

4 March 2019

Ref No: J01132 (Rev. 1)

Karaka & Drury Limited

Attention: Mr M Tollemache

Dear Mark

RE: Preliminary Geotechnical Appraisal Report for Auranga B2 Re-zoning Concept, Drury

Lander Geotechnical Consultants Limited have been engaged by Karaka & Drury Limited to undertake a desktop study of geotechnical conditions within a study area delineated by the red boundary on attached Figure 01 and also depicted on the attached McKenzie and Co drawings.

1 SCOPE AND OBJECTIVES

Our brief principally relates to the preparation of a Preliminary Geotechnical Appraisal Report (PGAR), in order to support a comprehensive structure planning process and subsequent plan change application.

More specifically, our scope of work for the PGAR comprises:

- Summary of the main topographical features present, soil types and underlying geology, areas of obvious historic land modification (e.g. fill), and potential constraints to future urban development
- The results of previous Lander Geotechnical preliminary geotechnical field investigations held on our database to assess the nature, bearing qualities and relative uniformity of the subsoils to the depths likely to be affected by any future land development works and future building loads
- Preparation of a PGAR presenting the findings of this preliminary work

In preparing this report, Lander Geotechnical have reviewed the following previous plan variation/geotechnical investigation reports:

- Lander Geotechnical Consultants Limited, Preliminary Geotechnical Appraisal Report, Auranga Bay Development, Bremner Road, Drury, reference J00137, dated 19 January 2016
- Lander Geotechnical Consultants Limited, Preliminary Geotechnical Appraisal Report, Auranga Development B1, Drury, reference J00557, dated 17 February 2017
- Lander Geotechnical Consultants Limited, Preliminary Geotechnical Appraisal Report, Auranga Development B2a and B2b, Drury, reference J00557, dated 17 February 2017
- Lander Geotechnical Consultants Limited, Preliminary Geotechnical Appraisal Report, Auranga Development B3, Drury, reference J00557, dated 17 February 2017

In addition, Lander Geotechnical Consultants Limited have been retained as geotechnical consultants since the commencement of the Auranga development and have undertaken detailed studies on



many properties with the Auranga A zone (currently under construction) to support various Resource Consent applications and have drawn upon our experience here.

2 SITE SPECIFIC APPRAISAL FOR THE AURANGA STUDY AREA

2.1 Site Description

2.1.1 General

The study area ("the site") comprises a number of separate properties, the legal descriptions and respective areas of each are able to be ascertained from Council's GIS database if required. The site is bounded by Great South Road to the east, Karaka Road to the south and plan change areas A and B to the north and west.

The majority of the site is in pasture or used for commercial activities. There are numerous dwellings and ancillary structures across the site associated with the current land uses.

The topography of the site is characterised by broad undulations and rolling terrain. There were no obvious signs of large scale instability or land modifications as a result of our preliminary work.

2.2 Desktop Review

2.2.1 General

As already mentioned, a desktop review has been carried out of previous Lander Geotechnical boreholes within the Auranga development (Bremner Road, Jesmond Road, Burberry Road and Karaka Road) and also of relevant geotechnical records from the New Zealand Geotechnical Database (NZGD - drillers logs and borehole logs). This review has found that these generally similar ground conditions are encountered across the site. Further details outlined below:

2.2.2 Geology

The geology of the area is covered in a 1:250,000 scale map by Schofield (1967) and in numerous Auckland Regional Water Board groundwater resource publications, although not in great detail.

Better descriptions of the soils encountered on similar terrain to the north of the site are presented in Kermode (1991, 1992) and these have been used below:

- The site is underlain by the Puketoka Formation of the Tauranga Group sedimentary lithology (Late Pliocene – Early Pleistocene epoch). In summary, these deposits comprise terrace alluvium (clays, silts, sands, pumiceous silts and organic deposits) overlain in places by weathered volcanic ash.
- The Puketoka Formation consists of undifferentiated, mainly pumiceous deposits of light-grey to orange-brown, well sorted (some graded, bedded 2-200mm), mud, sand and gravel comprising angular to well-rounded rhyolite pumice clasts and weathered rock derived from, the hinterland. Minor beds comprise white, pumiceous silt and clay, and black peat with rich organic clay. The deposits are very soft to soft, and weather to very soft, variously coloured clays, to depths as much as 10m. The formation is possibly up to 60m thick (however Lander Geotechnical's observations of other study areas nearby to the north would suggest such a thickness may not exist here). More specifically, within the surrounding areas the following ground conditions are evident from our desktop study:



- Near surface ground (i.e. upper 17m, as determined from NZGD drillers logs) generally comprises inorganic, firm to very stiff (generally stiff to very stiff) clays and silts. Hand auger boreholes carried out by Lander Geotechnical (up to 5m depth) have found these soils to generally comprise clays and silts with some sand.
- In general, silts and sands are prevalent below the upper layers of clays and silts (i.e. beyond 17m) and are recorded to significant depths (for example, Waitemata Group rock is present at 98.5m near Jesmond Road). In particular, a recent investigation carried out at 370 Karaka Road (located approximately 1.5km south-west of the subject site) found conditions in general agreement with closer boreholes, particularly to the presence of medium dense sands (i.e. indicating consistency of stratum within the wider area). Although sandier soils are generally found below clays/silts, local variations in stratigraphy do occur and in places sandier deposits are present near-surface.
- Of particular significance is the presence of clayey/silty organic and organic stained lenses. Peat is also noted in places. Organic soils are recorded within boreholes from surface level (0.0m) to depths of 9m and generally comprise beds of approximately 1-1.5m. Deposits closer to the surface are often associated with recent gully deposits (mullock) and are confined to the inverts and banks of gullies within these areas. Within the boreholes carried out by Lander Geotechnical, these deposits are often prevalent from 0.7m to 3.5m.
- Geological maps also show deposits of the South Auckland Volcanic Field lava and ash/tuff deposits to the south and east of the site. These deposits typically comprise fine-grained and coarse-grained, porphyritic, olivine basalt, basanite and hawaiite lava flows. These materials typically weather from a basaltic parent rock to orange and brown clays, silts and sands with various amounts of manganese content. These presence of South Auckland Volcanic Field deposits is consistent with the findings of previous hand augers carried out by Lander Geotechnical which show in some locations a mantle of volcanic materials over the upper 1-2m.

2.3 Preliminary Investigation Findings

Our fieldwork that forms the basis for this PGAR consists of relevant testing that was undertaken between July 2015 and February 2017 (refer section 2 of this report). These tests were selected for this PGAR as they are either within or near to the boundary of the proposed Auranga B2 re-zoning area. It involved the drilling of the following tests indicated on the appended site plan (Figure 01).

- 26 hand augers (HA) to depths of up to 5.0m
- 4 Trial Pits (TP) to depths of up to 4.0m.
- 1 SDMT to a depth of 21.0m.

A summary of findings of these tests are as follows:

- Topsoil was encountered at most borehole locations and ranged between 100mm and 400mm in thickness, averaging approximately 200mm. A deeper topsoil profile was identified in HA2017-15 to a depth of 600mm.
- The natural subsoils investigated by our boreholes predominantly consisted of stiff to hard, inorganic orange, brown, grey and yellow clayey silts, silty clays, silts and clays, with occasional sand and limonite inclusions. Organic and manganese inclusions were encountered in several boreholes.



- Organic soils were encountered in HA2017-18 and TP3 (2017) and comprised stiff to hard, black, organic clays fibrous peat from 1.4m-2.1m depth and 2.2m-4.0m (base of TP), respectively.
- Filling was identified in HA's 2017-15 and 2017-18. The fill consisted of an inorganic, stiff to very stiff, grey, orange and brown clayey silt. A moderately thin layer was encountered in 2017-15 from 0.6m to 0.8m depth that was underlain by a 200mm thick buried topsoil. A deeper fill profile was encountered within 2017-18 from 0.1m to 1.4m depth. No filling was detected at our other borehole locations although in farm environments the presence of old offal pits or rubbish pits can never be discounted.
- Vane shear strengths within the natural ground were between 60kPa and UTP (unable to penetrate), however, shear vanes were generally very stiff (>100kPa). Sensitivities to disturbance were typically in the range 1.5 5 (insensitive to sensitive).
- Groundwater was encountered within ten of the test locations between depths of 1.5m and 4.9m. Groundwater was not encountered in our other borehole locations and could be reasoned for by the dry summer period at the time of the investigations. A summary of the groundwater levels measured in presented in Table 1 and is also shown on Figure 01.
- The SDMT test inferred approximately 7m of stiff to very stiff clays and silts, with increasingly sandier materials below this. These results are consistent with both the borehole testing previously carried out by Lander Geotechnical and also the borehole logs reviewed within the surrounding area (refer section 3.2).
- Percolation tests P1, P2 and P3 returned percolation results of 0.24, 0.05 and 0.04 L/m2/min respectively. P4 was not tested due to a high standing water level following pre-soaking, indicating very slow percolation at this location. All four tests were carried out outside of the B2 re-zoning area, however, of these tests, P4 was the closest to the boundary of the B2 area.



Borehole No.	Land Use Area**	Depth Encountered (m)	Standing GWL (m)
HA 2015 – 14	Outside B2 Area	2.0	1.2
HA2015 - 15	Outside B2 Area	1.5	1.0
HA2015 - 67	Outside B2 Area	4.0	4.2
HA2015 - 68	Outside B2 Area	2.7	2.7
HA2015 - 70	Outside B2 Area	3.0	3.0
HA2015 - 71	Outside B2 Area	4.9	4.9
HA2017 - 14	B2 Town Centre Zone	1.8	2.0
HA2017 - 15	B2 Town Centre Zone	2.2	2.2
HA2017- 18	Outside B2 Area	1.8	1.8
TP2017 - 03	Outside B2 Area	3.4	*NE

Table 1. Measured Hand Auger and Trial Pit Groundwater Lo	ovole
Table 1. Measured Hand Auger and Thai Pit Groundwater L	evers.

Note: groundwater levels have only been displayed for boreholes where groundwater was encountered. The remaining tests did not encounter groundwater over the depths drilled on the date of testing.

*NE = Groundwater not observed at the end of testing.

** Refer McKenzie and Co drawing 003, Rev A, Project No. 1823-PC2B for land use area references.

2.4 Earthquake Risk and Liquefaction Potential

Based on our knowledge of the Hingaia Peninsula (directly to the north, across the tidal river) and the Auranga A area (immediately to the north-east), the general area is reportedly a low risk from earthquake occurrence. According to previous studies at Hingaia (which are considered to be applicable here), the Drury, Glenbrook, Karaka and Wairoa faults are reportedly the closest active faults and are located within approximately 5km of the study area.

 Development of the site should take into account earthquake risk and the design of future building foundations would likely need to include seismic loadings, as would be the case elsewhere in Auckland. Based on our experience at the Hingaia Peninsula just to the north, which is in the same geology and of similar topography, liquefaction potential is considered to be low risk in this local geology.

2.5 Geotechnical Considerations

2.5.1 Existing Filling

Filling was identified within HA's 2017-15 (within the site) and 2017-18 (beyond the site to the southeast) and could be associated with the sites current land use. In farm environments discreet areas of filling may also exist in areas that are not apparent at this stage, and there may also be filling



associated with platforms containing the existing dwellings and ancillary structures within the study area.

• The hand auger boreholes drilled in the filling identified to date were able to penetrate through the layer to the underlying natural ground. However, further investigations will be required to enable the layer to be fully quantified during a subsequent investigation phase (e.g. during the Resource / Subdivision Consent phase(s)). Generally speaking, we expect such fill areas will be contained in relatively localised areas and subject to contamination assessments (if required), could probably be dealt with on-site during subdivision construction works (e.g. by remediating such materials to meet engineering specifications).

2.5.2 Foundations for Buildings

2.5.2.1 Residential Construction

Where inorganic natural ground is present, bearing capacity is expected to be in accordance with the limitations imposed by NZS3604 (i.e. 300 kPa geotechnical ultimate). However, as is evident from the borehole findings to date the natural soils can contain pockets of weaker ground and/ or lenses of organics.

- Softer ground or lenses of organics can pose constraints to NZS3604 building foundations and residential end use, necessitating remediation during earthworks construction or specifically designed foundation solutions (e.g. "raft" foundations). Lander Geotechnical's experience in the delivery of hundreds of building platforms to the north (in the Hingaia area) indicates only a small proportion of lots may be affected by soft ground or organic soils, but in due course more intensive physical site investigations associated with the subdivision consent(s) will substantiate this risk.
- The soils are likely to fall within AS2870 Class M to H expansive site class, and this is subject to laboratory testing of soil samples collected during later more intensive investigation for the Resource Consent phases. Foundation design for end users will need to mitigate adverse effects from expansive soils.

2.5.2.2 Multi-Storey Construction

The geology within the Auranga area should <u>not</u> preclude construction of non-NZ3604 type construction associated with multi-storey and/or commercial buildings (e.g. within the proposed town centre). It is foreseeable that a combination of specifically designed raft and/or pile foundation system will be required to resist seismic loadings and/or mitigate bearing capacity/settlement issues. This is a specific investigation and design consideration.

2.5.3 Earthworks and Infrastructure

The natural deposits encountered across the site are typically of high strength and have good engineering characteristics for foundations and earthwork handling. Inorganic soils of relatively stiff to very stiff strength will be identified, although organic lenses and weaker sensitive layers are apparent in these materials.

• The identified materials can be sensitive to disturbance during earthworks and repetitive trafficking from heavy machinery, and some boreholes displayed isolated lenses that would have these characteristics. Careful site management and/ or subsoil drainage have been effective in minimising subgrade degradation issues on recent large residential developments in similar geology at the Hingaia area to the north. The deeper deposits in particular is likely to require conditioning prior to placement as filling as insitu moisture contents will likely be higher than those required for optimum compaction.



- Deep trenches are prone to collapse especially where ground water conditions change rapidly and the materials are less cohesive, but this risk can be minimised by appropriate shoring or battering as required by legislation and safe construction practices.
- Road subgrades are prone to degradation once exposed to the elements, but is normally dealt with by engineering design (e.g. subgrade improvement via undercutting and replacement, or lime stabilising, construction sequencing to reduce subgrade exposure time, etc.).
- High allophane content is associated with the surficial ash derived soils and appropriate earthworks methodologies specific to subsequent Resource Consent subdivisional plans should be recommended to mitigate any problems associated with the placement and compaction of these soils, if this mineralogy is present.
- Underfill drainage is usually adopted to control natural groundwater springs in the various drainage features that may be modified during development. They generally pose no constraints to end use if they are buried deep within engineered fills, or if this is not possible they can be aligned to site boundaries to avoid future building platforms.

3 CONCLUSIONS

The Auranga B2 re-zoning area comprises topography and ground conditions that are reasonably well understood geotechnically. Precedence in this type of geology has been set via the large residential developments in the Hingaia area just north of the study area, and more recently Auranga A to the immediate north-east which is currently under intensive residential subdivision construction. Provided there is due consideration to prevailing or perceived geotechnical issues during detailed site investigations for Resource Consent, then the study area as defined herein is considered suitable for re-zoning to future urban use.

4 **RECOMMENDATIONS**

The assessments presented in this report are based on a desktop review and visual inspections, plus a limited number of shallow borehole tests on the prevailing landform.

It is recommended that:

- To support future development (i.e. Resource Consent / Subdivision design), further physical geotechnical site investigations that are commensurate with subdivision and earthworks scheme(s) should be undertaken to substantiate ground conditions and address any geotechnical constraints. Such investigations are expected to comprise (but are not limited to) hand auger boreholes, trial pits using a hydraulic excavator in pre-existing fill areas, and soil sampling.
- Appropriate laboratory soil testing is undertaken to characterise engineering and earthworks handling properties, compressibility, permeability and susceptibility to erosion or dispersion. Experience with such testing at Auranga A suggests no major issues are likely to arise in this regard.

5 LIMITATIONS

This report has been prepared solely for the use of our client, Karaka & Drury Limited, its professional advisers and the relevant Territorial Authorities in relation to the specific project described herein. No liability is accepted in respect of its use for any other purpose or by any other person or entity. All future owners of this property should seek professional geotechnical advice to satisfy themselves as to its on-going suitability for their intended use.



For and on behalf of Lander Geotechnical Consultants Limited

Prepared by:

K.moro

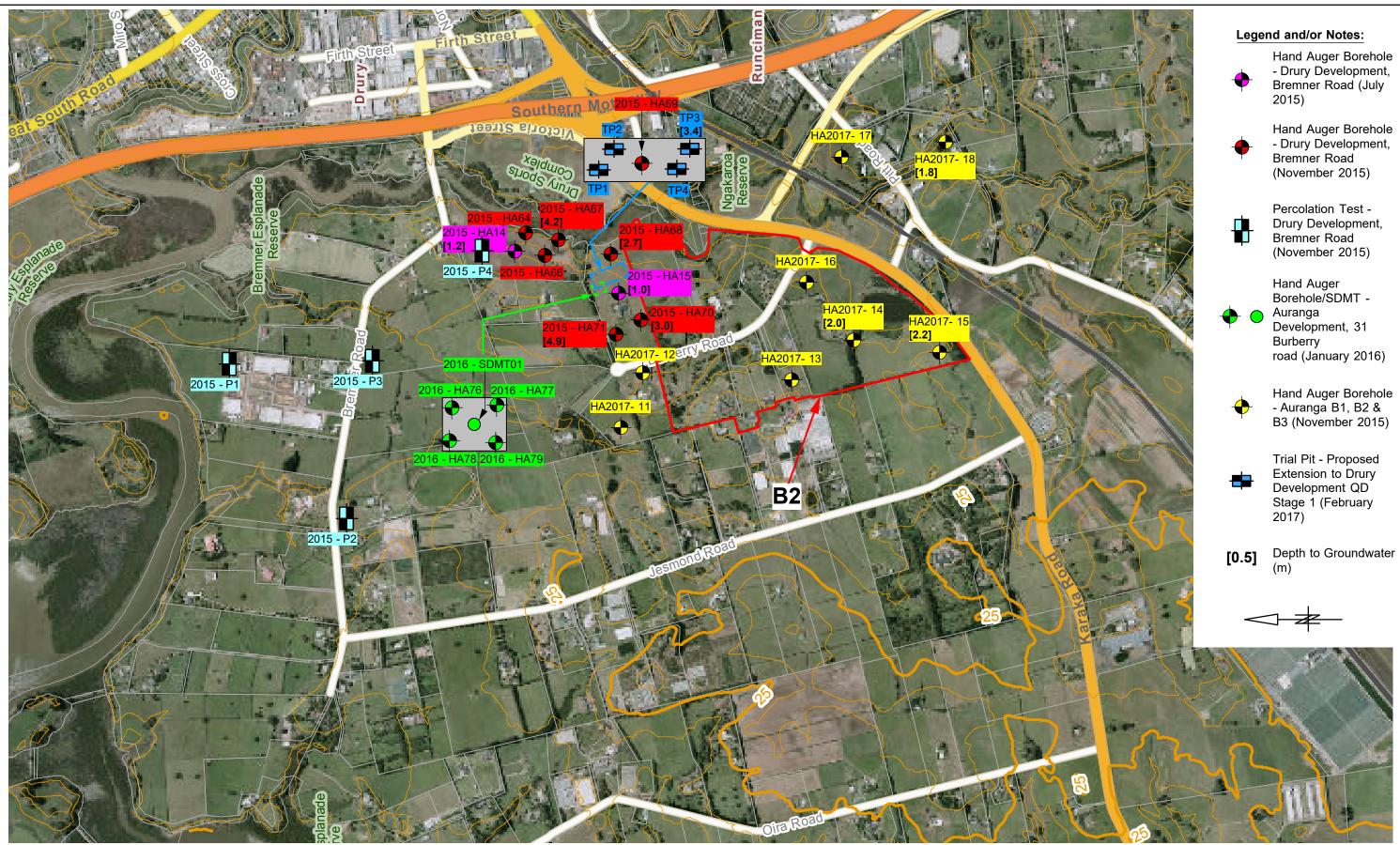
K. Meffan Engineering Geologist

Reviewed and Authorised by:

Allale

S.G. Lander Principal Geotechnical Engineer CMEngNZ, CPeng, IntPE(NZ)

Attachments: Auranga B2 Re-zoning concept plan drawings (McKenzie and Co) Site Plan (Figure 01) Field Investigation Data (from previous work)



BASE PLAN SOURCE: LGCL SITE PLAN, REF. J00557, DRAWN 16.02.17

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KARAKA AND DRURY LIMITED

AURANGA DEVELOPMENT B2, DRURY

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– becoming i	insensitive						- 2.5		130/ 69	1.9	I		
- becoming p	pink/ red and	1 orange	e streaked grey				F						
- EOB at 3.0	m Torget D	enth	182			<-x-x-x-x-x-x-x- <-x-x-x-x-x-x-x-x- <-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	- 		100/ 69	1.5			
_ ∟∪в at 3.0 -	m. raiget D	ehui					F						
-							-						
-							- 3.5 -						
-							-				¥.		
-													
_							- -						
-							-						
-							-4.5						
-							E						
-							L						
-							- -						
-							F						
-							- - 5.5						
-							F						
-							F						
-		6		Derek-Ir Di			-6.0	<u> </u>			Pluto	nic ttt	*****
		CONTRACT OF CONTRACT NO.	water not encountere	ed. 50mm	Topsoil Fill	XXXX	and Fravel		Sandston Siltstone	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Pluto		++++++
LANI geotech	DER	UTP = ι	unable to penetrate. end of borehole.	Checked:	Clay		rganic		Limeston	e	a		
geoteci	ai				Silt	XXXXX P	umice		Volcanic		čč		

Client :		K	ARAKA & D	RURY CON	SULTANT LTD)			Aug	er Bo	oreho	le No		2015 -	67
Project Loca	tio	n: D	RURY DEVI RURY	ELOPMENT	, BREMNER R	OAD,							Shee		of 71
Job Number			00137				V	ane ⊢ 19		Logge N	d By: //VC	Process GB	or :	Date: 19.1	1.15
Borehole mN			mE	Gro	ound R.L.				(F					ample	and
Location: Descrip	otion:		Refer to site p	olan				Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity			Other
		SC	OIL DESCR	RIPTION				Ľ	ă	St Wa	She	Sei		Detail	S
_ silty CLAY, orange	e/ bro	own mo	ottled brown.	Hard, dry, ı	medium plastici	ity	(-X-) (-X-) (-X-) (-X-)	x-x-x-x-x-x- x-x-x-x-x-x- x-x-x-x-x-x- x-x-x-x-x-x-x- x-	_						
							<-x- <-x- <-x- <-x-	x-x-x-x-x-x- x-x-x-x-x-x- x-x-x-x-x-x- x-x-x-x-x-x- x-x-x-x-x-x-x-x-	_						
 becomig moist, hig becoming moderat 							<-x- <-x- <-x- <-x-	x-x-x-x-x-x x-x-x-x-x-x- x-x-x-x-x-x-x-	- - 0.5		203/ 86	2.4			
-							(-x- (-x- (-x-	x-x-x-x-x-x- x-x-x-x-x-x- x-x-x-x-x-x-x	L					Sample Disturbe	
-							(-x- (-x- (-x-	x-x-x-x-x-x- x-x-x-x-x-x- x-x-x-x-x-x-x	_					0.5-1.0	
-							(-x- (-x- (-x- (-x-	x-x-x-x-x-x x-x-x-x-x-x-x-x-x-x-x-x-x-x	━1.0 -		UTP				
_ fine sandy CLAY, o				grey. Very s	tiff, moist, med	ium									
_ plasticity, moderate	ery s	ensitiv	е						-		178/ 80	2.2			
 becoming slightly f with minor orange 				ge streaked	light grey, high	plasticity	, 1993		-					Sample Disturbe	
- -									-					1.5-2.0	
 becoming hard 									- 2.0		208+				
fine SAND, orange orange orange limonite sta			ellow/ brown	. Loose, mo	ist, non plastic,	with som	ie		-						
_									-		156/ 37	4.2			
 slightly clayey fine moist, low plasticity 				mottled yell	ow/ brown. Ver	y stiff,			- -		150/ 57	4.2		Sample	3
silty CLAY, orange	e/ bro	own. Ve	ery stiff, moi				(-x- (-x-	x-x-x-x-x- x-x-x-x-x-	-					Disturbe 2.5-3.0	
CLAY, grey. Stiff, v									-3.0		86/ 36	2.4			
_ gravelly CLAY, with	h so	me fine	e sand, grey	. Stiff, wet, r	nedium plastici	ty									
sandy CLAY, with	trace	e fine a	ravel inclusi	ons, dark gr	een/ grey. Har	d, wet, hi	gh 📑								
plasticity, with blue	e/ gre	ey clasi	t inclusions	, 0	3,				— 3.5 -		UTP				
_ fine SAND, dark bl	lue/ g	grey. N	ledium dens	se, wet, non	plastic				F						
-									-4.0		UTP				
 becoming saturate 	ed								-	∇					
-									-						
-									- 4.5 -		UTP				
-									-						
-											UTP		2		
EOB at 5.0m. Targ	get D	epth.							-						
-									-						
_									-5.5						
-									F						
-															
_		Comm	nents:		Borehole Diameter:	Topsoil		s (and		Sandston	e	PI	utonic	+++++++++++++++++++++++++++++++++++++++
			dwater encou unable to per		50mm	Fill			iravel	******	Siltstone	2 1 1 1 1		o Core	
LANDER geotechnical			end of boreh		Checked:	Clay -	*****	201	rganic		Limeston	e	斑 ::::		
						i k	×××××	XX	B.	ō ŏ ŏ ŏ ŏ ŏ ŏ	- oldanic	~~~~~	~~~		

Client :		KA	ARAKA & DRUR	Y CON	SULTANT LTD			Au	iger B	oreho	le No.	. 2	015 -	68
Project	Locatio	n: DF	RURY DEVELOF RURY	PMENT	, BREMNER R	OAD,						Sheet		of 71
Job Nu	mber:		0137				Va	ne Head <mark>946</mark>		ed By: AB	Process GB	or :	Date: 19.1	1.15
Borehole	mN		mE	Gro	ound R.L.			T Î	level evel	Da)	ţy		ample	and
Location:	Description:	F	Refer to site plan					Legend	Standing	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity			Other
		SO	IL DESCRIPT	ION						Sh	Sel		Detail	
TOPSOIL silty CLAY,	dark brown	. Hard.	moist, medium p	olasticit	y, with trace roo	otlet								
_ inclusions			aked grey, withou				(-x-x-) (-x-x-) (-x-x-) (-x-x-)	-x-x-x- -x-x-x- -x-x-x- -x-x-x- -x-x-x-						
-							<-x-x-> <-x-x-> <-x-x-> <-x-x->		.5	215+				
- - with trace I	imonite silt i	nclusior	าร				(-x-x-) (-x-x-) (-x-x-) (-x-x-)	-x-x-x- -x-x-x- -x-x-x- -x-x-x-						
-							<-x-x- <-x-x-> <-x-x-> <-x-x->	-x-x-x- -x-x-x- -x-x-x- -x-x-x-						
- becoming v	very stiff, mo	oderatel	y sensitive			÷	<-x-x-x-x <-x-x-x-x <-x-x-x-x <-x-x-x-x		.0	196/61	3.2			
-							<-x-x-> <-x-x-> <-x-x-> <-x-x->	-x-x-x- -x-x-x- -x-x-x- -x-x-x-						
- becoming g	grey motted	orange	brown, with som	ie limor	nite silt inclusior	าร	<-x-x-> <-x-x-> <-x-x->		5	175/67	2.6			
- becoming c	orange strea	ked gre	y				<-x-x-x-> <-x-x-x-> <-x-x-x->	-x-x-x- -x-x-x- -x-x-x- -x-x-x-		175/6/	2.0			
- becoming y	vellow/brown	n and or	ange streaked g	rey, wit	th some fine sa	nd	<-x-x- <-x-x-x-x <-x-x-x-x <-x-x-x-x	-x-x-x- -x-x-x- -x-x-x- -x-x-x-						
sandy CLA	Y. arev. Stiff	f. moist	, high plasticity, i	nsensi	tive, with trace I	imonite s	(-x-x-) (-x-x-) (-x-x-)	- 2	0	64/38	1.7			
inclusions			pist, high plastici											n
- OLAT, light	gicy. very	Jun, Inc	ngri pidotor		SCHORING									
sandy CLA	Y, dark grey	/. Very s	stiff, moist, high	plastici	ty, extra sensitiv	ve		- 2 -	2.5	169/ 12	14			
slightly clay	yey SAND, c	lark gre	y. Very stiff, moi	st, low	to medium plas	sticity								
SAND, dar	k brown and	l black.	Medium dense,	moist,	no plasticity, wi	th some		<u> </u>	.0	UTP				
	rganic wood m. Target D		פווכ					Ę						
-	2							F						
_								- 3	5.5					
_								F						
_								-						
-								-4	.0					
-								F						
-								-4	.5					
-								F						
-								F						
-								-5	.0					
-								F						2
_								-	_					
-								-	.5					
-								-						
-								-6	.0	<u> </u>	 			
		Commo	ents: Iwater encountered	1 2 7m	Borehole Diameter: 50mm	Topsoil		Sand		Sandstor		2.7	tonic Core	+++++++++++++++++++++++++++++++++++++++
LAN	DER	UTP =	unable to penetrat		Checked:	Fill Clay		Gravel Organi		Siltstone			JUIE	
geotech		EOB =	end of borehole.		TT	Silt	××××× ××××× ×××××	× × Pumice		Volcanic				

Client :			ARAKA & DRURY RURY DEVELOPI						Aug	er Bo	oreho		. 2 Sheet	015 - 6	69 of 71
Job Nu		D	RURY 00137		, DICEMINER IN	UND,		Vane F 94		Logge A	d By: AB	Process		Date: 19.1	
Borehole Location:	mN Description:		mE Refer to site plan	Gro	ound R.L.	ĸ			Depth (m)	Standing Water Level	ne -(kPa) esidual		Sa	ample a ratory /	and Other
	Description.			DN			_	Legend	Dept	Stan Water	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity		Test Details	
- TOPSOIL							_		 -						
silty CLAY, -	, dark orange	e/ brow	vn. Hard, moist, hig	jh pla	sticity										
 clayey SIL⁻ sensitive, v 	T, orange. V with trace lim	ery stif ionite s	if, moist, medium to staining	o low	plasticity, mode	erately			- 0.5 -		UTP				4
-									— 1.0		199/ 89	2.2			
silty CLAY, trace limesto 	, orange. Ve one	ry stiff,	moist, high plastic	ity, m	oderately sens	itive, wit			_ _ 		187/ 74	2.5			
- - - becoming I - -	hard						2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -		- - - 2.0 -		215+				
- becoming v	very stiff		w/ brown and orang	ge					- - 2.5 -		162/ 77	2.1			
-	red streaked							-x-x-x-x-x-x-x- -x-x-x-x-x-x-x-x- -x-x-x-x-x-x-x-x-x- -x			161/ 74	2.2			
-									-						2
- -									- 3.5 - -						
- - -									- - - -						
-									- - - 4.5						
-									-						
- - -									- - -						
- - -									- - 						
-			5						- - 						
LANI	DEP		nents: dwater not encounter unable to penetrate.		Borehole Diameter: 50mm Checked:	Topsoil Fill		d c	and Gravel		Sandston Siltstone		77	onic	*******
geotech	hnical		end of borehole.			Clay Silt	××××× ××××× ×××××	XXX XXX XXXX P	rganic umice		Limeston Volcanic	e	~~~		

Client :					ISULTANT LTD				Aug	er Bo	oreho			5-70 70 of 71
	Location	DI	RURY		, DREWINER R	UAD,	Va	ane H		Logge	d By:	Process	sor: Da	ite:
Job Nu	mber:	JC	0137					175	50		B	GB		19.11.15
Borehole	mN		mE	Gro	ound R.L.			7	(E)	ng evel	Pa) Idual	ity	Sam	ple and
Location:	Description:	F	Refer to site plan					Legend	Depth (m)	andi er L	/ane ear(k	Soil Sensitivity	Laborat	ory / Other
		sc	DIL DESCRIP	ΓΙΟΝ				Le	De	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Sen		Гest etails
- TOPSOIL									-					
_ silty CLAY, _ plasticity, s	, dark brown sensitive	mottle	d light brown/ o	range. S	Stiff, moist, med	ium	2		-					
 with trace r 	manganese	oxide ir	nclusions						- 0.5 - -		82/13	6.3		
- becoming I -	moist, high p	lasticit	y, with some ma	anganes	se oxide inclusio	ons			-		60/ 12	5.0		
-	orange mottl	-	t brown t brown/ grey				4		- -		50/ 12	0.0		
-	very stiff, mc								- - 		134/ 53	2.5		
- becoming s -	slightly silty								- - - - 2.0		145/ 54	2.7		
- - becoming (-	orange/ brov	vn mott	led light grey, w	vith trace	e limonite staini	ng			-					
– becoming (- -	grey mottled	orange	e/ brown						- 2.5 - -		106/ 50	2.1		0
	stiff, insensit				æ		<		- 		64/ 37	1.7		
– EOB at 3.0 –)m. Target D	epth.							-					
-									- - 3.5					
-									E					
-									F					
-									-					
-									- 4.0					
-									-					
-									_					
-									-4.5					
F									L					
-									F					
-									-					
-									- 5.0	1				
-									-				1	
-									È					
L									-5.5					
F									F					
Ľ									F					
-									-					
-								14	-6.0	<u> </u>	<u> </u>		<u> </u>	
		Comm			Borehole Diameter:	Topsoil		Si Si	and		Sandstor	ie	Plutor	ic
	Sec 10		dwater encounter		50mm	Fill		G	ravel		Siltstone	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	No Co	re
LANI			unable to penetra end of borehole.	ate.	Checked:	Clay		O	rganic 🧯	<u>*******</u> ********* *********	Limeston	TITTT	薑	
geotec		200-	ond of boronoid.			Silt		×× ×× ××	umice		Volcanic		VVV	

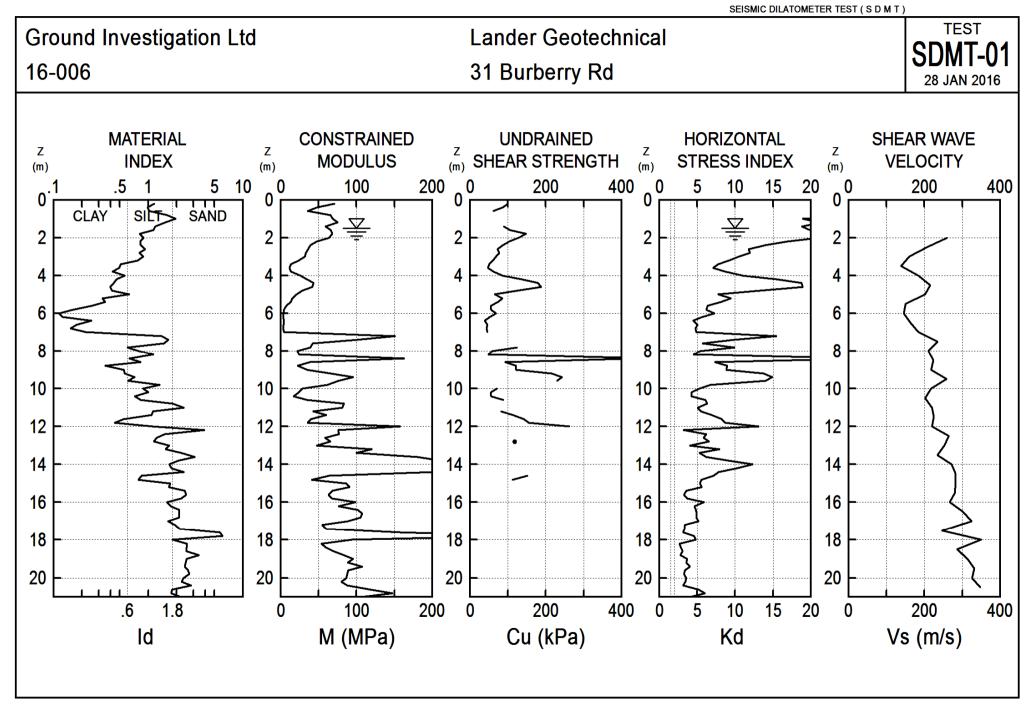
Client :		KARAKA & DRURY CON				Aug	er Bo	oreho	le No	. 2015	5 - 71
Project	Location	1 : DRURY DEVELOPMENT DRURY	, BREMNER RO	DAD,					r	Sheet 7	
Job Nu	mber:	J00137			Vane ⊦ 19	lead: 00	Logge	d By: IVC	Process GB		e: 9.11.15
	mN		ound R.L.								
Borehole Location:	Description:	Refer to site plan			Legend	Depth (m)	r Lev	ane r(kPa residu	oil itivity		le and ry / Other
		SOIL DESCRIPTION			Leg	Dep	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity	Τe	est ails
		SOIL DESCRIPTION									
- TOPSOIL		wn mottled grey/ brown. Very	stiff maint high	planticity							
_ Slity CLAY, _ moderately	/ orange/ bro / sensitive, w	wh motiled grey brown. Very vith trace rootlet inclusions	stin, moist, nigh	plasticity,	(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x						
-					(-x-x-x-x-x-x-x- -x-x-x-x-x-x-x-x- (-x-x-x-x	- 0.5		163/ 68	2.4		
 becoming of 	orange/ brow	n mottled light brown			<pre><-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x</pre>	F				Sam Distu	
-					(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	L				0.5-1	
- becoming	slightly silty (CLAY, light brown streaked lig	ht grey		(-x-x-x-x-x-x-x-x- (-x-x-x-x-x-x-x-x-x-x	-1.0		166/ 73	2.3		
- - becoming o	orange/ brow	vn streaked light grey, with mir	nor limonite stain	ing and	(-x-x-x-x-x-x-x-x- (-x-x-x-x-x-x-x-x-x-x	F					
 inclusions 					(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	Ļ					
-					<pre><-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x</pre>	-1.5		166/ 76	2.2		
- becoming of	orange/ brow	vn streaked grey			(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	-				Sam Distu	
-					(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	-				1.5-2	.0m
- becoming g	grey streake	d yellow/ brown, hard			(-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x)	- 2.0		208+			
F					(-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x)	-					
- - becoming y	yellow/ browi	n streaked grey			(-X-X-X-X-X-X-X) (-X-X-X-X-X-X-X) (-X-X-X-X-X-X-X) (-X-X-X-X-X-X-X)	-					
	very stiff, ins				(-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x)	- 2.5		144/ 80	1.8		
CLAY, ligh	t grev streak	ed yellow/ brown. Very stiff, m	oist, high plastic	ity,	(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x					Sam Distu	rbed
insensitive	- 3 - 7					F				2.5-3	8.0m
-						- 3.0		125/73	1.7		
slightly silty	CLAY, light	t grey streaked yellow/ brown.	Very stiff, moist,	high							
plasticity, i				_		-					
-					(-x-x-x-x-x-x-x (-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x)	- 3.5		111/61	1.8		
Ł											
-					(-x-x-x-x-x-x-x (-x-x-x-x-x-x-x-x-x-x-x-			100117			
 becoming i becoming i 	moderately s wet	sensitive				-4.0		122/ 47	2.6		
- - becoming	vellow/ brow	n streaked light grey			<pre><-x-x-x-x-x-x-x <-x-x-x-x-x-x-x-x <-x-x-x-x</pre>						
-	, ,				<pre></pre>	-		135/ 49	2.8		
- becoming	orange/ brov	vn specked light grey, with trac	ce limonite staini	ng	<pre></pre>	4.5		155/45	2.0		
					<pre></pre>	F					
_ becoming					(-x-x-x-x-x-x-x (-x-x-x-x-x-x-x-x-x-x-x-	-		68/ 27	2.5		
)m. Target D	epth.				-		00/21	2.0		
Ē						F					
L						-					
-						-					
F						-					
-											
		Comments:	Borehole Diameter:	Topsoil		Sand		Sandstor	ne	Plutonic	
		Groundwater encountered 4.9m.	50mm	Fill		Gravel		Siltstone	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	No Core	
LANI geotec	DER hnical	UTP = unable to penetrate. EOB = end of borehole.	Checked:	Clay	22222	Organic	*******	Limestor		<u></u>	
				Silt XXX XXX	XXXXX P	Pumice		Volcanic			

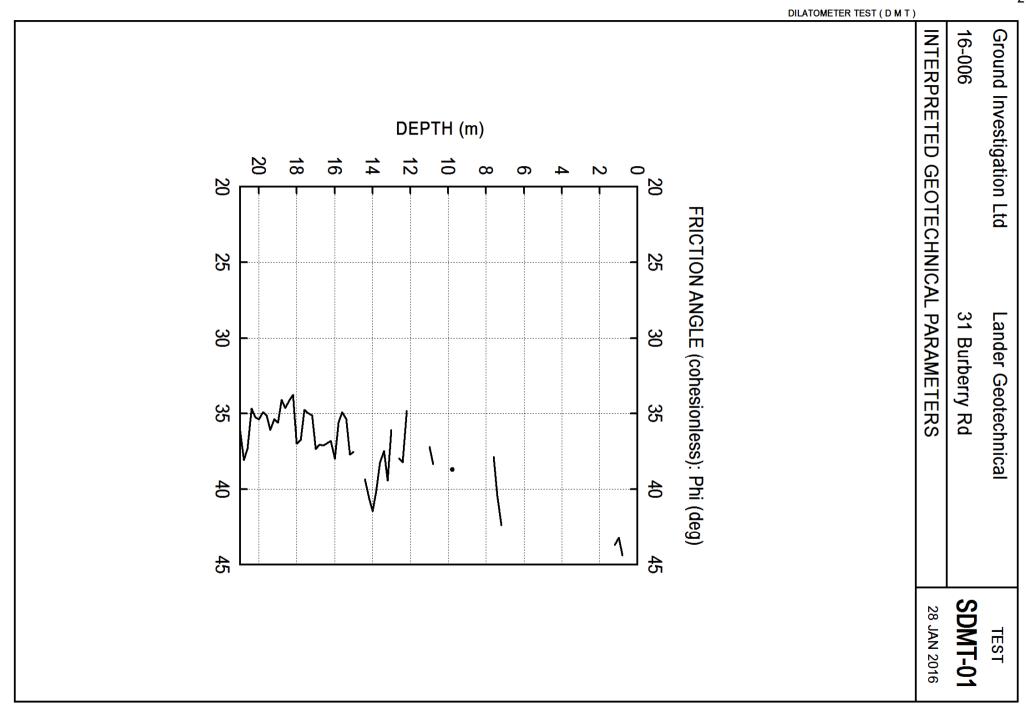
Client :		KA	RAKA & DRI	JRY CON	SULTANT LTE)		A	uge	er Bo	oreho	le No	2	2016 -	76
Project	Locatior		RANGA DE AD, DRURY	/ELOPME	ENT, 31 BURBE	ERRY						and the second se		76 0	of 79
Job Nu	mber:		0137				Va	ne Hea 1750		Logge T	d By: T	Process TT	or :	Date: 28.0	1.16
Borehole	mN		mE	Gro	ound R.L.					lg Vel	⊃a) iual		c	ample a	and
Location:	Description:	R	efer to site pla	n				Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity		ratory / Test	Other
		SO	IL DESCRI	PTION				Le	De	St Wat	She	Ser		Details	
_ TOPSOIL								<u> -</u>							
_ silty CLAY, _ sensitive	yellow/brow	n. Very	stiff, moist, r	nedium pl	asticity, modera	ately		x-x-x-x- x-x-x-x- x-x-x-x- x-x-x-x- x-x-x-x- x-x-x-x- x-x-x-x- x-x-x-x- x-x-x-x- x-x-x-x-x- x-x-x-x-x- x-x-x-x-x- x-x-x-x-x-x- x-			175/50				
- becoming I	orown/orange	9			,				• 0.5		175/50	3.5			
_ clayey SIL [⊤]	Γ, light browr	n/orang	e. Very stiff, i	noist, meo	dium plasticity,	sensitive			•1.0		159/37	4.3			
-									•1.5		186+				
			/ mottled ligh	t brown/or	ange. Very stif	f, moist,	××××								
-	high plasticit		ked grey					x - x - x - x - x - x - x - x - x - x -	2.0		186+				
-								x - x - x - x - x - x - x - x - x - x -	■ 2.5		186+				
- becoming s -	slightly silty C	CLAY, li	ght orange s	treaked lig	ht grey			x-x-x-x- x-x-x-x- x-x-x-x- x-x-x-x- x-x-x-x- x-x-x-x- x-x-x-x- x-x-x-x-							
— becoming i -	nsensitive							x - x - x - x - x - x - x - x - x - x -	■3.0		170/101	1.7			
- - -								x - x - x - x - x - x - x - x - x - x -	■ 3.5		149/90	1.7			
_ CLAY, red/ _ plasticity, ir		nt orang	e mottled lig	nt grey. Ve	ery stiff, moist,	high			■4.0		130/80	1.6			
-									4.0						
_ plasticity	ight yellow/g		ckea light yei	iow/grey.	√ery stiff, moist	i, nign		x-x x - x - x - x - x - x - x - x - x -	■4.5		186+		Test	Penet s/100m	rometer ım)
-							<	******	■5.0		186+		- - 7		
- EOB at 5.0	m. Target D	epth. S	cala Penetro	meter Tes	t commenced t	o 5.9m.		F	in ALEI				- 6 - 8		
-								F					- 10 - 10		
-									■5.5				- 10 - 12		
F								F					- 11		
F								F					- 10 - 12		
-					Borehole Diameter:		,11111	San	-6.0	 				Itonic	*******
		Comme Ground	ents: water not enco	untered.	50mm	Topsoil Fill		Grav			Sandston Siltstone		27	Core	******
LAN			inable to pene and of borehol		Checked:	Clay		Orga	anic of		Limeston	e			
geotech	nnical	EOR = 0	end of borenol	σ.	AB	Silt		× × Pum	ice		Volcanic				

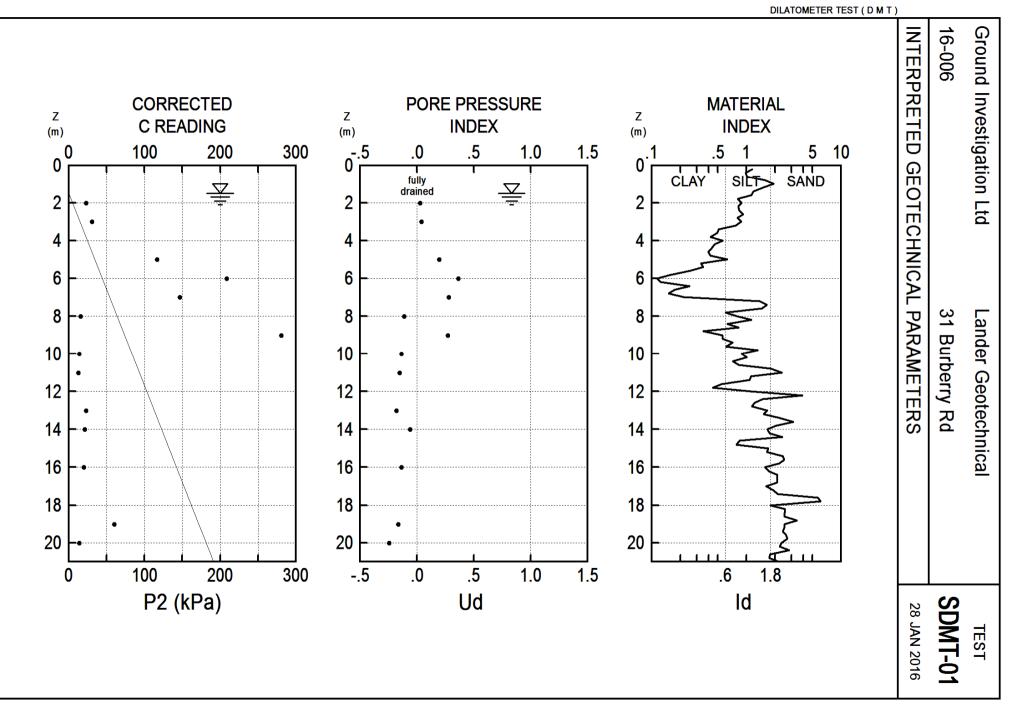
Client :		KΔ	RAKA & DRUR	Y CONS	ULTANT LTD			Auae	ər Bo	orehol	e No.	2	2016 - 7	7
	Location	: AU	JRANGA DEVEL			RY							t 77 of	79
		RC	DAD, DRURY				Vane H		Loggeo		Process	or :	Date: 28.01	.16
Job Nu		JO	0137	-			17			T T	TT		20.0	
Borehole	mN		mE	Grou	nd R.L.	-	– pu	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	ii tivity		Sample an oratory /	
Location:	Description:		Refer to site plan				Legend	Depti	Stan /ater	Va Shear eak / ri	Soil Sensitivity	Lau	Test Details	
		SO	DIL DESCRIPT	ION			luun	ļ	5	۵ (V	0)			
TOPSOIL								<u>}</u>						
silty CLAV	vellow/brown	. Harr	d, moist, medium	ו plasticit	ty, with some			+						
manganes	e oxide inclus	ions			and the second sec		<pre>c-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x</pre>	- 0.5		UTP				
•			and all free to a	ioict !	to medium -	eticity		F						
clayey SIL sensitive	T, brown/oran	ige. V	ery stiff, dry to m	ioist, low	to medium pla	isticity,		1						
-								-1.0		183/37	4.9			
-														
_														
- becoming	light brown/or	ange,	moderately sen	sitive				– 1.5		183/74	2.5			
-			light brown/ora		d moist mediu	,im								
_ sinty CLAY _ plasticity, v	, nym grey str with trace san	eakec d inclu	usions, with mind	or limonit	e silt inclusions	3	(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x							
	grey streaked						<pre>< - x - x - x - x - x - x - x - x - x -</pre>	- 2.0		UTP				
-			ning days and to see the line of		-1022		(-x-x-x-x-x-x- -x-x-x-x-x-x- (-x-x-x-x-x							
- becoming	orange and re	ed/ora	inge streaked gr	ey, high	plasticity		- x - x - x - x - x - x - x - x - x - x	x- x-						
- becoming	very stiff							- 2.5		186+				
- becoming	slightly silty C	LAY	abt orong					x- x- x-						
-	light grey mot	ued li	gnt orange					×		1000				
- becoming	insensitive							- 3.0		183/96	1.9			
-		le d''	bt area					×						
becoming	red/pink mott	ied lig	ini grey							104/10	3 4 7			
-							(-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x-x-x-x-x)	- 3.5	'	181/106	1.7			
- becoming	light grey mot	ttled li	ight orange				(-x-x-x-x-x) (-x-x-x-x-x-x) (-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x)	-x- -x- -x-						
┣								***		149/96	1.6			
-								-4.0		1-19190				
 becoming 	red/pink mott	tled lig	ght grey					121212						
ŀ								- 	,	157/96	5 1.6	Sca	ala Penet	romete
F								4.5				Tes		
È .							(-x-x-x-x-x) (-x-x-x-x-x-x) (-x-x-x-x-x-x) (-x-x-x-x-x-x)	-x- -x- -x-						
E					0		-x-x-x-x-x- -x-x-x-x-x-x- -x-x-x-x-x-x-			162/98	3 1.7	– 4		
EOB at 5.	.0m. Target D	epth.	Scala Penetrom	eter Tes	t commenced t	o 5.9m.		Ę				- 7 - 9		
F								F				- 9		
E									;			- 1	2	
E								Ļ				- 1 - 1	12 13	
F								-				- 1	13	
-								- 	2			-		
		Com	ments:		Borehole Diameter:	Topsoil		Sand		Sandsto			Plutonic	
		Grou	ndwater not encou		50mm	Fill		Gravel		Siltston		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	No Core	
LAN	IDER chnical		= unable to penetr = end of borehole.		Checked:	Clay		Organic	200000 000000 000000		~~~~			
goore					CIN	Silt	*******	Pumice		Volcan				1

Client : KARAKA & DRURY CONS				Auge	er Bo	rehol			
Project Location : AURANGA DEVELOPMEN ROAD, DRURY	NT, 31 BURBERI	RY	Vane H	land.	Logged		Process	Sheet 78 c	of 79
Job Number: J00137			Vane F		Logget T		TT		1.16
	und R.L.			Ê	g	oa) tual	ty	Sample a	and
Location: Description: Refer to site plan			Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity	Laboratory /	Other
SOIL DESCRIPTION			Le	De	St. Wat	She	Ser	Details	
TOPSOIL				1				4	
_ silty CLAY, yellow/brown. Very stiff, moist, medium pla	asticity		(-x-x-x-x-x-x-x- (-x-x-x-x-x-x-x-x- (-x-x-x-x	-					
-			<pre><-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x</pre>	- 0.5		186+			
-			<						
 becoming yellow/brown streaked brown/orange 			(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	-					
- ━ becoming stiff, sensitive			(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	- 1.0		93/19	4.9		
			(-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x)	L.					
 becoming grey/brown streaked brown/orange 				-					
 becoming very stiff 			(-x - x - x - x - x - x - x - x) (-x - x - x - x - x - x - x) (-x - x - x - x - x - x - x) (-x - x - x - x - x - x - x) (-x - x - x - x - x - x - x)	-1.5		186+			
becoming red and grey streaked light brown/orange			(-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x)	F					
5			<pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>						
 becoming moderately sensitive 			(-x-x-x-x-x-x-x (-x-x-x-x-x-x-x-x (-x-x-x-x	- 2.0		173/82	2.1		
 becoming orange streaked light grey, high plasticity 			<pre></pre>	-					
			(-x-x-x-x-x-x-x (-x-x-x-x-x-x-x-x))						
-			(-x-x-x-x-x-x-x (-x-x-x-x-x-x-x-x-x-x-x-	— 2.5		186+			
becoming slightly silty CLAY			(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	_					
			(-x-x-x-x-x-x- (-x-x-x-x-x-x-x-x-x-x-x-x	F					
- becoming insensitive			(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	-3.0		154/96	1.6	·	
CLAY, light orange streaked light grey. Very stiff, mois insensitive	st, high plasticity,								
F						1 10/02	1.6		
-				- -		149/93	1.0		
				8- 8-					
-						157/77	2.0		
 becoming moderately sensitive silty CLAY, orange streaked grey/yellow. Very stiff, m 	oist, high plastici	tv	(-x-x-x-x-x-x- (-x-x-x-x-x-x-x-x-x-x-x-x	***					
	leiet,		(-x-x-x-x-x-x- (-x-x-x-x-x-x- (-x-x-x-x-	×					
- becoming grey			(-x-x-x-x-x-x- (-x-x-x-x-x-x- (-x-x-x-x-			186+		Scala Pene	trometer
-			<-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	×				Test (blows/100r	mm)
-			(-x-x-x-x-x-x- (-x-x-x-x-x-x-x-x-x-x-x-x	×- ×-				L	
at 5.0m, becoming moderately sensitive	t commenced to	5 0m	(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	-5.0		154/64	2.4	- 3	
EOB at 5.0m. Target Depth. Scala Penetrometer Tes		0.011.		F				- 5 - 6	
E ·				F				- 5 - 7	
–				-5.5				- 6 - 6	
F				F				- 7	
				F				- 7 - 8	
				-6.0		8		Plutonic	******
Comments: Groundwater not encountered.		Topsoil Fill		Sand Gravel		Sandsto	2222	Plutonic	
LANDER UTP = unable to penetrate.		Clay		Organic		Limesto			
geotechnical EOB = end of borehole.	AB	Silt	× × × × × × × × × × × × × × × × × × ×	Pumice		Volcani	c		

										-				
Client :			ARAKA & DRURY					Auge	er Bo	orehol			2016 - 7	
Project	Location	: AL	JRANGA DEVELO	PMEN	IT, 31 BURBEF	RY						Shee		f 79
		R	DAD, DRURY				Vane I	Head: 750	Loggeo T		Process TT	or :	Date: 28.01	1.16
Job Nu	mper:	J0	0137				1/		1				20.0	
Borehole	mN		mE	Grou	nd R.L.		– p	(m) I	Standing Water Level	Vane Shear(kPa) _{peak / residual}	i ivity		Sample a	
Location:	Description:	F	Refer to site plan				Legend	Depth (m)	Stanc ater I	Var near(^{ak / re}	Soil Sensitivity	Lab	oratory / Test	
		SC	DIL DESCRIPTIO	N					őŠ	Sr Be	Š		Details	
TOPSOIL								-						
silty CLAY	, yellow/brown	n. Very	y stiff, moist, mediu	ım pla	sticity, sensitive	9	<pre><-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x</pre>	-						
- bosoming	brown/orange						<-x-x-x-x-x-x- <-x-x-x-x-x-x- <-x-x-x-x-	— 0.5 -		173/32	5.4			
- becoming	brownorange						(-x-x-x-x-x-x- (-x-x-x-x-x-x- (-x-x-x-x-	_						
-							(-x-x-x-x-x-x- (-x-x-x-x-x-x- (-x-x-x-x-	-						
-							<pre><</pre>	-1.0		<mark>183/3</mark> 5	5.2			
-							(-x-x-x-x-x-x- (-x-x-x-x-x-x-x-x-x-x-x-x	x- x- x-						
F							(=x-x-x-x-x-x- (-x-x-x-x-x-x- (-x-x-x-x-x-	x- x- x-						
-							(-x-x-x-x-x-x- (-x-x-x-x-x-x-x- (-x-x-x-x	-1.5		186+				
- becoming	red/brown stre	eaked	l light brown/orange	е				x						
F							(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x							
 becoming red/brown 		ange	streaked grey, high	h plast	icity, with occas	sional	<pre>< = = = = - = = = = = = = = = = = = = =</pre>	- 2.0		186+				
	noues						<pre>< = x = x = x = x = x = x = x = x = x =</pre>							
							(=x=x-x-x-x (=x=x-x-x-x-x (=x-x-x-x-x-x) (=x-x-x-x-x-x-x)	×						
ŀ							(=x=x=x=x=x=x (=x=x=x=x=x=x (=x=x=x=x=x=			186+				
- becomina	slightly silty C	LAY.	orange streaked g	rey, w	ithout red/brow	n mottles	·····	- 2.5 -		100+				
		,					(-x-x-x-x-x) (-x-x-x-x-x-x) (-x-x-x-x-x-x)							
-							(-x-x-x-x-x (-x-x-x-x-x-x) (-x-x-x-x-x-x)							
- becoming	light grey stre	eaked	light orange, insen	sitive			(-x-x-x-x-x-x) (-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x-x-x)	- 3.0		170/90	1.9			
-							(-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x							
							(-X-X-X-X-X) (-X-X-X-X-X) (-X-X-X-X-X-X) (-X-X-X-X-X-X)							
-							(-x-x-x-x-x) (-x-x-x-x-x-x) (-x-x-x-x-x-x)	- 3.5		154/104	4 1.5			
CLAY, ligh	nt orange mot	tled lig	ght grey. Very stiff,	moist	, high plasticity			2 2 -			1			
 moderate 	ly sensitive, w	ith oc	casional red/orang	e strea	aking			2- 2-						
–								-4.0		162/80	2.0			
- 1														
_ silty CLA	 orange mot with trace lim 	tled gi	rey. Very stiff, mois	st, high	n plasticity, moo	erately	(-x-x-x-x- (-x-x-x-x-x- (-x-x-x-x-x-x-x-	x-x- x-x- x-x-						
			with some limonite	e silt in	clusions		(-x-x-x-x- (-x-x-x-x-x- (-x-x-x-x-x-x-x-	-4.5		173/66	2.6		ala Penet	romete
F 1								x-x- x-x- x-x-				Tes (blo	st ws/100n	nm)
- becoming	i light grey, wi	nout	limonite silt inclusio	JIIS				x-x- x-x- x-x- x-x-						
- ,							(-x-x-x-x-x- (-x-x-x-x-x-x-x-x-x-x-x-x-x			186+		- 6		
- EOB at 5	.0m. Target D	epth.	Scala Penetromete	er Tes	t commenced t	o 5.9m.		+				6		
Ł								F						
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-								-5.5				Fg		
F								Ę				- 8	5	
F								┝				- 9		
						4	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	-6.0			 :::::		Diutopia	*****
		8.00.0	ments:	and d	Borehole Diameter: 50mm	Topsoil		Sand Gravel		Sandsto	22222	277	Plutonic No Core	
	DEP		ndwater not encounte = unable to penetrate		Checked:	Fill	///////	Gravel	******	Limesto		222		
geote	DER chnical	121 1222	= end of borehole.		AB	Clay Silt	******	Pumice		Volcan				
						Ont	*******		64444	sold voican		~~~~	And the second second	







SDMT-01	LEGEND	INTERPRETED PARAMETERS	GENERAL PARAMETERS
SDMI-UI	Z = Depth Below Ground Level	Phi = Safe floor value of Friction Angle	DeltaA = 10 kPa
28 JAN 2016	Po,P1,P2 = Corrected A,B,C readings	Ko = In situ earth press. coeff.	DeltaB = 69 kPa
Ground Investigation Ltd	Id = Material Index	M = Constrained modulus (at Sigma')	GammaTop = 17.0 kN/m^3
5	Ed = Dilatometer Modulus	Cu = Undrained shear strength	FactorEd = 34.7
Lander Geotechnical	Ud = Pore Press. Index = (P2-Uo)/(Po-Uo)	Ocr = Overconsolidation ratio	ZMCal = 0.0 kPa
16-006	Gamma = Bulk unit weight	(OCR = 'relative OCR'- generally	ZMAB = 0.0 kPa
31 Burberry Rd	Sigma' = Effective overb. stress	realistic. If accurate independent OCR	ZMC = 0.0 kPa
-	Uo = Pore pressure	available, apply suitable factor)	Zabs = 0.0 m
			Zw = 1.5 m

WaterTable at 1.50 m Reduction formulae according to Marchetti, ASCE Geot.Jnl.Mar. 1980, Vol.109, 299-321; Phi according to TC16 ISSMGE, 2001

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ko	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	SDMT-01 DESCRIPTION
0.2	388	883		377	814		17.7	3	0	1.16	>99.9	15.2		6.6	>99.9		70.9	99	SILT
0.4	357	762		351	693		17.7	7	Ō	0.98	50.6	11.9		4.6	>99.9		47.9	87	SILT
0.6	292	653		288	584		16.7	10	0	1.03	27.5	10.3		3.3	59.9		35.5	61	SILT
0.8	370	978		354	909		17.7	14	0	1.57	25.6	19.3				44	65.4		SANDY SILT
1.0	348	1035		328	966		18.6	17	0	1.95	18.9	22.2				43	68.7		SILTY SAND
1.2	471	1193		449	1124		17.7	21	0	1.50	21.3	23.4				44	75.4		SANDY SILT
1.4	478	1077		462	1008		17.7	25	0	1.18	18.8	18.9		2.7	33.0		58.7	89	SILT
1.6	559	1216		540	1147		19.1	27	1	1.13	19.9	21.1		2.8	36.0		66.3	105	SILT
1.8	738	1371		720	1302		19.1	29	3	0.81	24.7	20.2		3.1	50.7		67.8	148	SILT
2.0	669	1295	13	652	1226	23	19.1	31	5	0.89	21.0	19.9	0.03	2.9	39.1		63.8	128	SILT
2.2	571	1083		559	1014		17.7	33	7	0.82	16.9	15.8		2.5	27.9		47.3	104	SILT
2.4	499	960		490	891		17.7	34	9	0.83	14.0	13.9		2.3	20.9		39.3	86	SILT
2.6	441	893		432	824		17.7	36	11	0.93	11.8	13.6		2.0	15.9		36.1	72	SILT
2.8	467	888		460	819		17.7	37	13	0.80	11.9	12.5		2.0	16.3		33.2	77	SILT
3.0	432	856	21	425	787	31	17.7	39	15	0.88	10.5	12.6	0.04	1.9	13.3		32.0	68	SILT
3.2	391	740		388	671		17.7	41	17	0.76	9.1	9.8		1.7	10.7		23.7	60	CLAYEY SILT
3.4	344	582		346	513		16.7	42	19	0.51	7.8	5.8		1.6	8.3		13.0	51	SILTY CLAY
3.6	326	550		329	481		16.7	44	21	0.49	7.1	5.3		1.5	7.2		11.3	46	SILTY CLAY
3.8	409	642		411	573		16.7	45	23	0.42	8.7	5.6		1.7	9.9		13.2	62	SILTY CLAY
4.0	536	888		532	819		17.7	46	25	0.56	11.0	9.9		1.9	14.3		25.7	85	SILTY CLAY
4.2	771	1175		765	1106		18.6	48	26	0.46	15.4	11.8		2.4	24.3		34.5	135	SILTY CLAY
4.4	969	1432		960	1363		18.6	50	28	0.43	18.8	14.0		2.7	33.0		43.3	179	SILTY CLAY
4.6	1012	1458		1004	1389		18.6	51	30	0.40	18.9	13.4		2.7	33.4		41.5	188	SILTY CLAY
4.8	742	1100		738	1031		17.7	53	32	0.42	13.3	10.2		2.2	19.2		28.1	125	SILTY CLAY
5.0	461	795	107	458	726	117	17.7	55	34	0.63	7.7	9.3	0.20	1.6	8.3		20.8	65	CLAYEY SILT
5.2	564	809		566	740		17.7	56	36	0.33	9.4	6.0		1.8	11.2		14.7	86	CLAY
5.4	504	739		506	670		17.7	58	38	0.35	8.1	5.7		1.6	8.9		13.0	73	SILTY CLAY
5.6	414	586		419	517		16.7	59	40	0.26	6.4	3.4		1.4	6.1		6.9	56	CLAY
5.8 6.0	411	547	100	418 496	478 547	200	16.7 16.7	61	42	0.16	6.2 7.3	2.1 1.8	0 27	1.3 1.5	5.8 7.5		4.2 3.9	55	CLAY
6.0	488 398	616 520	199	496 406	547 451	209	16.7	62 64	44 46	0.11 0.13	7.3 5.7	1.8	0.37	1.5	7.5 5.1		3.9	69 51	CLAY CLAY
6.2 6.4		520 478		406 337	-		15.7		46	0.13		2.5		1.3			4.2	39	CLAY
6.4	330 376	478 510		383	409 441		16.7	65 66	48 50	0.25	4.5 5.0	2.5		1.1	3.5 4.2		4.2 3.6	39 46	CLAY
6.8	364	489		372	441		15.7	67	50	0.17	3.0 4.7	1.7		1.1	4.2 3.9		2.9	40	CLAY
7.0	380	409 528	137	387	420	147	16.7	69	52	0.15	4.7	2.5	0.28	1.1	4.0		4.4	44	CLAY
7.0	1198	2700	137	1137	2631	14/	20.6	70	56	1.38	4.0 15.4	2.5 51.8	0.20	1.1	4.0	42	150.9	40	SANDY SILT
7.4	817	2009		771	1940		19.1	70	58	1.64	9.9	40.6				42 40	100.9		SANDI SILI SANDY SILT
7.6	504	1173		484	1104		17.7	74	60	1.46	5.7	21.5				38	42.2		SANDY SILT
7.8	824	1333		404 812	1264		19.1	76	62	0.60	9.9	15.7		1.8	12.2	50	42.2 39.1	123	CLAYEY SILT
8.0	487	882	6	481	813	16	17.7	70	64	0.00	5.4	11.5	-0.11	1.0	4.7		21.6	59	CLAYEY SILT
8.2	430	893	5	421	824	-0	17.7	79	66	1.14	4.5	14.0	0.11	1.1	3.5		23.9	48	SILT
8.4	2295	3675		2240	3606		20.6	81	68	0.63	26.9	47.4		3.3	58.0		163.0	458	CLAYEY SILT
0.4	2233	5075		2230	2000		20.0	01	00	0.00	20.9			5.5	50.0		100.0	-100	CLENILL OLDI

Z (m)	A (kPa)	B (kPa)	C (kPa)	Po (kPa)	P1 (kPa)	P2 (kPa)	Gamma. (kN/m^3)	Sigma' (kPa)	Uo (kPa)	Id	Kd	Ed (MPa)	Ud	Ко	Ocr	Phi (Deg)	M (MPa)	Cu (kPa)	SDMT-01 DESCRIPTION
8.6	691	1250		677	1181		19.1	83	70	0.83	7.3	17.5		1.5	7.6		38.3	92	SILT
8.8	830	1162 1324	271	827 834	1093 1255	281	17.7	85	72 74	0.35 0.55	8.9	9.2	0 07	1.7	10.3		22.0	121 121	SILTY CLAY
9.0 9.2	844 1306	2031	2/1	1284	1255	281	18.6 18.6	86 88	74	0.55	8.8 13.7	14.6 23.5	0.27	1.7 2.2	10.2 20.3		34.6 65.9	215	SILTY CLAY SILTY CLAY
9.4	1450	2441		1414	2372		20.6	90	77	0.72	14.9	33.2		2.3	23.0		95.6	243	CLAYEY SILT
9.6	1391	2216		1364	2147		20.6	92	79	0.61	14.0	27.2		2.3	20.8		76.6	230	CLAYEY SILT
9.8	747	1622		717	1553		19.1	94	81	1.31	6.8	29.0				39	61.4		SANDY SILT
10.0	602	1107	4	591	1038	14	17.7	96	83	0.88	5.3	15.5	-0.14	1.2	4.6		28.9	71	SILT
10.2	509	985		499	916		17.7	97	85	1.01	4.2	14.5		1.0	3.2		23.8	55	SILT
10.4 10.6	510 712	875 1273		506 698	806 1204		17.7 19.1	99 101	87 89	0.72 0.83	4.2 6.0	10.4 17.6		1.0 1.3	3.2 5.6		16.9 35.0	55 88	CLAYEY SILT SILT
10.8	784	1976		738	1907		19.6	101	91	1.81	6.3	40.6		1.5	5.0	38	83.7	00	SILTY SAND
11.0	668	1933	3	619	1864	13	19.6	104	93	2.37	5.0	43.2	-0.15			37	81.0		SILTY SAND
11.2	695	1393		674	1324		19.1	106	95	1.12	5.4	22.6		1.2	4.8		42.8	82	SILT
11.4	877	1729		848	1660		19.1	108	97	1.08	6.9	28.2		1.5	7.0		60.2	113	SILT
11.6	1019	1573		1005	1504		18.6	110	99	0.55	8.2	17.3		1.6	9.1		39.8	142	SILTY CLAY
11.8 12.0	1085 1660	1575 3305		1074 1592	1506 3236		18.6 20.6	112 114	101 103	0.44 1.10	8.7 13.1	15.0 57.1		1.7 2.2	9.9 18.8		35.3 157.2	155 262	SILTY CLAY SILT
12.0	534	1990		475	1921		19.6	114	105	3.91	3.2	50.2		2.2	10.0	35	75.7	202	SAND
12.4	876	1992		834	1923		19.1	118	107	1.50	6.2	37.8				38	76.8		SANDY SILT
12.6	836	1726		805	1657		19.1	120	109	1.22	5.8	29.5				38	58.1		SANDY SILT
12.8	937	1881		904	1812		19.1	122	111	1.15	6.5	31.5		1.4	6.3		65.5	117	SILT
13.0	643	1515	13	613	1446	23	19.1	123	113	1.66	4.1	28.9	-0.18			36	47.3		SANDY SILT
13.2 13.4	1171 852	2696 2359		1109 791	2627 2290		20.6 19.6	125 127	115 117	1.53 2.23	7.9 5.3	52.7 52.0				39 37	120.0 99.6		SANDY SILT SILTY SAND
13.4	1028	3482		919	3413		21.1	127	119	3.12	6.2	86.5				38	180.3		SILTY SAND
13.8	1435	3896		1326	3827		21.1	132	121	2.08	9.2	86.8				40	209.9		SILTY SAND
14.0	1896	4604	11	1775	4535	21	20.6	134	123	1.67	12.3	95.8	-0.06			41	258.5		SANDY SILT
14.2	1612	4003		1506	3934		20.6	136	125	1.76	10.2	84.2				41	211.8		SANDY SILT
14.4	1316	3845		1204	3776		21.1	138	127	2.39	7.8	89.3				39	202.9	450	SILTY SAND
14.6 14.8	1162 937	2050 1604		1132 918	1981 1535		19.1 19.1	140 142	129 130	0.85 0.78	7.1 5.5	29.5 21.4		1.5 1.2	7.3 4.9		63.7 40.7	152 112	SILT CLAYEY SILT
14.0	958	2286		906	2217		19.1	142	130	1.70	5.4	45.5		1.2	4.9	38	40.7 86.7	112	SANDY SILT
15.2	1002	2362		948	2293		19.1	146	134	1.65	5.6	46.7				38	90.6		SANDY SILT
15.4	708	1990		658	1921		19.6	148	136	2.42	3.5	43.8				35	68.2		SILTY SAND
15.6	673	1913		625	1844		19.6	150	138	2.51	3.2	42.3				35	62.9		SILTY SAND
15.8	749	2009	10	700	1940	~~	19.6	152	140	2.22	3.7	43.0				36	68.1		SILTY SAND
16.0 16.2	1104 917	2542 2183	10	1046 868	2473 2114	20	19.1 19.1	154 156	142 144	1.58 1.72	5.9 4.6	49.5 43.2	-0.14			38 37	98.5 76.6		SANDY SILT SANDY SILT
16.4	969	2582		902	2513		19.1	158	144	2.13	4.8	55.9				37	101.8		SILTY SAND
16.6	1007	2682		937	2613		19.6	159	148	2.12	4.9	58.2				37	107.5		SILTY SAND
16.8	1007	2660		938	2591		19.6	161	150	2.10	4.9	57.3				37	105.2		SILTY SAND
17.0	1051	2428		996	2359		19.1	163	152	1.61	5.2	47.3				37	88.3		SANDY SILT
17.2	752	1844		711	1775		19.6	165	154	1.91	3.4	36.9				35	54.6		SILTY SAND
17.4 17.6	751 825	1956 3788		705 691	1887 3719		19.6 19.6	167 169	156 158	2.15 5.68	3.3 3.1	41.0 105.1				35 35	60.3 157.2		SILTY SAND SAND
17.8	1163	5801		945	5732		21.1	171	160	6.10	4.6	166.1				37	302.8		SAND
18.0	1058	2564		997	2495		19.1	173	162	1.79	4.8	52.0				37	94.0		SANDY SILT
18.2	672	1879		626	1810		19.6	175	164	2.56	2.6	41.1				34	53.6		SILTY SAND
18.4	715	1999		665	1930		19.6	177	166	2.54	2.8	43.9				34	59.7		SILTY SAND
18.6	777	2173		721	2104		19.6	179	168	2.50	3.1	48.0				35	69.1		SILTY SAND
18.8 19.0	748 919	2473 2635	50	676 847	2404 2566	60	19.6 19.6	181 183	170 172	3.42 2.54	2.8 3.7	60.0 59.6	-0.17			34 36	83.5 95.7		SAND SILTY SAND
19.0	919 893	2635	50	847 825	2566	60	19.6	183	174	2.54	3.7	59.6	-0.1/			36	95.7 88.1		SILTY SAND
19.4	1011	2845		933	2776		19.6	187	176	2.43	4.1	63.9				36	107.5		SILTY SAND
19.6	886	2560		816	2491		19.6	189	178	2.62	3.4	58.1				35	89.0		SILTY SAND
19.8	871	2553		801	2484		19.6	191	180	2.71	3.3	58.4				35	87.8		SILTY SAND
20.0	932	2542	4	865	2473	14	19.6	193	181	2.35	3.5	55.8	-0.24			35	86.8		SILTY SAND
20.2	917	2434		855	2365		19.6	195	183	2.25	3.4	52.4				35	79.8		SILTY SAND

Z	A	B	C	Po	P1	P2	Gamma	Sigma'	Uo (I-Da)	Id	Kd	Ed	Ud	Ko	Ocr	Phi	M (MDa)	Cu	SDMT-01
(m)	(kPa)	(kPa)	(kPa)	(kPa)	(kPa)	(kPa)	(kN/m^3)	(kPa)	(kPa)			(MPa)				(Deg)	(MPa)	(kPa)	DESCRIPTION
20.4	867	2586		795	2517		19.6	197	185	2.82	3.1	59.8				35	87.7		SILTY SAND
20.6	1287	3104		1210	3035		20.6	199	187	1.78	5.1	63.3				37	118.4		SANDY SILT
20.8	1485	3568		1395	3499		20.6	201	189	1.75	6.0	73.0				38	147.1		SANDY SILT
21.0	1104	2929		1027	2860		21.1	203	191	2.19	4.1	63.6				36	107.0		SILTY SAND

SDMT-01 - Tabular data: Vs, Go, Vs Repeatability

Each Vs value in the 'Vs Repeatability' column corresponds to a distinct energization.

Z	Vs	Go	Rho	Vs Repeatability	Var Coeff.
[m]	[m/s]	[MPa]	[kg/m^3]	[m/s]	[%]
2.00	260	132	1950	255,265	1.92
2.50	208	77.9	1800	205,210	1.23
3.00	160	46.1	1800	159,161	0.63
3.50	138	32.4	1700	137,138	0.51
4.00	184	60.9	1800	187,180	1.92
4.50	215	87.8	1900	216,214	0.47
5.00	202	73.4	1800	202,202	0.00
5.50	150	39.4	1750	150,151	0.47
6.00	146	36.2	1700	146,145	0.48
6.50	163	45.2	1700	163,163	0.00
7.00	184	57.6	1700	184,184	0.00
7.50	234	103	1875	233,234	0.30
8.00	210	79.4	1800	211,210	0.34
8.50	224	102	2025	224,225	0.32
9.00	218	90.3	1900	218,219	0.32
9.50	259	141	2100	259,259	0.00
10.00	218	85.5	1800	219,217	0.46
10.50	202	76.5	1875	203,202	0.35
11.00	220	96.8	2000	220,219	0.32
11.50	225	97.5	1925	225,225	0.00
12.00	220	102	2100	219,219,221	0.45
12.50	264	136	1950	264,264	0.00
13.00	252	124	1950	253,252	0.28
13.50	235	115	2075	235,235	0.00
14.00	272	155	2100	271,274	0.58
14.50	282	163	2050	280,284	0.71
15.00	282	155	1950	282,282	0.00
15.50	280	157	2000	279,280	0.25
16.00	267	139	1950	269,265	0.75
16.50	302	182	2000	304,301	0.52
17.00	324	205	1950	324,324	0.00
17.50	247	122	2000	243,249,247,250	1.09
18.00	350	239	1950	355,345	1.43
18.50	286	164	2000	286,287	0.25
19.00	314	197	2000	314,315	0.23
19.50	332	220	2000	336,329	1.06
20.00	326	213	2000	331,322	1.39
20.50	348	248	2050	348,348	0.00

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Z = 2.00 m Ds = 0.28 m	6.1 [mV]		20	40	60	80	100	120		6.1 [mV]		20 ∧	40	60	80	100	120
Dt = 1.11 ms Vs = 255 m/s	0			A.	\wedge		\sim	~~~		0		P	A	$A \sim$	\sim	\sim	~~~
28 JAN 2016 10:15:14	-6.1	[ms]	20	40	60	₩ 8 <u>0</u>	100	120		-6.1	[ms]	20	↓ ↓ 40	6 <u>0</u>	¥ 80	100	120
Z = 2.50 m	6		20	40	60	80	100	120		6		20	40	60	80	100	120
Ds = 0.33 m Dt = 1.59 ms	[mV]		A	πÂ	^	0				[mV]		A		^	•		
Vs = 205 m/s	0		\mathbb{N}	\mathbb{W}	\rightarrow					0			$\forall \forall$		$\sqrt{2}$		~~~~
28 JAN 2016 10:20:04	-6	[ms]	¥ 20	40	60	<mark>8</mark> 0	100	120		-6	[ms]	V 20	40	60	80	100	120
Z = 3.00 m	6.1 [mV]		20	40	60	80	100	120		6.1 [mV]		20	40	60	80	100	120
Ds = 0.36 m Dt = 2.26 ms	0		$\neg \uparrow$	\mathcal{M}	\sim	$\sim \infty$				0		\mathbb{N}	A F		\sim		
Vs = 159 m/s 28 JAN 2016	U		\mathbb{W}	W/S	\mathcal{O}^{-1}					Ū		\bigvee	\bigvee ~	<i>v</i> -	\mathbf{V}	0 V	
10:21:53	-6.1	[ms]	20	40	60	80 	100	120		-6.1	[ms]	20	40	<mark>60</mark>	80 	100	120
Z = 3.50 m Ds = 0.38 m	6.6 [mV]		20	40	60	80	100	120		6.6 [mV]		20	40	60	80	100	120
Dt = 2.81 ms Vs = 137 m/s	0		-	A		-	\sim			0		┭┦	λA	\wedge	A	\sim	<u>^</u>
28 JAN 2016 10:30:47		[ms]	20	¥0	0	80	100	120			[ms]	20	40	7 60	80	100	120
	-6.6 7	[20	40	60	80	100	120		-6.6 7	[iii3]	20	40	60	80	100	120
Z = 4.00 m Ds = 0.40 m	[mV]		20	$\bigwedge^{40} \land$	00	80	100	120		[mV]		20		60	80	100	120
Dt = 2.16 ms Vs = 187 m/s	0			$f \leq f$	\checkmark		100	<u>~</u>	-	0		\neg		\checkmark		6	<u>~~</u>
28 JAN 2016 10:33:13	-7	[ms]	20 20	40 40	60	80	100	120		-7	[ms]	20	40	60	8 <mark>0</mark>	100	120
Z = 4.50 m	4.3 [mV]		20	40	60	80	100	120		4.3 [mV]		20	40	60	80	100	120
Ds = 0.42 m Dt = 1.95 ms				A				N					Λ, r				
Vs = 216 m/s 28 JAN 2016	0		1	\mathbb{V}	V	V		V		0		V	∇	$\overline{\nabla}$	$\overline{}$	\sim	
10:45:31	-4.3	[ms]	20	40	60	8 <mark>0</mark>	100	120		-4.3	[ms]	20 I	40	<mark>6</mark> 0	80 	100	120
Z = 5.00 m Ds = 0.43 m	3.2 [mV]		20	40 //	60	80	100	120		3.2 [mV]		20	A ⁴⁰	60	80	100	120
Dt = 2.15 ms Vs = 202 m/s	0			\mathbb{A}	Ar	2				0			$ \mathcal{L} $	$\Lambda \rho$	<u>~</u>	\wedge	\sim
28 JAN 2016				V V		0							ΙV	$\mathbf{\nabla}$	V	Ĩ	
10:48:03	-3.2 3.2	[ms]		40	60	80	100	120		-3.2 3.2	[ms]		40	60	80	100	120
Z = 5.50 m Ds = 0.44 m	[mV]		20	40 //	60	80	100	120		5.2 [mV]		20	40	60	80	100	120
Dt = 2.95 ms Vs = 150 m/s	0			$\sqrt{1}$	\mathbb{N}		\checkmark	\sim		0			+	\bigwedge	\sim	\bigwedge	\sim
28 JAN 2016 10:51:23	-3.2	[ms]	20	40 40	60 60	<mark>8</mark> 0	100	120		-3.2	[ms]	20	∨ ∨ 40	60	80	100	120
Z = 6.00 m	3.1 [mV]		20	40	60	80	100	120		3.1 [mV]		20	40	60	80	100	120
Ds = 0.45 m Dt = 3.08 ms				A	M	~							\wedge	\wedge	~~ ^	٨	
Vs = 146 m/s 28 JAN 2016	0			T W	WXX		\mathbb{V}	7 \)		0				JV		\checkmark	~~~~
10:52:52	-3.1	[ms]	20	40	60	80 I	100	120		-3.1	[ms]	20	40	60	80 I	100	120
Z = 6.50 m	3.3 [mV]		20	40	60	80	100	120		3.3 [mV]		20	40 A	60	80	100	120
Ds = 0.46 m Dt = 2.80 ms	0			Δ	A	\sim	R.A.	w Av	\sim	0			$-\Delta$	A.	\sim	Δ	
Vs = 163 m/s 28 JAN 2016				W.	VV V	/	W [×]	<u> </u>		-			V	V	,	\vee	, , ,
10:55:30	-3.3	[ms]	20	40 I	60	80 	100	120		-3.3	[ms]	20	40	60	<mark>8</mark> 0	100	120

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Z = 7.00 m	2.9 [mV]		20	40	60	80	100	120		2.9 [mV]		20	40	60	80	100	120
Ds = 0.46 m Dt = 2.51 ms					Λ		<u>^</u>						A	A		۵	
Vs = 184 m/s	0				ANA	\sim	\sim	\sim	-	0			-1-	\mathbb{A}/\mathbb{B}	Jan	\searrow	\sim
28 JAN 2016				00	V									A			
10:58:37	-2.9	[ms]	20	40	60	80	100	120		-2.9	[ms]	20	40	60	80	100	120
Z = 7.50 m	2.1 [mV]		20	40	60	80	100	120		2.1 [mV]		20	40	60	80	100	120
Ds = 0.47 m Dt = 2.00 ms					M M		()e						\wedge			۸	
Vs = 233 m/s	0					\checkmark		\checkmark	-	0				$\uparrow \uparrow$	\sim	\sim	\checkmark
28 JAN 2016 11:04:38				v	V		-	100					A	V		-	100
11.04.36	-2.1	[ms]	20	40	60	80	100	120		-2.1	[ms]	20	40	60	80	100	120
Z = 8.00 m	1.7 [mV]		20	40	60	80	100	120		1.7 [mV]		20	40	60	80	100	120
Ds = 0.47 m Dt = 2.23 ms					N N	0	- 0						[\ A		- 6	
Vs = 211 m/s	0					\checkmark	\sim			0			\neg		\checkmark	\sim	\checkmark
28 JAN 2016 11:08:29		[ms]	20	40	60	80	100	120			[ms]	20	40	60	80	100	120
	-1.7	[a]							╡┤	-1.7	[]						
Z = 8.50 m Ds = 0.47 m	1.7 [mV]		20	40	60	80	100	120		1.7 [mV]		20	40	60 A	80	100	120
Ds = 0.47 m Dt = 2.12 ms	0	L			\mathbb{N}	$\lambda \sim$	~ 1	$\Delta \sim$		o	L			1 6	$\lambda \sim$	\sim 1	
Vs = 224 m/s	U			ĺ						U			\neg	V	\checkmark		\checkmark \checkmark
28 JAN 2016 11:11:58	-1.7	[ms]	20	40	60	80	100	120		-1.7	[ms]	20	40	60	80	100	120
7	1.3		20	40	60	80	100	120	╡	1.3		20	40	60	80	100	120
Z = 9.00 m Ds = 0.48 m	[mV]		20	40		80	100	120		[mV]		20	40	A	80	100	120
Dt = 2.18 ms	0					A_{a}	-	$\wedge \land$		0				\square	Δ_{\sim}	-	$\Delta $
Vs = 218 m/s 28 JAN 2016				, Y	$\mathbb{V} \setminus \mathbb{V}$		\vee						V	' V	\checkmark	\vee	• •
11:14:28	-1.3	[ms]	20	40	60	80	100	120		-1.3	[ms]	20	40	60	80	100	120
Z = 9.50 m	1		20	40	60	80	100	120	٦	1		20	40	60	80	100	120
Ds = 0.48 m	[mV]				Ń	<i>(</i>)		<u>,</u>		[mV]				Λ	^		<u> </u>
Dt = 1.84 ms Vs = 259 m/s	0				$ \mathbb{A} $	\mathbb{N}		\bigwedge	2	0				+	Æ	\sim	$\wedge \wedge$
28 JAN 2016					W	ľ	N. N.	Ý					١	[,] V		×	<i>,</i>
11:18:02	-1	[ms]	20	40	60	80	100	120		-1	[ms]	20	40	60	80	100	120
Z = 10.00 m	1.1 [mV]		20	40	60	80	100	120		1.1 [mV]		20	40	60	80	100	120
Ds = 0.48 m Dt = 2.20 ms						<i>∕</i> ∧∖	_	~						Λ	\wedge	_	A
Vs = 219 m/s	0				$\sqrt{1}$	\mathbb{H}	\frown	$\sqrt{2}$	2	0				f	$+ \forall$		\bigwedge
28 JAN 2016 11:20:10		[ma]	20	40	<u>ا</u>	У "	400	100			[mal	20	40	۲ م ۲	<i>,</i>	400	100
11.20.10	-1.1	[ms]		40	60	80	100	120	╡┤	-1.1	[ms]		40	60	80	100	120
Z = 10.50 m	980 [µV]		20	40	60	80	100	120		980 [µV]		20	40	60	80	100	120
Ds = 0.48 m Dt = 2.37 ms						M.	~-							$ \rangle$	Λ	\sim	$\wedge \wedge$
Vs = 203 m/s	0					∇		∇		0				∇	$\int \nabla$		\checkmark
28 JAN 2016 11:24:25	-980	[ms]	20	40	60	080 80	100	120		-980	[ms]	20	40	60	¥ 80	100	120
-	-980	-	20	40	60	80	100	120	╡┼	-980		20	40	60	80	100	120
Z = 11.00 m Ds = 0.48 m	[µV]		20	40	M	υs	100	120		[µV]		20	40	Â	80	100	120
Dt = 2.20 ms	0				//	Λ	\sim		2	0				$ \rightarrow $	_Α_	\sim	
Vs = 220 m/s 28 JAN 2016					\mathbb{W}	VV ×	φ	\vee \checkmark						V	\bigvee	1	\vee \checkmark
11:27:39	-900	[ms]	20	40	60	80	100	120		-900	[ms]	20	40	60	80	100	120
Z = 11.50 m	790		20	40	60	80	100	120	Ξt	790		20	40	60	80	100	120
Ds = 0.48 m	[µV]		•	.5	́∕∧					[µV]		_•		ĨΛ	~		
Dt = 2.15 ms Vs = 225 m/s	0				[]`	A		\mathbb{A}	A	0					\land	\sim	
28 JAN 2016					V	V I	~~	\vee						V	V	V	<u>۷</u> -
11:33:02	-790	[ms]	20	40	60	80	100	120		-790	[ms]	20 	40	60	80	100	120
	-790	-	1	I		1	1	1	-1	-790	-	1	I			-	

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· · · · · · · · · · · · · · · · · · ·																	
Z = 12.00 m Ds = 0.49 m	680 [µV]		20	40	60 (x	80	100	120		680 [µV]		20	40	60 A	80	100	120
Dt = 2.22 ms	0					Λ	\sim	<u>~</u>		0						\sim	
Vs = 219 m/s 28 JAN 2016	Ŭ				\mathbb{V}	\mathbb{V}	\bigvee	\vee		Ŭ				\vee	\mathbf{V}	V	\vee
11:35:44	-680	[ms]	20	40	60	80	100	120		-680	[ms]	20 I	40	60	80	100	120
Z = 12.50 m	590 [µV]		20	40	60	80	100	120		590 [µV]		20	40	60	80	100	120
Ds = 0.49 m Dt = 1.84 ms				\wedge		~ 0							$\bigwedge \land$				
Vs = 264 m/s 28 JAN 2016	0		V		\vee					0		V		V	$\overline{\mathbf{V}}$	∇	
11:41:07	-590	[ms]	20	40	60	80	100	120		-590	[ms]	20	40	60	80	100	120
Z = 13.00 m	430 [μV]		20	40	60	80	100	120		430 [μV]		20	40	60	80	100	120
Ds = 0.49 m Dt = 1.93 ms				\bigwedge	$\lambda \sim$		$\sim n$	•					A.	<u>م</u>	\sim		
Vs = 253 m/s 28 JAN 2016	0		I		\mathbb{V}	$\overline{\mathbf{v}}$				0		\neg	ΓV	V	$\overline{\nabla}$	\sim	
11:44:06	-430	[ms]	20	40	60	80	100	120		-430	[ms]	20	40	60	80	100	120
Z = 13.50 m	320 [µV]		20	40	60	80	100	120	Ť	320 [µV]		20	40	60	80	100	120
Ds = 0.49 m Dt = 2.08 ms						\wedge		~~~~~					\wedge		\sim	~ /	
Vs = 235 m/s 28 JAN 2016	0		1	$\sqrt{1}$		- J	y V			0			f	\mathcal{N}	V	\sim	\sim
11:51:13	-320	[ms]	20	40 40	60	80	100	120		-320	[ms]	20	♥ ♥ 40	60	80	100	120
Z = 14.00 m	360 [µV]		20	40	60	80	100	120	٦Ì	360 [μV]		20	40	60	80	100	120
Ds = 0.49 m Dt = 1.81 ms					^	\sim				[1.4]			\bigwedge		\sim		
Vs = 271 m/s	0			\bigvee	V	{}	/ 🗸			0			$\sqrt{1}$	fV	J	$f \nabla$	$\overline{}$
28 JAN 2016 11:55:10	-360	[ms]	20	40	60	80	100	120		-360	[ms]	20	40	60	80	100	120
Z = 14.50 m	370 [μV]		20	40	60	80	100	120		370 [μV]		20	40	60	80	100	120
Ds = 0.49 m Dt = 1.75 ms					A	~~~~		^					()	Α -	~	^	
Vs = 280 m/s 28 JAN 2016	0			\mathbb{V}						0			$\sqrt{1}$	\mathcal{N}		$f \lor$	
12:00:06	-370	[ms]	20	40	60	80	100	120		-370	[ms]	20	40	60	80	100	120
Z = 15.00 m	370 [μV]		20	40	60	80	100	120		370 [μV]		20	40	60	80	100	120
Ds = 0.49 m Dt = 1.74 ms				\square	<u>~</u> .	\sim	\wedge						\wedge	\wedge	\sim	\wedge	
Vs = 282 m/s 28 JAN 2016	0				/ ∨		\checkmark			0			\mathcal{N}	$\int \nabla$		$\sqrt{2}$	
12:02:51	-370	[ms]	20	40	60	80	100	120		-370	[ms]	20	40	60	80	100	120
Z = 15.50 m	350 [μV]		20	40	60	80	100	120	ŢŢ	350 [μV]		20	40	60	80	100	120
Ds = 0.49 m Dt = 1.76 ms				\square	A	\sim							\wedge	\wedge	\sim	\wedge	\wedge
Vs = 279 m/s 28 JAN 2016	0				$\sqrt{2}$	/	\bigvee \checkmark			0			\mathcal{N}	$\sqrt{\sqrt{2}}$	-	\wedge	
12:07:09	-350	[ms]	20	40	60	80	100	120		-350	[ms]	20 I	40	60	80	100	120
Z = 16.00 m	290 [µV]		20	40	60	80	100	120	ŢŢ	290 [μV]		20	40	60	80	100	120
Ds = 0.49 m Dt = 1.83 ms						\sim		<u> </u>							\sim	\sim	\wedge
Vs = 269 m/s 28 JAN 2016	0			V	\bigvee		\bigvee			0			\mathcal{N}	$\bigvee V$		\wedge	
12:09:25	-290	[ms]	20	40	60 60	80	100	120		-290	[ms]	20	40	60 60	80	100	120
Z = 16.50 m	290 [µV]		20	40	60	80	100	120	Ţ	290 [μV]		20	40	60	80	100	120
Ds = 0.49 m Dt = 1.62 ms								\wedge					()		\sim		
Vs = 304 m/s 28 JAN 2016	0				χ / χ		\bigvee	$\checkmark \lor$		0			$\overline{}$	$\forall \uparrow \chi$		\bigvee	\sim
28 JAN 2016 12:13:32	-290	[ms]	20	40	60 60	80	100	120		-290	[ms]	20	40	60 60	80	100	120
	-290	L	- 1		1	1	- 1		-1	-230		1	-	1	1		

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Z = 17.00 m	310		20	40	60	80	100	120		310		20	40	60	80	100	120
Ds = 0.49 m	[µV]		20	Ĩ (^		00	100	120		[µV]		20	^∧		00	100	120
Dt = 1.52 ms Vs = 324 m/s	0					\checkmark	\mathbf{A}	\wedge	-	0				$\uparrow \uparrow$		\searrow	\frown
28 JAN 2016 12:16:33		[ms]	20	40	60	80	100	120			[ms]	20	40	60 60	80	100	120
	-310 260	[[[113]	20							-310 260	linal	20	40				
Z = 17.50 m Ds = 0.49 m	[μV]		20	40	60	80	100	120		[µV]		20	⁴⁰	60	80	100	120
Dt = 2.03 ms Vs = 243 m/s	0			~~~~{	\mathcal{A}					0				$\rightarrow \uparrow$	\checkmark	$\searrow \land$	\mathbf{A}
28 JAN 2016				W	\bigvee	Ŵ	V						V	V	V	V	
12:22:39	-260	[ms]	20	40	60	80	100	120		-260	[ms]	20	40	60	80	100	120
Z = 18.00 m Ds = 0.49 m	240 [µV]		20	40	60	80	100	120		240 [µV]		20	40	60	80	100	120
Dt = 1.39 ms	0				Λ_{a}	\land	\wedge			0			\square	Λ_{-}		\wedge	\sim
Vs = 355 m/s 28 JAN 2016				\mathbb{V}		N		V					$\vee V$	\vee	V	/ ~	\sim
12:26:12	-240	[ms]	20 	40	60	80 	100	120		-240	[ms]	20 I	40	60	80	100	120
Z = 18.50 m	220 [µV]		20	40	60	80	100	120		220 [μV]		20	40	60	80	100	120
Ds = 0.49 m Dt = 1.73 ms	0				\wedge	\wedge	Δ	$\wedge \frown$		0			Δ	\wedge	\wedge	\wedge	
Vs = 286 m/s 28 JAN 2016	0			\mathbb{V}	∨		ý V			Ŭ			V	$ \vee$	Ì	<i>,</i> 0	\checkmark \neg
12:30:31	-220	[ms]	20	40	60	80	100	120		-220	[ms]	20	40	60	80	100	120
Z = 19.00 m	210 [μV]		20	40	60	80	100	120		210 [μV]		20	40	60	80	100	120
Ds = 0.49 m Dt = 1.57 ms	0			-	\wedge	\wedge		$\wedge \frown$		0			$\sum \sum$	\wedge	\wedge		$\wedge \frown$
Vs = 314 m/s 28 JAN 2016	U			\mathbb{V}	JV		\checkmark	\checkmark		U			\mathcal{V}	/V		\bigvee	\sim
12:33:22	-210	[ms]	20	40	⁷ 60	8 <mark>0</mark>	100	120		-210	[ms]	20	40	60	80	100	120
Z = 19.50 m	210 [μV]		20	40	60	80	100	120	٦	210 [μV]		20	40	60	80	100	120
Ds = 0.49 m Dt = 1.47 ms					\wedge	\wedge		\wedge						\wedge	\wedge	A	$\wedge \land$
Vs = 336 m/s 28 JAN 2016	0						∇			0			\mathcal{N}	$\int \nabla$		∇	
12:38:18	-210	[ms]	20 1	40	60	80	100	120		-210	[ms]	20 I	40	60	80	100	120
Z = 20.00 m	200 [µV]		20	40	60	80	100	120	זן	200 [µV]		20	40	60	80	100	120
Ds = 0.49 m Dt = 1.50 ms				\square	\wedge	\wedge		<u> </u>					\wedge	6	\wedge		
Vs = 331 m/s 28 JAN 2016	0				\bigvee		\checkmark			0			\sim	$\int $	/	\checkmark	
12:41:31	-200	[ms]	20	40	60 60	80	100	120		-200	[ms]	20	40	60 60	80	100	120
Z = 20.50 m	150 [μV]		20	40	60	80	100	120	ŢŢ	150 [μV]		20	40	60	80	100	120
Ds = 0.50 m Dt = 1.42 ms							•	<u> </u>					$ \land$		\wedge		
Vs = 348 m/s 28 JAN 2016	0				\mathbb{V}^{1}	\int	\checkmark			0			$\overline{\mathbf{v}}$	∇	\int	\checkmark	
12:47:49	-150	[ms]	20	40	60 60	~ 80	100	120		-150	[ms]	20	40	€0 60	80	100	120
L								-	- 1				-				

Client : KARAKA & DRURY LIMITED								Auger Borehole No. HA2017- 08									
Project Location: AURANGA B1, B2 & B3, DRURY											Sheet 8 of 28						
Job Nu	mber:	J	00557				Vane H 17	Head: 750	Logge A	d By: \B	Process GB		Date: 25.0	1.17			
Borehole	mN		mE	Gro	ound R.L.			(Ê	ng evel	Pa) ^{dual}	ły	S	ample a	and			
Location:	Description:		Refer to site plan	Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity		ratory / Test							
		SO	IL DESCRIPTIC	N					Na S	Sh	Se		Details	3			
TOPSOIL																	
silty CLAY,	, dark orange	/ brow	n. Very stiff, moist	to dr	y, medium plast	icity,	(-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	-									
 moderately 	/ sensitive [N	ATUR	AL]					- 0.5		164/ 47	3.5						
_ SILT, light	orange. Loos	se, moi	st to dry, no plasti	city			<pre></pre>	F									
- - with occasi	ional pink str	eaking						F									
-								— 1.0 -		181+							
-								-									
- — becomina I	moderately s	ensitiv	Э					-		155/ 71	2.2						
_ silty CLAY,	, brown/ grey	. Very	stiff, moist, mediu	n to I	nigh plasticity, w	ith minor	(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	-		100, 11							
_ limonite sil	t inclusions a	ind stai	ning				<pre><-x-x-x-x-x-x-x <-x-x-x-x-x-x-x-x <-x-x-x-x</pre>										
- bocoming	orango/ brow	n mer	lium plasticity				(-x-x-x-x-x-x-x (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x-x)	- 2.0		181+							
	oranger brow	n, mec	num plasticity				(-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x)	_									
F							(-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x)	F									
 becoming becoming 	insensitive streaked ora	nge/ pi	nk and yellow/ gre	у			(-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x-x)	- 2.5		153/ 80	1.9						
-							C = 2 = 2 = 2 = 2 = 2 = 2 = 2 = 2 = 2 =	-									
	ecoming mod		v sensitive				(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x			138/ 60	2.6						
- EOB at 3.0)m. Target D	epth.						Ę									
-								È									
-								- 3.5									
-								E									
-								F									
-								- 4.0									
-								F									
-								-									
L								E									
-								-5.0									
ŀ								F									
-								F									
F								-5.5									
F								F									
L.																	
		Comm		19	Borehole Diameter:	Topsoil		Sand		Sandstor			utonic	*******			
LAN	DEB		lwater not encounter unable to penetrate.		50mm Checked:	Fill Clay		Gravel Organic	******	Siltstone			o Core				
geotec			end of borehole.		TT	Silt	*****	Pumice	******	Volcanic	~~~~~						

Client :	KARAKA & DRURY LIMI	TED			Aug	er Bo	oreho	le No.	HA20	17- 09
Project Locatior	a: AURANGA B1, B2 & B3,	DRURY						S	Sheet 9	of 28
Job Number:	J00557			Vane ⊦ 30		Logge J		Processo GB		01.17
Borehole mN	mE Grou	und R.L.				ng ∋vel	Pa) dual	ity	Sample	and
Location: Description:	Refer to site plan			Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity	Laboratory Test	/ Other
	SOIL DESCRIPTION			Ľ	Ó	Na Na	Sh	о С	Detail	
TOPSOIL _ clayey SILT, dark orang	ge. Hard, dry to moist, low plas	ticity [NATURA	L]		+					
-										
					- 0.5		UTP			
					E					
					F					
 becoming moist 					— 1.0 -		UTP			
F					F					
 becoming very stiff, mo 	derately sensitive				-		114/ 57	2.0		
-					1					
 becoming yellow/orang 	е				L.					
_					- 2.0		112/ 56	2.0		
-										
- — becoming insensitive					- 2.5		130/106	12		
					- 2.5		130/100	1.2		
					_					
– – EOB at 3.0m. Target D	epth.				- 3.0		174/106	1.6		
					F					
F					-					
F					- 3.5					
F					F					
F					-4.0					
F					F					
F					-					
-					-4.5					
È i i					F					
-										
-					F					
-					-5.5					
F					F					
					F					
-	Commente	Borehole Diameter:	Topsoil		-6.0 Sand		Sandsto	ne	Plutonic	• • • • • • • • • • • • • • • • • • •
	Comments: Groundwater not encountered.	50mm	Fill	XXXXX	Gravel		Siltstone	222222	No Core	
LANDER geotechnical	UTP = unable to penetrate. EOB = end of borehole.	Checked:	Clay	XXXXX	Organic			-	異	
gooroonniour		77	Silt XXX		Pumice		Volcanio	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		

Client :		KARAKA & DRU	RY LIMI	ГED			Auge	ər Bo	rehol	le No.	HA	4201	7- 10		
Project Location: AURANGA B1, B2 & B3, DRURY								Sheet 10 o							
Job Nu	mber:	J00557				Vane H 17	Head: 7 <mark>50</mark>	Loggeo A	d By: \B	Processo GB		ate: 26.01	.17		
Borehole	mN	mE	Grou	und R.L.							Sam	iple ar	nd		
Location:	Description:	Refer to site plan			Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity	Laborat	tory / (Test	Other			
		SOIL DESCRIPT	ION			Ľ	ď	Na: Na:	Sht peat	Sei		etails			
TOPSOIL															
_ silty CLAY,	, orange/ brow	wn. Very stiff, moist, m	iedium p	lasticity [NATU	RAL]	(
-							- - 0.5		181+						
- becoming	brown														
-															
– becoming	light yellow/ b	prown					− 1.0		181+						
- becoming	brown streak	ed grey, high plasticity	(x- x- x-								
- k	inc'''						X- X- C-		4.55						
– becoming i -	nisensitive						- 1.5		159/93	1.7					
F							x- x-								
-							- 2.0		144/ 84	1.7					
- - becomina	brown, mediu	um plasticity													
		-				(-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x-x)	**************************************								
- becoming	moderately s	ensitive				(=x-x-x-x-x-x-) (=x-x-x-x-x-x-x-) (=x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-	- 2.5		138/ 63	2.2					
E						(-x-x-x-x-x-x) (-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x)	-								
ŀ						<pre>c-x-x-x-x-x-x- c-x-x-x-x-x-x-x- c-x-x-x-x</pre>			170/05	27					
- EOB at 3.0	0m. Target D	epth.				Τ	- 3.0		173/65	2.7					
-							F								
-							- - 3.5								
E .							F								
-							F								
-							-4.0								
-							F								
Ŀ							<u> </u>								
F							-4.5								
F							F								
-							- 								
t i							F								
F							F								
F							-5.5								
E							F								
F							-								
		Comments:		Borehole Diameter:	Topsoil	<i> </i>	-6.0 Sand		Sandsto	ine	Pluto	nic	+++++ ++++++ ++++++		
	Sec.	Groundwater not encour		50mm	Fill		Gravel		Siltstone	777777	2 2 2 2		iII		
LAN geotec		UTP = unable to penetra EOB = end of borehole.		Checked:	Clay	******	Organic				選				
900100				1-1	Silt **	<pre>xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx</pre>	Pumice		Volcanic	c	~~~				

Client : KARAKA & DRURY LI	MITED			Aug	er Bo	oreho	le No.	HA	2017- 11
Project Location : AURANGA B1, B2 & B	3, DRURY								1 of 28
Job Number: J00557			Vane H 17		Logged A	d By: .B	Process GB		te: 25.01.17
Bolellole	Fround R.L.		а	(m)	ng evel	e (Pa) idual	rity	Sam	ole and
Location: Description: Refer to site plan			Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity	Laborato T	ory / Other est
SOIL DESCRIPTION					Ϋ́Ξ	D B	Š	De	etails
	10			-					
SILT, orange/ brown. Loose, dry, no plasticity, sens becoming light orange	itive [NATURAL]			-					
				- 0.5		179/ 34	5.3		
				-					
silty CLAY, orange/ brown mottled light orange. Ver plasticity	y stiff, moist, med	lum		-		181+			
 becoming red/ pink mottled orange becoming red/ pink 				- - -		1014			
			(-x-x-x-x-x-x-x- (-x-x-x-x-x-x-x-x-x-x-x						
	×		(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	-1.5		181+			
				F					
				F					
-			(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	- 2.0		181+			
 becoming pink/ red mottled orange/ brown 			<	-					
-			<pre><-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x</pre>	- 2.5		181+			
- becoming orange/ brown -			<pre><</pre>						
-			<pre></pre>	-					
EOB at 3.0m. Target Depth.				- 3.0		181+			
-				È					
-				- 3.5					
-									
-				E					
_				-4.0					
-				E					
F				F					
F				-4.5					
F				F					
È.		~							
		140 1		F					
				F					
F				- 5.5					
t i i i i i i i i i i i i i i i i i i i				F					
-				-					
Comments:	Borehole Diameter:	Topsoil		Sand		Sandsto	one	Pluton	
Groundwater not encountered UTP = unable to penetrate.		Fill		Gravel		Siltstone	22222	No Co	ire
LANDER geotechnical EOB = end of borehole.	Checked:	Clay	*****	Organic Pumice		Limesto		vvv	

				1 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			T							
Client :		KA	ARAKA & DRUR	Y LIMI	TED			Aug	er Bo	oreho	le No.		HA20	17- 12
Project	Location	I: AL	JRANGA B1, B2	& B3,	DRURY							Shee	et 12	of 28
Job Nu	mber	10	0557				Vane H	Head: 750	Logge	d By: \B	Process GB		Date:)1.17
			mE	0	und R.L.		1/	1						
Borehole Location:	mN Description:	l	Refer to site plan				Legend	Depth (m)	nding r Lev	ane ir(kPa residua	oil itivity	Lab	Sample : oratory	and / Other
				DN			Leg	Dep	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity		Test Detail	
TOPSOIL								-						
-						1								
_ clayey SIL _ with minor	l , dark brown limonite silt i	n streak nclusioi	ed orange/ brow ns, with topsoil le	n. Ver echiną	y stiff, dry, low p g to 0.5m [NATL	JRAL]		- 0.5		181+				
-								_		1011				
_ silty CLAY,	mottled oran	nge and imonite	l grey. Very stiff, silt inclusions an	moist, d stair	medium plastic	city,	<pre><pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre></pre></pre>	-						
	ecoming orar			a otan				- 		152/ 87	1.7			
- becoming	cream/ grey,	high pla	asticity					-						
-							(-x-x-x-x-x-x-x (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x-x)							
- becoming I	moderately s	ensitive)				<pre><-x-x-x-x-x-x-x <-x-x-x-x-x-x-x-x <-x-x-x-x</pre>	-1.5		105/ 53	2.0			
- - becoming	blue/ grey							_						
-							<pre><-x-x-x-x-x-x-x-x <-x-x-x-x-x-x-x-x-x <-x-x-x-x</pre>	-						
becoming in the second seco	insensitive	kad blu	e/ grey, with trace	a fina	sand		<	- 2.0		152/103	1.5			
-	orange sued	neu blu	or groy, with tract		Gana		(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	L						
							<pre></pre>							
– without fine	e sand						<-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	— 2.5 -		159/107	1.5			
-							(-x-x-x-x-x-x-) (-x-x-x-x-x-x-) (-x-x-x-x-x-x-x-) (-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x							
F							(-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x-x)	-		105170	1.0			
- EOB at 3.0)m. Target D	epth.						- 3.0		135/ 73	1.8			
F								F						9
-								- 3.5						
-								Ę						
ŀ								F						
-								-4.0						
-								F						
								F						
-								-4.5						
-								E						
F								F						
-								- 5.0						
-								E						
-								-						
-								- 5.5						
								F						
-								-6.0						
		Comm	ents:		Borehole Diameter:	Topsoil		Sand		Sandstor	ne		Plutonic	
		Ground	water not encounte		50mm	Fill		Gravel		Siltstone	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2 2 2 2 2	No Core	
LAN geotec			unable to penetrate end of borehole.		Checked:	Clay		Organic				<u>要</u>		
						Silt XX	*****	Pumice	******	Volcanic		~~~		

Client :	KARAKA & DR	URY LIM	TED			Aug	er Bo	oreho	le No.	HA2	017- 13
Project Location	n: AURANGA B1,	B2 & B3,	DRURY								of 28
Job Number:	J00557				Vane H 30		Logged	d By: L/AB	Process GB		: 5.01.17
Borehole mN	mE	Gro	ound R.L.				1				
Location: Description:	Refer to site pla				Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity	Sample Laboratory	y / Other
	SOIL DESCRIF	PTION			Le	De	Sta Wati	She	Sen	Tes Deta	
TOPSOIL											
_ slightly clayey SILT, or sensitive [NATURAL]	ange. Very stiff, dry, r	no to low	plasticity, mode	rately		F					
-						- 0.5		177/ 57	3.1		
 becoming moist 											
-											
-						-1.0		162/60	2.7		
 silty CLAY, orange. Ve becoming high plasticit 		n plasticit	y, insensitive		<pre><-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x</pre>						
 with minor manganese 		onite stai	ning			F					
 with some manganese 	oxide, with some lime	onite stair	ning		(-x-x-x-x-x-x-x (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x)	— 1.5 -		129/ 74	1.7		
-					<pre><-x-x-x-x-x-x-x-x <-x-x-x-x-x-x-x-x-x-x-</pre>						
slightly silty CLAY, ora	nge. Very stiff, moist f	to wet, hig	gh plasticity, ins	ensitive,		- 2.0		140/ 72	1.9		
with minor limonite stai at 2.1m, becoming ora		ey, with m	ajor limonite sta	ining, wit	h	2.0		140/72	1.5		
some manganese oxid at 2.3m, becoming wet	e inclusions		-		(-x-x-x-x-x-x-x (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x-x-x-x)	-					
 becoming sensitive 						- 2.5		123/ 48	2.6		
-					(-x-x-x-x-x-x-x (-x-x-x-x-x-x-x-x-x-x-x-						
					(-x-x-x-x-x-x-x (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x-x)						
_ at 3.0m, becoming inse - EOB at 3.0m. Target D						- 3.0		116/77	1.5		
-						E					
r r						F					
-						- 3.5					
-						È					
-											
-											
						F					
_						-4.5					
-						F					
-						Ę					
-						— 5.0					
_						E					
						F					
-						- 5.5					
-						F					
-											
	Comments:		Borehole Diameter:	Topsoil		Sand		Sandston	e	Plutonic	
LANDER	Groundwater not encou		50mm	Fill		Gravel	www.www	Siltstone	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	No Core	
	UTP = unable to penet	rate.	Checked:	Clay		organic	*****	Limeston		尭	

Client :		K	ARAKA & DRUR	Y LIMI	TED				Aug	er Bo	oreho	le No.		HA20	17- 14
Project	Locatior	ו: A	URANGA B1, B2	& B3,	DRURY								Sheet	14	of 28
Job Nu	mber:	J	00557				ľ	Vane H 19	lead: 00	Logged J	0455	Process GB		Date: 25.0)1.17
Borehole	mN		mE	Gro	und R.L.					g Vel	⊃a) tual			ample	and
Location:	Description:		Refer to site plan					Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity	Labo	oratory / Test	Other
		SO	IL DESCRIPTI	ON				Le	Ď	St Wat	She	Ser		Detail	
TOPSOIL									-						
_ silty CLAY _ moderately	with some fir v sensitive [N	ne sano ATURA	d, orange. Very s \L]	tiff, mc	ist, medium pla	asticity,		x-x-x-x-x-x- x-x-x-x-x-x-x-x- x-x-x-x-x							
- becoming o	orange streal	ked ligh	nt grey				****		0.5		153/ 40	3.8			
- - ━ becoming v - fine sand -	wet, high pla	sticity, i	nsensitive, with s	some li	monite staining	ı, withou	t		- - - - -		132/ 79	1.7			
	SILT with so limonite stair		y, light grey. Stiff	, wet, l	ow plasticity, se	ensitive,			- 		58/ 13	4.5			
fine SAND	, light orange	e/ grey.	Loose, saturated	d, no pl	asticity, sensitiv	ve			- - -		126/ 22	5.7			
- becoming (- becoming (- becoming (dark grey moderately s	ensitive	9						- - - 2.5 -		123/ 43	2.9			
at 3.0m br	ecoming sense	sitive							-						
- EOB at 3.0							ŀ	*****	- 3.0		176/ 39	4.5			
-									F						
- ·									- 3.5						
-									F						
-									F						
-									-4.0						
E .									þ						
L									-						
Ē									-4.5 -						
-									-						
_									-						
t i									F						
F									F						
_									-5.5						
F									F						
-									F						
-	1	-			Porchala Di	<u>م</u>		1114	-6.0	 ;;;;;;;;;			 	lutor!	*******
		Comm Ground	ents: lwater encounterec	1.8m.	Borehole Diameter: 50mm	Topsoil Fill		}}}	Sand Gravel		Sandstor Siltstone	77777		lutonic o Core	*******
LAN		UTP =	unable to penetrate		Checked:	Clay		1110	Drganic	*******	Limestor				
geotec	hnical	FOB =	end of borehole.		TT	Silt		×××× F	umice		Volcanic				

Client :	KARAKA & DRU					Auge	er Bo	orehol			017- 15
Project Location	1 : AURANGA B1,	B2 & B3,	DRURY		Vane H	ood.	Logge	d By: I	Process		of 28
Job Number:	J00557				190		J		GB		5.01.17
Borehole mN Location: Description:	mE Refer to site pla		und R.L.		Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	ii itivity	Sample Laborator	
	SOIL DESCRIP				Leg	Dep	Star Wate	Va Shea _{peak /}	Soil Sensitivity	Te Deta	st
 TOPSOIL clayey SILT, mottled or sensitive [FILL] BURIED TOPSOIL clayey SILT, light grey. silty CLAY with some fimedium plasticity, inse with some limonite stai becoming high plasticit silty fine SAND, blue/ g staining clayey SILT with some becoming dark grey EOB at 3.0m. Target D 	SOIL DESCRIP	/ery stiff, plasticity led light g onite stair d, with mi	NATURAL] irey. Very stiff, ning nor limonite sta	moist, aining			Sta Sta Wate	 > 33 + 28 - 20 - 20 - 20 - 20 - 20 - 20 - 20 -	6.9		
- - - - - - -						- - - - - - - - - - - - - - - - - - -					
-			Porobolo Diamatan		, <i>11111</i> -	-6.0				Plutonic	++++++++ ++++++++
	Comments: Groundwater encounte	red 2.2m.	Borehole Diameter: 50mm	Topsoil Fill		and Gravel		Sandstor Siltstone	10 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Plutonic Plutonic	<u>tttttt</u>
LANDER	UTP = unable to penet	rate.	Checked:	Clay		rganic	*******	Limeston	1e		
geotechnical	EOB = end of borehole		TT	Silt		umice		Volcanic			

Client :		KARAKA & DRURY LIM	IITED			Aug	er Bo	oreho	le No.		HA201	7- 16
Project	Locatior	1 : AURANGA B1, B2 & B3	, DRURY				_			Sheet		of 28
Job Nu	mber:	J00557			Vane H 19	Head: 00	Logged J	d By: L	Process TT	or :	Date: <mark>25.0</mark>	1.17
Borehole	mN	mE Gr	ound R.L.				- T			S	ample a	and
Location:	Description:	Refer to site plan			Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity	Labo	ratory / Test	Other
		SOIL DESCRIPTION			Ľ	ă	Na S	Sh	Sel		Details	3
- TOPSOIL												
-												
_ clayey SIL	T, dark orang	ge. Hard, dry to moist, low pla	sticity [NATURA	.L]		- 0.5		UTP				
-						F						
-						F						
- becoming	wet, medium	n plasticity				— 1.0 -		UTP				
-	12	.e. •										
 becoming becoming 		tely sensitive				-		06/27	3.6			
	san, mouera					1.5		96/27	3.0			
-												
- — becoming [•]	very stiff					- - 2.0		107/40	2.7			
-						L L						
È						-						
- becoming	hard, with so	ome limonite staining				- 2.5		UTP				
-												
-								UTP				
- EOB at 3.0)m. Target D	Depth.				-3.0						
F						E						
-						- 3.5						
F						F						
-						F						
-						-4.0						
-						Ę						
-						- - 4.5						
-						+ 4.5						
-						L						
-						-5.0						
-						F						
						F						
-						— 5.5 -						
E .						F						
Ŀ						- 6.0						
		Comments:	Borehole Diameter:	Topsoil		Sand		Sandsto		Plu	utonic	******
		Groundwater not encountered. UTP = unable to penetrate.	50mm	Fill		Gravel		Siltstone	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		Core	
LAN geotec		EOB = end of borehole.	Checked: JL	Clay Silt		Organic Pumice				~~~		
			00			unice		Volcanio		~~~		

Client :		K	ARAKA & DRURY	/ LIMI	TED				Aug	er Bo	oreho	le No.		HA20	17- 17
Project	Locatior	1 : A	URANGA B1, B2	& B3,	DRURY								Shee	t 17 d	of 28
Job Nu	mber:	J	00557				Va	ane H 17		Logge C	d By: DR	Process TT	or :	Date: 07.0	2.17
Borehole Location:	mN		mE	Gro	und R.L.			pu	(m) (ding Level	ле (kPa) sidual	l ivity	S	ample a	and
	Description:		Refer to site plan)N				Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity	Lab	Test Details	
- TOPSOIL]]]]]							
-									-						
_ SILT, oran _ [NATURAI	ge/brown. Ve _]	ery stiff	, dry, no plasticity,	with	trace limonite s	taining	<pre></pre>		- 		181+				
- - with some -	limonite stair	ning, w	ith trace carbonac	eous	inclusions		*****		-						
slightly cla	yey SILT, bro	own. Ve	ery stiff, moist, low	/ plast	icity, with some	•			- 		<mark>181</mark> +				
		15							E						
 clayey SIL insensitive 	T, light grey i , with some l	mottled imonite	brown. Very stiff, staining	mois	t, medium plast	icity,			-		152/87	1.7			
- at 1.4m, w	ith major car	bonace	ous inclusions						-		132/07	1.7			
-	CLAY light	brown	grey mottled brow		a stiff wat may	dium									
			e, with minor limor						- 2.0		143/73	2.0			
-									Ē						
- becoming	insensitive								- 2.5		103/71	1.5			
[-						
CLAY, ora insensitive	nge mottled , with some l	light br limonite	own/grey. Very sti e staining, with trac	ff, we ce bla	t, high plasticity ick staining	,					101/87	1.2			
- EOB at 3.0	0m. Target D	epth.													
-									F						
-									- 3.5						
-									F						
-									-4.0			8			
Ē									E						
E									-						
-									-4.5						
-									-						
-									- - -						
-									-						
-									- 5.5						
F									F						
F									E						
-		Comm	ients:		Borehole Diameter:	Topsoil)) s	-6.0		Sandsto	ne	P	lutonic	
	DED	Ground	dwater not encounte unable to penetrate		50mm	Fill			Gravel	******	Siltstone			lo Core	
LAN geotec	DER hnical		end of borehole.	-	Checked:	Clay Silt		XX	Organic Pumice	******	Limestor	~~~~~	盘		

Client : KARAKA & DRU	RY LIMI	TED			Aug	er Bo	oreho	le No.	, H	A2017- 18
Project Location : AURANGA B1, B	32 & B3,	DRURY						:	Sheet	18 of 28
Job Number: J00557				Vane H		Logge C	d By: DR	Process TT	or: D	ate: 07.02.17
Borehole mN mE	Gro	und R.L.		σ	(m)	ing evel	e kPa) sidual	vity		nple and
Location: Description: Refer to site plan				Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity		tory / Other Test Details
TOPSOIL TOPSOIL						5	0, 4	0)	L	
 slightly clayey SILT, dark grey and orange mo low plasticity, insensitive, with some limonite s 			stiff, moist,		F					
	stanning [, icc]			-					
-					— 0.5 -		114/60	1.9		
-					F					
 becoming wet becoming stiff 							75/44	1.7		
- _ organic CLAY, black mottled dark grey. Stiff, v	wet to sa	turated high n	lasticity							
insensitive, with trace limonite staining [NATU		iturateu, mgn p	astiony,		- 1.5		73/56	1.3		
 becoming saturated 					-	_∇_				
amorphous PEAT, black. Very stiff, saturated sensitive	, high pla	asticity, modera	itely	******** ******** ********	- 2.0		125/59	2.1		
CLAY, brown mottled grey. Very stiff, saturate	ed, high	plasticity, with t	race		-					
clayey SILT, orange mottled light brown. Very		et, medium plas	ticity,		-					
 moderately sensitive, with some limonite stair 	ning				- 2.5		149/60	2.5		
-					F					
					-3.0		152/63	2.4		
EOB at 3.0m. Target Depth.					F					
-					F					
-					- 3.5					
-					-					
-										
-					F					
-					F					
-					- 4.5					
F					F					
-										
-					Ę					
-					F					
-					- 5.5					
-					F					
<u>L</u>					-					
Comments:		Borehole Diameter:	Topsoil		Sand		Sandstor	ne	Pluto	onic
Groundwater encounter UTP = unable to penetra		50mm Checked:	Fill	11110	Gravel		Siltstone		No C	ore
geotechnical EOB = end of borehole.			Clay Silt	××××××	Organic Pumice	******	Limestor			

					Γ	A				110.00	47 40
Client :						Aug	er Bo	oreno	le No		017- 19 of 28
Froject	Location	1 : AURANGA B1, B2 & B3,	DRUKT		Vane ⊦	lead:	Logged	d By:	Process		01 20
Job Nu	mber:	J00557		N.	19		G	B	TT		02.17
Borehole	mN	mE Gro	und R.L.		J D	(E	ng evel	e (Pa) idual	ity	Sample	and
Location:	Description:	Refer to site plan			Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity	Laboratory Tes	/ Other
		SOIL DESCRIPTION					SW	Sh	Se	Detai	ls
- TOPSOIL						-					
- cilty CLAX	orange/broy	wn mottled brown/grey. Very st	iff dry medium	nlasticity		F					
sensitive [N	NATURAL]		in, ary, modian	plaotiony,		- 0.5		120/30	4.0		
_ at 0.5m, be _	ecoming moi	st, high plasticity									
-					<pre><-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x</pre>	-					
– – becoming I	mottled oran	ge/brown and grey, moderately	/ sensitive			-1.0		105/49	2.1		
- becomina	slightly silty (CLAY, grey mottled brown			(-x-x-x-x-x-x-x- (-x-x-x-x-x-x-x-x- (-x-x-x-x						
	· · · · · · · · · · · · · · · · ·				<pre><</pre>	-					
- becoming i	insensitive, v	with minor decayed wood inclus	sions			-1.5		116/73	1.6		
F						F					
È					<	F					
- without de	cayed wood	inclusions				- 2.0		11 <mark>1/86</mark>	1.3		
L CLAY, ora	nge/brown m	nottled grey. Very stiff, moist, h	igh plasticity, in	sensitive	<u></u>						
-			5 1			-					
-						- 2.5		125/101	1 1.2		
-						<u>}-</u>					
-						-		119/82	1.5		
- EOB at 3.0	0m. Target D	epth.				- 3.0		119/02	1.5		
-						F					
-						- 3.5					
-						L					
-						Ł					
-						-4.0					
F						F					
E .						F					
-						-4.5					
-						F					
F						F					
-						- 5.0					
Ł						F					
F						F					
F						- 5.5					
È .						F					
E											
F		Comments:	Borehole Diameter:	Topsoil		Sand	1	Sandsto	ne	Plutonic	• • • • • • • • • • • • • • • • • • •
		Groundwater not encountered.	50mm	Fill		Gravel		Siltstone	77777	No Core	
LAN geotec	DER hnical	UTP = unable to penetrate. EOB = end of borehole.	Checked:	Clay	XXXXX	Organic	**************************************	Limestor	T.L.L.L.	<u></u>	
gooroo			JL	Silt	F	Pumice		Volcanic		~~~	

Client :		KARAKA & DRURY LIMI	ΓED			Auge	er Bo	orehol	le No.		HA201	7- 20
Project	Location :	AURANGA B1, B2 & B3,	DRURY							Shee		f 28
Job Nu	mber:	J00557			Vane H 19	_	Logge	d By: BB	Process TT	or :	Date: 07.02	2.17
Borehole	mN	mE Grou	und R.L.			(m	evel	Pa) dual	ity	ę	Sample a	nd
Location:	Description:	Refer to site plan			Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity	Lab	oratory / Test	Other
		SOIL DESCRIPTION					S S	Sh	Se		Details	
_ TOPSOIL												
silty CLAY, sensitive [N	brown/orange	mottled brown. Very stiff, dr	y, medium plast	icity,				425/22	6.1			
-	_	nottled light grey, moist				- 0.5 - -		135/22	0.1			
- - - becoming h	nigh plasticity, n	noderately sensitive			<pre>c-x-x-x-x-x-x- c-x-x-x-x-x-x-x- c-x-x-x-x</pre>	- - 		120/44	2.7			
-					(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	-						
- — becoming s	slightly silty CLA	AY, insensitive, with trace lin	nonite staining					125/96	1.3			
- - becoming l	light grey/brown	I				-						
- -					(-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x) (-x-x-x-x-x-x-x)	- 2.0		116/73	1.6			
 CLAY, grey staining 	y. Very stif, moi	st, high plasticity, insensitive	e, with trace lime	onite	<u></u>							
			п.			- 2.5		126/82	1.5			
- clayey SIL ⁻ -	T, dark grey. Ve	ery stiff, moist, medium plas	ticity, insensitive	e								
FOB at 3.0)m. Target Dept	th				-3.0		178/107	1.7 ¹			
-	m. raiget bep					E						
E						- 3.5						
Ē												
E						È						
-						-4.0						
E						F						
F						-						
F						- -						
F						E						
-						-5.0						
F						F						
						F						
-						-5.5						
-						Ę						
F						-						
-		omments:	Borehole Diameter:	Topsoil		-6.0 Sand		Sandsto	ne		Plutonic	*******
	G	roundwater not encountered.	50mm	Fill		Gravel		Siltstone	22222	777	No Core	
LAN geotec	VEN _	TP = unable to penetrate. OB = end of borehole.	Checked:	Clay	*****	Organic			~~~~~			
				Silt	XXXXXX	Pumice	******	Volcanie		vvv		

	Client :		KARAKA &	IT LIMI	TED			-	Trial	Pit N	lo.	Т	P1		
	Project	Locatio	n: PROPOSED DEVELOPM								Sheet		4		
	Job Nu	mber:	J00137		TAGE I, D	KUKT		\	ane He/ 946		Logge MVC	· ·	Process MV		Date: 15.02.17
phy	Pit	mN	mE	Gr	ound R.L.	14.08	9		q		(u	ater	ial g	ity	Sample and Laboratory Test Details
Stratigraphy	Location:	Description:	Refer to site	e plan					Legend		Depth (m)	Groundwater	Vane Dial Reading	Soil Sensitivity	nple ratory Detail
Stra			SOIL DESC	CRIPTION							De	Gro	R Va	Sei	Sar Labo
	TOPSOIL								())	$\overline{\mathcal{N}}$	_				
ASH DEPOSITS	silty CLAY	, orange/brow	/n. Hard, dry, mediur	n to high pla	sticity					1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	- - - - - - - - - - - - - - - - - - -		UTP		
MU	becoming	insensitive light yellow/g , pink streake	rey d light grey. Very sti	ff, moist, high	plasticity					1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	-1.5 - - - - - - - - - - - - - -		216/117	1.9	
ALLUVIUM		slightly silty C	LAY, light range mo	ttled light gre	у				× - × - × - × - × - × - × - × - × - × -		- 2.5 		142/73	1.9	
				Ec	OTP at 4.0m	n. Targe	t Depth		× - × - × - × - × - × - × - × - × - × -		- 4.0 - 4.5 - 4.5 		111/57	1.9	
			Comments: groundwater not	observed	Excavator 23T Checked:		Topsoil Fill Clay Silt		- Org	nd avel janice		Sands Siltstor Limes Volcar		_	tonic + + + Core

	Client :		KARAKA & DRI	URY CO	NSULTANT LIN	ITED			Trial	Pit I	No.	т	P2
	Project	Locatio	n: PROPOSED E>								Sheet	2 of	4
			DEVELOPMEN	T QD ST	AGE 1, DRUR	Y	Va	ne Head:	Logged	d By:	Process		Date:
L	Job Nu	mber:	J00137					946	MVC		MV	0	15.02.17
hy	Pit	mN	mE	Gro	ound R.L. 4.76	68		Ð	(u	ater	g al	Ą	Tes
Stratigraphy	Location:	Description:	Refer to site pla	in				Legend	Depth (m)	Groundwater	Vane Dial Reading	Soil Sensitivity	iple a atory etails
Stra			SOIL DESCRI	PTION				Ľ	Der	Grou	Var Re	Sen	Sample and Laboratory Test Details
H	TOPSOIL												
ALLUVIUM	becoming	moderately s	corange and light grey. V ensitive nor clay, light grey. Hard				2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	×-×-×-×-× ×-×-×-×-×-× ×-×-×-×-×-× ×-×-×-×-×-× ×-×-×-×-×-× ×-×-×-×-×-× ×-×-×-×-×-× ×-×-×-×-×-× ×-×-×-×-×-× ×-×-×-×-×-× ×-×-×-×-×-× ×-×-×-×-×-× ×-×-×-×-×-× ×-×-×-×-×-× ×-×-×-×-×-× ×-×-×-×-×-×-× ×-×-×-×-×-×-× ×-×-×-×-×-×-× ×-×-×-×-×-×-× ×-×-×-×-×-×-× ×-×-×-×-×-×-× ×-×-×-×-×-×-× ×-×-×-×-×-×-× ×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-×-×-×-×-× ×-×-×-×-×-×-×-×-×-×-×-×-×-× ×-			165/48	3.4	
	limonite si	taining	nor day, light grey. Hard	, moist, io	w plasucity, with	lace			- 1.5 				
	EOTP at 2	2.3m. Target [Depth.						-		UTP		
									- 3.0 - 3.5 - 3.5 - 4.0 - 4.5 				
Γ			Comments:		Excavator Used:	Topsoil	$\overline{\overline{D}}$	Sand	-6.0	Sands	stor	Plu	tonic + + +
			groundwater not obs	served	23T	Fill	\square	Gravel	***	Siltsto			Core
	LANI geotech	DER Inical			Checked:	Clay	 × × × ×	Organic		Limes		뷕	
	5					Silt	XXX	Pumice		Volca	inic	\sim	

	Client :		KARAKA & DRU	IRY CONSULTAN	T LIMITED		Trial	Pit I	No.	т	P3
	Project	Location	1: PROPOSED EX						Sheet		4
	Job Nu	mber:	J00137	QD STAGE 1, D	RURY	Vane Head: 946	Loggeo MVC		Process MV		Date: 15.02.17
phy	Pit	mN	mE	Ground R.L.	3.801	σ	Ê	ater	ial g	ţ	Sample and Laboratory Test Details
Stratigraphy	Location:	Description:	Refer to site plar	1		Legend	Depth (m)	Groundwater	Vane Dial Reading	Soil Sensitivity	Sample and aboratory Te Details
Stre			SOIL DESCRIF	PTION			De	Groi	Va R(Sei	Sar Labo
	TOPSOIL						4				
ALLUVIUM	becoming	moist							UTP		
	fine sandy	v SILT, orange	mottled light grey. Mediu	ım-dense, moist, no	plasticity		< < < < < < < <		UTP		
	over-cons	olidated, fibrou	us PEAT, black. Medium-	dense, moist, no pla	asticity	жжжжж. жжжжж.		Д	UTP		
			Comments:	Excavator	TOPSOI	Sand		Sands		= 1	tonic; + + +
	LANI geotect	DER	groundwater seepage 3.4m; no standing groundwater table	e at Checked:	Fill <u>Clay</u> Silt		oooo Frri	Limes	stor		Core

Γ	Client :		KARAKA & DRUI	RY CONSULTAN	T LIMITED			Trial	Pit I	No.	Т	P4
[Project	Location	PROPOSED EXT							Sheet	4 of	F 4
1	Job Nu	mber:	DEVELOPMENT J00137	QU STAGE 1, D	KUKY	Va	ane Head:	Logge MVC		Process MV		Date: 15.02.17
			mE	Cround D I	6.767		946					
Stratigraphy	Pit Location:	mN Description:	Refer to site plan	Ground R.L.	0.707		Legend	Depth (m)	Groundwater	Vane Dial Reading	Soil Sensitivity	Sample and Laboratory Test Details
Stratiç			SOIL DESCRIP				Leg	Dept	lroun	Vane Rea	Scensi	Samp borat Dei
	TOPSOIL		SOIL DESCRIP]	0			La .
ALLUVIUM			led orange. Very stiff, m	oist, high plasticity,	sensitive	1,2,1,2,1,2,1,2,1,2,1,2,1,2,1,2,1,2,1,2				171/42	4.1	
	plasticity		e clay, orange flecked da ırk bllue/grey, medium d		, moist, low to	• • • • • • • • • • • • • • • • • • •		- 1.5 - 1.5 - 2.0 - 2.0 - 2.5 		UTP		
			Comments:	EOTP at 3.0r	Used: Topso		Sand	- 3.0 - 3.5 - 3.5 - 4.0 - 4.0 - 4.5 	Sands			tonic + + +
	LAND geotech	DER	groundwater not obse	Checked:	Fill Clay Silt		Gravel Organic Pumice		Siltsto Limes Volca	stor		Core

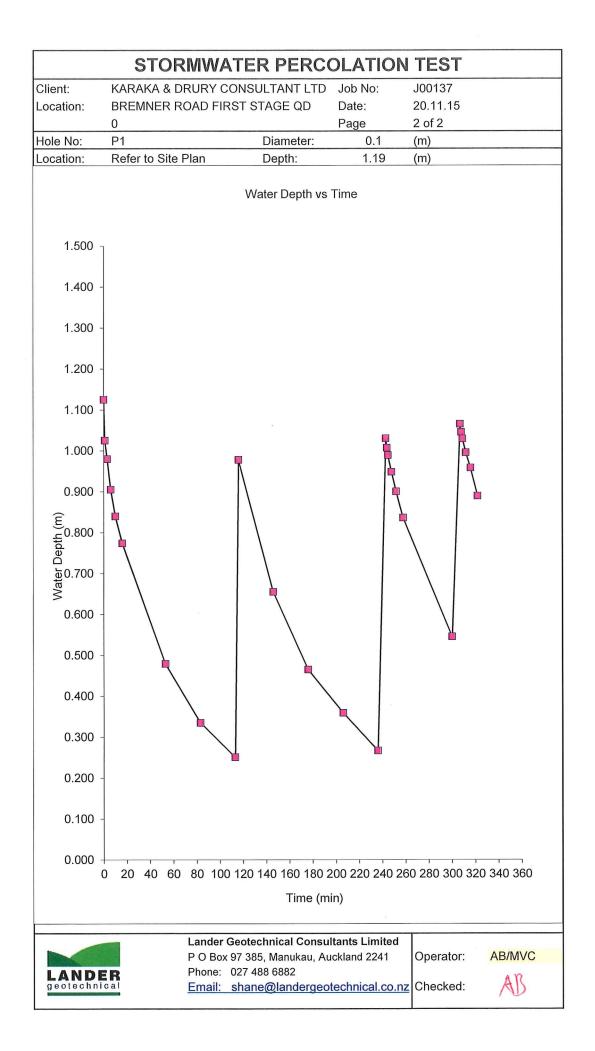
Client :		KARAK	A & DRURY CO	NSULTANT LTE)		Aug	er Bo	oreho	le No	. 2	2015 -	P1
Project	Locatio	n: DRURY DRURY	DEVELOPMEN	T, BREMNER F	ROAD,						Sheet		of <mark>4</mark>
Job Nu	mber:	J00137					Head: 46	Logge /	d By: \B	Process GB	or :	Date: 18.	11.15
Borehole Location:	mN Description:	mE Refer t	G site plan	round R.L.		Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity	S Labo		/ Other
		SOIL D	ESCRIPTION			Le	De	Sta Wate	She Peak	Sen		Test Detai	
TOPSOIL													
at 0.4m, be at 0.5m, be	ecoming ligh		stiff, moist, high /, moderately ser sitive nottled grey	-		(-x-x-x-x-x-x-	- - - - - - - - - - - - - - - - - - -		175/ 46	3.2			
- - becoming s - -	slightly silty	CLAY, with tr	ace limonite stai	ning									
 becoming s with minor 	stiff, insensit limonite silt	live inclusions					— 1.5 		95/ 49	1.9			
- 		et, moderately	v sensitive			<pre>< x - x - x - x - x - x - x - x - x - x</pre>	- 		107/ 49	2.2			
- -	m. raigot b	opun					F						
-							- 2.5						
-							F						
-							F						
-							<u>-</u> 3.0						
-													
-							- 3.5						
-							2						
-													
-							-						
-							-						
-							- 4.5						
							-						
-							- 						
-							-						
-							-						
-							- 5.5 -						
-							F						
-				-			- 6.0	00	0.0			-	
		Comments:	not encountered.	Borehole Diameter: 50mm	Topsoil		Sand		Sandston Siltstone	e 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Plu	itonic Core	
LAND	DER	UTP = unable	to penetrate.	Checked:	Fill Clay		Gravel Organic		Limeston	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		JUIE	
geotech	nnical	EOB = end of	borehole.	TT		<u> </u>	Pumice		Volcanic				

Project Location : DPUIPY DEVELOPMENT, BREMMER ROAD, Job Number: 300137 Comparison 2 of 4 Total : Coged B1: Total : Coged B1: Total : Coged B2: Processor: Coged B2: Proce	Client :		KARAKA & DRURY				Aug	or Br	oreho		2015	- P2		
DRURY Unit feature December: DORURY Worn feature To conserve To Boreholde December: OPCOSECUT TO TO TO SOIL Processor To 18.11.0 Processor To 18.11.0 Boreholde Location: mt mt mt Granut R.L. To 50 L. DESCRIPTION To 50 L.		Project Location : DRURY DEVELOPMENT, BREMNER ROAD												
Bordholds mk mE Ground R.L. Description: Refer to site plan ground R.L. ground R.L			DRURY		,	Vane	Head:	Logge	d By:					
TOPSOIL all QLAY, yellow brown. Very stiff, moist, medium plasticity, with trace infranchie inclusions -0.5 221/84 2.6 all O.M., becoming pare, motically sensitive at 0.5m, becoming hard, mediately sensitive -0.5 221/84 2.6 becoming orange streaked grey, with some fine sand -1.0 172/87 2.0 EOB at 1.0m. Target Depth. -1.0 -2.5 -1.0 -2.0 -1.5 -2.5 -3.0 -3.0 -4.0 -4.0 -4.0 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5	Job Nu	mber:	J00137			3	307	Т	т	GB	18	.11.15		
TOPSOIL all QLAY, yellow brown. Very stiff, moist, medium plasticity, with trace infranchie inclusions -0.5 221/84 2.6 all O.M., becoming pare, motically sensitive at 0.5m, becoming hard, mediately sensitive -0.5 221/84 2.6 becoming orange streaked grey, with some fine sand -1.0 172/87 2.0 EOB at 1.0m. Target Depth. -1.0 -2.5 -1.0 -2.0 -1.5 -2.5 -3.0 -3.0 -4.0 -4.0 -4.0 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5		mN	mE	Ground R.L.			Ê	ng evel	Pa) dual	ity	Sample	and		
TOPSOIL all QLAY, yellow brown. Very stiff, moist, medium plasticity, with trace infranchie inclusions -0.5 221/84 2.6 all O.M., becoming pare, motically sensitive at 0.5m, becoming hard, mediately sensitive -0.5 221/84 2.6 becoming orange streaked grey, with some fine sand -1.0 172/87 2.0 EOB at 1.0m. Target Depth. -1.0 -2.5 -1.0 -2.0 -1.5 -2.5 -3.0 -3.0 -4.0 -4.0 -4.0 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5	Location:	Description	Refer to site plan				epth (andii ter Le	Vane ear(k k / resi	Soil Isitiv	Laboratory	/ Other		
silling CLAV, yellow from N. Very stiff, moist, medium plasticity, with trace immontie indusions at 0.4m, becoming gare, motified yellow frown at 10.5m, becoming faird, moderately sensitive -0.5 221/84 2.6 becoming orange streaked grey, with some fine sand -1.0 172/87 2.0 TEOB at 1.0m. Target Depth. -1.0 172/87 2.0 -1.5 -2.5 -3.0 -2.5 -3.0 -2.5 -3.0 -3.0 -3.0 -3.0 -3.0 -3.0 -3.5 -4.5 -5.5 -5.5 -5.5 -5.0 -5.0 -5.0 -5.0 -5.0 -5.0 -5.0 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.0 -5.0 -5.0 -5.0 -5.0 -5.0 -5.0 -5.0 -5.0 -5.5 <td></td> <td></td> <td>SOIL DESCRIPTI</td> <td>N</td> <td></td> <td>Ľ</td> <td>Ď</td> <td>St Wa</td> <td>She</td> <td>Sei</td> <td>Deta</td> <td>ils</td>			SOIL DESCRIPTI	N		Ľ	Ď	St Wa	She	Sei	Deta	ils		
silling CLAV, yellow from N. Very stiff, moist, medium plasticity, with trace immontie indusions at 0.4m, becoming gare, motified yellow frown at 10.5m, becoming faird, moderately sensitive -0.5 221/84 2.6 becoming orange streaked grey, with some fine sand -1.0 172/87 2.0 TEOB at 1.0m. Target Depth. -1.0 172/87 2.0 -1.5 -2.5 -3.0 -2.5 -3.0 -2.5 -3.0 -3.0 -3.0 -3.0 -3.0 -3.0 -3.5 -4.5 -5.5 -5.5 -5.5 -5.0 -5.0 -5.0 -5.0 -5.0 -5.0 -5.0 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.0 -5.0 -5.0 -5.0 -5.0 -5.0 -5.0 -5.0 -5.0 -5.5 <td>- TOPSOIL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td><u></u></td> <td></td> <td></td> <td></td> <td></td> <td></td>	- TOPSOIL						<u></u>							
at 0.5m, Becoming and motiled yellow thrown -0.5 221/84 2.6 becoming orange streaked grey, with some fine sand -1.0 172/87 2.0 EOB at 1.0m. Target Depth. -1.5 -1.6 -2.0 -1.6 -2.0	silty CLAY	, yellow/ bro	wn. Very stiff, moist, med	lium plasticity, with t	race	(-x-x-x-x-x-) (-x-x-x-x-x-) (-x-x-x-x-x-)								
Comments: Comments: Some fine sand EOB at 1.0m. Target Depth. -1.0 172/87 2.0 -1.5 -1.5 -1.5 -1.5 -1.5 -2.0 -2.5 -2.5 -2.5 -2.5 -3.0 -3.5 -3.5 -3.5 -3.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -	at 0.4m, be	ecoming gre	y mottled yellow/ brown			<pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>	x-x- x-x- x-x-							
EOB at 1.0m. Target Depth. 10 172/87 2.0 -1.5 -1.5 -1.5 -1.5 -1.5 -2.0 -2.0 -2.0 -2.0 -2.0 -2.5 -3.0 -3.0 -3.0 -3.0 -3.0 -3.0 -3.0 -3.0 -3.0 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5						<-x-x-x-x-x <-x-x-x-x-x-x <-x-x-x-x-x-x-	— 0.5 —		221/84	2.6				
EOB at 1.0m. Target Depth.	 becoming 	orange strea	aked grey, with some fine	sand		<-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	x-x- x-x- x-x-							
EOB at 1.0m. Target Depth.	-					<-x-x-x-x-x-x <-x-x-x-x-x-x-x <-x-x-x-x-	x-x- x-x- x-x- x-x-		170/07	2.0				
	EOB at 1.0)m. Target D	Depth.				- 1.0		1/2/0/	2.0				
	F						F							
	Ŀ						-							
-2.5 -3.0 -3.5	F						- 1.5							
-2.5 -3.0 -3.5	F						F							
-2.5 -3.0 -3.5	-						- 20							
-3.0 -3.5 -3.5 -3.5 -4.5 -4.5 -5.0 -5.0 -5.5 -5.5 -5.5 -5.5 -5.0 -5.0 -5.5 -5.0 -5.5 -5.0 -5.0 <td>-</td> <td></td>	-													
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Groundwater not encountered. 50mm Fill Gravel With the second	-					///////		00	3		::	<u>}+++++++</u>		
LANDER UTP = unable to penetrate. Checked: Clay Organic Checked: Clay Checked: Checked: Clay Checked:									<u>.</u>	e	77			
geotechnical EOB = end of borehole.	LAN	DER	UTP = unable to penetrate						0 	2 2 2 2 2 2 2 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
			EOB = end of borehole.	TT		*****	2							

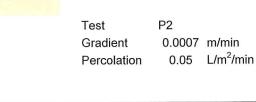
Client :	KARAKA & DRURY CON	SULTANT LTD			Aug	er Bo	oreho	le No.	2015 -	- P3
Project Location	: DRURY DEVELOPMENT DRURY	, BREMNER RO	DAD,							of 4
Job Number:	J00137			Vane ⊢ 30		Logge T	d By: T	Process GB		11.15
Borehole mN	mE Gro	ound R.L.				lg Vel	⊃a) Iual		Sample	and
Location: Description:	Refer to site plan			Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	Soil Sensitivity	Laboratory	/ Other
	SOIL DESCRIPTION			Ľ	Ď	St Wa	She	Ser	Detai	ils
TOPSOIL					-					
silty CLAY. orange strea moderately sensitive	ked grey. Very stiff, moist, mo	edium plasticity	1	(-					
				<pre>< z = z = z = z = z = z = z = z = z = z</pre>	- 		172/77	2.2		
 becoming slightly silty C 	LAY, high plasticity			<pre>c = z = z = z = z = z = z = z = z = z =</pre>	-					
-										
 becoming insensitive 				(-1.0		111/64	1.7		
- - with some limonite silt in	duciono			++++++++++++++++++++++++++++++++++++++	_					
r with some limonite silt in	ICIUSIONS			(-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x	_					
-				(-x-x-x-x-x-x-x- (-x-x-x-x-x-x-x- (-x-x-x-x	− 1.5 -		154/117	1.3		
- CLAX with minor fine or	and, grey. Very stiff, moist, hig	ah plaatioity ina	ongitivo	(-x-x-x-x-x-x-x- (-x-x-x-x-x-x-x- (-x-x-x-x	-					
with trace limonite silt inc	clusions	gii plasticity, ilis	ensitive,		- 2.0		128/77	1.7		
EOB at 2.0m. Target De	epth.				-					
-					-					
					- 2.5					
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	Comments: Groundwater not encountered.	Borehole Diameter: 50mm	Topsoil Fill		and ravel		Sandston Siltstone	e •••••• 2222222 222222 722222	Plutonic No Core	
LANDER	JTP = unable to penetrate. EOB = end of borehole.	Checked:	Clay	<u> /////</u>	rganic	******	Limeston	e		
geotechnical		T	Silt	XXXXXX XXXXXX XXXXXX	umice		Volcanic		~~	

N	Client : KARAKA & DRURY CONSULTANT LTD Project Location : DRURY DEVELOPMENT, BREMNER ROAD,						er Bo	oreho			P4 of 4
Job Nu		DRURY J00137			Vane H 19		Logge N	d By: ∕IVC	Process GB		11.15
Borehole Location:	mN Description:	mE Refer to site plan	Ground R.L.		pue	Depth (m)	Standing Water Level	Vane Shear(kPa) _{peak / residual}	oil tivity	Sample Laboratory	and / Other
		SOIL DESCRIPTIO	N		Legend	Dept	Star Watei	Va Shea _{peak / I}	Soil Sensitivity	Tes	t 🚺
- TOPSOIL											
– silty CLAY - becoming - - -	′ with minor fi orange/ brov	ine sand, orange/ brown. H vn streaked brown/ grey	lard, dry, high plas	ticity		- - - - - - -		208+ UTP			
- EOB at 1. - - -	0m. Target D	epth.				- - - - - - -		UTP			
- - - -						- - - - 2.0					
- - - -						- - - 2.5					
-						- - 					
- - -						- - - 3.5 -					
- - - -						- - 					
- - - -						- - - 4.5 -					
- - - -						- - 					
- - - - -						- - 5.5 - - -					
		Comments:	Borehole Diameter:	Topsoil	s ///////	-6.0		Sandston	 e 	Plutonic	
LAN geotec	DER	Groundwater not encountere UTP = unable to penetrate. EOB = end of borehole.		Fill	////// c	Gravel	**************************************	Siltstone	e	No Core	
georee			17.	Silt	××××××××× P	umice		Volcanic		~~~	

Client:	KARAKA & DRUR	Y CONSULTANT	LTD		Job No:	J0013
Location:	BREMNER ROAD	FIRST STAGE Q	D		Date:	20.11.
Lista Nisa	D4			Diamete	Page 0.1	1 of 2 (m)
Hole No: Location:	P1 Refer to Site Plan			Depth:	1.19	(m)
	onditions preceding t	ost.	Dry	Deptil.	1.10	
	presoaking:		Presoaked o	n 18 11 1	5	
Details of p	nesoaking.		T TCSCARCU U	10.11.10		
Time	Time	Depth	Water		Cum	
of Test	Interval	Reading	Depth		Time	
(hr.min)	(min)	(m)	(m)		(min)	
09:29	-	0.065	1.125		0	
09:30	1	0.165	1.025		1	
09:32	2	0.210	0.980		3	
09:35	3	0.285	0.905		6	
09:39	4	0.350	0.840		10	
09:45	6	0.416	0.774		16	
10:22	37	0.711	0.479		53	
10:52	30	0.855	0.335		83	
11:22	30	0.939	0.251		113	
11:25	3	0.212	0.978		116	
11:55	30	0.535	0.655		146 176	
12:25	30	0.725	0.465 0.359		206	
12:55	30 30	0.831 0.923	0.359		206	
13:25 13:32	30 7	0.923	1.030		230	
13:32	, 1	0.183	1.007		243	
13:34	1	0.201	0.989		245	
13:37	3	0.242	0.948		248	
13:41	4	0.290	0.900		252	
13:47	6	0.354	0.836		258	
14:29	42	0.645	0.545		300	
14:36	7	0.125	1.065		307	
14:37	1	0.145	1.045		308	
14:38	1	0.161	1.029		309	
<mark>14:41</mark>	3	0.195	0.995		312	
14:45	4	0.232	0.958		316	
<mark>14:5</mark> 1	6	0.301	0.889		322	
			Test	P1		
			Gradient		m/min	
			Percolation	0.24	L/m ² /min	
		Lander Geotechni P O Box 97 385. M	cal Consultants Li anukau, Auckland 2		Operator:	AB/M
LAND	EB	Phone: 027 488 6			Checked:	12



STORMWATER PERCOLATION TEST											
Client:	KARAKA & DRUR	Y CONSULTANT	LTD		Job No:	J00137					
Location:	BREMNER ROAD	FIRST STAGE Q	D		Date:	20.11.15					
					Page	1 of 2					
Hole No:	P2			Diamete	0.1	(m)					
Location:	Refer to Site Plan			Depth:	0.75	(m)					
Weather co	onditions preceding	test:	Dry								
Details of presoaking: Presoaked on 18.11.15											
Time	Time	Depth	Water		Cum						
of Test	Interval	Reading	Depth		Time						
(hr.min)	(min)	(m)	(m)		(min)						
10:02	-	0.020	0.730		0						
10:03	1	0.045	0.705		1						
10:04	1	0.075	0.675		2						
10:07	3	0.100	0.650		5						
10:11	4	0.123	0.627		9						
10:15	4	0.145	0.605		13						
10:45	30	0.234	0.516		. 43						
<mark>11:15</mark>	30	0.279	0.471		73						
11:45	30	0.314	0.436		103						
12:15	30	0.346	0.404		133						
12:45	30	0.373	0.377		163						
13:15	30	0.397	0.353		193						
13:51	36	0.421	0.329		229						



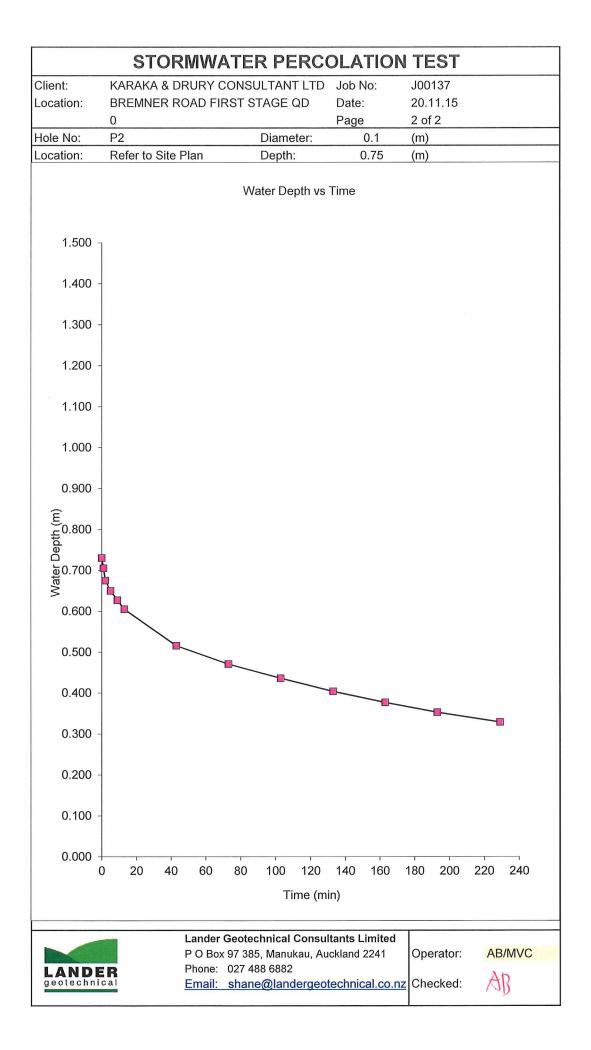


Lander Geotechnical Consultants Limited P O Box 97 385, Manukau, Auckland 2241 Phone: 027 488 6882 Email: shane@landergeotechnical.co.nz

Operator: AB/MVC

Checked:

LGCL_percolation_210715



STORMWATER PERCOLATION TEST											
Client:	KARAKA & DRUR	Y CONSULTANT	LTD	J	ob No:	J00137					
Location:	BREMNER ROAD	FIRST STAGE Q	D	D)ate:	20.11.15					
				F	'age	1 of 2					
Hole No:	P3			Diamete	0.1	(m)					
Location:	Refer to Site Plan			Depth:	1.05	(m)					
Weather co	onditions preceding	test:	Dry								
Details of p	resoaking:		Presoaked o	<mark>n</mark> 18.11.15							
Time	Time	Depth	Water		Cum						
of Test	Interval	Reading	Depth		Time						
(hr.min)	(min)	(m)	(m)		(min)						
10:24	-	0.025	1.025		0						
10:25	1	0.050	1.000		1						
10:26	1	0.085	0.965		2						
10:29	3	0.120	0.930		5						
10:32	3	0.160	0.890		8						
10:36	4	0.195	0.855		12						
10:39	3	0.225	0.825		15						
11:02	23	0.345	0.705		38						
11:08	6	0.360	0.690		44						
11:5 <mark>4</mark>	46	0.475	0.575		90						
12:24	30	0.525	0.525		120						
12:54	30	0.575	0.475		150						
13:24	30	0.600	0.450		180						
13:54	30	0.630	0.420		210						
14:23	29	0.650	0.400		239						

TestP3Gradient0.0007Percolation0.04

0.0007 m/min 0.04 L/m²/min

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Checked:

LGCL_percolation_210715

LANDER geotechnical

