SECTION

7 OF 20

E.5

TYPE B (16-OZ.) GEOTEXTILE CONFORMANCE TEST RESULTS

Precision Geosynthetic Laboratories

April 9, 2010

Joseph Voss
Envirotech Engineering & Consulting, Inc.
P.O. Box 6029
Enid, OK 73702

RE: ***Environmental Restoration Disposal Facility (ERDF)***

Dear Mr. Voss:

Thank you for consulting Precision Geosynthetic Laboratories (PGL) for your material testing needs.

Enclosed is the ***final*** laboratory report for the testing of four (4) 16oz Non-woven Geotextile samples specified on the proceeding sheet which were received on April 7, 2010.

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the intended final use and purpose of the material.

By accepting the data and results presented on this report, the Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liabilities in excess of the aforementioned limit.

The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself.

It is a policy of the company to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. ***Retained conformance samples are disposed of after one (1) month.*** On the other hand, should you need us to keep them at longer time, please advise us in writing.

Should you have any questions or if we may be of further service to you, please do not hesitate to contact us at telephone number: 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Carmelo V. Zantua
Technical/Laboratory Director

Enclosure: (Job No. G100262)

1160 North Gilbert Street, Anaheim, CA. 92801, Tel# 714-520-9631, Fax#714-520-9637

Precision Geosynthetic Laboratories

CLIENT: ***Envirotech Engineering & Consulting, Inc.***
PROJECT: ***Environmental Restoration Disposal Facility (ERDF)***

VERIFICATION OF MATERIAL PROPERTIES
(PGL Job No. G100262)

MATERIAL DESCRIPTION: 16oz Non-woven Geotextile

SAMPLED BY: PGL at SKAPS, GA

DATE RECEIVED: April 7, 2010 **DATE REPORTED:** April 9, 2010

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PGL CONTROL NUMBER
R#14758.001	65374
R#14758.010	65375
R#14758.019	65376
R#14758.028	65377

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
ASTM D5261	Mass per Unit Area
ASTM D4632	Grab Tensile
ASTM D4533	Trapezoid Tear Strength
ASTM D4833	Puncture Resistance
ASTM D5199	Thickness

TEST CONDITIONS: The samples were conditioned for a minimum of one hour in the laboratory at 22 ± 2°C (71.6 ± 3.6°F) and at 60 ± 10% relative humidity prior to test.

TEST RESULTS:

The test results are summarized in Tables 1 to 4.

PRECISION GEOSYNTHETIC LABORATORIES

GAI-LAP
Initial: CVZ #:0.13
DATE: 4/9/2010

Carmelo V. Zantua
Technical/Laboratory Director

1160 North Gilbert Street, Anaheim, CA. 92801, Tel# 714-520-9631, Fax#714-520-9637

TABLE

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/7/2010**
Date Reported: **4/9/2010**
Client Sample ID: **R#14758.001**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100262**
PGL Control No.: **65374**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	202	206	212	208	200	198	195	206	200	201	203	5	195	212	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	16.3	16.6	16.8	16.8	16.8						16.7	0.2	16.3	16.8	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	506	541	512	501	561	550	498	502	506	500	518	23	498	561	390
	TD	630	598	621	640	635	667	620	598	638	640	629	21	598	667	
	Apparent Breaking Elongation (percent)															
	MD	77	75	74	80	69	73	77	76	73	75	75	3	69	80	
	TD	107	114	114	107	110	114	107	112	120	123	113	6	107	123	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	300	298	306	278	311	306	320	298	297	306	303	10	278	320	240
		306	312	300	312	302										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	206	198	198	207	212	220	219	226	230	271	219	21	198	271	150
	TD	306	311	298	362	340	342	360	400	412	422	355	44	298	422	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 1

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/7/2010**
Date Reported: **4/9/2010**
Client Sample ID: **R#14758.010**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100262**
PGL Control No.: **65375**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	206	204	225	206	203	211	208	212	206	220	210	7	203	225	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	17.1	16.8	16.8	16.7	16.5						16.8	0.2	16.5	17.1	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	550	498	538	512	506	508	512	503	506	501	513	17	498	550	390
	TD	650	600	598	592	606	581	598	600	638	612	607	21	581	650	
	Apparent Breaking Elongation (percent)															
	MD	79	80	80	79	73	74	75	75	73	80	77	3	73	80	
	TD	104	102	94	99	102	99	94	102	105	101	100	4	94	105	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	306	311	304	302	306	401	388	378	360	300	326	36	300	401	240
		320	311	301	306	302										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	206	230	298	300	278	262	259	242	306	275	266	33	206	306	150
	TD	400	398	342	298	290	380	375	300	298	306	339	45	290	400	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

ISO 9001 - 2000

TABLE

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/7/2010**
Date Reported: **4/9/2010**
Client Sample ID: **R#14758.019**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100262**
PGL Control No.: **65376**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	202	204	203	200	195	206	220	212	202	204	205	7	195	220	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	16.6	16.8	16.7	16.8	17.1						16.8	0.2	16.6	17.1	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	488	506	501	503	498	550	542	490	500	506	508	21	488	550	390
	TD	590	608	598	598	600	612	606	598	700	631	614	32	590	700	
	Apparent Breaking Elongation (percent)															
	MD	77	80	86	82	73	79	80	80	79	80	80	3	73	86	
	TD	104	101	107	104	110	107	102	101	114	113	106	5	101	114	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	306	301	298	288	268	298	300	306	301	302	297	10	268	306	240
		298	282	302	306	300										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	198	206	211	200	207	210	206	199	190	192	202	7	190	211	150
	TD	320	306	298	288	275	280	298	306	308	400	308	35	275	400	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/7/2010**
Date Reported: **4/9/2010**
Client Sample ID: **R#14758.028**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100262**
PGL Control No.: **65377**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi)															
	provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"															
		206	198	198	206	202	202	211	206	198	199	203	5	198	211	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"															
		16.6	16.3	17.1	16.9	16.7						16.7	0.3	16.3	17.1	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and															
	1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	460	480	500	506	511	502	503	488	506	502	496	16	460	511	390
	TD	620	612	680	598	620	700	541	560	512	590	603	58	512	700	
	Apparent Breaking Elongation (percent)															
	MD	79	80	86	82	86	81	83	80	83	83	82	2	79	86	
	TD	104	102	107	110	114	107	114	113	113	114	110	5	102	114	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring															
	clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.															
		302	302	300	298	298	300	300	298	278	298	297	8	278	306	240
		280	298	306	300	301										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	230	198	206	220	342	230	260	200	198	201	228	44	198	342	150
	TD	301	206	312	298	206	400	388	378	406	400	330	78	206	406	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

April 9, 2010

Joseph Voss
Envirotech Engineering & Consulting, Inc.
P.O. Box 6029
Enid, OK 73702

RE: ***Environmental Restoration Disposal Facility (ERDF)***

Dear Mr. Voss:

Thank you for consulting Precision Geosynthetic Laboratories (PGL) for your material testing needs.

Enclosed is the ***final*** laboratory report for the testing of four (4) 16oz Non-woven Geotextile samples specified on the proceeding sheet which were received on April 7, 2010.

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the intended final use and purpose of the material.

By accepting the data and results presented on this report, the Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liabilities in excess of the aforementioned limit.

The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself.

It is a policy of the company to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. ***Retained conformance samples are disposed of after one (1) month.*** On the other hand, should you need us to keep them at longer time, please advise us in writing.

Should you have any questions or if we may be of further service to you, please do not hesitate to contact us at telephone number: 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Carmelo V. Zantua
Technical/Laboratory Director

Enclosure: (Job No. G100263)

1160 North Gilbert Street, Anaheim, CA. 92801, Tel# 714-520-9631, Fax#714-520-9637

Precision Geosynthetic Laboratories

CLIENT: ***Envirotech Engineering & Consulting, Inc.***
PROJECT: ***Environmental Restoration Disposal Facility (ERDF)***

VERIFICATION OF MATERIAL PROPERTIES
(PGL Job No. G100263)

MATERIAL DESCRIPTION: 16oz Non-woven Geotextile

SAMPLED BY: PGL at SKAPS, GA

DATE RECEIVED: April 7, 2010 **DATE REPORTED:** April 9, 2010

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PGL CONTROL NUMBER
R#14758.037	65378
R#14758.046	65379
R#14758.055	65380
R#14758.064	65381

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
ASTM D5261	Mass per Unit Area
ASTM D4632	Grab Tensile
ASTM D4533	Trapezoid Tear Strength
ASTM D4833	Puncture Resistance
ASTM D5199	Thickness

TEST CONDITIONS: The samples were conditioned for a minimum of one hour in the laboratory at 22 ± 2°C (71.6 ± 3.6°F) and at 60 ± 10% relative humidity prior to test.

TEST RESULTS:

The test results are summarized in Tables 1 to 4.

PRECISION GEOSYNTHETIC LABORATORIES

GAI-LAP

Initial: CVZ #:0.13

DATE: 4/9/2010

Carmelo V. Zantua
Technical/Laboratory Director

1160 North Gilbert Street, Anaheim, CA. 92801, Tel# 714-520-9631, Fax#714-520-9637

TABLE

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/7/2010**
Date Reported: **4/9/2010**
Client Sample ID: **R#14758.037**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100263**
PGL Control No.: **65378**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	211	206	220	212	200	198	196	190	199	200	203	9	190	220	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	16.8	16.6	16.8	16.8	16.8						16.8	0.1	16.6	16.8	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	460	500	480	479	498	478	468	490	480	495	483	13	460	500	390
	TD	560	578	561	598	612	608	612	606	598	590	592	20	560	612	
	Apparent Breaking Elongation (percent)															
	MD	77	73	80	78	76	81	77	76	73	74	76	3	73	81	
	TD	110	104	109	107	110	107	107	110	113	107	108	3	104	113	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	298	306	312	302	312	320	298	306	312	306	306	6	298	320	240
		302	311	302	298	300										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	230	275	306	280	275	260	245	238	240	236	259	25	230	306	150
	TD	320	312	306	312	306	280	362	398	400	378	337	43	280	400	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/7/2010**
Date Reported: **4/9/2010**
Client Sample ID: **R#14758.046**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100263**
PGL Control No.: **65379**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	206	208	207	208	212	200	198	195	206	200	204	5	195	212	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	17.1	17.1	16.8	16.7	16.8						16.9	0.2	16.7	17.1	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	500	480	498	480	478	498	478	506	480	498	490	11	478	506	390
	TD	560	598	630	620	612	602	598	638	620	621	610	22	560	638	
	Apparent Breaking Elongation (percent)															
	MD	77	73	82	75	82	82	86	82	79	81	80	4	73	86	
	TD	107	114	102	107	110	114	115	120	120	110	112	6	102	120	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	302	306	302	302	304	330	298	280	278	306	303	12	278	330	240
		312	302	302	312	303										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	238	206	242	220	211	198	206	205	202	202	213	15	198	242	150
	TD	286	238	248	250	262	280	278	262	300	298	270	21	238	300	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE :

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/7/2010**
Date Reported: **4/9/2010**
Client Sample ID: **R#14758.055**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100263**
PGL Control No.: **65380**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	220	211	206	202	202	200	198	199	206	202	204	7	198	220	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	16.6	16.5	17.1	17.1	16.8						16.8	0.3	16.5	17.1	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	480	506	570	487	480	500	498	489	498	500	501	26	480	570	390
	TD	680	598	606	620	598	606	578	638	611	600	614	28	578	680	
	Apparent Breaking Elongation (percent)															
	MD	77	76	73	79	73	82	86	81	80	77	78	4	73	86	
	TD	107	114	113	112	107	112	132	113	113	117	114	7	107	132	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	362	380	298	306	312	300	300	298	306	304	312	24	298	380	240
		302	302	312	302	302										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	207	212	202	202	198	203	202	198	206	202	203	4	198	212	150
	TD	283	300	298	306	312	320	288	278	282	306	297	14	278	320	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 1

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/7/2010**
Date Reported: **4/9/2010**
Client Sample ID: **R#14758.064**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100263**
PGL Control No.: **65381**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	202	207	208	200	202	206	212	200	206	202	204	4	200	212	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	16.8	17.0	17.1	17.0	16.8						16.9	0.1	16.8	17.1	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	488	498	500	511	502	504	480	498	506	500	499	9	480	511	390
	TD	638	641	612	600	600	638	618	606	599	630	618	17	599	641	
	Apparent Breaking Elongation (percent)															
	MD	77	73	71	80	73	80	79	75	75	77	76	3	71	80	
	TD	104	107	113	112	110	114	112	111	110	110	110	3	104	114	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	312	320	312	300	298	306	312	306	302	298	307	6	298	320	240
		306	312	302	306	311										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	206	230	198	198	206	212	206	238	210	206	211	13	198	238	150
	TD	284	238	299	306	298	300	302	298	280	298	290	20	238	306	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

April 9, 2010

Joseph Voss
Envirotech Engineering & Consulting, Inc.
P.O. Box 6029
Enid, OK 73702

RE: ***Environmental Restoration Disposal Facility (ERDF)***

Dear Mr. Voss:

Thank you for consulting Precision Geosynthetic Laboratories (PGL) for your material testing needs.

Enclosed is the ***final*** laboratory report for the testing of four (4) 16oz Non-woven Geotextile samples specified on the proceeding sheet which were received on April 7, 2010.

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the intended final use and purpose of the material.

By accepting the data and results presented on this report, the Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liabilities in excess of the aforementioned limit.

The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself.

It is a policy of the company to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. ***Retained conformance samples are disposed of after one (1) month.*** On the other hand, should you need us to keep them at longer time, please advise us in writing.

Should you have any questions or if we may be of further service to you, please do not hesitate to contact us at telephone number: 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Carmelo V. Zantua
Technical/Laboratory Director

Enclosure: (Job No. G100264)

1160 North Gilbert Street, Anaheim, CA. 92801, Tel# 714-520-9631, Fax#714-520-9637

Precision Geosynthetic Laboratories

CLIENT: ***Envirotech Engineering & Consulting, Inc.***
PROJECT: ***Environmental Restoration Disposal Facility (ERDF)***

VERIFICATION OF MATERIAL PROPERTIES
(PGL Job No. G100264)

MATERIAL DESCRIPTION: 16oz Non-woven Geotextile

SAMPLED BY: PGL at SKAPS, GA

DATE RECEIVED: April 7, 2010 **DATE REPORTED:** April 9, 2010

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PGL CONTROL NUMBER
R#14758.073	65382
R#14758.082	65383
R#14758.091	65384
R#14758.100	65385

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
ASTM D5261	Mass per Unit Area
ASTM D4632	Grab Tensile
ASTM D4533	Trapezoid Tear Strength
ASTM D4833	Puncture Resistance
ASTM D5199	Thickness

TEST CONDITIONS: The samples were conditioned for a minimum of one hour in the laboratory at 22 ± 2°C (71.6 ± 3.6°F) and at 60 ± 10% relative humidity prior to test.

TEST RESULTS:

The test results are summarized in Tables 1 to 4.

PRECISION GEOSYNTHETIC LABORATORIES

GAI-LAP

Initial: CVZ #:0.13

DATE: 4/9/2010

Carmelo V. Zantua
Technical/Laboratory Director

1160 North Gilbert Street, Anaheim, CA. 92801, Tel# 714-520-9631, Fax#714-520-9637

TABLE 1

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/7/2010**
Date Reported: **4/9/2010**
Client Sample ID: **R#14758.073**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100264**
PGL Control No.: **65382**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	200	195	198	203	204	200	211	205	204	200	202	4	195	211	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	16.8	17.0	16.9	16.9	16.8						16.9	0.1	16.8	17.0	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	550	548	548	560	575	561	550	498	535	507	543	24	498	575	390
	TD	612	599	638	641	655	675	583	636	648	652	634	28	583	675	
	Apparent Breaking Elongation (percent)															
	MD	77	80	77	85	86	85	81	73	86	83	81	5	73	86	
	TD	104	99	102	104	105	107	99	104	101	114	104	4	99	114	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	290	285	293	288	290	306	302	304	311	306	298	10	282	311	240
		311	302	306	290	282										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	242	220	212	206	290	245	238	240	232	220	234	24	206	290	150
	TD	312	300	298	288	306	312	300	312	302	302	303	7	288	312	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/7/2010**
Date Reported: **4/9/2010**
Client Sample ID: **R#14758.082**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100264**
PGL Control No.: **65383**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	209	212	206	207	200	200	203	204	206	208	205	4	200	212	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	16.8	16.8	17.0	17.0	16.9						16.9	0.1	16.8	17.0	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	538	550	544	560	550	561	591	578	561	578	561	17	538	591	390
	TD	638	600	596	606	621	640	638	648	675	660	632	26	596	675	
	Apparent Breaking Elongation (percent)															
	MD	77	76	79	80	79	79	83	83	86	82	80	3	76	86	
	TD	104	102	99	102	104	104	102	104	102	105	103	2	99	105	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	302	302	306	312	302	312	306	312	302	312	306	4	298	312	240
		306	308	306	298	311										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	220	236	221	238	248	230	226	212	206	210	225	14	206	248	150
	TD	238	260	298	306	312	280	312	306	302	300	291	25	238	312	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 1

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/7/2010**
Date Reported: **4/9/2010**
Client Sample ID: **R#14758.091**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100264**
PGL Control No.: **65384**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	215	215	208	209	210	211	200	206	212	208	209	4	200	215	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	16.8	17.1	17.3	17.0	16.9						17.0	0.2	16.8	17.3	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	506	488	502	498	506	512	506	498	498	506	502	7	488	512	390
	TD	598	606	632	595	638	672	666	638	678	691	641	34	595	691	
	Apparent Breaking Elongation (percent)															
	MD	77	74	81	81	80	81	75	78	77	94	80	6	74	94	
	TD	97	102	106	99	105	104	107	104	107	105	104	3	97	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	306	312	306	311	298	290	282	306	300	306	302	8	282	312	240
		312	302	306	298	302										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	230	206	189	192	207	212	230	220	218	210	211	14	189	230	150
	TD	230	228	248	255	260	306	298	303	304	320	275	35	228	320	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/7/2010**
Date Reported: **4/9/2010**
Client Sample ID: **R#14758.100**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100264**
PGL Control No.: **65385**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	208	198	206	212	205	205	208	205	198	199	204	5	198	212	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	17.0	17.0	17.1	17.2	16.9						17.0	0.1	16.9	17.2	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	460	450	490	495	502	506	500	498	498	500	490	19	450	506	390
	TD	560	620	598	638	678	700	599	599	606	612	621	41	560	700	
	Apparent Breaking Elongation (percent)															
	MD	77	75	80	79	73	81	75	77	77	77	77	2	73	81	
	TD	94	104	102	110	113	120	95	104	102	107	105	8	94	120	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	300	298	288	288	302	306	311	302	306	298	296	9	281	311	240
		288	298	283	281	288										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	206	220	236	224	226	230	198	199	206	201	215	14	198	236	150
	TD	260	300	290	245	320	332	288	302	208	260	281	37	208	332	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

April 13, 2010

Joseph Voss
Envirotech Engineering & Consulting, Inc.
P.O. Box 6029
Enid, OK 73702

RE: ***Environmental Restoration Disposal Facility (ERDF)***

Dear Mr. Voss:

Thank you for consulting Precision Geosynthetic Laboratories (PGL) for your material testing needs.

Enclosed is the ***final*** laboratory report for the testing of six (6) 16oz Non-woven Geotextile samples specified on the proceeding sheet which were received on April 9, 2010.

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the intended final use and purpose of the material.

By accepting the data and results presented on this report, the Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liabilities in excess of the aforementioned limit.

The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself.

It is a policy of the company to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. ***Retained conformance samples are disposed of after one (1) month.*** On the other hand, should you need us to keep them at longer time, please advise us in writing.

Should you have any questions or if we may be of further service to you, please do not hesitate to contact us at telephone number: 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Carmelo V. Zantua
Technical/Laboratory Director

Enclosure: (Job No. G100273)

1160 North Gilbert Street, Anaheim, CA. 92801, Tel# 714-520-9631, Fax#714-520-9637

Precision Geosynthetic Laboratories

CLIENT: ***Envirotech Engineering & Consulting, Inc.***
PROJECT: ***Environmental Restoration Disposal Facility (ERDF)***

VERIFICATION OF MATERIAL PROPERTIES
(PGL Job No. G100273)

MATERIAL DESCRIPTION: 16oz Non-woven Geotextile

SAMPLED BY: PGL at SKAPS, GA

DATE RECEIVED: April 9, 2010 **DATE REPORTED:** April 13, 2010

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PGL CONTROL NUMBER
R#14758.109	65421
R#14758.118	65422
R#14758.127	65423
R#14758.136	65424
R#14758.145	65425
R#14758.154	65426

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
ASTM D5261	Mass per Unit Area
ASTM D4632	Grab Tensile
ASTM D4533	Trapezoid Tear Strength
ASTM D4833	Puncture Resistance
ASTM D5199	Thickness

TEST CONDITIONS: The samples were conditioned for a minimum of one hour in the laboratory at 22 ± 2°C (71.6 ± 3.6°F) and at 60 ± 10% relative humidity prior to test.

TEST RESULTS:

The test results are summarized in Tables 1 to 6.

PRECISION GEOSYNTHETIC LABORATORIES

GAI-LAP

Initial: CVZ #:0.13

DATE: 4/13/2010

Carmelo V. Zantua
Technical/Laboratory Director

1160 North Gilbert Street, Anaheim, CA. 92801, Tel# 714-520-9631, Fax#714-520-9637

TABLE

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/9/2010**
Date Reported: **4/13/2010**
Client Sample ID: **R#14758.109**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100273**
PGL Control No.: **65421**

		SPECIMENS														Proj.
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs. MARV
METHOD	DESCRIPTION															
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	206	208	208	204	203	205	206	208	205	204	206	2	203	208	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	16.6	16.8	16.8	17.0	16.9						16.8	0.2	16.6	17.0	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	477	498	500	502	511	506	496	500	512	502	500	10	477	512	390
	TD	550	560	577	606	577	588	590	606	580	600	583	19	550	606	
	Apparent Breaking Elongation (percent)															
	MD	77	75	73	80	77	81	73	77	73	80	77	3	73	81	
	TD	97	94	94	104	99	93	110	107	97	104	100	6	93	110	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	303	298	291	288	290	293	300	300	302	304	297	6	288	306	240
		302	306	298	298	289										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	206	211	207	206	198	192	198	300	306	302	233	49	192	306	150
	TD	302	312	306	320	360	377	306	312	300	298	319	27	298	377	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 1

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/9/2010**
Date Reported: **4/13/2010**
Client Sample ID: **R#14758.118**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100273**
PGL Control No.: **65422**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"															
		212	206	202	203	200	208	206	201	204	203	204	3	200	212	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"															
		16.8	17.0	16.8	16.8	16.6						16.8	0.2	16.6	17.0	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	464	500	571	530	498	500	512	531	511	530	515	28	464	571	390
	TD	620	612	638	640	606	612	630	577	588	598	612	21	577	640	
	Apparent Breaking Elongation (percent)															
	MD	77	73	75	78	75	79	80	76	79	76	77	2	73	80	
	TD	104	107	104	102	107	102	101	97	94	97	101	4	94	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.															
		299	306	302	311	306	303	298	298	299	300	302	5	291	311	240
		302	311	302	300	291										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	200	282	290	288	202	248	242	300	298	289	264	38	200	300	150
	TD	300	298	306	289	298	288	299	306	312	301	300	7	288	312	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

ISO 9001 - 2000

TABLE

MATERIAL PROI ES

CLIENT: Enviroteh Engineering & Consulting, Inc.
PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/9/2010**
Date Reported: **4/13/2010**
Client Sample ID: **R#14758.127**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100273**
PGL Control No.: **65423**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	203	204	205	206	200	203	198	200	206	204	203	3	198	206	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	16.5	16.6	16.8	16.9	16.8						16.7	0.1	16.5	16.9	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	560	575	630	601	578	530	520	511	506	500	551	44	500	630	390
	TD	632	706	598	606	631	634	677	655	700	660	650	37	598	706	
	Apparent Breaking Elongation (percent)															
	MD	90	94	92	87	83	79	82	86	87	82	86	5	79	94	
	TD	103	101	99	104	105	107	104	104	102	104	103	2	99	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	298	299	306	342	301	312	306	311	301	302	304	13	288	342	240
		312	298	297	290	288										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	212	200	199	206	208	211	202	203	206	199	205	5	199	212	150
	TD	282	300	278	262	304	300	298	288	272	306	289	15	262	306	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 1

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/9/2010**
Date Reported: **4/13/2010**
Client Sample ID: **R#14758.136**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100273**
PGL Control No.: **65424**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	205	206	201	205	204	203	201	202	205	204	204	2	201	206	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	17.0	16.9	16.8	16.6	16.3						16.7	0.3	16.3	17.0	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	530	511	499	502	532	520	489	500	506	512	510	14	489	532	390
	TD	630	577	598	612	620	631	620	577	588	600	605	20	577	631	
	Apparent Breaking Elongation (percent)															
	MD	83	77	74	70	77	73	74	71	75	80	75	4	70	83	
	TD	102	95	95	97	104	101	102	93	93	102	98	4	93	104	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	288	306	298	306	307	306	312	302	298	288	301	9	286	312	240
		291	286	311	303	311										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	208	206	202	198	197	190	188	189	190	192	196	7	188	208	150
	TD	290	302	289	290	287	288	290	292	300	298	293	5	287	302	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

ISO 9001 - 2000

TABLE F

MATERIAL PROF ES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/9/2010**
Date Reported: **4/13/2010**
Client Sample ID: **R#14758.145**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100273**
PGL Control No.: **65425**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	215	208	212	208	210	203	206	208	208	206	208	3	203	215	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	16.9	16.8	17.0	16.6	16.7						16.8	0.2	16.6	17.0	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	500	500	511	530	520	512	500	500	500	512	508	10	500	530	390
	TD	631	600	621	577	630	612	620	630	578	601	610	20	577	631	
	Apparent Breaking Elongation (percent)															
	MD	80	77	77	73	80	77	76	76	79	80	78	2	73	80	
	TD	104	94	102	97	104	104	104	102	94	93	100	5	93	104	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	300	306	302	298	299	295	300	292	288	289	297	6	288	306	240
		292	292	306	300	299										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	188	188	168	198	206	204	208	212	201	202	197	13	168	212	150
	TD	300	298	289	292	302	306	301	298	300	292	298	5	289	306	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/9/2010**
Date Reported: **4/13/2010**
Client Sample ID: **R#14758.154**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100273**
PGL Control No.: **65426**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	220	215	208	203	204	208	208	206	212	208	209	5	203	220	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	17.1	17.1	17.3	17.2	16.8						17.1	0.2	16.8	17.3	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	510	512	489	490	506	512	500	499	501	511	503	9	489	512	390
	TD	560	577	588	590	600	612	600	577	620	612	594	19	560	620	
	Apparent Breaking Elongation (percent)															
	MD	77	73	80	77	76	77	76	75	75	80	77	2	73	80	
	TD	93	90	87	97	94	104	102	95	104	104	97	6	87	104	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	301	306	340	298	286	301	306	301	312	300	304	12	286	340	240
		298	298	306	312	300										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	180	188	206	211	206	230	260	300	288	290	236	45	180	300	150
	TD	282	280	245	301	331	306	300	302	298	290	294	22	245	331	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

April 13, 2010

Joseph Voss
Envirotech Engineering & Consulting, Inc.
P.O. Box 6029
Enid, OK 73702

RE: ***Environmental Restoration Disposal Facility (ERDF)***

Dear Mr. Voss:

Thank you for consulting Precision Geosynthetic Laboratories (PGL) for your material testing needs.

Enclosed is the ***final*** laboratory report for the testing of six (6) 16oz Non-woven Geotextile samples specified on the proceeding sheet which were received on April 9, 2010.

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the intended final use and purpose of the material.

By accepting the data and results presented on this report, the Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liabilities in excess of the aforementioned limit.

The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself.

It is a policy of the company to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. ***Retained conformance samples are disposed of after one (1) month.*** On the other hand, should you need us to keep them at longer time, please advise us in writing.

Should you have any questions or if we may be of further service to you, please do not hesitate to contact us at telephone number: 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Carmelo V. Zantua
Technical/Laboratory Director

Enclosure: (Job No. G100274)

1160 North Gilbert Street, Anaheim, CA. 92801, Tel# 714-520-9631, Fax#714-520-9637

Precision Geosynthetic Laboratories

CLIENT: ***Envirotech Engineering & Consulting, Inc.***
PROJECT: ***Environmental Restoration Disposal Facility (ERDF)***

VERIFICATION OF MATERIAL PROPERTIES
(PGL Job No. G100274)

MATERIAL DESCRIPTION: 16oz Non-woven Geotextile

SAMPLED BY: PGL at SKAPS, GA

DATE RECEIVED: April 9, 2010 **DATE REPORTED:** April 13, 2010

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PGL CONTROL NUMBER
R#14758.163	65427
R#14758.172	65428
R#14758.181	65429
R#14758.190	65430
R#14758.199	65431
R#14758.208	65432

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
ASTM D5261	Mass per Unit Area
ASTM D4632	Grab Tensile
ASTM D4533	Trapezoid Tear Strength
ASTM D4833	Puncture Resistance
ASTM D5199	Thickness

TEST CONDITIONS: The samples were conditioned for a minimum of one hour in the laboratory at 22 ± 2°C (71.6 ± 3.6°F) and at 60 ± 10% relative humidity prior to test.

TEST RESULTS:

The test results are summarized in Tables 1 to 6.

PRECISION GEOSYNTHETIC LABORATORIES

GAI-LAP

Initial: CVZ #:0.13

DATE: 4/13/2010

Carmelo V. Zantua
Technical/Laboratory Director

1160 North Gilbert Street, Anaheim, CA. 92801, Tel# 714-520-9631, Fax#714-520-9637

TABLE

MATERIAL PROF ES

CLIENT: Enviroter gineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/9/2010**
Date Reported: **4/13/2010**
Client Sample ID: **R#14758.163**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100274**
PGL Control No.: **65427**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	208	208	203	204	201	198	206	202	208	202	204	3	198	208	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	17.1	16.9	17.0	16.8	16.7						16.9	0.2	16.7	17.1	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	489	500	511	520	531	498	506	502	512	560	513	20	489	560	390
	TD	630	578	599	631	641	620	621	612	600	600	613	19	578	641	
	Apparent Breaking Elongation (percent)															
	MD	77	73	75	78	75	75	75	77	77	87	77	4	73	87	
	TD	104	94	94	105	101	101	110	107	94	102	101	6	94	110	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	300	302	305	298	295	297	289	297	306	312	297	7	289	312	240
		289	290	292	300	290										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	222	211	206	230	240	220	221	230	231	220	223	10	206	240	150
	TD	251	260	248	306	302	311	301	288	306	308	288	25	248	311	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 1

MATERIAL PROPERTIES

CLIENT: Enviroteen Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/9/2010**
Date Reported: **4/13/2010**
Client Sample ID: **R#14758.172**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100274**
PGL Control No.: **65428**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	215	206	203	205	206	207	210	210	210	203	207	4	203	215	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	17.0	17.0	16.8	16.8	16.6						16.8	0.2	16.6	17.0	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	500	512	503	498	500	502	506	511	502	499	503	5	498	512	390
	TD	560	571	582	530	582	600	580	542	586	542	567	23	530	600	
	Apparent Breaking Elongation (percent)															
	MD	77	76	75	77	77	77	76	80	76	77	77	1	75	80	
	TD	99	104	102	99	104	106	102	107	102	101	103	3	99	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	298	306	302	311	302	304	302	289	297	306	302	6	289	312	240
		302	312	302	298	298										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	277	288	240	227	228	230	298	280	242	230	254	28	227	298	150
	TD	298	306	312	300	277	289	290	281	288	290	293	11	277	312	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE

MATERIAL PROI ES

CLIENT: Enviroteo.. Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/9/2010**
Date Reported: **4/13/2010**
Client Sample ID: **R#14758.181**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100274**
PGL Control No.: **65429**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi)															
	provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"															
		210	208	204	206	212	200	199	200	206	203	205	4	199	212	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"															
		17.2	17.1	16.9	17.1	16.7						17.0	0.2	16.7	17.2	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and															
	1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	498	506	512	489	500	500	500	512	500	503	502	7	489	512	390
	TD	638	544	598	600	602	612	608	578	589	600	597	24	544	638	
	Apparent Breaking Elongation (percent)															
	MD	80	82	81	73	77	78	80	76	77	76	78	3	73	82	
	TD	104	94	94	104	102	107	102	99	94	97	100	5	94	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring															
	clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.															
		300	302	300	298	300	302	306	312	298	300	302	4	298	312	240
		300	300	302	306	299										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	271	260	206	238	241	240	230	211	200	200	230	25	200	271	150
	TD	288	298	306	311	302	289	302	311	306	302	302	8	288	311	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE

MATERIAL PROI ES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/9/2010**
Date Reported: **4/13/2010**
Client Sample ID: **R#14758.190**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100274**
PGL Control No.: **65430**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	206	208	208	206	207	200	203	204	205	202	205	3	200	208	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	16.8	17.0	17.0	17.0	16.9						16.9	0.1	16.8	17.0	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	520	512	530	520	488	498	500	512	500	498	508	13	488	530	390
	TD	520	512	560	598	600	612	602	638	620	630	589	44	512	638	
	Apparent Breaking Elongation (percent)															
	MD	77	80	81	81	80	77	77	77	76	78	78	2	76	81	
	TD	94	90	95	104	107	107	105	102	104	104	101	6	90	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	302	311	307	292	288	289	290	286	300	301	299	8	286	312	240
		298	306	312	300	298										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	206	208	206	203	208	198	306	312	304	290	244	51	198	312	150
	TD	306	312	340	320	298	298	306	312	289	281	306	17	281	340	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE

MATERIAL PRO ES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/9/2010**
Date Reported: **4/13/2010**
Client Sample ID: **R#14758.199**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100274**
PGL Control No.: **65431**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	200	200	203	204	205	206	202	204	200	203	203	2	200	206	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	16.8	17.0	16.8	16.8	16.8						16.9	0.1	16.8	17.0	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	500	511	506	489	506	512	520	500	500	506	505	8	489	520	390
	TD	560	578	588	600	612	635	620	612	600	602	601	21	560	635	
	Apparent Breaking Elongation (percent)															
	MD	80	77	76	77	77	77	80	76	80	77	78	2	76	80	
	TD	94	93	104	102	104	102	107	104	101	104	101	5	93	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	290	302	305	301	304	306	312	306	302	289	302	6	289	312	240
		302	312	301	300	298										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	205	200	206	311	288	298	289	206	202	212	242	48	200	311	150
	TD	302	306	300	320	333	316	298	288	306	311	308	13	288	333	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE

MATERIAL PRO ES

CLIENT: Enviroteh Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/9/2010**
Date Reported: **4/13/2010**
Client Sample ID: **R#14758.208**
Material Description: **16oz Non-Woven Geotextile**

QC'd By: **Byeo**
PGL Job No.: **G100274**
PGL Control No.: **65432**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	201	202	211	203	204	206	208	207	200	205	205	3	200	211	155
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	17.0	16.9	17.0	16.8	16.8						16.9	0.1	16.8	17.0	16.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	489	491	506	502	489	497	488	500	451	460	487	18	451	506	390
	TD	520	560	572	530	600	612	545	601	598	638	577	38	520	638	
	Apparent Breaking Elongation (percent)															
	MD	77	74	73	75	74	77	76	77	75	76	75	1	73	77	
	TD	94	104	102	94	107	105	99	104	104	102	101	5	94	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended to or beyond the outer edges of the clamping plates.	306	311	302	304	301	298	338	340	306	298	305	15	290	340	240
		299	298	290	292	290										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	230	206	212	203	198	198	206	211	220	221	210	10	198	230	150
	TD	300	298	298	306	302	312	302	311	302	306	304	5	298	312	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

E.6

GEOCOMPOSITE CONFORMANCE TEST RESULTS

Precision Geosynthetic Laboratories

Initial: EVZ #:0.13
DATE: 05/04/2010

Joseph Voss
Envirotech Engineering & Consulting, Inc.
P.O. Box 6029
Enid, OK 73702

Dear Mr. Voss:

Thank you for consulting Precision Geosynthetic Laboratories (PGL) for your material testing needs.

Enclosed is the ***final*** laboratory report for the conformance testing of four (4) 300 mil Double-Sided Geocomposite samples.

PROJECT NAME: Environmental Restoration Disposal Facility (ERDF)

REFERENCE PGL JOB NO.: G100311

DATE RECEIVED: April 15 and April 30, 2010 **DATE REPORTED:** May 4, 2010

SAMPLED BY: PGL at SKAPS, GA

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PGL CONTROL NUMBER
R#354710001	
Geocomposite	65624
Geonet	65628
Geotextile (Top)	66023
Geotextile (Bottom)	66024
R#354710019	
Geocomposite	65625
Geonet	65629
Geotextile (Top)	66025
Geotextile (Bottom)	66026
R#354710037	
Geocomposite	65626
Geonet	65630
Geotextile (Top)	66027
Geotextile (Bottom)	66028
R#354710055	
Geocomposite	65627
Geonet	65631
Geotextile (Top)	66029
Geotextile (Bottom)	66030

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geonet Component	
ASTM D1505	Density
ASTM D1777	Thickness
ASTM D5261	Mass per Unit Area
ASTM D1603	Carbon Black Content
ASTM D1238	Melt Flow Index

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

Precision Geosynthetic Laboratories

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geocomposite	
ASTM D7005	Ply Adhesion
ASTM D4716	Transmissivity
Geotextile Component	
ASTM D5261	Mass Per Unit Area
ASTM D4632	Grab Tensile
ASTM D4533	Trapezoid Tear Strength
ASTM D4833	Puncture Resistance
ASTM D5199	Thickness
ASTM D4491	Permittivity
ASTM D4751	Apparent Opening Size

TEST CONDITIONS: The samples were conditioned for a minimum of one hour in the laboratory at 22 ± 2°C (71.6 ± 3.6°F) and at 60 ± 10% relative humidity prior to test.

TEST RESULTS: The test results are summarized in Tables 1 to 4.

PRECISION GEOSYNTHETIC LABORATORIES

Belinda Jade R. Yeo
Quality Assurance

Carmelo V. Zantua
Technical/Laboratory Director

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

TABLE

MATERIAL PR IES

CLIENT: Enviro... ...gineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/15/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710001**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **65624**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
GEONET COMPONENT: C#65628															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	316	308	312	308	308	306	308	308	309	310	309	3	306	316	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9556	0.9556	0.9556								0.9556	0.0000	0.9556	0.9556	> 94
ASTM D1238 Melt Flow Index (grams/ 10 minutes)															
Procedure A *Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190° C and 2.16kg load.*	0.1981	0.1978	0.1978								0.1979	0.0002	0.1978	0.1981	0.1 - 1.1
ASTM D1603 Carbon Black Content (percent)	2.49	2.52									2.50	0.02	2.49	2.52	2 - 3
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.6	42.4	42.3	41.5	42.5						42.3	0.5	41.5	42.6	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.4° C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	2.47E-03	2.71E-03									2.59E-03	1.66E-04	2.47E-03	2.71E-03	1 x 10^{-3}
Flow Rate (gal/min)															
MD	1.21	1.32									1.26	0.08	1.21	1.32	
Transmissivity (gal/min/ft)															
MD	11.95	13.08									12.51	0.80	11.95	13.08	
Test Set-Up: ***Plate*** ***Geocomposite*** XXXXXX ***Plate***															
Thickness : 363.5 ***mils (Before)*** ***Thickness :*** 332 ***mils (After)***															
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
Full scale force range used for testing: 100 lbs.															
Side A of Composite															
MD	9.3	10.6	9.7	8.5	8.8						9.4	0.8	8.5	10.6	> 1
Side B of Composite															
MD	10.3	10.1	7.9	9.3	7.6						9.0	1.2	7.6	10.3	> 1

*MARV- Minimum Average Roll Values
MD - MACHINE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE

MATERIAL PR[illegible] IES

CLIENT: Envirotech Engineering & Consulting, Inc.
PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/15/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710019**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **65625**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
GEONET COMPONENT:	C#65629															
ASTM D1777	Thickness (mils)															
Test Option #1	*Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	320	312	308	308	312	316	311	308	312	315	312	4	308	320	200
ASTM D1505	Density (grams/ cm.^{3})	0.9554	0.9554	0.9554								0.9554	0.0000	0.9554	0.9554	> 94
ASTM D1238	Melt Flow Index (grams/ 10 minutes)															
Procedure A	*Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190^{0}C and 2.16kg load.*	0.2098	0.2111	0.2097								0.2102	0.0008	0.2097	0.2111	0.1 - 1.1
ASTM D1603	Carbon Black Content (percent)	2.47	2.52									2.49	0.04	2.47	2.52	2 - 3
ASTM D5261	Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.8	43.0	43.4	43.4	42.8						43.1	0.3	42.8	43.4	24
GEOCOMPOSITE:																
ASTM D4716	Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.4^{0}C Specimen Size: 12" x 14"*															
	Transmissivity (m.^{2}/ sec.)															
	MD	2.90E-03	3.01E-03									2.96E-03	7.89E-05	2.90E-03	3.01E-03	1 x 10^{-3}
	Flow Rate (gal/min)															
	MD	1.42	1.47									1.44	0.04	1.42	1.47	
	Transmissivity (gal/min/ft)															
	MD	14.02	14.56									14.29	0.38	14.02	14.56	

Test Set-Up:
Plate _____
Geocomposite XXXXXX
Plate _____

Thickness : 369.5 ***mils (Before)***
Thickness : 337.5 ***mils (After)***

ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)

Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.

Full scale force range used for testing: 100 lbs.

Side A of Composite																
MD	9.8	9.4	11.0	10.9	8.4							9.9	1.1	8.4	11.0	> 1
Side B of Composite																
MD	8.3	10.2	9.3	9.3	10.0							9.4	0.7	8.3	10.2	> 1

*MARV- Minimum Average Roll Values
MD - MACHINE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

ISO 9001 - 2000

TABLE

MATERIAL PR IES

CLIENT: Enviro gineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/15/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710037**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **65626**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
GEONET COMPONENT:	C#65630															
ASTM D1777	Thickness (mils)															
Test Option #1	*Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	316	310	316	318	318	320	321	318	316	315	317	3	310	321	200
ASTM D1505	Density (grams/ cm.^{3})	0.9573	0.9573	0.9573								0.9573	0.0000	0.9573	0.9573	> 94
ASTM D1238	Melt Flow Index (grams/ 10 minutes)															
Procedure A	*Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190^{0}C and 2.16kg load.*	0.1930	0.2001	0.2011								0.1981	0.0044	0.1930	0.2011	0.1 - 1.1
ASTM D1603	Carbon Black Content (percent)	2.45	2.50									2.47	0.03	2.45	2.50	2 - 3
ASTM D5261	Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	41.2	41.1	42.5	42.5	42.2						41.9	0.7	41.1	42.5	24
GEOCOMPOSITE:																
ASTM D4716	Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.4^{0}C Specimen Size: 12" x 14"*															
	Transmissivity (m.^{2}/ sec.)															
	MD	2.41E-03	2.46E-03									2.44E-03	3.62E-05	2.41E-03	2.46E-03	1 x 10^{-3}
	Flow Rate (gal/min)															
	MD	1.18	1.20									1.19	0.02	1.18	1.20	
	Transmissivity (gal/min/ft)															
	MD	11.65	11.90									11.78	0.17	11.65	11.90	
	Test Set-Up: ***Plate*** ***Geocomposite*** XXXXXX ***Plate***															
	Thickness : 356.5 ***mils (Before)*** ***Thickness :*** 327 ***mils (After)***															
ASTM D7005	Ply Bond Adhesion (lbs/ in.- width)															
	Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
	Full scale force range used for testing: 100 lbs.															
	Side A of Composite															
	MD	7.9	8.9	10.4	8.4	9.4						9.0	0.9	7.9	10.4	> 1
	Side B of Composite															
	MD	10.1	9.7	9.5	9.9	8.4						9.5	0.7	8.4	10.1	> 1

*MARV- Minimum Average Roll Values
MD - MACHINE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

ISO 9001 - 2000

TABLE

MATERIAL PRO[illegible]ES

CLIENT: Envirote[illegible]gineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/15/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710055**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **65627**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
GEONET COMPONENT: **C#65631**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	316	320	318	316	311	312	316	320	320	318	317	3	311	320	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9568	0.9568	0.9568								0.9568	0.0000	0.9568	0.9568	> 94
ASTM D1238 Melt Flow Index (grams/ 10 minutes)															
Procedure A *Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190° C and 2.16kg load.*	0.1878	0.1901	0.1871								0.1883	0.0016	0.1871	0.1901	0.1 - 1.1
ASTM D1603 Carbon Black Content (percent)	2.54	2.51									2.53	0.02	2.51	2.54	2 - 3
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.8	43.0	43.1	42.5	42.5						42.8	0.3	42.5	43.1	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.4° C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	2.53E-03	2.72E-03									2.62E-03	1.35E-04	2.53E-03	2.72E-03	1 x 10^{-3}
Flow Rate (gal/min)															
MD	1.23	1.33									1.28	0.07	1.23	1.33	
Transmissivity (gal/min/ft)															
MD	12.21	13.13									12.67	0.65	12.21	13.13	

Test Set-Up: ***Thickness :*** *363* ***mils (Before)***
Plate _____ ***Thickness :*** *332* ***mils (After)***
Geocomposite *XXXXXX*
Plate _____

ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)

Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.

Full scale force range used for testing: 100 lbs.

Side A of Composite															
MD	9.1	8.2	7.7	8.3	8.4						8.3	0.5	7.7	9.1	> 1
Side B of Composite															
MD	8.2	7.4	10.7	9.2	10.1						9.1	1.4	7.4	10.7	> 1

**MARV- Minimum Average Roll Values*
MD - MACHINE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710001**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **66023**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	94	90	93	91	93	91	93	90	93	91	92	1	90	94	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.5	8.4	8.4	8.5	8.4						8.4	0.1	8.4	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	238	242	250	236	231	240	241	238	242	232	239	5	231	250	220
	TD	342	290	330	288	306	312	300	298	306	311	308	17	288	342	
	Apparent Breaking Elongation (percent)															
	MD	77	73	79	79	80	80	79	75	82	79	78	3	73	82	
	TD	113	99	107	97	95	104	97	97	94	99	100	6	94	113	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	139	140	142	140	140	142	142	150	150	151	145	5	139	151	120
		150	146	150	149	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	99	102	100	97	106	120	111	110	120	122	109	9	97	122	95
	TD	130	142	142	141	138	140	142	143	140	143	140	4	130	143	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Envjronmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710001**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **66023**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	**1.70**	**1.73**	**1.70**	**1.63**							**1.69**	**0.04**	**1.63**	**1.73**	**1.5**
	Permeability (cm./ sec.)	**0.36**	**0.36**	**0.36**	**0.35**							**0.35**	**0.00**	**0.35**	**0.36**	
	Flow Rate (gpm/ ft.^{2})	**127**	**129**	**127**	**122**							**126**	**3**	**122**	**129**	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															**Opening:**
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															**70 maximum**
		70-100	**70-100**	**70-100**	**70-100**	**70-100**						**70-100**	N/A	N/A	N/A	**100 mininmum**
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		0.204	**0.205**	**0.201**	**0.205**	**0.210**						**0.205**	**0.003**	**0.201**	**0.210**	

End of Table 1A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710001**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **66024**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	88	93	90	91	93	93	90	91	89	90	91	2	88	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.3	8.5	8.3	8.2	8.0						8.3	0.2	8.0	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	234	239	242	237	243	250	242	236	238	248	241	5	234	250	220
	TD	298	291	334	289	312	308	299	307	313	304	305	13	289	334	
	Apparent Breaking Elongation (percent)															
	MD	80	80	79	77	79	79	79	73	80	73	78	3	73	80	
	TD	97	107	99	100	107	110	99	100	99	103	102	4	97	110	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	142	142	138	140	142	143	142	143	140	138	141	2	138	143	120
		142	143	140	142	143										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	126	118	115	110	106	112	112	100	101	112	111	8	100	126	95
	TD	130	136	150	152	160	158	162	162	160	160	153	11	130	162	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710001**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **66024**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	**1.61**	**1.70**	**1.64**	**1.66**							**1.65**	**0.04**	**1.61**	**1.70**	**1.5**
	Permeability (cm./ sec.)	**0.36**	**0.35**	**0.37**	**0.36**							**0.36**	**0.01**	**0.35**	**0.37**	
	Flow Rate ($gpm/ ft.^2$)	**120**	**127**	**123**	**124**							**124**	**3**	**120**	**127**	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	**70-100**	**70-100**	**70-100**	**70-100**						**70-100**	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	**0.209**	**0.210**	**0.211**	**0.211**	**0.212**						**0.211**	**0.001**	**0.209**	**0.212**	

End of Table 1B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710019**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **66025**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	93	93	91	91	90	89	88	90	92	90	91	2	88	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.3	8.4	8.5	8.5	8.4						8.4	0.1	8.3	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	239	236	248	246	239	239	250	246	240	240	242	5	236	250	220
	TD	306	287	331	298	342	307	312	290	299	290	306	18	287	342	
	Apparent Breaking Elongation (percent)															
	MD	79	79	80	77	76	77	80	80	79	80	79	2	76	80	
	TD	110	99	97	97	104	96	100	99	97	102	100	4	96	110	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	140	142	143	140	142	141	150	152	151	143	4	138	152	120
		146	143	140	142	142										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	120	120	118	115	110	106	98	98	106	112	110	8	98	120	95
	TD	138	192	152	154	156	155	160	162	160	160	159	13	138	192	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710019**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **66025**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	**1.75**	**1.78**	**1.72**	**1.72**							**1.74**	**0.03**	**1.72**	**1.78**	**1.5**
	Permeability (cm./ sec.)	**0.37**	**0.37**	**0.37**	**0.37**							**0.37**	**0.00**	**0.37**	**0.37**	
	Flow Rate (gpm/ ft.^{2})	**131**	**133**	**129**	**129**							**130**	**2**	**129**	**133**	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															**Opening: 70 maximum**
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	**70-100**	**70-100**	**70-100**	**70-100**	**70-100**						**70-100**	N/A	N/A	N/A	**100 mininmum**
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	**0.211**	**0.212**	**0.212**	**0.210**	**0.210**						**0.211**	**0.001**	**0.210**	**0.212**	

End of Table 2A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710019**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **66026**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	90	91	91	92	98	95	90	89	88	90	91	3	88	98	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.5	8.4	8.5	8.3	8.2						8.4	0.1	8.2	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	241	239	240	231	250	248	250	241	242	238	242	6	231	250	220
	TD	290	289	306	333	302	311	299	306	311	308	306	12	289	333	
	Apparent Breaking Elongation (percent)															
	MD	77	80	79	79	79	79	80	79	79	77	79	1	77	80	
	TD	109	97	107	97	96	104	99	93	94	98	99	5	93	109	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	142	142	140	140	140	142	142	140	140	144	5	138	151	120
		150	151	150	147	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	136	129	112	120	115	116	112	111	110	106	117	9	106	136	95
	TD	141	120	121	120	136	142	143	150	152	152	138	13	120	152	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710019**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **66026**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	**1.61**	**1.75**	**1.61**	**1.73**							**1.67**	**0.08**	**1.61**	**1.75**	**1.5**
	Permeability (cm./ sec.)	**0.36**	**0.36**	**0.36**	**0.37**							**0.36**	**0.01**	**0.36**	**0.37**	
	Flow Rate ($gpm/ ft.^2$)	**120**	**131**	**120**	**129**							**125**	**6**	**120**	**131**	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															**Opening: 70 maximum**
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	**70-100**	**70-100**	**70-100**	**70-100**	**70-100**						**70-100**	N/A	N/A	N/A	**100 mininmum**
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	**0.204**	**0.209**	**0.209**	**0.206**	**0.206**						**0.207**	**0.002**	**0.204**	**0.209**	

End of Table 2B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710037**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **66027**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	93	90	92	90	89	89	89	86	85	89	89	2	85	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.4	8.4	8.4	8.4	8.3						8.4	0.1	8.3	8.4	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	241	234	237	241	249	250	242	236	238	239	241	5	234	250	220
	TD	298	341	335	299	316	315	310	301	343	296	315	18	296	343	
	Apparent Breaking Elongation (percent)															
	MD	76	77	79	79	79	82	77	79	77	80	79	2	76	82	
	TD	103	113	107	104	97	97	94	97	110	110	103	7	94	113	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	139	140	142	138	142	142	141	140	143	140	141	2	138	143	120
		142	143	140	142	142										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	126	120	112	111	120	121	121	121	121	118	119	5	111	126	95
	TD	136	140	140	142	142	150	152	152	154	150	146	6	136	154	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710037**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **66027**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.67	1.67	1.70	1.64							1.67	0.03	1.64	1.70	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.37	0.36							0.36	0.00	0.36	0.37	
	Flow Rate ($gpm/ ft.^2$)	125	125	127	122							125	2	122	127	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.	0.208	0.209	0.209	0.207	0.205						0.208	0.002	0.205	0.209	

End of Table 3A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710037**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **66028**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	94	90	93	93	91	91	89	89	90	92	91	2	89	94	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.7	8.6	8.6	8.5	8.4						8.6	0.1	8.4	8.7	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	24	247	251	238	242	245	246	240	238	242	221	70	24	251	220
	TD	301	306	298	291	341	308	311	293	295	309	305	15	291	341	
	Apparent Breaking Elongation (percent)															
	MD	79	73	79	80	79	79	77	80	80	79	78	2	73	80	
	TD	110	99	107	95	97	104	95	99	97	113	102	6	95	113	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	140	142	141	140	146	150	152	153	150	148	6	138	154	120
		153	152	154	152	151										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	112	120	106	98	97	100	102	112	112	106	106	7	97	120	95
	TD	120	120	120	126	135	150	162	148	150	148	138	16	120	162	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710037**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **66028**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.67	1.64	1.64	1.76							1.68	0.06	1.64	1.76	1.5
	Permeability (cm./ sec.)	0.35	0.35	0.35	0.36							0.35	0.01	0.35	0.36	
	Flow Rate ($gpm/ ft.^2$)	125	122	123	131							125	4	122	131	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.208	0.209	0.210	0.211	0.211						0.210	0.001	0.208	0.211	

End of Table 3B

*MARV - Minimum Average Roll Values
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710055**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **66029**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV*
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	93	92	91	93	90	93	92	91	90	92	92	1	90	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.4	8.4	8.5	8.5	8.5						8.5	0.1	8.4	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	235	241	250	245	248	240	240	249	230	236	241	7	230	250	220
	TD	295	341	291	289	330	311	309	306	310	333	311	18	289	341	
	Apparent Breaking Elongation (percent)															
	MD	77	73	79	79	77	82	79	77	82	73	78	3	73	82	
	TD	104	95	97	95	99	107	97	94	97	107	99	5	94	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	136	142	146	152	142	138	140	142	152	151	144	5	136	152	120
		150	146	143	140	138										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	136	138	122	122	140	138	122	112	120	120	127	10	112	140	95
	TD	161	142	150	153	142	150	162	158	158	160	154	7	142	162	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710055**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **66029**

		SPECIMENS														Proj.
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	**DESCRIPTION**															**MARV ***
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.72	1.61	1.64	1.64							1.65	0.05	1.61	1.72	1.5
	Permeability (cm./ sec.)	0.36	0.38	0.36	0.35							0.36	0.01	0.35	0.38	
	Flow Rate ($gpm/ ft.^2$)	129	120	122	122							123	4	120	129	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.212	0.210	0.209	0.209	0.206						0.209	0.002	0.206	0.212	

End of Table 4A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710055**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **66030**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	82	84	86	86	89	92	91	100	93	90	89	5	82	100	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.4	8.5	8.6	8.6	8.5						8.5	0.1	8.4	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	241	241	242	240	238	233	248	251	241	230	240	6	230	251	220
	TD	295	290	304	311	301	296	320	311	305	330	306	12	290	330	
	Apparent Breaking Elongation (percent)															
	MD	82	79	79	73	80	77	79	79	82	77	79	3	73	82	
	TD	99	94	107	104	110	95	107	99	100	99	101	5	94	110	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	142	143	140	138	142	146	152	148	150	143	4	138	152	120
		143	140	142	144	142										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	106	112	120	126	131	128	120	120	120	120	120	7	106	131	95
	TD	136	150	142	178	146	150	152	146	144	142	149	11	136	178	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710055**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100311**
PGL Control No.: **66030**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.75	1.72	1.64	1.61							1.68	0.07	1.61	1.75	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.36	0.34							0.35	0.01	0.34	0.36	
	Flow Rate ($gpm/ ft.^2$)	131	129	122	120							126	5	120	131	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.208	0.208	0.209	0.210	0.207						0.208	0.001	0.207	0.210	

End of Table 4B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

GAI-LAP
Initial: GVZ #:0.13
DATE: 05/04/2010

Joseph Voss
Envirotech Engineering & Consulting, Inc.
P.O. Box 6029
Enid, OK 73702

Dear Mr. Voss:

Thank you for consulting Precision Geosynthetic Laboratories (PGL) for your material testing needs.

Enclosed is the ***final*** laboratory report for the conformance testing of four (4) 300 mil Double-Sided Geocomposite samples.

PROJECT NAME: Environmental Restoration Disposal Facility (ERDF)

REFERENCE PGL JOB NO.: G100312

DATE RECEIVED: April 15 and April 30, 2010 **DATE REPORTED:** May 4, 2010

SAMPLED BY: PGL at SKAPS, GA

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PGL CONTROL NUMBER
R#354710073	
Geocomposite	65632
Geonet	65636
Geotextile (Top)	66031
Geotextile (Bottom)	66032
R#354710091	
Geocomposite	65633
Geonet	65638
Geotextile (Top)	66033
Geotextile (Bottom)	66034
R#354710109	
Geocomposite	65634
Geonet	65639
Geotextile (Top)	66035
Geotextile (Bottom)	66036
R#354710127	
Geocomposite	65635
Geonet	65640
Geotextile (Top)	66037
Geotextile (Bottom)	66038

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geonet Component	
ASTM D1505	Density
ASTM D1777	Thickness
ASTM D5261	Mass per Unit Area
ASTM D1603	Carbon Black Content
ASTM D1238	Melt Flow Index

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

Precision Geosynthetic Laboratories

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geocomposite	
ASTM D7005	Ply Adhesion
ASTM D4716	Transmissivity
Geotextile Component	
ASTM D5261	Mass Per Unit Area
ASTM D4632	Grab Tensile
ASTM D4533	Trapezoid Tear Strength
ASTM D4833	Puncture Resistance
ASTM D5199	Thickness
ASTM D4491	Permittivity
ASTM D4751	Apparent Opening Size

TEST CONDITIONS: The samples were conditioned for a minimum of one hour in the laboratory at 22 ± 2°C (71.6 ± 3.6°F) and at 60 ± 10% relative humidity prior to test.

TEST RESULTS: The test results are summarized in Tables 1 to 4.

PRECISION GEOSYNTHETIC LABORATORIES

Belinda Jade R. Yeo
Quality Assurance

Carmelo V. Zantua
Technical/Laboratory Director

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

TABLE 1

MATERIAL PR(ES

CLIENT: Envirote gineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/15/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710073**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **65632**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
GEONET COMPONENT: **C#65636**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	316	318	311	308	312	316	315	316	318	315	314	3	308	318	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9563	0.9563	0.9563								0.9563	0.0000	0.9563	0.9563	> 0.94
ASTM D1238 Melt Flow Index (grams/ 10 minutes)															
Procedure A *Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190° C and 2.16kg load.*	0.1988	0.1978	0.1960								0.1975	0.0014	0.1960	0.1988	0.1 - 1.1
ASTM D1603 Carbon Black Content (percent)	2.54	2.53									2.54	0.01	2.53	2.54	2 - 3
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	43.7	42.5	42.8	42.8	43.0						43.0	0.4	42.5	43.7	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.6° C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	2.75E-03	2.40E-03									2.58E-03	2.48E-04	2.40E-03	2.75E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.35	1.18									1.26	0.12	1.18	1.35	
Transmissivity (gal/min/ft)															
MD	13.29	11.59									12.44	1.20	11.59	13.29	

Test Set-Up: ***Thickness :*** *362* ***mils (Before)***
Plate _____ ***Thickness :*** *333* ***mils (After)***
Geocomposite *XXXXXX*
Plate _____

ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)

Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.

Full scale force range used for testing: 100 lbs.

Side A of Composite															
MD	8.1	7.8	10.1	7.6	9.0						8.5	1.1	7.6	10.1	> 1
Side B of Composite															
MD	9.1	8.5	8.5	8.9	10.4						9.1	0.8	8.5	10.4	> 1

**MARV- Minimum Average Roll Values*
MD - MACHINE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE 2

MATERIAL PR ES

CLIENT: Envirote gineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/15/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710091**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **65633**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
GEONET COMPONENT: C#65637															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	316	320	330	321	326	321	320	318	316	318	321	4	316	330	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9568	0.9568	0.9568								0.9568	0.0000	0.9568	0.9568	> 0.94
ASTM D1238 Melt Flow Index (grams/ 10 minutes)															
Procedure A *Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190° C and 2.16kg load.*	0.2001	0.1981	0.1988								0.1990	0.0010	0.1981	0.2001	0.1 - 1.1
ASTM D1603 Carbon Black Content (percent)	2.47	2.50									2.48	0.02	2.47	2.50	2 - 3
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.8	42.5	42.5	42.9	43.0						42.8	0.2	42.5	43.0	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.6° C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	2.51E-03	2.39E-03									2.45E-03	8.57E-05	2.39E-03	2.51E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.23	1.17									1.20	0.04	1.17	1.23	
Transmissivity (gal/min/ft)															
MD	12.15	11.56									11.85	0.41	11.56	12.15	
Test Set-Up: ***Thickness :*** 359 ***mils (Before)***															
Plate _____ ***Thickness :*** 327.5 ***mils (After)***															
Geocomposite XXXXXX															
Plate _____															
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
Full scale force range used for testing: 100 lbs.															
Side A of Composite															
MD	10.4	10.1	10.4	8.7	8.6						9.6	0.9	8.6	10.4	> 1
Side B of Composite															
MD	9.0	9.2	8.9	8.8	8.8						8.9	0.2	8.8	9.2	> 1

**MARV- Minimum Average Roll Values*
MD - MACHINE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE 3.

MATERIAL PR ES

CLIENT: Envirote gineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/15/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710109**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **65634**

	SPECIMENS														Proj.
	1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs. MARV *
METHOD DESCRIPTION															
GEONET COMPONENT: **C#65638**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	320	320	321	318	316	317	316	310	311	312	316	4	310	321	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9558	0.9558	0.9558								0.9558	0.0000	0.9558	0.9558	> 0.94
ASTM D1238 Melt Flow Index (grams/ 10 minutes)															
Procedure A *Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190° C and 2.16kg load.*	0.1860	0.1878	0.1890								0.1876	0.0015	0.1860	0.1890	0.1 - 1.1
ASTM D1603 Carbon Black Content (percent)	2.45	2.48									2.47	0.02	2.45	2.48	2 - 3
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	40.8	40.8	41.4	41.5	42.5						41.4	0.7	40.8	42.5	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.6° C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	2.43E-03	2.46E-03									2.44E-03	1.84E-05	2.43E-03	2.46E-03	1 x 10^{-3}
Flow Rate (gal/min)															
MD	1.19	1.20									1.20	0.01	1.19	1.20	
Transmissivity (gal/min/ft)															
MD	11.73	11.86									11.80	0.09	11.73	11.86	
Test Set-Up: ***Plate*** ***Geocomposite*** XXXXXX ***Plate***															
Thickness : 355 ***mils (Before)*** ***Thickness :*** 326.5 ***mils (After)***															
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
Full scale force range used for testing: 100 lbs.															
Side A of Composite															
MD	8.5	8.3	9.6	8.0	7.3						8.3	0.8	7.3	9.6	> 1
Side B of Composite															
MD	9.4	6.8	8.4	12.8	9.1						9.3	2.2	6.8	12.8	> 1

*MARV- Minimum Average Roll Values
MD - MACHINE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

ISO 9001 - 2000

TABLE A

MATERIAL PR ES

CLIENT: Envirote gineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/15/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710127**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **65635**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
GEONET COMPONENT: C#65639															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	316	319	320	318	316	320	311	316	310	312	316	4	310	320	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9561	0.9561	0.9561								0.9561	0.0000	0.9561	0.9561	> 0.94
ASTM D1238 Melt Flow Index (grams/ 10 minutes)															
Procedure A *Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190° C and 2.16kg load.*	0.2111	0.2099	0.2106								0.2105	0.0006	0.2099	0.2111	0.1 - 1.1
ASTM D1603 Carbon Black Content (percent)	2.50	2.53									2.52	0.02	2.50	2.53	2 - 3
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	41.4	41.5	42.8	42.5	41.4						41.9	0.7	41.4	42.8	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.6° C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	2.93E-03	2.89E-03									2.91E-03	2.97E-05	2.89E-03	2.93E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.44	1.42									1.43	0.01	1.42	1.44	
Transmissivity (gal/min/ft)															
MD	14.15	13.95									14.05	0.14	13.95	14.15	
Test Set-Up: ***Plate*** ***Geocomposite*** XXXXXX ***Plate***															
Thickness : 366 ***mils (Before)*** ***Thickness :*** 334.5 ***mils (After)***															
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
Full scale force range used for testing: 100 lbs.															
Side A of Composite															
MD	7.4	7.3	10.8	8.4	10.7						8.9	1.7	7.3	10.8	> 1
Side B of Composite															
MD	8.9	8.4	7.2	10.2	9.5						8.8	1.1	7.2	10.2	> 1

*MARV- Minimum Average Roll Values
MD - MACHINE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710073**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **66031**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	93	92	92	90	93	92	92	90	90	88	91	2	88	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.5	8.4	8.4	8.6	8.6						8.5	0.1	8.4	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	236	232	240	248	250	238	231	235	239	250	240	7	231	250	220
	TD	302	295	289	303	311	311	332	325	304	299	307	13	289	332	
	Apparent Breaking Elongation (percent)															
	MD	82	79	82	79	79	75	79	82	79	78	79	2	75	82	
	TD	111	99	95	100	104	104	100	101	104	97	101	5	95	111	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	136	147	151	150	152	151	146	143	140	150	147	5	136	152	120
		146	152	152	146	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	130	124	120	120	111	110	109	110	106	102	114	9	102	130	95
	TD	182	162	159	161	160	160	155	152	152	151	159	9	151	182	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710073**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **66031**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.74	1.74	1.74	1.74							1.74	0.00	1.74	1.74	1.5
	Permeability (cm./ sec.)	0.35	0.36	0.36	0.37							0.36	0.01	0.35	0.37	
	Flow Rate ($gpm/ ft.^2$)	130	130	130	130							130	0	130	130	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening: 70 maximum
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.208	0.209	0.211	0.211	0.211						0.210	0.001	0.208	0.211	

End of Table 1A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710073**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **66032**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"															
		90	93	90	88	89	81	93	92	90	91	90	3	81	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"															
		8.5	8.5	8.4	8.4	8.5						8.5	0.1	8.4	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	234	242	241	238	245	250	233	250	243	239	241	6	233	250	220
	TD	299	304	311	340	321	303	315	311	295	290	309	15	290	340	
	Apparent Breaking Elongation (percent)															
	MD	79	75	77	80	77	75	79	80	77	77	78	2	75	80	
	TD	104	101	104	97	100	95	99	97	104	104	100	3	95	104	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.															
		138	142	142	138	142	142	152	153	150	152	145	5	138	153	120
		146	153	146	142	141										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	120	120	115	111	110	101	106	102	102	106	109	7	101	120	95
	TD	138	142	142	155	146	142	152	150	152	149	147	6	138	155	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710073**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **66032**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.77	1.69	1.76	1.66							1.72	0.05	1.66	1.77	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.37	0.35							0.36	0.01	0.35	0.37	
	Flow Rate ($gpm/ ft.^2$)	132	127	131	124							129	4	124	132	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.	0.208	0.209	0.209	0.207	0.205						0.208	0.002	0.205	0.209	

End of Table 1B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710091**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **66033**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"															
		92	91	93	92	90	93	92	92	92	92	92	1	90	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"															
		9.0	8.6	8.6	8.5	8.5						8.6	0.2	8.5	9.0	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	243	242	239	237	246	248	250	236	233	238	241	6	233	250	220
	TD	311	304	311	303	290	304	294	302	298	296	301	7	290	311	
	Apparent Breaking Elongation (percent)															
	MD	79	82	74	80	78	78	74	79	80	80	79	2	74	82	
	TD	97	95	99	100	95	104	100	97	104	101	99	3	95	104	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.															
		138	140	142	143	140	143	140	143	142	142	141	2	138	143	120
		143	140	142	142	142										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	128	120	120	112	100	106	102	120	112	109	113	9	100	128	95
	TD	120	142	146	150	152	153	150	150	146	142	145	10	120	153	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710091**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **66033**

		SPECIMENS														Proj.
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	**DESCRIPTION**															**MARV ***
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.74	1.77	1.69	1.66							1.71	0.05	1.66	1.77	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.36	0.35							0.36	0.00	0.35	0.36	
	Flow Rate ($gpm/ ft.^2$)	130	132	126	124							128	4	124	132	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.198	0.200	0.201	0.206	0.207						0.202	0.004	0.198	0.207	

End of Table 2A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710091**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **66034**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"															
		93	90	92	91	90	88	85	86	88	90	89	3	85	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"															
		8.5	8.6	8.7	8.6	8.7						8.6	0.1	8.5	8.7	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	235	241	249	242	242	249	239	240	244	236	242	5	235	249	220
	TD	340	298	324	302	299	311	311	295	381	307	317	26	295	381	
	Apparent Breaking Elongation (percent)															
	MD	79	75	80	80	79	80	79	75	79	78	79	2	75	80	
	TD	99	99	110	94	101	104	99	98	107	104	102	5	94	110	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.															
		138	142	142	143	140	143	140	138	140	142	142	3	138	150	120
		143	140	143	150	148										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	114	140	130	136	129	121	110	120	121	118	124	10	110	140	95
	TD	138	142	160	160	160	159	146	150	152	150	152	8	138	160	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710091**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **66034**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.75	1.74	1.75	1.74							1.74	0.00	1.74	1.75	1.5
	Permeability (cm./ sec.)	0.37	0.36	0.37	0.36							0.37	0.01	0.36	0.37	
	Flow Rate ($gpm/ ft.^2$)	131	130	131	130							130	0	130	131	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.209	0.211	0.211	0.209	0.208						0.210	0.001	0.208	0.211	

End of Table 2B

*MARV - Minimum Average Roll Values
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710109**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **66035**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"															
		90	92	92	90	93	92	91	93	90	90	91	1	90	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"															
		8.5	8.5	8.4	8.5	8.4						8.5	0.0	8.4	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	241	240	239	250	242	241	236	235	236	240	240	4	235	250	220
	TD	307	302	298	300	310	311	323	320	308	308	309	8	298	323	
	Apparent Breaking Elongation (percent)															
	MD	75	77	80	73	77	80	75	78	80	77	77	2	73	80	
	TD	113	104	99	97	107	95	100	103	98	99	102	5	95	113	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.															
		136	142	143	140	155	150	153	152	146	143	145	6	136	155	120
		142	143	140	143	140										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	120	112	116	111	108	110	110	120	121	112	114	5	108	121	95
	TD	141	150	162	160	160	146	142	155	146	142	150	8	141	162	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710109**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **66035**

		SPECIMENS														Proj.
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	**DESCRIPTION**															**MARV ***
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	**1.68**	**1.68**	**1.74**	**1.74**							**1.71**	**0.03**	**1.68**	**1.74**	**1.5**
	Permeability (cm./ sec.)	**0.35**	**0.36**	**0.36**	**0.36**							**0.36**	**0.00**	**0.35**	**0.36**	
	Flow Rate (gpm/ ft.^{2})	**126**	**126**	**130**	**130**							**128**	**3**	**126**	**130**	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															**Opening:**
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															**70 maximum**
		70-100	**70-100**	**70-100**	**70-100**	**70-100**						**70-100**	**N/A**	**N/A**	**N/A**	**100 mininmum**
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		0.208	**0.209**	**0.210**	**0.209**	**0.211**						**0.209**	**0.001**	**0.208**	**0.211**	

End of Table 3A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710109**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **66036**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"															
		94	92	91	88	89	89	89	92	90	92	91	2	88	94	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"															
		8.5	8.4	8.5	8.4	8.5						8.4	0.1	8.4	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	243	240	238	245	233	250	248	246	239	236	242	6	233	250	220
	TD	292	302	310	306	324	325	332	335	312	311	315	14	292	335	
	Apparent Breaking Elongation (percent)															
	MD	77	74	80	77	75	76	77	77	80	79	77	2	74	80	
	TD	99	100	104	99	104	100	104	100	97	100	101	2	97	104	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.															
		138	146	150	153	150	142	146	143	140	142	144	4	138	153	120
		143	140	143	140	140										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	110	110	120	112	112	110	106	102	110	110	110	5	102	120	95
	TD	140	150	152	162	160	162	157	158	142	140	152	9	140	162	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710109**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **66036**

		SPECIMENS														Proj.
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	**DESCRIPTION**															**MARV ***
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.63	1.77	1.60	1.63							1.66	0.08	1.60	1.77	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.37	0.38							0.37	0.01	0.36	0.38	
	Flow Rate (gpm/ ft.^{2})	122	133	120	122							124	6	120	133	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.212	0.204	0.207	0.210	0.210						0.209	0.003	0.204	0.212	

End of Table 3B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710127**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **66037**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	90	92	96	83	86	88	90	91	92	92	90	4	83	96	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.5	8.6	8.7	8.7	9.0						8.7	0.2	8.5	9.0	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	241	240	249	238	236	241	242	250	243	244	242	4	236	250	220
	TD	299	302	310	313	330	320	301	311	300	307	309	10	299	330	
	Apparent Breaking Elongation (percent)															
	MD	75	73	77	78	80	77	80	75	75	77	77	2	73	80	
	TD	113	100	99	99	96	95	100	107	113	111	103	7	95	113	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	142	138	152	151	146	142	143	140	142	142	144	5	136	152	120
		150	136	150	142	138										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	110	110	111	106	108	109	107	107	102	107	108	3	102	111	95
	TD	140	150	155	160	160	155	160	160	162	157	156	7	140	162	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710127**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **66037**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.70	1.63	1.63	1.71							1.67	0.04	1.63	1.71	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.35	0.36							0.36	0.00	0.35	0.36	
	Flow Rate ($gpm/ ft.^2$)	127	122	122	128							125	3	122	128	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.208	0.209	0.210	0.211	0.209						0.209	0.001	0.208	0.211	

End of Table 4A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 4B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710127**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **66038**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	88	90	92	92	93	90	88	85	93	92	90	3	85	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.4	8.4	8.2	8.3	8.5						8.4	0.1	8.2	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	240	239	234	241	246	249	238	238	236	232	239	5	232	249	220
	TD	301	298	294	290	306	310	298	297	311	321	303	9	290	321	
	Apparent Breaking Elongation (percent)															
	MD	77	77	79	79	80	82	79	79	75	77	78	2	75	82	
	TD	99	100	107	110	97	99	100	107	97	99	102	5	97	110	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	140	142	143	140	142	151	150	146	153	144	4	138	153	120
		146	142	143	142	142										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	108	111	106	120	112	111	108	102	112	121	111	6	102	121	95
	TD	160	160	150	146	142	152	152	156	178	182	158	13	142	182	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710127**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100312**
PGL Control No.: **66038**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.72	1.68	1.69	1.69							1.69	0.02	1.68	1.72	1.5
	Permeability (cm./ sec.)	0.37	0.37	0.36	0.36							0.37	0.00	0.36	0.37	
	Flow Rate ($gpm/ ft.^2$)	129	126	126	126							127	1	126	129	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.211	0.209	0.207	0.208	0.204						0.208	0.003	0.204	0.211	

End of Table 4B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

GAI-LAP
Initial: GVZ #:0.13
DATE: 05/04/2010

Joseph Voss
Envirotech Engineering & Consulting, Inc.
P.O. Box 6029
Enid, OK 73702

Dear Mr. Voss:

Thank you for consulting Precision Geosynthetic Laboratories (PGL) for your material testing needs.

Enclosed is the ***final*** laboratory report for the conformance testing of four (4) 300 mil Double-Sided Geocomposite samples.

PROJECT NAME: Environmental Restoration Disposal Facility (ERDF)

REFERENCE PGL JOB NO.: G100313

DATE RECEIVED: April 15 and April 30, 2010 **DATE REPORTED:** May 4, 2010

SAMPLED BY: PGL at SKAPS, GA

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PGL CONTROL NUMBER
R#354710145	
Geocomposite	65640
Geonet	65644
Geotextile (Top)	66039
Geotextile (Bottom)	66040
R#354710163	
Geocomposite	65641
Geonet	65645
Geotextile (Top)	66041
Geotextile (Bottom)	66042
R#354710181	
Geocomposite	65642
Geonet	65646
Geotextile (Top)	66043
Geotextile (Bottom)	66044
R#354710199	
Geocomposite	65643
Geonet	65647
Geotextile (Top)	66045
Geotextile (Bottom)	66046

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geonet Component	
ASTM D1505	Density
ASTM D1777	Thickness
ASTM D5261	Mass per Unit Area
ASTM D1603	Carbon Black Content
ASTM D1238	Melt Flow Index

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

Precision Geosynthetic Laboratories

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geocomposite	
ASTM D7005	Ply Adhesion
ASTM D4716	Transmissivity
Geotextile Component	
ASTM D5261	Mass Per Unit Area
ASTM D4632	Grab Tensile
ASTM D4533	Trapezoid Tear Strength
ASTM D4833	Puncture Resistance
ASTM D5199	Thickness
ASTM D4491	Permittivity
ASTM D4751	Apparent Opening Size

TEST CONDITIONS: The samples were conditioned for a minimum of one hour in the laboratory at 22 ± 2°C (71.6 ± 3.6°F) and at 60 ± 10% relative humidity prior to test.

TEST RESULTS: The test results are summarized in Tables 1 to 4.

PRECISION GEOSYNTHETIC LABORATORIES

Belinda Jade R. Yeo
Quality Assurance

Carmelo V. Zantua
Technical/Laboratory Director

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

TABLE

MATERIAL PRC ES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/15/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710145**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **65640**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
GEONET COMPONENT:															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	316	315	314	308	309	312	308	312	306	312	311	3	306	316	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9554	0.9554	0.9554								0.9554	0.0000	0.9554	0.9554	≥ 0.94
ASTM D1238 Melt Flow Index (grams/ 10 minutes)															
Procedure A *Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190° C and 2.16kg load.*	0.2078	0.2041	0.2048								0.2056	0.0020	0.2041	0.2078	0.1 - 1.1
ASTM D1603 Carbon Black Content (percent)	2.46	2.47									2.47	0.01	2.46	2.47	2 - 3
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	43.7	44.0	43.9	43.7	43.4						43.7	0.2	43.4	44.0	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.6° C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	3.23E-03	3.07E-03									3.15E-03	1.15E-04	3.07E-03	3.23E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.58	1.51									1.55	0.06	1.51	1.58	
Transmissivity (gal/min/ft)															
MD	15.62	14.83									15.23	0.56	14.83	15.62	

Test Set-Up: ***Thickness :*** 373 ***mils (Before)***
Plate _____ ***Thickness :*** 340 ***mils (After)***
Geocomposite XXXXXX
Plate _____

ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)

Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.
Full scale force range used for testing: 100 lbs.

Side A of Composite															
MD	7.0	8.5	9.0	9.8	7.8						8.4	1.1	7.0	9.8	> 1
Side B of Composite															
MD	9.5	8.3	8.0	10.3	8.8						9.0	0.9	8.0	10.3	> 1

*MARV- Minimum Average Roll Values
MD - MACHINE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE

MATERIAL PRO[illegible]ES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/15/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710163**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **65641**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
GEONET COMPONENT:															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	309	312	306	312	314	316	312	320	312	310	312	4	306	320	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9561	0.9561	0.9561								0.9561	0.0000	0.9561	0.9561	> 0.94
ASTM D1238 Melt Flow Index (grams/ 10 minutes)															
Procedure A *Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190° C and 2.16kg load.*	0.2060	0.2041	0.2078								0.2060	0.0019	0.2041	0.2078	0.1 - 1.1
ASTM D1603 Carbon Black Content (percent)	2.44	2.42									2.43	0.01	2.42	2.44	2 - 3
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.5	42.5	42.5	42.8	43.0						42.7	0.2	42.5	43.0	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.6° C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	2.93E-03	3.00E-03									2.97E-03	5.01E-05	2.93E-03	3.00E-03	1 x 10^{-3}
Flow Rate (gal/min)															
MD	1.44	1.47									1.45	0.02	1.44	1.47	
Transmissivity (gal/min/ft)															
MD	14.15	14.50									14.33	0.24	14.15	14.50	

Test Set-Up:
Plate _____ ***Thickness :*** 366.5 ***mils (Before)***
Geocomposite XXXXXX ***Thickness :*** 335.5 ***mils (After)***
Plate _____

ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
Full scale force range used for testing: 100 lbs.															
Side A of Composite															
MD	8.3	10.5	9.0	10.8	7.8						9.3	1.3	7.8	10.8	> 1
Side B of Composite															
MD	8.8	8.3	8.3	7.8	8.8						8.4	0.4	7.8	8.8	> 1

*MARV- Minimum Average Roll Values
MD - MACHINE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

ISO 9001 - 2000

TABLE

MATERIAL PRC IES

CLIENT: Envirotecn Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/15/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710181**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **65642**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
GEONET COMPONENT:															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	316	320	318	316	318	316	320	321	316	316	318	2	316	321	200
ASTM D1505 Density (grams/ cm.^{3})	0.9565	0.9565	0.9565								0.9565	0.0000	0.9565	0.9565	> 0.94
ASTM D1238 Melt Flow Index (grams/ 10 minutes)															
Procedure A *Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190° C and 2.16kg load.*	0.2201	0.2198	0.2180								0.2193	0.0011	0.2180	0.2201	0.1 - 1.1
ASTM D1603 Carbon Black Content (percent)	2.43	2.42									2.43	0.00	2.42	2.43	2 - 3
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.5	42.8	43.1	42.8	42.5						42.8	0.2	42.5	43.1	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.6° C Specimen Size: 12" x 14"*															
Transmissivity (m.^{2}/ sec.)															
MD	2.81E-03	2.89E-03									2.85E-03	5.36E-05	2.81E-03	2.89E-03	1 x 10^{-3}
Flow Rate (gal/min)															
MD	1.38	1.41									1.40	0.03	1.38	1.41	
Transmissivity (gal/min/ft)															
MD	13.58	13.94									13.76	0.26	13.58	13.94	

Test Set-Up:
Plate _____
Geocomposite XXXXXX
Plate _____

Thickness : 355.5 *mils (Before)*
Thickness : 325.5 *mils (After)*

ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)

Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.

Full scale force range used for testing: 100 lbs.

Side A of Composite															
MD	8.3	8.3	10.5	9.3	7.8						8.8	1.1	7.8	10.5	> 1
Side B of Composite															
MD	8.3	7.3	11.0	9.8	8.0						8.9	1.5	7.3	11.0	> 1

*MARV- Minimum Average Roll Values
MD - MACHINE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE
MATERIAL PRC ES

CLIENT: Envirotecn Engineering & Consulting, Inc.
PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/15/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710199**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **65643**

METHOD DESCRIPTION	1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
GEONET COMPONENT:															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	311	316	315	320	320	312	320	316	315	315	316	3	311	320	200
ASTM D1505 Density (grams/ cm.^{3})	0.9558	0.9558	0.9558								0.9558	0.0000	0.9558	0.9558	> 0.94
ASTM D1238 Melt Flow Index (grams/ 10 minutes)															
Procedure A *Condition FR-190/2.16. Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190^0 C and 2.16kg load.*	0.2138	0.2101	0.2160								0.2133	0.0030	0.2101	0.2160	0.1 - 1.1
ASTM D1603 Carbon Black Content (percent)	2.45	2.43									2.44	0.02	2.43	2.45	2 - 3
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	40.8	40.1	42.3	41.1	42.4						41.3	1.0	40.1	42.4	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min; Temperature of Test Water: 20.6^0 C Specimen Size: 12" x 14"*															
Transmissivity (m.^{2}/ sec.) *MD*	3.05E-03	2.94E-03									3.00E-03	7.70E-05	2.94E-03	3.05E-03	1 x 10^{-3}
Flow Rate (gal/min) *MD*	1.50	1.44									1.47	0.04	1.44	1.50	
Transmissivity (gal/min/ft) *MD*	14.75	14.22									14.49	0.37	14.22	14.75	

Test Set-Up:

Plate ______
Geocomposite *XXXXXX*
Plate ______

Thickness : *360.5* ***mils (Before)***
Thickness : *330* ***mils (After)***

METHOD DESCRIPTION	1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width) *Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm. Full scale force range used for testing: 100 lbs.*															
Side A of Composite *MD*	7.3	9.0	8.5	12.3	7.3						8.9	2.1	7.3	12.3	> 1
Side B of Composite *MD*	8.0	11.0	9.3	8.0	10.8						9.4	1.4	8.0	11.0	> 1

**MARV- Minimum Average Roll Values*
MD - MACHINE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

ISO 9001 - 2000

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710145**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **66039**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	93	92	92	91	89	90	93	92	91	93	92	1	89	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.5	8.4	8.4	8.4	8.5						8.5	0.0	8.4	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	240	239	237	238	242	233	243	246	249	239	240	5	233	249	220
	TD	306	300	299	295	330	290	310	312	315	320	308	12	290	330	
	Apparent Breaking Elongation (percent)															
	MD	77	78	79	82	75	74	78	80	77	79	78	2	74	82	
	TD	99	97	98	104	97	107	99	113	108	96	102	6	96	113	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	150	151	150	143	146	150	153	150	153	150	150	3	143	153	120
		153	150	153	150	153										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	120	121	111	108	109	120	120	121	120	112	116	5	108	121	95
	TD	138	142	150	152	120	136	142	146	150	146	142	9	120	152	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710145**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **66039**

		SPECIMENS														Proj. Specs.
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	MARV *
METHOD	DESCRIPTION															
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.67	1.61	1.67	1.64							1.65	0.03	1.61	1.67	1.5
	Permeability (cm./ sec.)	0.36	0.35	0.35	0.36							0.36	0.01	0.35	0.36	
	Flow Rate ($gpm/ ft.^2$)	125	120	125	123							123	2	120	125	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening: 70 maximum
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.207	0.208	0.210	0.210	0.211						0.209	0.002	0.207	0.211	

End of Table 1A

*MARV - Minimum Average Roll Values
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710145**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **66040**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	88	90	92	90	92	89	90	92	90	92	90	1	88	92	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.5	8.5	8.4	8.6	8.6						8.5	0.1	8.4	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	240	232	230	236	242	237	239	242	238	247	238	5	230	247	220
	TD	291	298	301	297	320	311	307	310	302	310	305	9	291	320	
	Apparent Breaking Elongation (percent)															
	MD	77	79	80	79	99	79	80	75	76	77	80	7	75	99	
	TD	97	99	100	104	107	97	99	100	107	110	102	5	97	110	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	150	153	150	156	148	143	140	132	130	131	139	10	129	156	120
		129	131	130	130	136										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	112	114	120	113	110	102	106	99	97	100	107	8	97	120	95
	TD	146	142	150	162	158	181	178	162	160	142	158	14	142	181	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710145**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **66040**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	**1.60**	**1.67**	**1.59**	**1.61**							**1.62**	**0.04**	**1.59**	**1.67**	**1.5**
	Permeability (cm./ sec.)	**0.35**	**0.35**	**0.34**	**0.37**							**0.35**	**0.01**	**0.34**	**0.37**	
	Flow Rate (gpm/ ft.^{2})	**120**	**125**	**119**	**120**							**121**	**3**	**119**	**125**	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															**Opening: 70 maximum**
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	**70-100**	**70-100**	**70-100**	**70-100**	**70-100**						**70-100**	N/A	N/A	N/A	**100 mininmum**
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	**0.206**	**0.208**	**0.201**	**0.202**	**0.203**						**0.204**	**0.003**	**0.201**	**0.208**	

End of Table 1B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710163**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **66041**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	93	90	88	88	90	92	90	92	90	91	90	2	88	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.6	8.7	8.6	9.0	8.4						8.7	0.2	8.4	9.0	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	241	238	240	249	242	239	236	232	240	238	239	4	232	249	220
	TD	320	306	289	298	301	296	311	310	305	306	304	9	289	320	
	Apparent Breaking Elongation (percent)															
	MD	79	77	73	79	80	79	74	75	77	74	77	2	73	80	
	TD	97	99	113	111	100	94	97	104	97	95	101	6	94	113	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	140	142	148	150	143	143	143	150	152	153	147	5	140	154	120
		154	151	148	150	141										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	120	115	116	120	112	113	108	102	106	120	113	6	102	120	95
	TD	150	150	162	158	160	160	160	158	160	152	157	5	150	162	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710163**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **66041**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	**1.73**	**1.75**	**1.76**	**1.75**							**1.75**	**0.01**	**1.73**	**1.76**	**1.5**
	Permeability (cm./ sec.)	**0.36**	**0.36**	**0.37**	**0.37**							**0.36**	**0.00**	**0.36**	**0.37**	
	Flow Rate ($gpm/ ft.^2$)	**129**	**131**	**131**	**131**							**131**	**1**	**129**	**131**	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															**Opening: 70 maximum 100 mininmum**
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	**70-100**	**70-100**	**70-100**	**70-100**	**70-100**						**70-100**	N/A	N/A	N/A	
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	**0.210**	**0.211**	**0.211**	**0.207**	**0.205**						**0.209**	**0.003**	**0.205**	**0.211**	

End of Table 2A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710163**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **66042**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	92	91	92	93	92	92	90	89	88	90	91	2	88	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.5	8.4	8.5	8.5	8.5						8.5	0.0	8.4	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	230	233	241	240	236	239	230	242	248	246	239	6	230	248	220
	TD	306	298	301	311	306	291	344	300	308	305	307	14	291	344	
	Apparent Breaking Elongation (percent)															
	MD	78	79	79	79	75	79	79	77	80	80	79	2	75	80	
	TD	106	100	107	99	97	98	94	96	97	100	99	4	94	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	130	136	146	142	143	146	150	150	143	142	5	130	150	120
		143	142	143	142	143										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	106	102	111	120	138	102	106	112	102	102	110	11	102	138	95
	TD	120	136	130	142	138	130	142	150	157	150	139	11	120	157	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710163**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **66042**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.64	1.62	1.73	1.73							1.68	0.06	1.62	1.73	1.5
	Permeability (cm./ sec.)	0.36	0.35	0.36	0.36							0.36	0.01	0.35	0.36	
	Flow Rate (gpm/ ft.^{2})	123	121	129	129							125	4	121	129	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.208	0.209	0.206	0.202	0.198						0.205	0.005	0.198	0.209	

End of Table 2B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710181**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **66043**

		SPECIMENS														Proj.
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs. MARV *
METHOD	**DESCRIPTION**															
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	93	92	92	90	91	92	91	93	90	93	92	1	90	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.5	8.5	8.4	8.4	8.5						8.5	0.0	8.4	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	241	240	241	239	245	249	232	236	250	242	241	5	232	250	220
	TD	320	306	305	298	295	296	289	290	320	316	304	12	289	320	
	Apparent Breaking Elongation (percent)															
	MD	74	73	77	79	82	79	80	79	79	80	78	3	73	82	
	TD	100	104	107	97	99	94	94	97	97	101	99	4	94	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	136	139	142	142	146	143	142	140	142	143	143	4	136	151	120
		140	151	151	146	146										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	105	114	120	120	126	128	120	120	119	120	119	6	105	128	95
	TD	150	160	160	150	152	150	162	160	158	159	156	5	150	162	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710181**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **66043**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.72	1.64	1.67	1.62							1.66	0.05	1.62	1.72	1.5
	Permeability (cm./ sec.)	0.36	0.35	0.36	0.35							0.36	0.01	0.35	0.36	
	Flow Rate (gpm/ ft.^{2})	129	122	125	121							124	3	121	129	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.208	0.208	0.207	0.205	0.201						0.206	0.003	0.201	0.208	

End of Table 3A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710181**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **66044**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	92	88	84	85	83	90	91	93	92	91	89	4	83	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.5	8.6	8.6	8.7	8.4						8.6	0.1	8.4	8.7	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	238	230	248	246	245	238	240	248	246	242	242	6	230	248	220
	TD	301	310	289	294	306	331	324	320	315	298	309	14	289	331	
	Apparent Breaking Elongation (percent)															
	MD	79	79	80	80	79	73	77	75	75	74	77	3	73	80	
	TD	99	107	104	96	97	94	107	99	107	104	101	5	94	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	142	143	146	148	150	152	146	148	150	145	4	138	152	120
		146	143	142	143	140										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	112	106	100	102	99	98	106	102	102	106	103	4	98	112	95
	TD	141	160	178	150	146	150	152	153	150	146	153	10	141	178	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710181**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **66044**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	**1.67**	**1.67**	**1.60**	**1.61**							**1.64**	**0.04**	**1.60**	**1.67**	**1.5**
	Permeability (cm./ sec.)	**0.35**	**0.37**	**0.37**	**0.36**							**0.36**	**0.01**	**0.35**	**0.37**	
	Flow Rate ($gpm/ ft.^2$)	**125**	**125**	**120**	**120**							**122**	**3**	**120**	**125**	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															**Opening:**
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															**70 maximum**
		70-100	**70-100**	**70-100**	**70-100**	**70-100**						**70-100**	N/A	N/A	N/A	**100 mininmum**
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	**0.209**	**0.210**	**0.206**	**0.205**	**0.204**						**0.207**	**0.003**	**0.204**	**0.210**	

End of Table 3B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710199**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **66045**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	94	92	91	88	92	92	90	93	92	89	91	2	88	94	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.5	8.5	8.5	8.6	8.6						8.5	0.1	8.5	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	244	241	241	237	241	235	241	240	248	246	241	4	235	248	220
	TD	289	298	306	299	311	320	325	315	310	302	308	11	289	325	
	Apparent Breaking Elongation (percent)															
	MD	79	80	74	77	82	79	80	79	79	74	79	3	74	82	
	TD	95	97	99	100	107	97	94	99	104	73	97	9	73	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	130	136	141	140	140	142	143	142	143	146	141	4	130	146	120
		145	143	143	142	142										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	120	112	112	106	102	112	112	106	100	102	108	6	100	120	95
	TD	140	142	142	150	162	140	150	150	153	150	148	7	140	162	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710199**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **66045**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	**1.75**	**1.72**	**1.76**	**1.72**							**1.74**	**0.02**	**1.72**	**1.76**	**1.5**
	Permeability (cm./ sec.)	**0.36**	**0.35**	**0.36**	**0.36**							**0.36**	**0.00**	**0.35**	**0.36**	
	Flow Rate (gpm/ ft.^{2})	**131**	**129**	**132**	**129**							**130**	**2**	**129**	**132**	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	**70-100**	**70-100**	**70-100**	**70-100**						**70-100**	**N/A**	**N/A**	**N/A**	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		0.203	**0.204**	**0.198**	**0.206**	**0.207**						**0.204**	**0.004**	**0.198**	**0.207**	

End of Table 4A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710199**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **66046**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"															
		93	96	92	89	88	*86	90	92	90	92	91	3	86	96	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"															
		8.4	8.5	8.6	8.6	8.6						8.5	0.1	8.4	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	241	240	241	249	232	230	236	242	236	249	240	6	230	249	220
	TD	299	330	290	299	300	306	311	320	315	330	310	14	290	330	
	Apparent Breaking Elongation (percent)															
	MD	80	79	78	74	80	82	79	77	77	73	78	3	73	82	
	TD	97	94	99	95	107	110	104	97	94	99	100	6	94	110	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.															
		136	142	143	142	143	143	140	140	142	150	143	4	136	152	120
		152	146	143	145	140										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	110	112	110	112	106	99	98	100	111	108	107	6	98	112	95
	TD	136	152	152	150	162	162	160	162	152	142	153	9	136	162	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/4/2010**
Client Sample ID: **R#354710199**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100313**
PGL Control No.: **66046**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.61	1.64	1.65	1.74							1.66	0.05	1.61	1.74	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.36	0.36							0.36	0.00	0.36	0.36	
	Flow Rate ($gpm/ ft.^2$)	120	123	124	130							124	4	120	130	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.	0.209	0.210	0.211	0.207	0.205						0.208	0.002	0.205	0.211	

End of Table 4B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

GAI-LAP
Initial: GVZ #:0.13
DATE: 05/10/2010

Joseph Voss
Envirotech Engineering & Consulting, Inc.
P.O. Box 6029
Enid, OK 73702

Dear Mr. Voss:

Thank you for consulting Precision Geosynthetic Laboratories (PGL) for your material testing needs.

Enclosed is the ***final*** laboratory report for the conformance testing of four (4) 300 mil Double-Sided Geocomposite samples.

PROJECT NAME: Environmental Restoration Disposal Facility (ERDF)

REFERENCE PGL JOB NO.: G100361

DATE RECEIVED: April 22, 30, and May 6, 2010 **DATE REPORTED:** May 10, 2010

SAMPLED BY: PGL at SKAPS, GA

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PGL CONTROL NUMBER
R#354710217	
Geocomposite	65856
Geonet	65860
Geotextile (Top)	66047
Geotextile (Bottom)	66048
R#354710235	
Geocomposite	65857
Geonet	65861
Geotextile (Top)	66049
Geotextile (Bottom)	66050
R#354710253	
Geocomposite	65858
Geonet	65862
Geotextile (Top)	66051
Geotextile (Bottom)	66052
R#354710271	
Geocomposite	65859
Geonet	65863
Geotextile (Top)	66053
Geotextile (Bottom)	66054

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geonet Component	
ASTM D1505	Density
ASTM D1777	Thickness
ASTM D5261	Mass per Unit Area
ASTM D1603	Carbon Black Content
ASTM D1238	Melt Flow Index

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

Precision Geosynthetic Laboratories

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geocomposite	
ASTM D7005	Ply Adhesion
ASTM D4716	Transmissivity
Geotextile Component	
ASTM D5261	Mass Per Unit Area
ASTM D4632	Grab Tensile
ASTM D4533	Trapezoid Tear Strength
ASTM D4833	Puncture Resistance
ASTM D5199	Thickness
ASTM D4491	Permittivity
ASTM D4751	Apparent Opening Size

TEST CONDITIONS: The samples were conditioned for a minimum of one hour in the laboratory at $22 \pm 2^{o}C$ ($71.6 \pm 3.6^{o}F$) and at $60 \pm 10\%$ relative humidity prior to test.

TEST RESULTS: The test results are summarized in Tables 1 to 4.

PRECISION GEOSYNTHETIC LABORATORIES

Belinda Jade R. Yeo
Quality Assurance

Carmelo V. Zantua
Technical/Laboratory Director

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

TABLE 1.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/22/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710217**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **65856**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
GEONET COMPONENT:	**C#65860**															
ASTM D1777	Thickness (mils)															
Test Option #1	*Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	312	308	311	308	309	312	316	312	310	311	311	2	308	316	200
ASTM D1505	Density (grams/ cm.^{3})	0.9549	0.9549	0.9549								0.9549	0.0000	0.9549	0.9549	> 0.94
ASTM D1238	Melt Flow Index (grams/ 10 minutes)															
Procedure A	*Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190^{0}C and 2.16kg load.*	0.2098	0.2076	0.2066								0.2080	0.0016	0.2066	0.2098	0.1 - 1.1
ASTM D1603	Carbon Black Content (percent)	2.54	2.49									2.52	0.04	2.49	2.54	2 - 3
ASTM D5261	Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.5	42.2	41.5	42.8	42.6						42.4	0.5	41.5	42.8	24
GEOCOMPOSITE:																
ASTM D4716	Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.2^{0}C Specimen Size: 12" x 14"*															
	Transmissivity (m.^{2}/ sec.)															
	MD	2.98E-03	2.90E-03									2.94E-03	5.19E-05	2.90E-03	2.98E-03	1 x 10^{-3}
	Flow Rate (gal/min)															
	MD	1.44	1.41									1.43	0.03	1.4	1.4	
	Transmissivity (gal/min/ft)															
	MD	14.37	14.02									14.19	0.25	14	14	
	Test Set-Up: ***Plate*** ***Geocomposite*** ***Plate***															
	Thickness : 353.5 ***mils (Before)*** ***Thickness :*** 322.5 ***mils (After)***															
ASTM D7005	Ply Bond Adhesion (lbs/ in.- width)															
	Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
	Full scale force range used for testing: 100 lbs.															
	Side A of Composite															
	MD	9.8	7.8	9.0	10.1	7.8						8.9	1.1	7.8	10.1	> 1
	Side B of Composite															
	MD	10.1	7.9	11.8	8.3	8.3						9.3	1.6	7.9	11.8	> 1

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE 2.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/22/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710235**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **65857**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
GEONET COMPONENT: C#65861															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	311	312	312	308	306	315	312	311	308	311	311	3	306	315	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9554	0.9554	0.9554								0.9554	0.0000	0.9554	0.9554	> 0.94
ASTM D1238 Melt Flow Index (grams/ 10 minutes)															
Procedure A *Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190° C and 2.16kg load.*	0.2061	0.2041	0.2048								0.2050	0.0010	0.2041	0.2061	0.1 - 1.1
ASTM D1603 Carbon Black Content (percent)	2.5	2.5									2.5	0.0	2.5	2.5	2 - 3
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.8	43.2	42.7	42.5	42.5						42.8	0.3	42.5	43.2	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.2° C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	3.14E-03	3.19E-03									3.17E-03	3.42E-05	3.14E-03	3.19E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.53	1.55									1.54	0.02	2	2	
Transmissivity (gal/min/ft)															
MD	15.19	15.42									15.30	0.17	15	15	
Test Set-Up: *Thickness : 361.5 mils (Before)* *Thickness : 331 mils (After)* *Plate* ____ *Geocomposite* XXXXXX *Plate* ____															
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm. *Full scale force range used for testing: 100 lbs.*															
Side A of Composite															
MD	7.8	10.3	7.5	6.8	10.1						8.5	1.6	6.8	10.3	> 1
Side B of Composite															
MD	8.2	10.3	8.5	10.4	11.3						9.7	1.3	8.2	11.3	> 1

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

TABLE 3.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/22/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710253**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **65858**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
GEONET COMPONENT:	C#65862															
ASTM D1777	Thickness (mils)															
Test Option #1	*Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	310	308	306	310	306	312	308	309	311	306	309	2	306	312	200
ASTM D1505	Density (grams/ cm.^{3})	0.9554	0.9554	0.9554								0.9554	0.0000	0.9554	0.9554	> 0.94
ASTM D1238	Melt Flow Index (grams/ 10 minutes)															
Procedure A	*Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190^0 C and 2.16kg load.*	0.1970	0.1981	0.1987								0.1979	0.0009	0.1970	0.1987	0.1 - 1.1
ASTM D1603	Carbon Black Content (percent)	2.46	2.41									2.44	0.03	2.41	2.46	2 - 3
ASTM D5261	Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	41.2	41.3	41.5	41.6	41.5						41.4	0.1	41.2	41.6	24
GEOCOMPOSITE:																
ASTM D4716	Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.2^0 C Specimen Size: 12" x 14"*															
	Transmissivity (m.^{2}/ sec.)															
	MD	2.98E-03	2.78E-03									2.88E-03	1.44E-04	2.78E-03	2.98E-03	1 x 10^{-3}
	Flow Rate (gal/min)															
	MD	1.45	1.35									1.40	0.07	1	1	
	Transmissivity (gal/min/ft)															
	MD	14.40	13.42									13.91	0.69	13	14	
	Test Set-Up: *Plate* ____ *Geocomposite* XXXXXX *Plate* ____											*Thickness :* 353.5 *mils (Before)* *Thickness :* 322.5 *mils (After)*				
ASTM D7005	Ply Bond Adhesion (lbs/ in.- width)															
	Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
	Full scale force range used for testing: 100 lbs.															
	Side A of Composite															
	MD	8.2	10.2	11.4	9.0	6.8						9.1	1.8	6.8	11.4	> 1
	Side B of Composite															
	MD	8.6	10.6	8.5	10.4	8.1						9.2	1.1	8.1	10.6	> 1

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE 4.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/22/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710271**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **65859**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
GEONET COMPONENT: C#65863															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	308	312	315	320	311	315	316	312	312	310	313	3	308	320	200
ASTM D1505 Density (grams/ cm.^{3})	0.9563	0.9563	0.9563								0.9563	0.0000	0.9563	0.9563	> 0.94
ASTM D1238 Melt Flow Index (grams/ 10 minutes)															
Procedure A *Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190^0 C and 2.16kg load.*	0.2178	0.2181	0.2141								0.2167	0.0022	0.2141	0.2181	0.1 - 1.1
ASTM D1603 Carbon Black Content (percent)	2.41	2.45									2.43	0.03	2.41	2.45	2 - 3
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.5	42.5	42.6	42.5	42.3						42.5	0.1	42.3	42.6	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psi, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.2^0 C Specimen Size: 12" x 14"*															
Transmissivity (m.^{2}/ sec.)															
MD	3.02E-03	2.97E-03									2.99E-03	4.02E-05	2.97E-03	3.02E-03	1 x 10^{-3}
Flow Rate (gal/min)															
MD	1.47	1.44									1.45	0.02	1	1	
Transmissivity (gal/min/ft)															
MD	14.60	14.33									14.46	0.19	14	15	
Test Set-Up: ***Plate*** _____ ***Geocomposite*** XXXXXX ***Plate*** _____															
Thickness : 356.5 ***mils (Before)*** ***Thickness :*** 323.5 ***mils (After)***															
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
Full scale force range used for testing: 100 lbs.															
Side A of Composite															
MD	7.1	8.3	10.5	8.3	10.3						8.9	1.5	7.1	10.5	> 1
Side B of Composite															
MD	8.3	7.9	10.6	11.9	6.7						9.1	2.1	6.7	11.9	> 1

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE 1A.

MATERIAL PROPEF

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710217**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **66047**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"															
		93	96	90	87	88	88	87	85	84	83	88	4	83	96	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"															
		8.5	8.4	8.4	8.5	8.3						8.4	0.1	8.3	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	243	233	230	246	237	241	232	250	231	243	239	7	230	250	220
	TD	289	295	301	321	312	299	311	290	306	298	302	10	289	321	
	Apparent Breaking Elongation (percent)															
	MD	80	77	79	79	73	77	80	80	82	79	79	2	73	82	
	TD	104	113	97	107	103	104	107	99	94	104	103	5	94	113	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.															
		130	128	140	150	153	150	148	152	153	150	146	8	128	153	120
		146	143	142	150	148										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	130	132	120	116	120	124	121	126	136	129	125	6	116	136	95
	TD	160	180	178	176	181	178	180	175	178	173	176	6	160	181	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710217**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **66047**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.68	1.63	1.60	1.60							1.63	0.04	2	2	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.35	0.36							0.36	0.00	0	0	
	Flow Rate (gpm/ ft.^{2})	126	122	120	119							122	3	119	126	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.210	0.211	0.206	0.202	0.206						0.207	0.004	0.202	0.211	

End of Table 1A

*MARV - Minimum Average Roll Values
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1E

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710217**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **66048**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"															
		88	90	93	91	91	93	91	87	88	90	90	2	87	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"															
		8.7	8.6	8.8	8.5	8.4						8.6	0.2	8.4	8.8	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	231	238	243	241	230	231	249	250	238	237	239	7	230	250	220
	TD	299	298	309	320	311	311	333	330	341	299	315	15	298	341	
	Apparent Breaking Elongation (percent)															
	MD	80	82	79	77	73	74	79	80	79	74	78	3	73	82	
	TD	107	104	114	99	97	104	108	99	100	94	103	6	94	114	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.															
		138	142	150	152	153	146	142	150	153	152	147	5	138	153	120
		146	147	142	143	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	120	126	115	122	120	113	120	121	121	121	120	4	113	126	95
	TD	180	178	182	178	168	178	175	175	176	175	176	4	168	182	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1B

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710217**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **66048**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.60	1.66	1.64	1.66							1.64	0.03	2	2	1.5
	Permeability (cm./ sec.)	0.36	0.35	0.36	0.35							0.36	0.00	0	0	
	Flow Rate (gpm/ ft.^{2})	119	124	123	124							123	2	119	124	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.207	0.209	0.210	0.206	0.207						0.208	0.002	0.206	0.210	

End of Table 1B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A

MATERIAL PROPE

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710235**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **66049**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	88	88	90	91	93	92	89	90	92	92	90	2	88	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.5	8.4	8.5	8.5	8.6						8.5	0.1	8.4	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	242	249	250	244	234	232	248	249	236	246	243	7	232	250	220
	TD	290	298	320	311	311	312	315	320	323	307	311	10	290	323	
	Apparent Breaking Elongation (percent)															
	MD	78	80	79	80	73	78	79	79	80	74	78	3	73	80	
	TD	100	99	94	104	106	94	101	103	99	104	101	4	94	106	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	140	152	153	150	142	146	143	150	152	148	5	138	153	120
		153	152	146	150	153										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	116	120	118	116	112	114	110	120	124	124	117	5	110	124	95
	TD	186	156	157	158	157	160	163	160	162	163	162	9	156	186	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710235**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **66049**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.74	1.69	1.68	1.68							1.70	0.03	2	2	1.5
	Permeability (cm./ sec.)	0.35	0.35	0.35	0.35							0.35	0.00	0	0	
	Flow Rate (gpm/ ft.^{2})	130	126	126	126							127	2	126	130	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 minimum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		0.206	0.201	0.195	0.204	0.206						0.202	0.005	0.195	0.206	

End of Table 2A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710235**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **66050**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	84	86	89	90	92	92	91	90	88	87	89	3	84	92	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.6	8.6	8.7	8.5	8.4						8.6	0.1	8.4	8.7	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	238	249	249	247	232	239	232	231	237	242	239	7	231	249	220
	TD	294	293	299	301	289	320	305	311	323	317	305	12	289	323	
	Apparent Breaking Elongation (percent)															
	MD	79	79	77	74	74	80	79	79	80	80	78	2	74	80	
	TD	104	96	107	107	99	112	111	112	96	112	106	7	96	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	150	153	152	148	150	153	152	152	148	150	148	5	140	153	120
		143	140	141	140	142										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	114	140	126	132	121	120	116	120	120	121	123	8	114	140	95
	TD	180	182	178	172	180	181	178	176	175	175	178	3	172	182	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 2E

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710235**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **66050**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.63	1.64	1.60	1.63							1.62	0.02	2	2	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.37	0.37							0.37	0.01	0	0	
	Flow Rate (gpm/ ft.^{2})	122	123	120	122							121	1	120	123	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 minimum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.	0.209	0.210	0.205	0.210	0.204						0.208	0.003	0.204	0.210	

End of Table 2B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3A

MATERIAL PROPE

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710253**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **66051**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	94	89	92	91	87	88	85	86	87	88	89	3	85	94	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.4	8.5	8.2	8.4	8.6						8.4	0.1	8.2	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	237	243	243	250	234	241	242	234	232	247	240	6	232	250	220
	TD	312	321	299	285	307	311	312	298	309	330	308	13	285	330	
	Apparent Breaking Elongation (percent)															
	MD	77	74	77	80	79	79	80	79	79	78	78	2	74	80	
	TD	96	100	107	99	97	107	108	104	104	97	102	5	96	108	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	140	142	142	150	141	150	146	142	152	144	5	138	152	120
		152	140	140	142	138										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	121	111	121	116	112	108	120	118	112	115	115	5	108	121	95
	TD	188	158	168	166	178	168	160	160	162	162	167	9	158	168	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3A

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710253**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **66051**

		SPECIMENS														
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs.
METHOD	**DESCRIPTION**															MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.71	1.71	1.69	1.75							1.72	0.02	2	2	1.5
	Permeability (cm./ sec.)	0.35	0.36	0.36	0.36							0.36	0.00	0	0	
	Flow Rate ($gpm/ ft.^2$)	128	128	126	131							128	2	126	131	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 minimum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.	0.207	0.209	0.210	0.206	0.205						0.207	0.002	0.205	0.210	

End of Table 3A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710253**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **66052**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"															
		86	87	88	89	90	92	92	90	93	92	90	2	86	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"															
		8.6	8.6	8.4	8.4	8.5						8.5	0.1	8.4	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	239	239	242	247	250	243	232	239	230	234	240	6	230	250	220
	TD	299	306	311	289	312	320	315	295	307	323	308	11	289	323	
	Apparent Breaking Elongation (percent)															
	MD	77	77	79	80	80	79	79	79	80	80	79	1	77	80	
	TD	99	96	100	104	107	107	99	101	104	107	102	4	96	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.															
		138	142	142	140	150	152	152	160	157	158	148	7	138	160	120
		146	142	142	150	152										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	130	112	120	116	120	121	120	112	109	130	119	7	109	130	95
	TD	202	180	178	188	160	178	190	206	200	198	188	14	160	206	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 3B

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710253**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **66052**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.68	1.56	1.71	1.72							1.67	0.07	2	2	1.5
	Permeability (cm./ sec.)	0.36	0.34	0.36	0.35							0.35	0.01	0	0	
	Flow Rate (gpm/ ft.^{2})	126	117	128	128							125	5	117	128	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 minimum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.207	0.203	0.206	0.204	0.205						0.205	0.002	0.203	0.207	

End of Table 3B

*MARV - Minimum Average Roll Values
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4A

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710271**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **66053**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	85	85	86	87	84	90	90	92	90	92	88	3	84	92	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.7	8.3	8.6	8.6	8.5						8.6	0.2	8.3	8.7	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	238	236	230	232	237	241	249	243	230	237	237	6	230	249	220
	TD	345	341	324	312	307	308	311	331	341	338	326	15	307	345	
	Apparent Breaking Elongation (percent)															
	MD	74	78	80	79	79	80	80	79	79	79	79	2	74	80	
	TD	99	97	127	97	100	104	99	104	108	107	104	9	97	127	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	140	145	150	150	148	142	142	138	150	146	9	128	162	120
		162	128	142	150	162										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	110	102	106	98	103	120	112	106	120	112	109	7	98	120	95
	TD	160	170	180	155	156	157	158	143	140	198	162	17	140	198	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4A

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710271**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **66053**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.74	1.74	1.74	1.71							1.74	0.02	2	2	1.5
	Permeability (cm./ sec.)	0.37	0.35	0.35	0.36							0.36	0.01	0	0	
	Flow Rate (gpm/ ft.^{2})	130	130	130	128							130	1	128	130	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.202	0.203	0.210	0.207	0.206						0.206	0.003	0.202	0.210	

End of Table 4A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4B

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710271**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **66054**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	86	85	84	89	92	92	92	88	87	88	88	3	84	92	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.4	8.3	8.2	8.6	8.6						8.4	0.2	8.2	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	248	242	243	238	238	230	241	236	241	239	240	5	230	248	220
	TD	341	300	306	311	301	301	306	318	320	332	314	14	300	341	
	Apparent Breaking Elongation (percent)															
	MD	74	74	80	82	77	77	82	78	77	82	78	3	74	82	
	TD	107	100	99	108	96	96	99	104	111	113	103	6	96	113	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	130	130	140	142	150	152	160	163	160	162	152	12	130	163	120
		161	163	162	159	148										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	106	101	102	120	111	106	120	121	112	120	112	8	101	121	95
	TD	136	140	142	140	140	142	150	142	138	140	141	4	136	150	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4B

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/10/2010**
Client Sample ID: **R#354710271**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100361**
PGL Control No.: **66054**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	**1.69**	**1.72**	**1.63**	**1.63**							**1.66**	**0.04**	**2**	**2**	**1.5**
	Permeability (cm./ sec.)	**0.36**	**0.35**	**0.36**	**0.36**							**0.35**	**0.00**	**0**	**0**	
	Flow Rate (gpm/ ft.^{2})	**126**	**128**	**122**	**122**							**124**	**3**	**122**	**128**	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															**Opening:**
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															**70 maximum**
		70-100	**70-100**	**70-100**	**70-100**	**70-100**						**70-100**	N/A	N/A	N/A	**100 mininmum**
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		0.206	**0.208**	**0.210**	**0.205**	**0.201**						**0.206**	**0.003**	**0.201**	**0.210**	

End of Table 4B

*MARV - Minimum Average Roll Values
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

GAI-LAP
Initial: @VZ #:0.13
DATE: 05/11/2010

Joseph Voss
Envirotech Engineering & Consulting, Inc.
P.O. Box 6029
Enid, OK 73702

Dear Mr. Voss:

Thank you for consulting Precision Geosynthetic Laboratories (PGL) for your material testing needs.

Enclosed is the ***final*** laboratory report for the conformance testing of four (4) 300 mil Double-Sided Geocomposite samples.

PROJECT NAME: Environmental Restoration Disposal Facility (ERDF)

REFERENCE PGL JOB NO.: G100362

DATE RECEIVED: April 22 and May 6, 2010 **DATE REPORTED:** May 11, 2010

SAMPLED BY: PGL at SKAPS, GA

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PGL CONTROL NUMBER
R#354710289	
Geocomposite	65864
Geonet	65868
Geotextile (Top)	66268
Geotextile (Bottom)	66269
R#354710307	
Geocomposite	65865
Geonet	65869
Geotextile (Top)	66270
Geotextile (Bottom)	66271
R#354710325	
Geocomposite	65866
Geonet	65870
Geotextile (Top)	66272
Geotextile (Bottom)	66273
R#354710343	
Geocomposite	65867
Geonet	65871
Geotextile (Top)	66274
Geotextile (Bottom)	66275

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geonet Component	
ASTM D1505	Density
ASTM D1777	Thickness
ASTM D5261	Mass per Unit Area
ASTM D1603	Carbon Black Content
ASTM D1238	Melt Flow Index

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

Precision Geosynthetic Laboratories

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geocomposite	
ASTM D7005	Ply Adhesion
ASTM D4716	Transmissivity
Geotextile Component	
ASTM D5261	Mass Per Unit Area
ASTM D4632	Grab Tensile
ASTM D4533	Trapezoid Tear Strength
ASTM D4833	Puncture Resistance
ASTM D5199	Thickness
ASTM D4491	Permittivity
ASTM D4751	Apparent Opening Size

TEST CONDITIONS: The samples were conditioned for a minimum of one hour in the laboratory at 22 ± 2°C (71.6 ± 3.6°F) and at 60 ± 10% relative humidity prior to test.

TEST RESULTS: The test results are summarized in Tables 1 to 4.

PRECISION GEOSYNTHETIC LABORATORIES

Belinda Jade R. Yeo
Quality Assurance

Carmelo V. Zantua
Technical/Laboratory Director

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

TABLE 1.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/22/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710289**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **65864**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
GEONET COMPONENT:	C#65868															
ASTM D1777	Thickness (mils)															
Test Option #1	*Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	308	312	312	316	313	311	308	306	312	312	311	3	306	316	200
ASTM D1505	Density (grams/ $cm.^3$)	0.9575	0.9575	0.9575								0.9575	0.0000	0.9575	0.9575	> 0.94
ASTM D1238	Melt Flow Index (grams/ 10 minutes)															
Procedure A	*Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190° C and 2.16kg load.*	0.2138	0.2130	0.2140								0.2136	0.0005	0.2130	0.2140	0.1 - 1.1
ASTM D1603	Carbon Black Content (percent)	2.52	2.48									2.50	0.03	2.48	2.52	2 - 3
ASTM D5261	Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	40.8	41.6	41.7	41.2	41.5						41.4	0.4	40.8	41.7	24
GEOCOMPOSITE:																
ASTM D4716	Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.2° C Specimen Size: 12" x 14"*															
	Transmissivity ($m.^2$/ sec.)															
	MD	3.23E-03	3.16E-03									3.19E-03	5.00E-05	3.16E-03	3.23E-03	1 x 10^{-3}
	Flow Rate (gal/min)															
	MD	1.57	1.53									1.55	0.02	1.53	1.57	
	Transmissivity (gal/min/ft)															
	MD	15.58	15.24									15.41	0.24	15.24	15.58	
	Test Set-Up: ***Plate*** _____ ***Geocomposite*** XXXXXX ***Plate*** _____															
	Thickness : 363.5 ***mils (Before)*** ***Thickness :*** 330.5 ***mils (After)***															
ASTM D7005	Ply Bond Adhesion (lbs/ in.- width)															
	Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
	Full scale force range used for testing: 100 lbs.															
	Side A of Composite															
	MD	7.3	8.5	10.3	8.0	9.0						8.6	1.1	7.3	10.3	> 1
	Side B of Composite															
	MD	7.8	7.8	10.8	7.5	10.3						8.8	1.6	7.5	10.8	> 1

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE 2.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/22/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710307**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **65865**

	SPECIMENS														Proj.
	1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs. MARV
METHOD DESCRIPTION															
GEONET COMPONENT: **C#65869**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	311	320	316	310	312	314	315	312	316	312	314	3	310	320	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9573	0.9573	0.9573								0.9573	0.0000	0.9573	0.9573	> 0.94
ASTM D1238 Melt Flow Index (grams/ 10 minutes)															
Procedure A *Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190° C and 2.16kg load.*	0.2078	0.2038	0.2060								0.2059	0.0020	0.2038	0.2078	0.1 - 1.1
ASTM D1603 Carbon Black Content (percent)	2.47	2.50									2.48	0.02	2.47	2.50	2 - 3
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.5	42.6	42.8	42.8	42.5						42.7	0.1	42.5	42.8	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.2° C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	2.86E-03	2.81E-03									2.83E-03	3.81E-05	2.81E-03	2.86E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.39	1.36									1.38	0.02	1.36	1.39	
Transmissivity (gal/min/ft)															
MD	13.82	13.56									13.69	0.18	13.56	13.82	

Test Set-Up:
Plate _____
Geocomposite *XXXXXX*
Plate _____

Thickness : *351* ***mils (Before)***
Thickness : *321* ***mils (After)***

ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)

Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.

Full scale force range used for testing: 100 lbs.

Side A of Composite															
MD	9.0	8.0	6.3	10.5	11.3						9.0	2.0	6.3	11.3	> 1
Side B of Composite															
MD	8.8	10.5	9.5	10.3	12.3						10.3	1.3	8.8	12.3	> 1

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

TABLE 3.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/22/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710325**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **65866**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
GEONET COMPONENT:	C#65870															
ASTM D1777	Thickness (mils)															
Test Option #1	*Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	308	312	312	308	311	308	312	312	310	312	310	2	308	312	200
ASTM D1505	Density (grams/ $cm.^3$)	0.9565	0.9565	0.9565								0.9565	0.0000	0.9565	0.9565	> 0.94
ASTM D1238	Melt Flow Index (grams/ 10 minutes)															
Procedure A	*Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190° C and 2.16kg load.*	0.2061	0.2030	0.2011								0.2034	0.0025	0.2011	0.2061	0.1 - 1.1
ASTM D1603	Carbon Black Content (percent)	2.50	2.47									2.48	0.03	2.47	2.50	2 - 3
ASTM D5261	Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.5	42.6	42.3	42.5	42.6						42.5	0.2	42.3	42.6	24
GEOCOMPOSITE:																
ASTM D4716	Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.3° C Specimen Size: 12" x 14"*															
	Transmissivity ($m.^2$/ sec.)															
	MD	3.03E-03	2.73E-03									2.88E-03	2.07E-04	2.73E-03	3.03E-03	1×10^{-3}
	Flow Rate (gal/min)															
	MD	1.47	1.33									1.40	0.10	1.33	1.47	
	Transmissivity (gal/min/ft)															
	MD	14.62	13.21									13.91	1.00	13.21	14.62	
	Test Set-Up: ***Plate*** ___ ***Geocomposite*** XXXXXX ***Plate*** ___															
	Thickness : 351 ***mils (Before)*** ***Thickness :*** 320.5 ***mils (After)***															
ASTM D7005	Ply Bond Adhesion (lbs/ in.- width)															
	Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
	Full scale force range used for testing: 100 lbs.															
	Side A of Composite															
	MD	8.0	10.5	7.3	10.0	8.0						8.8	1.4	7.3	10.5	> 1
	Side B of Composite															
	MD	8.0	7.8	10.5	9.5	10.3						9.2	1.3	7.8	10.5	> 1

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

TABLE 4.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/22/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710343**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **65867**

		SPECIMENS														Proj.
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs. MARV
METHOD	**DESCRIPTION**															
GEONET COMPONENT:	**C#65871**															
ASTM D1777	Thickness (mils)															
Test Option #1	*Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	308	308	309	311	310	312	312	309	312	310	310	2	308	312	200
ASTM D1505	Density (grams/ $cm.^3$)	0.9565	0.9565	0.9565								0.9565	0.0000	0.9565	0.9565	> 0.94
ASTM D1238	Melt Flow Index (grams/ 10 minutes)															
Procedure A	*Condition FR-190/2.16.Thin 0.1-0.25" specimen strips were charged to the cylinder at a test temperature of 190° C and 2.16kg load.*	0.2111	0.2120	0.2130								0.2120	0.0010	0.2111	0.2130	0.1 - 1.1
ASTM D1603	Carbon Black Content (percent)	2.56	2.51									2.53	0.04	2.51	2.56	2 - 3
ASTM D5261	Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	40.5	40.8	41.1	41.0	41.5						41.0	0.4	40.5	41.5	24
GEOCOMPOSITE:																
ASTM D4716	Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.3° C Specimen Size: 12" x 14"*															
	Transmissivity ($m.^2$/ sec.)															
	MD	3.09E-03	3.20E-03									3.14E-03	7.58E-05	3.09E-03	3.20E-03	1 x 10^{-3}
	Flow Rate (gal/min)															
	MD	1.50	1.56									1.53	0.04	1.50	1.56	
	Transmissivity (gal/min/ft)															
	MD	14.92	15.44									15.18	0.37	14.92	15.44	
	Test Set-Up: ***Plate*** ***Geocomposite*** ***Plate***											***Thickness :*** 329 ***mils (Before)*** ***Thickness :*** 362 ***mils (After)***				
		XXXXXX														
ASTM D7005	Ply Bond Adhesion (lbs/ in.- width)															
	Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
	Full scale force range used for testing: 100 lbs.															
	Side A of Composite															
	MD	8.0	9.3	8.8	10.8	8.5						9.1	1.1	8.0	10.8	> 1
	Side B of Composite															
	MD	10.3	8.0	10.5	9.5	10.8						9.8	1.1	8.0	10.8	> 1

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

TABLE 1A.

MATERIAL PROPER...

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710289**
Material Description: **Geotextile Component of Double-Sided Geoçomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **66268**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	84	85	84	86	88	90	92	98	100	95	90	6	84	100	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.3	8.2	8.3	8.4	8.5						8.3	0.1	8.2	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	260	258	260	255	247	262	250	245	240	251	253	7	240	262	220
	TD	306	312	320	313	290	281	298	307	321	340	309	17	281	340	
	Apparent Breaking Elongation (percent)															
	MD	87	80	79	76	76	77	80	79	80	75	79	3	75	87	
	TD	94	97	105	110	94	97	94	94	104	104	99	6	94	110	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	142	143	147	150	153	145	143	142	143	147	5	138	153	120
		150	153	152	151	146										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	151	157	150	153	150	148	150	153	150	146	151	3	146	157	95
	TD	153	146	150	143	153	143	145	146	159	150	149	5	143	159	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710289**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **66268**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.76	1.73	1.70	1.73							1.73	0.02	1.70	1.76	1.5
	Permeability (cm./ sec.)	0.36	0.35	0.36	0.36							0.36	0.00	0.35	0.36	
	Flow Rate ($gpm/ ft.^2$)	131	130	127	130							129	2	127	131	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	70 maximum 100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.207	0.203	0.204	0.203	0.198						0.203	0.003	0.198	0.207	

End of Table 1A

*MARV - Minimum Average Roll Values
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 1B

MATERIAL PROPEI

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710289**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **66269**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	86	88	88	84	83	84	85	84	83	86	85	2	83	88	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.6	8.4	8.3	8.2	8.3						8.4	0.1	8.2	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	250	252	238	239	241	261	277	260	259	262	254	12	238	277	220
	TD	280	306	320	332	340	312	280	290	301	320	308	21	280	340	
	Apparent Breaking Elongation (percent)															
	MD	80	83	81	77	75	80	76	77	76	73	78	3	73	83	
	TD	94	95	104	102	107	104	94	94	97	104	99	5	94	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	146	150	153	146	142	140	153	160	161	157	149	7	140	161	120
		150	146	150	143	140										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	140	153	148	120	121	120	120	120	120	117	128	14	117	153	95
	TD	136	142	150	153	145	150	153	160	153	150	149	7	136	160	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 1B

MATERIAL PROPE...S

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710289**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **66269**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.65	1.74	1.71	1.73							1.71	0.04	1.65	1.74	1.5
	Permeability (cm./ sec.)	0.35	0.36	0.36	0.35							0.36	0.01	0.35	0.36	
	Flow Rate (gpm/ ft.^{2})	123	130	128	130							128	3	123	130	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	70 maximum 100 minimum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.204	0.209	0.209	0.211	0.202						0.207	0.004	0.202	0.211	

End of Table 1B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A

MATERIAL PROPE

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710307**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **66270**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	85	86	88	88	88	89	91	92	92	87	88	2	85	92	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.4	8.3	8.3	8.4	8.6						8.4	0.1	8.3	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	270	250	260	258	242	260	260	260	255	240	255	9	240	270	220
	TD	280	298	300	310	310	298	298	277	300	312	298	12	277	312	
	Apparent Breaking Elongation (percent)															
	MD	77	80	75	77	80	75	77	77	76	77	77	2	75	80	
	TD	94	90	95	104	101	99	95	90	94	102	96	5	90	104	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	142	138	161	148	152	151	150	146	142	146	6	138	161	120
		147	150	148	140	142										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	138	140	152	152	146	153	146	142	143	137	145	6	137	153	95
	TD	140	150	153	150	142	143	150	162	155	153	150	7	140	162	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710307**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **66270**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.73	1.76	1.76	1.79							1.76	0.02	1.73	1.79	1.5
	Permeability (cm./ sec.)	0.36	0.37	0.37	0.37							0.37	0.00	0.36	0.37	
	Flow Rate ($gpm/ ft.^2$)	129	132	132	134							132	2	129	134	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	70 maximum 100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.207	0.205	0.206	0.207	0.208						0.207	0.001	0.205	0.208	

End of Table 2A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 2B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710307**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **66271**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	93	90	88	86	88	86	88	86	90	93	89	3	86	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.2	8.3	8.2	8.1	8.2						8.2	0.1	8.1	8.3	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	242	259	262	238	240	247	250	280	277	260	255	15	238	280	220
	TD	275	261	280	298	300	298	300	311	302	316	294	17	261	316	
	Apparent Breaking Elongation (percent)															
	MD	77	73	80	77	76	76	73	80	73	80	77	3	73	80	
	TD	90	93	90	93	90	90	90	94	97	94	92	2	90	97	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	142	142	150	152	152	150	155	147	150	150	6	138	157	120
		147	151	155	156	157										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	117	120	123	120	120	120	127	120	115	115	120	4	115	127	95
	TD	138	140	150	162	162	155	158	160	160	163	155	9	138	163	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710307**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **66271**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.65	1.70	1.67	1.67							1.67	0.02	1.65	1.70	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.35	0.35							0.35	0.01	0.35	0.36	
	Flow Rate (gpm/ $ft.^2$)	123	127	125	125							125	2	123	127	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.205	0.205	0.209	0.210	0.211						0.208	0.003	0.205	0.211	

End of Table 2B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 3A.

MATERIAL PROPE

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710325**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **66272**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"															
		90	92	91	88	88	90	100	102	102	100	94	6	88	102	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"															
		8.6	9.0	8.6	8.4	8.2						8.6	0.3	8.2	9.0	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	238	245	261	255	242	238	240	260	260	237	248	10	237	261	220
	TD	280	306	300	320	320	340	300	298	280	320	306	19	280	340	
	Apparent Breaking Elongation (percent)															
	MD	77	75	73	77	76	80	75	77	76	76	76	2	73	80	
	TD	94	90	93	102	104	102	94	97	93	102	97	5	90	104	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.															
		139	140	146	145	150	146	140	150	152	146	149	7	139	162	120
		155	162	160	158	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	116	120	117	116	115	120	115	112	106	102	114	6	102	120	95
	TD	138	140	142	150	162	162	160	160	159	163	154	10	138	163	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 3A

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710325**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **66272**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.73	1.73	1.76	1.70							1.73	0.02	1.70	1.76	1.5
	Permeability (cm./ sec.)	0.35	0.36	0.36	0.36							0.36	0.00	0.35	0.36	
	Flow Rate (gpm/ ft.^{2})	129	130	131	127							129	2	127	131	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	70 maximum 100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.209	0.211	0.211	0.201	0.202						0.207	0.005	0.201	0.211	

End of Table 3A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 3B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710325**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **66273**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	84	83	84	83	82	84	83	84	86	88	84	2	82	88	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	9.0	8.3	8.4	8.6	8.2						8.5	0.3	8.2	9.0	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	260	255	248	255	242	250	262	277	280	260	259	12	242	280	220
	TD	306	312	320	340	277	280	298	292	300	312	304	19	277	340	
	Apparent Breaking Elongation (percent)															
	MD	77	73	77	80	77	80	73	77	77	80	77	2	73	80	
	TD	94	97	107	102	94	92	94	95	97	94	96	5	92	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	150	153	148	150	150	152	153	150	142	146	149	4	142	153	120
		153	147	145	146	143										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	123	140	121	131	120	120	121	120	120	121	124	7	120	140	95
	TD	160	160	162	160	162	157	158	160	160	155	159	2	155	162	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710325**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **66273**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.70	1.67	1.67	1.65							1.67	0.02	1.65	1.70	1.5
	Permeability (cm./ sec.)	0.35	0.35	0.37	0.38							0.36	0.01	0.35	0.38	
	Flow Rate (gpm/ ft.^{2})	127	125	125	123							125	2	123	127	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	70 maximum 100 minimum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.211	0.210	0.209	0.206	0.203						0.208	0.003	0.203	0.211	

End of Table 3B

*MARV - Minimum Average Roll Values
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4A.

MATERIAL PROPE[illegible]

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710343**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **66274**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	86	83	84	85	84	83	84	83	84	83	84	1	83	86	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.6	8.6	8.2	8.4	8.5						8.5	0.1	8.2	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	242	260	260	261	277	260	255	242	250	251	256	10	242	277	220
	TD	280	277	298	306	312	320	312	320	320	340	308	19	277	340	
	Apparent Breaking Elongation (percent)															
	MD	73	77	80	77	75	77	77	76	73	80	77	2	73	80	
	TD	94	97	90	102	107	104	102	110	109	105	102	7	90	110	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	152	150	152	150	151	146	143	144	129	148	9	129	161	120
		136	147	155	161	160										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	112	109	120	112	106	120	116	117	102	120	113	6	102	120	95
	TD	138	142	162	160	158	162	153	150	154	170	155	10	138	170	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 4A

MATERIAL PROPE...

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710343**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **66274**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.71	1.70	1.74	1.65							1.70	0.04	1.65	1.74	1.5
	Permeability (cm./ sec.)	0.36	0.35	0.35	0.36							0.36	0.00	0.35	0.36	
	Flow Rate (gpm/ ft.^{2})	128	127	130	123							127	3	123	130	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.209	0.210	0.211	0.205	0.206						0.208	0.003	0.205	0.211	

End of Table 4A

*MARV - Minimum Average Roll Values
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4B

MATERIAL PROPE

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710343**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **66275**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	86	87	88	86	84	85	84	90	92	92	87	3	84	92	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.3	8.4	8.4	8.6	8.7						8.5	0.2	8.3	8.7	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	242	250	241	250	262	258	260	242	250	262	252	8	241	262	220
	TD	280	278	300	312	320	332	300	278	280	277	296	20	277	332	
	Apparent Breaking Elongation (percent)															
	MD	77	75	77	80	76	77	73	75	75	77	76	2	73	80	
	TD	94	90	95	104	105	107	97	97	97	95	98	5	90	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	141	150	138	142	148	152	146	155	150	146	146	6	138	159	120
		142	140	139	141	159										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	106	111	108	100	120	112	108	110	107	106	109	5	100	120	95
	TD	137	146	148	152	152	146	150	137	146	162	148	7	137	162	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 4B

MATERIAL PROPE[illegible]

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/11/2010**
Client Sample ID: **R#354710343**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100362**
PGL Control No.: **66275**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.73	1.67	1.68	1.70							1.70	0.03	1.67	1.73	1.5
	Permeability (cm./ sec.)	0.35	0.35	0.36	0.35							0.35	0.00	0.35	0.36	
	Flow Rate (gpm/ ft.^{2})	130	125	125	127							127	2	125	130	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.209	0.211	0.209	0.208	0.205						0.208	0.002	0.205	0.211	

End of Table 4B

*MARV - Minimum Average Roll Values
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

Precision Geosynthetic Laboratories

GAI-LAP
Initial: GVZ #:0.13
DATE: 05/17/2010

Joseph Voss
Envirotech Engineering & Consulting, Inc.
P.O. Box 6029
Enid, OK 73702

Dear Mr. Voss:

Thank you for consulting Precision Geosynthetic Laboratories (PGL) for your material testing needs.

Enclosed is the ***final*** laboratory report for the conformance testing of four (4) 300 mil Double-Sided Geocomposite samples.

PROJECT NAME: Environmental Restoration Disposal Facility (ERDF)

REFERENCE PGL JOB NO.: G100363

DATE RECEIVED: April 22 and May 6, 2010 **DATE REPORTED:** May 17, 2010

SAMPLED BY: PGL at SKAPS, GA

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PGL CONTROL NUMBER
R#354710361	
Geocomposite	65872
Geonet	65876
Geotextile (Top)	66276
Geotextile (Bottom)	66277
R#354710379	
Geocomposite	65873
Geonet	65877
Geotextile (Top)	66278
Geotextile (Bottom)	66279
R#354710397	
Geocomposite	65874
Geonet	65878
Geotextile (Top)	66280
Geotextile (Bottom)	66281
R#354710415	
Geocomposite	65875
Geonet	65879
Geotextile (Top)	66282
Geotextile (Bottom)	66283

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geonet Component	
ASTM D1505	Density
ASTM D1777	Thickness
ASTM D5261	Mass per Unit Area

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

Precision Geosynthetic Laboratories

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geocomposite	
ASTM D7005	Ply Adhesion
ASTM D4716	Transmissivity
Geotextile Component	
ASTM D5261	Mass Per Unit Area
ASTM D4632	Grab Tensile
ASTM D4533	Trapezoid Tear Strength
ASTM D4833	Puncture Resistance
ASTM D5199	Thickness
ASTM D4491	Permittivity
ASTM D4751	Apparent Opening Size

TEST CONDITIONS: The samples were conditioned for a minimum of one hour in the laboratory at 22 ± 2°C (71.6 ± 3.6°F) and at 60 ± 10% relative humidity prior to test.

TEST RESULTS: The test results are summarized in Tables 1 to 4.

PRECISION GEOSYNTHETIC LABORATORIES

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TABLE 1.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/22/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710361**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **65872**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
GEONET COMPONENT: C#65876															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	311	312	310	310	311	310	312	312	308	308	310	1	308	312	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9558	0.9558	0.9558								0.9558	0.0000	0.9558	0.9558	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.5	42.5	42.5	42.5	42.5						42.5	0.0	42.5	42.5	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.3 °C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	2.78E-03	2.71E-03									2.74E-03	4.74E-05	2.71E-03	2.78E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.35	1.32									1.34	0.02	1.32	1.35	
Transmissivity (gal/min/ft)															
MD	13.42	13.09									13.26	0.23	13.09	13.42	

Test Set-Up: ***Thickness :*** *347* ***mils (Before)***
Plate _____ ***Thickness :*** *314.5* ***mils (After)***
Geocomposite *XXXXXX*
Plate _____

ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)

Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.

Full scale force range used for testing: 100 lbs.

Side A of Composite															
MD	8.0	6.5	8.1	7.2	9.5						7.8	1.1	6.5	9.5	> 1
Side B of Composite															
MD	10.3	7.9	10.0	8.7	9.5						9.3	1.0	7.9	10.3	> 1

* *MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 2.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/22/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710379**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **65873**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
GEONET COMPONENT: **C#65877**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	311	308	312	314	316	317	310	311	310	310	312	3	308	317	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9573	0.9573	0.9573								0.9573	0.0000	0.9573	0.9573	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	41.9	42.2	42.2	42.2	42.5						42.2	0.2	41.9	42.5	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.3 °C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2/$ sec.)															
MD	3.07E-03	3.13E-03									3.10E-03	4.13E-05	3.07E-03	3.13E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.50	1.52									1.51	0.02	1.50	1.52	
Transmissivity (gal/min/ft)															
MD	14.85	15.13									14.99	0.20	14.85	15.13	

Test Set-Up:
Plate _____
Geocomposite XXXXXX
Plate _____

Thickness : 352.5 *mils (Before)*
Thickness : 320.5 *mils (After)*

ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)

Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.

Full scale force range used for testing: 100 lbs.

Side A of Composite															
MD	7.5	11.3	10.6	8.8	10.1						9.7	1.5	7.5	11.3	> 1
Side B of Composite															
MD	8.1	11.1	8.6	9.3	10.6						9.5	1.3	8.1	11.1	> 1

* *MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 3.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/22/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710397**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **65874**

	SPECIMENS														Proj.
	1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD DESCRIPTION															MARV *
GEONET COMPONENT: **C#65878**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	320	316	315	314	314	312	311	312	312	310	314	3	310	320	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9575	0.9575	0.9575								0.9575	0.0000	0.9575	0.9575	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	40.8	41.1	41.5	41.5	42.5						41.5	0.6	40.8	42.5	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.3 ^{0}C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	3.38E-03	3.25E-03									3.32E-03	8.81E-05	3.25E-03	3.38E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.64	1.58									1.61	0.04	1.58	1.64	
Transmissivity (gal/min/ft)															
MD	16.31	15.71									16.01	0.43	15.71	16.31	
Test Set-Up: ***Thickness :*** 360 ***mils (Before)***															
Plate _____ ***Thickness :*** 327.5 ***mils (After)***															
Geocomposite XXXXXX															
Plate _____															
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
Full scale force range used for testing: 100 lbs.															
Side A of Composite															
MD	8.5	10.8	8.1	8.7	10.3						9.3	1.2	8.1	10.8	> 1
Side B of Composite															
MD	7.8	9.4	9.5	9.2	11.1						9.4	1.2	7.8	11.1	> 1

* *MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 4.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/22/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710415**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **65875**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
GEONET COMPONENT: **C#65879**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	312	316	312	312	308	312	312	310	306	310	311	3	306	316	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9565	0.9565	0.9565								0.9565	0.0000	0.9565	0.9565	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	41.9	42.2	42.5	42.3	42.5						42.3	0.2	41.9	42.5	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.3 °C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	2.89E-03	3.06E-03									2.98E-03	1.19E-04	2.89E-03	3.06E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.41	1.49									1.45	0.06	1.41	1.49	
Transmissivity (gal/min/ft)															
MD	13.97	14.78									14.37	0.57	13.97	14.78	
Test Set-Up: ***Plate*** ***Geocomposite*** XXXXXX ***Plate***															
Thickness : 351 ***mils (Before)*** ***Thickness :*** 320.5 ***mils (After)***															
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
Full scale force range used for testing: 100 lbs.															
Side A of Composite															
MD	8.4	10.5	8.3	10.3	8.4						9.2	1.1	8.3	10.5	> 1
Side B of Composite															
MD	8.7	11.3	9.7	12.5	9.2						10.3	1.6	8.7	12.5	> 1

* *MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710361**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **66276**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	90	92	95	88	86	88	85	84	88	90	88	3	84	95	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.3	8.4	8.3	8.5	8.4						8.4	0.0	8.3	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	234	230	248	252	250	246	258	248	253	258	248	9	230	258	220
	TD	278	300	303	298	280	275	298	300	306	312	295	13	275	312	
	Apparent Breaking Elongation (percent)															
	MD	77	75	77	78	78	78	77	79	80	79	78	1	75	80	
	TD	97	100	94	94	92	94	99	101	102	104	98	4	92	104	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	142	137	140	142	143	145	146	152	150	148	8	137	162	120
		156	155	154	162	160										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	138	140	140	127	120	120	120	120	119	117	126	9	117	140	95
	TD	120	136	142	150	143	146	150	143	140	142	141	9	120	150	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710361**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **66276**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	**1.68**	**1.68**	**1.68**	**1.74**							**1.69**	**0.03**	**2**	**2**	**1.5**
	Permeability (cm./ sec.)	**0.35**	**0.35**	**0.35**	**0.36**							**0.35**	**0.00**	**0**	**0**	
	Flow Rate ($gpm/ ft.^2$)	**125**	**126**	**126**	**130**							**127**	**2**	**125**	**130**	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															**Opening:**
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															**70 maximum**
		70-100	**70-100**	**70-100**	**70-100**	**70-100**						**70-100**	N/A	N/A	N/A	**100 mininmum**
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	**0.207**	**0.208**	**0.209**	**0.206**	**0.206**						**0.207**	**0.001**	**0.206**	**0.209**	

End of Table 1A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710361**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **66277**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	84	86	88	88	85	83	84	82	83	84	85	2	82	88	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.3	8.2	8.0	8.3	8.4						8.3	0.2	8.0	8.4	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	231	242	230	240	230	232	228	236	240	236	234	5	228	242	220
	TD	260	298	300	276	260	268	280	288	275	268	277	14	260	300	
	Apparent Breaking Elongation (percent)															
	MD	77	75	80	75	77	75	78	78	76	76	77	2	75	80	
	TD	92	94	100	95	92	92	93	92	95	90	93	3	90	100	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	151	155	146	143	140	153	143	140	140	140	147	6	140	155	120
		150	152	153	147	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	120	120	116	140	127	120	120	116	115	110	120	8	110	140	95
	TD	128	132	140	143	142	150	143	140	155	156	143	9	128	156	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 1B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710361**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **66277**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.64	1.65	1.66	1.68							1.66	0.01	2	2	1.5
	Permeability (cm./ sec.)	0.35	0.35	0.35	0.35							0.35	0.00	0	0	
	Flow Rate ($gpm/ ft.^2$)	123	123	124	125							124	1	123	125	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 minimum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.211	0.209	0.206	0.205	0.201						0.206	0.004	0.201	0.211	

End of Table 1B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710379**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **66278**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	83	84	83	87	85	82	85	85	84	83	84	1	82	87	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.3	8.4	8.5	8.2	8.3						8.4	0.1	8.2	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	232	240	249	250	234	238	240	242	250	262	244	9	232	262	220
	TD	300	298	306	312	288	275	280	278	260	259	286	18	259	312	
	Apparent Breaking Elongation (percent)															
	MD	77	80	75	73	77	80	86	82	75	75	78	4	73	86	
	TD	92	97	94	102	94	94	97	95	90	94	95	3	90	102	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	140	160	150	153	156	153	150	162	160	160	157	6	140	162	120
		162	161	160	161	162										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	120	120	130	140	142	110	111	120	116	121	123	11	110	142	95
	TD	160	162	159	163	170	171	168	165	170	155	164	5	155	171	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710379**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **66278**

		SPECIMENS														Proj.
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	**DESCRIPTION**															**MARV ***
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	**1.79**	**1.79**	**1.68**	**1.68**							**1.73**	**0.06**	**1.68**	**1.79**	**1.5**
	Permeability (cm./ sec.)	**0.37**	**0.36**	**0.36**	**0.35**							**0.36**	**0.01**	**0.35**	**0.37**	
	Flow Rate ($gpm/ ft.^2$)	**134**	**134**	**126**	**125**							**130**	**5**	**125**	**134**	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															**Opening:**
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															**70 maximum**
		70-100	**70-100**	**70-100**	**70-100**	**70-100**						**70-100**	N/A	N/A	N/A	**100 mininmum**
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		0.211	**0.205**	**0.207**	**0.209**	**0.206**						**0.208**	**0.002**	**0.205**	**0.211**	

End of Table 2A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2E.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710379**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **66279**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	86	88	88	90	92	91	89	84	85	84	88	3	84	92	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.8	8.3	8.4	8.2	8.3						8.4	0.3	8.2	8.8	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	245	242	250	242	240	250	236	240	250	242	244	5	236	250	220
	TD	280	306	320	312	320	311	308	275	298	301	303	15	275	320	
	Apparent Breaking Elongation (percent)															
	MD	77	75	77	76	73	73	77	73	80	73	76	2	73	80	
	TD	94	97	102	104	101	104	97	94	94	97	98	4	94	104	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	159	160	160	160	159	150	146	142	150	143	151	7	142	160	120
		146	150	143	146	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	115	120	121	120	120	120	120	116	120	121	119	2	115	121	95
	TD	140	160	160	160	160	162	177	161	180	171	163	11	140	180	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 2B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710379**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **66279**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.65	1.61	1.66	1.65							1.64	0.02	1.61	1.66	1.5
	Permeability (cm./ sec.)	0.36	0.37	0.37	0.37							0.36	0.01	0.36	0.37	
	Flow Rate (gpm/ ft.^{2})	123	121	124	123							123	1	121	124	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening: 70 maximum
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.211	0.204	0.205	0.202	0.206						0.206	0.003	0.202	0.211	

End of Table 2B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710397**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **66280**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	86	88	89	84	83	84	86	90	92	90	87	3	83	92	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.5	8.6	8.6	8.8	8.7						8.6	0.1	8.5	8.8	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	230	250	257	260	255	260	250	262	250	242	252	10	230	262	220
	TD	260	278	336	298	300	312	300	278	290	290	294	21	260	336	
	Apparent Breaking Elongation (percent)															
	MD	77	80	73	77	75	70	73	77	76	76	75	3	70	80	
	TD	94	90	94	97	94	102	99	92	87	94	94	4	87	102	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	142	142	150	162	150	146	152	153	146	147	6	138	162	120
		142	141	152	142	152										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	158	120	160	160	160	120	122	130	127	120	138	19	120	160	95
	TD	160	175	180	171	168	160	160	162	159	162	166	7	159	180	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 3A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710397**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **66280**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.71	1.71	1.65	1.70							1.69	0.03	1.65	1.71	1.5
	Permeability (cm./ sec.)	0.35	0.36	0.36	0.35							0.35	0.00	0.35	0.36	
	Flow Rate ($gpm/ ft.^2$)	128	128	123	127							126	2	123	128	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.	0.208	0.205	0.209	0.210	0.211						0.209	0.002	0.205	0.211	

End of Table 3A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3b.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710397**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **66281**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	86	84	83	90	92	92	88	88	84	85	87	3	83	92	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.2	8.3	8.4	8.3	8.1						8.3	0.1	8.1	8.4	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	250	236	240	250	260	275	260	275	240	250	254	14	236	275	220
	TD	306	312	320	350	298	278	280	300	312	300	305	21	278	350	
	Apparent Breaking Elongation (percent)															
	MD	77	75	80	75	77	75	75	74	74	74	76	2	74	80	
	TD	94	104	102	107	97	95	93	87	97	94	97	6	87	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	140	143	142	150	143	146	150	152	147	146	147	4	140	152	120
		150	152	150	147	146										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	112	116	115	130	120	121	117	110	120	121	118	6	110	130	95
	TD	160	159	163	161	150	170	173	168	167	165	164	7	150	173	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710397**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **66281**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.73	1.73	1.73	1.76							1.74	0.02	1.73	1.76	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.36	0.36							0.36	0.00	0.36	0.36	
	Flow Rate (gpm/ ft.^{2})	129	129	129	132							130	1	129	132	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.	0.211	0.204	0.209	0.208	0.206						0.208	0.003	0.204	0.211	

End of Table 3B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710415**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **66282**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	93	96	95	94	88	95	96	88	88	86	92	4	86	96	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.4	8.3	8.2	8.1	8.2						8.3	0.1	8.1	8.4	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	260	260	260	275	260	260	260	260	241	260	260	8	241	275	220
	TD	312	320	280	278	300	306	311	308	320	317	305	15	278	320	
	Apparent Breaking Elongation (percent)															
	MD	77	72	73	77	80	81	80	79	76	77	77	3	72	81	
	TD	100	100	94	97	94	102	107	94	100	102	99	4	94	107	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	142	141	150	153	152	152	150	146	153	146	5	138	153	120
		146	143	142	142	142										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	120	130	128	123	130	127	120	115	110	120	122	7	110	130	95
	TD	138	150	146	152	162	160	162	162	170	172	157	11	138	172	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710415**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **66282**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.74	1.68	1.64	1.62							1.67	0.06	1.62	1.74	1.5
	Permeability (cm./ sec.)	0.35	0.36	0.36	0.37							0.36	0.01	0.35	0.37	
	Flow Rate ($gpm/ ft.^2$)	130	126	122	121							125	4	121	130	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		0.207	0.208	0.208	0.210	0.205						0.208	0.002	0.205	0.210	

End of Table 4A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710415**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **66283**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	98	91	93	98	86	85	97	98	100	102	95	6	85	102	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.3	8.2	8.3	8.4	8.2						8.3	0.1	8.2	8.4	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	260	260	262	245	250	262	275	255	248	250	257	9	245	275	220
	TD	340	312	300	288	298	290	278	306	315	320	305	18	278	340	
	Apparent Breaking Elongation (percent)															
	MD	77	75	80	77	75	76	77	81	80	76	77	2	75	81	
	TD	104	102	99	90	97	94	94	97	104	100	98	5	90	104	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	160	157	153	150	146	143	140	152	153	146	148	7	138	160	120
		146	152	142	138	140										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	118	120	117	116	120	121	110	113	100	102	114	8	100	121	95
	TD	186	142	120	136	155	154	156	160	160	167	154	18	120	186	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/17/2010**
Client Sample ID: **R#354710415**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100363**
PGL Control No.: **66283**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	**1.71**	**1.65**	**1.62**	**1.66**							**1.66**	**0.04**	**1.62**	**1.71**	**1.5**
	Permeability (cm./ sec.)	**0.36**	**0.36**	**0.36**	**0.35**							**0.36**	**0.00**	**0.35**	**0.36**	
	Flow Rate ($gpm/ ft.^2$)	**128**	**123**	**121**	**124**							**124**	**3**	**121**	**128**	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															**Opening:**
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.															**70 maximum**
		70-100	**70-100**	**70-100**	**70-100**	**70-100**						**70-100**	N/A	N/A	N/A	**100 mininmum**
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.	**0.209**	**0.210**	**0.205**	**0.207**	**0.206**						**0.207**	**0.002**	**0.205**	**0.210**	

End of Table 4B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

GAI-LAP
Initial: CVZ #:0.13
DATE: 05/19/2010

Joseph Voss
Envirotech Engineering & Consulting, Inc.
P.O. Box 6029
Enid, OK 73702

Dear Mr. Voss:

Thank you for consulting Precision Geosynthetic Laboratories (PGL) for your material testing needs.

Enclosed is the ***final*** laboratory report for the conformance testing of four (4) 300 mil Double-Sided Geocomposite samples.

PROJECT NAME: Environmental Restoration Disposal Facility (ERDF)

REFERENCE PGL JOB NO.: G100415

DATE RECEIVED: April 22 and May 6, 2010 **DATE REPORTED:** May 19, 2010

SAMPLED BY: PGL at SKAPS, GA

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PGL CONTROL NUMBER
R#354710433	
Geocomposite	66055
Geonet	66067
Geotextile (Top)	66284
Geotextile (Bottom)	66285
R#354710451	
Geocomposite	66056
Geonet	66068
Geotextile (Top)	66286
Geotextile (Bottom)	66287
R#354710469	
Geocomposite	66057
Geonet	66069
Geotextile (Top)	66288
Geotextile (Bottom)	66289
R#354710487	
Geocomposite	66058
Geonet	66070
Geotextile (Top)	66290
Geotextile (Bottom)	66291

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geonet Component	
ASTM D1505	Density
ASTM D1777	Thickness
ASTM D5261	Mass per Unit Area

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

Precision Geosynthetic Laboratories

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geocomposite	
ASTM D7005	Ply Adhesion
ASTM D4716	Transmissivity
Geotextile Component	
ASTM D5261	Mass Per Unit Area
ASTM D4632	Grab Tensile
ASTM D4533	Trapezoid Tear Strength
ASTM D4833	Puncture Resistance
ASTM D5199	Thickness
ASTM D4491	Permittivity
ASTM D4751	Apparent Opening Size

TEST CONDITIONS: The samples were conditioned for a minimum of one hour in the laboratory at $22 \pm 2^{\circ}C$ ($71.6 \pm 3.6^{\circ}F$) and at $60 \pm 10\%$ relative humidity prior to test.

TEST RESULTS: The test results are summarized in Tables 1 to 4.

PRECISION GEOSYNTHETIC LABORATORIES

Belinda Jade R. Yeo
Quality Assurance

Carmelo V. Zantua
Technical/Laboratory Director

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

TABLE 1.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710433**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66055**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
GEONET COMPONENT:	C#66067														
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	312	308	308	310	312	311	312	314	312	310	311	2	308	314	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9549	0.9549	0.9549								0.9549	0.0000	0.9549	0.9549	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.8	42.9	42.8	42.8	42.8						42.8	0.1	42.8	42.9	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.2° C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	3.27E-03	3.33E-03									3.30E-03	3.85E-05	3.27E-03	3.33E-03	1 x 10^{-3}
Flow Rate (gal/min)															
MD	1.59	1.62									1.60	0.02	1.59	1.62	
Transmissivity (gal/min/ft)															
MD	15.81	16.07									15.94	0.19	15.81	16.07	
Test Set-Up:															
Plate															
Geocomposite	XXXXXX														
Plate															
Thickness : 358.5 ***mils (Before)***															
Thickness : 324 ***mils (After)***															
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
Full scale force range used for testing: 100 lbs.															
Side A of Composite															
MD	9.3	10.0	8.8	10.0	9.8						9.6	0.5	8.8	10.0	> 1
Side B of Composite															
MD	8.8	8.8	10.3	8.8	8.8						9.1	0.7	8.8	10.3	> 1

MD - MACHINE DIRECTION
DC#1984 Record#265

TABLE 2.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710451**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66056**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
GEONET COMPONENT:	C#66068														
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	311	312	308	315	320 *	317	318	317	309	310	314	4	308	320	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9554	0.9554	0.9554								0.9554	0.0000	0.9554	0.9554	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.5	41.8	42.5	42.5	42.6						42.4	0.3	41.8	42.6	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.2° C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2/$ sec.)															
MD	3.15E-03	2.96E-03									3.05E-03	1.33E-04	2.96E-03	3.15E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.53	1.44									1.48	0.06	1.44	1.53	
Transmissivity (gal/min/ft)															
MD	15.21	14.30									14.76	0.64	14.30	15.21	
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
Full scale force range used for testing: 100 lbs.															
Side A of Composite															
MD	10.3	8.8	10.3	9.5	10.5						9.9	0.7	8.8	10.5	> 1
Side B of Composite															
MD	8.8	8.8	9.3	10.3	10.3						9.5	0.8	8.8	10.3	> 1

Test Set-Up: ***Thickness :*** *351.5* ***mils (Before)***

Plate _____ ***Thickness :*** *319.5* ***mils (After)***

Geocomposite *XXXXXX*

Plate _____

MD - MACHINE DIRECTION
DC#1984 Record#265

TABLE 3.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710469**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66057**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
GEONET COMPONENT:	C#66069														
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	308	311	312	316	308	312	310	312	309	312	311	2	308	316	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9556	0.9556	0.9556								0.9556	0.0000	0.9556	0.9556	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	44.4	43.7	43.9	44.1	43.9						44.0	0.3	43.7	44.4	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.2° C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	2.84E-03	2.90E-03									2.87E-03	4.53E-05	2.84E-03	2.90E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.38	1.41									1.39	0.02	1.38	1.41	
Transmissivity (gal/min/ft)															
MD	13.72	14.03									13.87	0.22	13.72	14.03	

Test Set-Up: *Thickness : 346.5 mils (Before)*
Plate _____ *Thickness : 312.5 mils (After)*
Geocomposite XXXXXX
Plate _____

ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)

Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.
Full scale force range used for testing: 100 lbs.

Side A of Composite															
MD	9.0	10.5	8.8	10.3	10.5						9.8	0.9	8.8	10.5	> 1
Side B of Composite															
MD	10.3	9.0	11.5	9.3	10.8						10.2	1.0	9.0	11.5	> 1

MD - MACHINE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE 4.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710487**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66058**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
GEONET COMPONENT:	C#66070														
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	315	308	312	320	317	318	316	315	318	320	316	4	308	320	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9554	0.9554	0.9554								0.9554	0.0000	0.9554	0.9554	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.8	43.2	43.1	42.8	43.7						43.1	0.4	42.8	43.7	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.2° C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	3.21E-03	3.26E-03									3.24E-03	3.57E-05	3.21E-03	3.26E-03	1 x 10^{-3}
Flow Rate (gal/min)															
MD	1.56	1.58									1.57	0.02	1.56	1.58	
Transmissivity (gal/min/ft)															
MD	15.52	15.76									15.64	0.17	15.52	15.76	
Test Set-Up:															
Plate															
Geocomposite	XXXXXX														
Plate															
Thickness : 356.5 ***mils (Before)***															
Thickness : 324 ***mils (After)***															
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
Full scale force range used for testing: 100 lbs.															
Side A of Composite															
MD	9.3	10.3	10.8	11.5	10.5						10.5	0.8	9.3	11.5	> 1
Side B of Composite															
MD	8.8	10.3	11.3	9.0	10.0						9.9	1.0	8.8	11.3	> 1

MD - MACHINE DIRECTION
DC#1984 Record#265

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710433**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66284**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	91	92	92	90	93	90	88	82	83	82	88	4	82	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.3	8.4	8.4	8.5	8.4						8.4	0.0	8.3	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	231	239	241	249	233	236	231	241	250	250	240	7	231	250	220
	TD	306	298	316	321	310	301	320	319	288	316	310	11	288	321	
	Apparent Breaking Elongation (percent)															
	MD	74	77	78	82	80	79	79	74	80	78	78	3	74	82	
	TD	107	99	110	111	110	96	104	110	97	107	105	6	96	111	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	163	162	163	160	160	159	160	159	160	159	160	2	157	163	120
		160	163	160	158	157										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	111	109	120	121	120	116	128	120	117	118	118	5	109	128	95
	TD	120	136	143	150	153	156	159	162	159	158	150	13	120	162	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710433**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66284**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	**1.61**	**1.64**	**1.61**	**1.68**							**1.64**	**0.03**	**1.61**	**1.68**	**1.5**
	Permeability (cm./ sec.)	**0.34**	**0.35**	**0.35**	**0.35**							**0.35**	**0.01**	**0.34**	**0.35**	
	Flow Rate (gpm/ ft.^{2})	**121**	**123**	**121**	**125**							**122**	**2**	**121**	**125**	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															**Opening:**
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															**70 maximum**
		70-100	**70-100**	**70-100**	**70-100**	**70-100**						**70-100**	N/A	N/A	N/A	**100 mininmum**
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	**0.208**	**0.208**	**0.210**	**0.210**	**0.211**						**0.209**	**0.001**	**0.208**	**0.211**	

End of Table 1A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710433**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66285**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	84	82	82	84	84	86	88	86	83	90	85	3	82	90	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.5	8.6	8.6	8.4	8.3						8.5	0.1	8.3	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	237	232	238	241	249	231	238	250	248	241	240	7	231	250	220
	TD	320	301	312	307	310	300	310	321	288	316	309	10	288	321	
	Apparent Breaking Elongation (percent)															
	MD	80	77	77	73	82	79	78	74	74	73	77	3	73	82	
	TD	110	97	104	111	111	99	110	104	96	107	105	6	96	111	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	159	163	158	163	159	160	160	163	160	160	160	2	158	163	120
		160	163	159	160	160										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	120	118	118	110	108	102	112	111	109	120	113	6	102	120	95
	TD	120	122	141	135	142	141	120	136	140	150	135	11	120	150	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710433**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66285**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	**1.60**	**1.61**	**1.78**	**1.76**							**1.69**	**0.10**	**1.60**	**1.78**	**1.5**
	Permeability (cm./ sec.)	**0.35**	**0.35**	**0.36**	**0.37**							**0.36**	**0.01**	**0.35**	**0.37**	
	Flow Rate (gpm/ ft.^{2})	**120**	**120**	**133**	**131**							**126**	**7**	**120**	**133**	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															**Opening:**
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															**70 maximum**
		70-100	**70-100**	**70-100**	**70-100**	**70-100**						**70-100**	N/A	N/A	N/A	**100 mininmum**
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	**0.203**	**0.203**	**0.205**	**0.206**	**0.209**						**0.205**	**0.002**	**0.203**	**0.209**	

End of Table 1B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710451**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66286**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"															
		88	92	92	88	88	90	88	83	82	86	88	3	82	92	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"															
		8.3	8.4	8.5	8.5	8.5						8.5	0.1	8.3	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	238	236	230	237	241	249	233	249	250	236	240	7	230	250	220
	TD	320	311	316	331	306	311	320	318	299	310	314	9	299	331	
	Apparent Breaking Elongation (percent)															
	MD	79	80	82	77	77	74	79	77	77	80	78	2	74	82	
	TD	110	111	84	111	110	99	111	111	110	111	107	9	84	111	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.															
		158	167	150	153	159	160	162	165	150	163	159	5	150	167	120
		162	160	161	163	155										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	120	118	115	120	122	126	130	122	118	111	120	5	111	130	95
	TD	160	159	150	146	150	180	158	160	162	159	158	9	146	180	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710451**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66286**

		SPECIMENS														Proj.
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	**DESCRIPTION**															MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.61	1.61	1.67	1.64							1.63	0.03	1.61	1.67	1.5
	Permeability (cm./ sec.)	0.36	0.37	0.36	0.35							0.36	0.01	0.35	0.37	
	Flow Rate ($gpm/ ft.^2$)	120	121	125	123							122	2	120	125	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.	70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	70 maximum 100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.	0.209	0.210	0.211	0.206	0.206						0.208	0.002	0.206	0.211	

End of Table 2A

*MARV - Minimum Average Roll Values
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710451**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66287**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	92	92	91	91	92	88	92	93	92	92	91	1	88	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.8	8.7	8.5	8.4	8.3						8.6	0.2	8.3	8.8	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	241	242	236	234	239	240	250	230	237	241	239	5	230	250	220
	TD	321	315	298	301	310	321	301	311	319	320	312	9	298	321	
	Apparent Breaking Elongation (percent)															
	MD	74	74	77	80	82	82	79	74	80	82	78	3	74	82	
	TD	107	110	96	99	107	111	96	111	111	111	106	6	96	111	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	139	140	143	150	153	158	160	159	163	160	153	8	139	163	120
		162	159	152	150	151										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	120	159	110	140	109	111	106	120	140	150	127	19	106	159	95
	TD	154	159	162	159	160	152	152	152	151	148	155	5	148	162	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710451**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66287**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.61	1.65	1.75	1.76							1.69	0.07	1.61	1.76	1.5
	Permeability (cm./ sec.)	0.35	0.35	0.37	0.36							0.36	0.01	0.35	0.37	
	Flow Rate (gpm/ ft.^{2})	121	124	131	131							127	5	121	131	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening: 70 maximum
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.	70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.	0.209	0.210	0.211	0.205	0.209						0.209	0.002	0.205	0.211	

End of Table 2B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710469**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66288**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	93	92	92	88	88	89	89	92	92	92	91	2	88	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.2	8.3	8.3	8.4	8.6						8.4	0.1	8.2	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	238	230	241	248	236	242	231	231	237	237	237	6	230	248	220
	TD	300	321	310	302	315	308	317	319	305	307	310	7	300	321	
	Apparent Breaking Elongation (percent)															
	MD	79	77	82	74	74	74	75	79	77	81	77	3	74	82	
	TD	97	107	111	99	110	96	107	111	107	109	105	6	96	111	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	175	180	180	176	178	180	175	168	175	180	173	8	160	181	120
		181	160	160	163	160										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	122	111	111	108	108	120	126	120	119	118	116	6	108	126	95
	TD	150	159	160	160	160	160	160	160	159	160	159	3	150	160	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 3A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710469**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66288**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.70	1.75	1.73	1.76							1.73	0.03	1.70	1.76	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.36	0.36							0.36	0.00	0.36	0.36	
	Flow Rate (gpm/ ft.^{2})	127	131	129	131							130	2	127	131	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening: 70 maximum 100 mininmum
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.	70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.	0.208	0.203	0.206	0.204	0.202						0.205	0.002	0.202	0.208	

End of Table 3A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3b.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710469**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66289**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	106	102	118	98	90	88	88	93	92	92	97	10	88	118	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.3	8.2	8.3	8.4	8.6						8.3	0.1	8.2	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	236	241	231	249	238	242	232	250	237	234	239	6	231	250	220
	TD	318	306	297	316	311	315	302	299	311	308	308	7	297	318	
	Apparent Breaking Elongation (percent)															
	MD	74	71	71	74	77	77	82	77	74	77	75	4	71	82	
	TD	129	110	96	111	111	111	99	96	111	111	108	10	96	129	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	159	163	159	163	155	154	153	150	162	175	161	7	150	175	120
		160	160	162	159	175										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	112	112	116	108	120	111	108	120	120	120	115	5	108	120	95
	TD	142	130	162	175	160	160	159	162	158	160	157	12	130	175	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710469**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66289**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.69	1.65	1.64	1.61							1.65	0.03	1.61	1.69	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.37	0.38							0.37	0.01	0.36	0.38	
	Flow Rate ($gpm/ ft.^2$)	126	124	123	121							123	2	121	126	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.210	0.210	0.211	0.205	0.202						0.208	0.004	0.202	0.211	

End of Table 3B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710487**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66290**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	84	86	84	83	82	93	92	92	88	88	87	4	82	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.7	8.4	8.5	8.3	8.2						8.4	0.2	8.2	8.7	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	241	239	230	233	237	241	243	249	237	240	239	5	230	249	220
	TD	302	311	317	321	315	330	324	313	299	305	314	10	299	330	
	Apparent Breaking Elongation (percent)															
	MD	74	76	77	79	76	76	79	77	78	78	77	1	74	79	
	TD	107	108	96	100	97	104	107	111	99	96	102	5	96	111	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	150	153	150	162	163	170	148	150	153	150	154	6	148	170	120
		153	150	152	150	153										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	118	112	116	118	120	120	120	118	119	120	118	3	112	120	95
	TD	138	140	152	153	150	153	150	153	150	146	149	5	138	153	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710487**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66290**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	**1.61**	**1.73**	**1.73**	**1.78**							**1.71**	**0.07**	**1.61**	**1.78**	**1.5**
	Permeability (cm./ sec.)	**0.37**	**0.37**	**0.36**	**0.36**							**0.36**	**0.01**	**0.36**	**0.37**	
	Flow Rate (gpm/ ft.^{2})	**121**	**129**	**129**	**133**							**128**	**5**	**121**	**133**	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															**Opening: 70 maximum 100 mininmum**
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	**70-100**	**70-100**	**70-100**	**70-100**	**70-100**						**70-100**	N/A	N/A	N/A	
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	**0.208**	**0.209**	**0.206**	**0.207**	**0.208**						**0.208**	**0.001**	**0.206**	**0.209**	

End of Table 4A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710487**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66291**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	86	88	88	90	85	86	88	91	88	83	87	2	83	91	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.4	8.3	8.6	9.1	8.1						8.5	0.4	8.1	9.1	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	231	236	240	239	236	242	249	238	232	236	238	5	231	249	220
	TD	307	317	321	311	299	309	325	300	307	315	311	8	299	325	
	Apparent Breaking Elongation (percent)															
	MD	74	77	74	79	74	75	79	80	74	74	76	2	74	80	
	TD	99	107	107	110	96	110	111	96	101	104	104	6	96	111	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	159	160	180	165	143	144	150	159	163	162	157	9	143	180	120
		158	157	150	153	152										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	108	112	108	98	106	112	120	116	117	118	111	7	98	120	95
	TD	138	142	150	152	148	150	162	153	150	150	149	6	138	162	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/19/2010**
Client Sample ID: **R#354710487**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100415**
PGL Control No.: **66291**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.78	1.75	1.70	1.70							1.73	0.04	1.70	1.78	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.35	0.35							0.36	0.00	0.35	0.36	
	Flow Rate (gpm/ ft.^{2})	133	131	127	127							130	3	127	133	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.	0.207	0.206	0.209	0.209	0.209						0.208	0.001	0.206	0.209	

End of Table 4B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

GAI-LAP
Initial: OVZ #:0.13
DATE: 05/26/2010

Joseph Voss
Envirotech Engineering & Consulting, Inc.
P.O. Box 6029
Enid, OK 73702

Dear Mr. Voss:

Thank you for consulting Precision Geosynthetic Laboratories (PGL) for your material testing needs.

Enclosed is the ***final*** laboratory report for the conformance testing of four (4) 300 mil Double-Sided Geocomposite samples.

PROJECT NAME: Environmental Restoration Disposal Facility (ERDF)

REFERENCE PGL JOB NO.: G100417

DATE RECEIVED: April 30 and May 6, 2010 **DATE REPORTED:** May 26, 2010

SAMPLED BY: PGL at SKAPS, GA

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PGL CONTROL NUMBER
R#354710577	
Geocomposite	66063
Geonet	66075
Geotextile (Top)	66300
Geotextile (Bottom)	66301
R#354710595	
Geocomposite	66064
Geonet	66076
Geotextile (Top)	66302
Geotextile (Bottom)	66303
R#354710613	
Geocomposite	66065
Geonet	66077
Geotextile (Top)	66304
Geotextile (Bottom)	66305
R#354710631	
Geocomposite	66066
Geonet	66078
Geotextile (Top)	66306
Geotextile (Bottom)	66307

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geonet Component	
ASTM D1505	Density
ASTM D1777	Thickness
ASTM D5261	Mass per Unit Area

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

Precision Geosynthetic Laboratories

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geocomposite	
ASTM D7005	Ply Adhesion
ASTM D4716	Transmissivity
Geotextile Component	
ASTM D5261	Mass Per Unit Area
ASTM D4632	Grab Tensile
ASTM D4533	Trapezoid Tear Strength
ASTM D4833	Puncture Resistance
ASTM D5199	Thickness
ASTM D4491	Permittivity
ASTM D4751	Apparent Opening Size

TEST CONDITIONS: The samples were conditioned for a minimum of one hour in the laboratory at 22 ± 2°C (71.6 ± 3.6°F) and at 60 ± 10% relative humidity prior to test.

TEST RESULTS: The test results are summarized in Tables 1 to 4.

PRECISION GEOSYNTHETIC LABORATORIES

Belinda Jade R. Yeo
Quality Assurance

Carmelo V. Zantua
Technical/Laboratory Director

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

TABLE 1.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710577**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66063**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
GEONET COMPONENT: **C#66075**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	320	316	315	310	315	316	315	320	312	309	315	4	309	320	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9561	0.9561	0.9561								0.9561	0.0000	0.9561	0.9561	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.8	43.0	43.7	43.0	43.7						43.2	0.4	42.8	43.7	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.2 °C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2/ sec.$)															
MD	2.86E-03	2.92E-03									2.89E-03	3.92E-05	2.86E-03	2.92E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.39	1.41									1.40	0.02	1.39	1.41	
Transmissivity (gal/min/ft)															
MD	13.84	14.10									13.97	0.19	13.84	14.10	
Test Set-Up: ***Plate*** ***Geocomposite*** XXXXXX ***Plate***															
Thickness : 347 ***mils (Before)*** ***Thickness :*** 315.5 ***mils (After)***															
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
Full scale force range used for testing: 100 lbs.															
Side A of Composite															
MD	7.8	9.2	8.1	10.8	8.3						8.8	1.2	7.8	10.8	> 1
Side B of Composite															
MD	7.4	8.5	11.2	8.9	8.2						8.8	1.4	7.4	11.2	> 1

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE 2.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710595**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66064**

	SPECIMENS														Proj.
	1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD DESCRIPTION															**MARV**
GEONET COMPONENT: **C#66076**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	308	312	308	312	310	310	312	308	312	308	310	2	308	312	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9549	0.9549	0.9549								0.9549	0.0000	0.9549	0.9549	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	44.3	44.4	44.2	44.0	44.1						44.2	0.2	44.0	44.4	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.2 °C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	2.78E-03	2.73E-03									2.76E-03	3.92E-05	2.73E-03	2.78E-03	1 x 10^{-3}
Flow Rate (gal/min)															
MD	1.35	1.32									1.34	0.02	1.32	1.35	
Transmissivity (gal/min/ft)															
MD	13.44	13.17									13.31	0.19	13.17	13.44	

Test Set-Up:
Plate _____
Geocomposite *XXXXXX*
Plate _____

Thickness : *341.5* ***mils (Before)***
Thickness : *310* ***mils (After)***

ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)

Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.

Full scale force range used for testing: 100 lbs.

Side A of Composite															
MD	9.2	10.6	9.0	7.6	10.2						9.3	1.2	7.6	10.6	> 1
Side B of Composite															
MD	8.6	7.9	10.3	8.6	10.7						9.2	1.2	7.9	10.7	> 1

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE 3.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710613**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66065**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
GEONET COMPONENT: **C#66077**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	310	316	315	316	312	314	313	308	312	308	312	3	308	316	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9554	0.9554	0.9554								0.9554	0.0000	0.9554	0.9554	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.5	42.6	42.4	42.7	42.6						42.6	0.1	42.4	42.7	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.2 ^0C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	3.04E-03	3.03E-03									3.04E-03	9.32E-06	3.03E-03	3.04E-03	1 x 10^{-3}
Flow Rate (gal/min)															
MD	1.48	1.47									1.47	0.00	1.47	1.48	
Transmissivity (gal/min/ft)															
MD	14.69	14.63									14.66	0.05	14.63	14.69	
Test Set-Up: *Thickness : 350.5 mils (Before)* *Thickness : 318 mils (After)* *Plate* ____ *Geocomposite* XXXXXX *Plate* ____															
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm. *Full scale force range used for testing: 100 lbs.*															
Side A of Composite															
MD	7.6	9.1	8.1	11.0	8.4						8.8	1.3	7.6	11.0	> 1
Side B of Composite															
MD	9.0	7.9	8.9	10.5	8.3						8.9	1.0	7.9	10.5	> 1

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

ISO 9001 - 2000

TABLE 4.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710631**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66066**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
GEONET COMPONENT: C#66078															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	312	320	316	315	307	312	320	312	316	315	314	4	307	320	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9558	0.9558	0.9558								0.9558	0.0000	0.9558	0.9558	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.8	43.1	43.3	43.4	43.1						43.2	0.2	42.8	43.4	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.2 ^{0}C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	3.21E-03	3.16E-03									3.18E-03	3.59E-05	3.16E-03	3.21E-03	1 x 10^{-3}
Flow Rate (gal/min)															
MD	1.56	1.53									1.55	0.02	1.53	1.56	
Transmissivity (gal/min/ft)															
MD	15.50	15.25									15.37	0.17	15.25	15.50	
Test Set-Up: ***Plate*** ***Geocomposite*** XXXXXX ***Plate***															
Thickness : 351.5 ***mils (Before)*** ***Thickness :*** 320.5 ***mils (After)***															
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
Full scale force range used for testing: 100 lbs.															
Side A of Composite															
MD	7.4	11.0	8.9	10.3	9.0						9.3	1.4	7.4	11.0	> 1
Side B of Composite															
MD	9.2	9.6	8.6	7.8	9.8						9.0	0.8	7.8	9.8	> 1

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710577**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66300**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	100	92	103	88	86	85	86	89	93	90	91	6	85	103	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.2	8.3	8.2	8.3	8.2						8.2	0.0	8.2	8.3	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	236	230	247	243	236	231	231	237	240	249	238	7	230	249	220
	TD	301	287	298	307	315	320	317	308	310	332	310	13	287	332	
	Apparent Breaking Elongation (percent)															
	MD	74	74	73	78	74	79	78	78	74	74	76	2	73	79	
	TD	99	100	100	104	108	105	107	104	104	108	104	3	99	108	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	140	161	162	150	153	150	162	158	163	155	153	7	140	163	120
		152	151	146	148	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	136	120	112	120	120	118	116	120	119	109	119	7	109	136	95
	TD	140	150	162	158	160	158	150	146	153	160	154	7	140	162	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710577**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66300**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.70	1.64	1.67	1.75							1.69	0.05	1.64	1.75	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.36	0.36							0.36	0.00	0.36	0.36	
	Flow Rate (gpm/ ft.^{2})	127	122	125	131							126	4	122	131	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	70 maximum 100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.207	0.206	0.207	0.207	0.201						0.206	0.003	0.201	0.207	

End of Table 1A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710577**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66301**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	92	93	94	90	89	83	88	96	98	100	92	5	83	100	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.2	8.1	8.3	8.2	8.4						8.3	0.1	8.1	8.4	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	231	243	239	230	238	247	248	250	236	238	240	7	230	250	220
	TD	287	298	301	315	313	307	310	321	312	316	308	10	287	321	
	Apparent Breaking Elongation (percent)															
	MD	74	77	79	77	74	74	74	77	77	78	76	2	74	79	
	TD	99	100	104	104	104	104	107	111	112	112	106	5	99	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	152	151	146	145	143	140	143	140	152	153	150	7	140	160	120
		160	160	158	150	153										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	120	121	120	116	120	122	120	118	116	120	119	2	116	122	95
	TD	128	121	150	120	139	160	159	158	160	160	145	17	120	160	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710577**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66301**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.69	1.60	1.75	1.60							1.66	0.07	1.60	1.75	1.5
	Permeability (cm./ sec.)	0.36	0.35	0.36	0.35							0.35	0.01	0.35	0.36	
	Flow Rate (gpm/ ft.^{2})	126	120	131	120							124	5	120	131	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		0.209	0.211	0.204	0.205	0.203						0.206	0.003	0.203	0.211	

End of Table 1B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710595**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66302**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	92	93	94	89	88	85	100	93	92	92	92	4	85	100	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.3	8.3	8.3	8.4	8.3						8.3	0.1	8.3	8.4	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	241	241	239	231	236	244	249	237	241	231	239	5	231	249	220
	TD	301	295	298	307	310	320	318	309	313	316	309	9	295	320	
	Apparent Breaking Elongation (percent)															
	MD	74	73	74	77	77	77	79	78	74	74	76	2	73	79	
	TD	96	99	100	107	111	111	112	108	107	112	106	6	96	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	140	140	143	140	153	150	156	153	150	152	148	5	140	156	120
		153	146	146	152	152										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	136	120	121	120	120	116	120	111	110	120	119	7	110	136	95
	TD	130	146	152	153	160	162	170	168	159	170	157	12	130	170	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 2A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710595**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66302**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.69	1.77	1.63	1.75							1.71	0.06	1.63	1.77	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.36	0.36							0.36	0.00	0.36	0.36	
	Flow Rate (gpm/ ft.^{2})	126	133	122	131							128	5	122	133	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.208	0.208	0.210	0.203	0.199						0.206	0.005	0.199	0.210	

End of Table 2A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710595**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66303**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	93	90	88	85	88	86	90	93	90	92	89	3	85	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.4	8.4	8.2	8.3	8.3						8.3	0.1	8.2	8.4	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	236	241	246	232	239	235	238	243	248	250	241	6	232	250	220
	TD	305	310	317	310	321	321	299	306	308	311	311	7	299	321	
	Apparent Breaking Elongation (percent)															
	MD	74	74	77	78	78	77	74	74	75	77	76	2	74	78	
	TD	100	107	108	111	111	115	101	108	111	111	108	5	100	115	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	150	153	150	153	152	153	152	152	153	152	150	5	140	158	120
		158	146	142	140	152										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	113	120	121	120	120	121	119	118	116	120	119	3	113	121	95
	TD	120	121	138	146	153	146	153	150	146	143	142	12	120	153	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710595**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66303**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.60	1.61	1.72	1.64							1.64	0.05	1.60	1.72	1.5
	Permeability (cm./ sec.)	0.35	0.35	0.36	0.35							0.35	0.01	0.35	0.36	
	Flow Rate (gpm/ ft.^{2})	120	120	129	122							123	4	120	129	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.208	0.209	0.211	0.206	0.205						0.208	0.002	0.205	0.211	

End of Table 2B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710613**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66304**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	100	98	95	90	89	88	91	102	95	91	94	5	88	102	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.2	8.3	8.3	8.2	8.5						8.3	0.1	8.2	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	235	243	241	230	239	232	237	242	241	241	238	4	230	243	220
	TD	289	299	301	312	315	301	317	320	325	304	309	11	289	325	
	Apparent Breaking Elongation (percent)															
	MD	73	74	78	77	77	80	79	77	78	74	77	2	73	80	
	TD	96	99	100	107	111	105	108	111	115	114	107	6	96	115	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	146	143	140	143	140	150	150	146	143	137	35	10	153	120
		146	10	151	153	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	132	120	112	110	140	130	128	130	121	120	124	9	110	140	95
	TD	160	158	160	158	146	153	150	146	153	150	153	5	146	160	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710613**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66304**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.66	1.63	1.61	1.61							1.63	0.02	1.61	1.66	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.36	0.37							0.36	0.00	0.36	0.37	
	Flow Rate (gpm/ ft.^{2})	124	122	120	120							122	2	120	124	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.207	0.208	0.203	0.203	0.205						0.205	0.002	0.203	0.208	

End of Table 3A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 3B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710613**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66305**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	83	82	82	86	89	90	92	93	89	90	88	4	82	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.6	8.3	8.5	8.4	8.6						8.5	0.1	8.3	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	230	239	249	236	232	240	244	247	242	241	240	6	230	249	220
	TD	298	301	288	306	311	320	316	311	321	307	308	10	288	321	
	Apparent Breaking Elongation (percent)															
	MD	74	74	77	74	74	77	78	74	74	77	76	2	74	78	
	TD	99	99	100	107	104	107	108	111	112	112	106	5	99	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	150	152	146	148	140	138	148	150	153	150	148	5	138	153	120
		153	152	146	143	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	110	110	120	111	120	121	120	106	120	103	114	7	103	121	95
	TD	120	122	142	143	150	162	158	159	160	158	147	15	120	162	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

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TABLE 3B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710613**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66305**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.78	1.72	1.78	1.77							1.76	0.03	1.72	1.78	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.36	0.36							0.36	0.00	0.36	0.36	
	Flow Rate ($gpm/ ft.^2$)	133	129	133	133							132	2	129	133	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.207	0.205	0.201	0.201	0.205						0.204	0.003	0.201	0.207	

End of Table 3B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710631**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66306**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	106	98	98	93	90	88	86	88	88	82	92	7	82	106	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.3	8.4	8.5	8.3	8.2						8.4	0.1	8.2	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	232	231	243	249	235	231	239	241	249	241	239	7	231	249	220
	TD	305	301	299	294	310	312	317	320	312	309	308	8	294	320	
	Apparent Breaking Elongation (percent)															
	MD	74	74	73	75	74	74	77	78	78	74	75	2	73	78	
	TD	108	111	99	100	108	111	111	112	112	100	107	5	99	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	160	158	158	158	150	146	153	146	150	153	152	5	143	160	120
		150	153	150	146	143										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	130	121	120	117	116	109	108	120	111	102	115	8	102	130	95
	TD	130	129	140	150	153	146	150	153	146	152	145	9	129	153	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 4A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710631**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66306**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.66	1.60	1.72	1.60							1.65	0.06	1.60	1.72	1.5
	Permeability (cm./ sec.)	0.37	0.35	0.36	0.35							0.36	0.01	0.35	0.37	
	Flow Rate ($gpm/ ft.^2$)	124	120	129	120							123	4	120	129	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.207	0.205	0.201	0.207	0.209						0.206	0.003	0.201	0.209	

End of Table 4A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710631**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66307**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	86	91	91	88	88	83	86	92	92	100	90	5	83	100	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.2	8.4	8.4	8.5	8.4						8.4	0.1	8.2	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	243	235	247	244	230	233	232	244	249	237	239	7	230	249	220
	TD	304	311	312	310	312	295	296	306	317	320	308	8	295	320	
	Apparent Breaking Elongation (percent)															
	MD	77	73	74	74	78	74	74	74	78	79	76	2	73	79	
	TD	111	111	108	111	112	108	100	112	112	108	109	4	100	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	140	140	142	143	140	143	140	143	140	142	141	1	140	143	120
		143	140	143	140	142										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	112	111	110	120	120	128	120	116	110	110	116	6	110	128	95
	TD	120	136	150	150	146	142	139	150	153	150	144	10	120	153	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **5/26/2010**
Client Sample ID: **R#354710631**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100417**
PGL Control No.: **66307**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.60	1.69	1.75	1.60							1.66	0.07	1.60	1.75	1.5
	Permeability (cm./ sec.)	0.35	0.36	0.36	0.35							0.35	0.01	0.35	0.36	
	Flow Rate ($gpm/ ft.^2$)	120	126	131	120							124	5	120	131	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.205	0.204	0.209	0.211	0.204						0.207	0.003	0.204	0.211	

End of Table 4B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

GAI-LAP
Initial: CVZ #:0.13
DATE: 06/01/2010

Joseph Voss
Envirotech Engineering & Consulting, Inc.
P.O. Box 6029
Enid, OK 73702

Dear Mr. Voss:

Thank you for consulting Precision Geosynthetic Laboratories (PGL) for your material testing needs.

Enclosed is the ***final*** laboratory report for the conformance testing of four (4) 300 mil Double-Sided Geocomposite samples.

PROJECT NAME: Environmental Restoration Disposal Facility (ERDF)

REFERENCE PGL JOB NO.: G100416

DATE RECEIVED: April 30 and May 6, 2010 **DATE REPORTED:** June 1, 2010

SAMPLED BY: PGL at SKAPS, GA

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PGL CONTROL NUMBER
R#354710505	
Geocomposite	66059
Geonet	66071
Geotextile (Top)	66292
Geotextile (Bottom)	66293
R#354710523	
Geocomposite	66060
Geonet	66072
Geotextile (Top)	66294
Geotextile (Bottom)	66295
R#354710541	
Geocomposite	66061
Geonet	66073
Geotextile (Top)	66296
Geotextile (Bottom)	66297
R#354710559	
Geocomposite	66062
Geonet	66074
Geotextile (Top)	66298
Geotextile (Bottom)	66299

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geonet Component	
ASTM D1505	Density
ASTM D1777	Thickness
ASTM D5261	Mass per Unit Area

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

Precision Geosynthetic Laboratories

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geocomposite	
ASTM D7005	Ply Adhesion
ASTM D4716	Transmissivity
Geotextile Component	
ASTM D5261	Mass Per Unit Area
ASTM D4632	Grab Tensile
ASTM D4533	Trapezoid Tear Strength
ASTM D4833	Puncture Resistance
ASTM D5199	Thickness
ASTM D4491	Permittivity
ASTM D4751	Apparent Opening Size

TEST CONDITIONS: The samples were conditioned for a minimum of one hour in the laboratory at 22 ± 2°C (71.6 ± 3.6°F) and at 60 ± 10% relative humidity prior to test.

TEST RESULTS: The test results are summarized in Tables 1 to 4.

PRECISION GEOSYNTHETIC LABORATORIES

Belinda Jade R. Yeo
Quality Assurance

Carmelo V. Zantua
Technical/Laboratory Director

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

TABLE

MATERIAL PRC IES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710505**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66059**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV*
GEONET COMPONENT: **C#66071**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	312	310	312	308	312	308	312	307	310	312	310	2	307	312	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9554	0.9554	0.9554								0.9554	0.0000	0.9554	0.9554	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.8	43.1	43.1	43.1	43.0						43.0	0.1	42.8	43.1	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.2° C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	2.81E-03	2.84E-03									2.82E-03	2.42E-05	2.81E-03	2.84E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.36	1.38									1.37	0.01	1.36	1.38	
Transmissivity (gal/min/ft)															
MD	13.55	13.72									13.63	0.12	13.55	13.72	

Test Set-Up: *Thickness : 340.5 mils (Before)*
Plate _____
Thickness : 316.5 mils (After)
Geocomposite XXXXXX
Plate _____

ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)

Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.

Full scale force range used for testing: 100 lbs.

Side A of Composite															
MD	8.6	7.8	10.3	10.5	7.8						9.0	1.3	7.8	10.5	> 1
Side B of Composite															
MD	8.5	10.5	8.3	7.5	10.3						9.0	1.3	7.5	10.5	> 1

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE

MATERIAL PROI ES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710523**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66060**

		SPECIMENS														Proj.
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	**DESCRIPTION**															**MARV***
GEONET COMPONENT:	**C#66072**															
ASTM D1777	Thickness (mils)															
Test Option #1	*Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	308	311	308	308	312	309	312	316	312	314	311	3	308	316	200
ASTM D1505	Density (grams/ $cm.^3$)	0.9556	0.9556	0.9556								0.9556	0.0000	0.9556	0.9556	> 0.94
ASTM D5261	Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.5	42.5	42.7	42.5	42.5						42.5	0.1	42.5	42.7	24
GEOCOMPOSITE:																
ASTM D4716	Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.2° C Specimen Size: 12" x 14"*															
	Transmissivity ($m.^2$/ sec.)															
	MD	3.10E-03	3.09E-03									3.10E-03	5.43E-06	3.09E-03	3.10E-03	1×10^{-3}
	Flow Rate (gal/min)															
	MD	1.50	1.50									1.50	0.00	1.50	1.50	
	Transmissivity (gal/min/ft)															
	MD	14.97	14.93									14.95	0.03	14.93	14.97	
	Test Set-Up:						***Thickness :***	352.5	***mils (Before)***							
	Plate						***Thickness :***	323.5	***mils (After)***							
	Geocomposite	XXXXXX														
	Plate															
ASTM D7005	Ply Bond Adhesion (lbs/ in.- width)															
	Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
	Full scale force range used for testing: 100 lbs.															
	Side A of Composite															
	MD	8.0	9.3	8.3	9.3	8.0						8.6	0.6	8.0	9.3	> 1
	Side B of Composite															
	MD	9.5	7.8	7.3	8.8	9.0						8.5	0.9	7.3	9.5	> 1

*MARV - Minimum Average Roll Values
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

ISO 9001 - 2000

TABLE

MATERIAL PRO. ...IES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710541**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66061**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV*
GEONET COMPONENT: **C#66073**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	316	320	317	318	310	311	312	308	310	315	314	4	308	320	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9558	0.9558	0.9558								0.9558	0.0000	0.9558	0.9558	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	43.2	43.0	43.4	43.1	43.0						43.1	0.2	43.0	43.4	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.2° C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2/$ sec.)															
MD	2.98E-03	3.05E-03									3.01E-03	4.83E-05	2.98E-03	3.05E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.45	1.48									1.46	0.02	1.45	1.48	
Transmissivity (gal/min/ft)															
MD	14.38	14.71									14.55	0.23	14.38	14.71	

Test Set-Up:
Plate _____
Geocomposite XXXXXX
Plate _____

Thickness : 346 *mils (Before)*
Thickness : 315 *mils (After)*

ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)

Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.

Full scale force range used for testing: 100 lbs.

Side A of Composite															
MD	7.8	9.0	7.3	8.5	8.5						8.2	0.7	7.3	9.0	> 1
Side B of Composite															
MD	7.3	8.5	6.8	8.5	9.8						8.2	1.2	6.8	9.8	> 1

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

ISO 9001 - 2000

TABLE

MATERIAL PRO[illegible] ES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **4/30/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710559**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66062**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV*
GEONET COMPONENT: **C#66074**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	315	308	312	308	312	320	320	321	312	316	314	5	308	321	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9549	0.9549	0.9549								0.9549	0.0000	0.9549	0.9549	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	43.1	43.0	43.7	43.0	43.9						43.3	0.4	43.0	43.9	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.2 ^{0}C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2/$ sec.)															
MD	2.98E-03	3.02E-03									3.00E-03	2.45E-05	2.98E-03	3.02E-03	1 x 10^{-3}
Flow Rate (gal/min)															
MD	1.45	1.47									1.46	0.01	1.45	1.47	
Transmissivity (gal/min/ft)															
MD	14.42	14.58									14.50	0.12	14.42	14.58	
Test Set-Up: ***Plate*** _____ ***Geocomposite*** XXXXXX ***Plate*** _____															
Thickness : 344 ***mils (Before)*** ***Thickness :*** 313 ***mils (After)***															
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
Full scale force range used for testing: 100 lbs.															
Side A of Composite															
MD	7.8	8.3	7.5	9.8	8.5						8.4	0.9	7.5	9.8	> 1
Side B of Composite															
MD	7.8	6.5	9.3	7.8	8.8						8.0	1.1	6.5	9.3	> 1

*MARV - Minimum Average Roll Values
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

ISO 9001 - 2000

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710505**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66292**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	94	92	92	90	88	88	82	82	86	89	88	4	82	94	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.4	8.5	8.5	8.6	8.6						8.5	0.1	8.4	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	233	237	240	234	236	239	249	240	237	244	239	5	233	249	220
	TD	311	301	315	319	307	321	323	331	312	299	314	10	299	331	
	Apparent Breaking Elongation (percent)															
	MD	74	73	74	74	79	77	78	82	80	78	77	3	73	82	
	TD	107	97	110	100	99	111	110	101	111	96	104	6	96	111	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	158	162	160	175	170	168	159	158	162	162	158	10	142	175	120
		150	146	142	143	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	136	100	120	132	112	108	108	106	129	120	117	12	100	136	95
	TD	136	140	150	153	158	150	153	150	158	150	150	7	136	158	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710505**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66292**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.67	1.61	1.61	1.67							1.64	0.03	1.61	1.67	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.36	0.36							0.36	0.00	0.36	0.36	
	Flow Rate ($gpm/ ft.^2$)	125	121	121	125							123	3	121	125	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.206	0.201	0.198	0.204	0.206						0.203	0.003	0.198	0.206	

End of Table 1A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710505**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66293**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	84	84	82	86	88	85	83	92	93	90	87	4	82	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.3	8.4	8.4	8.5	8.3						8.4	0.1	8.3	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	243	241	232	239	241	239	236	248	237	231	239	5	231	248	220
	TD	307	321	310	301	316	318	325	324	331	307	316	9	301	331	
	Apparent Breaking Elongation (percent)															
	MD	76	74	77	77	79	78	76	74	79	74	76	2	74	79	
	TD	100	107	108	99	101	110	111	111	111	96	105	6	96	111	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	150	150	146	150	153	150	146	153	152	156	154	5	146	164	120
		158	160	164	158	158										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	136	128	120	121	119	110	109	120	119	109	119	9	109	136	95
	TD	120	136	130	134	129	130	129	150	150	153	136	11	120	153	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710505**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66293**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.64	1.70	1.73	1.61							1.67	0.05	1.61	1.73	1.5
	Permeability (cm./ sec.)	0.35	0.36	0.36	0.35							0.36	0.01	0.35	0.36	
	Flow Rate ($gpm/ ft.^2$)	123	127	129	121							125	4	121	129	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.209	0.209	0.205	0.207	0.205						0.207	0.002	0.205	0.209	

End of Table 1B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710523**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66294**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	85	84	85	83	85	84	91	100	98	102	90	7	83	102	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.6	8.6	8.6	8.5	8.5						8.6	0.0	8.5	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	236	238	240	231	232	236	233	243	241	246	238	5	231	246	220
	TD	298	287	301	289	295	311	316	321	319	324	306	14	287	324	
	Apparent Breaking Elongation (percent)															
	MD	74	77	74	79	80	77	77	74	78	75	77	2	74	80	
	TD	99	100	100	96	100	104	107	111	113	112	104	6	96	113	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	150	153	150	160	160	163	160	158	160	162	159	5	150	170	120
		160	160	160	162	170										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	106	120	111	108	110	108	102	110	106	120	110	6	102	120	95
	TD	151	153	180	130	130	136	140	150	153	150	147	15	130	180	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710523**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66294**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.70	1.65	1.61	1.65							1.65	0.03	1.61	1.70	1.5
	Permeability (cm./ sec.)	0.35	0.36	0.36	0.37							0.36	0.01	0.35	0.37	
	Flow Rate (gpm/ ft.^{2})	127	124	121	123							124	3	121	127	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.209	0.209	0.211	0.211	0.212						0.210	0.001	0.209	0.212	

End of Table 2A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710523**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66295**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	84	84	83	84	85	83	82	85	86	88	84	2	82	88	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.2	8.1	8.5	8.5	8.5						8.4	0.2	8.1	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	241	241	239	233	241	239	230	237	240	249	239	5	230	249	220
	TD	307	310	317	315	320	301	319	331	306	300	313	9	300	331	
	Apparent Breaking Elongation (percent)															
	MD	74	77	77	75	77	77	77	77	78	79	77	1	74	79	
	TD	96	107	108	111	111	112	111	107	107	99	107	5	96	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	179	180	175	168	160	160	160	160	160	159	164	8	158	180	120
		160	160	160	162	158										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	118	116	111	110	120	108	112	110	101	98	110	7	98	120	95
	TD	120	136	150	153	150	153	159	150	153	150	147	11	120	159	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 2B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710523**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66295**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.73	1.75	1.76	1.78							1.75	0.02	1.73	1.78	1.5
	Permeability (cm./ sec.)	0.36	0.37	0.37	0.37							0.37	0.00	0.36	0.37	
	Flow Rate ($gpm/ ft.^2$)	129	131	131	133							131	1	129	133	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening: 70 maximum 100 mininmum
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.207	0.208	0.210	0.202	0.206						0.207	0.003	0.202	0.210	

End of Table 2B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 3A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710541**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66296**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	90	92	93	91	89	82	86	100	93	90	91	5	82	100	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.5	8.4	8.5	8.3	8.4						8.4	0.1	8.3	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	232	231	244	238	242	238	237	230	240	246	238	5	230	246	220
	TD	299	302	309	311	313	320	307	305	315	306	309	6	299	320	
	Apparent Breaking Elongation (percent)															
	MD	73	74	77	77	80	77	79	77	82	80	78	3	73	82	
	TD	99	100	107	104	102	112	111	111	100	100	105	5	99	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	140	143	150	152	150	162	163	170	168	156	10	138	170	120
		159	160	162	163	160										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	118	120	119	111	108	120	120	130	120	124	119	6	108	130	95
	TD	136	150	152	153	150	146	150	153	150	150	149	5	136	153	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 3A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710541**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66296**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.61	1.64	1.64	1.62							1.63	0.01	1.61	1.64	1.5
	Permeability (cm./ sec.)	0.35	0.35	0.35	0.35							0.35	0.00	0.35	0.35	
	Flow Rate (gpm/ ft.^{2})	120	122	122	121							122	1	120	122	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening: 70 maximum
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.207	0.206	0.206	0.205	0.202						0.205	0.002	0.202	0.207	

End of Table 3A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3B.

MATERIAL PROPERTIES -

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710541**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66297**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	84	85	86	88	88	90	88	90	91	88	88	2	84	91	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.6	8.5	8.3	8.4	8.4						8.4	0.1	8.3	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	235	230	244	240	239	246	248	241	244	250	242	6	230	250	220
	TD	304	299	287	301	318	312	315	321	330	325	311	13	287	330	
	Apparent Breaking Elongation (percent)															
	MD	73	77	77	79	79	77	77	78	79	82	78	2	73	82	
	TD	100	96	111	101	108	108	111	110	112	111	107	6	96	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	159	162	159	150	146	152	150	159	163	159	157	5	146	163	120
		162	159	162	160	160										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	115	126	120	121	118	120	136	120	126	120	122	6	115	136	95
	TD	136	140	150	153	150	153	150	146	150	150	148	6	136	153	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710541**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66297**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	**1.78**	**1.76**	**1.75**	**1.78**							**1.77**	**0.02**	**1.75**	**1.78**	**1.5**
	Permeability (cm./ sec.)	**0.38**	**0.38**	**0.36**	**0.36**							**0.37**	**0.01**	**0.36**	**0.38**	
	Flow Rate (gpm/ ft.^{2})	**133**	**132**	**131**	**133**							**132**	**1**	**131**	**133**	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															**Opening:**
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															**70 maximum**
		70-100	**70-100**	**70-100**	**70-100**	**70-100**						**70-100**	N/A	N/A	N/A	**100 mininmum**
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	**0.208**	**0.209**	**0.210**	**0.211**	**0.211**						**0.210**	**0.001**	**0.208**	**0.211**	

End of Table 3B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710559**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66298**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	86	85	84	85	90	92	92	88	88	86	87	3	84	92	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.5	8.5	8.4	8.2	8.4						8.4	0.1	8.2	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	235	231	239	246	236	249	244	231	233	231	237	7	231	249	220
	TD	290	301	321	315	299	321	321	317	315	321	312	11	290	321	
	Apparent Breaking Elongation (percent)															
	MD	74	73	74	77	79	77	78	78	78	77	77	2	73	79	
	TD	99	100	107	111	96	104	103	104	104	104	103	4	96	111	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	140	150	156	172	170	168	159	158	162	157	10	138	172	120
		162	160	158	158	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	120	121	120	126	118	136	120	121	116	117	122	6	116	136	95
	TD	138	140	146	150	159	160	159	150	146	142	149	8	138	160	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710559**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66298**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.61	1.64	1.64	1.67							1.64	0.03	1.61	1.67	1.5
	Permeability (cm./ sec.)	0.36	0.37	0.35	0.36							0.36	0.01	0.35	0.37	
	Flow Rate ($gpm/ ft.^2$)	121	123	123	125							123	2	121	125	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.208	0.206	0.206	0.202	0.203						0.205	0.002	0.202	0.208	

End of Table 4A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710559**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66299**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	88	88	83	85	83	82	84	86	88	90	86	3	82	90	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.3	8.4	8.4	8.5	8.4						8.4	0.1	8.3	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	230	238	232	246	237	240	242	236	232	233	237	5	230	246	220
	TD	301	289	295	308	311	321	329	299	304	316	307	12	289	329	
	Apparent Breaking Elongation (percent)															
	MD	77	77	79	78	77	77	78	79	77	77	78	1	77	79	
	TD	107	99	100	107	111	108	112	111	112	107	107	4	99	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	140	143	160	160	162	168	160	159	160	156	11	138	175	120
		175	160	159	140	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	118	120	115	111	120	108	120	120	115	115	116	4	108	120	95
	TD	136	140	152	153	150	152	175	142	139	142	148	11	136	175	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/1/2010**
Client Sample ID: **R#354710559**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100416**
PGL Control No.: **66299**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*															
		1.73	1.70	1.70	1.67							1.70	0.02	1.67	1.73	1.5
	Permeability (cm./ sec.)															
		0.35	0.36	0.35	0.36							0.36	0.00	0.35	0.36	
	Flow Rate ($gpm/ ft.^2$)															
		129	127	127	125							127	2	125	129	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		0.209	0.210	0.211	0.202	0.206						0.208	0.004	0.202	0.211	

End of Table 4B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

GAI-LAP
Initial: evz #:0.13
DATE: 06/07/2010

Joseph Voss
Envirotech Engineering & Consulting, Inc.
P.O. Box 6029
Enid, OK 73702

Dear Mr. Voss:

Thank you for consulting Precision Geosynthetic Laboratories (PGL) for your material testing needs.

Enclosed is the ***final*** laboratory report for the conformance testing of four (4) 300 mil Double-Sided Geocomposite samples.

PROJECT NAME: Environmental Restoration Disposal Facility (ERDF)

REFERENCE PGL JOB NO.: G100435

DATE RECEIVED: May 4 and May 6, 2010 **DATE REPORTED:** June 7, 2010

SAMPLED BY: PGL at SKAPS, GA

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PGL CONTROL NUMBER
R#354710721	
Geocomposite	66170
Geonet	66181
Geotextile (Top)	66316
Geotextile (Bottom)	66317
R#354710739	
Geocomposite	66171
Geonet	66182
Geotextile (Top)	66318
Geotextile (Bottom)	66319
R#354710757	
Geocomposite	66172
Geonet	66183
Geotextile (Top)	66320
Geotextile (Bottom)	66321
R#354710775	
Geocomposite	66173
Geonet	66184
Geotextile (Top)	66322
Geotextile (Bottom)	66323

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geonet Component	
ASTM D1505	Density
ASTM D1777	Thickness
ASTM D5261	Mass per Unit Area

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

Precision Geosynthetic Laboratories

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geocomposite	
ASTM D7005	Ply Adhesion
ASTM D4716	Transmissivity
Geotextile Component	
ASTM D5261	Mass Per Unit Area
ASTM D4632	Grab Tensile
ASTM D4533	Trapezoid Tear Strength
ASTM D4833	Puncture Resistance
ASTM D5199	Thickness
ASTM D4491	Permittivity
ASTM D4751	Apparent Opening Size

TEST CONDITIONS: The samples were conditioned for a minimum of one hour in the laboratory at 22 ± 2°C (71.6 ± 3.6°F) and at 60 ± 10% relative humidity prior to test.

TEST RESULTS: The test results are summarized in Tables 1 to 4.

PRECISION GEOSYNTHETIC LABORATORIES

Belinda Jade R. Yeo
Quality Assurance

Carmelo V. Zantua
Technical/Laboratory Director

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

TABLE

MATERIAL PRO[illegible]S

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/4/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710721**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66170**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
GEONET COMPONENT:	**C#66181**															
ASTM D1777	Thickness (mils)															
Test Option #1	*Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	310	309	311	310	320	321	310	312	309	320	313	5	309	321	200
ASTM D1505	Density (grams/ $cm.^3$)	0.9549	0.9549	0.9549								0.9549	0.0000	0.9549	0.9549	> 0.94
ASTM D5261	Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.5	42.5	42.5	42.2	42.5						42.5	0.1	42.2	42.5	24
GEOCOMPOSITE:																
ASTM D4716	Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.4° C Specimen Size: 12" x 14"*															
	Transmissivity ($m.^2/$ sec.)															
	MD	2.82E-03	2.95E-03									2.89E-03	8.89E-05	2.82E-03	2.95E-03	1×10^{-3}
	Flow Rate (gal/min)															
	MD	1.38	1.44									1.41	0.04	1.38	1.44	
	Transmissivity (gal/min/ft)															
	MD	13.64	14.25									13.95	0.43	13.64	14.25	
	Test Set-Up: ***Plate*** ***Geocomposite*** XXXXXX ***Plate***															
	Thickness : 347 ***mils (Before)*** ***Thickness :*** 315.5 ***mils (After)***															
ASTM D7005	Ply Bond Adhesion (lbs/ in.- width)															
	Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
	Full scale force range used for testing: 100 lbs.															
	Side A of Composite															
	MD	8.0	9.5	10.5	8.8	10.8						9.5	1.2	8.0	10.8	> 1
	Side B of Composite															
	MD	9.5	11.0	11.5	9.5	10.3						10.4	0.9	9.5	11.5	> 1

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE

MATERIAL PRC. ES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/4/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710739**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66171**

	SPECIMENS														Proj. Specs.
	1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	MARV
METHOD DESCRIPTION															
GEONET COMPONENT: **C#66182**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	316	315	316	310	316	312	316	315	308	312	314	3	308	316	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9554	0.9554	0.9554								0.9554	0.0000	0.9554	0.9554	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	43.0	43.0	43.0	43.5	43.7						43.3	0.3	43.0	43.7	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.4 °C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2/$ sec.)															
MD	3.31E-03	3.08E-03									3.19E-03	1.57E-04	3.08E-03	3.31E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.61	1.50									1.56	0.08	1.50	1.61	
Transmissivity (gal/min/ft)															
MD	15.96	14.90									15.43	0.76	14.90	15.96	

Test Set-Up: ***Thickness :*** 354.5 ***mils (Before)***
Plate _____ ***Thickness :*** 323 ***mils (After)***
Geocomposite XXXXXX
Plate _____

ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)

Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.
Full scale force range used for testing: 100 lbs.

Side A of Composite															
MD	9.3	11.0	10.8	11.5	11.3						10.8	0.9	9.3	11.5	> 1
Side B of Composite															
MD	9.0	10.3	10.3	11.8	12.5						10.8	1.4	9.0	12.5	> 1

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

TABLE

MATERIAL PRC ES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/4/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710757**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66172**

	SPECIMENS														Proj.
	1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs. MARV
METHOD DESCRIPTION															
GEONET COMPONENT: **C#66183**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	320	312	310	312	306	312	312	312	316	312	312	4	306	320	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9551	0.9551	0.9551								0.9551	0.0000	0.9551	0.9551	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.8	43.0	43.1	43.3	43.0						43.0	0.2	42.8	43.3	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.4 ^{0}C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	2.97E-03	2.88E-03									2.93E-03	5.93E-05	2.88E-03	2.97E-03	1 x 10^{-3}
Flow Rate (gal/min)															
MD	1.45	1.41									1.43	0.03	1.41	1.45	
Transmissivity (gal/min/ft)															
MD	14.34	13.93									14.14	0.29	13.93	14.34	

Test Set-Up: ***Thickness :*** *347* ***mils (Before)***
Plate _____ ***Thickness :*** *315.5* ***mils (After)***
Geocomposite *XXXXXX*
Plate _____

ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)

Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.

Full scale force range used for testing: 100 lbs.

Side A of Composite															
MD	8.8	10.3	9.5	8.8	8.8						9.2	0.7	8.8	10.3	> 1
Side B of Composite															
MD	7.5	9.0	8.3	10.0	8.5						8.7	0.9	7.5	10.0	> 1

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE

MATERIAL PRL ES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/4/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710775**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66173**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV
GEONET COMPONENT: **C#66184**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	316	319	319	320	321	320	320	320	316	318	319	2	316	321	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9549	0.9549	0.9549								0.9549	0.0000	0.9549	0.9549	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	41.5	42.4	42.5	42.5	42.6						42.3	0.4	41.5	42.6	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.4 °C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	3.31E-03	3.07E-03									3.19E-03	1.72E-04	3.07E-03	3.31E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.62	1.50									1.56	0.08	1.50	1.62	
Transmissivity (gal/min/ft)															
MD	15.99	14.82									15.41	0.83	14.82	15.99	
Test Set-Up:															
Plate															
Geocomposite XXXXXX															
Plate															
Thickness : 353 ***mils (Before)***															
Thickness : 321.5 ***mils (After)***															
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
Full scale force range used for testing: 100 lbs.															
Side A of Composite															
MD	7.5	7.8	10.3	9.8	10.5						9.2	1.4	7.5	10.5	> 1
Side B of Composite															
MD	9.3	8.8	10.3	11.3	9.8						9.9	1.0	8.8	11.3	> 1

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710721**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66316**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	85	86	85	89	85	93	90	93	95	98	90	5	85	98	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.2	8.3	8.4	8.1	8.3						8.3	0.1	8.1	8.4	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	232	242	241	231	233	239	244	249	234	243	239	6	231	249	220
	TD	306	295	302	307	313	317	304	322	316	310	309	8	295	322	
	Apparent Breaking Elongation (percent)															
	MD	74	74	73	74	78	80	79	74	75	75	76	2	73	80	
	TD	100	100	99	107	111	107	111	111	108	112	107	5	99	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	150	153	156	157	159	163	159	151	143	150	152	6	143	163	120
		143	150	143	153	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	108	109	110	121	119	123	126	124	121	130	119	8	108	130	95
	TD	138	142	146	153	150	143	150	177	170	156	153	12	138	177	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

ISO 9001 - 2000

TABLE 1A.

MATERIAL PROPER...

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710721**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66316**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.61	1.60	1.59	1.64							1.61	0.02	1.59	1.64	1.5
	Permeability (cm./ sec.)	0.35	0.35	0.34	0.35							0.35	0.01	0.34	0.35	
	Flow Rate ($gpm/ ft.^2$)	120	120	119	122							120	1	119	122	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.208	0.208	0.202	0.210	0.205						0.207	0.003	0.202	0.210	

End of Table 1A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1B.

MATERIAL PROPER...

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710721**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66317**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	83	86	87	86	87	83	86	90	85	85	86	2	83	90	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.5	8.3	8.5	8.5	8.3						8.4	0.1	8.3	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	231	239	244	246	238	244	250	234	243	240	241	6	231	250	220
	TD	310	306	288	299	310	315	321	311	311	320	309	10	288	321	
	Apparent Breaking Elongation (percent)															
	MD	74	73	74	74	74	78	78	77	74	77	76	2	73	78	
	TD	100	104	99	111	110	111	112	108	112	111	108	5	99	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	150	157	159	163	160	161	159	157	158	147	155	6	146	163	120
		150	153	147	146	153										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	117	116	120	121	112	110	110	110	120	117	115	4	110	121	95
	TD	138	142	153	159	162	160	163	170	162	160	157	10	138	170	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710721**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66317**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.78	1.75	1.64	1.60							1.69	0.09	1.60	1.78	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.36	0.35							0.36	0.01	0.35	0.36	
	Flow Rate ($gpm/ ft.^2$)	133	131	122	120							127	6	120	133	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	70 maximum 100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.206	0.207	0.208	0.203	0.205						0.206	0.002	0.203	0.208	

End of Table 1B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 2A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710739**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66318**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	85	86	88	87	90	93	87	86	87	84	87	3	84	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.2	8.5	8.4	8.5	8.4						8.4	0.1	8.2	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	231	236	233	245	246	234	239	247	246	241	240	6	231	247	220
	TD	304	309	313	294	302	309	315	321	329	309	310	10	294	329	
	Apparent Breaking Elongation (percent)															
	MD	78	74	74	74	74	77	74	73	75	75	75	2	73	78	
	TD	110	107	108	100	108	112	111	108	111	111	109	4	100	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	153	158	157	158	163	170	171	168	159	143	157	8	143	171	120
		150	153	150	152	147										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	120	120	127	130	142	121	117	116	117	120	123	8	116	142	95
	TD	140	140	152	153	160	171	177	178	160	159	159	14	140	178	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710739**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66318**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.63	1.72	1.64	1.61							1.65	0.05	1.61	1.72	1.5
	Permeability (cm./ sec.)	0.34	0.35	0.35	0.34							0.35	0.01	0.34	0.35	
	Flow Rate ($gpm/ ft.^2$)	122	129	122	120							123	4	120	129	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.210	0.202	0.202	0.208	0.205						0.205	0.004	0.202	0.210	

End of Table 2A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 2B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710739**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66319**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	87	86	88	86	87	90	93	89	88	87	88	2	86	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.5	8.6	8.5	8.4	8.3						8.5	0.1	8.3	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	231	238	234	244	249	247	237	232	237	234	238	6	231	249	220
	TD	302	310	287	291	305	316	321	309	299	306	305	10	287	321	
	Apparent Breaking Elongation (percent)															
	MD	74	73	74	74	74	77	78	79	78	78	76	2	73	79	
	TD	108	111	99	100	100	108	107	111	78	114	104	10	78	114	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	163	170	161	159	163	160	143	150	153	150	155	8	143	170	120
		143	150	154	150	153										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	130	127	121	119	120	111	120	109	118	123	120	6	109	130	95
	TD	160	159	147	163	160	162	159	147	163	170	159	7	147	170	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710739**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66319**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen.*															
	BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.															
		1.63	1.69	1.75	1.78							1.71	0.06	1.63	1.78	1.5
	Permeability (cm./ sec.)															
		0.35	0.36	0.36	0.36							0.36	0.00	0.35	0.36	
	Flow Rate (gpm/ ft.^{2})															
		122	126	131	133							128	5	122	133	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 minimum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		0.209	0.210	0.210	0.207	0.206						0.208	0.002	0.206	0.210	

End of Table 2B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710757**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66320**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	94	89	87	86	93	95	97	100	85	83	91	6	83	100	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.3	8.3	8.3	8.5	8.5						8.4	0.1	8.3	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	231	243	239	235	237	248	244	242	235	237	239	5	231	248	220
	TD	310	309	305	316	304	295	301	319	321	326	311	10	295	326	
	Apparent Breaking Elongation (percent)															
	MD	74	73	74	78	78	79	77	77	78	77	77	2	73	79	
	TD	108	111	111	112	112	96	99	114	113	111	109	6	96	114	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	140	142	146	153	150	143	146	153	142	150	151	7	140	162	120
		153	158	162	160	160										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	138	129	128	137	130	127	128	113	111	110	125	10	110	138	95
	TD	136	150	147	141	138	130	170	165	159	143	148	13	130	170	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710757**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66320**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen.*															
	BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.															
		1.63	1.63	1.61	1.60							1.62	0.02	1.60	1.63	1.5
	Permeability (cm./ sec.)															
		0.36	0.36	0.37	0.34							0.36	0.01	0.34	0.37	
	Flow Rate ($gpm/ ft.^2$)															
		122	122	120	120							121	1	120	122	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		0.209	0.210	0.203	0.200	0.206						0.206	0.004	0.200	0.210	

End of Table 3A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710757**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66321**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	86	87	83	84	82	87	86	90	91	87	86	3	82	91	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.4	8.3	8.3	8.3	8.5						8.4	0.1	8.3	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	241	239	234	238	246	247	236	233	237	244	240	5	233	247	220
	TD	309	301	288	309	319	306	321	314	318	309	309	10	288	321	
	Apparent Breaking Elongation (percent)															
	MD	77	77	74	74	74	78	78	74	77	79	76	2	74	79	
	TD	111	107	100	107	108	111	111	111	111	112	109	4	100	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	139	142	139	142	153	146	153	156	157	167	152	10	139	170	120
		170	161	158	143	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	121	119	117	111	111	108	120	121	120	120	117	5	108	121	95
	TD	130	163	160	142	162	159	158	157	151	146	153	11	130	163	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 3B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710757**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66321**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.72	1.64	1.69	1.72							1.69	0.04	1.64	1.72	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.36	0.35							0.36	0.00	0.35	0.36	
	Flow Rate (gpm/ $ft.^2$)	129	122	127	129							127	3	122	129	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening: 70 maximum 100 mininmum
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.206	0.206	0.204	0.203	0.201						0.204	0.002	0.201	0.206	

End of Table 3B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4A.

MATERIAL PROPER...

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710775**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66322**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	116	108	109	103	98	97	90	83	84	83	97	12	83	116	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.4	8.4	8.6	8.3	8.4						8.4	0.1	8.3	8.6	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	244	239	240	237	231	236	238	241	248	243	240	5	231	248	220
	TD	310	311	301	315	321	309	314	325	327	322	315	8	301	327	
	Apparent Breaking Elongation (percent)															
	MD	77	73	74	79	80	74	77	78	74	78	77	2	73	80	
	TD	100	107	111	101	111	108	107	109	111	112	108	4	100	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	140	150	162	155	142	138	146	155	153	149	7	138	162	120
		150	153	146	152	159										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	127	130	122	121	121	119	118	122	123	126	123	4	118	130	95
	TD	139	142	155	156	147	159	163	159	170	142	153	10	139	170	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 4A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710775**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66322**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.63	1.60	1.60	1.67							1.63	0.03	1.60	1.67	1.5
	Permeability (cm./ sec.)	0.36	0.37	0.35	0.36							0.36	0.01	0.35	0.37	
	Flow Rate (gpm/ ft.^{2})	122	120	120	125							122	2	120	125	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.	0.210	0.206	0.204	0.208	0.209						0.207	0.002	0.204	0.210	

End of Table 4A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 4B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710775**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66323**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	83	84	83	82	86	90	92	87	86	97	87	5	82	97	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.3	8.2	8.3	8.2	8.3						8.3	0.0	8.2	8.3	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	231	239	243	243	241	238	236	248	235	230	238	6	230	248	220
	TD	291	296	308	313	321	323	318	320	313	321	312	11	291	323	
	Apparent Breaking Elongation (percent)															
	MD	77	74	77	77	74	77	74	78	77	74	76	2	74	78	
	TD	99	100	107	107	111	111	112	108	107	111	107	4	99	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	140	140	146	153	160	160	159	160	147	140	152	8	140	160	120
		153	146	150	159	160										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	106	120	119	118	118	122	138	127	110	109	119	9	106	138	95
	TD	148	150	163	140	140	142	163	170	178	180	157	15	140	180	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 4B.

MATERIAL PROPER...

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710775**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100435**
PGL Control No.: **66323**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity ($sec.^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.64	1.64	1.72	1.69							1.67	0.04	1.64	1.72	1.5
	Permeability (cm./ sec.)	0.35	0.35	0.35	0.36							0.35	0.00	0.35	0.36	
	Flow Rate ($gpm/ ft.^2$)	122	122	129	126							125	3	122	129	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.204	0.207	0.210	0.202	0.198						0.204	0.005	0.198	0.210	

End of Table 4B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

GAI-LAP
Initial: CVZ #:0.13
DATE: 06/07/2010

Joseph Voss
Envirotech Engineering & Consulting, Inc.
P.O. Box 6029
Enid, OK 73702

Dear Mr. Voss:

Thank you for consulting Precision Geosynthetic Laboratories (PGL) for your material testing needs.

Enclosed is the ***final*** laboratory report for the conformance testing of three (3) 300 mil Double-Sided Geocomposite samples.

PROJECT NAME: Environmental Restoration Disposal Facility (ERDF)

REFERENCE PGL JOB NO.: G100436

DATE RECEIVED: May 4 and May 6, 2010 **DATE REPORTED:** June 7, 2010

SAMPLED BY: PGL at SKAPS, GA

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PGL CONTROL NUMBER
R#354710793	
Geocomposite	66174
Geonet	66185
Geotextile (Top)	66324
Geotextile (Bottom)	66325
R#354710811	
Geocomposite	66175
Geonet	66186
Geotextile (Top)	66326
Geotextile (Bottom)	66327
R#354710822	
Geocomposite	66176
Geonet	66187
Geotextile (Top)	66328
Geotextile (Bottom)	66329

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
Geonet Component	
ASTM D1505	Density
ASTM D1777	Thickness
ASTM D5261	Mass per Unit Area
Geocomposite	
ASTM D7005	Ply Adhesion
ASTM D4716	Transmissivity
Geotextile Component	
ASTM D5261	Mass Per Unit Area
ASTM D4632	Grab Tensile
ASTM D4533	Trapezoid Tear Strength
ASTM D4833	Puncture Resistance
ASTM D5199	Thickness
ASTM D4491	Permittivity
ASTM D4751	Apparent Opening Size

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

Precision Geosynthetic Laboratories

TEST CONDITIONS: The samples were conditioned for a minimum of one hour in the laboratory at 22 ± 2°C (71.6 ± 3.6°F) and at 60 ± 10% relative humidity prior to test.

TEST RESULTS: The test results are summarized in Tables 1 to 3.

PRECISION GEOSYNTHETIC LABORATORIES

Belinda Jade R. Yeo
Quality Assurance

Carmelo V. Zantua
Technical/Laboratory Director

1160 North Gilbert Street, Anaheim, CA. 92801, www.precisionlabs.net Tel# 714-520-9631, 800-522-4599 Fax#714-520-9637

TABLE 1.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/4/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710793**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100436**
PGL Control No.: **66174**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV*
GEONET COMPONENT: **C#66185**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	321	326	320	311	308	320	322	319	310	309	317	6	308	326	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9549	0.9549	0.9549								0.9549	0.0000	0.9549	0.9549	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	43.2	43.4	43.4	44.0	43.4						43.5	0.3	43.2	44.0	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.4 °C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2/$ sec.)															
MD	3.00E-03	2.72E-03									2.86E-03	1.99E-04	2.72E-03	3.00E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.47	1.33									1.40	0.10	1.33	1.47	
Transmissivity (gal/min/ft)															
MD	14.51	13.15									13.83	0.96	13.15	14.51	

Test Set-Up:
Plate _____
Geocomposite *XXXXXX*
Plate _____

Thickness : *346* ***mils (Before)***
Thickness : *315.5* ***mils (After)***

ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)

Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.

Full scale force range used for testing: 100 lbs.

Side A of Composite															
MD	9.3	8.0	10.5	9.0	10.5						9.5	1.1	8.0	10.5	> 1
Side B of Composite															
MD	8.5	10.5	9.0	10.5	11.5						10.0	1.2	8.5	11.5	> 1

**-MARV- Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE 2.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/4/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710811**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100436**
PGL Control No.: **66175**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV*
GEONET COMPONENT: **C#66186**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	316	319	320	312	308	318	308	312	310	316	314	5	308	320	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9551	0.9551	0.9551								0.9551	0.0000	0.9551	0.9551	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	44.4	44.3	44.2	43.7	43.4						44.0	0.4	43.4	44.4	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.4° C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2/$ sec.)															
MD	2.82E-03	2.83E-03									2.83E-03	3.70E-06	2.82E-03	2.83E-03	1×10^{-3}
Flow Rate (gal/min)															
MD	1.38	1.38									1.38	0.00	1.38	1.38	
Transmissivity (gal/min/ft)															
MD	13.64	13.67									13.66	0.02	13.64	13.67	
Test Set-Up: *Thickness :* 344.5 *mils (Before)*															
Plate _____ *Thickness :* 311.5 *mils (After)*															
Geocomposite XXXXXX															
Plate _____															
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
Full scale force range used for testing: 100 lbs.															
Side A of Composite															
MD	10.3	8.0	10.0	9.3	8.0						9.1	1.1	8.0	10.3	> 1
Side B of Composite															
MD	10.3	8.8	7.3	8.8	11.0						9.2	1.5	7.3	11.0	> 1

*-MARV- Minimum Average Roll Values
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE 3.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/4/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710822**
Material Description: **300mil Double-Sided Geocomposite**

QC'd By: **B. Yeo**
PGL Job No.: **G100436**
PGL Control No.: **66176**

METHOD DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV*
GEONET COMPONENT: **C#66187**															
ASTM D1777 Thickness (mils)															
Test Option #1 *Used deadweight type dial micrometer with 1.129+/-0.001in dia presser foot with an applied pressure of 0.6+/-0.03psi provided by a 272gm weight.*	315	316	318	318	320	320	321	316	309	310	316	4	309	321	200
ASTM D1505 Density (grams/ $cm.^3$)	0.9544	0.9544	0.9544								0.9544	0.0000	0.9544	0.9544	> 0.94
ASTM D5261 Mass per Unit Area (oz/ yd^2) *Test Specimen Size: 4" x 8"*	42.8	43.0	42.5	42.5	42.5						42.7	0.2	42.5	43.0	24
GEOCOMPOSITE:															
ASTM D4716 Transmissivity *Tested at Normal Pressure : 15,000 psf, Gradient: 0.1 , Seating Time: 15 min Temperature of Test Water: 20.4 °C Specimen Size: 12" x 14"*															
Transmissivity ($m.^2$/ sec.)															
MD	3.13E-03	3.21E-03									3.17E-03	5.94E-05	3.13E-03	3.21E-03	1 x 10^{-3}
Flow Rate (gal/min)															
MD	1.53	1.57									1.55	0.03	2	2	
Transmissivity (gal/min/ft)															
MD	15.11	15.52									15.32	0.29	15	16	
ASTM D7005 Ply Bond Adhesion (lbs/ in.- width)															
Instron Tensile Testing Machine is set for 305mm(12 in./min.) constant rate of extension with initial gauge length of 50mm.															
Full scale force range used for testing: 100 lbs.															
Side A of Composite															
MD	8.3	10.3	8.8	10.5	7.8						9.1	1.2	7.8	10.5	> 1
Side B of Composite															
MD	9.3	10.3	8.5	11.3	8.5						9.6	1.2	8.5	11.3	> 1

Test Set-Up: ***Thickness :*** *351* ***mils (Before)***
Plate _____
Thickness : *318* ***mils (After)***
Geocomposite *XXXXXX*
Plate _____

**-MARV- Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1984 Record#265

Precision Geosynthetic Laboratories

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710793**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100436**
PGL Control No.: **66324**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	85	86	88	86	83	85	90	93	88	90	87	3	83	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.2	8.3	8.2	8.3	8.2						8.2	0.0	8.2	8.3	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	236	241	233	238	247	244	233	231	238	241	238	5	231	247	220
	TD	304	311	306	295	308	313	322	329	301	310	310	10	295	329	
	Apparent Breaking Elongation (percent)															
	MD	74	73	74	74	74	77	79	80	78	74	76	2	73	80	
	TD	107	111	108	100	107	111	114	112	108	114	109	4	100	114	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	151	153	153	146	142	153	154	151	146	143	148	5	140	154	120
		140	143	151	153	142										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	137	140	142	128	121	126	105	140	127	119	129	12	105	142	95
	TD	138	152	157	146	153	150	157	158	158	160	153	7	138	160	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

ISO 9001 - 2000

TABLE 1A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710793**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100436**
PGL Control No.: **66324**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.69	1.73	1.69	1.75							1.72	0.03	1.69	1.75	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.36	0.36							0.36	0.00	0.36	0.36	
	Flow Rate (gpm/ ft.^{2})	127	129	127	131							128	2	127	131	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		0.208	0.209	0.210	0.203	0.204						0.207	0.003	0.203	0.210	

End of Table 1A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1B.

MATERIAL PROPER

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710793**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100436**
PGL Control No.: **66325**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"															
		83	86	90	88	88	90	93	86	88	86	88	3	83	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"															
		8.3	8.4	8.2	8.3	8.3						8.3	0.1	8.2	8.4	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	241	246	239	237	239	234	247	244	237	240	240	4	234	247	220
	TD	295	298	301	307	312	321	307	291	302	321	305	10	291	321	
	Apparent Breaking Elongation (percent)															
	MD	74	74	73	79	74	81	80	78	78	77	77	3	73	81	
	TD	100	99	104	103	111	111	111	101	111	114	107	5	99	114	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.															
		138	142	150	153	155	143	151	150	153	150	149	5	138	157	120
		157	147	149	152	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	108	110	112	116	112	102	107	109	109	110	109	4	102	116	95
	TD	145	150	163	158	146	153	142	151	143	150	150	7	142	163	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 1B.

MATERIAL PROPER...

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710793**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100436**
PGL Control No.: **66325**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.75	1.61	1.75	1.70							1.70	0.07	1.61	1.75	1.5
	Permeability (cm./ sec.)	0.36	0.35	0.36	0.36							0.36	0.00	0.35	0.36	
	Flow Rate (gpm/ ft.^{2})	131	120	131	127							127	5	120	131	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	70 maximum 100 minimum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.	0.209	0.208	0.209	0.204	0.202						0.206	0.003	0.202	0.209	

End of Table 1B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A.

MATERIAL PROPER...

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710811**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100436**
PGL Control No.: **66326**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	100	98	103	100	98	96	89	88	93	88	95	6	88	103	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.4	8.5	8.3	8.2	8.3						8.3	0.1	8.2	8.5	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	239	233	236	244	241	236	232	248	245	246	240	6	232	248	220
	TD	308	289	296	310	316	325	329	319	317	325	313	13	289	329	
	Apparent Breaking Elongation (percent)															
	MD	77	74	73	78	78	80	80	75	78	77	77	2	73	80	
	TD	100	99	108	111	112	112	112	111	104	105	107	5	99	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	161	160	163	155	153	150	153	150	146	153	153	6	143	163	120
		143	155	146	153	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	130	115	116	120	120	121	120	120	117	110	119	5	110	130	95
	TD	142	138	146	153	150	163	155	153	148	153	150	7	138	163	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710811**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100436**
PGL Control No.: **66326**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.78	1.78	1.78	1.78							1.78	0.00	1.78	1.78	1.5
	Permeability (cm./ sec.)	0.37	0.36	0.37	0.36							0.36	0.00	0.36	0.37	
	Flow Rate (gpm/ ft.^{2})	133	133	133	133							133	0	133	133	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 minimum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		0.208	0.209	0.204	0.204	0.206						0.206	0.002	0.204	0.209	

End of Table 2A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2B.

MATERIAL PROPER...

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710811**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100436**
PGL Control No.: **66327**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	87	85	85	85	85	86	88	86	93	87	87	3	85	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.2	8.4	8.6	8.7	8.6						8.5	0.2	8.2	8.7	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	236	238	232	242	247	238	236	248	244	238	240	5	232	248	220
	TD	309	306	305	312	316	308	329	323	331	310	315	9	305	331	
	Apparent Breaking Elongation (percent)															
	MD	76	77	74	73	78	74	78	78	74	78	76	2	73	78	
	TD	107	111	107	108	112	111	112	111	108	103	109	3	103	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	153	146	143	150	153	150	152	150	153	146	149	4	140	153	120
		143	140	150	153	146										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	137	122	120	120	117	111	111	107	110	117	117	9	107	137	95
	TD	139	140	143	142	150	160	163	160	163	148	151	10	139	163	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 2B.

MATERIAL PROPER...

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710811**
Material Description: **Geotextile Component of Double-Sided Geocomposite (Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100436**
PGL Control No.: **66327**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.64	1.67	1.61	1.61							1.63	0.03	1.61	1.67	1.5
	Permeability (cm./ sec.)	0.35	0.35	0.36	0.37							0.36	0.01	0.35	0.37	
	Flow Rate (gpm/ ft.^{2})	123	125	120	120							122	2	120	125	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.	0.206	0.210	0.210	0.211	0.206						0.209	0.002	0.206	0.211	

End of Table 2B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 3A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710822**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100436**
PGL Control No.: **66328**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	90	88	86	83	80	82	81	82	81	84	83	3	80	90	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.2	8.3	8.3	8.3	8.3						8.3	0.1	8.2	8.3	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	235	238	231	242	244	236	232	237	246	247	239	6	231	247	220
	TD	306	313	310	302	305	319	329	332	331	308	315	11	302	332	
	Apparent Breaking Elongation (percent)															
	MD	73	74	74	77	74	75	77	74	74	74	75	1	73	77	
	TD	108	107	107	107	111	111	111	108	115	114	110	3	107	115	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	140	142	150	163	178	175	180	175	178	168	165	16	140	180	120
		177	178	177	142	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	120	119	117	120	122	126	131	119	120	121	121	4	117	131	95
	TD	136	142	129	137	146	150	152	143	147	150	143	7	129	152	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories

TABLE 3A.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710822**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Top)**

QC'd By: **B. Yeo**
PGL Job No.: **G100436**
PGL Control No.: **66328**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.61	1.67	1.70	1.67							1.66	0.04	1.61	1.70	1.5
	Permeability (cm./ sec.)	0.36	0.36	0.36	0.35							0.36	0.00	0.35	0.36	
	Flow Rate (gpm/ ft.^{2})	120	125	127	125							124	3	120	127	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 mininmum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		0.209	0.205	0.206	0.207	0.208						0.207	0.002	0.205	0.209	

End of Table 3A

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3B.

MATERIAL PROPER...

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710822**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100436**
PGL Control No.: **66329**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D5199	Thickness (mils)															
	Apparatus: Dead weight dial micrometer with 56.4mm (2.22in) dia presser foot and a pressure of 2kPA (0.29psi) provided by a 509gm weight. Loading time: 5sec Specimen Size: 4" x 4"	86	92	92	88	88	90	93	89	92	92	90	2	86	93	80
ASTM D5261	Mass per Unit Area (oz/ yd.^{2})															
	Test Specimen Size: 4" x 8"	8.4	8.2	8.3	8.2	8.2						8.3	0.1	8.2	8.4	8.0
ASTM D4632	Grab Tensile															
	Test was performed as directed in D4632, dry condition. Instron Tensile Testing Machine with hydraulic action grips and 1 in x 2 in rubber faces was used. Maximum load used for testing: 1500 lbs															
	Grab Breaking Load (lbs)															
	MD	238	236	237	243	239	248	249	244	237	234	241	5	234	249	220
	TD	305	299	313	325	331	301	320	321	314	310	314	10	299	331	
	Apparent Breaking Elongation (percent)															
	MD	74	73	74	77	78	78	78	74	78	77	76	2	73	78	
	TD	108	111	111	108	112	78	108	107	108	111	106	10	78	112	
ASTM D4833	Puncture Resistance (lbs)															
	Specimens were tested as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens were extended beyond the outer edges of the clamping plates.	138	143	150	153	160	157	146	152	153	150	152	6	138	161	120
		155	160	158	161	150										
ASTM D4533	Trapezoid Tear Strength (lbs)															
	Specimens were tested as directed in Test Method D4533, dry condition.															
	MD	116	120	124	120	150	132	122	110	119	109	122	12	109	150	95
	TD	136	140	152	153	160	160	157	160	159	149	153	9	136	160	

Continued on next page

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

TABLE 3B.

MATERIAL PROPERTIES

CLIENT: Envirotech Engineering & Consulting, Inc.

PROJECT: Environmental Restoration Disposal Facility (ERDF)

Date Received: **5/6/2010**
Date Reported: **6/7/2010**
Client Sample ID: **R#354710822**
Material Description: **Geotextile Component of Double-Sided Geocomposite** **(Bottom)**

QC'd By: **B. Yeo**
PGL Job No.: **G100436**
PGL Control No.: **66329**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs. MARV *
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Four specimens were tested by holding the head constant at 50 mm. The corresponding water volume passing through the specimen was collected at the discharge side and the amount and time recorded. Five readings were taken for each specimen. BT Technology permittivity testing apparatus compliant to ASTM D4491 requirements was used.*	1.66	1.75	1.61	1.66							1.67	0.06	1.61	1.75	1.5
	Permeability (cm./ sec.)	0.35	0.36	0.35	0.36							0.35	0.00	0.35	0.36	
	Flow Rate (gpm/ ft.^{2})	124	131	120	124							125	4	120	131	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															Opening:
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															70 maximum
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	100 minimum
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		0.203	0.204	0.206	0.208	0.204						0.205	0.002	0.203	0.208	

End of Table 3B

**MARV - Minimum Average Roll Values*
MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Precision Geosynthetic Laboratories