Appendix E: ATTACHMENTS

Attachment E1: CT Scans of Tube Samples
Attachment E2: Oedometer Test Data
Attachment E3: Direct Shear Test Data
Attachment E4: Triaxial Test Data
Attachment E5: Direct Simple Shear Test Data
Appendix E
Attachment 1
CT Scans of Tube Samples
MR14-101 – Sa 1
Depth: 4.9 to 5.1 m / El. 928.1 to 927.9 m
INFERRED UPPER TILL

MR14-101 – Sa 2
Depth: 5.6 to 5.8 m / El. 927.4 to 927.2 m
INFERRED UPPER TILL

MR14-101 – Sa 3
Depth: 6.3 to 6.6 m / El. 926.7 to 926.4 m
INFERRED UPPER TILL

MR14-101 – Sa 5
Depth: 14.6 to 15.1 m / El. 918.4 to 917.9 m
INFERRED LOWER TILLS (BASAL TILL)

MR14-101 – Sa 6
Depth: 15.1 to 15.4 m / El. 917.9 to 917.6 m
INFERRED LOWER TILLS (BASAL TILL)
MR14-101 – Sa 7
Depth: 16.1 to 16.3 m / El. 916.9 to 916.7 m
INFERRED LOWER TILLS (BASAL TILL)

MR14-101 – Sa 8
Depth: 16.5 to 16.9 m / El. 916.5 to 916.1 m
INFERRED LOWER TILLS (LOWER GLACIOLACUSTRINE)
MR14-102 – Sa 1
Depth: 3.1 to 3.7 m / El. 929.4 to 928.8 m
INFERRED UPPER TILL

MR14-102 – Sa 2
Depth: 3.7 to 4.1 m / El. 928.8 to 928.4 m
INFERRED UPPER TILL

MR14-102 – Sa 3
Depth: 6.5 to 6.8 m / El. 926 to 925.7 m
INFERRED UPPER TILL

MR14-102 – Sa 5
Depth: 9.1 to 9.7 m / El. 923.4 to 922.8 m
INFERRED UPPER TILL

MR14-102 – Sa 6
Depth: 9.9 to 10.1 m / El. 922.6 to 922.4 m
INFERRED UPPER TILL
MR14-103 – Sa 1
Depth: 3.3 to 4.0 m / El. 927.4 to 926.7 m
INFERRED UPPER TILL

MR14-103 – Sa 2
Depth: 4.7 to 5.3 m / El. 926 to 925.4 m
INFERRED UPPER TILL

MR14-103 – Sa 4
Depth: 6.9 to 7.5 m / El. 923.8 to 923.2 m
INFERRED UPPER TILL

MR14-103 – Sa 5
Depth: 7.8 to 8.3 m / El. 922.9 to 922.4 m
INFERRED POSSIBLE UPPER GLACIOlacustrine WITH UPPER TILL INCLUSIONS

MR14-103 – Sa 6
Depth: 8.6 to 8.7 m / El. 922.1 to 922 m
INFERRED LOWER TILLS (BASAL TILL)
MR14-104 – Sa 1
Depth: 3.6 to 4.1 m / El. 928.1 to 927.6 m
INFERRED UPPER TILL

MR14-104 – Sa 2
Depth: 4.5 to 4.7 m / El. 927.2 to 927 m
INFERRED UPPER TILL

MR14-104 – Sa 4
Depth: 6.0 to 6.5 m / El. 925.7 to 925.2 m
INFERRED UPPER TILL

MR14-104 – Sa 5
Depth: 7.8 to 8.5 m / El. 923.9 to 923.2 m
INFERRED UPPER TILL

MR14-104 – Sa 7
Depth: 10.6 to 11.2 m / El. 921.1 to 920.5 m
INFERRED POSSIBLE UPPER GLACIOLUCUSTRINE WITHIN UPPER TILL
MR14-104 – Sa 8
Depth: 11.4 to 12.0 m / El. 920.3 to 919.7 m
INFERRED UPPER TILL

MR14-104 – Sa 9
Depth: 12.2 to 12.7 m / El. 919.5 to 919 m
INFERRED UPPER TILL
MR14-105 – Sa 2
Depth: 2.3 to 2.7 m / El. 929.4 to 929.0 m
INFERRED UPPER TILL OR POSSIBLE STRIPPING MATERIAL

MR 14-105 – Sa 3
Depth: 3.0 to 3.7 m / El. 928.7 to 928.0 m
INFERRED UPPER TILL

MR14-105 – Sa 4
Depth: 3.7 to 4.3 m / El. 927.9 to 927.3 m
INFERRED UPPER TILL

MR14-105 – Sa 5
Depth: 4.9 to 5.3 m / El. 926.7 to 926.3 m
INFERRED UPPER TILL
MR14-105 – Sa 7
Depth: 6.9 to 7.5 m / El. 924.7 to 924.1 m
INFERRED UPPER TILL

MR14-105 – Sa 8
Depth: 7.9 to 8.5 m / El. 923.7 to 923.1 m
INFERRED UPPER TILL

MR14-105 – Sa 9
Depth: 9.1 to 9.8 m / El. 922.5 to 921.9 m
INFERRED UPPER GLACIOLACUSTRINE WITHIN UPPER TILL

MR14-105 – Sa 10
Depth: 10.7 to 11.3 m / El. 920.9 to 920.3 m
INFERRED UPPER TILL
MR14-106 – Sa 1
Depth: 3.0 to 3.7 m / El. 926.4 to 925.7 m
INFERRED UPPER TILL

MR14-106 – Sa 2
Depth: 4.3 to 4.9 m / El. 925.0 to 924.4 m
INFERRED UPPER TILL

MR14-106 – Sa 3
Depth: 5.2 to 5.4 m / El. 924.1 to 923.9 m
INFERRED UPPER TILL

MR14-106 – Sa 4
Depth: 5.7 to 6.3 m / El. 923.6 to 923.0 m
INFERRED UPPER TILL
MR14-106 – Sa 5
Depth: 6.6 to 7.3 m / El. 922.7 to 922.0 m
INFERRED UPPER TILL

MR14-106 – Sa 7
Depth: 8.5 to 9.1 m / El. 920.8 to 920.2 m
INFERRED LOWER TILLS (BASAL TILL)

MR14-106 – Sa 8
Depth: 10.3 to 10.6 m / El. 919.0 to 918.7 m
INFERRED LOWER TILLS (BASAL TILL OVER LOWER GLACIOLACUSTRINE)
DSS TEST ATTEMPTED ON 8B BUT VOID PREVENTED TESTING
MR14-106A – Sa 1
Depth: 7.3 to 8.1 m / El. 921.4 to 920.6 m
INFERRED UPPER GLACIOLACustrINE

MR14-106C – Sa 1
Depth: 7.2 to 7.8 m / El. 921.3 to 920.7 m
INFERRED GLACIOLACustrINE OVER LOWER TILL

MR14-106C – Sa 2
Depth: 7.8 to 8.4 m / El. 920.7 to 920.1 m
INFERRED LOWER TILL

MR14-106D – Sa 1
Depth: 7.6 to 8.2 m / El. 921.1 to 920.5 m
INFERRED UPPER GLACIOLACustrINE – NOTE FOLDING

MR14-106D – Sa 2
Depth: 8.2 to 8.8 m / El. 920.5 to 919.9 m
INFERRED UPPER GLACIOLACustrINE
MR14-106E – Sa 1
Depth: 7.1 to 7.6 m / El. 921.9 to 921.4 m
**INFERRED UPPER TILL**

MR14-106E – Sa 2
Depth: 7.6 to 8.2 m / El. 921.4 to 920.8 m
**INFERRED UPPER TILL OVER UPPER GLACIOLACUSTRINE**

MR14-106E – Sa 3
Depth: 8.2 to 8.8 m / El. 920.8 to 920.2 m
**INFERRED UPPER GLACIOLACUSTRINE**

MR14-106E – Sa 4
Depth: 8.8 to 9.4 m / El. 920.2 to 919.6 m
**INFERRED UPPER GLACIOLACUSTRINE TRANSITIONING TO LOWER TILLS**

MR14-106F – Sa 1
Depth: 7.0 to 7.6 m / El. 921.7 to 921.1 m
**INFERRED UPPER TILL**
MR14-106F – Sa 2
Depth: 7.8 to 8.4 m / El. 920.9 to 920.3 m
INFERRED UPPER GLACIOLACUSTRINE

MR14-106F – Sa 3
Depth: 8.4 to 8.8 m / El. 920.3 to 919.9 m
INFERRED UPPER GLACIOLACUSTRINE OVER LOWER TILLS (BASAL)

MR14-106G – Sa 1
Depth: 7.0 to 7.6 m / El. 921.7 to 921. m
INFERRED UPPER TILL

MR14-106G – Sa 2
Depth: 7.6 to 8.2 m / El. 921.1 to 920.5 m
INFERRED UPPER GLACIOLACUSTRINE

MR14-106G – Sa 3
Depth: 8.2 to 8.6 m / El. 920.5 to 920.1 m
INFERRED UPPPER GLACIOLACUSTRINE

MR14-106H – Sa 1
Depth: 7.3 to 7.9 m / El. 921.3 to 920.7 m
INFERRED UPPER TILL OVER UPPER GLACIOLACUSTRINE
MR14-106H – Sa 2
Depth: 7.9 to 8.5 m / El. 920.7 to 920.1 m
INFERRED UPPER GLACIOLACUSTRINE

MR14-106I – Sa 1
Depth: 7.3 to 7.9 m / El. 921.3 to 920.7 m
INFERRED UPPER GLACIOLACUSTRINE - NOTE FOLDING

MR14-106I – Sa 2
Depth: 7.9 to 8.5 m / El. 920.7 to 920.1 m
INFERRED LOWER TILLS (BASAL)
MR14-107 – Sa 1
Depth: 2.7 to 3.1 m / El. 926.0 to 925.6 m
INFERRED UPPER TILL

MR14-107 – Sa 4
Depth: 4.6 to 5.2 m / El. 924.1 to 923.5 m
INFERRED UPPER TILL

MR14-107 – Sa 5
Depth: 6.1 to 6.7 m / El. 922.6 to 922 m
INFERRED UPPER TILL

MR14-107 – Sa 6
Depth: 6.9 to 7.6 m / El. 921.8 to 921.1 m
INFERRED UPPER TILL OVER UPPER GLU
MR14-107 – Sa 7
Depth: 7.9 to 8.5 m / El. 920.8 to 920.2 m
**INFERRED LOWER TILLS (BASAL TILL)**

MR14-107A – Sa 1
Depth: 7.2 to 7.8 m / El. 921.1 to 920.5 m
**INFERRED UPPER GLU**

MR14-107A – Sa 3
Depth: 9.3 to 9.9 m / El. 919.0 to 918.4 m
**INFERRED LOWER TILLS (BASAL TILL)**

MR14-107A – Sa 4
Depth: 10.1 to 10.5 m / El. 918.2 to 917.8 m
**INFERRED LOWER TILLS (BASAL TILL OVER LOWER GLU)**

MR14-107A – Sa 6
Depth: 11.4 to 11.7 m / El. 916.9 to 916.6 m
**INFERRED LOWER TILLS (BASAL TILL OVER LOWER GLU)**
MR14-107A – Sa 7
Depth: 11.9 to 12.1 m / El. 916.4 to 916.2 m
INFERRED LOWER TILLS (LOWER GLU)

MR14-107A – Sa 8
Depth: 12.3 to 12.9 / El. 916.0 to 915.4 m
INFERRED LOWER TILLS (LOWER GLU)

MR14-107B – Sa 1
Depth: 6.6 to 7.3 m / El. 921.8 to 921.1 m
INFERRED UPPER TILL OVER UPPER GLU
MR14-108 – Sa 1
Depth: 1.5 to 2.0 m / El. 927.1 to 926.6 m
INFERRED UPPER TILL

MR14-108 – Sa 2
Depth: 2.7 to 3.4 m / El. 925.9 to 925.2 m
INFERRED UPPER TILL

MR14-108 – Sa 3
Depth: 3.5 to 3.9 m / El. 925.1 to 924.7 m
INFERRED UPPER TILL

MR14-108 – Sa 7
Depth: 4.6 to 5.2 m / El. 924.0 to 923.4 m
INFERRED UPPER TILL
MR14-108 – Sa 4
Depth: 5.5 to 6.1 m / El. 923.1 to 922.5 m
**INFERRED UPPER TILL**

MR14-108 – Sa 5
Depth: 6.4 to 7.0 m / El. 922.2 to 921.6 m
**INFERRED UPPER TILL**

MR14-108A – Sa 6
Depth: 11.4 to 11.8 m / El. 917.2 to 916.8 m
**INFERRED LOWER TILLS (LOWER GLU)**
MR14-109 – Sa 1
Depth: 1.2 to 1.8 m / El. 927.8 to 927.2 m
INFERRED UPPER TILL
THIS SAMPLE TO BE EXTRUDED OCT 28 FOR COMPARISON/CALIBRATION TO CT SCAN RESULTS
CT SCANProvides ACCURATE REPRESENTATION OF SOIL FABRIC AND GRAVEL PARTICLES

MR14-109 – Sa 2
Depth: 2.4 to 3.0 m / El. 926.6 to 926.0 m
INFERRED UPPER TILL

MR14-109 – Sa 3
Depth: 3.4 to 4.0 m / El. 925.6 to 925.0 m
INFERRED UPPER TILL

MR14-109 – Sa 4
Depth: 4.6 to 5.1 m / El. 924.4 to 923.9 m
INFERRED UPPER TILL
MR14-109 – Sa 5
Depth: 6.4 to 6.7 m / El. 922.6 to 922.3 m
INFERRED UPPER TILL

MR14-109 – Sa 6
Depth: 12.2 to 12.6 m / El. 916.8 to 916.4 m
INFERRED LOWER TILL (LOWER GLU)
MR14-110 – Sa 1
Depth: 2.1 to 2.5 m / El. 926.6 to 926.2 m
INFERRED UPPER TILL

MR14-110 – Sa 2
Depth: 3.0 to 3.7 m / El. 925.7 to 925 m
INFERRED UPPER TILL

MR14-110 – Sa 4
Depth: 4.6 to 5.2 m / El. 924.1 to 923.5 m
INFERRED UPPER TILL

MR14-110 – Sa 5
Depth: 5.5 to 5.9 m / El. 923.2 to 922.8 m
INFERRED UPPER TILL
MR14-110 – Sa 6

Depth: 12.2 to 12.6 m / El. 916.5 to 916.1 m

INFERRED LOWER TILLS (LOWER GLU)
MR14-111 – Sa 1
Depth: 1.6 to 2.2 m / El. 927.0 to 926.4 m
INFERRED UPPER TILL

MR14-111 - Sa 3
Depth: 3.7 to 4.3 m / El. 924.9 to 924.3 m
INFERRED UPPER TILL – WITH UPPER GLU ZONE

MR14-111 – Sa 5
Depth: 5.5 to 6.1 m / El. 923.1 to 922.8 m
INFERRED UPPER TILL
MR14-112 – Sa 1
Depth: 1.5 to 2.0 m / El. 927.4 to 926.9 m
**INFERRED UPPER TILL**

MR14-112 – Sa 4
Depth: 4.3 to 4.9 m / El. 924.6 to 924.0 m
**INFERRED UPPER TILL**
MR14-113 – Sa 1
Depth: 1.2 to 1.8 m / El. 928.2 to 927.6 m
**INFERRED UPPER TILL**

MR14-113 – Sa 2
Depth: 3.7 to 4.1 m / El. 925.7 to 925.3 m
**INFERRED UPPER TILL**

MR14-113 – Sa 3
Depth: 4.9 to 5.5 m / El. 924.5 to 923.9 m
**INFERRED UPPER TILL**

MR14-113 – Sa 4
Depth: 6.1 to 6.7 m / El. 923.3 to 922.7 m
**INFERRED UPPER TILL**
MR14-113 – Sa 5
Depth: 7.3 to 7.5 m / El. 922.1 to 921.9 m
INFERRED UPPER TILL

MR14-113 – Sa 6
Depth: 9.0 to 9.4 m / El. 920.4 to 920 m
INFERRED UPPER TILL
MR14-114 – Sa 1
Depth: 2.4 to 3.0 m / El. 928.2 to 927.6 m
INFERRED UPPER TILL

MR14-114 – Sa 2
Depth 3.7 to 4.3 m / El. 926.9 to 926.3 m
INFERRED UPPER TILL

MR14-114 – Sa 3
Depth 4.6 to 5.2 m / El. 926.0 to 925.4 m
INFERRED UPPER TILL

MR14-114 – Sa 5
Depth 6.4 to 7.0 m / El. 924.2 to 923.6 m
INFERRED UPPER TILL
MR14-115 – Sa 1
Depth: 1.5 to 2.1 m / El. 927.6 to 927.0 m
INFERRED UPPER TILL

MR14-115 – Sa 3
Depth 3.5 to 4.1 m / El. 925.6 to 925.0 m
INFERRED UPPER TILL

MR14-115 – Sa 4
Depth 4.3 to 4.9 m / El. 924.8 to 924.2 m
INFERRED UPPER TILL
MR14-117 – Sa 1
Depth: 11.9 to 12.5 m / El. 920.7 to 920.1 m
**INFERRED UPPER TILL OVER UPPER GLU**

MR14-117 – Sa 2
Depth: 12.5 to 13.1 m / El. 920.1 to 919.5 m
**INFERRED UPPER GLU OVER LOWER TILLS**

MR14-117 – Sa 3
Depth: 13.4 to 14.0 m / El. 919.2 to 918.6 m
**INFERRED LOWER TILLS (BASAL TILL)**

MR14-117A – Sa 1
Depth: 11.9 to 12.5 m / El. 920.7 to 920.1 m
**INFERRED UPPER TILL OVER UPPER GLU**

MR14-117A – Sa 2
Depth: 12.5 to 13.1 m / El. 920.7 to 920.1 m
**INFERRED UPPER GLU OVER LOWER TILLS**
MR14-118 – Sa 1
Depth: 14.1 to 14.7 m / El. 923.6 to 923.0 m
INFERRED UPPER TILL WITH POSSIBLE UPPER GLU ZONE

MR14-118 – Sa 5
Depth: 16.8 to 17.4 m / El. 920.9 to 920.3 m
INFERRED UPPER GLU

MR14-118 – Sa 6
Depth: 17.4 to 18.0 m / El. 920.3 to 919.7 m
INFERRED LOWER TILLS (BASAL TILL)
Appendix E
Attachment 2
Oedometer Test Data
<table>
<thead>
<tr>
<th>Sample</th>
<th>Depth (m)</th>
<th>Elevation (m)</th>
<th>Unit</th>
<th>W/C (%)</th>
<th>PI</th>
<th>eo</th>
<th>`σ'_p (kPa)*</th>
<th>Cs</th>
<th>Cc</th>
<th>C_u/Cc</th>
<th>Comments</th>
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<td>14-105-Sa4C</td>
<td>4.1</td>
<td>927.6</td>
<td>Upper Till</td>
<td>12</td>
<td>11</td>
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<td>203</td>
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<td>922.7</td>
<td>Upper Till</td>
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<td>6</td>
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<td>13</td>
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<td>0.20</td>
<td>0.003</td>
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<td>0.08</td>
<td>0.0011</td>
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<td>7.6</td>
<td>920.9</td>
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<td>Upper GLU</td>
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<td>920.8</td>
<td>Upper GLU</td>
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<td>24/29</td>
<td>0.775</td>
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<td>14-106E-Sa4D</td>
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<td>919.7</td>
<td>Upper GLU / Lower Tills Transition Zone</td>
<td>25</td>
<td>19</td>
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<td>Upper GLU</td>
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<td>Upper GLU</td>
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<td>34</td>
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<td>921.1</td>
<td>Upper GLU</td>
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<td>7.1</td>
<td>921.6</td>
<td>Upper GLU</td>
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<td>23</td>
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<td>14-107A-Sa1B</td>
<td>7.3</td>
<td>920.9</td>
<td>Upper GLU</td>
<td>40</td>
<td>25</td>
<td>1.129</td>
<td>516</td>
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<td>0.43</td>
<td>0.00988</td>
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<td>6.9</td>
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<td>33</td>
<td>29</td>
<td>1.109</td>
<td>312</td>
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<td>920.5</td>
<td>Lower Tills (basal till)</td>
<td>13</td>
<td>8</td>
<td>0.448</td>
<td>331</td>
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<td>0.11</td>
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<td>916.7</td>
<td>Lower Tilt (lower GLU)</td>
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<td>14-110-Sa6B</td>
<td>12.4</td>
<td>916.3</td>
<td>Lower Tilt (lower GLU)</td>
<td>17</td>
<td>13</td>
<td>0.587</td>
<td>794</td>
<td>0.017</td>
<td>0.08</td>
<td>0.0008</td>
<td>0.01 Swelling occurred at beginning of test, results questionable. Further examination of data required.</td>
</tr>
<tr>
<td>14-113-Sa6C</td>
<td>9.4</td>
<td>920.0</td>
<td>Lower Tills (basal till)</td>
<td>19</td>
<td>11</td>
<td>0.546</td>
<td>355</td>
<td>0.018</td>
<td>0.07</td>
<td>0.0019</td>
<td>0.03 Questionable whether specimen is on NCL at end of loading</td>
</tr>
</tbody>
</table>

* Estimated preconsolidation pressure is an average of Casagrande, Bi-logarithmic and Work Method values.
Oedometer Preconsolidation Stress & Effective Vertical Overburden Stress Below Dam Crest for Different Stages

sig'p (not from 106 or 107)  sig'p (from 106 or 107)  sig'v (No Dam)  sig'v (Stage 3 - El. 944)  sig'v (Stage 5 - El. 951)  sig'v (Stage 8 - El. 964)
### Summary of cv Values from Panel Oedometer Testing

<table>
<thead>
<tr>
<th>Vertical Stress (kPa)</th>
<th>Upper Till</th>
<th>Upper GLU</th>
<th>Lower Tills</th>
<th>Transition Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5</td>
<td>8.54E-03</td>
<td>3.94E-04</td>
<td>7.06E-03</td>
<td>6.28E-04</td>
</tr>
<tr>
<td>25</td>
<td>3.47E-02</td>
<td>3.10E-04</td>
<td>3.74E-04</td>
<td>8.34E-04</td>
</tr>
<tr>
<td>50</td>
<td>1.99E-02</td>
<td>5.67E-04</td>
<td>1.96E-03</td>
<td>7.68E-04</td>
</tr>
<tr>
<td>100</td>
<td>2.24E-02</td>
<td>1.32E-03</td>
<td>1.03E-03</td>
<td>9.98E-04</td>
</tr>
<tr>
<td>200</td>
<td>2.70E-02</td>
<td>1.48E-03</td>
<td>1.33E-03</td>
<td>4.16E-03</td>
</tr>
<tr>
<td>400</td>
<td>1.57E-02</td>
<td>2.74E-03</td>
<td>9.18E-03</td>
<td>5.35E-04</td>
</tr>
<tr>
<td>1600</td>
<td>6.13E-03</td>
<td>6.18E-04</td>
<td>1.02E-03</td>
<td>3.98E-03</td>
</tr>
<tr>
<td>3200</td>
<td>3.44E-03</td>
<td>1.76E-03</td>
<td>5.35E-04</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Notes:**
- N/A - No load increment, cv not calculated.
- NC - Negligible consolidation, cv not calculated.

### Coefficient of Consolidation, cv (cm²/sec) - from Oedometer Tests

<table>
<thead>
<tr>
<th>Vertical Stress (kPa)</th>
<th>Upper GLU</th>
<th>Lower Tills</th>
<th>Upper GLU</th>
<th>Lower Tills</th>
<th>Upper GLU</th>
<th>Lower Tills</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5</td>
<td>12.5</td>
<td>6.01E-04</td>
<td>7.68E-04</td>
<td>4.16E-03</td>
<td>1.96E-03</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>1.83E-03</td>
<td>1.94E-03</td>
<td>2.12E-03</td>
<td>9.98E-04</td>
<td>1.85E-03</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>2.24E-02</td>
<td>1.32E-03</td>
<td>1.03E-03</td>
<td>9.98E-04</td>
<td>1.85E-03</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>2.70E-02</td>
<td>1.48E-03</td>
<td>1.33E-03</td>
<td>4.16E-03</td>
<td>1.85E-03</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>1.57E-02</td>
<td>2.74E-03</td>
<td>9.18E-03</td>
<td>5.35E-04</td>
<td>1.85E-03</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>6.13E-03</td>
<td>6.18E-04</td>
<td>1.02E-03</td>
<td>3.98E-03</td>
<td>1.85E-03</td>
<td></td>
</tr>
<tr>
<td>1600</td>
<td>3.44E-03</td>
<td>1.76E-03</td>
<td>5.35E-04</td>
<td>N/A</td>
<td>1.85E-03</td>
<td></td>
</tr>
<tr>
<td>3200</td>
<td>3.44E-03</td>
<td>1.76E-03</td>
<td>5.35E-04</td>
<td>N/A</td>
<td>1.85E-03</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- N/A - No load increment, cv not calculated.
- NC - Negligible consolidation, cv not calculated.

### Coefficient of Consolidation, cv (cm²/sec) - from Triaxial Tests

<table>
<thead>
<tr>
<th>Vertical Stress (kPa)</th>
<th>Upper GLU</th>
<th>Upper GLU</th>
<th>Upper GLU</th>
<th>Upper GLU</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-111-Sa5A</td>
<td>14-105-Sa4</td>
<td>14-113-Sa1</td>
<td>14-106E-Sa2B</td>
<td>14-106E-Sa2C</td>
</tr>
<tr>
<td>50</td>
<td>5.86E-03</td>
<td>1.68E-03</td>
<td>3.64E-03</td>
<td>7.68E-04</td>
</tr>
<tr>
<td>75</td>
<td>0.07E-03</td>
<td>2.04E-03</td>
<td>1.10E-03</td>
<td>3.98E-03</td>
</tr>
<tr>
<td>100</td>
<td>1.90E-03</td>
<td>1.99E-03</td>
<td>1.03E-03</td>
<td>9.98E-04</td>
</tr>
<tr>
<td>150</td>
<td>2.23E-02</td>
<td>1.32E-03</td>
<td>1.03E-03</td>
<td>9.98E-04</td>
</tr>
<tr>
<td>200</td>
<td>2.62E-02</td>
<td>1.48E-03</td>
<td>1.33E-03</td>
<td>4.16E-03</td>
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<tr>
<td>400</td>
<td>1.57E-02</td>
<td>2.74E-03</td>
<td>9.18E-03</td>
<td>5.35E-04</td>
</tr>
<tr>
<td>1600</td>
<td>6.13E-03</td>
<td>6.18E-04</td>
<td>1.02E-03</td>
<td>3.98E-03</td>
</tr>
<tr>
<td>3200</td>
<td>3.44E-03</td>
<td>1.76E-03</td>
<td>5.35E-04</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Notes:**
- N/A - No load increment, cv not calculated.
- NC - Negligible consolidation, cv not calculated.

### Average cv (cm²/sec) from Oedometer Tests

<table>
<thead>
<tr>
<th>Average cv (cm²/sec)</th>
<th>Min. cv (cm²/sec)</th>
<th>Max. cv (cm²/sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-105-Sa4C</td>
<td>14-106-Sa4A</td>
<td>14-106E-Sa4B</td>
</tr>
<tr>
<td>12.5</td>
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<td>8.0E-03</td>
</tr>
<tr>
<td>25</td>
<td>1.3E-03</td>
<td>8.0E-03</td>
</tr>
<tr>
<td>50</td>
<td>1.3E-03</td>
<td>8.0E-03</td>
</tr>
<tr>
<td>100</td>
<td>1.3E-03</td>
<td>8.0E-03</td>
</tr>
<tr>
<td>200</td>
<td>1.3E-03</td>
<td>8.0E-03</td>
</tr>
<tr>
<td>400</td>
<td>1.3E-03</td>
<td>8.0E-03</td>
</tr>
<tr>
<td>1600</td>
<td>1.3E-03</td>
<td>8.0E-03</td>
</tr>
</tbody>
</table>

**Notes:**
- Avg for Vert Stress < 400 kPa | 3E-03 | 8E-03 | 8E-03 |
Summary of cv Values from Panel Oedometer and Triaxial Tests

**Upper Till**

- cv vs sig v (kPa)
  - cv (cm²/sec)
  - sig v (kPa)

**Lower Tills**

- cv vs sig v (kPa)
  - cv (cm²/sec)
  - sig v (kPa)

**Upper GLU**

- Average Oedometer Data
- Average Triaxial Data

Average preconsolidation pressure at about 400 kPa
ONE DIMENSIONAL CONSOLIDATION TEST REPORT
TEST SUMMARY PLOT

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

MR14-105, Sa. 4C, 4.1 m / El. 927.5 m
Report Date: Dec. 12, 2014
Test Dates: Nov. 3 - 11, 2014

Initial Water Content = 11.7 %
Final Water Content = 13.2 %

\( e_0 = 0.439 \)
\( LL = 25 \% \)
\( Gs = 2.78 \)
\( PL = 14 \% \)
\( PI = 11 \% \)

Void Ratio (end of load increment) Vs Log of Pressure

- Initial Void Ratio

- Coeff. Of Consolidation (cm²/sec)

- Vertical Stress (kPa)
Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

Report Date: Dec. 12, 2014
Test Dates: Oct. 29 - Nov. 5, 2014

Initial Water Content = 10.8 %
Final Water Content = 10.0 %

Initial Void Ratio = 0.388
LL = 21 %
Gs = 2.78
PL = 15 %
PI = 6 %

Void Ratio (end of load increment) Vs Log of Pressure
ONE DIMENSIONAL CONSOLIDATION TEST REPORT
TEST SUMMARY PLOT

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

MR14-113, Sa. 1B, 1.3 m / El. 928.1 m
Report Date: Dec. 12, 2014
Test Dates: Nov. 4 - 12, 2014

Initial Water Content = 23.5 %
Final Water Content = 19.6 %

$e_0 = 0.737$  $LL = 27 \%$
$Gs = 2.78$  $PL = 14 \%$
$PI = 13 \%$

Void Ratio (end of load increment) Vs Log of Pressure
Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

MR14-113, Sa. 4A, 6.3 m / El. 923.1 m
Report Date: Dec. 12, 2014
Test Dates: Oct. 29 - Nov. 5, 2014

Initial Water Content = 10.8 %
Final Water Content = 12.4 %

$e_0 = 0.382$  $LL = 21\%$
$Gs = 2.78$  $PL = 14\%$
$PI = 7\%$

Void Ratio (end of load increment) Vs Log of Pressure

- Void Ratio
- Vertical Stress (kPa)
- Coefficient of Consolidation (cm$^2$/sec)
Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

MR14-106C, Sa. 1C, 7.6 m / El. 921.0 m
Report Date: Dec. 12, 2014
Test Dates: Nov. 17 - 24, 2014

Initial Water Content = 41.2 %  e_0 = 1.234  LL = 62 %
Final Water Content = 33.3 %  Gs = 2.83  PL = 24 %
                  PI = 38 %

Void Ratio (end of load increment) Vs Log of Pressure
Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

Report Date: Dec. 12, 2014
Test Dates: Dec. 1 - 7, 2014

Initial Water Content = 35.2 %
Final Water Content = 32.9 %

\( e_0 = 1.068 \)
\( G_s = 2.86 \)
\( \text{LL} = 55 \% \)
\( \text{PL} = 22 \% \)
\( \text{PI} = 33 \% \)

**Void Ratio (end of load increment) Vs Log of Pressure**

- Initial Void Ratio
- Coeff. Of Consolidation (cm²/sec)
- Vertical Stress (kPa)
ONE DIMENSIONAL CONSOLIDATION TEST REPORT
TEST SUMMARY PLOT

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280
Report Date: Dec. 12, 2014
Test Dates: Nov. 18 - 25, 2014

Initial Water Content = 25.5 %
Final Water Content = 21.7 %
Initial Void Ratio = 0.775
Final Void Ratio = 2.86

Initial Water Content:
Final Water Content:
Initial Void Ratio:
Final Void Ratio:

Void Ratio (end of load increment) Vs Log of Pressure

Void Ratio
Coefficient of Consolidation (cm^2/sec)
Vertical Stress (kPa)
Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

MR14-106E, Sa. 4B, 9.0 m / El. 920.0 m
Report Date: Dec. 12, 2014
Test Dates: Nov. 27 - Dec. 5, 2014

Initial Water Content = 48.4 %
Final Water Content = 46.9 %

\( e_0 = 1.432, \quad \text{LL} = 63 \% 
\)
\( G_s = 2.86, \quad \text{PL} = 22 \% 
\)
\( \text{PI} = 41 \% 
\)

- Void Ratio (end of load increment) Vs Log of Pressure
- Coeff. Of Consolidation (cm²/sec) Vs Vertical Stress (kPa)

**Initial Void Ratio**
Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280
MR14-106E, Sa. 4D, 9.2 m / El. 919.7 m
Report Date: Dec. 12, 2014
Test Dates: Nov. 19 - 25, 2014

Initial Water Content = 24.7 %
Final Water Content = 26.6 %

$e_0 = 0.780$  $LL = 41 \%$
$Gs = 2.86$  $PL = 22 \%$
$PI = 19 \%$

**Void Ratio (end of load increment) Vs Log of Pressure**

**Vertical Stress (kPa)**

**Void Ratio**

**Coeff. Of Consolidation (cm$^2$/sec)**
Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280
Report Date: Dec. 12, 2014
Test Dates: Nov. 19 - 26, 2014

Initial Water Content = 43.4 %
Final Water Content = 43.3 %

Void Ratio (end of load increment) Vs Log of Pressure
Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280
MR14-106G, Sa. 3A, 8.3 m / El. 920.4 m
Test Dates: Nov. 21 - 28, 2014
Report Date: Dec. 12, 2014

Initial Water Content = 42.6 %  e₀ = 1.286  LL = 57 %
Final Water Content = 38.6 %  Gs = 2.86  PL = 23 %
PI = 24 %

Void Ratio (end of load increment) Vs Log of Pressure

Initial Void Ratio
ONE DIMENSIONAL CONSOLIDATION TEST REPORT

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

MR14-106H, Sa. 1B, 7.5 m / El. 921.1 m
Report Date: Dec. 12, 2014
Test Dates: Nov. 18 - 26, 2014

Initial Water Content = 40.8 %
Final Water Content = 100.5 %

Void Ratio (end of load increment) Vs Log of Pressure

Initial Void Ratio

Void Ratio

Vertical Stress (kPa)

Coeff. Of Consolidation (cm²/sec)
Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280
Report Date: Dec. 12, 2014
Test Dates: Nov. 5 - 13, 2014

Initial Water Content = 34.8 %  
Final Water Content = 27.3 %

$e_0 = 1.058$  
$LL = 47 \%$

$Gs = 2.86$  
$PL = 24 \%$

$PI = 23 \%$

Void Ratio (end of load increment) Vs Log of Pressure

<table>
<thead>
<tr>
<th>Vertical Stress (kPa)</th>
<th>Coeff. Of Consolidation (cm²/sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0.100</td>
</tr>
<tr>
<td>100</td>
<td>0.010</td>
</tr>
<tr>
<td>1000</td>
<td>0.0010</td>
</tr>
<tr>
<td>10000</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

Initial Void Ratio
Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280
Report Date: Dec 1, 2014
Test Dates: Nov. 12 - 20, 2014

Initial Water Content = 32.5 %  
Final Water Content = 28.5 %

Initial Void Ratio = 1.109
LL = 49 %
Gs = 2.86
PL = 20 %
PI = 29 %

Void Ratio (end of load increment) Vs Log of Pressure

Coefficient of Consolidation (cm²/sec)
Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280
MR14-105, Sa. 10B, 11.2 m / El. 920.5 m
Report Date: Dec. 12, 2014
Test Dates: Nov. 4 to 11, 2014

Initial Water Content = 12.9 %
Final Water Content = 10.8 %

Initial Void Ratio = 0.448
LL = 21 %
Gs = 2.78
PL = 13 %
PI = 8 %

Void Ratio (end of load increment) Vs Log of Pressure

Coef. Of Consolidation (cm²/sec)

Vertical Stress (kPa)

Initial Void Ratio
ONE DIMENSIONAL CONSOLIDATION TEST REPORT
TEST SUMMARY PLOT

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280
MR14-113, Sa. 6C, 9.4 m / El. 920.0 m
Report Date: Dec. 12, 2014
Test Dates: Nov. 4 - 11, 2014

Initial Water Content = 18.7 %  e₀ = 0.546  LL = 28 %
Final Water Content = 17.5 %  Gs = 2.78  PL = 17 %
PI = 11 %

Void Ratio (end of load increment) Vs Log of Pressure

Initial Void Ratio
Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

MR14-107A, Sa. 6B, 11.6 m / El. 916.7 m

Report Date: Dec. 12, 2014
Test Dates: Nov. 25 - 29, 2014

Initial Water Content = 22.0 %  
Final Water Content = 21.8 %

$e_0 = 0.653 \quad LL = 40 \%$

$Gs = 2.78 \quad PL = 25 \%$

$PI = 15 \%$

Void Ratio (end of load increment) Vs Log of Pressure
One Dimensional Consolidation Test Report

Test Summary Plot

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280
MR14-110, Sa. 6B, 12.4 m / El. 916.3 m
Report Date: Dec. 12, 2014
Test Dates: Nov. 5 - 10, 2014

Initial Water Content = 17.2 %
Final Water Content = 20.4 %

Initial Void Ratio = 0.587
LL = 36 %
Gs = 2.78
PL = 23 %
PI = 13 %

Void Ratio (end of load increment) Vs Log of Pressure

Initial Void Ratio
Appendix E
Attachment 3
Direct Shear Test Data
DIRECT SHEAR TEST REPORT DS 14-1
MR14-106H, Sa.1B, 7.4 m / El. 921.2 m
300 kPa

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
Report Date: Nov. 28, 2014
File Number: 15-3-280

SAMPLE DESCRIPTION
CLAY (CH), grey, stiff, thinly bedded

<table>
<thead>
<tr>
<th></th>
<th>Start of Test</th>
<th>After Consolidation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet Density (kg/cu.m.):</td>
<td>1,838</td>
<td>1,881</td>
</tr>
<tr>
<td>Dry Density (kg/cu.m.):</td>
<td>1,325</td>
<td>1,384</td>
</tr>
<tr>
<td>Moisture Content:</td>
<td>38.2%</td>
<td>35.9%</td>
</tr>
<tr>
<td>Void Ratio:</td>
<td>1.076</td>
<td>0.987</td>
</tr>
<tr>
<td>Saturation:</td>
<td>99.0%</td>
<td>100%</td>
</tr>
<tr>
<td>Specific Gravity (assumed):</td>
<td></td>
<td>2.75</td>
</tr>
</tbody>
</table>

AFTER TEST NOTES

<table>
<thead>
<tr>
<th>NORMAL STRESS (kPa)</th>
<th>RESIDUAL STRESS (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>87</td>
</tr>
<tr>
<td>150</td>
<td>56</td>
</tr>
<tr>
<td>450</td>
<td>130</td>
</tr>
</tbody>
</table>

Moisture content taken from center of specimen = 31.2%

There was a large amount of extruded silty, clay between the shearbox halves.

The top cap was level and there was no misalignment of the shearbox halves.

The specimen did not separate along the shear surface.
DIRECT SHEAR TEST REPORT DS 14-1

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

Sample: MR14-106H, Sa.1B, 7.4 m / El. 921.2 m
Normal Stress = 300 kPa
Test Dates: Nov. 18 - 26, 2014
DIRECT SHEAR TEST REPORT DS 14-1

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

Sample: MR14-106H, Sa.1B, 7.4 m / El. 921.2 m
Normal Stress = 150 kPa
Test Dates: Nov. 18 - 26, 2014
DIRECT SHEAR TEST REPORT DS 14-1

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

Sample: MR14-106H, Sa.1B, 7.4 m / El. 921.2 m
Normal Stress = 450 kPa
Test Dates: Nov. 18 - 26, 2014
DIRECT SHEAR TEST REPORT DS 14-1
MR14-106H, Sa.1B, 7.4 m / El. 921.2 m
Normal Stress = 150, 300, 450 kPa

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach

Report Date: Nov. 28, 2014
File Number: 15-3-280

TEST MACHINE
Wykeham Farrance direct shear test apparatus with a 60 mm diameter round shear box. Vertical and horizontal strains were measured by electronic displacement transducers. The shear stress was measured with an electronic load cell. The normal force was applied by dead weights on a

TEST PROCEDURE
- The test specimen was manually trimmed from a Shelby tube sample.
- The shear plane was pre-cut with a knife prior to placement in the shearbox.
- The specimen was consolidated in two stages to the required normal stress. First to 100 kPa and then to 300 kPa.
- The first four cycles of horizontal displacement (0 - 57 mm) were run at .12 mm/min.
- The final two cycles (57 - mm) were run at .024 mm/min.
- The specimen was unloaded to a normal stress of 150 kPa.
- Four cycles were run at .12 mm/min and two at .024 mm/min.
- The specimen was loaded to a normal stress of 450 kPa.
- Four cycles were run at .12 mm/min and two at .024 mm/min.
DIRECT SHEAR TEST REPORT DS 14-1
MR14-106H, Sa.1B, 7.4 m / El. 921.2 m
Normal Stress = 150, 300, 450 kPa

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach

Report Date: Nov. 28, 2014
File Number: 15-3-280
Direct Shear Test Results

Client: Mt. Polley Review Panel
Project: Mt. Polley Tailings Storage Facility Breach
Job No.: 15-3-280

Sample: MR14-106H, Sa.1B
7.4 m / El. 921.2 m
Date: Nov. 28, 2014

Silty CLAY (CL), thinly bedded, stiff, medium plasticity

Residual Strength Parameters:
\( c' = 0 \text{ kPa} \quad F' = 16.4^\circ \)

Remarks: The direct shear specimen was trimmed from a 73 mm diameter Shelby tube sample. A shear plane was pre-cut through the specimen before it was set up in a direct shear machine. The first stage of shearing was run at a normal stress of 300 kPa. The second stage at 150 kPa and the third at 450 kPa
Direct Shear Test
MR14-106H, Sa. 1B, 7.4 m / El. 921.2 m

Trendline Line: \( y = 0.2952x \)

\( \phi = \tan^{-1}(0.2952) \)

\( \phi = 16.4^\circ \)
Appendix E
Attachment 4
Triaxial Test Data
### Summary of Panel Triaxial Test Data

<table>
<thead>
<tr>
<th>Sample</th>
<th>Depth (m)</th>
<th>Elevation (m)</th>
<th>Soil Unit</th>
<th>W/C (%)</th>
<th>PI</th>
<th>$\sigma'_{u}$ (kPa)</th>
<th>Maximum Deviator Stress ($\sigma'_1 - \sigma'_3$) (kPa)</th>
<th>Undrained Shear Strength (kPa)</th>
<th>Excess Pore Pressure at Failure (kPa)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-111 Sa5A</td>
<td>5.7</td>
<td>922.7</td>
<td>Upper Till</td>
<td>13</td>
<td>8</td>
<td>600</td>
<td>890</td>
<td>445</td>
<td>265</td>
<td></td>
</tr>
<tr>
<td>14-105 Sa4</td>
<td>3.9</td>
<td>927.8</td>
<td>Upper Till</td>
<td>16</td>
<td>14</td>
<td>600</td>
<td>575</td>
<td>288</td>
<td>367</td>
<td>First specimen compromised during testing, unable to complete test.</td>
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<tr>
<td>14-113 Sa1C</td>
<td>1.4</td>
<td>928.0</td>
<td>Upper Till</td>
<td>20</td>
<td>13</td>
<td>600</td>
<td>448</td>
<td>224</td>
<td>408</td>
<td></td>
</tr>
<tr>
<td>14-106 Sa2</td>
<td>4.8</td>
<td>923.9</td>
<td>Upper Till</td>
<td>12</td>
<td>10</td>
<td>600</td>
<td>639</td>
<td>320</td>
<td>343</td>
<td></td>
</tr>
<tr>
<td>14-106E Sa2C</td>
<td>8.0</td>
<td>921.0</td>
<td>GLU</td>
<td>35</td>
<td>29</td>
<td>150</td>
<td>185</td>
<td>93</td>
<td>88</td>
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<tr>
<td>14-106E Sa3C</td>
<td>8.8</td>
<td>920.2</td>
<td>GLU</td>
<td>40</td>
<td>33</td>
<td>300</td>
<td>242</td>
<td>121</td>
<td>183</td>
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<td>14-106E Sa3B</td>
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<td>920.6</td>
<td>GLU</td>
<td>40</td>
<td>35</td>
<td>600</td>
<td>367</td>
<td>184</td>
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<tr>
<td>14-106C Sa1B</td>
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<td>921.0</td>
<td>Upper GLU</td>
<td>39</td>
<td>30</td>
<td>75</td>
<td>106</td>
<td>53</td>
<td>51</td>
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<tr>
<td>14-106G Sa2B</td>
<td>7.8</td>
<td>920.9</td>
<td>Upper GLU</td>
<td>38</td>
<td>21</td>
<td>150</td>
<td>170</td>
<td>85</td>
<td>100</td>
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<tr>
<td>14-106G Sa2B</td>
<td>8.0</td>
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<td>Upper GLU</td>
<td>34</td>
<td>21</td>
<td>303</td>
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<td>135</td>
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<tr>
<td>14-106G Sa2B</td>
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<td>920.7</td>
<td>Upper GLU</td>
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<td>30</td>
<td>594</td>
<td>350</td>
<td>175</td>
<td>350</td>
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<tr>
<td>14-106F Sa2B</td>
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<td>14-106F Sa2B</td>
<td>8.1</td>
<td>920.7</td>
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<td>41</td>
<td>303</td>
<td>244</td>
<td>122</td>
<td>180</td>
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<tr>
<td>14-106F Sa2B</td>
<td>8.3</td>
<td>920.5</td>
<td>Upper GLU</td>
<td>38</td>
<td>41</td>
<td>594</td>
<td>N/A</td>
<td>N/A</td>
<td>900</td>
<td>Issues with backpressure system during test.</td>
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</tbody>
</table>

### Mohr-Coulomb Envelope

<table>
<thead>
<tr>
<th>Sample</th>
<th>Soil Unit</th>
<th>$\sigma'_f$ (kPa)</th>
<th>$\sigma'_u$ (kPa)</th>
<th>$p = (\sigma'_f + \sigma'_u)/2$ (kPa)</th>
<th>$q = (\sigma'_f - \sigma'_u)/2$ (kPa)</th>
<th>Friction Angle (degrees)*</th>
<th>q/$\sigma'_u$</th>
<th>Friction Angle (degrees)</th>
<th>Cohesion (kPa)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-111 Sa5A</td>
<td>Upper Till</td>
<td>335</td>
<td>1225</td>
<td>780</td>
<td>445</td>
<td>35°</td>
<td>0.36</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>14-105 Sa4</td>
<td>Upper Till</td>
<td>233</td>
<td>808</td>
<td>521</td>
<td>288</td>
<td>34°</td>
<td>0.36</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>14-113 Sa1C</td>
<td>Upper Till</td>
<td>192</td>
<td>640</td>
<td>416</td>
<td>224</td>
<td>33°</td>
<td>0.35</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>14-106 Sa2</td>
<td>Upper Till</td>
<td>257</td>
<td>896</td>
<td>577</td>
<td>320</td>
<td>34°</td>
<td>0.36</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>14-106E Sa2C</td>
<td>Upper GLU</td>
<td>62</td>
<td>247</td>
<td>155</td>
<td>93</td>
<td>37°</td>
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</tr>
<tr>
<td>14-106E Sa3C</td>
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<td>359</td>
<td>238</td>
<td>121</td>
<td>31°</td>
<td>0.34</td>
<td>33</td>
<td>21°</td>
<td></td>
</tr>
<tr>
<td>14-106E Sa3B</td>
<td>Upper GLU</td>
<td>236</td>
<td>603</td>
<td>420</td>
<td>184</td>
<td>26°</td>
<td>0.30</td>
<td>34</td>
<td>23°</td>
<td></td>
</tr>
<tr>
<td>14-106C Sa1B</td>
<td>Upper GLU</td>
<td>24</td>
<td>130</td>
<td>77</td>
<td>53</td>
<td>43°</td>
<td>0.41</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>14-106G Sa2B</td>
<td>Upper GLU</td>
<td>50</td>
<td>220</td>
<td>130</td>
<td>85</td>
<td>41°</td>
<td>0.39</td>
<td>50</td>
<td>30°</td>
<td></td>
</tr>
<tr>
<td>14-106G Sa2B</td>
<td>Upper GLU</td>
<td>103</td>
<td>573</td>
<td>270</td>
<td>135</td>
<td>30°</td>
<td>0.36</td>
<td>50</td>
<td>30°</td>
<td></td>
</tr>
<tr>
<td>14-106G Sa2B</td>
<td>Upper GLU</td>
<td>244</td>
<td>594</td>
<td>360</td>
<td>175</td>
<td>29°</td>
<td>0.29</td>
<td>50</td>
<td>30°</td>
<td></td>
</tr>
<tr>
<td>14-106F Sa2B</td>
<td>Upper GLU</td>
<td>39</td>
<td>225</td>
<td>130</td>
<td>93</td>
<td>46°</td>
<td>0.41</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>14-106F Sa2B</td>
<td>Upper GLU</td>
<td>123</td>
<td>367</td>
<td>270</td>
<td>122</td>
<td>27°</td>
<td>0.33</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

*For the purpose of estimating the peak friction angle of this specimen the cohesion was assumed equal to zero.
Summary of Triaxial Test Results - Upper GLU

- $y = 0.3722x + 29.774$
  - $R^2 = 0.9923$
- $y = 0.3883x + 33.288$
  - $R^2 = 0.9963$
Summary of Triaxial Test Data for Upper GLU
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-2B
MR14-105, Sa. 4B, 3.9 m / El. 927.7 m
Effective Confining Pressure = 600 kPa

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
Report Date: Nov. 23, 2014
File Number: 15-3-280
Test Dates: Nov. 15 - 21, 2014

Index Testing Data

<p>| | |</p>
<table>
<thead>
<tr>
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<th></th>
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<tbody>
<tr>
<td>Gravel:</td>
<td>10.2%</td>
</tr>
<tr>
<td>Liquid Limit:</td>
<td>28</td>
</tr>
<tr>
<td>Sand:</td>
<td>41.3%</td>
</tr>
<tr>
<td>Plastic Limit:</td>
<td>14</td>
</tr>
<tr>
<td>Silt:</td>
<td>31.3%</td>
</tr>
<tr>
<td>Plasticity Index:</td>
<td>14</td>
</tr>
<tr>
<td>Clay:</td>
<td>17.2%</td>
</tr>
<tr>
<td>Sp. Gr. (assumed):</td>
<td>2.78</td>
</tr>
</tbody>
</table>

Clayey SAND (SC), trace to some gravel, low plastic fines

Specimen Data

<table>
<thead>
<tr>
<th></th>
<th>As Set Up</th>
<th>As Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet Density (kg/cu.m.):</td>
<td>2,217</td>
<td>2,285</td>
</tr>
<tr>
<td>Dry Density (kg/cu.m.):</td>
<td>1,919</td>
<td>2,008</td>
</tr>
<tr>
<td>Moisture Content:</td>
<td>15.5%</td>
<td>13.8%</td>
</tr>
<tr>
<td>Void Ratio:</td>
<td>0.447</td>
<td>0.383</td>
</tr>
<tr>
<td>Saturation:</td>
<td>96%</td>
<td>100%</td>
</tr>
<tr>
<td>Pore Press. Parameter B:</td>
<td>0.50</td>
<td>0.98</td>
</tr>
</tbody>
</table>

Stress/Strain Data

<table>
<thead>
<tr>
<th></th>
<th>Maximum Stress Ratio</th>
<th>Maximum Deviator Stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axial Strain (%):</td>
<td>4.14</td>
<td>19.67</td>
</tr>
<tr>
<td>Stress Ratio:</td>
<td>3.70</td>
<td>3.44</td>
</tr>
<tr>
<td>Deviator Stress (kPa):</td>
<td>495</td>
<td>575</td>
</tr>
<tr>
<td>Change in Pore Pressure (kPa):</td>
<td>418</td>
<td>367</td>
</tr>
<tr>
<td>Effective Confining Pressure (kPa):</td>
<td>184</td>
<td>235</td>
</tr>
<tr>
<td>Pore Pressure Parameter A:</td>
<td>0.84</td>
<td>0.64</td>
</tr>
<tr>
<td>Rate of Displacement (%/hour):</td>
<td>0.83</td>
<td>0.83</td>
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</table>
Original Sample
The original Shelby tube sample was a 530 mm long by 73 mm diameter. The specimen was trimmed at 70 - 245 mm from the top of the sample.

Test Specimen
The ends of the sample were manually trimmed. The length of the test specimen was 155.08 mm and the diameter was 72.09 mm.

Test Apparatus
The specimen was mounted in a triaxial pressure chamber with 73 mm diameter end platens. Porous stone and filter paper disks were placed on both ends of the specimen. Filter paper strips were placed around the perimeter of the specimen to act as side drains. The specimen was enveloped in one latex membrane.

Test Procedure
An initial cell pressure of 100 kPa resulted in a pore pressure response of 66 kPa (B=0.66). The cell pressure and back pressure were increased in a series of 100 kPa increments until B=0.98 (at 550 kPa cell pressure). This indicated that the specimen was saturated. The specimen was consolidated in two stages to the required effective confining pressure of 600 kPa. During the first stage the sample was consolidated to an effective confining pressure of 200 kPa. For the second stage the sample was consolidated to the required effective confining pressure of 600 kPa. The back pressure valve was closed and axial loading was carried out until the deviator stress reached a peak and dropped off.

After Test
At the end of the test, no obvious shear plane was observed within the specimen. The specimen was weighed and samples were taken for moisture content, Atterberg limits and hydrometer tests.
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-2B

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

Effective Confining Pressure = 600 kPa
CU12-2B @ 600 kPa Before Test

Triaxial specimen
CU14-2B
CU12-2B @ 600 kPa After Test
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-4
MR14-106, Sa. 2, 4.8 m / El. 924.6 m
Effective Confining Pressure = 600 kPa

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
Report Date: Nov. 27, 2014
File Number: 15-3-280
Test Dates: Nov. 17 - 27, 2014

Index Testing Data

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
<th>Plasticity Index</th>
<th>Specific Gravity</th>
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<tbody>
<tr>
<td>Gravel:</td>
<td>11.2%</td>
<td>22</td>
<td></td>
<td>2.77</td>
</tr>
<tr>
<td>Sand:</td>
<td>36.2%</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silt:</td>
<td>34.2%</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clay:</td>
<td>18.4%</td>
<td>2.77</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

sandy, silty CLAY (CL), brown, moist, firm to stiff, some gravel to 15 mm dia.

Specimen Data

<table>
<thead>
<tr>
<th></th>
<th>As Set Up</th>
<th>As Tested</th>
</tr>
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<tbody>
<tr>
<td>Wet Density (kg/cu.m.):</td>
<td>2,312</td>
<td>2,374</td>
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<tr>
<td>Dry Density (kg/cu.m.):</td>
<td>2,062</td>
<td>2,151</td>
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<tr>
<td>Moisture Content:</td>
<td>12.1%</td>
<td>10.4%</td>
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<tr>
<td>Void Ratio:</td>
<td>0.344</td>
<td>0.288</td>
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<tr>
<td>Saturation:</td>
<td>98%</td>
<td>100%</td>
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<tr>
<td>Pore Press. Parameter B:</td>
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<td>0.99</td>
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Stress/Strain Data

<table>
<thead>
<tr>
<th></th>
<th>Maximum Stress Ratio</th>
<th>Maximum Deviator Stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axial Strain (%):</td>
<td>4.48</td>
<td>21.16</td>
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<tr>
<td>Stress Ratio:</td>
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</tr>
<tr>
<td>Deviator Stress (kPa):</td>
<td>543</td>
<td>639</td>
</tr>
<tr>
<td>Change in Pore Pressure (kPa):</td>
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<td>343</td>
</tr>
<tr>
<td>Effective Confining Pressure (kPa):</td>
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<td>263</td>
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<td>Pore Pressure Parameter A:</td>
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</tr>
<tr>
<td>Rate of Displacement (%/hour):</td>
<td>0.77</td>
<td>0.77</td>
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Original Sample
The original Shelby tube sample was 540 mm long by 73 mm in diameter. The specimen was trimmed at 340 - 520 mm from the top of the sample.

Test Specimen
The triaxial specimen was manually trimmed to a length of 160.13 mm and a diameter of 71.71 mm.

Test Apparatus
The specimen was mounted in a triaxial pressure chamber with 73 mm diameter end platens. Porous stone and filter paper disks were placed on both ends of the specimen. Filter paper strips were placed around the perimeter of the specimen to act as side drains. The specimen was enveloped in one latex membrane.

Test Procedure
An initial cell pressure of 100 kPa resulted in a pore pressure response of 74 kPa (B=0.73). The cell pressure and back pressure were increased in a series of 100 kPa increments until B=0.98 (at 450 kPa cell pressure). This indicated that the specimen was saturated. The specimen was consolidated in two stages to the required effective confining pressure of 600 kPa. During the first stage the sample was consolidated to an effective confining pressure of 200 kPa. During the second stage of consolidation to 600 kPa the cell pressure system failed and the cell pressure began dropping while the back pressure remained constant. The problem was detected just as the cell pressure became equal with the back pressure. The cell and back pressure valves were closed to isolate the sample while repairs were made to the cell pressure system. The cell pressure was increased in increments to the level it was at before the problem occurred. The specimen was then consolidated to the required effective confining pressure of 600 kPa. The back pressure valve was closed and axial loading was carried out until the deviator stress had levelled out.

After Test
At the end of the test the specimen had bulged in the middle with no visible shear plane. The specimen was weighed and samples were taken for moisture content, Atterberg limits and hydrometer tests.
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-4

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

MR14-106, Sa. 2, 4.8 m / El. 924.6 m
Effective Confining Pressure = 600 kPa

Mohr Circle at maximum Deviator Stress
CU14-4 @ 600 kPa Before Test
CU14-4 @ 600 kPa After Test
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-1
MR14-111, Sa. 5A, 5.7 m / El. 922.8 m
Effective Confining Pressure = 600 kPa

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach

Index Testing Data

<table>
<thead>
<tr>
<th></th>
<th>Gravel: 12.4%</th>
<th>Liquid Limit: 22</th>
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<tbody>
<tr>
<td>Sand:</td>
<td>34.6%</td>
<td>Plastic Limit: 14</td>
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<tr>
<td>Silt:</td>
<td>39.8%</td>
<td>Plasticity Index: 8</td>
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<tr>
<td>Clay:</td>
<td>13.2%</td>
<td>Sp. Gr. (assumed): 2.78</td>
</tr>
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</table>

sandy, silty CLAY (CL), grey, moist, stiff, some gravel to 12 mm dia.

Specimen Data

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<tr>
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<th>As Set Up</th>
<th>As Tested</th>
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<tbody>
<tr>
<td>Wet Density (kg/cu.m.):</td>
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<td>2,351</td>
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<tr>
<td>Dry Density (kg/cu.m.):</td>
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<td>2,111</td>
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<td>Moisture Content:</td>
<td>12.9%</td>
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<td>Void Ratio:</td>
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<td>0.316</td>
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<td>Saturation:</td>
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<td>100%</td>
</tr>
<tr>
<td>Pore Press. Parameter B:</td>
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<td>0.99</td>
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Stress/Strain Data

<table>
<thead>
<tr>
<th></th>
<th>Maximum Stress Ratio</th>
<th>Maximum Deviator Stress</th>
</tr>
</thead>
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<td>Change in Pore Pressure (kPa):</td>
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<td>Pore Pressure Parameter A:</td>
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<tr>
<td>Rate of Displacement (%/hour):</td>
<td>0.47</td>
<td>0.47</td>
</tr>
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</table>
Original Sample
The original Shelby tube sample was a 530 mm long by 73 mm diameter. The specimen was trimmed at 150 - 320 mm from the top of the sample.

Test Specimen
The ends of the sample were manually trimmed. The length of the test specimen was 138.17 mm and the diameter was 72.30 mm.

Test Apparatus
The specimen was mounted in a triaxial pressure chamber with 73 mm diameter end platens. Porous stone and filter paper disks were placed on both ends of the specimen. Filter paper strips were placed around the perimeter of the specimen to act as side drains. The specimen was enveloped in one latex membrane.

Test Procedure
An initial cell pressure of 100 kPa resulted in a pore pressure response of 87 kPa (B=0.88). The cell pressure and back pressure were increased in a series of 100 kPa increments until B=0.98 (at 400 kPa cell pressure). This indicated that the specimen was saturated. The specimen was consolidated in two stages to the required effective confining pressure of 600 kPa. During the first stage the sample was consolidated to an effective confining pressure of 200 kPa. For the second stage the sample was consolidated to the required effective confining pressure of 600 kPa. The back pressure valve was closed and axial loading was carried out until the deviator stress reached a peak and dropped off.

After Test
At the end of the test, no obvious shear plane was observed within the specimen. The specimen was weighed and samples were taken for moisture content, Atterberg limits, and hydrometer tests.
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-1

Mount Polley Review Panel  
Mount Polley Tailings Storage Facility Breach  
File Number: 15-3-280

Effective Confining Pressure = 600 kPa
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-1

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
MR14-111, Sa. 5A, 5.7 m / El. 922.8 m
File Number: 15-3-280

Effective Confining Pressure = 600 kPa
CU14-1 @ 600 kPa Before Test
CU14-1 @ 600 kPa After Test
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-3
MR14-113, Sa. 1C, 1.4 m / El. 928.0 m
Effective Confining Pressure =  600 kPa

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach

Report Date: Nov. 17, 2014
File Number: 15-3-280
Test Dates: Nov. 8 - 17, 2014

Index Testing Data

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<td>33.0%</td>
<td>Plastic Limit:</td>
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<td>Silt:</td>
<td>40.6%</td>
<td>Plasticity Index:</td>
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<tr>
<td>Clay:</td>
<td>19.9%</td>
<td>Sp. Gr. (assumed):</td>
<td>2.78</td>
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</table>

sandy, silty CLAY (CL), grey, moist, stiff, some gravel to 12 mm dia.

Specimen Data

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<thead>
<tr>
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<th>As Tested</th>
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<tr>
<td>Wet Density (kg/cu.m.):</td>
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<td>Dry Density (kg/cu.m.):</td>
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<td>1,974</td>
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<td>Moisture Content:</td>
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<td>Void Ratio:</td>
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<td>0.407</td>
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<tr>
<td>Saturation:</td>
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<td>100%</td>
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<td>Pore Press. Parameter B:</td>
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<td>0.98</td>
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Stress/Strain Data

<table>
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<td>Axial Strain (%):</td>
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<td>Stress Ratio:</td>
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<td>Deviator Stress (kPa):</td>
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<td>448</td>
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<td>Change in Pore Pressure (kPa):</td>
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<td>Effective Confining Pressure (kPa):</td>
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<td>191</td>
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<td>Pore Pressure Parameter A:</td>
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<td>0.91</td>
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<td>Rate of Displacement (%/hour):</td>
<td>0.26</td>
<td>0.26</td>
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</table>
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-3
MR14-113, Sa. 1C, 1.4 m / El. 928.0 m
Effective Confining Pressure = 600 kPa

Original Sample
The original Shelby tube sample was a 530 mm long by 73 mm diameter. The specimen was trimmed at 130 - 320 mm from the top of the sample.

Test Specimen
The ends of the sample were manually trimmed. The length of the test specimen was 148.76 mm and the diameter was 72.03 mm.

Test Apparatus
The specimen was mounted in a triaxial pressure chamber with 73 mm diameter end platens. Porous stone and filter paper disks were placed on both ends of the specimen. Filter paper strips were placed around the perimeter of the specimen to act as side drains. The specimen was enveloped in one latex rubber membrane.

Test Procedure
An initial cell pressure of 100 kPa resulted in a pore pressure response of 92 kPa (B=0.92). The cell pressure and back pressure were increased in a series of 100 kPa increments until B=0.98 (at 400 kPa cell pressure). This indicated that the specimen was saturated. The specimen was consolidated in two stages to the required effective confining pressure of 600 kPa. During the first stage the sample was consolidated to an effective confining pressure of 200 kPa. For the second stage the sample was consolidated to the required effective confining pressure of 600 kPa. The back pressure valve was closed and axial loading was carried out until the deviator stress reached a peak and dropped off.

After Test
At the end of the test, no obvious shear plane was observed within the specimen. The specimen was weighed and samples were taken for moisture content, Atterberg limits, hydrometer and specific gravity tests.
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-3

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

Effective Confining Pressure = 600 kPa

Deviator Stress (kPa) vs. Axial Strain

Stress Ratio vs. Axial Strain

Pore Pressure Change (kPa) vs. Axial Strain
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-3

Mount Polley Review Panel  
Mount Polley Tailings Storage Facility Breach  
MR14-113, Sa. 1C, 1.4 m / El. 928.0 m
File Number: 15-3-280  
Effective Confining Pressure = 600 kPa

Mohr Circle at maximum Deviator Stress
CU14-3 @ 600 kPa Before Test
CU14-3 @ 600 kPa After Test
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-7
MR14-106E, Sa. 2C, 8.0 m / El. 921.0 m
Effective Confining Pressure = 150 kPa

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
Report Date: Dec. 9, 2014
File Number: 15-3-280
Test Dates: Dec. 1 - 8, 2014

Index Testing Data

- Gravel: 0.0% Liquid Limit: 50
- Sand: 0.5% Plastic Limit: 21
- Silt: 48.2% Plasticity Index: 29
- Clay: 51.3% Sp. Gr. (assumed): 2.86

silty CLAY (CH), brown, thinly bedded, high plasticity

Specimen Data

<table>
<thead>
<tr>
<th></th>
<th>As Set Up</th>
<th>As Tested</th>
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<tbody>
<tr>
<td>Wet Density (kg/cu.m.):</td>
<td>1,876</td>
<td>1,919</td>
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<tr>
<td>Dry Density (kg/cu.m.):</td>
<td>1,386</td>
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<td>Moisture Content:</td>
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<td>Void Ratio:</td>
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<td>Saturation:</td>
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<td>100%</td>
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<td>Pore Press. Parameter B:</td>
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<td>0.97</td>
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Stress/Strain Data

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<tr>
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<th>Maximum Stress Ratio</th>
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<tbody>
<tr>
<td>Axial Strain (%):</td>
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<td>Stress Ratio:</td>
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<td>Deviator Stress (kPa):</td>
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<td>Change in Pore Pressure (kPa):</td>
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<td>88</td>
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<td>Effective Confining Pressure (kPa):</td>
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<td>62</td>
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<td>Pore Pressure Parameter A:</td>
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<td>0.48</td>
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<tr>
<td>Rate of Displacement (%/hour):</td>
<td>0.36</td>
<td>0.36</td>
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</table>
The original Shelby tube sample was 600 mm long by 73 mm in diameter.

**Test Specimen**

The triaxial specimen was taken from the lower half of the Shelby tube sample. It was manually trimmed to a length of 147.78 mm and a diameter of 71.64 mm.

**Test Apparatus**

The specimen was mounted in a triaxial pressure chamber with 73 mm diameter end platens. Porous stone and filter paper disks were placed on both ends of the specimen. Filter paper strips were placed around the perimeter of the specimen to act as side drains. The specimen was enveloped in one latex membrane.

**Test Procedure**

An initial cell pressure of 100 kPa resulted in a pore pressure response of 55 kPa (B=0.55). The cell pressure and back pressure were increased in a series of 100 kPa increments until B=0.98 (at 400 kPa cell pressure). This indicated that the specimen was saturated. The specimen was consolidated in two stages to the required effective confining pressure of 150 kPa. During the first stage the sample was consolidated to an effective confining pressure of 75 kPa. For the second stage the sample was consolidated to the required effective confining pressure of 150 kPa. The back pressure valve was closed and axial loading was carried out until the deviator stress reached a peak and dropped off.

**After Test**

At the end of the test a two shear planes at an angle of 60° crossed each other in the middle of the specimen. The specimen was weighed and samples were taken for moisture content, hydrometer and Atterberg limits.
Mohr Circle at maximum Deviator Stress
CU14-7 @ 150 kPa Before Test
CU14-7 @ 150 kPa After Test
## Index Testing Data

<p>| | | |</p>
<table>
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<tbody>
<tr>
<td>Gravel</td>
<td>0.0%</td>
<td>Liquid Limit</td>
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<tr>
<td>Sand</td>
<td>0.0%</td>
<td>Plastic Limit</td>
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<tr>
<td>Silt</td>
<td>42.4%</td>
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<tr>
<td>Clay</td>
<td>57.6%</td>
<td>Sp. Gr.:</td>
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silty CLAY (CH), brown, thinly bedded, medium plasticity

## Specimen Data

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<thead>
<tr>
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<th>As Set Up</th>
<th>As Tested</th>
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<td>Wet Density (kg/cu.m.):</td>
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<td>Dry Density (kg/cu.m.):</td>
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<td>Saturation:</td>
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<td>Pore Press. Parameter B:</td>
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## Stress/Strain Data

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<td>Deviator Stress (kPa):</td>
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<td>Change in Pore Pressure (kPa):</td>
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<tr>
<td>Effective Confining Pressure (kPa):</td>
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<td>Pore Pressure Parameter A:</td>
<td>0.76</td>
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<tr>
<td>Rate of Displacement (%/hour):</td>
<td>0.37</td>
<td>0.37</td>
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</table>
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-6
MR14-106E, Sa. 3C, 8.8 m / El. 920.2 m
Effective Confining Pressure = 300 kPa

Original Sample
The original Shelby tube sample was 600 mm long by 73 mm in diameter.

Test Specimen
The triaxial specimen was taken from the upper half of the Shelby tube sample. It was manually trimmed to a length of 152.71 mm and a diameter of 71.29 mm.

Test Apparatus
The specimen was mounted in a triaxial pressure chamber with 73 mm diameter end platens. Porous stone and filter paper disks were placed on both ends of the specimen. Filter paper strips were placed around the perimeter of the specimen to act as side drains. The specimen was enveloped in one latex membrane.

Test Procedure
An initial cell pressure of 100 kPa resulted in a pore pressure response of 74 kPa (B=0.76). The cell pressure and back pressure were increased in a series of 100 kPa increments until B=1.00 (at 500 kPa cell pressure). This indicated that the specimen was saturated. The specimen was consolidated in three stages to the required effective confining pressure of 300 kPa. During the first stage the sample was consolidated to an effective confining pressure of 50 kPa. For the second stage the sample was consolidated to an effective confining pressure of 100 kPa. For the third stage the sample was consolidated to the required effective confining pressure of 600 kPa. The back pressure valve was closed and axial loading was carried out until the deviator stress reached a peak and dropped off.

After Test
At the end of the test a shear plane at an angle of 60° had developed in the lower half of the specimen. The specimen was weighed and samples were taken for moisture content, hydrometer and Atterberg limits.
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-6

Mount Polley Review Panel  
Nov. 27 - Dec. 7, 2014
Mount Polley Tailings Storage Facility Breach  
MR14-106E, Sa. 3C, 8.8 m / El. 920.2 m
File Number: 15-3-280  
Effective Confining Pressure = 300 kPa

1. Graph showing Deviator Stress (kPa) vs. Axial Strain

2. Graph showing Stress Ratio vs. Axial Strain

3. Graph showing Pore Pressure Change (kPa) vs. Axial Strain
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-6

Mount Polley Review Panel Nov. 27 - Dec. 7, 2014
Mount Polley Tailings Storage Facility Breach MR14-106E, Sa. 3C, 8.8 m / El. 920.2 m
File Number: 15-3-280 Effective Confining Pressure = 300 kPa

Mohr Circle at maximum Deviator Stress
CU14-6 @ 300 kPa After Test
CU14-6 @ 300 kPa After Test
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-5
MR14-106E, Sa. 3B, 8.4 m / El. 920.5 m
Effective Confining Pressure = 600 kPa

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
Report Date: Dec. 9, 2014
File Number: 15-3-280
Test Dates: Nov. 21 - 29, 2014

Index Testing Data

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<tr>
<td>Gravel:</td>
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<td>Sand:</td>
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<td>Silt:</td>
<td>40.6%</td>
<td>Plasticity Index: 35</td>
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<tr>
<td>Clay:</td>
<td>58.4%</td>
<td>Sp. Gr.: 2.86</td>
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silty CLAY (CH), bown, thinly bedded, medium plasticity

Specimen Data

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<thead>
<tr>
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<th>As Set Up</th>
<th>As Tested</th>
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<tr>
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<td>Dry Density (kg/cu.m.)</td>
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<td>Moisture Content</td>
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<td>Void Ratio:</td>
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<td>Saturation:</td>
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<td>Pore Press. Parameter B</td>
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<td>0.99</td>
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Stress/Strain Data

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<td>Deviator Stress (kPa):</td>
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<td>Change in Pore Pressure (kPa):</td>
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<td>Effective Confining Pressure (kPa):</td>
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<td>Pore Pressure Parameter A:</td>
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<tr>
<td>Rate of Displacement (%/hour):</td>
<td>0.37</td>
<td>0.37</td>
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CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-5
MR14-106E, Sa. 3B, 8.4 m / El. 920.5 m
Effective Confining Pressure = 600 kPa

Original Sample
The original Shelby tube sample was 600 mm long by 73 mm in diameter.

Test Specimen
The triaxial specimen was taken near the bottom of the Shelby tube sample. It was manually trimmed to a length of 155.37 mm and a diameter of 71.71 mm.

Test Apparatus
The specimen was mounted in a triaxial pressure chamber with 73 mm diameter end platens. Porous stone and filter paper disks were placed on both ends of the specimen. Filter paper strips were placed around the perimeter of the specimen to act as side drains. The specimen was enveloped in one latex membrane.

Test Procedure
The initial application of cell pressure resulted in $B=1.00$ indicating that the specimen was saturated. An attempt was made to consolidate the specimen to an effective confining pressure of 50 kPa. It became clear within a few minutes that there was a leak between the cell and the back pressure. The apparatus was dismantled, fittings were tightened and a second membrane was placed over the specimen. Application of a cell pressure of 100 kPa resulted in a pore pressure response of 82 kPa ($B=0.84$). The cell pressure and back pressure were increased in a series of 100 kPa increments until $B=0.97$ (at 400 kPa cell pressure). This indicated that the specimen was saturated. The specimen was consolidated in two stages to the required effective confining pressure of 600 kPa. During the first stage the sample was consolidated to an effective confining pressure of 200 kPa. For the second stage the sample was consolidated to the required effective confining pressure of 600 kPa. The back pressure valve was closed and axial loading was carried out until shear planes were visible in the specimen.

After Test
At the end of the test two "V" shaped shear planes had formed at an angle of 60° to the horizontal. The shear planes met in the center of the specimen. The specimen was weighed and moisture content, Atterberg limits, hydrometer and specific gravity samples were taken.
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-5

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
MR14-106E, Sa. 3B, 8.4 m / El. 920.5 m
File Number: 15-3-280

Effective Confining Pressure = 600 kPa
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-5

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
MR14-106E, Sa. 3B, 8.4 m / El. 920.5 m
File Number: 15-3-280
Effective Confining Pressure = 600 kPa

Mohr Circle at maximum Deviator Stress
CU14-5 @ 600 kPa Before Test

Triaxial specimen CU14-5
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-8
MR14-106C, Sa. 1B, 7.5 m / El. 921.0 m
Effective Confining Pressure = 75 kPa

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280
Test Dates: Dec. 16 - 21, 2014

Test Dates: Dec. 16 - 21, 2014

Index Testing Data
Gravel: 0.0% Liquid Limit: 50
Sand: 0.2% Plastic Limit: 20
Silt: 46.9% Plasticity Index: 30
Clay: 52.9% Sp. Gr. (assumed): 2.86

silty CLAY (CH), brown, thinly bedded, high plasticity

Specimen Data

<table>
<thead>
<tr>
<th></th>
<th>As Set Up</th>
<th>As Tested</th>
</tr>
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<tbody>
<tr>
<td>Wet Density (kg/cu.m.):</td>
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<td>Dry Density (kg/cu.m.):</td>
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<td>Moisture Content:</td>
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<td>38.7%</td>
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<tr>
<td>Void Ratio:</td>
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<td>1.106</td>
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<tr>
<td>Saturation:</td>
<td>97%</td>
<td>100%</td>
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<tr>
<td>Pore Press. Parameter B:</td>
<td>0.55</td>
<td>0.97</td>
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Stress/Strain Data

<table>
<thead>
<tr>
<th></th>
<th>Maximum Stress Ratio</th>
<th>Maximum Deviator Stress</th>
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<tbody>
<tr>
<td>Axial Strain (%):</td>
<td>0.82</td>
<td>0.82</td>
</tr>
<tr>
<td>Stress Ratio:</td>
<td>5.53</td>
<td>5.53</td>
</tr>
<tr>
<td>Deviator Stress (kPa):</td>
<td>106</td>
<td>106</td>
</tr>
<tr>
<td>Change in Pore Pressure (kPa):</td>
<td>51</td>
<td>51</td>
</tr>
<tr>
<td>Effective Confining Pressure (kPa):</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Pore Pressure Parameter A:</td>
<td>0.48</td>
<td>0.48</td>
</tr>
<tr>
<td>Rate of Displacement (%/hour):</td>
<td>0.26</td>
<td>0.26</td>
</tr>
</tbody>
</table>
Original Sample

The original sample was a section of a 73 mm diameter Shelby tube sample. It was 180 mm long.

Test Specimen

The triaxial specimen was prepared by trimming the ends of the Shelby tube sample. The triaxial specimen was 155.35 mm long by 72.10 mm in diameter.

Test Apparatus

The specimen was mounted in a triaxial pressure chamber with 73 mm diameter end platens. Porous stone and filter paper disks were placed on both ends of the specimen. Filter paper strips were placed around the perimeter of the specimen to act as side drains. The specimen was enveloped in one latex membrane.

Test Procedure

An initial cell pressure of 100 kPa resulted in a pore pressure response of 71 kPa (B=0.72). The cell pressure and back pressure were increased in a series of 100 kPa increments until B=0.97 (at 500 kPa cell pressure). This indicated that the specimen was saturated. The specimen was consolidated in one stage to the required effective confining pressure of 75 kPa. The back pressure valve was closed and axial loading was carried out until the deviator stress reached a peak and dropped off.

After Test

At the end of the test a two shear planes at an angle of 55° crossed each other in the middle of the specimen. The specimen was weighed and samples were taken for moisture content, hydrometer and Atterberg limits.
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT CU 14-8

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach  MR14-106C, Sa. 1B, 7.5 m / El. 921.0 m
File Number: 15-3-280  Effective Confining Pressure = 75 kPa

Mohr Circle at maximum Deviator Stress
CU14-8 @ 75 kPa Before Test
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT

Mount Polley Review Panel
Mount Polley Tailings Storage Facility Breach
File Number: 15-3-280

Nov. 21 to Dec. 21, 2014
MR14-106E, Sa. 3B, 3C, 2C and
MR14-106C, Sa. 1B

Mohr Circle at maximum Deviator Stress
## Consolidated-Undrained Triaxial Compression Test

**Location:** Mount Polley Tailings Storage Facility, BC  
**Date:** December 4, 2014

### Specimen Data

<table>
<thead>
<tr>
<th>Diameter (mm)</th>
<th>Height (mm)</th>
<th>Weight of container + sample (g)</th>
<th>Weight of container (g)</th>
<th>Total Unit Weight (kN/m³)</th>
<th>Dry Unit Weight (kN/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>71.80</td>
<td>146.60</td>
<td>1110.07</td>
<td>0</td>
<td>18.35</td>
<td>14.11</td>
</tr>
</tbody>
</table>

### Consolidation

- **Specific Gravity, \( G_s \):** 2.85
- **Initial vertical effective stress, \( \sigma'_1 \) (kPa):** 12.3
- **Final vertical effective stress, \( \sigma'_1 \) (kPa):** 150.8
- **Initial effective isotropic stress, \( \sigma'_3 \) (kPa):** 12.3
- **Final effective isotropic stress, \( \sigma'_3 \) (kPa):** 148.9
- **Pore Pressure (kPa):** 553.9
- **Volume change during consolidation, \( \Delta V_c \) (cm³):** 11.61

### Water Content

<table>
<thead>
<tr>
<th>Tin No.</th>
<th>Before Saturation</th>
<th>After Shear</th>
</tr>
</thead>
<tbody>
<tr>
<td>64</td>
<td>14.66</td>
<td>C06</td>
</tr>
<tr>
<td>Weight of tin (g)</td>
<td>33.37</td>
<td>142.16</td>
</tr>
<tr>
<td>Tin + Wet weight (g)</td>
<td>86.82</td>
<td>1255.7</td>
</tr>
<tr>
<td>Tin + Dry weight (g)</td>
<td>74.48</td>
<td>976.65</td>
</tr>
<tr>
<td>Water Content (%)</td>
<td>30.0</td>
<td>33.4</td>
</tr>
</tbody>
</table>

### Saturation

- **Vertical Seating Pressure (kPa):** 13.8
- **Cell Pressure, \( \sigma_3 \) (kPa):** 565.4
- **Back Pressure (kPa):** 551.6
- **Effective Stress (kPa):** 13.8
- **Pore pressure coefficient, B:** 0.99

### Shear

- **Initial vertical effective stress, \( \sigma'_1 \) (kPa):** 176.4
- **Initial Isotropic effective stress, \( \sigma'_3 \) (kPa):** 50.0
- **Initial Pore Pressure (kPa):** 663.7
- **Strain rate (%/hr):** 0.4

**Comments / Observations:** assumed \( G_s \) of 2.85 as requested by Thurber

**Performers:**
- **Performed By:** MF
- **Checked By:** PS
- **Approved By:** JPS

**Dates:**
- **Date:** December 4, 2014
- **Date:** December 4, 2014
- **Date:** December 5, 2014
MEG TECHNICAL SERVICES
(A Division of MEG Consulting Limited)

Consolidated-Undrained Triaxial Compression Test (ASTM D 4767)

Project: Mount Polley Independent Expert Engineering Investigation and Review Panel
Project No.: 14-MTS-021
Location: Mount Polley Tailings Storage Facility, BC
Date: December 4, 2014
Borehole: MR14-106F
Depth (m): 7.98
Sample No.: SA 2B

<table>
<thead>
<tr>
<th>Description</th>
<th>Initial Value</th>
<th>Final Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Height (mm)</td>
<td>146.6</td>
<td>30.02</td>
</tr>
<tr>
<td>Initial Diameter (mm)</td>
<td>71.8</td>
<td>18.35</td>
</tr>
<tr>
<td>Weight of Specimen (g)</td>
<td>1110.07</td>
<td>14.11</td>
</tr>
<tr>
<td>Specific Gravity, Gs</td>
<td>2.85</td>
<td>0.98</td>
</tr>
<tr>
<td>Initial Total Unit Weight (kN/m³)</td>
<td>18.35</td>
<td>20.0</td>
</tr>
<tr>
<td>Initial Dry Unit Weight (kN/m³)</td>
<td>14.11</td>
<td>15.0</td>
</tr>
<tr>
<td>Initial Void Ratio, e_i</td>
<td>0.98</td>
<td>0.92</td>
</tr>
<tr>
<td>Initial Water Content (%)</td>
<td>30.02</td>
<td>33.44</td>
</tr>
<tr>
<td>Final Water Content (%)</td>
<td>18.35</td>
<td>20.0</td>
</tr>
<tr>
<td>Final Water Content (%)</td>
<td>14.11</td>
<td>15.0</td>
</tr>
</tbody>
</table>

Comments: Sample consolidated in three stages (50kPa, 100kPa and 150kPa)

Prepared By: MF
Checked By: PS
Approved By: JPS
Date: December 4, 2014

### Consolidated-Undrained Triaxial Compression Test (ASTM D 4767)

#### Specimen Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter (mm)</td>
<td>72.12</td>
</tr>
<tr>
<td>Height (mm)</td>
<td>149.04</td>
</tr>
<tr>
<td>Weight of container + sample (g)</td>
<td>1113.07</td>
</tr>
<tr>
<td>Weight of container (g)</td>
<td>0</td>
</tr>
<tr>
<td>Total Unit Weight (kN/m³)</td>
<td>17.94</td>
</tr>
<tr>
<td>Dry Unit Weight (kN/m³)</td>
<td>12.67</td>
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</table>

#### Consolidation

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity, Gs:</td>
<td>2.85</td>
</tr>
<tr>
<td>Initial vertical effective stress, ( \sigma'_1 ) (kPa)</td>
<td>17.3</td>
</tr>
<tr>
<td>Final vertical effective stress, ( \sigma'_1 ) (kPa)</td>
<td>303.5</td>
</tr>
<tr>
<td>Initial effective isotropic stress, ( \sigma'_3 ) (kPa)</td>
<td>17.3</td>
</tr>
<tr>
<td>Final effective isotropic stress, ( \sigma'_3 ) (kPa)</td>
<td>303.1</td>
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<tr>
<td>Total Unit Weight (kN/m³)</td>
<td>1149.04</td>
</tr>
<tr>
<td>Dry Unit Weight (kN/m³)</td>
<td>12.67</td>
</tr>
</tbody>
</table>

#### Water Content

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume change during consolidation, ( \Delta V_c ) (cm³)</td>
<td>19.26</td>
</tr>
<tr>
<td>Initial height of specimen (cm)</td>
<td>14.90</td>
</tr>
<tr>
<td>Initial area of specimen (cm²)</td>
<td>40.85</td>
</tr>
<tr>
<td>Initial volume of specimen (cm³)</td>
<td>608.82</td>
</tr>
<tr>
<td>Initial void ratio, ( e_i )</td>
<td>1.21</td>
</tr>
<tr>
<td>Final void ratio, ( e_i )</td>
<td>1.13</td>
</tr>
</tbody>
</table>

#### Saturation

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Seating Pressure (kPa)</td>
<td>13.8</td>
</tr>
<tr>
<td>Cell Pressure, ( \sigma_3 ) (kPa)</td>
<td>565.4</td>
</tr>
<tr>
<td>Back Pressure (kPa)</td>
<td>551.6</td>
</tr>
<tr>
<td>Effective Stress (kPa)</td>
<td>13.8</td>
</tr>
<tr>
<td>Pore pressure coefficient, B</td>
<td>0.99</td>
</tr>
</tbody>
</table>

#### Shear

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial vertical effective stress, ( \sigma'_1 ) (kPa)</td>
<td>319.8</td>
</tr>
<tr>
<td>Initial Isotropic effective stress, ( \sigma'_3 ) (kPa)</td>
<td>226.5</td>
</tr>
<tr>
<td>Initial Pore Pressure (kPa)</td>
<td>668.1</td>
</tr>
<tr>
<td>Strain rate (%/hr)</td>
<td>0.4</td>
</tr>
</tbody>
</table>

#### Comments / Observations:

assumed Gs of 2.85 as requested by Thurber

<table>
<thead>
<tr>
<th>Performed By</th>
<th>Checked By</th>
<th>Approved By</th>
</tr>
</thead>
<tbody>
<tr>
<td>MF</td>
<td>PS</td>
<td>JPS</td>
</tr>
<tr>
<td>December 4, 2014</td>
<td>December 4, 2014</td>
<td>December 5, 2014</td>
</tr>
</tbody>
</table>
MEG TECHNICAL SERVICES
(A Division of MEG Consulting Limited)

Consolidated-Undrained Triaxial Compression Test
(ASTM D 4767)

Project: Mount Polley Independent Expert Engineering Investigation and Review Panel
Location: Mount Polley Tailings Storage Facility, BC
Borehole: MR14-106F
Sample No.: SA 2B

Initial Height (mm): 149.0
Initial Diameter (mm): 72.1
Weight of Specimen (g): 1113.07
Specific Gravity, Gs: 2.85
Initial Total Unit Weight (kN/m³): 17.94
Initial Dry Unit Weight (kN/m³): 12.67
Initial Void Ratio, eᵢ: 1.21

Final Water Content (%): 35.58
Final Total Unit Weight (kN/m³): 18.4
Final Dry Unit Weight (kN/m³): 13.6
Final Void Ratio, eᵢ: 1.13

Comments: Sample consolidated in three stages (100kPa, 200kPa and 300kPa)

Prepared By: MF
Checked By: PS
Approved By: JPS
Date: December 4, 2014
### Specimen Data

| Diameter (mm) | 71.54 |
| Height (mm)   | 147.41 |
| Weight of container + sample (g) | 1110.75 |
| Weight of container (g)           | 0.00   |
| Total Unit Weight (kN/m³)         | 18.39  |
| Dry Unit Weight (kN/m³)           | 13.33  |

### Consolidation

| Specific Gravity, Gs: | 2.85   |
| Initial vertical effective stress, σ₁ (kPa) | 14.5   |
| Final vertical effective stress, σ’₁ (kPa)  | 613.4  |
| Initial effective isotropic stress, σ₃ (kPa) | 14.5   |
| Final effective isotropic stress, σ’₃ (kPa) | 599.1  |
| Weight of container (g)                  | 32.47  |
| Volume change during consolidation, ΔVₑ (cm³) | 21.16 |
| Initial height of specimen (cm)          | 14.74  |
| Initial area of specimen (cm²)           | 40.20  |
| Initial volume of specimen (cm³)         | 592.60 |
| Initial void ratio, εᵢ                    | 1.10   |
| Final void ratio, εᵢ                      | 1.02   |

### Water Content

| Tin No. | 94 | 1 |
| Weight of tin (g) | 32.47 | 149.57 |
| Tin + Wet weight (g) | 61.55 | 1219.02 |
| Tin + Dry weight (g) | 53.55 | 944.03 |
| Water Content (%)   | 38.0  | 34.6 |

### Saturation

| Vertical Seating Pressure (kPa) | 13.8 |
| Cell Pressure, σ₃ (kPa)         | 565.4 |
| Back Pressure (kPa)            | 551.6 |
| Effective Stress (kPa)         | 13.8 |
| Pore pressure coefficient, B   | 1.00  |

### Shear

| Initial vertical effective stress, σ’₁ (kPa) | 626.9 |
| Initial Isotropic effective stress, σ’₃ (kPa) | 613.7 |
| Initial Pore Pressure (kPa)                 | 557.8 |
| Strain rate (%/hr)                         | 0.4   |

Comments / Observations: assumed Gs of 2.85 as requested by Thurber

<table>
<thead>
<tr>
<th>Performed By: MF</th>
<th>Checked By: PS</th>
<th>Approved By: JPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date: December 4, 2014</td>
<td>Date: December 4, 2014</td>
<td>Date: December 5, 2014</td>
</tr>
</tbody>
</table>
Consolidated-Undrained Triaxial Compression Test  
(ASTM D 4767)

<table>
<thead>
<tr>
<th>Sample No.:</th>
<th>SA 2B</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Project:</th>
<th>Mount Polley Independent Expert Engineering Investigation and Review Panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>Mount Polley Tailings Storage Facility, BC</td>
</tr>
<tr>
<td>Date:</td>
<td>December 4, 2014</td>
</tr>
<tr>
<td>Borehole:</td>
<td>MR14-106F</td>
</tr>
<tr>
<td>Depth (m):</td>
<td>8.28</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Initial Height (mm):</th>
<th>147.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Water Content (%):</td>
<td>37.95</td>
</tr>
<tr>
<td>Final Water Content (%):</td>
<td>34.61</td>
</tr>
<tr>
<td>Initial Diameter (mm):</td>
<td>71.5</td>
</tr>
<tr>
<td>Initial Total Unit Weight (kN/m³):</td>
<td>18.39</td>
</tr>
<tr>
<td>Final Total Unit Weight (kN/m³):</td>
<td>19.3</td>
</tr>
<tr>
<td>Weight of Specimen (g):</td>
<td>1110.75</td>
</tr>
<tr>
<td>Initial Dry Unit Weight (kN/m³):</td>
<td>13.33</td>
</tr>
<tr>
<td>Final Dry Unit Weight (kN/m³):</td>
<td>14.4</td>
</tr>
<tr>
<td>Specific Gravity, Gs:</td>
<td>2.85</td>
</tr>
<tr>
<td>Initial Void Ratio, e_i:</td>
<td>1.10</td>
</tr>
<tr>
<td>Final Void Ratio, e_f:</td>
<td>1.02</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Loading to 210kPa</th>
</tr>
</thead>
</table>

Comments: Sample consolidated in three stages (200kPa, 400kPa and 600kPa)  
Backpressure pumped maxed out overnight at 200 kPa. When the pump was drained,  
the stress jumped to 360kPa. Test had to be stopped early to avoid bending loading  
piston.
### Specimen Data

| Diameter (mm) | 72.83 |
| Height (mm) | 157.60 |
| Weight of container + sample (g) | 1257.22 |
| Weight of container (g) | 0 |
| Total Unit Weight (kN/m³) | 18.79 |
| Dry Unit Weight (kN/m³) | 13.60 |

### Consolidation

- **Specific Gravity, Gs:** 2.85
- **Initial vertical effective stress, \( \sigma'_1 \) (kPa):** 21.0
- **Final vertical effective stress, \( \sigma'_1 \) (kPa):** 149.8
- **Initial effective isotropic stress, \( \sigma'_3 \) (kPa):** 21.0
- **Final effective isotropic stress, \( \sigma'_3 \) (kPa):** 150.0
- **Pore Pressure (kPa):** 552.4

### Water Content

<table>
<thead>
<tr>
<th>Tin No.</th>
<th>Before Saturation</th>
<th>After Shear</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>34.17</td>
<td>197.54</td>
</tr>
<tr>
<td></td>
<td>108.53</td>
<td>457.73</td>
</tr>
<tr>
<td>87.98</td>
<td>386.98</td>
<td></td>
</tr>
<tr>
<td>32.8</td>
<td>37.3</td>
<td></td>
</tr>
</tbody>
</table>

### Saturation

- **Volume change during consolidation, \( \Delta V_c \) (cm³):** 10.54
- **Initial height of specimen (cm):** 15.76
- **Initial area of specimen (cm²):** 41.66
- **Initial volume of specimen (cm³):** 656.47
- **Initial void ratio, \( e_i \):** 1.06
- **Final void ratio, \( e_f \):** 1.00

### Shear

- **Initial vertical effective stress, \( \sigma'_1 \) (kPa):** 150.0
- **Initial Isotropic effective stress, \( \sigma'_3 \) (kPa):** 150.0
- **Initial Pore Pressure (kPa):** 552.4
- **Strain rate (%/hr):** 0.4

### Comments / Observations:

Test was stopped at 12.2% strain to avoid damaging the equipment. Assumed Gs of 2.85 as requested by Thurber.
Consolidated-Undrained Triaxial Compression Test
(AMT D 4767)

Mount Polley Independent Expert Engineering Investigation and Review Panel

Prepared By: MF
Checked By: PS
Approved By: JPS

Comments:
Test was stopped at 12.2% strain to avoid damaging the equipment.
Sample consolidated in three stages (50kPa, 100kPa and 150kPa)

MEG TECHNICAL SERVICES
(A Division of MEG Consulting Limited)

Mount Polley Tailings Storage Facility, BC
November 20, 2014

Consolidated-Undrained Triaxial Compression Test (ASTM D 4767)

Initial Height (mm): 157.6
Initial Water Content (%): 38.19
Initial Diameter (mm): 72.8
Initial Total Unit Weight (kN/m³): 18.79
Weight of Specimen (g): 1257.22
Initial Void Ratio, e: 1.06

Final Water Content (%): 37.35
Final Total Unit Weight (kN/m³): 19.7
Final Dry Unit Weight (kN/m³): 14.4
Specific Gravity, Gs: 2.85
Final Void Ratio, e: 1.00

Sample No.: SA 2B
Borehole: MR14-106G
Location: Mount Polley Tailings Storage Facility, BC
Date: November 20, 2014
Depth (m): 7.77

Initial Total Unit Weight (kN/m³): 1257.22
Initial Dry Unit Weight (kN/m³): 13.60
Initial Water Content (%): 38.19
Initial Void Ratio, e: 1.06

Specific Gravity, Gs: 2.85
Final Void Ratio, e: 1.00

Initial Total Unit Weight (kN/m³): 1257.22
Initial Dry Unit Weight (kN/m³): 13.60
Initial Water Content (%): 38.19
Initial Void Ratio, e: 1.06

Specific Gravity, Gs: 2.85
Final Void Ratio, e: 1.00

MEG TECHNICAL SERVICES
(A Division of MEG Consulting Limited)

Mount Polley Independent Expert Engineering Investigation and Review Panel

Prepared By: MF
Checked By: PS
Approved By: JPS

Comments:
Test was stopped at 12.2% strain to avoid damaging the equipment.
Sample consolidated in three stages (50kPa, 100kPa and 150kPa)

MEG TECHNICAL SERVICES
(A Division of MEG Consulting Limited)

Mount Polley Independent Expert Engineering Investigation and Review Panel

Prepared By: MF
Checked By: PS
Approved By: JPS

Comments:
Test was stopped at 12.2% strain to avoid damaging the equipment.
Sample consolidated in three stages (50kPa, 100kPa and 150kPa)
### Consolidated-Undrained Triaxial Compression Test (ASTM D 4767)

**Project:** Mount Polley Independent Expert Engineering Investigation and Review Panel  
**Location:** Mount Polley Tailings Storage Facility, BC  
**Date:** November 21, 2014

<table>
<thead>
<tr>
<th>Specimen Data</th>
<th>Consolidation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter (mm)</td>
<td>35.66</td>
</tr>
<tr>
<td>Height (mm)</td>
<td>76.70</td>
</tr>
<tr>
<td>Weight of container + sample (g)</td>
<td>140.7</td>
</tr>
<tr>
<td>Weight of container (g)</td>
<td>0</td>
</tr>
<tr>
<td>Total Unit Weight (kN/m³)</td>
<td>18.02</td>
</tr>
<tr>
<td>Dry Unit Weight (kN/m³)</td>
<td>13.46</td>
</tr>
<tr>
<td>Specific Gravity, Gs:</td>
<td>2.85</td>
</tr>
<tr>
<td>Initial vertical effective stress, ( \sigma_1 ) (kPa):</td>
<td>17.6</td>
</tr>
<tr>
<td>Final vertical effective stress, ( \sigma'_1 ) (kPa):</td>
<td>310.0</td>
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<tr>
<td>Initial effective isotropic stress, ( \sigma'_3 ) (kPa):</td>
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<tr>
<td>Final effective isotropic stress, ( \sigma'_3 ) (kPa):</td>
<td>302.7</td>
</tr>
<tr>
<td>Weight of container (g):</td>
<td></td>
</tr>
<tr>
<td>Pore Pressure (kPa):</td>
<td>548.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Water Content</th>
<th>Volume change during consolidation, ( \Delta V_c ) (cm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tin No.</td>
<td>29 C106</td>
</tr>
<tr>
<td>Weight of tin (g)</td>
<td>34.78</td>
</tr>
<tr>
<td>Tin + Wet weight (g)</td>
<td>92.63</td>
</tr>
<tr>
<td>Tin + Dry weight (g)</td>
<td>77.99</td>
</tr>
<tr>
<td>Water Content (%)</td>
<td>33.9</td>
</tr>
<tr>
<td>Initial height of specimen (cm):</td>
<td>7.67</td>
</tr>
<tr>
<td>Initial area of specimen (cm²):</td>
<td>9.99</td>
</tr>
<tr>
<td>Initial volume of specimen (cm³):</td>
<td>76.61</td>
</tr>
<tr>
<td>Initial void ratio, ( e_i ):</td>
<td>1.08</td>
</tr>
<tr>
<td>Final void ratio, ( e_i ):</td>
<td>1.01</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Saturation</th>
<th>Shear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Seating Pressure (kPa):</td>
<td>13.8</td>
</tr>
<tr>
<td>Initial vertical effective stress, ( \sigma'_1 ) (kPa):</td>
<td>0.0</td>
</tr>
<tr>
<td>Cell Pressure, ( \sigma'_3 ) (kPa):</td>
<td>565.4</td>
</tr>
<tr>
<td>Initial Isotropic effective stress, ( \sigma'_3 ) (kPa):</td>
<td>0.0</td>
</tr>
<tr>
<td>Back Pressure (kPa):</td>
<td>551.6</td>
</tr>
<tr>
<td>Initial Pore Pressure (kPa):</td>
<td>0.0</td>
</tr>
<tr>
<td>Effective Stress (kPa):</td>
<td>13.8</td>
</tr>
<tr>
<td>Strain rate (%/hr):</td>
<td>0.4</td>
</tr>
<tr>
<td>Pore pressure coefficient, B:</td>
<td>1.00</td>
</tr>
</tbody>
</table>

**Comments / Observations:** Test was stopped at 14.4% strain to avoid damaging the equipment. Assumed Gs of 2.85 as requested by Thurber.

**Performed By:** MF  
**Checked By:** PS  
**Approved By:** JPS

**Date:** November 21, 2014
Sample consolidated in three stages (100kPa, 200kPa and 300kPa)

Comments: Test was stopped at 14.4% strain to avoid damaging the equipment

Sample No.: SA 2B

<table>
<thead>
<tr>
<th>Initial Height (mm)</th>
<th>Initial Water Content (%)</th>
<th>Final Water Content (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>76.7</td>
<td>33.88</td>
<td>34.85</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Initial Diameter (mm)</th>
<th>Initial Total Unit Weight (kN/m³)</th>
<th>Final Total Unit Weight (kN/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.7</td>
<td>18.02</td>
<td>19.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weight of Specimen (g)</th>
<th>Initial Dry Unit Weight (kN/m³)</th>
<th>Final Dry Unit Weight (kN/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>140.70</td>
<td>13.46</td>
<td>14.4</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Specific Gravity, Gs:</th>
<th>Initial Void Ratio, e_i:</th>
<th>Final Void Ratio, e_f:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.85</td>
<td>1.08</td>
<td>1.01</td>
</tr>
</tbody>
</table>
### Specimen Data

| Diameter (mm) | 35.65 |
| Height (mm) | 84.33 |
| Weight of container + sample (g) | 152.4 |
| Weight of container (g) | 0 |
| Total Unit Weight (kN/m³) | 17.76 |
| Dry Unit Weight (kN/m³) | 12.82 |

### Specific Gravity, Gs

- **Diameter (mm):** 35.65
- **Height (mm):** 84.33
- **Weight of container + sample (g):** 152.4
- **Weight of container (g):** 0
- **Total Unit Weight (kN/m³):** 17.76
- **Dry Unit Weight (kN/m³):** 12.82

### Consolidation

| Initial vertical effective stress, \( \sigma'_1 \) (kPa) | 14.2 |
| Initial effective isotropic stress, \( \sigma'_3 \) (kPa) | 14.2 |
| Initial Isotropic effective stress, \( \sigma'_3 \) (kPa) | 14.2 |
| Initial Pore Pressure (kPa) | 586.0 |

### Water Content

<table>
<thead>
<tr>
<th>Tin No.</th>
<th>Before Saturation</th>
<th>After Shear</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>35.35</td>
<td>197.54</td>
</tr>
<tr>
<td>Weight of tin (g)</td>
<td>89.57</td>
<td>257.85</td>
</tr>
<tr>
<td>Tin + Wet weight (g)</td>
<td>74.5</td>
<td></td>
</tr>
<tr>
<td>Tin + Dry weight (g)</td>
<td>38.5</td>
<td></td>
</tr>
<tr>
<td>Water Content (%)</td>
<td>38.5</td>
<td></td>
</tr>
</tbody>
</table>

### Volume change during consolidation, \( \Delta V_c \) (cm³)

- **Volume change during consolidation, \( \Delta V_c \) (cm³):** 5.80

### Saturation

| Vertical Seating Pressure (kPa) | 13.8 |
| Cell Pressure, \( \sigma'_3 \) (kPa) | 565.4 |
| Back Pressure (kPa) | 551.6 |
| Effective Stress (kPa) | 13.8 |
| Pore pressure coefficient, B | 1.00 |

### Shear

| Initial vertical effective stress, \( \sigma'_1 \) (kPa) | 552.8 |
| Initial Isotropic effective stress, \( \sigma'_3 \) (kPa) | 532.1 |
| Initial Pore Pressure (kPa) | 612.9 |
| Strain rate (%/hr) | 0.4 |

**Comments / Observations:** assumed Gs of 2.85 as requested by Thurber
**Consolidated-Undrained Triaxial Compression Test (ASTM D 4767)**

**Project:** Mount Polley Independent Expert Engineering Investigation and Review Panel  
**Project No.:** 14-MTS-021  
**Location:** Mount Polley Tailings Storage Facility, BC  
**Date:** November 24, 2014  
**Borehole:** MR14-106G  
**Depth (m):** 8.04  
**Sample No.:** Sa2B

**Initial Height (mm):** 84.3  
**Initial Diameter (mm):** 35.7  
**Weight of Specimen (g):** 152.40  
**Specific Gravity, Gs:** 2.85

**Initial Water Content (%):** 38.49  
**Initial Total Unit Weight (kN/m³):** 17.76  
**Initial Void Ratio, eᵢ:** 1.18

**Final Water Content (%):** 38.37  
**Final Total Unit Weight (kN/m³):** 19.8  
**Final Void Ratio, eᵢ:** 1.06

**Comments:** Sample consolidated in three stages (200kPa, 400kPa and 600kPa)

---

**Prepared By:** MF  
**Checked By:** PS  
**Approved By:** JPS  
**Date:** November 24, 2014  
**Date:** November 25, 2014  
**Date:** November 26, 2014
Appendix E
Attachment 5
Direct Simple Shear Test Data
# Panel Direct Simple Shear Test Data Summary

<table>
<thead>
<tr>
<th>Sample</th>
<th>Sample Depth (m)</th>
<th>Sample Elevation (m)</th>
<th>Oedometer sig'_p (kPa)</th>
<th>W/C (%)</th>
<th>PI</th>
<th>Initial Confining Stress (kPa)</th>
<th>OCR</th>
<th>Initial Shear Stress (kPa)</th>
<th>Shear Bias</th>
<th>Peak Undrained Strength Ratio</th>
<th>Strain at Peak Strength at 20% Strain</th>
<th>Undrained Strength Ratio at 20% Strain</th>
<th>Inferred Soil Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-106A-Sa1C-T1</td>
<td>7.6</td>
<td>921.2</td>
<td>442</td>
<td>43</td>
<td>31</td>
<td>600</td>
<td>1.00</td>
<td>0</td>
<td>0</td>
<td>0.22</td>
<td>10%</td>
<td>0.18</td>
<td>Upper GLU</td>
<td></td>
</tr>
<tr>
<td>14-106A-Sa1C-T2</td>
<td>7.6</td>
<td>921.1</td>
<td>442</td>
<td>37</td>
<td>31</td>
<td>600</td>
<td>1.00</td>
<td>60</td>
<td>10%</td>
<td>0.23</td>
<td>small</td>
<td>Upper GLU</td>
<td>Upper GLU</td>
<td></td>
</tr>
<tr>
<td>14-106A-Sa1C-T3</td>
<td>7.6</td>
<td>921.1</td>
<td>442</td>
<td>38</td>
<td>31</td>
<td>600</td>
<td>1.00</td>
<td>120</td>
<td>20%</td>
<td>0.26</td>
<td>small</td>
<td>Upper GLU</td>
<td>Upper GLU</td>
<td></td>
</tr>
<tr>
<td>14-106A-Sa1C-T4</td>
<td>7.7</td>
<td>921.1</td>
<td>442</td>
<td>33</td>
<td>31</td>
<td>300</td>
<td>1.47</td>
<td>60</td>
<td>20%</td>
<td>0.28</td>
<td>5%</td>
<td>0.25</td>
<td>Upper GLU</td>
<td></td>
</tr>
<tr>
<td>14-106C-Sa1B-T1</td>
<td>7.4</td>
<td>921.2</td>
<td>454</td>
<td>44</td>
<td>33</td>
<td>600</td>
<td>1.00</td>
<td>180</td>
<td>30%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Upper GLU</td>
<td></td>
</tr>
<tr>
<td>14-106C-Sa1B-T2</td>
<td>7.3</td>
<td>921.2</td>
<td>454</td>
<td>43</td>
<td>33</td>
<td>600</td>
<td>1.00</td>
<td>150</td>
<td>25%</td>
<td>0.27</td>
<td>1%</td>
<td>0.15</td>
<td>Upper GLU</td>
<td></td>
</tr>
<tr>
<td>14-106C-Sa1B-T3</td>
<td>7.3</td>
<td>921.2</td>
<td>454</td>
<td>39</td>
<td>31</td>
<td>600</td>
<td>1.00</td>
<td>60</td>
<td>10%</td>
<td>0.21</td>
<td>8%</td>
<td>0.17</td>
<td>Upper GLU</td>
<td></td>
</tr>
<tr>
<td>14-106G-Sa1B-T1</td>
<td>7.8</td>
<td>920.9</td>
<td>510</td>
<td>44</td>
<td>21</td>
<td>600</td>
<td>1.00</td>
<td>60</td>
<td>10%</td>
<td>0.21</td>
<td>7%</td>
<td>0.17</td>
<td>Upper GLU</td>
<td></td>
</tr>
<tr>
<td>14-106G-Sa1B-T2</td>
<td>8.1</td>
<td>920.6</td>
<td>510</td>
<td>38</td>
<td>21</td>
<td>600</td>
<td>1.00</td>
<td>120</td>
<td>20%</td>
<td>0.26</td>
<td>small</td>
<td>Upper GLU</td>
<td>Upper GLU</td>
<td></td>
</tr>
<tr>
<td>14-107-Sa1B-T1</td>
<td>7.1</td>
<td>921.5</td>
<td>330</td>
<td>44</td>
<td>23</td>
<td>300</td>
<td>1.10</td>
<td>30</td>
<td>10%</td>
<td>0.27</td>
<td>5%</td>
<td>0.22</td>
<td>Upper GLU</td>
<td></td>
</tr>
<tr>
<td>14-107-Sa1B-T2</td>
<td>7.2</td>
<td>921.5</td>
<td>330</td>
<td>43</td>
<td>23</td>
<td>300</td>
<td>1.10</td>
<td>30</td>
<td>10%</td>
<td>0.25</td>
<td>6%</td>
<td>0.20</td>
<td>Upper GLU</td>
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<tr>
<td>14-107A-Sa1A-T1</td>
<td>7.4</td>
<td>920.9</td>
<td>516</td>
<td>43</td>
<td>34</td>
<td>600</td>
<td>1.00</td>
<td>0</td>
<td>0%</td>
<td>0.21</td>
<td>9%</td>
<td>0.15</td>
<td>Upper GLU</td>
<td></td>
</tr>
<tr>
<td>14-107A-Sa1A-T2</td>
<td>7.3</td>
<td>921.0</td>
<td>516</td>
<td>42</td>
<td>34</td>
<td>600</td>
<td>1.00</td>
<td>0</td>
<td>0%</td>
<td>0.20</td>
<td>9%</td>
<td>0.18</td>
<td>Upper GLU</td>
<td></td>
</tr>
<tr>
<td>14-107A-Sa7</td>
<td>12.0</td>
<td>916.3</td>
<td>701</td>
<td>22</td>
<td>15</td>
<td>600</td>
<td>1.2</td>
<td>0</td>
<td>0%</td>
<td>0.30</td>
<td>10%</td>
<td>0.25</td>
<td>Lower Tills (Lower GLU)</td>
<td></td>
</tr>
<tr>
<td>14-109-Sa6B</td>
<td>12.4</td>
<td>916.6</td>
<td>750</td>
<td>22</td>
<td>13</td>
<td>300</td>
<td>2.5</td>
<td>30</td>
<td>10%</td>
<td>0.42</td>
<td>7%</td>
<td>0.35</td>
<td>Lower Tills (Lower GLU)</td>
<td></td>
</tr>
<tr>
<td>14-110-Sa6C</td>
<td>12.4</td>
<td>916.3</td>
<td>794</td>
<td>21</td>
<td>15</td>
<td>300</td>
<td>2.6</td>
<td>30</td>
<td>10%</td>
<td>0.27</td>
<td>7%</td>
<td>0.22</td>
<td>Lower Tills (Lower GLU)</td>
<td></td>
</tr>
<tr>
<td>14-113-Sa4B</td>
<td>6.5</td>
<td>922.9</td>
<td>380</td>
<td>13</td>
<td>7</td>
<td>300</td>
<td>1.3</td>
<td>30</td>
<td>10%</td>
<td>0.43</td>
<td>N/A</td>
<td>0.49</td>
<td>Upper Tills</td>
<td></td>
</tr>
</tbody>
</table>

For Average Upper GLU:
- No shear bias: 0.21 (9%), 0.17 (7%)
- 10% shear bias: 0.23 (5%), 0.19 (7%)
- >20% shear bias: 0.27 (3%), 0.21 (7%)
- All data: 0.24 (7%), 0.19 (7%)

Sample partially disturbed due to sampling overlap with field vane.
Sample sheared when attempting to apply shear bias.

Average Upper GLU (no shear bias) 0.21 9% 0.17
Average Upper GLU (10% shear bias) 0.23 5% 0.19
Average Upper GLU (>20% shear bias) 0.27 3% 0.21
Average Upper GLU (all data) 0.24 7% 0.19

Notes:
- Upper GLU
- Lower Tills (Lower GLU)
DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

PROJECT: Mount Polley Independent Expert Engineering Investigation and Review Panel
Project No.: 14-MTS-021

LOCATION: Mount Polley Tailings Storage Facility, BC
Date: November 4, 2014

Borehole: MR14-106A
Depth (m): 7.58

Sample No.: Sa1C - T1
Station: DSS1

Initial Height (mm): 23.3
Weight of Specimen (g): 180.90
Initial Void Ratio, e$: 1.22

Diameter of Ring (mm): 73.3
Total Unit Weight (kN/m$^3$): 18.06
Final Void Ratio, e$: 0.93

Specific Gravity, Gs: 2.85
Dry Unit Weight (kN/m$^3$): 12.62
Natural Water Content (%): 43.1

Final Water Content (%): 32.4
Initial Degree of Saturation, Sr (%): $>$100
Final Degree of Saturation, Sr (%): $>$100

Type of Test: Constant Volume

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (m)</th>
<th>Total Unit Weight (kN/m$^3$)</th>
<th>Effective Vertical Stress, $\sigma'$ (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa1C - T1</td>
<td>7.70</td>
<td>18.1</td>
<td>600</td>
</tr>
</tbody>
</table>

Comments: Assumed Gs of 2.85 as instructed by Thurber

Prepared By: MF
Checked By: PS
Approved By: JPS
Date: November 10, 2014
MEG TECHNICAL SERVICES
(A Division of MEG Consulting Limited)

DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

Project: Mount Polley Independent Expert Engineering Investigation and Review Panel
Location: Mount Polley Tailings Storage Facility, BC
Date: November 4, 2014
Borehole: MR14-106A
Depth (m): 7.58
Sample No.: Sa1C - T1
Station: DSS1

Sample Pictures

Sample in ring assembly after shear

Sample after test. Location of possible lab vane visible in the middle section of the sample. The top portion of the sample was stuck to the top porous stone and revealed the lab vane test location. MEG was unaware a vane test was performed at the test location.

Cross section of the sample after the test was completed. Lamination of sample visible.

Prepared By: MF
Checked By: PS
Approved By: JPS
Date: November 10, 2014
Date: November 10, 2014
Date: November 11, 2014
DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

Sample No.: Sa1C - T2
Station: DSS1
Initial Height (mm): 23.4
Diameter of Ring (mm): 73.2
Specific Gravity,Gs: 2.85
Initial Void Ratio, e_i: 1.10
Final Water Content (%): 30.7

Location: Mount Polley Tailings Storage Facility, BC
Date: November 19, 2014
Project: Mount Polley Independent Expert Engineering Investigation and Review Panel
Project No.: 14-MTS-021
Borehole: MR14-106A
Depth (m): 7.61
Sample No.: Sa1C - T2
Station: DSS1
Initial Height (mm): 23.4
Diameter of Ring (mm): 73.2
Specific Gravity,Gs: 2.85
Initial Void Ratio, e_i: 1.10
Final Water Content (%): 30.7

Equipment error stopped the test at 10% strain

Assumed Gs of 2.85 as instructed by Thurber

Type of Test: Constant Volume

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (m)</th>
<th>Total Unit Weight (kN/m³)</th>
<th>Effective Vertical Stress, σ'v (kPa)</th>
<th>Static Bias (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa1C - T2</td>
<td>7.76</td>
<td>18.2</td>
<td>600</td>
<td>60</td>
</tr>
</tbody>
</table>

Comments: Assumed Gs of 2.85 as instructed by Thurber

Prepared By: MF
Date: November 19, 2014

Checked By: PS
Date: November 19, 2014

Approved By: JPS
Date: November 20, 2014
MEG TECHNICAL SERVICES
(A Division of MEG Consulting Limited)

DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

<table>
<thead>
<tr>
<th>Project:</th>
<th>Mount Polley Independent Expert Engineering Investigation and Review Panel</th>
<th>Project No.:</th>
<th>14-MTS-021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>Mount Polley Tailings Storage Facility, BC</td>
<td>Date:</td>
<td>November 19, 2014</td>
</tr>
<tr>
<td>Borehole:</td>
<td>MR14-106A</td>
<td>Depth (m):</td>
<td>7.61</td>
</tr>
<tr>
<td>Sample No.:</td>
<td>Sa1C - T2</td>
<td>Station:</td>
<td>DSS1</td>
</tr>
</tbody>
</table>

Sample Pictures

Cross section of the sample after the test was completed. Lamination of sample visible.

Prepared By: MF  Checked By: PS  Approved By: JPS
Date: November 19, 2014  Date: November 19, 2014  Date: November 20, 2014
**DIRECT SIMPLE SHEAR TEST (ASTM D 6528)**

**Project:** Mount Polley Independent Expert Engineering Investigation and Review Panel  
**Project No.:** 14-MTS-021  
**Location:** Mount Polley Tailings Storage Facility, BC  
**Date:** November 20, 2014

**Sample No.:** Sa1C - T3  
**Station:** DSS1

**Initial Height (mm):** 23.4  
**Weight of Specimen (g):** 181.51  
**Initial Void Ratio, e_i:** 1.13

**Diameter of Ring (mm):** 73.0  
**Total Unit Weight (kN/m³):** 18.16  
**Final Void Ratio, e_f:** 0.85

**Specific Gravity, G_s:** 2.85  
**Dry Unit Weight (kN/m³):** 13.14  
**Natural Water Content (%):** 38.2

**Final Water Content (%):** 34.4  
**Initial Degree of Saturation, Sr (%):** 96.6  
**Final Degree of Saturation, Sr (%):** >100

**Comments:** Assumed Gs of 2.85 as instructed by Thurber

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (m)</th>
<th>Total Unit Weight (kN/m³)</th>
<th>Effective Vertical Stress, σ'v (kPa)</th>
<th>Static Bias (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa1C - T3</td>
<td>7.82</td>
<td>18.2</td>
<td>600</td>
<td>120</td>
</tr>
</tbody>
</table>

**Type of Test: Constant Volume**

Prepared By: MF  
Checked By: PS  
Approved By: JPS

Date: November 10, 2014  
Date: November 10, 2014  
Date: November 11, 2014
MEG TECHNICAL SERVICES
(A Division of MEG Consulting Limited)

DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

Project: Mount Polley Independent Expert Engineering Investigation and Review Panel
Project No.: 14-MTS-021
Location: Mount Polley Tailings Storage Facility, BC
Date: November 27, 2014

Borehole: MR14-106A
Depth (m): 7.67

Sample No.: Sa1C - T4
Station: DSS1

Initial Height (mm): 20.0
Weight of Specimen (g): 153.39
Initial Void Ratio, $e_v$: 1.07

Diameter of Ring (mm): 73.0
Total Unit Weight (kN/m$^3$): 18.01
Final Void Ratio, $e_f$: 0.90

Specific Gravity, Gs: 2.85
Dry Unit Weight (kN/m$^3$): 13.53
Natural Water Content (%): 33.1

Final Water Content (%): 36.6
Initial Degree of Saturation, Sr (%): 88.4
Final Degree of Saturation, Sr (%): > 100

---

**Comments:**
Assumed Gs of 2.85 as instructed by Thurber
Equipment error stopped the test at 17% strain

---

**Type of Test: Constant Volume**

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (m)</th>
<th>Total Unit Weight (kN/m$^3$)</th>
<th>Effective Vertical Stress, $\sigma_v$ (kPa)</th>
<th>Static Bias (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa1C - T4</td>
<td>7.87</td>
<td>18.0</td>
<td>300</td>
<td>60</td>
</tr>
</tbody>
</table>

---

Prepared By: MF
Checked By: PS
Approved By: JPS
Date: November 27, 2014
Date: December 1, 2014
Date: December 2, 2014
DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

Project: Mount Polley Independent Expert Engineering Investigation and Review
Project No.: 14-MTS-021
Location: Mount Polley Tailings Storage Facility, BC
Date: November 28, 2014
Borehole: MR14-106C
Depth (m): 7
Sample No.: Sa1B - T3
Station: Static DSS

Initial Height (mm): 22.4
Diameter of Ring (mm): 66.5
Specific Gravity, Gs: 2.85
Initial Void Ratio, e0: -

Weight of Specimen (g): 134.68
Total Unit Weight (kN/m³): 16.99
Dry Unit Weight (kN/m³): 11.84
Natural Water Content (%): 43.6

Final Water Content (%): -
Initial Degree of Saturation, Sr (%): 91.2
Final Degree of Saturation, Sr (%): -

Sample failed during the application of the static Bias

Type of Test: Constant Volume

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (m)</th>
<th>Total Unit Weight (kN/m³)</th>
<th>Effective Vertical Stress, σv (kPa)</th>
<th>Static Bias (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa1B - T3</td>
<td>7.41</td>
<td>17.0</td>
<td>600</td>
<td>180</td>
</tr>
</tbody>
</table>

Comments: Assumed GS of 2.85 as instructed by Thurber

Prepared By: MF
Checked By: PS
Approved By: JPS
Date: November 28, 2014
Date: December 1, 2014
Date: December 2, 2014
DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

Sample No.: Sa1B - T2
Location: Mount Polley Tailings Storage Facility, BC
Date: November 28, 2014

Initial Height (mm): 22.4
Diameter of Ring (mm): 66.5
Specific Gravity, Gs: 2.85
Final Water Content (%): 34.9

Weight of Specimen (g): 138.47
Total Unit Weight (kN/m³): 17.47
Dry Unit Weight (kN/m³): 12.20
Natural Water Content (%): 43.2

Initial Degree of Saturation, Sr (%): 95.3
Final Degree of Saturation, Sr (%): >100

Type of Test: Constant Volume

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (m)</th>
<th>Total Unit Weight (kN/m³)</th>
<th>Effective Vertical Stress, σ'v (kPa)</th>
<th>Static Bias (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa1B - T2</td>
<td>7.38</td>
<td>17.5</td>
<td>600</td>
<td>150</td>
</tr>
</tbody>
</table>

Comments: Assumed Gs of 2.85 as instructed by Thurber
DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

Project: Mount Polley Independent Expert Engineering Investigation and Review
Project No.: 14-MTS-021
Location: Mount Polley Tailings Storage Facility, BC
Date: November 28, 2014
Borehole: MR14-106C
Depth (m): 7.34
Sample No.: Sa1B - T3
Station: DSS1

Initial Height (mm): 23.4
Weight of Specimen (g): 178.02
Initial Void Ratio, e₀: 1.18
Diameter of Ring (mm): 73.0
Total Unit Weight (kN/m³): 17.83
Final Void Ratio, eₖ: 0.94
Specific Gravity, Gₛ: 2.85
Dry Unit Weight (kN/m³): 12.83
Natural Water Content (%): 38.9
Final Water Content (%): 34.9
Initial Degree of Saturation, Sr (%): 94.1
Final Degree of Saturation, Sr (%): >100

Type of Test: Constant Volume

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (m)</th>
<th>Total Unit Weight (kN/m³)</th>
<th>Effective Vertical Stress, σᵥ (kPa)</th>
<th>Static Bias (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa1B - T3</td>
<td>7.41</td>
<td>17.8</td>
<td>600</td>
<td>60</td>
</tr>
</tbody>
</table>

Comments: Assumed GS of 2.85 as instructed by Thurber
### Direct Simple Shear Test (ASTM D 6528)

**Project:** Mount Polley Independent Expert Engineering Investigation and Review Panel  
**Project No.:** 14-MTS-021  
**Location:** Mount Polley Tailings Storage Facility, BC  
**Date:** November 18, 2014

#### Sample Details
- **Sample No.:** Sa2B - T1  
- **Station:** DSS2

#### Test Parameters
- **Initial Height (mm):** 20.3
- **Diameter of Ring (mm):** 73.0
- **Specific Gravity, Gs:** 2.85
- **Final Water Content (%):** 35.9

#### Calculations
- **Initial Height:** 20.3 mm
- **Diameter of Ring:** 73.0 mm
- **Specific Gravity:** 2.85
- **Final Water Content:** 35.9%

#### Graphs
- [Graph 1: Shear Stress vs. Effective Vertical Stress](#)
- [Graph 2: Shear Stress vs. Shear Strain](#)
- [Graph 3: Static Bias vs. Total Unit Weight](#)
- [Graph 4: Shear Stress vs. Shear Strain](#)

#### Table: Type of Test - Constant Volume

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (m)</th>
<th>Total Unit Weight (kN/m³)</th>
<th>Effective Vertical Stress, σ'v (kPa)</th>
<th>Static Bias (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa2B - T1</td>
<td>7.86</td>
<td>20.9</td>
<td>600</td>
<td>60</td>
</tr>
</tbody>
</table>

**Comments:** Assumed Gs of 2.85 as instructed by Thurber

**Prepared By:** MF  
**Checked By:** PS  
**Approved By:** PS

**Date:** November 18, 2014  
**Date:** November 18, 2014  
**Date:** November 19, 2014
DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

Project: Mount Polley Independent Expert Engineering Investigation and Review Panel
Location: Mount Polley Tailings Storage Facility, BC
Borehole: MR14-106G
Sample No.: Sa2B - T1
Date: November 18, 2014
Depth (m): 7.84
Station: DSS2

Sample Pictures

Cross section of the sample after the test was completed. Lamination of sample visible.
MEG TECHNICAL SERVICES
(A Division of MEG Consulting Limited)

DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

Project: Mount Polley Independent Expert Engineering Investigation and Review Panel
Location: Mount Polley Tailings Storage Facility, BC
Date: November 27, 2014
Project No.: 14-MTS-021
Borehole: MR14-106G
Depth (m): 8.13
Sample No.: Sa2b - T2
Station: DSS2

<table>
<thead>
<tr>
<th>Initial Height (mm):</th>
<th>23.5</th>
<th>Weight of Specimen (g):</th>
<th>181.04</th>
<th>Initial Void Ratio, $e_i$:</th>
<th>1.16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter of Ring (mm):</td>
<td>73.4</td>
<td>Total Unit Weight (kN/m³):</td>
<td>17.87</td>
<td>Final Void Ratio, $e_f$:</td>
<td>0.94</td>
</tr>
<tr>
<td>Specific Gravity, Gs:</td>
<td>2.85</td>
<td>Dry Unit Weight (kN/m³):</td>
<td>12.92</td>
<td>Natural Water Content (%):</td>
<td>38.3</td>
</tr>
<tr>
<td>Final Water Content (%):</td>
<td>28.7</td>
<td>Initial Degree of Saturation, Sr (%):</td>
<td>93.8</td>
<td>Final Degree of Saturation, Sr (%):</td>
<td>87.5</td>
</tr>
</tbody>
</table>

| Depth (m): | 8.16 |
| Total Unit Weight (kN/m³): | 17.9 |
| Effective Vertical Stress, $\sigma'v$ (kPa): | 600 |
| Static Bias (kPa): | 120 |

Type of Test: Constant Volume

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (m)</th>
<th>Total Unit Weight (kN/m³)</th>
<th>Effective Vertical Stress, $\sigma'v$ (kPa)</th>
<th>Static Bias (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa2b - T2</td>
<td>8.16</td>
<td>17.9</td>
<td>600</td>
<td>120</td>
</tr>
</tbody>
</table>

Comments: Assumed Gs of 2.85 as instructed by Thurber
DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

Project No.: 14-MTS-021
Location: Mount Polley Tailings Storage Facility, BC
Date: November 4, 2014
Borehole: MR14-107
Depth (m): 7.14
Sample No.: Sa 6C
Station: DSS1

Initial Height (mm): 23.5
Diameter of Ring (mm): 73.2
Specific Gravity, Gs: 2.85
Final Water Content (%): 38.7

Weight of Specimen (g): 178.49
Total Unit Weight (kN/m³): 17.70
Dry Unit Weight (kN/m³): 12.33
Natural Water Content (%): 43.5

Initial Degree of Saturation, Sr (%): 97.8
Final Degree of Saturation, Sr (%): >100

Type of Test: Constant Volume

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (m)</th>
<th>Total Unit Weight (kN/m³)</th>
<th>Effective Vertical Stress, σ'v (kPa)</th>
<th>Static Bias (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa 6C</td>
<td>7.20</td>
<td>17.7</td>
<td>300</td>
<td>30</td>
</tr>
</tbody>
</table>

Comments: Assumed Gs of 2.85 as instructed by Thurber

Prepared By: MF
Checked By: PS
Approved By: JPS
Date: November 4, 2014
## DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

<table>
<thead>
<tr>
<th>Project:</th>
<th>Mount Polley Independent Expert Engineering Investigation and Review Panel</th>
<th>Project No.:</th>
<th>14-MTS-021</th>
</tr>
</thead>
<tbody>
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<td>Location:</td>
<td>Mount Polley Tailings Storage Facility, BC</td>
<td>Date:</td>
<td>November 4, 2014</td>
</tr>
<tr>
<td>Borehole:</td>
<td>MR14-107</td>
<td>Depth (m):</td>
<td>7.14</td>
</tr>
<tr>
<td>Sample No.:</td>
<td>Sa 6C</td>
<td>Station:</td>
<td>DSS1</td>
</tr>
</tbody>
</table>

### Sample Pictures

![Sample in ring assembly after shear](image1)

Sample in ring assembly after shear

![Cross section of the sample after the test was completed. Lamination of sample visible.](image2)

Cross section of the sample after the test was completed. Lamination of sample visible.

<table>
<thead>
<tr>
<th>Prepared By:</th>
<th>MF</th>
<th>Checked By:</th>
<th>PS</th>
<th>Approved By:</th>
<th>JPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
<td>November 4, 2014</td>
<td>Date:</td>
<td>November 4, 2014</td>
<td>Date:</td>
<td>November 5, 2014</td>
</tr>
</tbody>
</table>
MEG TECHNICAL SERVICES
(A Division of MEG Consulting Limited)

DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

Project: Mount Polley Independent Expert Engineering Investigation and Review Panel
Project No.: 14-MTS-021
Location: Mount Polley Tailings Storage Facility, BC
Date: November 7, 2014
Borehole: MR14-107
Depth (m): 7.17
Station: DSS1

Initial Height (mm): 23.4  Weight of Specimen (g): 174.06  Initial Void Ratio, e_i: 1.31
Diameter of Ring (mm): 72.9  Total Unit Weight (kN/m³): 17.44  Final Void Ratio, e_f: 1.13
Specific Gravity, G_s: 2.89  Dry Unit Weight (kN/m³): 12.23  Natural Water Content (%): 42.6
Final Water Content (%): 42.3  Initial Degree of Saturation, S_r (%): 93.5  Final Degree of Saturation, S_r (%): >100

Comments: Assumed G_s of 2.85 as instructed by Thurber

Type of Test: Constant Volume

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (m)</th>
<th>Total Unit Weight (kN/m³)</th>
<th>Effective Vertical Stress, σ'v (kPa)</th>
<th>Static Bias (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa 6C - T2</td>
<td>7.23</td>
<td>17.4</td>
<td>300</td>
<td>30</td>
</tr>
</tbody>
</table>

Prepared By: MF  Checked By: PS  Approved By: JPS
Date: November 7, 2014  Date: November 7, 2014  Date: November 8, 2014
DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

Project: Mount Polley Independent Expert Engineering Investigation and Review Panel
Project No.: 14-MTS-021

Location: Mount Polley Tailings Storage Facility, BC
Date: November 7, 2014

Borehole: MR14-107
Depth (m): 7.17

Sample No.: Sa 6C - T2
Station: DSS1

Sample Pictures

Cross section of the sample after the test was completed. Lamination of sample visible.
Type of Test: Constant Volume

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (m)</th>
<th>Total Unit Weight (kN/m³)</th>
<th>Effective Vertical Stress, σ'v (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa 1A - T1</td>
<td>7.21</td>
<td>19.5</td>
<td>600</td>
</tr>
</tbody>
</table>

Comments: Assumed Gs of 2.85 as instructed by Thurber
# DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

<table>
<thead>
<tr>
<th>Project:</th>
<th>Mount Polley Independent Expert Engineering Investigation and Review Panel</th>
<th>Project No.:</th>
<th>14-MTS-021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>Mount Polley Tailings Storage Facility, BC</td>
<td>Date:</td>
<td>November 10, 2014</td>
</tr>
<tr>
<td>Borehole:</td>
<td>MR14-107A</td>
<td>Depth (m):</td>
<td>7.23</td>
</tr>
<tr>
<td>Sample No.:</td>
<td>Sa 1A - T1</td>
<td>Station:</td>
<td>DSS</td>
</tr>
</tbody>
</table>

## Sample Pictures

Groove pattern on the top surface of the sample

Cross section of the sample after the test was completed

<table>
<thead>
<tr>
<th>Prepared By:</th>
<th>MF</th>
<th>Checked By:</th>
<th>PS</th>
<th>Approved By:</th>
<th>JPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
<td>November 10, 2014</td>
<td>Date:</td>
<td>November 10, 2014</td>
<td>Date:</td>
<td>November 11, 2014</td>
</tr>
</tbody>
</table>
DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

**Project:** Mount Polley Independent Expert Engineering Investigation and Review Panel

**Location:** Mount Polley Tailings Storage Facility, BC

**Date:** November 20, 2014

**Borehole:** MR14-107A

**Sample No.:** Sa 1A - T2

**Depth (m):** 7.26

**Initial Height (mm):** 22.4

**Diameter of Ring (mm):** 66.5

**Specific Gravity, Gs:** 2.85

**Final Water Content (%):** 41.0

**Final Degree of Saturation, Sr (%):** >100

**Dry Unit Weight (kN/m³):** 13.90

**Natural Water Content (%):** 42.1

**Initial Void Ratio, eᵣ:** 1.01

**Final Void Ratio, eᵣ:** 0.91

**Comments:** Assumed Gs of 2.85 as instructed by Thurber

**Type of Test:** Constant Volume

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (m)</th>
<th>Total Unit Weight (kN/m³)</th>
<th>Effective Vertical Stress, σ'v (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa 1A - T2</td>
<td>7.21</td>
<td>19.7</td>
<td>600</td>
</tr>
</tbody>
</table>

Prepared By: MF

Checked By: PS

Approved By: JPS

Date: November 20, 2014

Date: November 20, 2014

Date: November 21, 2014
DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

Project: Mount Polley Independent Expert Engineering Investigation and Review Panel
Project No.: 14-MTS-021

Location: Mount Polley Tailings Storage Facility, BC
Date: November 20, 2014

Borehole: MR14-107A
Depth (m): 7.26

Sample No.: Sa 1A - T2
Station: DSS

Sample Pictures

Cross section of the sample after the test was completed
DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

Project: Mount Polley Independent Expert Engineering Investigation and Review Panel
Project No.: 14-MTS-021
Location: Mount Polley Tailings Storage Facility, BC
Date: October 31, 2014

Depth (m): 11.96
Sample No.: Sa 7
Station: DSS
Initial Height (mm): 22.4
Weight of Specimen (g): 164.61
Initial Void Ratio, $e_i$: 0.59
Diameter of Ring (mm): 66.5
Total Unit Weight (kN/m$^3$): 20.77
Final Void Ratio, $e_f$: 0.51
Specific Gravity, Gs: 2.75
Dry Unit Weight (kN/m$^3$): 16.99
Natural Water Content (%): 22.2
Final Water Content (%): 21.8
Initial Degree of Saturation, Sr (%): >100
Final Degree of Saturation, Sr (%): >100

Type of Test: Constant Volume

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (m)</th>
<th>Total Unit Weight (kN/m$^3$)</th>
<th>Effective Vertical Stress, $\sigma_v$ (kPa)</th>
<th>Static Bias (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa 6B</td>
<td>11.84</td>
<td>20.8</td>
<td>300</td>
<td>30</td>
</tr>
</tbody>
</table>

Comments: Assumed Gs of 2.75 as instructed by Thurber

Prepared By: MF
Checked By: PS
Approved By: JPS
Date: October 31, 2014
# DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

**Project:** Mount Polley Independent Expert Engineering Investigation and Review Panel  
**Project No.:** 14-MTS-021

**Location:** Mount Polley Tailings Storage Facility, BC  
**Date:** October 31, 2014

**Borehole:** MR14-109  
**Depth (m):** 12.42

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Station</th>
<th>Initial Height (mm)</th>
<th>Diameter of Ring (mm)</th>
<th>Specific Gravity, Gs</th>
<th>Final Water Content (%)</th>
<th>Initial Degree of Saturation, Sr (%)</th>
<th>Natural Water Content (%)</th>
<th>Final Degree of Saturation, Sr (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa 6B</td>
<td>DSS</td>
<td>22.4</td>
<td>66.5</td>
<td>2.75</td>
<td>21.8</td>
<td>&gt;100</td>
<td>22.2</td>
<td>&gt;100</td>
</tr>
</tbody>
</table>

**Initial Void Ratio, e_i:** 0.59  
**Final Void Ratio, e_f:** 0.51  
**Dry Unit Weight (kN/m³):** 16.99  
**Total Unit Weight (kN/m³):** 20.77  
**Weight of Specimen (g):** 164.61

<table>
<thead>
<tr>
<th>Initial Void Ratio, e_i:</th>
<th>Final Void Ratio, e_f:</th>
<th>Dry Unit Weight (kN/m³):</th>
<th>Total Unit Weight (kN/m³):</th>
<th>Weight of Specimen (g):</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.59</td>
<td>0.51</td>
<td>16.99</td>
<td>20.77</td>
<td>164.61</td>
</tr>
</tbody>
</table>

**Prepared By:** MF  
**Checked By:** PS  
**Approved By:** JPS

**Date:** October 31, 2014  
**Date:** October 31, 2014  
**Date:** November 3, 2014

**Comments:** Slip was observed at the sample-porous stone interface (see pictures)  
Assumed Gs of 2.75 as instructed by Thurber

---

**Graphs:**
- Shear stress vs. effective vertical stress ($\tau$ vs. $\sigma_v'$)
- Shear strain vs. shear stress ($\gamma$ vs. $\tau$)
- Shear strain vs. effective vertical stress ($\gamma$ vs. $\sigma_v'$)

**Table:**

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (m)</th>
<th>Total Unit Weight (kN/m³)</th>
<th>Effective Vertical Stress, $\sigma_v'$ (kPa)</th>
<th>Static Bias (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa 6B</td>
<td>12.46</td>
<td>20.8</td>
<td>300</td>
<td>30</td>
</tr>
</tbody>
</table>

**Type of Test:** Constant Volume
DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

Project: Mount Polley Independent Expert Engineering Investigation and Review Panel
Location: Mount Polley Tailings Storage Facility, BC
Borehole: MR14-109
Sample No.: Sa 6B

Date: October 31, 2014
Depth (m): 12.42
Station: DSS

Sample Pictures

Partial slip along the sample-porous stone interface. Porous stone is level with the bottom ring.

Groove pattern on the top surface of the sample.

Cross section of the sample after the test was completed. Possible lamination present.

Prepared By: MF  
Checked By: PS  
Approved By: JPS

Date: October 31, 2014  
Date: October 31, 2014  
Date: November 3, 2014
# DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

**Project:** Mount Polley Independent Expert Engineering Investigation and Review Panel  
**Project No.:** 14-MTS-021  
**Location:** Mount Polley Tailings Storage Facility, BC  
**Date:** October 31, 2014

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Station</th>
<th>Initial Height (mm)</th>
<th>Weight of Specimen (g)</th>
<th>Initial Void Ratio, e₀</th>
<th>Diameter of Ring (mm)</th>
<th>Total Unit Weight (kN/m³)</th>
<th>Final Void Ratio, e_f</th>
<th>Specific Gravity, Gₛ</th>
<th>Dry Unit Weight (kN/m³)</th>
<th>Natural Water Content (%)</th>
<th>Final Water Content (%)</th>
<th>Initial Degree of Saturation, Sr (%)</th>
<th>Final Degree of Saturation, Sr (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa 6C</td>
<td>DSS</td>
<td>22.4</td>
<td>143.97</td>
<td>0.80</td>
<td>66.5</td>
<td>18.17</td>
<td>0.71</td>
<td>2.75</td>
<td>14.98</td>
<td>21.2</td>
<td>22.4</td>
<td>73.0</td>
<td>86.9</td>
</tr>
</tbody>
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**Type of Test:** Constant Volume  

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (m)</th>
<th>Total Unit Weight (kN/m³)</th>
<th>Effective Vertical Stress, σ_v (kPa)</th>
<th>Static Bias (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa 6C</td>
<td>12.45</td>
<td>18.2</td>
<td>300</td>
<td>30</td>
</tr>
</tbody>
</table>

**Comments:** Gₛ of 2.75 as instructed by Thurber

---

**Prepared By:** MF  
**Checked By:** PS  
**Approved By:** JPS  
**Date:** October 31, 2014
### Project Details

<table>
<thead>
<tr>
<th>Project</th>
<th>Mount Polley Independent Expert Engineering Investigation and Review Panel</th>
<th>Project No.:</th>
<th>14-MTS-021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Mount Polley Tailings Storage Facility, BC</td>
<td>Date:</td>
<td>October 31, 2014</td>
</tr>
<tr>
<td>Borehole</td>
<td>MR14-110</td>
<td>Depth (m):</td>
<td>12.47</td>
</tr>
<tr>
<td>Sample No.:</td>
<td>Sa 6C</td>
<td>Station:</td>
<td>DSS</td>
</tr>
</tbody>
</table>

### Sample Pictures

- **Groove pattern on the top surface of the sample**
- **Cross section of the sample after the test was completed.**

<table>
<thead>
<tr>
<th>Prepared By:</th>
<th>MF</th>
<th>Date:</th>
<th>October 31, 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checked By:</td>
<td>PS</td>
<td>Date:</td>
<td>October 31, 2014</td>
</tr>
<tr>
<td>Approved By:</td>
<td>JPS</td>
<td>Date:</td>
<td>November 2, 2014</td>
</tr>
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</table>
## DIRECT SIMPLE SHEAR TEST (ASTM D 6528)

**Project:** Mount Polley Independent Expert Engineering Investigation and Review Panel  
**Project No.:** 14-MTS-021  
**Location:** Mount Polley Tailings Storage Facility, BC  
**Date:** October 31, 2014  
**Sample No.:** DSS1  
**Station:**  

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Height (mm)</td>
<td>23.5</td>
</tr>
<tr>
<td>Diameter of Ring (mm)</td>
<td>73.4</td>
</tr>
<tr>
<td>Specific Gravity, Gs</td>
<td>2.75</td>
</tr>
<tr>
<td>Weight of Specimen (g)</td>
<td>227.90</td>
</tr>
<tr>
<td>Total Unit Weight (kN/m³)</td>
<td>22.53</td>
</tr>
<tr>
<td>Dry Unit Weight (kN/m³)</td>
<td>20.04</td>
</tr>
<tr>
<td>Initial Void Ratio, ε_i</td>
<td>0.35</td>
</tr>
<tr>
<td>Final Void Ratio, ε_f</td>
<td>0.31</td>
</tr>
<tr>
<td>Natural Water Content (%)</td>
<td>12.5</td>
</tr>
<tr>
<td>Initial Degree of Saturation, Sr (%)</td>
<td>&gt;100</td>
</tr>
<tr>
<td>Final Degree of Saturation, Sr (%)</td>
<td>&gt;100</td>
</tr>
</tbody>
</table>

**Graphs:**

- **Graph 1:** Effective Vertical Stress vs. Shear Stress
- **Graph 2:** Effective Vertical Stress vs. Shear Strain

**Comments:** Slip was observed at the sample-porous stone interface (see pictures)

**Type of Test:** Constant Volume

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (m)</th>
<th>Total Unit Weight (kN/m³)</th>
<th>Effective Vertical Stress, o'v (kPa)</th>
<th>Static Bias (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa 4B</td>
<td>6.57</td>
<td>22.5</td>
<td>300</td>
<td>30</td>
</tr>
</tbody>
</table>

Prepared By: MF  
Checked By: PS  
Approved By: JPS  
Date: October 31, 2014
## Direct Simple Shear Test (ASTM D 6528)

**Project:** Mount Polley Independent Expert Engineering Investigation and Review Panel  
**Project No.:** 14-MTS-021  
**Location:** Mount Polley Tailings Storage Facility, BC  
**Date:** October 31, 2014  
**Borehole:** MR14-113  
**Depth (m):** 6.57  
**Sample No.:** Sa 4B  
**Station:** DSS1

<table>
<thead>
<tr>
<th>Sample Pictures</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.jpg" alt="Sample Picture 1" /></td>
</tr>
<tr>
<td><img src="image2.jpg" alt="Sample Picture 2" /></td>
</tr>
<tr>
<td><img src="image3.jpg" alt="Sample Picture 3" /></td>
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<tr>
<td><img src="image4.jpg" alt="Sample Picture 4" /></td>
</tr>
<tr>
<td><img src="image5.jpg" alt="Sample Picture 5" /></td>
</tr>
</tbody>
</table>

- **Partial slip along the sample-porous stone interface. Porous stone is level with the third ring from the bottom.**
- **Groove pattern on the top surface of the sample.**
- **Cross section of the sample after the test was completed. Fine gravel particle present.**
- **Groove pattern on the bottom surface of the sample. Grooves show tearing from slip along the interface. Missing sample from groove pattern was stuck to the porous stone.**

**Prepared By:** MF  
**Checked By:** PS  
**Approved By:** JPS  
**Date:** October 31, 2014