PREPARED BY:

CONESTOGA-ROVERS & ASSOCIATES

4141 Davis Creek Court
Kalamazoo, MI 49001-0838
Telephone: (269) 344-1230 Fax: (269) 344-8558
www.CRAworld.com

DRAFT

SUBMITTAL

DATE: September 20, 2010

SUBMITTAL NO.: 56913-36

PROJECT NO.: 56913

PROJECT NAME: 12th Street Landfill

CONSTRUCTION MANAGER: Jodie Dembowske
Conestoga-Rovers & Associates
4141 Davis Creek Court
Kalamazoo, MI 49001

ENGINEER: Mr. Greg Carli
Conestoga-Rovers & Associates
261 Martindale Rd., Unit #3
St. Catherines, ON L2W 1A2

SUPPLIER: Mid-America Lining

SUBCONTRACTOR: TRI/ Environmental Inc.
9063 Bee Cave Road
Austin, TX 78733

MANUFACTURER: Agru America

QTY	SPEC. NO. & TITLE	DWG. NO.	DESCRIPTION / LOCATION INSTALLED
1	02072 LLDPE Geomembrane		Textured 40 mil Liner - Testing Peel and Shear

CONSTRUCTION MANAGER'S / ENGINEER'S REVIEW AND APPROVAL:

US EPA RECORDS CENTER REGION 5
421838

COPY TO: File 056913

COMPLETED BY: Jodie Dembowske
[Please Print]

SIGNED: Jodie Dembowske

Form1030

TRI/Environmental, Inc.
A Texas Research International Company

DRAFT

Date: 2010-09-18

Mail To:
Jodie Dembowske
CRA Eng.
4141 Davis Creek Court
Kalamazoo , MI , 49001

e-mail:jdembowske@craworld.com

Bill To:

CRA Eng.
56913

Dear Ms. Dembowske,

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:	**12TH STREET LANDFILL**
TRI Job Reference Number:	**4036**
Material(s) Tested:	(8) 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,

Melissa Hunter

Melissa Hunter
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

http://www.geosyntheticstesting.com
9063 Bee Caves Road / Austin, Tx. 78733 / 512.263.2101 / fax: 512.263.2558

TRI/Environmental, Inc.
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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: CRA Eng.
Project: 12TH STREET LANDFILL

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 4036

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-1 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	82	89	86	83	79	**84**
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)	83	78	84	82	87	**82**
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)	107	112	108	113	110	**110**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-2 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	92	94	89	92	91	**91**
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)	83	80	85	81	85	**83**
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)	109	115	111	109	111	**111**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: CRA Eng.
Project: 12TH STREET LANDFILL

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 4036

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-3 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	84	84	87	83	82	**84**
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)	86	89	88	85	89	**87**
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)	110	111	109	108	109	**109**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-4 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	84	83	76	88	90	**84**
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)	75	86	81	77	88	**81**
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)	105	106	106	108	107	**106**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: CRA Eng.
Project: 12TH STREET LANDFILL

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 4036

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-5 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	83	83	83	84	81	**83**
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)	82	91	83	87	86	**86**
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)	107	110	109	110	115	**110**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-6 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	87	88	84	84	86	**86**
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)	89	90	87	92	88	**89**
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)	88	93	89	92	94	**91**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI/Environmental, Inc.
A Texas Research International Company

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: CRA Eng.
Project: 12TH STREET LANDFILL

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 4036

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-7 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	91	93	101	94	86	**93**
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)	87	96	80	91	92	**89**
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)	111	110	112	108	110	**110**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-8 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	89	90	82	84	85	**86**
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)	91	95	90	95	93	**93**
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)	101	106	109	110	106	**106**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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PREPARED BY:

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Telephone: (269) 344-1230 Fax: (269) 344-8558
www.CRAworld.com

DRAFT

SUBMITTAL

DATE: September 21, 2010

SUBMITTAL NO.: 56913-37

PROJECT NO.: 56913

PROJECT NAME: 12th Street Landfill

CONSTRUCTION MANAGER: Jodie Dembowske
Conestoga-Rovers & Associates
4141 Davis Creek Court
Kalamazoo, MI 49001

ENGINEER: Mr. Greg Carli
Conestoga-Rovers & Associates
261 Martindale Rd., Unit #3
St. Catherines, ON L2W 1A2

SUPPLIER: Mid-America Lining

SUBCONTRACTOR: TRI/ Environmental Inc.
9063 Bee Cave Road
Austin, TX 78733

MANUFACTURER: Agru America

QTY	SPEC. NO. & TITLE	DWG. NO.	DESCRIPTION / LOCATION INSTALLED
1	02072 LLDPE Geomembrane		Textured 40 mil Liner - Testing Peel and Shear – 2nd Batch

CONSTRUCTION MANAGER'S / ENGINEER'S REVIEW AND APPROVAL:

COPY TO: File 056913

COMPLETED BY: Jodie Dembowske
[Please Print]

SIGNED: Jodie Dembowske

Form1030

TRI/Environmental, Inc.
A Texas Research International Company

DRAFT

Date: 2010-09-21

Mail To:
Jodie Dembowske
Conestoga Rovers and Associates
4141 DAvis Creek Road
Kalamazoo , MI , 49001

e-mail:jdembowske@craworld.com

Bill To:

Conestoga Rovers and Associates
Project # : 56913

Dear Dembowske,

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:	**12th Street Landfill**
TRI Job Reference Number:	**4052**
Material(s) Tested:	(5) Heat Fusion Weld Seam(s) (2) Single Extrusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

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

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

Sincerely,

Melissa Hunter

Melissa Hunter
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

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TRI/Environmental, Inc.
A Texas Research International Company

DRAFT

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Conestoga Rovers and Associates
Project: 12th Street Landfill

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 4052

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-9 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	90	91	90	89	88	**90**
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)	90	90	78	92	88	**88**
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)	110	111	111	115	110	**111**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-10 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	105	94	98	88	92	**95**
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)	86	104	85	101	89	**93**
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)	111	110	114	113	115	**113**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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

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A Texas Research International Company

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Conestoga Rovers and Associates
Project: 12th Street Landfill

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 4052

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-11 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	91	83	83	83	89	**86**
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)	97	88	96	93	93	**93**
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)	115	114	120	120	119	**118**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-12 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	91	91	90	95	95	**92**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	81	83	85	88	86	**84**
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)	109	107	111	110	113	**110**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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A Texas Research International Company

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Conestoga Rovers and Associates
Project: 12th Street Landfill

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 4052

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-13 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	96	98	94	98	99	**97**
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)	94	93	92	91	99	**94**
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)	106	104	106	110	108	**107**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI/Environmental, Inc.
A Texas Research International Company

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS - SINGLE TRACK
TRI Client: Conestoga Rovers and Associates
Project: 12th Street Landfill

Material: 40 mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 4052

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-14 | Weld: Single Extrusion						
Side: Peel						**Peel**
Peel Strength (ppi)	88	92	87	88	88	**88**
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)	86	87	89	86	86	**87**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-15 | Weld: Single Extrusion						
Side: Peel						**Peel**
Peel Strength (ppi)	87	81	88	72	88	**83**
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)	86	86	85	88	89	**87**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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PREPARED BY:

DRAFT

CONESTOGA-ROVERS & ASSOCIATES

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SUBMITTAL

DATE: September 22, 2010

SUBMITTAL NO.: 56913-38

PROJECT NO.: 56913

PROJECT NAME: 12th Street Landfill

CONSTRUCTION MANAGER: Jodie Dembowske
Conestoga-Rovers & Associates
4141 Davis Creek Court
Kalamazoo, MI 49001

ENGINEER: Mr. Greg Carli
Conestoga-Rovers & Associates
261 Martindale Rd., Unit #3
St. Catherines, ON L2W 1A2

SUPPLIER: Mid-America Lining

SUBCONTRACTOR: TRI/ Environmental Inc.
9063 Bee Cave Road
Austin, TX 78733

MANUFACTURER: Agru America

QTY	SPEC. NO. & TITLE	DWG. NO.	DESCRIPTION / LOCATION INSTALLED
1	02072 LLDPE Geomembrane		Textured 40 mil Liner - Testing Peel and Shear – 3rd Batch

CONSTRUCTION MANAGER'S / ENGINEER'S REVIEW AND APPROVAL:

COPY TO: File 056913

COMPLETED BY: Jodie Dembowske
[Please Print]

SIGNED: Jodie Dembowske

Form1030

TRI/Environmental, Inc.
A Texas Research International Company

DRAFT

Date: 2010-09-22

Mail To:
Jodie Dembowske
Conestoga Rovers and Associates
4141 DAvis Creek Road
Kalamazoo , MI , 49001

e-mail:jdembowske@craworld.com

Bill To:

Conestoga Rovers and Associates
Project # : 56913

Dear Dembowske,

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:	**12th Street Landfill**
TRI Job Reference Number:	**4080**
Material(s) Tested:	(3) Heat Fusion Weld Seam(s) (1) Single Extrusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

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

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

Sincerely,

Jennifer T. Tenney

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

http://www.geosyntheticstesting.com
9063 Bee Caves Road / Austin, Tx. 78733 / 512.263.2101 / fax: 512.263.2558

TRI/Environmental, Inc.
A Texas Research International Company

DRAFT

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Conestoga Rovers and Associates
Project: 12th Street Landfill

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 4080

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-16 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	80	82	79	79	86	**81**
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)	84	80	81	83	81	**82**
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)	111	112	109	106	109	**110**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-17 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	90	88	83	91	85	**87**
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)	89	88	82	90	87	**87**
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)	109	105	107	110	109	**108**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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

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DRAFT

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Conestoga Rovers and Associates
Project: 12th Street Landfill

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 4080

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-18 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	94	81	93	86	89	**89**
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)	83	90	94	88	90	**89**
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)	109	107	109	110	112	**109**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI/Environmental, Inc.
A Texas Research International Company

DRAFT

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS - SINGLE TRACK

TRI Client: Conestoga Rovers and Associates

Project: 12th Street Landfill

Material: 40 mil. LLDPE

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

TRI Log#: 4080

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-19 | Weld: Single Extrusion						
Side: Peel						**Peel**
Peel Strength (ppi)	87	92	90	88	90	**89**
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)	89	87	87	92	89	**89**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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TRI/Environmental, Inc.
A Texas Research International Company

Date: 2010-09-27

Mail To:
Jodie Dembowske
Conestoga Rovers and Associates
4141 DAvis Creek Road
Kalamazoo , MI , 49001

e-mail:jdembowske@craworld.com

Bill To:

Conestoga Rovers and Associates
Project # : 56913

Dear Dembowske,

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:	**12th Street Landfill**
TRI Job Reference Number:	**4132**
Material(s) Tested:	(3) 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.
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FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

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

Sincerely,

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

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TRI/Environmental, Inc.
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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Conestoga Rovers and Associates
Project: 12th Street Landfill

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 4132

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-20 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	84	78	80	96	91	**86**
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)	91	90	88	96	87	**90**
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)	105	106	112	115	108	**109**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-21 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	83	89	85	87	92	**87**
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)	97	93	112	102	86	**98**
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)	102	105	108	110	104	**106**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Conestoga Rovers and Associates
Project: 12th Street Landfill

Material: 40mil. LLDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 4132

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-22 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	87	72	81	90	94	**85**
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)	88	87	84	92	89	**88**
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)	97	98	99	100	96	**98**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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