Photo 1 Installing Non-Woven Geotextile

Photo 2 Typical Destructive Sample of Geomembrane Seam for Lab Testing

Photo 3 *HDPE Liner Welding Cell 1 West to Cell 1 East Tie in*

Photo 4 *Field Tensiometer*

Photo 5 Primary Geomembrane Installation

Photo 6 Seaming GCL and Primary Geomembrane Installation

Photo 7 Typical Geomembrane Repair

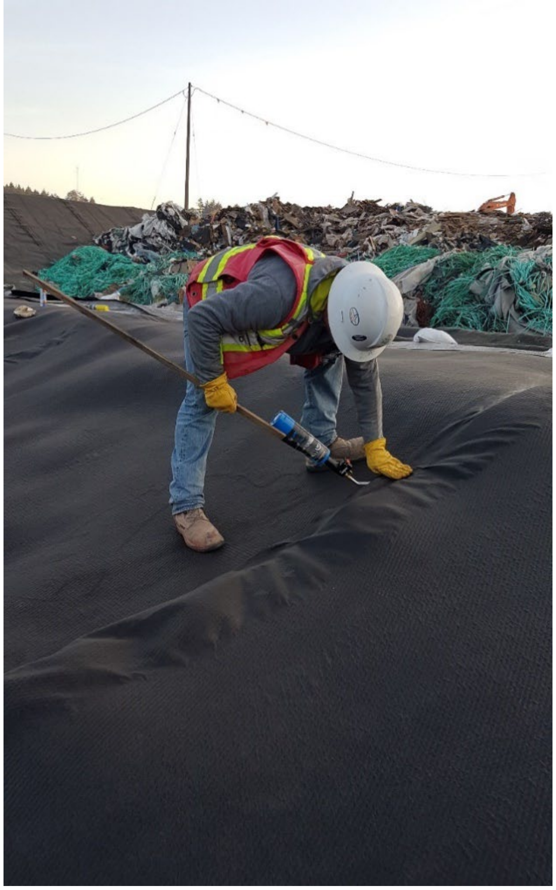


Photo 8 Seaming Geomembrane

Photo 9 Typical Drainage Geocomposite Cable Ties

Photo 10 Installing GCL on top of Geocomposite

Phot 11 Test Weld

Photo 12 Leachate Sump with Primary Geomembrane

Photo 13 ***Deploying Non-Woven Geotextile***

Photo 14 ***Geomembrane Welding in Liner Anchor Trench***

Photo 15 Seaming the Geomembrane

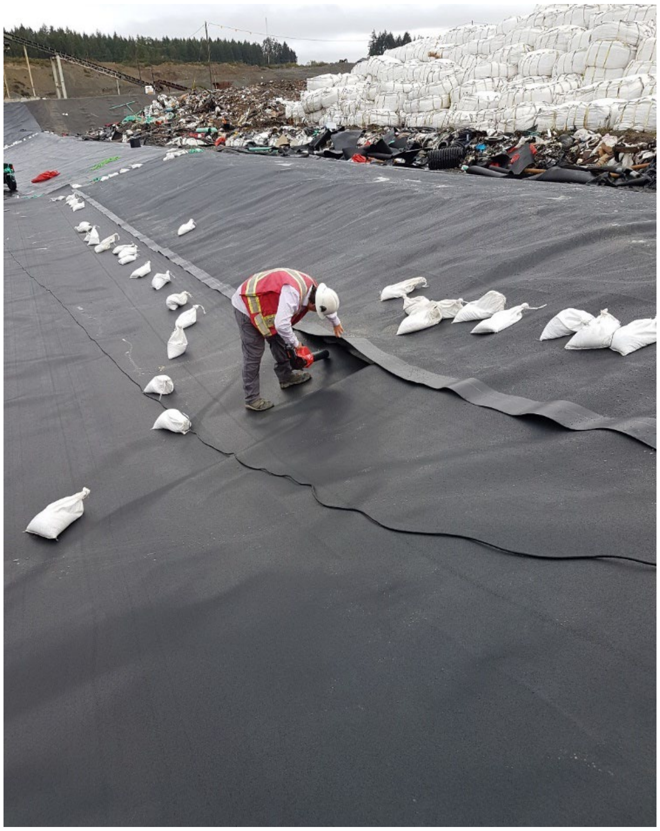


Photo 16 Seaming the Geomembrane

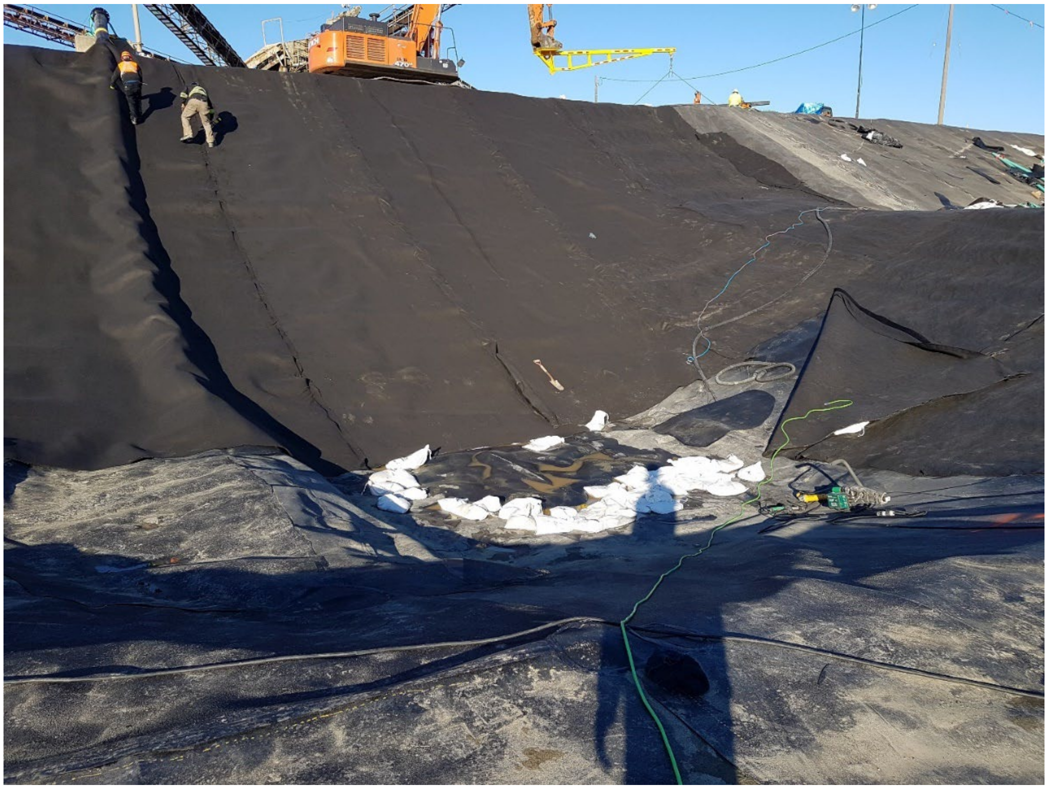


Photo 17 ***Seaming Geocomposite on the North Berm***

Photo 18 ***HDPE Pipe Fusion Machine***

Photo 19 50 mm Leak Detection Riser Pipe

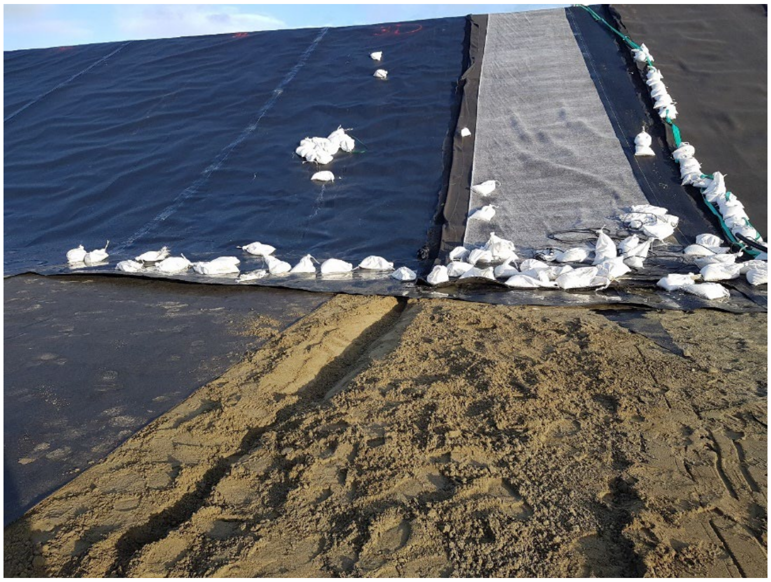


Photo 20 Deploying the secondary GCL on the North Berm

Photo 21 *Placing Leachate Collection Pipes*

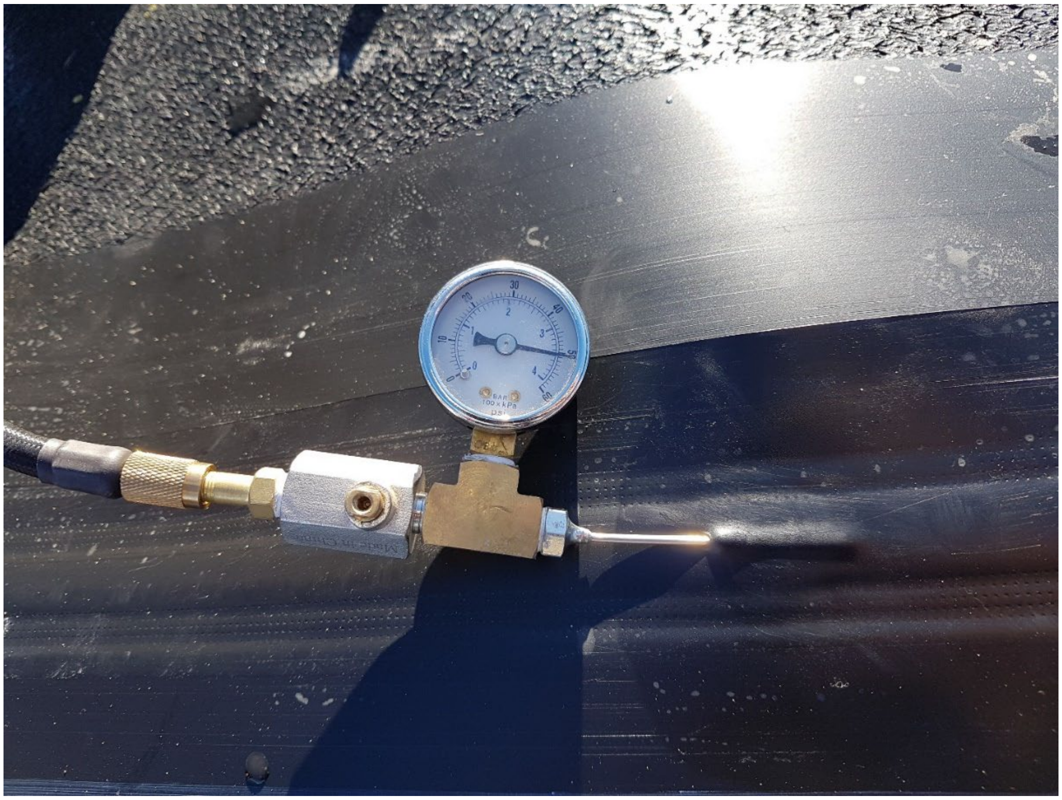


Photo 22 *Geomembrane Seam Pressure Test*

Photo 23 ***Deploying Primary GCL on top of*** Geotextile

Photo 24 ***Geomembrane Seaming***

Photo 25 Completed repair to damaged liner area (November 18, 2022)

Photo 24 Cell 1 West viewed from northwest corner (September 22, 2023)

Photo 25 Leachate and leak detection risers / concrete poured for pump station (September 22, 2023)

Photo 26 Leachate and leak detection risers / concrete poured for pump station (September 22, 2023)

Photo 27 Pipe directing leachate to Cell 1 East (September 22, 2023)

Photo 28 Cell 1 West from northeast corner (September 22, 2023)

Photo 29 West perimeter road. Berm to prevent surface water run-on visible on right side of photo (September 22, 2023)

Photo 30 South end of Cell 2 (September 22, 2023)

Appendix C

Material Test Results

METRO
TESTING + ENGINEERING

CCIL CCAR OQM
401-6741 Cariboo Rd., Burnaby, BC V3N 4A3
t: 604.436.9111 **tf:** 1.844.732.2638
e: info@metrotesting.ca

To: GHD Limited - 735 (Ontario)
455 Phillip Street
Waterloo, ON
N2L 3X2

Date: 28-Nov-22
Project No.: MB41159

Attn: Roxy Hasior, P.Eng.

Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C117

This test method covers the determination of the amount of material finer than a 75-um sieve in aggregates by washing.

Product	Date Sampled	Sample Source	Proceedure Used	Percentage of Material Finer than a 75-um (0.1%)
75mm Minus	2022-11-18		A	**0.5%**
			Contract Requirements:	n/a
			MoT Specified Limit:	n/a

Comment:

Percentage of material finer than 75-um sieve is 0.5

Conducted by:

Peregrina Israel
Senior Laboratory Technician
CCIL Certified

Reviewed by:

Andy Bernardino, AScT
Quality Supervisor/Technical Lead
for Asphalt and Aggregate
CCIL Certified

Metro Testing + Engineering

401 - 6741 Cariboo Rd, Burnaby, BC V3N 4A3
Tel: (604) 436-9111 Fax: (604) 436-9050

CCIL
CERTIFIED TESTING LABORATORY

SIEVE ANALYSIS REPORT
Series 8 16 30 50

PROJECT NO. MB41159
CLIENT GHD Limited - 735 (Ontario)
CC David Barbour
Airesse MacPhee
David Barbour

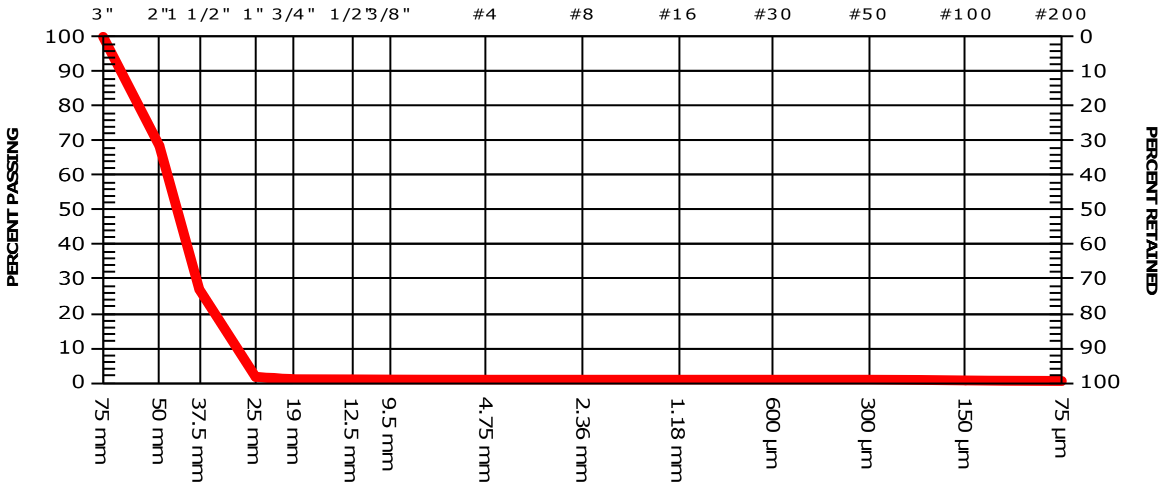
TO
GHD Limited - 735 (Ontario)
455 Phillip Street
Waterloo, ON
N2L 3X2

ATTN : Roxy Hasior, P.Eng

PROJECT Upland Landfill
Materials Testing
7295 Gold River Highway
Campbell River
CONTRACTOR GHD Ltd.

SIEVE TEST NO. 1
DATE RECIEVED 2022.Nov.22
DATE TESTED 2022.Nov.28
DATE SAMPLED 2022.Nov.18

SUPPPLIER N/A
SOURCE N/A
SPECIFICATION
MATERIAL TYPE 75MM MINUS
SAMPLED BY CLIENT
TESTED BY PI
TEST METHOD WASHED



GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
3"	75 mm	100.0	
2"	50 mm	68.5	
1 1/2"	37.5 mm	27.0	
1"	25 mm	1.7	
3/4"	19 mm	1.0	
1/2"	12.5 mm		
3/8"	9.5 mm		

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
No. 4	4.75 mm	0.9	
No. 8	2.36 mm	0.9	
No. 16	1.18 mm	0.9	
No. 30	600 µm	0.9	
No. 50	300 µm	0.9	
No. 100	150 µm	0.7	
No. 200	75 µm	0.5	

COMMENTS

Page 1 2022.Nov.28

PER.

Metro Testing + Engineering

401 - 6741 Cariboo Rd, Burnaby, BC V3N 4A3
Tel: (604) 436-9111 Fax: (604) 436-9050

CERTIFIED TESTING LABORATORY

SIEVE ANALYSIS REPORT
Series 8 16 30 50

PROJECT NO. MB41159
CLIENT GHD Limited - 735 (Ontario)
CC David Barbour
Airesse MacPhee
David Barbour

TO
GHD Limited - 735 (Ontario)
455 Phillip Street
Waterloo, ON
N2L 3X2

ATTN : David Barbour

PROJECT Upland Landfill
Materials Testing
7295 Gold River Highway
Campbell River
CONTRACTOR GHD Ltd.

SIEVE TEST NO. 1
DATE RECIEVED 2022.Nov.22
DATE TESTED 2022.Nov.28
DATE SAMPLED 2022.Nov.18

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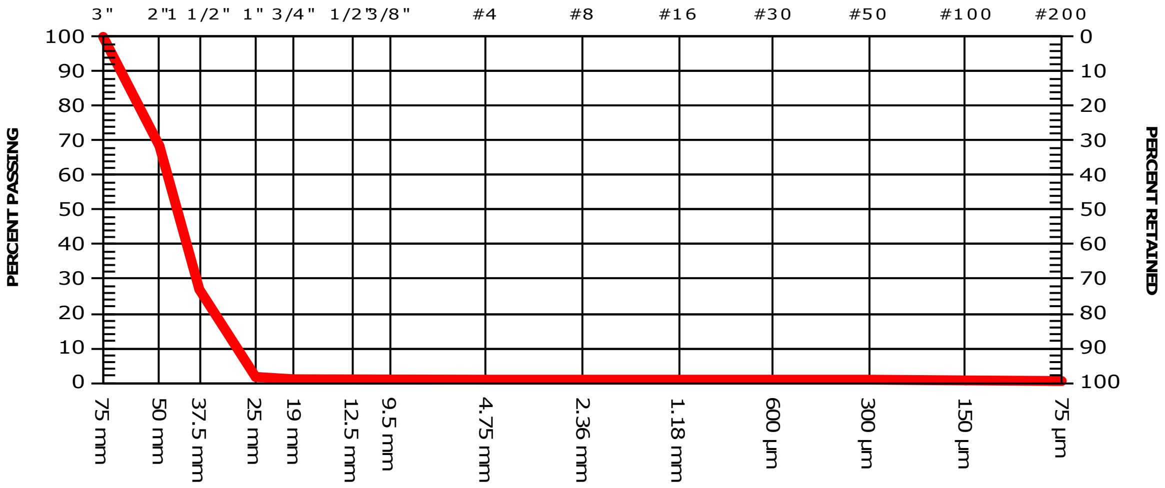
SOURCE N/A
SPECIFICATION
MATERIAL TYPE 75MM MINUS

SAMPLED BY CLIENT
TESTED BY PI
TEST METHOD WASHED



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COMMENTS

2022.Nov.28

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METRO
TESTING + ENGINEERING

Metro Testing + Engineering

401 - 6741 Cariboo Rd, Burnaby, BC V3N 4A3
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CCIL
CERTIFIED TESTING LABORATORY

SIEVE ANALYSIS REPORT
Series 8 16 30 50

PROJECT NO. MB41159
CLIENT GHD Limited - 735 (Ontario)
CC David Barbour
Airesse MacPhee
David Barbour

TO
GHD Limited - 735 (Ontario)
455 Phillip Street
Waterloo, ON
N2L 3X2

ATTN : Airesse MacPhee

PROJECT Upland Landfill
Materials Testing
7295 Gold River Highway
Campbell River
CONTRACTOR GHD Ltd.

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DATE RECIEVED 2022.Nov.22
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DATE SAMPLED 2022.Nov.18

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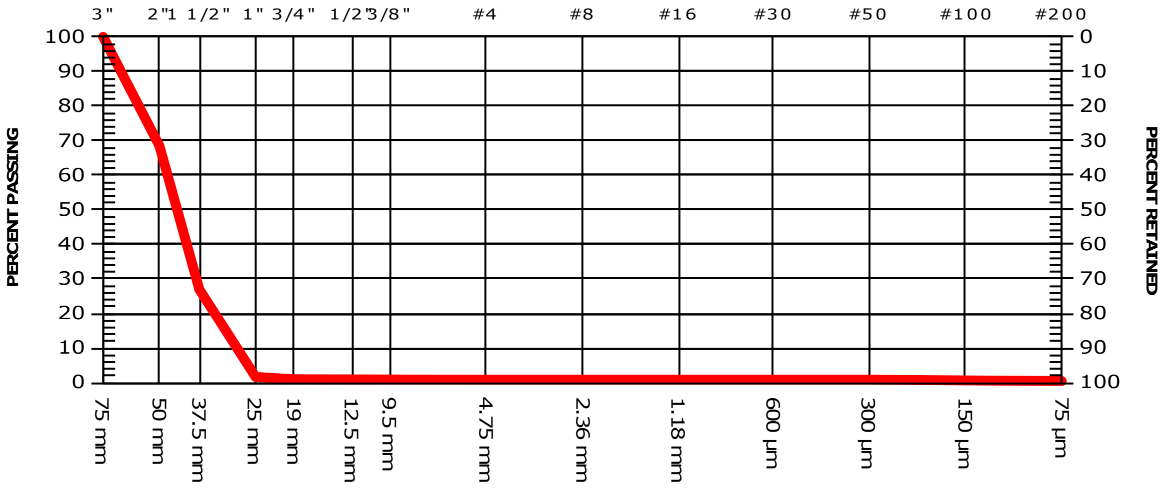
SAMPLED BY CLIENT
TESTED BY PI
TEST METHOD WASHED



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COMMENTS

2022.Nov.28

PER.

METRO
TESTING + ENGINEERING

Metro Testing + Engineering

401 - 6741 Cariboo Rd, Burnaby, BC V3N 4A3
Tel: (604) 436-9111 Fax: (604) 436-9050

CCIL
CERTIFIED TESTING LABORATORY

SIEVE ANALYSIS REPORT
Series 8 16 30 50

PROJECT NO. MB41159
CLIENT GHD Limited - 735 (Ontario)
CC David Barbour
Airesse MacPhee
David Barbour

TO
Upland Landfill
455 Phillip Street
Waterloo, ON
N2L 3X2

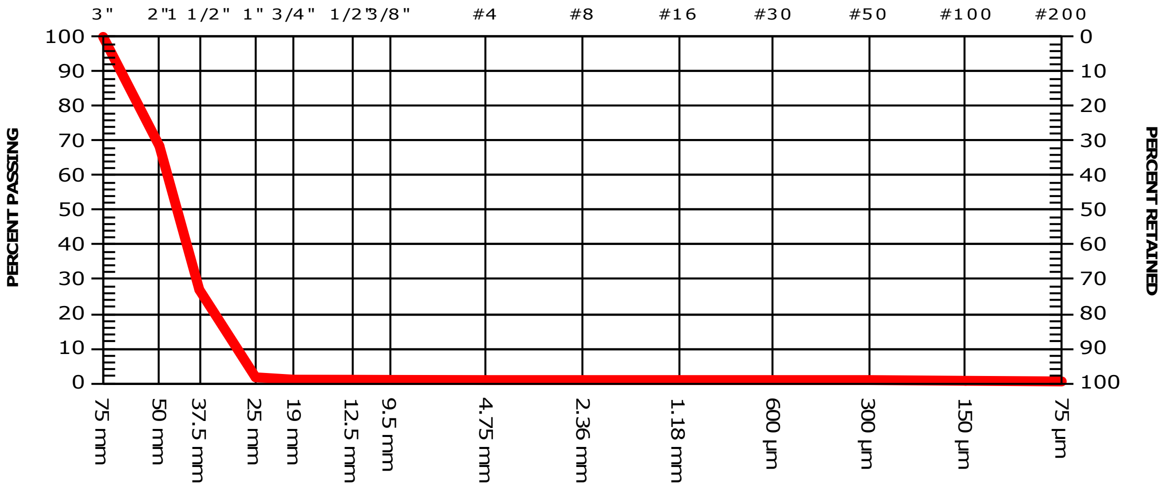
ATTN : David Barbour

PROJECT Upland Landfill
Materials Testing
7295 Gold River Highway
Campbell River
CONTRACTOR GHD Ltd.

SIEVE TEST NO. 1 DATE RECIEVED 2022.Nov.22 DATE TESTED 2022.Nov.28 DATE SAMPLED 2022.Nov.18

SUPPPLIER N/A
SOURCE N/A
SPECIFICATION
MATERIAL TYPE 75MM MINUS

SAMPLED BY CLIENT
TESTED BY PI
TEST METHOD WASHED



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No. 200	75 µm	0.5	

COMMENTS

2022.Nov.28

PER.

Appendix D

Product Data

Submittal Transmittal

Project Description:	Northwin Landfill Phase 1 West	**Contract No.:**	Click or tap here to enter text.
		Project No.:	11222680
Submitted by:	Upland Contracting Ltd.	**Submittal #:**	**001**

Submitted to Consultant by the General Contractor on Date: [Publish Date]

Verification by General Contractor:

The document attached with this shop drawing transmittal was/were reviewed against following specifications and it complies with following specifications with listed exceptions:

Spec No.	Meets following specifications	with Following exceptions
ASTM D4716	Transmissivity	
ASTM D7005	Ply Adhesion	
ASTM D5199	Thickness	
ASTM D1505	Density	
ASTM D7179		Tensile Strength
ASTM D4218	Carbon Black	
ASTM D5261	Mass per Unit Area	
ASTM D4632	Grab Tensile Strength, Grab Elongation	
ASTM D6241	Puncture Strength	
ASTM D4533	Trapezoidal Tear Strength	
ASTM D4751	Apparent Opening Size	
ASTM D4491	Permittivity	
ASTM D4491		Water Flow Rate

Submittal Information: ***(Describe the submittal)***

Notes: SKAPS TN 330-2-8 (GeoNet)	Contractor's Signature or Stamp

Email Submittals to: Susan.McPhee@ghd.com; Sandi.Mullins@ghd.com; Kira.Turner@ghd.com and cc:

For Consultant Use Only

Notes/Comments:

Tensile Strength spec: 13.3N/mm, Submittal: 13.12kN/m
Minimal difference in tensile strength

Water Flow Rate spec: 3865 lpm/m2, Submittal: 4075 lpm/m2
Proposed material exceeds the minimum required spec

REVIEWED BY: Toby Wong

Shop Drawing Review

Submission No. **001**

Contractor’s Reference

ENGINEER's review is for the sole purpose of ascertaining conformance with general design concepts expressed in the contract Documents, and in no way constitutes approval of the detail design inherent in CONTRACTOR's Shop Drawings, responsibility for which remains solely with CONTRACTOR submitting same. Review does not authorize changes to Contract Documents.

- ☐ Reviewed
- ☒ Reviewed as Noted
- ☐ Revise and Resubmit
- ☐ Not Subject to Review
- ☐ Other

By: **GHD Limited**

Signed: **Roxy Hasior**

Date: **June 10, 2022**

SKAPS TRANSNET™ HDPE GEOCOMPOSITE TN 330-2-8

SKAPS TRANSNET™ geocomposite consists of SKAPS GeoNet made from HDPE resin with nonwoven polypropylene geotextile fabric heat bonded on both sides of geonet.

Property	Test Method	Unit	Value	Qualifier
Geonet				
Thickness	ASTM D 5199	mil (mm)	300 (7.62)	MAV(3)
Carbon Black	ASTM D 4218	%	2.0	MAV
Tensile Strength	ASTM D 7179	lb/in (kN/m)	75 (13.12)	MAV
Melt Flow	ASTM D 1238(2)	g/10 min	1.0	Maximum
Density	ASTM D 1505	g/cm^3	0.94	MAV
Transmissivity(1)	ASTM D 4716	gal/min/ft (m^2/sec)	38.67 (8.0 x 10^{-3})	MAV
Composite				
Ply Adhesion	ASTM D 7005	lb/in (g/cm)	1.0 (178)	MAV
Transmissivity(1)	ASTM D 4716	gal/min/ft (m^2/sec)	4.35 (9.0 x 10^{-4})	MAV
Geotextile				
Fabric Weight	ASTM D 5261	oz/yd^2 (gm/m^2)	8 (271)	MARV(4)
Grab Tensile	ASTM D 4632	lb (N)	225 (1001)	MARV
Grab Elongation	ASTM D 4632	%	50	MARV
Trapezoid Tear	ASTM D 4533	lb (N)	90 (400)	MARV
CBR Puncture	ASTM D 6241	lb (N)	600 (2670)	MARV
Water Flow(5)	ASTM D 4491	gpm/ft^2 (l/min/m^2)	100 (4075)	MARV
Permittivity(5)	ASTM D 4491	sec^{-1}	1.26	MARV
Permeability(5)	ASTM D 4491	cm/sec	0.30	MARV
AOS	ASTM D 4751	US Sieve (mm)	80 (0.180)	MaxARV

Notes:

(1) Transmissivity measured using water at 21 ± 2 °C (70 ± 4 °F) with a gradient of 0.1 and a confining pressure of 10,000 psf (479 kPa) between steel plates after 15 minutes. Values may vary with individual labs.
(2) Condition 190/2.16
(3) Minimum average value.
(4) MARV is statistically defined as mean minus two standard deviations and it is the value which is exceeded by 97.5% of all the test data.
(5) At the time of manufacturing. Handling may change these properties.

This information is provided for reference purposes only and is not intended as a warranty or guarantee. SKAPS assumes no liability in connection with the use of this information. Geotextile and Geonet properties are prior to lamination.

Submittal Transmittal

Project Description:	Northwin Landfill Phase 1 West	**Contract No.:**	Click or tap here to enter text.
		Project No.:	11222680
Submitted by:	Upland Contracting Ltd.	**Submittal #:**	**002**

Submitted to Consultant by the General Contractor on Date: [Publish Date]

Verification by General Contractor:

The document attached with this shop drawing transmittal was/were reviewed against following specifications and it complies with following specifications with listed exceptions:

Spec No.	Meets following specifications	with Following exceptions
ASTM D5261	Mass per Unit Area	
ASTM D4632	Grab Tensile Strength, Grab Elongation	
ASTM D4833		Puncture Strength
ASTM D4533	Trapezoidal Tear Strength	
ASTM D4355	UV Resistance	

Submittal Information: ***(Describe the submittal)***

Notes: SKAPS GE280 (Non-woven Geotextile)	Contractor's Signature or Stamp

Email Submittals to: Susan.McPhee@ghd.com; Sandi.Mullins@ghd.com; Kira.Turner@ghd.com and cc:

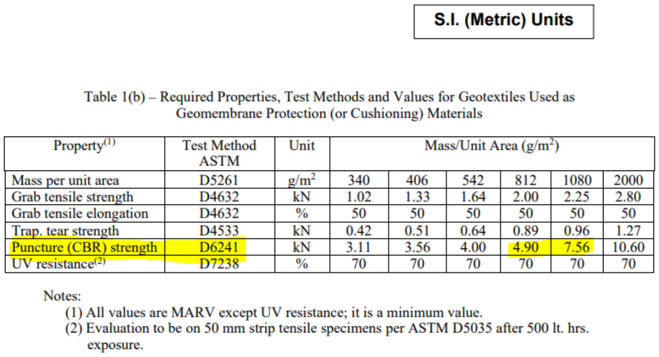
For Consultant Use Only

Notes/Comments:

Puncture strength spec: ASTM D4833, Submittal: ASTM D6241

ASTM has recently replaced the standard pin puncture strength test, D4833, with the CBR puncture strength test, D6241.

Based on GRI -GT12(a)∗ - ASTM Version Standard Specification Standard Specification for “Test Methods and Properties for Nonwoven Geotextiles Used as Protection (or Cushioning) Materials”, the CBR exceeds the required strength for 949 g/m2 material at 8.914 kN



S.I. (Metric) Units

Table 1(b) – Required Properties, Test Methods and Values for Geotextiles Used as Geomembrane Protection (or Cushioning) Materials

Property[(1)]	Test Method ASTM	Unit	Mass/Unit Area (g/m^2)					
Mass per unit area	D5261	g/m^2	340	406	542	812	1080	2000
Grab tensile strength	D4632	kN	1.02	1.33	1.64	2.00	2.25	2.80
Grab tensile elongation	D4632	%	50	50	50	50	50	50
Trap. tear strength	D4533	kN	0.42	0.51	0.64	0.89	0.96	1.27
Puncture (CBR) strength	D6241	kN	3.11	3.56	4.00	4.90	7.56	10.60
UV resistance[(2)]	D7238	%	70	70	70	70	70	70

Notes:
(1) All values are MARV except UV resistance; it is a minimum value.
(2) Evaluation to be on 50 mm strip tensile specimens per ASTM D5035 after 500 lt. hrs. exposure.

REVIEWED BY: Toby Wong

Shop Drawing Review

Submission No. **002**

Contractor’s Reference

ENGINEER's review is for the sole purpose of ascertaining conformance with general design concepts expressed in the contract Documents, and in no way constitutes approval of the detail design inherent in CONTRACTOR's Shop Drawings, responsibility for which remains solely with CONTRACTOR submitting same. Review does not authorize changes to Contract Documents.

- ☐ Reviewed
- ☒ Reviewed as Noted
- ☐ Revise and Resubmit
- ☐ Not Subject to Review
- ☐ Other

By: **GHD Limited**

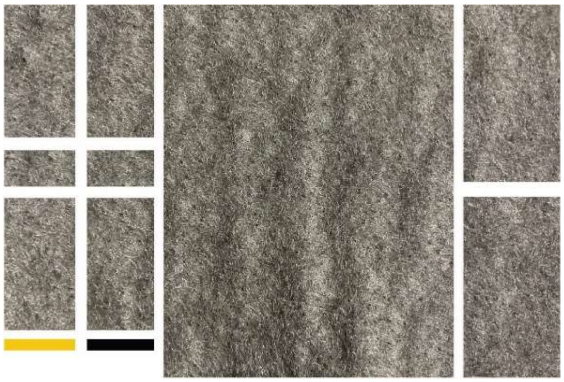
Signed: **Roxy Hasior**

Date: **June 10, 2022**

HEAVY WEIGHT NON-WOVEN GEOTEXTILE

GE - 280

SKAPS GE-280 is a needle-punched nonwoven geotextile made of 100% polypropylene staple fibers, which are formed into a random network for dimensional stability. SKAPS GE-280 resists ultraviolet deterioration, rotting, biological degradation, naturally encountered basics and acids.



Polypropylene is stable within a pH range of 2 to 13. SKAPS GE-280 conforms to the physical property values listed below:

Property	Method	English (MARV[2])	Metric (MARV[2])
Weight	ASTM D 5261	28 oz/yd^2	949 g/m^2
Grab Tensile Strength	ASTM D 4632	550 lbs	2.45 kN
Grab Elongation	ASTM D 4632	50%	50%
Trapezoid Tear Strength	ASTM D 4533	250 lbs	1.11 kN
CBR Puncture Resistance	ASTM D 6241	2004 lbs	8.914 kN
UV Resistance	ASTM D 4355	70%/500 hrs.	70%/500 hrs.

At time of manufacturing. Handling may change these properties.

Submittal Transmittal

Project Description:	Northwin Landfill Phase 1 West	**Contract No.:**	Click or tap here to enter text.
		Project No.:	11222680
Submitted by:	Upland Contracting Ltd.	**Submittal #:**	**003**

Submitted to Consultant by the General Contractor on Date: [Publish Date]

Verification by General Contractor:

The document attached with this shop drawing transmittal was/were reviewed against following specifications and it complies with following specifications with listed exceptions:

Spec No.	Meets following specifications	with Following exceptions
ASTM D4632	Grab Tensile Strength, Grab Elongation	
ASTM D4833		Puncture Strength
ASTM D4533	Trapezoidal Tear Strength	
ASTM D4751	Apparent Opening Size	
ASTM D4491	Permittivity	
ASTM D4491	Water Flow Rate	
ASTM 4355	UV Resistance	

Submittal Information: ***(Describe the submittal)***

Notes: SKAPS SW-315 (Woven Geotextile)	Contractor's Signature or Stamp

Email Submittals to:

For Consultant Use Only

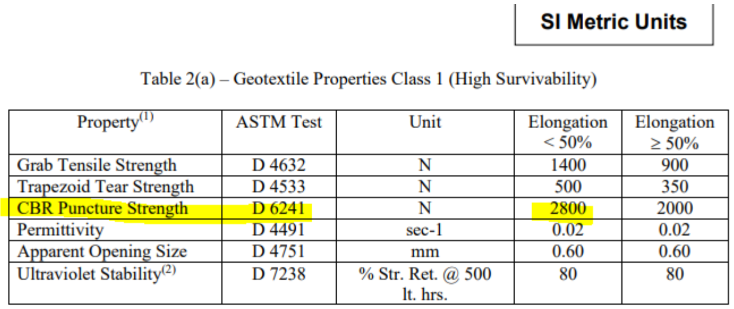
Notes/Comments:

Puncture Strength spec: ASTM D4833, Submittal: ASTM D6241

GRI GT13(a) – ASTM Version Standard Specification⁎ Standard Specification for “Test Methods and Properties for Geotextiles Used as Separation Between Subgrade Soil and Aggregate”

ASTM D6241 is acceptable as an alternative to ASTM D4833.

Product meets GRI standard specification for CBR puncture strength for a high survivability geotextile.



SI Metric Units

Table 2(a) – Geotextile Properties Class 1 (High Survivability)

Property(1)	ASTM Test	Unit	Elongation < 50%	Elongation ≥ 50%
Grab Tensile Strength	D 4632	N	1400	900
Trapezoid Tear Strength	D 4533	N	500	350
CBR Puncture Strength	D 6241	N	2800	2000
Permittivity	D 4491	sec-1	0.02	0.02
Apparent Opening Size	D 4751	mm	0.60	0.60
Ultraviolet Stability(2)	D 7238	% Str. Ret. @ 500 lt. hrs.	80	80

REVIEWED BY: Roxy Hasior

Shop Drawing Review

Submission No. **003**

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☐ Reviewed
☐ Reviewed as Noted
☐ Revise and Resubmit
☐ Not Subject to Review
☐ Other

By: **GHD Limited**

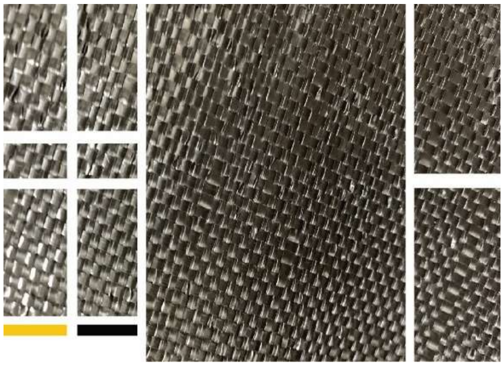
Signed: **Roxy Hasior**

Date: **June 10, 2022**

WOVEN GEOTEXTILE

SW - 315

SKAPS woven geotextile fabrics are woven polypropylene materials offering optimum performance when used in stabilization applications. Produced from first quality raw materials, they provide the perfect balance of strength and separation in styles capable of functioning exceptionally well in a wide range of performance requirements.



Unless indicated below, all listed properties are Minimum Average Roll Values

Property	Method	English (MARV[2])	Metric (MARV[2])
Grab Tensile	ASTM D 4632	315 lbs.	1.4 kN
Grab Elongation	ASTM D 4632	15%	15%
Trapezoid Tear	ASTM D 4533	120 lbs.	0.533 kN
CBR Puncture Resistance	ASTM D 6241	1000 lbs	4.45 kN
Water Flow[3]	ASTM D 4491	4 gpm/sf	163 l/min/m^2
Permittivity[3]	ASTM D 4491	0.05 sec^{-1}	0.05 sec^{-1}
AOS[3]	ASTM D 4751	40 U.S. Sieve	0.425 mm
UV Resistance	ASTM D 4355	70%/500 hrs.	70%/500 hrs.

Packaging

Roll Dimensions (W x L)	12.5 x 360 ft. 17.5 x 258 ft.	3.81 m x 110 m 5.33 m x 79 m
Area Per Roll	500 sq. yards	420 sq. meters

Note

1. The property values listed above are subject to change without notice.
2. Minimum Average Roll Values (MARV) is calculated as the average minus two standard deviations. Statistically, it yields approximately 97.5% degree of confidence that any samples taken from quality assurance testing will meet or exceed the values described above.
3. At time of manufacturing. Handling may change these properties.

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

Submittal Transmittal

Project Description:	Northwin Landfill Phase 1 West	**Contract No.:**	Click or tap here to enter text.
		Project No.:	11222680
Submitted by:	Upland Contracting Ltd.	**Submittal #:**	**004**

Submitted to Consultant by the General Contractor on Date: [Publish Date]

Verification by General Contractor:

The document attached with this shop drawing transmittal was/were reviewed against following specifications and it complies with following specifications with listed exceptions:

Spec No.	Meets following specifications	with Following exceptions
ASTM D5261	Cap Nonwoven, Mass/Unit Area	
ASTM D4643		Moisture Content
ASTM D5890	Free Swell	
ASTM D5891	Fluid Loss	
ASTM D5993	Bentonite Mass (Dry)	
ASTM D6768	Grab Tensile Strength	
ASTM D6496 ASTM D4632		Peel Strength
ASTM D6243	Internal Shear Strength	

Submittal Information: ***(Describe the submittal)***

Notes: Bentomat DN TR-401 (Geosynthetic Clay Liner)	Contractor's Signature or Stamp

Email Submittals to: Susan.McPhee@ghd.com; Sandi.Mullins@ghd.com; Kira.Turner@ghd.com and cc:

For Consultant Use Only

Notes/Comments:

Moisture Content spec: ASTM D4643, Submittal: ASTM D2216

ASTM D4643 test method can be used as a substitute for test method D2216 when more rapid results are desired to expedite other phases of testing. Test methods are considered equivalent.

Peel Strength spec: 2100 N/m, Submittal: 1401 N/m

CETCO's manufacturing process does not include thermal bonding of needle-punched fibers.

REVIEWED BY:

Shop Drawing Review

Submission No. **004**

Contractor's Reference

ENGINEER's review is for the sole purpose of ascertaining conformance with general design concepts expressed in the contract Documents, and in no way constitutes approval of the detail design inherent in CONTRACTOR's Shop Drawings, responsibility for which remains solely with CONTRACTOR submitting same. Review does not authorize changes to Contract Documents.

- ☐ Reviewed
- ☒ Reviewed as Noted
- ☐ Revise and Resubmit
- ☐ Not Subject to Review
- ☐ Other

By: **GHD Limited**

Signed:

Date:

CETCO®

CETCO 2870 Forbs Avenue Hoffman Estates, IL 60192
847.851.1800 800.527.9948 Fax 847.851.1339 **www.cetco.com**

May 12, 2022

RE: Northwin Landfill ('22)
Geosynthetic Clay Liner

To whom it may concern:

CETCO® was provided with Section 02 56 13.16 - Geosynthetic Clay Liner, pages 02 56 13.15 – 1 through 8, dated August, 2020 of the Technical Specification for the Northwin Landfill Phase 1 East. Based upon our review of this information, CETCO® proposes to supply Bentomat® DN as the geosynthetic clay liner (GCL) for this project. A Technical Data Sheet (TDS) for Bentomat® DN is enclosed, and Bentomat® DN will meet or exceed the project requirements as indicated by the aforementioned document with the exceptions and clarifications identified below.

- **Peel Strength:** The Technical Specification requires a GCL peel strength of 12 lb/in (2100 N/m). This is an index test that can be manipulated by processes such as "thermal bonding." CETCO®'s manufacturing process does not include thermal bonding of needle-punched fibers. Independent research by Bareither et al, 2018 has demonstrated that non heat-treated GCLs exhibit greater shear strength than heat-treated GCLs (of similar peel strengths). This is perhaps due to brittleness caused by the heat-treating process. Accordingly, we are proposing Bentomat® DN with an 8 lb/in peel manufactured using CETCO®'s propriety high-density needle-punching technology. A GCL with a 12 lb/in peel strength can be offered at additional cost.
- **Bentonite Montmorillonite Content:** The Specification requires that the bentonite consist of at least 90 percent sodium montmorillonite. Unfortunately, there are no reliable test methods available for determining sodium montmorillonite content. The available methods can only give a qualitative indication of montmorillonite content. For this reason, the industry uses free swell (ASTM D5890) and fluid loss (ASTM D5891) tests to evaluate sodium bentonite quality. Only bentonite whose primary constituent is the clay mineral sodium montmorillonite will meet the free swell, fluid loss, and hydraulic conductivity values required for Bentomat GCLs. CETCO® certifies that the Bentomat GCL supplied to this project will be manufactured using the finest grade native Wyoming sodium bentonite, whose primary constituent is the mineral sodium montmorillonite, and that the bentonite will meet the minimum fluid loss, free swell, and moisture values required in the Specification.
- **Minimum Average Roll Value:** The GCL Properties table requires that the Bentonite Mass and Peel Strength meet the Minimum Average Roll Value (MARV). However, neither of the governing industry standard specifications: ASTM D5889, *Standard Practice for Quality Control of Geosynthetic Clay Liners*, or GRI-GCL3*, Standard Specification for Test Methods, Required Properties, and Testing Frequencies of Geosynthetic Clay Liners* require manufacturing quality control testing to be reported in MARV. As such, CETCO® testing and reporting conforms to these industry specifications, and reports minimum or maximum average values, as applicable, for our GCLs. Accordingly, CETCO® recommends that the manufacturing quality control testing conform to the current industry standard for this project.

In addition to our Bentomat® DN TDS and the Technical References, please find enclosed our quotation based upon the above-indicated exceptions. Placement of an order in connection with the above-referenced project acknowledges receipt of this letter and acceptance of the proposed product and exceptions and clarifications made herein. We appreciate your interest in CETCO® Environmental Products. Please call Rob Stafford at (970) 749-6118 if you have any further questions.

Best Regards,

Rob Stafford
Technical Sales Manager
CETCO® Environmental Products

Enclosures (4)

TECHNICAL REFERENCE

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 Moisture Content[2]	ASTM D2216	1 per 50 tonnes	12% max.
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.

Submittal Transmittal

Project Description:	Northwin Landfill Phase 1 West	**Contract No.:**	Click or tap here to enter text.
		Project No.:	11222680
Submitted by:	Upland Contracting Ltd.	**Submittal #:**	**005**

Submitted to Consultant by the General Contractor on Date: [Publish Date]

Verification by General Contractor:

The document attached with this shop drawing transmittal was/were reviewed against following specifications and it complies with following specifications with listed exceptions:

Spec No.	Meets following specifications	with Following exceptions
ASTM D5199		Thickness
ASTM D1505/D792	Density	
ASTM D638 Type IV, 2 pm		Tensile Strength at Yield Tensile Strength at Break Elongation at Yield Elongation at Break
ASTM D5397		Stress Crack Resistance
ASTM D1603	Carbon Black Content	
ASTM D5596	Carbon Black Dispersion	
ASTM D4833	Puncturing Resistance	
ASTM D1004	Tear Resistance	
GRI Test Method GM12		Asperity Height

Submittal Information: ***(Describe the submittal)***

Notes: SKAPS HD-60T2 AVG HDPE Geomembrane	Contractor's Signature or Stamp

Email Submittals to: Susan.McPhee@ghd.com; Sandi.Mullins@ghd.com; Kira.Turner@ghd.com and cc:

For Consultant Use Only

Notes/Comments:

Thickness spec: ASTM D5199, Submittal: ASTM D5994
Tensile Strength at Yield spec: ASTM D638, Submittal: ASTM D6693
Tensile Strength at Break spec: ASTM D638, Submittal: ASTM D6693
Elongation at Yield spec: ASTM D638, Submittal: ASTM D6693
Elongation at Break spec: ASTM D638, Submittal: ASTM D6693
Stress Crack Resistance spec: 200 hour, Submittal: 500 hour
Asperity Height spec: GRI Test Method GM12, Submittal: ASTM D7466

Submittal compared to GRI - GM13 Standard Specification* Standard Specification for “Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes” (attached)

Submittal meets the requirement of GRI Standard Specification for all except the ASTM method for testing geomembrane thickness.

ASTM D5199
Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes (04.08)

ASTM D5994
Test Method for Measuring the Core Thickness of Textured Geomembranes, (04.08)

The two methods can be taken as substantially equivalent.

REVIEWED BY: Toby Wong

Shop Drawing Review

Submission No. **005**

Contractor’s Reference

ENGINEER's review is for the sole purpose of ascertaining conformance with general design concepts expressed in the contract Documents, and in no way constitutes approval of the detail design inherent in CONTRACTOR's Shop Drawings, responsibility for which remains solely with CONTRACTOR submitting same. Review does not authorize changes to Contract Documents.

- ☐ Reviewed
- ☒ Reviewed as Noted
- ☐ Revise and Resubmit
- ☐ Not Subject to Review
- ☐ Other

By: **GHD Limited**

Signed: **Roxy Hasior**

Date: **June 10, 2022**

ENGLISH UNITS

Table 2(a) – High Density Polyethylene (HDPE) Geomembrane - Textured

Properties	Test Method	Test Value							Testing Frequency (minimum)
		30 mils	40 mils	50 mils	60 mils	80 mils	100 mils	120 mils	
Thickness mils (min. ave.) - mils • lowest individual for 8 out of 10 values - % • lowest individual for any of the 10 values - %	D 5994	nom. -5% -10 -15	nom. -5% -10 -15	nom. -5% -10 -15	nom. -5% -10 -15	nom. -5% -10 -15	nom. -5% -10 -15	nom. -5% -10 -15	per roll
Asperity Height mils (min. ave.) - mils	D 7466	16	16	16	16	16	16	16	every 2nd roll *(1)*
Formulated Density (min. ave.) - g/cc	D 1505/D 792	0.940	0.940	0.940	0.940	0.940	0.940	0.940	200,000 lb
Tensile Properties (min. ave.) *(2)* • yield strength - lb/in. • break strength - lb/in. • yield elongation - % • break elongation - %	D 6693 Type IV	63 45 12 100	84 60 12 100	105 75 12 100	126 90 12 100	168 120 12 100	210 150 12 100	252 180 12 100	20,000 lb
Tear Resistance (min. ave.) - lb	D 1004	21	28	35	42	56	70	84	45,000 lb
Puncture Resistance (min. ave.) - lb	D 4833	45	60	75	90	120	150	180	45,000 lb
Stress Crack Resistance *(3)* - hr.	D 5397 (App.)	500	500	500	500	500	500	500	per GRI GM10
Carbon Black Content (range) - %	D 4218 *(4)*	2.0-3.0	2.0-3.0	2.0-3.0	2.0-3.0	2.0-3.0	2.0-3.0	2.0-3.0	20,000 lb
Carbon Black Dispersion	D 5596	note *(5)*	note *(5)*	note *(5)*	note *(5)*	note *(5)*	note *(5)*	note *(5)*	45,000 lb
Oxidative Induction Time (OIT) (min. ave.) *(6)* (a) Standard OIT - min. — or — (b) High Pressure OIT - min.	D 8117 D 5885	100 400	100 400	100 400	100 400	100 400	100 400	100 400	200,000 lb
Oven Aging at 85°C *(6), (7)* (a) Standard OIT (min. ave.) - % retained after 90 days — or — (b) High Pressure OIT (min. ave.) - % retained after 90 days	D 5721 D 8117 D 5885	55 80	55 80	55 80	55 80	55 80	55 80	55 80	per each formulation
UV Resistance *(8)* (a) Standard OIT (min. ave.) — or — (b) High Pressure OIT (min. ave.) - % retained after 1600 hrs *(10)*	D 7238 D 8117 D 5885	N.R. *(9)* 50	N.R. *(9)* 50	N.R. *(9)* 50	N.R. *(9)* 50	N.R. *(9)* 50	N.R. *(9)* 50	N.R. *(9)* 50	per each formulation

(1) Alternate the measurement side for double sided textured sheet

(2) Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of 5 test specimens each direction.
Yield elongation is calculated using a gage length of 1.3 inches
Break elongation is calculated using a gage length of 2.0 inches

(3) SP-NCTL per ASTM D5397 Appendix, is not appropriate for testing geomembranes with textured or irregular rough surfaces. Test should be conducted on smooth edges of textured rolls or on smooth sheets made from the same formulation as being used for the textured sheet materials.
The yield stress used to calculate the applied load for the SP-NCTL test should be the manufacturer's mean value via MQC testing.

(4) Other methods such as D 1603 (tube furnace) or D 6370 (TGA) are acceptable if an appropriate correlation to D 4218 (muffle furnace) can be established.

(5) Carbon black dispersion (only near spherical agglomerates) for 10 different views:
9 in Categories 1 or 2 and 1 in Category 3

(6) The manufacturer has the option to select either one of the OIT methods listed to evaluate the antioxidant content in the geomembrane.

(7) It is also recommended to evaluate samples at 30 and 60 days to compare with the 90 day response.

(8) The condition of the test should be 20 hr. UV cycle at 75°C followed by 4 hr. condensation at 60°C.

(9) Not recommended since the high temperature of the Std-OIT test produces an unrealistic result for some of the antioxidants in the UV exposed samples.

(10) UV resistance is based on percent retained value regardless of the original HP-OIT value.

SI (METRIC UNITS)

Table 2(b) – High Density Polyethylene (HDPE) Geomembrane - Textured

Properties	Test Method	Test Value							Testing Frequency (minimum)
		0.75 mm	1.00 mm	1.25 mm	1.50 mm	2.00 mm	2.50 mm	3.00 mm	
Thickness (min. ave.) - mm • lowest individual for 8 out of 10 values - % • lowest individual for any of the 10 values - %	D 5994	nom. -5% -10 -15	nom. -5% -10 -15	nom. -5% -10 -15	nom. -5% -10 -15	nom. -5% -10 -15	nom. -5% -10 -15	nom. -5% -10 -15	per roll
Asperity Height mils (min. ave.) - mm	D 7466	0.40	0.40	0.40	0.40	0.40	0.40	0.40	every 2nd roll *(1)*
Formulated Density (min. ave.) - g/cc	D 1505/D 792	0.940	0.940	0.940	0.940	0.940	0.940	0.940	90,000 kg
Tensile Properties (min. ave.) *(2)* • yield strength - kN/m • break strength - kN/m • yield elongation - % • break elongation - %	D 6693 Type IV	11 8 12 100	15 10 12 100	18 13 12 100	22 16 12 100	29 21 12 100	37 26 12 100	44 32 12 100	9,000 kg
Tear Resistance (min. ave.) - N	D 1004	93	125	156	187	249	311	374	20,000 kg
Puncture Resistance (min. ave.) - N	D 4833	200	267	333	400	534	667	800	20,000 kg
Stress Crack Resistance *(3)* - hr.	D 5397 (App.)	500	500	500	500	500	500	500	per GRI GM10
Carbon Black Content (range) - %	D 4218 *(4)*	2.0-3.0	2.0-3.0	2.0-3.0	2.0-3.0	2.0-3.0	2.0-3.0	2.0-3.0	9,000 kg
Carbon Black Dispersion	D 5596	note *(5)*	note *(5)*	note *(5)*	note *(5)*	note *(5)*	note *(5)*	note *(5)*	20,000 kg
Oxidative Induction Time (OIT) (min. ave.) *(6)* (a) Standard OIT - min. — or — (b) High Pressure OIT - min.	D 8117 D 5885	100 400	100 400	100 400	100 400	100 400	100 400	100 400	90,000 kg
Oven Aging at 85°C *(6), (7)* (a) Standard OIT (min. ave.) - % retained after 90 days — or — (b) High Pressure OIT (min. ave.) - % retained after 90 days	D 5721 D 8117 D 5885	55 80	55 80	55 80	55 80	55 80	55 80	55 80	per each formulation
UV Resistance *(8)* (a) Standard OIT (min. ave.) — or — (b) High Pressure OIT (min. ave.) - % retained after 1600 hrs *(10)*	D 7238 D 8117 D 5885	N.R. *(9)* 50	N.R. *(9)* 50	N.R. *(9)* 50	N.R. *(9)* 50	N.R. *(9)* 50	N.R. *(9)* 50	N.R. *(9)* 50	per each formulation

(1) Alternate the measurement side for double sided textured sheet

(2) Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of 5 test specimens each direction.
Yield elongation is calculated using a gage length of 33 mm
Break elongation is calculated using a gage length of 50 mm

(3) The SP-NCTL test is not appropriate for testing geomembranes with textured or irregular rough surfaces. Test should be conducted on smooth edges of textured rolls or on smooth sheets made from the same formulation as being used for the textured sheet materials.
The yield stress used to calculate the applied load for the SP-NCTL test should be the manufacturer's mean value via MQC testing.

(4) Other methods such as D 1603 (tube furnace) or D 6370 (TGA) are acceptable if an appropriate correlation to D 4218 (muffle furnace) can be established.

(5) Carbon black dispersion (only near spherical agglomerates) for 10 different views:
9 in Categories 1 or 2 and 1 in Category 3

(6) The manufacturer has the option to select either one of the OIT methods listed to evaluate the antioxidant content in the geomembrane.

(7) It is also recommended to evaluate samples at 30 and 60 days to compare with the 90 day response.

(8) The condition of the test should be 20 hr. UV cycle at 75°C followed by 4 hr. condensation at 60°C.

(9) Not recommended since the high temperature of the Std-OIT test produces an unrealistic result for some of the antioxidants in the UV exposed samples.

(10) UV resistance is based on percent retained value regardless of the original HP-OIT value.

SKAPS HD-60T2 AVG
HDPE GEOMEMBRANE
Textured Double Sided

SKAPS INDUSTRIES
571 Industrial Pkwy
Commerce, GA 30529
Phone: (706) 336-7000
Fax: (706) 336-7007
E-Mail: contact@skaps.com

SKAPS HD-60T2 AVG Geomembrane is manufactured utilizing the highest quality standards to provide the greatest durability in geomembrane applications. The geomembrane is formulated to meet the requirements of GRI GM13 specifications.

PROPERTY	TEST METHOD	FREQUENCY	VALUE	QUALIFIER
Thickness (minimum avg), mils	ASTM D 5994	Per Roll	60	MAV(1)
Thickness (minimum), mils			54	MIN
Asperity Height, mils	ASTM D 7466	2nd Roll	16	MAV
Density, g/cc	ASTM D 1505	200,000 lb	0.940	MIN
Tensile Properties (both directions)	ASTM D 6693 Type IV Specimen, 2 in/min	20,000 lb		
Strength at Yield, lb/in width			126	MAV
Elongation at Yield, % (1.3 in. GL)			12	MAV
Strength at Break, lb/in width			90	MAV
Elongation at Break, % (2 in. GL)			100	MAV
Tear Resistance, lb	ASTM D 1004	45,000 lb	42	MAV
Puncture Resistance, lb	ASTM D 4833	45,000 lb	90	MAV
Carbon Black Content, %	ASTM D 4218	20,000 lb	2-3	Range
Carbon Black Dispersion (Category)	ASTM D 5596	45,000 lb	Note (2)	Category
Stress Crack Resistance, hr.	ASTM D 5397, Appendix	200,000 lb	500	MIN
Oxidative Induction Time, minutes	ASTM D 3895 200°C, 1 atm O_2	200,000 lb	100	MIN
ROLL DIMENSIONS				
Roll Length, ft			490	NOM
Roll Width, ft			23.5	
Roll Area, sf			11,515	

Notes:
(1) Minimum average value
(2) Carbon black dispersion (only near spherical agglomerates) for 10 different views:
9 in Categories 1 or 2 and 1 in Category 3

1/6/2021

Appendix E

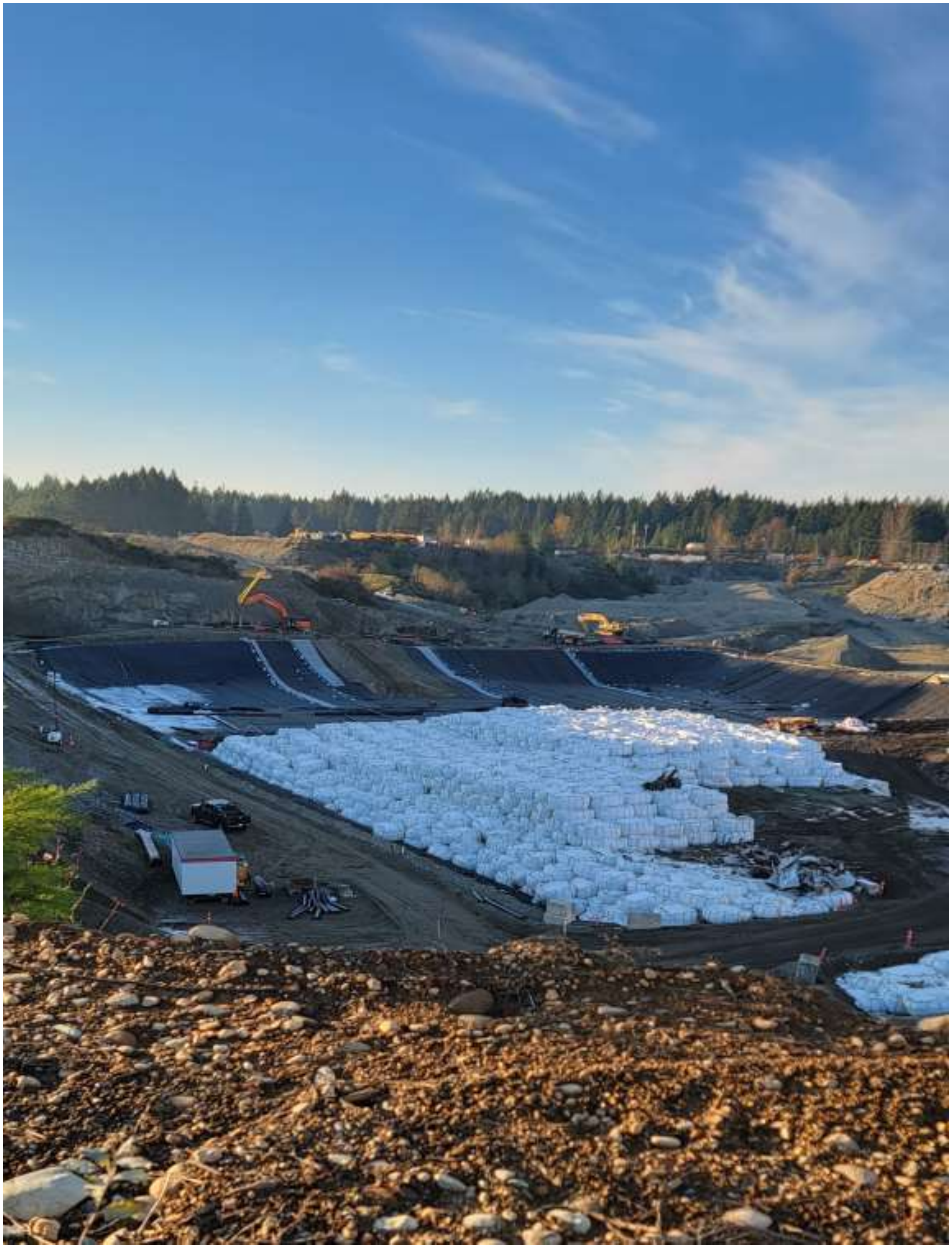
Geosynthetics QA/QC Information

C.J.Cassidy

Consulting Inc.

NORTHWIN LANDFILL - WEST CELL - 2022

CAMPBELL RIVER, B.C.



C.J. Cassidy
Consulting Inc.

NORTHWIN LANDFILL - WEST CELL - 2022

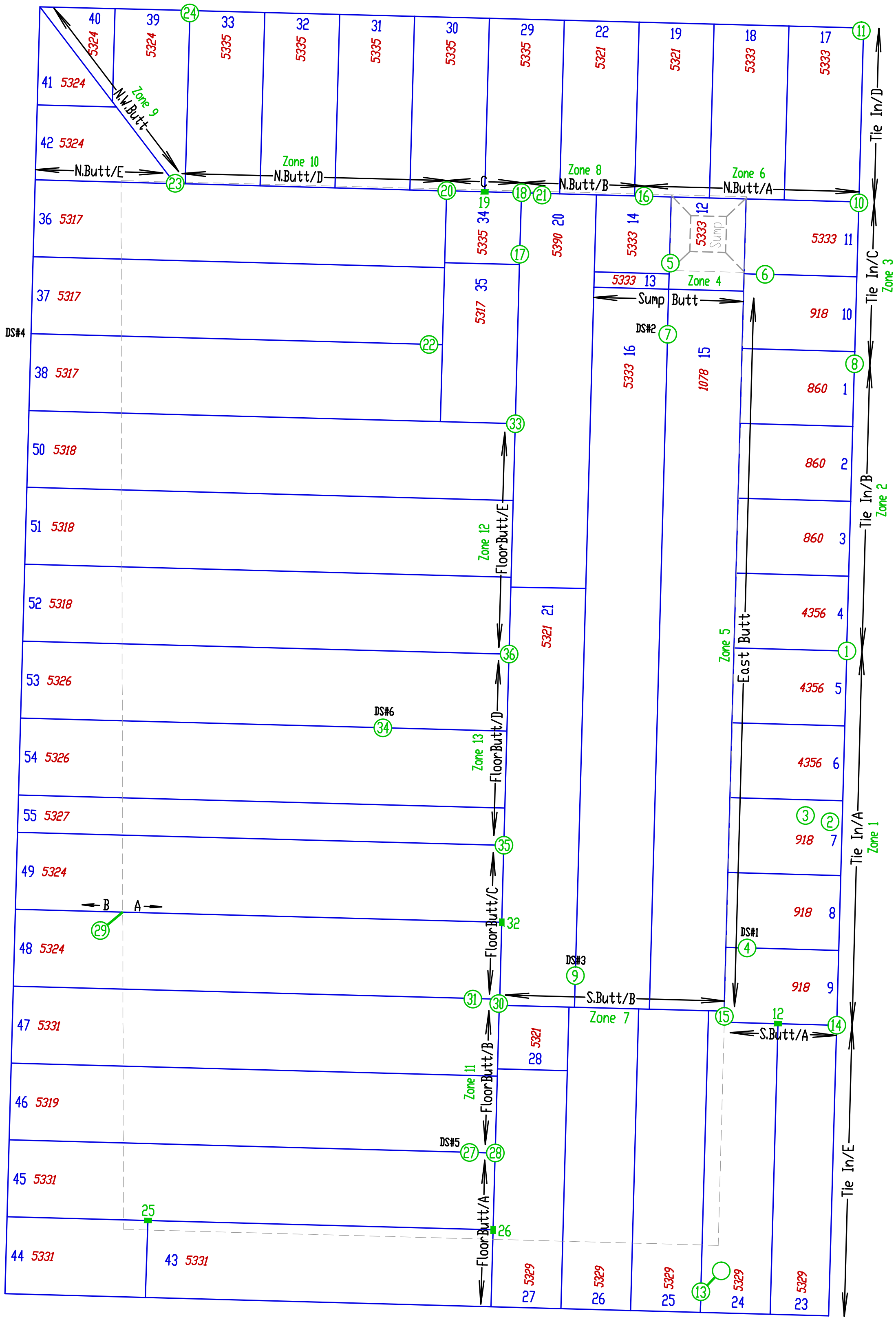
CAMPBELL RIVER, B.C.

Secondary Liner

Primary Liner

NORTHWIN LANDFILL WEST CELL

SECONDARY LINER



Blue = Liner   Red = Roll Numbers   Green = Extrusion Welds

DATE: December 19, 2022
SCALE: NTS
FILE NAME: SecondaryRep-2022
DRAWN BY: SSC
CHECKED BY: CJC

C.J. Cassidy
Consulting Inc.

NORTHWIN LANDFILL - 2022
CAMPBELL RIVER, B.C.
West Cell Secondary Liner Representative Drawing

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Friday, October 14, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
10:10	1	CJC				860	350	1	152	1	149	1	200	CC	
10:10	1	CJC				860	350	2	148	2	150	2	191	CC	
10:10	1	CJC				860	350	3	130	3	162	3	194	CC	
10:10	1	CJC				860	350	4	154	4	161	4	190	CC	
10:10	1	CJC				860	350	5	143	5	170	5	200	CC	
2:45	X1	MC	485	485				1	142	1		1	184	CC	
2:45	X1	MC	485	485				2	129	2		2	181	CC	
2:45	X1	MC	485	485				3	99	3		3	184	CC	
2:45	X1	MC	485	485				4	102	4		4	180	CC	
2:45	X1	MC	485	485				5	126	5		5	177	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Tuesday, October 18, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
9:15	1	JC			860		250	1	125	1	130	1	205	CC	
9:15	1	JC			860		250	2	125	2	129	2	195	CC	
9:15	1	JC			860		250	3	136	3	140	3	202	CC	
9:15	1	JC			860		250	4	133	4	122	4	202	CC	
9:15	1	JC			860		250	5	118	5	132	5	194	CC	
10:00	X1	RC	500	500				1	118	1		1	190	CC	
10:00	X1	RC	500	500				2	124	2		2	195	CC	
10:00	X1	RC	500	500				3	135	3		3	183	CC	
10:00	X1	RC	500	500				4	115	4		4	180	CC	
10:00	X1	RC	500	500				5	119	5		5	186	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Wednesday, October 19, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
10:30	1	JC			860		250	1	143	1	137	1	194	CC	
10:30	1	JC			860		250	2	134	2	149	2	190	CC	
10:30	1	JC			860		250	3	147	3	158	3	192	CC	
10:30	1	JC			860		250	4	158	4	147	4	193	CC	
10:30	1	JC			860		250	5	146	5	149	5	194	CC	
12:03	X1	RC	500	500				1	117	1		1	173	CC	
12:03	X1	RC	500	500				2	117	2		2	175	CC	
12:03	X1	RC	500	500				3	111	3		3	178	CC	
12:03	X1	RC	500	500				4	121	4		4	176	CC	
12:03	X1	RC	500	500				5	110	5		5	180	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Saturday, October 22, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
10:24	1	RC			860		300	1	147	1	132	1	199	CC	
10:24	1	RC			860		300	2	142	2	132	2	204	CC	
10:24	1	RC			860		300	3	132	3	126	3	208	CC	
10:24	1	RC			860		300	4	148	4	136	4	206	CC	
10:24	1	RC			860		300	5	126	5	143	5	205	CC	
12:05	X1	RC	500	500				1	99	1		1	184	CC	
12:05	X1	RC	500	500				2	97	2		2	167	CC	
12:05	X1	RC	500	500				3	102	3		3	167	CC	
12:05	X1	RC	500	500				4	118	4		4	159	CC	
12:05	X1	RC	500	500				5	113	5		5	172	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Tuesday, October 25, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
8:10	1	JC			860		300	1	125	1	128	1	210	CC	
8:10	1	JC			860		300	2	126	2	146	2	210	CC	
8:10	1	JC			860		300	3	141	3	135	3	209	CC	
8:10	1	JC			860		300	4	142	4	143	4	212	CC	
8:10	1	JC			860		300	5	128	5	135	5	212	CC	
12:00	X1	MC	500	500				1	109	1		1	196	CC	
12:00	X1	MC	500	500				2	112	2		2	196	CC	
12:00	X1	MC	500	500				3	100	3		3	203	CC	
12:00	X1	MC	500	500				4	109	4		4	200	CC	
12:00	X1	MC	500	500				5	95	5		5	201	CC	

C.J.Cassidy

Consulting Inc.

WELDER QUALIFICATIONS

DATE Wednesday, October 26, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	**WELDER NUMBER**	**TECH INITIALS**	**BARREL TEMP ºF**	**PREHEAT TEMP ºF**	**SET TEMP ºF**	**MEASURED SPEED**	**SPEED SETTINGS**		**PEEL INSIDE**		**PEEL OUTSIDE**		**SHEAR VALUE**	**QC INITIAL**	**WEATHER / COMMENTS:**
8:39	1	JC			860		300	1	162	1	166	1	206	CC	
8:39	1	JC			860		300	2	175	2	154	2	218	CC	
8:39	1	JC			860		300	3	155	3	155	3	205	CC	
8:39	1	JC			860		300	4	158	4	158	4	204	CC	
8:39	1	JC			860		300	5	161	5	155	5	211	CC	
8:09	X1	MC	500	500				1	119	1		1	212	CC	
8:09	X1	MC	500	500				2	88	2		2	207	CC	
8:09	X1	MC	500	500				3	119	3		3	210	CC	
8:09	X1	MC	500	500				4	131	4		4	213	CC	
8:09	X1	MC	500	500				5	119	5		5	206	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Friday, October 28, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
8:14	1	JC			860		300	1	162	1	166	1	206	CC	
8:14	1	JC			860		300	2	132	2	133	2	201	CC	
8:14	1	JC			860		300	3	155	3	155	3	205	CC	
8:14	1	JC			860		300	4	141	4	149	4	204	CC	
8:14	1	JC			860		300	5	161	5	155	5	204	CC	
8:40	X1	RC	500	500				1	119	1		1	211	CC	
8:40	X1	RC	500	500				2	98	2		2	207	CC	
8:40	X1	RC	500	500				3	120	3		3	210	CC	
8:40	X1	RC	500	500				4	130	4		4	213	CC	
8:40	X1	RC	500	500				5	120	5		5	211	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Tuesday, November 01, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
12:15	1	JC			860		300	1	130	1	133	1	198	CC	
12:15	1	JC			860		300	2	141	2	140	2	198	CC	
12:15	1	JC			860		300	3	151	3	145	3	193	CC	
12:15	1	JC			860		300	4	146	4	148	4	199	CC	
12:15	1	JC			860		300	5	132	5	137	5	195	CC	
11:35	X1	RC	500	500				1	91	1		1	186	CC	Warm sample, rain coming.
11:35	X1	RC	500	500				2	98	2		2	193	CC	
11:35	X1	RC	500	500				3	93	3		3	192	CC	
11:35	X1	RC	500	500				4	88	4		4	196	CC	
11:35	X1	RC	500	500				5	87	5		5	189	CC	

C.J. Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Thursday, November 03, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
9:10	1	JC			860		300	1	140	1	123	1	191	CC	
9:10	1	JC			860		300	2	134	2	129	2	190	CC	
9:10	1	JC			860		300	3	132	3	132	3	193	CC	
9:10	1	JC			860		300	4	126	4	141	4	192	CC	
9:10	1	JC			860		300	5	127	5	137	5	195	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Tuesday, November 08, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
10:07	1	JC			860		300	1	138	1	130	1	204	CC	
10:07	1	JC			860		300	2	146	2	150	2	203	CC	
10:07	1	JC			860		300	3	135	3	148	3	199	CC	
10:07	1	JC			860		300	4	136	4	145	4	204	CC	
10:07	1	JC			860		300	5	149	5	138	5	196	CC	
10:45	X1	MC	500	500				1	116	1		1	203	CC	
10:45	X1	MC	500	500				2	99	2		2	204	CC	
10:45	X1	MC	500	500				3	101	3		3	201	CC	
10:45	X1	MC	500	500				4	102	4		4	200	CC	
10:45	X1	MC	500	500				5	113	5		5	199	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Wednesday, November 09, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
9:50	1	JC			860		300	1	140	1	130	1	204	CC	
9:50	1	JC			860		300	2	146	2	150	2	197	CC	
9:50	1	JC			860		300	3	141	3	132	3	199	CC	
9:50	1	JC			860		300	4	138	4	149	4	204	CC	
9:50	1	JC			860		300	5	144	5	139	5	196	CC	
10:10	X1	RC	500	500				1	100	1		1	204	CC	
10:10	X1	RC	500	500				2	111	2		2	204	CC	
10:10	X1	RC	500	500				3	100	3		3	200	CC	
10:10	X1	RC	500	500				4	102	4		4	200	CC	
10:10	X1	RC	500	500				5	97	5		5	201	CC	

C.J. Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Thursday, November 10, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	**WELDER NUMBER**	**TECH INITIALS**	**BARREL TEMP ºF**	**PREHEAT TEMP ºF**	**SET TEMP ºF**	**MEASURED SPEED**	**SPEED SETTINGS**		**PEEL INSIDE**		**PEEL OUTSIDE**		**SHEAR VALUE**	**QC INITIAL**	**WEATHER / COMMENTS:**
1:27	1	JC			860		300	1	140	1	141	1	189	CC	
1:27	1	JC			860		300	2	167	2	143	2	193	CC	
1:27	1	JC			860		300	3	154	3	169	3	200	CC	
1:27	1	JC			860		300	4	145	4	144	4	199	CC	
1:27	1	JC			860		300	5	161	5	155	5	197	CC	
7:23	X1	RC	500	500				1	99	1		1	189	CC	
7:23	X1	RC	500	500				2	101	2		2	199	CC	
7:23	X1	RC	500	500				3	97	3		3	196	CC	
7:23	X1	RC	500	500				4	98	4		4	196	CC	
7:23	X1	RC	500	500				5	102	5		5	197	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Saturday, November 12, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
11:30	1	JC			860		300	1	169	1	155	1	189	CC	
11:30	1	JC			860		300	2	151	2	126	2	196	CC	
11:30	1	JC			860		300	3	122	3	140	3	200	CC	
11:30	1	JC			860		300	4	134	4	145	4	203	CC	
11:30	1	JC			860		300	5	167	5	129	5	204	CC	
7:20	X1	RC	500	500				1	100	1		1	190	CC	
7:20	X1	RC	500	500				2	88	2		2	200	CC	
7:20	X1	RC	500	500				3	98	3		3	204	CC	
7:20	X1	RC	500	500				4	98	4		4	204	CC	
7:20	X1	RC	500	500				5	101	5		5	188	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Monday, November 14, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
11:25	1	JC			860		300	1	131	1	143	1	216	CC	
11:25	1	JC			860		300	2	135	2	145	2	198	CC	
11:25	1	JC			860		300	3	127	3	145	3	211	CC	
11:25	1	JC			860		300	4	136	4	153	4	211	CC	
11:25	1	JC			860		300	5	116	5	147	5	209	CC	
10:13	X1	RC	500	500				1	114	1		1	188	CC	
10:13	X1	RC	500	500				2	113	2		2	189	CC	
10:13	X1	RC	500	500				3	109	3		3	180	CC	
10:13	X1	RC	500	500				4	122	4		4	181	CC	
10:13	X1	RC	500	500				5	125	5		5	176	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Tuesday, November 15, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
9:33	1	JC			860		300	1	128	1	141	1	187	CC	
9:33	1	JC			860		300	2	134	2	138	2	192	CC	
9:33	1	JC			860		300	3	136	3	132	3	198	CC	
9:33	1	JC			860		300	4	122	4	149	4	188	CC	
9:33	1	JC			860		300	5	120	5	144	5	206	CC	
9:51	X1	RC	500	500				1	119	1		1	199	CC	
9:51	X1	RC	500	500				2	116	2		2	191	CC	
9:51	X1	RC	500	500				3	122	3		3	195	CC	
9:51	X1	RC	500	500				4	108	4		4	207	CC	
9:51	X1	RC	500	500				5	124	5		5	184	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Wednesday, November 16, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
9:45	1	JC			860		300	1	125	1	134	1	184	CC	
9:45	1	JC			860		300	2	123	2	148	2	182	CC	
9:45	1	JC			860		300	3	136	3	140	3	191	CC	
9:45	1	JC			860		300	4	140	4	149	4	201	CC	
9:45	1	JC			860		300	5	138	5	153	5	189	CC	
10:26	X1	RC	500	500				1	120	1		1	187	CC	
10:26	X1	RC	500	500				2	119	2		2	196	CC	
10:26	X1	RC	500	500				3	126	3		3	192	CC	
10:26	X1	RC	500	500				4	121	4		4	203	CC	
10:26	X1	RC	500	500				5	118	5		5	199	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Thursday, November 17, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	**WELDER NUMBER**	**TECH INITIALS**	**BARREL TEMP ºF**	**PREHEAT TEMP ºF**	**SET TEMP ºF**	**MEASURED SPEED**	**SPEED SETTINGS**		**PEEL INSIDE**		**PEEL OUTSIDE**		**SHEAR VALUE**	**QC INITIAL**	**WEATHER / COMMENTS:**
1:20	1	JC			860		300	1	139	1	136	1	206	CC	
1:20	1	JC			860		300	2	134	2	142	2	192	CC	
1:20	1	JC			860		300	3	140	3	153	3	189	CC	
1:20	1	JC			860		300	4	138	4	149	4	197	CC	
1:20	1	JC			860		300	5	145	5	150	5	189	CC	
1:28	X1	MC	500	500				1	120	1		1	181	CC	
1:28	X1	MC	500	500				2	117	2		2	183	CC	
1:28	X1	MC	500	500				3	118	3		3	171	CC	
1:28	X1	MC	500	500				4	119	4		4	178	CC	
1:28	X1	MC	500	500				5	120	5		5	186	CC	

C.J.Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Friday, October 14, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **SECONDARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
1	860	East Slope	11.00	7.30	80.30	
2	860	East Slope	11.00	7.30	80.30	
3	860	East Slope	11.00	7.30	80.30	
4	4356	East Slope	11.00	7.30	80.30	
5	4356	East Slope	11.00	7.30	80.30	
6	4356	East Slope	11.00	7.30	80.30	
7	918	East Slope	11.00	7.30	80.30	
8	918	East Slope	11.00	7.30	80.30	
9	918	East Slope	11.00	7.30	80.30	

722.70 **sq m**

C.J.Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Tuesday, October 18, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
10	918	East Slope	11.50	7.30	83.95	
11	5333	East Slope	11.50	7.30	83.95	
12	5333	Sump	9.00	7.30	65.70	
13	5333	Sump	1.50	7.30	10.95	
14	5333	Sump	8.00	7.30	58.40	

302.95 **sq m**

C.J.Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Wednesday, October 19, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
15	1078	East Floor	70.00	7.30	511.00	
16	5333	East Floor	70.00	7.30	511.00	
17	5333	North Slope	23.00	7.30	167.90	
18	5333	North Slope	23.00	7.30	167.90	
19	5321	North Slope	23.00	7.30	167.90	

1525.70 **sq m**

C.J.Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Saturday, October 22, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
20	5390	Floor	40.00	7.30	292.00	
21	5321	Floor	40.00	7.30	292.00	

584.00 **sq m**

C.J.Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Tuesday, October 25, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
22	5321	North Slope	23.00	7.30	167.90	

167.90 **sq m**

PANEL PLACEMENT LOG

C.J. Cassidy
Consulting Inc.

DATE Wednesday, October 26, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **SECONDARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
23	5329	S.Slope/Floor	30.00	7.30	219.00	
24	5329	S.Slope/Floor	30.00	7.30	219.00	
25	5329	S.Slope/Floor	30.00	7.30	219.00	

657.00 **sq m**

PANEL PLACEMENT LOG

C.J.Cassidy
Consulting Inc.

DATE Friday, October 28, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **SECONDARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
26	5329	S.Slope/Floor	30.00	7.30	219.00	
27	5329	S.Slope/Floor	23.50	7.30	171.55	
28	5321	S.Slope/Floor	7.00	7.30	51.10	

441.65 **sq m**

PANEL PLACEMENT LOG

C.J. Cassidy
Consulting Inc.

DATE Tuesday, November 01, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **SECONDARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
29	5335	North Slope	22.00	7.30	160.60	
30	5335	North Slope	21.00	7.30	153.30	

313.90 **sq m**

C.J. Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Thursday, November 03, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **SECONDARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
31	5335	North Slope	19.00	7.30	138.70	
32	5335	North Slope	19.00	7.30	138.70	
33	5335	North Slope	19.00	7.30	138.70	

416.10 **sq m**

C.J. Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Tuesday, November 08, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **SECONDARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
34	5335	North Floor	7.00	7.30	51.10	

51.10 **sq m**

PANEL PLACEMENT LOG

DATE Wednesday, November 09, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
35	5317	North Floor	14.50	7.30	105.85	
36	5317	W.Slope/Floor	40.00	7.30	292.00	
37	5317	W.Slope/Floor	40.00	7.30	292.00	
38	5317	W.Slope/Floor	40.00	7.30	292.00	
39	5324	N.W.Corner	18.00	7.30	131.40	
40	5324	N.W.Corner	9.00	7.30	65.70	
41	5324	N.W.Corner	8.00	7.30	58.40	
42	5324	N.W.Corner	15.00	7.30	109.50	

1346.85 **sq m**

PANEL PLACEMENT LOG

C.J.Cassidy
Consulting Inc.

DATE Saturday, November 12, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **SECONDARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
43	5331	S.W.Slope/Floor	33.00	7.30	240.90	
44	5331	S.W.Slope/Floor	15.00	7.30	109.50	
45	5331	W.Slope/Floor	47.00	7.30	343.10	

693.50 **sq m**

PANEL PLACEMENT LOG

C.J. Cassidy
Consulting Inc.

DATE Monday, November 14, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **SECONDARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
46	5319	W.Slope/Floor	47.00	7.30	343.10	
47	5331	W.Slope/Floor	47.00	7.30	343.10	

686.20 **sq m**

C.J.Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Tuesday, November 15, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
48	5324	W.Slope/Floor	47.00	7.30	343.10	
49	5324	W.Slope/Floor	47.00	7.30	343.10	

686.20 **sq m**

C.J. Cassidy

Consulting Inc.

PANEL PLACEMENT LOG

DATE Wednesday, November 16, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **SECONDARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
50	5318	W.Slope/Floor	47.00	7.30	343.10	
51	5318	W.Slope/Floor	47.00	7.30	343.10	
52	5318	W.Slope/Floor	47.00	7.30	343.10	

1029.30 **sq m**

C.J.Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Thursday, November 17, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
53	5326	W.Slope/Floor	47.00	7.30	343.10	
54	5326	W.Slope/Floor	47.00	7.30	343.10	
55	5327	W.Slope/Floor	47.00	3.50	164.50	

850.70 **sq m**

C.J. Cassidy

Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Friday, October 14, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
1/2	11.0	10:25	CJC	1	10:40	10:45	40	40	FTB	FTB	N/A	CC	
2/3	11.0	10:33	CJC	1	10:44	10:49	40	40	FTB	FTB	N/A	CC	
3/4	11.0	10:39	CJC	1	11:00	11:05	40	40	FTB	FTB	N/A	CC	
4/5	11.0	11:05	CJC	1	11:20	11:25	40	40	FTB	FTB	N/A	CC	
5/6	11.0	11:10	CJC	1	11:25	11:30	40	40	FTB	FTB	N/A	CC	
6/7	11.0	11:18	CJC	1	11:35	11:40	40	40	FTB	FTB	N/A	CC	
7/8	11.0	12:00	CJC	1	12:15	12:20	40	40	FTB	FTB	N/A	CC	
8/9	11.0	12:12	CJC	1	12:25	12:30	40	40	FTB	FTB	N/A	CC	
TieIn/A	36.5	12:45	CJC	1	2:20	2:25	40	39	FTB	FTB	N/A	CC	Panels 5 to 9, Tie In to existing cell.
TieIn/B	29.0	12:45	CJC	1	2:10	2:15	41	39	FTB	FTB	N/A	CC	Panels 1 to 4, Tie In to existing cell.

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Tuesday, October 18, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
1/10	11.0	9:25	JC	1	9:50	9:55	40	40	FTB	FTB	N/A	CC	
10/11	11.5	10:15	JC	1	11:16	11:21	40	39	FTB	FTB	N/A	CC	
10/11/12	9.0	10:36	JC	1	10:55	11:00	40	39	FTB	FTB	N/A	CC	
13/14	7.3	10:42	JC	1	10:50	10:55	40	40	FTB	FTB	N/A	CC	
12/13/14	9.0	10:51	JC	1	11:05	11:10	40	40	FTB	FTB	N/A	CC	
TieIn/C	14.5	11:55	JC	1	12:55	1:00	40	38	FTB	FTB	N/A	CC	Panels 10 & 11, Tie In to existing cell.

C.J.Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Wednesday, October 19, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
15/16	70.0	10:50	JC	1	11:35	11:40	40	40	FTB	FTB	N/A	CC	Floor Panels.
17/18	23.0	1:36	JC	1	1:36	1:41	40	40	FTB	FTB	N/A	CC	North Slope.
18/19	23.0	1:51	JC	1	2:01	2:06	40	39	FTB	FTB	N/A	CC	North Slope.
E.Butt	72.0	11:20	JC	1	12:10	12:15	40	38	FTB	FTB	N/A	CC	Panels 1 - 10 to Panel 15.
SumpButt	14.5	2:22	JC	1	2:43	2:48	40	40	FTB	FTB	N/A	CC	Panels 12 & 13 to 15 & 16.

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Saturday, October 22, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
20/21	7.3	9:25	RC	1	11:20	11:25	40	40	FTB	FTB	N/A	CC	Cross Seam.
20/21/13/14/16	79.0	10:50	RC	1	12:03	12:08	40	40	FTB	FTB	N/A	CC	Floor Panels.
N.Butt/A	21.0	11:35	RC	1	12:24	12:29	40	40	FTB	FTB	N/A	CC	Panels 17 - 19.
TieIn/D	23.0	2:40	RC	1	3:00	3:05	40	38	FTB	FTB	N/A	CC	Panel 17, Tie In to existing cell.

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Tuesday, October 25, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
19/22	23.0	8:30	JC	1	9:02	9:07	40	38	FTB	FTB	N/A	CC	

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Wednesday, October 26, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
23/24	30.0	12:37	JC	1	2:00	2:05	40	38	FTB	FTB	N/A	CC	
24/25	30.0	1:02	JC	1	2:10	2:15	40	40	FTB	FTB	N/A	CC	
S.Butt/A	20.0	1:25	JC	1	2:14	2:19	40	40	FTB	FTB	N/A	CC	Panels 22 & 23 to Panel 9.
TieIn/E	30.0	1:40	JC	1	2:20	2:25	40	40	FTB	FTB	N/A	CC	Panel 23, Tie In to existing cell.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Friday, October 28, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
25/26	30.0	8:45	JC	1	9:38	9:43	40	38	FTB	FTB	N/A	CC	
27/28	7.3	9:05	JC	1	9:46	9:51	40	40	FTB	FTB	N/A	CC	Cross Seam.
26/27/28	30.0	9:12	JC	1	9:48	9:53	40	40	FTB	FTB	N/A	CC	
S.Butt/B	21.5	9:26	JC	1	10:09	10:15	40	40	FTB	FTB	N/A	CC	Panels 25,26,28 to Panels 15,16,21.

C.J.Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Tuesday, November 01, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
22/29	22.0	8:19	JC	1	8:45	8:50	40	40	FTB	FTB	N/A	CC	
20/30	21.0	9:00	JC	1	9:05	9:10	40	38	FTB	FTB	N/A	CC	
N.Butt/B	11.0	9:25	JC	1	9:50	9:55	40	40	FTB	FTB	N/A	CC	Panels 22 & 29.

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Thursday, November 03, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
30/31	19.0	9:34	JC	1	10:05	10:10	40	40	FTB	FTB	N/A	CC	
31/32	19.0	10:03	JC	1	10:15	10:20	40	40	FTB	FTB	N/A	CC	
32/33	19.0	10:15	JC	1	10:34	10:40	40	40	FTB	FTB	N/A	CC	

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Tuesday, November 08, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
34/20	7.0	9:29	JC	1	10:05	10:10	40	40	FTB	FTB	N/A	CC	
N.Butt/C	7.3	9:45	JC	1	10:21	10:26	40	40	FTB	FTB	N/A	CC	Panels 29 & 30 to Panel 34.

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Wednesday, November 09, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
34/35	7.3	1:11	JC	1	1:17	1:23	40	40	FTB	FTB	N/A	CC	
36/37	40.0	1:15	JC	1	1:29	1:34	40	39	FTB	FTB	N/A	CC	
37/38	40.0	12:10	JC	1	12:22	12:27	40	39	FTB	FTB	N/A	CC	
33/39	18.0	2:26	JC	1	2:38	2:43	40	40	FTB	FTB	N/A	CC	
39/40	9.0	2:11	JC	1	2:40	2:45	40	40	FTB	FTB	N/A	CC	
41/42	8.0	2:59	JC	1	3:25	3:30	40	40	FTB	FTB	N/A	CC	
34/36	7.0	12:57	JC	1	1:21	1:26	40	40	FTB	FTB	N/A	CC	
35/37/38	14.0	12:43	JC	1	1:10	1:15	40	40	FTB	FTB	N/A	CC	
35/20	21.0	1:35	JC	1	1:51	1:56	40	38	FTB	FTB	N/A	CC	
N.W.Butt	21.0	3:22	JC	1	3:55	4:00	40	40	FTB	FTB	N/A	CC	Panels 39 - 41.
N.Butt/D	25.0	3:39	JC	1	4:11	4:16	40	39	FTB	FTB	N/A	CC	Panels 30 - 33.
N.Butt/E	15.0	3:39	JC	1	4:15	4:20	40	40	FTB	FTB	N/A	CC	Panels 36/42.

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Saturday, November 12, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
43/44	7.3	11:20	JC	1	12:06	12:11	40	40	FTB	FTB	N/A	CC	Cross Seam.
43/44/45	47.0	11:40	JC	1	12:13	12:18	40	40	FTB	FTB	N/A	CC	
FloorButt/A	14.5	12:05	JC	1	12:40	12:45	40	40	FTB	FTB	N/A	CC	Panels 43, 45 to Panel 27.

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Monday, November 14, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
45/46	47.0	9:37	JC	1	11:01	11:06	40	40	FTB	FTB	N/A	CC	
46/47	47.0	10:10	JC	1	11:12	11:17	40	40	FTB	FTB	N/A	CC	
FloorButt/B	14.5	10:40	JC	1	11:20	11:25	40	40	FTB	FTB	N/A	CC	Panels 45, 46, 47 to Panels 27 & 28.

C.J.Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Tuesday, November 15, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
47/48	47.0	10:36	JC	1	11:17	11:22	40	40	FTB	FTB	N/A	CC	
48/49/A	36.5	10:15	JC	1	11:25	11:30	40	40	FTB	FTB	N/A	CC	
48/49/B	10.5	10:15	JC	1	11:37	11:42	40	40	FTB	FTB	N/A	CC	
FloorButt/C	14.5	11:11	JC	1	11:56	12:01	40	40	FTB	FTB	N/A	CC	Panels 48, 49 to Panel 21.

C.J. Cassidy

Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Wednesday, November 16, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
38/50	47.0	10:45	JC	1	12:15	12:20	40	40	FTB	FTB	N/A	CC	
50/51	47.0	10:11	JC	1	12:13	12:18	40	40	FTB	FTB	N/A	CC	
51/52	47.0	11:07	JC	1	12:28	12:33	40	40	FTB	FTB	N/A	CC	
FloorButt/E	22.5	11:40	JC	1	12:40	12:45	40	40	FTB	FTB	N/A	CC	Panels 50 - 52 to Panels 20 & 21.

C.J. Cassidy

Consulting Inc.

NON-DESTRUCTIVE TESTING SEAM LOG

DATE Thursday, November 17, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
52/53	47.0	1:44	JC	1	2:53	2:58	40	40	FTB	FTB	N/A	CC	
53/54	47.0	9:44	JC	1	12:10	12:15	40	40	FTB	FTB	N/A	CC	
54/55	47.0	10:25	JC	1	12:30	12:35	40	40	FTB	FTB	N/A	CC	
55/49	47.0	11:06	JC	1	12:35	12:40	40	40	FTB	FTB	N/A	CC	
FloorButt/D	18.0	2:15	JC	1	3:05	3:10	40	40	FTB	FTB	N/A	CC	Panels 53 - 55 to Panel 21.

C.J. Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Friday, October 14, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
1	Patch	4/5	Oct 14	MC	X1	CG	Pass	At Intersection of TieIn/A & TieIn/B, Tie In to Existing Liner.
2	Patch	P7	Oct 14	MC	X1	CG	Pass	
3	Patch	P7	Oct 14	MC	X1	CG	Pass	
4	Patch	8/9	Oct 14	MC	X1	CG	Pass	Destruct #1.
Zone 1	Beads	TieIn/A	Oct 14	MC	X1	CG	Pass	All "T" Intersections along Tie In A.
Zone 2	Beads	TieIn/B	Oct 14	MC	X1	CG	Pass	All "T" Intersections along Tie In B.

C.J. Cassidy

Consulting Inc.

EXTRUSION WELD REPORT

DATE Tuesday, October 18, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **SECONDARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
5	Patch	12/14	Oct 18	RC	X1	CG	Pass	
6	Patch	10/11	Oct 18	RC	X1	CG	Pass	
Zone 3	Beads	TieIn/C	Oct 18	RC	X1	CG	Pass	All "T" Intersections along Tie In C.

EXTRUSION WELD REPORT

C.J. Cassidy
Consulting Inc.

DATE Wednesday, October 19, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022 **MATERIAL** 60mil HDPE - **SECONDARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
7	Patch	15/16	Oct 19	RC	X1	CG	Pass	Destruct #2.
8	Patch	P1/TieIn	Oct 19	RC	X1	CG	Pass	At Intersection of TieIn/B & TieIn/C, Tie In to Existing Liner.
Zone 4	Beads	Sump	Oct 19	RC	X1	CG	Pass	All "T" Intersections in Sump Area.
Zone 5	Beads	East Butt	Oct 19	RC	X1	CG	Pass	All "T" Intersections along East Butt Seam.

C.J.Cassidy

Consulting Inc.

EXTRUSION WELD REPORT

DATE Saturday, October 22, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
9	Patch	16/21	Oct 22	RC	X1	CG	Pass	Destruct #3.
10	Patch	P11/TieIn/C	Oct 22	RC	X1	CG	Pass	At Intersection of TieIn/C & TieIn/D, Tie In to Existing Liner.
11	Patch	P17/TieIn/D	Oct 22	RC	X1	CG	Pass	At Intersection of TieIn/D at North Slope of Existing Liner.
Zone 6	Beads	N.Butt/A	Oct 22	RC	X1	CG	Pass	All "T" Intersections along North Butt/A.

C.J.Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Wednesday, October 26, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
12	Bead	S.Butt/A	Oct 26	MC	X1	CG	Pass	"T" Intersection along South Butt/A.
13	Patch/Bead	24/25	Oct 26	MC	X1	CG	Pass	South Slope, fish mouth repair.
14	Patch	9/23	Oct 26	MC	X1	CG	Pass	At Intersection of TieIn/A & TieIn/E, Tie In to Existing Liner.

EXTRUSION WELD REPORT

C.J. Cassidy
Consulting Inc.

DATE Friday, October 28, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **SECONDARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
15	Patch	9/24	Oct 28	RC	X1	CG	Pass	At Intersection of South Butt/A and South Butt/B.
Zone 7	Beads	S.Butt/B	Oct 28	RC	X1	CG	Pass	All "T" Intersections along South Butt/B and Seam 27/28.

C.J.Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Tuesday, November 01, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
16	Patch	N.Butt	Nov 1	RC	X1	CG	Pass	At Intersection of N.Butt/A and N.Butt/B.
Zone 8	Beads	N.Butt/B	Nov 1	RC	X1	CG	Pass	All "T" Intersections along North Butt/B.

EXTRUSION WELD REPORT

C.J. Cassidy
Consulting Inc.

DATE Tuesday, November 08, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
17	Patch	20/34	Nov 8	MC	X1	RC	PASS	
18	Patch	N.Butt	Nov 8	MC	X1	RC	PASS	At Intersection of N.Butt/B and N.Butt/C.
19	Bead	N.Butt	Nov 8	MC	X1	RC	PASS	"T" Intersection along N.Butt/C.

C.J. Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Wednesday, November 09, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
20	Patch	N.Butt	Nov 9	RC	X1	MC	PASS	At Intersection of N.Butt/C and N.Butt/D.
21	Patch	N.Butt	Nov 9	RC	X1	MC	PASS	At Panel 20/29.
22	Patch	37/38	Nov 9	RC	X1	MC	PASS	Destruct #4.
Zone 9	Beads	N.W.Butt	Nov 9	RC	X1	MC	PASS	All "T" Intersections along N.W.Butt.
Zone 10	Beads	N.Butt/D	Nov 9	RC	X1	MC	PASS	All "T" Intersections along N.Butt/D and 35/36/37.

C.J. Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Thursday, November 10, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
23	Patch	N.Butt	Nov 10	RC	X1	MC	PASS	At Intersection of N.W.Butt.
24	Patch	33/39	Nov 10	RC	X1	MC	PASS	At Anchor Trench.

EXTRUSION WELD REPORT

C.J. Cassidy
Consulting Inc.

DATE Saturday, November 12, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
25	Bead	43/44/45	Nov 12	RC	X1	CC	PASS	"T" Intersection on Seam 43/44/45.
26	Bead	F.Butt/A	Nov 12	RC	X1	CC	PASS	"T" Intersection on Floor Butt/A.

C.J.Cassidy

Consulting Inc.

EXTRUSION WELD REPORT

DATE Monday, November 14, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
27	Patch	45/46	Nov 14	RC	X1	CC	PASS	Destruct #5.
28	Patch	Floor Butt	Nov 14	RC	X1	CC	PASS	At Intersection of Floor Butt/A and Floor Butt/B.
Zone 11	Beads	F.Butt/B	Nov 14	RC	X1	CC	PASS	All "T" Intersections along Floor Butt/B.

C.J. Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Tuesday, November 15, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
29	Patch/Bead	48/49	Nov 15	RC	X1	CC	PASS	Fishmouth at Toe of Slope.
30	Patch	Floor Butt	Nov 15	RC	X1	CC	PASS	At Intersection of Floor Butt/B and Floor Butt/C.
31	Patch	47/48	Nov 15	RC	X1	CC	PASS	Near Floor Butt Seam.
32	Bead	Floor Butt	Nov 15	RC	X1	CC	PASS	"T" Intersection on Floor Butt/C.

C.J. Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Wednesday, November 16, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022 **MATERIAL** 60mil HDPE - **SECONDARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
33	Patch	Floor Butt	Nov 16	RC	X1	MC	PASS	At North End of Floor Butt/E.
Zone 12	Beads	F.Butt/E	Nov 16	RC	X1	MC	PASS	All "T" Intersections along Floor Butt/E.

C.J.Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Thursday, November 17, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
34	Patch	53/54	Nov 17	MC	X1	RC	PASS	Destruct #6.
35	Patch	Floor Butt	Nov 17	MC	X1	RC	PASS	At Intersection of Floor Butt/C and Floor Butt/D.
36	Patch	Floor Butt	Nov 17	MC	X1	RC	PASS	At Intersection of Floor Butt/D and Floor Butt/E.
Zone 13	Beads	F.Butt/D	Nov 17	MC	X1	RC	PASS	All "T" Intersections along Floor Butt/D.

C.J.Cassidy

Consulting Inc.

DESTRUCTIVE TESTING REPORT

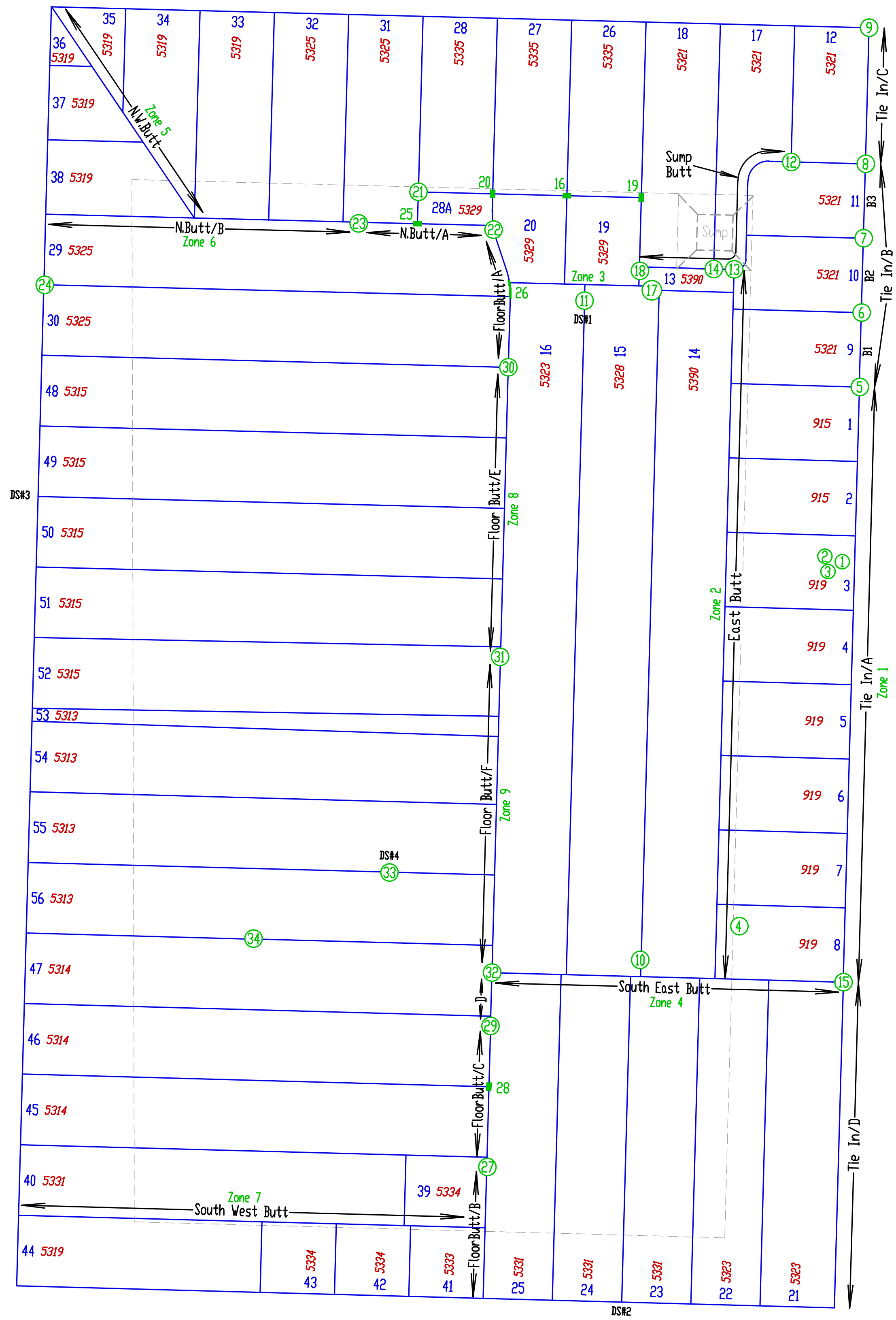
PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **SECONDARY LINER**

WELD DATE	D.S. #	SEAM #	TECH INITIAL	WELDER NUMBER	PEEL 1		SHEAR	PEEL 2		SHEAR	PEEL 3		SHEAR	PEEL 4		SHEAR	PEEL 5		SHEAR	QC INITIAL	COMMENTS / LOCATION
					IN	OUT		IN	OUT		IN	OUT		IN	OUT		IN	OUT			
10-14-22	1	8/9	JC	1	116	123	182	124	124	180	124	110	183	120	112	184	134	133	180	CC	Near Toe.
10-19-22	2	15/16	JC	1	145	123	198	139	134	200	121	129	195	133	128	197	121	140	190	CC	3m from the North End.
10-22-22	3	16/21	JC	1	149	144	195	124	129	198	103	110	199	124	114	201	132	118	204	CC	7m from the South End.
11-09-22	4	37/38	JC	1	147	165	202	144	144	199	156	162	206	160	123	208	121	167	210	CC	Run out at Anchor Trench.
11-14-22	5	45/46	JC	1	135	136	207	131	110	208	145	135	200	107	139	207	124	111	200	CC	On Floor.
11-17-22	6	53/54	JC	2	118	129	204	133	139	211	126	138	195	124	118	191	127	122	203	CC	On Floor.

NORTHWIN LANDFILL WEST CELL

PRIMARY LINER



Blue = Liner Red = Roll Numbers Green = Extrusion Welds

DATE: December 19, 2022	C.J. Cassidy Consulting Inc.	NORTHWIN LANDFILL - 2022
SCALE: NTS		CAMPBELL RIVER, B.C.
FILE NAME: WestCellRep-2022		West Cell Primary Liner Representative Drawing
DRAWN BY: SSC		
CHECKED BY: CJC		

C.J. Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Saturday, October 15, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
11:42	1	JC			860		600	1	123	1	142	1	178	CC	
11:42	1	JC			860		600	2	121	2	152	2	181	CC	
11:42	1	JC			860		600	3	117	3	150	3	176	CC	
11:42	1	JC			860		600	4	132	4	141	4	182	CC	
11:42	1	JC			860		600	5	146	5	124	5	179	CC	
9:45	X1	RC	500	500				1	118	1		1	190	CC	
9:45	X1	RC	500	500				2	124	2		2	195	CC	
9:45	X1	RC	500	500				3	135	3		3	183	CC	
9:45	X1	RC	500	500				4	115	4		4	180	CC	
9:45	X1	RC	500	500				5	119	5		5	186	CC	

C.J.Cassidy

Consulting Inc.

WELDER QUALIFICATIONS

DATE Monday, October 17, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
7:46	1	JC			860		250	1	145	1	156	1	197	CC	
7:46	1	JC			860		250	2	151	2	171	2	197	CC	
7:46	1	JC			860		250	3	143	3	138	3	197	CC	
7:46	1	JC			860		250	4	151	4	135	4	192	CC	
7:46	1	JC			860		250	5	157	5	139	5	196	CC	
9:55	X1	RC	500	500				1	91	1		1	187	CC	
9:55	X1	RC	500	500				2	92	2		2	186	CC	
9:55	X1	RC	500	500				3	106	3		3	188	CC	
9:55	X1	RC	500	500				4	97	4		4	189	CC	
9:55	X1	RC	500	500				5	102	5		5	189	CC	

C.J.Cassidy

Consulting Inc.

WELDER QUALIFICATIONS

DATE Friday, October 21, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
10:20	1	JC			860		250	1	121	1	143	1	204	CC	
10:20	1	JC			860		250	2	112	2	140	2	206	CC	
10:20	1	JC			860		250	3	120	3	120	3	204	CC	
10:20	1	JC			860		250	4	119	4	119	4	204	CC	
10:20	1	JC			860		250	5	125	5	125	5	204	CC	
11:50	X1	RC	500	500				1	111	1		1	199	CC	
11:50	X1	RC	500	500				2	112	2		2	200	CC	
11:50	X1	RC	500	500				3	122	3		3	202	CC	
11:50	X1	RC	500	500				4	123	4		4	198	CC	
11:50	X1	RC	500	500				5	140	5		5	202	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Monday, October 24, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
11:46	1	JC			860		300	1	138	1	125	1	199	CC	
11:46	1	JC			860		300	2	130	2	133	2	199	CC	
11:46	1	JC			860		300	3	125	3	128	3	203	CC	
11:46	1	JC			860		300	4	129	4	122	4	201	CC	
11:46	1	JC			860		300	5	119	5	130	5	203	CC	
12:15	X1	MC	500	500				1	120	1		1	187	CC	
12:15	X1	MC	500	500				2	119	2		2	188	CC	
12:15	X1	MC	500	500				3	105	3		3	188	CC	
12:15	X1	MC	500	500				4	111	4		4	189	CC	
12:15	X1	MC	500	500				5	118	5		5	181	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Tuesday, October 25, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
8:10	1	JC			860		300	1	125	1	128	1	210	CC	
8:10	1	JC			860		300	2	126	2	146	2	210	CC	
8:10	1	JC			860		300	3	141	3	135	3	209	CC	
8:10	1	JC			860		300	4	142	4	143	4	212	CC	
8:10	1	JC			860		300	5	128	5	135	5	212	CC	
12:00	X1	MC	500	500				1	109	1		1	196	CC	
12:00	X1	MC	500	500				2	112	2		2	196	CC	
12:00	X1	MC	500	500				3	100	3		3	203	CC	
12:00	X1	MC	500	500				4	109	4		4	200	CC	
12:00	X1	MC	500	500				5	95	5		5	201	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Wednesday, October 26, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
8:39	1	JC			860		300	1	162	1	166	1	206	CC	
8:39	1	JC			860		300	2	175	2	154	2	218	CC	
8:39	1	JC			860		300	3	155	3	155	3	205	CC	
8:39	1	JC			860		300	4	158	4	158	4	204	CC	
8:39	1	JC			860		300	5	161	5	155	5	211	CC	
8:09	X1	MC	500	500				1	119	1		1	212	CC	
8:09	X1	MC	500	500				2	88	2		2	207	CC	
8:09	X1	MC	500	500				3	119	3		3	210	CC	
8:09	X1	MC	500	500				4	131	4		4	213	CC	
8:09	X1	MC	500	500				5	119	5		5	206	CC	

C.J.Cassidy

Consulting Inc.

WELDER QUALIFICATIONS

DATE Friday, October 28, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
8:14	1	JC			860		300	1	162	1	166	1	206	CC	
8:14	1	JC			860		300	2	132	2	133	2	201	CC	
8:14	1	JC			860		300	3	155	3	155	3	205	CC	
8:14	1	JC			860		300	4	141	4	149	4	204	CC	
8:14	1	JC			860		300	5	161	5	155	5	204	CC	
8:40	X1	RC	500	500				1	119	1		1	211	CC	
8:40	X1	RC	500	500				2	98	2		2	207	CC	
8:40	X1	RC	500	500				3	120	3		3	210	CC	
8:40	X1	RC	500	500				4	130	4		4	213	CC	
8:40	X1	RC	500	500				5	120	5		5	211	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Saturday, October 29, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
9:01	1	JC			860		300	1	162	1	166	1	204	CC	
9:01	1	JC			860		300	2	165	2	178	2	204	CC	
9:01	1	JC			860		300	3	155	3	155	3	205	CC	
9:01	1	JC			860		300	4	139	4	144	4	204	CC	
9:01	1	JC			860		300	5	166	5	150	5	204	CC	
10:30	X1	RC	500	500				1	121	1		1	201	CC	
10:30	X1	RC	500	500				2	100	2		2	201	CC	
10:30	X1	RC	500	500				3	100	3		3	203	CC	
10:30	X1	RC	500	500				4	125	4		4	200	CC	
10:30	X1	RC	500	500				5	119	5		5	198	CC	

C.J.Cassidy

Consulting Inc.

WELDER QUALIFICATIONS

DATE Monday, October 31, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
8:55	1	JC			860		300	1	131	1	234	1	201	CC	
8:55	1	JC			860		300	2	116	2	162	2	203	CC	
8:55	1	JC			860		300	3	134	3	146	3	192	CC	
8:55	1	JC			860		300	4	134	4	148	4	199	CC	
8:55	1	JC			860		300	5	144	5	114	5	198	CC	
10:10	X1	RC	500	500				1	121	1		1	201	CC	
10:10	X1	RC	500	500				2	127	2		2	202	CC	
10:10	X1	RC	500	500				3	124	3		3	194	CC	
10:10	X1	RC	500	500				4	116	4		4	205	CC	
10:10	X1	RC	500	500				5	123	5		5	195	CC	
								5		5		5		CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Tuesday, November 01, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
12:15	1	JC			860		300	1	130	1	133	1	198	CC	
12:15	1	JC			860		300	2	141	2	140	2	198	CC	
12:15	1	JC			860		300	3	151	3	145	3	193	CC	
12:15	1	JC			860		300	4	146	4	148	4	199	CC	
12:15	1	JC			860		300	5	132	5	137	5	195	CC	
11:35	X1	RC	500	500				1	91	1		1	186	CC	Warm sample rain coming
11:35	X1	RC	500	500				2	98	2		2	193	CC	
11:35	X1	RC	500	500				3	93	3		3	192	CC	
11:35	X1	RC	500	500				4	88	4		4	196	CC	
11:35	X1	RC	500	500				5	87	5		5	189	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Wednesday, November 02, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
6:34	1	JC			860		300	1	129	1	146	1	216	CC	
6:34	1	JC			860		300	2	153	2	143	2	218	CC	
6:34	1	JC			860		300	3	145	3	143	3	218	CC	
6:34	1	JC			860		300	4	143	4	150	4	223	CC	
6:34	1	JC			860		300	5	156	5	144	5	213	CC	
6:49	X1	RC	500	500				1	115	1		1	207	CC	
6:49	X1	RC	500	500				2	113	2		2	200	CC	
6:49	X1	RC	500	500				3	133	3		3	210	CC	
6:49	X1	RC	500	500				4	99	4		4	206	CC	
6:49	X1	RC	500	500				5	98	5		5	202	CC	

C.J.Cassidy

Consulting Inc.

WELDER QUALIFICATIONS

DATE Saturday, November 05, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
1:58	1	JC			860		300	1	131	1	124	1	199	CC	
1:58	1	JC			860		300	2	116	2	143	2	203	CC	
1:58	1	JC			860		300	3	134	3	146	3	192	CC	
1:58	1	JC			860		300	4	134	4	148	4	199	CC	
1:58	1	JC			860		300	5	144	5	129	5	198	CC	
2:15	X1	RC	500	500				1	125	1		1	206	CC	
2:15	X1	RC	500	500				2	131	2		2	198	CC	
2:15	X1	RC	500	500				3	119	3		3	197	CC	
2:15	X1	RC	500	500				4	121	4		4	200	CC	
2:15	X1	RC	500	500				5	136	5		5	188	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Thursday, November 10, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
1:27	1	JC			860		300	1	140	1	141	1	189	CC	
1:27	1	JC			860		300	2	167	2	143	2	193	CC	
1:27	1	JC			860		300	3	154	3	169	3	200	CC	
1:27	1	JC			860		300	4	145	4	144	4	199	CC	
1:27	1	JC			860		300	5	161	5	155	5	197	CC	
7:23	X1	MC	500	500				1	99	1		1	189	CC	
7:23	X1	MC	500	500				2	101	2		2	199	CC	
7:23	X1	MC	500	500				3	97	3		3	196	CC	
7:23	X1	MC	500	500				4	98	4		4	196	CC	
7:23	X1	MC	500	500				5	102	5		5	197	CC	

C.J. Cassidy

Consulting Inc.

WELDER QUALIFICATIONS

DATE Saturday, November 12, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
1:40	1	JC			860		300	1	142	1	137	1	155	CC	
1:40	1	JC			860		300	2	132	2	130	2	154	CC	
1:40	1	JC			860		300	3	152	3	142	3	157	CC	
1:40	1	JC			860		300	4	133	4	129	4	151	CC	
1:40	1	JC			860		300	5	143	5	143	5	155	CC	
1:53	X1	MC	500	500				1	114	1		1	158	CC	
1:53	X1	MC	500	500				2	120	2		2	156	CC	
1:53	X1	MC	500	500				3	112	3		3	156	CC	
1:53	X1	MC	500	500				4	114	4		4	157	CC	
1:53	X1	MC	500	500				5	115	5		5	157	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Monday, November 14, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
1:27	1	JC			860		300	1	131	1	131	1	151	CC	
1:27	1	JC			860		300	2	130	2	132	2	148	CC	
1:27	1	JC			860		300	3	132	3	126	3	154	CC	
1:27	1	JC			860		300	4	131	4	122	4	153	CC	
1:27	1	JC			860		300	5	127	5	137	5	148	CC	
1:45	X1	RC	500	500				1	116	1		1	129	CC	
1:45	X1	RC	500	500				2	125	2		2	120	CC	
1:45	X1	RC	500	500				3	121	3		3	120	CC	
1:45	X1	RC	500	500				4	123	4		4	105	CC	
1:45	X1	RC	500	500				5	129	5		5	129	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Tuesday, November 15, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
11:20	1	JC			860		300	1	146	1	129	1	183	CC	
11:20	1	JC			860		300	2	134	2	134	2	156	CC	
11:20	1	JC			860		300	3	140	3	139	3	161	CC	
11:20	1	JC			860		300	4	155	4	137	4	165	CC	
11:20	1	JC			860		300	5	145	5	152	5	159	CC	
11:38	X1	RC	500	500				1	119	1		1	167	CC	
11:38	X1	RC	500	500				2	104	2		2	199	CC	
11:38	X1	RC	500	500				3	116	3		3	160	CC	
11:38	X1	RC	500	500				4	113	4		4	174	CC	
11:38	X1	RC	500	500				5	120	5		5	155	CC	

C.J.Cassidy

Consulting Inc.

WELDER QUALIFICATIONS

DATE Wednesday, November 16, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
9:32	1	JC			860		300	1	144	1	137	1	199	CC	
9:32	1	JC			860		300	2	140	2	142	2	200	CC	
9:32	1	JC			860		300	3	152	3	150	3	187	CC	
9:32	1	JC			860		300	4	149	4	150	4	192	CC	
9:32	1	JC			860		300	5	153	5	148	5	193	CC	
10:16	X1	RC	500	500				1	138	1		1	188	CC	
10:16	X1	RC	500	500				2	142	2		2	190	CC	
10:16	X1	RC	500	500				3	135	3		3	191	CC	
10:16	X1	RC	500	500				4	137	4		4	199	CC	
10:16	X1	RC	500	500				5	141	5		5	194	CC	

C.J.Cassidy

Consulting Inc.

WELDER QUALIFICATIONS

DATE Thursday, November 17, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
9:49	1	JC			860		300	1	178	1	163	1	202	CC	
9:49	1	JC			860		300	2	141	2	158	2	209	CC	
9:49	1	JC			860		300	3	153	3	162	3	214	CC	
9:49	1	JC			860		300	4	174	4	151	4	216	CC	
9:49	1	JC			860		300	5	145	5	153	5	211	CC	
10:05	X1	RC	500	500				1	126	1		1	189	CC	
10:05	X1	RC	500	500				2	120	2		2	205	CC	
10:05	X1	RC	500	500				3	124	3		3	196	CC	
10:05	X1	RC	500	500				4	119	4		4	191	CC	
10:05	X1	RC	500	500				5	125	5		5	187	CC	

C.J. Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Friday, November 18, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
10:33	1	JC			860		300	1	146	1	134	1	210	CC	
10:33	1	JC			860		300	2	152	2	136	2	207	CC	
10:33	1	JC			860		300	3	141	3	142	3	208	CC	
10:33	1	JC			860		300	4	136	4	147	4	213	CC	
10:33	1	JC			860		300	5	140	5	152	5	210	CC	
10:40	X1	RC	500	500				1	123	1		1	201	CC	
10:40	X1	RC	500	500				2	116	2		2	187	CC	
10:40	X1	RC	500	500				3	132	3		3	191	CC	
10:40	X1	RC	500	500				4	128	4		4	200	CC	
10:40	X1	RC	500	500				5	130	5		5	195	CC	

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Saturday, November 19, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
8:47	1	JC			860		300	1	144	1	142	1	201	CC	
8:47	1	JC			860		300	2	124	2	129	2	194	CC	
8:47	1	JC			860		300	3	152	3	126	3	195	CC	
8:47	1	JC			860		300	4	130	4	131	4	196	CC	
8:47	1	JC			860		300	5	129	5	144	5	192	CC	
9:05	X1	MC	500	500				1	122	1		1	199	CC	
9:05	X1	MC	500	500				2	117	2		2	200	CC	
9:05	X1	MC	500	500				3	119	3		3	196	CC	
9:05	X1	MC	500	500				4	118	4		4	185	CC	
9:05	X1	MC	500	500				5	129	5		5	188	CC	

C.J.Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Saturday, October 15, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
1	915	East Slope	11.50	7.30	83.95	
2	915	East Slope	11.50	7.30	83.95	
3	919	East Slope	11.50	7.30	83.95	
4	919	East Slope	11.50	7.30	83.95	
5	919	East Slope	11.50	7.30	83.95	
6	919	East Slope	11.50	7.30	83.95	
7	919	East Slope	11.50	7.30	83.95	
8	919	East Slope	11.50	7.30	83.95	

671.60 **sq m**

C.J.Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Friday, October 21, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
9	5321	East Slope	11.50	7.30	83.95	
10	5321	East Slope	11.50	7.30	83.95	
11	5321	East Slope	10.00	7.30	73.00	
12	5321	North Slope	17.00	7.30	124.10	
13	5390	Sump	3.00	7.30	21.90	
14	5390	Floor	67.50	7.30	492.75	

879.65 **sq m**

C.J.Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Monday, October 24, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
15	5328	Floor	68.00	7.30	496.40	
16	5323	Floor	68.00	7.30	496.40	

992.80 **sq m**

C.J.Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Tuesday, October 25, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **PRIMARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
17	5321	North Slope	27.00	7.30	197.10	
18	5321	North Slope	27.00	7.30	197.10	

394.20 **sq m**

PANEL PLACEMENT LOG

C.J. Cassidy
Consulting Inc.

DATE Wednesday, October 26, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
19	5329	Floor	9.00	7.30	65.70	Floor West of Sump
20	5329	Floor	9.00	7.30	65.70	Floor West of Sump

131.40 **sq m**

C.J.Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Friday, October 28, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
21	5323	S.E.Slope	30.00	7.30	219.00	

219.00 **sq m**

C.J.Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Saturday, October 29, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **PRIMARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
22	5323	S.Slope/Floor	30.00	7.30	219.00	

219.00 **sq m**

C.J. Cassidy Consulting Inc.

PANEL PLACEMENT LOG

DATE Monday, October 31, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
23	5331	S.Slope/Floor	30.00	7.30	219.00	
24	5331	S.Slope/Floor	30.00	7.30	219.00	
25	5331	S.Slope/Floor	30.00	7.30	219.00	

657.00 **sq m**

C.J.Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Tuesday, November 01, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
26	5335	North Slope	19.00	7.30	138.70	
27	5335	North Slope	19.00	7.30	138.70	

277.40 **sq m**

PANEL PLACEMENT LOG

C.J. Cassidy
Consulting Inc.

DATE Saturday, November 05, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **PRIMARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
28	5335	North Slope	19.00	7.30	138.70	
28A	5329	North Slope	1.50	7.30	10.95	

149.65 **sq m**

PANEL PLACEMENT LOG

C.J. Cassidy
Consulting Inc.

DATE Thursday, November 10, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
29	5325	W.Slope/Floor	46.00	7.30	335.80	
30	5325	W.Slope/Floor	46.00	7.30	335.80	
31	5325	North Slope	20.00	7.30	146.00	
32	5325	North Slope	20.00	7.30	146.00	

963.60 **sq m**

C.J. Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Saturday, November 12, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
33	5319	W.Slope/Floor	20.00	7.30	146.00	
34	5319	N.W.Corner	19.00	7.30	138.70	
35	5319	N.W.Corner	11.00	7.30	80.30	
36	5319	N.W.Corner	5.00	7.30	36.50	
37	5319	N.W.Corner	10.00	7.30	73.00	
38	5319	N.W.Corner	15.00	7.30	109.50	
					584.00	**sq m**

PANEL PLACEMENT LOG

C.J.Cassidy
Consulting Inc.

DATE Monday, November 14, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **PRIMARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
39	5334	South Floor	8.00	7.30	58.40	
40	5331	S.Slope/Floor	40.50	7.30	295.65	
41	5333	South Slope	7.00	7.30	51.10	
42	5334	South Slope	7.00	7.30	51.10	
43	5334	South Slope	7.00	7.30	51.10	
44	5319	South Slope	26.00	7.30	189.80	

697.15 **sq m**

PANEL PLACEMENT LOG

C.J.Cassidy
Consulting Inc.

DATE Tuesday, November 15, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **PRIMARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
45	5314	W.Slope/Floor	47.00	7.30	343.10	
46	5314	W.Slope/Floor	47.00	7.30	343.10	

686.20 **sq m**

C.J.Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Wednesday, November 16, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
47	5314	W.Slope/Floor	47.00	7.30	343.10	

343.10 **sq m**

PANEL PLACEMENT LOG

C.J.Cassidy
Consulting Inc.

DATE Thursday, November 17, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **PRIMARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
48	5315	W.Slope/Floor	46.00	7.30	335.80	
49	5315	W.Slope/Floor	46.00	7.30	335.80	
50	5315	W.Slope/Floor	46.00	7.30	335.80	

1007.40 **sq m**

PANEL PLACEMENT LOG

C.J.Cassidy
Consulting Inc.

DATE Friday, November 18, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
51	5315	W.Slope/Floor	46.00	7.30	335.80	
52	5315	W.Slope/Floor	47.00	7.30	343.10	

678.90 **sq m**

C.J.Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Saturday, November 19, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
53	5313	W.Slope/Floor	47.00	2.00	94.00	
54	5313	W.Slope/Floor	47.00	7.30	343.10	
55	5313	W.Slope/Floor	47.00	7.30	343.10	
56	5313	W.Slope/Floor	47.00	7.30	343.10	

1123.30 **sq m**

C.J. Cassidy

Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Saturday, October 15, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

					AIR PRESSURE TESTING				PEELS				
Seam NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
1/2	11.5	11:58	JC	1	12:15	12:20	40	40	FTB	FTB	N/A	CC	
2/3	11.5	12:23	JC	1	12:30	12:35	40	40	FTB	FTB	N/A	CC	
3/4	11.5	12:30	JC	1	12:40	12:45	40	40	FTB	FTB	N/A	CC	
4/5	11.5	12:39	JC	1	12:50	12:55	40	40	FTB	FTB	N/A	CC	
5/6	11.5	12:47	JC	1	1:00	1:05	40	40	FTB	FTB	N/A	CC	
6/7	11.5	1:05	JC	1	2:00	2:05	40	40	FTB	FTB	N/A	CC	
7/8	11.5	1:46	JC	1	2:15	2:20	40	40	FTB	FTB	N/A	CC	
TieIn/A	68.0	8:03	JC	1	11:20	11:25	40	39	FTB	FTB	N/A	CC	Panels 1 to 10, Tie In to existing cell.

C.J.Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Friday, October 21, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
1/9	11.5	10:45	JC	1	10:59	11:04	40	40	FTB	FTB	N/A	CC	
9/10	11.5	10:52	JC	1	11:05	11:10	40	40	FTB	FTB	N/A	CC	
10/11	10.0	10:59	JC	1	11:30	11:35	40	40	FTB	FTB	N/A	CC	
11/12	7.3	11:06	JC	1	11:11	11:16	40	39	FTB	FTB	N/A	CC	
13/14	7.3	12:54	JC	1	1:21	1:26	40	40	FTB	FTB	N/A	CC	
E.Butt	68.5	1:31	JC	1	2:12	2:17	40	38	FTB	FTB	N/A	CC	Panels 1 - 10, E. Floor Butt Seam.
TieIn/B1	7.2	1:11	JC	1	2:04	2:09	40	40	FTB	FTB	N/A	CC	Panels 9, Tie In to existing cell.
TieIn/B2	7.2	1:11	JC	1	2:06	2:11	40	40	FTB	FTB	N/A	CC	Panel 10, Tie In to existing cell.
TieIn/B3	7.2	1:11	JC	1	2:10	2:15	40	40	FTB	FTB	N/A	CC	Panel 11, Tie In to existing cell.
TieIn/C	17.0	1:47	JC	1	2:54	2:59	40	40	FTB	FTB	N/A	CC	Panel 12, Tie In to existing cell.

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Monday, October 24, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
14/15	67.5	12:30	JC	1	1:30	1:35	40	39	FTB	FTB	N/A	CC	Floor Panels
15/16	68.0	12:00	JC	1	12:41	12:46	40	40	FTB	FTB	N/A	CC	Floor Panels

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Tuesday, October 25, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
12/17	17.0	8:30	JC	1	9:02	9:07	40	38	FTB	FTB	N/A	CC	
17/18	27.0	10:31	JC	1	10:43	10:48	40	40	FTB	FTB	N/A	CC	
Sump Butt	25.0	10:07	JC	1	10:34	10:39	41	40	FTB	FTB	N/A	CC	Panels 10, 11, 13, 17 & 18 in Sump.

C.J.Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Wednesday, October 26, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
19/20	9.0	9:40	JC	1	10:05	10:10	40	38	FTB	FTB	N/A	CC	
15/16/19/20	14.0	9:55	JC	1	10:16	10:21	40	40	FTB	FTB	N/A	CC	

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Friday, October 28, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
TieIn/D	30.0	4:09	JC	1	4:21	4:26	40	38	FTB	FTB	N/A	CC	Panel 21, Tie In to existing cell.

C.J.Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING SEAM LOG

DATE Saturday, October 29, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
21/22	30.0	10:10	JC	1	11:35	11:40	40	40	FTB	FTB	N/A	CC	

C.J.Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Monday, October 31, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
22/23	30.0	9:45	JC	1	10:05	10:10	40	40	FTB	FTB	N/A	CC	
23/24	30.0	10:13	JC	1	10:25	10:30	40	38	FTB	FTB	N/A	CC	
24/25	30.0	10:31	JC	1	10:45	10:50	40	40	FTB	FTB	N/A	CC	
S.E.Butt	36.0	10:52	JC	1	12:01	12:06	40	40	FTB	FTB	N/A	CC	Panels 21 - 25.

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Tuesday, November 01, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

					AIR PRESSURE TESTING				PEELS				
Seam NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
26/27	19.0	12:52	JC	1	1:05	1:10	40	38	FTB	FTB	N/A	CC	
19/20/26/27	14.5	1:15	JC	1	1:31	1:36	40	40	FTB	FTB	N/A	CC	
18/19/26	29.0	4:07	JC	1	4:31	4:36	40	40	FTB	FTB	N/A	CC	

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Saturday, November 05, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

					AIR PRESSURE TESTING				PEELS				
Seam NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
28/28A	7.3	8:55	JC	1	12:20	12:25	40	40	FTB	FTB	N/A	CC	Cross Seam
27/28	20.0	9:12	JC	1	12:35	12:40	40	39	FTB	FTB	N/A	CC	

C.J. Cassidy

Consulting Inc.

NON-DESTRUCTIVE TESTING SEAM LOG

DATE Thursday, November 10, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

					AIR PRESSURE TESTING				PEELS				
Seam NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
29/30	46.0	1:45	JC	1	2:01	2:06	40	40	FTB	FTB	N/A	CC	
28/31	20.0	2:32	JC	1	2:45	2:50	40	40	FTB	FTB	N/A	CC	
31/32	20.0	3:10	JC	1	3:26	3:31	40	40	FTB	FTB	N/A	CC	
N.Butt/A	11.0	2:40	JC	1	3:05	3:10	40	38	FTB	FTB	N/A	CC	Panel 31, 28 & 20.
FloorButt/A	12.0	2:46	JC	1	3:15	3:20	40	40	FTB	FTB	N/A	CC	Panels 29 & 30 to Panel16 & 20.

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Saturday, November 12, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

					AIR PRESSURE TESTING				PEELS				
Seam NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
32/33	20.0	2:10	JC	1	3:09	3:14	40	40	FTB	FTB	N/A	CC	
33/34	19.0	2:26	JC	1	3:04	3:09	40	40	FTB	FTB	N/A	CC	
34/35	11.0	2:36	JC	1	2:50	2:55	40	40	FTB	FTB	N/A	CC	
36/37	5.0	2:40	JC	1	2:56	3:01	40	40	FTB	FTB	N/A	CC	
37/38	10.0	2:43	JC	1	3:01	3:06	40	40	FTB	FTB	N/A	CC	
N.W.Butt	26.0	2:59	JC	1	3:28	3:33	40	38	FTB	FTB	N/A	CC	Panels 34 - 38.
N.Butt/B	31.0	3:16	JC	1	3:36	3:41	40	39	FTB	FTB	N/A	CC	Panel 29 to Panels 31 - 33 & 38..

C.J.Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Monday, November 14, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

					AIR PRESSURE TESTING				PEELS				
Seam NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
39/40	7.3	1:45	JC	1	2:01	2:06	40	40	FTB	FTB	N/A	CC	
41/42	7.0	2:32	JC	1	2:45	2:50	40	40	FTB	FTB	N/A	CC	
42/43	7.0	3:10	JC	1	3:26	3:31	40	40	FTB	FTB	N/A	CC	
43/44	7.0	2:40	JC	1	3:05	3:10	40	40	FTB	FTB	N/A	CC	
S.W.Butt	47.0	3:22	JC	1	1:24	1:29	40	38	FTB	FTB	N/A	CC	Panels39 - 44.
FloorButt/B	14.5	3:41	JC	1	1:12	1:17	40	40	FTB	FTB	N/A	CC	Panels 39 & 41 to Panel 25.

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Tuesday, November 15, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

					AIR PRESSURE TESTING				PEELS				
Seam NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
39/40/45	47.0	12:15	JC	1	1:11	1:16	40	40	FTB	FTB	N/A	CC	
45/46	47.0	2:30	JC	1	1:28	1:33	40	40	FTB	FTB	N/A	CC	
FloorButt/C	14.5	3:01	JC	1	1:40	1:45	40	40	FTB	FTB	N/A	CC	Panels 45 & 46 to Panel 25.

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Wednesday, November 16, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

					AIR PRESSURE TESTING				PEELS				
Seam NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
46/47	47.0	11:58	JC	1	1:30	1:35	40	40	FTB	FTB	N/A	CC	
FloorButt/D	5.0	12:24	JC	1	1:56	2:01	40	40	FTB	FTB	N/A	CC	Panell 47 to Panel 25.

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Thursday, November 17, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

					AIR PRESSURE TESTING				PEELS				
Seam NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
30/48	46.0	10:44	JC	1	11:16	11:21	40	40	FTB	FTB	N/A	CC	
48/49	46.0	10:17	JC	1	11:23	11:23	40	40	FTB	FTB	N/A	CC	
49/50	46.0	11:49	JC	1	12:35	12:40	40	40	FTB	FTB	N/A	CC	

C.J.Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Friday, November 18, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

					AIR PRESSURE TESTING				PEELS				
Seam NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
50/51	46.0	12:02	JC	1	1:32	1:37	40	40	FTB	FTB	N/A	CC	
51/52	46.0	12:36	JC	1	1:40	1:45	40	39	FTB	FTB	N/A	CC	
FloorButt/E	30.0	1:22	JC	1	1:51	1:56	40	40	FTB	FTB	N/A	CC	Panels 48 - 51 to Panel16.

C.J. Cassidy

Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Saturday, November 19, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

					AIR PRESSURE TESTING				PEELS				
Seam NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
52/53	47.0	11:25	JC	1	1:25	1:30	40	40	FTB	FTB	N/A	CC	
53/54	47.0	10:15	JC	1	1:15	1:20	40	39	FTB	FTB	N/A	CC	
54/55	47.0	10:36	JC	1	1:12	1:17	40	40	FTB	FTB	N/A	CC	
55/56	47.0	11:03	JC	1	1:00	1:05	40	40	FTB	FTB	N/A	CC	
56/47	47.0	12:04	JC	1	2:02	2:07	40	40	FTB	FTB	N/A	CC	
FloorButt/F	31.0	12:47	JC	1	2:39	2:44	40	39	FTB	FTB	N/A	CC	Panels 47 & 52 - 56 to Panel16.

EXTRUSION WELD REPORT

C.J. Cassidy
Consulting Inc.

DATE Saturday, October 15, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **PRIMARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
Zone 1	Beads	Tie In/A	Oct 15	RC	X1	CG	Pass	All "T" Intersections along Tie In/A to existing cell..

C.J.Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Monday, October 17, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
1	Patch	P3	Oct 17	RC	X1	CG	Pass	Upper Slope.
2	Patch	P3	Oct 17	RC	X1	CG	Pass	Upper Slope.
3	Patch	P3	Oct 17	RC	X1	CG	Pass	Upper Slope.
4	Patch	P8	Oct 17	RC	X1	CG	Pass	Toe of Slope.

C.J.Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Friday, October 21, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
5	Patch	1/9	Oct 21	RC	X1	CG	Pass	At Intersection of TieIn/A and TieIn/B1.
6	Patch	9/10	Oct 21	RC	X1	CG	Pass	At Intersection of TieIn/B1 and TieIn/B2.
7	Patch	10/11	Oct 21	RC	X1	CG	Pass	At Intersection of TieIn/B2 and TieIn/B3.
8	Patch	11/12	Oct 21	RC	X1	CG	Pass	At Intersection of TieIn/B3 and TieIn/C.
9	Patch	TieIn/C	Oct 21	RC	X1	CG	Pass	At Achor Trench of Panel 12 and TieIn/C.
Zone 2	Beads	East Butt	Oct 21	RC	X1	CG	Pass	All "T" Intersections along East Butt Seam.

C.J. Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Monday, October 24, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
10	Patch	14/15	Oct 24	MC	X1	CG	Pass	Near South Butt Seam.
11	Patch	15/16	Oct 24	MC	X1	CG	Pass	Destruct #4.

C.J. Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Tuesday, October 25, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
12	Patch	Sump Butt	Oct 25	MC	X1	CG	Pass	At Intersection of 11/12/17.
13	Patch	Sump Butt	Oct 25	MC	X1	CG	Pass	At Intersection of 10/13/17.
14	Patch	Sump Butt	Oct 25	MC	X1	CG	Pass	At Intersection of 13/17/18.

C.J.Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Wednesday, October 26, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
Zone 3	Beads	15/16/19/20	Oct 26	MC	X1	CG	Pass	"T" Intersections.

C.J.Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Monday, October 31, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
15	Patch	8/21	Oct 31 2022	RC	X1	CG	Pass	At Intersection of TieIn/A and TieIn/D.
Zone 4	Beads	S.E.Butt	Oct 31 2022	RC	X1	CG	Pass	All "T" Intersections along South East Butt Seam.

C.J. Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Tuesday, November 01, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
16	Beads	19/20/26/27	Nov 1	RC	X1	CG	Pass	"T" Intersection.
17	Patch	13/14/15	Nov 1	RC	X1	CG	Pass	At Intersection of 13/14/15.
18	Patch	13/18/19	Nov 1	RC	X1	CG	Pass	At Intersection of 13/18/19.
19	Bead	18/19/26	Nov 1	RC	X1	CG	Pass	"T" Intersection.

C.J. Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Saturday, November 05, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
20	Bead	27/28	Nov 5	RC	X1	RC	Pass	"T" Intersection.
21	Patch	28/31	Nov 5	RC	X1	RC	Pass	At Intersection of 28/28A.

C.J. Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Thursday, November 10, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
22	Patch	20/28A	Nov 10	MC	X1	RC	Pass	At Intersection of North Butt/A and Floor Butt/A.
23	Patch	North Butt	Nov 10	MC	X1	RC	Pass	At Intersection of North Butt/A and North Butt/B.
24	Patch	29/30	Nov 10	MC	X1	RC	Pass	At Anchor Trench.
25	Bead	28A/31	Nov 10	MC	X1	RC	Pass	"T" Intersection on North Butt/A.
26	Bead	29/30	Nov 10	MC	X1	RC	Pass	"T" Intersection on Floor Butt/A.

C.J.Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Saturday, November 12, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
Zone 5	Beads	N.W.Butt	Nov 12	MC	X1	CG	Pass	All "T" Intersections along North West Butt.
Zone 6	Beads	N.Butt/B	Nov 12	MC	X1	CG	Pass	All "T" Intersections along North Butt/B.

C.J.Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Monday, November 14, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
Zone 7	Beads	S.W.Butt	Nov 14	RC	X1	CG	Pass	All "T" Intersections along 39/40, S.W.Butt and Floor Butt/B.

C.J. Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Tuesday, November 15, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **PRIMARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
27	Patch	Floor Butt	Nov 15	RC	X1	CG	Pass	At Intersection of Floor Butt/B and Floor Butt/C.
28	Bead	Floor Butt	Nov 15	RC	X1	CG	Pass	"T" Intersections on Floor Butt/C.

C.J.Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Wednesday, November 16, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
29	Patch	Floor Butt	Nov 16	RC	X1	CG	Pass	At Intersection of Floor Butt/C and Floor Butt/D.

C.J. Cassidy

Consulting Inc.

EXTRUSION WELD REPORT

DATE Friday, November 18, 2022

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022**

MATERIAL 60mil HDPE - **PRIMARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
30	Patch	Floor Butt	Nov 18	RC	X1	CG	Pass	At Intersections of Floor Butt/A and Floor Butt/E.
Zone 8	Beads	Foor Butt/E	Nov 18	RC	X1	CG	Pass	All "T" Intersections along Floor Butt/E.

C.J. Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Saturday, November 19, 2022

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022

MATERIAL 60mil HDPE - **PRIMARY LINER**

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
31	Patch	Floor Butt	Nov 19	MC	X1	CG	Pass	At Intersections of Floor Butt/E and Floor Butt/F.
32	Patch	Foor Butt	Nov 19	MC	X1	CG	Pass	At Intersections of Floor Butt/D and Floor Butt/F.
33	Patch	55/56	Nov 19	MC	X1	CG	Pass	Destruct #4.
34	Patch	47/56	Nov 19	MC	X1	CG	Pass	On Floor.
Zone 9	Beads	Foor Butt/F	Nov 19	MC	X1	CG	Pass	All "T" Intersections along Floor Butt/F.

C.J.Cassidy
Consulting Inc.

DESTRUCTIVE TESTING REPORT

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WEST CELL - 2022 **MATERIAL** 60mil HDPE - **PRIMARY LINER**

WELD DATE	D.S. #	SEAM #	TECH INITIAL	WELDER NUMBER	PEEL 1		SHEAR	PEEL 2		SHEAR	PEEL 3		SHEAR	PEEL 4		SHEAR	PEEL 5		SHEAR	QC INITIAL	COMMENTS / LOCATION
					IN	OUT		IN	OUT		IN	OUT		IN	OUT		IN	OUT			
10-24-22	1	15/16	JC	1	124	146	194	142	139	190	126	136	191	130	139	193	128	134	195	CC	North end of seam 15/16.
10-31-22	2	23/24	JC	1	122	132	204	129	145	205	131	119	202	144	154	199	132	154	201	CC	Run out in Anchor Trench.
11-17-22	3	49/50	JC	1	134	141	189	137	127	181	137	137	187	131	128	188	124	127	186	CC	Run out in Anchor Trench.
11-19-22	4	55/56	JC	1	123	123	182	119	135	190	121	138	197	122	128	200	121	126	191	CC	10m from Floor Butt/F.

C.J.Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Wednesday, July 05, 2023

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WATER TREATMENT POND - 2023

MATERIAL 60mil HDPE

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
5:29	1	JC			860		450	1	108	1	113	1	181	MC	
5:29	1	JC			860		450	2	132	2	120	2	179	MC	
5:29	1	JC			860		450	3	138	3	120	3	182	MC	
5:29	1	JC			860		450	4	131	4	125	4	182	MC	
5:29	1	JC			860		450	5	119	5	131	5	181	MC	

C.J. Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Thursday, July 06, 2023

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WATER TREATMENT POND - 2023

MATERIAL 60mil HDPE

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH							
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºF	PREHEAT TEMP ºF	SET TEMP ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
5:15	1	JC			860		450	1	134	1	132	1	176	MC	
5:15	1	JC			860		450	2	118	2	132	2	171	MC	
5:15	1	JC			860		450	3	131	3	121	3	182	MC	
5:15	1	JC			860		450	4	136	4	119	4	179	MC	
5:15	1	JC			860		450	5	137	5	127	5	180	MC	
6:47	Ex1	JC	500	505				1	143	1		1	200	MC	
6:47	Ex1	JC	500	505				2	143	2		2	204	MC	
6:47	Ex1	JC	500	505				3	144	3		3	208	MC	
6:47	Ex1	JC	500	505				4	139	4		4	200	MC	
6:47	Ex1	JC	500	505				5	124	5		5	203	MC	

C.J. Cassidy
Consulting Inc.

PANEL PLACEMENT LOG

DATE Wednesday, July 05, 2023

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WATER TREATMENT POND - 2023 **MATERIAL** 60mil HDPE

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
1	15330	N.Slope/Floor	26.00	7.30	189.80	
2	15330	N.Slope/Floor	26.00	7.30	189.80	
3	15330	South Slope	12.00	7.30	87.60	
4	15330	South Slope	12.00	7.30	87.60	
5	15330	S.W.Corner	10.00	7.30	73.00	
6	15330	S.W.Corner	13.00	7.30	94.90	
7	15330	West Side	12.00	7.30	87.60	
8	15330	West Side	12.00	7.30	87.60	
9	15330	N.W.Corner	11.00	7.30	80.30	
10	15330	N.W.Corner	10.20	7.30	74.46	
11	15320	N.E.Corner	12.00	7.30	87.60	
12	15320	N.E.Corner	14.00	7.30	102.20	
13	15320	East Side	14.00	7.30	102.20	
14	15320	East Side	14.00	7.30	102.20	
15	15320	S.E.Corner	13.00	7.30	94.90	
16	15320	S.E.Corner	12.00	7.30	87.60	

1629.36 **sq m**

C.J. Cassidy

Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Wednesday, July 05, 2023

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WATER TREATMENT POND - 2023 **MATERIAL** 60mil HDPE

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
1/2	26.0	6:02	JC	1	9:11	9:16	40	40	FTB	FTB	N/A	MC	
3/4	12.0	7:12	JC	1	9:10	9:15	40	40	FTB	FTB	N/A	MC	
5/6/7	10.0	9:20	JC	1	9:57	10:02	40	40	FTB	FTB	N/A	MC	
6/7	12.0	9:10	JC	1	9:56	10:01	40	40	FTB	FTB	N/A	MC	
7/8	12.0	7:30	JC	1	9:48	9:53	40	40	FTB	FTB	N/A	MC	
8/9	11.0	8:00	JC	1	9:27	9:32	40	40	FTB	FTB	N/A	MC	
9/10	10.2	8:30	JC	1	9:25	9:30	40	40	FTB	FTB	N/A	MC	
11/12	12.0	10:50	JC	1	9:00	9:05	40	40	FTB	FTB	N/A	MC	
12/13	14.0	10:30	JC	1	8:55	9:00	40	40	FTB	FTB	N/A	MC	
13/14	14.0	10:15	JC	1	8:55	9:00	40	40	FTB	FTB	N/A	MC	
14/15	13.0	12:30	JC	1	10:45	10:50	40	40	FTB	FTB	N/A	MC	
15/16	12.0	1:05	JC	1	10:30	10:35	40	40	FTB	FTB	N/A	MC	

C.J. Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE Thursday, July 06, 2023

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WATER TREATMENT POND - 2023 **MATERIAL** 60mil HDPE

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	**SEAM LENGTH**	**WELD TIME**	**TECH INITIAL**	**WELDER NUMBER**	**TIME START**	**TIME FINISH**	**PSI START**	**PSI FINISH**	**PEEL INSIDE**	**PEEL OUTSIDE**	**VAC-TEST Pass/FAIL**	**QC INITIAL**	**COMMENTS:**
South Butt	14.6	7:50	JC	1	8:15	8:20	40	40	FTB	FTB	N/A	MC	Panels 1 & 2 to Panels 3 & 4.
E.Butt/A	10.0	8:14	JC	1	9:10	9"15	40	40	FTB	FTB	N/A	MC	Panels 11 & 12 to Panel 2.
E.Butt/B	15.0	8:14	JC	1	9:28	9:33	40	40	FTB	FTB	N/A	MC	Panels 12 - 14 to Panel 2.
E.Butt/C	7.3	8:14	JC	1	10:07	10:12	40	40	FTB	FTB	N/A	MC	Panel 15 to Panel 3.
E.Butt/D	4.5	8:14	JC	1	10:07	10:12	40	40	FTB	FTB	N/A	MC	Panel 16 to Panel 3.
W.Butt/A	16.0	8:42	JC	1	9:19	9:24	40	40	FTB	FTB	N/A	MC	Panels 8 - 10 to Panel 1.
W.Butt/B	9.0	8:42	JC	1	9:25	9:30	40	40	FTB	FTB	N/A	MC	Panels 7 & 8 to Panels 1 & 2.
W.Butt/C	12.0	8:42	JC	1	10:02	10:07	40	40	FTB	FTB	N/A	MC	Panel 4 to 5.

EXTRUSION WELD REPORT

C.J. Cassidy
Consulting Inc.

DATE Thursday, July 06, 2023

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WATER TREATMENT POND - 2023 **MATERIAL** 60mil HDPE

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
1	Patch	1/2	July 6	JC	Ex1	MC	Pass	On Floor.
2	Patch	E.Butt	July 6	JC	Ex1	MC	Pass	At Seam 15/16.
3	Patch	E.Butt	July 6	JC	Ex1	MC	Pass	At Intersection of South Butt.
4	Patch	E.Butt	July 6	JC	Ex1	MC	Pass	At Panel 12.
5	Patch	W.Butt	July 6	JC	Ex1	MC	Pass	At Panel 8.
6	Patch	W.Butt	July 6	JC	Ex1	MC	Pass	At Intersection of South Butt.
Zone 1	Beads	S.Butt	July 6	JC	Ex1	MC	Pass	All "T" Intersections along South Butt.
Zone 2	Beads	E.Butt	July 6	JC	Ex1	MC	Pass	All "T" Intersections along East Butt.
Zone 3	Beads	EW.Butt	July 6	JC	Ex1	MC	Pass	All "T" Intersections along West Butt.

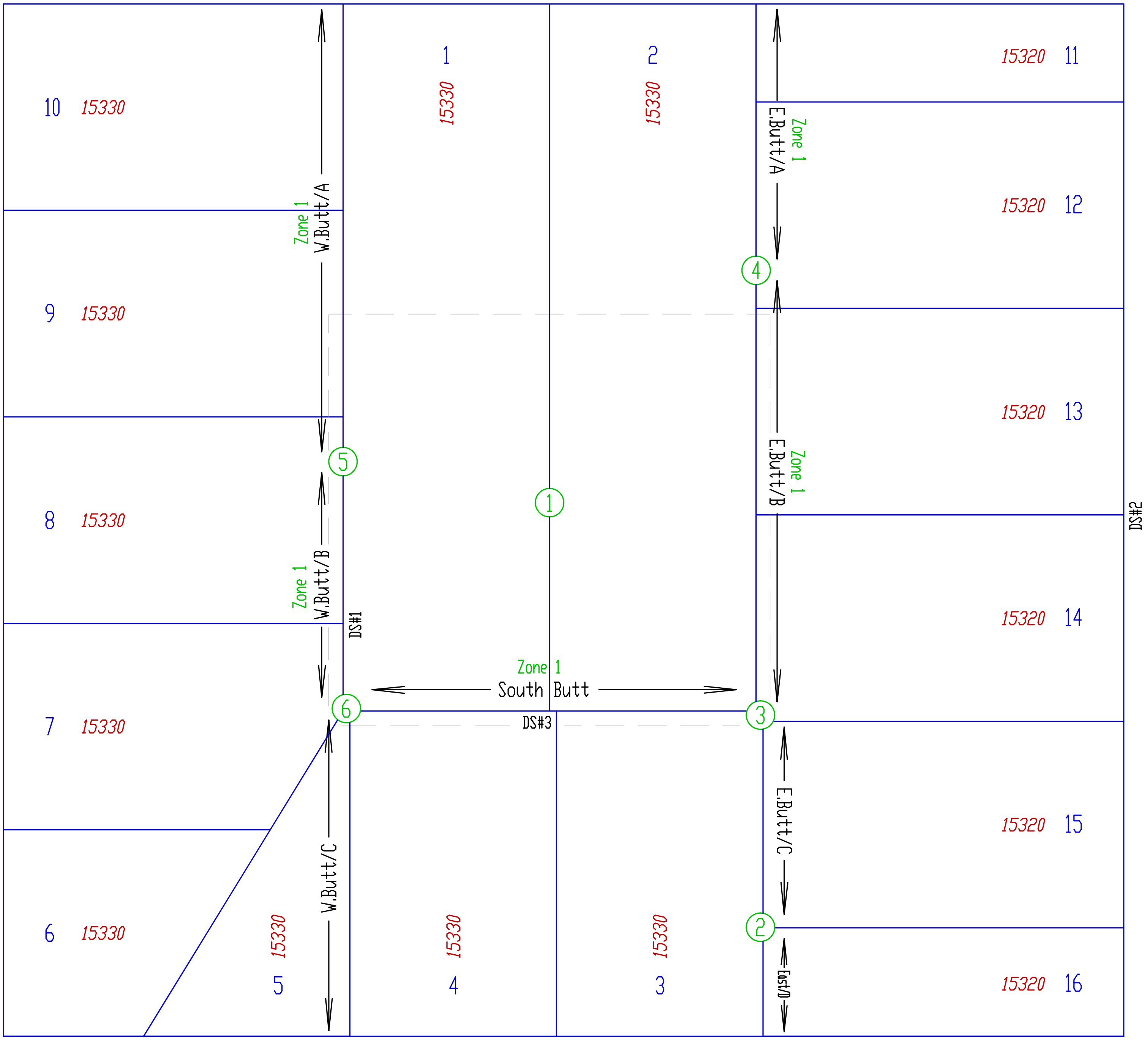
DESTRUCTIVE TESTING REPORT

C.J.Cassidy
Consulting Inc.

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - WATER TREATMENT POND - 2023 **MATERIAL** 60mil HDPE

WELD DATE	D.S. #	SEAM #	TECH INITIAL	WELDER NUMBER	PEEL 1		SHEAR	PEEL 2		SHEAR	PEEL 3		SHEAR	PEEL 4		SHEAR	PEEL 5		SHEAR	QC INITIAL	COMMENTS / LOCATION
					IN	OUT		IN	OUT		IN	OUT		IN	OUT		IN	OUT			
7-05-23	1	7/8	JC	1	137	111	216	127	135	216	121	114	209	138	119	210	181	138	207	MC	At Start of Seam.
7-05-23	2	13/14	JC	1	142	124	201	141	127	203	123	146	203	140	121	208	128	141	202	MC	In Anchor Trench.
7-06-23	3	S.Butt	JC	1	128	129	208	131	136	222	167	133	199	129	132	205	131	127	210	MC	On South Butt Seam.

NORTHWIN LANDFILL - WATER TREATMENT POND



Blue = Liner Red = Roll Numbers Green = Extrusion Welds

DATE: July 10, 2023	C.J. Cassidy Consulting Inc.	NORTHWIN LANDFILL - 2023
SCALE: NTS		CAMPBELL RIVER, B.C.
FILE NAME: CampbellRiverPond-2023		Water Treatment Pond Liner Representative Drawing
DRAWN BY: SSC		
CHECKED BY: CJC		

TESTING, RESEARCH, CONSULTING AND FIELD SERVICES
AUSTIN, TX - USA | ANAHEIM, CA - USA | ANDERSON, SC - USA | GOLD COAST - AUSTRALIA | SUZHOU - CHINA

Date: 2022-10-24

Mail To:	**Bill To:**
David Barbour	
GHD Services	**GHD Services**
	11222680

, ,

e-mail:
david.barbour@ghd.com roxanne.hasior@ghd.com rosemarie.rocca@ghd.com

Dear Barbour,

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:	**Upland LF Northwin LF Phase 1 West**
TRI Job Reference Number:	**76033**
Material(s) Tested:	(1) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

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

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

Nicole Saucedo

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

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Services
Project: Upland LF Northwin LF Phase 1 West

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76033

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-2 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	131	127	122	124	142	**129**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	138	147	169	145	158	**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)	199	196	190	188	186	**192**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2022-10-27

Mail To:
David Barbour
GHD Limited

, ,

Bill To:

GHD Limited
11222680

e-mail:
david.barbou@ghd.com roxanne.hasior@ghd.com rosemarie.rocca@ghd.com

Dear Mr. Barbour,

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:	**Upland Landfill - Northwin Landfill Phase 1 East**
TRI Job Reference Number:	**76142**
Material(s) Tested:	(2) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

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

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

Jennifer T. Tenney

Jennifer Tenney
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Limited
Project: Upland Landfill - Northwin Landfill Phase 1 East

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76142

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-3 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	132	133	130	137	138	**134**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	142	142	145	149	154	**146**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	191	192	192	198	203	**195**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Sample ID: DT-4 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	148	149	145	153	154	**150**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	146	140	146	151	145	**146**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	192	195	190	203	200	**196**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

TRI
TESTING, RESEARCH, CONSULTING AND FIELD SERVICES
AUSTIN, TX - USA | ANAHEIM, CA - USA | ANDERSON, SC - USA | GOLD COAST - AUSTRALIA | SUZHOU - CHINA

Date: 2024-03-19

Mail To:	**Bill To:**
David Barbour **GHD Limited**	**GHD Limited**

, ,

e-mail:
david.barbour@ghd.com roxanne.hasior@ghd.com rosemarie.rocca@ghd.com

Dear Mr. Barbour,

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:	**Upland LF Northwin Landfill Phase 1 West**
TRI Job Reference Number:	**76142**
Material(s) Tested:	(2) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

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

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

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

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Limited
Project: Upland LF Northwin Landfill Phase 1 West

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76142

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-3 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	132	133	130	137	138	**134**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	142	142	145	149	154	**146**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	191	192	192	198	203	**195**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-4 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	148	149	145	153	154	**150**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	146	140	146	151	145	**146**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	192	195	190	203	200	**196**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

TRI
TESTING, RESEARCH, CONSULTING AND FIELD SERVICES
AUSTIN, TX - USA | ANAHEIM, CA - USA | ANDERSON, SC - USA | GOLD COAST - AUSTRALIA | SUZHOU - CHINA

Date: 2022-11-02

Mail To:
David Barbour
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, ,

Bill To:

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11222680

e-mail:
david.barbou@ghd.com roxanne.hasior@ghd.com rosemarie.rocca@ghd.com

Dear Mr. Barbour,

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:	**Upland Landfill - Northwin Landfill Phase 1 East**
TRI Job Reference Number:	**76309**
Material(s) Tested:	(1) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

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

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

Mansukh Patel
Sr. Laboratory Coordinator
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Limited
Project: Upland Landfill - Northwin Landfill Phase 1 East

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76309

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-5 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	135	145	136	136	144	**139**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	149	151	137	146	151	**147**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	198	160	192	194	199	**189**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

TESTING, RESEARCH, CONSULTING AND FIELD SERVICES
AUSTIN, TX - USA | ANAHEIM, CA - USA | ANDERSON, SC - USA | GOLD COAST - AUSTRALIA | SUZHOU - CHINA

Date: 2024-03-19

Mail To:	**Bill To:**
David Barbour **GHD Limited**	**GHD Limited**

, ,

e-mail:
david.barbour@ghd.com roxanne.hasior@ghd.com rosemarie.rocca@ghd.com

Dear Mr. Barbour,

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:	**Upland LF Northwin Landfill Phase 1 West**
TRI Job Reference Number:	**76309**
Material(s) Tested:	(1) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

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

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

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

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Limited
Project: Upland LF Northwin Landfill Phase 1 West

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76309

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-5 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	135	145	136	136	144	**139**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	149	151	137	146	151	**147**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	198	160	192	194	199	**189**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2022-11-11

Mail To:	**Bill To:**
David Barbour	
GHD Limited	**GHD Limited**
	11222680

, ,

e-mail:
david.barbou@ghd.com roxanne.hasior@ghd.com rosemarie.rocca@ghd.com

Dear Mr. Barbour,

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:	**Upland Landfill - Northwin Landfill Phase 1 East**
TRI Job Reference Number:	**76556**
Material(s) Tested:	(1) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

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

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

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

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Limited
Project: Upland Landfill - Northwin Landfill Phase 1 East

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76556

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-6 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	158	152	161	161	162	**159**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	154	154	169	151	148	**155**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	197	194	187	192	196	**193**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

TESTING, RESEARCH, CONSULTING AND FIELD SERVICES
AUSTIN, TX - USA | ANAHEIM, CA - USA | ANDERSON, SC - USA | GOLD COAST - AUSTRALIA | SUZHOU - CHINA

Date: 2024-03-19

Mail To:	**Bill To:**
David Barbour	
GHD Limited	**GHD Limited**

, ,

e-mail:
david.barbour@ghd.com roxanne.hasior@ghd.com rosemarie.rocca@ghd.com

Dear Mr. Barbour,

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:	**Upland LF Northwin Landfill Phase 1 West**
TRI Job Reference Number:	**76556**
Material(s) Tested:	(1) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
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SIP	Separation in the plane of the sheet (leaving the bond intact).
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NON-FTB	100% peel.

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

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

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Limited
Project: Upland LF Northwin Landfill Phase 1 West

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76556

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-6 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	158	152	161	161	162	**159**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	154	154	169	151	148	**155**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	197	194	187	192	196	**193**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2022-11-17

Mail To:	**Bill To:**
David Barbour	
GHD Limited	**GHD Limited**
	11222680

, ,

e-mail:
david.barbou@ghd.com roxanne.hasior@ghd.com rosemarie.rocca@ghd.com

Dear Mr. Barbour,

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:	**Upland Landfill - Northwin Landfill Phase 1 East**
TRI Job Reference Number:	**76686**
Material(s) Tested:	(1) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

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

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

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

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Limited
Project: Upland Landfill - Northwin Landfill Phase 1 East

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76686

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-7 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	145	145	152	141	171	**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)	144	138	149	151	144	**145**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	201	202	193	195	195	**197**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2024-03-19

Mail To:
David Barbour
GHD Limited

Bill To:

GHD Limited

, ,

e-mail:
david.barbour@ghd.com roxanne.hasior@ghd.com rosemarie.rocca@ghd.com

Dear Mr. Barbour,

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:	**Upland LF Northwin Landfill Phase 1 West**
TRI Job Reference Number:	**76686**
Material(s) Tested:	(1) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

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

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Sincerely,
sigfile
geolab

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

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Limited
Project: Upland LF Northwin Landfill Phase 1 West

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76686

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-7 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	145	145	152	141	171	**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)	144	138	149	151	144	**145**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	201	202	193	195	195	**197**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

TRI
TESTING, RESEARCH, CONSULTING AND FIELD SERVICES
AUSTIN, TX - USA | ANAHEIM, CA - USA | ANDERSON, SC - USA | GOLD COAST - AUSTRALIA | SUZHOU - CHINA

Date: 2022-11-21

Mail To:
David Barbour
GHD Limited

, ,

Bill To:

GHD Limited
11222680

e-mail:
david.barbour@ghd.com roxanne.hasior@ghd.com rosemarie.rocca@ghd.com

Dear Mr. Barbour,

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:	**Upland Landfill - Northwin Landfill Phase 1 East**
TRI Job Reference Number:	**76750**
Material(s) Tested:	(2) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

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

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

Jennifer T. Tenney

Jennifer Tenney
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Limited
Project: Upland Landfill - Northwin Landfill Phase 1 East

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76750

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-8 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	155	153	155	163	158	**157**
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)	167	161	168	141	175	**162**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	201	208	200	194	195	**200**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-9 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	160	135	145	172	174	**157**
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)	161	167	166	171	166	**166**
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	190	191	191	198	**193**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2024-03-19

Mail To:	**Bill To:**
David Barbour **GHD Limited**	**GHD Limited**

, ,

e-mail:
david.barbour@ghd.com roxanne.hasior@ghd.com rosemarie.rocca@ghd.com

Dear Mr. Barbour,

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:	**Upland LF Northwin Landfill Phase 1 West**
TRI Job Reference Number:	**76750**
Material(s) Tested:	(2) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

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

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

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

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Limited
Project: Upland LF Northwin Landfill Phase 1 West

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76750

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-8 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	155	153	155	163	158	**157**
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)	167	161	168	141	175	**162**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	201	208	200	194	195	**200**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-9 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	160	135	145	172	174	**157**
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)	161	167	166	171	166	**166**
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	190	191	191	198	**193**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TESTING, RESEARCH, CONSULTING AND FIELD SERVICES
AUSTIN, TX - USA | ANAHEIM, CA - USA | ANDERSON, SC - USA | GOLD COAST - AUSTRALIA | SUZHOU - CHINA

Date: 2022-11-23

Mail To:
David Barbour
GHD Services

, ,

Bill To:

GHD Services
11222680

e-mail:
david.barbour@ghd.com roxanne.hasior@ghd.com rosemarie.rocca@ghd.com

Dear Barbour,

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:	**Upland LF Northwin LF Phase 1 West**
TRI Job Reference Number:	**76826**
Material(s) Tested:	(1) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

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

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

Jennifer T. Tenney

Jennifer Tenney
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Services
Project: Upland LF Northwin LF Phase 1 West

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 76826

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-10 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	139	150	145	169	147	**150**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	158	150	156	157	160	**156**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	203	202	193	195	195	**198**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Appendix F

Field Inspection Notes

Matthew Senior

From: Roxy Hasior
Sent: Friday, October 27, 2023 10:34 AM
To: Matthew Senior
Subject: FW: Upland Landfill Drainrock Placement June 6th

CompleteRepositor 088877
Description: Upland Landfill
JobNo: 8877
OperatingCentre: 08
RepoEmail: 088877@ghd.com
RepoType: Project

From: David Barbour <David.Barbour@ghd.com>
Sent: Wednesday, June 7, 2023 8:56 AM
To: Roxy Hasior <Roxanne.Hasior@ghd.com>; Rose Marie Rocca <RoseMarie.Rocca@ghd.com>
Subject: Upland Landfill Drainrock Placement June 6th

Hi Rose and Roxy,

I received a text from Terry Stuart yesterday that they were placing drain rock in the new cell at the Upland Landfill and that I should come do an inspection. I went to site at 3 pm to take a look.

Crew had begun placing drain rock on the cell floor. Terry informed me the material is from the Upland pit and GHD had received sieve analysis results last year.

Activities had stopped for the day when I arrived.

Generally it looked like they were following proper procedures for filling. A roadway higher than1 m high was being used to haul material into the cell before it was spread.

The drain rock contained some large stones some as big as 8”. It was mostly clean, but not washed, but it looked like the operators had scoped up some material from the pit floor (4th photo below).

The old landfill has been completely excavated (5th photo) an material moved to the new cell.

Let me know if you have any questions,

David Barbour
P. Eng.
Construction Engineering Inspector & Waste Management Engineer

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138 East 7th Avenue Suite 100 Vancouver British Columbia V5T 1M6 Canada
T 778 347-1339 **E** david.barbour@ghd.com

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A30D

David Barbour
P. Eng.
Construction Engineering Inspector & Waste Management Engineer

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Matthew Senior

From: Roxy Hasior
Sent: Friday, October 27, 2023 10:33 AM
To: Matthew Senior
Subject: FW: Upland Landfill June 13

CompleteRepository 088877
Description: Upland Landfill
JobNo: 8877
OperatingCentre: 08
RepoEmail: 088877@ghd.com
RepoType: Project

From: David Barbour <David.Barbour@ghd.com>
Sent: Friday, June 16, 2023 11:01 AM
To: Roxy Hasior <Roxanne.Hasior@ghd.com>; Rose Marie Rocca <RoseMarie.Rocca@ghd.com>
Subject: Upland Landfill June 13

Hi Rose and Roxy,

I inspected the Upland landfill on June 13.

I provided direction to excavator operators to have geocomposite installed to the grade break and tied into the drainrock at the cell floor where slopes have been adjusted due to the fill on top of the bedrock on the west side of the cell. (First two photos below)

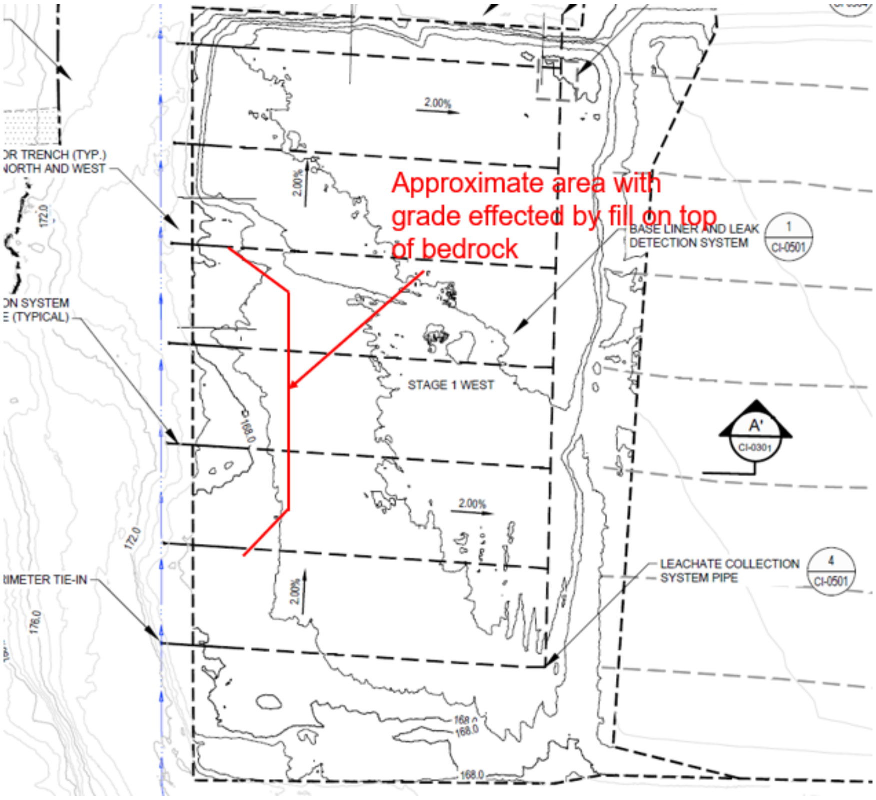
The operators were mounding drain rock on top of the leachate pipes in the bottom of the cell after exposing top of pipe by hand to confirm exact location. Depth of coverage was acceptable >300 mm .

I estimate an area about 20 x 30 m on the south east part of the cell has some silty sand mixed with the drainrock. Approximately 20% of the loads hauled into this area appear to be affected. Northwin has spoken to the operators loading the material and asked them to avoid loading material that is sitting directly on the pit floor..

Most of the oversized rock had been removed from the cell.

The final two photos are of the old landfill. Most of the waste has been remove although some cleanup is required.

Let me know if you have any questions,


2.00%
2.00%
OR TRENCH (TYP.)
NORTH AND WEST
172.0
Approximate area with grade effected by fill on top of bedrock
BASE LINER AND LEAK DETECTION SYSTEM
1
CI-0501
ON SYSTEM
E (TYPICAL)
STAGE 1 WEST
168.0
A'
CI-0301
2.00%
172.0
LEACHATE COLLECTION SYSTEM PIPE
4
CI-0501
RIMETER TIE-IN
2.00%
176.0
168.0
168.0
168.0

CAT

David Barbour
P. Eng.
Construction Engineering Inspector & Waste Management Engineer

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Connect

Matthew Senior

From: Roxy Hasior
Sent: Wednesday, November 1, 2023 2:11 PM
To: Matthew Senior
Cc: David Barbour
Subject: FW: Uplands Landfill Update week of July 3-7

CompleteRepositor 088877
Description: Upland Landfill
JobNo: 8877
OperatingCentre: 08
RepoEmail: 088877@ghd.com
RepoType: Project

From: David Barbour <David.Barbour@ghd.com>
Sent: Sunday, July 9, 2023 5:16 PM
To: Roxy Hasior <Roxanne.Hasior@ghd.com>; Rose Marie Rocca <RoseMarie.Rocca@ghd.com>; Riley Kieser <Riley.Kieser@ghd.com>
Subject: Uplands Landfill Update week of July 3-7

Hello all,

Uplands is near completion of Cell1 West.

Remaining work is to:

- install drainrock in the sump
- complete woven geotextile installation (95% complete to date)
- Install leachate pump and related infrastructure

Work completed last week included:

- Regraded a portion of the top of effluent holding pond and installed geotextile and HDPE liner on top of existing liner.
- Completed geo-composite installation on west slope of Cell 1 West and tie in to drain rock
- Installed 2 leachate pump out riser pipes

There are a few things we should discuss when I am back after July 18th.

- Uplands has installed a pipe connecting to one of the leachate collection pipes that ties into Cell 1 East sump with the intention of pumping from Cell 1 West sump into the pipe.
- We are waiting for the final QA data from Joe Cassidy which includes the recent work on the effluent pond
- I am not sure what information is outstanding from Uplands such as material submittals and as built surveys

Geotextile on effluent pond before HDPE