ENG-TECH
CONSULTING LIMITED

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November 17, 2015 File No. 15-030-02

DGH Engineering Ltd.
12 Aviation Blvd,
St. Andrews, MB
R1A 3N5

ATTENTION: Mr. Feida Meng

RE: Miami Colony Lagoon Storage – Hydraulic Conductivity

ENG-TECH Consulting Limited (ENG-TECH) received three (3) Shelby tube samples from the above site; of which two (2) samples were requested for hydraulic conductivity testing. Manitoba Conservation was present during the extraction of the tubes and they selected representative samples from ST1 and ST2 for testing.

ENG-TECH prepared the samples in accordance with ASTM D5084-03, *Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials using a Flexible Wall Permeameter*. The final hydraulic conductivity values (k_{20}) of 1.0×10^{-8} cm/sec and 3.8×10^{-8} cm/sec were obtained for the samples identified as ST1 and ST2, respectively. The hydraulic conductivity test data is outlined in Table 1, while the graphical representations of the hydraulic conductivity versus elapsed time are shown in Figures 1 and 2.

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

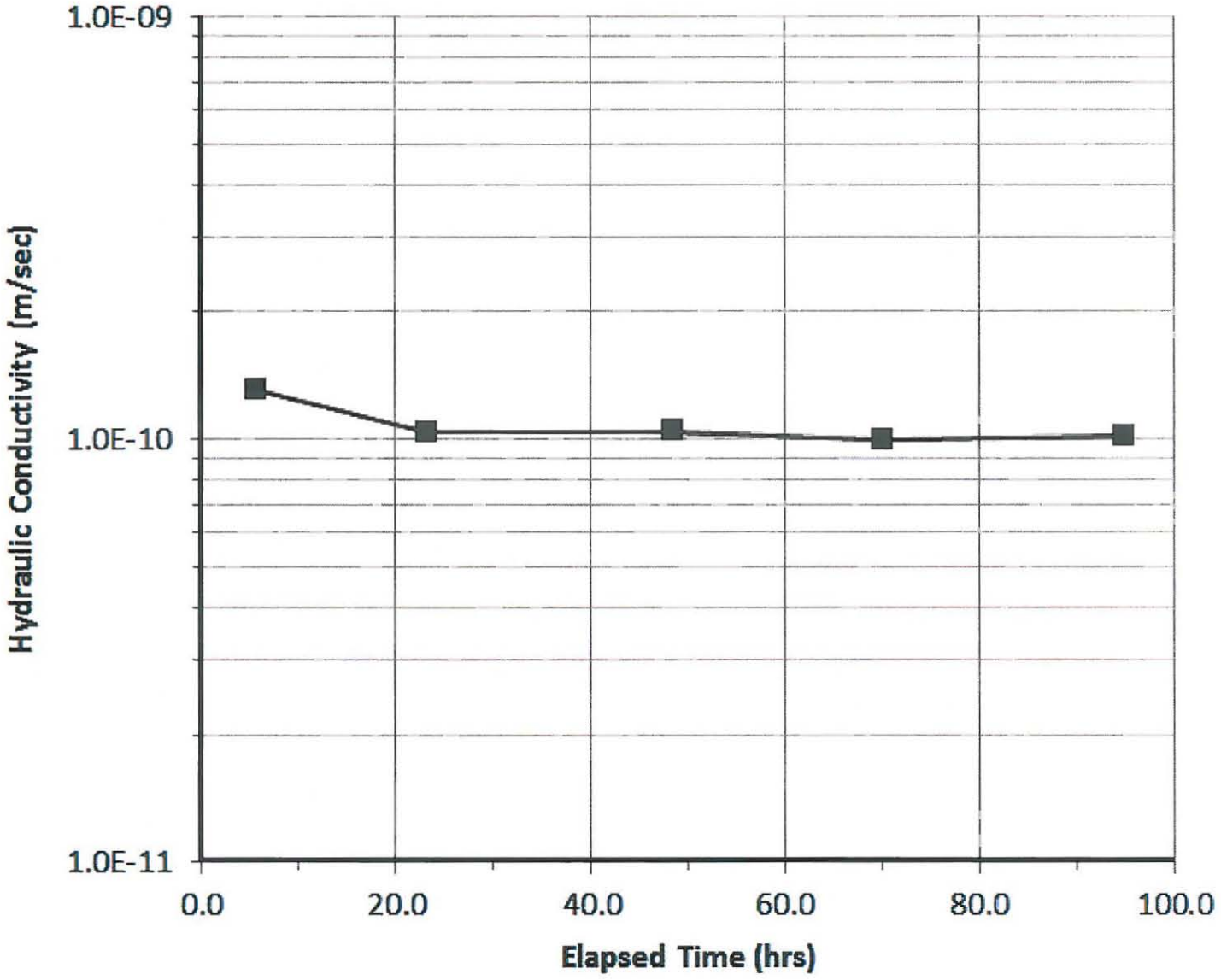
Clark Hryhoruk, M.Sc., P.Eng.
President, Geotechnical Engineer

CDH/erm

Attachments: Table 1 – Hydraulic Conductivity Test Data
Figure 1 – Hydraulic Conductivity Versus Elapsed Time (ST1)
Figure 2 – Hydraulic Conductivity Versus Elapsed Time (ST2)

TABLE 1
HYDRAULIC CONDUCTIVITY TEST DATA
MIAMI COLONY LAGOON STORAGE

SAMPLE IDENTIFICATION	ST1	ST2
INITIAL VALUES		
ENG-TECH Reference No.	15-30-2-58	15-30-2-59
Length of Sample in Tube (cm)	66.0	61.0
Length (cm)	6.49	5.69
Diameter (cm)	6.52	6.66
Area (cm^2)	33.4	34.8
Volume (cm^3)	216.5	198.0
Water Content (%)	28.3	27.6
Bulk Dry Density (kg/m^3)	1515	1480
Specific Gravity (G_s) (assumed)	2.70	2.70
Void Ratio	0.782	0.824
Degree of Saturation (%)	97.7	90.4
FINAL VALUES		
Length (cm)	6.44	5.74
Diameter (cm)	6.65	6.81
Area (cm^2)	34.7	36.4
Volume (cm^3)	223.3	208.9
Water Content (%)	30.0	32.9
Bulk Dry Density (kg/m^3)	1493	1417
Specific Gravity (G_s) (assumed)	2.70	2.70
Void Ratio	0.808	0.905
Degree of Saturation (%)	~100	98.1
CONSOLIDATION PHASE		
Confining Pressure (kPa)	103.4	103.4
Pore Water Pressure (kPa)	82.7	82.7
Effective Stress (kPa)	20.7	20.7
PERMEATION PHASE		
Confining Pressure (kPa)	103.4	103.4
Pore Water Pressure (kPa)	82.7	82.7
Effective Stress (kPa)	20.7	20.7
Hydraulic Gradient	17.5	19.6
Permeant Fluid	Distilled Water	Distilled Water
HYDRAULIC CONDUCTIVITY at TEST TEMPERATURE OF 19 °C (cm/sec)	1.0×10^{-8}	3.7×10^{-8}
HYDRAULIC CONDUCTIVITY at TEMPERATURE OF 20 °C (K_{20}) (cm/sec)	1.0×10^{-8}	3.8×10^{-8}



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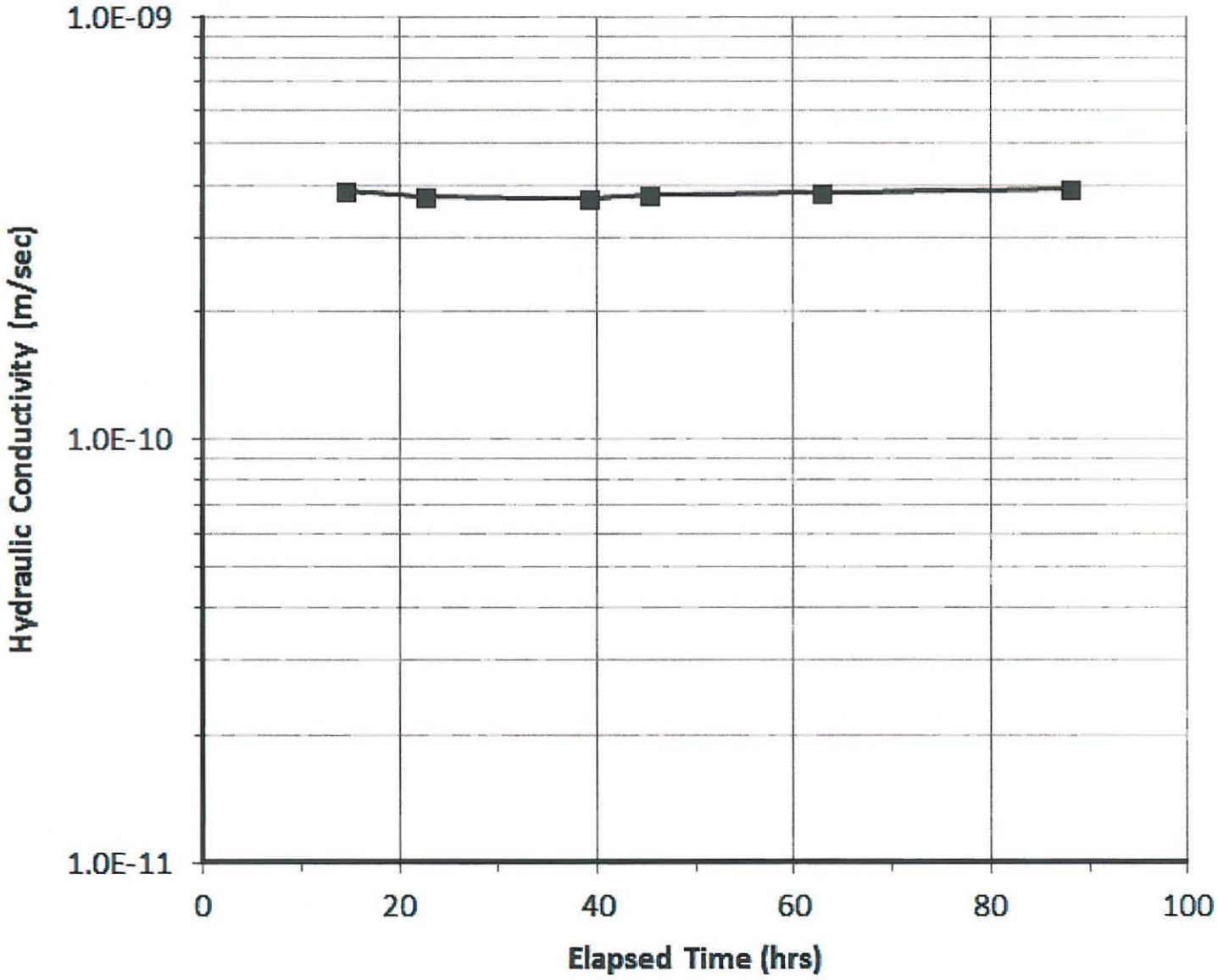
Certificate of Authorization
ENG-TECH Consulting Limited
No. 2475 Expiry: April 30, 2016

CLIENT:			PROJECT:	
DGH ENGINEERING LTD.			MIAMI COLONY LAGOON STORAGE	
DATE: NOVEMBER 2015			FILE No.: 15-030-02	HYDRAULIC CONDUCTIVITY VERSUS ELAPSED TIME (ST1)
DRAWN BY: ERM	FIGURE No.: 1	REV.:	SCALE: N/A	



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DATE: NOVEMBER 2015			FILE No.: 15-030-02	HYDRAULIC CONDUCTIVITY VERSUS ELAPSED TIME (ST2)
DRAWN BY: ERM	FIGURE No.: 2	REV.:	SCALE: N/A	