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October 4, 2018

File No. 18-166-79

Decker Colony
88082 RR 264
Decker, Manitoba
R0M 0K0

ATTENTION: Phillip Waldner

RE: Hydraulic Conductivity Test Results, Decker Waste Water

ENG-TECH Consulting Limited (ENG-TECH) received two (2) Shelby tube samples from the above project on September 24, 2018 and completed the requested hydraulic conductivity testing on a sample selected by Manitoba Sustainable. The Shelby Tube sample was extracted on September 24, 2018 at ENG-TECH laboratory.

The sample labelled as ST1 was prepared for testing in accordance with ASTM D5084-16a, *Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials using a Flexible Wall Permeameter*. The final hydraulic conductivity value (k_{20}) of 1.2×10^{-8} cm/sec was obtained for the sample identified as ST1. The hydraulic conductivity test data is outlined in Table 1, while the graphical representation of the hydraulic conductivity versus elapsed time is shown in Figure 1. Photographs of the sample are attached.

ENG-TECH trusts the above is all the information you require. If you have any questions, please contact the undersigned.

Sincerely,
ENG-TECH Consulting Limited

A handwritten signature in black ink, appearing to read "Clark Hryhoruk".

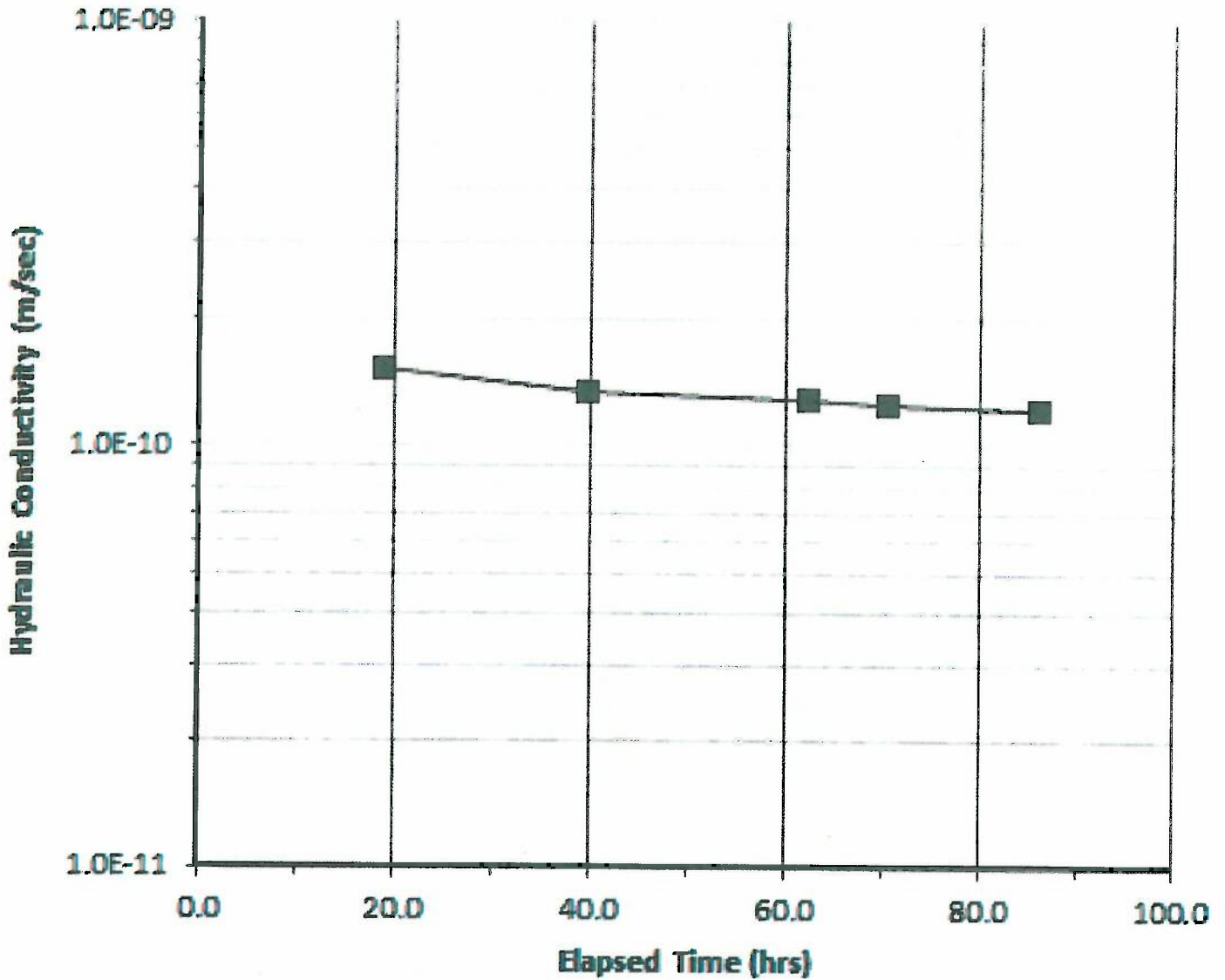
Clark Hryhoruk, M.Sc., P.Eng.
President, Geotechnical Engineer

CDH/pfpc

Attachments: Table 1 – Hydraulic Conductivity Test Data (Decker Waste Water)
Figure 1 – Hydraulic Conductivity Versus Elapsed Time (ST1)
Photographs (1 and 2)

**TABLE 1
HYDRAULIC CONDUCTIVITY TEST DATA
DECKER WASTE WATER**

SAMPLE IDENTIFICATION	ST1
INITIAL VALUES	
ENG-TECH Reference No.	18-166-79-4
Length of Sample in Tube (cm)	40.6
Length (cm)	6.95
Diameter (cm)	7.24
Area (cm ²)	41.1
Volume (cm ³)	286.0
Water Content (%)	14.2
Bulk Dry Density (kg/m ³)	1902
Specific Gravity (G _s) (assumed)	2.70
Void Ratio	0.420
Degree of Saturation (%)	91.1
FINAL VALUES	
Length (cm)	7.02
Diameter (cm)	7.33
Area (cm ²)	42.2
Volume (cm ³)	296.1
Water Content (%)	16.9
Bulk Dry Density (kg/m ³)	1835
Specific Gravity (G _s) (assumed)	2.70
Void Ratio	0.472
Degree of Saturation (%)	97.0
CONSOLIDATION PHASE	
Confining Pressure (kPa)	103.4
Pore Water Pressure (kPa)	82.7
Effective Stress (kPa)	20.7
PERMEATION PHASE	
Confining Pressure (kPa)	103.4
Pore Water Pressure (kPa)	82.7
Effective Stress (kPa)	20.7
Hydraulic Gradient	16.0
Permeant Fluid	Potable Tap Water
HYDRAULIC CONDUCTIVITY at TEST TEMPERATURE OF 22 °C (cm/sec)	1.3 x 10 ⁻⁸
HYDRAULIC CONDUCTIVITY at TEMPERATURE OF 20 °C (K₂₀) (cm/sec)	1.2 x 10 ⁻⁸



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ENG STAMP:



CLIENT:
 DECKER COLONY

DATE:
 OCTOBER 2018

DRAWN BY:
 PFPC

FIGURE No:
 1

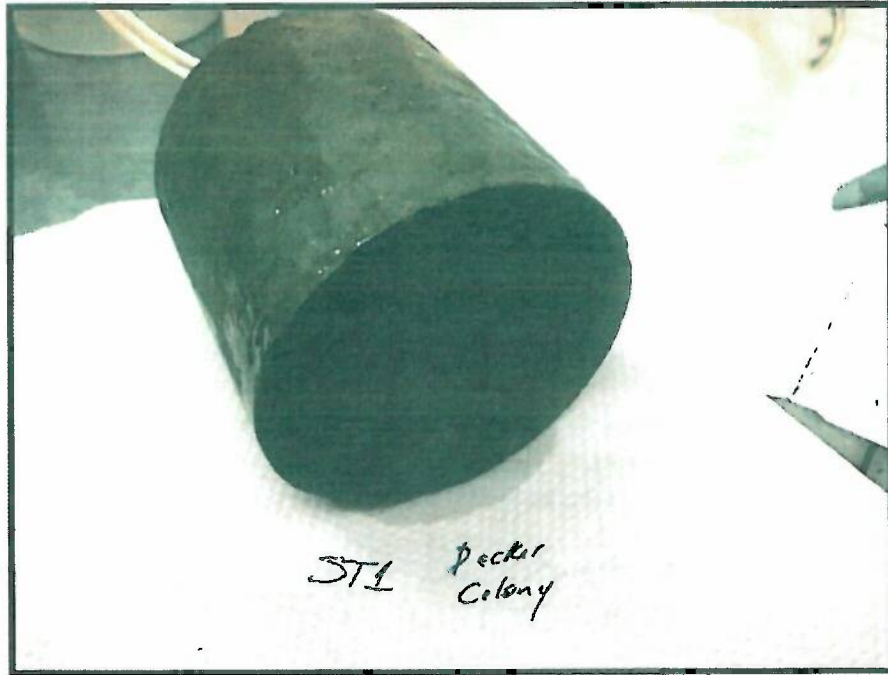
REV:

PROJECT:
 DECKER WASTE WATER

FILE No.:
 18-166-79

SCALE:
 N/A

HYDRAULIC CONDUCTIVITY
 VERSUS ELAPSED TIME
 (ST1)



PHOTOGRAPH #1: Sample ST1 upon completion of test.



PHOTOGRAPH #2: Sample ST1 after breaking apart.