

BOREHOLE LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 18.08 AHD
EASTING: 313612.3
NORTHING: 6257883.58
DIP/AZIMUTH: 90°/-

BORE No: 1
PROJECT No: 73603.00
DATE: 28/8/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
18	0.04	ASPHALTIC CONCRETE																A			PID<1
	0.55	ROADBASE - green-grey, medium to coarse grained, gravelly sand																			
		roadbase, medium to coarse, subangular, basaltic gravel																			
17	0.9	FILLING - brown sandy clay filling with some gravel and fibro cement fragments																A			PID<1
	1.1	FILLING - brown silty clay filling with some gravel and sand																S			4,8,7
		FILLING - apparently well compacted, brown clay, trace of ironstone gravel, silt and charcoal																E			N = 15
	1.8																				PID<1
16	2.1	SILTY CLAY - grey silty clay																			
		SHALY CLAY - extremely low strength, extremely weathered, light grey and red brown shale, some medium strength ironstone bands																A			PID<1
																		S			25/100 refusal
15	3																				pp = 570
																		C	72		pp = 600
14	4																				
	4.9	SHALE - extremely to very low strength, slightly weathered with an extremely weathered band, fragmented and fractured and slightly fractured, grey brown shale, some low to medium strength bands																			PL(A) = 0.1
13																					PL(A) = 0.3
																		C	100	9	
12	6																				
	6.35	SHALE - medium then low strength, slightly weathered, fractured and slightly fractured, grey brown shale, with some extremely low strength bands																			PL(A) = 0.5
11	7																				
	7.5	LAMINITE - high strength, fresh, slightly fractured, grey laminite. Approximately 20% fine grained sandstone laminations																C	100	92	PL(A) = 0.2
																					PL(A) = 1.5
	8.3	Bore discontinued at 8.3m Termination depth reached																			PL(A) = 2.1
9	9																				

RIG: Scout 1

DRILLER: LC

LOGGED: DW/SI

CASING: HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m; rotary to 2.6m; NMLC coring to 8.3m

WATER OBSERVATIONS: No free groundwater observed whilst drilling

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 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)



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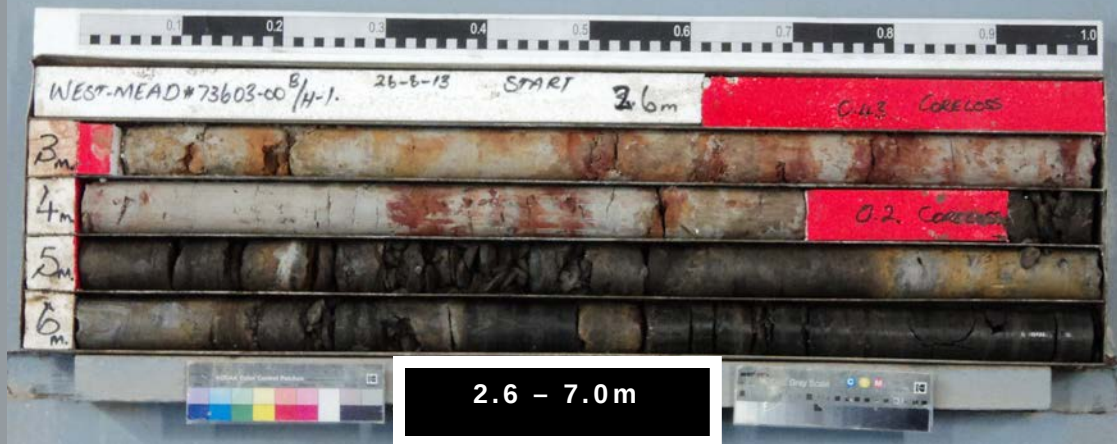
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PROPOSED CARPARK - WESTMEAD

BORE 1

PROJECT 73603

AUG 2013



DOUGLAS PARTNERS PTY LTD

PROPOSED CARPARK - WESTMEAD

BORE 1

PROJECT 73603

AUG 2013



BOREHOLE LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 17.75 AHD
EASTING: 313576.18
NORTHING: 6257874.72
DIP/AZIMUTH: 90°/-

BORE No: 2
PROJECT No: 73603.00
DATE: 28/8/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low		Medium	High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type
	0.055	ASPHALTIC CONCRETE																				A			PID<1
	0.5	ROADBASE - grey, fine to coarse grained, gravelly sand roadbase, fine to medium gravel, dry																				A			PID<1
17		SILTY CLAY - brown and grey mottled silty clay with a trace of fine to medium, ironstone gravel, moist																				A			PID<1
1	1.0	SHALY CLAY - extremely low strength, extremely weathered, light grey and red brown shale, with some medium strength ironstone bands																				S			6,19,31 N = 50
16																									pp = 300
2																						C	100		pp >=500
15																									
3																									
3.55		SHALE - extremely to very low strength, highly weathered, fragmented and fractured, grey shale. Some low strength bands																				C	91	0	PL(A) = 0.1
4																									
14																									
5.1		SHALE - low to medium and medium strength, slightly weathered, fragmented and fractured, grey shale, with some very low strength bands																							PL(A) = 0.1
13																									
5																									
12																									PL(A) = 0.5
6																									
11																									
7																									PL(A) = 0.6
10																									
7.75		LAMINITE - high strength, fresh, slightly fractured, grey laminite. Approximately 20% fine grained sandstone laminations																							
8																									
8.5		Bore discontinued at 8.5m Termination depth reached																							
9																									
9																									
8																									

RIG: Scout 1

DRILLER: LC

LOGGED: AK/SI

CASING: HW to 1.5m

TYPE OF BORING: Auger to 1.0m; rotary to 1.55m; NMLC coring to 8.5m

WATER OBSERVATIONS: No free groundwater observed whilst drilling

REMARKS: Standpipe installed to 8.5m; (screen: 1.0 to 8.5m; gravel: 0.8-8.5m; bentonite: 0.2-0.8m then backfill and gatic cover)

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 1s(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test 1s(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 17.75 AHD
EASTING: 313576.18
NORTHING: 6257874.72
DIP/AZIMUTH: 90°/-

BORE No: 2
PROJECT No: 73603.00
DATE: 28/8/2013
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			
	0.055	ASPHALTIC CONCRETE		A	0.1		PID<1		Cap	
		ROADBASE - grey, fine to coarse grained, gravelly sand roadbase, fine to medium gravel, dry		A	0.5		PID<1		Concrete	
	0.5	SILTY CLAY - brown and grey mottled silty clay with a trace of fine to medium, ironstone gravel, moist		A	0.5				Bentonite	
	1.0	SHALY CLAY - extremely low strength, extremely weathered, light grey and red brown shale, with some medium strength ironstone bands		A	1.0		PID<1 6,19,31 N = 50			
				S	1.45					
					1.55		pp = 300			
					1.65					
	2			C	2.55		pp >=500		Gravel pack	
	3				3.4					
	3.55	SHALE - extremely to very low strength, highly weathered, fragmented and fractured, grey shale. Some low strength bands			3.9		PL(A) = 0.1			
	4			C	4.9		PL(A) = 0.1		Screen	
	5.1	SHALE - low to medium and medium strength, slightly weathered, fragmented and fractured, grey shale, with some very low strength bands			5.1					
				C	5.7		PL(A) = 0.5			
	6				6.6					
	7			C	6.95		PL(A) = 0.6			
	7.75	LAMINITE - high strength, fresh, slightly fractured, grey laminite. Approximately 20% fine grained sandstone laminations			7.75					
				C	8.3		PL(A) = 1.4			
	8.5	Bore discontinued at 8.5m Termination depth reached			8.5				End Cap	
	9									

RIG: Scout 1

DRILLER: LC

LOGGED: AK/SI

CASING: HW to 1.5m

TYPE OF BORING: Auger to 1.0m; rotary to 1.55m; NMLC coring to 8.5m

WATER OBSERVATIONS: No free groundwater observed whilst drilling

REMARKS: Standpipe installed to 8.5m; (screen: 1.0 to 8.5m; gravel: 0.8-8.5m; bentonite: 0.2-0.8m then backfill and gatic cover)

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 1s(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test 1s(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



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DOUGLAS PARTNERS PTY LTD

PROPOSED CARPARK - WESTMEAD

BORE 2

PROJECT 73603

AUG 2013



DOUGLAS PARTNERS PTY LTD

PROPOSED CARPARK - WESTMEAD

BORE 2

PROJECT 73603

AUG 2013



BOREHOLE LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 19.88 AHD
EASTING: 313561.14
NORTHING: 6257823.5
DIP/AZIMUTH: 90°/-

BORE No: 3
PROJECT No: 73603.00
DATE: 27/8/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low		Medium	High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
	0.03	ASPHALTIC CONCRETE																								PID<1
	0.45	ROADBASE - well compacted, dark grey-green, gravelly sand roadbase, humid																								PID<1
19	0.7	FILLING - well compacted, mottled red, orange and green, sandy clay filling, humid																								
1	1.3	SILTY CLAY - very stiff, brown mottled red, low plasticity, silty clay, trace of fine to medium grained sand, damp																				S				6,15,23 N = 38
	1.8	SHALY CLAY - extremely low strength, extremely weathered, light grey mottled orange, shaly clay, with some ironstone gravel, damp																								
2	2.2																									
	2.4	SHALE - extremely low strength, extremely weathered, thinly laminated, light grey shale																				S				25/80 refusal
3	3	SHALE - low strength, moderately weathered, slightly to highly fractured, dark grey mottled orange, thinly laminated shale																								PL(A) = 1.3
	4																					C	100	45		PL(A) = 0.4
4	4.4m	very low strength, highly weathered																								PL(A) = 0.5
5	5.15m	extremely low strength, extremely weathered bands																								PL(A) = 0.3
6	6																					C	100	50		PL(A) = 3.3
7	6.7	SHALE - medium to high strength, slightly weathered, fractured, dark grey stained orange, thinly laminated shale																								
8	8																					C	100	100		PL(A) = 0.8
9	8.4	Bore discontinued at 8.4m Termination depth reached																								
10	10																									

RIG: Scout 1

DRILLER: LC

LOGGED: JE

CASING: HW to 2.6m

TYPE OF BORING: Auger to 2.6m; NMLC coring to 8.4m

WATER OBSERVATIONS: No free groundwater observed whilst drilling

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 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	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



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PROPOSED CARPARK- WESTMEAD

BORE 3

PROJECT 73603

AUG 2013



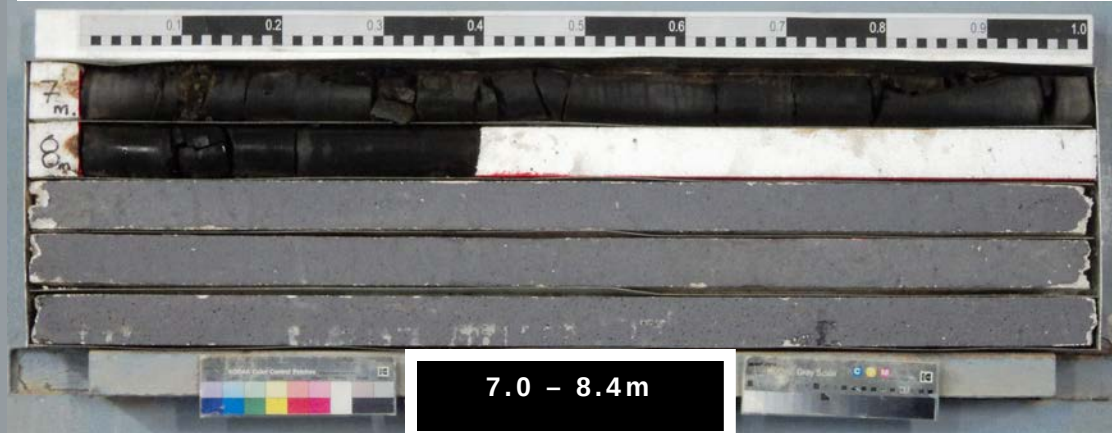
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PROPOSED CARPARK - WESTMEAD

BORE 3

PROJECT 73603

AUG 2013



BOREHOLE LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 19.71 AHD
EASTING: 313518.53
NORTHING: 6257769.31
DIP/AZIMUTH: 90°/-

BORE No: 4
PROJECT No: 73603.00
DATE: 27/8/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
19 1 18 2 17 3 16 4 15 5 14 6 13 7 12 8 11 9 10	0.04	ASPHALTIC CONCRETE																								PID<1
	0.45	ROADBASE - dark grey-green, fine grained, silty sandy gravel roadbase, humid																								PID<1
	0.8	FILLING - brown mottled red-grey, silty sandy clay filling, damp																								PID<1
		FILLING - moderately compacted, light brown-grey, fine to medium grained sand filling, with some silt, humid																								8,5,5 N = 10
	1.9	SILTY CLAY - very stiff, red mottled dark grey, low plasticity, silty clay, trace of fine grained, ironstone gravel and rootlets, damp																								PID<1
																										14,16,21 N = 37
	3.4	SHALY CLAY - extremely low strength, extremely weathered, light grey mottled orange, shaly clay, damp																								
	3.9	SHALE - extremely low strength, extremely weathered, light grey, thinly laminated shale																								11,23,30 N = 53
	4.83	SHALE - medium strength, slightly weathered, fragmented then highly fractured, dark grey, thinly laminated shale, with extremely low strength bands																								PL(A) = 0.4
																										PL(A) = 0.6
																										PL(A) = 0.7
																										PL(A) = 1

RIG: Scout 1

DRILLER: LC

LOGGED: JE

CASING: HW to 3.0m

TYPE OF BORING: Auger to 3.0m; rotary to 4.3m; NMLC coring to 8.0m

WATER OBSERVATIONS: No free groundwater observed whilst drilling

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 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	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 19.71 AHD
EASTING: 313518.53
NORTHING: 6257769.31
DIP/AZIMUTH: 90°/-

BORE No: 4
PROJECT No: 73603.00
DATE: 27/8/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample			
	0.04	ASPHALTIC CONCRETE		D	0.1		PID<1		Cap
	0.45	ROADBASE - dark grey-green, fine grained, silty sandy gravel roadbase, humid		D	0.5		PID<1		Filling
	0.8	FILLING - brown mottled red-grey, silty sandy clay filling, damp		D	1.0		PID<1		
		FILLING - moderately compacted, light brown-grey, fine to medium grained sand filling, with some silt, humid		D	1.5				Bentonite
	1.9	SILTY CLAY - very stiff, red mottled dark grey, low plasticity, silty clay, trace of fine grained, ironstone gravel and rootlets, damp		S	1.95		8,5,5 N = 10		
				D	2.0		PID<1		
				D	2.5				
				S	2.95		14,16,21 N = 37		
	3.4	SHALY CLAY - extremely low strength, extremely weathered, light grey mottled orange, shaly clay, damp			3.8				
	3.9	SHALE - extremely low strength, extremely weathered, light grey, thinly laminated shale		S	4.25		11,23,30 N = 53		Gravel Pack
				C	4.3				
	4.83	SHALE - medium strength, slightly weathered, fragmented then highly fractured, dark grey, thinly laminated shale, with extremely low strength bands			4.8		PL(A) = 0.4		Machine Slotted PVC Screen
				C	5.7		PL(A) = 0.6		
					6.25				
					6.4		PL(A) = 0.7		
		7.5m: slightly fractured		C	7.55		PL(A) = 1		
	8.0	Bore discontinued at 8.0m Termination depth reached			8.0				End Cap

RIG: Scout 1

DRILLER: LC

LOGGED: JE

CASING: HW to 3.0m

TYPE OF BORING: Auger to 3.0m; rotary to 4.3m; NMLC coring to 8.0m

WATER OBSERVATIONS: No free groundwater observed whilst drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

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



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PROPOSED CARPARK - WESTMEAD

BORE 4

PROJECT 73603

AUG 2013



BOREHOLE LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 18.66 AHD
EASTING: 313547.86
NORTHING: 6257851.26
DIP/AZIMUTH: 90°/-

BORE No: 5
PROJECT No: 73603.00
DATE: 29/8/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low		Medium	High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
18 1 17 2 3 4 5 6 7 8 9	0.04	ASPHALTIC CONCRETE																								PID<1
	0.2	ROADBASE - dark grey, silty sandy gravel roadbase, humid																					D			PID<1
	0.6	FILLING - brown, silty sandy clay filling, humid																					D			
	1.3	SILTY CLAY - stiff then hard, brown, low plasticity silty clay, trace of fine to medium grained sand, damp																				D				6,9,25 N = 34
		SILTY CLAY - hard, light grey mottled orange-red, low plasticity, silty clay, with some medium to coarse grained, ironstone gravel (Residual Soil)																				S				
	2																									
	3																									pp = 400
	4																									pp = 350
	5	SHALY CLAY - extremely low strength, extremely weathered, fragmented, grey stained orange-brown, shaly clay																								
	6	SHALE - extremely low to very low strength, highly weathered, unbroken and sightly fractured, dark grey mottled orange, shale From 4.75m: very low to low strength																								
	7	From 6.0m: low strength																								
	8	SHALE - medium strength then high strength, slightly weathered, unbroken and slightly fractured, dark grey shale																								
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102																										
103																										

RIG: Scout 1

DRILLER: LC

LOGGED: JE

CASING: HW to 1.3m

TYPE OF BORING: Auger to 1.0m; rotary to 2.0m; NMLC coring to 8.28m

WATER OBSERVATIONS: No free groundwater observed whilst drilling

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 1s(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test 1s(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



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DOUGLAS PARTNERS PTY LTD

PROPOSED CARPARK- WESTMEAD

BORE 5

PROJECT 73603

AUG 2013



DOUGLAS PARTNERS PTY LTD

PROPOSED CARPARK - WESTMEAD

BORE 5

PROJECT 73603

AUG 2013



BOREHOLE LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 19.21 AHD
EASTING: 313523.14
NORTHING: 6257819.76
DIP/AZIMUTH: 90°/-

BORE No: 6
PROJECT No: 73603.00
DATE: 28/8/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing								
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low		Medium	High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
19.04	0.04	ASPHALTIC CONCRETE																										
	0.45	ROADBASE - dark grey-green, silty sandy gravel roadbase, humid																					A					
18.00	1.00	SILTY CLAY - very stiff then hard, brown, low plasticity, silty clay, trace of fine to medium grained sand, damp																					A					
17.60	1.60	Below 0.9m: red mottled dark grey, with some fine to coarse grained ironstone gravel																					S					
17.20	2.00	SILTY CLAY - hard, light grey mottled red-brown, low plasticity, silty clay, with some medium to coarse, ironstone gravel, damp (Residual Soil)																					A					
16.75	2.50	SHALY CLAY - extremely low strength, extremely weathered, light grey and red-brown shaly clay, with some ironstone bands																										
15.80	3.80	SHALE - very low to low strength, highly weathered, grey mottled orange shale, with some medium strength bands																										
14.50	5.00																											
13.50	6.35	SHALE - medium then medium to high strength, slightly weathered, fractured, grey-brown shale, with some very low strength bands																										
12.50	7.00																											
11.50	7.90	SILTSTONE - high strength, fresh, slightly fractured, grey siltstone, with some fine grained sandstone laminations																										
10.50	8.45	Bore discontinued at 8.45m Termination depth reached																										
9.00																												

RIG: Scout 1

DRILLER: LC

LOGGED: JE/SI

CASING: HW to 2.7m

TYPE OF BORING: Auger to 2.5m; rotary to 2.9m; NMLC coring to 8.45m

WATER OBSERVATIONS: No free groundwater observed whilst drilling

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 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)



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PROPOSED CARPARK - WESTMEAD

BORE 6

PROJECT 73603

AUG 2013



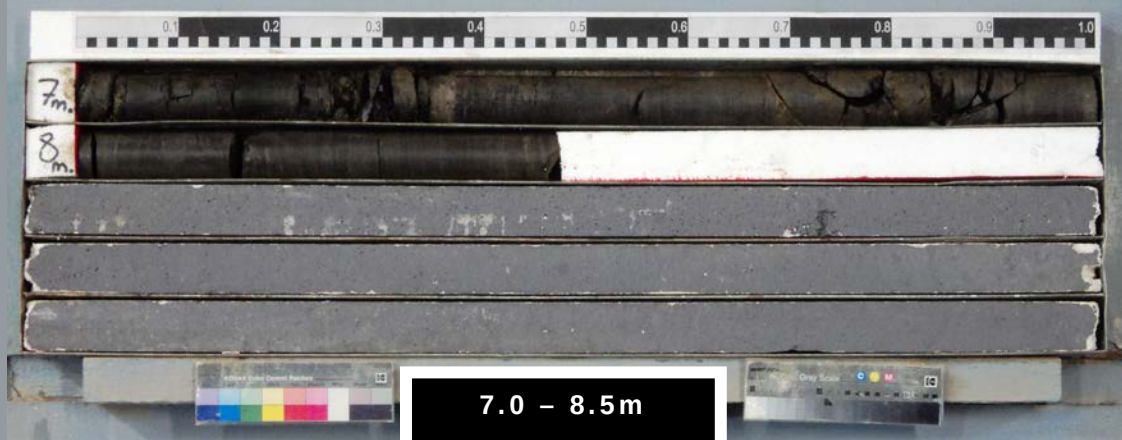
DOUGLAS PARTNERS PTY LTD

PROPOSED CARPARK - WESTMEAD

BORE 6

PROJECT 73603

AUG 2013



BOREHOLE LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 18.05 AHD
EASTING: 313522.05
NORTHING: 6257857.44
DIP/AZIMUTH: 90°/-

BORE No: 7
PROJECT No: 73603.00
DATE: 29/8/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength				Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing							
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low		Low	Medium	High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
18	0.04	ASPHALTIC CONCRETE																								PID<1
	0.35	ROADBASE - dark grey and green silty sandy gravel roadbase, humid																								PID<1
	1	SILTY CLAY - stiff then very stiff, brown mottled red, low plasticity, silty clay, trace of fine to medium grained sand, humid																								PID<1 6,6,12 N = 18
	1.1	SILTY CLAY - hard, light grey mottled orange-red, silty clay, with some medium to coarse, ironstone gravel, damp																								PID<1 12,21,27 N = 48
	2	From 1.9m: humid																								PID<1 12,21,27 N = 48
	2.3	SHALY CLAY - extremely low strength, extremely weathered, light grey mottled orange, shaly clay, damp																								
	3																									
	4																									pp = 520
	4.33	SHALE - very low strength, moderately then highly weathered, unbroken then fractured and slightly fractured, dark grey and grey shale																								pp = 600
	5																									
	6																									PL(A) = 0.3
	6.33	SHALE - medium then high strength, slightly weathered, fractured and slightly fractured, dark grey shale																								PL(A) = 0.8
	7																									
	8	Bore discontinued at 8.0m Termination depth reached																								PL(A) = 1.3
	9																									

RIG: Scout 1

DRILLER: LC

LOGGED: JE

CASING: HW to 2.7m

TYPE OF BORING: Auger to 2.5m; rotary to 3.0m; NMLC coring to 8.0m

WATER OBSERVATIONS: No free groundwater observed whilst drilling

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 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	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



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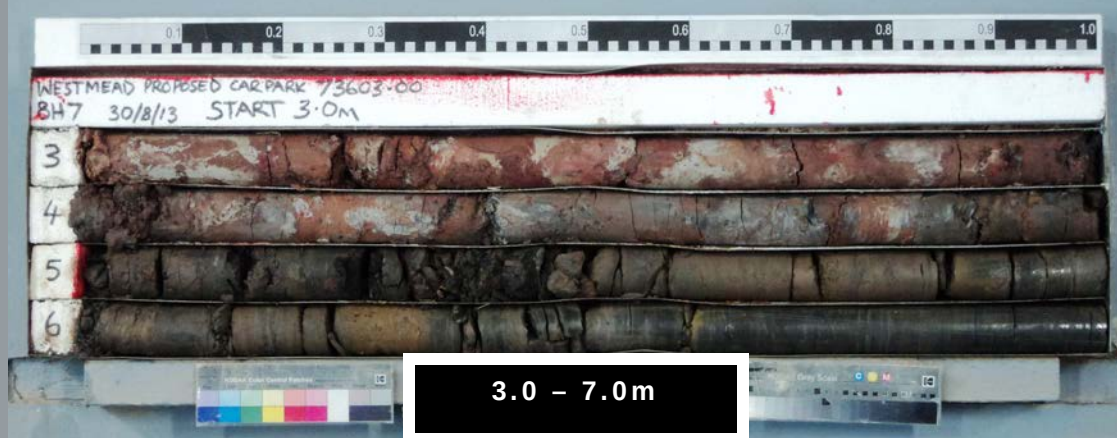
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PROPOSED CARPARK- WESTMEAD

BORE 7

PROJECT 73603

AUG 2013



DOUGLAS PARTNERS PTY LTD

PROPOSED CARPARK - WESTMEAD

BORE 7

PROJECT 73603

AUG 2013



BOREHOLE LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 18.98 AHD
EASTING: 313475.1
NORTHING: 6257788.4
DIP/AZIMUTH: 90°/-

BORE No: 8
PROJECT No: 73603.00
DATE: 29/8/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength				Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing								
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low		Low	Medium	High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
	0.04	ASPHALTIC CONCRETE																									PID<1
	0.4	ROADBASE - grey, silty sandy gravel roadbase, humid																									PID<1
18	1	SILTY CLAY - stiff to very stiff, brown, low plasticity silty clay, trace of fine to medium sand, damp From 0.9m: red mottled grey																									PID<1 4,7,9 N = 16
17	2	SILTY CLAY - very stiff then hard, red mottled light grey, silty clay, with some medium to coarse, ironstone gravel, damp (Residual Soil)																									7,10,12 N = 22
16	3																										
15	4																										
14	5	SHALY CLAY - extremely low strength, light grey mottled orange, shaly clay, damp																									12,21,33 N = 54
13	6	SHALE - very low to low strength, highly weathered, unbroken, dark grey mottled orange, thinly laminated shale																									PL(A) = 0.2 PL(A) = 0.1
12	7	SHALE - medium strength, slightly weathered, slightly fractured, dark grey shale																									PL(A) = 0.2 PL(A) = 1.4
11	8	Bore discontinued at 8.17m Termination depth reached																									PL(A) = 1.6
10	9																										

RIG: Scout 1

DRILLER: LC

LOGGED: JE

CASING: HW to 2.7m

TYPE OF BORING: Auger to 2.5m; rotary to 4.3m; NMLC coring to 8.17m

WATER OBSERVATIONS: No free groundwater observed whilst drilling

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 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)

DOUGLAS PARTNERS PTY LTD

PROPOSED CARPARK - WESTMEAD

BORE 8

PROJECT 73603

AUG 2013



BOREHOLE LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 18.20 AHD
EASTING: 313479.78
NORTHING: 6257837.36
DIP/AZIMUTH: 90°/--

BORE No: 9
PROJECT No: 73603.00
DATE: 29/8/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
18	0.04	ASPHALTIC CONCRETE																								PID<1
	0.35	ROADBASE - grey, silty sandy gravel roadbase, humid																								PID<1
	1	SILTY CLAY - very stiff, brown mottled red, low plasticity, silty clay, trace of fine to medium sand, damp From 1.0m: dark grey mottled red																								PID<1 8,10,12 N = 22
	2	From 1.7m: grey mottled red-orange																								
	2.8	SHALY CLAY - extremely low strength, extremely weathered, light grey mottled orange, shaly clay, with some medium to coarse-grained ironstone gravel, damp																								6,12,14 N = 26
	4																									pp = 600
	4.2	SHALE - very low strength, highly weathered, slightly fractured, dark grey mottled orange shale 4.6m: shaly clay seam																								
	5																									
	6	6.3m: gravelly shaly clay seam																								PL(A) = 0.3
	7																									
	7.55	SHALE - medium strength, slightly weathered, slightly fractured, grey shale																								PL(A) = 0.3
	7.8																									PL(A) = 1.6
	8.0	SANDSTONE - high strength, slightly weathered, fractured, orange-brown and grey, fine to medium grained sandstone Bore discontinued at 8.0m Termination depth reached																								
	9																									

RIG: Scout 1

DRILLER: LC

LOGGED: JE

CASING: HW to 2.7m

TYPE OF BORING: Auger to 2.5m; rotary to 3.5m; NMLC coring to 8.0m

WATER OBSERVATIONS: No free groundwater observed whilst drilling

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 1s(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test 1s(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)



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PROPOSED CARPARK - WESTMEAD

BORE 9

PROJECT 73603

AUG 2013



BOREHOLE LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 17.00 AHD
EASTING: 313426.42
NORTHING: 6257820.71
DIP/AZIMUTH: 90°/-

BORE No: 10
PROJECT No: 73603.00
DATE: 28/8/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
17	0.03	ASPHALTIC CONCRETE																								PID<1
	0.3	ROADBASE - dark grey-green, silty sandy gravel roadbase, humid																				D				PID<1 4, 14, 20 N = 34
	1	SILTY CLAY - stiff then hard, brown, silty clay, trace of fine to medium grained sand, damp																				D				
	1.2	1.2m: red mottled dark grey																				S				
	2	2.0m: red mottled light grey and orange, with some medium to coarse grained ironstone gravel																								
	3																					S				7, 10, 17 N = 27
	3.8	SHALY CLAY - extremely low strength, extremely weathered, light grey mottled orange, shaly clay, damp																								
	5.15	SHALE - medium then high strength, highly weathered, slightly fractured, dark grey mottled orange, shale																				C	100	27		PL(A) = 0.1
	6	Below 6.3m: slightly weathered, dark grey																								PL(A) = 0.8
	7																					C	100	100		PL(A) = 1.4
	8																									PL(A) = 1
	8.0	Bore discontinued at 8.0m Termination depth reached																								PL(A) = 1.6
	9																									
	9																									

RIG: Bobcat

DRILLER: LC

LOGGED: JE

CASING: HW to 1.5m

TYPE OF BORING: Auger to 1.5m; rotary to 4.0m; NMLC coring to 8.0m

WATER OBSERVATIONS: No free groundwater observed whilst drilling

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 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)



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BOREHOLE LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 17.00 AHD
EASTING: 313426.42
NORTHING: 6257820.71
DIP/AZIMUTH: 90°/-

BORE No: 10
PROJECT No: 73603.00
DATE: 28/8/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Well Construction Details	
				Type	Depth	Sample			
	0.03	ASPHALTIC CONCRETE		D	0.1		PID<1	Cap	
	0.3	ROADBASE - dark grey-green, silty sandy gravel roadbase, humid						Filling	
		SILTY CLAY - stiff then hard, brown, silty clay, trace of fine to medium grained sand, damp		D	1.0		PID<1	Bentonite	
	1	1.2m: red mottled dark grey		S	1.45		4,14,20 N = 34		
	2	2.0m: red mottled light grey and orange, with some medium to coarse grained ironstone gravel		S	2.5		7,10,17 N = 27		
	3				2.95			Gravel pack	
	3.8	SHALY CLAY - extremely low strength, extremely weathered, light grey mottled orange, shaly clay, damp			4.0				
	4			C	4.6		PL(A) = 0.1		
	5.15	SHALE - medium then high strength, highly weathered, slightly fractured, dark grey mottled orange, shale			5.17		PL(A) = 0.8	Machine slotted PVC Screen	
	6	Below 6.3m: slightly weathered, dark grey		C	5.5				
	7				6.4		PL(A) = 1.4		
	8				6.85		PL(A) = 1		
	8.0	Bore discontinued at 8.0m Termination depth reached			7.8		PL(A) = 1.6	End Cap	
	9				8.0				

RIG: Bobcat

DRILLER: LC

LOGGED: JE

CASING: HW to 1.5m

TYPE OF BORING: Auger to 1.5m; rotary to 4.0m; NMLC coring to 8.0m

WATER OBSERVATIONS: No free groundwater observed whilst drilling

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 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	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



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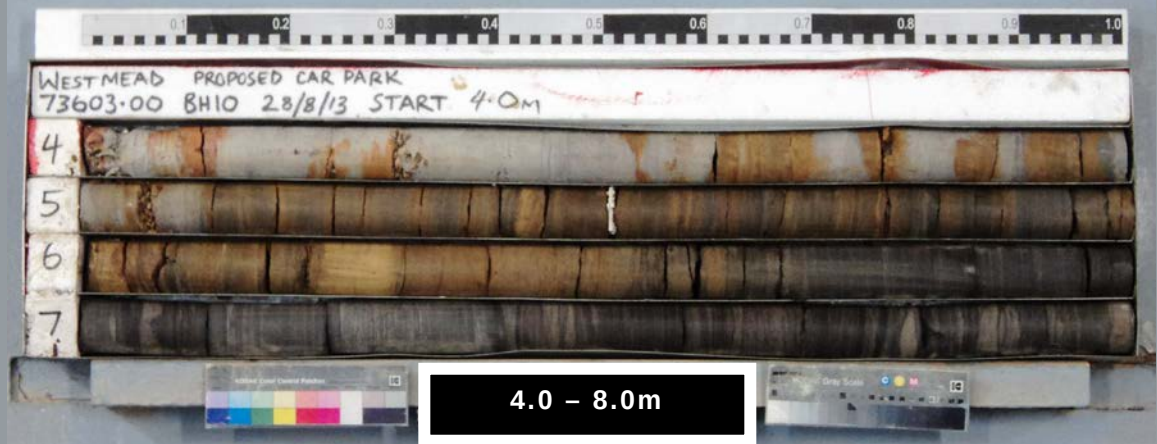
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PROPOSED CARPARK - WESTMEAD

BORE 10

PROJECT 73603

AUG 2013



TEST PIT LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 18.40 AHD
EASTING: 313621.46
NORTHING: 6257893.51

PIT No: 101
PROJECT No: 73603.00
DATE: 31/8/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
18	0.05	FILLING - brown, sandy silt topsoil filling, moist		D, E	0.1		PID<1					
		FILLING - apparently well compacted, brown, medium plasticity, gravelly clay filling, fine to coarse gravel of masonry and fibro cement pipe fragments, with some cobbles of masonry and fibro cement pipe fragments, dry to moist		D, E	0.5		PID<1					
1	0.9	FILLING - apparently well compacted, red-brown, silty clay filling, with some cobbles of fibro cement pipe and concrete fragments, trace of boulder-sized concrete fragments up to 100mm, moist		D, E	1.0		PID<1	1				
17	1.3	FILLING - apparently well compacted, grey mottled red-brown and yellow-brown, silty clay filling, trace of rootlets and clay pipe fragments, moist		D, E	1.5		PID<1					
	1.7	FILLING - light grey, fibro cement sheets		E	1.7							
	1.8	TOPSOIL - hard, dark brown, non-plastic, sandy silt topsoil, fine sand, moist										
2	2.0	SILTY CLAY - hard, brown, high plasticity, silty clay, moist (Residual Soil)		D, E	2.0		PID<1	2				
16				B								
				D	2.5		PID<1					
	2.7	SILTY CLAY - hard, grey mottled red-brown, high plasticity, silty clay, moist (Residual Soil)										
3	3.0	Pit discontinued at 3.0m Termination depth reached		D	3.0			3				
15												
4								4				
14												

RIG: Kubota 4 tonne excavator; 300mm wide bucket

LOGGED: AK

SURVEY DATUM: MGA94

WATER OBSERVATIONS: Free groundwater not observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

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	W	Water seep
E	Environmental sample	W	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)

TEST PIT LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 18.91 AHD
EASTING: 313558.97
NORTHING: 6257874.74

PIT No: 102
PROJECT No: 73603.00
DATE: 31/8/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
	0.25	FILLING - apparently well compacted, grey-brown, medium plasticity, gravelly clay filling, fine to coarse gravel of ripped shale and fibro cement fragments, with some cobbles of brick fragments and rootlets, moist Pit discontinued at 0.25m Terminated as buried services warning tape was encountered		D, E	0.1		PID<1					
18	1											
17	2											
16	3											
15	4											
14												

RIG: Kubota 4 tonne excavator; 300mm wide bucket

LOGGED: AK

SURVEY DATUM: MGA94

WATER OBSERVATIONS: Free groundwater not observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

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	S	Shear vane (kPa)
				V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 18.70 AHD
EASTING: 313531.09
NORTHING: 6257867.3

PIT No: 103
PROJECT No: 73603.00
DATE: 31/8/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
18 1 17 2 16 3 15 4 14		FILLING - variably compacted, brown, low plasticity, gravelly sandy clay filling, fine sand, fine to coarse gravel of masonry and fibro cement fragments, trace of cobble-sized fragments of concrete and rootlets, dry to moist		D, E	0.1		PID<1					
				D, E	0.5		PID<1					
	0.9	SILTY CLAY - hard, red-brown, high plasticity, silty clay, trace of roots and rootlets, moist (Residual Soil)		D, E	1.0		PID<1					
				B	1.1							
				D	1.5							
	2.1	SILTY CLAY - hard, grey mottled red-brown, high plasticity, silty clay, with frequent ironstone bands recovered as medium to coarse gravel and cobbles, moist (Residual Soil)										
	2.8	Pit discontinued at 2.8m Terminated due to unproductive digging rate		D	2.8							

RIG: Kubota 4 tonne excavator; 300mm wide bucket

LOGGED: AK

SURVEY DATUM: MGA94

WATER OBSERVATIONS: Free groundwater not observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

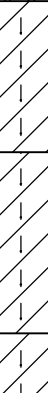
SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial 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)

TEST PIT LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 19.0 AHD
EASTING: 313496
NORTHING: 6257856

PIT No: 104
PROJECT No: 73603.00
DATE: 31/8/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
19.0 18.0 17.0 16.0		FILLING - relatively well compacted, brown, medium plasticity, gravelly clay filling, fine to coarse gravel of fibro cement and masonry fragments, with some cobble-sized masonry and concrete fragments, trace of roots and rootlets, dry		D, E	0.1		PID<1					
				D, E	0.5		PID<1					
	1.4	SILTY CLAY - hard, brown, medium to high plasticity, silty clay, trace of rootlets (possible filling)		D, E	1.5		PID<1					
	1.9	SILTY CLAY - hard, brown mottled red, yellow and grey, high plasticity, silty clay, trace of rootlets, moist (RESIDUAL SOIL)		E	2.0		PID<1					
15.0 14.0	2.5	SILTY CLAY - hard, grey mottled red-brown, medium to high plasticity, silty clay, trace of fine to medium, ironstone gravel, moist (RESIDUAL SOIL)										
	2.7	Pit discontinued at 2.7m Terminated due to unproductive digging rate										
13.0 12.0 11.0 10.0	3											
9.0 8.0 7.0 6.0	4											

RIG: Kubota 4 tonne excavator; 300mm wide bucket

LOGGED: AK

SURVEY DATUM: MGA94

WATER OBSERVATIONS: Free groundwater not observed

REMARKS: Level interpolated from survey drawing

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

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)	

TEST PIT LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 17.36 AHD
EASTING: 313463.65
NORTHING: 6257850.94

PIT No: 105
PROJECT No: 73603.00
DATE: 31/8/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
17		FILLING - apparently well compacted, brown, low to medium plasticity, sandy clay filling, fine to medium sand, with some fine to medium gravel of ripped shale, cobbles of concrete fragments and rootlets, dry		D, E	0.1		PID<1					
	0.45	SILTY CLAY - very stiff, red-brown, medium plasticity, silty clay, trace of roots and rootlets, moist (Residual Soil)		D, E, B	0.5 0.6		PID<1					
		- hard below 0.9m										
1												
16												
	1.7	SILTY CLAY - hard, grey mottled red-brown, high plasticity, silty clay, with some fine to medium, ironstone gravel, moist (Residual Soil)		D	1.8							
2												
15												
	2.8	SILTY CLAY - hard, grey stained yellow-brown, high plasticity, silty clay, moist (Residual Soil)		D	2.9							
3	3.0	Pit discontinued at 3.0m Termination depth reached										
14												
4												
13												

RIG: Kubota 4 tonne excavator; 300mm wide bucket

LOGGED: AK

SURVEY DATUM: MGA94

WATER OBSERVATIONS: Free groundwater not observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

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	W	Water seep
E	Environmental sample	W	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)

TEST PIT LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 19.74 AHD
EASTING: 313509.18
NORTHING: 6257818.71

PIT No: 106
PROJECT No: 73603.00
DATE: 7/9/2013
SHEET 1 **OF** 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
		FILLING - apparently moderately well compacted, brown, gravelly clay filling, medium to coarse, angular gravel of ripped shale, trace of roots and rootlets, dry to moist		D, E*	0.1		PID<1					
	0.5	FILLING - apparently well compacted, grey, medium to coarse grained, gravelly sand filling, fine, sub-angular gravel, dry		D, E	0.5		PID<1					
	0.7	FILLING - apparently well compacted, brown, silty clay filling, trace of fine gravel and rootlets, dry		D, E	0.8		PID<1					
	0.9	SILTY CLAY - very stiff to hard, brown, medium plasticity, silty clay, moist (Residual Soil)		D, E	1.0		PID<1					
	1.3	GRAVELLY CLAY - hard, red-brown, medium plasticity, gravelly clay, fine, sub-angular, ironstone gravel, dry to moist (Residual Soil)		D	1.4							
	1.8	SILTY CLAY - hard, grey mottled red and yellow-brown, medium to high plasticity, silty clay, with some fine to medium, ironstone gravel, moist (Residual Soil)		D	2.0							
	2.7	GRAVELLY CLAY - hard, grey mottled red and yellow-brown, medium plasticity, gravelly clay, fine to coarse, angular, ironstone gravel, dry to moist (Residual Soil)										
	3.0	Pit discontinued at 3.0m Termination depth reached		D	3.0							

RIG: Kubota 4 tonne excavator: 300mm wide bucket

LOGGED: AK

SURVEY DATUM: MGA94

WATER OBSERVATIONS: Free groundwater not observed

REMARKS: *BD1-100913 is blind replicate of 0 - 0.1m

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

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	W	Water seep
E	Environmental sample	W	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)



Douglas Partners
Geotechnics | Environment | Groundwater

TEST PIT LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 19.5 AHD
EASTING: 313494
NORTHING: 6257801

PIT No: 107
PROJECT No: 73603.00
DATE: 7/9/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)
				Type	Depth	Sample	Results & Comments		
		FILLING - variably compacted, brown silty clay filling, with some fine to medium sand and fine to medium gravel, trace of fibro cement fragments and rootlets, moist		D, E	0.1		PID<1		
	0.35	FILLING - well compacted, grey, fine grained, silty gravel filling, silty material of ash, dry		D, E	0.45		PID<1		
	0.5	FILLING - well compacted, brown, silty clay filling, trace of clay pipe fragments, moist		D, E	0.5		PID<1		
	0.8	SILTY CLAY - very stiff, brown, medium plasticity, silty clay, moist (Residual Soil)		D, E	0.7		PID<1		
				E	0.8		PID<1		
	1.2	SILTY CLAY - hard, red-brown, medium plasticity, silty clay, with some fine ironstone gravel, moist (Residual Soil)		E	1.0		PID<1		
				D	1.5				
	2.2	SILTY CLAY - hard, grey mottled red-brown, medium to high plasticity, silty clay, with some fine, ironstone gravel, moist (Residual Soil)		D	2.3				
		2.8m: as above but with yellow-brown mottling and medium grained, ironstone gravel							
	3.0	GRAVELLY CLAY - hard, grey mottled red and yellow-brown, gravelly clay, medium to coarse, sub-angular, ironstone gravel, moist (Residual Soil)		D	3.1				
	3.1								
		Note - first attempt to north encountered filling over an asphaltic concrete pavement and concrete kerb; pit terminated at 0.35m. Second attempt south of pit encountered filling and possible buried service encased in no-fines concrete; pit terminated at 0.8m. Pit discontinued at 3.1m Termination depth reached							

RIG: Kubota 4 tonne excavator; 300mm wide bucket

LOGGED: AK

SURVEY DATUM: MGA94

WATER OBSERVATIONS: Free groundwater not observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

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	W	Water seep
E	Environmental sample	W	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)

TEST PIT LOG

CLIENT: Health Infrastructure
PROJECT: Westmead Car Park
LOCATION: Institute Road, Westmead

SURFACE LEVEL: 19.96 AHD
EASTING: 313480.01
NORTHING: 6257778.78

PIT No: 108
PROJECT No: 73603.00
DATE: 31/8/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
		FILLING - apparently well compacted, brown, low plasticity, sandy clay filling, fine sand, with some roots and rootlets, dry		D, E	0.1		PID<1					
	0.4	FILLING - apparently well compacted, light brown, fine to medium grained, sand filling, trace of rootlets, dry		D, E	0.5		PID<1					
	0.55	FILLING - apparently well compacted, grey, fine to coarse grained, gravelly sand filling, fine to medium gravel of shale fragments, dry										
	0.9	SILTY CLAY - hard, brown, medium plasticity, silty clay, trace of fine, ironstone gravel, moist (Residual Soil)		D, E, B	1.0		PID<1					
					1.1							
	1.9	SILTY CLAY - hard, mottled grey and red-brown, high plasticity, silty clay, trace of fine to medium, ironstone gravel and rootlets, moist (Residual Soil)		D	1.9							
		- ironstone bands encountered below 2.2m depth, recovered as fine to coarse, subangular gravel			2.0							
	3.0	Pit discontinued at 3.0m Termination depth reached										

RIG: Kubota 4 tonne excavator; 300mm wide bucket

LOGGED: AK

SURVEY DATUM: MGA94

WATER OBSERVATIONS: Free groundwater not observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

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	W	Water seep
E	Environmental sample	W	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)

Appendix D

Laboratory Test Results

Results of Moisture Content Test

Client:	Health Infrastructure	Project No:	73603
Project:	Proposed Carpark	Report No:	1
		Report Date:	11/09/2013
Location:	Corner of Institute and Darcy Roads, Westmead	Date Sampled:	26/08/2013
		Date of Test:	02/09/2013
		Page:	1 of 1

TEST LOCATION	DEPTH (m)	DESCRIPTION	MOISTURE CONTENT (%)
BH1	2.5	Light grey silty clay	11.9
BH2	1.0-1.45	Light grey silty clay	15.5
BH3	1.0	Light brown silty clay	23.1
BH4	2.0	Red brown silty clay	18.1
BH5	1.0	Orange brown silty clay	24.5
BH6	0.5	Light brown silty clay	18.9
BH7	0.5	Red brown silty clay	11.8
BH8	2.5	Red brown silty clay	17.8
BH9	0.5	Brown silty clay	21.7
BH10	1.0	Red brown and grey silty clay	26.7

Test Method(s): AS 1289.2.1.1

Sampling Method(s): Sampled by Engineering Department

Remarks:



NATA Accredited Laboratory Number: 828

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025

Tested: LW
Checked: BH


Brett Hughes
 Laboratory Manager

Results of Moisture Content Test

Client:	Health Infrastructure	Project No:	73603
Project:	Proposed Carpark	Report No:	2
		Report Date:	11/09/2013
Location:	Corner of Institute and Darcy Roads, Westmead	Date Sampled:	26/08/2013
		Date of Test:	02/09/2013
		Page:	1 of 1

TEST LOCATION	DEPTH (m)	DESCRIPTION	MOISTURE CONTENT (%)
TP106	1.0	Brown silty clay	25.1
TP107	1.5	Red brown silty clay	23.4

Test Method(s): AS 1289.2.1.1

Sampling Method(s): Sampled by Engineering Department

Remarks:



NATA Accredited Laboratory Number: 828

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025

Tested: LW
Checked: BH


Brett Hughes
 Laboratory Manager

Results of Moisture Content, Plasticity and Linear Shrinkage Tests

Client: Health Infrastructure		Project No: 73603	
Project: Proposed Carpark		Report No: 3	
Location: Corner of Institute and Darcy Roads, Westmead		Report Date: 11/09/2013	
		Date Sampled: 26/08/2013	
		Date of Test: 10/09/2013	
		Page: 1 of 1	

Test Location	Depth (m)	Description	Code	W _F %	W _L %	W _P %	PI %	*LS %
TP101	2.0	Brown silty clay	2,5	25.2	65	25	40	-
TP103	1.5	Red brown silty clay with some ironstone gravel	2,5	24.6	79	31	48	-
TP104	1.5	Brown silty clay	-	21.3	-	-	-	-
TP105	1.8	Grey mottled red brown silty clay	2,5	19.5	60	22	38	-
TP108	1.9-2.0	Mottled Grey and red brown silty clay	2,5	23.5	66	28	38	-

Legend:

W_F Field Moisture Content
 W_L Liquid limit
 W_P Plastic limit
 PI Plasticity index
 LS Linear shrinkage from liquid limit condition (Mould length 125mm)

Code:

Sample history for plasticity tests

1. Air dried
2. Low temperature (<50°C) oven dried
3. Oven (105°C) dried
4. Unknown

Test Methods:

Moisture Content: AS 1289 2.1.1
 Liquid Limit: AS 1289 3.1.2
 Plastic Limit: AS 1289 3.2.1
 Plasticity Index: AS 1289 3.3.1
 Linear Shrinkage: AS 1289 3.4.1

Method of preparation for plasticity tests

5. Dry sieved
6. Wet sieved
7. Natural

*Specify if sample crumbled CR or curled CU

Sampling Methods: Sampled by Engineering Department

Remarks:



NATA Accredited Laboratory Number: 828

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025

Tested: LW

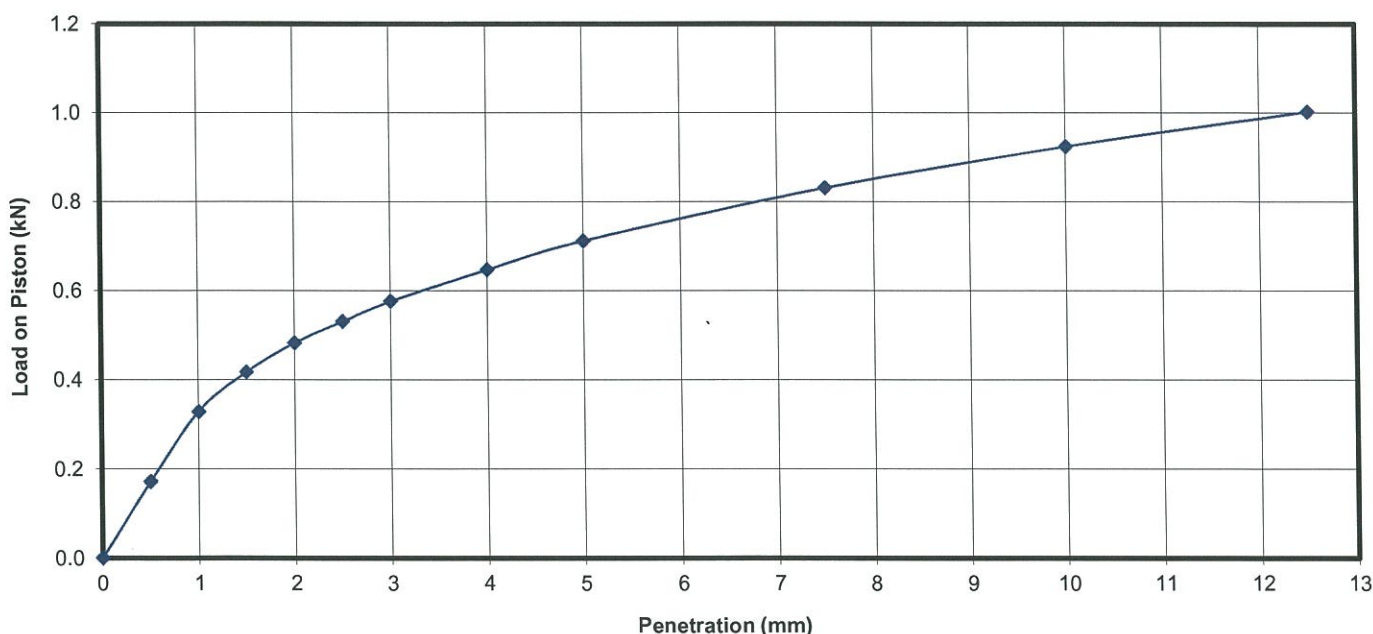
Checked: BH



Brett Hughes
Laboratory Manager

Results of California Bearing Ratio Test

Client :	Health Infrastructure	Project No. :	73603.00
Project :	Proposed Carpark	Report No. :	4
Location :	Corner of Institute and Darcy Roads, Westmead	Report Date :	23/09/2013
Test Location :	TP101	Date Sampled :	31/08/2013
Depth / Layer :	2.0-2.5m	Date of Test:	14/09/2013
		Page:	1 of 1



Description: Brown silty clay

Test Method(s): AS1289 6.1.1, AS1289 5.1.1, AS1289 2.1.1

Sampling Method(s): Engineering Department

Percentage > 19mm: 0.0%

LEVEL OF COMPACTION: 100% of STD MDD
MOISTURE RATIO: 101% of STD OMC

SURCHARGE: 4.5 kg
SOAKING PERIOD: 4 days

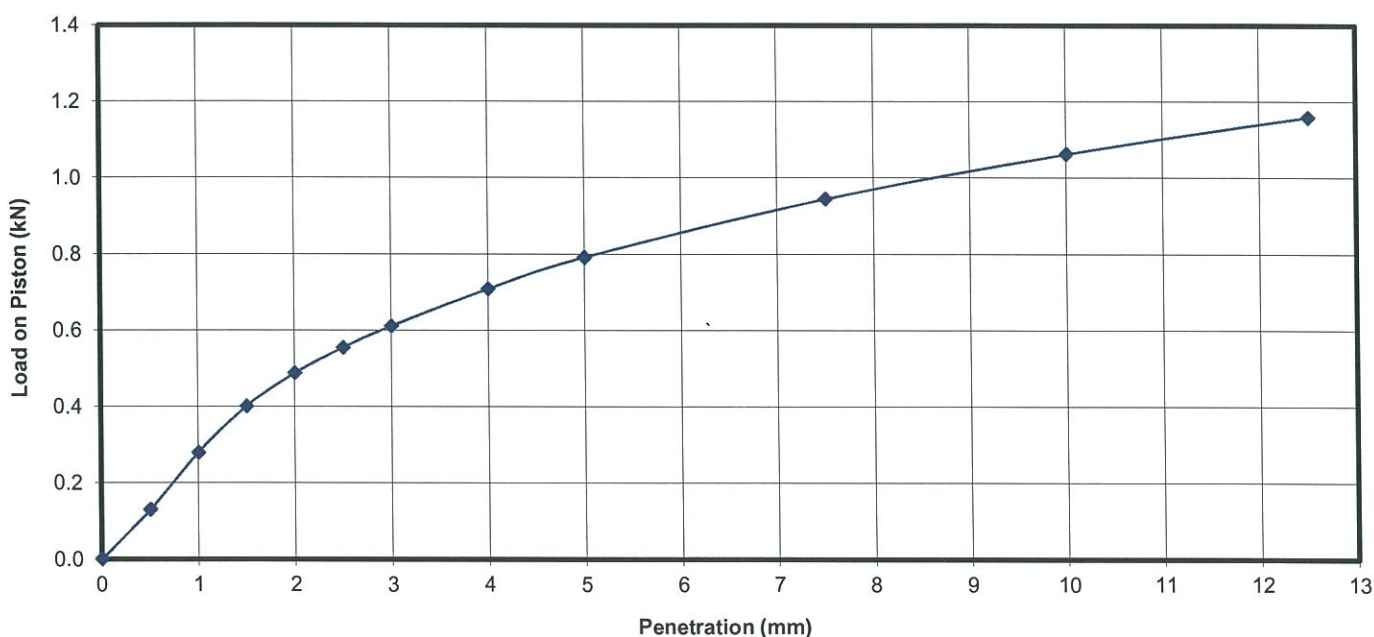
SWELL: 0.8%

CONDITION	MOISTURE CONTENT %	DRY DENSITY t/m ³
At compaction	30.0	1.44
After soaking	32.8	1.44
After test		
Top 30mm of sample	34.6	-
Remainder of sample	31.3	-
Field values	29.2	-
Standard Compaction	29.7	1.44

RESULTS		
TYPE	PENETRATION	CBR (%)
TOP	2.5 mm	4
	5.0 mm	3.5

Results of California Bearing Ratio Test

Client :	Health Infrastructure	Project No. :	73603.00
Project :	Proposed Carpark	Report No. :	5
Location :	Corner of Institute and Darcy Roads, Westmead	Report Date :	23/09/2013
Test Location :	TP103	Date Sampled :	31/08/2013
Depth / Layer :	1.1m	Date of Test:	14/09/2013
		Page:	1 of 1



Description: Red brown silty clay

Test Method(s): AS1289 6.1.1, AS1289 5.1.1, AS1289 2.1.1

Sampling Method(s): Engineering Department

Percentage > 19mm: 2.2% Excluded

LEVEL OF COMPACTION: 100% of STD MDD

SURCHARGE: 4.5 kg

SWELL: 0.9%

MOISTURE RATIO: 98% of STD OMC

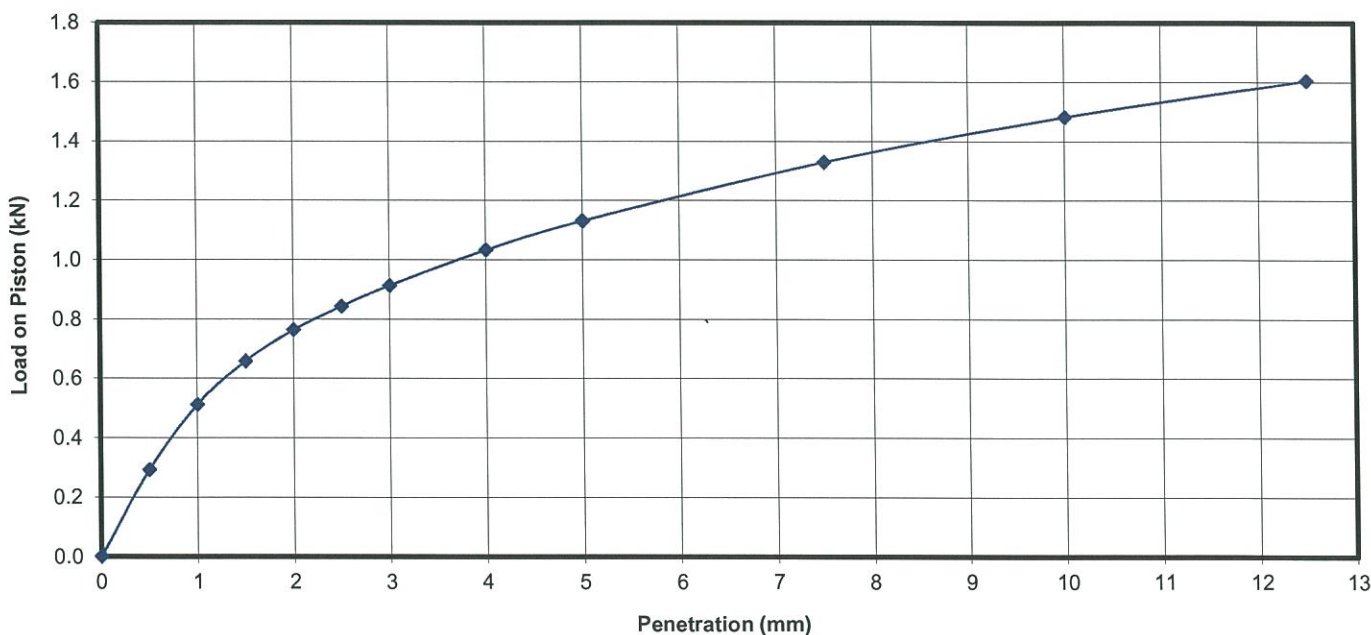
SOAKING PERIOD: 4 days

CONDITION	MOISTURE CONTENT %	DRY DENSITY t/m ³
At compaction	24.2	1.51
After soaking	27.5	1.51
After test		
Top 30mm of sample	29.9	-
Remainder of sample	28.5	-
Field values	21.5	-
Standard Compaction	24.6	1.50

RESULTS		
TYPE	PENETRATION	CBR (%)
TOP	2.5 mm	4.5
	5.0 mm	4

Results of California Bearing Ratio Test

Client :	Health Infrastructure	Project No. :	73603.00
Project :	Proposed Carpark	Report No. :	6
Location :	Corner of Institute and Darcy Roads, Westmead	Report Date :	23/09/2013
Test Location :	TP105	Date Sampled :	31/08/2013
Depth / Layer :	0.5-0.6m	Date of Test:	16/09/2013
		Page:	1 of 1



Description: Red brown silty clay

Test Method(s): AS1289 6.1.1, AS1289 5.1.1, AS1289 2.1.1

Sampling Method(s): Engineering Department

Percentage > 19mm: 0.0%

LEVEL OF COMPACTION: 100% of MDD

SURCHARGE: 4.5 kg

SWELL: 0.7%

MOISTURE RATIO: 99% of OMC

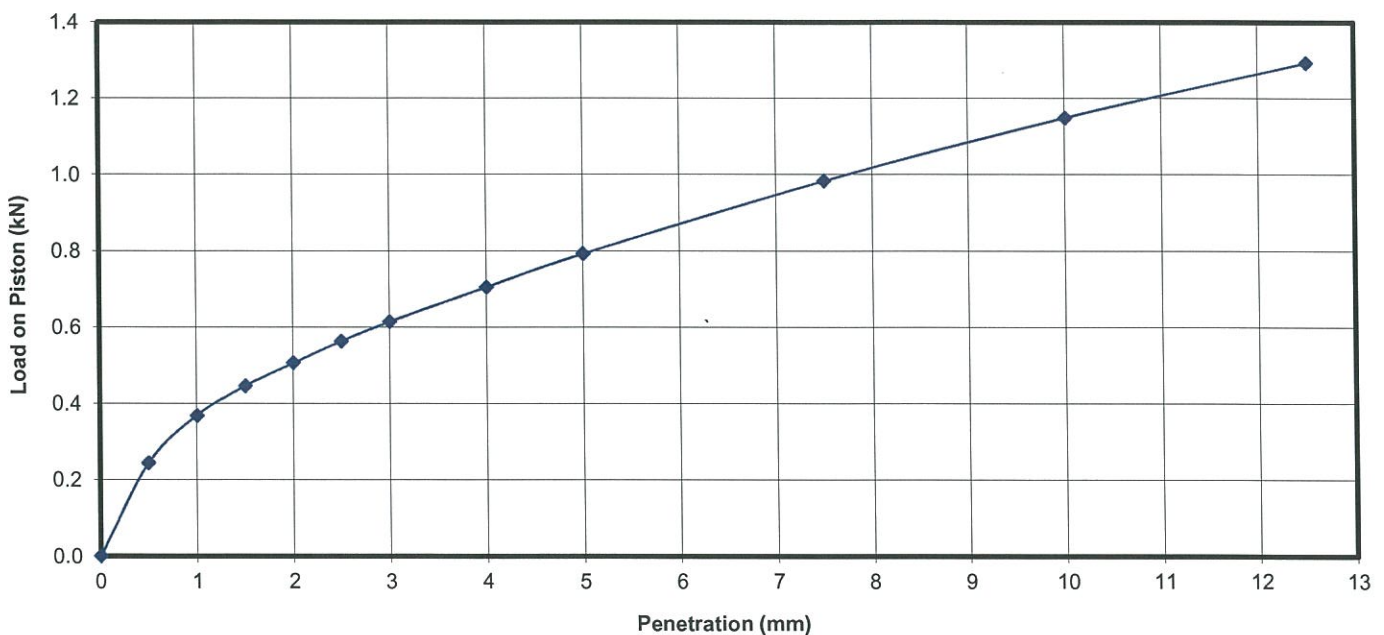
SOAKING PERIOD: 4 days

CONDITION	MOISTURE CONTENT %	DRY DENSITY t/m ³
At compaction	31.3	1.43
After soaking	33.6	1.43
After test		
Top 30mm of sample	31.4	-
Remainder of sample	32.7	-
Field values	28.5	-
Standard Compaction	31.5	1.42

RESULTS		
TYPE	PENETRATION	CBR (%)
TOP	2.5 mm	6
	5.0 mm	6

Results of California Bearing Ratio Test

Client :	Health Infrastructure	Project No. :	73603.00
Project :	Proposed Carpark	Report No. :	7
Location :	Corner of Institute and Darcy Roads, Westmead	Report Date :	23/09/2013
Test Location :	TP108	Date Sampled :	31/08/2013
Depth / Layer :	1.0-1.1m	Date of Test:	16/09/2013
		Page:	1 of 1



Description: Brown silty clay

Test Method(s): AS1289 6.1.1, AS1289 5.1.1, AS1289 2.1.1

Sampling Method(s): Engineering Department

Percentage > 19mm: 0.0%

LEVEL OF COMPACTION: 101% of STD MDD
MOISTURE RATIO: 98% of STD OMC

SURCHARGE: 4.5 kg
SOAKING PERIOD: 4 days

SWELL: 1.2%

CONDITION	MOISTURE CONTENT %	DRY DENSITY t/m ³
At compaction	31.8	1.40
After soaking	34.9	1.40
After test		
Top 30mm of sample	33.0	-
Remainder of sample	33.2	-
Field values	32.1	-
Standard Compaction	32.4	1.39

RESULTS		
TYPE	PENETRATION	CBR (%)
TOP	2.5 mm	4.5
	5.0 mm	4

CERTIFICATE OF ANALYSIS

96809

Client:

Douglas Partners Pty Ltd
96 Hermitage Rd
West Ryde
NSW 2114

Attention: Atha Kapitanof

Sample log in details:

Your Reference:	<u>73603.00, Westmead Car Park</u>
No. of samples:	3 soils
Date samples received / completed instructions received	04/09/13 / 04/09/13

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	11/09/13 / 11/09/13
Date of Preliminary Report:	None Issued

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:



Jacinta Hurst
Laboratory Manager

Miscellaneous Inorg - soil				
Our Reference:	UNITS	96809-1	96809-2	96809-3
Your Reference	-----	TP101	BH6	BH9
Depth	-----	2.0	1.0	2.0
Date Sampled		31/08/2013	28/08/2013	29/08/2013
Type of sample		Soil	Soil	Soil
Date prepared	-	06/09/2013	06/09/2013	06/09/2013
Date analysed	-	06/09/2013	06/09/2013	06/09/2013
pH 1:5 soil:water	pH Units	5.1	4.3	5.0
Electrical Conductivity 1:5 soil:water	µS/cm	480	540	600
Chloride, Cl 1:5 soil:water	mg/kg	36	590	600
Sulphate, SO4 1:5 soil:water	mg/kg	520	9	77

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 22nd ED, 4500-H+.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell and dedicated meter, in accordance with APHA 22nd ED 2510 and Rayment & Lyons.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA 22nd ED, 4110-B.

Client Reference: 73603.00, Westmead Car Park

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Miscellaneous Inorg - soil						Base Duplicate %RPD		
Date prepared	-			06/09/2013	96809-1	06/09/2013 06/09/2013	LCS-1	06/09/2013
Date analysed	-			06/09/2013	96809-1	06/09/2013 06/09/2013	LCS-1	06/09/2013
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	96809-1	5.1 5.1 RPD: 0	LCS-1	101%
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	96809-1	480 480 RPD: 0	LCS-1	103%
Chloride, Cl 1:5 soil:water	mg/kg	2	Inorg-081	<2	96809-1	36 [N/T]	LCS-1	94%
Sulphate, SO4 1:5 soil:water	mg/kg	2	Inorg-081	<2	96809-1	520 [N/T]	LCS-1	94%

Report Comments:

Asbestos ID was analysed by Approved Identifier: Not applicable for this job
 Asbestos ID was authorised by Approved Signatory: Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.