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Geotechnical Engineering Ltd T/A Soil & Rock Consultants

12 August 2016

Our Ref. 16425

Bluebarn Consulting Ltd PO Box 21-525 Henderson Auckland 0650

Attention: Michael Gordon

Dear Sir,

PRELIMINARY GEOTECHNICAL APPRAISAL 3094 – 3096 GREAT NORTH ROAD, NEW LYNN

1.0 Introduction

As requested, we have undertaken a geotechnical desktop study and geotechnical assessment at the above site to assist with the due diligence process and assessment of development options. At this stage no detailed plans of the property redevelopment were available.

The scope of this assessment, as detailed in our fee estimate dated 26 July 2016, is as follows:

- 1. Detailed walkover inspection
- 2. Review of geological maps
- 3. Drilling of three hand augerholes (5.0m max depth)
- 4. Review of previous boreholes and augerholes carried out within the site by Soil & Rock Consultants.
- 5. Review of existing geotechnical reports for nearby sites
- 6. Review of historical aerial photographs
- 7. Prepare a Preliminary Geotechnical Assessment report suitable for use for due diligence and assessment of development options.

Geotechnical / Environmental / Stormwater / Hydrogeology

2.0 Walkover Inspection - Site Description

The Site is located to the south of Great North Road and west of the Clark Street extension and is presently occupied by two commercial (warehouse office and retail) buildings. The property has access directly off Clark Street (extension). The public transport railway line runs adjacent to the southern site boundary and Rewarewa stream flows from south to north along the full extent of the western site boundary. The stream is marked by steep banks thickly vegetated with native plants.

The ground surface ascends from Great North Road gently to the south and has been modified by previous earthworks to form essentially level platforms for the earlier developments. The buildings are surrounded by extensive areas of car parking.

3.0 Geological Maps

According to the Auckland Geological Map, GNS Map, Scale 1:250,000 dated 2013 the site is underlain by Puketoka Formation of the Tauranga Group of Pliocene to Pleistocene age.

The Puketoka Formation soils comprised clays, silts and sands with highly variable lesser fractions of each, frequently saturated at depth. Black, organic clay and peat may also be present. At some locations, surficial volcanic ash deposits, typically less than 1m in thickness, may overlie the deposits.

Puketoka Formation deposits are typically variable in strength ranging from soft to very stiff and are over consolidated or normally consolidated. Saturated sands and fibrous Peat deposits are prone to consolidation settlement under surcharge loads.

During the field investigation soils of the Waitemata group were encountered directly underlying the Puketoka Formation soils.

The soils of the Waitemata Group are Miocene in age and generally regarded as the 'basement' soils around the Auckland area and generally are found from ground surface or underlying volcanic or alluvial deposits.

The Waitemata Group soils are favourable with respect to foundation design and earth working considerations however consideration must be given to the shrink/swell potential of the material, which varies from site-to-site. Shrink/swell effects are seasonal and can result in significant damage to structures however are a normal engineering consideration within these soils.





Figure 1 - Adapted from GNS Science - New Zealand Geology Web Map

4.0 Current Investigation

The on-site component of our current scope comprised the drilling of three hand augerholes (AH101 – AH103).

The locations of all field tests were measured in by tape from existing site features and inferred boundaries without survey control and are therefore approximate only. Test locations are shown on the attached Site Plan, Drawing No. 16425/1.

Measurements of the undrained shear strengths were undertaken in the augerholes at intervals of depth by means of a hand held shear vane. The test method was in accordance with the New Zealand Geotechnical Society Guidelines for Hand Held Shear Vane Tests, dated August 2001. The peak vane shear strengths and the remoulded vane shear strength values shown on the attached augerhole logs represent dial readings off the vane, adjusted using the BS 1377 calibration. Correction factors based on calibration tests are shown on the attached logs.



A visual-tactile field classification of the subsoils encountered during drilling was carried out in accordance with "Guidelines for the Field Classification and Description of Soil and Rock for Engineering Purposes", issued by the New Zealand Geotechnical Society Inc. (2005).

The results of the three hand augerholes (2016) are summarised in the Section 8 below, along with result from previous investigation work.

5.0 Previous Geotechnical Reports by Soil & Rock Consultants

Soil & Rock Consultants have carried out a number of geotechnical investigations in the area. The two closest and most relevant are as follows:

- Soil and Rock Consultants, 'Geotechnical Investigation for Rewarewa Walkway Between Great North Road and Hugh Brown Reserve, New Lynn, Job No. 06075, dated 26 May 2006.
- Soil & Rock Consultants, 'Bank Stability and Risk Assessment at Rewarewa Creek South of Great North Road, Rewarewa Creek, New Lynn, Job No 09233, dated June 2010.

The above reports were carried out for Auckland Council with regard to the bank stability of the Rewarewa Creek. The more relevant of the two reports is that dated June 2010, as a significant number of our augerholes and boreholes were located within the subject site (as shown on the attached Site Plan, Drawing No. 16425/1).

The materials encountered during these investigations are summarised in Section 8 below.

The conclusion of these reports were that many parts of the steep stream banks along the Rewarewa Creek are at risk of instability and soil creep. Within the subject site the areas considered to be at risk of instability didn't extend to the footprints of the existing buildings.



6.0 Previous Reports by Other Consultants

The Auckland Council property files were obtained for two neighbouring properties where recent construction has been carried out. These properties are as follows:

- 1. 2-6 Titirangi Road, New Lynn. Bunnings Warehouse constructed 2014-2015.
- 2. 42-50 Totara Road, New Lynn. Retail and Carpark Building constructed 2012.

The following documents were encountered which are considered of geotechnical relevance:

- Tonkin & Taylor Ltd, "Proposed Bunnings Development Corner, Great North Road & Titirangi Road, New Lynn, Preliminary Geotechnical Assessment" Ref No: 27571.001 Rev1, dated October 2010.
- (ii) Tonkin & Taylor Ltd, "Bunnings Warehouse Development, New Lynn, Detailed Design Support, Geotechnical Analysis" Ref No. 27571.3000/A, dated March 2014.
- (iii) Tonkin & Taylor Ltd, "Bunnings Warehouse, Great South Road (sic) and Titirangi Road, New Lynn, Producer Statement – Construction Review (PS4) Pile Driving. BC No. ABA/2014/354" Ref No. 27571.400, dated June 2015.
- (iv) Tonkin & Taylor Ltd, "New Warehouse, Great South Road (sic) and Titirangi Road, New Lynn, Construction Observations & Producer Statement – Construction Review (PS4) Pile Driving. BC No. ABA/2014/354" Ref No. 27571.300, dated May 2015.
- (v) Tonkin & Taylor Ltd, "New Lynn Merchant Quarter, New Lynn, Auckland, Geotechnical Investigation Report" Ref No: 27606, dated December 2010.
- (vi) Tonkin & Taylor Ltd, "New Lynn Merchant Quarter, Building A, Construction Observations & Producer Statement, BC No: ABA/2011/1411" Ref No: 27606.004, dated October 2012.

A brief summary of these documents is provided overleaf.



6.1 Bunnings Warehouse

Investigation:

- The investigation carried out by Tonkin & Taylor (T&T) comprised eight Cone Penetration Tests(CPTs), two machine boreholes and 20 percussion boreholes.
- Non-engineered fill up to 3.3m deep was encountered and included construction debris in places.
- Puketoka Formation alluvial deposits were encountered to depths between 3.0m and 7.0m.
- Weathered Waitemata Group soils were encountered below the Puketoka Formation soils and generally comprised a 1.0m to 2.0m thick layer.
- Waitemata Group rock was encountered underlying the Puketoka Formation and weathered Waitemata Group soils. This was described as weak to extremely weak sandstone and siltstone. The depth to rock was shown to be shallower in the north (closer to Great North Road), and deeper in the south (closer to the stream).
- Groundwater levels were recorded between 1.2m and 5.0m below ground level.

Geotechnical Findings and Recommendations:

- Preliminary foundation recommendations indicated that either shallow foundations (strip or pad footings) or piles would be appropriate for the support of the warehouse.
- The risk of instability was identified on the stream bank at the southern side of the Bunnings site.
- Subsoil drainage was recommended to prevent hydrostatic uplift on the pavement areas.
- The subsoil category for seismic design actions was designated as Class C Shallow soil site.

Construction

The PS4s (Producer Statement – Construction Review) prepared by T&T show the following:

- The foundations comprised mainly of driven steel UC piles (embedded in the order of 8.5m to 12.0m deep) with a smaller number of bored concrete piles.
- Some soft subgrade areas were encountered during construction. These were undercut and replaced with compacted granular fill underlain by a geotextile fabric.

6.2 New Lynn Merchant Quarter Buildings A & B (47 Totara Avenue)

- The investigation carried out by T&T comprised eight Cone Penetration Tests(CPTs), and five machine boreholes.
- Fill up to 1.1m deep was encountered.
- Puketoka Formation alluvial deposits between 13.2m and 17.8m thick were encountered below the fill.

- Weathered Waitemata Group soils were encountered below the Puketoka Formation soils and generally comprised a 0.4m to 4.4m thick layer.
- Waitemata Group rock was encountered underlying the Puketoka Formation and weathered Waitemata Group soils. This was described as weak to extremely weak sandstone and siltstone. The depth to rock was shown to range between 15.0m and 19.5m below ground level.
- Groundwater was encountered in three of the five boreholes, at depths between 1.3m and 1.7m below ground level.

Geotechnical Findings and Recommendations:

- Preliminary foundation recommendations indicated that a raft type foundation would be suitable for Building A, while piles embedded into the bedrock were required for Building B.
- The subsoil category for seismic design actions was designated as Class C Shallow soil site.

Construction

The PS4 (Producer Statement – Construction Review) prepared by T&T for Building A shows the following:

• The foundations comprised bored concrete piles embedded between 6m and 10m into Waitemata Group rock.

7.0 Historical Aerial Photographs

Historical aerial photographs were obtained from both Google Earth and Auckland Council's GIS system. The photographs examined are listed in the table below.

Table 1: Aerial Photographs

Date	Source
1940	Auckland Council GIS
1959	Auckland Council GIS
1996	Auckland Council GIS
2010	Auckland Council GIS
8 March 2016	Google Earth







Note: Positioning of aerial photographs in relation to other features (such as property boundaries) are not exact on Auckland Council's GIS website, and vary between photographs.





Photograph 5: Aerial photo taken in March 2016 indicating the recent road developments with the Clark Street widening and extension adjacent to the eastern boundary of the subject site.

Comparison of aerial photographs from 1959 through to 2016 reveals the following points considered relevant from a geotechnical perspective:

- No significant change in the alignment or shape of stream beds and gullies.
- Major earthworks at various locations to form building platforms and roads
- The land-use over the time span of the aerial photos has remained predominantly commercial.

8.0 Subsurface Conditions – Subject Site

Table 2 below summarises the subsurface conditions encountered in hand augerholes carried out within the site as part of the current scope. Table 3 summarises subsurface conditions encountered in hand augerholes and machine boreholes carried out within the site as part of previous investigations.

Conclusions and recommendations contained in this report are based on the results of our field investigation and in-situ testing within augerholes at point locations and information from geological maps. The nature and continuity of the subsurface conditions away from the test locations are inferred however actual subsurface conditions could vary from the assumed model. This is particularly so where previous manmade disturbances and placement of non-engineered fill may have occurred in the past, typically associated with landscaping and/or previous construction activities.



Test Location	Depth Drilled	Depth of Topsoil and/or Fill	Depth to Base of Alluvial Deposits	Depth to Groundwater
All dep	ا ths measured in metres	s below present ground	l level. NE = Not Encou	untered
AH 101	4.5	1.1	2.2	NE
AH 102	5.0	0.5	4.3	NE
AH 103	5.0	0.2	2.7	3.0

Table 2 – Summary of Current Field Investigation

Table 3 – Summary of 2010 Field Investigation (Job No. 09233)

Test Location	Depth Drilled	Depth of Topsoil and/or Fill	Depth to Base of Alluvial Deposits	Depth to Base of Weathered Waitemata Group Soils	Depth to Waitemata Group Rock	Depth to Groundwater				
All depths measured in metres below present ground level. NE = Not Encountered										
AH1	3.1	1.5	>3.1	NE	>3.1	NE				
AH2	2.1	0.7	>2.1	NE	>3.1	NE				
AH3	3.2	0.2	>3.2	NE	>3.2	NE				
AH4	5.0	0.4	>5.0	NE	>5.0	NE				
AH5	3.2	0.5	NE	>3.2	>3.2	NE				
AH6	2.7	0.5*	NE	>2.7	>2.7	NE				
AH7	2.1	0.4	NE	>2.1	>2.1	NE				
AH8	3.4	0.1	NE	>3.4	>3.4	2.0				
AH9	3.0	0.5*	NE	>3.0	>3.0	NE				
AH10	3.3	0.1	NE	>3.3	>3.3	3.1				
MB1	10	5.3	NE	7.0	7.0	0.2				
MB2	10	4.7	NE	7.4	7.4	5.3				

*Colluvium, not fill encountered in upper 0.5m of AH6 and AH9

• **Topsoil.** Topsoil was encountered from the ground surface at the locations of hand augerholes AH101, AH103, AH3, AH4, AH7, AH8, AH10, MB1, MB2 and MB3 to depths between 0.1m and 0.4m below present ground level (bpgl). Topsoil is unsuitable for the support of permanent structures (ie building foundations, floor slabs, retaining walls etc)



• **Non-Engineered Fill.** Non-Engineered Fill was encountered from the ground surface at the locations of hand augerholes AH101, AH102, AH1, AH2, AH3 and AH5 to depths between 0.5m and 1.5m below present ground level (bpgl).

In MB1 and MB2 non-engineered fill was encountered to depths of 5.3m and 4.7m respectively.

The non-engineered fill generally consisted of variable amounts of gravels, sands and clays intermixed with topsoil inclusions. Non-Engineered fill is unsuitable for the support of permanent structures (ie building foundations, floor slabs, retaining walls etc).

• Alluvial Deposits. Alluvial Deposits were encountered within hand augerholes AH101 to AH103 (2016) and AH1 to AH4 (2009), underlying the topsoil and/or fill. In AH101 to AH103 the alluvial deposits were encountered to the top of the Weathered Waitemata Group soils between 2.2m and 4.4m bpgl. In AH1 to AH4 the alluvial deposits were encountered to the base of the augerholes.

The alluvial soils comprised stiff to hard silts and clays. Vane shear strengths recorded within the cohesive soils ranged from approximately 60kPa to greater than 200kPa and at some test depths the vane was unable to penetrate the soil, indicated as UTP on the attached augerhole logs.

• Weathered Waitemata Group Soil. Weathered Waitemata Group soils were encountered within hand augerholes AH101 to AH103 underlying the alluvial deposits, to the termination depths of the augerholes between 4.5m and 5.0m bpgl. Weathered Waitemata Group soils were also encountered within AH5 to AH10 underlying the topsoil and/or fill, to the termination depths of the augerholes.

In MB1 and MB2 weathered Waitemata Group soils were encountered underlying the fill and/or topsoil, to the contact with Waitemata Group Rock at depths of 7.0m and 7.4m.

The weathered Waitemata Group soils typically comprised very stiff to hard silts and clays, with occasional layers of loose too medium dense sands. Vane shear strengths recorded within the cohesive soils ranged from 97kPa to greater than 190kPa. The majority of the soils encountered were non-cohesive and Scala blows per/100mm ranged from 3 to 25 indicating loose to very dense soils.



• Waitemata Group Rock. Sandstone and siltstone of the Waitemata Group were encountered in MB1 and MB2 at depths of 7.0m and 7.4m below ground level.

9.0 Geotechnical Discussion & Conclusions

9.1 Presence of Fill

Deep fill deposits (4.7m to 5.3m) were encountered in the machine boreholes at the north-western side of the existing building (between the building and the stream). Such material is not suitable for the support of multistorey buildings due to variability in both composition and engineering properties.

To accurately establish the extent of the fill, additional boreholes would be required, and could form part of a design-specific geotechnical investigation.

9.2 Land Stability

Our 2010 report identifies the potential for land instability and soil creep on and near the stream banks. We have attached a plan (Drawing No. 09233/4) which shows the area considered to be at risk of instability under high groundwater conditions.

It is recommended that during the concept design stage of any future development, additional stability analysis is undertaken in accordance with the latest Council guidelines, so assessment can be made of how the proposed development would affect, and be affected by land stability considerations.

9.3 Foundations

Shallow Foundations

It is possible that shallow foundations could be used to support future buildings. There would be significant constraints to the use of shallow foundations, which would include proximity to the stream banks (land stability) and whether the building is situated on fill. The primary factor on influencing whether shallow foundations could be used, would be the design loads of the proposed building.

The concentrated loading under columns of multi-level buildings usually exceeds both the bearing capacity and settlement performance of shallow footings. Multi-level buildings on this site will most likely be founded on bored, in-situ cast concrete piles embedded in the Waitemata Group rock.



13

Pile Foundations

It is probable that at least one of the above factors (slope stability, presence of fill, building loads) would cause pile foundations to be necessary. Given that the buildings recently constructed on nearby sites, as discussed in Section 6, are supported by pile foundations, it is likely that piles will be required on the subject site also.

Piles would likely require embedment into Waitemata Group rock, which was encountered at depths of 7.0m and 7.4m during our 2010 investigation work. The embedment would be dictated by structural design requirements.

Based on comparison of the geotechnical data from the subject site and surrounding sites, it appears that the depth to rock increases towards the east and decreases towards the west. A detailed geotechnical investigation during the design phase would allow the depth and strength characteristics of the rock across the site area to be determined.

9.4 Excavation Considerations

At the time of preparation of this report, no concept designs were available, therefore it is not known whether basement levels may be incorporated into future developments, or the extent of site earthworks.

If basement levels are proposed, it is likely that bulk excavation will encounter the groundwater table. This will have implications on both consenting (groundwater diversion) and construction (weakening of subgrade and additional temporary stability considerations).

Any excavations will require careful consideration of both temporary and permanent stability, however this is exaggerated when groundwater is present or when cuts are located in close proximity to site boundaries, existing structures or steep ground.

9.5 Further Geotechnical Work – Intrusive Investigation

A development specific investigation should be carried out once the preliminary design concept has been decided. This should include:

- 5-6 Machine Boreholes
- 2-4 Cone Penetration Tests (CPTs)
- Laboratory testing (Unconfined Compressive Strength (UCS), Plasticity Index)



- Permeability testing
- Groundwater monitoring
- Hand augerholes and Scala penetrometer testing

The site specific investigation should address the following geotechnical issues:

- Foundation capacity (shallow and deep)
- Foundation settlement characteristics
- Temporary excavation stability
- Groundwater conditions (groundwater drawdown if applicable)
- Pavement design parameters
- Excavatability of soils and rock

9.6 Environmental Assessment

If it is proposed to remove the fill material from the site, a detailed contamination assessment will most likely be required by Council. Even if all fill material Is to remain on site, a contamination assessment may be required for Resource Consent application.

10.0 Limitations

This report has been prepared for the sole benefit of our Client, Bluebarn Consulting Ltd, and their client Cambridge Clothing Company Ltd, with respect to the particular brief given to us. The data and/or opinions contained in this report may not be used in other contexts or for any other purpose without our prior review and agreement.

The recommendations given in this report are based on site data from discrete locations. Inferences about the subsoil conditions away from the test locations have been made, but cannot be guaranteed. Variations in ground conditions from those described in this report could exist across the site. A specific geotechnical investigation must be undertaken in relation to any specific development proposal on the site.



We trust this is satisfactory and if you have any queries please contact us at your convenience.

Yours faithfully, SOIL & ROCK CONSULTANTS

Prepared by: Chris Windross Engineering Geologist

Reviewed by: Damir Soric Senior Geotechnical Engineer, CPEng



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ΪΫ́		$\begin{pmatrix} \times & \times \\ \times & \times \\ \times & \times \end{pmatrix}$	minor fine sa	and, trace to mi	nor clay, sligh	tly plastic		_					
Ъ		×××									• • • • • • • • • •		
	3.0	× x x	trace clay, n	on-plastic to sli	ghtly plastic			3.0	52			147 V	
		× × ×						_					
	_	× × × × × ×						_					
QI 10	-	×、×	minor clay. b	prownish arev w	vith orange mo	ottles, slightly		-					
<u>.</u>	3.5	×××	plastic	or fine cand	0			35	43 <u>r</u>			145 V	
2.GU		× × ×		ST THE SAIL					•				
ZOT	_	× × × × × ×	minor to con	no clav, cliabtly	plastic to mov	doratoly plastic		_					
Υ' γ	-	× × ×		ne clay, slightly	plastic to mot			_					
GL	4.0	\times \times \times \times \times \times	minor fine to	medium sand,	, minor clay, d	ark grey with dark		4.0		 L		 144 V	
2010	<u></u>	× × × ×	orange mott	les, slightly plas	Stic						[
-90-L		^ × × × ×	trace limonit slightly plast	e sandstone no ic to moderatel	odules, minor f ly plastic	to some clay,		_					
а 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		× × × × ,	Clayey SILT	, dark grey, ver	y stiff, moist, r	moderately plastic	1	-					
ROL	4.5	× × ×		ED WAITEMA	TA GROUP SO	OILS)		<u>4</u> .5		90 r_	•••••	1	90 V
A G		××、	stiff, slightly	plastic to mode	rately plastic	y, dain giey, very		_					
AAT.		~	trace fine sa	ind, some clay,	moderately pl	astic		-					
TEN	-	× 、×						-					
MA	<u>5</u> .0	× ^ × ,						<u>5</u> .0	52	· · · · · · · · · · · · · · · · · · ·		I 38 ∨	
			END OF BOI	RE. 5.00 METR	RES.						0		
HA I			rarget depth										

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		Concultorito	CLIENT: Blue Barn	Consulting Ltd				Aug	er Hole	No: AH	103
	For well-g	consultants rounded solutions	PROJECT: Geotechn North Roa	ical Investigation, 3094 id, New Lynn	4-30	96 Gr	eat	She	et 1	of 1	
Dril Dril Dat Dat	I Type: Han led By: JW e Started: 1/8. e Finished: 1/8.	nd Auger /16 /16	Project No: Coordinates: Ground Elevation: Water Level:	16425 Groundwater not encount	tered		Logged By Shear Var Surface C	y: ne No - Ca onditions:	JW libration Da Slightly	ate: GEO3	54 - 24/03/2016 ass
STRATIGRAPHY	DEPTH (m) GRAPHIC LOG	Soil descript "Guideline	ion in accordance with the Society Inc 2005 s for Field Description of S Engineering Use"	NZ Geotechnical oil and Rock in	WATER LEVEL (m)	DEPTH (m)	NATURAI LIQUID LI PLASTIC 50 SHEAR S REMOUL POCKET 50	L WATER IMIT LIMIT TRENGTH DED SHE PENETRO	CONTENT	- △ × □ 50 (%) ○ v ⊙ p 50 (kPa)	LABORATORY TESTS
RMATION TOPSOIL		SILT, trace t trace rootlet Silty CLAY, plastic (PUK orange mott	o minor fine sand, dark bro inclusions (TOPSOIL/FILL grey, stiff, moist, moderatel ETOKA FORMATION) les	wn, firm, non-plastic,) y plastic to highly		 0.5 1.0 	64 59		0 V		
PUKETOKA FOR	1.5 × × × × × × × × × × × × × × × × × × ×	SILT minor to orange mott moderately j minor clay, s some clay, l slightly plast minor fine to plastic some clay, s trace fine sa intermixed, n trace clay, n	ine sand, minor to some cl les, stiff to very stiff, moist, plastic ght brownish orange and li ic to moderately plastic medium sand, minor clay, lightly plastic to moderately nd, minor clay, dark grey a noist, hard, slightly plastic on-plastic to slightly plastic	ay, light grey with slightly plastic to ght grey intermixed, stiff, wet, slightly / plastic nd dark orange			50 r		121 V		200+ UTP V
	x x x	Fine sandy 3 (WEATHER SILT, trace t non-plastic Fine to med non-plastic SILT, trace of Fine to med black mottle inclusions SILT, trace t non-plastic Fine to med non-plastic	SILT, dark grey, hard, mois ED WAITEMATA GROUP ine sand, trace clay, dark g ium sandy SILT, dark grey, clay, dark grey, hard, satura ium sandy SILT, dark grey s, hard, saturated, non-plas o minor fine sand, dark gree ium sandy SILT, dark grey, and sandy SILT, dark grey, ine sand, dark grey, hard, s	t to wet, hard SOILS) rey, hard, saturated, hard, saturated, ated, non-plastic with trace brownish stic, trace organic y, hard, saturated, hard, saturated, saturated, non-plastic							200+ UTP V
	5.0 × >	END OF BOI Target depth	RE. 5.00 METRES.			<u>5.0</u>					

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Job No: 09233 Job Name: Rewarewa Walkway Job Suburb: New Lynn	AUGER	RHOLE	LOG AH	1
Borehole location: See site plan				
Surface Elevation [m]: Datum:			-	2
Surface Conditions: Steep, grassed				-age1
Soil description in accordance with the NZ Geotechnical So "Guidelines for the FieldDescription of Soil and Rock in Engi	ciety Inc 2005 ineering use"	Graphic Log Depth (m) Sample Type	Beak Vane Shear Strength (I Remoulded Vane Shear Strength (I 0 0 0 0 0 0 0 0 0 0 0 0 0	kPa) [●] kPa) [□]
Intermixed grey, orange, brown SILT, some clay, stiff, mois	t, trace of gravel,			
rootlet inclusions [FILL]				
Dark brown, occasional fine gravel				
Intermixed dark brown, orange				•
	lightly plactic to			
Brownish orange SILI, some clay, suit to very still, moist, s moderately plastic [ALLUVIAL DEPOSITS]	slightly plastic to	++++ ++++ ++++		
moderately plastic [ALLOVIAL DEF COTTO]		+ + + + + + +		
Trees of restletingly since fine cond		‡ ‡ ‡ ‡ —2		
I race of rootlet inclusions, fine sand				
Grevish orange		╞╤╤╪╤╾ ╞┿╤╪╤╼ ╻┽╻┽		
, ,				
Brownish grey SILT, some fine sand, trace of clay, very stil	ff, moist, non to			
slightly plastic				UIP
Fine gravel		++++		
Dark grey, streaked orange clayey SILT, very stiff, moist, n	noderately plastic			
		^{∓+∓+} ± ⁺ ± ⁺ → 3		
Dark grey, some clay and fine sand				UTP
End of Augernole 3.1 metres (too stiff to auger)				
		_		
·				
		-5		
Observations: Groundwater not encountered 1 Sept 2009				
· · ·				
Date: 1 September 2009 Shear Vane No: 023			387 Great North Re	bad
Logged by: HZ Shear Vane Calib Facto	r: 1.00	Soil&Rock Cons	Ultants PO Box 21-424 Henderson, Auckla	nd 1231
Drilling Method: Hand auger Date of last calibration:	13 July 2009	CONSULTING GEOTECHNICAL	LENGINEERS 09 835 1740 Fax 0	9 835 1847 k co pz

Job No: 09233	Job Name: Rewarewa Walkway Job Suburb: New Lynn	AUGER	HOLE LC	OG AH 2
Borehole locatio	on: See site plan			
Surface Elevatio	on [m]: Datum:			
Surface Condition	ons: Steep, grassed			Page2
Soil description ir "Guidelines for th	n accordance with the NZ Geotechnical Se ne FieldDescription of Soil and Rock in Eng	ociety Inc 2005 jineering use"	Graphic Log Depth (m) Sample Type Groundwater	Peak Vane Shear Strength (kPa) Remoulded Vane Shear Strength (kPa) [□]
Intermixed dark	brown, orange SILT, some clay, stof, mois	t, moderately plastic,		
trace of fine roo	otlets [FILL]			
Medium gravel				
Brownish orang of rootlet inclus	ge SILT, minor clay - some clay, stiff, moist ions, fine sand [ALLUVIAL DEPOSITS]	slightly plastic, trace	**** ****	- <u>-</u>
Greyish orange	, trace of clay, minor fine sand			
Orange / grey S	SILT trace of fine sand some clay, year, sti	ff moist moderately		
plastic	SILT, trace of time sand, some clay, very su	n, moist, moderately		
			++++ ++++ ±+±+	
Brown, orange.	. moist to wet		⁺ ++++-2	
End of Augerho	ble 2.1 metres (too stiff to auger)			
Observations	Groundwater not encountered 4. Sent 2000		-5	
Observations: (Groundwater not encountered 1 Sept 2009			
Date: 1 Septemb	ber 2009 Shear Vane No: 023			387 Great North Road PO Box 21-424
Logged by: HZ	Shear Vane Calib Facto	or: 1.00	SOII& KOCK CONSULTAN	Henderson, Auckland 1231 RS 09 835 1740 Fax 09 835 1847
Drilling Method:	Hand auger Date of last calibration:	13 July 2009 🛛 🔬		www.soilandrock.co.nz

Borehole location: See site plan						
Surface Elevation [m]: Datum:	—					
Surface Conditions: Bush, grassed						Page3
Soil description in accordance with the NZ Geotechnical So "Guidelines for the FieldDescription of Soil and Rock in Eng	ociety Inc 2005 gineering use"	raphic Log epth (m)	ample Type	bie Peak Shear Remo Shear	Vane Strength ulded Va Strength	ı (kPa) [●] ne ı (kPa) [□]
TOD001			<u>ر</u> ک	<u>り 0 5(</u>) 100	150 20
IOPSOIL Intermixed orange, pale brown SILT, some clay, trace of s	and, moist,					
Light orange SILT, some clay, trace of sand, loose, dry to	moist, non plastic	++++ ++++				
ALLUVIAL DEPOSITS]	· ·	+++++++++++++++++++++++++++++++++++++++				
Staining [20mm dia]		++ ++ + ++ ++ ++ + ++ ++ ++ ++ ++ ++ ++				
Pale brownish orange SILT, trace of sand, loose, dry to m	oist, non plastic	++++ ++++ +++++ +++++ +++++ +++++ +++++				
Pale brownish orange, mottled orange SILT, trace of - son sand, loose / firm, dry to moist, non plastic	me clay, trace of	+++++ ++++++ +++++++++++++++++++++++++				
Trace of rootlets, very stiff		++++ ++++- +++++- +++++- +++++2				
Light grey, streaked orange SILT, trace sand, loose, dry to	o moist, non plastic	***** ***** ****** ******				
		++++ ++++ +++++ +++++ +++++ +++++ +++++ ++++				UTP
		*+++ ++++- +++++ *++++				UTF
End of Augerhole 3.2						
					·	
						<u> </u>
		4				
		_				
					-	
		-5				
Observations: Groundwater not encountered 1 Sept 2009						
Data: 1 Sontember 2000 Shear Vano No: C765					7 Great North	

Job No: 09233	Job Name: Rew Job Suburb: Ne	arewa Walkway w Lynn	AUGER	RHOLE	LO	G Al	H 4
Borehole locatio	on: See site plan						
Surface Elevation	on [m]: [Datum:					Deret
Surface Condition	ons: Steep, grass	ed					Page4
Soil description in "Guidelines for t	n accordance with he FieldDescriptio	the NZ Geotechnical So n of Soil and Rock in Eng	ociety Inc 2005 jineering use"	Graphic Log Depth (m)	Groundwater	eak Vane hear Stren emoulded hear Stren	gth (kPa) [●] Vane gth (kPa) [□]
TOPSOIL Inter	rmixed dark brown	Silt				<u> </u>	
Pale orange, st plastic [ALLUV	treaked pale brown IAL DEPOSITS]	n sandy [uniform] SILT, di	ry to moist, non	***** ********************************			
Light brown SII moist, non plas Dry	LT, trace of to som stic to slightly plasi	e clay, trace of to some s ic	sand, very stiff, dry to		-		UTP
Light grey, stre slightly plastic	eaked orange, mot	tled dark orange clayey S	ILT, very stiff, dry,	**** ***** ***** ***** ***** ***** *****			UTP
Dry to moist, s	tiff			++++ ++++ ++++			
Light grey, stre	eaked orange SILT	, some clay, stiff, moist, r	noderately plastic				UTP
Light grey SIL	T, very stiff, moist,	non plastic		++++ ++++ +++++ +++++ +++++ +++++ +++++ ++++			UTP
				+ + + + + + + +			UTP
Dry to moist				*** *** ***- ***- ***- ***- ***- ***-			UTP
Dry				+ + + + + + + +			UTP
End of Augerh	nole 5.0 metres (ta	arget depth)		+++++			UTP
Observations:	Groundwater not	encountered 1 Sept 2009		<u>, t</u> f	- <u></u> i <u>.</u> i		
Date: 1 Septem	ber 2009	Shear Vane No: G765	or: 1.404	Soil&Rock Cor	nsultants	387 Great I PO Box 21 Henderson	North Road -424 Auckland 1231
Drilling Method	Hand auger	Date of last calibration:	14 July 2009	CONSULTING GEOTECHNI	CAL ENGINEER	5 09 835 174 www.soil	0 Fax 09 835 1847 androck.co.nz

Job No: 09233	Job Name: Rev Job Suburb: Ne	varewa Walkway ew Lynn	AUGEF	RHOLE L	LOG AH 5
Borehole locatio	on: See site plan				
Surface Elevatio	on [m]:	Datum:			
Surface Condition	ons: Steep, Strea	ambank			Page5
Soil description ir "Guidelines for th	accordance with ne FieldDescriptio	the NZ Geotechnical Socie on of Soil and Rock in Engine	ety Inc 2005 eering use"	raphic Log epth (m) ample Type	b Beak Vane Shear Strength (kPa) Remoulded Vane Shear Strength (kPa)
Dark brown SIL	T, minor clay, stif	f, moist, slightly plastic [FILL]		
Light brownish (orange clayey SIL	T, stiff, moist, moderately pl	astic		
Pale orange SIL [WEATHERED	_T, some clay, tra WAITEMATA GR	ice fine sand, very stiff, mois CUP SOILS]	t, slightly plastic	X +++++ +++++ ++++++ ++++++ ++++++ ++++++	
Pale grey, light	orange SILT, min	or clay, very stiff, moist, slig	htly plastic	++++ ++++ +++++ +++++ +++++ +++++ ++++++	UTP
Light orange, pa	ale grey fine sanc	ly SILT, very stiff, moist, non	plastic	**** ++++ ++++ ++++ ++++ ++++ ++++ +++	UTP
Light grey sand	y SILT, dense, m	oist, non plastic		• • • •	ОТР
Light grey, oran	nge SILT, minor c	lay, very stiff, moist, slightly p	plastic	++++ ++++ +++++ +++++ +++++ +++++ +++++ ++++	UTP
End of Augerbo	le 3.2 metres (tor	stiff to auger)		<u>,+,+</u>	
Observations: 0	Groundwater not e	encountered 1 Sept 2009		- 5	
Date: 1 Septemb	er 2009	Shear Vane No: G740			387 Great North Road
Logged by: Drilling Method: H	Hand auger	Shear Vane Calib Factor: Date of last calibration: 17	1.508	Soil&Rock Consul consulting geotechnical en	PO Box 21-424 Henderson, Auckland 1231 09 835 1740 Fax 09 835 1847 www.soilandrock.co.nz

Job No: 09233	Job Name: Rew Job Suburb: Ne	arewa Walkway w Lynn		HOLE	LOG	AH 6
Borehole locatio	on: See site plan					
Surface Elevatio	on [m]: [Datum:				Page6
Surface Condition	ons: Steep, Strea	mbank			- Deek	Vana
Soil description ir "Guidelines for tl	n accordance with he FieldDescriptio	the NZ Geotechnical n of Soil and Rock in E	Society Inc 2005 ngineering use"	Graphic Log Depth (m) Sample Type	Beak Sheal Remo Sheal Sheal O O O	vane r Strength (kPa) ⊃ulded Vane r Strength (kPa)
Light brown, da plastic [COLLU	irk brown, minor li JVIUM]	ght orange SILT, minor	clay, stiff, moist, slightly			
Light orange SI [WEATHERED	ILT, some clay, ve WAITEMATA GR	ry stiff, moist, moderate OUP SOILS]	ely plastic	++++ +++++ ++++++ ++++++ ++++++ ++++++ ++++		
Light orange S	ILT, minor clay, ve	ery stiff, moist, slightly p	lastic			
Light orange, d clay, very stiff,	lark orange, freque moist, non to sligh	ent limonite banded SIL itly plastic	.T, minor sand, trace of	**** ****- *****- *****- *****- *****- *****- *****- *****- *****- *****- ******		UTP
				+++ +++ ++++ +++++ +++++ +++++ +++++ ++++		UTP
End of Augerho	ole 2.7 metres (too	o stiff to auger)				
				- - - - - 4 -		
Observations:	Groundwater not	encountered 1 Sept 200	09			
Date: 1 Septemb Logged by:	ber 2009	Shear Vane No: G74 Shear Vane Calib Fa	0 ctor: 1.508	Soil&Rock Cons consulting geotechnic	3 Sultants AL ENGINEERS 0	87 Great North Road 'O Box 21-424 Jenderson, Auckland 1231 19 835 1740 Fax 09 835 1847

Borehole locatio	on: See site pl	an						
Surface Elevatio	on [m]:	Datum:						
Surface Condition	ons: Steep, ba	are				-		Page7
Soil description ir "Guidelines for th	accordance v ne FieldDescri	vith the NZ Geotechnical ption of Soil and Rock in E	Society Inc 2005 Engineering use"	raphic Log epth (m)	ample Type	Beak Shea Remo Shea	Vane r Strength oulded Va r Strength	n (kPa) [●] ne □ n (kPa) [□]
TOPSOIL					<u>ທີ່</u>	0 5	0 100	150 200
Orange SILT, s trace of rootlet SOILS]	ome clay to cla inclusions, fine	ayey, stiff to very stiff, mois a sand [WEATHERED WA	st, moderately plastic, ITEMATA GROUP			{		
Greyish orange				+++++++++++++++++++++++++++++++++++++++				
Trace of clay, n	ninor fine sand	, slightly plastic		+++++ ++++++++++++++++++++++++++++++++		1		
Sandy silt [fine]	, trace of clay	, non to slightly plastic						
Some fine sand	1							
Brownish orang	je fine sandy S	SILT, trace of clay, non to s	slightly plastic					
Brownish orang	je fine sand, d	ense, moist, non plastic		++++ ++++ ++++ ++++ ++++				
				+ ⁺ ++ +++++-2				
End of Augerho	le 2.1 metres	(too dense to auger)		<u>++++</u>				
				_5				
Observations: (Groundwater n	ot encountered 1 Sept 20	09		!			1
Date: 1 Septemb	er 2009	Shear Vane No: 023				38	7 Great North	Road

Job No: 09233	Job Name: Job Suburt	Rewarewa Walkway o: New Lynn	AUGER	HOLE	LO	G AH 8	
Borehole locatio	on: See site p	olan					
Surface Elevation	on [m]:	Datum:				_	
Surface Condition	ons: Steep, g	rassed				Page	3
Soil description ir "Guidelines for th	n accordance he FieldDesc	with the NZ Geotechnical Se ription of Soil and Rock in Eng	ociety Inc 2005 gineering use"	iraphic Log lepth (m)	broundwater	eak Vane lear Strength (kPa) emoulded Vane lear Strength (kPa) [[]	
						50 100 150	200
Light brown cla WAITEMATA G	yey SILT, stif BROUP SOIL	f, moist, moderately plastic [V S]	VEATHERED				
Light orange, s	treaked white	SILT, some clay, stiff, dry to	moist, slightly plastic				
Light brown cla	iyey SILT, vei	y stiff, moist, slightly plastic to		1Sept 09			
Light orange, s plastic Limonite, wet	treaked white	SILT, some clay, very stiff, d	++++ +++++ +++++ +++++ +++++ +++++ +++++			TP	
Light grey, stre	aked orange	SILT, trace of sand, very stiff,	, wet, non plastic	**************************************			TP TP
End of Augerh	ole 3.4 metre	s (too stiff to auger)		++++ 			
Observations:				- 5			
Date: 1 Septem	ber 2009	Shear Vane No: G765	tor: 1 404	Soil&Rock Cor	nsultants	387 Great North Road PO Box 21-424 Henderson, Auroland 422	1
Drilling Method:	Hand auger	Date of last calibration	: 14 July 2009	CONSULTING GEOTECHNI	CAL ENGINEERS	09 835 1740 Fax 09 835 1 www.soilandrock.co.nz	847 <u>z</u>

Job No: 09233	Job Name: Rewarewa Walkway Job Suburb: New Lynn	AUGER	HOLE LO	G AH 9
Borehole locatio	on: See site plan	-		
Surface Elevatio	on Im1: Datum:	4		
Surface Conditio	ons: Steep. bare	-		Page9
Soil description in	accordance with the NZ Geotechnical Soci	ety Inc 2005		eak Vane
"Guidelines for th	he FieldDescription of Soil and Rock in Engin	eering use"	aphic Loi pth (m) mple Tyr oundwat	near Strength (kPa) [™] emoulded Vane near Strength (kPa) [™]
				50 100 150 200
Intermixed light moderately plas	grey, dark brown, orange SILT, some clay, vo stic, trace of rootlet inclusions, fine sand [COL	ery stiff, moist, .LUVIUM]		
Orange silty CL GROUP SOILS	AY, very stiff, moist, highly plastic [WEATHEI]	RED WAITEMATA		
Dark brownish	orange			
Orange, trace c	of rootlet inclusions [to 5mm dia]			156+
Orange / grey o sand, trace of r	clayey SILT, very stiff, moist, moderately plast ootlet inclusions	ic, trace of fine		
Some clay				
			++++- ++++-2 ++++- ++++- ++++- ++++- +++- +++- +++-	
Greyish orange	3			
Greyish orange slightly plastic,	e SILT, minor fine sand, trace of clay, stiff to v some fine limonite gravel	very stiff, moist,	+∓++ ++++ ++++ ++++	
End of Augerho	ole 3.0 metres (too stiff to auger)			
Observations:	Groundwater not encountered 1 Sept 2009			
Date: 1 Septemb	ber 2009 Shear Vane No: 023			387 Great North Road
Logged by: HZ Drilling Method:	Shear Vane Calib Factor:Hand augerDate of last calibration: 15	1.00 1.00 3 July 2009	Soil&Rock Consultants onsulting geotecrnical engineers	PO Box 21-424 Henderson, Auckland 1231 09 835 1740 Fax 09 835 1847 www.soilandrock.co.nz

Job No: 09233 Job Name: Rewarewa Walkway Job Suburb: New Lynn AUGERHOLE LOG AH 10							
Borehole locatio	on: See site plan						
Surface Elevatio	n [m]: Datum:	_					
Surface Condition	ons: Steep, grassed					Page10	
Soil description ir "Guidelines for th	n accordance with the NZ Geotechnical Soc ne FieldDescription of Soil and Rock in Engin	iety Inc 2005 eering use"	aphic Log spth (m)	tmple Type oundwater	Peak Vane Shear Strer Remoulded Shear Strer	lgth (kPa) [●] Vane lgth (kPa)	
				<u>ତ </u>	0 50 1	00 150 200	
TOPSOIL Light orange, w [WEATHERED	hite SILT, some clay, stiff, dry, non to slightly WAITEMATA GROUP SOILS] .T, trace of clay and sand, very stiff, moist, no	plastic					
Light orange S	ILT, some clay, very stiff, dry, non plastic		****/2 ****/2 ****/ ******/ ******/ ******/ ******/ ******/ ******/ ******/ ******/ ******/ ******/			UTP	
End of Augerh	ole 3.3 metres (too stiff to auger)		*+++ ++++ +++++ +++++ +++++ +++++ +++++ ++++	1Sept 0	9	UTP	
Observations			4 5				
Date: 1 Septeml Logged by: Drilling Method:	ber 2009 Shear Vane No: G765 Shear Vane Calib Factor Hand auger Date of last calibration: 1	: 1.404	COIL&ROCK CO	DINSUITAT NICAL ENGIN	387 Great PO Box 21 Hendersor 09 835 174 www.soil	North Road -424 n, Auckland 1231 40 Fax 09 835 1847 androck.co.nz	

Job	Job no: 09233 Job Name: Rewarewa Walkway New Lynn					R	E	H	Ol	E	LOC	GI	MB	1		. .	
Bor	Borehole Location: See site plan							0.1						She	et 1	of 1	ORV
Su	Surface Elevation: Datum:					(1		SA						`		TEST	3
Sur	face Conditions:	Level, grassed]		el (n	g	tion			ar Jed				; (%)	g/m ³	
	Soil / Rock descriptio	on in accordance with the	NZ Geotechnical Society Inc. Publication	bo.		Lev	etho	ondi	/pe	y (%	Shea kPa) iould	ater			Itent	t <u>X</u>	ts
Ë	"Guideline for the Fi	eld Classification and De Purposes". Dec	ember 2005	ic L	E	bed	Ъ	Ö	e T	nple	ed S Jth (I Rem	pidwa			cor	ensi	Tes
<u>.</u>	Soil / Rock Description				epth	paduc	illing	[dm]	ldmi	San	ctor reng ak/F	no	H	 L.	ater	Ď	her
ő						Å	ā	Sa	Sa	20 80	Fa Str Pe	Ū	5	ñ	3	ă	ð
	Brown SILT, s	ome clay, firm,	wet, sl plastic [TOPSOIL]	KX.													
	Grey, brown, r	nottied yellow s	lity fine SAND, minor	\bigotimes	E					Δ	UTP [du	e grav	el]				
	Vallow bra	gnuy plastic		\bigotimes	F			t =									
		VVVII		\mathbb{X}	E1					$\langle / / /$	UTP	5006					
	piece brick			\boxtimes	' ‡			Ш				ber 2					
	Yellow, brown, or	ange CLAY, some	medium sand, trace fine gravel,	\bigotimes	E						90/47	tem					
	very stiff, moist, h	ighly plastic	The last inclusion from the	\mathbb{K}	F				ł			Sep					
4	Brown, yellow, wr medium gravel, s	tiff. moist. moderate	, sity clay inclusions, tine to	\bigotimes	E,			g				e					
				\mathbb{X}	ב≮			မ									
	Red brown fir	e / coarse scor	a SAND loose wet	₩	£						UTP						
ΞĒ	ited, brown in	107 002130 30011	a 6/ (145, 10000, wet	\mathbb{K}	}						0						
	Yellow white s	silty CLAY, very	stiff, moist, highly plastic	Ŵ	E												
	30 mm Top	soil inclusion		\mathbb{X}	נ∦		R										
	Brown SILT, som	e clay, very stiff, mo	bist, sl plastic IBURIED TOPSOILI	\bigotimes	£		BAR				120/62						
	Yellow, orang	e, brown mottle	d silty CLAY, minor	\mathbb{W}	₽		N										
	Topsoil inclus	ions, very stiff, r	noist, moderately plastic	\mathbb{X}	E		۳ ۱۳										
				\bigotimes	╞╶												
				\otimes	Ł						210+						
	Brown, orang	e stained clave	/ SILT, some fine sand,	\bigotimes	₽			t			2.00						
	stiff, moist, mo	oderately plastic	;	\otimes	E			Celle									
	Brown SILT, som	e clay, wood fragm	ents, stiff, moist, slightly plastic	\mathbb{N}	<u></u> }°			Ш									
Ę	BIOWN SILT, SOM	ie clay to clayey, ve)IL]	ry stin, moist, slightly plastic	<u> </u>	E						74/20						
1	Dark orange s	silty CLAY, very	stiff, moist, highly plastic	EX-						$\langle / / /$	1 / 1/39						
IE	Orange, grey,	silty, minor fine sand	sand stiff wet slightly plastic	-x	£												
	Dark orange fine	SAND, some silt, so	ome clay, very stiff, moist, sl plasti		1-0	1					1						
REI	Grey silty CLAY,	hard, moist, highly	plastic		÷.												
王	Grey fine SAND,	some silt, minor cla	y, hard, moist, slightly plastic		Ē					$\langle / / /$							
١Ð	Grey clayey SILT	, some fine sand, h	ard, moist, moderately plastic	XXX	ŧ,												
\square	Grey alternati	ing fine weak SA	ANDSTONE / weak		ŧ,						OIF			1			
	MUDSTONE	[approx 100 - 150 r	nm thick]		E												
ТŞ					E												
18					Ë,	2					UTP					1	
15					Ē	1	Ш										
L R					÷		12										
E					E		LE	g									
					E			8									
I	Grev fine SA	ND. medium der	nse, wet			"											
3				,	÷			-									
	Weak to very weak				÷			ellen	1	$\sqrt{//}$							
	Fracture di	pping 70°, rough	<u>ו</u>	<u> </u>	E			[™]									<u> </u>
		E.O.B. 10.0 metres	(target depth)			1											
D	ate started: 1 Sec	otember 2009	Observations:							Γ		-					
	ate finished: 1 Sep	otember 2009								_		Soli	&Roc	:k Ca	ms	ulix	anîs
	Driller: DCN.Drilling.Ltd.											CONSE 387 Great	North Road	EOTECHI	NICAI	ENS.	INEERS
s	hear Vane No:	DR4374								Ļ	- Walt	PO Box 21 Ph 09 835	-124, Henderso 1740 Fax 09 8	n, Auckland 123 35 1847 www	soilandro	ck.co.nz	
L	ogged by: DG	Checked by:															
S D	hear Vane Calib Factor ate of last calibration:	r: 1.49 29 January 2009	Cad Ref: 09233 bh 1-3.dwg		_												

Job no: 09233 Job Name: Rewarewa Walkway New Lynn			В	0	R	E	Η	OI	_E	LOC	GI	MB	2				
Parahala Lagation: Sap site plan						1							She	et 1	of 1		
Surface Elevation: Datum:					_		SA	MPLE	DATA		FIELC	TESTS		LAB	ORAT	ORY 3	
Surf	ace Conditions:	Level, grassed				je (m	5	tion			led				(%)	()	
ł. Unit	Soil / Rock description in accordance with the NZ Geotechnical Society Inc. Publication "Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes", December 2005			tphic Log	oth (m)	tuced Leve	ing Methoo	Iple Condit	nple Type	ample ecovery (%	tored Shea ngth (kPa) k/Remould	undwater	F	-	er content	Density(kg	er Tests
Geo	Soil / Rock Description			Gra	Dep	Rec	Drill	San	San	20 80	Fact Stre Pea	0 0	С	5	Wat	ΓΩ	Othe
	Brown SILT, som	e clay, firm, moist, s	lightly plastic [TOPSOIL]		-												
FILL	Brown, white mottled silty CLAY, very stiff, moist, highly plastic Orange, brown Yellow Organic stained black and brown Yellow, orange, white Yellow, white silty, some sand, moderately plastic 30 mm dia Topsoil inclusion, stiff Orange, yellow, brown, mottled red, yellow						ARREL	Good			210+ 107/15 110/44 90/35 81/50						
S	Grey, brown clayey SILT, some topsoil, very stiff, moist, mod plastic Orange, brown silty CLAY, some sand, very stiff, moist, moderately to highly plastic Brown, orange / brown, yellow clayey SILT, topsoil inclusions, very stiff, moist, moderately plastic Brown SILT some clay stiff moist slightly plastic IBURIED TOPSOIL						OPEN B				110/62	tember 2009					
EMATA GROUP SOIL	Yellow brown silty CLAY, very stiff, moist, highly plastic Mottled orange, white			-×- -×- -×-				Excellent			107/47	- ▲ 3 Sep					
D WAITE	Grey clayey S plastic	SILT, some fine	sand, stiff, wet, moderately	× ¥ × × × × × × × × × × × × × ×													
WEATHERE	Wet, slightly p Grey	Iastic	J, some clay, very stiff,	××××		,					UTP			-			
JP ROCKS	Grey fine SANDSTONE very weak to weak, fracture, vert, rough Grey SILTSTONE, very weak Grey fine SANDSTONE, weak to very weak			××	iiiik Kii	3	TUBE				UTP						
TEMATA GROI						ð	TRIPLE 1				UTP						
WAF	Grey SILTSTONE, very weak									H							1
					E						UTP						
F		E.O.B. 10.0 metres	(target depth)	<u></u>	+++	4	+	+	+		1						<u>}</u>
Da Da Di Ty Si Lo	ate started: 1 Ser ate finished: 1 Ser iller: DCN I rpe of Rig: tractor near Vane No: I ogged by: DG	otember 2009 otember 2009 Drilling.Ltd. mounted DR4374 Checked by:	Observations:									Soll Consu 387 Great PO Box 21 Ph 09 835	RADIC LTINE 61 North Road 424, Henderson, 1740 Fax 09 83	COTECHN Auckland 123 5 1847 www.	I I CAL 1 soilandro	ENG ck.co.nz	I DEERS
Sh Da	Shear Vane Calib Factor: 1.49 Date of last calibration: 29 January 2009 Cad Ref: 09233 bh 1-3.dwg											•					





Approximate Augerhole Locations, Soil and Rock Consultants, 1 August 2016

KEY: . МВ 1

Approximate Machine Borehole Locations, Soil and Rock Consultants, 1 September 2009



Α'

Approximate Augerhole Locations, Soil and Rock Consultants, 1 September 2009

Approximate Cross Section Locations, Soil and Rock Consultants, 1 September 2009

NOTES:

- 1. Locations of features approximate only.
- 2. Location of all buried services to be verified prior to construction
- 3. Original sheet size A3
- Boundary information on this Site plan adapted from information on Quickmap by Custom Software 4

	A	MENDMENTS						
DATE	REV	DESCRIPTION						
02/08/2016	А							
Check all dimensions and levels on site before commencing construction. This drawing and design remains the property of Geotechnica Engineering Ltd. and may not be reproduced without the written permission of Geotechnical Engineering Ltd.								
Scil&Rock Consultants CONSULTING GEOTECHNICAL ENGINEERS Lavel 1, 387 Great North Road, Waitakere 0612 Pb 062 21-242 Horderson, Waitakere 0650 Ph 09 835 1740 Fax 09 835 1847 www.soilandrok.co.nz								
3094-3	3096 I	6 Great North Road New Lynn						
Site plan								
16425		DRAWN: DATE: CW/JW 02/08/2016						
SCALES: 1: AT A3	500	CHECKED: REV. A						
CAD REF:	Site pl	an l						

