

Appendix I Geotechnical Assessment

Prepared by Torlesse



Report Layout

Report Sheet No. 1 of 4–Overview, Findings & Recommendations

Report Sheet No. 2 of 4–Public Data Search

Report Sheet No. 3 of 4–Ground Model and Geotechnical Hazard Assessment

Report Sheet No. 4 of 4-Liquefaction Assessment

Appendix A–Sketches

Appendix B-Topographic Survey and Proposed Site Levels

Appendix C-Investigation Records

Appendix D-Liquefaction Analysis

Introduction

Sussex Trust have engaged Torlesse Ltd (Torlesse) to provide a geotechnical assessment of 160 Mazengarb Road, as supporting documentation for resource and building consent.

This report presents the findings based on the scope of service set out in the email agreement dated 9 July 2024. Our scope of work comprises the following:

- Complete an intrusive geotechnical investigation comprising of Test Pits to a target depth of 3.0 metres below ground level with associated Scala penetrometer testing.
- Complete 2 days CPT Testing across the site to refusal.
- Complete a geotechnical assessment report including liquefaction assessment and recommendations to assist in the developed and detailed design stages.

Previous Reports

Torlesse undertook a previous pre-purchase assessment of the site, which is referenced below. However, all relevant information has been updated with site specific data collected as part of the intrusive investigation and is presented within this report.

• Torlesse, 'Geotechnical Desktop Study-Pre-purchase Assessment', dated 15 May 2024.

Received Information

We have received the following information:

- Cuttriss, 'Scheme Plan-Existing and Proposed Contours', no date.
- Design Group Stapleton Elliott, 'Masterplan–160 Mazengrab Road, Paraparaumu-RC02', dated 20 June 2024.

Proposed Development

The proposed development consists of the following key aspects:

- Increasing site levels by up to 2.0m to create a near level building platform between 5.8m RL and 6.5m RL.
- A total of 41 individual units are proposed consisting of 1 and 2 storey structures.
- The units are a mix of 1, 2 and 3 bedroom units.
- The units are proposed to be timber framed with the use of light • weight construction material.
- The development also includes a driveway and associated parking.

A copy of the proposed layout is included in Appendix B, while Sketch 2 in Appendix A shows the testing locations overlaid on the proposed development.

The existing topographic survey and proposed contours are also included in Appendix B.

Findings

The following is a summary of the key findings from the data search, investigation and geotechnical assessment:

- The site is underlain by beach sands to at least 15m bgl.
- The sands consistently increase density with depth and are at low risk of static settlement.
- Fill was locally identified in TP02 up to 0.9m bgl. Fill was not encountered in the other test locations and is considered to be localised.
- Groundwater was identified at an approximate RL of 2.5m.
- The site is at low risk of all identified geotechnical hazards with the • exception of liquefaction which presents a moderate risk.

Recommendations

The site does not meet NZS 3604 conditions due to some low DCP
blow counts and presence of liquefaction at the site.
The proposed 3.3m to 4.0m crust at the site will reduce the impact
of linus featien during a LUC asignsis avant

of liquefaction during a ULS seismic event.

Discussion

The site is generally level lying and underlain by sand. The proposed 3.3m+ crust at the site will significantly mitigate the risk of liquefaction induced ejecta at the surface and also the impact of settlement on the proposed structures.

Geotechnically the site is well suited to residential development, and the identified liquefaction risk can be mitigated through the proposed earthworks and foundation design.

Recommendations are presented in the table below.

Conclusion

Statement of Suitability

In my professional opinion, not to be construed as a guarantee, I (Nick Clendon, PEngGeol 1015552) consider the site is suitable for subdivision as long as the recommendations presented here are adhered to and specific engineering design is undertaken.

Element	Recommendations	Comments		
Site subsoil Class	Site Class D			
Recommended Foundation Type	Shallow foundations	Low bearing pressure waffle slab or stiff concrete raft type for at a depth of 0.3m below cleared ground level or on imported NZS4431 as per the proposed plans.		
Ultimate Bearing Capacity	200kPa	The natural ground is suitable for founding, following proof ro approval by a Torlesse geotechnical engineer. The fill identified in TP02 will require inspection and proof rol earthworks stage to confirm suitability. So localised re-work be required.		
Strength Reduction Factor	0.5	As per MBIE/NZGS Module 4 (2021) and B1/VM4.		
Settlement <25mm		Adopting either of the foundation options above will result in differential settlements being less than 25mm over a 6m leng combinations as per B1/VM4.		
Earthworks Specification Required		In general the site will be raised to achieve proposed site level site won material or imported fill (either quarry fill such as GA considered appropriate. Due to the underlying sand nature o earthworks can be carried out in winter months typically with cohesionless (granular) fill material. Fill works should be inlin NZS4404:2010 and NZS4431:2022.		
Cut and Fill batters	A maximum slope angle of 1V:3H is recommended for all cut and fill batters within the sand material up to a maximum height of 4m.	It is recommended any slope greater than 1V:3H are retained specific slope stability assessment is completed. Temporary cut or fill slopes can be at angles of 1V:1H within th		
Further Investigations	None required			
Construction Monitoring	Yes, refer to earthworks specification	 The earthworks specification will provide detailed hold/inspected development of the site. This will include but not be limited t Site clearance Subgrade inspections Fill placement and testing 		

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Notes:

Applicability Statement:

This report has been prepared on behalf of, and for the exclusive use of, the Client, and is subject to, and issued in accordance with, the provisions of the contract between Torlesse and the Client. Torlesse accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party. In preparing this report, Torlesse has relied upon information provided by or on behalf of our Client. Torlesse accept no responsibility for the reliability or accuracy of this information. This report is not to be reproduced either wholly or in part without Torlesse's prior written approval. Interpretation of the ground conditions presented have been based on geotechnical data from point locations, between which ground conditions may differ. The actual underlying ground conditions may differ from those presented in this report.





Figure 1: KCDC flood hazard map—Ponding



Figure 2: NZGD test locations

Summary of Site Observations

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Element	Description
Date of Visit	4 and 8 July 2024
Vegetation and topography	The property is vegetated with several large trees and grass. The north area of the higher elevation than the south area (up to 2m difference in places), with generally topography.
Site structures (buildings, walls, etc)	There is currently an existing dwelling and garage located on the property. In terms the garage has a concrete slab while the dwelling is on piles.
Underground and overhead services	All services are underground on this property.
Soil/ rock exposures	No soil or rock exposures were observed on the property,
Water/ Drainage	No drainage features were observed.

Summary of Public Data

Source	Source Description	Data Description	Notes
	NZ Geological Webmap (1:50,000)	Holocene windblown deposits	Inactive dunes.
GNS	NZ Active Fault	Ohariu Fault ~ 3.5km southeast	Dextral, RI II >2,000 to <= 3,500 y moderate.
	Database	Gibbs Fault—4.7km southeast	Dextral, RI III >3,500 to <= 5,000 y
		Combined Hazard	Moderate to high
CWDC	Mannad Hazard	Ground Shaking	Moderate
GWRC	Маррец назаги	Liquefaction	High
		Slope	Low
	Flood Hazards	Ponding on site	Stream corridor shown 120m sou
KCDC		GWRC Flood Hazard Webmap notes a 1%AEP.	property.
	Historical Aerial	1940s—One building existing on site	
	Imagery	1991—Two buildings added to property.	
		1942—Single building present on the property.	
	Historical Aerial	1964—Small structure added to north end of site.	No major changes to site betwee
Retrolens	blens Images	1966—Northern structure no longer present.	
		1991—Building added to south end of property, near the existing driveway	
NZGD	Nearby Investigation Records	18 CPTs and 5 hand auger logs have been completed within 300m of the site.	Logs generally indicated sands w increasing soil strength.

Kaikoura PGAs

Strong motion stations throughout the Wellington region recorded ground motions during the 2016 Kaikoura earthquake which was a 7.8 M_w event. A record for the Paraparaumu Primary School is shown adjacent.

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Site	PAP5
Location	Paraparaumu Primary Schoo
Distance from site	~2.6km south
PGA (g)	0.092
Subsoil Class	D

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Ground Investigation

A geotechnical investigation was completed between the 4 and 8 July 2024 and consisted of 6 No. Test Pits to a maximum depth of 3.2m below existing ground level and 10 CPTs to a maximum depth of 15m where refusal was encountered.

- CPT05 was repeated due to early refusal with the second test achieving 12m.
- A DCP was undertaken at each pit location to refusal.
- The test locations are shown on Sketch 1 in Appendix A.
- A full copy of the Test Pit and CPT logs are included in Appendix C.

Based off the above data and our existing knowledge of sites in the area we have developed a ground model which is presented in the adjacent table.

Site Geotechnical Hazards

Torlesse has undertaken a qualitative assessment of the site geotechnical hazards. For simplicity, we have adopted a three-tiered system (low/moderate/high) to characterise the significance of the risk specific to the proposed development. The risk allocation may differ for any subsequent or additional developments at the site.

Typically risks with a low rating are no longer further assessed, while those with moderate or high are assessed in more detail.

Ground Motion Parameters

The ground motion parameters for geotechnical analysis are estimated using the MBIE and NZGS Earthquake Geotechnical Engineering Practice Module 1. Two design cases have been considered, all with an assumed 50-year design life. The design peak ground accelerations (PGA) are outlined in the table below.

Design Case	Importance Level	Return Period	Mw	PGA (g)
SLS1	2	25 years	6.5	0.13
ULS	2	500 years	7.7	0.68

Ground Model and Material Properties

Unit	Description	Strength	Depth to top of layer (mbegl)	γ (kN/m³)	
Beach Deposits	Fine to medium grained sand	Loose to medium dense	0.0	17	
Beach Deposits	Fine to coarse grained sand	Medium dense	0.3–1.1	18	Γ
Beach Deposits	Fine to coarse grained sand	Dense	1.5—2.5	20	
Beach Deposits	Sand	Very dense	3.1–4.8	22	Γ
Beach Deposits	Sand	Dense	6—6.5	20	
Beach Deposits	Sand	Very dense	12—14	20	
Groundwater	Groundwater is estimated to be at tions and CPT data.	2m RL, approximately 2.5 to 4m belo	ow existing groun	d level (mbe	g
Notes	γ bulk unit weight; ${f \phi}'$ effective frie	ction angle; c' effective cohesion. To	opsoil not shown	in ground m	0

Geotechnical Hazards

Geohazard	Risk category	Notes
Weak or variable soils	Low	The soils were consistent across the property, typically granular in nature and strength with depth.
Shallow groundwater	Low	Water was encountered at 2.6m bgl in TP05 and some seepage was observed other test locations.
Slope instability	Low	The site is flat and is not located near any slopes.
Liquefaction	Moderate	Refer to sheet 4 for a detailed liquefaction assessment.
Lateral spreading	Low	The nearest free face is approximately 50m away, where a pond is present on property. However it is of limited extent and considered to be a low risk. The over 300m away.
Fault rupture	Low	The nearest fault is 3.5km away. The nearest major fault as per NZS1170.5 is the which is >20km away.



Figure 3: Photo near CPT02, looking South





Figure 4: Photo near TP05, looking North

Figure 5: Photo near TP04, looking Southeast

Φ' (°)	c' (kPa)	
30	0	
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36	0	
40	0	
36	0	
40	0	
based on observa-		

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Sussex Trust

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Ground Motion Parameters

The ground motion parameters are detailed on sheet 3 above and have been utilised for the liquefaction assessment.

Liquefaction Assessment

An assessment utilising the software CLiq (v.3.4.1.4) has been undertaken. A summary of the assessment is provided below. Descriptions of performance levels are taken from MBIE/ NZGS (Module 3, 2021, p. 24) guidance and presented in the adjacent table.

- The assessment is based on proposed site levels.
- A fines correction value (CFC) is set as 0%.
- A groundwater table at 2.5m RL has been used across the site and the CPTs adjusted based on the proposed fill levels. The values utilsied for depth to groundwater from the top of the fill can be seen in the summary table below.
- Note the ground levels at location CPT05 and CPT06 are proposed to • be raised 1.2m during development. This will increase the crust thickness to approximately 3.3m.
- Under SLS seismic loading, no liquefaction is predicted. Note the Kaikoura 2016 earthquake event (0.09g/M_w 7.8) generated similar levels of shaking as SLS loading and we are not aware of any reports of liquefaction in this area.
- Under ULS earthquake conditions, the majority of the liquefaction is occurring between 6 and 11m below proposed site levels. With more variable levels of liquefaction occurring between 4 and 6m below proposed site levels.
- Overall the liquefaction hazard is considered to be moderate due to the proposed crust thickness and the typically increasing density of the ground profile with depth.
- A summary of the results are presented below. A full copy of the assessment is included in Appendix D.







	Current mRL Proposed Fill Depth to Thickness (m) Groundwater (mbgl)		Depth to	ULS loading condition						
Test ID			Free Field Settlement (mm)	LPI (ISH)	LSN	Performance level				
CPT01	6.2	0.05	3.90	90	3	9	Moderate/ High			
CPT02	5.5	0.90	3.90	120	7	10	High			
CPT03	6.8	-0.55	3.75	70	3	8	Moderate			
CPT04	6.9	-0.60	3.80	80	2	9	Moderate			
CPT05 part 2	4.6	1.20	3.30	110	11	15	High			
CPT06	4.7	1.20	3.30	90	6	12	Moderate			
CPT07	6.0	-0.10	3.40	80	4	7	Moderate			
CPT08	6.5	-0.50	3.5	85	3	7	High			
CPT09	6.2	0.30	4.0	80	5	8	Moderate			
CPT10	4.9	1.1	3.5	45	2	4	Mild			

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5	Very severe	ground distortion (lateral st	rains/stretch,	vertical offsets						
		and angular distortion).								



APPENDIX A: SKETCHES



^{Client:} Sussex Trust

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Site Location: 160 Mazengarb Road, Paraparaumu

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Project Name: Geotechnical Assessment Report

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APPENDIX B: TOPOGRAPHICAL SURVEY AND PROPOSED SITE LEVELS



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ISSUED FOR INFORMATION

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SECTION B-B

SECTION E-E





SECTION C-C

SECTION F-F

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Address: 160 Mazengarb Road, Paraparaumu Legal Description: LOT 12 DP 90944 District Plan Zone: General Residential Zone

RC02 REV.

MASTERPLAN

THAMES PACIFIC

160 Mazengarb Road, Paraparaumu, WELLINGTON, 5032

CONCEPT

Contractors shall verify all dimensions on site before commercing work. Do not scale from the drawings. If in doubt ask. Copyright of this drawing is vested in Designgroup Stapleton Elliott.

PROJECT No.	PROJECT NUMBER
PLOT DATE.	20/06/2024 3:10:29 pm



designgroup

stapleton elliott

APPENDIX C: INVESTIGATION RECORDS

	Te	st Pit & DCP Log No: TP01									ТМ
	Clie	ent: Sussex Trust								6	SSP
	Job	Name: 160 Mazengarb Road, Paraparaum	u				GEO	TECH	INICAL	ENGINEE	RS
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	Depth Scale	Lithologic Description	Symbol	, ,	Samples	Vane Shear Test (Su)	Pocket Penetrometer	Ма 0 5 I	nual DCP 10 15 20	Comme	nts / Additional Notes
	_	Ground Surface									
	1	TOPSOIL Fine to coarse SAND Light brown, loose, moist. Fine to medium SAND With trace silt. Dark brown, loose to medium dense, moist. Silt is non-plastic. Fine SAND Light brown, medium dense, moist. Fine to medium SAND Grey, medium dense, moist. From 2.2m bgl - Medium dense to dense. From 2.5m bgl - Dense.									
& DCP Log / toritesse / Lauryn / July 14, 2024 08:18 PM	3 4 5	Test Hole Terminated at 3 m - Target depth.			st Loo	cation	Notes				
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TP01 Pit



TP01 Stockpile

Torlesse Ltd Job Number: T0399/02 Date: 15 July 2024

Те	st Pit & DCP Log No: TP02							ТМ
Clie	ent: Sussex Trust					ηΓΙ	PS ⁰	SP
Job	Name: 160 Mazengarb Road, Paraparaumu	l			GEO	TECHNICAL	ENGINEERS	
Log Ente Rev	ged by:LHCo-ordinatesWGS 84Co-ordinatesered by:LHPlunge (Degrees):90Siewed by:NCTrend (Degrees):0E	ontract tart Dat nd Date	or: CPT e: 2024 e: 2024	Elite -07-08 -07-08		Elevation: 6 Northing: - Easting: 1	m 40.89052 75.00427	Page No: 1 of 1
Depth Scale	Lithologic Description	Symbol	Samples	Vane Shear Test (Su)	Pocket Penetrometer	Manual DCP 0 5 10 15 20	Comments / Add	itional Notes
	Ground Surface							
- - - - - - - - - - -	Fine to medium SAND With trace gravel. Dark brown, loose, dry to moist. Gravels are fine to medium, sub-round. (FILL?). Fine to medium SAND							
	With trace rootlets. Brown, loose, dry to moist. Fine SAND Light brown, medium dense, dry to moist.		-					
- - - -	Fine to coarse SAND Grey brown, medium dense to dense, moist.		-					
- 2 - - - - - - - - - - - -	From 2.1m bgl - Dense.							
Lauryn / July 14. 2024 08: 18 PM	Test Hole Terminated at 3.1 m - Target depth.							
amp; DCP Log / torlesse /								
Test Loreste Lest Stands Equilibrium Size Wat Wat	t <u>Location Information:</u> ipment: Excavator (m): 0.8 x 2.7m er Level (m): er Level (Elv):	T C E G	est <u>Lo</u> oordina levatio roundv	cation ates ob n estim vater w	Notes tained ated fr as not	from mobile pho om Cuttriss Con encountered.	one GPS. sultants Topograp	hic Survey.
Log Log	ging completed in general accordance with NZGS 2005 Guideline	es						





TP02 Pit



TP02 Stockpile

Torlesse Ltd Job Number: T0399/02 Date: 15 July 2024

Те	est Pit & DCP Log No: TP03						ТМ
Cli Joi	ent: Sussex Trust o No.: T0399						PSSP
Joi	o Name: 160 Mazengarb Road, Paraparaur	nu			GEO	TECHNICAL E	ENGINEERS
Log Ent Rev	Logged by:LHCo-ordinatesWGS 84ContraEntered by:LHPlunge (Degrees): 90Start 1Reviewed by:NCTrend (Degrees): 0End D			Γ Elite 4-07-08 4-07-08		Elevation: 5 Northing: -4 Easting: 17	m Page No: 0.89075 1 of 1 75.00415
Depth Scale	Lithologic Description	Symbol	Samples	Vane Shear Test (Su)	Pocket Penetrometer	Manual DCP 0 5 10 15 20	Comments / Additional Notes
	Ground Surface						
- 0 	TOPSOIL Fine SAND With minor tree roots. Brown, loose to medium dense, dry. Fine to coarse SAND With trace rootlets. Light brown, medium dense, dry to moist. From 1.2m bgl - Medium dense to dense. From 1.2m bgl - Dense. From 2.0m bgl - Moist. Fine to coarse SAND Grey, dense, moist to wet.						
ig / Torlesse Test Pit & amp: amp: DCP Log / torlesse / Lauryn / July 14. 2024 08:18 PM	Test Hole Terminated at 3.2 m - Target depth and pit wall collapse. st Location Information: uipment: Excavator e (m): 0.8 x 2.7m ter Level (m): ter Level (Elv):		<u>Fest Lo</u> Coordin Elevatio	Dcation nates ob on estim	Notes tained ated fr as not	S: I from mobile phonorom Cuttriss Consistence	ne GPS. sultants Topographic Survey.
Lo Lo	gging completed in general accordance with NZGS 2005 Guide	elines					





TP03 Pit



TP03 Stockpile

Те	st Pit & DCP Log No: TP04								ТМ
Clie Job Job	nt: Sussex Trust No.: T0399 Name: 160 Mazengarb Road, Paraparaur	mu				GEO	TECH	NICALI	PSSP ENGINEERS
Loge Ente Rev	ged by:LHCo-ordinatesWGS 84ered by:LHPlunge (Degrees): 90iewed by:NCTrend (Degrees): 0	Cont Start End	racto Date Date	or: CPT e: 2024 : 2024	Elite -07-08 -07-08		E N E	levation: 6 . lorthing: -4 asting: 1	.5 m Page No: 10.89083 1 of 1 75.00359
Depth Scale	Lithologic Description		Symbol	Samples	Vane Shear Test (Su)	Pocket Penetrometer	Man 0 5	ual DCP 10 15 20	Comments / Additional Notes
	Ground Surface						_		
0	TOPSOIL	1	\$17 ·			(
Ę	Fine to medium SAND	—:	:::						
F	Light brown, loose to medium dense, moist.	:)		
L									
-	Fine to coarse SAND						>		
F	Light brown, loose, moist.		::				Í		
F		•	••••				I I		
- 1									
E	From 1.1m bgl - Medium dense.	•							
F									
+		•							
F		•							
-							↓		
F							•		
	From 2.0m hal - Dense	•							
\mathbf{F}			•••				•		
t			••••						
-									
+		:							
Ĺ		•							
-		•	\cdot					\mathbf{i}	
F_									
	Test Hole Terminated at 3 m - Target depth.								
+									
F									
₹ A									
8:18									
024 0									
14,2								.↓	
Ang - 4								+	
nryn -									
e/La									
ortess								≮_	
g / tc									
SP Lo								`•	
ä D									
10:au						NI			
	t Location Information:			ordine	cation	Notes	<u>):</u> from m	obile nho	ne GPS.
	(m): 0.8 x 2.7m		E	evatio	n estim	ated fi	rom Cut	triss Con	sultants Topographic Survey.
Wat	er Level (m):		G	oundv	vater w	as not	encour	ntered.	
월 Wat	er Level (Elv):								
L/ Log	ging completed in general accordance with NZGS 2005 Guide	elines							





TP04 Pit



TP04 Stockpile

Те	st Pit & DCP Log No: TP05				Т		ТМ
Clie Job	nt: Sussex Trust No.: T0399						PSSP
Job	Name: 160 Mazengarb Road, Paraparaun	nu			GEO	TECHNICAL	ENGINEERS
Log Ente Rev	ged by:LHCo-ordinatesWGS 84ered by:LHPlunge (Degrees): 90rewed by:NCTrend (Degrees): 0	Contrac Start D End Da	ctor: C ate: 20 ite: 20	PT Elite 024-07-08 024-07-08		Elevation:4 Northing: -4 Easting: 1	.5 m Page No: 40.89123 1 of 1 75.00398
Depth Scale	Lithologic Description	Symbol	Samnlac	samples Vane Shear Test (Su)	Pocket Penetrometer	Manual DCP 0 5 10 15 20	Comments / Additional Notes
_	Ground Surface				-	•	
- 0	TOPSOIL	şШŻ.	· :				
Ł	Fine to coarse SAND	•••	•				
F	Light brown, loose, moist.	×	(• •X				
-	Sandy SILT	×				∮	
Ę	Sand is fine to medium. Gravels are fine, sub-angular.	×	×				
F	Fine to medium SAND	:.'	:				
	Dark brown, medium dense, moist.		•				
F'							
F	Silty fine SAND						
Ę	Fine to coarse SAND						
-	Grey, medium dense, moist.		:			4	
Ľ			:				
-	From 1.8m bgl - Strong organic smell.		:				
F_						•	
F			:			🔍	
t			•				
	From 2.5m bgl - Saturated.		:				
$+$ $\stackrel{4}{\rightarrow}$	Organics in base of pit (bark). Test Hole Terminated at 2.6 m - Refusal on organic material (possible		-				
1 202	log).	°					
- 10 N							
- 3 0							
-							
-							
Z -							
8:18							
024 0							
14,2							
Anr 4							
auryn							
e / Lé							
orless							
og /t							
CPL							
<u>;</u>							
	t Location Information		 Test	 Location	l Notes	<u> </u>	
Equ	pment: Excavator		Coord	dinates ol	otained	<u>.</u> from mobile pho	one GPS.
Size	(m): 0.8 x 2.7m		Eleva	ition estin	nated fr	rom Cuttriss Con	sultants Topographic Survey.
wat Wat	er Level (m): 2.6 m er Level (Flv): 1.9 m						
/Tor							
Log	ging completed in general accordance with NZGS 2005 Guide	lines					





TP05 Pit



TP05 Stockpile

Torlesse Ltd Job Number: T0399/02 Date: 15 July 2024

Те	st Pit & DCP Log No: TP06								ТМ
Clie	ent: Sussex Trust							Pc	1 22
Job	Name: 160 Mazengarb Road, Paraparau	mu				GEO	TECHNICAL	. ENGINEEF	S
Log Ente Rev	Logged by:LHCo-ordinatesWGS 84ContraEntered by:LHPlunge (Degrees): 90Start IReviewed by:NCTrend (Degrees): 0End D			tractor: CPT Elite t Date: 2024-07-08 Date: 2024-07-08			Elevation: Northing: Easting:	5 m -40.89094 175.0044	Page No: 1 of 1
Depth Scale	Lithologic Description	Swhol		Samples	Vane Shear Test (Su)	Pocket Penetrometer	Manual DCP 0 5 10 15 2	Comment	s / Additional Notes
	Ground Surface								
imp: DCP Log / torlesse / Lauryn / July 14. 2024 08:18 PM 	Fine SAND With trace tree roots. Grey brown, loose to medium dense, dry. Fine SAND Light brown, medium dense to dense, dry. From 1.1m bgl - Dense. Fine to coarse SAND Grey, dense, moist. From 3.0m bgl - Wet. Test Hole Terminated at 3.1 m - Target depth and pit wall collapse.								
<u>J Torlesse Test Pit & amp;amp</u> Equ Size Wat	at Location Information: ipment: Excavator e (m): 0.8 x 2.7m ter Level (m): ter Level (Elv):		Tes Coo Ele Gro obs	st Loc ordina vatior oundw served	cation ates ob n estim vater w d in the	Notes tained ated fr as not base	from mobile pr om Cuttriss Co encountered, h of the pit.	one GPS. nsultants Topo owever some s	ographic Survey. seepage was
Log	gging completed in general accordance with NZGS 2005 Guid	lelines							





TP06 Pit



TP06 Stockpile























APPENDIX D: LIQUEFACTION ANALYSIS

Project: Geotechnical Assessment Report

Location: 160 Mazengarb Road

CPT: CPT-01

Total depth: 13.99 m



CLiq v.3.5.3.9 - CPTU data presentation & interpretation software - Report created on: 24/07/2024, 3:20:16 pm Project file: H:\Shared drives\TORLESSE\8. PROJECTS\T0399 - 160 Mazengarb Road\5. ANALYSIS & DESIGN\160 Mazengarb_nc_24-07-2024.clq

Project: Geotechnical Assessment Report

Location: 160 Mazengarb Road

CPT: CPT-02

Total depth: 13.98 m



CLiq v.3.5.3.9 - CPTU data presentation & interpretation software - Report created on: 24/07/2024, 3:20:17 pm Project file: H:\Shared drives\TORLESSE\8. PROJECTS\T0399 - 160 Mazengarb Road\5. ANALYSIS & DESIGN\160 Mazengarb_nc_24-07-2024.clq

Project: Geotechnical Assessment Report

Location: 160 Mazengarb Road

CPT: CPT-03

Total depth: 14.98 m



Project: Geotechnical Assessment Report

Location: 160 Mazengarb Road

CPT: CPT-04

Total depth: 14.85 m



Project: Geotechnical Assessment Report

Location: 160 Mazengarb Road

CPT: CPT-05

Total depth: 2.83 m



CLiq v.3.5.3.9 - CPTU data presentation & interpretation software - Report created on: 24/07/2024, 3:20:18 pm Project file: H:\Shared drives\TORLESSE\8. PROJECTS\T0399 - 160 Mazengarb Road\5. ANALYSIS & DESIGN\160 Mazengarb_nc_24-07-2024.clq

Project: Geotechnical Assessment Report

Location: 160 Mazengarb Road

CPT: CPT-06

Total depth: 13.14 m



Project: Geotechnical Assessment Report

Location: 160 Mazengarb Road

CPT: CPT-07

Total depth: 11.91 m



Project: Geotechnical Assessment Report

Location: 160 Mazengarb Road

CPT: CPT-08

Total depth: 14.58 m



CLiq v.3.5.3.9 - CPTU data presentation & interpretation software - Report created on: 24/07/2024, 3:20:19 pm Project file: H:\Shared drives\TORLESSE\8. PROJECTS\T0399 - 160 Mazengarb Road\5. ANALYSIS & DESIGN\160 Mazengarb_nc_24-07-2024.clq

Project: Geotechnical Assessment Report

Location: 160 Mazengarb Road

CPT: CPT-09

Total depth: 13.97 m



Project: Geotechnical Assessment Report

Location: 160 Mazengarb Road

CPT: CPT-05A

Total depth: 12.03 m



CLiq v.3.5.3.9 - CPTU data presentation & interpretation software - Report created on: 24/07/2024, 3:20:20 pm Project file: H:\Shared drives\TORLESSE\8. PROJECTS\T0399 - 160 Mazengarb Road\5. ANALYSIS & DESIGN\160 Mazengarb_nc_24-07-2024.clq

Project: Geotechnical Assessment Report

Location: 160 Mazengarb Road

CPT: CPT-10

Total depth: 12.35 m



CLiq v.3.5.3.9 - CPTU data presentation & interpretation software - Report created on: 24/07/2024, 3:20:21 pm Project file: H:\Shared drives\TORLESSE\8. PROJECTS\T0399 - 160 Mazengarb Road\5. ANALYSIS & DESIGN\160 Mazengarb_nc_24-07-2024.clq