

(In reply, please refer to)
Our File: 14-9199-2000

October 02, 2014

Manitoba Conservation and Water Stewardship
Environmental Approvals Branch
123 Main Street, Suite 160
Winnipeg, MB R3C 1A5

Attention: Ms. Siobhan Burland Ross, M.Eng, P.Eng.
Manager – Environmental Approvals Branch

Re: Notice of Alteration to License 2704-R; Change in Liner Material

Dear Ms. Burland Ross:

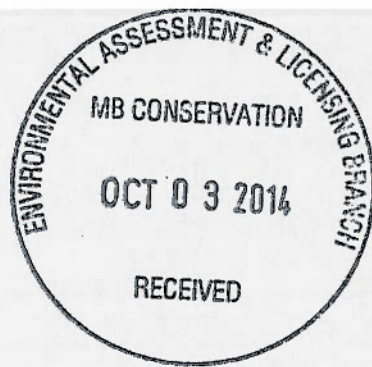
The following letter is a Notice of Alteration and liner installation report, as requested in the letter issued to our client, the Village of Dunnottar, dated September 23, 2014.

Description of Alteration – 30 mil PVC liner changed to 60 mil HDPE liner

The license 2704-R states that a 30 mil PVC liner is to be installed in the passive filter cells. At the request of the Manitoba Water Services Board (MWSB), the liner was changed to a much thicker and more resilient 60 mil HDPE liner. To our understanding, the request to change the liner material and thickness was made because the MWSB has recently experienced complications with the thinner PVC liner and preferred to construct with the HDPE liner instead. Functionally, this change does not affect the performance of the passive filter. In comparison to the 30 mil PVC liner, the 60 mil HDPE liner is thicker and more rigid making it more robust; typically more puncture resistant and more resistant to heat and chemicals. This additional resistance is not expected to be required for the passive filter since the filter receives treated lagoon effluent. The liner was installed on proof rolled sandy soil that was free from sharp objects and stones. A geotextile cushion was installed over the liner for further protection from penetration before the granular drain rock and filter media were placed in the cell. Overall, the alteration resulted in a more robust liner material installed in the passive filter cells than what was specified in the license.

Liner Installation Report

Installation of the 60 mil HDPE liner at the Dunnottar Passive Filter occurred during the first week of September. Titan Environmental Containment Ltd. (Titan) supplied and installed the liner as a sub-contractor to Arnason Industries Ltd. (Arnason). An on-site observer from Dillon Consulting Ltd. (Dillon) was present during that time to witness the liner installation. The HDPE liner was supplied in standard 22.5 foot rolls and was installed using standard wedge weld seaming and extrusion rod seaming techniques. Within the cells, there were only two pipe penetrations in total, with an additional two penetrations at the top of the intermediate berm where the distribution pipes rise vertically to the distribution box. Details of the panel installation, penetrations, and test results are contained in the report by Titan Environmental attached in Appendix A.



DILLON
CONSULTING

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Dillon Consulting
Limited

The liner on the North cell (Cell #2) was installed first, with the major panels running North-South. However, due to the difficulty in pulling the textured liner up the intermediate embankment, the installation method was changed for the South cell (Cell #1) to facilitate installation with the help of a small vehicle (John Deere Mule). Other than the difficulty in manually pulling the liner up the embankments, there were no issues with installation of the liner. In fact, the liner was placed and all wedge welds completed in a single day (September 3, 2014). Both wedge welders were tested prior to welding the panels; none of the welds failed the testing criteria as shown in Appendix A. During actual welding, speed and temperature of the welders were kept constant to closely reflect the weld quality of the test seams. There were no instances of interrupted wedge welds. Minimum overlap of 125 mm was maintained along the wedge welds and was indicated with continuous white markings along each seam so that overlap distance could be visually confirmed. Wedge weld characteristics and testing results can be found in Appendix A.

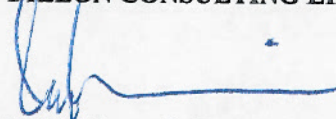
Extrusion seaming was required at the liner penetrations and at the corners of the filter cells. In addition, T – weld reinforcements were provided along the butt seams throughout the cells. Prior to extrusion welding, the liner was “tacked” into location with a hot air leister. Along each seam where extrusion welds were required, the liner was ground with a hand held grinder to reveal fresh liner material suitable for bonding with the extrusion bead. Each day, prior to use, the extrusion welder was tested and documented. Extrusion welding locations and test results can be found in Appendix A.

In addition to this written documentation and the installation report by Titan, Dillon has provided photographs documenting the liner installation process. A sample of the installation photographs have been provided in Appendix B with descriptions. Additional photographs are available upon request.

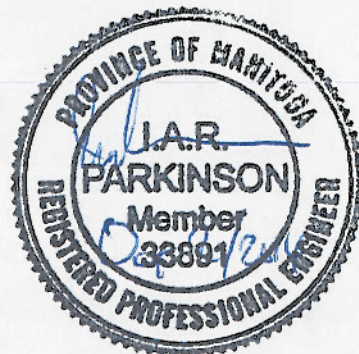
If you have any questions, please contact the undersigned at 204-453-2301, or by email at iparkinson@dillon.ca.

Sincerely,

DILLON CONSULTING LIMITED



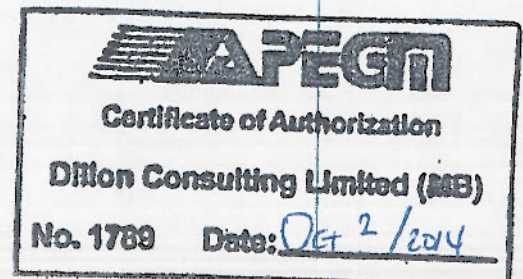
Ian Parkinson, P. Eng.
Project Manager



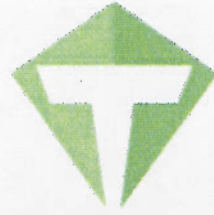
FZ/knh

Attachments: Appendix A – Titan Environmental Containment Liner Installation Report
Appendix B – Liner Installation Photos
Cheque Payable to Minister of Finance for \$500.00

cc. Kristine Shields, CAO – Village of Dunnottar
Dave Shwaluk, Manitoba Water Services Board



**Appendix A –
Titan Environmental Containment
Liner Installation Report**



TITAN
Environmental Containment

L4081

**PASSIVE FILTRATION CELLS
QAQC 60mil HDPE Geomembrane**

DUNNOTTAR, SK

COMPLETED 8-SEP-14



LEGEND:

EXTRUSION DETAIL R1 TO R12

P17 R5	R4			P13 R3	P11	P10	P9 R2
P18	P8						
P19	P7						
P20	P16 P15 P14		P5 R7 R8	P6			
P24	P4						
P25	P3						
P26	P2						
P27	R10 R9			P1 R12	R1		
P28 R6	P23	P22	P21				

<p>Report any discrepancies to Titan Environmental Containment Ltd. Do not scale dimensions from drawing. Do not modify drawing, re-use it, or use it for purposes other than those intended at the time of its preparation without prior written permission from Titan Environmental Containment Ltd.</p> <p>NOT APPROVED FOR CONSTRUCTION</p>	<p>PROJ. NO.: L4081</p>	<p>PASSIVE FILTRATION CELLS - DUNNOTTAR ME</p>	
	<p>DATE: 8-SEPT-14</p>	<p>TITAN ENVIRONMENTAL CONTAINMENT LTD.</p>	
	<p>DRAWN BY: LM</p>	<p>CLIENT: ARNASON</p>	
	<p>REV. BY: KP</p>	<p>DWG TITLE: PANEL LAYOUT AS-BUILT</p>	<p>REV. NO.: 001</p>





PANEL PLACEMENT LOG

Project Name: Dunnoitar

Product Type: GSE 60 MIL TEXTURE

DATE	PANEL NUMBER	ROLL NUMBER	LENGTH	WIDTH	COMMENTS
DD/MMM/YY			FEET		
03-Sep-14	1	108170870	102	22.5	
03-Sep-14	2	108170870	102	22.5	
03-Sep-14	3	108170870	102	22.5	
03-Sep-14	4	108170870	101	22.5	
03-Sep-14	5	108170870	75	22.5	
03-Sep-14	6	108170869	26	22.5	
03-Sep-14	7	108170869	101	22.5	
03-Sep-14	8	108170869	101	22.5	
03-Sep-14	9	108170869	32	22.5	
03-Sep-14	10	108170869	32	22.5	
03-Sep-14	11	108170869	32	22.5	
03-Sep-14	12	108170869	32	11	
03-Sep-14	13	108170869	32	22.5	
03-Sep-14	14	108170944	90	22.5	
03-Sep-14	15	108170944	90	22.5	
03-Sep-14	16	108170944	90	22.5	
03-Sep-14	17	108170944	33	22.5	
03-Sep-14	18	108170944	33	22.5	
03-Sep-14	19	108170944	33	22.5	
03-Sep-14	20	108170943	93	22.5	
03-Sep-14	21	108170943	93	22.5	
03-Sep-14	22	108170943	93	22.5	
03-Sep-14	23	108170943	33	22.5	
03-Sep-14	24	108170943	33	22.5	
03-Sep-14	25	108170943	33	22.5	
03-Sep-14	26	108170943	33	22.5	
03-Sep-14	27	108170943	33	12	
03-Sep-14	28	108170943	33	22.5	



WEDGE SEAM LOG

Project Name: Dunnotlar

Product Type: GSE 60 MIL TEXTURE

SEAM LOG							AIR TEST INFORMATION						
BETWEEN PANELS	WELD DATE	TIME OF DAY		TECHNICIAN	WEDGE #	SEAM LENGTH	TEST DATE	START TIME	START PSI	FINISH TIME	FINISH PSI	TEST RESULTS	QC TECHNICIAN
		DD/MMM/YY	AM										
P1-P2	3-Sep-14		1:50	GS	DW-12	102	5-Sep-14	8:18 AM	41	8:23 AM	40	PASS	GS
P2-P3	3-Sep-14		2:05	BL	DW-2	102	5-Sep-14	8:18 AM	57	8:23 AM	55	PASS	GS
P3-P4	3-Sep-14		2:17	GS	DW-12	101	5-Sep-14	8:18 AM	49	8:23 AM	48	PASS	GS
P5-P6	3-Sep-14		2:30	BL	DW-2	22.5	5-Sep-14	8:24 AM	35	8:29 AM	33	PASS	GS
P4-P5/P6	3-Sep-14		2:35	BL	DW-2	101	5-Sep-14	8:12 AM	36	8:17 AM	35	PASS	GS
P5/P6-P7	3-Sep-14		3:10	BL	DW-2	101	5-Sep-14	8:12 AM	47	8:17 AM	45	PASS	GS
P7-P8	3-Sep-14		3:37	BL	DW-2	101	5-Sep-14	8:12 AM	38	8:17 AM	37	PASS	GS
P9-P10	3-Sep-14		2:47	GS	DW-12	32	5-Sep-14	8:06 AM	43	8:11 AM	40	PASS	GS
P10-P11	3-Sep-14		2:55	GS	DW-12	32	5-Sep-14	8:06 AM	45	8:11 AM	45	PASS	GS
P11-P12	3-Sep-14		3:04	GS	DW-12	32	5-Sep-14	8:06 AM	45	8:11 AM	43	PASS	GS
P12-P13	3-Sep-14		3:13	GS	DW-12	32	5-Sep-14	8:00 AM	48	8:05 AM	47	PASS	GS
P14-P15	3-Sep-14		4:50	BL	DW-2	90	6-Sep-14	9:30 AM	37	9:35 AM	36	PASS	GS
P15-P16	3-Sep-14		5:13	BL	DW-2	90	6-Sep-14	9:30 AM	32	9:35 AM	30	PASS	GS
P17-P16	3-Sep-14		5:37	BL	DW-2	33	6-Sep-14	9:30 AM	41	9:35 AM	39	PASS	GS
P18-P19	3-Sep-14		5:47	BL	DW-2	33	6-Sep-14	9:37 AM	39	9:42 AM	38	PASS	GS
P19-P20	3-Sep-14		5:58	BL	DW-2	33	6-Sep-14	9:37 AM	43	9:42 AM	41	PASS	GS
P21-P22	3-Sep-14		6:15	BL	DW-2	93	6-Sep-14	9:37 AM	31	9:42 AM	31	PASS	GS
P22-P23	3-Sep-14		6:40	BL	DW-2	93	6-Sep-14	9:43 AM	37	9:48 AM	35	PASS	GS
P20-P24	3-Sep-14		7:10	BL	DW-2	33	6-Sep-14	9:43 AM	36	9:48 AM	35	PASS	GS
P24-P25	3-Sep-14		7:22	BL	DW-2	33	6-Sep-14	9:43 AM	39	9:48 AM	37	PASS	GS
P25-P26	3-Sep-14		7:37	BL	DW-2	33	6-Sep-14	9:50 AM	42	9:55 AM	41	PASS	GS
P26-P27	3-Sep-14		7:49	BL	DW-2	33	6-Sep-14	9:50 AM	44	9:55 AM	42	PASS	GS
P27-P28	3-Sep-14		8:10	BL	DW-2	33	6-Sep-14	9:50 AM	48	9:55 AM	47	PASS	GS

TITAN
WEDGE TRIAL LOG

Project Name: Dunnollar

Product Type: GSE 60 MIL TEXTURE

Wedge #: 12
Date: SEPTEMBER 3, 2014
Sheet Type: GSE 60 MIL TEXTURE

AM TEST

Time: _____ AM		ELONGATION	FAILURE TYPE
Technician: _____			
Sheet Temp: _____ °C			
Wedge Speed: _____ m/min			
Wedge Temp: _____ °C / °F			
INSIDE PEEL		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
OUTSIDE PEEL		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
SHEAR PEEL		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.

PM TEST

Time: <u>1:45</u> PM		ELONGATION	FAILURE TYPE
Technician: <u>GS</u>			
Sheet Temp: <u>18</u> °C			
Wedge Speed: <u>400</u> m/min			
Wedge Temp: <u>850</u> °F			
INSIDE PEEL		145	200%+ F.T.B.
		138	200%+ F.T.B.
		148	200%+ F.T.B.
		135	200%+ F.T.B.
		137	200%+ F.T.B.
OUTSIDE PEEL		128	200%+ F.T.B.
		147	200%+ F.T.B.
		147	200%+ F.T.B.
		138	200%+ F.T.B.
		142	200%+ F.T.B.
SHEAR PEEL		188	200%+ F.T.B.
		195	200%+ F.T.B.
		189	200%+ F.T.B.
		192	200%+ F.T.B.
		191	200%+ F.T.B.

NOTES:

Wedge #: DW-2
Date: September 3, 2014
Sheet Type: GSE 60 MIL TEXTURE

AM TEST

Time: _____ AM		ELONGATION	FAILURE TYPE
Technician: _____			
Sheet Temp: _____ °C			
Wedge Speed: _____ m/min			
Wedge Temp: _____ °C / °F			
INSIDE PEEL		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
OUTSIDE PEEL		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
SHEAR PEEL		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.

PM TEST

Time: <u>1:55</u> PM		ELONGATION	FAILURE TYPE
Technician: <u>BL</u>			
Sheet Temp: <u>18</u> °C			
Wedge Speed: <u>400</u> m/min			
Wedge Temp: <u>850</u> °F			
INSIDE PEEL		147	200%+ F.T.B.
		152	200%+ F.T.B.
		158	200%+ F.T.B.
		140	200%+ F.T.B.
		148	200%+ F.T.B.
OUTSIDE PEEL		136	200%+ F.T.B.
		156	200%+ F.T.B.
		154	200%+ F.T.B.
		152	200%+ F.T.B.
		150	200%+ F.T.B.
SHEAR PEEL		188	200%+ F.T.B.
		189	200%+ F.T.B.
		188	200%+ F.T.B.
		190	200%+ F.T.B.
		191	200%+ F.T.B.

NOTES:



EXTRUDER TRIAL LOG

Project Name: Dunnottar

Product Type: GSE 60 MIL TEXTURE

Extruder#: 7

Date: September 4, 2014

Sheet Type: GSE 60 MIL TEXTURE

AM TEST

Time: <u>9:55</u> AM		ELONGATION	FAILURE TYPE
Technician: <u>DP</u>			
Sheet Temp: <u>10</u> °C			
Barrel/Air Temp: <u>455-465</u> °C / °F			
INSIDE PEEL	122	200%+	F.T.B.
	92	200%+	F.T.B.
	107	200%+	F.T.B.
	112	200%+	F.T.B.
	99	200%+	F.T.B.
SHEAR PEEL	170	200%+	F.T.B.
	169	200%+	F.T.B.
	174	200%+	F.T.B.
	168	200%+	F.T.B.
	171	200%+	F.T.B.

PM TEST

Time: _____ PM		ELONGATION	FAILURE TYPE
Technician: _____			
Sheet Temp: _____ °C			
Barrel/Air Temp: _____ °C / °F			
INSIDE PEEL		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
SHEAR PEEL		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.

NOTES:

Extruder#: 7

Date: September 5, 2014

Sheet Type: GSE 60 MIL TEXTURE

AM TEST

Time: <u>8:00</u> AM		ELONGATION	FAILURE TYPE
Technician: <u>DP</u>			
Sheet Temp: <u>11</u> °C			
Barrel/Air Temp: <u>455/465</u> °C / °F			
INSIDE PEEL	120	200%+	F.T.B.
	125	200%+	F.T.B.
	99	200%+	F.T.B.
	110	200%+	F.T.B.
	108	200%+	F.T.B.
SHEAR PEEL	160	200%+	F.T.B.
	165	200%+	F.T.B.
	171	200%+	F.T.B.
	170	200%+	F.T.B.
	162	200%+	F.T.B.

PM TEST

Time: _____ PM		ELONGATION	FAILURE TYPE
Technician: _____			
Sheet Temp: _____ °C			
Barrel/Air Temp: _____ °C / °F			
INSIDE PEEL		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
SHEAR PEEL		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.

NOTES:



EXTRUDER TRIAL LOG

Project Name: Dunnottar

Product Type: GSE 60 MIL TEXTURE

Extruder#: 7

Date: September 6, 2014

Sheet Type: GSE 60 MIL TEXTURE

AM TEST

Time: <u>7:45</u> AM		ELONGATION	FAILURE TYPE
Technician: <u>DP</u>			
Sheet Temp: <u>8</u> °C			
Barrel/Air Temp: <u>455-465</u> °C / °F			
INSIDE PEEL	125	200%+	F.T.B.
	120	200%+	F.T.B.
	122	200%+	F.T.B.
	130	200%+	F.T.B.
	129	200%+	F.T.B.
SHEAR PEEL	160	200%+	F.T.B.
	170	200%+	F.T.B.
	172	200%+	F.T.B.
	168	200%+	F.T.B.
	165	200%+	F.T.B.

PM TEST

Time: _____ PM		ELONGATION	FAILURE TYPE
Technician: _____			
Sheet Temp: _____ °C			
Barrel/Air Temp: _____ °C / °F			
INSIDE PEEL		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
SHEAR PEEL		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.
		200%+	F.T.B.

NOTES:



EXTRUSION DETAIL LOG

CODE LEGEND
BO-BLOCK OFF
P-PATCH
PT-PENETRATION
E-EXTRUSION BEAD
T-THREE PANEL INTERSECTION
C-CAPSTRIP
DT-DESTRUCTIVE TEST

Project Name Dunnotar

Product Type: GSE 60 MIL TEXTURE

DETAIL LETTER	DETAIL DATE	TECHNICIAN	CODE	DIMENSIONS	LOCATION	TEST DATE	TEST RESULTS	QC TECH	TEST TYPE
			SEE LEGEND			DD/MMM/YY			
R1	4-Sep-2014	DP	E	15'	P1	4-Sep-2014	PASS	BL	VACUUM TESTED
R2	4-Sep-2014	DP	E	17'	P9	4-Sep-2014	PASS	BL	VACUUM TESTED
R3	5-Sep-2014	DP	E	35'	P13	6-Sep-2014	PASS	BL	VACUUM TESTED
R4	5-Sep-2014	DP	E	31'	P14	6-Sep-2014	PASS	BL	VACUUM TESTED
R5	5-Sep-2014	DP	E	12'	P17	6-Sep-2014	PASS	BL	VACUUM TESTED
R6	5-Sep-2014	DP	E	14'	P28	6-Sep-2014	PASS	BL	VACUUM TESTED
R7	5-Sep-2014	DP	PT	2' X 4'	P5	6-Sep-2014	PASS	BL	VACUUM TESTED
R8	5-Sep-2014	DP	PT	2' X 4'	P5	6-Sep-2014	PASS	BL	VACUUM TESTED
R9	5-Sep-2014	DP	E	40'	P21	6-Sep-2014	PASS	BL	VACUUM TESTED
R10	6-Sep-2014	DP	PT	4' X 4'	P21	6-Sep-2014	PASS	BL	VACUUM TESTED
R11	6-Sep-2014	DP	E	42'	P1	6-Sep-2014	PASS	BL	VACUUM TESTED
R12	6-Sep-2014	DP	PT	4' X 4'	P1	6-Sep-2014	PASS	BL	VACUUM TESTED

* UNLESS OTHERWISE NOTED, ALL 3 PANEL INTERSECTIONS COME WITH VACUUM TESTED EXTRUDED T WELDS.



BUTT SEAM LOG

Project Name: Dunnottar

BUTT SEAM LOG									AIR TEST INFORMATION				
BUTT SEAM LETTER	BUTT SEAM		WELD DATE	TIME OF DAY		TECHNICIAN	WEDGE #	SEAM LENGTH	TEST DATE	START PSI	FINISH PSI	TEST RESULTS	QC TECHNICIAN
	Seam Starts Between Panels	Finishes Between Panels	DD/MMM/YY	AM	PM			FEET	DD/MMM/YY				
A	P8-P9	P8-P13	3-Sep-14		3:27	GS	DW-12	101'	5-Sep-14	43	42	PASS	GS
B	P13-P14	P5-P14	3-Sep-14		4:30	BL	DW-2	88'	6-Sep-14	41	40	PASS	GS
C	P5-P21	P1-P21	3-Sep-14		5:50	GS	DW-12	93'	6-Sep-14	37	35	PASS	GS
D	P16-P23	P14-P21	3-Sep-14		6:25	GS	DW-12	66'	6-Sep-14	42	40	PASS	GS
E	P16-P17	P23-P28	3-Sep-14		7:30	GS	DW-12	182'	6-Sep-14	39	37	PASS	SG