QUEANBEYAN RIVER CROSSING (REFER DRAWING 017 FOR PLAN)

SW
LtoM
622.28mAHD
(-0.1m)
BH15
EOH 5.50m

MW to SW
HW

HW
SW
SW
SW
MW
SW
LtoM
MtoH
H
MtoH

629.36mAHD
(0.1m)
BH16
EOH 6.00m

MW/SW
HW/MW

SW
VLtoL
LtoM
H

630.14mAHD
(0.0m)
BH17
EOH 3.00m

591.72mAHD
(-16.7m)
TP49S
EOH 2.30m

593.79mAHD
(0.0m)
TP49
EOH 0.80m

601.54mAHD
(-0.6m)
TP50
EOH 0.20m

607.17mAHD
(-0.9m)
TP51
EOH 0.80m

609.92mAHD
(-0.1m)
TP52
EOH 0.90m

627.15mAHD
(25.9m)
TP53
EOH 1.10m

622.41mAHD
(74.8m)
TP54
EOH 1.10m

630.19mAHD
(-24.1m)
TP55
EOH 0.70m

INFERRED GEOLOGICAL BOUNDARY
Appendix A - Engineering Borehole Logs
**Engineering Log - Borehole**

**Borehole ID:** BH01  
**Date started:** 05 May 2014  
**Date completed:** 05 May 2014  
**Logged by:** BC  
**Checked by:** BC

**Client:** Opus International Consultants NSW Pty Ltd  
**Principal:** Queanbeyan City Council  
**Project:** Ellerton Drive Extension  
**Location:** Queanbeyan, NSW

**Relevant data:****

- **RL (m):**  
  - 617  
  - 616  
  - 615  
  - 614  
  - 613  
  - 612  
  - 611  
  - 610

- **Bedrock**
  - **SILTSTONE:** Mottled yellow/brown, extremely weathered, estimated low strength.

- **Colluvium**
  - **Silty SAND:** Fine grained, pale brown.
  - **Silty CLAY:** High plasticity, pale yellow-brown.

**Soil Types:**

- **Classification System**
  - Plasticity or particle characteristic, colour, secondary and minor components

**Additional Observations:**

- **SPT:** Standard penetration test (SPT)
- **SPT with solid cone:** SPT with solid cone
- **Wp:** Hammer bouncing
- **W:** Vane shear; peak/remoulded (kPa)
- **N:** Standard penetration test (SPT) sample recovered

**Drilling Information:**

- **Method:** Auger drilling*
- **Support:** M (mud) N (nil)
- **Penetration:** No resistance ranging to refusal
- **Samples & tests:** B (bulk disturbed sample) C (casing) D (disturbed sample) E (environmental sample)
  - **SPT:** SPT - sample recovered
  - **SPT with solid cone:** SPT with solid cone
- **Water:** 10-Oct-12 water level on date shown
- **Hand penetrometer (kPa):** 100, 200, 300

**Material Substance:**

- **Water:** Dry, moist, wet
- **Material Description:** Bulk disturbed sample, disturbed sample, environmental sample

**Consistency / Relative Density:**

- **Moisture:** VS (very soft), S (soft), F (firm), ST (stiff), VFS (very stiff)
- **Hardness:** H (hard), Fb (frangible)
- **VIB:** Very loose
- **L:** Loose
- **Density:** MD (medium dense), D (dense), VD (very dense)
### Engineering Log - Borehole

**client:** Opus International Consultants NSW Pty Ltd  
**principal:** Queanbeyan City Council  
**project:** Ellerton Drive Extension  
**location:** Queanbeyan, NSW

**Borehole ID:** BH02  
**date started:** 05 May 2014  
**date completed:** 05 May 2014

**drilling information**

<table>
<thead>
<tr>
<th>method &amp; support penetration</th>
<th>samples &amp; field tests</th>
<th>material description</th>
<th>soil description</th>
<th>additional observations</th>
</tr>
</thead>
</table>

**material substance**

<table>
<thead>
<tr>
<th>RL (m)</th>
<th>SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components</th>
<th>hand penetrometer (kPa)</th>
<th>structures and additional observations</th>
</tr>
</thead>
</table>

- **Gravelly Sandy CLAY:** medium plasticity, pale brown, fine grained sand, trace fine grained angular gravel.

- **SILTSTONE:** grey-brown, extremely to highly weathered, estimated low strength.

  Borehole BH02 terminated at 4.0 m Target depth.
# Engineering Log - Borehole

**client:** Opus International Consultants NSW Pty Ltd  
**principal:** Queanbeyan City Council  
**project:** Ellerton Drive Extension  
**location:** Queanbeyan, NSW

**Borehole ID:** BH03  
**date started:** 06 May 2014  
**date completed:** 06 May 2014  
**logged by:** BC  
**checked by:** BC

<table>
<thead>
<tr>
<th>RL (m)</th>
<th>621</th>
<th>620</th>
<th>619</th>
<th>618</th>
<th>617</th>
<th>616</th>
<th>615</th>
<th>614</th>
</tr>
</thead>
</table>
| drill model: Cammacchio  
| mounting: Trailer  
| casing diameter : HQ

**SOIL TYPE:** plasticity or particle characteristic, colour, secondary and minor components  
**classification symbol:**

<table>
<thead>
<tr>
<th>classification symbol</th>
<th>soil description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL</td>
<td>Sandy CLAY: medium plasticity, pale brown, fine grained sand, with some fine grained angular gravel.</td>
</tr>
<tr>
<td>SHALE</td>
<td>pale grey, highly to moderately weathered, estimated low strength.</td>
</tr>
</tbody>
</table>

Borehole BH03 continued as cored hole

<table>
<thead>
<tr>
<th>method &amp; support</th>
<th>samples &amp; field tests</th>
<th>material description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AD</td>
<td>M mud N nl</td>
<td>Sandy CLAY: medium plasticity, pale brown, fine grained sand, with some fine grained angular gravel.</td>
</tr>
<tr>
<td>AS</td>
<td>auger drilling*</td>
<td>Sandy CLAY: medium plasticity, pale brown, fine grained sand, with some fine grained angular gravel.</td>
</tr>
<tr>
<td>RR</td>
<td>roller/tricone</td>
<td>Sandy CLAY: medium plasticity, pale brown, fine grained sand, with some fine grained angular gravel.</td>
</tr>
<tr>
<td>W</td>
<td>washbee</td>
<td>Sandy CLAY: medium plasticity, pale brown, fine grained sand, with some fine grained angular gravel.</td>
</tr>
<tr>
<td>CT</td>
<td>cable tool</td>
<td>Sandy CLAY: medium plasticity, pale brown, fine grained sand, with some fine grained angular gravel.</td>
</tr>
<tr>
<td>HA</td>
<td>hand auger</td>
<td>Sandy CLAY: medium plasticity, pale brown, fine grained sand, with some fine grained angular gravel.</td>
</tr>
<tr>
<td>DT</td>
<td>disturb</td>
<td>Sandy CLAY: medium plasticity, pale brown, fine grained sand, with some fine grained angular gravel.</td>
</tr>
<tr>
<td>B</td>
<td>blank bit</td>
<td>Sandy CLAY: medium plasticity, pale brown, fine grained sand, with some fine grained angular gravel.</td>
</tr>
<tr>
<td>Y</td>
<td>V bit</td>
<td>Sandy CLAY: medium plasticity, pale brown, fine grained sand, with some fine grained angular gravel.</td>
</tr>
<tr>
<td>T</td>
<td>TC bit *</td>
<td>Sandy CLAY: medium plasticity, pale brown, fine grained sand, with some fine grained angular gravel.</td>
</tr>
<tr>
<td>e.g. AD/T</td>
<td></td>
<td>Sandy CLAY: medium plasticity, pale brown, fine grained sand, with some fine grained angular gravel.</td>
</tr>
</tbody>
</table>

**Consistency / relative density**

<table>
<thead>
<tr>
<th>moisture</th>
<th>soil description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VS</td>
<td>very soft</td>
</tr>
<tr>
<td>S</td>
<td>soft</td>
</tr>
<tr>
<td>F</td>
<td>firm</td>
</tr>
<tr>
<td>ST</td>
<td>stiff</td>
</tr>
<tr>
<td>VSI</td>
<td>very stiff</td>
</tr>
<tr>
<td>M</td>
<td>moist</td>
</tr>
<tr>
<td>W</td>
<td>wet</td>
</tr>
<tr>
<td>Ho</td>
<td>friable</td>
</tr>
<tr>
<td>V</td>
<td>very loose</td>
</tr>
<tr>
<td>L</td>
<td>loose</td>
</tr>
<tr>
<td>MD</td>
<td>medium dense</td>
</tr>
<tr>
<td>D</td>
<td>dense</td>
</tr>
<tr>
<td>VD</td>
<td>very dense</td>
</tr>
</tbody>
</table>

---

*Copyright © Coffey Australia 2014*
Engineering Log - Cored Borehole

client: Opus International Consultants NSW Pty Ltd
principal: Queanbeyan City Council
project: Ellerton Drive Extension
location: Queanbeyan, NSW

Borehole ID: BH03
date started: 06 May 2014
date completed: 06 May 2014
logged by: BC
checked by: BC

drilling information

method & support
drill model: Camacchio
mounting: Trailer
casing diameter: HQ

material substance

material description
ROCK TYPE: grain characteristics, colour, structure, minor components

estimated strength & b/C (MPa)
samples, field tests & b/C(%) (MPa)

defect spacing (mm)
defect & RQD

additional observations and defect descriptions
(type, inclination, planarity, roughness, coating, thickness, other)

rock mass defects

water

not observable

samples, field tests & b/C (0%)

defect type

material description

samples, field tests & b/C (0%)

Additional notes:

SHALE: fine grained, brown, indistinctly bedded at 50°, highly jointed along defects and bedding.

NO CORE: 0.30 m

SHALE: fine grained, brown, indistinctly bedded at 50°, highly jointed along defects and bedding.

Borehole BH03 terminated at 6.00 m

Target depth
**PointID:** BH03  **Depth Range:** 1.00 - 6.00 m

**Core Photograph**

**Client:** Opus International Consultants NSW Pty Ltd

**Project:** Ellerton Drive Extension

**Project NO:** GeotfysH 09703AA

**Borehole No:** BH03  **Date:** 23/5/14

**Depth:** 1.00 - 6.00 m

---

<table>
<thead>
<tr>
<th>drawn</th>
<th>SB</th>
<th>approved</th>
<th>BC</th>
</tr>
</thead>
<tbody>
<tr>
<td>date</td>
<td>24/06/2014</td>
<td>scale</td>
<td>N.T.S.</td>
</tr>
<tr>
<td>original size</td>
<td>A4</td>
<td>title</td>
<td>CORE PHOTOGRAPH BH03</td>
</tr>
</tbody>
</table>

---

**Project no:** GEOTFYSH09703AA  **fig no:** 17  **rev:**
### Drilling Information

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Material Substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>637</td>
<td>Silty SAND: fine to medium grained, orange-brown, with some fine grained angular gravel.</td>
</tr>
<tr>
<td>636</td>
<td>SANDSTONE: grey-brown, highly weathered, estimated low strength.</td>
</tr>
</tbody>
</table>

Borehole BH04 continued as cored hole

### Classification Symbol & Soil Description

<table>
<thead>
<tr>
<th>Consistency / Relative Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>VS</td>
</tr>
<tr>
<td>S</td>
</tr>
<tr>
<td>F</td>
</tr>
<tr>
<td>St</td>
</tr>
<tr>
<td>VB</td>
</tr>
<tr>
<td>H</td>
</tr>
<tr>
<td>W</td>
</tr>
<tr>
<td>Fb</td>
</tr>
<tr>
<td>VL</td>
</tr>
<tr>
<td>L</td>
</tr>
<tr>
<td>MD</td>
</tr>
<tr>
<td>D</td>
</tr>
<tr>
<td>VD</td>
</tr>
</tbody>
</table>

### Moisture

<table>
<thead>
<tr>
<th>Moisture</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
</tr>
<tr>
<td>W</td>
</tr>
<tr>
<td>V</td>
</tr>
<tr>
<td>L</td>
</tr>
</tbody>
</table>

### Support

<table>
<thead>
<tr>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>C</td>
</tr>
</tbody>
</table>

### Penetration

<table>
<thead>
<tr>
<th>Penetration</th>
</tr>
</thead>
<tbody>
<tr>
<td>no resistance</td>
</tr>
</tbody>
</table>

### SPT - Sample Recovered

<table>
<thead>
<tr>
<th>SPT with solid cone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vb</td>
</tr>
<tr>
<td>H</td>
</tr>
</tbody>
</table>

### Vane Shear; Peak/Remoulded (kPa)

<table>
<thead>
<tr>
<th>Vane Shear; Peak/Remoulded (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nc</td>
</tr>
<tr>
<td>R</td>
</tr>
<tr>
<td>HB</td>
</tr>
</tbody>
</table>

### Hand Penetrometer (kPa)

<table>
<thead>
<tr>
<th>Hand Penetrometer (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Na</td>
</tr>
<tr>
<td>Wa</td>
</tr>
<tr>
<td>S</td>
</tr>
<tr>
<td>Vc</td>
</tr>
</tbody>
</table>

### Drill Model & Mounting

- Drill Model: Camacchio
- Mounting: Trailer

---

**Engineering Log - Borehole**

**Borehole ID:** BH04  
**Sheet:** 1 of 2  
**Project No.:** GEOTFYSH09703AA

**Client:** Opus International Consultants NSW Pty Ltd  
**Project:** Ellerton Drive Extension  
**Location:** Queanbeyan, NSW  
**Date Started:** 06 May 2014  
**Date Completed:** 07 May 2014  
**Logged by:** BC  
**Checked by:** BC

---

**Material Description**

- **SOIL TYPE:** plasticity or particle characteristic, colour, secondary and minor components

---

**Additional Observations**

- **Borehole BH04 continued as cored hole**
### Rocks

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.13</td>
<td>Fine to medium grained, grey, trace of quartz veins interlaminated into sandstone.</td>
</tr>
<tr>
<td>0.05</td>
<td>Fine to medium grained, grey, trace of quartz veins interlaminated into sandstone.</td>
</tr>
</tbody>
</table>

### Engineering Log - Cored Borehole

**Borehole ID:** BH04  
**Date started:** 06 May 2014  
**Date completed:** 07 May 2014  
**Logged by:** BC  
**Checked by:** BC

**Borehole BH04 terminated at 5.00 m**

**Target depth 100%**

### Rock Mass Defects

**Defects are:** JT, 70°, PL, RO, Clay CO

**Highly Fractured Zone:** 2530mm comprising joints, partings, seams, 70° PL, ST, SN Fe

### Rock Mass Properties

**Estimated Strength & IS (MPa)**

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Samples</th>
<th>Field tests</th>
<th>IS (50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.13</td>
<td>100%</td>
<td>4.26</td>
<td>1.58</td>
</tr>
<tr>
<td>0.05</td>
<td>6%</td>
<td>3.75</td>
<td>2.06</td>
</tr>
<tr>
<td>0.05</td>
<td>68%</td>
<td>3.49</td>
<td>2.49</td>
</tr>
</tbody>
</table>

### Observations

- **Water:** Not Observable
- **Temperature:** Not Observable
- **Compressibility:** Not Observable

### Modification of Borehole

- **Coring at:** 0.70m

---

**Note:** This text is extracted from a table format in the image. The table includes data on depth, rock type, material description, and rock mass defects.
PointID: BH04 Depth Range: 0.70 - 5.00 m

client: Opus International Consultants NSW Pty Ltd
project: Ellerton Drive Extension
Ellerton Drive, Quanbeyan, NSW
title: CORE PHOTOGRAPH BH04
project no: GEOTFYSH09703AA
fig no: 18

<table>
<thead>
<tr>
<th>drawn</th>
<th>SB</th>
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<tr>
<td>approved</td>
<td>BC</td>
</tr>
<tr>
<td>date</td>
<td>24/06/2014</td>
</tr>
<tr>
<td>scale</td>
<td>N.T.S.</td>
</tr>
<tr>
<td>original size</td>
<td>A4</td>
</tr>
</tbody>
</table>
**Engineering Log - Borehole**

**client:** Opus International Consultants NSW Pty Ltd  
**principal:** Queanbeyan City Council  
**project:** Ellerton Drive Extension  
**location:** Queanbeyan, NSW

**Borehole ID:** BH05  
**date started:** 07 May 2014  
**date completed:** 08 May 2014  
**logged by:** BC/ RB  
**checked by:** BC

**Position:** E: 704930; N: 6084749 (Datum Not Specified)  
**Surface Elevation:** 640.60m (Datum Not Specified)  
**Angle from Horizontal:** 90°  
**Drill Model:** Camacchio  
**Mounting:** Trailer  
**Casing Diameter:** 100 mm

### Drilling Information & Material Substance

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Soil Type</th>
<th>Material Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>640</td>
<td>Clayey SAND</td>
<td>medium grained, pale brown, low plasticity clay, with some fine grained, angular gravel.</td>
</tr>
<tr>
<td>639</td>
<td>SANDSTONE</td>
<td>orange-brown, extremely to highly weathered, estimated low strength.</td>
</tr>
</tbody>
</table>

Additional Observations:
- Borehole BH05 continued as cored hole

### Additional Information

- **Method & Support:**
  - AD: Auger drilling
  - AS: Auger screwing
  - RR: Roller/tricone
  - W: Washbore
  - CT: Cable tool
  - HA: Hand auger
  - DT: Disturb

- **Samples & Field Tests:**
  - B: bulk disturbed sample
  - D: disturbed sample
  - E: environmental sample
  - SS: split spoon sample
  - HP: hand penetrometer (kPa)
  - N: standard penetration test (SPT)
  - N*: SPT - sample recovered
  - NC: SPT with solid cone
  - VS: vane shear; peak/remoulded (kPa)
  - R: refusal
  - HB: hammer bouncing

- **Classification Symbol & Soil Description:**
  - Based on Unified Classification System

- **Consistency / Relative Density:**
  - VS: very soft
  - S: soft
  - F: firm
  - St: stiff
  - VSt: very stiff
  - H: hard
  - W: wet
  - V: very loose
  - L: loose
  - MD: medium dense
  - D: dense
  - WD: very dense

- **Moisture:**
  - 10-Oct-12 water level on date shown

- **Penetration:**
  - no resistance ranging to refusal

- **Water:**
  - inflow
  - outflow
**Engineering Log - Cored Borehole**

**client:** Opus International Consultants NSW Pty Ltd  
**principal:** Queanbeyan City Council  
**project:** Ellerton Drive Extension  
**location:** Queanbeyan, NSW

**drill model:** Camacchio  
**mounting:** Trailer  
**casing diameter:** 100 mm

---

**material substance**

<table>
<thead>
<tr>
<th>depth (m)</th>
<th>graphic log</th>
<th>material description</th>
<th>rock mass defects</th>
<th>defect type</th>
<th>additional observations and defect descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.80</td>
<td></td>
<td>start coring at 0.80m</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.80 - 0.55</td>
<td></td>
<td>NO CORE: 0.55 m</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.55</td>
<td></td>
<td>SANDSTONE: fine grained, brown, indistinctly bedded @ 40°, iron stained.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.60 - 0.55</td>
<td></td>
<td>NO CORE: 0.55 m</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.55</td>
<td></td>
<td>SANDSTONE: fine grained, brown, indistinctly bedded @ 40°, iron stained.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.60 - 0.55</td>
<td></td>
<td>NO CORE: 0.55 m</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.55</td>
<td></td>
<td>SANDSTONE: fine grained, pale grey, massive, with a trace of quartz veins.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.55</td>
<td></td>
<td>SILTSTONE: dark green, indistinct wavy bedded @ 90° to 70°, iron stained, sandstone veins.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**weathering & alteration**

- XW: extreme weathered  
- HW: highly weathered  
- DW: distinctly weathered  
- MW: moderately weathered  
- SW: slightly weathered  
- FR: fresh

---

**method & support**

- DT: database  
- AD: auger drilling  
- BR: roller core  
- CB: claw or blade bit  
- NM: core  
- Q: core (47.5mm)  
- P: core (85.0mm)  
- SPT: standard penetration test

---

**graphic log / core recovery**

- core run & RQD  
- barrel withdrawn  
- water pressure test result (lugeons) for depth interval shown

---

**sample tests**

- samples, field tests & (b) (MPa)  
- % core recovered  
- RQD = Rock Quality Designation (%)

---

**defect type**

- PT: parting  
- JT: joint  
- SU: shear zone  
- SS: shear surface  
- CS: crushed seam  
- SM: seam  
- DB: drilling break

---

**Borehole BH05 terminated at 5.50 m Target depth**
PointID : BH05 Depth Range: 0.80 - 5.50 m

client: Opus International Consultants NSW Pty Ltd
project: Ellerton Drive Extension
Ellerton Drive, Quanbeyan, NSW
title: CORE PHOTOGRAPH
BH05

drawn: SB
approved: BC
date: 24/06/2014
scale: N.T.S.
original size: A4
### Engineering Log - Borehole

**client:** Opus International Consultants NSW Pty Ltd  
**principal:** Queanbeyan City Council  
**project:** Ellerton Drive Extension  
**location:** Queanbeyan, NSW  
**date started:** 08 May 2014  
**date completed:** 08 May 2014  
**logged by:** BC/ RB  
**checked by:** BC

**Borehole ID:** BH06  
**sheet no.:** 1 of 3  
**project no.:** GEOTFYSH09703AA

#### Drilling Information

- **Method:** Camacchio  
- **Mounting:** Trailer  
- **Casing Diameter:** 100 mm  
- **Penetration:** No Drift

#### Material Substance

<table>
<thead>
<tr>
<th>RL (m)</th>
<th>Consistency / Relative Density</th>
<th>Soil Type</th>
<th>Conditioning</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>650</td>
<td>D</td>
<td>Colluvium</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>649</td>
<td>M</td>
<td>Sandstone</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>648</td>
<td>L</td>
<td>Bedrock</td>
<td>L</td>
<td></td>
</tr>
</tbody>
</table>

#### Additional Observations

- **SOIL TYPE:** plasticity or particle characteristic, colour, secondary and minor components
- **MOISTURE:** dry, moist, wet
- **WATER:** inflow, outflow
- **WATER OUTFLOW:** level on date shown
- **SUPPORT:** mud, casing
- **METHOD:** auger drilling, roller/ticone, washbore, hand auger, diatube, blank bit, V bit, TC bit, etc.
- **CONSISTENCY / RELATIVE DENSITY:** very soft, soft, firm, stiff, very stiff, very loose, loose, medium dense, dense, very dense

**Borehole BH06 continued as cored hole**
### Engineering Log - Cored Borehole

**client:** Opus International Consultants NSW Pty Ltd  
**principal:** Queanbeyan City Council  
**project:** Ellerton Drive Extension  
**location:** Queanbeyan, NSW

**Borehole ID:** BH06  
**date started:** 08 May 2014  
**date completed:** 08 May 2014  
**logged by:** BC/RB  
**checked by:** BC

**Position:** E: 704927; N: 6084590 (Datum Not Specified)  
**Surface elevation:** 650.89m (Datum Not Specified)  
**Orientation:** angle from horizontal: 90°

**Casing diameter:** 100 mm  
**Drill model:** Camacchio  
**Mounting:** Trailer

---

### Drilling Information

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Water Level on Date</th>
<th>Graphic Log</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>10/10/12, water level on date shown</td>
<td>SW</td>
</tr>
<tr>
<td>2.0</td>
<td></td>
<td>SW</td>
</tr>
<tr>
<td>3.0</td>
<td></td>
<td>SW</td>
</tr>
<tr>
<td>4.0</td>
<td></td>
<td>SW</td>
</tr>
<tr>
<td>5.0</td>
<td></td>
<td>SW</td>
</tr>
<tr>
<td>6.0</td>
<td></td>
<td>MW</td>
</tr>
<tr>
<td>7.0</td>
<td></td>
<td>SW</td>
</tr>
</tbody>
</table>

---

### Material Substance

#### SANDSTONE
- Fine grained, pale brown, distinctly bedded at 40°.
- No core: 0.25 m

#### QUARTZITE
- Pale grey, massive, iron stained quartz veins at 35°.
- No core: 0.13 m

#### SHALE
- Fine to medium grained, brown, distinctly bedded at 60°, with interlaminated quartz veins (approx. 20%).
- No core: 0.28 m

---

### Rock Mass Defects

- JT, 30°, ST, RO, Fe SN  
- JT, 35°, PL, RO, CN

**Highly Fractured Zone:** 1780mm comprising closely spaced joints oriented at 30° to 40°

---

### Water Pressure Test Result (lugeons) for Depth Interval Shown

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Water Pressure Test Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>7.0</td>
<td></td>
</tr>
</tbody>
</table>

---

### Additional Observations and Defect Descriptions

- Defects are: JT, 60°, PL, RO, Fe SN, unless otherwise described

---

### Rock Quality Designation (%)

- RQD = Rock Quality Designation

---

### Weathering & Alteration

- *A* replaced with *A* for alteration strength

---

### Defect Type

- PT: parting  
- PL: planar

---

### Planarity

- JT: joint  
- CU: curved

---

### Defect Support

- PL: polished  
- SV: smooth

---

### Coating

- CN: clean  
- SN: stained
### Engineering Log - Cored Borehole

**client:** Opus International Consultants NSW Pty Ltd  
**principal:** Queanbeyan City Council  
**project:** Ellerton Drive Extension  
**location:** Queanbeyan, NSW

**Borehole ID:** BH06  
**date started:** 08 May 2014  
**date completed:** 08 May 2014  
**logged by:** BC/ RB  
**checked by:** BC

**position:** E: 704927; N: 6084590 (Datum Not Specified)  
**surface elevation:** 650.89m (Datum Not Specified)  
**from horizontal:** 90°  
**drill model:** Camacchio  
**mounting:** Trailer  
**casing diameter:** 100 mm

---

#### rock mass defects

<table>
<thead>
<tr>
<th>method &amp; support</th>
<th>water</th>
<th>graphic log</th>
<th>material description</th>
<th>estimated strength &amp; stiffness</th>
<th>samples</th>
<th>defect spacing (mm)</th>
<th>additional observations and defect descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>ROCK TYPE: grain characteristics, colour, structure, minor components</td>
<td></td>
<td></td>
<td></td>
<td>particular general</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>QUARTZITE: pale grey, massive, iron stained veins, highly fractured, jointed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SHALE: fine to medium grained, brown, distinctly bedded at 60°, with interlaminated quartz veins (approx. 20%).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Borehole BH06 terminated at 9.00 m  
Target depth

---

#### Rock Quality Designation (RQD)

- JT, 75°, PL, RO, Fe SN
- JT, 30 - 40°, PL, RO, Fe SN
- PT, 30°, PL, RO, Fe SN

---

#### Additional Observations and Defect Descriptions

- **Defect Type:**
  - JT: joint  
  - TL: tensile裂纹  
  - DT: dike, dyke  
  - PT: parting  
  - SM: seam  
  - SB: shear band  

- **defect description:**
  - VL: very low  
  - L: low  
  - M: medium  
  - H: high  
  - VH: very high  
  - EH: extremely high

---

#### Water Pressure Test Result

- **interval shown:**
  - Water pressure test result (gage) for depth interval shown

---

#### Cored Borehole Information

- **project no.:** GEOTFYSH09703AA  
- **date started:** 08 May 2014  
- **date completed:** 08 May 2014  
- **logged by:** BC/ RB  
- **checked by:** BC
PointID: BH06 Depth Range: 1.00 - 9.00 m

**PROJECT:** ELLERTON DRIVE EXTENSION

**PROJECT NO:** GEOTFYSH09703AA

**BOREHOLE NO:** BH6  **DATE:** 23/5/14

**DEPTH:** 1.00m - 9.00m

---

**client:** Opus International Consultants NSW Pty Ltd

**project:** Ellerton Drive Extension

Ellerton Drive, Quanbeyan, NSW

**title:** CORE PHOTOGRAPH

**BH06**

---

**drawn** | **SB** | **approved** | **BC**
--- | --- | --- | ---
**date** | 24/06/2014 | **scale** | N.T.S.
**original size** | A4 | **project no:** | GEOTFYSH09703AA
**fig no:** | 20 | **rev:** |
**Engineering Log - Borehole**

**client:** Opus International Consultants NSW Pty Ltd  
**principals:** Queanbeyan City Council  
**project:** Ellerton Drive Extension  
**location:** Queanbeyan, NSW

**Borehole ID:** BH07  
**date started:** 12 May 2014  
**date completed:** 12 May 2014  
**logged by:** BC/ RB  
**checked by:** BC

---

**Position:** E: 704919; N: 6084551 (Datum Not Specified)  
**Surface elevation:** 651.02m (Datum Not Specified)  
**Angle from horizontal:** 90°  
**Position:** E: 704919; N: 6084551 (Datum Not Specified)

**Drilling Information**

<table>
<thead>
<tr>
<th>RL (m)</th>
<th>Gravel, medium grained, sub-angular, pale brown.</th>
<th>Sandstone, pale brown, extremely to highly weathered, estimated low strength.</th>
</tr>
</thead>
<tbody>
<tr>
<td>650</td>
<td>Fill: Silty GRAVEL.</td>
<td>Sandstone: pale brown, extremely to highly weathered, estimated low strength.</td>
</tr>
</tbody>
</table>

---

**Material Substance**

**SOIL TYPE:** plasticity or particle characteristic, colour, secondary and minor components

<table>
<thead>
<tr>
<th>Samples &amp; Field Tests</th>
<th>Classification Symbol</th>
<th>SOIL TYPE</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GM</td>
<td>FILL</td>
<td>Fill: Silty GRAVEL: medium grained, sub-angular, pale brown.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sandstone: pale brown, extremely to highly weathered, estimated low strength.</td>
<td></td>
</tr>
</tbody>
</table>

---

**Additional Observations**

Borehole BH07 continued as cored hole

---

**Method & Support**

<table>
<thead>
<tr>
<th>M</th>
<th>N</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>654</td>
<td>655</td>
<td>656</td>
</tr>
</tbody>
</table>

---

**Material Description**

**SOIL TYPE:** plasticity or particle characteristic, colour, secondary and minor components

<table>
<thead>
<tr>
<th>Samples &amp; Field Tests</th>
<th>Classificationsymbol</th>
<th>SOIL TYPE</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GM</td>
<td>FILL</td>
<td>Fill: Silty GRAVEL: medium grained, sub-angular, pale brown.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sandstone: pale brown, extremely to highly weathered, estimated low strength.</td>
<td></td>
</tr>
</tbody>
</table>

---

**Consistency / Relative Density**

<table>
<thead>
<tr>
<th>Moisture</th>
<th>Consistency</th>
<th>Relative Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry</td>
<td>VS</td>
<td>Very soft</td>
</tr>
<tr>
<td>Moist</td>
<td>S</td>
<td>Soft</td>
</tr>
<tr>
<td>Wet</td>
<td>F</td>
<td>Firm</td>
</tr>
<tr>
<td>Very wet</td>
<td>VL</td>
<td>Very loose</td>
</tr>
<tr>
<td>Loose</td>
<td>L</td>
<td>Loose</td>
</tr>
<tr>
<td>Medium</td>
<td>MD</td>
<td>Medium dense</td>
</tr>
<tr>
<td>Dense</td>
<td>D</td>
<td>Dense</td>
</tr>
<tr>
<td>Very dense</td>
<td>VD</td>
<td>Very dense</td>
</tr>
</tbody>
</table>