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Geotechnical Assessment Report

8 Nobeline Drive, Rolleston

Issue Date:	**13 February 2025**
MNZ Reference:	**200357-9-RP-001[A]**
Prepared for:	**YourSection Ltd**

Report Tracking – 8 Nobeline Drive, Rolleston

Revision	Status	Date	Prepared by	Reviewed by
A	Final	13 February 2025	C McDermott	J Byron-Joyce

Authorisation

Author's Signature		**Reviewer's Signature**	
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Miyamoto New Zealand Limited

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Table of Contents

1. Introduction and Scope 1
2. Site Description and Proposed Development 1
3. Desktop Study 3
4. Geotechnical Site Investigation 4
5. Geotechnical Evaluation and Assessment 5
6. Assessment of Geotechnical Hazards as per RMA Section 106 5
7. Development Recommendations 6
8. Additional Considerations 7
9. Limitations 8

References 9

Appendix A: Site Photographs

Appendix B: Geotechnical Investigation Results

1. Introduction and Scope

Miyamoto New Zealand Ltd (Miyamoto) has been engaged by YourSection Ltd (the Client) to conduct a geotechnical investigation and assessment for the proposed subdivision of 8 Nobeline Drive, Rolleston (the Site). The purpose of this assessment is to characterise the geotechnical conditions and hazards at the site in support of the subdivision application at Selwyn District Council.

The following has been undertaken as part of this phase of works:

- Desktop study to identify relevant available geological and geotechnical information.
- Site walkover inspection of the land.
- Geotechnical site investigation, comprising:
    - 3 No. Hand Augered boreholes (HA) to a maximum depth of 1.2 m.
    - 5 No. Machine Augered boreholes (MA) to a maximum depth of 1.2 m.
    - 8 No. Dynamic Cone Penetrometer (DCP) tests to a maximum depth of 1.3 m.
- Geotechnical assessment and reporting of the findings, including development and foundation design recommendations.

The geotechnical investigation and assessment were carried out considering the Ministry of Business, Innovation & Employment (MBIE) and New Zealand Geotechnical Society (NZGS) Guidance documents Earthquake geotechnical engineering practice - Modules 1 to 4 (November 2021), and other relevant documents as required.

2. Site Description and Proposed Development

The site, legally described as LOT 14 DP 483709, is located in Rolleston and is approximately 4.0 hectares (ha) in area. The site is relatively flat with a difference in elevation of ~2.0 m across the site. A gentle channel, indicative of an overland flow path, is observed to traverse the site. The property is bound by Nobeline Drive to the northwest, Lincoln Rolleston Road to the southwest and by rural properties on the southeast and northeast boundaries. A site location plan is provided as Figure 1.

The groundcover comprises predominantly vegetated pasture (low height crops) with a small grouping of trees adjacent to the southwest boundary. Site photographs are provided in Appendix A.

The site is not located within the MBIE Residential Foundation Technical Categories (TC), with the land mapped as ‘N/A - Urban Non-residential’.

The proposed development comprises subdivision of the site into 69No. new residential lots with associated infrastructure. Earthworks will be required to form the building platforms, services, and roading. The preliminary subdivision layout plan is shown by Figure 2.



Figure 1: Site Location Plan



Figure 2: Preliminary Subdivision Layout Plan

3. Desktop Study

3.1 References

The following third-party resources have been reviewed and are referenced in our assessment:

- New Zealand Geotechnical Database (NZGD).
- Environment Canterbury (ECan).
- Selwyn District Council (SDC).
- Canterbury Maps.
- GNS Science Geological Maps.
- Google Earth Imagery.

3.2 Contaminated Land Considerations

The ECan Listed Land Use Register (LLUR) was reviewed and holds no previous records of land contamination for the site.

An independent assessment of contaminated land is being undertaken by others and will be presented under separate cover.

3.3 Natural Hazards

3.3.1 Flooding

As per the Partially Operative Selwyn District Plan, the site is mapped within the 'Plains Flood Management…2023' area, the requirements of SDC regarding such should be followed.

3.3.2 Liquefaction

The site is mapped in an area classified as 'Liquefaction Damage Unlikely…2023' as per the Partially Operative Selwyn District Plan.

With reference to the Canterbury Maps, liquefaction was not mapped on site during the 2010-2011 Canterbury Earthquake Sequence (CES).

3.4 Ground Motion

The site is not located within the NZGD 'Conditional PGA for Liquefaction Assessment' mapping layers, however, it is in close proximity and we have extrapolated the data for the site.

Using the MBIE and Bradley & Hughes (2012) procedures, we have found that the site was "sufficiently tested" to the Serviceability Limit State (SLS) level of earthquake demand during the September 2010 event of the CES. This indicates that land and building damage in a future SLS event is likely to be similar to the September event.

Utilising a derivation of the Bradley and Hughes method, we can suggest that the site was not tested to Ultimate Limit State (ULS) level of shaking during the CES. Based on the probabilistic analysis of the PGAs experienced at the site, the nature of land and building

damage is likely to be more severe during a future ULS event than that already experienced during the individual CES events.

4. Geotechnical Site Investigation

Geotechnical data available from the New Zealand Geotechnical Database (NZGD), previous works within proximity of the site, and Environment Canterbury (ECan) has been used as part of our assessment.

On 24 January 2025, Miyamoto undertook / supervised a site investigation comprising the following:

- 3 No. Hand Augered boreholes (HA) to a maximum depth of 1.2 m.
- 5 No. Machine Augered boreholes (MA) to a maximum depth of 1.2 m.
- 8 No. Dynamic Cone Penetrometer (DCP) tests to a maximum depth of 1.3 m.

The exploratory hole locations are shown in Figure 3, summarised in Table 1, and the engineering logs / plots are included as Appendix B.



Figure 3: Exploratory Hole Location Plan

Table 1: Geotechnical Investigation Summary

Ref	Source	Test Type	Depth
HA/MA01 to 08	Miyamoto (200357-9)	Hand Auger / Machine Auger with associated Dynamic Cone Penetrometer	0.4 to 1.3 mbgl
217400	NZGD	Trial Pit & Dynamic Cone Penetrometer	1.9 mbgl
226203		Trial Pit	2.0 mbgl
217379		Trial Pit & Dynamic Cone Penetrometer	0.9 mbgl
BX23/0533	ECan	Machine Borehole (Air Rotary)	48 mbgl
BX23/0648		Machine Borehole (Air Rotary)	48 mbgl
BX23/0620		Machine Borehole (Rotary)	48 mbgl

5. Geotechnical Evaluation and Assessment

5.1 Ground Profile

The ground profile interpreted from the on-site shallow ground investigation, correlated with the available existing data, generally comprises a layer of topsoil (0.1 m to 0.4 m in thickness), overlying medium dense Sand and / or stiff to very stiff Silt and mixtures thereof to between 0.4 m and 1.2 mbgl, below which dense to very dense Sandy / Silty Gravel and Cobbles are present to depth.

The ECan well bore logs indicate the gravel layer continues to depth.

5.2 Groundwater Conditions

Standing groundwater was not encountered during our site-specific investigation. With reference to the nearby ECan well bores, groundwater is likely to be present at depths ranging from 12 to 13 mbgl.

5.3 Site Subsoil Class

Based on the results of our site-specific investigation, investigation data from the surrounding area, geological maps and other published information, we consider NZS1170.5 Site Subsoil 'Class D - deep or soft soil' to be appropriate.

5.4 Liquefaction Assessment

Based on our assessment, including published mapping (Partially Operative Selwyn District Plan), the performance of the land during previous seismic events, the site-specific ground conditions and groundwater regime, we concur that the risk of damaging effects from liquefaction at the site is low with the seismic performance expected to be equivalent to MBIE Technical Category (TC) 1 as per the MBIE Guidance (2012).

6. Assessment of Geotechnical Hazards as per RMA Section 106

As per the requirements of Section 106 of the Resource Management Act (RMA) (2017), we have undertaken an assessment of the significant geotechnical hazards that may affect the site. These hazards include, but are not limited to erosion, falling debris, slippage, subsidence, and inundation.

At the time of our site visit, there was no evidence of erosion or erosional features on site. The shallow soils could be vulnerable to erosion if the topsoil layer is removed and left unprotected for prolonged periods of time. This can be easily mitigated with appropriate design measures during construction.

Given the proximity of the site to any source, rockfall (falling debris) is not considered a risk to the site and given the site is generally flat with only a minor gradual change in elevation across the site, slope instability (slippage) is not considered to be a risk.

On the basis of our geotechnical assessment herein, we do not consider subsidence (under either static or seismic loading) to be a significant hazard for normal construction (i.e. NZS3604 compliant buildings).

As per the Partially Operative Selwyn District Plan, the site is mapped within the 'Plains Flood Management…2023' area, the requirements of SDC regarding such should be followed.

Provided that the geotechnical recommendations given in this report are followed, and the appropriate engineering measures implemented, we consider that the land is unlikely to be affected nor worsen, accelerate, or result in material damage by the proposed development.

7. Development Recommendations

7.1 Earthworks

Earthworks will be required to form the building platforms, services and roading.

As general guidance, earthworks are to be undertaken in accordance with NZS4431:2022 (Engineered fill construction for lightweight structures) and WorkSafe New Zealand (July 2016) Good Practice Guidelines - Excavation Safety. For a site of this nature, the following would typically be required for the earthworks:

- Review and approval of earthworks methodology by suitably qualified geo-professional / engineer.
- Removal of vegetation, topsoil and organic matter (organic rich soils or peat) as well as any uncontrolled fill from the development areas (staged as required).
- Excavate to the required level(s) with incorporation of temporary and / or permanent support / retention as required (e.g. areas where a cut may exceed 0.5 m in loose, cohesionless soils).
- Subgrade to be proof rolled and inspected by suitably qualified geo-professional / engineer.
- Fill to be placed and compacted as specified in 4431:2022 (in layers of suitable thickness to achieve the required compaction) with testing of fill material by nuclear densometer testing (NDM), or other approved methods, undertaken by an accredited third-party. Testing frequency will be confirmed during the future stages of the project with the results provided to a suitably qualified geo-professional / engineer (along with particle size distribution and compaction curves for the fill) for certification.

7.2 Foundation Recommendations

Preliminarily, NZS3604 foundations are considered geotechnically feasible for NZS3604 compliant structures, subject to building-specific geotechnical investigations to assess the available bearing capacity.

Consideration should be given to cut / fill boundaries intersecting the building locations.

7.3 Stormwater Management

Stormwater management is outside the scope of our works and will require detailed design by a suitably experienced person, however, it is recommended that the design of any stormwater systems that discharge to land, is reviewed by Miyamoto to ensure there are no adverse effects on the development from a geotechnical perspective.

7.4 Pavement / Roading Infrastructure / Services

As for stormwater management, roading / pavements / services are outside the scope of our works and will require detailed design by a suitably experienced person. Miyamoto would be happy to provide geotechnical advice as and when required.

7.5 Contaminated Land

An independent assessment of contaminated land is being undertaken by others and will be presented under separate cover.

8. Additional Considerations

As we have undertaken the initial investigation and are familiar with the site, we are in a good position to assist with the future stages of the project including the recommendations included in this report. We would be pleased to provide a detailed scope and fee estimate for these works. However, should we not be engaged to undertake the future works, it is recommended that a suitably qualified geo-professional / engineer be engaged for the following works:

- Review of earthworks management plan.
- Construction monitoring of earthworks as per 4431:2022.
- Provision of a Geotechnical Completion Report and associated certification.

9. Limitations

This report is subject to the following limitations:

- This report has been prepared by Miyamoto for the Client for the purpose(s) agreed with the Client (Purpose). Miyamoto accepts no responsibility for the validity, appropriateness, sufficiency, or consequences of the Client using the report for purposes other than for the Purpose.
- This report is not intended for general publication or circulation. This report is not to be reproduced by the Client except in relation to the Purpose, without Miyamoto's prior written permission. Miyamoto disclaims all risk and all responsibility to any third party.
- This report is provided based on the various assumptions contained in the report. The assumptions were based on the professional judgment of Miyamoto.
- Miyamoto's professional services are performed using a degree of care and skill reasonably exercised by reputable consultants providing the same or similar services as at the date of this report.
- The sub surface information has been obtained from investigation carried out at discrete locations, which by their nature only provide information about a relatively small volume of subsoils. While Miyamoto has taken reasonable skill and care in carrying out the investigation to determine the subsoil condition, the subsoil condition could differ substantially from the results of any sampling investigation. Miyamoto is not responsible for and does not accept any liability in respect of any difference between the actual subsoil conditions and the results of our investigation.
- Any susceptibility analysis carried out in respect of liquefaction is based on Miyamoto's current understanding as an experienced professional engineering consultant of the data, methods etc. Future seismic events may change our understanding of liquefaction and its affects, which may affect the content of this report. Miyamoto is not responsible for and does not accept any liability where the content of this report is changed due to a change in industry knowledge of matters relating to liquefaction.
- This report specifically excludes assessment or advice relating to hazardous materials, such as asbestos.
- Where the Client provides information to Miyamoto, including design calculations and drawings of the as-built structure, or where the report indicates that we have obtained and/or relied upon information provided from a third party, Miyamoto has not made any independent verification of this information except as expressly stated in the report. Miyamoto assumes no responsibility for any inaccuracies in, or omissions to, that information.
- A change in circumstances, facts, information after the report has been provided may affect the adequacy or accuracy of the report. Miyamoto is not responsible for the adequacy or accuracy of the report because of any such changes.

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New Zealand Standard NZS1170.5 (2004). Structural Design Actions, Part 5: Earthquake Actions - New Zealand Standard.

New Zealand Standard NZS3604 (2011). Timber-framed buildings

New Zealand Standard NZS4431 (2022). Engineered fill construction for lightweight structures - New Zealand Standard.

Selwyn District Council - District Plan Online Maps, https://eplan.selwyn.govt.nz/eplan/#/Property/7941662.

Selwyn District Council - Partially Operative Selwyn District Plan Online Maps - https://eplan.selwyn.govt.nz/review/property/VAL2405506516/0/166?_t=property

Appendix A: Site Photographs



Photograph 1: Looking ~Northeast from HA01



Photograph 2: Looking ~Southeast from HA01 (grouping of trees shown)

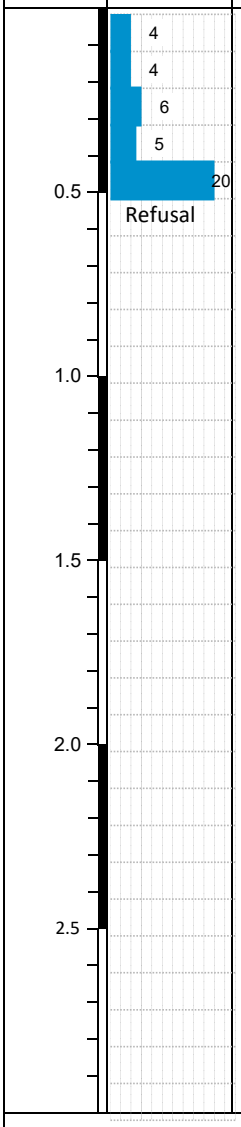
Appendix B: Geotechnical Investigation Results

miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS	*PROJECT NUMBER:*	**200357-9**
	CLIENT:	**YourSection Ltd**
	TESTING COMPLETED:	**24 January 2025**

SHALLOW GROUND INVESTIGATION LOG

HA01

PROJECT:	**9 Nobeline Drive, Rolleston**				
LOGGED BY:	**CMD**	*TOTAL TESTING DEPTH:*	**0.4 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CMD**	*TESTING METHOD:*	**HA + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	



Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
0.5	4 4 6 5 20 Refusal	NOT ENCOUNTERED		Sandy SILT; brown, dry with rootlets (TOPSOIL)											
				SILT; pale brown, low-med plasticity, dry											
				EOH - Refusal on gravel											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
MA	MACHINE AUGER	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
SV	SHEAR VANE	UW	UNIT WEIGHT (kN/m³)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL						

NOTES

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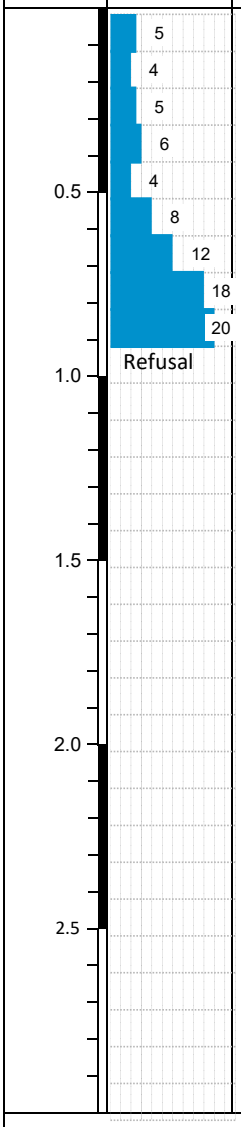
	CLIENT:	**YourSection Ltd**
	TESTING COMPLETED:	**24 January 2025**

SHALLOW GROUND INVESTIGATION LOG

HA02

PROJECT:	**9 Nobeline Drive, Rolleston**				
LOGGED BY:	**CMD**	*TOTAL TESTING DEPTH:*	**0.9 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CMD**	*TESTING METHOD:*	**HA + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	



Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
				SILT with some Sand; dark brown, dry with rootlets (TOPSOIL)											
				Sandy SILT; light brown, low plasticity, dry											
				SAND; fine to medium grained, light brown, dry											
				EOH - Refusal on gravel											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
MA	MACHINE AUGER	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
SV	SHEAR VANE	UW	UNIT WEIGHT (kN/m³)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL						

NOTES

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	CLIENT:	**YourSection Ltd**
	TESTING COMPLETED:	**24 January 2025**

SHALLOW GROUND INVESTIGATION LOG

MA03

PROJECT:	**9 Nobeline Drive, Rolleston**				
LOGGED BY:	**CMD**	*TOTAL TESTING DEPTH:*	**0.6 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CMD**	*TESTING METHOD:*	**MA + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
			USC	*Soil Characteristics*	*Graphic Log*		*Atterberg Limits*			*Grain Size*			*WC (%)*	*UW*	
							LL	*PL*	*PI*	*GR*	*SA*	*FC*			
0	3	NOT ENCOUNTERED		Sandy SILT; brown, dry with rootlets (TOPSOIL)											
	5			Gravelly Silty SAND, fine to medium grained, light brown, dry. Gravel is rounded to sub-rounded, fine to coarse, grey											
0.5	8														
	6														
	9														
	20														
	Refusal			**EOH - Target Stratum (gravel)**											
1.0															
1.5															
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
MA	MACHINE AUGER	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
SV	SHEAR VANE	UW	UNIT WEIGHT (kN/m³)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL						

NOTES

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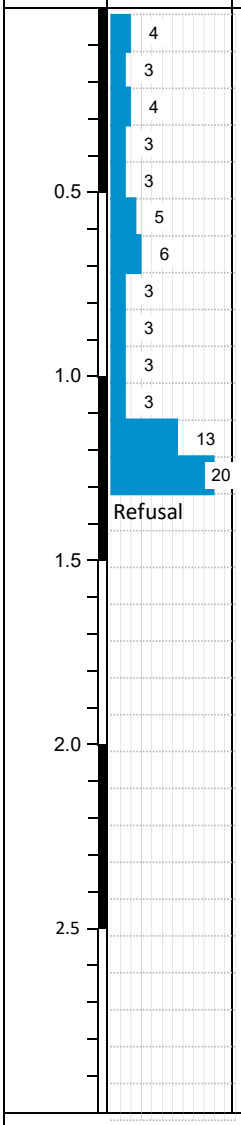
	CLIENT:	**YourSection Ltd**
	TESTING COMPLETED:	**24 January 2025**

SHALLOW GROUND INVESTIGATION LOG

MA04

PROJECT:	**9 Nobeline Drive, Rolleston**				
LOGGED BY:	**CMD**	*TOTAL TESTING DEPTH:*	**1.3 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CMD**	*TESTING METHOD:*	**MA + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	



Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
				Silty SAND; fine to medium grained, brown, dry with rootlets (TOPSOIL)											
				SAND with some Silt; fine to medium grained, dry.											
				becomes moist											
				becomes Silty SAND, wet											
				EOH - Target stratum (gravel)											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
MA	MACHINE AUGER	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
SV	SHEAR VANE	UW	UNIT WEIGHT (kN/m³)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL						

NOTES

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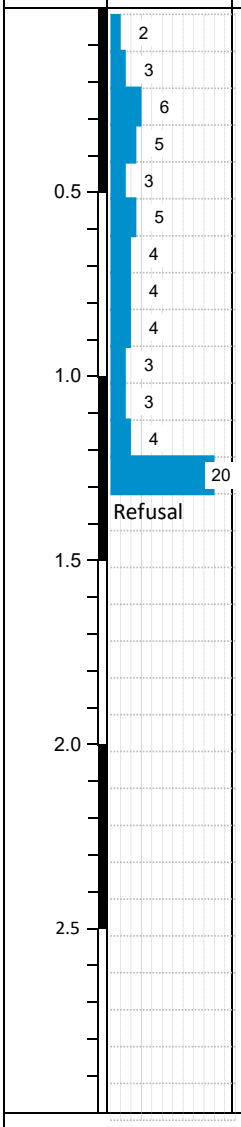
	CLIENT:	**YourSection Ltd**
	TESTING COMPLETED:	**24 January 2025**

SHALLOW GROUND INVESTIGATION LOG

HA05

PROJECT:	**9 Nobeline Drive, Rolleston**				
LOGGED BY:	**CMD**	*TOTAL TESTING DEPTH:*	**1.3 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CMD**	*TESTING METHOD:*	**HA + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	



Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
				Sandy SILT; dark brown, dry with rootlets (TOPSOIL)											
				SILT with some Sand, low-medium plasticity, light brown, dry											
				SAND; fine to medium grained, light brown, dry becomes moist, with some Silt and orange staining becomes fine to coarse, moist to wet											
				EOH - Refusal on gravel											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
MA	MACHINE AUGER	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
SV	SHEAR VANE	UW	UNIT WEIGHT (kN/m³)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL						

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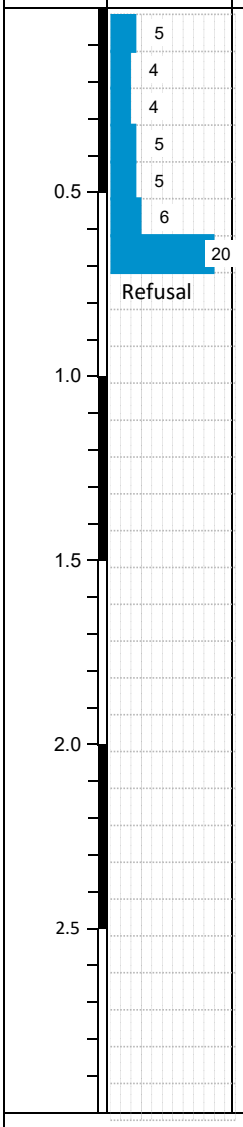
SHALLOW GROUND INVESTIGATION LOG

MA06

PROJECT:	**9 Nobeline Drive, Rolleston**				
LOGGED BY:	**CMD**	*TOTAL TESTING DEPTH:*	**1.0 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CMD**	*TESTING METHOD:*	**MA + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	



Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
			USC	*Soil Characteristics*	*Graphic Log*		*Atterberg Limits*			*Grain Size*			*WC (%)*	*UW*	
							LL	*PL*	*PI*	*GR*	*SA*	*FC*			
0				Sandy SILT; brown, dry with rootlets (TOPSOIL)											
				SAND with trace Silt, fine to medium grained, brown, dry											
0.5				becomes moist with some Silt											
1.0				**EOH - Target stratum (gravel)**											
1.5															
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
MA	MACHINE AUGER	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
SV	SHEAR VANE	UW	UNIT WEIGHT (kN/m³)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL						

NOTES

miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS	*PROJECT NUMBER:*	**200357-9**
	CLIENT:	**YourSection Ltd**
	TESTING COMPLETED:	**24 January 2025**

SHALLOW GROUND INVESTIGATION LOG

MA07

PROJECT:	**9 Nobeline Drive, Rolleston**				
LOGGED BY:	**CMD**	*TOTAL TESTING DEPTH:*	**0.6 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CMD**	*TESTING METHOD:*	**MA + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
			USC	*Soil Characteristics*	*Graphic Log*		*Atterberg Limits*			*Grain Size*			*WC (%)*	*UW*	
							LL	*PL*	*PI*	*GR*	*SA*	*FC*			
0.0	5	NOT ENCOUNTERED		Sandy SILT; brown, dry with rootlets (TOPSOIL)											
	7			Sandy SILT; light brown, low plasticity, dry											
0.5	8														
	11														
	20														
	Refusal														
1.0				EOH - Target stratum (gravel)											
1.5															
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
MA	MACHINE AUGER	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
SV	SHEAR VANE	UW	UNIT WEIGHT (kN/m³)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL						

NOTES

miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS	*PROJECT NUMBER:*	**200357-9**
	CLIENT:	**YourSection Ltd**
	TESTING COMPLETED:	**24 January 2025**

SHALLOW GROUND INVESTIGATION LOG

MA08

PROJECT:	**9 Nobeline Drive, Rolleston**				
LOGGED BY:	**CMD**	*TOTAL TESTING DEPTH:*	**0.9 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CMD**	*TESTING METHOD:*	**MA + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
			USC	*Soil Characteristics*	*Graphic Log*		*Atterberg Limits*			*Grain Size*			*WC (%)*	*UW*	
							LL	*PL*	*PI*	*GR*	*SA*	*FC*			
0	3	NOT ENCOUNTERED		Sandy SILT; brown, dry with rootlets (TOPSOIL)											
	3			Silty SAND; fine to medium grained, light brown, dry											
	3			becomes with some Silt											
0.5	4														
	5														
	5														
	6														
	5														
1.0	20														
	Refusal			**EOH - Target stratum (gravel)**											
1.5															
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
MA	MACHINE AUGER	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
SV	SHEAR VANE	UW	UNIT WEIGHT (kN/m^3)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL						

NOTES

miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS	*PROJECT NUMBER:* **200357-9** *CLIENT:* **YourSection Ltd** *TESTING COMPLETED:* **24 January 2025**
SITE INVESTIGATION PLAN	**9 Nobeline Drive, Rolleston**



NZGD ID: 217400

LandTech CONSULTING

Client: Philip Kennard
Project: Proposed Residential Subdivision
Address: Nobeline Drive, Rolleston, Christchurch

Augerhole No.: TP08
Sheet No.: 1 of 1

Project No.:	LTC24061	**Coordinates:**	NZTM2000: E1552429.00, N5171886.00	**Logged By:**	KP
Drill Type:	Digger	**Reduced Level:**	40.00m (NZVD2016)	**Shear Vane No.:**	
Date Started:	26-Mar-24	**Ground Conditions:**	Near Level, Grass	**Calibration Factor:**	
Date Finished:	26-Mar-24	**Groundwater Level (m):**	Not Encountered	**Calibration Date:**	

Stratigraphy	Depth (m)	Graphic Log	Description	Groundwater Level (m)
Topsoil	0.0	TS	SILT, trace fine sand, dark greyish brown, stiff, dry, non-plastic, minor rootlets.	
ALLUVIAL DEPOSITS	0.5		SILT, trace fine sand, light yellowish brown, hard, dry, non-plastic.	
	1.0		Fine to medium sandy fine to coarse subround to rounded GRAVEL, minor subround to rounded cobbles, greyish brown, very dense, dry. 1.2m: Fine to coarse sandy, brown, wet.	
	1.5			
	2.0		End of Augerhole: 1.9m [TARGET DEPTH]	
	2.5			

Soil description in accordance with Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes, NZ Geotechnical Society Inc, 2005

In-situ Field Testing

Shear Strength (kPa) — ● Peak ● Remoulded — 50 100 150 200

Dynamic Cone (Scala) Penetrometer

Depth (m)	Blow Count
-0.1	3
-0.2	5
-0.3	6
-0.4	9
-0.5	11
-0.6	10
-0.7	10
-0.8	14
-0.9	12
-1.0	12
-1.1	40

Scala Blow Count / 100mm — 0 5 10 15 20

Target Depth Achieved.

In- situ testing inaccordance with the following standards:
Scala Penetrometer Testing: NZS 4402: 1988, Test 6.5.2, Dynamic Cone Penetrometer
Shear Vane Testing: Guideline for Hand Held Shear Vane Test, NZGS, August 2001

LandTech Consulting Ltd: Unit 3, 16 Leslie Hills Drive, Riccarton Christchurch, 8011 Ph: 03 390 1371
Email: info@landtech.nz
Website: www.landtech.nz

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NZGD ID: 217400

NZGD ID: 226203

BOREHOLE LOG

Hole # **TP10**

landform projects

Project: 139 Levi Road
For: Gould Developments Limited
Project #:
Co-ordinates: 1552400.000, 5171867.323 **Grid system:** NZTM2000 (E, N)
Drill method: Excavator **Contractor:** LFP
Hole depth: 2.00 **Equipment:** Excavator

LFP Ref #: 2034
Date started: 2/09/2024
Date finished: 2/09/2024
R.L.: 39.70m NZVD(2016)
Logged by: CLS
Checked By: RBW

R.L. (m)	STRATA DESCRIPTION	USCS	Graphic	DEPTH	Geological UNIT	Water & Piezo	Shear Vane (kPa)	sub sampled
39.7	Organic SILT, some sand, minor fresh organics, dark brown, soft to firm, moist, non plastic; Sand, fine; Organics, rootlets	OL		0.0	TOPSOIL			
39.2	Silty fine to cobble GRAVEL, some sand, brown to light brown, dense, moist; gravel, greywacke, rounded; Sand, fine to coarse	GM		0.5	SPRINGSTON FORMATION			
38.7	Sandy fine to cobble GRAVEL, brown, dense, moist; Gravel, greywacke, rounded; Sand, fine to coarse	GW		1.0				
38.2				1.5				
37.7	E.O.H. Target Depth			2.0				
37.2				2.5				
36.7				3.0				
36.2				3.5				
35.7				4.0				
35.2				4.5				
34.7				5.0				

Shear Vane (kPa): 0 100 200 | 5 10 15 20

0 25 50 peak (kPa) residual (kPa) Size: mm #: | 5 10 15 20 | 0

blows/100mm are calculated from mm/blow as recorded

Notes: R.L. sourced from RTK survey
No static groundwater encountered

Logged in accordance with the "Guidelines for the Classification and Description of Soil and Rock for Engineering Purposes" Dec 2005 NZGS.
R.L. is inferred and/or interpolated unless otherwise stated.

Shear Vane performed and corrected as per NZGS Guidelines.
Scala Penetrometer Test carried out to NZS 4402: Test 6.5.2 & field measured as mm per blow(s) .

NZGD ID: 226203

NZGD ID: 217379

LandTech CONSULTING

Client: Philip Kennard
Project: Proposed Residential Subdivision
Address: Nobeline Drive, Rolleston, Christchurch

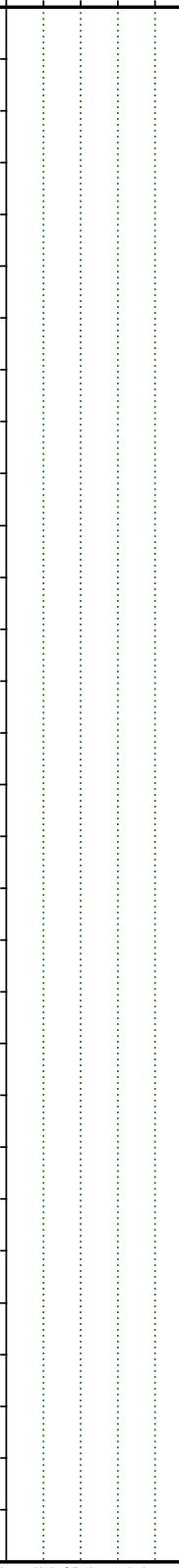
Augerhole No.: HA05
Sheet No.: 1 of 1

Project No.:	LTC24061	**Coordinates:**	NZTM2000: E1552344.00, N5171816.00	**Logged By:**	KP
Drill Type:	50mm Hand Auger	**Reduced Level:**	40.00m (NZVD2016)	**Shear Vane No.:**	
Date Started:	26-Mar-24	**Ground Conditions:**	Near Level, Grass	**Calibration Factor:**	
Date Finished:	26-Mar-24	**Groundwater Level (m):**	Not Encountered	**Calibration Date:**	

Stratigraphy	Depth (m)	Graphic Log	Description	Groundwater Level (m)
Topsoil	0.0	TS	SILT, trace fine sand, dark greyish brown, stiff, dry, non-plastic, trace rootlets.	
ALLUVIAL DEPOSITS	0.3		SILT, trace fine sand, light yellowish brown, hard, dry, non-plastic.	
	0.5		End of Augerhole: 0.5m [TOO STIFF TO AUGER]	

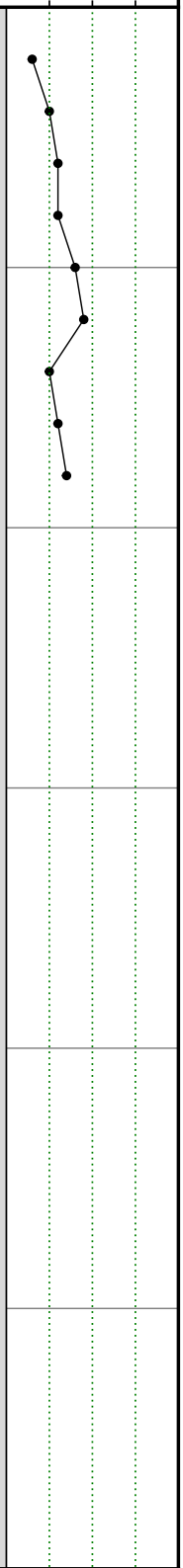
In-situ Field Testing

Shear Strength (kPa) — ● Peak ● Remoulded



Dynamic Cone (Scala) Penetrometer

Depth (m)	Blow Count
-0.1	3
-0.2	5
-0.3	6
-0.4	6
-0.5	8
-0.6	9
-0.7	5
-0.8	6
-0.9	7



Too stiff to auger due to hard silt.

In- situ testing inaccordance with the following standards:
Scala Penetrometer Testing: NZS 4402: 1988, Test 6.5.2, Dynamic Cone Penetrometer
Shear Vane Testing: Guideline for Hand Held Shear Vane Test, NZGS, August 2001

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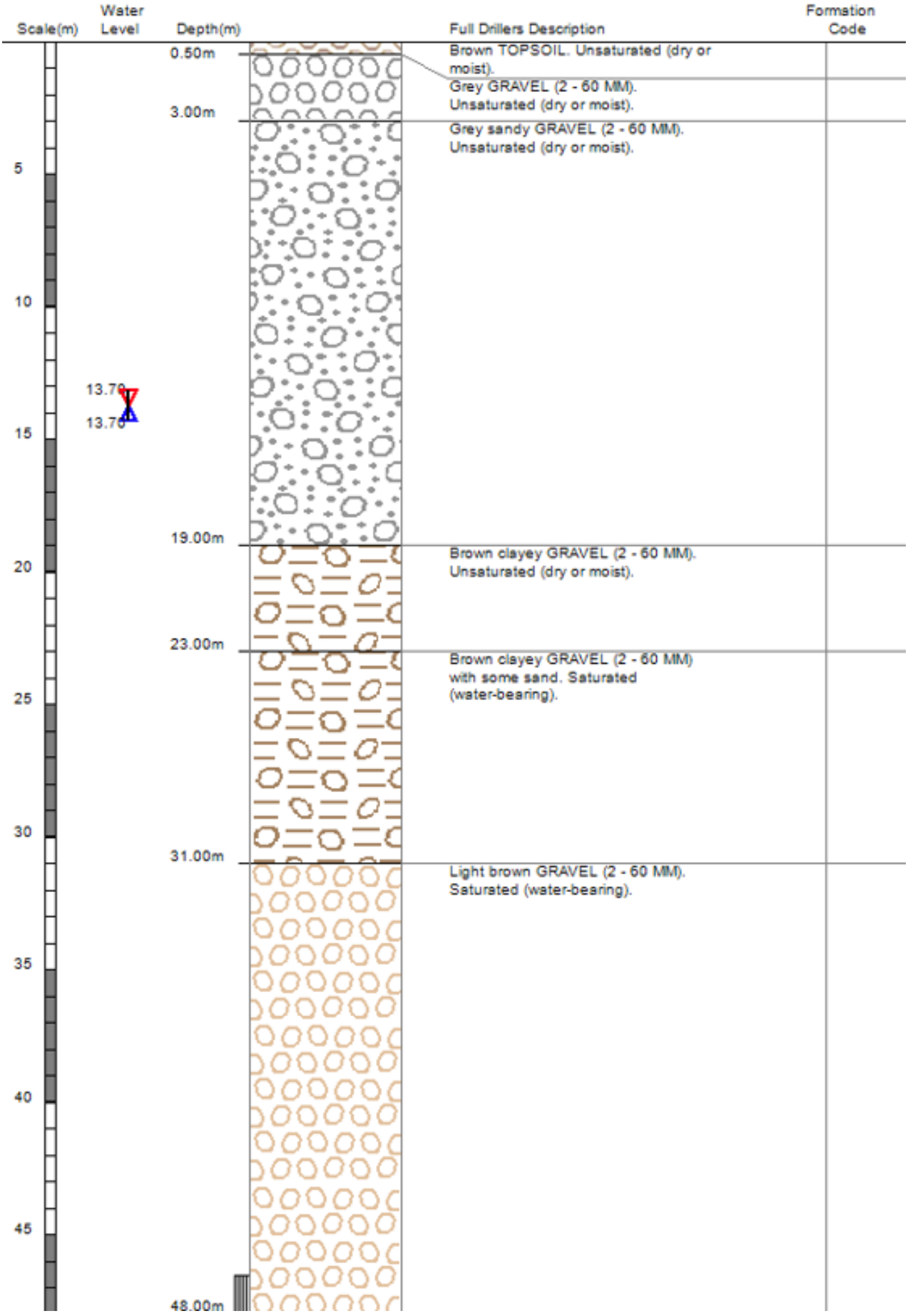
NZGD ID: 217379

Borelog for well BX23/0533

Grid Reference (NZTM): 1552674 mE, 5171682 mN
Location Accuracy: 10 - 50m
Ground Level Altitude: 38.6 m +MSD Accuracy: < 2.5 m
Driller: East Coast Drilling
Drill Method: Air Rotary
Borelog Depth: 48.0 m Drill Date: 20-Nov-2015

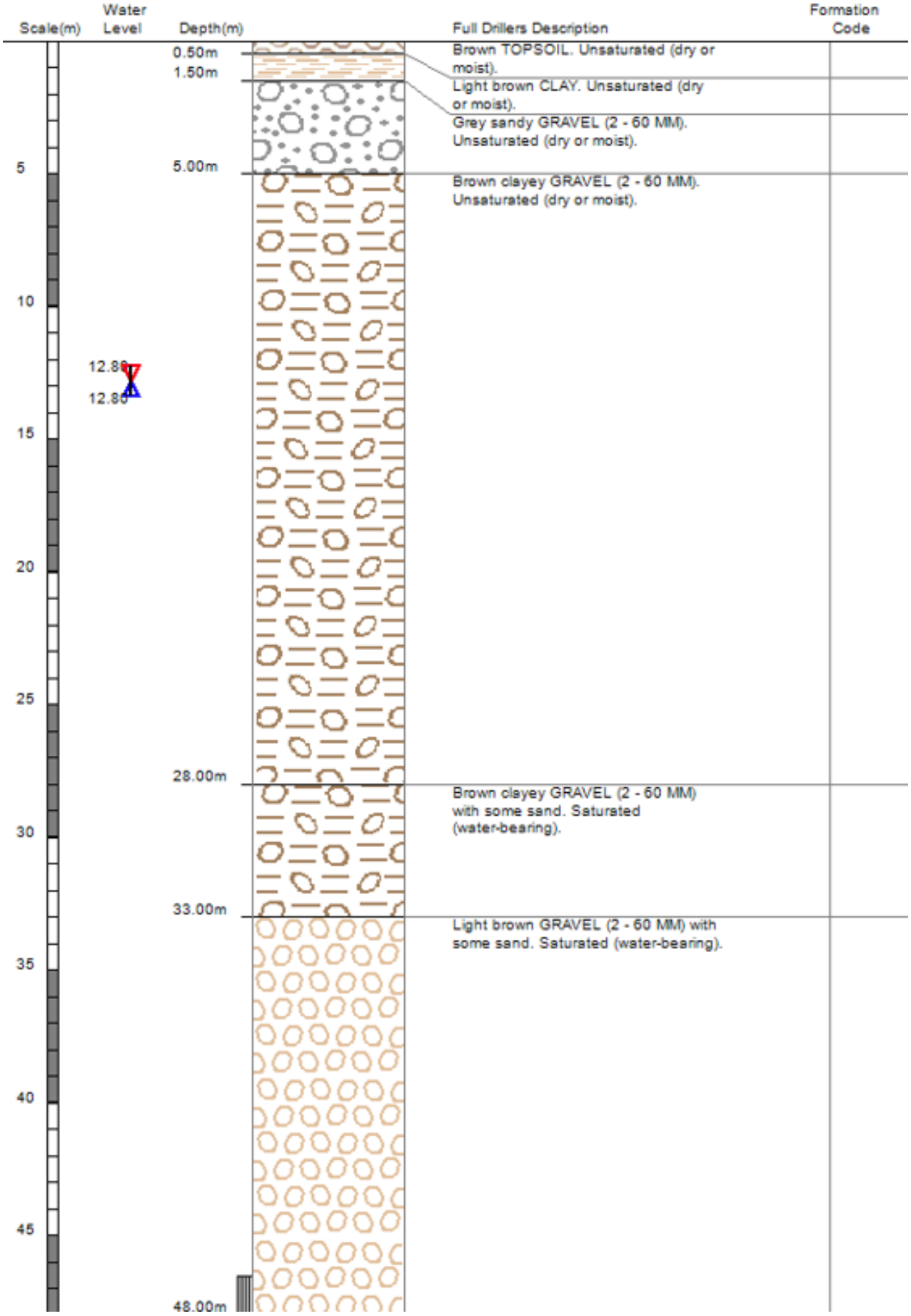
Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha



Borelog for well BX23/0648

Grid Reference (NZTM): 1552732 mE, 5171909 mN
Location Accuracy: 10 - 50m
Ground Level Altitude: 39.6 m +MSD Accuracy: < 2.5 m
Driller: East Coast Drilling
Drill Method: Air Rotary
Borelog Depth: 48.0 m Drill Date: 17-Nov-2016

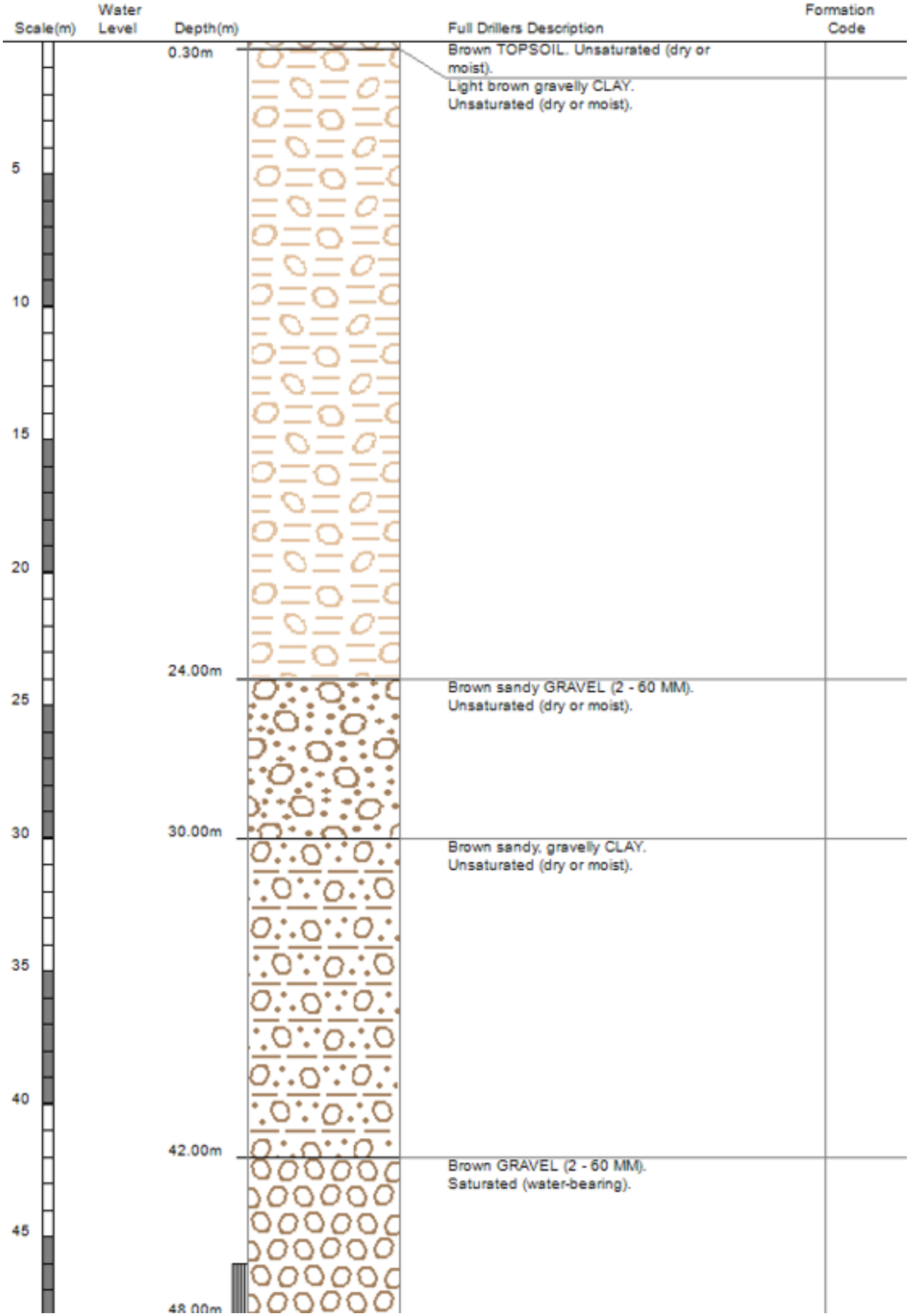
Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha



Borelog for well BX23/0620

Grid Reference (NZTM): 1552630 mE, 5172006 mN
Location Accuracy: 10 - 50m
Ground Level Altitude: m +MSD Accuracy: < 2.5 m
Driller: Daly Water Wells Ltd
Drill Method: Rotary Rig
Borelog Depth: 48.0 m Drill Date: 08-Aug-2016

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha



Geotechnical Assessment Report

202 Lincoln Rolleston Road, Rolleston

Issue Date:	**30 April 2025**
MNZ Reference:	**200357-10-RP-001[A]**
Prepared for:	**YourSection Ltd**

Report Tracking – 202 Lincoln Rolleston Road, Rolleston

Revision	Status	Date	Prepared by	Reviewed by
A	Final	30 April 2025	C McDermott	J Byron-Joyce

Authorisation

Author's Signature		**Reviewer's Signature**	
Name	Charles McDermott	**Name**	Joseph Byron-Joyce
Title	Geotechnical Engineer BEng(Hons) CPEng CMEng(NZ) IntPE(NZ)	**Title**	Engineering Geologist BSc (Geology) CMEngNZ PEngGeol

Miyamoto New Zealand Limited

www.miyamoto.nz

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Table of Contents

1. Introduction and Scope....1
2. Site Description and Proposed Development....1
3. Desktop Study....2
4. Geotechnical Site Investigation....3
5. Geotechnical Evaluation and Assessment....4
6. Assessment of Geotechnical Hazards as per RMA Section 106....5
7. Development Recommendations....6
8. Additional Considerations....7
9. Limitations....8

References....9

Appendix A: Site Photographs

Appendix B: Geotechnical Investigation Results

1. Introduction and Scope

Miyamoto New Zealand Ltd (Miyamoto) has been engaged by YourSection Ltd (the Client) to conduct a geotechnical assessment for the proposed subdivision of 202 Lincoln Rolleston Road, Rolleston (the Site). The purpose of this assessment is to characterise the geotechnical conditions and hazards at the site in support of the subdivision application at Selwyn District Council.

The following has been undertaken as part of this phase of works:

- Desktop study to identify relevant available geological and geotechnical information.
- Site walkover inspection of the land.
- Geotechnical site investigation, comprising:
    - 4 No. Trial Pits (TP) to a maximum depth of 1.8 m.
    - 4 No. Dynamic Cone Penetrometer (DCP) tests to a maximum depth of 1.3 m.
- Geotechnical assessment and reporting of the findings, including development and foundation design recommendations.

The geotechnical investigation and assessment were carried out considering the Ministry of Business, Innovation & Employment (MBIE) and New Zealand Geotechnical Society (NZGS) Guidance documents Earthquake geotechnical engineering practice - Modules 1 to 4 (November 2021), and other relevant documents as required.

2. Site Description and Proposed Development

The site, legally described as LOT 15 DP 483709, is located in Rolleston and is approximately 4.0 hectares (ha) in area. The topography of the site is relatively flat with a difference in elevation of ~2.0 m and visible shallow undulations / channel features. The property is bound by Lincoln Rolleston Road to the southwest and by rural properties on all other boundaries. A site location plan is provided as Figure 1.

The site currently houses a residential dwelling and a number of farm buildings / sheds. The groundcover comprises predominantly grassland with areas of vegetated pasture (low height crops), a horse training area and localised groupings of small trees. The CCC property file indicates there is a dripline discharge system located to the southeast of the site (refer Figure 2). Site photographs are provided in Appendix A.

The site is not located within the MBIE Residential Foundation Technical Categories (TC), with the land mapped as ‘N/A - Urban Non-residential’.

The proposed development comprises residential subdivision of the site. At this stage the number of lots and the layout of such have not been specified. Earthworks will be required to form the building platforms, services, and roading.



Figure 1: Site Location Plan

3. Desktop Study

3.1 References

The following third-party resources have been reviewed and are referenced in our assessment:

- New Zealand Geotechnical Database (NZGD).
- Environment Canterbury (ECan).
- Selwyn District Council (SDC).
- Canterbury Maps.
- GNS Science Geological Maps.
- Google Earth Imagery.

3.2 Contaminated Land Considerations

An independent assessment of contaminated land is being undertaken by others and will be presented under separate cover.

3.3 Natural Hazards

3.3.1 Flooding

As per the Partially Operative Selwyn District Plan, the site is mapped within the 'Plains Flood Management…2023' area, the requirements of SDC regarding such should be followed.

3.3.2 Liquefaction

The site is mapped in an area classified as 'Liquefaction Damage Unlikely…2023' as per the Partially Operative Selwyn District Plan.

With reference to the Canterbury Maps, liquefaction was not mapped on site during the 2010-2011 Canterbury Earthquake Sequence (CES).

3.4 Ground Motion

The site is not located within the NZGD 'Conditional PGA for Liquefaction Assessment' mapping layers, however, it is in close proximity and we have extrapolated the data for the site.

Using the MBIE and Bradley & Hughes (2012) procedures, we have found that the site was 'sufficiently tested' to the Serviceability Limit State (SLS) level of earthquake demand during the September 2010 event of the CES. This indicates that land and building damage in a future SLS event is likely to be similar to the September event.

Utilising a derivation of the Bradley and Hughes method, we can suggest that the site was not tested to Ultimate Limit State (ULS) level of shaking during the CES. Based on the probabilistic analysis of the PGAs experienced at the site, the nature of land and building damage is likely to be more severe during a future ULS event than that already experienced during the individual CES events.

4. Geotechnical Site Investigation

Geotechnical data available from the New Zealand Geotechnical Database (NZGD), previous works within proximity of the site, and Environment Canterbury (ECan) has been used as part of our assessment.

On 29 April 2025 Miyamoto undertook / supervised a site investigation comprising the following:

- 4 No. Trial Pits (TP) to a maximum depth of 1.4 m.
- 4 No. Dynamic Cone Penetrometer (DCP) tests to a maximum depth of 1.3 m.

The exploratory hole locations are shown in Figure 2, summarised in Table 1, and the engineering logs / plots are included as Appendix B.



Figure 2: Exploratory Hole Location Plan

Table 1: Geotechnical Investigation Summary

Ref	Source	Test Type	Depth
200357-10 TP01 to 04	Miyamoto (200357-10)	Trial Pit with associated Dynamic Cone Penetrometer	0.5 to 1.8 mbgl
200357-9 HA/MA 02, 03, 04 & 06	Miyamoto (200357-9)	Hand Auger / Machine Auger with associated Dynamic Cone Penetrometer	0.6 to 1.3 mbgl
2022_TP01 & 02	Miyamoto	Trial Pit & Dynamic Cone Penetrometer	0.6 mbgl
LDE_TP09	NZGD		3.0 mbgl
216165		Hand Auger & Dynamic Cone Penetrometer	0.4 mbgl
216166			0.4 mbgl
BX23/0533	ECan	Machine Borehole (Air Rotary)	48 mbgl
M36/4966		Machine Borehole (Rotary/Percussion)	48 mbgl

5. Geotechnical Evaluation and Assessment

5.1 Ground Profile

The ground profile interpreted from the on-site shallow ground investigation, correlated with the available existing data, generally comprises a layer of topsoil (0.1 m to 0.3 m in thickness), overlying predominantly medium dense Sand with occasional stiff Silt and mixtures thereof to between 0.4 m and 1.2 mbgl, below which dense to very dense predominantly Sandy, occasionally Silty Gravel and Cobbles are present to depth.

The ECan well bore logs indicate the gravel layer continues to depth.

5.2 Groundwater Conditions

Standing groundwater was not encountered during our site-specific investigation. With reference to the nearby ECan well bores and the Canterbury Maps, groundwater is likely to be present at a depth of >10 mbgl.

5.3 Site Subsoil Class

Based on the results of our site-specific investigation, investigation data from the surrounding area, geological maps and other published information, we consider NZS1170.5 Site Subsoil 'Class D - deep or soft soil' to be appropriate.

5.4 Liquefaction Assessment

Based on our assessment, including published mapping (Partially Operative Selwyn District Plan), the performance of the land during previous seismic events, the site-specific ground conditions and groundwater regime, we concur that the risk of damaging effects from liquefaction at the site is low with the seismic performance expected to be equivalent to MBIE Technical Category (TC) 1 as per the MBIE Guidance (2012).

6. Assessment of Geotechnical Hazards as per RMA Section 106

As per the requirements of Section 106 of the Resource Management Act (RMA) (2017), we have undertaken an assessment of the significant geotechnical hazards that may affect the site. These hazards include, but are not limited to erosion, falling debris, slippage, subsidence, and inundation.

At the time of our site visit, there was no evidence of erosion or erosional features on site. The shallow soils could be vulnerable to erosion if the topsoil layer is removed and left unprotected for prolonged periods of time. This can be easily mitigated with appropriate design measures during construction.

Given the proximity of the site to any source, rockfall (falling debris) is not considered a risk to the site and given the site is generally flat with only a minor gradual change in elevation across the site, slope instability (slippage) is not considered to be a risk.

On the basis of our geotechnical assessment herein, we do not consider subsidence (under either static or seismic loading) to be a significant hazard for normal construction (i.e. NZS3604 compliant buildings).

As per the Partially Operative Selwyn District Plan, the site is mapped within the 'Plains Flood Management…2023' area, the requirements of SDC regarding such should be followed.

Provided that the geotechnical recommendations given in this report are followed, and the appropriate engineering measures implemented, we consider that the land is unlikely to be affected nor worsen, accelerate, or result in material damage by the proposed development.

7. Development Recommendations

7.1 Earthworks

Earthworks will be required to form the building platforms, services and roading.

As general guidance, earthworks are to be undertaken in accordance with NZS4431:2022 (Engineered fill construction for lightweight structures) and WorkSafe New Zealand (July 2016) Good Practice Guidelines - Excavation Safety. For a site of this nature, the following would typically be required for the earthworks:

- Review and approval of earthworks methodology by suitably qualified geo-professional / engineer.
- Removal of vegetation, topsoil and organic matter (organic rich soils or peat) as well as any uncontrolled fill from the development areas (staged as required).
- Excavate to the required level(s) with incorporation of temporary and / or permanent support / retention as required (e.g. areas where a cut may exceed 0.5 m in loose, cohesionless soils).
- Subgrade to be proof rolled and inspected by suitably qualified geo-professional / engineer.
- Fill to be placed and compacted as specified in 4431:2022 (in layers of suitable thickness to achieve the required compaction) with testing of fill material by nuclear densometer testing (NDM), or other approved methods, undertaken by an accredited third-party. Testing frequency will be confirmed during the future stages of the project with the results provided to a suitably qualified geo-professional / engineer (along with particle size distribution and compaction curves for the fill) for certification.

Additionally, the building foundations and dripline discharge system are to be removed along with any underlying soft or otherwise unsuitable material, and replaced in line with the above recommendations.

7.2 Foundation Recommendations

Preliminarily, NZS3604 foundations are considered geotechnically feasible for NZS3604 compliant structures, subject to building-specific geotechnical investigations to assess the available bearing capacity.

Consideration should be given to cut / fill boundaries intersecting the building locations.

7.3 Stormwater Management

Stormwater management is outside the scope of our works and will require detailed design by a suitably experienced person, however, it is recommended that the design of any stormwater systems that discharge to land, is reviewed by Miyamoto to ensure there are no adverse effects on the development from a geotechnical perspective.

7.4 Pavement / Roading Infrastructure / Services

As for stormwater management, roading / pavements / services are outside the scope of our works and will require detailed design by a suitably experienced person. Miyamoto would be happy to provide geotechnical advice as and when required.

7.5 Contaminated Land

An independent assessment of contaminated land is being undertaken by others and will be presented under separate cover.

8. Additional Considerations

As we have undertaken the initial investigation and are familiar with the site, we are in a good position to assist with the future stages of the project including the recommendations included in this report. We would be pleased to provide a detailed scope and fee estimate for these works. However, should we not be engaged to undertake the future works, it is recommended that a suitably qualified geo-professional / engineer be engaged for the following works:

- Review of earthworks management plan.
- Construction monitoring of earthworks as per 4431:2022.
- Provision of a Geotechnical Completion Report and associated certification.

9. Limitations

This report is subject to the following limitations:

- This report has been prepared by Miyamoto for the Client for the purpose(s) agreed with the Client (Purpose). Miyamoto accepts no responsibility for the validity, appropriateness, sufficiency, or consequences of the Client using the report for purposes other than for the Purpose.
- This report is not intended for general publication or circulation. This report is not to be reproduced by the Client except in relation to the Purpose, without Miyamoto's prior written permission. Miyamoto disclaims all risk and all responsibility to any third party.
- This report is provided based on the various assumptions contained in the report. The assumptions were based on the professional judgment of Miyamoto.
- Miyamoto's professional services are performed using a degree of care and skill reasonably exercised by reputable consultants providing the same or similar services as at the date of this report.
- The sub surface information has been obtained from investigation carried out at discrete locations, which by their nature only provide information about a relatively small volume of subsoils. While Miyamoto has taken reasonable skill and care in carrying out the investigation to determine the subsoil condition, the subsoil condition could differ substantially from the results of any sampling investigation. Miyamoto is not responsible for and does not accept any liability in respect of any difference between the actual subsoil conditions and the results of our investigation.
- Any susceptibility analysis carried out in respect of liquefaction is based on Miyamoto's current understanding as an experienced professional engineering consultant of the data, methods etc. Future seismic events may change our understanding of liquefaction and its affects, which may affect the content of this report. Miyamoto is not responsible for and does not accept any liability where the content of this report is changed due to a change in industry knowledge of matters relating to liquefaction.
- This report specifically excludes assessment or advice relating to hazardous materials, such as asbestos.
- Where the Client provides information to Miyamoto, including design calculations and drawings of the as-built structure, or where the report indicates that we have obtained and/or relied upon information provided from a third party, Miyamoto has not made any independent verification of this information except as expressly stated in the report. Miyamoto assumes no responsibility for any inaccuracies in, or omissions to, that information.
- A change in circumstances, facts, information after the report has been provided may affect the adequacy or accuracy of the report. Miyamoto is not responsible for the adequacy or accuracy of the report because of any such changes.

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Appendix A: Site Photographs



Photograph 1: Looking ~Northeast from TP04 towards existing dwelling



Photograph 2: Looking ~Southwest from TP03 along the northern boundary towards Lincoln Rolleston Road

Appendix B: Geotechnical Investigation Results

miyamoto. ENGINEERS + CONSTRUCTION CONSULTANTS

PROJECT NUMBER:	**200357-10**
CLIENT:	**YourSection Ltd**
TESTING COMPLETED:	**29 April 2025**

SHALLOW GROUND INVESTIGATION LOG

TP01

PROJECT:	**202 Lincoln Rolleston Road**			
LOGGED BY:	**JBJ**	*TOTAL TESTING DEPTH:*	**1.4 mbgl**	
PROCESSED BY:	**CMD**	*TESTING METHOD:*	**TP + DCP**	*SHEAR VANE NUMBER:* -
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
			USC	*Soil Characteristics*	*Graphic Log*		*Atterberg Limits*			*Grain Size*			*WC (%)*	*UW*	
							LL	*PL*	*PI*	*GR*	*SA*	*FC*			
0.0	2	NOT ENCOUNTERED		SILT; brown, moist (TOPSOIL)											
	3			Silty SAND, fine to medium grained, pale yellow brown, moist.											
	4			Sandy GRAVEL, fine to coarse grained, rounded to sub-rounded, brown grey, moist.											
0.5	9														
	21														
	Refusal														
1.0															
1.5				**EOH - Target Stratum (gravel)**											
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
MA	MACHINE AUGER	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
SV	SHEAR VANE	UW	UNIT WEIGHT (kN/m^3)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL						

NOTES

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PROJECT NUMBER:	**200357-10**
CLIENT:	**YourSection Ltd**
TESTING COMPLETED:	**29 April 2025**

SHALLOW GROUND INVESTIGATION LOG

TP02

PROJECT:	**202 Lincoln Rolleston Road**			
LOGGED BY:	**JBJ**	*TOTAL TESTING DEPTH:*	**1.7 mbgl**	
PROCESSED BY:	**CMD**	*TESTING METHOD:*	**TP + DCP**	*SHEAR VANE NUMBER:* -
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full

Depth (m)	DCP Test Results (Blows per 100mm)	GWL	Soil Description			Sample Taken	Lab Testing								Shear Vane Reading (kPa) peak/remoulded
							Atterberg Limits			Grain Size			WC (%)	UW	
			USC	Soil Characteristics	Graphic Log		LL	PL	PI	GR	SA	FC			
0.5	6	NOT ENCOUNTERED		SILT; brown, moist with rootlets (TOPSOIL)											
	10			Silty SAND, fine to medium grained, pale brown, moist.											
	11			with some gravel											
	6														
	4														
	7			gravel absent											
	3														
1.0	4														
	3														
	8														
	20			Sandy GRAVEL, fine to coarse grained, rounded to sub-rounded, grey, moist.											
	Refusal														
1.5															
				EOH - Target Stratum (gravel)											
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
MA	MACHINE AUGER	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
SV	SHEAR VANE	UW	UNIT WEIGHT (kN/m^3)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL						

NOTES

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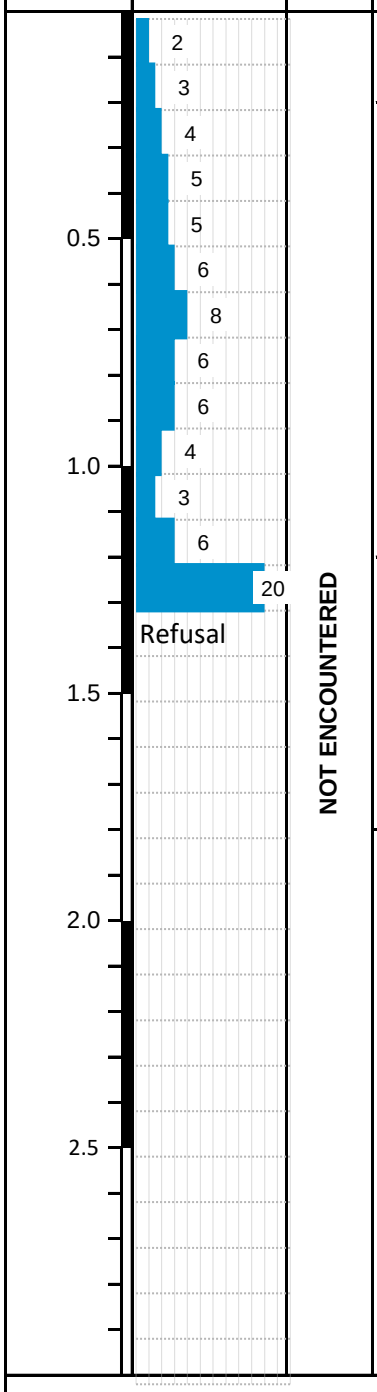
PROJECT NUMBER:	**200357-10**
CLIENT:	**YourSection Ltd**
TESTING COMPLETED:	**29 April 2025**

SHALLOW GROUND INVESTIGATION LOG

TP03

PROJECT:	**202 Lincoln Rolleston Road**			
LOGGED BY:	**JBJ**	*TOTAL TESTING DEPTH:*	**1.8 mbgl**	
PROCESSED BY:	**CMD**	*TESTING METHOD:*	**TP + DCP**	*SHEAR VANE NUMBER:* -
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full



Depth (m)	DCP Test Results (Blows per 100mm)	GWL	Soil Description: USC	Soil Description: Soil Characteristics	Soil Description: Graphic Log	Sample Taken	Lab Testing: Atterberg Limits LL	PL	PI	Lab Testing: Grain Size GR	SA	FC	Lab Testing: WC (%)	Lab Testing: UW	Shear Vane Reading (kPa) peak/remoulded
				SILT; brown, moist (TOPSOIL)											
				Silty SAND, fine to medium grained, pale brown / yellow, moist.											
				Sandy GRAVEL, fine to coarse grained, rounded to sub-rounded, grey, moist. with cobbles (<250 mm)											
				EOH - Target Stratum (gravel)											



LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
MA	MACHINE AUGER	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
SV	SHEAR VANE	UW	UNIT WEIGHT (kN/m³)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL						

NOTES

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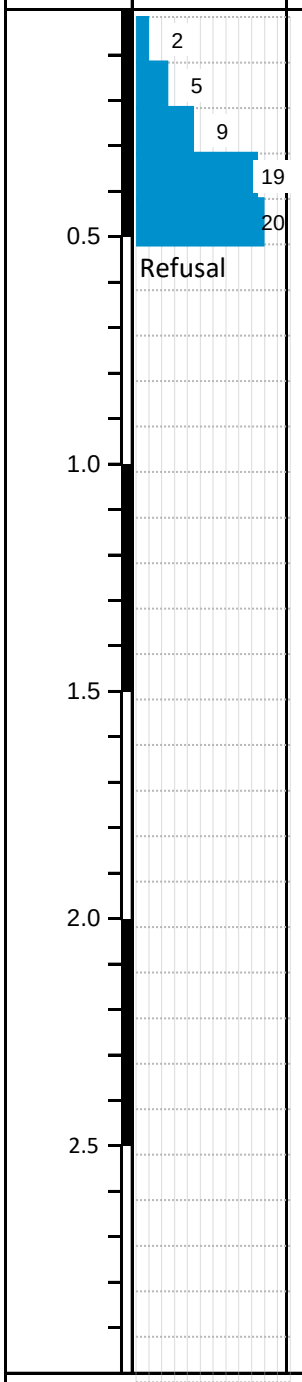
PROJECT NUMBER:	**200357-10**
CLIENT:	**YourSection Ltd**
TESTING COMPLETED:	**29 April 2025**

SHALLOW GROUND INVESTIGATION LOG

TP04

PROJECT:	**202 Lincoln Rolleston Road**			
LOGGED BY:	**JBJ**	*TOTAL TESTING DEPTH:*	**1.4 mbgl**	
PROCESSED BY:	**CMD**	*TESTING METHOD:*	**TP + DCP**	*SHEAR VANE NUMBER:* -
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full



Depth (m)	DCP Test Results (Blows per 100mm)	GWL	Soil Description: USC	Soil Description: Soil Characteristics	Soil Description: Graphic Log	Sample Taken	Lab Testing: Atterberg Limits LL	Lab Testing: Atterberg Limits PL	Lab Testing: Atterberg Limits PI	Lab Testing: Grain Size GR	Lab Testing: Grain Size SA	Lab Testing: Grain Size FC	Lab Testing: WC (%)	Lab Testing: UW	Shear Vane Reading (kPa) peak/remoulded
				Silty SAND; brown, moist (TOPSOIL)											
				Silty SAND, fine to medium grained, pale brown / yellow, moist.											
				Sandy GRAVEL, fine to coarse grained, rounded to sub-rounded, grey brown, moist with fine rootlets. Rootlets absent											
				EOH - Target Stratum (gravel)											



LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
MA	MACHINE AUGER	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
SV	SHEAR VANE	UW	UNIT WEIGHT (kN/m^3)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL						

NOTES

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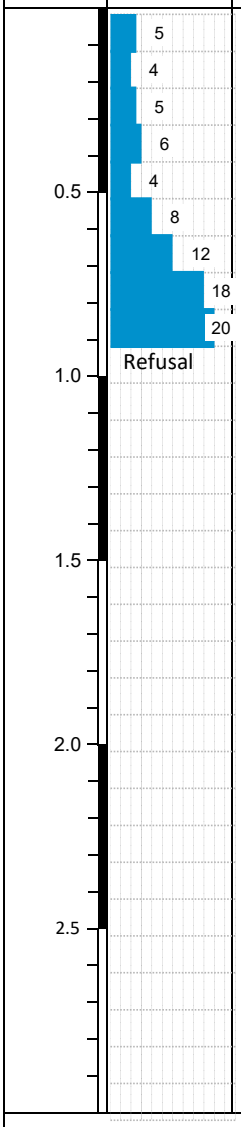
PROJECT NUMBER:	**200357-9**
CLIENT:	**YourSection Ltd**
TESTING COMPLETED:	**24 January 2025**

SHALLOW GROUND INVESTIGATION LOG

HA02

PROJECT:	**9 Nobeline Drive, Rolleston**				
LOGGED BY:	**CMD**	*TOTAL TESTING DEPTH:*	**0.9 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CMD**	*TESTING METHOD:*	**HA + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	



Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
				SILT with some Sand; dark brown, dry with rootlets (TOPSOIL)											
				Sandy SILT; light brown, low plasticity, dry											
				SAND; fine to medium grained, light brown, dry											
				EOH - Refusal on gravel											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
MA	MACHINE AUGER	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
SV	SHEAR VANE	UW	UNIT WEIGHT (kN/m³)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL						

NOTES

miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS

PROJECT NUMBER:	**200357-9**
CLIENT:	**YourSection Ltd**
TESTING COMPLETED:	**24 January 2025**

SHALLOW GROUND INVESTIGATION LOG

MA03

PROJECT:	**9 Nobeline Drive, Rolleston**				
LOGGED BY:	**CMD**	*TOTAL TESTING DEPTH:*	**0.6 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CMD**	*TESTING METHOD:*	**MA + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
			USC	*Soil Characteristics*	*Graphic Log*		*Atterberg Limits*			*Grain Size*			*WC (%)*	*UW*	
							LL	*PL*	*PI*	*GR*	*SA*	*FC*			
0.0	3	NOT ENCOUNTERED		Sandy SILT; brown, dry with rootlets (TOPSOIL)											
0.5	5			Gravelly Silty SAND, fine to medium grained, light brown, dry. Gravel is rounded to sub-rounded, fine to coarse, grey											
	8														
	6														
	9														
	20														
	Refusal			**EOH - Target Stratum (gravel)**											
1.0															
1.5															
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
MA	MACHINE AUGER	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
SV	SHEAR VANE	UW	UNIT WEIGHT (kN/m³)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL						

NOTES

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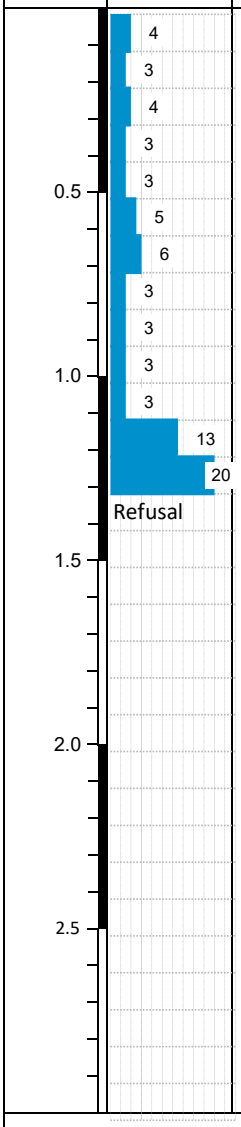
PROJECT NUMBER:	**200357-9**
CLIENT:	**YourSection Ltd**
TESTING COMPLETED:	**24 January 2025**

SHALLOW GROUND INVESTIGATION LOG

MA04

PROJECT:	**9 Nobeline Drive, Rolleston**				
LOGGED BY:	**CMD**	*TOTAL TESTING DEPTH:*	**1.3 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CMD**	*TESTING METHOD:*	**MA + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	



Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
0.0				Silty SAND; fine to medium grained, brown, dry with rootlets (TOPSOIL)											
0.5				SAND with some Silt; fine to medium grained, dry.											
				becomes moist											
1.0				becomes Silty SAND, wet											
1.3				**EOH - Target stratum (gravel)**											
1.5															
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
MA	MACHINE AUGER	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
SV	SHEAR VANE	UW	UNIT WEIGHT (kN/m³)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL						

NOTES

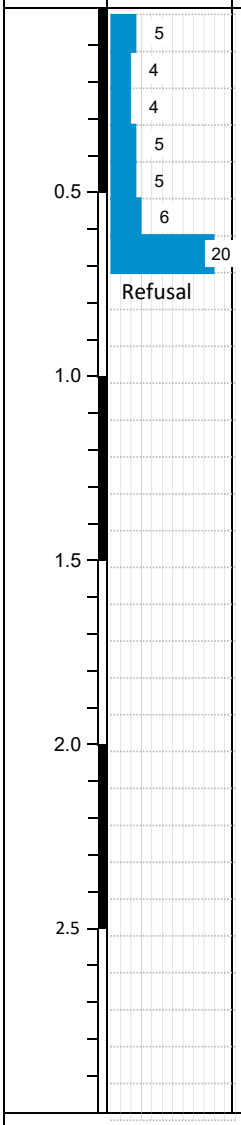
miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS

PROJECT NUMBER:	**200357-9**
CLIENT:	**YourSection Ltd**
TESTING COMPLETED:	**24 January 2025**

SHALLOW GROUND INVESTIGATION LOG

MA06

PROJECT:	**9 Nobeline Drive, Rolleston**				
LOGGED BY:	**CMD**	*TOTAL TESTING DEPTH:*	**1.0 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CMD**	*TESTING METHOD:*	**MA + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	



Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
			USC	*Soil Characteristics*	*Graphic Log*		*Atterberg Limits*			*Grain Size*			*WC (%)*	*UW*	
							LL	*PL*	*PI*	*GR*	*SA*	*FC*			
0				Sandy SILT; brown, dry with rootlets (TOPSOIL)											
				SAND with trace Silt, fine to medium grained, brown, dry											
0.5				becomes moist with some Silt											
1.0				**EOH - Target stratum (gravel)**											
1.5															
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
MA	MACHINE AUGER	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
SV	SHEAR VANE	UW	UNIT WEIGHT (kN/m³)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL						

NOTES

miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS	*PROJECT NUMBER:*	**200357-1**
	CLIENT:	**YourSection Ltd**
	TESTING COMPLETED:	**10 June 2022**

SHALLOW GROUND INVESTIGATION LOG

2022_TP01

PROJECT:	**148, 156 & 178 Lincoln Rolleston Road & 487 Weedens Road**				
LOGGED BY:	**CMD / CM**	*TOTAL TESTING DEPTH:*	**0.5 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CM**	*TESTING METHOD:*	**HA + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E mbgl**	This report may only be reproduced in full	

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
0	2 3 5 Refusal	NOT ENCOUNTERED		Silty TOPSOIL, dark brown to black with rootlets											
				SILT, light brown, dry, low plasticity with trace Sand											
0.5				Sandy / Silty GRAVEL & COBBLES, gravel is greywacke, medium to coarse, rounded to sub-rounded; sand is fine to course											
				EOH - Target Stratum											
1.0															
1.5															
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
SV	SHEAR VANE	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
GWL	GROUNDWATER LEVEL	UW	UNIT WEIGHT (kN/m³)	WC	WATER CONTENT	▽	STANDING GWL
mbgl	METERS BELOW GROUND LEVEL						

NOTES

As per MINZ policy, the DCP was transferred to the base of the hand auger borehole at 1.9m depth

miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS	*PROJECT NUMBER:*	**200357-1**
	CLIENT:	**YourSection Ltd**
	TESTING COMPLETED:	**10 June 2022**

SHALLOW GROUND INVESTIGATION LOG

2022_TP02

PROJECT:	**148, 156 & 178 Lincoln Rolleston Road & 487 Weedens Road**				
LOGGED BY:	**CMD / CM**	*TOTAL TESTING DEPTH:*	**0.4 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CM**	*TESTING METHOD:*	**HA + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
0	1 3 4 Refusal	NOT ENCOUNTERED		Silty TOPSOIL, dark brown to black with rootlets											
				SILT, light brown, dry, low plasticity with trace Sand											
0.5				Sandy / Silty GRAVEL & COBBLES, gravel is greywacke, medium to coarse, rounded to sub-rounded; sand is fine to course											
				EOH - Target Stratum											
1.0															
1.5															
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
SV	SHEAR VANE	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
GWL	GROUNDWATER LEVEL	UW	UNIT WEIGHT (kN/m³)	WC	WATER CONTENT	▽	STANDING GWL
mbgl	METERS BELOW GROUND LEVEL						

NOTES

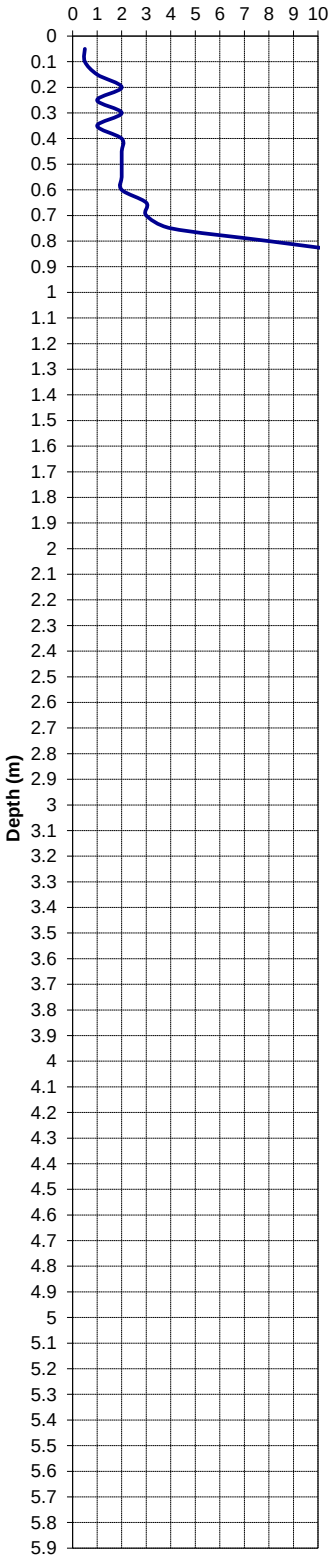
TEST PIT LOG

TEST PIT No: TP 9

Client: Bussell Developments	**Project:** Proposed Subdivision Stage 1	**LDE Project No.:** 10774
Project Location: Weedons Road, Rolleston	**Test pit Location:** Refer to site plan	**Excavation date:** 25/07/2013
Co-ordinates: mN mE	**Excavation method:** 5 Tonne Excavator	**Excavated by:** Canterbury Bobcats **Logged by:** SP

Depth (m)	Graphic	Moisture	Strength	Soil Description	Geology
0.0 – 0.2		M		SILT, organic, minor sand, dark brown, moist.	TOPSOIL
0.3 – 0.7		M		SILT, sandy, minor clay, light brown grey, slightly plastic, sand is fine to coarse, moist	Alluvium
0.8 – 2.9		M		GRAVEL, sandy, minor silt, gravel is sub rounded, sand if fine to coarse, moist	Alluvium
3.0				End of test pit at 3.0m - target depth reached.	

Penetrometer test (blows/50mm)



Notes: Shear strength lines are indicative only.
Shear strength calibrated and adjusted for plasticity

NZGD ID: 216165

LandTech CONSULTING

Client: Mike Greer Homes Mid-Canterbury Ltd
Project: Lot Specific Soil Report - New dwelling
Address: Falcons Landing Subdivision

Augerhole No.: Lot 53 - HA01
Sheet No.: 1 of 1

Project No.:	LTC24008	**Coordinates:**	NZTM2000: E1552488.49, N5171629.32	**Logged By:**	KP
Drill Type:	50mm Hand Auger	**Reduced Level:**	.15m (LVD1937)	**Shear Vane No.:**	
Date Started:	26-Feb-24	**Ground Conditions:**	Near Level, Grass	**Calibration Factor:**	
Date Finished:	26-Feb-24	**Groundwater Level (m):**	Not Encountered	**Calibration Date:**	

Stratigraphy	Depth (m)	Graphic Log	Description	Groundwater Level (m)
Topsoil / Fill	0	TS TS TS	SILT, minor fine to medium subangular to subround gravel, dark greyish brown, hard, dry, non-plastic, trace organics.	
			End of Augerhole: 0.1m	
			[TOO DENSE TO AUGER]	

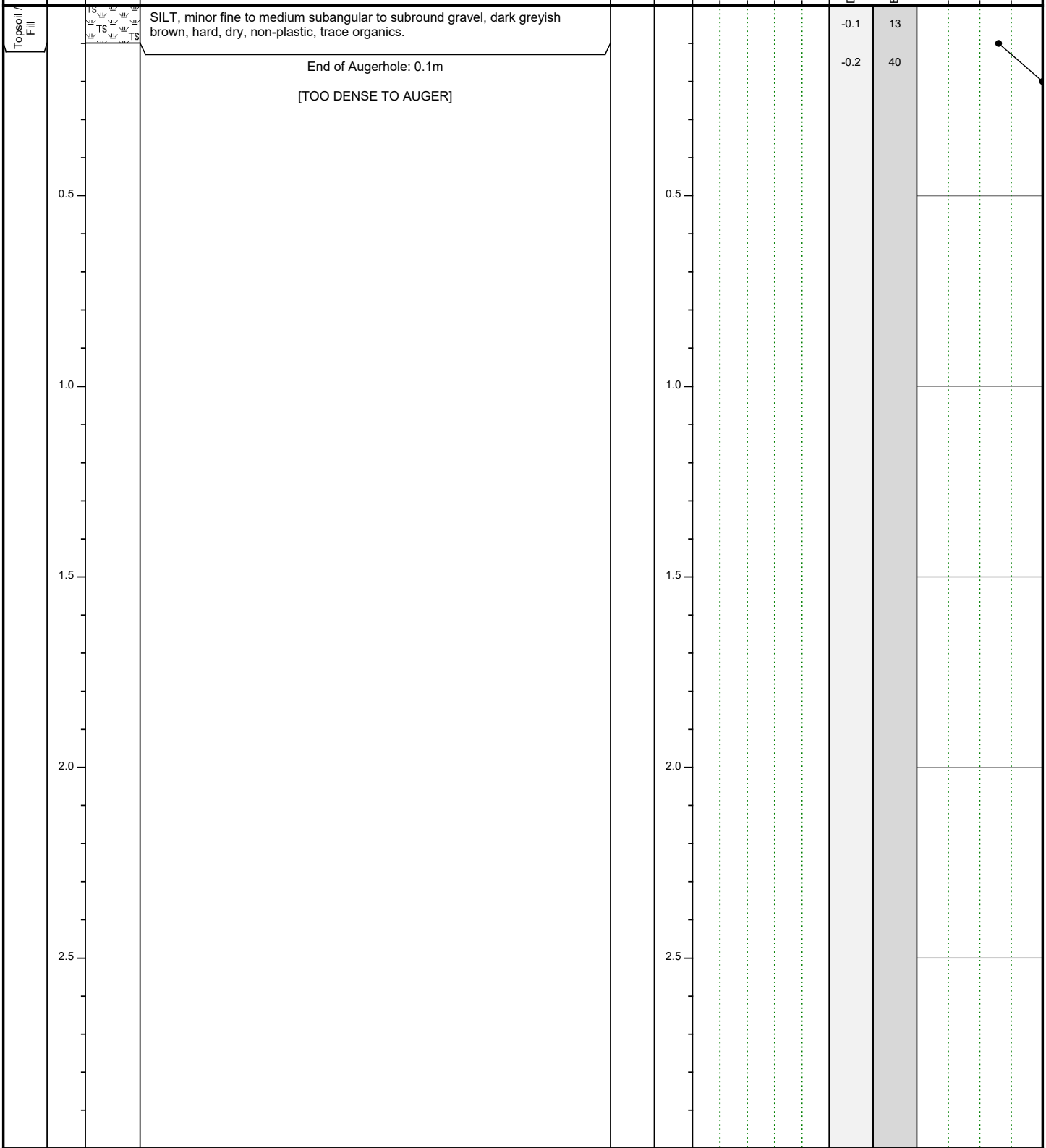
Soil description in accordance with Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes, NZ Geotechnical Society Inc, 2005

In-situ Field Testing

Shear Strength (kPa) — ● Peak ● Remoulded

Dynamic Cone (Scala) Penetrometer

Depth (m)	Blow Count
-0.1	13
-0.2	40



Too dense to auger due to inferred gravel

In- situ testing inaccordance with the following standards:
Scala Penetrometer Testing: NZS 4402: 1988, Test 6.5.2, Dynamic Cone Penetrometer
Shear Vane Testing: Guideline for Hand Held Shear Vane Test, NZGS, August 2001

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Website: www.landtech.nz

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NZGD ID: 216165

NZGD ID: 216165

LandTech CONSULTING

Client: Mike Greer Homes Mid-Canterbury Ltd
Project: Lot Specific Soil Report - New dwelling
Address: Falcons Landing Subdivision

Augerhole No.: Lot 53 - HA02
Sheet No.: 1 of 1

Project No.:	LTC24008	**Coordinates:**	NZTM2000: E1552497.52, N5171614.30	**Logged By:**	KP
Drill Type:	50mm Hand Auger	**Reduced Level:**	.15m (LVD1937)	**Shear Vane No.:**	
Date Started:	26-Feb-24	**Ground Conditions:**	Near Level, Grass	**Calibration Factor:**	
Date Finished:	26-Feb-24	**Groundwater Level (m):**	Not Encountered	**Calibration Date:**	

Stratigraphy	Depth (m)	Graphic Log	Description	Groundwater Level (m)
Topsoil / Fill	0	TS TS TS	SILT, minor fine to medium subangular to subround gravel, dark greyish brown, hard, dry, non-plastic, trace organics.	
			End of Augerhole: 0.1m	
			[TOO DENSE TO AUGER]	

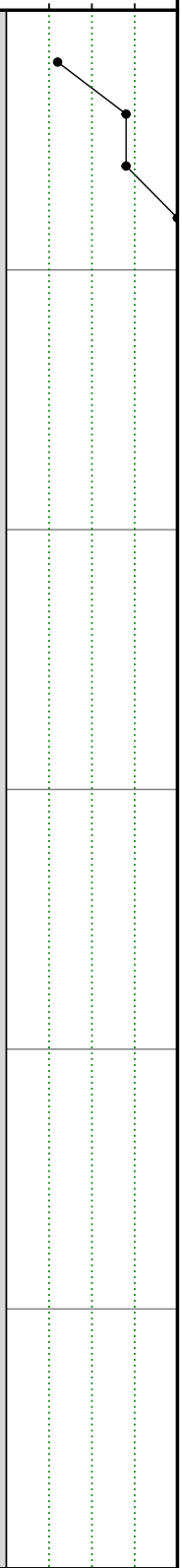
Soil description in accordance with Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes, NZ Geotechnical Society Inc, 2005

In-situ Field Testing

Shear Strength (kPa)

Dynamic Cone (Scala) Penetrometer

Depth (m)	Blow Count
-0.1	6
-0.2	14
-0.3	14
-0.4	40



Too dense to auger due to inferred gravel

In- situ testing inaccordance with the following standards:

Scala Penetrometer Testing: NZS 4402: 1988, Test 6.5.2, Dynamic Cone Penetrometer

Shear Vane Testing: Guideline for Hand Held Shear Vane Test, NZGS, August 2001

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NZGD ID: 216165

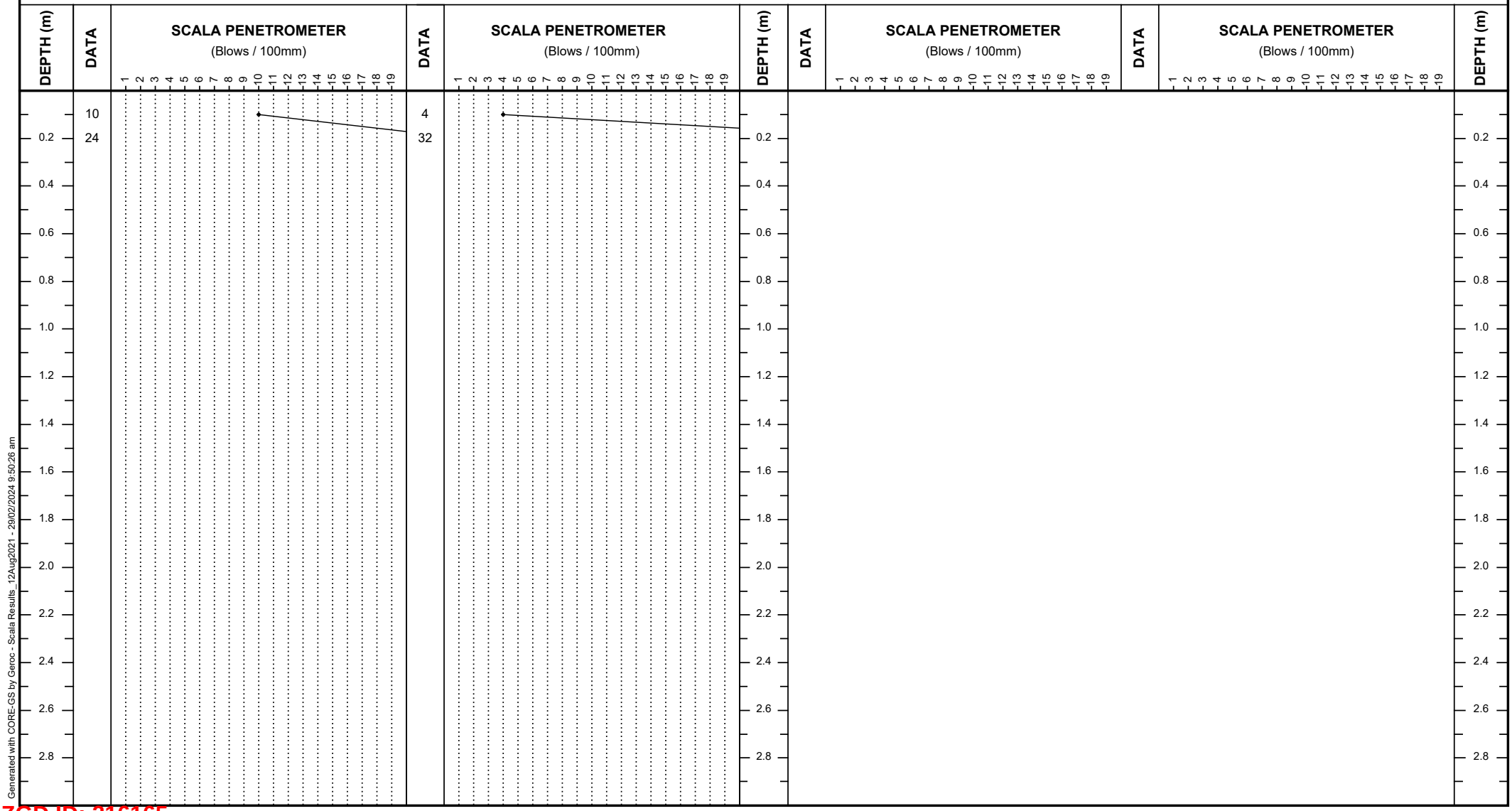
LandTech CONSULTING

Client: Mike Greer Homes Mid-Canterbury Ltd

Project: Lot Specific Soil Report - New dwelling

Address: Falcons Landing Subdivision

Lot 53 - SP01	Lot 53 - SP02		
Tested By: KP & BE	**Tested By:** KP & BE	**Tested By:**	**Tested By:**
Ground Conditions: Near Level, Grass	**Ground Conditions:** Near Level, Grass	**Ground Conditions:**	**Ground Conditions:**
Coordinates: NZTM2000 E 1552497.14 N 5171625.09	**Coordinates:** NZTM2000 E 1552487.73 N 5171619.14	**Coordinates:**	**Coordinates:**
Test Date: 26-Feb-24	**Test Date:** 26-Feb-24	**Test Date:**	**Test Date:**



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NZGD ID: 216165

NZGD ID: 216166

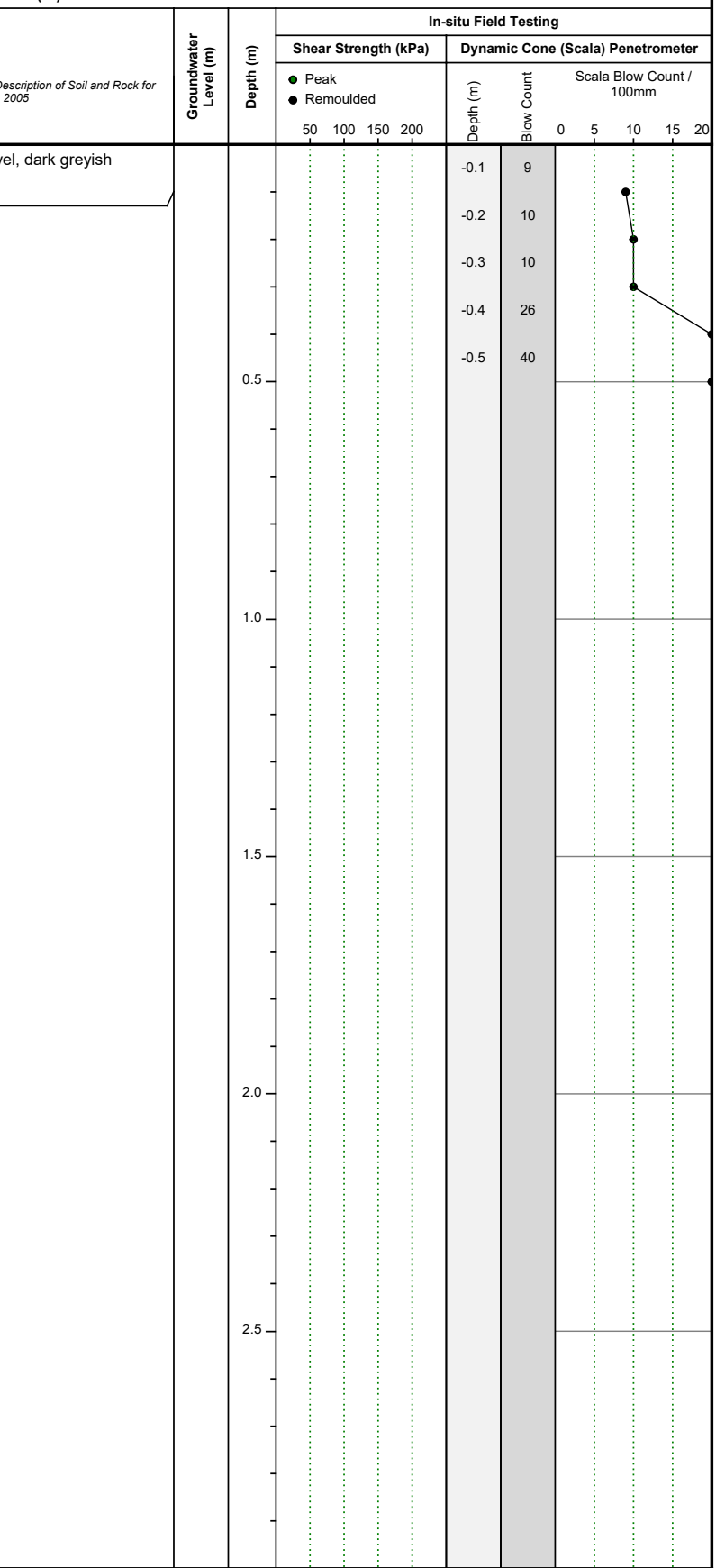
LandTech CONSULTING

Client: Mike Greer Homes Mid-Canterbury Ltd
Project: Lot Specific Soil Report - New dwelling
Address: Falcons Landing Subdivision

Augerhole No.: Lot 54 - HA01
Sheet No.: 1 of 1

Project No.:	LTC24008	**Coordinates:**	NZTM2000: E1552502.13, N5171638.14	**Logged By:**	KP
Drill Type:	50mm Hand Auger	**Reduced Level:**	.15m (LVD1937)	**Shear Vane No.:**	
Date Started:	26-Feb-24	**Ground Conditions:**	Near Level, Grass	**Calibration Factor:**	
Date Finished:	26-Feb-24	**Groundwater Level (m):**	Not Encountered	**Calibration Date:**	

Stratigraphy	Depth (m)	Graphic Log	Description	Groundwater Level (m)
Topsoil / Fill	0.0	TS TS TS	SILT, minor fine to medium subangular to subround gravel, dark greyish brown, hard, dry, non-plastic, trace organics.	
			End of Augerhole: 0.1m	
			[TOO DENSE TO AUGER]	



Too dense to auger due to inferred gravel

In- situ testing inaccordance with the following standards:
Scala Penetrometer Testing: NZS 4402: 1988, Test 6.5.2, Dynamic Cone Penetrometer
Shear Vane Testing: Guideline for Hand Held Shear Vane Test, NZGS, August 2001

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NZGD ID: 216166

NZGD ID: 216166

LandTech CONSULTING

Client: Mike Greer Homes Mid-Canterbury Ltd
Project: Lot Specific Soil Report - New dwelling
Address: Falcons Landing Subdivision

Augerhole No.: Lot 54 - HA02
Sheet No.: 1 of 1

Project No.:	LTC24008	**Coordinates:**	NZTM2000: E1552511.09, N5171623.19	**Logged By:**	KP
Drill Type:	50mm Hand Auger	**Reduced Level:**	.15m (LVD1937)	**Shear Vane No.:**	
Date Started:	26-Feb-24	**Ground Conditions:**	Near Level, Grass	**Calibration Factor:**	
Date Finished:	26-Feb-24	**Groundwater Level (m):**	Not Encountered	**Calibration Date:**	

Stratigraphy	Depth (m)	Graphic Log	Description	Groundwater Level (m)
Topsoil / Fill	0	TS TS TS	SILT, minor fine to medium subangular to subround gravel, dark greyish brown, hard, dry, non-plastic, trace organics.	
			End of Augerhole: 0.1m	
			[TOO DENSE TO AUGER]	
	0.5			
	1.0			
	1.5			
	2.0			
	2.5			

Soil description in accordance with Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes, NZ Geotechnical Society Inc, 2005

In-situ Field Testing

Shear Strength (kPa)

Peak
Remoulded

50 100 150 200

Dynamic Cone (Scala) Penetrometer

Depth (m)	Blow Count
-0.1	8
-0.2	9
-0.3	18
-0.4	40

Scala Blow Count / 100mm
0 5 10 15 20

Too dense to auger due to inferred gravel

In- situ testing inaccordance with the following standards:
Scala Penetrometer Testing: NZS 4402: 1988, Test 6.5.2, Dynamic Cone Penetrometer
Shear Vane Testing: Guideline for Hand Held Shear Vane Test, NZGS, August 2001

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NZGD ID: 216166

NZGD ID: 216166

Client: Mike Greer Homes Mid-Canterbury Ltd

Project: Lot Specific Soil Report - New dwelling

Address: Falcons Landing Subdivision

Lot 54 - SP01	Lot 54 - SP02		
Tested By: KP & BE	**Tested By:** KP & BE	**Tested By:**	**Tested By:**
Ground Conditions: Near Level, Grass	**Ground Conditions:** Near Level, Grass	**Ground Conditions:**	**Ground Conditions:**
Coordinates: NZTM2000 E 1552510.87 N 5171634.05	**Coordinates:** NZTM2000 E 1552501.39 N 5171628.03	**Coordinates:**	**Coordinates:**
Test Date: 26-Feb-24	**Test Date:** 26-Feb-24	**Test Date:**	**Test Date:**

DEPTH (m)	DATA	SCALA PENETROMETER (Blows / 100mm)	DATA	SCALA PENETROMETER (Blows / 100mm)	DEPTH (m)	DATA	SCALA PENETROMETER (Blows / 100mm)	DATA	SCALA PENETROMETER (Blows / 100mm)	DEPTH (m)
0.2	7		10		0.2					0.2
0.4	10		30		0.4					0.4
0.6	24				0.6					0.6
0.8					0.8					0.8
1.0					1.0					1.0
1.2					1.2					1.2
1.4					1.4					1.4
1.6					1.6					1.6
1.8					1.8					1.8
2.0					2.0					2.0
2.2					2.2					2.2
2.4					2.4					2.4
2.6					2.6					2.6
2.8					2.8					2.8

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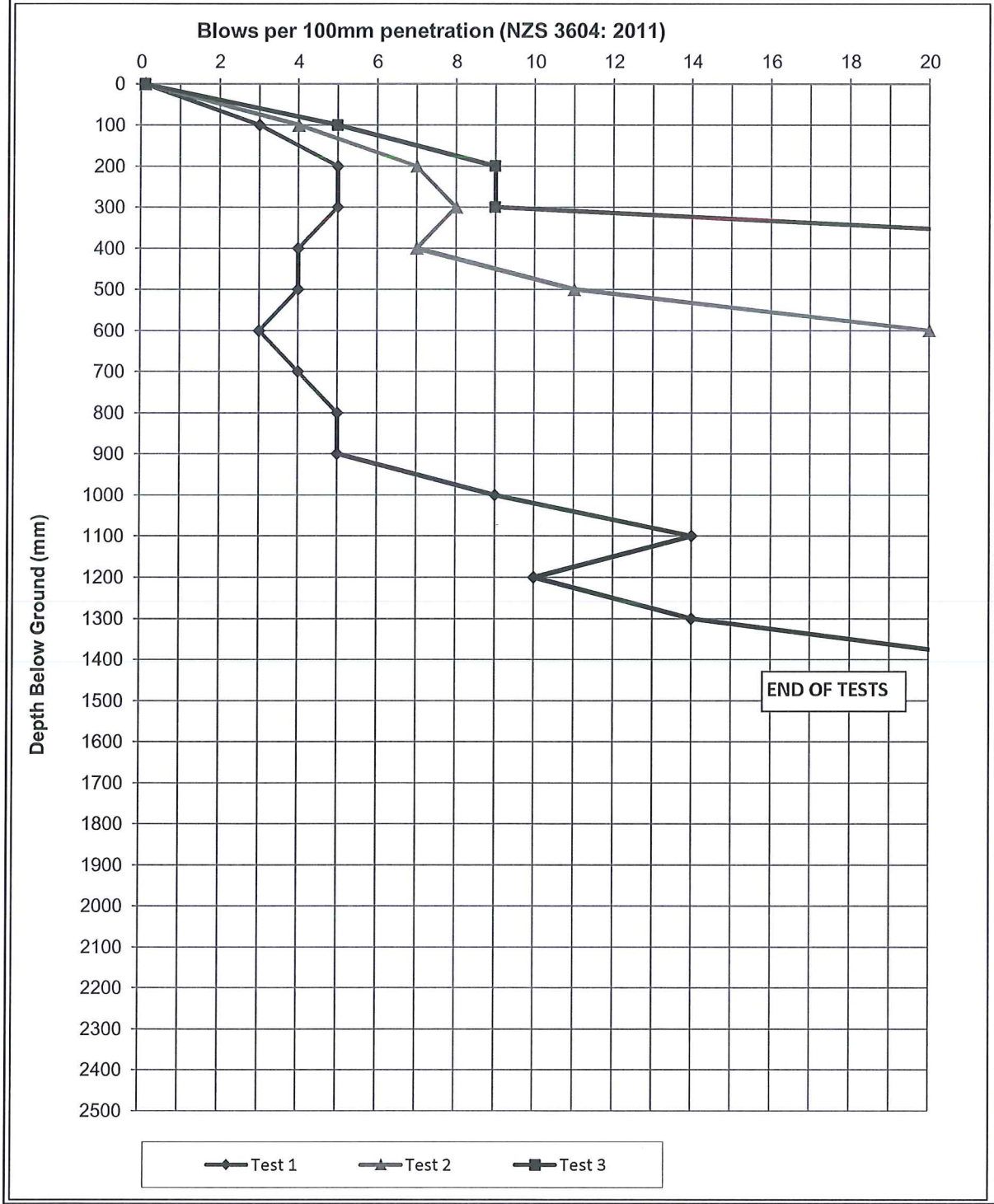
NZGD ID: 216166

Scala Penetrometer Test Results

Location	202 Lincoln-Rolleston Road, Rolleston
Description:	Scala penetrometer soil bearing capacity testing - proposed 21m x 6m barn
Date:	24-Oct-15
Designer:	VW
Water Table	N / A



Notes:

An allowable minimum bearing capacity of 100kPa is required for "good ground" as defined in NZS 3604:2011

Additional comments:

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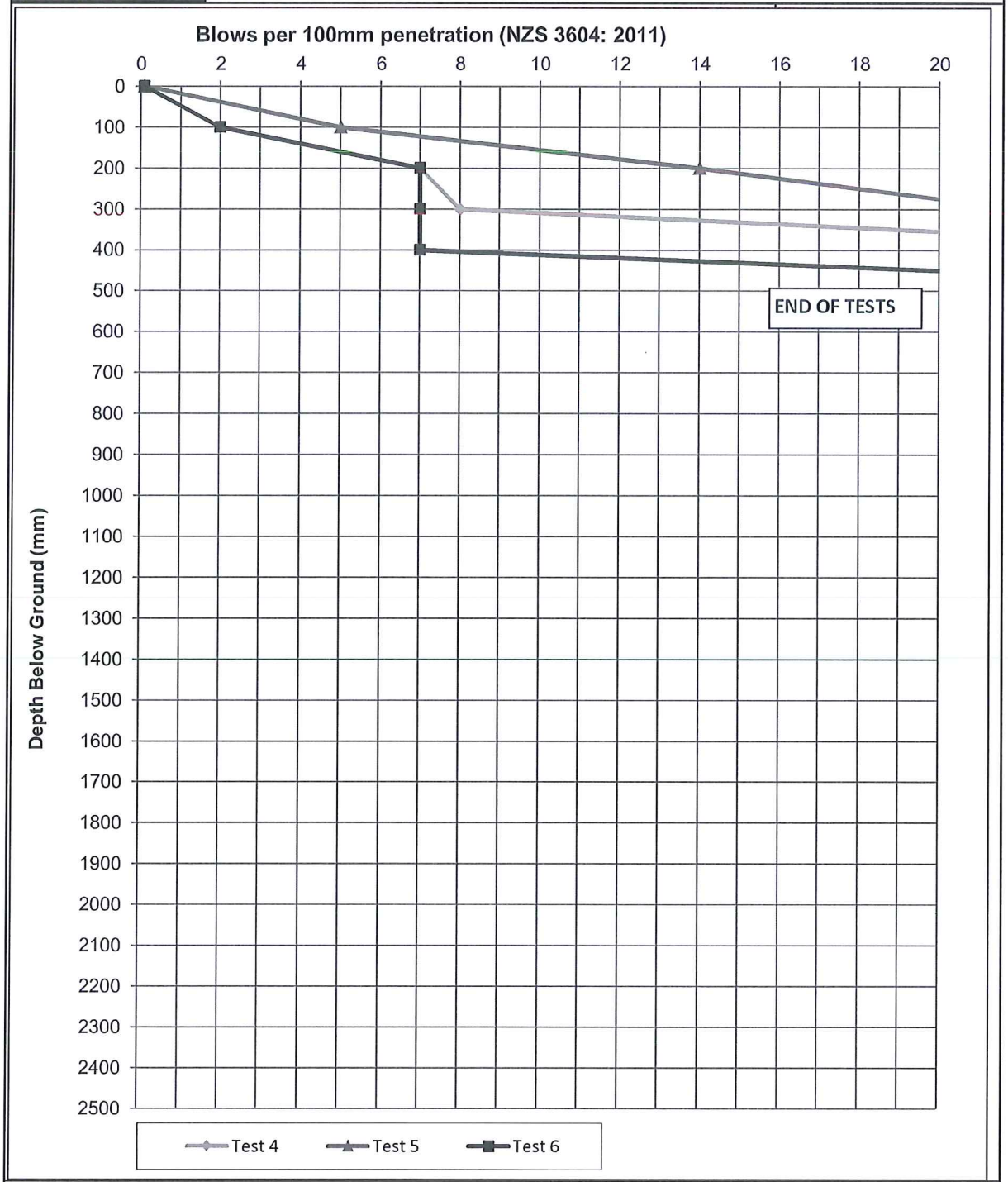
Scala Penetrometer Test Results

Location	202 Lincoln-Rolleston Road, Rolleston
Description:	Scala penetrometer soil bearing capacity testing - proposed 12m x 6m shed
Date:	24-Oct-15
Designer:	VW
Water Table	N / A



Notes:

An allowable minimum bearing capacity of 100kPa is required for "good ground" as defined in NZS 3604:2011

Additional comments:

Lincoln DESIGN GROUP LTD
PO Box 69122 Lincoln 7640

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Lincoln DESIGN GROUP LTD
PO Box 69122 Lincoln 7640

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SITE PLAN

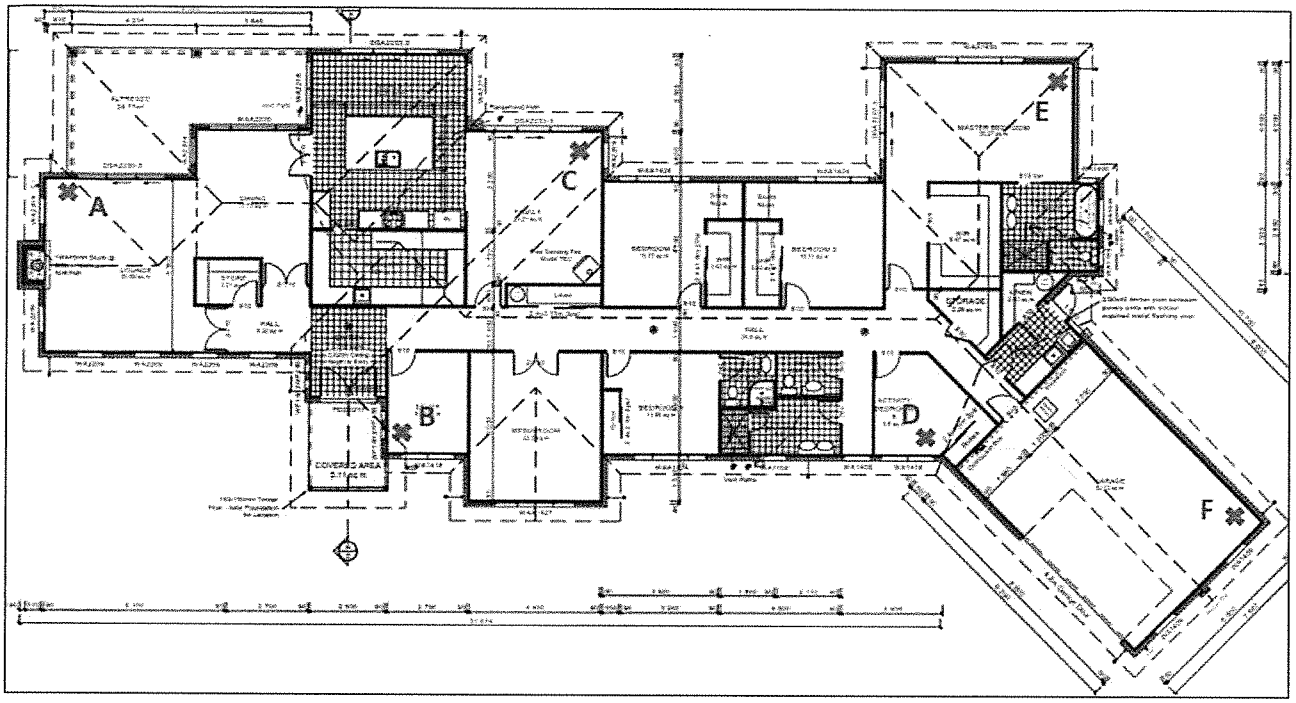

Figure 2: Approximate soil test locations

DOCUMENT CONTROL RECORD				
Report Title		Proposed residence at 202 Lincoln-Rolleston Road, Rolleston – scala penetrometer soil test report		
Client		Denise Geayley	**Client Contact**	dgeayley@snap.net.nz
Rev	**Date**	**Revision Details**	**Prepared by**	**Reviewed by**
A	27 Oct 2015	Issued to Client	Victor Wong (CPEng)	Bernald Wong

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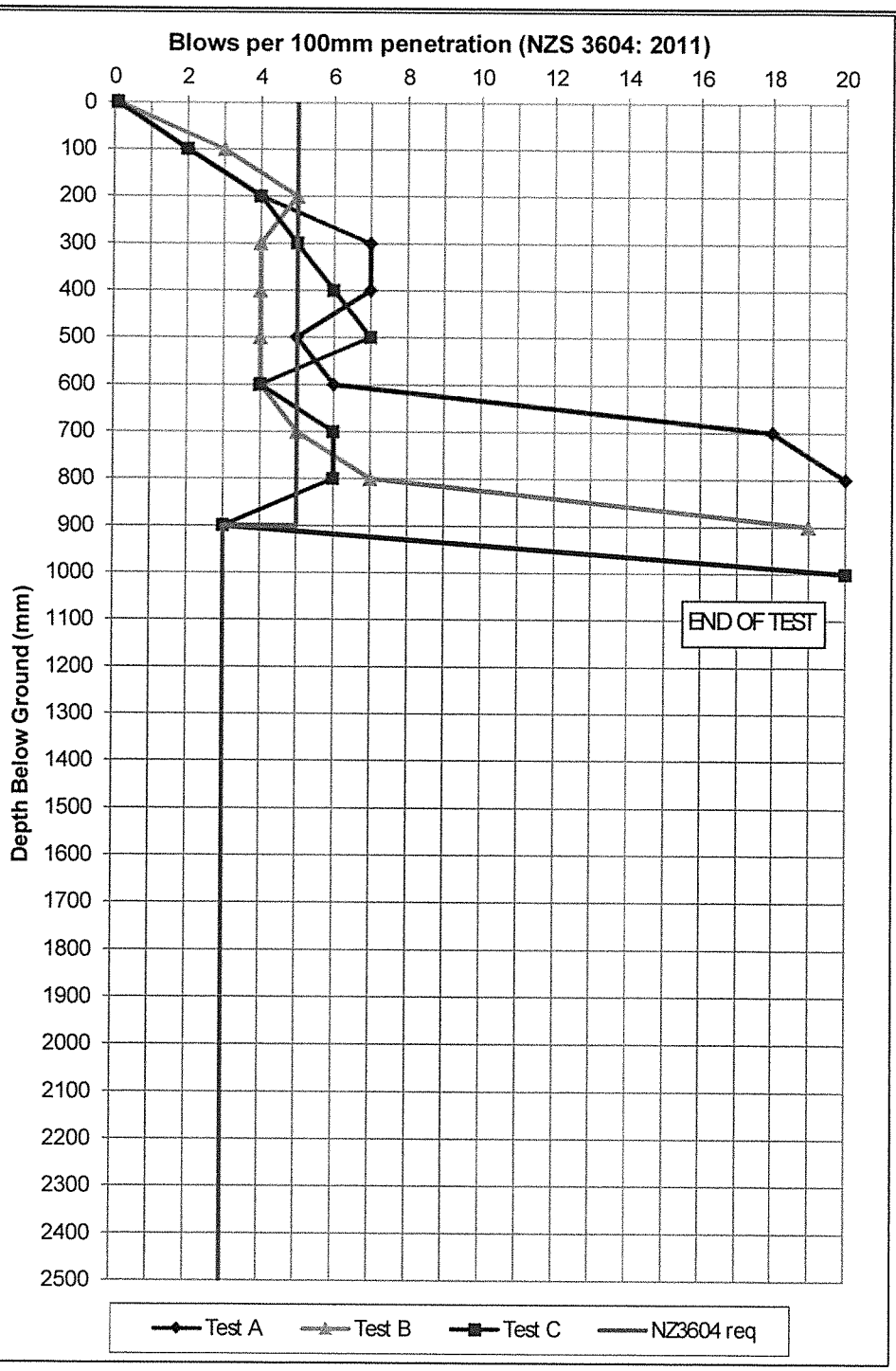
Scala Penetrometer Test Results

Location	202 Lincoln-Rolleston Road, Rolleston
Description:	Scala penetrometer soil bearing capacity testing - Proposed House (a)
Date:	24-Oct-15
Designer:	VW
Water Table	N / A

Depth (m)	Soil Description Bore A
0.00	GL
	Brown SILTY TOPSOIL
0.50	Light Brown SANDY SILT
	Auger refusal at 600mm depth. Possible gravels.
1.00	
1.50	
2.00	
2.50	
3.00	



Notes:

An allowable minimum bearing capacity of 100kPa is required for "good ground" as defined in NZS 3604:2011

Additional comments:

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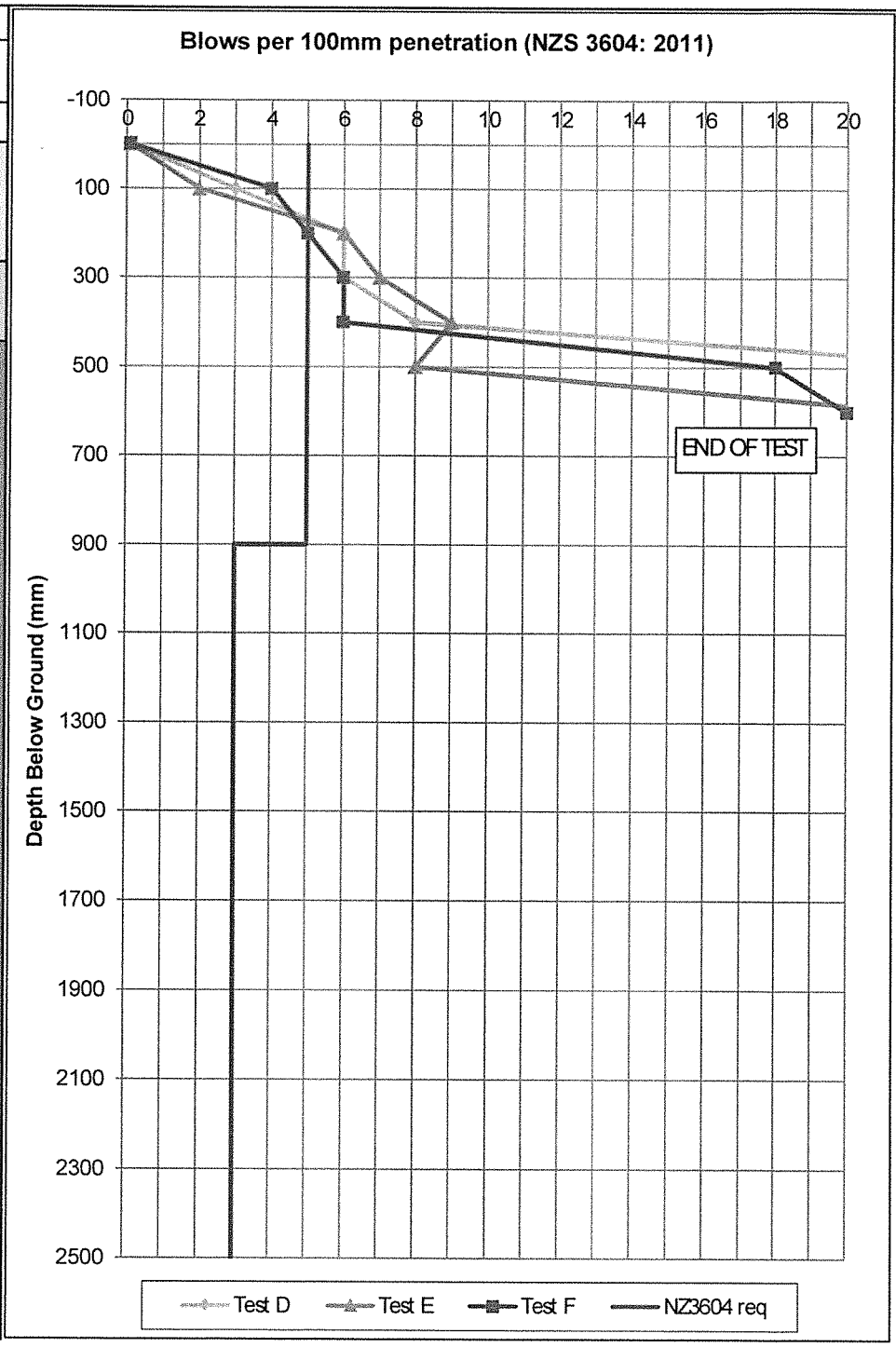
Scala Penetrometer Test Results

Location	202 Lincoln-Rolleston Road, Rolleston
Description:	Scala penetrometer soil bearing capacity testing - Proposed House (b)
Date:	24-Oct-15
Designer:	VW
Water Table	N / A

Depth (m)	Soil Description
	Bore F
0.00	GL
	Brown SILTY TOPSOIL
0.50	Light Brown SILT
	Auger refusal at 450mm depth. Possible gravels
1.00	
1.50	
2.00	
2.50	
3.00	



Notes:

An allowable minimum bearing capacity of 100kPa is required for "good ground" as defined in NZS 3604:2011

Additional comments:

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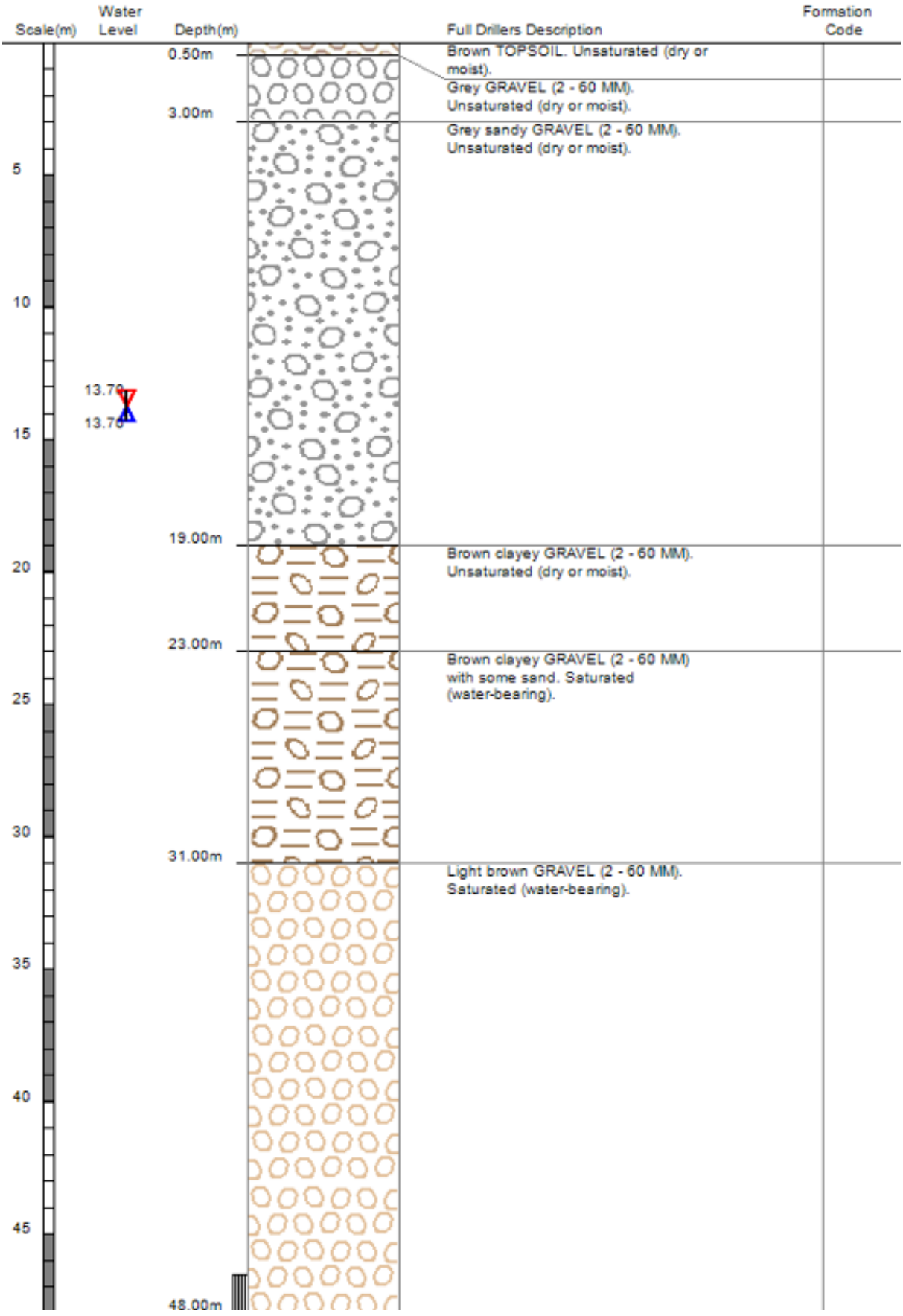
Lincoln DESIGN GROUP LTD
PO Box 69122 Lincoln 7640

Borelog for well BX23/0533

Grid Reference (NZTM): 1552674 mE, 5171682 mN
Location Accuracy: 10 - 50m
Ground Level Altitude: 38.6 m +MSD Accuracy: < 2.5 m
Driller: East Coast Drilling
Drill Method: Air Rotary
Borelog Depth: 48.0 m Drill Date: 20-Nov-2015

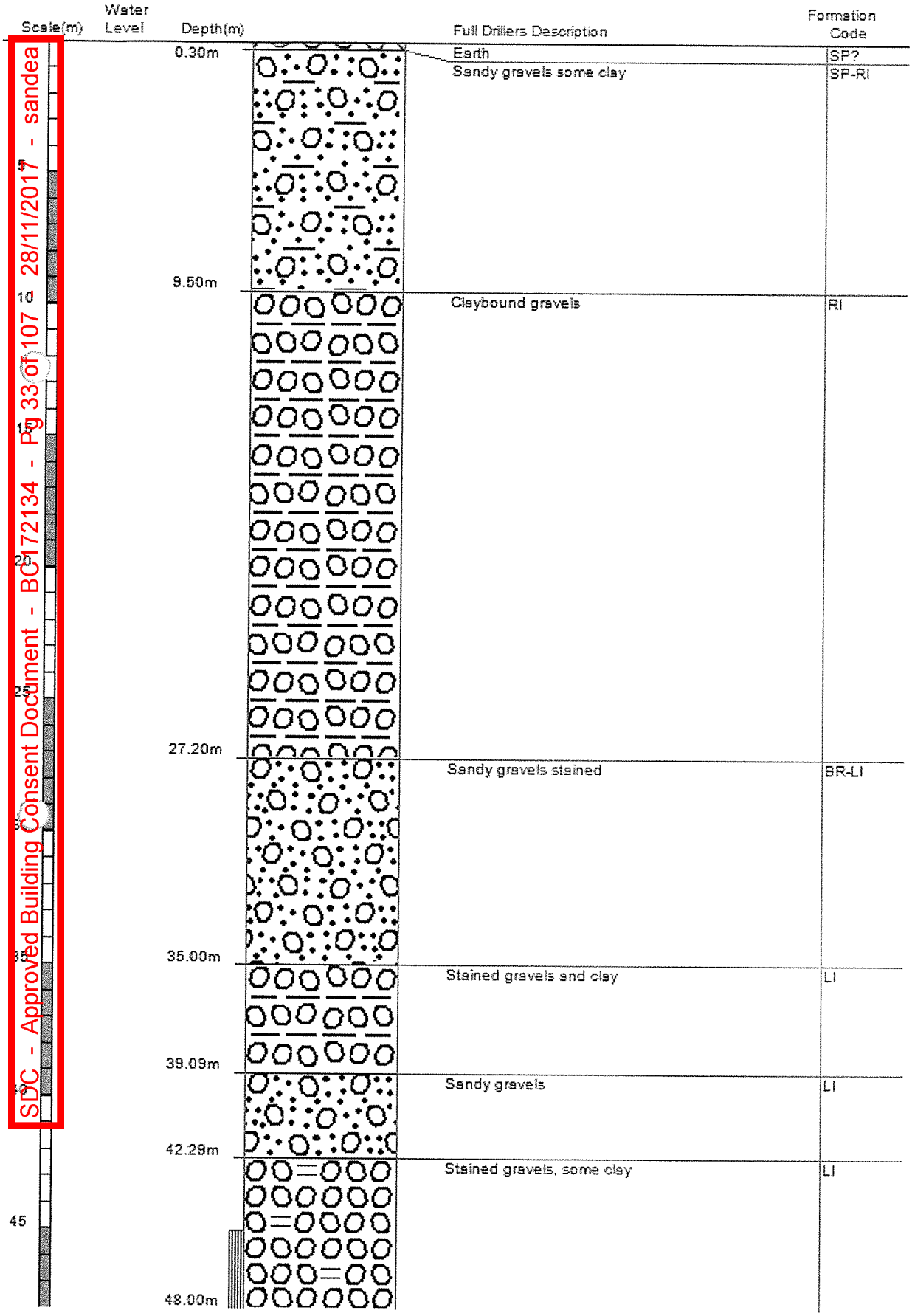
Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha



Borelog for well M36/4966

Grid Reference (NZTM): 1552787 mE, 5171550 mN
Location Accuracy: 50 - 300m
Ground Level Altitude: 38.6 m +MSD Accuracy: < 2.5 m
Driller: McMillan Drilling Ltd
Drill Method: Rotary/Percussion
Borelog Depth: 48.0 m Drill Date: 18-Aug-1995

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha



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