



4.4.3 General Details

The proposed on-grade lower ground floor slab should be constructed independent of the building footings and walls (ie. designed as a “floating” slab) to permit relative movement, as a variable subgrade comprising soil and shale bedrock is expected. Based on the laboratory test results, we recommend that the design of the slab-on-grade be based on a CBR of 3%, a long-term Young’s Modulus of 15MPa or a short-term Young’s Modulus of 25MPa for the compacted clay subgrade.

Slab joints should be designed to resist shear forces but not bending moments by providing dowelled or keyed joints. Slabs founded on a combination of shale and soil subgrade should be provided with joints at or close to the change in founding conditions. If this is not possible, then additional reinforcement should be provided to the slabs to cater for the differential settlement.

The slab-on-grade should be provided with at least a 100mm thick sub-base of good quality, durable, single size, crushed rock (free of fines) such as “blue metal” gravel or equivalent quality, which will also act as underfloor drainage.

The underfloor drainage should include a gravity drainage system and/or a sump and pump dewatering system. The retaining wall drains should be connected into the underfloor drainage system. Groundwater seepage monitoring should be carried out during excavation prior to finalising the design of the pump out facility. The sump(s) should have an automatic level control pump to avoid flooding of the basement level. Outlets into the stormwater system will require Council approval.



4.5 Northern External Pavement Area

We recommend that the design of the proposed external concrete pavement be based on a CBR of 3% or a short-term Young's Modulus of 25MPa for the compacted clay subgrade.

Concrete pavements should be supported on at least a 100mm thick sub-base of good quality fine crushed rock such as RTA QA Specification 3051 unbound material (eg. DGB20), and compacted to a minimum density ratio of 98% of Modified Maximum Dry Density (MMDD). Adequate moisture conditioning to within 2% of Modified Optimum Moisture Content (MOMC) should be provided during placement so as to reduce the potential for material breakdown during compaction. The sub-base material will provide more uniform slab support and would reduce "pumping" of subgrade "fines" at joints. Slab joints should be designed to resist shear forces but not bending moments by providing dowelled or keyed joints.

If the pavement edge is unconstrained by a landscaping strip, we recommend that an edge thickening be provided for protection against erosion and the effects of possible future topsoil stripping.

Density tests should be regularly carried out on the granular sub-base materials to confirm the above specification is achieved. The frequency of density testing should be at least one test per layer per 1000m², or three tests per layer, or three tests per visit, whichever requires the most tests. Level 2 testing of fill compaction is the minimum permissible in AS3798-2007. The GTA should be directly engaged by Health Infrastructure or their representative.

Subsoil drains should be provided along the perimeter of all proposed external pavement areas, with invert levels of at least 200mm below subgrade level. The drainage trenches should be excavated with a uniform longitudinal fall to appropriate discharge points so as to reduce the risk of water ponding. The subgrade should be



graded to promote water flow towards the subsoil drains. Discharge from the subsoil drains should be piped to the stormwater system.

4.6 Soil Aggression

The laboratory soil pH test results indicated moderately to highly acidic subsoil conditions. The laboratory soil sulphate test results indicated non-aggressive soil sulphate conditions. In accordance with Table 6.4.2(C) of AS2159-2009 ("Piling – Design and Installation"), the exposure classification to buried concrete is "moderate".

4.7 Earthquake Design Parameters

For earthquake design in accordance with AS1170.4-2007 ("Structural Design Actions, Part 4: Earthquake Actions in Australia"), the following design parameters should be adopted:

- Hazard Factor (Z) = 0.08
- Site Subsoil Class = Class B_e

4.8 Additional Geotechnical Input

We summarise below the previously recommended additional work that needs to be carried out:

1. Test pit investigation to confirm the footing details and foundation materials of nearby building located within the zone of influence of the proposed excavation.
2. Dilapidation survey reports.
3. Vibration monitoring.
4. Proof testing of anchors.
5. Rock face inspections.
6. Inspection of toe restraint bedrock for perimeter piles.



7. Proof rolling inspections.
8. Footing inspections.
9. Insitu density testing of all engineered fill (including retaining wall backfill and service trench backfill) and DGB20 sub-base materials.
10. Groundwater seepage monitoring.

5 GENERAL COMMENTS

The recommendations presented in this report include specific issues to be addressed during the construction phase of the project. As an example, special treatment of soft spots may be required as a result of their discovery during proof-rolling, etc. In the event that any of the construction phase recommendations presented in this report are not implemented, the general recommendations may become inapplicable and Jeffery and Katauskas Pty Ltd accept no responsibility whatsoever for the performance of the structure where recommendations are not implemented in full and properly tested, inspected and documented.

Occasionally, the subsurface conditions between the completed boreholes may be found to be different (or may be interpreted to be different) from those expected. Variation can also occur with groundwater conditions, especially after climatic changes. If such differences appear to exist, we recommend that you immediately contact this office.

This report provides advice on geotechnical aspects for the proposed civil and structural design. As part of the documentation stage of this project, Contract Documents and Specifications may be prepared based on our report. However, there may be design features we are not aware of or have not commented on for a variety of reasons. The designers should satisfy themselves that all the necessary advice has been obtained. If required, we could be commissioned to review the



geotechnical aspects of contract documents to confirm the intent of our recommendations has been correctly implemented.

This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose. If there is any change in the proposed development described in this report then all recommendations should be reviewed. Copyright in this report is the property of Jeffery and Katauskas Pty Ltd. We have used a degree of care, skill and diligence normally exercised by consulting engineers in similar circumstances and locality. No other warranty expressed or implied is made or intended. Subject to payment of all fees due for the investigation, the client alone shall have a licence to use this report. The report shall not be reproduced except in full.

Should you have any queries regarding this report, please do not hesitate to contact the undersigned.

Andrew Jackaman
Senior Associate

Reviewed By:

Agi Zenon
Senior Associate
For and on behalf of
JEFFERY AND KATAUSKAS PTY LTD

Ref No:24595ZA
 Table A: Page 1 of 1

TABLE A
SUMMARY OF LABORATORY TEST RESULTS

AS 1289	TEST METHOD	2.1.1	3.1.2	3.2.1	3.3.1	3.4.1
BOREHOLE NUMBER	DEPTH m	MOISTURE CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	PLASTICITY INDEX %	LINEAR SHRINKAGE %
JK1	2.50-3.00	6.5				
JK1	5.50-6.00	7.2				
JK2	0.50-0.95	22.0	Slippage*	na	na	na
JK2	2.50-3.00	5.9				
JK2	5.50-6.00	9.2				
JK3	1.50-1.95	15.9	49	18	31	14.5
JK3	5.50-6.00	9.4				
JK3	7.00-7.40	6.5				
JK4	2.50-3.00	6.7				
JK4	4.00-4.50	9.7				
JK5	4.00-4.50	12.5				
JK5	6.10-6.50	9.3				
JK6	1.00-1.50	6.9				
JK6	4.00-4.50	13.5				
JK6	7.00-7.50	11.0				
JK7	0.50-0.95	17.6				
JK7	9.50-10.00	15.1				

Notes:

- The test sample for liquid and plastic limit was air-dried & dry-sieved
- The linear shrinkage mould was 125mm
- Refer to appropriate notes for soil descriptions
- *Denotes slippage in the atterberg bowl(lack of clay fines)
- na denotes not applicable

Ref No: 24595ZA
Table B: Page 1 of 1

TABLE B
SUMMARY OF FOUR DAY SOAKED C.B.R. TEST RESULT

BOREHOLE NUMBER	JK1
DEPTH (m)	0.10 - 1.00
Surcharge (kg)	9.0
Maximum Dry Density (t/m ³)	1.58 STD
Optimum Moisture Content (%)	22.5
Moulded Dry Density (t/m ³)	1.51
Sample Density Ratio (%)	96
Sample Moisture Ratio (%)	87
Moisture Contents	
Insitu (%)	19.2
Moulded (%)	19.5
After soaking and	
After Test, Top 30mm(%)	32.1
Remaining Depth (%)	27.4
Material Retained on 19mm Sieve (%)	0
Swell (%)	2.0
C.B.R. value: @5.0mm penetration	3.0

NOTES:


- Refer to appropriate Borehole logs for soil descriptions
- Test Methods :
 - (a) Soaked C.B.R. : AS 1289 6.1.1
 - (b) Standard Compaction : AS 1289 5.1.1
 - (c) Moisture Content : AS 1289 2.1.1



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Approved Signatory
(A. Jatickonda)


Date: 18/3/11

Ref No: 24595ZA
Table C: Page 1 of 1

TABLE C
SUMMARY OF POINT LOAD STRENGTH INDEX TEST RESULTS

BOREHOLE NUMBER	DEPTH	$I_{S(50)}$	ESTIMATED UNCONFINED COMPRESSIVE STRENGTH
	m	MPa	(MPa)
JK5	8.30-8.34	1.3	26
	8.91-8.94	1.0	20
	9.10-9.15	1.0	20
	10.19-10.21	0.3	6
	10.81-10.85	0.6	12
JK7	5.00-5.03	1.3	26
	5.21-5.24	0.1	2

NOTES:

1. In the above table testing was completed in the Axial direction.
2. The above strength tests were completed at the 'as received' moisture content.
3. Test Method: RTA T223.
4. The Estimated Unconfined Compressive Strength was calculated from the point load Strength Index by the following approximate relationship and rounded off to the nearest whole number :
$$U.C.S. = 20 I_{S(50)}$$



Borehole No.
JK 1
1/1

BOREHOLE LOG

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED GRAYTHWAITE REHABILITATION CENTRE
Location: RYDE HOSPITAL, FOURTH AVENUE, DENISTONE, NSW

Job No. 24595ZA **Method:** SPIRAL AUGER **R.L. Surface:** \approx 89.4m
Date: 22-2-11 **JK300** **Datum:** AHD
Logged/Checked by: D.S. / *AS*

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	US	DB	DS									
DRY ON COMPLETION						0		CH	FILL: Silty clay topsoil, medium plasticity, brown, with root fibres. SILTY CLAY: high plasticity, red brown.	MC < PL MC < PL	H	-	GRASS COVER
					N = 12 7,5,7							> 600 > 600 > 600	RESIDUAL
						1		CL	SILTY CLAY: low plasticity, light grey mottled red brown.				
					N = 22 5,6,16								
						2		-	SHALE: light grey and red brown.	XW	EL		VERY LOW 'TC' BIT RESISTANCE
										DW	L-M		LOW RESISTANCE
						3							
						4							
						5			SHALE: dark grey and red brown.		M		LOW TO MODERATE RESISTANCE
						6			END OF BOREHOLE AT 6.0m				
						7							



Borehole No.

JK2

1/1

BOREHOLE LOG

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED GRAYTHWAITE REHABILITATION CENTRE
Location: RYDE HOSPITAL, FOURTH AVENUE, DENISTONE, NSW

Job No. 24595ZA

Method: SPIRAL AUGER
JK300

R.L. Surface: \approx 89.5m

Date: 22-2-11

Datum: AHD

Logged/Checked by: D.S. *AS*

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
DRY ON COMPLETION						0			FILL: Silty clay topsoil, medium plasticity, brown, with root fibres. FILL: Silty clay, medium plasticity, red brown, with fine to medium grained ironstone gravel and root fibres, trace of ash and fine grained sand. FILL: Clayey silt, low plasticity, brown, trace of fine grained sand.	MC < PL			GRASS COVER
					N = 10 3,5,5	1						> 600 > 600 > 600	APPEARS WELL COMPACTED
					N = 3 2,2,1	2			FILL: Silty clay, high plasticity, dark grey.				APPEARS POORLY COMPACTED
						3		-	SHALE: light grey and red brown.	DW	VL-L		VERY LOW TO LOW 'TC' BIT RESISTANCE
						4							
						5			SHALE: dark grey and red brown.		L-M		LOW RESISTANCE WITH MODERATE BANDS
						6			END OF BOREHOLE AT 6.0m				
						7							



Borehole No.
JK3
1/2

BOREHOLE LOG

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED GRAYTHWAITE REHABILITATION CENTRE
Location: RYDE HOSPITAL, FOURTH AVENUE, DENISTONE, NSW

Job No. 24595ZA **Method:** SPIRAL AUGER **R.L. Surface:** \cong 93.2m
Date: 21-2-11 **JK300** **Datum:** AHD
Logged/Checked by: D.S. *AS*

Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	US	DB									
					0			FILL: Silty clay, medium plasticity, brown, with fine to medium grained ironstone gravel and a trace of root fibres.	MC < PL			GRASS COVER
				N = 5 5,2,3			CL	SILTY CLAY: medium plasticity, light grey mottled red brown.	MC < PL	St	-	RESIDUAL
				N = 15 5,5,10	1					H	550 > 600 > 600	
				N > 7 11,7/ 50mm REFUSAL	2							TOO FRIABLE FOR HAND PENETROMETER TESTING
					3		-	SHALE: light grey, with red brown bands.	XW	EL	-	VERY LOW 'TC' BIT RESISTANCE
					4				XW-DW	EL-VL		
					5							
					6							
					7							



Borehole No.
JK3
2/2

BOREHOLE LOG

Client: HEALTH INFRASTRUCTURE Project: PROPOSED GRAYTHWAITE REHABILITATION CENTRE Location: RYDE HOSPITAL, FOURTH AVENUE, DENISTONE, NSW												
Job No. 24595ZA Date: 21-2-11			Method: SPIRAL AUGER JK300 Logged/Checked by: D.S./ <i>AS</i>				R.L. Surface: \approx 93.2m Datum: AHD					
Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	US	DB									
								SHALE: dark grey and red brown.	DW	L		LOW RESISTANCE
								END OF BOREHOLE AT 8.0m				
					8							
					9							
					10							
					11							
					12							
					13							
					14							

Job No. 24595ZA **Method:** SPIRAL AUGER
Date: 21-2-11 JK300 **R.L. Surface:** \cong 92.5m
Logged/Checked by: D.S./ *AG* **Datum:** AHD

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
DRY ON COMPLETION						0	[Cross-hatched pattern]	-	ASPHALTIC CONCRETE: 40mm.t. FILL: Sand, fine to medium grained, yellow brown, with fine to medium grained sandstone gravel.	D	-	-	
					N = 13 3,6,7	1	[Diagonal hatching pattern]	CH	SILTY CLAY: high plasticity, red brown with trace of fine to medium grained ironstone gravel.	MC < PL	H	- > 600 > 600 > 600	RESIDUAL
					SPT 4/0mm REFUSAL	2	[Horizontal hatching pattern]	-	SHALE: light grey.	DW	M	-	MODERATE 'TC' BIT RESISTANCE
											L-M		LOW TO MODERATE RESISTANCE
ON 15-3-11						3							
AFTER 28 HRS (22-2-11)						4			SHALE: red brown.				
						5			SHALE: red brown, with M strength bands.		VL-L		LOW RESISTANCE WITH VERY LOW AND MODERATE BANDS
						6			as above, but with clay seams.				50mm DIA. PVC STANDPIPE INSTALLED TO 6.0m DEPTH. SLOTTED BETWEEN 0.5m AND 6.0m. CAST-IRON 'GATIC' COVER CONCRETED AT SURFACE
						7			END OF BOREHOLE AT 6.0m				



Borehole No.
JK5
1/3

BOREHOLE LOG

Client: HEALTH INFRASTRUCTURE Project: PROPOSED GRAYTHWAITE REHABILITATION CENTRE Location: RYDE HOSPITAL, FOURTH AVENUE, DENISTONE, NSW												
Job No. 24595ZA Date: 22-2-11			Method: SPIRAL AUGER JK300 Logged/Checked by: D.S. / <i>AS</i>			R.L. Surface: \approx 96.7m Datum: AHD						
Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	USO	DB									
DRY ON COMPLETION OF AUGERING ON COMPLETION OF CORING					0		-	ASPHALTIC CONCRETE: 40mm.t.	M	-	-	
							CH	FILL: Silty clayey sand, fine to medium grained, brown, with fine to medium grained igneous gravel. SILTY CLAY: high plasticity, red brown, with a trace of ironstone gravel.	MC < PL	H	-	RESIDUAL
				N = 11 3,5,6	1						> 600 > 600 > 600	
					2		-	SHALE: light grey and red brown.	DW	L-M		MODERATE 'TC' BIT RESISTANCE WITH LOW BANDS
					3					VL		VERY LOW RESISTANCE
					4							
					5							
					6			SHALE: dark grey and red brown.		L		
					7							



Borehole No.

JK5

2/3

BOREHOLE LOG

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED GRAYTHWAITE REHABILITATION CENTRE
Location: RYDE HOSPITAL, FOURTH AVENUE, DENISTONE, NSW

Job No. 24595ZA

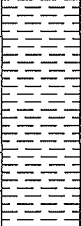
Method: SPIRAL AUGER
JK300

R.L. Surface: \cong 96.7m

Date: 22-2-11

Datum: AHD

Logged/Checked by: D.S. *AS*

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
						8			SHALE: dark grey and red brown.	DW	L-M		VERY LOW TO LOW RESISTANCE WITH MODERATE BANDS
									SHALE: dark grey.	SW-FR	M		MODERATE RESISTANCE
									REFER TO CORED BOREHOLE LOG				
						9							
						10							
						11							
						12							
						13							
						14							

JEFFERY & KATAUSKAS PTY LTD

JOB No: 24595ZA JK5 START CORING AT 8.20m

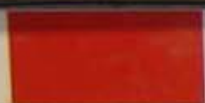
8

9

10

CORE LOSS 0.71m

END OF BH





Borehole No.


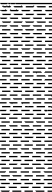
JK5

3/3

CORED BOREHOLE LOG

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED GRAYTHWAITE REHABILITATION CENTRE
Location: RYDE HOSPITAL, FOURTH AVENUE, DENISTONE, NSW

Job No. 24595ZA **Core Size:** NMLC **R.L. Surface:** \cong 96.7m
Date: 22-2-11 **Inclination:** VERTICAL **Datum:** AHD
Drill Type: JK300 **Bearing:** - **Logged/Checked by:** D.S./ *AS*

Water Loss/Level	Barrel Lift	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, structure, minor components.	Weathering	Strength	POINT LOAD STRENGTH INDEX I _s (50)	DEFECT DETAILS												
								DEFECT SPACING (mm)						DESCRIPTION Type, inclination, thickness, planarity, roughness, coating.						
							EL	VL	L	M	H	VH	EH	500	300	100	50	10	Specific	General
		8		START CORING AT 8.20m																
FULL RET- URN				SHALE: dark grey, with light grey laminae, bedded at 0-5°.	FR	M-H				X										
		9								X										
				CORE LOSS: 0.71m						X										-CS,0°,5mm.t -XWS/CS,0°,20mm.t
		10		SHALE: dark grey, with light grey laminae, bedded at 0-5°.	FR	M				X										
										X										
		11		END OF BOREHOLE AT 11.00m																
		12																		
		13																		
		14																		

BOREHOLE LOG

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED GRAYTHWAITE REHABILITATION CENTRE
Location: RYDE HOSPITAL, FOURTH AVENUE, DENISTONE, NSW

Job No. 24595ZA










Method: SPIRAL AUGER
JK300

R.L. Surface: \approx 93.6m

Date: 21-2-11

Datum: AHD

Logged/Checked by: D.S./ *AS*

Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB									
					0		-	ASPHALTIC CONCRETE: 40mm.t. FILL: Silty gravelly sand, fine to medium grained, brown, fine to medium grained igneous gravel.	M	-	-	
				N > 10 2,10/ 150mm REFUSAL			CH	SILTY CLAY: high plasticity, light grey mottled red brown. SHALE: light grey and red brown.	MC > PL	St	-	RESIDUAL
					1		-		DW	L-M	180 150 200	LOW 'TC' BIT RESISTANCE WITH MODERATE BANDS
					2							
					3			as above, but red brown.		M		MODERATE RESISTANCE
					4			as above, but with clay seams.		L-M		LOW RESISTANCE WITH MODERATE BANDS
					5					M		MODERATE RESISTANCE
					6			SHALE: dark grey and red brown.				
					7			SHALE: dark grey.	SW-FR	M-H		MODERATE TO HIGH RESISTANCE

▼
AFTER
27 HRS
(22-2-11)

ON
COMPLE-
TION
▼



Borehole No.

JK6

2/2

BOREHOLE LOG

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED GRAYTHWAITE REHABILITATION CENTRE
Location: RYDE HOSPITAL, FOURTH AVENUE, DENISTONE, NSW

Job No. 24595ZA

Method: SPIRAL AUGER
JK300

R.L. Surface: \cong 93.6m

Date: 21-2-11

Datum: AHD

Logged/Checked by: D.S. / *AS*

Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB									
					8			SHALE: dark grey.	SW-FR	M-H		MODERATE TO HIGH RESISTANCE
										H		HIGH RESISTANCE
					9			END OF BOREHOLE AT 9.0m				50mm DIA. PVC STANDPIPE INSTALLED TO 9.0m DEPTH. SLOTTED BETWEEN 0.5m AND 9.0m. CAST-IRON 'GATIC' COVER CONCRETED AT SURFACE
					10							
					11							
					12							
					13							
					14							

BOREHOLE LOG

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED GRAYTHWAITE REHABILITATION CENTRE
Location: RYDE HOSPITAL, FOURTH AVENUE, DENISTONE, NSW

Job No. 24595ZA



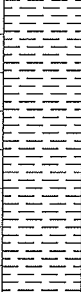
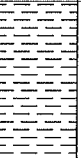
Method: SPIRAL AUGER
JK300

R.L. Surface: \approx 94.6m

Date: 21-2-11

Datum: AHD

Logged/Checked by: D.S. / *AS*

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	U50	DB	DS									
ON COMPLETION OF AUGER-ING AT 2.75m DEPTH					N = 16 3,6,10	0		-	ASPHALTIC CONCRETE: 40mm.t.	D	-	-	
								CH	FILL: Sand, fine to medium grained, yellow brown, with fine to medium grained sandstone gravel. SILTY CLAY: high plasticity, red brown and light grey, with XW shale seams.	MC < PL	H	-	RESIDUAL
						1		-	SHALE: light grey and red brown.	DW	L	-	LOW 'TC' BIT RESISTANCE
						2							
						3		-	REFER TO CORED BOREHOLE LOG	-	-	-	INTRODUCED DRILL FLUSH WATER
						4							
						5							
						6		-	SHALE: orange brown and grey.	DW	L	-	LOW RESISTANCE
						7							



Borehole No.

JK7

2/3

BOREHOLE LOG

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	ES	U50	DB	DS									
						8			SHALE: orange brown and grey.	DW	L		LOW RESISTANCE
						9							
						10			as above, but with clay seams.	XW	EL		VERY LOW RESISTANCE
						10			END OF BOREHOLE AT 10.0m				
						11							
						12							
						13							
						14							

JEFFERY & KATAUSKAS PTY LTD

JOB No: 24595ZA

JK7

START CORING AT 2.75 m

2

3

CORE LOSS 1.70 m

4



5



BH CONTINUED WITH AUGER DRILLING

G





Borehole No.
JK7
3/3

CORED BOREHOLE LOG

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED GRAYTHWAITE REHABILITATION CENTRE
Location: RYDE HOSPITAL, FOURTH AVENUE, DENISTONE, NSW

Job No. 24595ZA **Core Size:** NMLC **R.L. Surface:** \approx 94.6m
Date: 21-2-11 **Inclination:** VERTICAL **Datum:** AHD
Drill Type: JK300 **Bearing:** - **Logged/Checked by:** D.S. *AS*

Water Loss/Level	Barrel Lift	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, structure, minor components.	Weathering	Strength	POINT LOAD STRENGTH INDEX I _s (50)												DEFECT DETAILS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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FOURTH AVENUE

PRIVATE
PROPERTY



True North

Site North

RYEDALE ROAD

BOREHOLE LOCATION PLAN

SCALE (m)



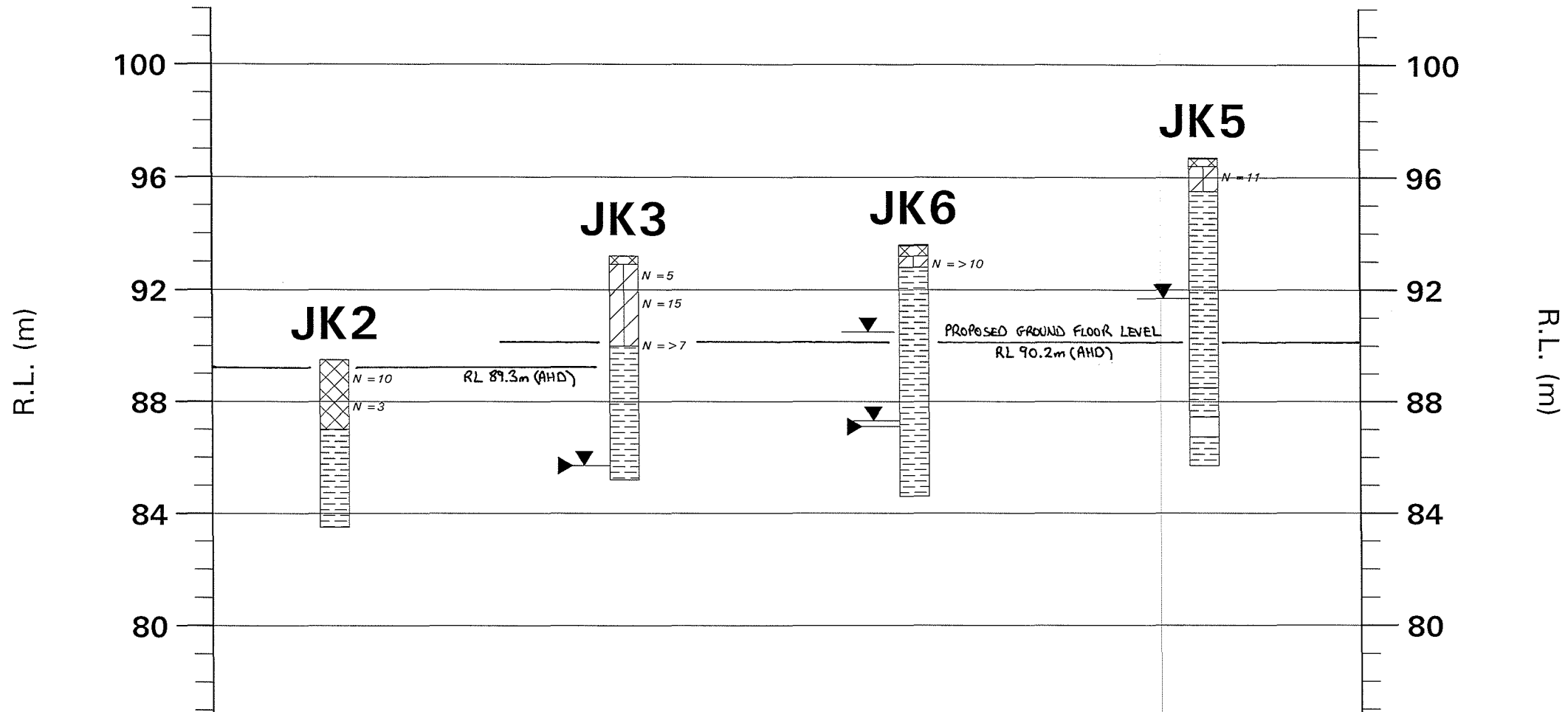
Jeffery and Katauskas Pty Ltd
CONSULTING GEOTECHNICAL & ENVIRONMENTAL ENGINEERS



Report No. 24595ZA

Figure No. 1

GRAPHICAL BOREHOLE SUMMARY



	Fill		Asphaltic/Bituminous Paving or Coal		Observed water level	Nc	SOLID CONE BLOW COUNTS PER 150mm
	Shale		Core Loss/Empty		Groundwater seepage level		
	Silty Clay			N	SPT "N" VALUE		

NOTE: REFER TO BOREHOLE LOGS

Scale: 1 : 200 (vert) ; NTS (horiz)

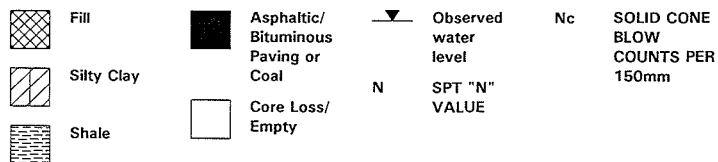
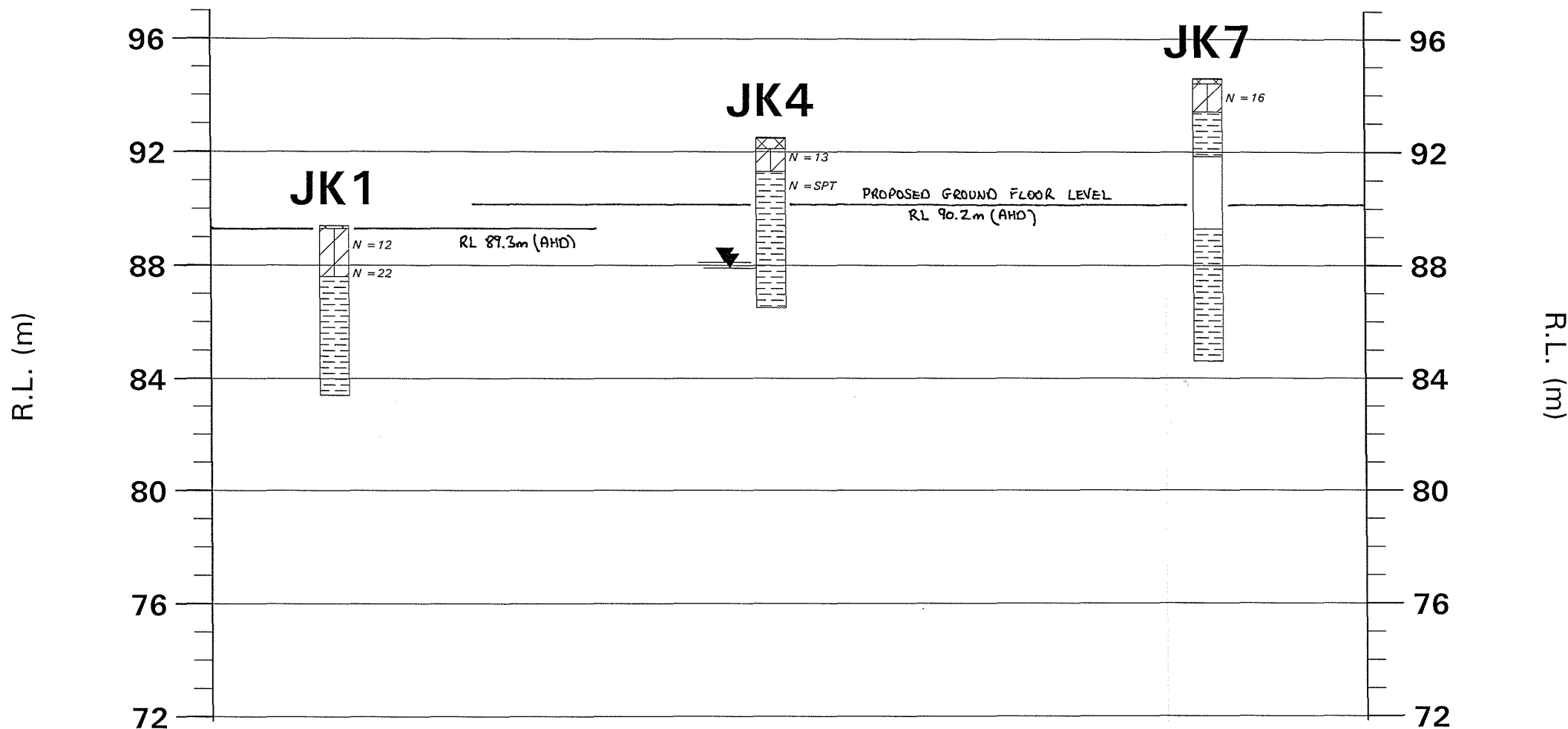
Jeffery and Katauskas Pty Ltd

Job No.: 24595ZA

Figure No.: 2



GRAPHICAL BOREHOLE SUMMARY



Scale: 1 : 200 (vert) ; NTS (horiz)

Jeffery and Katauskas Pty Ltd

Job No.: 24595ZA

Figure No.: 3

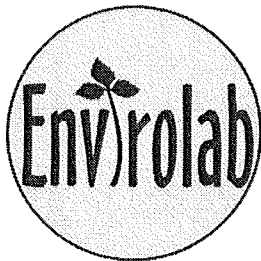


NOTE: REFER TO BOREHOLE LOGS



APPENDIX A

**Envirolab Services Pty Ltd Soil pH & Soil Sulphate Test Results
(Report Ref: 52449^{REV R00}, dated 8 March 2011)**



Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS

52449

Client:

Environmental Investigation Services

PO Box 976
North Ryde BC
NSW 1670

Attention: David Schwarzer

Sample log in details:

Your Reference:

24595ZA, Denistone

No. of samples:

3 soils

Date samples received / completed instructions received

01/03/2011 / 01/03/2011

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:

8/03/11 / 8/03/11

Date of Preliminary Report:

Not Issued

NATA accreditation number 2901. This document shall not be reproduced except in full.

This document is issued in accordance with NATA's accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Tests not covered by NATA are denoted with *.

Results Approved By:

Giovanni Agosti
Technical Manager

Envirolab Reference: 52449
Revision No: R 00



Miscellaneous Inorg - soil				
Our Reference:	UNITS	52449-1	52449-2	52449-3
Your Reference	-----	JK1	JK3	JK5
Depth	-----	0.5-0.95	0.5-0.95	0.5-0.95
Date Sampled		22/02/2011	21/02/2011	22/02/2011
Type of sample		Soil	Soil	Soil
Date prepared	-	04/02/2011	04/02/2011	04/02/2011
Date analysed	-	07/02/2011	07/02/2011	07/02/2011
pH 1:5 soil:water	pH Units	4.6	4.4	4.5
Sulphate, SO ₄ 1:5 soil:water	mg/kg	84	65	100