Yazon, Edwin

From:	Stephen McCabe <smccabe@gflenv.com></smccabe@gflenv.com>
Sent:	December 14, 2022 10:13 AM
То:	Yazon, Edwin
Cc:	Stephen McCabe
Subject:	Re: Cell 11 Liner - Rm of Ritchot WDG
Attachments:	WX0469022 MidCanada Waste Disposal Ground - Cell 11 Hydraulic Conductivity
	Evaluation.pdf

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Good morning Edwin,

Due to the ongoing circumstances at the other two landfills in the Winnipeg area, our landfill is having to accommodate quite a significant increase in waste. The biggest factor would be when Brady Road Landfill cannot accept loads and the City of Winnipeg requests that all residential waste loads be sent to MidCanada instead to ensure that residential waste collection in the city can continue. We are also accommodating commercial loads from all ends of the City when the closures happen. At this point we are still managing to place waste in our active landfill cell without placing waste into the new cell # 11. I am concerned with the recent large increase in volume of waste coming into our landfill while waiting for the conductivity reports, because I do not want to go to a higher elevation in any of our landfill cells than what is approved in our design and be out of compliance in any way.

Our 3rd party engineers have provided the attached in regards to the hydraulic conductivity of the clays used at the WDG for liner construction. There are examples of the HC of our compacted clay liners as well as examples of the HC of our in-situ clay at the site. All HC tests that we have ever performed on the WDG property have met the regulatory requirement. This includes both the testing of previous liners and in-situ clay.

Our engineers expect to have our HC results in about a week and I will get them to you as soon as I receive them. At this time, I am requesting that we get permission to start working our way into cell # 11 and using a small portion of the lined floor to deposit waste until the official results come in and are approved by you and your department. If you require any additional information, or have any questions, please reach out to me at any time.

I really appreciate your consideration of this request.

Thank you.

Stephen McCabe | Regional Manager, Landfills and Soil Treatment Facilities

GFL Environmental Inc. 1373 Bernat Road, Grande Pointe, MB R0A 0T0 **T** (204) 878-2369 | **F** (204) 987-9601 | **C** (204) 781-7804 | smccabe@gflenv.com | <u>www.gflenv.com</u>

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WSP Environment & Infrastructure Canada Limited



	ercent Con	ple Dry De bisture Cor Proctor De	Justin M Huberdeau December 6, 2022 GWM Progarm 2022-2023 Shelby 1 e Dry Density 1405 kg/m ³ sture Content 32.3 % octor Density %		
7.9 mm	Initial Wate	r Content			32.3 %
1.8 mm	Initial Bulk	Density			1859 kg/m ³
.45 cm ²	Initial Dry D	ensity			1405 kg/m ³
3.9 cm ³	Initial Void I	Ratio			0.90
	Specific Gra	avity			2.67 assumed
7.1 kPa	Effective Co	onsolidation I	Pressure		21.0 kPa
∂.5 kPa	Differential	Pressure			13.8 kPa
2.7 kPa	Pore Press	ure Paramete	∌r B		98.0
7.0 mm	Post Test V	Vater Conten	t		43.9 %
71.0 mm Post Tes					2036 kg/m ³
.59 cm ²	Post Test D	Pry Density			1415 kg/m ³
3.1 cm ³	Post Test V	oid Ratio			0.89
SAMPLE DATA		Initial	Post Test	1	
t Weight of Sample	e (g)	360.47	378.92		
Weight of Sample	e (g)	272.44	263.29		
lume of Sample (cr	m ³)	193.90	186.08		
olume of Solids (cm	n ³)	102.04	98.61		
olume of Voids (cm	1 ³)	91.86	87.47		
me of Pore Water ((cm ³)	88.03	115.63		
Void Ratio		0.90	0.89		
Saturation		0.96	1.32		
3ulk Density (kg/m ³	3)	1859	2036		
Dry Density (kg/m ³))	1405	1415		
loisture Content (%	6)	32.3	43.9		
meability Value	4.77E-09	cm/sec			
	Re	eviewed By:		HM	
			 Reviewed By:	Reviewed By:	Reviewed By:HM

Project No. WX0469022

Client MidCanada Enviromental Sei







Project Location <u>GWM Progarm 2022-2023</u>

WSP Environment & Infrastructure Canada Limited

Project No.	WX0469022
Client	MidCanada Enviromental Services
Borehole No.	Shelby #1 (S-1)
Depth	1.0-3.0 m
Project Manager	Justin M Huberdeau

	115)
Date	December 6, 2022	
Project	GWM Progarm 2022-2023	
Test Type	Shelby	
Sample No.	1	

Permeant Type De-Aired Tapwater

Soil Description Silty Clay

	Flexible Wall Permeability Test												
Elapsed Time	Incremental Time	Effective Head	Gradient (i)	Incremental Volume Out	Incremental Volume In	Ratio outflow vs inflow	Cumulative Volume Out	Cumulative Volume In	Permeability Based on Incremental Flow Out of Sample	Permeability Based on Incremental Flow into Sample	Cumulative Vol (out) / Vol of voids	Cumulative Vol (in) / Vol of voids	Temperature
(s)	(s)	(kPa)		(cm ³)	(cm ³)		(cm ³)	(cm ³)	(cm/s)	(cm/s)			(°C)
0	0	13.79	29.34	0.0	0.0	0.95	0.0	0.0	0	0	0.000	0.000	20
237600	237600	13.79	29.34	1.8	1.9	0.95	1.8	1.9	6.4E-09	6.8E-09	0.021	0.022	20
324000	86400	13.79	29.34	0.6	0.7	0.86	2.4	2.6	5.9E-09	6.9E-09	0.027	0.030	20
410400	86400	13.79	29.34	0.5	0.6	0.83	2.9	3.2	4.9E-09	5.9E-09	0.033	0.037	20
496800	86400	13.79	29.34	0.8	0.5	1.60	3.7	3.7	7.8E-09	4.9E-09	0.042	0.042	20
583200	86400	13.79	29.34	0.5	0.7	0.71	4.2	4.4	4.9E-09	6.9E-09	0.048	0.050	20
842400	259200	13.79	29.34	1.5	1.5	1.00	5.7	5.9	4.9E-09	4.9E-09	0.065	0.067	20
932400	90000	13.79	29.34	0.5	0.4	1.25	6.2	6.3	4.7E-09	3.8E-09	0.071	0.072	20
1015200	82800	13.79	29.34	0.4	0.4	1.00	6.6	6.7	4.1E-09	4.1E-09	0.075	0.077	20

Final Permeability Value 4.77E-09 cm/sec

Reviewed By:

НМ

WSP Environment & Infrastructure Canada Limited



Project No.	WX0469022	Proje	ect Manager	Just	Justin M Huberdeau			
Client MidCa	nada Enviromental Services		Date	Dec	cember 6	, 2022		
Borehole No.	Shelby #2 (S-1)	Proje	ect Location	GWM F	Progarm 2	2022-2023		
Depth	1.0-3.0 m	_	Test Type		Shelby	/		
Proctor density		_	Sample No.		2			
Proctor moisture		_						
Permeant Type	De-Aired Tapwater		Test Sam	ple Dry Den	sity	<u>1143</u> kg/m ^o		
Soli Description	Silty Clay	le: Porcont Cor	st Sample M	Disture Con		51.2 %		
		Percent Cor	npaction of	Proctor Den	sity	70		
Initial Sample Height	45.2 mm	Initial Wate	er Content			51.2 %		
Initial Sample Diameter	72 1 mm	Initial Bulk	Density			1727 kg/m ³		
Initial Sample Area	40.87 cm^2	Initial Dry F	Density			1143 kg/m^3		
Initial Sample View	184.6 cm^3	Initial Void	Patio			1 2/		
	184.0 611	Specific Cr				2.67 occurred		
		Specific Gi	avity			2.07 assumed		
Consolidation Cell Pressure	317.1 kPa	Effective C	onsolidation	Pressure		21.0 kPa		
Consolidation Back Pressure - b	296.5 kPa	Differential	Pressure			13.8 kPa		
Consolidation Back Pressure - b	282.7 kPa	Pore Press	sure Paramet	er B		98.0		
Post Test Sample Height	45.0 mm	Post Test \	Nater Conter	ht		578%		
Post Test Sample Diameter	71.5 mm	Post Test F	Rulk Density	it is a second s		1825 kg/m^3		
Post Tost Sample Area	40.15 cm^2	Post Tost [Dry Donsity			1020 kg/m^3		
Post Test Sample Volume	40.15 cm^3					1 07 Kg/III		
Post rest Sample volume		POSITESI				1.31		
	SAMPLE DATA		Initial	Post Test				
	Wet Weight of Sampl	e (g)	318.80	329.83	1			
	Dry Weight of Sample	e (q)	210.88	208.97				
	Volume of Sample (cm^{3})	184.58	180.68				
	Volume of Solids (c	m ³)	78 98	78 27				
	Volume of Voids (cr	m ³)	105.60	102.42				
	Volume of Pere Water	(cm^{3})	103.00	102.42				
			107.92	1 20.00				
			1.04	1.01				
		3	1.02	1.18				
	Buik Density (kg/m	1) 3,	1/2/	1825				
	Dry Density (kg/m	~) >()	1143	1157				
	Moisture Content (%)	51.2	57.8				
	Final Pormoshility Value	1 525-00	cm/soc					
	i mai i enneavinty value	7.J2L-U3	011/366					
Comments:								
		R	eviewed By:	H	HM			
			-					



Sample No. 2

Project No. WX0469022 Client MidCanada Enviromental Sei Borehole No. Shelby #2 (S-1) Depth 1.0-3.0 m



WSP Environment & Infrastructure Canada Limited

Project No.	WX0469022
Client	MidCanada Enviromental Services
Borehole No.	Shelby #2 (S-1)
Depth	1.0-3.0 m
Project Manager	Justin M Huberdeau



Permeant Type De-Aired Tapwater

Soil Description Silty Clay

	Flexible Wall Permeability Test												
Elapsed Time	Incremental Time	Effective Head	Gradient (i)	Incremental Volume Out	Incremental Volume In	Ratio outflow vs inflow	Cumulative Volume Out	Cumulative Volume In	Permeability Based on Incremental Flow Out of Sample	Permeability Based on Incremental Flow into Sample	Cumulative Vol (out) / Vol of voids	Cumulative Vol (in) / Vol of voids	Temperature
(s)	(s)	(kPa)		(cm ³)	(cm ³)		(cm ³)	(cm ³)	(cm/s)	(cm/s)			(°C)
0	0	13.79	31.14	0.0	0.0	1.25	0.0	0.0	0	0	0.000	0.000	20
237600	237600	13.79	31.14	1.5	1.2	1.25	1.5	1.2	5.0E-09	4.0E-09	0.015	0.012	20
324000	86400	13.79	31.14	0.6	0.4	1.50	2.1	1.6	5.5E-09	3.7E-09	0.021	0.016	20
410400	86400	13.79	31.14	0.6	0.5	1.20	2.7	2.1	5.5E-09	4.6E-09	0.026	0.021	20
496800	86400	13.79	31.14	0.7	0.4	1.75	3.4	2.5	6.4E-09	3.7E-09	0.033	0.024	20
583200	86400	13.79	31.14	0.6	0.5	1.20	4.0	3.0	5.5E-09	4.6E-09	0.039	0.029	20
842400	259200	13.79	31.14	1.3	1.3	1.00	5.3	4.3	4.0E-09	4.0E-09	0.052	0.042	20
932400	90000	13.79	31.14	0.5	0.6	0.83	5.8	4.9	4.4E-09	5.3E-09	0.057	0.048	20
1015200	82800	13.79	31.14	0.5	0.4	1.25	6.3	5.3	4.8E-09	3.8E-09	0.062	0.052	20
													Ĺ

Final Permeability Value 4.52E-09 cm/sec

Reviewed By:

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Project No.	WX0469022	Proje	ect Manager	Just	in M Hu	berdeau	
Client MidCa	anada Enviromental Services	_	Date	Dec	cember	6, 2022	
Borehole No.	Shelby #3 (S-1)	_ Proje	ct Location	GWM F	Progarm	2022-2023	
Depth	1.0-3.0 m	_	Test Type		Shelb	ру	
Proctor density		Sample No. 3					
	De Aired Terruster	_	Test Com		- 14. /	$1000 k m^3$	
Soil Description	Silty Clay	<u> </u>	Test Sam	iple Dry Den	Sity	20.2 V/	
	Silty Clay	 Percent Cor	nnaction of	Proctor Den	sitv	<u> </u>	
					<u> </u>	70	
Initial Sample Height	50.2 mm	Initial Wate	er Content			38.3 %	
Initial Sample Diameter	72.0 mm	Initial Bulk	Density			1842 kg/m ³	
Initial Sample Area	40.75 cm ²	Initial Dry D	Density			1332 kg/m ³	
Initial Sample Volume	204.6 cm^3	Initial Void	Ratio			1.00	
		Specific Gr	avity			2 67 assumed	
			avity			2.07 000011100	
Consolidation Cell Pressure	317.1 kPa	Effective C	onsolidation	Pressure		21.0 kPa	
Consolidation Back Pressure -	296.5 kPa	Differential	Pressure			13.8 kPa	
Consolidation Back Pressure -	t 282.7 kPa	Pore Press	ure Paramet	er B		98.0	
Post Test Sample Height	45.0 mm	Post Test V	Vater Conter	nt		44.6 %	
Post Test Sample Diameter	71.0 mm	Post Test E	Bulk Density			2214 kg/m ³	
Post Test Sample Area	39.59 cm ²	Post Test [Dry Density			1532 kg/m ³	
Post Test Sample Volume	178.2 cm ³	Post Test \	Post Test Void Ratio			0.74	
·					-		
	SAMPLE DATA		Initial	Post Test			
	Wet Weight of Samp	le (g)	376.89	394.52			
	Dry Weight of Sampl	le (g)	272.54	272.87			
	Volume of Sample (cm ³)	204.58	178.16			
	Volume of Solids (c	m ³)	102.07	102.20			
	Volume of Voids (c	m ³)	102.51	75.97			
	Volume of Pore Water	r (cm ³)	104.35	121.65			
	Void Ratio		1.00	0.74			
	Saturation		1.02	1.60			
	Bulk Density (kg/m	า ³)	1842	2214			
	Dry Density (kg/m	³)	1332	1532			
	Moisture Content (%)	38.3	44.6			
	· · · · · · · · · · · · · · · · · · ·						
	Final Permeability Value	5.46E-09	cm/sec				
Comments:							
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		R	eviewea By:	F	IIVI		





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Project No.	WX0469022
Client	MidCanada Enviromental Services
Borehole No.	Shelby #3 (S-1)
Depth	1.0-3.0 m
Project Manager	Justin M Huberdeau

	- 115	
Date	December 6, 2022	
Project	GWM Progarm 2022-2023	
Test Type	Shelby	
Sample No.	3	

De-Aired Tapwater Permeant Type

Soil Description Silty Clay

	Flexible Wall Permeability Test												
Elapsed Time	Incremental Time	Effective Head	Gradient (i)	Incremental Volume Out	Incremental Volume In	Ratio outflow vs inflow	Cumulative Volume Out	Cumulative Volume In	Permeability Based on Incremental Flow Out of Sample	Permeability Based on Incremental Flow into Sample	Cumulative Vol (out) / Vol of voids	Cumulative Vol (in) / Vol of voids	Temperature
(s)	(s)	(kPa)		(cm ³)	(cm ³)		(cm ³)	(cm ³)	(cm/s)	(cm/s)			(°C)
0	0	13.79	28.02	0.0	0.0	1.18	0.0	0.0	0	0	0.000	0.000	20
237600	237600	13.79	28.02	2.0	1.7	1.18	2.0	1.7	7.4E-09	6.3E-09	0.026	0.022	20
324000	86400	13.79	28.02	0.5	0.6	0.83	2.5	2.3	5.1E-09	6.1E-09	0.033	0.030	20
410400	86400	13.79	28.02	0.6	0.7	0.86	3.1	3.0	6.1E-09	7.1E-09	0.041	0.039	20
496800	86400	13.79	28.02	0.7	0.5	1.40	3.8	3.5	7.1E-09	5.1E-09	0.050	0.046	20
583200	86400	13.79	28.02	0.6	0.7	0.86	4.4	4.2	6.1E-09	7.1E-09	0.058	0.055	20
842400	259200	13.79	28.02	1.2	1.8	0.67	5.6	6.0	4.1E-09	6.1E-09	0.074	0.079	20
932400	90000	13.79	28.02	0.6	0.6	1.00	6.2	6.6	5.9E-09	5.9E-09	0.082	0.087	20
1015200	82800	13.79	28.02	0.4	0.4	1.00	6.6	7.0	4.3E-09	4.3E-09	0.087	0.092	20

Final Permeability Value 5.46E-09 cm/sec

Reviewed By:

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Project No.	WX0469022	Proje	ct Manager	Jus	Justin M Huberdeau			
Client MidCa	nada Enviromental Services	Date Decemb				ber 6, 2022		
Borehole No.	Shelby #4 (S-1)	_ Proje	ct Location	GWM	Progarm	n 2022-2023		
Depth	Depth 0.5-2.5 m			Test Type St				
Proctor density		_	Sample No.		4			
Proctor moisture		_	T (0			4400 100/003		
Permeant Type	De-Aired Tapwater	- To	lest Sam	nple Dry Der	ISITY	sity <u>1126</u> kg/m [°]		
Soli Description	Silty Clay	lest Sample Moisture Cont			nent	sity %		
				Troctor Der		70		
Initial Sample Height	44.4 mm	Initial Wate	er Content			52.7 %		
Initial Sample Diameter	72.5 mm	Initial Bulk	Density			1719 kg/m ³		
Initial Sample Area	41.28 cm^2	Initial Drv D	Density			1126 kg/m ³		
Initial Sample Volume	183.4 cm^3	Initial Void	Ratio			1 37		
		Specific Gr	avity			2.67 assumed		
			avity			2.07 000011100		
Consolidation Cell Pressure	317.1 kPa	onsolidation	Pressure		21.0 kPa			
Consolidation Back Pressure - k	296.5 kPa Differ		Pressure			13.8 kPa		
Consolidation Back Pressure - t	282.7 kPa	Pore Press	ure Paramet	er B		98.0		
Post Test Sample Height	44.1 mm	Post Test V	Post Test Water Content			59.7 %		
Post Test Sample Diameter	72.0 mm	Post Test E	ost Test Bulk Density			1857 kg/m ³		
Post Test Sample Area	40.72 cm ²	Post Test [1163 kg/m ³				
Post Test Sample Volume	179.6 cm ³	Post Test Void Ratio				1.30		
·								
	SAMPLE DATA		Initial	Post Test				
	Wet Weight of Sampl	le (g)	315.30	333.43				
	Dry Weight of Sample	e (g)	206.49	208.85				
	Volume of Sample (o	cm ³)	183.43	179.55				
	Volume of Solids (c	m ³)	77.34	78.22				
	Volume of Voids (cr	Volume of Voids (cm ³) 10						
	Volume of Pore Water	(cm ³)	108.81	124.58				
	~ /	1.37	1.30					
	Saturation		1.03	1.23				
	Bulk Density (kg/m	lk Density (kg/m ³)		1857				
	Dry Density (kg/m	1126	1163					
	Moisture Content (%)		52 7	59.7				
		/0/	02					
	Final Permeability Value	4.78E-09	cm/sec					
Comments:								
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		R	eviewed By:	I				



WSP Environment & Infrastructure Canada Limited

Project No.	WX0469022					
Client	MidCanada Enviromental Services					
Borehole No.	Shelby #4 (S-1)					
Depth	0.5-2.5 m					
Project Manager	Justin M Huberdeau					

	- <u>\\</u> SD						
Date	December 6, 2022						
Project	GWM Progarm 2022-2023						
Test Type	Shelby						
Sample No.	4						

De-Aired Tapwater Permeant Type

Soil Description Silty Clay

Flexible Wall Permeability Test													
Elapsed Time	Incremental Time	Effective Head	Gradient (i)	Incremental Volume Out	Incremental Volume In	Ratio outflow vs inflow	Cumulative Volume Out	Cumulative Volume In	Permeability Based on Incremental Flow Out of Sample	Permeability Based on Incremental Flow into Sample	Cumulative Vol (out) / Vol of voids	Cumulative Vol (in) / Vol of voids	Temperature
(s)	(s)	(kPa)		(cm ³)	(cm ³)		(cm ³)	(cm ³)	(cm/s)	(cm/s)			(°C)
0	0	13.79	31.66	0.0	0.0	0.79	0.0	0.0	0	0	0.000	0.000	20
237600	237600	13.79	31.66	1.1	1.4	0.79	1.1	1.4	3.6E-09	4.5E-09	0.011	0.014	20
324000	86400	13.79	31.66	0.3	0.4	0.75	1.4	1.8	2.7E-09	3.6E-09	0.014	0.018	20
410400	86400	13.79	31.66	0.5	0.4	1.25	1.9	2.2	4.4E-09	3.6E-09	0.019	0.022	20
496800	86400	13.79	31.66	0.5	0.6	0.83	2.4	2.8	4.4E-09	5.3E-09	0.024	0.028	20
583200	86400	13.79	31.66	0.6	0.6	1.00	3.0	3.4	5.3E-09	5.3E-09	0.030	0.034	20
842400	259200	13.79	31.66	1.4	1.6	0.87	4.4	5.0	4.2E-09	4.7E-09	0.043	0.049	20
932400	90000	13.79	31.66	0.5	0.6	0.83	4.9	5.6	4.3E-09	5.1E-09	0.048	0.055	20
1015200	82800	13.79	31.66	0.5	0.5	1.00	5.4	6.1	4.6E-09	4.6E-09	0.053	0.060	20

Final Permeability Value 4.78E-09 cm/sec

Reviewed By:

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