Before the Hearing Panel
Appointed by the West Coast Regional Council

Under	the Resource Management Act 1991
In the matter of	a hearing on submissions on the proposed Te Tai o Poutni Plan
	Hearing Stream Rural, Rural Lifestyle and Settlement Zones
	Tauranga Bay Holdings Limited
	Submission Numbers: 597 / Further submission: 32

Evidence of Andrei Cotiga

4 July 2024

Introduction

1 My name is Andrei Cotiga.

2 I have completed a Bachelors of Engineering with Honours, a Masters in Geotechnical Engineering, and I am a Chartered Member of Engineering New Zealand.

3 I am employed by Eliot Sinclair and have held this position since October 2022.

4 My previous work experience includes 18 years of experience in Geotechnical Engineering.

5 An assessment report was carried out in November 2022. The report was reviewed from a geotechnical point of view by Stuart Challenger on 18 October 2022.

6 Stuart Challenger is no longer employed with Eliot Sinclair. For this Evidence I have read the existing report, confirm that I fully agree with the presented information, and will herein refer to it as my own.

7 I have reviewed the Technical Report – TTPP Zone Change Assessment (**attached** as Appendix A) supporting the submission of Tauranga Bay Holdings Limited (**the Submitters**), relating to the following land at Tauranga Bay Road, Cape Foulwind, Westport (**the Site**):

(a) Section 41 SO 13711

(b) Section 2 SO 14304

(c) Lot 1 DP 19769 and

(d) Lot 1 DP 12325

8 The Submitters seek the rezoning of the Site from proposed General Rural and Rural Lifestyle Zone to Rural Residential Precinct, Rural Lifestyle and General Rural Zone as part of the Te Tai Poutini District Plan process.

9 This evidence provides a brief summary of my Geotechnical assessment.

Code of Conduct for Expert Witnesses

10 While this is not a hearing before the Environment Court, I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court of New Zealand Practice Note 2023 and that I have complied with it when preparing my evidence. Other than when I state I am relying on the advice of another person, this evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

Executive Summary

11 My assessment supports inclusion of the Site within Rural Residential Precinct, Rural Lifestyle and General Rural zones.

12 The report supporting the original submission detailed the findings of a geotechnical assessment of the site to identify its suitability for re-zoning, from a geotechnical and natural hazards perspective. We found that the site is not subject to any natural hazards that would prevent the proposed zoning change. The underlying ground conditions are suitable for the construction of typical residential foundations, with the requirement that individual geotechnical reports be prepared for each building location, which is a standard part of the building consent process.

13 Since the time of the submission we have undertaken further geotechnical testing of the site. The additional testing consisted of six machine dug test pits in the southern corner of the site (site plan and test pit logs **attached** as Appendix B). At these test locations, similar ground conditions to those described in the original report and submission were encountered. This shows the ground conditions are consistent across a larger area of the site, and further supports the findings of the original report and submission.

Rebuttal of Council Decision

14 I acknowledge the Councils S24A recommendation to reject the rezoning submission, however, I note that no issues have been raised involving geotechnical considerations of or natural hazards.

Conclusion

15 The matters raised by the council do not change my overall recommendation in regard to the rezoning of the site from a geotechnical or natural hazards perspective.

16 I am satisfied that the proposed rezoning is a suitable outcome for Site, provided site specific geotechnical assessment is undertaken of any future building areas.

Dated 4 July 2024

Andrei Cotiga

Geotechnical Engineer

BE (Hons) Civil ME CPEng

Appendix A – Technical Report – TTPP Zone Change Assessment

Technical Report – TTPP Zone Change

Sec 2 SO 14304, Sec 41 SO 13711, Lot 1 DP 19769 & Lot 1 DP 12325

Prepared for Tauranga Bay Holdings

510783

eliot sinclair

Technical Report – TTPP Zone Change

Sec 2 SO 14304, Sec 41 SO 13711, Lot 1 DP 19769 & Lot 1 DP 12325

Prepared for Tauranga Bay Holdings

510783

Quality Control Certificate

Eliot Sinclair & Partners Limited

eliotsinclair.co.nz

Action	Name	Signature	Date
Prepared by:	Shannon Hopkins Survey Technician		19 September 2022
Reviewed by:	Stuart Challenger Civil Engineer | Branch Manager, Hokitika BE NatRes BSc CMEngNZ CPEng		18 October 2022
Directed and approved for release by:	Claire McKeever Resource Management Planner | Associate BSurv(Hons) MS+SNZ MNZPI claire.mckeever@eliotsinclair.co.nz		3 November 2022
Status:	Final		
Release date:			
Reference no:	510783		
Distributed to:	Tauranga Bay Holdings		

Contents

1. Introduction

1.1. Scope of Works

Eliot Sinclair has been engaged by Tauranga Bay Holdings Ltd to undertake a geotechnical investigation on Section 41 SO 13711, Sec 2 SO 14304, Lot 1 DP 19769 and Lot 1 DP 12325, Tauranga Bay Road, Cape Foulwind. The purpose of the investigation was to:

- Assess the site's environmental hazards to determine site suitability for future development, to support an application for a zone change in relation to the proposed Te Tai Poutini Plan.
- Investigate the shallow ground conditions to determine minimum foundation requirements for future dwellings.
- Provide information in relation to the provision and availability of services to the site.

2. Site Description

2.1. Legal Description

The legal description of the sites is Section 41 SO 13711, Sec 2 SO 14304, Lot 1 DP 19769 and Lot 1 DP 12325. The sites are all held in one record of title at present being RT 747162. The four sites have a total area of nearly 100 ha. (Note that the whole of the RT is not included as there is a current subdivision application in progress for Sec 39 SO 13711) The sites are located on the south-eastern side Tauranga Bay Road and front Wilsons Lead Road, extending approximately 380m on either side of the road from the turn off. The site is in Cape Foulwind, which is roughly 12km west of Westport. Figure 1 below illustrates an overview of the site location.

Figure 1. Figure showing location of site (Eliot Sinclair, 2022)

2.2. Proposed Plan Zone Change

The sites are at present located within the Rural Environment Zone under the operative District Plan.

The proposed Te Tai Poutini Plan (TTPP) shows the intended zoning of the site as Rural Lifestyle and General Rural Zone. There is proposed areas of Rural Residential located to the north and west of the site. This technical report is being undertaken to provide supporting information in relation to rezoning areas of the site as Rural Residential. Figure 2 below is an overview of the proposed zoning from the TTPP.

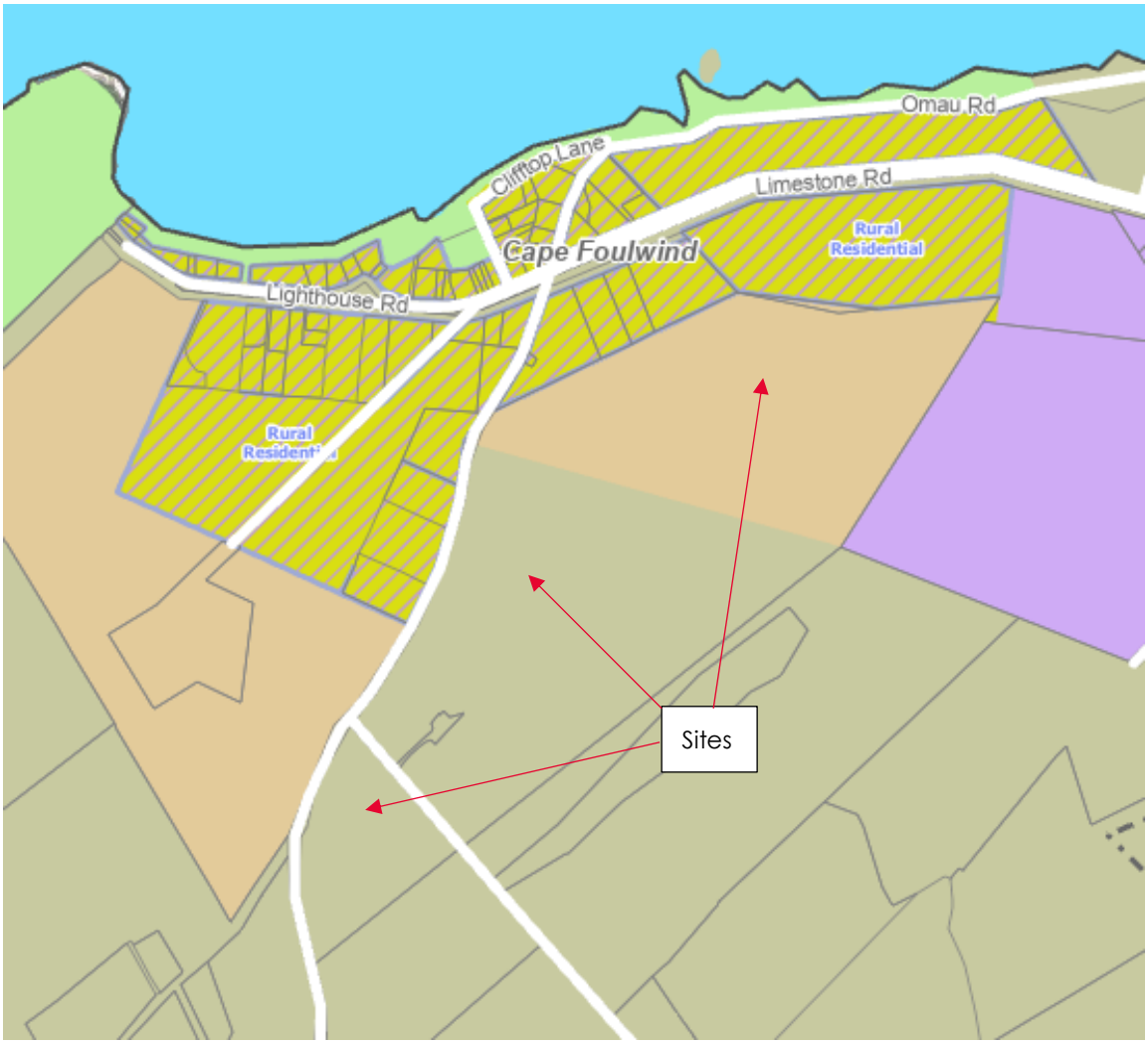

Figure 2. Intended zoning of site under the TTPP (draft TTPP 2022, https://westcoast.isoplan.co.nz/eplan/)

2.3. Geology

Geological mapping[1] of the area notes the site is underlain with Late Pleistocene shoreline deposits (Q5b) consisting of marine sand and gravel.

The GNS database[2] indicates the closest active fault is the Lower Buller Fault, which lies approximately 13.5km to the south-east, the Alpine Fault is located approximately 89km to the south-east of the site. The area is in the NZS3604: 2011 Zone 3 earthquake rating zone.

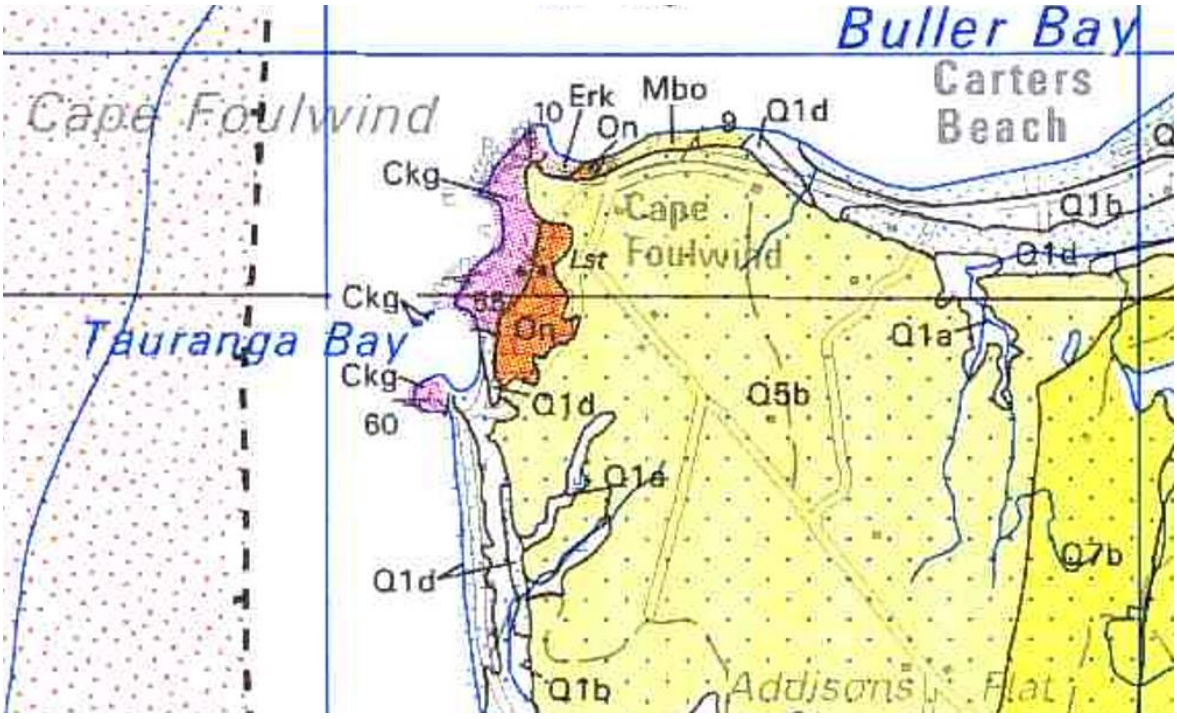

Figure 3. Geology of the area (Geology of the Greymouth Area, Institute of Geological and Nuclear Sciences, 2002, Pg 12)

2.4. Topography

The site is large with a total area of nearly 100 ha. It has been cleared and is in rough pasture. The site is undulating with drainage channels, shallow gullies, and large areas of flat land, being the areas that have been investigated in relation to the future rural residential type of use of the sites. Figure 4 below is an aerial overview of the sites.

[1] Nathan, S., Rattenbury, M.S., Suggate, R.P. (compliers) 2002. Geology of the Greymouth area. Institute of Geological and Nuclear Sciences 1: 250 000 geological map 12. 1 sheet + 58p. Lower Hutt, New Zealand. Institute of Geological and Nuclear Sciences Limited

[2] https://data.gns.cri.nz/af/

Figure 4. Aerial photo showing vegetation on site and gullies running through the site

3. Geotechnical Investigation

Two separate geotechnical investigations have been undertaken over the sites. An in-depth investigation has been undertaken on Sec 41 SO 13711 (ES Job No 510322) as it is likely to form the initial subdivision application in the future for the sites. A further broader investigation has been undertaken on Sec 2 SO 14304, Lot 1 DP 19769 and Lot 1 DP 12325 being the sites located on the north side of Wilsons Lead Road to allow for reporting in support for a zone change.

An Investigation has also previously been undertaken on Sec 39 SO 13711 (ES Job No. 510402) which indicates the presence of Iron Pan at shallow depths east of the site.

3.1. Investigation of Sec 41 SO 13711

On the 3rd May 2022 we undertook our geotechnical site investigation which consisted of a site walkover, sixteen scala penetrometer tests, and the inspection of twelve machine dug test pits. The full Site Investigation Records can be found in Appendix B. Our testing was undertaken in fifteen locations, labelled A – O and illustrated in Figure 5, and through Figures 6 - 9.

3.2. Investigation of Sec 2 SO 14304, Lot 1 DP 19769 and Lot 1 DP 12325

On the 8th August 2022 a geotechnical site investigation was undertaken to support the application for a zone change, this investigation included a site walkover, five machine dug test pits and measurement of percolation rates in two of the test pits. Due to the nature of the previous investigation on Sec 41 SO 13711 and another investigation on Sec 39 SO 13711 also undertaken for Tauranga Bay Holdings, this broader investigation allowed us to make informed recommendations on the site for future rural residential use. The location of our test pits can be found in Figure 10, labelled P – T.

The two Falling Head Permeameter tests were undertaken at locations P & Q.

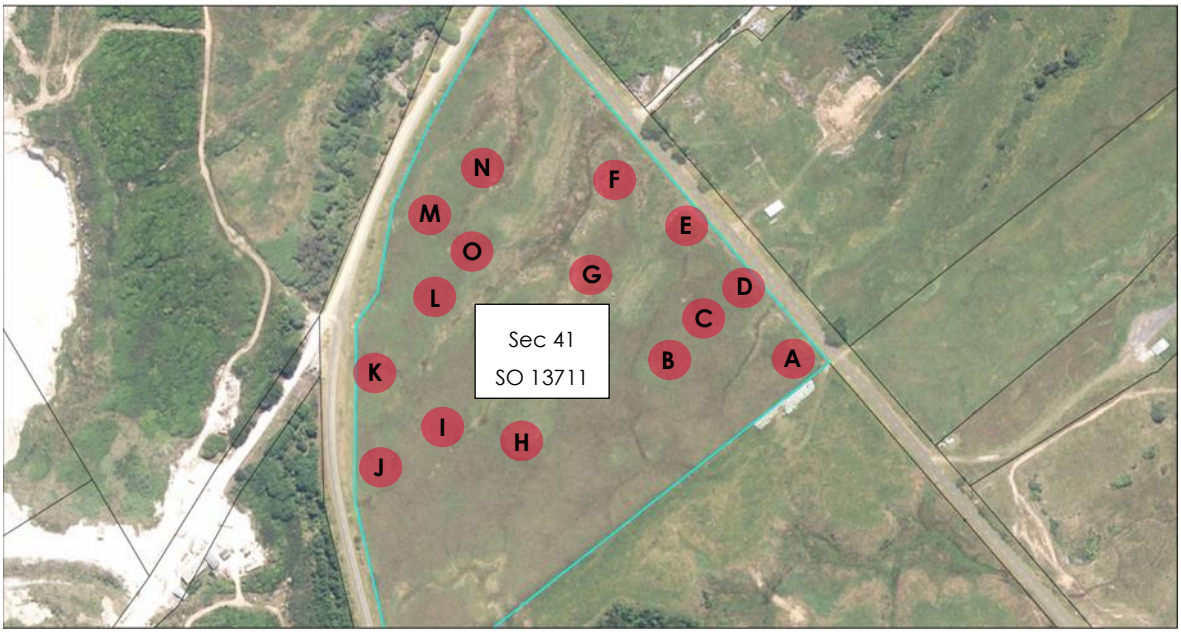

Figure 5. Aerial of the site indicating the areas investigated (Eliot Sinclair, 2022).

Figure 6. Test location areas investigated (Eliot Sinclair, 2022)

Figure 7. Test location areas investigated (Eliot Sinclair, 2022)

Figure 8. Test location areas investigated (Eliot Sinclair, 2022)

Figure 9. Test location areas investigated (Eliot Sinclair, 2022)

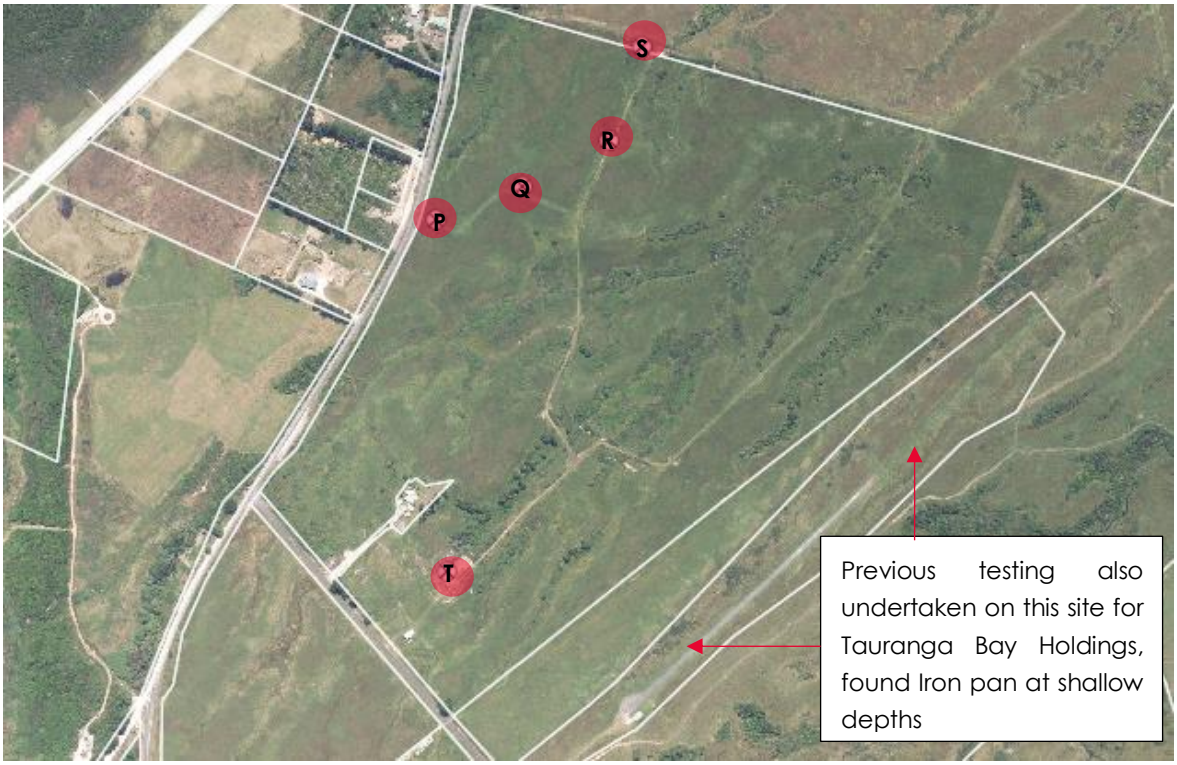

Figure 10. Additional test pits undertaken on 8th August 2022

3.3. Geotechnical Summary

3.3.1. Iron pan

From our geotechnical investigation we confirm the presence of shallow iron pan underlies the site which was encountered at each of the fifteen locations investigated on Sec 41. Iron pan was also found at shallow depths for all 5 additional Test Pits. (P – T) The iron pan was encountered at depths ranging between 0.2m – 1.55m below the existing ground level. Under the iron pan layer was dense sand which can provide strong bearing capacity greater than "Good Ground" requirements as defined in NZS3604: 2011.

Iron Pan was also located at shallow depths for the previous testing undertaken for Tauranga Bay Holdings on Sec 39 SO 13711, east of the sites and shown in Figure 10 above.

3.3.2. Groundwater

Test pits ranged in depths of between 1.4m and 2.9m below the existing ground level and groundwater was not encountered in any of the test pits.

3.4. Geotechnical overview by Area

Table 1. Summary of depth to iron pan encountered in each area investigated

Area	Test no.	Test pit depth to iron pan	Scala depth to iron pan	Depth of test pit
A	01, 02	0.6m	0.7m – 0.9m	2.2m
B	03, 04	0.45m	0.4m – 0.6m	2.4m
C	05	-	0.6m	-
D	06	0.2m	-	2.0m
E	07	1.2m	1.2m	2.3m
F	08	0.2m	0.25m	1.4m
G	09	0.3m	0.3m	2.2m
H	10	0.35m	0.4m	2.2m
I	11	0.5m	0.45m	2.2m
J	12	1.55m	1.5m	2.9m
K	13	0.8m	0.6m	2.2m
L	14	0.4m	0.4m	2.0m
M	15	0.3m	0.25m	2.0m
N	16	-	0.55m	-
O	17	-	0.3m	-
p	18	0.3m	-	2.8m
Q	19	0.4m	-	2.8m

Area	Test no.	Test pit depth to iron pan	Scala depth to iron pan	Depth of test pit
R	20	0.9m	-	1.2m
S	21	0.8m	-	2.0m
T	22	Surface	-	2.0m

4. Natural Hazards

At the time of a future subdivision application for these sites council can refuse subdivision consent if there is a significant risk from natural hazards. To determine whether there is a significant risk from natural hazards, decision-makers are guided by the requirements of RMA Section 106(1A). This requires a combined assessment of:

- The likelihood of natural hazards occurring (whether individual or in combination).
- The material damage that would result from natural hazards to land where the consent is sought, neighbouring land, or structures.
- Any likely subsequent use of the land where the consent is sought that would accelerate, worsen, or result in material damage of the kind referred to in the previous point.

Decision-makers are required to consider the magnitude of risk of natural hazards, including natural hazards that have a high impact but low probability of occurrence. This aligns the assessment with the definition of *'effect'* Section 3 of the RMA.

The RMA defines natural hazards as: *Any atmospheric or earth or water related occurrence (including earthquake, tsunami, erosion, volcanic and geothermal activity, landslip, subsidence, sedimentation, wind, drought, fire, or flooding) the action of which adversely affects or may adversely affect human life, property, or other aspects of the environment.*

Hazard identification is a key component of any site-specific risk assessment. The risk assessment for relevant natural hazards at the site is presented below, which considers the likelihood and consequences of the hazard at the site in the context of the proposed activity (future rural residential subdivision) as compared against the current site context.

We have considered the risk of subsidence, falling debris, erosion, tsunami, land slippage, sedimentation, wind, drought, fire, geothermal activity, climate change, sea level rise, and volcanic activity and conclude these are very unlikely to pose an unacceptable risk to life at this site.

In relation to other potential natural hazards, we comment as follows.

4.1. Earthquake Shaking

NZ is a seismically active country. New buildings and infrastructure will be designed, consented, and built to acceptable industry standards and New Zealand Building Code requirements and as such will be designed for any likely shaking as detailed in the current design codes, which will address the risk.

4.2. Earthquake Fault Rupture

There are no recorded active fault traces across the site. The site is not located within a fault hazard area or fault avoidance zone. The closest active fault is the Lower Buller Fault, which lies approximately 13.5km south-east of the site.

4.3. Liquefaction

The site is classified in the West Coast Regional Liquefaction Assessment[3] as being in an area where liquefaction damage is unlikely. The site is underlain with Late Pleistocene shoreline deposits (Q5b) consisting of marine sand and gravel. This composition, which was confirmed onsite during our geotechnical investigation, is not considered susceptible to liquifying and therefore we consider there to be negligible risk of damage caused by liquefaction from a seismic event.

5. Foundation Recommendations

Based on our geotechnical investigation, we consider the shallow iron pan can provide bearing capacity in excess of that required for "Good Ground" as defined in NZS3604: 2011. Our testing confirms the twenty areas we undertook our testing are appropriate building areas. The iron pan layer in these areas investigated was encountered between the surface and 1.55m below the existing ground level.

For each of the twenty areas we investigated; A – T, we recommend That foundations in accordance with NZS3604: 2011 be used. We do not recommend the use of driven timber piles because of the iron pan layer, which may stop the piles reaching the required minimum depth, plus Area J (test 12) did not meet the requirements for driven timber piles.

Where the iron pan was encountered within the top 600mm from the surface, we consider foundations which extend into the Good Ground we consider the iron pan layer be used. We anticipate this to be the case for areas B, C, D, F, G, H, I, L, M, N, O, P, Q and T.

In the areas where the iron pan layer was encountered deeper than 600mm from the existing ground level, we recommend a gravel raft into which NZS3604: 2011 foundations can be used. Excavation to the iron pan will be required and backfilled with compacted clean sandy gravels. We anticipate this to be the case for areas A, E, J, K, R and S.

[3] Beca Limited. West Coast Regional Liquefaction Assessment, 1 November 2021

6. Infrastructure Requirements

6.1. Potable Water

There is no Council reticulated water available to the site. Rainwater tanks will be required for water supply for the site. We recommended that a leaf diverter and a first flush diverter be installed.

When establishing the roof water tanks it is important that the requirements of SNZ PAS 4509: 2008 are followed. These requirements will depend on the subdivision layout and can be established following change in zoning.

6.2. Stormwater

There are no Council storm water drains in the local area, stormwater overflow from the rainwater tanks will need to be discharged appropriately without causing erosion or ponding. If onsite stormwater disposal is required, the underlying iron pan is a limiting infiltration layer and will need to be considered.

Once the iron pan layer was broken, soakage was found within the underlying sands. The Falling Head infiltration testing undertaken found soakage of between 200mm/hr and 300mm/hr (2.8m deep test pits). We consider that stormwater soak pits can be designed using a conservative soakage rate of 100mm/hr, lowest value and using a safety factor of two.

There is several existing drains and gullies on site that can also be used to manage the flow of stormwater.

6.3. Wastewater

There is no Council sewer available to the site. Onsite wastewater treatment and disposal will be required. Whilst our test pits did not encounter groundwater within 3.0m of the ground surface, the falling head infiltration test showed an indicative permeability of between about 1 and 1.5m/day (using a safety factor of between 3 and 5 plus multiplying by 24hrs to get metres per day). From the test pits which show dense sands and the infiltration rate we assess the soils to be massive loams with a soil category of 3.

The design of any on-site wastewater system should be undertaken in accordance with AS/NZS1547: 2012 for massive loam with a soil category of 3.

The operative district plan and draft TTPP have minimum areas for non-sewered sites (1500m² and 1000m² respectively) it would be expected that any future lots have areas more than these minimum requirements to ensure sufficient space on-site to treat wastewater.

6.4. Vehicle Access

There is currently access to the sites from both Wilsons Lead Road and Tauranga Bay Road. There is a location approximately 30m south of the existing access on Tauranga Bay Road to Lot 1 DP 19769 where sight distance of more than 300m can be achieved in both directions. The existing site accesses either side of Wilsons Lead Road also have good sight distances, see attached photos in Appendix A showing sight from existing or proposed accesses.

It is expected that any future accesses to the site will be designed and built to meet the required access standards dependent on the number of allotments serviced.

6.5. Power Reticulation

Communications with Buller Network have confirmed that the 11kv line running in front of and adjacent to the sites has sufficient capacity to supply future subdivisions of a rural-residential nature, specific design would be required for each individual future subdivision dependent on layout.

6.6. Telecommunications

There is Chorus telecommunications running underground along both Tauranga Bay Road and Wilsons Lead Road. Due to the rural – residential nature of the site future subdivisions would possibly look at facilitating telecommunications via cellular coverage and satellite internet/phone reducing the need for terrestrial connections. There is a large selection of providers for both cellular phone coverage and wireless broadband. See Figures 11 and 12 below for Spark and Vodafone coverage in the area.

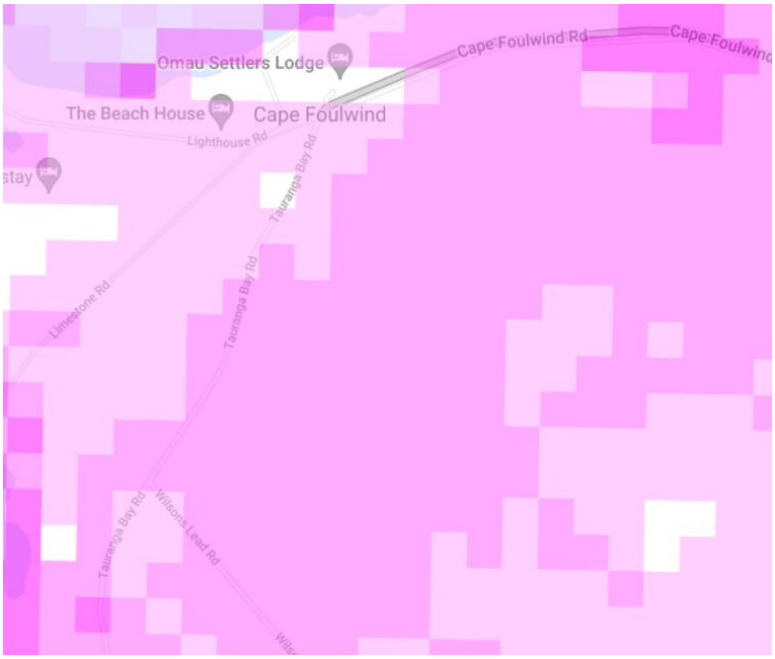

Figure 11. Spark 4G coverage in the area (https://www.spark.co.nz/shop/mobile/network/)

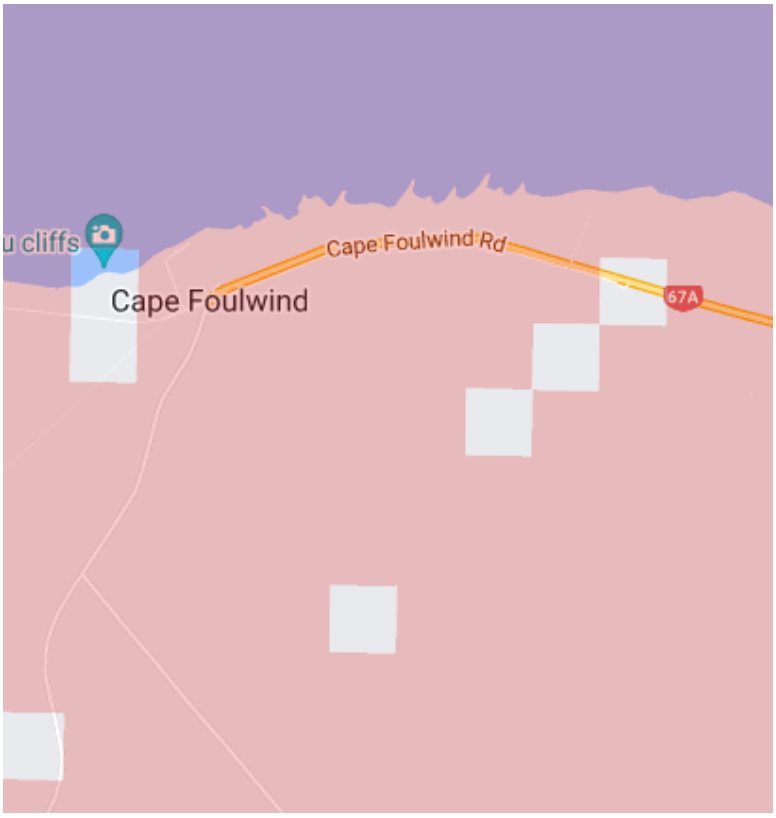

Figure 12. Vodafone Rural Broadband coverage (https://www.vodafone.co.nz/network/coverage/)

7. Conclusion

Based on our geotechnical investigation, we consider Section 41 SO 13711, Sec 2 SO 14304, Lot 1 DP 19769 and Lot 1 DP 12325 Tauranga Bay and Wilsons Lead Road are suitable for subdivision with allotments of a rural-residential nature being possible.

We recommend that new building foundations be in accordance with NZS3604: 2011 and extend into the Good Ground either with deep foundations or in conjunction with a gravel raft.

We do not consider the site will be subject to any natural hazards and will not create any hazards if developed under the direction of suitably qualified individuals. It is expected that any future subdivision applications will provide site specific engineering reports dealing with natural hazards and foundation requirements.

Disclaimer

This report has been prepared by Eliot Sinclair & Partners Limited ("Eliot Sinclair") only for the intended purpose as a technical supporting documentation for a resource consent application.

The report is based on Eliot Sinclair desk top review and site investigation of 14 July 2022. In addition, we have considered information from the Institute of Geological and Nuclear Sciences 1: 250 000 geological map 12 and the Te Tai o Poutini Plan.

Where data supplied by Tauranga Bay Holdings or other external sources, including previous site investigation reports, have been relied upon, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by Eliot Sinclair for incomplete or inaccurate data supplied by other parties.

Whilst every care has been taken during our investigation and interpretation of subsurface conditions to ensure that the conclusions drawn, and the opinions and recommendations expressed are correct at the time of reporting, Eliot Sinclair has not performed an assessment of all possible conditions or circumstances that may exist at the site. Variations in conditions may occur between investigatory locations and there may be conditions such as subsoil strata and features that were not detected by the scope of the investigation that was carried out or have been covered over or obscured over time. Eliot Sinclair does not provide any warranty, either express or implied, that all conditions will conform exactly to the assessments contained in this report.

The exposure of conditions or materials that vary from those described in this report, or occurrence of additional strong seismicity, or any update to the Building Act, NZBC or MBIE's Guidance may require a review of our recommendations. Eliot Sinclair should be contacted to confirm the validity of this report should any of these occur.

This report has been prepared for the benefit of Tauranga Bay Holdings and the Buller District Council. for the purposes as stated above. No liability is accepted by Eliot Sinclair or any of their employees with respect to the use of this report, in whole or in part, for any other purpose or by any other party.

Appendix A. Site photographs

Figure 1. Photo showing sight distance looking SW from likely access location to northern site off Tauranga Bay Road

Figure 2. Photo showing sight distance looking NE from likely access location to northern site off Tauranga Bay Road

Figure 3. Photo showing typical ground conditions on site, these surface conditions are expected where shallow iron pan limits surface water from draining away

Figure 4. Photo showing surface conditions if topsoil and iron pan is removed, creating dry land suitable for residential use

Figure 5. Photo of test pit at location P, underlying iron pan can be seen overlying sand

Figure 6. Photo of Falling Head Permeameter testing being undertaken

Figure 7. Photo of sight distance from access to Sec 41 along Wilsons Lead Road looking NW

Figure 8. Photo of sight distance from access to Sec 41 along Wilsons Lead Road looking SE

Appendix B – Additional Testing

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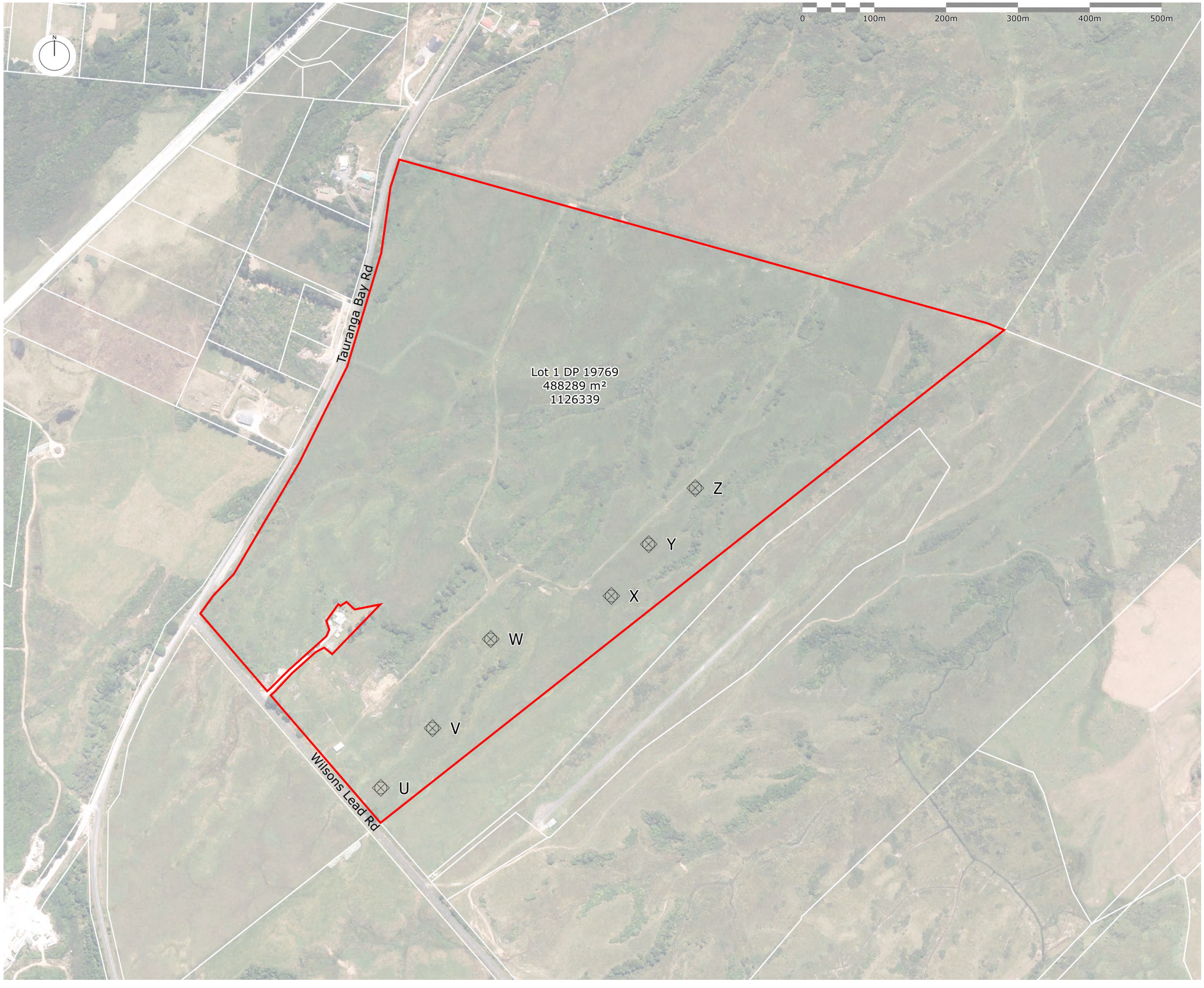


NOTES
1. Contractors to verify all dimensions and the location of all underground services on site prior to commencing work.
2. Unless noted otherwise, all work shall be undertaken in accordance with the NZBC and any relevant Territorial Authority Engineering Standards and Specifications as a minimum standard.

LEGEND

Test Pit

LINZ NZ Primary Parcels

REV.	DRAWN	DATE	NOTE
A	GIS	27.06.24	Preliminary

CLIENT

XX

DESIGNED	**GIS**
DRAWN	**GIS**
CHECKED	**XX**
APPROVED	**27.06.24** **XX**
STATUS	**PRELIMINARY**
SCALE	**1:5000** **[A3]**

TESTING LOCATIONS PLAN FROM CORE-GS

XX
XX

XX
XX

PROJECT	SET	SHEET	REV.
510783	**01**	**XXXX**	**A**

eliot sinclair

Site Investigation Record

Client: Tauranga Bay Holdings Ltd

Site: Wilsons Lead Road, Cape Foulwind

Technical Category: N/A

Lot: 1 **D.P.:** 19769

Date Tested: 8-Jun-2023

Log Sheet No.: 1 of 1 **Project No.:** 510783

Dynamic Cone Penetrometer (DCP) Test Results

Number of Blows per 100mm

Depth (m)

Soil Profile

Test Location U

Water

0.0 – SILT, with minor sand; brown. Damp; Rootlets.

0.4 – SAND; orange. Dry; Iron Pan.

0.6 – SAND; light brown. Dry to damp; Very Firm Sandstone.

2.0 – EOH: 1.9m

Groundwater Not Encountered

U

Minimum penetration resistance (based on 300mm wide footing founded at 300mm depth) required for 'Good Ground' as defined in the Acceptable Solutions and Verification Methods for NZBC Clause B1 Structure.

Site Plan: (Not to Scale)

Comments:

Field Staff:	Prepared By:	Soil Profile From:
SJH	SJH	☐ Hand Auger
Job Manager:	**Approved By:**	☐ Spade Hole
AC	AC	☑ Test Pit

Note: This record identifies the geotechnical conditions encountered at the noted test location(s) only. It is possible that ground conditions could be different away from the point(s) of testing.

Site Investigation Record

Client: Tauranga Bay Holdings Ltd

Site: Wilsons Lead Road, Cape Foulwind

Technical Category: N/A

Lot: 1 **D.P.:** 19769

Date Tested: 8-Jun-2023

Log Sheet No.: 1 of 1 **Project No.:** 510783

Dynamic Cone Penetrometer (DCP) Test Results

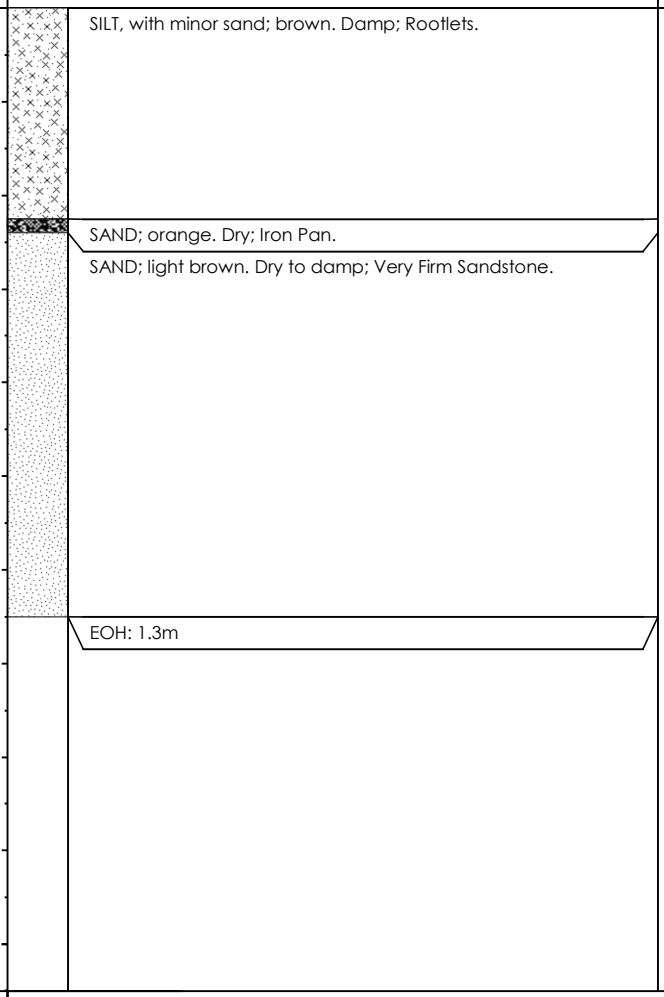
Number of Blows per 100mm

Depth (m)

Soil Profile

Test Location V

Water



V

Minimum penetration resistance (based on 300mm wide footing founded at 300mm depth) required for 'Good Ground' as defined in the Acceptable Solutions and Verification Methods for NZBC Clause B1 Structure.

Site Plan: (Not to Scale)

Comments:

Field Staff:	Prepared By:	Soil Profile From:
SJH	SJH	☐ Hand Auger
Job Manager:	**Approved By:**	☐ Spade Hole
AC	AC	☑ Test Pit

Note: This record identifies the geotechnical conditions encountered at the noted test location(s) only. It is possible that ground conditions could be different away from the point(s) of testing.

Site Investigation Record

Client: Tauranga Bay Holdings Ltd

Site: Wilsons Lead Road, Cape Foulwind

Technical Category: N/A

Lot: 1 **D.P.:** 19769

Date Tested: 8-Jun-2023

Log Sheet No.: 1 of 1 **Project No.:** 510783

Dynamic Cone Penetrometer (DCP) Test Results

Number of Blows per 100mm

Depth (m)

Soil Profile

Test Location W

Water

0.0 – SILT, with minor sand; brown. Damp; Rootlets.

0.4 – SAND; orange. Dry; Iron Pan.

SAND; light brown. Dry to damp; Very Firm Sandstone.

1.6 – EOH: 1.6m

Groundwater Not Encountered

W

Minimum penetration resistance (based on 300mm wide footing founded at 300mm depth) required for 'Good Ground' as defined in the Acceptable Solutions and Verification Methods for NZBC Clause B1 Structure.

Site Plan: (Not to Scale)

Comments:

Field Staff:	Prepared By:	Soil Profile From:
SJH	SJH	☐ Hand Auger
Job Manager:	**Approved By:**	☐ Spade Hole
AC	AC	☑ Test Pit

Note: This record identifies the geotechnical conditions encountered at the noted test location(s) only. It is possible that ground conditions could be different away from the point(s) of testing.

Site Investigation Record

Client: Tauranga Bay Holdings Ltd

Site: Wilsons Lead Road, Cape Foulwind

Technical Category: N/A

Lot: 1 **D.P.:** 19769

Date Tested: 8-Jun-2023

Log Sheet No.: 1 of 1 **Project No.:** 510783

Dynamic Cone Penetrometer (DCP) Test Results

Number of Blows per 100mm

Depth (m)

Soil Profile

Test Location X

Water

0.0 – SILT, with minor sand; brown. Damp; Rootlets.

0.2 – SAND; orange. Dry; Iron Pan.

0.4 – SAND; light brown. Dry to damp; Very Firm Sandstone.

0.6

0.8

1.0

1.2 – EOH: 1.2m

1.4

1.6

1.8

2.0

Groundwater Not Encountered

X

Minimum penetration resistance (based on 300mm wide footing founded at 300mm depth) required for 'Good Ground' as defined in the Acceptable Solutions and Verification Methods for NZBC Clause B1 Structure.

Site Plan: (Not to Scale)

Comments:

Field Staff:	Prepared By:	Soil Profile From:
SJH	SJH	☐ Hand Auger
Job Manager:	**Approved By:**	☐ Spade Hole
AC	AC	☑ Test Pit

Note: This record identifies the geotechnical conditions encountered at the noted test location(s) only. It is possible that ground conditions could be different away from the point(s) of testing.

Site Investigation Record

Client: Tauranga Bay Holdings Ltd

Site: Wilsons Lead Road, Cape Foulwind

Technical Category: N/A

Lot: 1 **D.P.:** 19769

Date Tested: 8-Jun-2023

Log Sheet No.: 1 of 1 **Project No.:** 510783

Dynamic Cone Penetrometer (DCP) Test Results

Number of Blows per 100mm

Depth (m)

Soil Profile

Test Location Y

Water

0.0 – SILT, with minor sand; brown. Damp; Rootlets.

0.2 – SAND; orange. Dry; Iron Pan.

0.4 – SAND; light brown. Dry to damp; Very Firm Sandstone.

0.6

0.8

1.0

1.2

1.4 – EOH: 1.5m

1.6

1.8

2.0

Groundwater Not Encountered

Y

Minimum penetration resistance (based on 300mm wide footing founded at 300mm depth) required for 'Good Ground' as defined in the Acceptable Solutions and Verification Methods for NZBC Clause B1 Structure.

Site Plan: (Not to Scale)

Comments:

Field Staff:	Prepared By:	Soil Profile From:
SJH	SJH	☐ Hand Auger
Job Manager:	**Approved By:**	☐ Spade Hole
AC	AC	☑ Test Pit

Note: This record identifies the geotechnical conditions encountered at the noted test location(s) only. It is possible that ground conditions could be different away from the point(s) of testing.

Site Investigation Record

Client: Tauranga Bay Holdings Ltd

Site: Wilsons Lead Road, Cape Foulwind

Technical Category: N/A

Lot: 1 **D.P.:** 19769

Date Tested: 8-Jun-2023

Log Sheet No.: 1 of 1 **Project No.:** 510783

Dynamic Cone Penetrometer (DCP) Test Results

Number of Blows per 100mm

Depth (m)

Soil Profile

Test Location Z

Water

0.2 — SILT, with minor sand; brown. Damp; Rootlets.

0.4 — SAND; orange. Dry; Iron Pan.

SAND; light brown. Dry to damp; Very Firm Sandstone.

0.6

0.8

1.0

1.2

1.4

1.6

1.8

2.0

Groundwater Not Encountered

Z

Minimum penetration resistance (based on 300mm wide footing founded at 300mm depth) required for 'Good Ground' as defined in the Acceptable Solutions and Verification Methods for NZBC Clause B1 Structure.

Site Plan: (Not to Scale)

Comments:

Field Staff:	Prepared By:	Soil Profile From:
SJH	SJH	☐ Hand Auger
Job Manager:	**Approved By:**	☐ Spade Hole
AC	AC	☑ Test Pit

Note: This record identifies the geotechnical conditions encountered at the noted test location(s) only. It is possible that ground conditions could be different away from the point(s) of testing.