the onset of SCG.
- For potable water service, WL Plastics PE4710 black polyethylene compounds are certified to NSF-61

Physical Property	Test Method	Typical Value ⁽¹⁾
Cell classification (black compound)	ASTM D3350	PE445574C
Melt Index (190/2.16)	ASTM D1238	0.1 g/10 min
High Load Melt Index ⁽²⁾ (190/21.6)	ASTM D1238	4 – 20 g/10 min
Density natural resin (73°F/23°C)	ASTM D792/D1505	0.941-0.959 g/cm ³
Density with 2% minimum carbon black (73°F/23°C)	ASTM D792/D1505	0.960 g/cm ³
Tensile strength at yield (2 in/min; 73°F/23°C)	ASTM D638	3500 – 4000 psi
Tensile elongation (2 in/min; 73°F/23°C)	ASTM D638	>400%
Flexural modulus (73°F/23°C)	ASTM D790	>120,000 psi
SCG Resistance, PENT (80°C, 2.4 MPa)	ASTM F1473	> 500 h
Thermal stability	ASTM D3350	>428°F (> 220°C)
Brittleness temperature	ASTM D746	<-103°F (<-75°C)
Thermal expansion coefficient	ASTM D696	9 x 10 ⁻⁶ in/in/°F
HDB ⁽³⁾ at 73°F (23°C)	ASTM D2837/PPI TR-3	1600 psi (11.0 MPa)
HDB ⁽³⁾ at 140°F (60°C)	ASTM D2837/PPI TR-3	1000 psi (6.9 MPa)
HDS ⁽³⁾ for water at 73°F (23°C)	ASTM D2837/PPI TR-3	1000 psi (6.9 MPa)
HDS for water at 140°F (60°C)	ASTM D2837/PPI TR-3	630 psi (4.3 MPa)
RCP Resistance, Critical Pressure at 32°F (0°C)	ISO 13477	>174 psi (>1.2 MPa) ⁽⁴⁾
RCP Resistance, Critical Temp. at 72.5 psi (0.5 MPa)	ISO 13477	<2°F (<-17°C) ⁽⁴⁾

Contact WL Plastics Customer Service for availability. (1)Typical values determined from laboratory tests of samples of compounds (resins) prepared as plaque specimens in accordance with industry standard test methods. Values determined on samples prepared from pipe may vary. The typical values presented herein are for PE4710 polyethylene pipe compounds (resins) but do not constitute engineering properties for pipe. (2)Overall range of HLM values for all compounds from all WL Plastics compound suppliers; HLM variation for an individual compound will be well within the overall range. (3)Listed HDB and HDS ratings in accordance with ASTM D 2837 and PPI TR-3 are published in PPI TR-4 by the compound manufacturer (independent listing) and by WL Plastics (dependent listing). WL Plastics dependent listing compounds are identified by a compound code for the supplier: C (Chevron-Phillips); D (Dow); E (Lyondell Basell); S (Ineos). (4)RCP data not available for compound code C.

This publication is intended for use as a piping system guide. It should not be used in place of a professional engineer's judgment or advice and it is not intended as installation instructions. The information in this publication does not constitute a guarantee or warranty for piping installations and cannot be guaranteed because the conditions of use are beyond our control. The user of this information assumes all risk associated with its use. WL Plastics Corporation has made every reasonable effort to ensure accuracy, but the information in this publication may not be complete, especially for special or unusual applications. Changes to this publication may occur from time to time without notice. Contact WL Plastics Corporation to determine if you have the most current edition. Publication duplication permitted.

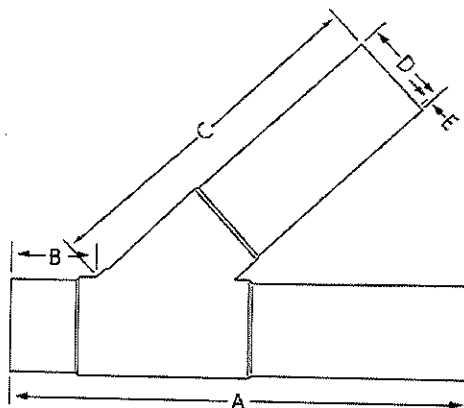


WL102 – IPS PIPE SIZES AND PRESSURE CLASS

PE4710		PC ^B , psi	335	320	250	200	160	150	140	125	110	100	80	65
IPS SIZE ^A	AVG OD, in	DR	7	7.3	9	11	13.5	14.3	15.5	17	19	21	26	32.5
3/4	1.050	Min wall, in Avg ID ^C , in Weight, lb/ft	0.150 0.732 0.187	0.144 0.745 0.177	0.117 0.803 0.148	0.095 0.848 0.124								
1	1.315	Min wall, in Avg ID ^C , in Weight, lb/ft	0.188 0.917 0.288	0.180 0.933 0.278	0.146 1.005 0.232	0.120 1.062 0.195								
1 1/4	1.660	Min wall, in Avg ID ^C , in Weight, lb/ft	0.237 1.157 0.459	0.227 1.178 0.442	0.184 1.269 0.369	0.151 1.340 0.310								
1 1/2	1.900	Min wall, in Avg ID ^C , in Weight, lb/ft	0.271 1.325 0.600	0.260 1.348 0.580	0.211 1.452 0.485	0.173 1.534 0.406								
2	2.375	Min wall, in Avg ID ^C , in Weight, lb/ft	0.339 1.656 0.939	0.325 1.685 0.906	0.264 1.816 0.758	0.216 1.917 0.634	0.176 2.002 0.526	0.166 2.023 0.499	0.153 2.050 0.462	0.140 2.079 0.425				
2 1/2	2.875	Min wall, in Avg ID ^C , in Weight, lb/ft	0.411 2.004 1.377	0.394 2.040 1.329	0.319 2.198 1.109	0.261 2.321 0.928	0.213 2.424 0.771	0.201 2.449 0.731	0.185 2.482 0.677	0.169 2.516 0.622				
3	3.500	Min wall, in Avg ID ^C , in Weight, lb/ft	0.500 2.440 2.040	0.479 2.484 1.968	0.389 2.676 1.646	0.318 2.825 1.376	0.259 2.950 1.141	0.245 2.981 1.084	0.226 3.021 1.006	0.206 3.064 0.923	0.184 3.109 0.830	0.167 3.147 0.757		
4	4.500	Min wall, in Avg ID ^C , in Weight, lb/ft	0.643 3.137 3.372	0.616 3.193 3.253	0.500 3.440 2.720	0.409 3.633 2.275	0.333 3.793 1.887	0.315 3.833 1.793	0.290 3.885 1.660	0.265 3.939 1.526	0.237 3.998 1.374	0.214 4.046 1.247	0.173 4.133 1.018	0.138 4.206 0.819
5	5.563	Min wall, in Avg ID ^C , in Weight, lb/ft	0.795 3.878 5.154	0.762 3.947 4.975	0.618 4.253 4.156	0.506 4.491 3.479	0.412 4.689 2.886	0.389 4.738 2.737	0.359 4.802 2.540	0.327 4.869 2.328	0.293 4.942 2.100	0.265 5.001 1.909	0.214 5.109 1.557	0.171 5.200 1.254
6	6.625	Min wall, in Avg ID ^C , in Weight, lb/ft	0.946 4.619 7.305	0.908 4.701 7.059	0.736 5.064 5.894	0.602 5.348 4.930	0.491 5.585 4.095	0.463 5.643 3.879	0.427 5.719 3.599	0.390 5.799 3.307	0.349 5.886 2.978	0.315 5.956 2.703	0.255 6.085 2.209	0.204 6.193 1.781
8	8.625	Min wall, in Avg ID ^C , in Weight, lb/ft	1.232 6.013 12.385	1.182 6.120 11.963	0.958 6.593 9.988	0.784 6.963 8.359	0.639 7.271 6.939	0.603 7.346 6.578	0.556 7.445 6.100	0.507 7.549 5.597	0.454 7.663 5.044	0.411 7.754 4.591	0.332 7.922 3.744	0.265 8.062 3.012
10	10.750	Min wall, in Avg ID ^C , in Weight, lb/ft	1.536 7.494 19.245	1.473 7.628 18.581	1.194 8.218 15.515	0.977 8.678 12.983	0.796 9.062 10.774	0.752 9.156 10.224	0.694 9.280 9.490	0.632 9.409 8.695	0.566 9.551 7.838	0.512 9.665 7.128	0.413 9.873 5.805	0.331 10.049 4.689
12	12.750	Min wall, in Avg ID ^C , in Weight, lb/ft	1.821 8.889 27.062	1.747 9.047 26.138	1.417 9.747 21.837	1.159 10.293 18.267	0.944 10.748 15.155	0.892 10.860 14.383	0.823 11.006 13.348	0.750 11.160 12.238	0.671 11.327 11.021	0.607 11.463 10.023	0.490 11.710 8.169	0.392 11.918 6.587
14	14.000	Min wall, in Avg ID ^C , in Weight, lb/ft	2.000 9.760 32.635	1.918 9.934 31.511	1.556 10.702 26.329	1.273 11.302 22.030	1.037 11.801 18.279	0.979 11.925 17.334	0.903 12.085 16.082	0.824 12.254 14.763	0.737 12.438 13.292	0.667 12.587 12.093	0.538 12.858 9.848	0.431 13.087 7.952

Molded Butt Fusion Lateral Wye

Dimension Sheet



Product Family:	Injection Molded Butt Fusion Fitting	Fitting Design:	45° Wye
Resin Status:	NSF Listed Bi-Modal Virgin Resin	Nominal Pipe Sizes:	2" – 8"
Resin Type:	ASTM D3350 designated PE3408/PE4710/PE100	Nominal Pipe Standard:	IPS
Resin Cell Class:	4455574-CC3	Currently Available SDR's:	17, 11
Manufactured and tested to meet requirements of:		ASTM D2513, ASTM D3261, ANSI/AWWA C901 & C906, FM 1613, NSF 61	
For use on pipe and fittings conforming to:		ASTM D2513, ASTM D3035, ASTM F-714	

For Material and Testing information, please refer to our Molded Fitting Specification Sheet.

IPS

SDR 17 (standard dimension ratio)

125 PSI (MAOP @ 73.4° F)

Nominal Size	A [in.]	B [in.]	C [in.]	D [in.]	E [in.]	Weight [lbs.]	Item Code	FM Class
2" IPS	23.74	5.28	13.10	2.375	0.140	2.10	100901	-----
3" IPS	24.56	5.90	13.10	3.500	0.206	3.00	100903	-----
4" IPS	28.50	5.70	20.60	4.500	0.264	7.00	100905	-----
6" IPS	34.65	5.30	26.00	6.625	0.390	19.8	100907	-----
8" IPS	37.40	5.70	27.56	8.625	0.507	44.9	100909	-----

IPS

SDR 11 (standard dimension ratio)

200 PSI (MAOP @ 73.4° F)

Nominal Size	A [in.]	B [in.]	C [in.]	D [in.]	E [in.]	Weight [lbs.]	Item Code	FM Class
2" IPS	23.74	5.28	13.10	2.375	0.216	2.20	100900	-----
3" IPS	24.56	5.90	13.10	3.500	0.318	4.70	100902	-----
4" IPS	28.50	5.70	20.60	4.500	0.409	9.70	100904	-----
6" IPS	34.65	5.30	26.00	6.625	0.603	26.2	100906	-----
8" IPS	37.40	5.70	27.56	8.625	0.785	52.0	100908	-----



Performance Pipe Molded Fittings Submittal

**This submittal outlines the standards and cell classification for
Molded fittings produced by Performance Pipe.**

Performance Pipe Molded Fittings are produced in six different Series for application in various industries.

The DriscoPlex 8100 series fitting (IPS or CTS) is an all purpose fitting that meets several application standards. It is produced out of High Performance High Density PE4710. This material code designation meets and exceeds PE3408, PE3608, PE4710 and PE100 submittal requests.

The Driscoplex 6500 series fittings are produced of High Performance Medium Density resin. It meets or exceeds PE2406 and 2708 submittal requests.

The Factory Mutual Approved (FMA) Driscoplex 1500 and 1600 series fittings are manufactured with High Performance High Density PE4710 resin.

The Driscoplex 4000 Series Ductile Iron Pipe Size (DIPS) fittings are produced to several manufacturing standards. The fittings are manufactured of High Performance High Density PE4710 resin.

The Driscoplex 5300 series fittings are made for the Geothermal Industry. The fittings are manufactured from High Performance High Density resins that meet or exceed PE3408 and 3608 submittal requests.

Table 1



Series	Application	Manufacturing Standard	ASTM Material Designation Code	Cell Classification	Sizes of Manufacture
8100	Mun., Ind. & Energy Gas, Water, Sewer, Oil field, Landfill Various	ASTM D-2513 AWWA C906 ASTM D-3261	PE 4710	445574C	½" – 1 ¼" CTS ½" – 8" IPS
6500	Gas Distribution	ASTM D-2513 ASTM D-3261 ASTM D-2683 CAN/CSA-B137.4	PE 2708	234373E	½" – 1 ¼" CTS ½" – 8" IPS
4000 (DIPS)	Mun. & Ind. Potable Water, Various	AWWA C906 ASTM F-714 ASTM D-3035	PE 4710	445574C	3" – 8" DIPS
1500 (IPS) 1600 (DIPS)	Factory Mutual Fire Main(FMA)	FM 1610 ASTM F-714 AWWA 901 & C906	PE 4710	445574C	2" – 8" IPS
5300	Geothermal	ASTM D3035 ASTM F714	PE3608	445574C	2" – 8" IPS

Performance Pipe Mechanical Joint Adapters are manufactured through 12" (IPS & DIPS) sizes.

Performance Pipe Flange Adapters 20", 22" and 24" and transition fittings are manufactured of PE3608 resin.

All other High Density fittings are manufactured of PE4710 High Performance High Density resins.

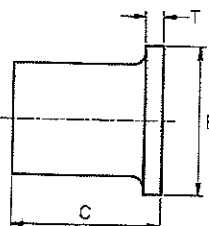
The applications listed in Table 1 are limited by the table space requirements. Please see the Performance Pipe Municipal, Industrial & Energy Submittal Sheet (PP515) for applications and Industries.

Performance Pipe PE4710 fittings meet and exceed PE3408, PE3608, PE4710, and PE100 submittal requirements.

TABLE 2

Standard	Application
AWWA C-906 AWWA C-901	Covers manufacturing of pressure pipe and fittings primarily intended for use in the transportation of water and other liquids.
ASTM D-2513	Covers manufacturing requirements and test methods for fittings intended for use in fuel gas mains and services.
ASTM F-714	Covers polyethylene pipe made in dimensions based on outside diameters 3" and larger.
ASTM D-3035	Covers polyethylene pipe made in dimensions based on outside diameters less than 3".
ASTM D-3261	This Specification covers molded and machined fittings for use with polyethylene pipe for various applications.
ASTM D-2683	Covers socket-type fittings for outside diameter controlled polyethylene fittings.
CAN/CSA-B137.4	Covers Canadian Standards Association standards for outside diameter controlled gas pipe & fittings.
NSF-61	Performance Pipe PE3608 and PE4710 high density fittings are produced from NSF 61 listed resin compounds.

Performance pipe's fittings are connected using butt fusion, sidewall fusion, socket fusion, and other mechanical methods, such as flanges, mechanical joint adapters and compression couplings.

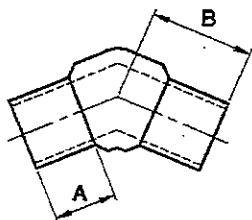


IPS Flange Adapters

PRODUCED TO AWWA C901-02/C906-99 AND
ASTM D2513 & D3261

Nominal Size Actual Size	DR	Dimensions B x C (in)	Dimension T (in)	Package Qty.	Package Weight (lbs.)	Std. Item	FM 150 200	Reference Code	
1 1/2" 1.900"	DR 9	3 1/8 x 6	0.4	10	4	Y		*M1.5*ADFL*	
	DR 11		0.3		6				
2" 2.375"	DR 7	3 3/4 x 6	0.4	15	7	Y		*M020*ADFL*	
	DR 9				6				x
	DR 11	3 3/4 x 6 1/8	0.3		5	N	x		
	DR 17								
3" 3.500"	DR 7	4 3/4 x 6	0.6	12	14	Y		*M030*ADFL*	
	DR 9				12				x
	DR 11	4 5/8 x 6 1/8	0.4		10	N	x		
	DR 17								
4" 4.500"	DR 7	6 5/8 x 6	0.8	10	23	Y		*M040*ADFL*	
	DR 9				21				x
	DR 11	6 1/8 x 7 1/8	0.5		17	N	x		
	DR 17						13		
6" 6.625"	DR 7	8 5/8 x 8 1/8	1.1	10	68	Y		*M060*ADFL*	
	DR 9				66				x
	DR 11	8 1/8 x 8	0.7	12	60	N	x		
	DR 17				50				
8" 8.625"	DR 7	10 3/4 x 8 5/8	1.4	1	11	Y		*M080*ADFL*	
	DR 9				10				x
	DR 11	10 3/4 x 11	0.9		9	N	x		
	DR 17				5				
	DR 21				3				
	DR 26								
10" 10.750"	DR 7	13 x 8 3/4	1.7	1	17	Y		*M100*ADFL*	
	DR 9				15				x
	DR 11	13 x 12	1.1		11	N	x		
	DR 17				8				
	DR 21				7				
	DR 26				6				
12" 12.750"	DR 7	15 1/8 x 9 1/8	2.1	1	25	Y		*M120*ADFL*	
	DR 9				22				x
	DR 11	15 1/2 x 12	1.3		17	N	x		
	DR 17				13				
	DR 21				11				
	DR 26				9				

- x - Indicates certification/approval for application at additional charge.
 - Dimensions and weights are approximate and subject to change.
 - Drawing No. CU70D275



sweep
elbows

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Butt 45° Elbows
PRODUCED TO ASTM D2513 & D3261
AND AWWA C901-02 & 906-99

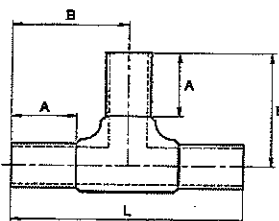
Butt 45 Degree Ells	DR/Wall	Dimensions A x B (in)	Package Quantity	Package Weight (lbs.)	Box Quan tity	CSA ¹	IAPMO ¹	FM		Reference Number
								150	200	
2" IPS	DR 7	2.45 x 3.20	20	20.0	20					*M020*L45D*
	DR 9			18.6						
	DR 11			15.2						
	DR 17			13.0						
3" IPS	DR 7	3.10 x 5.38	4	11.4	4					*M030*L45D*
	DR 9			10.8					x	
	DR 11 / 11.5			9.0		x ²		x		
	DR 13.5									
	DR 17									
4" IPS	DR 7	3.00 x 5.38	4	15.1	4				x	*M040*L45D*
	DR 9	3.00 x 4.93		9.4						
	DR 11 / 11.5					x ²		x		
	DR 13.5					x				
	DR 17									
6" IPS	DR 7	4.25 x 7.12	2	20.4	2				x	*M060*L45D*
	DR 9	4.00 x 6.38		13.3						
	DR 11 / 11.5					x ²	x	x		
	DR 13.5					x				
	DR 17									
8" IPS	DR 7	6.00 x 10.00	1	22.7	1				x	*M080*L45D*
	DR 9			17.0						
	DR 11					x		x		
	DR 13.5					x				
	DR 17					16.3				

¹ - CSA and IAPMO available as DriscoPlex® 6500 MDPE materials ONLY.

² - CSA only DR11 is approved (not 11.5)

x - Indicates certification/approval for application at additional charge.

- Drawing No. CU70B257



BUTT TEE

PRODUCED TO ASTM D2513 & D3261
and AWWA C901-02 & C906-99

Molded Butt Tee	DR/Wall	Dimensions A x B x L (in)	Package Quantity	Package Weight (lbs.)	Box Quantity	CSA ¹	IAPMO ¹	FM 150	200	Reference Number
1/2" CTS	0.090 wall	1.69 x 2.83 x 5.65	10	0.6	100	x				*M.50*TSTR*
3/4" CTS	0.090 wall	1.72 x 2.94 x 5.88	10	1.1	50					*M.75*TSTR*
1" CTS	0.102 wall	1.72 x 2.94 x 5.88	10	1.3	50					*M010*TSTR*
	0.125 wall				50					
1/2" IPS	DR 9.3	1.72 x 2.94 x 5.88	10	.8	50					*M.50*TSTR*
3/4" IPS	DR 11	1.72 x 2.94 x 5.88	10	1.2	50	x				*M.75*TSTR*
1" IPS	DR 9	1.72 x 3.06 x 6.12	10	1.8	50					*M010*TSTR*
	DR 11				50	x				
1 1/4" IPS	DR 9	2.50 x 3.90 x 7.80	10	4.4	10					*M1.25*TSTR*
	DR 10	2.75 x 4.53 x 9.25	10	5.2	10	x				
	DR 11				10	x				
1 1/2" IPS	DR 11	3.02 x 4.62 x 9.24	10	6.6	10	x	x			*M1.50*TSTR*
	DR 9				10					
2" IPS	DR 7	2.88 x 5.125 x 10.25	10	14.0	10					*M020*TSTR*
	DR 9		10	11.8	10				x	
	DR 11		10	10.0	10	x	x	x		
	DR 17		10	10.0	10					
3" IPS	DR 7	3.00 x 6.06 x 12.13	4	15.3	4					*M030*TSTR*
	DR 9	3.00 x 5.72 x 11.44	4	14.9	4				x	
	DR 11 /		4	10.4	4	x ²	x	x		
	DR 13.5				4	x				
	DR 17				4					
4" IPS	DR 7	3.00 x 6.22 x 12.44	4	23.0	4					*M040*TSTR*
	DR 9	3.00 x 6.75 x 13.50	4	22.0	4				x	
	DR 11 /		4	21.0	4	x ²	x	x		
	DR 13.5		4	20.0	4	x				
	DR 17		4	19.9	4					
6" IPS	DR 7	4.25 x 8.63 x 17.25	1	16.7	1					*M060*TSTR*
	DR 9	4.06 x 8.31 x 16.62	1	11.6	1				x	
	DR 11 /				1	x ²	x	x		
	DR 13.5				1	x				
	DR 17				1					
8" IPS	DR 7	6.00 x 12.09 x 24.18	1	37.6	1					*M080*TSTR*
	DR 9		1	36.6	1					
	DR 11		1	27.5	1	x		x		
	DR 13.5		1	26.3	1	x				
	DR 17				1					

¹ - CSA and IAPMO available as DriscoPlex® 6500 MDPE materials ONLY.

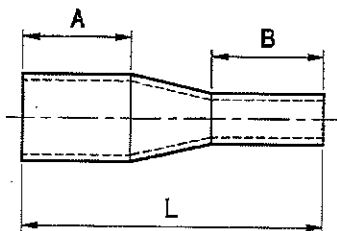
² - CSA only DR11 is approved (not 11.5)

x - Indicates certification/approval for application or test at additional charge.

- Drawing No. CU70B246 for 1/2" CTS thru 1" IPS & CU70B256 for 1-1/4" IPS thru 8" IPS



Section- 33 00 00



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Butt Reducer IPS x IPS
PRODUCED TO ASTM D2513 and D3261
and AWWA C901-02 & C906-99

Butt Reducers IPS X IPS	DR	Dimensions L x A x B (in)	Package Quantity	Package Weight (lbs.)	Box Quan- tity	CSA ¹	IAPMO ¹	FM 150 200	Reference Number
1" IPS x 1/2" IPS	DR 11 x 9.3	4.72 x 1.65 x 1.76	10	0.7	200				*M*RSTI*
1" IPS x 3/4" IPS	DR 11 x 11	4.74 x 1.71 x 1.76	10	0.8	150	x			*M*RSTI*
1 1/4" IPS x 1" IPS	DR 10 x 11 DR 11 x 11	4.78 x 1.70 x 1.76	10	1.2	100	x x			*M*RSTI*
1 1/2" IPS x 3/4" IPS	DR 9 x 9 DR 11 x 11	6.38 x 2.50 x 3.00	10	2.3	10	x			*M*RSTI*
1 1/2" IPS x 1" IPS	DR 9 x 9 DR 11 x 11	6.38 x 2.50 x 3.00	10	2.5	10	x			*M*RSTI*
2" IPS x 1" IPS	DR 11 x 11	7.15 x 2.90 x 3.60	10	3.0	10	x			*M*RSTI*
2" IPS x 1 1/4" IPS	DR 9 x 9 DR 11 x 10 DR 11 x 11	6.88 x 2.88 x 3.25	10	3.5	10	x			*M*RSTI*
2" IPS x 1 1/2" IPS	DR 9 x 9 DR 11 x 11	6.25 x 2.63 x 2.00	10	3.0	10	x			*M*RSTI*
3" IPS x 2" IPS	DR 7 x 7 DR 9 x 9 DR 11 x 11† DR 13.5 x DR 17 x 11†	6.88 x 2.94 x 3.00 8.00 x 3.12 x 2.81	10	9.7 8.5	10	x x	x	x	*M*RSTI*
4" IPS x 2" IPS	DR 7 x 7 DR 9 x 9 DR 11 x 11† DR 13.5 x DR 17 x 11†	7.38 x 3.00 x 2.88 7.75 x 3.06 x 2.81	10	16.3 15.3 11.6	10	x x	x	x	*M*RSTI*
4" IPS x 3" IPS	DR 7 x 7 DR 9 x 9 DR 11 x 11† DR 13.5 x DR 17 x 17	6.88 x 3.00 x 3.00 7.88 x 3.12 x 3.00	10	17.3 14.6	10	x x	x	x	*M*RSTI*
6" IPS x 4" IPS	DR 7 x 7 DR 9 x 9 DR 11 x 11† DR 13.5 x DR 17 x 17	8.00 x 3.00 x 3.00 11.50 x 4.12 x 4.12	6	24.6 23.0 27.1 26.2 24.8	6	x x	x	x	*M*RSTI*
8" IPS x 6" IPS	DR 7 x 7 DR 9 x 9 DR 11 x 11† DR 13.5 x DR 17 x 17	11.62 x 4.37 x 4.50	1	9.9 7.5	1	x x	x	x	*M*RSTI*

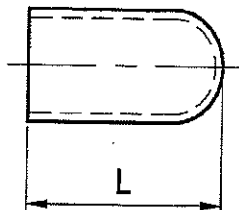
† - Fittings 3" DR 11 and larger also meet DR 11.5 criteria.

¹ - CSA and IAPMO available as DriscoPlex® 6500 MDPE materials ONLY.

x - Indicates certification/approval for application or test at additional charge.

- Drawing No. CU70B249 for 1" IPS x 1/2" IPS, 2" IPS x 3/4" IPS, and 1-1/4" IPS x 1" IPS.

- Drawing No. CU70B319 for 1-1/2" IPS x 3/4" IPS thru 8" IPS x 6" IPS



BUTT END CAP

PRODUCED TO ASTM D2513 and D3261
and AWWA C901-02 & C906-99

Butt End Cap	DR/Wall	Dimension L (in)	Package Quantity	Package Weight (lbs.)	Box Quantity	CSA ¹	IAPMO ¹	FM		Reference Number
								150	200	
1/2" CTS	0.090 wall	2.00	10	0.2	200	x				*M.50*CPST*
3/4" CTS	0.090 wall	2.30	10	0.2	100					*M.75*CPST*
1" CTS	0.102 wall	2.30	10	0.3	100					*M010*CPST*
	0.125 wall									
1/2" IPS	DR 9.3	2.20	10	0.2	100					*M.50*CPST*
3/4" IPS	DR 11	2.30	10	0.3		x				*M.75*CPST*
1" IPS	DR 9	2.40	10	0.5	50	x	x			*M010*CPST*
	DR 11									
1 1/4" IPS	DR 9	3.31	10	1.2	50	x				*M1.25*CPST*
	DR 10 DR 11	3.94				x				
1 1/2" IPS	DR 11	3.70	10	1.3	50	x				*M1.50*CPST*
2" IPS	DR 7	4.25	10	3.2	40					*M020*CPST*
	DR 9			2.6			x		x	
	DR 11					x		x		
	DR 17									
3" IPS	DR 7	4.80	10	10.0	10					*M030*CPST*
	DR 9			8.1					x	
	DR 11 / 11.5	3.94		5.6		x ²	x	x		
	DR 13.5					x				
	DR 17									
4" IPS	DR 7	8.50	10	23.7	10				x	*M040*CPST*
	DR 9			9.0		x ²	x	x		
	DR 11 / 11.5	x								
	DR 13.5									
	DR 17									
6" IPS	DR 7	9.88	6	27.9	6				x	*M060*CPST*
	DR 9			5.20		5	14.1	5	x ²	
	DR 11 / 11.5	x								
	DR 13.5									
	DR 17									
8" IPS	DR 7	5.00	1	5.6					x	*M080*CPST*
	DR 9			4.3						
	DR 11					x		x		
	DR 13.5					x				
	DR 17									

¹ - CSA and IAPMO available as DriscoPlex® 6500 MDPE materials ONLY.

² - CSA only DR11 is approved (not 11.5)

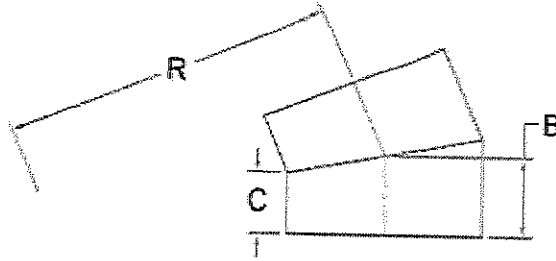
x - Indicates certification/approval for application or test at additional charge.

- Drawing Nos. CU70B248 for 1/2" CTS thru 1" IPS

- Drawing Nos. CU70B258 for 1-1/4" thru 8" IPS

WOLSELEY

INDUSTRIAL GROUP

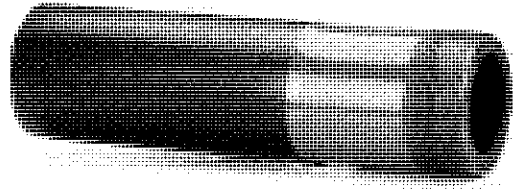


IPS FAB 2 SEG. 22.5 ELBOW

Nominal Size Actual OD	Pressure Class (psi)	Feed Stock	Dimension R x C x B (in)	Weight per Item (lbs)	Part #
2" 2.3750"	100	DR 17	13-1/8 x 4 x 4-1/4	1	PEI17HB225KF2
	160	DR 11		1	PEI11HB225KF2
	200	DR 9		1	PEI9HB225KF2
	250	DR 7		1	PEI7HB225KF2
3" 3.50"	100	DR 17	13-5/8 x 4 x 4-3/8	1	PEI17HB225MF2
	160	DR 11		1	PEI11HB225MF2
	200	DR 9		1	PEI9HB225MF2
	250	DR 7		2	PEI7HB225MF2
4" 4.500"	100	DR 17	14-1/4 x 5 x 5-1/2	2	PEI17HB225PF2
	160	DR 11		2	PEI11HB225PF2
	200	DR 9		3	PEI9HB225PF2
	250	DR 7		3	PEI7HB225PF2
6" 6.625"	100	DR 17	15-1/4 x 6 x 16-5/8	6	PEI17HB225UF2
	160	DR 11		6	PEI11HB225UF2
	200	DR 9		7	PEI9HB225UF2
	250	DR 7		8	PEI7HB225UF2
8" 8.625"	100	DR 17	16-1/4 x 6-1/2 x 7-3/8	10	PEI17HB225XF2
	160	DR 11		10	PEI11HB225XF2
	200	DR 9		12	PEI9HB225XF2
	250	DR 7		15	PEI7HB225XF2
10" 10.750"	100	DR 17	17-1/4 x 6-1/2 x 7-5/8	11	PEI17HB22510F2
	160	DR 11		17	PEI11HB22510F2
	200	DR 9		20	PEI9HB22510F2
	250	DR 7		24	PEI7HB22510F2
12" 12.750"	100	DR 17	19-1/2 x 8 x 9-1/4	19	PEI17HB22512F2
	160	DR 11		28	PEI11HB22512F2
	200	DR 9		34	PEI9HB22512F2
	250	DR 7		42	PEI7HB22512F2
14" 14.000"	100	DR 17	21 x 8 x 9-3/8	23	PEI17HB22514F2
	160	DR 11		35	PEI11HB22514F2
	200	DR 9		41	PEI9HB22514F2
	250	DR 7		51	PEI7HB22514F2
16" 16.000"	100	DR 17	24 x 8 x 9-5/8	31	PEI17HB22516F2
	160	DR 11		46	PEI11HB22516F2
	200	DR 9		55	PEI9HB22516F2
	250	DR 7		66	PEI7HB22516F2
18" 18.000"	100	DR 17	27 x 8 x 9-3/4	41	PEI17HB22518F2
	160	DR 11		60	PEI11HB22518F2
	200	DR 9		71	PEI9HB22518F2
	250	DR 7		85	



1101 McKinley Street
Anoka, MN 55303
Phone (763) 786-6682
Fax (763) 786-2167
www.polycam.com



Part Name: Male Thread HDPE Transition Fitting
Part Number: 710-xxxx

Threaded Transitions

The POLY-CAM Threaded Transition is a multi-level mechanical transition fitting. The polyethylene or pipe-quality copolymer material are hydraulically compressed into the transition fitting.

All threaded transitions can be made to be AIS (American Iron and Steel) or BABA compliant upon request.

Design

Relaxation of the pipe creates a seal to prevent leakage. Under pressure, the internal pressure within the pipe increases the sealing surface area on the barb. Under zero internal pressure, the compression and tensional strain created by the compression of the multi-level barbs are greater than the stress created by relaxation and/or thermal expansion and contraction. As the internal pressure increases, the connection between the pipe material and transition fitting increases.

- Sizes range from .5 to 12" NPT.
- All National Pipe Threads are made to ANSI/ASME B1.20.1 - 2013.

System Performance

The transition fitting is designed to handle the pressure rating of the HDPE pipe with a 2:1 safety factor at 73.40 degrees Fahrenheit with a minimum 50-year design life.

Quality Assurance

The transition fitting shall be manufactured by Poly-Cam, Inc. Poly-Cam, Inc. shall provide quality assurance with regards to proper installation, compatibility, performance, and acceptance. The transition joint meets or exceeds the requirements of:

- ASTM 1598, ASTM 1599, and ASTM D3261
- All fittings meet ARRA requirements.
- Meets NSF 61, listing PM13570

Note: This fitting does not meet ASTM D2513. The fitting CANNOT be used in natural gas applications.

Installation

HDPE pipe end: Install transition fitting to comply with the pipe manufacturer's recommended procedures. All field welds shall be completed per Plastic Pipe Institute's welding procedure for butt fusion.

Threaded Fitting: When installing the transition fitting:

- Always use pipe joint sealant or Teflon tape.
- Always use strap wrenches.
- **Do not use a pipe wrench.**
- **Always use 2 wrenches when connecting.**
- **Over tightening may cause ovality or damage.**
- **Always pressure test for leaks before backfilling.**
- Backfill and compact carefully around transition and service line to prevent ground shifts which could damage the valve and/or transition fitting.

Material

Threaded Fitting:

- Manufactured of Carbon Steel (A53 or A106 grade), Type 304 Stainless Steel (ASTM A249 or ASTM A269), Type 316 Stainless Steel (ASTM A249 or ASTM A269), C954 grade Aluminum Bronze (Lead Free material this complies with California AB1953, SB1334 and SB1935), or ERW pipe (ASTM SA-312).
- For carbon steel, the **epoxy coating** (IF 194T Red Iron Oxide) is fusion bonded to the metal. Meets NSF 61, FDA 175.300, AWWA C116-01, C213-01, UL 262 and FM 1120/1130

High-Density Polyethylene: HDPE pipe

- Meets ASTM D-3350 with minimum cell classification values of 345464C (PE 3408), PE445574C (PE 4710)
- Meets ASTM F714.
- Density shall be no less than 0.955 g/cm as referenced in ASTM D1505
- Melt index no greater than 0.15 g/10 minutes when tested per ASTM D 1238
- Tensile Strength at Yield -tensile shall be 3,200 psi to less than 3,500 psi as referenced in ASTM D638
- ESCR-Environmental Stress Crack Resistance shall be over 5,000 hours with zero failures when tested per ASTM D 1693-Condition C
- All pipe meets ASTM 3035.
- All certifications will be submitted upon request.

Warranty



Certified to
NSF/ANSI/CAN 61

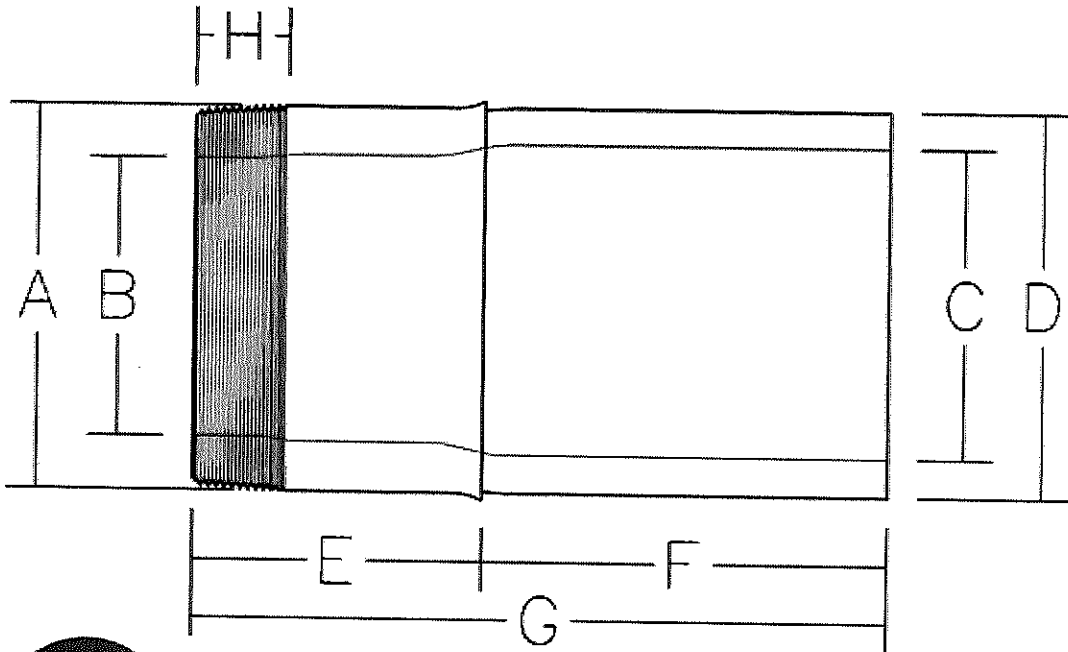
The warranty period is one year after the date of substantial completion of installation.

Revision Date: 9-14-2024

Series 710 Transition with Male NPT

SDR 11

Nominal Size (In.)	Coupling O.D. A	Pressed SDR11 PE Pipe I.D. B	Exposed SDR11 PE Pipe I.D. C	Exposed PE Pipe O.D. D	Coupling Length E	Exposed PE Pipe Length F	Overall Length G	Thread Length H
0.5	0.990	~0.625	0.68	0.840	1.8	7.2	9	0.78
0.75	1.240	~0.79	0.85	1.050	1.9	7.05	8.95	0.8
1	1.315	~0.84	1.06	1.315	2	6	8	0.98
1.25	1.660	~1.06	1.34	1.660	2.6	5.4	8	1.01
1.5	1.900	~1.28	1.53	1.900	2.65	5.35	8	1.03
2	2.375	~1.64	1.92	2.375	3	5	8	1.06
2.5	2.875	~1.99	2.31	2.875	3.75	4.25	8	1.57
3	3.500	~2.42	2.83	3.500	4	4	8	1.63
4	4.500	~3.23	3.63	4.500	4.5	7.5	12	1.73
5	5.563	~4.0	4.49	5.563	5	8	13	1.84
6	6.625	~4.8	5.35	6.625	5.5	7.5	13	1.95
8	8.625	~6.3	6.96	8.625	6	9	15	2.15
10	10.750	~7.9	8.68	10.750	7	9	16	2.36
12	12.750	~9.5	10.29	12.750	9.4	8.6	18	2.56



Certified to
NSF/ANSI/CAN 61

Revision Date: 9-14-2024



Section- 33 00 00

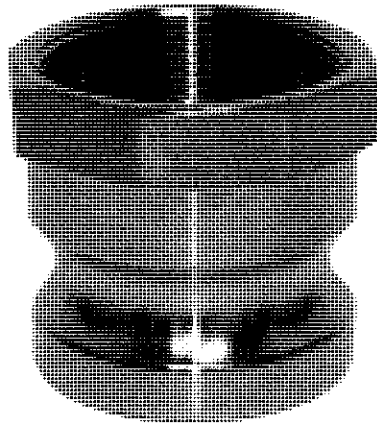


CAMLOCK FITTINGS



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SEARCH

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- 8" Male Adapter x 8" Female NPT Thread

 [CLICK HERE for All Sizes](#)

Qty

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DETAILS

REVIEWS

 [CLICK HERE for All Type A Sizes](#)

Product Description:

- 8 inch Type A Stainless Steel Male Cam and Groove Adapter x Female NPT Thread. (Snaplock Brand)

How to use:

- To quickly connect, Insert the 8" Type A into a 8" Female Coupler and then close all 4 cam handles.
- To quickly disconnect, lift up the cam lever arms and uncouple the two threaded pipe fittings.

To Install:

- Thread the Female NPT end onto a 8" Male NPT Thread.

Will Connect with:

- The male adapter end will couple with a **8" Female Coupler. (PTK Style)**
- The thread will connect onto a **8" Male NPT Thread.** (National Pipe Thread)

Used to:

- Install a 8" Male Cam & Groove onto a 8" Male NPT Thread.
- Connect with a 8" Female Coupling.

Style:

- PTK Style - Compatible with PT Coupling and Kuriyama

Material:

- Constructed out of Stainless Steel 316.
- For other materials scroll down to "**Related Products**".

8" Camlocks Compatibility

There are two styles in the 8" size that are not compatible with each other:

- **PTK Type** - PT Coupling and Kuriyama.
- **NECO Type** - Neco, Ever-Tite and Dixon (Andrews).

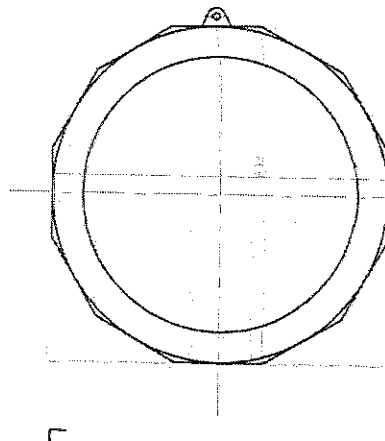
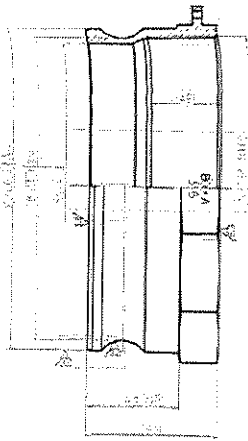
PTK and NECO differences:

- **PTK Type** - The OD of the Male Adapter is **less than 9" Outer Diameter (OD)**
- **NECO Type** - The OD of the Male Adapter is **a little over 9" Outer diameter (OD)**

Dimensions:

A

Section- 33 00 00



Specifications:

8"

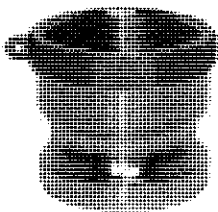
A800-SS

Stainless Steel 316

8" Female NPT

150 PSI

RELATED PRODUCTS



A800-AL

UPSELL PRODUCTS





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CAMLOCK FITTINGS



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DC800-SS

- 8" Stainless Steel Dust Cap

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DETAILS

REVIEWS

[CLICK HERE for All Type DC Sizes](#)

Product Description:

- 6 inch Type DC Stainless Steel Female Cam and Groove Dust Cap.

How to use:

- To quickly connect, slide the 8" Type DC onto a 8" Male Adapter and then simultaneously close the two cam handles.
- To quickly disconnect, lift up the cam lever arms and uncouple the two pipe fittings.

To Install:

- Slide the 8" Cam & Groove Dust Cap onto a 8" Male Adapter and then close the two cam handles.

Used to:

- Close and seal off a 8" Male Adapter and to prevent contaminates and dust from entering.

More Options:

- Sealing off a thread can be done by using [Threaded Caps](#), [Hex Plugs](#) or [Square Head Plugs](#).
- For more items to use the 8" Dust Cap on scroll down "[Upsell Products](#)".

Material:

- Constructed out of Stainless Steel.
- For other materials scroll down to "[Related Products](#)".

Specifications:

8"

DC800-SS

Stainless Steel 316

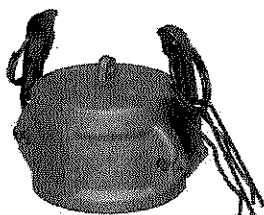
Stainless Steel 304

Buna-N (Buna Nitrile)

8" Female End Cap

Not for pressure (safety concerns)

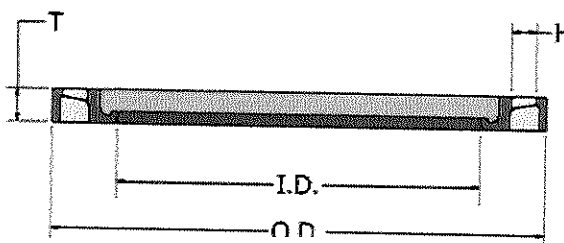
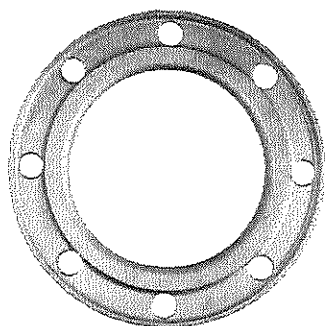
RELATED PRODUCTS



[DC800-AL](#)

Stainless Steel Back-Up Ring

Dimension Sheet



ductile iron allowed



Integrity Fusion Products offers a line of class 150 **Convuluted Stainless Steel Backup Rings** manufactured from **ASTM A351CF8M (316) 70/30/30** material and are available in a variety of nominal **IPS** and **DIPS** HDPE pipe diameters and SDR ratings up to 24". For sizes 28" to 36", we offer **ASTM A351CF8M (316) 70/30/30 Flat Plate Style Backup Rings**. Integrity Fusion Products **Stainless Steel Backup Rings** are designed and manufactured to comply with the drilling and mating requirements set forth in **ANSI/ASME B16.5** and **AWWA C207** for use in applications *24" and smaller*; and with **ANSI/ASME B16.47** and **AWWA C207** for use in applications *26" and larger*. All Integrity Fusion Stainless Steel Backup Rings, 12" and smaller, have been FM tested and approved. SDR 11 Backup Rings meet all FM 200 requirements, and SDR 7 - 9 Backup rings all meet FM 335 requirements.

IPS

SDR 11 (316 Stainless Steel Backup Ring)

200 PSI Class 150# Bolt Pattern

Nominal Size	OD (in.)	ID (in.)	Thickness (in.)	# Bolt Holes	Hole Dia. (ins)	Weight [lbs.]	Item Code	FM Class
2" IPS	6.00	2.64	0.45	4	0.75	1.70	100241	FM 200
3" IPS	7.50	3.75	0.53	4	0.75	2.60	100242	FM 200
4" IPS	9.00	4.80	0.55	8	0.75	3.80	100243	FM 200
6" IPS	11.00	6.90	0.63	8	0.88	5.50	100244	FM 200
8" IPS	13.50	8.90	0.85	8	0.88	9.50	100245	FM 200
10" IPS	16.00	11.00	0.99	12	1.00	13.9	100246	FM 200
12" IPS	19.00	13.15	1.26	12	1.00	16.6	100247	FM 200
14" IPS	21.00	14.42	1.38	12	1.13	33.0	100248	----
16" IPS	23.50	16.47	1.57	16	1.13	44.0	100249	----
18" IPS	25.00	18.50	1.65	16	1.25	48.0	100250	----
20" IPS	27.50	20.50	1.85	20	1.25	63.0	100252	----
24" IPS	32.00	24.60	2.18	20	1.38	98.0	100253	----
28" IPS (**)	36.42	28.66	2.76	28	1.42	277.8	100265	----
30" IPS (**)	38.78	30.67	2.87	28	1.42	327.5	100266	----
32" IPS (**)	41.73	32.52	----	28	1.63	204.6	100267	----
34" IPS (**)	43.74	34.53	----	32	1.63	224.9	100268	----
36" IPS (**)	46.06	36.81	3.50	32	1.65	520.0	100269	----

** Double asterisk shows the Backup Ring is a flat plate design

316SS BOLT

STAINLESS STEEL

(TYPE 316)

3/4 x 5 1/2
5/8 x 4 1/2

MECHANICAL PROPERTIES

FULL SIZE BOLTS, SCREWS, STUDS		MACHINED TEST SPECIMENS OF BOLTS, SCREWS, STUDS			
YIELD STRENGTH, MIN, 0.2% OFFSET, PSI	TENSILE STRENGTH, MIN PSI	YIELD STRENGTH, MIN, 0.2% OFFSET, PSI	TENSILE STRENGTH, MIN PSI	ELONGATION IN 4D, MIN, %	HARDNESS ROCKWELL, MIN
50,000	90,000	45,000	85,000	20	B85

CHEMICAL PROPERTIES

ELEMENT	CHEMICAL COMPOSITION, % MAX (UNLESS MIN/MAX LIMITS GIVEN)
CARBON	0.08
MANGANESE	2.00
PHOSPHORUS, MAX	0.045
SULFUR, MAX	0.030
SILICON	1.00
CHROMIUM	16.00-18.00
MOLYBDENUM	2.00-3.00
NICKEL	10.00-14.00

316SS BOLTS ARE INTENDED FOR USE IN CORROSIVE ENVIRONMENTS. ADDED NICKEL AND MOLYBDENUM GIVE THEM SUPERIOR CORROSION RESISTANCE AND INCREASED TENSILE STRENGTH AT HIGH TEMPERATURES WHEN COMPARED TO 304SS. 316SS BOLTS ARE SUPPLIED IN A HEX HEAD PATTERN PER ASME B18.2.1 STANDARD FOR SQUARE AND HEX BOLTS AND SCREWS. THE NUT NORMALLY USED WITH A 316SS BOLT IS A 316SS HEX NUT.

NOTE: PROPERTIES AND APPLICATION PARAMETERS ARE TYPICAL AND ARE PRESENTED IN GOOD FAITH BUT NO WARRANTY IS EXPRESSED OR IMPLIED.

316SS NUT

STAINLESS STEEL

(TYPE 316)

MECHANICAL PROPERTIES

YIELD STRENGTH, PSI	TENSILE STRENGTH, PSI	MAGNETIC PERMEABILITY	REDUCTION IN AREA %	ELONGATION %	HARDNESS ROCKWELL, MIN
S5,000-75,000	100,000-125,000	2.0 MAX	40	30	B100

CHEMICAL PROPERTIES

ELEMENT	CHEMICAL COMPOSITION,% MAX (UNLESS MIN/MAX LIMITS GIVEN)
CARBON	0.08
MANGANESE	2.00
PHOSPHORUS	0.045
SULFUR	0.030
SILICON	1.00
CHROMIUM	16.00-18.00
MOLYBDENUM	2.00-3.00
NICKEL	10.00-14.00

316SS NUTS ARE INTENDED FOR USE IN CORROSIVE ENVIRONMENTS. ADDED NICKEL AND MOLYBDENUM GIVE THEM SUPERIOR CORROSION RESISTANCE AND INCREASED TENSILE STRENGTH AT HIGH TEMPERATURES WHEN COMPARED TO 304SS. 316SS NUTS ARE SUPPLIED IN A HEX HEAD PATTERN PER ASME B18.2.2 STANDARD FOR SQUARE AND HEX NUTS. THE BOLT NORMALLY USED WITH A 316SS NUT IS A 316SS HEX BOLT.

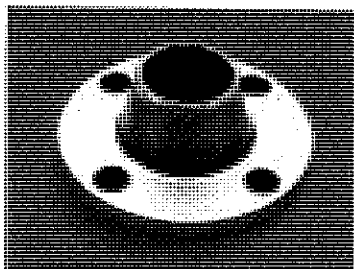
NOTE: PROPERTIES AND APPLICATION PARAMETERS ARE TYPICAL AND ARE PRESENTED IN GOOD FAITH BUT NO WARRANTY IS EXPRESSED OR IMPLIED.

WELLGROW INDUSTRIES CORP.

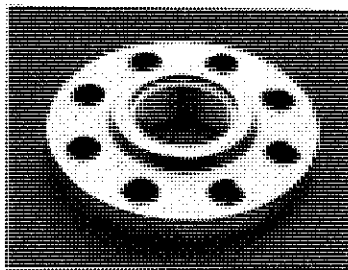
ANSI Flanges

blind flanges should be
HDPE

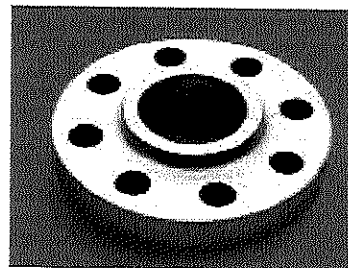
Dimension	: ANSI B16.5, B16.47, B16.36, B16.48
Material Spec	: ASTM A182, A351, DIN, ASTM A105, A216 WCB
Material Grades	: F304, F304L, F316, F316L, CF8, CF8, CF8M, CF3M, DIN1.4301, DIN1.4306, DIN1.4401, DIN1.4404, DIN1.4308, DIN1.4408, DIN1.4306, DIN1.4409, DIN1.0402, DIN1.0460, DIN1.0619
Class	: 150, 300, 400, 600, 900, 1500, 2500



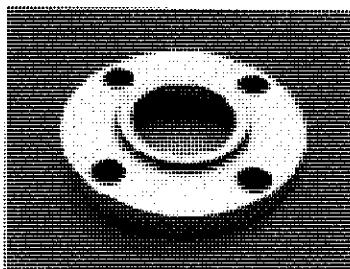
WELD NECK



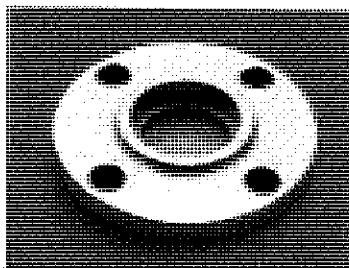
THREADED



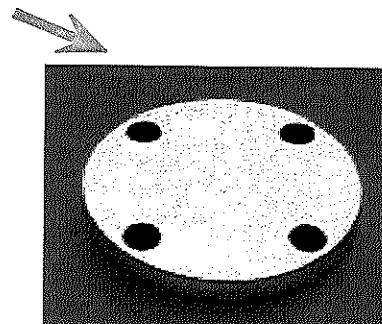
SLIP-ON



LAP JOINT



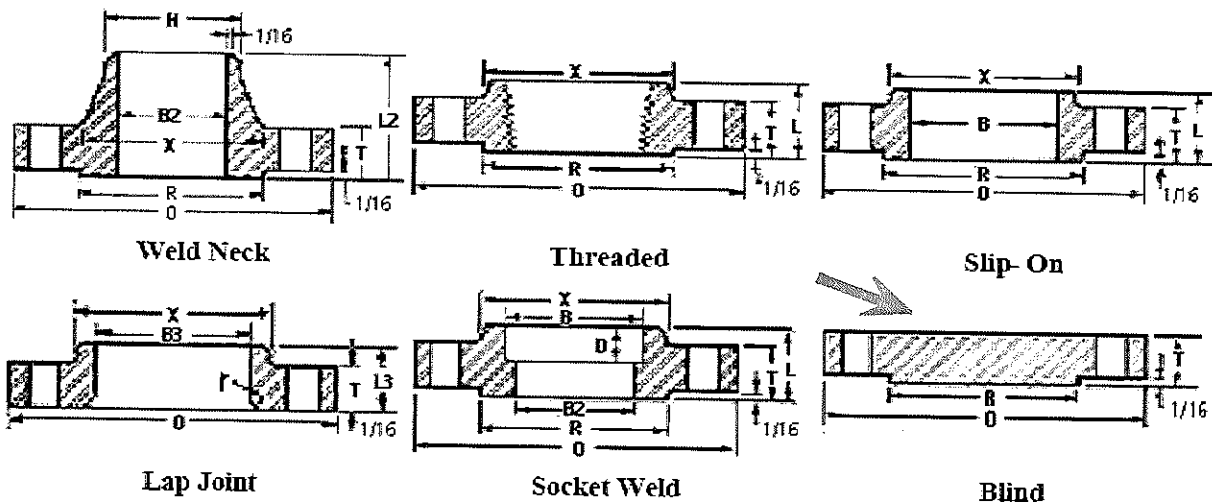
SOCKET WELD



BLIND

WELLGROW INDUSTRIES CORP.

ANSI B16.5 Class 150 Flanges



Nom. Pipe Size	O	T1	R	X	No. 2/Dia. of Holes	Bolt Circle Dia.	L21	H	B23	L	B	r	L34	B3	D
1/2	3.50	0.44	1.38	1.19	4-0.62	2.38	1.88	0.84	0.62	0.62	0.88	0.12	0.62	0.90	0.38
3/4	3.88	0.50	1.69	1.50	4-0.62	2.75	2.06	1.05	0.82	0.62	1.09	0.12	0.62	1.11	0.44
1	4.25	0.56	2.00	1.94	4-0.62	3.12	2.19	1.32	1.05	0.69	1.36	0.12	0.69	1.38	0.50
1-1/4	4.62	0.62	2.50	2.31	4-0.62	3.50	2.25	1.66	1.38	0.81	1.70	0.19	0.81	1.72	0.56
1-1/2	5.00	0.68	2.88	2.56	4-0.62	3.88	2.44	1.90	1.61	0.88	1.95	0.25	0.88	1.97	0.62
2	6.00	0.75	3.62	3.06	4-0.75	4.75	2.50	2.38	2.07	1.00	2.44	0.31	1.00	2.46	0.69
2-1/2	7.00	0.88	4.12	3.56	4-0.75	5.50	2.75	2.88	2.47	1.12	2.94	0.31	1.12	2.97	0.75
3	7.50	0.94	5.00	4.25	4-0.75	6.00	2.75	3.50	3.07	1.19	3.57	0.38	1.19	3.60	0.81
3-1/2	8.50	0.94	5.50	4.81	8-0.75	7.00	2.81	4.00	3.55	1.25	4.07	0.38	1.25	4.10	0.88
4	9.00	0.94	6.19	5.31	8-0.75	7.50	3.00	4.50	4.03	1.31	4.57	0.44	1.31	4.60	0.94
5	10.00	0.94	7.31	6.44	8-0.88	8.50	3.50	5.56	5.05	1.44	5.66	0.44	1.44	5.69	0.94
6	11.00	1.00	8.50	7.56	8-0.88	9.50	3.50	6.63	6.07	1.56	6.72	0.50	1.56	6.75	1.06
8	13.50	1.12	10.62	9.69	8-0.88	11.75	4.00	8.63	7.98	1.75	8.72	0.50	1.75	8.75	1.25
10	16.00	1.19	12.75	12.00	12-1.00	14.25	4.00	10.75	10.02	1.94	10.88	0.50	1.94	10.92	1.31
12	19.00	1.25	15.00	14.38	12-1.00	17.00	4.50	12.75	12.00	2.19	12.88	0.50	2.19	12.92	1.56
14	21.00	1.38	16.25	15.75	12-1.12	18.75	5.00	14.00	13.25	2.25	14.14	0.50	3.12	14.18	1.63
16	23.50	1.44	18.50	18.00	16-1.12	21.25	5.00	16.00	15.25	2.50	16.16	0.50	3.44	16.19	1.75
18	25.00	1.56	21.00	19.88	16-1.25	22.75	5.50	18.00	17.25	2.69	18.18	0.50	3.81	18.20	1.94
20	27.50	1.69	23.00	22.00	20-1.25	25.00	5.69	20.00	19.25	2.88	20.20	0.50	4.06	20.25	2.13
22	29.50	1.81	25.25	24.25	20-1.38	27.25	5.88	22.00	21.25	3.13	22.22	0.50	4.25	22.25	2.38
24	32.00	1.88	27.25	26.12	20-1.38	29.50	6.00	24.00	23.25	3.25	24.25	0.50	4.38	24.25	2.50

Dimensions in inches.



AmericanBiltrite
IndustrialRubber

FLUOROELASTOMER

IM-75

8" x 6"

GRADE	Industrial
FINISH	Smooth
POWDER	No
TRIMMED	Yes
COLOR	Black

TECHNICAL SPECIFICATIONS

SPECIFICATION ASTM D2240 | Z1= HARDNESS 75 +/-5 SHORE A
POLYMER: FLUOROELASTOMER (FKM)

ASTM	DESCRIPTION	VALUE
	SPECIFIC GRAVITY (gr/cc)	1.95
D2240	HARDNESS (shore A)	75 +/-5
D412	TENSILE (psi)	1000 min.
	ULTIMATE ELONGATION (%)	225 min.
	TEMPERATURE RANGE (general guideline)	-20° to 450°F (-29° to 232°C)

Material is within commercial sheet rubber gauge tolerances.
The documentation for sheet rubber gauge tolerances is published on our website.
Please ensure the product meets your application specification prior to order placement.
Specifications are subject to change without notice. The website version prevails.

	GAUGE IN (MM)	WIDTH IN (MM)	SURFACE/ROLL SFT (M ²)	LENGTH/ROLL LFT (M)	WEIGHT/ROLL LBS (KG)
350-04-482	1/16 (1.60)	48 (1219.2)	200 (18.58)	50 (15.24)	150 (68.0)
350-04-486	1/16 (1.60)	48 (1219.2)	100 (9.29)	25 (7.62)	75 (34.0)
350-04-488	1/16 (1.60)	48 (1219.2)	40 (3.72)	10 (3.05)	30 (13.6)
350-04-489	1/16 (1.60)	48 (1219.2)	20 (1.86)	5 (1.52)	15 (6.8)
350-08-482	1/8 (3.20)	48 (1219.2)	204 (18.95)	51 (15.55)	286 (129.7)
350-08-486 ¹	1/8 (3.20)	48 (1219.2)	100 (9.29)	25 (7.62)	140 (63.5)
350-08-488 ¹	1/8 (3.20)	48 (1219.2)	40 (3.72)	10 (3.05)	56 (25.4)
350-08-489 ¹	1/8 (3.20)	48 (1219.2)	20 (1.86)	5 (1.52)	28 (12.7)
350-12-482	3/16 (4.80)	48 (1219.2)	80 (7.43)	20 (6.10)	152 (68.9)
350-16-482	1/4 (6.35)	48 (1219.2)	80 (7.43)	20 (6.10)	202 (91.6)

¹ Made to order.



SUBMITTAL REVIEW 04R1

To	<u>Southcentral Construction Inc.</u>	Date	<u>September 4, 2025</u>	Page 1 of 3
	<u>205 E. Dimond Blvd., PMB 555</u>	Client	<u>Matanuska-Susitna Borough, Alaska</u>	
	<u>Anchorage, AK 99515</u>	Project Name	<u>Central Landfill Cell 4 Expansion Construction</u>	
		Project No.	<u>BMCD 167550</u>	
Attention	<u>Dane Dahlgren</u>	Via	<u>Email</u>	

Regarding the following technical submittals:

Dwg. No./Spec	Description	Action Taken	Comments
33 00 00 1.04B(1)&(2)	Manufacturer's Product Data / Scaled Shop Drawings	C	Contractor to review Construction Plans and Specifications and provide manufacturer's product data and scaled shop drawings for all HDPE pipes and fitting included the design documents.
33 00 00 1.04B(1)&(2)	6" ADS Single Wall Pipe Perf Pipe w/sock	A	
33 00 00 1.04B(1)&(2)	4", 6", 8" DR 11 HDPE Pipe, 6" 8" DR 11 Perf Pipe	A	
33 00 00 1.04B(1)&(2)	Molded Butt Fusion Wye Drisco Plex 8100	A	
33 00 00 1.04B(1)&(2)	4" DR 17, 6" 8" DR 11 IPS Flange Adapters	C	Per 33 00 00, Part 2.04(A) all fittings shall match the size and SDR rating of the receiving pipe.
33 00 00 1.04B(1)&(2)	4", 6", 45 degree Elbows DR 11	A	
33 00 00 1.04B(1)&(2)	8" Butt Tee DR 11, DR 17	B	Other dimensions of tees are needed for the completion of the Project and are not included in this submittal. Per 33 00 00, Part 2.04(A) all fittings shall match the size and SDR rating of the receiving pipe.
33 00 00 1.04B(1)&(2)	4" Butt Reducer DR 11, 6" Butt Reducer DR 11	B	Other dimensions of reducers are needed for the completion of the Project and are not included in this submittal. Per 33 00 00, Part 2.04(A) all fittings shall match the size and SDR rating of the receiving pipe.

EXPLANATION OF ENGINEER'S ACTION (See Contract Documents for additional explanation.)

- A - SUBMITTAL ACCEPTED.
- B - SUBMITTAL ACCEPTABLE AS NOTED.
- C - SUBMITTAL RETURNED FOR REVISION.
- D - SUBMITTAL NOT ACCEPTABLE.
- E - PRELIMINARY SUBMITTAL.
- F - FOR REFERENCE; NO ACCEPTANCE REQUIRED.
- G - DISTRIBUTION COPY.

ADDITIONAL SUBMITTALS REQUIRED

Action	Copies	Reproducible



010515 Form GCO-12

To	<u>Southcentral Construction Inc.</u>	Date	<u>September 4, 2025</u>	Page 2 of 3
	<u>205 E. Dimond Blvd., PMB 555</u>	Client	<u>Matanuska-Susitna Borough, Alaska</u>	
	<u>Anchorage, AK 99515</u>	Project Name	<u>Central Landfill Cell 4 Expansion Construction</u>	
		Project No.	<u>BMcD</u>	
Attention	<u>Dane Dahlgren</u>	Via	<u>Email</u>	

33 00 00 1.04B(1)&(2)	8" But End Cap DR 11	B	Other dimensions of caps are needed for the completion of the Project and are not included in this submittal. Per 33 00 00, Part 2.04(A) all fittings shall match the size and SDR rating of the receiving pipe.
33 00 00 1.04B(1)&(2)	4", 6" 8" 22.5 Elbow DR 11	A	
33 00 00 1.04B(1)&(2)	Poly Cam Male ThredHDPE Transition Fitting	A	
33 00 00 1.04B(1)&(2)	4", 6". 8" Transition With Male NTP	A	
33 00 00 1.04B(1)&(2)	8" 316 SS Camlock Fittings	A	
33 00 00 1.04B(1)&(2)	3", 6", 8" Backing Rings/Bolts and Nuts	B	Per 33 00 00, Part 2.13(A), all above grade fasteners shall be Grade 2 zinc plated carbon steel and permanent underground fasteners shall be 304 SST.
33 00 00 1.04B(1)&(2)	6", 8" Blind Flanges	A	
33 00 00 1.04B(1)&(2)	6", 8" Fluoroelastomer Gaskets	A	
33 00 00 1.04C(1)	Affidavit of Compliance		To be submitted.
33 00 00 1.04C(2)	Field Testing Documentation		To be submitted.
33 00 00 1.04C(3)	Certification of Personnel's Factory Training		To be submitted.

EXPLANATION OF ENGINEER'S ACTION
(See Contract Documents for additional explanation.)

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ADDITIONAL SUBMITTALS REQUIRED

Action	Copies	Reproducible



010515 Form GCO-12

To Southcentral Construction Inc. Date September 4, 2025 Page 3 of 3
205 E. Dimond Blvd., PMB 555 Client Matanuska-Susitna Borough, Alaska
Anchorage, AK 99515 Project Name Central Landfill Cell 4 Expansion Construction
Project No. BMcD
Attention Dane Dahlgren Via Email

33 00 00 1.04D	Utility Survey		To be submitted.
33 00 00 1.04E	Project Record Documents		To be submitted.

By Fred Doran, PE

EXPLANATION OF ENGINEER'S ACTION
(See Contract Documents for additional explanation.)

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ADDITIONAL SUBMITTALS REQUIRED

Action	Copies	Reproducible



Southcentral Construction Inc.
205 E. Dimond Blvd., PMB 555
Anchorage, AK 99515

Submittal Transmittal

PROJECT Central Landfill Cell 4 Expantion SUBMITTAL NO. 4A
CONTRACTOR Southcentral Construction Inc. CONTRACT NO. 25-179B
ORIGINATOR Dane Dahlgren SPEC. SECTION 33 00 00
DATE SUBMITTED 9/3/25 DRAWING NO. _____ SHEET OF

TO: Matanuska-Susitna Bor
350 East Dahlia Ave.
Palmer, Ak. 99645

SUBMITTED AS SPECIFIED

ATTN:

ITEM: <u>HDPE Pipe & Fittings Resubmittal</u>		REVIEW ACTION						
SUPPLIER/CONTRACTOR: <u>Ferguson Ent.</u>		COPIES SENT	NO EXCEPTION TAKEN MAKE CORRECTION AS NOTED	AMEND AND RESUBMIT	REJECTED RESUBMIT	COPIES RETURNED	NOTES ATTACHED	
☐ Original Submittal ☐ 3rd ☒ 2nd ☐ 4th								
IDENT. NO.	DETAILED DESCRIPTION (Provide Itemized List of Contents of This Submittal)	A	B	C	D			
1	4" DR17 ,6",8" DR11 IPS Flange Adapters	1					•	
2	4" 6", 45 degree Sweep Elbows DR 11	1	•					
3	6",8" HDPE Blind Flanges	1	•					
4	6",8" Viton Gaskets	1	•					
5	4X2 Fernco adapter for gas well head	1	•					
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Complete either (a) or (b), following:

☐

(a) We have verified that the material or equipment contained in this submittal meets all the requirements specified or shown (no exceptions).

☐

(b) We have verified that the material or equipment contained in this submittal meets all the requirements specified or shown, except the following deviations (list deviations, attach a separate sheet if necessary).

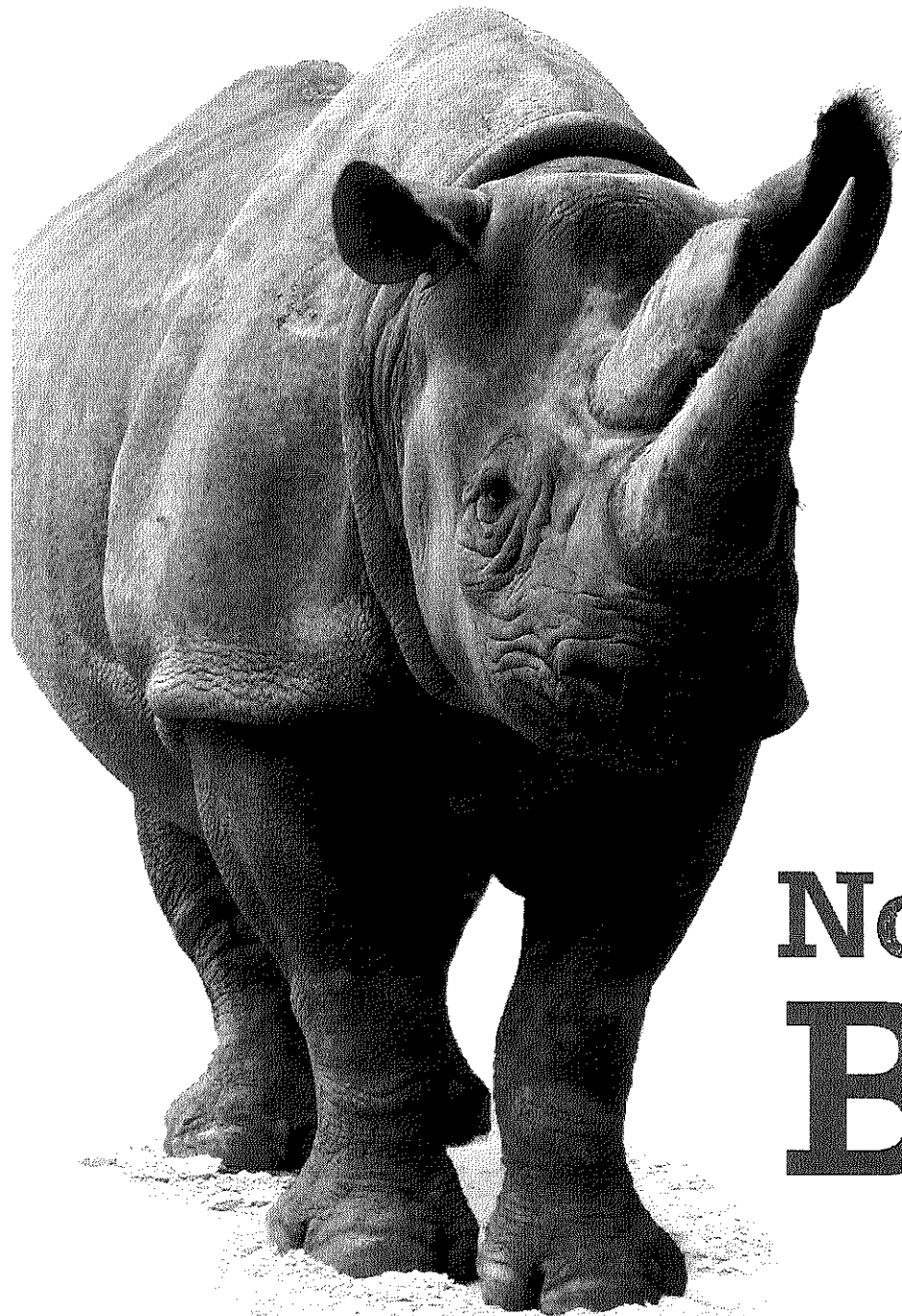
Corrections or comments made relative to submittals during this review do not relieve the Contractor from compliance with the requirements of the drawings and specifications. This submittal is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The Contractor is responsible for confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of other trades, and performing his work in a safe and satisfactory manner.

CONTRACTOR: Dane Dahlgren
(Signature)

ENGINEER: _____
(Signature)

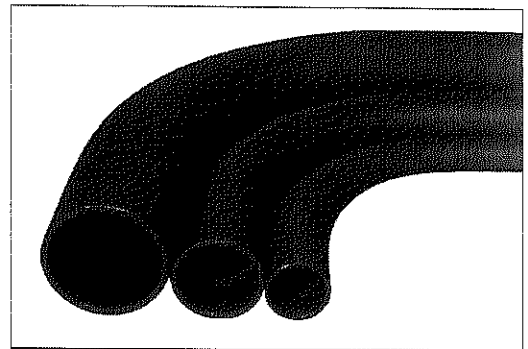
ROUTING	REC'D BY NAME/COMPANY	DATE REC'D	DATE FWD	COMMENTS
Project Manager				
Designer				
Project Manager	Dane Dahlgren			
Contractor	Southcentral Construction Inc.	9/3/2025	9/3/2025	

The STATE OF THE ARC* ... just got BIGGER!!!!



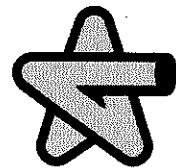
For over a decade, Pipestar International Inc. has been providing you with game-changing 2"-14" SEAMLESS HDPE bends.

Now, that STATE OF THE ARC* SEAMLESS BEND technology is available in 16", 18" and 20" SUPER ARC* sizes.



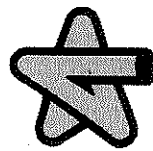
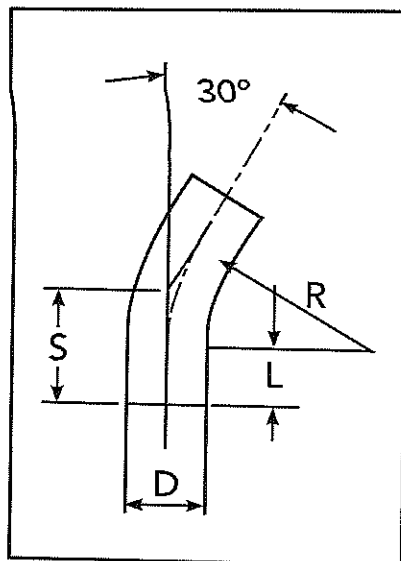
Now that's BIG!!!

To make your HDPE pipe jobs easier, more efficient and longer lasting, insist on HDPE SEAMLESS ARC* BENDS. For specifications or to connect with a Pipestar International distributor in the US or Canada, visit www.arcbends.com

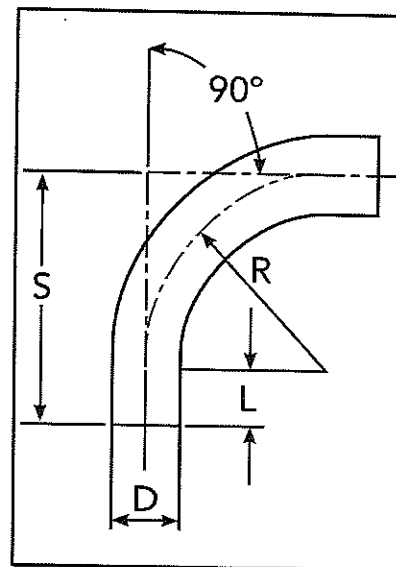
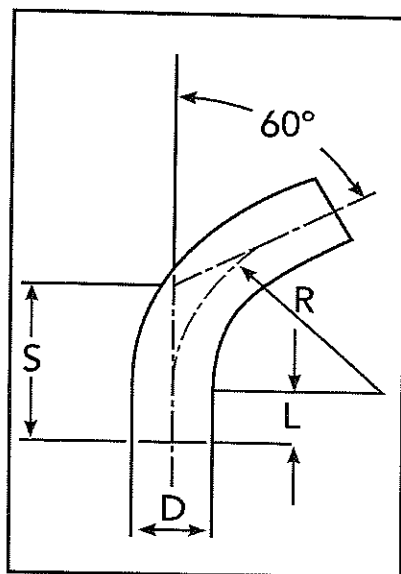
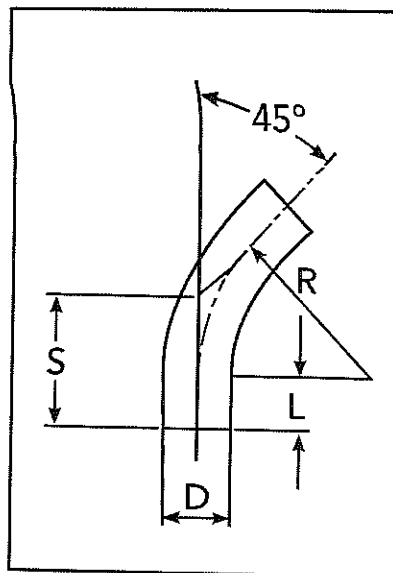


PIPESTAR
INTERNATIONAL INC.

*ARC is a registered trademark of Pipestar International Inc.



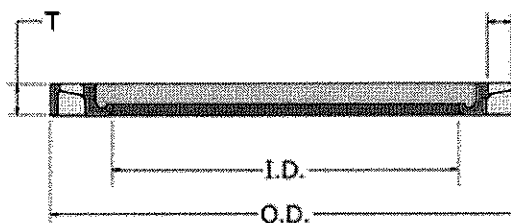
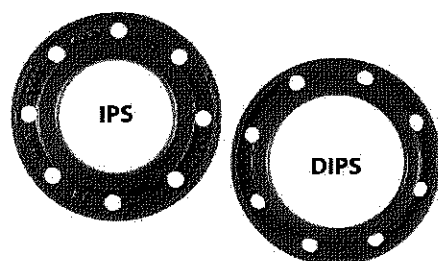
PIPESTAR
INTERNATIONAL INC.



DIMENSIONS

SIZE	D	L	R	S-30°	S-45°	S-60°	S-90°
2" IPS	2.375"	6"	7.13"	7.5"	9"	10.5"	13.3"
3" IPS	3.5"	6"	10.5"	8.8"	10.3"	12.1"	16.5"
4" IPS	4.5"	6"	13.5"	9.6"	11.6"	13.8"	19.5"
6" IPS	6.625"	7"	19.9"	12.3"	15.2"	18.5"	26.9"
8" IPS	8.625"	10"	24.5"	16.6"	20.1"	24.2"	34.5"
10" IPS	10.75"	11"	32.25"	19.6"	24.3"	29.6"	43.2"
12" IPS	12.75"	13"	38.3"	23.3"	28.7"	35.1"	51.3"
14" IPS	14"	13"	38.9"	23.4"	29.1"	35.5"	51.9"
16" IPS	16"	16"	48"	28.9"	35.9"	43.7"	64"
18" IPS	18"	18"	54"	32.5"	40.4"	49.2"	72"
20" IPS	20"	20"	60"	36.1"	44.9"	54.6"	80"

58 Paramount Road, Winnipeg, Manitoba, Canada R2X 2W3
Tel: 204-949-3910 Fax: 204-949-3919 Website: www.arcbends.com



Integrity Fusion Products offers a line of **Convuluted Ductile Iron Backup Rings** manufactured from **ASTM A536 grade 65-45-12** material and are available in a variety of nominal **IPS** and **DIPS** HDPE pipe diameters and SDR ratings. Our **Convuluted Ductile Iron Backup Rings** are designed and manufactured to comply to the drilling and mating requirements in **ANSI/ASME B16.5** and **AWWA C207** for use in applications *24" and smaller*, and with **ANSI/ASME B16.47** and **AWWA C207** for use in applications *26" and larger*. Our **Fusion Bonded Epoxy Coating** offers superior long-term corrosion resistance characteristics over the industry standard Red Oxide primer, or painted epoxy coatings which tend to chip and rust shortly after installation, and as a visual convenience to our customers, our Epoxy Coated Backup Rings are **color coded** as follows: Red indicates an IPS size, and Blue indicates a DIPS size. All Integrity Fusion Ductile Iron Backup Rings, 12" and smaller, have been FM tested and approved. SDR 11 Backup Rings meet all FM 200 requirements, and SDR 7 – 9 Backup rings all meet FM 335 requirements. **Also Available in Red Oxide Primer.**

IPS

SDR 11 (Epoxy Coated Ductile Iron Backup Ring)

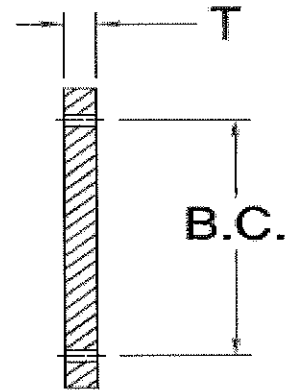
200 PSI Class 150# Bolt Pattern

Nominal Size	OD (in.)	ID (in.)	Thickness (in.)	# Bolt Holes	Hole Dia. (ins)	Weight [lbs.]	Item Code	FM Class
2" IPS	6.00	2.60	0.50	4	0.75	1.80	100200	FM 200
3" IPS	7.50	3.75	0.53	4	0.75	2.80	100202	FM 200
4" IPS	9.00	4.75	0.55	8	0.75	3.80	100204	FM 200
6" IPS	11.00	6.88	0.63	8	0.88	5.60	100206	FM 200
8" IPS	13.50	8.88	0.85	8	0.88	9.80	100208	FM 200
10" IPS	16.00	11.00	0.98	12	1.00	13.30	100210	FM 200
12" IPS	19.00	13.15	1.25	12	1.00	22.30	100212	FM 200
14" IPS	21.00	14.40	1.38	12	1.13	31.00	100214	----
16" IPS	23.50	16.40	1.65	16	1.13	42.00	100216	----
18" IPS	25.00	18.34	1.67	16	1.25	45.00	100218	----
20" IPS	27.50	20.50	1.81	20	1.25	58.00	100220	----
24" IPS	32.00	24.50	2.17	20	1.38	86.00	100222	----
28" IPS	36.50	28.60	2.50	28	1.38	113.0	100224	----
30" IPS	38.75	30.60	2.60	28	1.38	141.0	100226	----
32" IPS	41.75	32.60	2.75	28	1.63	161.0	100227	----
36" IPS	46.00	36.60	3.15	32	1.63	217.0	100228	----

WOLSELEY

INDUSTRIAL GROUP

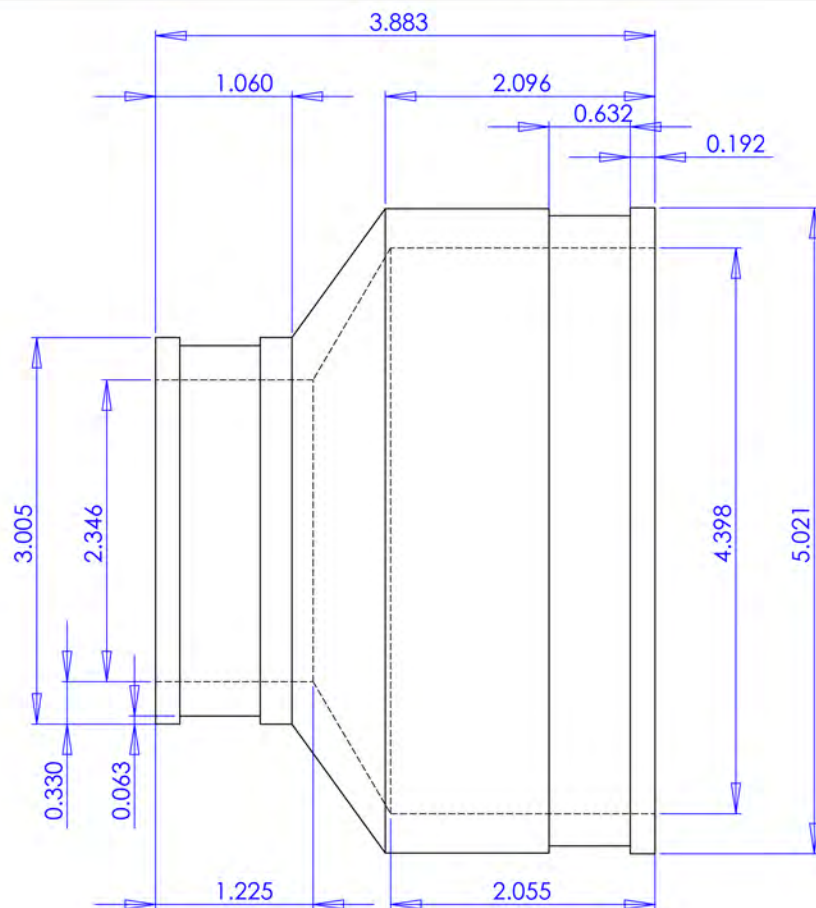
IPS HDPE BLIND FLANGE



Nominal size	Pressure Class(psi)	Dimensions B.C. xT (in)	Weight per Item(lbs)	Bolt Diameter	Part #	Part #
2" 2.375"	Non Pressure	4-3/4 x 1	2	0.625	4	PEIHBBFKF
3" 3.500"	Non Pressure	6 x 1	2	0.625	4	PEIHBBFMF
4" 4.500"	Non Pressure	7-1/2 x 1	3	0.625	8	PEIHBBFPF
6" 6.625"	Non Pressure	9-1/2 x 1	4	0.75	8	PEIHBBFUF
8" 8.625"	Non Pressure	11-3/4 x 1	6	0.75	8	PEIHBBFXF
10" 10.750"	Non Pressure	14-1/4 x 1	9	0.875	12	PEIHBBF10F
12" 12.750"	Non Pressure	17 x 1	13	0.875	12	PEIHBBF12F
14" 14.00"	Non Pressure	18-3/4 x 1	15	1	12	PEIHBBF14F
16" 16.00"	Non Pressure	21-1/4 x 1	19	1	16	PEIHBBF16F
18" 18.00"	Non Pressure	22-3/4 x 1	22	1.125	16	PEIHBBF18F
20" 20.000"	Non Pressure	25 x 1	20	1.125	20	PEIHBBF20F
22" 22.000"	Non Pressure	27-1/4 x 1	30	1.25	20	
24" 24.000"	Non Pressure	29-1/2 x 1	36	1.25	20	PEIHBBF24F
26" 26.000"	Non Pressure	31-3/4 x 1	61	1.25	24	PEIHBBF26F
28" 28.000"	Non Pressure	34 x 1-1/2	69	1.25	28	PEIHBBF28F
30" 30.000"	Non Pressure	36 x 1-1/2	78	1.25	28	PEIHBBF30F



Davison, MI • PH: 810-653-9626 • FAX: 810-653-8714 • www.Fernco.com



*This Part requires two clamps, part numbers 042-300 & 080-300.
See additional drawing for information on these clamps.

NOTES:
- SOME HIDDEN LINES NOT SHOWN
- BREAK ALL SHARP CORNERS
- REPORT ALL CHANGES TO ENGINEERING

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FERNCO, INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FERNCO, INC. IS PROHIBITED.

Part Weight	.965 lbs.
Min/Max Temp.	-30/140 Degrees F
Pressure Tested	4.3 PSI
Material	Flexible PVC
Installation Torque	60" Lbs.
Conforms to ASTM	D5926
Box Quantity	10
Clamps used	300 Series

TOLERANCES:
.X= Fractional ±
.XX= ±.02
.XXX= ±.030
ANG.= ±0.5°
UNLESS OTHERWISE SPECIFIED

DESCRIPTION:

Coupling 4" Plastic x 2"
Plastic

1056-42

UNITS: INCHES
SIZE A
3RD ANGLE PROJECTION
DO NOT SCALE DRAWING

DESIGNER:
D. Brady

SCALE
not to scale

CHECKER: DATE: 2/6/2007

SHEET 1 OF 1



Thermodyn™
Where Your Success Is Sealed

75 Duro Commercial Grade Viton™ Fluoroelastomer

Product Code: Style 6300-TD70C

Description: 66% Fluorine commercial grade Viton™ fluoroelastomer

Specifications: TD-70C Commercial Grade Viton fluoroelastomer
Temperature range -20°F - 400°F continuous

<u>Typical Rubber Properties</u>	<u>Test Method</u>	<u>Typical Value</u>
Hardness (Shore A)	ASTM D2240	75±5
Tensile Strength	ASTM D412	1200 psi min
Elongation	ASTM D412	250% min
Compression Set	ASTM D395B	50% max
Fluid resistance	ASTM D471	30% max
Specific Gravity	ASTM D792	1.92 nominal
Color	Visual	Black

- Thickness & Width as specified.
- This is a commercial grade of Viton™ fluoroelastomer based gasket, recommended for use in fuel, hydrocarbon based fluids, and aggressive media.
- This material is based upon 100% fluoroelastomer with a 66% minimum fluorine. No Substitutions will be accepted
- Compression Set, Plied, Method B 50% compression (168 hr @ 175°C)

Thermodyn products are manufactured to general RMA standards and meet the above data sheet guidelines. It is the responsibility of the end user to qualify the material to its intended application. Defects or damage resulting from misuse or mishandling are not covered by Thermodyn's limited liability policy. Values covered in this data sheet are nominal values that we believe to be accurate and reliable for purposes of qualification in end use applications.

Viton™ is a registered trade name of The Chemours Company



THERMODYN CORPORATION
3550 Silica Road, Sylvania Ohio 43560 U.S.A.
PH: 419-841-7782 Toll-Free: 1-800-654-6518 (North America Only) Fax: 419-841-3139
WWW.THERMODYN.COM





SUBMITTAL REVIEW 05

To	<u>Southcentral Construction Inc.</u>	Date	<u>August 18, 2025</u>	Page 1 of 2
	<u>205 E. Dimond Blvd., PMB 555</u>	Client	<u>Matanuska-Susitna Borough, Alaska</u>	
	<u>Anchorage, AK 99515</u>	Project Name	<u>Central Landfill Cell 4 Expansion Construction</u>	
		Project No.	<u>BMCD 167550</u>	
Attention	<u>Dane Dahlgren</u>	Via	<u>Email</u>	

Regarding the following technical submittals:

Dwg. No./Spec	Description	Action Taken	Comments
33 00 00 1.04B(1)&(2)	Manufacturer's Product Data / Scaled Shop Drawings	C	Contractor to review Construction Plans and Specifications and provide manufacturer's product data and scaled shop drawings for all gas related HDPE pipes, fittings, and wellhead included the design documents.
33 00 00 1.04B(1)&(2)	6" SDR 45-Deg Sweep Bend	A	
33 00 00 1.04B(1)&(2)	8" X 4" Butt Reducer DR 11	B	Other dimensions of reducers are needed for the completion of the gas portion of this Project and are not included in this submittal. Per 33 00 00, Part 2.04(A) all fittings shall match the size and SDR rating of the receiving pipe.
33 00 00 1.04B(1)&(2)	8" X 4" Molded Butt Fusion Reducing Tee DR 11	B	Other dimensions of tees are needed for the completion of the gas portion of this Project and are not included in this submittal. Per 33 00 00, Part 2.04(A) all fittings shall match the size and SDR rating of the receiving pipe.
33 00 00 1.04B(1)&(2)	Pipe star 4" Schedule 40 T&C Galv Pipe	A	
33 00 00 1.04B(1)&(2)	SS316 SS Male Adapter X Female NPT CL	A	
33 00 00 1.04B(1)&(2)	SS Dust Cap 4", 6" CL	A	
33 00 00 1.04B(1)&(2)	DI 3X2 Tapped Blind Flange	A	

EXPLANATION OF ENGINEER'S ACTION
(See Contract Documents for additional explanation.)

- A - SUBMITTAL ACCEPTED.
- B - SUBMITTAL ACCEPTABLE AS NOTED.
- C - SUBMITTAL RETURNED FOR REVISION.
- D - SUBMITTAL NOT ACCEPTABLE.
- E - PRELIMINARY SUBMITTAL.
- F - FOR REFERENCE; NO ACCEPTANCE REQUIRED.
- G - DISTRIBUTION COPY.

ADDITIONAL SUBMITTALS REQUIRED

Action	Copies	Reproducible



010515 Form GCO-12

To Southcentral Construction Inc. Date August 18, 2025 Page 2 of 2
205 E. Dimond Blvd., PMB 555 Client Matanuska-Susitna Borough, Alaska
Anchorage, AK 99515 Project Name Central Landfill Cell 4 Expansion Construction
Project No. BMcD 167550
Attention Dane Dahlgren Via Email

33 00 00 1.04B(1)&(2)	Precision Well Head	A	
33 00 00 1.04B(1)&(2)	Polar Guard Insulated Well Head Cover	A	
33 00 00 1.04B(1)&(2)	Stabilizer Well Head Cap & Control Valve	C	QED does not make a 4" X 2" wellcap, so a 4" X 2" fernco will be used instead.
33 00 00 1.04B(1)&(2)	Solarguard Flex Hose	A	
33 00 00 1.04C(1)	Affidavit of Compliance		To be submitted.
33 00 00 1.04C(2)	Field Testing Documentation		To be submitted.
33 00 00 1.04C(3)	Certification of Personnel's Factory Training		To be submitted.
33 00 00 1.04D	Utility Survey		To be submitted.
33 00 00 1.04E	Project Record Documents		To be submitted.

By Fred Doran, PE

EXPLANATION OF ENGINEER'S ACTION
(See Contract Documents for additional explanation.)

- A - SUBMITTAL ACCEPTED.
- B - SUBMITTAL ACCEPTABLE AS NOTED.
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- G - DISTRIBUTION COPY.

ADDITIONAL SUBMITTALS REQUIRED

Action	Copies	Reproducible



Southcentral Construction Inc.
205 E. Dimond Blvd., PMB 555
Anchorage, AK 99515

Submittal Transmittal

PROJECT Central Landfill Cell 4 Expantion SUBMITTAL NO. 5
CONTRACTOR Southcentral Construction Inc. CONTRACT NO. 25-179B
ORIGINATOR Dane Dahlgren SPEC. SECTION 33 00 00
DATE SUBMITTED 7/30/25 DRAWING NO. _____ SHEET OF

TO: Matanuska-Susitna Bor
350 East Dahlia Ave.
Palmer, Ak. 99645

SUBMITTED AS SPECIFIED

ATTN:

		REVIEW ACTION						
ITEM: _ LFG Well Head & Fittings		COPIES SENT	NO EXCEPTION TAKEN	MAKE CORRECTION AS NOTED	AMEND AND RESUBMIT	REJECTED RESUBMIT	COPIES RETURNED	NOTES ATTACHED
SUPPLIER/CONTRACTOR: Ferguson Ent.								
☒ Original Submittal ☐ 2nd ☐ 3rd ☐ 4th								
IDENT. NO.	DETAILED DESCRIPTION (Provide Itemized List of Contents of This Submittal)		A	B	C	D		
1	8"x4" Butt Reducer DR11	1		●				
2	8"x4" Molded Butt Fusion Reducing Tee DR 11	1		●				
3	Pipe star 4" Schedule 40 T&C Galv Pipe	1	●					
4	SS316 SS Male Adapter X Female NPT CL	1	●					
5	SS Dust Cap 4",6" CL	1	●					
6	DI 3X2 Tapped Blind Flange	1	●					
7	Precision Well Head	1	●					
8	Polar Guard InsulatedWell Head Cover	1	●					
9	Stabilizer Well Head Cap & Control Valve	1			●			
10	Solarguard Flex Hose	1	●					
11		1						
12		1						
13		1						
14		1						
15		1						

Complete either (a) or (b), following:

☐

(a) We have verified that the material or equipment contained in this submittal meets all the requirements specified or shown (no exceptions).

☐

(b) We have verified that the material or equipment contained in this submittal meets all the requirements specified or shown, except the following deviations (list deviations, attach a separate sheet if necessary).

Corrections or comments made relative to submittals during this review do not relieve the Contractor from compliance with the requirements of the drawings and specifications. This submittal is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The Contractor is responsible for confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of other trades, and performing his work in a safe and satisfactory manner.

CONTRACTOR: Dane Dahlgren
(Signature)

ENGINEER: _____
(Signature)

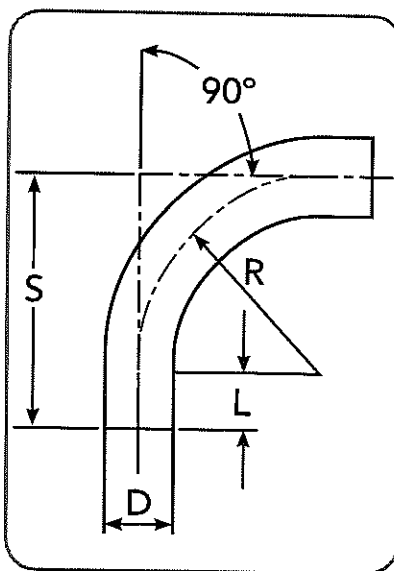
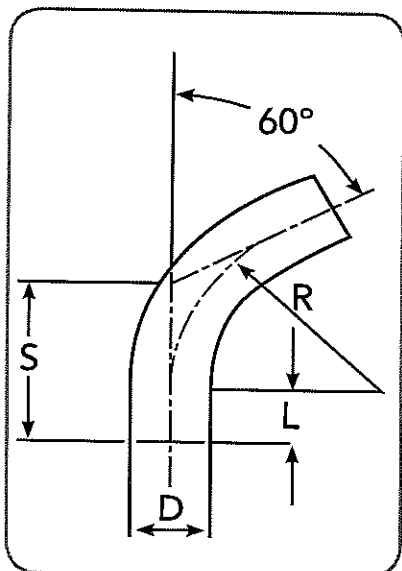
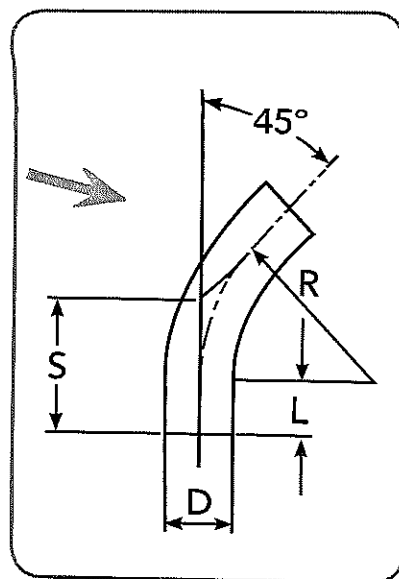
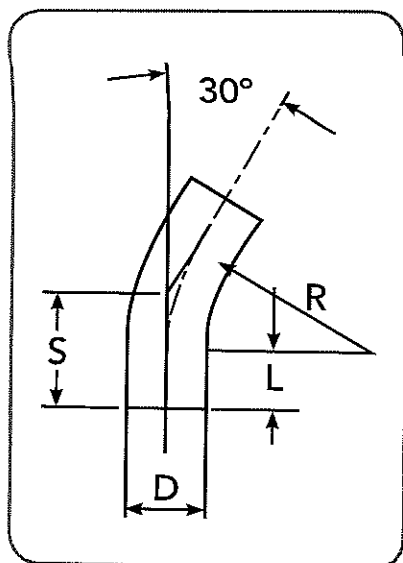
ROUTING	REC'D BY NAME/COMPANY	DATE REC'D	DATE FWD	COMMENTS
Project Manager				
Designer				
Project Manager	Dane Dahlgren			
Contractor	Southcentral Construction Inc.	7/30/2025	7/30/2025	

A

Section- 33 00 00



PIPESTAR
INTERNATIONAL INC.



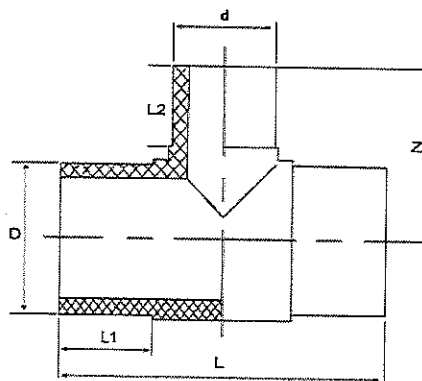
DIMENSIONS

SIZE	D	L	R	S-30°	S-45°	S-60°	S-90°
2" IPS	2.375"	6"	7.13"	7.5"	9"	10.5"	13.3"
3" IPS	3.5"	6"	10.5"	8.8"	10.3"	12.1"	16.5"
4" IPS	4.5"	6"	13.5"	9.6"	11.6"	13.8"	19.5"
6" IPS	6.625"	7"	19.9"	12.3"	15.2"	18.5"	26.9"
8" IPS	8.625"	10"	24.5"	16.6"	20.1"	24.2"	34.5"
10" IPS	10.75"	11"	32.25"	19.6"	24.3"	29.6"	43.2"
12" IPS	12.75"	13"	38.3"	23.3"	28.7"	35.1"	51.3"
14" IPS	14"	13"	38.9"	23.4"	29.1"	35.5"	51.9"
16" IPS	16"	16"	48"	28.9"	35.9"	43.7"	64"
18" IPS	18"	18"	54"	32.5"	40.4"	49.2"	72"
20" IPS	20"	20"	60"	36.1"	44.9"	54.6"	80"



Molded Butt Fusion Reducing Tee Dimension Sheet

18



IPS

SDR 11 (standard dimension ratio)

200 PSI (MAOP @ 73.4° F)

Nominal Size	L [in.]	D [in.]	d [in.]	L1 [in.]	L2 [in.]	Z [ins.]	Weight	Item Code	FM Class
3 x 2 IPS	11.80	3.500	2.375	3.62	2.48	5.90	1.50	100800	FM 200
4 x 2 IPS	13.78	4.500	2.375	3.94	2.48	6.89	2.50	100802	FM 200
4 x 3 IPS	13.78	4.500	3.500	3.94	3.62	6.89	2.70	100804	FM 200
6 x 2 IPS	18.10	6.625	2.375	4.72	2.48	9.06	6.20	100806	FM 200
6 x 3 IPS	18.10	6.625	3.500	4.72	3.62	9.06	6.40	100808	FM 200
6 x 4 IPS	18.10	6.625	4.500	4.72	3.94	9.06	6.60	100810	FM 200
8 x 2 IPS	23.60	8.625	2.375	5.71	2.48	11.80	14.9	100812	FM 200
8 x 3 IPS	23.60	8.625	3.500	5.71	3.62	11.80	14.3	100814	FM 200
8 x 4 IPS	23.60	8.625	4.500	5.71	3.94	11.80	15.0	100816	FM 200
8 x 6 IPS	23.60	8.625	6.625	5.71	4.72	11.80	15.6	100818	FM 200
10 x 4 IPS	27.40	10.75	4.500	6.30	3.94	13.78	22.0	100820	FM 200
10 x 6 IPS	27.40	10.75	6.625	6.30	4.72	13.78	25.3	100822	FM 200
10 x 8 IPS	27.40	10.75	8.625	6.30	5.71	13.78	26.2	100824	FM 200
12 x 6 IPS	31.40	12.75	6.625	7.48	4.72	15.95	47.1	100826	FM 200
12 x 8 IPS	31.40	12.75	8.625	7.48	5.71	15.95	48.9	100828	FM 200
12 x 10 IPS	31.40	12.75	10.75	7.48	6.30	15.95	52.3	100830	FM 200

IPS

SDR 9 (standard dimension ratio)

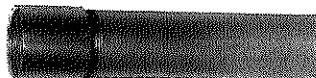
255 PSI (MAOP @ 73.4° F)

Nominal Size	L [in.]	D [in.]	d [in.]	L1 [in.]	L2 [in.]	Z [ins.]	Weight	Item Code	FM Class
3 x 2 IPS	11.80	3.500	2.375	3.62	2.48	5.90	1.50	100832	-----
4 x 2 IPS	13.78	4.500	2.375	3.94	2.48	6.89	2.50	100836	-----
4 x 3 IPS	13.78	4.500	3.500	3.94	3.62	6.89	2.70	100834	-----
6 x 2 IPS	18.10	6.625	2.375	4.72	2.48	9.06	6.20	100842	-----
6 x 3 IPS	18.10	6.625	3.500	4.72	3.62	9.06	6.40	100840	-----
6 x 4 IPS	18.10	6.625	4.500	4.72	3.94	9.06	6.60	100838	-----
8 x 2 IPS	23.60	8.625	2.375	5.71	2.48	11.80	14.9	100850	-----
8 x 3 IPS	23.60	8.625	3.500	5.71	3.62	11.80	14.3	100848	-----
8 x 4 IPS	23.60	8.625	4.500	5.71	3.94	11.80	15.0	100846	-----
8 x 6 IPS	23.60	8.625	6.625	5.71	4.72	11.80	15.6	100844	-----

A

Section- 33 00 00

Product Details and Specifications



4 in. Sch. 40 T&C Galv A53A Pipe SRL Threaded and Coupled Single Random Length Welded Galvanize
4 GALV T&C A53A S40 PIPE
ALT CODE : GGPTCA53P
ITEM# : 7367

DESCRIPTION

- Import

SPECIFICATIONS

ANSI Specifications

- ANSI B1.20.1
- ANSI C.80.6
- ANSI C80.1
- ANSI C80.3
- ANSI C80.5

Application

Fire Protection

ASME Specifications

ASME B36.10M

ASTM Specifications

- ASTM A-53
- ASTM A-53M
- ASTM A-865

Coating

Galvanized

End Connection 1

Threaded

End Connection 2

Threaded

End Connections

Threaded

Material

Carbon Steel

Origin

Global

Pipe/Tubing Size

4 in

Pressure Class

1900 psi

Wall Thickness

0.237 in

DETAILS

ALT.CODES2

IGPTCA53P

ALT.CODES3

GGPTCA53PN

ALT.CODESS

IGPTCA120P

ALTCODE

GGPTCA53P

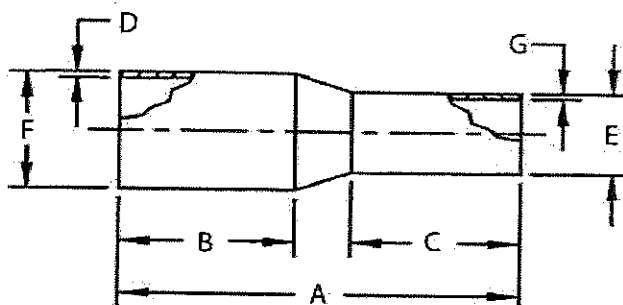
DEFAULT VENDOR

VENDOR ALPHA : GLOBAL2 (33589)

VENDOR NAME : GLOBAL (33589)

Section- 33 00 00

DEPT DESC	COMM / INDU - PIPE STL (30)
DISC GROUP DESC	GBL CS ERW GRD-A GALV T&C 1/2 & UP CSP (0083)
FREIGHT CODE	CL50
GLBL PROD HIER	018006006015
LDL	N
LINEBUY DESC	GBL CS PIPE - ERW GR A CSP DC STK (105)
LINEBUY SEQ	620
LONG DESCRIPTION	4 Galvanized Threaded & Coupled A53A Schedule 40 Pipe
MASTER PRODUCT ID	7367
PARCEL RESTRICT FLAG	E
PER QTY	100
PICK TYPE	PIPE
SELL MULTIPLIER	21
SHORT DESCRIPTION	4 GALV T&C A53A S40 PIPE
UOM	C
VENDOR PROD CODE	GGPTCA53P



Product Family:	Injection Molded Butt Fusion Fitting	Fitting Design:	Reducer
Resin Status:	NSF Listed Bi-Modal Virgin Resin	Nominal Primary Pipe Sizes:	1" - 12"
Resin Type:	ASTM D3350 designated PE3408/PE4710/PE100	Nominal Pipe Standard:	IPS and DIPS
Resin Cell Class:	4455574-CC3	Currently Available SDR's:	17, 11, 9
Manufactured and tested to meet requirements of: ASTM D2513, ASTM D3261, ANSI/AWWA C901 & C906, FM 1613, NSF 61			
For use on pipe and fittings conforming to: ASTM D2513, ASTM D3035, ASTM F-714			

For Material and Testing Information, please refer to our Molded Fitting Specification Sheet.

IPS

SDR 17 (standard dimension ratio)

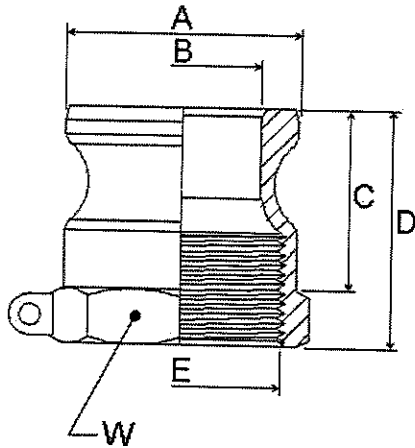
125 PSI (MAOP @ 73.4° F)

Nominal Size	A [in.]	B [in.]	C [in.]	D (wall) [in.]	E (OD) [in.]	F (OD) [ins.]	G (wall) [ins.]	Weight [lbs.]	Item Code	FM Class
3 x 2 IPS	7.87	3.94	2.95	0.206	2.375	3.500	0.140	0.45	100608	----
4 x 2 IPS	9.06	4.33	2.95	0.264	2.375	4.500	0.140	0.80	100612	----
4 x 3 IPS	9.06	4.33	3.94	0.264	3.500	4.500	0.206	1.05	100616	----
6 x 3 IPS	11.03	5.06	3.71	0.390	3.500	6.625	0.206	2.05	100620	----
6 x 4 IPS	11.42	5.12	4.33	0.390	4.500	6.625	0.264	2.55	100622	----
8 x 4 IPS	12.80	5.99	4.05	0.507	4.500	8.625	0.264	4.40	100626	----
8 x 6 IPS	12.80	6.10	5.12	0.507	6.625	8.625	0.390	5.05	100628	----
10 x 6 IPS	14.06	6.16	5.29	0.632	6.625	10.70	0.390	7.55	100632	----
10 x 8 IPS	14.37	6.25	5.81	0.632	8.625	10.70	0.507	9.15	100634	----
12 x 6 IPS	16.00	6.95	5.22	0.750	6.625	12.70	0.390	11.75	100636	----
12 x 8 IPS	16.54	7.09	6.10	0.750	8.625	12.70	0.507	13.45	100638	----
12 x 10 IPS	16.54	7.09	6.69	0.750	10.70	12.70	0.632	14.05	100640	----

STAINLESS STEEL - MALE ADAPTER X FEMALE NPT, TYPE - A

FNW®

A-A-59326D COMPATIBLE | MATERIALS: CF8M MOD



DIMENSIONS (INCHES)

Product Code	Size	A	B	C	D	E	W
FNWCGASSD *	1/2"	0.96	0.55	1.03	1.61	NPT	1.13
FNWCGASSF	3/4"	1.26	0.83	1.00	1.54	NPT	1.54
FNWCGASSG	1"	1.44	0.94	1.36	1.91	NPT	1.72
FNWCGASSH	1-1/4"	1.79	1.21	1.54	2.07	NPT	2.04
FNWCGASSJ	1-1/2"	2.10	1.52	1.61	2.15	NPT	2.38
FNWCGASSK	2"	2.48	1.81	1.88	2.50	NPT	2.77
FNWCGASSL	2-1/2"	2.98	2.28	1.95	2.68	NPT	3.13
FNWCGASSM	3"	3.60	2.88	2.02	2.76	NPT	3.85
FNWCGASSP	4"	4.71	3.87	2.07	2.94	NPT	4.99
FNWCGASSU	6"	6.93	5.91	2.20	3.12	NPT	7.39

*1/2" Type A does not have pull ring hole.

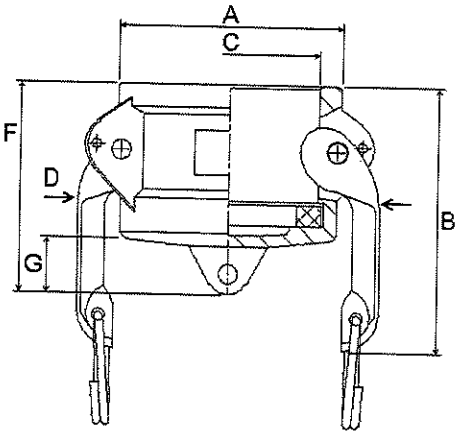
W = Wrenching (Flat-to-Flat)

STAINLESS STEEL - DUST CAP, TYPE - DC

A-A-59326D COMPATIBLE | MATERIALS: CF8M MOD

STANDARD MATERIALS

Description	Material
Body	Stainless-Steel (#316)
Gasket	Buna-N (Standard Offer)
Arm	Stainless-Steel (#304)
Pin	Stainless-Steel
Pull-Ring	Stainless-Steel
Safety-Pin	Steel (Plated)



DIMENSIONS (INCHES)

Product Code	Size	A	B	C	D	*E*	F	G
FNWCGDCSSD	1/2"	1.32	1.92	1.00	1.80	2.56	1.70	0.38
FNWCGDCSSF	3/4"	1.61	1.94	1.28	2.10	2.62	1.81	0.47
FNWCGDCSSG	1"	1.85	2.19	1.47	2.40	2.91	2.09	0.47
FNWCGDCSSH	1-1/4"	2.26	3.09	1.81	3.25	3.47	2.30	0.47
FNWCGDCSSJ	1-1/2"	2.58	3.12	2.13	3.56	3.54	2.34	0.46
FNWCGDCSSK	2"	2.91	3.14	2.51	3.93	3.52	2.57	0.47
FNWCGDCSSL	2-1/2"	3.54	3.33	3.01	4.43	3.52	2.75	0.47
FNWCGDCSSM	3"	4.17	3.73	3.63	5.42	4.04	2.81	0.47
FNWCGDCSSP	4"	5.45	3.74	4.73	6.52	4.75	2.83	0.47
FNWCGDCSSU	6"	7.62	5.47	6.95	9.38	5.59	3.54	0.77

E dimension for Arm & Ring "stretched", shown as Type-B specification sheet.
For safety reasons, dust caps and dust plugs should not be used in pressure applications.

CLASS 125 FLANGE IRON FITTINGS



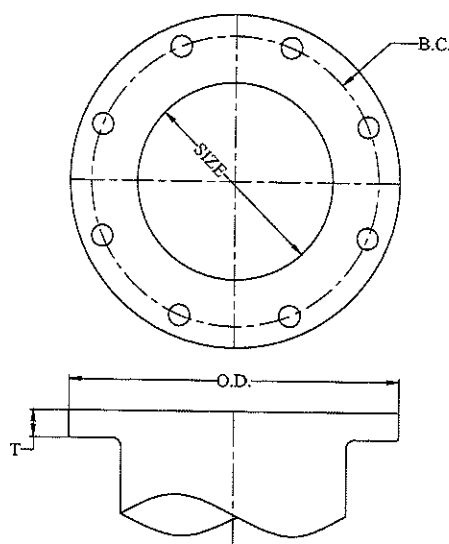
C110 DUCTILE IRON FULL BODY FITTINGS

SAMPLE SPECIFICATIONS

(Current ANSI/AWWA revisions apply)

Flanged fittings, 2" through 64", shall be manufactured of ductile iron in accordance with all applicable terms and provisions of standards ANSI/AWWA C110/A21.10. Flange surfaces shall be faced and drilled in accordance with ANSI Class 125, B16.1. All ductile iron flanged fittings shall be rated for water pressure of 250 psi. Flanged ductile iron fittings in 24" (610 mm) and smaller sizes may be rated for 350 psi (2,413 kPa) with the use of special gaskets.

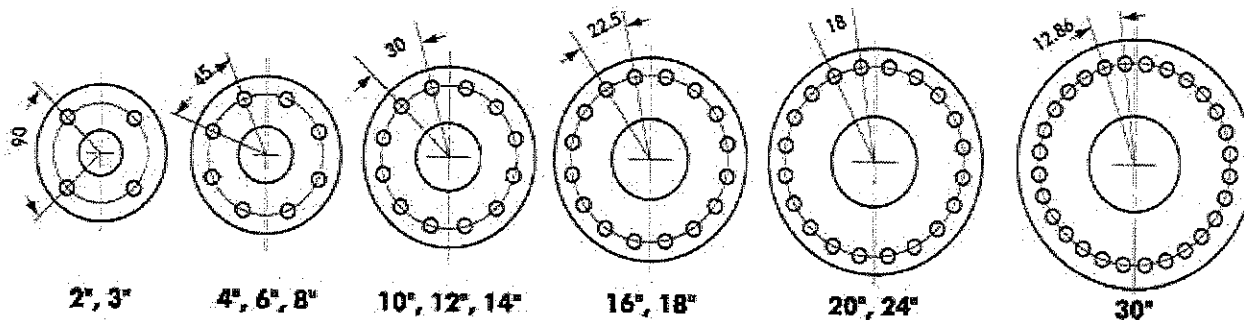
NOTE: Fittings are available prime coated, bare or epoxy coated. All coated fittings meet requirements of NSF-61, NSF-372 and Annex G. Interiors of fittings shall be lined and seal coated in accordance with ANSI/AWWA C104/A21.4. Installation of fittings shall be per AWWA C110.



ANSI/AWWA C110 Class 125 Flange Fittings

FLANGE DETAILS						
Nominal Pipe Size Inch	Flange O.D.	B.C. Diameter	Flange Thickness T	Bolt Hole Diameter	Number of Bolts	Bolt Dia. and Lengths
2	6.00	4.75	0.62	0.750	4.00	5/8 x 2 1/4
3	7.50	6.00	0.75	0.750	4.00	5/8 x 2 1/2
4	9.00	7.50	0.94	0.750	8.00	5/8 x 3
6	11.00	9.50	1.00	0.880	8.00	3/4 x 3 1/2
8	13.50	11.75	1.12	0.880	8.00	3/4 x 3 1/2
10	16.00	14.25	1.19	1.000	12.00	7/8 x 4
12	19.00	17.00	1.25	1.000	12.00	7/8 x 4
14	21.00	18.75	1.38	1.130	12.00	1 x 4 1/2
16	23.50	21.25	1.44	1.130	16.00	1 x 4 1/2
18	25.00	22.75	1.56	1.250	16.00	1 1/8 x 5
20	27.50	25.00	1.69	1.250	20.00	1 1/8 x 5
24	32.00	29.50	1.88	1.375	20.00	1 1/4 x 5 1/2
30	38.75	36.00	2.12	1.375	28.00	1 1/4 x 6 1/2
36	46.00	42.75	2.38	1.625	32.00	1 1/2 x 7
42	53.00	49.50	2.62	1.625	36.00	1 1/2 x 7 1/2
48	59.50	56.00	2.75	1.625	44.00	1 1/2 x 8
54	66.25	62.75	3.00	2.00	44	1 3/4 x 8 1/2
60	73.00	69.25	3.12	2.00	52	1 3/4 x 9
64	80.00	76.00	3.38	2.00	52	1 3/4 x 9

Contact Tyler Union for 54"-64" flange fitting information.

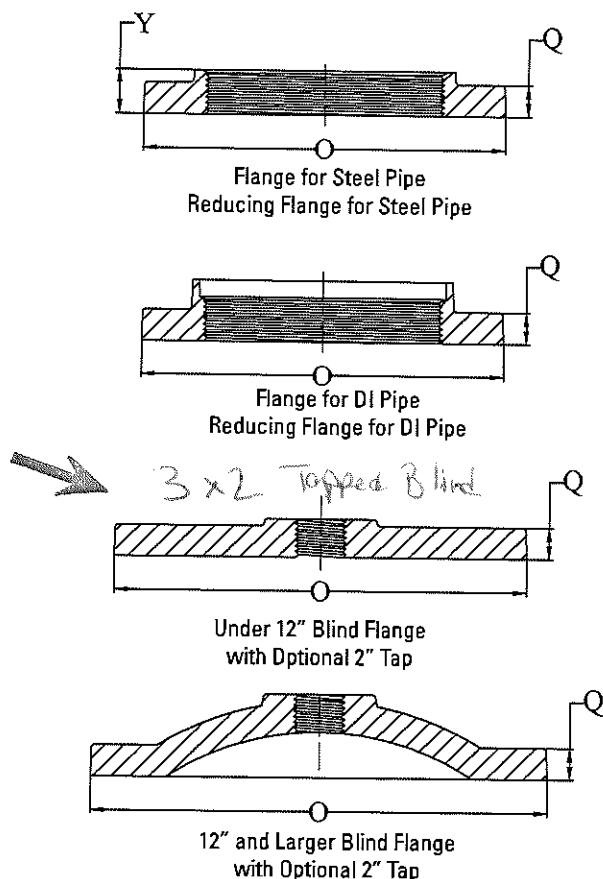


NOTE: Drilling templates are in multiples of four so that fittings may be made to face in any quarter. Bolt holes shall straddle the center line.



CLASS 125 FLANGE IRON FITTINGS | FLANGES

C110 DUCTILE IRON FULL BODY FITTINGS



FLANGES										
Sizes					Domestic Weight	Import Weight	Domestic Weight	Import Weight	Domestic Weight	Import Weight
Size	D	Q	Y	Z	Steel	Steel	DI	DI	Blind	Blind
2	6.00	0.62	1.00	4.75	4	—	—	—	—	—
2½	7.00	0.69	1.13	5.50	6	—	—	—	—	—
3	7.50	0.75	1.19	6.00	9	—	6	7	8	9
4	9.00	0.94	1.31	7.50	15	—	13	12	14	16
6	11.00	1.00	1.56	9.50	29	—	19	17	27	25
8	13.50	1.12	1.75	11.75	31	—	29	26	38	38
10	16.00	1.19	1.94	14.25	50	—	36	38	55	66
12	19.00	1.25	2.19	—	63	—	61	57	73	85
14	21.00	1.38	2.25	—	—	—	59	61	116	120
16	23.50	1.44	2.50	—	—	—	78	83	153	145
18	25.00	1.56	2.69	—	—	—	98	98	176	179
20	27.50	1.69	2.88	—	—	—	103	110	215	244
24	32.00	1.88	3.25	—	—	—	147	145	348	364
30	38.75	2.12	—	—	—	—	255	212	615	546
36	46.00	2.38	—	—	—	—	360	324	900	958
42	53.00	2.62	—	—	—	—	535	533	1300	1300
48	59.50	2.75	—	—	—	—	650	646	1620	1740

DI REDUCING FLANGE THREADED FOR STEEL PIPE		
Size	Tap x O.D.	Domestic Weight
4x3	3x9	16
6x4	4x11	25
8x4	4x13.5	44
8x6	6x13.5	31
10x6	6x15	50
12x6	8x19	60
10x8	8x16	55
12x10	10x19	72

DI REDUCING FLANGE THREADED FOR DUCTILE IRON PIPE		
Size	Tap x O.D.	Weight
4x3	3x9	16
6x4	4x11	25
8x4	4x13.5	40
8x6	6x13.5	35
10x8	8x16	50
12x8	8x19	85

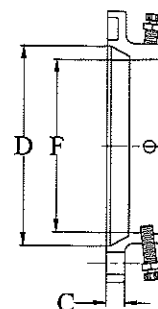
*FLANGE WEIGHTS (LBS.)				
Size	Weight	Weight	Weight	Weight
2	0.75	12.00	0.00	0.00
3	1.00	15.00	0.00	0.00
4	1.50	17.00	0.00	0.00
6	2.50	22.00	0.00	0.00
8	3.50	27.00	0.00	0.00
10	5.00	32.00	0.00	0.00
12	7.00	37.00	0.00	0.00
14	9.00	42.00	0.00	0.00
16	11.00	47.00	0.00	0.00
18	13.00	52.00	0.00	0.00
20	15.00	57.00	0.00	0.00
24	21.00	67.00	0.00	0.00
30	31.00	77.00	0.00	0.00
36	41.00	87.00	0.00	0.00
42	51.00	97.00	0.00	0.00
48	61.00	107.00	0.00	0.00

*Not included in AWWA C110.

DIMENSIONS (INCHES)									
Size	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight
2	0.75	12.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	1.00	15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.50	17.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	2.50	22.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	3.50	27.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	5.00	32.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	7.00	37.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	9.00	42.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	11.00	47.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	13.00	52.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	15.00	57.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	21.00	67.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	31.00	77.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	41.00	87.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
42	51.00	97.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48	61.00	107.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

All set screws are 5/8" 80lb. torque head.

Note: Recommended for class 53—class 56 wall thickness D.I. pipe.

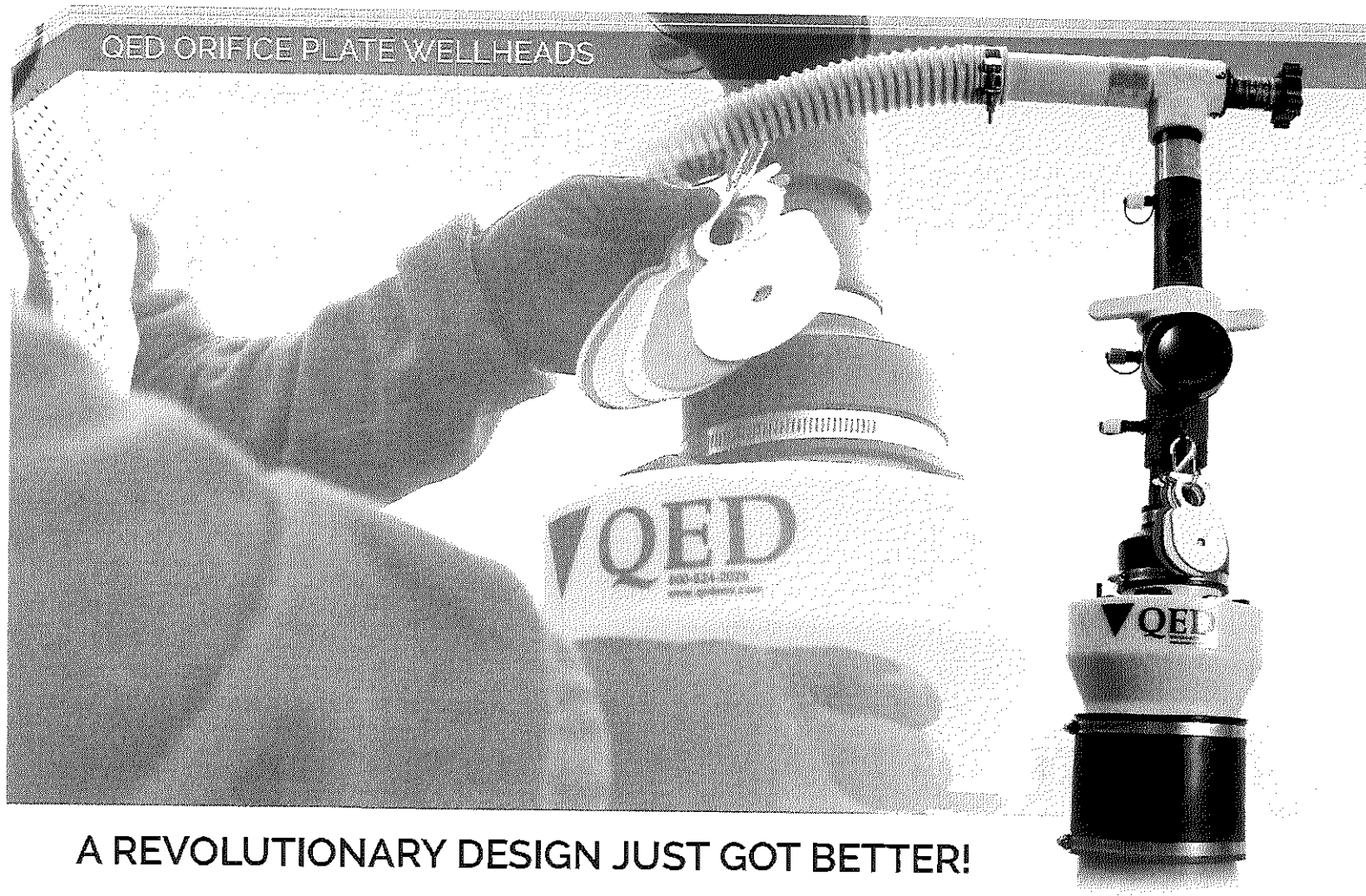




PRECISION WELLHEADS

ORP215M-R

QED ORIFICE PLATE WELLHEADS



A REVOLUTIONARY DESIGN JUST GOT BETTER!

The QED ORP215M-R Wellhead combines easy orifice plate exchanges for more accurate flow measurement with precise adjustment of gas flow, especially at very low rates (under 10 scfm). Changing to the correct orifice plate takes only seconds, with no time wasted shutting down the control valve or retuning the well. Only the ORP215M-R family includes a complete kit of six orifice plates securely attached to the wellhead for quick access. A removable dust cover permits easy confirmation of plate size, giving you high confidence in your flow measurements. The Precision Fine Tune Control Valve provides exact control of gas flow. Unlike traditional valves, this unique design achieves near linear flow adjustment across its entire range. Molded, glass-filled polypropylene construction boosts strength and resistance to harsh field conditions, significantly increasing wellhead durability. Easier hose fitting and simpler service save valuable field time and help reduce maintenance and labor costs.

FEATURES

- Glass filled molded construction is resistant to UV and weather
- Serviceable control valve with stainless steel rod for long service life
- Permanent orifice plate retainer keeps plates at hand
- Easy port fittings wellhead fittings quick, protected analyzer connections
- Tapered field connection for easy to attach hose

Product designs and specifications are subject to change without notice. User is responsible for determining suitability of product.

QED Environmental Systems Inc.
2355 Bishop Circle West Dexter, MI 48130, USA



info@qedenv.com 800.624.2026
734.995.2547

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QED Environmental Systems Ltd.
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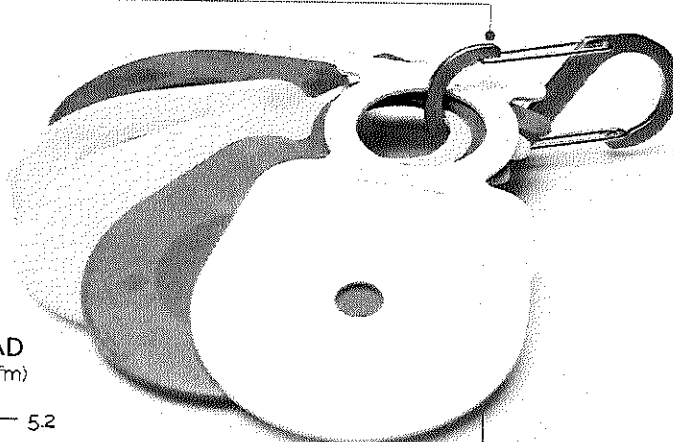
ORP215M-R

Section- 33 00 00

Orifice Plate Kit: 40770

Set of 6 Nylon plates:

- 0.40" (10 mm)
- 0.50" (13 mm)
- 0.75" (19 mm)
- 1" (25 mm)
- 1.25" (31 mm)
- 1.40" (35 mm)
- Stainless Steel
- S-retainer
- Stainless Steel
- Kit for horizontal wellheads



2" WELLHEAD (Ranges in scfm)

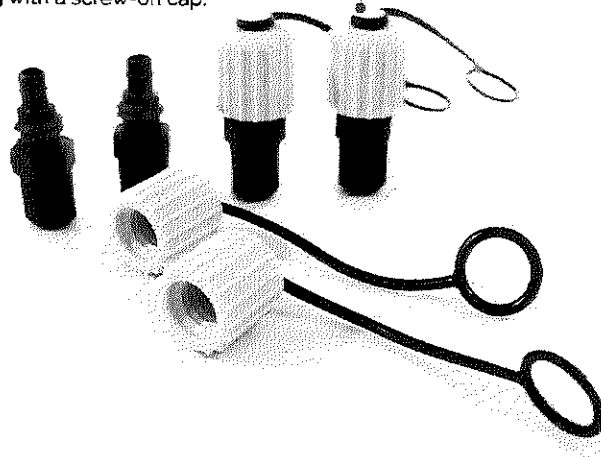
Orifice Plate Diameter	40"	50"	75"	1.00"	1.25"	1.40"
	1.6	2.6	5.9	10.7	17.7	23.7
	5.2	8.2	19.6	33.8	56	75

Optimal Flow Range using 0.5-5 inch DP

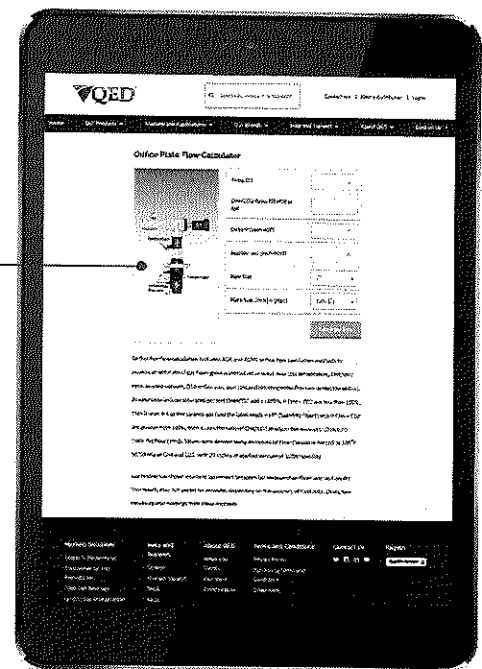
Easy Port™ Wellhead Fittings

The 1st barbed LFG wellhead fitting with a screw-on cap.

QED's Easy Port™ Fittings are engineered specifically for LFG wellheads. Made with fiber reinforced engineered plastic, they have a screw-on cap that seals tightly, making them bird proof. The sample ports have heavy walls to reduce heat loss and freezing, and are UV protected for much longer field life. The cap seals tightly but can be easily removed with a simple twist, and it is tethered to the fitting so it cannot be dropped or lost.



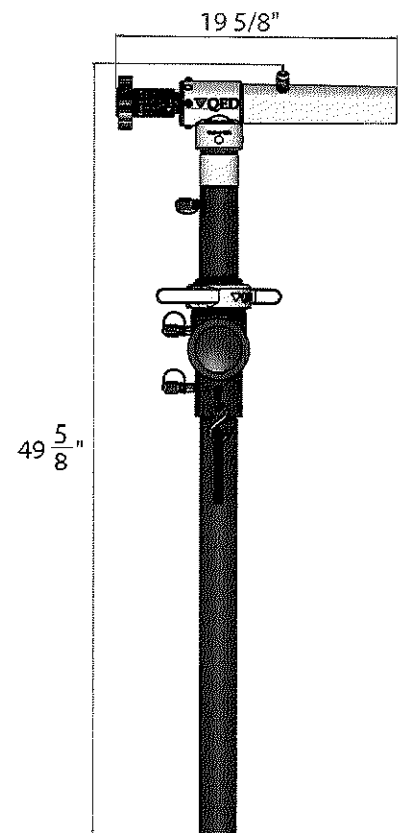
Orifice Plate Flow Calculator



Use the ORP Flow Calculator to determine the best orifice plate for your site conditions.
<https://www.qedenv.com/en-us/tools/orifice-plate-flow-calculator/>

TECHNICAL SPECIFICATION

Wellhead Model:	ORP215M-R
Flow Range:	0-125 scfm (0-212 m ³ /h)
Wellhead Materials:	Glass-filled polypropylene, Viton®
Operating Temperature:	-20 to 200 °F (-28 to 94 °C)
Flow Adjustment:	0-100% via 10 turn valve
Operating Orientation:	Vertical or Horizontal Specific Models
Orifice Plates - Size (in)	0.4, 0.5, 0.75, 1.0, 1.25 & 1.40 (0.62 coefficient)
Orifice Plate Material	Vertical - Nylon; Horizontal - Stainless Steel



QED Environmental Systems Inc.
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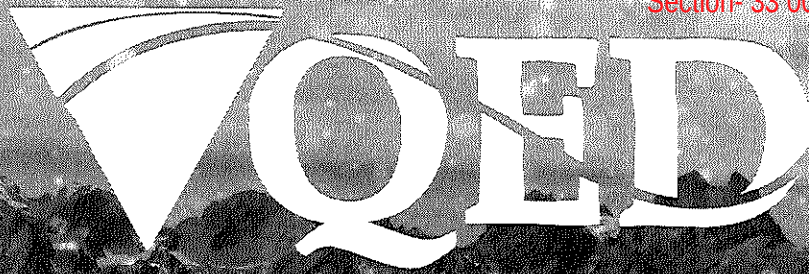
Data Sheet Reference : TDS 2413



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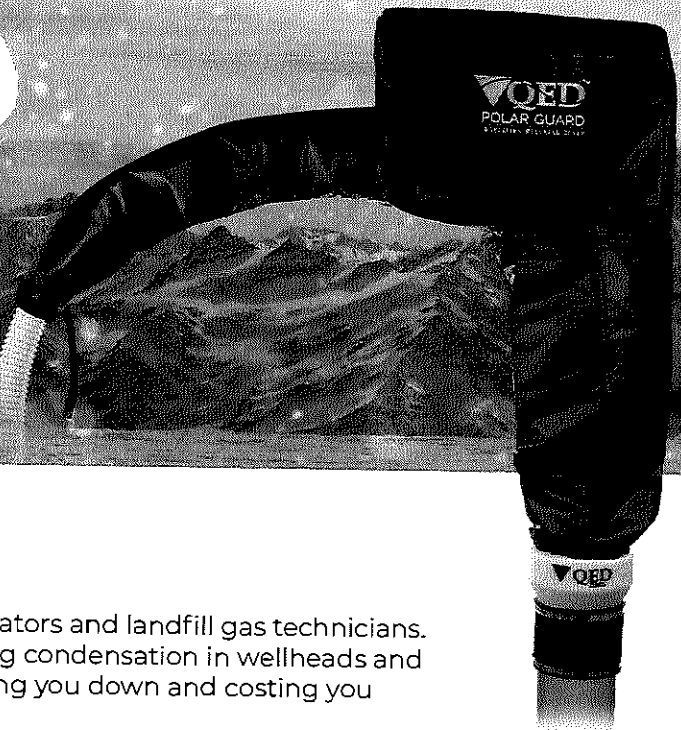
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POLAR GUARD

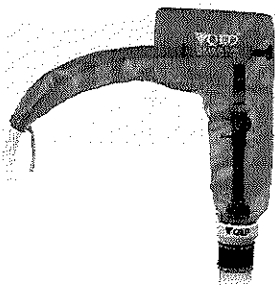
INSULATING WELLHEAD COVER



Winter weather can cause many problems for landfill operators and landfill gas technicians. Sub-zero temperatures and harsh winds can lead to freezing condensation in wellheads and landfill gas hoses; affecting your gas extraction levels, slowing you down and costing you money.

Protect your wellheads from the elements with the QED PolarGuard™ Insulating Wellhead Cover. Made from high quality materials and field-tested in the arctic temperatures of northern Canada, the PolarGuard™ Insulating Wellhead Cover blocks the polar winds and guards against freezing temperatures; keeping your wellheads and gas collection hoses safe and warm.

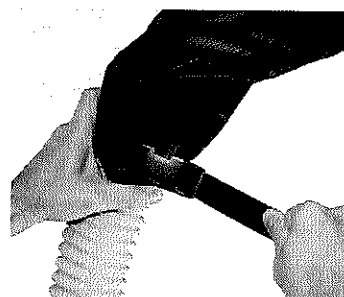
The PolarGuard™ Insulating Wellhead Cover features Velcro closures and web buckle straps for quick and secure installation and Velcro access flaps allowing for easy gas monitoring and maintenance. Uninterrupted workflow is important to you and frozen condensation in your wellheads and collection hose can cause delays that you don't need. Protect your investment with the PolarGuard™



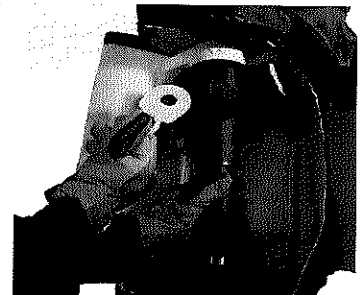
Available for
Quick- Change Orifice Plate
and Accu-Flo pitot tube
wellheads, up to 3"



Protect against freezing
condensation



Durable Velcro closures and
web buckle straps



Easy access to
connections for
monitoring and
maintenance

© Product designs and specifications are subject to change without notice. User is responsible for determining suitability of product.



Highly Visible Well Caps Allow Easy Liquid Level Access and Reduce Wellhead Leaks

QED's innovative Stabilizer™ LFG Well Caps (patent pending) feature a unique support ring molded directly into the Cap that aligns and stabilizes the LFG wellhead. This takes pressure off the flexible coupling and the flex hose and, along with watertight threads, reduces leaks from the wellhead. The caps are molded in a bright yellow, which helps identify and protect the entire well from damage.

This is the first engineered gas well cap that allows liquid level readings without removing the wellhead – faster, safer, less system disruption. Air introduction and gas release are minimized, eliminating the need to shut down the well for level measurements and rebalancing of the wellfield.

Well Caps without pump fittings are a good way to start on gas recovery wells. A pump fitting kit can be added later for dual extraction wells.

Designed to work with 6" and 8" diameter wells with 2" or 3" wellheads, all models provide ports to accommodate a down well pump. There is also an economy model for 6" gas-only wells.

The durable, heavy-walled, polyethylene construction of the LFG Well Cap makes it ideal for any climate.

Stabilizer™ LFG Well Cap Advantages

- Bright yellow Caps are highly visible in the field
- Support ring reduces wellhead leaks, minimizing air introduction and gas release
- Easy access for liquid level reading – faster, safer, less system disruption
- Pump fitting kits allow conversion of gas recovery caps to dual extraction



QED LandFill Gas Products
Environmental Systems

*The First Engineered Solutions
for LFG Measurement & Control*

QED Environmental Systems – A Test America Company P.O. Box 3726 Ann Arbor, MI 48106-3726 USA
Phone (734) 995-2547 • Toll Free (800) 624-2026 • Fax (734) 995-1170 • info@qedenv.com • www.qedenv.com

Specifications:

Section- 33 00 00

	6" (152 mm) Diameter		8" (203 mm) Diameter	
	2" (50 mm) Gas Pipe	3" (76 mm) Gas Pipe	2" (50 mm) Gas Pipe	3" (76 mm) Gas Pipe
Well Caps without fittings	 Well Diameter: 6" (152 mm) Gas Wellhead: 2" (50 mm) pipe Ports: .5" (12 mm), .75" (19 mm), 1.5" (38 mm), 1" (25 mm) and .75" (19 mm)	 Well Diameter: 6" (152 mm) Gas Wellhead: 3" (76 mm) pipe Ports: .5" (12 mm), .75" (19 mm), 1.5" (38 mm), 1" (25 mm) and .75" (19 mm)	 Well Diameter: 8" (203 mm) Gas Wellhead: 2" (50 mm) pipe Ports: .5" (12 mm), .75" (19 mm), 1.5" (38 mm), .75" (19 mm) and .75" (19 mm)	 Well Diameter: 8" (203 mm) Gas Wellhead: 3" (76 mm) pipe Ports: .5" (12 mm), .75" (19 mm), 1.5" (38 mm), .75" (19 mm) and .75" (19 mm)
Cap without fittings	Model GWC62	Model GWC63	Model GWC82	Model GWC83

Pump Fitting Kits				
1" (25 mm) discharge tube*	Model 40588	Model 40588	Model 40538	Model 40538
1.25" (31 mm) discharge tube*	Model 40589	Model 40589	Model 40539	Model 40539

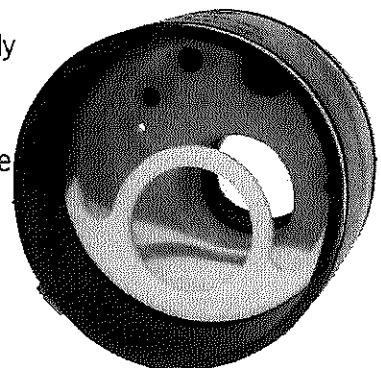
*Fitting kits come with .5" air supply, .625" air exhaust, filter/regulator bracket and stainless steel pump support eyelet. Cap Material: Polyethylene, UV8 rated for sunlight and outdoor use.

Well Caps with fittings	 Well Diameter: 6" (152 mm) Gas Wellhead: 2" (50 mm) pipe Ports: 1" (25 mm) and .75" (19 mm)	 Well Diameter: 6" (152 mm) Gas Wellhead: 3" (76 mm) pipe Ports: 1" (25 mm) and .75" (19 mm)	 Well Diameter: 8" (203 mm) Gas Wellhead: 2" (50 mm) pipe Ports: 2 @ .75" (19 mm)	 Well Diameter: 8" (203 mm) Gas Wellhead: 3" (76 mm) pipe Ports: 2 @ .75" (19 mm)
Cap w/ fittings, 1" (25 mm) discharge	Model GWC6284	Model GWC6384	Model GWC8284	Model GWC8384
Cap w/ fittings, 1.25" (31 mm) discharge	Model GWC6283	Model GWC6383	Model GWC8283	Model GWC8383

Economy Well Cap (Gas-only, no secondary support ring)	 Well Diameter: 6" (152 mm) Gas Wellhead: 2" (50 mm) pipe Access ports: 2 @ .75" (19 mm) NPT
Cap without fittings	Model GW622

Unique Support Ring Feature Helps Prevent Wellhead Leaks

A support ring molded directly into the Stabilizer™ LFG Well Cap aligns and stabilizes the LFG wellhead, taking pressure off the flexible coupling and the flex hose and reducing leaks from the wellhead.

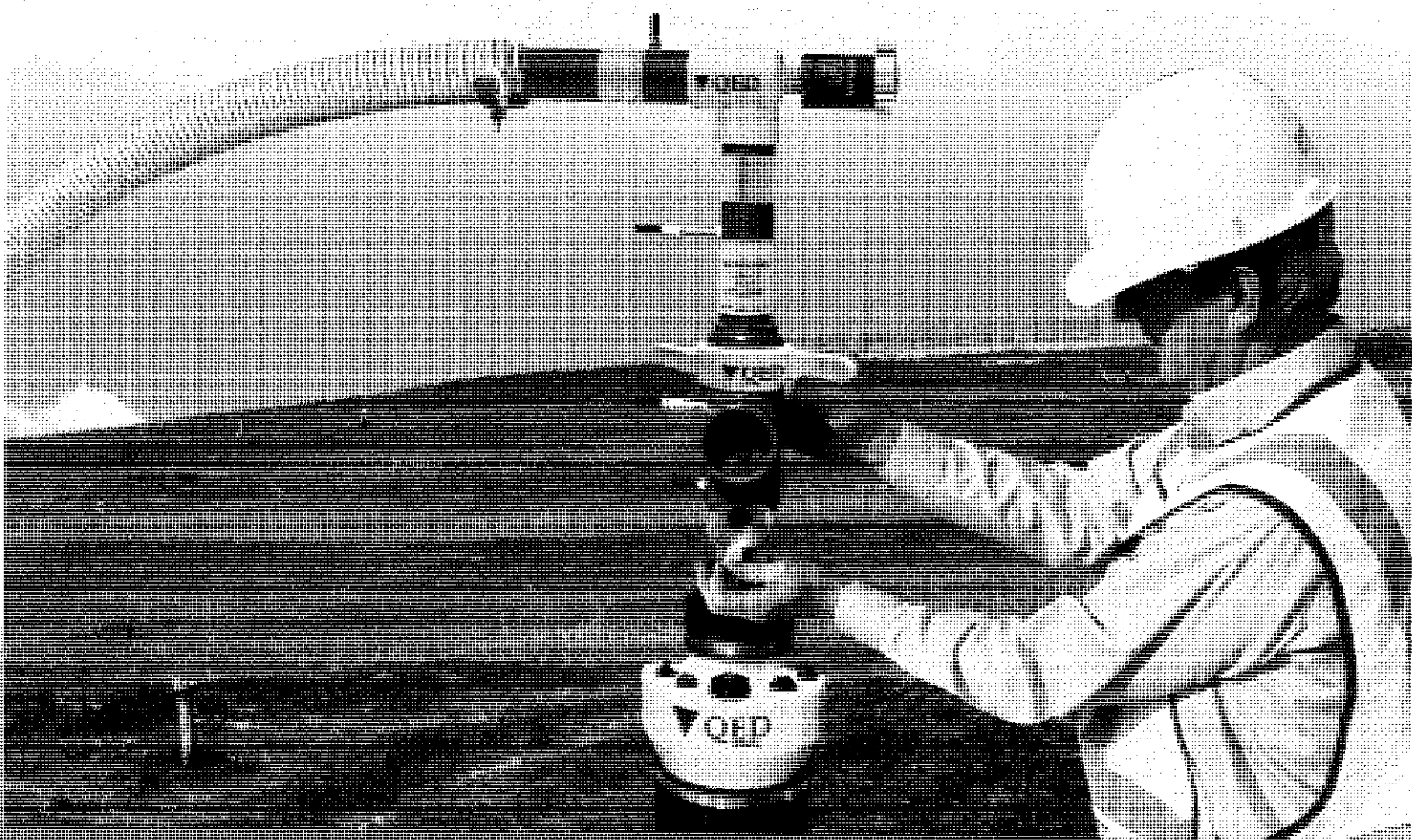


Section- 33 00 00



Landfill Gas Products

The First Engineered Solutions
for LFG Measurement & Control



QED LandFill Gas Products

1-800-888-2026 www.qedusa.com info@qedusa.com

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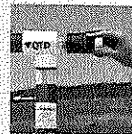
2500 Spring Creek Way
Beverly Hills, CA 90212
Phone: 310-274-2747
Fax: 310-274-1170

New wellheads reduce balance gas and oxygen concentrations while increasing or maintaining a steady flow of methane.

WELLHEADS

Section- 33 00 00

Fine Tune Control Valves™3



Linear gas flow adjustment over the entire range of valve movement, even under 10 SCFM.

Quick-Change™ Orifice Plate Wellheads . .4



Accessible orifice plate housing allows for quick and easy confirmation of plate size and placement.

QED Union Orifice Plate Wellheads6

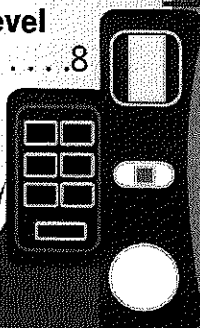
High Level Indicators8

Optional Dewatering Pumps



www.qedenv.com/ap4plus

Digital Level Meters8



WELL CAPS

Stabilizer™ Well Cap7



Unique support ring feature stabilizes the wellhead, reducing leaks.

Landfill Gas Calculator8



Measure the value of your increased gas flow with our innovative Landfill Gas Calculators.

CONTROL VALVE

Section- 33 00 00

The heart of every QED Wellhead, the Fine Tune Control Valve™ allows fine tuning even under 10 SCFM

QED's Precision Fine Tune Control™ Valve (patent pending) is a revolutionary breakthrough in landfill gas wellfield tuning. Unlike traditional "gate" type valves, this allows you to easily and precisely adjust the gas flow from a well, rather than just turning the flow on or off. The valve design gives you the ability to achieve linear flow adjustment across the entire range of valve movement.

The valve also has a high visibility metered scale that allows you to observe the valve setting, and quickly and accurately return to the exact flow setting after a shutdown. The rising stem valve exposes more of the metered scale as it is opened, allowing you to see and record numerically exactly how far the valve is open.

Heavy-duty stainless steel stem and handle outlasts plastic used in standard gate valves

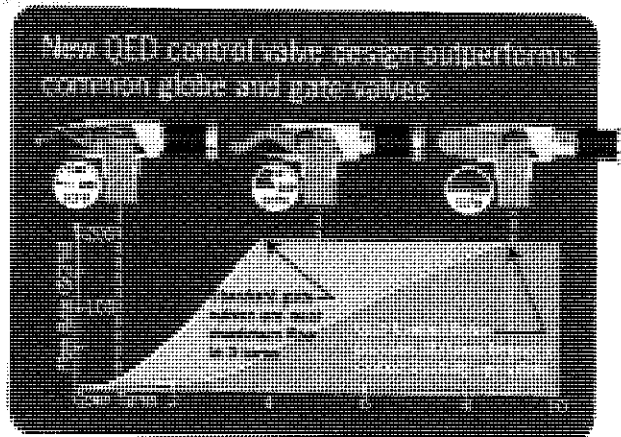
The valve uses a "flow-tuned" design valve plug, which allows for fine tuning even at very low gas flow rates (under 10 SCFM).

The rugged stainless steel valve stem and handle make the valve much more durable in the harsh outdoor environment to which landfill gas wells are exposed.

Fine Tune Control Valve Advantages:

- Linear flow over the entire range of valve movement, including less than 10 SCFM flow.
- Position scale shows exact valve setting and open/closed at a glance.
- Heavy-duty stainless steel stem and handle for strength and long-term durability.

New QED control valve design outperforms common globe and gate valves



www.qedenv.com/controlvalve

Specifications:

Model Number:

Flow at 40" w.c. vacuum:

Materials:

Control Valves not intended for leak tight shutoff over 5 psi

2"

CV2000

200 SCFM (340 m³/h)

304 Stainless Steel, PVC, Viton®

3"

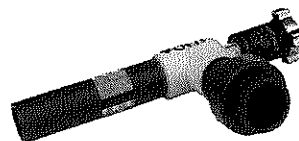
CV3000

400 SCFM (680 m³/h)

304 Stainless Steel, PVC, Viton®

CV2000A

CV2000 with addapter to use the Fine Tune Control Valve with an existing wellhead.



Quick-Change™ Orifice Plate Wellhead

Revolutionary orifice plate can be viewed and changed instantly

QED's new Quick-Change™ (patent pending) Orifice Plate Wellhead combines easy plate exchanges for accurate flow measurements with precise adjustment control over a broad flow range.

The Quick-Change Orifice Plate feature makes it as easy as 1-2-3 for the operator to change to the most appropriate size plate for the given conditions. The accessible plate housing allows for easy confirmation of plate size and placement giving you the highest confidence in your flow reading.

Changing to the correct orifice plate can be done in seconds, and there is no time wasted shutting down the control valve or rebalancing the wellfield. These benefits all save valuable field time and help reduce labor costs.

Accessible housing allows easy viewing of installed plate

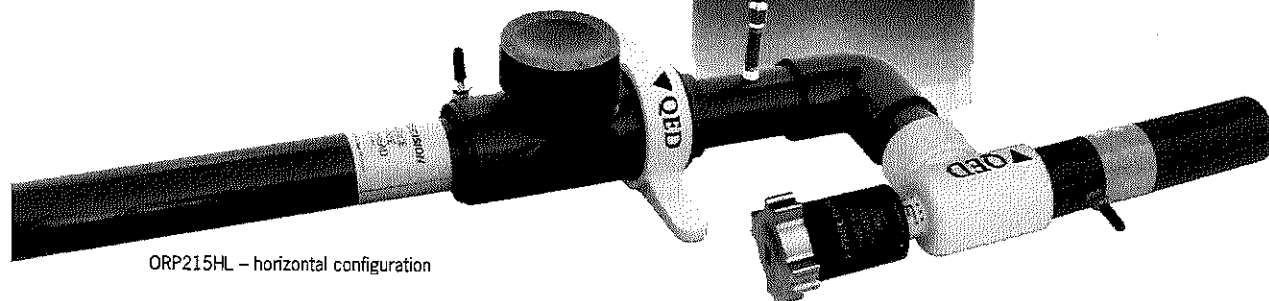
The Wellhead's control valve design allows you to finely control gas flow even at rates under 10 SCFM. This unique design will change the way operators adjust gas flow. Wells can now be tuned by flow rather than by vacuum. Well Cap is sold separately.



www.qedenv.com/quickchange

Quick-Change Orifice Plate Advantages:

- Saves time – plates can be changed in seconds
- Accurate flow measurements – match the right plate with the gas flow
- Reduces reporting errors – easy to identify the plate in use

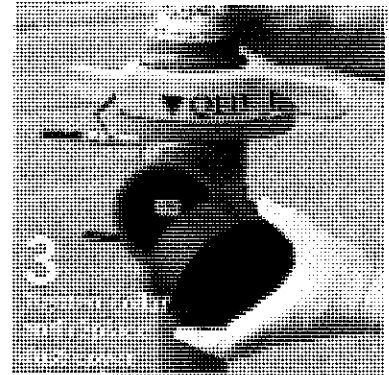
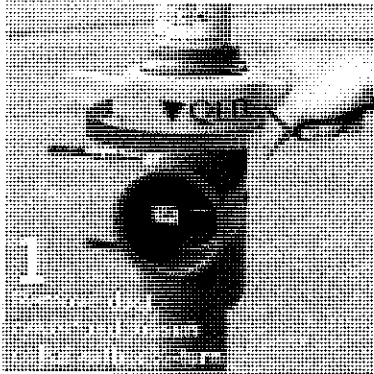


ORP215HL – horizontal configuration

WELLHEADS

Section- 33 00 00

Quick-Change™ Orifice Plate Wellhead



Specifications:

Model:

Optimal Flow Range:

Wellhead Materials:
PVC, Stainless Steel, Viton®
Fitting Options:
Brass barbs,
quick connects

vertical



1 1/4" (32 mm)
ORP115
0-60 scfm
(0-102 m³/h)

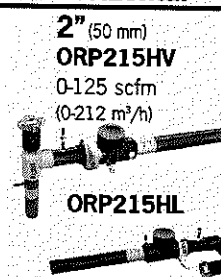


2" (50 mm)
ORP215
0-125 scfm
(0-212 m³/h)



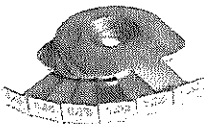
3" (80 mm)
ORP315
30-300 scfm
(50-500 m³/h)

horizontal



2" (50 mm)
ORP215HV
0-125 scfm
(0-212 m³/h)

Quick-Change Orifice Plates



1 1/4" vertical Plate Kit

40747
set of 4 plates:
0.26" (6.6 mm)
0.50" (13 mm)
0.75" (19 mm)
0.95" (24 mm)

2" vertical Plate Kit

40640
set of 6 plates:
0.40" (10 mm)
0.50" (13 mm)
0.75" (19 mm)
1" (25 mm)
1.25" (31 mm)
1.40" (35 mm)

3" vertical Plate Kit

40660
set of 3 plates:
1.25" (31 mm)
1.75" (44 mm)
2.10" (53 mm)

2" horizontal Plate Kit

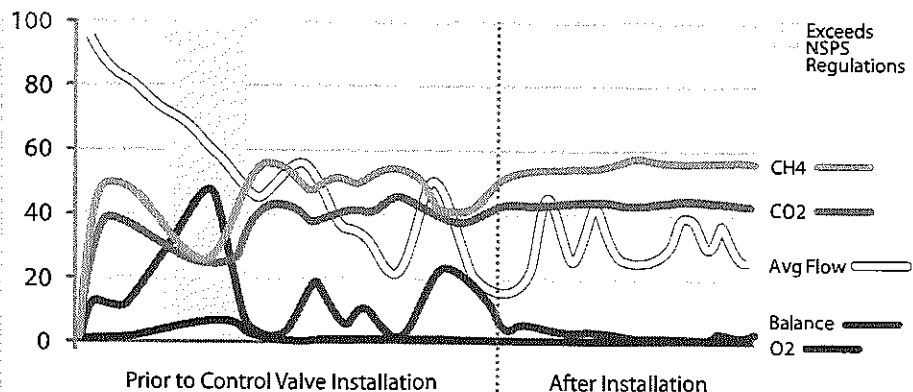
40690
set of 6 plates:
0.40" (10 mm)
0.50" (13 mm)
0.75" (19 mm)
1" (25 mm)
1.25" (31 mm)
1.40" (35 mm)



QED's Quick-Change Orifice Plates are constructed of 1/8" stainless steel. With several sizes of orifice plate available, it is easy to select the right plate for the appropriate pressure drop allowing for accurate flow measurement readings.

South Texas Landfill Case Study

Prior to the installation of the Fine Tune Control Valve, Well 90 (right) was out of compliance. Oxygen concentration had increased to 6.4% and the balance gas concentration spiked at 48.4%. After installation, those concentrations have been reduced, helping maintain compliance while gently increasing methane production.

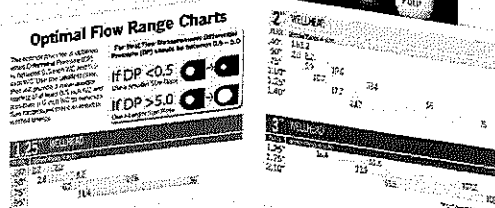


WELLHEADS

Section- 33 00 00

ORIFICE PLATE TOOLS

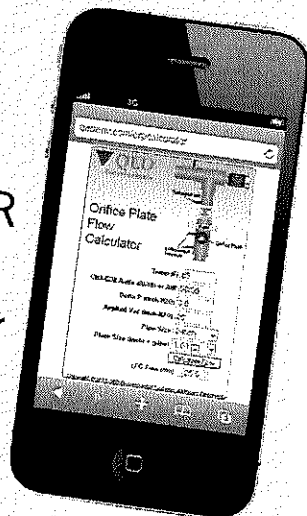
ORIFICE PLATE SELECTOR GUIDE



Download a printable and foldable Orifice Plate Guide at www.qedenv.com/files/ORPcurvecard-WEB.pdf. Or contact QED to have one mailed to you.

ORIFICE PLATE FLOW CALCULATOR

Use the mobile version of the Orifice Plate Flow Calculator at www.qedenv.com/orpcalculator



LANDFILL GAS CALCULATOR

Starting Value	Ending Value
Landfill Gas Flow (SCFM) 34	Landfill Gas Flow (SCFM) 38
Annualized LFG Collected (SCF) 17,870,400	Annualized LFG Collected (SCF) 19,972,800
Methane Content (percent) 51	Methane Content (percent) 54
Annualized Methane Collected (SCF) 9,113,904	Annualized Methane Collected (SCF) 10,785,312
(mmBtu) 9,113	(mmBtu) 10,785
Annual Total \$ 36,455.61	Annual Total \$ 43,141.24
Summary of Changes	
Current Methane Value \$ (U.S. Dollars per mmBtu) 4.00	Additional SCFM 4
Current Annual Value of 1 SCFM \$ (U.S. Dollars per 1,000 cubic feet) 1,072.22	Additional Methane (mmBtu) 1,671
See Total Cost of Pumping Gas	Value of Additional Methane \$ 6,685.63

Measure the value of your increased gas flow with our innovative Landfill Gas Calculators:

Calculate increased methane value using landfill dewatering pump systems at www.qedenv.com/landfillgas.

See the value of increased flow and methane content at www.qedenv.com/landfillgas2.

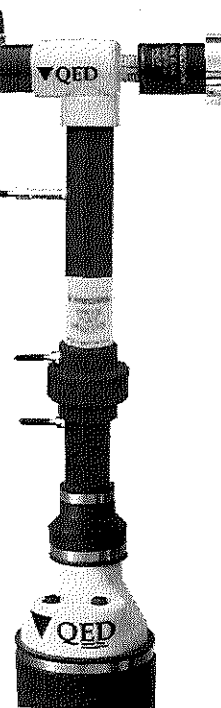
QED Union Orifice Plate Wellhead

QED's new Traditional Orifice Plate Wellhead is available for both 2" and 3" pipes. The wellhead is constructed of sturdy, economical Schedule 80 PVC and QED's Orifice Plates are constructed of 1/8" stainless steel.



Set of interchangeable orifice plates

Using the most appropriate orifice plate size with minimal pressure drop is essential to generate stable flow readings with the best resolution. Using the right size plate means you will always have confidence in your flow reading and you will be sure to meet your compliance regulations.

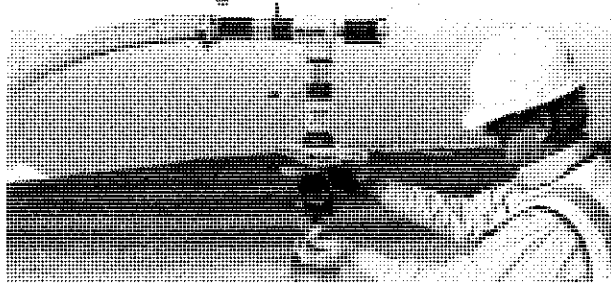


www.qedenv.com/traditional-wellhead

Specifications:	2" (50 mm)	3" (76 mm)
Model:	OPU200	OPU300
Optimal Flow Range:	0-125 SCFM (0-212 m³/h)	30-300 SCFM (50-500 m³/h)
Materials:	304 Stainless Steel, PVC, Viton®	

40572 2" Orifice Plate Kit – includes all 6 orifice plates for OPU200
40600 3" Orifice Plate Kit – includes 3 orifice plates for OPU300

Questions?



Do you have questions about landfill gas management?

Call us to speak with an experienced

technical sales expert at **1-800-810-9908**.

Email us at info@qedenv.com or visit us on the web at www.qedenv.com/landfillproducts

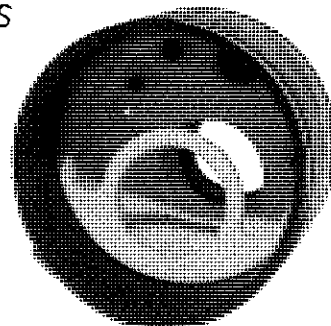
C, use 4" X 2" fernco instead

WELL CAPS

Section- 33 00 00

Highly visible Stabilizer™ Well Caps allow easy liquid level access and reduce wellhead leaks

QED's innovative Stabilizer™ LFG Well Caps (patent pending) feature a unique support ring molded directly into the Cap that aligns and stabilizes the LFG well-head. This takes pressure off the flexible coupling and the flex hose and, along with watertight threads, reduces leaks from the wellhead. The caps are molded in a bright yellow, which helps identify and protect the entire well from damage.



Unique support ring feature helps prevent wellhead leaks

This is the first engineered gas well cap that allows liquid level readings without removing the wellhead – faster, safer, less system disruption. Air introduction and gas release are minimized, eliminating the need to shut down the vacuum system for level measurements and rebalancing of the wellfield.



www.qedenv.com
/wellcaps

Well Caps without pump fittings are a good way to start

on gas recovery wells. A pump fitting kit can be added later for dual extraction wells.

Stabilizer™ LFG Well Cap Advantages:

- Bright yellow Caps are highly visible in the field
- Support ring reduces wellhead leaks, minimizing air introduction and gas release
- Easy access for liquid level reading – faster, safer, less system disruption
- Pump fitting kits allow conversion of gas recovery caps to dual extraction

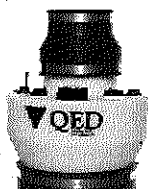
Designed to work with 6" and 8" diameter wells with 2" or 3" well-heads, all models provide ports to accommodate a downwell pump. There is also an economy model for 6" gas-only wells.

Well Caps without fittings



Model GWC62

Well Diameter: 6" (152 mm)
Gas Wellhead: 2" (50 mm) pipe
Ports: .5" (12 mm),
2 @ .75" (19 mm),
1.5" (38 mm), 1" (25 mm)



Model GWC63

Well Diameter: 6" (152 mm)
Gas Wellhead: 3" (76 mm) pipe
Ports: .5" (12 mm),
2 @ .75" (19 mm),
1.5" (38 mm), 1" (25 mm)



Model GWC82

Well Diameter: 8" (203 mm)
Gas Wellhead: 2" (50 mm) pipe
Ports: .5" (12 mm),
3 @ .75" (19 mm),
1.5" (38 mm)



Model GWC83

Well Diameter: 8" (203 mm)
Gas Wellhead: 3" (76 mm) pipe
Ports: .5" (12 mm),
3 @ .75" (19 mm),
1.5" (38 mm)

Well Caps with fittings



1" (25 mm) discharge

Model GWC6284

Well Diameter: 6" (152 mm)
Gas Wellhead: 2" (50 mm) pipe
Ports: 1" (25 mm), .75" (19 mm)



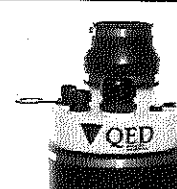
Model GWC6384

Well Diameter: 6" (152 mm)
Gas Wellhead: 3" (76 mm) pipe
Ports: 1" (25 mm), .75" (19 mm)



Model GWC8284

Well Diameter: 8" (203 mm)
Gas Wellhead: 2" (50 mm) pipe
Ports: 2 @ .75" (19 mm)



Model GWC8384

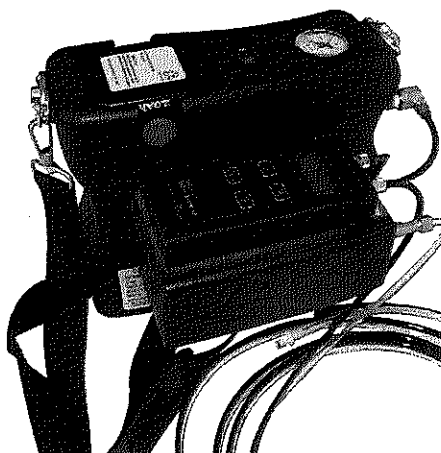
Well Diameter: 8" (203 mm)
Gas Wellhead: 3" (76 mm) pipe
Ports: 2 @ .75" (19 mm)

LIQUID LEVEL MEASUREMENT

Section- 33 00 00

Digital Level Meter

Safe and easy measurement of liquid height in landfill gas wells, even under vacuum or pressure conditions



www.qedenv.com/digitallevelmeter

The Digital Level Meter allows you to easily and accurately measure liquid levels in gas wells equipped with a down-well liquid sensing tube or an Easy Level Indicator (patent pending). There is no need to open the well to take a reading, so gas collection is not stopped and workers are not exposed to gas or leachate.

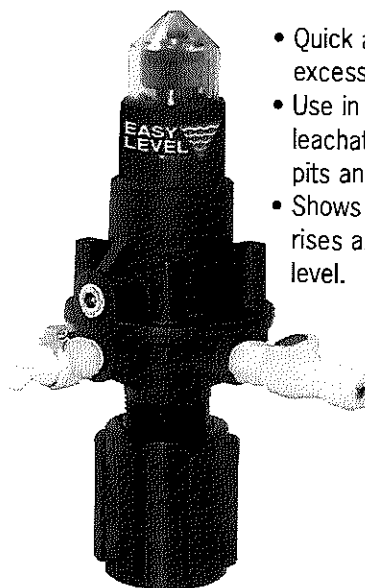
The Digital Level Meter is capable of measuring liquid depths up to 100 ft. above the liquid level probe, and automatically compensates for pressure or vacuum conditions above the liquid. The light-weight hip pack also houses a small compressor powered by a rechargeable, removable battery. A spare battery and AC battery charger are provided. The entire unit weighs only 9lbs. and includes an adjustable shoulder strap.

To measure the liquid level, the Digital Level Meter's quick connect fittings are attached to the ports of a dedicated liquid sensing tube or an Easy Level Indicator, and the meter's air source is then activated. The level meter displays the liquid depth over the probe, without false readings in foaming wells.

- Easy and accurate liquid level measurements.
- No gas shutoff.
- Not affected by foam.
- Includes downwell liquid sensing tube.
- No need to open a well to take a reading.
- Gas collection does not stop.

Easy Level™ High Level Indicator

Easy Level™ makes it easy to see if the liquid level has exceeded the maximum level desired



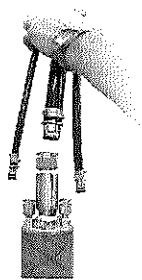
- Quick and easy indication of excess liquid levels.
- Use in landfill gas wells, leachate risers, tanks, sumps, pits and wells.
- Shows orange when liquid level rises above the predetermined level.

- Liquid sensing ports and level measurement system can read liquid level above the probe.



www.qedenv.com/easylevel

OTHER EASY PRODUCTS



Easy Connections with Easy Fittings™

- Pump is easy to snap onto and off of the tubing with Easy Fittings™ without cutting the tubing.
- Our sheathed tubing is available cut-to-length and individually labeled, with Easy Fittings factory-installed.
- Our sheathed nylon pump tubing sets offer maximum chemical resistance, reduced weight, and less tangling.

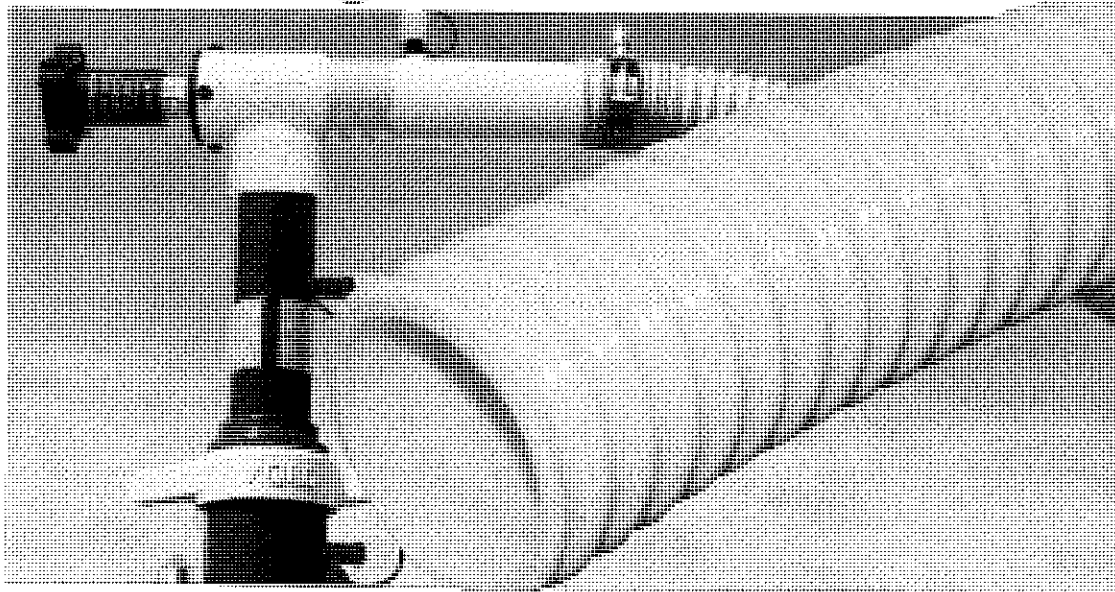
Easy Bolt™

Easy Bolts™ provide the function of traditional nut and bolt sets by using a lever action clamp to tighten the flange. Makes flanges easy to access with no wrenches or tools.



LANDFILL GAS HOSE Exclusively from QED

Solarguard™ Flex Hose



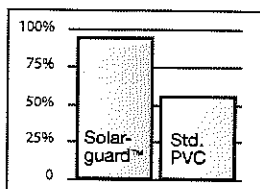
Reduce Your Flex Hose Cost! UV-resistant flex hose **lasts twice as long** as conventional PVC hose

Solarguard™ Flex Hose from QED is made with UV-resistant flexible PVC with a rigid PVC helix. This unique formula extends the useful life of Solarguard hose over typical clear PVC landfill gas flex hose. Tests have shown that Solarguard hose maintains tensile strength and lasts twice as long as standard PVC hose.

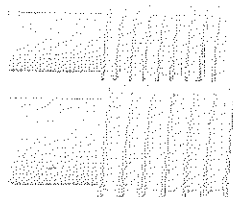
With Solarguard hose, you'll save on both the cost of replacement hose and the labor costs of fixing air leaks from cracked hose. QED's Banding Kits save you even more,

with a lower purchase price, longer service life, and easier installation and removal than helical hose clamps, which can be expensive, difficult to use, and tend to corrode easily. The banding coils are uniquely designed to fit Solarguard hose, and use high strength, all stainless steel clamps, which are user friendly, durable, and far less expensive.

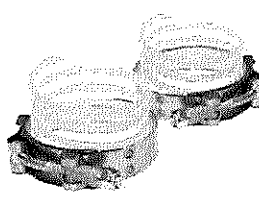
Solarguard hose is yet another innovative, useful product you have come to expect from QED, backed by our local sales and technical support team, and expert customer service.



Tensile strength retention
Solarguard hose's UV inhibitors reduce plasticizer loss, helping maintain flexibility and preventing the hose from becoming brittle, cracking, and leaking.



Available in two sizes
Solarguard hose fits over 2" and 3" PVC pipe, and comes in 5' and 100' lengths. It comes in QED's highly visible, distinctive yellow color.



High Strength, Stainless Steel Banding Kits
QED's banding kit makes securing the hose easy and eliminates the need for helical clamps.

Buy Online

These products can be purchased at the online store:
store.qedenv.com

or Call
(800) 810-9908



Innovative Environmental Products

(800) 624-2026 • www.qedenv.com

P.O. Box 3726 Ann Arbor, MI 48106-3726 USA • (734) 995-2547 • Fax (734) 995-1170 • info@qedenv.com

Solarguard™ Flex Hose

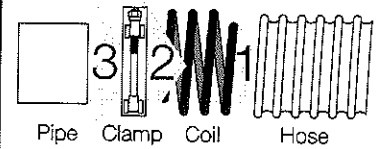
Flexible Hose

Model Number	Length ft. (m)	ID in. (mm)	OD in. (mm)	Working Pressure psi (bar)	Vac. Rating @68° F	Min. Bend Radius in. (mm)	Weight lbs./ft. (kg/m)	Service Temp. Min. ° F (° C)	Service Temp. Max. ° F (° C)
40946	100 (31)	2.38 (61)	2.91 (74)	40 (2.8)	Full	3.5 (89)	0.73 (.3)	-4 (-20)	150 (66)
40947	5 (1.5)	2.38 (61)	2.91 (74)	40 (2.8)	Full	3.5 (89)	0.73 (.3)	-4 (-20)	150 (66)
40948	100 (31)	3.5 (89)	4.14 (105)	35 (2.4)	Full	7 (178)	1.31 (.6)	-4 (-20)	150 (66)
40949	5 (1.5)	3.5 (89)	4.14 (105)	35 (2.4)	Full	7 (178)	1.31 (.6)	-4 (-20)	150 (66)

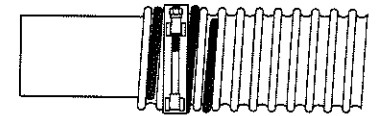
Banding Kits

Model Number	Hose Size in. (mm)	Includes:
40979	2.38 (61)	Contains 2 Stainless Steel Band Clamps and 2 Banding Coils
40980	3.5 (89)	Contains 2 Stainless Steel Band Clamps and 2 Banding Coils

How to Use Banding Kit



1. Thread coil onto hose
2. Center clamp over coil
3. Insert pipe
4. Tighten clamp



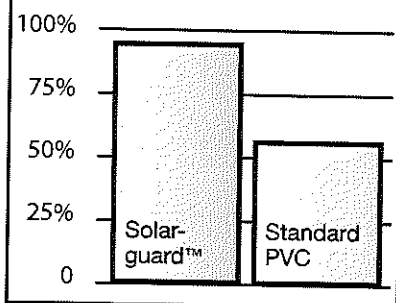
Completed Assembly



Solarguard™ Flex Hose Advantages

- Lasts longer
- Blocks damaging UV rays
- Maintains flexibility
- High visibility yellow
- Better clamps

Tensile Strength Retention



During accelerated UV testing, Solarguard hose can retain 97% original tensile strength compared to only 55% for similar PVC hoses.



Innovative Environmental Products



SUBMITTAL REVIEW 05R1

To	<u>Southcentral Construction Inc.</u>	Date	<u>September 4, 2025</u>	Page 1 of 2
	<u>205 E. Dimond Blvd., PMB 555</u>	Client	<u>Matanuska-Susitna Borough, Alaska</u>	
	<u>Anchorage, AK 99515</u>	Project Name	<u>Central Landfill Cell 4 Expansion Construction</u>	
		Project No.	<u>BMCD 167550</u>	
Attention	<u>Dane Dahlgren</u>	Via	<u>Email</u>	

Regarding the following technical submittals:

Dwg. No./Spec	Description	Action Taken	Comments
33 00 00 1.04B(1)&(2)	Manufacturer's Product Data / Scaled Shop Drawings	C	Contractor to review Construction Plans and Specifications and provide manufacturer's product data and scaled shop drawings for all gas related HDPE pipes, fittings, and wellhead included the design documents.
33 00 00 1.04B(1)&(2)	6" SDR 45-Deg Sweep Bend	A	
33 00 00 1.04B(1)&(2)	8" X 4" Butt Reducer DR 11	B	Other dimensions of reducers are needed for the completion of the gas portion of this Project and are not included in this submittal. Per 33 00 00, Part 2.04(A) all fittings shall match the size and SDR rating of the receiving pipe.
33 00 00 1.04B(1)&(2)	8" X 4" Molded Butt Fusion Reducing Tee DR 11	B	Other dimensions of tees are needed for the completion of the gas portion of this Project and are not included in this submittal. Per 33 00 00, Part 2.04(A) all fittings shall match the size and SDR rating of the receiving pipe.
33 00 00 1.04B(1)&(2)	Pipe star 4" Schedule 40 T&C Galv Pipe	A	
33 00 00 1.04B(1)&(2)	SS316 SS Male Adapter X Female NPT CL	A	
33 00 00 1.04B(1)&(2)	SS Dust Cap 4", 6" CL	A	
33 00 00 1.04B(1)&(2)	DI 3X2 Tapped Blind Flange	A	

EXPLANATION OF ENGINEER'S ACTION
(See Contract Documents for additional explanation.)

- A - SUBMITTAL ACCEPTED.
- B - SUBMITTAL ACCEPTABLE AS NOTED.
- C - SUBMITTAL RETURNED FOR REVISION.
- D - SUBMITTAL NOT ACCEPTABLE.
- E - PRELIMINARY SUBMITTAL.
- F - FOR REFERENCE; NO ACCEPTANCE REQUIRED.
- G - DISTRIBUTION COPY.

ADDITIONAL SUBMITTALS REQUIRED

Action	Copies	Reproducible



010515 Form GCO-12

To Southcentral Construction Inc. Date September 4, 2025 Page 2 of 2
205 E. Dimond Blvd., PMB 555 Client Matanuska-Susitna Borough, Alaska
Anchorage, AK 99515 Project Name Central Landfill Cell 4 Expansion Construction
Project No. BMcD 167550
Attention Dane Dahlgren Via Email

33 00 00 1.04B(1)&(2)	Precision Well Head	A	
33 00 00 1.04B(1)&(2)	Polar Guard Insulated Well Head Cover	A	
33 00 00 1.04B(1)&(2)	Stabilizer Well Head Cap & Control Valve	A	QED does not make a 4" X 2" wellcap, so a 4" X 2" fernco will be used instead.
33 00 00 1.04B(1)&(2)	Solarguard Flex Hose	A	
33 00 00 1.04C(1)	Affidavit of Compliance		To be submitted.
33 00 00 1.04C(2)	Field Testing Documentation		To be submitted.
33 00 00 1.04C(3)	Certification of Personnel's Factory Training		To be submitted.
33 00 00 1.04D	Utility Survey		To be submitted.
33 00 00 1.04E	Project Record Documents		To be submitted.

By Fred Doran, PE

EXPLANATION OF ENGINEER'S ACTION
(See Contract Documents for additional explanation.)

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ADDITIONAL SUBMITTALS REQUIRED

Action	Copies	Reproducible



Southcentral Construction Inc.
205 E. Dimond Blvd., PMB 555
Anchorage, AK 99515

Submittal Transmittal

PROJECT Central Landfill Cell 4 Expantion
CONTRACTOR Southcentral Construction Inc.
ORIGINATOR Dane Dahlgren
DATE SUBMITTED 9/3/25 DRAWING NO. _____

SUBMITTAL NO. 4A
CONTRACT NO. 25-179B
SPEC. SECTION 33 00 00
SHEET OF

TO: Matanuska-Susitna Bor
350 East Dahlia Ave.
Palmer, Ak. 99645

SUBMITTED AS SPECIFIED

ATTN:

		REVIEW ACTION						
ITEM:		COPIES SENT	NO EXCEPTION TAKEN	MAKE CORRECTION AS NOTED	AMEND AND RESUBMIT	REJECTED RESUBMIT	COPIES RETURNED	NOTES ATTACHED
SUPPLIER/CONTRACTOR:			A	B	C	D		
☐ Original Submittal ☐ 3rd								
☒ 2nd ☐ 4th								
IDENT. NO.	DETAILED DESCRIPTION (Provide Itemized List of Contents of This Submittal)							
1	4" DR17 ,6",8" DR11 IPS Flange Adapters	1						●
2	4",6", 45 degree Sweep Elbows DR 11	1	●					
3	6",8" HDPE Blind Flanges	1	●					
4	6",8" Viton Gaskets	1	●					
5	4X2 Fernco adapter for gas well head	1	●					
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Complete either (a) or (b), following:

☐

(a) We have verified that the material or equipment contained in this submittal meets all the requirements specified or shown (no exceptions).

☐

(b) We have verified that the material or equipment contained in this submittal meets all the requirements specified or shown, except the following deviations (list deviations, attach a separate sheet if necessary).

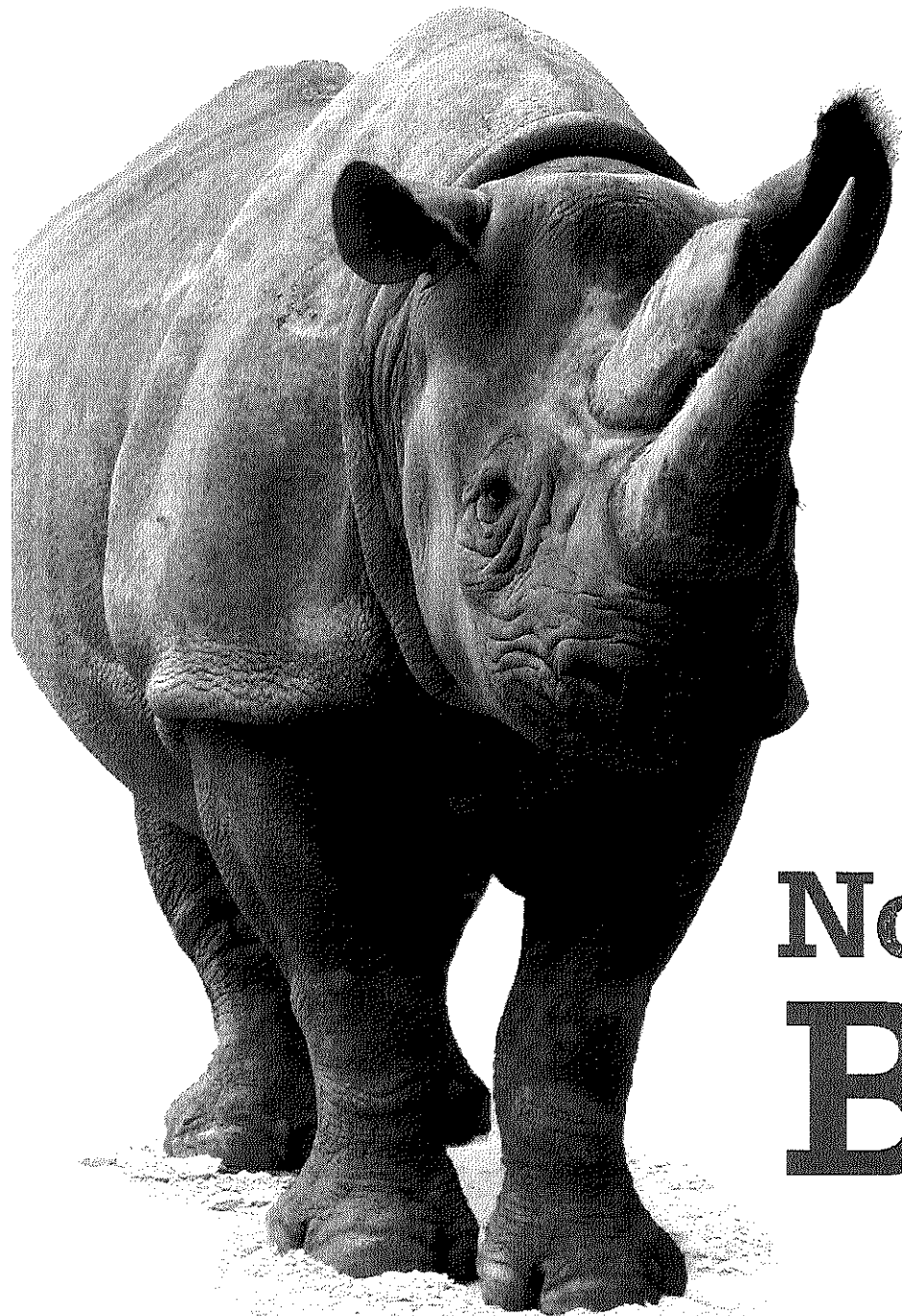
Corrections or comments made relative to submittals during this review do not relieve the Contractor from compliance with the requirements of the drawings and specifications. This submittal is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The Contractor is responsible for confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of other trades, and performing his work in a safe and satisfactory manner.

CONTRACTOR: **Dane Dahlgren**
(Signature)

ENGINEER: _____
(Signature)

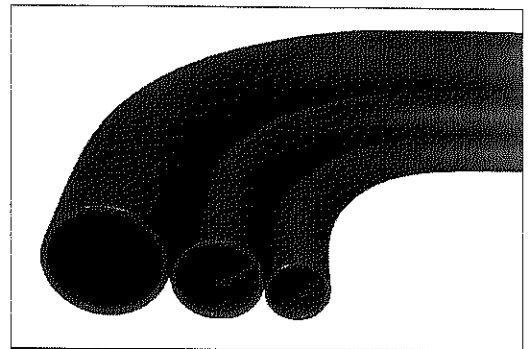
ROUTING	REC'D BY NAME/COMPANY	DATE REC'D	DATE FWD	COMMENTS
Project Manager				
Designer				
Project Manager	Dane Dahlgren			
Contractor	Southcentral Construction Inc.	9/3/2025	9/3/2025	

The STATE OF THE ARC* ... just got BIGGER!!!!



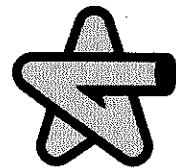
For over a decade, Pipestar International Inc. has been providing you with game-changing 2"-14" SEAMLESS HDPE bends.

Now, that STATE OF THE ARC* SEAMLESS BEND technology is available in 16", 18" and 20" SUPER ARC* sizes.



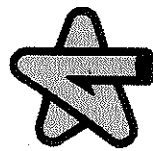
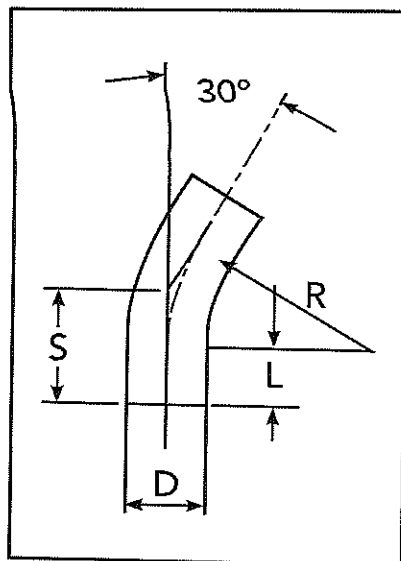
Now that's BIG!!!

To make your HDPE pipe jobs easier, more efficient and longer lasting, insist on HDPE SEAMLESS ARC* BENDS. For specifications or to connect with a Pipestar International distributor in the US or Canada, visit www.arcbends.com

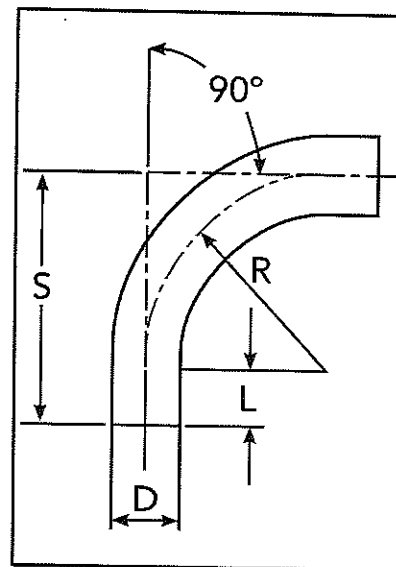
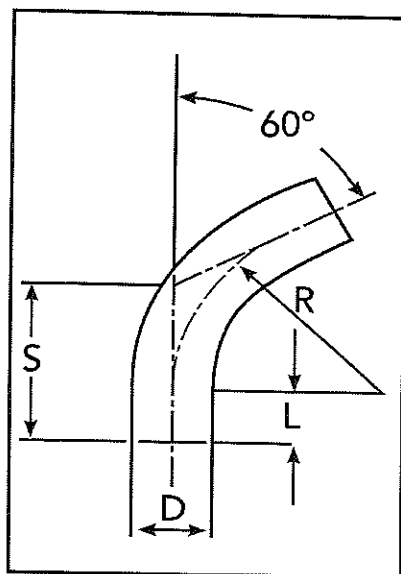
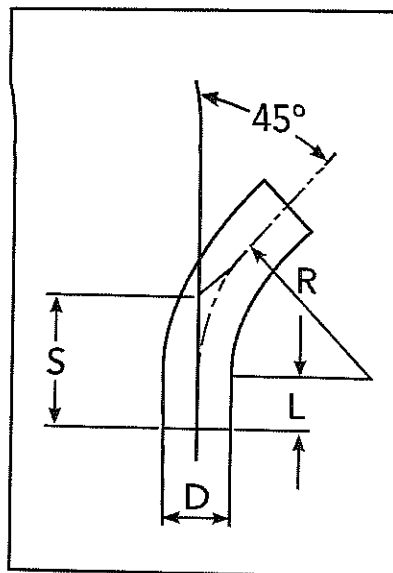


PIPESTAR
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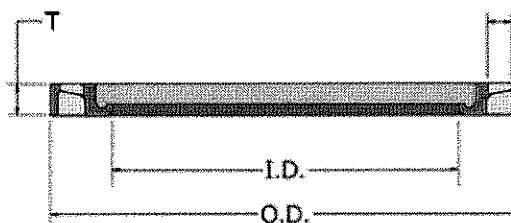
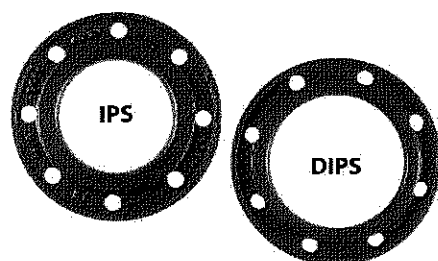
PIPESTAR
INTERNATIONAL INC.



DIMENSIONS

SIZE	D	L	R	S-30°	S-45°	S-60°	S-90°
2" IPS	2.375"	6"	7.13"	7.5"	9"	10.5"	13.3"
3" IPS	3.5"	6"	10.5"	8.8"	10.3"	12.1"	16.5"
4" IPS	4.5"	6"	13.5"	9.6"	11.6"	13.8"	19.5"
6" IPS	6.625"	7"	19.9"	12.3"	15.2"	18.5"	26.9"
8" IPS	8.625"	10"	24.5"	16.6"	20.1"	24.2"	34.5"
10" IPS	10.75"	11"	32.25"	19.6"	24.3"	29.6"	43.2"
12" IPS	12.75"	13"	38.3"	23.3"	28.7"	35.1"	51.3"
14" IPS	14"	13"	38.9"	23.4"	29.1"	35.5"	51.9"
16" IPS	16"	16"	48"	28.9"	35.9"	43.7"	64"
18" IPS	18"	18"	54"	32.5"	40.4"	49.2"	72"
20" IPS	20"	20"	60"	36.1"	44.9"	54.6"	80"

58 Paramount Road, Winnipeg, Manitoba, Canada R2X 2W3
Tel: 204-949-3910 Fax: 204-949-3919 Website: www.arcbends.com



Integrity Fusion Products offers a line of **Convuluted Ductile Iron Backup Rings** manufactured from **ASTM A536 grade 65-45-12** material and are available in a variety of nominal **IPS** and **DIPS** HDPE pipe diameters and SDR ratings. Our **Convuluted Ductile Iron Backup Rings** are designed and manufactured to comply to the drilling and mating requirements in **ANSI/ASME B16.5** and **AWWA C207** for use in applications *24" and smaller*, and with **ANSI/ASME B16.47** and **AWWA C207** for use in applications *26" and larger*. Our **Fusion Bonded Epoxy Coating** offers superior long-term corrosion resistance characteristics over the industry standard Red Oxide primer, or painted epoxy coatings which tend to chip and rust shortly after installation, and as a visual convenience to our customers, our Epoxy Coated Backup Rings are **color coded** as follows: Red indicates an IPS size, and Blue indicates a DIPS size. All Integrity Fusion Ductile Iron Backup Rings, 12" and smaller, have been FM tested and approved. SDR 11 Backup Rings meet all FM 200 requirements, and SDR 7 – 9 Backup rings all meet FM 335 requirements. **Also Available in Red Oxide Primer.**

IPS

SDR 11 (Epoxy Coated Ductile Iron Backup Ring)

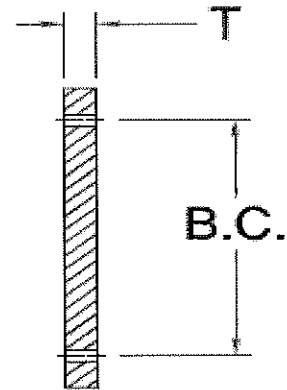
200 PSI Class 150# Bolt Pattern

Nominal Size	OD (in.)	ID (in.)	Thickness (in.)	# Bolt Holes	Hole Dia. (ins)	Weight [lbs.]	Item Code	FM Class
2" IPS	6.00	2.60	0.50	4	0.75	1.80	100200	FM 200
3" IPS	7.50	3.75	0.53	4	0.75	2.80	100202	FM 200
4" IPS	9.00	4.75	0.55	8	0.75	3.80	100204	FM 200
6" IPS	11.00	6.88	0.63	8	0.88	5.60	100206	FM 200
8" IPS	13.50	8.88	0.85	8	0.88	9.80	100208	FM 200
10" IPS	16.00	11.00	0.98	12	1.00	13.30	100210	FM 200
12" IPS	19.00	13.15	1.25	12	1.00	22.30	100212	FM 200
14" IPS	21.00	14.40	1.38	12	1.13	31.00	100214	----
16" IPS	23.50	16.40	1.65	16	1.13	42.00	100216	----
18" IPS	25.00	18.34	1.67	16	1.25	45.00	100218	----
20" IPS	27.50	20.50	1.81	20	1.25	58.00	100220	----
24" IPS	32.00	24.50	2.17	20	1.38	86.00	100222	----
28" IPS	36.50	28.60	2.50	28	1.38	113.0	100224	----
30" IPS	38.75	30.60	2.60	28	1.38	141.0	100226	----
32" IPS	41.75	32.60	2.75	28	1.63	161.0	100227	----
36" IPS	46.00	36.60	3.15	32	1.63	217.0	100228	----

WOLSELEY

INDUSTRIAL GROUP

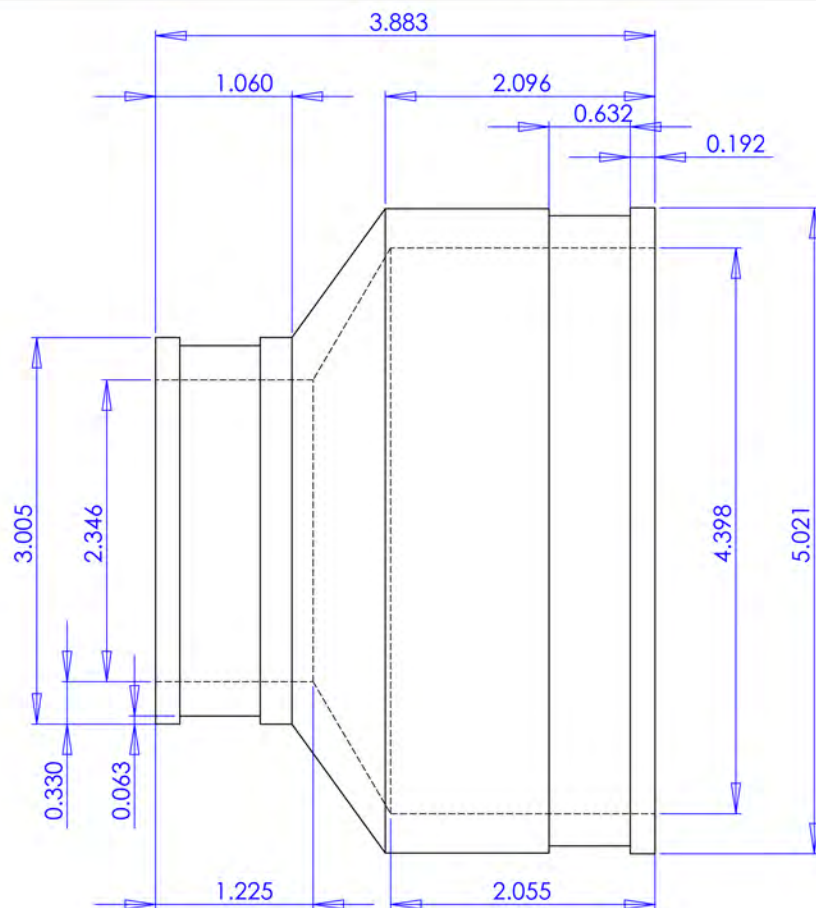
IPS HDPE BLIND FLANGE



Nominal size	Pressure Class(psi)	Dimensions B.C. xT (in)	Weight per Item(lbs)	Bolt Diameter	Part #	Part #
2" 2.375"	Non Pressure	4-3/4 x 1	2	0.625	4	PEIHBBFKF
3" 3.500"	Non Pressure	6 x 1	2	0.625	4	PEIHBBFMF
4" 4.500"	Non Pressure	7-1/2 x 1	3	0.625	8	PEIHBBFPF
6" 6.625"	Non Pressure	9-1/2 x 1	4	0.75	8	PEIHBBFUF
8" 8.625"	Non Pressure	11-3/4 x 1	6	0.75	8	PEIHBBFXF
10" 10.750"	Non Pressure	14-1/4 x 1	9	0.875	12	PEIHBBF10F
12" 12.750"	Non Pressure	17 x 1	13	0.875	12	PEIHBBF12F
14" 14.00"	Non Pressure	18-3/4 x 1	15	1	12	PEIHBBF14F
16" 16.00"	Non Pressure	21-1/4 x 1	19	1	16	PEIHBBF16F
18" 18.00"	Non Pressure	22-3/4 x 1	22	1.125	16	PEIHBBF18F
20" 20.000"	Non Pressure	25 x 1	20	1.125	20	PEIHBBF20F
22" 22.000"	Non Pressure	27-1/4 x 1	30	1.25	20	
24" 24.000"	Non Pressure	29-1/2 x 1	36	1.25	20	PEIHBBF24F
26" 26.000"	Non Pressure	31-3/4 x 1	61	1.25	24	PEIHBBF26F
28" 28.000"	Non Pressure	34 x 1-1/2	69	1.25	28	PEIHBBF28F
30" 30.000"	Non Pressure	36 x 1-1/2	78	1.25	28	PEIHBBF30F



Davison, MI • PH: 810-653-9626 • FAX: 810-653-8714 • www.Fernco.com



*This Part requires two clamps, part numbers 042-300 & 080-300.
See additional drawing for information on these clamps.

NOTES:
-SOME HIDDEN LINES NOT SHOWN
-BREAK ALL SHARP CORNERS
-REPORT ALL CHANGES TO ENGINEERING

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FERNCO, INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FERNCO, INC. IS PROHIBITED.

Part Weight	.965 lbs.
Min/Max Temp.	-30/140 Degrees F
Pressure Tested	4.3 PSI
Material	Flexible PVC
Installation Torque	60" Lbs.
Conforms to ASTM	D5926
Box Quantity	10
Clamps used	300 Series

TOLERANCES:
.X= Fractional ±
.XX= ±.02
.XXX= ±.030
ANG.= ±0.5°
UNLESS OTHERWISE SPECIFIED

DESCRIPTION:	
Coupling 4" Plastic x 2" Plastic	
1056-42	
UNITS:	SIZE
INCHES	A
3RD ANGLE PROJECTION	DO NOT SCALE DRAWING
DESIGNER:	CHECKER:
D. Brady	
DATE:	SHEET 1 OF 1
2/6/2007	

SCALE
not to scale



Thermodyn™
Where Your Success Is Sealed

75 Duro Commercial Grade Viton™ Fluoroelastomer

Product Code: Style 6300-TD70C

Description: 66% Fluorine commercial grade Viton™ fluoroelastomer

Specifications: TD-70C Commercial Grade Viton fluoroelastomer
Temperature range -20°F - 400°F continuous

<u>Typical Rubber Properties</u>	<u>Test Method</u>	<u>Typical Value</u>
Hardness (Shore A)	ASTM D2240	75±5
Tensile Strength	ASTM D412	1200 psi min
Elongation	ASTM D412	250% min
Compression Set	ASTM D395B	50% max
Fluid resistance	ASTM D471	30% max
Specific Gravity	ASTM D792	1.92 nominal
Color	Visual	Black

- Thickness & Width as specified.
- This is a commercial grade of Viton™ fluoroelastomer based gasket, recommended for use in fuel, hydrocarbon based fluids, and aggressive media.
- This material is based upon 100% fluoroelastomer with a 66% minimum fluorine. No Substitutions will be accepted
- Compression Set, Plied, Method B 50% compression (168 hr @ 175°C)

Thermodyn products are manufactured to general RMA standards and meet the above data sheet guidelines. It is the responsibility of the end user to qualify the material to its intended application. Defects or damage resulting from misuse or mishandling are not covered by Thermodyn's limited liability policy. Values covered in this data sheet are nominal values that we believe to be accurate and reliable for purposes of qualification in end use applications.

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3550 Silica Road, Sylvania Ohio 43560 U.S.A.
PH: 419-841-7782 Toll-Free: 1-800-654-6518 (North America Only) Fax: 419-841-3139
WWW.THERMODYN.COM



APPENDIX H – GRANULAR DRAINAGE MATERIAL DOCUMENTATION



Material Test Report

Report No: MAT:P25-1038-01

Issue No: 1

Client: Southcentral Construction Inc.

Project No: 3544

Project: MSB Central Landfill Cell 4 Expansion

Location: Palmer, AK

Accreditation is granted by AAP and is limited to the standards for which the laboratory is accredited. Report approved by John Rego, P.E. Results relate only to items tested. All testing performed in accordance with approved project plans and specifications. Report shall not be reproduced, except in full, without prior written approval of EMC Engineering, LLC.

Submitted By: Candace Sakalaskas, Lab Supervisor

Date: 10/1/2025

Sample Details

Sample ID P25-1038-01
Field Sample ID P-366-25
Date Sampled 9/30/2025
Source MSB Central Landfill
Material Granular Drainage Material
Specification Granular Drainage Material
Sampling Method AASHTO Method

Other Test Results

Description	Method	Result	Limits
Dispersion device	ASTM D 422	Dispersant by hand	
Dispersion time (min)			
Shape			
Hardness			

Comments

N/A

Material Test Report

Report No: MAT:P25-1086-01
Issue No: 1

Client: Southcentral Construction Inc.

Project No: 3544

Project: MSB Central Landfill Cell 4 Expansion

Location: Palmer, AK

Accreditation is granted by AAP and is limited to the standards for which the laboratory is accredited. Report approved by John Rego, P.E. Results relate only to items tested. All testing performed in accordance with approved project plans and specifications. Report shall not be reproduced, except in full, without prior written approval of EMC Engineering, LLC.

Submitted By: Candace Sakalaskas, Lab Supervisor
Date: 10/21/2025

Sample Details

Sample ID P25-1086-01
Field Sample ID P-376-25
Date Sampled 10/17/2025
Source MSB Central Landfill
Material Granular Drainage Material
Specification Granular Drainage Material

Particle Size Distribution

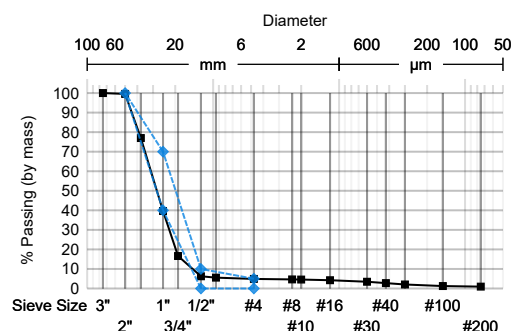
Method: AASHTO T 27
Drying By: Oven
Date Tested: 10/21/2025
Tested By: Candace Sakalaskas

Sieve Size	% Passing	Limits
3in	100	
2in	100	100
1½in	77	
1in	40	40 – 70
¾in	17	
½in	6	0 – 10
3/8in	6	
No.4	5	0 – 5
No.8	5	
No.10	5	
No.16	4	
No.30	3	
No.40	3	
No.50	2	
No.100	1	
No.200	1.0	

Other Test Results

Description	Method	Result	Limits
Cu	AASHTO T 27	2.14	
Cc		1.09	
Procedure	AASHTO T 11	A	

Chart



Comments

N/A

APPENDIX I – LEAK LOCATION SURVEY DOCUMENTATION



OVER 30 YEARS

LEAK LOCATION SERVICES, INC.

November 4, 2025

Mr. Dane Dahlgren
Southcentral Construction Inc.
6927 Old Seward Hwy Ste 202
Anchorage, AK 99518

Email: DDahlgren@sccak.com

Subject: Report for the Geomembrane Leak Location Survey of the Cell 4 Expansion
Located at the Central Landfill near Palmer, Alaska
LLSI Project 4092

Dear Mr. Dahlgren,

On October 28th and 29th, 2025, Matthew Kemnitz of Leak Location Services, Inc. (LLSI) conducted a geomembrane leak location survey of the subject site. The site has an area of approximately 127,300 square feet and is lined from the bottom up with a prepared subgrade, 6-inches of sand, geosynthetic clay liner (GCL), 60 mil HDPE textured geomembrane liner, geotextile cushion fabric and 18 inches of granular drainage material. The site has 3H:1V side slopes. This report documents the results of the survey.

or 60 mil LLDPE textured
geomembrane liner

I. RESULTS

No leaks were found during the survey of the geomembrane lined ~~pond~~ landfill cell. The leak location survey equipment was tested for proper operation and functionality using an artificial leak. This procedure was conducted at the beginning and end of the day by LLSI personnel to verify equipment functionality. A 0.25-inch diameter artificial leak was placed above the geomembrane and leak location survey lines were run along both sides of the test leak. Leak location survey measurements were collected to determine the maximum distance the leak could be detected. The artificial leak could be detected from 6.7-feet away allowing for a survey grid spacing of 10 feet, per ASTM D7007. Figure 1 shows the artificial leak data for the leak location survey.

II. PRINCIPLE OF THE ELECTRICAL SURVEY METHOD

A. General

The electrical leak location method detects electrical paths through the liner caused by water or moisture in the leaks. A voltage is impressed across the geomembrane being tested. Electrical current flowing through any leaks in the geomembrane produces localized anomalous areas of high current density near the leaks. These areas are located by making electrical potential measurement scans in or on the electrically conductive material covering the geomembrane.

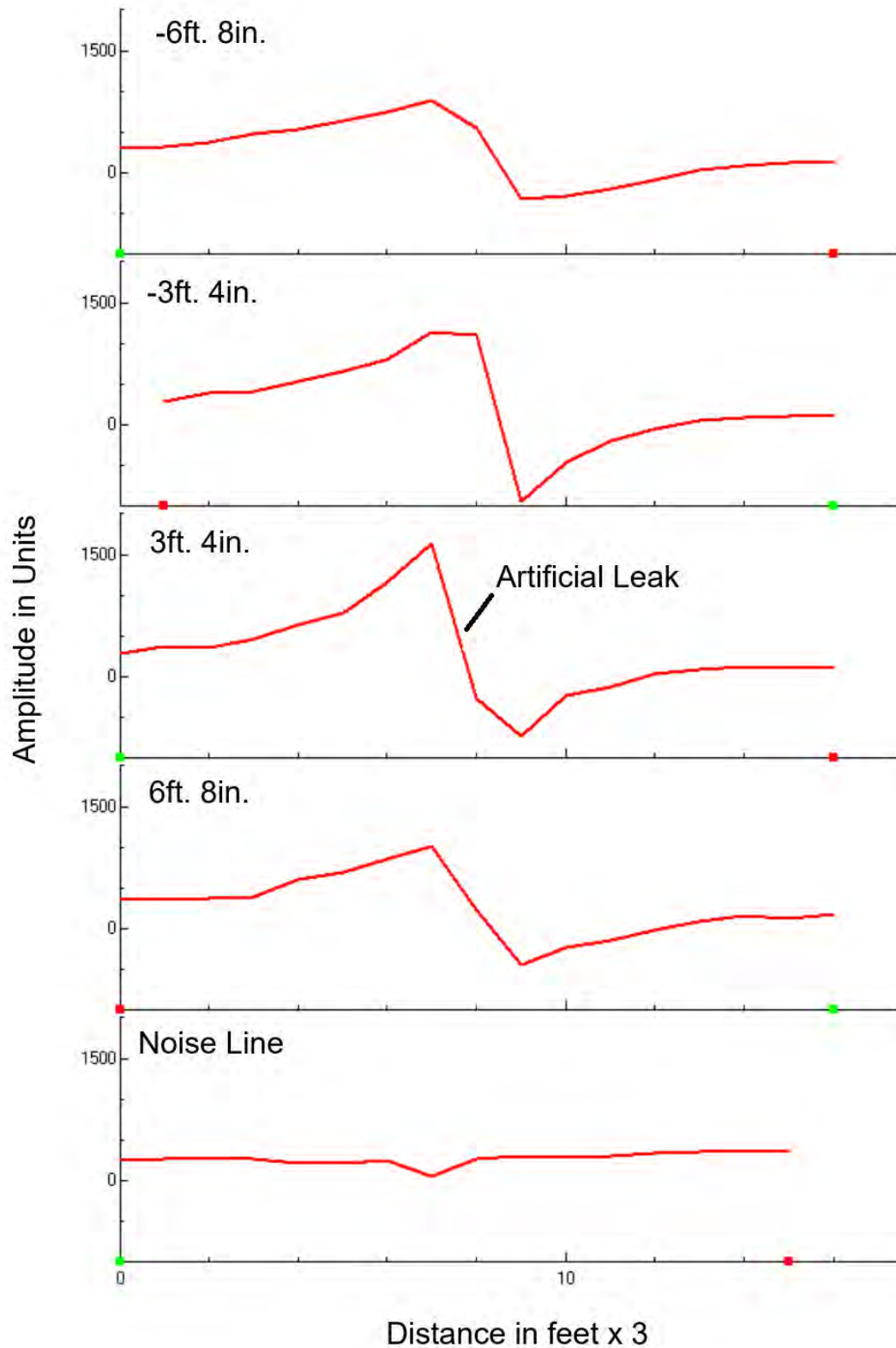


FIGURE 1. PLOT OF THE ARTIFICIAL LEAK DATA FOR THE LEAK LOCATION SURVEY

B. Soil Survey

Surveys with soil covering the geomembrane are conducted by making point-by-point potential measurements on the wetted cover material with special electrodes. The data is recorded with a portable digital data acquisition system to reduce the tendency for human error. Readings are taken using dipole measurements with a fixed electrode spacing. The data is downloaded to a computer for storage, plotting and analysis, allowing LLSI to detect smaller leak signals than methods conducted without data collection. If a suspect area is indicated in the data, manual measurements are made to further pinpoint the signal position for excavation while the survey personnel are on site.

If there are any questions regarding the electrical survey or this report, please contact us at (210) 408-1241. We appreciate the opportunity to have been of service to you.

Respectfully,



Matthew Kemnitz
President



Leak Location Services, Inc.



**Engineer of Record Statement of Compliance for
Cell 4 Expansion Construction**

ENGINEER OF RECORD STATEMENT OF COMPLIANCE

The construction of the Cell 4 Expansion at the Central Landfill has been completed in substantial conformance with the drawings and technical specifications for the project, designated by the Matanuska - Susitna Borough (Borough) as Project No. 25-179B.

As of the date of this statement, the Cell 4 Expansion is ready to be placed into operation

The construction of this project includes the Base Bid as defined by Construction Contract Documents issued for construction on June 2, 2025, the contract between the Borough and Southcentral Construction, Inc. (SCC) was executed on August 8, 2025, the Notice to Proceed was awarded to SCC on August 18, 2025, and project completion established for August 30, 2026. There have been no change orders to date. The completed project includes the Cell 4 Expansion composite liner system, leachate collection systems, and landfill gas collection systems. Cell 4 Expansion earthwork, liner system, and leachate collection systems have been tested and demonstrated by the construction contractor and have been accepted by the Borough.

The period of performance for Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell) and the Borough's construction quality assurance activities began on August 8, 2025, with submittal review, through October 29, 2025, when the leak location survey work was completed. Ongoing work remains for the contractor to install and connect landfill gas collection piping.

This statement is based upon the regular observation of construction operations by Borough and Burns & McDonnell representatives, and observation and review of the Contractor's quality control testing methods and associated test results.

Sincerely,

Burns & McDonnell Engineering Company, Inc.

