Yazon, Edwin

From: Stephen McCabe <smccabe@gflenv.com>
Sent: December 14, 2022 10:13 AM
To: 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

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 | www.gflenv.com

Flexible Wall Permeability Test

(ASTM D5084 - Constant Head Method A)

WSP Environment & Infrastructure
Canada Limited

Project No.	WX0469022	**Project Manager**	Justin M Huberdeau
Client	MidCanada Enviromental Services	**Date**	December 6, 2022
Borehole No.	Shelby #1 (S-1)	**Project Location**	GWM Progarm 2022-2023
Depth	1.0-3.0 m	**Test Type**	Shelby
Proctor density		**Sample No.**	1
Proctor moisture			
Permeant Type	De-Aired Tapwater	**Test Sample Dry Density**	1405 kg/m^3
Soil Description	Silty Clay	**Test Sample Moisture Content**	32.3 %
		Percent Compaction of Proctor Density	%

Initial Sample Height	47.9	mm	Initial Water Content	32.3	%
Initial Sample Diameter	71.8	mm	Initial Bulk Density	1859	kg/m^3
Initial Sample Area	40.45	cm^2	Initial Dry Density	1405	kg/m^3
Initial Sample Volume	193.9	cm^3	Initial Void Ratio	0.90	
			Specific Gravity	2.67	assumed
Consolidation Cell Pressure	317.1	kPa	Effective Consolidation Pressure	21.0	kPa
Consolidation Back Pressure - b	296.5	kPa	Differential Pressure	13.8	kPa
Consolidation Back Pressure - b	282.7	kPa	Pore Pressure Parameter B	98.0	
Post Test Sample Height	47.0	mm	Post Test Water Content	43.9	%
Post Test Sample Diameter	71.0	mm	Post Test Bulk Density	2036	kg/m^3
Post Test Sample Area	39.59	cm^2	Post Test Dry Density	1415	kg/m^3
Post Test Sample Volume	186.1	cm^3	Post Test Void Ratio	0.89	

SAMPLE DATA	Initial	Post Test
Wet Weight of Sample (g)	360.47	378.92
Dry Weight of Sample (g)	272.44	263.29
Volume of Sample (cm^3)	193.90	186.08
Volume of Solids (cm^3)	102.04	98.61
Volume of Voids (cm^3)	91.86	87.47
Volume of Pore Water (cm^3)	88.03	115.63
Void Ratio	0.90	0.89
Saturation	0.96	1.32
Bulk Density (kg/m^3)	1859	2036
Dry Density (kg/m^3)	1405	1415
Moisture Content (%)	32.3	43.9

Final Permeability Value 4.77E-09 cm/sec

Comments:

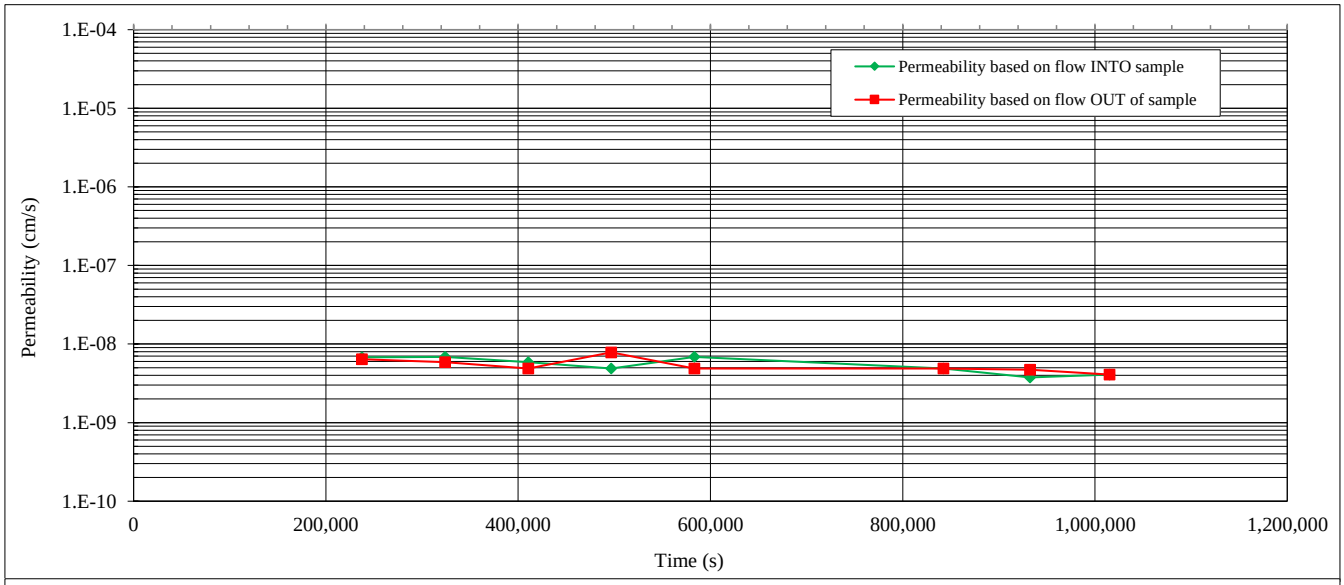
Reviewed By: HM

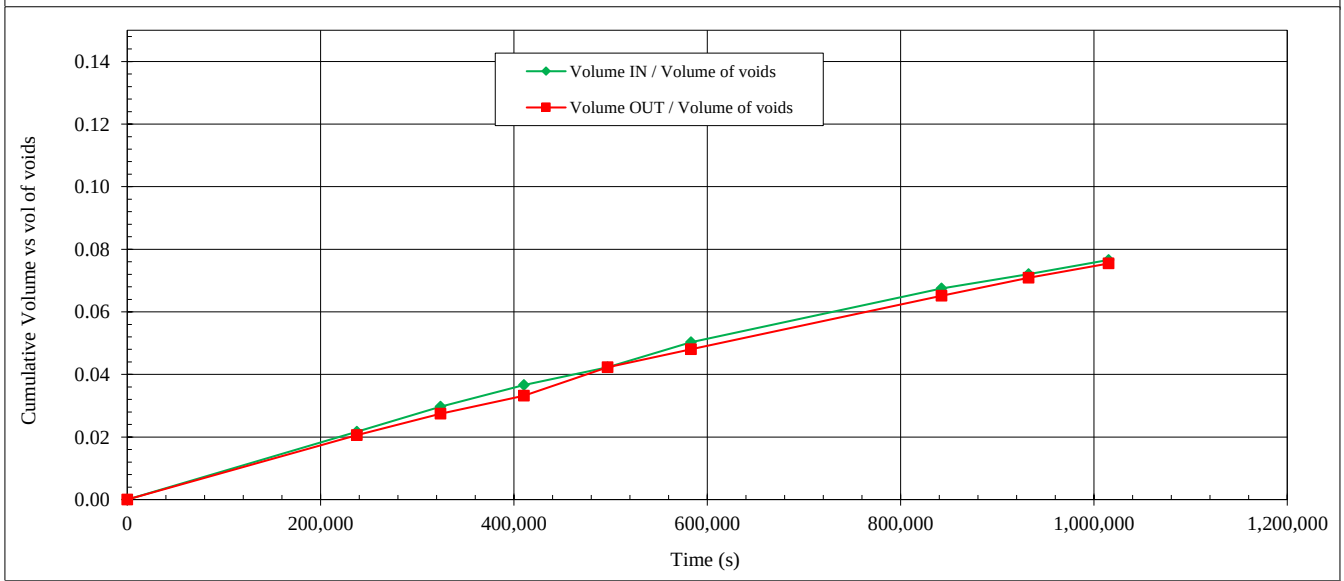
Flexible Wall Permeability Test

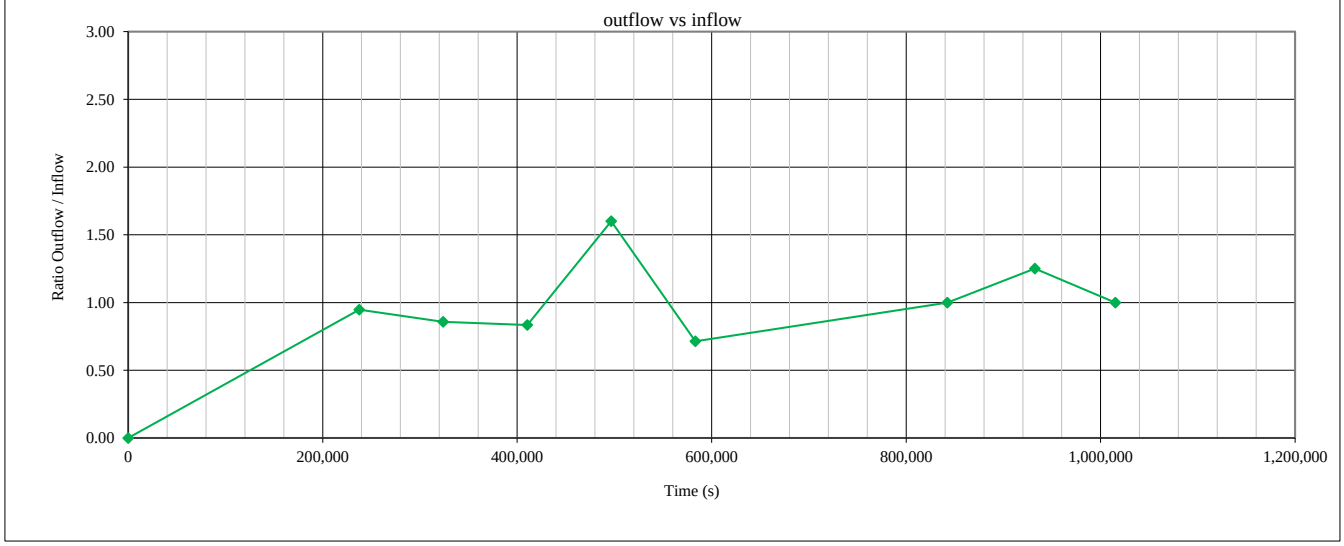
(ASTM D5084 - Constant Head Method A)

WSP Environment &Infrastructure
Canada Limited

Project No.	WX0469022	**Date**	December 6, 2022
Client	MidCanada Enviromental Se	**Project Location**	GWM Progarm 2022-2023
Borehole No.	Shelby #1 (S-1)	**Test Type**	Shelby
Depth	1.0-3.0 m	**Sample No.**	1







Flexible Wall Permeability Test (ASTM D5084 - Constant Head Method A)

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

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)			(^oC)
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: ***HM***

Flexible Wall Permeability Test

(ASTM D5084 - Constant Head Method A)

WSP Environment & Infrastructure
Canada Limited

Project No.	WX0469022	**Project Manager**	Justin M Huberdeau
Client	MidCanada Enviromental Services	**Date**	December 6, 2022
Borehole No.	Shelby #2 (S-1)	**Project Location**	GWM Progarm 2022-2023
Depth	1.0-3.0 m	**Test Type**	Shelby
Proctor density		**Sample No.**	2
Proctor moisture			
Permeant Type	De-Aired Tapwater	**Test Sample Dry Density**	1143 kg/m^3
Soil Description	Silty Clay	**Test Sample Moisture Content**	51.2 %
		Percent Compaction of Proctor Density	%

Initial Sample Height	45.2 mm	Initial Water 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 Density	1143 kg/m^3
Initial Sample Volume	184.6 cm^3	Initial Void Ratio	1.34
		Specific Gravity	2.67 assumed
Consolidation Cell Pressure	317.1 kPa	Effective Consolidation Pressure	21.0 kPa
Consolidation Back Pressure - I	296.5 kPa	Differential Pressure	13.8 kPa
Consolidation Back Pressure - I	282.7 kPa	Pore Pressure Parameter B	98.0
Post Test Sample Height	45.0 mm	Post Test Water Content	57.8 %
Post Test Sample Diameter	71.5 mm	Post Test Bulk Density	1825 kg/m^3
Post Test Sample Area	40.15 cm^2	Post Test Dry Density	1157 kg/m^3
Post Test Sample Volume	180.7 cm^3	Post Test Void Ratio	1.31

SAMPLE DATA	Initial	Post Test
Wet Weight of Sample (g)	318.80	329.83
Dry Weight of Sample (g)	210.88	208.97
Volume of Sample (cm^3)	184.58	180.68
Volume of Solids (cm^3)	78.98	78.27
Volume of Voids (cm^3)	105.60	102.42
Volume of Pore Water (cm^3)	107.92	120.86
Void Ratio	1.34	1.31
Saturation	1.02	1.18
Bulk Density (kg/m^3)	1727	1825
Dry Density (kg/m^3)	1143	1157
Moisture Content (%)	51.2	57.8

Final Permeability Value 4.52E-09 cm/sec

Comments:

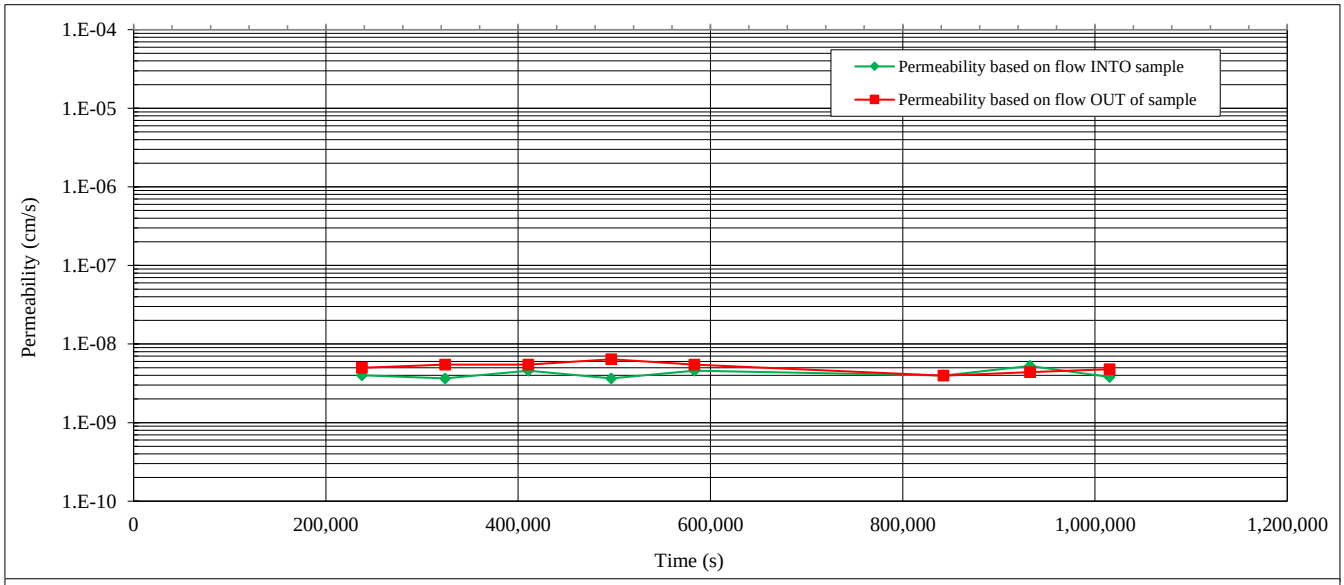
Reviewed By: HM

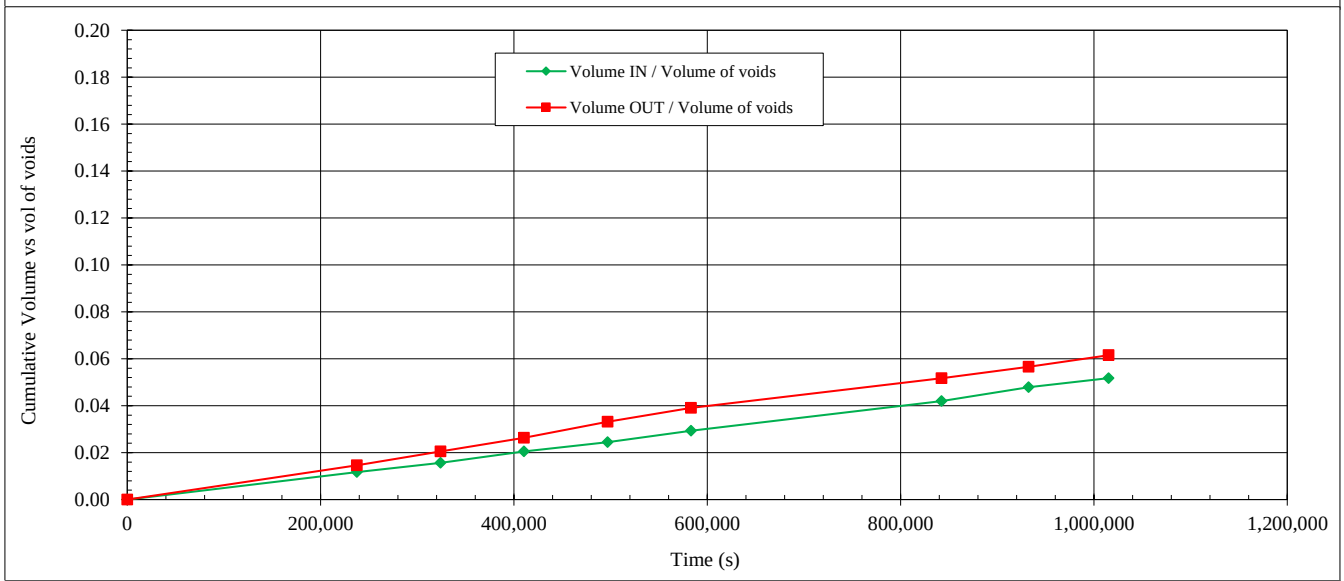
Flexible Wall Permeability Test

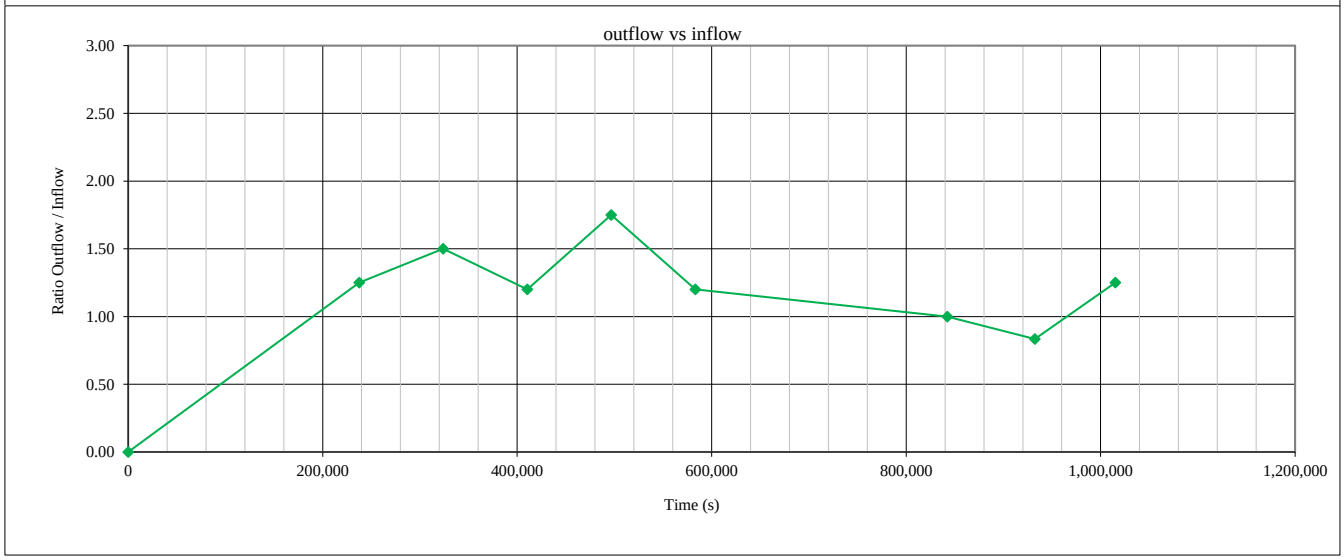
(ASTM D5084 - Constant Head Method A)

WSP Environment &Infrastructure
Canada Limited

Project No.	WX0469022	**Date**	December 6, 2022
Client	MidCanada Enviromental Se	**Project Location**	GWM Progarm 2022-2023
Borehole No.	Shelby #2 (S-1)	**Test Type**	Shelby
Depth	1.0-3.0 m	**Sample No.**	2







Flexible Wall Permeability Test (ASTM D5084 - Constant Head Method A)

WSP Environment & Infrastructure
Canada Limited

Project No. WX0469022 **Date** December 6, 2022
Client MidCanada Enviromental Services **Project** GWM Progarm 2022-2023
Borehole No. Shelby #2 (S-1) **Test Type** Shelby
Depth 1.0-3.0 m **Sample No.** 2
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)			(^oC)
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

Final Permeability Value 4.52E-09 **cm/sec**

Reviewed By: ***HM***

Flexible Wall Permeability Test

(ASTM D5084 - Constant Head Method A)

WSP Environment & Infrastructure
Canada Limited

Project No.	WX0469022	**Project Manager**	Justin M Huberdeau
Client	MidCanada Enviromental Services	**Date**	December 6, 2022
Borehole No.	Shelby #3 (S-1)	**Project Location**	GWM Progarm 2022-2023
Depth	1.0-3.0 m	**Test Type**	Shelby
Proctor density		**Sample No.**	3
Proctor moisture			
Permeant Type	De-Aired Tapwater	**Test Sample Dry Density**	1332 kg/m^3
Soil Description	Silty Clay	**Test Sample Moisture Content**	38.3 %
		Percent Compaction of Proctor Density	%

Initial Sample Height	50.2	mm	Initial Water 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 Density	1332	kg/m^3
Initial Sample Volume	204.6	cm^3	Initial Void Ratio	1.00	
			Specific Gravity	2.67	assumed
Consolidation Cell Pressure	317.1	kPa	Effective Consolidation Pressure	21.0	kPa
Consolidation Back Pressure - I	296.5	kPa	Differential Pressure	13.8	kPa
Consolidation Back Pressure - I	282.7	kPa	Pore Pressure Parameter B	98.0	
Post Test Sample Height	45.0	mm	Post Test Water Content	44.6	%
Post Test Sample Diameter	71.0	mm	Post Test 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 Void Ratio	0.74	

SAMPLE DATA	Initial	Post Test
Wet Weight of Sample (g)	376.89	394.52
Dry Weight of Sample (g)	272.54	272.87
Volume of Sample (cm^3)	204.58	178.16
Volume of Solids (cm^3)	102.07	102.20
Volume of Voids (cm^3)	102.51	75.97
Volume of Pore Water (cm^3)	104.35	121.65
Void Ratio	1.00	0.74
Saturation	1.02	1.60
Bulk Density (kg/m^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:

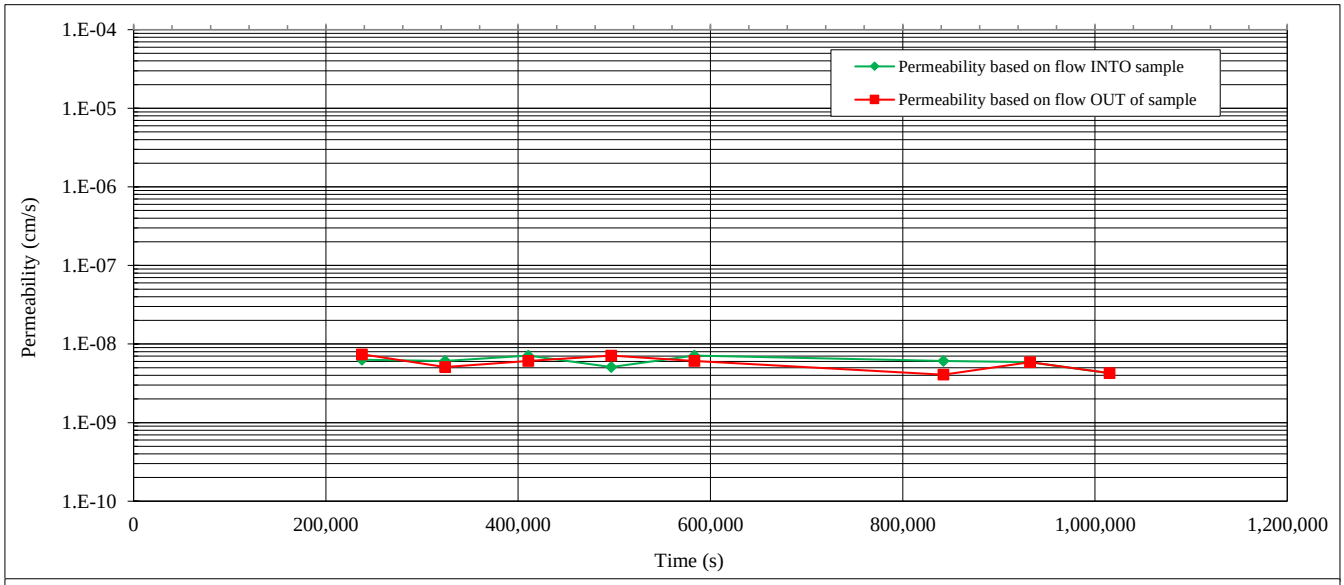
Reviewed By: HM

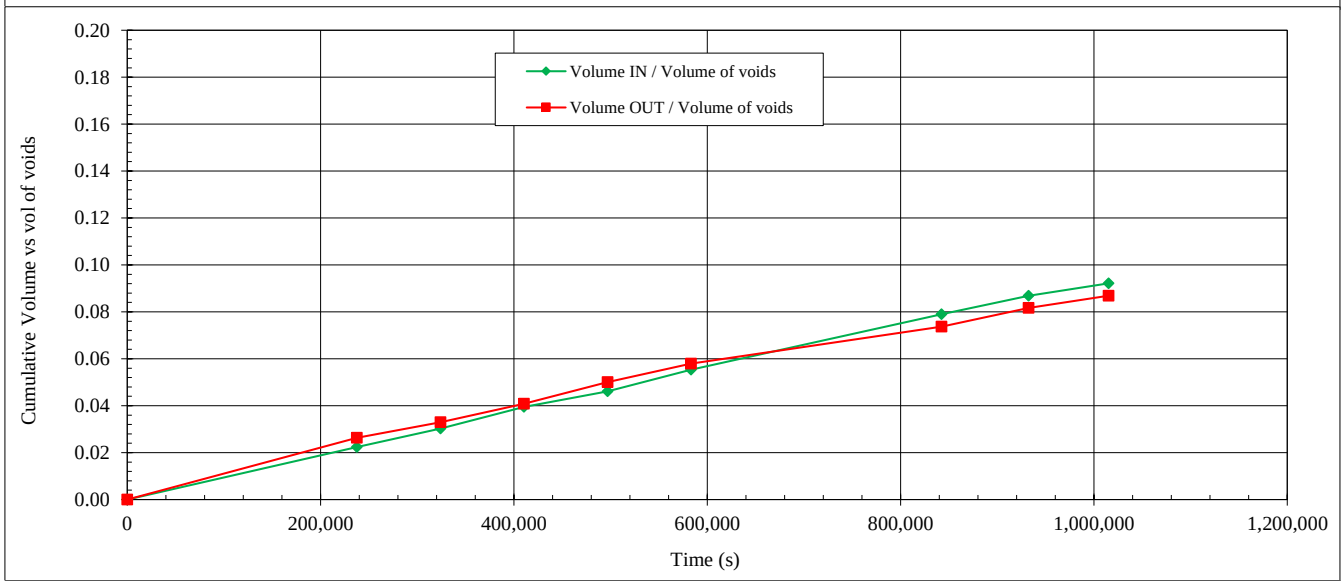
Flexible Wall Permeability Test

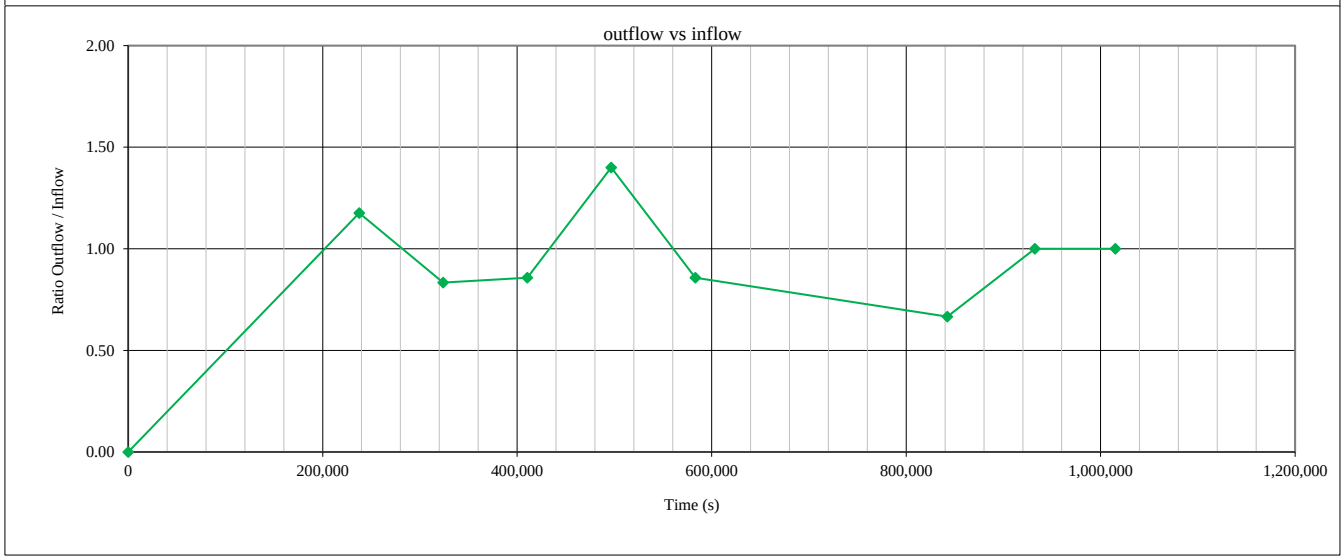
(ASTM D5084 - Constant Head Method A)

WSP Environment &Infrastructure
Canada Limited

Project No.	WX0469022	**Date**	December 6, 2022
Client	MidCanada Enviromental Se	**Project Location**	GWM Progarm 2022-2023
Borehole No.	Shelby #3 (S-1)	**Test Type**	Shelby
Depth	1.0-3.0 m	**Sample No.**	3







Flexible Wall Permeability Test (ASTM D5084 - Constant Head Method A)

WSP Environment & Infrastructure
Canada Limited

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

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

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)			(^oC)
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: ***HM***

Flexible Wall Permeability Test

(ASTM D5084 - Constant Head Method A)

WSP Environment & Infrastructure
Canada Limited

Project No.	WX0469022	**Project Manager**	Justin M Huberdeau
Client	MidCanada Enviromental Services	**Date**	December 6, 2022
Borehole No.	Shelby #4 (S-1)	**Project Location**	GWM Progarm 2022-2023
Depth	0.5-2.5 m	**Test Type**	Shelby
Proctor density		**Sample No.**	4
Proctor moisture			
Permeant Type	De-Aired Tapwater	**Test Sample Dry Density**	1126 kg/m^3
Soil Description	Silty Clay	**Test Sample Moisture Content**	52.7 %
		Percent Compaction of Proctor Density	%

Initial Sample Height	44.4	mm	Initial Water Content	52.7	%
Initial Sample Diameter	72.5	mm	Initial Bulk Density	1719	kg/m^3
Initial Sample Area	41.28	cm^2	Initial Dry Density	1126	kg/m^3
Initial Sample Volume	183.4	cm^3	Initial Void Ratio	1.37	
			Specific Gravity	2.67	assumed
Consolidation Cell Pressure	317.1	kPa	Effective Consolidation Pressure	21.0	kPa
Consolidation Back Pressure - b	296.5	kPa	Differential Pressure	13.8	kPa
Consolidation Back Pressure - b	282.7	kPa	Pore Pressure Parameter B	98.0	
Post Test Sample Height	44.1	mm	Post Test Water Content	59.7	%
Post Test Sample Diameter	72.0	mm	Post Test Bulk Density	1857	kg/m^3
Post Test Sample Area	40.72	cm^2	Post Test Dry Density	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 Sample (g)	315.30	333.43
Dry Weight of Sample (g)	206.49	208.85
Volume of Sample (cm^3)	183.43	179.55
Volume of Solids (cm^3)	77.34	78.22
Volume of Voids (cm^3)	106.10	101.33
Volume of Pore Water (cm^3)	108.81	124.58
Void Ratio	1.37	1.30
Saturation	1.03	1.23
Bulk Density (kg/m^3)	1719	1857
Dry Density (kg/m^3)	1126	1163
Moisture Content (%)	52.7	59.7

Final Permeability Value 4.78E-09 cm/sec

Comments:

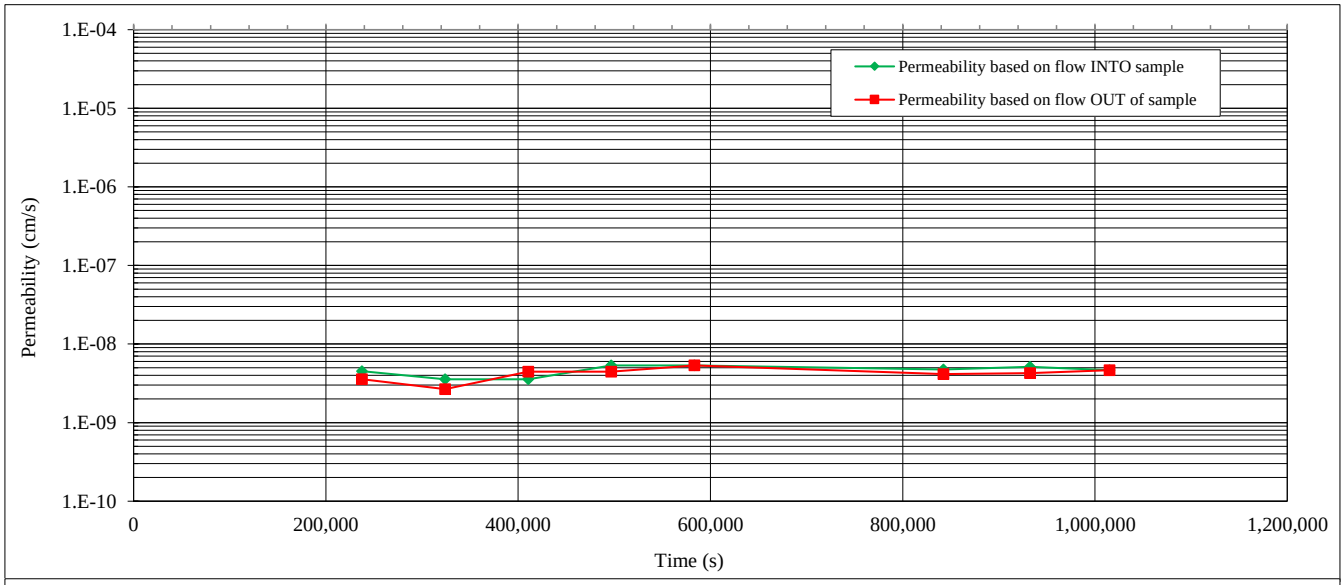
Reviewed By: HM

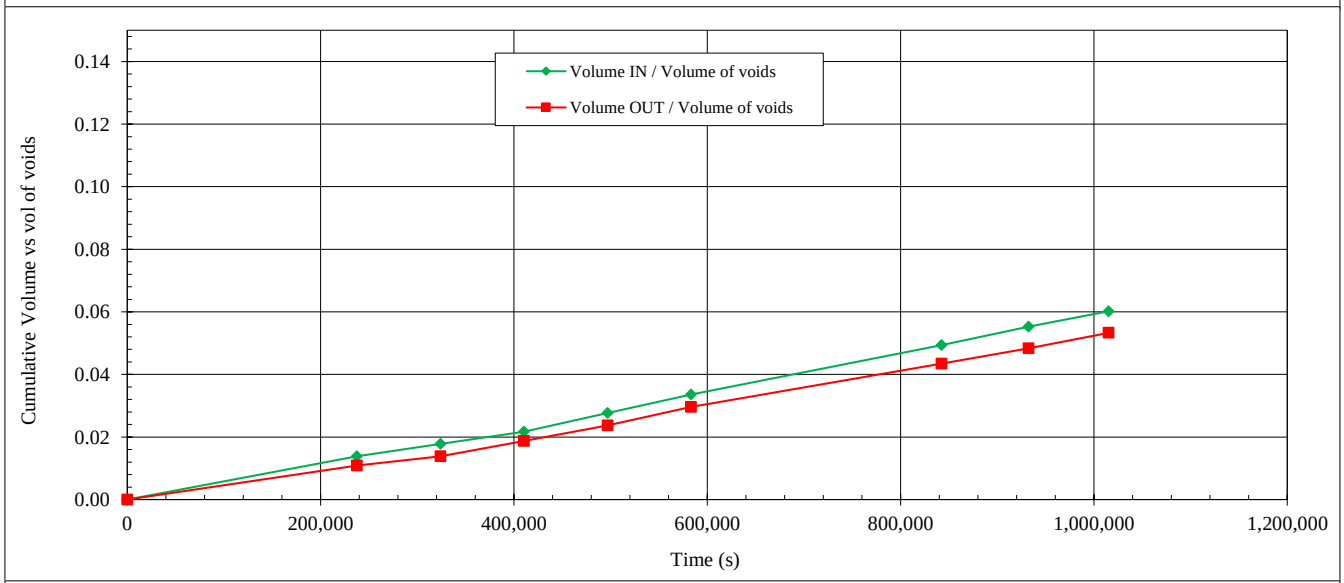
Flexible Wall Permeability Test

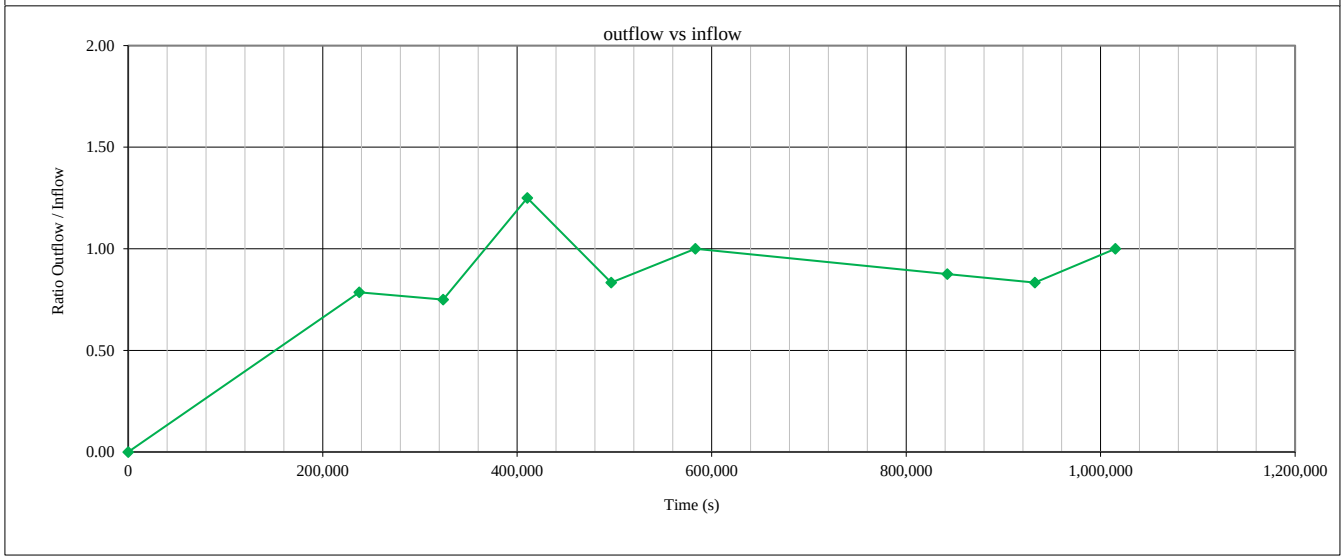
(ASTM D5084 - Constant Head Method A)

WSP Environment &Infrastructure
Canada Limited

Project No.	WX0469022	**Date**	December 6, 2022
Client	MidCanada Enviromental Se	**Project Location**	GWM Progarm 2022-2023
Borehole No.	Shelby #4 (S-1)	**Test Type**	Shelby
Depth	0.5-2.5 m	**Sample No.**	4







Flexible Wall Permeability Test (ASTM D5084 - Constant Head Method A)

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

Date December 6, 2022
Project GWM Progarm 2022-2023
Test Type Shelby
Sample No. 4

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)			(^oC)
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: ***HM***