Appendix H: PDP Geotechnical Assessment

80 Struie Road, Hororata, Canterbury – Geotechnical Report – Proposed Solar Farm

Prepared for

Rā Tuatahi No 1. Limited

July 2024

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Quality Control Sheet

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CLIENT	Rā Tuatahi No 1. Limited
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Revision History

REV	Date	Status/Purpose	Prepared By	Reviewed by	Approved
1	11/03/2024	Draft	Kyla Thorn	Jason Grieve	Andrew Smith
2	3/04/2024	Final	Kyla Thorn	Jason Grieve	Andrew Smith
3	23/07/2024	Final	Kyla Thorn	Jason Grieve	Andrew Smith

DOCUMENT CONTRIBUTORS

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Approved by

Andrew Smith

Limitations:

This report has been prepared by Pattle Delamore Partners Limited (PDP) on the basis of information provided by Rā Tuatahi No 1. Limited and others (not directly contracted by PDP for the work). PDP has not independently verified the provided information and has relied upon it being accurate and sufficient for use by PDP in preparing the report. PDP accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information.

This report has been prepared by PDP on the specific instructions of Rā Tuatahi No 1. Limited for the limited purposes described in the report. PDP accepts no liability if the report is used for a different purpose or if it is used or relied on by any other person. Any such use or reliance will be solely at their own risk.

Table of Contents

Appendices

1.0 Introduction

1.1 Scope

Pattle Delamore Partners Limited (PDP) has been engaged by Rā Tuatahi No 1. Limited to undertake a geotechnical assessment. This is required to support a Resource Consent application for the proposed change in land use and associated soil disturbance activities to create a solar farm development at 80 Struie Road, Hororata, Selwyn District (i.e., the site).

The site is a total land development area of approximately 10.2 hectares (ha). The legal description of the site is LOT 6 DP 66179 BLK IX XIII HAWKINS SD WITH LOT 6 SUBJ TO & WITH INT IN R/W

The proposed development involves a change in land use from rural to commercial/industrial to establish a solar array on the site, this will incorporate approximately 10 ha of solar panels along with associated earthworks and landscaping.

The objective of the assessment was to determine the following:

- Review of published information – site history, geological, hydro-geological setting and natural risk hazard assessment.
- Incorporation of ground testing data available from the New Zealand Geotechnical Database (NZGD) and any other available ground data, into our assessment and interpretation.
- The consistency and density of the soils underlying the site, based on shallow and deep testing data acquired during ground investigations.

At the time of reporting the proposed structures are in their design phase, and as such further detailed geotechnical assessment and foundation design recommendations will be required once the final design has been completed.

1.2 Site Location and Description

The site is located approximately 4 km east of Hororata. The site is accessed by a dirt track along the southeast boundary of 90 Struie Road, Hororata. The site is surrounded by a combination of pastoral farmland and forestry.

The topography of the site generally comprises flat paddocks that have recently, been cleared of exotic forest, leaving tree stumps and slash materials associated with the removal of the trees behind.

2.0 Published Information

2.1 General

A review of the publicly available information in the vicinity of the site has been undertaken, the results of the desktop appraisal are discussed in the following sections.

2.2 Historical Aerial Photographs

Historical aerial photographs from between 1941 and 2023 have been reviewed for the site. These photographs have been sourced from Canterbury Map Partners administered by ECan and Google Earth Pro.

A summary of the historical aerial photography is provided below:

- Aerial photographs spanning between 1941 and 1985 show the site to be in pasture and/or cropping, as evidenced by different colour shades of the paddocks. The surrounding land use to the site is for a similar purpose up until the late 1980s.
- Aerial photographs spanning between 1995 to 2018 show the site being utilised for forestry operations, as evidenced by the presence of rows of trees. The surrounding land is either used for cropping, sheep grazing or forestry operations.
- The aerial photograph from 2023 shows evidence of tree clearing or recently cleared trees.

2.3 Geological Setting

A review of the Geological & Nuclear Sciences (GNS) 1:250,000 Scale, Christchurch geological map, (2008) the site is underlain by late Pleistocene River Deposits (Q2a), described as *'brownish grey river alluvium'*.

2.4 New Zealand Geotechnical Database

A review of the New Zealand Geotechnical Database (NZGD) was undertaken, no relevant information was available in the site or any of the properties in proximity to the site.

2.5 Active Faults

A review of the GNS active fault database indicates the following faults are located in the general proximity of the site:

- The Greendale Fault with a recurrence interval of >10,000 to <=20,000 years is located approximately 5.0 km southeast of the site.
- The Hororata Fault with an unknown recurrence interval is located approximately 6.0 km northwest of the site.

- The Porters Pass Fault with a recurrence interval of <=2,000 years is located approximately 35 km northwest of the site.

The site is not mapped within a known fault hazard area and/or fault corridor avoidance zone.

2.6 Hydrogeological Setting

A review of the Environment Canterbury (ECAN) water bores map indicates three water bores (BX22/0198, BX22/0140, and BX22/0077) are located within 600 m of the site.

BX22/0198 is located on the north-eastern boundary of 132 Struie Road, Hororata i.e., on the northern boundary of the site. The water bore was drilled November 2018 to a termination depth of 39.0 m below ground level (m bgl) and screened between 34.5 – 36 m bgl. The highest ground water level was recorded to be 4.8 m bgl.

Bore BX22/0140 conversely was drilled to a slightly shallower depth of 30.0 m bgl in November 2016, screened between 28.5 and 30.0 m bgl. The highest ground water level was recorded to be 2.6 m bgl.

Bore BX22/0077 conversely was drilled to a slightly shallower depth of 29.0 m bgl in February 2015, screened between 27.6 and 29.1 m bgl. The highest ground water level was recorded to be 10.6 m bgl.

These three bores provide an assessment of the hydrogeological setting that contradict each well record, one showing a ground water level of >4.8 m, another showing 2.6 m bgl and the other having a water level 10.6 m bgl.

2.7 Liquefaction Risk

The Selwyn District liquefaction overlay (2006) accessed form Canterbury Maps indicates site is mapped as having low liquefaction potential.

2.8 Flood Risk

A review of the Selwyn District natural hazards overlay available on Canterbury Maps (accessed 6/03/2024) indicates the site has an overland flow path which runs through the centre of the site. The model indicates the centre will be inundated to an approximate depth of 0.3 m during a 1 in 200-year flood event.

3.0 Geotechnical Investigation

3.1 General

The geotechnical Investigation was undertaken on 30 November 2023 following site walkover and service location to check for any underground utilities and identify safe working areas within the site for the geotechnical investigation.

3.2 Investigation Scope

The geotechnical investigation comprised eight machine excavated test pits excavated to target depths ranging between approximately 2.4 and 3.0 m bgl. Scala penetrometer tests were undertaken from the ground surface at the location of each of the test pits, the Scala penetrometer tests were terminated at depths ranging between approximately 0.4 and 1.2 m bgl when the soils became too dense to penetrate further.

All test locations are shown on the site plan presented in Appendix A.

3.3 Field investigations

The test pits were logged in accordance with the New Zealand geotechnical Society (NZGS) Guidance, the full test pit logs are appended in Appendix B.

The test pit logs indicate the following vertical stratigraphy profile across the site:

- Topsoil was encountered from the ground surface to depths ranging between 0.25 and 0.3 m bgl.
- The topsoil is underlain by a medium dense to very dense sandy greywacke GRAVEL with minor to some cobbles and boulders. The silty GRAVEL was encountered to the extent of the test pits at depths ranging between approximately 2.4 and 3.0 m bgl.
- Scala penetrometer tests undertaken in the sandy Gravel returned values ranging between approximately 3 and 28 blows per 100 mm of penetration, indicating the silty GRAVEL underlying the site has a relative density of medium dense to very dense.

The stratigraphy encountered was generally consistent across the greater site. The side walls of the excavations were generally stable during the excavation, pits were backfilled with arisings and compacted with excavator bucket.

The complete test pit logs with associated Scala penetrometer data are presented in Appendix B.

3.4 Groundwater

Groundwater was not encountered in any of the eight test pits during the investigation.

4.0 Development Considerations

The following gives foundation considerations to be utilised in the proposed development:

- At the time of this report the final foundation design had not been provided. It is recommended that any foundation configuration be founded into the natural gravels beneath the topsoil. Shallow footings or pile foundations are both considered suitable. For design the following drained parameters can be used to represent the natural gravels:
  - Internal angle of friction = 36°
  - Cohesion = 0 kPa
  - Unit weight = 20 kNm^3.
- If piling options are selected these must be embedded a minimum of three times the pile diameter into competent natural soils.
- Any filling to be undertaken as part of the development is to be compacted in accordance with NZS4431:2022 'Engineered Fill for Lightweight Structures'. The suitability of any existing fill for use as engineered fill is an option that must be confirmed by a suitably qualified geotechnical engineer or engineering geologist.
- Available ultimate bearing capacity should be assessed once the foundation geometries for the proposed solar panels are known, this should be completed to the requirements of the Building Code Verification method B1/VM4 although where the foundations are bearing onto the underlying gravels a ultimate bearing capacity of >200 kPa should be readily available.

5.0 Conclusions

The following has been concluded from this geotechnical investigation:

- The ground conditions underlying the site are generally consistent with minor variations in depths across the site. Topsoil depth ranges between approximately 0.25 to 0.3 m across the site. The topsoil is underlain by a medium dense to very dense sandy gravel that extended to a depth greater than 3.0 m bgl.
- Groundwater was not encountered in any of the test pits undertaken as part of this investigation.
- The site is mapped as having a low liquefaction potential.
- A flood model for the site indicates the presence of an overland flow path which can be inundated to a depth of approximately 0.3 m during a 1:200-year flood event.
- Any foundation design and fill placement at the site should be done in accordance with the recommendations discussed in Section 4.0.

6.0 References

Forsyth, P.J.; Barrell, D.J.A.; Jongens, R. (compilers) 2008 - Geology of the Christchurch area: Institute of Geological & Nuclear Sciences 1:250,000 geological map 16. 1 Sheet + 67 p. Lower Hutt, New Zealand. GNS Science.

Active Fault Database: https://data.gns.cri.nz/af/ - Accessed March 2024.

Canterbury Maps Historical Imagery; https://apps.canterburymaps.govt.nz/CanterburyHistoricAerialImagery/ - Accessed on March 2024.

Retrolens Historical Image Resource: https://retrolens.co.nz/ - Accessed on March 2024.

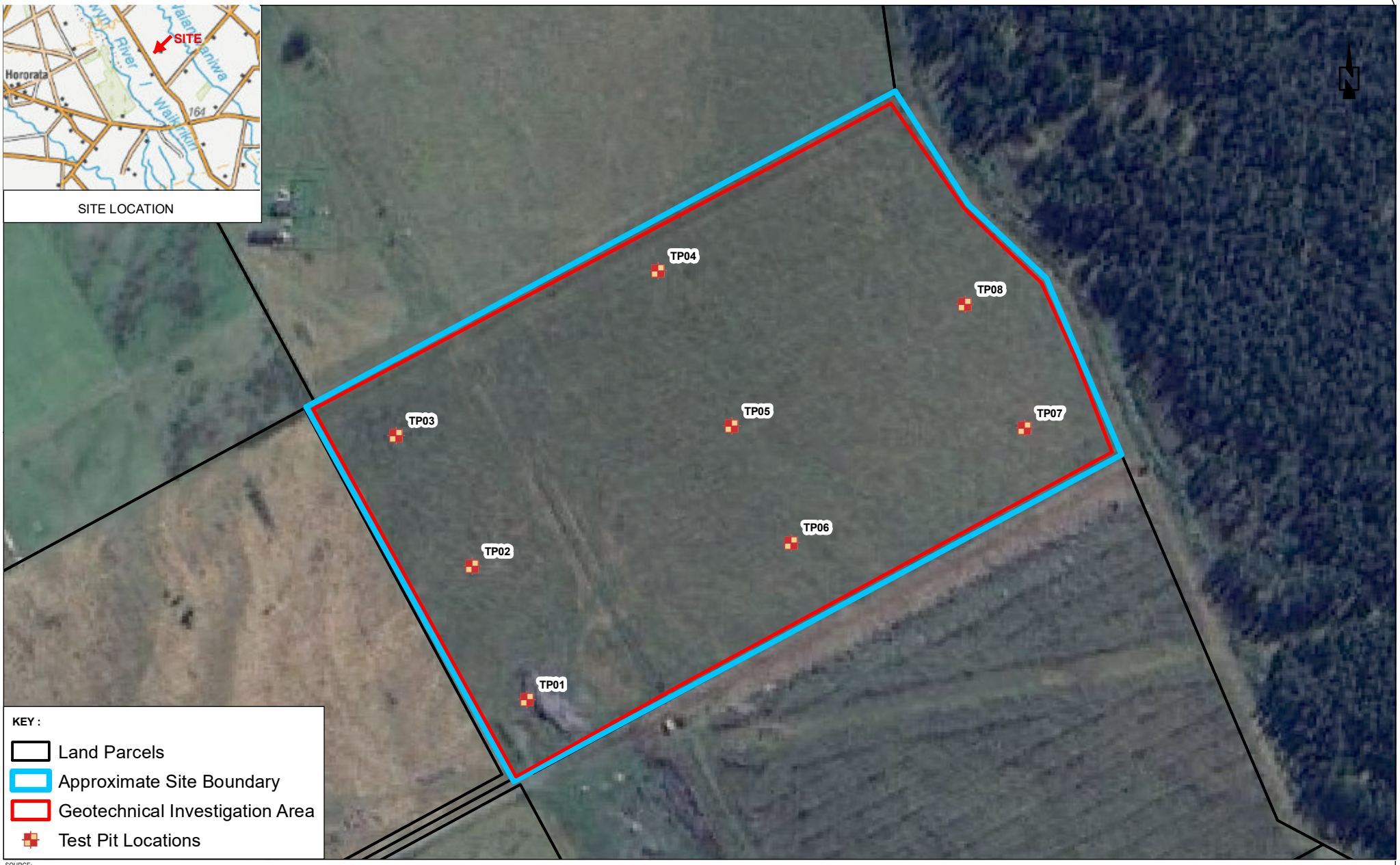
Canterbury Maps Viewer website: https://mapviewer.canterburymaps.govt.nz/ Accessed March 2024.

New Zealand Geotechnical Database. Accessed March 2024.

New Zealand Standard NZS4431:2022. Engineered fill construction for lightweight structures.

Williams, A. Burns, D. Farqhuar, G. and Mills, M. December 2005. NZGS Guidelines – Field Description of Soil and Rock.

Appendix A: Site Plan



SOURCE:
1. AERIAL IMAGERY (FLOWN 2018) SOURCED FROM CANTERBURY MAP PARTNERS ADMINISTERED BY ENVIRONMENT CANTERBURY (MAY NOT BE SPATIALLY ACCURATE).
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET SOURCED FROM THE LINZ DATA SERVICE https://data.linz.govt.nz/ AND LICENSED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.

FIGURE 1: GEOTECHNICAL INVESTIGATION AREA

SCALE : 1:3,000 (A4)

0 37.5 75 150
Meters

Appendix B: Test Pit Logs

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INVESTIGATION LOG

Job No.: C048980001
Test No.: TP01
Sheet: 1 of 1
Date: 30/11/23
Ground Level mRL: Ground

Client:
Rā Tuatahi No 1. Limited

Site Address:
80 Struie Rd, Hororata

Project:
Proposed Solar Farm Development

Coordinates:
1519445mE, 5178612mN (NZTM)

Interpretation	Geological Description (Soil and Rock logged in accordance with New Zealand Geotechnical Society field description of soil and rock (2005).)	Graphic Log	Depth (m)	RL (m)	Squeeze Zone	Samples	Scala Penetrometer (Blows / 100 mm)	Vane Shear Strength (kPa)	Water
Topsoil	Gravelly SAND, with some silt, with minor cobbles; brown. Medium dense, moist; gravel, fine to coarse, subround, greywacke; cobbles, subrounded, up to 200mm, greywacke; containing trace roots and rootlets.	TS	0				4		
Late Pleistocene Alluvial Deposits	Sandy GRAVEL, with some cobbles; greyish brown. Loose, moist, well graded; gravel, fine to coarse, subround, greywacke; sand, fine to coarse; cobbles, subrounded, up to 200mm, greywacke; containing trace roots.						4		
	0.50m: Becomes very dense.						2		
	1.00m: Contains some boulders, greywacke, subrounded, up to 400 mm diameter.		1				3		
							18		
			2				20		
	EOH: 2.40m Target Depth						EOS: 0.60m		Groundwater not encountered
			3						
			4						

Scala Penetrometer: (Blows / 100 mm) 2 4 6 8 10 12 14 16 18

Vane Shear Strength (kPa) Vane: 50 100 150 200 Values

Remarks

1. Groundwater not encountered.
2. Test pit sides remained stable throughout excavation.
3. Test pit backfilled with arisings.

Investigation Type

- ☐ Hand Auger
- ☑ Test Pit

Water

- Standing Water Level
- In flow
- Out flow

Contractor:	Rig/Plant Used:	Logged By:	Checked By:	Hole Depth:
Protranz	8 tonne excavator	HP	JG	2.40 m

0.00-2.40m

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INVESTIGATION LOG

Job No.: C048980001
Test No.: TP02
Sheet: 1 of 1
Date: 30/11/23
Ground Level mRL: Ground

Client:
Rā Tuatahi No 1. Limited

Site Address:
80 Struie Rd, Hororata

Project:
Proposed Solar Farm Development

Coordinates:
1519413mE, 5178689mN (NZTM)

Interpretation	Geological Description (Soil and Rock logged in accordance with New Zealand Geotechnical Society field description of soil and rock (2005).)	Graphic Log	Depth (m)	RL (m)	Squeeze Zone	Samples	Scala Penetrometer (Blows / 100 mm)	Vane Shear Strength (kPa)	Water
Topsoil	Gravelly SAND, with some silt, with minor cobbles; brown. Medium dense, dry; gravel, fine to coarse, subrounded, greywacke; cobbles, subrounded, up to 200mm, greywacke; containing trace roots and rootlets.	TS	0				5		
Late Pleistocene Alluvial Deposits	Sandy GRAVEL, with some cobbles, with minor boulders; greyish brown. Dense, moist, well graded; gravel, fine to coarse, subrounded, greywacke; sand, fine to coarse; cobbles, subrounded, up to 200mm, greywacke; boulders, subrounded, up to 450 mm, greywacke; containing trace roots.						5		
	0.50m: Becomes very dense.		1				13		
							14		
							12		
			2				19		
	2.20m: becomes greyish brown with iron staining.						28 >>		
							EOS: 0.70m		
	EOH: 3.00m Target Depth		3						
			4						

Vane: 50 100 150 200 Values

Groundwater not encountered

Remarks

1. Groundwater not encountered.
2. Test pit sides remained stable throughout excavation.
3. Test pit backfilled with arisings.

Investigation Type

- [ ] Hand Auger
- [x] Test Pit

Water

- Standing Water Level
- In flow
- Out flow

Contractor:	Rig/Plant Used:	Logged By:	Checked By:	Hole Depth:
Protranz	8 tonne excavator	HP	JG	3.00 m

0.00-3.00m

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INVESTIGATION LOG

Job No.: C048980001
Test No.: TP03
Sheet: 1 of 1
Date: 30/11/23
Ground Level mRL: Ground

Client:
Rā Tuatahi No 1. Limited

Site Address:
80 Struie Rd, Hororata

Project:
Proposed Solar Farm Development

Coordinates:
1519369mE, 5178765mN (NZTM)

Interpretation	Geological Description (Soil and Rock logged in accordance with New Zealand Geotechnical Society field description of soil and rock (2005).)
Topsoil	Gravelly SAND, with some silt, with minor cobbles; brown. Dense, moist; gravel, fine to coarse, subrounded, greywacke; cobbles, subrounded, up to 200mm, greywacke; containing trace roots and rootlets.
Late Pleistocene Alluvial Deposits	Sandy GRAVEL, with some cobbles; greyish brown. Very dense, moist, well graded; gravel, fine to coarse, subrounded, greywacke; sand, fine to coarse; cobbles, subrounded, up to 200mm, greywacke; containing trace roots.
	EOH: 2.50m Target Depth

Graphic Log: TS

Depth (m): 1, 2, 3, 4

RL (m)

Squeeze Zone

Samples

Scala Penetrometer (Blows / 100 mm)

2 4 6 8 10 12 14 16 18

8
7
19
21 >>
20
25 >>

EOS: 0.60m

Vane Shear Strength (kPa)
Vane: 50 100 150 200
Values

Water: Groundwater not encountered

Remarks

1. Groundwater not encountered.
2. Test pit sides remained stable throughout excavation.
3. Test pit backfilled with arisings.

Investigation Type

- [ ] Hand Auger
- [x] Test Pit

Water

- Standing Water Level
- In flow
- Out flow

Contractor:	Rig/Plant Used:	Logged By:	Checked By:	Hole Depth:
Protranz	8 tonne excavator	HP	JG	2.50 m

0.00-2.50m

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INVESTIGATION LOG

Job No.: C048980001
Test No.: TP04
Sheet: 1 of 1
Date: 30/11/23
Ground Level mRL: Ground

Client:
Rā Tuatahi No 1. Limited

Site Address:
80 Struie Rd, Hororata

Project:
Proposed Solar Farm Development

Coordinates:
1519521mE, 5178860mN (NZTM)

Interpretation	Geological Description (Soil and Rock logged in accordance with New Zealand Geotechnical Society field description of soil and rock (2005).)	Depth (m)
Topsoil	Gravelly SAND, with some silt, with minor cobbles; brown. Medium dense, moist; gravel, fine to coarse, subrounded, greywacke; cobbles, subrounded, up to 200mm, greywacke; containing trace roots and rootlets.	0
Late Pleistocene Alluvial Deposits	Sandy GRAVEL, with some cobbles; greyish brown. Medium dense, moist, well graded; gravel, fine to coarse, subrounded, greywacke; sand, fine to coarse; cobbles, subrounded, up to 200mm, greywacke; containing trace roots.	
	0.80m: Becomes dense.	
	1.00m: Becomes very dense.	1
	1.70m: Contains minor boulders, greywacke, subrounded, up to 400 mm diameter.	
	2.10m: Becomes greyish brown with iron staining.	2
	EOH: 3.00m Target Depth	3
		4

Graphic Log: TS

Squeeze Zone

Samples

Scala Penetrometer (Blows / 100 mm)

Depth (m)	Blows / 100 mm
0	3
	5
	3
	4
	4
	4
	3
	4
	13
1	13
	18
	22 >>

EOS: 1.20m

Vane Shear Strength (kPa)
Vane: Values

Water
Groundwater not encountered

Remarks
1. Groundwater not encountered.
2. Test pit sides remained stable throughout excavation.
3. Test pit backfilled with arisings.

Investigation Type
- [ ] Hand Auger
- [x] Test Pit

Water
- Standing Water Level
- In flow
- Out flow

Contractor:	Rig/Plant Used:	Logged By:	Checked By:	Hole Depth:
Protranz	8 tonne excavator	HP	JG	3.00 m

0.00-3.00m

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INVESTIGATION LOG

Job No.: C048980001
Test No.: TP05
Sheet: 1 of 1
Date: 30/11/23
Ground Level mRL: Ground

Client:
Rā Tuatahi No 1. Limited

Site Address:
80 Struie Rd, Hororata

Project:
Proposed Solar Farm Development

Coordinates:
1519564mE, 5178771mN (NZTM)

Interpretation	Geological Description	Depth (m)
Topsoil	Gravelly SAND, with some silt, with minor cobbles; brown. Medium dense, moist; gravel, fine to coarse, subrounded, greywacke; cobbles, subrounded, up to 200mm, greywacke; containing trace roots and rootlets.	0
Late Pleistocene Alluvial Deposits	Sandy GRAVEL, with some cobbles; greyish brown. Medium dense, moist, well graded; gravel, fine to coarse, subrounded, greywacke; sand, fine to coarse; cobbles, subrounded, up to 200mm, greywacke; containing trace roots.	
	0.40m: Becomes very dense.	
	1.50m: Contains minor boulders, greywacke, subrounded, up to 450 mm diameter.	
	EOH: 2.70m Target Depth	2.70

Graphic Log: TS

Scala Penetrometer (Blows / 100 mm): 5, 2, 6, 8, 17, 20
EOS: 0.60m

Vane Shear Strength (kPa) — Vane: Values

Water: Groundwater not encountered

Remarks

1. Groundwater not encountered.
2. Test pit sides remained stable throughout excavation.
3. Test pit backfilled with arisings.

Investigation Type
- [ ] Hand Auger
- [x] Test Pit

Water
- Standing Water Level
- In flow
- Out flow

Contractor:	Rig/Plant Used:	Logged By:	Checked By:	Hole Depth:
Protranz	8 tonne excavator	HP	JG	2.70 m

0.00-2.70m

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INVESTIGATION LOG

Job No.: C048980001
Test No.: TP06
Sheet: 1 of 1
Date: 30/11/23
Ground Level mRL: Ground

Client:
Rā Tuatahi No 1. Limited

Site Address:
80 Struie Rd, Hororata

Project:
Proposed Solar Farm Development

Coordinates:
1519598mE, 5178703mN (NZTM)

Interpretation	Geological Description (Soil and Rock logged in accordance with New Zealand Geotechnical Society field description of soil and rock (2005).)	Depth (m)
Topsoil	Gravelly SAND, with some silt, with minor cobbles; brown. Medium dense, moist; gravel, fine to coarse, subrounded, greywacke; cobbles, subrounded, up to 200mm, greywacke; containing trace roots and rootlets.	0
Late Pleistocene Alluvial Deposits	Sandy GRAVEL, with some cobbles; greyish brown. Medium dense, moist, well graded; gravel, fine to coarse, subrounded, greywacke; sand, fine to coarse; cobbles, subrounded, up to 200mm, greywacke; containing trace roots.	
	0.60m: Becomes very dense.	0.6
	1.10m: Contains some boulders, greywacke, subrounded, up to 400 mm diameter.	1.1
	EOH: 2.50m Target Depth	2.5

Graphic Log: TS

Scala Penetrometer (Blows / 100 mm): 4, 4, 4, 5, 3, 4, 20

EOS: 0.70m

Vane Shear Strength (kPa) — Vane: Values

Water: Groundwater not encountered

Remarks

1. Groundwater not encountered.
2. Test pit sides remained stable throughout excavation.
3. Test pit backfilled with arisings.

Investigation Type
- [ ] Hand Auger
- [x] Test Pit

Water
- Standing Water Level
- In flow
- Out flow

Contractor:	Rig/Plant Used:	Logged By:	Checked By:	Hole Depth:
Protranz	8 tonne excavator	HP	JG	2.50 m

0.00-2.50m

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INVESTIGATION LOG

Job No.: C048980001
Test No.: TP07
Sheet: 1 of 1
Date: 30/11/23
Ground Level mRL: Ground

Client:
Rā Tuatahi No 1. Limited

Site Address:
80 Struie Rd, Hororata

Project:
Proposed Solar Farm Development

Coordinates:
1519734mE, 5178769mN (NZTM)

Interpretation	Geological Description (Soil and Rock logged in accordance with New Zealand Geotechnical Society field description of soil and rock (2005).)
Topsoil	Gravelly SAND, with some silt, with minor cobbles; brown. Medium dense, moist; gravel, fine to coarse, subrounded, greywacke; cobbles, subrounded, up to 200mm, greywacke; containing trace roots and rootlets.
Late Pleistocene Alluvial Deposits	Sandy GRAVEL, with some cobbles; greyish brown. Very dense, moist, well graded; gravel, fine to coarse, subrounded, greywacke; sand, fine to coarse; cobbles, subrounded, up to 200mm, greywacke; containing trace roots.
	1.20m: Contains some boulders, greywacke, subrounded, up to 400 mm diameter.
	EOH: 2.80m Target Depth

Graphic Log: TS

Depth (m): 1, 2, 3, 4

RL (m)

Squeeze Zone

Samples

Scala Penetrometer (Blows / 100 mm)

2 4 6 8 10 12 14 16 18

5
7
9
17
20
20

EOS: 0.60m

Vane Shear Strength (kPa)
Vane:
50 100 150 200
Values

Water
Groundwater not encountered

Remarks
1. Groundwater not encountered.
2. Test pit sides remained stable throughout excavation.
3. Test pit backfilled with arisings.

Investigation Type
- [ ] Hand Auger
- [x] Test Pit

Water
- Standing Water Level
- In flow
- Out flow

Contractor:	Rig/Plant Used:	Logged By:	Checked By:	Hole Depth:
Protranz	8 tonne excavator	HP	JG	2.80 m

0.00-2.80m

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INVESTIGATION LOG

Job No.: C048980001
Test No.: TP08
Sheet: 1 of 1
Date: 30/11/23
Ground Level mRL: Ground

Client:
Rā Tuatahi No 1. Limited

Site Address:
80 Struie Rd, Hororata

Project:
Proposed Solar Farm Development

Coordinates:
1519699mE, 5178841mN (NZTM)

Interpretation	Geological Description	Depth (m)
Topsoil	Gravelly SAND, with some silt, with minor cobbles; brown. Medium dense, moist; gravel, fine to coarse, subrounded, greywacke; cobbles, subrounded, up to 200mm, greywacke; containing trace roots and rootlets.	0.00
Late Pleistocene Alluvial Deposits	Sandy GRAVEL, with some cobbles; greyish brown. Very dense, moist, well graded; gravel, fine to coarse, subrounded, greywacke; sand, fine to coarse; cobbles, subrounded, up to 200mm, greywacke; containing trace roots.	0.40
	EOH: 2.80m Target Depth	2.80

Graphic Log: TS

Scala Penetrometer (Blows / 100 mm): 6, 5, 9, 20 — EOS: 0.40m

Vane Shear Strength (kPa) — Vane: Values

Water: Groundwater not encountered

Remarks
1. Groundwater not encountered.
2. Test pit sides remained stable throughout excavation.
3. Test pit backfilled with arisings.

Investigation Type
- [ ] Hand Auger
- [x] Test Pit

Water
- Standing Water Level
- In flow
- Out flow

Contractor:	Rig/Plant Used:	Logged By:	Checked By:	Hole Depth:
Protranz	8 tonne excavator	HP	JG	2.80 m

0.00-2.80m