Appendix D2

Geotechnical investigations:

RMS Factual Geotechnical Investigation Report
## Consolidation Test

**Client:** ROADS AND MARITIME SERVICES, SOUTHERN REGION  
**Principal:** ROADS AND MARITIME SERVICES, SOUTHERN REGION  
**Project:** BERRY BYPASS  
**Location:** PRINCES HIGHWAY  
**Borehole:** AS1289 6.6.1  
**Sample No.:** B5  
**Material Description:** (SC) CLAYEY SAND - fine to coarse, mottled brown, lines of high plasticity.

### Initial Dry Density (t/m³): 1.36  
### Initial Moisture Content (%): 35.1  
### Initial Degree of Saturation (%): 97.6  
### Soil Particle Density (t/m³): 2.65  
### Final Moisture Content (%): 28.0  
### Initial Specimen Height (mm): 20.023

<table>
<thead>
<tr>
<th>Pressure Range (kPa)</th>
<th>Void Ratio</th>
<th>Consolidation</th>
<th>Cv</th>
<th>mv</th>
<th>Cc</th>
<th>Cu</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>at start of load increment</td>
<td>at end of load increment</td>
<td>(%)</td>
<td>m³/year</td>
<td>m³/kN</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.946</td>
<td>0.943</td>
<td>0.150</td>
<td>1.2658</td>
<td>0.00018</td>
<td>0.00589</td>
</tr>
<tr>
<td>12.5</td>
<td>0.943</td>
<td>0.932</td>
<td>0.689</td>
<td>1.82883</td>
<td>0.00043</td>
<td>0.03486</td>
</tr>
<tr>
<td>25</td>
<td>0.932</td>
<td>0.913</td>
<td>1.663</td>
<td>5.08850</td>
<td>0.00039</td>
<td>0.06295</td>
</tr>
<tr>
<td>50</td>
<td>0.913</td>
<td>0.881</td>
<td>3.321</td>
<td>8.00377</td>
<td>0.00034</td>
<td>0.10718</td>
</tr>
<tr>
<td>100</td>
<td>0.881</td>
<td>0.839</td>
<td>5.494</td>
<td>5.23385</td>
<td>0.00022</td>
<td>0.14043</td>
</tr>
<tr>
<td>200</td>
<td>0.839</td>
<td>0.772</td>
<td>8.945</td>
<td>7.52972</td>
<td>0.00018</td>
<td>0.22307</td>
</tr>
<tr>
<td>400</td>
<td>0.772</td>
<td>0.690</td>
<td>13.145</td>
<td>5.37089</td>
<td>0.00012</td>
<td>0.27149</td>
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<tr>
<td>800</td>
<td>0.690</td>
<td>0.605</td>
<td>17.500</td>
<td>5.28685</td>
<td>0.00006</td>
<td>0.28150</td>
</tr>
<tr>
<td>1600</td>
<td>0.605</td>
<td>0.612</td>
<td>17.155</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>800</td>
<td>0.612</td>
<td>0.630</td>
<td>16.246</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>0.630</td>
<td>0.653</td>
<td>15.043</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>0.653</td>
<td>0.692</td>
<td>13.035</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Lane Cove West Laboratory - Accreditation No. 431  
Garry K Collins  
Approved Signatory
Stage Load: 13 kPa
Rig Number: 11
Stage: 4.0 to 12.5

**Compression v's Time (Log Scale)**

*Adjusted max value of x axis*

**Primary**
- Time (mins): 6.3
- Time (mins): 48.3

(Dial) $t_0 = 12.756$ mm
(Dial) $t_{100} = 12.724$ mm
$t_{100} = 831.5$ mins

**Secondary**
- Time (mins): 1884.3
- Time (mins): 3684.3

$\Delta Ht = 0.0034$ mm/log cycle

Initial dial gauge height = 12.754 mm
Final dial gauge height = 12.722 mm

**Compression v's Time (Sq. Root Scale)**

*Adjusted max value of x axis*

**Primary**
- Root Time

$t_0 = \#N/A$ mm
$t_{90} = \#N/A$ mm

$t_{90} = \#N/A$ mins
Stage Load: 25 kPa
Rig Number: 11
Stage: 12.5 - 25

Compression v's Time (Log Scale)

Compression v's Time (Sq. Root Scale)

Adjust max value of x axis

Primary
4.1 Time (mins)
13.117 Time (mins)

Secondary
1878.117 Time (mins)
3138.134 Time (mins)

(Dial) t0 = 12.694 mm
(Dial) t100 = 12.628 mm
(Dial) t50 = 12.661 mm

Initial dial gauge height = 12.690 mm
Final dial gauge height = 12.616 mm

ΔHx = 0.009 mm/log cycle

Root Time

Primary

Root Time

Adjust max value of x axis
Stage Load: 50 kPa  
Rig Number: 11  
Stage: 25 - 50

**Compression v's Time (Log Scale)**

**Compression v's Time (Sq. Root Scale)**

- **Adjust max value of x axis**

<table>
<thead>
<tr>
<th>Primary</th>
<th>Time (mins)</th>
<th>Secondary</th>
<th>Time (mins)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.65</td>
<td></td>
<td>869.633</td>
<td></td>
</tr>
<tr>
<td>5.633</td>
<td></td>
<td>1049.65</td>
<td></td>
</tr>
</tbody>
</table>

(Dial) \( t_0 \) = 12.566 mm  
(Dial) \( t_{100} \) = 12.468 mm  
(Dial) \( t_{50} \) = 12.517 mm  
\( t_{100} \) = 15.5 mins  
\( t_{50} \) = 2.0 mins

Initial dial gauge height = 12.557 mm  
Final dial gauge height = 12.421 mm

\( \Delta H \alpha = 0.0245 \text{ mm/log cycle} \)
Stage Load: 100 kPa
Rig Number: 11
Stage: 50 - 100

Compress v's Time (Log Scale)

Adjust max value of x axis

Primary
1.733 Time (mins)
3.733 Time (mins)

(Dial) t0 = 12.304 mm
(Dial) t100 = 12.155 mm

Secondary
2454.75 Time (mins)
3534.717 Time (mins)

(Dial) t50 = 12.230 mm

ΔHx = 0.0253 mm/log cycle

Initial dial gauge height = 12.287 mm
Final dial gauge height = 12.089 mm

Compress v's Time (Sq. Root Scale)

Adjust max value of x axis

Primary
Root Time

Root Time

t0 = #N/A mm
t90 = #N/A mm
Stage Load: 200 kPa
Rig Number: 11
Stage: 100 - 200

Compression vs Time (Log Scale)

Compression vs Time (Square Root Scale)

Adjust max value of x axis

<table>
<thead>
<tr>
<th>Primary</th>
<th>Time (mins)</th>
<th>Secondary</th>
<th>Time (mins)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.267</td>
<td>11.975 mm</td>
<td>673.283</td>
<td>11.702 mm</td>
</tr>
<tr>
<td>6.283</td>
<td>11.702 mm</td>
<td>1033.283</td>
<td>22.8 mins</td>
</tr>
</tbody>
</table>

(Dial) t0 = 11.975 mm
(Dial) t100 = 11.702 mm

(Dial) t50 = 11.838 mm

ΔHt = 0.0269 mm/log cycle

Initial dial gauge height = 11.944 mm
Final dial gauge height = 11.654 mm

t0 = #N/A mm
t90 = #N/A mm
t90 = #N/A mins
Stage Load: 400 kPa
Rig Number: 11
Stage: 200 - 400

Compression v's Time (Log Scale)

Compression v's Time (Sq. Root Scale)

Adjust max value of x axis

Primary
2
Time (mins)
4.983
Time (mins)

Secondary
100
Time (mins)
1121
Time (mins)

(Dial) \( t_0 \) = 11.605 mm
(Dial) \( t_{100} \) = 11.069 mm
\( t_{100} \) = 11.4 mins
\( t_{50} \) = 11.337 mm
\( t_{50} \) = 1.2 mins

\( \Delta H_0 \) = 0.0508 mm/log cycle

Initial dial gauge height = 11.653 mm
Final dial gauge height = 10.963 mm

Adjust max value of x axis

Primary
Root Time

Secondary
Root Time

t_0 = #N/A mm
t_{90} = #N/A mm
t_{90} = #N/A mins
Stage Load: 800 kPa
Rig Number: 11
Stage: 400 - 800

Compression v's Time (Log Scale)

Compression v's Time (Sq. Root Scale)

Adjust max value of x axis

<table>
<thead>
<tr>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (mins)</td>
<td>Time (mins)</td>
</tr>
<tr>
<td>2.383</td>
<td>744.383</td>
</tr>
<tr>
<td>5.4</td>
<td>1224.4</td>
</tr>
</tbody>
</table>

(Dial) t0 = 10.906 mm
(Dial) t100 = 10.217 mm
(Dial) t50 = 10.561 mm
ΔH: 0.0463 mm/log cycle

Initial dial gauge height = 10.963 mm
Final dial gauge height = 10.122 mm

Adjust max value of x axis

Primary
Root Time

Root Time

t0 = #N/A mm
t90 = #N/A mm

Initial dial gauge height = 10.963 mm
Final dial gauge height = 10.122 mm
Stage Load: 1600 kPa
Rig Number: 11
Stage: 800 - 1600

Compress v's Time (Log Scale)

Compress v's Time (Sq. Root Scale)

Adjust max value of x axis

<table>
<thead>
<tr>
<th>Primary</th>
<th>Time (mins)</th>
<th>Secondary</th>
<th>Time (mins)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td></td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>5.1</td>
<td></td>
<td>200</td>
<td></td>
</tr>
</tbody>
</table>

(Dial) t0 = 10.074 mm
(Dial) t100 = 9.346 mm
(Dial) t50 = 9.710 mm
ΔH0 = 0.0729 mm/log cycle
Initial dial gauge height = 10.120 mm
Final dial gauge height = 9.250 mm

Adjust max value of x axis

<table>
<thead>
<tr>
<th>Primary</th>
<th>Root Time (mins)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t0 = #N/A mm</td>
</tr>
<tr>
<td></td>
<td>t90 = #N/A mm</td>
</tr>
</tbody>
</table>

Primary Root Time

Primary Root Time
Stage Load: 800 kPa
Rig Number: 11
Stage: 1600 - 800

Stage 9 (Rebound)

Compression v's Time (Log Scale)

Compressive strain:
- $t_0$: 9.3 mm
- $t_{100}$: #N/A mm
- $t_{50}$: #N/A mm/mins

Compression v's Time (Sqrt. Root Scale)

Initial dial gauge height: 9.249 mm
Final dial gauge height: 9.319 mm

Adjust max value of x axis

Primary
- Time (mins)
- Time (mins)

Secondary
- Time (mins)
- Time (mins)

Primary
- Root Time
- Root Time
Stage Load: 200 kPa
Rig Number: 11
Stage: 800 - 200

**Stage 10 (Rebound)**

**Compression vs Time (Log Scale)**

**Compression vs Time (Square Root Scale)**

Adjust max value of x axis

<table>
<thead>
<tr>
<th>Primary</th>
<th>Time (mins)</th>
<th>Secondary</th>
<th>Time (mins)</th>
</tr>
</thead>
<tbody>
<tr>
<td>t₀</td>
<td>9.3 mm</td>
<td>t₁₀₀</td>
<td>#/N/A mm</td>
</tr>
<tr>
<td>t₁₀₀</td>
<td>#/N/A mins</td>
<td>t₅₀</td>
<td>#/N/A mm</td>
</tr>
</tbody>
</table>

ΔH₀ = #/N/A mm/log cycle

Initial stage height = 9.319 mm

Final stage height = 9.501 mm
Stage Load: 50 kPa
Rig Number: 11
Stage: 200 - 50

**Stage 11 (Rebound)**

**Compression v's Time (Log Scale)**

- Initial stage height = 9.501 mm
- Final stage height = 9.742 mm

**Compression v's Time (Sq. Root Scale)**

- Adjust max value of x axis

<table>
<thead>
<tr>
<th>Primary</th>
<th>Time (mins)</th>
<th>Secondary</th>
<th>Time (mins)</th>
</tr>
</thead>
<tbody>
<tr>
<td>t0</td>
<td>9.523 mm</td>
<td>t50</td>
<td>#N/A mm</td>
</tr>
<tr>
<td>t100</td>
<td>#N/A mm</td>
<td>t50</td>
<td>#N/A mm</td>
</tr>
<tr>
<td>t100</td>
<td>#N/A mins</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Initial stage height = 9.501 mm
Final stage height = 9.742 mm
Stage 12 (Rebound)

Stage Load: 4 kPa
Rig Number: 11
Stage: 50 - 4

Compression v's Time (Log Scale)

Compression v's Time (Sq. Root Scale)

Adjust max value of x axis

<table>
<thead>
<tr>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (mins)</td>
<td>Time (mins)</td>
</tr>
<tr>
<td>t0 = 9.753 mm</td>
<td>t50 = #N/A mm</td>
</tr>
<tr>
<td>t100 = #N/A mm</td>
<td>t50 = #N/A mins</td>
</tr>
</tbody>
</table>

Initial height = 9.742 mm
Final height = 10.144 mm

ΔH = #N/A mm/log cycle