

Appendix D2

Geotechnical investigations:

RMS Factual Geotechnical Investigation Report

APPENDIX A
BOREHOLE LOGS AND CORE PHOTOS

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : B10

FILE / JOB NO : G4372

SHEET : 1 OF 3

PROJECT : BERRY BYPASS
LOCATION : SOUTHERN ALIGNMENT

POSITION : E: 288397.640, N: 6148144.710 (56 MGA94)

SURFACE ELEVATION : 1.590 (AHD)

ANGLE FROM HORIZONTAL : 90°

RIG TYPE : COMACCHIO 205 MOUNTING : Track

CONTRACTOR : TERRATEST

DRILLER : A ZUMMO

DATE STARTED : 17/4/12

DATE COMPLETED : 17/4/12

DATE LOGGED : 18/4/12

LOGGED BY : RH

CHECKED BY : DH

DRILLING				MATERIAL			
PROGRESS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY	STRUCTURE & Other Observations
DRILLING & CASING: ADT, HW Casing WATER: N/A DRILLING PENETRATION: VE-E, E-F, E, F-H, H-VH, F, VH GROUND WATER LEVELS: - SAMPLES & FIELD TESTS: 1.00m SPT 2, 4, 5 N*=9; 1.45m; 2.50m SPT 4, 7, 7 N*=14; 2.95m; 3.95m SPT 5, 9, 8 N*=17; 4.40m; 5.70m SPT 5, 14, 19 N*=33; 6.15m; 6.95m SPT 13, 15, 9/50mm N*=R 7.30m	0.0	[Symbol]	OL	CLAYEY ORGANIC SILT: black, low to medium plasticity	M to W		TOPSOIL
	0.50m	[Symbol]	CI	SANDY SILTY CLAY: brown grey, medium plasticity, fine grained sand			ALLUVIUM
	0.95m	[Symbol]		CLAY: grey with yellow brown and red brown, high plasticity			1.00: SPT Recovery: 0.25 m 1.10: Acid sulphate test sample 1.30: HP Samp = 200 - 250 kPa
	1.00m	[Symbol]	CH			Vst	
	1.45m	[Symbol]					
	2.00m	[Symbol]					
	2.50m	[Symbol]		with Fe cemented zones			2.50: SPT Recovery: 0.45 m
	2.80m	[Symbol]	CI-CH	CLAY: grey, yellow brown and dark red brown, medium and high plasticity, with Fe cemented zones throughout			2.75: HP Samp = 200 - 225 kPa 2.85: Acid sulphate test sample
	2.95m	[Symbol]					
	3.50m	[Symbol]		CLAYEY GRAVEL AND GRAVELLY CLAY: gravel is pale and dark green, fine to coarse gravel, rounded to angular, extremely weathered tuffaceous, with fine to coarse grained sand, and silt; clay is medium to high plasticity, tuffaceous		M	
	3.95m	[Symbol]	GC / CI-CH			MD and Vst	3.95: SPT Recovery: 0.35 m 4.10: Acid sulphate test sample
	4.40m	[Symbol]		trace of basalt gravel			
	4.70m	[Symbol]		CLAYEY GRAVEL AND COBBLES: pale and dark green with red brown and grey, fine to coarse gravel, rounded to angular, tuff and basalt, medium and high plasticity, tuffaceous clay, with fine to coarse grained sand		D and VD	
5.00m	[Symbol]	GC					
5.60m	[Symbol]		GRAVELLY CLAYEY SAND AND CLAYEY SAND: pale green and pale green grey with red brown, fine to coarse grained sand, medium and high plasticity, tuffaceous clay, fine to coarse angular to sub-rounded tuff and basalt gravel, with pockets of sandy clay			5.70: SPT Recovery: 0.4 m	
5.70m	[Symbol]	SC			D		
6.15m	[Symbol]						
6.75m	[Symbol]	GC	SANDY CLAYEY GRAVEL: pale green, pale grey and red brown, fine to coarse gravel, sub-rounded to sub-angular, tuff and basalt, medium and high plasticity, fine to coarse grained sand, with tuffaceous clay			6.95: SPT Recovery: 0.2 m	
6.95m	[Symbol]						
7.30m	[Symbol]		BOULDERS LATITE: brown				
7.40m	[Symbol]		Continued as Cored Drill Hole				
8.00m	[Symbol]						

RMS:LIB 32.GLB Log RTA NON-CORE DRILL HOLE G4372 BERRY BYPASS.GPJ <-DrawingFiles> 10/May/2012 14:43:30.002 Datgel.CPT Tool.gINT Add-In

See Explanatory Notes for details of abbreviations & basis of descriptions.

CORED DRILL HOLE LOG

HOLE NO : B10

FILE / JOB NO : G4372

SHEET : 2 OF 3


PROJECT : BERRY BYPASS
LOCATION : SOUTHERN ALIGNMENT

POSITION : E: 288397.640, N: 6148144.710 (56 MGA94) SURFACE ELEVATION : 1.590 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : COMACCHIO 205 MOUNTING : Track CONTRACTOR : TERRATEST DRILLER : A ZUMMO

DATE STARTED : 17/4/12 DATE COMPLETED : 17/4/12 DATE LOGGED : 18/4/12 LOGGED BY : RH CHECKED BY : DH

CASING DIAMETER : HW BARREL (Length) : 3.00 m BIT : IMPREG. BIT CONDITION : GOOD

DRILLING				MATERIAL				FRACTURES							
PROGRESS		CORE LOSS (CORE LOSS DRILL RUN %)	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH (s(50))				NATURAL FRACTURE (mm)	VISUAL	ADDITIONAL DATA (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other	
DRILLING & CASING	WATER							EL _{-0.03}	VL _{-0.1}	L _{-0.1}	M ₋₁				H ₋₃
				0.0											
				1.0											
				2.0											
				3.0											
				4.0											
				5.0											
				6.0											
				7.0											
				7.40		7.40m START CORING AT 7.40m									
				8.00		CLAYEY GRAVEL, COBBLES AND BOULDERS: brown, red grey brown, red brown and pale green, moderately and highly weathered latite, low and medium plasticity, with fine to coarse grained sand; (ALLUVIUM)									

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See Explanatory Notes for details of abbreviations & basis of descriptions.

CORED DRILL HOLE LOG

HOLE NO : B10

FILE / JOB NO : G4372

SHEET : 3 OF 3

PROJECT : BERRY BYPASS
LOCATION : SOUTHERN ALIGNMENT

POSITION : E: 288397.640, N: 6148144.710 (56 MGA94) SURFACE ELEVATION : 1.590 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : COMACCHIO 205 MOUNTING : Track CONTRACTOR : TERRATEST DRILLER : A ZUMMO

DATE STARTED : 17/4/12 DATE COMPLETED : 17/4/12 DATE LOGGED : 18/4/12 LOGGED BY : RH CHECKED BY : DH

CASING DIAMETER : HW BARREL (Length) : 3.00 m BIT : IMPREG. BIT CONDITION : GOOD

DRILLING		MATERIAL				FRACTURES	
PROGRESS	DEPTH (m)	GRAPHIC LOG	DESCRIPTION	Weathering	ESTIMATED STRENGTH Is(50)	NATURAL FRACTURE (mm)	ADDITIONAL DATA
DRILLING & CASING	DEPTH		ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)		● Axial ○ Diametral		(joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
0% LOSS 8.20 0% LOSS 8.50 49% LOSS 9.30 93% LOSS 10.80 0% LOSS 11.60 0% LOSS 13.07	8.0 8.91m 9.0 9.30m 10.0 10.70m 10.76m 11.0 11.60 12.0 13.07m 13.0		CLAYEY SANDY GRAVEL AND COBBLES: brown, red grey brown, red brown and pale green grey, fine to coarse gravel, moderately and highly weathered latite, low and medium plasticity, fine to coarse grained sand, trace quartz gravel, medium to very high strength cobbles; (ALLUVIUM) CORE LOSS 0.39m (8.91-9.30) CORE LOSS 1.40m (9.30-10.70) COBBLES: red brown, latite SANDY SILTSTONE: dark grey, layered, 0° - 15° current bedding, fine grained sand, with silty sandstone and siltstone lenses, trace of shell fossils Slight increase in sand BOREHOLEB10 TERMINATED AT 13.07 m	F	EL _{-0.03} VL _{-0.1} L _{-0.3} M ₋₁ H ₋₃ VH ₋₁₀ EH	20 40 100 300 1000	Visual fracture descriptions: HB, HBDB, DL, DB, DBBP CN traces of pyrites, etc.

RMS:LIB 32.GLB Log RTA CORED DRILL HOLE G4372 BERRY BYPASS.GPJ <DrawingFiles> 10/May/2012 14:43 8.30.002 Datgel CPT Tool.GINT Add-In

See Explanatory Notes for details of abbreviations & basis of descriptions.



Geotechnical Investigation
Bore Hole: B10

Photo 1 of 2

G4372
HW 1 - Princes Highway
Berry Bypass



Transport
Roads & Maritime
Services



Geotechnical Investigation
Bore Hole: B10

Photo 2 of 2

G4372
HW 1 - Princes Highway
Berry Bypass



Transport
Roads & Maritime
Services

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : B11

FILE / JOB NO : G4372

SHEET : 1 OF 3

PROJECT : BERRY BYPASS
LOCATION :

POSITION : E: 287880.650, N: 6147969.080 (56 MGA94)

SURFACE ELEVATION : 3.120 (AHD)

ANGLE FROM HORIZONTAL : 90°

RIG TYPE : DB515

MOUNTING : Track

CONTRACTOR : RMS

DRILLER : R MORTON

DATE STARTED : 2/4/12

DATE COMPLETED : 4/4/12

DATE LOGGED : 4/4/12

LOGGED BY : MH

CHECKED BY : DH

DRILLING				MATERIAL			
PROGRESS	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	RELATIVE DENSITY	STRUCTURE & Other Observations
DRILLING & CASING		CLASSIFICATION SYMBOL	Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components				
ADT HW Casing	0.0	CH-OH	CLAY: dark brown to black, high plasticity, trace silt		F to St		ALLUVIUM
	0.50m						0.50: SPT Recovery: 0.4 m
	0.95m	CH	CLAY: brown and grey brown mottled orange red, high plasticity		St		0.80: HP Samp = 160 - 220 kPa
	1.50m						1.50: SPT Recovery: 0.45 m
	1.95m	CI-CH	CLAY WITH SILT: grey and grey brown mottled orange, medium to high plasticity				1.70: HP Samp = 220 - 250 kPa
	2.50m	CH	CLAY: grey and dark grey mottled orange red, high plasticity, trace silt, trace fine grained sand	M			2.50: SPT Recovery: 0.45 m
	2.95m	CH	with more silt and fine grained sand		VSt		2.70: HP Samp = 220 - 320 kPa
	3.50m						
	4.15m	CI-CH	CLAY WITH SAND AND GRAVEL: brown and pale grey mottled red brown, medium to high plasticity, with fine grained sand, with fine gravel				4.15: SPT Recovery: 0.15 m
	4.60m						
	5.25m						
	5.65m	GW	GRAVEL WITH SAND: brown and red brown, fine to coarse gravel, sub-angular to angular, with fine to coarse grained sand, trace silt		D		5.65: SPT Recovery: 0.2 m
	6.10m						
	6.70m				W		
	7.15m		SANDY CLAY WITH SILT: grey, dark grey and grey brown, low plasticity, fine grained sand, with silt, evidence of weathered charcoal pieces to 3mm		S		7.15: SPT Recovery: 0.45 m
	7.60m						
	8.0						

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See Explanatory Notes for details of abbreviations & basis of descriptions.

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : B11

FILE / JOB NO : G4372

SHEET : 2 OF 3

PROJECT : BERRY BYPASS
LOCATION :

POSITION : E: 287880.650, N: 6147969.080 (56 MGA94)

SURFACE ELEVATION : 3.120 (AHD)

ANGLE FROM HORIZONTAL : 90°

RIG TYPE : DB515

MOUNTING : Track

CONTRACTOR : RMS

DRILLER : R MORTON

DATE STARTED : 2/4/12

DATE COMPLETED : 4/4/12

DATE LOGGED : 4/4/12

LOGGED BY : MH

CHECKED BY : DH

DRILLING					MATERIAL							
PROGRESS		DRILLING PENETRATION	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY	RELATIVE DENSITY	STRUCTURE & Other Observations
DRILLING & CASING	WATER											
WB NW Casing 0% Water LOSS		E		8.65m SPT 6, 4, 6 N*=10	8.0	(Symbol: Sand with silt)	8.25m	SANDY GRAVEL WITH SILT: brown and dark brown, fine to medium gravel, sub-angular to angular, fine to coarse grained sand, with silt, trace clay	W	S		8.65: SPT Recovery: 0.3 m
		F		9.10m	9.0	(Symbol: Sand with silt)		possible 250mm coarse gravel and cobble layer		MD		
				10.15m SPT 30/70mm N*=R 10.22m	10.0	(Symbol: Sandstone)	10.15m 10.22m	SANDY SILTSTONE / SILTY SANDSTONE: grey and dark grey; moderately weathered, low strength Continued as Cored Drill Hole				BEDROCK 10.15: SPT Recovery: 0.06 m BEDROCK
					11.0							
					12.0							
					13.0							
					14.0							
					15.0							
					16.0							

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See Explanatory Notes for details of abbreviations & basis of descriptions.

CORED DRILL HOLE LOG

HOLE NO : B11

FILE / JOB NO : G4372

SHEET : 3 OF 3

PROJECT : BERRY BYPASS
LOCATION :

POSITION : E: 287880.650, N: 6147969.080 (56 MGA94) SURFACE ELEVATION : 3.120 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : DB515 MOUNTING : Track CONTRACTOR : RMS DRILLER : R MORTON

DATE STARTED : 2/4/12 DATE COMPLETED : 4/4/12 DATE LOGGED : 4/4/12 LOGGED BY : MH CHECKED BY : DH

CASING DIAMETER : HW/NW BARREL (Length) : 1.50 m BIT : BLADE BIT/ROCK ROLLER/STEPFACE BIT CONDITION : GOOD

DRILLING			MATERIAL				FRACTURES				
DRILLING & CASING	WATER	CORE LOSS (CORE LOSS DRILL RUN %)	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) ● Axial ○ Diametral	NATURAL FRACTURE (mm)	VISUAL	ADDITIONAL DATA (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
10.22m START CORING AT 10.22m											
NM/Casing		0% LOSS	Is(50) d=1.86 a=2.07 MPa	8.0		SILTY SANDSTONE: dark grey and grey, fine grained, moderate to well cemented, poorly sorted, carbonaceous veneers and laminations throughout, trace pyrites on bedding laminations	MW to SW HW EW HW MW to SW MW SW to F				BP 5° Fe IR RF DB DB DB DB DB DB FZ DB BP 5° CN IR RF BPDB 25° CN IR RF DL DB JT 50° CN IR RF DB DB JT 40° CN IR RF DB BPDB 10° CN IR RF DB DB DB DL DB JTDB 40° CN IR RF JTDB 30° CN IR RF DB DB DB DL BPDB 0° CN IR RF FZ 40 mm fragmented
NM/Casing		0% LOSS	Is(50) d=2.08 a=2.56 MPa	11.0							
NM/Casing		0% LOSS	11.53	11.53							
NM/Casing		0% LOSS	Is(50) d=1.35 a=2.19 MPa	12.0							
NM/Casing		0% LOSS	13.07	13.07							
NM/Casing		0% LOSS	Is(50) d=1.5 a=2.46 MPa	13.0							
NM/Casing		0% LOSS	14.59	14.59							
NM/Casing		0% LOSS	Is(50) d=1.4 a=1.8 MPa	14.0							
NM/Casing		0% LOSS	16.00	16.00							

RMS:LIB 32.GLB Log RTA CORED DRILL HOLE G4372 BERRY BYPASS.GPJ <DrawingFiles> 10/May/2012 14:44 8.30.002 Datgel CPT Tool.GINT Add-In

See Explanatory Notes for details of abbreviations & basis of descriptions.

BOREHOLEB11 TERMINATED AT 16.00 m

ROADS AND MARITIME SERVICES, NSW





ROADS & MARITIME SERVICES
G 4372
BERRY BYPASS
BH- B- 11
10-22 TO 15-00 M
03-04-12

G4372 BERRY BYPASS CORE START
BH-B-11 BH: B-11 10-25M

10

11

12

13

14

Geotechnical Investigation
Bore Hole: B11

Photo 1 of 2

G4372
HW 1 - Princes Highway
Berry Bypass



Transport
Roads & Maritime
Services



Geotechnical Investigation
Bore Hole: B11

Photo 2 of 2

G4372
HW 1 - Princes Highway
Berry Bypass



Transport
Roads & Maritime
Services

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : B12

FILE / JOB NO : G4372

SHEET : 1 OF 4

PROJECT : BERRY BYPASS
LOCATION :

POSITION : E: 287739.570, N: 6147927.320 (56 MGA94)

SURFACE ELEVATION : 4.660 (AHD)

ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Edson 3000

MOUNTING : Truck

CONTRACTOR : TERRATEST

DRILLER : R. WELSH

DATE STARTED : 5/3/12

DATE COMPLETED : 6/3/12

DATE LOGGED : 6/3/12

LOGGED BY : TW

CHECKED BY : DH

DRILLING				MATERIAL						
PROGRESS		GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	STRUCTURE & Other Observations
DRILLING & CASING	WATER									
ADT HW Casing		06/03/12		0.0	Cl-CH		SILTY CLAY: dark brown, medium to high plasticity			TOPSOIL
			0.50m SPT 2, 2, 3 N [*] =5	0.20m			CLAY: mottled grey and yellow brown, medium plasticity, trace fine grained sand		St	ALLUVIUM 0.50: SPT Recovery: 0.38 m 0.85: HP Samp = 110 - 135 kPa
			1.10m U75	1.0						
			1.65m SPT 1, 2, 2 N [*] =4	2.0	Cl				F	1.55: HP Samp = 70 kPa 1.65: SPT Recovery: 0.45 m
			2.10m	3.0						
			3.00m SPT HW/150mm, 0, 1, 2 N [*] =3	3.0						3.00: SPT Recovery: 0.5 m
			3.60m	3.35m			CLAYEY SAND: grey, fine to coarse grained sand, non plastic, with occasional pockets of low plasticity sandy clay		L	3.30: HP Samp = 85 kPa
				3.60m	SC					
				3.95m						
				4.0			TIMBER LOG		M	
			4.50m SPT 3, 3, 7 N [*] =10	4.5						4.50: SPT Recovery: 0.28 m
			4.95m	4.70m	CL		SANDY CLAY: grey, low plasticity, fine grained sand		F	4.65: HP Samp = 65 kPa
				4.95m			SANDY GRAVEL: grey, fine to coarse gravel, non plastic, trace clay		L - MD	
				5.0	GW					
				5.50m						
				6.00m SPT 3, 3, 5 N [*] =8			GRAVEL (CLAY BOUND): dark grey and blue grey, fine to coarse gravel, sub-angular, in medium plasticity clay matrix			6.00: SPT Recovery: 0.45 m
			6.45m	6.0						
				7.0	GC				L	
			7.50m SPT 0, 4, 4 N [*] =8	7.0						7.50: SPT Recovery: 0.45 m
			7.95m	8.0						

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See Explanatory Notes for details of abbreviations & basis of descriptions.

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : B12

FILE / JOB NO : G4372

SHEET : 2 OF 4

PROJECT : BERRY BYPASS
LOCATION :

POSITION : E: 287739.570, N: 6147927.320 (56 MGA94)

SURFACE ELEVATION : 4.660 (AHD)

ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Edson 3000

MOUNTING : Truck

CONTRACTOR : TERRATEST

DRILLER : R. WELSH

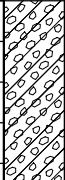
DATE STARTED : 5/3/12

DATE COMPLETED : 6/3/12

DATE LOGGED : 6/3/12

LOGGED BY : TW

CHECKED BY : DH

DRILLING					MATERIAL								
PROGRESS		DRILLING PENETRATION	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY	RELATIVE DENSITY	STRUCTURE & Other Observations	
DRILLING & CASING	WATER												
WB/RR HW Casing 0% Polymer LOSS (HW casing at 4.60m)		F			8.0	 GC	GRAVEL (CLAY BOUND): dark grey and blue grey, fine to coarse gravel, sub-angular, in medium plasticity clay matrix <i>(continued)</i>				L		
		H		9.00m SPT 12, 10, 20/149mm HB N=R 9.45m	9.45m				M				
		E			10.0	10.10m	GP	GRAVEL AND COBBLES: dark grey and blue grey				MD - D	
					10.50m SPT 12, 10, 12/150mm HB N=R	10.65m 10.70m	CH	SILTY CLAY: blue grey, high plasticity				RESIDUAL SOIL	
					11.0		SILTSTONE: grey Continued as Cored Drill Hole				BEDROCK		
					12.0								
					13.0								
					14.0								
					15.0								
					16.0								

RMS:LIB 32.GLB Log RTA NON-CORE DRILL HOLE G4372 BERRY BYPASS.GPJ <-DrawingFiles> 10/May/2012 14:44:8.30.002 Datgel.CPT Tool.gINT Add-in

See Explanatory Notes for details of abbreviations & basis of descriptions.

CORED DRILL HOLE LOG

HOLE NO : B12

FILE / JOB NO : G4372

SHEET : 3 OF 4

PROJECT : BERRY BYPASS
LOCATION :

POSITION : E: 287739.570, N: 6147927.320 (56 MGA94) SURFACE ELEVATION : 4.660 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Edson 3000 MOUNTING : Truck CONTRACTOR : TERRATEST DRILLER : R. WELSH

DATE STARTED : 5/3/12 DATE COMPLETED : 6/3/12 DATE LOGGED : 6/3/12 LOGGED BY : TW CHECKED BY : DH

CASING DIAMETER : HW BARREL (Length) : 3.00 m BIT : IMPREG BIT CONDITION : GOOD

DRILLING			MATERIAL				FRACTURES				
DRILLING & CASING	WATER	CORE LOSS (CORE LOSS DRILL RUN %)	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering E _{1-0.03} V _{1-0.1} L _{1-0.3} M ₁₋₁ H ₁₋₃ VH ₁₋₁₀ EH ₁₋₁₀	ESTIMATED STRENGTH Is(50) ● Axial ○ Diametral	NATURAL FRACTURE (mm) 20 40 100 300 1000	VISUAL	ADDITIONAL DATA (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
				8.0							
						10.70m START CORING AT 10.70m					
		0% LOSS	SPT 7, 12/150mm HB N=R 10.80m Is(50) d=0.24 MPa	11.0		SILTSTONE: dark grey, bedded at 0-10°.	EW HW F				180 mm clayey layer BPs 0 - 5° Clay PR RF S JT 90° Clay PR RF JT 20° Clay PR RF JT 60° Clay PR RF BP 10° Clay PR RF
		5% LOSS		12.00							BPs & JTs 0 - 90° Clay IR RF UN S PR
		5% LOSS		12.74m							SM Clay 30 mm
		20% Polymer LOSS (HW casing at 10.50m)		12.89m		CORE LOSS 0.15m (12.74-12.89)	EW				
		0% LOSS	Is(50) d=0.62 MPa	13.0		SILTSTONE: dark grey, bedded at 0-10°.	F				BPs & JTs 5 - 60° Clay IR RF PR DB DB BPs & JTs 5 - 70° Clay CN IR RF UN PR DB DB DB HB JT 30° MS PR RF SM Clay 40 mm DBs
		0% LOSS	Is(50) a=1.24 MPa	14.0		14.21m	EW F				HB
		0% LOSS	Is(50) a=4.68 MPa	15.0		SILTSTONE: dark grey with grey, with fine grained sandstone interbedding. Bedded at 0-10°. Occasional thin off-white secondary mineralised veins and pale blue grey latite clasts and inclusions.					DB DB
		0% LOSS		16.0							

RMS.LIB 32.GLB Log RTA CORED DRILL HOLE G4372 BERRY BYPASS.GPJ <DrawingFiles> 10/May/2012 14:45 8.30.02 Datalog CPT Tool.GINT Add-In

See Explanatory Notes for details of abbreviations & basis of descriptions.

CORED DRILL HOLE LOG

HOLE NO : B12

PROJECT : BERRY BYPASS
LOCATION :

FILE / JOB NO : G4372
SHEET : 4 OF 4

POSITION : E: 287739.570, N: 6147927.320 (56 MGA94) SURFACE ELEVATION : 4.660 (AHD) ANGLE FROM HORIZONTAL : 90°
RIG TYPE : Edson 3000 MOUNTING : Truck CONTRACTOR : TERRATEST DRILLER : R. WELSH
DATE STARTED : 5/3/12 DATE COMPLETED : 6/3/12 DATE LOGGED : 6/3/12 LOGGED BY : TW CHECKED BY : DH
CASING DIAMETER : HW BARREL (Length) : 3.00 m BIT : IMPREG BIT CONDITION : GOOD

DRILLING		MATERIAL				FRACTURES		
PROGRESS	LOSS	DEPTH (m)	GRAPHIC LOG	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) ● - Axial ○ - Diametral	NATURAL FRACTURE (mm)	ADDITIONAL DATA (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
DRILLING & CASING	WATER							
HQ3	0% LOSS	16.0		SILTSTONE: dark grey with grey, with fine grained sandstone interbedding. Bedded at 0-10°. Occasional thin off-white secondary mineralised veins and pale blue grey latite clasts and inclusions. <i>(continued)</i>	T	●	20 40 100 300 1000	DB DB DB DBs Diameter of core wittled away after initially leaving down hole and coring over to retain DBs
	20% Polymer LOSS (HW casing at 10.50m)	17.0			●			
	0% LOSS	18.0						
	0% LOSS	18.60		18.60m				
BOREHOLEB12 TERMINATED AT 18.60 m								
		19.0						
		20.0						
		21.0						
		22.0						
		23.0						
		24.0						

RMS:LIB 32.GLB Log RTA CORED DRILL HOLE G4372 BERRY BYPASS.GPJ <DrawingFiles> 10/May/2012 14:45 8.30.002 Datgel CPT Tool.GINT Add.in

See Explanatory Notes for details of abbreviations & basis of descriptions.



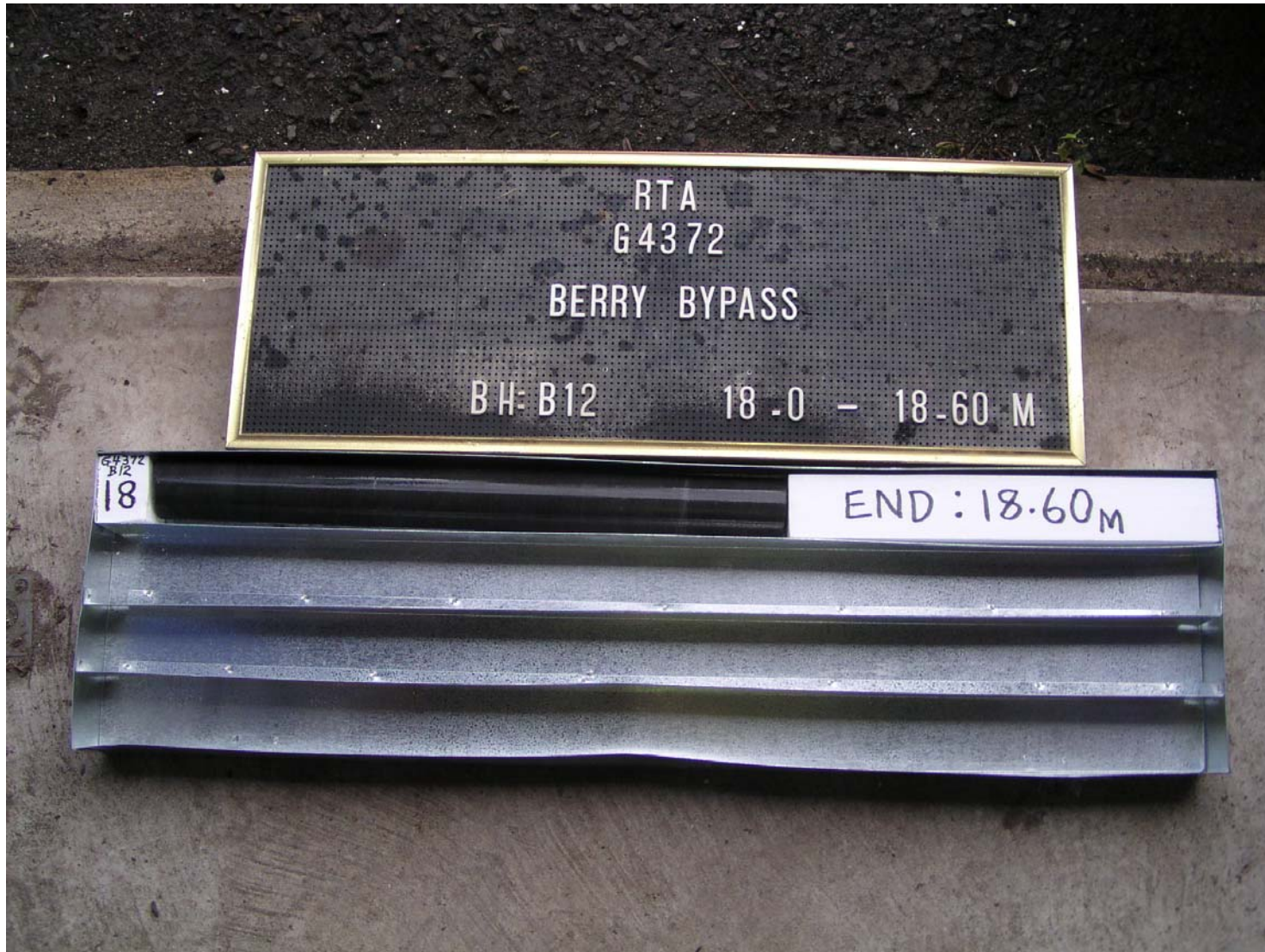
Geotechnical Investigation
Bore Hole: B12

Photo 1 of 2

G4372
HW 1 - Princes Highway
Berry Bypass



Transport
Roads & Maritime
Services



Geotechnical Investigation
Bore Hole: B12

Photo 2 of 2

G4372
HW 1 - Princes Highway
Berry Bypass



Transport
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CORED DRILL HOLE LOG

HOLE NO : B13

FILE / JOB NO : G4372

SHEET : 2 OF 3

PROJECT : BERRY BYPASS
LOCATION :

POSITION : E: 287302.200, N: 6147783.770 (56 MGA94) SURFACE ELEVATION : 6.910 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : DB515 MOUNTING : Track CONTRACTOR : RMS DRILLER : R MORTON

DATE STARTED : 31/3/12 DATE COMPLETED : 1/4/12 DATE LOGGED : 1/4/12 LOGGED BY : MH CHECKED BY : DH

CASING DIAMETER : HW BARREL (Length) : 1.50 m BIT : STEPFACE BIT CONDITION : GOOD

DRILLING			MATERIAL				FRACTURES					
DRILLING & CASING	WATER	CORE LOSS (CORE LOSS DRILL DEPTH)	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH (s(50)) ● Axial ○ Diametral	NATURAL FRACTURE (mm)	VISUAL	ADDITIONAL DATA (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other	
												EL _{-0.03}
				0.0								
				1.0								
				2.0								
				3.0								
				4.0								
				5.0								
				6.0								
				7.0								
				7.35m		7.35m START CORING AT 7.35m						
				8.0		SANDY SILTSTONE / SILTY SANDSTONE: dark grey and grey, poorly sorted, moderately to well cemented, carbonaceous veneers throughout	MW to HW EW MW to HW					JT 30° Fe Clay IR RF JT 30° Fe IR RF JT 30° Fe Clay PR RF FZ 40 mm fragmented JT 50° Fe IR RF JT 40 - 60° Fe Clay IR RF JT 30° Fe IR RF JT 40° Fe PR RF

RMS: LIB 32, GLEB Log, Log RTA CORED DRILL HOLE G4372 BERRY BYPASS.GPJ <DrawingFiles> 10/May/2012 14:45 8.30.002 Datalog CPT Tool.GINT Add-In

See Explanatory Notes for details of abbreviations & basis of descriptions.

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : B13

FILE / JOB NO : G4372

SHEET : 1 OF 3

PROJECT : BERRY BYPASS
LOCATION :

POSITION : E: 287302.200, N: 6147783.770 (56 MGA94)

SURFACE ELEVATION : 6.910 (AHD)

ANGLE FROM HORIZONTAL : 90°

RIG TYPE : DB515

MOUNTING : Track

CONTRACTOR : RMS

DRILLER : R MORTON

DATE STARTED : 31/3/12

DATE COMPLETED : 1/4/12

DATE LOGGED : 1/4/12

LOGGED BY : MH

CHECKED BY : DH

DRILLING				MATERIAL			
PROGRESS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	STRUCTURE & Other Observations
DRILLING & CASING				Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components		RELATIVE DENSITY	
ADT HW Casing 0% Water LOSS WB H	0.0 0.50m SPT 0, 0, 3 N*=3 0.95m 1.50m SPT HW/450mm 1.95m 2.50m SPT 2, 2, 3 N*=5 2.95m 4.10m SPT 6, 8, 33/149mm N*=R 4.55m 5.60m SPT 12, 15, 16 N*=31 6.05m 7.10m SPT 23, 30/100mm N*=R 7.35m		CI SC SC GW	CLAY WITH SILT / SILT WITH CLAY: dark brown and brown, medium plasticity, trace fine grained sand SANDY CLAY: brown and yellow brown, low plasticity, fine grained sand, trace root fibres CLAY: pale grey and grey mottled orange red, low to medium plasticity, with lens of medium to high plasticity clay SANDY CLAYEY GRAVEL: red brown, brown and pale grey mottled red and orange, fine to coarse gravel, medium plasticity, fine to coarse grained sand, with possible cobbles SANDY SILTSTONE: dark grey and grey, trace of mica	M VS F to St M to W D	ALLUVIUM 0.50: SPT Recovery: 0.45 m 0.70: HP Samp = 50 - 110 kPa 1.40: HP Samp = 10 - 30 kPa 1.50: SPT Recovery: 0.45 m 2.50: SPT Recovery: 0.45 m 2.80: HP Samp = 50 - 200 kPa 4.10: SPT Recovery: 0.3 m 5.60: SPT Recovery: 0.18 m BEDROCK	Continued as Cored Drill Hole

See Explanatory Notes for details of abbreviations & basis of descriptions.

RMS.LIB.32.GLB.Log.RTA.NON-CORE.DRILL.HOLE.G4372.BERRY.BYPASS.GPJ <-DrawingFiles> 10/May/2012 14:45:8.30.002 Datgel.CPT.Tool.gINT.Add-In

CORED DRILL HOLE LOG

HOLE NO : B13

FILE / JOB NO : G4372

SHEET : 3 OF 3

PROJECT : BERRY BYPASS
LOCATION :

POSITION : E: 287302.200, N: 6147783.770 (56 MGA94) SURFACE ELEVATION : 6.910 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : DB515 MOUNTING : Track CONTRACTOR : RMS DRILLER : R MORTON

DATE STARTED : 31/3/12 DATE COMPLETED : 1/4/12 DATE LOGGED : 1/4/12 LOGGED BY : MH CHECKED BY : DH

CASING DIAMETER : HW BARREL (Length) : 1.50 m BIT : STEPFACE BIT CONDITION : GOOD

DRILLING			MATERIAL				FRACTURES		
DRILLING & CASING	WATER	PROGRESS	DEPTH (m)	GRAPHIC LOG	DESCRIPTION	Weathering	ESTIMATED STRENGTH (s(50))	NATURAL FRACTURE (mm)	ADDITIONAL DATA
DRILLING & CASING	WATER	PROGRESS	DEPTH (m)	GRAPHIC LOG	ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH (s(50)) ● Axial ○ Diametral	NATURAL FRACTURE (mm)	(joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
NMLC	0% Water LOSS	0% LOSS	8.0	8.55m	SANDY SILTSTONE / SILTY SANDSTONE: dark grey and grey, poorly sorted, moderately to well cemented, carbonaceous veneers throughout (<i>continued</i>)	EW HW to MW SW	EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -9 EH -10	20 40 100 300 1000	JT 10° - 40° Fe IR RF BP 0° Fe IR RF JT 60° Fe IR RF JT 70° Fe ST RF JT 30° CN IR RF DB
					BOREHOLEB13 TERMINATED AT 8.55 m				
			9.0						
			10.0						
			11.0						
			12.0						
			13.0						
			14.0						
			15.0						
			16.0						

See Explanatory Notes for details of abbreviations & basis of descriptions.



Geotechnical Investigation
Bore Hole: B13

Photo 1 of 1

G4372
HW 1 - Princes Highway
Berry Bypass



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NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : B14

FILE / JOB NO : G4372

SHEET : 1 OF 3

PROJECT : BERRY BYPASS
LOCATION : SOUTHERN ALIGNMENT

POSITION : E: 287108.990, N: 6147635.180 (56 MGA94)

SURFACE ELEVATION : 12.930 (AHD)

ANGLE FROM HORIZONTAL : 90°

RIG TYPE : COMACCHIO 205 MOUNTING : Track

CONTRACTOR : TERRATEST

DRILLER : A ZUMMO

DATE STARTED : 13/4/12

DATE COMPLETED : 15/4/12

DATE LOGGED : 15/4/12

LOGGED BY : RH

CHECKED BY : DH

DRILLING				MATERIAL			
PROGRESS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	STRUCTURE & Other Observations
DRILLING & CASING				Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components		RELATIVE DENSITY	
N/A	0.0	ML	ML	CLAYEY SILT: dark brown, low plasticity, trace sand	W		TOPSOIL
	0.20m		CI	SILTY CLAY: yellow brown and brown, medium plasticity, trace sand, and ferruginous nodules			ALLUVIUM
	0.95m		CI	GRAVELLY SANDY CLAY: red brown, yellow brown and pale grey, medium plasticity, fine to coarse grained sand, angular ferruginous gravel			1.00: SPT Recovery: 0.15 m 1.10: Acid sulphate test sample
	1.20m		GC	SANDY CLAYEY GRAVEL AND COBBLES: red brown, yellow brown and pale grey, fine to coarse gravel, rounded to angular, basalt, medium plasticity, fine to coarse grained sand, with pockets of medium to high plasticity clay, basalt cobbles			1.30: HP Samp = 175 - 200 kPa
	2.00m		GC	gravel is low to very high strength, cobbles are predominantly slightly weathered and very high strength	M		1.50: Water bailed from hole to 8.0m depth. water inflow from below ground level whilst bailing
	2.40m		GC	with medium to high plasticity sandy clay pockets to 200mm. Brown, red brown and red grey brown			2.40: SPT Recovery: 0.15 m
	4.05m		GC	predominantly sub-rounded gravel			4.05: SPT Recovery: 0.2 m 4.10: Acid sulphate test sample
	5.05m		S	CLAY: yellow brown, pale red brown and pale grey, high plasticity, trace silt, fine grained sand, and basalt gravel			5.05: RESIDUAL DYKE MATERIAL?
	5.70m		CH	Note : clay expanded into borehole when rods were withdrawn	W with M		5.70: SPT Recovery: 0.25 m 5.80: Acid sulphate test sample
	6.15m		CH	CLAY: pale green and pale blue, high plasticity, with silty sandstone gravel, and cobbles			6.00: HP Samp = 250 - 300 kPa
	6.50m		CH				
	7.10m		GC	CLAYEY GRAVEL AND COBBLES: grey, dark grey, grey brown and red brown, fine to coarse gravel, angular, sandy siltstone and silty sandstone, low and medium plasticity, matrix of silty clay, with fine to coarse grained sand	M		7.10: BRECCIATED BEDROCK
	7.65m		GC	Continued as Cored Drill Hole			
	8.0						

See Explanatory Notes for details of abbreviations & basis of descriptions.

RMS.LIB 32.GLB Log RTA NON-CORE DRILL HOLE C4372 BERRY BYPASS.GPJ <-DrawingFiles> 10/May/2012 14:46:8.30.002 Datgel.CPT Tool.gINT Add-In

CORED DRILL HOLE LOG

HOLE NO : B14

FILE / JOB NO : G4372

SHEET : 2 OF 3


PROJECT : BERRY BYPASS
 LOCATION : SOUTHERN ALIGNMENT

POSITION : E: 287108.990, N: 6147635.180 (56 MGA94) SURFACE ELEVATION : 12.930 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : COMACCHIO 205 MOUNTING : Track CONTRACTOR : TERRATEST DRILLER : A ZUMMO

DATE STARTED : 13/4/12 DATE COMPLETED : 15/4/12 DATE LOGGED : 15/4/12 LOGGED BY : RH CHECKED BY : DH

CASING DIAMETER : HQ/HW BARREL (Length) : 3.00 m BIT : IMPREG. BIT CONDITION : GOOD

DRILLING				MATERIAL				FRACTURES							
PROGRESS		CORE LOSS (CORE LOSS DRILL RUN %)	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH (s(50))				NATURAL FRACTURE (mm)	VISUAL	ADDITIONAL DATA (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other	
DRILLING & CASING	WATER							EL _{-0.03}	VL _{-0.1}	L _{-0.1}	M _{-0.3}				H ₋₁
				0.0											
				1.0											
				2.0											
				3.0											
				4.0											
				5.0											
				6.0											
				7.0											
				8.0		7.65m START CORING AT 7.65m 8.00m CLAYEY GRAVEL AND COBBLES: grey, dark grey and red brown, fine to coarse gravel, angular, sandy siltstone and silty sandstone, low and medium plasticity, with sand									

RMS:LIB 32.GLB Log RTA CORED DRILL HOLE G4372 BERRY BYPASS.GPJ <DrawingFiles> 10/May/2012 14:46 8.30.002 Datalog CPT Tool.GINT Add-In

See Explanatory Notes for details of abbreviations & basis of descriptions.

CORED DRILL HOLE LOG

HOLE NO : B14

FILE / JOB NO : G4372

SHEET : 3 OF 3

PROJECT : BERRY BYPASS
LOCATION : SOUTHERN ALIGNMENT

POSITION : E: 287108.990, N: 6147635.180 (56 MGA94) SURFACE ELEVATION : 12.930 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : COMACCHIO 205 MOUNTING : Track CONTRACTOR : TERRATEST DRILLER : A ZUMMO

DATE STARTED : 13/4/12 DATE COMPLETED : 15/4/12 DATE LOGGED : 15/4/12 LOGGED BY : RH CHECKED BY : DH

CASING DIAMETER : HQ/HW BARREL (Length) : 3.00 m BIT : IMPREG. BIT CONDITION : GOOD

DRILLING		MATERIAL				FRACTURES	
PROGRESS	DEPTH (m)	GRAPHIC LOG	DESCRIPTION	Weathering	ESTIMATED STRENGTH Is(50)	NATURAL FRACTURE (mm)	ADDITIONAL DATA
DRILLING & CASING	DEPTH		(texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)		● Axial ○ Diametral		(joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
47% LOSS	8.0	8.18m	DOLERITE: red brown and pale green grey, fine grained, altered, with clay CORE LOSS 0.47m (8.18-8.65)	EW			Residual & EW bedrock
	8.65	8.65m					Loss in probable silty clay. Normal drilling penetration
71% LOSS	8.76m	8.76m	SILTY CLAY: red brown and pale green grey, medium plasticity DOLERITE: pale green grey and red brown, altered, grain size to 1mm	EW to HW			Residual clay JT 70° MS PR SL Clay JT 0 - 5° Fe Clay CT PR RF
Is(50) d=0.06 a=0.08 MPa	9.0	9.10m	CORE LOSS 1.10m (9.10-10.20)				
	10.0	10.20m					Loss in probable yellow brown, pale brown and pale green grey silty clay. Normal drilling penetration to 9.5m then rapid to penetration to 10.10m. Stiff becoming soft.
SPT 24, 24, 23 N=47	10.20	10.20m	CLAYEY SAND / DOLERITE: pale blue grey, fine and medium grained sand, low plasticity; dense 10.25-10.37m : black meta-siltstone cobble	EW			10.40: Acid sulphate test sample Residual / EW bedrock
0% LOSS	10.65m	10.65m					
	11.0	11.0	SANDY SILTSTONE AND DOLERITE: siltstone is dark grey and pale grey, layered, horizontally, fine grained sand; dolerite is pale grey, fine grained, highly altered, contact zone on vertical dyke	SW and HW			Vertically divided core - half sandy siltstone, half dolerite
	11.60	11.60					CO 85 - 90° Clay CT PR S BP 0 - 5° Clay CN PR RF S trace pyrites JT 0 - 90° Clay CN IR SL PR RF S
0% LOSS	12.00	12.00m					
	12.0	12.00m	BOREHOLEB14 TERMINATED AT 12.00 m 50mm standpipe piezometer installed. Slotted with filter sock 6.0-12.0m				
	13.0						
	14.0						
	15.0						
	16.0						

RMS:LIB 32.GLB Log RTA CORED DRILL HOLE G4372 BERRY BYPASS.GPJ <DrawingFiles> 10/May/2012 14:46 8.30.002 Datgel CPT Tool.gINT Add-In

See Explanatory Notes for details of abbreviations & basis of descriptions.



Geotechnical Investigation
Bore Hole: B14

Photo 1 of 1

G4372
HW 1 - Princes Highway
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