coffey geotechnics

Engineering Log - Cored Borehole

Borehole No. **CBH15**
Sheet 2 of 3
Project No: **GEOTUNAN02580-AA**

Client: **MAUNSELL AECOM**
Date started: **23.3.2007**
Principal: **RTA**
Date completed: **23.3.2007**
Project: **GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**
Logged by: **CA**
Borehole Location: **AUSTRAL PARK LANE, TOOLIJOOA (REFER SITE PLAN)**
Checked by:

drill model & mounting: FOX UB40 TRUCK | Easting: 293530.18 | slope: -90° | R.L. Surface: 36.06
hole diameter: 100 mm Drilling fluid: | Northing: 6151294.7 | 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
			35	1								
						SANDSTONE - medium grained, orange, laminated @ 0 deg with dark bands	SW		D 1.09 A 1.83	26		—JT @ 30 deg PL, RO
			34	2		SILTSTONE - grey / pale grey, distinctly laminated @ 0 deg	FR		D 1.45 A 4.4	100		—PT, PL, SO —JT @ 45 deg PL, RO
			33	3					D 5.27 A 6.02			—PT, PL, SO JT @ 15 deg UN, RO
			32	4					D 5.01 A 5.81	98		—JT @ 20 deg PL, SO —PT, PL, SO —PT, PL, SO —PT, PL, SO
			31	5		Silty SANDSTONE - fine grained, pale grey, pink, laminated @ 0 deg with trace gravel pieces						
			30	6								
			29	7					D 4.51 A 6.19	100		
				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barrel withdrawn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

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 GU02580-AA LOGS.GPJ COFFEY.GDT 4.6.07
Form GEO 5.5 Issue 3 Rev. 3

coffey geotechnics

Engineering Log - Cored Borehole

Borehole No. **CBH15**
Sheet 3 of 3
Project No: **GEOTUNAN02580-AA**

Client: **MAUNSELL AECOM**
Date started: **23.3.2007**
Principal: **RTA**
Date completed: **23.3.2007**
Project: **GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**
Logged by: **CA**
Borehole Location: **AUSTRAL PARK LANE, TOOLIJOOA (REFER SITE PLAN)**
Checked by:

drill model & mounting: FOX UB40 TRUCK | Easting: 293530.18 | slope: -90° | R.L. Surface: 36.06
hole diameter: 100 mm Drilling fluid: | Northing: 6151294.7 | 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
			27	9		Silty SANDSTONE - fine grained, pale grey, pink, laminated @ 0 deg with trace gravel pieces *(continued)*	FR			100		
			26	10					D 4.76			
			25	11						100		
			24	12								
			23	13								
			22	14					D 6.53 A 4.01	100		
			21	15		CBH15 terminated at 14.85m						
				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

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

Borehole No. **CBH15**

Engineering Log - Piezometer

Sheet 1 of 2

Project No: **GEOTUNAN02580-AA**

Client: **MAUNSELL AECOM**

Date started: **23.3.2007**

Principal: **RTA**

Date completed: **23.3.2007**

Project: **GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**

Logged by: **CA**

Borehole Location: **AUSTRAL PARK LANE, TOOLIJOOA (REFER SITE PLAN)**

Checked by:

drill model & mounting: FOX UB40 TRUCK | Easting: 293530.18 | slope: -90° | R.L. Surface: 36.06

hole diameter: | Northing: 6151294.7 | bearing: | datum:

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
ADT		C				36				Organic CLAY: low plasticity, dark brown & orange with trace gravel	M	S	FILL
										Concrete BOULDERS: angular fill / rubble	-	-	
						35	1			Gravelly CLAY - low to medium plasticity, orange brown, angular	M	F	RESIDUAL
										SANDSTONE - medium grained, pale yellow, brown and orange with minor shale and silty clay seams			SANDSTONE (XW)
										SANDSTONE - medium grained, orange, laminated @ 0 deg with dark bands			
						34	2			SILTSTONE - grey / pale grey, distinctly laminated @ 0 deg			
						33	3						
						32	4						
										Silty SANDSTONE - fine grained, pale grey, pink, laminated @ 0 deg with trace gravel pieces			
						31	5						
						30	6						
						29	7						
							8						

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
DT	diatube
B	blank bit
V	V bit
T	TC bit
TBX	Tubex

*bit shown by suffix e.g. ADT

support: C casing; N nil

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
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
P	pressure meter
Bs	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer
ALT	air lift test

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

Borehole No. **CBH15**

Sheet 2 of 2

Engineering Log - Piezometer

Project No: **GEOTUNAN02580-AA**

Client: ***MAUNSELL AECOM***

Date started: ***23.3.2007***

Principal: ***RTA***

Date completed: ***23.3.2007***

Project: ***GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE***

Logged by: ***CA***

Borehole Location: ***AUSTRAL PARK LANE, TOOLIJOOA (REFER SITE PLAN)***

Checked by:

drill model & mounting: FOX UB40 TRUCK | Easting: 293530.18 | slope: -90° | R.L. Surface: 36.06

hole diameter: | Northing: 6151294.7 | bearing: | datum:

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
						28				Silty SANDSTONE - fine grained, pale grey, pink, laminated @ 0 deg with trace gravel pieces *(continued)*			
						27	9						
						26	10						
						25	11						
						24	12						
						23	13						
						22	14						
						21	15			Borehole terminated at 14.85m			
							16						

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
DT	diatube
B	blank bit
V	V bit
T	TC bit
TBX	Tubex

*bit shown by suffix e.g. ADT

support

C casing N nil

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
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
P	pressure meter
Bs	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer
ALT	air lift test

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

PIEZOMETER GU02580-AA LOGS.GPJ COFFEY.GDT 4.6.07

Form GEO 5.10 Issue 3 Rev.0

coffey geotechnics

Engineering Log - Borehole

Borehole No.	**CBH16**
Sheet	1 of 3
Project No:	**GEOTUNAN02580-AA**
Client:	**MAUNSELL AECOM**
Date started:	**22.3.2007**
Principal:	**RTA**
Date completed:	**22.3.2007**
Project:	**GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**
Logged by:	**SD**
Borehole Location:	**MILLERS LANE, TOOLIJOOA (REFER SITE PLAN)**
Checked by:	

drill model and mounting: H-POWER SCOUT TRUCK | Easting: 296184.46 | slope: -90° | R.L. Surface: 24.87

hole diameter: 100 mm | Northing 6152071.25 | 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									TOPSOIL	M	S		TOPSOIL
					24	1			Sandy CLAY; medium plasticity, brown, with trace of fine to coarse grained gravel		F		
									Silty CLAY: medium to high plasticity, pale brown/orange mottled, with trace fine to coarse grained gravel, sub-angular	D	H		RESIDUAL
				SPT 12,31,33 N*=64	23	2							
ADT									Silty CLAY: medium to high plasticity, pale brown/orange mottled, with trace of fine to coarse grained gravel, sub-angular, with some fine to coarse grained gravel, HW to XW sandstone				XW-HW ROCK
				SPT 14,19,26 N*=45	22	3			Silty CLAY: medium to high plasticity, pale brown/orange mottled, with trace of fine to coarse grained gravel, sub-angular, with some fine to coarse grained gravel, HW to XW sandstone, with trace of organic material	W			
			29/03/2007		21	4			10mm band of sandstone				
													water at 4.5m
					20	5			CLAY: medium to high plasticity, grey, with trace of gravel, HW to XW sandstone	>Wp			Inflow at 4.5m
									Borehole CBH16 continued as cored hole				
					19	6							
					18	7							
					17	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.	**CBH16**
Sheet	2 of 3
Project No:	**GEOTUNAN02580-AA**
Client:	**MAUNSELL AECOM**
Date started:	**22.3.2007**
Principal:	**RTA**
Date completed:	**22.3.2007**
Project:	**GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**
Logged by:	**SD**
Borehole Location:	**MILLERS LANE, TOOLIJOOA (REFER SITE PLAN)**
Checked by:	

drill model & mounting: H-POWER SCOUT TRUCK | Easting: 296184.46 | slope: -90° | R.L. Surface: 24.87

hole diameter: 100 mm Drilling fluid: | Northing: 6152071.25 | 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
		29/03/2007	24	1								
			23	2								
			22	3								
			21	4								
			20	5								
						CLAYSTONE: pale brown/grey/orange, HW/XW rock in form of clay present	XW/HW			0		JT @ 90 deg, ST< RO, CO, coating is black/red 1mm thick, JT 80mm long
			19	6		SANDSTONE: pale brown/grey/orange, massive	SW/FR		D 4.71 A 4.23			JT @ 45 deg, open, PL, RO, CN Fossilised objetc 2 x 20mm
			18	7		6.8m to 6.9m: layer of conglomerate gravel, up to 10mm				74		JT @ 45 deg, open, RO, PL, CN JT @ 0 deg, PL, RO, CN JT @ 5 deg, PL, RO, CN
			17	8								JT @ 0 deg, PL, RO, CN

JT @ 0 deg PL, RO, CN open @ 50 mm spacing

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.	**CBH16**
Sheet	3 of 3
Project No:	**GEOTUNAN02580-AA**
Client:	**MAUNSELL AECOM**
Date started:	**22.3.2007**
Principal:	**RTA**
Date completed:	**22.3.2007**
Project:	**GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**
Logged by:	**SD**
Borehole Location:	**MILLERS LANE, TOOLIJOOA (REFER SITE PLAN)**
Checked by:	

drill model & mounting: H-POWER SCOUT TRUCK | Easting: 296184.46 | slope: -90° | R.L. Surface: 24.87

hole diameter: 100 mm Drilling fluid: | Northing: 6152071.25 | 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
						SANDSTONE: pale brown/grey/orange, massive *(continued)*	SW/FR			74		SZ @ 0 deg, 20mm trhick, VR JT @ 90 deg, 100mm long, PL, RO, CN
			16	9		SANDSTONE: pale brown/grey/orange, massive, patches of dark grey material 5 to 10mm in size distributed throughout						JT @ 90 deg, PL, RO, CN
												JT @ 0 deg, PL, RO, CN
			15	10								
										98		JT @ 15 deg, CU, RO, CN
			14	11					D 4.86 A 4.28			JT @ 5 deg, PL, RO, CN
												JT @ 0 deg, PL, RO, CN JT @ 0 deg, ST, RO, CN JT @ 0 deg, PL, RO, CN
			13	12					D 5.01 A 4.51			JT @ 0 deg, PL, RO, CN
						SANDSTONE: pale brown/grey/orange, massive, patches of dark grey material 5 to 10mm in size distributed throughout, some 50 to 60mm in size						
			12	13		12.9m to 13.0m: Gravel conglomerate 5 to 10mm	SW					JT @ 0 deg, PL, RO, CN
						SANDSTONE: pale brown/grey/orange, massive, patches of dark grey material 5 to 10mm in size distributed throughout, highly fractured				20		JT @ 45 deg, PL, RO CN, SO 80mm spacing
			11	14								
			10	15		NO CORE: 14.8m to 15.0m						
			9	16		CBH16 terminated at 15m						

CORED BOREHOLE GU02580-AA LOGS.GPJ COFFEY.GDT 4.6.07

Form GEO 5.5 Issue 3 Rev. 3

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

Borehole No. **CBH16**

Engineering Log - Piezometer

Sheet 1 of 2

Project No: **GEOTUNAN02580-AA**

Client: ***MAUNSELL AECOM***

Date started: ***22.3.2007***

Principal: ***RTA***

Date completed: ***22.3.2007***

Project: ***GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE***

Logged by: ***SD***

Borehole Location: ***MILLERS LANE, TOOLIJOOA (REFER SITE PLAN)***

Checked by:

drill model & mounting: H-POWER SCOUT TRUCK | Easting: 296184.46 | slope: -90° | R.L. Surface: 24.87

hole diameter: | Northing: 6152071.25 | bearing: | datum:

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
ADV						24	1			TOPSOIL	M	S	TOPSOIL
										Sandy CLAY; medium plasticity, brown, with trace of fine to coarse grained gravel		F	
										Silty CLAY: medium to high plasticity, pale brown/orange mottled, with trace fine to coarse grained gravel, sub-angular	D	H	RESIDUAL
				SPT 12,31,33 N*=64		23	2						
ADT										Silty CLAY: medium to high plasticity, pale brown/orange mottled, with trace of fine to coarse grained gravel, sub-angular, with some fine to coarse grained gravel, HW to XW sandstone			XW-HW ROCK
				SPT 14,19,26 N*=45		22	3			Silty CLAY: medium to high plasticity, pale brown/orange mottled, with trace of fine to coarse grained gravel, sub-angular, with some fine to coarse grained gravel, HW to XW sandstone, with trace of organic material	W		
			29/03/2007			21	4			10mm band of sandstone			
						20	5			CLAY: medium to high plasticity, grey, with trace of gravel, HW to XW sandstone	>Wp		water at 4.5m Inflow at 4.5m
										CLAYSTONE: pale brown/grey/orange, HW/XW rock in form of clay present			
						19	6			SANDSTONE: pale brown/grey/orange, massive			
						18	7			6.8m to 6.9m: layer of conglomerate gravel, up to 10mm			
						17	8						

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
DT	diatube
B	blank bit
V	V bit
T	TC bit
TBX	Tubex

*bit shown by suffix e.g. ADT

support

C casing N nil

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
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
P	pressure meter
Bs	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer
ALT	air lift test

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

Borehole No. **CBH16**

Sheet 2 of 2

Project No: **GEOTUNAN02580-AA**

Engineering Log - Piezometer

Client: ***MAUNSELL AECOM***

Date started: ***22.3.2007***

Principal: ***RTA***

Date completed: ***22.3.2007***

Project: ***GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE***

Logged by: ***SD***

Borehole Location: ***MILLERS LANE, TOOLIJOOA (REFER SITE PLAN)***

Checked by:

drill model & mounting: H-POWER SCOUT TRUCK | Easting: 296184.46 | slope: -90° | R.L. Surface: 24.87

hole diameter: | Northing: 6152071.25 | bearing: | datum:

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
						16	9			SANDSTONE: pale brown/grey/orange, massive *(continued)*			
										SANDSTONE: pale brown/grey/orange, massive, patches of dark grey material 5 to 10mm in size distributed throughout			
						15	10						
						14	11						
						13	12			SANDSTONE: pale brown/grey/orange, massive, patches of dark grey material 5 to 10mm in size distributed throughout, some 50 to 60mm in size			
						12	13			12.9m to 13.0m: Gravel conglomerate 5 to 10mm			
										SANDSTONE: pale brown/grey/orange, massive, patches of dark grey material 5 to 10mm in size distributed throughout, highly fractured			
						11	14						
						10	15			NO CORE: 14.8m to 15.0m			
										Borehole terminated at 15m			
						9	16						

PIEZOMETER GU02580-AA LOGS.GPJ COFFEY.GDT 4.6.07

Form GEO 5.10 Issue 3 Rev.0

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
DT	diatube
B	blank bit
V	V bit
T	TC bit
TBX	Tubex

*bit shown by suffix e.g. ADT

support

C casing N nil

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
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
P	pressure meter
Bs	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer
ALT	air lift test

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 - Borehole

Borehole No.	**CBH17**
Sheet	1 of 3
Project No:	**GEOTUNAN02580-AA**
Client:	**MAUNSELL AECOM**
Date started:	**13.3.2007**
Principal:	**RTA**
Date completed:	**14.3.2007**
Project:	**GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**
Logged by:	**DD**
Borehole Location:	**KIMBERLEY PARK STUD, FOXGROUND (REFER SITE PLAN)**
Checked by:	

drill model and mounting: H-POWER SCOUT TRUCK | Easting: 295092.08 | slope: -90° | R.L. Surface: 42.35

hole diameter: 100 mm | Northing 6153406.06 | 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			42				Silty CLAY: medium plasticity, brown, with some fine to coarse grained sand and fine gravel, subrounded to sunbangular	Wp	F/St		ALLUVIUM
				U_{50}		1							
			▼ 29/03/2007	SPT 3,6,6 N*=12	41				Silty CLAY: medium plasticity, green/red/orange mottled, with some fine to medium grained sand, with trace of fine to medium grained gravel (XW Sandstone)		VSt	×	1.0m to 1.1m: ASS Sample 1.1m to 1.3m: SPT Sample 1.35m to 1.45m: ASS Sample
						2							
				U_{50}	40								2.1m Below Surface @ Completion
				SPT 5,6,10 N*=16					Silty CLAY: medium plasticity, red/orange mottled, with fine to coarse grained sand and fine grained gravel (XW Sandstone) and iron staining	<=Wp			
						3			Silty CLAY: low to medium plasticity, pale grey/pale yellow mottled, with some fine to coarse grained sand with a trace of fine to medium gravel (ironstone), rounded to subrounded	>=Wp	S/F		2.7m to 2.9m: SPT Sample
					39								Intermittant gravel fine to medium grained subrounded, sandstone or ironstone
						4			Silty CLAY: low plasticity, pale grey	<Wp			3.8m to 4.5m: Grab Sample
					38								
						5			Silty CLAY: low to medium plasticity, pale orange, with some fine to coarse grained sand becoming pale yellow with a trace of rootlets	>Wp		×	RESIDUAL
					37								
ADT				SPT 10,-,- N*=R		6			SANDSTONE: XW / HW	D			XW / HW SILTY SANDSTONE SPT bouncing @ 5.65m (10/150, - , -) 5.5m to 5.6m: SPT Sample
					36				Borehole CBH17 continued as cored hole				
						7							
					35								
						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

BOREHOLE GU02580-AA LOGS.GPJ COFFEY.GDT 4.6.07

Form GEO 5.3 issue 3 Rev.2

coffey geotechnics

Engineering Log - Cored Borehole

Borehole No. **CBH17**
Sheet 2 of 3
Project No: **GEOTUNAN02580-AA**

Client: **MAUNSELL AECOM**
Date started: **13.3.2007**
Principal: **RTA**
Date completed: **14.3.2007**
Project: **GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**
Logged by: **DD**
Borehole Location: **KIMBERLEY PARK STUD, FOXGROUND (REFER SITE PLAN)**
Checked by:

drill model & mounting: H-POWER SCOUT TRUCK | Easting: 295092.08 | slope: -90° | R.L. Surface: 42.35
hole diameter: 100 mm Drilling fluid: | Northing: 6153406.06 | 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)
		29/03/2007	42	1								
			41	2								
			40	3								
			39	4								
			38	5								
			37	6								
			36	7								
NQ			35	8		SILTSTONE: grey, indistinctly bedded at 0 deg	SW/FR		D 1.73 A 1.45	65		PT, PL, RO, VN, 5 deg JT, PL, RO, CN, 30 deg JT, PL, RO, CN, 30 deg PT, IR, VR, CN, 10 deg

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

CORED BOREHOLE GU02580-AA LOGS.GPJ COFFEY.GDT 4.6.07
Form GEO 5.5 Issue 3 Rev. 3

coffey geotechnics

Engineering Log - Cored Borehole

Borehole No.	**CBH17**
Sheet	3 of 3
Project No:	**GEOTUNAN02580-AA**
Client:	**MAUNSELL AECOM**
Date started:	**13.3.2007**
Principal:	**RTA**
Date completed:	**14.3.2007**
Project:	**GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**
Logged by:	**DD**
Borehole Location:	**KIMBERLEY PARK STUD, FOXGROUND (REFER SITE PLAN)**
Checked by:	

drill model & mounting: H-POWER SCOUT TRUCK | Easting: 295092.08 | slope: -90° | R.L. Surface: 42.35

hole diameter: 100 mm | Drilling fluid: | Northing: 6153406.06 | 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
NQ			34	9		Tuffaceous SANDSTONE: medium grained, dark grey, massive *(continued)*	MW			65		JT, PL, RO, CN
						NO CORE: 8.40m to 8.57m						
			33	10		Tuffaceous SANDSTONE: medium grained, dark grey, massive	SW					CS, IR, RO, CN CS, PL, RO, CN CS, IR, VR, SN PT, PL, VR, CN, 0 to 5 deg PT, PL, RO, CN, 0 to 5 deg CS, IR, VR, SN PT, PL, RO, CN, 0 to 5 deg PT, PL, RO, CN, 0 to 5 deg PT, IR, VR, CN, 0 to 5 deg SZ, PL, VR, SN PT, PL, RO, CN, 0 to 5 deg CS, PL, VR, CN PT, PL, VR, CN, 0 to 5 deg PT, IR, RO, CN, 0 to 5 deg PT, PL, RO, CN, 0 to 5 deg PT, PL, VR, CN, 0 to 5 deg PT, PL, RO, CN, 0 to 5 deg PT, VN, RO, CN, 0 to 5 deg PT, PL, RO, CN, 0 to 5 deg PT, PL, RO, CN, 0 to 5 deg PT, PL, RO, CN, 0 to 5 deg PT, PL, VR, CN, 0 to 5 deg PT, PL, RO, CN, 5 deg PT, PL, RO, CN, 5 deg PT, PL, RO, CN, 10 deg PT, IR, RO, CN, 5 to 10 deg PT, IR, RO, CN, 0 to 5 deg PT, IR, RO, CN, 0 to 5 deg PT, PL, SO PT, PL, SO PT, PL, SO PT, PL, SO PT, IR, RO PT, PL, SO PT, PL, SO
			32	11					D A 3.82 5.55	50		
			31	12					D A 4.41 4.64			
			30	13			FR					
			29			NO CORE: 13.00m to 13.03m Tuffaceous SANDSTONE: medium grained, dark grey/blue, massive				82		JT, RO, 80 deg PT, PL, SO CS, 40mm long
				14		NO CORE: 13.81m to 13.96m						
			28			Tuffaceous SANDSTONE: medium grained, dark grey, massive	SW/FR					JT, ST, RO, 60 deg JT, PL, RO, 30 deg
						NO CORE: 14.48m to 14.52m			D A 5.01 5.78			
				15		Tuffaceous SANDSTONE: medium grained, dark grey/blue, massive						
			27			CBH17 terminated at 14.71m						
				16								

CORED BOREHOLE GU02580-AA LOGS.GPJ COFFEY.GDT 4.6.07

Form GEO 5.5 Issue 3 Rev. 3

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

Borehole No. **CBH17**

Sheet 1 of 2

Engineering Log - Piezometer

Project No: **GEOTUNAN02580-AA**

Client: **MAUNSELL AECOM**

Date started: **13.3.2007**

Principal: **RTA**

Date completed: **14.3.2007**

Project: **GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**

Logged by: **DD**

Borehole Location: **KIMBERLEY PARK STUD, FOXGROUND (REFER SITE PLAN)**

Checked by:

drill model & mounting: H-POWER SCOUT TRUCK | Easting: 295092.08 | slope: -90° | R.L. Surface: 42.35

hole diameter: | Northing: 6153406.06 | bearing: | datum:

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
ADV		C	▼ 29/03/2007			42	1			Silty CLAY: medium plasticity, brown, with some fine to coarse grained sand and fine gravel, subrounded to sunbangular	Wp	F/St	ALLUVIUM
				U_{50}									
				SPT 3,6,6 N*=12		41	2			Silty CLAY: medium plasticity, green/red/orange mottled, with some fine to medium grained sand, with trace of fine to medium grained gravel (XW Sandstone)		VSt	1.0m to 1.1m: ASS Sample 1.1m to 1.3m: SPT Sample 1.35m to 1.45m: ASS Sample
				U_{50}									2.1m Below Surface @ Completion
				SPT 5,6,10 N*=16		40	3			Silty CLAY: medium plasticity, red/orange mottled, with fine to coarse grained sand and fine grained gravel (XW Sandstone) and iron staining	<=Wp		
						39				Silty CLAY: low to medium plasticity, pale grey/pale yellow mottled, with some fine to coarse grained sand with a trace of fine to medium gravel (ironstone), rounded to subrounded	>=Wp	S/F	2.7m to 2.9m: SPT Sample Intermittant gravel fine to medium grained subrounded, sandstone or ironstone
						38	4			Silty CLAY: low plasticity, pale grey	<Wp		3.8m to 4.5m: Grab Sample
						37	5			Silty CLAY: low to medium plasticity, pale orange, with some fine to coarse grained sand becoming pale yellow with a trace of rootlets	>Wp		RESIDUAL
ADT				SPT 10,-,- N*=R			6			SANDSTONE: XW / HW	D		XW / HW SILTY SANDSTONE SPT bouncing @ 5.65m (10/150, - , -) 5.5m to 5.6m: SPT Sample
NQ						36	7			SILTSTONE: grey, indistinctly bedded at 0 deg			
						35	8						

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
DT	diatube
B	blank bit
V	V bit
T	TC bit
TBX	Tubex

*bit shown by suffix e.g. ADT

support

C casing N nil

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
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
P	pressure meter
Bs	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer
ALT	air lift test

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

Borehole No. **CBH17**

Sheet 2 of 2

Engineering Log - Piezometer

Project No: **GEOTUNAN02580-AA**

Client: ***MAUNSELL AECOM***

Date started: ***13.3.2007***

Principal: ***RTA***

Date completed: ***14.3.2007***

Project: ***GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE***

Logged by: ***DD***

Borehole Location: ***KIMBERLEY PARK STUD, FOXGROUND (REFER SITE PLAN)***

Checked by:

drill model & mounting: H-POWER SCOUT TRUCK | Easting: 295092.08 | slope: -90° | R.L. Surface: 42.35

hole diameter: | Northing: 6153406.06 | bearing: | datum:

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
NQ						34	9			Tuffaceous SANDSTONE: medium grained, dark grey, massive *(continued)*			
										NO CORE: 8.40m to 8.57m			
						33				Tuffaceous SANDSTONE: medium grained, dark grey, massive			
							10						
						32							
							11						
						31							
							12						
						30							
							13			NO CORE: 13.00m to 13.03m			
						29				Tuffaceous SANDSTONE: medium grained, dark grey/blue, massive			
							14			NO CORE: 13.81m to 13.96m			
										Tuffaceous SANDSTONE: medium grained, dark grey, massive			
						28				NO CORE: 14.48m to 14.52m			
										Tuffaceous SANDSTONE: medium grained, dark grey/blue, massive			
							15			Borehole terminated at 14.71m			
						27							
							16						

PIEZOMETER GU02580-AA LOGS.GPJ COFFEY.GDT 4.6.07

Form GEO 5.10 Issue 3 Rev.0

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
DT	diatube
B	blank bit
V	V bit
T	TC bit
TBX	Tubex

*bit shown by suffix e.g. ADT

support

C casing N nil

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
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
P	pressure meter
Bs	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer
ALT	air lift test

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 - Borehole

Borehole No.	**CBH18**
Sheet	1 of 3
Project No:	**GEOTUNAN02580-AA**
Client:	**MAUNSELL AECOM**
Date started:	**12.3.2007**
Principal:	**RTA**
Date completed:	**17.3.2007**
Project:	**GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**
Logged by:	**DD**
Borehole Location:	**DOOLEY LANE, TOOLIJOOA (REFER SITE PLAN)**
Checked by:	

drill model and mounting: GEMCO TRAILER | Easting: 296726.41 | slope: -90° | R.L. Surface: 16.48

hole diameter: 100 mm | Northing 6150829.08 | 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			16				FILL/TOPSOIL: Silty CLAY: dark brown, medium plasticity, with trace of fine to coarse grained gravel, sub-angular to angular and rootlets	M	L		TOPSOIL/FILL diesel smell in topsoil
				SPT 2,1,3 N*=4		1			FILL: Silty CLAY: pale brown, medium to high plasticity, with trace of fine to coarse grained, sub-angular to angular gravel	<Wp	F		FILL
					15					<Wp			
				SPT 8,21,22 N*=43		2			Silty CLAY: pale brown/grey/red mottled, medium to high plasticity		VSt/H		RESIDUAL
					14								
ADT				SPT 17 N*=R		3			Silty CLAY: medium plasticity, green/grey/pale brown mottled, trace of coarse grained gravel, sub-rounded to rounded of XW to HW sandstone				XW/HW SANDSTONE
					13								
						4							
					12				Borehole CBH18 continued as cored hole				
						5							
					11								
						6							
					10								
						7							
					9								
						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, C casing, N nil

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

BOREHOLE GU02580-AA LOGS.GPJ COFFEY.GDT 4.6.07

Form GEO 5.3 Issue 3 Rev.2

coffey geotechnics

Engineering Log - Cored Borehole

Borehole No.	**CBH18**
Sheet	2 of 3
Project No:	**GEOTUNAN02580-AA**
Client:	**MAUNSELL AECOM**
Date started:	**12.3.2007**
Principal:	**RTA**
Date completed:	**17.3.2007**
Project:	**GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**
Logged by:	**DD**
Borehole Location:	**DOOLEY LANE, TOOLIJOOA (REFER SITE PLAN)**
Checked by:	

drill model & mounting: GEMCO TRAILER | Easting: 296726.41 | slope: -90° | R.L. Surface: 16.48

hole diameter: 100 mm | Drilling fluid: | Northing: 6150829.08 | 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
			16	1								
			15	2								
			14	3								
			13	4								
NQ Wireline			12	5		Silty SANDSTONE: grey with red/brown staining on joints / surfaces, fine grained	HW		D A 4.12 6.7	13		—4.0m to 4.6m: HW/XW, JT @ 0 deg, PL, RO, SN with Fe —JT @ 90 deg, PL, RO, SN with Fe —JT @ 45 deg, PL, RO, CN, open —JT @ 0 deg, PL, RO, CN, open —JT @ 0 deg, PL, RO, CN, open —SZ, PL, VR, CN, open —JT @ 5 deg, PL, RO, CN, open —JT @ 0 deg, PL, RO, CN, open
						Silty SANDSTONE: fine grained, pale grey with small bands <1mm of dark grey	SW					
			11	6		Silty SANDSTONE: fine grained, pale grey with small bands <1mm of dark grey @ 5 to 10mm spacing	SW/FR					—JT @ 0 deg, PL, RO, CN, spaced @ 10mm intervals —JT @ 5 deg, PL, RO, CN, open —JT @ 0 deg, PL, RO, CN, open, spaced @ 10mm intervals —JT @ 0 deg, PL, RO, CN, open —SZ, VR, CN —JT @ 0 deg, PL, RO, CN, open —JT @ 0 deg, PL, RO, CN, open —JT @ 0 deg, PL, RO, CN, open
			10	7					D A 4.41 5.36	33		—JT @ 0 deg, PL, RO, CN, open —JT @ 0 deg, PL, RO, CN, open —SZ @ 0 deg, VR, CN —JT @ 0 deg, ST, RO, CN
			9			Silty SANDSTONE: fine grained, pale grey, massive						
				8								

Filled JT @ 0 deg, black PL, @ 5 to 10mm spacing

CORED BOREHOLE GU02580-AA LOGS.GPJ COFFEY.GDT 4.6.07

Form GEO 5.5 Issue 3 Rev. 3

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.	**CBH18**
Sheet	3 of 3
Project No:	**GEOTUNAN02580-AA**
Client:	**MAUNSELL AECOM**
Date started:	**12.3.2007**
Principal:	**RTA**
Date completed:	**17.3.2007**
Project:	**GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**
Logged by:	**DD**
Borehole Location:	**DOOLEY LANE, TOOLIJOOA (REFER SITE PLAN)**
Checked by:	

drill model & mounting: GEMCO TRAILER | Easting: 296726.41 | slope: -90° | R.L. Surface: 16.48

hole diameter: 100 mm | Drilling fluid: | Northing: 6150829.08 | 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
NQ Wireline			8	8		Silty SANDSTONE: fine grained, pale grey, massive *(continued)*	SW/FR			33		JT @ 5 deg, PL, RO, CN JT @ 0 deg, ST, RO, CN JT @ 0 deg, PL, RO, CN CS, running 90 deg, UN with pink filling runs from 8.57m to 9.0m
				9			FR		D A 2.93 5.58			JT @ 0 deg, PL, RO, CN JT @ 0 deg, PL, RO, CN
			7			9.15m to 9.35m: Layer of gravel conglomerate concrete, gravel, 10 to 20mm						JT @ -5 deg, PL, RO, CN JT @ 45 deg, ST, RO, CN JT @ 5 deg, PL, RO, CN
				10		9.5m to 10.0m: Rock generally grey pattern, pink fragments also present				60		JT @ 0 deg, PL, RO, CN, open JT @ 0 deg, closed, PL, filled with white JT @ 45 deg, PL, RO, CN, open JT @ 0 deg, PL, RO, closed, filled with white
			6									
				11								
			5						D A 4.12 7.02			JT @ 0 deg, PL, RO, CN JT @ 0 deg, PL, RO, CN
				12		SANDSTONE: fine to medium grained, grey/pale blue, laminated @ 0 deg						
			4									
				13						100		
			3									
				14								
			2			14.3m to 14.5m: Gravel conglomerate cemented 2 to 5mm						JT @ 45 deg, closed, filled with white
				15		14.7m to 14.75m: Gravel conglomerate CBH18 terminated at 14.75m						
			1									
				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

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

Borehole No. **CBH18**

Sheet 1 of 2

Project No: **GEOTUNAN02580-AA**

Engineering Log - Piezometer

Client: **MAUNSELL AECOM**

Date started: **12.3.2007**

Principal: **RTA**

Date completed: **17.3.2007**

Project: **GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**

Logged by: **DD**

Borehole Location: **DOOLEY LANE, TOOLIJOOA (REFER SITE PLAN)**

Checked by:

drill model & mounting: GEMCO TRAILER | Easting: 296726.41 | slope: -90° | R.L. Surface: 16.48

hole diameter: | Northing: 6150829.08 | bearing: | datum:

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
ADV		C				16				FILL/TOPSOIL: Silty CLAY: dark brown, medium plasticity, with trace of fine to coarse grained gravel, sub-angular to angular and rootlets	M	L	TOPSOIL/FILL diesel smell in topsoil
				SPT 2,1,3 N*=4			1			FILL: Silty CLAY: pale brown, medium to high plasticity, with trace of fine to coarse grained, sub-angular to angular gravel	<Wp	F	FILL
						15					<Wp		
				SPT 8,21,22 N*=43			2			Silty CLAY: pale brown/grey/red mottled, medium to high plasticity		VSt/H	RESIDUAL
						14							
ADT				SPT 17 N*=R			3			Silty CLAY: medium plasticity, green/grey/pale brown mottled, trace of coarse grained gravel, sub-rounded to rounded of XW to HW sandstone			XW/HW SANDSTONE
						13							
							4						
NQ Wireline										Silty SANDSTONE: grey with red/brown staining on joints / surfaces, fine grained			
						12							
							5			Silty SANDSTONE: fine grained, pale grey with small bands <1mm of dark grey			
						11							
							6			Silty SANDSTONE: fine grained, pale grey with small bands <1mm of dark grey @ 5 to 10mm spacing			
						10							
							7						
						9				Silty SANDSTONE: fine grained, pale grey, massive			
							8						

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
DT	diatube
B	blank bit
V	V bit
T	TC bit
TBX	Tubex

*bit shown by suffix e.g. ADT

support: C casing; N nil

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
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
P	pressure meter
Bs	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer
ALT	air lift test

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

Borehole No. **CBH18**

Engineering Log - Piezometer

Sheet 2 of 2

Project No: **GEOTUNAN02580-AA**

Client: **MAUNSELL AECOM**

Date started: **12.3.2007**

Principal: **RTA**

Date completed: **17.3.2007**

Project: **GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**

Logged by: **DD**

Borehole Location: **DOOLEY LANE, TOOLIJOOA (REFER SITE PLAN)**

Checked by:

drill model & mounting: GEMCO TRAILER | Easting: 296726.41 | slope: -90° | R.L. Surface: 16.48

hole diameter: | Northing: 6150829.08 | bearing: | datum:

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
NQ Wireline						8	9			Silty SANDSTONE: fine grained, pale grey, massive *(continued)*			
						7				9.15m to 9.35m: Layer of gravel conglomerate concrete, gravel, 10 to 20mm			
						6	10			9.5m to 10.0m: Rock generally grey pattern, pink fragments also present			
						5	11						
						4	12			SANDSTONE: fine to medium grained, grey/pale blue, laminated @ 0 deg			
						3	13						
						2	14			14.3m to 14.5m: Gravel conglomerate cemented 2 to 5mm			
										14.7m to 14.75m: Gravel conglomerate			
						1	15			Borehole terminated at 14.75m			
							16						

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
DT	diatube
B	blank bit
V	V bit
T	TC bit
TBX	Tubex

*bit shown by suffix e.g. ADT

support

C casing N nil

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
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
P	pressure meter
Bs	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer
ALT	air lift test

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 - Borehole

Borehole No.	**CBH19**
Sheet	1 of 2
Project No:	**GEOTUNAN02580-AA**
Client:	**MAUNSELL AECOM**
Date started:	**21.3.2007**
Principal:	**RTA**
Date completed:	**21.3.2007**
Project:	**GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**
Logged by:	**SD**
Borehole Location:	**PRINCES HWY, GERRINGONG (REFER SITE PLAN)**
Checked by:	

drill model and mounting: H-POWER SCOUT TRUCK | Easting: 298874.34 | slope: -90° | R.L. Surface: 62.51

hole diameter: 100 mm | Northing 6152750.34 | 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									TOPSOIL: Silty Sand: fine to coarse grained, brown, with trace rootlets	M	L		TOPSOIL
										D	D		ROADBASE
					62				ROADBASE: grey, coarse gravel, subangular to angular, with fine to coarse grained sand	M	St		FILL
				SPT 4,5,7 N*=12		1			Silty CLAY: medium plasticity, brown orange mottled, with some fine to coarse grained sand and trace fine gravel ,subangular to angular				
				SPT 4,6,6 N*=12	61	2			Silty CLAY: medium plasticity, orange pale brown mottled with trace fine to coarse grained gravel, subangular to angular, xw sandstone fragments			×	
				SPT 4,6,8 N*=14	60	3			Silty CLAY: medium plasticity, white pale brown orange mottled, with some trace fine to coarse grained gravel subangular to angular and also cobble 30mm long			×	RESIDUAL
					59	4							
					58	5			CLAY: high plasticity, white pale brown mottled, with trace fine to coarse grained gravel, subangular to angular of xw rock		St/VSt	×	RESIDUAL XW ROCK
				SPT 5,8,12 N*=20	57	6			Silty CLAY: medium plasticity, pale brown/brown, with some trace fine to coarse grained gravel of xw rock, subangualr to angular	D	Fb		RESIDUAL XW ROCK
			▼ 29/03/2007		56	7			Silty CLAY: medium to high plasticity, brown, with trace fine to coarse grained, subangular to angular	<Wp	St	×	RESIDUAL XW ROCK
					55	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, C casing, N nil

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

BOREHOLE GU02580-AA LOGS.GPJ COFFEY.GDT 6.6.07

Form GEO 5.3 Issue 3 Rev.2

coffey geotechnics

Engineering Log - Borehole

Borehole No.	**CBH19**
Sheet	2 of 2
Project No:	**GEOTUNAN02580-AA**
Client:	**MAUNSELL AECOM**
Date started:	**21.3.2007**
Principal:	**RTA**
Date completed:	**21.3.2007**
Project:	**GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**
Logged by:	**SD**
Borehole Location:	**PRINCES HWY, GERRINGONG (REFER SITE PLAN)**
Checked by:	

drill model and mounting: H-POWER SCOUT TRUCK Easting: 298874.34 slope: -90° R.L. Surface: 62.51

hole diameter: 100 mm Northing 6152750.34 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
ADV				SPT 8,8,7 N*=15	54	9			Gravelly CLAY: medium to high plasticity, red / brown, gravel is fine to coarse grained of hw/xw sandstone / siltstone	>=Wp	St	×	Water @ 8m Inflow at 8m SANDSTONE / SILTSTONE (XW/HW)
					53	10							
					52	11							
				SPT 8,13,14 N*=27	51	12			Gravelly CLAY: medium plasticity, green / pale brown with coarse grained gravel of xw rock up to 5mm		St		
					50				12.4m to 12.6m Gravel layer				
						13			Borehole CBH19 terminated at 12.6m				
					49	14							
					48	15							
					47	16							

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

Borehole No. **CBH19**

Sheet 1 of 2

Engineering Log - Piezometer

Project No: **GEOTUNAN02580-AA**

Client: **MAUNSELL AECOM**

Date started: **21.3.2007**

Principal: **RTA**

Date completed: **21.3.2007**

Project: **GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**

Logged by: **SD**

Borehole Location: **PRINCES HWY, GERRINGONG (REFER SITE PLAN)**

Checked by:

drill model & mounting: H-POWER SCOUT TRUCK | Easting: 298874.34 | slope: -90° | R.L. Surface: 62.51

hole diameter: | Northing: 6152750.34 | bearing: | datum:

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
ADV						62	1			TOPSOIL: Silty Sand: fine to coarse grained, brown, with trace rootlets	M	L	TOPSOIL
										ROADBASE: grey, coarse gravel, subangular to angular, with fine to coarse grained sand	D	D	ROADBASE
				SPT 4,5,7 N*=12						Silty CLAY: medium plasticity, brown orange mottled, with some fine to coarse grained sand and trace fine gravel ,subangular to angular	M	St	FILL
				SPT 4,6,6 N*=12		61	2			Silty CLAY: medium plasticity, orange pale brown mottled with trace fine to coarse grained gravel, subangular to angular, xw sandstone fragments			
				SPT 4,6,8 N*=14		60	3			Silty CLAY: medium plasticity, white pale brown orange mottled, with some trace fine to coarse grained gravel subangular to angular and also cobble 30mm long			RESIDUAL
						59	4						
				SPT 5,8,12 N*=20		58	5			CLAY: high plasticity, white pale brown mottled, with trace fine to coarse grained gravel, subangular to angular of xw rock		St/VSt	RESIDUAL XW ROCK
						57	6			Silty CLAY: medium plasticity, pale brown/brown, with some trace fine to coarse grained gravel of xw rock, subangualr to angular	D	Fb	RESIDUAL XW ROCK
			29/03/2007			56	7			Silty CLAY: medium to high plasticity, brown, with trace fine to coarse grained, subangular to angular	<Wp	St	RESIDUAL XW ROCK
						55	8						

PIEZOMETER GU02580-AA LOGS.GPJ COFFEY.GDT 6.6.07

Form GEO 5.10 Issue 3 Rev.0

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
DT	diatube
B	blank bit
V	V bit
T	TC bit
TBX	Tubex

*bit shown by suffix e.g. ADT

support

C casing N nil

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
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
P	pressure meter
Bs	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer
ALT	air lift test

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

Borehole No. **CBH19**

Sheet 2 of 2

Engineering Log - Piezometer

Project No: **GEOTUNAN02580-AA**

Client: **MAUNSELL AECOM**

Date started: **21.3.2007**

Principal: **RTA**

Date completed: **21.3.2007**

Project: **GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**

Logged by: **SD**

Borehole Location: **PRINCES HWY, GERRINGONG (REFER SITE PLAN)**

Checked by:

drill model & mounting: H-POWER SCOUT TRUCK | Easting: 298874.34 | slope: -90° | R.L. Surface: 62.51

hole diameter: | Northing: 6152750.34 | bearing: | datum:

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
ADV				SPT 8,8,7 N*=15		54	9			Gravelly CLAY: medium to high plasticity, red / brown, gravel is fine to coarse grained of hw/xw sandstone / siltstone	>=Wp	St	Water @ 8m Inflow at 8m SANDSTONE / SILTSTONE (XW/HW)
						53	10						
				SPT 8,13,14 N*=27		52	11						
						51	12			Gravelly CLAY: medium plasticity, green / pale brown with coarse grained gravel of xw rock up to 5mm		St	
						50				12.4m to 12.6m Gravel layer Borehole terminated at 12.6m			
						49	13						
						48	14						
						47	15						
							16						

PIEZOMETER GU02580-AA LOGS.GPJ COFFEY.GDT 4.6.07

Form GEO 5.10 Issue 3 Rev.0

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
DT	diatube
B	blank bit
V	V bit
T	TC bit
TBX	Tubex

*bit shown by suffix e.g. ADT

support

C casing N nil

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
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
P	pressure meter
Bs	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer
ALT	air lift test

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 - Borehole

Borehole No.	**CBH20**
Sheet	1 of 3
Project No:	**GEOTUNAN02580-AA**
Client: **MAUNSELL AECOM**	Date started: **28.3.2007**
Principal: **RTA**	Date completed: **28.3.2007**
Project: **GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**	Logged by: **CA**
Borehole Location: **ROSE VALLEY RD, GERRINGONG (REFER SITE PLAN)**	Checked by:

drill model and mounting: GEMCO TRAILER | Easting: 301239.56 | slope: -90° | R.L. Surface: 11.27

hole diameter: 100 mm | Northing 6155714.67 | 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
ADT		C			11				Silty SAND: fine grained, dark brown	D	L		FILL from 0 to 1.15m
									Sandy CLAY: low plasticity, brown with trace highly weathered Tuff pieces		F		
NMLC						1			BOULDERS: fine grained, grey				INITIATE CORING: V bit and TC bit refusal @0.69 m on very high strength boulder. Continue with NMLC @ 0.69m
					10				CLAY: low plasticity, dark brown				ALLUVIUM trace roots
						2			Gravelly CLAY: low to medium plasticity, pale grey and orange, angular gravel.				
					9								
						3							
					8								
ADV									CLAY: low plasticity, brown with trace angular gravel		VSt		CONCLUDE CORING AND CONTINUE WITH ADV from 3.6m to 7.25m
						4							
					7								
				SPT 9,18,R N*=R					CLAY: low plasticity, brown and pale grey with trace gravel and extremely weathered material		H		SPT bouncing @ 4.87m (9, 18, 9/70)
					6	5							
ADT					5	6							V bit refusal
						7							
					4				Borehole CBH20 continued as cored hole				
						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, C casing, N nil

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. **CBH20**
Sheet 2 of 3
Project No: **GEOTUNAN02580-AA**

Client: ***MAUNSELL AECOM***
Date started: ***28.3.2007***
Principal: ***RTA***
Date completed: ***28.3.2007***
Project: ***GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE***
Logged by: ***CA***
Borehole Location: ***ROSE VALLEY RD, GERRINGONG (REFER SITE PLAN)***
Checked by:

drill model & mounting: GEMCO TRAILER | Easting: 301239.56 | slope: -90° | R.L. Surface: 11.27
hole diameter: 100 mm | Drilling fluid: | Northing: 6155714.67 | 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)
NQ			4	8		TUFF: fine grained, black with orange laminations/ irregularly orientated bands and blue grey interbedded pockets.	MW/SW			27		—PT, IR, SO, CN —JT @ 30 deg UN, SO, CN —JT @ 60 deg PL, RO, CN

RL ticks: 11, 10, 9, 8, 7, 6, 5, 4 — depth ticks: 1, 2, 3, 4, 5, 6, 7, 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

Form GEO 5.5 Issue 3 Rev. 3
CORED BOREHOLE GU02580-AA LOGS.GPJ COFFEY.GDT 4.6.07

coffey geotechnics

Engineering Log - Cored Borehole

Borehole No.	**CBH20**
Sheet	3 of 3
Project No:	**GEOTUNAN02580-AA**
Client:	**MAUNSELL AECOM**
Date started:	**28.3.2007**
Principal:	**RTA**
Date completed:	**28.3.2007**
Project:	**GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**
Logged by:	**CA**
Borehole Location:	**ROSE VALLEY RD, GERRINGONG (REFER SITE PLAN)**
Checked by:	

drill model & mounting: GEMCO TRAILER | Easting: 301239.56 | slope: -90° | R.L. Surface: 11.27

hole diameter: 100 mm | Drilling fluid: | Northing: 6155714.67 | 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
NQ			3	9		TUFF: fine grained, black with orange laminations/ irregularly orientated bands and blue grey interbedded pockets. *(continued)*	MW/SW			27		JT @ 45 deg 50mm long UN, RO	
			2			SILTSTONE: grey, laminated @ 0 deg with some iron staining				38		JT @ 60 deg CU, SO	
						Silty SANDSTONE: medium grained, pale red and brown	SW/FR					CS 180mm long	
				10						78		PT, IR, SO, SN	
			1				FR					PT, IR, SO, SN	
												PT, IR, RO	
				11								JT @ 50 deg ST, RO	
			0							100		PT, CU, SO	
												CS 260mm long	
				12		SILTSTONE: pale grey, distinctly laminated @ 0 deg						PT, PL, SO	
			-1									PT, PL, RO	
				13						100		PT, PL, RO	
			-2									PT, PL, RO	
				14								PT, PL, RO	
			-3							100			
				15		CBH20 terminated at 14.52m							
			-4										
				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

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

CORED BOREHOLE GU02580-AA LOGS.GPJ COFFEY.GDT 4.6.07

Form GEO 5.5 Issue 3 Rev. 3

coffey geotechnics

Borehole No. **CBH20**

Engineering Log - Piezometer

Sheet 1 of 2

Project No: **GEOTUNAN02580-AA**

Client: **MAUNSELL AECOM**

Date started: **28.3.2007**

Principal: **RTA**

Date completed: **28.3.2007**

Project: **GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**

Logged by: **CA**

Borehole Location: **ROSE VALLEY RD, GERRINGONG (REFER SITE PLAN)**

Checked by:

drill model & mounting: GEMCO TRAILER | Easting: 301239.56 | slope: -90° | R.L. Surface: 11.27

hole diameter: | Northing: 6155714.67 | bearing: | datum:

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
ADT		C				11				Silty SAND: fine grained, dark brown	D	L	FILL from 0 to 1.15m
										Sandy CLAY: low plasticity, brown with trace highly weathered Tuff pieces		F	
NMLC							1			BOULDERS: fine grained, grey			INITIATE CORING: V bit and TC bit refusal @0.69 m on very high strength boulder. Continue with NMLC @ 0.69m
						10				CLAY: low plasticity, dark brown			ALLUVIUM trace roots
							2			Gravelly CLAY: low to medium plasticity, pale grey and orange, angular gravel.			
						9	3						
						8							
ADV							4			CLAY: low plasticity, brown with trace angular gravel		VSt	CONCLUDE CORING AND CONTINUE WITH ADV from 3.6m to 7.25m
				SPT 9,18,R N*=R		7				CLAY: low plasticity, brown and pale grey with trace gravel and extremely weathered material		H	SPT bouncing @ 4.87m (9, 18, 9/70)
						6	5						
ADT							6						V bit refusal
						5							
							7						
NQ						4				TUFF: fine grained, black with orange laminations/ irregularly orientated bands and blue grey interbedded pockets.			TC Bit Refusal
							8						

PIEZOMETER GU02580-AA LOGS.GPJ COFFEY.GDT 4.6.07

Form GEO 5.10 Issue 3 Rev.0

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
DT	diatube
B	blank bit
V	V bit
T	TC bit
TBX	Tubex

*bit shown by suffix e.g. ADT

support

C casing N nil

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
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
P	pressure meter
Bs	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer
ALT	air lift test

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

Borehole No. **CBH20**

Sheet 2 of 2

Engineering Log - Piezometer

Project No: **GEOTUNAN02580-AA**

Client: **MAUNSELL AECOM**

Date started: **28.3.2007**

Principal: **RTA**

Date completed: **28.3.2007**

Project: **GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE**

Logged by: **CA**

Borehole Location: **ROSE VALLEY RD, GERRINGONG (REFER SITE PLAN)**

Checked by:

drill model & mounting: GEMCO TRAILER | Easting: 301239.56 | slope: -90° | R.L. Surface: 11.27

hole diameter: | Northing: 6155714.67 | bearing: | datum:

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
NQ						3	9			TUFF: fine grained, black with orange laminations/ irregularly orientated bands and blue grey interbedded pockets. *(continued)*			
						2				SILTSTONE: grey, laminated @ 0 deg with some iron staining			
							10			Silty SANDSTONE: medium grained, pale red and brown			
						1	11						
						0							
							12			SILTSTONE: pale grey, distinctly laminated @ 0 deg			
						-1	13						
						-2							
							14						
						-3							
							15			Borehole terminated at 14.52m			
						-4							
							16						

PIEZOMETER GU02580-AA LOGS.GPJ COFFEY.GDT 4.6.07

Form GEO 5.10 Issue 3 Rev.0

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
DT	diatube
B	blank bit
V	V bit
T	TC bit
TBX	Tubex

*bit shown by suffix e.g. ADT

support

C casing N nil

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
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
P	pressure meter
Bs	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer
ALT	air lift test

classification symbols and soil description

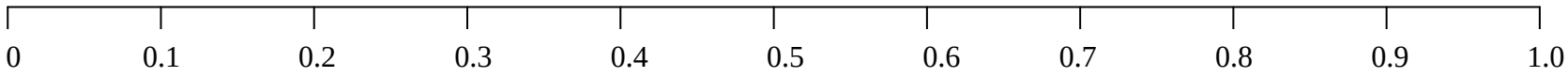
based on unified classification system

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



Scale (m)

drawn	**CA**
approved	**SM**
date	**14 MAR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client:	**MAUNSELL / AECOM**
project:	**GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**
title:	**CORE PHOTO CBH1 4.03m - 10.05m**
project no: **GU2580AA**	figure no: N/A

drawn	**CA**
approved	**SM**
date	**5 APR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client: **MAUNSELL / AECOM**

project: **GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**

title: **CORE PHOTO CBH2 10.00m - 16.20m**

project no: **GU2580AA**

figure no: N/A

drawn	**CA**
approved	**SM**
date	**16 MAR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client: **MAUNSELL / AECOM**

project: **GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**

title: **CORE PHOTO CBH 3 6.00m – 15.00m**

project no: **GU2580AA**

figure no: N/A

drawn	**CA**
approved	**SM**
date	**30 MAR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client:	**MAUNSELL / AECOM**
project:	**GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**
title:	**CORE PHOTO CBH 20 0.69m – 14.52m**
project no: **GU2580AA**	figure no: N/A

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

Scale (m)

drawn	**CA**
approved	**SM**
date	**10 APR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client: **MAUNSELL / AECOM**

project: **GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**

title: **CORE PHOTO CBH 18 4.0m – 14.75m**

project no: **GU2580AA**

figure no: N/A

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

Scale (m)

drawn	**CA**
approved	**SM**
date	**10 APR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client:	**MAUNSELL / AECOM**
project:	**GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**
title:	**CORE PHOTO CBH 18 4.0m – 14.75m**
project no: **GU2580AA**	figure no: N/A

drawn	**CA**
approved	**SM**
date	**5 APR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client:	**MAUNSELL / AECOM**
project:	**GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**
title:	**CORE PHOTO CBH17 6.65m – 14.71m**
project no: **GU2580AA**	figure no: N/A

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

Scale (m)

drawn	**CA**
approved	**SM**
date	**10 APR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client: **MAUNSELL / AECOM**

project: **GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**

title: **CORE PHOTO CBH 16 5.10m – 15.00m**

project no: **GU2580AA**

figure no: N/A

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

Scale (m)

drawn	**CA**
approved	**SM**
date	**26 MAR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client: **MAUNSELL / AECOM**

project: **GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**

title: **CORE PHOTO CBH 15 1.6m – 14.85m**

project no: **GU2580AA**

figure no: N/A

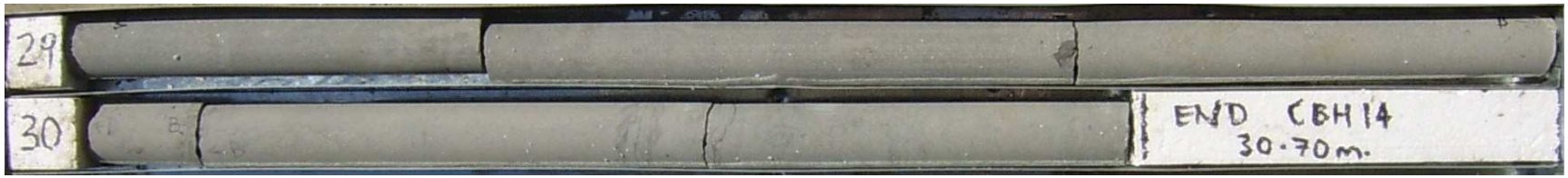
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

Scale (m)

drawn	**CA**
approved	**SM**
date	**26 MAR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client:	**MAUNSELL / AECOM**
project:	**GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**
title:	**CORE PHOTO CBH 15 1.6m – 14.85m**
project no: **GU2580AA**	figure no: N/A



0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

Scale (m)

drawn	**CA**
approved	**SM**
date	**10 APR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client: **MAUNSELL / AECOM**

project: **GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**

title: **CORE PHOTO CBH 14 9.10m – 30.70m**

project no: **GU2580AA**

figure no: N/A

drawn	**CA**
approved	**SM**
date	**10 APR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client: **MAUNSELL / AECOM**

project: **GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**

title: **CORE PHOTO CBH 14 9.10m – 30.70m**

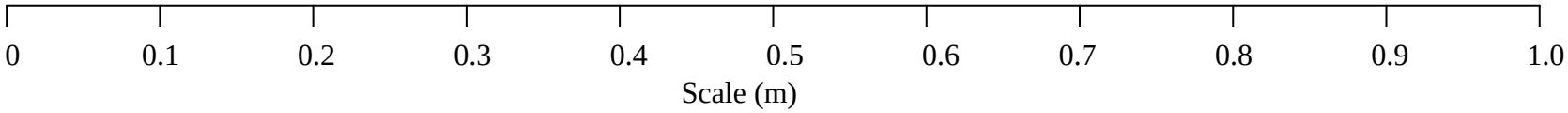
project no: **GU2580AA**

figure no: N/A

drawn	**CA**
approved	**SM**
date	**10 APR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client:	**MAUNSELL / AECOM**
project:	**GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**
title:	**CORE PHOTO CBH 14 9.10m – 30.70m**
project no: **GU2580AA**	figure no: N/A



drawn	**CA**
approved	**SM**
date	**10 APR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client:	**MAUNSELL / AECOM**
project:	**GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**
title:	**CORE PHOTO CBH 13 5.48m – 9.00m**
project no: **GU2580AA**	figure no: N/A

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

Scale (m)

drawn	**CA**
approved	**SM**
date	**30 MAR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client: **MAUNSELL / AECOM**

project: **GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**

title: **CORE PHOTO CBH 12 6.00m – 15.74m**

project no: **GU2580AA**

figure no: N/A

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

Scale (m)

drawn	**CA**
approved	**SM**
date	**26 MAR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

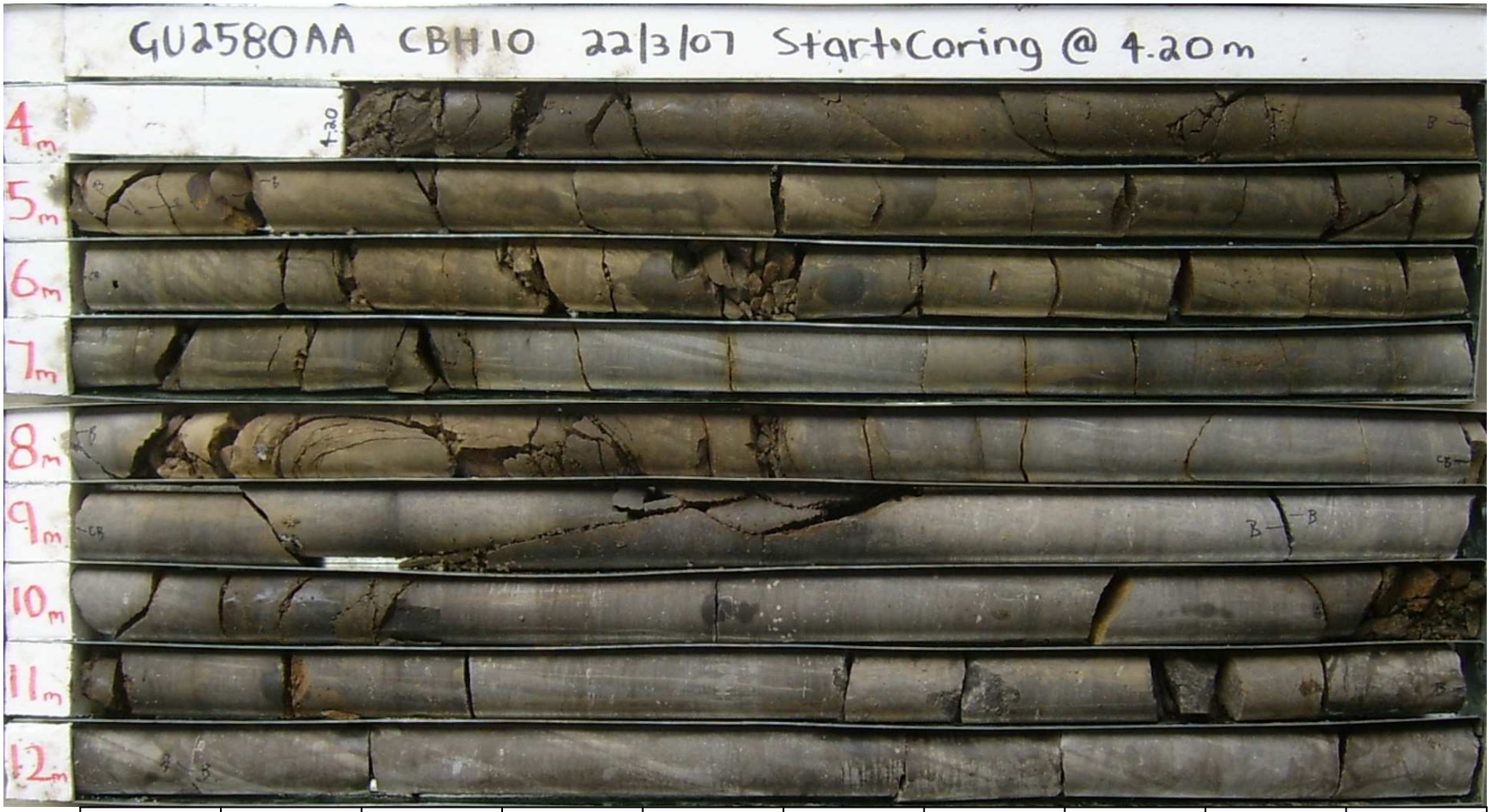
client: **MAUNSELL / AECOM**

project: **GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**

title: **CORE PHOTO CBH10 4.20 – 17.20m**

project no: **GU2580AA**

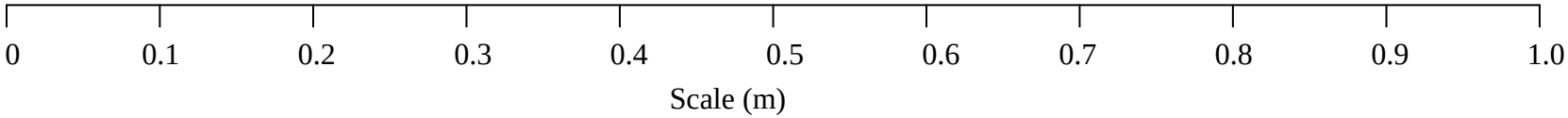
figure no: N/A



drawn	**CA**
approved	**SM**
date	**26 MAR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

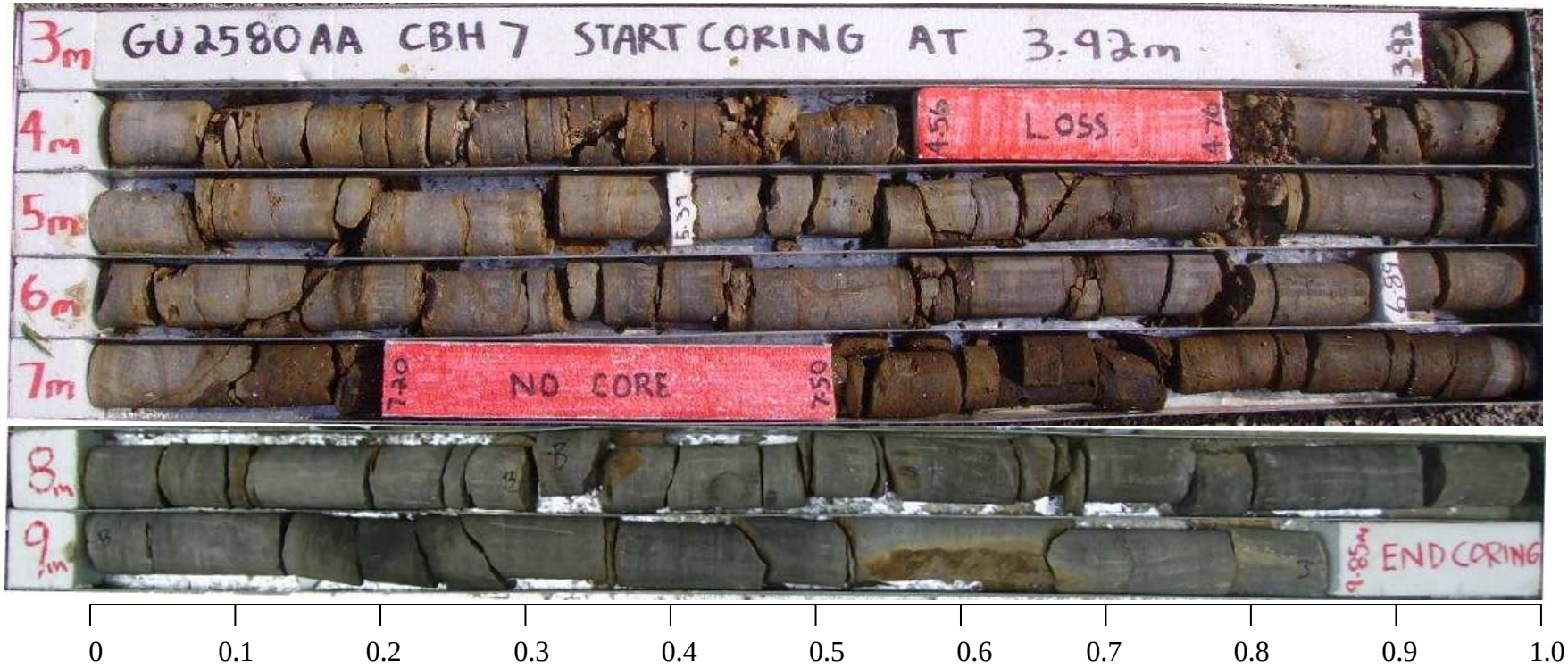
client:	**MAUNSELL / AECOM**
project:	**GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**
title:	**CORE PHOTO CBH10 4.20 – 17.20m**
project no: **GU2580AA**	figure no: N/A



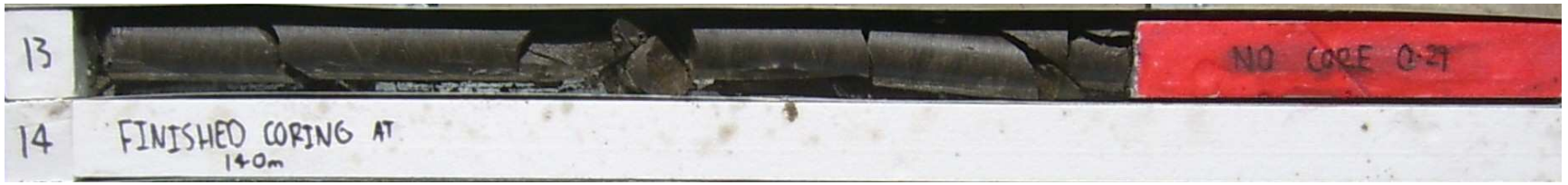
drawn	**CA**
approved	**SM**
date	**14 MAR 07**
scale	**NTS**
original size	**A4**

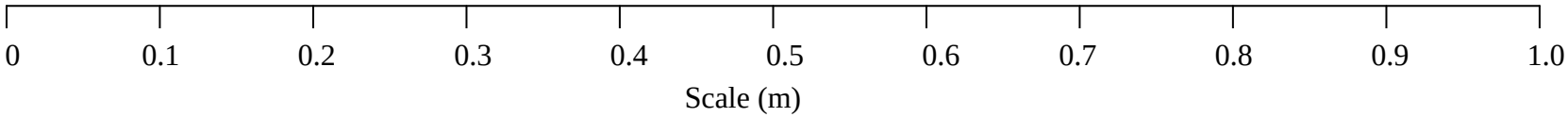
coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client:	**MAUNSELL / AECOM**
project:	**GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**
title:	**CORE PHOTO CBH9 6.22m – 9.93m**
project no: **GU2580AA**	figure no: N/A



drawn	**CA**	coffey geotechnics SPECIALISTS MANAGING THE EARTH	client:	**MAUNSELL / AECOM**
approved	**SM**		project:	**GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**
date	**14 MAR 07**		title:	**CORE PHOTO CBH7 3.92m – 9.85m**
scale	**NTS**		project no: **GU2580AA**	figure no: N/A
original size	**A4**			





drawn	**CA**
approved	**SM**
date	**5 APR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client:	**MAUNSELL / AECOM**
project:	**GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**
title:	**CORE PHOTO CBH6 4.00m – 14.00m**
project no: **GU2580AA**	figure no: N/A

drawn	**CA**
approved	**SM**
date	**5 APR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client:	**MAUNSELL / AECOM**
project:	**GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**
title:	**CORE PHOTO CBH6 4.00m – 14.00m**
project no: **GU2580AA**	figure no: N/A

drawn	**CA**
approved	**SM**
date	**26 MAR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client:	**MAUNSELL / AECOM**
project:	**GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**
title:	**CORE PHOTO CBH 5 8.10m – 12.00m**
project no: **GU2580AA**	figure no: N/A

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

Scale (m)

drawn	**CA**
approved	**SM**
date	**14 MAR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client: **MAUNSELL / AECOM**

project: **GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**

title: **CORE PHOTO CBH4 7.86m - 15.14m**

project no: **GU2580AA** figure no: N/A

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

Scale (m)

drawn	**CA**
approved	**SM**
date	**30 MAR 07**
scale	**NTS**
original size	**A4**

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

client: **MAUNSELL / AECOM**

project: **GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION**

title: **CORE PHOTO CBH 20 0.69m – 14.52m**

project no: **GU2580AA** figure no: N/A