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# Engineering Log - Excavation

Excavation No. **TP09 - 1**

Sheet 1 of 1

Project No: **GEOTWARA20576AA**

Client: **APP CORPORATION**

Date started: **24.4.2009**

Principal:

Date completed: **24.4.2009**

Project: **PROPSOED HMRI BUILDINGS**

Logged by: **DGS**

Test pit location: **REFER TO FIGURE**

Checked by:

equipment type and model: Yanmar | Pit Orientation: | Easting: 377720.68 m | R.L. Surface: 86.17

excavation dimensions: 2m long 0.4m wide | Northing: 6356708.04 m | datum: AHD

**excavation information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AST | | N | None Observed | | 86.0 | | | | **FILL:** Clayey SAND, fine to medium grained, brown, low plasticity fines. | M | MD | | FILL (surafce gravel) |
| | | | | | | | | | **FILL:** Sandy CLAY, low to medium pasticity, orange mottled grey, fine to medium grained gravel. | >Wp | St | | |
| | | | | | | 0.5 | | SP | **Clayey SAND:** fine to medium grained, brown, low plasticity fines, trace of fine gravel. | M | D | | TOPSOIL |
| | | | | | | | | CL | **Sandy CLAY:** low to medium plasticity, orange, fine to medium grained sand. | >Wp | St | | RESIDUAL |
| | | | | | 85.5 | | | | | | VSt | | |
| | | | | | | | | | **CONGLOMERATE:** SANDSTONE, fine to medium grained, yellow mottled grey. | <Wp | | | EXTREMELY WEATHERED ROCK |
| | | | | | | | | | Test pit TP09 - 1 terminated at 0.8m | | | | |
| | | | | | 85.0 | 1.0 | | | | | | | |
| | | | | | 84.5 | 1.5 | | | | | | | |
| | | | | | | 2.0 | | | | | | | |

Sketch

**method**
- N natural exposure
- X existing excavation
- BH backhoe bucket
- B bulldozer blade
- R ripper
- E excavator

**support**
- S shoring
- N nil

**penetration**
1 2 3 4 — no resistance ranging to refusal

**water**
- water level on date shown
- water inflow
- water outflow

**notes, samples, tests**
- $U_{50}$ undisturbed sample 50mm diameter
- $U_{63}$ undisturbed sample 63mm diameter
- D disturbed sample
- V vane shear (kPa)
- Bs bulk sample
- E environmental sample
- R refusal

**classification symbols and soil description**
based on unified classification system

**moisture**
- D dry
- M moist
- W wet
- Wp plastic limit
- $W_L$ liquid limit

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

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# Engineering Log - Excavation

Excavation No. **TP09 - 2**

Sheet 1 of 1

Project No: **GEOTWARA20576AA**

Client: ***APP CORPORATION***

Date started: ***24.4.2009***

Principal:

Date completed: ***24.4.2009***

Project: ***PROPSOED HMRI BUILDINGS***

Logged by: ***DGS***

Test pit location: ***REFER TO FIGURE***

Checked by:

equipment type and model: Yanmar | Pit Orientation: | Easting: 377735.32 m | R.L. Surface: 82.48

excavation dimensions: 2m long 0.4m wide | Northing: 6356709.24 m | datum: AHD

**excavation information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | | N | None Observed | | | | | SP | **Clayey Gravelly SAND:** fine to medium grained, dark brown, fine to medium grained gravel. low plasticity fines. | M | D | | TOPSOIL |
| | | | | | | | | SP | **Clayey SAND:** fine to medium grained, orange, medium to high plasticity fines. | | | | RESIDUAL |
| | | | | | 82.0 | 0.5 | | | **CONGLOMERATE:** fine to medium grained, yellow / orange mottled grey. | M-D | | | EXTREMELY WEATHERED ROCK |
| | | | | | | | | | Test pit TP09 - 2 terminated at 0.6m | | | | |
| | | | | | 81.5 | 1.0 | | | | | | | |
| | | | | | 81.0 | 1.5 | | | | | | | |
| | | | | | 80.5 | 2.0 | | | | | | | |

Sketch



**method**
- N natural exposure
- X existing excavation
- BH backhoe bucket
- B bulldozer blade
- R ripper
- E excavator

**support**
- S shoring
- N nil

**penetration** 1 2 3 4 — no resistance ranging to refusal

**water**
- water level on date shown
- water inflow
- water outflow

**notes, samples, tests**
- $U_{50}$ undisturbed sample 50mm diameter
- $U_{63}$ undisturbed sample 63mm diameter
- D disturbed sample
- V vane shear (kPa)
- Bs bulk sample
- E environmental sample
- R refusal

**classification symbols and soil description** based on unified classification system

**moisture**
- D dry
- M moist
- W wet
- Wp plastic limit
- $W_L$ liquid limit

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

TESTPIT TP09-1 - TP09-17.GPJ COFFEY.GDT 5.6.09

Form GEO 5.2 Issue 3 Rev.2

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# Engineering Log - Excavation

Excavation No. **TP09 - 3**

Sheet 1 of 1

Project No: **GEOTWARA20576AA**

Client: **APP CORPORATION**

Date started: **24.4.2009**

Principal:

Date completed: **24.4.2009**

Project: **PROPSOED HMRI BUILDINGS**

Logged by: **DGS**

Test pit location: **REFER TO FIGURE**

Checked by:

equipment type and model: Yanmar | Pit Orientation: | Easting: 377749.04 m | R.L. Surface: 82.48

excavation dimensions: 2m long 0.4m wide | Northing: 6356655.25 m | datum: AHD

| excavation information | | | | | | material substance | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL / depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
| E | | N | None Observed ▼ | | 82.0 0.5 | | | **FILL:** Clayey SAND, fine to medium grained, brown, low plasticity fines, trace of fine gravel and some boulders to 150mm. | M | D | | PROBABLE FILL |
| | | | | | | | CM | **Sandy CLAY:** low to medium plasticity, orange, fine to coarse grained sand. | >Wp | VSt | | PROBABLE SLIGHTLY WEATHERED |
| | | | | | 81.5 1.0 | | CH | **Sandy CLAY:** medium to high plasticity, orange mottled grey, trace of fine to medium grained gravel. | | H | | RESIDUAL |
| | | | | | | | | **CONGLOMERATE:** SANDSTONE, low to medium strength, orange mottled grey, fine to coarse grained sand, fine to medium grained gravel. | <Wp | | | EXTREMELY WEATHERED ROCK |
| | | | | | 81.0 1.5 | | | Test pit TP09 - 3 terminated at 1.2m | | | | |
| | | | | | 80.5 2.0 | | | | | | | |

Sketch

**method**
- N natural exposure
- X existing excavation
- BH backhoe bucket
- B bulldozer blade
- R ripper
- E excavator

**support**
- S shoring
- N nil

**penetration** 1 2 3 4 — no resistance ranging to refusal

**water**
- water level on date shown
- water inflow
- water outflow

**notes, samples, tests**
- $U_{50}$ undisturbed sample 50mm diameter
- $U_{63}$ undisturbed sample 63mm diameter
- D disturbed sample
- V vane shear (kPa)
- Bs bulk sample
- E environmental sample
- R refusal

**classification symbols and soil description** based on unified classification system

**moisture**
- D dry
- M moist
- W wet
- Wp plastic limit
- $W_L$ liquid limit

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

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# Engineering Log - Excavation

Excavation No. **TP09 - 4**

Sheet 1 of 1

Project No: **GEOTWARA20576AA**

Client: ***APP CORPORATION***

Date started: ***24.4.2009***

Principal:

Date completed: ***24.4.2009***

Project: ***PROPSOED HMRI BUILDINGS***

Logged by: ***DGS***

Test pit location: ***REFER TO FIGURE***

Checked by:

equipment type and model: Yanmar | Pit Orientation: | Easting: 377758.24 m | R.L. Surface: 79.03

excavation dimensions: 2m long 0.4m wide | Northing: 6356696.35 m | datum: AHD

**excavation information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | | N | None Observed | Bs | 78.5 | 0.5 | | | **FILL:** Clayey Gravelly SAND, fine to coarse grained gravel, some boulders to 150mm, low plasticity fines, orange / brown. | D-M<br>M | D | | FILL |
| | | | | | 78.0 | 1.0 | | | | | | | |
| | | | | | 77.5 | 1.5 | | SP | **Clayey SAND:** fine to coarse grained gravel, grey mottled brown, low plasticity fines, trace of fine gravel. | M-W | | | RESIDUAL |
| | | | | | | | | CL | **Sandy CLAY:** low to medium plasticity, brown mottled grey, fine to medium grained sand, trace of fine gravel. | >Wp | VSt | X | |
| | | | | | | 2.0 | | | Test pit TP09 - 4 terminated at 1.8m | | | | |

Sketch

**method**
- N natural exposure
- X existing excavation
- BH backhoe bucket
- B bulldozer blade
- R ripper
- E excavator

**support**
- S shoring
- N nil

**penetration** 1 2 3 4 — no resistance ranging to refusal

**water**
- water level on date shown
- water inflow
- water outflow

**notes, samples, tests**
- $U_{50}$ undisturbed sample 50mm diameter
- $U_{63}$ undisturbed sample 63mm diameter
- D disturbed sample
- V vane shear (kPa)
- Bs bulk sample
- E environmental sample
- R refusal

**classification symbols and soil description** based on unified classification system

**moisture**
- D dry
- M moist
- W wet
- Wp plastic limit
- $W_L$ liquid limit

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

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# Engineering Log - Excavation

Excavation No. **TP09 - 5**

Sheet 1 of 1

Project No: **GEOTWARA20576AA**

Client: **APP CORPORATION**

Date started: **28.4.2009**

Principal:

Date completed: **28.4.2009**

Project: **PROPSOED HMRI BUILDINGS**

Logged by: **DGS**

Test pit location: **REFER TO FIGURE**

Checked by:

equipment type and model: Yanmar | Pit Orientation: | Easting: 377785.18 m | R.L. Surface: 71.47

excavation dimensions: 2m long 0.4m wide | Northing: 6356679.06 m | datum: AHD

| excavation information | | | | | | material substance | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL / depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
| AST | | N | None Observed | | 71.0 / 0.5 | | | **FILL:** Clayey Gravely SAND, fine grained, grey, fine to medium grained gravel, medium to high plasticity fines. | M | D | | FILL |
| | | | | Bs | | | CH | **CLAY:** high plasticity, orange / brown mottled grey, trace of fine to medium grained sand, trace of fine gravel. | >Wp | VSt | × | RESIDUAL |
| | | | | | 70.5 / 1.0 | | | | | | × | |
| | | | | | | | CH | **CLAY:** medium to high plasticity, pale grey mottled orange, some fine to medium grained sand, trace of fine gravel. | <Wp | H | | |
| | | | | | 70.0 / 1.5 | | | **CONGLOMERATE:** SANDSTONE | | | | EXTREMELY WEATHERED ROCK |
| | | | | | 69.5 / 2.0 | | | Test pit TP09 - 5 terminated at 1.9m | | | | |

Sketch

**method**
- N natural exposure
- X existing excavation
- BH backhoe bucket
- B bulldozer blade
- R ripper
- E excavator

**support**
- S shoring
- N nil

**penetration**
1 2 3 4 — no resistance ranging to refusal

**water**
- water level on date shown
- water inflow
- water outflow

**notes, samples, tests**
- $U_{50}$ undisturbed sample 50mm diameter
- $U_{63}$ undisturbed sample 63mm diameter
- D disturbed sample
- V vane shear (kPa)
- Bs bulk sample
- E environmental sample
- R refusal

**classification symbols and soil description**
based on unified classification system

**moisture**
- D dry
- M moist
- W wet
- Wp plastic limit
- $W_L$ liquid limit

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

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# Engineering Log - Excavation

Excavation No. **TP09 - 6**

Sheet 1 of 1

Project No: **GEOTWARA20576AA**

Client: **APP CORPORATION**

Date started: **28.4.2009**

Principal:

Date completed: **28.4.2009**

Project: **PROPSOED HMRI BUILDINGS**

Logged by: **DGS**

Test pit location: **REFER TO FIGURE**

Checked by:

equipment type and model: Yanmar | Pit Orientation: | Easting: 377814.05 m | R.L. Surface: 75.65

excavation dimensions: 2m long 0.4m wide | Northing: 6356784.71 m | datum: AHD

**excavation information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | | N | None Observed | Bs | 75.5 | 0.5 | | | **FILL:** Clayey Gravelly SAND, fine to medium grained, pale brown, fine gravel, medium to high plasticity fines. | M | D | | FILL |
| | | | | | 75.0 | 1.0 | | | | | | | |
| | | | | | 74.5 | 1.5 | | | **Sandy CLAY:** low to medium plasticity, brown / grey, fine sand. | >Wp | VSt | | RESIDUAL |
| | | | | | 74.0 | | | | **CLAYSTONE:** low to medium strength, pale brown / grey, trace of fine sand. | <Wp | | | EXTREMELY WEATHERED ROCK |
| | | | | | | 2.0 | | | Test pit TP09 - 6 terminated at 1.9m | | | | |

Sketch

**method**
- N natural exposure
- X existing excavation
- BH backhoe bucket
- B bulldozer blade
- R ripper
- E excavator

**support**
- S shoring
- N nil

**penetration** 1 2 3 4 — no resistance ranging to refusal

**water**
- water level on date shown
- water inflow
- water outflow

**notes, samples, tests**
- $U_{50}$ undisturbed sample 50mm diameter
- $U_{63}$ undisturbed sample 63mm diameter
- D disturbed sample
- V vane shear (kPa)
- Bs bulk sample
- E environmental sample
- R refusal

**classification symbols and soil description** based on unified classification system

**moisture**
- D dry
- M moist
- W wet
- Wp plastic limit
- $W_L$ liquid limit

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

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# Engineering Log - Excavation

Excavation No. **TP09 - 7**

Sheet 1 of 1

Project No: **GEOTWARA20576AA**

Client: **APP CORPORATION**

Date started: **28.4.2009**

Principal:

Date completed: **28.4.2009**

Project: **PROPSOED HMRI BUILDINGS**

Logged by: **DGS**

Test pit location: **REFER TO FIGURE**

Checked by:

equipment type and model: Yanmar | Pit Orientation: | Easting: 377851.66 m | R.L. Surface: 66.02

excavation dimensions: 2m long 0.4m wide | Northing: 6356694.2 m | datum: AHD

**excavation information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AST | | N | None Observed | | 65.5 | 0.5 | | MS/SP | **Silty SAND:**, fine to medium grained, grey / brown, low to medium plasticity fines, trace of fine to mediuim grained gravel. | M | D | | SLOPEWASH |
| | | | | | 65.0 | 1.0 | | SC/CH | **Sandy CLAY:** high plasticity, orange mottled grey, fine to medium grained sand, trace of fine gravel. | >Wp | St | | RESIDUAL |
| | | | | | 64.5 | 1.5 | | CH | **CLAY:** medium to high plasticity, grey mottled orange, trace of fine gravel. | | VSt | | |
| | | | | | | 2.0 | | | Test pit TP09 - 7 terminated at 2m | | | | |

Sketch

**method**
- N natural exposure
- X existing excavation
- BH backhoe bucket
- B bulldozer blade
- R ripper
- E excavator

**support**
- S shoring
- N nil

**penetration** 1 2 3 4 — no resistance ranging to refusal

**water**
- water level on date shown
- water inflow
- water outflow

**notes, samples, tests**
- $U_{50}$ undisturbed sample 50mm diameter
- $U_{63}$ undisturbed sample 63mm diameter
- D disturbed sample
- V vane shear (kPa)
- Bs bulk sample
- E environmental sample
- R refusal

**classification symbols and soil description** based on unified classification system

**moisture**
- D dry
- M moist
- W wet
- Wp plastic limit
- $W_L$ liquid limit

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

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# Engineering Log - Excavation

Excavation No. **TP09 - 8**

Sheet 1 of 1

Project No: **GEOTWARA20576AA**

Client: **APP CORPORATION**

Date started: **27.4.2009**

Principal:

Date completed: **27.4.2009**

Project: **PROPSOED HMRI BUILDINGS**

Logged by: **DGS**

Test pit location: **REFER TO FIGURE**

Checked by:

equipment type and model: Yanmar | Pit Orientation: | Easting: 377897.6 m | R.L. Surface: 61.43

excavation dimensions: 2m long 0.4m wide | Northing: 6356718.18 m | datum: AHD

| excavation information | | | | | | | material substance | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa 100 200 300 400 | structure and additional observations |
| AST | | N | None Observed | | | | | MS | **Silty SAND:** fine to medium grained, grey, low plasticity fines, some fine gravel. | M | D | | SLOPEWASH |
| | | | | Bs | 61.0 | 0.5 | | CH | **CLAY:** medium to high plasticity, orange / brown mottled grey becoming grey mottled brown / red, trace of fine to medium grained sand. | >Wp | VSt | | RESIDUAL |
| | | | | | 60.5 | 1.0 | | | **CLAYSTONE:** low to medium strength, pale grey / yellow, some fine to medium grained sand. | <Wp | | | EXTREMELY WEATHERED ROCK |
| | | | | | 60.0 | 1.5 | | | Test pit TP09 - 8 terminated at 1.2m | | | | |
| | | | | | 59.5 | 2.0 | | | | | | | |

Sketch

**method**
- N natural exposure
- X existing excavation
- BH backhoe bucket
- B bulldozer blade
- R ripper
- E excavator

**support**
- S shoring
- N nil

**penetration** 1 2 3 4 — no resistance ranging to refusal

**water**
- water level on date shown
- water inflow
- water outflow

**notes, samples, tests**
- $U_{50}$ undisturbed sample 50mm diameter
- $U_{63}$ undisturbed sample 63mm diameter
- D disturbed sample
- V vane shear (kPa)
- Bs bulk sample
- E environmental sample
- R refusal

**classification symbols and soil description** based on unified classification system

**moisture**
- D dry
- M moist
- W wet
- Wp plastic limit
- $W_L$ liquid limit

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

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# Engineering Log - Excavation

Excavation No. **TP09 - 9**

Sheet 1 of 1

Project No: **GEOTWARA20576AA**

Client: **APP CORPORATION**

Date started: **27.4.2009**

Principal:

Date completed: **27.4.2009**

Project: **PROPSOED HMRI BUILDINGS**

Logged by: **DGS**

Test pit location: **REFER TO FIGURE**

Checked by:

equipment type and model: Yanmar | Pit Orientation: | Easting: 377848.37 m | R.L. Surface: 70.13

excavation dimensions: 2m long 0.4m wide | Northing: 6356785.46 m | datum: AHD

**excavation information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AST | | N | None Observed | | 70.0 | | | CH | **Silty CLAY:** medium to high plasticity, dark brown, trace of fine sand. | >Wp | St | | TOPSOIL |
| | | | | | | | | CH | **CLAY:** high plasticity, orange / brown. | | | | RESIDUAL |
| | | | | Bs | | 0.5 | | | | | | | |
| | | | | | 69.5 | | | | | | | | |
| | | | | | | | | CH | **CLAY:** medium to high plasticity, grey mottled orange / grey, trace of fine gravel. | | VSt | | |
| | | | | | | 1.0 | | | | | | | |
| | | | | | 69.0 | | | | | | | | |
| | | | | | | 1.5 | | | **CLAYSTONE:** pale grey, low to medium plasticity, trace of fine sand. | <Wp | | | EXTREMELY WEATHERED ROCK |
| | | | | | 68.5 | | | | Test pit TP09 - 9 terminated at 1.5m | | | | |
| | | | | | | 2.0 | | | | | | | |

Sketch

**method**
N natural exposure
X existing excavation
BH backhoe bucket
B bulldozer blade
R ripper
E excavator

**support**
S shoring N nil

**penetration**
1 2 3 4
no resistance ranging to refusal

**water**
water level on date shown
water inflow
water outflow

**notes, samples, tests**
$U_{50}$ undisturbed sample 50mm diameter
$U_{63}$ undisturbed sample 63mm diameter
D disturbed sample
V vane shear (kPa)
Bs bulk sample
E environmental sample
R refusal

**classification symbols and soil description**
based on unified classification system

**moisture**
D dry
M moist
W wet
Wp plastic limit
$W_L$ liquid limit

**consistency/density index**
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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# Engineering Log - Excavation

Excavation No. **TP09 -10**

Sheet 1 of 1

Project No: **GEOTWARA20576AA**

Client: ***APP CORPORATION***

Date started: ***28.4.2009***

Principal:

Date completed: ***28.4.2009***

Project: ***PROPSOED HMRI BUILDINGS***

Logged by: ***DGS***

Test pit location: ***REFER TO FIGURE***

Checked by:

equipment type and model: Yanmar | Pit Orientation: | Easting: 377897.68 m | R.L. Surface: 62.96

excavation dimensions: 2m long 0.4m wide | Northing: 6356767.78 m | datum: AHD

**excavation information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AST | | N | None Observed | | | | | SP | **Silty SAND:** fine to medium grained, dark grey, medium to high plasticity fines. | D-M | D | | SLOPEWASH |
| | | | | | 62.5 | 0.5 | | CH | **CLAY:** high plasticity, brown mottled grey and red, trace of fine to medium grained sand. | >Wp | St | | RESIDUAL |
| | | | | Bs | 62.0 | 1.0 | | | | | | | |
| | | | | | 61.5 | 1.5 | | CH | **CLAY:**medium to high plasticity, grey mottled brown and red, trace of fine to medium gained sand. | <Wp | VSt | | Sandstone fragments noted 0.8 - 2m. |
| | | | | | 61.0 | 2.0 | | | Test pit TP09 -10 terminated at 2m | | | | |
| | | | | | 60.5 | 2.5 | | | | | | | |

Sketch

**method**
N natural exposure
X existing excavation
BH backhoe bucket
B bulldozer blade
R ripper
E excavator

**support**
S shoring N nil

**penetration**
1 2 3 4 no resistance ranging to refusal

**water**
water level on date shown
water inflow
water outflow

**notes, samples, tests**
$U_{50}$ undisturbed sample 50mm diameter
$U_{63}$ undisturbed sample 63mm diameter
D disturbed sample
V vane shear (kPa)
Bs bulk sample
E environmental sample
R refusal

**classification symbols and soil description**
based on unified classification system

**moisture**
D dry
M moist
W wet
Wp plastic limit
$W_L$ liquid limit

**consistency/density index**
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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# Engineering Log - Excavation

Excavation No. **TP09 -11**

Sheet 1 of 1

Project No: **GEOTWARA20576AA**

Client: ***APP CORPORATION***

Date started: ***27.4.2009***

Principal:

Date completed: ***27.4.2009***

Project: ***PROPSOED HMRI BUILDINGS***

Logged by: ***DGS***

Test pit location: ***REFER TO FIGURE***

Checked by:

equipment type and model: Yanmar | Pit Orientation: | Easting: 377830.18 m | R.L. Surface: 73.34

excavation dimensions: 2m long 0.4m wide | Northing: 6356838.24 m | datum: AHD

**excavation information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AST | | N | None Observed | | 73.0 | 0.5 | | SP | **Clayey SAND:** fine to medium grained, dark grey, medium to high plasticity fines. | M | | | TOPSOIL |
| | | | | | | | | CH | **CLAY:** medium to high platicity, grey, trace of fine sand. | >Wp | St | × | RESIDUAL |
| | | | | | 72.5 | 1.0 | | | | | VSt | | × |
| | | | | | | | | | **CLAYSTONE:** low to medium strength, grey. | <Wp | | | EXTREMELY WEATHERED ROCK |
| | | | | | 72.0 | 1.5 | | | Test pit TP09 -11 terminated at 1.3m | | | | |
| | | | | | 71.5 | 2.0 | | | | | | | |

Sketch

**method**
N natural exposure
X existing excavation
BH backhoe bucket
B bulldozer blade
R ripper
E excavator

**support**
S shoring N nil

**penetration**
1 2 3 4
no resistance ranging to refusal

**water**
water level on date shown
water inflow
water outflow

**notes, samples, tests**
$U_{50}$ undisturbed sample 50mm diameter
$U_{63}$ undisturbed sample 63mm diameter
D disturbed sample
V vane shear (kPa)
Bs bulk sample
E environmental sample
R refusal

**classification symbols and soil description**
based on unified classification system

**moisture**
D dry
M moist
W wet
Wp plastic limit
$W_L$ liquid limit

**consistency/density index**
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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# Engineering Log - Excavation

Excavation No. **TP09 -12**

Sheet 1 of 1

Project No: **GEOTWARA20576AA**

Client: **APP CORPORATION**

Date started: **27.4.2009**

Principal:

Date completed: **27.4.2009**

Project: **PROPSOED HMRI BUILDINGS**

Logged by: **DGS**

Test pit location: **REFER TO FIGURE**

Checked by:

equipment type and model: Yanmar | Pit Orientation: | Easting: 377910.76 m | R.L. Surface: 66.35

excavation dimensions: 2m long 0.4m wide | Northing: 6356875.96 m | datum: AHD

| excavation information | | | | | | material substance | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL / depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
| AST | | N | None Observed | | 66.0 / 0.5 | | SP | **Clayey SAND:** fine to medium grained, grey, medium to high plasticity fines. | M | D | | TOPSOIL |
| | | | | | | | CH | **CLAY:** high plasticity fines, orange mottled grey, trace of fine to medium grained sand, trace fo fine gravel. | >Wp | St | | RESIDUAL |
| | | | | | 65.5 / 1.0 | | CH | **CLAY:** medium to high plasticity, grey becoming grey mottled orange, trace of fine to medium grained sand. | <Wp | VSt | | |
| | | | | | | | | **CONGLOMERATE:** SANDSTONE, pale yellow, low plasticity fines, fine to medium grained sand. | | | | EXTREMELY WEATHERED ROCK |
| | | | | | 65.0 / 1.5 / 64.5 / 2.0 | | | Test pit TP09 -12 terminated at 1m | | | | |

Sketch

**method**
- N natural exposure
- X existing excavation
- BH backhoe bucket
- B bulldozer blade
- R ripper
- E excavator

**support**
- S shoring
- N nil

**penetration**
1 2 3 4 — no resistance ranging to refusal

**water**
- water level on date shown
- water inflow
- water outflow

**notes, samples, tests**
- $U_{50}$ undisturbed sample 50mm diameter
- $U_{63}$ undisturbed sample 63mm diameter
- D disturbed sample
- V vane shear (kPa)
- Bs bulk sample
- E environmental sample
- R refusal

**classification symbols and soil description**
based on unified classification system

**moisture**
- D dry
- M moist
- W wet
- Wp plastic limit
- $W_L$ liquid limit

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

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# Engineering Log - Excavation

Excavation No. **TP09 -13**

Sheet 1 of 1

Project No: **GEOTWARA20576AA**

Client: ***APP CORPORATION***

Date started: ***27.4.2009***

Principal:

Date completed: ***27.4.2009***

Project: ***PROPSOED HMRI BUILDINGS***

Logged by: ***DGS***

Test pit location: ***REFER TO FIGURE***

Checked by:

equipment type and model: Yanmar | Pit Orientation: | Easting: 377938.76 m | R.L. Surface: 61.25

excavation dimensions: 1.5m long 0.4m wide | Northing: 6356871.03 m | datum: AHD

**excavation information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | | N | None Observed | Bs | 61.0 | 0.5 | | | **Silty SAND:** fine to medium grained, grey, low plasticity fines, trace of fine to medium grained gravel. | D-M | D | | TOPSOIL |
| | | | | | | | | | **Gravelly CLAY:** medium to high plasticity, orange mottled grey, fine to medium grained gravel, some sandstone cobbles to 200mm, trace of fine to medium grained sand. | >Wp | St | | RESIDUAL |
| | | | | | | | | | | | VSt | | |
| | | | | | | | | | **CONGLOMERATE:** SANDSTONE, pale yellow mottled grey, low plasticity fines, fine to medium grained sand. | <Wp | | | EXTREMELY WEATHERED ROCK |
| | | | | | 60.5 | 1.0 | | | Test pit TP09 -13 terminated at 0.6m | | | | |
| | | | | | 60.0 | 1.5 | | | | | | | |
| | | | | | 59.5 | 2.0 | | | | | | | |

Sketch

**method**
N natural exposure
X existing excavation
BH backhoe bucket
B bulldozer blade
R ripper
E excavator

**support**
S shoring N nil

**penetration**
1 2 3 4
no resistance ranging to refusal

**water**
water level on date shown
water inflow
water outflow

**notes, samples, tests**
$U_{50}$ undisturbed sample 50mm diameter
$U_{63}$ undisturbed sample 63mm diameter
D disturbed sample
V vane shear (kPa)
Bs bulk sample
E environmental sample
R refusal

**classification symbols and soil description**
based on unified classification system

**moisture**
D dry
M moist
W wet
Wp plastic limit
$W_L$ liquid limit

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

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# Engineering Log - Excavation

Excavation No. **TP09 -14**

Sheet 1 of 1

Project No: **GEOTWARA20576AA**

Client: **APP CORPORATION**

Date started: **29.4.2009**

Principal:

Date completed: **29.4.2009**

Project: **PROPSOED HMRI BUILDINGS**

Logged by: **DGS**

Test pit location: **REFER TO FIGURE**

Checked by:

equipment type and model: Yanmar | Pit Orientation: | Easting: 377638.86 m | R.L. Surface: 96.91

excavation dimensions: 2m long 0.4m wide | Northing: 6356667.44 m | datum: AHD

**excavation information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | | N | None Observed | | 96.5 | 0.5 | | | **FILL:** Silty SAND, fine to medium grained, brown, low plasticity fines, some fine to medium grained gravel. | M | D | | FILL |
| | | | | | | | | | **FILL:** Gravelly Clayey SAND, fine to medium grained, orange / brown, medium to high plasticity fines, fine to medium grained gravel, some boulders to 200mm. | | | | |
| | | | | | | | | | **Gravelly Sandy CLAY:** low to medium plasticity, orange some brown and grey mottled. | >Wp | VSt | | RESIDUAL |
| | | | | | 96.0 | | | | **CONGLOMERATE:** low to medium strength, orange, fine to medium grained sand, fine gravel, low plasticity fines. | | | | EXTREMELY WEATHERED ROCK |
| | | | | | | 1.0 | | | Test pit TP09 -14 terminated at 0.9m | | | | |
| | | | | | 95.5 | 1.5 | | | | | | | |
| | | | | | 95.0 | 2.0 | | | | | | | |

Sketch

**method**
N natural exposure
X existing excavation
BH backhoe bucket
B bulldozer blade
R ripper
E excavator

**support**
S shoring N nil

**penetration**
1 2 3 4 — no resistance ranging to refusal

**water**
water level on date shown
water inflow
water outflow

**notes, samples, tests**
$U_{50}$ undisturbed sample 50mm diameter
$U_{63}$ undisturbed sample 63mm diameter
D disturbed sample
V vane shear (kPa)
Bs bulk sample
E environmental sample
R refusal

**classification symbols and soil description**
based on unified classification system

**moisture**
D dry
M moist
W wet
Wp plastic limit
$W_L$ liquid limit

**consistency/density index**
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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# Engineering Log - Excavation

Excavation No. **TP09 -15**

Sheet 1 of 1

Project No: **GEOTWARA20576AA**

Client: **APP CORPORATION**

Date started: **29.4.2009**

Principal:

Date completed: **29.4.2009**

Project: **PROPSOED HMRI BUILDINGS**

Logged by: **DGS**

Test pit location: **REFER TO FIGURE**

Checked by:

equipment type and model: Yanmar | Pit Orientation: | Easting: 377646.68 m | R.L. Surface: 94.57

excavation dimensions: 2m long 0.4m wide | Northing: 6356670.1 m | datum: AHD

**excavation information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | | N | None Observed | | 94.5 | | | SP | **Silty SAND:** fine to medium grained, brown, low plasticity fines. | M | MD | | FILL |
| | | | | | | | | GP | **GRAVEL:** medium grained, grey. | | D | | |
| | | | | | | | | CH | **Gravelly Sandy CLAY:** low to medium plasticity , orange, fine to medium grained gravel, fine to medium grained sand. | >Wp | St | | RESIDUAL |
| | | | | | 94.0 | 0.5 | | | **SANDSTONE:** fine to medium grained, orange, trace of fine gravel. | M | | | EXTREMELY WEATHERED ROCK. |
| | | | | | 93.5 | 1.0 | | | Test pit TP09 -15 terminated at 0.75m | | | | |
| | | | | | 93.0 | 1.5 | | | | | | | |
| | | | | | | 2.0 | | | | | | | |

Sketch

**method**
N natural exposure
X existing excavation
BH backhoe bucket
B bulldozer blade
R ripper
E excavator

**support**
S shoring N nil

**penetration**
1 2 3 4
no resistance ranging to refusal

**water**
water level on date shown
water inflow
water outflow

**notes, samples, tests**
$U_{50}$ undisturbed sample 50mm diameter
$U_{63}$ undisturbed sample 63mm diameter
D disturbed sample
V vane shear (kPa)
Bs bulk sample
E environmental sample
R refusal

**classification symbols and soil description**
based on unified classification system

**moisture**
D dry
M moist
W wet
Wp plastic limit
$W_L$ liquid limit

**consistency/density index**
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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# Engineering Log - Excavation

Excavation No. **TP09 -16**

Sheet 1 of 1

Project No: **GEOTWARA20576AA**

Client: **APP CORPORATION**

Date started: **29.4.2009**

Principal:

Date completed: **29.4.2009**

Project: **PROPSOED HMRI BUILDINGS**

Logged by: **DGS**

Test pit location: **REFER TO FIGURE**

Checked by:

equipment type and model: Yanmar | Pit Orientation: | Easting: 377638.4 m | R.L. Surface: 95.13

excavation dimensions: 2m long 0.4m wide | Northing: 6356684.25 m | datum: AHD

**excavation information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AST | | N | None Observed | | 95.0 | 0.5 | | | **FILL:** Silty SAND, fine to medium grained, brown, low plasticity fines, trace of fine gravel. | M | MD | | FILL |
| | | | | | 94.5 | 1.0 | | | **FILL:** SAND, fine to coarse grained, yellow. | D-M | | | FILL - (DUNE SAND) |
| | | | | | 94.0 | 1.5 | | | | | | | |
| | | | | | 93.5 | 2.0 | | | End at 1.5m due to refusal on concrete<br>Test pit TP09 -16 terminated at 1.5m | | | | |

Sketch

**method**
- N natural exposure
- X existing excavation
- BH backhoe bucket
- B buildozer blade
- R ripper
- E excavator

**support**
- S shoring
- N nil

**penetration**
1 2 3 4 — no resistance ranging to refusal

**water**
- water level on date shown
- water inflow
- water outflow

**notes, samples, tests**
- $U_{50}$ undisturbed sample 50mm diameter
- $U_{63}$ undisturbed sample 63mm diameter
- D disturbed sample
- V vane shear (kPa)
- Bs bulk sample
- E environmental sample
- R refusal

**classification symbols and soil description**
based on unified classification system

**moisture**
- D dry
- M moist
- W wet
- Wp plastic limit
- $W_L$ liquid limit

**consistency/density index**
- VS very soft
- S soft
- F firm
- St stiff
- VSt very stiff
- H hard
- Fb friable
- VL very loose
- L loose
- MD medium dense
- D dense
- VD very dense

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# Engineering Log - Excavation

Excavation No. **TP09 -17**

Sheet 1 of 1

Project No: **GEOTWARA20576AA**

Client: **APP CORPORATION**

Date started: **29.4.2009**

Principal:

Date completed: **29.4.2009**

Project: **PROPSOED HMRI BUILDINGS**

Logged by: **DGS**

Test pit location: **REFER TO FIGURE**

Checked by:

equipment type and model: Yanmar | Pit Orientation: | Easting: 377632.32 m | R.L. Surface: 95.75

excavation dimensions: 2m long 0.4m wide | Northing: 6356679.71 m | datum: AHD

**excavation information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AST | | N | None Observed | | 95.5 | 0.5 | | | **FILL:** Silty SAND, fine to medium grained, brown, low plasticity fines. | M | D | | FILL |
| | | | | | | | | | **FILL:** Clayey Gravelly SAND, fine to medium grained, pale brown, fine to medium grained, medium to high plasticity fines. | | | | |
| | | | | | 95.0 | 1.0 | | | **Gravelly Clayey SAND:** medium to high plasticity, brown mottled orange / yellow becoming orange / yellow mottled grey, fine to medium grained sand, fine to medium grained gravel. | >Wp | St | | RESIDUAL |
| | | | | | 94.5 | | | | **CONGLOMERATE:** low to medium strength, pale yellow mottled grey and brown, fine gravel, low to medium plasticity fines. | <Wp | | | EXTREMELY WEATHERD ROCK |
| | | | | | 94.0 | 1.5 2.0 | | | Test pit TP09 -17 terminated at 1.4m | | | | |

Sketch

**method**
- N natural exposure
- X existing excavation
- BH backhoe bucket
- B bulldozer blade
- R ripper
- E excavator

**support**
- S shoring
- N nil

**penetration** 1 2 3 4 — no resistance ranging to refusal

**water**
- water level on date shown
- water inflow
- water outflow

**notes, samples, tests**
- $U_{50}$ undisturbed sample 50mm diameter
- $U_{63}$ undisturbed sample 63mm diameter
- D disturbed sample
- V vane shear (kPa)
- Bs bulk sample
- E environmental sample
- R refusal

**classification symbols and soil description** based on unified classification system

**moisture**
- D dry
- M moist
- W wet
- Wp plastic limit
- $W_L$ liquid limit

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

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# Engineering Log - Borehole

| | |
|---|---|
| Borehole No. | **BH 20** |
| Sheet | 1 of 2 |
| Project No: | **GEOTWARA20576AB** |
| Client: | **APP CORPORATION** |
| Date started: | **24.4.2009** |
| Principal: | |
| Date completed: | **24.4.2009** |
| Project: | **PROPOSED HMRI BUILDINGS, JOHN HUNTER HOSPITAL** |
| Logged by: | **GDT** |
| Borehole Location: | **JOHN HUNTER HOSPITAL** |
| Checked by: | |

drill model and mounting: Jackroo Trailer | Easting: 377697.91 | slope: -90° | R.L. Surface: 85.32

hole diameter: 100 mm | Northing 6356739.43 | bearing: | datum:

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | N | | | 85 | | | | **TOPSOIL:** low plasticity clay, trace of fine to medium grained sand, dark brown, rare plastic and brick fragments. | | | | TOPSOIL |
| | | | None Observed | | 84 | 1 | | | Borehole BH 20 continued as cored hole | | | | |
| | | | | | 83 | 2 | | | | | | | |
| | | | | | 82 | 3 | | | | | | | |
| | | | | | 81 | 4 | | | | | | | |
| | | | | | 80 | 5 | | | | | | | |
| | | | | | 79 | 6 | | | | | | | |
| | | | | | 78 | 7 | | | | | | | |
| | | | | | | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |

*bit shown by suffix e.g. ADT

**support**

M mud N nil
C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown
water inflow
water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

**classification symbols and soil description**

based on unified classification system

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

coffey geotechnics

# Engineering Log - Cored Borehole

| | |
|---|---|
| Borehole No. | **BH 20** |
| Sheet | 2 of 2 |
| Project No: | **GEOTWARA20576AB** |
| Client: | **APP CORPORATION** |
| Date started: | **24.4.2009** |
| Principal: | |
| Date completed: | **24.4.2009** |
| Project: | **PROPOSED HMRI BUILDINGS, JOHN HUNTER HOSPITAL** |
| Logged by: | **GDT** |
| Borehole Location: | **JOHN HUNTER HOSPITAL** |
| Checked by: | |

drill model & mounting: Jackroo Trailer | Easting: 377697.91 | slope: -90° | R.L. Surface: 85.32

hole diameter: 100 mm | Drilling fluid: | Northing: 6356739.43 | bearing: | datum:

| drilling information | | | | | material substance | | | | | rock mass defects | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| method | core-lift | water | RL | depth metres | graphic log core recovery | material: rock type; grain characteristics, colour, structure, minor components | weathering alteration | estimated strength VL L M H VH EH | $Is_{(50)}$ MPa D- diametral A- axial | RQD % | defect spacing mm 30 100 300 1000 3000 | defect description: type, inclination, planarity, roughness, coating, thickness — particular / general |
| | | | 85 | | | Continued from non-cored borehole | | | | | | |
| | | None Observed | 84 | 1 | | **Pebbly SANDSTONE:** fine to coarse grained, subrounded, orange mottled grey, red and black with some conglomerate bands. | DW | | D 0.5 A 0.7 | 100 | | JT, 45°, IR, RO, SN, iron<br>JT, 32°, IR, RO, SN, iron |
| | | | 83 | 2 | | | | | D 1.6 A 1.8 | | | JT, 20°, IR, RO, SN, iron<br>SM, 50°, IR, RO, closed 2mm<br>Fractured Rock, 100mm |
| | | | 82 | 3 | | | | | | 90 | | JT, 27°, IR, RO, CN, iron<br>JT, 51°, IR, RO, CN<br>Fractured Rock, 80mm |
| | | | 81 | 4 | | **NO CORE:** | | | D 1 A 1.1 | 13 | | |
| | | | 80 | 5 | | | | | | 13 | | |
| | | | 79 | 6 | | **SANDSTONE:** fine to coarse grained, grey mottled orange with pebbles, recovered as sandy gravel. | XW | | | | | Extremely fractured rock, 500mm. |
| | | | 78 | 7 | | BH 20 terminated at 6.4m | | | | | | |
| | | | | 8 | | | | | | | | |

**method**
DT diatube; AS auger screwing; AD auger drilling; RR roller/tricone; CB claw or blade bit; NMLC NMLC core; NQ, HQ, PQ wireline core

**core-lift**
casing used; barrel withdrawn

**graphic log/core recovery**
core recovered - graphic symbols indicate material; no core recovered

**water**
10/1/98 water level on date shown; water inflow; partial drill fluid loss; complete drill fluid loss; 25 water pressure test result (lugeons) for depth interval shown

**weathering**
FR fresh; SW slightly weathered; MW moderately weathered; HW highly weathered; XW extremely weathered; DW distinctly weathered (covers MW and HW)

**strength**
VL very low; L low; M medium; H high; VH very high; EH extremely high

**defect type**
JT joint; PT parting; SM seam; SZ sheared zone; SS sheared surface; CS crushed seam

**planarity**
PL planar; CU curved; UN undulating; ST stepped; IR irregular

**roughness**
VR very rough; RO rough; SO smooth; SL slickensided

**coating**
CN clean; SN stained; VN veneer; CO coating

**GEOTWARA20576AB BOREHOLE : BH20 0.5m to 5.0m**
**Box 1 of 2**


**GEOTWARA20576AB BOREHOLE : BH20 5.0m to 6.4m**
**Box 2 of 2**


| | | | | |
|---|---|---|---|---|
| drawn | GDT | coffey geotechnics SPECIALISTS MANAGING THE EARTH | client: | APP CORPORATION PTY LTD |
| approved | ABL | | project: | PROPOSED HMRI BUILDINGS<br>JOHN HUNTER HOSPITAL, NEW LAMBTON |
| date | 12/05/2009 | | title: | PHOTOGRAPHS OF CORE, BH20 (0.5m to 6.4m) |
| scale | NTS | | project no: GEOTWARA20576AB | figure no: BH 20 |
| original size | A4 | | | |

F:\GEOTECHNICS\JOB FILES\WARA 20500 - 20599\WARA20576AB\Photos\Core Box Photos\[GEOTWARA20576AB BH21.xlsx]A4 Portrait Figure

coffey geotechnics

# Engineering Log - Borehole

Borehole No. **BH 21**

Sheet 1 of 3

Project No: **GEOTWARA20576AB**

Client: **APP CORPORATION**

Date started: **22.4.2009**

Principal:

Date completed: **22.4.2009**

Project: **PROPOSED HMRI BUILDINGS, JOHN HUNTER HOSPITAL**

Logged by: **GDT**

Borehole Location: **JOHN HUNTER HOSPITAL**

Checked by:

drill model and mounting: Jackroo Trailer | Easting: 377749.57 | slope: -90° | R.L. Surface: 77.13

hole diameter: 100 mm | Northing 6356790.92 | bearing: | datum:

| drilling information | | | | | | | material substance | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa 100 200 300 400 | structure and additional observations |
| | | N | | | 77 | | | CH | **FILL:** Sandy Clayey GRAVEL, fine to coarse grained, pale yellow - brown, fine to coarse grained sand, high plasticity clay, contains concrete and brick fragments. | W D | L | | FILL |
| | | | | | | | | CH | **FILL:** Sandy CLAY, high plasticity, brown, fine to coarse grained sand, with alluminium and glass. | | F | | |
| | | | | | 76 | 1 | | CH | **CLAY:** high plasticity, red brown, trace of surounded gravel. | | St | | RESIDUAL SOIL |
| | | | | | | | | | Borehole BH 21 continued as cored hole | | | | |
| | | | | | 75 | 2 | | | | | | | |
| | | | | | 74 | 3 | | | | | | | |
| | | | | | 73 | 4 | | | | | | | |
| | | | | | 72 | 5 | | | | | | | |
| | | | | | 71 | 6 | | | | | | | |
| | | | | | 70 | 7 | | | | | | | |
| | | | | | | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |

*bit shown by suffix e.g. ADT

**support**

M mud N nil

C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown

water inflow

water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

**classification symbols and soil description**

based on unified classification system

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

coffey geotechnics

# Engineering Log - Cored Borehole

| | |
|---|---|
| Borehole No. | **BH 21** |
| Sheet | 2 of 3 |
| Project No: | **GEOTWARA20576AB** |
| Client: | **APP CORPORATION** |
| Date started: | **22.4.2009** |
| Principal: | |
| Date completed: | **22.4.2009** |
| Project: | **PROPOSED HMRI BUILDINGS, JOHN HUNTER HOSPITAL** |
| Logged by: | **GDT** |
| Borehole Location: | **JOHN HUNTER HOSPITAL** |
| Checked by: | |

drill model & mounting: Jackroo Trailer | Easting: 377749.57 | slope: -90° | R.L. Surface: 77.13

hole diameter: 100 mm Drilling fluid: Water | Northing: 6356790.92 | bearing: | datum:

| drilling information | | | | | material substance | | | | | rock mass defects | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| method | core-lift | water | RL | depth metres | graphic log core recovery | material: rock type; grain characteristics, colour, structure, minor components | weathering alteration | estimated strength VL L M H VH EH | $Is_{(50)}$ MPa D- diametral A- axial | RQD % | defect spacing mm 30 100 300 1000 3000 | defect description: type, inclination, planarity, roughness, coating, thickness — particular / general |
| | | | 77 | | | | | | | | | |
| | | | | 1 | | Continued from non-cored borehole | | | | | | |
| | | | 76 | | | **Gravelly CLAY:** high plasticity, dark brown, subrounded to angular gravel. | XW | | | | | Extremely fractured rock, 150mm |
| | | | | | | **CLAYSTONE:** pale grey, trace of fine grained sand and carbonaceous bands. | HW | | | | | Highly fractured rock, 410mm |
| | | | | 2 | | | | | | 0 | | PT, 0°, PL, SO, VN, clay |
| | | | 75 | | | | | | | | | S,. 0°, PL, SO, CO, clay, 50mm |
| | | | | | | | | | | | | JT, 45°, PL, SO, VN, clay |
| | | | | | | | | | | | | JT, 45°, PL, SO, VN, clay |
| | | | | | | | | | | | | Extremely parted zone, 400mm. |
| | | | | 3 | | | | | | | | JT, 88°, IR, RO, CO, clay, 2mm |
| | | | 74 | | | | | | | | | Fractured rock |
| | | | | | | | | | | 0 | | |
| | | | | | | **Carbonaceous CLAYSTONE:** dark brown, with pale yellow, grey, siltstone bands and some coal. | MW | | | | | |
| | | | | 4 | | | | | | | | |
| | | | 73 | | | | | | | | | |
| | | | | | | **CLAYSTONE:** red brown to pale brown - grey, with trace of carbonaceous laminations. | HW | | | | | PT, 0°, PL, RO, CO, clay |
| | | | | | | | | | | | | PT, 0°, PL, RO, CO, clay |
| | | | | | | | | | | | | JT, 62°, IR, RO, CN |
| | | | | 5 | | | | | | | | Extremely fractured rock |
| | | | 72 | | | **COAL:** dull, extremely cleated, distinctly weathered. | | | | | | |
| | | | | | | **NO CORE:** | | | | | | |
| | | | | | | | | | | 10 | | |
| | | | | | | **COAL:** dull, black, with some low plasticity clay, and trace of silt. | FR | | | | | |
| | | | | 6 | | | | | | | | |
| | | | 71 | | | **NO CORE:** | | | | | | |
| | | | | | | | | | | | | |
| | | | | 7 | | | | | | | | |
| | | | 70 | | | | | | | | | |
| | | | | | | **SILTSTONE:** pale grey with trace of carbonaceous laminations. | FR | | | | | |
| | | | | | | | | | | 72 | | JT, 88°, PL, SO, CN, 600mm long |
| | | | | | | | | | | | | SZ, 0°, PL, SO, clay and fragments, 100mm |
| | | | | 8 | | | | | | | | Extremely fractured rock, 200mm |

**method**

| | |
|---|---|
| DT | diatube |
| AS | auger screwing |
| AD | auger drilling |
| RR | roller/tricone |
| CB | claw or blade bit |
| NMLC | NMLC core |
| NQ, HQ, PQ | wireline core |

**core-lift**

- casing used
- barrel withdrawn

**graphic log/core recovery**

- core recovered - graphic symbols indicate material
- no core recovered

**water**

- 10/1/98 water level on date shown
- water inflow
- partial drill fluid loss
- complete drill fluid loss
- water pressure test result (lugeons) for depth interval shown (25)

**weathering**

| | |
|---|---|
| FR | fresh |
| SW | slightly weathered |
| MW | moderately weathered |
| HW | highly weathered |
| XW | extremely weathered |
| DW | distinctly weathered (covers MW and HW) |

**strength**

| | |
|---|---|
| VL | very low |
| L | low |
| M | medium |
| H | high |
| VH | very high |
| EH | extremely high |

**defect type**

| | |
|---|---|
| JT | joint |
| PT | parting |
| SM | seam |
| SZ | sheared zone |
| SS | sheared surface |
| CS | crushed seam |

**roughness**

| | |
|---|---|
| VR | very rough |
| RO | rough |
| SO | smooth |
| SL | slickensided |

**planarity**

| | |
|---|---|
| PL | planar |
| CU | curved |
| UN | undulating |
| ST | stepped |
| IR | irregular |

**coating**

| | |
|---|---|
| CN | clean |
| SN | stained |
| VN | veneer |
| CO | coating |

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# Engineering Log - Cored Borehole

| | |
|---|---|
| Borehole No. | **BH 21** |
| Sheet | 3 of 3 |
| Project No: | **GEOTWARA20576AB** |
| Client: | **APP CORPORATION** |
| Date started: | **22.4.2009** |
| Principal: | |
| Date completed: | **22.4.2009** |
| Project: | **PROPOSED HMRI BUILDINGS, JOHN HUNTER HOSPITAL** |
| Logged by: | **GDT** |
| Borehole Location: | **JOHN HUNTER HOSPITAL** |
| Checked by: | |

drill model & mounting: Jackroo Trailer | Easting: 377749.57 | slope: -90° | R.L. Surface: 77.13

hole diameter: 100 mm | Drilling fluid: Water | Northing: 6356790.92 | bearing: | datum:

| drilling information | | | | | material substance | | | | | rock mass defects | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| method | core-lift | water | RL | depth metres | graphic log / core recovery | material: rock type; grain characteristics, colour, structure, minor components | weathering alteration | estimated strength (VL L M H VH EH) | $Is_{(50)}$ MPa: D- diametral, A- axial | RQD % | defect spacing mm (30 100 300 1000 3000) | defect description: type, inclination, planarity, roughness, coating, thickness (particular / general) |
| | | | 69 | 9 | | **Interlaminated SILTSTONE and SANDSTONE:** fine to medium grained, pale grey to grey. | FR | | D 0.1 A 0.7 | 72 | | JT, 67°, IR, RO, CN |
| | | | 68 | | | **NO CORE:** | HW | | | | | Extremely fractured rock, 320mm |
| | | | | | | **COAL:** dull, black with silt, low plasticity clay. | MW | | | | | |
| | | | | | | **SILTSTONE:** grey with trace of carbonaceous laminations. | | | | | | |
| | | | | | | **CLAYSTONE:** green, grey, slightly laminated. | | | | | | |
| | | | 67 | 10 | | **TUFF:** fine to medium grained, pale grey to grey mottled black and yellow. | SW | | D 0.7 A 0.7 | 93 | | |
| | | | 66 | 11 | | **SANDSTONE:** fine to coarse grained, grey mottled orange. | | | | | | JT, 70°, IR, RO, VN, coal |
| | | | | | | **TUFF:** fine to medium grained, yellow - grey mottled white. | | | D 0.3 A 0.5 | | | JT, 70°, IR, RO, VN, coal |
| | | | 65 | 12 | | | | | | | | JT, 45°, IR, RO, VN, coal |
| | | | 64 | 13 | | | | | | 100 | | JT, 40°, PL, RO, CN |
| | | | | | | | | | | | | JT, 80°, IR, RO, CN |
| | | | | | | | | | | | | JT, 42°, IR, RO, CN |
| | | | 63 | 14 | | BH 21 terminated at 13.7m | | | | | | |
| | | | 62 | 15 | | | | | | | | |
| | | | | 16 | | | | | | | | |

**method**

| | |
|---|---|
| DT | diatube |
| AS | auger screwing |
| AD | auger drilling |
| RR | roller/tricone |
| CB | claw or blade bit |
| NMLC | NMLC core |
| NQ, HQ, PQ | wireline core |

**core-lift**

- casing used
- barrel withdrawn

**graphic log/core recovery**

- core recovered - graphic symbols indicate material
- no core recovered

**water**

- 10/1/98 water level on date shown
- water inflow
- partial drill fluid loss
- complete drill fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

**weathering**

| | |
|---|---|
| FR | fresh |
| SW | slightly weathered |
| MW | moderately weathered |
| HW | highly weathered |
| XW | extremely weathered |
| DW | distinctly weathered (covers MW and HW) |

**strength**

| | |
|---|---|
| VL | very low |
| L | low |
| M | medium |
| H | high |
| VH | very high |
| EH | extremely high |

**defect type**

| | |
|---|---|
| JT | joint |
| PT | parting |
| SM | seam |
| SZ | sheared zone |
| SS | sheared surface |
| CS | crushed seam |

**roughness**

| | |
|---|---|
| VR | very rough |
| RO | rough |
| SO | smooth |
| SL | slickensided |

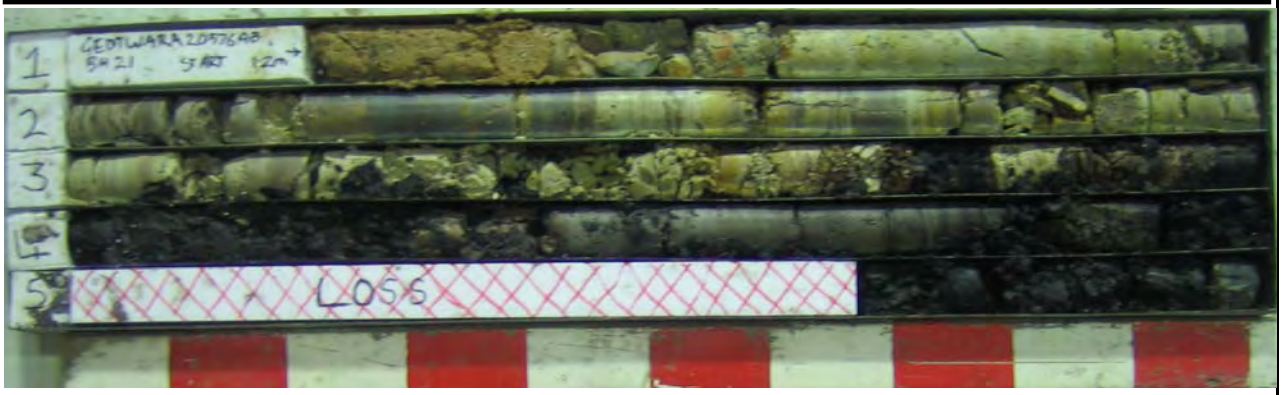
**planarity**

| | |
|---|---|
| PL | planar |
| CU | curved |
| UN | undulating |
| ST | stepped |
| IR | irregular |

**coating**

| | |
|---|---|
| CN | clean |
| SN | stained |
| VN | veneer |
| CO | coating |

**GEOTWARA20576AB BOREHOLE : BH21 1.2m to 6.0m**
**Box 1 of 3**




**GEOTWARA20576AB BOREHOLE : BH21 6.0m to 11.0m**
**Box 2 of 3**


**GEOTWARA20576AB BOREHOLE : BH21 11.0m to 13.7m**
**Box 3 of 3**


| | | | | |
|---|---|---|---|---|
| drawn | GDT | coffey geotechnics SPECIALISTS MANAGING THE EARTH | client: | APP CORPORATION PTY LTD |
| approved | ABL | | project: | PROPOSED HMRI BUILDINGS<br>JOHN HUNTER HOSPITAL, NEW LAMBTON |
| date | 12/05/2009 | | title: | PHOTOGRAPHS OF CORE, BH21 (1.2m to 13.7m) |
| scale | NTS | | project no: GEOTWARA20576AB | figure no: BH 21 |
| original size | A4 | | | |

F:\GEOTECHNICS\JOB FILES\WARA 20500 - 20599\WARA20576AB\Photos\Core Box Photos\[GEOTWARA20576AB BH21.xlsx]A4 Portrait Figure

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# Engineering Log - Borehole

Borehole No. **BH 22**
Sheet 1 of 13
Project No: **GEOTWARA20576AB**

Client: **APP CORPORATION**
Date started: **6.4.2009**
Principal:
Date completed: **17.4.2009**
Project: **PROPOSED HMRI BUILDINGS, JOHN HUNTER HOSPITAL**
Logged by: **GDT**
Borehole Location: **SEE DRAWING**
Checked by:

drill model and mounting: Hydra Power Truck | Easting: 377796.98 | slope: -90° | R.L. Surface: 74.89
hole diameter: 61.3 mm | Northing 6356832.37 | bearing: | datum:

| drilling information | | | | | | | material substance | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
| ADV | | C | | | | | | CL | **Gravelly Clayey SAND:** fine to coarse grained, brown, mottled yellow and red, low plasticity clay, fine to coarse grained, subrounded to sub angular gravel. | W <Wp | L S | | Track Material |
| | | | | | | | | | **Gravelly CLAY:** low plasticity, pale brown. | | | | |
| | | | | SPT 2,4,7 N*=11 | 74 | 1 | | CL | **Sandy Gravelly CLAY:** low plasticity, pale grey, fine to coarse grained sand and gravel. | | F | | EXTREMELY WEATHERED SANDSTONE / CONGLOMERATE |
| | | | | SPT 4,5,7 N*=12 | 73 | 2 | | CL | **CLAY:** low plasticity, dark brown, moderately carbonaceous. | | St | | |
| | | | | | | | | CL | **CLAY:** low plasticity, white to grey, some carbonaceous bands, minor carbonaceous laminations and trace of sand. | | VSt | | HIGHLY WEATHERED MUDSTONE |
| | | | | SPT 2,4,24 N*=28 | 72 | 3 | | | | | | | |
| | | | | | 71 | 4 | | | | | | | |
| | | | | SPT 3,17,25 N*=42 | 70 | 5 | | CL | **CLAY:** low plasticity, dark brown to brown, trace of sand, highly carbonaceous. | | | | SPT refusal 25 blows / 70mm<br>WEATHERED COAL? |
| | | | | | | | | CL | **CLAY:** low plasticity, white to pale grey, trace of fine sand. | | | | HIGHLY WEATHERED SILTSTONE |
| | | | | | 69 | 6 | | | | | | | |
| RR | | | | SPT 2,25 N*=R | | | | | **SILTSTONE:** white to pale grey, trace of fine sand. | D | | | SPT refusal 25 blows / 20mm |
| | | | | | 68 | 7 | | | | | | | |
| | | | | | | | | | **Interbedded SILTSTONE and SANDSTONE:** pale grey to pale yellow. | | | | |
| | | | | | 67 | 8 | | | | | | | |

**method**
AS auger screwing*
AD auger drilling*
RR roller/tricone
W washbore
CT cable tool
HA hand auger
DT diatube
B blank bit
V V bit
T TC bit
*bit shown by suffix
e.g. ADT

**support**
M mud N nil
C casing

**penetration**
1 2 3 4
no resistance ranging to refusal

**water**
10/1/98 water level on date shown
water inflow
water outflow

**notes, samples, tests**
$U_{50}$ undisturbed sample 50mm diameter
$U_{63}$ undisturbed sample 63mm diameter
D disturbed sample
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
V vane shear (kPa)
P pressuremeter
Bs bulk sample
E environmental sample
R refusal

**classification symbols and soil description**
based on unified classification system

**moisture**
D dry
M moist
W wet
Wp plastic limit
$W_L$ liquid limit

**consistency/density index**
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

Form GEO 5.3 Issue 3 Rev.2
BOREHOLE ALL LOGS.GPJ COFFEY GDT 6.3.09

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# Engineering Log - Borehole

Borehole No. **BH 22**
Sheet 2 of 13
Project No: **GEOTWARA20576AB**

Client: ***APP CORPORATION*** Date started: ***6.4.2009***
Principal: Date completed: ***17.4.2009***
Project: ***PROPOSED HMRI BUILDINGS, JOHN HUNTER HOSPITAL*** Logged by: ***GDT***
Borehole Location: ***SEE DRAWING*** Checked by:

drill model and mounting: Hydra Power Truck | Easting: 377796.98 | slope: -90° | R.L. Surface: 74.89
hole diameter: 61.3 mm | Northing 6356832.37 | bearing: | datum:

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RR | | C | | SPT 36 N=R | 66 | 9 | | | **Interbedded SILTSTONE and SANDSTONE** pale grey to pale yellow. *(continued)* | D | VSt | | SPT refusal 25 blows / 20mm |
| | | | | SPT 25 N=R | 65 | 10 | | | | | | | SPT refusal 25 blows / 90mm |
| | | | | | 64 | 11 | | | **Clayey SAND:** fine to coarse grained, white spotted black and dark grey, with low plasticity fines. | | VD | | WEATHERED SANDSTONE |
| | | | | SPT 25 N=R | 63 | 12 | | | | | | | SPT refusal 25 blows / 90mm |
| | | | | | | | | | **Carbonaceous MUDSTONE:** dark brown to black. **Clay SHALE:** dark grey, slightly silty, highly carbonaceous with minor coaly bands, 50mm thick. | | | | |
| | | | | SPT 25 N=R | 62 | 13 | | | | | | | |
| | | | | | 61 | 14 | | | **SANDSTONE:** fine to medium grained, dark grey spotted black and white with some clay seams. | | | | SPT refusal 25 blows / 80mm MODERATELY WEATHERED |
| | | | | SPT 25 N=R | 60 | 15 | | | | | | | SPT refusal 25 blows / 10mm, no sample |
| | | | | | 59 | 16 | | | Borehole BH 22 continued as cored hole | | | | |

**method**
AS auger screwing*
AD auger drilling*
RR roller/tricone
W washbore
CT cable tool
HA hand auger
DT diatube
B blank bit
V V bit
T TC bit
*bit shown by suffix
e.g. ADT

**support**
M mud N nil
C casing

**penetration**
1 2 3 4 no resistance ranging to refusal

**water**
10/1/98 water level on date shown
water inflow
water outflow

**notes, samples, tests**
$U_{50}$ undisturbed sample 50mm diameter
$U_{63}$ undisturbed sample 63mm diameter
D disturbed sample
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
V vane shear (kPa)
P pressuremeter
Bs bulk sample
E environmental sample
R refusal

**classification symbols and soil description**
based on unified classification system

**moisture**
D dry
M moist
W wet
Wp plastic limit
$W_L$ liquid limit

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

coffey geotechnics

# Engineering Log - Cored Borehole

Borehole No. **BH 22**

Sheet 3 of 13

Project No: **GEOTWARA20576AB**

Client: ***APP CORPORATION***

Date started: ***6.4.2009***

Principal:

Date completed: ***17.4.2009***

Project: ***PROPOSED HMRI BUILDINGS, JOHN HUNTER HOSPITAL***

Logged by: ***GDT***

Borehole Location: ***SEE DRAWING***

Checked by:

drill model & mounting: Hydra Power Truck | Easting: 377796.98 | slope: -90° | R.L. Surface: 74.89

hole diameter: 61.3 mm Drilling fluid: | Northing: 6356832.37 | bearing: | datum:

| drilling information | | | | | material substance | | | | | rock mass defects | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| method | core-lift | water | RL | depth metres | graphic log / core recovery | material: rock type; grain characteristics, colour, structure, minor components | weathering / alteration | estimated strength (VL L M H VH EH) | $Is_{(50)}$ MPa D- diametral A- axial | RQD % | defect spacing mm (30 100 300 1000 3000) | defect description: type, inclination, planarity, roughness, coating, thickness (particular / general) |
| | | | 66 | 9 | | | | | | | | |
| | | | 65 | 10 | | | | | | | | |
| | | | 64 | 11 | | | | | | | | |
| | | | 63 | 12 | | | | | | | | |
| | | | 62 | 13 | | | | | | | | |
| | | | 61 | 14 | | | | | | | | |
| | | | 60 | 15 | | | | | | | | |
| | | | | | | Continued from non-cored borehole | | | D A | | | |
| HQ | | | 59 | 16 | | **Interlaminated SILTSTONE and SANDSTONE:** dark grey to grey, fine to medium grained sandstone, SRQD = 90%, RD = 3°. | FR | | 0.5 2.5 | 100 97 | | |

**method**

| | |
|---|---|
| DT | diatube |
| AS | auger screwing |
| AD | auger drilling |
| RR | roller/tricone |
| CB | claw or blade bit |
| NMLC | NMLC core |
| NQ, HQ, PQ | wireline core |

**core-lift**

- casing used
- barrel withdrawn

**graphic log/core recovery**

- core recovered - graphic symbols indicate material
- no core recovered

**water**

- 10/1/98 water level on date shown
- water inflow
- partial drill fluid loss
- complete drill fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

**weathering**

| | |
|---|---|
| FR | fresh |
| SW | slightly weathered |
| MW | moderately weathered |
| HW | highly weathered |
| XW | extremely weathered |
| DW | distinctly weathered (covers MW and HW) |

**strength**

| | |
|---|---|
| VL | very low |
| L | low |
| M | medium |
| H | high |
| VH | very high |
| EH | extremely high |

**defect type**

| | |
|---|---|
| JT | joint |
| PT | parting |
| SM | seam |
| SZ | sheared zone |
| SS | sheared surface |
| CS | crushed seam |

**planarity**

| | |
|---|---|
| PL | planar |
| CU | curved |
| UN | undulating |
| ST | stepped |
| IR | irregular |

**roughness**

| | |
|---|---|
| VR | very rough |
| RO | rough |
| SO | smooth |
| SL | slickensided |

**coating**

| | |
|---|---|
| CN | clean |
| SN | stained |
| VN | veneer |
| CO | coating |

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# Engineering Log - Cored Borehole

Borehole No. **BH 22**
Sheet 4 of 13
Project No: **GEOTWARA20576AB**

Client: ***APP CORPORATION***
Date started: ***6.4.2009***
Principal:
Date completed: ***17.4.2009***
Project: ***PROPOSED HMRI BUILDINGS, JOHN HUNTER HOSPITAL***
Logged by: ***GDT***
Borehole Location: ***SEE DRAWING***
Checked by:

drill model & mounting: Hydra Power Truck | Easting: 377796.98 | slope: -90° | R.L. Surface: 74.89
hole diameter: 61.3 mm Drilling fluid: | Northing: 6356832.37 | bearing: | datum:

| drilling information | | | | | material substance | | | | | rock mass defects | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| method | core-lift | water | RL | depth metres | graphic log core recovery | material: rock type; grain characteristics, colour, structure, minor components | weathering alteration | estimated strength VL L M H VH EH | $Is_{(50)}$ MPa D- diam-etral A- axial | RQD % | defect spacing mm 30 100 300 1000 3000 | defect description: type, inclination, planarity, roughness, coating, thickness — particular / general |
| HQ | | | 58 | 17 | | **Interlaminated SILTSTONE and SANDSTONE:** dark grey to grey, fine to medium grained sandstone, SRQD = 90%, RD = 3°. *(continued)* | FR | | D 0 A 1.1 | 97 | | |
| | | | | | | Highly fractured zone yellow stained, some loss of core (20mm). | MW / SW | | | 100 | | Highly jointed material ~20°, numerous joints over 100mm. |
| | | | 57 | 18 | | | | | | 99 | | JT, 8°, stepped, RO, SN, iron. JT, 0°, PL, RO, SN, iron. |
| | | | | | | **SANDSTONE:** fine to coarse grained, pale brown, with some subrounded fine gravel, SRQD = 100%, RD = 3°. | | | | | | PT, 11°, PL, SO, CN |
| | | | 56 | 19 | | | | | D 1.8 A 2.1 | | | |
| | | | 55 | 20 | | | | | | 98 | | |
| | | | | | | **CONGLOMERATE:** fine to coarse grained, pale brown, mottled black and dark grey, subrounded clasts, matrix supported, SRQD = 100%, RD = 3°. | | | D 0.9 A 1.8 | | | PT, 5°, IR, RO, CN |
| | | | 54 | 21 | | **SANDSTONE:** fine to coarse grained, pale brown to pale grey, some laminations and pebbly bands, SRQD = 100%, RD = 3°. | | | | | | SM, 24°, PL, SO, sand and rock fragments, 35mm |
| | | | 53 | 22 | | **CONGLOMERATE:** fine to coarse grained, pale brown mottled grey and white, subrounded clasts, matrix supported, trace sandstone bands, SRQD = 99%, RD= 2°. | | | | 100 | | |
| | | | 52 | 23 | | | | | | | | |
| | | | | | | Sandstone band (23.5 - 23.6) | | | D 0.3 A 0.3 | | | JT, 21°, PL, RO, SN, iron. |
| | | | 51 | 24 | | | | | | | | |

**method**
DT diatube
AS auger screwing
AD auger drilling
RR roller/tricone
CB claw or blade bit
NMLC NMLC core
NQ, HQ, PQ wireline core

**core-lift**
casing used
barrel withdrawn

**graphic log/core recovery**
core recovered - graphic symbols indicate material
no core recovered

**water**
10/1/98 water level on date shown
water inflow
partial drill fluid loss
complete drill fluid loss
25 water pressure test result (lugeons) for depth interval shown

**weathering**
FR fresh
SW slightly weathered
MW moderately weathered
HW highly weathered
XW extremely weathered
DW distinctly weathered (covers MW and HW)

**strength**
VL very low
L low
M medium
H high
VH very high
EH extremely high

**defect type**
JT joint
PT parting
SM seam
SZ sheared zone
SS sheared surface
CS crushed seam

**planarity**
PL planar
CU curved
UN undulating
ST stepped
IR irregular

**roughness**
VR very rough
RO rough
SO smooth
SL slickensided

**coating**
CN clean
SN stained
VN veneer
CO coating

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# Engineering Log - Cored Borehole

Borehole No. **BH 22**
Sheet 5 of 13
Project No: **GEOTWARA20576AB**

Client: ***APP CORPORATION***
Date started: ***6.4.2009***
Principal:
Date completed: ***17.4.2009***
Project: ***PROPOSED HMRI BUILDINGS, JOHN HUNTER HOSPITAL***
Logged by: ***GDT***
Borehole Location: ***SEE DRAWING***
Checked by:

drill model & mounting: Hydra Power Truck | Easting: 377796.98 | slope: -90° | R.L. Surface: 74.89
hole diameter: 61.3 mm Drilling fluid: | Northing: 6356832.37 | bearing: | datum:

| drilling information | | | | | material substance | | | | | rock mass defects | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| method | core-lift | water | RL | depth metres | graphic log / core recovery | material: rock type; grain characteristics, colour, structure, minor components | weathering alteration | estimated strength VL L M H VH EH | $Is_{(50)}$ MPa D- diametral A- axial | RQD % | defect spacing mm 30 100 300 1000 3000 | defect description: type, inclination, planarity, roughness, coating, thickness — particular / general |
| HQ | | | 50 | 25 | | **CONGLOMERATE:** fine to coarse grained, pale brown mottled grey and white, subrounded clasts, matrix supported, trace sandstone bands, SRQD = 99%, RD= 2°. *(continued)* | SW | | | | | |
| | | | | | | Sandstone band (24.88 - 24.94) | | | | | | PT, 10°, CU, SO, SN, iron. |
| | | | 49 | 26 | | | | | | 100 | | |
| | | | 48 | 27 | | | | | D 1.3 A 1.4 | | | SM, 15°, IR, SO, SN, iron stained, sand infill 2mm. |
| | | | | | | | | | | | | SM, 0°, IR, RO, weak carbonate matrix, 20mm. |
| | | | 47 | 28 | | Small cobble clasts. | | | D 0.3 A 0.3 | | | hole through core, 20mm x 5mm probable solution feature |
| | | | | | | | | | | | | SM, 0°, IR, RO, sand, 25mm |
| | | | 46 | 29 | | | | | | 100 | | |
| | | | | | | Sandstone band (29.54 - 29.62) | | | D 1.5 A 1.9 | | | JT, 30°, PL, RO, CN |
| | | | 45 | 30 | | Becoming pale grey mottled grey, dark grey and white. | FR | | | | | |
| | | | | | | | | | | | | SM, 5°, PL, RO, sand and gravel, 15mm. |
| | | | 44 | 31 | | | | | D 0.7 A 0.8 | 98 | | SM, 0°, IR, RO, gravel, 40mm. |
| | | | 43 | 32 | | | | | | | | |

**method**
DT diatube
AS auger screwing
AD auger drilling
RR roller/tricone
CB claw or blade bit
NMLC NMLC core
NQ, HQ, PQ wireline core

**core-lift**
casing used
barrel withdrawn

**graphic log/core recovery**
core recovered - graphic symbols indicate material
no core recovered

**water**
10/1/98 water level on date shown
water inflow
partial drill fluid loss
complete drill fluid loss
25 water pressure test result (lugeons) for depth interval shown

**weathering**
FR fresh
SW slightly weathered
MW moderately weathered
HW highly weathered
XW extremely weathered
DW distinctly weathered (covers MW and HW)

**strength**
VL very low
L low
M medium
H high
VH very high
EH extremely high

**defect type**
JT joint
PT parting
SM seam
SZ sheared zone
SS sheared surface
CS crushed seam

**roughness**
VR very rough
RO rough
SO smooth
SL slickensided

**planarity**
PL planar
CU curved
UN undulating
ST stepped
IR irregular

**coating**
CN clean
SN stained
VN veneer
CO coating

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# Engineering Log - Cored Borehole

Borehole No. **BH 22**
Sheet 6 of 13
Project No: **GEOTWARA20576AB**
Date started: **6.4.2009**
Date completed: **17.4.2009**
Logged by: **GDT**
Checked by:

Client: ***APP CORPORATION***
Principal:
Project: ***PROPOSED HMRI BUILDINGS, JOHN HUNTER HOSPITAL***
Borehole Location: ***SEE DRAWING***

drill model & mounting: Hydra Power Truck | Easting: 377796.98 | slope: -90° | R.L. Surface: 74.89
hole diameter: 61.3 mm Drilling fluid: | Northing: 6356832.37 | bearing: | datum:

| drilling information | | | | | material substance | | | | | rock mass defects | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| method | core-lift | water | RL | depth metres | graphic log / core recovery | material: rock type; grain characteristics, colour, structure, minor components | weathering alteration | estimated strength VL L M H VH EH | $Is_{(50)}$ MPa D- diametral A- axial | RQD % | defect spacing mm 30 100 300 1000 3000 | defect description: type, inclination, planarity, roughness, coating, thickness — particular / general |
| HQ | | | 42 | 33 | | **CONGLOMERATE:** fine to coarse grained, pale brown mottled grey and white, subrounded clasts, matrix supported, trace sandstone bands, SRQD = 99%, RD= 2°. *(continued)* Sandstone band (32.45 - 32.5) | FR | | D 1.6 A 1.8 | 98 | | |
| | | | | | | **NO CORE:** loss 190mm. | | | | | | Gravel band, 100mm thick |
| | | | | | | **CONGLOMERATE:** fine to coarse grained, sub angular, recovered as gravel. | FR / SW-FR | | | | | |
| | | | 41 | 34 | | **CONGLOMERATE:** fine to coarse grained, grey with some yellow staining, sub rounded to sub angular, clasts supported, SRQD = 100%, RD = 50°. | | | | | | JT, 60°, IR, RO, SN iron stained. |
| | | | | | | **SANDSTONE:** fine to medium grained, pale brown to pale grey, slightly sideritic, trace of pebble band, RD = 5°, ARQD = 100%. Sidrite band. | | | D 0.6 A 1.8 | 96 | | |
| | | | 40 | 35 | | **CONGLOMERATE:** fine to coarse grained, grey spotted dark grey, white and red, subrounded clasts, matrix supported, SRQD = 99%, RD = 5°. | | | | | | SM, 10°, IR, RO, gravel, 25mm |
| | | | 39 | 36 | | | | | D 0.3 A 0.3 | | | |
| | | | 38 | 37 | | | | | | | | |
| | | | 37 | 38 | | Sandstone band (38.10 - 38.23) Very little matrix between medium grained conglomerate some diametral loss of grains during drilling due to weak matrix. | | | D 0 A 0.1 | 99 | | |
| | | | 36 | 39 | | | | | | | | |
| | | | | | | **SANDSTONE:** fine to medium grained, grey with some silt shale laminations and sideritic bands, SRQD = 99%, RD = 3°. Siderite (39.36 - 39.59) | | | | 100 | | JT, 12°, PL, SO, CN<br>JT, 12°, PL, SO, CN<br>PT, 18°, PL, SO, CO, coal |
| | | | 35 | 40 | | | | | | | | |

**method**
DT diatube
AS auger screwing
AD auger drilling
RR roller/tricone
CB claw or blade bit
NMLC NMLC core
NQ, HQ, PQ wireline core

**core-lift**
casing used
barrel withdrawn

**graphic log/core recovery**
core recovered - graphic symbols indicate material
no core recovered

**water**
10/1/98 water level on date shown
water inflow
partial drill fluid loss
complete drill fluid loss
25 water pressure test result (lugeons) for depth interval shown

**weathering**
FR fresh
SW slightly weathered
MW moderately weathered
HW highly weathered
XW extremely weathered
DW distinctly weathered (covers MW and HW)

**strength**
VL very low
L low
M medium
H high
VH very high
EH extremely high

**defect type**
JT joint
PT parting
SM seam
SZ sheared zone
SS sheared surface
CS crushed seam

**planarity**
PL planar
CU curved
UN undulating
ST stepped
IR irregular

**roughness**
VR very rough
RO rough
SO smooth
SL slickensided

**coating**
CN clean
SN stained
VN veneer
CO coating

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# Engineering Log - Cored Borehole

| | |
|---|---|
| Borehole No. | **BH 22** |
| Sheet | 7 of 13 |
| Project No: | **GEOTWARA20576AB** |
| Client: | **APP CORPORATION** |
| Date started: | **6.4.2009** |
| Principal: | |
| Date completed: | **17.4.2009** |
| Project: | **PROPOSED HMRI BUILDINGS, JOHN HUNTER HOSPITAL** |
| Logged by: | **GDT** |
| Borehole Location: | **SEE DRAWING** |
| Checked by: | |

drill model & mounting: Hydra Power Truck | Easting: 377796.98 | slope: -90° | R.L. Surface: 74.89

hole diameter: 61.3 mm Drilling fluid: | Northing: 6356832.37 | bearing: | datum:

**drilling information** | **material substance** | **rock mass defects**

| method | core-lift | water | RL | depth metres | graphic log core recovery | material: rock type; grain characteristics, colour, structure, minor components | weathering alteration | estimated strength VL L M H VH EH | Is(50) MPa D- diametral A- axial | RQD % | defect spacing mm 30 100 300 1000 3000 | defect description: type, inclination, planarity, roughness, coating, thickness — particular / general |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ | | | | | | **SANDSTONE:** fine to medium grained, grey with some silt shale laminations and sideritic bands, SRQD = 99%, RD = 3°. *(continued)* | SW-FR | | D 0.7 A 2.1 | | | PT, 12°, PL, SO, CO, coal |
| | | | 34 | 41 | | | | | | 100 | | |
| | | | | | | **SILTSTONE:** dark grey with some sandy laminations and trace of carbonaceous laminations, SRQD = 100%, RD = 6°. | | | D 0.4 A 2.3 | | | PT, 10°, CU, SO, CO, coal<br>JT, 41°, PL, SO, CN |
| | | | 33 | 42 | | **COAL:** dull, black, with some bright bands, slightly to extremely cleated, RD 5°, SRQD = 37%. | | | | | | PT, 4°, PL, SO, CN |
| | | | | | | **DUDLEY SEAM (41.86 - 43.84)** | | | D 0.2 A 0.1 | | | JT, 85°, IR, SO, CN |
| | | | 32 | 43 | | Mudstone band, 20mm (43.20) | | | | 98 | | JT, 76°, IR, SO, CN<br>JT, 60°, PL, RO, CN |
| | | | | | | Mudstone band, 100mm (43.50)<br>Mudstone band, 80mm (43.62) | DW<br>FR | | | 100<br>53 | | Extremely cleated coal, 140mm |
| | | | 31 | 44 | | **Silt SHALE:** dark grey, slight laminated, SRQD = 100%, RD = 3°. | | | | | | |
| | | | | | | | | | D 0.1 A 0.6 | 100 | | |
| | | | 30 | 45 | | | | | | | | |
| | | | 29 | 46 | | | | | | | | JT, 78°, IR, SO, CN |
| | | | | | | **COAL:** bright, black, highly cleated, trace tuff bands, SRQD = 0%, RD = 3°. | | | D 0 A 0.8 | 87 | | JT, 51°, PL, SL, CN<br>Highly cleated coal, 330mm.<br>PT, 0°, PL, RO, CN |
| | | | 28 | 47 | | Tuff band, pale brown, 20mm, (46.54)<br>Tuff band, pale brown, 5mm, (46.65) | | | | | | SZ, 5°, PL, SL, flakes, 15mm |
| | | | | | | **Silty SHALE:** dark grey, some minor laminations, RD = 3°, SRQD = 96%. | | | | | | JT, 70°, PL, SO, CN |
| | | | 27 | 48 | | | | | | | | SZ, 0°, IR, RO, rock chips, 30mm |

**method**

| | |
|---|---|
| DT | diatube |
| AS | auger screwing |
| AD | auger drilling |
| RR | roller/tricone |
| CB | claw or blade bit |
| NMLC | NMLC core |
| NQ, HQ, PQ | wireline core |

**core-lift**

- casing used
- barrel withdrawn

**graphic log/core recovery**

- core recovered - graphic symbols indicate material
- no core recovered

**water**

- 10/1/98 water level on date shown
- water inflow
- partial drill fluid loss
- complete drill fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

**weathering**

| | |
|---|---|
| FR | fresh |
| SW | slightly weathered |
| MW | moderately weathered |
| HW | highly weathered |
| XW | extremely weathered |
| DW | distinctly weathered (covers MW and HW) |

**strength**

| | |
|---|---|
| VL | very low |
| L | low |
| M | medium |
| H | high |
| VH | very high |
| EH | extremely high |

**defect type**

| | |
|---|---|
| JT | joint |
| PT | parting |
| SM | seam |
| SZ | sheared zone |
| SS | sheared surface |
| CS | crushed seam |

**planarity**

| | |
|---|---|
| PL | planar |
| CU | curved |
| UN | undulating |
| ST | stepped |
| IR | irregular |

**roughness**

| | |
|---|---|
| VR | very rough |
| RO | rough |
| SO | smooth |
| SL | slickensided |

**coating**

| | |
|---|---|
| CN | clean |
| SN | stained |
| VN | veneer |
| CO | coating |

coffey geotechnics

# Engineering Log - Cored Borehole

Borehole No. **BH 22**
Sheet 8 of 13
Project No: **GEOTWARA20576AB**

Client: **APP CORPORATION**
Date started: **6.4.2009**
Principal:
Date completed: **17.4.2009**
Project: **PROPOSED HMRI BUILDINGS, JOHN HUNTER HOSPITAL**
Logged by: **GDT**
Borehole Location: **SEE DRAWING**
Checked by:

drill model & mounting: Hydra Power Truck | Easting: 377796.98 | slope: -90° | R.L. Surface: 74.89
hole diameter: 61.3 mm Drilling fluid: | Northing: 6356832.37 | bearing: | datum:

**drilling information** | **material substance** | **rock mass defects**

| method | core-lift | water | RL | depth metres | graphic log core recovery | material: rock type; grain characteristics, colour, structure, minor components | weathering alteration | estimated strength VL L M H VH EH | $Is_{(50)}$ MPa D- diametral A- axial | RQD % | defect spacing mm 30 100 300 1000 3000 | defect description: type, inclination, planarity, roughness, coating, thickness — particular / general |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ | | | 26 | 49 | | **SANDSTONE:** fine to medium grained, grey with silty shale laminations and trace sideritic bands, SRQD = 99%, RD = 5°. *(continued)* Siderite band, 60mm | FR | | D 1.1 A 6.2 | 99 | | |
| | | | | | | Siderite band, 60mm (49.26 - 49.32). | | | | | | SZ, 5°, IR, RO, rock flakes, 10mm |
| | | | 25 | 50 | | | | | | | | |
| | | | 24 | 51 | | | | | D 0.1 A 1.6 | | | |
| | | | | | | **Silty SHALE:** dark grey, with some fine sand, becoming laminated with depth, SRQD = 98%, RD = 0°- 3°. Siderite band (51.79 - 52.05) | | | | | | JT, 42°, PL, SO, CN<br>JT, 42°, PL, SO, CN<br>JT, 42°, PL, SO, CN<br>SZ, 0°, PL, RO, rock flakes, 20mm |
| | | | 23 | 52 | | | | | | 97 | | |
| | | | | | | | | | | | | JT, 56°, PL, RO, CN |
| | | | 22 | 53 | | **SANDSTONE:** fine to coarse grained, pale grey with black carbonaceous wisps, SRQD = 100%, RD = 3°. | | | D 1.4 A 3.8 | | | |
| | | | | | | Siderite band, 60mm (53.31). | | | | | | |
| | | | 21 | 54 | | Siderite band, 30mm (53.69). | | | | | | |
| | | | | | | **Silty SHALE:** pale grey to dark grey, trace of fine sand, SRQD = 90%, RD = 5°. | | | | | | |
| | | | 20 | 55 | | | | | D 0.3 A 1.8 | 95 | | SZ, 5°, IR, RO, rock fragments, 20mm |
| | | | | | | | | | | | | JT, 55°, CU, SO, CN |
| | | | | | | | | | D 0.2 A 2.6 | | | JT, 51°, PL, SO, CN |
| | | | 19 | 56 | | | | | | | | JT, 60°, PL, SO, CN |

**method**
DT diatube
AS auger screwing
AD auger drilling
RR roller/tricone
CB claw or blade bit
NMLC NMLC core
NQ, HQ, PQ wireline core

**core-lift**
casing used
barrel withdrawn

**graphic log/core recovery**
core recovered - graphic symbols indicate material
no core recovered

**water**
10/1/98 water level on date shown
water inflow
partial drill fluid loss
complete drill fluid loss
25 water pressure test result (lugeons) for depth interval shown

**weathering**
FR fresh
SW slightly weathered
MW moderately weathered
HW highly weathered
XW extremely weathered
DW distinctly weathered (covers MW and HW)

**strength**
VL very low
L low
M medium
H high
VH very high
EH extremely high

**defect type**
JT joint
PT parting
SM seam
SZ sheared zone
SS sheared surface
CS crushed seam

**roughness**
VR very rough
RO rough
SO smooth
SL slickensided

**planarity**
PL planar
CU curved
UN undulating
ST stepped
IR irregular

**coating**
CN clean
SN stained
VN veneer
CO coating

CORED BOREHOLE ALL LOGS.GPJ COFFEY.GDT 6.3.09
Form GEO 5.5 Issue 3 Rev. 3

coffey geotechnics

# Engineering Log - Cored Borehole

| | |
|---|---|
| Borehole No. | **BH 22** |
| Sheet | 9 of 13 |
| Project No: | **GEOTWARA20576AB** |
| Client: | **APP CORPORATION** |
| Date started: | **6.4.2009** |
| Principal: | |
| Date completed: | **17.4.2009** |
| Project: | **PROPOSED HMRI BUILDINGS, JOHN HUNTER HOSPITAL** |
| Logged by: | **GDT** |
| Borehole Location: | **SEE DRAWING** |
| Checked by: | |

drill model & mounting: Hydra Power Truck | Easting: 377796.98 | slope: -90° | R.L. Surface: 74.89

hole diameter: 61.3 mm Drilling fluid: | Northing: 6356832.37 | bearing: | datum:

**drilling information** | **material substance** | **rock mass defects**

| method | core-lift | water | RL | depth metres | graphic log core recovery | material: rock type; grain characteristics, colour, structure, minor components | weathering alteration | estimated strength VL L M H VH EH | $Is_{(50)}$ MPa D- diametral A- axial | RQD % | defect spacing mm 30 100 300 1000 3000 | defect description: type, inclination, planarity, roughness, coating, thickness — particular / general |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ | | | 18 | 57 | | **Interbedded SANDSTONE and SILTSTONE:** fine to medium grained, pale grey with grey, shale laminations, SRQD = 100%, RD = 3°. | FR | | | 95 | | SZ, 0°, IR, RI, rock fragments, 30mm<br>JT, 70°, IR, SO, CN<br>JT, 62°, IR, SO, CN |
| | | | 17 | 58 | | **Silty SHALE:** dark grey with trace of fine to medium grained sand, SRQD = 100%, RD = 5°. | | | D 0.5 A 1.3 | 100 | | |
| | | | 16 | 59 | | Siderite band, 30mm (58.96).<br>Sandstone band, fine to medium grained, pale grey, 50mm (59.0) | | | | | | |
| | | | 15 | 60 | | **Interlaminated SILTSTONE and SANDSTONE:** fine sandstone, pale grey to grey, SRQD = 100%, RD = 5°. | | | D 0.9 A 2.5 | | | |
| | | | | | | **SANDSTONE:** fine to coarse grained, pale grey with some carbonaceous wisps, SRQD = 100%, RD = 5°. | | | | | | |
| | | | 14 | 61 | | **Silty SHALE:** dark grey , trace of sandstone laminations, SRQD = 100%, RD = 5°. | | | | | | JT, 68°, PL, SO, CN |
| | | | | | | **SANDSTONE:** fine to medium grained, grey with carbobaceous wisps, SRQD = 100%, RD = 5°. | | | D 0.7 A 3.2 | 100 | | |
| | | | 13 | 62 | | **SANDSTONE:** fine to medium grained, grey with silty shale laminations, SRQD = 100%, RD = 5°. | | | | | | |
| | | | | | | **Silty SHALE:** dark grey, trace of fine sand and carbonaceous laminations, SRQD = 100%, RD = 3°. | | | | | | |
| | | | 12 | 63 | | | | | D 0.2 A 0.8 | 100 | | |
| | | | 11 | 64 | | | | | | | | |

**method**
DT diatube; AS auger screwing; AD auger drilling; RR roller/tricone; CB claw or blade bit; NMLC NMLC core; NQ, HQ, PQ wireline core

**core-lift**
casing used; barrel withdrawn

**graphic log/core recovery**
core recovered - graphic symbols indicate material; no core recovered

**water**
10/1/98 water level on date shown; water inflow; partial drill fluid loss; complete drill fluid loss; 25 water pressure test result (lugeons) for depth interval shown

**weathering**
FR fresh; SW slightly weathered; MW moderately weathered; HW highly weathered; XW extremely weathered; DW distinctly weathered (covers MW and HW)

**strength**
VL very low; L low; M medium; H high; VH very high; EH extremely high

**defect type**
JT joint; PT parting; SM seam; SZ sheared zone; SS sheared surface; CS crushed seam

**planarity**
PL planar; CU curved; UN undulating; ST stepped; IR irregular

**roughness**
VR very rough; RO rough; SO smooth; SL slickensided

**coating**
CN clean; SN stained; VN veneer; CO coating

coffey geotechnics

# Engineering Log - Cored Borehole

| | |
|---|---|
| Borehole No. | **BH 22** |
| Sheet | 10 of 13 |
| Project No: | **GEOTWARA20576AB** |
| Client: | **APP CORPORATION** |
| Date started: | **6.4.2009** |
| Principal: | |
| Date completed: | **17.4.2009** |
| Project: | **PROPOSED HMRI BUILDINGS, JOHN HUNTER HOSPITAL** |
| Logged by: | **GDT** |
| Borehole Location: | **SEE DRAWING** |
| Checked by: | |

drill model & mounting: Hydra Power Truck | Easting: 377796.98 | slope: -90° | R.L. Surface: 74.89

hole diameter: 61.3 mm Drilling fluid: | Northing: 6356832.37 | bearing: | datum:

| drilling information | | | | | material substance | | | | | rock mass defects | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| method | core-lift | water | RL | depth metres | graphic log core recovery | material: rock type; grain characteristics, colour, structure, minor components | weathering alteration | estimated strength VL L M H VH EH | $Is_{(50)}$ MPa D- diametral A- axial | RQD % | defect spacing mm 30 100 300 1000 3000 | defect description: type, inclination, planarity, roughness, coating, thickness (particular / general) |
| HQ | | | 10 | 65 | | **Carbonaceous Silty SHALE:** trace of pyrite streaks, SRQD = 100%, RD = 3°. *(continued)* | FR | | | 100 | | |
| | | | | | | **Carbonaceous SHALE:** dark grey, SRQD = 99%, RD = 3°. Tuff band, 50mm (64.96) | | | | | | SM, 0°, PL, RO, clay, 5mm |
| | | | 9 | 66 | | **COAL:** bright, minor, dull, moderate to high cleated, rare tuff bands, SRQD = 0%, RD = 5°. **YARD SEAM (65.31 - 65.94)** Tuff band, 10mm. | | | | 60 | | PT, 5°, PL, SO, CN<br>JT, 45°, PL, SO, CN<br>JT, 85°, PL, SO, CN<br>Extremely cleated coal, <0mm |
| | | | | | | **NO CORE:** core loss, 110m | | | D 0 A 0.7 | | | |
| | | | 8 | 67 | | **Clay SHALE:** dark grey to black, highly carbonaceous, SRQD = 100%, RD = 5°. **SANDSTONE:** fine to medium grained, slightly sideritic, SRQD = 100%, RD = 5°. **Silty SHALE:** siderite with rare coaly bands near top, SRQD = 89%, RD = 5°. | | | | | | JT, 72°, IR, SO, CN |
| | | | 7 | 68 | | **SANDSTONE:** fine to medium grained, grey with some siltstone laminations, SRQD = 100%, RD = 5°. | | | D 0.1 A 1.5 | 95 | | |
| | | | 6 | 69 | | **SANDSTONE:** fine to coarse grained, pale grey with black wisps, SRQD = 87%, RD = 5°. | | | D 3.1 A 6.7 | | | SZ, 10°, IR, RO, large sandstone fragments, 80mm<br>JT, 45°, IR, RO, CN |
| | | | | | | **SIDERITE:** pale grey, brown mottled grey, SRQD = 74%, RD = 10°. | | | | | | PT, 10°, IR, RO, CN |
| | | | 5 | 70 | | **Silty SHALE:** dark grey with some laminations, trace of fine sand, SRQD = 97%, RD = 5°. | | | | | | SM, 3°, PL, SO, coal, 30mm<br>PT, 5°, PL, SO, CN<br>JT, 62°, PL, SL, VN, calcite |
| | | | 4 | 71 | | **Interlaminated Silty SHALE and SANDSTONE:** fine to medium grained, grey to dark grey, SRQD = 100%, RD = 5°. | | | D 0 A 1.4 | 97 | | PT, 3°, CU, SO,CO, coal, <1mm |
| | | | 3 | 72 | | **SANDSTONE:** fine to medium grained, pale grey, SRQD = 100%, RD = 3°. | | | D 2.7 A 3.6 | | | |

**method**
DT diatube
AS auger screwing
AD auger drilling
RR roller/tricone
CB claw or blade bit
NMLC NMLC core
NQ, HQ, PQ wireline core

**core-lift**
casing used
barrel withdrawn

**graphic log/core recovery**
core recovered - graphic symbols indicate material
no core recovered

**water**
10/1/98 water level on date shown
water inflow
partial drill fluid loss
complete drill fluid loss
25 water pressure test result (lugeons) for depth interval shown

**weathering**
FR fresh
SW slightly weathered
MW moderately weathered
HW highly weathered
XW extremely weathered
DW distinctly weathered (covers MW and HW)

**strength**
VL very low
L low
M medium
H high
VH very high
EH extremely high

**defect type**
JT joint
PT parting
SM seam
SZ sheared zone
SS sheared surface
CS crushed seam

**planarity**
PL planar
CU curved
UN undulating
ST stepped
IR irregular

**roughness**
VR very rough
RO rough
SO smooth
SL slickensided

**coating**
CN clean
SN stained
VN veneer
CO coating

coffey geotechnics

# Engineering Log - Cored Borehole

Borehole No. **BH 22**
Sheet 11 of 13
Project No: **GEOTWARA20576AB**

Client: **APP CORPORATION**
Date started: **6.4.2009**
Principal:
Date completed: **17.4.2009**
Project: **PROPOSED HMRI BUILDINGS, JOHN HUNTER HOSPITAL**
Logged by: **GDT**
Borehole Location: **SEE DRAWING**
Checked by:

drill model & mounting: Hydra Power Truck | Easting: 377796.98 | slope: -90° | R.L. Surface: 74.89
hole diameter: 61.3 mm Drilling fluid: | Northing: 6356832.37 | bearing: | datum:

| drilling information | | | | | material substance | | | | | rock mass defects | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| method | core-lift | water | RL | depth metres | graphic log / core recovery | material: rock type; grain characteristics, colour, structure, minor components | weathering alteration | estimated strength (VL L M H VH EH) | $Is_{(50)}$ MPa D- diametral A- axial | RQD % | defect spacing mm (30 100 300 1000 3000) | defect description: type, inclination, planarity, roughness, coating, thickness (particular / general) |
| HQ | | | 2 | 73 | | **Interlaminated SANDSTONE and Silty SHALE:** fine to medium grained sandstone, pale grey to grey, rare siderite bands, SRQD = 100%, RD = 3°. *(continued)* | FR | | D 0.4 A 1.5 | 97 | | JT, 62°, PL, SO, CN |
| | | | 1 | 74 | | **SANDSTONE:** fine to medium grained, grey, silt shale laminations, SRQD = 100%, RD = 3°. | | | D 2.9 A 3.1 | 100 | | |
| | | | 0 | 75 | | | | | | 100 | | |
| | | | -1 | 76 | | | | | D 0.5 A 2 | 100 | | |
| | | | -2 | 77 | | **Interlaminated SILTSTONE and SANDSTONE:** grey to dark grey, fine grained sand, SRQD = 100%, RD = 5°. | | | D 0.1 A 1.3 | 100 | | JT, 45°, PL, RO, CN |
| | | | -3 | 78 | | Siderite band, 100mm (77.95) | | | | | | |
| | | | -4 | 79 | | **Silty SHALE:** dark grey, trace of fine sand, SRQD = 99%, RD = 0-10°. | | | | 100 | | JT, 41°, IR, RO, CN. |
| | | | -5 | 80 | | | | | | | | JT, 45°, PL, SO, CN |
| | | | | | | | | | | | | JT, 62°, PL, SO, CN |

**method**
DT diatube; AS auger screwing; AD auger drilling; RR roller/tricone; CB claw or blade bit; NMLC NMLC core; NQ, HQ, PQ wireline core

**core-lift**
casing used
barrel withdrawn

**graphic log/core recovery**
core recovered - graphic symbols indicate material
no core recovered

**water**
10/1/98 water level on date shown
water inflow
partial drill fluid loss
complete drill fluid loss
25 water pressure test result (lugeons) for depth interval shown

**weathering**
FR fresh; SW slightly weathered; MW moderately weathered; HW highly weathered; XW extremely weathered; DW distinctly weathered (covers MW and HW)

**strength**
VL very low; L low; M medium; H high; VH very high; EH extremely high

**defect type**
JT joint; PT parting; SM seam; SZ sheared zone; SS sheared surface; CS crushed seam

**planarity**
PL planar; CU curved; UN undulating; ST stepped; IR irregular

**roughness**
VR very rough; RO rough; SO smooth; SL slickensided

**coating**
CN clean; SN stained; VN veneer; CO coating

coffey geotechnics

# Engineering Log - Cored Borehole

| | |
|---|---|
| Borehole No. | **BH 22** |
| Sheet | 12 of 13 |
| Project No: | **GEOTWARA20576AB** |
| Client: | **APP CORPORATION** |
| Date started: | **6.4.2009** |
| Principal: | |
| Date completed: | **17.4.2009** |
| Project: | **PROPOSED HMRI BUILDINGS, JOHN HUNTER HOSPITAL** |
| Logged by: | **GDT** |
| Borehole Location: | **SEE DRAWING** |
| Checked by: | |

drill model & mounting: Hydra Power Truck | Easting: 377796.98 | slope: -90° | R.L. Surface: 74.89

hole diameter: 61.3 mm Drilling fluid: | Northing: 6356832.37 | bearing: | datum:

**drilling information** | **material substance** | **rock mass defects**

| method | core-lift | water | RL | depth metres | graphic log core recovery | material: rock type; grain characteristics, colour, structure, minor components | weathering alteration | estimated strength VL L M H VH EH | $Is_{(50)}$ MPa D- diametral A- axial | RQD % | defect spacing mm 30 100 300 1000 3000 | defect description: type, inclination, planarity, roughness, coating, thickness — particular / general |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ | | | -6 | 81 | | **Silty SHALE:** dark grey, trace of fine sand, SRQD = 99%, RD = 0-10°. *(continued)* | FR | | D 0.3 A 0.7 | 100 | | JT, 60°, IR, CI |
| | | | | | | Sideritic band, 100mm (81.2) | | | | 98 | | SM, PL, RO, flakey shale, 10mm |
| | | | -7 | 82 | | | | | | | | JT, 72°, PL, RO, CN |
| | | | -8 | 83 | | | | | D 0.6 A 2.5 | 100 | | JT, 68°, PL, SO, CN |
| | | | | | | **Interlaminated SILTSTONE and SANDSTONE:** trace of carbonaceous wisps, SRQD = 100%, RD = 5°. | | | | | | JT, 88°, CU, SO, CN (82.68 - 83.90) |
| | | | -9 | 84 | | | | | | | | JT, 55°, CU, SO, CN |
| | | | | | | | | | D 0.5 A 0.2 | 71 | | JT, 60°, PL, SO, SN, iron stained |
| | | | -10 | 85 | | **COAL:** bright, black, extremely cleated, SRQD = 0%, RD = 3°. **BOREHOLE SEAM (84.85 - 87.56)** | FR | | | | | JT, 60°, PL, SO, SN, iron stained |
| | | | | | | **CORE LOSS:** | | | | 0 | | SZ, 0°, IR, RO, rock fragments |
| | | | -11 | 86 | | **COAL:** bright, minor, dull, trace of claystone bands, extremely cleated to crushed, SRQD = 0%, RD = 3°. Claystone band, 10mm, (85.73) | | | | 0 | | JT, 62°, PL, SO, SN, iron stained |
| | | | | | | Claystone band, red, brown, 15mm, (86.11) | | | | | | |
| | | | | | | **CORE LOSS:** | FR | | | | | |
| | | | -12 | 87 | | **COAL:** bright, minor dull, extremely cleated to crushed, SRQD = 0%, RD = 3°. Claystone band, 50mm, (86.93) | | | | 100 | | |
| | | | | | | **NO CORE:** propable claystone based on geophysics. | | | | | | |
| | | | | | | **COAL:** bright, minor dull, extremely cleated to crushed, SRQD = 0%, RD = 3°. | | | | | | |
| | | | -13 | 88 | | **SANDSTONE:** fine to coarse grained, pale grey, SRQD = 100%, RD = 0°. | | | D A | | | |

**method**
DT diatube; AS auger screwing; AD auger drilling; RR roller/tricone; CB claw or blade bit; NMLC NMLC core; NQ, HQ, PQ wireline core

**core-lift**
casing used; barrel withdrawn

**graphic log/core recovery**
core recovered - graphic symbols indicate material; no core recovered

**water**
10/1/98 water level on date shown; water inflow; partial drill fluid loss; complete drill fluid loss; 25 water pressure test result (lugeons) for depth interval shown

**weathering**
FR fresh; SW slightly weathered; MW moderately weathered; HW highly weathered; XW extremely weathered; DW distinctly weathered (covers MW and HW)

**strength**
VL very low; L low; M medium; H high; VH very high; EH extremely high

**defect type**
JT joint; PT parting; SM seam; SZ sheared zone; SS sheared surface; CS crushed seam

**planarity**
PL planar; CU curved; UN undulating; ST stepped; IR irregular

**roughness**
VR very rough; RO rough; SO smooth; SL slickensided

**coating**
CN clean; SN stained; VN veneer; CO coating

coffey geotechnics

# Engineering Log - Cored Borehole

Borehole No. **BH 22**
Sheet 13 of 13
Project No: **GEOTWARA20576AB**

Client: **APP CORPORATION**
Date started: **6.4.2009**
Principal:
Date completed: **17.4.2009**
Project: **PROPOSED HMRI BUILDINGS, JOHN HUNTER HOSPITAL**
Logged by: **GDT**
Borehole Location: **SEE DRAWING**
Checked by:

drill model & mounting: Hydra Power Truck | Easting: 377796.98 | slope: -90° | R.L. Surface: 74.89
hole diameter: 61.3 mm Drilling fluid: | Northing: 6356832.37 | bearing: | datum:

| drilling information | | | | | material substance | | | | | rock mass defects | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| method | core-lift | water | RL | depth metres | graphic log / core recovery | material: rock type; grain characteristics, colour, structure, minor components | weathering / alteration | estimated strength (VL L M H VH EH) | $Is_{(50)}$ MPa D- diametral A- axial | RQD % | defect spacing mm (30 100 300 1000 3000) | defect description: type, inclination, planarity, roughness, coating, thickness (particular / general) |
| HQ | | | -14 | 89 | | **SANDSTONE:** fine to coarse grained, pale grey, SRQD = 100%, RD = 0°. *(continued)* | FR | | 2 1.9 | | | |
| | | | | | | | | | D A 2.2 1.6 | 100 | | |
| | | | -15 | 90 | | | | | | | | |
| | | | -16 | 91 | | | | | | 100 | | |
| | | | -17 | 92 | | | | | | | | |
| | | | -18 | 93 | | BH 22 terminated at 92.74m | | | | | | |
| | | | -19 | 94 | | | | | | | | |
| | | | -20 | 95 | | | | | | | | |
| | | | -21 | 96 | | | | | | | | |

**method**
DT diatube
AS auger screwing
AD auger drilling
RR roller/tricone
CB claw or blade bit
NMLC NMLC core
NQ, HQ, PQ wireline core

**core-lift**
casing used
barrel withdrawn

**graphic log/core recovery**
core recovered - graphic symbols indicate material
no core recovered

**water**
10/1/98 water level on date shown
water inflow
partial drill fluid loss
complete drill fluid loss
25 water pressure test result (lugeons) for depth interval shown

**weathering**
FR fresh
SW slightly weathered
MW moderately weathered
HW highly weathered
XW extremely weathered
DW distinctly weathered (covers MW and HW)

**strength**
VL very low
L low
M medium
H high
VH very high
EH extremely high

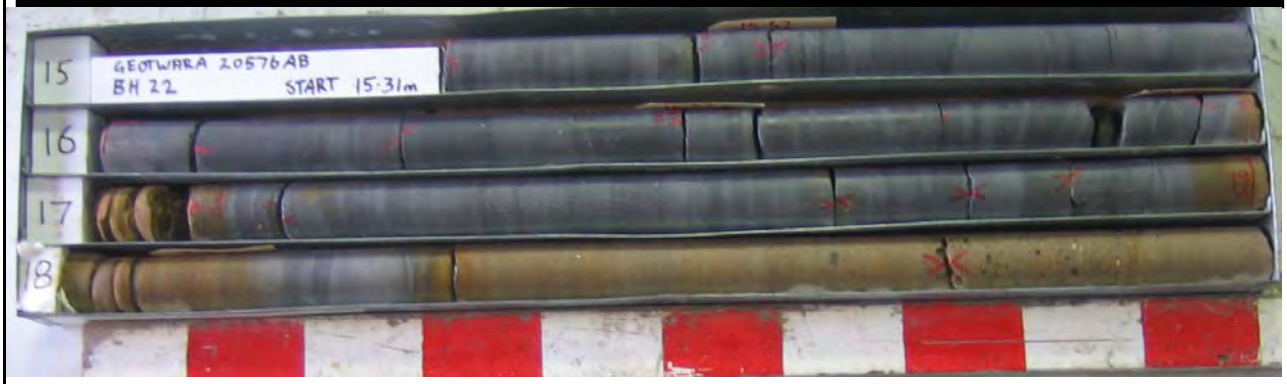
**defect type**
JT joint
PT parting
SM seam
SZ sheared zone
SS sheared surface
CS crushed seam

**planarity**
PL planar
CU curved
UN undulating
ST stepped
IR irregular

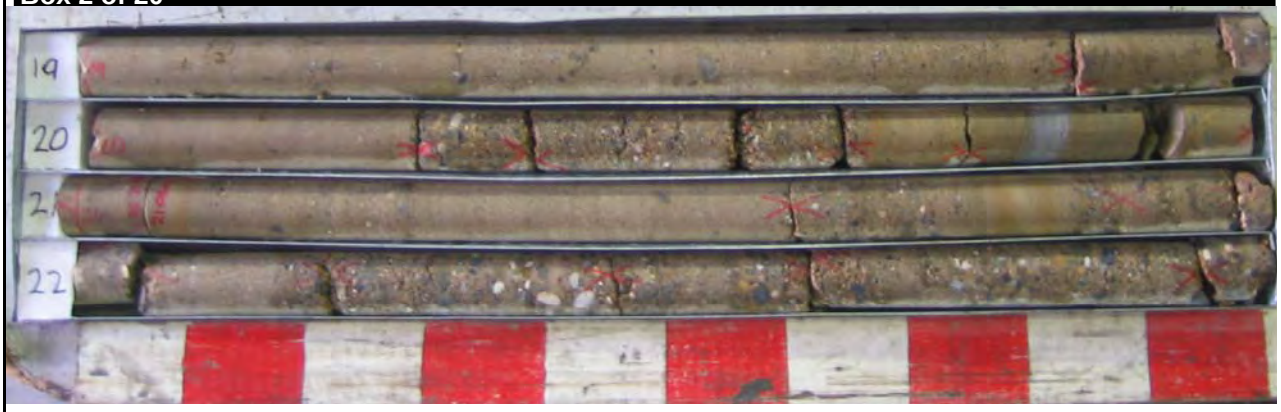
**roughness**
VR very rough
RO rough
SO smooth
SL slickensided

**coating**
CN clean
SN stained
VN veneer
CO coating

**GEOTWARA20576AB BOREHOLE : BH22 15.31m to 19.00m**
**Box 1 of 20**




**GEOTWARA20576AB BOREHOLE : BH22 19.00m to 23.00m**
**Box 2 of 20**




**GEOTWARA20576AB BOREHOLE : BH22 23.00m to 27.00m**
**Box 3 of 20**


| | | | | |
|---|---|---|---|---|
| drawn | GDT | coffey geotechnics SPECIALISTS MANAGING THE EARTH | client: | APP CORPORATION PTY LTD |
| approved | ABL | | project: | PROPOSED HMRI BUILDINGS<br>JOHN HUNTER HOSPITAL, NEW LAMBTON |
| date | 12/05/2009 | | title: | PHOTOGRAPHS OF CORE, BH22 (15.0m to 27.0m) |
| scale | N/A | | project no: GEOTWARA20576AB | figure no: BH 22 |
| original size | A4 | | | |

F:\GEOTECHNICS\JOB FILES\WARA 20500 - 20599\WARA20576AB\Photos\Core Box Photos\[GEOTWARA20576AB BH22 1 - 3.xlsx]A4 Portrait Figure

**GEOTWARA20576AB BOREHOLE : BH22 27.00m to 31.00m**
**Box 4 of 20**

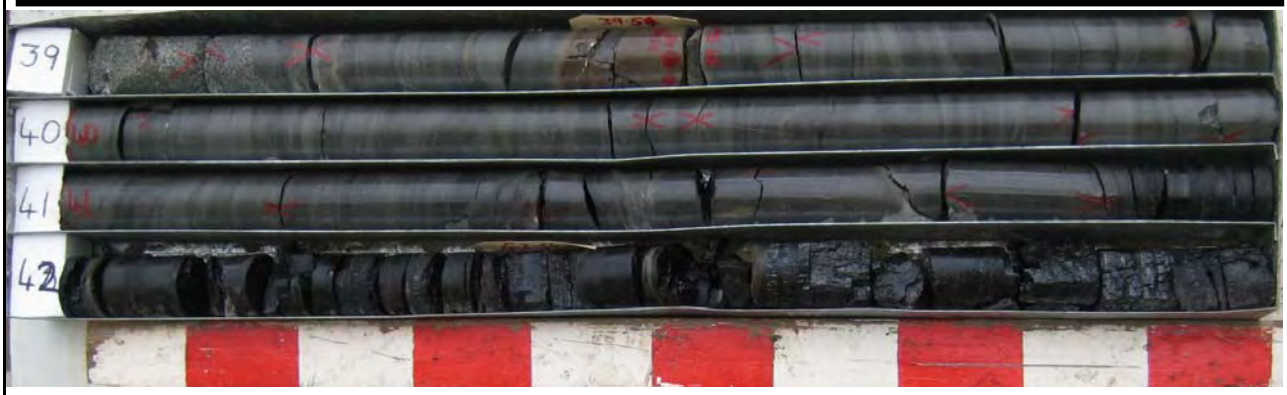

**GEOTWARA20576AB BOREHOLE : BH22 31.00m to 35.00m**
**Box 5 of 20**


**GEOTWARA20576AB BOREHOLE : BH22 35.00m to 39.00m**
**Box 6 of 20**


| | | | | |
|---|---|---|---|---|
| drawn | GDT | coffey geotechnics SPECIALISTS MANAGING THE EARTH | client: | APP CORPORATION PTY LTD |
| approved | ABL | | project: | PROPOSED HMRI BUILDINGS<br>JOHN HUNTER HOSPITAL, NEW LAMBTON |
| date | 12/05/2009 | | title: | PHOTOGRAPHS OF CORE, BH22 (27.0m to 39.0m) |
| scale | N/A | | project no: GEOTWARA20576AB | figure no: BH 22 |
| original size | A4 | | | |

F:\GEOTECHNICS\JOB FILES\WARA 20500 - 20599\WARA20576AB\Photos\Core Box Photos\[GEOTWARA20576AB BH22 4 - 6.xlsx]A4 Portrait Figure

**GEOTWARA20576AB BOREHOLE : BH22 39.00m to 43.00m**
**Box 7 of 20**




**GEOTWARA20576AB BOREHOLE : BH22 43.00m to 47.00m**
**Box 8 of 20**


**GEOTWARA20576AB BOREHOLE : BH22 47.00m to 51.00m**
**Box 9 of 20**


| | | | | |
|---|---|---|---|---|
| drawn | GDT | coffey geotechnics SPECIALISTS MANAGING THE EARTH | client: | APP CORPORATION PTY LTD |
| approved | ABL | | project: | PROPOSED HMRI BUILDINGS<br>JOHN HUNTER HOSPITAL, NEW LAMBTON |
| date | 12/05/2009 | | title: | PHOTOGRAPHS OF CORE, BH22 (39.0m to 51.0m) |
| scale | N/A | | project no: GEOTWARA20576AB | figure no: BH 22 |
| original size | A4 | | | |

F:\GEOTECHNICS\JOB FILES\WARA 20500 - 20599\WARA20576AB\Photos\Core Box Photos\[GEOTWARA20576AB BH22 7 - 9.xlsx]A4 Portrait Figure