

Appendix A **Monitoring bore logs**

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 251 AHD
EASTING: 230111
NORTHING: 6410330
DIP/AZIMUTH: 90°/-

BORE No: A01-D
PROJECT No: 49761
DATE: 26/8/2011
SHEET 1 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
251.0		SILTY CLAY - Dark Brown silty clay, M+Wp	[Diagonal Hatching]						
250.0	1								
249.0	2								
248.0	3	CLAY - Brown clay, trace fine grained sand, M+Wp	[Diagonal Hatching]						
247.0	4								
246.0	5								
245.0	6						▼		
244.0	6.2	GRAVEL/SAND - Undifferentiated, sandy clay in parts from 6.2m to 7.0m	[Gravel/Sand Pattern]						
243.0	7								From 0.0m to 13.8m, grout
242.0	8								
241.0	9								

RIG: Hydrapower MDR105 **DRILLER:** Myers (Macquarie) **LOGGED:** Benson **CASING:** Deep HWT to 20.6m

TYPE OF BORING: 4% blade bit washbore

WATER OBSERVATIONS: Some water loss from 6.2m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	FD	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample
BLK	Block sample	LI	Tube sample (10 mm dia.)
C	Core drilling	W	Water sample
CC	Disturbed sample	Wp	Water seep
E	Environmental sample	▼	Water level
		PLD	Point load axial test (kPa)
		PLD(S)	Point load diametral test (kPa)
		gp	Pocket penetrometer (kPa)
		SP	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 251 AHD
EASTING: 230111
NORTHING: 6410330
DIP/AZIMUTH: 90°/-

BORE No: A01-D
PROJECT No: 49761
DATE: 26/8/2011
SHEET 2 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details		
				Type	Depth	Sample		Results & Comments		
24.1		GRAVEL/SAND - Undifferentiated, sandy clay in parts from 6.2m to 7.0m (continued)								
24.0	11									
23.8	12									
23.6	13									
23.4	14								From 14.35m to 13.8m, bentonite	
23.2	15									
23.0	16					D	16.0			
22.8	17								From 15.6m to 16.6m, screen From 13.8m to 20.6m, gravel	
22.6	17.4			RESIDUAL CLAY - Grey, some completely weathered coal in returns from 17.4m to 18.0m						
22.4	18									
22.2	19								From 16.6m to 20.6m, sump	

RIG: Hydrapower MDR105

DRILLER: Myers (Macquarie)

LOGGED: Benson

CASING: Deep HWT to 20.6m

TYPE OF BORING: 4% blade bit washbore

WATER OBSERVATIONS: Some water loss from 6.2m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	FD	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample
BLK	Block sample	LI	Tube sample (ø mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		D	Gas sample
		PL(A)	Point load axial test (kN/25) (MPa)
		PL(D)	Point load diameter test (kN/25) (MPa)
		gp	Pocket penetrometer (kPa)
		SPT	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 251 AHD
EASTING: 230111
NORTHING: 6410330
DIP/AZIMUTH: 90°/-

BORE No: A01-D
PROJECT No: 49761
DATE: 26/8/2011
SHEET 3 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
20.1		RESIDUAL CLAY - Grey, some completely weathered coal in returns from 17.4m to 18.0m (continued)	▨						█	█
	20.6	Bore discontinued at 20.6m, limit of investigation						End cap		
21.0	21									
22.0	22									
23.0	23									
24.0	24									
25.0	25									
26.0	26									
27.0	27									
28.0	28									
29.0	29									

RIG: Hydrapower MDR105 **DRILLER:** Myers (Macquarie) **LOGGED:** Benson **CASING:** Deep HWT to 20.6m
TYPE OF BORING: 4% blade bit washbore
WATER OBSERVATIONS: Some water loss from 6.2m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PLA Point load axial test (t/50) (MPa)
BLK Block sample	LT Tube sample (ø mm dia.)	PLD Point load diametral test (t/50) (MPa)
CD Core drilling	W Water sample	gp Pocket penetrometer (kPa)
D Disturbed sample	wp Water seep	S Standard penetration test
E Environmental sample	WL Water level	V Shear vane (kPa)













BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 251 AHD
EASTING: 230111
NORTHING: 6410330
DIP/AZIMUTH: 90°/-

BORE No: A01-S
PROJECT No: 49761
DATE: 26/8/2011
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
251		SILTY CLAY - Dark Brown silty clay, M _v W _p						From 0.0m to 1.0m, grout	
	1			D	1.0			From 1.0m to 1.8m, bentonite	
	2								
	3	CLAY - Brown clay, trace fine grained sand, M _v W _p							
	4			D	4.0				
	5							From 1.0m to 7.0m, screen	
	6						From 1.0m to 8.5m, gravel		
	6.2	GRAVEL/SAND - Undifferentiated, sandy clay in parts from 6.2m to 7.0m					▼		
	7								
	8							From 7.0m to 8.5m, sump	
	8.6	Bore discontinued at 8.6m, limit of investigation						End cap	
	9							From 8.5m to 8.6m, backfill	

RIG: Hydrapower MDR105

DRILLER: Myers (Macquarie)

LOGGED: Benson

CASING:

TYPE OF BORING: 4% blade bit washbore

WATER OBSERVATIONS: Free groundwater observed at 6.2m

REMARKS: Location BY70015CH

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	D Gas sample	FD Photo ionisation detector (ppm)
B Bulk sample	F Piston sample	FL(A) Point load axial test (t/25) (MPa)
BLK Block sample	LI Tube sample (ø mm dia.)	PL(D) Point load diametral test (t/25) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
CC Disturbed sample	Wp Water seep	SP Standard penetration test
E Environmental sample	Wt Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
 PROJECT: Bylong Confidential
 LOCATION: Bylong

SURFACE LEVEL: TBC
 EASTING: 230645
 NORTHING: 6404074
 DIP/AZIMUTH: 90°/-

BORE No: A02-D
 PROJECT No: 49761
 DATE: 28/2/2012
 SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	Stickup 0.6m
	0.4	SANDY SILT - (Stiff), dark brown, fine to coarse grained sandy silt with some clay, trace rootlets, M-Wp							
	1.0	SILTY CLAY/CLAYEY SILT - Very stiff to hard, brown silty clay/clayey silt, with slightly to some fine to coarse grained sand, M-Wp							
	1.0	From 1.0m, sandy silt in parts							
	2.0								
	2.0	From 2.5m, trace fine to coarse grained sand, M-Wp							
	3.0								
	3.0								
	4.0	SANDY CLAY - Hard, grey mottled red brown fine to coarse grained sandy clay, M-Wp							
	4.0								
	4.0								
	5.0	From 5.3m, very stiff							
	6.0								
	6.0								
	7.0	From 7.2m, hard							
	8.0	From 7.8m, trace coarse sized subrounded gravel							
	8.3	SANDSTONE - Extremely low strength, extremely weathered, grey mottled yellow brown, fine to coarse grained sandstone with trace fine to coarse sized subrounded gravel (soil-like properties)							
	8.75	Bore discontinued at 8.75m, limit of investigation							
	9.0								

RIG: Envirodrill DRILLER: Total Drilling (Foody) LOGGED: Semmler CASING: HW to 5.5m
 TYPE OF BORING: Solid flight auger to 5.5m, wash boring to 8.3m
 WATER OBSERVATIONS: Free groundwater observed at 5.3m (28/2/12), 4.4m (29/2/12)
 REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (k50) (MPa)	
BLK Block sample	U Tube sample (ø mm dia.)	PL(D) Point load diametral test (k50) (MPa)	
C Core drilling	W Water sample	gp Pocket penetrometer (kPa)	
CO Disturbed sample	Wp Water seep	S Standard penetration test	
E Environmental sample	Wl Water level	V Shear vane (kPa)	



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 230645
NORTHING: 6404074
DIP/AZIMUTH: 90°/-

BORE No: A02-S
PROJECT No: 49761
DATE: 28/2/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	Stickup	Diagram
	0.4	SANDY SILT - (Stiff), dark brown, fine to coarse grained sandy silt with some clay, trace rootlets, M-Wp	| | | | |					Stickup 0.6m	
	1	SILTY CLAY/CLAYEY SILT - Very stiff to hard, brown silty clay/clayey silt, with slightly to some fine to coarse grained sand, M-Wp From 1.0m, sandy silt in parts	| | | | |						
	2	From 2.5m, trace fine to coarse grained sand, M-Wp	| | | | |					From 0.6m to 3.6m, gravel From 0.8m to 3.6m, screen	
	3.8	Bore discontinued at 3.8m, limit of investigation	| | | | |					End cap	
	4								
	5								
	6								
	7								
	8								
	9								

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** HW to 5.5m
TYPE OF BORING: Solid flight auger to 3.8m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Bore located immediately adjacent A02-D. Strata inferred from A02-D Borehole Log

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PLA(A) Point load axial test (k50) (MPa)
BLX Block sample	U Tube sample (ø mm dia.)	PLD(C) Point load diametral test (k50) (MPa)
C Core drilling	W Water sample	gp Pocket penetrometer (kPa)
CC Disturbed sample	wp Water seep	SL Standard penetration test
E Environmental sample	Wl Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
 PROJECT: Bylong Confidential
 LOCATION: Bylong

SURFACE LEVEL: 288.00 AHD
 EASTING: 232614
 NORTHING: 6405417
 DIPIAZIMUTH: 90°/-

BORE No: A03D
 PROJECT No: 49761.02
 DATE: 30/5/2012
 SHEET 1 OF 2

Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
			Type	Depth	Sample			Results & Comments
0.0 - 1.0	CLAY - (Stiff to very stiff) dark brown clay, trace to some silt, trace fine to medium grained sand, M>Wp From 1.0m, increasing sand content						From 0m to 0.3m, bentonite
1.5	CLAYEY SAND - Loose dark brown clayey fine to medium grained sand, trace to some silt, saturated		S	1.5		23.5 N = 8	
1.85 - 1.95	CLAY - Very stiff dark brown mottled red clay, trace fine to medium grained sand, M>Wp		pp	1.85 - 1.95		200-300 kPa	
2.1	SANDY CLAY - (Soft) dark brown fine to medium grained sandy clay, some silt, M<Wp (inferred from cuttings on auger)			2.1			
2.5 - 2.75	SANDY CLAY - Very stiff brown fine to coarse grained sandy clay, trace silt, M>Wp		pp	2.5 - 2.75		290-350 kPa 4.6, 10 N = 16	
3.05	CLAY - Very stiff brown clay, M>Wp		S, pp	3.05		200-290 kPa	From 0.3m to 5.7m, backfill cuttings
4.3 - 4.6	SILTY SAND - Loose light brown silty fine to medium grained sand with grey mottling, saturated		S	4.3 - 4.6		64.5 N = 9	
4.7	CLAY - Stiff light brown clay with grey mottling, M>Wp		pp	4.7		160-200 kPa	
5.75 - 6.2	SILTY CLAY - Stiff to very stiff light brown silty clay with grey mottling, trace fine grained sand, M>Wp		S, pp	5.75 - 6.2		48.6 N = 12	From 5.7m to 6.2m, bentonite
6.5	CLAY - Stiff light brown clay, M>Wp			6.5			
7.25 - 7.7	CLAY - Very stiff to hard brown and grey clay, slightly gravelly (gravel subrounded up to 7mm diameter), trace to some fine to medium grained sand, M>Wp		pp S	7.25 - 7.7		340-450 kPa 6.8, 10 N = 18	From 6.2m to 9.4m, gravel From 6.4m to 9.4m, 50mm diameter Class 18 machine silted PVC screen
8.75 - 9.2	SILTY CLAY/CLAYEY SILT - Hard grey (and brown in parts) silty clay/clayey silt, trace fine grained sand, M>Wp		S, pp pp	8.75 - 9.2		68.8 N = 14	
9.2 - 9.75	SANDSTONE - Extremely low strength, extremely weathered, brown, fine to coarse grained sandstone		S	9.2 - 9.75		24,17.9 N = 26	End cap

RIG: Total (Envirodrill) DRILLER: Foody LOGGED: Holden CASING: HW to 2.5m
 TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 9.75m
 WATER OBSERVATIONS: Free groundwater observed at 1.0m
 REMARKS:

A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test (kPa)
BLK Block sample	U Tube sample (ø mm dia.)	PL(D) Point load diametral test (kPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
CO Disturbed sample	Wp Water seep	S Standard penetration test
E Environmental sample	Wl Water level	v Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 288.00 AHD
EASTING: 232614
NORTHING: 6405417
DIP/AZIMUTH: 90°/-

BORE No: A03D
PROJECT No: 49761.02
DATE: 30/5/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
288	10.05	At 9.75m, refusal by drilling		S					
	10.2	CLAYSTONE - Extremely low strength, extremely weathered, grey claystone Bore discontinued at 10.2m, limit of investigation							
	11								
	12								
	13								
	14								
	15								
	16								
	17								
	18								
	19								

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 9.75m
WATER OBSERVATIONS: Free groundwater observed at 1.0m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PI(D) Photo ionisation detector (ppm)
B Bulk sample	P Pluton sample	PL(A) Point load axial test (t/50) (MPa)
BLK Block sample	LI Tube sample (ø mm dia.)	PL(D) Point load diametral test (t/50) (MPa)
CD Core drilling	W Water sample	gp Pocket penetrometer (kPa)
D Disturbed sample	Wp Water seep	SL Standard penetration test
E Environmental sample	Wl Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 288.00 AHD
EASTING: 232614
NORTHING: 6405417
DIP/AZIMUTH: 90°/-

BORE No: A03S
PROJECT No: 49761.02
DATE: 30/5/2012
SHEET 1 OF 1

Bore No.	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	0.0	CLAY - (Stiff to very stiff) dark brown clay, trace to some silt, trace fine to medium grained sand, M>Wp	[Diagonal Hatching]					From 0m to 0.3m, bentonite	[Bentonite]
	1.0	From 1.0m, increasing sand content					▼		
	1.5	CLAYEY SAND - Loose dark brown clayey fine to medium grained sand, trace to some silt, saturated	[Dotted]	S	1.5				
	1.8			PP	1.85				
	2.1	CLAY - Very stiff dark brown mottled red clay, trace fine to medium grained sand, M>Wp	[Diagonal Hatching]		1.95				
	2.5	SANDY CLAY - (Soft) dark brown fine to medium grained sandy clay, some silt, M<Wp (inferred from cuttings on auger)	[Dotted]		2.6			From 0.3m to 3.5m, gravel	
	2.75	SANDY CLAY - Very stiff brown fine to coarse grained sandy clay, trace silt, M>Wp	[Diagonal Hatching]		2.75			From 0.5m to 3.5m, 50mm diameter Class 18 machine slotted PVC screen	
	3.0	CLAY - Very stiff brown clay, M>Wp	[Diagonal Hatching]	pp	3.05				
	3.05			S, PP					
	3.05					200-350 kPa 4.6, 10 N = 16 200-290 kPa		End cap	
	4.0	Bore discontinued at 4.0m, limit of investigation						From 6.2m to 9.4m, gravel	[Diagonal Hatching]
	4.0								
	5.0								
	6.0								
	7.0								
	8.0								
	9.0								

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger to 4.0m
WATER OBSERVATIONS: Free groundwater observed at 1.0m
REMARKS: Well in close proximity to A03D, soil profile inferred from log

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test (kPa) (MPa)
BLK Block sample	U Tube sample (ø mm dia.)	PL(D) Point load diametral test (kPa) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
CC Core sample	Wp Water seep	SPT Standard penetration test
D Disturbed sample	Wl Water level	V Shear vane (kPa)
E Environmental sample		

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 294.75 AHD
EASTING: 233789
NORTHING: 6405925
DIP/AZIMUTH: 90°/-

BORE No: A04
PROJECT No: 49761.02
DATE: 16/5/2012
SHEET 1 OF 1

Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction From -0.6m to 0.2m Class 15 Drilling From 0m to 0.2m, bentonite From 0.2m to 5.2m, 5mm gravel From 5.2m to 6.2m, screen End cap
			Type	Depth	Sample	Results & Comments		
0.6	SANDY SILTY CLAY - (Very soft), dark brown fine to medium grained sandy silty clay, M-Wp (humid)							
0.8	SAND - Grey-brown fine to coarse grained sand, slightly silty, trace subrounded gravel up to 5mm diameter, wet From 0.8m, saturated							
1.5	From 1.5m, very loose		S	1.5		22.1 N = 3		
1.95				1.95				
3.0				3.0				
3.2	SAND - Loose, light brown fine to medium sand, trace silt, saturated		S	3.2		32.4 N = 6		
3.45				3.45				
4.5				4.5				
4.7	SAND - Medium dense, brown, fine to coarse grained sand, trace silt, trace subrounded gravel up to 5mm diameter, saturated		S	4.7		57.9 N = 16		
4.95				4.95				
6.0	From 6m, loose		S	6.0		33.2 N = 5		
6.45	Bore discontinued at 6.45m, limit of investigation			6.45				

RIG: Total (Enviro-drill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 6.0m
WATER OBSERVATIONS: Free groundwater observed at 0.8m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test (t/50) (MPa)
BLX Block sample	U Tube sample (ø mm dia.)	PL(D) Point load diametral test (t/50) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
CO Disturbed sample	Wp Water seep	S Standard penetration test
E Environmental sample	Wt Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 231260
NORTHING: 6407410
DIP/AZIMUTH: 90°/-

BORE No: A06
PROJECT No: 49761
DATE: 10 - 12/9/2013
SHEET 1 OF 6

BZ	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	0.3	SILTY CLAY/CLAYEY SILT - (Stiff), dark brown silty clay/clayey silt, with some sand, M>Wp	|||||							
	1	SILTY SAND - Medium dense, brown silty fine to coarse grained sand, with some fine sized subrounded gravel, humid	- - - - -							
	1.4	SILTY CLAY - Very stiff, brown silty clay with some fine to coarse grained sand, M<Wp	/ / / / /							
	2.5	SILTY SAND - Loose, yellow brown silty, fine to coarse grained sand, with trace clay, saturated	- - - - -							
	4.0	SAND - Loose, brown, fine to coarse grained sand with some silt, saturated	- - - - -							
	5.0	CLAYEY SAND - Loose, fine to coarse grained clayey sand with interbedded sandy clay, saturated	/ / / / /							
	7.0	SANDY CLAY - Soft to firm, gray mottled yellow brown, fine to coarse grained sandy clay with trace fine sized subrounded gravel, M>Wp From 7.3m, hard	/ / / / /							
	9.3	GRAVELLY CLAY - Hard, yellow brown, slightly sandy, fine to medium sized subangular gravelly clay with some coarse sized, subrounded gravel and subrounded cobbles, M>Wp	X X X X X							
	10.0									

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 10.6m
TYPE OF BORING: Solid flight auger to 10.5m, rock roller to 10.85m, HQ3 to 53.86m
WATER OBSERVATIONS: Free groundwater observed at 3.0m
REMARKS: 50% water loss at 13.5m

SAMPLING & IN SITU TESTING LEGEND			
S - Auger sample	SI - Soil Sample	P(C)	Pore pressure sensor (PPT)
SB - Solid Sample	SL - Soil Sample	P(S)	Pressure cell (PCC) (PPT)
CI - Core Sample	TL - Thin Section (in mm dia.)	TS (SI)	Thin Section (SI) (PPT)
CS - Core Sample	W - Water Sample	TS (SI)	Thin Section (SI) (PPT)
CS - Core Sample	W - Water Sample	TS (SI)	Thin Section (SI) (PPT)
CS - Core Sample	W - Water Sample	TS (SI)	Thin Section (SI) (PPT)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 231260
NORTHING: 6407410
DIP/AZIMUTH: 90°/-

BORE No: A06
PROJECT No: 49761
DATE: 10 - 12/9/2013
SHEET 2 OF 6

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
		SANDSTONE - Extremely low strength, extremely weathered, grey mottled yellow brown/red brown, fine to coarse grained sandstone							
	10.85	SANDSTONE - High strength, slightly weathered, light orange fine to medium grained sandstone							
	11			C	11.17		PL(A) = 1.82 PL(D) = 1.41		11
		From 11.8m, interbedded with siltstone							
	12				11.9				12
	12.08	COAL - High strength, fresh, fractured black coal		C					
		From 12.85m, mudstone							
	12.89	CORE LOSS: 0.16m (12.89m - 13.05m)							
	13				13.05				13
	13.05	SILTSTONE - Medium strength, fresh, grey siltstone					PL(A) = 0.64 PL(D) = 0.59		
		From 13.7m, high strength with some sandstone laminations		C					14
	14								
	14.4	CARBONACEOUS SILTSTONE - High strength, fresh, dark brown carbonaceous siltstone							
	15				14.85				15
	15.91	COAL - High strength, fresh, black coal					PL(A) = 1.99		
	16	From 16.15m to 16.30m, tuffaceous laminations		C					16
	17	From 16.80m to 17.08m, carbonaceous siltstone band							17
	17.57	TUFFACEOUS CLAYSTONE - High strength, fresh, light grey tuffaceous claystone							
	18	From 17.77m to 18.07m, carbonaceous siltstone band					PL(A) = 1.24		18
	18.47	COAL - High strength, fresh, black coal							19
	19			C					
	19.51	SANDSTONE - High strength, fresh, grey fine to medium grained sandstone					PL(A) = 2.17		
				C	19.82 19.85				

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 10.6m
TYPE OF BORING: Solid flight auger to 10.5m, rock roller to 10.85m, HQ3 to 53.86m
WATER OBSERVATIONS: Free groundwater observed at 3.0m
REMARKS: 50% water loss at 13.5m

<ul style="list-style-type: none"> 1. Auger sample 2. Solid sample 3. Core sample 4. Disturbed sample 5. Environmental sample 6. Grab sample 7. Zone sample (in situ test) 8. Ring sample 9. Water sample 10. Water test 	<ul style="list-style-type: none"> 11. Cone sample 12. Split sample 13. Water sample 14. Water test 	<ul style="list-style-type: none"> 15. Field pressuremeter (FPM) 16. Field cone penetrometer (FCPT) 17. Field self-healing penetrometer (SHS) 18. Standard penetration test 19. Shear vane (SV)
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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 231260
NORTHING: 6407410
DIP/AZIMUTH: 90°/-

BORE No: A06
PROJECT No: 49761
DATE: 10 - 12/9/2013
SHEET 3 OF 6

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		SANDSTONE - High strength, fresh, grey fine to medium grained sandstone (continued)					PL(D) = 1.25			
	21		C		21.1				21	
					21.41		PL(A) = 2.84 PL(D) = 1.84			
			GT002		21.45					
					21.75					
	22		C						22	
	23	From 23.05m, medium strength, coarse grained			23.21				23	
			GT003		23.51		PL(A) = 1.08			
					23.56					
	24	From 24.05m, some fine to medium sized gravel			24.05				24	
	25								25	
	25.08	COAL - High strength, fresh, black coal	C						25	
	26				26.66		PL(A) = 2.12		26	
	27				27.09				27	
					27.51		PL(A) = 1.77			
	28								28	
	28.67		C		28.51		PL(A) = 1.35		28	
	29	SANDSTONE - High strength, fresh, dark grey, medium to coarse grained sandstone			28.94		PL(A) = 1.97 PL(D) = 1.71		29	
			GT004		28.98					
					29.28					
		From 29.33m, grey, fine to medium grained			29.87		PL(A) = 2.29			

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 10.6m
TYPE OF BORING: Solid flight auger to 10.5m, rock roller to 10.85m, HQ3 to 53.86m
WATER OBSERVATIONS: Free groundwater observed at 3.0m
REMARKS: 50% water loss at 13.5m

SAMPLING & IN SITU TESTING LEGEND			
1. Auger sample	11. Cone sampler	21. Plastic penetrometer test (PPM)	
2. Solid sampler	12. Water sampler	22. Field vane shear test (FVST) (S&B)	
3. Cone sampler	13. Water sampler (in situ - 45.1)	23. (S&B) Plastic penetrometer test (PPM)	
4. Standard sampler	14. Water sampler	24. Standard penetrometer test	
5. Environmental sampler	15. Water test	25. Shear vane (SV)	
	16. Cone sampler		
	17. Water sampler		
	18. (S&B) Plastic penetrometer test (PPM)		
	19. (S&B) Plastic penetrometer test (PPM)		
	20. Standard penetrometer test		

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 231260
NORTHING: 6407410
DIP/AZIMUTH: 90°/-

BORE No: A06
PROJECT No: 49761
DATE: 10 - 12/9/2013
SHEET 4 OF 6

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details
				Type	Depth	Sample	Results & Comments		
		SANDSTONE - High strength, fresh, dark grey, medium to coarse grained sandstone (continued)		C	30.14		PL(D) = 1.83		
31					C	31.4		PL(D) = 2.64	31
	32.7	SILTSTONE - High strength, fresh, grey siltstone with some sand			33.14		PL(A) = 1.93		
33						33.18		PL(D) = 1.2	33
34					C				34
35					C	35.2		PL(A) = 2.28 PL(D) = 1.11	35
	36.83	SANDSTONE - High to very high strength, fresh, grey fine to medium grained sandstone			36.14				
36					G7005	36.44		PL(A) = 2.41 PL(D) = 1.63	36
						36.49			
37					C				37
38					C	38.48		PL(A) = 3.78 PL(D) = 2.6	38
				C	39.15			39	

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 10.6m
TYPE OF BORING: Solid flight auger to 10.5m, rock roller to 10.85m, HQ3 to 53.86m
WATER OBSERVATIONS: Free groundwater observed at 3.0m
REMARKS: 50% water loss at 13.5m

P - Auger sample B - Soil sample BH - Soil sample C - Cone sample D - Dilatometer sample E - Environmental sample	S1 - Soil sample T1 - Triaxial sample U1 - U-tube sample (in situ test) W1 - Water sample Y - Water level	P(C) - Photo cross-section (PCC) PL(A) - Plast. limit (ASTM D 2922) (40%) PL(D) - Plast. limit (ASTM D 2922) (60%) S - Standard penetration test T - Shear vane (ASTM)
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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 231260
NORTHING: 6407410
DIP/AZIMUTH: 90°/-

BORE No: A06
PROJECT No: 49761
DATE: 10 - 12/9/2013
SHEET 5 OF 6

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	41	SANDSTONE - High to very high strength, fresh, grey fine to medium grained sandstone (continued) From 40.19m to 40.3m, sideritic From 40.3m, interbedded with siltstone		C	40.34		PL(A) = 3.94 PL(D) = 1.67			
	41.29	SILTSTONE - High strength, fresh, grey siltstone			41.68		PL(A) = 1.74 PL(D) = 1.12			
	42	MUDSTONE - High strength, fresh, grey mudstone			42.15					
	43	From 42.70m, tuffaceous band 110mm thick			42.78		PL(A) = 1.61 PL(D) = 1			
	44	From 43.5m to 43.97m, interbedded with sandstone		C	44.38		PL(A) = 1.85			
	45	SANDSTONE - High strength, fresh, grey fine grained sandstone			45.13					
	46			C	46.1		PL(A) = 2.26 PL(D) = 1.71			
	47				46.97	QT006				
	48				47.26 47.3		PL(A) = 1.21			
	49	From 48.21m, interbedded with mudstone laminations up to 15mm thick			48.12					
	49.19	MUDSTONE - High strength, fresh, brown and grey mudstone with fine grained sandstone laminations up to 10mm thick		C						

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 10.6m
TYPE OF BORING: Solid flight auger to 10.5m, rock roller to 10.85m, HQ3 to 53.86m
WATER OBSERVATIONS: Free groundwater observed at 3.0m
REMARKS: 50% water loss at 13.5m


1 - Auger sample	11 - Soil sample	21 - Field vane shear test (FVT)
2 - Solid sample	12 - Water sample	22 - PL(A) Field test per AS 1289 (1999)
3 - Core sample	13 - Tensile strength (TS) test	23 - PL(D) Field test per AS 1289 (1999)
4 - Disturbed sample	14 - Slant sample	24 - Unconfined compression test (UCT)
5 - Undisturbed sample	15 - Water level	25 - Shear vane (SV)
	16 - Water level	

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 231260
NORTHING: 6407410
DIP/AZIMUTH: 90°/-

BORE No: A06
PROJECT No: 49761
DATE: 10 - 12/9/2013
SHEET 6 OF 6

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
	50.32	SANDSTONE - High strength, fresh, grey fine grained sandstone MUDSTONE - High strength, fresh, grey and brown mudstone with some interbedded siltstone		C	50.23		PL(A) = 1.21	
	50.67							
	51				51.12			51
	52				51.93		PL(A) = 1.35	52
	53							53
	53.86	Bore discontinued at 53.86m , limit of investigation			53.86			54
	54							54
	55							55
	56							56
	57							57
	58							58
	59							59

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 10.6m
TYPE OF BORING: Solid flight auger to 10.5m, rock roller to 10.85m, HQ3 to 53.86m
WATER OBSERVATIONS: Free groundwater observed at 3.0m
REMARKS: 50% water loss at 13.5m

P - Auger sample B - Soil sample C - Cone sample D - Dilatant sample E - Environmental sample	S - Soil sample T - Tensile sample A - Aligned sample W - Water sample V - Water level	P(C) - Pushed sampler PL(A) - Pushed sampler S(S) - Soil sample S(W) - Soil sample S(T) - Soil sample S(V) - Soil sample	P(C) - Pushed sampler PL(A) - Pushed sampler S(S) - Soil sample S(W) - Soil sample S(T) - Soil sample S(V) - Soil sample
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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 231260
NORTHING: 6407410
DIP/AZIMUTH: 90°/-

BORE No: A06-D
PROJECT No: 49761
DATE: 28/2/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction	
				Type	Depth	Sample		Results & Comments	Stickup	Details
	0.3	SILTY CLAY/CLAYEY SILT - (Stiff), dark brown silty clay/clayey silt, with some sand, M>Wp							
	1.0	SILTY SAND - Medium dense, brown silty fine to coarse grained sand, with some fine sized subrounded gravel, humid		S	1.0		5.6.8 N = 14		
	1.4	SILTY CLAY - Very stiff, brown silty clay with some fine to coarse grained sand, M<Wp			1.45				
	2.5	SILTY SAND - Loose, yellow brown silty, fine to coarse grained sand, with trace clay, saturated		S	2.5		3.2.3 N = 5		
	2.95				2.95				From 0m to 5.7m, backfill cuttings
	4.0	SAND - Loose, brown, fine to coarse grained sand with some silt, saturated		S	4.0		3.3.3 N = 6		
	4.45				4.45				
	5.0	CLAYEY SAND - Loose, fine to coarse grained clayey sand with interbedded sandy clay, saturated			5.5		50kPa (sandy clay -50mm) 3.1.1 N = 2		
	5.6			pp S	5.6				
	5.95				5.95				From 5.7m to 6.9m, bentonite
	7.0	SANDY CLAY - Soft to firm, grey mottled yellow brown, fine to coarse grained sandy clay with trace fine sized subrounded gravel, M>Wp		pp S pp	7.0 7.1 7.3 7.45		50kPa 3.7.12 N = 19 >450kPa		
	7.3m	From 7.3m, hard							
	8.5			S	8.5		2.17.17 N = 34		From 6.9m to 10m, gravel From 7m to 10m, screen
	8.95				8.95				
	9.3	GRAVELLY CLAY - Hard, yellow brown, slightly sandy, fine to medium sized subangular gravelly clay with some coarse sized, subrounded gravel and subrounded cobbles, M>Wp							
	10.0				10.0				

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 10.0m
WATER OBSERVATIONS: Free groundwater observed at 2.4m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test (kPa) (MPa)
BLK Block sample	U Tuber sample (ø mm dia.)	PL(D) Point load diametral test (kPa) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
CO Disturbed sample	Wp Water seep	S Standard penetration test
E Environmental sample	Wl Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 231260
NORTHING: 6407410
DIP/AZIMUTH: 90°/-

BORE No: A06-D
PROJECT No: 49761
DATE: 28/2/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	10.27	SANDSTONE - Extremely low strength, extremely weathered, grey mottled yellow brown/red brown, fine to coarse grained sandstone Bore discontinued at 10.27m, limit of investigation	[Dotted Pattern]	S	10.27		21, 45/120mm		END CAP	
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 10.0m
WATER OBSERVATIONS: Free groundwater observed at 2.4m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PLA Point load axial test (t/50) (MPa)
BLK Block sample	U Tube sample (ø mm dia.)	PLD Point load diametral test (t/50) (MPa)
C Core drilling	W Water sample	gp Pocket penetrometer (kPa)
CD Disturbed sample	W- Water seep	S Standard penetration test
E Environmental sample	W- Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 231260
NORTHING: 6407410
DIP/AZIMUTH: 90°/-

BORE No: A06-S
PROJECT No: 49761
DATE: 28/2/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction	
				Type	Depth	Sample	Results & Comments		Stickup 0.7m	Details
	0.3	SILTY CLAY/CLAYEY SILT - (Stiff), dark brown silty clay/clayey silt, with some sand, M>Wp								
	1	SILTY SAND - Medium dense, brown silty fine to coarse grained sand, with some fine sized subrounded gravel, humid							From 0m to 1.2m, bentonite	
	1.4	SILTY CLAY - Very stiff, brown silty clay with some fine to coarse grained sand, M<Wp								
	2						▼			
	2.5	SILTY SAND - Loose, yellow brown silty, fine to coarse grained sand, with trace clay, saturated							From 1.2m to 4.54m, gravel From 1.54m to 4.54m, screen	
	3									
	4	SAND - Loose, brown, fine to coarse grained sand with some silt, saturated								
	4.0									
	4.54	Bore discontinued at 4.54m, limit of investigation							End cap	
	5									
	6									
	7									
	8									
	9									

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 4.54m
WATER OBSERVATIONS: Free groundwater observed at 2.4m
REMARKS: Bore located immediately adjacent A06-D. Strata inferred from A06-D Borehole Log

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PLA Point load axial test (t/50) (MPa)
BLX Block sample	U Tube sample (ø mm dia.)	PLD Point load diametral test (t/50) (MPa)
C Core drilling	W Water sample	gp Pocket penetrometer (kPa)
CO Disturbed sample	Wp Water seep	S Standard penetration test
E Environmental sample	Wl Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 267.35 AHD
EASTING: 230231
NORTHING: 6408492
DIP/AZIMUTH: 90°/-

BORE No: A08D
PROJECT No: 49761.02
DATE: 23/5/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
267.35	0.4	SAND - (Very loose) brown fine to medium grained sand, some silt, humid From 0.1m, increase clay content	[Dotted pattern]					Stickup = 0.5m From 0m to 0.2m, bentonite
267.35	1.0	CLAY - Very stiff, dark grey-brown clay, trace to some silt, trace fine to medium grained sand, M>Wp	[Diagonal lines]					
267.35	1.5			pp	1.5			
267.35	1.6			S	1.6			
267.35	1.85			S	1.85		200-250 kPa 3.5.7 N = 12	
267.35	1.95			S	1.95			
267.35	2.6			S, pp	2.6		4.4.6 N = 10 160-250 kPa	From 0.2m to 5m, backfill cuttings and gravel
267.35	3.0	CLAYEY SAND - Loose brown clayey fine to coarse grained sand, trace to some subrounded gravel up to 5mm diameter, trace silt, saturated	[Dotted pattern]		3.05			
267.35	3.6	CLAY - (Soft) dark brown-grey clay, trace silt, M>Wp	[Diagonal lines]					
267.35	4.1				4.1			
267.35	4.15	SAND - Loose to medium dense fine to medium grained sand, slightly clayey, trace silt, saturated	[Dotted pattern]				3.4.6 N = 10	
267.35	4.85	CLAY - Very soft dark brown-grey clay, trace silt, M>Wp	[Diagonal lines]		4.85			
267.35	5.65				5.6			From 5m to 5.4m, bentonite
267.35	5.8	CLAYEY SAND - Very loose light brown fine to medium grained sand, trace to some silt, trace subrounded gravel up to 5mm diameter, saturated	[Dotted pattern]				3.2.1 N = 3	
267.35	6.05	SILTY SAND - Very loose light brown fine to medium grained silty sand, saturated	[Dotted pattern]		6.05			
267.35	6.6	CLAY - Very stiff light brown clay, M>Wp	[Diagonal lines]					
267.35	7.1				7.1			From 5.4m to 5.6m, gravel
267.35	7.3	SAND - Medium dense light grey fine to medium grained sand, saturated	[Dotted pattern]		7.3			From 5.6m to 5.6m, 50mm diameter Class 18 machine slotted PVC screen
267.35	7.55	CLAY - Stiff light brown and grey clay, M>Wp	[Diagonal lines]		7.55		150-200 kPa 4.3.6 N = 9 230-280 kPa	
267.35	7.8							
267.35	8.6	SAND - Medium dense brown-yellow fine to coarse grained sand, trace subrounded gravel up to 10mm diameter, saturated	[Dotted pattern]		8.6			End cap
267.35	9.0							
267.35	9.05	SANDSTONE - Extremely weathered, extremely low strength, brown, fine to coarse grained sandstone Bore discontinued at 9.05m, limit of investigation	[Dotted pattern]		9.05		10.12.16 N = 28	

RIG: Total (Envirodrill)

DRILLER: Foody

LOGGED: Holden

CASING: HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 8.6m

WATER OBSERVATIONS: Free groundwater observed at 3.0m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test (kPa)
BLK Block sample	U Tube sample (ø mm dia.)	PL(D) Point load diametral test (kPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
CO Disturbed sample	Wp Water seep	S Standard penetration test
E Environmental sample	Wl Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 267.35 AHD
EASTING: 230229
NORTHING: 6408492
DIP/AZIMUTH: 90°/-

BORE No: A08S
PROJECT No: 49761.02
DATE: 23/5/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
267.35	0.4	SAND - (Very loose) brown fine to medium grained sand, some silt, humid From 0.1m, increase clay content	[Dotted pattern]					Stickup = 0.5m From 0m to 0.3m, bentonite
267.35	1	CLAY - Very stiff, dark grey-brown clay, trace to some silt, trace fine to medium grained sand, M-Wp	[Diagonal lines]					From 0.3m to 1.5m, backfill cuttings and gravel
267.35	2			pp S	1.5 1.6 1.65 1.95		200-250 kPa 3.5.7 N = 12	From 1.5m to 1.8m, bentonite
267.35	3	CLAYEY SAND - Loose brown clayey fine to coarse grained sand, trace to some subrounded gravel up to 5mm diameter, trace silt, saturated	[Dotted pattern]	S, pp	2.6 3.05		4.4.6 N = 10 160-250 kPa	From 1.8m to 5.0m, gravel From 2.0m to 5.0m, 50mm diameter Class 18 machine silted PVC screen
267.35	4	CLAY - (Soft) dark brown-grey clay, trace silt, M-Wp	[Diagonal lines]					
267.35	4.15	SAND - Loose to medium dense fine to medium grained sand, slightly clayey, trace silt, saturated	[Dotted pattern]	S	4.1		3.4.6 N = 10	
267.35	4.85	CLAY - Very soft dark brown-grey clay, trace silt, M-Wp	[Diagonal lines]		4.85			
267.35	5.0	Bore discontinued at 5.0m, limit of investigation						End cap

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger to 5.0m
WATER OBSERVATIONS: Free groundwater observed at 3.0m
REMARKS: Well in close proximity to A08D, soil profile inferred from A08D Log

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test (t/50) (MPa)
BLK Block sample	U Tube sample (ø mm dia.)	PL(D) Point load diametral test (t/50) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
CC Core	Wp Water seep	S Standard penetration test
D Disturbed sample	Wl Water level	V Shear vane (kPa)
E Environmental sample		

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 255.35 AHD
EASTING: 228646
NORTHING: 6409921
DIP/AZIMUTH: 90°/-

BORE No: A09
PROJECT No: 49761.02
DATE: 26/7/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
249	0.5	SAND - (Loose) dark brown fine to medium grained sand, trace silt, humid	[Symbol]	A	0.5			Stickup = 0.5m
248	1.0	SAND - (Loose) brown fine to medium grained sand, trace subrounded gravel up to 20mm, trace silt, wet	[Symbol]	A	1.0			From 0m to 0.4m, bentonite
247	1.5	From 1.3m, increasing gravel content	[Symbol]	S	1.5			▼
246	1.5	From 1.5m, saturated	[Symbol]	S	1.95		3.3.3 N = 6	
245	2.0	GRAVELLY SAND/SANDY GRAVEL - (Loose) dark brown fine to coarse grained sandy gravel/gravelly sandy gravel, subrounded up to 40mm, some silt, trace clay, saturated	[Symbol]	A	2.5			
244	2.0	From 2.0m, some boulders up to 300mm	[Symbol]	S	3.1		11, 11, 12 N = 23	
243	3.0	GRAVELLY CLAYEY SAND - Medium dense, brown gravelly clayey fine to coarse grained sand, gravel subrounded up to 20mm, trace silt, saturated	[Symbol]	S	3.55			From 0.4m to 6.6m, gravel
242	4.0	From 2.5m, increasing clay content	[Symbol]	S	4.6		12, 13, 10 N = 23	From 0.6m to 6.6m, 50mm diameter Class 18 machine slotted PVC screen
241	5.0	From 4.6m, gravelly sand, trace to some clay	[Symbol]	S	5.05			
240	6.0		[Symbol]	S	6.1		9, 17, 18 N = 25	
239	6.5		[Symbol]	S	6.55			End cap
238	6.85	SANDSTONE - Extremely low strength, extremely weathered, brown mottled grey fine to medium grained sandstone	[Symbol]	S	6.75		20, 20 for 60mm/150mm	
237	7.0	Bore discontinued at 6.85m, limit of investigation	[Symbol]	S	6.85			

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 6.75m
WATER OBSERVATIONS: Free groundwater observed at 1.5m
REMARKS:

A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test (kN/50) (MPa)
BLK Block sample	U Tube sample (ø mm dia.)	PL(D) Point load diametral test (kN/50) (MPa)
C Core drilling	W Water sample	gp Pocket penetrometer (kPa)
CC Disturbed sample	Wp Water seep	S Standard penetration test
E Environmental sample	Wl Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 278.25 AHD
EASTING: 230457
NORTHING: 6408650
DIP/AZIMUTH: 90°/-

BORE No: A10
PROJECT No: 49761.02
DATE: 23/5/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
278.25	0.4	SILTY CLAY - (Stiff), dark brown silty clay, some sand, M>Wp						From 0m to 0.2m, bentonite
		SAND - (Loose), brown fine to medium grained sand, slightly silty, trace clay, humid						
277	1.0	CLAY - Very stiff, dark brown clay, some silt, M>Wp						From 0.2m to 2.3m, backfill cuttings
				1.5				
				1.6			4.78 N = 15 340-440 kPa	
	1.75	SAND - Medium dense, grey fine to medium grained sand, trace silt, moist		sp				
276	2.1	CLAY - Very stiff, dark brown clay, trace silt, M>Wp						From 2.3m to 2.6m, bentonite
				2.6				
	2.75	SAND - Medium dense, grey fine to medium grained sand, trace silt, some clay, saturated		sp			4.79 N = 16 230-240 kPa	
275	3.0			3.05				
	3.3	SANDY CLAY - Firm, dark brown sandy clay, trace silt, M>Wp						
274	4.15	SAND - Medium dense, brown, fine to medium grained sand, some clay, trace silt, saturated		S			5.67 N = 13	▼
				4.1				
				4.55				
273	5.0	SANDY CLAY - (Soft), brown, fine to medium sandy clay, M>Wp (inferred from drill cuttings)						
				5.5			3.35 N = 8	
	5.55	CLAYEY SAND - (Medium dense), clayey fine to medium sand, saturated (inferred from cuttings)		S				
272	6.0			6.05				From 2.6m to 6m, gravel From 3m to 6m, 50mm diameter Class 18 machine slotted PVC screen
	6.4	CLAYEY SAND - (Medium dense), clayey fine to medium grained sand, saturated (inferred from cuttings)						
	6.8	SAND - Medium dense, brown fine to coarse grained sand, some to slight subrounded gravel up to 30mm diameter, trace to some clay, trace silt, saturated From 6.8m to 8m, bands of clay and sandy clay observed in cuttings		S			4.8.12 N = 20	
271	7.0			7.1				
				7.55				
270	8.0	SANDY CLAY - Medium dense, grey fine to coarse grained sandy clay, trace subrounded gravel, trace silt, M>Wp						
	8.65	CLAY - Very stiff, grey clay, trace silt, M>Wp		sp			200-250 kPa	
	8.85			8.85			5.5.18 N = 23	
	9.0	GRAVELLY SAND - Medium dense, brown gravelly fine to coarse grained sand, subrounded gravel up to 40mm diameter, trace silt, saturated From 9.1m to 9.6m, bands of clay observed in cuttings		S				End cap
268	9.8			9.05				
	9.8	GRAVELLY CLAY / CLAYEY GRAVEL - Hard,						
	10.6							

RIG: Total (Envirodrill)

DRILLER: Foody

LOGGED: Holden

CASING: HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 10.1m

WATER OBSERVATIONS: Free groundwater observed at 4.5m

REMARKS:


SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	GD	Gas sample
B	Block sample	P	Piston sample
BLK	Block sample	LI	Tube sample (10 mm dia.)
C	Core drilling	W	Water sample
CC	Disturbed sample	W	Water seep
CC	Environmental sample	W	Water level
		PD	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (kPa)
		PL(D)	Point load diametral test (kPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 278.25 AHD
EASTING: 230457
NORTHING: 6408650
DIP/AZIMUTH: 90°/-

BORE No: A10
PROJECT No: 49761.02
DATE: 23/5/2012
SHEET 2 OF 2

BL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	10.00	yellow-brown slightly fine to coarse sandy gravel, subrounded to 20mm diameter, M-Wp SANDSTONE - Extremely low strength, extremely weathered, yellow / light brown mottled red-brown, fine to coarse grained sandstone Bore discontinued at 10.55m, limit of investigation		S	10.1		28.27.24 N = 51		
	10.55								
	11								
	12								
	13								
	14								
	15								
	16								
	17								
	18								
	19								

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 10.1m
WATER OBSERVATIONS: Free groundwater observed at 4.5m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PLA Point load axial test (t/50) (MPa)
BLK Block sample	U Tube sample (ø mm dia.)	PLD Point load diametral test (t/50) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
CO Core	Wp Water seep	S Standard penetration test
D Disturbed sample	Wl Water level	V Shear vane (kPa)
E Environmental sample		

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 230167
NORTHING: 6402188
DIP/AZIMUTH: 90°/-

BORE No: A11-D
PROJECT No: 49761
DATE: 1/3/2012
SHEET 1 OF 2

Borehole ID	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	Stickup (0.0m)	Screen
	1.0	SANDY SILT - (Stiff), dark brown, fine to coarse grained sandy silt, M-Wp (humid)	[Graphic Log Pattern]						
	1.0 - 1.45	SAND - Medium dense, brown/grey brown, slightly silty, fine to coarse grained sand, humid At 1.4m, medium to coarse grained sand	[Graphic Log Pattern]	S	1.0 1.45		6.74 N = 11		
	2.5 - 2.95	From 2.5m, fine to coarse grained sand with trace silt and fine sized subrounded gravel	[Graphic Log Pattern]	S	2.5 2.95		3.42 N = 6		From 0m to 4.8m, backfill cuttings
	3.8 - 4.4	SANDY CLAY / CLAYEY SAND - Stiff, brown/grey brown, fine to coarse grained sandy clay/clayey sand, M-Wp SILTY CLAY - Stiff, grey brown silty clay with thin clayey sand and sand lenses, M-Wp	[Graphic Log Pattern]	pp S pp	4.15 4.2 4.4 4.6		100kPa 3.33 N = 6 150kPa		
	5.65 - 6.1	From 5.65m to 5.9m, predominantly silt with slightly to some fine grained sand	[Graphic Log Pattern]	pp S pp	5.65 5.7 5.95 6.1		80kPa 3.44 N = 8 180kPa		From 4.8m to 6.1m, bentonite
	7.15 - 7.6	From 7.15m, very stiff SAND - Medium dense, grey, fine to medium grained sand with some coarse grained sand, trace silt, saturated	[Graphic Log Pattern]	pp S	7.15 7.2 7.6		300kPa 5.8, 11 N = 19		
	8.0 - 8.65	From 8.0m, some fine to medium sized subrounded gravel From 8.65m, fine to coarse grained sand, sandy clay in parts, trace coarse sized subrounded gravel	[Graphic Log Pattern]	S	8.65 9.1		13, 10.8 N = 18		From 6.1m to 12.2m, gravel From 6.2m to 12.2m, screen

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 13.15m
WATER OBSERVATIONS: Free groundwater observed at 1.7m
REMARKS:



SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	U-tube sample (ø mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	▼	Water level
		FD	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (kN/m²) (MPa)
		PL(D)	Point load diametral test (kN/m²) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 230167
NORTHING: 6402188
DIP/AZIMUTH: 90°/-

BORE No: A11-D
PROJECT No: 49761
DATE: 1/3/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
	10.2	SANDY GRAVEL - Dense, yellow brown, fine to coarse grained sandy, fine sized subrounded gravel with some medium sized subrounded gravel, trace coarse sized subrounded gravel, trace silt, saturated		S	10.1		25/100mm (no recovery)	
				S	10.2		11,11,16 N = 27	
					10.65			
					11.65	S			7, 1500mm bouncing (no recovery)
					12.1			End cap
	13.15	SILTSTONE - Extremely low strength, extremely weathered, gray siltstone Bore discontinued at 13.25m, limit of investigation		S	13.15		25/100mm	
	13.25				13.25			

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 13.15m
WATER OBSERVATIONS: Free groundwater observed at 1.7m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PI(D) Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test (t/50) (MPa)
BLX Block sample	U Tube sample (ø mm dia.)	PL(D) Point load diametral test (t/50) (MPa)
C Core drilling	W Water sample	gp Pocket penetrometer (kPa)
CD Disturbed sample	Wp Water seep	S Standard penetration test
E Environmental sample	Wl Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 230167
NORTHING: 6401288
DIP/AZIMUTH: 90°/-

BORE No: A11-S
PROJECT No: 49761
DATE: 1/3/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments		Stickup 0.0m	
		SANDY SILT - (Stiff), dark brown, fine to coarse grained sandy silt, M-Wp (humid)	| | | | |						From 0m to 0.8m, bentonite	
	1.0	SAND - Medium dense, brown/grey brown, slightly silty, fine to coarse grained sand, humid At 1.4m, medium to coarse grained sand					▼		
	2									
	3	From 2.5m, fine to coarse grained sand with trace silt and fine sized subrounded gravel	. . . . .						From 0.8m to 3.9m, gravel From 0.8m to 3.9m, screen
	3.8 3.9	SANDY CLAY / CLAYEY SAND - Stiff, brown/grey brown, fine to coarse grained sandy clay/clayey sand, M-Wp Bore discontinued at 3.9m, limit of investigation	| | | | |						End cap	
	4									
	5									
	6									
	7									
	8									
	9									

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 3.9m
WATER OBSERVATIONS: Free groundwater observed at 1.7m
REMARKS: Bore located immediately adjacent A11-D, strata inferred from A11-D Borehole Log

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PLA Point load axial test (t/50) (MPa)
BLK Block sample	U Tube sample (ø mm dia.)	PLD Point load diametral test (t/50) (MPa)
C Core drilling	W Water sample	gp Pocket penetrometer (kPa)
CD Disturbed sample	Wp Water seep	SL Standard penetration test
E Environmental sample	Wl Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 341.50 AHD
EASTING: 229867
NORTHING: 6398595
DIP/AZIMUTH: 90°/-

BORE No: A12
PROJECT No: 49761.02
DATE: 17/5/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
341.50	0.1	SAND - (Very loose), grey fine sand, trace silt, humid						Stickup = 0.5m From 0m to 0.2m, bentonite
		SAND - Loose, grey-brown fine to coarse sand, trace silt, humid From 0.5m, wet From 0.8m, saturated						
340.50	1							
340.00		From 1.5m, trace subrounded gravel up to 10mm diameter		S	1.5		1.22 N = 4	
339.50	2				1.95			
339.00		From 3.0m to 3.1m, brown-orange clay lense		S	3.0		1.25 N = 7	
338.50	3				3.45			From 0.2m to 6.2m, gravel From 0.2m to 6.2m, 50mm diameter Class 18 machine slotted PVC screen
338.00	3.35	SAND - Loose, light grey fine to medium grained sand, trace to some clay, trace silt, saturated			3.45			
337.50	3.7	CLAY - (Soft), dark grey clay, (inferred from drill cuttings), M>Wp			4.0		3.22 N = 4 30-50 kPa	
337.00	4.0	SANDY CLAY - Soft, brown, fine to coarse sandy clay, trace silt, M>Wp From 4.1m to 4.45m, clay and clayey fine to coarse sand bands From 4.5m, increasing clay content			S _{pp}	4.45		
336.50	5				5.5		4.45 N = 9 30 kPa	
336.00	5.7	From 5.5m to 5.7m, clay with some fine to coarse sand, M>Wp		S _{pp}	5.95			
335.50	6	SANDY CLAY / CLAYEY SAND - Loose to stiff, light grey fine to medium grained sandy clay / clayey sand, trace silt, M>Wp (saturated)			7.0		3.48 N = 12 150-250 kPa	End cap
335.00	6.5	CLAY - Stiff to very stiff, light brown clay, trace subrounded gravel up to 10mm diameter, trace fine to medium grained sand, M>Wp		S _{pp}	7.45			
334.50	7	From 7.35m to 7.45m, light grey fine to medium grained sand band			8.5		7.8.9 N = 17	
334.00	8				8.95			
333.50	8.5	SAND - Medium dense, light grey fine to coarse grained sand, trace subrounded gravel up to 7mm diameter, trace silt, saturated		S	8.95			
333.00	9	From 9.2m, orange and light brown clay and sandy clay in parts			10.0			
332.50	9.8	GRAVELLY SAND - Medium dense, orange gravelly fine						
332.00	10.0							

RIG: Total (Envirodrill)

DRILLER: Foody

LOGGED: Holden

CASING: HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 10m

WATER OBSERVATIONS: Free groundwater observed at 0.8m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (25 mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PLD	Photo lithiation detector (ppm)
		PL(A)	Point load axial test (kSPa)
		PL(D)	Point load diametral test (kSPa)
		gp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 341.50 AHD
EASTING: 229867
NORTHING: 6398595
DIP/AZIMUTH: 90°/-

BORE No: A12
PROJECT No: 49761.02
DATE: 17/5/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	10.45	to coarse grained sand, trace silt, gravel subrounded up to 30mm diameter, saturated SANDSTONE - Very low strength, extremely weathered, orange and light brown, fine to coarse grained sandstone Bore discontinued at 10.45m, limit of investigation	[Dotted Pattern]	S	10.45		13,10.8 N = 18			
341	11									
340	12									
339	13									
338	14									
337	15									
336	16									
335	17									
334	18									
333	19									
332	20									

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 10m
WATER OBSERVATIONS: Free groundwater observed at 0.8m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PI(D) Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test (k50) (MPa)
BLK Block sample	U Tube sample (ø mm dia.)	PL(D) Point load diametral test (k50) (MPa)
CD Core drilling	W Water sample	gp Pocket penetrometer (kPa)
D Disturbed sample	Wp Water seep	S Standard penetration test
E Environmental sample	Wl Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 251.75 AHD
EASTING: 229527
NORTHING: 6411267
DIP/AZIMUTH: 90°/-

BORE No: A13
PROJECT No: 49761
DATE: 26/8/2011
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
251.75	1	SILTY CLAY - Dark brown-brown silty clay, trace fine to coarse grained sand, trace subangular, fine sized gravel		D				From 0.0m to 1.2m, grout	
251.20	1.5	CLAY - Brown-pale brown clay, trace fine grained sand, M>Wp		D	1.5			From 0.9m to 1.4m, bentonite	
248	3.0	SAND - Pale brown, fine to coarse grained sand, trace silt, trace gravel		D	3.5				
247	4.3	SAND/GRAVEL - Undifferentiated		D	4.5			From 1.2m to 7.2m, screen From 1.4m to 7.6m, gravel	
242	7.6	Bore discontinued at 7.6m, limit of investigation						From 7.2m to 7.6m, sump End cap	

RIG: Hydrapower MDR105 **DRILLER:** Myers (Macquarie) **LOGGED:** Benson **CASING:** HWT to 7.6m
TYPE OF BORING: 4% blade bit washbore
WATER OBSERVATIONS: Some water loss from 6.2m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PLA(A) Point load axial test (x20) (MPa)
BLX Block sample	U Tube sample (ø mm dia.)	PLD(C) Point load diametral test (x20) (MPa)
CD Core drilling	W Water sample	pp Pocket penetrometer (kPa)
CS Disturbed sample	wp Water seep	SPT Standard penetration test
EE Environmental sample	Wt Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 280.20 AHD
EASTING: 225363
NORTHING: 6406840
DIP/AZIMUTH: 90°/-

BORE No: A14
PROJECT No: 49761.02
DATE: 27/7/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
280.20	0.0	SILTY CLAY - (Stiff) dark brown silty clay, trace fine to medium grained sand, M>Wp	[Diagonal Hatching]	A	0.5			Stickup = 0.5m From 0m to 0.2m, bentonite
279	1.0		[Diagonal Hatching]	A	1.0			From 0.2m to 1.6m, backfill
278	1.4	CLAY - Hard, brown clay, trace silt, trace fine to medium grained sand, M>Wp	[Diagonal Hatching]		1.5			
		From 2.1m, trace silt and subangular gravel up to 10mm	[Diagonal Hatching]	sp	1.6		360-550 kPa 4.8,11 N = 19	
	2.0	From 2.6m, very stiff	[Diagonal Hatching]	A	2.5		5,10.5 N = 15 300-370 kPa	From 1.6m to 2.1m, bentonite
	2.8	CLAYEY SAND - Medium dense, brown clayey fine to medium grained sand, trace silt, trace subangular and subrounded gravel up to 10mm	[Diagonal Hatching]	S	2.8			
	3.0		[Diagonal Hatching]	sp	3.05			
	3.75	GRAVELLY CLAY - Very stiff, brown gravelly clay, gravel subangular and subrounded up to 20mm, M>Wp	[Diagonal Hatching]	S	4.1		5.9,15 N = 24	
	4.45	CLAYEY GRAVELLY SAND - Dense, brown clayey gravelly fine to coarse grained sand, gravel subangular to subrounded up to 20mm, trace silt, saturated	[Diagonal Hatching]	S	4.55			
	4.75	GRAVELLY SAND - Dense, brown mottled red gravelly fine to coarse grained sand, gravel subangular to subrounded up to 40mm, some clay, trace silt, saturated	[Diagonal Hatching]	S	5.6		9,18,20 N = 38	From 2.1m to 6.3m, gravel From 2.3m to 6.3m, 50mm diameter Class 16 machine slotted PVC screen
	6.0	From 5.75m, seepage (water loss)	[Diagonal Hatching]	S	6.05			
	7.0		[Diagonal Hatching]	S	7.1		12,23,17 N = 40	
	8.0		[Diagonal Hatching]	S	7.55			
	8.6	SILTY CLAY - Firm to stiff, yellowish brown silty clay, some fine to medium grained sand, M>Wp	[Diagonal Hatching]	S	8.6		10,5,7 N = 12 90-150 kPa	End cap
	9.75		[Diagonal Hatching]	sp	8.78			

RIG: Total (Envirodrill)

DRILLER: Foody

LOGGED: Holden

CASING: HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 11.45m

WATER OBSERVATIONS: Free groundwater observed at -4.0m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	PD	Photo ionisation detector (ppm)
B	Block sample	P	Piston sample
BLK	Block sample	U	Tube sample (ø mm dia.)
CD	Core drilling	W	Water sample
DS	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		sp	Standard penetration test
		V	Shear vane (kPa)
		PLU(A)	Point load axial test (kSPa)
		PLU(D)	Point load diametral test (kSPa)
		pp	Pocket penetrometer (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 280.20 AHD
EASTING: 225363
NORTHING: 6406840
DIP/AZIMUTH: 90°/-

BORE No: A14
PROJECT No: 49761.02
DATE: 27/7/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	10.3	GRAVELLY SAND - Medium dense, gravelly fine to coarse grained sand, gravel subangular to subrounded up to 40mm, some clay, trace to some silt, saturated (continued)	G	S	10.1		8,10,8 N = 18		
	10.3					10.4			
	11	SILTY SAND - Medium dense, light grey silty fine to medium grained sand, some subangular to subrounded gravel up to 20mm, saturated	S					11	
	11.25	SAND - Medium dense, brown fine to coarse grained sand, trace silt, saturated	S						
	11.75	SANDSTONE - Extremely low strength, extremely weathered, grey fine to coarse grained sandstone From 11.45m, drilling refusal	S		11.45		27,18,24 N = 42		
	11.75	Bore discontinued at 11.75m, limit of investigation			11.75				
	12							12	
	13							13	
	14							14	
	15							15	
	16							16	
	17							17	
	18							18	
	19							19	

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 11.45m
WATER OBSERVATIONS: Free groundwater observed at -4.0m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PLA Point load axial test (t/50) (MPa)
BLK Block sample	U Tube sample (ø mm dia.)	PLD Point load diametral test (t/50) (MPa)
C Core drilling	W Water sample	gp Pocket penetrometer (kPa)
CC Disturbed sample	Wp Water seep	S Standard penetration test
E Environmental sample	Wl Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 229.30 AHD
EASTING: 234816
NORTHING: 6405886
DIP/AZIMUTH: 90°/-

BORE No: A15
PROJECT No: 49761.02
DATE: 15 - 16/5/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	0.0	SANDY SILTY CLAY - (Very soft to soft), dark brown fine to medium sandy silty clay, M-Wp (humid)						From 0m to 0.1m, bentonite	
	0.7	SAND - Brown, fine to coarse grained sand, trace to some silt, trace subrounded gravel up to 10mm, wet From 0.8m, saturated					▼		
	1								
	2								
	3								
	4							From 0.1m to 6.2m, gravel From 0.3m to 6.3m, 50mm diameter Class 18 machine slotted PVC screen	
	5								
	6								
	6.3	Bore discontinued at 6.3m, limit of investigation						End cap	
	7								
	8								
	9								
	10								

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 6.3m
WATER OBSERVATIONS: Free groundwater observed at 0.8m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PLA Point load axial test (t/50) (MPa)
BLK Block sample	U Tube sample (ø mm dia.)	PLD Point load diametral test (t/50) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
D Disturbed sample	Wp Water seep	S Standard penetration test
E Environmental sample	Wl Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 219.50 AHD
EASTING: 226404
NORTHING: 6416905
DIP/AZIMUTH: 90°/-

BORE No: A16
PROJECT No: 49761.02
DATE: 26/7/2012
SHEET 1 OF 1

BL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details
				Type	Depth	Sample	Results & Comments		
	0.5	SANDY CLAY - (Soft) brown fine to medium grained sandy clay, some silt, M-Wp						0.5	Pickup at 0.5m From 0m to 0.1m, bentonite From 0.2m to 0.6m, casing From 0.1m to 1.3m, gravel From 0.2m to 1.3m, 50mm diameter Class 18 machine slotted PVC screen End cap
	1.3	Bore discontinued at 1.3m, limit of investigation						1.3	
	2							2	
	3							3	
	4							4	
	5							5	
	6							6	
	7							7	
	8							8	
	9							9	
	10							10	

RIG: **DRILLER:** Foody **LOGGED:** Holden **CASING:** Uncased
TYPE OF BORING: Shovel - by hand
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PI(D) Photo ionisation detector (ppm)
BB Bulk sample	P Piston sample	PL(A) Point load axial test (t/50) (MPa)
BLX Block sample	U Tube sample (ø mm dia.)	PL(D) Point load diametral test (t/50) (MPa)
C Core drilling	W Water sample	gp Pocket penetrometer (kPa)
D Disturbed sample	Wp Water seep	S Standard penetration test
E Environmental sample	Wl Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 230062
NORTHING: 6401194
DIP/AZIMUTH: 90°/-

BORE No: A17-D
PROJECT No: 49761
DATE: 28/2/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction	
				Type	Depth	Sample		Results & Comments	Stickup/0.00m	Details
	0.7	SANDY SILT - Stiff, dark brown, fine to coarse grained sandy silt, M>Wp	[Pattern]						
	1.0	CLAYEY SILT - Stiff to very stiff, dark brown clayey silt with some fine to coarse grained sand, M>Wp	[Pattern]						
	1.4	SAND and CLAY - Soft to firm, grey, fine to coarse grained sand and clay, M>>Wp (wet to saturated)	[Pattern]	pp	1.2		250kPa		
					1.4		2.3.1		
					1.45		N = 4		
							<50kPa		
	2.6	SILTY SAND - Loose, grey, fine to medium grained silty sand with trace coarse grained sand, saturated	[Pattern]	S	2.6		6.2.1		From 0m to 4.7m, backfill cuttings
					3.05		N = 3		
	4.1	SANDY CLAY - Stiff to very stiff, grey, fine to coarse grained sandy clay with trace fine sized subrounded gravel, M>Wp	[Pattern]	pp	4.1		130kPa		
				S	4.5		3.4.5		
				pp	4.55		N = 9		
							200 kPa		
	5.6	From 5.6m to 6.05m, firm, sandy clay with fine to coarse grained silty sand and sandy silt bands	[Pattern]	S	5.6		3.1.2		From 4.7m to 7.1m, bentonite
					6.05		N = 3		
	7.1	SILTY CLAY - Stiff, grey silty clay with some fine grained sand with thin sandy lenses (fine to medium grained), M>Wp	[Pattern]	pp	7.1		140kPa		
				pp	7.3		200kPa		
				S	7.5		3.4.5		
				pp	7.55		N = 9		
							100kPa		
	8.6	CLAYEY SAND and SANDY CLAY - Medium dense/stiff, grey mottled yellow brown/brown, fine to coarse grained clayey sand and sandy clay with some fine to medium sized subrounded gravel, (saturated), M>Wp	[Pattern]	S	8.6		6.6.8		From 7.1m to 11.3m, gravel
					9.05		N = 14		From 7.3m to 11.3m, screen
		From 9.3m to 9.5m, some fine to coarse sized, subrounded gravel							

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 11.6m
WATER OBSERVATIONS: Free groundwater observed at 1.5m
REMARKS:





SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test (kPa) (MPa)
BLK Block sample	U Tube sample (ø mm dia.)	PL(D) Point load diametral test (kPa) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
D Disturbed sample	Wp Water seep	S Standard penetration test
E Environmental sample	Wl Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 230062
NORTHING: 6401194
DIP/AZIMUTH: 90°/-

BORE No: A17-D
PROJECT No: 49761
DATE: 28/2/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample				Results & Comments
	10.5	From 10.2m to 10.3m, fine to medium grained sand band		S	10.1		43.9 N = 12 150kPa	11	End cap 
	11	GRAVELLY SAND - Medium dense, brown, fine to coarse sized subrounded gravelly fine to coarse grained sand, with some silt and clay, saturated		SP	10.4 10.55				
	11.7	SILTSTONE - Extremely low strength to very low strength, extremely weathered, grey siltstone		S	11.6	10, 20, 3080mm bouncing			
	12	Bore discontinued at 11.98m, limit of investigation			11.98				
	13								
	14								
	15								
	16								
	17								
	18								
	19								

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 11.6m
WATER OBSERVATIONS: Free groundwater observed at 1.5m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PI(D) Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test (t/50) (MPa)
BLX Block sample	LT Tube sample (ø mm dia.)	PL(D) Point load diametral test (t/50) (MPa)
C Core drilling	W Water sample	gp Pocket penetrometer (kPa)
CD Disturbed sample	Wp Water seep	S Standard penetration test
E Environmental sample	Wl Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 230062
NORTHING: 6401194
DIP/AZIMUTH: 90°/-

BORE No: A17-S
PROJECT No: 49761
DATE: 28/2/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction	
				Type	Depth	Sample	Results & Comments		Stickup	Details
	0.7	SANDY SILT - Stiff, dark brown, fine to coarse grained sandy silt, M-Wp	| | | | |							
	1	CLAYEY SILT - Stiff to very stiff, dark brown clayey silt with some fine to coarse grained sand, M-Wp	| | | | |							
	1.4	SAND and CLAY - Soft to firm, grey, fine to coarse grained sand and clay, M>>Wp (wet to saturated)	| | | | |				▼			
	2.6	SILTY SAND - Loose, grey, fine to medium grained silty sand with trace coarse grained sand, saturated	| | | | |							
	4.1	SANDY CLAY - Stiff to very stiff, grey, fine to coarse grained sandy clay with trace fine sized subrounded gravel, M-Wp	| | | | |							
	4.2	Bore discontinued at 4.2m, limit of investigation								
	4.2							End cap	End cap	
	5									
	6									
	7									
	8									
	9									

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 4.2m
WATER OBSERVATIONS: Free groundwater observed at 1.5m
REMARKS: Bore located immediately adjacent A17-D. Strata inferred from A17-D Borehole Log

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test (t/50) (MPa)
BLX Block sample	U Tube sample (ø mm dia.)	PL(D) Point load diametral test (t/50) (MPa)
C Core drilling	W Water sample	gp Pocket penetrometer (kPa)
CO Disturbed sample	Wp Water seep	S Standard penetration test
E Environmental sample	Wl Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 327.50 AHD
EASTING: 229979
NORTHING: 6400329
DIP/AZIMUTH: 90°/-

BORE No: A18
PROJECT No: 49761.02
DATE: 21/5/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well	
				Type	Depth	Sample		Results & Comments	Structure	Construction Details
327.50	0.0	SANDY SILT - Dark brown, fine to medium grained sandy silt, abundant organics, M<Wp (humid) From 0.5m, increasing clay content	| | | | |					From 0m to 0.2m, bentonite	| | | | |
326.50	1.0	SILTY CLAY - Dark brown silty clay, some to slightly (fine to medium) sandy, M>Wp	/ / / / /				▼		| | | | |
325.50	1.5	SAND - Very loose, fine to coarse grained sand, trace silt, trace subrounded gravel up to 5mm diameter, saturated	. . . . .	S	1.5		1.11 N = 2		| | | | |
324.50	1.95	SANDY CLAY - Very soft, dark brown fine to coarse grained sandy clay, some silt, M>>Wp	/ / / / /		1.95				| | | | |
323.50	2.7	From 2.5m, increasing sand content, trace subrounded gravel up to 5mm diameter	/ / / / /		2.7		0.10 N = 1		| | | | |
322.50	3.1	SAND - Very loose, dark brown fine to coarse grained sand, some clay, trace silt, trace subrounded gravel up to 5mm diameter, saturated	. . . . .		3.15			From 0.2m to 6.2m, gravel From 0.2m to 6.2m, 50mm diameter Class 18 machine slotted PVC screen	| | | | |
321.50	4.2	SAND - Loose, grey fine to coarse grained sand, trace silt, trace subrounded gravel up to 5mm diameter, saturated	. . . . .		4.2		2.44 N = 8		| | | | |
320.50	4.65	GRAVELLY SAND - Medium dense, brown gravelly fine to coarse grained sand, gravel subrounded up to 30mm diameter, trace silt, saturated	. . . . .		4.65				| | | | |
319.50	5.7		. . . . .		5.7		6.66 N = 12		| | | | |
318.50	6.15		. . . . .		6.15			End cap	| | | | |
317.50	7.1	SILTY SAND - Loose, brown silty fine to medium grained sand, saturated	- - - - -		7.2		2.23 N = 5		| | | | |
316.50	7.65		- - - - -		7.65				| | | | |
315.50	8.5	SANDY SILT - Stiff, grey sand brown fine to medium grained sandy silt, trace clay, M>Wp	| | | | |		8.7		4.45 N = 9		| | | | |
314.50	9.0	GRAVELLY SAND - Medium dense, brown gravelly fine to coarse grained sand, gravel, subrounded up to 20mm diameter, trace silt, saturated	. . . . .		9.15				| | | | |

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 11.7m
WATER OBSERVATIONS: Free groundwater observed at 1.5m
REMARKS:



SAMPLING & IN SITU TESTING LEGEND		
A	Auger sample	PD
B	Block sample	PL(A)
BLK	Block sample	PL(D)
C	Core drilling	gp
D	Disturbed sample	S
E	Environmental sample	W
G	Gas sample	Wp
P	Piston sample	Wt
U	Tube sample (ø mm dia.)	Wl
W	Water sample	Wv
W	Water seep	
W	Water level	
		PL(B)
		PL(C)
		pp
		S
		V
		Photo ionisation detector (ppm)
		Point load axial test (kN/25) (MPa)
		Point load diametral test (kN/25) (MPa)
		Pocket penetrometer (kPa)
		Standard penetration test
		Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 327.50 AHD
EASTING: 229979
NORTHING: 6400329
DIP/AZIMUTH: 90°/-

BORE No: A18
PROJECT No: 49761.02
DATE: 21/5/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
327 326 325 324 323 322 321 320 319 318 317 316 315 314 313 312 311 310 309 308 307	11 12	<p>GRAVELLY SAND - Medium dense, brown gravelly fine to coarse grained sand, gravel, subrounded up to 20mm diameter, trace silt, saturated (continued)</p> <p>From 10.3m to 10.33m, yellow-brown, fine to medium sand band</p> <p>From 10.5m to 10.53m, grey clay band, M>Wp</p>		S	10.2 10.65 11.7 12.15		<p>6.88 N = 14</p> <p>100mm, bouncing</p>	11 12	
	12.1 12.15	<p>SANDSTONE - Extremely low strength, extremely weathered, yellow- light brown mottled red-brown, fine to coarse grained sandstone</p> <p>Bore discontinued at 12.15m, limit of investigation</p>							

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 11.7m
WATER OBSERVATIONS: Free groundwater observed at 1.6m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
BB Bulk sample	P Piston sample	PLA Point load axial test (t/50) (MPa)
BLK Block sample	U Tube sample (ø mm dia.)	PLD Point load diametral test (t/50) (MPa)
CD Core drilling	W Water sample	gp Pocket penetrometer (kPa)
DS Disturbed sample	Wp Water seep	S Standard penetration test
ES Environmental sample	WL Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
 PROJECT: Bylong Confidential
 LOCATION: Bylong

SURFACE LEVEL: 246.25 AHD
 EASTING: 229995
 NORTHING: 6412730
 DIPIAZIMUTH: 90°/-

BORE No: A19
 PROJECT No: 49761.02
 DATE: 24/7/2012
 SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details Stickup = 0.5m
				Type	Depth	Sample			Results & Comments
242	0.3	CLAY - (Soft to firm) dark brown clay, some silt, M-Wp						From 0m to 1.7m, backfill and bentonite
		SILTY SAND - (Very loose to loose) dark brown silty fine to medium sand, some clay, humid						
241	1.3	CLAY - Hard, dark brown clay, some silt, trace fine to medium grained sand, M-Wp		S	1.5			From 1.7m to 2.0m, bentonite
				sp	1.9 1.95	8,11.18 N = 29 >400 kPa		
240	2.87	CLAYEY SAND - Medium dense, light grey and brown clayey fine to medium grained sand, trace silt, wet		S	2.54			From 2.0m to 5.2m, gravel From 2.2m to 5.2m, 50mm diameter Class 18 machine slotted PVC screen
		GRAVELLY SAND - Medium dense, brown gravelly fine to coarse grained sand, gravel subrounded up to 20mm, some to slightly clayey in parts, wet From 3.5m to 3.85m, light grey clay band (inferred from cuttings)		sp	2.87 2.90	8,7.7 N = 14 350-450 kPa		
240	4.4	GRAVELLY SANDSTONE - Extremely low strength, extremely weathered, red fine grained gravelly fine to coarse grained sandstone		S	4.04			End cap
				sp	4.40	8,11.11 N = 22		
240	5.0	CLAYSTONE - Extremely low strength, extremely weathered, grey claystone		S	5.54			
				sp	5.90	6,10.14 N = 24		
239	6.6	From 6.6m, drilling refusal Bore discontinued at 6.6m, limit of investigation						

RIG: Total (Envirodrill) DRILLER: Foody LOGGED: Holden CASING: HW to 2.5m
 TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 6.6m
 WATER OBSERVATIONS: Free groundwater observed at ~3.5m
 REMARKS:

SAMPLING & IN SITU TESTING LEGEND		
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test (kN) (MPa)
BLK Block sample	U Tube sample (ø mm dia.)	PL(D) Point load diametral test (kN) (MPa)
C Core drilling	W Water sample	gp Pocket penetrometer (kPa)
D Disturbed sample	Wp Water seep	S Standard penetration test
E Environmental sample	Wl Water level	V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 273.50 AHD
EASTING: 231188
NORTHING: 6407766
DIP/AZIMUTH: 90°/-

BORE No: A20
PROJECT No: 49761.02
DATE: 9/7/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details Stickup = 0.5m
				Type	Depth	Sample			Results & Comments
273.50	0.0	SAND - (Loose), dark brown fine to medium grained sand, some silt, trace clay, humid						
	1.0	CLAYEY SAND - (Loose) dark brown clayey fine to medium grained sand, some silt, humid to wet						From 0m to 0.9m, bentonite
	1.5	SANDY CLAY - (Soft) dark brown fine to medium grained sandy clay, some silt, M>Wp						
	1.5	From 1.5m, sandy clay / clayey sand (M>Wp)		S	1.5		2.22 N = 4	
	2.0	From 2.0m, saturated		pp	1.85 1.95		50-100 kPa	▼
	2.5	CLAY - Stiff, dark brown clay, trace to some silt, trace fine to medium grained sand, M>Wp						
	2.67	From 3.0m, trace fine grained subrounded gravel up to 5mm		S, pp	2.67 3.12		3.45 N = 9	
	3.12						180-200 kPa	
	4.3	SILTY CLAY - Very soft, light brown silty clay, trace fine to medium grained sand, M>Wp						
	4.3			pp	4.17 4.3		0-40 kPa	
	4.43	CLAY - Very stiff, brown mottled red and light grey clay, slightly silty, trace to some fine to medium grained sand, M>Wp						
	4.43			S	4.43		2.18 N = 7	
	4.62			pp	4.62		250-330 kPa	
	5.5	SANDY CLAY - Hard, light brown mottled red and light grey fine to medium grained sandy clay, trace to some silt, M>Wp						
	5.67			S, pp	5.67 6.12		6, 11, 14 N = 25	
	6.12						350-400 kPa	
	6.7	SANDSTONE - Extremely low strength, extremely weathered, brown fine to coarse grained sandstone						
	7.17			S	7.17		11, 33, bouncing	End cap
	7.47	CLAYSTONE - Extremely low strength, extremely weathered, brown mottled light grey claystone						
	7.47	Bore discontinued at 7.47m, limit of investigation			7.47			

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 7.17m
WATER OBSERVATIONS: Free groundwater observed at 2.0m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND		
A	Auger sample	FD
B	Block sample	PL(A)
BLK	Block sample	PL(D)
C	Core drilling	pp
CS	Disturbed sample	S
E	Environmental sample	W
G	Gas sample	W
P	Piston sample	W
U	Tube sample (ø mm dia.)	W
W	Water sample	W
W	Water seep	W
W	Water level	W
FD	Photo ionisation detector (ppm)	
PL(A)	Point load axial test (t/50) (MPa)	
PL(D)	Point load diametral test (t/50) (MPa)	
pp	Pocket penetrometer (kPa)	
S	Standard penetration test	
V	Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 2.58 AHD
EASTING: 230924
NORTHING: 6412502
DIP/AZIMUTH: 90°/-

BORE No: A22
PROJECT No: 49761.02
DATE: 22/10/2012
SHEET 1 OF 1

RI	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction	
				Type	Depth	Sample		Results & Comments	Details
	0.0	SAND - (Very loose), brown, fine grained sand with trace to some clay, humid		A	0.1			From 0m to 0.3m, asphalt and concrete	
	0.5	From 0.5m, slightly clayey with trace fine sized subangular gravel, damp		A	0.5				
1	1.0	From 1.0m, trace coal and gravel		S			3,4,4 N = 8	From 0.3m to 1.7m, backfill and cuttings From 0m to 2.2m, Class 18 PVC	
	1.45								
2	1.8	GRAVELLY SAND - (Medium dense), brown, fine to medium sized subangular gravelly fine to medium grained sand, trace to some clay, damp		S	2.5		4,17,25 N = 42	From 1.7m to 2.0m, bentonite	
	2.0	CLAYEY SAND - Dense, brown, fine to medium grained clayey sand, humid		S	2.95				
	3.0			A	3.3				
	3.8	From 3.3m, white fine to medium sized subangular gravel, dry to humid (slow drilling progress)		S, pp	4.0		6,15,19 N = 34 >400 kPa		
	4.0	From 3.8m, moist to wet		S	4.45				
5	5.0	CLAY - Hard, brown clay, slightly sandy with some sandstone in parts, M<Wp		S	5.5		9,13,21 N = 34	From 2.0m to 7.2m, 50mm gravel From 2.2m to 7.2m, 50mm diameter Class 18 machine slotted PVC screen	
	6.0			S	5.95				
	6.5	SANDSTONE - Low to medium strength, highly to moderately weathered, brown and grey, fine to medium grained sandstone with some clay in parts							
	7.0			S	7.2		10,16,29 N = 45	End cap	
	7.65	Bore discontinued at 7.65m, limit of investigation		S	7.65				

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 2.6m
TYPE OF BORING: Solid flight auger to 7.0m, wash bore to 7.2m
WATER OBSERVATIONS: Free groundwater observed at 3.4m during drilling
REMARKS:

A	Auger sample	S	Soil sample	PP	Pushed penetrometer test (PP)
W	Water sample	U	Uplift sample	PT	Pushed test (PT)
C	Cone sample	T	Tension sample	ST	Standard penetration test (SPT)
D	Disturbed sample	W	Water sample	S	Shear test (S)
E	Environmental sample	W	Water test	T	Shear test (T)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: A23
PROJECT No: 49761.02
DATE: 15-16/10/12
SHEET 1 OF 2

Bore No.	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction	
				Type	Depth	Sample		Results & Comments	Details	Diagram
A23	0.0 - 0.3	SAND - (Very loose), brown, fine grained sand with some silt and trace fine to medium sized subrounded gravel, humid At 0.5m, humid to damp	[Dotted pattern]	A	0.1			From 0m to 0.3m, asphalt and concrete	[Diagram: 0m to 0.3m]
	A			0.5					
	1.0 - 1.45	From 1.0m, loose	[Dotted pattern]	S	1.0		3.3,3 N = 6	From 0.3m to 2.9m, backfill and cuttings From 0m to 3.4m, Class 18 PVC	[Diagram: 0.3m to 2.9m]
					1.45				
	2.1 - 2.68	From 2.1m, fine to coarse grained sand	[Dotted pattern]	S,pp	2.68		2.3,2 N = 5 90-130 kPa	From 2.9m to 3.2m, bentonite	[Diagram: 2.9m to 3.2m]
					3.13				
	3.8 - 4.18	From 3.8m, trace gravel	[Diagonal lines]	S,pp	4.18		3.6,4 N = 10 120-170 kPa		[Diagram: 3.8m to 4.18m]
		From 4.18m, stiff	[Diagonal lines]		4.5				
	5.9 - 5.95	SAND - Loose to medium dense, brown, fine to medium grained sand, slightly clayey with trace silt, saturated	[Dotted pattern]	S	5.65		4.2,3 N = 5	From 3.2m to 9.4m, 5mm gravel From 3.4m to 9.4m, 50mm diameter Class 18 machine slotted PVC screen	[Diagram: 3.2m to 9.4m]
						5.95			
	6.25 - 7.15	GRAVELLY SAND - Very dense, brown, fine to coarse sized, subangular gravelly fine to coarse grained sand with some clay in parts, saturated	[Dotted pattern with circles]	S	7.15		15,15,18 N = 33		[Diagram: 6.25m to 7.15m]
						7.45			
8.0 - 9.4	SANDY GRAVEL - (Very dense), brown, fine to medium grained sandy fine sized subangular gravel, saturated	[Dotted pattern with circles]					End cap	[Diagram: 8.0m to 9.4m]	
	9.4 - 10.1						From 9.4m to 10.1m, backfilled	[Diagram: 9.4m to 10.1m]	

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 2.7m
TYPE OF BORING: Solid flight auger to 3.13m, wash boring to 10.15m
WATER OBSERVATIONS: Free groundwater observed at 5.0m
REMARKS:

S	Soil sample	W	Water sample
A	Auger sample	W1	Water sample (1st)
B	Block sample	W2	Water sample (2nd)
C	Core sample	W3	Water sample (3rd)
D	Disturbed sample	W4	Water sample (4th)
E	Environmental sample	W5	Water sample (5th)
PP	Penetration test	W6	Water sample (6th)
PT	Plate load test	W7	Water sample (7th)
PL	Pressuremeter test	W8	Water sample (8th)
PS	Pressuremeter test (small)	W9	Water sample (9th)
PT	Pressuremeter test (large)	W10	Water sample (10th)
PT	Pressuremeter test (small)	W11	Water sample (11th)
PT	Pressuremeter test (large)	W12	Water sample (12th)
PT	Pressuremeter test (small)	W13	Water sample (13th)
PT	Pressuremeter test (large)	W14	Water sample (14th)
PT	Pressuremeter test (small)	W15	Water sample (15th)
PT	Pressuremeter test (large)	W16	Water sample (16th)
PT	Pressuremeter test (small)	W17	Water sample (17th)
PT	Pressuremeter test (large)	W18	Water sample (18th)
PT	Pressuremeter test (small)	W19	Water sample (19th)
PT	Pressuremeter test (large)	W20	Water sample (20th)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: A23
PROJECT No: 49761.02
DATE: 15-16/10/12
SHEET 2 OF 2

RIG	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	10.12 10.15	SANDSTONE - Medium to high strength, highly to moderately weathered, brown, fine to coarse grained sandstone (continued) BASALT - Medium to high strength, fresh, black/dark brown, fractured basalt Bore discontinued at 10.15m, limit of investigation	[Symbol]		10.1 10.15		40/150mm		with sandstone	
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									

DRAFT

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 2.7m
TYPE OF BORING: Solid flight auger to 3.13m, wash boring to 10.15m
WATER OBSERVATIONS: Free groundwater observed at 5.0m
REMARKS:

(S) - Split sample	(T) - Test sample	(P) - Photo processed slurry (PP)	(S) - Slurry sample
(C) - Core sample	(L) - Liquid sample	(S) - Slurry sample	(S) - Slurry sample
(D) - Disturbed sample	(W) - Water sample	(S) - Slurry sample	(S) - Slurry sample
(E) - Environmental sample	(W) - Water sample	(S) - Slurry sample	(S) - Slurry sample

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: A24D
PROJECT No: 49761.02
DATE: 16/10/2012
SHEET 1 OF 1

Bore No.	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction	
				Type	Depth	Sample		Results & Comments	Details	Diagram
A24D	0.1	SAND - (Very loose), brown, fine grained sand with some silt and trace rootlets, humid		A	0.1			From 0m to 0.5m, concrete	
	A			0.5					
	1.2	SANDY SILT / SILTY SAND - Very loose, dark brown, fine to medium grained silty sand / sandy silt		S _{pp}	1.2		2.1.1 N = 2 30-60 kPa		
	S _{pp}			1.4					
	2.0	From 2.0m, some fine to medium sized subangular gravel						From 0m to 5.6m, Class 18 PVC From 0.5m to 4.8m, backfill and cuttings	
	2.8	GRAVELLY SAND - Loose, light brown, fine to medium sized subangular gravelly fine to coarse grained sand, trace silt, humid		S _{pp}	2.55		4.5.4 N = 9 220-240 kPa		
	3.0								
	4.1	From 4.1m, wet, slightly clayey						From 4.8m to 5.3m, bentonite	
	4.4	From 4.25m, saturated		S _{pp}	4.4		5.3.6 N = 9 80-120 kPa		
	4.45	CLAY - Stiff, dark brown clay with trace to some fine grained sand and trace silt, M>Wp							
	5.3	From 5.3m, trace to some fine sized subangular gravel						From 5.3m to 5.6m, 5mm gravel From 5.6m to 5.6m, 50mm diameter Class 18 machine slotted PVC screen	
	5.65	CLAYEY SAND - Very loose, brown, fine grained clayey sand with trace fine to medium sized gravel in parts, saturated		S	5.6		8.2.2 N = 4		
5.95									
7.2	From 7.2m, medium dense with firm to stiff sandy clay in parts						End cap		
7.65	SANDSTONE - Medium strength, highly to moderately weathered, red and brown fine to coarse grained sandstone		S _{pp}	7.2		3.5.4 N = 9 50-140 kPa			
7.65									
8.55	BASALT - High strength, moderately weathered to fresh, dark grey basalt Bore discontinued at 8.6m, limit of investigation		S	8.55		31.27.23 N = 50			
8.6									

RIG: Total (Envirodrill)

DRILLER: Foody

LOGGED: Fulham

CASING: HW to 2.4m

TYPE OF BORING: Solid flight auger to 2.55m, wash boring to 8.6m

WATER OBSERVATIONS: Free groundwater observed at 4.4m

REMARKS:

A	Auger sample	W	Water sample	PT	Pressure transducer (PT)
B	Ball sample	WT	Water test	PT (A)	Pressure transducer (PT) (A)
CB	Core barrel	TT	Triaxial test (in situ test)	PT (B)	Pressure transducer (PT) (B)
C	Core sample	AT	Atmospheric test	PT (C)	Pressure transducer (PT) (C)
D	Disturbed sample	WT	Water test	PT (D)	Pressure transducer (PT) (D)
E	Environmental sample	WT	Water test	PT (E)	Pressure transducer (PT) (E)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: A24S
PROJECT No: 49761.02
DATE: 16/10/2012
SHEET 1 OF 1

Bore	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction	
				Type	Depth	Sample		Results & Comments	Details
	0.0							Stickup = 0.00m	
	0.1	SAND - (Very loose), brown, fine grained sand with some silt and trace rootlets, humid		A	0.1			From 0m to 0.4m, concrete	
	0.5			A	0.5				
	1.2	SANDY SILT / SILTY SAND - Very loose, dark brown, fine to medium grained silty sand / sandy silt		S _{pp}	1.2		2.1.1 N = 2 30-60 kPa	From 0.4m to 1.9m, backfill and cuttings	
	1.4			S _{pp}	1.4			From 0m to 2.4m, Class 18 PVC	
	2.0	From 2.0m, some fine to medium sized subangular gravel						From 1.9m to 2.2m, bentonite	
	2.55			S _{pp}	2.55		4.5.4 N = 9 220-240 kPa		
	3.0	GRAVELLY SAND - Loose, light brown, fine to medium sized subangular gravelly fine to coarse grained sand, trace silt, humid		S _{pp}	3.0				
	4.1	From 4.1m, wet, slightly clayey		S _{pp}	4.1		5.3.6 N = 9 80-120 kPa	From 2.2m to 5.4m, 5mm gravel	
	4.4	From 4.25m, saturated		S _{pp}	4.4			From 2.4m to 5.4m, 50mm diameter Class 18 machine slotted PVC screen	
	4.45	CLAY - Stiff, dark brown clay with trace to some fine grained sand and trace silt, M>Wp		S _{pp}	4.45				
	5.4	From 5.3m, trace to some fine sized subangular gravel Bore discontinued at 5.4m, limit of investigation						End cap	
	6.0								
	7.0								
	8.0								
	9.0								

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 5.4m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
A - Auger sample	W - Water sample	PP - Pushed sampler	PPC - Pushed sampler (cuttings)
B - Bulk sample	U - Undisturbed sample	PS - Pushed sampler (silt)	PSA - Pushed sampler (silt)
C - Cone sampler	WU - Water sample (undisturbed)	SS - Shallow sampler	SSA - Shallow sampler (cuttings)
D - Disturbed sample	WU - Water sample (undisturbed)	S - Standard penetration test	S - Standard penetration test
E - Environmental sample	WU - Water sample (undisturbed)	Y - Shear vane (off)	Y - Shear vane (off)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
 PROJECT: Bylong Confidential
 LOCATION: Bylong

SURFACE LEVEL: --
 EASTING:
 NORTHING:
 DIP/AZIMUTH: 90°/-

BORE No: A25
 PROJECT No: 49761.02
 DATE: 17/10/2012
 SHEET 1 OF 1

Bore	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction	
				Type	Depth	Sample		Results & Comments	Stickup = 0.00m
		SAND - (Very loose), dark brown, fine grained sand with some silt and organics, humid		A	0.1			From 0m to 0.4m, concrete	
		From 0.5m, trace organics, damp		A	0.5				
1		From 1.0m, trace fine to medium sized subrounded gravel, some silt, damp to moist		S	1.0		3, 1, 2 N = 3	From 0.4m to 2.0m, backfill and cuttings From 0m to 2.5m, Class 18 PVC	
					1.45				
2		From 2.5m, medium dense, slightly silty, some gravel		S	2.5		4, 7, 8 N = 13	From 2.0m to 2.3m, bentonite	
					2.8				
3	3.2	GRAVELLY SAND - Light brown, fine to medium sized subangular gravelly fine to medium grained sand with trace clay							
4	4.0	SANDY CLAY - Hard, brown, fine to medium grained sandy clay, M+ Wp		S, pp	4.0		9, 14, 22 N = 36 550-600 kPa	From 2.3m to 5.5m, 5mm gravel From 2.5m to 5.5m, 50mm diameter Class 18 machine slotted PVC screen	
		SANDY CLAY / CLAYEY SAND - Dense, light grey, fine to medium grained sandy clay / clayey sand From 4.6m, some fine to medium sized subangular to subrounded gravel, damp			4.45				
5	5.3	SANDSTONE - Medium strength, highly to moderately weathered, brown, fine to medium grained sandstone with some fragmented basalt in parts and some fine to medium sized subangular gravel		S	5.5		27, 25/30mm	End cap	
		Bore discontinued at 5.68m, limit of investigation			5.68				
6									
7									
8									
9									

RIG: Total (Envirodrill)

DRILLER: Foody

LOGGED: Fulham

CASING: HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash bore to 5.68m

WATER OBSERVATIONS:

REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
(A)	Auger sample	(S)	Soil sample
(S)	Soil sample	(T)	Test sample
(S, pp)	Soil sample (in situ)	(W)	Water sample
(S, pp)	Soil sample (in situ)	(W, T)	Water sample (in situ)
(S, pp)	Soil sample (in situ)	(W, T)	Water sample (in situ)
(S, pp)	Soil sample (in situ)	(W, T)	Water sample (in situ)
(S, pp)	Soil sample (in situ)	(W, T)	Water sample (in situ)
(S, pp)	Soil sample (in situ)	(W, T)	Water sample (in situ)
(S, pp)	Soil sample (in situ)	(W, T)	Water sample (in situ)
(S, pp)	Soil sample (in situ)	(W, T)	Water sample (in situ)
(S, pp)	Soil sample (in situ)	(W, T)	Water sample (in situ)
(S, pp)	Soil sample (in situ)	(W, T)	Water sample (in situ)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE01A/D
PROJECT No: 49761.02
DATE: 17/10/2012
SHEET 1 OF 2

Borehole ID	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
	0.15	SAND - (Loose), brown, fine to medium grained sand, slightly clayey, damp		A	0.1			From 0m to 0.4m, concrete
		CLAY - Very stiff to hard, dark brown clay, trace to some fine grained sand, M4Wp		A	0.5		300-500 kPa	
	1.0			S,pp	1.0		450-500 kPa	
	1.8	SANDY GRAVEL - (Medium dense), brown, fine to medium grained sandy fine to medium sized subangular to subrounded gravel with trace to some silt			1.45			
	2.7	GRAVELLY SAND - Medium dense, brown, fine to medium grained sandy fine to medium sized gravelly fine to medium grained sand, slightly clayey, wet		S	2.9		9,13,12 N = 25	From 0.4m to 5.9m, backfill and cuttings From 0m to 6.4m, Class 18 PVC
		From 2.95m, saturated with some cobbles up to 40mm (basalt + sandstone)		S	3.2			
	3.6	SANDY GRAVEL - Medium dense to dense, brown, fine to medium grained sandy fine to medium sized subangular to subrounded gravel, slightly cobbly (with basalt and sandstone up to 40mm), some to slightly clayey, saturated		S	4.0		13, 18, 12 N = 30	
				S	4.2			
	4.9	CLAY - (Stiff), brown clay with trace cobbles		(S)	5.55		12,15/30mm (bouncing)	From 5.9m to 6.2m, bentonite
				(S)	5.73			
	6.3	SANDY GRAVEL - Medium dense, brown, fine to medium grained sandy fine to medium sized subangular to subrounded gravel, slightly clayey with some cobbles up to 40mm, saturated		S	6.95		5,11,12 N = 23	
				S	7.15			From 6.2m to 9.4m, 5mm gravel From 6.4m to 9.4m, 50mm diameter Class 18 machine slotted PVC screen
				(S)	8.9		27/150mm (bouncing)	
				(S)	9.05			
	9.4	CLAYEY GRAVELLY SAND - Dense to medium dense, brown clayey fine to medium sized subangular to subrounded gravelly fine to coarse grained sand, moist, grading to rock		S	9.6		4, 29, 10/20mm	End cap
				S	9.75			
	10.0							

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 2.45m
TYPE OF BORING: Solid flight auger to 2.45m, wash bore to 11.25m
WATER OBSERVATIONS: Free groundwater observed at 2.95m during drilling
REMARKS:

A - Auger sample	SI - Soil sample	PCV - Photo cross-section (depth)
BS - Solid sample	TS - Test sample	PS (S) - Press test soil (psi) (S&S)
CS - Cone sample	TS (S) - Test sample (in mm dia.)	TS (SI) - Press test (soil) (psi) (SI)
D - Disturbed sample	W - Water sample	SI (S) - Soil sample (SI)
E - Environmental sample	WT - Water test	S - Standard penetration test
		ST - Shear test (psi)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE01A/D
PROJECT No: 49761.02
DATE: 17/10/2012
SHEET 2 OF 2

RIG	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	11	SANDSTONE - High strength, moderately weathered, fine to medium grained sandstone	[Pattern]							
	11.25	Bore discontinued at 11.25m, limit of investigation			11.2 11.25		5, 10, 32/50mm (bouncing)			
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									

DRAFT

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 2.45m
TYPE OF BORING: Solid flight auger to 2.45m, wash bore to 11.25m
WATER OBSERVATIONS: Free groundwater observed at 2.95m during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1) Auger sample	11) Cone sample	21) Push probe test (CPT)	
2) Solid sample	12) Triaxial sample	22) Field vane test (FVT)	
3) Core sample	13) Triaxial sample (in situ)	23) Field vane test (FVT) (off)	
4) Disturbed sample	14) Liquid sample	24) Shear vane test (SVT)	
5) Environmental sample	15) Water sample	25) Shear vane test (SVT)	
	16) Water level	26) Shear vane test (SVT)	
	17) Water level	27) Shear vane test (SVT)	

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE01A/S
PROJECT No: 49761.02
DATE: 17/10/2012
SHEET 1 OF 1

Bore	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction	
				Type	Depth	Sample		Results & Comments	Details
	0.15	SAND - (Loose), brown, fine to medium grained sand, slightly clayey, damp		A	0.1			Stickup = 0.15m	
		CLAY - Very stiff to hard, dark brown clay, trace to some fine grained sand, M4Wp		A,pp	0.5		300-500 kPa	From 0m to 0.3m, concrete	
	1			S,pp	1.0			From 0.3m to 1.3m, backfill and cuttings	
	1.8				1.45		450->500 kPa	From 0m to 1.6m, Class 18 PVC	
	2	SANDY GRAVEL - (Medium dense), brown, fine to medium grained sandy fine to medium sized subangular to subrounded gravel with trace to some silt						From 1.3m to 1.6m, bentonite	
	2.7	GRAVELLY SAND - Medium dense, brown, fine to medium sized gravelly fine to medium grained sand, slightly clayey, wet		S	2.9		9,13,12		
	3	From 2.95m, saturated with some cobbles up to 40mm (basalt + sandstone)		S	3.2		N = 25		
	3.8	SANDY GRAVEL - Medium dense to dense, brown, fine to medium grained sandy fine to medium sized subangular to subrounded gravel, slightly cobbly (with basalt and sandstone up to 40mm), some to slightly clayey, saturated		S	4.0		13, 18, 12		
	4			S	4.2		N = 30		
	4.8	Bore discontinued at 4.8m, limit of investigation						End cap	
	5								
	6								
	7								
	8								
	9								

RIG: Total (Envirodrill)

DRILLER: Foody

LOGGED: Fulham

CASING: HW to 2.45m

TYPE OF BORING: Solid flight auger to 4.8m

WATER OBSERVATIONS:

REMARKS:

A	Auger sample	SI	Soil sample	SPC	Point corrected standard (SPC)
AS	Soil sample	SW	Water sample	PL	Point load test (PL) (kPa)
CS	Core sample	TS	Triaxial sample (in situ test)	PS	Point load test (PS) (kPa)
C	Core sample	WS	Water sample	SI	Soil index (SI) (kPa)
D	Disturbed sample	W	Water test	S	Standard penetration test
E	Environmental sample	WT	Water test	V	Shear vane (kPa)



Douglas Partners
 Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/-

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 1 OF 14

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	0.15	TOPSOIL - Generally comprising dark brown, fine grained silt topsoil, humid		A	0.1					
		SANDY SILT - (Loose), dark brown, fine grained sandy silt, M<<Wp		A	0.5					
	1	From 1.0m, medium dense with some fine size subangular/subrounded gravel		S	1.0		6.6.6 N = 12			
					1.45					
	2.0	GRAVEL - Loose, brown, coarse sized subrounded gravel with trace silt		A	2.0					
		From 2.6m to 2.8m, fine sized subangular/subrounded gravel, wet		S	2.5		5.4.2 N = 6 pp = 60			
	2.9	CLAY - Firm, brown clay with some medium sized gravel, M>Wp			2.9					
					2.95					
	3.4	CLAYEY GRAVEL - Medium dense brown fine to medium sized subangular / subrounded clayey gravel with some fine grained sand, stiff gravelly clay in parts		A	4.0		6.5.9 N = 14 pp = 150-200 kPa			
				S,pp	4.45					
	5.5	GRAVEL - Medium dense, brown, fine to medium sized subangular / subrounded gravel, slightly clayey with some medium grained sand, wet		A	5.5		pp = 50 14, 15, 18 N = 33			
				S	5.95					
				S	6.1		12.8.18 N = 26			
				S	6.55					
	7	From 7.5m, dense with some clay			7.6		11, 14, 17 N = 31			
				S	8.05					
	9	From 9.1m, medium dense		S	9.1		8, 11, 13 N = 24			
				S	9.55					

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m
TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m
WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at 101.5m
REMARKS: 100% water loss at 2.3m, 100% water loss at 36.7m

A - Auger sample	S - Soil sample	PP - Plasticity index (PI)
B - Bulk sample	T - Test sample	PL - Plastic limit (PL)
CH - Cone sample	U - U-test sample (in mm dia.)	PL ₁₀₀ - Plastic limit (PL) at 100g
C - Core sample	V - Void sample	SH - Shrinkage limit (SH)
D - Disturbed sample	W - Water test	S ₁ - Standard penetration test
E - Environmental sample	X - Water test	S ₂ - Shear vane (SV)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/-

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 2 OF 14

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	11	GRAVEL - Medium dense, brown, fine to medium sized subangular / subrounded gravel, slightly clayey with some medium grained sand, wet (continued)		S	10.6 10.7		16 (bouncing)			
	11.4	SANDSTONE - Extremely low strength, extremely weathered, friable, grey, fine to medium grained sandstone								
	12			S	12.1		11,21,23 N = 44			
	12.5	COAL - Medium to high strength, slightly weathered, black coal			12.55					
	13	COAL - High strength, fresh stained, highly fractured black coal			13.0					
	13.47	CORE LOSS - 1.48m (13.47m to 14.95m)	X							
	14			C						
	15	SILTSTONE - Extremely low to very low strength, fresh stained, friable grey siltstone From 15.25m to 15.90m, rock roller, no core recovered		A	15.0 15.25		PL(A) = 0.02			
	16	SILTSTONE - Very low strength, fresh stained, friable grey siltstone		C	15.9 16.44		PL(A) = 0.07 PL(D) = 0.03			
	17									
	17.35	SANDSTONE - Very low strength, fresh stained, friable grey fine grained sandstone		C	17.4 17.57		PL(A) = 0.06 PL(D) = 0.06			
	18	SILTSTONE - Very low strength, fresh stained, dark grey siltstone From 18.6m, low strength			18.16 18.37 18.7		PL(A) = 0.08 PL(D) = 0.07 PL(A) = 0.11			
	19	From 18.85m to 19.04m, extremely low strength, tuff band		C						
					19.58 19.81 19.85		PL(A) = 0.1			

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m
TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m
WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at 101.5m
REMARKS: 100% water loss at 8.9m, 100% water loss at 36.7m

S	Soil Sample	PL(D)	Point Load (D) (kPa)
C	Core Sample	PL(A)	Point Load (A) (kPa)
A	Auger Sample	PL(D)	Point Load (D) (kPa)
W	Water Sample	PL(A)	Point Load (A) (kPa)
GT001	Grout Sample	PL(D)	Point Load (D) (kPa)
W	Water Sample	PL(A)	Point Load (A) (kPa)
W	Water Sample	PL(D)	Point Load (D) (kPa)
W	Water Sample	PL(A)	Point Load (A) (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/-

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 3 OF 14

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	20.27	From 19.98m to 20.13m, very low strength, tuff band							
		SANDSTONE - Low strength, fresh stained, light grey and grey, fine to medium grained sandstone		C	20.45		PL(A) = 0.14		
	21				21.18 21.22		PL(A) = 0.1 PL(D) = 0.08		21
	22	MUDSTONE - Low strength, fresh, dark grey mudstone			22.19		PL(A) = 0.14 PL(D) = 0.16		22
	22.55	From 22.29m to 22.39m, tuff band							
		SANDSTONE - Medium strength, fresh, grey fine to medium grained sandstone		C					23
	24								24
	24.07	CORE LOSS - 0.11m (24.07m to 24.22m)			24.18				
	24.22	SILTSTONE - Low strength, fresh, grey and light grey siltstone			24.67		PL(A) = 0.24 PL(D) = 0.16		
	25								25
	24.96	CARBONACEOUS MUDSTONE - Medium strength, fresh, dark brown carbonaceous mudstone			25.48		PL(A) = 0.56 PL(D) = 0.36		
	25.22	From 25.22m to 25.4m, coal							
	25.79	SILTSTONE - Medium strength, fresh, grey siltstone			26.18		PL(D) = 0.36		26
	26								27
	26.3	SANDSTONE - Low to medium strength, fresh, grey fine to medium grained sandstone		C					
	27				27.18				27
	28								28
	28.25	From 28.08m, very low strength			28.08				
	28.41	CORE LOSS - 0.16m (28.25m to 28.41m)							
		SANDSTONE - Very low strength, fresh, grey fine to medium grained sandstone							29
	29	From 28.66m, medium strength with some fine sized gravel in parts		C					
					29.55		PL(A) = 0.52		
					29.6				
					29.81				

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m
TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m
WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes
REMARKS: 100% water loss @ 8.7m, 100% water loss at 36.7m

1. Auger sample	11. Thin section (in mm dia.)	21. Photo processed slotted (PDS)
2. Solid sample	12. Water sample	22. Photo scan (not 630 (100) (100))
3. Core sample	13. Slotted sample (in mm dia.)	23. Photo scan (not 630 (100) (100))
4. Disturbed sample	14. Water sample	24. Slotted sample (not 630 (100) (100))
5. Undisturbed sample	15. Water test	25. Slotted sample (not 630 (100) (100))
	16. Water test	26. Slotted sample (not 630 (100) (100))
	17. Water test	27. Slotted sample (not 630 (100) (100))
	18. Water test	28. Slotted sample (not 630 (100) (100))
	19. Water test	29. Slotted sample (not 630 (100) (100))
	20. Water test	30. Slotted sample (not 630 (100) (100))



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/-

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 4 OF 14

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		SANDSTONE - Very low strength, fresh, grey fine to medium grained sandstone (continued)		C	30.18 30.22		PL(A) = 0.76 PL(D) = 0.62			
				C						
	31.08	CORE LOSS - 0.12m (30.96m to 31.08m)								
		SANDSTONE - Medium strength, fresh, grey fine to coarse grained sandstone with some fine sized gravel in parts								
				C	32.13		PL(A) = 0.96 PL(D) = 0.93			
					33.18					
				C						
	34.24	CORE LOSS - 0.15m (34.09m to 34.24m)								
		SANDSTONE - Medium strength, fresh, grey fine to coarse grained sandstone with some fine sized gravel in parts								
				C	34.18 34.29		PL(A) = 0.5			
					35.2					
	35.58	From 35.52m, low strength								
	35.65	CORE LOSS - 0.07m (35.58m to 35.65m)		C						
		SANDSTONE - Very low to low strength, fresh, grey fine to medium grained sandstone								
	36.33	From 35.77m, very high strength								
	36.44	CORE LOSS - 0.11m (36.33m to 36.44m)								
		SANDSTONE - Medium strength, fresh, grey fine to medium grained sandstone								
				C			PL(D) = 5.75			
					38.36		PL(A) = 0.62 PL(D) = 0.44			
				GT003	38.41 38.65					
		From 38.66m, siderite band, 70mm thick								
		From 38.9m, mudstone band, 80mm thick								
				C						
					39.15					

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m
TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m
WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at 101.5m to 101.7m
REMARKS: 100% water loss at 6.0m, 100% water loss at 36.7m

B	Auger sample	11	Water sample	10	Free penetrometer test (FPT)
BH	Block sample	12	Water sample	11	Field vane test (FVT) (15m)
C	Core sample	13	Water sample (in situ test)	12	Field vane test (FVT) (15m)
D	Disturbed sample	14	Water level	13	Standard penetration test (SPT)
E	Undisturbed sample	15	Water level	14	Shear vane (SV)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/-

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 5 OF 14

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
		SANDSTONE - Medium strength, fresh, grey fine to medium grained sandstone (continued)						
	40.33						PL(A) = 0.68 PL(D) = 0.57	
	41	From 41.0m, some fine to medium sized gravel	C					
	42				42.15 42.18		PL(A) = 1.38	
	43		C					
	44				44.0		PL(A) = 1.15 PL(D) = 1.01	
	45				45.15 45.27		PL(A) = 1.38	
	46		C					
	47				47.32		PL(A) = 1.11	
	47.65	CARBONACEOUS MUDSTONE - High strength, fresh, dark brown carbonaceous mudstone with some coal	C		48.18			
	48							
	49							
	49.42	SILTSTONE - Low strength, fresh, grey siltstone	C		49.46			
			GT004		49.73		PL(A) = 0.16 PL(D) = 0.14	
			C		49.78			

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m
TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m
WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at 101.5m
REMARKS: 100% water loss @ 6.0m, 100% water loss at 36.7m

SAMPLING & IN SITU TESTING LEGEND			
1. Auger sample	11. Cone sample	21. Split sample	31. Plasticity index (PI)
2. Solid sample	12. Water content (w)	22. Liquid limit (LL)	32. Plastic limit (PL)
3. Core sample	13. Liquid limit (LL)	23. Shrinkage limit (SL)	33. Plasticity index (PI)
4. Standard sample	14. Water content (w)	24. Shrinkage limit (SL)	34. Plasticity index (PI)
5. Environmental sample	15. Water content (w)	25. Shrinkage limit (SL)	35. Plasticity index (PI)
	16. Water content (w)	26. Shrinkage limit (SL)	36. Plasticity index (PI)
	17. Water content (w)	27. Shrinkage limit (SL)	37. Plasticity index (PI)
	18. Water content (w)	28. Shrinkage limit (SL)	38. Plasticity index (PI)
	19. Water content (w)	29. Shrinkage limit (SL)	39. Plasticity index (PI)
	20. Water content (w)	30. Shrinkage limit (SL)	40. Plasticity index (PI)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/-

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 6 OF 14

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	51	SILTSTONE - Low strength, fresh, grey siltstone (continued) From 50.15m, interbedded with fine grained sandstone laminations From 50.55m, medium strength From 50.85m to 54.67m, highly fractured, interbedded with extremely low to very low strength bands (crush zone)	C	50.43		PL(A) = 0.34 PL(D) = 0.36				
	52		C	51.18						
	52.88 53.03	CORE LOSS - 0.15m (52.88m to 53.03m)								
	54	SILTSTONE - Medium strength, fresh, highly fractured grey to light grey siltstone interbedded with very low strength bands (crush zone)	C	53.65		PL(D) = 0.09				
	54.27			54.18						
	55	SILTSTONE - Medium strength, fresh, grey and light grey siltstone From 54.67m, interbedded with laminations of extremely low to very low strength siltstone generally at 50mm to 100mm spacings	C	54.59		PL(D) = 1.38				
	56			56.19		PL(A) = 1.02				
	57			57.08						
	57.24	From 57.14m, very low strength, tuff	G7005	57.14						
	58	CARBONACEOUS MUDSTONE - High strength, fresh, dark brown carbonaceous mudstone with some coal lenses	C	57.34		PL(A) = 1.62				
				57.39						
		From 58.55m to 58.81m, low strength, tuff		58.46						
	58.91			58.77		PL(A) = 0.14				
	59	SANDSTONE - Medium strength, fresh, grey and dark grey, fine to medium grained sandstone with some very low strength bands	C							
	59.5 59.54	CORE LOSS - 0.04m (59.5m to 59.54m)								

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m
TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m
WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at 101.5m
REMARKS: 100% water loss at 5.97m, 100% water loss at 36.7m

W - Auger sample	SI - Soil sample	PLD - Plasticity index (PI)
W1 - Solid sample	SI1 - Soil sample	PL(A) - Plasticity index (PI) (A)
W2 - Core sample	SI2 - Soil sample (in situ)	PL(D) - Plasticity index (PI) (D)
C - Consolidated sample	W - Water sample	SI3 - Soil sample (in situ)
U - Unconsolidated sample	W1 - Water sample	SI4 - Soil sample (in situ)
	W2 - Water sample	SI5 - Soil sample (in situ)
	W3 - Water sample	SI6 - Soil sample (in situ)
	W4 - Water sample	SI7 - Soil sample (in situ)
	W5 - Water sample	SI8 - Soil sample (in situ)
	W6 - Water sample	SI9 - Soil sample (in situ)
	W7 - Water sample	SI10 - Soil sample (in situ)
	W8 - Water sample	SI11 - Soil sample (in situ)
	W9 - Water sample	SI12 - Soil sample (in situ)
	W10 - Water sample	SI13 - Soil sample (in situ)
	W11 - Water sample	SI14 - Soil sample (in situ)
	W12 - Water sample	SI15 - Soil sample (in situ)
	W13 - Water sample	SI16 - Soil sample (in situ)
	W14 - Water sample	SI17 - Soil sample (in situ)
	W15 - Water sample	SI18 - Soil sample (in situ)
	W16 - Water sample	SI19 - Soil sample (in situ)
	W17 - Water sample	SI20 - Soil sample (in situ)
	W18 - Water sample	SI21 - Soil sample (in situ)
	W19 - Water sample	SI22 - Soil sample (in situ)
	W20 - Water sample	SI23 - Soil sample (in situ)
	W21 - Water sample	SI24 - Soil sample (in situ)
	W22 - Water sample	SI25 - Soil sample (in situ)
	W23 - Water sample	SI26 - Soil sample (in situ)
	W24 - Water sample	SI27 - Soil sample (in situ)
	W25 - Water sample	SI28 - Soil sample (in situ)
	W26 - Water sample	SI29 - Soil sample (in situ)
	W27 - Water sample	SI30 - Soil sample (in situ)
	W28 - Water sample	SI31 - Soil sample (in situ)
	W29 - Water sample	SI32 - Soil sample (in situ)
	W30 - Water sample	SI33 - Soil sample (in situ)
	W31 - Water sample	SI34 - Soil sample (in situ)
	W32 - Water sample	SI35 - Soil sample (in situ)
	W33 - Water sample	SI36 - Soil sample (in situ)
	W34 - Water sample	SI37 - Soil sample (in situ)
	W35 - Water sample	SI38 - Soil sample (in situ)
	W36 - Water sample	SI39 - Soil sample (in situ)
	W37 - Water sample	SI40 - Soil sample (in situ)
	W38 - Water sample	SI41 - Soil sample (in situ)
	W39 - Water sample	SI42 - Soil sample (in situ)
	W40 - Water sample	SI43 - Soil sample (in situ)
	W41 - Water sample	SI44 - Soil sample (in situ)
	W42 - Water sample	SI45 - Soil sample (in situ)
	W43 - Water sample	SI46 - Soil sample (in situ)
	W44 - Water sample	SI47 - Soil sample (in situ)
	W45 - Water sample	SI48 - Soil sample (in situ)
	W46 - Water sample	SI49 - Soil sample (in situ)
	W47 - Water sample	SI50 - Soil sample (in situ)
	W48 - Water sample	SI51 - Soil sample (in situ)
	W49 - Water sample	SI52 - Soil sample (in situ)
	W50 - Water sample	SI53 - Soil sample (in situ)
	W51 - Water sample	SI54 - Soil sample (in situ)
	W52 - Water sample	SI55 - Soil sample (in situ)
	W53 - Water sample	SI56 - Soil sample (in situ)
	W54 - Water sample	SI57 - Soil sample (in situ)
	W55 - Water sample	SI58 - Soil sample (in situ)
	W56 - Water sample	SI59 - Soil sample (in situ)
	W57 - Water sample	SI60 - Soil sample (in situ)
	W58 - Water sample	SI61 - Soil sample (in situ)
	W59 - Water sample	SI62 - Soil sample (in situ)
	W60 - Water sample	SI63 - Soil sample (in situ)
	W61 - Water sample	SI64 - Soil sample (in situ)
	W62 - Water sample	SI65 - Soil sample (in situ)
	W63 - Water sample	SI66 - Soil sample (in situ)
	W64 - Water sample	SI67 - Soil sample (in situ)
	W65 - Water sample	SI68 - Soil sample (in situ)
	W66 - Water sample	SI69 - Soil sample (in situ)
	W67 - Water sample	SI70 - Soil sample (in situ)
	W68 - Water sample	SI71 - Soil sample (in situ)
	W69 - Water sample	SI72 - Soil sample (in situ)
	W70 - Water sample	SI73 - Soil sample (in situ)
	W71 - Water sample	SI74 - Soil sample (in situ)
	W72 - Water sample	SI75 - Soil sample (in situ)
	W73 - Water sample	SI76 - Soil sample (in situ)
	W74 - Water sample	SI77 - Soil sample (in situ)
	W75 - Water sample	SI78 - Soil sample (in situ)
	W76 - Water sample	SI79 - Soil sample (in situ)
	W77 - Water sample	SI80 - Soil sample (in situ)
	W78 - Water sample	SI81 - Soil sample (in situ)
	W79 - Water sample	SI82 - Soil sample (in situ)
	W80 - Water sample	SI83 - Soil sample (in situ)
	W81 - Water sample	SI84 - Soil sample (in situ)
	W82 - Water sample	SI85 - Soil sample (in situ)
	W83 - Water sample	SI86 - Soil sample (in situ)
	W84 - Water sample	SI87 - Soil sample (in situ)
	W85 - Water sample	SI88 - Soil sample (in situ)
	W86 - Water sample	SI89 - Soil sample (in situ)
	W87 - Water sample	SI90 - Soil sample (in situ)
	W88 - Water sample	SI91 - Soil sample (in situ)
	W89 - Water sample	SI92 - Soil sample (in situ)
	W90 - Water sample	SI93 - Soil sample (in situ)
	W91 - Water sample	SI94 - Soil sample (in situ)
	W92 - Water sample	SI95 - Soil sample (in situ)
	W93 - Water sample	SI96 - Soil sample (in situ)
	W94 - Water sample	SI97 - Soil sample (in situ)
	W95 - Water sample	SI98 - Soil sample (in situ)
	W96 - Water sample	SI99 - Soil sample (in situ)
	W97 - Water sample	SI100 - Soil sample (in situ)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/-

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 7 OF 14

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details
				Type	Depth	Sample	Results & Comments		
		SANDSTONE - Medium strength, fresh, grey fine to medium grained sandstone with some bands of siltstone (continued)		C	60.13				
					60.7		PL(A) = 0.57		
61	61.1	SILTSTONE - Medium strength, fresh, grey siltstone		C				61	
		From 61.75m to 62.68m, low strength						62	
62					62.53		PL(A) = 0.29 PL(D) = 0.21		
63	63.11	LAMINITE - Medium strength, fresh, grey fine to medium grained laminite			63.11			63	
64					64.23		PL(A) = 0.46	64	
65								65	
66	66.33	MUDSTONE - Medium strength, fresh, grey mudstone			66.1		PL(A) = 0.9 PL(D) = 0.6	66	
					66.15				
67								67	
68		From 67.8m to 69.23m, carbonaceous			67.89		PL(A) = 0.69	68	
		From 68.37m to 68.52m, low strength, tuff band							
		From 68.52m to 68.79m, high strength, coal band							
69		From 69.04m to 69.23m, some coal			69.13			69	
		From 69.23m, high strength							
				C	69.62				
				G7006	69.88		PL(A) = 1.33		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m
TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m
WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes
REMARKS: 100% water loss at 36.7m, 100% water loss at 36.7m

B	Auger sample	11	Soil sample	PTC	Point-to-point test (PTC)
BH	Block sample	12	Soil sample	PL(A)	Plasticity limit (PL)
C	Core sample	13	Soil sample (in situ)	PL(D)	Plasticity limit (PL)
D	Disturbed sample	14	Soil sample	SH	Shear test (SH)
E	Disturbed sample	15	Water sample	W	Water content (W)
F	Disturbed sample	16	Water test	Y	Shear test (Y)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/-

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 8 OF 14

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
		MUDSTONE - Medium strength, fresh, grey mudstone (continued)			69.91				
	71			C					71
	72	From 71.8m, medium strength			71.96 72.11		PL(A) = 1 PL(D) = 0.84		72
	72.84	From 72.61m to 72.7m, very low strength, tuff band			72.8		PL(A) = 0.48		
	72.91	From 72.81m, coal							
		CORE LOSS - 0.07m (72.84m to 72.91m)							
	73.41	CARBONACEOUS MUDSTONE - Medium strength, fresh, dark brown carbonaceous mudstone with some coal		C	73.55		PL(A) = 0.7 PL(D) = 0.71		73
	74	LAMINITE - Medium strength, fresh, grey to light grey, fine to medium grained laminite							74
	74.52	MUDSTONE - High strength, fresh, grey mudstone			74.4		PL(A) = 1.66		
	75				75.13 75.32		PL(A) = 1.76		75
	76	From 75.76m, some coal							
	76.0	SANDSTONE - High strength, fresh, grey fine grained sandstone		C					76
	76.91	SILTSTONE - High strength, fresh, grey siltstone			77.19		PL(A) = 1.35		77
	77.94	From 77.86m, tuff							
	78.45	CARBONACEOUS MUDSTONE - High strength, fresh, dark brown carbonaceous mudstone with some coal			78.15				78
	78.51	CORE LOSS - 0.06m (78.45m to 78.51m)			78.54		PL(A) = 1.12		
	79	CARBONACEOUS MUDSTONE - High strength, fresh, dark brown carbonaceous mudstone with some coal		C					79
	79.52	SILTSTONE - High strength, fresh, grey siltstone							

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m
TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m
WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes
REMARKS: 100% water loss @ 6.0m, 100% water loss at 36.7m

SAMPLING & IN SITU TESTING LEGEND

1. Auger sample	11. Core sample	21. Field permeability test (FPT)
2. Solid sample	12. Water sample	22. Field vane test (FVT)
3. Core sample	13. Slurry sample	23. Field cone test (FCT)
4. Disturbed sample	14. Water sample	24. Field penetration test (FPT)
5. Undisturbed sample	15. Water test	25. Standard penetration test
		26. Shear vane (SV)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/-

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 9 OF 14

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	81	SILTSTONE - High strength, fresh, grey siltstone (continued)	|	C	80.34		PL(A) = 1.33			
			|		81.15					
			|		81.47		PL(A) = 1.41			
			|		81.51	GT007				
			|		81.77					
	82	From 81.58m, laminite	|							
	82.58	SANDSTONE - High to very high strength, friable, fine to medium grained sandstone	|	C						
			|		83.3		PL(A) = 2.84 PL(D) = 3.05			
		From 83.63m, high strength siltstone	|							
	83.66	COAL - High strength, fresh, black coal	█							
			█		84.18		PL(A) = 1.19			
			█		84.3					
	84.7	SANDSTONE - High strength, fresh, grey fine to medium grained sandstone with some siltstone laminations	|	C						
			|		86.65		PL(A) = 1.56			
			|		87.18					
			|		88.33	GT008				
			|	C	88.61		PL(A) = 2.31			
	89.35	MUDSTONE - High strength, fresh, dark grey mudstone	|							
			|		89.81		PL(A) = 1.66			

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m

TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m

WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes

REMARKS: 100% water loss @ 8.7m, 100% water loss at 36.7m

SAMPLING & IN SITU TESTING LEGEND

P	Auger sample	SI	Soil Sample	PLC	Point-to-point cone test (PPCT)
BS	Solid Sample	SL	Slurry Sample	PL(A)	Pressure cell test (PCT) (200)
CS	Core Sample	TL	Triaxial Sample (see also J)	PL(D)	Pressure cell test (PCT) (400)
C	Clay Sample	U	Upland Sample	PL(D)	Pressure cell test (PCT) (400)
D	Disturbed Sample	W	Water Test	S	Standard penetration test
E	Environmental Sample	WT	Water Test	S	Standard penetration test
				ST	Shear test (STS)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/-

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 10 OF 14

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		MUDSTONE - High strength, fresh, dark grey mudstone (continued)		C	90.2					
	91	From 90.59m to 91.1m, sandstone and siltstone bands up to 100mm thick					PL(A) = 2.31			
					91.4					
				GT009	91.48					
				C	91.73					
	91.88	COAL - Medium to high strength, fresh, black coal								
	92									
	93	From 93.4m, some carbonaceous mudstone								
	94				93.2					
	94	From 94.3m to 94.54m, tuff band								
	95			C	94.9		PL(A) = 0.48			
	95.41	From 95.2m, carbonaceous mudstone								
		TUFF CLAYSTONE - High strength, fresh, grey tuff claystone		GT010	95.43					
					95.74		PL(D) = 1.17			
					95.78					
	96.04	COAL - High strength, fresh, black coal								
	97									
	97.11	SILTSTONE - High strength, fresh, grey siltstone								
	98									
					97.58		PL(A) = 2.85			
				C	97.62		PL(D) = 1.84			
				GT011	97.95					
	98.88	LAMINITE - High strength, fresh, grey, fine to medium grained laminites								
	99									
					99.25		PL(A) = 1.59			
					99.29		PL(D) = 1.23			
	99.54	SANDSTONE - Medium strength, fresh, grey medium to coarse grained sandstone		C						

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m
TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m
WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at 101.5m to 101.7m
REMARKS: 100% water loss at 2.3m, 100% water loss at 36.7m

<ul style="list-style-type: none"> 1. Auger samples 2. Solid samples 3. Core samples 4. Disturbed samples 5. Environmental samples 6. Soil samples 7. Water samples (in situ) 8. Water samples 9. Water level 	<ul style="list-style-type: none"> 10. Cone samples 11. Triaxial samples (in situ) 12. Triaxial samples 13. Water level 14. Water level 15. Shear vane (in situ) 16. Shear vane (in situ) 17. Shear vane (in situ) 18. Shear vane (in situ) 19. Shear vane (in situ) 20. Shear vane (in situ)
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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/-

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 11 OF 14

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
		SANDSTONE - Medium strength, fresh, grey medium to coarse grained sandstone (continued)			100.5 100.56 100.84	GT013	PL(A) = 0.72 PL(D) = 0.71		
	101.07	COAL - High strength, fresh, black coal	[REDACTED]	C				101	
	102				102.18 102.22		PL(A) = 1.28		102
	103			C					103
	104								104
	104.91	SANDSTONE - Medium strength, fresh, grey fine to medium grained sandstone		C	104.88 105.19				105
	106				106.0 106.27 106.3	GT013	PL(A) = 0.85 PL(D) = 0.58		106
	107	From 106.6m, high strength		C					107
	108	From 107.4m, fine grained sandstone							108
	109	From 109.04m to 109.28m, very high strength mudstone band		C	108.22 108.26		PL(A) = 2.59 PL(D) = 2.71		109
					109.57		PL(A) = 2.12 PL(D) = 1.02		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m
TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m
WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at 109.04m to 109.28m
REMARKS: 100% water loss at 6.0m, 100% water loss at 36.7m

B	Auger sample	11	Soil sample	17C	Field vane shear test (FVT)
BH	Block sample	12	Water sample	17D	Field vane shear test (FVT) (S&M)
CB	Core sample	13	Water sample (in situ test)	18	Field vane shear test (FVT) (S&M)
C	Continuous sample	14	Water sample	19	Field vane shear test (FVT) (S&M)
D	Disturbed sample	15	Water test	20	Shear vane (SV)
E	Disturbed sample	16	Water test	21	Shear vane (SV)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/-

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 12 OF 14

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		SANDSTONE - Medium strength, fresh, grey fine to medium grained sandstone (continued)		C						
	110.85	SILTSTONE - High strength, fresh, grey siltstone	[Graphic Log]		111.23		PL(A) = 1.85		111	
	111				111.44					
	112	SANDSTONE - Very high strength, fresh, grey fine to medium grained sandstone From 114.48m to 115.03m, mudstone	[Graphic Log]	C				112		
	112.1									
	113								113	
	114				113.71		PL(A) = 3.27		114	
					114.22					
	115								115	
			C		115.43		PL(A) = 3.08 PL(D) = 3.61	116		
	116				116.47					
				GT614						
					116.83		PL(A) = 3.25			
	117				116.87					
					117.2			117		
	118				117.81		PL(A) = 3.27	118		
				C						
	119							119		
	119.24	SILTSTONE - High strength, fresh, grey siltstone	[Graphic Log]		119.53		PL(A) = 1.01			

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m
TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m
WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes
REMARKS: 100% water loss @ 6.7m, 100% water loss at 36.7m

SAMPLING & IN SITU TESTING LEGEND			
S	Soil Sample	W	Water Sample
U	Undisturbed Sample	W1	Water Sample (1)
D	Disturbed Sample	W2	Water Sample (2)
U1	Undisturbed Sample (1)	W3	Water Sample (3)
U2	Undisturbed Sample (2)	W4	Water Sample (4)
U3	Undisturbed Sample (3)	W5	Water Sample (5)
U4	Undisturbed Sample (4)	W6	Water Sample (6)
U5	Undisturbed Sample (5)	W7	Water Sample (7)
U6	Undisturbed Sample (6)	W8	Water Sample (8)
U7	Undisturbed Sample (7)	W9	Water Sample (9)
U8	Undisturbed Sample (8)	W10	Water Sample (10)
U9	Undisturbed Sample (9)	W11	Water Sample (11)
U10	Undisturbed Sample (10)	W12	Water Sample (12)
U11	Undisturbed Sample (11)	W13	Water Sample (13)
U12	Undisturbed Sample (12)	W14	Water Sample (14)
U13	Undisturbed Sample (13)	W15	Water Sample (15)
U14	Undisturbed Sample (14)	W16	Water Sample (16)
U15	Undisturbed Sample (15)	W17	Water Sample (17)
U16	Undisturbed Sample (16)	W18	Water Sample (18)
U17	Undisturbed Sample (17)	W19	Water Sample (19)
U18	Undisturbed Sample (18)	W20	Water Sample (20)
U19	Undisturbed Sample (19)	W21	Water Sample (21)
U20	Undisturbed Sample (20)	W22	Water Sample (22)
U21	Undisturbed Sample (21)	W23	Water Sample (23)
U22	Undisturbed Sample (22)	W24	Water Sample (24)
U23	Undisturbed Sample (23)	W25	Water Sample (25)
U24	Undisturbed Sample (24)	W26	Water Sample (26)
U25	Undisturbed Sample (25)	W27	Water Sample (27)
U26	Undisturbed Sample (26)	W28	Water Sample (28)
U27	Undisturbed Sample (27)	W29	Water Sample (29)
U28	Undisturbed Sample (28)	W30	Water Sample (30)
U29	Undisturbed Sample (29)	W31	Water Sample (31)
U30	Undisturbed Sample (30)	W32	Water Sample (32)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/-

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 13 OF 14

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		SILTSTONE - High strength, fresh, grey siltstone (continued) From 120.65m to 120.66m, very low strength tuff	C	120.21						
	121		C	121.21			PL(A) = 1.37 PL(D) = 1.39		121	
	122		C						122	
	122.2	SANDSTONE - High strength, fresh, grey fine grained sandstone								
	123	From 122.92m, some siderite bands up to 30mm thick		123.2 123.39			PL(A) = 1.85 PL(D) = 1.88		123	
	124		C						124	
	125		C	125.02 125.05 125.38			PL(A) = 1.56		125	
	126		C	126.02 126.52			PL(A) = 1.04		126	
	127	From 127.0m, medium strength	C						127	
	127.9	SILTSTONE - Low strength, fresh, grey siltstone with some fine grained sandstone bands up to 50mm thick and some siderite bands up to 30mm thick	C	128.73 129.13			PL(A) = 0.27 PL(D) = 0.16		128 129	

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m
TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m
WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at 101.5m
REMARKS: 100% water loss at 6.0m, 100% water loss at 36.7m

SAMPLING & IN SITU TESTING LEGEND			
1. Auger sample	11. Core sample	21. Split barrel sampler	31. Pressuremeter test (PMT)
2. Solid sample	12. Water sample	22. Standard penetration test (SPT)	32. Field vane shear test (FVST)
3. Cone sample	13. Slurry sample (in situ test)	23. Dilatometer test (DMT)	33. Field consolidation test (FCT)
4. Dilatometer sample	14. Water level	24. Standard penetration test (SPT)	34. Shear vane (SV)
5. Environmental sample	15. Water level	25. Shear vane (SV)	



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/-

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 14 OF 14

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	131	SILTSTONE - Low strength, fresh, grey siltstone with some fine grained sandstone bands up to 50mm thick and some siderite bands up to 30mm thick. (continued) From 130.27m, medium strength								
	132			C	130.65		PL(A) = 0.45			
	132				131.57		PL(A) = 0.52			
	132.18	Bore discontinued at 132.18m , limit of investigation								
	133									
	134									
	135									
	136									
	137									
	138									
	139									

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m
TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m
WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at 101.5m to 101.7m, 100% water loss at 36.7m, 100% water loss at 36.7m
REMARKS: 100% water loss at 36.7m, 100% water loss at 36.7m

(S) - Split barrel sampler (SB) - Solid sampler (C) - Cone sampler (D) - Dilatometer sampler (E) - Environmental sampler	(G) - Gas sampler (L) - Liquid sampler (in situ test) (M) - Moisture sampler (W) - Water sampler (WT) - Water test	(P) - Pressure sampler (PL) - Pressure sampler (in situ test) (S) - Shear sampler (T) - Temperature sampler (V) - Vane sampler	(U) - Undisturbed sampler (V) - Vane sampler (W) - Water sampler (WT) - Water test (X) - X-ray fluorescence (XRF) (Y) - Yield stress sampler (in situ test) (Z) - Zirconium sampler (in situ test)
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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230102
NORTHING: 6413814
DIP/AZIMUTH: 90°/-

BORE No: AGE02-D
PROJECT No: 49761
DATE: 30/10/2013
SHEET 1 OF 2

Borehole ID	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments		Stickup	Details
	0.15	TOPSOIL - Generally comprising dark brown, fine grained silt topsoil, humid	[Symbol]							
		SANDY SILT - (Loose), dark brown, fine grained sandy silt, M<<Wp	[Symbol]							
	1	From 1.0m, medium dense with some fine size subangular/subrounded gravel	[Symbol]							
	2.0	GRAVEL - Loose, brown, coarse sized subrounded gravel with trace silt	[Symbol]							
	2.6	From 2.6m to 2.8m, fine sized subangular/subrounded gravel, wet	[Symbol]							
	2.9	CLAY - Firm, brown clay with some medium sized gravel, M>Wp	[Symbol]							
	3.4	CLAYEY GRAVEL - Medium dense brown fine to medium sized subangular / subrounded clayey gravel with some fine grained sand, stiff gravelly clay in parts	[Symbol]							
	5.5	GRAVEL - Medium dense, brown, fine to medium sized subangular / subrounded gravel, slightly clayey with some medium grained sand, wet	[Symbol]							
	7.5	From 7.5m, dense with some clay	[Symbol]							
	9.1	From 9.1m, medium dense	[Symbol]							
								From 0.0m to 4.8m, grout		
								From 4.8m to 5.2m, bentonite		
								From 5.2m to 11.5m, gravel		
								From 5.5m to 11.5m, screen		

RIG: Hydropower Scout **DRILLER:** Total Drilling (Sawyer) **LOGGED:** Fulham **CASING:** HW to 11.4m
TYPE OF BORING: HW casing advanced, rotary to 11.4m
WATER OBSERVATIONS: Free groundwater observed at 2.3m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1. Auger samples	11. Cone samples	21. Field vane shear (FVS)	31. Field vane shear (FVS) (200)
2. Soil samples	12. Water samples	22. Field vane shear (FVS) (100)	32. Field vane shear (FVS) (150)
3. Core samples	13. Slurry samples	23. Field vane shear (FVS) (50)	33. Field vane shear (FVS) (200)
4. Standard samples	14. Water level	24. Standard penetration test	34. Standard penetration test
5. Environmental samples	15. Water level	25. Shear vane (SV)	35. Shear vane (SV)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230102
NORTHING: 6413814
DIP/AZIMUTH: 90°/-

BORE No: AGE02-D
PROJECT No: 49761
DATE: 30/10/2013
SHEET 2 OF 2

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details
				Type	Depth	Sample	Results & Comments		
	11	GRAVEL - Medium dense, brown, fine to medium sized subangular / subrounded gravel, slightly clayey with some medium grained sand, wet (continued)	▨						▨
	11.4	SANDSTONE - Extremely low strength, extremely weathered, friable, grey, fine to medium grained sandstone						End cap	▨
	12								
	12.5	Bore discontinued at 12.5m , limit of investigation							
	13								
	14								
	15								
	16								
	17								
	18								
	19								

RIG: Hydropower Scout **DRILLER:** Total Drilling (Sawyer) **LOGGED:** Fulham **CASING:** HW to 11.4m
TYPE OF BORING: HW casing advanced, rotary to 11.4m
WATER OBSERVATIONS: Free groundwater observed at 2.3m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
R - Auger sample	S - Soil sample	P(C) - Photo cross-section (depth)	P(S) - Photo soil sample (depth) (dry)
W - Soil sample	T - Test sample	P(S) - Photo soil sample (depth) (saturated)	P(S) - Photo soil sample (depth) (saturated)
C - Cone sample	U - Uplift sample (in situ test)	S - Soil sample	S - Soil sample
D - Disturbed sample	W - Water sample	S - Soil sample	S - Soil sample
E - Environmental sample	W - Water level	S - Soil sample	S - Soil sample

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230102
NORTHING: 6413816
DIP/AZIMUTH: 90°/-

BORE No: AGE02-S
PROJECT No: 49761
DATE: 31/10/2013
SHEET 1 OF 1

Bore No.	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments		Stickup = 0.357	
	0.15	TOPSOIL - Generally comprising dark brown, fine grained silt topsoil, humid	[Symbol]							
		SANDY SILT - (Loose), dark brown, fine grained sandy silt, M<<Wp	[Symbol]							
	1	From 1.0m, medium dense with some fine size subangular/subrounded gravel	[Symbol]							
	2.0	GRAVEL - Loose, brown, coarse sized subrounded gravel with trace silt	[Symbol]							
	2.6	From 2.6m to 2.8m, fine sized subangular/subrounded gravel, wet	[Symbol]							
	3	CLAY - Firm, brown clay with some medium sized gravel, M>Wp	[Symbol]							
	3.4	CLAYEY GRAVEL - Medium dense brown fine to medium sized subangular / subrounded clayey gravel with some fine grained sand, stiff gravelly clay in parts	[Symbol]							
	4.8	Bore discontinued at 4.8m, limit of investigation	[Symbol]							
	5									
	6									
	7									
	8									
	9									

RIG: Hydropower Scout **DRILLER:** Total Drilling (Sawyer) **LOGGED:** Fulham **CASING:** HW to 4.8m
TYPE OF BORING: HW casing advanced, rotary to 4.8m
WATER OBSERVATIONS: Free groundwater observed at 2.3m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1. Auger samples	11. Soil samples	21. Field vane shear test (FVT)	
2. Hand auger samples	12. Water samples	22. Field vane shear test (FVT) (S&S)	
3. Cone samples	13. Water samples (in situ)	23. Field vane shear test (FVT) (S&S)	
4. Standard samples	14. Water samples	24. Field vane shear test (FVT) (S&S)	
5. Environmental samples	15. Water level	25. Shear vane (SV)	

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE04-D
PROJECT No: 49761
DATE: 23/11/2012
SHEET 1 OF 2

Borehole ID	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction	
				Type	Depth	Sample	Results & Comments		Details	Stickup
	0.5	TOPSOIL - Brown, gravelly silt topsoil, generally comprising fine to medium sized subangular gravel with some fine grained sand, humid	[Pattern]							
	1	GRAVELLY SILT - Brown, fine to medium sized, subangular gravelly silt with trace to some fine to medium grained sand, humid From 0.75m, some clay	[Pattern]							
	2.0	CLAYEY SAND - Brown, fine to medium grained clayey sand with trace to some silt From 2.5m, with some coarse grained sand	[Pattern]							
	4.0	SILTY SAND - Brown, fine to coarse grained silty sand with trace clay (humid?) From 5.5m, with some clay	[Pattern]							
	7.0	SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized, subangular, subrounded gravel, saturated From 8.5m, with some clay	[Pattern]							
								From 0m to 9.0m, backfilled with drill cuttings		

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 2.5m
TYPE OF BORING: Wash boring from 0.0m to 17.3m
WATER OBSERVATIONS: No free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1. Auger samples	12. Soil samples	23. Field permeability (slug)	
2. Split barrel	13. Water samples	24. Field permeability (slug) (100)	
3. Cone samples	14. T-bar samples (in situ test)	25. Field permeability (slug) (100)	
4. Standard samples	15. Algal samples	26. Field permeability (slug) (100)	
5. Environmental samples	16. Water samples	27. Shear vane (off)	
	17. Water test		

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE04-D
PROJECT No: 49761
DATE: 23/11/2012
SHEET 2 OF 2

RIG	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	11	SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized, subangular, subrounded gravel, saturated (continued)	[Dotted pattern]							
	11.5	SANDY CLAY - Firm to stiff, brown, fine grained sandy clay	[Diagonal lines]						From 9.0m to 14.0m, bentonite	
	13.0	SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized subangular gravel with some clay	[Dotted pattern]							
	16.5	From 16.5m, with some fine to coarse sized subangular gravel	[Dotted pattern]						From 14.0m to 17.3m, 5mm gravel From 14.3m to 17.3m, Class 18 PVC Screen	
	17.3	Bore discontinued at 17.3m, limit of investigation							End cap	

DRAFT

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 2.5m
TYPE OF BORING: Wash boring from 0.0m to 17.3m
WATER OBSERVATIONS: No free groundwater observations obscured due to drilling fluids
REMARKS:

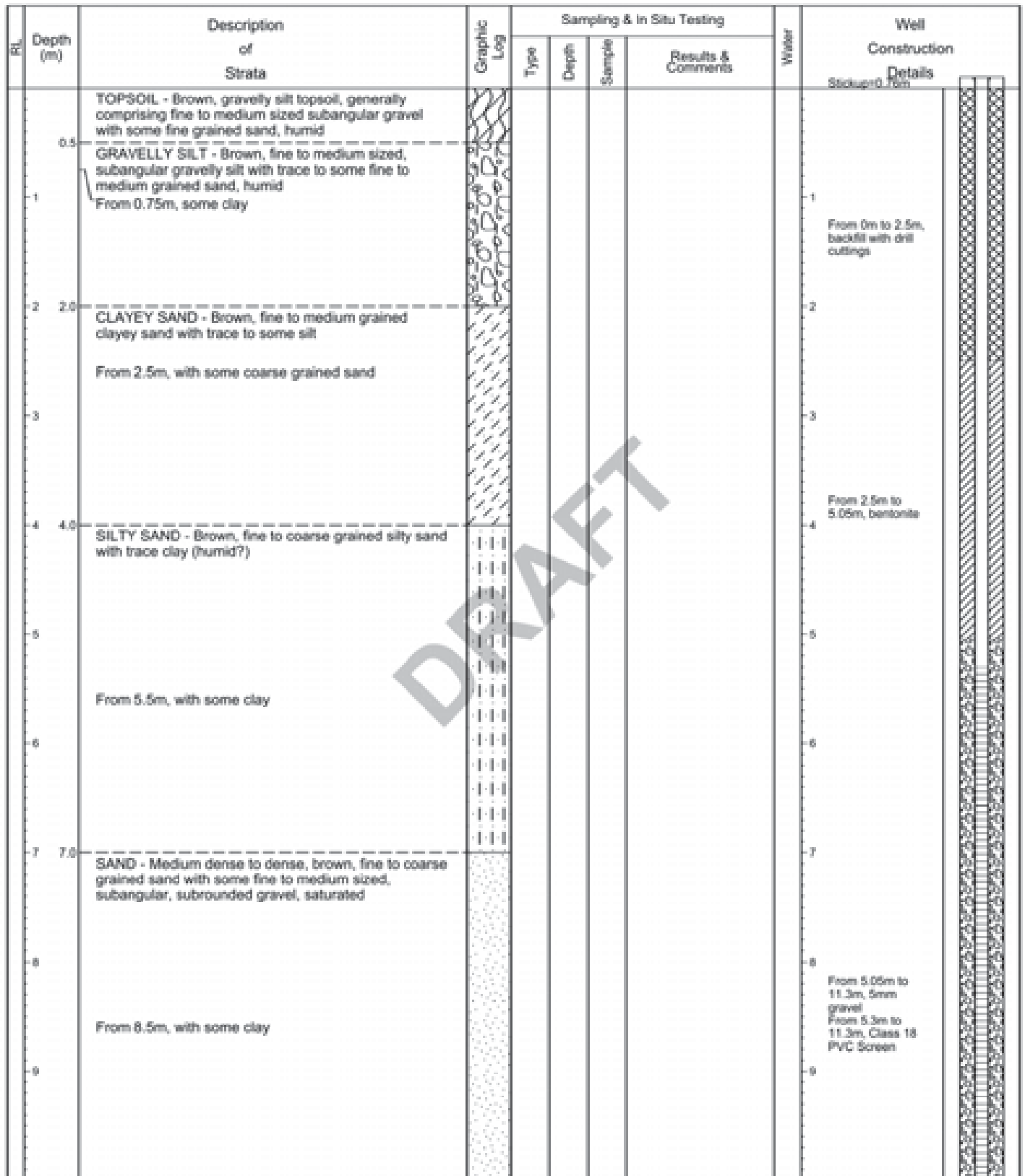
SAMPLING & IN SITU TESTING LEGEND			
1) Auger sample	12) Soil sample	20) Photo processed images (PPI)	
2) Soil sample	13) Water sample	21) Photo processed images (PPI)	
3) Cone sample	14) Water sample (in situ test)	22) Photo processed images (PPI)	
4) Standard sample	15) Slurry sample	23) Photo processed images (PPI)	
5) Environmental sample	16) Water sample	24) Photo processed images (PPI)	
	17) Water test	25) Photo processed images (PPI)	
		26) Photo processed images (PPI)	
		27) Photo processed images (PPI)	
		28) Photo processed images (PPI)	
		29) Photo processed images (PPI)	
		30) Photo processed images (PPI)	
		31) Photo processed images (PPI)	
		32) Photo processed images (PPI)	
		33) Photo processed images (PPI)	
		34) Photo processed images (PPI)	
		35) Photo processed images (PPI)	
		36) Photo processed images (PPI)	
		37) Photo processed images (PPI)	
		38) Photo processed images (PPI)	
		39) Photo processed images (PPI)	
		40) Photo processed images (PPI)	

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE04-S
PROJECT No: 49761
DATE: 23/11/2012
SHEET 1 OF 2



RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 2.5m
TYPE OF BORING: Wash boring from 0.0m to 11.3m
WATER OBSERVATIONS: No free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1. Auger sample	12. Soil sample	23. Field permeability test (PT)	
2. Split spoon	13. Water sample	24. Field vane shear test (FVST) (SPT)	
3. Cone sampler	14. Water sample (in situ test)	25. Field vane shear test (FVST) (SPT)	
4. Standard sampler	15. Slurry sample	26. Field permeability test (FPT)	
5. Environmental sample	16. Water test	27. Shear vane (SPT)	

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE04-S
PROJECT No: 49761
DATE: 23/11/2012
SHEET 2 OF 2

RIG	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details
				Type	Depth	Sample	Results & Comments		
	11	SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized, subangular, subrounded gravel, saturated (continued)	[Dotted pattern]						[Dotted pattern]
	11.3	Bore discontinued at 11.3m, limit of investigation						End cap	
	12								
	13								
	14								
	15								
	16								
	17								
	18								
	19								

DRAFT

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 2.5m
TYPE OF BORING: Wash boring from 0.0m to 11.3m
WATER OBSERVATIONS: No free groundwater observations obscured due to drilling fluids
REMARKS:

(S) - Split sample	(T) - Test sample	(P) - Photo preserved sample (PP)	(P) - Photo preserved sample (PP)
(S) - Split sample	(T) - Test sample	(P) - Photo preserved sample (PP)	(P) - Photo preserved sample (PP)
(S) - Split sample	(T) - Test sample	(P) - Photo preserved sample (PP)	(P) - Photo preserved sample (PP)
(S) - Split sample	(T) - Test sample	(P) - Photo preserved sample (PP)	(P) - Photo preserved sample (PP)
(S) - Split sample	(T) - Test sample	(P) - Photo preserved sample (PP)	(P) - Photo preserved sample (PP)
(S) - Split sample	(T) - Test sample	(P) - Photo preserved sample (PP)	(P) - Photo preserved sample (PP)
(S) - Split sample	(T) - Test sample	(P) - Photo preserved sample (PP)	(P) - Photo preserved sample (PP)
(S) - Split sample	(T) - Test sample	(P) - Photo preserved sample (PP)	(P) - Photo preserved sample (PP)
(S) - Split sample	(T) - Test sample	(P) - Photo preserved sample (PP)	(P) - Photo preserved sample (PP)
(S) - Split sample	(T) - Test sample	(P) - Photo preserved sample (PP)	(P) - Photo preserved sample (PP)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE05A
PROJECT No: 49761
DATE: 29/11/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction	
				Type	Depth	Sample		Results & Comments	Details
		SILTY CLAY - (Stiff) brown silty clay, some fine to coarse grained sand, trace fine subangular gravel, M>Wp						Stickup 0.50m	
	1	From 1.0m, very stiff					9,13,16 N = 29	From 0m to 0.3m, cement	
	1.35	SILTY SAND/SILTY CLAY - Medium dense, brown silty, fine to medium grained sand interbedded with very stiff to hard clay and silty clay, M>Wp							
	2	From 2.5m to 2.95m, hard clay band					>500kPa 7,14,15 N = 29	From 0.3m to 4.5m, backfill and cuttings	
	3								
	4	From 4.0m to 4.25m, sandy clay band, M>Wp, transitioning into sand					>230-250kPa 10,12,14 N = 26		
	4.25	SAND - Medium dense, brown, fine to medium grained sand, some fine subangular/subrounded gravel, some silt, humid							
	5	From 5.0m, damp						From 4.5m to 5.4m, bentonite	
	5.7	GRAVELLY SAND - Medium dense, brown, fine to coarse grained, subangular/subrounded gravelly, fine to coarse grained sand, trace silt, damp to wet					5.5,7 N = 12		
	6	From 6.25m, interbedded with sandy clay in parts							
	7						18,12,14 N = 26	From 5.2m to 8.4m, gravel From 5.4m to 8.4m, Class 18 PVC Screen	
	8.4	Bore discontinued at 8.4m, limit of investigation						End cap	

RIG: Hydropower Scout **DRILLER:** Sawyer **LOGGED:** Holden **CASING:** HW to 8.6m
TYPE OF BORING: Solid flight auger to 7.0m, wash boring to 9.2m, HQ3 to 58.90m
WATER OBSERVATIONS: Free groundwater observed at 6.25m
REMARKS:

S	Soil sample	W	Water sample	PT	Penetration test (SPT)
CS	Core sample	WT	Water test	PL	Plate load test (PLT)
CS	Core sample	WT	Water test	PL	Plate load test (PLT)
CS	Core sample	WT	Water test	PL	Plate load test (PLT)
CS	Core sample	WT	Water test	PL	Plate load test (PLT)
CS	Core sample	WT	Water test	PL	Plate load test (PLT)
CS	Core sample	WT	Water test	PL	Plate load test (PLT)
CS	Core sample	WT	Water test	PL	Plate load test (PLT)
CS	Core sample	WT	Water test	PL	Plate load test (PLT)
CS	Core sample	WT	Water test	PL	Plate load test (PLT)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/-

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 1 OF 15

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
1	0.1	SILTY SAND - (Loose), brown, medium grained silty sand with some fine sized subangular gravel, dry to humid From 0.6m, trace medium sized gravel From 1m, medium dense	[Dashed pattern]	A	0.1					
	A			0.25						
	A			0.5						
	A			1.0						
2	1.45		[Dashed pattern]	S	1.45		4.7, 13 N = 20			
3	2.3	CLAYEY GRAVEL - Loose to medium dense, brown, fine sized subangular clayey gravel with some coarse grained sand, humid to damp From 3m, damp	[Circular pattern]	S	2.5		5.4, 6 N = 10			
				2.95						
4	3.5	CLAYEY SAND - Loose, brown, fine to medium grained clayey sand with trace to some fine sized subangular gravel, damp From 5.9m to 6.2m, clayey gravel, humid From 7m, slightly gravelly From 8.5m, medium dense	[Diagonal lines]	S	4.0		2.3, 3 N = 6			
				4.45						
				5.5						
				5.95						
6	7.0		[Diagonal lines]	S	7.0		4.4, 5 N = 9			
				7.45						
9	8.5		[Diagonal lines]	S	8.5		6.7, 8 N = 15			
				8.95						
9.5	9.5	SAND - Medium dense, brown, fine to coarse grained sand, slightly fine sized gravel with some clay, humid to damp								

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

SAMPLING & IN SITU TESTING LEGEND

A - Auger sample	SI - Soil sample	PTC - Photo cross-section (PTC)
B - Auger sample	ST - Soil test	PLM - Photo log (not for use) (PLM)
CS - Cone sample	T - Test sample (in mm dia.)	PS - Photo section (not for use) (PS)
C - Cone sample	W - Water sample	SI - Soil sample (not for use) (SI)
D - Soil sample	W - Water sample	S - Standard penetration test
E - Environmental sample	W - Water test	S - Shear test (ST)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/-

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 2 OF 15

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	10.0	SAND - Medium dense, brown, fine to coarse grained sand, slightly fine sized gravel with some clay, humid to damp (continued)		S	10.0		6, 16, 30/130mm refusal			
	10.45									
11	11.1	GRAVELLY CLAY - (Stiff), grey, fine sized gravelly clay, M>Wp From 11.5m, some cobbles of brown, fine to medium grained sandstone		S	11.5		25/115mm refusal			
	11.62									
12	12.1	SANDY CLAY - Very stiff to hard, brown, fine to medium grained sandy clay, M>Wp From 13.3m, grey		S _{sp}	13.0		10, 12, 14 N = 26 >300 kPa			
13	13.45									
14	14.5	GRAVEL - (Medium dense), brown, medium to coarse sized subangular gravel, slightly clayey in parts, interbedded with weathered sandstone cobbles		S	14.5		30/150mm refusal			
	14.65									
15	15.1	CORE LOSS - 15.1m to 15.75m (0.65m), (very little drilling resistance, gravel)		C	15.0					
	15.1									
16	16.05	GRAVEL - (Medium dense), brown, medium to coarse sized subrounded gravel with some clay, some fine to medium grained sand and some sandstone cobbles up to 60mm CORE LOSS - 16.05m to 16.65m (0.6m), (very little drilling resistance, gravel)		C	16.05					
	16.65									
17	16.95	GRAVEL - (Medium dense), brown, medium to coarse sized subrounded gravel with some clay, some fine to medium grained sand and some sandstone cobbles up to 60mm CORE LOSS - 16.95m to 17.6m (0.65m), (very little drilling resistance, gravel)		C	16.95					
	17.6									
18	18.2	SANDSTONE - Extremely low strength, extremely weathered, brown sandstone SANDSTONE - Very low strength, highly weathered, light brown, fine to medium grained sandstone		C	18.25		20, 26/100mm refusal			
	18.55									
19	18.55	SANDSTONE - Very low to low strength, moderately weathered, light brown, fine to medium grained sandstone		C	18.5		PL(A) = 0.04 PL(D) = 0.06 PL(A) = 0.15 PL(D) = 0.12 PL(A) = 0.05 PL(D) = 0.04 PL(A) = 0.1 PL(D) = 0.06 PL(A) = 0.01 PL(D) = 0.01			
	18.55									
	18.8									
	19.08									
	19.2									
	19.49									
	19.66									
	19.91									

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

S	Standard sample	W	Water sample	PL(D)	Penetration test (D)
Sp	Special sample	WT	Water test	PL(A)	Penetration test (A)
C	Core sample	WV	Water volume	PL(S)	Penetration test (S)
D	Disturbed sample	WV	Water volume	PL(S)	Penetration test (S)
U	Undisturbed sample	WV	Water volume	PL(S)	Penetration test (S)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/-

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 3 OF 15

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
	20.26	CORE LOSS - 20.26m to 20.30m (0.04m)		C			PL(A) = 0.12	
	20.3							PL(A) = 0.05 PL(D) = 0.04
		SANDSTONE - Very low to low strength, moderately weathered, light brown, fine to medium grained sandstone From 20.6m, slightly weathered From 21.2m, fresh, grey		C	20.3 20.42			
	21							PL(A) = 0.11 PL(D) = 0.08	21
		CORE LOSS - 22.14m to 22.34m (0.2m)		C	21.15 21.2			
	22							PL(D) = 0.05
	22.14	SANDSTONE - Very low strength, fresh, grey, medium to coarse grained sandstone		C	21.96			
	22.34							PL(A) = 0.1 PL(D) = 0.06
		MUDSTONE - Medium strength, fresh, dark grey mudstone		C	22.45 22.53			
	23							PL(A) = 0.05 PL(D) = 0.07 PL(A) = 0.06 PL(D) = 0.06 PL(A) = 0.03 PL(D) = 0.06 PL(A) = 0.04 PL(D) = 0.05 PL(A) = 0.4 PL(A) = 0.5
	23.37	CORE LOSS - 23.37m to 23.45m (0.08m)		C	22.85 22.92			
	23.45							PL(A) = 0.07 PL(D) = 0.12
		MUDSTONE - Medium strength, fresh, dark grey mudstone		C	23.33 23.45			
	24							PL(A) = 0.34
	24.38	CORE LOSS - 24.38m to 24.48m (0.1m)		C	23.72 23.77			
	24.48							PL(A) = 0.07 PL(D) = 0.12
		MUDSTONE - Medium strength, fresh, dark grey mudstone		C	24.2 24.3			
	25							PL(A) = 0.07 PL(D) = 0.12
	25.05	COAL - Medium strength, fresh, black coal with some tuff		C	24.85 24.9			
	25.38							PL(A) = 0.04 PL(A) = 0.67
		TUFF - Extremely low strength, fresh, light grey tuff From 25.61m, medium strength, coal		C	25.45 25.64			
	26							PL(A) = 0.59 PL(D) = 0.36	26
		SILTSTONE - Medium strength, fresh, light grey siltstone From 26.34m, coal		C	25.92 26.39			
	27							PL(A) = 1.11
	26.55	CORE LOSS - 26.55m to 26.61m (0.06m)		C	26.55 26.67			
	26.61							PL(A) = 1.33 PL(A) = 0.09 PL(A) = 2.23	27
		CARBONACEOUS SILTSTONE - High strength, fresh, dark brown carbonaceous siltstone From 26.72m, very low strength, light grey tuff		C	26.74 26.87			
	28							PL(A) = 0.05	28
		COAL - High strength, fresh, black coal At 26.93m, tuff band, 10mm thick At 27.47m, very low strength tuff band, 30mm thick At 27.77m, very low strength tuff band, 60mm thick At 27.89m, very low strength tuff band, 10mm thick At 28m, very low strength tuff band, 10mm thick		C	27.2 27.8			
	28.07							PL(A) = 0.59	28
		SILTSTONE - Medium strength, fresh, light grey siltstone From 28.64m, grey		C	28.15 28.46			
	29							PL(A) = 0.71	29
		From 29.52m, high strength		C	28.67 28.71			
								PL(A) = 1.63 PL(D) = 1.05
				C	29.56			

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

SAMPLING & IN SITU TESTING LEGEND

A - Auger sample	11 - Thin section (20 mm dia.)	17 - Field permeability test (FPT)
B - Split sample	12 - Water sample	18 (A) - Field test soil shear (FSS) (SPT)
C - Core sample	13 - Liquid limit (LL) test (SPT)	18 (B) - Field test soil shear (FSS) (SPT)
D - Disturbed sample	14 - Water sample	19 - Shear vane (SV)
E - Undisturbed sample	15 - Water test	20 - Shear vane (SV)
	16 - Clay mineralogy (CM)	



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/-

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 4 OF 15

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		SILTSTONE - Medium strength, fresh, light grey siltstone (continued) From 30.2m, dark grey	|---|	C	30.15					
			|---|		30.5		PL(A) = 1.99			
	31		|---|		31.29		PL(A) = 1.75			31
			|---|		31.7		PL(A) = 1.97 PL(D) = 1.01			
	32	CARBONACEOUS SILTSTONE - High strength, fresh, dark brown carbonaceous siltstone From 32.29m to 32.39m, coal	|//|		32.2		PL(A) = 0.98 PL(A) = 1.67 PL(D) = 0.83			32
			|//|		32.4					
	32.76	SILTSTONE - High strength, fresh, dark grey siltstone	|---|		32.89		PL(A) = 1.52			
	33	CORE LOSS - 33.1m to 33.13m (0.03m)	|---|		33.13		PL(A) = 1.98			33
			|---|		33.24		PL(D) = 1.17			
		SANDSTONE - High strength, fresh, grey, medium grained sandstone	|---|							
	34		|---|		34.39		PL(A) = 0.84 PL(D) = 0.76			34

	35	From 35m, medium strength with some fine sized subrounded gravel	|---|		35.31		PL(A) = 1.04 PL(D) = 0.87			35

	36		|---|		36.15		PL(A) = 1.9 PL(D) = 1.11			36
			|---|		36.25					
		From 36.7m, high strength	|---|		36.91		PL(A) = 0.56 PL(D) = 0.49			37

	37	From 37.2m, medium strength	|---|		37.46		PL(A) = 1.34			37

	38	From 38.11m, mudstone band, 70mm thick	|---|		38.0					38
			|---|		38.32		PL(A) = 1.51			
			|---|		38.36		PL(D) = 1.27			
			|---|	G7003 C	38.62					
	39	From 39.15m, medium strength, medium to coarse grained	|---|		39.1					39
			|---|		39.4		PL(A) = 2.1 PL(D) = 1.04			

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

Q - Auger samples	SI - Soil Sample	PTC - Photo cross-section (PCC)
W - Soil samples	TS - Thin section	PL(A) - Plasticity limit (PI) (Sh) (SI)
SI - Soil samples	TC - Thin section (in mm scale)	PL(D) - Plasticity limit (PI) (SI) (SI)
C - Core samples	AI - Aired samples	SI - Soil samples (SI) (SI) (SI)
D - Disturbed samples	W - Water samples	SI - Soil samples (SI) (SI) (SI)
E - Environmental samples	Y - Water level	SI - Soil samples (SI) (SI) (SI)
		SI - Soil samples (SI) (SI) (SI)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/-

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 5 OF 15

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		SANDSTONE - High strength, fresh, grey, medium grained sandstone (continued)								
		From 40.5m to 41.81m, fine to medium grained with no gravel								
	41				40.64		PL(A) = 1.73 PL(D) = 1.24			
				C	41.01					
				GT003	41.31		PL(A) = 2.13 PL(D) = 1.76			
					41.37					
	42				42.15		PL(A) = 2.13			
					42.25					
					42.65		PL(A) = 0.74			
	43				42.99		PL(A) = 1.62			
		COAL - Medium strength, highly fresh black coal		C						
	44									
	44.25				44.25					
	44.3	CORE LOSS - 44.25m to 44.3m (0.05m)			44.35		PL(A) = 0.1			
		TUFF - Very low strength, fresh, light grey tuff								
	44.74	From 44.5m to 44.55m, medium strength coal		C	44.64		PL(A) = 0.91			
		From 44.58m, medium strength coal			44.82		PL(A) = 0.74			
	45				44.9					
	45.1	SILTSTONE - Medium strength, fresh, grey and dark grey siltstone		C	45.18		PL(A) = 0.82			
		LAMINITE - Medium strength, fresh, grey and light grey, fine to medium grained laminites		C	45.22					
		From 45.45m, high strength		GT004	45.27		PL(A) = 1.2			
					45.5					
	46				45.54					
					46.6		PL(A) = 1.86			
	47									
		From 47.5m, medium strength			47.76		PL(A) = 0.63 PL(D) = 0.34			
	48				48.19					
	48.34	SILTSTONE - Medium strength, fresh, dark grey siltstone			48.6		PL(A) = 0.88 PL(D) = 0.57			
	48.85									
	49	CARBONACEOUS MUDSTONE - High strength, fresh, dark brown carbonaceous mudstone with some very low strength bands up to 20mm thick			49.06		PL(A) = 0.71			
					49.35		PL(A) = 0.57			
					49.52					
				C	49.93		PL(A) = 0.47			

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

1. Auger sample	11. Cone sampler	21. Soil sample	31. Field vane shear test (FVST)
2. Solid sampler	12. Triaxial sampler	22. Tensile sampler	32. Field vane shear test (FVST) (2nd)
3. Core sampler	13. Triaxial sampler (in situ)	23. Tensile sampler (in situ)	33. Field vane shear test (FVST) (3rd)
4. Dilatant sampler	14. Water sampler	24. Water sampler	34. Shear vane (SV)
5. Environmental sampler	15. Water test	25. Water test	35. Shear vane (SV)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/-

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 6 OF 15

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		From 50.05m to 50.23m, extremely low strength, tuff bands up to 110mm thick			50.08		PL(D) = 0.3 PL(A) = 0.05 PL(D) = 0.06 PL(A) = 0.04 PL(D) = 0.06			
	50.41	TUFF - Very low strength, fresh, grey and light grey tuff		C	50.47					
	50.76	LAMINITE - Medium strength, fresh, grey and light grey, fine to medium grained laminite			51.13		PL(A) = 1.17			51
	51				51.16					
		From 51.39m to 52.04m, siltstone			51.82		PL(A) = 1.01 PL(D) = 0.61			52
	52			C	52.7		PL(A) = 0.95			53
	53.7	SILTSTONE - High strength, fresh, dark grey siltstone			53.54		PL(A) = 1.01			
	54				54.07		PL(A) = 1.13			54
		From 54.54m to 54.7m, medium strength, tuff			54.17					
		From 54.7m to 54.9m, medium strength coal			54.66		PL(A) = 0.37 PL(A) = 0.4			55
	55				54.82					
					55.36		PL(A) = 0.84 PL(D) = 0.36			
	56			C	55.37					
					55.57					
	56				56.1		PL(A) = 1.13 PL(D) = 0.46			56
	57				57.08		PL(A) = 0.88			57
	57.44	LAMINITE - High strength, fresh, grey and dark grey, fine to medium grained laminite			57.12					
	58				57.89		PL(A) = 1.41			58
	59	From 59m, medium strength siltstone			59.17		PL(A) = 0.77			59
		From 59.36m, medium strength carbonaceous mudstone			59.51		PL(A) = 0.99 PL(D) = 0.73			
	59.6				59.81		PL(A) = 1.8 PL(D) = 1.33			
		From 59.75m, very high strength								

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

<ul style="list-style-type: none"> 1 - Auger sample 2 - Solid sample 3 - Core sample 4 - Disturbed sample 5 - Environmental sample 6 - Soil sample 7 - Water sample (in situ test) 8 - Slurp sample 9 - Water sample 10 - Water test 11 - Field vane test (100 mm dia.) 12 - Slurp sample 13 - Water sample 14 - Water test 15 - Field vane test (100 mm dia.) 16 - Slurp sample 17 - Water sample 18 - Water test 19 - Field vane test (100 mm dia.) 20 - Slurp sample 21 - Water sample 22 - Water test 23 - Field vane test (100 mm dia.) 24 - Slurp sample 25 - Water sample 26 - Water test 27 - Field vane test (100 mm dia.) 28 - Slurp sample 29 - Water sample 30 - Water test 31 - Field vane test (100 mm dia.) 32 - Slurp sample 33 - Water sample 34 - Water test 35 - Field vane test (100 mm dia.) 36 - Slurp sample 37 - Water sample 38 - Water test 39 - Field vane test (100 mm dia.) 40 - Slurp sample 41 - Water sample 42 - Water test 43 - Field vane test (100 mm dia.) 44 - Slurp sample 45 - Water sample 46 - Water test 47 - Field vane test (100 mm dia.) 48 - Slurp sample 49 - Water sample 50 - Water test 51 - Field vane test (100 mm dia.) 52 - Slurp sample 53 - Water sample 54 - Water test 55 - Field vane test (100 mm dia.) 56 - Slurp sample 57 - Water sample 58 - Water test 59 - Field vane test (100 mm dia.) 60 - Slurp sample 61 - Water sample 62 - Water test 63 - Field vane test (100 mm dia.) 64 - Slurp sample 65 - Water sample 66 - Water test 67 - Field vane test (100 mm dia.) 68 - Slurp sample 69 - Water sample 70 - Water test 71 - Field vane test (100 mm dia.) 72 - Slurp sample 73 - Water sample 74 - Water test 75 - Field vane test (100 mm dia.) 76 - Slurp sample 77 - Water sample 78 - Water test 79 - Field vane test (100 mm dia.) 80 - Slurp sample 81 - Water sample 82 - Water test 83 - Field vane test (100 mm dia.) 84 - Slurp sample 85 - Water sample 86 - Water test 87 - Field vane test (100 mm dia.) 88 - Slurp sample 89 - Water sample 90 - Water test 91 - Field vane test (100 mm dia.) 92 - Slurp sample 93 - Water sample 94 - Water test 95 - Field vane test (100 mm dia.) 96 - Slurp sample 97 - Water sample 98 - Water test 99 - Field vane test (100 mm dia.) 100 - Slurp sample
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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/-

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 7 OF 15

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details
				Type	Depth	Sample	Results & Comments		
		SANDSTONE - High strength, fresh, grey, fine grained sandstone with some siltstone laminations up to 20mm thick (continued)		C	60.14				
	60.65	SILTSTONE - High strength, fresh, grey siltstone	[Siltstone pattern]		60.59		PL(A) = 4.3		
	61				61.12		PL(A) = 1.31		61
	62				62.23		PL(A) = 1.2		62
	63	From 63.76m, carbonaceous From 63.99m to 64.15m, very low strength tuff From 64.15m to 64.26m, trace coal	[Carbonaceous pattern]		63.14 63.19		PL(A) = 1.07		63
	64				64.12		PL(A) = 0.04		64
	64.85				64.68		PL(A) = 1.9		65
	65	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone			65.25		PL(A) = 1.37		65
	65.74	SILTSTONE - High strength, fresh, grey siltstone	[Siltstone pattern]		65.1		PL(A) = 2.31		66
	66				66.13				
	66.84				66.39				
	67	CARBONACEOUS MUDSTONE - High strength, fresh, dark grey carbonaceous mudstone with some tuff laminations			67.28		PL(A) = 2.34		67
	67.58	SANDSTONE - Medium strength, fresh, light grey, medium grained sandstone	[Sandstone pattern]		67.9		PL(A) = 1.04 PL(D) = 0.47		68
	68				69.13				
	69				69.16		PL(A) = 1.96 PL(D) = 1.96		69

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

1. Auger sample	11. Cone sampler	21. Split barrel sampler (45mm dia.)	31. Water sampler
2. Solid sampler	12. Triaxial sampler	22. Water sampler (45mm dia.)	32. Water level
3. Core sampler	13. Triaxial sampler (45mm dia.)	23. Water sampler (45mm dia.)	33. Water level
4. Standard sampler	14. Triaxial sampler (45mm dia.)	24. Water sampler (45mm dia.)	34. Water level
5. Environmental sampler	15. Triaxial sampler (45mm dia.)	25. Water sampler (45mm dia.)	35. Water level
	16. Triaxial sampler (45mm dia.)	26. Water sampler (45mm dia.)	36. Water level
	17. Triaxial sampler (45mm dia.)	27. Water sampler (45mm dia.)	37. Water level
	18. Triaxial sampler (45mm dia.)	28. Water sampler (45mm dia.)	38. Water level
	19. Triaxial sampler (45mm dia.)	29. Water sampler (45mm dia.)	39. Water level
	20. Triaxial sampler (45mm dia.)	30. Water sampler (45mm dia.)	40. Water level



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
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LOCATION: Bylong

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EASTING: 235105
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DIP/AZIMUTH: 90°/-

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 8 OF 15

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	71	SANDSTONE - Medium strength, fresh, light grey, medium grained sandstone (continued)								
	71				70.75		PL(A) = 2.48 PL(D) = 2.21			71
	71.49	From 71.22m, medium strength			71.43		PL(A) = 0.64			
	72	SILTSTONE - Medium strength, fresh, dark grey siltstone			71.88		PL(A) = 0.98 PL(D) = 0.75			72
	72				72.12					
	72				72.56		PL(A) = 0.81 PL(D) = 0.56			
	72.82	CARBONACEOUS MUDSTONE - High strength, fresh dark brown carbonaceous mudstone								73
	73	At 73.16m, tuff band, 75mm thick			73.34		PL(A) = 1.34			
	73	At 73.64m, tuff band, 70mm thick								
	74	From 73.87m, coal			73.92		PL(A) = 1.03			74
	74.03	SILTSTONE - Very high strength, fresh, grey siltstone with some bands of sandstone up to 100mm thick								
	75	From 75m, high strength			74.87		PL(A) = 3.12 PL(D) = 3.04			75
	75				75.13					
	75				75.21		PL(A) = 1.6			
	75				75.24					
	75				75.49					
	76	From 75.98m, very high strength sandstone with siltstone bands								76
	76				76.52		PL(A) = 3.4			
	77	SILTSTONE - High strength, fresh, grey siltstone								77
	77				77.68		PL(A) = 1.92			
	78				78.14					78
	78	From 78.42m to 79.2m, medium strength								
	79				78.61		PL(A) = 1.02			
	79				79.55		PL(A) = 1.29			
	79				79.94		PL(A) = 2.21			

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
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WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

S	Soil Sample	PL	Penetration Test
SL	Soil Log	PL(A)	Penetration Test (Average)
SLD	Soil Log Diagram	PL(D)	Penetration Test (Depth)
SLT	Soil Log Table	PL(S)	Penetration Test (Soil)
SLV	Soil Log View	PL(T)	Penetration Test (Total)
SLW	Soil Log Water	PL(W)	Penetration Test (Water)
SLX	Soil Log X-ray	PL(Y)	Penetration Test (Y-axis)
SLZ	Soil Log Z-axis	PL(Z)	Penetration Test (Z-axis)
SLA	Soil Log A-axis	PL(B)	Penetration Test (B-axis)
SLB	Soil Log B-axis	PL(C)	Penetration Test (C-axis)
SLC	Soil Log C-axis	PL(D)	Penetration Test (D-axis)
SLD	Soil Log D-axis	PL(E)	Penetration Test (E-axis)
SLE	Soil Log E-axis	PL(F)	Penetration Test (F-axis)
SLF	Soil Log F-axis	PL(G)	Penetration Test (G-axis)
SLG	Soil Log G-axis	PL(H)	Penetration Test (H-axis)
SLH	Soil Log H-axis	PL(I)	Penetration Test (I-axis)
SLI	Soil Log I-axis	PL(J)	Penetration Test (J-axis)
SLJ	Soil Log J-axis	PL(K)	Penetration Test (K-axis)
SLK	Soil Log K-axis	PL(L)	Penetration Test (L-axis)
SLL	Soil Log L-axis	PL(M)	Penetration Test (M-axis)
SLM	Soil Log M-axis	PL(N)	Penetration Test (N-axis)
SLN	Soil Log N-axis	PL(O)	Penetration Test (O-axis)
SLO	Soil Log O-axis	PL(P)	Penetration Test (P-axis)
SLP	Soil Log P-axis	PL(Q)	Penetration Test (Q-axis)
SLQ	Soil Log Q-axis	PL(R)	Penetration Test (R-axis)
SLR	Soil Log R-axis	PL(S)	Penetration Test (S-axis)
SLS	Soil Log S-axis	PL(T)	Penetration Test (T-axis)
SLT	Soil Log T-axis	PL(U)	Penetration Test (U-axis)
SLU	Soil Log U-axis	PL(V)	Penetration Test (V-axis)
SLV	Soil Log V-axis	PL(W)	Penetration Test (W-axis)
SLW	Soil Log W-axis	PL(X)	Penetration Test (X-axis)
SLX	Soil Log X-axis	PL(Y)	Penetration Test (Y-axis)
SLY	Soil Log Y-axis	PL(Z)	Penetration Test (Z-axis)
SLZ	Soil Log Z-axis	PL(A)	Penetration Test (A-axis)
SLA	Soil Log A-axis	PL(B)	Penetration Test (B-axis)
SLB	Soil Log B-axis	PL(C)	Penetration Test (C-axis)
SLC	Soil Log C-axis	PL(D)	Penetration Test (D-axis)
SLD	Soil Log D-axis	PL(E)	Penetration Test (E-axis)
SLE	Soil Log E-axis	PL(F)	Penetration Test (F-axis)
SLF	Soil Log F-axis	PL(G)	Penetration Test (G-axis)
SLG	Soil Log G-axis	PL(H)	Penetration Test (H-axis)
SLH	Soil Log H-axis	PL(I)	Penetration Test (I-axis)
SLI	Soil Log I-axis	PL(J)	Penetration Test (J-axis)
SLJ	Soil Log J-axis	PL(K)	Penetration Test (K-axis)
SLK	Soil Log K-axis	PL(L)	Penetration Test (L-axis)
SLL	Soil Log L-axis	PL(M)	Penetration Test (M-axis)
SLM	Soil Log M-axis	PL(N)	Penetration Test (N-axis)
SLN	Soil Log N-axis	PL(O)	Penetration Test (O-axis)
SLO	Soil Log O-axis	PL(P)	Penetration Test (P-axis)
SLP	Soil Log P-axis	PL(Q)	Penetration Test (Q-axis)
SLQ	Soil Log Q-axis	PL(R)	Penetration Test (R-axis)
SLR	Soil Log R-axis	PL(S)	Penetration Test (S-axis)
SLS	Soil Log S-axis	PL(T)	Penetration Test (T-axis)
SLT	Soil Log T-axis	PL(U)	Penetration Test (U-axis)
SLU	Soil Log U-axis	PL(V)	Penetration Test (V-axis)
SLV	Soil Log V-axis	PL(W)	Penetration Test (W-axis)
SLW	Soil Log W-axis	PL(X)	Penetration Test (X-axis)
SLX	Soil Log X-axis	PL(Y)	Penetration Test (Y-axis)
SLY	Soil Log Y-axis	PL(Z)	Penetration Test (Z-axis)
SLZ	Soil Log Z-axis	PL(A)	Penetration Test (A-axis)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/-

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 9 OF 15

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		From 79.9m to 80.11m, high strength carbonaceous with some coal								
	80.72	SILTSTONE - High strength, fresh, grey siltstone (continued)		C						
	81	SANDSTONE - Very high strength, fresh, light grey, fine to medium grained sandstone with some siltstone bands up to 40mm thick								
	81.03						PL(A) = 5.49			
	81.15						PL(D) = 4.08			81
	81.51	TUFF - Medium strength, fresh, light grey tuff								
	81.57						PL(A) = 0.67			
	81.72	COAL - High strength, fresh, black coal and carbonaceous siltstone								
	81.75						PL(A) = 2.41			
	82	SILTSTONE - High strength, fresh, grey siltstone								82
	82.07									
	82.53			C			PL(A) = 2			
	82.67	SANDSTONE - High strength, fresh, grey and light grey, fine to medium grained sandstone								
	83									
	83.4m	From 83.4m, coarse grained								
	84	CONGLOMERATE - High strength, fresh, grey, fine to medium sized subrounded with fine to coarse grained sand and clay matrix, conglomerate with interbedded medium to coarse grained sandstone								
	84.0									
	84.17						PL(A) = 2.58			84
	84.2						PL(D) = 1.79			
	85									
	85.1						PL(A) = 1.79			
	85.14						PL(D) = 1.39			
	85.46			C						
	86									
	87									
	87.1						PL(A) = 1.94			87
	87.15						PL(D) = 1.76			
	88									
	88.1						PL(A) = 0.87			
	88.1	From 88.22m, thin coal laminations					refusal			
	88.93			C						
	89	SANDSTONE - High strength, fresh, grey, medium grained sandstone								
	89.05						PL(A) = 2.1			89
							PL(D) = 2.06			

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

1. Auger sample	11. Cone sampler	21. Thin section (in vacuo)	31. Photo cross-section (PCC)
2. Solid sample	12. Water sampler	22. Thin section (in vacuo)	32. Photo cross-section (PCC)
3. Core sample	13. Slotted sampler (in vacuo)	23. Thin section (in vacuo)	33. Photo cross-section (PCC)
4. Disturbed sample	14. Water sampler	24. Thin section (in vacuo)	34. Photo cross-section (PCC)
5. Environmental sample	15. Water test	25. Thin section (in vacuo)	35. Photo cross-section (PCC)
		26. Thin section (in vacuo)	36. Photo cross-section (PCC)
		27. Thin section (in vacuo)	37. Photo cross-section (PCC)
		28. Thin section (in vacuo)	38. Photo cross-section (PCC)
		29. Thin section (in vacuo)	39. Photo cross-section (PCC)
		30. Thin section (in vacuo)	40. Photo cross-section (PCC)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/-

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 10 OF 15

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
		SANDSTONE - High strength, fresh, grey, medium grained sandstone (continued)		C	90.1 90.16		PL(A) = 1.94 PL(D) = 1.09	
	91				91.0		PL(A) = 2.48 PL(D) = 2.8	91
		From 91.33m to 91.8m, interbedded conglomerate bands (40mm thickness, 20mm to 150mm spacings)						
	92	From 91.85m, interbedded siltstone, fine grained sandstone		C	92.0		PL(A) = 2.29	92
	93				93.0 93.2		PL(A) = 3.14 PL(D) = 2.66	93
	94				93.8		PL(A) = 2.51 PL(D) = 2.2	94
	94.08	COAL - High strength, fresh, dark brown coal with interbedded carbonaceous siltstone			94.25		PL(A) = 1.03	
	94.65	From 94.6m, grading to dark grey		C	94.75		PL(A) = 1.01	
	95.05	SILTSTONE - Medium to high strength, fresh, dark grey siltstone						95
	95.42	From 94.95m, grading to very fine to fine grained sandstone			95.45 95.47		PL(A) = 1.86	
	96	SANDSTONE - High strength, Fresh, dark grey to grey, very fine to fine grained sandstone with interbedded siltstone		DT009	95.86			96
		SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone with interbedded very fine grained sandstone and siltstone			96.2 96.4		PL(A) = 1.34 PL(D) = 0.8	
		At 95.88m to 95.91m, conglomerate band						
	97	From 96.66m to 97.45m, medium to coarse grained, pebbly in parts			97.23		PL(A) = 1.26 PL(D) = 1.13	97
	98			C	98.2		PL(A) = 1.66 PL(D) = 1.59	98
	99	From 99.18m, coarse grained		C	99.18			99

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

1. Auger sample	11. Test sample	21. Photo processed slotted (P/S)
2. Solid sample	12. Test sample	22. Photo processed slotted (P/S)
3. Core sample	13. Test sample (in situ test)	23. Photo processed slotted (P/S)
4. Slotted sample	14. Water sample	24. Photo processed slotted (P/S)
5. Environmental sample	15. Water test	25. Photo processed slotted (P/S)
		26. Photo processed slotted (P/S)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/-

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 11 OF 15

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	100.17 100.3	COAL - High strength, fresh, dark brown coal with interbedded carbonaceous siltstone			100.1 100.25		PL(A) = 0.78 PL(A) = 1.18		
	101	SILTSTONE - High strength, fresh grey siltstone with interbedded, fine to medium grained sandstone From 100.65m to 101.15m, fine to medium grained sandstone with interbedded siltstone From 100.3m to 102.3m, sparse tuffaceous bands (less than 30mm thick)		C	101.05		PL(A) = 2.84 PL(D) = 1.46	101	
	102				101.6 101.97	GT010			102
	102.24	SILTSTONE and SANDSTONE - High strength, fresh, grey to dark grey siltstone and fine to medium grained sandstone			102.15 102.2		PL(A) = 1.39		
	103				102.55		PL(A) = 1.31		
	104				103.05		PL(A) = 2.55 PL(D) = 1.45	103	
	104	At 104.07m to 104.17m, coal band		C	103.7 103.75		PL(A) = 2.58		
	104.6	COAL - High strength, fresh, dark brown coal with interbedded carbonaceous siltstone			104.07 104.45	GT011	PL(A) = 2.08 PL(D) = 1.55	104	
	105				104.45				
	105.43	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone with interbedded siltstone			105.15 105.18		PL(A) = 1.48	105	
	106				105.78 106.62	GT012	PL(A) = 2.77 PL(D) = 2.41	106	
	106.63	COAL - High strength, fresh, dark brown coal with interbedded carbonaceous siltstone		C	106.3 106.35		PL(A) = 2.29 PL(D) = 1.23		
	107				106.75 106.83	GT013	PL(A) = 1.01	107	
	108	From 107.63m, band interbedded tuffaceous claystone / siltstone			107.15				
	109	At 108.58m to 108.6m, tuffaceous siltstone			107.8		PL(A) = 1.98	108	
	109.27	TUFFACEOUS CLAYSTONE / SILTSTONE - Medium strength, fresh, pale grey tuffaceous claystone / siltstone			108.22 108.45		PL(A) = 0.92 PL(D) = 0.62	109	
	109.52	From 109.42m, tuffaceous siltstone, high strength		C	109.3		PL(A) = 1.24		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

B	Auger sample	11	Flow sampler	PL(A)	Permeability (at 100 kPa)
BH	Block sample	12	Triaxial sampler	PL(A)	Permeability (at 100 kPa) (Self)
C	Core sample	13	Triaxial sampler (in situ test)	PL(A)	Permeability (at 100 kPa) (Self)
D	Disturbed sample	14	Agid sampler	PL(A)	Permeability (at 100 kPa)
E	Environmental sample	15	Water sample	PL(A)	Permeability (at 100 kPa)
		16	Water level	PL(A)	Permeability (at 100 kPa)
		17	Shear vane (SV)	PL(A)	Permeability (at 100 kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/-

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 12 OF 15

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	110.33	At 109.57m to 109.58m, tuffaceous siltstone			110.1		PL(A) = 2.34 PL(D) = 1.32		
		At 109.65m to 109.7m, tuffaceous siltstone / claystone			110.45		PL(A) = 1.91		
		COAL - High strength, fresh, dark brown coal with interbedded carbonaceous siltstone (continued)			110.55	C			
	110.88	TUFFACEOUS CLAYSTONE / SILTSTONE - Medium strength, fresh, pale grey tuffaceous claystone / siltstone			110.88	DT014			111
	111	From 110.75m, high strength			111.24				
		COAL - High strength, fresh, dark brown coal with interbedded siltstone bands			111.7		PL(A) = 1.01		
	112								112
	112.13	SILTSTONE - High strength, fresh, grey siltstone with some sandstone bands up to 40mm thick			112.4		PL(A) = 1.96		
					112.72	C			
	113				113.02	DT015	PL(A) = 3.86		113
					113.05				
	114				113.96		PL(A) = 2.85		114
					114.24				
	114.57	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone							
	115				115.05		PL(A) = 2.16		115
						C			
	116	From 115.92m, medium strength, coarse grained			116.06		PL(A) = 0.6		116
					116.5		PL(A) = 1.58		
					116.53	DT016			
					116.84				117
	117				117.26				
					117.8		PL(A) = 0.79		
	117.93	COAL - Medium to high strength, fresh, fractured black coal							118
	118					C			
					118.82		PL(A) = 1.36		119
	119								
					119.87		PL(A) = 0.89		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

Q - Auger samples	SI - Soil samples	PT - Photo processed slotted (PT)
SA - Solid samples	TC - Test samples	PL(A) - Plastic limit (ASTM D 2000) (S&M)
CL - Cone samples	TR - Trial samples (in situ test)	PL(D) - Plastic limit (ASTM D 2000) (S&M)
C - Core samples	AL - Alund samples	SI (SI) - Soil index (ASTM D 2000) (S&M)
D - Disturbed samples	W - Water samples	SI (SI) - Soil index (ASTM D 2000) (S&M)
E - Environmental samples	WT - Water test	S - Shear samples (S)
		Y - Shear vane (S)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/-

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 13 OF 15

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details
				Type	Depth	Sample	Results & Comments		
		COAL - Medium to high strength, fresh, fractured black coal (continued)		C	120.21				
	121				120.85		PL(A) = 1.18		121
	122			C					122
					122.29		PL(A) = 1.68		
	123				122.95		PL(A) = 0.92 PL(D) = 0.7		123
					123.21				
	123.6	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone with some siltstone bands up to 50mm thick							
	124				124.29				124
				DT017	124.59		PL(A) = 1.59 PL(D) = 1.73		
				C	124.62				
	125								125
					125.8		PL(A) = 1.84 PL(D) = 1.53		
	126				126.25				126
					126.86		PL(A) = 1.6 PL(D) = 1.73		
	127								127
				C	127.95		PL(A) = 2.65 PL(D) = 1.43		
	128								128
					128.81		PL(A) = 2.83 PL(D) = 1.41		
	129				129.25				129
		From 129.7m, very high strength		C	129.8		PL(A) = 5.49		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

1. Auger sample	11. Water sample	21. Photo cross-section (PCS)
2. Solid sample	12. Water sample	22. PL(A)
3. Core sample	13. Water sample (in mm dia.)	23. PL(D)
4. Disturbed sample	14. Water sample	24. Shear test (ASTM)
5. Undisturbed sample	15. Water test	25. Shear test (ASTM)
	16. Water test	26. Shear test (ASTM)
	17. Water test	27. Shear test (ASTM)
	18. Water test	28. Shear test (ASTM)
	19. Water test	29. Shear test (ASTM)
	20. Water test	30. Shear test (ASTM)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/-

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 14 OF 15

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details
				Type	Depth	Sample	Results & Comments		
	131	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone with some siltstone bands up to 50mm thick (continued)					PL(A) = 3.74 PL(D) = 3.16		
	131	From 131.3m, high strength		C	130.65				
	132				131.48		PL(A) = 2.72 PL(D) = 1.64		
	132				132.24				
	132.62	SILTSTONE - Very high strength, fresh, grey siltstone			132.61		PL(A) = 3.7		
	133								
	133.48	SANDSTONE - High strength, fresh, grey, fine grained sandstone with siltstone laminations							
	134			C					
	134	From 134.57m to 134.92m, high strength mudstone band			134.12		PL(A) = 3.76		
	134			GT016	134.16				
	134				134.43				
	134				134.66		PL(A) = 2.32 PL(D) = 1.4		
	135				135.25				
	135				135.5		PL(A) = 1.22 PL(D) = 1.43		
	136								
	136			C	136.66		PL(A) = 2.81 PL(D) = 1.76		
	137								
	137.32	MUDSTONE - High strength, fresh, brown / grey mudstone with some fine grained sandstone laminations			137.65		PL(A) = 2.52 PL(D) = 1.82		
	138				138.27				
	138	From 138.36m, light grey			138.6		PL(A) = 1.84 PL(D) = 1.84		
	139			C					
	139				139.59		PL(A) = 4.66 PL(D) = 3.45		
	139				139.93		PL(A) = 0.68		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

1. Auger sample	11. Cone sample	21. Plasticity index (PI)
2. Solid sample	12. Water content	22. Free swell (FS)
3. Core sample	13. Liquid limit (LL)	23. Free swell (FS) (15%)
4. Standard sample	14. Shrinkage limit (SL)	24. Plasticity index (PI) (15%)
5. Environmental sample	15. Water level	25. Standard penetration test (SPT)
	16. Water level	26. Shear vane (SV)
		27. Field vane test (FVT)
		28. Field vane test (FVT) (15%)
		29. Field vane test (FVT) (15%)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/-

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 15 OF 15

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		At 139.67m, medium strength tuff band, 130mm thick	[Symbol]				PL(D) = 0.52			
	140.66	MUDSTONE - High strength, fresh, brown / grey mudstone with some fine grained sandstone laminations (continued)		C	140.36		PL(A) = 1.2			
	141	From 140m to 140.13m, dark grey SANDSTONE - High strength, fresh, grey, fine grained sandstone			140.76		PL(A) = 2.63 PL(D) = 1.92	141		
	141.3	MUDSTONE - High strength, fresh, grey / brown mudstone	[Symbol]		141.24					
	142				141.51		PL(A) = 2.51	142		
	142.58	SANDSTONE - High strength, fresh, grey, fine grained sandstone		C	142.48		PL(A) = 1.88			
	143				142.93		PL(A) = 2.11 PL(D) = 1.37	143		
	144	From 143.44m, medium strength with some mudstone laminations up to 10mm thick			143.61		PL(A) = 0.89 PL(D) = 0.7			
				GT019	143.77					
					144.0			144		
					144.25					
	145			C	144.78		PL(A) = 0.82 PL(D) = 0.46	145		
	145.26	Bore discontinued at 145.26m , limit of investigation			145.26					
	146							146		
	147							147		
	148							148		
	149							149		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

SAMPLING & IN SITU TESTING LEGEND			
P - Split sampler	S - Soil sample	PL(D) - Plasticity limit (PL)	PL(A) - Plasticity limit (PL)
PL - Split sampler	T - Tensile sampler	PL(D) - Plasticity limit (PL)	PL(A) - Plasticity limit (PL)
C - Cone sampler	W - Water sample	PL(D) - Plasticity limit (PL)	PL(A) - Plasticity limit (PL)
D - Dilatometer sampler	W - Water sample	PL(D) - Plasticity limit (PL)	PL(A) - Plasticity limit (PL)
E - Environmental sampler	W - Water sample	PL(D) - Plasticity limit (PL)	PL(A) - Plasticity limit (PL)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235107
NORTHING: 6406728
DIP/AZIMUTH: 90°/-

BORE No: B3-D
PROJECT No: 49761
DATE: 28/11/2013
SHEET 1 OF 2

ICZ	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction	
				Type	Depth	Sample	Results & Comments		TOC = 0.500m	Details
	1	<p>SILTY SAND - (Loose), brown, medium grained silty sand with some fine sized subangular gravel, dry to humid</p> <p>From 0.6m, trace medium sized gravel</p> <p>From 1m, medium dense</p>	[Dashed pattern]						[Casing symbols]	
	2.3	<p>CLAYEY GRAVEL - Loose to medium dense, brown, fine sized subangular gravel with some coarse grained sand, humid to damp</p> <p>From 3m, damp</p>	[Circular pattern]						[Casing symbols]	
	3.5	<p>CLAYEY SAND - Loose, brown, fine to medium grained clayey sand with trace to some fine sized subangular gravel, damp</p> <p>From 5.9m to 6.2m, clayey gravel, humid</p> <p>From 7m, slightly gravelly</p> <p>From 8.5m, medium dense</p>	[Diagonal line pattern]					<p>From 0m to 14.0m, grout</p> <p>From -0.500m to 15.7m, Class 18 blank</p>	[Casing symbols]	
	9.5	<p>SAND - Medium dense, brown, fine to coarse grained sand, slightly fine sized gravel with some clay, humid to damp</p>	[Diagonal line pattern]						[Casing symbols]	

RIG: Hydropower Scout **DRILLER:** Total Drilling (Sinclair) **LOGGED:** Fulham **CASING:** HW to 17.9m
TYPE OF BORING: Solid flight to 14m, HW casing advanced to 17.9m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

1. Auger samples	11. Grab samples	21. Field permeability (slug)
2. Solid samples	12. Triaxial samples	22. Field permeability (slug)
3. Cone samples	13. Triaxial samples (in situ)	23. Field permeability (slug)
4. Disturbed samples	14. Water samples	24. Shear vane (SV)
5. Undisturbed samples	15. Water level	



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235109
NORTHING: 6406728
DIP/AZIMUTH: 90°/-

BORE No: B3-S
PROJECT No: 49761
DATE: 27/11/2013
SHEET 1 OF 2

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments		TOC = 0.538m	
	1	SILTY SAND - (Loose), brown, medium grained silty sand with some fine sized subangular gravel, dry to humid From 0.6m, trace medium sized gravel From 1m, medium dense	[Diagonal lines pattern]						[Triangular pattern]	
	2.3	CLAYEY GRAVEL - Loose to medium dense, brown, fine sized subangular gravel with some coarse grained sand, humid to damp From 3m, damp	[Circular pattern]						[Triangular pattern]	
	3.5	CLAYEY SAND - Loose, brown, fine to medium grained clayey sand with trace to some fine sized subangular gravel, damp From 5.9m to 6.2m, clayey gravel, humid From 7m, slightly gravelly From 8.5m, medium dense	[Dotted pattern]					From 0m to 9.5m, grout From -0.538m to 10.15m, Class 18 blank	[Triangular pattern]	
	9.5	SAND - Medium dense, brown, fine to coarse grained sand, slightly fine sized gravel with some clay, humid to damp	[Horizontal lines pattern]					From 9.5m to 9.9m, bentonite	[Hatched pattern]	

RIG: Hydropower Scout **DRILLER:** Total Drilling (Sawyer) **LOGGED:** Fulham **CASING:** Uncased
TYPE OF BORING: Solid flight to 13.6m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
R - Augercast sample	SI - Soil sample	R1 - First penetration test (PT)	R2 - Second penetration test
R2 - Solid sample	II - T-bar sampler (4 mm dia.)	R3 - Third penetration test (PT)	R3 - Third penetration test (PT)
C1 - Cone sampler	III - Liquid sampler	R4 - Fourth penetration test (PT)	R4 - Fourth penetration test (PT)
D - Dilatometer sample	W - Water sample	R5 - Fifth penetration test (PT)	R5 - Fifth penetration test (PT)
E - Environmental sample	Y - Water level	R6 - Sixth penetration test (PT)	R6 - Sixth penetration test (PT)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235109
NORTHING: 6406728
DIP/AZIMUTH: 90°/-

BORE No: B3-S
PROJECT No: 49761
DATE: 27/11/2013
SHEET 2 OF 2

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		SAND - Medium dense, brown, fine to coarse grained sand, slightly fine sized gravel with some clay, humid to damp (continued)								
	11.1	GRAVELLY CLAY - (Stiff), grey, fine sized gravelly clay, M>Wp From 11.5m, some cobbles of brown, fine to medium grained sandstone								
	12.1	SANDY CLAY - Very stiff to hard, brown, fine to medium grained sandy clay, M>Wp								
	13.65	Bore discontinued at 13.65m , limit of investigation							End cap	

RIG: Hydropower Scout **DRILLER:** Total Drilling (Sawyer) **LOGGED:** Fulham **CASING:** Uncased
TYPE OF BORING: Solid flight to 13.6m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
S	Soil Sample	W	Water Sample
U	Undisturbed Sample	T	Water Test
D	Disturbed Sample		
1	1-100mm		
2	100-200mm		
3	200-300mm		
4	300-400mm		
5	400-500mm		
6	500-600mm		
7	600-700mm		
8	700-800mm		
9	800-900mm		
10	900-1000mm		

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 227521
NORTHING: 6409097
DIP/AZIMUTH: 90°/-

BORE No: M2
PROJECT No: 49761
DATE: 11/12/2013
SHEET 1 OF 1

ICZ	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	TOC = 0.495m
	0.8	SILTY CLAY - (Stiff), brown silty clay, M<<Wp		A	0.1				
				A	0.25				
				A	0.5				
	1	CLAY - (Hard), light brown clay with trace to some silt, M<<Wp At 1.0m, cobble		A	1.0		25/150mm		
				S	1.15				
	2.2	GRAVEL - Dense, brown, fine to medium sized subangular / subrounded gravel, slightly medium grained sandy with some clay, damp		S	2.5		13, 14, 19 N = 33		From 2.1m to 2.6m, bentonite
				S	2.95				
		From 3.5m, trace sand and trace clay, moist		D	3.5				
	4	From 3.9m to 4.05m, clay band From 4.05m, some gravel up to 35mm in diameter		pp	4.0		230 kPa 8, 24, 14/75mm		
				S	4.38				From 2.6m to 5.9m, gravel From 2.9m to 5.9m, Class 18 machine slotted
	5	From 5.0m, wet with some fine to medium grained sand		S	5.5				
	5.68			S	5.71		18, 12/60 (bouncing)		
	5.95	SANDSTONE - Medium strength, moderately weathered, brown, fine to medium grained sandstone Bore discontinued at 5.95m, limit of investigation		S	6.0		3/0 (bouncing)		End cap
	7								
	8								
	9								

RIG: Hydropower Scout **DRILLER:** Total Drilling (Sawyer) **LOGGED:** Fulham **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 5.95m
WATER OBSERVATIONS: Free groundwater observed at 5.6m
REMARKS:

A - Auger samples	SI - Soil sample	PO - Photo penetrometer test (PPT)
B - Bulk samples	TC - Test cone	PS (M) - Pressuremeter test (M) (100kPa)
CB - Cone beam	TV - Test cone	PS (S) - Pressuremeter test (S) (100kPa)
C - Cone samples	W - Water sample	PS (L) - Pressuremeter test (L) (100kPa)
D - Dilatometer samples	Wt - Water test	S - Standard penetration test
E - Environmental samples	Wt - Water test	S - Shear cone (SC)



BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: A23W
PROJECT No: 49761.02
DATE: 23/10/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction	
				Type	Depth	Sample		Results & Comments	Details
		SAND - (Very loose), brown, fine grained sand with some silt and trace fine to medium sized subrounded gravel, humid At 0.5m, humid to damp	[Dotted pattern]					Stickup = 0.02m	[Hatched pattern]
	1	From 1.0m, loose						From 0m to 0.4m, asphalt and concrete	[Hatched pattern]
	2	From 2.1m, fine to coarse grained sand							[Hatched pattern]
	2.4	SANDY CLAY - Firm to stiff, dark brown, fine to coarse grained sandy clay with some fine sized gravel, M>Wp	[Diagonal hatching]						[Hatched pattern]
	3								[Hatched pattern]
	4	From 3.8m, trace gravel From 4.18m, stiff							[Hatched pattern]
	5							From 0.4m to 8.8m, backfill and cuttings	[Hatched pattern]
	5.9	SAND - Loose to medium dense, brown, fine to medium grained sand, slightly clayey with trace silt, saturated	[Dotted pattern]					From 0m to 10.4m, Class 18 PVC	[Hatched pattern]
	6.25	GRAVELLY SAND - Very dense, brown, fine to coarse sized, subangular gravelly fine to coarse grained sand with some clay in parts, saturated	[Dotted pattern with circles]						[Hatched pattern]
	7								[Hatched pattern]
	8.0	SANDY GRAVEL - (Very dense), brown, fine to medium grained sandy fine sized subangular gravel, saturated	[Dotted pattern with circles]						[Hatched pattern]
	9								[Hatched pattern]
	9.06	CORE LOSS - 9.06m to 10.53m	[X pattern]		9.06				[Hatched pattern]
				C	9.52				[Hatched pattern]
				C				From 8.8m to 10.35m, bentonite	[Hatched pattern]

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 11m
TYPE OF BORING: Solid flight auger to 9.06m, HQ3 to 16.5m
WATER OBSERVATIONS:
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1 - Auger sample	11 - Cone sample	21 - Cone sample	31 - Cone sample
2 - Solid sample	12 - Water sample	22 - Water sample	32 - Water sample
3 - Core sample	13 - Slurry sample	23 - Slurry sample	33 - Slurry sample
4 - Standard sample	14 - Water sample	24 - Water sample	34 - Water sample
5 - Environmental sample	15 - Water test	25 - Water test	35 - Water test
	16 - Cone sample	26 - Cone sample	36 - Cone sample
	17 - Water sample	27 - Water sample	37 - Water sample
	18 - Slurry sample	28 - Slurry sample	38 - Slurry sample
	19 - Slurry sample	29 - Slurry sample	39 - Slurry sample
	20 - Water sample	30 - Water sample	
	32 - Water sample		
	33 - Slurry sample		
	34 - Water sample		
	35 - Water test		

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: A23W
PROJECT No: 49761.02
DATE: 23/10/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
		CORE LOSS - 9.06m to 10.53m (continued)							
	10.53	SANDSTONE - Very low strength, extremely to highly weathered, grey and brown, fine grained sandstone		C	10.64		PL(A) = 0.09 PL(D) = 0.07		
	10.79				10.79				
	11	CORE LOSS - 10.79m to 11.81m							
	11.81	SANDSTONE - Extremely low to very low strength, extremely to highly weathered, grey and brown, fine grained sandstone		C	11.91		PL(A) = 0 PL(D) = 0		
	12				12.17		PL(A) = 0.07 PL(D) = 0.02		
	12.31	CORE LOSS - 12.31m to 12.52m							
	12.52	SANDSTONE - Extremely low to very low strength, extremely to highly weathered, grey and brown, fine grained sandstone		C	12.65		PL(A) = 0.13 PL(D) = 0.03 PL(A) = 0.2		
	12.68				12.8				
	12.91	CORE LOSS - 12.86m to 12.91m							
	13.33	SILTSTONE - Low strength, highly to moderately weathered, grey and brown siltstone with interbedded very low to low strength bands up to 80mm long		C	13.29				
	13.43				13.33		PL(A) = 0.78 PL(D) = 0.61		
	13.67	CORE LOSS - 13.33m to 13.43m							
	14	SILTSTONE - Medium strength, moderately weathered, grey and orange-brown siltstone From 13.72m, slightly weathered with some highly weathered bands		C	13.87				
	14				13.83				
	14	CORE LOSS - 13.87m to 13.95m							
	15	SANDSTONE - Medium to high strength, fresh, grey, fine to medium grained sandstone with trace highly weathered bands up to 30mm thick From 14.2m, some siltstone laminations up to 30mm thick		C	14.48		PL(A) = 1.26 PL(D) = 1.06		
	15				15.08				
	16								
	16.5								
	16.5	Bore discontinued at 16.5m, limit of investigation							
	17								
	18								
	19								

From 10.35m to 16.4m, 5mm gravel
 From 10.4m to 16.4m, 50mm diameter Class 18 machine slotted PVC screen

End cap

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 11m
TYPE OF BORING: Solid flight auger to 9.06m, HQ3 to 16.5m
WATER OBSERVATIONS:
REMARKS:

1 - Auger sample	11 - Cone sample (4 mm dia.)	21 - Push down test (PDT)
2 - Solid sample	12 - Water sample	22 - Push down test (PDT) (100g)
3 - Core sample	13 - Slit sample (4 mm dia.)	23 - Push down test (PDT) (200g)
4 - Disturbed sample	14 - Water sample	24 - Shear vane (SV)
5 - Environmental sample	15 - Water test	25 - Shear vane (SV)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE01W
PROJECT No: 49761.02
DATE: 25/10/12-
SHEET 1 OF 3

Borehole ID	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction	
				Type	Depth	Sample	Results & Comments		Details	Stickup
	0.15	<p>TOPSOIL - Brown silty sand topsoil, generally comprising fine-grained sand, trace clay, abundant rootlets</p> <p>CLAY - Hard, brown clay, M<Wp</p>	[Hatched Pattern]							
	1.0	From 1.0m, with some fine sized subrounded gravel	[Hatched Pattern]							
	1.5	From 1.5m, orange brown	[Hatched Pattern]							
	2.5	<p>SANDY GRAVEL - Brown sandy gravel, fine to coarse grained sand, fine to medium sized, subrounded gravel, moist to wet</p> <p>From 2.8m, saturated</p>	[Gravel Pattern]							
	3.0		[Gravel Pattern]							
	4.0		[Gravel Pattern]							
	5.0		[Gravel Pattern]							
	6.0		[Gravel Pattern]						From 0m to 11.7m, backfill	
	7.0		[Gravel Pattern]							
	8.0		[Gravel Pattern]							
	9.0	From about 9.5m, with some cobbles	[Gravel Pattern]							

RIG: Total (Envirodrill) **DRILLER:** Total (Sawyer) **LOGGED:** Cowan **CASING:** HW to 11.25m
TYPE OF BORING: Solid flight auger with TC Bit to 9.2m, rotary to 20.45m
WATER OBSERVATIONS: Free groundwater observed at 2.8m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1. Auger sample	11. Grab sample	21. Push sampler (100mm dia)	31. Push sampler (150mm dia)
2. Core sample	12. Grab sample (100mm dia)	22. Push sampler (100mm dia)	32. Push sampler (150mm dia)
3. Grab sample	13. Grab sample (150mm dia)	23. Push sampler (150mm dia)	33. Push sampler (150mm dia)
4. Grab sample	14. Grab sample (200mm dia)	24. Push sampler (200mm dia)	34. Push sampler (200mm dia)
5. Grab sample	15. Grab sample (250mm dia)	25. Push sampler (250mm dia)	35. Push sampler (250mm dia)
6. Grab sample	16. Grab sample (300mm dia)	26. Push sampler (300mm dia)	36. Push sampler (300mm dia)
7. Grab sample	17. Grab sample (350mm dia)	27. Push sampler (350mm dia)	37. Push sampler (350mm dia)
8. Grab sample	18. Grab sample (400mm dia)	28. Push sampler (400mm dia)	38. Push sampler (400mm dia)
9. Grab sample	19. Grab sample (450mm dia)	29. Push sampler (450mm dia)	39. Push sampler (450mm dia)
10. Grab sample	20. Grab sample (500mm dia)	30. Push sampler (500mm dia)	40. Push sampler (500mm dia)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE01W
PROJECT No: 49761.02
DATE: 25/10/12-
SHEET 2 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
		SANDY GRAVEL - Brown sandy gravel, fine to coarse grained sand, fine to medium sized, subrounded gravel, moist to wet (continued)							
	11								
	11.53	SANDSTONE - Medium strength, moderately to slightly weathered, yellow brown, fine to medium grained sandstone		C	11.53				
	12.1	From 12.01m to 12.1m, granite fragments		C	11.9		PL(A) = 2.74 PL(D) = 2.38		
	12.23	CORE LOSS - 0.13m		C	11.94				
	12.32	SANDSTONE - Medium strength, moderately to slightly weathered, yellow brown, fine to medium grained sandstone		C	12.32				
	12.39	CORE LOSS - 0.07m		C	12.52				
	12.79	SANDSTONE - Medium strength, moderately to slightly weathered, yellow brown, fine to medium grained sandstone		C	12.79				
	12.85	CORE LOSS - 0.06m		C	12.85				
	13	BASALT - High to very high strength, fresh, grey basalt							From 11.7m to 14.3m, bentonite
	13.5	CORE LOSS - 0.06m		S	13.5		2585mm		
	13.59	Casing advanced rotary drilling, no sample recovered		C	13.59				
	13.75	SILTSTONE - Very low to low strength, slightly weathered to fresh, grey siltstone, trace fine to medium grained sand and clay		C	13.96		PL(A) = 0 PL(D) = 0.02		
	14	CORE LOSS - 0.16m		C	14.0				
	15	SANDSTONE - Very low to low strength, fresh, grey, fine grained sandstone with some clay and silt							
	15.04	From 13.92m to 13.98m, extremely low strength, extremely weathered, clay seam			15.04				
	15.5	From 14.14m to 14.16m, extremely low strength, extremely weathered			15.5		PL(A) = 0.14 PL(D) = 0.08		
	15.55	From 14.47m to 14.49m, extremely low strength, extremely weathered, clay seam			15.55				
	16	From 16.3m to 16.45m, carbonaceous siltstone, medium to high strength, fresh, dark grey		C					
	17	From 16.93m to 17.12m, high strength		G7001					
	18	From 18.3m to 20.45m, gravel							From 14.3m to 20.45m, gravel
	18.12	LAMINITE - Very low to low strength, fresh, grey and dark grey laminae, fine grained sand			18.03		PL(A) = 0.1 PL(D) = 0.05		From 14.45m to 20.45m, Class 18 PVC
	18.07	From 18.56m to 18.62m, fine grained sandstone layer			18.07				
	19	From 19.18m to 19.75m, fine grained sandstone layer		C					
	19.75	From 19.47m, coal lense, 5mm thick							
	19.75	SILTSTONE - Low strength, fresh, grey siltstone							

RIG: Total (Envirodrill) **DRILLER:** Total (Sawyer) **LOGGED:** Cowan **CASING:** HW to 11.25m
TYPE OF BORING: Solid flight auger with TC Bit to 9.2m, rotary to 20.45m
WATER OBSERVATIONS: Free groundwater observed at 2.8m
REMARKS:

1 - Auger sample	11 - Test sample	21 - Field permeability test (PT)
2 - Solid sample	12 - Test sample	22 - Field permeability test (PT)
3 - Core sample	13 - Test sample (in situ test)	23 - Field permeability test (PT)
4 - Disturbed sample	14 - Test sample	24 - Field permeability test (PT)
5 - Environmental sample	15 - Water sample	25 - Shear vane (SV)
	16 - Water test	
	17 - Test sample	
	18 - Test sample	
	19 - Test sample	
	20 - Test sample	

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE01W
PROJECT No: 49761.02
DATE: 25/10/12-
SHEET 3 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	20.45	SILTSTONE - Low strength, fresh, grey siltstone (continued)	- - - - -	C					End cap	20.45 20.45
	20.45	Bore discontinued at 20.45m, limit of investigation								
	21									
	22									
	23									
	24									
	25									
	26									
	27									
	28									
	29									

DRAFT

RIG: Total (Envirodrill) **DRILLER:** Total (Sawyer) **LOGGED:** Cowan **CASING:** HW to 11.25m
TYPE OF BORING: Solid flight auger with TC Bit to 9.2m, rotary to 20.45m
WATER OBSERVATIONS: Free groundwater observed at 2.8m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1) Auger sample	11) Soil sample	21) Field vane shear test (FVT)	
2) Solid sample	12) Water sample	22) Field vane shear test (FVT) (S&S)	
3) Cone sample	13) T-bar sample (in situ test)	23) Field vane shear test (FVT) (S&S)	
4) Standard sample	14) Slurry sample	24) Standard penetration test (SPT)	
5) Environmental sample	15) Water test	25) Shear vane (SV)	

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE03W
PROJECT No: 49761
DATE: 7 - 11/12/2012
SHEET 2 OF 4

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
	10.4	SANDY CLAY/CLAYEY SAND - Firm/(medium dense), brown, fine to medium grained sandy clay/clayey sand, slightly gravelly (gravel subangular and subrounded fine grained) From 10.4m, interbedded with basalt and sandstone boulders (inferred from high drilling resistance and cuttings)		S,pp	10.25		28 for 100mm, 0.0	
	10.4			S	10.85		34, 30 for 90mm, 0	
	11.45	CORE LOSS - 0.3m		C	11.75			
	11.75	SANDY CLAY/CLAYEY SAND - Firm/(medium dense), brown, fine to medium grained sandy clay/clayey sand, slightly gravelly (gravel subangular and subrounded fine grained)						
	13.2	GRAVELLY SAND - (Dense), brown, fine to medium subangular and subrounded gravelly fine to medium grained sand interbedded with basalt and sandstone cobbles/boulders						
	13.7	CORE LOSS - 0.75m		C	14.0			
	14.45	GRAVELLY SAND - (Dense), brown, fine to medium subangular and subrounded gravelly fine to medium grained sand interbedded with basalt and sandstone cobbles/boulders						
	14.85	CORE LOSS - 0.63m		C	15.5			
	15.5	GRAVELLY SAND - (Dense), brown, fine to medium subangular and subrounded gravelly fine to medium grained sand interbedded with basalt and sandstone cobbles/boulders						
	15.95	CORE LOSS - 0.63m		C	16.45			
	16.58	GRAVELLY SAND - (Dense), brown, fine to medium subangular and subrounded gravelly fine to medium grained sand interbedded with basalt and sandstone cobbles/boulders						
	16.7	CORE LOSS - 0.3m (wash bored to clean hole after installing casing)		C	17.0			
	16.95	TUFF - Fresh, very low strength, light grey tuff					250kPa	From 16.7m to 18.0m, grout
	17.0	CLAY - Fresh, extremely low strength, dark grey clay					PL(A) = 0.97	
	17.32	CORE LOSS - 0.3m (wash bored to clean hole after installing casing)		C	17.48		PL(A) = 4.63	
	17.68	CLAY - Fresh, very low strength, dark grey clay						
	17.98	SILTSTONE - Fresh, low strength, grey siltstone laminated with some tuff and fine to medium grained sandstone					PL(A) = 1.97	
	18.0	From 17.62m, grading into sandstone						
	18.57	SANDSTONE - Fresh, high strength, light grey, fine to medium grained sandstone with some tuff laminations						
	19.2	From 17.88m, grading into tuff						
	19.28	TUFF - Fresh, low strength, light grey tuff laminated with some fine to medium strength sandstone					PL(A) = 1.23	
	19.73	SANDSTONE - Fresh, medium strength, light grey, fine					PL(D) = 1.02	
	19.77							

RIG: Hydropower Scout **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 17.00m
TYPE OF BORING: Solid flight auger to 5.5m, wash boring to 13.20m, HQ3 to 31.50m
WATER OBSERVATIONS: Free groundwater observed at 4.7m
REMARKS:

S	Soil sample	W	Water sample	PL(A)	Penetration test (100mm)
S,pp	Soil sample for pore pressure	W,pp	Water sample for pore pressure	PL(D)	Penetration test (100mm)
C	Core sample	W,pp	Water sample for pore pressure	PL(100)	Penetration test (100mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(150)	Penetration test (150mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(300)	Penetration test (300mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(450)	Penetration test (450mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(600)	Penetration test (600mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(750)	Penetration test (750mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(900)	Penetration test (900mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(1050)	Penetration test (1050mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(1200)	Penetration test (1200mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(1350)	Penetration test (1350mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(1500)	Penetration test (1500mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(1650)	Penetration test (1650mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(1800)	Penetration test (1800mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(1950)	Penetration test (1950mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(2100)	Penetration test (2100mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(2250)	Penetration test (2250mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(2400)	Penetration test (2400mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(2550)	Penetration test (2550mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(2700)	Penetration test (2700mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(2850)	Penetration test (2850mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(3000)	Penetration test (3000mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(3150)	Penetration test (3150mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(3300)	Penetration test (3300mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(3450)	Penetration test (3450mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(3600)	Penetration test (3600mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(3750)	Penetration test (3750mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(3900)	Penetration test (3900mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(4050)	Penetration test (4050mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(4200)	Penetration test (4200mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(4350)	Penetration test (4350mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(4500)	Penetration test (4500mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(4650)	Penetration test (4650mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(4800)	Penetration test (4800mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(4950)	Penetration test (4950mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(5100)	Penetration test (5100mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(5250)	Penetration test (5250mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(5400)	Penetration test (5400mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(5550)	Penetration test (5550mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(5700)	Penetration test (5700mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(5850)	Penetration test (5850mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(6000)	Penetration test (6000mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(6150)	Penetration test (6150mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(6300)	Penetration test (6300mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(6450)	Penetration test (6450mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(6600)	Penetration test (6600mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(6750)	Penetration test (6750mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(6900)	Penetration test (6900mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(7050)	Penetration test (7050mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(7200)	Penetration test (7200mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(7350)	Penetration test (7350mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(7500)	Penetration test (7500mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(7650)	Penetration test (7650mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(7800)	Penetration test (7800mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(7950)	Penetration test (7950mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(8100)	Penetration test (8100mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(8250)	Penetration test (8250mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(8400)	Penetration test (8400mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(8550)	Penetration test (8550mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(8700)	Penetration test (8700mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(8850)	Penetration test (8850mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(9000)	Penetration test (9000mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(9150)	Penetration test (9150mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(9300)	Penetration test (9300mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(9450)	Penetration test (9450mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(9600)	Penetration test (9600mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(9750)	Penetration test (9750mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(9900)	Penetration test (9900mm)
C,pp	Core sample for pore pressure	W	Water sample	PL(10050)	Penetration test (10050mm)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE03W
PROJECT No: 49761
DATE: 7 - 11/12/2012
SHEET 3 OF 4

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
	20.17	to medium grained sandstone with trace siltstone laminations						
	20.27	LAMINITE - Fresh, medium strength, grey laminite						
	20.37	From 19.8m, grading into siltstone						
	20.49	SILTSTONE - Fresh, medium strength, dark grey siltstone (continued)						
	20.65	From 20.04m, significant water loss						
21	21.32	CORE LOSS - 0.07m						
		SILTSTONE - Fresh, medium strength grey siltstone						
		COAL - Fresh, medium strength, dark brown/black coal						
22		COAL/CARBONACEOUS SILTSTONE - Fresh, high strength, dark brown carbonaceous siltstone laminated with coal						
		SILTSTONE - Fresh, medium strength, grey siltstone						
		From 20.91m to 21.94m, fine to medium grained sandstone band						
23		SANDSTONE - Fresh, medium strength, light grey, fine to medium grained sandstone						
	23.28	From 21.32m to 21.97m, some siltstone laminations						
	23.46	From 22.9m, low strength, fine to coarse grained						
		From 23.22m, very low strength						
24		CORE LOSS - 0.20m						
		SANDSTONE - Fresh, very low strength, light grey, fine to coarse grained sandstone						
		From 23.70m, medium strength						
		From 23.43m to 24.64m, laminite band						
25		From 25.45m to 25.76m, very high strength, fine to medium grained sandstone band						
26		From 26.07m, very low to low strength, thinly laminated with very low strength clay seams						
	26.48	SANDY CLAY - Fresh, extremely low strength, light grey, medium strength sandy clay						
	26.55	From 24.15m to 29.0m, bentonite						
	26.7	CORE LOSS - 0.15m						
	26.72	SANDY CLAY - Fresh, extremely low strength, light grey, fine to medium grained sandy clay						
27		SANDSTONE - Fresh, medium strength, light grey, fine to medium grained sandstone						
28								
	27.84							
	28.28							
	28.33							
29								
	29.6							
	29.89							

RIG: Hydropower Scout **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 17.00m
TYPE OF BORING: Solid flight auger to 5.5m, wash boring to 13.20m, HQ3 to 31.50m
WATER OBSERVATIONS: Free groundwater observed at 4.7m
REMARKS:

1 - Auger sample	11 - Cone sample	21 - Push down test (PDT)
2 - Solid sample	12 - Tube sample	22 - Push test with 500 N/m ² (500)
3 - Core sample	13 - Tube sample (4 mm dia.)	23 - Push test (Standard test) (ST)
4 - Disturbed sample	14 - Water sample	24 - Standard penetration test
5 - Environmental sample	15 - Water test	25 - Shear test (ST)



BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE03W
PROJECT No: 49761
DATE: 7 - 11/12/2012
SHEET 4 OF 4

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	30.05	SILTSTONE - Fresh, medium strength, grey and brown siltstone (bedded on 10° offset) (continued)	[Dotted pattern]	C					
	30.44	SANDSTONE - Fresh, medium strength, light grey, fine to medium grained sandstone From 30.29m to 30.39m, low to medium strength siltstone band	[Dotted pattern]	C	30.55		PL(A) = 1.15		
	30.55		[Dotted pattern]	C		30.83			
	31	CORE LOSS - 0.11m							
	31.5	SANDSTONE - Fresh, medium strength, light grey, fine to medium grained sandstone From 30.75m, fine to coarse grained Bore discontinued at 31.5m, limit of investigation	[Dotted pattern]			31.5		End cap	[End cap symbol]
	32								
	33								
	34								
	35								
	36								
	37								
	38								
	39								

DRAFT

RIG: Hydropower Scout **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 17.00m
TYPE OF BORING: Solid flight auger to 5.5m, wash boring to 13.20m, HQ3 to 31.50m
WATER OBSERVATIONS: Free groundwater observed at 4.7m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1	Auger sample	11	Water sample
2	Rotary sample	12	Water sample
3	Core sample	13	Water sample
4	Disturbed sample	14	Water test
5	Environmental sample	15	Water test
6	Soil sample	16	Soil sample
7	Soil sample	17	Soil sample
8	Soil sample	18	Soil sample
9	Soil sample	19	Soil sample
10	Soil sample	20	Soil sample

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE04
PROJECT No: 49761
DATE: 23/11/2012
SHEET 1 OF 7

RIG	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction	
				Type	Depth	Sample	Results & Comments		Sticker	Details
	0.5	TOPSOIL - Brown, gravelly silt topsoil, generally comprising fine to medium sized subangular gravel with some fine grained sand, humid	D	0.1						
			D	0.25						
			D	0.5						
		GRAVELLY SILT - Brown, fine to medium sized, subangular gravelly silt with trace to some fine to medium grained sand, humid	D	0.75						
		From 0.75m, some clay	S	1.0		7,10,11 N = 21				
			S	1.45						
	2.0	CLAYEY SAND - Brown, fine to medium grained clayey sand with trace to some silt	D	2.0						
		From 2.5m, with some coarse grained sand	S	2.5		3,5,10 N = 15				
			S	2.95						
	4.0	SILTY SAND - Brown, fine to coarse grained silty sand with trace clay (humid?)	S	4.0		6,9,9 N = 18				
			S	4.45						
		From 5.5m, with some clay	S	5.5		3,4,5 N = 9				
			S	5.95						
	7.0	SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized, subangular, subrounded gravel, saturated	S	7.0		8,10,17 N = 27				
			S	7.45						
		From 8.5m, with some clay	S	8.5		15,15,16 N = 31				
			S	8.95						

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m
TYPE OF BORING: Solid flight auger to 7.0m, rotary to 18.35m, HQ3 to 66.17m
WATER OBSERVATIONS: Free groundwater observed at 6.30m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
D - Auger sample	S - Soil sample	P - Push sampler	P(C) - Push sampler (clean)
D(S) - Solid sample	L - Liquid sample	P(S) - Push sampler (soil)	P(S)(C) - Push sampler (soil) (clean)
D(S) - Core sample	W - Water sample	P(S)(C) - Push sampler (soil) (clean)	P(S)(C) - Push sampler (soil) (clean)
D(S) - Disturbed sample	W - Water sample	P(S)(C) - Push sampler (soil) (clean)	P(S)(C) - Push sampler (soil) (clean)
D(S) - Environmental sample	W - Water sample	P(S)(C) - Push sampler (soil) (clean)	P(S)(C) - Push sampler (soil) (clean)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE04
PROJECT No: 49761
DATE: 23/11/2012
SHEET 2 OF 7

RIG	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	10.0	SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized, subangular, subrounded gravel, saturated (continued)		S	10.00		7, 15, 25/135mm		
	10.44								
	11.5	SANDY CLAY - Firm to stiff, brown, fine grained sandy clay		S, pp	11.5		2, 1, 3 N = 4 50-200kPa		
	11.95								
	13.0	SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized subangular gravel with some clay		S	13.0		9, 14, 26 N = 40		
	13.45								
	14.5			S	14.5		8, 8, 4 N = 12		
	14.95								
	16.5	From 16.5m, with some fine to coarse sized subangular gravel		S	16.5		24, 25/140mm		
	16.79								
	18.0	SILTSTONE - Extremely low to very low strength, highly weathered, grey, siltstone		S	18.0		25/100mm		
	18.1								
	18.35	SANDSTONE - Very low to low strength, slightly weathered, grey white fine to medium grained sandstone			18.35		PL(A) = 0.15 PL(D) = 0.07		
	18.49								
	19.02	From 19.02m to 19.18m, siltstone band		C					
	19.3								
	19.77	SILTSTONE - Very low to low strength, slightly weathered to fresh, grey, grey to white siltstone			19.77		PL(A) = 0.47 PL(D) = 0.2		

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m
TYPE OF BORING: Solid flight auger to 7.0m, rotary to 18.35m, HQ3 to 66.17m
WATER OBSERVATIONS: Free groundwater observed at 6.30m
REMARKS:

S	Soil sample	PL(A)	Plate load test (100mm dia)
pp	Pressure plate	PL(D)	Plate load test (150mm dia)
W	Water sample	TS	Triaxial shear test (100mm dia)
W	Water sample	TS (10)	Triaxial shear test (100mm dia)
W	Water sample	TS (15)	Triaxial shear test (150mm dia)
W	Water sample	TS (20)	Triaxial shear test (200mm dia)
W	Water sample	TS (30)	Triaxial shear test (300mm dia)
W	Water sample	TS (40)	Triaxial shear test (400mm dia)
W	Water sample	TS (50)	Triaxial shear test (500mm dia)
W	Water sample	TS (60)	Triaxial shear test (600mm dia)
W	Water sample	TS (70)	Triaxial shear test (700mm dia)
W	Water sample	TS (80)	Triaxial shear test (800mm dia)
W	Water sample	TS (90)	Triaxial shear test (900mm dia)
W	Water sample	TS (100)	Triaxial shear test (1000mm dia)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE04
PROJECT No: 49761
DATE: 23/11/2012
SHEET 3 OF 7

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	20.63	From 19.90m, dark grey SILTSTONE - Very low to low strength, slightly weathered to fresh, grey, grey to white siltstone (continued)		C					
	20.8	From 20.52m, coal, extremely low strength, extremely weathered, black							
	20.87								
	21.04	CORE LOSS - 0.17m							
	21.2	COAL - Low to medium strength, slightly weathered to fresh, black, fragmented coal			21.2				
	21.38	TUFF - Very low strength, moderately weathered, white, tuff							
	21.55								
	22	COAL - Low to medium strength, slightly weathered to fresh, black coal							
		CORE LOSS - 0.19m							
		COAL - Low strength, slightly weathered to fresh, black, fragmented coal		C			PL(A) = 0.93		
	23	SILTSTONE - Low strength, slightly weathered to fresh, grey siltstone							
		From 21.62m to 21.65m, extremely low strength, extremely weathered							
		From 21.94m, clay band, 10mm thick			23.54		PL(A) = 0.72 PL(D) = 0.35		
		From 22.17m, low to medium strength							
	24				24.2				
	25								
	25.27	COAL / CARBONACEOUS SILTSTONE - Very low to low strength, slightly weathered, black, dark brown coal / carbonaceous siltstone		C			PL(A) = 1.18 PL(D) = 0.42		
		From 25.72m to 25.89m, tuff band							
		From 25.89m, low to medium strength							
	26								
	26.27	SILTSTONE - Low strength, fresh, grey siltstone							
	27								
	27.41	CARBONACEOUS SILTSTONE - Low strength, fresh, dark brown to black, carbonaceous silt			27.43		PL(A) = 1.51 PL(D) = 0.1		
	28								
	29	From 28.7m to 28.86m, with some coal bands up to 20mm thick		C			PL(A) = 1 PL(D) = 0.34		
					29.28				

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m
TYPE OF BORING: Solid flight auger to 7.0m, rotary to 18.35m, HQ3 to 66.17m
WATER OBSERVATIONS: Free groundwater observed at 6.30m
REMARKS:

1 - Auger sample	11 - Core sample (10 mm dia.)	21 - Water sample	31 - Push down test (PDT)
2 - Auger sample	12 - Core sample (25 mm dia.)	22 - Water sample	32 - Push down test (PDT)
3 - Auger sample	13 - Core sample (50 mm dia.)	23 - Water sample	33 - Push down test (PDT)
4 - Auger sample	14 - Core sample (75 mm dia.)	24 - Water sample	34 - Push down test (PDT)
5 - Auger sample	15 - Core sample (100 mm dia.)	25 - Water sample	35 - Push down test (PDT)
6 - Auger sample	16 - Core sample (125 mm dia.)	26 - Water sample	36 - Push down test (PDT)
7 - Auger sample	17 - Core sample (150 mm dia.)	27 - Water sample	37 - Push down test (PDT)
8 - Auger sample	18 - Core sample (175 mm dia.)	28 - Water sample	38 - Push down test (PDT)
9 - Auger sample	19 - Core sample (200 mm dia.)	29 - Water sample	39 - Push down test (PDT)
10 - Auger sample	20 - Core sample (225 mm dia.)	30 - Water sample	40 - Push down test (PDT)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE04
PROJECT No: 49761
DATE: 23/11/2012
SHEET 4 OF 7

RT	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	30.25	COAL / STONEY COAL - Low to medium strength, fresh, black, dark brown coal / stoney coal		C	30.18					
	31.30.99	SILTSTONE - Low to medium strength, fresh, grey siltstone			31.32		PL(A) = 0.54 PL(D) = 0.51			
	31.61	COAL / STONEY COAL - Low to medium strength, fresh, black, dark brown coal / stoney coal		C						
	31.94	SILTSTONE - Medium strength, fresh, grey siltstone								
	33.04				33.04		PL(A) = 1.08 PL(D) = 0.49			
	33.27	TUFFACEOUS SANDSTONE - Low strength, moderately weathered, grey to white, fine to coarse grained tuffaceous sandstone			33.07					
	33.46	SILTSTONE - Low to medium strength, fresh, grey siltstone								
	35.32				35.32		PL(A) = 2.61 PL(D) = 0.65			
	36.05				36.05					
	36.2	LAMINITE - Medium strength, fresh, grey, fine grained laminite								
	37.41				37.41		PL(A) = 5.79 PL(D) = 3.35			
	37.8	SILTSTONE - Medium strength, fresh, grey siltstone								
	38.57	TUFF - Very low to low strength, fresh, grey to white								
	38.64	COAL - Low to medium strength, fresh, black coal								
	39.06	From 38.88m, low to medium strength			39.06					
	39.18	From 39.18m, low strength								
	39.4	SILTSTONE - Medium strength, fresh, grey siltstone		C						
	39.68	LAMINITE - Medium strength, fresh, grey, fine to medium grained laminite			39.94		PL(A) = 0.75			

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m
TYPE OF BORING: Solid flight auger to 7.0m, rotary to 18.35m, HQ3 to 66.17m
WATER OBSERVATIONS: Free groundwater observed at 6.30m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1 - Auger sample	11 - Core sample (30 mm dia.)	21 - Water sample	31 - Push down test (PDT)
2 - Solid sample	12 - Water sample	22 - Water sample (40 mm dia.)	32 - Push down test (PDT) (100mm)
3 - Core sample	13 - Water sample	23 - Water sample (50 mm dia.)	33 - Push down test (PDT) (150mm)
4 - Disturbed sample	14 - Water sample	24 - Water sample (60 mm dia.)	34 - Push down test (PDT) (200mm)
5 - Environmental sample	15 - Water test	25 - Water sample (75 mm dia.)	35 - Push down test (PDT) (250mm)
		26 - Water sample (100 mm dia.)	36 - Push down test (PDT) (300mm)
		27 - Water sample (125 mm dia.)	37 - Push down test (PDT) (350mm)
		28 - Water sample (150 mm dia.)	38 - Push down test (PDT) (400mm)
		29 - Water sample (175 mm dia.)	39 - Push down test (PDT) (450mm)
		30 - Water sample (200 mm dia.)	40 - Push down test (PDT) (500mm)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE04
PROJECT No: 49761
DATE: 23/11/2012
SHEET 5 OF 7

Borehole ID	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
		LAMINITE - Medium strength, fresh, grey, fine to medium grained laminite (continued)					PL(D) = 0.78		
	40.82						PL(A) = 2.59 PL(D) = 1.58		
	42.2	CARBONACEOUS SILTSTONE - Medium strength, fresh, dark grey carbonaceous siltstone							
	42.63						PL(A) = 1 PL(D) = 0.46		
	43.17	LAMINITE - Medium strength, fresh, grey, fine to medium grained laminite		C					
	44.8			C			PL(A) = 2.22 PL(D) = 0.93		
	45.15	CARBONACEOUS SILTSTONE - Medium to high strength, fresh, dark grey to black carbonaceous siltstone (possible coal / stoney coal?)							
	46.84			C			PL(A) = 0.91 PL(D) = 0.33		
	47.14	SANDSTONE - Medium to high strength, fresh, grey, fine grained sandstone							
	48.08								
	48.22	CARBONACEOUS SILTSTONE - Medium to high strength, fresh, dark grey to black carbonaceous siltstone (possible coal / stoney coal?)					PL(A) = 1.88 PL(D) = 0.63		
	48.25								
	48.88	COAL - Medium strength, fresh, black coal							
	49.21	TUFF - Very low to low strength, moderately weathered, grey to white tuff with some fine to medium grained sand		C					
	49.6	CARBONACEOUS SILTSTONE - Medium to high							

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m
TYPE OF BORING: Solid flight auger to 7.0m, rotary to 18.35m, HQ3 to 66.17m
WATER OBSERVATIONS: Free groundwater observed at 6.30m
REMARKS:

1 - Auger sample	11 - Soil sample	21 - Field vane shear test (FVT)
2 - Solid sample	12 - Water sample	22 - Field vane shear test (FVT) (dry)
3 - Core sample	13 - Tensile sample (in situ test)	23 - Field vane shear test (FVT) (saturated)
4 - Disturbed sample	14 - Slurry sample	24 - Shear vane shear test
5 - Undisturbed sample	15 - Water test	25 - Shear vane (off)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE04
PROJECT No: 49761
DATE: 23/11/2012
SHEET 6 OF 7

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	50.51	strength, fresh, dark grey to black carbonaceous siltstone (possible coal / stoney coal?) COAL - Medium strength, fresh, black coal (continued)	█						
		TUFF - Medium to high strength, fresh, grey to white tuff with some fine grained sand	∨	C					
	51.06	COAL - Medium strength, fresh, black coal	█		51.18				
			█		51.66		PL(A) = 1.95 PL(D) = 0.81		
	52	From 51.9m to 51.97m, tuff band	█						
	52.19	SANDSTONE - Medium to high strength, fresh, grey, fine to medium grained sandstone	█	C					
			█		53.27		PL(A) = 2.99 PL(D) = 1.4		
			█		54.14				
			█		55.17		PL(A) = 2.1 PL(D) = 0.87		From 54.0m to 56.5m, bentonite
		From 55.77m, fine to coarse grained with trace to some fine sized, subrounded gravel	█	C					
			█		57.15 57.18		PL(A) = 0.82 PL(D) = 0.92		
	57.61	COAL - Low to medium strength, fresh, black coal	█						
	58.09	CORE LOSS - 0.25m	X	C					
	58.84	COAL - Low to medium strength, fragmented, black coal	█						
			█		59.71		PL(A) = 0.87 PL(D) = 0.15		
	60.0		█						

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m
TYPE OF BORING: Solid flight auger to 7.0m, rotary to 18.35m, HQ3 to 66.17m
WATER OBSERVATIONS: Free groundwater observed at 6.30m
REMARKS:

1 - Auger sample	11 - Tuff sample (in situ)	21 - Fresh unconsolidated siltstone (PL)
2 - Solid sample	12 - Tuff sample (in situ)	22 - Fresh sandstone (PL)
3 - Core sample	13 - Tuff sample (in situ)	23 - Fresh sandstone (PL)
4 - Disturbed sample	14 - Tuff sample (in situ)	24 - Fresh sandstone (PL)
5 - Environmental sample	15 - Tuff sample (in situ)	25 - Fresh sandstone (PL)
	16 - Tuff sample (in situ)	26 - Fresh sandstone (PL)
	17 - Tuff sample (in situ)	27 - Fresh sandstone (PL)
	18 - Tuff sample (in situ)	28 - Fresh sandstone (PL)
	19 - Tuff sample (in situ)	29 - Fresh sandstone (PL)
	20 - Tuff sample (in situ)	30 - Fresh sandstone (PL)
	21 - Tuff sample (in situ)	31 - Fresh sandstone (PL)
	22 - Tuff sample (in situ)	32 - Fresh sandstone (PL)
	23 - Tuff sample (in situ)	33 - Fresh sandstone (PL)
	24 - Tuff sample (in situ)	34 - Fresh sandstone (PL)
	25 - Tuff sample (in situ)	35 - Fresh sandstone (PL)
	26 - Tuff sample (in situ)	36 - Fresh sandstone (PL)
	27 - Tuff sample (in situ)	37 - Fresh sandstone (PL)
	28 - Tuff sample (in situ)	38 - Fresh sandstone (PL)
	29 - Tuff sample (in situ)	39 - Fresh sandstone (PL)
	30 - Tuff sample (in situ)	40 - Fresh sandstone (PL)



BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE04
PROJECT No: 49761
DATE: 23/11/2012
SHEET 7 OF 7

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	60.48	SILTSTONE - Medium to high strength, fresh, grey siltstone	C		60.15				From 57.17m to 63.17m, Class 18 PVC Screen
	61	SANDSTONE - Medium to high strength, fresh, grey, fine to medium grained sandstone	C		60.84		PL(A) = 2.89 PL(D) = 2.19		
	62		C						From 56.5m to 66.17m, gravel
	63	From 62.64m, high to very high strength	C		63.13				
	64		C		63.86		PL(A) = 2.84 PL(D) = 2.23		
	65		C						
	66		C		65.68		PL(A) = 4.12 PL(D) = 3.46		
	66.17	Bore discontinued at 66.17m, limit of investigation			66.17				End cap
	67								
	68								
	69								

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m
TYPE OF BORING: Solid flight auger to 7.0m, rotary to 18.35m, HQ3 to 66.17m
WATER OBSERVATIONS: Free groundwater observed at 6.30m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1 - Auger sample	11 - Thin section (in mm dia.)	21 - Thin section (in mm dia.)	31 - Thin section (in mm dia.)
2 - Solid sample	12 - Water sample	22 - Water sample	32 - Water sample
3 - Core sample	13 - Slurried sample	23 - Slurried sample	33 - Slurried sample
4 - Disturbed sample	14 - Water test	24 - Water test	34 - Water test
5 - Undisturbed sample	15 - Water test	25 - Water test	35 - Water test
6 - Auger sample	16 - Thin section (in mm dia.)	26 - Thin section (in mm dia.)	36 - Thin section (in mm dia.)
7 - Solid sample	17 - Water sample	27 - Water sample	37 - Water sample
8 - Core sample	18 - Slurried sample	28 - Slurried sample	38 - Slurried sample
9 - Disturbed sample	19 - Water test	29 - Water test	39 - Water test
10 - Undisturbed sample	20 - Water test	30 - Water test	40 - Water test

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE04-W
PROJECT No: 49761
DATE: 23/11/2012
SHEET 1 OF 3

Bore No.	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction	
				Type	Depth	Sample		Results & Comments	Stickup	Details
AGE04-W	0.1	TOPSOIL - Brown, gravelly silt topsoil, generally comprising fine to medium sized subangular gravel with some fine grained sand, humid		D	0.1			-	-
	D			0.25					
	0.5	GRAVELLY SILT - Brown, fine to medium sized, subangular gravelly silt with trace to some fine to medium grained sand, humid From 0.75m, some clay		D	0.5				
	D			0.75					
	S			1.0		7,10,11 N = 21			
	S			1.45					
	2.0	CLAYEY SAND - Brown, fine to medium grained clayey sand with trace to some silt From 2.5m, with some coarse grained sand		D	2.0				
	S			2.5		3,5,10 N = 15			
	S			2.95					
	4.0	SILTY SAND - Brown, fine to coarse grained silty sand with trace clay (humid?) From 5.5m, with some clay		S	4.0		6,9,9 N = 18		
	S			4.45					
	S			5.5		3,4,5 N = 9			
	S			5.95					
	7.0	SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized, subangular, subrounded gravel, saturated From 8.5m, with some clay		S	7.0		8,10,17 N = 27		
	S			7.45					
S	8.5				15,15,16 N = 31				
S	8.95								

RIG: HydroPower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m

TYPE OF BORING:

WATER OBSERVATIONS: No free groundwater observations obscured due to drilling fluids

REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
D	Disturbed sample	U	Undisturbed sample
S	Standard sample	W	Water test
W	Water test	PT	Penetration test (PT)
PT	Penetration test (PT)	PL	Plate load test (PL)
PL	Plate load test (PL)	ST	Standard penetration test (SPT)
ST	Standard penetration test (SPT)	SW	Swelling test (SW)
SW	Swelling test (SW)	SH	Shear test (SH)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE04-W
PROJECT No: 49761
DATE: 23/11/2012
SHEET 2 OF 3

RIG	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	10.0 - 10.44	SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized, subangular, subrounded gravel, saturated (continued)	[Dotted pattern]	S			7, 15, 25/135mm		
	11.5 - 11.95	SANDY CLAY - Firm to stiff, brown, fine grained sandy clay	[Diagonal hatching]	S, pp			2, 1, 3 N = 4 50-200kPa		
	13.0 - 13.45	SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized subangular gravel with some clay	[Dotted pattern]	S			9, 14, 26 N = 40		
	14.5 - 14.95		[Dotted pattern]	S			8, 8, 4 N = 12		
	16.5 - 16.79	From 16.5m, with some fine to coarse sized subangular gravel	[Dotted pattern]	S			24, 25/140mm		
	18.0 - 18.1	SILTSTONE - Extremely low to very low strength, highly weathered, grey, siltstone	[Horizontal hatching]	S			25/100mm		
	18.35 - 18.49	SANDSTONE - Very low to low strength, slightly weathered, grey white fine to medium grained sandstone	[Vertical hatching]				PL(A) = 0.15 PL(D) = 0.07		From 17.4m to 19.7m, bentonite
	19.02 - 19.18	From 19.02m to 19.18m, siltstone band	[Horizontal hatching]						
	19.3 - 19.77	SILTSTONE - Very low to low strength, slightly weathered to fresh, grey, grey to white siltstone	[Horizontal hatching]	C			PL(A) = 0.47 PL(D) = 0.2		

RIG: HydroPower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m

TYPE OF BORING:

WATER OBSERVATIONS: No free groundwater observations obscured due to drilling fluids

REMARKS:

S	Soil sample	PP	Pressure plate oedometer (CPTU)
W	Water sample	PL(A)	Pressure plate test (150 mm dia)
U	Undisturbed sample	PL(D)	Pressure plate test (150 mm dia)
D	Disturbed sample	U	Unconfined compression test
W	Water test	Y	Shear vane (100mm)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE05
PROJECT No: 49761
DATE: 29/11/2012
SHEET 1 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction	
				Type	Depth	Sample		Results & Comments	Stickup 0.50m	Details
		SILTY CLAY - (Stiff) brown silty clay, some fine to coarse grained sand, trace fine subangular gravel, M>Wp							
	1.0	From 1.0m, very stiff							
	1.35	SILTY SAND/SILTY CLAY - Medium dense, brown silty, fine to medium grained sand interbedded with very stiff to hard clay and silty clay, M>Wp							
	2.5	From 2.5m to 2.95m, hard clay band							
	2.5			pp	2.5				
	2.6			S	2.6		>500kPa		
	2.7			S	2.7		7, 14, 15		
	2.95				2.95		N = 29		
	4.0	From 4.0m to 4.25m, sandy clay band, M>Wp, transitioning into sand							
	4.0			pp	4.0		>230-250kPa		
	4.0			S	4.0		10, 12, 14		
	4.25			S	4.25		N = 26		
	4.45	SAND - Medium dense, brown, fine to medium grained sand, some fine subangular/subrounded gravel, some silt, humid							
	5.0	From 5.0m, damp							
	5.5				5.5				
	5.5			S	5.5		5.5, 7		
	5.7	GRAVELLY SAND - Medium dense, brown, fine to coarse grained, subangular/subrounded gravelly, fine to coarse grained sand, trace silt, damp to wet							
	5.7	From 6.25m, interbedded with sandy clay in parts							
	5.95				5.95				
	5.95			S	5.95		N = 12		
	7.0				7.0				
	7.0			S	7.0		18, 12, 14		
	7.45				7.45		N = 26		
	8.7	SANDSTONE - Highly weathered, low strength, brown, fine to medium grained sandstone							
	8.7	From 8.7m to 9.2m, high drilling resistance using wash boring (changed to HQ at 9.2m)							
	8.8				8.8		41/130mm (bounding)		
	8.8			S	8.8		N=50		
	9.2				9.2				
	9.25				9.25				
	9.62				9.62		PL(A) = 0.45		
	9.62			C	9.62				

RIG: Hydropower Scout **DRILLER:** Sawyer **LOGGED:** Holden **CASING:** HW to 8.6m

TYPE OF BORING: Solid flight auger to 7.0m, wash boring to 9.2m, HQ3 to 58.90m

WATER OBSERVATIONS: Free groundwater observed at 6.25m

REMARKS:

S	Soil sample	W	Water sample
pp	Penetration test	Wp	Water potential
PL	Pressure Limit	Wt	Water table
PL(A)	Pressure Limit (A)	Wt	Water table
PL(B)	Pressure Limit (B)	Wt	Water table
PL(C)	Pressure Limit (C)	Wt	Water table
PL(D)	Pressure Limit (D)	Wt	Water table
PL(E)	Pressure Limit (E)	Wt	Water table
PL(F)	Pressure Limit (F)	Wt	Water table
PL(G)	Pressure Limit (G)	Wt	Water table
PL(H)	Pressure Limit (H)	Wt	Water table
PL(I)	Pressure Limit (I)	Wt	Water table
PL(J)	Pressure Limit (J)	Wt	Water table
PL(K)	Pressure Limit (K)	Wt	Water table
PL(L)	Pressure Limit (L)	Wt	Water table
PL(M)	Pressure Limit (M)	Wt	Water table
PL(N)	Pressure Limit (N)	Wt	Water table
PL(O)	Pressure Limit (O)	Wt	Water table
PL(P)	Pressure Limit (P)	Wt	Water table
PL(Q)	Pressure Limit (Q)	Wt	Water table
PL(R)	Pressure Limit (R)	Wt	Water table
PL(S)	Pressure Limit (S)	Wt	Water table
PL(T)	Pressure Limit (T)	Wt	Water table
PL(U)	Pressure Limit (U)	Wt	Water table
PL(V)	Pressure Limit (V)	Wt	Water table
PL(W)	Pressure Limit (W)	Wt	Water table
PL(X)	Pressure Limit (X)	Wt	Water table
PL(Y)	Pressure Limit (Y)	Wt	Water table
PL(Z)	Pressure Limit (Z)	Wt	Water table

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE05
PROJECT No: 49761
DATE: 29/11/2012
SHEET 2 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	10.2	SILTSTONE/SANDSTONE - Moderately weathered, low strength, brown, fine to medium grained sandstone laminated with grey siltstone (continued)		C	10.07 10.2		PL(A) = 0.37		
		SILTSTONE - Slightly weathered, very low strength, grey siltstone			10.5		PL(A) = 0.17		
	11	From 11.2m, medium strength			11.22		PL(A) = 1.08		
		From 11.5m, fresh			12.1				
	12.36	TUFF - Fresh, very low strength, light grey tuff			12.6				
	12.36	MUDSTONE - Fresh, medium strength, dark grey mudstone			12.6				
	12.48								
	12.72	COAL - Fresh, medium strength, black/dark brown coal			13.18		PL(A) = 1.19		
		SILTSTONE - Fresh, medium strength, grey siltstone			14.13		GT-001		
	14.28	MUDSTONE - Fresh, medium strength, dark grey mudstone			14.23				
					14.57		PL(A) = 1.38		
	15.23	COAL - Fresh, medium strength, dark grey coal			15.11				
	15.5	SILTSTONE - Fresh, medium strength, grey siltstone			16.68		PL(A) = 1.56 PL(D) = 1.31		
	17.23	COAL - Fresh, medium strength, black coal			17.2		PL(A) = 1.8		
	17.7	From 17.66m, coal seam			18.14		PL(A) = 3.97		
		SILTSTONE - Fresh, high strength, dark grey siltstone			18.17				
		From 17.73m to 17.74m, coal seam			18.5		PL(A) = 1.87		
		From 17.86m to 17.89m, coal seam			18.54		GT-002		
		From 17.95m, coal seam			18.93				
		From 18.17m to 18.56m, medium strength, thinly laminated with coal			19.22				
	19.22	CARBONACEOUS SILTSTONE/COAL - Fresh, medium strength, dark brown carbonaceous siltstone laminated with black coal			19.75		PL(A) = 2.45		

RIG: Hydropower Scout **DRILLER:** Sawyer **LOGGED:** Holden **CASING:** HW to 8.6m
TYPE OF BORING: Solid flight auger to 7.0m, wash boring to 9.2m, HQ3 to 58.90m
WATER OBSERVATIONS: Free groundwater observed at 6.25m
REMARKS:

1 - Auger sample	11 - Cone sample	21 - Push over shear test (POSS)
2 - Solid sample	12 - Triaxial sample	22 - Push over shear test (POSS) (SBS)
3 - Core sample	13 - Triaxial sample (in situ test)	23 - Push over shear test (POSS) (SBS)
4 - Disturbed sample	14 - Auger sample	24 - Standard penetration test
5 - Environmental sample	15 - Water sample	25 - Shear vane (SV)
	16 - Water test	

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE05
PROJECT No: 49761
DATE: 29/11/2012
SHEET 3 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
	20.08	SILTSTONE - Fresh, medium strength, grey siltstone		C	20.32		PL(A) = 1.86 PL(D) = 1.39	
	21	From 21.46m to 21.64m, medium strength sandstone band			21.14			
	21.91	LAMINITE - Fresh, medium strength, grey laminitic		C	22.53		PL(A) = 2.11 PL(D) = 2.33	
	23	From 23.0m, grading into sandstone						
	23.19	SANDSTONE - Fresh, high strength, light grey, fine to medium grained sandstone			23.44		PL(A) = 5.33 PL(D) = 3.58	
	24							
	24.15	CONGLOMERATE - Fresh, high strength, grey, medium grained conglomerate in a fine to medium grained sandstone matrix			24.28			
	24.33							
	24.58	SANDSTONE - Fresh, high strength, grey, fine to medium grained sandstone			24.66		PL(A) = 5.08 PL(D) = 3.69	
	24.93							
	25.27	CONGLOMERATE - Fresh, high strength, grey, medium grained conglomerate in a fine to medium grained sandstone matrix						
	25.27	SANDSTONE - Fresh, high strength, grey, fine to medium grained sandstone		C				
	26	SILTSTONE - Fresh, medium strength, dark grey siltstone			25.97		PL(A) = 1.83 PL(D) = 2.69	
	26.47	From 26.27m, grading into tuff						
	26.47	TUFF - Fresh, high strength, light grey tuff			26.5		PL(A) = 4.2	
	26.47	From 26.47m to 26.97m, heat affected			26.58		GT-003	
	27	From 26.97m, very low strength						
	27.07				27.03			
	27.19	COAL/CARBONACEOUS MUDSTONE - Fresh, high strength, dark brown/black coal/carbonaceous mudstone						
	27.27							
	27.63	COAL - Fresh, medium strength, black coal			27.66		PL(A) = 8.44 PL(D) = 3.64	
	28	CARBONACEOUS MUDSTONE - Fresh, high strength, dark brown/black mudstone						
	28.23							
	28.28	CARBONACEOUS MUDSTONE/COAL - Fresh, high strength coal/cark brown mudstone		C				
	28.43							
	29	TUFF - Fresh, medium strength, light grey tuff (possibly heat affected)			29.0		PL(A) = 6.43 PL(D) = 4.84	
		COAL - Fresh, medium strength, black coal						
		LAMINITE - Fresh, high strength, grey laminitic (fine to medium grained sandstone)						
		From 29.64m, grading into mudstone						

RIG: Hydropower Scout **DRILLER:** Sawyer **LOGGED:** Holden **CASING:** HW to 8.6m
TYPE OF BORING: Solid flight auger to 7.0m, wash boring to 9.2m, HQ3 to 58.90m
WATER OBSERVATIONS: Free groundwater observed at 6.25m
REMARKS:

1 - Auger sample	11 - Cone sample (30 mm dia.)	21 - Water sample	31 - Shear vane (100)
2 - Solid sample	12 - Cone sample (45 mm dia.)	22 - Water sample	32 - Shear vane (200)
3 - Core sample	13 - Cone sample (75 mm dia.)	23 - Water sample	33 - Shear vane (300)
4 - Disturbed sample	14 - Cone sample (100 mm dia.)	24 - Water sample	34 - Shear vane (400)
5 - Environmental sample	15 - Cone sample (150 mm dia.)	25 - Water sample	35 - Shear vane (500)
6 - Auger sample	16 - Cone sample (200 mm dia.)	26 - Water sample	36 - Shear vane (600)
7 - Solid sample	17 - Cone sample (250 mm dia.)	27 - Water sample	37 - Shear vane (700)
8 - Core sample	18 - Cone sample (300 mm dia.)	28 - Water sample	38 - Shear vane (800)
9 - Disturbed sample	19 - Cone sample (350 mm dia.)	29 - Water sample	39 - Shear vane (900)
10 - Environmental sample	20 - Cone sample (400 mm dia.)	30 - Water sample	40 - Shear vane (1000)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE05
PROJECT No: 49761
DATE: 29/11/2012
SHEET 4 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	30.05	MUDSTONE - Fresh, high strength, dark grey/black mudstone			30.08				
	31.31.03	SANDSTONE/SILTSTONE - Fresh, high strength, light grey, fine grained sandstone interbedded with grey siltstone (bedding up to 200mm thick)		C	30.96 31.0 31.24		PL(A) = 4.94 GT-004		
	32				32.18		PL(A) = 6.94		
	33				33.04 33.08		PL(A) = 4.69		
	33.38	MUDSTONE - Fresh, high strength, dark grey/black mudstone							
	34				34.05		PL(A) = 4.59		
	34.52	From 34.38m to 34.40m, medium strength coal seam COAL - Fresh, medium strength, black coal		C					
	34.87	SILTSTONE - Fresh, high strength, dark grey siltstone			35.04		PL(A) = 4		
	35.42 35.46 35.66	COAL - Fresh, medium strength, black coal SILTSTONE - Fresh, high strength, dark grey siltstone							
	36	CARBONACEOUS MUDSTONE/COAL - Fresh, high strength, grey/black carbonaceous mudstone/coal			36.14 36.24		GT-010		
	36.8	From 36.62m to 36.68m, high strength tuff band			36.73				
	36.89	TUFF - Fresh, medium strength, light grey/brown tuff COAL - Fresh, medium strength, dark grey/black coal							
	37.59	TUFF - Fresh, low strength, light grey/brown tuff		C	37.65		PL(A) = 0.59 PL(D) = 0.41		
	38.37.99	From 37.76m to 37.90m, high strength mudstone band From 37.9m, high strength COAL - Fresh, medium dense, dark grey/black coal							
	38.65	TUFF - Fresh, medium strength, light grey/brown tuff			38.63		GT-005		
	39	From 38.69m to 38.70m, very low strength From 38.83m to 38.90m, very low strength							From 38.0m to 41.7m, bentonite
	39.7	COAL - Fresh, medium strength, black coal		C	39.2				

RIG: Hydropower Scout **DRILLER:** Sawyer **LOGGED:** Holden **CASING:** HW to 8.6m
TYPE OF BORING: Solid flight auger to 7.0m, wash boring to 9.2m, HQ3 to 58.90m
WATER OBSERVATIONS: Free groundwater observed at 6.25m
REMARKS:

1 - Auger sample	11 - Thin section (4 mm dia.)	21 - Thin section (10 mm dia.)	31 - Thin section (20 mm dia.)
2 - Auger sample	12 - Thin section (4 mm dia.)	22 - Thin section (10 mm dia.)	32 - Thin section (20 mm dia.)
3 - Auger sample	13 - Thin section (4 mm dia.)	23 - Thin section (10 mm dia.)	33 - Thin section (20 mm dia.)
4 - Auger sample	14 - Thin section (4 mm dia.)	24 - Thin section (10 mm dia.)	34 - Thin section (20 mm dia.)
5 - Auger sample	15 - Thin section (4 mm dia.)	25 - Thin section (10 mm dia.)	35 - Thin section (20 mm dia.)
6 - Auger sample	16 - Thin section (4 mm dia.)	26 - Thin section (10 mm dia.)	36 - Thin section (20 mm dia.)
7 - Auger sample	17 - Thin section (4 mm dia.)	27 - Thin section (10 mm dia.)	37 - Thin section (20 mm dia.)
8 - Auger sample	18 - Thin section (4 mm dia.)	28 - Thin section (10 mm dia.)	38 - Thin section (20 mm dia.)
9 - Auger sample	19 - Thin section (4 mm dia.)	29 - Thin section (10 mm dia.)	39 - Thin section (20 mm dia.)
10 - Auger sample	20 - Thin section (4 mm dia.)	30 - Thin section (10 mm dia.)	40 - Thin section (20 mm dia.)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE05
PROJECT No: 49761
DATE: 29/11/2012
SHEET 5 OF 6

Borehole ID	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	40.08	SILTSTONE - Fresh, high strength, grey siltstone							
	40.27						PL(A) = 5.98 PL(D) = 5.1		
	41.08	From 40.93m, grading into sandstone							
	41.08	SANDSTONE - Fresh, high strength, light grey, fine to medium grained sandstone		C	41.15		GT-006		
					41.62		PL(A) = 4.98 PL(D) = 3.7		
					41.66				
		From 42.64m, fine to coarse grained			42.13				
		From 43.52m, medium strength, slightly fine grained			43.66		PL(A) = 1.55 PL(D) = 1.64		
	43.73	COAL - Fresh, medium strength, black coal							
	45.0	CORE LOSS			45.1				From 41.7m to 46.1m, gravel From 41.9m to 47.9m, Class 18 PVC Screen
	45.45	COAL - Fresh, medium strength, black coal							
	46.1	SANDSTONE - Fresh, high strength, grey, fine to medium grained sandstone		C	46.38		PL(A) = 6.94 PL(D) = 6.95		
					47.34		PL(A) = 7.57 PL(D) = 6.83		
					47.4		GT-007		
		From 47.69m to 47.79m, medium strength, fine to coarse grained			47.69				
					48.1				
					48.8		PL(A) = 6.81 PL(D) = 6.81		
	49.08	SANDSTONE - Fresh, high strength, grey, fine to medium grained sandstone		C	49.55		GT-008		From 47.9m to 50.9m, Class 18 PVC (sump)
					49.88		PL(A) = 3.84		
	49.95								

RIG: Hydropower Scout **DRILLER:** Sawyer **LOGGED:** Holden **CASING:** HW to 8.6m
TYPE OF BORING: Solid flight auger to 7.0m, wash boring to 9.2m, HQ3 to 58.90m
WATER OBSERVATIONS: Free groundwater observed at 6.25m
REMARKS:

1 - Auger sample	11 - Cone sample (in situ)	21 - Push down test (PDT)
2 - Solid sample	12 - Cone sample (in situ)	22 - Push down test (PDT)
3 - Core sample	13 - Cone sample (in situ)	23 - Push down test (PDT)
4 - Disturbed sample	14 - Cone sample (in situ)	24 - Push down test (PDT)
5 - Environmental sample	15 - Cone sample (in situ)	25 - Push down test (PDT)
6 - Soil sample	16 - Cone sample (in situ)	26 - Push down test (PDT)
7 - Soil sample	17 - Cone sample (in situ)	27 - Push down test (PDT)
8 - Soil sample	18 - Cone sample (in situ)	28 - Push down test (PDT)
9 - Soil sample	19 - Cone sample (in situ)	29 - Push down test (PDT)
10 - Soil sample	20 - Cone sample (in situ)	30 - Push down test (PDT)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE05
PROJECT No: 49761
DATE: 29/11/2012
SHEET 6 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	50.36	CONGLOMERATE - Fresh, high strength, grey conglomerate (fine to medium sized gravel in fine to coarse grained sand matrix)	●●●●●	C	49.92		PL(D) = 3.64		
		SANDSTONE - Fresh, high strength, grey, fine to medium grained sandstone (continued)	- - - - -		50.73				
	51	SILTSTONE - Fresh, high strength, dark grey siltstone	- - - - -		51.04		PL(A) = 5.38		
	51.53	SANDSTONE - Fresh, high strength, light grey, fine to medium grained sandstone	●●●●●	C					
	53				53.16 53.2		PL(A) = 9 PL(D) = 6.78 QT-009		
	54				53.62 53.85				
	55	From 54.5m, very high strength		C	55.54		PL(A) = 11.98 PL(D) = 9.05		
	56.9	Bore discontinued at 56.9m, limit of investigation			56.9				
	57								
	58								
	59								

RIG: Hydropower Scout **DRILLER:** Sawyer **LOGGED:** Holden **CASING:** HW to 8.6m
TYPE OF BORING: Solid flight auger to 7.0m, wash boring to 9.2m, HQ3 to 56.90m
WATER OBSERVATIONS: Free groundwater observed at 6.25m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
●	Auger sample	□	Soil sample
○	Rotary sample	▨	Water sample
■	Soil sample	▩	Water sample (in situ)
□	Soil sample	▩	Water sample
○	Rotary sample	▩	Water sample
■	Soil sample	▩	Water sample
○	Rotary sample	▩	Water sample
■	Soil sample	▩	Water sample

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE05W
PROJECT No: 49761
DATE: 29/11/2012
SHEET 1 OF 2

Borehole ID	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction	
				Type	Depth	Sample		Results & Comments	Details	Stickup
	0.0	SILTY CLAY - (Stiff) brown silty clay, some fine to coarse grained sand, trace fine subangular gravel, M>Wp						From 0m to 0.3m, cement	
	1.0	From 1.0m, very stiff		S	1.0		9,13,16 N = 29		
	1.35	SILTY SAND/SILTY CLAY - Medium dense, brown silty, fine to medium grained sand interbedded with very stiff to hard clay and silty clay, M>Wp			1.45				
	2.5	From 2.5m to 2.95m, hard clay band			2.5				
	2.6			pp	2.6		>500kPa		
	2.7			S	2.7		7,14,15 N = 29		
	2.95				2.95				
	4.0	From 4.0m to 4.25m, sandy clay band, M>Wp, transitioning into sand			4.0				
	4.0			pp	4.0		>230-250kPa		
	4.25			S	4.25		10,12,14 N = 26		From 0.3m to 8.4m, grout
	4.45	SAND - Medium dense, brown, fine to medium grained sand, some fine subangular/subrounded gravel, some silt, humid			4.45				
	5.0	From 5.0m, damp			5.5				
	5.5			S	5.5		5.5,7 N = 12		
	5.7	GRAVELLY SAND - Medium dense, brown, fine to coarse grained, subangular/subrounded gravelly, fine to coarse grained sand, trace silt, damp to wet			5.95				
	6.25	From 6.25m, interbedded with sandy clay in parts			7.0				
	7.0			S	7.0		18,12,14 N = 26		
	7.45				7.45				
	8.7	SANDSTONE - Highly weathered, low strength, brown, fine to medium grained sandstone			8.8				
	8.7			S	8.8		41/130mm (bouncing) N=50		From 8.4m to 9.5m, bentonite
	9.2	From 8.7m to 9.2m, high drilling resistance using wash boring (changed to HQ at 9.2m)			9.2				
	9.25				9.25				
	9.62			C	9.62		PL(A) = 0.45		
	9.99								

RIG: Hydropower Scout **DRILLER:** Sawyer **LOGGED:** Holden **CASING:** HW to 8.6m
TYPE OF BORING: Solid flight auger to 7.0m, wash boring to 9.2m, HQ3 to 9.99m
WATER OBSERVATIONS: Free groundwater observed at 6.25m
REMARKS:

S	Standard Penetration Test	W	Water Sample
pp	Pressure Penetration Test	Wt	Water Test
SS	Soil Sample		
TS	Test Sample		
TS (100mm dia)	Test Sample (100mm dia)		
TS (150mm dia)	Test Sample (150mm dia)		
TS (200mm dia)	Test Sample (200mm dia)		
TS (300mm dia)	Test Sample (300mm dia)		
TS (400mm dia)	Test Sample (400mm dia)		
TS (500mm dia)	Test Sample (500mm dia)		
TS (600mm dia)	Test Sample (600mm dia)		
TS (750mm dia)	Test Sample (750mm dia)		
TS (900mm dia)	Test Sample (900mm dia)		
TS (1100mm dia)	Test Sample (1100mm dia)		
TS (1300mm dia)	Test Sample (1300mm dia)		
TS (1500mm dia)	Test Sample (1500mm dia)		
TS (1800mm dia)	Test Sample (1800mm dia)		
TS (2100mm dia)	Test Sample (2100mm dia)		
TS (2400mm dia)	Test Sample (2400mm dia)		
TS (2700mm dia)	Test Sample (2700mm dia)		
TS (3000mm dia)	Test Sample (3000mm dia)		
TS (3300mm dia)	Test Sample (3300mm dia)		
TS (3600mm dia)	Test Sample (3600mm dia)		
TS (3900mm dia)	Test Sample (3900mm dia)		
TS (4200mm dia)	Test Sample (4200mm dia)		
TS (4500mm dia)	Test Sample (4500mm dia)		
TS (4800mm dia)	Test Sample (4800mm dia)		
TS (5100mm dia)	Test Sample (5100mm dia)		
TS (5400mm dia)	Test Sample (5400mm dia)		
TS (5700mm dia)	Test Sample (5700mm dia)		
TS (6000mm dia)	Test Sample (6000mm dia)		
TS (6300mm dia)	Test Sample (6300mm dia)		
TS (6600mm dia)	Test Sample (6600mm dia)		
TS (6900mm dia)	Test Sample (6900mm dia)		
TS (7200mm dia)	Test Sample (7200mm dia)		
TS (7500mm dia)	Test Sample (7500mm dia)		
TS (7800mm dia)	Test Sample (7800mm dia)		
TS (8100mm dia)	Test Sample (8100mm dia)		
TS (8400mm dia)	Test Sample (8400mm dia)		
TS (8700mm dia)	Test Sample (8700mm dia)		
TS (9000mm dia)	Test Sample (9000mm dia)		
TS (9300mm dia)	Test Sample (9300mm dia)		
TS (9600mm dia)	Test Sample (9600mm dia)		
TS (9900mm dia)	Test Sample (9900mm dia)		
TS (10200mm dia)	Test Sample (10200mm dia)		
TS (10500mm dia)	Test Sample (10500mm dia)		
TS (10800mm dia)	Test Sample (10800mm dia)		
TS (11100mm dia)	Test Sample (11100mm dia)		
TS (11400mm dia)	Test Sample (11400mm dia)		
TS (11700mm dia)	Test Sample (11700mm dia)		
TS (12000mm dia)	Test Sample (12000mm dia)		
TS (12300mm dia)	Test Sample (12300mm dia)		
TS (12600mm dia)	Test Sample (12600mm dia)		
TS (12900mm dia)	Test Sample (12900mm dia)		
TS (13200mm dia)	Test Sample (13200mm dia)		
TS (13500mm dia)	Test Sample (13500mm dia)		
TS (13800mm dia)	Test Sample (13800mm dia)		
TS (14100mm dia)	Test Sample (14100mm dia)		
TS (14400mm dia)	Test Sample (14400mm dia)		
TS (14700mm dia)	Test Sample (14700mm dia)		
TS (15000mm dia)	Test Sample (15000mm dia)		
TS (15300mm dia)	Test Sample (15300mm dia)		
TS (15600mm dia)	Test Sample (15600mm dia)		
TS (15900mm dia)	Test Sample (15900mm dia)		
TS (16200mm dia)	Test Sample (16200mm dia)		
TS (16500mm dia)	Test Sample (16500mm dia)		
TS (16800mm dia)	Test Sample (16800mm dia)		
TS (17100mm dia)	Test Sample (17100mm dia)		
TS (17400mm dia)	Test Sample (17400mm dia)		
TS (17700mm dia)	Test Sample (17700mm dia)		
TS (18000mm dia)	Test Sample (18000mm dia)		
TS (18300mm dia)	Test Sample (18300mm dia)		
TS (18600mm dia)	Test Sample (18600mm dia)		
TS (18900mm dia)	Test Sample (18900mm dia)		
TS (19200mm dia)	Test Sample (19200mm dia)		
TS (19500mm dia)	Test Sample (19500mm dia)		
TS (19800mm dia)	Test Sample (19800mm dia)		
TS (20100mm dia)	Test Sample (20100mm dia)		
TS (20400mm dia)	Test Sample (20400mm dia)		
TS (20700mm dia)	Test Sample (20700mm dia)		
TS (21000mm dia)	Test Sample (21000mm dia)		
TS (21300mm dia)	Test Sample (21300mm dia)		
TS (21600mm dia)	Test Sample (21600mm dia)		
TS (21900mm dia)	Test Sample (21900mm dia)		
TS (22200mm dia)	Test Sample (22200mm dia)		
TS (22500mm dia)	Test Sample (22500mm dia)		
TS (22800mm dia)	Test Sample (22800mm dia)		
TS (23100mm dia)	Test Sample (23100mm dia)		
TS (23400mm dia)	Test Sample (23400mm dia)		
TS (23700mm dia)	Test Sample (23700mm dia)		
TS (24000mm dia)	Test Sample (24000mm dia)		
TS (24300mm dia)	Test Sample (24300mm dia)		
TS (24600mm dia)	Test Sample (24600mm dia)		
TS (24900mm dia)	Test Sample (24900mm dia)		
TS (25200mm dia)	Test Sample (25200mm dia)		
TS (25500mm dia)	Test Sample (25500mm dia)		
TS (25800mm dia)	Test Sample (25800mm dia)		
TS (26100mm dia)	Test Sample (26100mm dia)		
TS (26400mm dia)	Test Sample (26400mm dia)		
TS (26700mm dia)	Test Sample (26700mm dia)		
TS (27000mm dia)	Test Sample (27000mm dia)		
TS (27300mm dia)	Test Sample (27300mm dia)		
TS (27600mm dia)	Test Sample (27600mm dia)		
TS (27900mm dia)	Test Sample (27900mm dia)		
TS (28200mm dia)	Test Sample (28200mm dia)		
TS (28500mm dia)	Test Sample (28500mm dia)		
TS (28800mm dia)	Test Sample (28800mm dia)		
TS (29100mm dia)	Test Sample (29100mm dia)		
TS (29400mm dia)	Test Sample (29400mm dia)		
TS (29700mm dia)	Test Sample (29700mm dia)		
TS (30000mm dia)	Test Sample (30000mm dia)		

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE05W
PROJECT No: 49761
DATE: 29/11/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	10.2	SILTSTONE/SANDSTONE - Moderately weathered, low strength, brown, fine to medium grained sandstone laminated with grey siltstone (continued)		C	10.07 10.2		PL(A) = 0.27			
		SILTSTONE - Slightly weathered, very low strength, grey siltstone			10.5		PL(A) = 0.17			
	11	From 11.2m, medium strength								
		From 11.5m, fresh		C	11.22		PL(A) = 1.08			
	12				12.1					
	12.36	TUFF - Fresh, very low strength, light grey tuff			12.6					
	12.36	MUDSTONE - Fresh, medium strength, dark grey mudstone								
	12.48									
	12.72	COAL - Fresh, medium strength, black/dark brown coal								
	13	SILTSTONE - Fresh, medium strength, grey siltstone		C	13.18		PL(A) = 1.19		From 9.5m to 15.7m, gravel From 9.7m to 15.7m, Class 18 PVC Screen	
	14				14.13		GT-001			
	14.28	MUDSTONE - Fresh, medium strength, dark grey mudstone			14.23					
					14.57		PL(A) = 1.38			
	15				15.11					
	15.23	COAL - Fresh, medium strength, dark grey coal								
	15.5	SILTSTONE - Fresh, medium strength, grey siltstone							End cap	
	15.7	Bore discontinued at 15.7m, limit of investigation								
	16									
	17									
	18									
	19									

RIG: Hydropower Scout **DRILLER:** Sawyer **LOGGED:** Holden **CASING:** HW to 8.6m
TYPE OF BORING: Solid flight auger to 7.0m, wash boring to 9.2m, HQ3 to 58.90m
WATER OBSERVATIONS: Free groundwater observed at 6.25m
REMARKS:

B	Auger sample	12	Soil sample	PLC	Point pressure cell (PPC)
BS	Solid sample	13	Water sample	PL(A)	Pressure cell (PC) (100/100)
C	Core sample	14	Triaxial sample (in situ test)	PL(B)	Pressure cell (PC) (100/100)
D	Disturbed sample	15	Water sample	PL(C)	Pressure cell (PC) (100/100)
E	Environmental sample	16	Water test	PL(D)	Pressure cell (PC) (100/100)
		17	Water test	PL(E)	Pressure cell (PC) (100/100)
		18	Water test	PL(F)	Pressure cell (PC) (100/100)
		19	Water test	PL(G)	Pressure cell (PC) (100/100)
		20	Water test	PL(H)	Pressure cell (PC) (100/100)
		21	Water test	PL(I)	Pressure cell (PC) (100/100)
		22	Water test	PL(J)	Pressure cell (PC) (100/100)
		23	Water test	PL(K)	Pressure cell (PC) (100/100)
		24	Water test	PL(L)	Pressure cell (PC) (100/100)
		25	Water test	PL(M)	Pressure cell (PC) (100/100)
		26	Water test	PL(N)	Pressure cell (PC) (100/100)
		27	Water test	PL(O)	Pressure cell (PC) (100/100)
		28	Water test	PL(P)	Pressure cell (PC) (100/100)
		29	Water test	PL(Q)	Pressure cell (PC) (100/100)
		30	Water test	PL(R)	Pressure cell (PC) (100/100)
		31	Water test	PL(S)	Pressure cell (PC) (100/100)
		32	Water test	PL(T)	Pressure cell (PC) (100/100)
		33	Water test	PL(U)	Pressure cell (PC) (100/100)
		34	Water test	PL(V)	Pressure cell (PC) (100/100)
		35	Water test	PL(W)	Pressure cell (PC) (100/100)
		36	Water test	PL(X)	Pressure cell (PC) (100/100)
		37	Water test	PL(Y)	Pressure cell (PC) (100/100)
		38	Water test	PL(Z)	Pressure cell (PC) (100/100)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE08C
PROJECT No: 49761
DATE: 7-13/12/12
SHEET 1 OF 4

Borehole ID	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction	
				Type	Depth	Sample		Results & Comments	Details	Stations
	0.0 - 1.0	SANDY SILT - Stiff, brown, fine to coarse grained sandy silt with abundant organics, M<Wp	[Symbol]						
	1.0 - 1.28	SANDSTONE AND SILTSTONE - Extremely low strength, extremely weathered, yellow brown / grey brown, fine to medium grained sandstone and carbonaceous siltstone	[Symbol]	1.0		15.21/130mm, refusal, bouncing			
	1.28 - 1.6	CORE LOSS - 0.32m	[Symbol]						
	1.6 - 1.9	SILTSTONE - Low strength, moderately weathered, grey / grey brown siltstone with interbedded fine to medium grained sandstone	[Symbol]	1.9		PL(A) = 0.48			
	1.9 - 2.22	SANDSTONE - Low to medium strength, moderately weathered, grey / grey brown fine to medium grained sandstone	[Symbol]						
	2.22 - 3.3		[Symbol]						
	3.3 - 3.4		[Symbol]	3.3		PL(A) = 0.31			
	3.4 - 4.7	From 3.87m, interbedded siltstone	[Symbol]						
	4.7 - 5.15	SANDSTONE - High strength, fresh, grey, medium grained sandstone with interbedded siltstone to 5.25m	[Symbol]	4.8		PL(A) = 0.97			
	5.15 - 6.0	From 5.25m, medium to coarse grained	[Symbol]						
	6.0 - 6.36		[Symbol]	6.0		PL(A) = 1.77			
	6.36 - 8.9		[Symbol]						
	8.9 - 9.4	At 9.42m to 9.46m, tuffaceous claystone	[Symbol]	8.9		PL(A) = 1.35			
	9.4 - 9.75	COAL - High strength, fresh, black / dark brown coal with interbedded carbonaceous siltstone	[Symbol]	9.4		PL(A) = 1.06			

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 1.65m

TYPE OF BORING: Solid flight auger to 1.0m, HQ3 coring to 36.4m

WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids

REMARKS:

[Symbol] - Auger sample	[Symbol] - Core sample	[Symbol] - Photo cross-section (PCC)
[Symbol] - Solid sample	[Symbol] - Water sample	[Symbol] - PL(A) - Press. load test (150 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (50 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (75 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (100 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (125 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (150 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (175 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (200 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (225 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (250 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (275 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (300 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (325 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (350 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (375 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (400 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (425 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (450 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (475 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (500 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (525 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (550 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (575 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (600 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (625 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (650 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (675 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (700 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (725 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (750 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (775 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (800 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (825 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (850 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (875 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (900 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (925 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (950 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (975 mm dia)
[Symbol] - Core sample	[Symbol] - Water sample	[Symbol] - PL(S) - Press. load test (1000 mm dia)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE08C
PROJECT No: 49761
DATE: 7-13/12/12
SHEET 2 OF 4

Borehole ID	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	10.33	At 9.95m to 9.98m, tuffaceous claystone							
	11	SANDSTONE AND SILTSTONE - High strength, fresh, grey / dark grey, fine to medium grained sandstone and siltstone (laminate?)		C	10.7		PL(A) = 1.01		
	12				12.05		PL(A) = 1.13		
		At 12.49m to 12.8m, carbonaceous siltstone / coal			12.34				
	13								
	13.14	CARBONACEOUS SILTSTONE / COAL - Medium strength, fresh, dark brown carbonaceous siltstone / coal		C	13.35		PL(A) = 0.62		
	14								
	13.95	SILTSTONE AND SANDSTONE - High strength, fresh, grey / dark grey siltstone and fine to medium grained sandstone			14.95		PL(A) = 1.54		
	15				15.29				
	16				16.25		PL(A) = 1.55		
	17				16.95		PL(A) = 2.84		
		At 17.65m to 17.85m, carbonaceous siltstone			17.53		PL(A) = 2.98		
	18								
	17.95	CORE LOSS - 0.05m							
	18.0	COAL - Medium to high strength, fresh, dark brown / black coal with interbedded carbonaceous siltstone			18.34				
	19								
	18.76	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone		C	19.35		PL(A) = 1.99		
	19.5				19.75		PL(A) = 1.67		

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 1.65m

TYPE OF BORING: Solid flight auger to 1.0m, HQ3 coring to 36.4m

WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids

REMARKS:

1 - Auger sample	11 - Thin section (4 mm dia.)	21 - Thin section (10 mm dia.)	31 - Photo micrograph (10x)
2 - Solid sample	12 - Water sample	22 - Water sample	32 - Photo micrograph (20x)
3 - Core sample	13 - Slurp sample	23 - Water sample	33 - Photo micrograph (40x)
4 - Disturbed sample	14 - Water sample	24 - Water sample	34 - Photo micrograph (80x)
5 - Environmental sample	15 - Water test	25 - Water test	35 - Photo micrograph (100x)
		26 - Water test	36 - Photo micrograph (200x)
		27 - Water test	37 - Photo micrograph (400x)
		28 - Water test	38 - Photo micrograph (800x)
		29 - Water test	39 - Photo micrograph (1600x)
		30 - Water test	40 - Photo micrograph (3200x)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE08C
PROJECT No: 49761
DATE: 7-13/12/12
SHEET 3 OF 4

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
		CARBONACEOUS SILTSTONE / COAL - Medium strength, fresh, dark brown carbonaceous siltstone / coal (continued)							
	21	From 21m, coal with interbedded carbonaceous siltstone		C					
		At 21.38m to 21.39m, tuffaceous claystone band							
	21.3				21.34		PL(A) = 0.64 PL(D) = 1.32		
	22								
	22.65			C			PL(A) = 0.87		
	23	At 23.11m to 23.24m, tuffaceous claystone band							
		At 23.32m to 23.37m, tuffaceous claystone band							
	23.52	TUFFACEOUS CLAYSTONE - Medium strength, fresh, pale grey tuffaceous claystone							
	23.76	At 23.52m to 23.55m, extremely low strength, extremely weathered							
	24	COAL - Medium to high strength, fresh, dark brown / black coal with interbedded carbonaceous siltstone							
	24.6	At 24.22m to 24.25m, tuffaceous band							
	24.36				24.65		PL(A) = 1.56		
	25	SANDSTONE AND SILTSTONE - High strength, fresh, grey / dark grey fine to medium grained sandstone and siltstone							
	26			C					
	27.35				27.38		PL(A) = 1.9		
	27.88	SANDSTONE - High strength, fresh, grey, coarse grained sandstone with interbedded pebbly sandstone							
	28			C			PL(A) = 1.19		
	29								
									From 25.7m to 29.25m, bentonite

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 1.65m

TYPE OF BORING: Solid flight auger to 1.0m, HQ3 coring to 36.4m

WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids

REMARKS:

1 - Auger sample	11 - Thin section (4 mm dia.)	21 - Thin section (10 mm dia.)	31 - Thin section (25 mm dia.)
2 - Solid sample	12 - Water sample	22 - Water sample	32 - Water sample
3 - Core sample	13 - Slurried sample	23 - Slurried sample	33 - Slurried sample
4 - Disturbed sample	14 - Water sample	24 - Water sample	34 - Water sample
5 - Environmental sample	15 - Water test	25 - Water test	35 - Water test
	16 - Soil sample	26 - Soil sample	36 - Soil sample
	17 - Thin section	27 - Thin section	37 - Thin section
	18 - Thin section (4 mm dia.)	28 - Thin section (10 mm dia.)	38 - Thin section (25 mm dia.)
	19 - Slurried sample	29 - Slurried sample	39 - Slurried sample
	20 - Water sample	30 - Water sample	
	21 - Thin section (10 mm dia.)	31 - Thin section (25 mm dia.)	
	22 - Water sample	32 - Water sample	
	23 - Slurried sample	33 - Slurried sample	
	24 - Water sample	34 - Water sample	
	25 - Water test	35 - Water test	
	26 - Soil sample	36 - Soil sample	
	27 - Thin section	37 - Thin section	
	28 - Thin section (10 mm dia.)	38 - Thin section (25 mm dia.)	
	29 - Slurried sample	39 - Slurried sample	
	30 - Water sample		
	31 - Thin section (25 mm dia.)		
	32 - Water sample		
	33 - Slurried sample		
	34 - Water sample		
	35 - Water test		
	36 - Soil sample		
	37 - Thin section		
	38 - Thin section (25 mm dia.)		
	39 - Slurried sample		

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE08C
PROJECT No: 49761
DATE: 7-13/12/12
SHEET 4 OF 4

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	30.74	SANDSTONE - High strength, fresh, grey, coarse grained sandstone with interbedded pebbly sandstone (continued)		C	30.45 30.47		PL(A) = 0.97		
	31	COAL - Medium to high strength, dark brown / black coal At 30.99m, tuffaceous claystone band 10mm			30.9		PL(A) = 0.69		
	32			C	32.8		PL(A) = 1.16		From 29.25m to 34m, 5mm gravel From 29.4m to 33.5m, Class 18 PVC Screen
	33.02	CORE LOSS - 0.36m	X						
	33.38	COAL - Medium to high strength, dark brown / black coal			33.38				
	33.82	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone with interbedded coarse grained sandstone and sparse thin siltstone laminations		C	34.05		PL(A) = 2.67		
	36.4	Bore discontinued at 36.4m, limit of investigation			36.35 36.4		PL(A) = 2.84		End cap

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 1.65m
TYPE OF BORING: Solid flight auger to 1.0m, HQ3 coring to 36.4m
WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids
REMARKS:

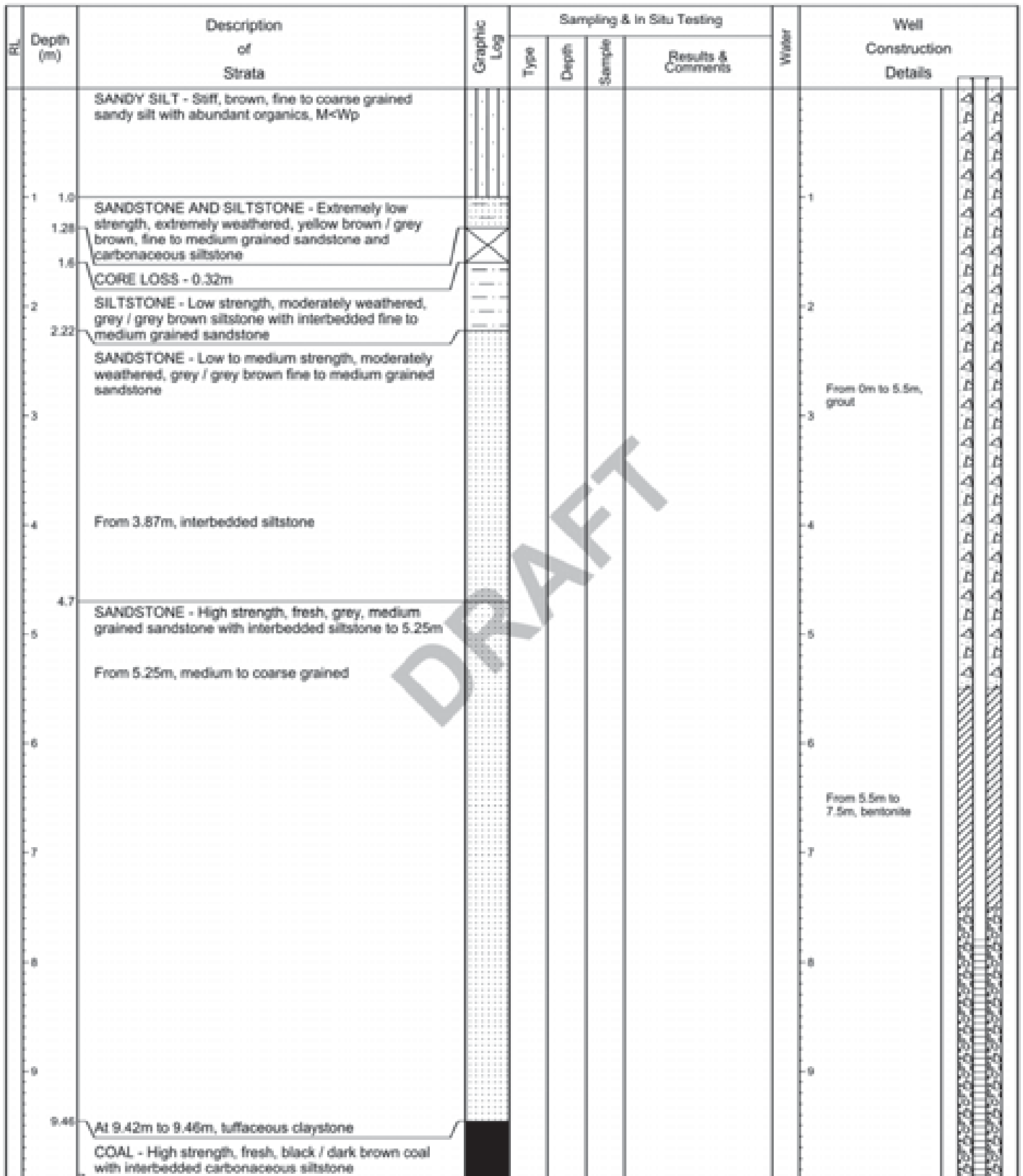
SAMPLING & IN SITU TESTING LEGEND			
1 - Auger sample	11 - Thin section (4 mm dia.)	21 - Split barrel sampler (SBS)	31 - Photo cross-section (PCS)
2 - Solid sample	12 - Thin section (8 mm dia.)	22 - Water sample	32 - Photo cross-section (PCS)
3 - Core sample	13 - Thin section (16 mm dia.)	23 - Water sample	33 - Photo cross-section (PCS)
4 - Disturbed sample	14 - Thin section (32 mm dia.)	24 - Water sample	34 - Photo cross-section (PCS)
5 - Undisturbed sample	15 - Thin section (64 mm dia.)	25 - Water sample	35 - Photo cross-section (PCS)
	16 - Thin section (128 mm dia.)	26 - Water sample	36 - Photo cross-section (PCS)
	17 - Thin section (256 mm dia.)	27 - Water sample	37 - Photo cross-section (PCS)
	18 - Thin section (512 mm dia.)	28 - Water sample	38 - Photo cross-section (PCS)
	19 - Thin section (1024 mm dia.)	29 - Water sample	39 - Photo cross-section (PCS)
	20 - Thin section (2048 mm dia.)	30 - Water sample	40 - Photo cross-section (PCS)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE08W
PROJECT No: 49761
DATE: 7-13/12/12
SHEET 1 OF 2



RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** Uncased
TYPE OF BORING: Rock roller from 0.0m to 13.8m
WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1 - Auger sample	11 - Soil sample	21 - Field permeability test (PVT)	
2 - Auger sample	12 - Soil sample	22 - Field permeability test (PVT)	
3 - Core sample	13 - Soil sample (in situ test)	23 - Field permeability test (PVT)	
4 - Soil sample	14 - Soil sample	24 - Field permeability test (PVT)	
5 - Soil sample	15 - Soil sample	25 - Field permeability test (PVT)	
6 - Soil sample	16 - Soil sample	26 - Field permeability test (PVT)	
7 - Soil sample	17 - Soil sample	27 - Field permeability test (PVT)	
8 - Soil sample	18 - Soil sample	28 - Field permeability test (PVT)	
9 - Soil sample	19 - Soil sample	29 - Field permeability test (PVT)	
10 - Soil sample	20 - Soil sample	30 - Field permeability test (PVT)	

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE08W
PROJECT No: 49761
DATE: 7-13/12/12
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		At 9.95m to 9.98m, tuffaceous claystone								
	10.33	SANDSTONE AND SILTSTONE - High strength, fresh, grey / dark grey, fine to medium grained sandstone and siltstone (laminate?)							From 7.5m to 13.8m, 5mm gravel From 7.8m to 13.8m, Class 18 PVC Screen	
	11									
	12									
	13	At 12.49m to 12.8m, carbonaceous siltstone / coal								
	13.14	CARBONACEOUS SILTSTONE / COAL - Medium strength, fresh, dark brown carbonaceous siltstone / coal								
	13.8	Bore discontinued at 13.8m, limit of investigation							End cap	
	14									
	15									
	16									
	17									
	18									
	19									

DRAFT

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** Uncased
TYPE OF BORING: Rock roller from 0.0m to 13.8m
WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1) Auger sample	12) Soil sample	21) Photo cross-section (PCC)	
2) Rock sample	13) Water sample	22) Photo cross-section (PCC) (2nd)	
3) Core sample	14) Water sample (in well - 20 l)	23) Photo cross-section (PCC) (3rd)	
4) Disturbed sample	15) Water sample	24) Photo cross-section (PCC) (4th)	
5) Environmental sample	16) Water level	25) Standard penetration test	
	17) Water level	26) Shear vane (SV)	

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE11
PROJECT No: 49761
DATE: 4/12/2012
SHEET 1 OF 2

RIG	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
	0 to 4.2	SANDY SILT - Stiff, brown, fine to coarse grained sandy silt with trace fine sized subrounded gravel, M=1Wp From 2m, some fine sized subrounded gravel, some coarse grained sandy silt with some fine to medium grained sand		S	1.0 1.45 2.5 2.95		5,3,3 N = 6 14,24,24 N = 48	From 0m to 0.3m, concrete From 0.3m to 3.6m, backfill and cuttings From 0m to 5.25m, Class 18 Blank
	4.2 to 5.72	SANDSTONE - Extremely low strength, extremely weathered, yellow brown medium to coarse grained sandstone From 4.44m, fine to coarse grained sandstone		S	4.0 4.2 4.21		15,20/60mm	From 3.6m to 5.25m, bentonite
	5.72 to 6.2	At 5.54m to 5.72m, conglomerate band (medium to coarse sized subrounded gravel) SANDSTONE - High strength, slightly weathered, pale grey mottled yellow brown, medium grained sandstone		pp pp C pp pp	4.58 4.65 4.68 4.95 5.15		550 kPa 300 kPa 250 kPa 300 kPa	
	6.2 to 8.8	From 8.19m, fine to medium grained sandstone, interbedded carbonaceous siltstone / sandstone		C	6.2			
	8.8 to 9.73	At 9.51m to 9.73m, pebbly sandstone From 9.74m to 9.86m, thin coal laminations		C	8.8			From 5.2m to 14.2m, 5mm gravel

RIG: Hydropower Scout DRILLER: (Total) Wakeman LOGGED: Semmler CASING: HW to 4.0m

TYPE OF BORING: Solid flight auger to 4.2m, rockroller blade bit wash boring to 4.44m, HQ3 coring to 14.79m

WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids

REMARKS:

S	Standard sample	W	Water sample	PP	Pressure penetration test
Wp	Water sample	Wt	Water test	PT	Point to point test (PT)
C	Core sample	Wt	Water test	PT	Point to point test (PT)
pp	Pressure penetration sample	Wt	Water test	PT	Point to point test (PT)
		Wt	Water test	PT	Point to point test (PT)
		Wt	Water test	PT	Point to point test (PT)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE11
PROJECT No: 49761
DATE: 4/12/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		At 9.84m to 9.96m, conglomerate	[Dotted pattern]						From 5.2m to 14.2m, Class 18 PVC Screen	
		From 9.96m, interbedded siltstone								
		SANDSTONE - High strength, slightly weathered, pale grey mottled yellow brown, medium grained sandstone (continued)								
	10.87	From 10.26m, fine grained sandstone		C						
	11	SILTSTONE - High strength, fresh, grey siltstone								
		From 10.92m, fresh								
	12				11.82					
		From 12.33m, sandstone/siltstone								
	12.58	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone								
	13			C						
	14	From 13.76m, interbedded siltstone							Bentonite	
	14.79	Bore discontinued at 14.79m, limit of investigation								
	15									
	16									
	17									
	18									
	19									

DRAFT

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.0m

TYPE OF BORING: Solid flight auger to 4.2m, rockroller blade bit wash boring to 4.44m, HQ3 coring to 14.79m

WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids

REMARKS:

1 - Auger sample	11 - Cone sample	21 - Push probe test (PPT)
2 - Solid sample	12 - Water sample	22 - Push probe test (PPT) (SPT)
3 - Core sample	13 - Water sample (in situ test)	23 - Push probe test (PPT) (SPT) (SPT)
4 - Standard sample	14 - Water sample	24 - Push probe test (PPT) (SPT) (SPT)
5 - Environmental sample	15 - Water test	25 - Push probe test (PPT) (SPT) (SPT)
		26 - Push probe test (PPT) (SPT) (SPT)
		27 - Push probe test (PPT) (SPT) (SPT)
		28 - Push probe test (PPT) (SPT) (SPT)
		29 - Push probe test (PPT) (SPT) (SPT)
		30 - Push probe test (PPT) (SPT) (SPT)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE11W
PROJECT No: 49761
DATE: 4/12/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments		Sealup to (m)	
	0	SANDY SILT - Stiff, brown, fine to coarse grained sandy silt with trace fine sized subrounded gravel, M=1Wp	| | | | |						From 0m to 0.3m, concrete	| |
	2	From 2m, some fine sized subrounded gravel, some coarse grained sandy silt with some fine to medium grained sand	| | | | |						From 0.3m to 3.6m, backfill and cuttings	| |
	4.2	SANDSTONE - Extremely low strength, extremely weathered, yellow brown medium to coarse grained sandstone From 4.44m, fine to coarse grained sandstone	| | | | |						From 3.6m to 5.1m, bentonite	| |
	5.72	At 5.54m to 5.72m, conglomerate band (medium to coarse sized subrounded gravel)	| | | | |							| |
	6	SANDSTONE - High strength, slightly weathered, pale grey mottled yellow brown, medium grained sandstone	| | | | |							| |
	8	From 8.19m, fine to medium grained sandstone, interbedded carbonaceous siltstone / sandstone	| | | | |							| |
	9.51	At 9.51m to 9.73m, pebbly sandstone	| | | | |							| |
	9.74	From 9.74m to 9.86m, thin coal laminations	| | | | |						From 5.1m to 14.2m, 5mm gravel	| |

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.0m

TYPE OF BORING: Solid flight auger to 4.2m, rockroller blade bit wash boring to 4.44m, HQ3 coring to 14.79m

WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids

REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1 - Auger sample	11 - Cone sample	21 -	31 -
2 - Solid sample	12 -	22 -	32 -
3 - Core sample	13 -	23 -	33 -
4 -	14 -	24 -	34 -
5 -	15 -	25 -	35 -
6 -	16 -	26 -	36 -
7 -	17 -	27 -	37 -
8 -	18 -	28 -	38 -
9 -	19 -	29 -	39 -
10 -	20 -	30 -	40 -

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE11W
PROJECT No: 49761
DATE: 4/12/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		At 9.84m to 9.96m, conglomerate							From 5.2m to 14.2m, Class 18 PVC Screen	
		From 9.96m, interbedded siltstone								
		SANDSTONE - High strength, slightly weathered, pale grey mottled yellow brown, medium grained sandstone (continued)								
	10.87	From 10.26m, fine grained sandstone								
	11	SILTSTONE - High strength, fresh, grey siltstone								
		From 10.92m, fresh								
	12									
		From 12.33m, sandstone/siltstone								
	12.58	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone								
	13									
		From 13.76m, interbedded siltstone								
	14								End Cap	
									From 14.2m to 14.76m, bentonite	
	14.76	Bore discontinued at 14.76m, limit of investigation								
	15									
	16									
	17									
	18									
	19									

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.0m

TYPE OF BORING: Solid flight auger to 4.2m, rockroller blade bit wash boring to 4.44m, HQ3 coring to 14.76m

WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids

REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1) Auger sample	11) Cone sampler	21) Water sample	31) Photo cross-section (PCS)
2) Solid sampler	12) Thin section (in situ)	22) Water sample (in situ)	32) Photo cross-section (PCS)
3) Core sampler	13) Liquid sampler (in situ)	23) Water sample (in situ)	33) Photo cross-section (PCS)
4) Standard sampler	14) Water sample	24) Water sample (in situ)	34) Photo cross-section (PCS)
5) Environmental sampler	15) Water test	25) Water sample (in situ)	35) Photo cross-section (PCS)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 2.59 AHD
EASTING: 230020
NORTHING: 6400304
DIP/AZIMUTH: 90°/-

BORE No: AGE12
PROJECT No: 49761.02
DATE: 25 - 29/10/2012
SHEET 1 OF 3

Borehole ID	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction		
				Type	Depth	Sample		Results & Comments	Details	Stickup = 0.33m
AGE12	0.1	SAND - Very loose, brown, fine grained sand with some clay and trace silt, humid	[Dotted pattern]	A	0.1			Water level: ~1.0m	[Well casing diagram]	
	A			0.5						
	1.0	From 1.0m, slightly clayey, damp	[Dotted pattern]	S	1.0		1.1, 1			
	S			1.45		N = 2				
	2.0	CLAYEY SAND/SANDY CLAY - (Loose), brown, fine to medium grained clayey sand/sandy clay, saturated	[Diagonal lines]							
	2.4	SANDY GRAVEL - Loose, brown, fine to medium grained sandy fine to medium sized subangular, subrounded gravel with some clay, saturated	[Dotted pattern]	S	2.5		5.3, 3			
	S			2.9		N = 6				
	2.9	SAND - Loose, brown, fine to medium grained sand, slightly clayey, saturated	[Dotted pattern]	pp	2.95		160kPa			
	pp			2.95						
	3.0	SANDY CLAY - Stiff, brown, fine to medium grained sandy clay, M>Wp	[Diagonal lines]							
	4.0	SAND - Loose, brown, fine to medium grained sand, some to slightly clayey, saturated	[Dotted pattern]	S	4.2		3.5, 4			
	S			4.65		N = 9				
5.65	From 5.65m, medium dense, slightly clayey in parts	[Dotted pattern]	S	5.65		4.7, 5				
S			6.1		N = 12					
6.8	SILTY CLAY - Very soft, dark brown silty clay with trace fine grained sand, M>Wp	[Diagonal lines]	S, pp	7.0		0.0, 0				
S, pp			7.45		0-50kPa					
8.5	CLAYEY SAND - Loose, grey, fine to medium grained clayey sand, wet to saturated	[Diagonal lines]	S, pp	8.65		3.3, 3				
S, pp			9.1		N = 6					
9.5	SANDY GRAVEL - Medium dense, brown, fine to medium grained sand, fine to medium sized subangular, subrounded gravel, slightly clayey, wet	[Dotted pattern]	S	9.5		20-60kPa				
S			9.5							

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 10.6m
TYPE OF BORING: Solid flight auger to 2.5m, wash bore to 12.3m, HQ to 22.72m
WATER OBSERVATIONS: Groundwater measured at 7.0m during drilling
REMARKS: At 17.18m, water loss (500L)

A - Auger sample	S - Soil sample	PP - Pushed sampler (open)	PS - Pushed sampler (closed)
SA - Solid auger	SS - Soil sample (in situ)	SP - Pushed sampler (open)	PS - Pushed sampler (closed)
CA - Core auger	SW - Water sample	SP - Pushed sampler (open)	PS - Pushed sampler (closed)
D - Disturbed sample	W - Water test	SP - Pushed sampler (open)	PS - Pushed sampler (closed)
E - Environmental sample		SP - Pushed sampler (open)	PS - Pushed sampler (closed)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 2.59 AHD
EASTING: 230020
NORTHING: 6400304
DIP/AZIMUTH: 90°/-

BORE No: AGE12
PROJECT No: 49761.02
DATE: 25 - 29/10/2012
SHEET 3 OF 3

Bore No.	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	19.5	CORE LOSS - 0.14m SILTSTONE - Medium strength, slightly weathered to fresh, grey siltstone (continued) From 20.05m, medium to high strength, with some very low to low bands From 20.52m to 20.60m, tuff band		C	20.25					
	20.05			C	20.57					
	21.23			C						
	22.72			C						
	22.72	Bore discontinued at 22.72m, limit of investigation			22.72			End cap		
	23									
	24									
	25									
	26									
	27									
	28									
	29									

DRAFT

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 10.6m
TYPE OF BORING: Solid flight auger to 2.5m, wash bore to 12.3m, HQ to 22.72m
WATER OBSERVATIONS: Groundwater measured at 7.0m during drilling
REMARKS: At 17.18m, water loss (500L)

① - Auger sample	⑪ - Core sample	⑲ - Push down test (PDT) (100g)
② - Auger sample	⑫ - 7.5cm sample (in 100mm dia.)	⑳ - Push down test (PDT) (100g)
③ - Core sample	⑬ - Auger sample	㉑ - Nuclear density test (NDT)
④ - Disturbed sample	⑭ - Water test	㉒ - Shear vane test (SVT)
⑤ - Environmental sample	⑮ - Water test	
		㉓ - Push down test (PDT) (100g)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE13
PROJECT No: 49761
DATE: 4-6/12/12
SHEET 1 OF 5

Borehole ID	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction	
				Type	Depth	Sample		Results & Comments	Details	0.1m
AGE13	0.5	SANDY SILT - Stiff, brown, fine to coarse grained sandy silt, M<Wp	[Pattern]	A	0.5			[Casing Details]	[Well Details]
	1.0								
	1.1	SAND AND SILT - Very stiff, yellow brown slightly fine to medium sized subrounded gravelly fine to coarse grained, trace subrounded cobbles, M<Wp (moist)	[Pattern]	S	1.0		11, 10, 5 N = 15 220 kPa		
	1.4			pp	1.4				
	1.45	SANDY CLAY - Very stiff, dark brown, fine to coarse grained sandy clay with some silt, M>Wp	[Pattern]	A	2.0				
	2.2								
	2.0	From 2.0m, M>Wp							
	2.2	SANDY CLAY - Hard, fine to coarse grained, fine to medium grained sandy clay with interbedded silty clay, M<Wp (residual)	[Pattern]	pp	2.5		>150 kPa 5, 12, 21 N = 33		
	2.7				pp	2.7			
	2.9	SILTSTONE - Extremely low strength, extremely weathered, grey siltstone (soil like properties)	[Pattern]	A	2.95				
	3.5								
	4.0	From 4.14m, carbonaceous siltstone, interbedded fine grained sandstone	[Pattern]	S	4.0		15, 140mm, ref. bouncing		
	4.14				S	4.14			
5.1	CORE LOSS - 0.53m	[Pattern]	C	5.1					
5.63	SILTSTONE - Medium strength, slightly weathered, grey siltstone with interbedded fine to medium grained sandstone At 5.89m, extremely weathered carbonaceous siltstone / coal lense	[Pattern]	C	5.77					
6.1				C	6.1				
8.7	SANDSTONE - High strength, fresh, yellow brown, medium grained sandstone	[Pattern]	C	9.1					
9.1				C	9.1				

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.5m

TYPE OF BORING: Solid flight auger to 4.0m, rock roller blade bit wash boring to 7777, HQ3 coring to 45.21m

WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids

REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
S	Soil Sample	W	Water Sample
pp	Pressure Probe	Wp	Water Pressure
A	Auger	Wt	Water Temperature
C	Core	Wv	Water Velocity
D	Disturbance	Wd	Water Depth
E	Electromagnetic	Wf	Water Flow
F	Flow	Wg	Water Gradient
G	Gravel	Wh	Water Head
H	Hardness	Wi	Water Infiltration
I	Iron	Wj	Water Injection
J	Jet	Wk	Water Key
K	Knife	Wl	Water Level
L	Log	Wm	Water Loss
M	Mud	Wn	Water Noise
N	Nail	Wo	Water Output
O	Oil	Wp	Water Pressure
P	Pipe	Wq	Water Quantity
Q	Quality	Wr	Water Resistance
R	Rail	Ws	Water Sensitivity
S	Sample	Wt	Water Temperature
T	Tool	Wv	Water Velocity
U	Ultrasonic	Ww	Water Volume
V	Valve	Wx	Water Viscosity
W	Well	Wy	Water Yield
X	X-ray	Wz	Water Zone

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE13
PROJECT No: 49761
DATE: 4-6/12/12
SHEET 2 OF 5

RIG	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	11	SANDSTONE - High strength, fresh, yellow brown, medium grained sandstone (continued) From 11.0m, medium to coarse grained		C	11.05					
	12			C	12.12					
	13	From 13.17m, coarse grained								
	14	At 13.59m to 13.61m, conglomerate band		C						
	15				15.15					
	16									
	17									
	18									
	18.14	SILTSTONE - High strength, fresh, dark grey siltstone with interbedded carbonaceous siltstone and thin coal laminations			18.13					
	19									
	19.15	COAL / CARBONACEOUS SILTSTONE - Fresh, dark brown coal / carbonaceous siltstone At 19.49m to 19.62m, siltstone band		C						
									From 0m to 34.5m, backfill/cuttings	

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.5m

TYPE OF BORING: Solid flight auger to 4.0m, rock roller blade bit wash boring to 7777, HQ3 coring to 45.21m

WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids

REMARKS:









SAMPLING & IN SITU TESTING LEGEND			
1 - Auger sample	11 - Cone sample	21 - Rock core sample (RCS)	31 - Rock core sample (RCS)
2 - Solid sample	12 - Cone sample (in situ)	22 - Rock core sample (RCS)	32 - Rock core sample (RCS)
3 - Core sample	13 - Cone sample	23 - Rock core sample (RCS)	33 - Rock core sample (RCS)
4 - Disturbed sample	14 - Water sample	24 - Rock core sample (RCS)	34 - Rock core sample (RCS)
5 - Environmental sample	15 - Water sample	25 - Rock core sample (RCS)	35 - Rock core sample (RCS)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE13
PROJECT No: 49761
DATE: 4-6/12/12
SHEET 3 OF 5

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	20.12	TUFFACEOUS CLAYSTONE - Medium strength, fresh, pale grey tuffaceous claystone							
	20.34								
	21	CARBONACEOUS SILTSTONE / COAL - High strength, fresh, dark brown coal / carbonaceous siltstone At 20.86m to 20.89m, tuffaceous claystone / siltstone At 21.16m to 21.19m, tuffaceous siltstone / claystone		C					
	21.16								
	22	At 22.38m to 22.54m, carbonaceous siltstone / coal		C					
	22.4								
	23	SANDSTONE / SILTSTONE - High strength, fresh, grey to dark grey, fine to medium grained sandstone / siltstone Geom 23.6m to 23.98m, siltstone band							
	24								
	24	At 23.98m to 24.62m, carbonaceous siltstone / coal		C					
	24.17								
	26			C					
	27								
	27								
	27.13								
	28	At 28.10m to 28.55m, carbonaceous siltstone / coal		C					
	29								
	29.89								

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.5m

TYPE OF BORING: Solid flight auger to 4.0m, rock roller blade bit wash boring to 7777, HQ3 coring to 45.21m

WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids

REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1	Auger sample	11	Water sample
2	Rock sample	12	Water test
3	Core sample	13	Water test
4	Disturbed sample	14	Water test
5	Environmental sample	15	Water test
6	Soil sample	16	Water test
7	Soil sample	17	Water test
8	Soil sample	18	Water test
9	Soil sample	19	Water test
10	Soil sample	20	Water test
21	Soil sample	21	Water test
22	Soil sample	22	Water test
23	Soil sample	23	Water test
24	Soil sample	24	Water test
25	Soil sample	25	Water test
26	Soil sample	26	Water test
27	Soil sample	27	Water test
28	Soil sample	28	Water test
29	Soil sample	29	Water test
30	Soil sample	30	Water test
31	Soil sample	31	Water test
32	Soil sample	32	Water test
33	Soil sample	33	Water test
34	Soil sample	34	Water test
35	Soil sample	35	Water test
36	Soil sample	36	Water test
37	Soil sample	37	Water test
38	Soil sample	38	Water test
39	Soil sample	39	Water test
40	Soil sample	40	Water test
41	Soil sample	41	Water test
42	Soil sample	42	Water test
43	Soil sample	43	Water test
44	Soil sample	44	Water test
45	Soil sample	45	Water test
46	Soil sample	46	Water test
47	Soil sample	47	Water test
48	Soil sample	48	Water test
49	Soil sample	49	Water test
50	Soil sample	50	Water test

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE13
PROJECT No: 49761
DATE: 4-6/12/12
SHEET 4 OF 5

Borehole ID	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	30.16	COAL - High strength, fresh, dark brown to black coal with interbedded carbonaceous siltstone (continued)		C						
	31.27	TUFFACEOUS CLAYSTONE - Medium strength, fresh, pale grey tuffaceous claystone								
	31.45	COAL - High strength, fresh, dark brown to black coal with interbedded carbonaceous siltstone		C						
	31.52m to 31.53m	At 31.52m to 31.53m, tuffaceous claystone								
	31.57m to 31.62m	At 31.57m to 31.62m, tuffaceous claystone								
	32.14m to 32.15m	At 32.14m to 32.15m, tuffaceous claystone								
	32.17m to 32.19m	At 32.17m to 32.19m, siderite?								
	32.92	TUFFACEOUS CLAYSTONE - Medium strength, fresh, pale grey, tuffaceous claystone								
	33.2	COAL - Medium to high strength, fresh, dark brown coal with interbedded carbonaceous siltstone		C						
	33.73m to 33.78m	At 33.73m to 33.78m, tuffaceous claystone								
	34.47	TUFFACEOUS SANDSTONE / SILTSTONE - High strength, fresh, pale grey to grey, tuffaceous fine to medium grained sandstone / siltstone		C						
	34.8m	From 34.8m, tuffaceous siltstone / claystone								
	35.0	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone		C						
	36.22	SANDSTONE - High strength, fresh, grey, medium grained sandstone with interbedded siltstone		C						
	37.52m	From 37.52m, coarse grained sandstone with interbedded pebbly sandstone		C						
	38.58	COAL - High strength, fresh, dark brown to black, coal		C						
	39.53m	At 39.53m, tuffaceous siltstone (tuffaceous siltstone -5mm)		C						

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.5m

TYPE OF BORING: Solid flight auger to 4.0m, rock roller blade bit wash boring to 7777, HQ3 coring to 45.21m

WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids

REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1 - Auger sample	11 - Core sample	21 - Push sampler	31 - Push sampler (with 100mm dia.)
2 - Solid sample	12 - Thin section (4 mm dia.)	22 - Push sampler	32 - Push sampler (with 100mm dia.)
3 - Core sample	13 - Auger sample	23 - Push sampler	33 - Push sampler (with 100mm dia.)
4 - Disturbed sample	14 - Water sample	24 - Push sampler	34 - Push sampler (with 100mm dia.)
5 - Environmental sample	15 - Water test	25 - Push sampler	35 - Push sampler (with 100mm dia.)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE13
PROJECT No: 49761
DATE: 4-6/12/12
SHEET 5 OF 5

RI	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		At 39.89m, tuffaceous siltstone - 10mm COAL - High strength, fresh, dark brown to black, coal (continued)								
	41	At 40.9m, tuffaceous siltstone - 5 mm		C					From 37.6m to 43.6m, Class 18 PVC Screen	
		At 41.3m, tuffaceous siltstone - 5mm							From 37.1m to 45.1m, 5mm gravel	
	42.1	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone			42.21					
	44	From 43.95m, interbedded coarse grained sandstone		C					End cap	
	45.21	Bore discontinued at 45.21m, limit of investigation			45.21					
	46									
	47									
	48									
	49									

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.5m

TYPE OF BORING: Solid flight auger to 4.0m, rock roller blade bit wash boring to 7777, HQ3 coring to 45.21m

WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids

REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1 - Auger sample	11 - Cone sample	21 - Push probe test (PPT)	31 - Push probe test (PPT) (SPT)
2 - Solid sample	12 - T-bar sample (4 mm dia.)	22 - Push probe test (PPT) (SPT)	32 - Push probe test (PPT) (SPT)
3 - Core sample	13 - Auger sample	23 - Push probe test (PPT)	33 - Push probe test (PPT)
4 - Standard sample	14 - Water sample	24 - Standard penetration test	34 - Standard penetration test
5 - Environmental sample	15 - Water test	25 - Shear vane (SV)	

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE13W
PROJECT No: 49761
DATE: 4-6/12/12
SHEET 1 OF 2

RIG	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction	
				Type	Depth	Sample		Results & Comments	Details	Stickup
	0.5	SANDY SILT - Stiff, brown, fine to coarse grained sandy silt, M<Wp		A	0.5				
	1.0				1.0				
	1.1	SAND AND SILT - Very stiff, yellow brown slightly fine to medium sized subrounded gravelly fine to coarse grained, trace subrounded cobbles, M<Wp (moist)		S	1.4		11, 10, 5 N = 15 220 kPa		From 0m to 2.5m, grout
	1.4				1.45				
	2.0	SANDY CLAY - Very stiff, dark brown, fine to coarse grained sandy clay with some silt, M>Wp		A	2.0				
	2.2	From 2.0m, M>Wp							
	2.5	SANDY CLAY - Hard, fine to coarse grained, fine to medium grained sandy clay with interbedded silty clay, M<Wp (residual)		S	2.5		>150 kPa 5, 12, 21 N = 33		
	2.7				2.7				
	2.9	SILTSTONE - Extremely low strength, extremely weathered, grey siltstone (soil like properties)		A	2.9				
	3.5				3.5				From 2.5m to 4.05m, bentonite
	4.0	From 4.14m, carbonaceous siltstone, interbedded fine grained sandstone		S	4.0		15, 140mm, ref. bouncing		
	4.14				4.14				
	5.1	CORE LOSS - 0.53m							
	5.63	SILTSTONE - Medium strength, slightly weathered, grey siltstone with interbedded fine to medium grained sandstone							
	5.89	At 5.89m, extremely weathered carbonaceous siltstone / coal lense							
	8.7	SANDSTONE - High strength, fresh, yellow brown, medium grained sandstone							From 4.05m to 14.1m, 25mm gravel From 4.1m to 14.1m, Class 10 PVC Screen

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.5m
TYPE OF BORING: Solid flight auger to 4.0m
WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
S	Soil Sample	W	Water Sample
A	Auger Sample	U	Uplift Sample
C	Core Sample	Y	Yield Sample
D	Disturbed Sample	Z	Zone Sample
E	Emulsion Sample	Q	Quality Sample
F	Flow Sample	R	Rock Sample
G	Grout Sample	S	Soil Sample
H	Hardness Sample	T	Temperature Sample
I	Iron Sample	V	Vibration Sample
J	Jacking Sample	W	Water Sample
K	Key Sample	X	X-ray Sample
L	Lubricant Sample	Y	Yield Sample
M	Mud Sample	Z	Zone Sample
N	Nutrient Sample	AA	Acoustic Sample
O	Oil Sample	AB	Acoustic Backscatter Sample
P	Oil Sample	AC	Acoustic Backscatter Sample
Q	Quality Sample	AD	Acoustic Backscatter Sample
R	Rock Sample	AE	Acoustic Backscatter Sample
S	Soil Sample	AF	Acoustic Backscatter Sample
T	Temperature Sample	AG	Acoustic Backscatter Sample
U	Uplift Sample	AH	Acoustic Backscatter Sample
V	Vibration Sample	AI	Acoustic Backscatter Sample
W	Water Sample	AJ	Acoustic Backscatter Sample
X	X-ray Sample	AK	Acoustic Backscatter Sample
Y	Yield Sample	AL	Acoustic Backscatter Sample
Z	Zone Sample	AM	Acoustic Backscatter Sample

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: AGE13W
PROJECT No: 49761
DATE: 4-6/12/12
SHEET 2 OF 2

RIG	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	11	SANDSTONE - High strength, fresh, yellow brown, medium grained sandstone (continued) From 11.0m, medium to coarse grained								
	12									
	13	From 13.17m, coarse grained At 13.59m to 13.61m, conglomerate band								
	14									
	14.1	Bore discontinued at 14.1m, limit of investigation							End cap	
	15									
	16									
	17									
	18									
	19									

DRAFT

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.5m
TYPE OF BORING: Solid flight auger to 4.0m
WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1) Auger sample	12) Soil sample	20) Field permeability test (PT)	
2) Solid sample	13) Water sample	21) Field vane test (FVT)	
3) Cone sample	14) T-bar sample (in situ test)	22) Field vane test (FVT) (200)	
4) Standard sample	15) Slant sample	23) Field permeability test (FPT)	
5) Environmental sample	16) Water test	24) Shear vane test	
	17) Water test		

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229442
NORTHING: 6406005
DIP/AZIMUTH: 90°/-

BORE No: AGE14
PROJECT No: 49761
DATE: 4/12/2013
SHEET 1 OF 6

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Stackup = 95mm Details
				Type	Depth	Sample			Results & Comments
		SILTY SAND - (Loose), brown, fine grained silty sand, dry	| | | |	A	0.1			
			| | | |	A	0.25			
		From 0.5m to 1.5m, some coarse grained sand and trace fine to medium sized subangular/subrounded gravel	| | | |	A	0.5			
		From 1.0m, dense	| | | |		1.0			
			| | | |	S			10, 15, 20 N = 35	
		At 1.45m, sandstone cobbles	| | | |		1.45			
			| | | |	U _u	1.5			
			| | | |	pp	1.67		>400 kPa	
	1.8	CLAY - (Hard), red/brown clay with some fine grained sand and trace fine sized gravel, M<<Wp	| | | |					
			| | | |		2.5		17, 27/150mm refusal	
			| | | |	S	2.8			
			| | | |		3.0			
			| | | |	D				
	4		| | | |					
			| | | |	D				
	4.8		| | | |	D	4.8			

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 3.25m, HW to 7.5m
TYPE OF BORING: Solid flight auger to 2.5m, HQ to 6.0m, rotary to 8.0m, HQ to 27.01m
WATER OBSERVATIONS: Free groundwater measured at 22.5m during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
A - Auger sample	U _u - Undisturbed	PP - Pressure	PCU - Plasticity
B - Auger sample	U _d - Disturbed	PL - Liquid Limit	PI - Plasticity Index
CU - Cone sampler	U _u - Undisturbed	PL _L - Liquid Limit (LL)	PI _L - Plasticity Index (LI)
D - Disturbed sample	U _d - Disturbed	PL _N - Liquid Limit (LL)	PI _N - Plasticity Index (LI)
DP - Disturbed sample	U _d - Disturbed	PL _N - Liquid Limit (LL)	PI _N - Plasticity Index (LI)
	U _u - Undisturbed	PL _N - Liquid Limit (LL)	PI _N - Plasticity Index (LI)
	U _d - Disturbed	PL _N - Liquid Limit (LL)	PI _N - Plasticity Index (LI)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229442
NORTHING: 6406005
DIP/AZIMUTH: 90°/-

BORE No: AGE14
PROJECT No: 49761
DATE: 4/12/2013
SHEET 2 OF 6

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		GRAVEL - (Medium dense), brown, fine to medium sized subangular/subrounded gravel with trace clay, humid (continued)		D						
	6.0	CLAY - Hard, red/brown clay with trace fine to medium sized gravel, M<<Wp		S	6.0		12.20/25/100mm refusal			
		From 6.5m, some weathered siltstone cobbles up to 30mm in diameter		S	6.4					
				S	6.5		12.20/115mm refusal			
				S	6.77					
	7.6	SILTSTONE - Very low to low strength, highly weathered, brown and grey siltstone		S	7.6		20/90mm refusal bouncing			
				S	7.66					
				S	7.85		8/10mm refusal bouncing			
				S	7.86					
	8.0	SILTSTONE - Extremely low to very low strength, extremely to highly weathered, brown siltstone		S	8.0					
	8.12	CORE LOSS - 0.18m (8.12m to 8.30m)								
	8.3	SILTSTONE - Very low strength, highly weathered, brown siltstone		C						
				C	8.58		PL(A) = 0.05 PL(D) = 0.03			
				C	8.8					
		From 9.09m, slightly weathered		C	8.97		PL(A) = 0.69			
		From 9.3m, medium strength		C	9.34		PL(A) = 0.77			
	9.45	SANDSTONE - Medium strength, slightly weathered, light brown, fine grained sandstone		C						
				C	9.63		PL(A) = 4.41 PL(D) = 0.63			
				C	9.8					

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 3.25m, HW to 7.5m
TYPE OF BORING: Solid flight auger to 2.5m, HQ to 6.0m, rotary to 8.0m, HQ to 27.01m
WATER OBSERVATIONS: Free groundwater measured at 22.5m during drilling
REMARKS:

S	Soil Sample	W	Water Sample	PL(A)	Penetration Test (ASTM D1585)
U	Undisturbed Sample	W1	Water Level	PL(D)	Penetration Test (ASTM D1585)
U1	Undisturbed Sample	W2	Water Level	PL(D)	Penetration Test (ASTM D1585)
U2	Undisturbed Sample	W3	Water Level	PL(D)	Penetration Test (ASTM D1585)
U3	Undisturbed Sample	W4	Water Level	PL(D)	Penetration Test (ASTM D1585)
U4	Undisturbed Sample	W5	Water Level	PL(D)	Penetration Test (ASTM D1585)
U5	Undisturbed Sample	W6	Water Level	PL(D)	Penetration Test (ASTM D1585)
U6	Undisturbed Sample	W7	Water Level	PL(D)	Penetration Test (ASTM D1585)
U7	Undisturbed Sample	W8	Water Level	PL(D)	Penetration Test (ASTM D1585)
U8	Undisturbed Sample	W9	Water Level	PL(D)	Penetration Test (ASTM D1585)
U9	Undisturbed Sample	W10	Water Level	PL(D)	Penetration Test (ASTM D1585)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229442
NORTHING: 6406005
DIP/AZIMUTH: 90°/-

BORE No: AGE14
PROJECT No: 49761
DATE: 4/12/2013
SHEET 3 OF 6

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		SANDSTONE - Medium strength, slightly weathered, light brown, fine grained sandstone (continued) From 10.0m, high strength, fresh								
	10.46	LAMINITE - High strength, fresh stained, grey and light grey, fine grained laminites From 10.77m, fresh								
	11		C							
					11.31		PL(A) = 2.8		11 From 0.0m to 22.0m, grout From -0.541m to 22.7m, Class 18 blank	
	12	From 12.1m, coarse grained mudstone								
	12.3	COAL - Medium strength, fresh, black coal								
	12.68	SILTSTONE - High strength, fresh, dark grey siltstone								
	13	From 13.02m to 13.66m, interbedded with fine grained sandstone bands up to 50mm thick								
			G7001 C		13.3		PL(A) = 2.08 PL(D) = 1.37			
					13.49					
	14	From 14.0m, medium strength, carbonaceous								
					14.11		PL(A) = 0.96			
	14.36	COAL - Medium to high strength, fresh black coal								
					14.53		PL(A) = 0.89			
					14.99					

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 3.25m, HW to 7.5m
TYPE OF BORING: Solid flight auger to 2.5m, HQ to 6.0m, rotary to 8.0m, HQ to 27.01m
WATER OBSERVATIONS: Free groundwater measured at 22.5m during drilling
REMARKS:

1. Auger samples	11. Cone samples	21. Field permeability (DPT)
2. Solid samples	12. Water samples	22. Field vane shear (FVS) (S&S)
3. Core samples	13. Slurry samples (in situ test)	23. Field vane shear (FVS) (S&S)
4. Disturbed samples	14. Water samples	24. Shear vane (S&S)
5. Undisturbed samples	15. Water level	25. Shear vane (S&S)
	16. Water level	
	17. Water level	
	18. Water level	
	19. Water level	
	20. Water level	



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229442
NORTHING: 6406005
DIP/AZIMUTH: 90°/--

BORE No: AGE14
PROJECT No: 49761
DATE: 4/12/2013
SHEET 4 OF 6

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample				Results & Comments
		COAL - Medium to high strength, fresh black coal (continued)	[Solid black bar]		14.99				
		From 15.61m to 15.84m, tuff band	[Solid black bar]		15.4		PL(A) = 1.15		
16			[Solid black bar]						
		From 16.84m to 17.04m, medium strength, tuff band	[Solid black bar]						
17			[Solid black bar]						
	17.6	From 17.55m, very low strength, tuff TUFF - High strength, fresh, light grey tuff	[Solid black bar]						
			[Solid black bar]	C	16.5		PL(A) = 2.53		
			[Solid black bar]		16.95		PL(A) = 0.54		
	18.0	COAL - Very high strength, fresh, black coal	[Solid black bar]		17.99		PL(A) = 3.36		
			[Solid black bar]		18.05				
19	19.05	SILTSTONE - High strength, fresh, grey siltstone with some fine grained sandstone bands up to 50mm thick	[Solid black bar]						
			[Solid black bar]	C	19.3		PL(A) = 2.49		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 3.25m, HW to 7.5m
TYPE OF BORING: Solid flight auger to 2.5m, HQ to 6.0m, rotary to 8.0m, HQ to 27.01m
WATER OBSERVATIONS: Free groundwater measured at 22.5m during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1. Auger samples	11. T-bar samples	21. Field vane shear (FVS)	31. Field cone penetrometer test (FCPT)
2. Solid samples	12. Water samples (in 100ml jar)	22. PL(A)	32. Field vane shear test (FVST) (S&B)
3. Cone samples	13. Slurry samples (in 100ml jar)	23. (U)	33. Field vane shear test (FVST) (S&B)
4. Disturbed samples	14. Water samples	24. Shear vane (SV)	34. Shear vane (SV)
5. Undisturbed samples	15. Water level	25. Shear vane (SV)	

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229442
NORTHING: 6406005
DIP/AZIMUTH: 90°/-

BORE No: AGE14
PROJECT No: 49761
DATE: 4/12/2013
SHEET 6 OF 6

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details
				Type	Depth	Sample	Results & Comments		
	25.67	COAL - Medium strength, fresh, black coal (continued)			25.45		PL(A) = 1.68		
	26	SANDSTONE - High strength, fresh, grey, coarse grained sandstone		C					
					26.25				
				GT004	26.4		PL(A) = 1.71 PL(D) = 1.78		
					26.49				
					26.79		PL(A) = 0.08		
	27.01	Bore discontinued at 27.01m , limit of investigation			27.01			End cap	

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 3.25m, HW to 7.5m
TYPE OF BORING: Solid flight auger to 2.5m, HQ to 6.0m, rotary to 8.0m, HQ to 27.01m
WATER OBSERVATIONS: Free groundwater measured at 22.5m during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
1. Auger sample	11. Cone sample	21. Push down test (PDT)	31. Push down test (PDT) (100%)
2. Solid sample	12. Water sample	22. Push down test (PDT) (50%)	32. Push down test (PDT) (25%)
3. Core sample	13. Slurry sample	23. Slurry sample (SS)	33. Slurry sample (SS) (100%)
4. Standard sample	14. Water level	24. Standard penetration test	34. Standard penetration test
5. Environmental sample	15. Water level	25. Shear vane (SV)	35. Shear vane (SV)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229851
NORTHING: 6405267
DIP/AZIMUTH: 90°/-

BORE No: AGE15
PROJECT No: 49761
DATE: 3/12/2013
SHEET 1 OF 7

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Stockup = 0.500m Details
				Type	Depth	Sample	Results & Comments		
		SANDY SILT - (Loose), brown, fine grained sandy silt, dry to humid	|||||	A	0.1				
				A	0.25				
				A	0.5				
1	1.0	CLAY - Hard (dry), red/brown clay with some fine grained sand and some silt, M<<Wp	/ / / / /	S	1.0		13,23/150 refusal		
					1.3				
				U ₁₅	1.5				
				PP	1.65		>400 kPa		
2									
		From 2.5m, trace fine sized gravel		S	2.5		21,28/150 refusal		
					2.8				
				U ₁₅	3.0				
3				PP	3.11		>400 kPa		
				S	4.0		13, 18, 19 N = 37		
4					4.45				

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 7.2m
TYPE OF BORING: Solid flight auger to 7.0m, rotary to 7.8m, HQ to 30.34m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: 20% water loss at 11.24m, 100% water loss at 11.94m

SAMPLING & IN SITU TESTING LEGEND			
A - Auger sample	U ₁₅ - 15 min U ₁₅ test	PP - Pressure plate test (kPa)	U ₁₅ - 15 min U ₁₅ test
B - Bulk sample	T - Triaxial test	PS (A) - Pressure sensitive test (kPa)	PS (B) - Pressure sensitive test (kPa)
CB - Cone beam	W - Water content	PS (C) - Pressure sensitive test (kPa)	PS (D) - Pressure sensitive test (kPa)
C - Core sample	Y - Water yield	PS (E) - Pressure sensitive test (kPa)	PS (F) - Pressure sensitive test (kPa)
D - Disturbed sample	Z - Water level	PS (G) - Pressure sensitive test (kPa)	PS (H) - Pressure sensitive test (kPa)
E - Undisturbed sample		PS (I) - Pressure sensitive test (kPa)	PS (J) - Pressure sensitive test (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229851
NORTHING: 6405267
DIP/AZIMUTH: 90°/-

BORE No: AGE15
PROJECT No: 49761
DATE: 3/12/2013
SHEET 2 OF 7

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		CLAY - Hard (dry), red/brown clay with some fine grained sand and some silt, M<<Wp (continued)								
		From 5.5m, grading to rock								
6				B	5.5		15,25/120mm refusal			
					5.77					
								From 0.0m to 12.6m, grout		
									From -0.503m to 13.9m, Class 18 blank	
7		SANDSTONE - Low strength, highly weathered, brown fine grained sandstone with some fine sized gravel bands		S	7.0		15,24,25/130 refusal			
						7.43				
		CORE LOSS - 0.45m (7.80m to 8.25m)			7.8					
		SANDSTONE - Extremely low to very low strength, extremely to highly weathered, brown, fine to medium grained sandstone		C	8.43		PL(A) = 0.02			
						8.85		PL(A) = 0.24		
					8.93		PL(D) = 0.15			
9		From 9.04m, extremely weathered		C						
		CORE LOSS - 0.29m (9.1m to 9.39m)								
		WEATHERED COAL - Extremely low strength, extremely weathered, friable, dark brown coal			9.42		PL(A) = 0.01			
						9.45				
		SILTSTONE - Medium strength, moderately weathered, brown siltstone		C	9.72		PL(A) = 1.05			
		From 9.47m, weathered coal								
		CORE LOSS - 0.17m (9.48m to 9.65m)								

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 7.2m
TYPE OF BORING: Solid flight auger to 7.0m, rotary to 7.8m, HQ to 30.34m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: 20% water loss at 11.24m, 100% water loss at 11.94m

SAMPLING & IN SITU TESTING LEGEND

B	Auger sample	11	Soil sample	17C	Field vane shear test (FVT)
BH	Soil sample	12	Water sample	17D	Field vane shear test (FVT) (S&M)
CB	Core sample	13	Water sample (in situ)	18	Field vane shear test (FVT) (S&M)
C	Soil sample	14	Water sample	19	Field vane shear test (FVT) (S&M)
D	Soil sample	15	Water test	20	Field vane shear test (FVT) (S&M)
E	Soil sample	16	Water test	21	Field vane shear test (FVT) (S&M)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229851
NORTHING: 6405267
DIP/AZIMUTH: 90°/-

BORE No: AGE15
PROJECT No: 49761
DATE: 3/12/2013
SHEET 3 OF 7

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
	10.4	SILTSTONE - High strength, moderately weathered, brown siltstone (continued)	| | | | |		10.15		PL(A) = 0.8		
	11	SANDSTONE - Medium strength, moderately weathered, brown, fine to medium grained sandstone	| | | | |		10.9		PL(A) = 0.95		
		From 11.25m, slightly weathered		C	11.5		PL(A) = 0.53		
	12				12.0				
		From 12.2m, moderately weathered			12.82		PL(A) = 1.02		
	13	From 12.72m, slightly weathered			12.82				From 12.6m to 13.3m, bentonite
		From 12.97m, coarse grained		C	13.67		PL(A) = 0.76 PL(D) = 0.59		
	14				14.03				
	14.05	From 13.99m, highly weathered			14.28		PL(A) = 0.04		
		WEATHERED COAL - Extremely low strength, extremely weathered, friable, dark brown and red weathered coal	[Solid Black Box]		14.28				
		From 14.2m, very low strength		C					
	15.0	From 14.85m, extremely low strength			15.0				

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 7.2m
TYPE OF BORING: Solid flight auger to 7.0m, rotary to 7.8m, HQ to 30.34m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: 20% water loss at 11.24m, 100% water loss at 11.94m

1. Auger sample	11. Cone sample (in situ)	21. Field vane shear test (FVT)
2. Solid sample	12. Water sample	22. PL(A) Field test (see 10.15)
3. Core sample	13. Water sample (in situ)	23. PL(D) Field test (see 10.15)
4. Disturbed sample	14. Slant sample	24. Field vane shear test (FVT)
5. Undisturbed sample	15. Water sample	25. Shear vane (SV)
	16. Water test	

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229851
NORTHING: 6405267
DIP/AZIMUTH: 90°/-

BORE No: AGE15
PROJECT No: 49761
DATE: 3/12/2013
SHEET 4 OF 7

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	15.13	CORE LOSS - 0.13m (15.0m to 15.13m)	X		15.0					
		SANDSTONE - Medium strength, moderately to slightly weathered, brown and grey, fine to medium grained sandstone From 15.27m, high strength			15.28		PL(A) = 1.24			
	16	From 16.0m, some very low strength bands up to 20mm thick		C	16.55		PL(A) = 1.83			
					16.86		PL(A) = 1.9			
	17	From 17.21m, very high strength, fresh, light grey, (possibly heat affected)			17.95		PL(A) = 3.18			
	18				18.0					
				C	18.6		PL(A) = 5.38 PL(D) = 3.81			
	19				19.08		PL(A) = 1.93 PL(D) = 1.96			
	19.2	MUDSTONE - Medium strength, fresh stained, brown mudstone	▨		19.48		PL(A) = 0.96			
				C	19.7					

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 7.2m
TYPE OF BORING: Solid flight auger to 7.0m, rotary to 7.8m, HQ to 30.34m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: 20% water loss at 11.24m, 100% water loss at 11.94m

1. Auger samples	11. Water samples	21. Field permeability (PFA)
2. Solid samples	12. Water samples (in core etc.)	22. Field vane shear (FVS)
3. Core samples	13. Slurries	23. Field permeability (FPA)
4. Disturbed samples	14. Water level	24. Shear vane (SV)
5. Undisturbed samples	15. Water level	
	16. Cone samples	
	17. Water level	
	18. Slurries	
	19. Slurries	
	20. Field permeability (FPA)	

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229851
NORTHING: 6405267
DIP/AZIMUTH: 90°/-

BORE No: AGE15
PROJECT No: 49761
DATE: 3/12/2013
SHEET 5 OF 7

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
		MUDSTONE - Medium strength, fresh stained, brown mudstone (continued) From 20.0m, high strength	[Pattern]						
		From 20.38m to 20.6m, fine to medium grained sandstone band		C					
	21				20.08		PL(A) = 1.72		
					20.38		PL(A) = 1.95 PL(D) = 1.12		
					20.81		PL(A) = 1.32		
					20.99				
	21.14	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone with some mudstone from 21.57m to 22.72m			21.44		PL(A) = 1.9 PL(D) = 1.09		
	22			C				From 13.3m to 30.34m, gravel	
					22.12		PL(A) = 1.99	From 13.9m to 30.34m, Class 18 machine slotted	
	23	From 22.8m, very high strength			23.23		PL(A) = 4.23 PL(D) = 3.23		
	24				24.02				
				C	24.18		PL(D) = 14.16		
	24.74	MUDSTONE - High strength, fresh, dark grey mudstone	[Pattern]						

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 7.2m
TYPE OF BORING: Solid flight auger to 7.0m, rotary to 7.8m, HQ to 30.34m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: 20% water loss at 11.24m, 100% water loss at 11.94m

1. Auger samples	11. Cone samples	21. Field vane shear (FVS)
2. Solid samples	12. Triaxial samples	22. Field vane shear (FVS)
3. Core samples	13. Triaxial samples (in situ)	23. Field vane shear (FVS)
4. Disturbed samples	14. Field vane	24. Shear vane (SV)
5. Undisturbed samples	15. Water samples	25. Shear vane (SV)
	16. Water level	
	17. Water level	

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229851
NORTHING: 6405267
DIP/AZIMUTH: 90°/-

BORE No: AGE15
PROJECT No: 49761
DATE: 3/12/2013
SHEET 6 OF 7

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		MUDSTONE - High strength, fresh, dark grey mudstone (continued)								
	25.44	SILTSTONE - Very high strength, fresh, light grey siltstone								
	26			C	26.0		PL(A) = 3.12		26	
		From 26.45m to 26.55m, high strength tuff From 26.55m, grey			26.51		PL(A) = 1.25			
					26.83		PL(A) = 1.57 PL(D) = 1.08			
	27				26.97				27	
		From 27.32m, very high strength with some interbedded sandstone laminations up to 30mm thick								
	28				27.95		PL(A) = 3.2		28	
				C						
	28.65	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone								
	29				28.9		PL(A) = 1.47		29	
	29.66	MUDSTONE - High strength, fresh, grey mudstone								
					29.95		PL(A) = 1.18			

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 7.2m
TYPE OF BORING: Solid flight auger to 7.0m, rotary to 7.8m, HQ to 30.34m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: 20% water loss at 11.24m, 100% water loss at 11.94m

1. Auger sample	11. Core sample (in situ)	21. Field vane shear test (FVT)
2. Solid sample	12. Water sample	22. Field vane shear test (FVT) (dry)
3. Core sample	13. Water sample (in situ)	23. Field vane shear test (FVT) (dry) (in situ)
4. Disturbed sample	14. Water sample	24. Standard penetration test (SPT)
5. Undisturbed sample	15. Water test	25. Shear vane (SV)
	16. Water test	
	17. Water test	

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229851
NORTHING: 6405267
DIP/AZIMUTH: 90°/-

BORE No: AGE15
PROJECT No: 49761
DATE: 3/12/2013
SHEET 7 OF 7

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details
				Type	Depth	Sample	Results & Comments		
		MUDSTONE - High strength, fresh, grey mudstone (continued)	[Vertical line pattern]	C	29.99 29.99		PL(D) = 1.14		[Vertical line pattern]
	30.34	Bore discontinued at 30.34m , limit of investigation			30.34			End cap	[End cap symbol]
	31								
	32								
	33								
	34								

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 7.2m
TYPE OF BORING: Solid flight auger to 7.0m, rotary to 7.8m, HQ to 30.34m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: 20% water loss at 11.24m, 100% water loss at 11.94m

SAMPLING & IN SITU TESTING LEGEND			
B - Auger sample	H - Core sample	PL - Plasticity limit (PI)	PL(D) - Plasticity limit (PI) (D)
BS - Solid sample	HS - Core sample (see BS)	PL(L) - Plasticity limit (PI) (L)	PL(D)(L) - Plasticity limit (PI) (L) (D)
CS - Cone sample	WS - Water sample	SI - Shear vane (SV)	SI(D) - Shear vane (SV) (D)
DS - Dilatant sample	W - Water test	SI - Shear vane (SV)	SI(D) - Shear vane (SV) (D)
ES - Emulsion sample	W - Water test	SI - Shear vane (SV)	SI(D) - Shear vane (SV) (D)



Bylong: Drillhole Summary

MG094_565

Hole Number: BY0001CH Hole Type: Part Open/Core Drilling

Easting : 233576.58

Date: 10/05/2011 Tenement: AUTH287

Northing : 6409320.64

Total Depth: 200.44 m

Area : Bylong Station

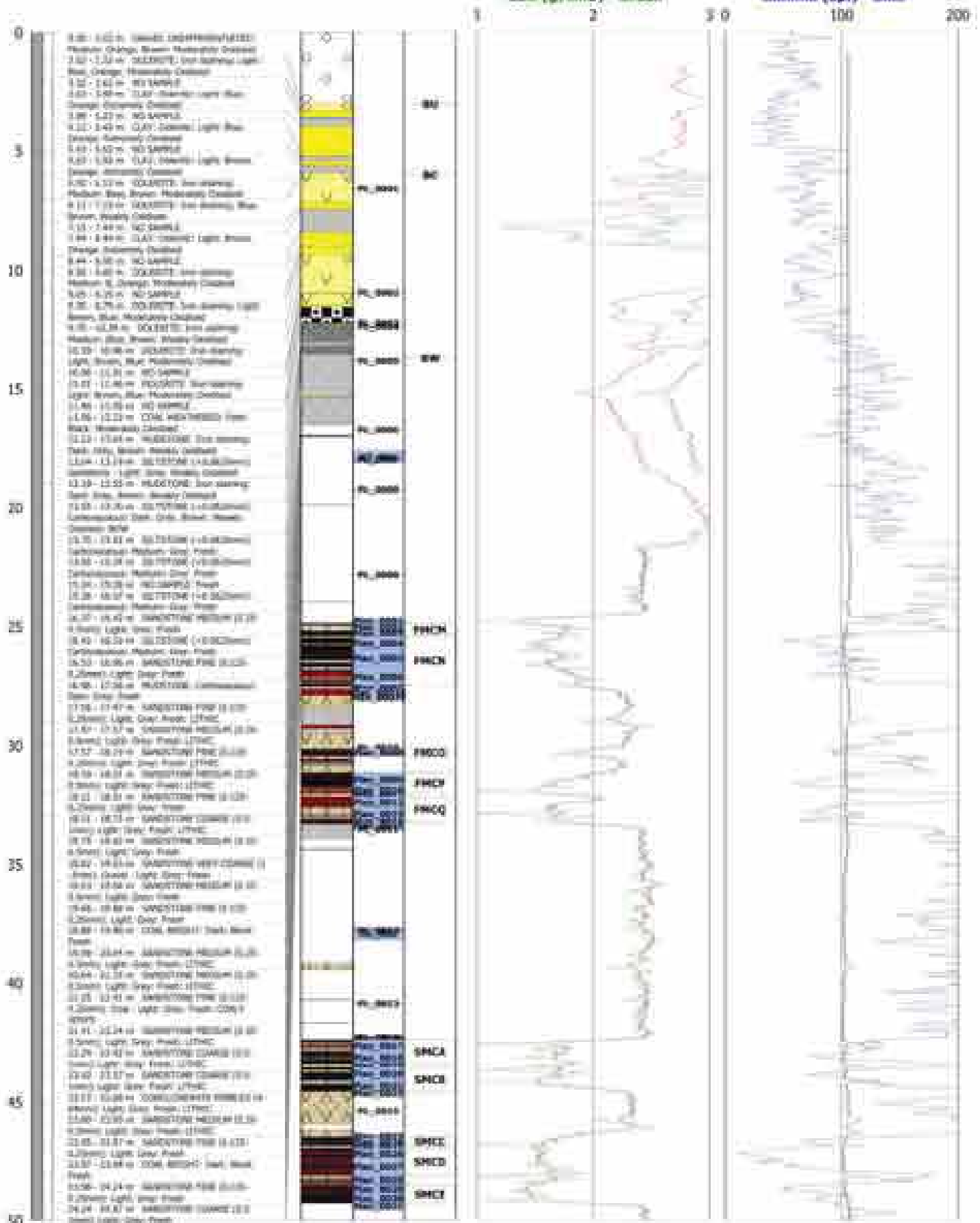
Height : 375.40

LSD (g/cm3) - Red

SSD (g/cm3) - Green

Caliper (mm) - Maroon

Gamma (api) - Blue





Bylong: Drillhole Summary

MG494_565

Hole Number: BY0001CH Hole Type: Part Open/Core Drilling

Easting : 233576.58

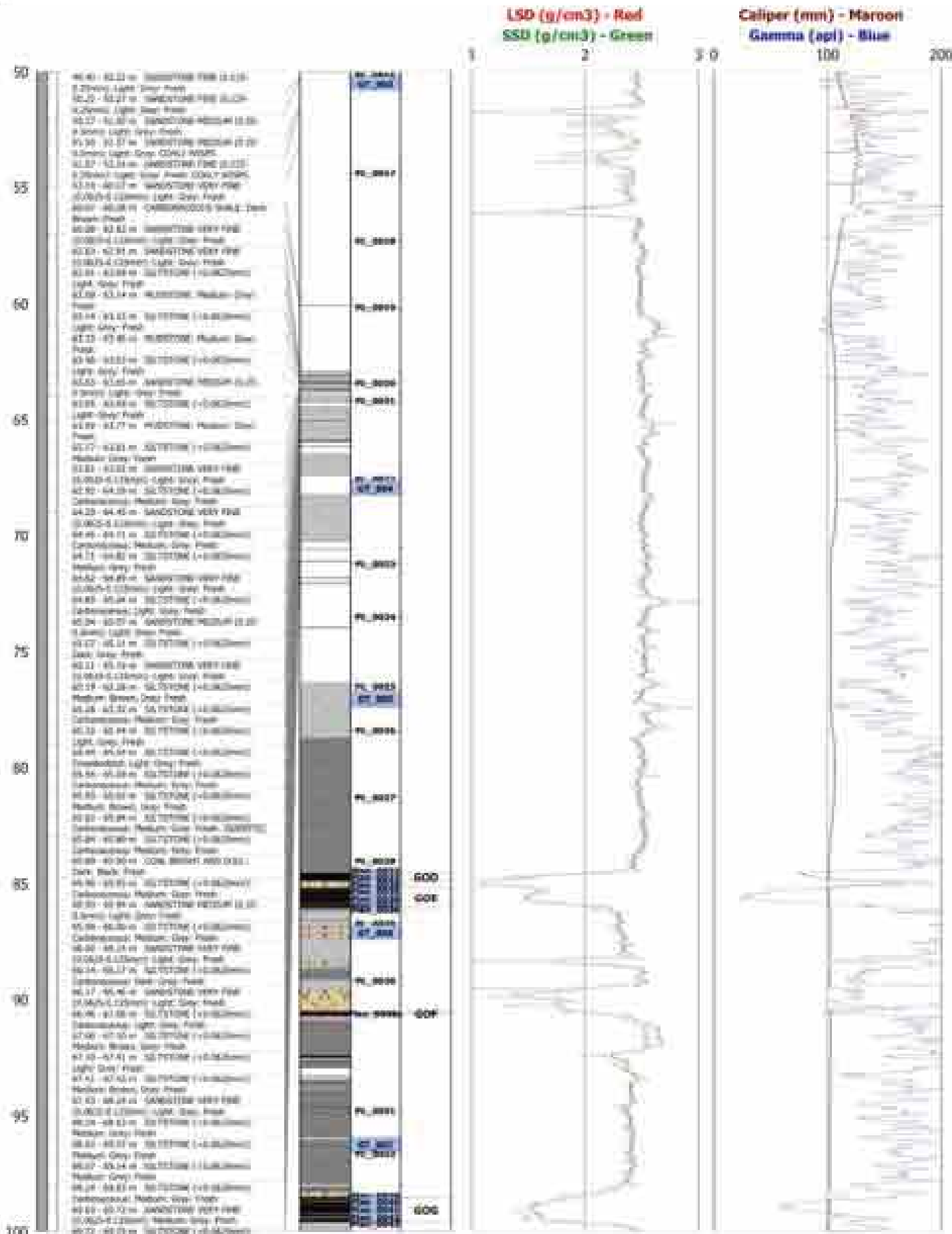
Date: 10/05/2011 Tenement: AUTH287

Northing : 6409320.64

Total Depth: 200.44 m

Area : Bylong Station

Height : 375.40





Bylong: Drillhole Summary

MG94_565

Hole Number: BY0001CH Hole Type: Part Open/Core Drilling

Easting : 233576.58

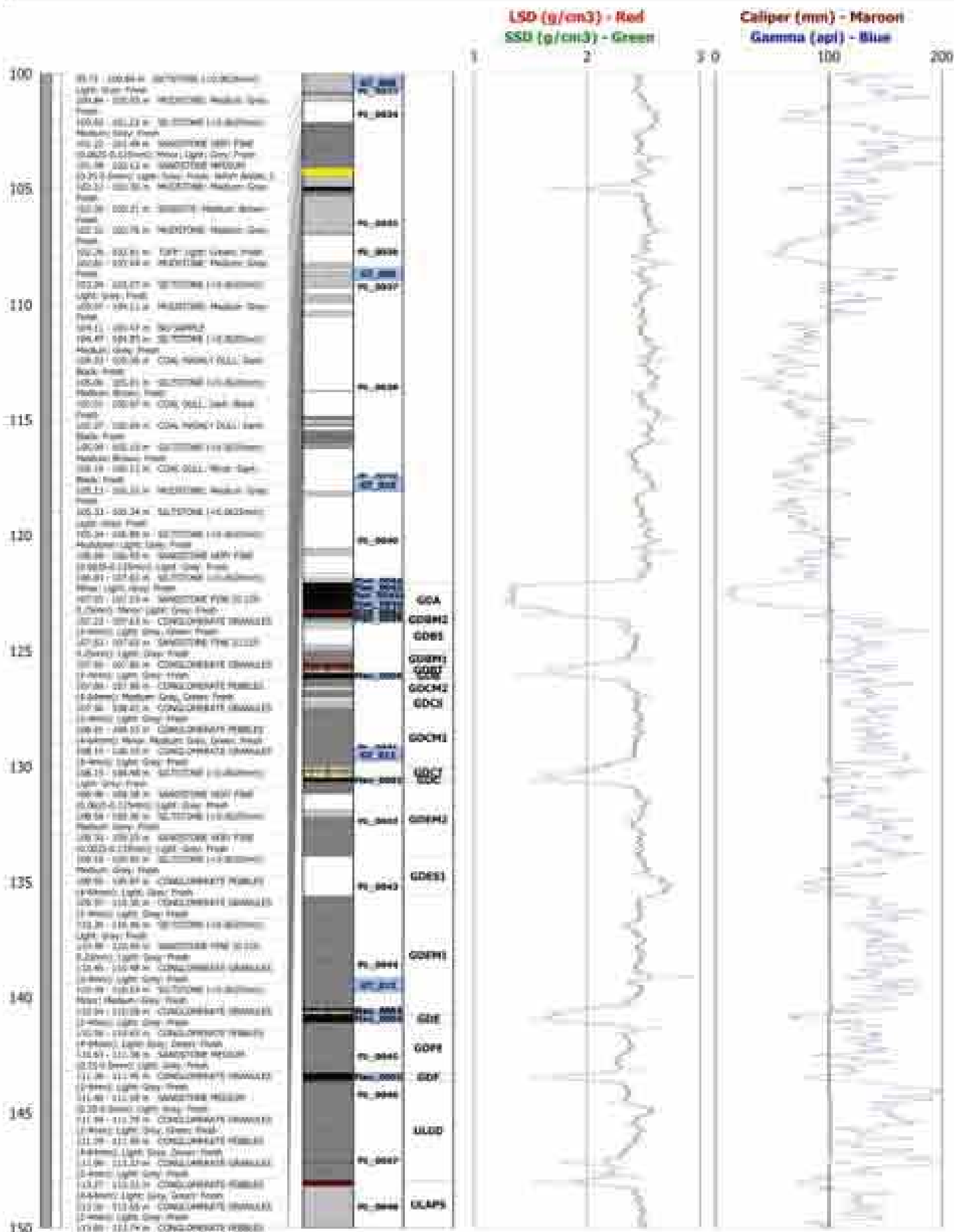
Date: 10/05/2011 Tenement: AUTH287

Northing : 6409320.64

Total Depth: 200.44 m

Area : Bylong Station

Height : 375.40





Bylong: Drillhole Summary

MG94_565

Hole Number: BY0001CH Hole Type: Part Open/Core Drilling

Easting : 233576.58

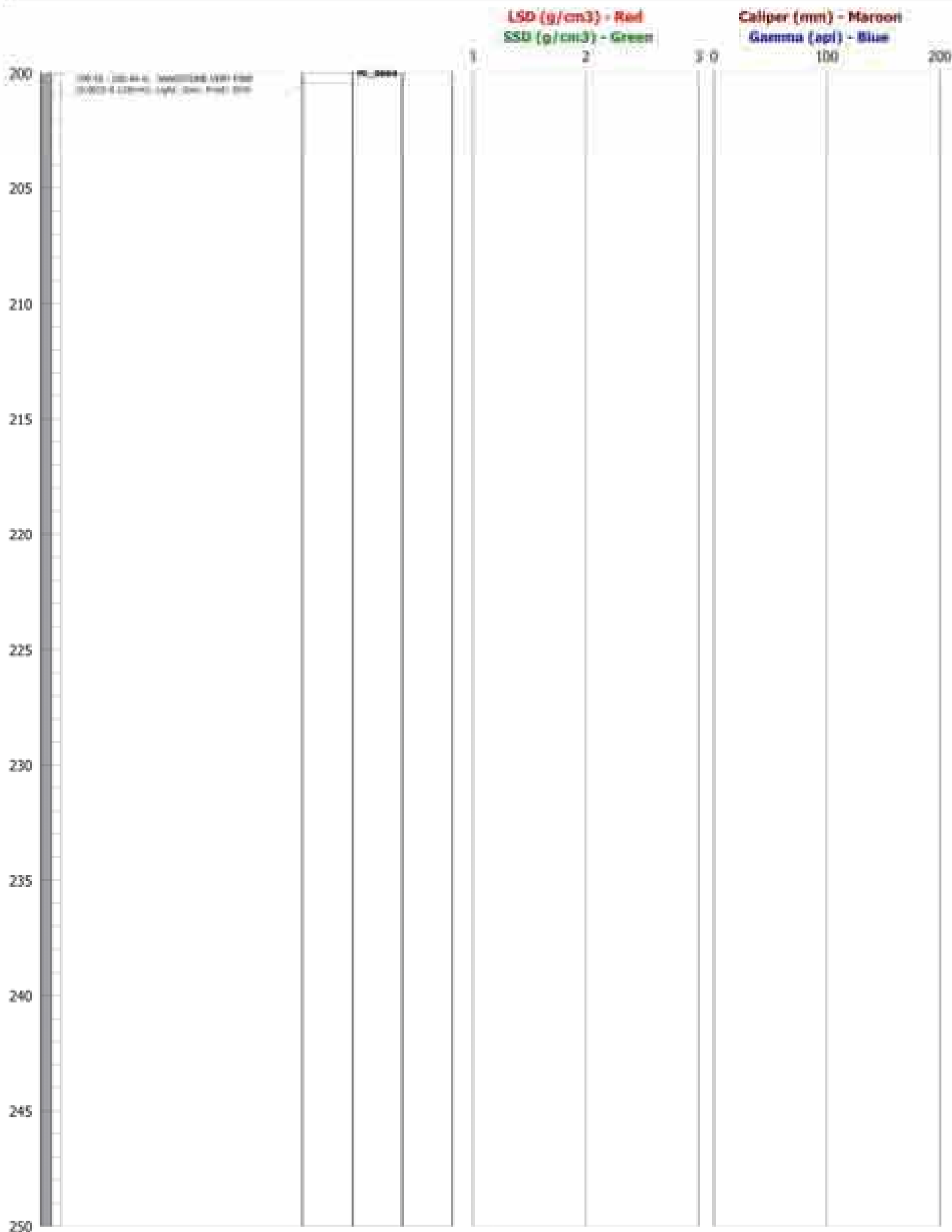
Date: 10/05/2011 Tenement: AUTH287

Northing : 6409320.64

Total Depth: 200.44 m

Area : Bylong Station

Height : 375.40





Bylong: Drillhole Summary

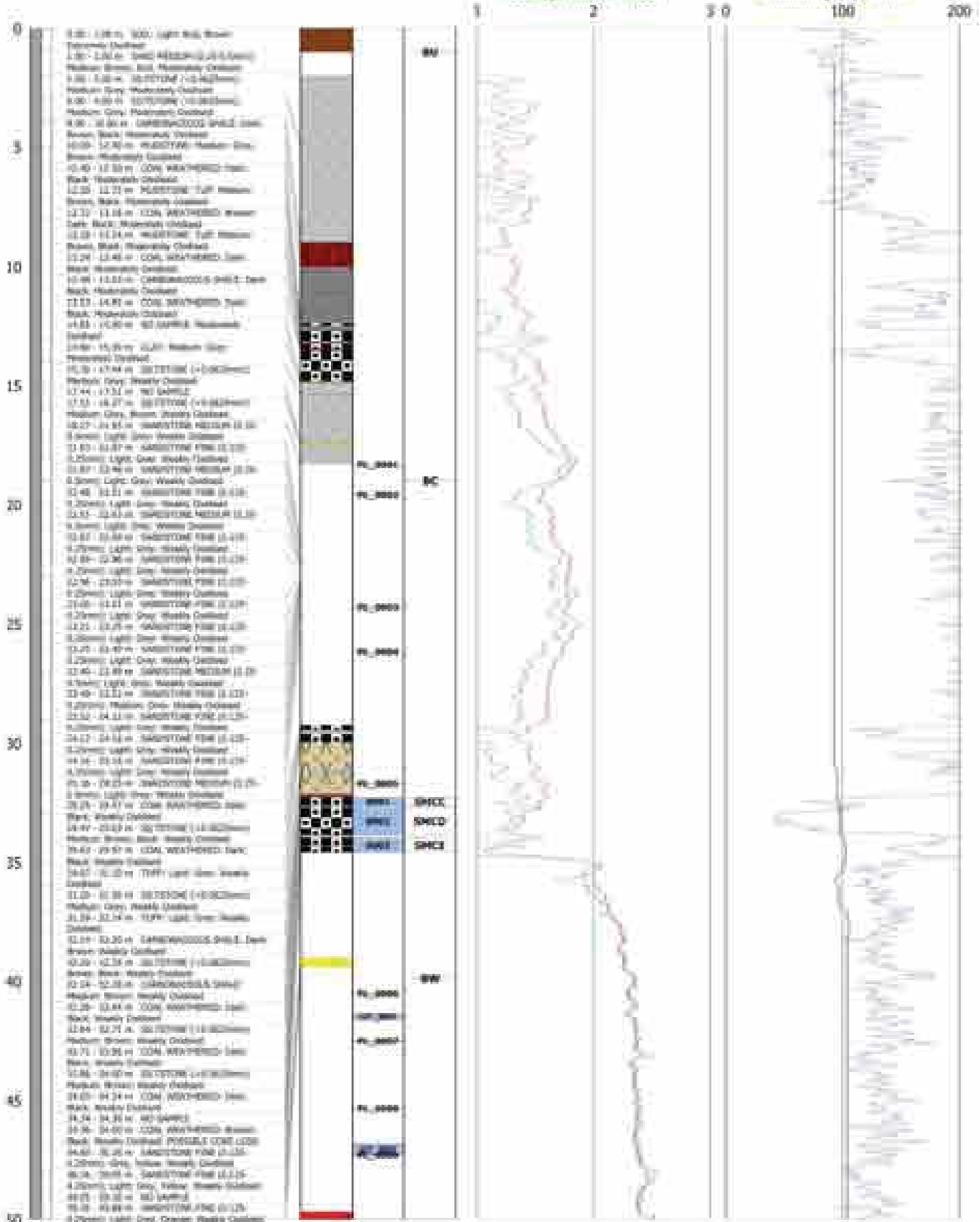
MG494_565

Hole Number: BY0007CH Hole Type: Part Open/Core Drilling
 Date: 6/06/2011 Tenement: AUTH287
 Total Depth: 186.64 m Area: Bylong Station

Easting: 230443.17
 Northing: 6410217.64
 Height: 368.69

LSD (g/cm3) - Red
 SSD (g/cm3) - Green

Caliper (mm) - Maroon
 Gamma (api) - Blue





Bylong: Drillhole Summary

MG94_565

Hole Number: BY0007CH Hole Type: Part Open/Core Drilling

Easting : 230443.17

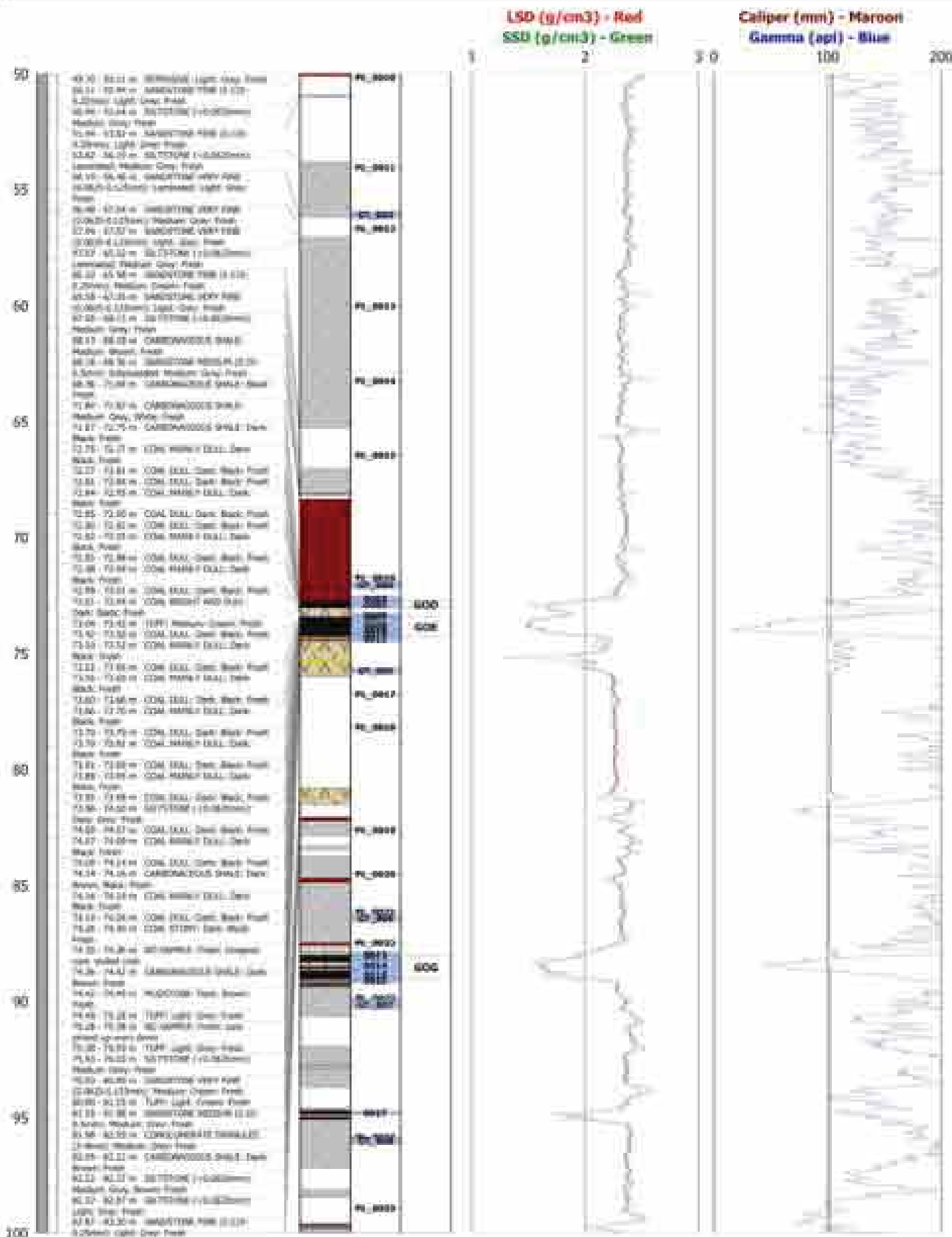
Date: 6/06/2011 Tenement: AUTH287

Northing : 6410217.64

Total Depth: 186.64 m

Area : Bylong Station

Height : 368.69





Bylong: Drillhole Summary

MG494_565

Hole Number: BY0007CH Hole Type: Part Open/Core Drilling

Easting : 230443.17

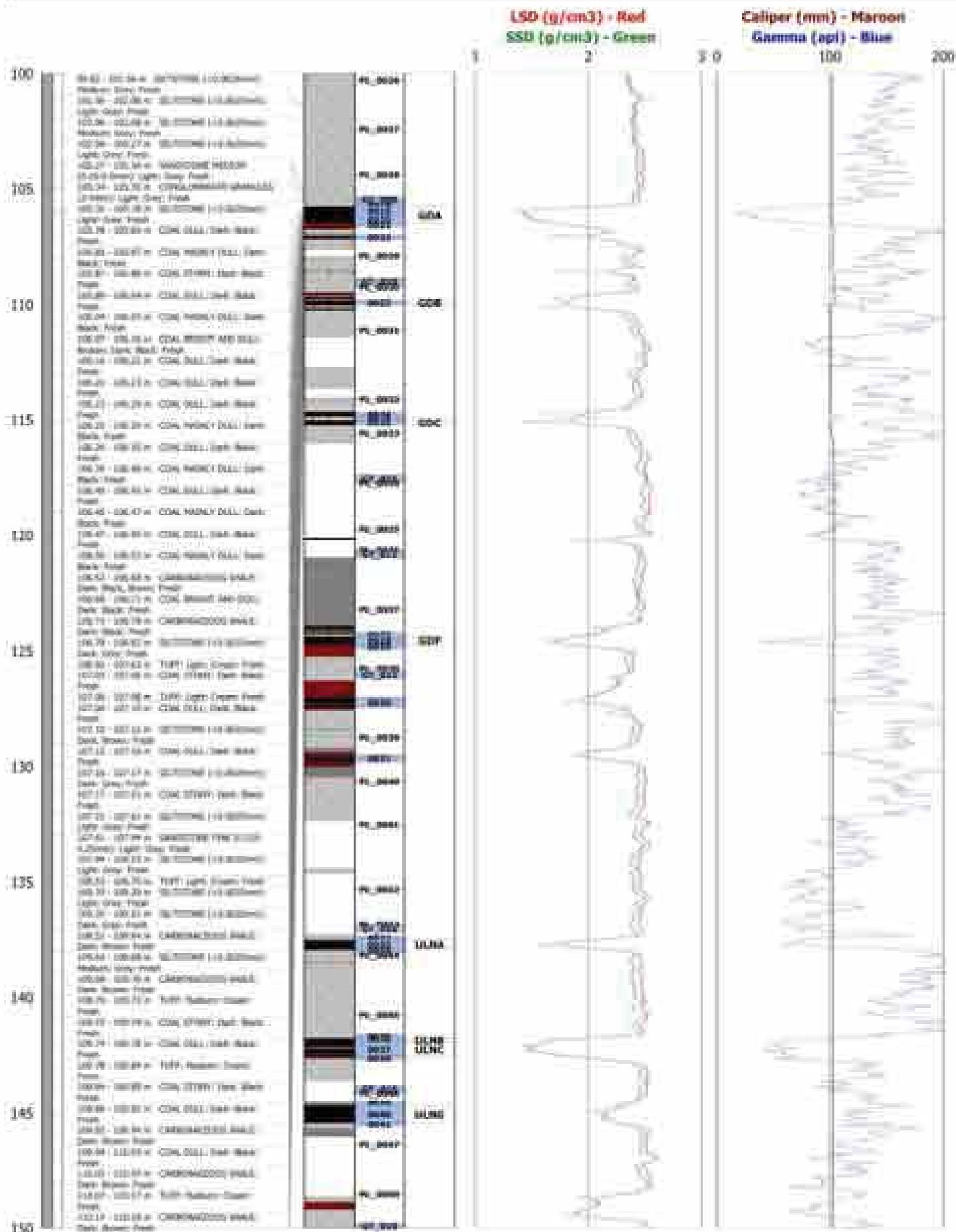
Date: 6/06/2011 Tenement: AUTH287

Northing : 6410217.64

Total Depth: 186.64 m

Area : Bylong Station

Height : 368.69





Bylong: Drillhole Summary

MG094_565

Hole Number: BY0007CH Hole Type: Part Open/Core Drilling

Easting : 230443.17

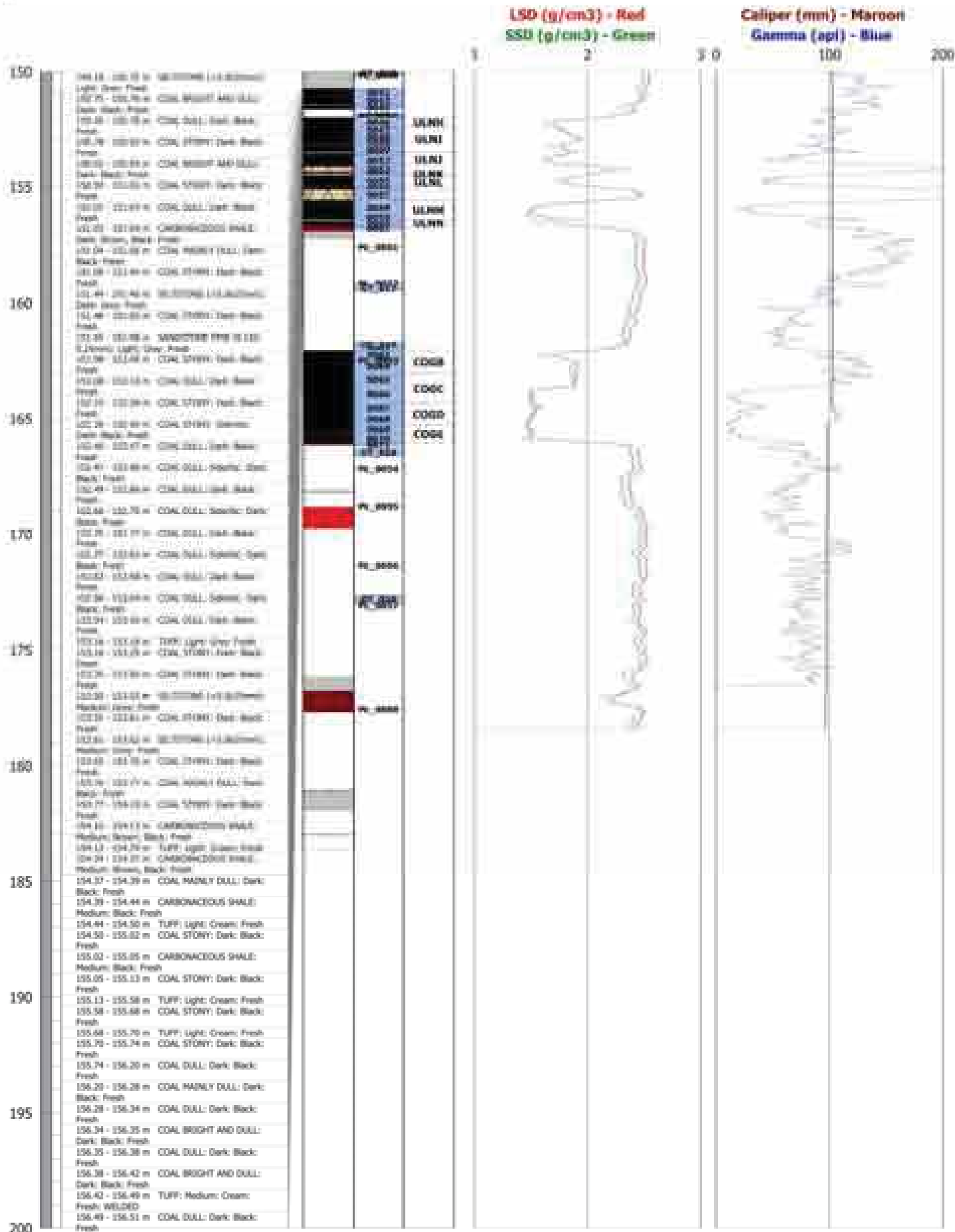
Date: 6/06/2011 Tenement: AUTH287

Northing : 6410217.64

Total Depth: 186.64 m

Area : Bylong Station

Height : 368.69





Bylong: Drillhole Summary

MGAS4_565

Hole Number: BY0007CH Hole Type: Part Open/Core Drilling

Easting : 230443.17

Date : 6/06/2011

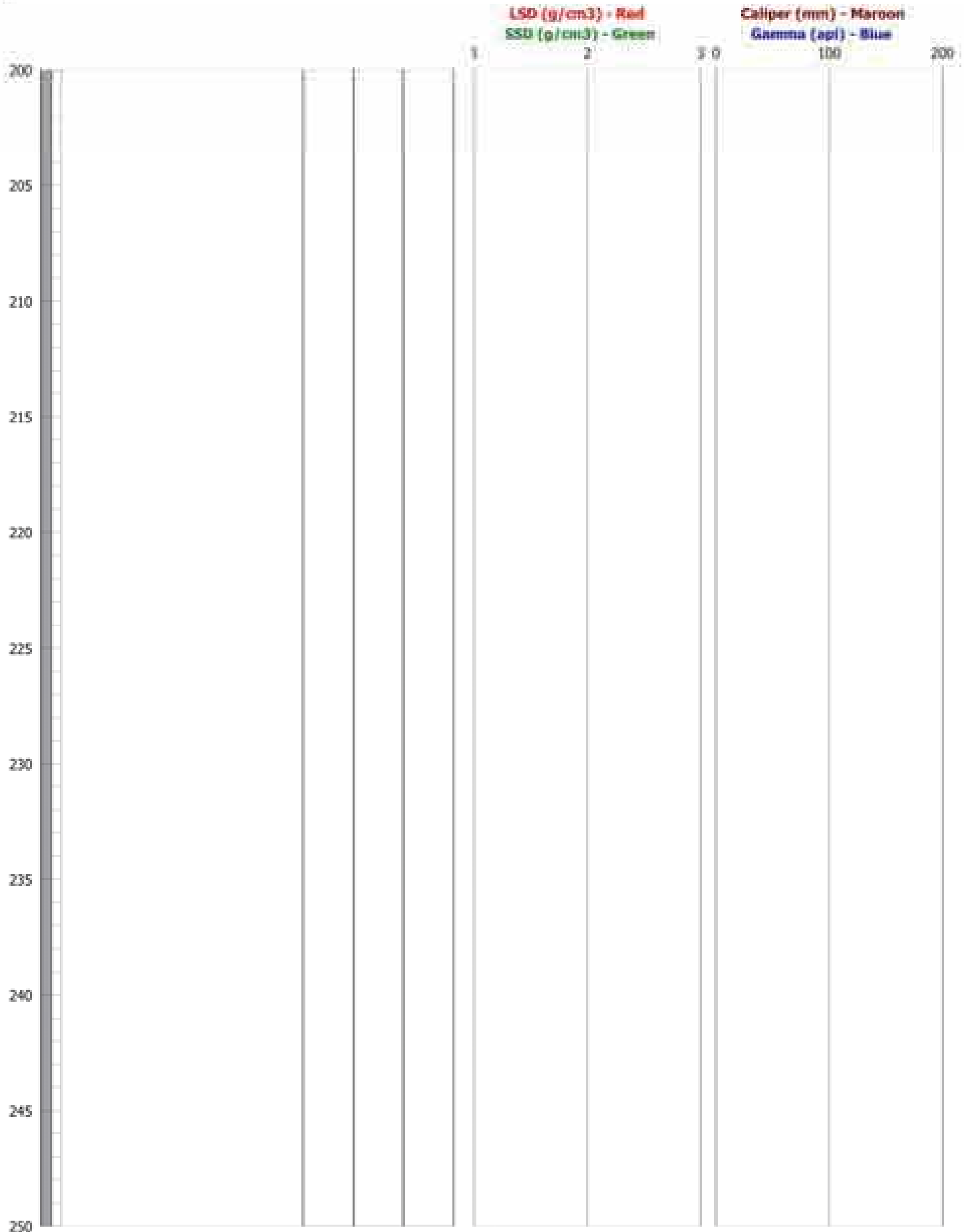
Tenement : AUTH287

Northing : 6410217.64

Total Depth : 186.64 m

Area : Bylong Station

Height : 368.69





Bylong: Drillhole Summary

Hole Number: BY0010CH Hole Type: Core Drilling

Date: 22/06/2011 Tenement: AUTH287

Total Depth: 147.52 m

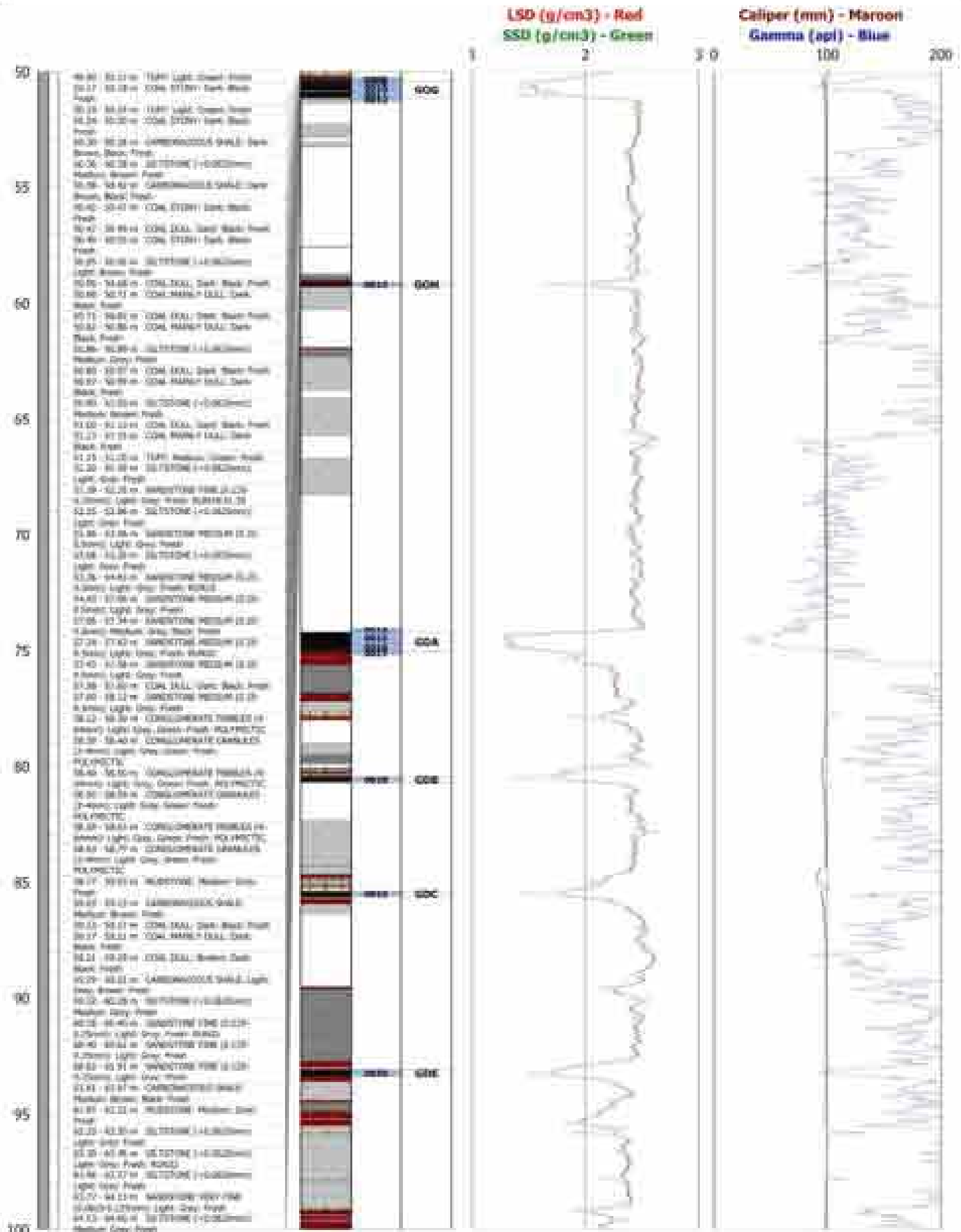
Area: Bylong Station

MG494_565

Easting: 231893.30

Northing: 6412109.84

Height: 301.35





Bylong: Drillhole Summary

MG494_565

Hole Number: BY0010CH Hole Type: Core Drilling

Easting : 231893.30

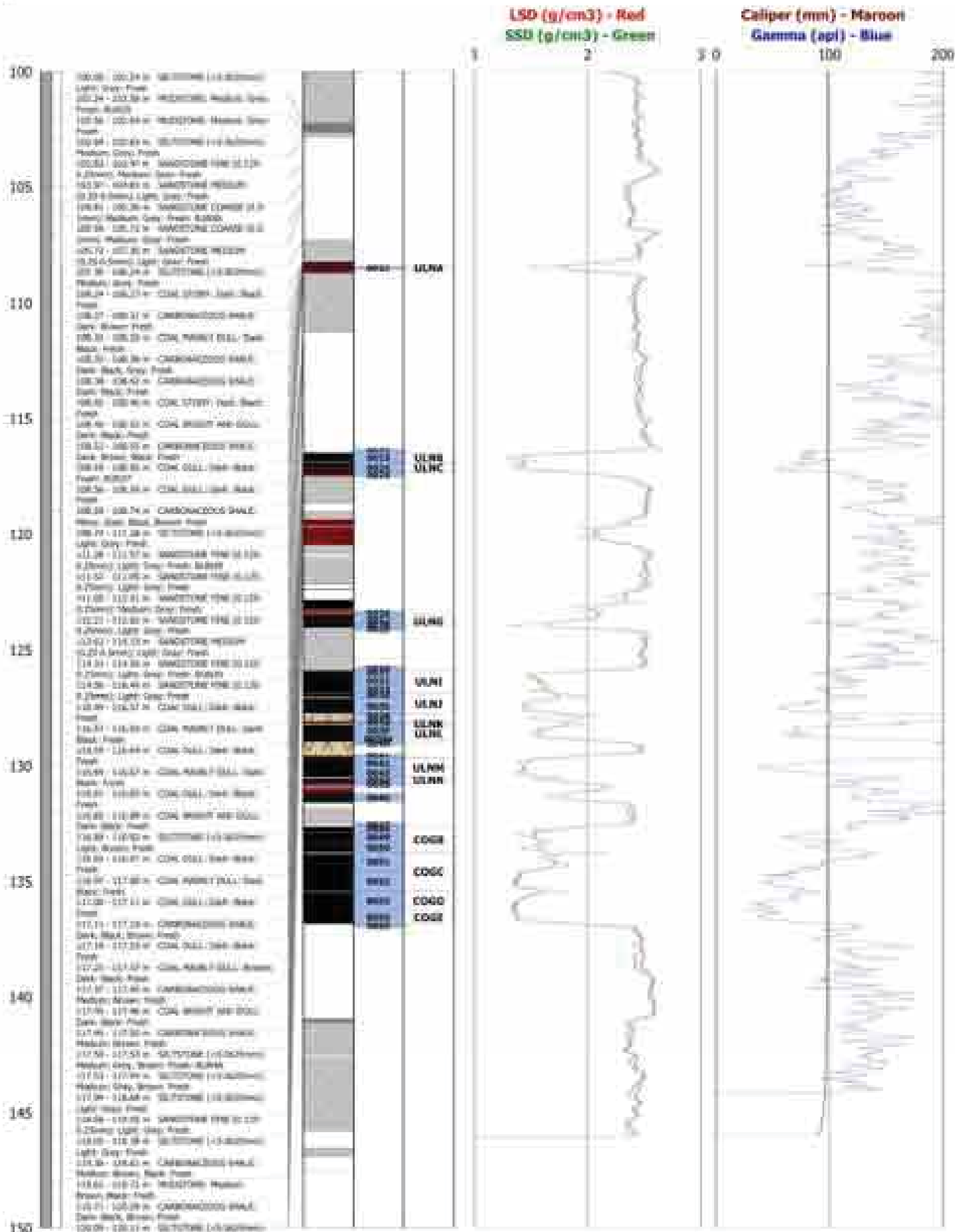
Date: 22/06/2011 Tenement: AUTH287

Northing : 6412109.84

Total Depth: 147.52 m

Area : Bylong Station

Height : 301.35





Bylong: Drillhole Summary

MG94_565

Hole Number: BY0010CH Hole Type: Core Drilling

Easting : 231893.30

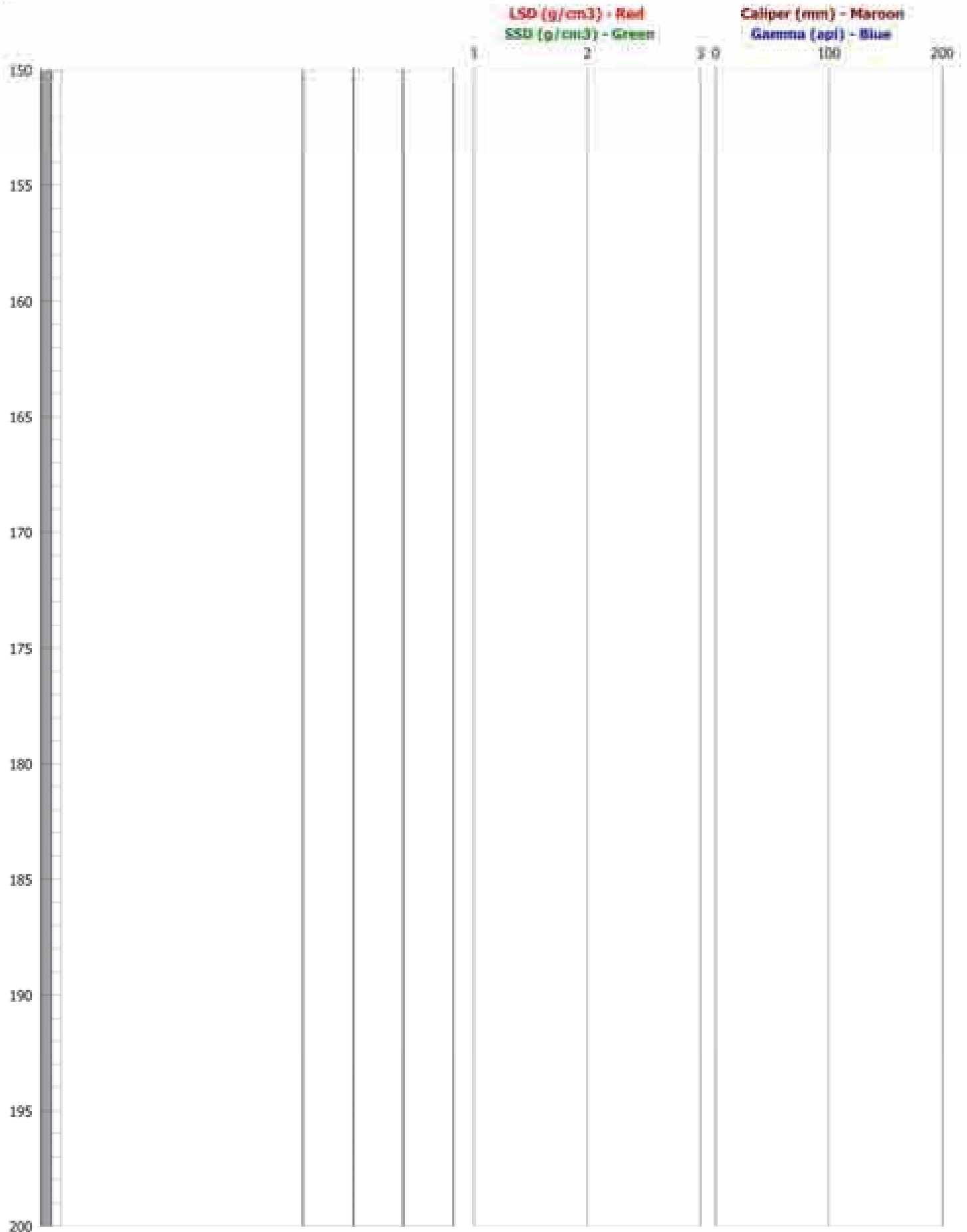
Date : 22/06/2011 Tenement : AUTH287

Northing : 6412109.84

Total Depth : 147.52 m

Area : Bylong Station

Height : 301.35





Bylong: Drillhole Summary

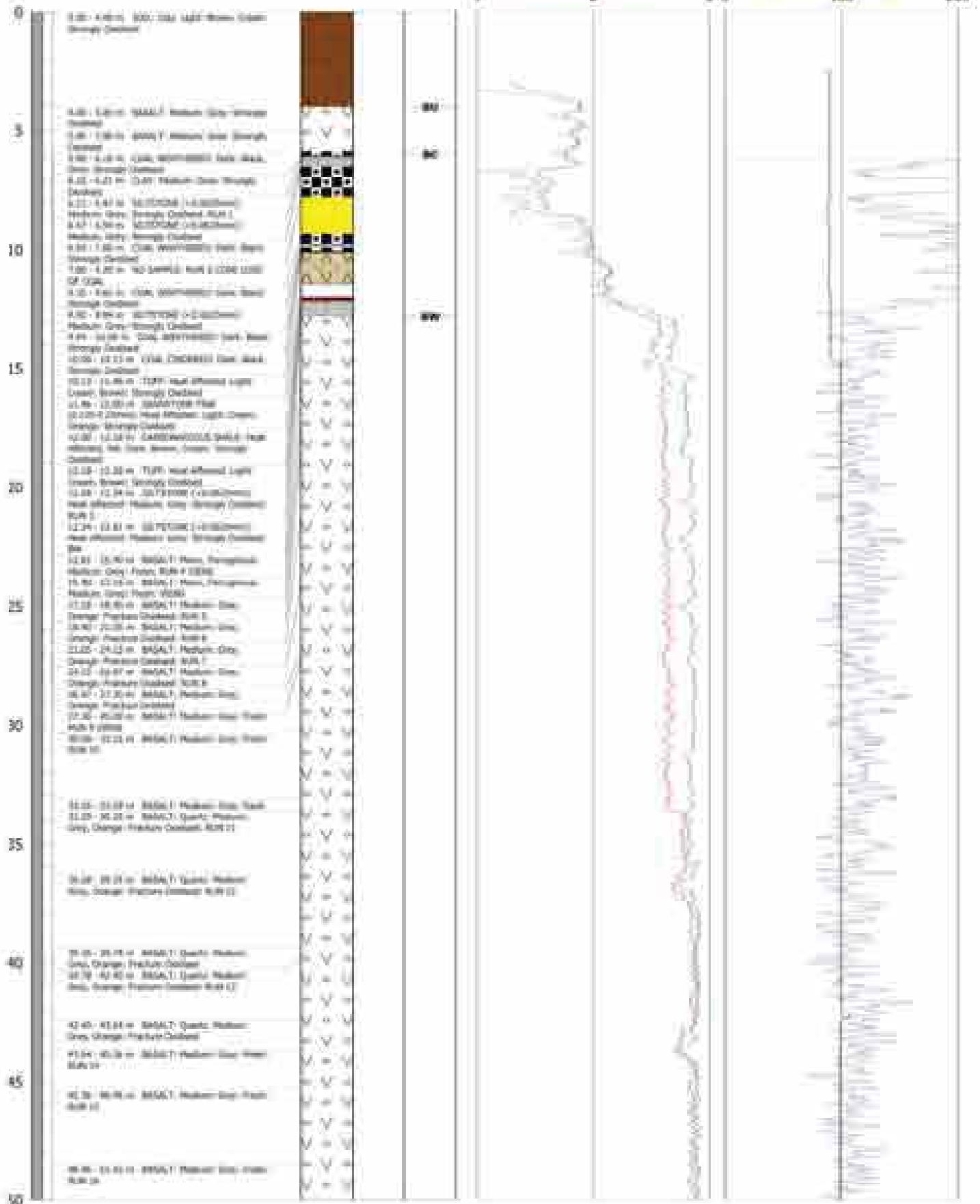
MG094_565

Hole Number: BY0011CH Hole Type: Part Open/Core Drilling
Date: 24/06/2011 Tenement: AUTH287
Total Depth: 219.68 m Area: Bylong Station

Easting: 232912.43
Northing: 6411415.62
Height: 358.10

LSD (g/cm3) - Red
SSD (g/cm3) - Green

Caliper (mm) - Maroon
Gamma (api) - Blue



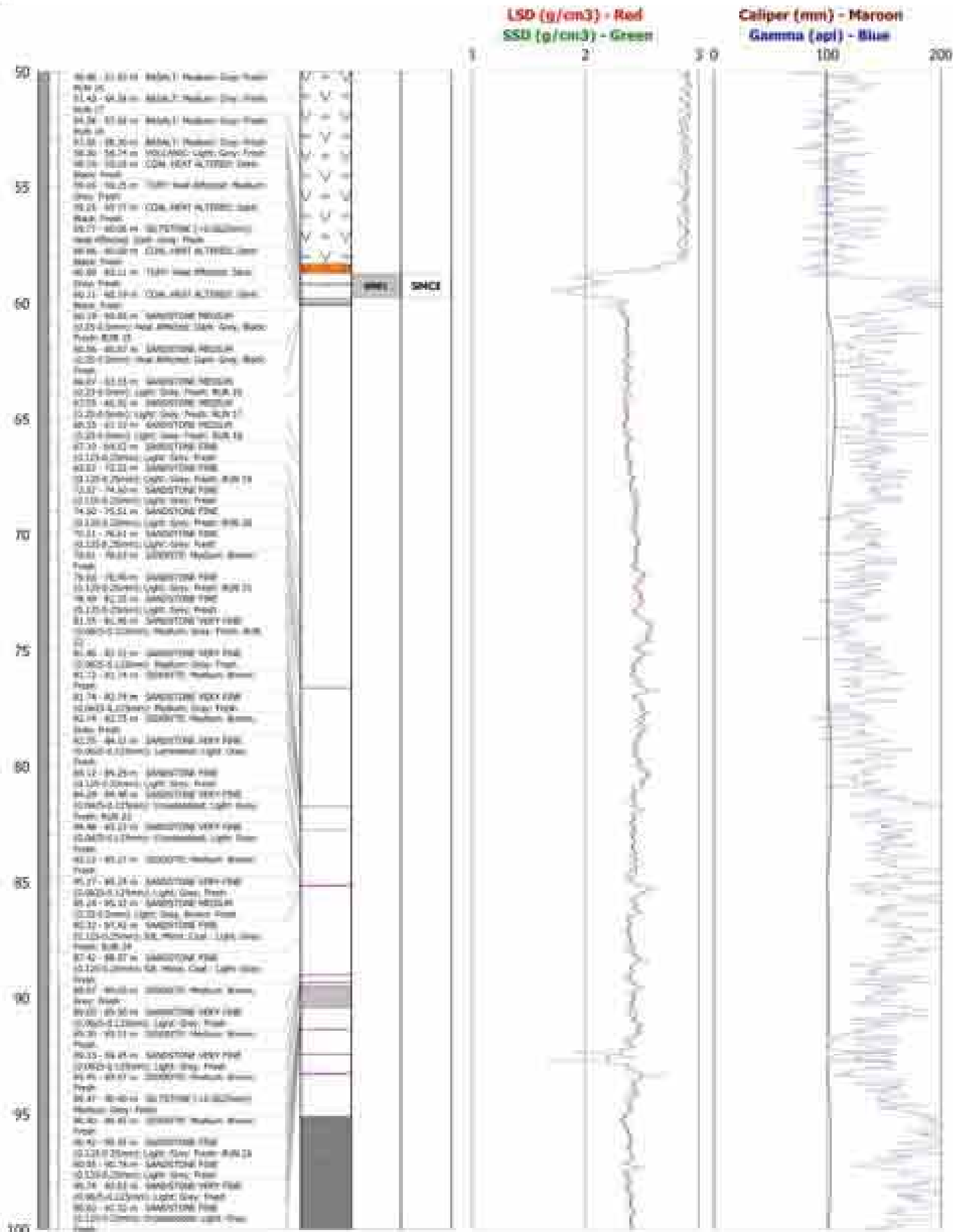


Bylong: Drillhole Summary

Hole Number: BY0011CH Hole Type: Part Open/Core Drilling
 Date: 24/06/2011 Tenement: AUTH287
 Total Depth: 219.68 m Area: Bylong Station

MG494_565

Easting : 232912.43
 Northing : 6411415.62
 Height : 358.10





Bylong: Drillhole Summary

MG94_565

Hole Number: BY0011CH Hole Type: Part Open/Core Drilling

Easting : 232912.43

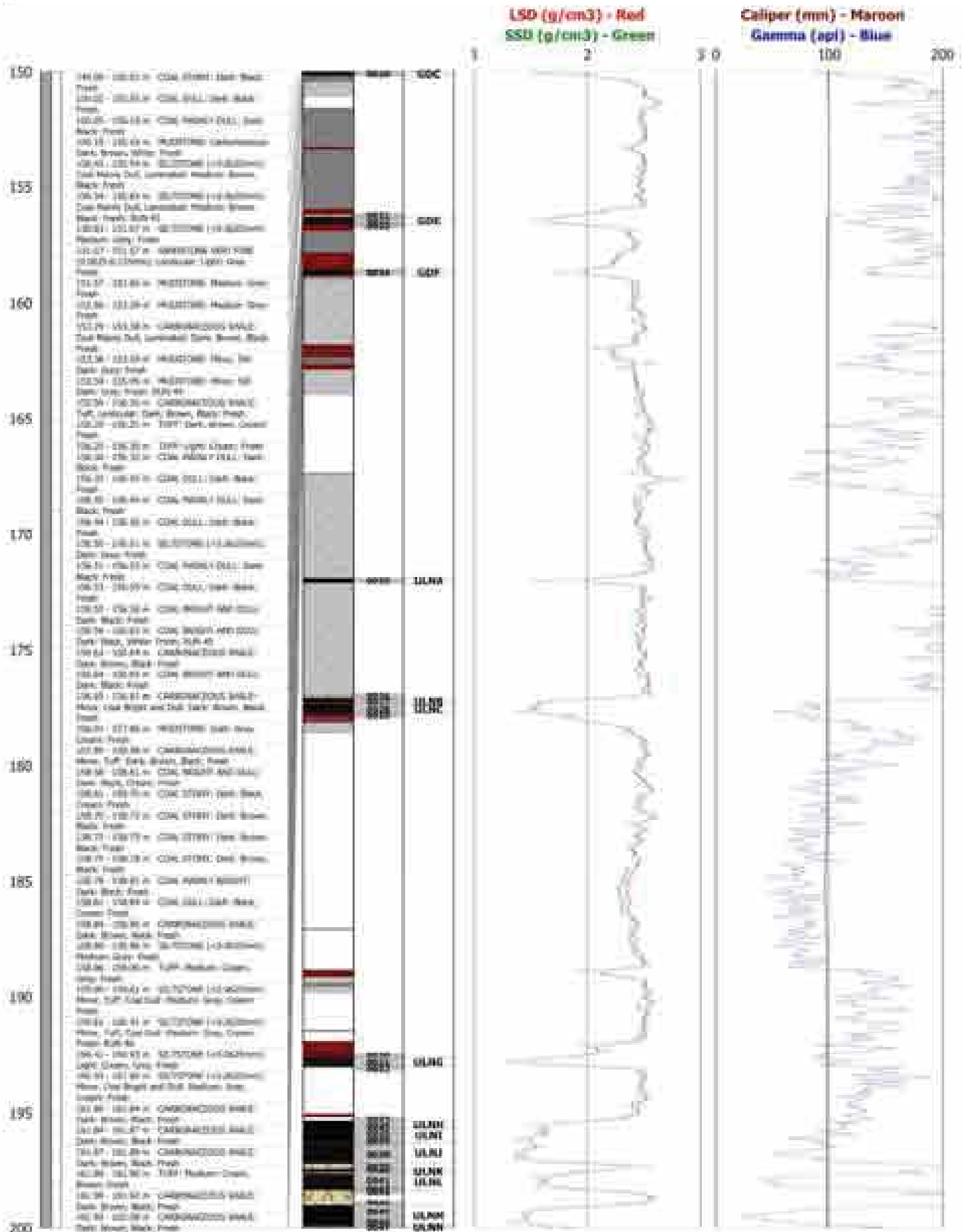
Date: 24/06/2011 Tenement: AUTH287

Northing : 6411415.62

Total Depth: 219.68 m

Area : Bylong Station

Height : 358.10





Bylong: Drillhole Summary

MG94_565

Hole Number: BY0011CH Hole Type: Part Open/Core Drilling

Easting : 232912.43

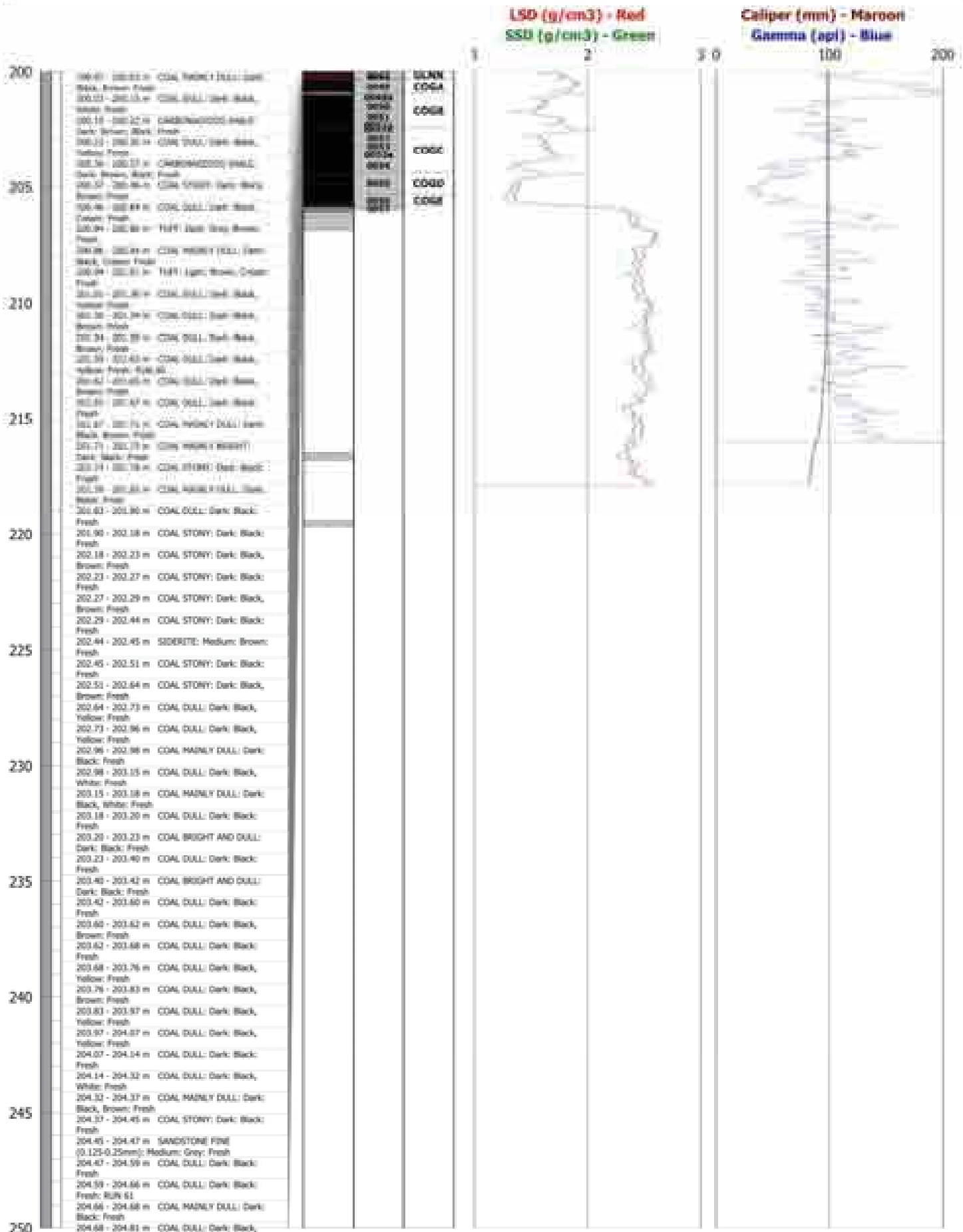
Date: 24/06/2011 Tenement: AUTH287

Northing : 6411415.62

Total Depth: 219.68 m

Area : Bylong Station

Height : 358.10





Bylong: Drillhole Summary

MG094_565

Hole Number: BY0011CH Hole Type: Part Open/Core Drilling

Easting : 232912.43

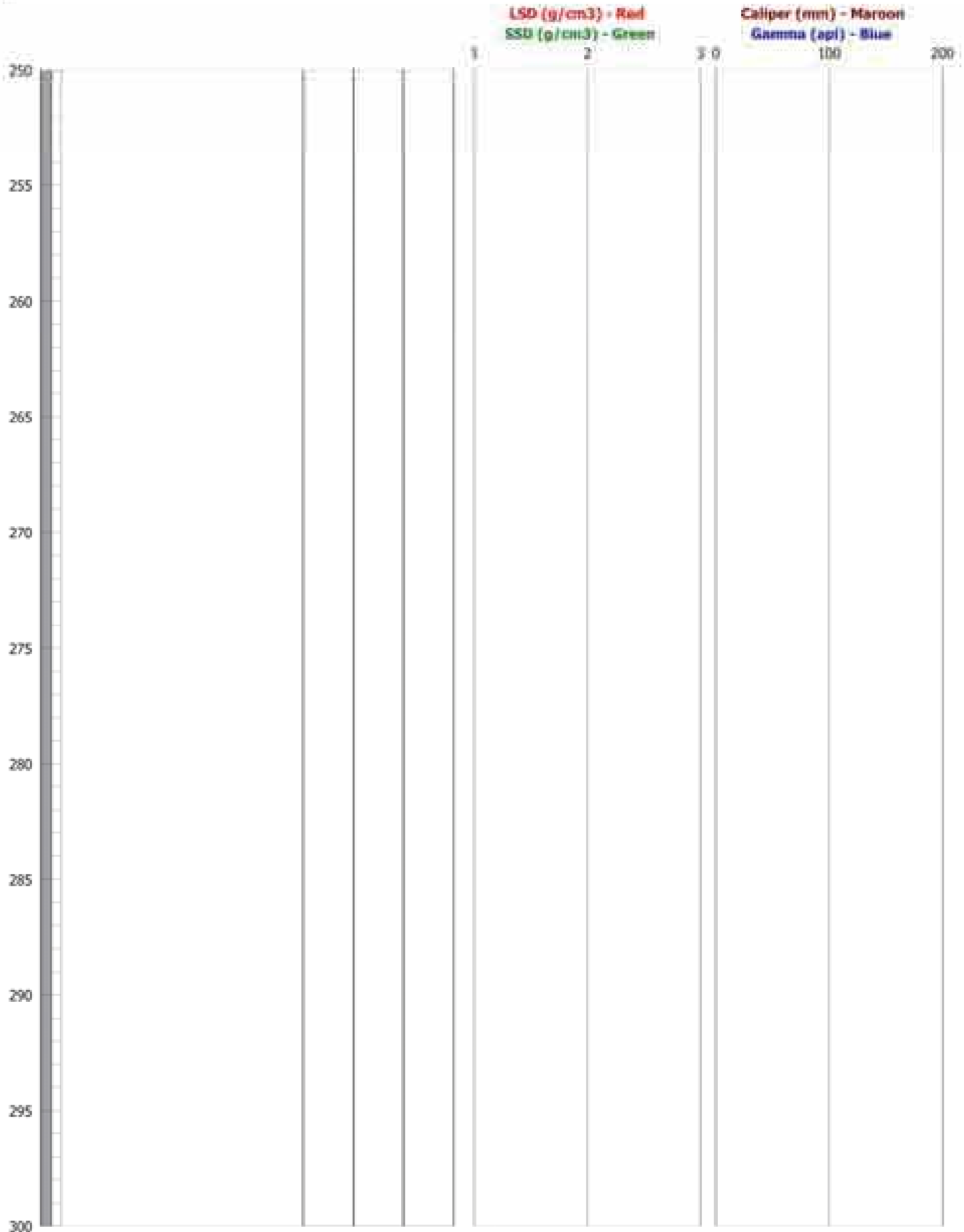
Date: 24/06/2011 Tenement: AUTH287

Northing: 6411415.62

Total Depth: 219.68 m

Area : Bylong Station

Height : 358.10





Bylong: Drillhole Summary

MG494_565

Hole Number: BY0014CHR Hole Type: Part Open/Core Drilling

Easting : 229612.00

Date: 28/07/2011 Tenement: AUTH287

Northing : 6410336.00

Total Depth: 66.29 m

Area : Bylong Station

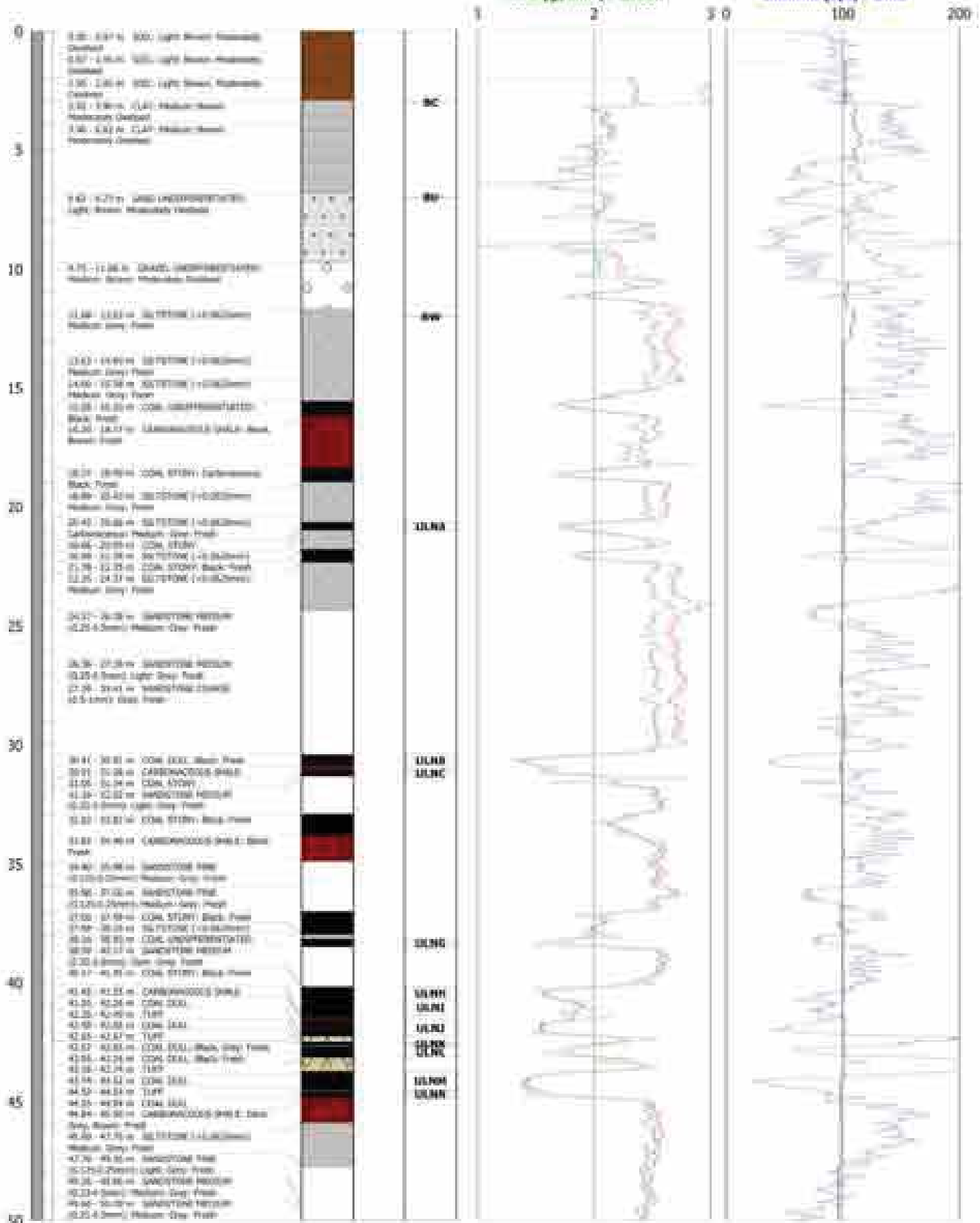
Height : 307.00

LSD (g/cm3) - Red

SSD (g/cm3) - Green

Caliper (mm) - Maroon

Gamma (api) - Blue





Bylong: Drillhole Summary

MG094_565

Hole Number: BY0014CHR Hole Type: Part Open/Core Drilling

Easting : 229612.00

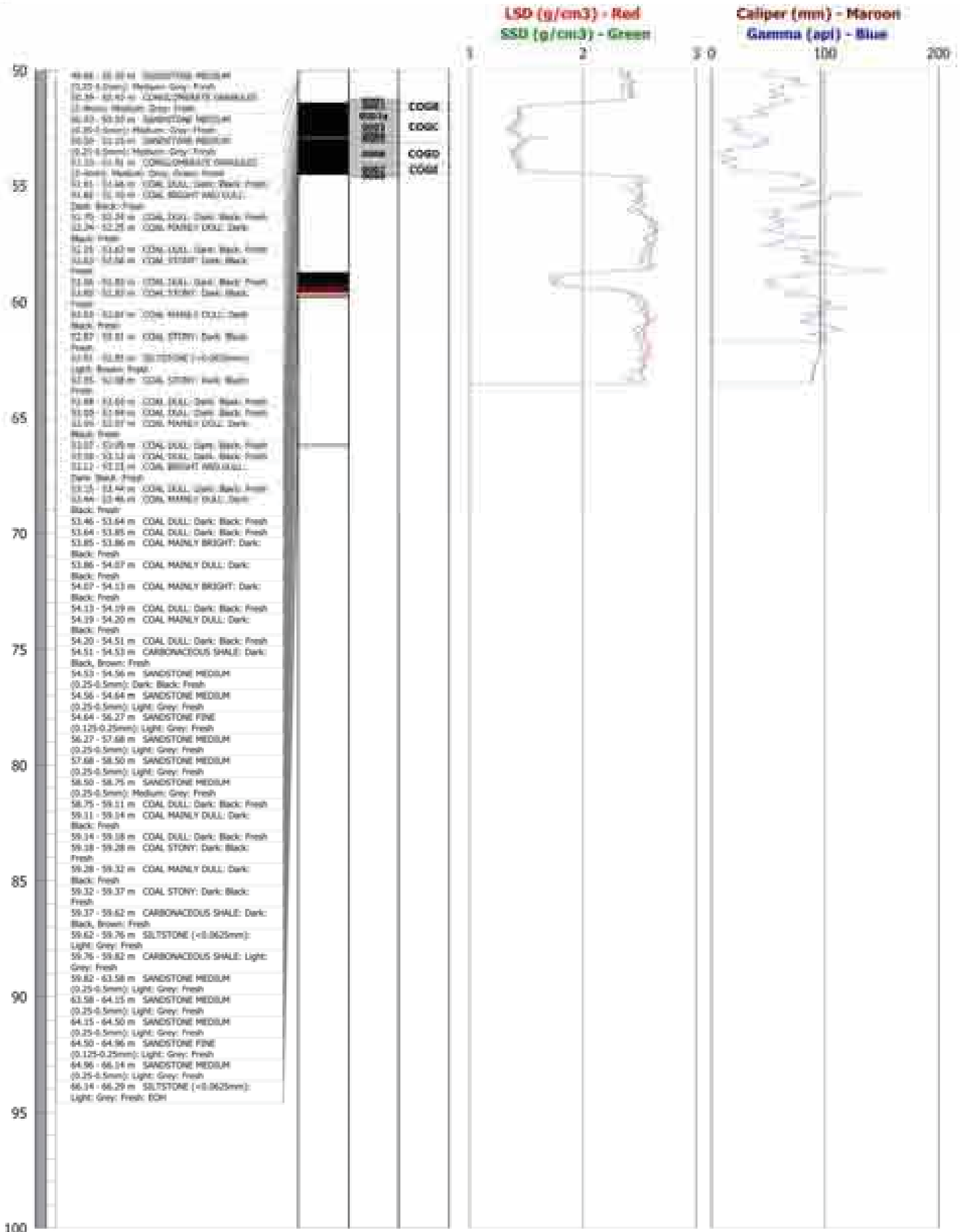
Date: 28/07/2011 Tenement: AUTH287

Northing : 6410336.00

Total Depth: 66.29 m

Area : Bylong Station

Height : 307.00





Bylong: Drillhole Summary

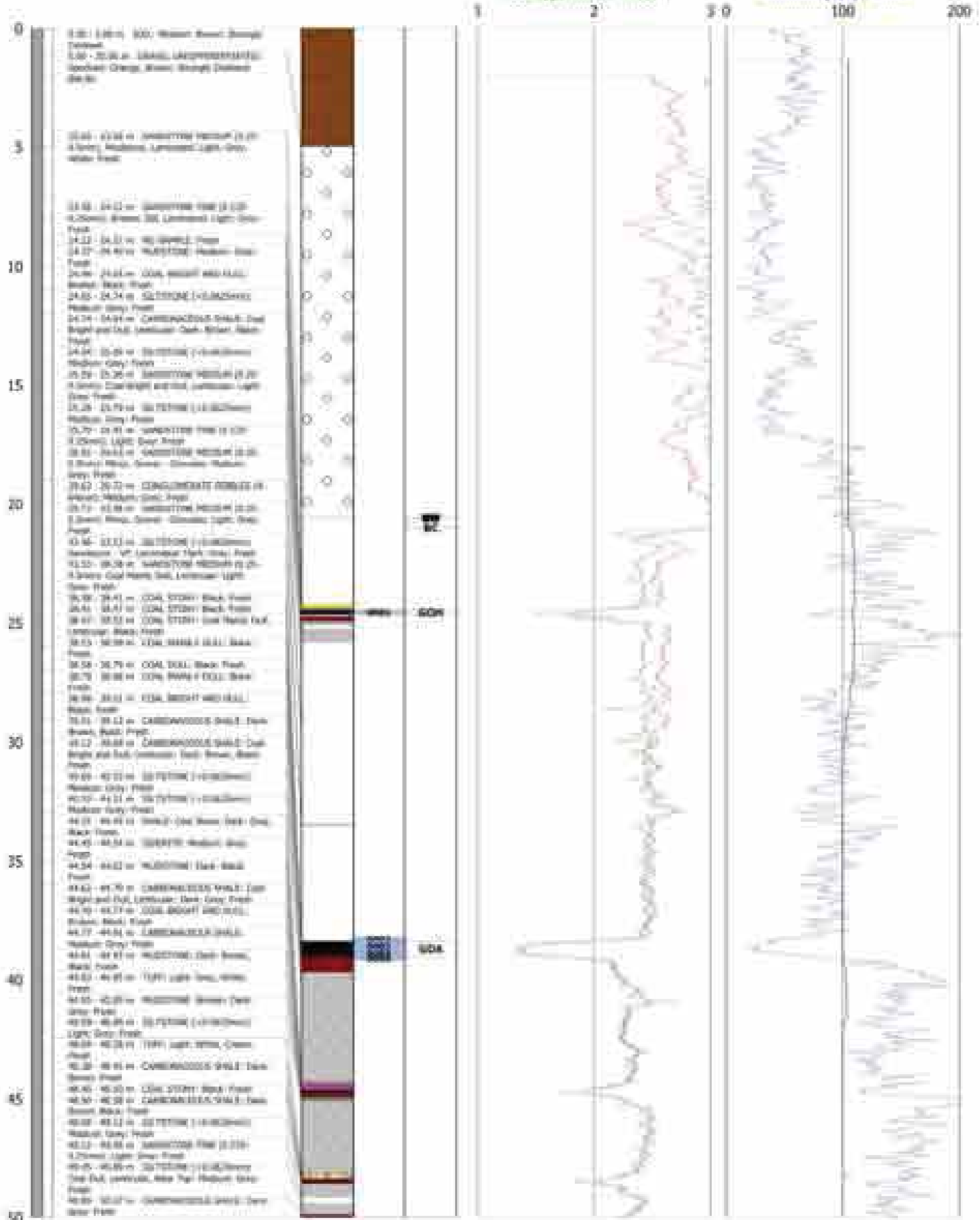
MG494_565

Hole Number: BY0015CH Hole Type: Core Drilling
 Date: 7/07/2011 Tenement: AUTH287
 Total Depth: 102.70 m Area: Bylong Station

Easting: 230110.63
 Northing: 6412947.60
 Height: 247.24

LSD (g/cm3) - Red
 SSD (g/cm3) - Green

Caliper (mm) - Maroon
 Gamma (api) - Blue





Bylong: Drillhole Summary

MG494_565

Hole Number: BY0015CH Hole Type: Core Drilling

Easting: 230110.63

Date: 7/07/2011

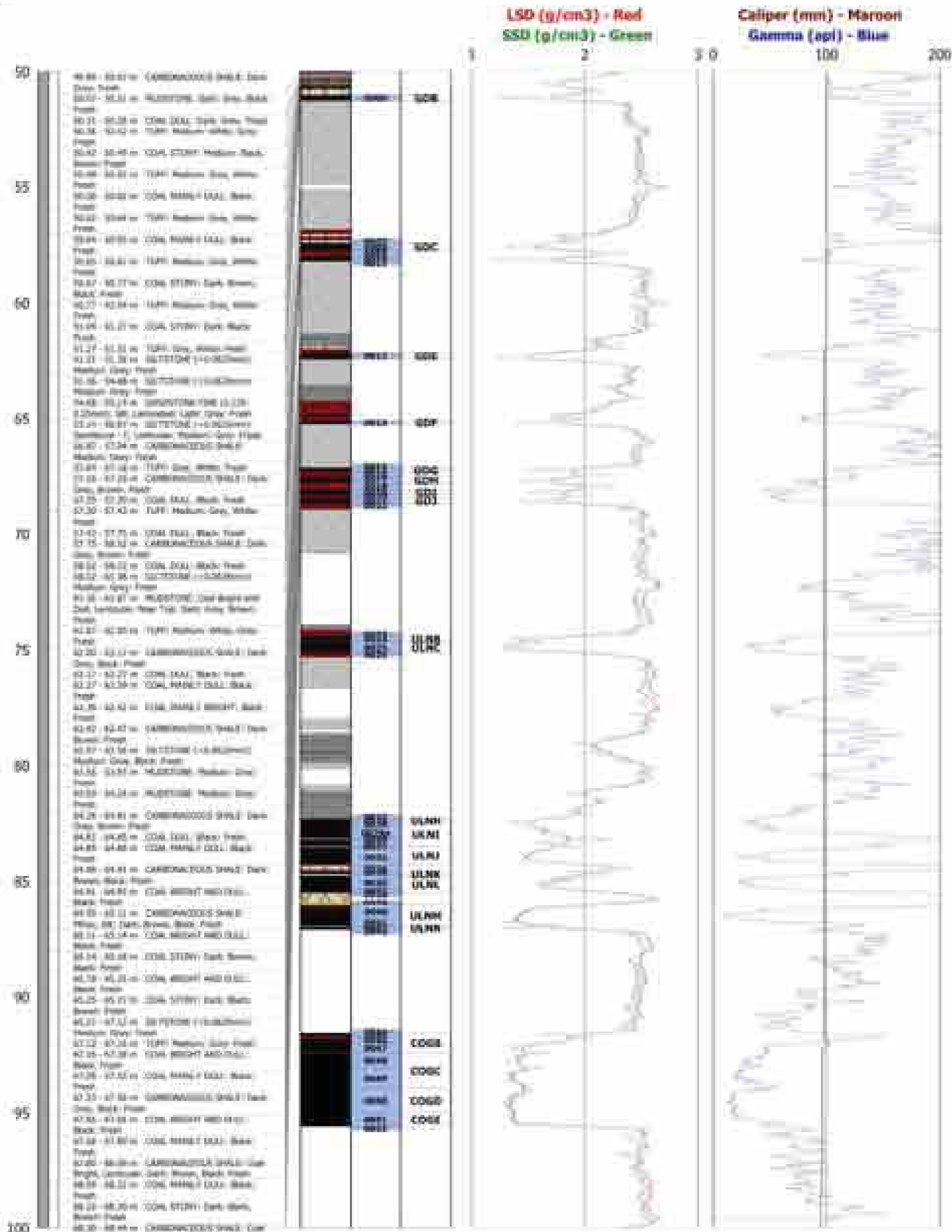
Tenement: AUTH287

Northing: 6412947.60

Total Depth: 102.70 m

Area: Bylong Station

Height: 247.24





Bylong: Drillhole Summary

MG94_565

Hole Number: BY0015CH Hole Type: Core Drilling

Easting : 230110.63

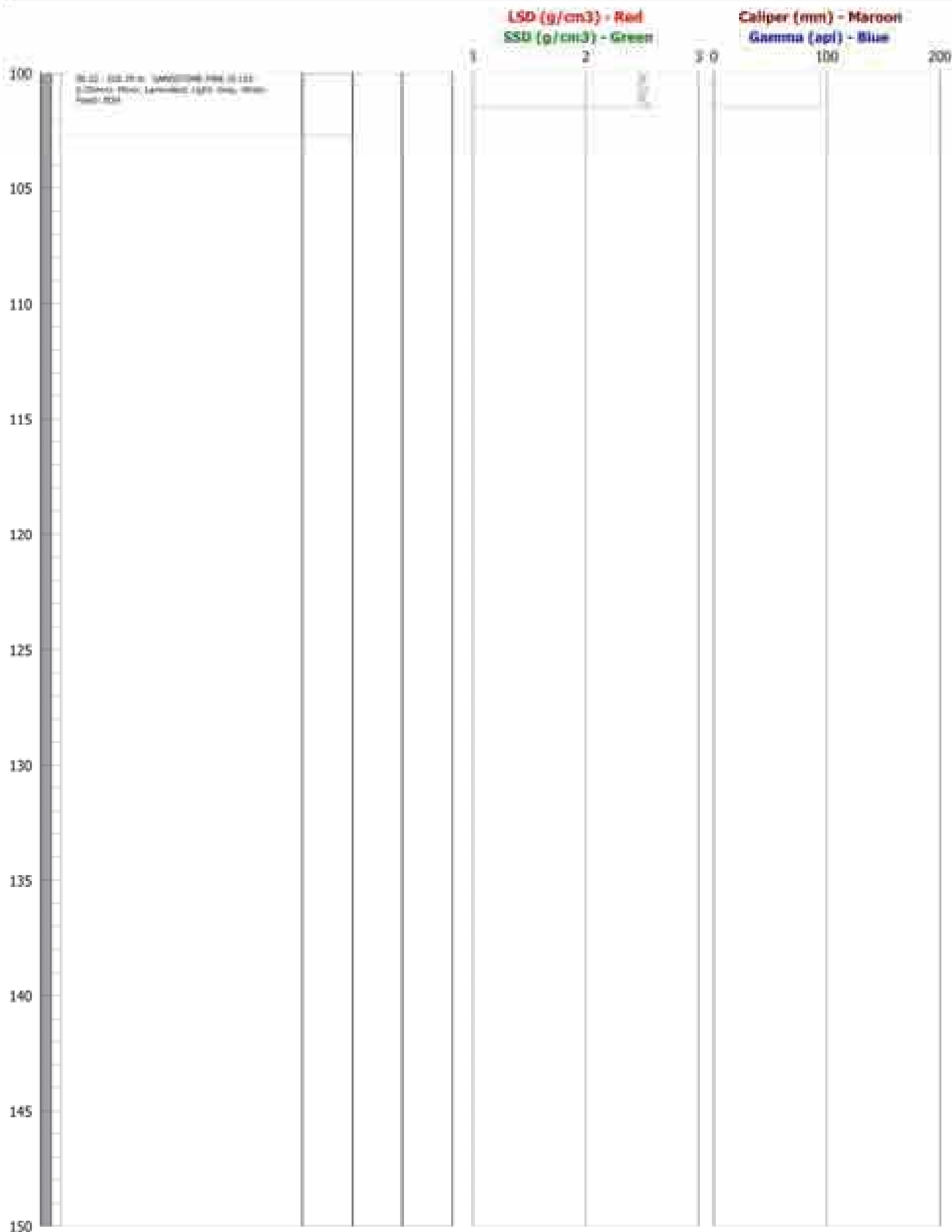
Date : 7/07/2011 Tenement : AUTH287

Northing : 6412947.60

Total Depth : 102.70 m

Area : Bylong Station

Height : 247.24





Bylong: Drillhole Summary

MG94_565

Hole Number: BY0016CH Hole Type: Core Drilling

Easting: 231315.37

Date: 13/07/2011 Tenement: AUTH287

Northing: 6408236.40

Total Depth: 54.75 m

Area: Bylong Station

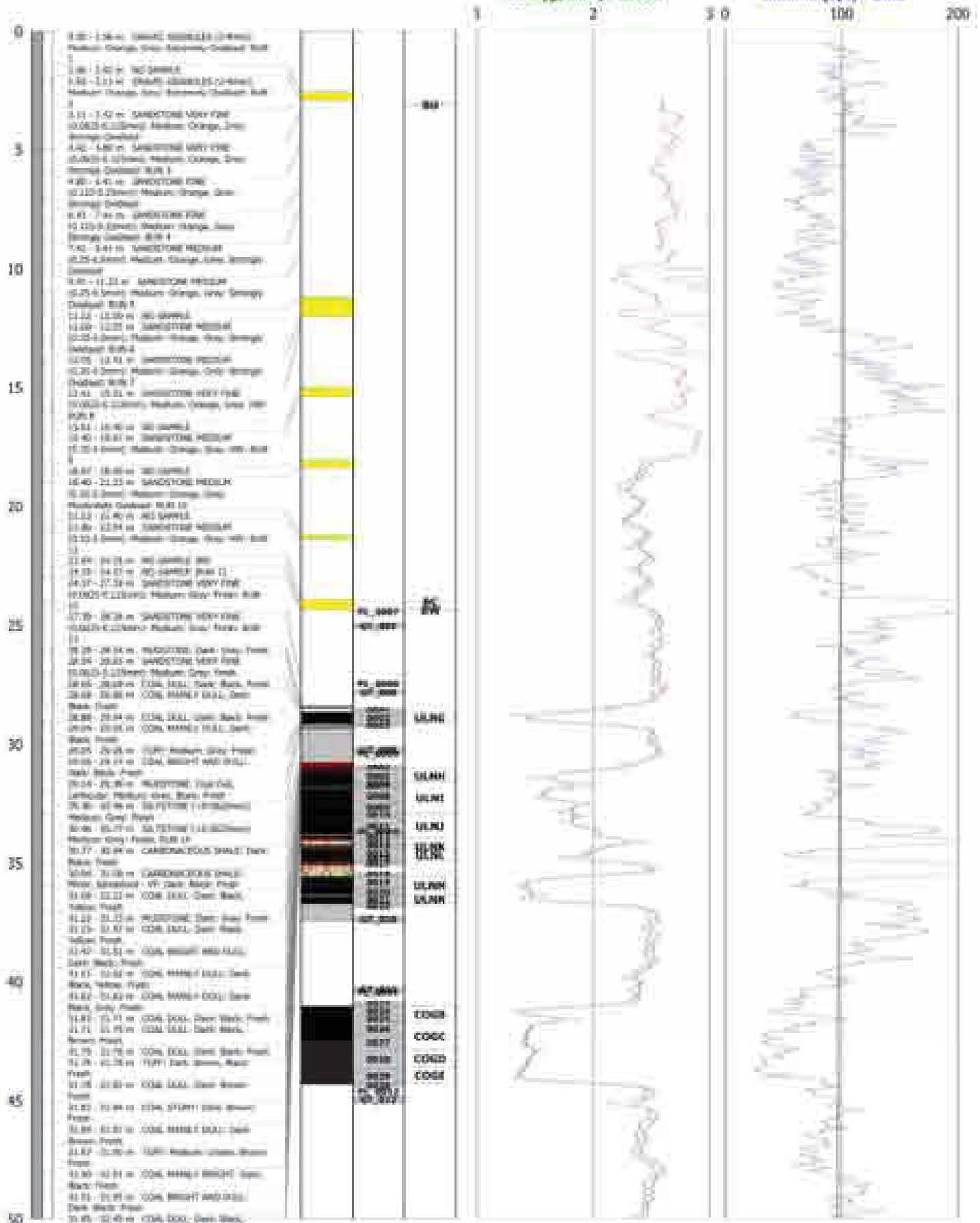
Height: 292.89

LSD (g/cm3) - Red

SSD (g/cm3) - Green

Caliper (mm) - Maroon

Gamma (api) - Blue





Bylong: Drillhole Summary

MG94_565

Hole Number: BY0016CH Hole Type: Core Drilling

Easting : 231315.37

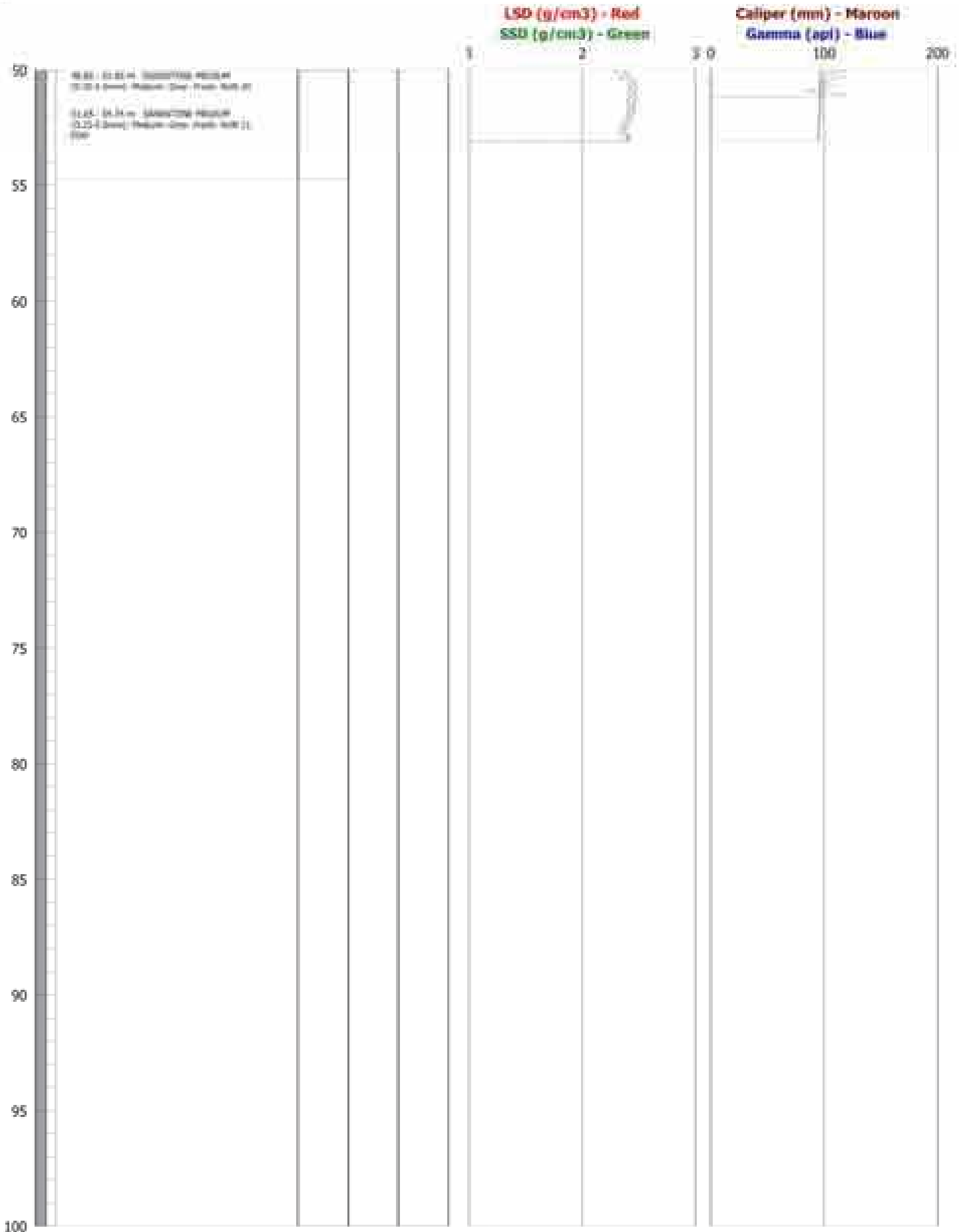
Date : 13/07/2011 Tenement : AUTH287

Northing : 6408236.40

Total Depth : 54.75 m

Area : Bylong Station

Height : 292.89



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 227087
NORTHING: 6408374
DIP/AZIMUTH: 90°/-

BORE No: M1
PROJECT No: 49761
DATE: 11/12/2013
SHEET 2 OF 5

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
		SILTY CLAY - (Stiff), brown silty clay with some fine grained sand, M<<Wp (continued)	[Diagonal hatching pattern]						
		From 5.5m, mottled brown and dark brown							
	5.8			oB	5.5		>400 kPa 10.25/150mm refusal		
		SANDSTONE - Low strength, moderately weathered, brown, fine grained sandstone		S	5.8		4/50mm refusal		
				S	5.9		refusal		
				S	5.94		bouncing		
	6.5				6.5				
		SANDSTONE - High strength, moderately weathered, orange, fine to medium grained sandstone with some very low strength tuff bands			6.65		PL(A) = 0.05		
				C	7.3		PL(A) = 2.17		
					7.4		PL(A) = 0.6		
					7.45		PL(D) = 0.74		
					7.55		PL(A) = 1.35		
		From 7.45m, medium strength							
				C	8.1		PL(A) = 0.62 PL(D) = 0.81		
					8.66		PL(A) = 2.13 PL(D) = 1.66		
					8.98				
				C	9.26		PL(A) = 2.13 PL(D) = 1.19		
					9.59				
				C	9.75		PL(A) = 4.06 PL(D) = 4		
					10.0		PL(A) = 2.31		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 6.0m

TYPE OF BORING: Solid flight auger to 5.9m, rotary to 6.5m, HQ to 23.95m

WATER OBSERVATIONS: Free groundwater measured at 16.20m at completion of drilling, groundwater measured at 10.2m 12/12/2013

REMARKS: 50% water loss at 11.59m

o - Auger sample	oB - Grab sample	oC - Photo processed slurry (PPS)
oC - Solid sample	oD - 7.5mm sample	PL(A) - Field test (per 630 kPa) (S&B)
oD - Core sample	oE - 15mm sample (in 100mm dia.)	PL(D) - Field test (per 1000 kPa) (S&B)
oE - Slurried sample	oF - Water sample	oG - Slurried sample (S&B)
oF - Environmental sample	oH - Water level	oI - Slurried sample (S&B)
		oJ - Shear vane (S&B)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 227087
NORTHING: 6408374
DIP/AZIMUTH: 90°/-

BORE No: M1
PROJECT No: 49761
DATE: 11/12/2013
SHEET 3 OF 5

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
		SANDSTONE - High strength, moderately weathered, orange, fine to medium grained sandstone with some very low strength tuff bands (continued)					PL(D) = 2.38			
		From 10.47m, brown								
	11				10.52		PL(A) = 1.41			
				C	11.04		PL(A) = 1.24			
					11.3		PL(A) = 0.73 PL(D) = 0.31			
	12				11.89 11.93		PL(A) = 0.73 PL(D) = 0.41			
					12.33		PL(A) = 1.39			
					12.52 12.58		PL(A) = 1.47			
	13			GT001	12.9 12.94		PL(A) = 3.43			
				C	13.7		PL(A) = 4.87			
	14				13.98		PL(A) = 2.9 PL(D) = 1.63			
					14.29		PL(A) = 4.14			
				C	14.93		PL(A) = 0.65			
										From 14.4m to 15.2m, bentonite

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 6.0m

TYPE OF BORING: Solid flight auger to 5.9m, rotary to 6.5m, HQ to 23.95m

WATER OBSERVATIONS: Free groundwater measured at 16.20m at completion of drilling, groundwater measured at 10.2m 12/12/2013

REMARKS: 50% water loss at 11.59m

S - Split Sample B - Bulk Sample C - Cone Sample D - Diluted Sample E - Environmental Sample	W - Water Sample T - Water Test G - Gas Sample U - Urethane Sample V - Vial Sample W - Water Sample Y - Water Test	P - Photo PL(A) - Plastic Limit (ASTM D 2487) PL(D) - Plastic Limit (ASTM D 2487) SL - Shrinkage Limit (ASTM D 2487) S _u - Shear Strength (ASTM D 2487) S _v - Shear Vane (ASTM D 2487)
--	--	---

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 227087
NORTHING: 6408374
DIP/AZIMUTH: 90°/-

BORE No: M1
PROJECT No: 49761
DATE: 11/12/2013
SHEET 4 OF 5

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
		SANDSTONE - High strength, moderately weathered, orange, fine to medium grained sandstone with some very low strength tuff bands (continued) From 15.04m, fresh stained			14.94				
	16				15.96		PL(A) = 2.35 PL(D) = 1.15		16
		From 16.33m, fresh, grey		C					
	17				16.82		PL(A) = 2.97 PL(D) = 2.33		17
					17.93				18
	18				18.33		PL(A) = 4.13 PL(D) = 3.8		
				C					
	19				18.86		PL(A) = 3.25		19
					19.22				From 15.5m to 23.0m, Class 18 machine slotted
	19.63	SILTSTONE - High strength, fresh, dark grey siltstone		C					From 15.2m to 23.95m, gravel
		From 19.9m to 20.1m, sandstone band			19.79		PL(A) = 2.29 PL(D) = 1.17		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 6.0m

TYPE OF BORING: Solid flight auger to 5.9m, rotary to 6.5m, HQ to 23.95m

WATER OBSERVATIONS: Free groundwater measured at 16.20m at completion of drilling, groundwater measured at 10.2m 12/12/2013

REMARKS: 50% water loss at 11.59m

SAMPLING & IN SITU TESTING LEGEND			
S	Soil Sample	PL	Penetration Test (PL)
SL	Soil Log	PL(A)	Penetration Test (PL) - (A)
SL	Soil Log	PL(D)	Penetration Test (PL) - (D)
SL	Soil Log	PL(S)	Penetration Test (PL) - (S)
SL	Soil Log	PL(T)	Penetration Test (PL) - (T)
SL	Soil Log	PL(U)	Penetration Test (PL) - (U)
SL	Soil Log	PL(V)	Penetration Test (PL) - (V)
SL	Soil Log	PL(W)	Penetration Test (PL) - (W)
SL	Soil Log	PL(X)	Penetration Test (PL) - (X)
SL	Soil Log	PL(Y)	Penetration Test (PL) - (Y)
SL	Soil Log	PL(Z)	Penetration Test (PL) - (Z)
SL	Soil Log	PL(1)	Penetration Test (PL) - (1)
SL	Soil Log	PL(2)	Penetration Test (PL) - (2)
SL	Soil Log	PL(3)	Penetration Test (PL) - (3)
SL	Soil Log	PL(4)	Penetration Test (PL) - (4)
SL	Soil Log	PL(5)	Penetration Test (PL) - (5)
SL	Soil Log	PL(6)	Penetration Test (PL) - (6)
SL	Soil Log	PL(7)	Penetration Test (PL) - (7)
SL	Soil Log	PL(8)	Penetration Test (PL) - (8)
SL	Soil Log	PL(9)	Penetration Test (PL) - (9)
SL	Soil Log	PL(10)	Penetration Test (PL) - (10)
SL	Soil Log	PL(11)	Penetration Test (PL) - (11)
SL	Soil Log	PL(12)	Penetration Test (PL) - (12)
SL	Soil Log	PL(13)	Penetration Test (PL) - (13)
SL	Soil Log	PL(14)	Penetration Test (PL) - (14)
SL	Soil Log	PL(15)	Penetration Test (PL) - (15)
SL	Soil Log	PL(16)	Penetration Test (PL) - (16)
SL	Soil Log	PL(17)	Penetration Test (PL) - (17)
SL	Soil Log	PL(18)	Penetration Test (PL) - (18)
SL	Soil Log	PL(19)	Penetration Test (PL) - (19)
SL	Soil Log	PL(20)	Penetration Test (PL) - (20)
SL	Soil Log	PL(21)	Penetration Test (PL) - (21)
SL	Soil Log	PL(22)	Penetration Test (PL) - (22)
SL	Soil Log	PL(23)	Penetration Test (PL) - (23)
SL	Soil Log	PL(24)	Penetration Test (PL) - (24)
SL	Soil Log	PL(25)	Penetration Test (PL) - (25)
SL	Soil Log	PL(26)	Penetration Test (PL) - (26)
SL	Soil Log	PL(27)	Penetration Test (PL) - (27)
SL	Soil Log	PL(28)	Penetration Test (PL) - (28)
SL	Soil Log	PL(29)	Penetration Test (PL) - (29)
SL	Soil Log	PL(30)	Penetration Test (PL) - (30)
SL	Soil Log	PL(31)	Penetration Test (PL) - (31)
SL	Soil Log	PL(32)	Penetration Test (PL) - (32)
SL	Soil Log	PL(33)	Penetration Test (PL) - (33)
SL	Soil Log	PL(34)	Penetration Test (PL) - (34)
SL	Soil Log	PL(35)	Penetration Test (PL) - (35)
SL	Soil Log	PL(36)	Penetration Test (PL) - (36)
SL	Soil Log	PL(37)	Penetration Test (PL) - (37)
SL	Soil Log	PL(38)	Penetration Test (PL) - (38)
SL	Soil Log	PL(39)	Penetration Test (PL) - (39)
SL	Soil Log	PL(40)	Penetration Test (PL) - (40)
SL	Soil Log	PL(41)	Penetration Test (PL) - (41)
SL	Soil Log	PL(42)	Penetration Test (PL) - (42)
SL	Soil Log	PL(43)	Penetration Test (PL) - (43)
SL	Soil Log	PL(44)	Penetration Test (PL) - (44)
SL	Soil Log	PL(45)	Penetration Test (PL) - (45)
SL	Soil Log	PL(46)	Penetration Test (PL) - (46)
SL	Soil Log	PL(47)	Penetration Test (PL) - (47)
SL	Soil Log	PL(48)	Penetration Test (PL) - (48)
SL	Soil Log	PL(49)	Penetration Test (PL) - (49)
SL	Soil Log	PL(50)	Penetration Test (PL) - (50)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 227087
NORTHING: 6408374
DIP/AZIMUTH: 90°/-

BORE No: M1
PROJECT No: 49761
DATE: 11/12/2013
SHEET 5 OF 5

Elev	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
	21	SILTSTONE - High strength, fresh, dark grey siltstone (continued)	C							
					20.27					
					20.73		PL(A) = 1.42			
					21.19					
			GT002		21.43					
			C		21.7		PL(A) = 2.61 PL(D) = 1.59			
	22				22.26		PL(A) = 0.53			
	22.59	SANDSTONE - Medium strength, fresh, grey, fine to medium grained sandstone with some siltstone laminations								
	23				22.99					
					23.51		PL(A) = 0.71		From 23.0m to 23.95m, Class 18 blank	
	23.95	Bore discontinued at 23.95m, limit of investigation			23.95				End cap	
	24									

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 6.0m

TYPE OF BORING: Solid flight auger to 5.9m, rotary to 6.5m, HQ to 23.95m

WATER OBSERVATIONS: Free groundwater measured at 16.20m at completion of drilling, groundwater measured at 10.2m 12/12/2013

REMARKS: 50% water loss at 11.59m

1 - Auger samples	11 - Thin section (in mm dia.)	21 - Photo processed slotted (PDS)
2 - Solid samples	12 - Water samples	22 - Photo processed split block (PSS) (dry)
3 - Cone samples	13 - Slotted section (in mm dia.)	23 - Photo processed split block (PSS) (wet)
4 - Standard samples	14 - Water samples	24 - Slotted section (in mm dia.)
5 - Environmental samples	15 - Water level	25 - Shear vane (SV)
	16 - Water level	
	17 - Water level	

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/-

BORE No: OP032
PROJECT No: 49761
DATE: 12/12/2012
SHEET 1 OF 1

RI	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well	
				Type	Depth	Sample		Results & Comments	Construction	Backup+0.50m Details
	0.75	SILTY SAND - (Medium dense), red brown silty, fine to medium grained sand, trace fine grained subangular gravel, humid From 0.5m, slightly clayey, some fine sized subangular gravel						From 0m to 0.3m, concrete	
	1.0	SILTY CLAY - Hard, brown silty clay, some fine grained subangular gravel and fine to medium grained sand, M-Wp							
	1.25			SB	1.0 1.0 1.25		>500kPa 6.27.30 N = 57		
	1.5	SANDSTONE - Medium strength, highly weathered, grey, fine to medium grained sandstone							
	1.67	CORE LOSS - 0.17m							
	2.0	SILTSTONE/SANDSTONE - Medium strength, slightly to moderately weathered, grey, fine to medium grained sandstone (moderately weathered), thinly bedded with siltstone (slightly weathered)		C	2.0		PL(A) = 0.91 PL(D) = 0.32		
	2.78	From 1.95m to 2.02m, moderately weathered, sandstone band						From 0m to 4.65m, Class 18 PVC	
	3.0	From 2.34m to 2.47m, moderately weathered sandstone band			2.95 3.0		PL(A) = 1.14 PL(D) = 0.89	From 0.3m to 4.65m, bentonite	
	4.0	SANDSTONE - High strength, moderately weathered, grey, fine to medium grained sandstone From 3.92m, fine to coarse grained, medium strength							
	4.22			C	4.22		PL(A) = 0.85 PL(D) = 0.66		
	4.74	COAL - Extremely low strength, extremely weathered, black coal with red mottled sections							
	4.92	CORE LOSS - 1.29m							
	6.0				6.0			From 4.8m to 6.35m, 5mm gravel	
	6.21	COAL - Extremely low strength, extremely weathered black coal		C	6.4			From 4.65m to 6.35m, Class 18 PVC Screen	
	6.37							End Cap	
	6.4	CARBONACEOUS SILTSTONE - Low strength, moderately weathered, brown carbonaceous siltstone							
	6.55	CORE LOSS - 0.150m							
	6.76	CARBONACEOUS SILTSTONE - Low strength, moderately weathered carbonaceous siltstone							
	7.0	SANDSTONE - High strength, slightly weathered, grey/brown, fine to medium grained sandstone		C	7.64		PL(A) = 1.54 PL(D) = 1.1		From 6.35m to 8.65m, bentonite
	8.0	From 8.29m, moderately weathered							
	8.55				8.55		PL(A) = 1.73		
	8.65	Bore discontinued at 8.65m, limit of investigation			8.65				

RIG: Hydropower Scout **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 1.25m
TYPE OF BORING: Solid flight auger to 1.6m, HQ3 to 8.65m
WATER OBSERVATIONS: Free groundwater obscured due to drilling fluids. No free groundwater observed whilst auger drilling
REMARKS: From 2.6m, water loss

SB - Split barrel sampler	W - Water sample	PL(A) - Pressuremeter test (PL(A))	PL(D) - Pressuremeter test (PL(D))
SB - Split barrel sampler	W - Water sample	PL(A) - Pressuremeter test (PL(A))	PL(D) - Pressuremeter test (PL(D))
SB - Split barrel sampler	W - Water sample	PL(A) - Pressuremeter test (PL(A))	PL(D) - Pressuremeter test (PL(D))
SB - Split barrel sampler	W - Water sample	PL(A) - Pressuremeter test (PL(A))	PL(D) - Pressuremeter test (PL(D))
SB - Split barrel sampler	W - Water sample	PL(A) - Pressuremeter test (PL(A))	PL(D) - Pressuremeter test (PL(D))
SB - Split barrel sampler	W - Water sample	PL(A) - Pressuremeter test (PL(A))	PL(D) - Pressuremeter test (PL(D))
SB - Split barrel sampler	W - Water sample	PL(A) - Pressuremeter test (PL(A))	PL(D) - Pressuremeter test (PL(D))
SB - Split barrel sampler	W - Water sample	PL(A) - Pressuremeter test (PL(A))	PL(D) - Pressuremeter test (PL(D))
SB - Split barrel sampler	W - Water sample	PL(A) - Pressuremeter test (PL(A))	PL(D) - Pressuremeter test (PL(D))
SB - Split barrel sampler	W - Water sample	PL(A) - Pressuremeter test (PL(A))	PL(D) - Pressuremeter test (PL(D))

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: 313.68 AHD
EASTING: 233693.28
NORTHING: 6403938.79
DIP/AZIMUTH: 90°/--

BORE No: A21
PROJECT No: 49761
DATE: 29-30/4/13
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction	
				Type	Depth	Sample		Results & Comments	Stickup = 0.63m	Details
313.68	0.2	TOPSOIL - Brown silty sand topsoil, generally comprising fine to medium grained sand, abundant rootlets, humid	[Hatched]	D	0.5				
312.00	1.0	SILTY SAND - Medium dense, brown, fine to medium grained silty sand with trace to some fine sized gravel, with some clay, humid	[Dotted]	S	1.0		6,10,13 N = 23		
311.00	2.0	From 2.0m, with some fine to coarse grained sand, fine to coarse sized subangular to angular gravel	[Dotted]	S	1.45				
310.00	3.0	SAND - Yellow brown, fine to medium grained sand with trace to some silt, trace clay, some fine to medium sized subrounded, subangular gravel, humid	[Dotted]	D	2.5		6,12,16 N = 28		
309.00	4.0		[Dotted]	S	2.95				
308.00	5.0		[Dotted]	D	3.0			From 0m to 7.0m, grout	
307.00	6.0	From 6.5m, with some clay lense	[Dotted]	S	4.0		5,7,6 N = 13		
306.00	7.0	From 7.1m to 7.4m, very stiff, brown clay, M<Wp	[Dotted]	S	4.45		4,5,8 N = 13		
305.00	8.0	CLAYEY SAND - Medium dense, brown, fine to coarse grained clayey sand, damp	[Hatched]	D	5.5				
304.00	9.0	SAND - Brown, fine to coarse grained sand with some clay lenses, trace fine sized gravel, damp	[Dotted]	S	5.95		4,12,10 N = 22		
	10.0		[Dotted]	D	6.0				
			[Dotted]	S,pp	7.0		3,7,10 N = 17 230-300 kPa		
			[Dotted]	D	7.45			From 7.0m to 8.05m, bentonite	

RIG: TD Rig 106

DRILLER: (Total) Sawyer

LOGGED: Cowan

CASING: Uncased

TYPE OF BORING: Solid flight auger TC to 14.95m

WATER OBSERVATIONS: Free groundwater observed at 11.25m

REMARKS: Top of pipe RL 314.31 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)


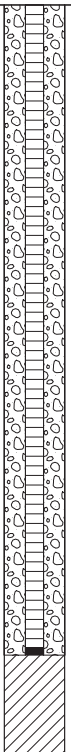
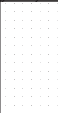



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: 313.68 AHD
EASTING: 233693.28
NORTHING: 6403938.79
DIP/AZIMUTH: 90°/--

BORE No: A21
PROJECT No: 49761
DATE: 29-30/4/13
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
303	11	CLAYEY SAND - Medium dense, brown, fine to coarse grained clayey sand, damp		S	10.0		4,5,9 N = 14	From 8m to 14.3m, 5mm gravel From 8.3m to 14.3m, Class 18 PVC Screen	
302	12			S	10.45		3,3,8 N = 11		
301	13			S	11.5		4,7,8 N = 15		
300	14	SANDSTONE - Extremely low strength, extremely weathered, brown, fine to medium grained sandstone with trace to some fine sized gravel		S	13.0		12,22,23 N = 45	End cap From 14.3m to 14.95m, bentonite	
299	14.2			S	13.45				
298	15	Bore discontinued at 14.95m			14.5				
297	16				14.95				
296	17								
295	18								
294	19								

RIG: TD Rig 106

DRILLER: (Total) Sawyer

LOGGED: Cowan

CASING: Uncased

TYPE OF BORING: Solid flight auger TC to 14.95m

WATER OBSERVATIONS: Free groundwater observed at 11.25m

REMARKS: Top of pipe RL 314.31 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	sp	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: 270.68 AHD
EASTING: 228647.04
NORTHING: 6409111.72
DIP/AZIMUTH: 90°/--

BORE No: AGE07W
PROJECT No: 49761
DATE: 7-9/5/13
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction	
				Type	Depth	Sample	Results & Comments		Stickup = 0.65m	Details
270.68	0.2	TOPSOIL - Grey brown sandy silt topsoil, generally comprising fine to medium grained sand, abundant rootlets, humid								
270.68	0.6	SANDY SILT / SILTY SAND - Red brown, fine to medium grained sandy silt / silty sand, humid with trace to some clay								
269	1	SILTY CLAY - Hard, red brown silty clay with trace to some fine to medium grained sand, M<<Wp								
266	2.5	CLAYSTONE - Extremely low strength, extremely weathered grey claystone								
266	2.9	CORE LOSS - 0.25m (2.90m-3.15m)								
267	3.15	CLAYSTONE - Extremely low strength, extremely weathered, red brown, orange brown fragmented claystone								
267	3.35	From 3.35m, extremely low to very low strength, highly to moderately weathered, grey								
267	3.5	From 3.5m, extremely low strength, extremely weathered, orange brown								
266	3.73	From 3.73m, very low to low strength, moderately weathered, grey								
266	4.63	From 3.88m, extremely low to very low strength, fragmented								
266	4.0	From 4.0m, very low to low strength								
266	4.07	From 4.07m, extremely low to very low strength, fragmented								
265	5.35	From 4.11m, very low to low strength, grey brown, highly fractured								
265	5.64	From 4.35m, brown, orange brown with some grey								
265	6.02	From 4.56m, extremely low strength, extremely weathered, orange brown								
265	6.3	CORE LOSS - 0.72m (4.63m-5.35m)								
264	6.5	BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt								
264	7	CLAYSTONE - Extremely low to very low strength, extremely to highly weathered, brown claystone								
263	6.3	CORE LOSS - 0.28m (6.02m-6.3m)								
263	8	CLAYSTONE - Low strength, moderately to slightly weathered, grey, brown, claystone								
263	8	SANDSTONE - Low strength, moderately to slightly weathered, grey brown, fine to medium grained sandstone								
262	7.0	From 7.0m, with some dark grey								
262	9.1	CORE LOSS - 0.04m (9.10m-9.14m), rock roller cleaning out hole								
261	9.14	SANDSTONE - Low strength, moderately to slightly weathered, grey brown, fine to medium grained sandstone								

RIG: TD Rig 106

DRILLER: (Total) Sawyer

LOGGED: Cowan

CASING: HW to 7.2m

TYPE OF BORING: 100mm DTH to 20m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Description from AGE07 Log. Top of pipe RL 271.32 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PLD	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: 270.68 AHD
EASTING: 228647.04
NORTHING: 6409111.72
DIP/AZIMUTH: 90°/-

BORE No: AGE07W
PROJECT No: 49761
DATE: 7-9/5/13
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
260	11	From 9.54m, with some red brown From 9.9m, medium to high strength, slightly weathered SANDSTONE - Low strength, moderately to slightly weathered, grey brown, fine to medium grained sandstone (continued)								
259	12	From 10.46m, high to very high strength From 10.6m, fine to coarse grained with trace fine sized subrounded gravel (microgranite?) From 11.58m, medium to coarse grained with some fine sized subrounded gravel (microgranite?)								
258	12.41	CLAYSTONE - Very low strength, moderately weathered, brown claystone								
257	13	From 12.51m, brown From 12.59m to 12.64m, very low to low strength, extremely to highly weathered, black coal From 12.69m, extremely low to very low strength, extremely to highly weathered, light brown and white From 12.79m, low strength, moderately weathered						From 8.9m to 17.55m, 5mm gravel From 9.5m to 17m, Class 18 PVC Screen		
256	14	STONE COAL - Low to medium strength, slightly weathered to fresh, dark brown to black From 12.99m to 13.01m, coal From 13.03m to 13.06m, coal From 13.21m to 13.29m, bands of coal up to 20mm thick From 13.33m to 13.48m, coal								
255	15	SILTSTONE - Medium to high strength, fresh, grey siltstone SANDSTONE - Medium to high strength, fresh, grey, fine to medium grained sandstone with some siltstone laminations								
254	16	SILTSTONE - Medium to high strength, fresh, grey siltstone From 15.7m to 16.25m, fine grained sandstone, intrusion, 80°, 25-35mm thick From 15.81m to 16.69m, carbonaceous siltstone								
253	17	LAMINITE - Medium to high strength, fresh, grey, fine grained laminite								
252	18									
251	18.14	SILTSTONE - Medium to high strength, fresh, grey siltstone								
250	19									
249	19.15	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone								
248	20.0								End cap	

Bore discontinued at 20.0m, limit of investigation

RIG: TD Rig 106

DRILLER: (Total) Sawyer

LOGGED: Cowan

CASING: HW to 7.2m

TYPE OF BORING: 100mm DTH to 20m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Description from AGE07 Log. Top of pipe RL 271.32 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test ts(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test ts(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	sp	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)





Bylong: Drillhole Summary

Hole Number: BY0001CH **Hole Type:** Part Open/Core Drilling
Date: 10/05/2011 **Tenement:** AUTH287
Total Depth: 200.44 m **Area:** Bylong Station

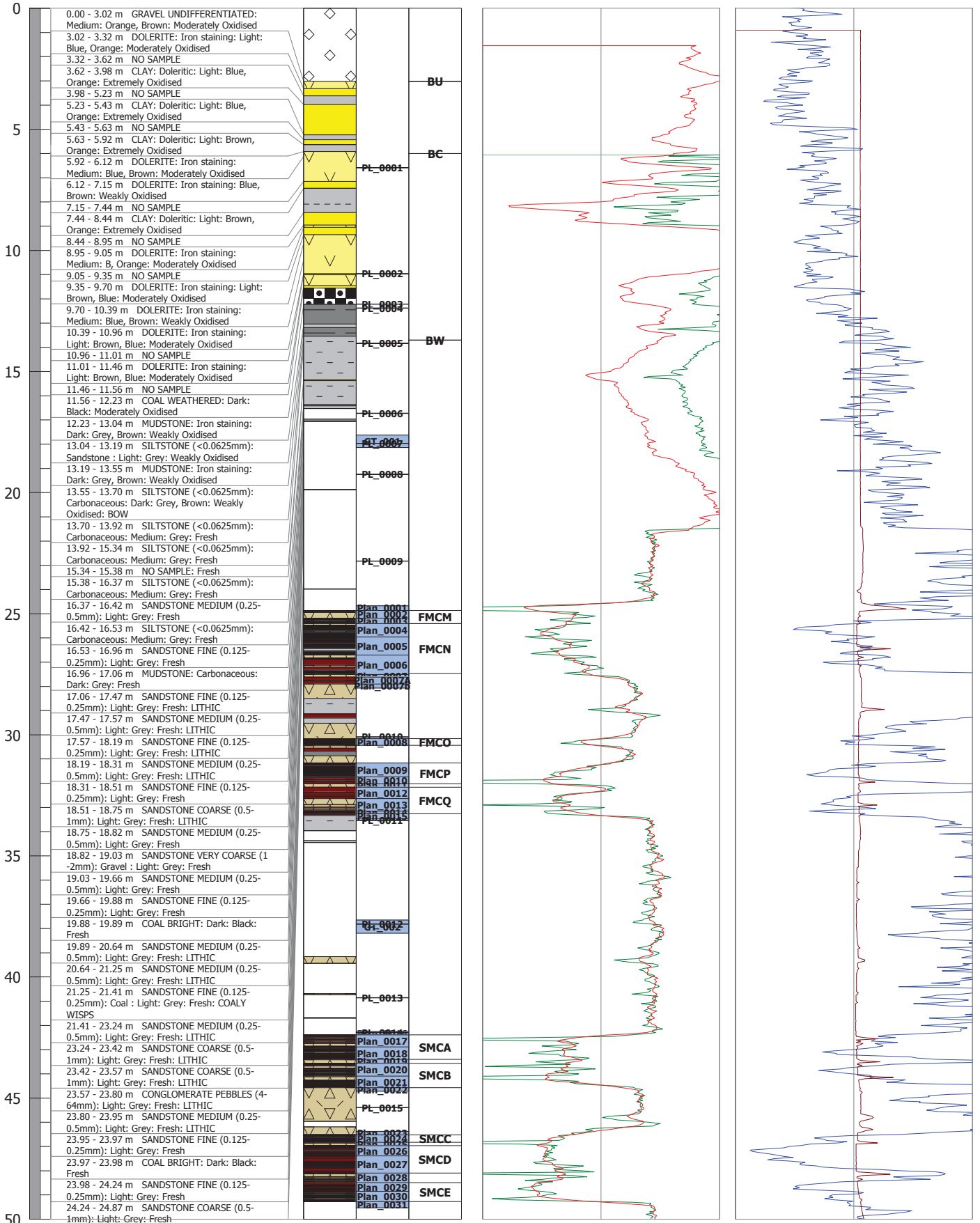
MGA94_56S

Easting : 233576.58
Northing : 6409320.64
Height : 375.40

LSD (g/cm3) - Red
SSD (g/cm3) - Green

Caliper (mm) - Maroon
Gamma (api) - Blue

1 2 3 0 100 200



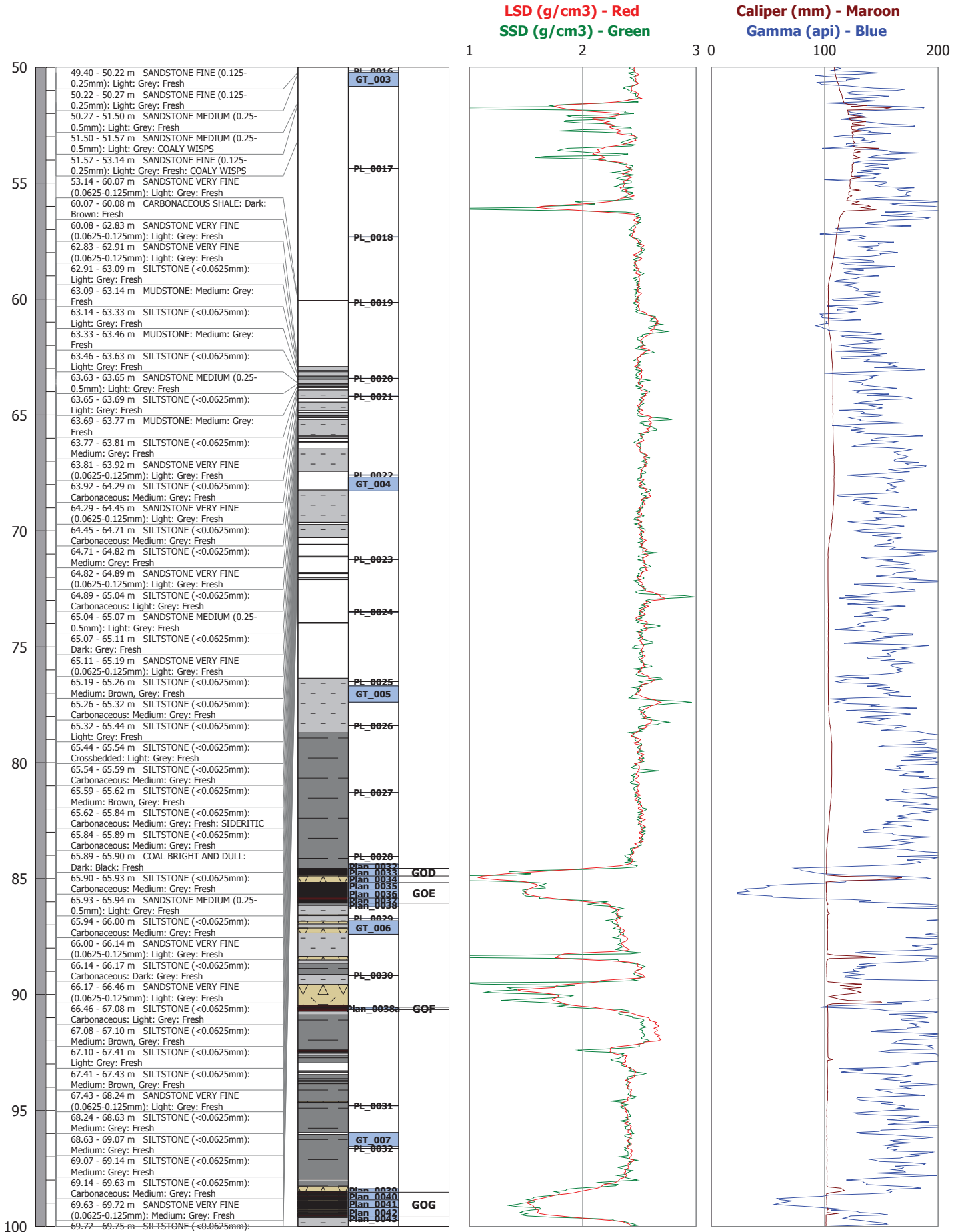


Bylong: Drillhole Summary

Hole Number: **BY0001CH** Hole Type: Part Open/Core Drilling
 Date: 10/05/2011 Tenement: AUTH287
 Total Depth: 200.44 m Area: Bylong Station

MGA94_56S

Easting : 233576.58
 Northing : 6409320.64
 Height : 375.40



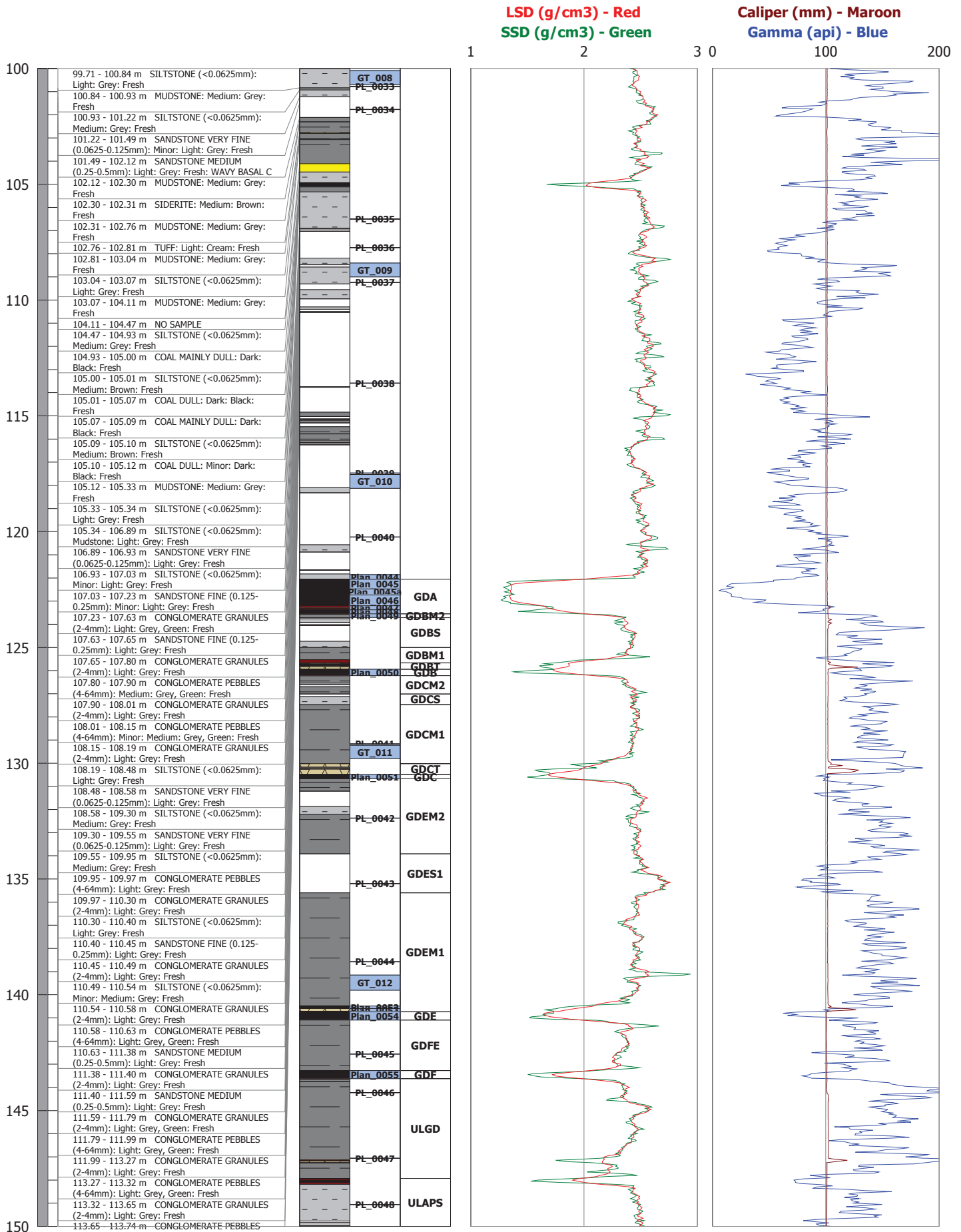


Bylong: Drillhole Summary

Hole Number: **BY0001CH** Hole Type: Part Open/Core Drilling
 Date: 10/05/2011 Tenement: AUTH287
 Total Depth: 200.44 m Area: Bylong Station

MGA94_56S

Easting : 233576.58
 Northing : 6409320.64
 Height : 375.40



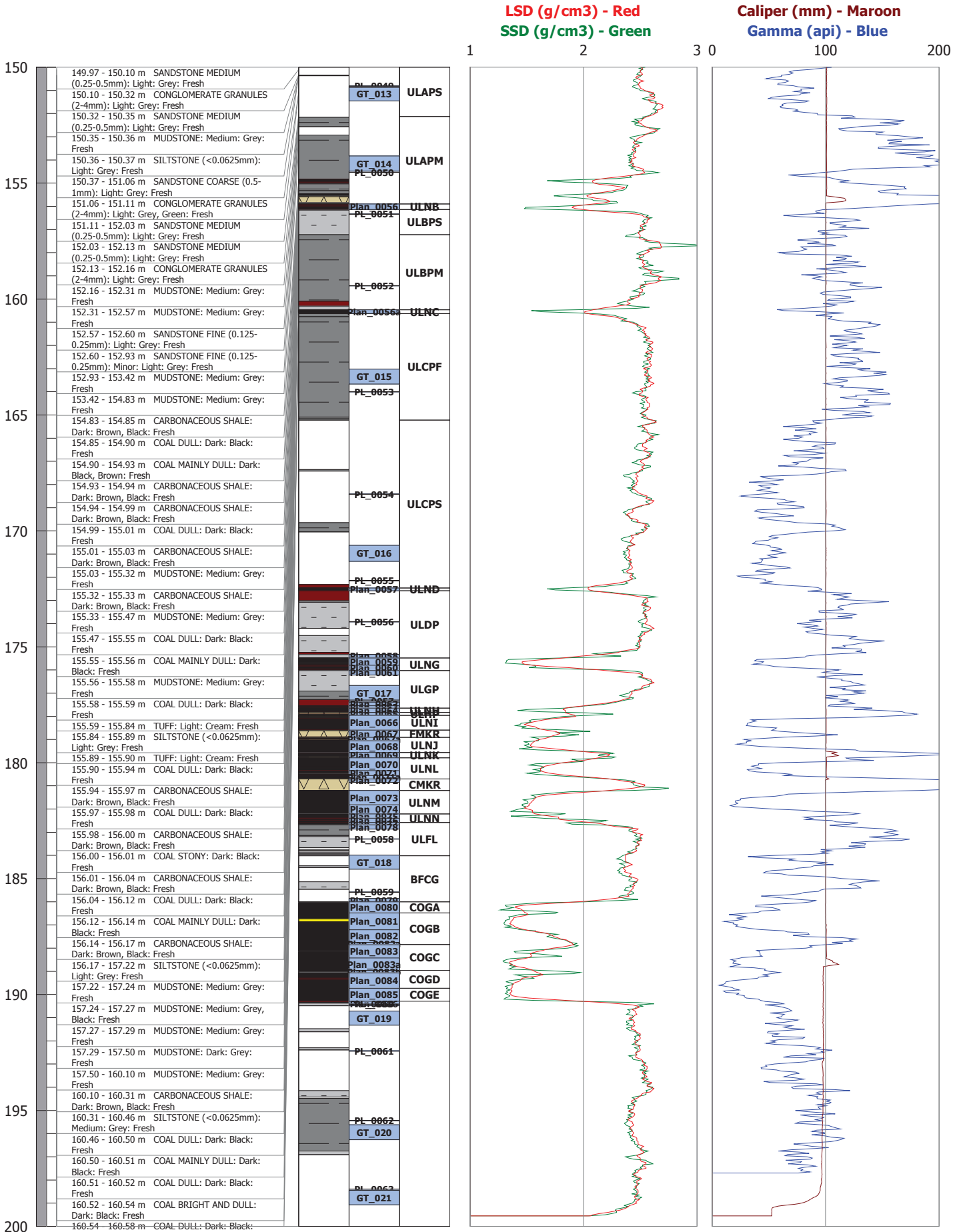


Bylong: Drillhole Summary

Hole Number: **BY0001CH** Hole Type: Part Open/Core Drilling
 Date: 10/05/2011 Tenement: AUTH287
 Total Depth: 200.44 m Area: Bylong Station

MGA94_56S

Easting : 233576.58
 Northing : 6409320.64
 Height : 375.40





Bylong: Drillhole Summary

MGA94_56S

Hole Number: BY0001CH Hole Type: Part Open/Core Drilling

Easting : 233576.58

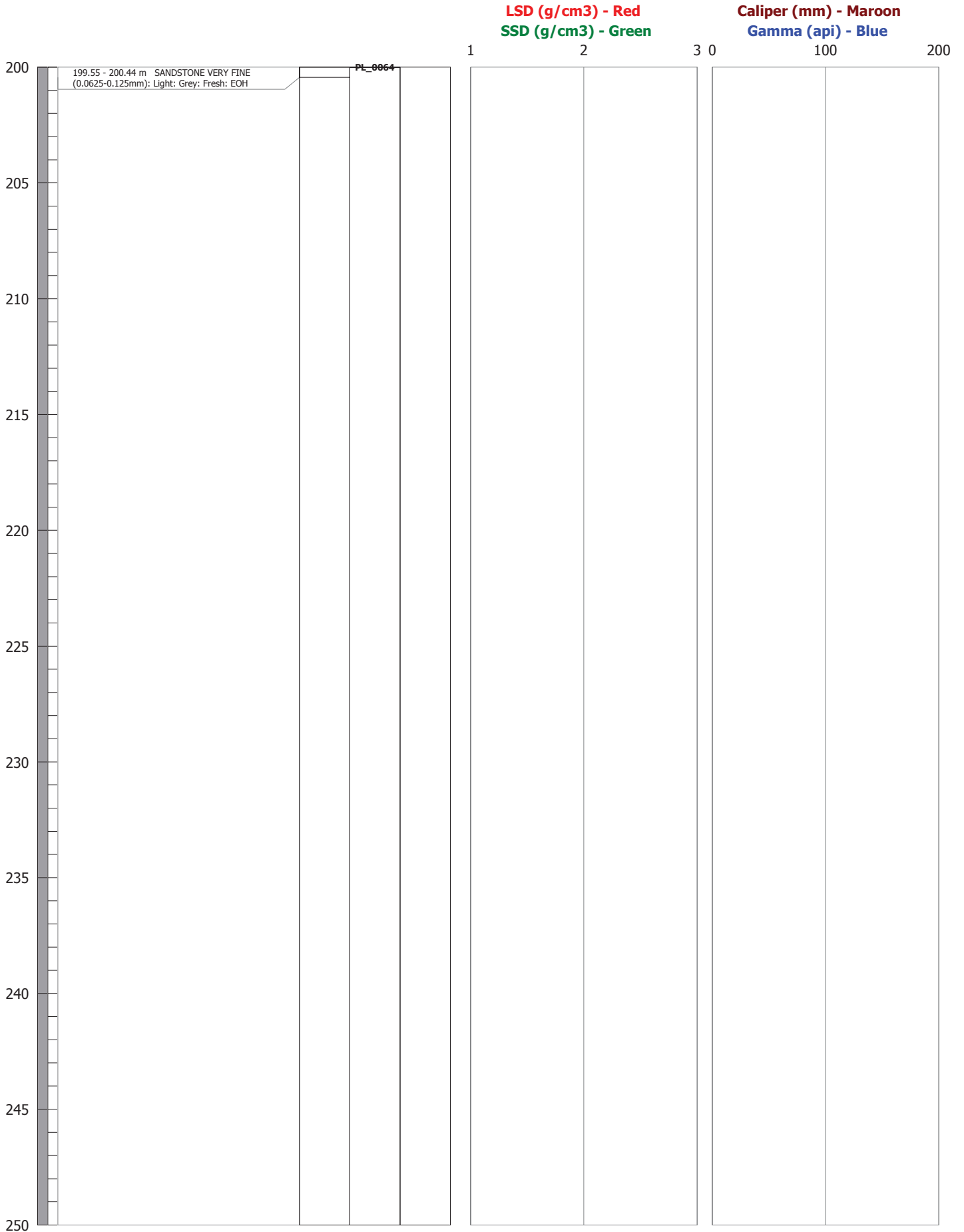
Date : 10/05/2011 Tenement: AUTH287

Northing : 6409320.64

Total Depth : 200.44 m

Area : Bylong Station

Height : 375.40





Bylong: Drillhole Summary

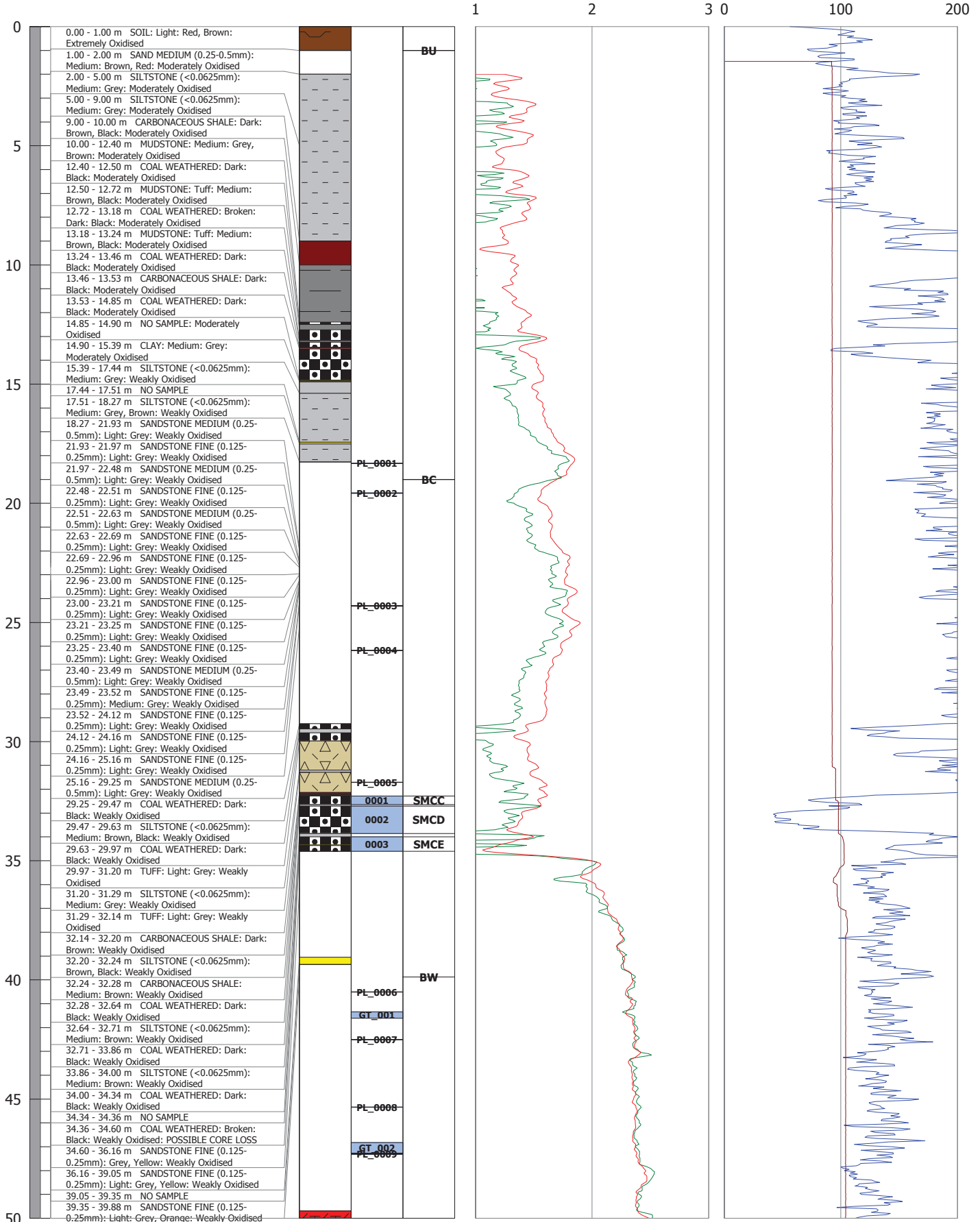
Hole Number: BY0007CH **Hole Type:** Part Open/Core Drilling
Date: 6/06/2011 **Tenement:** AUTH287
Total Depth: 186.64 m **Area:** Bylong Station

MGA94_56S

Easting : 230443.17
Northing : 6410217.64
Height : 368.69

LSD (g/cm3) - Red
SSD (g/cm3) - Green

Caliper (mm) - Maroon
Gamma (api) - Blue





Bylong: Drillhole Summary

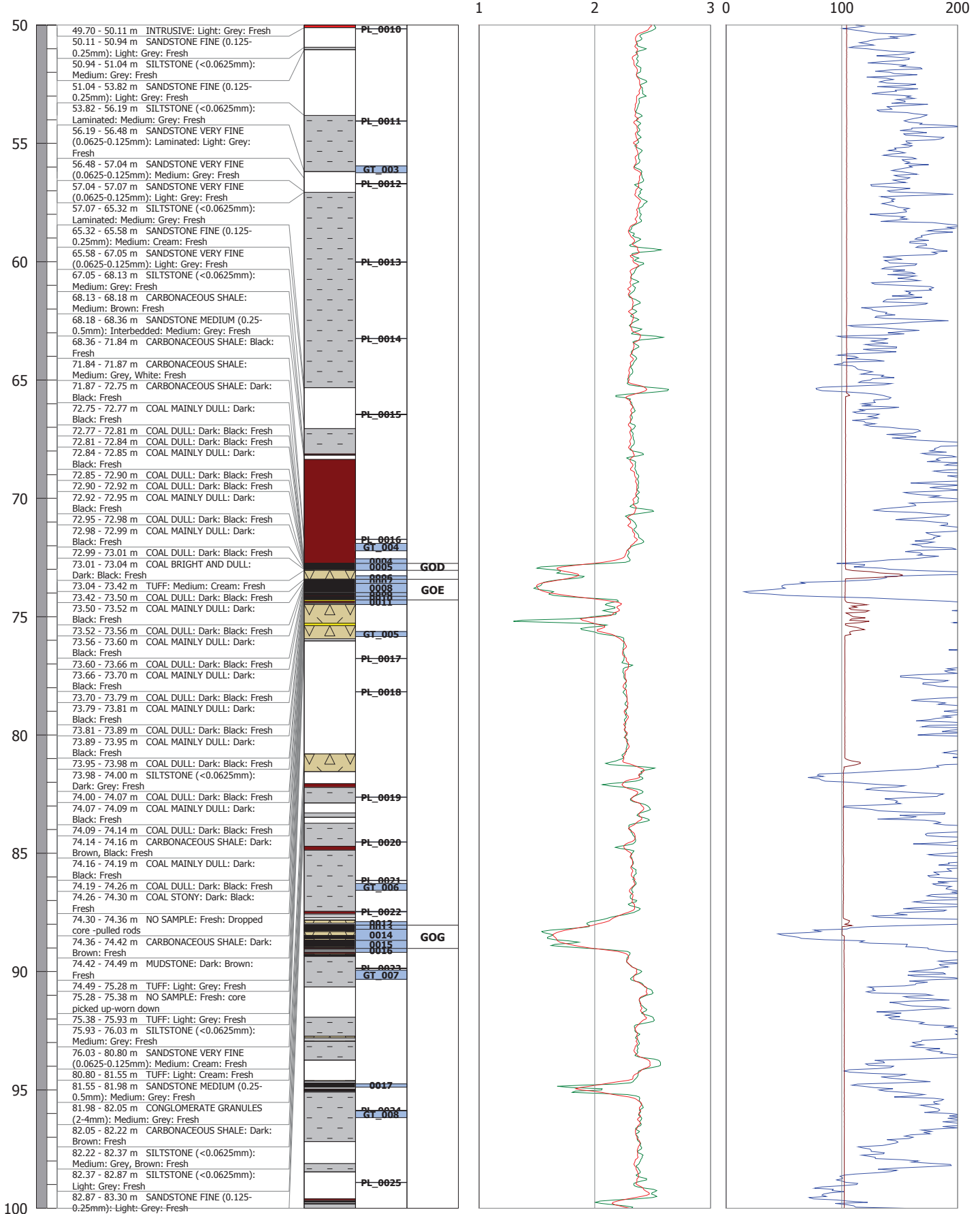
Hole Number: **BY0007CH** Hole Type: Part Open/Core Drilling
 Date: 6/06/2011 Tenement: AUTH287
 Total Depth: 186.64 m Area: Bylong Station

MGA94_56S

Easting : 230443.17
 Northing : 6410217.64
 Height : 368.69

LSD (g/cm3) - Red
 SSD (g/cm3) - Green

Caliper (mm) - Maroon
 Gamma (api) - Blue



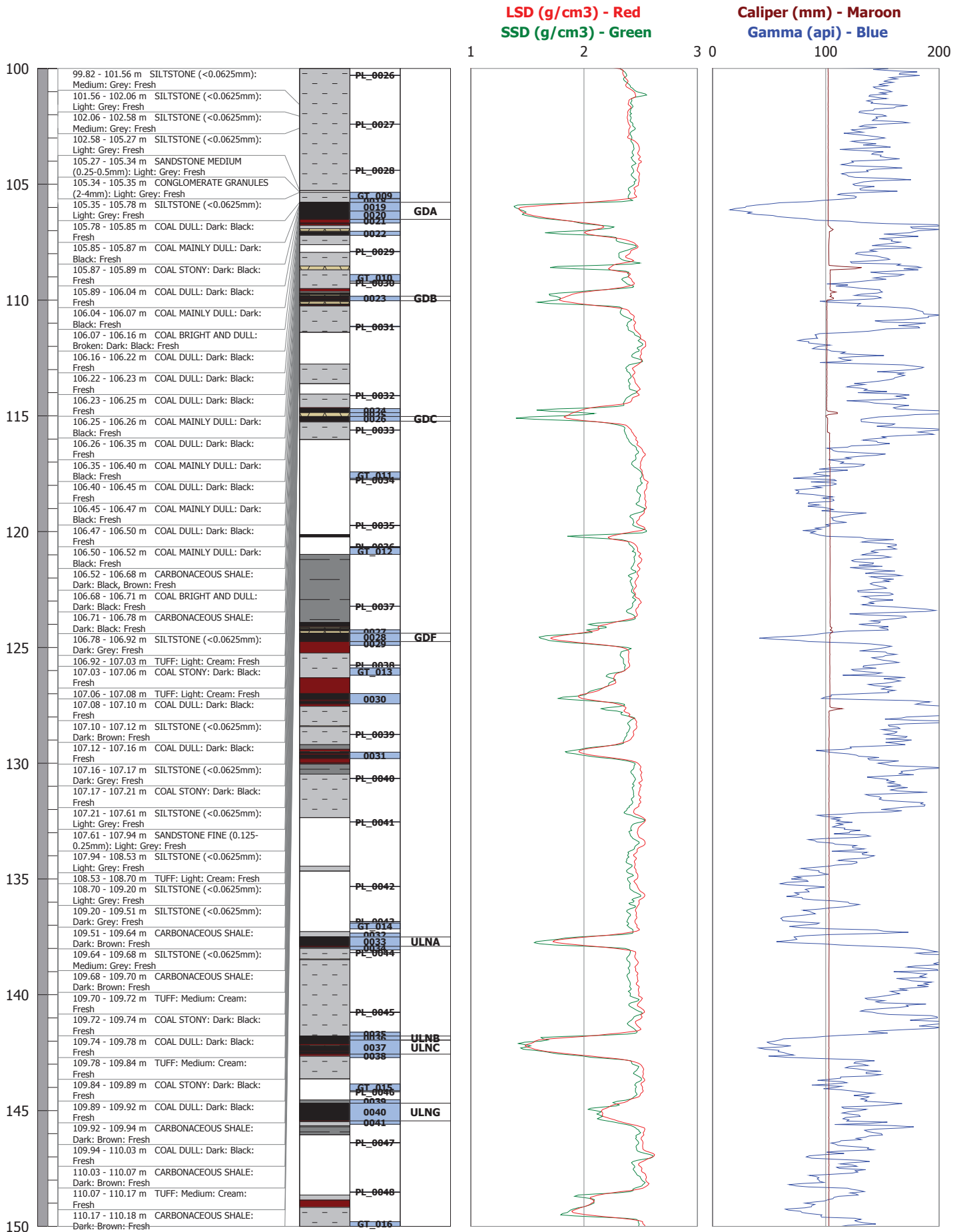


Bylong: Drillhole Summary

Hole Number: **BY0007CH** Hole Type: Part Open/Core Drilling
 Date: 6/06/2011 Tenement: AUTH287
 Total Depth: 186.64 m Area: Bylong Station

MGA94_56S

Easting : 230443.17
 Northing : 6410217.64
 Height : 368.69



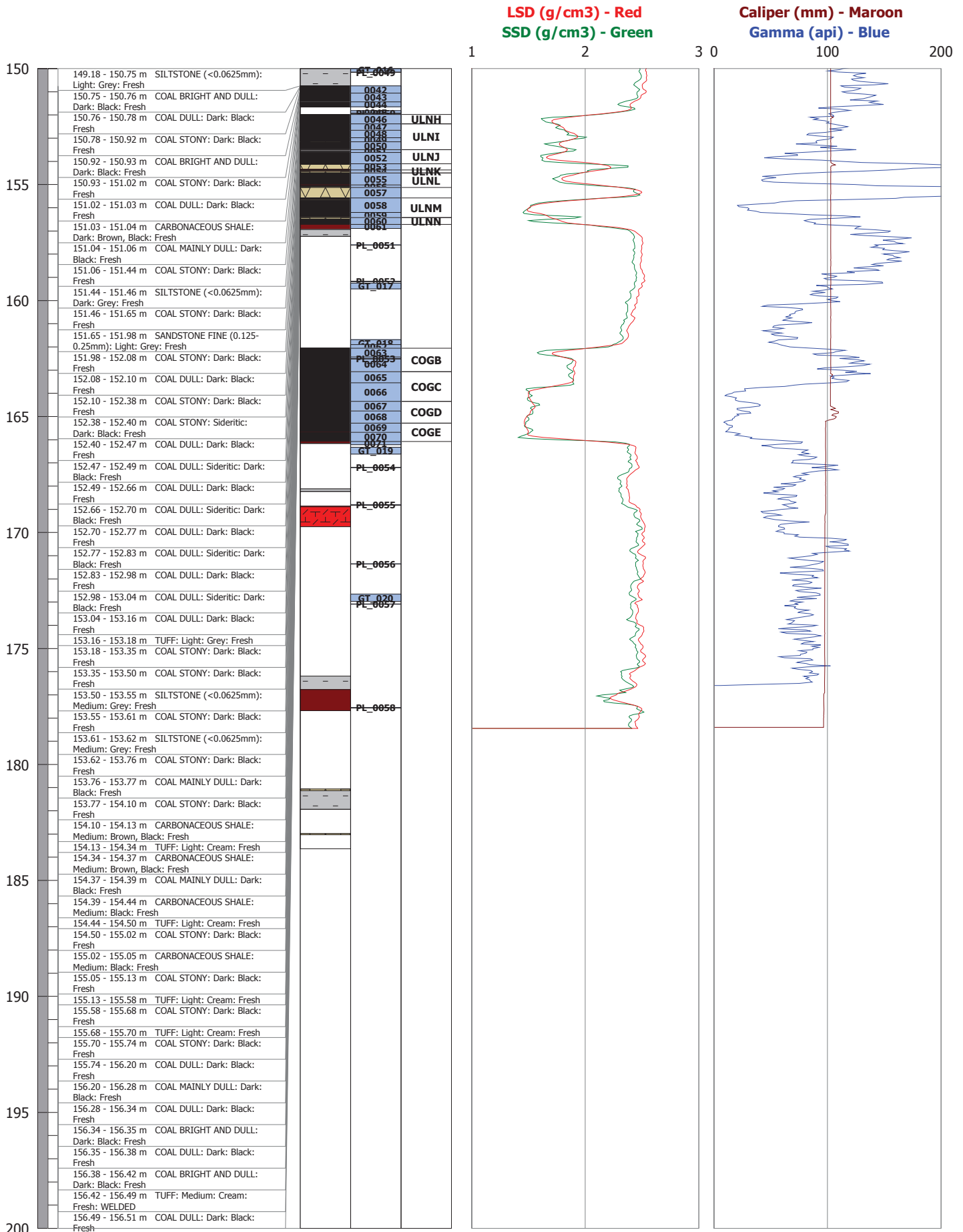


Bylong: Drillhole Summary

Hole Number: BY0007CH **Hole Type:** Part Open/Core Drilling
Date: 6/06/2011 **Tenement:** AUTH287
Total Depth: 186.64 m **Area:** Bylong Station

MGA94_56S

Easting: 230443.17
Northing: 6410217.64
Height: 368.69





Bylong: Drillhole Summary

MGA94_56S

Hole Number: BY0007CH Hole Type: Part Open/Core Drilling

Easting : 230443.17

Date : 6/06/2011

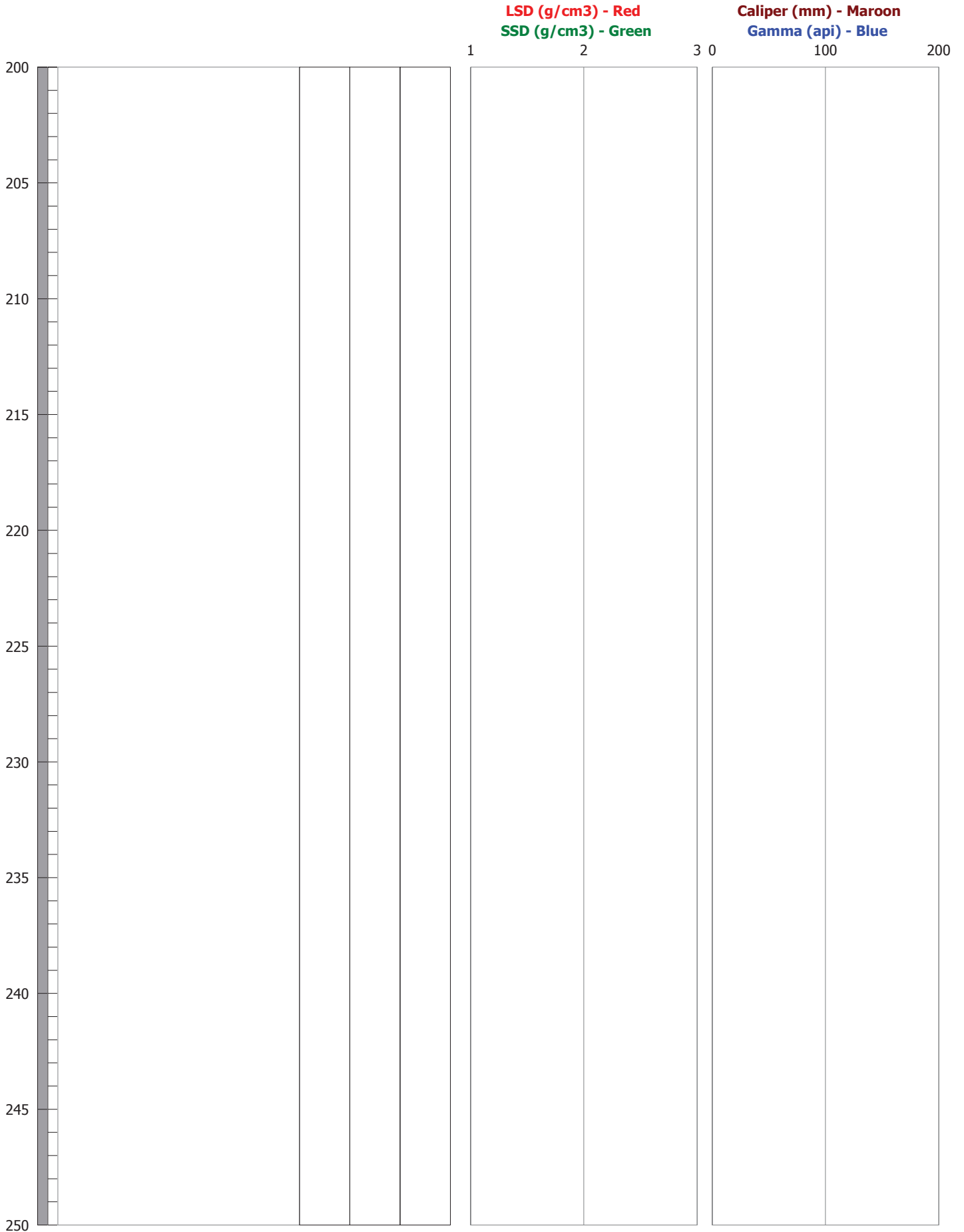
Tenement: AUTH287

Northing : 6410217.64

Total Depth: 186.64 m

Area : Bylong Station

Height : 368.69





Bylong: Drillhole Summary

Hole Number: BY0010CH Hole Type: Core Drilling

Date: 22/06/2011 Tenement: AUTH287

Total Depth: 147.52 m

Area: Bylong Station

MGA94_56S

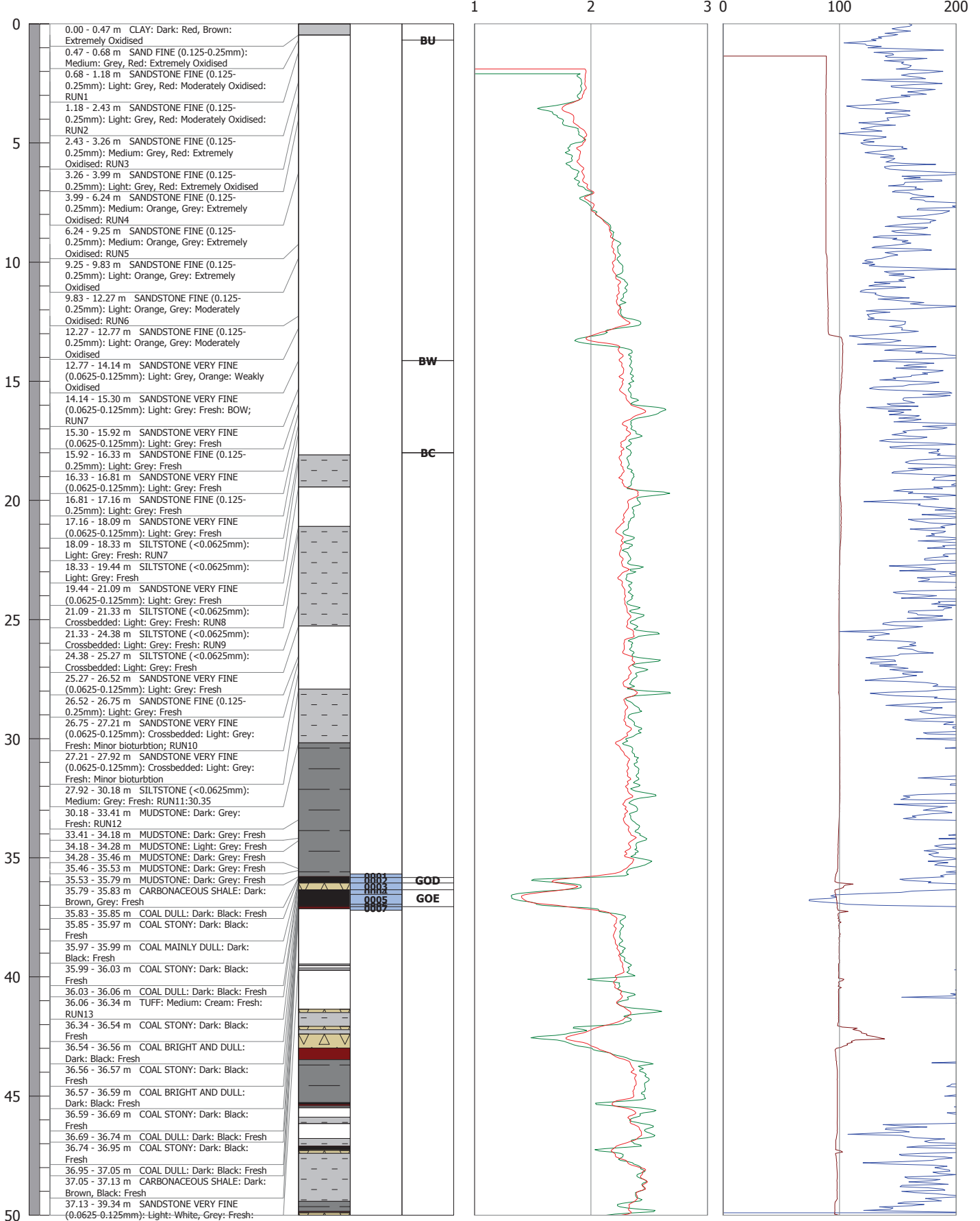
Easting: 231893.30

Northing: 6412109.84

Height: 301.35

LSD (g/cm³) - Red
SSD (g/cm³) - Green

Caliper (mm) - Maroon
Gamma (api) - Blue





Bylong: Drillhole Summary

Hole Number: BY0010CH Hole Type: Core Drilling

Date: 22/06/2011 Tenement: AUTH287

Total Depth: 147.52 m

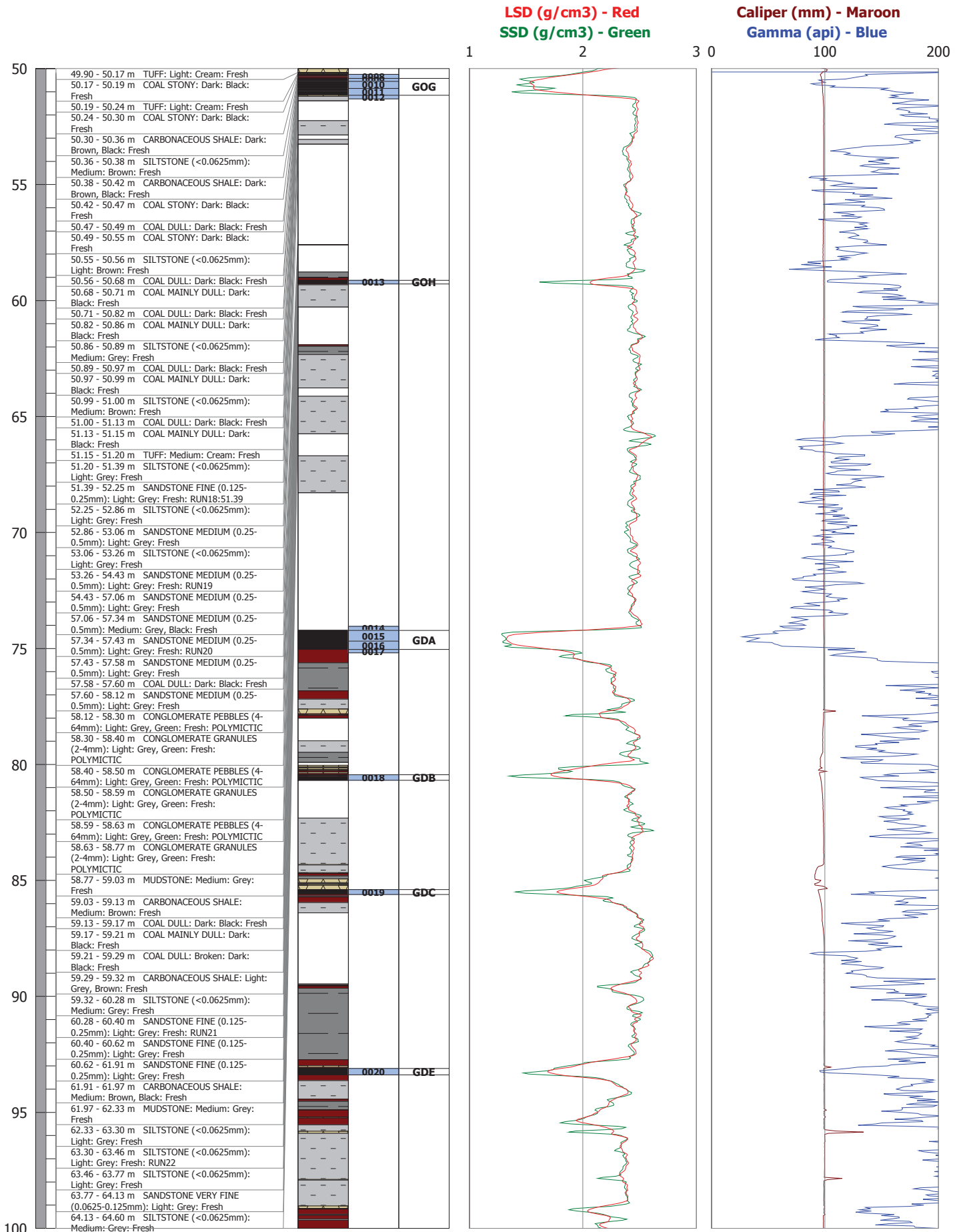
Area: Bylong Station

MGA94_56S

Easting: 231893.30

Northing: 6412109.84

Height: 301.35





Bylong: Drillhole Summary

Hole Number: BY0010CH Hole Type: Core Drilling

Date: 22/06/2011 Tenement: AUTH287

Total Depth: 147.52 m

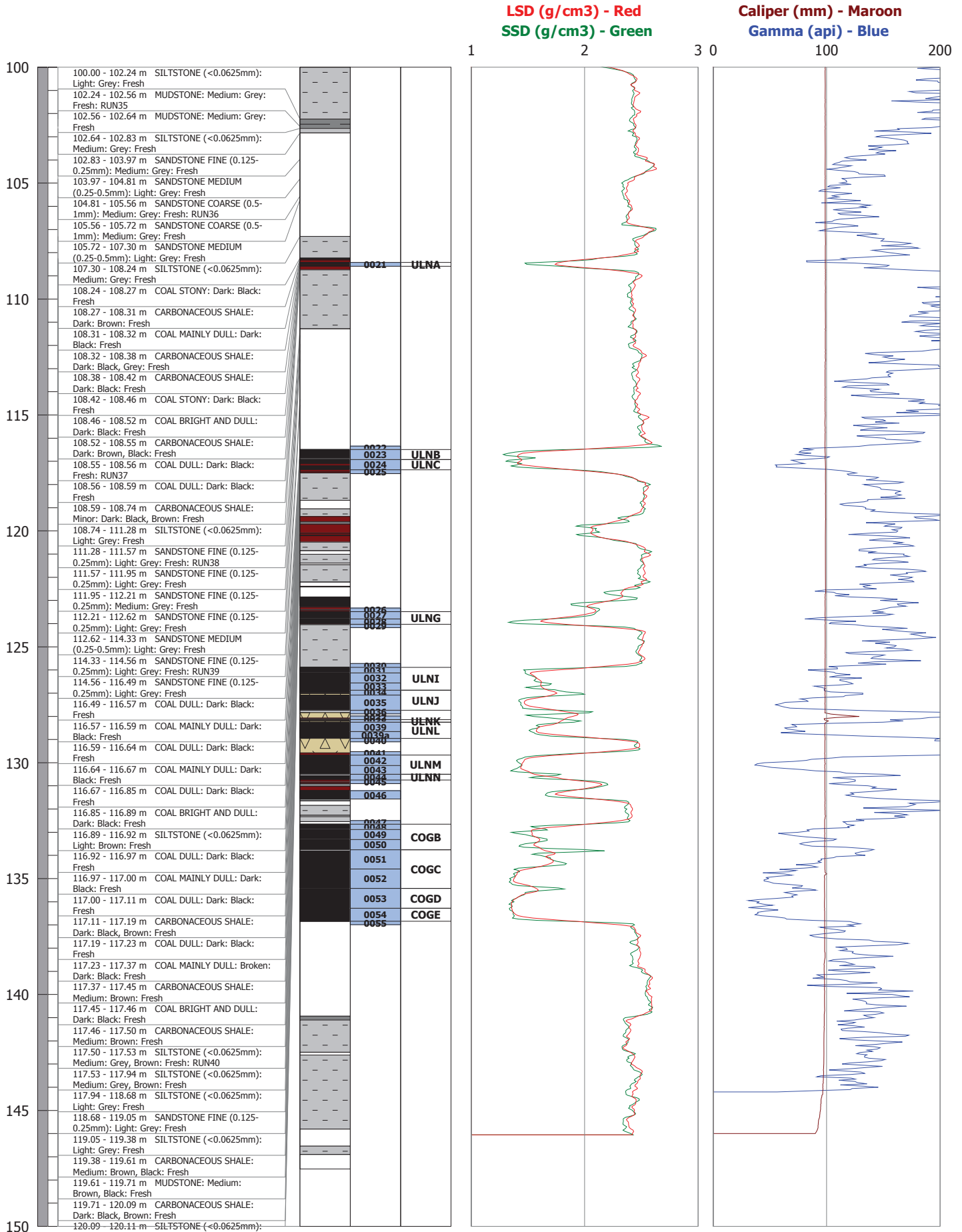
Area: Bylong Station

MGA94_56S

Easting: 231893.30

Northing: 6412109.84

Height: 301.35





Bylong: Drillhole Summary

MGA94_56S

Hole Number: BY0010CH Hole Type: Core Drilling

Easting : 231893.30

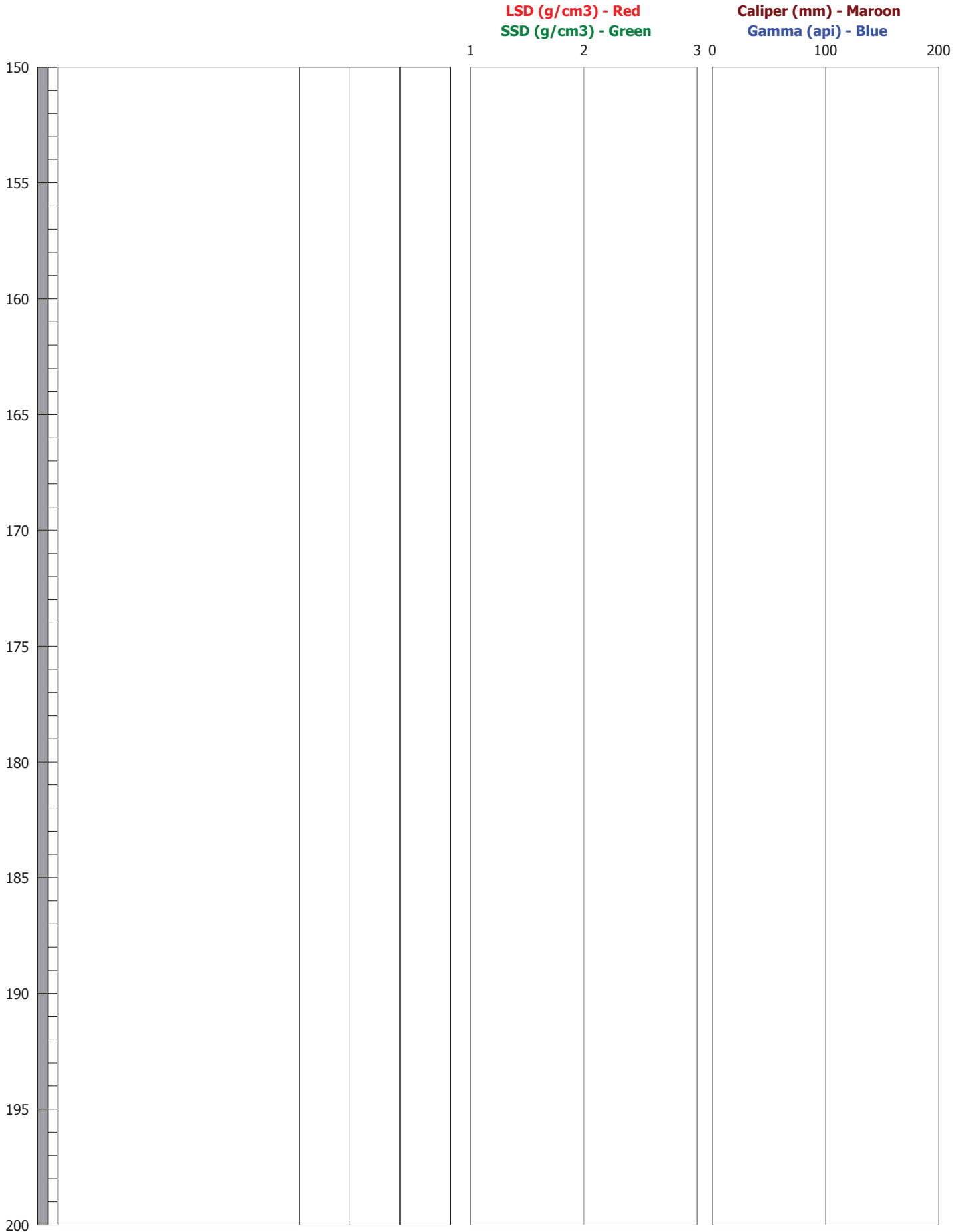
Date : 22/06/2011 Tenement: AUTH287

Northing : 6412109.84

Total Depth: 147.52 m

Area : Bylong Station

Height : 301.35





Bylong: Drillhole Summary

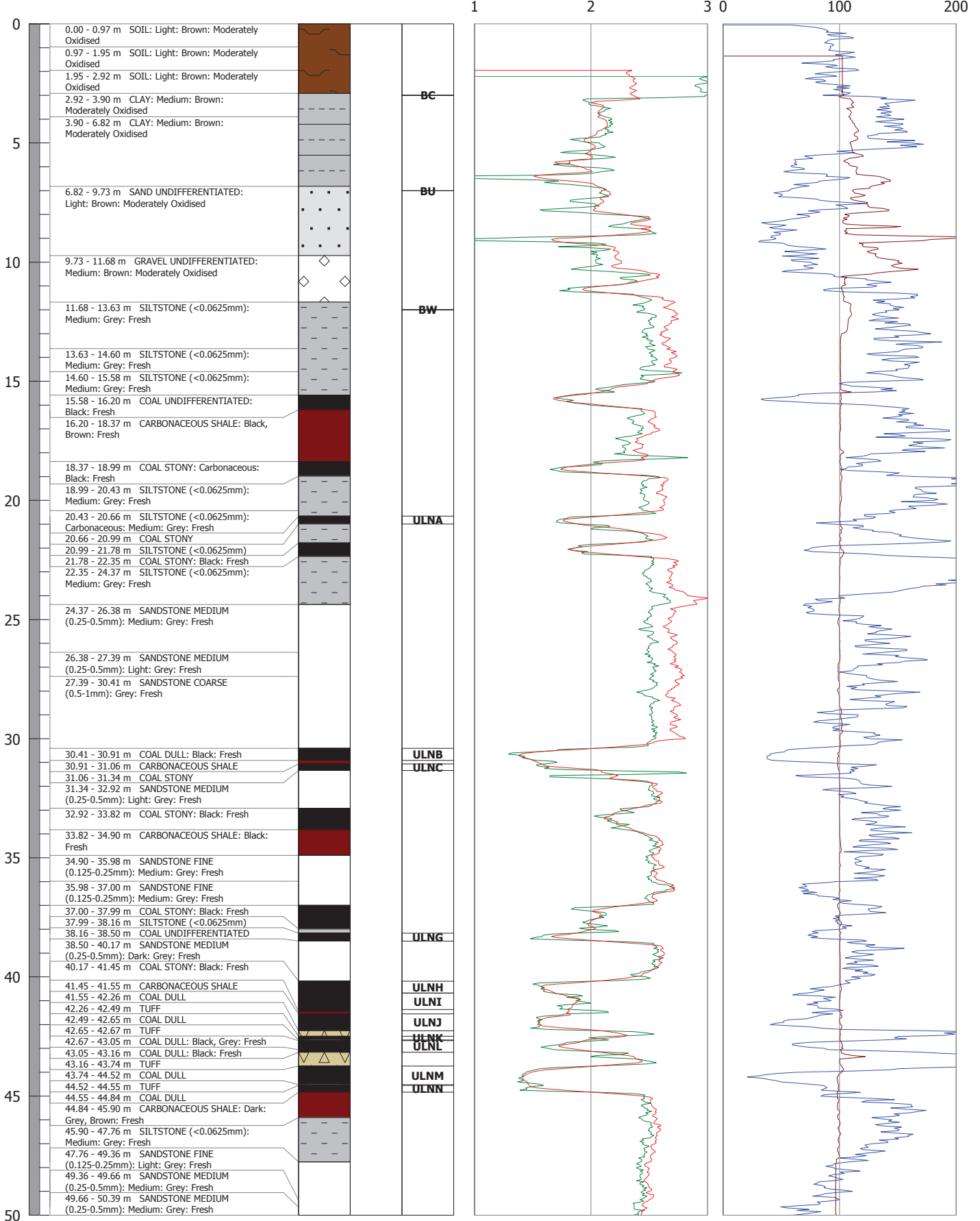
Hole Number: BY0014CHR **Hole Type:** Part Open/Core Drilling
Date: 28/07/2011 **Tenement:** AUTH287
Total Depth: 66.29 m **Area:** Bylong Station

MGA94_56S

Easting : 229612.00
Northing : 6410336.00
Height : 307.00

LSD (g/cm3) - Red
SSD (g/cm3) - Green

Caliper (mm) - Maroon
Gamma (api) - Blue





Bylong: Drillhole Summary

Hole Number: **BY0014CHR** Hole Type: Part Open/Core Drilling
 Date: 28/07/2011 Tenement: AUTH287
 Total Depth: 66.29 m Area: Bylong Station

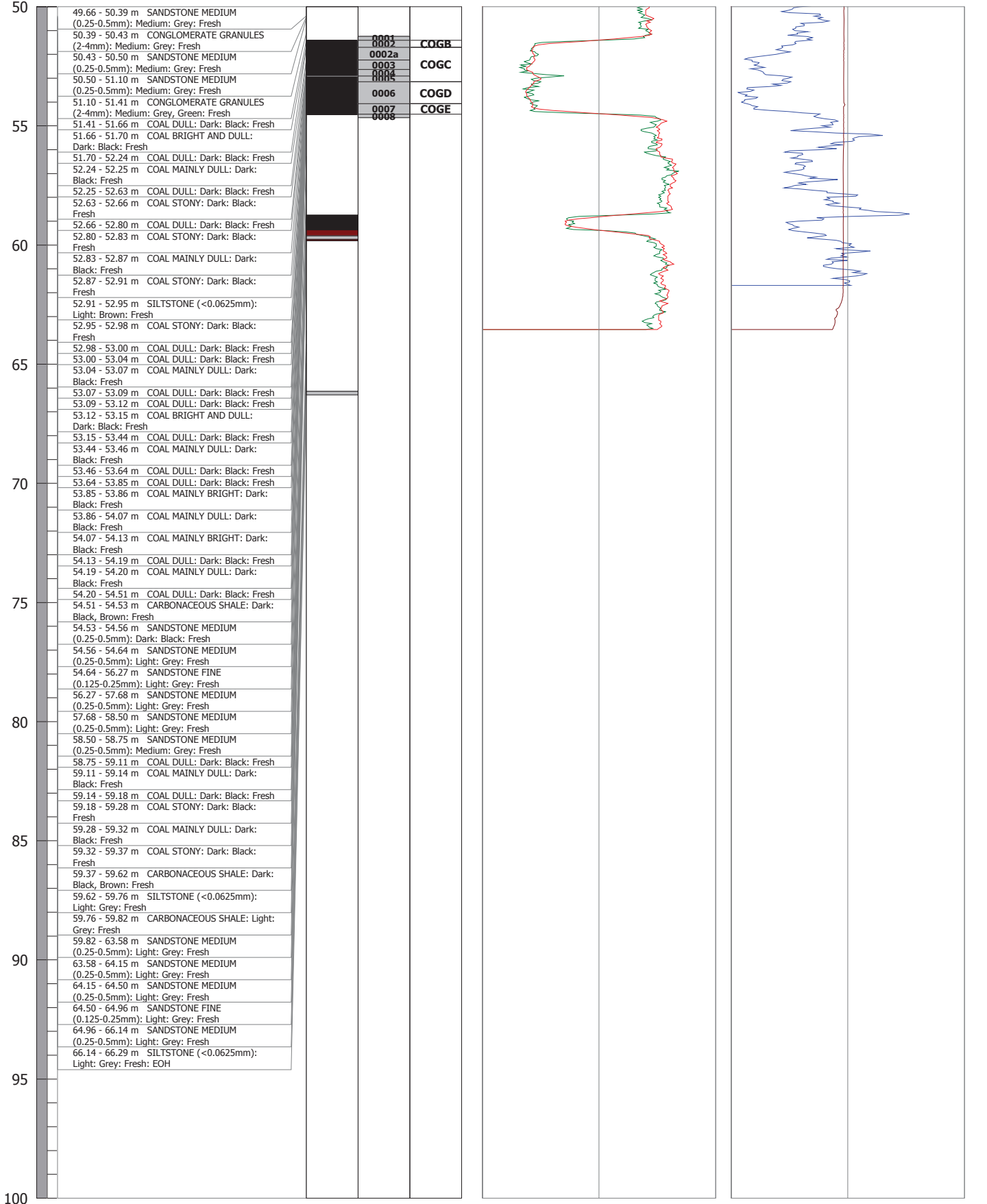
MGA94_56S

Easting : 229612.00
 Northing : 6410336.00
 Height : 307.00

LSD (g/cm3) - Red
 SSD (g/cm3) - Green

Caliper (mm) - Maroon
 Gamma (api) - Blue

1 2 3 0 100 200





Bylong: Drillhole Summary

Hole Number: BY0015CH Hole Type: Core Drilling

Date: 7/07/2011 Tenement: AUTH287

Total Depth: 102.70 m

Area: Bylong Station

MGA94_56S

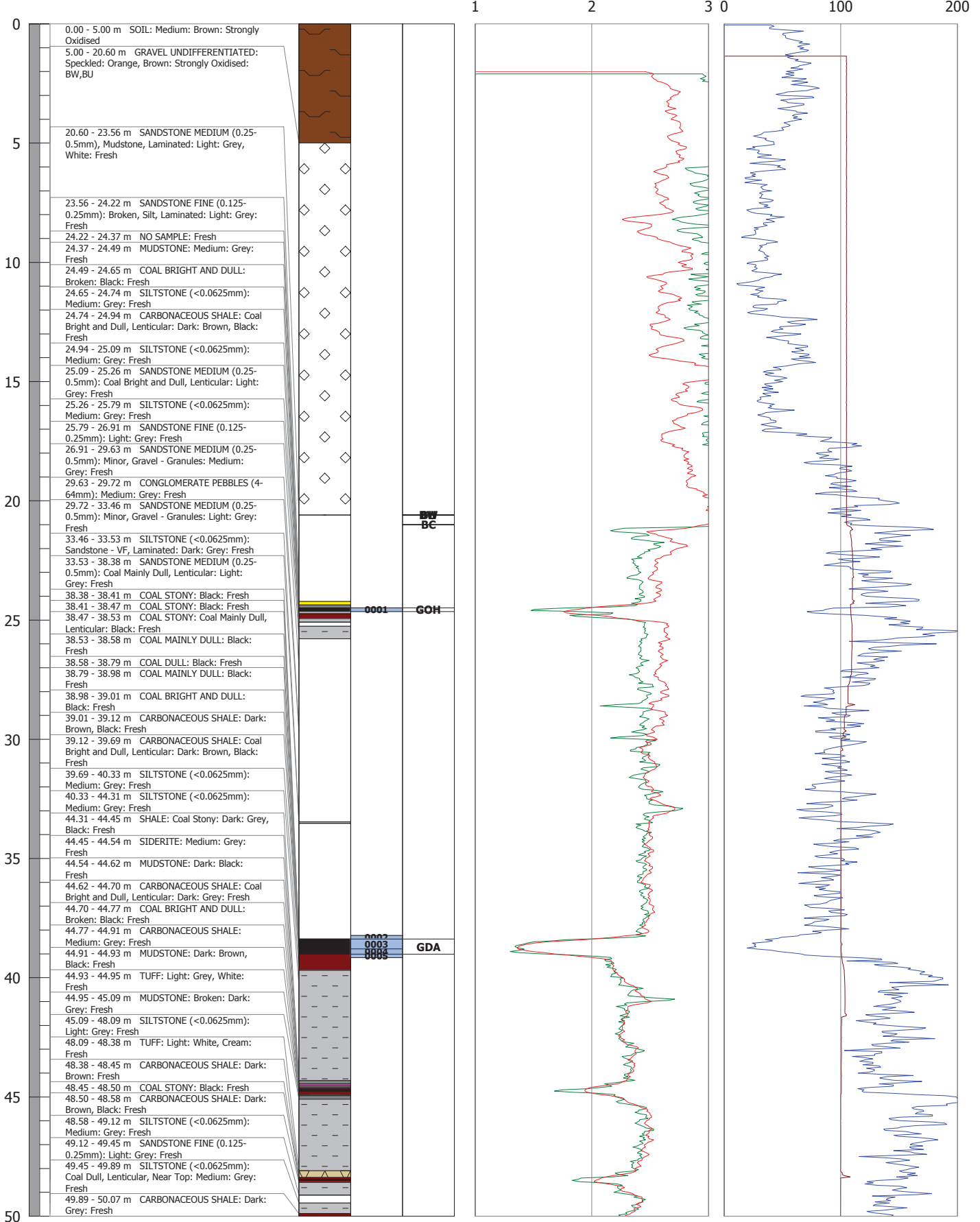
Easting: 230110.63

Northing: 6412947.60

Height: 247.24

LSD (g/cm³) - Red
SSD (g/cm³) - Green

Caliper (mm) - Maroon
Gamma (api) - Blue





Bylong: Drillhole Summary

Hole Number: BY0015CH Hole Type: Core Drilling

Date: 7/07/2011 Tenement: AUTH287

Total Depth: 102.70 m

Area: Bylong Station

MGA94_56S

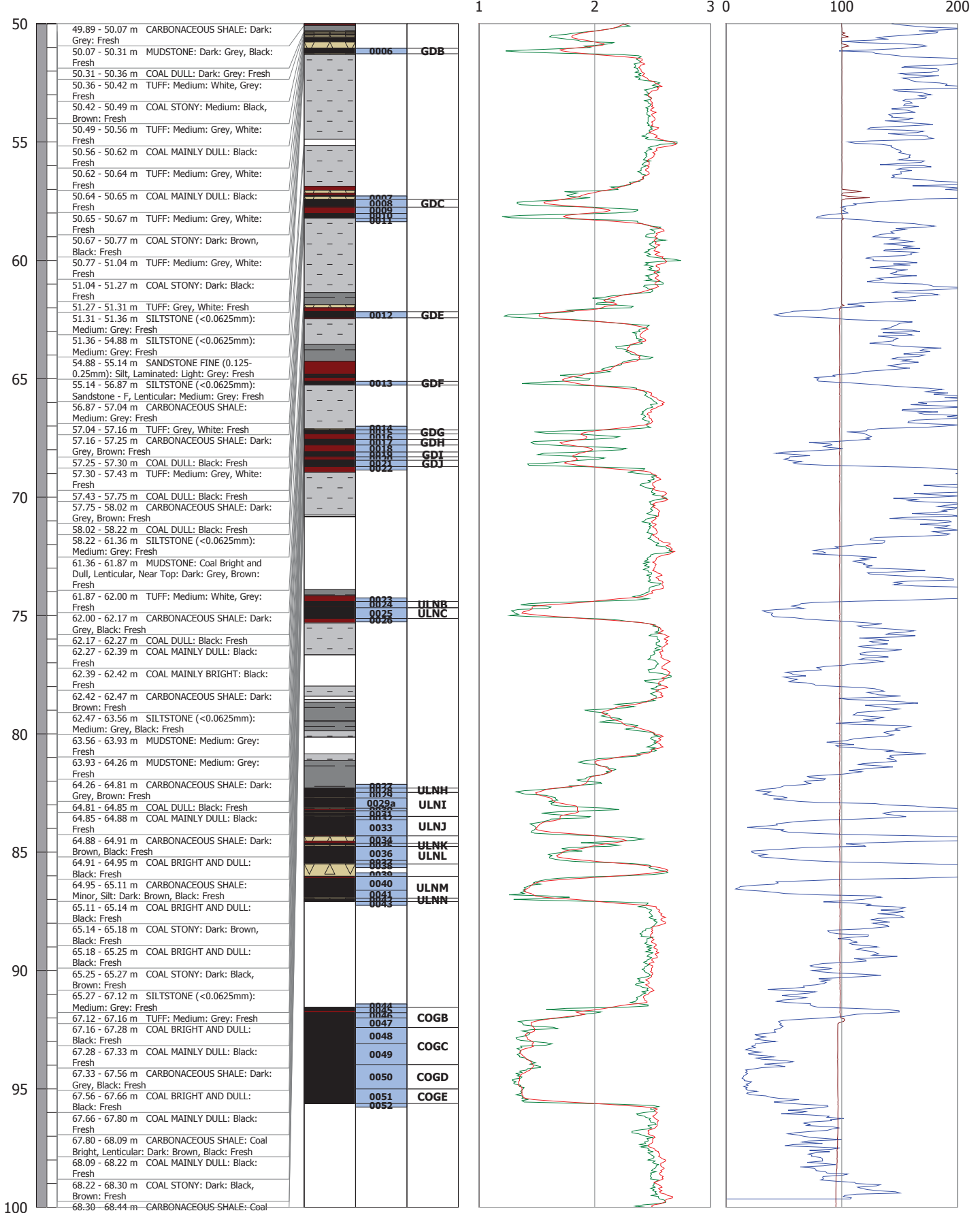
Easting: 230110.63

Northing: 6412947.60

Height: 247.24

LSD (g/cm3) - Red
SSD (g/cm3) - Green

Caliper (mm) - Maroon
Gamma (api) - Blue





Bylong: Drillhole Summary

MGA94_56S

Hole Number: BY0015CH Hole Type: Core Drilling

Easting : 230110.63

Date : 7/07/2011

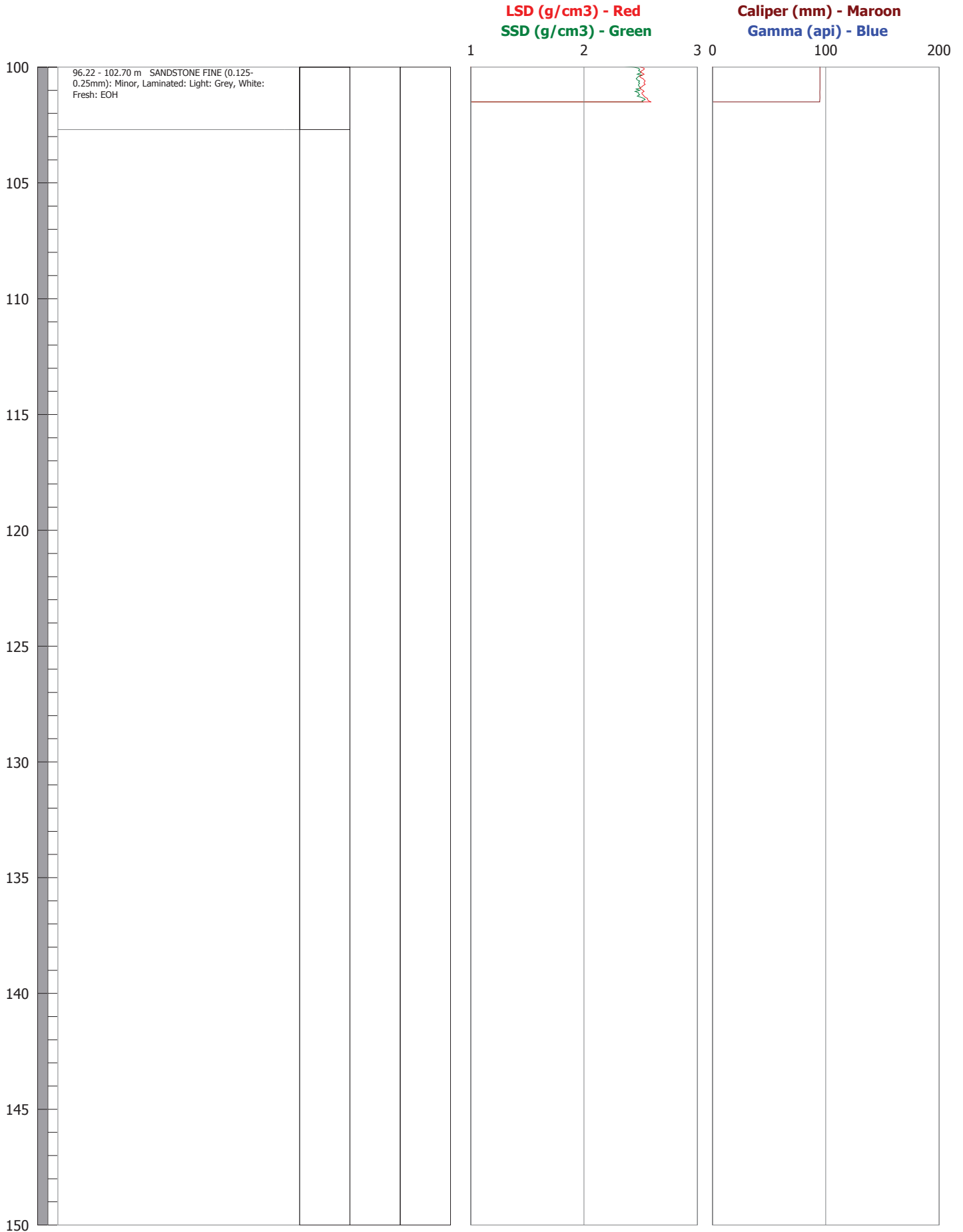
Tenement: AUTH287

Northing : 6412947.60

Total Depth: 102.70 m

Area : Bylong Station

Height : 247.24





Bylong: Drillhole Summary

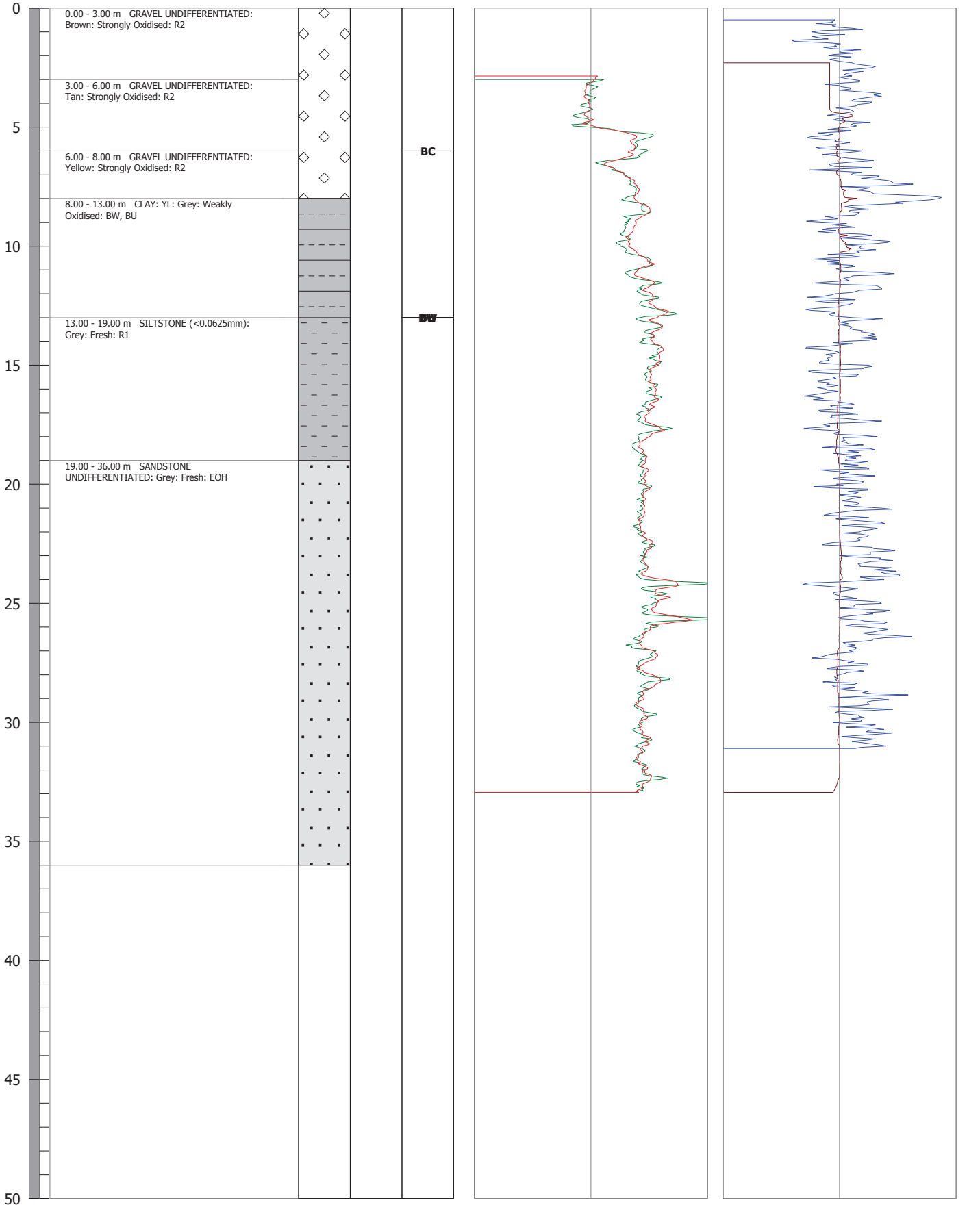
Hole Number: BY0020 **Hole Type:** Open (Chip) Drilling
Date: 14/07/2011 **Tenement:** AUTH342
Total Depth: 36.00 m **Area:** Harley Hill

MGA94_56S

Easting : 230571.56
Northing : 6401183.53
Height : 332.37

LSD (g/cm3) - Red
SSD (g/cm3) - Green

Caliper (mm) - Maroon
Gamma (api) - Blue



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 1 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments		Stickup=0.7m	
364	0.2	TOPSOIL - Red-brown silty gravelly sand topsoil, generally comprising fine to medium grained sand, fine to medium sized, rounded to subrounded gravel, humid			0.0				From 0m to 0.4m, bentonite	
365	0.5	BASALT - High strength, moderately weathered, grey with some brown, red-brown and yellow, highly fractured / fragmented basalt		C						
		CORE LOSS - (0.5m to 2.37m)			1.85					
366	2.37	BASALT - High strength, moderately weathered, grey with some brown, red-brown and yellow, highly fractured / fragmented basalt		C	2.47					
				C	2.72					
				C	2.93					
367	3.16	CORE LOSS - (3.16m to 3.52m)		C						
368	3.52	BASALT - High strength, moderately weathered, grey with some brown, red-brown and yellow, highly fractured / fragmented basalt		C	3.52					
				C	3.77					
				C	4.03					
369	4.27	CORE LOSS - (4.27m to 4.36m)		C	4.3					
	4.36	BASALT - High strength, moderately weathered, grey with some brown, red-brown and yellow, highly fractured / fragmented basalt		C	4.76					
370	6.59	CORE LOSS - (6.59m to 6.63m)		C	6.59				From 0.4m to 11.4m, grout	
371	6.63	BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt		C						
				C	8.01					
372				C	8.7					
				C	9.25					
				C	9.64				From 0.7m to 17.0m, Class 18 PVC Casing	

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 3 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
364		BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt (continued)	XX	C					From 17.0m to 23.0m, Class 18 PVC Screen	
	20.46		XX	C	20.46					
	20.57	CORE LOSS - (20.46m to 20.57m)	XX	C						
	20.88	BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt	XX	C	20.88					
	21.20.96	CORE LOSS - (20.88m to 20.96m)	XX	C						
		BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt	XX	C	21.46					
			XX	C	21.98					
		From 22.29m, extremely weathered	XX	C	22.38					
			XX	C	23.38					
			XX	C	23.98					
			XX	C	24.08					
			XX	C	24.64					
			XX	C	26.73					
			XX	C	27.11					
			XX	C	27.67					
			XX	C	28.65					
	28.65	CORE LOSS - (28.65m to 28.87m)	XX	C						
	28.87	BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt	XX	C	29.25					
		From 29.19m, extremely weathered	XX	C	29.65					
	29.65	CORE LOSS - (29.65m to 29.75m)	XX	C						
	29.75		XX	C						

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 4 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
394		BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt (continued)	X X X X X X	C	30.35					
31	31.05	SANDSTONE - Medium strength, extremely weathered, orange, fine grained sandstone CORE LOSS - (31.05m to 31.86m)	X X		31.05				31	
32	32.16	SANDSTONE - Medium to high strength, extremely weathered, orange fine grained sandstone with some tuff From 32.05m to 32.09m, low strength	X X	C					32	
33	33.04	SANDSTONE - High strength, moderately to slightly weathered, grey, fine to medium grained sandstone with trace to some siltstone (heat affected until 33.04m)	X X		33.23		PL(A) = 1.49 PL(D) = 1.16		33	
34		From 33.65m, slightly weathered			33.65				34	
35		From 34.3m, slightly weathered to fresh								
35		From 34.82m, medium strength, fresh		C	35.0		PL(A) = 0.48 PL(D) = 0.31		35	
36		At 35.4m, coal lense, 2mm thick								
36				GT001	35.98				36	
37					36.28		PL(A) = 0.53 PL(D) = 0.36			
37					36.32					
37					36.75				37	
38		From 38.0m, low to medium strength		C	38.09		PL(A) = 0.37 PL(D) = 0.27		38	
39									39	
				C	39.73					

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 6 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
414		SANDSTONE - High strength, moderately to slightly weathered, grey, fine to medium grained sandstone with trace to some siltstone (heat affected until 33.04m) <i>(continued)</i>		C	50.24		PL(A) = 0.51 PL(D) = 0.32		
51									
415					51.72		PL(A) = 0.89 PL(D) = 0.62		
52							51.76		
416				C	53.35		PL(A) = 0.47 PL(D) = 0.33		
53									
417		From 54.69m, low to medium strength			54.69				
54									
418				C	55.25		PL(A) = 0.57 PL(D) = 0.25		
55									
419					57.68				
56									
420				C	58.01	GT003	PL(A) = 0.26 PL(D) = 0.35		
57							58.04		
421					59.67		PL(A) = 0.34 PL(D) = 0.24		
58									
422									59

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 7 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
424		SANDSTONE - High strength, moderately to slightly weathered, grey, fine to medium grained sandstone with trace to some siltstone (heat affected until 33.04m) <i>(continued)</i>	[Dotted pattern]	C						
61	60.71									
425		From 60.78 to 60.83m, siderite band								
62	61.7			C			PL(A) = 0.21 PL(D) = 0.14			
426		From 63.28m to 63.3m, tuff band From 63.59m to 64.08m, very low strength	[Dotted pattern]							
64	63.59 63.63							PL(A) = 0.09 PL(D) = 0.04		
427		From 65.31m, very low to low strength	[Dotted pattern]							
65	65.2							PL(A) = 0.27 PL(D) = 0.06		
428		MUDSTONE - Fresh, dark grey mudstone								
66	66.23			C			PL(A) = 0.46 PL(D) = 0.06			
429		From 68.4m, medium strength with some siltstone	[Horizontal line pattern]							
67	66.61									
430			[Horizontal line pattern]							
68	68.14							PL(A) = 0.41 PL(D) = 0.27		
431			[Horizontal line pattern]							
69	68.51 68.55 68.82							PL(A) = 0.7 PL(D) = 0.2		
432										
69	69.61			C						

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		sp	Standard penetration test
		S	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 9 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
444		SANDSTONE AND SILTSTONE - Low to medium strength, fresh, grey to dark grey fine to medium grained sandstone interbedded with siltstone bands up to 10mm thick (<i>continued</i>)					PL(D) = 0.16			
81	80.89	MUDSTONE - Medium to high strength, fresh, dark grey mudstone		C						
445		From 81.43m, trace very low strength tuff bands					PL(A) = 1.47 PL(D) = 0.16			
82										
446		From 82.13m, low to medium strength, interbedded fine to medium grained sandstone					PL(A) = 0.38 PL(D) = 0.21			
83										
447		SANDSTONE - Medium to high strength, fresh, grey, fine to medium grained sandstone		C						
84										
448							PL(A) = 1.78 PL(D) = 1			
85										
449		MUDSTONE - Medium to high strength, fresh, black coal with trace high tuff bands up to 60mm thick								
86	85.25									
450		COAL - Medium to high strength, fresh, black coal with trace high strength tuff bands up to 60mm thick		C						
87	86.93						PL(A) = 0.63 PL(D) = 0.45 PL(D) = 0.13			
451		SILTSTONE - Medium to high strength, fresh, dark grey siltstone with some fine to medium grained sand								
88	87.88									
452		SANDSTONE - High strength, fresh, grey to dark grey fine to coarse grained sandstone with trace to some siltstone bands up to 30mm thick								
89							PL(A) = 0.05 PL(D) = 0.57			
							PL(A) = 1.11 PL(D) = 0.78			
							PL(A) = 2.13 PL(D) = 1.55			

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 10 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
454		SANDSTONE - High strength, fresh, grey to dark grey fine to coarse grained sandstone with trace to some siltstone bands up to 30mm thick (<i>continued</i>) From 90.28m to 91.00m, medium to high strength, fine sized pebbly sandstone	[Dotted pattern]	C	90.61 90.65		PL(A) = 1.36 PL(D) = 1.05			
91									91	
455										
92										92
456				C	92.54		PL(A) = 2.4 PL(D) = 1.76			
93									93	
457										
94									94	
458										
95				C	95.41 95.44 95.74	GT012	PL(A) = 4.09 PL(D) = 3.71			
459										
96									96	
460										
96.9					96.43 96.65		PL(A) = 3.1 PL(D) = 2.26			
461		MUDSTONE - Medium to high strength, fresh, dark brown mudstone with some coal lenses up to 10mm thick	[Horizontal lines]							
97					97.39		PL(A) = 1.28 PL(D) = 0.27		97	
462										
98				C	98.27		PL(A) = 1.39 PL(D) = 0.48		98	
463		SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick	[Horizontal lines]							
99					99.49				99	
				C						

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 11 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
464	100.57	SANDSTONE - Medium to high strength, fresh, grey to dark grey fine to coarse grained sandstone	[Pattern]	GT013	100.26		PL(A) = 1.01 PL(D) = 0.93			
	100.56 100.59									
465	101	From 102.00m, high strength with trace fine sized gravel	[Pattern]	C						
466	102									
467	103		[Pattern]	GT014	102.6		PL(A) = 2.32 PL(D) = 1.57			
	103				102.96 102.99					
468	103.59	COAL - Medium to high strength, fresh black coal	[Pattern]	C			PL(A) = 0.24 PL(D) = 0.33			
	104				103.96 104.0 GT015 104.2					
469	104.74	SILTSTONE - Medium to high strength, fresh, dark grey siltstone with trace to some fine grained sand	[Pattern]	C			PL(A) = 0.61 PL(D) = 0.37			
	105				105.19 GT016 105.22 105.46 105.6					
470	106	From 106.38m to 106.86m, carbonaceous	[Pattern]	C			PL(A) = 1.73 PL(D) = 1.78			
	107				106.39 106.57					
471	107.21	TUFF - Very low to low strength, fresh, light grey tuff From 107.43m, medium strength	[Pattern]	GT017	107.32		PL(A) = 0.38 PL(D) = 0.18			
	107				107.42					
472	107.81	COAL - Medium to high strength, fresh black coal At 107.86m, extremely low to very low strength, tuff band 20mm thick	[Pattern]	C			PL(A) = 0.58 PL(D) = 0.17			
	108				107.7 107.74					
	108.22	MUDSTONE - Medium to high strength, fresh, grey mudstone	[Pattern]	C			PL(A) = 0.52 PL(D) = 0.33			
	109	SILTSTONE AND SANDSTONE - Medium strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick	[Pattern]		108.6					
	109.94									

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 12 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
474	110.46	MUDSTONE - Medium to high strength, fresh, grey mudstone <i>(continued)</i>			110.26		PL(A) = 4.26 PL(D) = 2.67			
	111.11	COAL - Medium to high strength, fresh black coal From 110.51m, interbedded tuff bands up to 90mm thick		C						
475	111.57	SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick			111.57			111		
476	112.16				112.16		PL(A) = 1.82 PL(D) = 0.3	112		
477	114.22			C	114.22			113		
478	114.56				114.56		PL(A) = 0.82 PL(D) = 0.6	114		
479	116.35	MUDSTONE/COAL - Medium strength, fresh, dark brown to black mudstone/coal with some extremely low to very low strength tuff bands up to 110mm thick			116.31		PL(A) = 0.59 PL(D) = 0.12	115		
480	117.28	SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick			117.56		PL(A) = 1.71 PL(D) = 0.89	116		
481	117.6				117.6			117		
482	118.33				118.33			118		
	118.66			GT018	118.66		PL(A) = 2.19 PL(D) = 1.01	119		
	118.7			C	118.7					
	119.23	MUDSTONE - Medium to high strength, fresh, dark brown mudstone with some siderite								
	120.0				120.0		PL(A) = 2.88			

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 13 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
364		MUDSTONE - Medium to high strength, fresh, dark brown mudstone with some siderite (<i>continued</i>)	[Hatched Pattern]	C			PL(D) = 1.18			
	121				120.57				121	
	122			C					122	
		From 122.60m to 122.81m, coal band								
	123				122.87		PL(A) = 1.03 PL(D) = 0.9		123	
		From 123.08m, thinly laminated with tuff								
	124				123.57				124	
	124				124.32		PL(A) = 1.18 PL(D) = 0.63		124	
		From 124.71m, coal with some calcite								
124.92		SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick	[Horizontal Dashed Pattern]	C					125	
	126				126.13				126	
		From 125.97m, trace to some tuff laminations up to 2mm thick			126.33	GT019	PL(A) = 0.97 PL(D) = 0.35			
					126.37					
	127								127	
		From 127.40m to 127.86m, carbonaceous mudstone with trace coal lenses up to 2mm thick								
	128			C	127.72		PL(A) = 1.55 PL(D) = 0.44		128	
		From 127.86m, high strength								
	129				128.57		PL(A) = 2.61 PL(D) = 1.19		129	
	129.71	SANDSTONE - High strength, fresh, grey fine to coarse grained sandstone	[Horizontal Dotted Pattern]	C						

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 14 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
494		SANDSTONE - High strength, fresh, grey fine to coarse grained sandstone (<i>continued</i>)								
131					130.6		PL(A) = 2.12 PL(D) = 1.81			
495				C					131	
132									132	
496		From 132.35m, trace to some fine to medium sized gravel			132.46 132.5		PL(A) = 1.85 PL(D) = 1.66			
497									133	
134				C	134.01		PL(A) = 2.53 PL(D) = 1.86		134	
498									135	
135									135	
499					135.56				136	
136									136	
500									137	
137					136.71 136.75	GT020	PL(A) = 0.69 PL(D) = 1.27		137	
501				C	137.07				138	
138									138	
502									139	
138.46		CARBONACEOUS MUDSTONE - High strength, fresh, dark brown mudstone with some coal lenses up to 5mm thick			138.42 138.57		PL(A) = 3.34 PL(D) = 0.51			
138.96		SANDSTONE - High to very high strength, fresh grey fine to medium grained sandstone		C						

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 15 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details							
				Type	Depth	Sample		Results & Comments							
504	140.33	SANDSTONE - High to very high strength, fresh grey fine to medium grained sandstone (continued)		C											
	141.53														
	142.19														
	142.36														
505	142.71	CARBONACEOUS MUDSTONE - High strength, fresh, dark brown mudstone with some coal lenses up to 5mm thick		C											
	143.17														
506	143.17	From 142.94m, slightly tuffy													
	143.38	COAL - High strength, fresh, black coal													
	143.42														
507	144.05	SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick													
	144.22														
	144.26														
	144.52														
508	145.3														
509	146.24														
510	147.62														
511	148.5	SANDSTONE - Medium strength, fresh, fine to medium grained sandstone		C											
512	149														

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test ts(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test ts(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 16 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
514		SANDSTONE - Medium strength, fresh, fine to medium grained sandstone (continued)		C						
					150.56		PL(D) = 0.05			
					150.59					
	151	From 150.98m, fine to coarse grained with trace fine sized gravel								151
515										
	152			C	151.96		PL(A) = 0.9 PL(D) = 1.86			152
				C	151.99					
				GT024	152.3		PL(A) = 0.74 PL(D) = 0.42			
					152.33					
	152.51	MUDSTONE - Medium strength, dark brown carbonaceous mudstone								
					152.82		PL(A) = 1.55 PL(D) = 0.04			153
	153	From 153.10m, slightly fine to medium grained sandy								
517										
	154				153.6					
					154.1		PL(A) = 2.42 PL(D) = 0.44			154
518										
					154.5		PL(A) = 3.34 PL(D) = 0.2			
					154.54					
	155			C						155
				GT025						
519										
	155.49	COAL - High strength, fresh, black coal								
					155.93					156
520										
	156.15	SANDSTONE - High strength, fresh, dark grey fine grained sandstone with some siltstone bands up to 20mm thick								
					156.57					157
521										
	158				157.7		PL(A) = 2.75 PL(D) = 1.18			
				GT026	157.74					
					157.96					158
522										
	158.52	From 158.36m, carbonaceous siltstone								
		COAL - Medium to high strength, fresh, black coal					PL(A) = 2.16 PL(D) = 0.66			
					158.51					
	159	From 159.19m, trace calcite and siderite								159
					159.18		PL(A) = 1.39 PL(D) = 0.05			
				GT027	159.21					
					159.49					
					159.57					
					159.83		PL(A) = 1.13 PL(D) = 0.38			

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		sp	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 17 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
524		COAL - Medium to high strength, fresh, black coal (continued)	█		160.33		PL(A) = 0.84 PL(D) = 0.98			
		From 160.52m to 160.91m, low to medium strength, tuff band				160.6		PL(A) = 0.27		
161				C					161	
161.48		TUFF - High to very high strength, fresh, light grey tuff	∇							
162			∇		161.93		PL(A) = 3.55 PL(D) = 2.01		162	
162.09		COAL - Medium to high strength, fresh, black coal	█		162.37		PL(A) = 3.2 PL(D) = 0.58			
						162.55				
163									163	
163.22		SILTSTONE - Medium to high strength, fresh, dark grey siltstone with some fine to medium grained sand and trace to some fine to medium sized gravel	—		163.55		PL(A) = 2.76 PL(D) = 1.33			
164			—	GT028	163.59					
			—		163.84				164	
165				C						
					164.25		PL(A) = 2.46 PL(D) = 0.74			
					164.4		PL(D) = 1.18			
					164.5		PL(D) = 0.78			
					164.6		PL(D) = 0.92			
					164.71		PL(D) = 0.95			
					164.79		PL(D) = 0.47			
					164.92		PL(D) = 0.86			
165.15		SANDSTONE - Medium to high strength, fresh, grey to dark grey fine to coarse grained sandstone, quartzone in parts	▤		165.03		PL(D) = 0.78			
						165.19		PL(D) = 0.32		
						165.29		PL(D) = 0.51		
						165.39		PL(D) = 0.35		
						165.52		PL(D) = 0.56		
						165.55		PL(D) = 0.73		
						165.62		PL(D) = 0.42		
						165.72		PL(D) = 0.67		
						165.82		PL(D) = 2.09		
						165.92		PL(D) = 1.17		
						166.03		PL(D) = 1.37		
						166.13		PL(D) = 1.38		
						166.23		PL(D) = 1.12		
						166.33		PL(D) = 0.45		
						166.44		PL(D) = 0.94		
					C	166.54		PL(D) = 0.87		
						166.64		PL(D) = 1.47		
						166.74		PL(D) = 1.12		
						166.83		PL(D) = 1.46		
						166.94		PL(D) = 0.92		
				GT029	167.04		PL(D) = 0.84			
					167.14		PL(D) = 1.27			
					167.24		PL(D) = 0.7			
168		From 168.00m, low to medium strength			167.34		PL(D) = 0.67			
					167.48		PL(A) = 1.45 PL(D) = 1.09			
					167.55		PL(D) = 1.69			
					167.59		PL(D) = 2.06			
					167.84		PL(D) = 0.26			
					167.9		PL(D) = 0.2			
					168.0		PL(D) = 0.48			
					168.1		PL(D) = 0.63			
					168.2		PL(D) = 0.55			
				C	168.3		PL(D) = 0.61			
					168.4		PL(D) = 0.67			
					168.5		PL(D) = 0.93			
					168.54		PL(D) = 0.51			
					168.6		PL(D) = 0.51			
					168.7		PL(D) = 0.87			
169									169	
169.25		COAL - Medium to high strength, fresh, black coal	█							

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		sp	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 18 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details		
				Type	Depth	Sample				
534		COAL - Medium to high strength, fresh, black coal (continued)	[Redacted]		168.8		PL(D) = 0.45			
					168.9		PL(D) = 0.57			
					169.0		PL(A) = 0.8			
					169.1		PL(D) = 0.33			
					169.2		PL(D) = 0.45			
					170.15					
					170.22					
171					171.05		PL(A) = 0.68			
535					GT030 171.09		PL(D) = 0.26	171		
					171.32		PL(A) = 1.12			
			171.35		PL(D) = 0.23					
			171.45							
172						172				
536										
173				C	173.01		PL(A) = 2.17 PL(D) = 0.57	173		
537										
173.33		SANDSTONE - High to very high strength, fresh, grey fine to coarse grained sandstone	[Redacted]		173.4		PL(A) = 2.77			
					GT031 173.44		PL(D) = 2.09			
					173.64					
174								174		
538										
							174.47		PL(A) = 3.15	
							174.5		PL(D) = 1.41	
175								175		
539										
176						C	176.14		PL(A) = 3.57 PL(D) = 2.65	176
540										
177						177				
541										
					177.51					
178					177.97		PL(A) = 3.51	178		
542					178.04		PL(D) = 1.88 PL(A) = 3.88 PL(D) = 2.48			
179				C	179.04		PL(A) = 2.98 PL(D) = 0.57	179		
		From 178.70m, trace to some siltstone laminations up to 2mm thick								
							PL(A) = 2.8			

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 19 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample				Results & Comments
544	180.02	SANDSTONE - High to very high strength, fresh, grey fine to coarse grained sandstone (continued)		C	180.02		PL(D) = 1.14		
545	180.65	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone, thinly laminated with trace to some siltstone			180.57 180.65				181
546	181	From 181.63m to 181.87m, siltstone band thinly laminated with some fine to medium strength sandstone							182
547	182				182.7 GT032 182.74 C 183.0		PL(A) = 3.26 PL(D) = 1.8		183
548	183	From 183.86m to 183.90m, carbonaceous siltstone band							184
549	184	From 184.26m to 184.36m, fine to coarse grained sand							185
550	185	From 184.55m to 184.18m, conglomerate (fine to medium gravel in a fine to coarse sand matrix)							186
551	185	From 185.05m to 185.11m, carbonaceous siltstone			185.08 185.1		PL(A) = 2.58 PL(D) = 1.67		187
552	186	From 185.69m to 185.77m, low strength tuff			185.63 185.82				188
553	186.2	From 186m, grading into laminite							189
554	186.2	LAMINITE - High to very high strength, fresh, grey laminite		C	186.64 186.9		PL(A) = 3.65 PL(D) = 1.38		
555	187.17	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone							
556	187.47	SILTSTONE - High strength, fresh, grey siltstone							
557	188								
558	188.85	TUFF - Medium strength, fresh, grey tuff			188.78 GT033 188.82 188.91		PL(A) = 1.63		
559	188.97	From 188.95m to 188.97m, very low strength							
560	189	SILTSTONE - High strength, fresh, grey, siltstone							

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 20 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
554	190.62	SILTSTONE - High strength, fresh, grey, siltstone (continued) From 190.4m, grading into sandstone								
555	191	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone laminated with trace siltstone						191		
556	191.91	SILTSTONE / SANDSTONE - High strength, fresh, grey siltstone interbedded with fine to medium grained sandstone up to 400mm thick, spaced up to 300mm apart								
557	192	At 192.39m, very low strength clay seam								
558	193	From 192.5m to 192.98m, very high strength, fine to medium grained sandstone band, laminated with trace siltstone								
559	193	At 192.76m, very low strength clay seam								
560	194									
561	195									
562	196	From 195.31m to 195.36m, medium strength, thinly laminated with very low strength clay seams								
563	196	From 195.42m to 195.44m, very low strength clay seam								
564	196	From 195.91m to 195.64m, medium strength, thinly laminated with very low strength clay seams								
565	196	From 196.23m to 197.12m, medium strength, thinly laminated with very low strength clay seams								
566	197									
567	198	From 197.63m to 197.68m, medium strength, thinly laminated with very low strength clay seams								
568	198	From 197.88m to 198.25m, medium strength, thinly laminated with very low strength clay seams								
569	198	From 198.34m to 198.54m, medium strength, thinly laminated with very low strength clay seams								
570	199	From 199.02m to 199.15m, medium strength, thinly laminated with very low strength clay seams								
571	199									
572	199									

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		SP	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 21 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details
				Type	Depth	Sample	Results & Comments		
564	200.42	From 200.33m to 200.42m, very low strength clay seam	GT035		200.0 200.2				
		SILTSTONE - Medium to high strength, fresh, grey siltstone							
565	201	From 201.14m to 201.2m, low strength, very thinly laminated with clay seams	C						
566	202								
567	203	From 203.0m, medium strength From 203.08m to 203.12m, tuffaceous siltstone From 203.2m to 203.3m, tuffaceous siltstone			203.06		PL(A) = 0.96		
568	203.59	Bore discontinued at 203.59m, limit of investigation			203.59				
569	204								
570	205								
571	206								
572	207								
	208								
	209								

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 1 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction	
				Type	Depth	Sample	Results & Comments		Stickup=0.6m	Details
364	0.2	TOPSOIL - Red-brown silty gravelly sand topsoil, generally comprising fine to medium grained sand, fine to medium sized, rounded to subrounded gravel, humid			0.0				From 0m to 0.4m, asphalt	
365	0.5	BASALT - High strength, moderately weathered, grey with some brown, red-brown and yellow, highly fractured / fragmented basalt		C						
		CORE LOSS - (0.5m to 2.37m)			1.85					
366	2.37	BASALT - High strength, moderately weathered, grey with some brown, red-brown and yellow, highly fractured / fragmented basalt		C	2.47					
				C	2.72					
				C	2.93					
367	3.16	CORE LOSS - (3.16m to 3.52m)		C						
368	3.52	BASALT - High strength, moderately weathered, grey with some brown, red-brown and yellow, highly fractured / fragmented basalt		C	3.52					
				C	3.77					
				C	4.03					
369	4.27	CORE LOSS - (4.27m to 4.36m)		C	4.3					
	4.36	BASALT - High strength, moderately weathered, grey with some brown, red-brown and yellow, highly fractured / fragmented basalt		C	4.76					
370				C						
371	6.59	CORE LOSS - (6.59m to 6.63m)		C	6.59					
	6.63	BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt		C						
372				C	8.01					
				C	8.7					
				C	9.25					
				C	9.64					

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 2 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
374		BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt (continued)	X X X X X X X X X X	C						
			X X X X X X X X X X		10.62					
11			X X X X X X X X X X	C						
375			X X X X X X X X X X		11.25					
12			X X X X X X X X X X	C						
376			X X X X X X X X X X		12.33					
			X X X X X X X X X X	C		12.67				
13			X X X X X X X X X X	C					From 0.4m to 25.5m, grout	
377			X X X X X X X X X X		13.38					
14			X X X X X X X X X X	C						
378		X X X X X X X X X X		15.28						
		X X X X X X X X X X	C		15.63			From 0.7m to 30.0m, Class 18 PVC Screen		
15		X X X X X X X X X X								
379		X X X X X X X X X X		15.28						
		X X X X X X X X X X	C		15.63					
16		X X X X X X X X X X								
380		X X X X X X X X X X		18.18						
		X X X X X X X X X X	C		18.56					
17		X X X X X X X X X X	C							
381		X X X X X X X X X X		18.18						
		X X X X X X X X X X	C		18.56					
18		X X X X X X X X X X								
382		X X X X X X X X X X		18.18						
		X X X X X X X X X X	C		18.56					
19		X X X X X X X X X X	C							
		X X X X X X X X X X		19.44						
		X X X X X X X X X X	C							

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 3 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
364		BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt (continued)	XX	C						
	20.46		XX	C	20.46					
	20.57	CORE LOSS - (20.46m to 20.57m)	XX	C						
	20.88	BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt	XX	C	20.88					
	21		XX	C						
	21	CORE LOSS - (20.88m to 20.96m)	XX	C						
	21.46	BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt	XX	C	21.46					
	21.98		XX	C	21.98					
	22		XX	C						
	22	From 22.29m, extremely weathered	XX	C	22.38					
	23		XX	C						
	23	From 23.26m, moderately weathered From 23.39m, slightly weathered	XX	C						
	24		XX	C	24.08					
	24		XX	C	24.64					
	25	From 24.6m to 26.0m, highly weathered	XX	C						
	26		XX	C						
	26		XX	C	26.73					
	27		XX	C	27.11					
	27		XX	C	27.67					
	28		XX	C						
	28		XX	C	28.65					
	28.65	CORE LOSS - (28.65m to 28.87m)	XX	C						
	28.87	BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt	XX	C	29.25					
	29	From 29.19m, extremely weathered	XX	C						
	29		XX	C	29.65					
	29.65	CORE LOSS - (29.65m to 29.75m)	XX	C						
	29.75		XX	C						

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 4 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
394		BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt (continued)	X X X X X X X X	C	30.35					
31	31.0 31.05	SANDSTONE - Medium strength, extremely weathered, orange, fine grained sandstone CORE LOSS - (31.05m to 31.86m)	X X		31.05			31		
32	31.86 32.16	SANDSTONE - Medium to high strength, extremely weathered, orange fine grained sandstone with some tuff From 32.05m to 32.09m, low strength	X X					32		
33		SANDSTONE - High strength, moderately to slightly weathered, grey, fine to medium grained sandstone with trace to some siltstone (heat affected until 33.04m)	X X		33.23		PL(A) = 1.49 PL(D) = 1.16	33	From 29.5m to 36m, gravel From 30.0m to 36.0m, Class 18 PVC Screen	
34		From 33.65m, slightly weathered	X X		33.65			34		
35		From 34.3m, slightly weathered to fresh	X X							
35		From 34.82m, medium strength, fresh	X X		35.0		PL(A) = 0.48 PL(D) = 0.31	35		
36		At 35.4m, coal lense, 2mm thick	X X							
36			X X		35.98			36	End cap	
37			X X		36.28 36.32		PL(A) = 0.53 PL(D) = 0.36			
37			X X		36.75			37		
38		From 38.0m, low to medium strength	X X		38.09		PL(A) = 0.37 PL(D) = 0.27	38		
39			X X		39.73			39		

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 5 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details		
				Type	Depth	Sample				Results & Comments
40.4		SANDSTONE - High strength, moderately to slightly weathered, grey, fine to medium grained sandstone with trace to some siltstone (heat affected until 33.04m) (continued)			40.06		PL(A) = 0.52 PL(D) = 0.37			
41										
40.5		From 43.7m, medium strength		C						
42										
40.6							42.38		PL(A) = 0.21 PL(D) = 0.24	
43							42.7			
40.7		From 48.8m, slightly interbedded with siltstone bands up to 100mm thick								
44										
40.8						C	44.23		PL(A) = 0.73 PL(D) = 0.59	
45										
40.9							45.69			
46							46.09		PL(A) = 0.63 PL(D) = 0.58	
41.0										
47										
41.1						C				
48							47.97			
41.2							48.31		PL(A) = 0.74 PL(D) = 0.78	
49					48.34					
					48.68					
				GT002						
				C						

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND		
A	Auger sample	PID Photo ionisation detector (ppm)
B	Bulk sample	P Piston sample
BLK	Block sample	U Tube sample (x mm dia.)
C	Core drilling	W Water sample
D	Disturbed sample	> Water seep
E	Environmental sample	≡ Water level
G	Gas sample	PLD Point load axial test ls(50) (MPa)
		PL(D) Point load diametral test ls(50) (MPa)
		pp Pocket penetrometer (kPa)
		S Standard penetration test
		V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 6 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample				Results & Comments
414		SANDSTONE - High strength, moderately to slightly weathered, grey, fine to medium grained sandstone with trace to some siltstone (heat affected until 33.04m) <i>(continued)</i>		C	50.24		PL(A) = 0.51 PL(D) = 0.32		
51									
415					51.72		PL(A) = 0.89 PL(D) = 0.62		
52									
416					53.35		PL(A) = 0.47 PL(D) = 0.33		
53									
417					54.69				
54									
418		From 54.69m, low to medium strength			55.25		PL(A) = 0.57 PL(D) = 0.25		
55									
419					57.68				
56									
420					58.01	GT003	PL(A) = 0.26 PL(D) = 0.35		
57									
421					58.04				
58									
422					59.67		PL(A) = 0.34 PL(D) = 0.24		
	59								

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 7 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
424		SANDSTONE - High strength, moderately to slightly weathered, grey, fine to medium grained sandstone with trace to some siltstone (heat affected until 33.04m) <i>(continued)</i>		C						
	61	From 60.78 to 60.83m, siderite band			60.71					61
425							PL(A) = 0.21 PL(D) = 0.14			
	62			C						62
426										
	63	From 63.28m to 63.3m, tuff band								
427		From 63.59m to 64.08m, very low strength			63.59 63.63		PL(A) = 0.09 PL(D) = 0.04			64
428										
	65			C						65
429		From 65.31m, very low to low strength			65.2		PL(A) = 0.27 PL(D) = 0.06			
	66	MUDSTONE - Fresh, dark grey mudstone								
430							PL(A) = 0.46 PL(D) = 0.06			66
	67				66.23 66.61					67
431										
	68			C			PL(A) = 0.41 PL(D) = 0.27			68
432		From 68.4m, medium strength with some siltstone			68.51 68.55 68.82	GT004	PL(A) = 0.7 PL(D) = 0.2			
	69									69
				C						
					69.61					

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test ts(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test ts(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	sp	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 9 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
444		SANDSTONE AND SILTSTONE - Low to medium strength, fresh, grey to dark grey fine to medium grained sandstone interbedded with siltstone bands up to 10mm thick (<i>continued</i>)					PL(D) = 0.16			
81	80.89	MUDSTONE - Medium to high strength, fresh, dark grey mudstone		C						
445		From 81.43m, trace very low strength tuff bands					PL(A) = 1.47 PL(D) = 0.16		81	
82		From 82.13m, low to medium strength, interbedded fine to medium grained sandstone					PL(A) = 0.38 PL(D) = 0.21		82	
446				GT009						
83	83.12	SANDSTONE - Medium to high strength, fresh, grey, fine to medium grained sandstone		C			PL(A) = 0.79 PL(D) = 0.55		83	
447										
84							PL(A) = 1.78 PL(D) = 1		84	
448										
85	85.25	MUDSTONE - Medium to high strength, fresh, black coal with trace high tuff bands up to 60mm thick							85	
449				GT010			PL(A) = 0.63 PL(D) = 0.45 PL(D) = 0.13			
86	86.99	COAL - Medium to high strength, fresh, black coal with trace high strength tuff bands up to 60mm thick		C			PL(A) = 0.05 PL(D) = 0.57		86	
450										
87	86.93	SILTSTONE - Medium to high strength, fresh, dark grey siltstone with some fine to medium grained sand							87	
451				GT011			PL(A) = 1.11 PL(D) = 0.78			
88	87.88	SANDSTONE - High strength, fresh, grey to dark grey fine to coarse grained sandstone with trace to some siltstone bands up to 30mm thick							88	
452							PL(A) = 2.13 PL(D) = 1.55		89	
89				C						

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)






BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 10 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details		
				Type	Depth	Sample	Results & Comments				
454		SANDSTONE - High strength, fresh, grey to dark grey fine to coarse grained sandstone with trace to some siltstone bands up to 30mm thick (<i>continued</i>) From 90.28m to 91.00m, medium to high strength, fine sized pebbly sandstone		C	90.61 90.65		PL(A) = 1.36 PL(D) = 1.05				
91									91		
455						C	92.54		PL(A) = 2.4 PL(D) = 1.76		92
92											93
456				C	93.66					94	
457					94.38		PL(A) = 0.92 PL(D) = 0.96			95	
458				C	95.41 95.44 95.74	GT012	PL(A) = 4.09 PL(D) = 3.71			96	
459					96.43 96.65		PL(A) = 3.1 PL(D) = 2.26			97	
460	96.9	MUDSTONE - Medium to high strength, fresh, dark brown mudstone with some coal lenses up to 10mm thick			97.39		PL(A) = 1.28 PL(D) = 0.27			98	
461				C	98.27		PL(A) = 1.39 PL(D) = 0.48			99	
462	98.21	SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick			99.49						
463				C							

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 11 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
464	100.57	SANDSTONE - Medium to high strength, fresh, grey to dark grey fine to coarse grained sandstone	[Pattern]	GT013	100.26		PL(A) = 1.01 PL(D) = 0.93			
	100.56 100.59									
465	101	From 102.00m, high strength with trace fine sized gravel	[Pattern]	C						
466	102									
467	103									
	103.59	COAL - Medium to high strength, fresh black coal	[Pattern]	GT014	102.6		PL(A) = 2.32 PL(D) = 1.57			
	104									
468	104.74	SILTSTONE - Medium to high strength, fresh, dark grey siltstone with trace to some fine grained sand	[Pattern]	C	103.96		PL(A) = 0.24 PL(D) = 0.33			
	105			GT015	104.0 104.2					
469	105	From 106.38m to 106.86m, carbonaceous	[Pattern]	GT016	105.19		PL(A) = 0.61 PL(D) = 0.37			
	106				105.22					
	107				105.46					
	108				105.6					
470	107.21	TUFF - Very low to low strength, fresh, light grey tuff From 107.43m, medium strength	[Pattern]	C	106.39		PL(A) = 1.73 PL(D) = 1.78			
	107				106.57					
471	107.81	COAL - Medium to high strength, fresh black coal At 107.86m, extremely low to very low strength, tuff band 20mm thick	[Pattern]	GT017	107.32		PL(A) = 0.38 PL(D) = 0.18			
	108				107.42					
472	108.22	MUDSTONE - Medium to high strength, fresh, grey mudstone	[Pattern]	C	107.7		PL(A) = 0.58 PL(D) = 0.17			
	109				107.74					
	109	SILTSTONE AND SANDSTONE - Medium strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick	[Pattern]	C	108.6		PL(A) = 0.52 PL(D) = 0.33			
	109									
	109.94									

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 12 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
474	110.46	MUDSTONE - Medium to high strength, fresh, grey mudstone <i>(continued)</i>								
		COAL - Medium to high strength, fresh black coal From 110.51m, interbedded tuff bands up to 90mm thick		C	110.26		PL(A) = 4.26 PL(D) = 2.67			
475	111.11	SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick			111.57				111	
476	112				112.16		PL(A) = 1.82 PL(D) = 0.3		112	
477	113			C					113	
478	114				114.22		PL(A) = 0.82 PL(D) = 0.6		114	
					114.56					
479	115								115	
480	116			C					116	
	116.35	MUDSTONE/COAL - Medium strength, fresh, dark brown to black mudstone/coal with some extremely low to very low strength tuff bands up to 110mm thick			116.31		PL(A) = 0.59 PL(D) = 0.12			
481	117								117	
	117.28	SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick			117.56		PL(A) = 1.71 PL(D) = 0.89			
482	118				117.6				118	
					118.33					
				GT018						
					118.66		PL(A) = 2.19 PL(D) = 1.01			
				C	118.7				119	
	119.23	MUDSTONE - Medium to high strength, fresh, dark brown mudstone with some siderite								
					120.0		PL(A) = 2.88			

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 13 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
484		MUDSTONE - Medium to high strength, fresh, dark brown mudstone with some siderite (<i>continued</i>)		C			PL(D) = 1.18			
	121				120.57				121	
485				C					122	
	123	From 122.60m to 122.81m, coal band			122.87		PL(A) = 1.03 PL(D) = 0.9		123	
486		From 123.08m, thinly laminated with tuff								
	124				123.57				124	
487										
	125	From 124.71m, coal with some calcite			124.32		PL(A) = 1.18 PL(D) = 0.63		125	
488				C						
	126	SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick			126.13				126	
489		From 125.97m, trace to some tuff laminations up to 2mm thick			126.33		PL(A) = 0.97 PL(D) = 0.35			
	127				126.37				127	
490										
	128	From 127.40m to 127.86m, carbonaceous mudstone with trace coal lenses up to 2mm thick			127.72		PL(A) = 1.55 PL(D) = 0.44		128	
491		From 127.86m, high strength								
	129				128.57		PL(A) = 2.61 PL(D) = 1.19		129	
492										
	129.71	SANDSTONE - High strength, fresh, grey fine to coarse grained sandstone			129.4					
493				C						

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 14 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
494		SANDSTONE - High strength, fresh, grey fine to coarse grained sandstone (<i>continued</i>)								
131					130.6		PL(A) = 2.12 PL(D) = 1.81		131	
495				C						
132									132	
496		From 132.35m, trace to some fine to medium sized gravel			132.46 132.5		PL(A) = 1.85 PL(D) = 1.66		133	
497										
133									133	
498				C	134.01		PL(A) = 2.53 PL(D) = 1.86		134	
134										
499					135.56				135	
135										
500					136.71 136.75		PL(A) = 0.69 PL(D) = 1.27		136	
136										
501				GT020 C	137.07				137	
137										
502					138.42 138.57		PL(A) = 3.34 PL(D) = 0.51		138	
138										
138.46		CARBONACEOUS MUDSTONE - High strength, fresh, dark brown mudstone with some coal lenses up to 5mm thick								
138.96		SANDSTONE - High to very high strength, fresh grey fine to medium grained sandstone		C					139	

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 15 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
504	141	SANDSTONE - High to very high strength, fresh grey fine to medium grained sandstone (continued)		C	140.33		PL(A) = 2.97 PL(D) = 2.1			
505	142				141.53					
506	142.71				142.19		PL(A) = 3.63 PL(D) = 2.85			
					142.36		PL(A) = 4.35			
					142.4	GT021	PL(D) = 2.52			
	143	CARBONACEOUS MUDSTONE - High strength, fresh, dark brown mudstone with some coal lenses up to 5mm thick		C	142.71					
507	143.17	From 142.94m, slightly tuffy			143.18	GT022	PL(A) = 0.31 PL(D) = 0.08			
		COAL - High strength, fresh, black coal			143.38					
					143.42					
508	144.05	SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick			144.22		PL(A) = 2.01 PL(D) = 0.61			
					144.26	GT023				
					144.52					
					144.57					
509	145				145.3		PL(A) = 1.63 PL(D) = 0.49			
510	146			C	146.24		PL(A) = 3.56 PL(D) = 1.85			
511	147									
					147.62					
512	148.5	SANDSTONE - Medium strength, fresh, fine to medium grained sandstone		C						
	149									

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 16 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
514		SANDSTONE - Medium strength, fresh, fine to medium grained sandstone (continued)		C						
					150.56		PL(D) = 0.05			
					150.59					
	151	From 150.98m, fine to coarse grained with trace fine sized gravel								151
515										
	152			C	151.96		PL(A) = 0.9 PL(D) = 1.86			152
				C	151.99					
				GT024	152.3		PL(A) = 0.74 PL(D) = 0.42			
					152.33					
	152.51	MUDSTONE - Medium strength, dark brown carbonaceous mudstone								
					152.82		PL(A) = 1.55 PL(D) = 0.04			153
	153	From 153.10m, slightly fine to medium grained sandy								
517										
	154				153.6					
					154.1		PL(A) = 2.42 PL(D) = 0.44			154
					154.5		PL(A) = 3.34 PL(D) = 0.2			
					154.54					
	155			C						155
				GT025						
	155.49	COAL - High strength, fresh, black coal								
					155.93					156
516										
	156.15	SANDSTONE - High strength, fresh, dark grey fine grained sandstone with some siltstone bands up to 20mm thick								
					156.57					157
	157									
518										
					157.7		PL(A) = 2.75 PL(D) = 1.18			
				GT026	157.74					
					157.96					158
	158			C						
					158.51		PL(A) = 2.16 PL(D) = 0.66			
	158.52	From 158.36m, carbonaceous siltstone								
		COAL - Medium to high strength, fresh, black coal								
	159	From 159.19m, trace calcite and siderite								159
					159.18		PL(A) = 1.39 PL(D) = 0.05			
				GT027	159.21					
					159.49					
					159.57					
				C	159.83		PL(A) = 1.13 PL(D) = 0.38			

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 17 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details	
				Type	Depth	Sample	Results & Comments			
524		COAL - Medium to high strength, fresh, black coal (continued)	█		160.33		PL(A) = 0.84 PL(D) = 0.98			
		From 160.52m to 160.91m, low to medium strength, tuff band				160.6		PL(A) = 0.27		
161				C					161	
161.48		TUFF - High to very high strength, fresh, light grey tuff	∇							
162			∇		161.93		PL(A) = 3.55 PL(D) = 2.01		162	
162.09		COAL - Medium to high strength, fresh, black coal	█		162.37		PL(A) = 3.2 PL(D) = 0.58			
						162.55				
163									163	
163.22		SILTSTONE - Medium to high strength, fresh, dark grey siltstone with some fine to medium grained sand and trace to some fine to medium sized gravel	---		163.55		PL(A) = 2.76 PL(D) = 1.33			
			---	GT028	163.59					
164			---		163.84				164	
			---	C						
			---		164.25		PL(A) = 2.46 PL(D) = 0.74			
			---		164.4		PL(D) = 1.18			
			---		164.5		PL(D) = 0.78			
			---		164.6		PL(D) = 0.92			
			---		164.71		PL(D) = 0.95			
			---		164.79		PL(D) = 0.47			
			---		164.92		PL(D) = 0.86			
165			---		165.03		PL(D) = 0.78		165	
165.15		SANDSTONE - Medium to high strength, fresh, grey to dark grey fine to coarse grained sandstone, quartzone in parts	·		165.19		PL(D) = 0.32			
			·		165.29		PL(D) = 0.51			
			·		165.39		PL(D) = 0.35			
			·		165.52		PL(D) = 0.56			
			·		165.55		PL(D) = 0.73			
			·		165.62		PL(D) = 0.42			
			·		165.72		PL(D) = 0.67			
			·		165.82		PL(D) = 2.09			
			·		165.92		PL(D) = 1.17			
			·		166.03		PL(D) = 1.37			
			·		166.13		PL(D) = 1.38			
			·		166.23		PL(D) = 1.12			
			·		166.33		PL(D) = 0.45			
			·		166.44		PL(D) = 0.94			
167			·	C	166.54		PL(D) = 0.87		167	
			·		166.64		PL(D) = 1.47			
			·		166.74		PL(D) = 1.12			
			·		166.83		PL(D) = 1.46			
			·		166.94		PL(D) = 0.92			
			·	GT029	167.04		PL(D) = 0.84			
			·		167.14		PL(D) = 1.27			
			·		167.24		PL(D) = 0.7			
168		From 168.00m, low to medium strength	·		167.34		PL(D) = 0.67		168	
			·		167.48		PL(A) = 1.45 PL(D) = 1.09			
			·		167.55		PL(D) = 1.69			
			·		167.59		PL(D) = 2.06			
			·		167.84		PL(D) = 0.26			
			·		167.9		PL(D) = 0.2			
			·		168.0		PL(D) = 0.48			
169			·		168.1		PL(D) = 0.63		169	
			·		168.2		PL(D) = 0.55			
169.25		COAL - Medium to high strength, fresh, black coal	█	C	168.3		PL(D) = 0.61			
						168.4		PL(D) = 0.67		
					168.5		PL(D) = 0.93			
					168.54		PL(D) = 0.51			
					168.6		PL(D) = 0.51			
					168.7		PL(D) = 0.87			

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		sp	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 18 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details		
				Type	Depth	Sample				Results & Comments
534		COAL - Medium to high strength, fresh, black coal (continued)	[Redacted]		168.8		PL(D) = 0.45			
					168.9		PL(D) = 0.57			
					169.0		PL(A) = 0.8			
					169.1		PL(D) = 0.33			
					169.2		PL(D) = 0.45			
					170.15	C				
					170.22					
171					171.05			PL(A) = 0.68	171	
535					GT030 171.09			PL(D) = 0.26		
					171.32			PL(A) = 1.12		
			171.35			PL(D) = 0.23				
			171.45							
172							172			
536										
173				C	173.01		PL(A) = 2.17	173		
							PL(D) = 0.57			
173.33		SANDSTONE - High to very high strength, fresh, grey fine to coarse grained sandstone	[Redacted]		173.4		PL(A) = 2.77			
					GT031 173.44			PL(D) = 2.09		
					173.64					
174									174	
538										
							174.47		PL(A) = 3.15	
							174.5		PL(D) = 1.41	
175									175	
539										
176						C	176.14		PL(A) = 3.57	176
							PL(D) = 2.65			
177							177			
541										
					177.51					
178					177.97		PL(A) = 3.51	178		
					178.04		PL(D) = 1.88			
							PL(A) = 3.88			
							PL(D) = 2.48			
179		From 178.70m, trace to some siltstone laminations up to 2mm thick		C	179.04		PL(A) = 2.98	179		
							PL(D) = 0.57			
							PL(A) = 2.8			

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 19 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample		
544	180.02	SANDSTONE - High to very high strength, fresh, grey fine to coarse grained sandstone (continued)		C				
	180.57							
	180.65	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone, thinly laminated with trace to some siltstone						181
545	181							
	181.63m to 181.87m	siltstone band thinly laminated with some fine to medium strength sandstone						182
546	182							
	182.7					PL(A) = 3.26 PL(D) = 1.8		
	182.74			GT032				
	183.0			C				183
547	183							
	183.86m to 183.90m	carbonaceous siltstone band						184
548	184							
	184.26m to 184.36m	fine to coarse grained sand						
	184.55m to 184.18m	conglomerate (fine to medium gravel in a fine to coarse sand matrix)						
549	185					PL(A) = 2.58 PL(D) = 1.67		185
	185.05m to 185.11m	carbonaceous siltstone						
	185.08			C				
	185.1							
	185.63			C				
	185.69m to 185.77m	low strength tuff						186
550	186							
	186m	grading into laminite						
	186.2	LAMINITE - High to very high strength, fresh, grey laminite		C		PL(A) = 3.65 PL(D) = 1.38		186
	186.64							
	186.9							187
551	187							
	187.17	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone						
	187.47	SILTSTONE - High strength, fresh, grey siltstone						188
552	188							
	188.78					PL(A) = 1.63		
	188.85	TUFF - Medium strength, fresh, grey tuff						189
	188.82			GT033				
	188.97	From 188.95m to 188.97m, very low strength						
	188.91	SILTSTONE - High strength, fresh, grey, siltstone						

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ts(50) (MPa)
		PL(D)	Point load diametral test ts(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 21 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
564	200.42	From 200.33m to 200.42m, very low strength clay seam		GT035	200.0 200.2			
565	201	SILTSTONE - Medium to high strength, fresh, grey siltstone						
566	202	From 201.14m to 201.2m, low strength, very thinly laminated with clay seams						
567	203	From 203.0m, medium strength From 203.08m to 203.12m, tuffaceous siltstone From 203.2m to 203.3m, tuffaceous siltstone			203.06	PL(A) = 0.96		
568	203.59	Bore discontinued at 203.59m, limit of investigation			203.59			
569	204							
570	205							
571	206							
572	207							
573	208							
574	209							

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)





Bylong : Drillhole Summary

Hole Number : **BY0188**

Date : 26/02/2013

Total Depth : 43.56 m

Hole Type : Open (RAB)

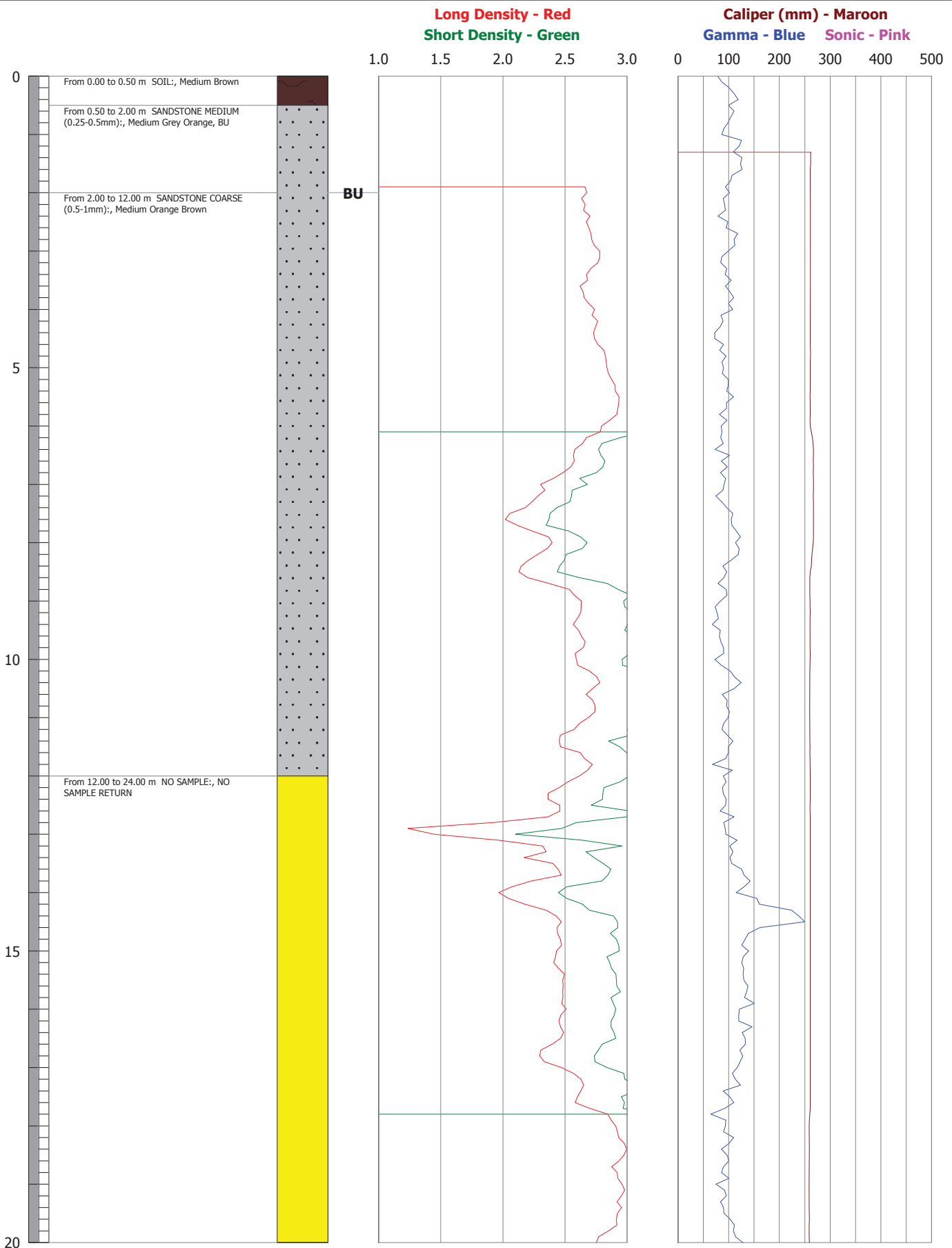
Tenement : AUTH342

Area : Wallings Pastora

Easting : 230858.01

Northing : 6404063.51

Height : 326.60 *MGA94_56S*





Bylong : Drillhole Summary

Hole Number : **BY0188**

Date : 26/02/2013

Total Depth : 43.56 m

Hole Type : Open (RAB)

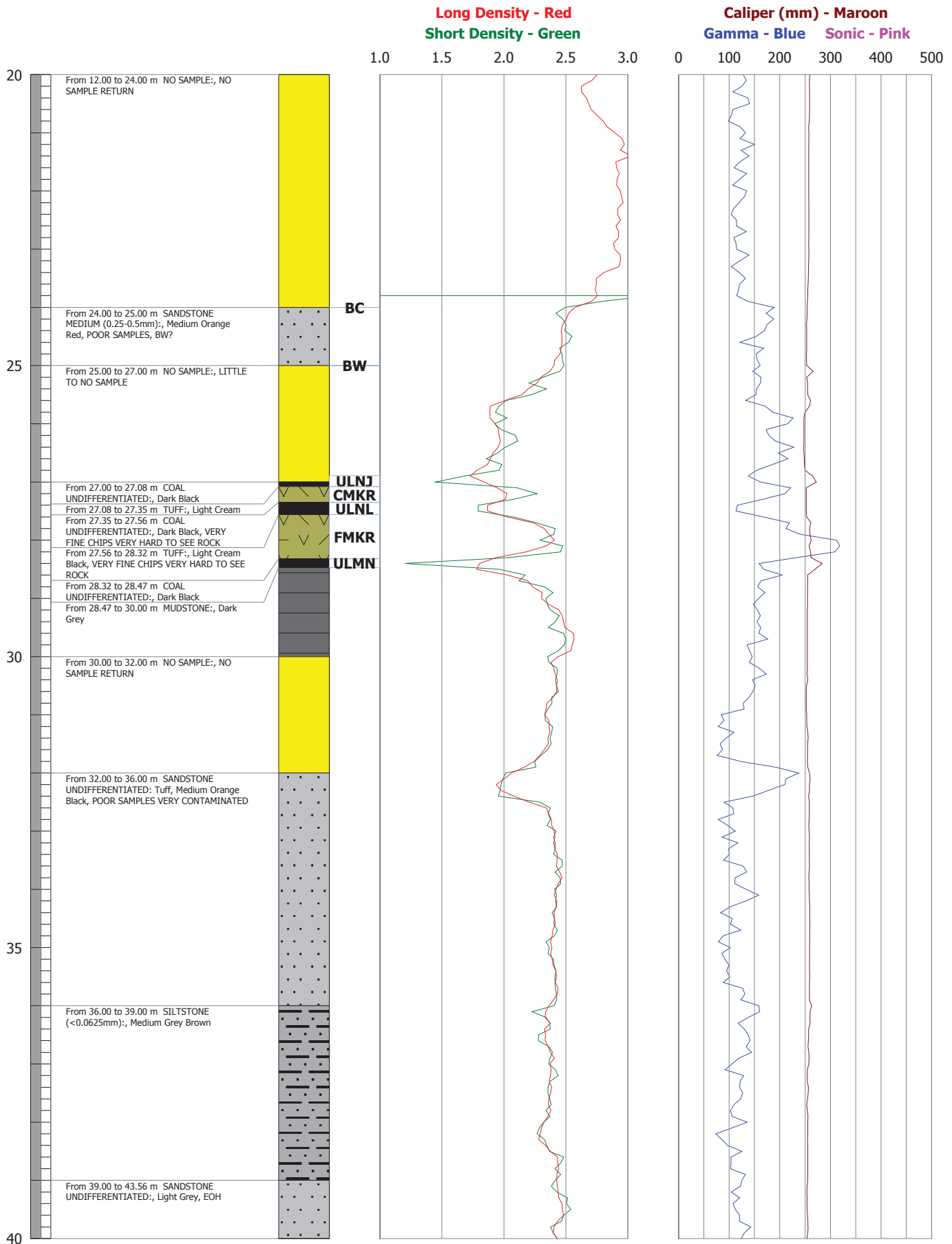
Tenement : AUTH342

Area : Wallings Pastora

Easting : 230858.01

Northing : 6404063.51

Height : 326.60 *MGA94_56S*





Bylong : Drillhole Summary

Hole Number : **BY0188**

Hole Type : Open (RAB)

Easting : 230858.01

Date : 26/02/2013

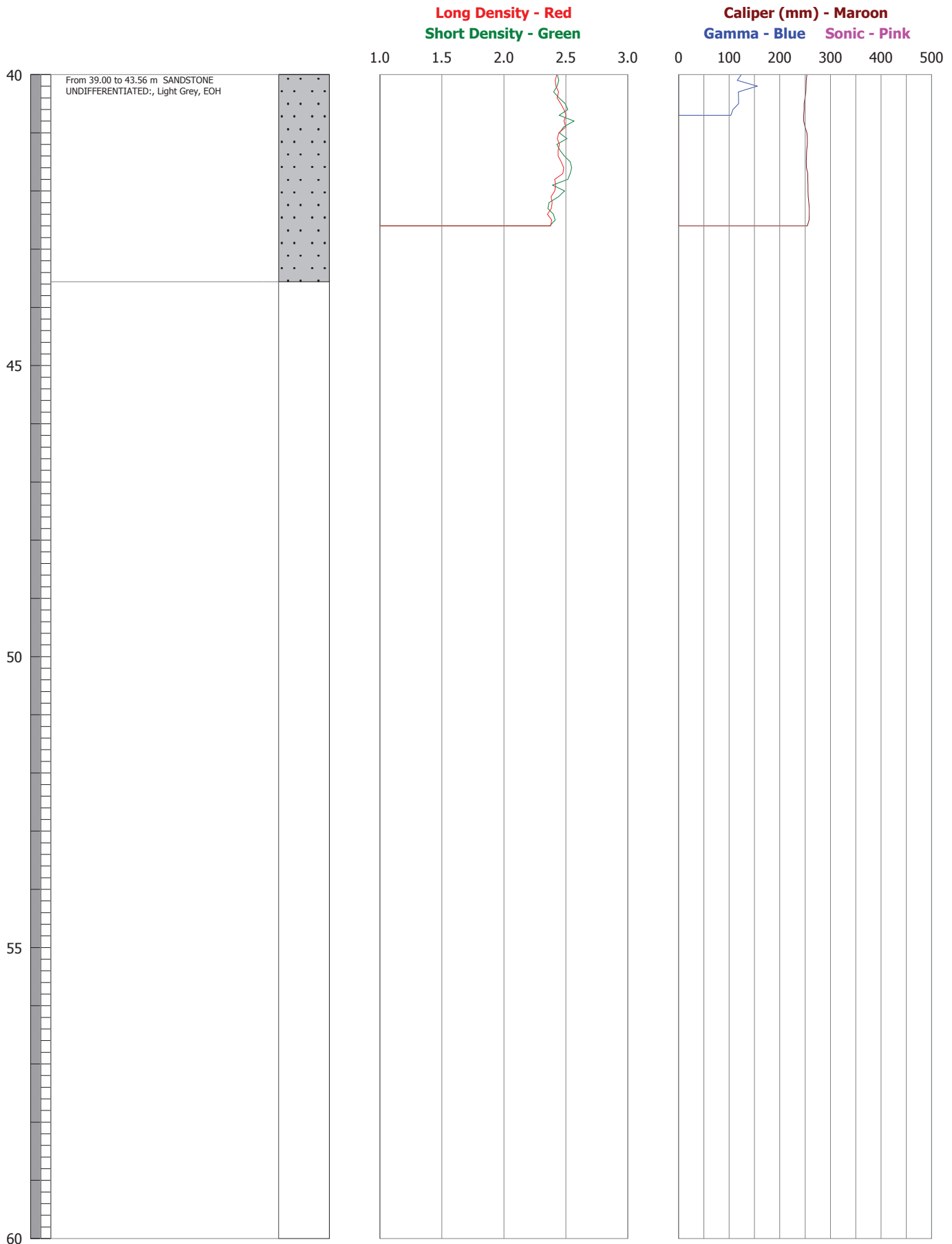
Tenement : AUTH342

Northing : 6404063.51

Total Depth : 43.56 m

Area : Wallings Pastora

Height : 326.60 *MGA94_56S*





Bylong : Drillhole Summary

Hole Number : **BY0204CH** Hole Type : Fully Cored

Date : 27/03/2013

Tenement : AUTH342

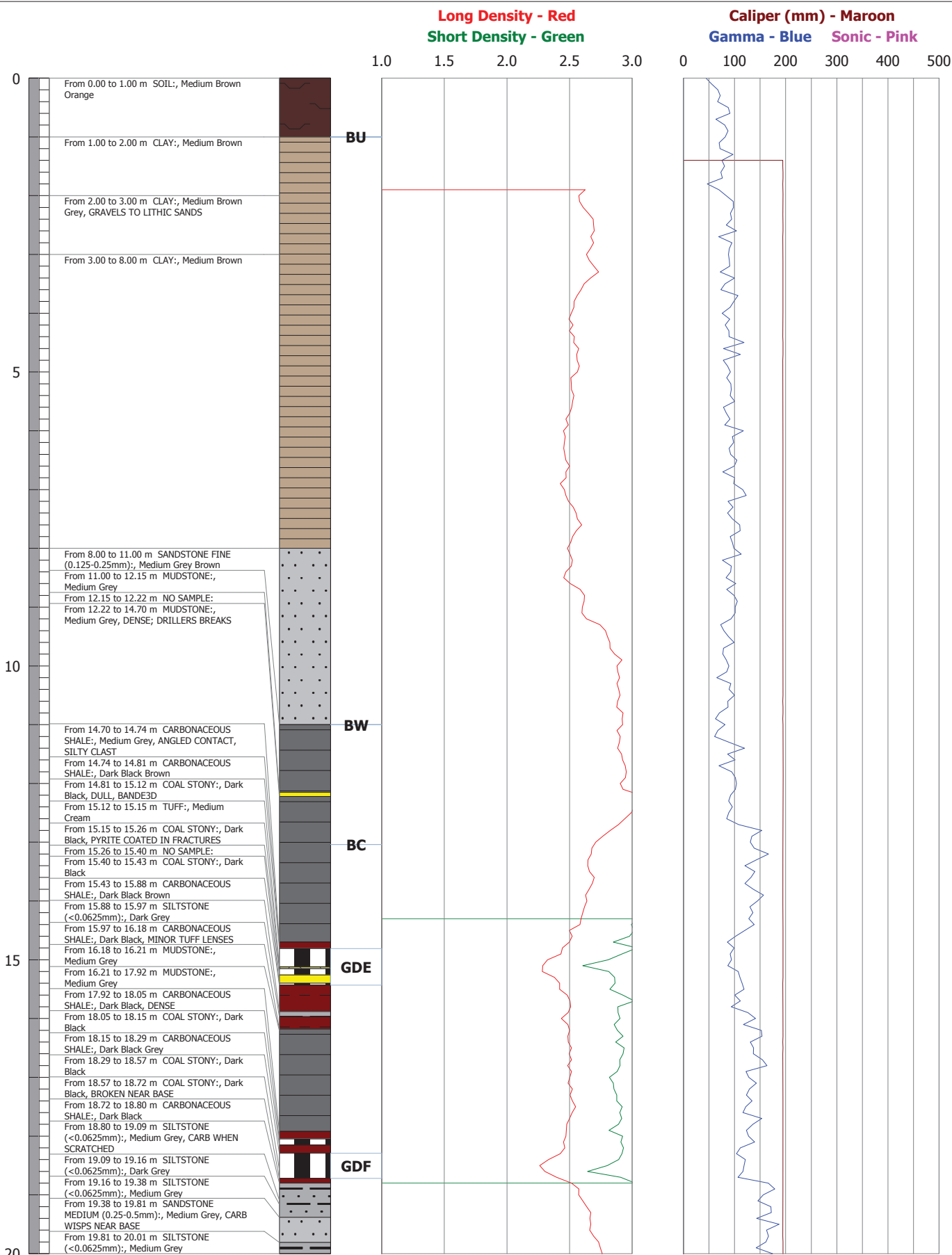
Easting : 232611.11

Northing : 6405079.77

Total Depth : 69.45 m

Area : Walling Pastoral

Height : 296.74 *MGA94_56S*





Bylong : Drillhole Summary

Hole Number : BY0204CH Hole Type : Fully Cored

Date : 27/03/2013

Tenement : AUTH342

Easting : 232611.11

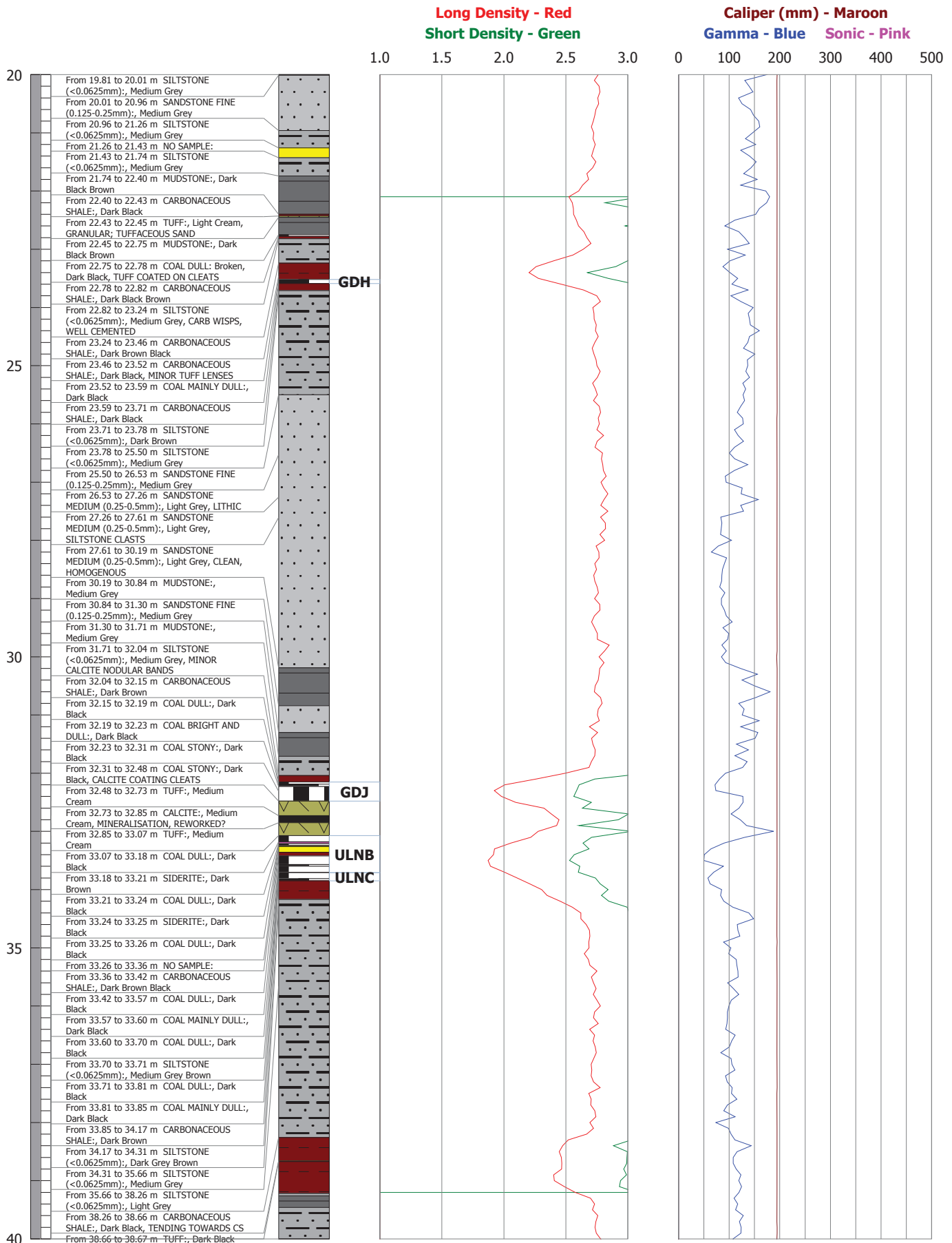
Northing : 6405079.77

Total Depth : 69.45 m

Area : Walling Pastoral

Height : 296.74

MGA94_56S





Bylong : Drillhole Summary

Hole Number : **BY0204CH** Hole Type : Fully Cored

Easting : 232611.11

Date : 27/03/2013

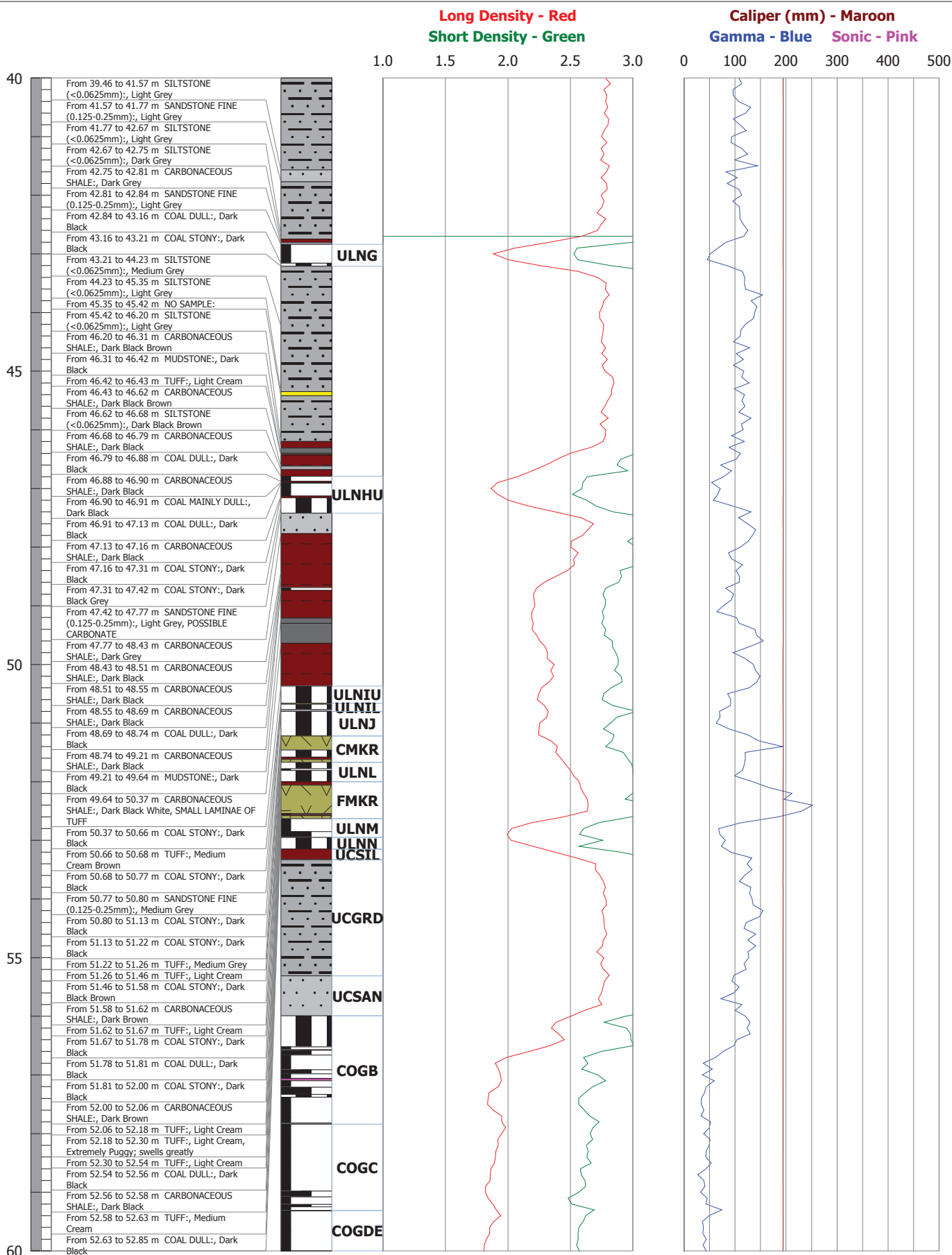
Tenement : AUTH342

Northing : 6405079.77

Total Depth : 69.45 m

Area : Walling Pastoral

Height : 296.74 *MGA94_56S*





Bylong : Drillhole Summary

Hole Number : BY0204CH Hole Type : Fully Cored

Date : 27/03/2013

Tenement : AUTH342

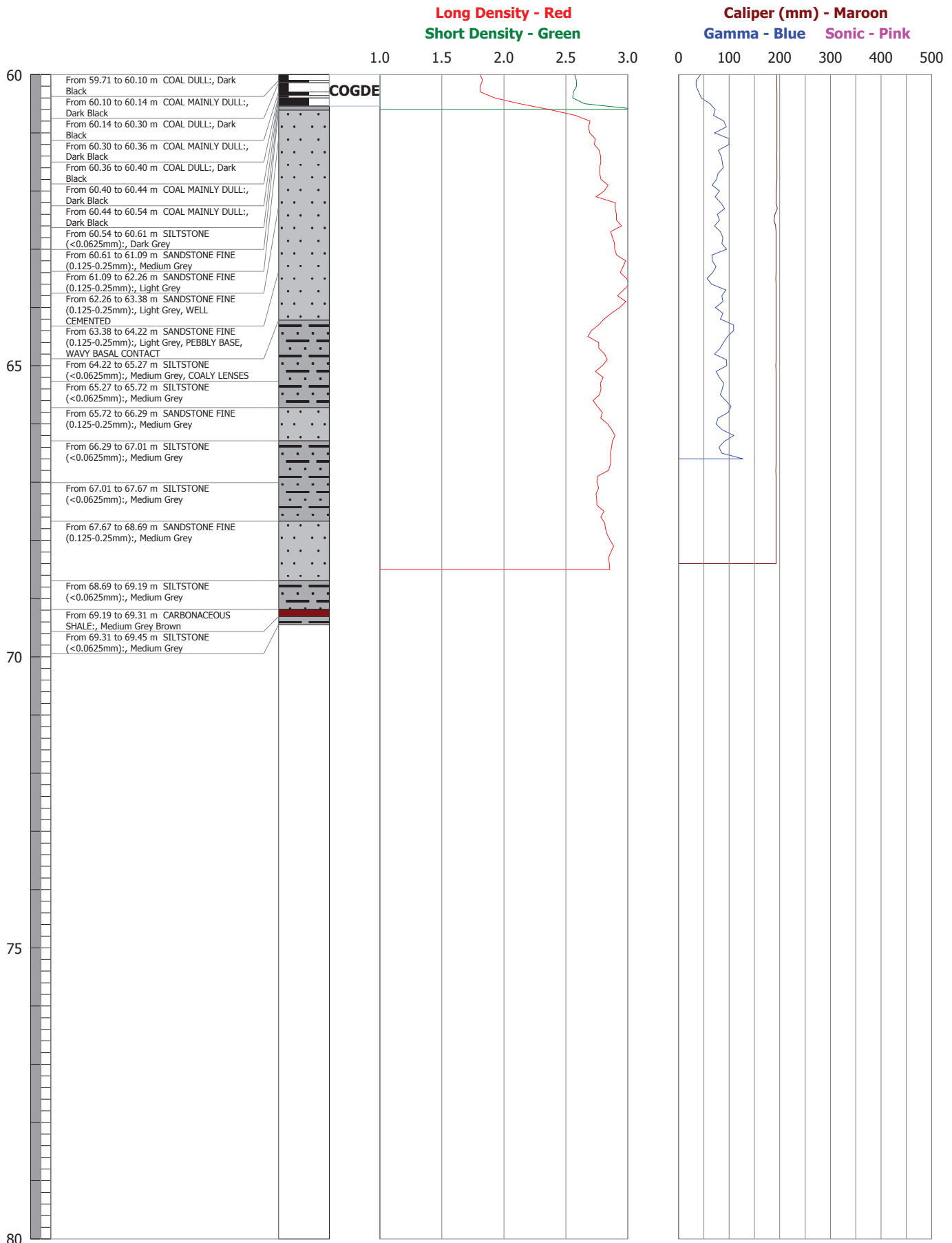
Total Depth : 69.45 m

Area : Walling Pastoral

Easting : 232611.11

Northing : 6405079.77

Height : 296.74 MGA94_56S





Bylong : Drillhole Summary

Hole Number : BY0208CH Hole Type : Fully Cored

Date : 4/04/2013

Tenement : AUTH342

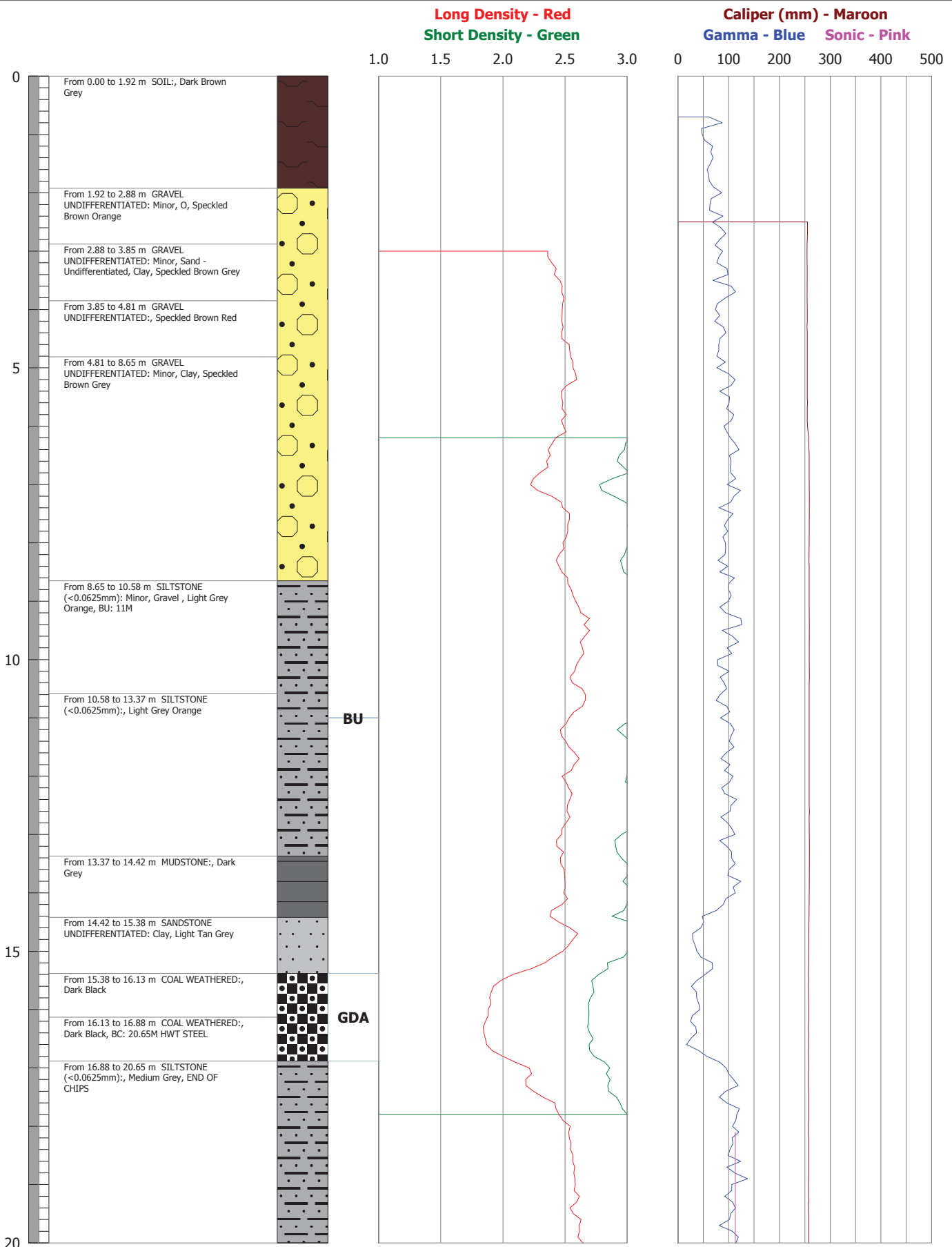
Easting : 234269.38

Northing : 6403672.42

Total Depth : 108.60 m

Area : Wallings Pastora

Height : 327.08 MGA94_56S





Bylong : Drillhole Summary

Hole Number : BY0208CH Hole Type : Fully Cored

Date : 4/04/2013

Tenement : AUTH342

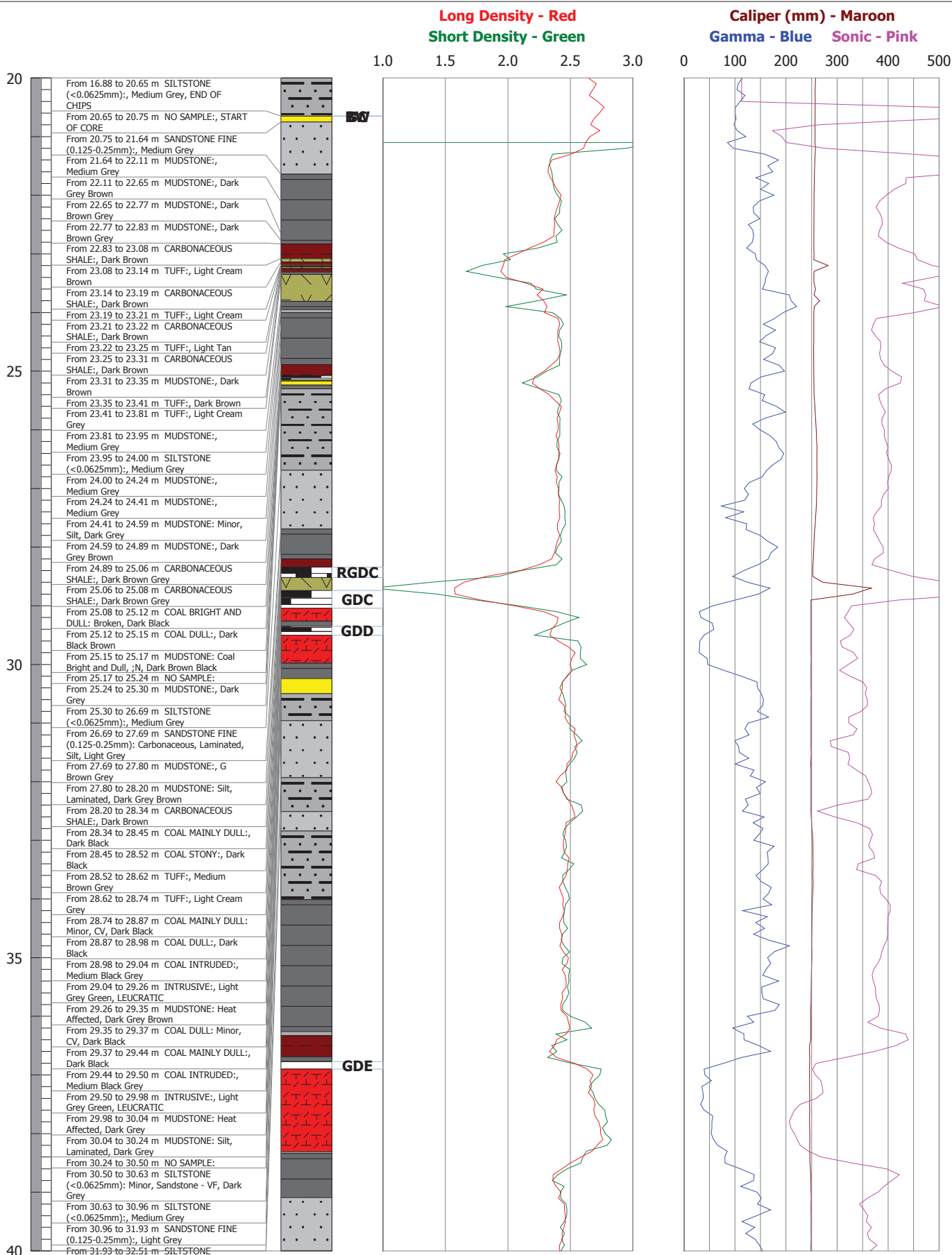
Total Depth : 108.60 m

Area : Wallings Pastora

Easting : 234269.38

Northing : 6403672.42

Height : 327.08 MGA94_56S





Bylong : Drillhole Summary

Hole Number : **BY0208CH** Hole Type : Fully Cored

Easting : 234269.38

Date : 4/04/2013

Tenement : AUTH342

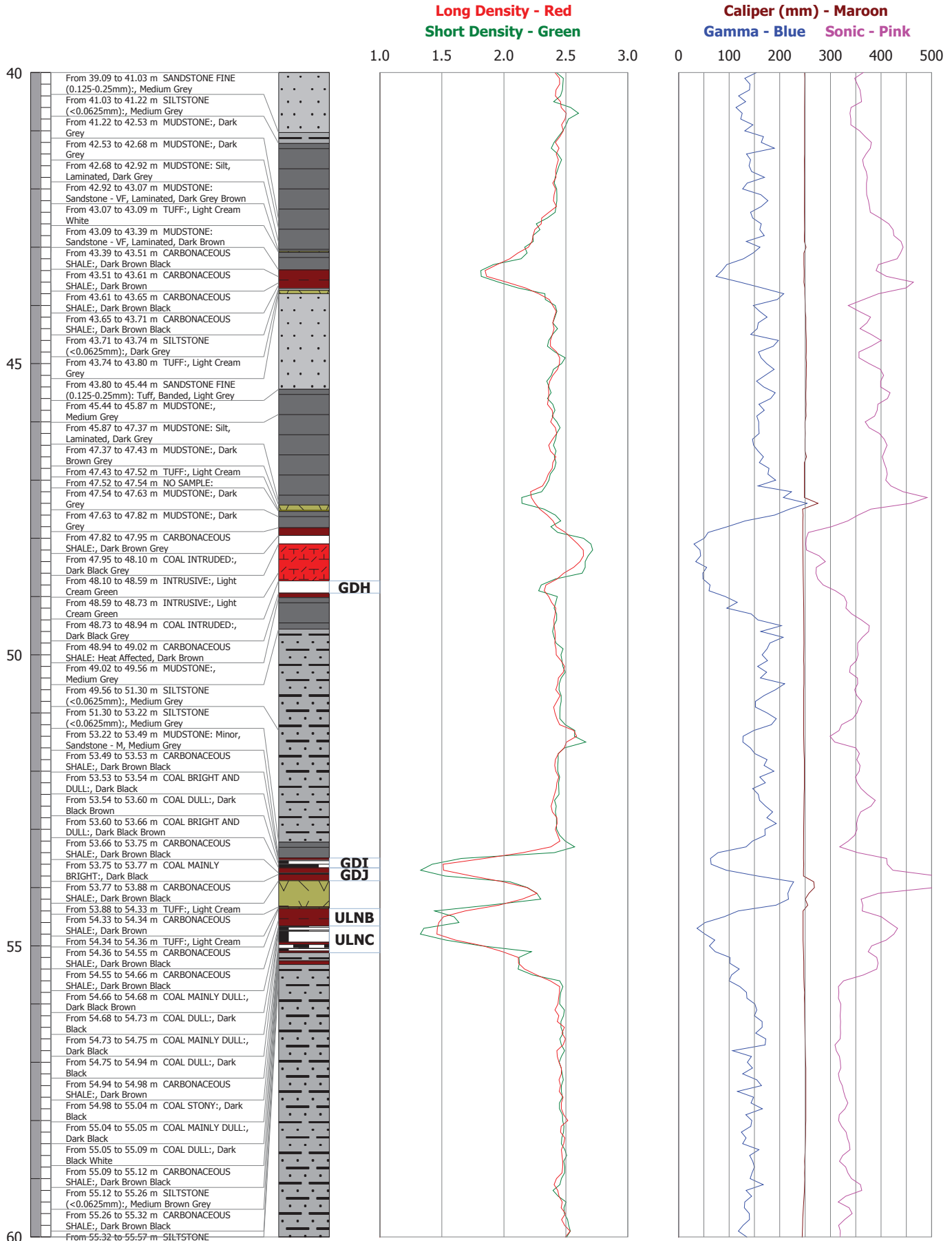
Northing : 6403672.42

Total Depth : 108.60 m

Area : Wallings Pastora

Height : 327.08

MGA94_56S





Bylong : Drillhole Summary

Hole Number : **BY0208CH** Hole Type : Fully Cored

Easting : 234269.38

Date : 4/04/2013

Tenement : AUTH342

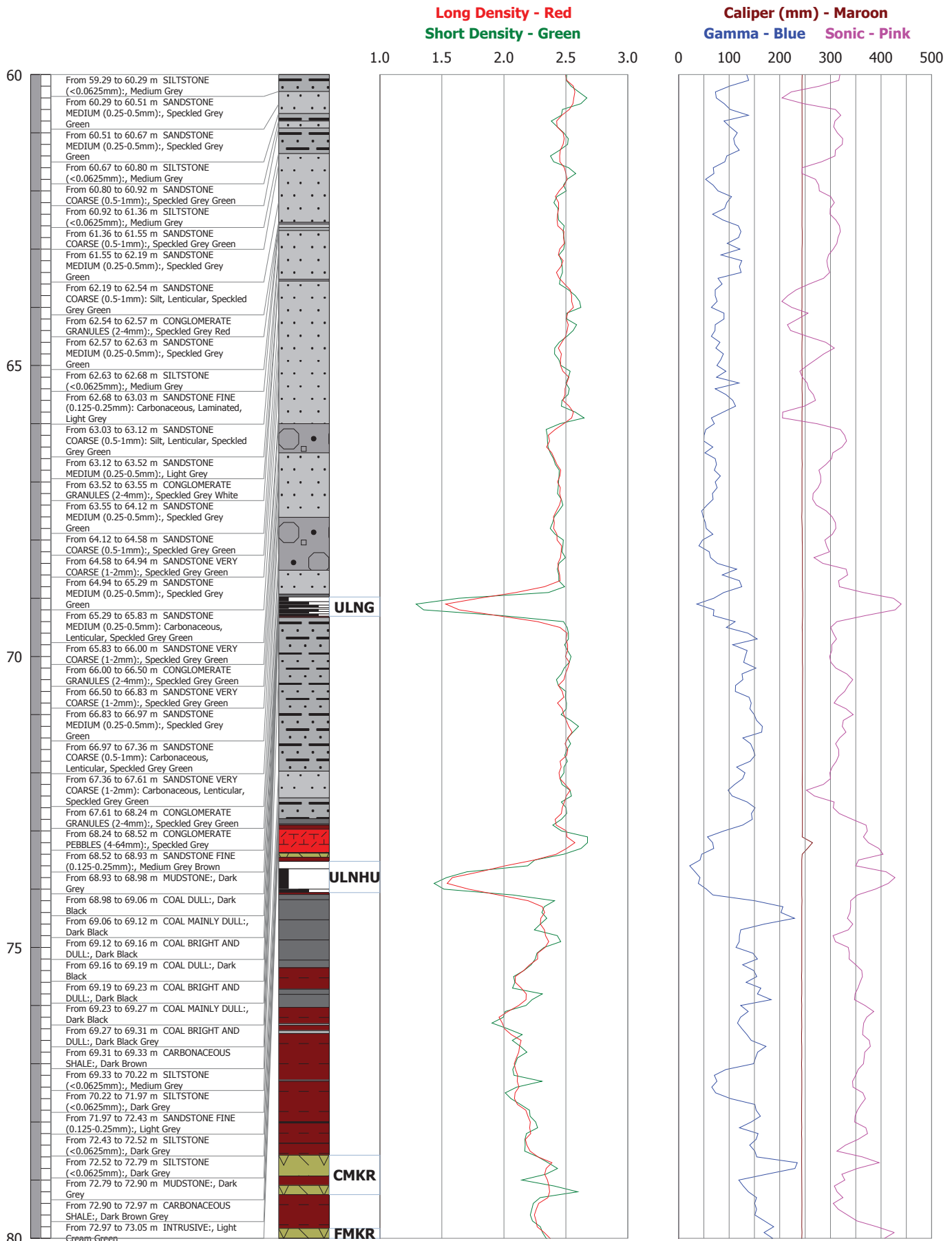
Northing : 6403672.42

Total Depth : 108.60 m

Area : Wallings Pastora

Height : 327.08

MGA94_56S





Bylong : Drillhole Summary

Hole Number : BY0208CH Hole Type : Fully Cored

Easting : 234269.38

Date : 4/04/2013

Tenement : AUTH342

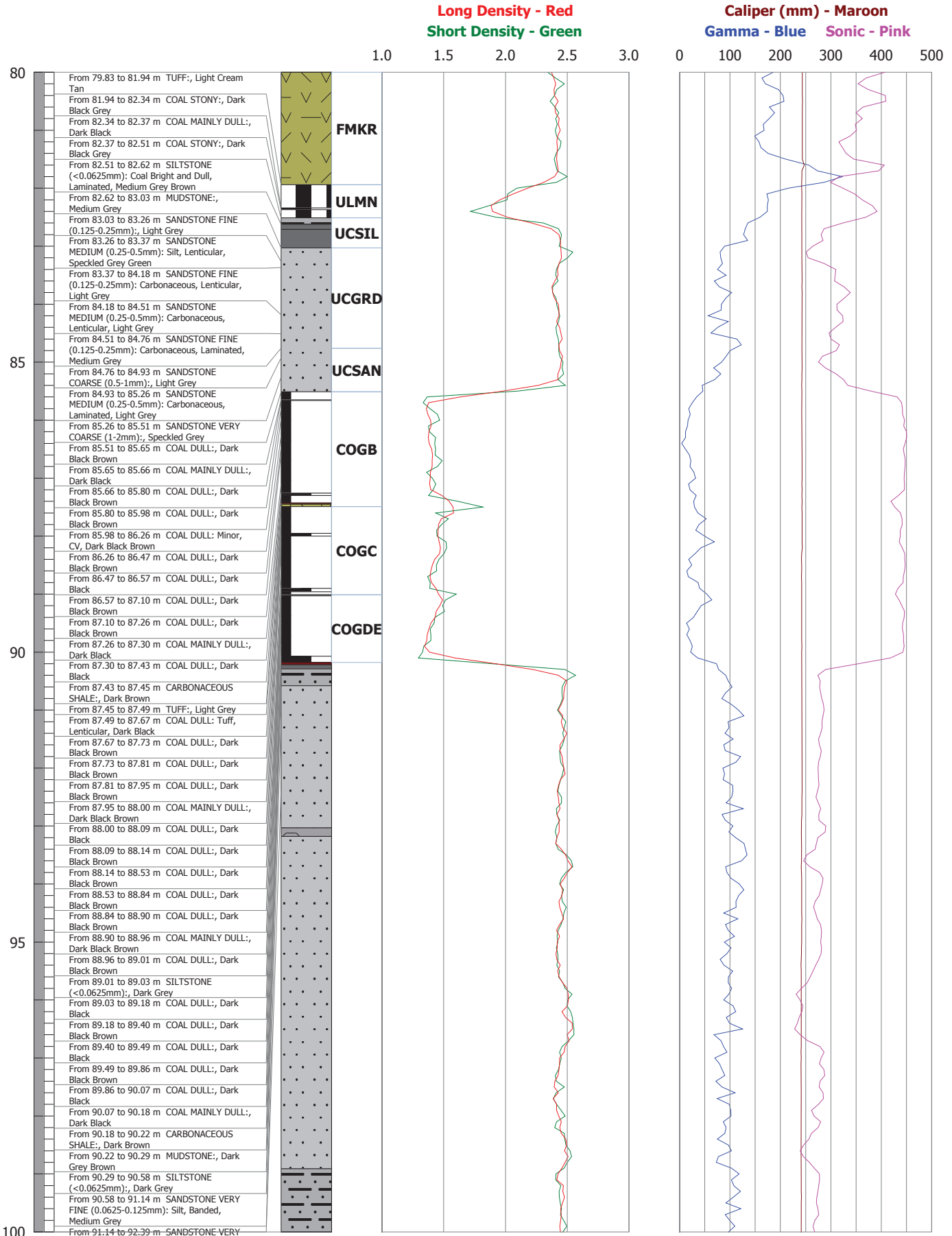
Northing : 6403672.42

Total Depth : 108.60 m

Area : Wallings Pastora

Height : 327.08

MGA94_56S





Bylong : Drillhole Summary

Hole Number : BY0208CH Hole Type : Fully Cored

Date : 4/04/2013

Tenement : AUTH342

Easting : 234269.38

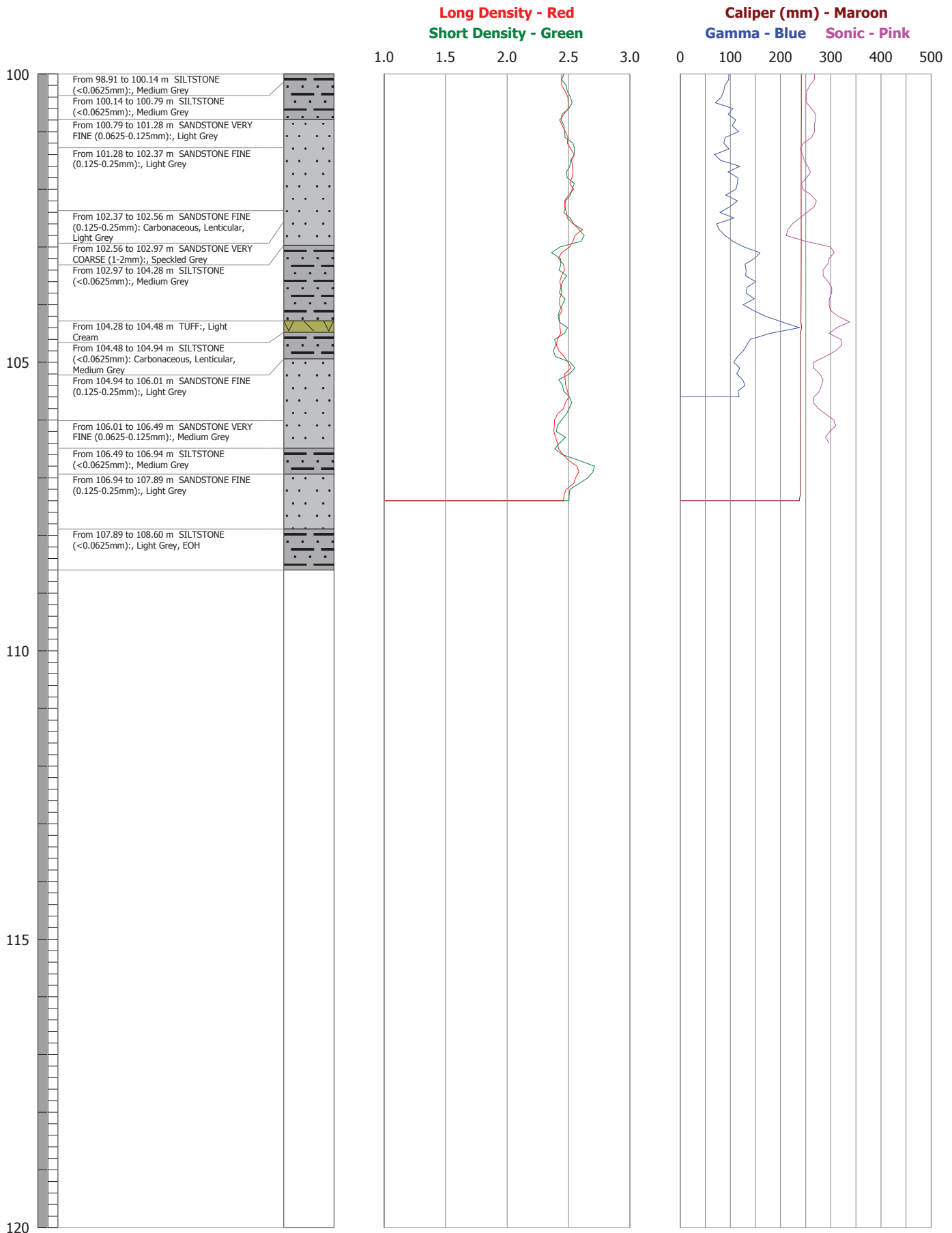
Northing : 6403672.42

Total Depth : 108.60 m

Area : Wallings Pastora

Height : 327.08

MGA94_56S



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: 301.42 AHD
EASTING: 232343.35
NORTHING: 6404982.41
DIP/AZIMUTH: 90°/--

BORE No: CPT36
PROJECT No: 49761
DATE: 30/5/7/6/13
SHEET 1 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction	
				Type	Depth	Sample		Results & Comments	Details
301	0.0	TOPSOIL - Brown sandy silt topsoil, generally comprising fine to medium grained sand, abundant rootlets, trace clay, humid		D	0.0			TOC = 0.62m	
	0.7	SANDY GRAVEL - Medium dense, red, brown, sandy gravel, generally comprising fine to coarse grained sand, fine to medium sized subrounded, subangular gravel, humid		S	0.5		8,9,11 N = 20	From 0m to 0.4m, concrete	
	1.35	SILTY SAND - Medium dense, orange, grey brown, fine to medium grained silty sand with some to slightly clayey, humid		S	1.0				
	2.0	From 2.3m, with some fine to medium sized subangular gravel and ironstained cemented parts		U, pp ₇₅	1.45		>400 kPa		
	2.5			S	1.8				
	3.0			D	2.01				
	3.5	SANDSTONE - Low to medium strength, moderately weathered, grey brown, fine to medium grained sandstone		D	2.5		7,9,16 N = 25		
	3.7			D	2.95				
	4.5	SANDSTONE - Low to medium strength, moderately weathered, brown, fine to medium grained sandstone		D	3.0				
	4.56	From 4.56m to 4.69m, extremely low strength, extremely weathered, fragmented		C	3.5			From 0.4m to 7.65m, bentonite	
	4.74	From 4.74m, clay seam 10mm thick		C	3.7				
	5.03	From 5.03m, clay seam 10mm thick		C	4.5				
	5.14	From 5.14m to 5.30m, intermixed clay seams through joints, 1-60mm thick		C	5.92				
	5.39	From 5.39m to 5.41m, extremely low strength, extremely weathered		C	6.2				
	5.71	From 5.71m to 5.73m, clay seam		C	6.85				
	6.11	From 6.11m to 6.2m, extremely low strength, extremely weathered, fragmented		C	6.9		350 kPa		
	6.85	SILTSTONE - Very low to low strength, highly to moderately weathered, grey brown siltstone		pp	6.93		>400 kPa		
	7.0	CLAYSTONE - Extremely low strength, extremely weathered, dark brown claystone		pp	7.0		>400 kPa		
	7.15	From 6.88m, white		pp	7.15		300 kPa		
	7.18	From 6.98m, yellow brown		pp	7.18		>400 kPa		
	7.3	CORE LOSS - 0.14m		C	7.3				
	8.0	CLAYSTONE - Extremely low strength, extremely weathered, white, yellow brown, dark brown claystone		C	8.0				
	8.45	SANDSTONE - Low to medium strength, slightly weathered, grey, brown, fine to medium grained sandstone		C	8.45				
	8.8	From 7.6m to 7.63m, extremely low strength, extremely weathered, yellow brown		C	8.8				
	9.19	From 7.8m, moderately to slightly weathered, brown		C	8.97		PL(A) = 0.68 PL(D) = 0.42		
	9.92	SANDSTONE - Low to medium strength, slightly to moderately weathered, brown, fine to medium grained sandstone		C	9.19				
	9.92	SILTSTONE - Low to medium strength, slightly		C	9.92				

RIG: TD Rig 106 **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 4.1m
TYPE OF BORING: Solid flight auger (TC) to 3.8m, rock roller to 4.5m, HQ3 to 59.15m
WATER OBSERVATIONS: Free groundwater observed at 12.05m
REMARKS: Top of pipe RL 302.05 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
CD	Disturbed sample	>	Water seep
EE	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: 301.42 AHD
EASTING: 232343.35
NORTHING: 6404982.41
DIP/AZIMUTH: 90°/--

BORE No: CPT36
PROJECT No: 49761
DATE: 30/5-7/6/13
SHEET 2 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
291	11	weathered, brown siltstone laminated with some sandstone MUDSTONE - Moderately weathered, fresh, dark grey mudstone (continued)	C					
			C	10.2 10.3			PL(A) = 0.62	
		From 11.41m to 11.45m, slightly weathered	C	11.33			PL(A) = 0.76 PL(D) = 0.81	
	12.0	MUDSTONE / SILTSTONE - Medium strength, fresh, dark grey mudstone, thinly laminated with some siltstone	C	12.0				From 7.65m to 15.5m, 5mm gravel From 8.0m to 15.5m, Class 18 PVC Screen
	12.9	MUDSTONE - Medium strength, fresh, dark grey mudstone	C	13.41				
	13.61	SILTSTONE - Medium strength, fresh, light and dark grey siltstone	GT001 C	13.78 13.82			PL(A) = 0.63 PL(D) = 0.45	
	15		C	15.0				
	15.4	MUDSTONE - Medium strength, fresh, dark grey laminated with some light grey siltstone	C	16.0			PL(A) = 0.66 PL(D) = 0.43	
	16.47	From 16.29m to 16.47m, low strength, coal / carbonaceous mudstone band SILTSTONE - Medium strength, fresh, grey	C	17.2			PL(A) = 0.69 PL(D) = 0.6	
	17.48	LAMINITE - Medium strength, fresh, grey laminite	C	18.0				
	17.75	From 17.68m to 17.74m, low strength, very thinly laminated with clay seams From 17.74m, very low strength clay seam	C	18.6				
	18	SILTSTONE - Medium strength, fresh, light and dark grey siltstone	C	18.99			PL(A) = 0.89 PL(D) = 0.83	
	19.03	From 17.75m to 18.17m, thinly laminated with some fine sandstone From 18.17m to 18.27m, fine sandstone	GT002 C	18.99 19.0				
	19.9	MUDSTONE / SILTSTONE - Medium strength, fresh, dark grey From 19.7m to 19.9m, low strength coal seam	C					

RIG: TD Rig 106 **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 4.1m
TYPE OF BORING: Solid flight auger (TC) to 3.8m, rock roller to 4.5m, HQ3 to 59.15m
WATER OBSERVATIONS: Free groundwater observed at 12.05m
REMARKS: Top of pipe RL 302.05 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
CD	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(5) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: 301.42 AHD
EASTING: 232343.35
NORTHING: 6404982.41
DIP/AZIMUTH: 90°/--

BORE No: CPT36
PROJECT No: 49761
DATE: 30/5-7/6/13
SHEET 3 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample				Results & Comments
281	21	SILTSTONE - Medium strength, fresh, grey (<i>continued</i>)		C	20.17		PL(A) = 0.63		
	21.4	From 21.18m to 21.19m, coal lense							
	21.4	From 21.21m to 21.22m, coal lense							
	21.77	From 21.3m to 21.31m, coal lense							
	21.77	From 21.36m to 21.37m, coal lense							
	22	From 21.39m to 21.4m, tuff lense (heat affected)							
	22	CARBONACEOUS SILTSTONE / COAL - Medium strength, fresh, dark grey carbonaceous siltstone laminated with black coal		C	21.67		PL(A) = 0.88		
	23	SILTSTONE - High strength, fresh, grey			22.67		PL(A) = 1.36		
	23.23	LAMINITE - High strength, fresh, light and dark grey laminite							
	24	From 23.95m, grading into sandstone			23.96		PL(A) = 2.04		
	24.26	SANDSTONE - Very high strength, fresh, light grey, fine to medium grained sandstone			24.0				
	25	From 24.56m to 24.64m, siltstone band							
	25.12			GT003					
	25.56			C	25.56		PL(A) = 4.63		
	25.61				25.61				
	26	From 26.22m to 26.33m, fine to coarse grained sandstone, trace fine gravel							
	27	From 26.7m to 27.81m, fine to coarse grained sandstone, trace fine gravel			27.0				
	28								
	28.19	SILTSTONE - Very high strength, fresh, grey			28.4		PL(A) = 3.79		
	28.44	CARBONACEOUS SILTSTONE / COAL - High strength, fresh, dark brown carbonaceous siltstone laminated with black coal		GT004	28.44				
	28.89			C	28.8		PL(A) = 1.21		
	28.89	TUFF - High strength, fresh, light grey tuff (heat affected?)			28.84				
	29			GT005	28.94				
	29.36	CARBONACEOUS SILTSTONE / COAL - High strength, fractured, dark brown carbonaceous siltstone laminated with black coal			29.36				
	30.0						PL(A) = 2.02		

RIG: TD Rig 106 **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 4.1m
TYPE OF BORING: Solid flight auger (TC) to 3.8m, rock roller to 4.5m, HQ3 to 59.15m
WATER OBSERVATIONS: Free groundwater observed at 12.05m
REMARKS: Top of pipe RL 302.05 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
CD	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		gp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: 301.42 AHD
EASTING: 232343.35
NORTHING: 6404982.41
DIP/AZIMUTH: 90°/--

BORE No: CPT36
PROJECT No: 49761
DATE: 30/5-7/6/13
SHEET 4 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details
				Type	Depth	Sample			Results & Comments
271	30.44	From 30.34m to 30.36m, tuff laminations SILTSTONE - High strength, fresh, grey siltstone	C					From 15.5m to 44.5m, bentonite
31					30.95 31.0		PL(A) = 1.27	31
270	32	SILTSTONE / SANDSTONE - Very high strength, fresh, dark grey siltstone, thinly bedded with light grey fine grained sandstone	C					32
269	32.0							
33		From 33.2m, medium bedded			32.9 33.0		PL(A) = 2.68	33
268	34							
267	34				33.96		PL(A) = 7.22 PL(D) = 5.32	34
266	35	From 34.59m, fine to medium grained sandstone band MUDSTONE - High strength, fresh, dark grey black mudstone	C					35
266	35.56	From 35.43m to 35.45m, coal lense			35.38		PL(A) = 1.63	
265	36	SILTSTONE / SANDSTONE - High strength, fresh, dark grey siltstone laminated with fine grained sandstone	C					36
265	36.0				36.0 36.05		PL(A) = 2.18 PL(D) = 1.51	36
264	37	From 37.41m, thinly bedded						37
263	38				37.97 38.0			38
263	38				38.41 38.46	C GT006	PL(A) = 2.53 PL(D) = 2.04	
262	39				39.0			39
262	39.38	COAL - Medium strength, fresh, black	C					
262	39.7	SILTSTONE - High strength, fresh, dark grey						

RIG: TD Rig 106 **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 4.1m
TYPE OF BORING: Solid flight auger (TC) to 3.8m, rock roller to 4.5m, HQ3 to 59.15m
WATER OBSERVATIONS: Free groundwater observed at 12.05m
REMARKS: Top of pipe RL 302.05 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
CD	Disturbed sample	>	Water seep
EE	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		gp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: 301.42 AHD
EASTING: 232343.35
NORTHING: 6404982.41
DIP/AZIMUTH: 90°/--

BORE No: CPT36
PROJECT No: 49761
DATE: 30/5-7/6/13
SHEET 5 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details
				Type	Depth	Sample	Results & Comments		
261	40.52	SILTSTONE - High strength, fresh, dark grey (continued)							
41	40.83	LAMINITE - High strength, fresh, light and dark grey laminite		C			PL(A) = 2.56 PL(D) = 1.76		
260	41.71	MUDSTONE - High strength, fresh, dark grey black					PL(A) = 0.4		
42	42.0								
259	42.67	COAL - Medium strength, fresh, black					PL(A) = 0.45 PL(D) = 0.42		
43	43.05	SILTSTONE / SANDSTONE - High strength, fresh, grey		C					
258	43.51 to 44.18	From 43.51m to 44.18m, some fine grained sandstone laminations					PL(A) = 2.59		
44	43.76 43.81			GT007					
257	44.24								
45	44.81	STONEY COAL - Medium strength, fresh, black							
44.93	44.99	CORE LOSS - 0.06m							
256	45.27	STONEY COAL - Medium strength, fresh, black							
45.37	45.27	TUFF - Medium strength, fresh, light grey							
46	45.86	CARBONACEOUS MUDSTONE / COAL - High strength, fresh, black carbonaceous mudstone / coal		C			PL(A) = 1.25		
46.07	45.45 to 45.5m	From 45.45m to 45.5m, brown tuff band							
255	45.9m to 45.93m	From 45.9m to 45.93m, light grey tuff band							
46.02m to 46.07m	46.02m to 46.07m	light grey tuff band							
47	46.6m to 46.91m	MUDSTONE - High strength, fresh, black							
46.91m	46.6m to 46.91m	thinly laminated weathered tuff							
254	47.35						PL(A) = 1.68		
48	47.65m	From 47.65m, grading into tuff							
253	47.95	TUFF - Medium strength, fresh, light brown tuff						From 44.5m to 50.5m, 2mm gravel At 47.75m, vibrating wire piezometer	
48.46	48.46	MUDSTONE - High strength, fresh, black					PL(A) = 2.77		
48.73	48.5								
48.9	48.73	TUFF - Medium strength, fresh, light brown					PL(A) = 0.57		
252	48.9	SILTSTONE - High strength, fresh, dark grey black		C					
				GT008					

RIG: TD Rig 106 **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 4.1m
TYPE OF BORING: Solid flight auger (TC) to 3.8m, rock roller to 4.5m, HQ3 to 59.15m
WATER OBSERVATIONS: Free groundwater observed at 12.05m
REMARKS: Top of pipe RL 302.05 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
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E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		gp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: 301.42 AHD
EASTING: 232343.35
NORTHING: 6404982.41
DIP/AZIMUTH: 90°/--

BORE No: CPT36
PROJECT No: 49761
DATE: 30/5-7/6/13
SHEET 6 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample		Results & Comments	
251	50.45	SILTSTONE - High strength, fresh, dark grey black (continued)							
	50.69	COAL / CARBONACEOUS MUDSTONE - High strength, fresh, dark brown black		C					
	51	SILTSTONE / SANDSTONE - High strength, fresh, light grey, fine to medium, light grey fine sandstone mixed with dark grey siltstone			51.0				
					51.5		PL(A) = 2.38		
	51.92	SILTSTONE - High strength, fresh, dark grey siltstone laminated with some fine sandstone			52.09				
				GT009					
	52.57	SANDSTONE - High strength, fresh, light grey, fine to medium grained sandstone laminated with some siltstone		C	52.43		PL(A) = 2.62		From 50.5m to 54.25m, bentonite
					52.46				
					53.4		PL(A) = 2.21 PL(D) = 1.58		
					54.0				
	54.63	COAL - High strength, fresh, black coal							
				C					
					55.84		PL(A) = 1.5		
					56.44				
					56.48		PL(A) = 1.63		From 54.25m to 58.9m, 2mm gravel
				GT010					At 56.75m, vibrating wire piezometer
					56.85				
					57.0				
				C					
					58.18		PL(A) = 1.41		
	58.87	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone							
	59.15	Bore discontinued at 59.15m, limit of investigation			59.15				From 58.9m to 59.11m, bentonite

RIG: TD Rig 106 **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 4.1m
TYPE OF BORING: Solid flight auger (TC) to 3.8m, rock roller to 4.5m, HQ3 to 59.15m
WATER OBSERVATIONS: Free groundwater observed at 12.05m
REMARKS: Top of pipe RL 302.05 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
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E	Environmental sample	≡	Water level
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		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

