ENG-TECH
CONSULTING LIMITED

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October 28, 2016

File No. 16-167-01

Edie Construction Ltd.
Box 674, RR1
Dugald, Manitoba
R0E 0K0

**ATTENTION:** Calvin Edie

**RE:** Hydraulic Conductivity Test Results, Lorette Secondary Cell No. 3

ENG-TECH Consulting Limited (ENG-TECH) received the six (6) Shelby tube samples from the above site, and two (2) samples were extracted on October 14, 2016 and selected for hydraulic conductivity testing by MB Sustainable Development.

ENG-TECH prepared the samples labelled ST5 (8'-10') and ST6 (5'-7') for testing 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 3.3 x $10^{-9}$ cm/sec and 8.9 x $10^{-9}$ cm/sec were obtained for the samples identified as ST5 (8'-10') and ST6 (5'-7'), 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

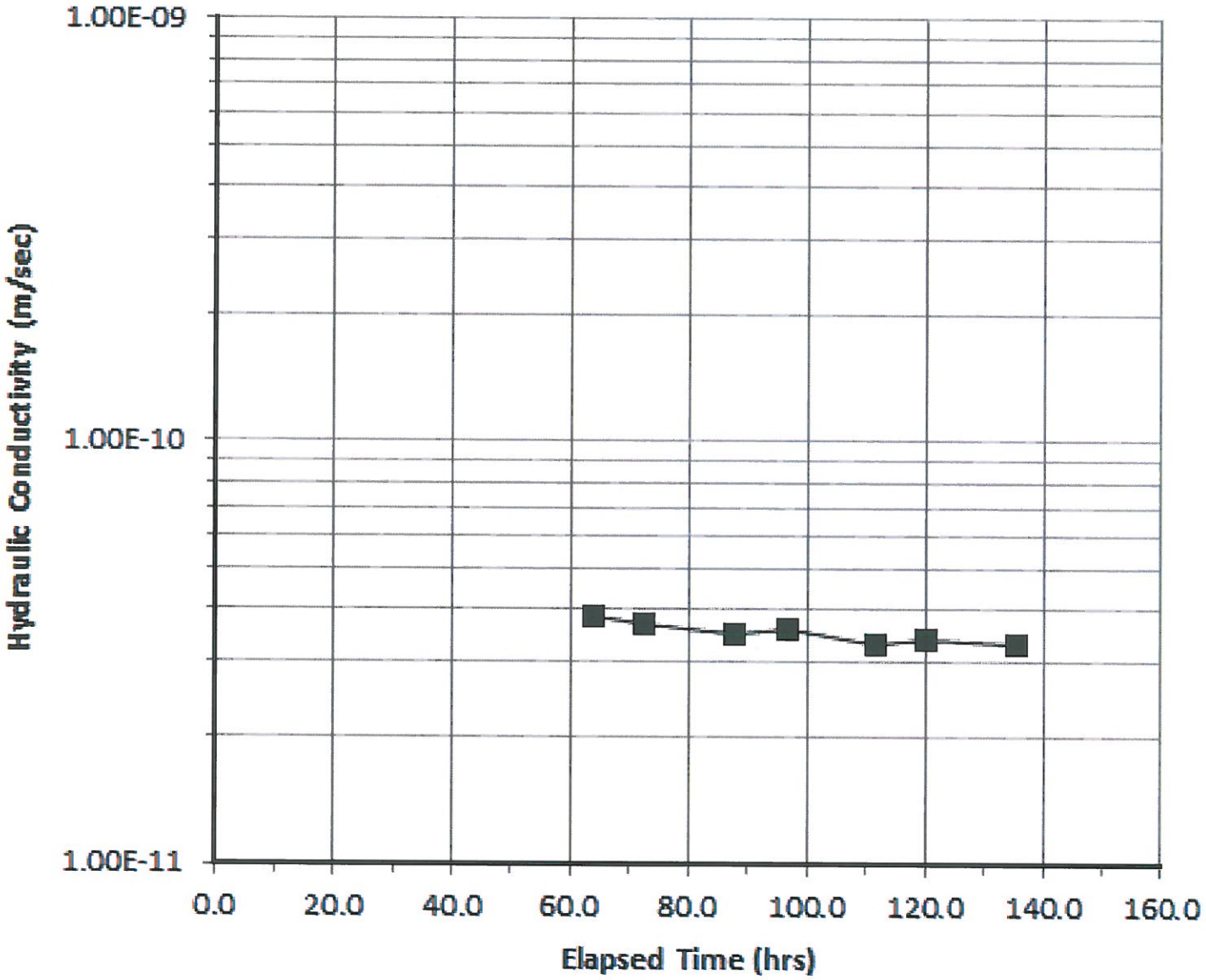
Clark Hryhoruk, M.Sc., P.Eng.
President, Geotechnical Engineer

CDH/pfpc

Attachments: Table 1 – Hydraulic Conductivity Test Data
Figure 1 – Hydraulic Conductivity Versus Elapsed Time (ST5 8'-10')
Figure 2 – Hydraulic Conductivity Versus Elapsed Time (ST6 5'-7')

**TABLE 1**
**HYDRAULIC CONDUCTIVITY TEST DATA**
**LORETTE SECONDARY CELL No. 3**

| **SAMPLE IDENTIFICATION** | ST5 (8'-10') | ST6 (5'-7') |
|---|---|---|
| **INITIAL VALUES** | | |
| ENG-TECH Reference No. | 16-167-1-29 | 16-167-1-30 |
| Length of Sample in Tube (cm) | Approx. 75.0 | Approx. 75.0 |
| Length (cm) | 6.50 | 7.39 |
| Diameter (cm) | 6.97 | 7.00 |
| Area ($cm^2$) | 38.1 | 38.5 |
| Volume ($cm^3$) | 247.9 | 284.3 |
| Water Content (%) | 30.7 | 56.7 |
| Bulk Dry Density ($kg/m^3$) | 1932 | 1709 |
| Specific Gravity ($G_s$) (assumed) | 2.68 | 2.68 |
| Void Ratio | 0.81 | 1.46 |
| Degree of Saturation (%) | 100 | 100 |
| **FINAL VALUES** | | |
| Length (cm) | 6.54 | 7.51 |
| Diameter (cm) | 7.07 | 7.05 |
| Area ($cm^2$) | 39.2 | 39.0 |
| Volume ($cm^3$) | 256.6 | 293.0 |
| Water Content (%) | 33.3 | 56.3 |
| Bulk Dry Density ($kg/m^3$) | 1918 | 1689 |
| Specific Gravity ($G_s$) (assumed) | 2.68 | 2.68 |
| Void Ratio | 0.86 | 1.48 |
| Degree of Saturation (%) | 100 | 100 |
| **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 | 17.2 | 15.0 |
| Permeant Fluid | Distilled Water | Distilled Water |
| **HYDRAULIC CONDUCTIVITY at TEST TEMPERATURE OF 21 °C (cm/sec)** | $3.3 \times 10^{-9}$ | $9.1 \times 10^{-9}$ |
| **HYDRAULIC CONDUCTIVITY at TEMPERATURE OF 20 °C ($K_{20}$) (cm/sec)** | $3.3 \times 10^{-9}$ | $8.9 \times 10^{-9}$ |

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APEGM Certificate of Authorization
ENG-TECH Consulting Limited
No. 2475 Expiry: April 30, 2017

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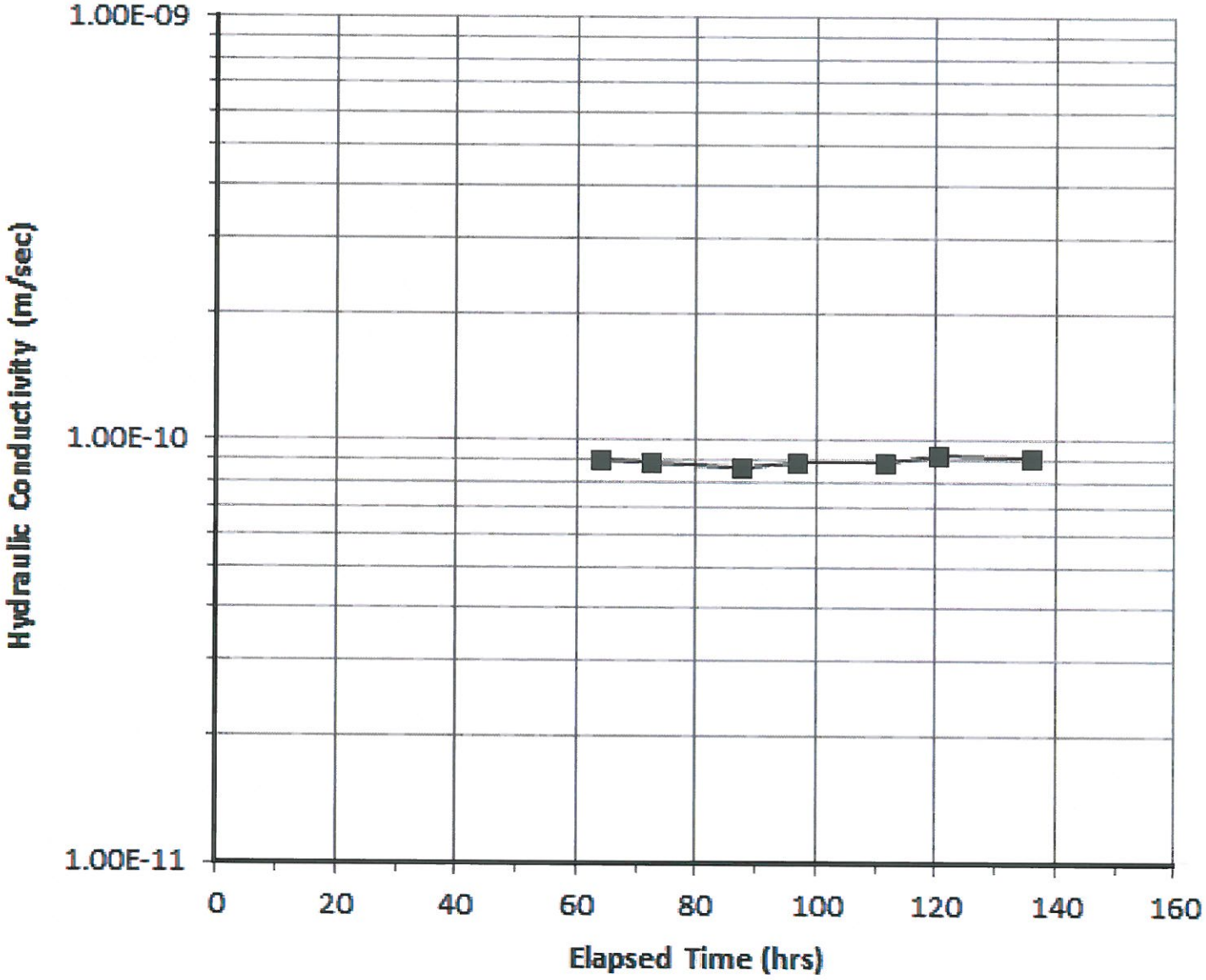
|---|---|---|---|---|
| CLIENT: EDIE CONSTRUCTION LTD. | | | PROJECT: LORETTE SECONDARY CELL No. 3 | |
| DATE: OCTOBER 2016 | | | FILE No.: 16-167-01 | HYDRAULIC CONDUCTIVITY VERSUS ELAPSED TIME (ST5 8'-10') |
| DRAWN BY: PFPC | FIGURE No.: 1 | REV.: | SCALE: N/A | |

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| DATE: OCTOBER 2016 | | | FILE No.: 16-167-01 | HYDRAULIC CONDUCTIVITY VERSUS ELAPSED TIME (ST6 5'-7') |
| DRAWN BY: PFPC | FIGURE No.: 2 | REV.: | SCALE: N/A | |