LLANDEM CONSULTING ENGINEERS LTD

BUILDING SUITABILITY REPORT

BUILDING SUITABILITY REPORT

8 HINEMOA TERRACE

TAIRUA

DATE 22 APRIL 2024
CLIENT MR T. DRUMMOND
ENGINEER DEREK STEWART
EMAIL llandemengineering@gmail.com

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1.0 INTRODUCTION

1.1 Project Details

THAMES COROMANDEL DISTRICT COUNCIL
C/o Mr T. Drummond
Taidrummond1@gmail.com

PHYSICAL	8 Hinemoa Terrace, Tairua
LEGAL	DPS 33876
AREA	Site = 600m^2

Prepared For	Mr T. Drummond	Property owner
Prepared By	Derek Stewart	Llandem Consulting Engineers

1.2 Proposal

The owner intends to relocate a second-hand dwelling in the upper southern corner of the site and construct a new garage adjacent to Hinemoa Terrace at the above address.

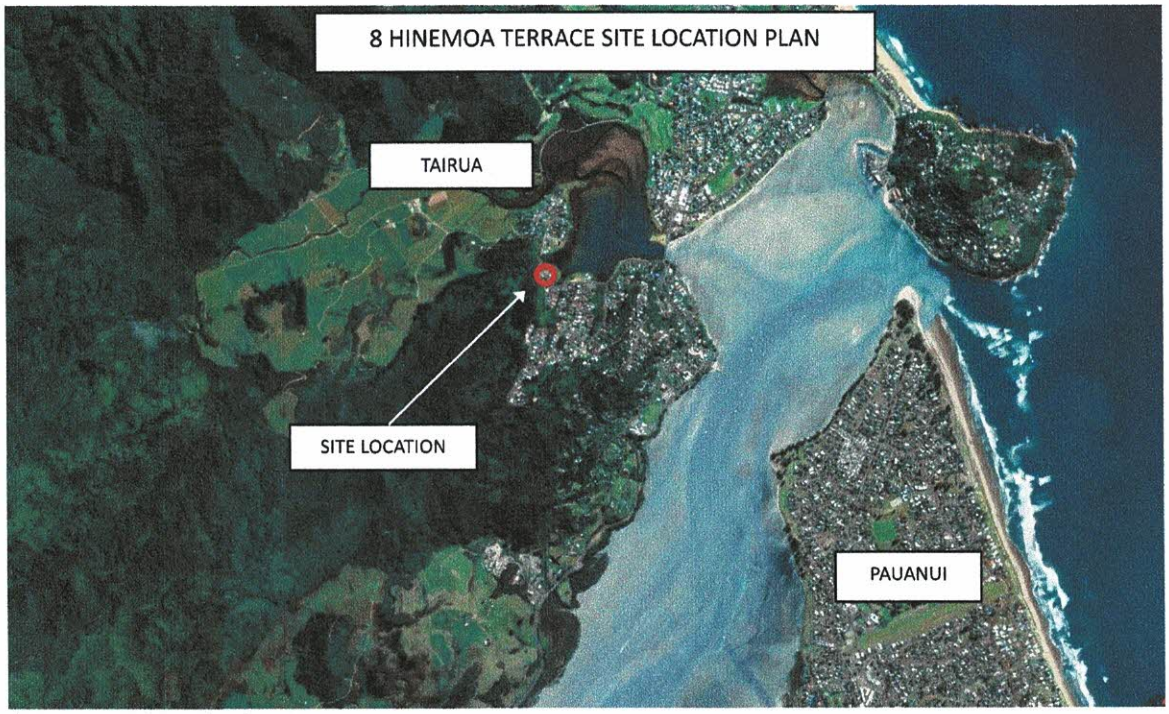
Llandem Consulting Engineers Ltd have been engaged to carry out a Geotechnical Investigation and desktop study in order to prepare a Building Suitability Report to support the proposed building consent application.
The Report will make comment and provide recommendations on the following items which apply to the proposed residential development.

- Assess building site suitability and foundation design criteria in terms of NZ Building Code requirements.
- Identify geotechnical restraints relating to the proposed building foundations.
- Provide foundation options and design criteria.
- Storm Water & Waste Water disposal options.
- Seismicity / Liquefaction Potential.

1.3 Site Conditions & Characteristics

The vacant Lot is located within a historic subdivision on an elevated ridge above the Tairua Estuary. The section slopes at 15° above the road to the upper south-eastern boundary and has good exposure to sun and prevailing winds. The site is covered in a grass swarth and has a minor cut/fill earthwork to construct a level parking platform for a boat. Currently vehicle access is not provided to site via a road crossing and as a result with need to be constructed as part of the building consent application.

(See Appendix A for Site Location Plan)



(Site Location Plan)

2.0 DESKTOP STUDY

During my desktop study TCDC 3 Waters Map was researched to locate public S/W, W/W connections, and site contours and will be referred to where applicable. (i.e. The contours highlighted a moderately steep (35 - 37°) escarpment approximately 25m to the east of a site.

(See Map in Appendix A)

3.0 GEOTECHNICAL INVESTIGATION

3.1 Geological setting

As part of my Desk Top Investigation reference has been made to the Geological Map 3 "Auckland" Scale 1: 250,000 provided by the Institute of Geological and Nuclear Sciences.

The site lithology is defined as part of the Ignimbrite Whitianga group of the Coromandel Ranges. The volcanic stratigraphy was formed during the Pliocene Period and predominantly consists of ignimbrite, pumice breccia and sediment. In general, these types of volcanism undergo moderately deep weathering with limited continuities and are suitable for residential development.

3.2 Site investigation

Our geotechnical investigation employed the following approaches to determine the geological lithology, provide a subsurface strength profile and identify features that may affect the proposed development,

- 2 x 50mm diameter hand bores
- 6 x Scala Penetrometer tests (S.P.T.)
- Site walkover to identify geological features.

(See Appendix A for Bore Logs and Test Locations highlighted on Site Plan)

3.3 Subsurface stratigraphy

The typical natural stratigraphy encountered throughout the proposed building site area is as follows.

Running Depth	Stratigraphy	Later Depth	Characteristics
0.00 – 0.05m	Topsoil	0.05m	n/a
0.05 – 1.0m	Medium dense silty loam ash	0.9m	qa = 90 – 100kpa Type S soil reactivity
1.0 – 3.0m	Stiff transitional silty clay	> 2.0	qa = 100 – 250kpa Type M soil reactivity

A ground water table was not encountered in the bores.
The Scala Penetrometer results confirmed our subsoil stratigraphy highlighting a medium dense ash extending to 1.0m below the existing ground level. Below the ash a competent C/W transitional ignimbrite was encountered which became more competent with depth i.e. with qa – allowable end bearing capacities varying between 120 - > 250kPA & SU 200 – 240++ kPa.

(See Appendix A for Scala Penetrometer Test Results)

3.4 Walkover Survey

During the course of my walkover survey no adverse geological features such as soil creep, slumping or slope instability were noted within the building site location that would affect the proposed residential development. However, the following items would need to be addressed.

- Stormwater discharge form the neighbours R.O.W above your site. Unfortunately, the R.O.W is sloping toward your section and may require a nib or channel to divert neighbouring R.O.W runoff to the road.
- The area of shallow unengineered fill should be removed or ensure pile foundations are embedded a minimum 0.9m below the fill

4.0 SEISMISCITY / LIQUEFACTION POTENTIAL

No major active faults are recorded in the vicinity of the site and accordingly, NZS 1170 Structural Design Actions Part 5 – Earthquake Action New Zealand indicates a basic value of 0.15g.
The ground conditions can be categorised as Subsoil Class C.

As the underlying natural cohesive silty clay soils are firm/stiff coupled with a depressed ground water table the potential for liquefaction during seismic shaking of the site is considered to be low.

5.0 FOUNDATION CONCLUSIONS AND RECOMMENDATIONS

In general Councils require building sites to provide a 1.5 Factor of Safety (FOS) against building site instability as set out in NZ Building Code Documents B1 – VM4. Due to the gentle sloping topography throughout the proposed building site and a lack of limiting geotechnical features a > 1.5 FOS against slope failure can be assumed.

Also, as the geotechnical investigation revealed the underlying substrata consisted of a medium dense silty loam, with (qa) allowable in-ground end bearing capacities >100kpa, the subsoil meets good ground specifications (as per NZS 3604:2011 i.e. qu > 300kpa).

As a result, foundations can be designed to NZS3604:2011 specifications for light timber framed dwellings providing the following conditions are adopted.

5.1 Piled Foundations on Slopes > 12° beyond the sewer trench

I would recommend extending all driven or cast ensitu pile foundations to a minimum of 0.9m below the natural ground surface bearing on competent ground > qa = 100kpa.

5.2 Piles located within a 45° angle from the existing S.S pipe

Where foundation piles are located within a 45° angle from the pipe invert, the piles will need to be embedded 0.8m below the zone of influence

5.3 Slabs on grade

I would recommend removing topsoil and excavating a level building platform. A minimum 0.2m depth of imported GAP40 hardfill can be used as a fill material compacted to a minimum qa = 100kPa. Note – due to the sloping topography it is likely an engineer designed retention structure will be required to retain cut batters above the proposed garage adjacent to the southern boundary and or where retained heights exceed 0.6m.

6.0 STORMWATER DISPOSAL

It is a TCDC mandatory requirement to attenuate stormwater flows to match pre-development surface runoff for sections < 2,500m^2. As this particular section us less than 2,500m^2 a TCDC approved above or inground detention tank will be required to attenuate roof runoff based on the following design parameters.

7.0 WASTEWATER DISPOSAL

Based on the TCDC 3 Waters Map an existing public S.S connection is located on site which can be utilised for wastewater disposal.

8.0 LIMITATIONS

This report has been prepared for **Mr T. Drummond** and should not be used without reference to LLANDEM CONSULTING ENGINEERS LTD.

Note inferences about the nature and continuity of subsoils away from the investigation points are made but cannot be guaranteed.

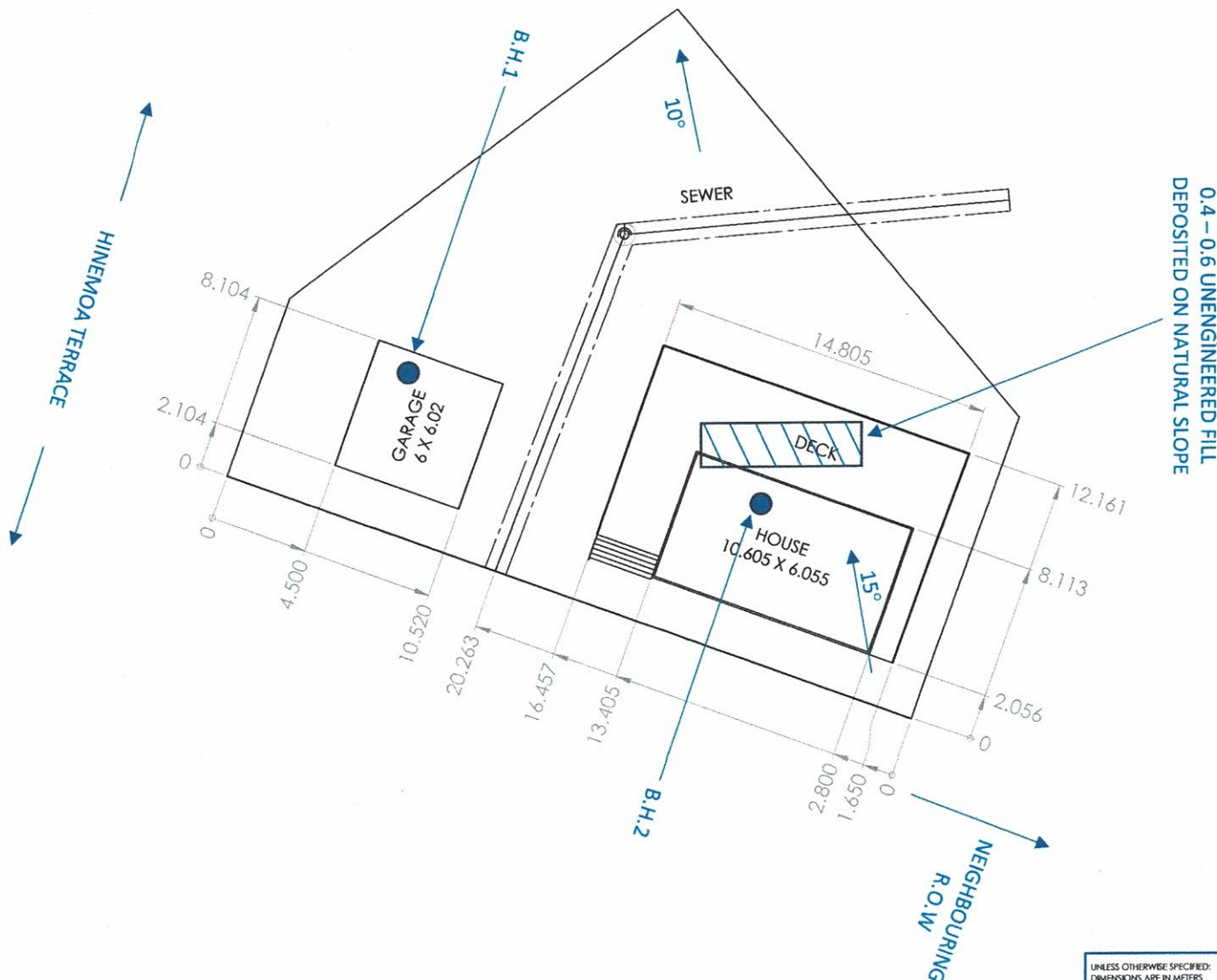
No allowance has been made for deep-seated global failures of the eastern escarpment effecting the building site.

Prepared By:

Derek Stewart CP Eng. MIPENZ
LLANDEM CONSULTING ENGINEERS LTD

APPENDIX A

- SITE LAYOUT, TEST LOCATION & BUILDING SITE LOCATION PLAN
- TCDC 3 WATERS MAP
- S.P.T. RESULTS
- BORE LOGS



8 HINEMOA TERRACE
SITE LAYOUT & TEST LOCATION PLAN

JOHN DRUMMOND DESIGN
LBP DESIGN 2

TITLE:
SITE PLAN
8 HINEMOA TERRACE
TAIRUA

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN METERS

	NAME	DATE
DRAWN	T. DRUMMOND	23/02/24
CHK'D	J. DRUMMOND	23/02/24

DWG NO.
8-HINEMOA-001

A3

REV 0

SCALE:1:200 DO NOT SCALE DRAWING SHEET 1 OF 1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Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors

TYPICAL SCALA PENETROMETER TEST RESULTS

SPT 1
0.05m BELOW GROUND LEVEL ADJACENT TO B.H.1.

DEPTH	qa = Kpa
0.05 – 0.37	98
0.37 – 0.67	100
0.67 – 0.9	120

SPT 2
0.05m BELOW GROUND LEVEL ADJACENT TO B.H.2

DEPTH	qa = Kpa
0.05 – 0.350	100
0.350 – 0.57	130
0.57 – 0.9	110

SPT 3
1.0m BELOW GROUND LEVEL IN B.H.1.

DEPTH	qa = Kpa
1.0 – 1.2	150
1.2 – 1.5	170
1.5 – 1.87	1.70
1.87 – 2.0	250

SPT 4
1.0m BELOW GROUND LEVEL IN B.H.2.

DEPTH	qa = Kpa
1.0 – 1.2	85
1.2 – 1.5	190
1.5 – 1.74	235

CLIENT: MR T. DRUMMOND LOCATION: 8 HINEMOA TERRACE, TAIRUA	Logged/ Checked:	Sheet ___1 Of ___1	Job #
	Diameter: 50mm	Date:10/04/2024	Borehole 1
	Weight		Probe #

Stratigraphy	SOIL DESCRIPTION T = Topsoil, C = Clay, S = Sand, P = Peat, F = Fill, Si = Silt, G = Gravel, R = Rock	Legend	Depth (m) GL (m)	Water Level	Shear Vane Dial (kPa)	Residual Strength (kPa)	Sensitivity	Probe Blows	Comments Samples Other Tests
	Dense brown silt fill 300 thick	F	0.10						
	Very dense orange silty ash - Natural	Si	0.30 0.50						
	Becomes less dense & cohesive - light brown		0.80 1.00						
	Becomes a silty clay	C	1.30 1.50						
	Becomes cohesive & moist clayey silt		2.00			200			
		C/Si	2.30 2.50			240+			
	E.O.B No ground water table encountered.		3.00			U.T.P			
			3.50						
			4.00						
			4.50						
			5.00						

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CLIENT: MR T. DRUMMOND LOCATION: 8 HINEMOA TERRACE, TAIRUA	Logged/ Checked:	Sheet ___1 Of ___1	Job #
	Diameter: 50mm	Date:10/04/2024	Borehole 2
	Weight		Probe #

Stratigraphy	SOIL DESCRIPTION T = Topsoil, C = Clay, S = Sand, P = Peat, F = Fill, Si = Silt, G = Gravel, R = Rock	Legend	Depth (m) GL (m)	Water Level	Shear Vane Dial (kPa)	Residual Strength (kPa)	Sensitivity	Probe Blows	Comments Samples Other Tests
	Topsoil Medium dense brown silty ash	T	1.50 0.50						
	Firm to stiff brown silty clay	C	1.00						
	Becomes a stiff orange silty clay		1.20 1.50						
	Becomes moist	C	1.70 2.00			240+			
	Becomes brown clayey silt. Cohesive.	C/Si	2.30 2.50			240+			
	E.O.B No ground water table encountered		2.90 3.50 4.00 4.50 5.00			240++			

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