

December 13, 2017

F:\100\118 Pipestone\118.09 Reston Lagoon Upgrade and Pipestone Forcemain\01 Correspondence\Lagoon\174 Oct - Dec\Ltr - Reston Lagoon Cell 4.docx

Ms. Tracey Braun
Environmental Approvals Branch
Manitoba Sustainable Development
Box 80, 160-123 Main Street
Winnipeg, Manitoba
R3C 1A5

Via e-mail

P-118.09

Dear Ms. Braun,

RE: RM of Pipestone – Reston Lagoon Upgrade and Expansion – Approval Request to Utilize Cell 4

By way of this letter the RM of Pipestone is requesting to utilize the bottom 0.75 m of Cell 4 of the Reston lagoon over the winter of 2017/2018.

Hydraulic conductivity testing of Cell 4 was completed on October 13, 2017. The following is a summary of the Shelby tube samples tested from the Cell:

ST6 (6' – 8' from TH4 located on the south top of dike) – 5.2×10^{-8} cm/s
ST8 (1' – 3' from TH8 located in the middle of the cell floor) – 3.3×10^{-8} cm/s
ST1 (3' – 5' from TH1 in the NW corner of the north dike) – 5.6×10^{-6} cm/s
ST4 (1' – 3' from TH2 in the middle of the north dike) – 7.7×10^{-8} cm/s
ST5 (5' – 7' from TH2 in the middle of the north dike) – sample was not cohesive enough to be tested and was deemed a failed test.

The east, west and south dikes of Cell 4 as well as the cell floor of Cell 4 was deemed accepted by Asit Dey of Manitoba Sustainable Development. A section of the north cut-off wall of Cell 4 (ST1 from TH1 and ST5 from TH2) was noted to be a concern. Following the initial testing on October 13, 2017, two areas of the north dike around TH1 and TH2 were excavated and replaced with suitable clay from the borrow area and re-tested on November 10, 2017. The following additional Shelby tube samples were tested:

ST1 (4' – 6' from TH1 located in the NW corner of Cell 4) – 1.1×10^{-7} cm/s
ST3 (1' – 3' from TH4 located in the middle of the north dike) - sample was not cohesive enough to be tested and was deemed a failed test.

Once the results of the Shelby tubes were obtained the weather conditions were such that an additional repair could not be completed. In the spring of 2018, the north dike of Cell 4 will have to be excavated and replaced with high plastic clay from a borrow area approximately 1.5 m below the top of dike in the northwest corner and 0.9 m below the top of dike in the middle of the north dike. All Shelby tube samples from the test hole auguring and from the Shelby tube samples extruded but not tested indicate the clay liner up to 1.0 m above the cell floor meet or exceed the licence requirements. Also the north dike cut-off wall was constructed 3 m thick further protecting the environment from potential impacts related to potential soils slightly below the hydraulic conductivity requirements.

JRCC.ca

The RM of Pipestone is requesting permission to send wastewater from the Community of Pipestone to the Reston lagoon over the winter and spring of 2017/2018 and repair the top portion of the Cell 4 north dike in the spring of 2018 and re-test. The Community of Pipestone is currently sending wastewater to the Pipestone lagoon which has known leakage concerns and sending effluent to the Reston lagoon would be a better solution for Environmental risk mitigation. By placing Cell 4 into partial operation the RM would begin proper decommissioning procedures for the Pipestone lagoon.

An assessment of the Reston lagoon levels was completed by JRCC personnel on November 16, 2017. The primary cell had a water level of 0.18 m and existing Storage Cell 2 had a water level of 0.79 m. Cell 4 was empty. The storage capacity of the lagoon as of November 16, 2017 is therefore:

Expanded primary cell (0.18 m to 1.5 m) – 34,950 m³

Existing storage cell 2 (0.79 m to 1.5 m) – 12,500 m³

Hydraulic capacity of new cell 4 (0 m to 1.5 m) – 27,600 m³

Total hydraulic capacity of all 3 cells – 75,050 m³

The expected hydraulic loadings from November 16 to June 15 from Reston and Pipestone based on the 2018 projected loadings from the EAP document are as follows:

Reston – 50,050 m³

Pipestone – 10,005 m³

Total – 60,055 m³

From the calculations the RM of Pipestone will require 100% of the capacity of the expanded primary cell and Storage Cell 2 plus 42% of Cell 4 (0 to 0.7m) to have sufficient capacity until the discharge date next spring (without using any freeboard).

Therefore it is requested that the bottom 0.75 m of the Cell 4 capacity (to provide 50 mm of safety factor) be placed into operation. This will provided 0.3 m of freeboard to the area of concern (1.1 x 10⁻⁷ cm/s) in the NW corner of Cell 4 (1.5 m below the top of dike) and 0.85 m to the area of concern in the middle of the north top of dike of Cell 4 (0.9 m below the top of dike).

Please review this letter and provide approval to utilize the bottom 0.75 m of Cell 4 over this winter/spring. If you have any questions or require any additional information, please contact me.

Sincerely,

JR Cousin Consultants Ltd.



Brett McCormac, P.Eng.
Environmental Engineer

enc Hydraulic Conductivity Results
cc Michelle Halls, CAO, RM of Pipestone – via email
Dee Genaille, MWSB – via email
Asit Dey, Manitoba Sustainable Development – via email



LABORATORY

199 Henlow Bay
 Winnipeg MB R3Y 1G4
 Tel: (204) 488-6999

**HYDRAULIC CONDUCTIVITY
 ASTM D5084**

A.D. Hanslip Excavating & Demolition Ltd.
 739 Lockport Road
 Lockport, MB
 R1A 3J2

PROJECT: Reston Lagoon

REPORT NO.: 1

Attention: Allan Hanslip

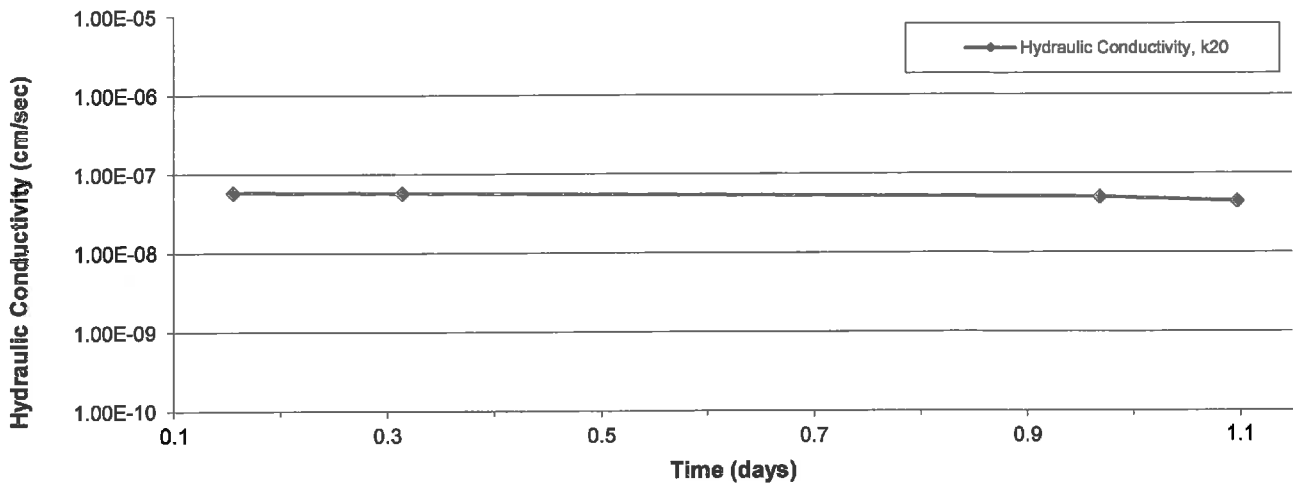
PROJECT NO.: 123313178

SAMPLE FIELD I.D.: ST-6 @ 6'-8' (top)

SOIL DESCRIPTION: Clay till, brown, stiff, moist, medium plasticity, some silt

DATE TESTED: October 18 to October 21, 2017
 CONFINING PRESSURE (kPa): 137.9
 EFFECTIVE SATURATION STRESS (kPa): 34.5
 ASSUMED SPECIFIC GRAVITY: 2.71
 HYDRAULIC GRADIENT: 19.0
 TYPE OF PERMEANT LIQUID: De-aired Water
 HYDRAULIC CONDUCTIVITY, "k" (cm/s): 6.0E-08
 HYDRAULIC CONDUCTIVITY, "k₂₀" (cm/s): 5.2E-08

	Height (mm)	Diameter (mm)	Wet Mass (g)	Dry Density (g/cm ³)	Water Content by Mass (%)	Water Content by Volume (%)	Saturation (%)
Initial Reading	78.7	73.0	690.6	1.803	16.4	29.6	88.4
Final Reading	78.0	72.7	700.0	1.860	16.4	30.5	97.3



REPORT DATE: October 23, 2017

REVIEWED BY: Jason Thompson, C.E.T.

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PROJECT: Reston Lagoon

REPORT NO.: 2

Attention: Allan Hanslip

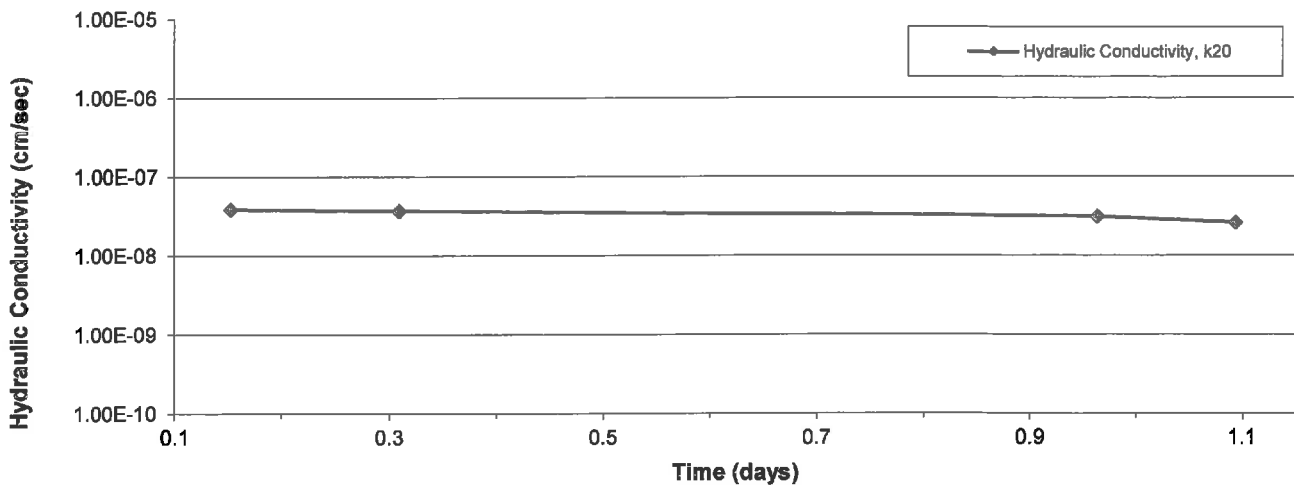
PROJECT NO.: 123313178

SAMPLE FIELD I.D.: ST-8 @ 1'-3' (top)

SOIL DESCRIPTION: Clay till, brown, stiff, moist, medium plasticity, some silt

DATE TESTED: October 18 to October 21, 2017
 CONFINING PRESSURE (kPa): 137.9
 EFFECTIVE SATURATION STRESS (kPa): 34.5
 ASSUMED SPECIFIC GRAVITY: 2.71
 HYDRAULIC GRADIENT: 19.1
 TYPE OF PERMEANT LIQUID: De-aired Water
 HYDRAULIC CONDUCTIVITY, "k" (cm/s): 3.8E-08
 HYDRAULIC CONDUCTIVITY, "k₂₀" (cm/s): **3.3E-08**

	Height (mm)	Diameter (mm)	Wet Mass (g)	Dry Density (g/cm ³)	Water Content by Mass (%)	Water Content by Volume (%)	Saturation (%)
Initial Reading	78.5	72.3	687.4	1.826	16.7	30.5	93.6
Final Reading	77.8	72.4	688.9	1.837	17.1	31.4	97.6



REPORT DATE: October 23, 2017

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PROJECT: Reston Lagoon

REPORT NO.: 6

Attention: Allan Hanslip

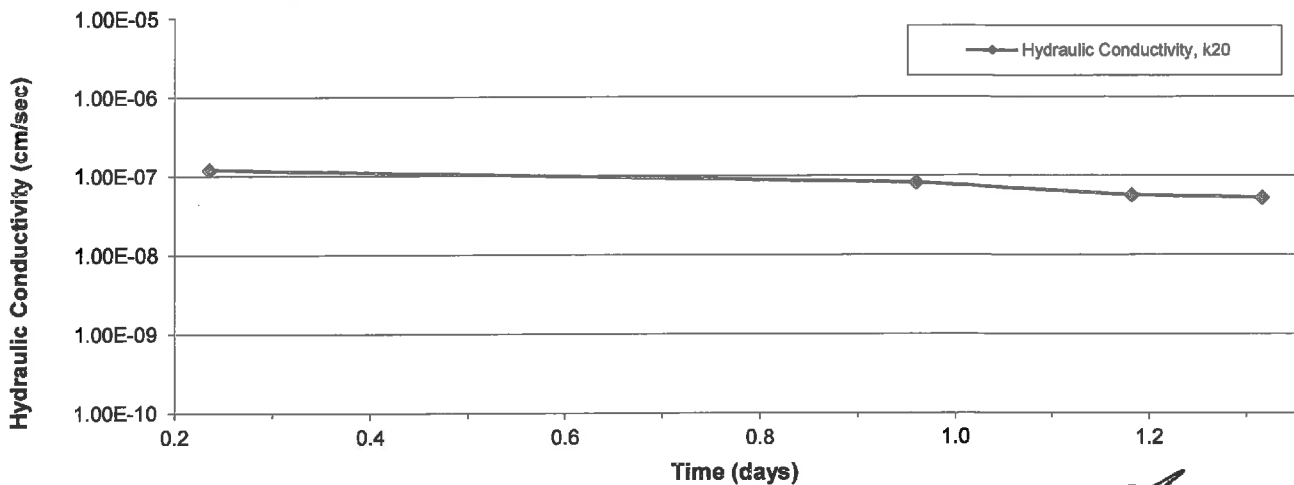
PROJECT NO.: 123313178

SAMPLE FIELD I.D.: ST-4, 1'-3', TH2

SOIL DESCRIPTION: Sandy silt till, brown, stiff, moist, medium plasticity, some clay, trace gravel

DATE TESTED: October 24 to October 28, 2017
 CONFINING PRESSURE (kPa): 137.9
 EFFECTIVE SATURATION STRESS (kPa): 34.5
 ASSUMED SPECIFIC GRAVITY: 2.71
 HYDRAULIC GRADIENT: 19.6
 TYPE OF PERMEANT LIQUID: De-aired Water
 HYDRAULIC CONDUCTIVITY, "k" (cm/s): 8.2E-08
 HYDRAULIC CONDUCTIVITY, "k₂₀" (cm/s): **7.7E-08**

	Height (mm)	Diameter (mm)	Wet Mass (g)	Dry Density (g/cm ³)	Water Content by Mass (%)	Water Content by Volume (%)	Saturation (%)
Initial Reading	73.7	71.9	628.8	1.899	10.6	20.1	67.2
Final Reading	75.7	71.5	662.8	1.890	15.4	29.1	96.3



REPORT DATE: October 30, 2017

REVIEWED BY:  Jason Thompson, C.E.T.

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PROJECT: Reston Lagoon

REPORT NO.: 5

Attention: Allan Hanslip

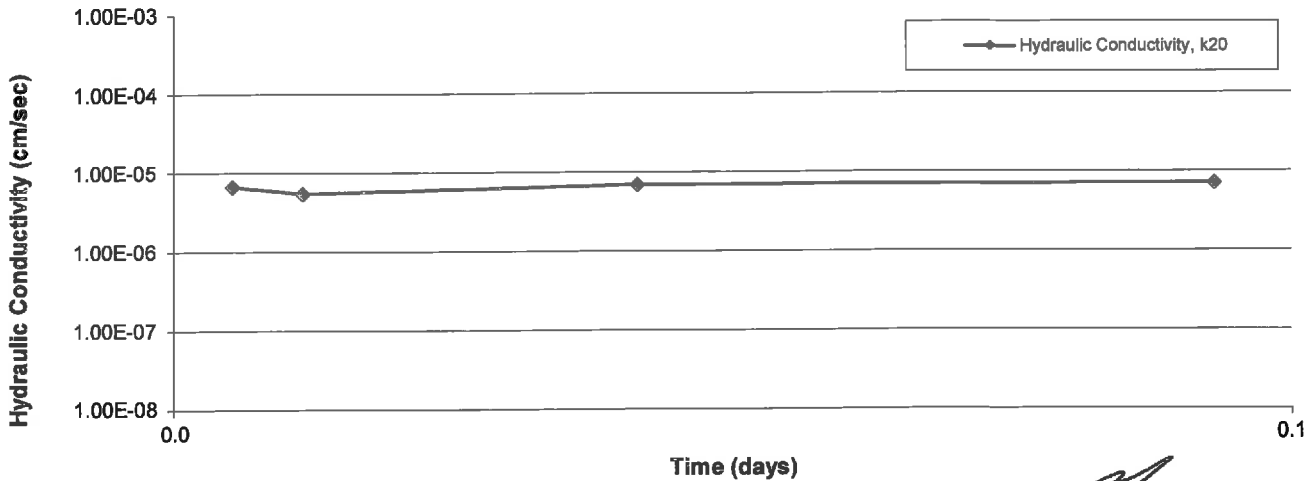
PROJECT NO.: 123313178

SAMPLE FIELD I.D.: ST-1, 3'-5', TH1

SOIL DESCRIPTION: Sandy silt till, brown, moist, medium plasticity, some clay, trace gravel

DATE TESTED: October 24 to October 27, 2017
 CONFINING PRESSURE (kPa): 137.9
 EFFECTIVE SATURATION STRESS (kPa): 34.5
 ASSUMED SPECIFIC GRAVITY: 2.65
 HYDRAULIC GRADIENT: 10.0
 TYPE OF PERMEANT LIQUID: De-aired Water
 HYDRAULIC CONDUCTIVITY, "k" (cm/s): 5.9E-06
 HYDRAULIC CONDUCTIVITY, "k₂₀" (cm/s): 5.6E-06

	Height (mm)	Diameter (mm)	Wet Mass (g)	Dry Density (g/cm ³)	Water Content by Mass (%)	Water Content by Volume (%)	Saturation (%)
Initial Reading	78.8	70.5	616.4	1.827	9.8	17.9	57.5
Final Reading	78.1	70.6	647.3	1.812	16.9	30.5	96.5



REPORT DATE: October 28, 2017

REVIEWED BY:  Jason Thompson, C.E.T.

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PROJECT: Reston Lagoon

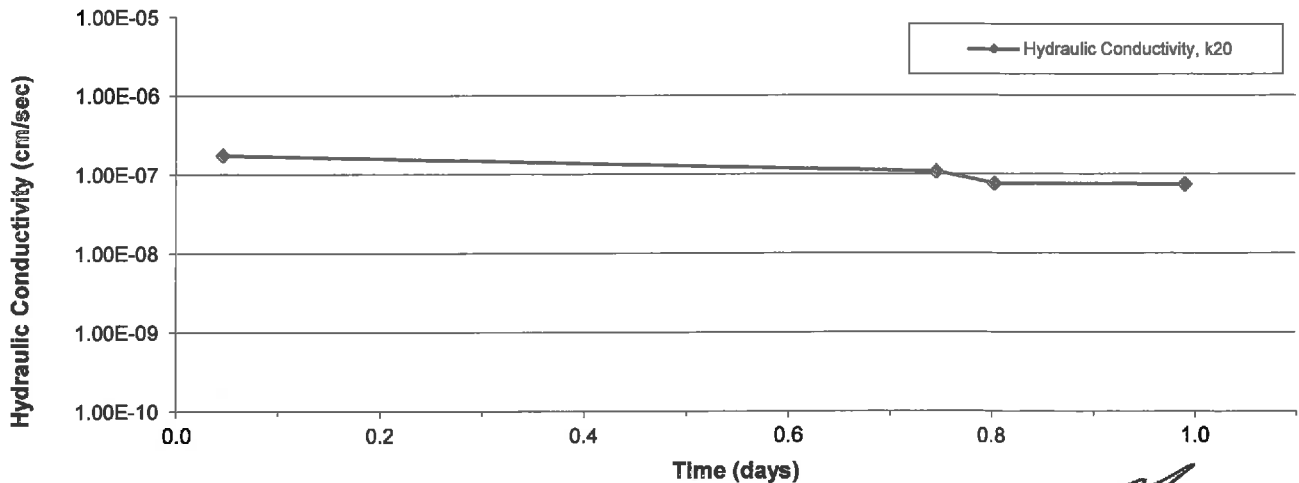
REPORT NO.: 7

Attention: Allan Hanslip

PROJECT NO.: 123313178

SAMPLE FIELD I.D.: ST1 @ 4'-6'
SOIL DESCRIPTION: Clay, brown, moist, stiff (crumbly), medium plasticity, trace to some silt, trace coarse sand to fine gravel
DATE TESTED: November 15 to November 18, 2017
CONFINING PRESSURE (kPa): 137.9
EFFECTIVE SATURATION STRESS (kPa): 34.5
ASSUMED SPECIFIC GRAVITY: 2.71
HYDRAULIC GRADIENT: 19.4
TYPE OF PERMEANT LIQUID: De-aired Water
HYDRAULIC CONDUCTIVITY, "k" (cm/s): 1.1E-07
HYDRAULIC CONDUCTIVITY, "k₂₀" (cm/s): 1.1E-07

	Height (mm)	Diameter (mm)	Wet Mass (g)	Dry Density (g/cm ³)	Water Content by Mass (%)	Water Content by Volume (%)	Saturation (%)
Initial Reading	77.8	70.5	608.5	1.741	15.0	26.2	73.1
Final Reading	76.5	69.9	631.3	1.801	19.5	35.1	104.6



REPORT DATE: November 18, 2017

REVIEWED BY:  Jason Thompson, C.E.T.

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