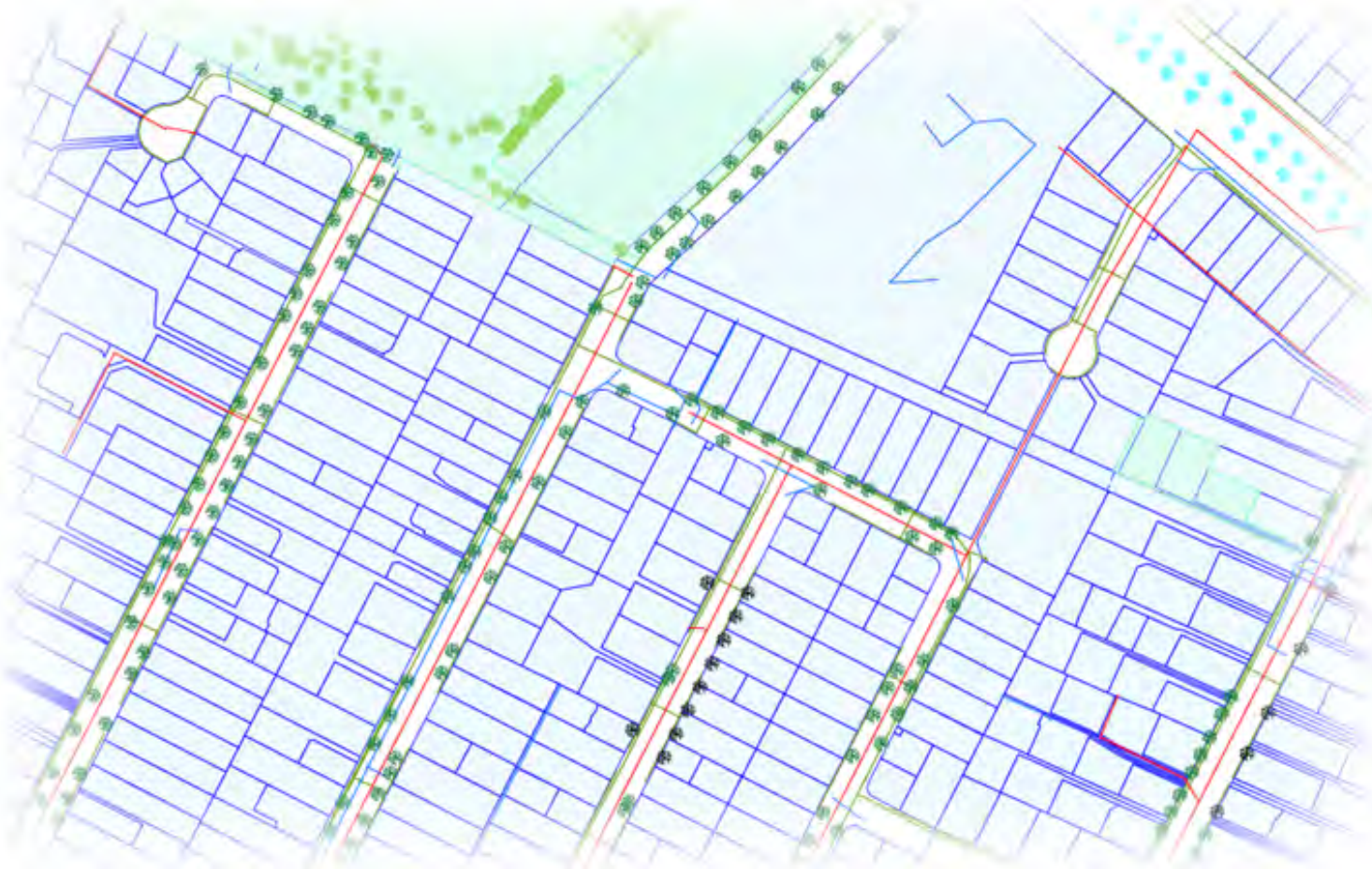
Christchurch City Council

Land Information Memorandum



Property address:
511 Halswell Road

LIM number: 70247280
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Land Information Memorandum

Christchurch City Council

Application details

Please supply to	YOURSECTION RS LTD
Client reference	RIVERSTONE
Phone number	
Fax number	
Date issued	18 June 2021
Date received	10 June 2021

Property details

Property address	511 Halswell Road
Valuation roll number	23562 09200
Valuation information	Capital Value: $5650000 Land Value: $5600000 Improvements Value: $50000 *Please note: these values are intended for Rating purposes*
Legal description	Pt RS 1593 Canterbury Dist Pt RS 1593 Canterbury Dist
Existing owner	Yoursection RS Limited PO Box 9301 TOWER JUNCTION CHRISTCHURCH 8149

Council references

Debtor number	4188171
Rate account ID	73054377
LIM number	70247280
Property ID	1022691

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Land Information Memorandum

Document information

This Land Information Memorandum (LIM) has been prepared for the purpose of section 44A of the Local Government Official Information and Meetings Act 1987 (LGOIMA). It is a summary of the information that we hold on the property. Each heading or "clause" in this LIM corresponds to a part of section 44A.

Sections 1 to 10 contain all of the information known to the Christchurch City Council that must be included under section 44A(2) LGOIMA. Any other information concerning the land as the Council considers, at its discretion, to be relevant is included at section 11 of this LIM (section 44A(3) LGOIMA). If there are no comments or information provided in these sections this means that the Council does not hold information on the property that corresponds to that part of section 44A.

The information included in this LIM is based on a search of Council records only and there may be other information relating to the land which is unknown to the Council. Please note that other agencies may also hold information relevant to the property, or administer legislation relevant to the use of the land, for example, the Regional Council (Ecan), Heritage New Zealand Pouhere Taonga, and Land Information New Zealand.

Council records may not show illegal or unauthorised building or works on the property. The applicant is solely responsible for ensuring that the land is suitable for a particular purpose.

A LIM is only valid at the date of issue as information is based only upon information the Council held at the time of that LIM request being made.

Property file service

This Land Information Memorandum does not contain all information held on a property file. Customers may request property files by phoning the Council's Customer Call Centre on (03) 941 8999, or visiting any of the Council Service Centres. For further information please visit www.ccc.govt.nz .

To enable the Council to measure the accuracy of this LIM document based on our current records, we would appreciate your response should you find any information contained therein which may be considered to be incorrect or omitted. Please telephone the Customer Call Centre on (03) 941 8999.

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A search of records held by the Council has revealed the following information:

1. Special features and characteristics of the land

Section 44A(2)(a) LGOIMA. This is information known to the Council but not apparent from the district scheme under the Town and Country Planning Act 1977 or a district plan under the Resource Management Act 1991. It identifies each (if any) special feature or characteristic of the land concerned, including but not limited to potential erosion, avulsion, falling debris, subsidence, slippage, alluvion, or inundation, or likely presence of hazardous contaminants.

(For enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

- **Consultant Report Available**

  The Tonkin & Taylor Darfield Earthquake 4 September 2010 Geotechnical Land Damage Assessment & Reinstatement Stage 1 Report indicates areas of observed surface manifestations of liquefaction resulting from the earthquake. This property is within one of the identified areas. The report can be viewed at www.eqc.govt.nz/canterbury-quake/stage-one/stage1.aspx

- **Consultant Report Available**

  Land Information New Zealand (LINZ) engaged Tonkin and Taylor to provide a Geotechnical Report on Ground Movements that occurred as a result of the Canterbury Earthquake Sequence. The report indicates this property may have been effected by a degree of earthquake induced subsidence. The report obtained by LINZ can be accessed on their website at https://www.linz.govt.nz/land/surveying/earthquakes/canterbury-earthquakes/information-for-canterbury-surveyors

- **Liquefaction Vulnerability**

  Christchurch City Council holds indicative information on liquefaction hazard for Christchurch. Information on liquefaction, including an interactive web tool, can be found on the Council website at ccc.govt.nz/liquefaction. Depending on the liquefaction potential of the area that the property is in, the Council may require site-specific investigations before granting future subdivision or building consent for the property.

- **Property Affected by a Spring**

  Council records show a spring on the property.

Related information

- There is attached a sub division soil investigation report covering this property.
- There are attached hazard/special site characteristics supplementary sheet/s.

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2. Private and public stormwater and sewerage drains

Section 44A(2)(b) LGOIMA. This is information about private and public stormwater and sewerage drains as shown in the Council's records.

(For stormwater and sewerage enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

- **Property within Local Pressurised Sewer System Zone**

  This property is in a local pressure sewer system catchment within the Christchurch wastewater network. If there is a house on the property, there will already be a wastewater pressure pump and tank. If a house is yet to be built, a new wastewater pressure pump and tank will need to be installed. General information about pressure sewer systems can be found on the Council website. More detailed information can be obtained by contacting Council Customer Services on 03 941 8999.

Related information

- The property is shown to be served by an on-site septic tank disposal system.
- No details of the private stormwater system serving this property are shown on the plan or on Council records.
- This property has been identified as being in a pressurised wastewater system zone and attached is a copy of the systems user guide. For more information you can refer to https://ccc.govt.nz/services/water-and-drainage/wastewater/about-wastewater/types-of-wastewater-systems or contact Christchurch City Councils 3 waters unit on (03) 941-8999.

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3. Drinking Water Supply

Section 44A(2)(ba) and (bb) LGOIMA. This is information notified to the Council about whether the land is supplied with drinking water, whether the supplier is the owner of the land or a networked supplier, any conditions that are applicable, and any information the Council has about the supply.

Please note the council does not guarantee a particular water quality to its customers. If you require information on current water quality at this property please contact the Three Waters & Waste Unit.

(For water supply queries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

Water Supply

Christchurch City Council is the networked supplier of water to this property. This property is connected to the Christchurch City Council Water Supply. The conditions of supply are set out in the Christchurch City Council Water Supply, Wastewater & Stormwater Bylaw (2014), refer to www.ccc.govt.nz.

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4. Rates

Section 44A(2)(c) LGOIMA. This is information on any rates owing in relation to the land.

(For rates enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

(a) Annual rates

Annual rates to 30/06/2021: $ 33,271.48

	Instalment Amount	Date Due
Instalment 1	$ 8,317.78	31/08/2020
Instalment 2	$ 8,317.78	30/11/2020
Instalment 3	$ 8,317.78	28/02/2021
Instalment 4	$ 8,318.14	31/05/2021

Rates owing as at 18/06/2021: $ 0.00

(b) Excess water charges

$ 0.00

(For water charge enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

(c) Final water meter reading required?

Reading is Required

(To arrange a final water meter reading, please phone (03) 941 8999 or visit www.ccc.govt.nz.

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5. Consents, certificates, notices, orders, or requisitions affecting the land and buildings

*Section 44A(2)(d) LGOIMA. This is information concerning any consent, certificate, notice, order, or requisition, affecting the land or any building on the land, previously issued by the Council.*The information in this section may also cover building consent and/or code compliance information issued by building certifiers under the Building Act 1991 and building consent authorities that are not the Council under the Building Act 2004.

You can check the property file to identify whether any consent or certificate was issued by a building certifier under the Building Act 1991.

Section 44A(2)(da) LGOIMA. The information required to be provided to a territorial authority under section 362T(2) of the Building Act 2004. There is currently no information required to be provided by a building contractor to a territorial authority under section 362T(2) of the Building Act 2004. The Building (Residential Consumer Rights and Remedies) Regulations 2014 only prescribed the information that must be given to the clients of a building contractor.

(For building enquiries, please phone (03) 941 8999, email EPADutyBCO@ccc.govt.nz or visit www.ccc.govt.nz.

(a) Consents

- BCN/1956/4315 Applied: 12/11/1956 Status: Completed
  511 Halswell Road Halswell
  Permit issued 13/11/1956
  SEPTIC TANK & ASSOCIATED DRAINAGE- Historical Reference PER56560372
- BCN/1982/2860 Applied: 26/04/1982 Status: Completed
  511 Halswell Road Halswell
  Permit granted 27/04/1982
  Permit issued 27/04/1982
  KENT LOG FIRE - WETBACK- Historical Reference PER82127340
- BCN/1989/4560 Applied: 26/06/1989 Status: Completed
  511 Halswell Road Halswell
  Permit granted 04/07/1989
  Permit issued 04/07/1989
  IMPLEMENT & STORAGE SHED- Historical Reference PER89136326
- BCN/2010/4221 Applied: 11/05/2010 Status: Completed
  511 Halswell Road Halswell
  Accepted for processing 11/05/2010
  Building consent granted 28/05/2010
  Building consent issued 28/05/2010
  PIM Granted 28/05/2010
  PIM Issued 28/05/2010
  Code Compliance Certificate Granted 19/07/2010
  Code Compliance Certificate Issued 19/07/2010
  FIRENZO FORTE AQUALUX AG INBUILT WETBACK WOODBURNER CLEAN AIR CERTIFICATION: 102107- Historical Reference ABA10102903

(b) Certificates

Note: Code Compliance Certificates were only issued by the Christchurch City Council since January 1993.

(c) Notices

(d) Orders

(e) Requisitions

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Related information

- Council holds no record of building permit/consent for dwelling at this address. No information is held by Council relating to the materials, construction or year the dwelling was built.

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6. Certificates issued by a building certifier

Section 44A(2)(e) LGOIMA. This is information notified to the Council concerning any certificate issued by a building certifier pursuant to the Building Act 1991 or the Building Act 2004.

(For building enquiries, please phone (03) 941 8999, email EPADutyBCO@ccc.govt.nz or visit www.ccc.govt.nz.

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7. Weathertightness

Section 44A(2)(ea) LGOIMA. This is information notified to the Council under section 124 of the Weathertight Homes Resolution Services Act 2006.

(For weathertight homes enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

If there is no information below this means Council is unaware of any formal Weathertight Homes Resolution Services claim lodged against this property.

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8. Land use and conditions

Section 44A(2)(f) LGOIMA. This is information relating to the use to which the land may be put and conditions attached to that use. The planning information provided below is not exhaustive and reference to the Christchurch District Plan and any notified proposed changes to that plan is recommended: https://ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/plans/christchurch-district-plan/.

There maybe some provisions of the Christchurch City Plan or Banks Peninsula District Plan that affect this property that are still operative.

(For planning queries, please phone (03) 941 8999, email DutyPlanner@ccc.govt.nz or visit www.ccc.govt.nz.

- **Regional plan or bylaw**

There may be objectives, policies or rules in a regional plan or a regional bylaw that regulate land use and activities on this site. Please direct enquiries to Canterbury Regional Council (Environment Canterbury).

- **Waterway Provisions for Other Councils**

A resource consent or permit may also be required from the Canterbury Regional Council or other territorial authority, particularly with respect to water bodies managed by those authorities. Please refer to the relevant regional plan and any relevant bylaws, and contact the Christchurch City Council if you are uncertain which authority manages the water body in question.

(a)(i)Christchurch City Plan & Banks Peninsula District Plan

(ii)Christchurch District Plan

- **High Flood Hazard Management Area**

  This property or parts of, are within the High Flood Hazard Management Area (HFHMA) in the Christchurch District Plan. A resource consent is likely to be required for new buildings or to subdivide this property. Further information can be found at www.ccc.govt.nz/hfhma.

- **Liquefaction Management Area (LMA)**

  Property or part of property within the Liquefaction Management Area (LMA) Overlay which is operative.

- **Outline Development Plan**

  Property or part of property is within an Outline Development Plan area which is affected by specific provisions that are operative.

- **Remainder Slope Instability Management Area**

  Property or part of property within the Christchurch District Plan Remainder of Port Hills and Banks Peninsula Slope Instability Management Area overlay.

- **Waterway Provisions**

  This property or part of this property is close to at least one waterway. It may be within the setback for an Environmental Asset Waterway. Within that setback, District Plan rules apply to activities including buildings, earthworks, fences and impervious surfacing. Any part of the property within the setback will be affected by those rules.

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- **Waterway Provisions**

  This property or part of this property is close to at least one waterway. It may be within the setback for a Downstream Waterway. Within that setback, District Plan rules apply to activities including buildings, earthworks, fences and impervious surfacing. Any part of the property within the setback will be affected by those rules.

- **Flood Management Area**

  Property or part of property within the Flood Management Area (FMA) Overlay which is operative.

- **District Plan Zone**

  Property or part of property within the Residential New Neighbourhood Zone which is operative.

- **District Plan Zone**

  Property or part of property within the Rural Urban Fringe Zone which is operative.

(b) Resource consents

If there are any land use resource consents issued for this property the Council recommends that you check those resource consents on the property file. There may be conditions attached to those resource consents for the property that are still required to be complied with.

- RMA/2020/163 - Land Use Consent
  511 Halswell Road Halswell
  Earthworks for residential development
  Status: Processing complete
  Applied 28/01/2020
  Granted 10/02/2020
  Decision issued 10/02/2020

- RMA/2020/2770 - Land Use Consent
  511 Halswell Road Halswell
  To conduct earthworks and stockpiling on site
  Status: Processing complete
  Applied 27/11/2020
  Granted 27/01/2021
  Decision issued 27/01/2021

- RMA/2020/3076 - Combined subdivision / land use consent
  511 Halswell Road Halswell
  To subdivide 4 allotments to create 87 residential allotments. Land use consent for earthworks and under the NES for contaminated land.
  Status: On hold - waiting for response from applicant
  Applied 22/12/2020

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- RMA/2021/733 - Land Use Consent
  511 Halswell Road Halswell
  Earthworks - Associated with the formation of vehicle crossings
  Status: Processing complete
  Applied 24/03/2021
  Granted 11/06/2021
  Decision issued 11/06/2021

Related information

- Council records show that there are current/on hold monitoring job in our system. This monitoring is to ensure that the resource consent conditions have been met. For further information you can contact the Compliance & Investigation team A on 941 8999 or email: rcmon@ccc.govt.nz and reference to resource consent RMA/2021/733 & RMA/2020/2770.

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9. Other land and building classifications

Section 44A(2)(g) LGOIMA. This is information notified to the Council by any statutory organisation having the power to classify land or buildings for any purpose.

(For land and building enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

Please refer to Section 1 for details

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10. Network utility information

Section 44A(2)(h) LGOIMA. This is information notified to the Council by any network utility operator pursuant to the Building Act 1991 or the Building Act 2004.

(For network enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

l **None recorded for this property**

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11. Other information

Section 44A(3) LGOIMA. This is information concerning the land that the Council has the discretion to include if it considers it to be relevant.

(For any enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

(a) Kerbside waste collection

- Your recycling is collected Fortnightly on the Week 2 collection cycle on a Tuesday. Please leave your recycling at the Kerbside by 6:00 a.m. Your nearest recycling depot is the Parkhouse Road EcoDrop.

- Your refuse is collected Fortnightly on the Week 2 collection cycle on a Tuesday. Please leave your rubbish at the Kerbside by 6:00 a.m. Your nearest rubbish depot is the Parkhouse Road EcoDrop.

- Your organics are collected Weekly on Tuesday. Please leave your organics at the Kerbside by 6:00 a.m.

(b) Other

- **Floor Levels Information**

  Christchurch City Council holds a variety of information relevant to building/property development across the city. This includes minimum finished floor levels that need to be set to meet the surface water requirements in clause E1.3.2 of the building code (where this applies), and the requirements of the Christchurch District Plan (where a property is in the Flood Management Area). Where this information has been processed for your site, it can be viewed at https://ccc.govt.nz/floorlevelmap/, otherwise site specific advice can be obtained by emailing floorlevels@ccc.govt.nz.

- **Community Board**

  Property located in Halswell-Hornby-Riccarton Community Board.

- **Guest Accommodation**

  Guest accommodation (including whole unit listings on Airbnb; BookaBach; etc.) generally requires a resource consent in this zone when the owner is not residing on the site. For more information, please refer to: https://ccc.govt.nz/providing-guest-accommodation/.

- **Tsunami Evacuation Zone**

  This property is not in a tsunami evacuation zone. It is not necessary to evacuate in a long or strong earthquake or during an official Civil Defence tsunami warning. Residents may wish to offer to open their home to family or friends who need to evacuate from a tsunami zone, and should plan with potential guests to do so in advance.More information can be found at https://ccc.govt.nz/services/civil-defence/hazards/tsunami-e vacuation-zones-and-routes/

- **Electoral Ward**

  Property located in Halswell Electoral Ward

- **Listed Land Use Register**

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Hazardous activities and industries involve the use, storage or disposal of hazardous substances. These substances can sometimes contaminate the soil. Environment Canterbury identifies land that is used or has been used for hazardous activities and industries. This information is held on a publically available database called the Listed Land Use Register (LLUR). The Christchurch City Council may not hold information that is held on the LLUR Therefore, it is recommended that you check Environment Canterbury's online database at www.llur.ecan.govt.nz

- **Spatial Query Report**

  A copy of the spatial query report is attached at the end of this LIM. The spatial query report lists land use resource consents that have been granted within 100 metres of this property.

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Geotechnical Investigation and Assessment Report for Subdivision

Riverstone Subdivision, 2 & 4 Glovers Road, Halswell, Christchurch

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Issue Date: **20 October 2020**

Document Ref: **200357-RP-001[A]**

Prepared for: **Yoursection Ltd**

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Christchurch • Wellington • Auckland • Kapiti Coast • California • Nevada • Washington, D.C
Costa Rica • Colombia • Haiti • Liberia • Italy • Turkey • India • Nepal • Japan

Report Tracking - 2 & 4 Glovers Road, Halswell, Christchurch

Revision	Status	Date	Prepared by	Reviewed by
A	Final	20 October 2020	C. Gibbens	A. Giannakogiorgos

Authorisation

Author's Signature		**Approver's Signature**	
Name	Clem Gibbens	**Name**	Andreas Giannakogiorgos
Title	Engineering Geologist BSc MSc (Hons) MEngNZ	**Title**	Chartered Professional Engineer (Geotechnical) BSc MSc DIC CMEngNZ CPEng IntPE (NZ)

Miyamoto International New Zealand Ltd
Level 1, 236 Hereford Street | Christchurch 8011

www.miyamoto.nz

Executive Summary

Miyamoto International NZ Ltd (MINZ) has been engaged by Yoursection Ltd to undertake a geotechnical land suitability assessment for the proposed residential subdivision at 2 & 4 Glovers Road, Halswell, Christchurch. The key findings of our evaluation and assessment are outlined below.

GROUND CONDITIONS	**Ground profile**	The sub-surface conditions comprise mainly topsoil over sand-silt mixtures underlain by soft clayey silts and shallow gravel. The ground conditions are variable in horizontal and vertical spread.	
	Soil classification as per NZS 1170.5:2004	Residential Subdivision Area: Class 'D' (deep or soft soil site)	
	Depth to water table	Perched water tables and shallow saturated soils were encountered within the top 1.0 to 2.0m bgl. Permanent ground water is anticipated below the soft silts within the underlying sands and gravels.	
SEISMIC ASSESSMENT	**Design Earthquake Event**	**SLS/SLS2**	**ULS**
	Estimated "free-field" Index post-liquefaction volumetric settlements	< 50mm	< 80mm
	Liquefaction Severity Number (LSN) Value	< 15 Little to minor expression of liquefaction	< 25 Little to moderate expression of liquefaction
	MBIE Technical Categorization (TC)	**Mapped MBIE**	Rural & Unmapped
		Site Specific Foundation TC	TC2
GEOTECHNICAL CONSIDERATIONS	Our assessment of the site under RMA Section 106 found that the subsidence hazard is present on-site due to presence of soft/loose soil layers and liquefiable deposits, though these hazards can be mitigated by the options listed in this report. As the site is located within an FMA set out by CCC, a portion of the site will require filling to raise the ground level to a suitable level for the proposed development by around 1.0m close to Green's Stream. Filling of the site will likely cause static some consolidation settlements in the soft compressible soils underlying the site, though this is not expected to be a significant risk to the development, based on the pre-loading trial undertaken by MINZ previously. A period of monitoring of the site filling works during the raising of the site levels and for a period (~6 months) is advised to be safeguard against the anticipated static settlements.		

Table of Contents

1. Introduction

Miyamoto International NZ Ltd (Miyamoto) has been engaged by Yoursection Ltd to undertake a geotechnical evaluation and assessment as part of a land suitability assessment for the proposed new extension of the residential Riverstone Subdivision at 2 & 4 Glovers Road, Halswell, Christchurch.

Miyamoto have previously completed a geotechnical assessment for resource consenting purposes for the initial stage of the Riverstone Subdivision located at 511 Halswell Road, Christchurch (190666-RP-001[A] – 511 Halswell Road, dated 10 October 2019), as well as undertaking a trial pre-load assessment for the same property (190666-TM-001[A]_511 Halswell Road_Pre-load Trial, dated 28 January 2020). Both documents are referenced as part of this assessment, with this report supplementing and expanding on the work already undertaken.

The scope of this geotechnical engineering assessment was to evaluate the geotechnical conditions at the site and to provide preliminary recommendations for development of the sections. This assessment comprised the following:

- Research of the available information from the New Zealand Geotechnical Database (NZGD), Christchurch City Council (CCC) and Environment Canterbury (ECan);
- Site walkover inspection of the land;
- Shallow field investigation comprising hand-augered boreholes (HA) with associated dynamic cone penetrometer (DCP) and shear vane (SV) tests;
- Deep field investigation comprising Cone Penetration Tests (CPT) with accompanying Dynamic Probe Super Heavy (DPSH) testing;
- Multichannel Analysis of Surface Waves (MASW) geophysical survey;
- Ground Penetrating Radar (GPR) geophysical survey;
- Liquefaction analyses using CPT-based liquefaction triggering procedures;
- Reporting of the findings.

The geotechnical investigation and assessment were carried out considering the Ministry of Business, Innovation & Employment (MBIE) Guidance documents “Planning and engineering guidance for potentially liquefaction-prone land” - Version 1, dated September 2017, “Repairing and rebuilding houses affected by the Canterbury earthquakes” - Version 3, dated December 2012, and “Earthquake geotechnical engineering practice - Modules 2 & 3”. This report presents our findings and conclusions which are provided to facilitate the development of the extended subdivision plan for the site.

2. Site Description

The site, legally described as Lot 1 (2 Glovers) and Lot 2 (4 Glovers) DP 83635, is in Halswell, Christchurch and is approximately 8.3 hectares (ha) in total area. There is an approximate elevation change of 2.0m over 460m at an average gradient of 0.4%. The site generally slopes from north to south, with the low point at the southern boundary of both sections. The property is bound by Glovers Road along the northern boundaries and is bound by rural

properties on the south and east boundaries, and the 511 Halswell Road section to the west. Green's Stream runs through the southern end of both sections.

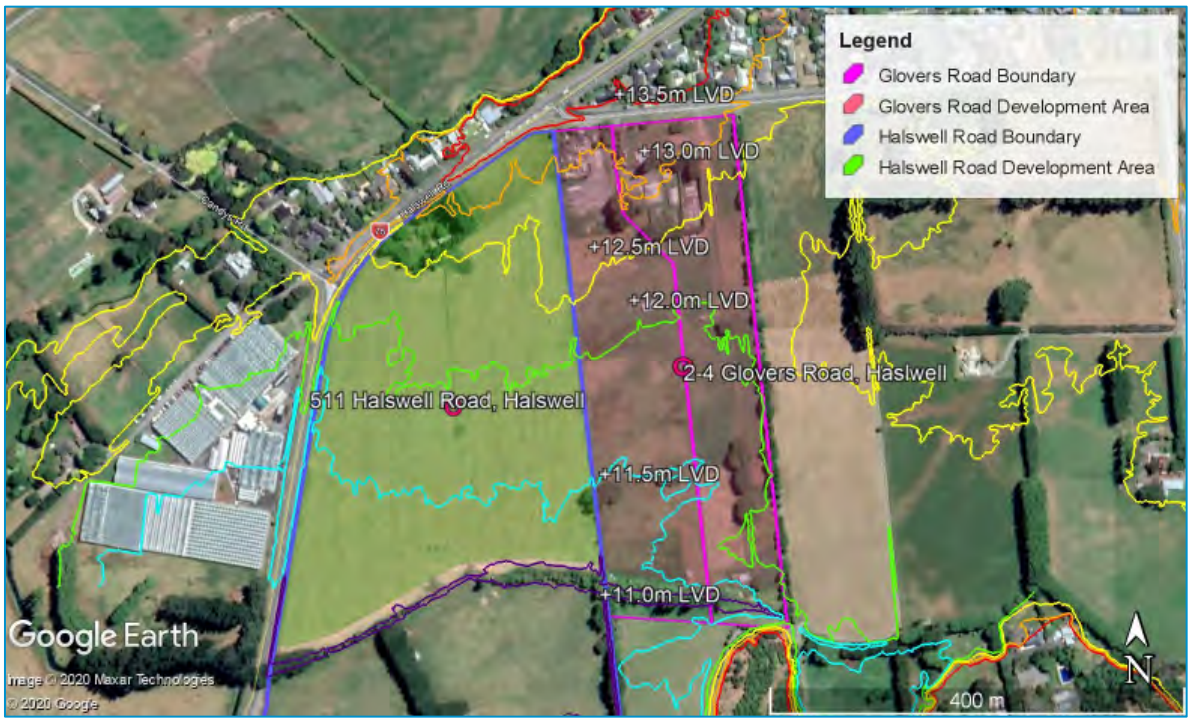

Figure 1: Proposed Site Layout with (Scale as Shown)

The property is located within the "Rural and Unmapped" category listed under the MBIE Technical Categories Map. The site location with reference to the MBIE Technical Categories is shown in Figure 2.

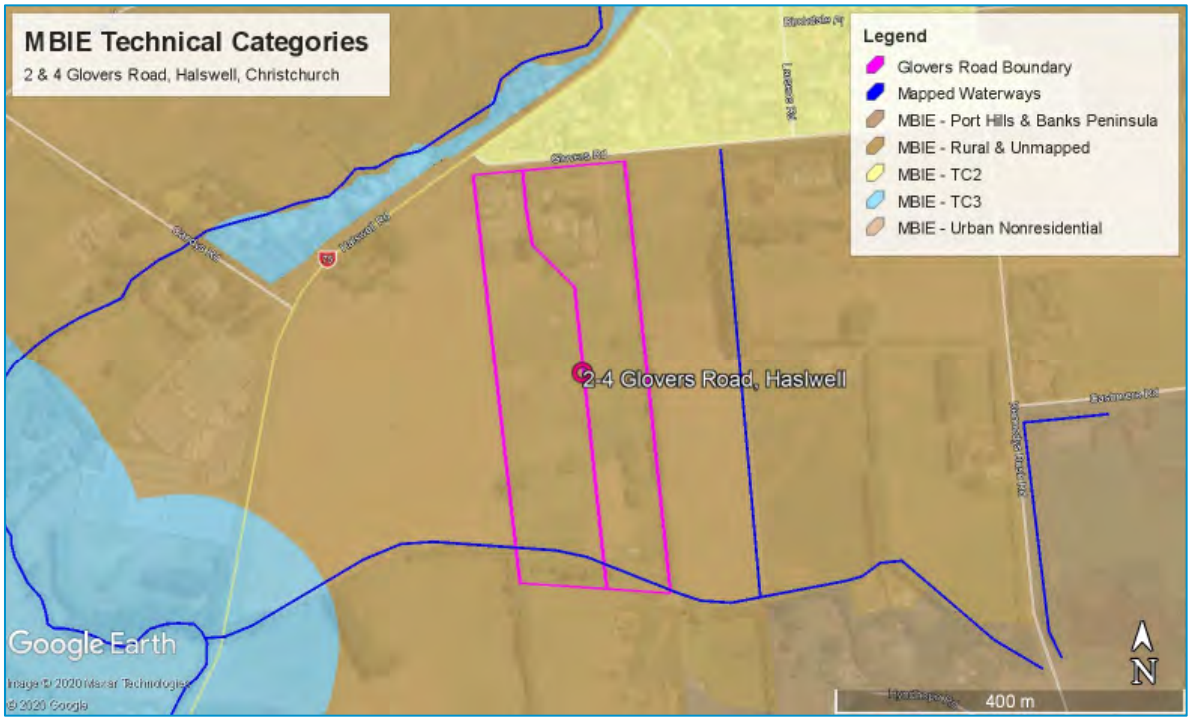

Figure 2: Site Location Plan Showing MBIE Technical Categories and Mapped Waterways (Scale as Shown)

The Riverstone Subdivision is proposed to, currently, be comprised of 239 residential lots with reserves located throughout. A draft plan of the subdivision, including the Glovers Road properties, is presented in Appendix A.

3. Desk Study

The following sources of third-party information were considered and are referenced in this report:

- New Zealand Geotechnical Database (NZGD);
- Environment Canterbury (ECan);
- Christchurch City Council (CCC).

New Zealand Geotechnical Database

The NZGD website was reviewed to identify any additional information related to the extent of land damage after the CES on the site and in the immediate surrounding areas. The results of this review indicate that no significant land damage was observed across the site. Table 1 provides a summary of the information obtained from our review of the NZGD.

Table 1: Desk Study Information Summary (NZGD)

	September 2010 (M_w 7.1)	February 2011 (M_w 6.2)	June 2011 (M_w 6.0)	December 2011 (M_w 5.9)
Aerial Photography Review	Outside of photographed area	Areas of likely ejecta identified in the central and northern areas of both properties, though mainly confined to 2 Glovers Road	Outside of photographed area	Outside of photographed area
Land damage observations	Minor ground cracking but no observed ejected liquefied material was recorded on the properties on the opposite side of Glovers Road in the September 2010 CES event and along Halswell Road and sections of Glovers Road during the June 2011 CES event.			
Observed ground cracking	No cracks mapped on the properties, 10mm – 200mm ground cracks mapped ~65m west of the northernmost boundary of the site within the residential area on the opposite side of Halswell Road			
PGA (g) ± SD	0.294 ± 0.390	0.356 ± 0.435	0.145 ± 0.465	0.139 ± 0.250
Scaled $PGA_{7.5}$ $PGA_{16\%ile}$ to $PGA_{84\%ile}$[(I)] (g)	0.179 to 0.394	0.164 to 0.391	0.061 to 0.156	0.071 to 0.117

(I) Scaled to M7.5 using Idriss and Boulanger recommendations (2008); 68% confidence $PGA_{7.5}$ range

Contaminated Land Considerations

The ECan Listed Land Use Register (LLUR) was reviewed and holds records of potentially Hazardous Activities and Industrial List (HAIL) sites. At this time, a small area that intersects the southern end of both sections is listed as a potential HAIL site. The LLUR lists this small area (in the vicinity of a storage shed) as an A10-classified area, which relates to "persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glass houses or spray sheds", though this has not been investigated by ECan. The property reports for both sections are included in Appendix B.

An environmental assessment is outside the scope of this assessment and has been undertaken by others.

Flood Hazard

Christchurch is a low-lying city and there have always been areas that are prone to flooding during heavy rainfall. The CES has worsened flood risk in many areas of the city through damage to waterways and land. Flood Management Areas (FMAs) have been identified by CCC in the District Plan and take into consideration the impacts of the CES.

At the time of writing this report the site is located within a FMA as indicated by the CCC District Plan.

It is understood that a Finished Floor Level (FFL) of 21.25m above Christchurch Drainage Datum (CDD) is a requirement for development of the site.

Ground Motion

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 and February 2011 events of the CES. This indicates that land and building damage in a future SLS event is likely to be similar to these individual events.

Additionally, based on the SLS2 level of shaking (M_w 6.0 and PGA of 0.19g) which was introduced by MBIE following the updated liquefaction triggering CPT-based procedure by Boulanger & Idriss (2014), it is our opinion the site was "sufficiently tested" to the SLS2 level of earthquake demand during the September 2010 and February 2011 events of the CES.

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. Subsurface Conditions

Geological Setting

The geological map of the area (GNS 1:250,000 QMap) indicates that most of the site has surface geology consisting of "modern (Quaternary) river floodplain and low-level degradation terraces (<2° slopes) comprised of unweathered, variably sorted gravel/sand/silt/clay".

Field Investigations

The NZGD website was reviewed to identify relevant geotechnical investigations completed within the site vicinity, additional to the data identified for use in the original site assessment for the neighbouring section, though nothing for inclusion was identified.

Miyamoto undertook the following site-specific ground investigations and testing:

- Five (5) hand-augered boreholes (referenced HA1 to HA5) with in-situ shear vane testing;
- Five (5) Dynamic Cone Penetrometer (DCP) tests (referenced DCP1 to DCP5);
- Laboratory testing including fines content (FC) and Atterberg Limits;
- Twelve (12) Cone Penetration Tests (CPTu) with porewater pressure measurements;
- Multichannel Analysis of Surface Waves (MASW) geophysical survey;
- Ground Penetrating Radar (GPR) geophysical survey.

The general details of the ground investigations are summarised in Table 2, the test locations are shown in Figure 3 and Figure 4, and the HA/DCP logs and CPT plots are presented in Appendix C and the geophysical survey report is presented in Appendix D.

Table 2: Summary of Ground Investigations

Test Ref.	Source	Source Ref.	Test Type	Depth (m bgl)
HA1/DCP1 to HA5/DCP5	MINZ	200357	Hand Auger/ DCP	1.8 to 3.9
CPTu001 to CPTu012	LandTest	19096	CPT	10.0 to 15.0
MASW 1 to MASW 3	Southern Geophysical Ltd	2050	MASW	Up to 40.0
GPR 1 to GPR 11			GPR	Up to 4.0

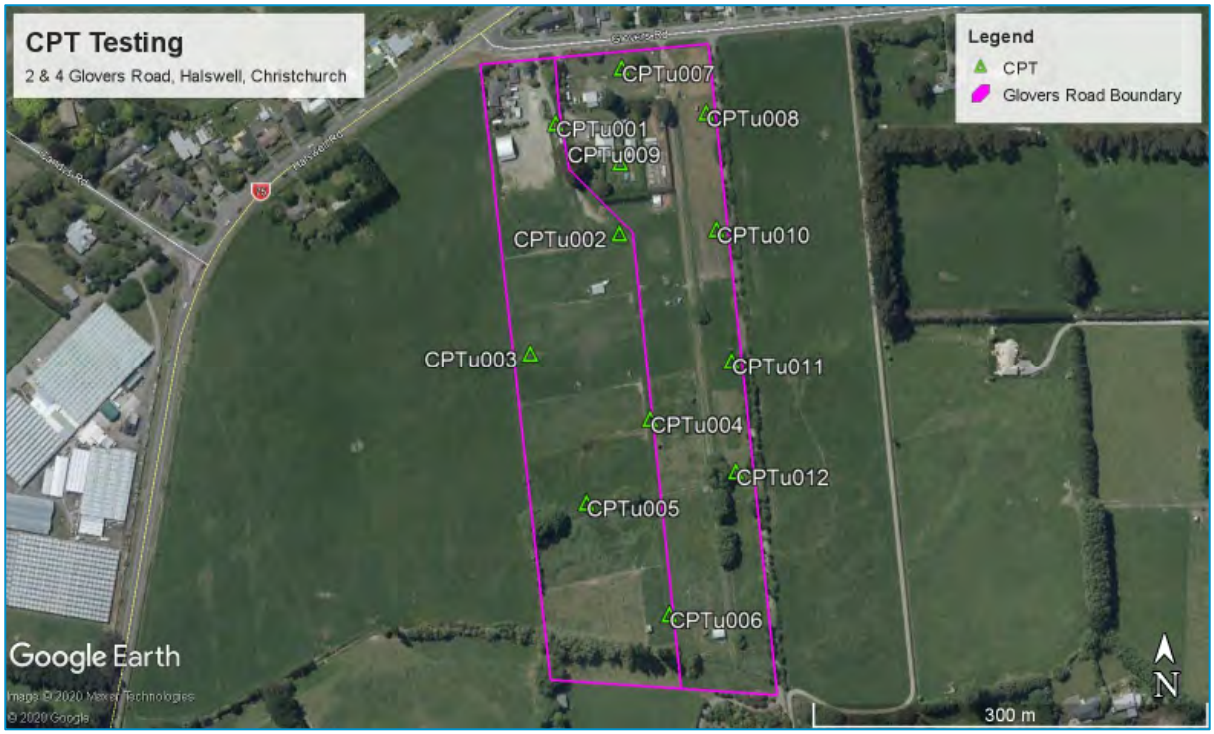

Figure 3: CPT Investigation Location Plan (Scale as Shown)

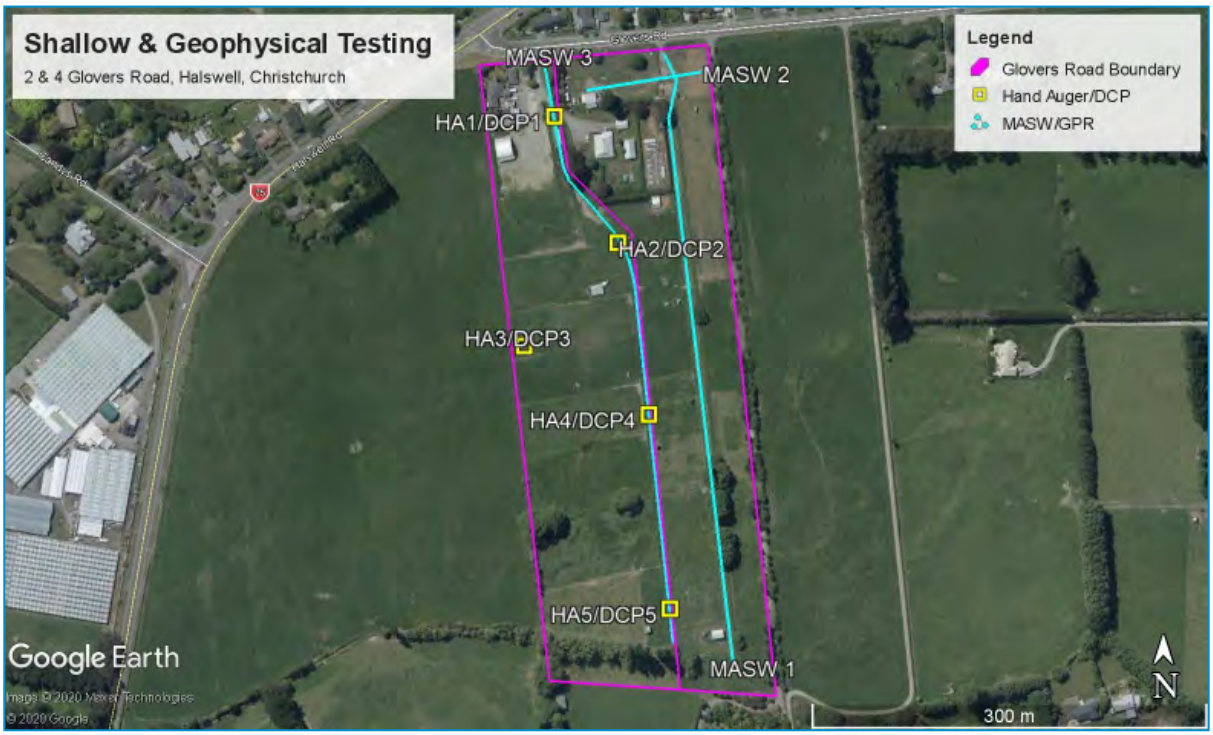

Figure 4: Other Geotechnical Investigation Location Plan (Scale as Shown)

Laboratory Test Results

Laboratory testing was undertaken on samples obtained from our shallow ground investigation to assess the soil characteristics across the site. The testing undertaken includes wet sieving to determine the fines content, and Atterberg limits tests to determine the plastic and liquid limits. A summary of the test results is presented in Table 3, with the full results presented in Appendix C.

Table 3: Laboratory Test Results

Sample Ref.	Depth of sample (m)	Soil Description	Plasticity Index	% Passing		
				0.3 mm	0.15 mm	0.063 mm
C20-319	HA1 1.5m – 2.3m	Silty SAND, brownish grey, wet, non-plastic	-	100	90	49
C20-320	HA1 2.3m – 3.8m	Silty SAND, brownish grey, saturated, non-plastic	-	100	91	49
C20-321	HA2 2.7m – 4.0m	Silty CLAY, some sand, dark grey, saturated, low plasticity	9	99	96	85
C20-312	HA3 2.0m – 3.4m	Sandy SILT, dark grey, saturated, non-plastic	NP	100	99	59
C20-323	HA5 1.5m – 1.8m	Silty SAND, brownish grey, wet, non-plastic	-	99	77	42

Ground Conditions

The ground conditions interpreted from the existing data and investigations undertaken as part of this assessment are presented graphically in the geotechnical cross sections included in Appendix E and the basic soil descriptions are outlined in Table 4.

A near-surface paleo-feature (old river terrace or paleochannel) was identified during the site testing with the CPT's completed at the southern end of the site (CPTu004 to CPTu006 and CPTu012) refusing in dense soils within the upper 5m, before testing was continued with the DPSH. The shallow investigation (HA5/DCP5) also refused at a shallow depth due to dense soils. The testing at the northern end of the site all reached the target depths and were consistent in their findings.

Table 4: Ground Conditions Summary

Layer	Soil Name
a	Silty SAND and Sandy SILT, loose to firm
b	Clayey SILT, soft to firm, medium plasticity
c	Silty SAND, medium dense to dense with increasing depth
GS	Gravelly SAND to Sandy GRAVEL, dense
d	Clayey SILT to silty CLAY, firm
e	Medium dense SAND with silt and gravels
f	Clayey SILT, firm to stiff
S	Silty SAND to Sandy SILT, medium dense to very stiff

MASW & GPR Geophysical Survey

The shear wave velocity (V_S) measurement was assessed with a MASW survey. The results of the survey were used to refine the boundaries and extents between the shallow, softer soils and denser sandy/gravelly layers with the MASW survey reflecting the findings of the intrusive investigations, with 2 clearly defined areas for the north and south of the site. The soils in the northern part of the site had a generally lower shear wave velocity (V_S < 180m/s) to approximately 20.0m depth, though discrete layers of denser, higher V_S soils were identified above this depth before becoming lower velocity again. For the southern part of the site, the lower V_S soils are generally terminated shallower (<5m depth) before the V_S increased in the gravelly dense material.

Additionally, the measured cone tip resistance (q_c) and interpreted shear wave velocity from the CPT data generally shows a consistent pattern with the recorded values from the MASW survey as seen in the CPT profiles in Appendix C. It should be noted that due to the high velocity layers towards the south, thin lower velocity layers were not picked up as seen in the DPSH data. This is reflected in the cross sections presented in Appendix E.

The GPR survey was undertaken to further supplement the MASW surveys for the near-surface soils. The primary objective of this survey was to assist in identifying softer or denser layers that may not have been picked up in the MASW survey. The results generally show a consistent correlation with the MASW survey. The softer soils generally had a poor reflection, with denser material showing a clearer reflection. The shallow gravelly soils at the southern end of the site were also clear within the upper 4.0m of the soil profile.

Groundwater

Our site-specific shallow investigation encountered groundwater levels between 1.0m and 1.8m bgl, however the cohesive soils below the recorded depth were noted to not be saturated, indicating that a perched water table is likely present on-site. The CPT data shows variable piezometric conditions indicating a groundwater table depth between 0.7m and 2.4m bgl, due to the differing depth of cohesive soils in the upper soil profile and different elevations. The shallower groundwater depths were generally confined to the lower elevations of the property.

Based on the above, a groundwater depth range of between 0.7m to 2.4m bgl was adopted for the liquefaction triggering and free-field settlement assessment, depending on the location of the test across the site.

Site Subsoil Class

Based on the site-specific investigation, geological maps and other available information, the site is classified as a Class D (deep or soft soil) site.

Shallow Soils

The geotechnical investigations indicate the existence of low velocity ($V_s \leq 180$m/s), soils between approximately 4.0m and 20.0m depth, with the lower V_S soils encountered at greater depths towards the north of the sections. There are also locations where denser pockets of material were identified within these lower V_S layers. Those layers have lower strength and have the potential for long-term consolidation settlements from loads, such as residential dwellings. This is further discussed later in this report.

5. Liquefaction Assessment

Methodology

An assessment of the earthquake-induced free-field post-liquefaction volumetric settlement at the site has been carried out in accordance with the MBIE Guidance and using proprietary liquefaction assessment software, for SLS and ULS earthquake scenarios.

The seismic design requirements adopted for use in the analyses are defined in MBIE/NZGS Earthquake Geotechnical Engineering Practice Module 3 (May 2016), and Part C of the MBIE Guidelines “Repairing and rebuilding houses affected by the Canterbury earthquakes” and its subsequent updates - clarifications. These are:

- Buildings of normal use (Importance Level 2);
- Deep or soft soil sites (Class D) as specified previously;

- Boulanger and Idriss (2014) methodology for liquefaction triggering, as per the MBIE Guidance subsequent updates (Issue 7, October 2014);
- Zhang et al. (2002) post-liquefaction volumetric strain calculation for estimating the free-field settlements;

Calculations were performed for the full depth of the CPTs and the upper 10m of the soil profile (as per the MBIE Guidance "index value" estimations). It should be noted that the settlement estimates only account for the free-field component of the expected settlement. Actual total settlements under SLS or ULS earthquake loading may be greater or less.

The Liquefaction Severity Number (LSN[1]) has been calculated and used in our assessment as it tends to better reflect the more damaging effects of shallow liquefaction, which is more critical for shallow founded structures. The level of ground damage associated with LSN is summarised in Table 5.

Table 5: Liquefaction Severity Number Ranges and Related Effects

LSN Value	Observed Performance
<10	Little to no expression of liquefaction, minor effects
10 – 20	Minor expression of liquefaction, some sand boils
20 – 30	Moderate expression of liquefaction, with sand boils and some structural damage
30 – 40	Moderate to severe expression of liquefaction, settlement can cause structural damage
40 – 50	Major expression of liquefaction, undulations and damage to ground surface, sever total and differential settlement of structures
>50	Severe damage, extensive evidence of liquefaction at surface, sever total and differential settlements affecting structures, damage to services

Liquefaction Assessment Results

Due to the rapid changes at the interface between fine and coarse-grained soils, a layer correction was applied. The cone tip penetration, and subsequently, the ability to resist liquefaction of a sandy material, is reduced by the surrounding silty layers, while the I_c[2] of the silt layers is reduced due to the presence of the surrounding sandy layers and hence the susceptibility of the fine layers is overestimated. For our analysis, an I_c change of >0.05 per 10mm has been adopted, which eliminates the liquefaction potential for the layer.

The results of our liquefaction triggering analyses utilising the CPT data are presented in Appendix F and summarised in Table 6.

[1] **LSN = Liquefaction Severity Number**. LSN (van Ballegooy et al., 2014) is a vulnerability indicator (damage index) quantifying liquefaction-induced damage developed to reflect more damaging effects of shallow liquefaction on residential land and foundations following the Canterbury Earthquakes (2010-11). LSN considers depth weighted calculated volumetric densification strain within soil layers as a proxy for the severity of liquefaction land damage likely at the ground surface.

[2] **I_c = Soil Behaviour Classification Index -** Robertson & Wride 1998.

Table 6: Estimated "Free-Field" Post-Liquefaction Volumetric Ground Surface Settlements

Earthquake scenario	Moment magnitude (M_w) / PGA (g)	MBIE "Index Value" (mm)	MBIE Technical Category	LSN Values
GWD = varying (in-situ) and 0.5m to 1.2m (earthquake); Layer transition applied				
SLS SLS2	7.5/0.13 6.0/0.19	< 35 5 – 50	TC2 TC2	1 – 5 2 – 16
ULS	7.5/0.35	5 – 80	TC2	5 – 25

In accordance with the MBIE Guidance, the analysis indicates that under SLS and ULS loading conditions the predicted index value settlements fall within the expected future land performance values for a TC2 category site. The higher settlements were located on the land at the northern area of the 2 Glovers Road section, which generally correlates with observed liquefaction ejecta in the aerial photographs.

Based on the LSN estimated for the design events, 'little to minor' expression of liquefaction may be expected for a future SLS design event, and 'little to moderate' expression of liquefaction may be expected for a future ULS design event. The values of LSN at the upper end of the ranges estimated are generally located in the central portion of the development area (where ejecta has been observed following the CES events).

Lateral Spreading

Given the generally flat topography of the site, and the assumption that the site will be levelled further during the development of the subdivision, there is unlikely to be significant height differences, apart from the area immediately adjacent to Green's Stream. As the area needs to be developed with the FMA in mind, and land levels lifted, there is the potential for a more pronounced 'free-face' that could create a risk of lateral spreading. Options to address this are discussed later in the report.

6. Site Designation Assessment

Based on the findings of our desk study, our site-specific ground investigation and observations, and assessment of the performance of the land, we consider the MBIE TC2 category generally appropriate for the site. Despite the deformation characteristics of TC2, the land does not meet the definition of 'Good Ground' as per the New Zealand Standards without modification to standard foundation systems and specific engineering design to account for this due to the soft soils.

7. Geotechnical Considerations for Subdivision

Geotechnical Hazards

The most significant geotechnical hazards at the site comprise the potential for earthquake-induced soil liquefaction and potential static subsidence of the soft compressible soils. These hazards can be partly mitigated by providing strengthened foundations, which reduce the potential for differential settlement of the buildings and are designed to be re-levellable.

However, as part of the land development it is understood that, in order to meet the CCC FFL requirements, the site grade will need to be raised by filling. Site filling works can induce

additional loading of the underlying soft compressible deposits and potentially lead to consolidation settlement of the fill and / or construction above. To assess the likely influence of filling, a pre-load trial was undertaken by Miyamoto. This trial indicates that static settlements are not believed to pose a significant risk to the Halswell Road section of the development. Given the similar soil conditions found, it is our professional opinion that this statement also applies to the Glovers Road properties. It is still recommended that settlement plates are installed during the site filling works and these should be founded at the base of the fill with upstands extending through the top of the fill. It is advised that the settlement plates are monitored during the raising of the site levels and for a period (up to 6 months) to assess any static settlements and ensure performance is in line with the pre-loading trial findings.

The current subdivision plan for the entire site is not currently finalised and until it is further developed, specific detailed recommendations cannot be provided, however, the following sections outline general considerations for future development.

Development Considerations

Based on the land survey data (provided by others), a maximum level of approximately 22.3m CDD was identified at the northern extent of property. The land drops to approximately 19.6m CDD next to Green's Stream, though the development does not extend to this point. The low point of the development area is at approximately 20.4m CDD. As discussed above, the site will require filling to meet the CCC FFL requirements (FFL = 21.25m CDD based on the Halswell Road site), particularly if the preferred foundation options comprise concrete slab foundations. It is anticipated that maximum filling would be in the proximity of 1.2m.

Currently, there is no indication of cutting or removal of material to the north of the site. All earthworks should be undertaken in accordance with NZS 4431:1989 (code of practice for earth fill for residential development) prior to the construction of any foundations. The monitoring scheme (mentioned earlier) should be fully developed once the final details of the proposed earthworks are known.

The southern extent of the filling (in proximity of Green's Stream) will be the maximum height of fill required and will require detailed design to ensure stability. It is our understanding the development area is to extend to within 15m of Green's Stream. A shallow vegetated slope is considered suitable given the height of filling is not likely to exceed 1.2m, and provided the slope is not at a gradient exceeding 1.0m vertical to 2.0m horizontal.

Based on the above and the previously completed works, the following foundation solutions would be considered suitable for the construction of NZS3604 compliant structures for the subdivision:

- MBIE TC2 (Options 1 to 4) enhanced foundation slab;
- Specifically designed, enhanced NZS 3604 perimeter foundation wall and shallow piles.

Based on development works proposed, a geotechnical ultimate bearing capacity of 200kPa can be assumed at a high level, though this value is indicative only. The available bearing capacity must be confirmed on-site prior to construction works at the time of any building consent application.

The foundation types detailed above are also preliminary and should be further developed and optimised in collaboration with the structural engineer once further details of any proposed structure are finalised.

Stormwater Management

Stormwater management is outside the scope of our works. However, it is understood the southern section of the Halswell Road site (area south of Green's Stream) will be utilised for stormwater detention and treatment for the Riverstone subdivision as a whole, with shallow basins excavated through this area. As mentioned in the initial assessment undertaken, this material is unlikely to be suitable for filling of the development area.

Services

Buried services are vulnerable to ground deformations when located within and/or in proximity of potentially liquefiable and compressible soils. Services for the residential development should be designed by a suitably qualified person in collaboration with the geotechnical engineers to accommodate the likelihood of future ground deformations.

Pavement/Roading Infrastructure

As for the services at the site, pavements will require detailed design by a suitably experienced person in collaboration with the geotechnical engineer, the finished ground levels and compaction characteristics of the filling material.

It is currently understood that the new areas of development will link into the Halswell Road property as well as having its own access onto Glovers Road, and it is assumed that filling in this area will be required to raise the grade. The underlying soils in this area are generally typical for the site with the upper 1.0m comprising topsoil over soft silt (loosely corresponding to a CBR of ~2 to 3 below the topsoil).

8. Assessment Against RMA Section 106

As per the requirements of Section 106 of the Resource Management Act (RMA) (2017), we have undertaken a high-level assessment of the significant geotechnical hazards that may affect the site, outside of the hazards already discussed in this report (i.e. static and earthquake-induced subsidence, and lateral spreading). These hazards include, but are not limited to:

- Erosion;
- Falling debris;
- Slippage;
- Inundation.

At the time of our site visit, there was no evidence of erosion. Likewise, no evidence was observed to suggest that lateral movement is an issue on the site, given the site is generally

flat. Rock Fall or slope movement are also not considered a risk to this area of the development.

As part of the site is identified as being within a Flood Management Area (FMA) as defined by the CCC, inundation is likely to be a risk, as the site currently stands. If the site is built up to ensure the FFLs set by the CCC are met and suitable stormwater drainage is in place, then inundation is not considered an imminent risk to the development.

Based on our assessment, we consider that the "significant" geotechnical hazards may be mitigated to an acceptable standard, provided that the geotechnical recommendations given in this report are followed, and the appropriate engineering measures implemented, we consider that the development is unlikely to be affected nor worsen, accelerate or result in material damage.

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.
- 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 Client is responsible for ensuring that the design of any foundations ensures the functionality of the building under SLS level loads.
- 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 as a result of any such changes.
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If you have any queries or you require any further clarification on any aspects of this report, please do not hesitate to contact Miyamoto International (NZ) Ltd.

10. References

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Appendices

A. Updated Indicative Subdivision Plan (Davie Lovell Smith)

AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION

NOTES :

1. Areas and dimensions are approximate only and are subject to final survey and deposit of plans.
2. Service easements to be created as required.
3. This plan has been prepared for discussion purposes only. No liability is accepted if the plan is used for any other purposes.
4. The position of Greens Drain is approximate and subject to survey.

Total Area : 23.1161 ha

Comprised in: RT's CB10B/654, CB48C/117 & CB48C/118

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Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:

Halswell Road

SHEET TITLE:

Proposed Subdivision of Pt RS 1593, RS 772 & Lots 1 & 2 DP 83635

DRAWING STATUS

For Discussion Purposes

SCALE : 1:1000@A1 1:2000@A3

DATE : October 2020

CAD FILE : J:\2017\Concept_R6.dwg

REVISION : R6

DRAWING No : C20017

SHEET No: 1 OF 1

B. ECan Listed Land Use Register Files

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Dear Sir/Madam

Thank you for submitting your property enquiry in regards to our Listed Land Use Register (LLUR) which holds information about sites that have been used, or are currently used for activities which have the potential to have caused contamination.

The LLUR statement provided indicates the location of the land parcel(s) you enquired about and provides information regarding any LLUR sites within a radius specified in the statement of this land.

Please note that if a property is not currently entered on the LLUR, it does not mean that an activity with the potential to cause contamination has never occurred, or is not currently occurring there. The LLUR is not complete, and new sites are regularly being added as we receive information and conduct our own investigations into current and historic land uses.

The LLUR only contains information held by Environment Canterbury in relation to contaminated or potentially contaminated land; other information relevant to potential contamination may be held in other files (for example consent and enforcement files).

If your enquiry relates to a farm property, please note that many current and past activities undertaken on farms may not be listed on the LLUR. Activities such as the storage, formulation and disposal of pesticides, offal pits, foot rot troughs, animal dips and underground or above ground fuel tanks have the potential to cause contamination.

Please contact and Environment Canterbury Contaminated Sites Officer if you wish to discuss the contents of the LLUR statement, or if you require additional information.
For any other information regarding this land please contact Environment Canterbury Customer Services.

Yours sincerely

Contaminated Sites Team

Property Statement
from the Listed Land Use Register

Visit www.ecan.govt.nz/HAIL for more information about land uses.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Date:	13 October 2020
Land Parcels:	Lot 1 DP 83635 Valuation No(s): 2356209300

The information presented in this map is specific to the property you have selected. Information on nearby properties may not be shown on this map, even if the property is visible.

Summary of sites:

Site ID	Site Name	Location	HAIL Activity(s)	Category
26587	26587	Halswell West	A10 - Persistent pesticide bulk storage or use;	Not Investigated

Please note that the above table represents a summary of sites and HAILs intersecting the area of enquiry only.

Information held about the sites on the Listed Land Use Register

Site 26587: 26587 (Intersects enquiry area.)

Site Address:	Halswell West
Legal Description(s):	Lot 1 DP 83635,Lot 2 DP 83635

Site Category:	Not Investigated
Definition:	Verified HAIL has not been investigated.

Land Uses (from HAIL):

Period From	Period To	HAIL land use
Pre 1994	Pre 2004	Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glass houses or spray sheds

Notes:

17 Oct 2013 Area defined from: 1994-2004 ECan Aerial Photographs

Note: Multiple glass houses were noted in aerial photographs reviewed.

Investigations:

There are no investigations associated with this site.

Information held about other investigations on the Listed Land Use Register

For further information from Environment Canterbury, contact Customer Services and refer to enquiry number ENQ265562.

Disclaimer:

The enclosed information is derived from Environment Canterbury's Listed Land Use Register and is made available to you under the Local Government Official Information and Meetings Act 1987 and Environment Canterbury's Contaminated Land Information Management Strategy (ECan 2009).

The information contained in this report reflects the current records held by Environment Canterbury regarding the activities undertaken on the site, its possible contamination and based on that information, the categorisation of the site. Environment Canterbury has not verified the accuracy or completeness of this information. It is released only as a copy of Environment Canterbury's records and is not intended to provide a full, complete or totally accurate assessment of the site. It is provided on the basis that Environment Canterbury makes no warranty or representation regarding the reliability, accuracy or completeness of the information provided or the level of contamination (if any) at the relevant site or that the site is suitable or otherwise for any particular purpose. Environment Canterbury accepts no responsibility for any loss, cost, damage or expense any person may incur as a result of the use, reference to or reliance on the information contained in this report.

Any person receiving and using this information is bound by the provisions of the Privacy Act 1993.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
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PO Box 345
Christchurch 8140

P. 03 365 3828
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E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Dear Sir/Madam

Thank you for submitting your property enquiry in regards to our Listed Land Use Register (LLUR) which holds information about sites that have been used, or are currently used for activities which have the potential to have caused contamination.

The LLUR statement provided indicates the location of the land parcel(s) you enquired about and provides information regarding any LLUR sites within a radius specified in the statement of this land.

Please note that if a property is not currently entered on the LLUR, it does not mean that an activity with the potential to cause contamination has never occurred, or is not currently occurring there. The LLUR is not complete, and new sites are regularly being added as we receive information and conduct our own investigations into current and historic land uses.

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If your enquiry relates to a farm property, please note that many current and past activities undertaken on farms may not be listed on the LLUR. Activities such as the storage, formulation and disposal of pesticides, offal pits, foot rot troughs, animal dips and underground or above ground fuel tanks have the potential to cause contamination.

Please contact and Environment Canterbury Contaminated Sites Officer if you wish to discuss the contents of the LLUR statement, or if you require additional information.
For any other information regarding this land please contact Environment Canterbury Customer Services.

Yours sincerely

Contaminated Sites Team

Property Statement
from the Listed Land Use Register

Visit www.ecan.govt.nz/HAIL for more information about land uses.

Environment Canterbury
Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Date:	13 October 2020
Land Parcels:	Lot 2 DP 83635 Valuation No(s): 2356209301

The information presented in this map is specific to the property you have selected. Information on nearby properties may not be shown on this map, even if the property is visible.

Summary of sites:

Site ID	Site Name	Location	HAIL Activity(s)	Category
26587	26587	Halswell West	A10 - Persistent pesticide bulk storage or use;	Not Investigated

Please note that the above table represents a summary of sites and HAILs intersecting the area of enquiry only.

Information held about the sites on the Listed Land Use Register

Site 26587: 26587 (Intersects enquiry area.)

Site Address:	Halswell West
Legal Description(s):	Lot 1 DP 83635,Lot 2 DP 83635

Site Category:	Not Investigated
Definition:	Verified HAIL has not been investigated.

Land Uses (from HAIL):

Period From	Period To	HAIL land use
Pre 1994	Pre 2004	Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glass houses or spray sheds

Notes:

17 Oct 2013 Area defined from: 1994-2004 ECan Aerial Photographs

Note: Multiple glass houses were noted in aerial photographs reviewed.

Investigations:

There are no investigations associated with this site.

Information held about other investigations on the Listed Land Use Register

For further information from Environment Canterbury, contact Customer Services and refer to enquiry number ENQ265560.

Disclaimer:

The enclosed information is derived from Environment Canterbury's Listed Land Use Register and is made available to you under the Local Government Official Information and Meetings Act 1987 and Environment Canterbury's Contaminated Land Information Management Strategy (ECan 2009).

The information contained in this report reflects the current records held by Environment Canterbury regarding the activities undertaken on the site, its possible contamination and based on that information, the categorisation of the site. Environment Canterbury has not verified the accuracy or completeness of this information. It is released only as a copy of Environment Canterbury's records and is not intended to provide a full, complete or totally accurate assessment of the site. It is provided on the basis that Environment Canterbury makes no warranty or representation regarding the reliability, accuracy or completeness of the information provided or the level of contamination (if any) at the relevant site or that the site is suitable or otherwise for any particular purpose. Environment Canterbury accepts no responsibility for any loss, cost, damage or expense any person may incur as a result of the use, reference to or reliance on the information contained in this report.

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C. Geotechnical Investigation Results

MINZ Shallow Investigation Logs

Laboratory Soil Sample Test Results

LandTest CPT/DPSH Plot

miyamoto. ENGINEERS + CONSTRUCTION CONSULTANTS

PROJECT NUMBER:	**200357**
CLIENT:	**Yoursection Ltd.**
TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA1/DCP1

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**				
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**2.9 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**	*SHEAR VANE NUMBER:*	**2102**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.65 mbgl**	This report may only be reproduced in full	

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
0.0	1			SILT: low plasticity, dark brown, moist, with minor rootlets (TOPSOIL)											
	1														
	1														
	1														
0.5	3			SILT: low plasticity, brown, moist, with minor fine sand											
	2														
	1														
	2														
	1														
1.0	2														
	2														
	2														
	2														
	2														
	1														
1.5	2			Silty SAND: fine to medium, brown-grey, wet											
	2	▽													
	2														
	2														
	2					DIST. SAMPLE					51%	49%			
2.0	3			at 2.0m: becomes blue-grey, saturated											
	3														
	2														
	1														
	1														
2.5	2					DIST. SAMPLE					51%	49%			
	2														
	3														
	4														
	5			...contd on next page											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	HA	HAND AUGER	LL	LIQUID LIMIT	Gr	GRAVEL
GWL	GROUNDWATER LEVEL	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	Sa	SAND
mbgl	METERS BELOW GROUND LEVEL	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
WC	WATER CONTENT	UW	UNIT WEIGHT (kN/m^3)	NE	NOT ENCOUNTERED	▽	STANDING GWL

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA1/DCP1 (contd.)

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**						
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**3.9**	**mbgl**	*HOLE DIAMETER:*	**50 mm**	
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**		*SHEAR VANE NUMBER:*	**2102**	
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.65**	**mbgl**	This report may only be reproduced in full		

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
	9	1.65m bgl --->		Silty SAND: fine to medium, blue-grey, saturated (contd.)		DIST. SAMPLE					51%	49%			
	9														
	9														
	9														
3.5	7														
	6														
	6														
	7														
	7			SILT: low plasticity, blue-grey, saturated											
4.0				**EOH (Target Depth Reached)**											
4.5															
5.0															
5.5															

LEGEND

ABBREVIATIONS

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

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA2/DCP2

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**				
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**3.9 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**	*SHEAR VANE NUMBER:*	**2102**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.3 mbgl**	This report may only be reproduced in full	

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
0	1			SILT: non-plastic, dark brown, moist, with some sand and rootlets (TOPSOIL)											
	2														
	1														
	2			SILT: low plasticity, yellow-brown, moist, with some sand											66 / 16
0.5	2														
	3														
	3			SAND: fine to medium, orange-brown, moist, with trace of silt											
	3														
	2														
	2														
1.0	4														
	3														
	2	▽													
	3														
	2														
1.5	2			Clayey SILT: low to medium plasticity, grey, moist, with some sand											
	3														
	4														
	3			at 1.9m: becomes wet, mottled orange											
	Self Weight														63 / 16
2.0	1														
	3			at 2.2m: mottling absent											
	3														
	3			at 2.3m: becomes saturated											
	4														
2.5	4														
	5														
	5														
	7						DIST. SAMPLE	29	20	9	-	15%	85%		
	7			...contd on next page											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	HA	HAND AUGER	LL	LIQUID LIMIT	Gr	GRAVEL
GWL	GROUNDWATER LEVEL	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	Sa	SAND
mbgl	METERS BELOW GROUND LEVEL	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
WC	WATER CONTENT	UW	UNIT WEIGHT (kN/m^3)	NE	NOT ENCOUNTERED	▽	STANDING GWL

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA2/DCP2 (contd.)

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**						
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**3.9**	**mbgl**	*HOLE DIAMETER:*	**50 mm**	
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**		*SHEAR VANE NUMBER:*	**2102**	
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.3**	**mbgl**	This report may only be reproduced in full		

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
	7	1.3m bgl -->		Clayey SILT: low to medium plasticity, grey, saturated, with some sand (contd.)											
	7														
	8														
	7														
3.5	7					DIST. SAMPLE	29	20	9	-	15%	85%			
	6														
	7														
	8														
	7														
4.0				**EOH (Target Depth Reached)**											
4.5															
5.0															
5.5															

LEGEND

ABBREVIATIONS

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

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA3/DCP3

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**						
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**4.1**	**mbgl**	*HOLE DIAMETER:*	**50 mm**	
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**		*SHEAR VANE NUMBER:*	**2102**	
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.8**	**mbgl**	This report may only be reproduced in full		

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
0.0	2			SILT: non-plastic, dark brown, dry, with some sand and rootlets (TOPSOIL)											
	1														
	2														
	2														
	2			SILT: low plasticity, light brown, moist											
0.5	2														
	2			SAND: fine to medium, orange brown, moist											
	2														
	2														
	2														
1.0	2														
	2														
	3														
	1			Sandy SILT: low plasticity, orange brown, wet											
	2														
1.5	3			SILT: medium plasticity, brown, wet											
	3														
	3	▽													
	5														
	2														
2.0	2			Sandy SILT: non-plastic, dark grey, saturated			DIST. SAMPLE	Non-Plastic		-	41%	59%			
	2														
	3														
	4														
	4														
2.5	5														
	5														
	2														
	4														
	5			...contd on next page											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	HA	HAND AUGER	LL	LIQUID LIMIT	Gr	GRAVEL
GWL	GROUNDWATER LEVEL	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	Sa	SAND
mbgl	METERS BELOW GROUND LEVEL	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
WC	WATER CONTENT	UW	UNIT WEIGHT (kN/m^3)	NE	NOT ENCOUNTERED	▽	STANDING GWL

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA3/DCP3 (contd.)

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**						
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**4.1**	**mbgl**	*HOLE DIAMETER:*	**50 mm**	
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**		*SHEAR VANE NUMBER:*	**2102**	
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.8**	**mbgl**	This report may only be reproduced in full		

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
			USC	*Soil Characteristics*	*Graphic Log*		*Atterberg Limits*			*Grain Size*			*WC (%)*	*UW*	
							LL	*PL*	*PI*	*Gr*	*Sa*	*FC*			
	5	1.8m bgl ⟶		Sandy SILT: non-plastic, dark grey, saturated (contd.)		DIST. SAMPLE	Non-Plastic			-	41%	59%			
	7														
	8														
	8														
3.5	8														
	7														
	8														
	9														
4.0	10														
				EOH (Target Depth Reached)											
4.5															
5.0															
5.5															

LEGEND

ABBREVIATIONS

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

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA4/DCP4

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**				
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**2.9 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**	*SHEAR VANE NUMBER:*	**2102**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.2 mbgl**	This report may only be reproduced in full	

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
0	2			Sandy SILT: non-plastic, brown, moist, with minor rootlets (TOPSOIL)											
	1														
	2														
	2			SAND: fine to medium, grey, moist, with some silt											
	2														
0.5	2														
	1														
	1			at 0.8m: becomes wet											
	1														
	2														
1.0	3			Sandy SILT: low plasticity, brown-grey, wet, sand is fine											
	3	▽													
	3			at 1.2m: becomes saturated											
	3														
1.5	2														
	2														
	2														
	3														
	3														
	3														
2.0	3			SILT: low to medium plasticity, blue-grey, saturated											
	3														
	4														
	3														
	4			Silty SAND: fine to medium, grey, saturated											
2.5	4														
	5														
	4														
	4														
				EOH (Target Depth Reached)											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	HA	HAND AUGER	LL	LIQUID LIMIT	Gr	GRAVEL
GWL	GROUNDWATER LEVEL	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	Sa	SAND
mbgl	METERS BELOW GROUND LEVEL	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
WC	WATER CONTENT	UW	UNIT WEIGHT (kN/m^3)	NE	NOT ENCOUNTERED	▽	STANDING GWL

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA5/DCP5

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**						
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**1.9**	**mbgl**	*HOLE DIAMETER:*	**50 mm**	
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**		*SHEAR VANE NUMBER:*	**2102**	
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.0**	**mbgl**	This report may only be reproduced in full		

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
0.0	2			SILT: low plasticity, brown, moist, with minor fine sand (TOPSOIL)											
	1														
	2														
	2														
	2														
0.5	3			Sandy SILT: low plasticity, grey, moist, sand is fine											
	2														
	2														
	2														
	1	▽													
1.0	1			at 1.0m: becomes wet											
	2														
	3			at 1.2m: becomes saturated											
	3														
	3														
1.5	2			Silty SAND: fine to medium, grey, saturated		DIST. SAMPLE				-	58%	42%			
	2														
	5			at 1.8m: with minor fine to medium gravel											
2.0	11			**EOH (Practical Refusal on Gravel)**											
2.5															

LEGEND

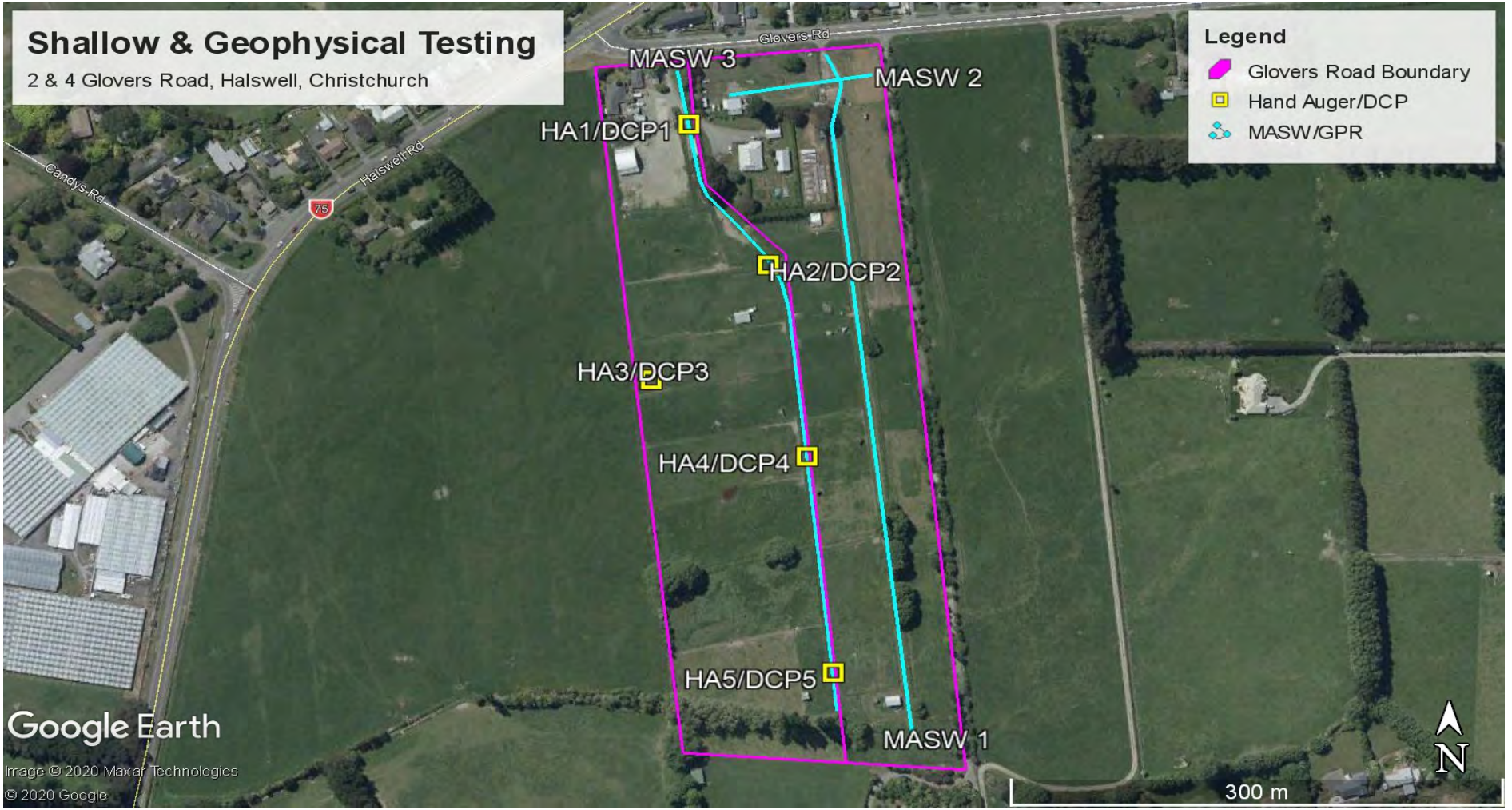
ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	HA	HAND AUGER	LL	LIQUID LIMIT	Gr	GRAVEL
GWL	GROUNDWATER LEVEL	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	Sa	SAND
mbgl	METERS BELOW GROUND LEVEL	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
WC	WATER CONTENT	UW	UNIT WEIGHT (kN/m^3)	NE	NOT ENCOUNTERED	▽	STANDING GWL

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**
SITE INVESTIGATION PLAN	**2 & 4 Glovers Road, Halswell, Christchurch**	



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TEST REPORT

Lab Job No: 8378-032

Your ref.: -

Date of Issue: 14/09/2020

Date of Re-Issue: -

Page: 1 of 8

Test Report

C20-450

PROJECT:	2 Glovers Road – Laboratory Testing
CLIENT:	Miyamoto International NZ Ltd, 518 Colombo Street, Christchurch, 8011
ATTENTION:	Clem Gibbens
INSTRUCTIONS:	Determination of Particle-Size Distribution-Wet Sieving method Determination of the Liquid & Plastic Limits, Plasticity Index and Water Content Determination of the Water Content of Soils
TEST METHOD:	NZS 4402:1986 Test 2.8.1 NZS 4402:1986 Tests 2.2, 2.3, 2.4 NZS 4402:1986 Test 2.1
SAMPLING METHOD:	Client - SNA
TEST RESULTS:	As per Laboratory sheets attached

Jeremy Brokenshire
Laboratory Technician

Nick van Warmerdam
Approved Signatory

ACCREDITED
IANZ
TESTING LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

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Middleton, Christchurch
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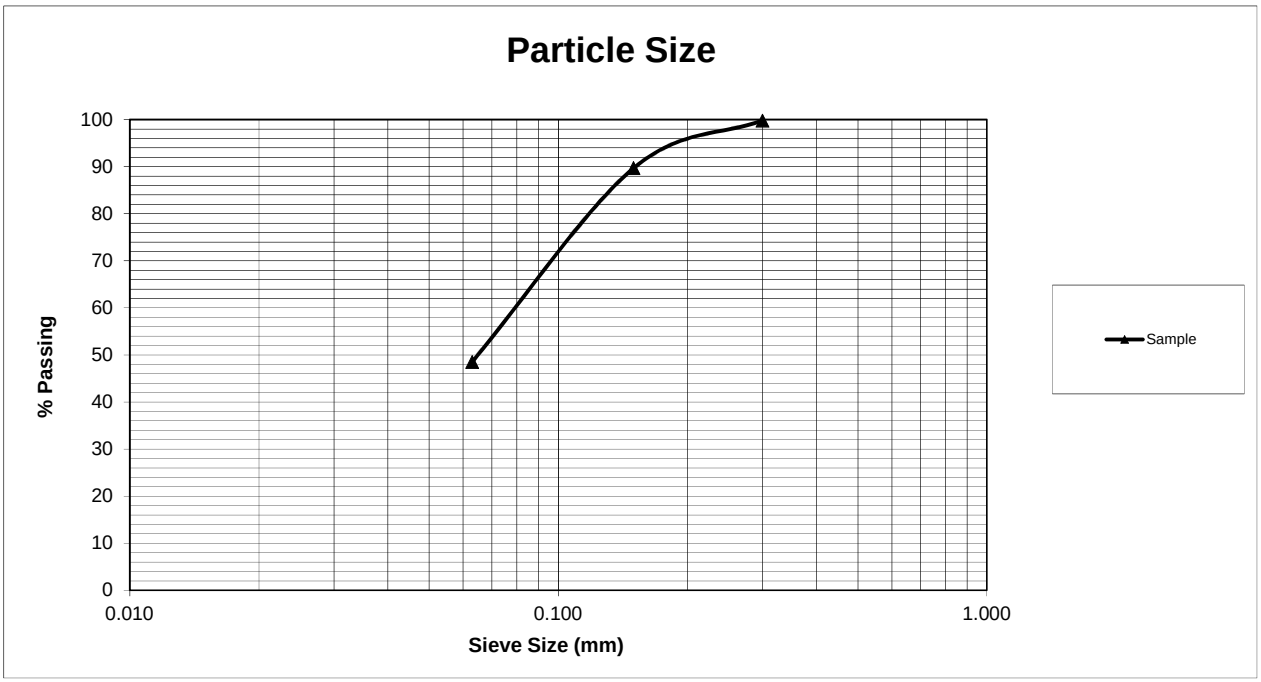
DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - GRAPH

NZS 4402: 1986 Test 2.8.1, 2.8.2

Lab Job No:	8378-032	**Sample No:**	C20-319
Client:	Miyamoto International NZ Ltd	**Tested By:**	D.P
Location:	2 Glovers Road HA01 (1.5-2.3m)	**Date:** **Checked By:**	9/09/2020 J.B
Date Received:	8/09/2020	**Date:**	14/09/2020
Report No:	C20-450	**Page:**	2 of 8
REF:	-		
Sampling Method: **Date Sampled:**	Sampled by client - SNA 4/09/2020	**Sampled By:**	Client
Test Details: **History:**	Wet sieving method Natural		
Description of Sample:	Silty SAND, brownish grey, wet, no plasticity		

	% Passing		
Sieve Size	**Max**	**Min**	**Sample**
0.300	-	-	100
0.150	-	-	90
0.063	-	-	49



The percentage passing the finest sieve was obtained by difference.

N. van Warmerdam
Approved Signatory

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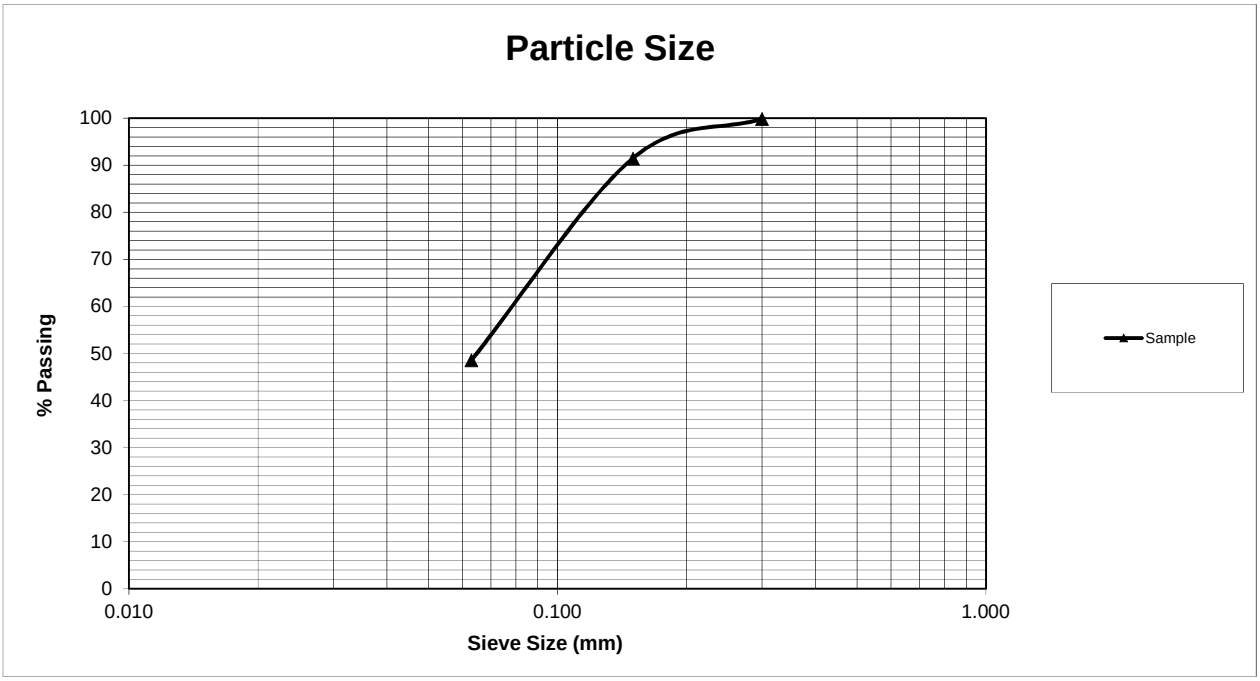
DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - GRAPH

NZS 4402: 1986 Test 2.8.1, 2.8.2

Lab Job No:	8378-032	**Sample No:**	C20-320
Client:	Miyamoto International NZ Ltd	**Tested By:**	D.P
Location:	2 Glovers Road HA01 (2.3-3.8m)	**Date:** **Checked By:**	9/09/2020 J.B
Date Received:	8/09/2020	**Date:**	14/09/2020
Report No:	C20-450	**Page:**	3 of 8
REF:	-		
Sampling Method:	Sampled by client - SNA	**Sampled By:**	Client
Date Sampled:	4/09/2020		
Test Details:	Wet sieving method		
History:	Natural		
Description of Sample:	Silty SAND, brownish grey, saturated, no plasticity		

	% Passing		
Sieve Size	**Max**	**Min**	**Sample**
0.300	-	-	100
0.150	-	-	91
0.063	-	-	49



The percentage passing the finest sieve was obtained by difference.

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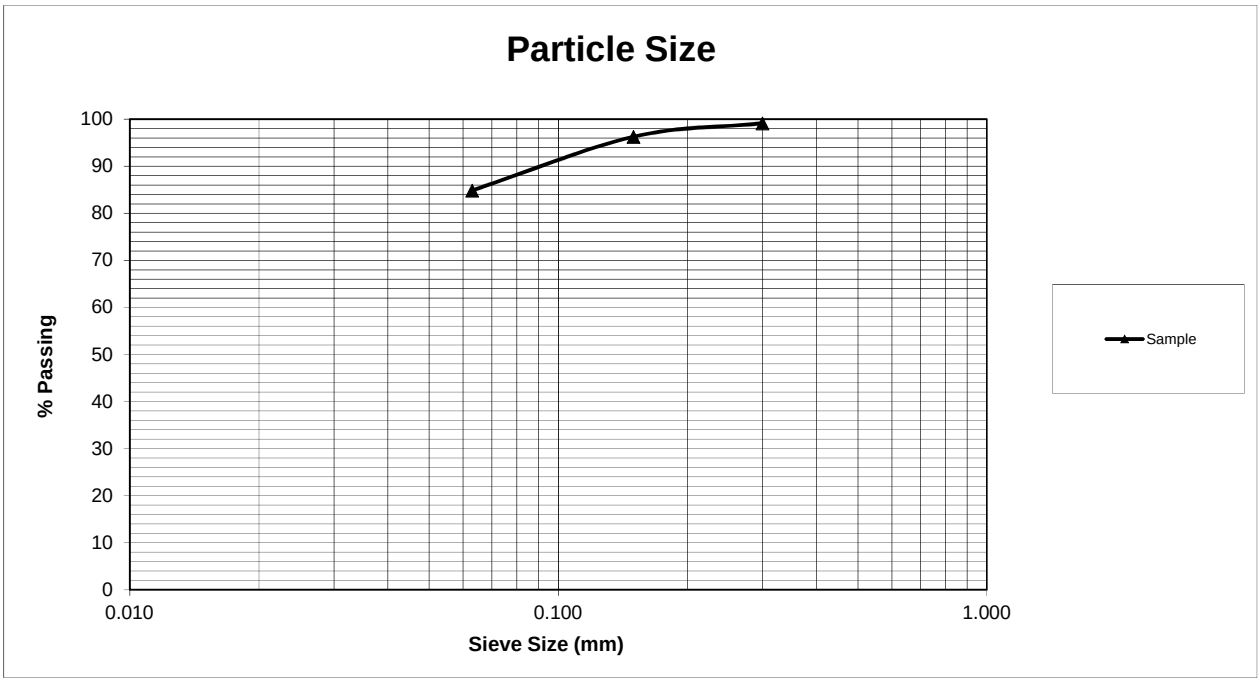
DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - GRAPH

NZS 4402: 1986 Test 2.8.1, 2.8.2

Lab Job No:	8378-032	**Sample No:**	C20-321
Client:	Miyamoto International NZ Ltd	**Tested By:**	D.P
Location:	2 Glovers Road HA02 (2.7-4.0m)	**Date:** **Checked By:**	9/09/2020 J.B
Date Received:	8/09/2020	**Date:**	14/09/2020
Report No:	C20-450	**Page:**	4 of 8
REF:	-		
Sampling Method:	Sampled by client - SNA	**Sampled By:**	Client
Date Sampled:	4/09/2020		
Test Details:	Wet sieving method		
History:	Natural		
Description of Sample:	Silty CLAY, some sand, dark grey saturated, low plasticity		

	% Passing		
Sieve Size	**Max**	**Min**	**Sample**
0.300	-	-	99
0.150	-	-	96
0.063	-	-	85



The percentage passing the finest sieve was obtained by difference.

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DETERMINATION OF THE LIQUID & PLASTIC LIMITS, PLASTICITY INDEX & WATER CONTENT

NZS 4402: 1986 Test 2.2, 2.3, 2.4

Lab Job No:	8378-032	**Sample No.:**	C20-321
Client:	Miyamoto International NZ Ltd	**Tested By:**	S.P.S
Location:	2 Glovers Road HA02 (2.7-4.0m)	**Date Tested:**	11/09/2020
		Checked By:	J.B
Date Received:	8/09/2020	**Date Checked:**	14/09/2020
Report No:	C20-450	**Page:**	5 of 8
REF:	-		
Sampling Method:	Sampled by client - SNA	**Sampled By:**	Client
Date Sampled:	4/09/2020		

Test Details:

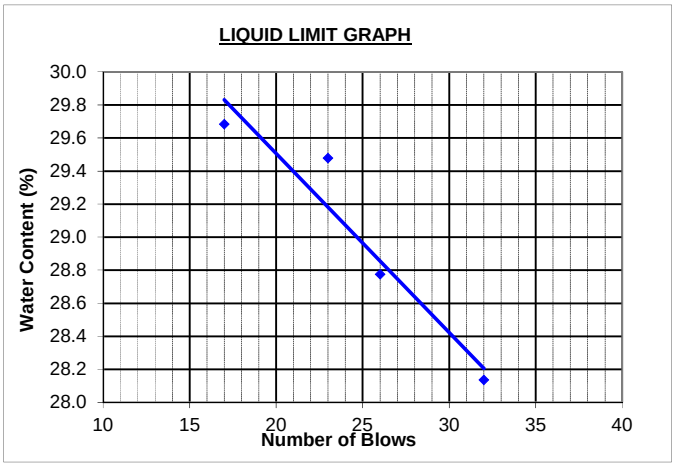
Test performed on: Fraction passing 425mm sieve

Sample history: Natural state

Description of Sample: Silty CLAY, some sand, dark grey saturated, low plasticity

	Liquid Limit				Plastic Limit	
No. of blows	17	23	26	32		
Water content (%)	29.7	29.5	28.8	28.1	20.0	19.2

NWC	**30.5**
Liquid Limit	**29**
Plastic Limit	**20**
Plasticity Index	**9**



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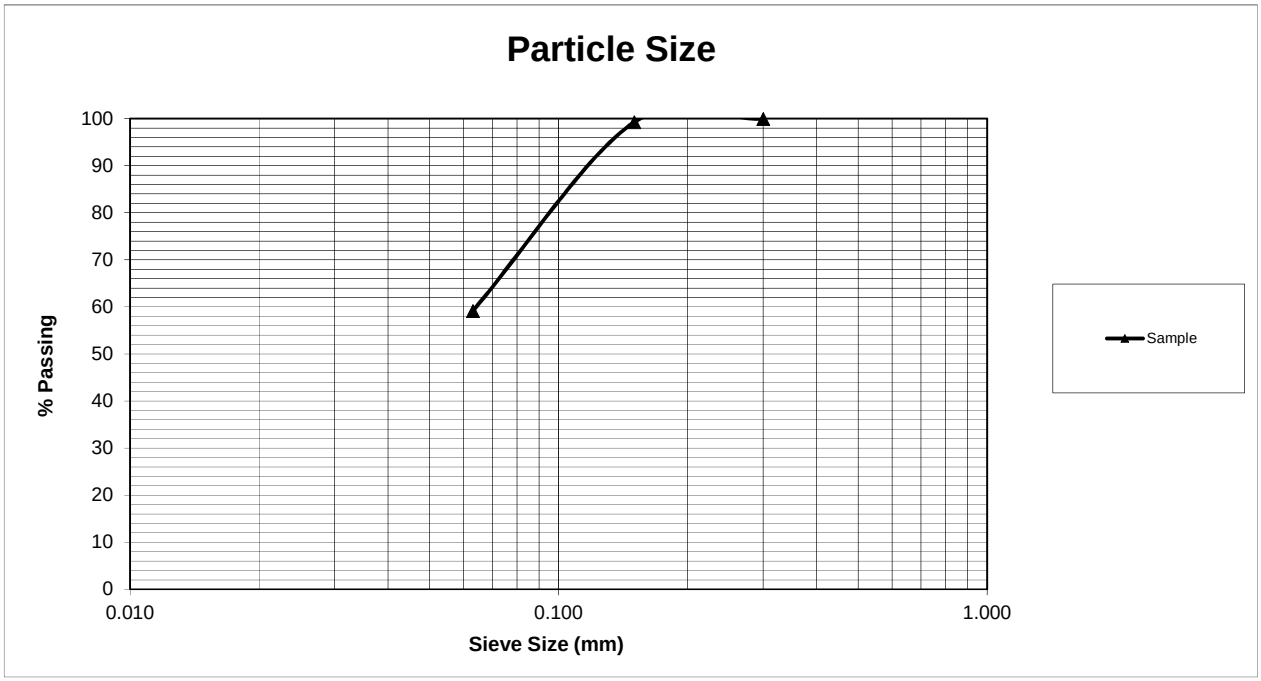
DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - GRAPH

NZS 4402: 1986 Test 2.8.1, 2.8.2

Lab Job No:	8378-032	**Sample No:**	C20-322
Client:	Miyamoto International NZ Ltd	**Tested By:**	D.P
Location:	2 Glovers Road HA03 (2.0-3.4m)	**Date:** **Checked By:**	9/09/2020 J.B
Date Received:	8/09/2020	**Date:**	14/09/2020
Report No:	C20-450	**Page:**	6 of 8
REF:	-		
Sampling Method:	Sampled by client - SNA	**Sampled By:**	Client
Date Sampled:	4/09/2020		
Test Details:	Wet sieving method		
History:	Natural		
Description of Sample:	Sandy SILT, dark grey, saturated, no plasticity		

	% Passing		
Sieve Size	**Max**	**Min**	**Sample**
0.300	-	-	100
0.150	-	-	99
0.063	-	-	59



The percentage passing the finest sieve was obtained by difference.

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DETERMINATION OF THE LIQUID & PLASTIC LIMITS, PLASTICITY INDEX & WATER CONTENT

NZS 4402: 1986 Test 2.2, 2.3, 2.4

Lab Job No:	8378-032	**Sample No.:**	C20-322
Client:	Miyamoto International NZ Ltd	**Tested By:**	S.P.S
Location:	2 Glovers Road	**Date Tested:**	11/09/2020
	HA03 (2.0-3.4m)	**Checked By:**	J.B
Date Received:	8/09/2020	**Date Checked:**	14/09/2020
Report No:	C20-450	**Page:**	7 of 8
REF:	-		
Sampling Method:	Sampled by client - SNA	**Sampled By:**	Client
Date Sampled:	4/09/2020		

Test Details:

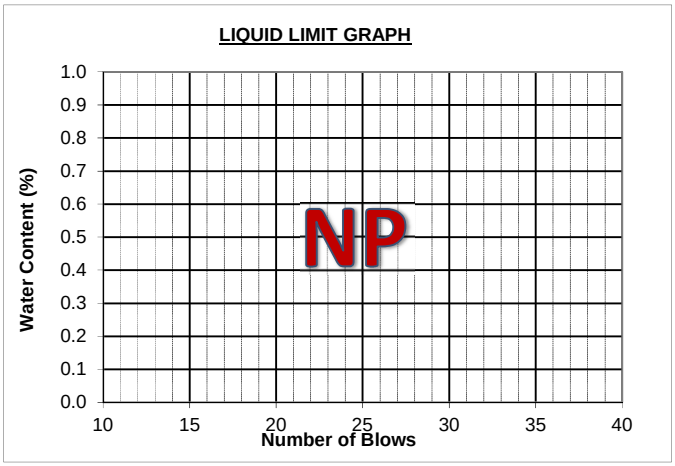
Test performed on: Fraction passing 425mm sieve

Sample history: Natural state

Description of Sample: Sandy SILT, dark grey, saturated, no plasticity

	Liquid Limit	Plastic Limit
No. of blows	NP	NP
Water content (%)		

NWC	28.9
Liquid Limit	-
Plastic Limit	-
Plasticity Index	-



Unable to obtain Liquid Limit or Plastic Limit.

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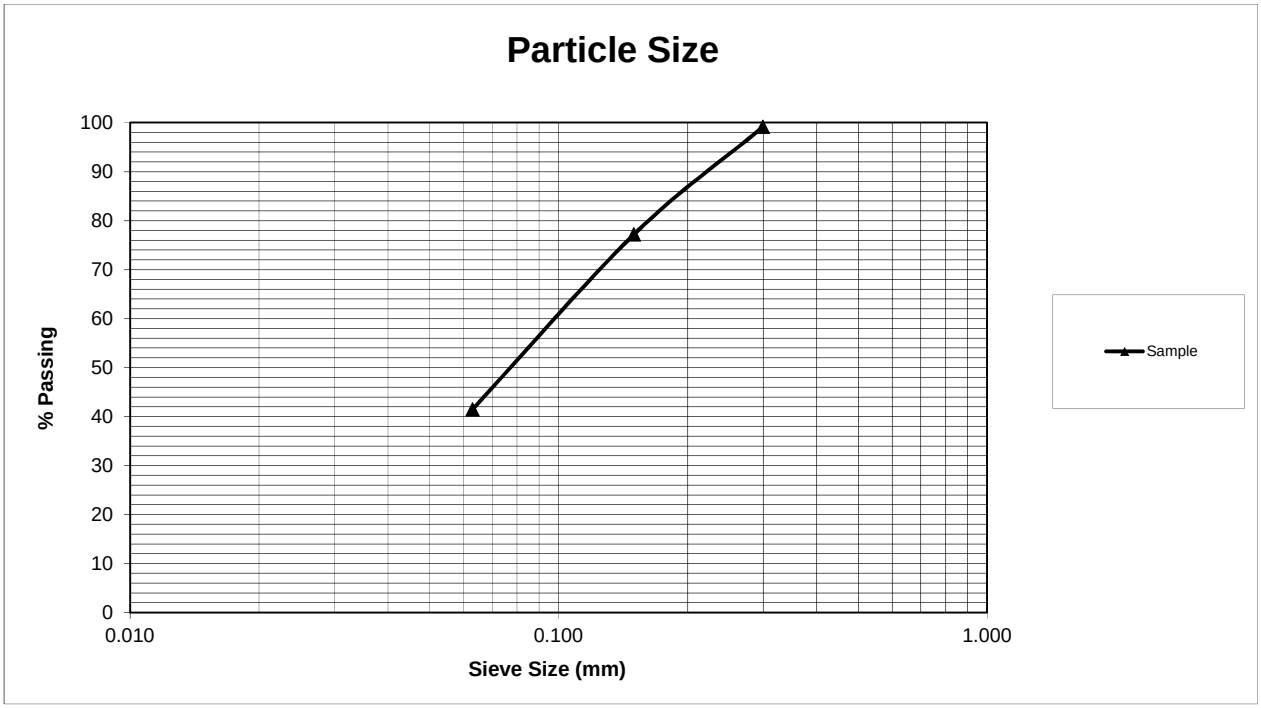
DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - GRAPH

NZS 4402: 1986 Test 2.8.1, 2.8.2

Lab Job No:	8378-032	**Sample No:**	C20-323
Client:	Miyamoto International NZ Ltd	**Tested By:**	D.P
Location:	2 Glovers Road HA05 (1.5-1.8m)	**Date:** **Checked By:**	9/09/2020 J.B
Date Received:	8/09/2020	**Date:**	14/09/2020
Report No:	C20-450	**Page:**	8 of 8
REF:	-		
Sampling Method:	Sampled by client - SNA	**Sampled By:**	Client
Date Sampled:	4/09/2020		
Test Details:	Wet sieving method		
History:	Natural		

Description of Sample: Silty SAND, brownish grey, wet, no plasticity

	% Passing		
Sieve Size	**Max**	**Min**	**Sample**
0.300	-	-	99
0.150	-	-	77
0.063	-	-	42



The percentage passing the finest sieve was obtained by difference.

N. van Warmerdam
Approved Signatory

Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
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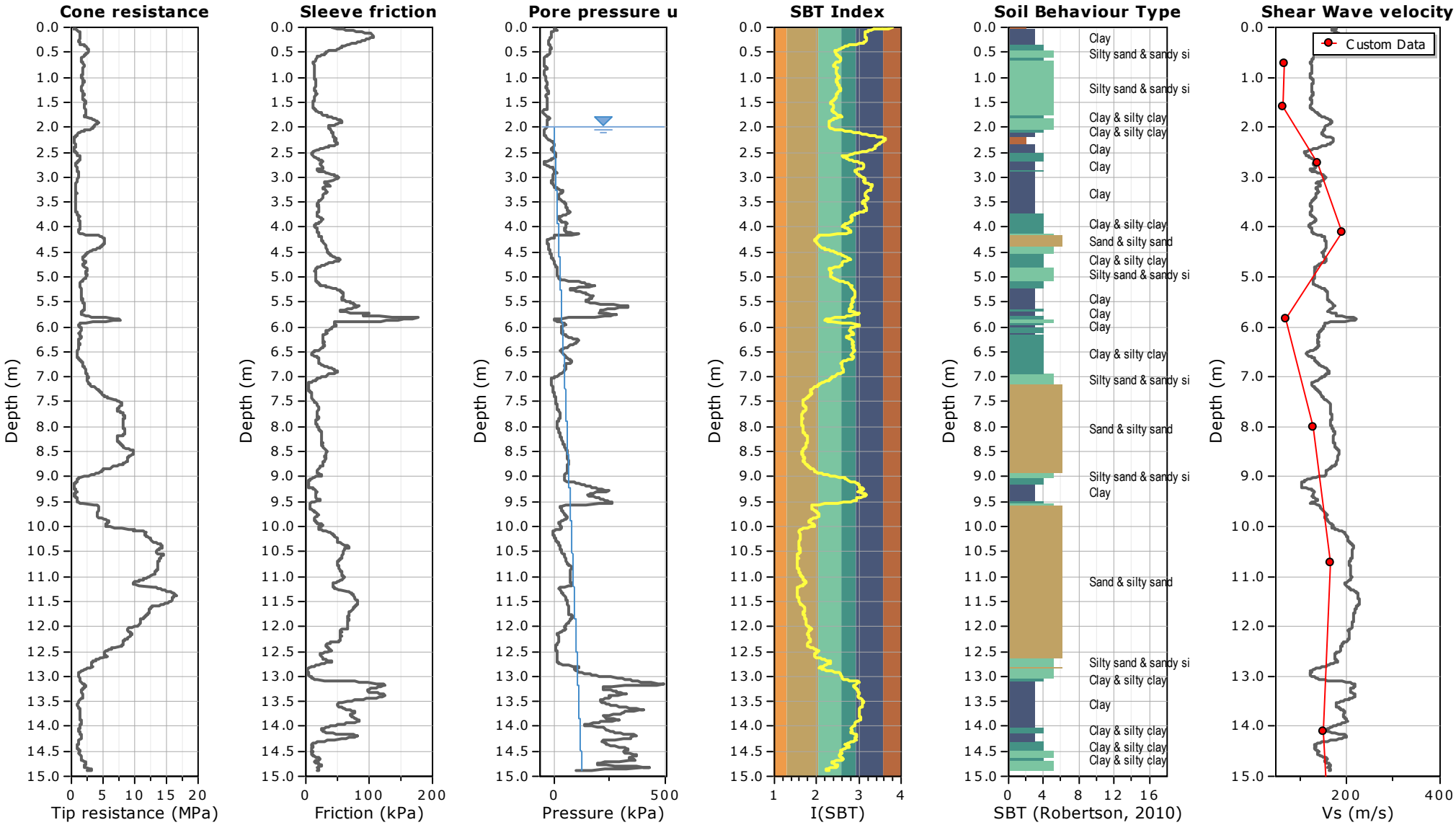
http://www.miyamoto.nz

CPT: CPTu001 Edited
Total depth: 14.89 m, Date: 7/10/2020
Surface Elevation: 12.90 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



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Christchurch Central, Christchurch
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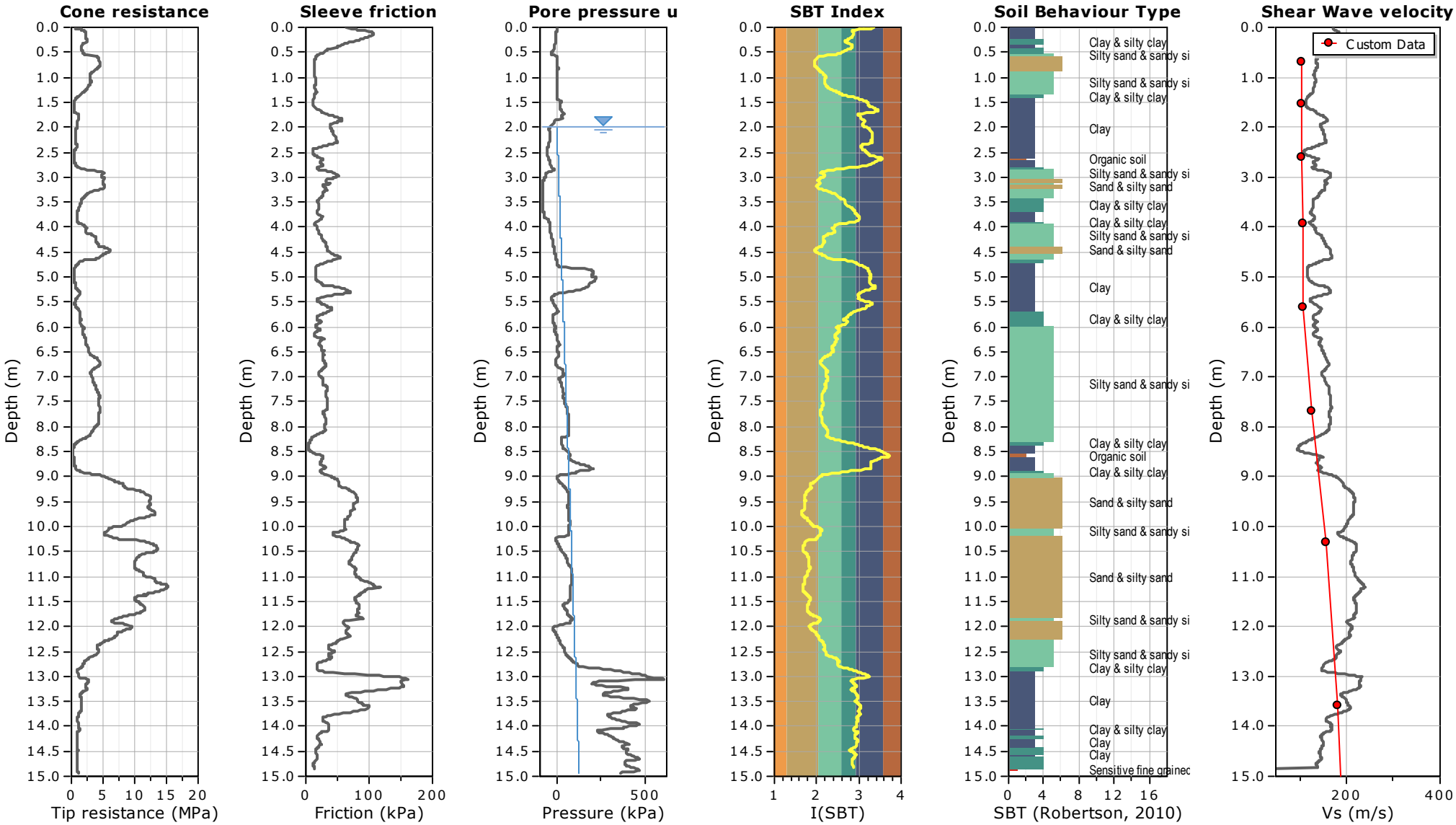
CPT: CPTu002
Total depth: 14.93 m, Date: 24/08/2020
Surface Elevation: 12.40 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



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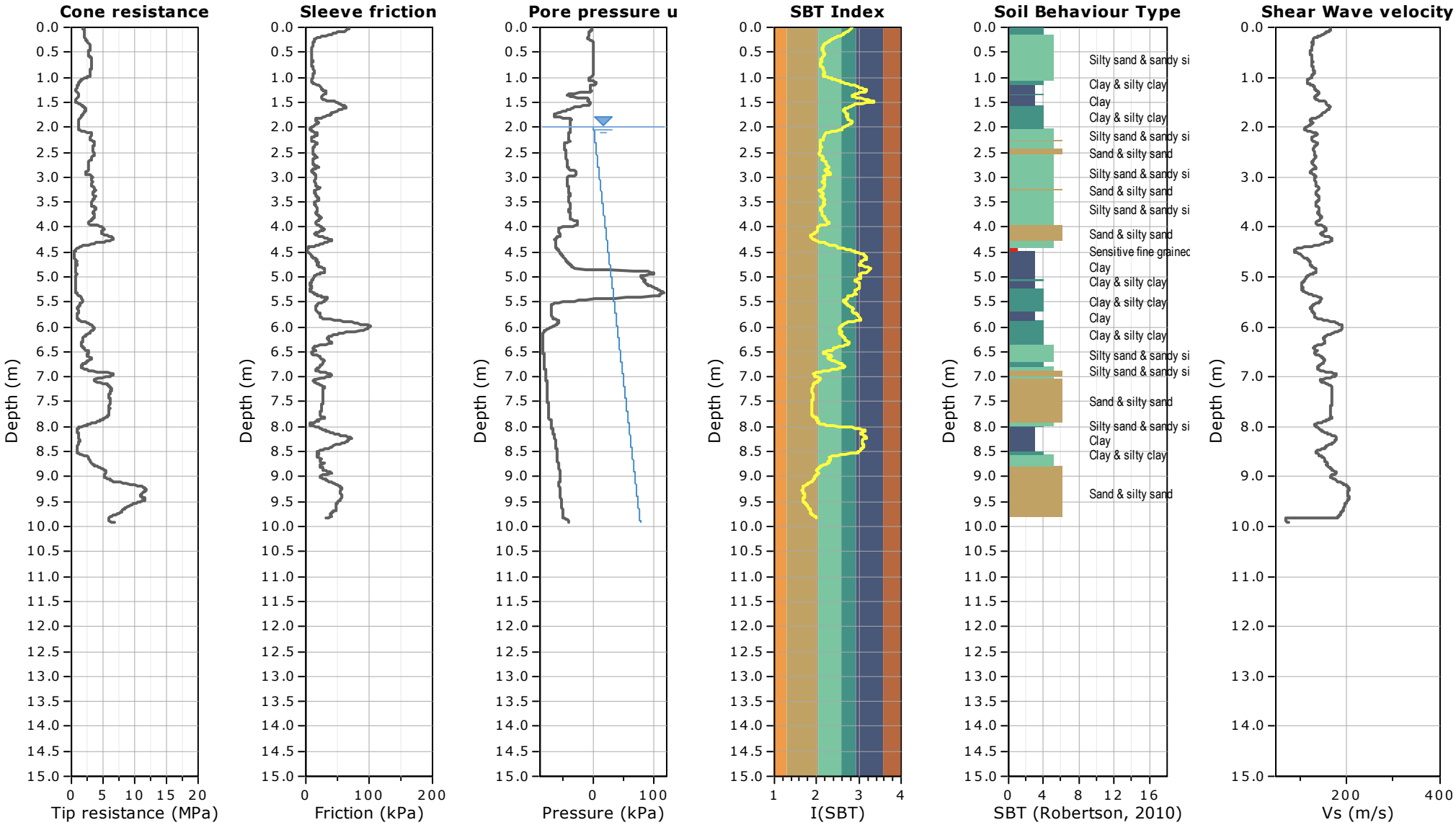
CPT: CPTu003
Total depth: 9.91 m, Date: 24/08/2020
Surface Elevation: 12.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
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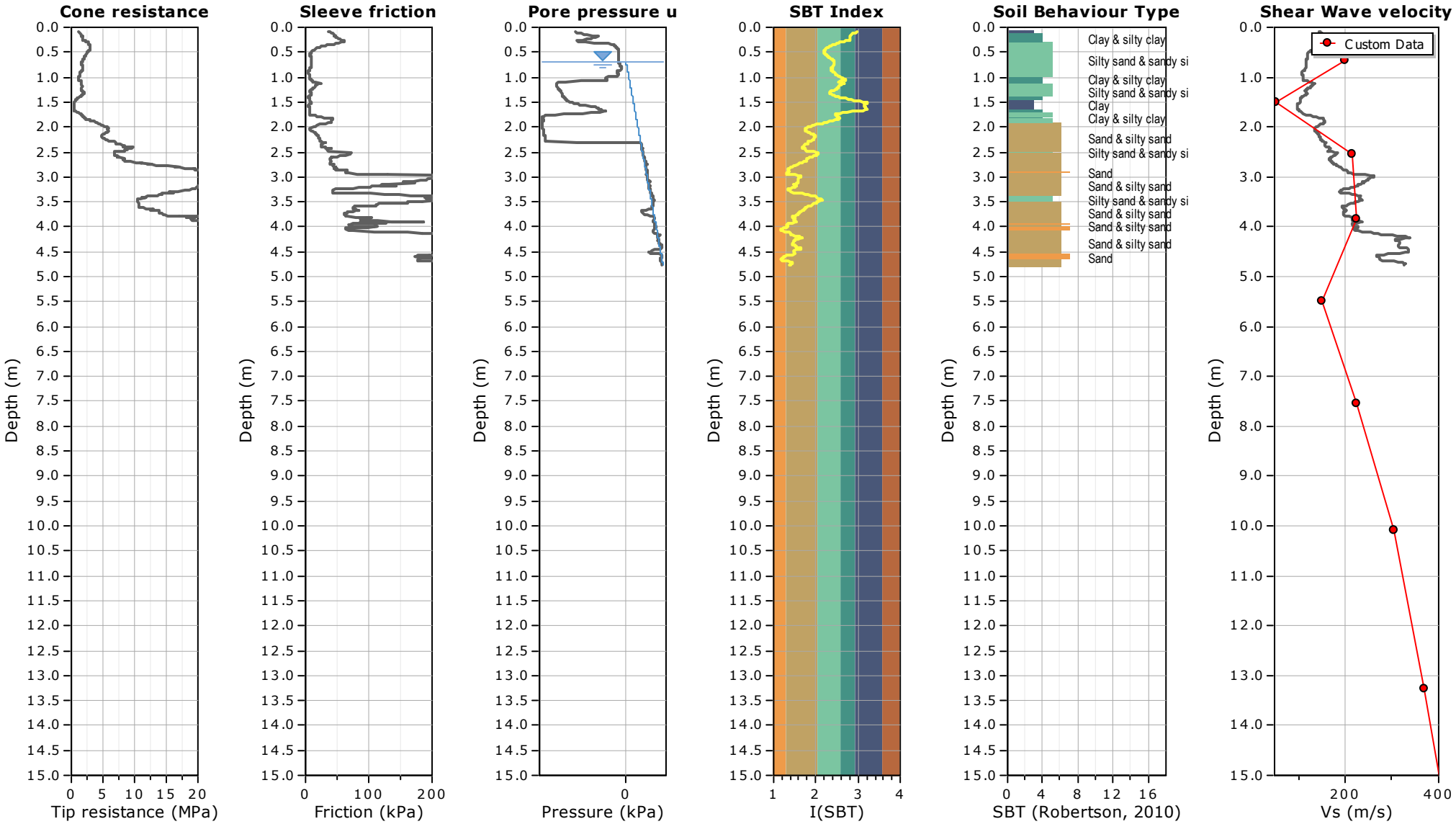
CPT: CPTu004
Total depth: 4.78 m, Date: 24/08/2020
Surface Elevation: 11.70 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



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Christchurch Central, Christchurch
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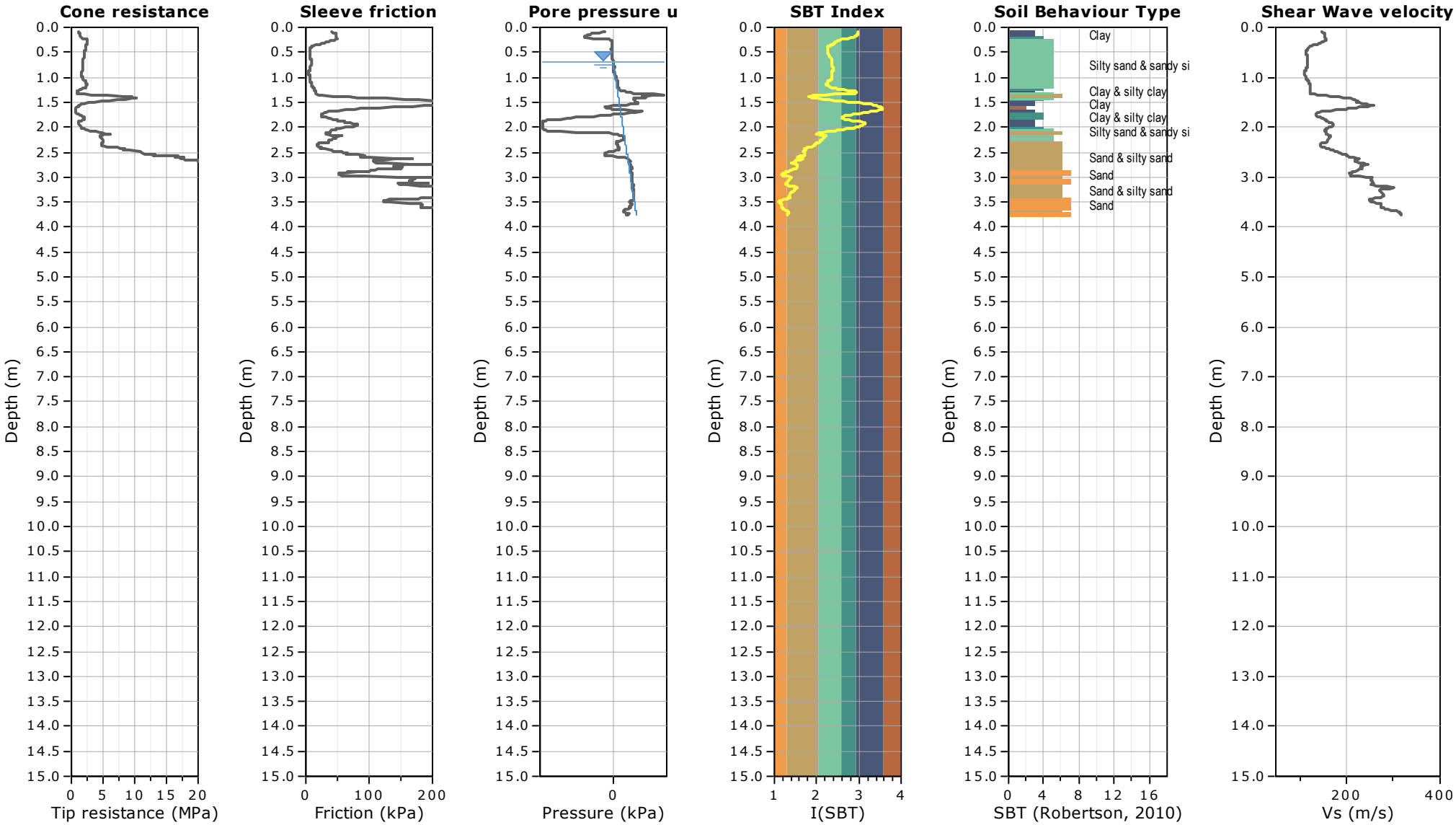
CPT: CPTu005
Total depth: 3.76 m, Date: 24/08/2020
Surface Elevation: 11.50 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
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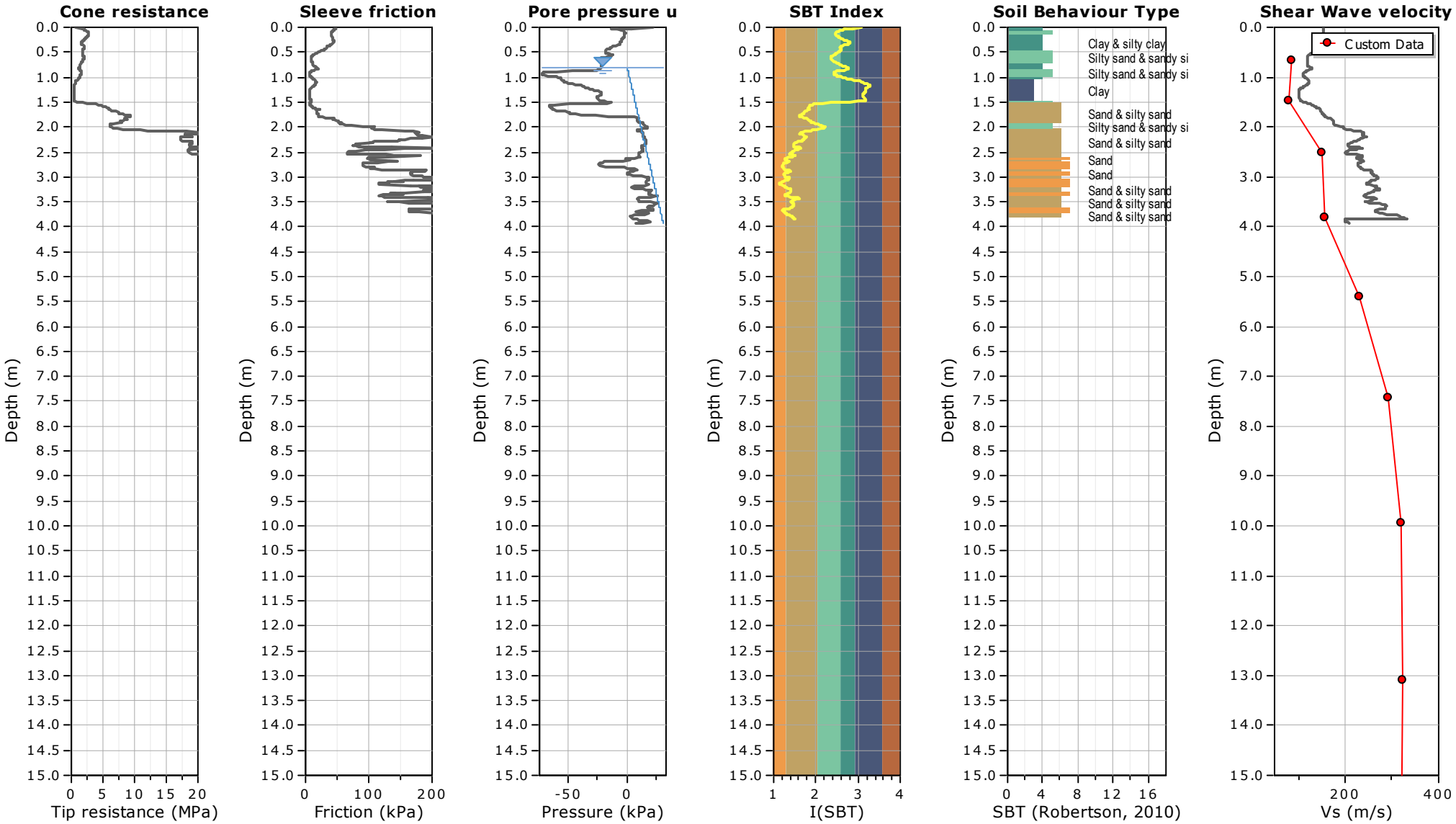
CPT: CPTu006
Total depth: 3.93 m, Date: 24/08/2020
Surface Elevation: 11.70 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



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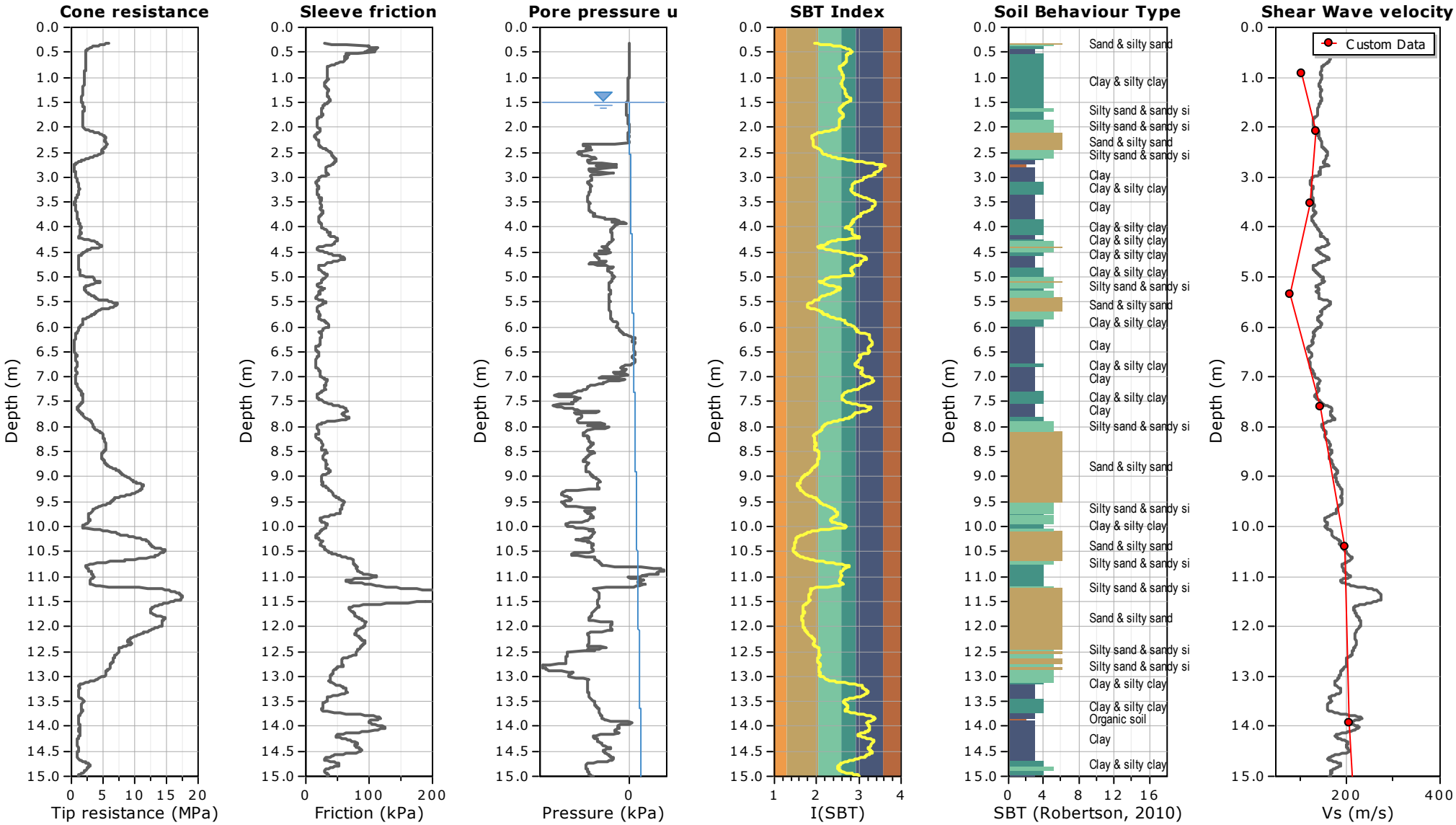
CPT: CPTu007
Total depth: 15.00 m, Date: 1/10/2020
Surface Elevation: 13.20 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
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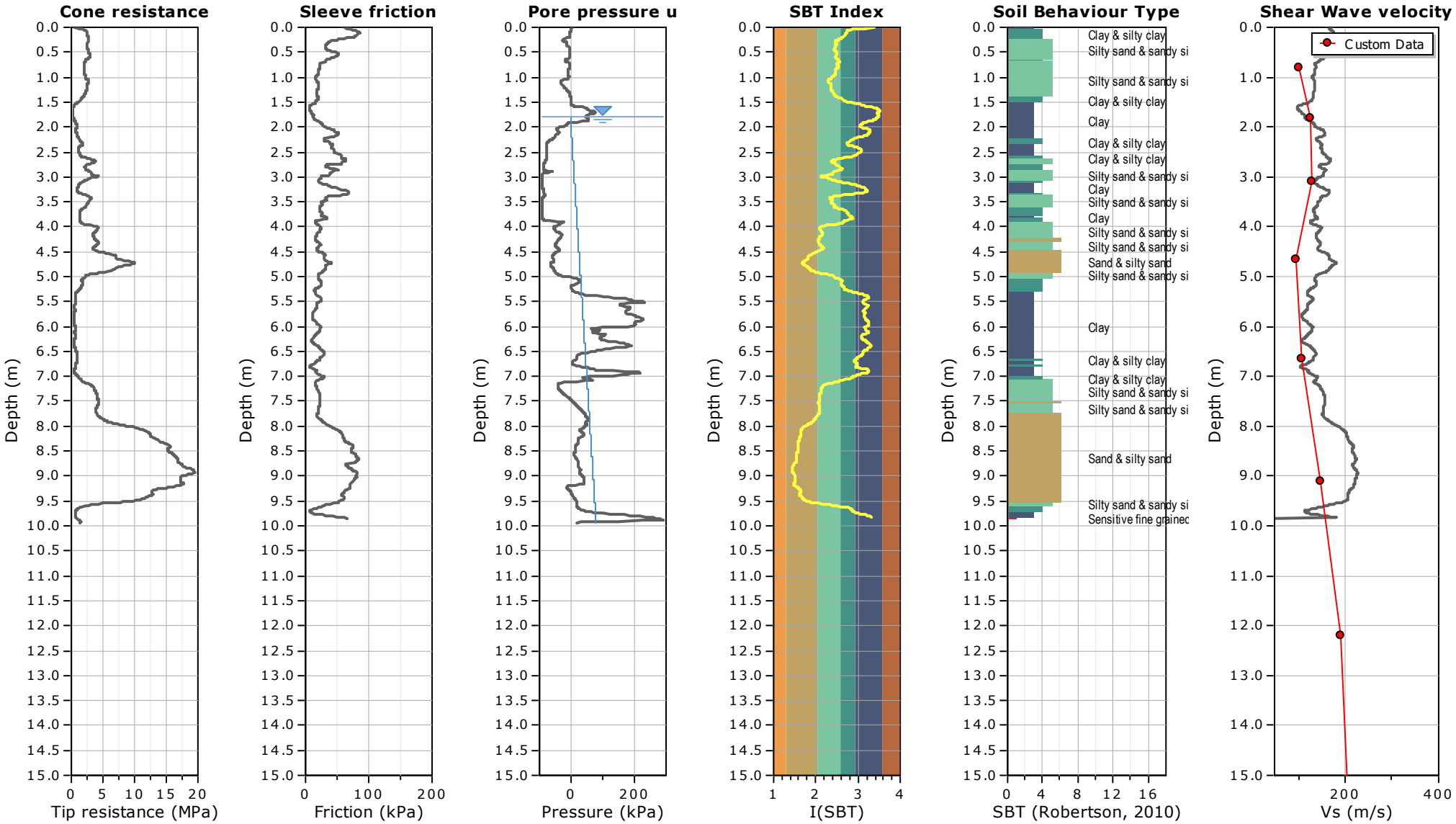
CPT: CPTu008
Total depth: 9.93 m, Date: 1/10/2020
Surface Elevation: 12.60 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
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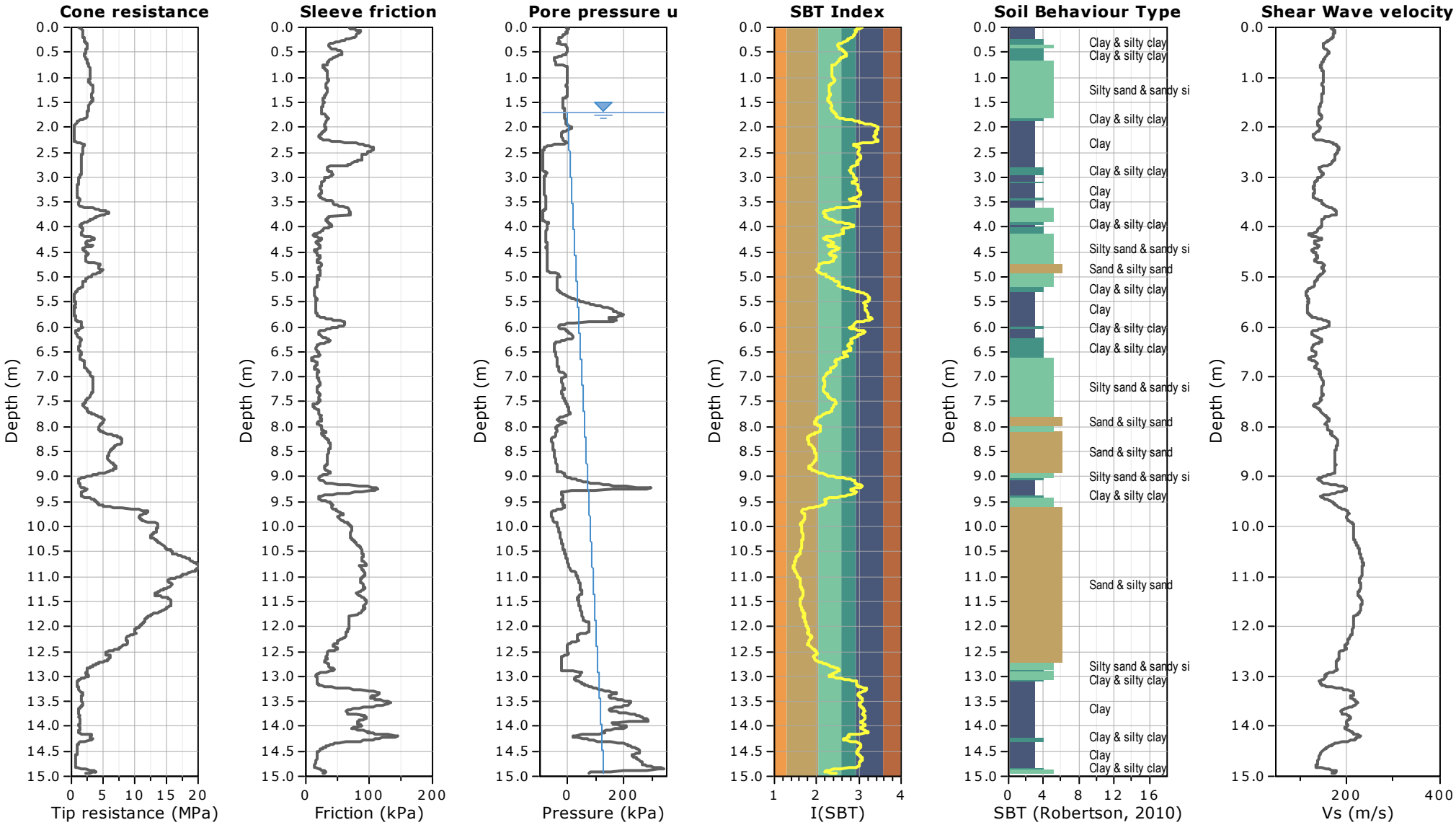
CPT: CPTu009
Total depth: 14.95 m, Date: 1/10/2020
Surface Elevation: 12.80 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



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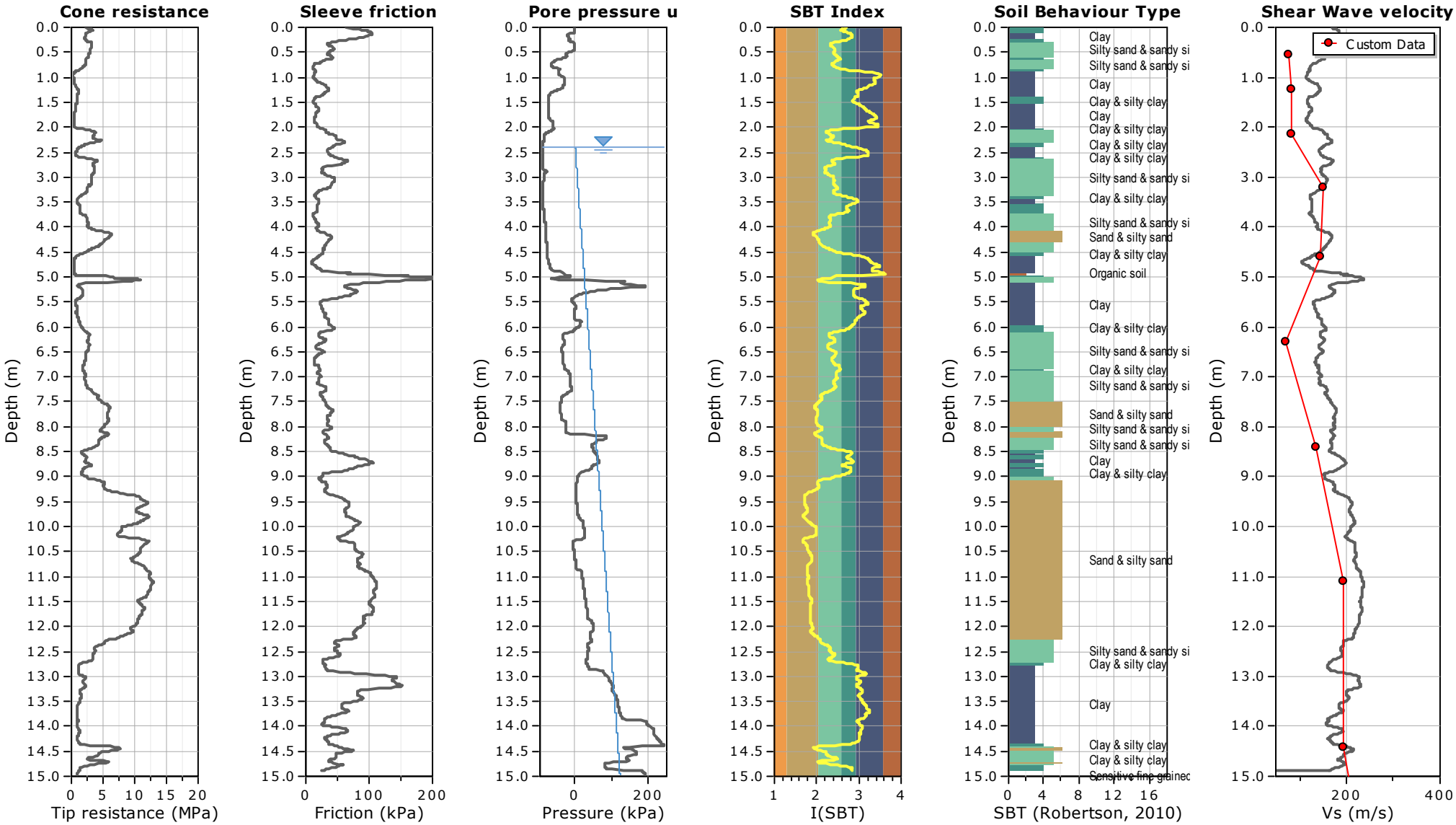
CPT: CPTu010
Total depth: 14.97 m, Date: 1/10/2020
Surface Elevation: 12.30 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



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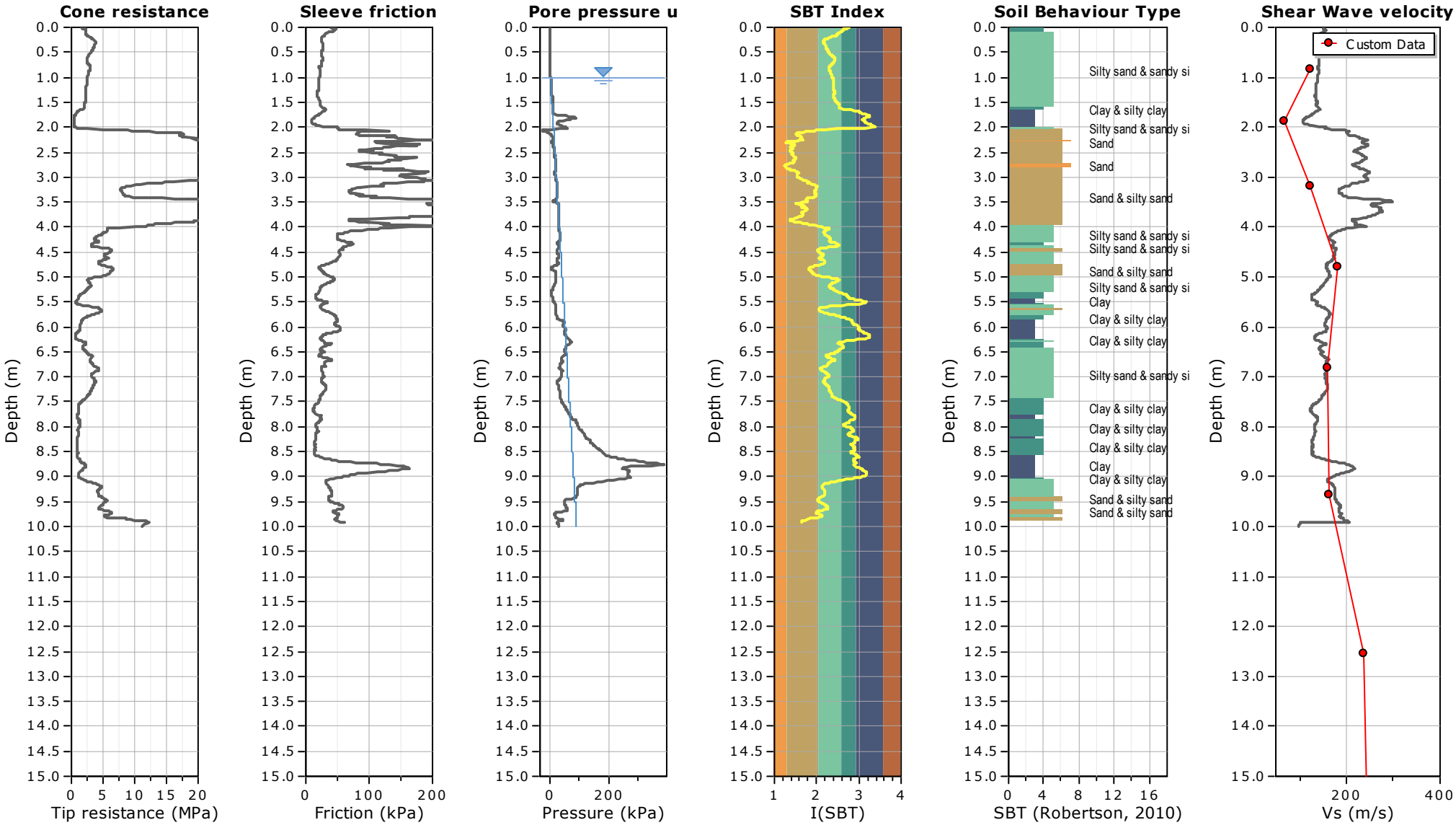
CPT: CPTu011
Total depth: 9.99 m, Date: 1/10/2020
Surface Elevation: 12.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
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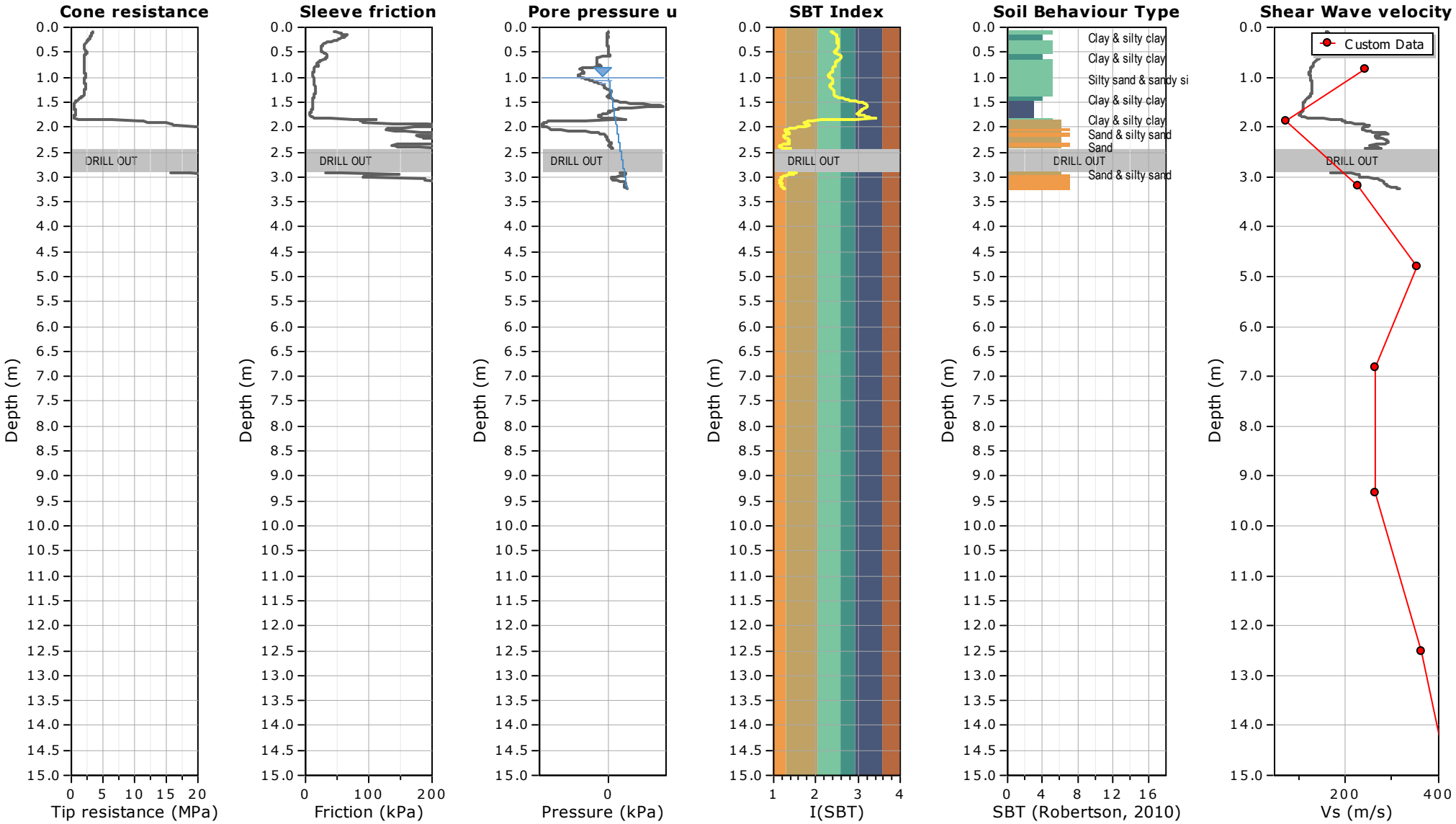
CPT: CPTu012
Total depth: 3.25 m, Date: 1/10/2020
Surface Elevation: 11.90 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



CONE PENETRATION TEST (CPT) REPORT

Client: Miyamoto International NZ

Location: 2 Glovers Road, Christchurch

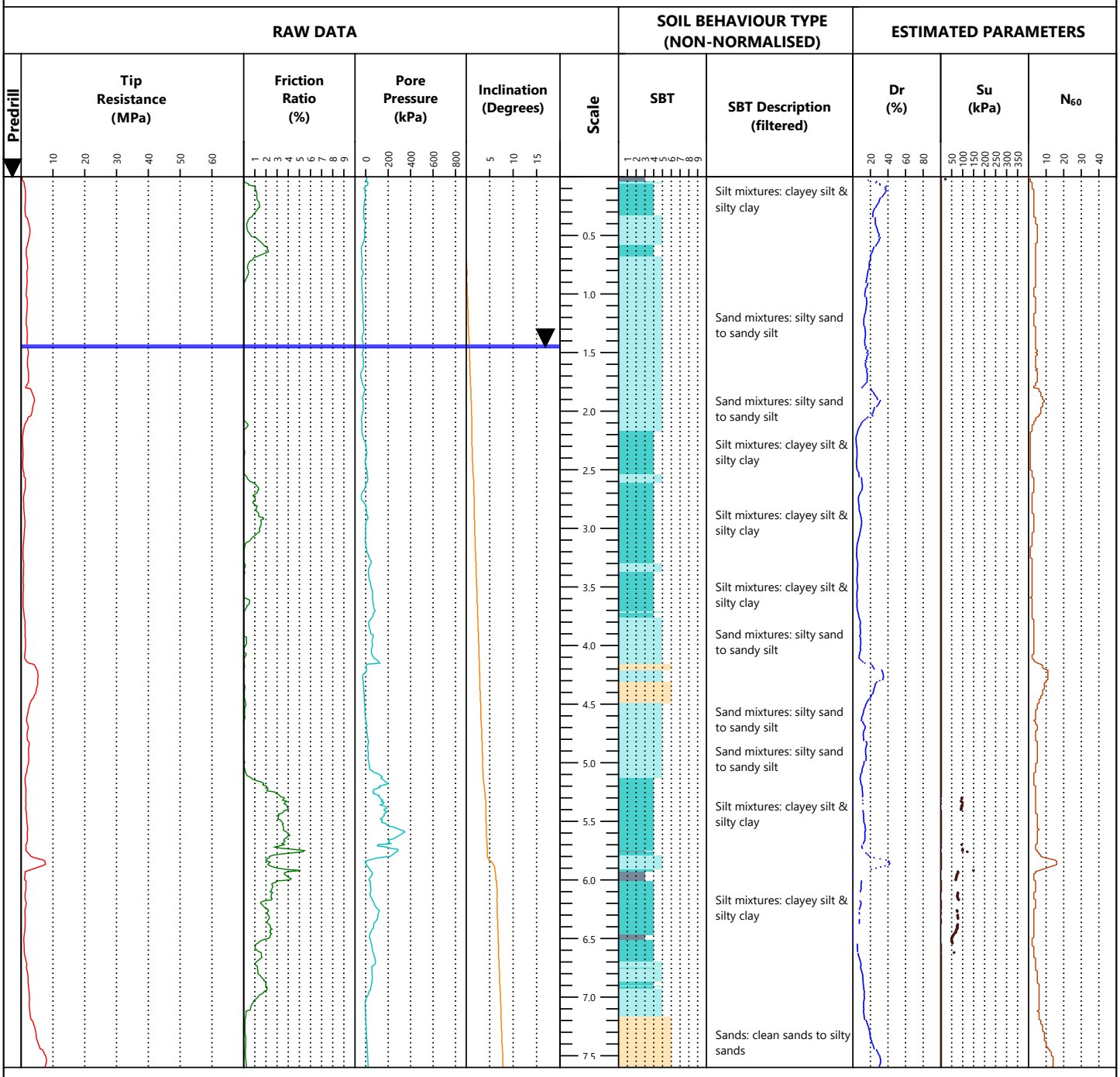
Printed: 20/08/2020

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu001
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 18/8/2020

Grid Reference: 1564920.46m E, 5173116.23m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS711
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.45m
Collapse: 1.60m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.4528	20.369
Local Friction	0.2535	0.2535
Pore Pressure	3.0597	3.0579

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

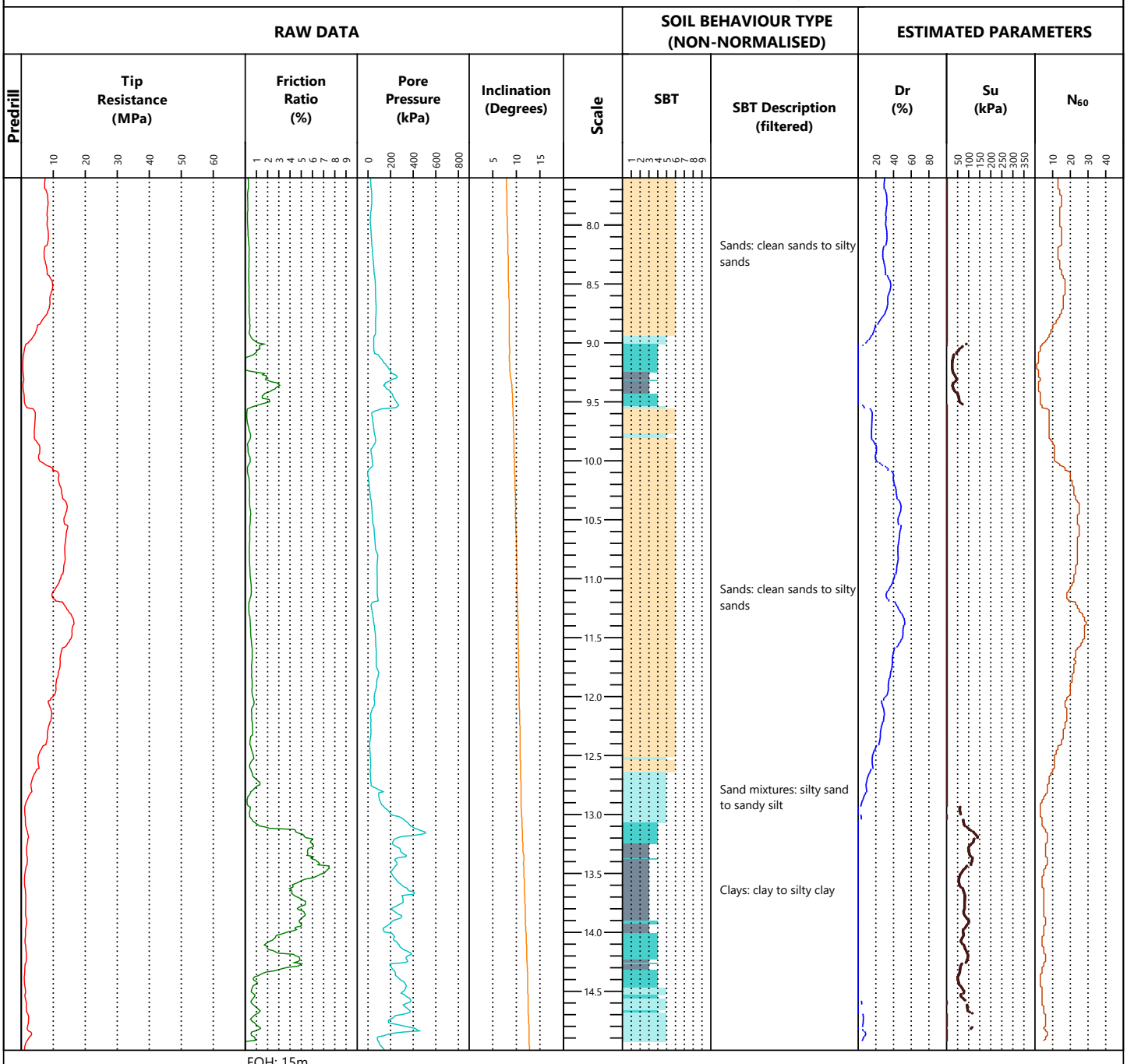
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu001
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 18/8/2020

Grid Reference: 1564920.46m E, 5173116.23m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



EOH: 15m

Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS711
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.45m
Collapse: 1.60m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.4528	20.369
Local Friction	0.2535	0.2535
Pore Pressure	3.0597	3.0579

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

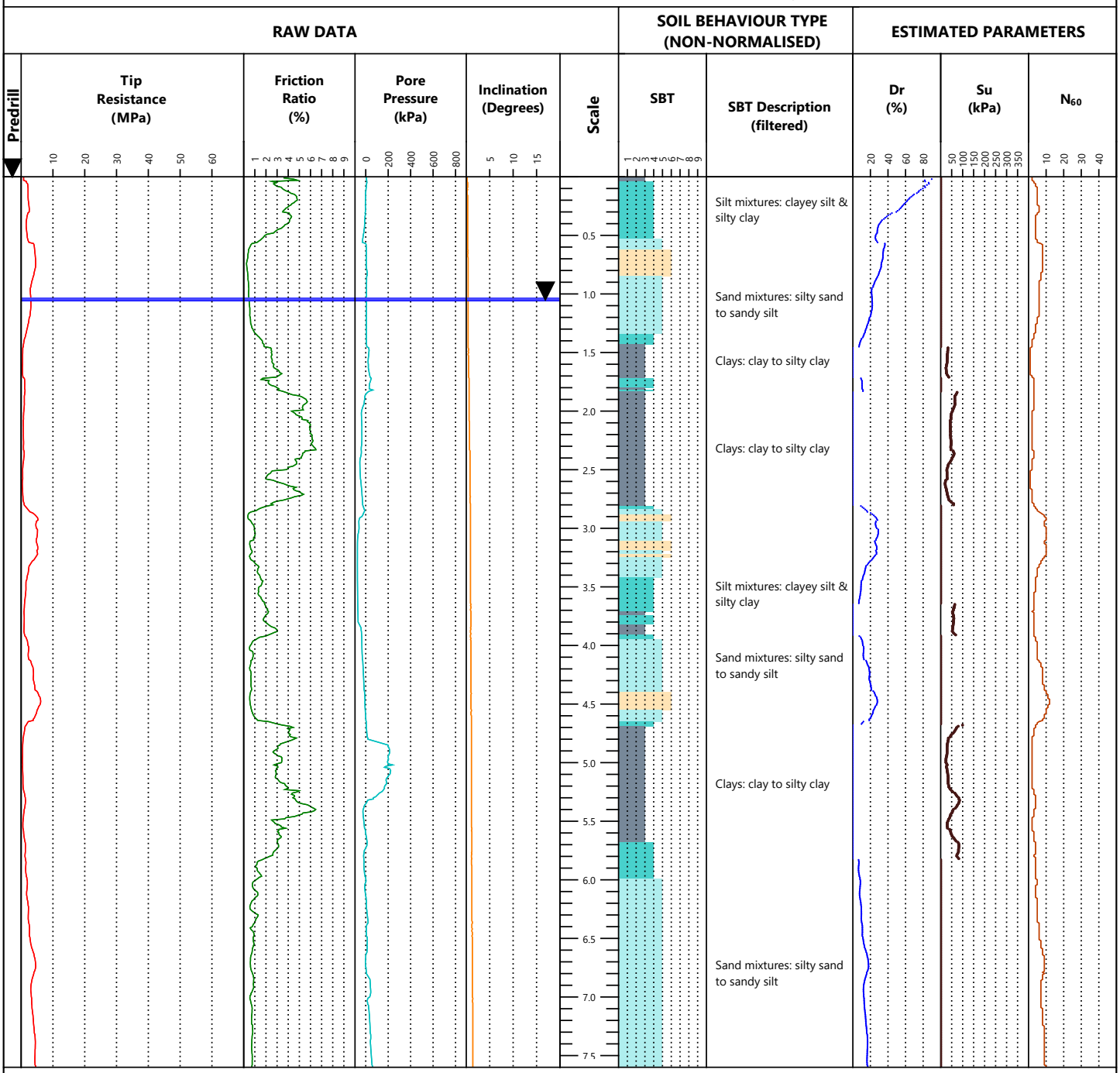
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu002
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 17/8/2020

Grid Reference: 1564969.32m E, 5173033.19m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS711
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.05m
Collapse: 2.45m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.4004	20.348
Local Friction	0.2537	0.2536
Pore Pressure	3.0612	3.0605

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

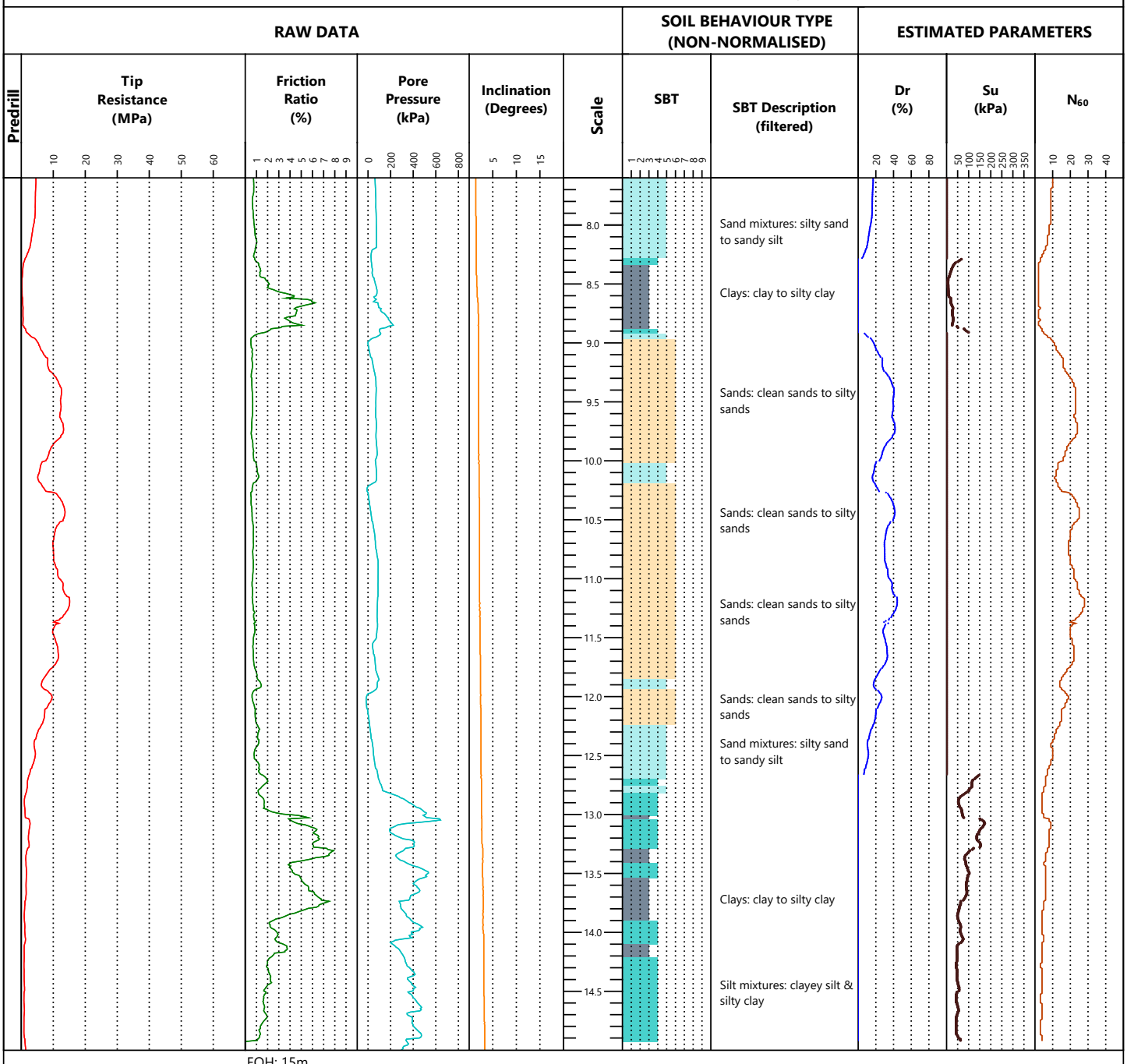
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu002
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 17/8/2020

Grid Reference: 1564969.32m E, 5173033.19m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



EOH: 15m

Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS711
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.05m
Collapse: 2.45m

Termination
Target Depth: ✓

Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.4004	20.348
Local Friction	0.2537	0.2536
Pore Pressure	3.0612	3.0605

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

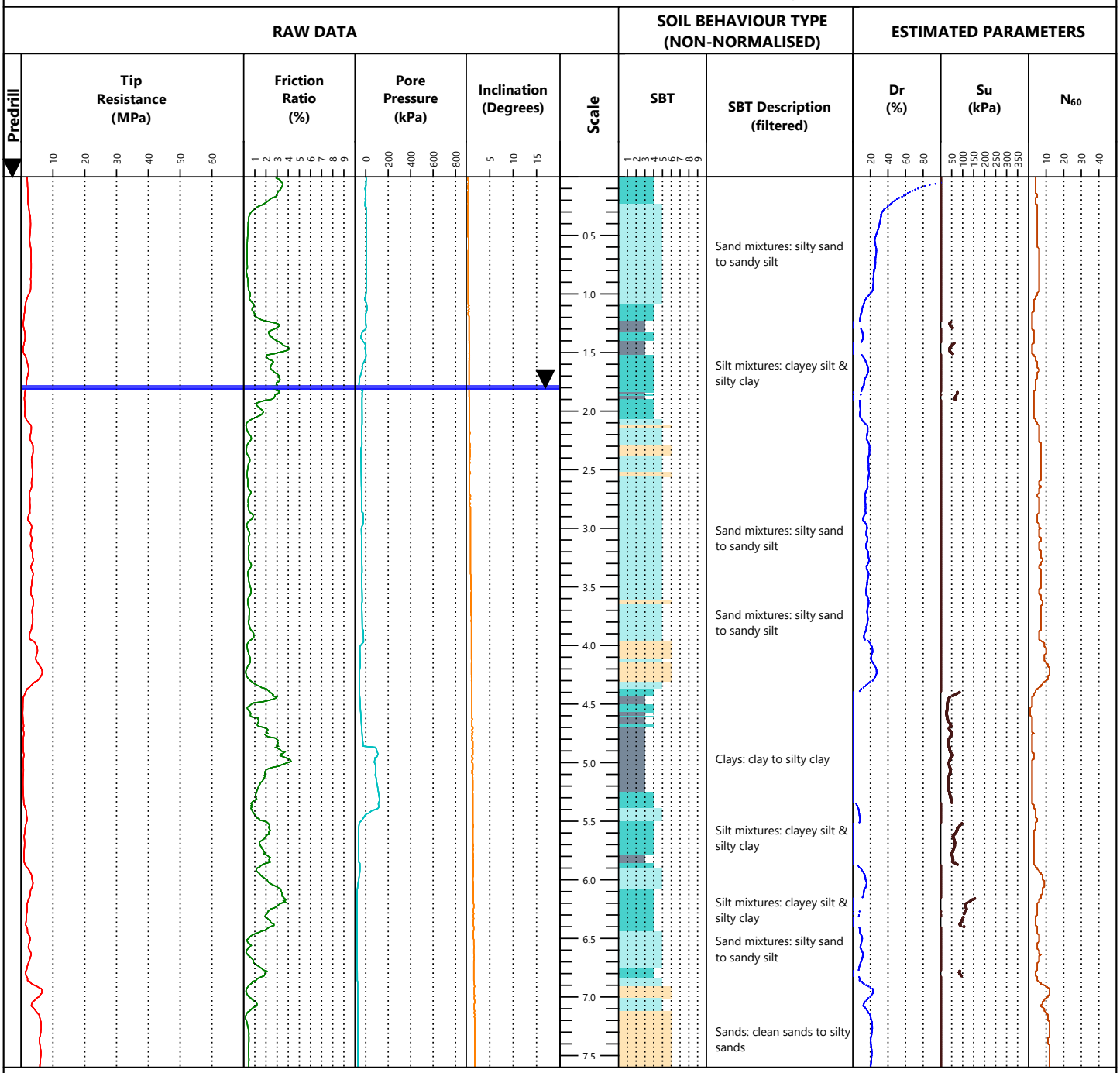
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

McMILLAN Drilling
LandTest

Client: Miyamoto International NZ	**Bore No.:** CPTu003
Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch
Date: 13/8/2020
Grid Reference: 1564902m E, 5172941.77m N (NZTM) - Map or aerial photograph
Rig Operator: B. Wilson
Elevation: 0.00m
Datum: Ground
Equipment: Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.8m
Collapse: 2.70m

Termination
Target Depth: ✓

Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3554	11.3094
Local Friction	0.1187	0.1186
Pore Pressure	0.9596	0.9557

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

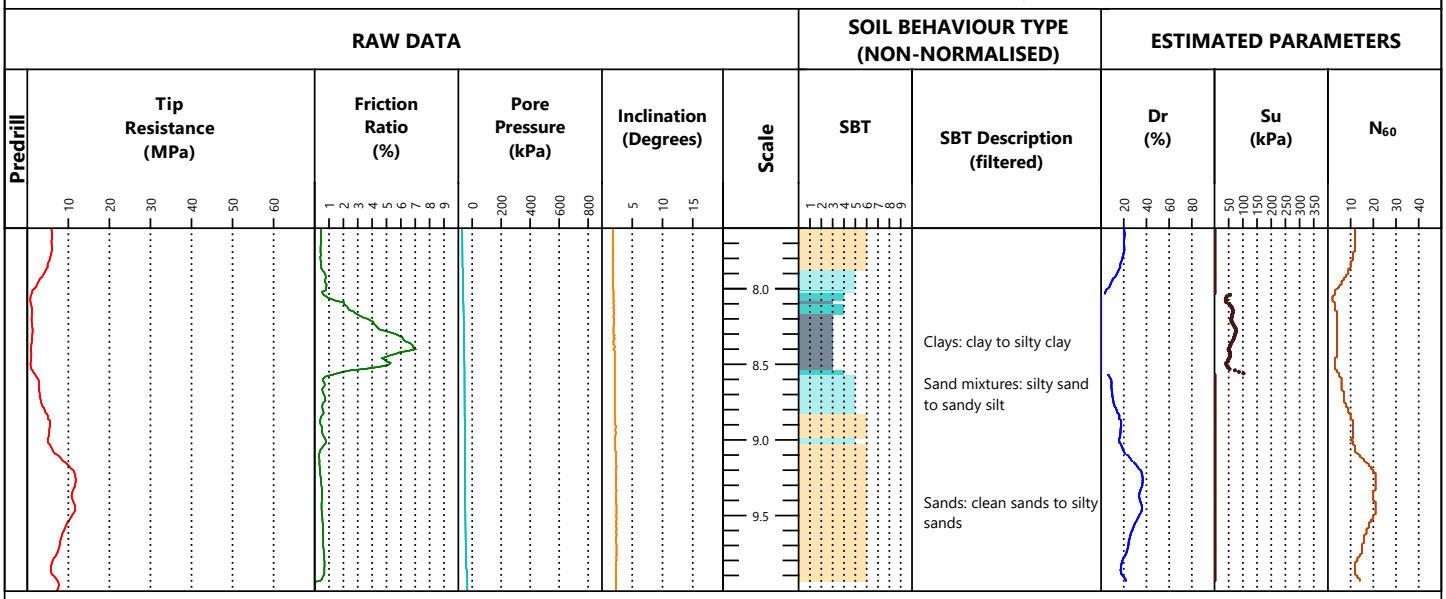
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu003
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 13/8/2020

Grid Reference: 1564902m E, 5172941.77m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.8m
Collapse: 2.70m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3554	11.3094
Local Friction	0.1187	0.1186
Pore Pressure	0.9596	0.9557

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

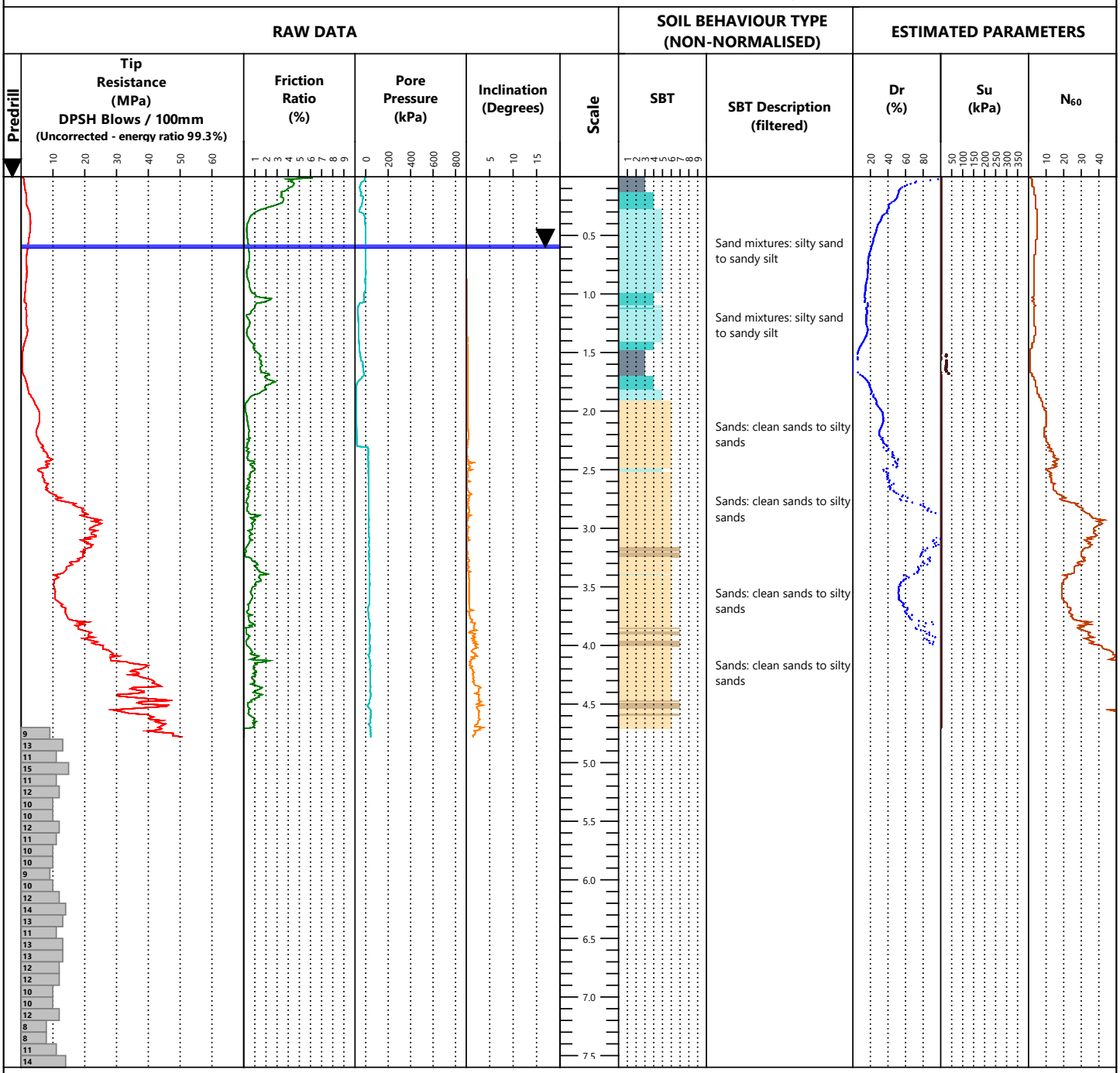
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu004
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 19/8/2020

Grid Reference: 1564993.47m E, 5172892.27m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 0.6m
Collapse: 1.95m

Termination
Target Depth: ☐
Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3452	11.2685
Local Friction	0.1186	0.1191
Pore Pressure	0.9595	0.9554

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

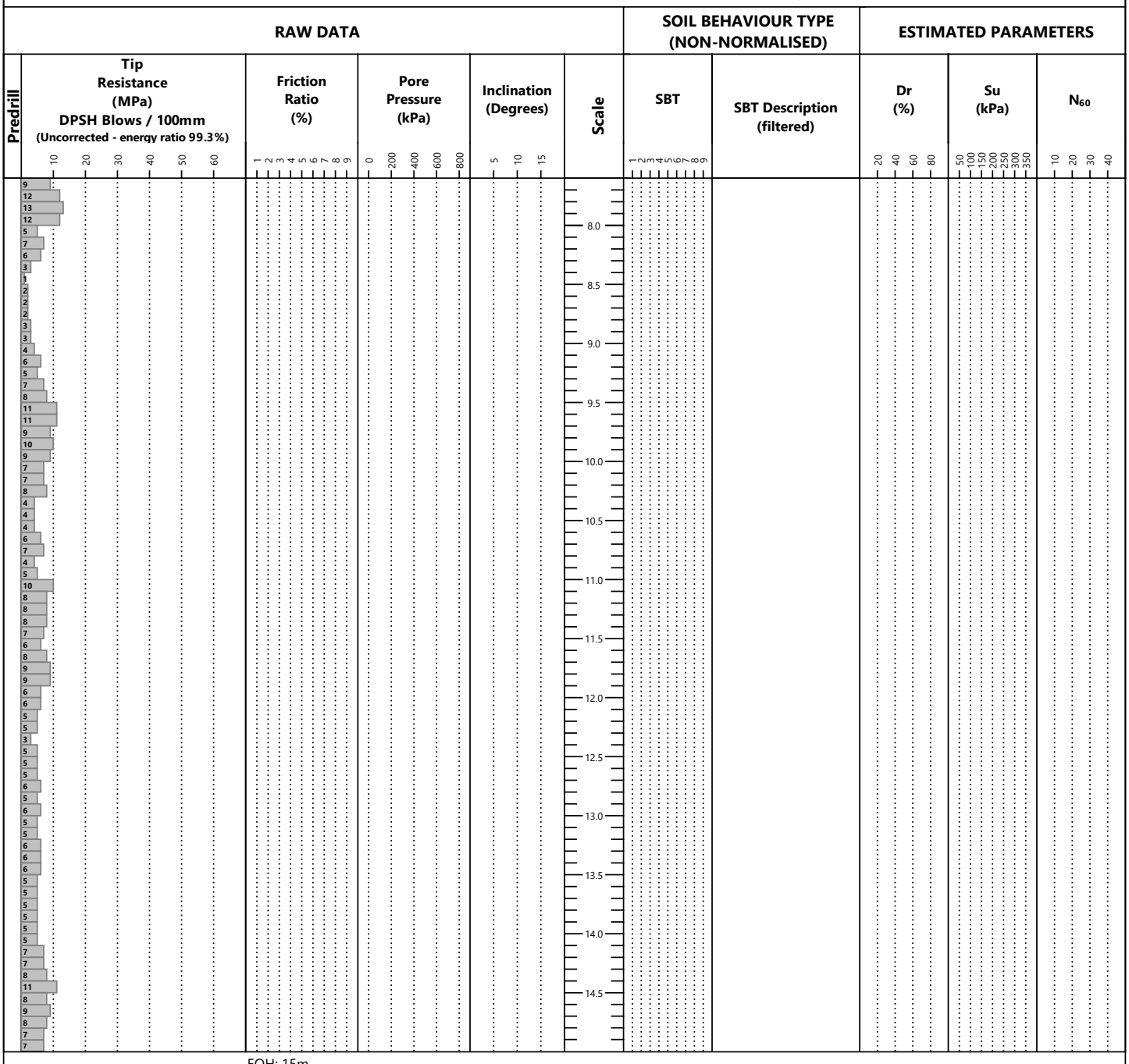
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu004
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 19/8/2020

Grid Reference: 1564993.47m E, 5172892.27m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 0.6m
Collapse: 1.95m

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3452	11.2685
Local Friction	0.1186	0.1191
Pore Pressure	0.9595	0.9554

Termination

Target Depth: ☐

Effective Refusal

Tip: ☑
Gauge: ☐
Inclinometer: ☐

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

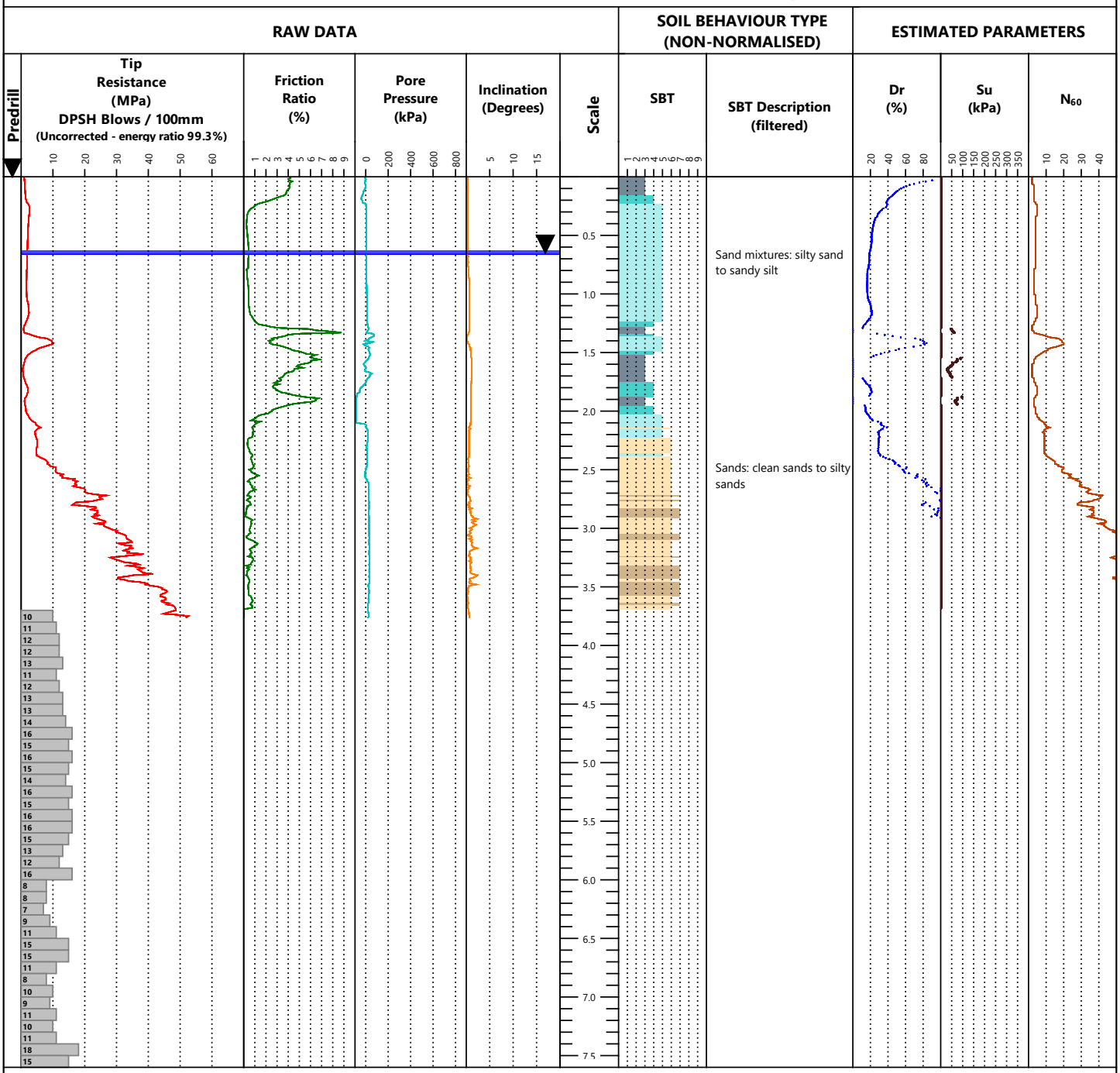
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu005
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 19/8/2020

Grid Reference: 1564945.37m E, 5172828.71m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 0.65m
Collapse: 1.45m

Termination
Target Depth: ☐
Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.4066	11.2583
Local Friction	0.1183	0.1192
Pore Pressure	0.9587	0.9583

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

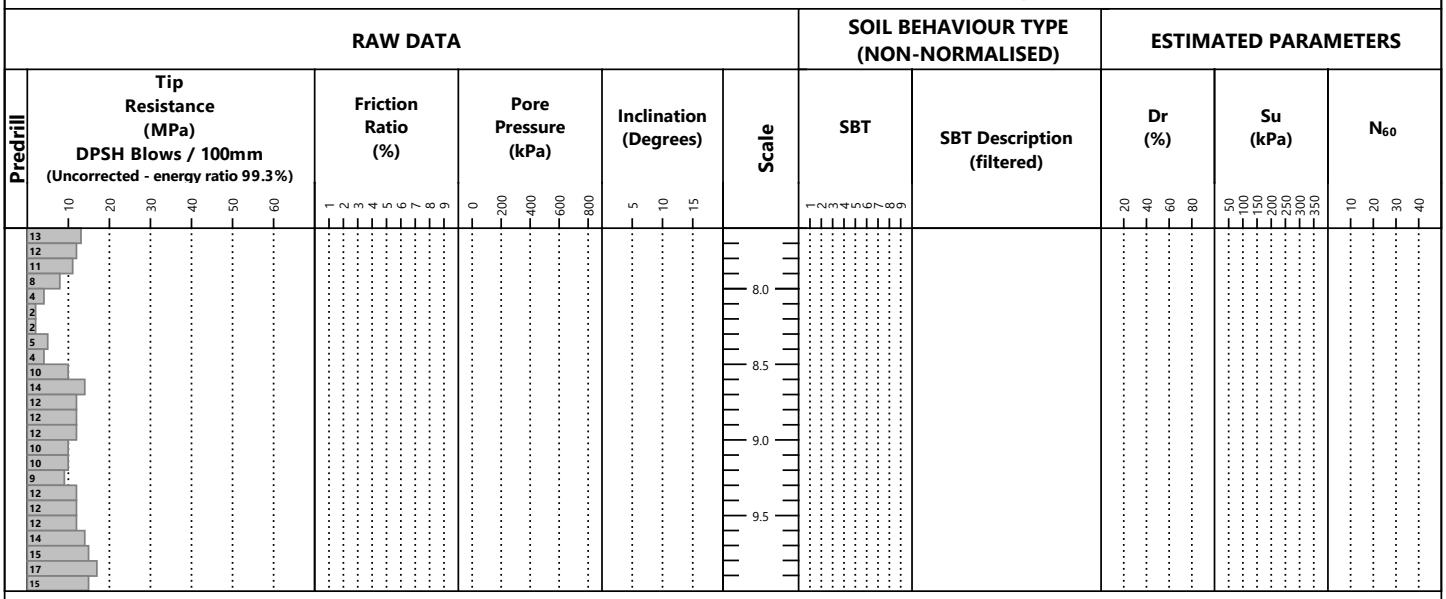
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu005
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 19/8/2020

Grid Reference: 1564945.37m E, 5172828.71m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 0.65m
Collapse: 1.45m

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.4066	11.2583
Local Friction	0.1183	0.1192
Pore Pressure	0.9587	0.9583

Termination

Target Depth: ☐

Effective Refusal

Tip: ☑
Gauge: ☐
Inclinometer: ☐

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

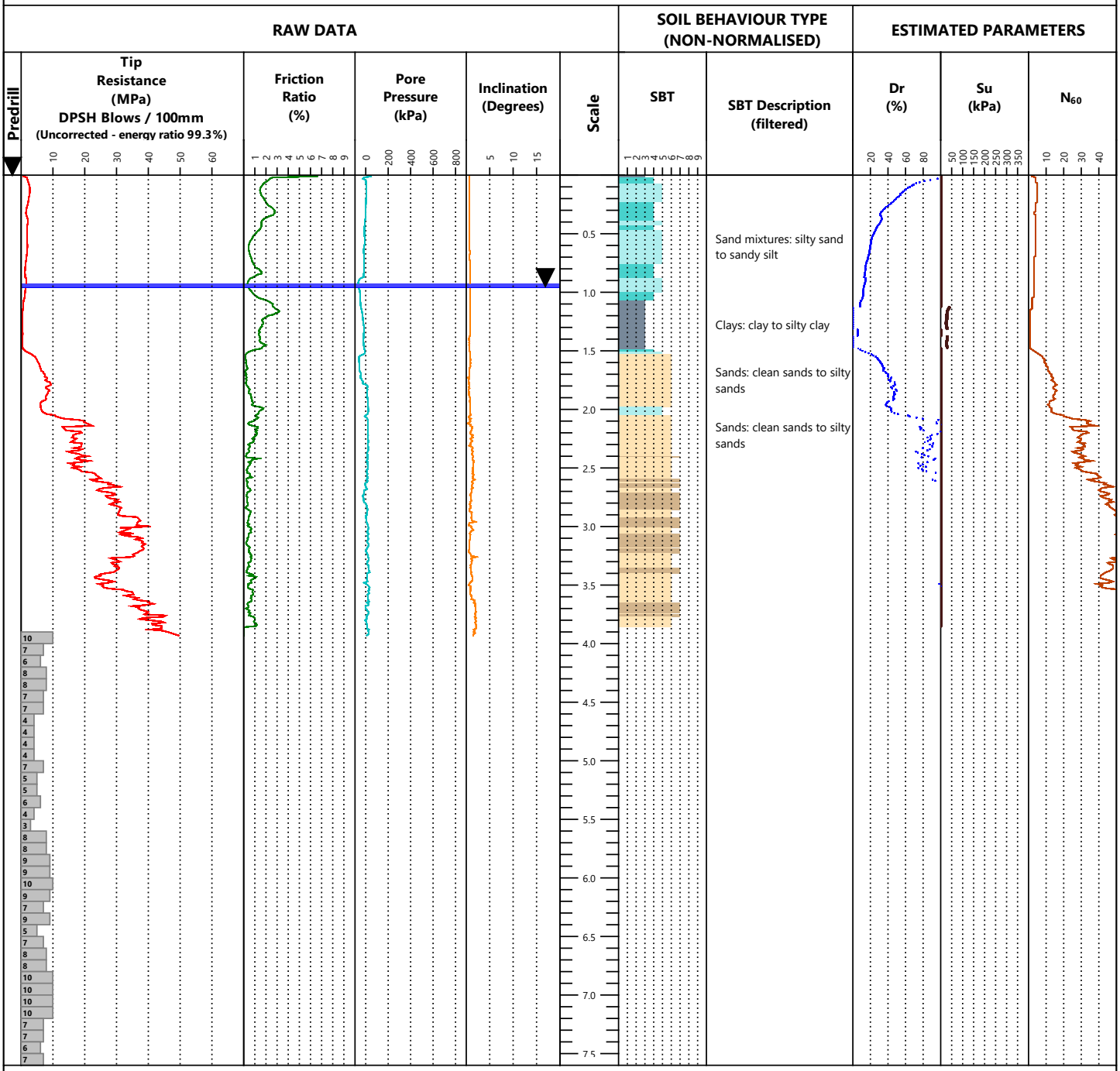
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu006
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 13/8/2020

Grid Reference: 1565008.77m E, 5172744.63m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 0.95m
Collapse: 1.40m

Termination
Target Depth: ☐
Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3708	11.2634
Local Friction	0.1178	0.119
Pore Pressure	0.9592	0.9542

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

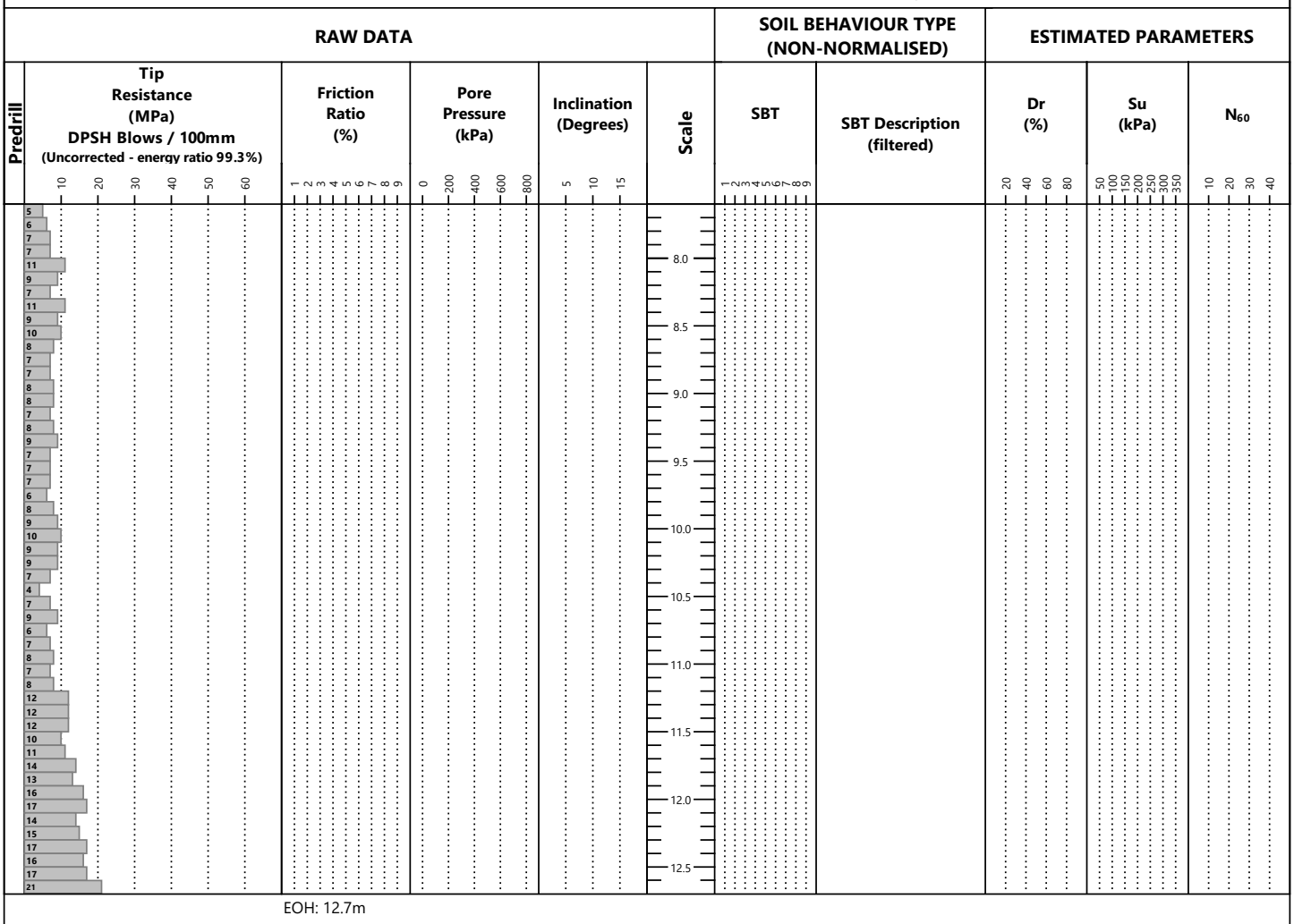
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu006
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 13/8/2020

Grid Reference: 1565008.77m E, 5172744.63m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 0.95m
Collapse: 1.40m

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3708	11.2634
Local Friction	0.1178	0.119
Pore Pressure	0.9592	0.9542

Termination

Target Depth: ☐

Effective Refusal

Tip: ☑
Gauge: ☐
Inclinometer: ☐

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

TEST DETAIL

PointID: CPTu001
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS711
Cone Area Ratio: 0.79

Date: 18/8/2020
Predrill: -
Water Level: 1.45m
Collapse: 1.60m

Termination
Target Depth: ☑
Effective Refusal
Tip: ☐
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.4528	20.369
Local Friction	0.2535	0.2535
Pore Pressure	3.0597	3.0579

PointID: CPTu002
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS711
Cone Area Ratio: 0.79

Date: 17/8/2020
Predrill: -
Water Level: 1.05m
Collapse: 2.45m

Termination
Target Depth: ☑
Effective Refusal
Tip: ☐
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.4004	20.348
Local Friction	0.2537	0.2536
Pore Pressure	3.0612	3.0605

PointID: CPTu003
Sounding: 1

Operator: B. Wilson
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80

Date: 13/8/2020
Predrill: -
Water Level: 1.8m
Collapse: 2.70m

Termination
Target Depth: ☑
Effective Refusal
Tip: ☐
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3554	11.3094
Local Friction	0.1187	0.1186
Pore Pressure	0.9596	0.9557

PointID: CPTu004
Sounding: 1

Operator: B. Wilson
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80

Date: 19/8/2020
Predrill: -
Water Level: 0.6m
Collapse: 1.95m

Termination
Target Depth: ☐
Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3452	11.2685
Local Friction	0.1186	0.1191
Pore Pressure	0.9595	0.9554

PointID: CPTu005
Sounding: 1

Operator: B. Wilson
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80

Date: 19/8/2020
Predrill: -
Water Level: 0.65m
Collapse: 1.45m

Termination
Target Depth: ☐
Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.4066	11.2583
Local Friction	0.1183	0.1192
Pore Pressure	0.9587	0.9583

TEST DETAIL

PointID: CPTu006
Sounding: 1

Operator: B. Wilson
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80

Date: 13/8/2020
Predrill: -
Water Level: 0.95m
Collapse: 1.40m

Termination

Target Depth: ☐

Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3708	11.2634
Local Friction	0.1178	0.119
Pore Pressure	0.9592	0.9542

McMILLAN Drilling
LandTest

CPT CALIBRATION AND TECHNICAL NOTES

These notes describe the technical specifications and associated calibration references pertaining to the Pagani piezocone types measuring cone resistance, sleeve friction, inclination and pore pressure (piezocone, 10cm^2)

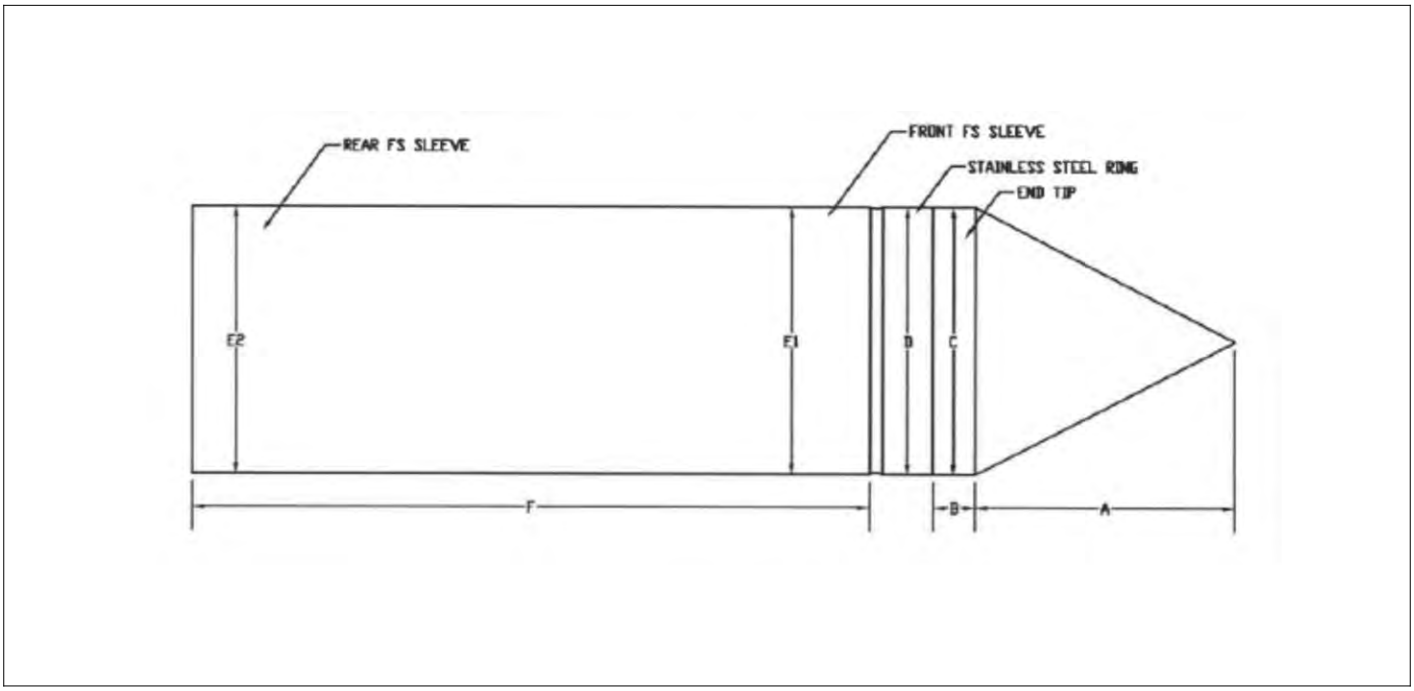
Dimensions

Dimensional specifications are detailed below. All tolerances are routinely checked prior to testing and measurements taken are electronically recorded. All records are kept on file and available on request.

Technical specifications

	Tip	Friction	Pore Pressure	Inclination
Maximum Measuring Range:	50 - 100 MPa	1.60 MPa	2.50 MPa	0° - 20°
Resolution:	24 bit	24 bit	24 bit	12 bit
Accuracy:	0.005 MPa	0.04 MPa	0.04 MPa	0.5°

Length:	320 mm	**Weight:**	1.8 kg
Diameter:	35.8 mm	**Opening angle of bit:**	60°
Cone base area:	10 cm^2	**Side sleeve surfaces:**	150 cm^2
Cone area ratio:	0.80	**Tip and Local Friction sensor displacement:**	80 mm



LandTest McMILLAN Drilling

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z087/19

Calibrated system *(Sistema tarato)* :

Serial number	Mkj328
Sensor	TIP RESISTANCE
Max. Capacity [MPa]:	100
Scaling Factor:	195500
Tip net area ratio (a_n):	0,80
Sleeve net ratio (b_n):	0,00

Addressee *(destinatario)* :
LANDTEST
307 Cashel street, Christchurch
New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 200 kN
Serial Number	138913

Power press:

Manufacturer	Easydur Italiana
Model	Aura 20T
Serial Number	29084

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

Last verification date:	15/01/2019
Certificate N.	LAT 091 2019-014
Temperature of calibration	22°C
Humidity	53%

Factory calibration in accordance with ASTM D5778-12

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z087/19

Calibrated system *(Sistema tarato)* :

Serial number	Mkj328
Sensor	SLEEVE FRICTION
Max. Capacity [kPa]:	1600
Scaling Factor:	30696

Addressee *(destinatario)* :
LANDTEST
307 Cashel street, Christchurch
New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 50 kN
Serial Number	65495

Power press:

Manufacturer	Easydur Italiana
Model	Aura 10T
Serial Number	29002

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z087/19

Calibrated system *(Sistema tarato)* :

Serial number	Mkj328
Sensor	PORE PRESSURE
Max. Capacity [kPa]:	2500
Scaling Factor:	16963
Sensor	TILT ANGLE
Max. Inclination [°]:	20
Scaling Factor:	140137

Addressee *(destinatario)* :
LANDTEST
307 Cashel street, Christchurch
New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Pressure Generator:

Manufacturer	AEP transducers
Model	GPM500

Digital Indicator:

Manufacturer	AEP transducers
Model	LAB DMM
Serial Number	301796

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

The adopted calibration procedure has been developed according to the suggestions given by Prof. Paul W. Mayne (Georgia Institute of Technology) and Prof. Diego Lo Presti (University of Pisa)

Cone calibrated by Claudio C.

Date of issue 27/06/2019

Land Test McMILLAN Drilling

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z024/20

Calibrated system *(Sistema tarato)* :

Serial number	Mks711
Sensor	TIP RESISTANCE
Max. Capacity [MPa]:	100
Scaling Factor:	190780
Tip net area ratio (a_n):	0,79
Sleeve net ratio (b_n):	0,00

Addressee *(destinatario)* :
McMillan Drilling Ltd
36 Hickory Place,Islington
Christchurch 8042,New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 200 kN
Serial Number	138913

Power press:

Manufacturer	Easydur Italiana
Model	Aura 20T
Serial Number	29084

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

Last verification date:	16/01/2020
Certificate N.	LAT 091 2020-015
Temperature of calibration	22°C
Humidity	45%

Factory calibration in accordance with ASTM D5778-12

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z024/20

Calibrated system *(Sistema tarato)* :

Serial number	Mks711
Sensor	SLEEVE FRICTION
Max. Capacity [kPa]:	1600
Scaling Factor:	31343

Addressee *(destinatario)* :
McMillan Drilling Ltd
36 Hickory Place,Islington
Christchurch 8042,New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 50 kN
Serial Number	65495

Power press:

Manufacturer	Easydur Italiana
Model	Aura 10T
Serial Number	29002

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

Last verification date: 16/01/2020

The adopted calibration procedure has been developed acc
Prof. Paul W. Mayne (Georgia Institute of technology) and

Cone calibrated by

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z024/20

Calibrated system *(Sistema tarato)* :

Serial number	Mks711
Sensor	PORE PRESSURE
Max. Capacity [kPa]:	2500
Scaling Factor:	10298
Sensor	TILT ANGLE
Max. Inclination [°]:	20
Scaling Factor:	280277

Addressee *(destinatario)* :
McMillan Drilling Ltd
36 Hickory Place,Islington
Christchurch 8042,New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Pressure Generator:

Manufacturer	MENSOR
Model	CPC 4000
Serial Number	41000V56
Sensor Descr	Silicon Pressure Transducer
Sensor Serial Number	41000SYF

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

Last verification date:	28/02/2019
Certificate N.	162632
Temperature of calibration	22°C
Humidity	45%

Factory calibration in accordance with ASTM D5778-12

CONE PENETRATION TEST (CPT) REPORT

McMILLAN Drilling

LandTest

Client: Miyamoto International NZ

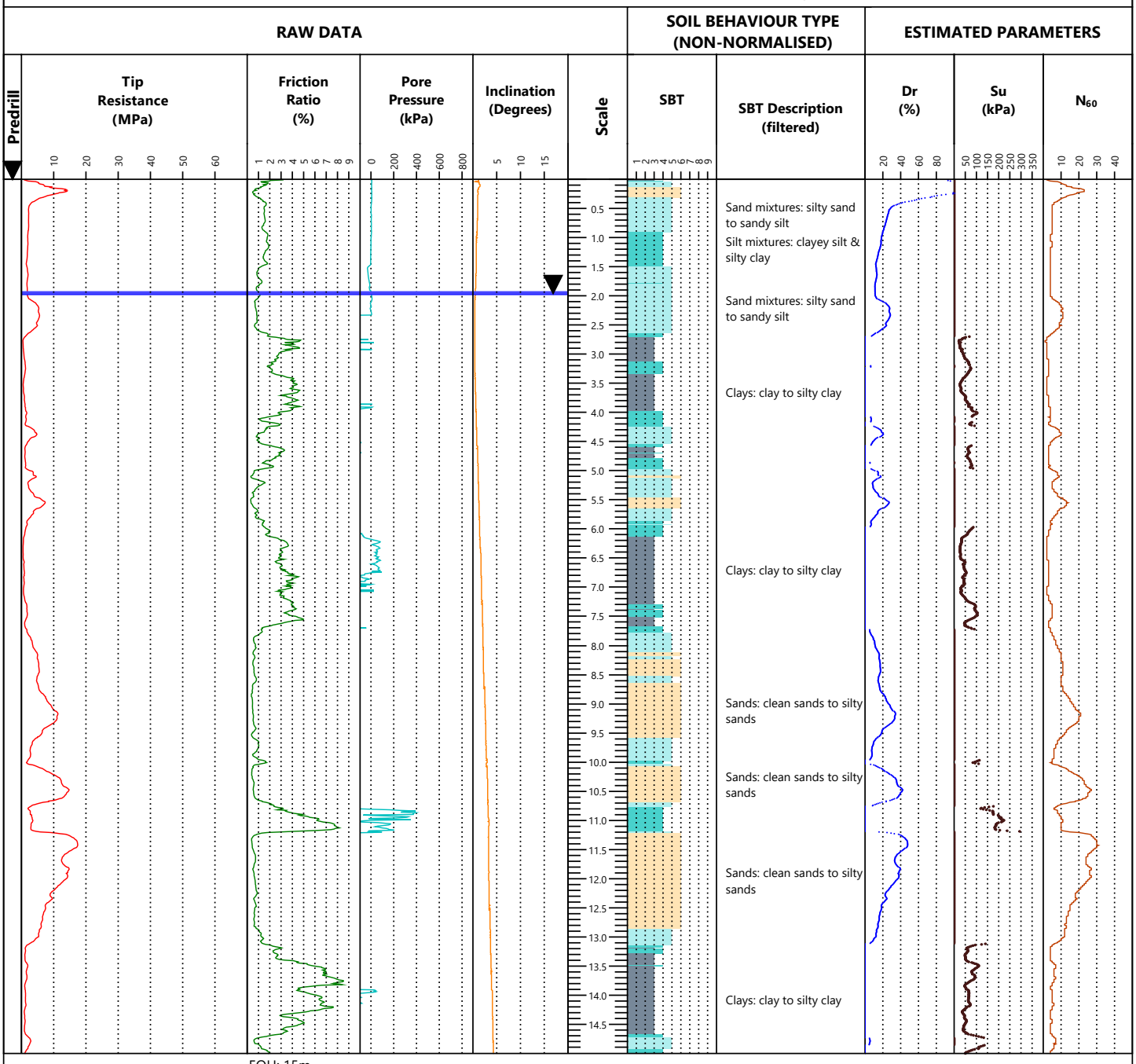
Location: 2-4 Glovers Road, Christchurch

Printed: 29/09/2020

McMILLAN Drilling
LandTest

Client: Miyamoto International NZ	**Bore No.:** CPTu007
Project: 2-4 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2-4 Glovers Road, Christchurch
Date: 24/9/2020
Grid Reference: 1564970.4m E, 5173158.32m N (NZTM) - Map or aerial photograph
Rig Operator: E. Diaz
Elevation: 0.00m
Datum: Ground
Equipment: Pagani TG63-150



EOH: 15m

Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.96m
Collapse: 2.0m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9412	11.8737
Local Friction	0.1606	0.161
Pore Pressure	1.4594	1.262

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

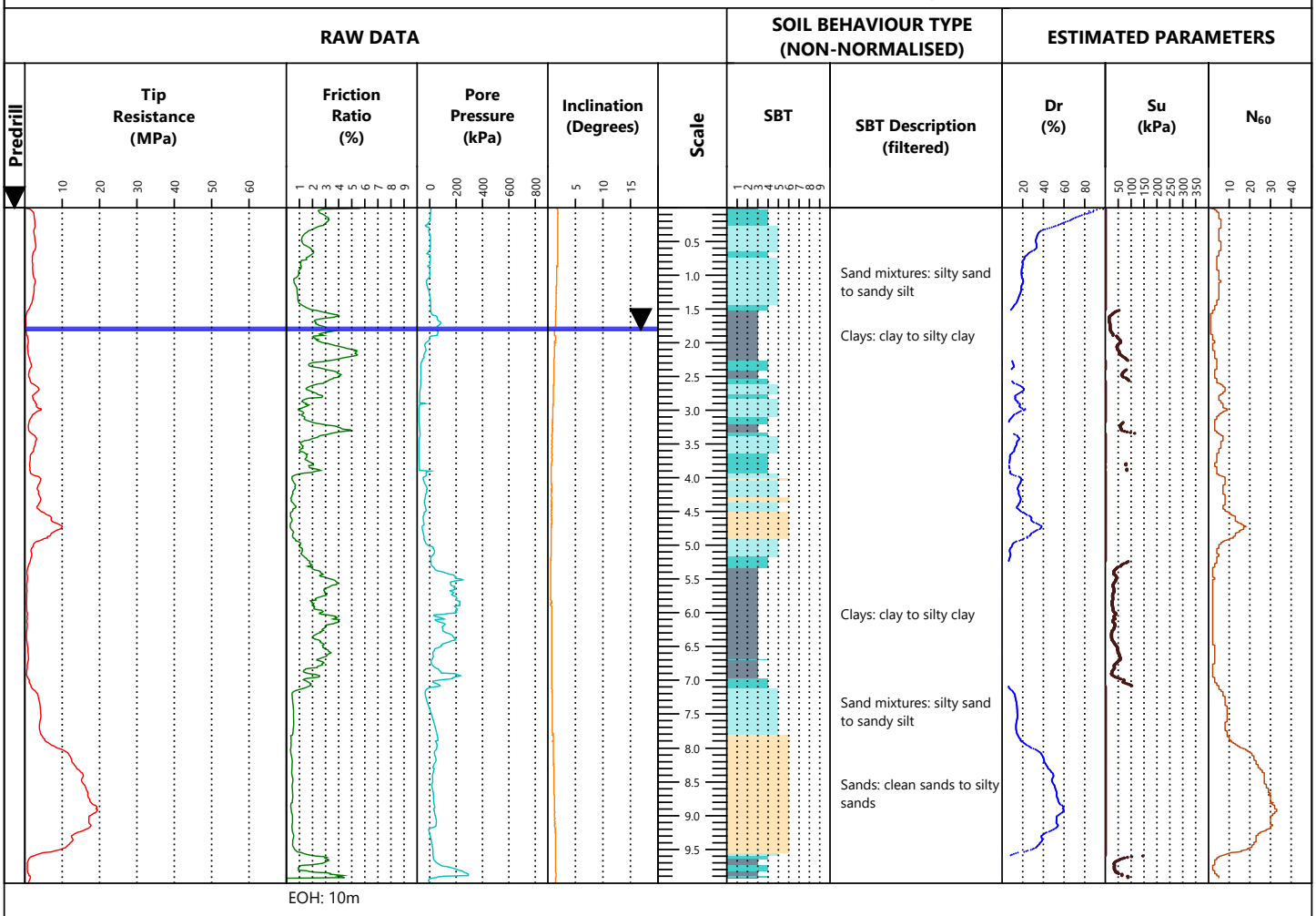
Remarks
Invalid pore water pressure data from 2.33m.

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu008
	Project: 2-4 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2-4 Glovers Road, Christchurch **Date:** 24/9/2020

Grid Reference: 1565034.78m E, 5173124.87m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.8m
Collapse: 2.2m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9516	11.8425
Local Friction	0.1609	0.1614
Pore Pressure	1.459	1.4561

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

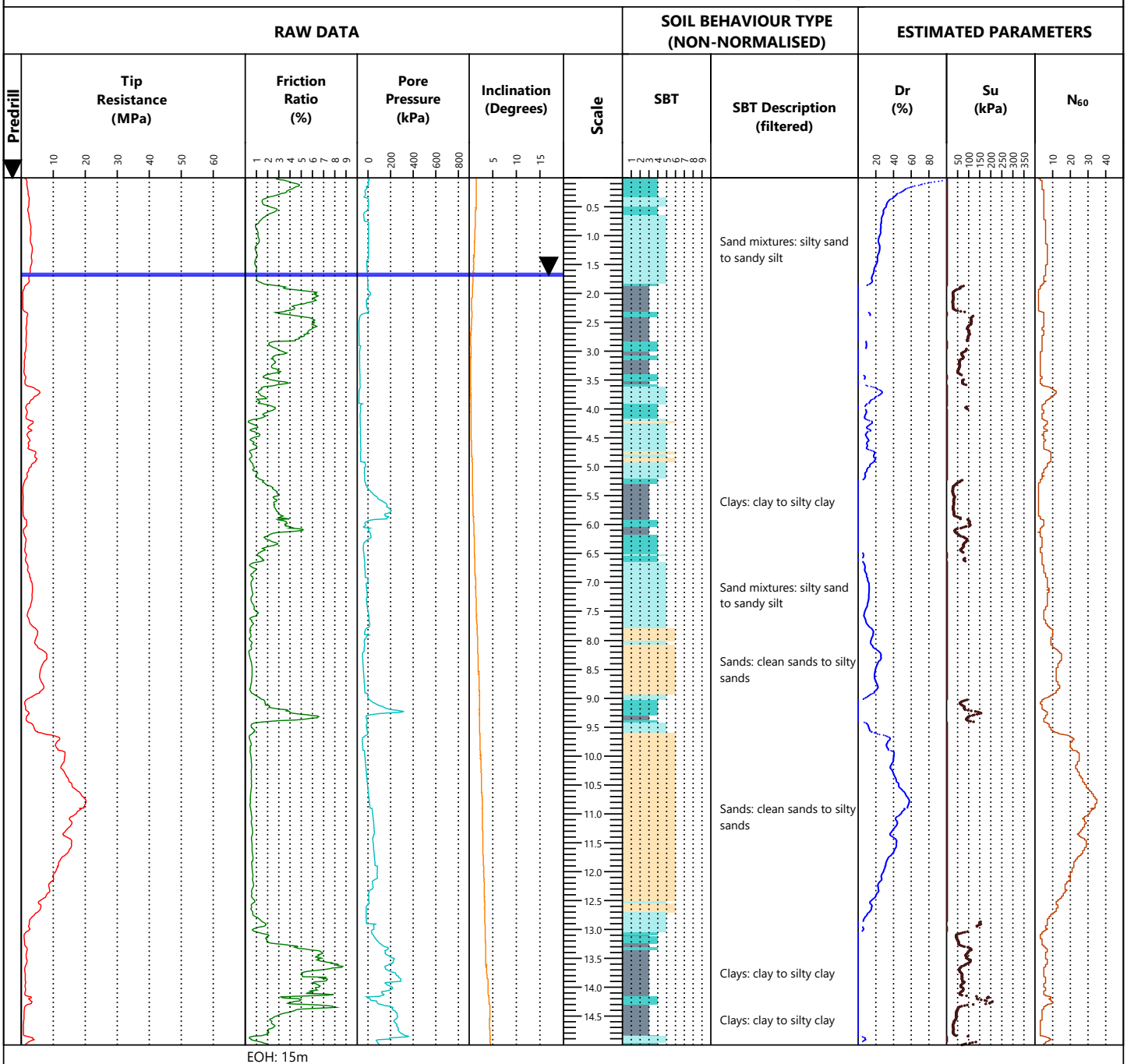
McMILLAN Drilling
LandTest

Client: Miyamoto International NZ		**Bore No.:** CPTu009
Project: 2-4 Glovers Road, Christchurch		**Job No.:** 19096

Site Location: 2-4 Glovers Road, Christchurch **Date:** 24/9/2020

Grid Reference: 1564969.64m E, 5173086.81m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



EOH: 15m

Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.68m
Collapse: 1.80m

Termination
Target Depth: ✓

Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9464	11.801
Local Friction	0.1604	0.1611
Pore Pressure	1.4592	1.4568

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

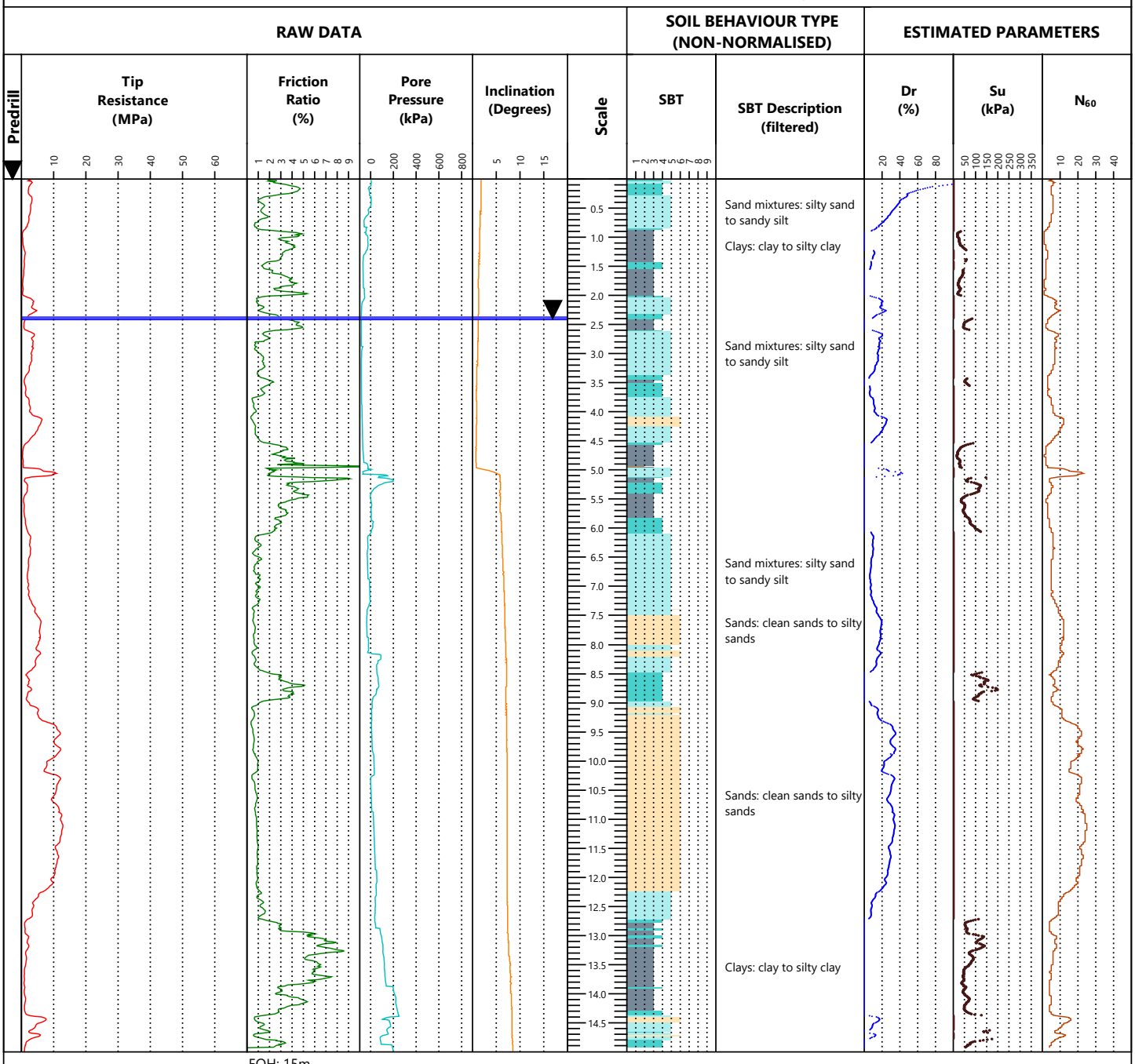
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu010
	Project: 2-4 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2-4 Glovers Road, Christchurch **Date:** 25/9/2020

Grid Reference: 1565043.16m E, 5173036.65m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



EOH: 15m

Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 2.4m
Collapse: 2.50m

Termination
Target Depth: ✓

Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9568	11.8166
Local Friction	0.1618	0.1622
Pore Pressure	1.4599	1.4582

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

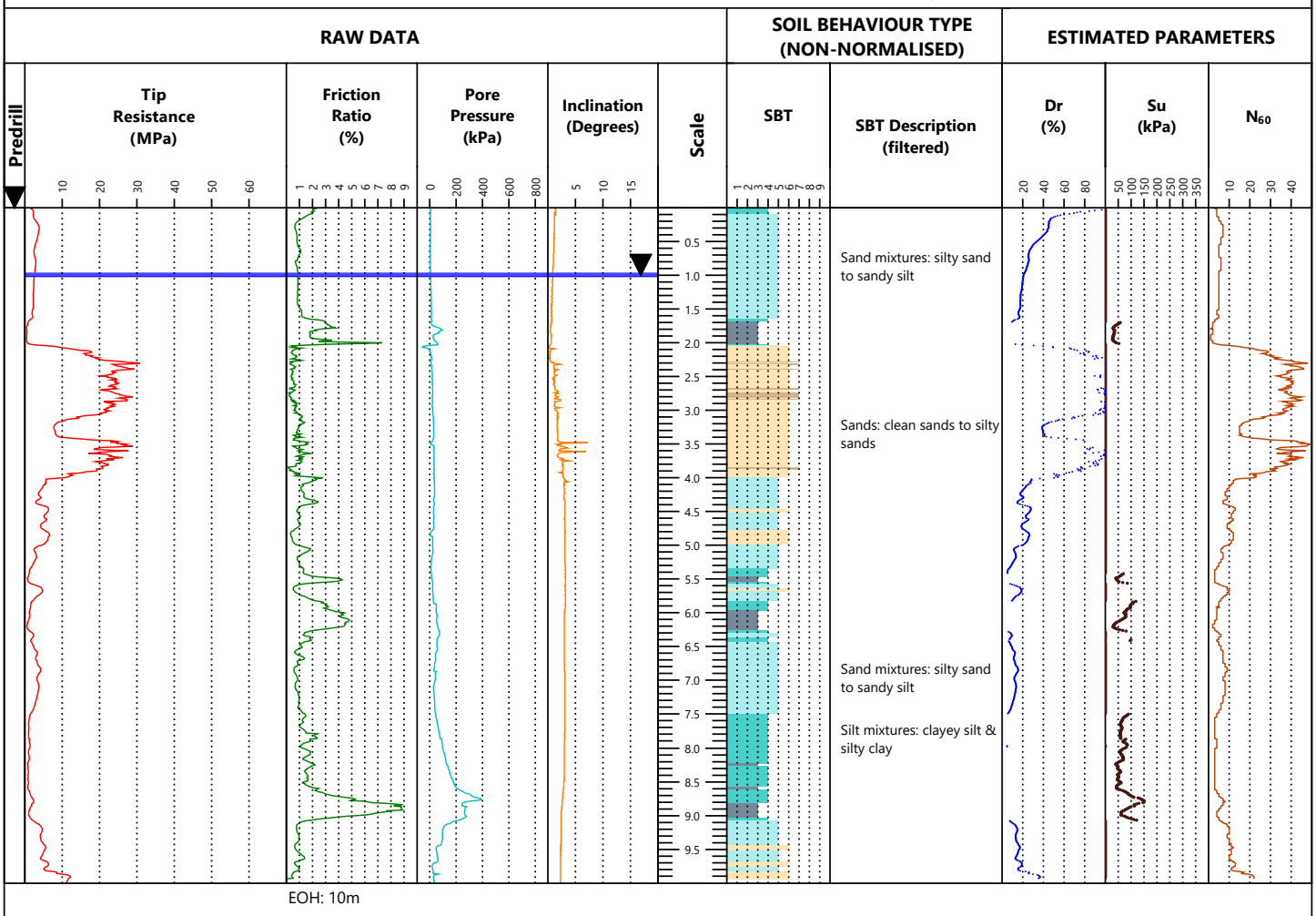
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu011
	Project: 2-4 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2-4 Glovers Road, Christchurch **Date:** 25/9/2020

Grid Reference: 1565055.15m E, 5172937.04m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1m
Collapse: 5.1m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9464	11.8166
Local Friction	0.1615	0.1621
Pore Pressure	1.4598	1.455

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

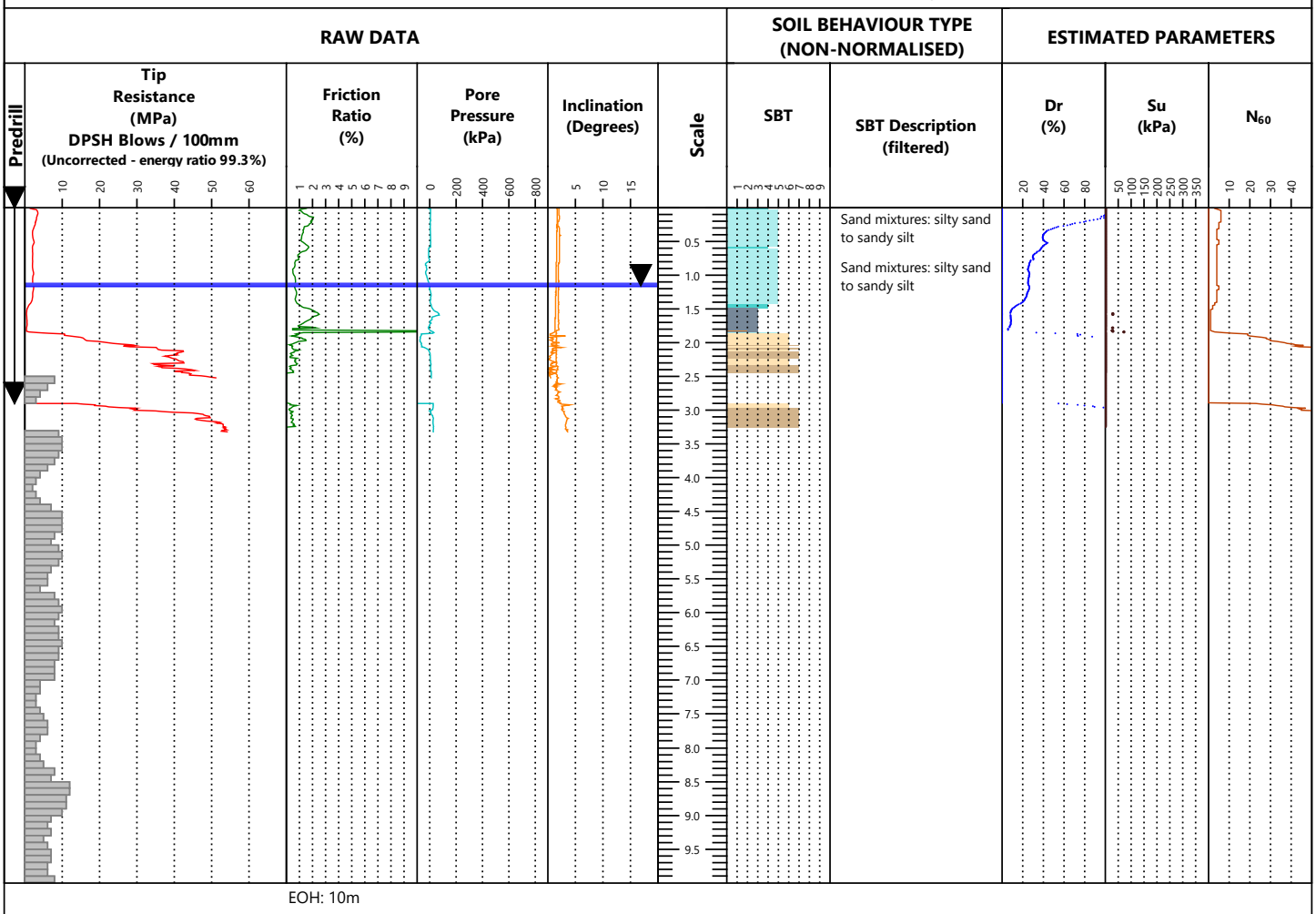
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu012
	Project: 2-4 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2-4 Glovers Road, Christchurch **Date:** 29/9/2020

Grid Reference: 1565058.83m E, 5172852.91m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: 2.9m
Water Level: 1.15m
Collapse: 2.2m

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.8737	11.8321
Local Friction	0.1612	0.1611
Pore Pressure	1.4542	1.4556

Termination

Target Depth: ☐

Effective Refusal

Tip: ✓
Gauge: ☐
Inclinometer: ☐

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

TEST DETAIL

PointID: CPTu007
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 24/9/2020
Predrill: -
Water Level: 1.96m
Collapse: 2.0m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9412	11.8737
Local Friction	0.1606	0.161
Pore Pressure	1.4594	1.262

PointID: CPTu008
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 24/9/2020
Predrill: -
Water Level: 1.8m
Collapse: 2.2m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9516	11.8425
Local Friction	0.1609	0.1614
Pore Pressure	1.459	1.4561

PointID: CPTu009
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 24/9/2020
Predrill: -
Water Level: 1.68m
Collapse: 1.80m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9464	11.801
Local Friction	0.1604	0.1611
Pore Pressure	1.4592	1.4568

PointID: CPTu010
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 25/9/2020
Predrill: -
Water Level: 2.4m
Collapse: 2.50m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9568	11.8166
Local Friction	0.1618	0.1622
Pore Pressure	1.4599	1.4582

PointID: CPTu011
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 25/9/2020
Predrill: -
Water Level: 1m
Collapse: 5.1m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9464	11.8166
Local Friction	0.1615	0.1621
Pore Pressure	1.4598	1.455

TEST DETAIL

PointID: CPTu012
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 29/9/2020
Predrill: -
Water Level: -
Collapse: -

Termination

Target Depth: ☐

Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9568	11.8062
Local Friction	0.1607	0.1609
Pore Pressure	1.4567	1.4562

Sounding: 2

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 29/9/2020
Predrill: 2.9m
Water Level: 1.15m
Collapse: 2.2m

Termination

Target Depth: ☐

Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.8737	11.8321
Local Friction	0.1612	0.1611
Pore Pressure	1.4542	1.4556

McMILLAN Drilling
LandTest

CPT CALIBRATION AND TECHNICAL NOTES

These notes describe the technical specifications and associated calibration references pertaining to the Pagani piezocone types measuring cone resistance, sleeve friction, inclination and pore pressure (piezocone, 10cm^2)

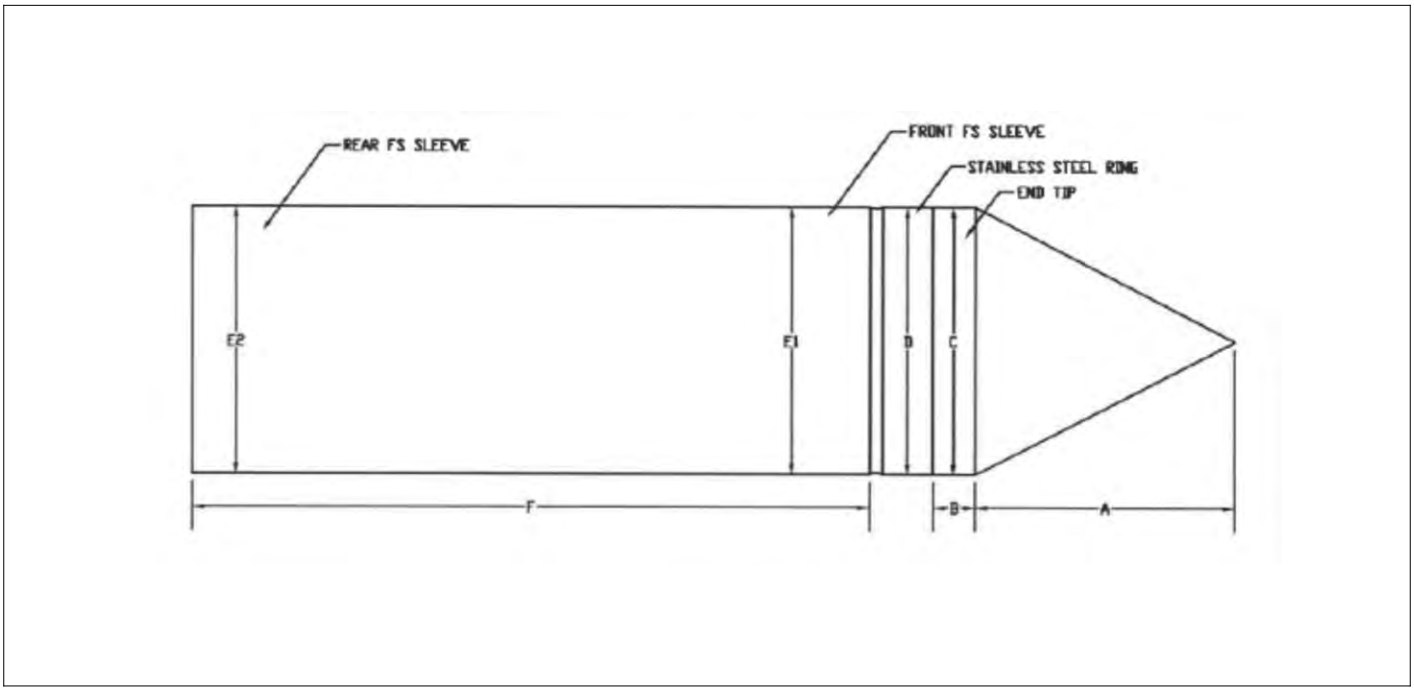
Dimensions

Dimensional specifications are detailed below. All tolerances are routinely checked prior to testing and measurements taken are electronically recorded. All records are kept on file and available on request.

Technical specifications

	Tip	Friction	Pore Pressure	Inclination
Maximum Measuring Range:	50 - 100 MPa	1.60 MPa	2.50 MPa	0° - 20°
Resolution:	24 bit	24 bit	24 bit	12 bit
Accuracy:	0.005 MPa	0.04 MPa	0.04 MPa	0.5°

Length:	320 mm	**Weight:**	1.8 kg
Diameter:	35.8 mm	**Opening angle of bit:**	60°
Cone base area:	10 cm^2	**Side sleeve surfaces:**	150 cm^2
Cone area ratio:	0.80	**Tip and Local Friction sensor displacement:**	80 mm



Land Test — McMILLAN Drilling

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z023/20

Calibrated system *(Sistema tarato)* :

Serial number	Mkj329
Sensor	TIP RESISTANCE
Max. Capacity [MPa]:	100
Scaling Factor:	192610
Tip net area ratio (a_n):	0,79
Sleeve net ratio (b_n):	0,00

Addressee *(destinatario)* :
McMillan Drilling Ltd
36 Hickory Place,Islington
Christchurch 8042,New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 200 kN
Serial Number	138913

Power press:

Manufacturer	Easydur Italiana
Model	Aura 20T
Serial Number	29084

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

Last verification date:	16/01/2020
Certificate N.	LAT 091 2020-015
Temperature of calibration	22°C
Humidity	45%

Factory calibration in accordance with ASTM D5778-12

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z023/20

Calibrated system *(Sistema tarato)* :

Serial number	Mkj329
Sensor	SLEEVE FRICTION
Max. Capacity [kPa]:	1600
Scaling Factor:	30794

Addressee *(destinatario)* :
McMillan Drilling Ltd
36 Hickory Place,Islington
Christchurch 8042,New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 50 kN
Serial Number	65495

Power press:

Manufacturer	Easydur Italiana
Model	Aura 10T
Serial Number	29002

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*
Last verification date: 16/01/2020

The adopted calibration procedure has been developed according to the suggestions given by Prof. Paul W. Mayne (Georgia Institute of technology) and Prof. Diego Lo Presti (University of Pisa)

Cone calibrated by _____

Date of issue 05/02/2020

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z023/20

Calibrated system *(Sistema tarato)* :

Serial number	Mkj329
Sensor	PORE PRESSURE
Max. Capacity [kPa]:	2500
Scaling Factor:	10657
Sensor	TILT ANGLE
Max. Inclination [°]:	20
Scaling Factor:	151152

Addressee *(destinatario)* :
McMillan Drilling Ltd
36 Hickory Place,Islington
Christchurch 8042,New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Pressure Generator:

Manufacturer	MENSOR
Model	CPC 4000
Serial Number	41000V56
Sensor Descr	Silicon Pressure Transducer
Sensor Serial Number	41000SYF

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*
Last verification date: 28/02/2019

D. Southern Geophysical MASW and GPR Report

October 2020

GEOPHYSICAL REPORT

Geophysical Site Investigation:

2-4 Glovers Road, Christchurch

Report prepared for Miyamoto International NZ Ltd

Southern Geophysical

3/28 Tanya St, Bromley, Christchurch 8062

Ph: 03 384 4302

Web: www.southerngeophysical.com

Data collected and report prepared for Southern Geophysical Ltd by:

Christian Ruegg, MSc, Geophysicist

Nick McConachie, BSc, Geologist

Report internally reviewed for Southern Geophysical by:
Mike Finnemore, PhD, Senior Geophysicist

Table of Contents

SGL Reference: 2050

Report Version 1

Summary:

Southern Geophysical Ltd was contracted to undertake a geophysical survey using Multi-channel Analysis of Surface Waves (MASW) at 2-4 Glovers Road, Christchurch. The geophysical survey was conducted on September 24th, 2020 and includes three MASW lines (Figure 1). The aim of the survey was to assess the shear-wave velocities and structure of the subsurface to a depth of over 20 m. The MASW results show low shear-wave velocities to a depth of 10 m in the northern part of the site (100 m/s to 150 m/s), with higher velocities to the south (100 m/s to 300 m/s). The boundary between these two zones is a feature characteristic of the edge of a paleochannel, buried valley, or dipping volcanic strata, crossing the site east to west and dipping to the north. It is possible that high velocities imaged by the MASW survey to the south (>500 m/s from approximately 20 m depth) are associated with volcanic rock, but there are no boreholes available for ground truthing to that depth.

Methodology:

MASW is a geophysical technique that uses the dispersive nature of surface waves to model shear-wave velocity versus depth.

A MASW survey is undertaken as a series of lines or points across the surface of the site. The MASW points in this survey were collected using a 24-channel towed seismic array, with 4.5 Hz geophones. The geophone spacing was 1 m and the source offset was 10 m. The seismic source was a 16 lb sledgehammer impacting an aluminium plate. Recording parameters for the MASW survey were set with a 0.125 ms sample interval, 1.5 s record length, 24 dB gains, and a geophone trigger system.

The field records were processed using the Kansas Geological Survey software package SurfSeis6++ ©. The geometry for each point was set according to the survey parameters and the dispersion curves were generated and edited. The inversions were run using a 10 layer variable depth model. The velocity data was interpolated into 2D profiles showing V_s variations with depth (Figures 2 to 3). The output shear-wave velocity data is included as data files (CSV format), supplementary to this report.

Supplementary to the MASW profiles, a series of Ground Penetrating Radar lines were acquired with a GSSI 200 MHz antenna (Figure 1). The radargrams are included in (Figures 4 and 5).

Survey positions were recorded using a Geo 7X Trimble GNSS system with a Tornado antenna. The GNSS positions were differentially corrected using a local GeoNet base station. The GNSS points were output in NZTM2000, with heights in Mean Sea Level (MSL). The accuracy of the survey positions is +/- 0.1 m. The site had no significant topographic changes, and the lines have not been corrected for elevation.

Results:

A total of three MASW lines were acquired at the site with a total MASW survey length of approximately 1 km (Figure 1). The ground surface was well compacted farm tracks and farm yards. A series of GPR lines were acquired along each MASW line to provide a high resolution image of the substrate (Figures 4 and 5).

In homogenous soils, with gradually increasing shear-wave velocities and no sharp lateral discontinuities, the accuracy of the shear-wave velocities derived from the MASW processing is considered to be +/- 10%.[1] The quality of the seismic data and the dispersion curves used in this report is very good, with a good signal-to-noise ratio. If there is a velocity inversion present in the shear-wave profile (decreasing velocity with depth), the shear-wave velocity of the reduced velocity zone and the thickness of that zone can often be underestimated by the inversion process.

Conclusions:

The MASW survey was considered to be of good quality, with modelled shear-wave velocities accurate to +/- 10%. The velocities in the top 5 m are likely to be more accurate then the deeper velocities, due to the presence of multiple velocity inversions. The MASW survey indicates a horizontal layer defined by a sharp increase in shear-wave velocity (180 m/s to 220 m/s) at around 5 m depth in the southern part of the site, consistent with the surface of dense gravels or sands. In the northern part of the site a similar 180 m/s to 220 m/s surface was observed at 20 m depth. There is a well-defined dipping surface dividing the south and the north, possibly associated with a buried valley edge, paleochannel, or

[1] Stephenson, W.J., Louie, J.N., Pullammanappallil, S., Williams, R.A., and Odum, J.K. 2005. Blind Shear-wave Velocity Comparison of ReMi and MASW Results with Boreholes to 200 m in Santa Clara Valley: Implications for Earthquake Ground-Motion Assessment. *Bulletin of the Seismological Society of America*, Vol. 95, pp. 2506-2516.

bedrock interface. This edge feature is apparent in both MASW 1 and MASW 3, as well as GPR 4 and GPR 10.

While the limitations of the MASW method should be considered when evaluating these results, the quality of the data collected at the site and the confidence in the shear-wave velocities derived from the MASW data is good.

Disclaimer:

This document has been provided by Southern Geophysical Ltd subject to the following:

Non-invasive geophysical testing has limitations and is not a complete source of testing. Often there is a need to couple non-invasive methods with invasive testing methods, such as drilling, especially in cases where the non-invasive testing indicates anomalies.

This document has been prepared for the particular purpose outlined in the project proposal and no responsibility is accepted for the use of this document, in whole or in part, in other contexts or for any other purpose. Southern Geophysical Ltd did not perform a complete assessment of all possible conditions or circumstances that may exist at the site. Conditions may exist which were undetectable given the limited nature of the enquiry Southern Geophysical Ltd was retained to undertake with respect to the site. Variations in conditions often occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account. Accordingly, additional studies and actions may be required by the client.

We collected our data and based our report on information which was collected at a specific point in time. The passage of time affects the information and assessment provided by Southern Geophysical Ltd. It is understood that the services provided allowed Southern Geophysical Ltd to form no more than an opinion of the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes for whatever reason. Where data is supplied by the client or other sources, including where previous site investigation data have been used, it has been assumed that the information is correct. No responsibility is accepted by Southern Geophysical Ltd for incomplete or inaccurate data supplied by others. This document is provided for sole use by the client and is confidential to that client and its professional advisers. No responsibility whatsoever for the contents of this document will be accepted to any person other than the client. Any use which a third party makes of this document, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. Southern Geophysical Ltd accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this document.

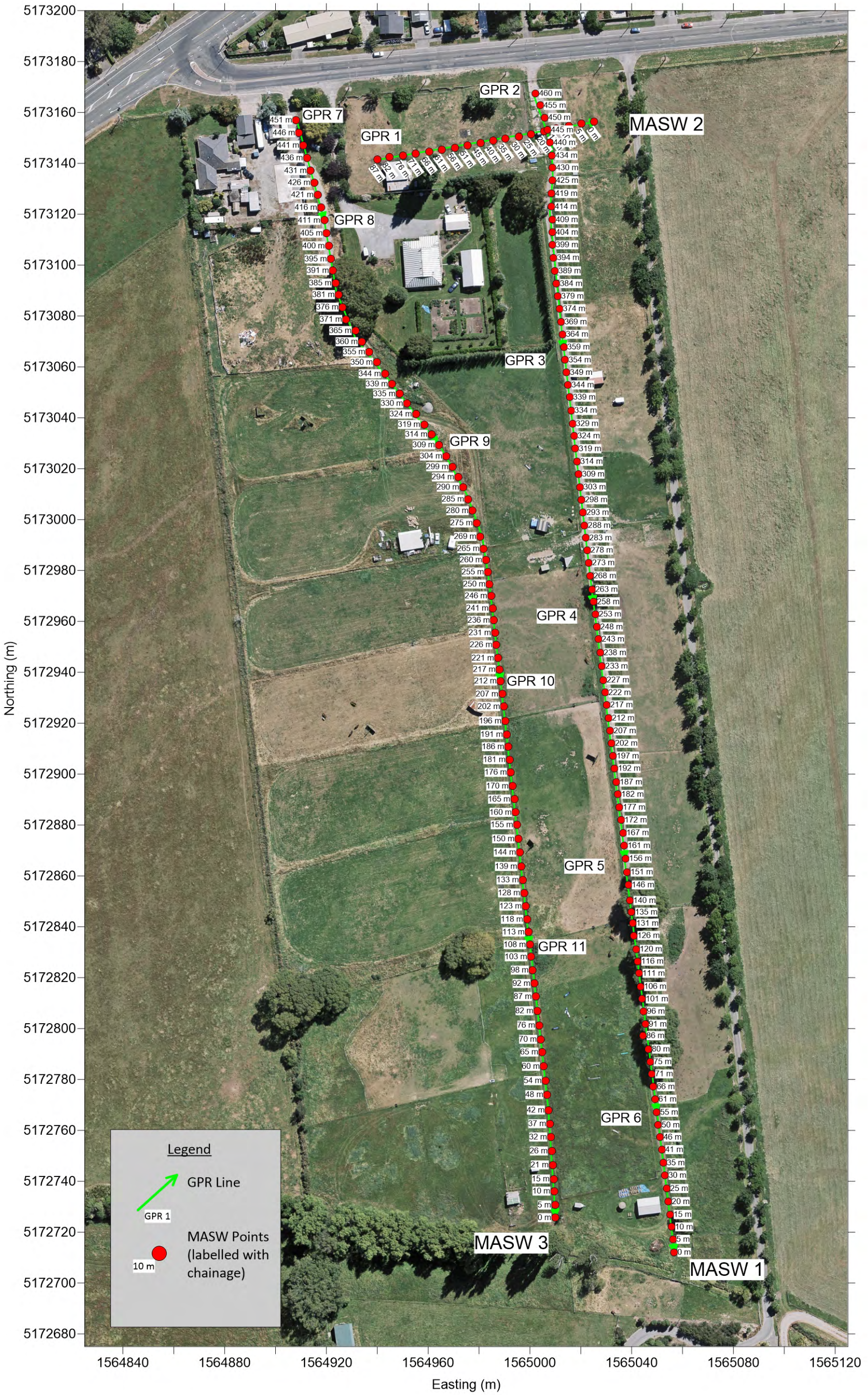


Figure 1: Site Map

2-4 Glovers Road, Christchurch

NOTES- Coordinates NZ2000 TM Grid.
Aerial photograph sourced from LINZ, Crown Copyright ©

SCALE (m)

0 25 50 75 100 125

A3

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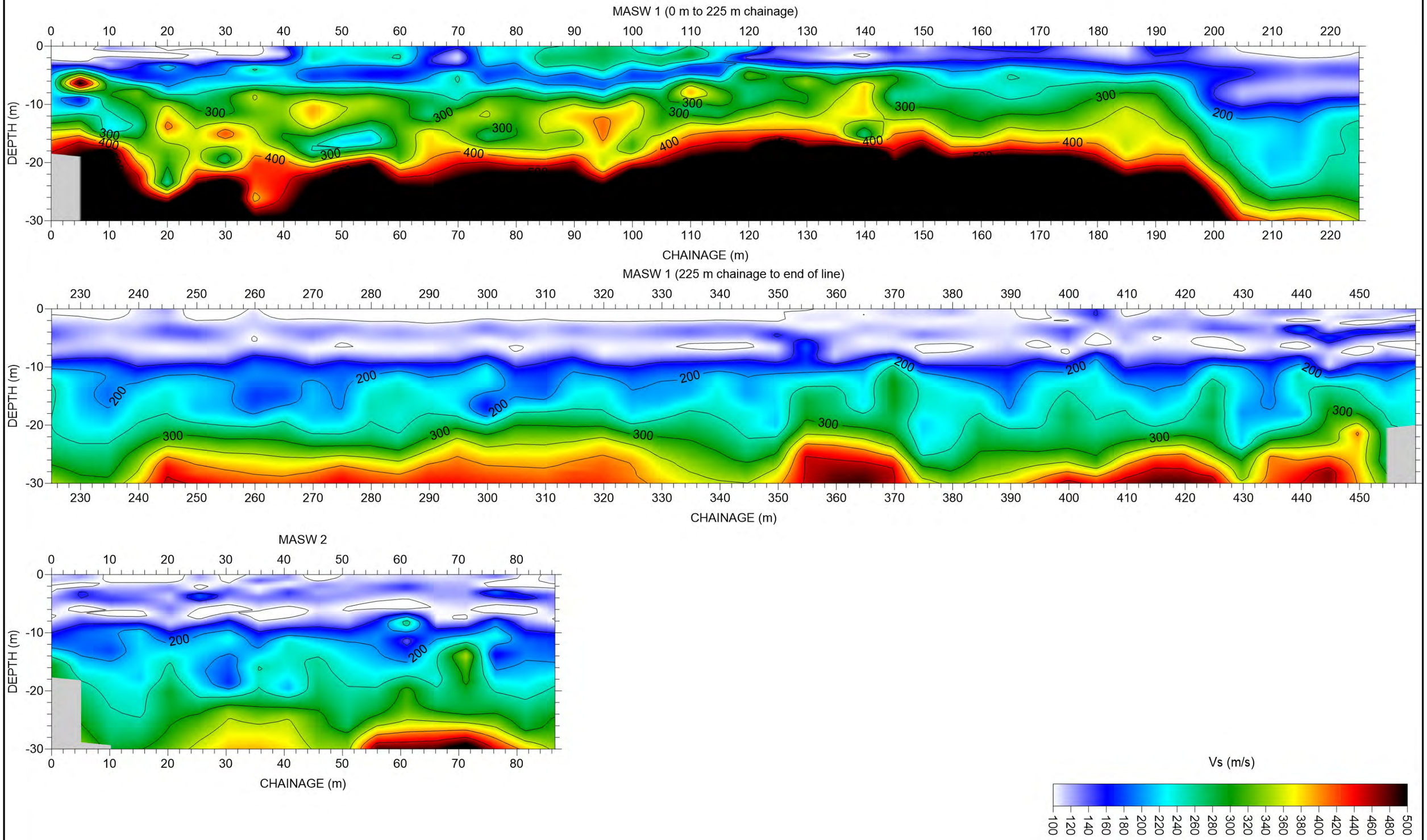

DRAWING- **Figure 2: MASW 1 and 2**

LOCATION- **2-4 Glovers Road, Christchurch**

NOTES MASW Vs profile has contour intervals of 50 m/s (Vs).

See site map for location of points.

A3

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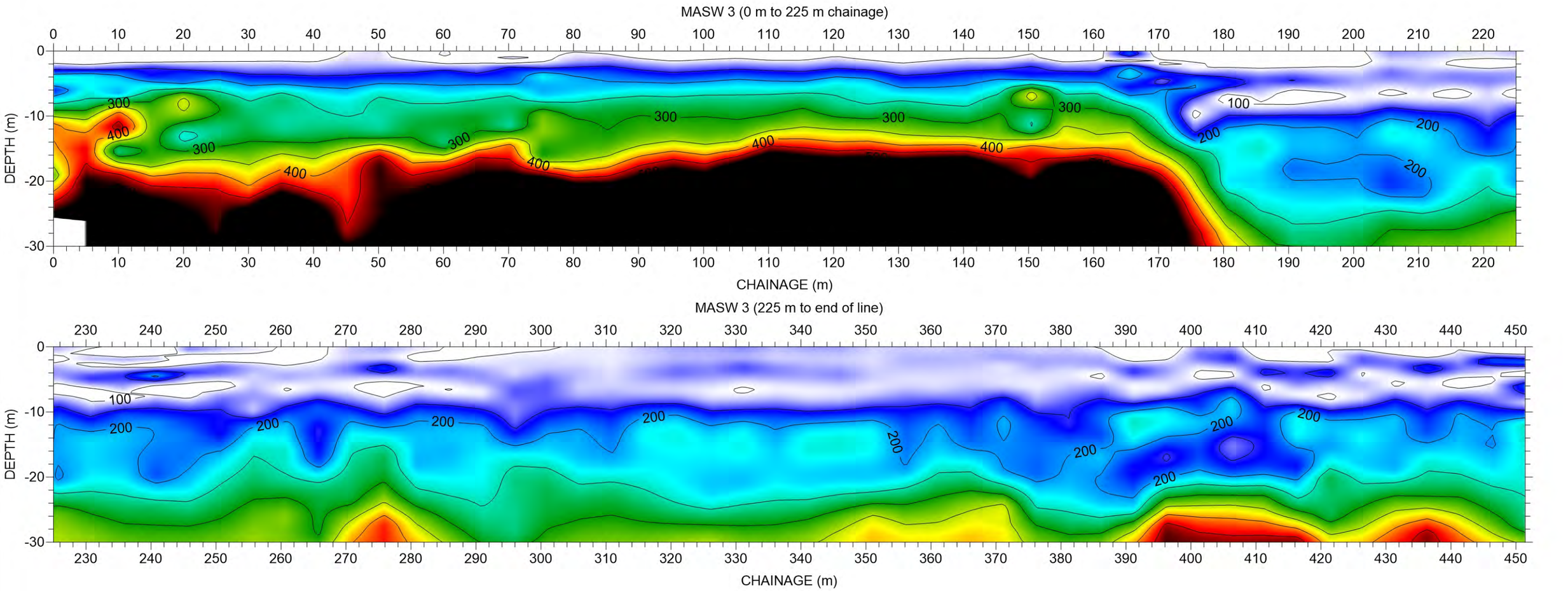

DRAWING- **Figure 3: MASW 3**

LOCATION- **2-4 Glover Street, Christchurch**

NOTES MASW Vs profile has contour intervals of 50 m/s (Vs).

See site map for location of points.

A3

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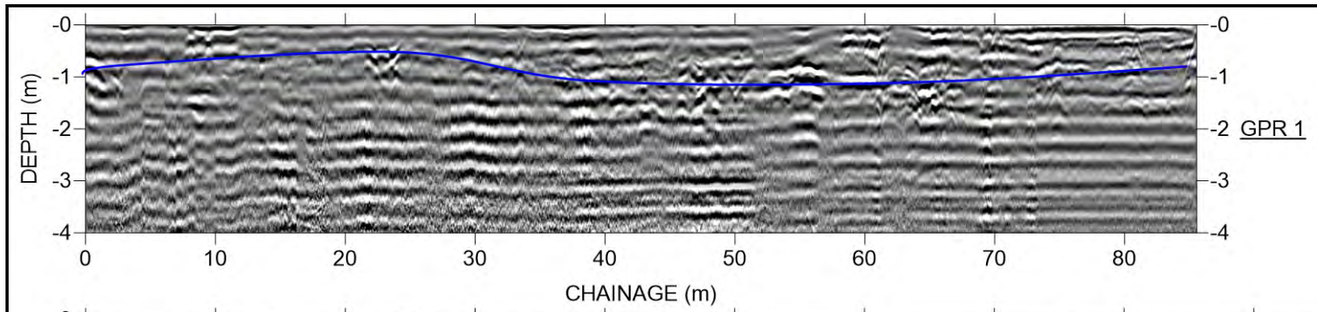

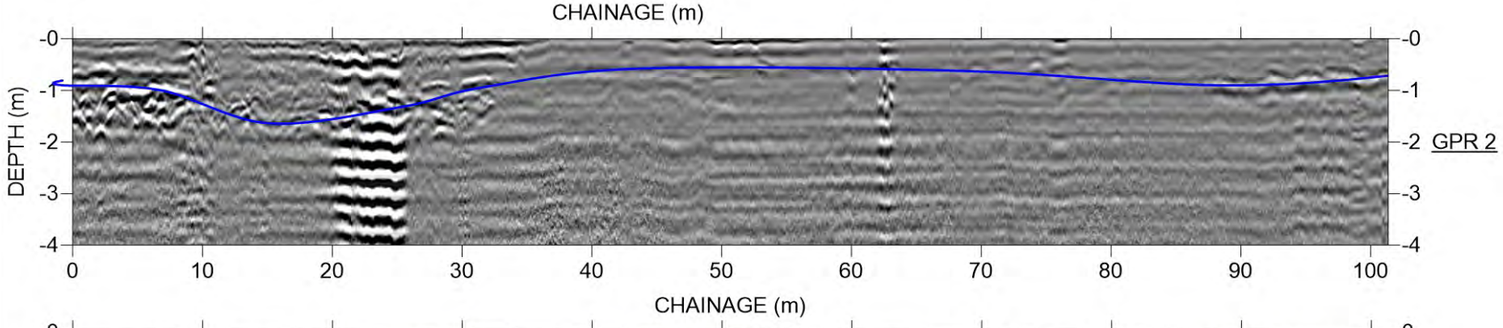

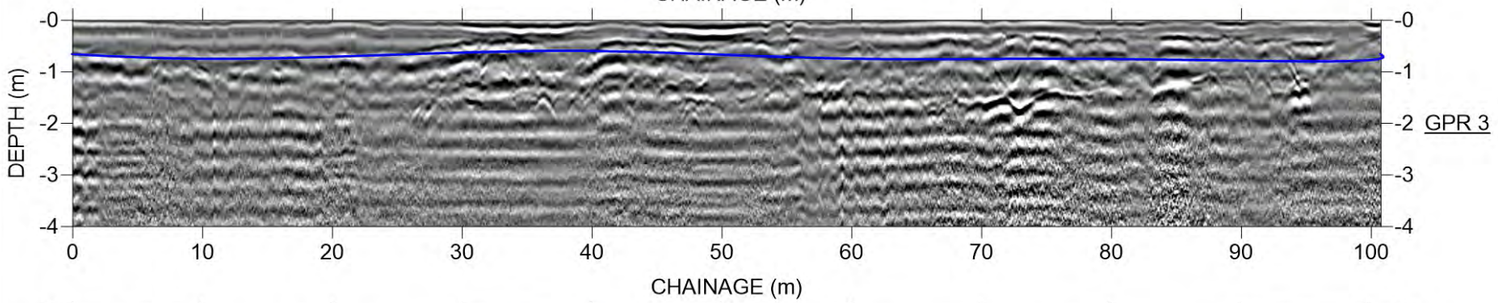

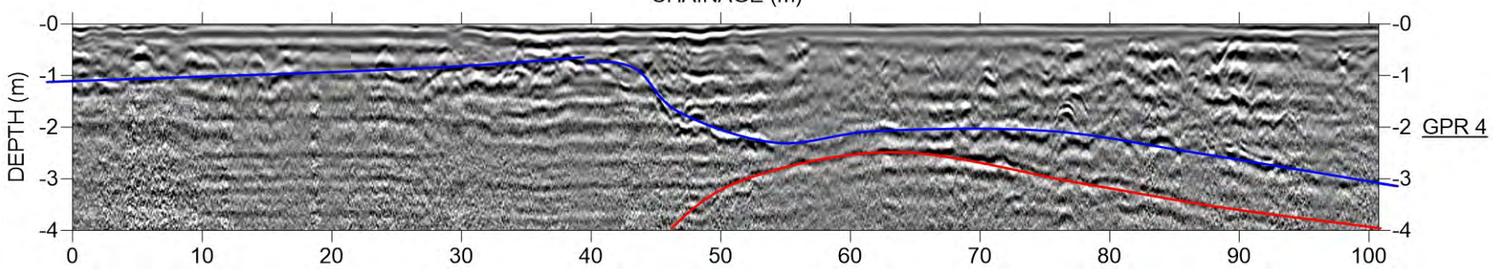

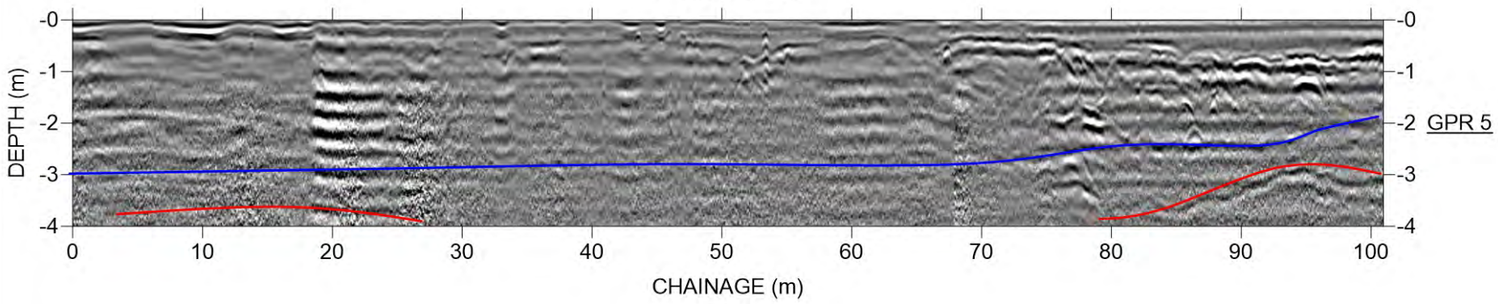

Some reflectors are annotated for reference. Note the profiles have been plotted with a 4:1 vertical exaggeration. See site map for line locations.

DRAWING- **Figure 4: GPR Radargrams 1 to 5**

LOCATION- **2-4 Glover Street, Christchurch**

NOTES

A3

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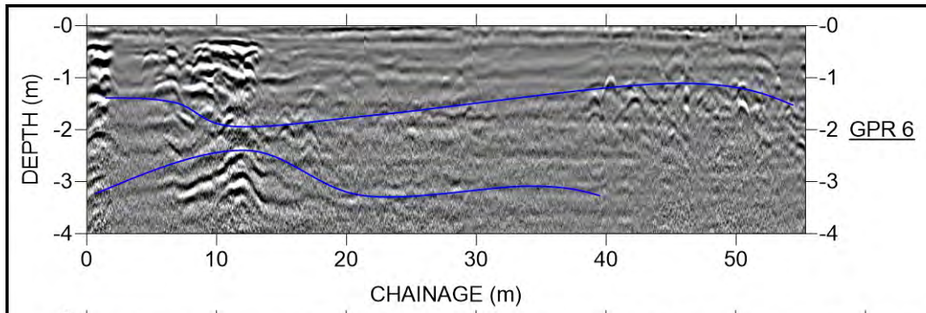
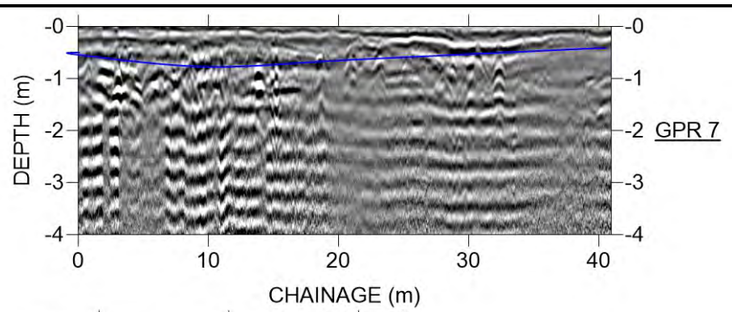
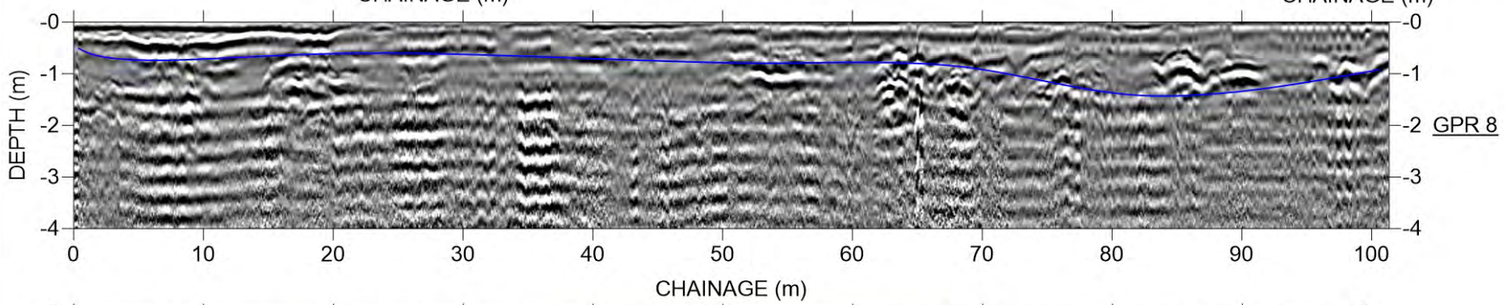
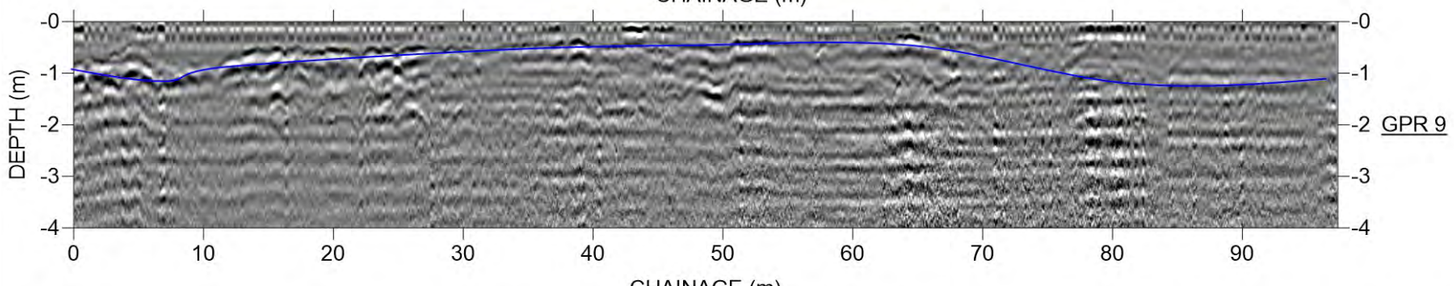
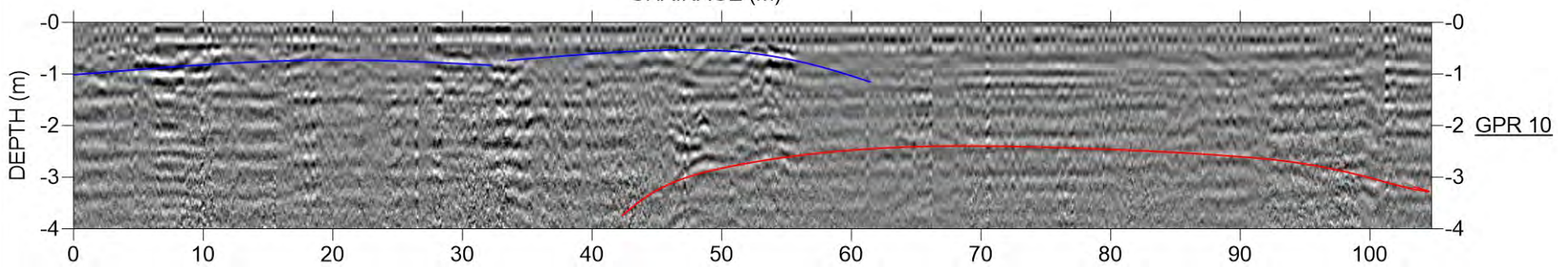
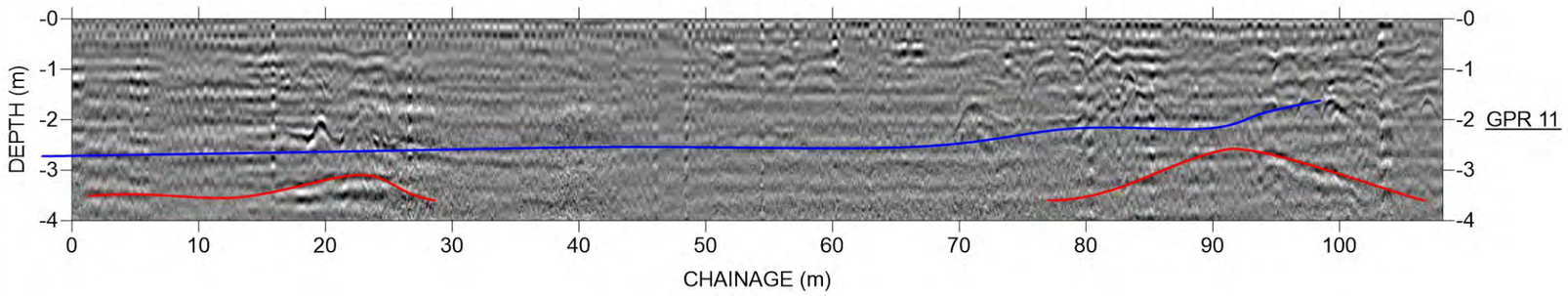












Some reflectors are annotated for reference. Note the profiles have been plotted with a 4:1 vertical exaggeration. See site map for line locations.

DRAWING- **Figure 5: GPR Radargrams 6 to 11**

LOCATION- **2-4 Glover Street, Christchurch**

NOTES

A3

Southern Geophysical Ltd

www.southerngeophysical.com

E. Geotechnical Cross Sections

miyamoto.

236 Hereford Street,
PO BOX 137 Cashel Street
Christchurch 8011

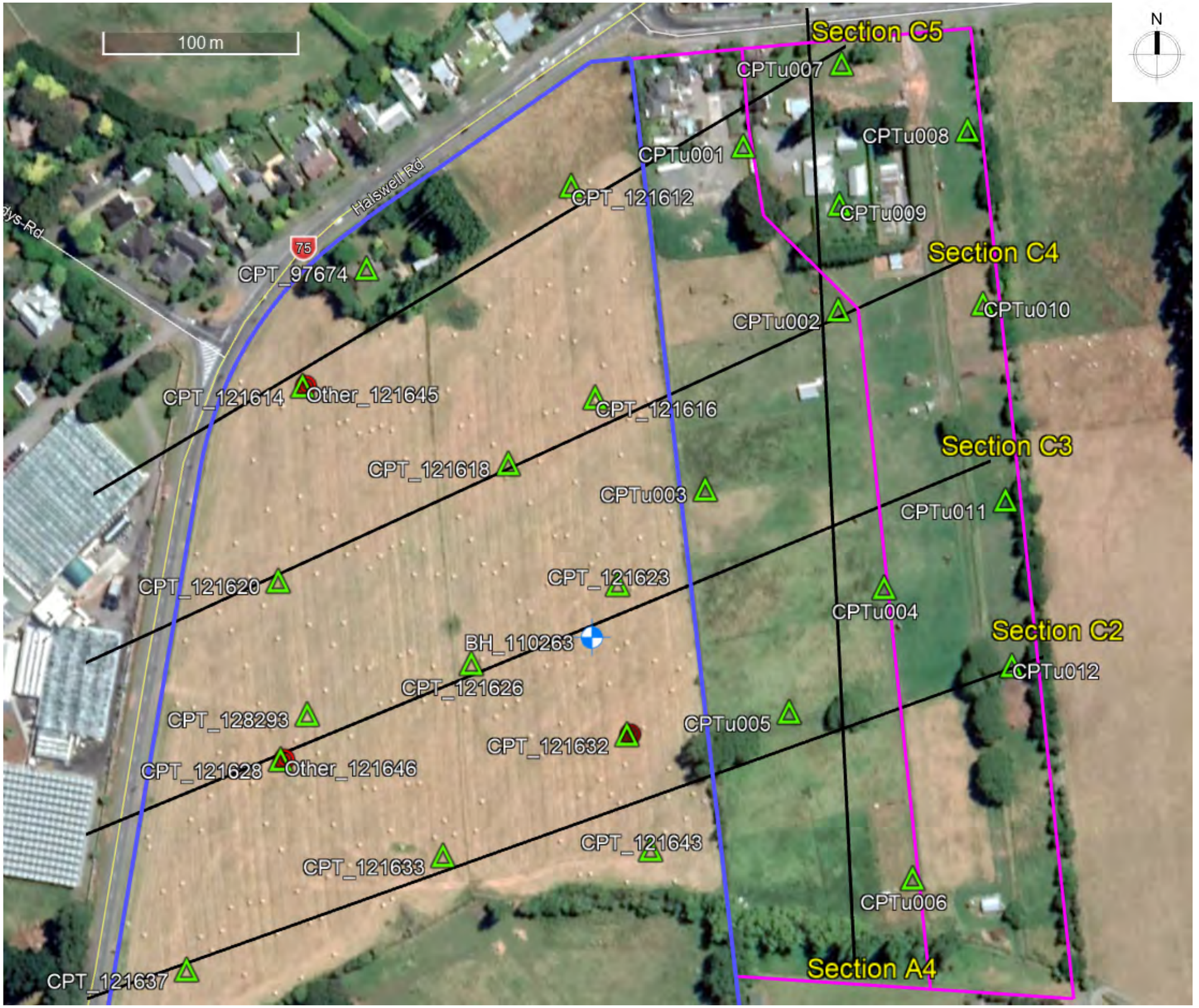
T: 64 03 377 4095
miyamoto.nz
projects@miyamoto.nz

PROJECT No: 200357
GEOTECHNICAL CROSS SECTIONS FOR 2&4 GLOVERS ROAD, HALSWELL, CHRISTCHURCH 8025

ISSUE DATE: 19/10/20 REV: 1

SHEET LIST

SHEET N°	SHEET NAME	REV.
S1	LOCATION PLAN	1
S2.1	GEOTECHNICAL CROSS-SECTION 1	1
S2.2	GEOTECHNICAL CROSS-SECTION 2	1
S2.3	GEOTECHNICAL CROSS-SECTION 3	1



miyamoto.
236 Hereford Street,
PO BOX 137 Cashel Street
Christchurch 8011
T: 64 03 377 4095
miyamoto.nz
projects@miyamoto.nz

SITE SURVEY DRAWINGS FOR
2&4 GLOVERS ROAD,
HALSWELL,
CHRISTCHURCH 8025

REVISION HISTORY

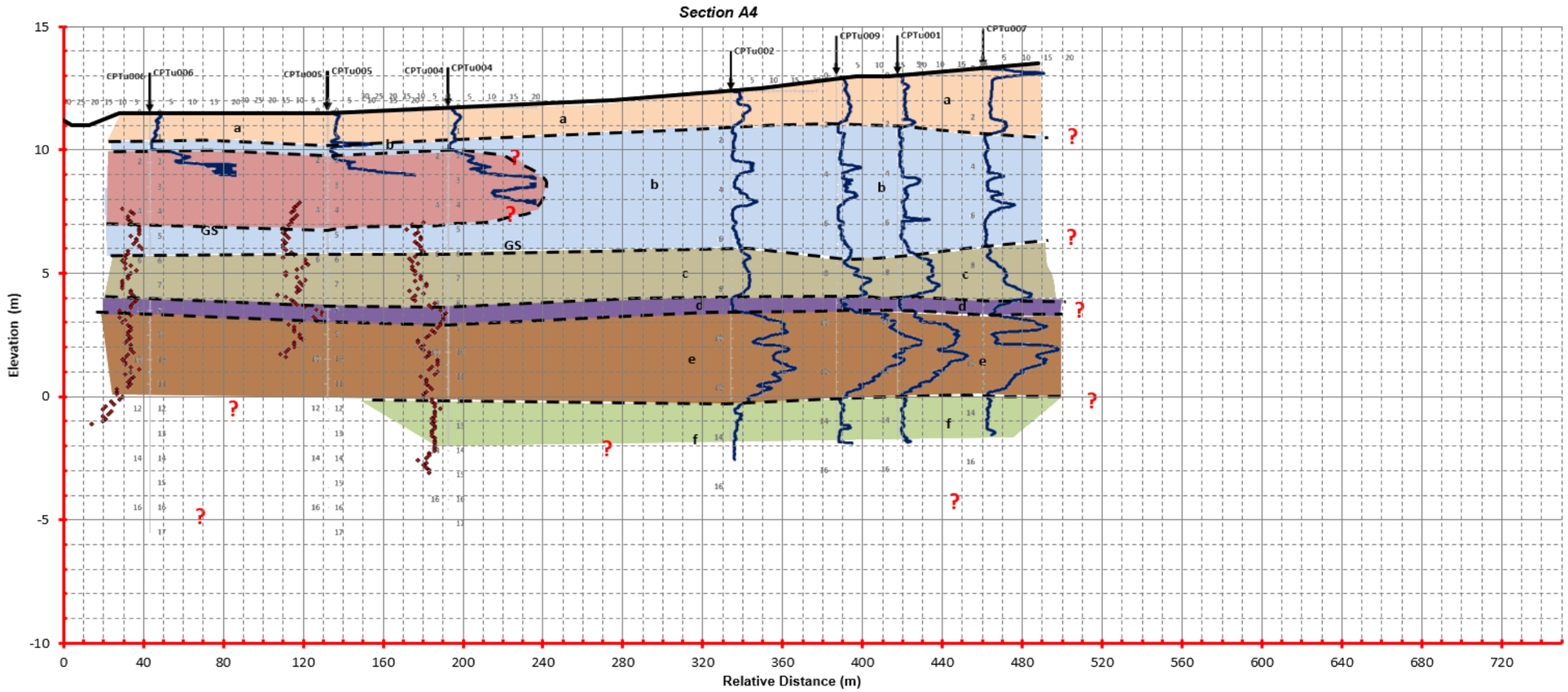
REV	DATE	DESCRIPTION
1	19/10/20	FINAL

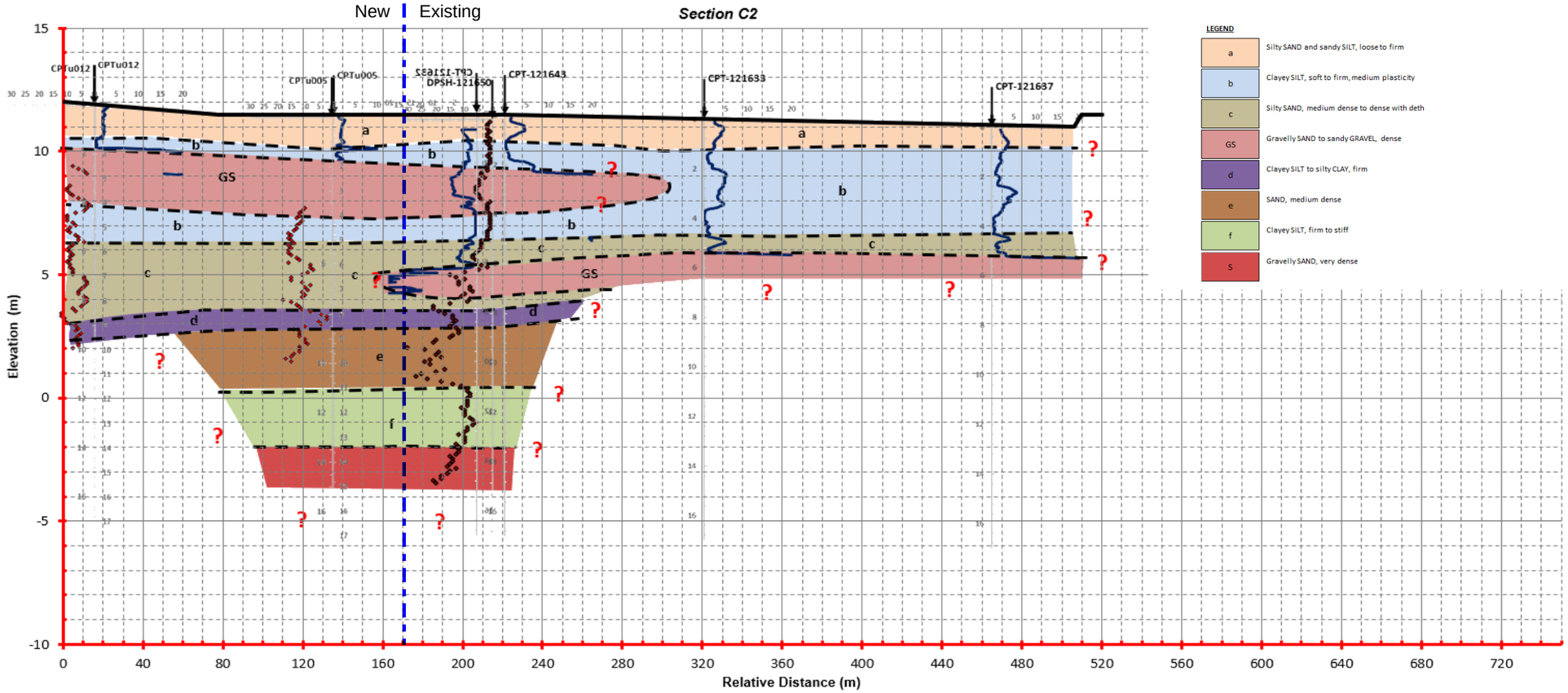
CLIENT:	YOURSECTION LTD
PROJECT No.:	200357
VERSION DATE:	16/10/2020
DRAWN:	CG
ENGINEER:	CG
APPROVED:	AG

SIZE: A3

LOCATION PLAN

SHEET No.: S1 REV. 1





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PO BOX 137 Cashel Street
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miyamoto.nz
projects@miyamoto.nz

SITE SURVEY DRAWINGS FOR 2&4 GLOVERS ROAD, HALSWELL, CHRISTCHURCH 8025

REVISION HISTORY

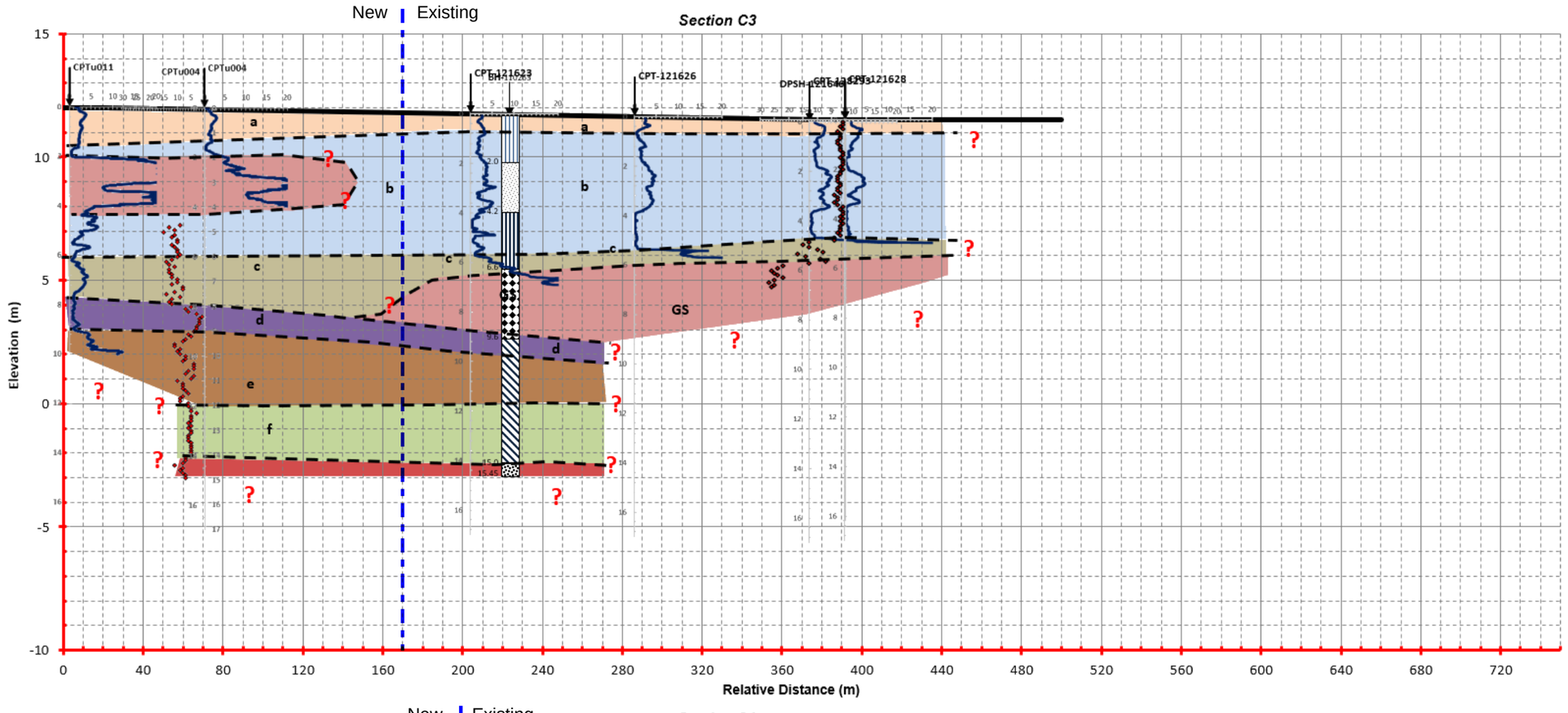
REV	DATE	DESCRIPTION
1	19/10/20	FINAL

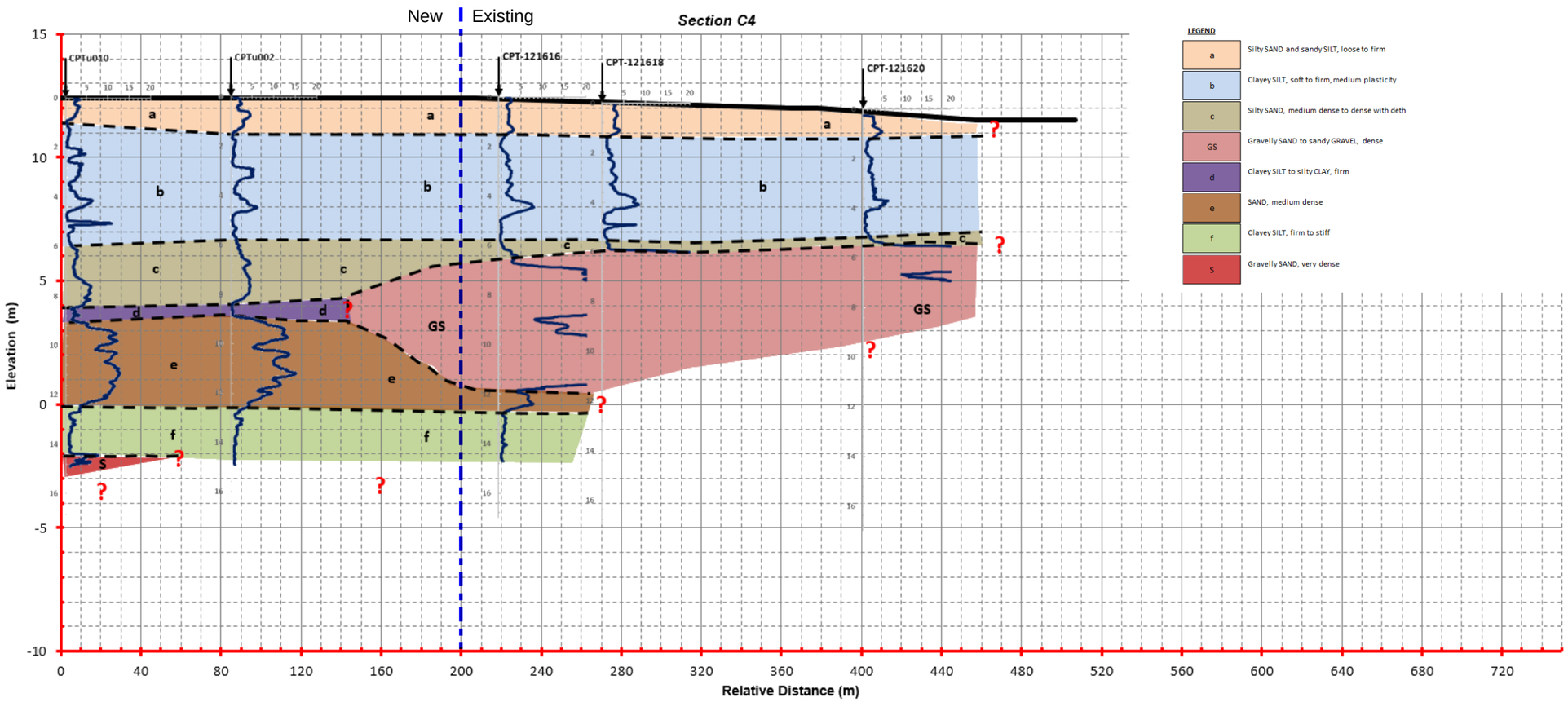
CLIENT:	YOURSECTION LTD
PROJECT No.:	200357
VERSION DATE:	16/10/2020
DRAWN:	CG
ENGINEER:	CG
APPROVED:	AG

SIZE: A3

GROUND MODEL SHEET 1

SHEET No.: S2.1 REV. 1





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236 Hereford Street,
PO BOX 137 Cashel Street
Christchurch 8011
T: 64 03 377 4095
miyamoto.nz
projects@miyamoto.nz

SITE SURVEY DRAWINGS FOR 2&4 GLOVERS ROAD, HALSWELL, CHRISTCHURCH 8025

REVISION HISTORY

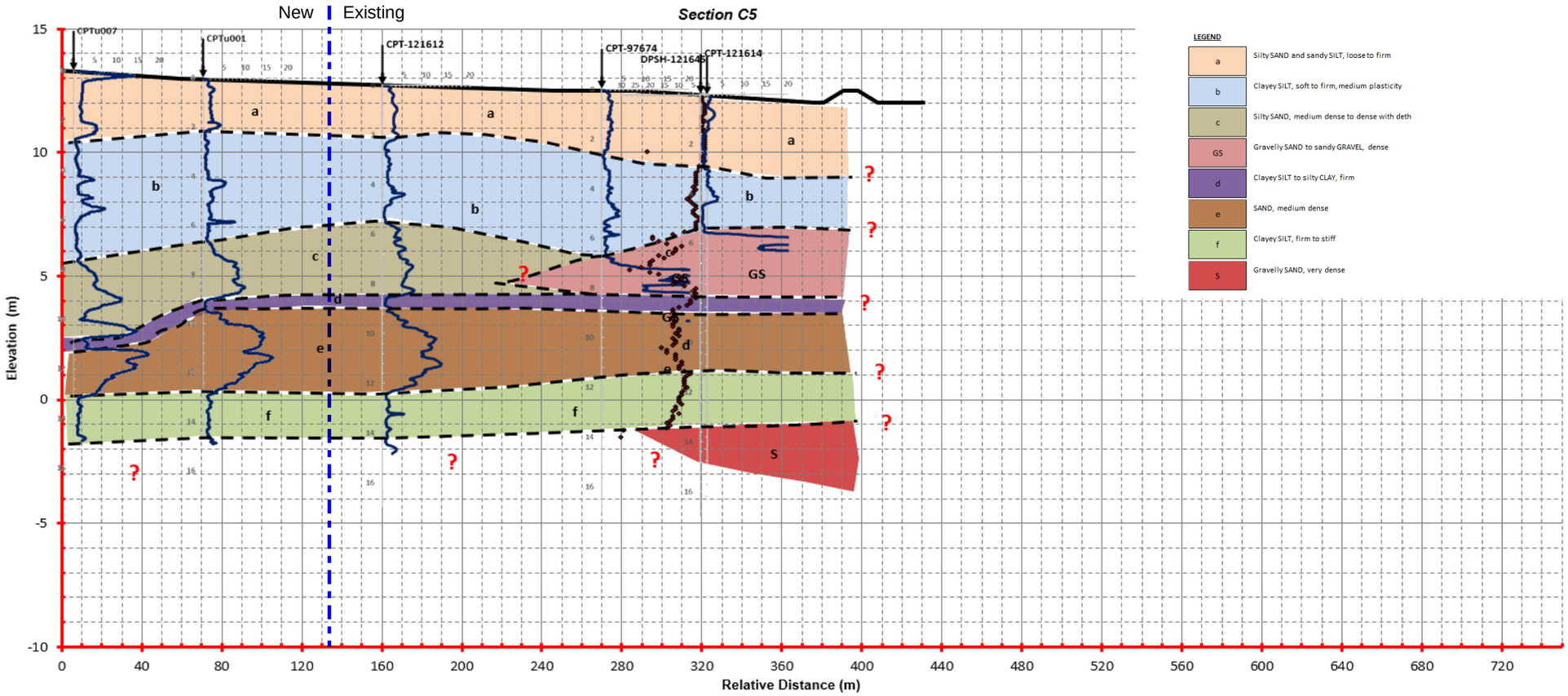
REV	DATE	DESCRIPTION
1	19/10/20	FINAL

CLIENT:	YOURSECTION LTD
PROJECT No.:	200357
VERSION DATE:	16/10/2020
DRAWN:	CG
ENGINEER:	CG
APPROVED:	AG

SIZE: A3

GROUND MODEL
SHEET 2

SHEET No.: S2.2 REV. 1



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SITE SURVEY DRAWINGS FOR 2&4 GLOVERS ROAD, HALSWELL, CHRISTCHURCH 8025

REVISION HISTORY

REV	DATE	DESCRIPTION
1	19/10/20	FINAL

CLIENT: YOURSECTION LTD

PROJECT No.: 200357

VERSION DATE: 16/10/2020

DRAWN: CG

ENGINEER: CG

APPROVED: AG

SIZE: A3

GROUND MODEL
SHEET 3

SHEET No.: S2.3 REV. 1

F. Liquefaction Analyses

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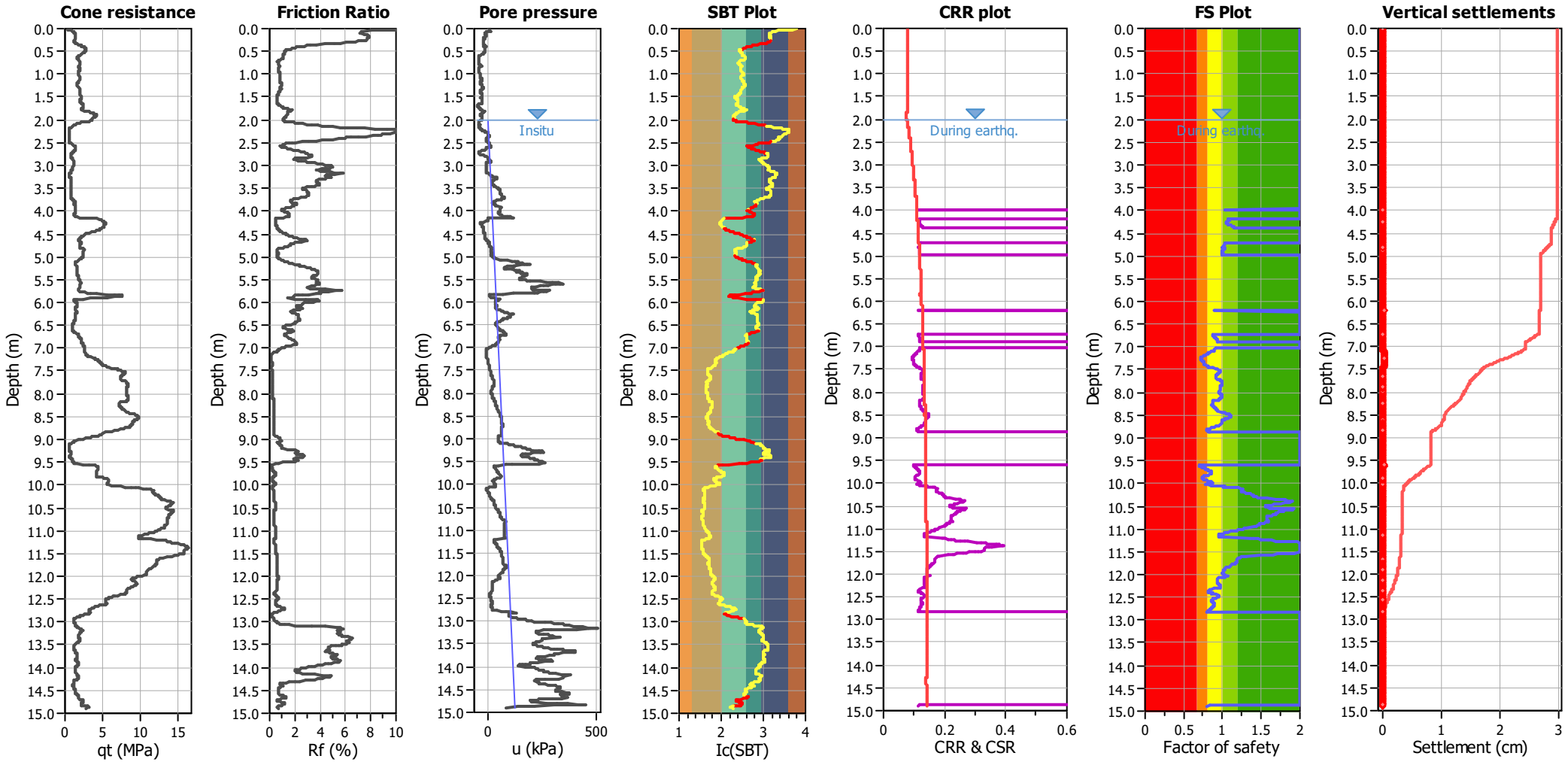
Project: MINZ200357 - Geotechnical Investigation and Assessment
Location: 2 Glovers Road Subdivision, Halswell, Christchurch

CPT: CPTu001 SLS
Total depth: 14.89 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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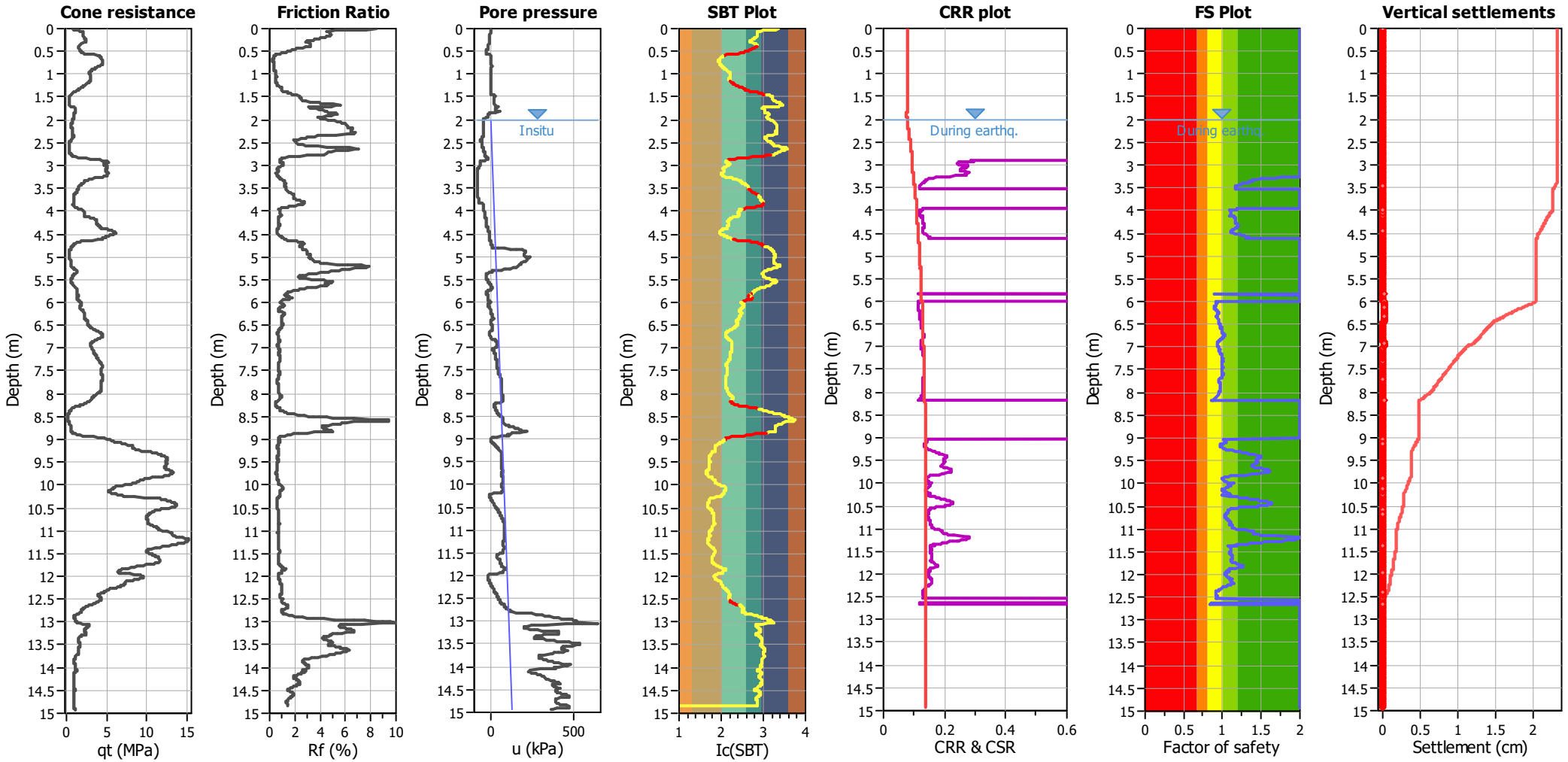
Project: MINZ200357 - Geotechnical Investigation and Assessment
Location: 2 Glovers Road Subdivision, Halswell, Christchurch

CPT: CPTu002 SLS
Total depth: 14.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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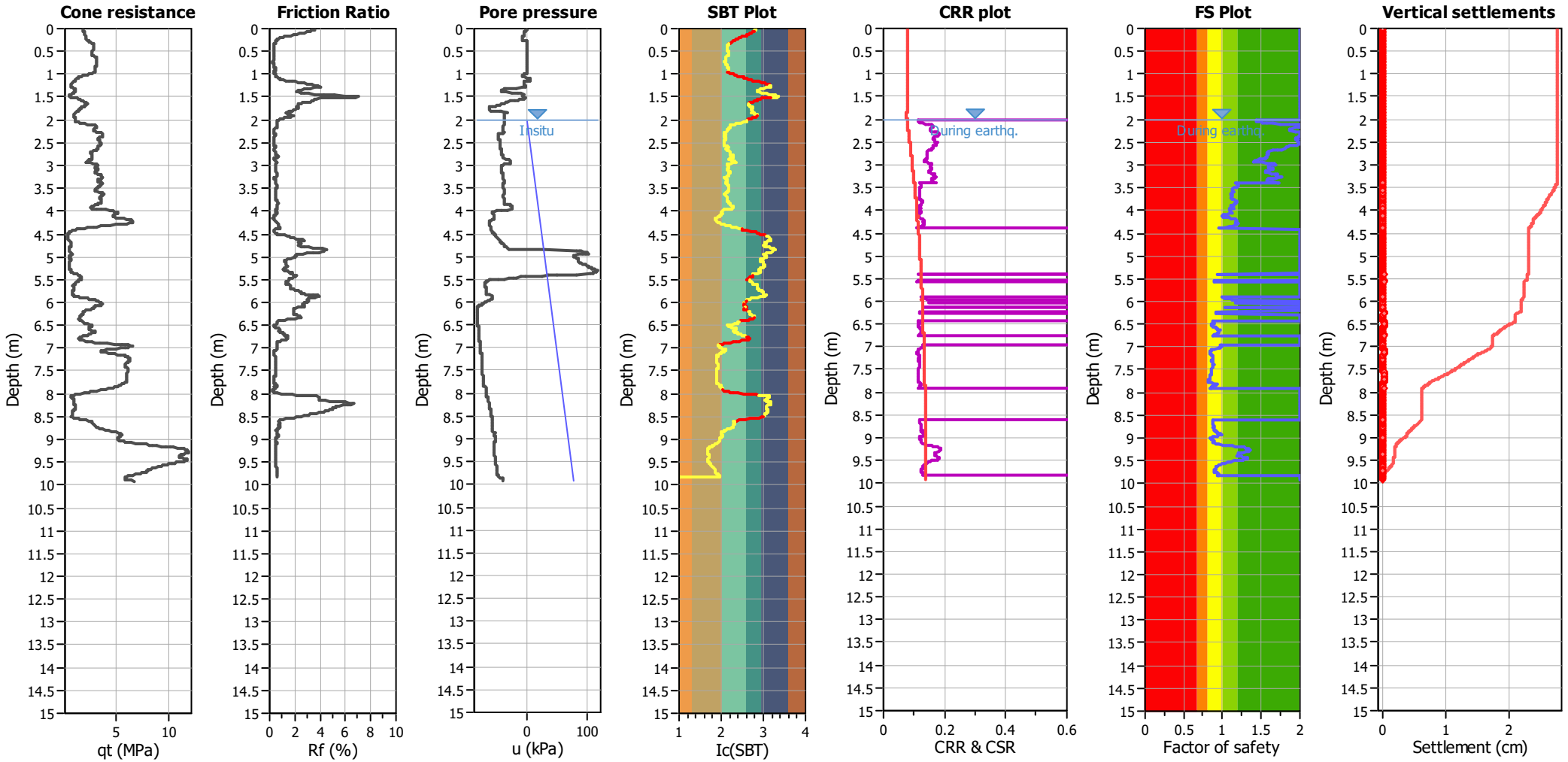
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu003 SLS
Total depth: 9.91 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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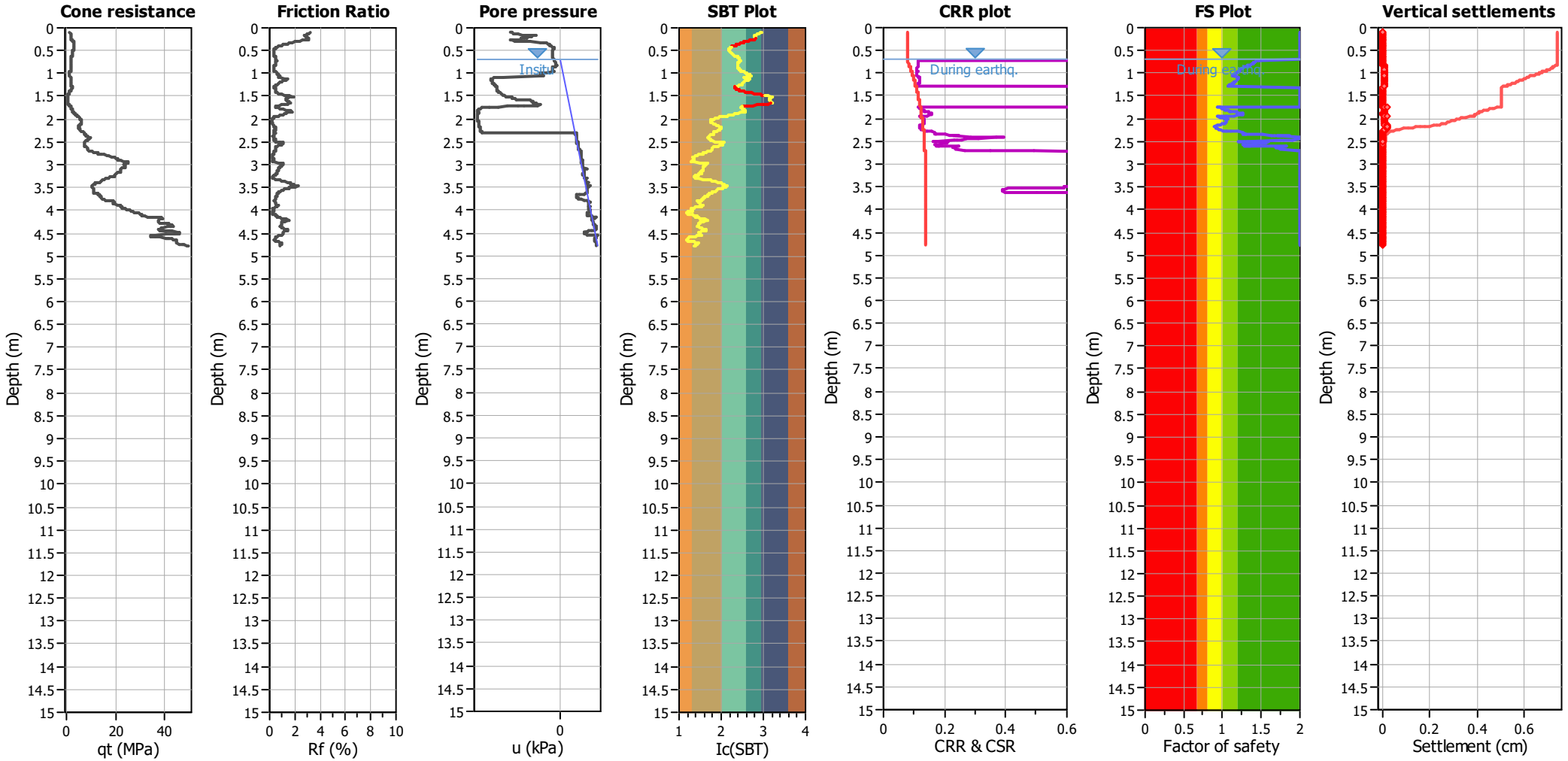
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu004 SLS
Total depth: 4.78 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.70 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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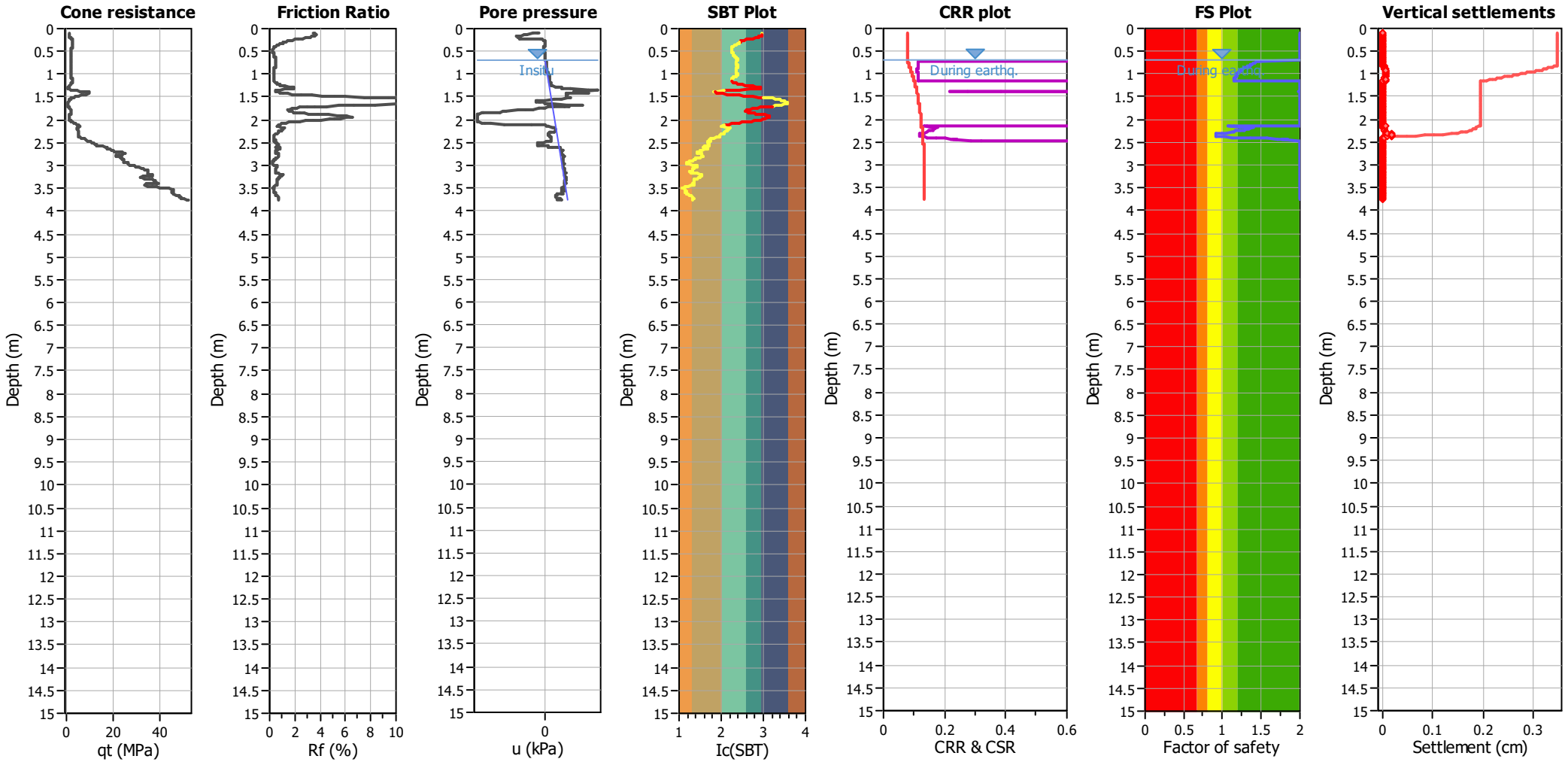
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu005 SLS
Total depth: 3.76 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.70 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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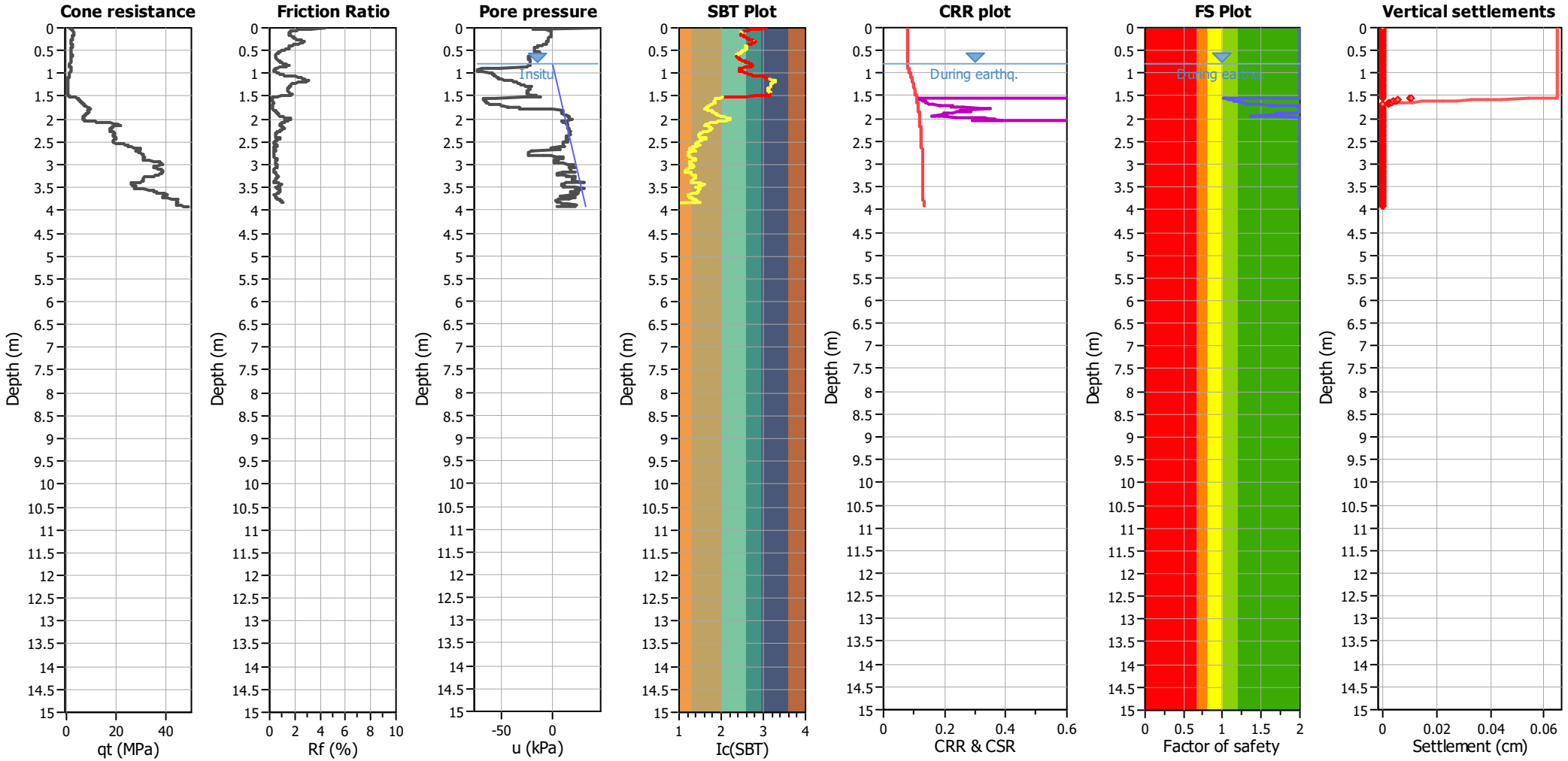
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu006 SLS
Total depth: 3.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.80 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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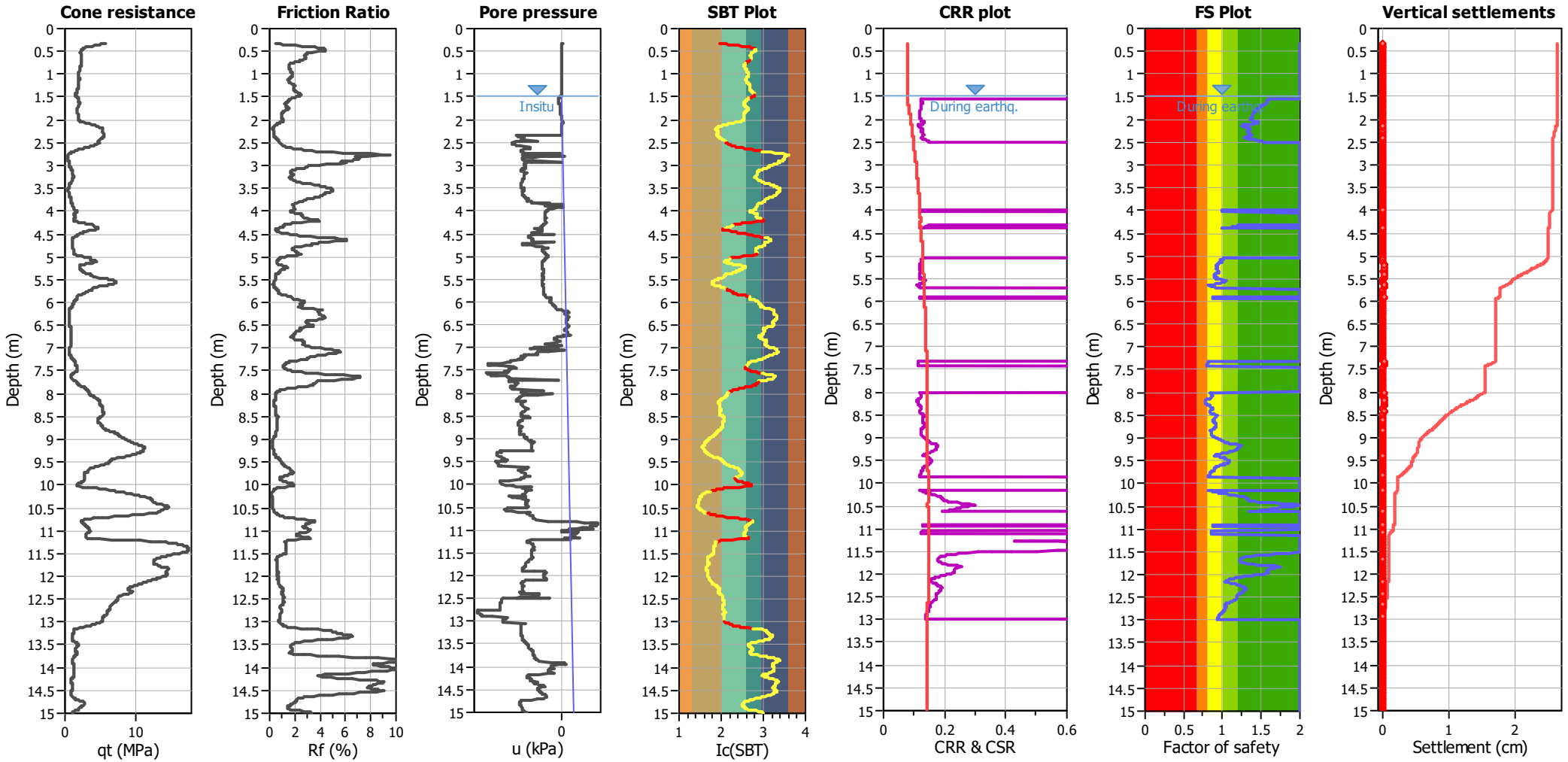
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu007 SLS
Total depth: 15.00 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.50 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.50 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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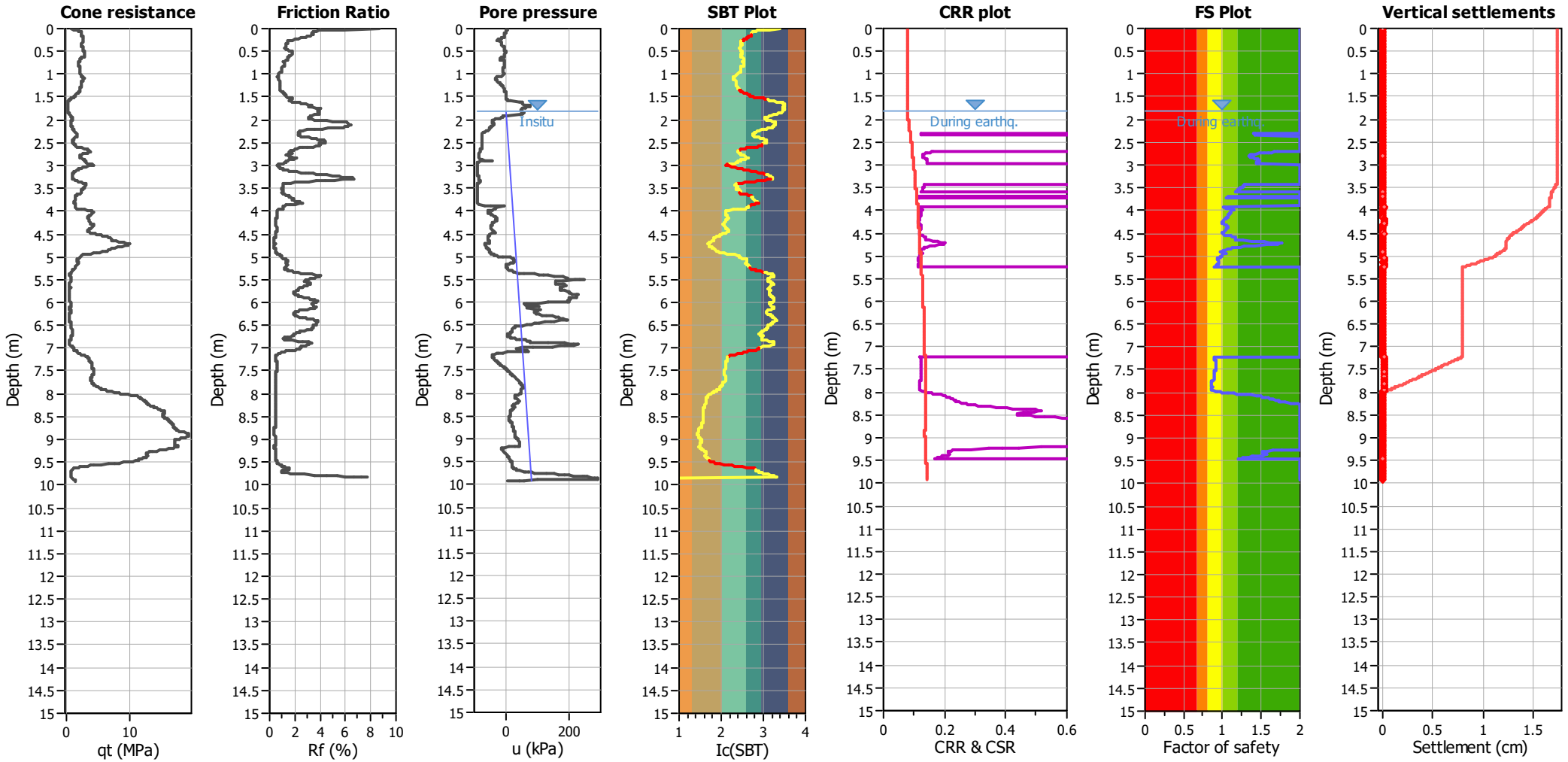
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu008 SLS
Total depth: 9.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.80 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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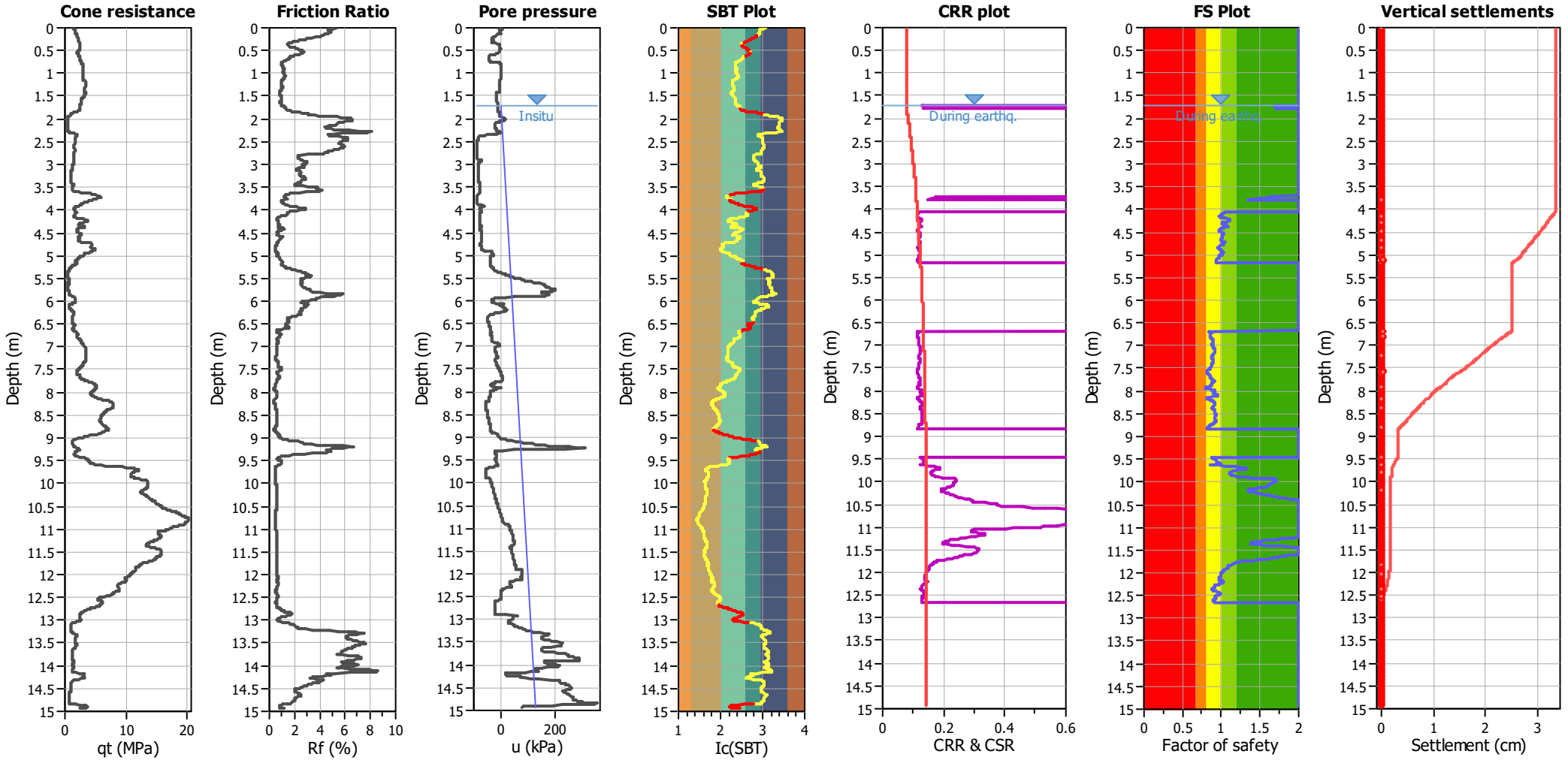
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu009 SLS
Total depth: 14.95 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.70 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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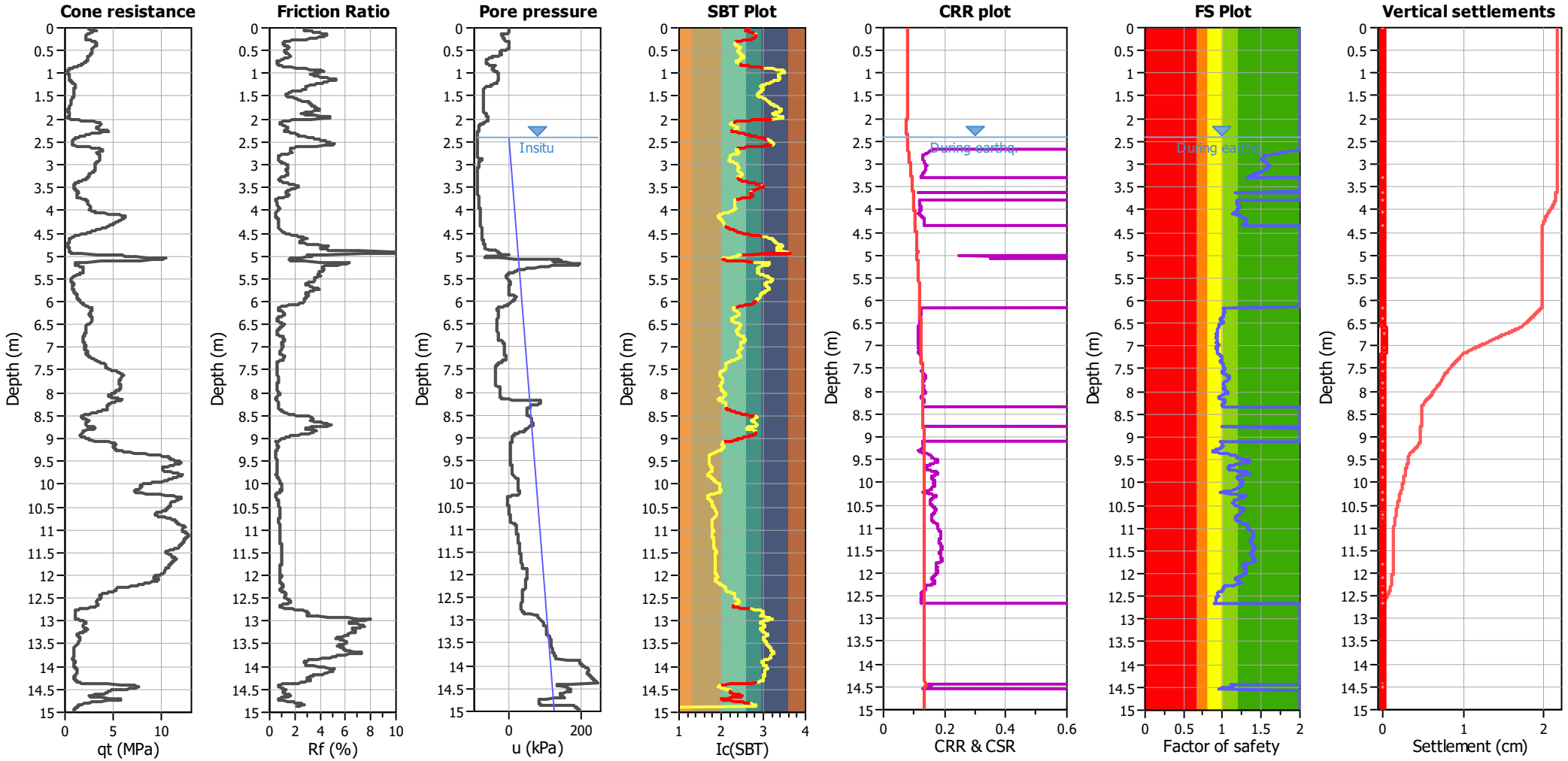
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu010 SLS
Total depth: 14.97 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.40 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.40 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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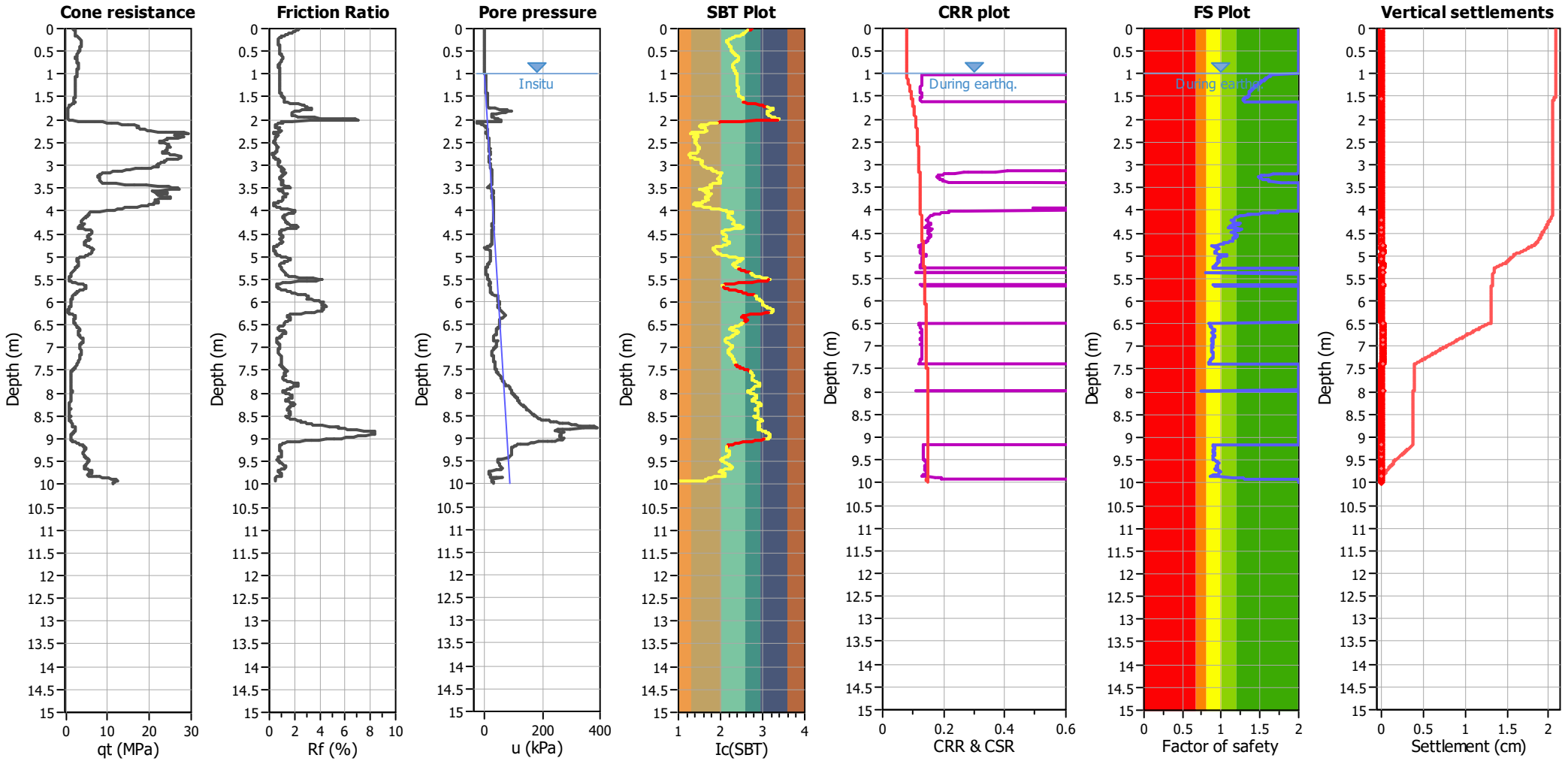
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu011 SLS
Total depth: 9.99 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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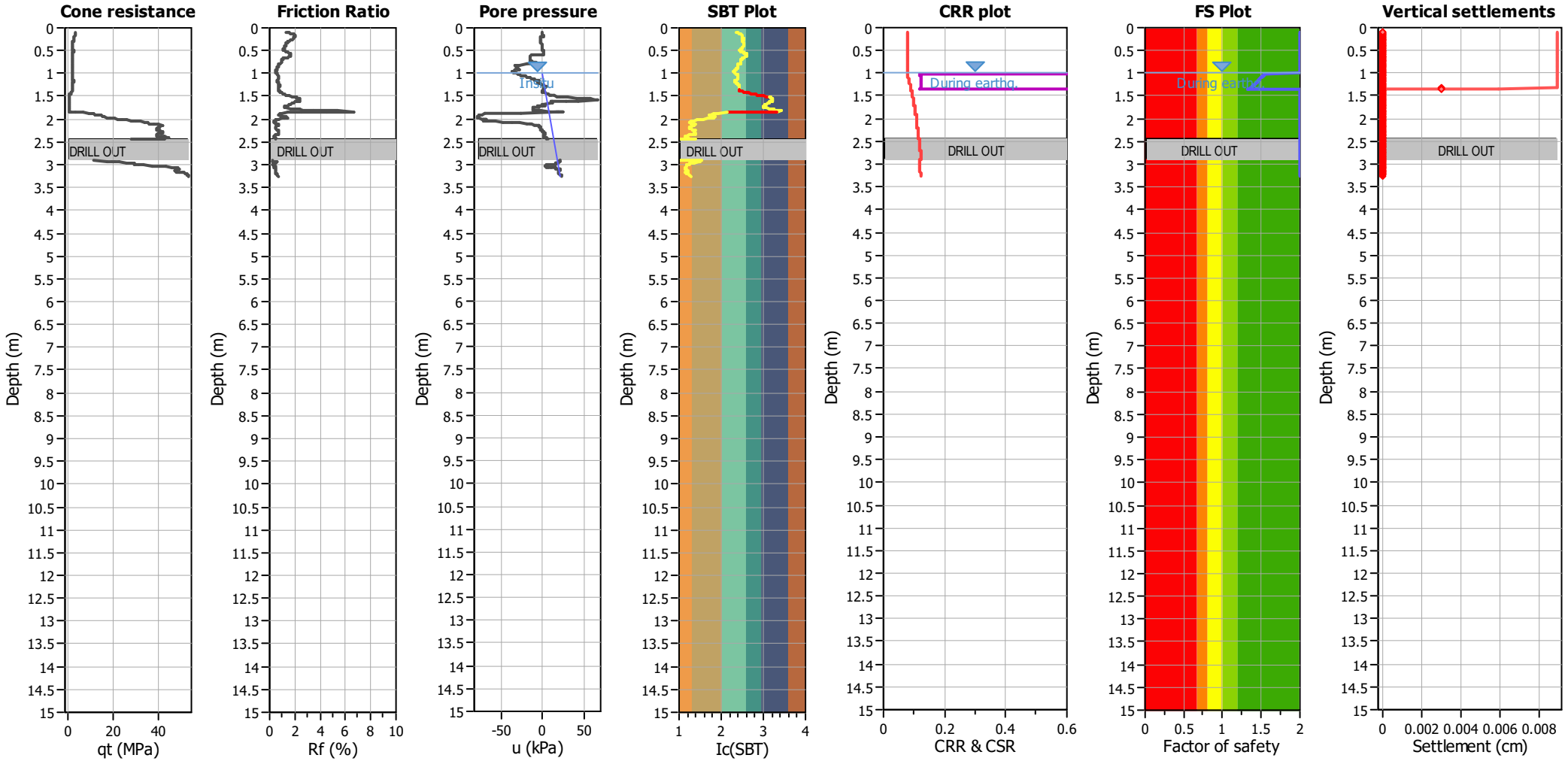
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu012 SLS
Total depth: 3.25 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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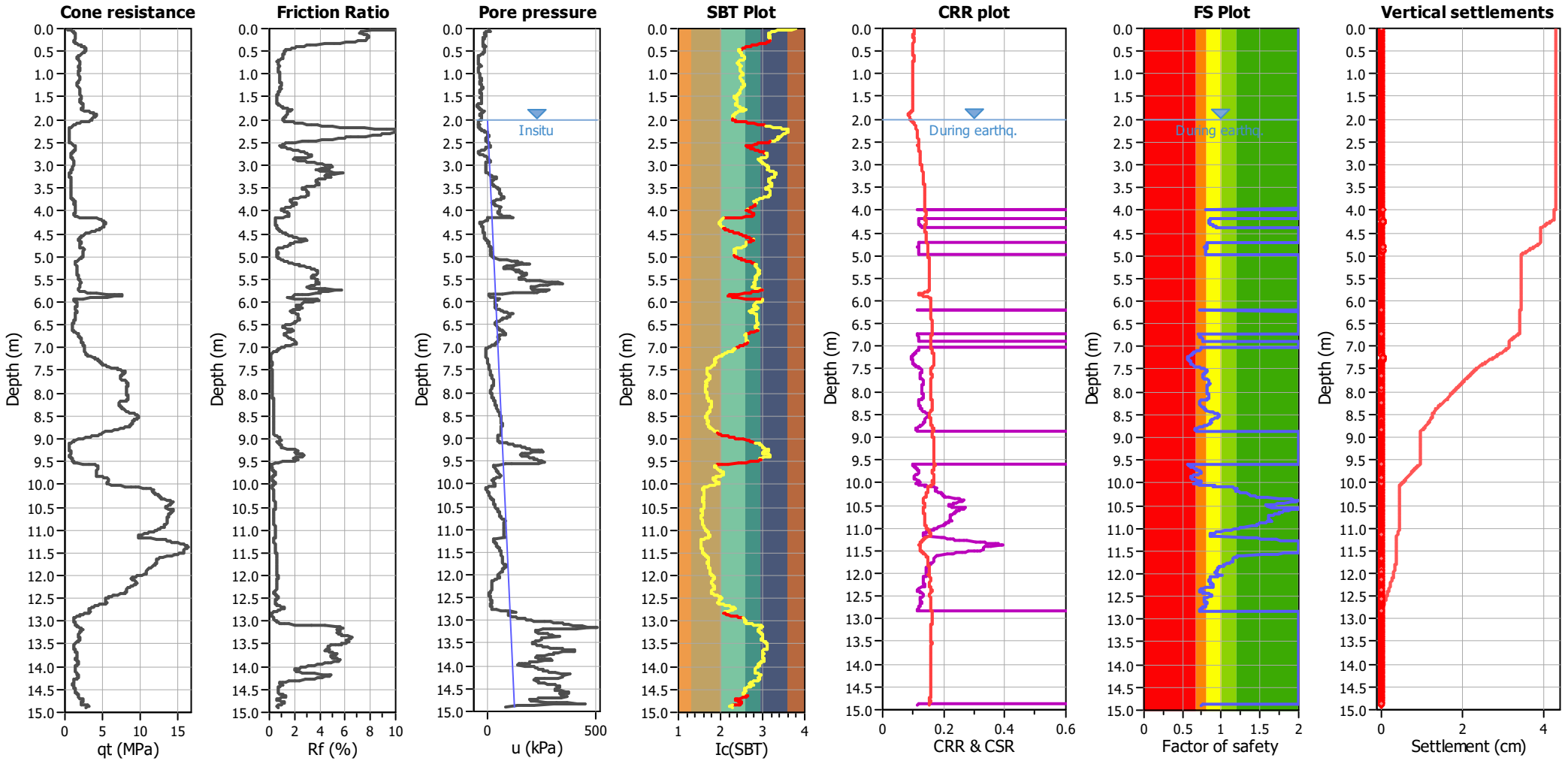
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu001 SLS2
Total depth: 14.89 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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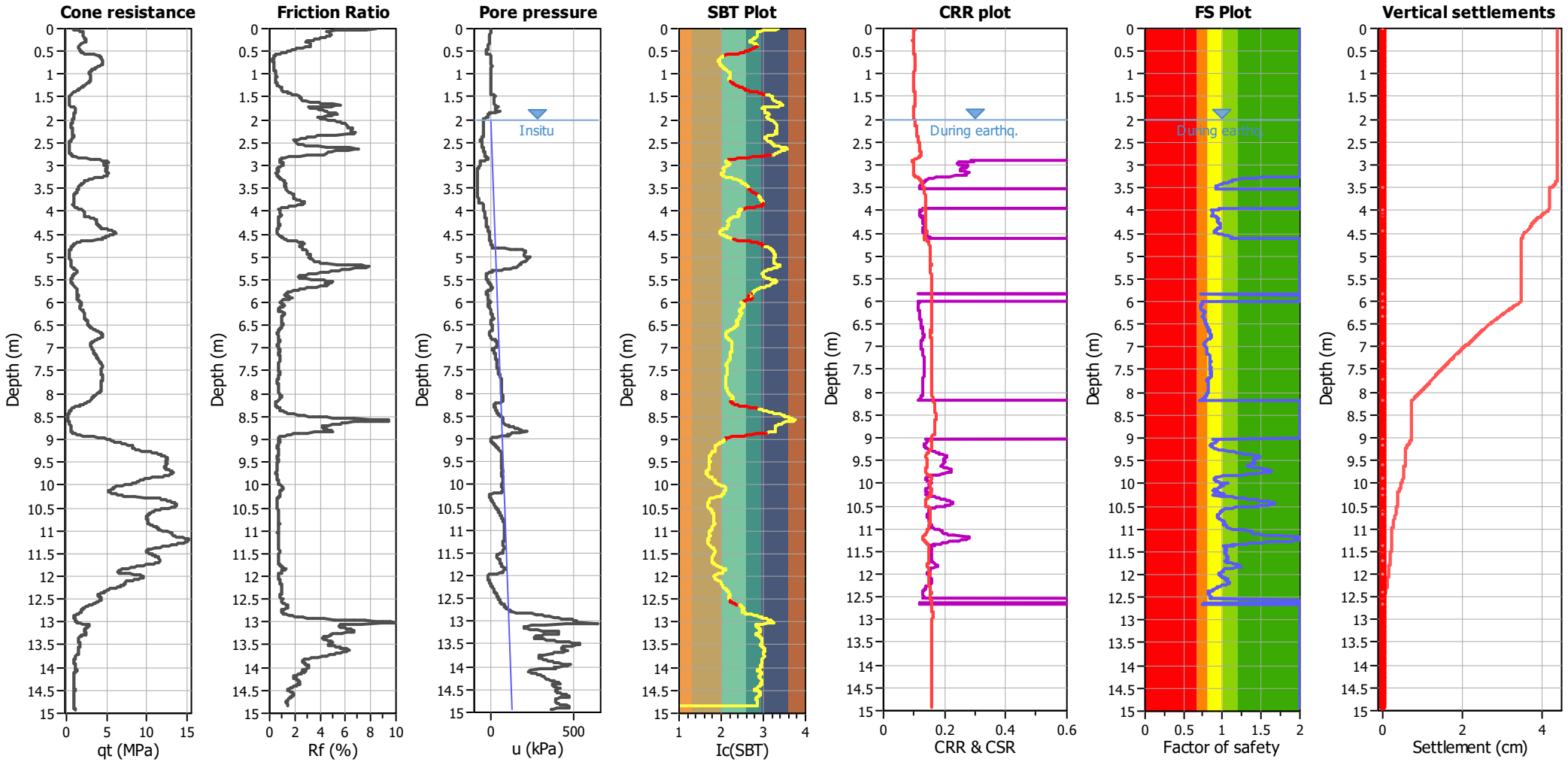
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu002 SLS2
Total depth: 14.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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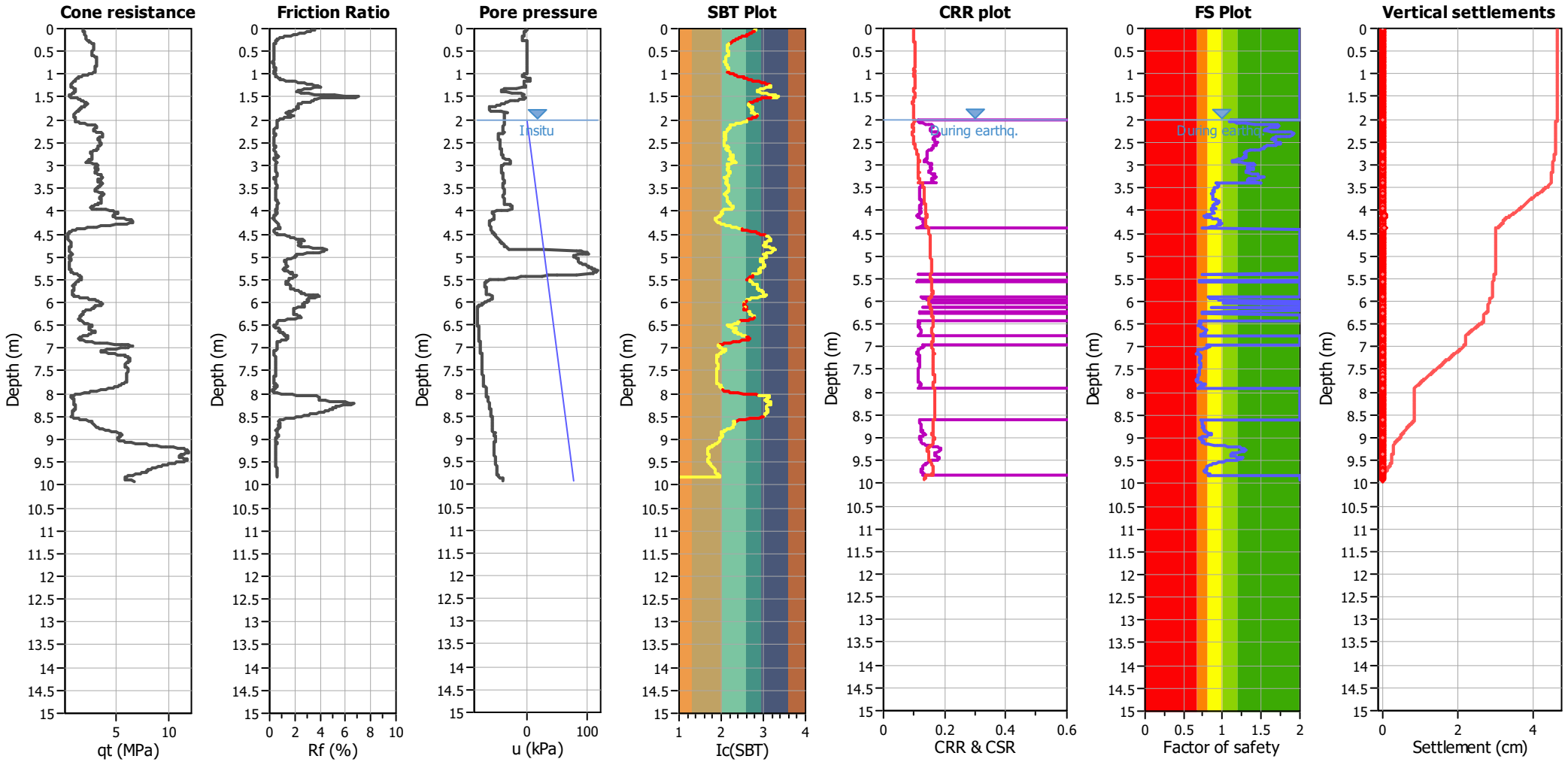
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu003 SLS2
Total depth: 9.91 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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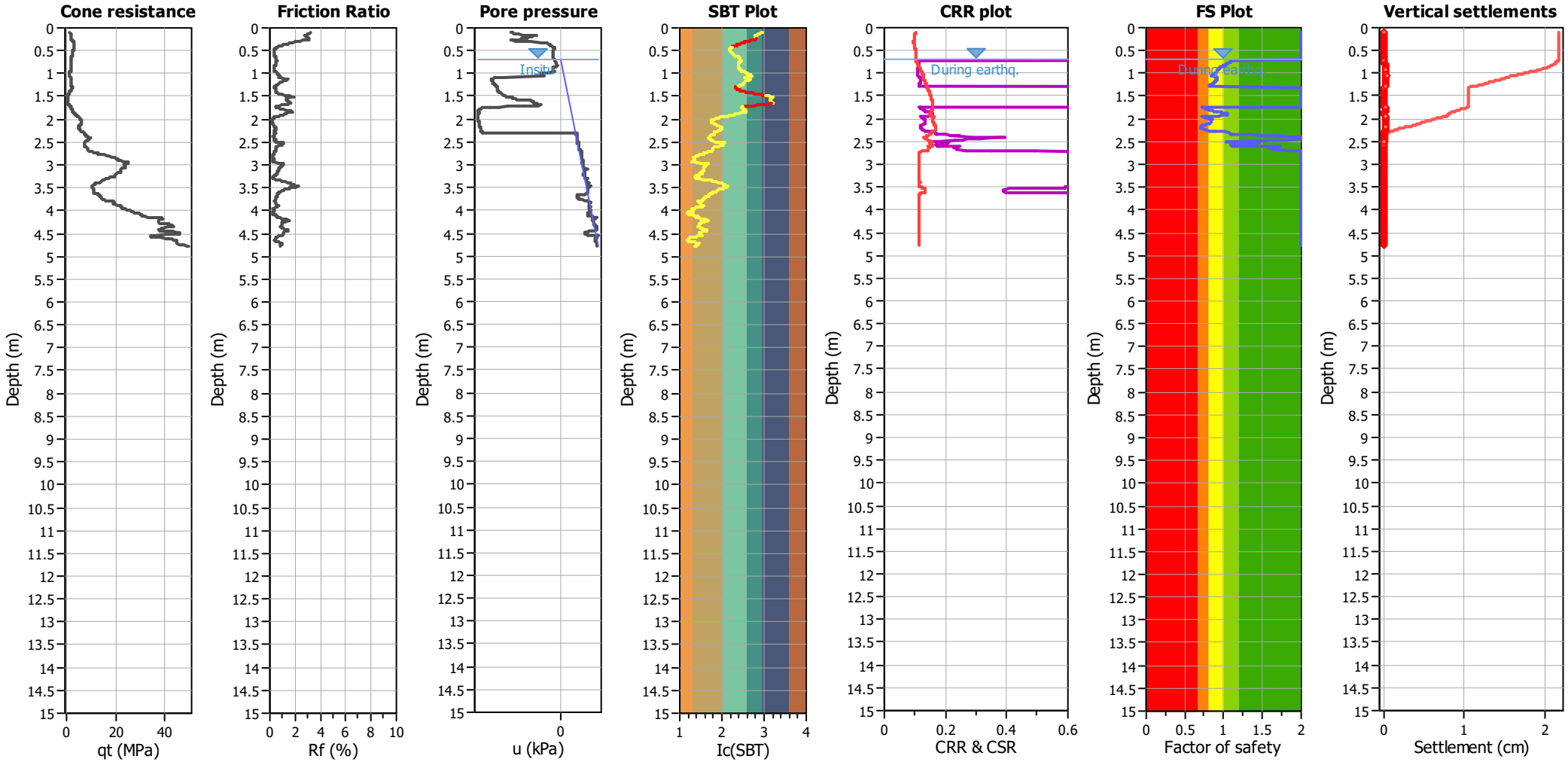
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu004 SLS2
Total depth: 4.78 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.70 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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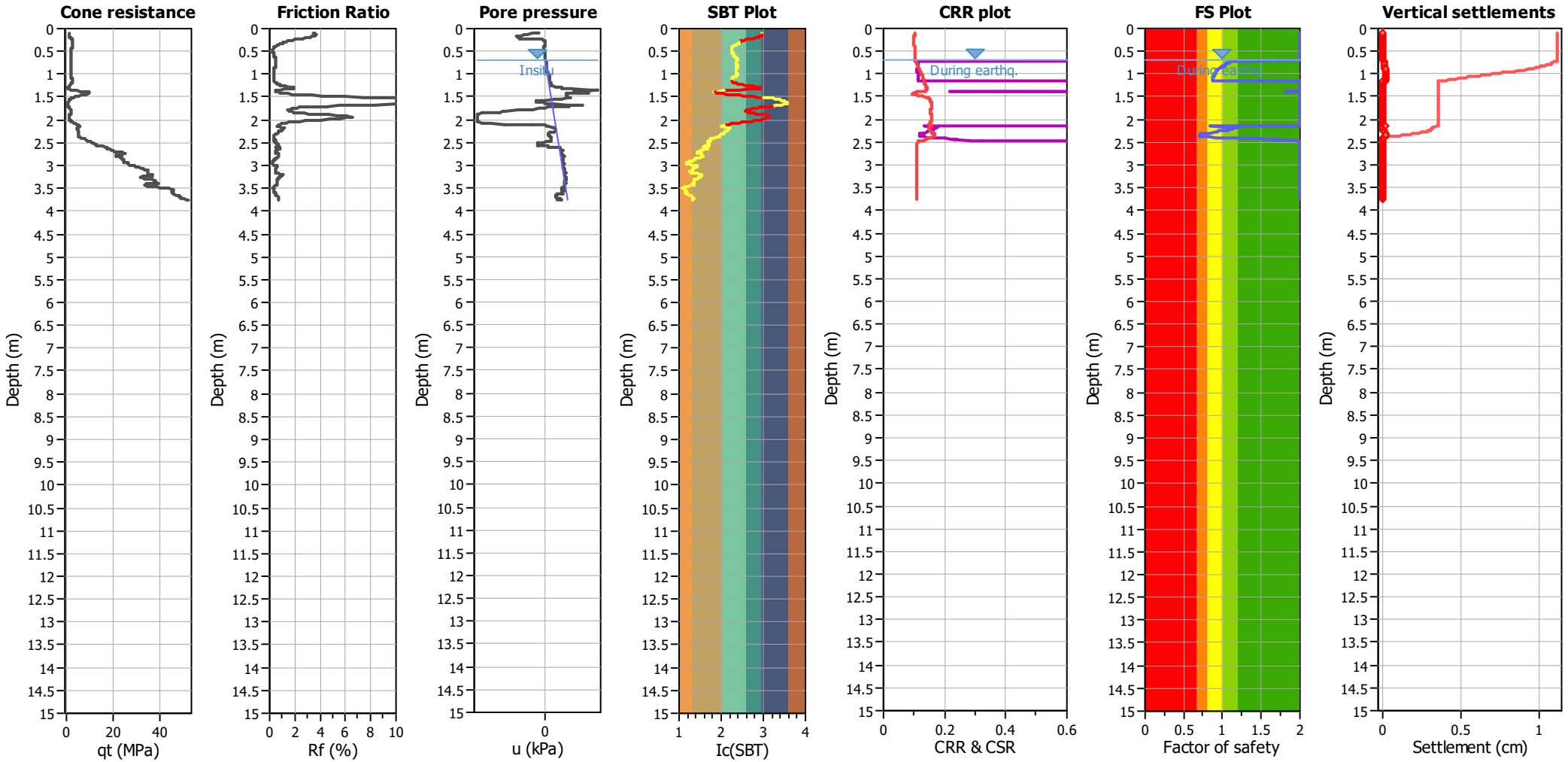
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu005 SLS2
Total depth: 3.76 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.70 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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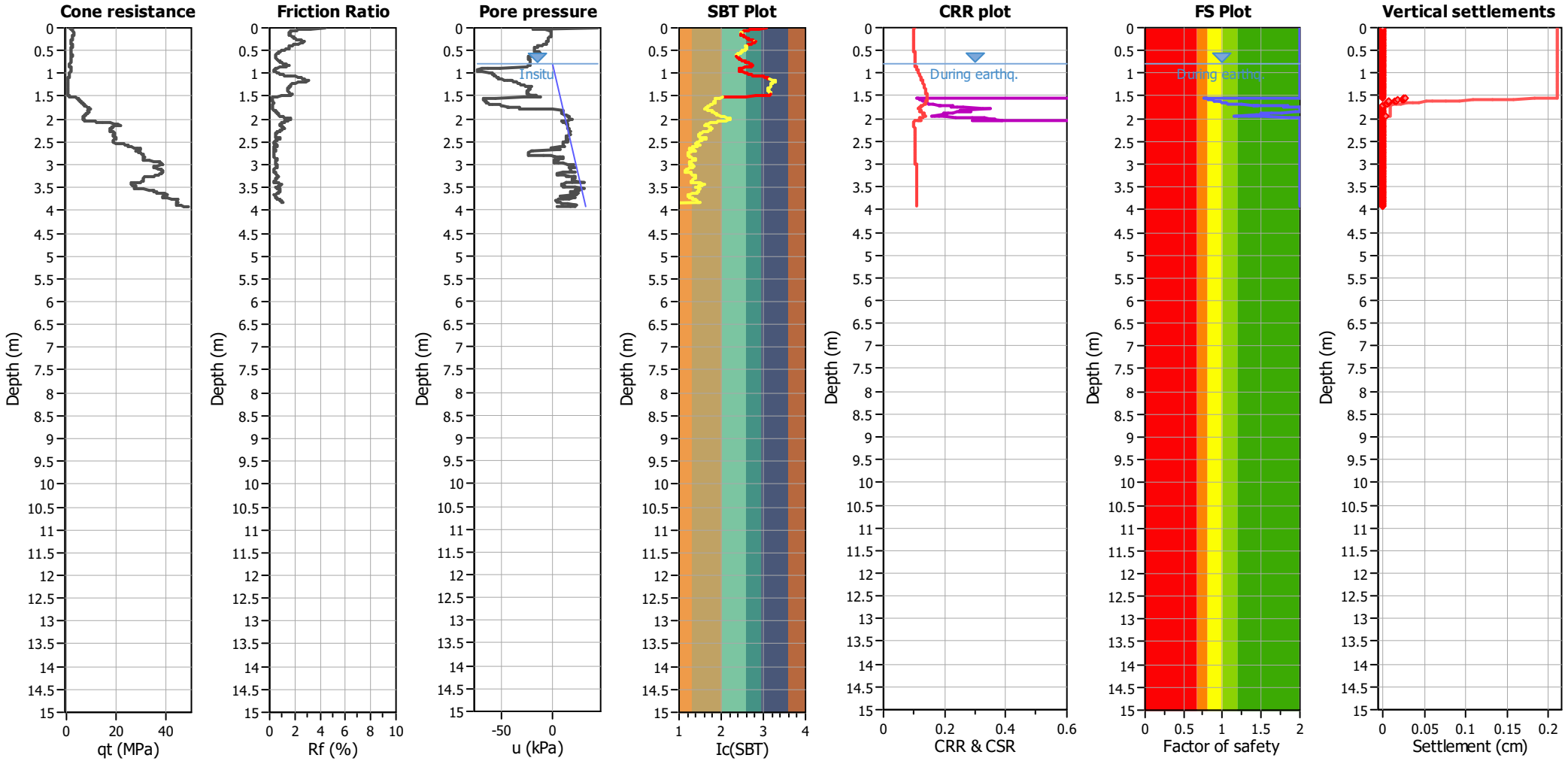
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu006 SLS2
Total depth: 3.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.80 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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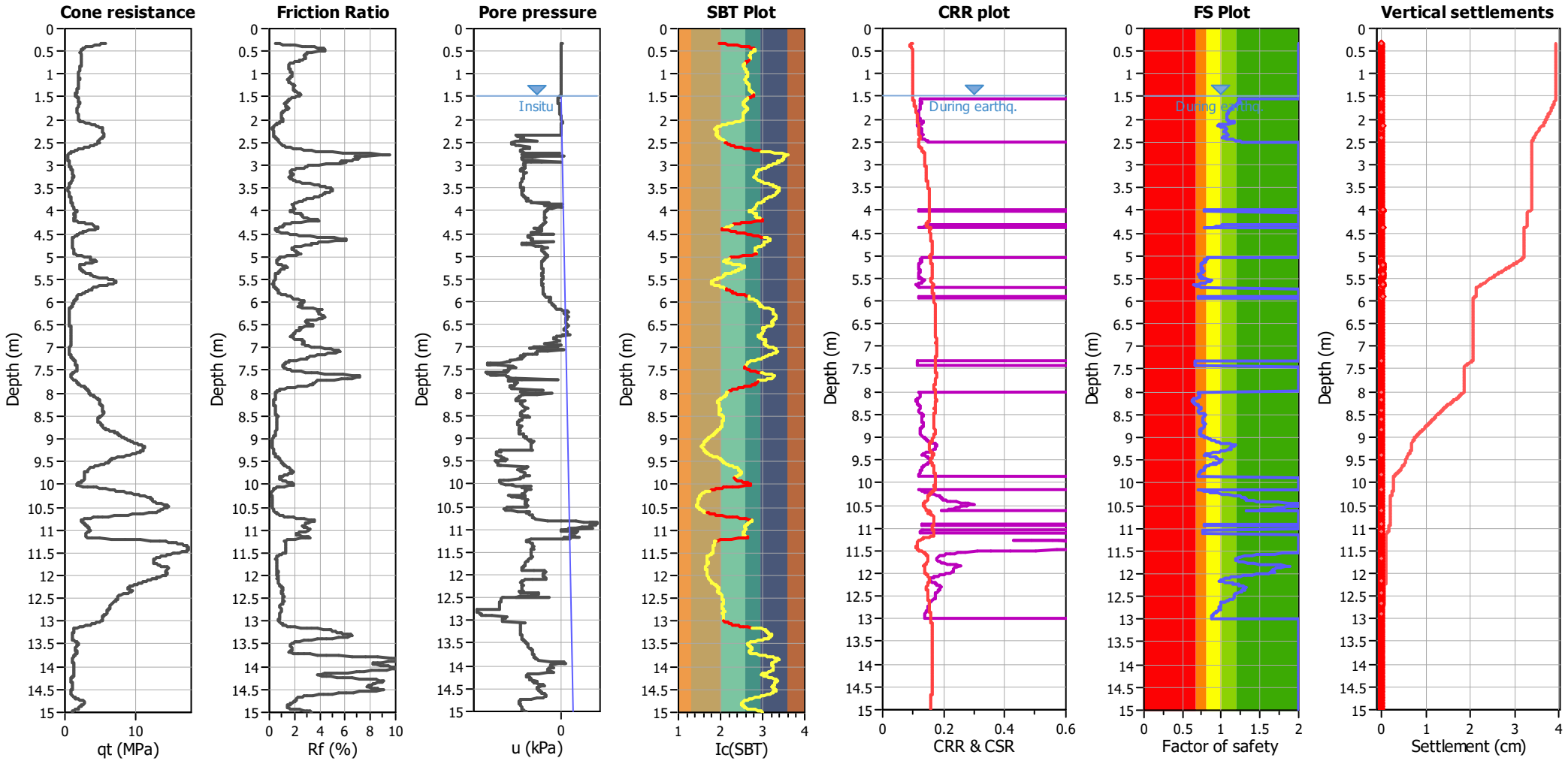
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu007 SLS2
Total depth: 15.00 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.50 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.50 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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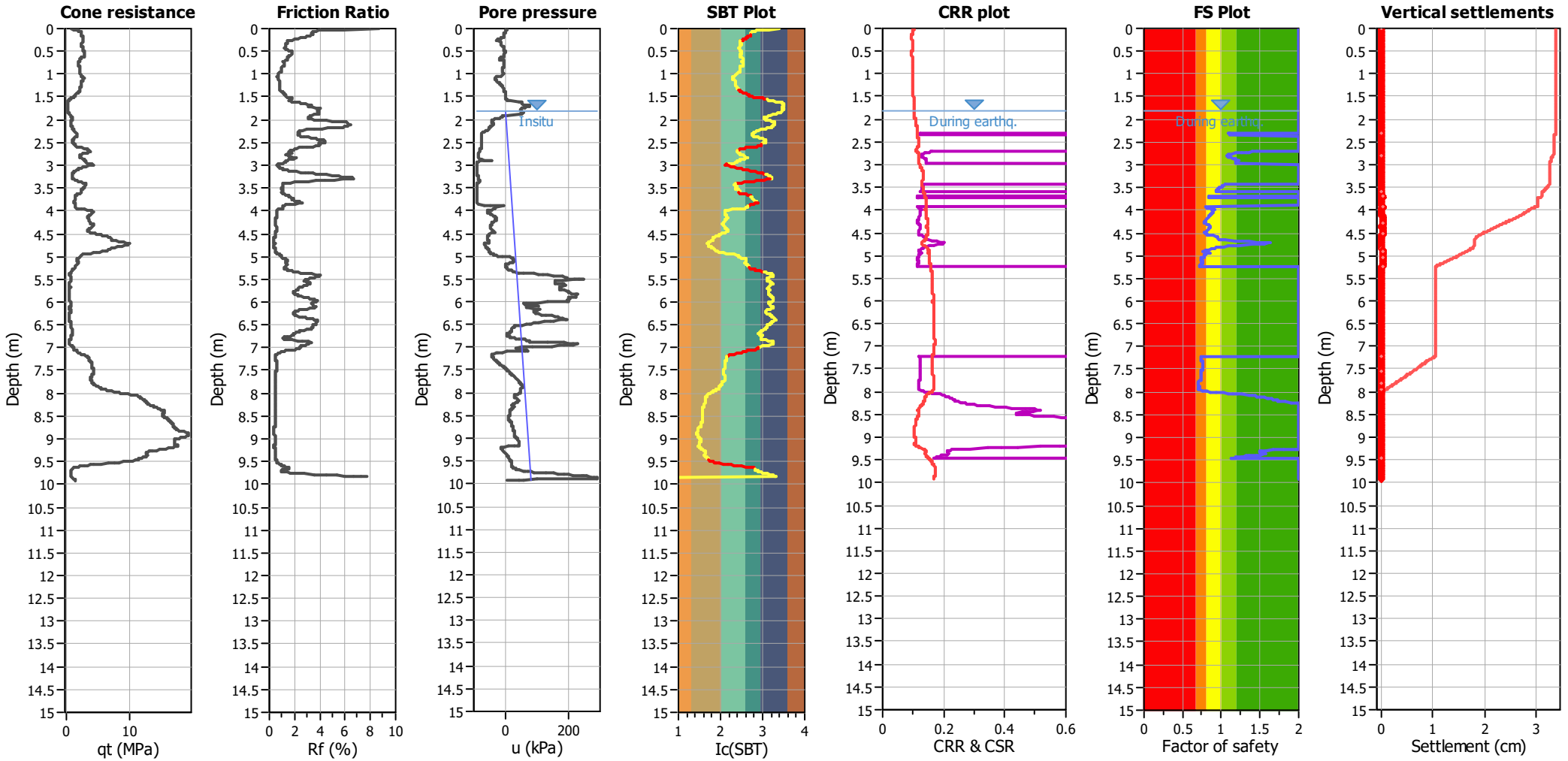
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu008 SLS
Total depth: 9.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.80 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.80 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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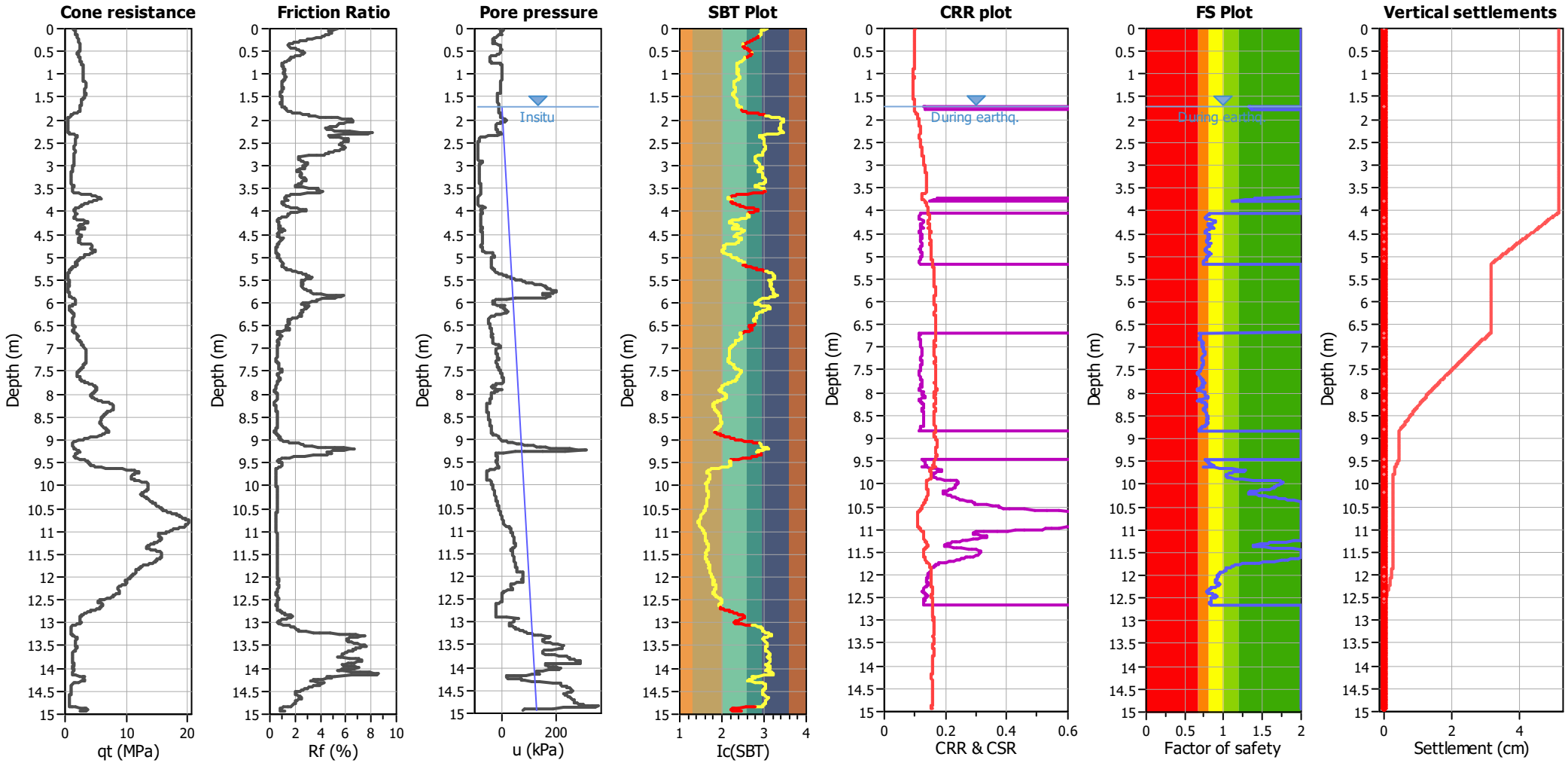
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu009 SLS2
Total depth: 14.95 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.70 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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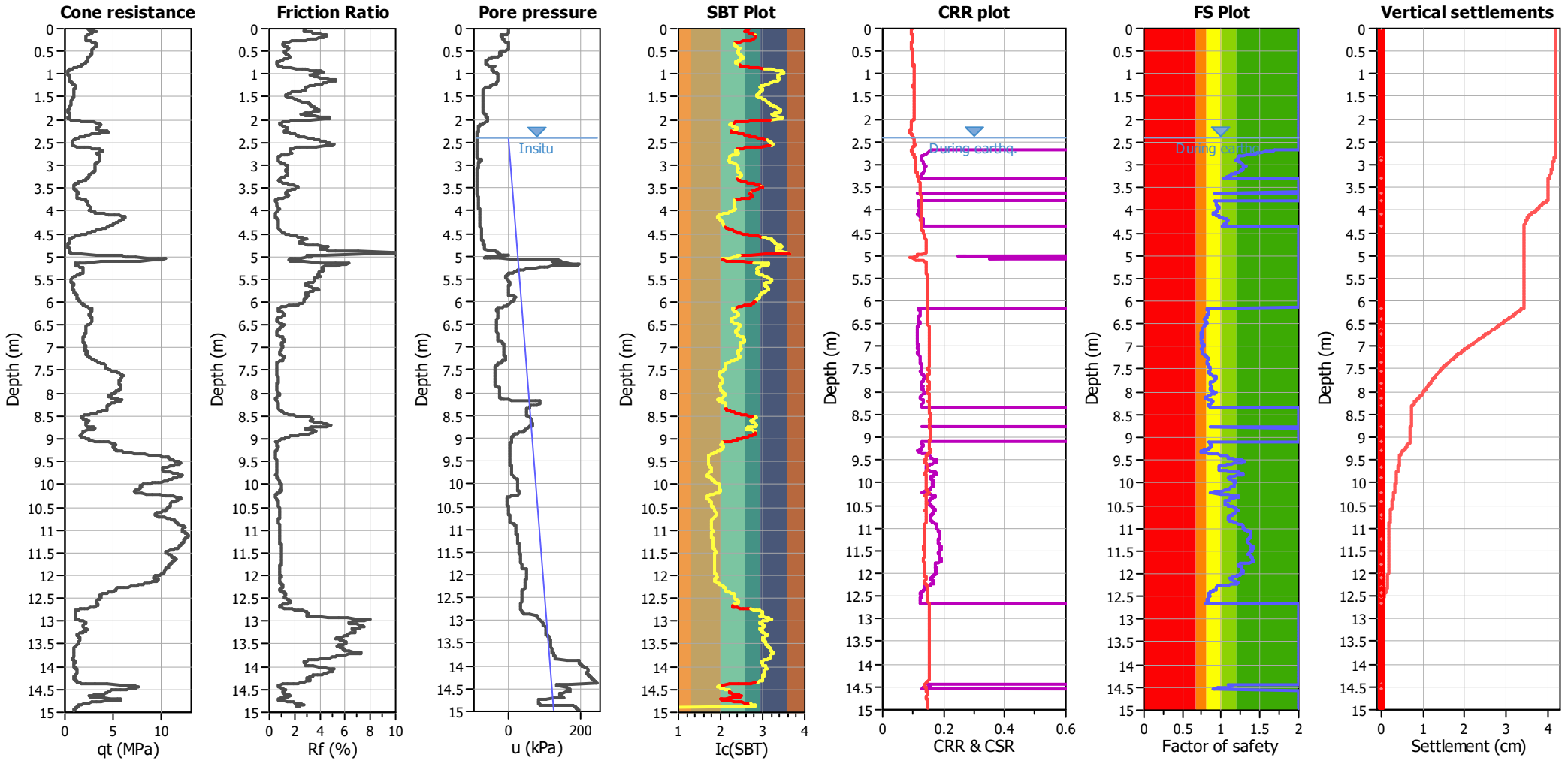
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu010 SLS2
Total depth: 14.97 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.40 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.40 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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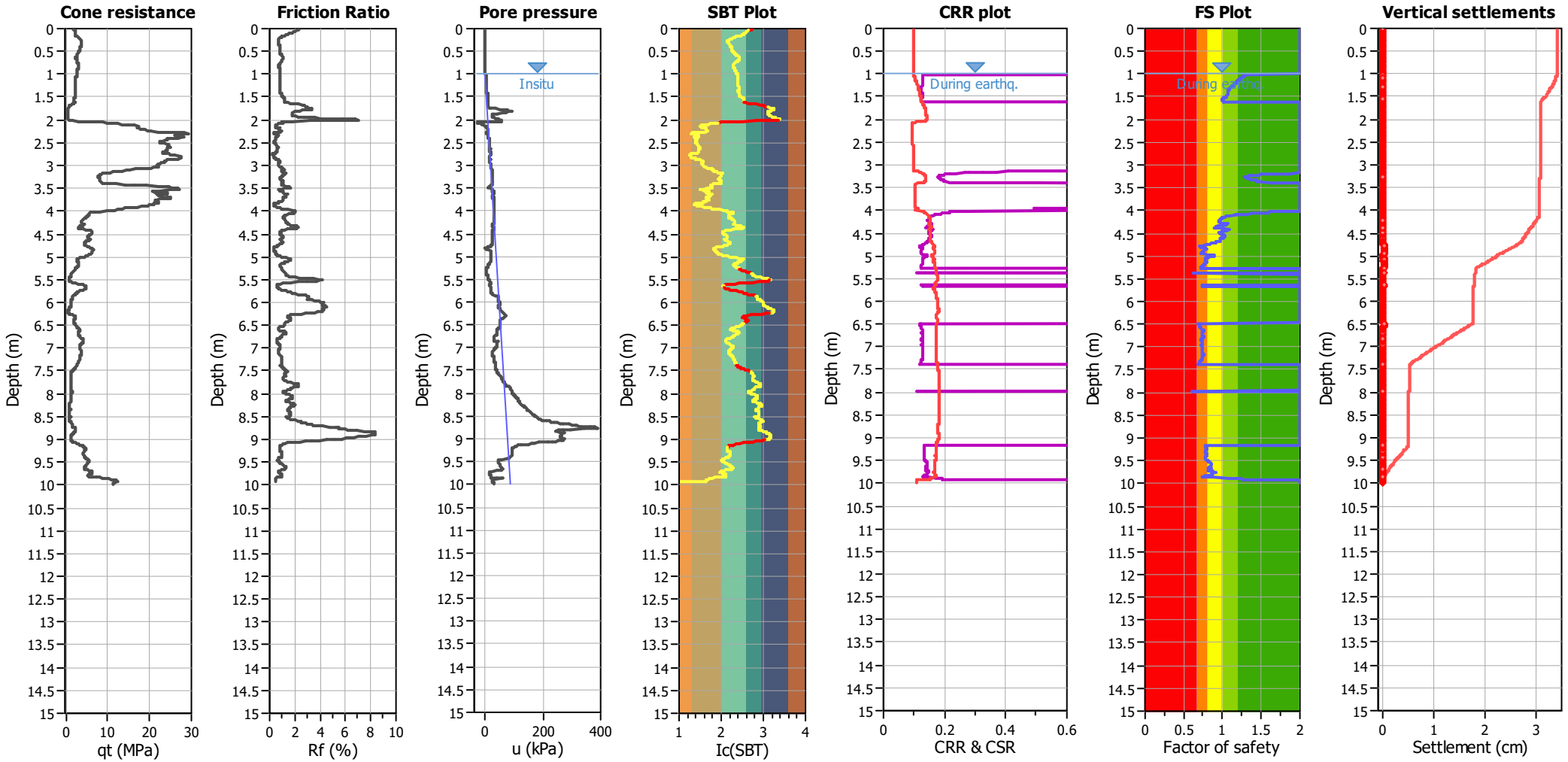
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu011 SLS2
Total depth: 9.99 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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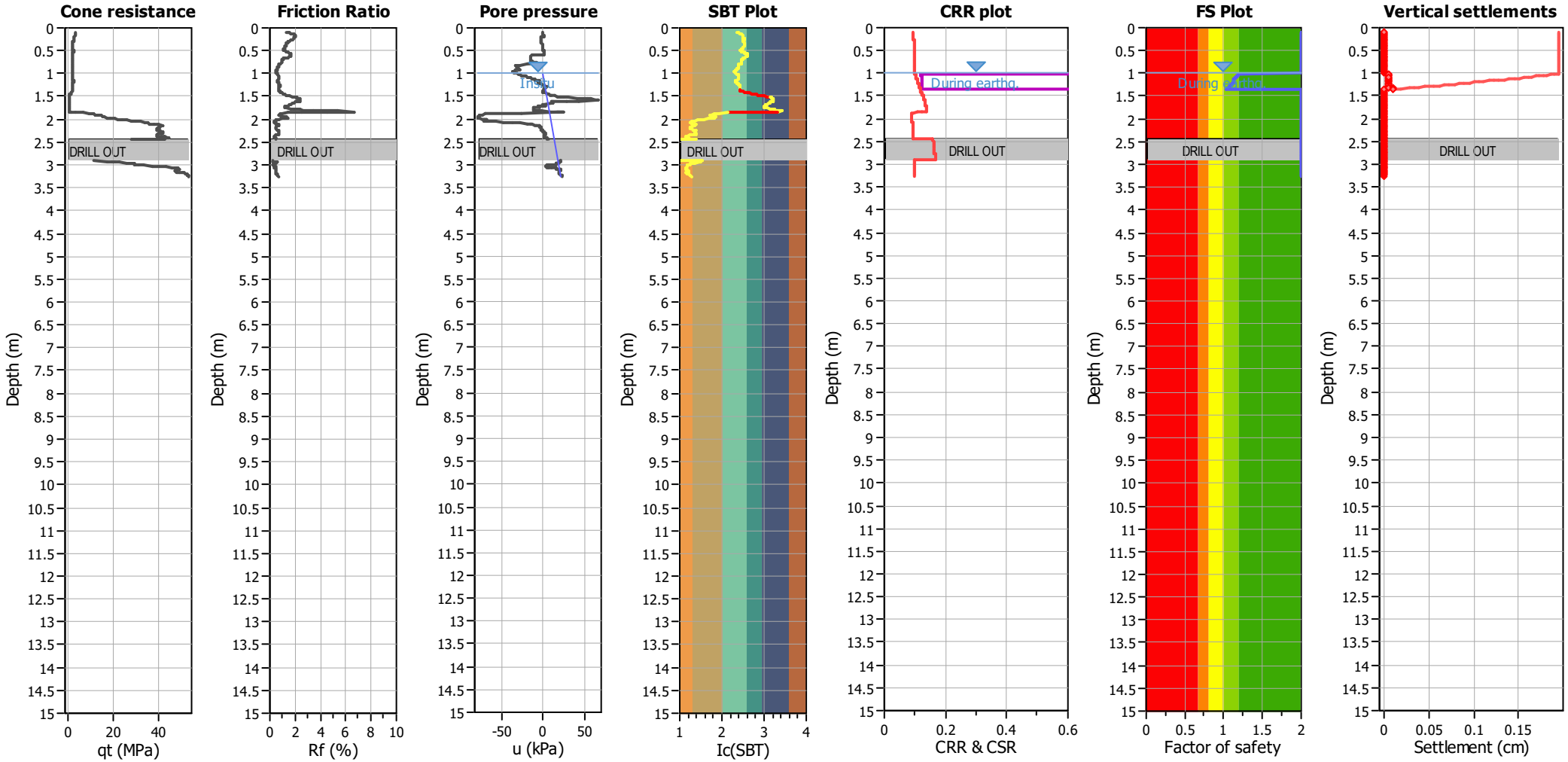
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu012 SLS2
Total depth: 3.25 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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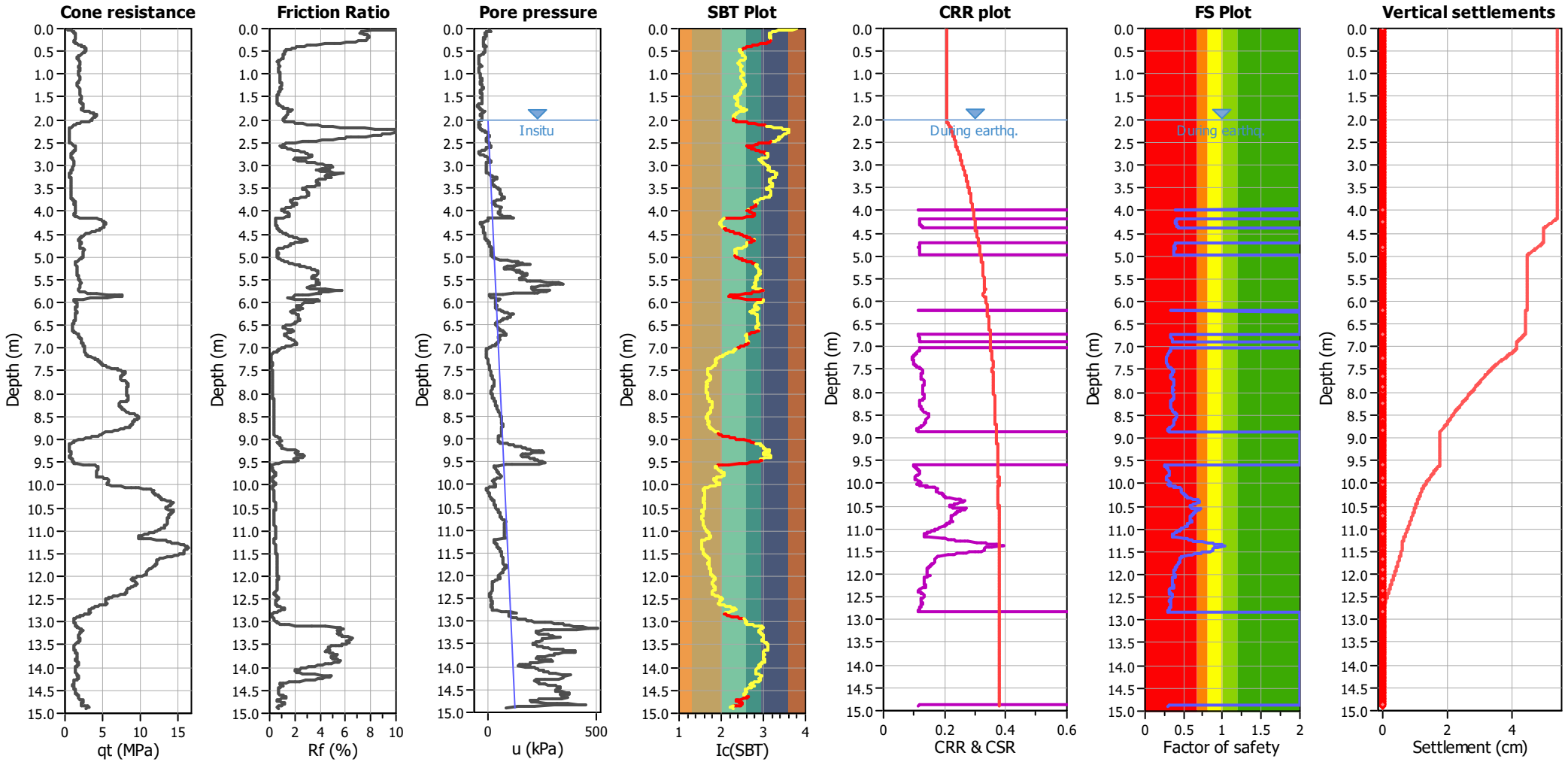
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu001 ULS
Total depth: 14.89 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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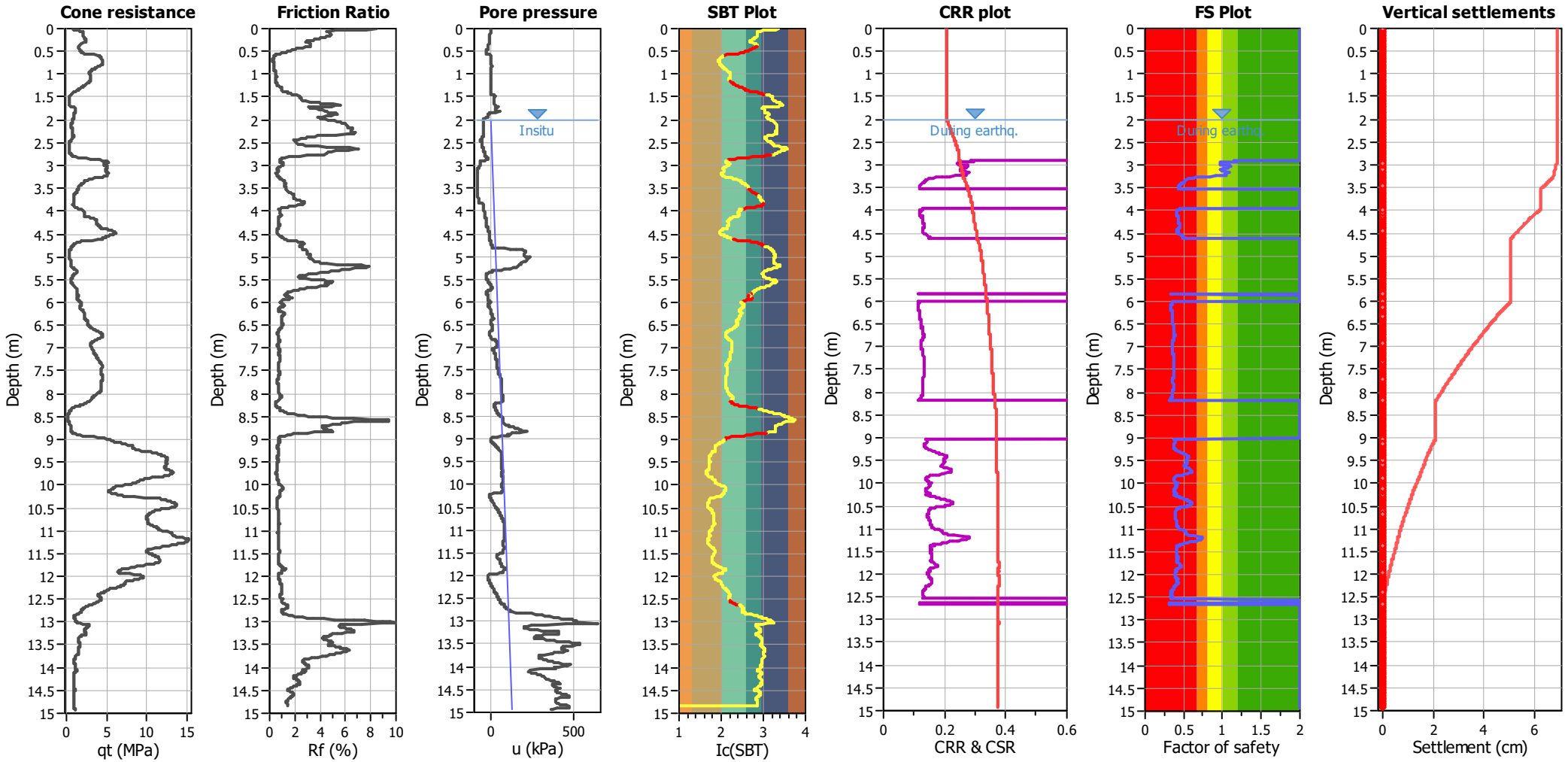
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu002 ULS
Total depth: 14.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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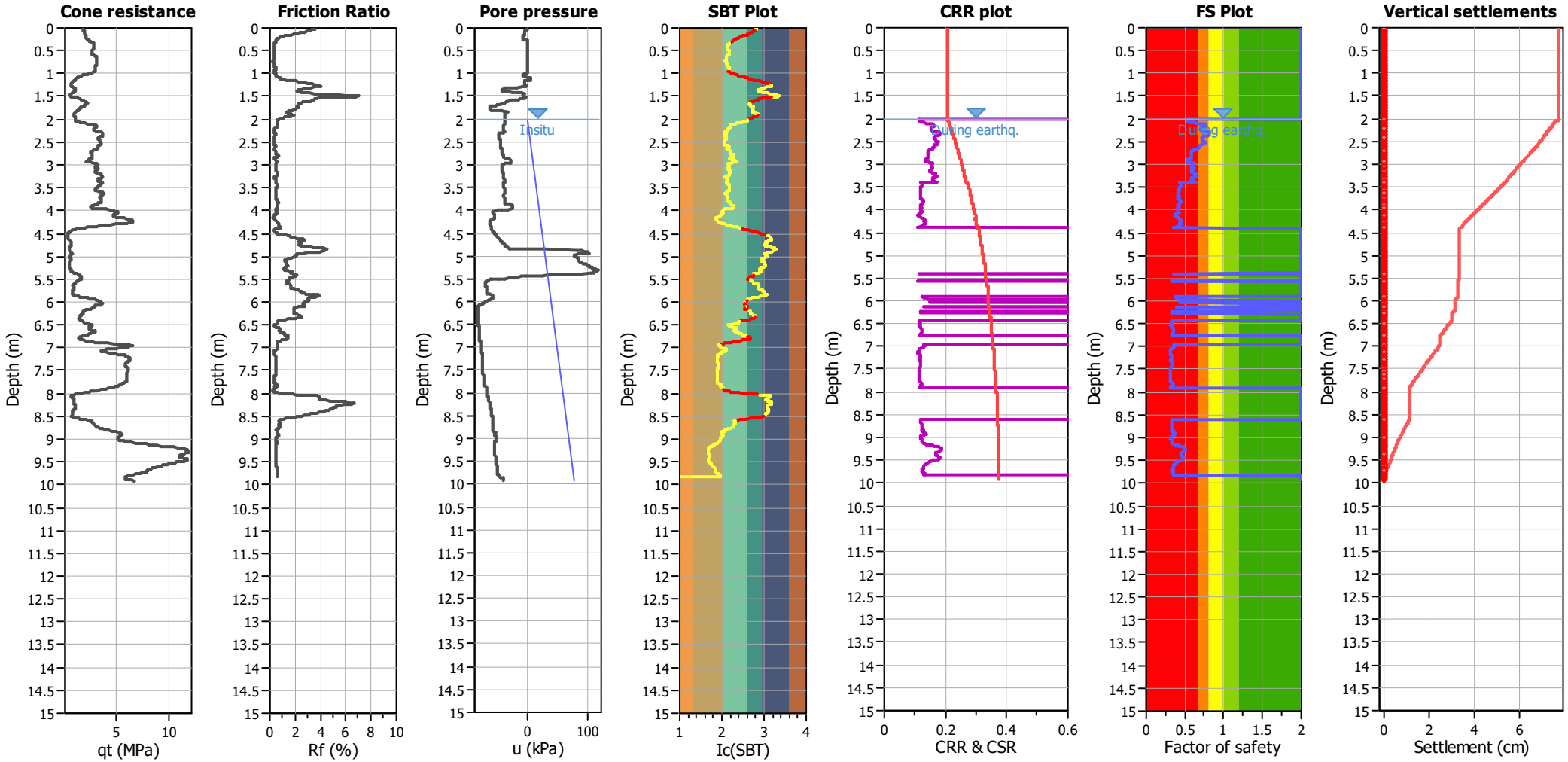
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu003 ULS
Total depth: 9.91 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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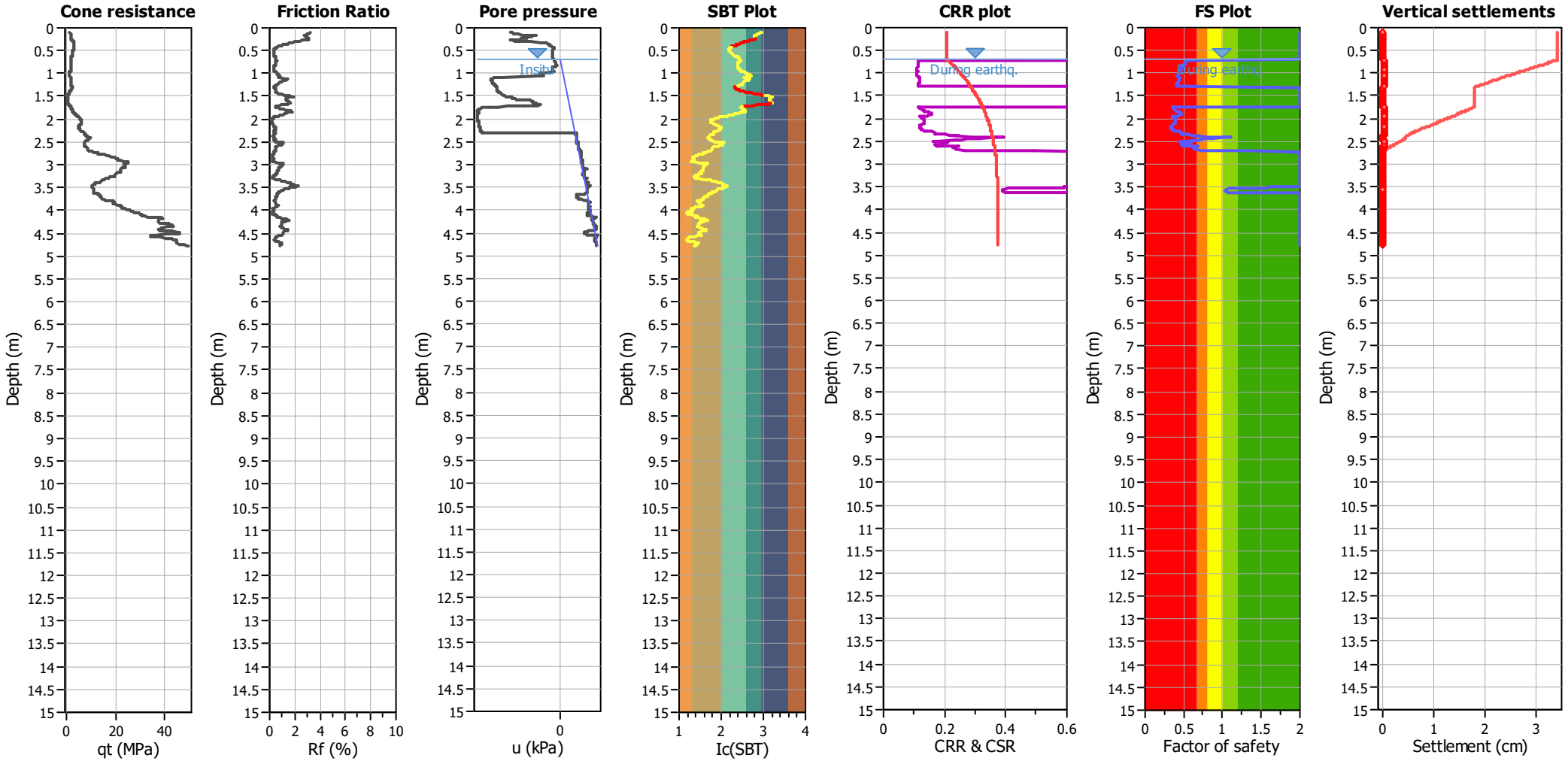
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu004 ULS
Total depth: 4.78 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.70 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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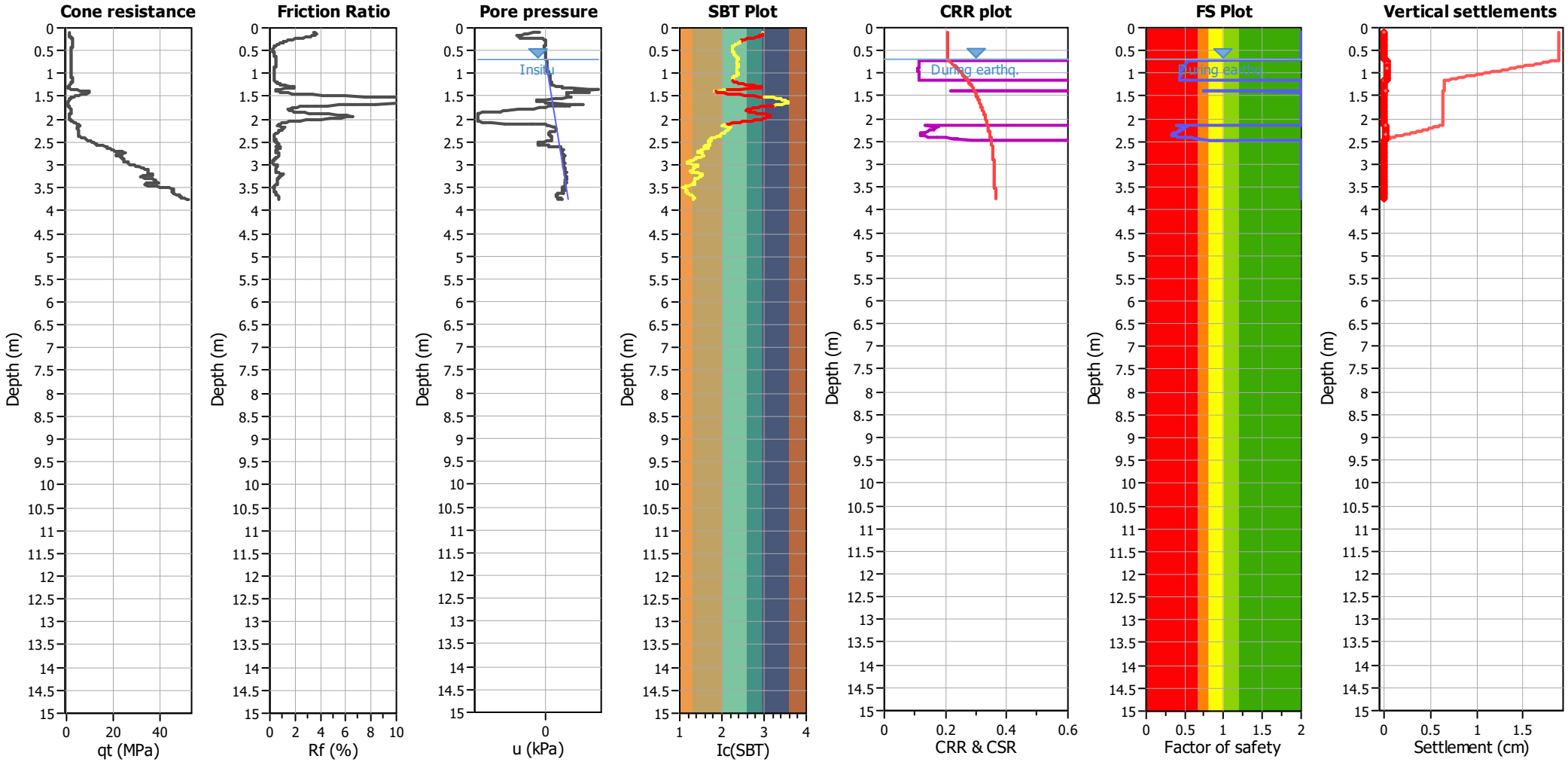
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu005 ULS
Total depth: 3.76 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.70 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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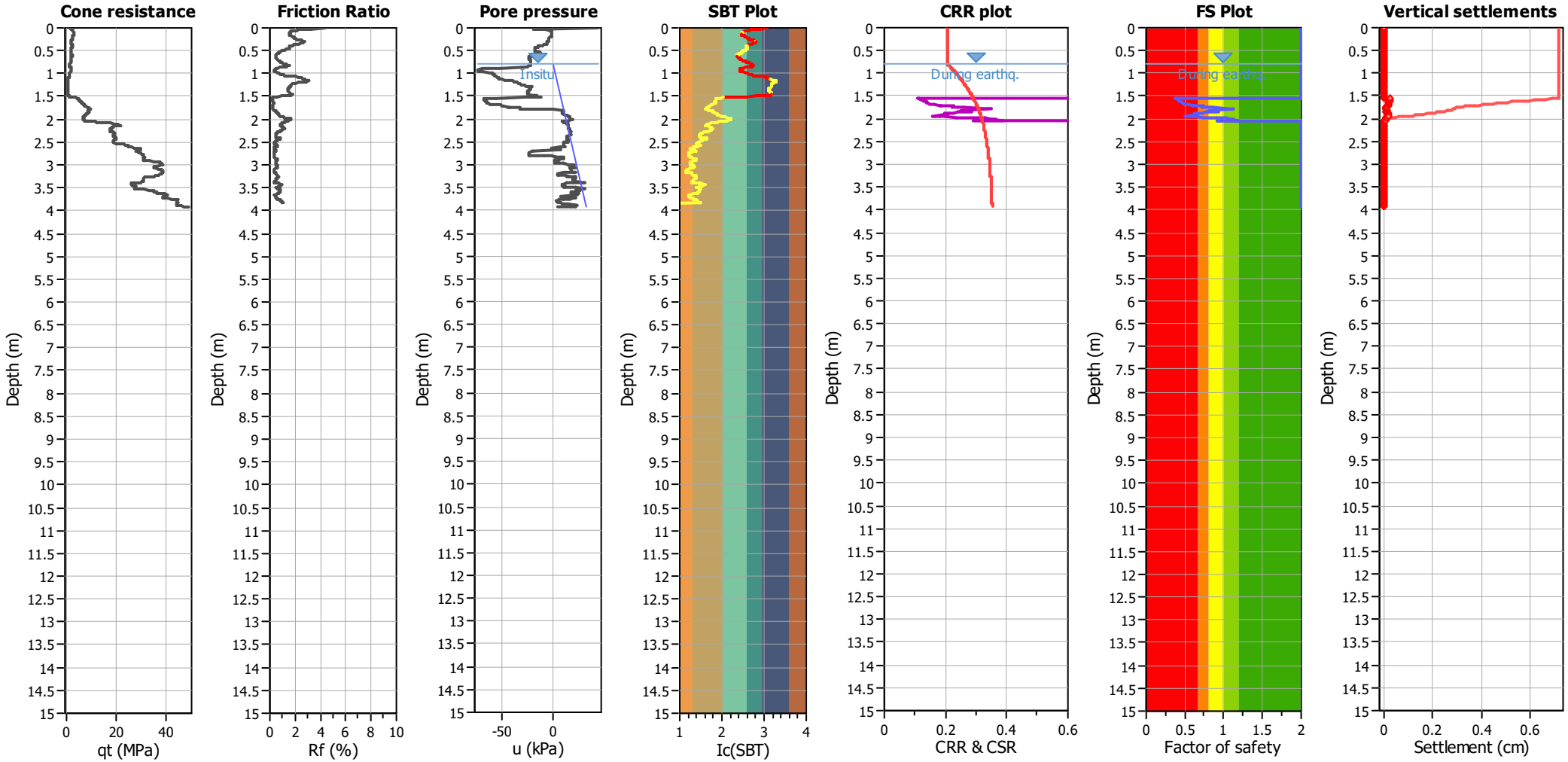
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu006 ULS
Total depth: 3.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.80 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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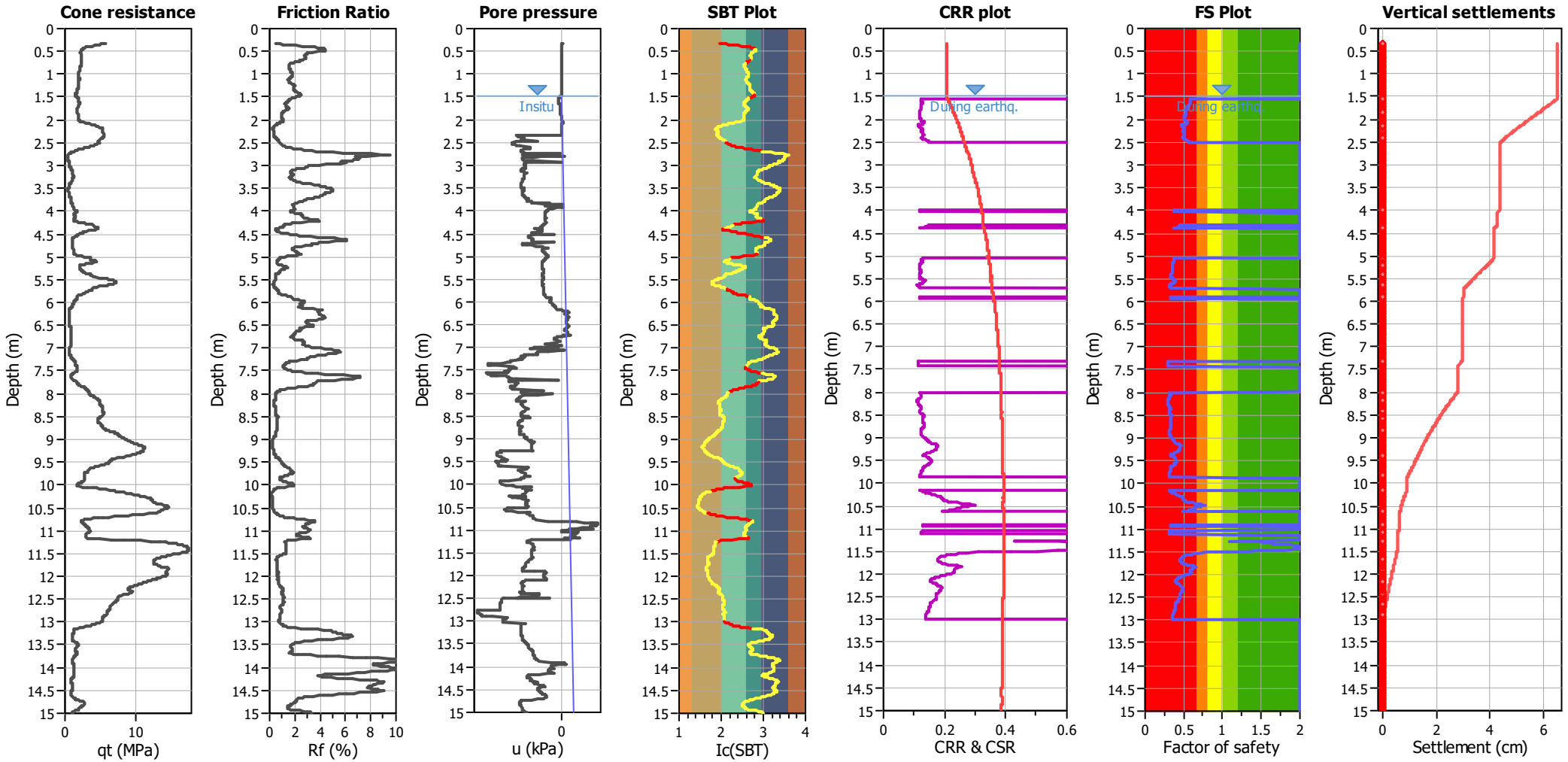
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu007 ULS
Total depth: 15.00 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.50 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.50 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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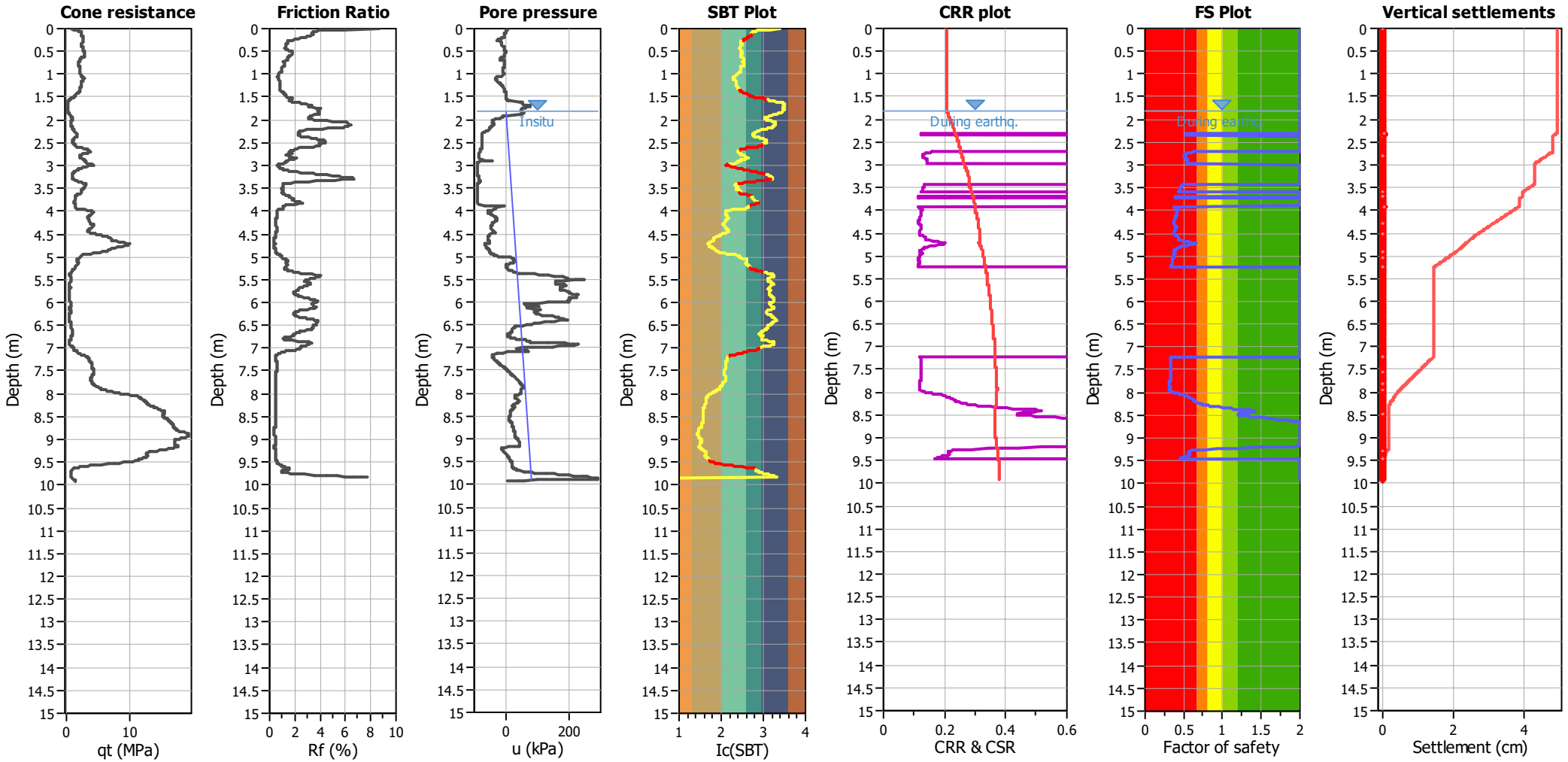
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu008 ULS
Total depth: 9.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.80 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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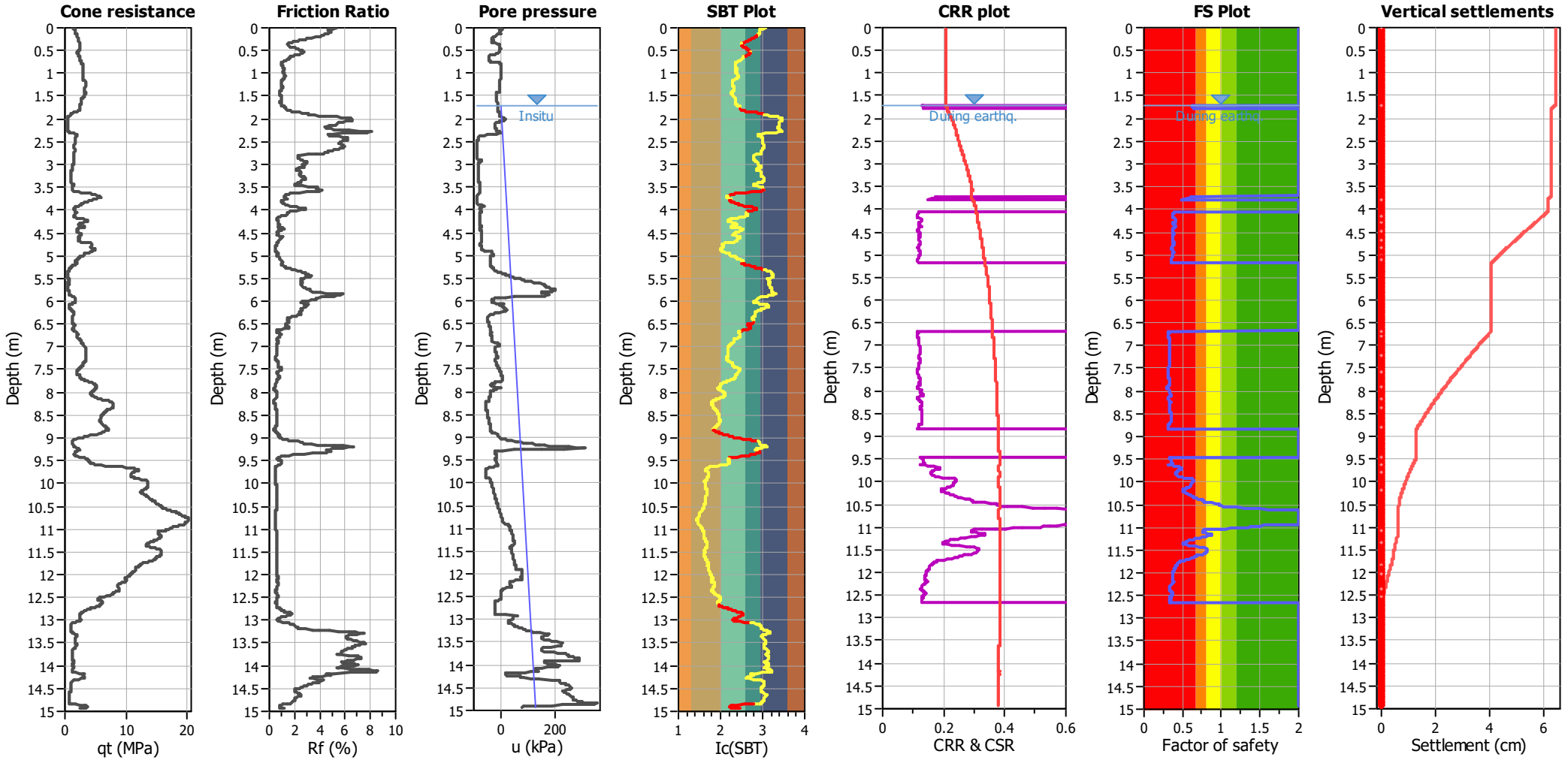
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu009 ULS
Total depth: 14.95 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.70 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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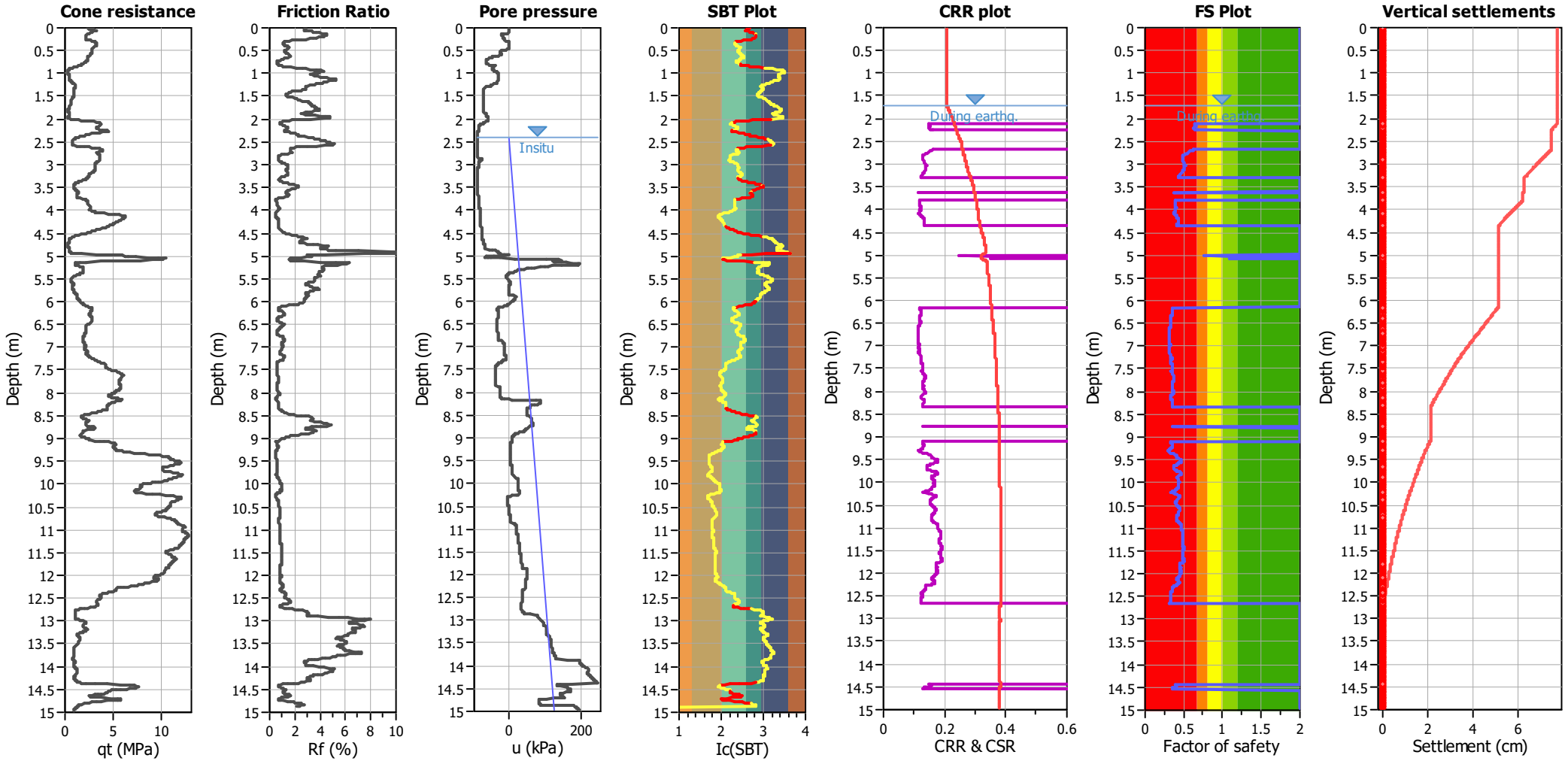
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu010 ULS
Total depth: 14.97 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.40 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.70 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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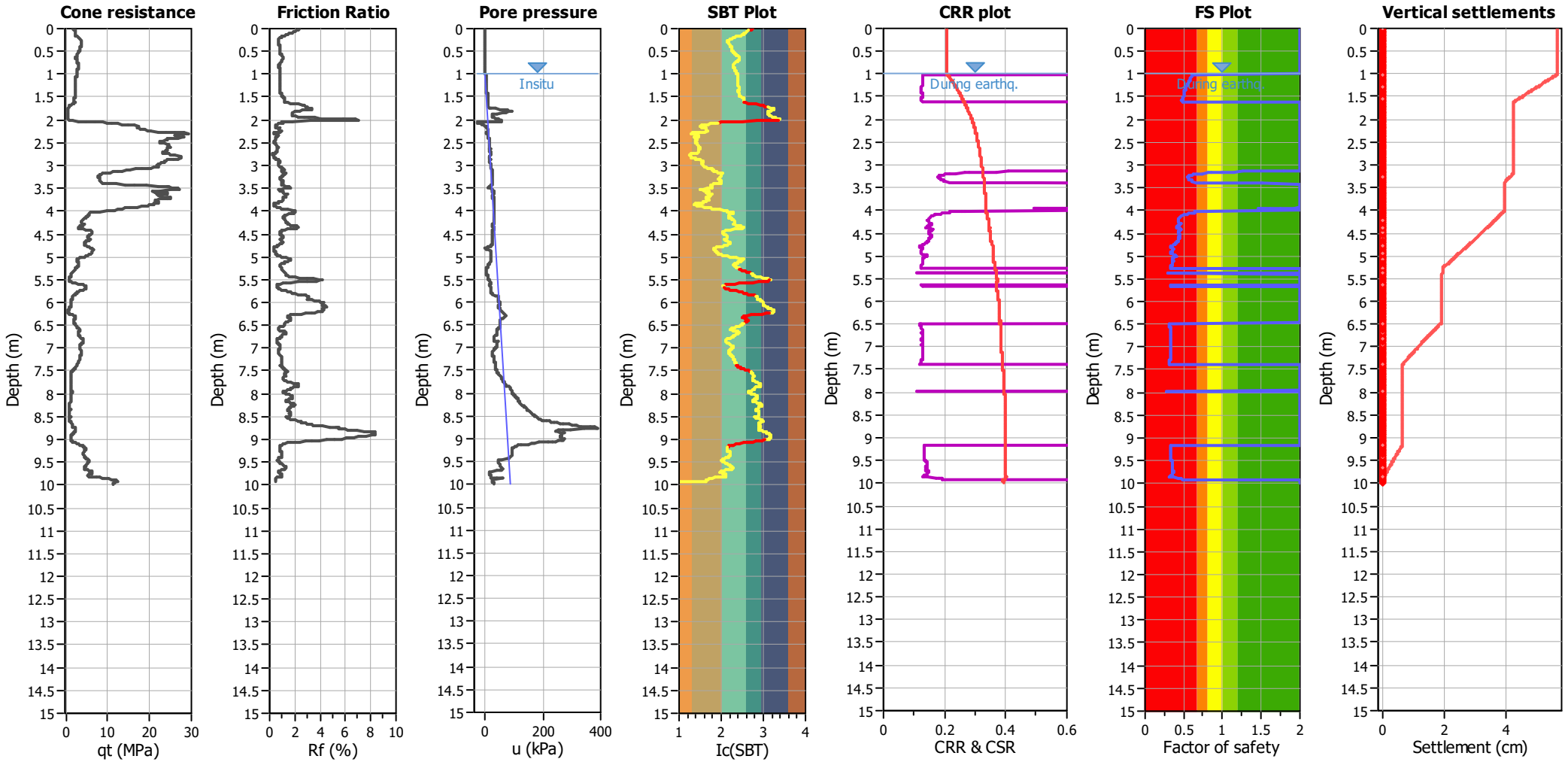
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu011 ULS
Total depth: 9.99 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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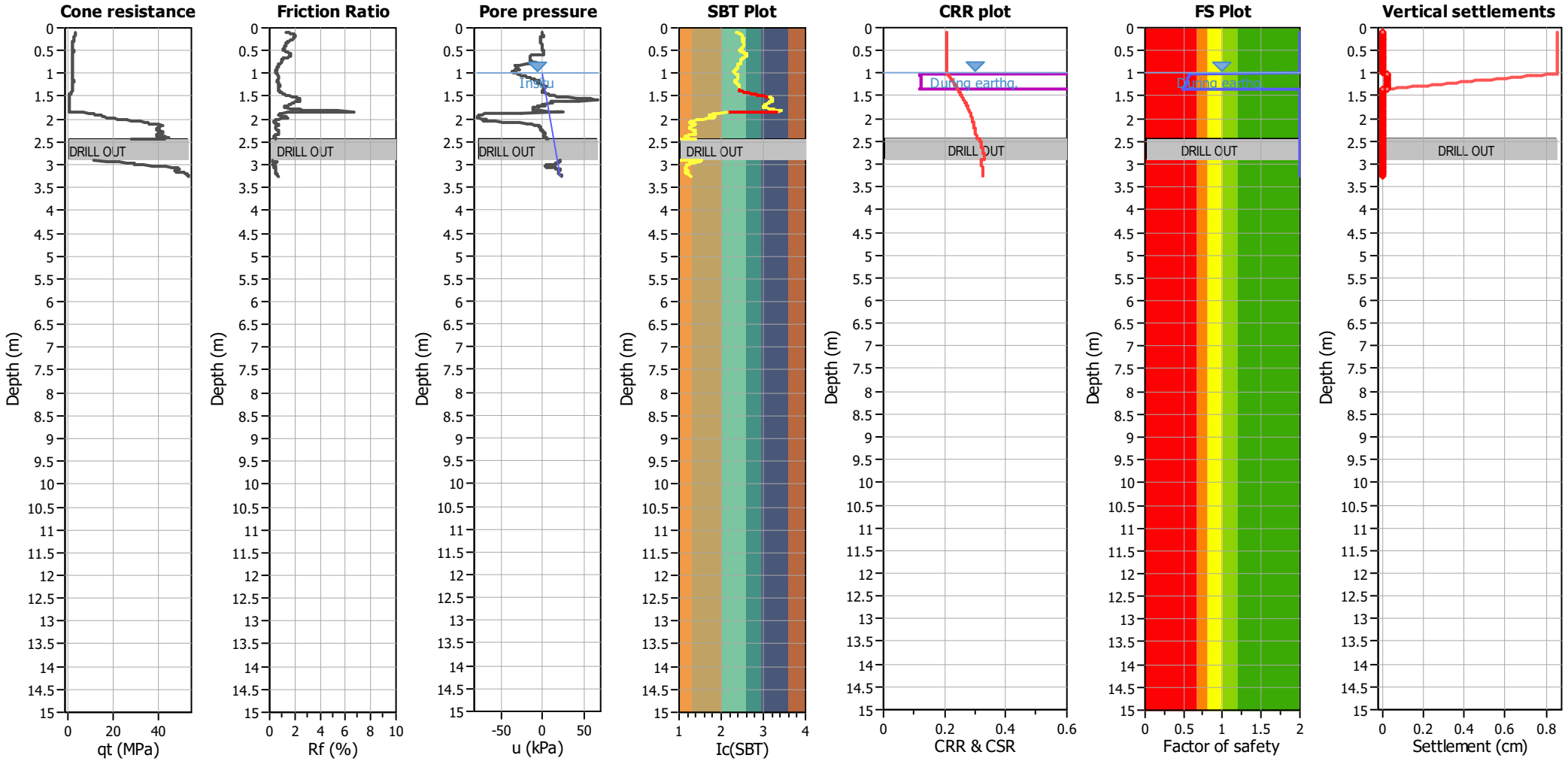
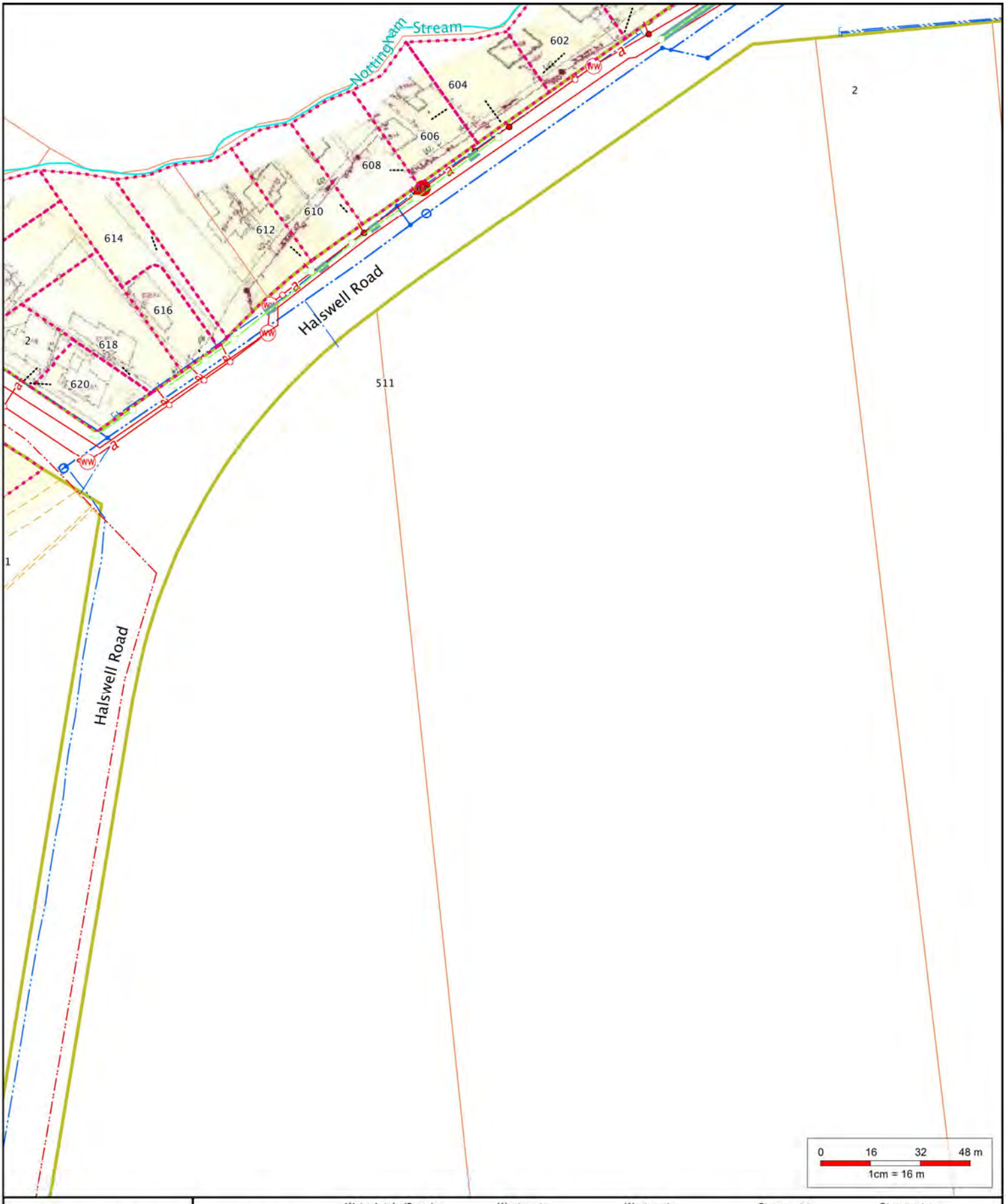
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu012 ULS
Total depth: 3.25 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



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Christchurch City Council

ph: 941-8300 fax: 941-8385

Accuracy not guaranteed. Onsite verification required. Display of data scale dependent, full detail available at 1:500.

Private Drainage

Standard Infrastructure
- Bio Gas
- Condensate Trap
- End Cap
- Inlet
- Outlet
- Valve
- Main
- Cable

Water Intake/Supply
- Connector
- Bellows
- Connector
- Hydrant

Water Intake/Supply
- Inlet
- Meter
- Outlet
- Pump
- Restrictor
- Valve
- Air Release
- Butterfly
- Flow restriction
- Gate
- Pressure Activated
- Sluice
- Valve
- Reservoir
- Structure
- Lateral
- Main
- Sub Main

Wastewater
- End Cap
- Valve
- Air Gap Separator
- Vent
- Eye
- Eye (Vertical)
- Outfall
- Pump
- Junction
- Access
- Flush Manhole
- Inspection Point
- Standard Manhole
- Trap
- Vented Manhole
- Lateral
- Main
- Pressure Main

Wastewater
- Lateral Fitting

Local Pressure
- CP Control Panel
- BK Boundary Kit
- T Tank System
- Site
- V Vacuum Chamber
- BU Vacuum Breather

Stormwater
- Bend
- Change
- Eye
- Flow Restriction
- Inlet
- Dome Sump
- Double Sump
- Gross Debris Trap

Stormwater
- Inlet
- Inlet
- Inlet Headwall
- Pipe End
- Silt Trap
- Single Sump
- Soak Pit
- Triple Sump
- Junction
- Standard Manhole
- Outlet
- Pump
- Structure
- Basin
- Lateral
- Main
- Lateral Fitting
- Double Sump

Stormwater
- Lateral Fitting
- Single Sump
- Soak Pit
- Inspection point
- Manhole

All services
- Pipe Protection
- —a— Abandoned
- —p— Proposed
- —os— Out of service

Landbase
- Easement

1 : 1,900 on A4

18/06/2021 7:44:30 AM

Christchurch City Council

ph: 941-8300 fax: 941-8385

Accuracy not guaranteed. Onsite verification required. Display of data scale dependent, full detail available at 1:500.

Private Drainage

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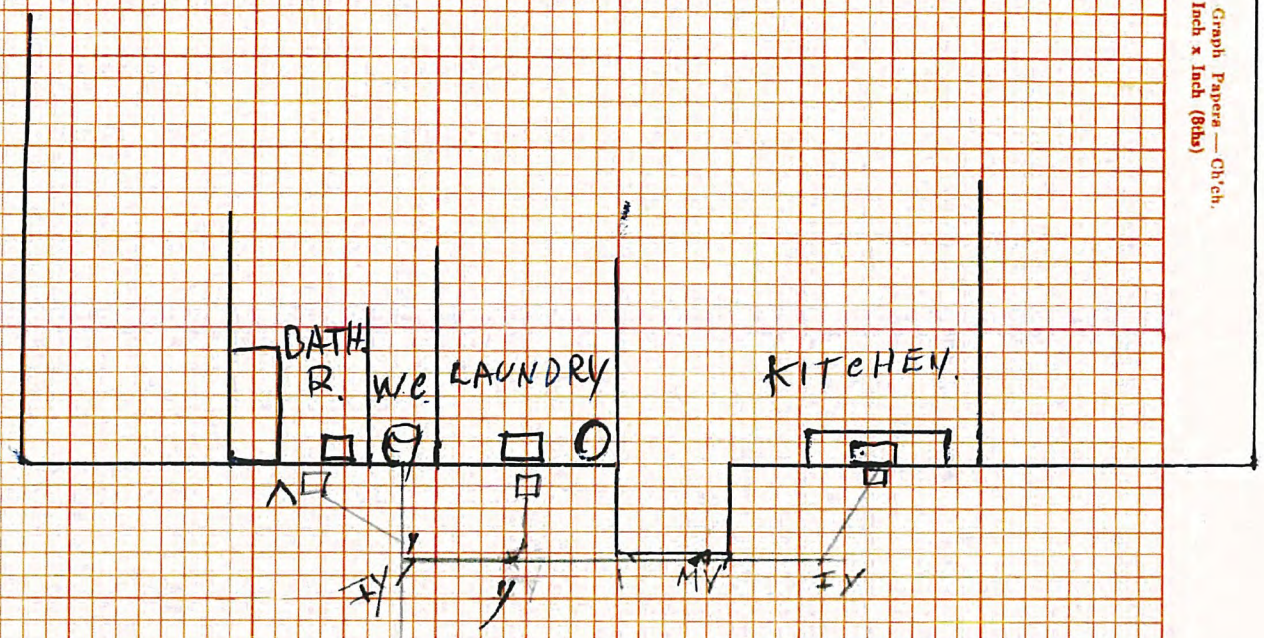
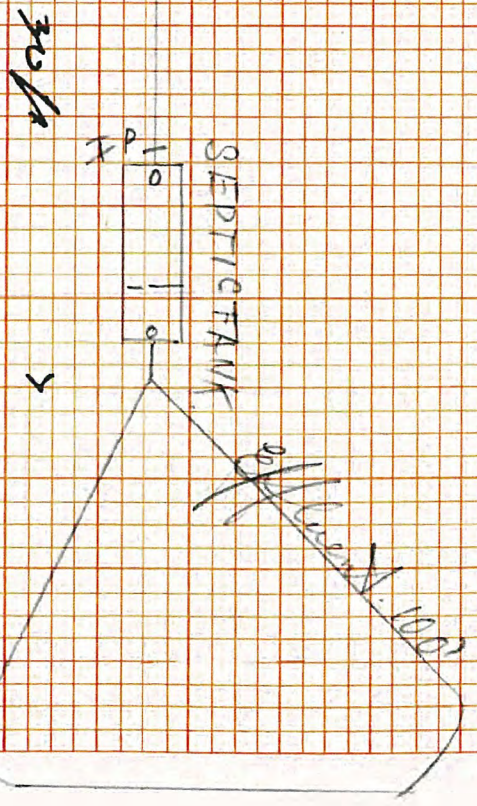
Landbase
- Easement

Mr J Legg. Halswell.





Your guide to the pressure wastewater system

For alarms call

Christchurch City Council

(03) 941 8999

Rev 3 - Updated 21/08/2014

If the alarm sounds

1. The alarm noise can be turned off by pressing the button underneath the alarm panel. The alarm light on the panel will remain on.

   If your pressure wastewater system has had a short term build up of wastewater then the system will automatically clean itself and the alarm light will go out.

2. If the alarm light is still on after one hour (1 hr) then call the Christchurch City Council on (03) 941 8999. The Council number is also on the alarm panel.

3. The Council call centre operator will ask you a series of questions to help determine the urgency and nature of any repairs that may be required.

4. The Council call centre operator will ask for your name and contact number so that the maintenance contractor can call you regarding any repairs.

5. The system has a 24hr emergency storage capacity. However, while waiting for any repairs you should try to minimise the amount of wastewater going through the system.

6. If the alarm sounded because of a short term build up of wastewater and then cleared you should consider what might have made this happen (for example flushing inappropriate items) and avoid this happening again.

7. If you notice any irregularity with the system (for example the alarm sounding often), contact the Christchurch City Council on (03) 941 8999.

Press the button located under the alarm panel. This will turn off the sound but the light will remain on.

↓

Wait an hour and then check to see if the light on the alarm panel is still on.

↓

If the light on the alarm panel is no longer lit then no further action is required.

↓

If the light on the alarm panel is still on then call the Christchurch City Council on (03) 941 8999.

↓

The call centre operator will ask for your address, name and contact number.

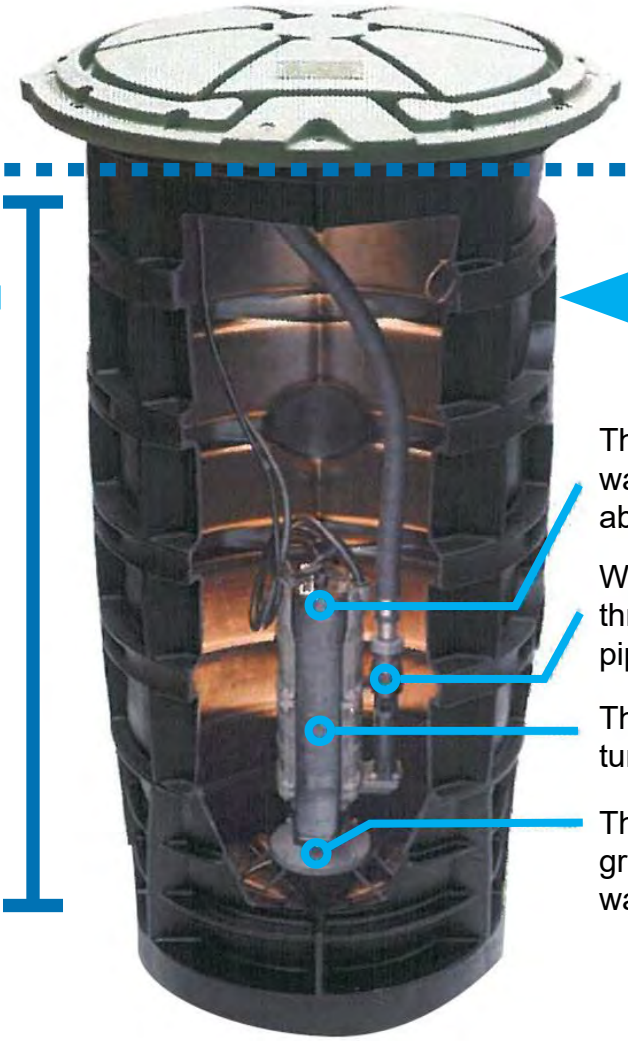
The pressure wastewater system

The wastewater system for this property is a pressure wastewater system.

A pressure wastewater system includes an individual pump and tank. The pump is located within the tank. The tank is located underground and you will only see the lid at the surface. Wastewater from your house flows through a pipe (a private lateral) to the tank. The tank then pumps the wastewater to the pipes in the street. From the street the wastewater goes to the wastewater treatment plant.

The pressure wastewater system is very reliable and robust. There is very little you need to do and very little that can go wrong.

The pressure wastewater system



Using the system

There are a few things you need to know to ensure that the pressure wastewater system runs smoothly. The system operates like a normal wastewater system. It takes wastewater from your toilet, sink, shower, bath, dishwasher, and washing machine and transfers it to the wastewater pipes in the street, and onto the wastewater treatment plant.

To avoid blockages and damage to the pressure wastewater system there are a number of items that should not be disposed of via the system.

The following items should not be flushed down the toilet or sink:

- **glass**
- **metal**
- **gravel or sand, including stone from fish tanks**
- **seafood shells**
- **socks, rags, clothes**
- **plastic**
- **nappies, sanitary napkins, tampons, 'wet' wipes**
- **kitty litter**
- **explosives**
- **flammable materials**
- **lubricating oil and grease**
- **strong chemicals**
- **petol, diesel**
- **stormwater runoff**

Before you go on holiday

Before you go on holiday, even if it is just for a few days, you should flush the pressure wastewater system before you go. This is to avoid the possibility of the system becoming smelly while you are away. **To flush the system simply run a tap in the kitchen or bathroom sink for about five minutes before you go.**

Taking care of the system

- Do not flush any inappropriate items through the system.
- Do not put heavy weights on the lid of the tank. The lid can be walked on, but this should be avoided.
- Do not touch the valves in the boundary kit.
- Do not turn off the power to the pump unless evacuating in an emergency or if there is a broken wastewater pipe.
- Do not cover the unit in any way. This includes covering it with dirt, garden mulch, or concrete.
- Ensure access to the unit is available at all times.
- If you are going on holiday, even for just a few days, you should flush the system before you go. Simply run clean water down your kitchen or bathroom sink for five minutes (5 mins).
- If you do accidentally break a pipe under the ground contact the Christchurch City Council on (03) 941 8999 immediately and tell them what happened. While waiting for the pipe to be repaired minimise the amount of wastewater going through the system.
- Contact the Christchurch City Council on (03) 941 8999 if you install a swimming or spa pool.
- Contact the Christchurch City Council on (03) 941 8999 if you are making any modifications to your home which may affect the system (for example a house addition).
- Do not attempt to repair the system yourself. Always call the Christchurch City Council on (03) 941 8999.

Trouble shooting

What happens if...

1. The system is damaged and needs repair?

The alarm will go off. Follow the alarm procedure on page 2.

2. You notice a bad smell around the tank

When operating normally there should be no noticeable odours coming from the unit. If it is smelly, the unit may just need flushing. Just run clean water down your kitchen or bathroom sink for about five minutes. If the unit remains smelly contact the Christchurch City Council on (03) 941 8999.

3. You notice wet spots around the unit or wastewater pipes

The pumping unit and pipes are sealed. If you notice wet spots and there hasn't been any recent heavy rain contact the Christchurch City Council on (03) 941 8999.

4. The alarm keeps going off when it rains

This means that rainwater may be getting into the system and overloading it. Contact the Christchurch City Council on (03) 941 8999.

5. The neighbours alarm goes and they are away

Do not investigate yourself. Contact the Christchurch City Council on (03) 941 8999.

6. There is a power failure

If there is a power failure the pump will not run. The tank has 24 hours of emergency storage so minimise the amount of wastewater going through the system. When the power comes on again the system will reset itself.

7. There is a flood

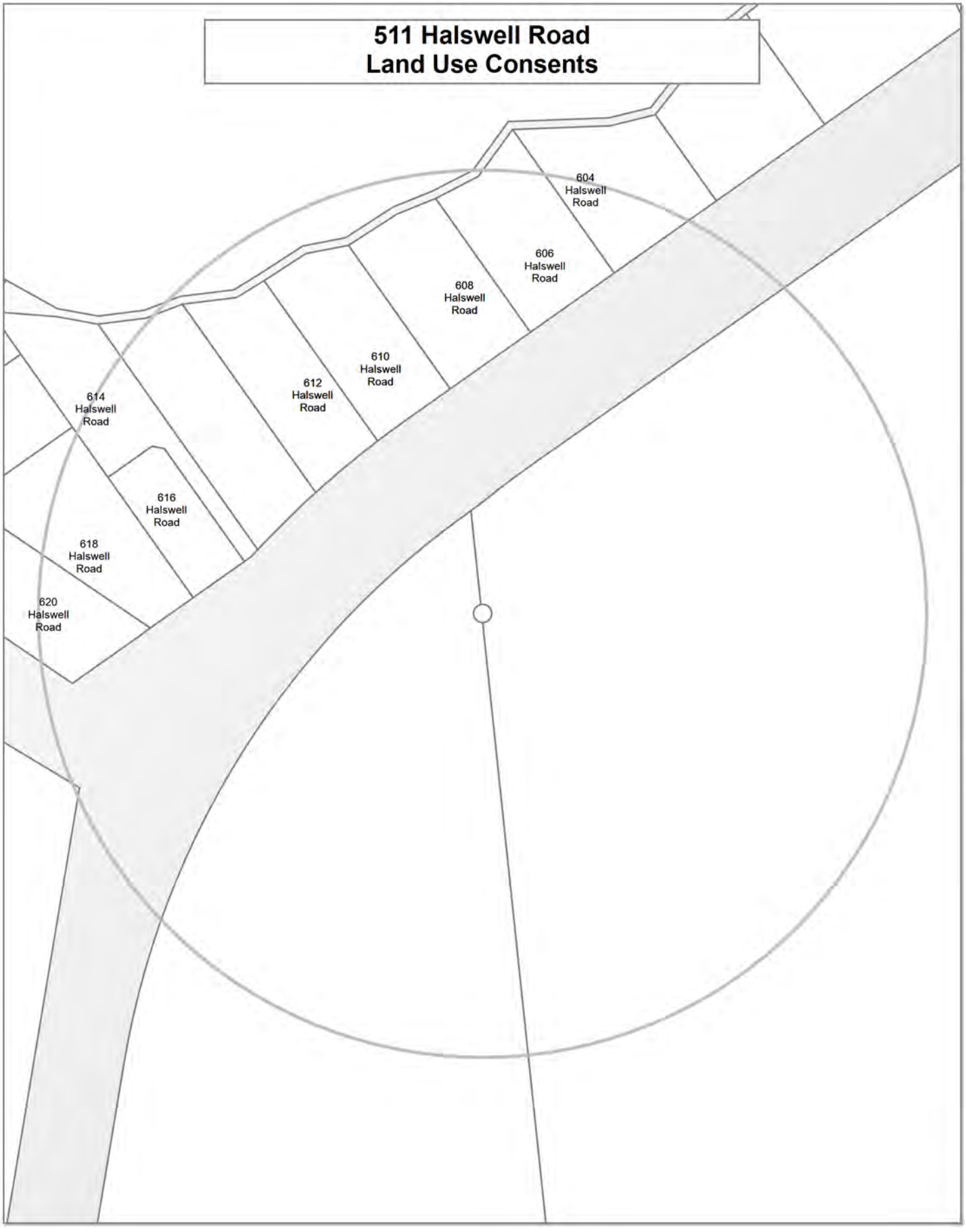
If you can safely stay in your home in a flood then simply minimise the amount of wastewater going through the system.

8. You need to evacuate due to an emergency (such as an earthquake)

If you can, flush out the system by running water down your kitchen or bathroom sink for about five minutes. Turn off the power to the pump. The on/off switch is located by the alarm panel.

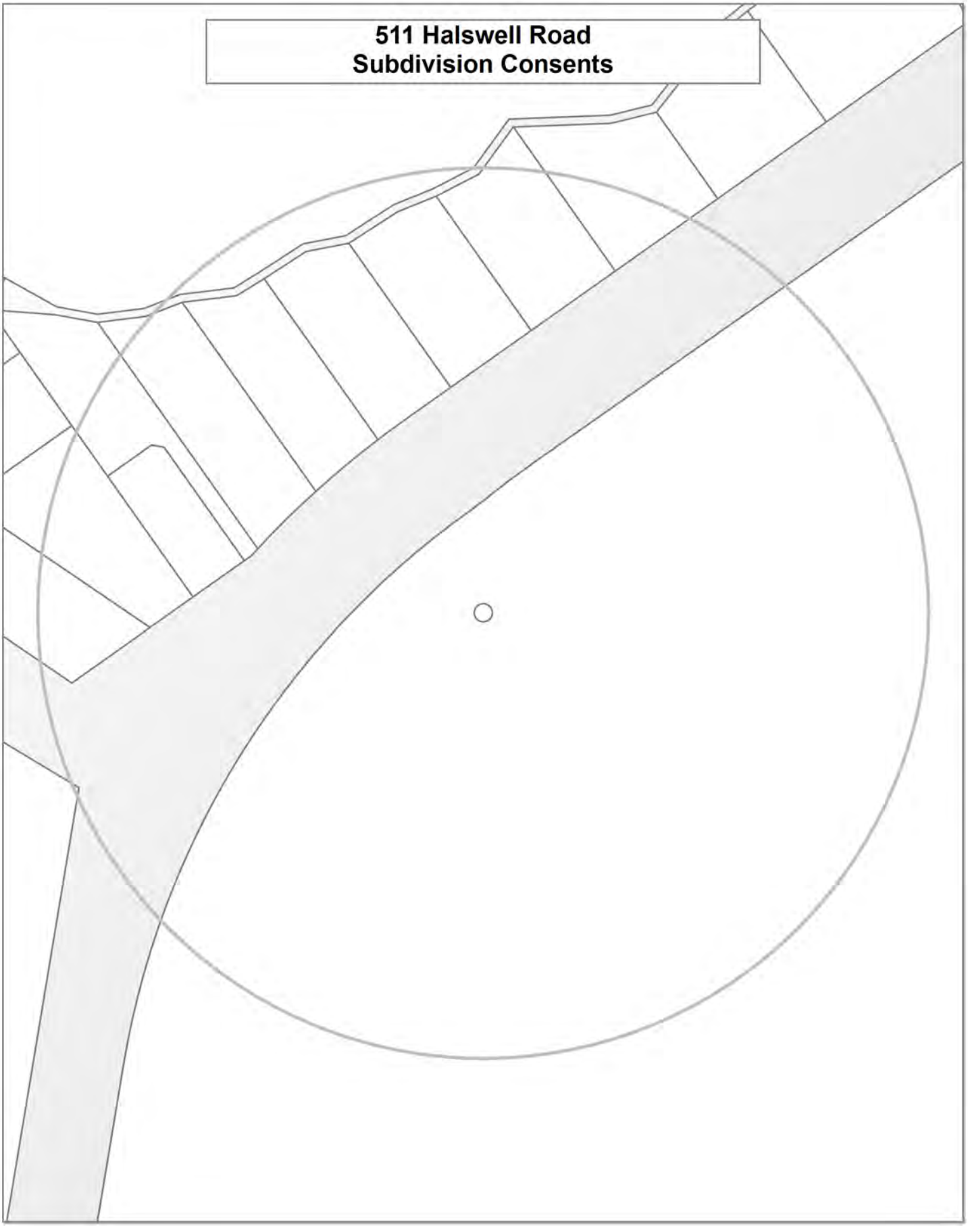
Spatial Query Report

Christchurch City Council



Spatial Query Report

Christchurch City Council



Spatial Query Report

Land Use Resource Consents within 100 metres of 511 Halswell Road

Note:This list does not include subdivision Consents and Certificates of Compliance issued under the Resource Management Act.

604 Halswell Road

RMA/2000/2667

Application for alterations to and the erection of additions to a dwelling to create a family flat and alterations to an existing garage - Historical Reference RMA20003424

Processing complete

Applied 25/10/2000

Decision issued 09/11/2000

Granted 08/11/2000

606 Halswell Road

RMA/2003/306

Application to construct living area and garage additions to the existing dwelling. - Historical Reference RMA20012561

Processing complete

Applied 30/01/2003

Decision issued 05/03/2003

Granted 05/03/2003

608 Halswell Road

RMA/1993/1222

Consent to operate a car dismantling yard in the ind. 4 zone. - Historical Reference RES954404

Processing complete

Applied 23/07/1993

Decision issued 23/08/1993

Granted 23/08/1993

RMA/1999/3584

Application for the total garage length of wall to exceed 9m while located within 1.8m of the internal boundary in terms of both the Proposed and Transitional - Historical Reference RES992616

Processing complete

Applied 10/09/1999

Decision issued 06/10/1999

Granted 06/10/1999

610 Halswell Road

RMA/1979/625

Application for consent to use a property at Halswell Junction Road for a relocated car wreckers yard. - Historical Reference RES954401

Processing complete

Applied 01/11/1979

Decision issued 03/06/1980

Granted 03/06/1980

RMA/1982/774

Application for a car, truck and machinery wrecking yard on a site zoned Industrial 3 (R). - Historical Reference RES954397

Processing complete

Applied 11/02/1982

Decision issued 06/04/1982

Granted 06/04/1982

612 Halswell Road

RMA/1985/401

Extension is 1.71m from boundary - Historical Reference RES9207117

Processing complete

Applied 24/10/1985

Decision issued 01/01/1999

Declined 01/01/1999

RMA/1986/368

Exceed recession plane on the southwestern boundary (Lot 5) with proposed new dwelling - Historical Reference RES9207118

Processing complete

Applied 08/02/1986

Decision issued 01/01/1999

Declined 01/01/1999

614 Halswell Road

RMA/2007/1175

Application to erect a new dwelling with attached garage on the proposed Lot 2 - Historical Reference RMA92008428

Processing complete

Applied 22/05/2007

Decision issued 08/06/2007

Granted 08/06/2007

616 Halswell Road

RMA/2006/1492

Application to erect a garage within the street scene setback - Historical Reference RMA92005550

Processing complete

Applied 29/06/2006

Granted 04/08/2006

Decision issued 04/08/2006

Spatial Query Report

618 Halswell Road

RMA/2015/189

Replacement single-storey dwelling - Historical Reference RMA92028356

Processing complete

Applied 27/01/2015

Decision issued 26/02/2015

Granted 25/02/2015

620 Halswell Road

RMA/1990/346

distance between new dwelling and rear boundary to be reduced from 1.8m to 1.6m - Historical Reference RES9207124

Processing complete

Applied 01/10/1990

Decision issued 24/10/1990

Granted 24/10/1990

Data Quality Statement

Land Use Consents

All resource consents are shown for sites that have been labelled with an address. For sites that have been labelled with a cross (+) no resource consents have been found. Sites that have no label have not been checked for resource consents. This will be particularly noticeable on the margins of the search radius. If there are such sites and you would like them included in the check, please ask for the LIM spatial query to be rerun accordingly. This will be done free of charge although there may be a short delay. Resource consents which are on land occupied by roads, railways or rivers are not, and currently cannot be displayed, either on the map or in the list. Resource consents that relate to land that has since been subdivided, will be shown in the list, but not on the map. They will be under the address of the land as it was at the time the resource consent was applied for. Resource consents that are listed as Non-notified and are current, may in fact be notified resource consents that have not yet been through the notification process. If in doubt. Please phone (03)941 8999.

The term “resource consents” in this context means land use consents. Subdivision consents and certificates of compliance are excluded.

Subdivision Consents

All subdivision consents are shown for the sites that have been labelled with consent details. For Sites that have been labelled with a cross (+) no records have been found. Sites that have no label have not been checked for subdivision consents. This will be particularly noticeable on the margins of the search radius. If there are such sites and you would like them included in the check, please ask for the LIM spatial query to be rerun accordingly. This will be done free of charge although there may be a short delay.

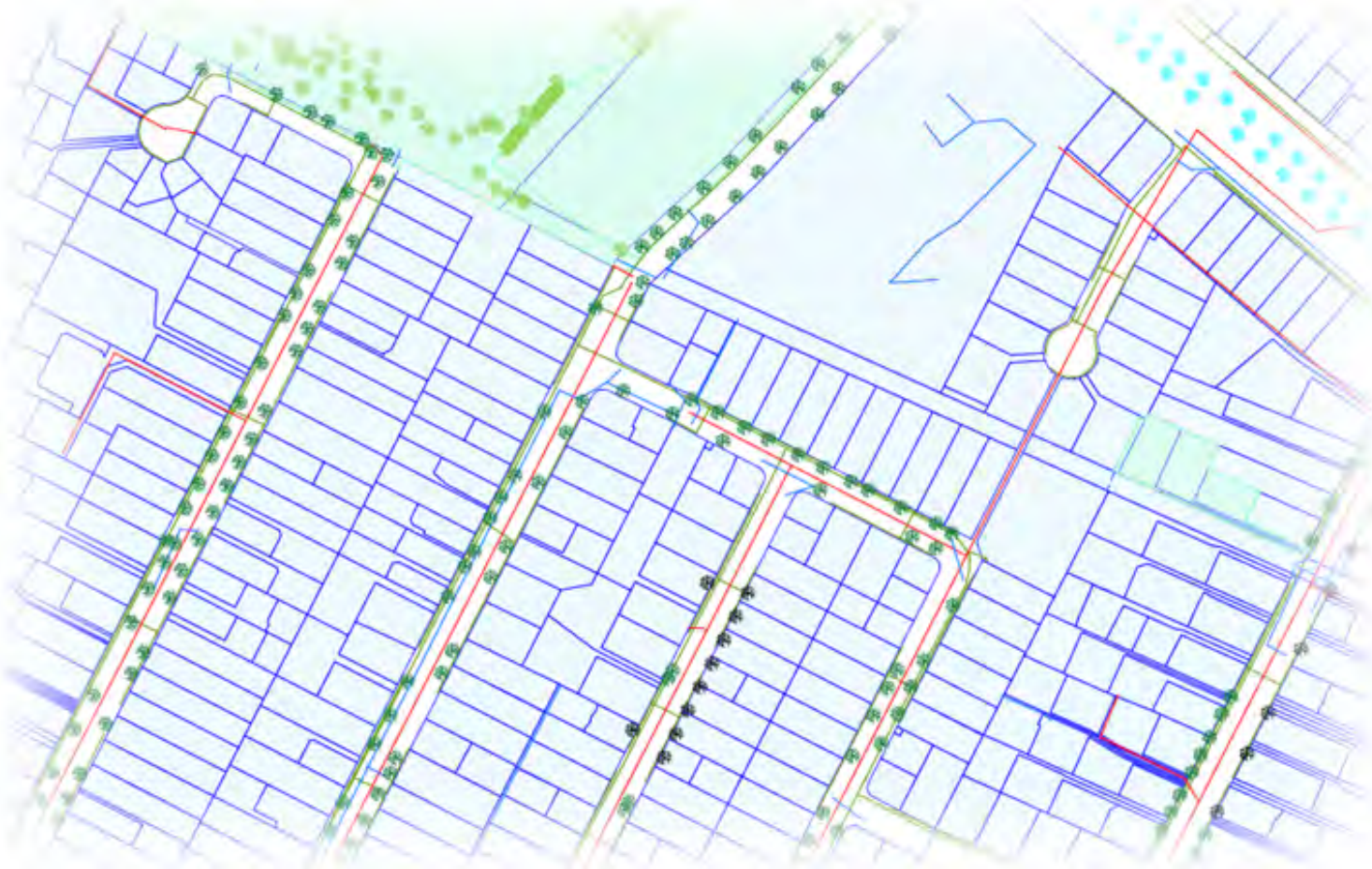
The term “subdivision consents” in this context means a resource consent application to subdivide land. Non subdivision land use resource consents and certificates of compliance are excluded.

This report will only record those subdivision applications which have not been completed i.e once a subdivision has been given effect to and the new lots/properties have been established the application which created those lots will not be shown

All subdivision consent information is contained on the map and no separate list is supplied

Christchurch City Council

Land Information Memorandum



Property address:
2 Glovers Road

Christchurch City Council
53 Hereford Street, PO Box 73015
Christchurch 8154, New Zealand
Tel 64 3 941 8999
Fax 64 3 941 8984
www.ccc.govt.nz

LIM number: 70247282

Land Information Memorandum

Christchurch City Council

Application details

Please supply to	YOURSECTION RS LTD
Client reference	RIVERSTONE
Phone number	
Fax number	
Date issued	18 June 2021
Date received	10 June 2021

Property details

Property address	2 Glovers Road
Valuation roll number	23562 09300
Valuation information	Capital Value: $3050000 Land Value: $2400000 Improvements Value: $650000 *Please note: these values are intended for Rating purposes*
Legal description	Lot 1 DP 83635
Existing owner	Yoursection RS Limited 2 Glovers Road Christchurch 8025

Council references

Debtor number	4188171
Rate account ID	73054381
LIM number	70247282
Property ID	1022692

Christchurch City Council
53 Hereford Street, PO Box 73015
Christchurch 8154, New Zealand
Tel 64 3 941 8999
Fax 64 3 941 8984
www.ccc.govt.nz

Land Information Memorandum

Document information

This Land Information Memorandum (LIM) has been prepared for the purpose of section 44A of the Local Government Official Information and Meetings Act 1987 (LGOIMA). It is a summary of the information that we hold on the property. Each heading or "clause" in this LIM corresponds to a part of section 44A.

Sections 1 to 10 contain all of the information known to the Christchurch City Council that must be included under section 44A(2) LGOIMA. Any other information concerning the land as the Council considers, at its discretion, to be relevant is included at section 11 of this LIM (section 44A(3) LGOIMA). If there are no comments or information provided in these sections this means that the Council does not hold information on the property that corresponds to that part of section 44A.

The information included in this LIM is based on a search of Council records only and there may be other information relating to the land which is unknown to the Council. Please note that other agencies may also hold information relevant to the property, or administer legislation relevant to the use of the land, for example, the Regional Council (Ecan), Heritage New Zealand Pouhere Taonga, and Land Information New Zealand.

Council records may not show illegal or unauthorised building or works on the property. The applicant is solely responsible for ensuring that the land is suitable for a particular purpose.

A LIM is only valid at the date of issue as information is based only upon information the Council held at the time of that LIM request being made.

Property file service

This Land Information Memorandum does not contain all information held on a property file. Customers may request property files by phoning the Council's Customer Call Centre on (03) 941 8999, or visiting any of the Council Service Centres. For further information please visit www.ccc.govt.nz .

To enable the Council to measure the accuracy of this LIM document based on our current records, we would appreciate your response should you find any information contained therein which may be considered to be incorrect or omitted. Please telephone the Customer Call Centre on (03) 941 8999.

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Fax 64 3 941 8984
www.ccc.govt.nz

Land Information Memorandum

A search of records held by the Council has revealed the following information:

1. Special features and characteristics of the land

Section 44A(2)(a) LGOIMA. This is information known to the Council but not apparent from the district scheme under the Town and Country Planning Act 1977 or a district plan under the Resource Management Act 1991. It identifies each (if any) special feature or characteristic of the land concerned, including but not limited to potential erosion, avulsion, falling debris, subsidence, slippage, alluvion, or inundation, or likely presence of hazardous contaminants.

(For enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

- **Consultant Report Available**

  Land Information New Zealand (LINZ) engaged Tonkin and Taylor to provide a Geotechnical Report on Ground Movements that occurred as a result of the Canterbury Earthquake Sequence. The report indicates this property may have been effected by a degree of earthquake induced subsidence. The report obtained by LINZ can be accessed on their website at https://www.linz.govt.nz/land/surveying/earthquakes/canterbury-earthquakes/information-for-canterbury-surveyors

- **Liquefaction Vulnerability**

  Christchurch City Council holds indicative information on liquefaction hazard for Christchurch. Information on liquefaction, including an interactive web tool, can be found on the Council website at ccc.govt.nz/liquefaction. Depending on the liquefaction potential of the area that the property is in, the Council may require site-specific investigations before granting future subdivision or building consent for the property.

- **Softground**

  Council records show that site contains Soft Ground. Predominant Ground Material: N/A Reason for Assessment: Subdivision Should further buildings be proposed on this site, specific foundation design may be required.

Related information

- There is attached a sub division soil investigation report covering this property.
- There are attached hazard/special site characteristics supplementary sheet/s.

Christchurch City Council
53 Hereford Street, PO Box 73015
Christchurch 8154, New Zealand
Tel 64 3 941 8999
Fax 64 3 941 8984
www.ccc.govt.nz

2. Private and public stormwater and sewerage drains

Section 44A(2)(b) LGOIMA. This is information about private and public stormwater and sewerage drains as shown in the Council's records.

(For stormwater and sewerage enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

- **Property within Local Pressurised Sewer System Zone**

  This property is in a local pressure sewer system catchment within the Christchurch wastewater network. If there is a house on the property, there will already be a wastewater pressure pump and tank. If a house is yet to be built, a new wastewater pressure pump and tank will need to be installed. General information about pressure sewer systems can be found on the Council website. More detailed information can be obtained by contacting Council Customer Services on 03 941 8999.

Related information

- The dwelling/building is shown to be served by a sewer drain.
- The dwelling/building is shown to be served by a stormwater drain to soakpit.
- The drainage works associated with this property have not been plotted on the Council's drainage plan. A copy of the field Inspectors pickup/approved site plan showing the drains and house outline is attached.

Christchurch City Council
53 Hereford Street, PO Box 73015
Christchurch 8154, New Zealand
Tel 64 3 941 8999
Fax 64 3 941 8984
www.ccc.govt.nz

3. Drinking Water Supply

Section 44A(2)(ba) and (bb) LGOIMA. This is information notified to the Council about whether the land is supplied with drinking water, whether the supplier is the owner of the land or a networked supplier, any conditions that are applicable, and any information the Council has about the supply.

Please note the council does not guarantee a particular water quality to its customers. If you require information on current water quality at this property please contact the Three Waters & Waste Unit.

(For water supply queries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

Water Supply

Christchurch City Council is the networked supplier of water to this property. This property is connected to the Christchurch City Council Water Supply. The conditions of supply are set out in the Christchurch City Council Water Supply, Wastewater & Stormwater Bylaw (2014), refer to www.ccc.govt.nz.

Christchurch City Council
53 Hereford Street, PO Box 73015
Christchurch 8154, New Zealand
Tel 64 3 941 8999
Fax 64 3 941 8984
www.ccc.govt.nz

4. Rates

Section 44A(2)(c) LGOIMA. This is information on any rates owing in relation to the land.

(For rates enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

(a) Annual rates

Annual rates to 30/06/2021: $ 18,862.95

	Instalment Amount	Date Due
Instalment 1	$ 4,715.67	31/08/2020
Instalment 2	$ 4,715.67	30/11/2020
Instalment 3	$ 4,715.67	28/02/2021
Instalment 4	$ 4,715.94	31/05/2021

Rates owing as at 18/06/2021: $ 0.00

(b) Excess water charges

$ 0.00

(For water charge enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

(c) Final water meter reading required?

Reading is Required

(To arrange a final water meter reading, please phone (03) 941 8999 or visit www.ccc.govt.nz.

Christchurch City Council
53 Hereford Street, PO Box 73015
Christchurch 8154, New Zealand
Tel 64 3 941 8999
Fax 64 3 941 8984
www.ccc.govt.nz

5. Consents, certificates, notices, orders, or requisitions affecting the land and buildings

*Section 44A(2)(d) LGOIMA. This is information concerning any consent, certificate, notice, order, or requisition, affecting the land or any building on the land, previously issued by the Council.*The information in this section may also cover building consent and/or code compliance information issued by building certifiers under the Building Act 1991 and building consent authorities that are not the Council under the Building Act 2004.

You can check the property file to identify whether any consent or certificate was issued by a building certifier under the Building Act 1991.

Section 44A(2)(da) LGOIMA. The information required to be provided to a territorial authority under section 362T(2) of the Building Act 2004. There is currently no information required to be provided by a building contractor to a territorial authority under section 362T(2) of the Building Act 2004. The Building (Residential Consumer Rights and Remedies) Regulations 2014 only prescribed the information that must be given to the clients of a building contractor.

(For building enquiries, please phone (03) 941 8999, email EPADutyBCO@ccc.govt.nz or visit www.ccc.govt.nz.

(a) Consents

- BCN/1968/6253 Applied: 24/12/1968 Status: Completed
  2 Glovers Road Halswell
  Permit granted 27/01/1969
  Permit issued 27/01/1969
  DWELLING- Historical Reference PER68011068 - No information/ or plans held on property file.
- BCN/1984/3401 Applied: 10/05/1984 Status: Completed
  2 Glovers Road Halswell
  Permit granted 14/05/1984
  Permit issued 14/05/1984
  KENT LOG FIRE & WETBACK- Historical Reference PER84030024 - No information/ or plans held on property file.
- BCN/1985/5186 Applied: 31/07/1985 Status: Completed
  2 Glovers Road Halswell
  Permit granted 16/09/1985
  Permit issued 16/09/1985
  ADDITION OF WORKSHOP TO GARAGE- Historical Reference PER85031623 - No information/ or plans held on property file.
- BCN/1985/7457 Applied: 18/11/1985 Status: Completed
  2 Glovers Road Halswell
  Permit granted 26/11/1985
  Permit issued 26/11/1985
  BATHROOM ,HAYSHED, GARAGE- Historical Reference PER85031989 - No information/ or plans held on property file.
- BCN/1986/5070 Applied: 01/08/1986 Status: Completed
  2 Glovers Road Halswell
  Permit granted 07/10/1986
  Permit issued 07/10/1986
  OUTSIDE TOILET- Historical Reference PER86032884 - No information/ or plans held on property file.
- BCN/1988/8181 Applied: 21/11/1988 Status: Completed
  2 Glovers Road Halswell
  Permit granted 01/12/1988
  Permit issued 01/12/1988
  TUNNEL HOUSE- Historical Reference PER88035596 - No information/ or plans held on property file.

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- BCN/1988/8182 Applied: 21/11/1988 Status: Completed
  2 Glovers Road Halswell
  Permit granted 29/11/1988
  Permit issued 29/11/1988
  PACKING SHED- Historical Reference PER88035597 - No information/ or plans held on property file.
- BCN/1989/5917 Applied: 17/08/1989 Status: Completed
  2 Glovers Road Halswell
  Permit granted 31/08/1989
  Permit issued 31/08/1989
  DWELLING EXTENSION- Historical Reference PER89036498 - No information/ or plans held on property file.
- BCN/1990/815 Applied: 12/02/1990 Status: Completed
  2 Glovers Road Halswell
  Permit issued 12/02/1990
  DRAINAGE & PLUMBING: ALTERATIONS- Historical Reference PER90151475
- BCN/1994/504 Applied: 01/02/1994 Status: Completed
  2 Glovers Road Halswell
  Accepted for processing 01/02/1994
  Building consent granted 15/02/1994
  Building consent issued 18/02/1994
  Code Compliance Certificate Granted 25/03/1994
  Code Compliance Certificate Issued 25/03/1994
  GARAGE- Historical Reference CON94000576
- BCN/1994/6003 Applied: 21/07/1994 Status: Completed
  2 Glovers Road Halswell
  Accepted for processing 21/07/1994
  Building consent granted 30/08/1994
  Building consent issued 01/09/1994
  Code Compliance Certificate Granted 25/10/1995
  Code Compliance Certificate Issued 25/10/1995
  CATTERY- Historical Reference CON94006454
- BCN/1998/3338 Applied: 19/05/1998 Status: Completed
  2 Glovers Road Halswell
  Accepted for processing 19/05/1998
  Building consent granted 14/08/1998
  Building consent issued 28/08/1998
  Code Compliance Certificate Granted 14/09/2001
  Code Compliance Certificate Issued 14/09/2001
  FOUNDATIONS & ALTERATIONS TO RELOCATE DETACHED DWELLING DEMOLISH EXISTING COTTAGE- Historical Reference CON98003663
- BCN/1998/4204 Applied: 17/06/1998 Status: Completed
  2 Glovers Road Halswell
  Accepted for processing 17/06/1998
  Building consent granted 09/07/1998
  Building consent issued 09/07/1998
  Code Compliance Certificate Granted 22/07/1999
  Code Compliance Certificate Issued 22/07/1999
  CONSERVATORY- Historical Reference CON98004637

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- BCN/1998/7233 Applied: 05/10/1998 Status: Completed
  2 Glovers Road Halswell
  Accepted for processing 05/10/1998
  Building consent granted 15/10/1998
  Building consent issued 30/10/1998
  Code Compliance Certificate Granted 04/03/1999
  Code Compliance Certificate Issued 04/03/1999
  GARAGE/STOREROOM- Historical Reference CON98007958
- BCN/1998/9233 Applied: 23/12/1998 Status: Completed
  2 Glovers Road Halswell
  Accepted for processing 23/12/1998
  Building consent granted 19/01/1999
  Building consent issued 25/01/1999
  Code Compliance Certificate Granted 02/08/1999
  Code Compliance Certificate Issued 02/08/1999
  DWELLING ADDITION - STUDY, REMOVE WALL & LOGAIRE ATLANTA LOGBURNER - WETBACK- Historical Reference CON98010198
- BCN/2001/5701 Applied: 13/08/2001 Status: Completed
  2 Glovers Road Halswell
  Accepted for processing 13/08/2001
  Building consent granted 22/08/2001
  Building consent issued 22/08/2001
  PIM Granted 22/08/2001
  PIM Issued 22/08/2001
  Code Compliance Certificate Granted 21/09/2001
  Code Compliance Certificate Issued 21/09/2001
  HAY SHED- Historical Reference ABA10017967
- BCN/2020/6981 Applied: 06/03/2015 Status: Completed
  2 Glovers Road Halswell
  Certificate of acceptance refused 13/04/2015
  Building Act Certificate of Acceptance considered for a rented sleepout. One Bedroom with no hot or cold water, no kitchen. - Historic Reference BAA37000913

(b) Certificates

Note: Code Compliance Certificates were only issued by the Christchurch City Council since January 1993.

(c) Notices

(d) Orders

(e) Requisitions

Related information

- The Council has previously issued other consents, certificates, notices, orders, and/ or requisitions for this property that have been resolved or are no longer current or relate to a building that is no longer on the land. For further information pleasecontact the compliance and investigation team on 941 8999 and reference CSR91884083.

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6. Certificates issued by a building certifier

Section 44A(2)(e) LGOIMA. This is information notified to the Council concerning any certificate issued by a building certifier pursuant to the Building Act 1991 or the Building Act 2004.

(For building enquiries, please phone (03) 941 8999, email EPADutyBCO@ccc.govt.nz or visit www.ccc.govt.nz.

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7. Weathertightness

Section 44A(2)(ea) LGOIMA. This is information notified to the Council under section 124 of the Weathertight Homes Resolution Services Act 2006.

(For weathertight homes enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

If there is no information below this means Council is unaware of any formal Weathertight Homes Resolution Services claim lodged against this property.

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8. Land use and conditions

Section 44A(2)(f) LGOIMA. This is information relating to the use to which the land may be put and conditions attached to that use. The planning information provided below is not exhaustive and reference to the Christchurch District Plan and any notified proposed changes to that plan is recommended: https://ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/plans/christchurch-district-plan/.

There maybe some provisions of the Christchurch City Plan or Banks Peninsula District Plan that affect this property that are still operative.

(For planning queries, please phone (03) 941 8999, email DutyPlanner@ccc.govt.nz or visit www.ccc.govt.nz.

- **Regional plan or bylaw**

There may be objectives, policies or rules in a regional plan or a regional bylaw that regulate land use and activities on this site. Please direct enquiries to Canterbury Regional Council (Environment Canterbury).

- **Waterway Provisions for Other Councils**

A resource consent or permit may also be required from the Canterbury Regional Council or other territorial authority, particularly with respect to water bodies managed by those authorities. Please refer to the relevant regional plan and any relevant bylaws, and contact the Christchurch City Council if you are uncertain which authority manages the water body in question.

(a)(i)Christchurch City Plan & Banks Peninsula District Plan

(ii)Christchurch District Plan

- **High Flood Hazard Management Area**

  This property or parts of, are within the High Flood Hazard Management Area (HFHMA) in the Christchurch District Plan. A resource consent is likely to be required for new buildings or to subdivide this property. Further information can be found at www.ccc.govt.nz/hfhma.

- **Liquefaction Management Area (LMA)**

  Property or part of property within the Liquefaction Management Area (LMA) Overlay which is operative.

- **Outline Development Plan**

  Property or part of property is within an Outline Development Plan area which is affected by specific provisions that are operative.

- **Remainder Slope Instability Management Area**

  Property or part of property within the Christchurch District Plan Remainder of Port Hills and Banks Peninsula Slope Instability Management Area overlay.

- **Waterway Provisions**

  This property or part of this property is close to at least one waterway. It may be within the setback for an Environmental Asset Waterway. Within that setback, District Plan rules apply to activities including buildings, earthworks, fences and impervious surfacing. Any part of the property within the setback will be affected by those rules.

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- **Development Constraint Conditions**

  Council records show there is a specific condition on the use of this site: Well on Property

- **Development Constraint Conditions**

  Council records show there is a specific condition on the use of this site: Specific Site Level required

- **Flood Management Area**

  Property or part of property within the Flood Management Area (FMA) Overlay which is operative.

- **District Plan Zone**

  Property or part of property within the Residential New Neighbourhood Zone which is operative.

(b) Resource consents

If there are any land use resource consents issued for this property the Council recommends that you check those resource consents on the property file. There may be conditions attached to those resource consents for the property that are still required to be complied with.

- RMA/1974/419 - Resource consents
  2 Glovers Road Halswell
  To permit a subdivision less than the area permitted under the District planning scheme. - Historical Reference RES955313
  Status: Processing complete
  Applied 21/10/1974
  Decision issued 21/10/1974
  Granted 21/10/1974

- RMA/1989/257 - Resource consents
  2 Glovers Road Halswell
  4.6m side yard instead of the required 10m - Historical Reference RES9206551
  Status: Processing complete
  Applied 17/08/1989
  Decision issued 23/08/1989
  Granted 23/08/1989

- RMA/1993/1160 - Resource consents
  2 Glovers Road Halswell
  The erection of a boarding cattery in the rural 2 zone at Glovers Road. - Historical Reference RES94101932
  Status: Processing complete
  Applied 12/03/1993
  Decision issued 19/05/1993
  Granted 19/05/1993

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- RMA/1998/1327 - Resource consents
  2 Glovers Road Halswell
  Application for a temporary additional rural dwelling a proposed dwelling is to be constructed which is to replace an existing cottage on - Historical Reference RES981500
  Status: Processing complete
  Applied 08/06/1998
  Decision issued 17/07/1998
  Granted 17/07/1998

- RMA/1998/1529 - Resource consents
  2 Glovers Road Halswell
  Application for a dwelling addition which intrudes the 10m setback in terms of both the Proposed and Transitional Plans. - Historical Reference RES981736
  Status: Processing complete
  Applied 01/07/1998
  Decision issued 08/07/1998
  Granted 08/07/1998

- RMA/1999/2499 - Resource consents
  2 Glovers Road Halswell
  Application to subdivide a 5261m2 allotment, including an existing dwelling, garage and cattery, from a 12.3192 ha property. - Historical Reference RES991246
  Status: Processing complete
  Applied 30/04/1999
  Decision issued 09/09/1999
  Declined 09/09/1999

- RMA/2020/2557 - Land Use Consent
  2 Glovers Road Halswell
  Remediation of contaminated soils
  Status: Processing complete
  Applied 06/11/2020
  Granted 09/12/2020
  Decision issued 09/12/2020

- RMA/2020/2770 - Land Use Consent
  511 Halswell Road Halswell
  To conduct earthworks and stockpiling on site
  Status: Processing complete
  Applied 27/11/2020
  Granted 27/01/2021
  Decision issued 27/01/2021

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- RMA/2020/3076 - Combined subdivision / land use consent
  511 Halswell Road Halswell
  To subdivide 4 allotments to create 87 residential allotments. Land use consent for earthworks and under the NES for contaminated land.
  Status: On hold - waiting for response from applicant
  Applied 22/12/2020

- RMA/1999/5158 - Subdivision Consent
  Fee Simple SUBDIVISION - Historical Reference RMA4366
  Status: Processing complete
  Applied 30/04/1999

- RMA/2000/1933 - Subdivision Consent
  2 LOT FEE SIMPLE APP 223 recieved 29/9/00 certified 9/10/00 224 REQUESTED 08/03/01 Issued 13/3/01 DP 83635 - Historical Reference RMA20002667
  Status: Processing complete
  Applied 02/08/2000
  Granted 22/08/2000
  Decision issued 22/08/2000

Related information

- Council records show that there is a current/on hold monitoring job in our system. This monitoring is to ensure that the resource consent conditions have been met. For further information you can contact the Compliance & Investigation team A on 941 8999 or email: rcmon@ccc.govt.nz and reference to resource consent RMA/2020/2770 - RMA/2020/2557.

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9. Other land and building classifications

Section 44A(2)(g) LGOIMA. This is information notified to the Council by any statutory organisation having the power to classify land or buildings for any purpose.

(For land and building enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

Please refer to Section 1 for details

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10. Network utility information

Section 44A(2)(h) LGOIMA. This is information notified to the Council by any network utility operator pursuant to the Building Act 1991 or the Building Act 2004.

(For network enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

l **None recorded for this property**

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11. Other information

Section 44A(3) LGOIMA. This is information concerning the land that the Council has the discretion to include if it considers it to be relevant.

(For any enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

(a) Kerbside waste collection

- Your recycling is collected Fortnightly on the Week 2 collection cycle on a Tuesday. Please leave your recycling at the Kerbside by 6:00 a.m. Your nearest recycling depot is the Parkhouse Road EcoDrop.

- Your refuse is collected Fortnightly on the Week 2 collection cycle on a Tuesday. Please leave your rubbish at the Kerbside by 6:00 a.m. Your nearest rubbish depot is the Parkhouse Road EcoDrop.

- Your organics are collected Weekly on Tuesday. Please leave your organics at the Kerbside by 6:00 a.m.

(b) Other

- **Floor Levels Information**

  Christchurch City Council holds a variety of information relevant to building/property development across the city. This includes minimum finished floor levels that need to be set to meet the surface water requirements in clause E1.3.2 of the building code (where this applies), and the requirements of the Christchurch District Plan (where a property is in the Flood Management Area). Where this information has been processed for your site, it can be viewed at https://ccc.govt.nz/floorlevelmap/, otherwise site specific advice can be obtained by emailing floorlevels@ccc.govt.nz.

- **Community Board**

  Property located in Halswell-Hornby-Riccarton Community Board.

- **Guest Accommodation**

  Guest accommodation (including whole unit listings on Airbnb; BookaBach; etc.) generally requires a resource consent in this zone when the owner is not residing on the site. For more information, please refer to: https://ccc.govt.nz/providing-guest-accommodation/.

- **Tsunami Evacuation Zone**

  This property is not in a tsunami evacuation zone. It is not necessary to evacuate in a long or strong earthquake or during an official Civil Defence tsunami warning. Residents may wish to offer to open their home to family or friends who need to evacuate from a tsunami zone, and should plan with potential guests to do so in advance.More information can be found at https://ccc.govt.nz/services/civil-defence/hazards/tsunami-e vacuation-zones-and-routes/

- **Electoral Ward**

  Property located in Halswell Electoral Ward

- **Listed Land Use Register**

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Hazardous activities and industries involve the use, storage or disposal of hazardous substances. These substances can sometimes contaminate the soil. Environment Canterbury identifies land that is used or has been used for hazardous activities and industries. This information is held on a publically available database called the Listed Land Use Register (LLUR). The Christchurch City Council may not hold information that is held on the LLUR Therefore, it is recommended that you check Environment Canterbury's online database at www.llur.ecan.govt.nz

- **Spatial Query Report**

  A copy of the spatial query report is attached at the end of this LIM. The spatial query report lists land use resource consents that have been granted within 100 metres of this property.

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CHRISTCHURCH
THE GARDEN CITY
The city that shines

Resource Management Act 1991/Building Act 1991

Hazards or Special Site Characteristics

SOCKBURN SERVICE CENTRE

Location Glovers Road Number: 2

Legal Description: Lot 1 D.P. 83635 Ward: Wigram

Date Recorded 1:4:90 Severity 1 Accuracy A by George Marsh Computer Entry 3:6:93

DETAILS:
Water Way Setback - Specific Site level
Soft ground -

☑ **WATER WAY SETBACK** Glovers Drain

LOCATION OF INFORMATION: **Sockburn Service Centre**

The site (or part of) is located within the waterway setback requirement of the City Plan as specified below: (as amended and publicly notified 8 May 1999).

- ☐ 10 metres for upstream rivers
- ☐ 30 metres for downstream rivers
- ☐ 10 metres Hill waterway (from centreline of waterway)
- ☐ 3 metres Utility to be piped
- ☑ 5 metres Utility waterway
- ☐ 7 metres Environmental waterway
- ☐ 20 metres upstream rural river

Within this setback, filling, excavation or the erection of buildings is a Discretionary activity requiring a Resource Consent.

☑ **SITE LEVEL** **FLOOD PRONE AREA** ☐

File No. or Source of Information: **Water Services Unit**

A minimum site level is recorded against the property.
The land may require raising for stormwater purposes. (where there is a proposal for further development)

☑ RL _____ metres set to Water Services Unit Datum

☑ Can be obtained from the Water Services Unit.

Note: Minimum floor levels above the site level relates to the type of construction, i.e. 150mm brick etc, 225mm weatherboard/AS 3500 Confirmation of the Reduced Level (RL) is required to be made by a Registered Surveyor.

☑ **SOFT GROUND**

Structural Engineer's soil response and bore hole tests are required for any structures on this site. Where necessary, provide design foundation drawings and supporting calculations or "Producer Statements"
Lot 1 DP 54911 Subd Wig 20002667

KEY Severity [1] Low [2] Moderate [3] Extreme [4] Unknown

Accuracy [A] Confirmed [B] Unconfirmed [C] Personal Observation

Geotechnical Investigation and Assessment Report for Subdivision

Riverstone Subdivision, 2 & 4 Glovers Road, Halswell, Christchurch

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Issue Date: **20 October 2020**

Document Ref: **200357-RP-001[A]**

Prepared for: **Yoursection Ltd**

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Costa Rica • Colombia • Haiti • Liberia • Italy • Turkey • India • Nepal • Japan

Report Tracking - 2 & 4 Glovers Road, Halswell, Christchurch

Revision	Status	Date	Prepared by	Reviewed by
A	Final	20 October 2020	C. Gibbens	A. Giannakogiorgos

Authorisation

Author's Signature		**Approver's Signature**	
Name	Clem Gibbens	**Name**	Andreas Giannakogiorgos
Title	Engineering Geologist BSc MSc (Hons) MEngNZ	**Title**	Chartered Professional Engineer (Geotechnical) BSc MSc DIC CMEngNZ CPEng IntPE (NZ)

Miyamoto International New Zealand Ltd
Level 1, 236 Hereford Street | Christchurch 8011

www.miyamoto.nz

Executive Summary

Miyamoto International NZ Ltd (MINZ) has been engaged by Yoursection Ltd to undertake a geotechnical land suitability assessment for the proposed residential subdivision at 2 & 4 Glovers Road, Halswell, Christchurch. The key findings of our evaluation and assessment are outlined below.

GROUND CONDITIONS	**Ground profile**	The sub-surface conditions comprise mainly topsoil over sand-silt mixtures underlain by soft clayey silts and shallow gravel. The ground conditions are variable in horizontal and vertical spread.	
	Soil classification as per NZS 1170.5:2004	Residential Subdivision Area: Class 'D' (deep or soft soil site)	
	Depth to water table	Perched water tables and shallow saturated soils were encountered within the top 1.0 to 2.0m bgl. Permanent ground water is anticipated below the soft silts within the underlying sands and gravels.	
SEISMIC ASSESSMENT	**Design Earthquake Event**	**SLS/SLS2**	**ULS**
	Estimated "free-field" Index post-liquefaction volumetric settlements	< 50mm	< 80mm
	Liquefaction Severity Number (LSN) Value	< 15 Little to minor expression of liquefaction	< 25 Little to moderate expression of liquefaction
	MBIE Technical Categorization (TC)	**Mapped MBIE**	Rural & Unmapped
		Site Specific Foundation TC	TC2
GEOTECHNICAL CONSIDERATIONS	Our assessment of the site under RMA Section 106 found that the subsidence hazard is present on-site due to presence of soft/loose soil layers and liquefiable deposits, though these hazards can be mitigated by the options listed in this report. As the site is located within an FMA set out by CCC, a portion of the site will require filling to raise the ground level to a suitable level for the proposed development by around 1.0m close to Green's Stream. Filling of the site will likely cause static some consolidation settlements in the soft compressible soils underlying the site, though this is not expected to be a significant risk to the development, based on the pre-loading trial undertaken by MINZ previously. A period of monitoring of the site filling works during the raising of the site levels and for a period (~6 months) is advised to be safeguard against the anticipated static settlements.		

Table of Contents

1. Introduction

Miyamoto International NZ Ltd (Miyamoto) has been engaged by Yoursection Ltd to undertake a geotechnical evaluation and assessment as part of a land suitability assessment for the proposed new extension of the residential Riverstone Subdivision at 2 & 4 Glovers Road, Halswell, Christchurch.

Miyamoto have previously completed a geotechnical assessment for resource consenting purposes for the initial stage of the Riverstone Subdivision located at 511 Halswell Road, Christchurch (190666-RP-001[A] – 511 Halswell Road, dated 10 October 2019), as well as undertaking a trial pre-load assessment for the same property (190666-TM-001[A]_511 Halswell Road_Pre-load Trial, dated 28 January 2020). Both documents are referenced as part of this assessment, with this report supplementing and expanding on the work already undertaken.

The scope of this geotechnical engineering assessment was to evaluate the geotechnical conditions at the site and to provide preliminary recommendations for development of the sections. This assessment comprised the following:

- Research of the available information from the New Zealand Geotechnical Database (NZGD), Christchurch City Council (CCC) and Environment Canterbury (ECan);
- Site walkover inspection of the land;
- Shallow field investigation comprising hand-augered boreholes (HA) with associated dynamic cone penetrometer (DCP) and shear vane (SV) tests;
- Deep field investigation comprising Cone Penetration Tests (CPT) with accompanying Dynamic Probe Super Heavy (DPSH) testing;
- Multichannel Analysis of Surface Waves (MASW) geophysical survey;
- Ground Penetrating Radar (GPR) geophysical survey;
- Liquefaction analyses using CPT-based liquefaction triggering procedures;
- Reporting of the findings.

The geotechnical investigation and assessment were carried out considering the Ministry of Business, Innovation & Employment (MBIE) Guidance documents “Planning and engineering guidance for potentially liquefaction-prone land” - Version 1, dated September 2017, “Repairing and rebuilding houses affected by the Canterbury earthquakes” - Version 3, dated December 2012, and “Earthquake geotechnical engineering practice - Modules 2 & 3”. This report presents our findings and conclusions which are provided to facilitate the development of the extended subdivision plan for the site.

2. Site Description

The site, legally described as Lot 1 (2 Glovers) and Lot 2 (4 Glovers) DP 83635, is in Halswell, Christchurch and is approximately 8.3 hectares (ha) in total area. There is an approximate elevation change of 2.0m over 460m at an average gradient of 0.4%. The site generally slopes from north to south, with the low point at the southern boundary of both sections. The property is bound by Glovers Road along the northern boundaries and is bound by rural

properties on the south and east boundaries, and the 511 Halswell Road section to the west. Green's Stream runs through the southern end of both sections.

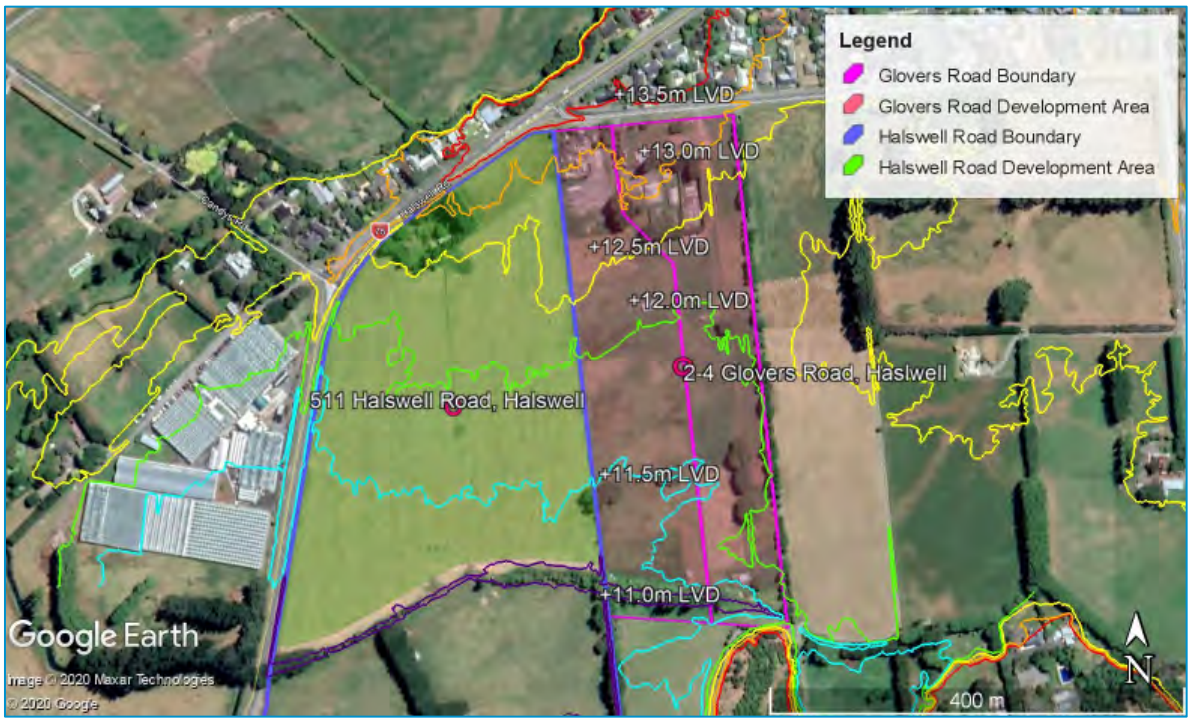

Figure 1: Proposed Site Layout with (Scale as Shown)

The property is located within the "Rural and Unmapped" category listed under the MBIE Technical Categories Map. The site location with reference to the MBIE Technical Categories is shown in Figure 2.

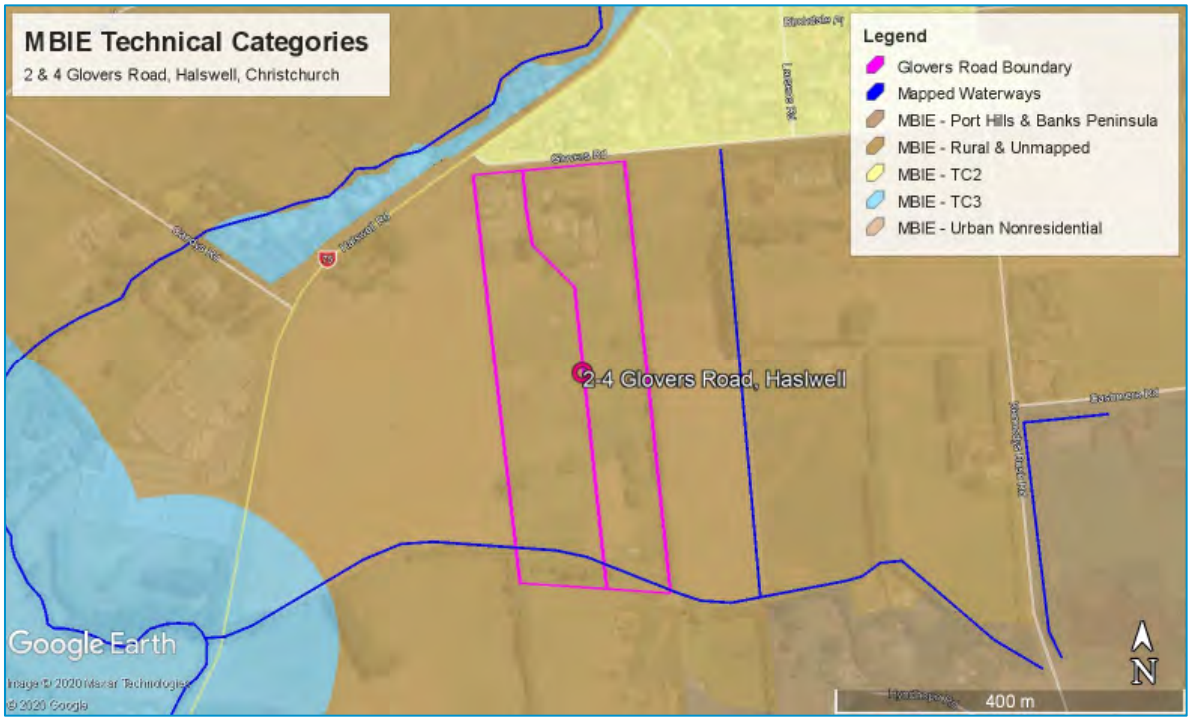

Figure 2: Site Location Plan Showing MBIE Technical Categories and Mapped Waterways (Scale as Shown)

The Riverstone Subdivision is proposed to, currently, be comprised of 239 residential lots with reserves located throughout. A draft plan of the subdivision, including the Glovers Road properties, is presented in Appendix A.

3. Desk Study

The following sources of third-party information were considered and are referenced in this report:

- New Zealand Geotechnical Database (NZGD);
- Environment Canterbury (ECan);
- Christchurch City Council (CCC).

New Zealand Geotechnical Database

The NZGD website was reviewed to identify any additional information related to the extent of land damage after the CES on the site and in the immediate surrounding areas. The results of this review indicate that no significant land damage was observed across the site. Table 1 provides a summary of the information obtained from our review of the NZGD.

Table 1: Desk Study Information Summary (NZGD)

	September 2010 (M_w 7.1)	February 2011 (M_w 6.2)	June 2011 (M_w 6.0)	December 2011 (M_w 5.9)
Aerial Photography Review	Outside of photographed area	Areas of likely ejecta identified in the central and northern areas of both properties, though mainly confined to 2 Glovers Road	Outside of photographed area	Outside of photographed area
Land damage observations	Minor ground cracking but no observed ejected liquefied material was recorded on the properties on the opposite side of Glovers Road in the September 2010 CES event and along Halswell Road and sections of Glovers Road during the June 2011 CES event.			
Observed ground cracking	No cracks mapped on the properties, 10mm – 200mm ground cracks mapped ~65m west of the northernmost boundary of the site within the residential area on the opposite side of Halswell Road			
PGA (g) ± SD	0.294 ± 0.390	0.356 ± 0.435	0.145 ± 0.465	0.139 ± 0.250
Scaled $PGA_{7.5}$ $PGA_{16\%ile}$ to $PGA_{84\%ile}$[(I)] (g)	0.179 to 0.394	0.164 to 0.391	0.061 to 0.156	0.071 to 0.117

(I) Scaled to M7.5 using Idriss and Boulanger recommendations (2008); 68% confidence $PGA_{7.5}$ range

Contaminated Land Considerations

The ECan Listed Land Use Register (LLUR) was reviewed and holds records of potentially Hazardous Activities and Industrial List (HAIL) sites. At this time, a small area that intersects the southern end of both sections is listed as a potential HAIL site. The LLUR lists this small area (in the vicinity of a storage shed) as an A10-classified area, which relates to "persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glass houses or spray sheds", though this has not been investigated by ECan. The property reports for both sections are included in Appendix B.

An environmental assessment is outside the scope of this assessment and has been undertaken by others.

Flood Hazard

Christchurch is a low-lying city and there have always been areas that are prone to flooding during heavy rainfall. The CES has worsened flood risk in many areas of the city through damage to waterways and land. Flood Management Areas (FMAs) have been identified by CCC in the District Plan and take into consideration the impacts of the CES.

At the time of writing this report the site is located within a FMA as indicated by the CCC District Plan.

It is understood that a Finished Floor Level (FFL) of 21.25m above Christchurch Drainage Datum (CDD) is a requirement for development of the site.

Ground Motion

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 and February 2011 events of the CES. This indicates that land and building damage in a future SLS event is likely to be similar to these individual events.

Additionally, based on the SLS2 level of shaking (M_w 6.0 and PGA of 0.19g) which was introduced by MBIE following the updated liquefaction triggering CPT-based procedure by Boulanger & Idriss (2014), it is our opinion the site was "sufficiently tested" to the SLS2 level of earthquake demand during the September 2010 and February 2011 events of the CES.

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. Subsurface Conditions

Geological Setting

The geological map of the area (GNS 1:250,000 QMap) indicates that most of the site has surface geology consisting of "modern (Quaternary) river floodplain and low-level degradation terraces (<2° slopes) comprised of unweathered, variably sorted gravel/sand/silt/clay".

Field Investigations

The NZGD website was reviewed to identify relevant geotechnical investigations completed within the site vicinity, additional to the data identified for use in the original site assessment for the neighbouring section, though nothing for inclusion was identified.

Miyamoto undertook the following site-specific ground investigations and testing:

- Five (5) hand-augered boreholes (referenced HA1 to HA5) with in-situ shear vane testing;
- Five (5) Dynamic Cone Penetrometer (DCP) tests (referenced DCP1 to DCP5);
- Laboratory testing including fines content (FC) and Atterberg Limits;
- Twelve (12) Cone Penetration Tests (CPTu) with porewater pressure measurements;
- Multichannel Analysis of Surface Waves (MASW) geophysical survey;
- Ground Penetrating Radar (GPR) geophysical survey.

The general details of the ground investigations are summarised in Table 2, the test locations are shown in Figure 3 and Figure 4, and the HA/DCP logs and CPT plots are presented in Appendix C and the geophysical survey report is presented in Appendix D.

Table 2: Summary of Ground Investigations

Test Ref.	Source	Source Ref.	Test Type	Depth (m bgl)
HA1/DCP1 to HA5/DCP5	MINZ	200357	Hand Auger/ DCP	1.8 to 3.9
CPTu001 to CPTu012	LandTest	19096	CPT	10.0 to 15.0
MASW 1 to MASW 3	Southern Geophysical Ltd	2050	MASW	Up to 40.0
GPR 1 to GPR 11			GPR	Up to 4.0

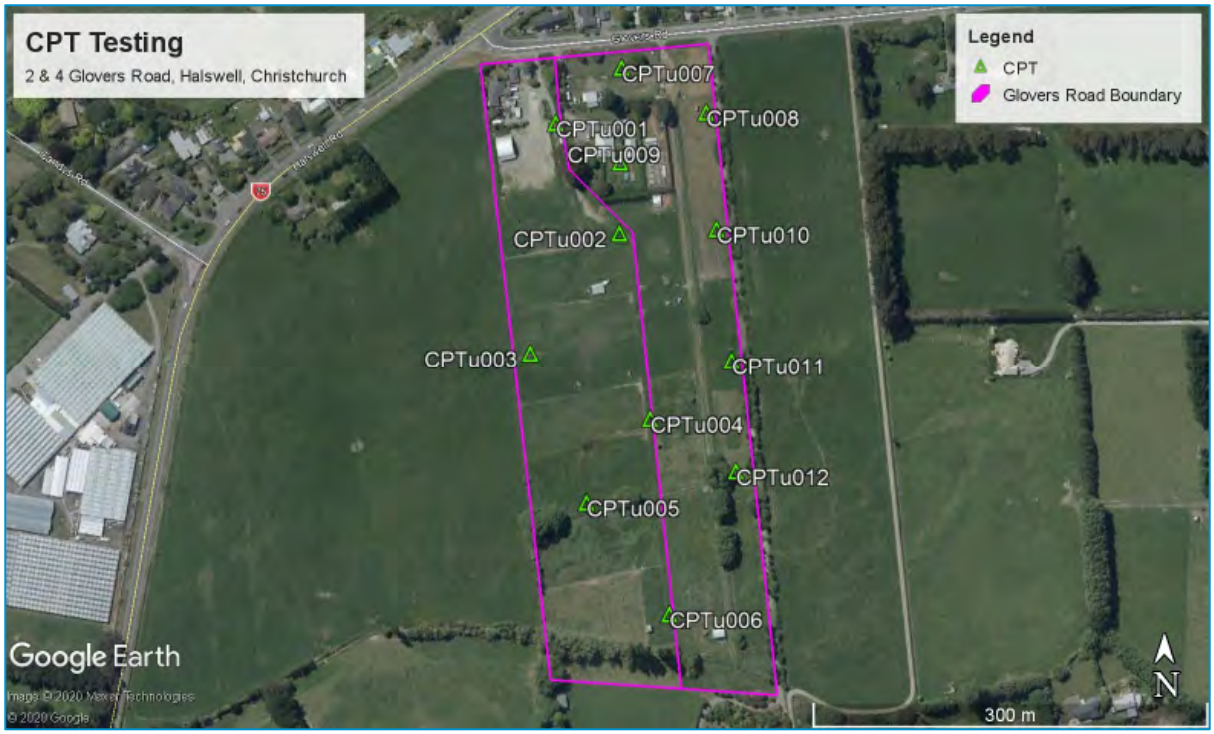

Figure 3: CPT Investigation Location Plan (Scale as Shown)

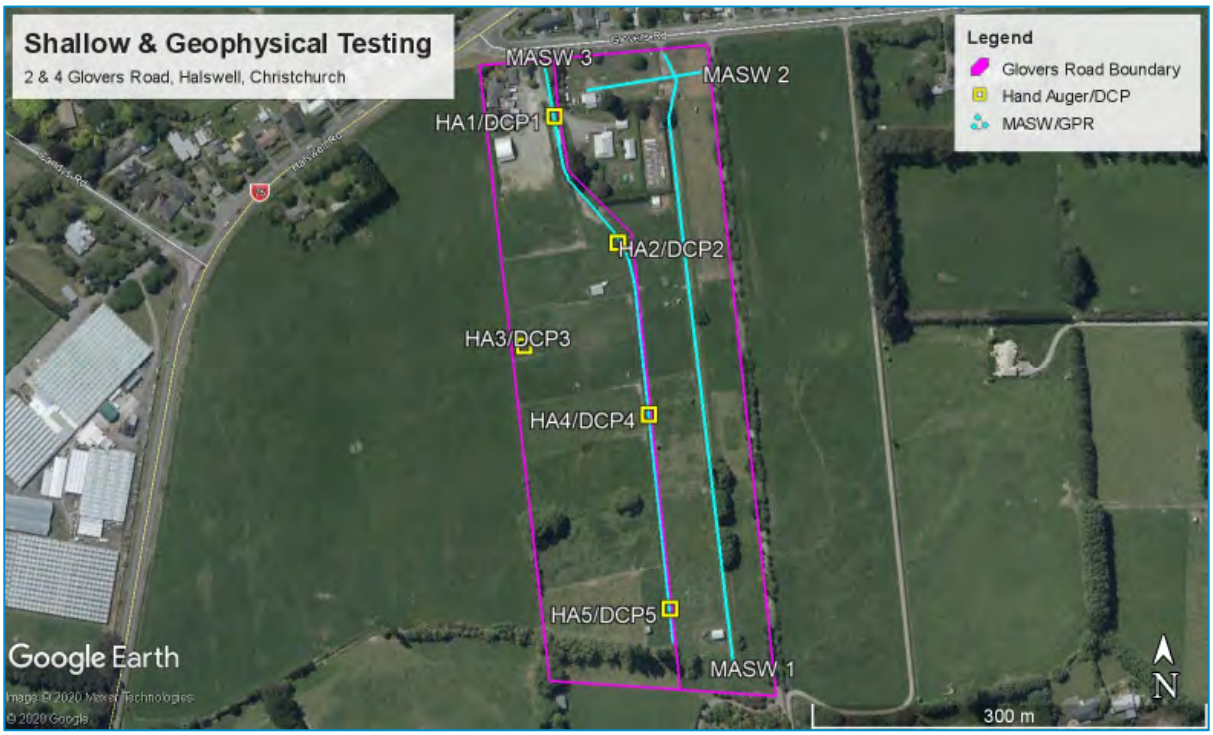

Figure 4: Other Geotechnical Investigation Location Plan (Scale as Shown)

Laboratory Test Results

Laboratory testing was undertaken on samples obtained from our shallow ground investigation to assess the soil characteristics across the site. The testing undertaken includes wet sieving to determine the fines content, and Atterberg limits tests to determine the plastic and liquid limits. A summary of the test results is presented in Table 3, with the full results presented in Appendix C.

Table 3: Laboratory Test Results

Sample Ref.	Depth of sample (m)	Soil Description	Plasticity Index	% Passing		
				0.3 mm	0.15 mm	0.063 mm
C20-319	HA1 1.5m – 2.3m	Silty SAND, brownish grey, wet, non-plastic	-	100	90	49
C20-320	HA1 2.3m – 3.8m	Silty SAND, brownish grey, saturated, non-plastic	-	100	91	49
C20-321	HA2 2.7m – 4.0m	Silty CLAY, some sand, dark grey, saturated, low plasticity	9	99	96	85
C20-312	HA3 2.0m – 3.4m	Sandy SILT, dark grey, saturated, non-plastic	NP	100	99	59
C20-323	HA5 1.5m – 1.8m	Silty SAND, brownish grey, wet, non-plastic	-	99	77	42

Ground Conditions

The ground conditions interpreted from the existing data and investigations undertaken as part of this assessment are presented graphically in the geotechnical cross sections included in Appendix E and the basic soil descriptions are outlined in Table 4.

A near-surface paleo-feature (old river terrace or paleochannel) was identified during the site testing with the CPT's completed at the southern end of the site (CPTu004 to CPTu006 and CPTu012) refusing in dense soils within the upper 5m, before testing was continued with the DPSH. The shallow investigation (HA5/DCP5) also refused at a shallow depth due to dense soils. The testing at the northern end of the site all reached the target depths and were consistent in their findings.

Table 4: Ground Conditions Summary

Layer	Soil Name
a	Silty SAND and Sandy SILT, loose to firm
b	Clayey SILT, soft to firm, medium plasticity
c	Silty SAND, medium dense to dense with increasing depth
GS	Gravelly SAND to Sandy GRAVEL, dense
d	Clayey SILT to silty CLAY, firm
e	Medium dense SAND with silt and gravels
f	Clayey SILT, firm to stiff
S	Silty SAND to Sandy SILT, medium dense to very stiff

MASW & GPR Geophysical Survey

The shear wave velocity (V_S) measurement was assessed with a MASW survey. The results of the survey were used to refine the boundaries and extents between the shallow, softer soils and denser sandy/gravelly layers with the MASW survey reflecting the findings of the intrusive investigations, with 2 clearly defined areas for the north and south of the site. The soils in the northern part of the site had a generally lower shear wave velocity (V_S < 180m/s) to approximately 20.0m depth, though discrete layers of denser, higher V_S soils were identified above this depth before becoming lower velocity again. For the southern part of the site, the lower V_S soils are generally terminated shallower (<5m depth) before the V_S increased in the gravelly dense material.

Additionally, the measured cone tip resistance (q_c) and interpreted shear wave velocity from the CPT data generally shows a consistent pattern with the recorded values from the MASW survey as seen in the CPT profiles in Appendix C. It should be noted that due to the high velocity layers towards the south, thin lower velocity layers were not picked up as seen in the DPSH data. This is reflected in the cross sections presented in Appendix E.

The GPR survey was undertaken to further supplement the MASW surveys for the near-surface soils. The primary objective of this survey was to assist in identifying softer or denser layers that may not have been picked up in the MASW survey. The results generally show a consistent correlation with the MASW survey. The softer soils generally had a poor reflection, with denser material showing a clearer reflection. The shallow gravelly soils at the southern end of the site were also clear within the upper 4.0m of the soil profile.

Groundwater

Our site-specific shallow investigation encountered groundwater levels between 1.0m and 1.8m bgl, however the cohesive soils below the recorded depth were noted to not be saturated, indicating that a perched water table is likely present on-site. The CPT data shows variable piezometric conditions indicating a groundwater table depth between 0.7m and 2.4m bgl, due to the differing depth of cohesive soils in the upper soil profile and different elevations. The shallower groundwater depths were generally confined to the lower elevations of the property.

Based on the above, a groundwater depth range of between 0.7m to 2.4m bgl was adopted for the liquefaction triggering and free-field settlement assessment, depending on the location of the test across the site.

Site Subsoil Class

Based on the site-specific investigation, geological maps and other available information, the site is classified as a Class D (deep or soft soil) site.

Shallow Soils

The geotechnical investigations indicate the existence of low velocity ($V_s \leq 180$m/s), soils between approximately 4.0m and 20.0m depth, with the lower V_S soils encountered at greater depths towards the north of the sections. There are also locations where denser pockets of material were identified within these lower V_S layers. Those layers have lower strength and have the potential for long-term consolidation settlements from loads, such as residential dwellings. This is further discussed later in this report.

5. Liquefaction Assessment

Methodology

An assessment of the earthquake-induced free-field post-liquefaction volumetric settlement at the site has been carried out in accordance with the MBIE Guidance and using proprietary liquefaction assessment software, for SLS and ULS earthquake scenarios.

The seismic design requirements adopted for use in the analyses are defined in MBIE/NZGS Earthquake Geotechnical Engineering Practice Module 3 (May 2016), and Part C of the MBIE Guidelines “Repairing and rebuilding houses affected by the Canterbury earthquakes” and its subsequent updates - clarifications. These are:

- Buildings of normal use (Importance Level 2);
- Deep or soft soil sites (Class D) as specified previously;

- Boulanger and Idriss (2014) methodology for liquefaction triggering, as per the MBIE Guidance subsequent updates (Issue 7, October 2014);
- Zhang et al. (2002) post-liquefaction volumetric strain calculation for estimating the free-field settlements;

Calculations were performed for the full depth of the CPTs and the upper 10m of the soil profile (as per the MBIE Guidance "index value" estimations). It should be noted that the settlement estimates only account for the free-field component of the expected settlement. Actual total settlements under SLS or ULS earthquake loading may be greater or less.

The Liquefaction Severity Number (LSN[1]) has been calculated and used in our assessment as it tends to better reflect the more damaging effects of shallow liquefaction, which is more critical for shallow founded structures. The level of ground damage associated with LSN is summarised in Table 5.

Table 5: Liquefaction Severity Number Ranges and Related Effects

LSN Value	Observed Performance
<10	Little to no expression of liquefaction, minor effects
10 – 20	Minor expression of liquefaction, some sand boils
20 – 30	Moderate expression of liquefaction, with sand boils and some structural damage
30 – 40	Moderate to severe expression of liquefaction, settlement can cause structural damage
40 – 50	Major expression of liquefaction, undulations and damage to ground surface, sever total and differential settlement of structures
>50	Severe damage, extensive evidence of liquefaction at surface, sever total and differential settlements affecting structures, damage to services

Liquefaction Assessment Results

Due to the rapid changes at the interface between fine and coarse-grained soils, a layer correction was applied. The cone tip penetration, and subsequently, the ability to resist liquefaction of a sandy material, is reduced by the surrounding silty layers, while the I_c[2] of the silt layers is reduced due to the presence of the surrounding sandy layers and hence the susceptibility of the fine layers is overestimated. For our analysis, an I_c change of >0.05 per 10mm has been adopted, which eliminates the liquefaction potential for the layer.

The results of our liquefaction triggering analyses utilising the CPT data are presented in Appendix F and summarised in Table 6.

[1] **LSN = Liquefaction Severity Number**. LSN (van Ballegooy et al., 2014) is a vulnerability indicator (damage index) quantifying liquefaction-induced damage developed to reflect more damaging effects of shallow liquefaction on residential land and foundations following the Canterbury Earthquakes (2010-11). LSN considers depth weighted calculated volumetric densification strain within soil layers as a proxy for the severity of liquefaction land damage likely at the ground surface.

[2] **I_c = Soil Behaviour Classification Index -** Robertson & Wride 1998.

Table 6: Estimated "Free-Field" Post-Liquefaction Volumetric Ground Surface Settlements

Earthquake scenario	Moment magnitude (M_w) / PGA (g)	MBIE "Index Value" (mm)	MBIE Technical Category	LSN Values
GWD = varying (in-situ) and 0.5m to 1.2m (earthquake); Layer transition applied				
SLS SLS2	7.5/0.13 6.0/0.19	< 35 5 – 50	TC2 TC2	1 – 5 2 – 16
ULS	7.5/0.35	5 – 80	TC2	5 – 25

In accordance with the MBIE Guidance, the analysis indicates that under SLS and ULS loading conditions the predicted index value settlements fall within the expected future land performance values for a TC2 category site. The higher settlements were located on the land at the northern area of the 2 Glovers Road section, which generally correlates with observed liquefaction ejecta in the aerial photographs.

Based on the LSN estimated for the design events, 'little to minor' expression of liquefaction may be expected for a future SLS design event, and 'little to moderate' expression of liquefaction may be expected for a future ULS design event. The values of LSN at the upper end of the ranges estimated are generally located in the central portion of the development area (where ejecta has been observed following the CES events).

Lateral Spreading

Given the generally flat topography of the site, and the assumption that the site will be levelled further during the development of the subdivision, there is unlikely to be significant height differences, apart from the area immediately adjacent to Green's Stream. As the area needs to be developed with the FMA in mind, and land levels lifted, there is the potential for a more pronounced 'free-face' that could create a risk of lateral spreading. Options to address this are discussed later in the report.

6. Site Designation Assessment

Based on the findings of our desk study, our site-specific ground investigation and observations, and assessment of the performance of the land, we consider the MBIE TC2 category generally appropriate for the site. Despite the deformation characteristics of TC2, the land does not meet the definition of 'Good Ground' as per the New Zealand Standards without modification to standard foundation systems and specific engineering design to account for this due to the soft soils.

7. Geotechnical Considerations for Subdivision

Geotechnical Hazards

The most significant geotechnical hazards at the site comprise the potential for earthquake-induced soil liquefaction and potential static subsidence of the soft compressible soils. These hazards can be partly mitigated by providing strengthened foundations, which reduce the potential for differential settlement of the buildings and are designed to be re-levellable.

However, as part of the land development it is understood that, in order to meet the CCC FFL requirements, the site grade will need to be raised by filling. Site filling works can induce

additional loading of the underlying soft compressible deposits and potentially lead to consolidation settlement of the fill and / or construction above. To assess the likely influence of filling, a pre-load trial was undertaken by Miyamoto. This trial indicates that static settlements are not believed to pose a significant risk to the Halswell Road section of the development. Given the similar soil conditions found, it is our professional opinion that this statement also applies to the Glovers Road properties. It is still recommended that settlement plates are installed during the site filling works and these should be founded at the base of the fill with upstands extending through the top of the fill. It is advised that the settlement plates are monitored during the raising of the site levels and for a period (up to 6 months) to assess any static settlements and ensure performance is in line with the pre-loading trial findings.

The current subdivision plan for the entire site is not currently finalised and until it is further developed, specific detailed recommendations cannot be provided, however, the following sections outline general considerations for future development.

Development Considerations

Based on the land survey data (provided by others), a maximum level of approximately 22.3m CDD was identified at the northern extent of property. The land drops to approximately 19.6m CDD next to Green's Stream, though the development does not extend to this point. The low point of the development area is at approximately 20.4m CDD. As discussed above, the site will require filling to meet the CCC FFL requirements (FFL = 21.25m CDD based on the Halswell Road site), particularly if the preferred foundation options comprise concrete slab foundations. It is anticipated that maximum filling would be in the proximity of 1.2m.

Currently, there is no indication of cutting or removal of material to the north of the site. All earthworks should be undertaken in accordance with NZS 4431:1989 (code of practice for earth fill for residential development) prior to the construction of any foundations. The monitoring scheme (mentioned earlier) should be fully developed once the final details of the proposed earthworks are known.

The southern extent of the filling (in proximity of Green's Stream) will be the maximum height of fill required and will require detailed design to ensure stability. It is our understanding the development area is to extend to within 15m of Green's Stream. A shallow vegetated slope is considered suitable given the height of filling is not likely to exceed 1.2m, and provided the slope is not at a gradient exceeding 1.0m vertical to 2.0m horizontal.

Based on the above and the previously completed works, the following foundation solutions would be considered suitable for the construction of NZS3604 compliant structures for the subdivision:

- MBIE TC2 (Options 1 to 4) enhanced foundation slab;
- Specifically designed, enhanced NZS 3604 perimeter foundation wall and shallow piles.

Based on development works proposed, a geotechnical ultimate bearing capacity of 200kPa can be assumed at a high level, though this value is indicative only. The available bearing capacity must be confirmed on-site prior to construction works at the time of any building consent application.

The foundation types detailed above are also preliminary and should be further developed and optimised in collaboration with the structural engineer once further details of any proposed structure are finalised.

Stormwater Management

Stormwater management is outside the scope of our works. However, it is understood the southern section of the Halswell Road site (area south of Green's Stream) will be utilised for stormwater detention and treatment for the Riverstone subdivision as a whole, with shallow basins excavated through this area. As mentioned in the initial assessment undertaken, this material is unlikely to be suitable for filling of the development area.

Services

Buried services are vulnerable to ground deformations when located within and/or in proximity of potentially liquefiable and compressible soils. Services for the residential development should be designed by a suitably qualified person in collaboration with the geotechnical engineers to accommodate the likelihood of future ground deformations.

Pavement/Roading Infrastructure

As for the services at the site, pavements will require detailed design by a suitably experienced person in collaboration with the geotechnical engineer, the finished ground levels and compaction characteristics of the filling material.

It is currently understood that the new areas of development will link into the Halswell Road property as well as having its own access onto Glovers Road, and it is assumed that filling in this area will be required to raise the grade. The underlying soils in this area are generally typical for the site with the upper 1.0m comprising topsoil over soft silt (loosely corresponding to a CBR of ~2 to 3 below the topsoil).

8. Assessment Against RMA Section 106

As per the requirements of Section 106 of the Resource Management Act (RMA) (2017), we have undertaken a high-level assessment of the significant geotechnical hazards that may affect the site, outside of the hazards already discussed in this report (i.e. static and earthquake-induced subsidence, and lateral spreading). These hazards include, but are not limited to:

- Erosion;
- Falling debris;
- Slippage;
- Inundation.

At the time of our site visit, there was no evidence of erosion. Likewise, no evidence was observed to suggest that lateral movement is an issue on the site, given the site is generally

flat. Rock Fall or slope movement are also not considered a risk to this area of the development.

As part of the site is identified as being within a Flood Management Area (FMA) as defined by the CCC, inundation is likely to be a risk, as the site currently stands. If the site is built up to ensure the FFLs set by the CCC are met and suitable stormwater drainage is in place, then inundation is not considered an imminent risk to the development.

Based on our assessment, we consider that the "significant" geotechnical hazards may be mitigated to an acceptable standard, provided that the geotechnical recommendations given in this report are followed, and the appropriate engineering measures implemented, we consider that the development is unlikely to be affected nor worsen, accelerate or result in material damage.

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.
- 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 Client is responsible for ensuring that the design of any foundations ensures the functionality of the building under SLS level loads.
- 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 as a result of any such changes.
- This report is not to be reproduced, either wholly or in part, without our prior written permission.

If you have any queries or you require any further clarification on any aspects of this report, please do not hesitate to contact Miyamoto International (NZ) Ltd.

10. References

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Appendices

A. Updated Indicative Subdivision Plan (Davie Lovell Smith)

AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION

NOTES :

1. Areas and dimensions are approximate only and are subject to final survey and deposit of plans.
2. Service easements to be created as required.
3. This plan has been prepared for discussion purposes only. No liability is accepted if the plan is used for any other purposes.
4. The position of Greens Drain is approximate and subject to survey.

Total Area : 23.1161 ha

Comprised in: RT's CB10B/654, CB48C/117 & CB48C/118

DAVIE LOVELL-SMITH
PLANNING SURVEYING ENGINEERING

116 Wrights Road P O Box 679 Christchurch 8140. New Zealand
Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:

Halswell Road

SHEET TITLE:

Proposed Subdivision of Pt RS 1593, RS 772 & Lots 1 & 2 DP 83635

DRAWING STATUS

For Discussion Purposes

SCALE : 1:1000@A1 1:2000@A3

DATE : October 2020

CAD FILE : J:\2017\Concept_R6.dwg

REVISION : R6

DRAWING No : C20017

SHEET No: 1 OF 1

B. ECan Listed Land Use Register Files

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Dear Sir/Madam

Thank you for submitting your property enquiry in regards to our Listed Land Use Register (LLUR) which holds information about sites that have been used, or are currently used for activities which have the potential to have caused contamination.

The LLUR statement provided indicates the location of the land parcel(s) you enquired about and provides information regarding any LLUR sites within a radius specified in the statement of this land.

Please note that if a property is not currently entered on the LLUR, it does not mean that an activity with the potential to cause contamination has never occurred, or is not currently occurring there. The LLUR is not complete, and new sites are regularly being added as we receive information and conduct our own investigations into current and historic land uses.

The LLUR only contains information held by Environment Canterbury in relation to contaminated or potentially contaminated land; other information relevant to potential contamination may be held in other files (for example consent and enforcement files).

If your enquiry relates to a farm property, please note that many current and past activities undertaken on farms may not be listed on the LLUR. Activities such as the storage, formulation and disposal of pesticides, offal pits, foot rot troughs, animal dips and underground or above ground fuel tanks have the potential to cause contamination.

Please contact and Environment Canterbury Contaminated Sites Officer if you wish to discuss the contents of the LLUR statement, or if you require additional information.
For any other information regarding this land please contact Environment Canterbury Customer Services.

Yours sincerely

Contaminated Sites Team

Property Statement
from the Listed Land Use Register

Visit www.ecan.govt.nz/HAIL for more information about land uses.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Date:	13 October 2020
Land Parcels:	Lot 1 DP 83635 Valuation No(s): 2356209300

The information presented in this map is specific to the property you have selected. Information on nearby properties may not be shown on this map, even if the property is visible.

Summary of sites:

Site ID	Site Name	Location	HAIL Activity(s)	Category
26587	26587	Halswell West	A10 - Persistent pesticide bulk storage or use;	Not Investigated

Please note that the above table represents a summary of sites and HAILs intersecting the area of enquiry only.

Information held about the sites on the Listed Land Use Register

Site 26587: 26587 (Intersects enquiry area.)

Site Address:	Halswell West
Legal Description(s):	Lot 1 DP 83635,Lot 2 DP 83635

Site Category:	Not Investigated
Definition:	Verified HAIL has not been investigated.

Land Uses (from HAIL):

Period From	Period To	HAIL land use
Pre 1994	Pre 2004	Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glass houses or spray sheds

Notes:

17 Oct 2013 Area defined from: 1994-2004 ECan Aerial Photographs

Note: Multiple glass houses were noted in aerial photographs reviewed.

Investigations:

There are no investigations associated with this site.

Information held about other investigations on the Listed Land Use Register

For further information from Environment Canterbury, contact Customer Services and refer to enquiry number ENQ265562.

Disclaimer:

The enclosed information is derived from Environment Canterbury's Listed Land Use Register and is made available to you under the Local Government Official Information and Meetings Act 1987 and Environment Canterbury's Contaminated Land Information Management Strategy (ECan 2009).

The information contained in this report reflects the current records held by Environment Canterbury regarding the activities undertaken on the site, its possible contamination and based on that information, the categorisation of the site. Environment Canterbury has not verified the accuracy or completeness of this information. It is released only as a copy of Environment Canterbury's records and is not intended to provide a full, complete or totally accurate assessment of the site. It is provided on the basis that Environment Canterbury makes no warranty or representation regarding the reliability, accuracy or completeness of the information provided or the level of contamination (if any) at the relevant site or that the site is suitable or otherwise for any particular purpose. Environment Canterbury accepts no responsibility for any loss, cost, damage or expense any person may incur as a result of the use, reference to or reliance on the information contained in this report.

Any person receiving and using this information is bound by the provisions of the Privacy Act 1993.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Dear Sir/Madam

Thank you for submitting your property enquiry in regards to our Listed Land Use Register (LLUR) which holds information about sites that have been used, or are currently used for activities which have the potential to have caused contamination.

The LLUR statement provided indicates the location of the land parcel(s) you enquired about and provides information regarding any LLUR sites within a radius specified in the statement of this land.

Please note that if a property is not currently entered on the LLUR, it does not mean that an activity with the potential to cause contamination has never occurred, or is not currently occurring there. The LLUR is not complete, and new sites are regularly being added as we receive information and conduct our own investigations into current and historic land uses.

The LLUR only contains information held by Environment Canterbury in relation to contaminated or potentially contaminated land; other information relevant to potential contamination may be held in other files (for example consent and enforcement files).

If your enquiry relates to a farm property, please note that many current and past activities undertaken on farms may not be listed on the LLUR. Activities such as the storage, formulation and disposal of pesticides, offal pits, foot rot troughs, animal dips and underground or above ground fuel tanks have the potential to cause contamination.

Please contact and Environment Canterbury Contaminated Sites Officer if you wish to discuss the contents of the LLUR statement, or if you require additional information.
For any other information regarding this land please contact Environment Canterbury Customer Services.

Yours sincerely

Contaminated Sites Team

Property Statement
from the Listed Land Use Register

Visit www.ecan.govt.nz/HAIL for more information about land uses.

Environment Canterbury
Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
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PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Date:	13 October 2020
Land Parcels:	Lot 2 DP 83635 Valuation No(s): 2356209301

The information presented in this map is specific to the property you have selected. Information on nearby properties may not be shown on this map, even if the property is visible.

Summary of sites:

Site ID	Site Name	Location	HAIL Activity(s)	Category
26587	26587	Halswell West	A10 - Persistent pesticide bulk storage or use;	Not Investigated

Please note that the above table represents a summary of sites and HAILs intersecting the area of enquiry only.

Information held about the sites on the Listed Land Use Register

Site 26587: 26587 (Intersects enquiry area.)

Site Address:	Halswell West
Legal Description(s):	Lot 1 DP 83635,Lot 2 DP 83635

Site Category:	Not Investigated
Definition:	Verified HAIL has not been investigated.

Land Uses (from HAIL):

Period From	Period To	HAIL land use
Pre 1994	Pre 2004	Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glass houses or spray sheds

Notes:

17 Oct 2013 Area defined from: 1994-2004 ECan Aerial Photographs

Note: Multiple glass houses were noted in aerial photographs reviewed.

Investigations:

There are no investigations associated with this site.

Information held about other investigations on the Listed Land Use Register

For further information from Environment Canterbury, contact Customer Services and refer to enquiry number ENQ265560.

Disclaimer:

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The information contained in this report reflects the current records held by Environment Canterbury regarding the activities undertaken on the site, its possible contamination and based on that information, the categorisation of the site. Environment Canterbury has not verified the accuracy or completeness of this information. It is released only as a copy of Environment Canterbury's records and is not intended to provide a full, complete or totally accurate assessment of the site. It is provided on the basis that Environment Canterbury makes no warranty or representation regarding the reliability, accuracy or completeness of the information provided or the level of contamination (if any) at the relevant site or that the site is suitable or otherwise for any particular purpose. Environment Canterbury accepts no responsibility for any loss, cost, damage or expense any person may incur as a result of the use, reference to or reliance on the information contained in this report.

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C. Geotechnical Investigation Results

MINZ Shallow Investigation Logs

Laboratory Soil Sample Test Results

LandTest CPT/DPSH Plot

miyamoto. ENGINEERS + CONSTRUCTION CONSULTANTS

PROJECT NUMBER:	**200357**
CLIENT:	**Yoursection Ltd.**
TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA1/DCP1

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**				
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**2.9 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**	*SHEAR VANE NUMBER:*	**2102**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.65 mbgl**	This report may only be reproduced in full	

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
0.0	1			SILT: low plasticity, dark brown, moist, with minor rootlets (TOPSOIL)											
	1														
	1														
	1														
0.5	3			SILT: low plasticity, brown, moist, with minor fine sand											
	2														
	1														
	2														
	1														
1.0	2														
	2														
	2														
	2														
	2														
	1														
1.5	2			Silty SAND: fine to medium, brown-grey, wet											
	2	▽													
	2														
	2														
	2					DIST. SAMPLE					51%	49%			
2.0	3			at 2.0m: becomes blue-grey, saturated											
	3														
	2														
	1														
	1														
2.5	2					DIST. SAMPLE					51%	49%			
	2														
	3														
	4														
	5			...contd on next page											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	HA	HAND AUGER	LL	LIQUID LIMIT	Gr	GRAVEL
GWL	GROUNDWATER LEVEL	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	Sa	SAND
mbgl	METERS BELOW GROUND LEVEL	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
WC	WATER CONTENT	UW	UNIT WEIGHT (kN/m^3)	NE	NOT ENCOUNTERED	▽	STANDING GWL

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA1/DCP1 (contd.)

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**						
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**3.9**	**mbgl**	*HOLE DIAMETER:*	**50 mm**	
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**		*SHEAR VANE NUMBER:*	**2102**	
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.65**	**mbgl**	This report may only be reproduced in full		

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
	9	1.65m bgl --->		Silty SAND: fine to medium, blue-grey, saturated (contd.)		DIST. SAMPLE					51%	49%			
	9														
	9														
	9														
3.5	7														
	6														
	6														
	7														
	7			SILT: low plasticity, blue-grey, saturated											
4.0				**EOH (Target Depth Reached)**											
4.5															
5.0															
5.5															

LEGEND

ABBREVIATIONS

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

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA2/DCP2

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**				
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**3.9 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**	*SHEAR VANE NUMBER:*	**2102**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.3 mbgl**	This report may only be reproduced in full	

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
0	1			SILT: non-plastic, dark brown, moist, with some sand and rootlets (TOPSOIL)											
	2														
	1														
	2			SILT: low plasticity, yellow-brown, moist, with some sand											66 / 16
0.5	2														
	3														
	3			SAND: fine to medium, orange-brown, moist, with trace of silt											
	3														
	2														
	2														
1.0	4														
	3														
	2	▽													
	3														
	2														
1.5	2			Clayey SILT: low to medium plasticity, grey, moist, with some sand											
	3														
	4														
	3			at 1.9m: becomes wet, mottled orange											
	Self Weight														63 / 16
2.0	1														
	3			at 2.2m: mottling absent											
	3														
	3			at 2.3m: becomes saturated											
	4														
2.5	4														
	5														
	5														
	7						DIST. SAMPLE	29	20	9	-	15%	85%		
	7			...contd on next page											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	HA	HAND AUGER	LL	LIQUID LIMIT	Gr	GRAVEL
GWL	GROUNDWATER LEVEL	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	Sa	SAND
mbgl	METERS BELOW GROUND LEVEL	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
WC	WATER CONTENT	UW	UNIT WEIGHT (kN/m^3)	NE	NOT ENCOUNTERED	▽	STANDING GWL

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA2/DCP2 (contd.)

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**						
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**3.9**	**mbgl**	*HOLE DIAMETER:*	**50 mm**	
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**		*SHEAR VANE NUMBER:*	**2102**	
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.3**	**mbgl**	This report may only be reproduced in full		

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
	7	1.3m bgl -->		Clayey SILT: low to medium plasticity, grey, saturated, with some sand (contd.)											
	7														
	8														
	7														
3.5	7					DIST. SAMPLE	29	20	9	-	15%	85%			
	6														
	7														
	8														
	7														
4.0				**EOH (Target Depth Reached)**											
4.5															
5.0															
5.5															

LEGEND

ABBREVIATIONS

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

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA3/DCP3

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**						
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**4.1**	**mbgl**	*HOLE DIAMETER:*	**50 mm**	
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**		*SHEAR VANE NUMBER:*	**2102**	
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.8**	**mbgl**	This report may only be reproduced in full		

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
0.0	2			SILT: non-plastic, dark brown, dry, with some sand and rootlets (TOPSOIL)											
	1														
	2														
	2														
	2			SILT: low plasticity, light brown, moist											
0.5	2														
	2			SAND: fine to medium, orange brown, moist											
	2														
	2														
	2														
1.0	2														
	2														
	3														
	1			Sandy SILT: low plasticity, orange brown, wet											
	2														
1.5	3			SILT: medium plasticity, brown, wet											
	3														
	3	▽													
	5														
	2														
2.0	2			Sandy SILT: non-plastic, dark grey, saturated			DIST. SAMPLE	Non-Plastic		-	41%	59%			
	2														
	3														
	4														
	4														
2.5	5														
	5														
	2														
	4														
	5			...contd on next page											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	HA	HAND AUGER	LL	LIQUID LIMIT	Gr	GRAVEL
GWL	GROUNDWATER LEVEL	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	Sa	SAND
mbgl	METERS BELOW GROUND LEVEL	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
WC	WATER CONTENT	UW	UNIT WEIGHT (kN/m^3)	NE	NOT ENCOUNTERED	▽	STANDING GWL

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA3/DCP3 (contd.)

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**						
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**4.1**	**mbgl**	*HOLE DIAMETER:*	**50 mm**	
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**		*SHEAR VANE NUMBER:*	**2102**	
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.8**	**mbgl**	This report may only be reproduced in full		

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
			USC	*Soil Characteristics*	*Graphic Log*		*Atterberg Limits*			*Grain Size*			*WC (%)*	*UW*	
							LL	*PL*	*PI*	*Gr*	*Sa*	*FC*			
	5	1.8m bgl ⟶		Sandy SILT: non-plastic, dark grey, saturated (contd.)		DIST. SAMPLE	Non-Plastic			-	41%	59%			
	7														
	8														
	8														
3.5	8														
	7														
	8														
	9														
4.0	10														
				EOH (Target Depth Reached)											
4.5															
5.0															
5.5															

LEGEND

ABBREVIATIONS

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

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA4/DCP4

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**				
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**2.9 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**	*SHEAR VANE NUMBER:*	**2102**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.2 mbgl**	This report may only be reproduced in full	

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
0	2			Sandy SILT: non-plastic, brown, moist, with minor rootlets (TOPSOIL)											
	1														
	2														
	2			SAND: fine to medium, grey, moist, with some silt											
	2														
0.5	2														
	1														
	1			at 0.8m: becomes wet											
	1														
	2														
1.0	3			Sandy SILT: low plasticity, brown-grey, wet, sand is fine											
	3	▽													
	3			at 1.2m: becomes saturated											
	3														
1.5	2														
	2														
	2														
	3														
	3														
	3														
2.0	3			SILT: low to medium plasticity, blue-grey, saturated											
	3														
	4														
	3														
	4			Silty SAND: fine to medium, grey, saturated											
2.5	4														
	5														
	4														
	4														
				EOH (Target Depth Reached)											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	HA	HAND AUGER	LL	LIQUID LIMIT	Gr	GRAVEL
GWL	GROUNDWATER LEVEL	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	Sa	SAND
mbgl	METERS BELOW GROUND LEVEL	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
WC	WATER CONTENT	UW	UNIT WEIGHT (kN/m^3)	NE	NOT ENCOUNTERED	▽	STANDING GWL

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA5/DCP5

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**						
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**1.9**	**mbgl**	*HOLE DIAMETER:*	**50 mm**	
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**		*SHEAR VANE NUMBER:*	**2102**	
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.0**	**mbgl**	This report may only be reproduced in full		

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
0.0	2			SILT: low plasticity, brown, moist, with minor fine sand (TOPSOIL)											
	1														
	2														
	2														
	2														
0.5	3			Sandy SILT: low plasticity, grey, moist, sand is fine											
	2														
	2														
	2														
	1	▽													
1.0	1			at 1.0m: becomes wet											
	2														
	3			at 1.2m: becomes saturated											
	3														
	3														
1.5	2			Silty SAND: fine to medium, grey, saturated		DIST. SAMPLE				-	58%	42%			
	2														
	5			at 1.8m: with minor fine to medium gravel											
2.0	11			**EOH (Practical Refusal on Gravel)**											
2.5															

LEGEND

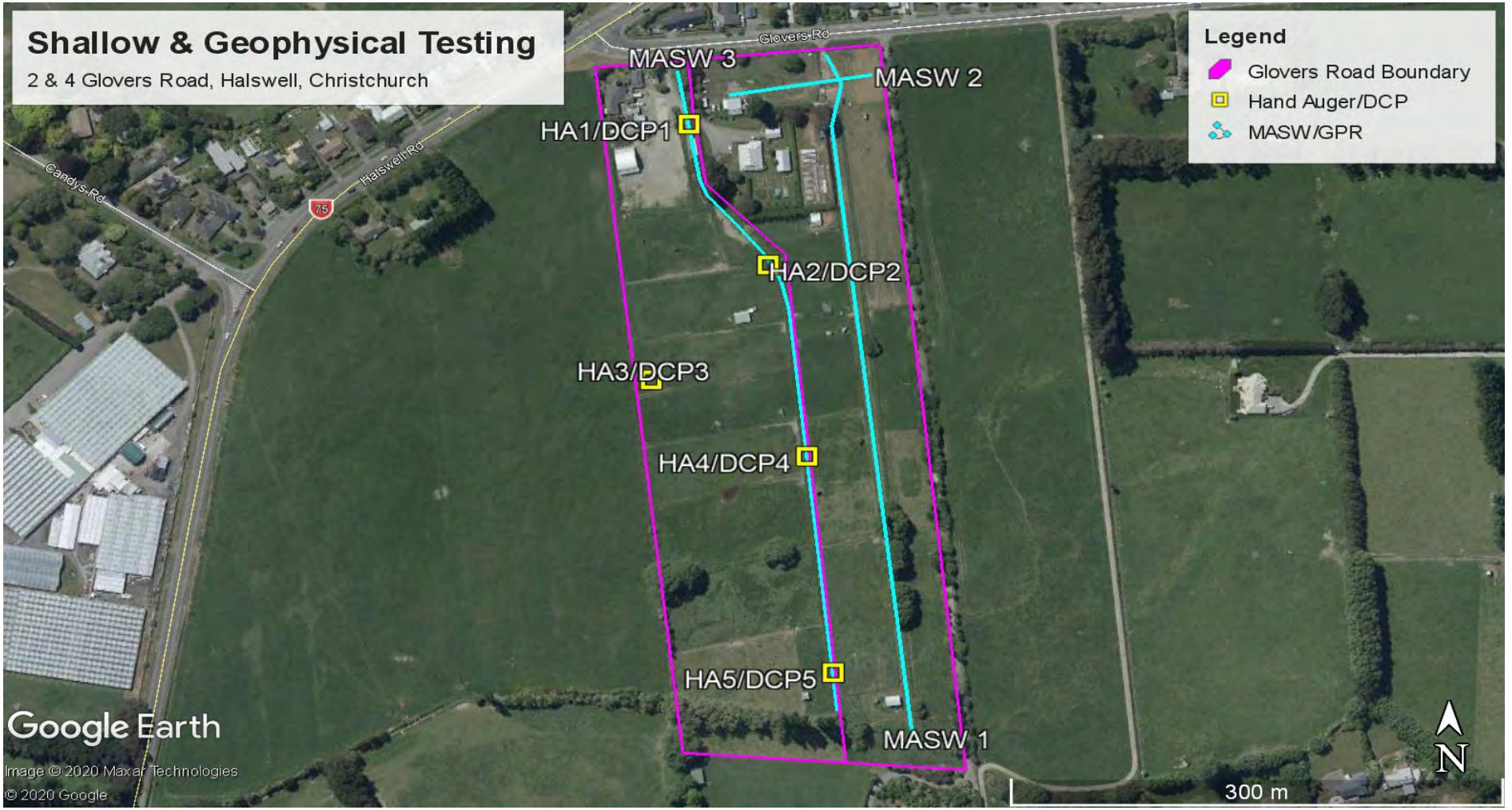
ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	HA	HAND AUGER	LL	LIQUID LIMIT	Gr	GRAVEL
GWL	GROUNDWATER LEVEL	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	Sa	SAND
mbgl	METERS BELOW GROUND LEVEL	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
WC	WATER CONTENT	UW	UNIT WEIGHT (kN/m^3)	NE	NOT ENCOUNTERED	▽	STANDING GWL

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**
SITE INVESTIGATION PLAN	**2 & 4 Glovers Road, Halswell, Christchurch**	



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18B Birmingham Drive
Middleton
Christchurch
E: info@geocivil.co.nz
M: 027 6565 317

TEST REPORT

Lab Job No: 8378-032

Your ref.: -

Date of Issue: 14/09/2020

Date of Re-Issue: -

Page: 1 of 8

Test Report

C20-450

PROJECT:	2 Glovers Road – Laboratory Testing
CLIENT:	Miyamoto International NZ Ltd, 518 Colombo Street, Christchurch, 8011
ATTENTION:	Clem Gibbens
INSTRUCTIONS:	Determination of Particle-Size Distribution-Wet Sieving method Determination of the Liquid & Plastic Limits, Plasticity Index and Water Content Determination of the Water Content of Soils
TEST METHOD:	NZS 4402:1986 Test 2.8.1 NZS 4402:1986 Tests 2.2, 2.3, 2.4 NZS 4402:1986 Test 2.1
SAMPLING METHOD:	Client - SNA
TEST RESULTS:	As per Laboratory sheets attached

Jeremy Brokenshire
Laboratory Technician

Nick van Warmerdam
Approved Signatory

ACCREDITED
IANZ
TESTING LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

Christchurch Laboratory
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Middleton, Christchurch
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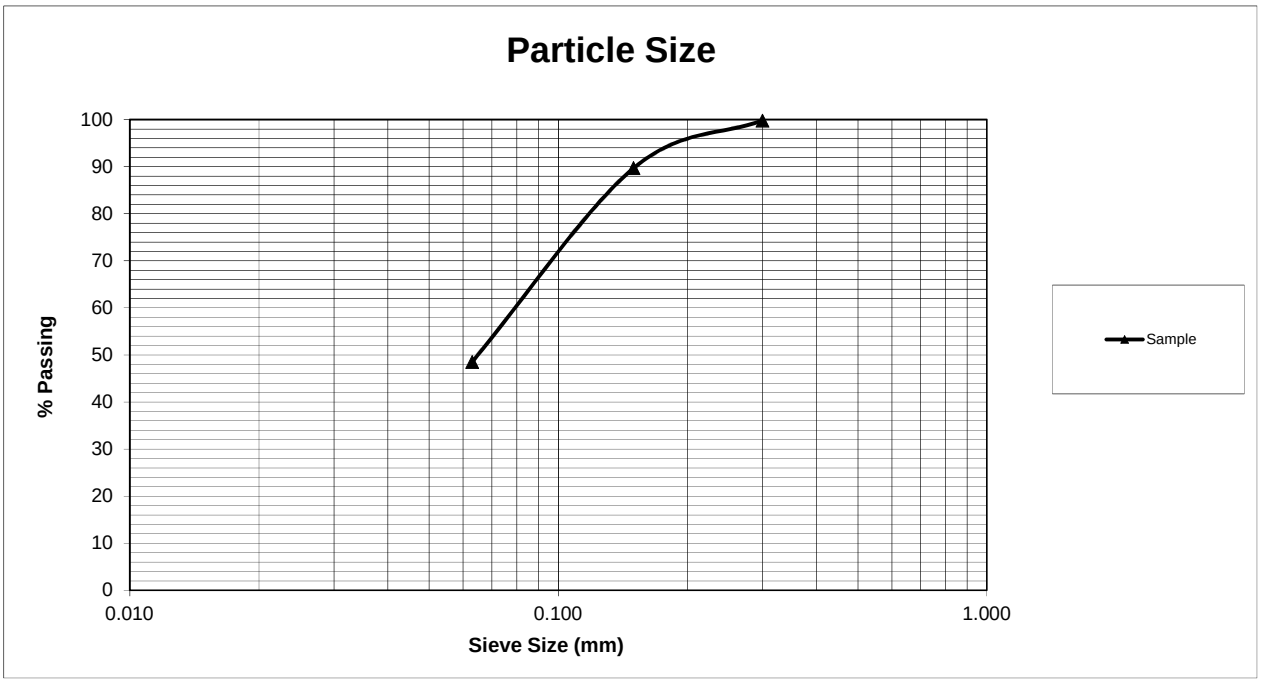
DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - GRAPH

NZS 4402: 1986 Test 2.8.1, 2.8.2

Lab Job No:	8378-032	**Sample No:**	C20-319
Client:	Miyamoto International NZ Ltd	**Tested By:**	D.P
Location:	2 Glovers Road HA01 (1.5-2.3m)	**Date:** **Checked By:**	9/09/2020 J.B
Date Received:	8/09/2020	**Date:**	14/09/2020
Report No:	C20-450	**Page:**	2 of 8
REF:	-		
Sampling Method: **Date Sampled:**	Sampled by client - SNA 4/09/2020	**Sampled By:**	Client
Test Details:	Wet sieving method		
History:	Natural		
Description of Sample:	Silty SAND, brownish grey, wet, no plasticity		

	% Passing		
Sieve Size	**Max**	**Min**	**Sample**
0.300	-	-	100
0.150	-	-	90
0.063	-	-	49



The percentage passing the finest sieve was obtained by difference.

N. van Warmerdam
Approved Signatory

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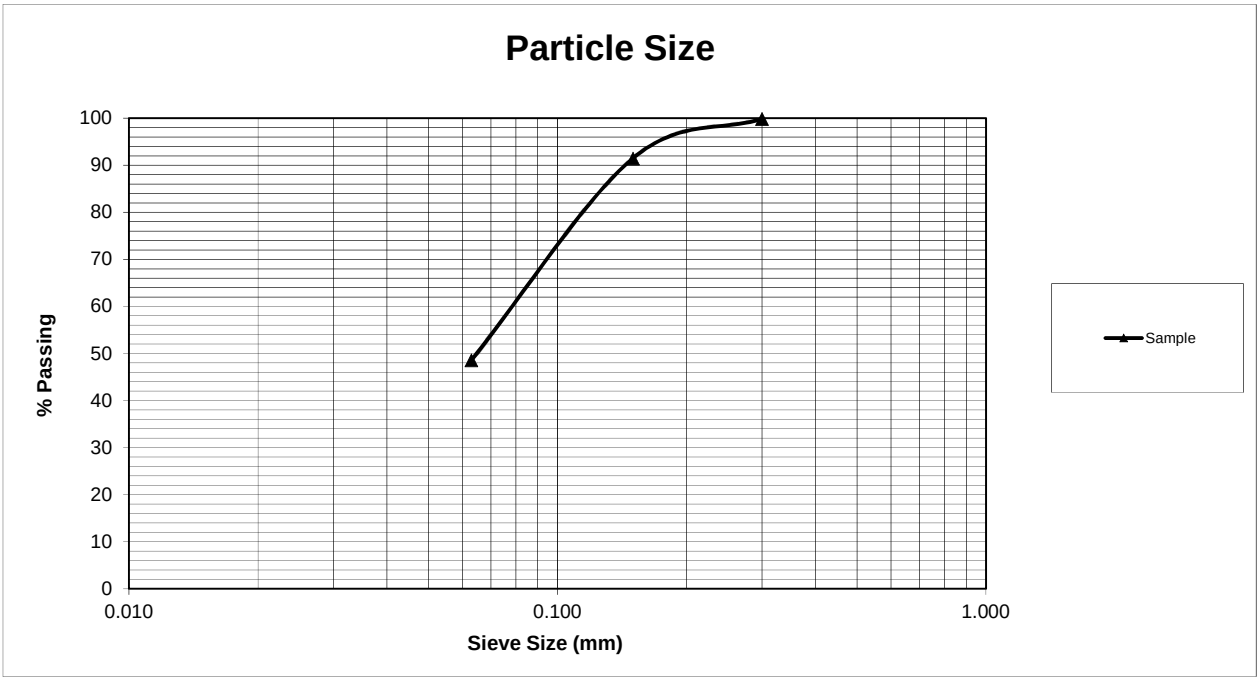
DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - GRAPH

NZS 4402: 1986 Test 2.8.1, 2.8.2

Lab Job No:	8378-032	**Sample No:**	C20-320
Client:	Miyamoto International NZ Ltd	**Tested By:**	D.P
Location:	2 Glovers Road HA01 (2.3-3.8m)	**Date:** **Checked By:**	9/09/2020 J.B
Date Received:	8/09/2020	**Date:**	14/09/2020
Report No:	C20-450	**Page:**	3 of 8
REF:	-		
Sampling Method:	Sampled by client - SNA	**Sampled By:**	Client
Date Sampled:	4/09/2020		
Test Details:	Wet sieving method		
History:	Natural		
Description of Sample:	Silty SAND, brownish grey, saturated, no plasticity		

	% Passing		
Sieve Size	**Max**	**Min**	**Sample**
0.300	-	-	100
0.150	-	-	91
0.063	-	-	49



The percentage passing the finest sieve was obtained by difference.

N. van Warmerdam
Approved Signatory

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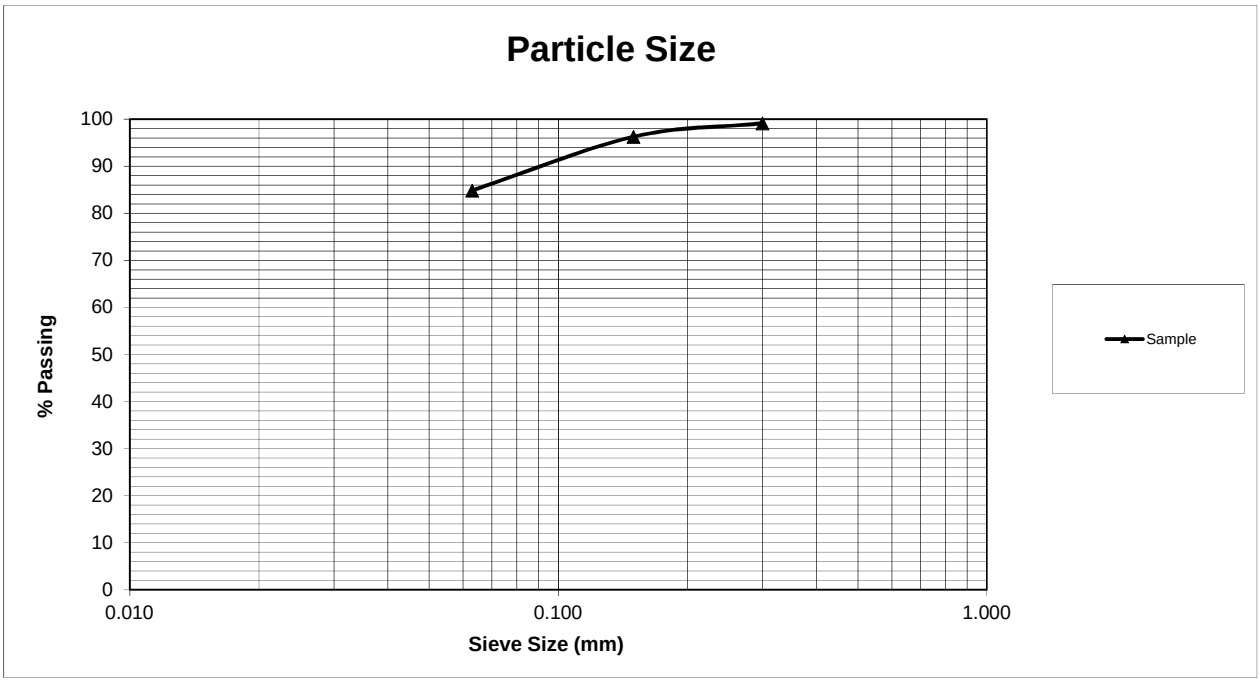
DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - GRAPH

NZS 4402: 1986 Test 2.8.1, 2.8.2

Lab Job No:	8378-032	**Sample No:**	C20-321
Client:	Miyamoto International NZ Ltd	**Tested By:**	D.P
Location:	2 Glovers Road HA02 (2.7-4.0m)	**Date:** **Checked By:**	9/09/2020 J.B
Date Received:	8/09/2020	**Date:**	14/09/2020
Report No:	C20-450	**Page:**	4 of 8
REF:	-		
Sampling Method:	Sampled by client - SNA	**Sampled By:**	Client
Date Sampled:	4/09/2020		
Test Details:	Wet sieving method		
History:	Natural		

Description of Sample: Silty CLAY, some sand, dark grey saturated, low plasticity

	% Passing		
Sieve Size	**Max**	**Min**	**Sample**
0.300	-	-	99
0.150	-	-	96
0.063	-	-	85



The percentage passing the finest sieve was obtained by difference.

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DETERMINATION OF THE LIQUID & PLASTIC LIMITS, PLASTICITY INDEX & WATER CONTENT

NZS 4402: 1986 Test 2.2, 2.3, 2.4

Lab Job No:	8378-032	**Sample No.:**	C20-321
Client:	Miyamoto International NZ Ltd	**Tested By:**	S.P.S
Location:	2 Glovers Road HA02 (2.7-4.0m)	**Date Tested:**	11/09/2020
		Checked By:	J.B
Date Received:	8/09/2020	**Date Checked:**	14/09/2020
Report No:	C20-450	**Page:**	5 of 8
REF:	-		
Sampling Method:	Sampled by client - SNA	**Sampled By:**	Client
Date Sampled:	4/09/2020		

Test Details:

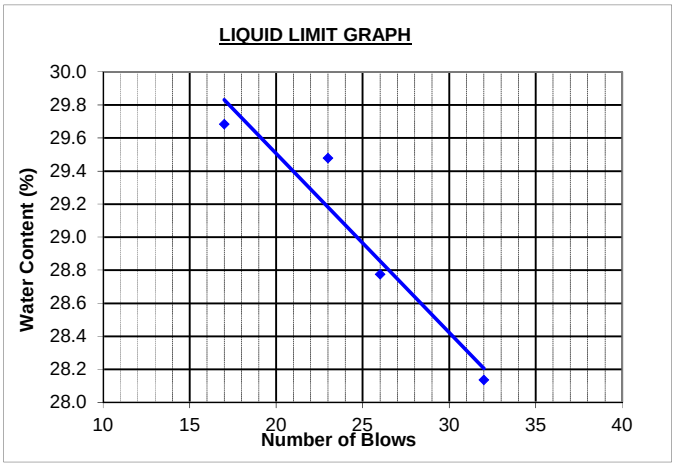
Test performed on: Fraction passing 425mm sieve

Sample history: Natural state

Description of Sample: Silty CLAY, some sand, dark grey saturated, low plasticity

	Liquid Limit				Plastic Limit	
No. of blows	17	23	26	32		
Water content (%)	29.7	29.5	28.8	28.1	20.0	19.2

NWC	**30.5**
Liquid Limit	**29**
Plastic Limit	**20**
Plasticity Index	**9**



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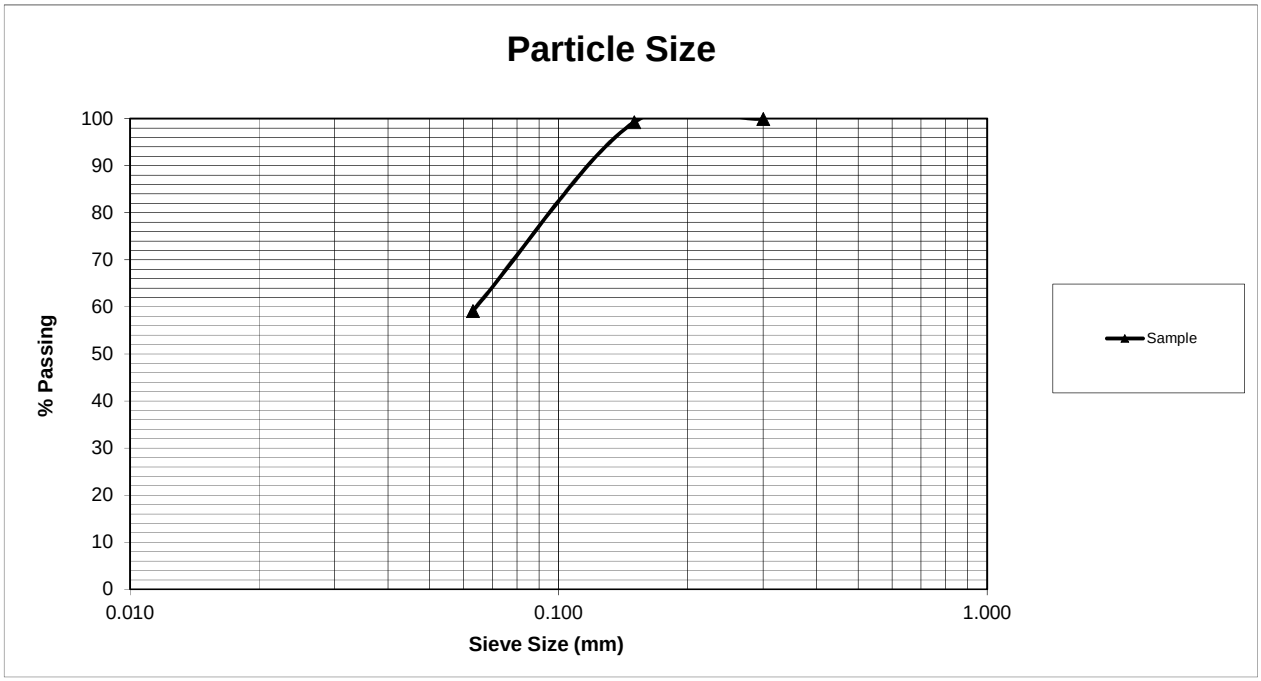
DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - GRAPH

NZS 4402: 1986 Test 2.8.1, 2.8.2

Lab Job No:	8378-032	**Sample No:**	C20-322
Client:	Miyamoto International NZ Ltd	**Tested By:**	D.P
Location:	2 Glovers Road HA03 (2.0-3.4m)	**Date:** **Checked By:**	9/09/2020 J.B
Date Received:	8/09/2020	**Date:**	14/09/2020
Report No:	C20-450	**Page:**	6 of 8
REF:	-		
Sampling Method:	Sampled by client - SNA	**Sampled By:**	Client
Date Sampled:	4/09/2020		
Test Details:	Wet sieving method		
History:	Natural		
Description of Sample:	Sandy SILT, dark grey, saturated, no plasticity		

	% Passing		
Sieve Size	**Max**	**Min**	**Sample**
0.300	-	-	100
0.150	-	-	99
0.063	-	-	59



The percentage passing the finest sieve was obtained by difference.

N. van Warmerdam
Approved Signatory

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DETERMINATION OF THE LIQUID & PLASTIC LIMITS, PLASTICITY INDEX & WATER CONTENT

NZS 4402: 1986 Test 2.2, 2.3, 2.4

Lab Job No:	8378-032	**Sample No.:**	C20-322
Client:	Miyamoto International NZ Ltd	**Tested By:**	S.P.S
Location:	2 Glovers Road HA03 (2.0-3.4m)	**Date Tested:**	11/09/2020
		Checked By:	J.B
Date Received:	8/09/2020	**Date Checked:**	14/09/2020
Report No:	C20-450	**Page:**	7 of 8
REF:	-		
Sampling Method:	Sampled by client - SNA	**Sampled By:**	Client
Date Sampled:	4/09/2020		

Test Details:

Test performed on: Fraction passing 425mm sieve

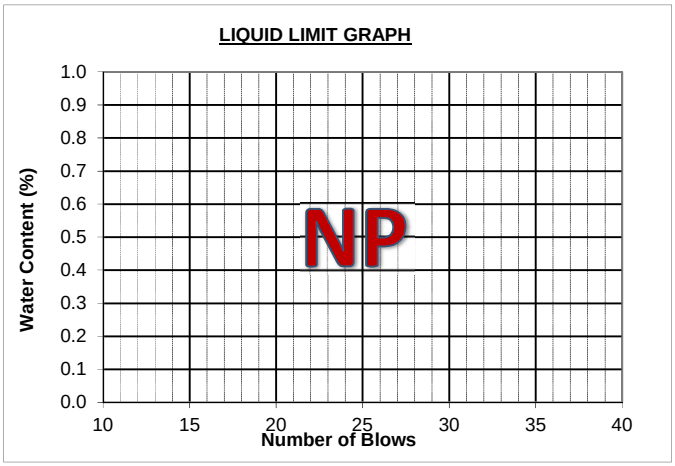
Sample history: Natural state

Description of Sample: Sandy SILT, dark grey, saturated, no plasticity

	Liquid Limit
No. of blows	NP
Water content (%)	

Plastic Limit
NP

NWC	**28.9**
Liquid Limit	**-**
Plastic Limit	**-**
Plasticity Index	**-**



Unable to obtain Liquid Limit or Plastic Limit.

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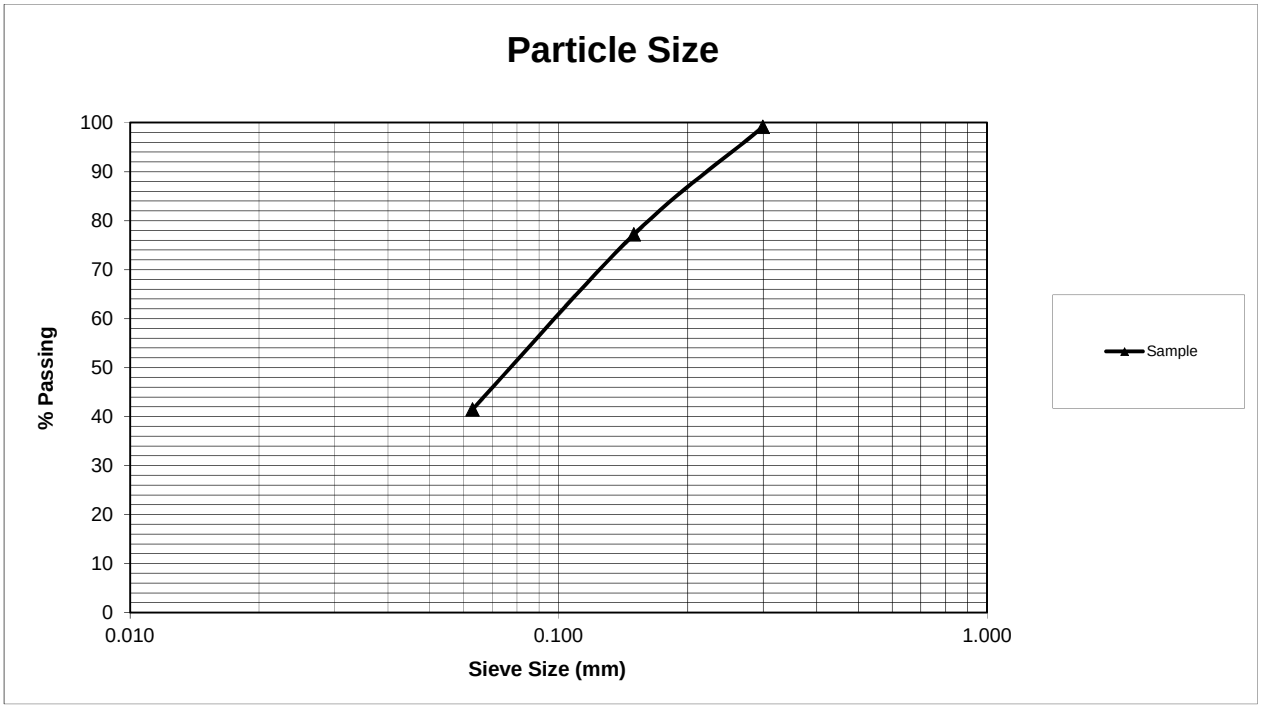
DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - GRAPH

NZS 4402: 1986 Test 2.8.1, 2.8.2

Lab Job No:	8378-032	**Sample No:**	C20-323
Client:	Miyamoto International NZ Ltd	**Tested By:**	D.P
Location:	2 Glovers Road HA05 (1.5-1.8m)	**Date:** **Checked By:**	9/09/2020 J.B
Date Received:	8/09/2020	**Date:**	14/09/2020
Report No:	C20-450	**Page:**	8 of 8
REF:	-		
Sampling Method:	Sampled by client - SNA	**Sampled By:**	Client
Date Sampled:	4/09/2020		
Test Details:	Wet sieving method		
History:	Natural		
Description of Sample:	Silty SAND, brownish grey, wet, no plasticity		

	% Passing		
Sieve Size	**Max**	**Min**	**Sample**
0.300	-	-	99
0.150	-	-	77
0.063	-	-	42



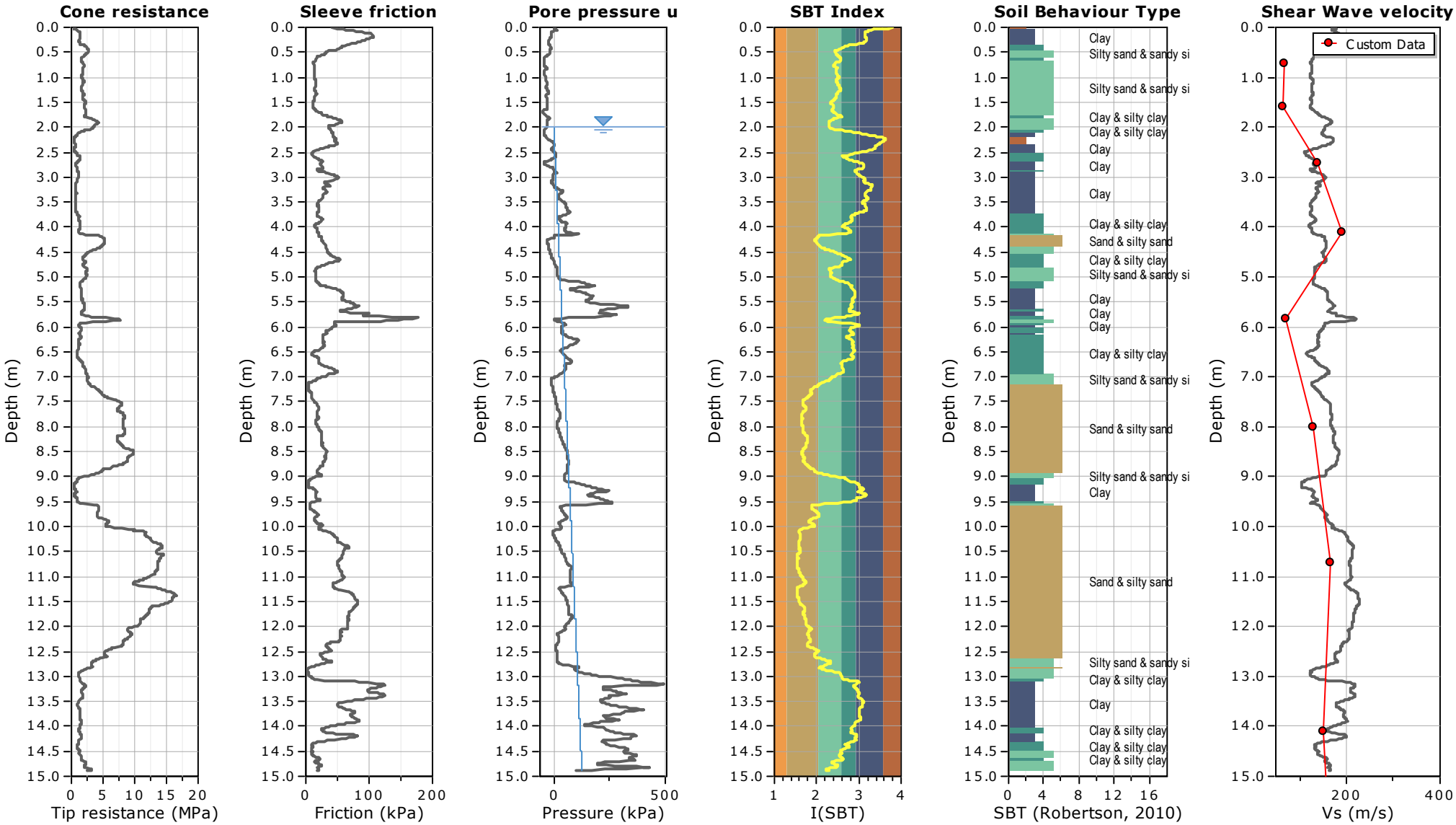
The percentage passing the finest sieve was obtained by difference.

N. van Warmerdam
Approved Signatory

Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu001 Edited
Total depth: 14.89 m, Date: 7/10/2020
Surface Elevation: 12.90 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

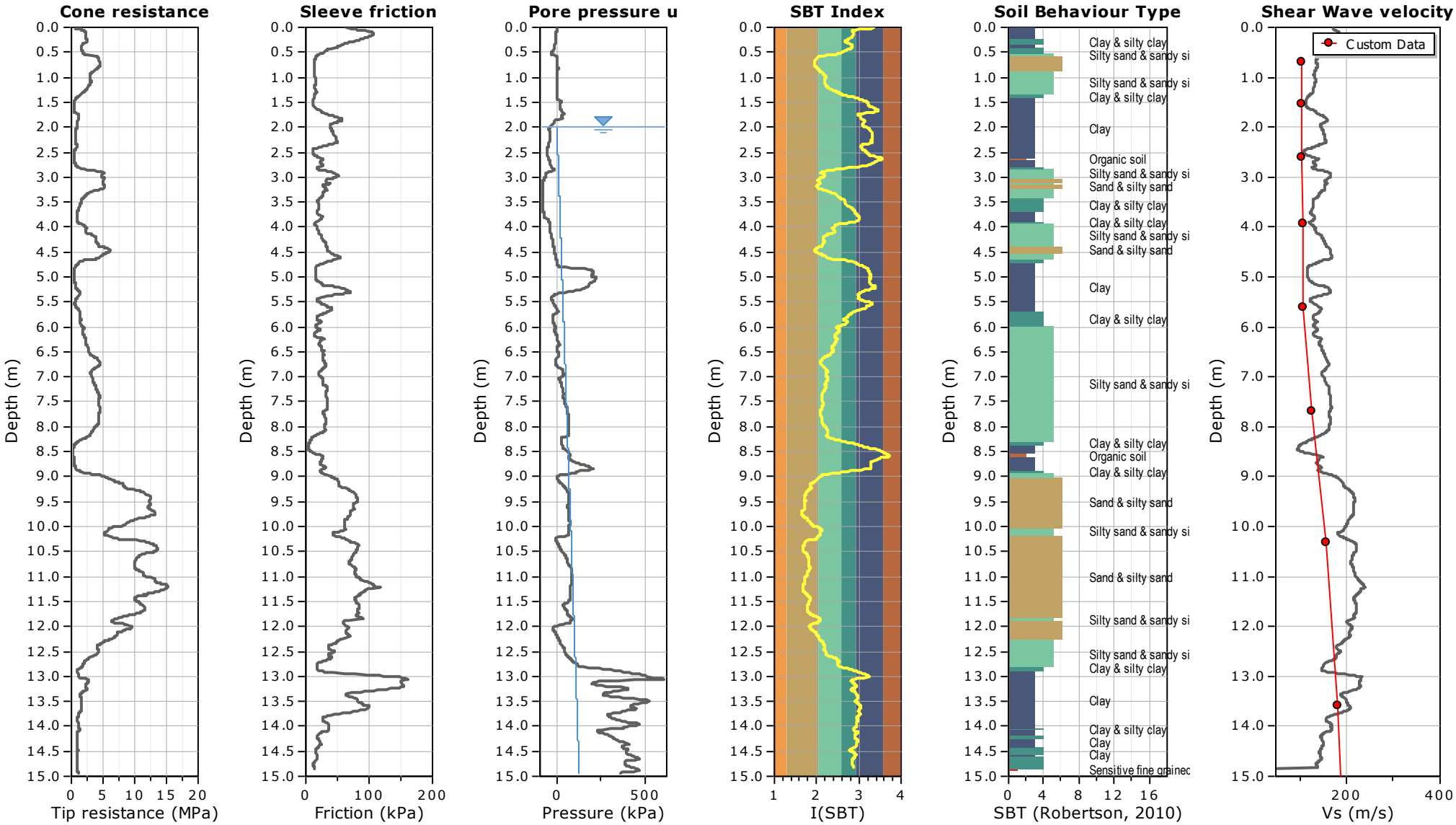
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu002
Total depth: 14.93 m, Date: 24/08/2020
Surface Elevation: 12.40 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

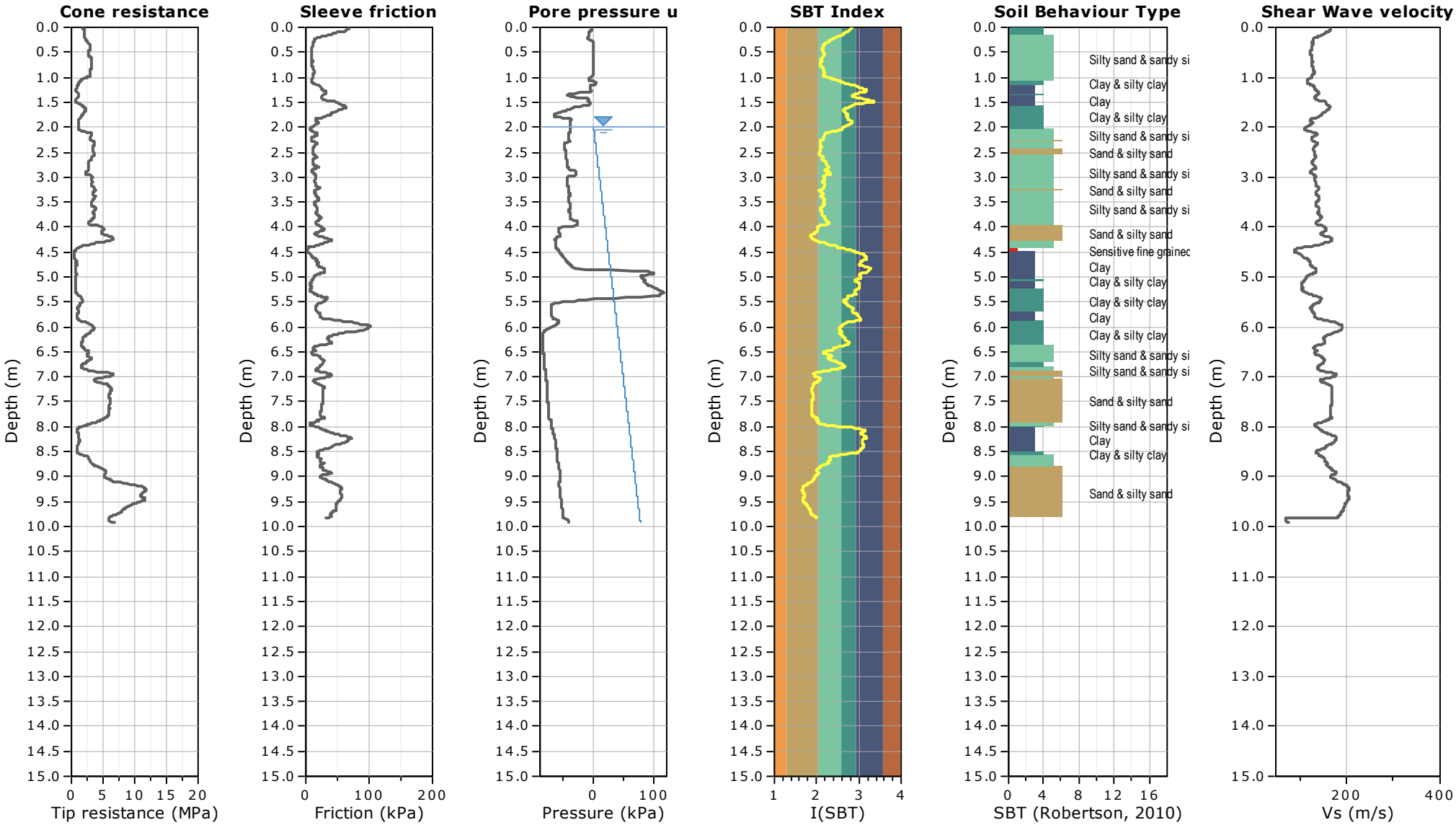
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu003
Total depth: 9.91 m, Date: 24/08/2020
Surface Elevation: 12.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

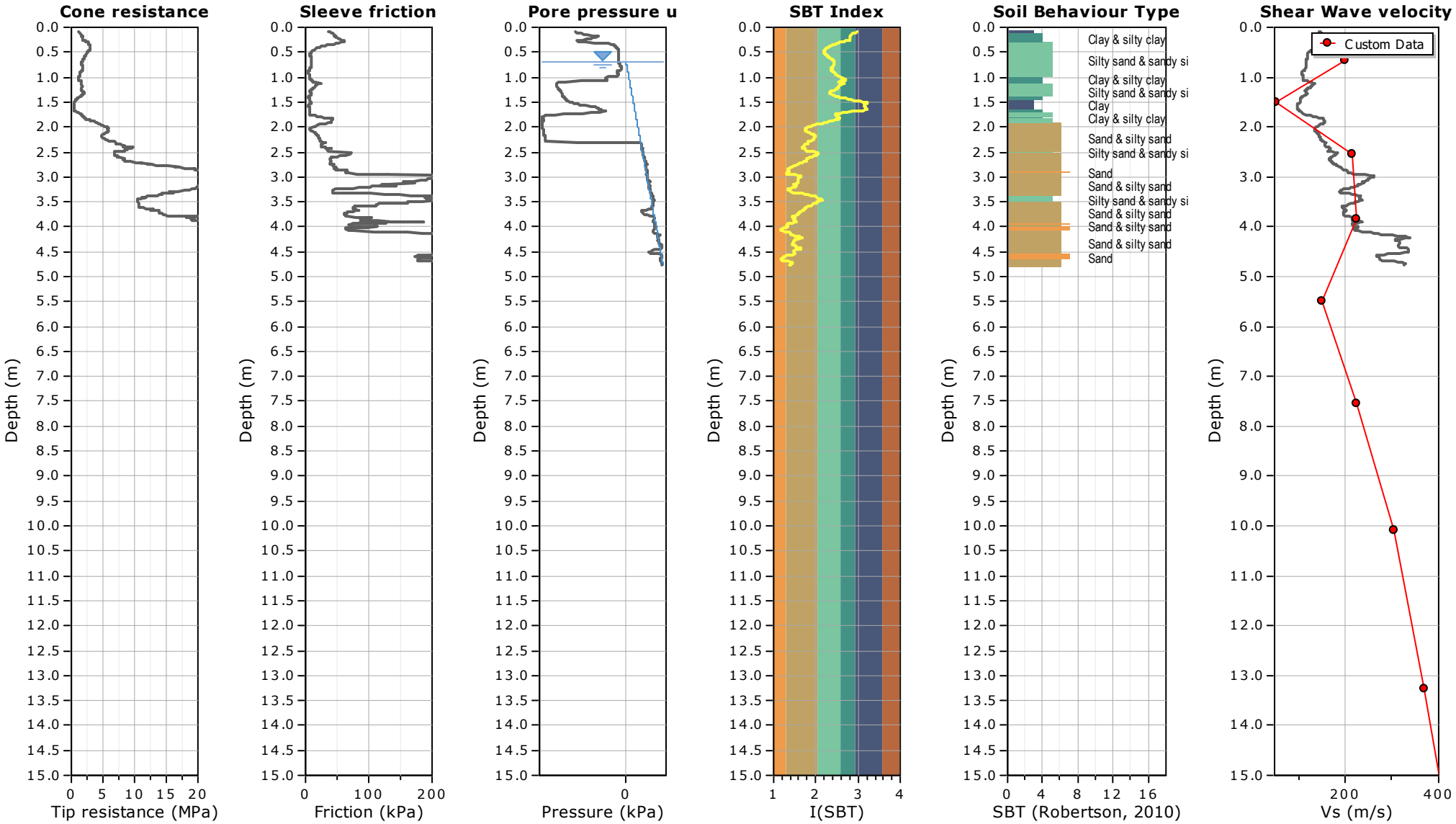
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu004
Total depth: 4.78 m, Date: 24/08/2020
Surface Elevation: 11.70 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

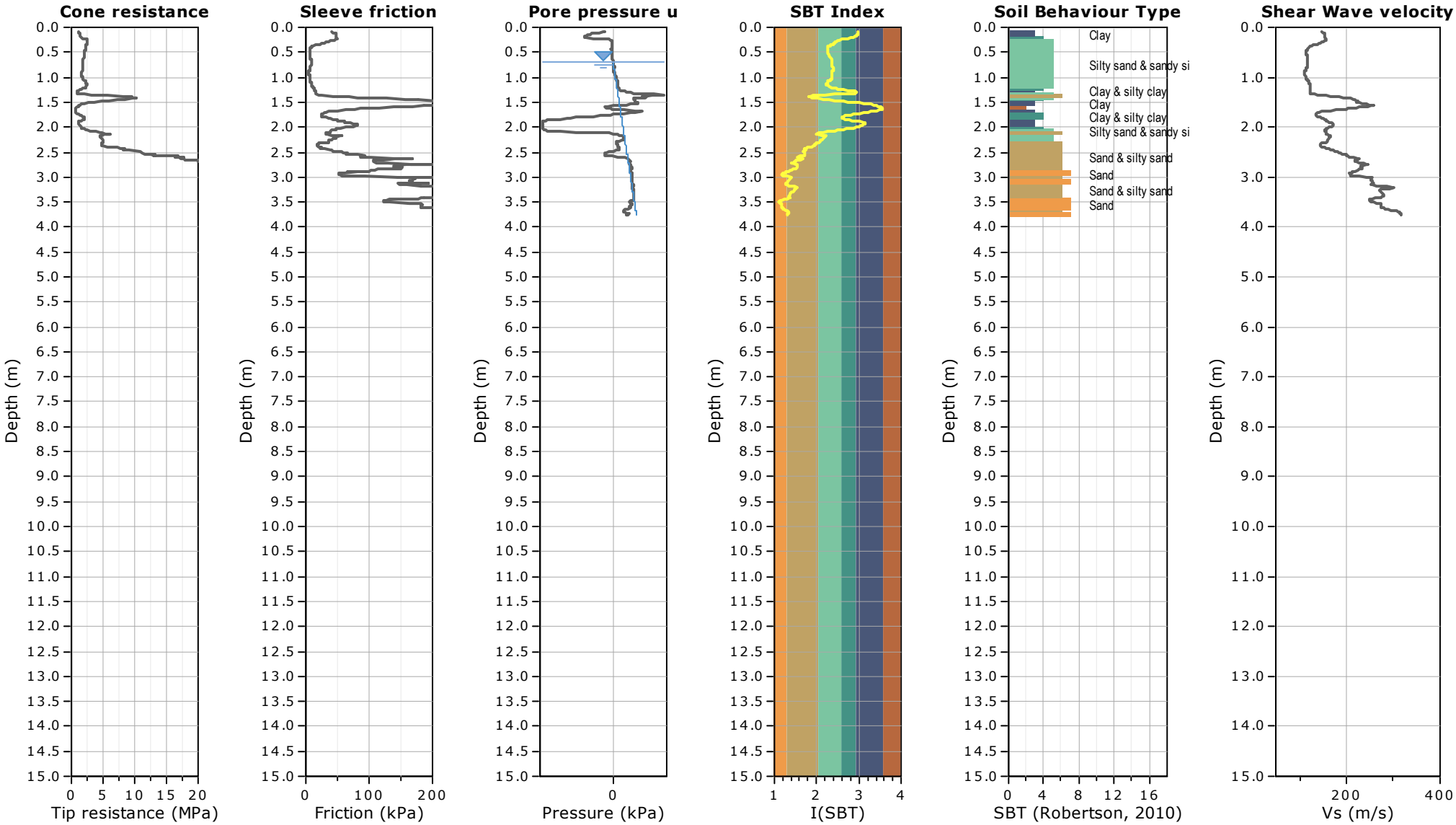
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu005
Total depth: 3.76 m, Date: 24/08/2020
Surface Elevation: 11.50 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
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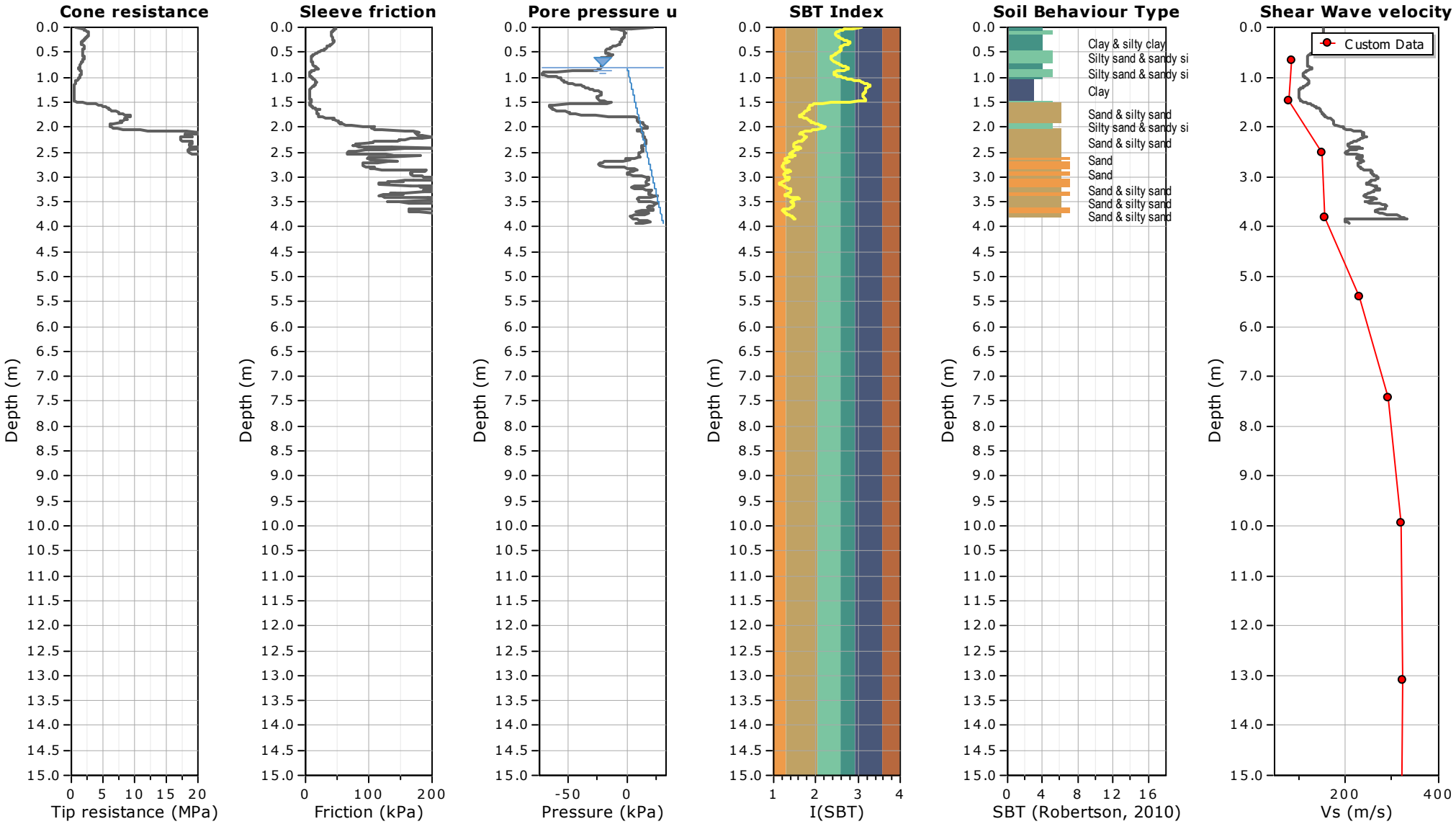
http://www.miyamoto.nz

CPT: CPTu006
Total depth: 3.93 m, Date: 24/08/2020
Surface Elevation: 11.70 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
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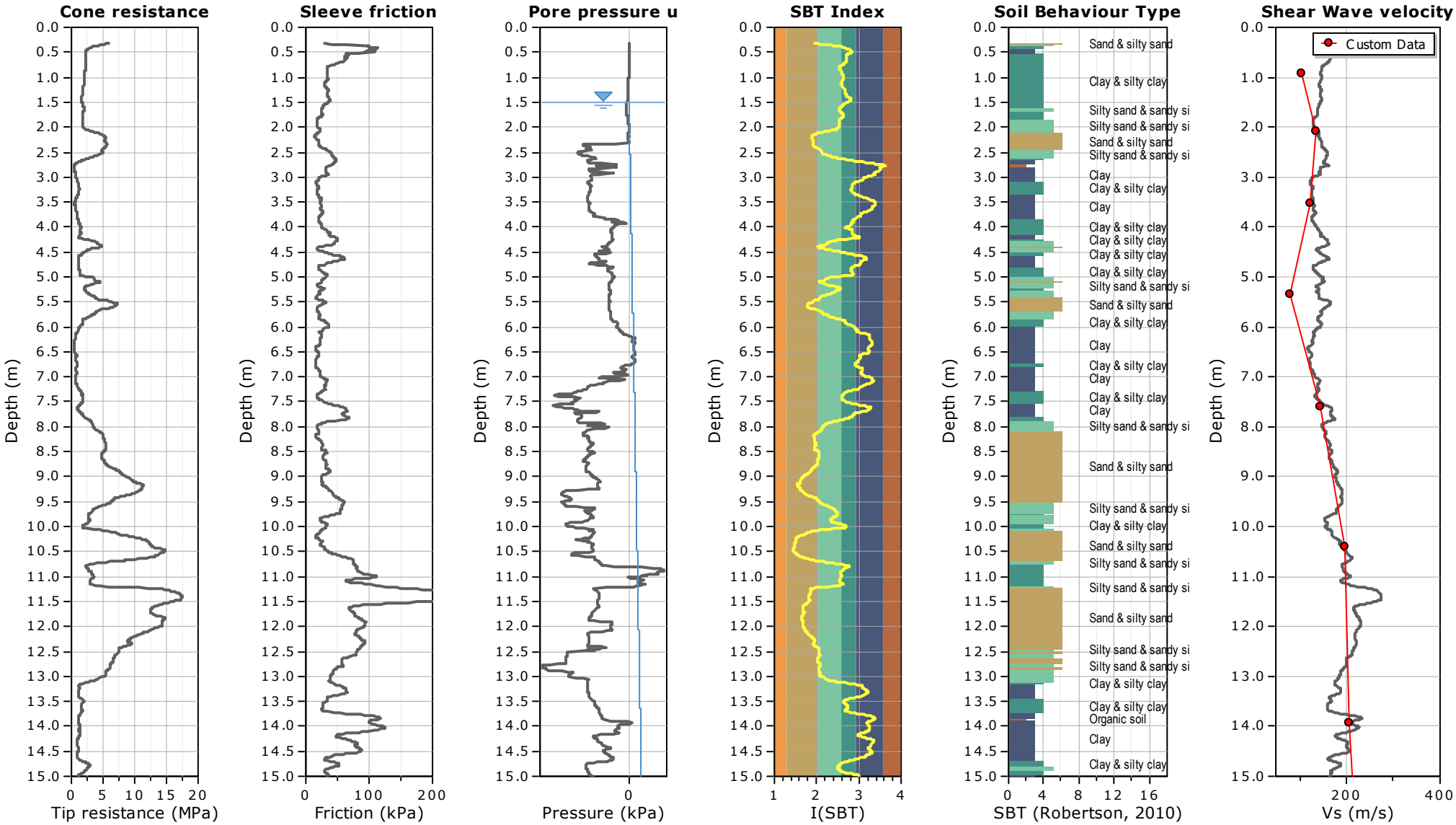
CPT: CPTu007
Total depth: 15.00 m, Date: 1/10/2020
Surface Elevation: 13.20 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

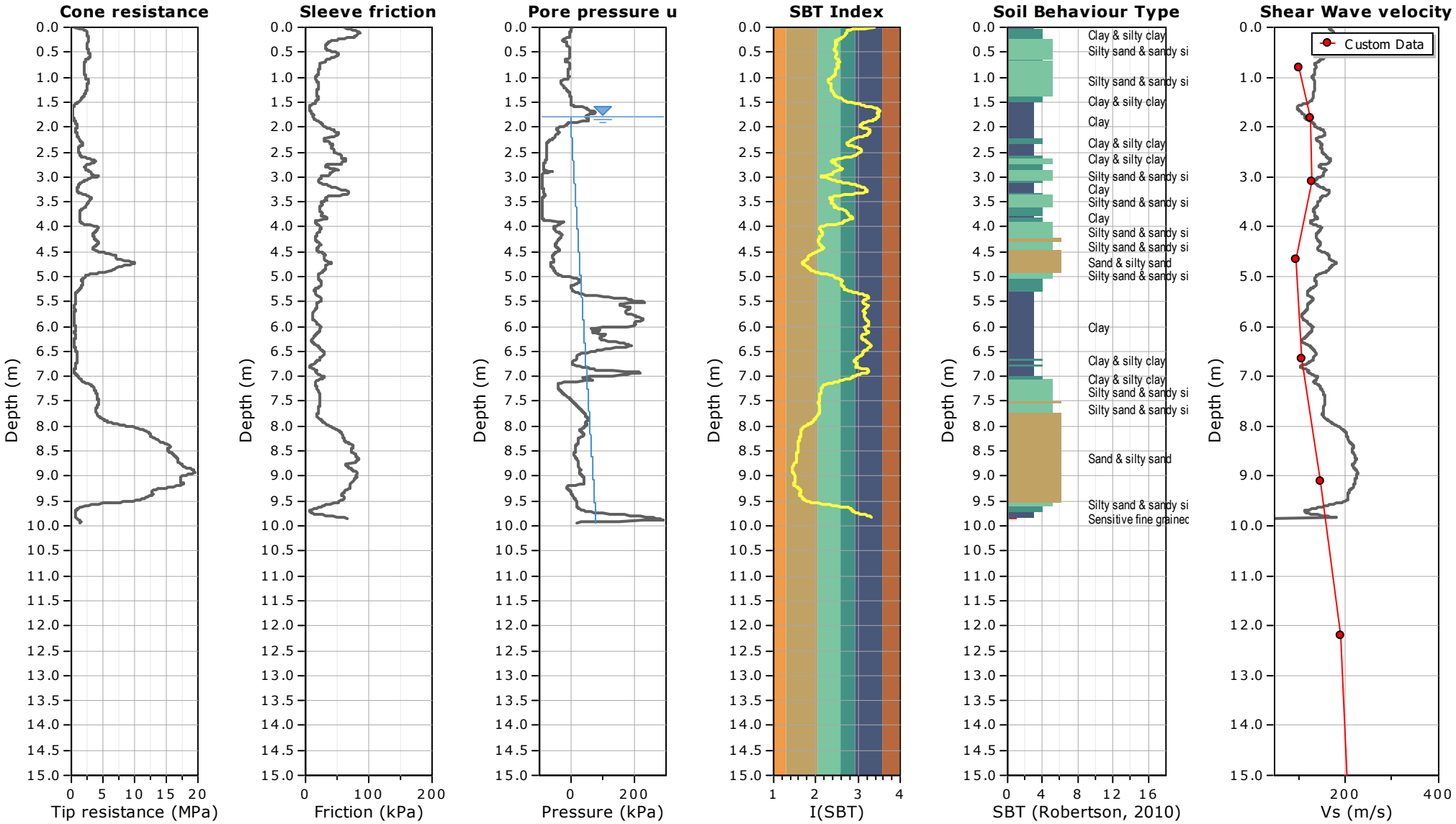
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu008
Total depth: 9.93 m, Date: 1/10/2020
Surface Elevation: 12.60 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

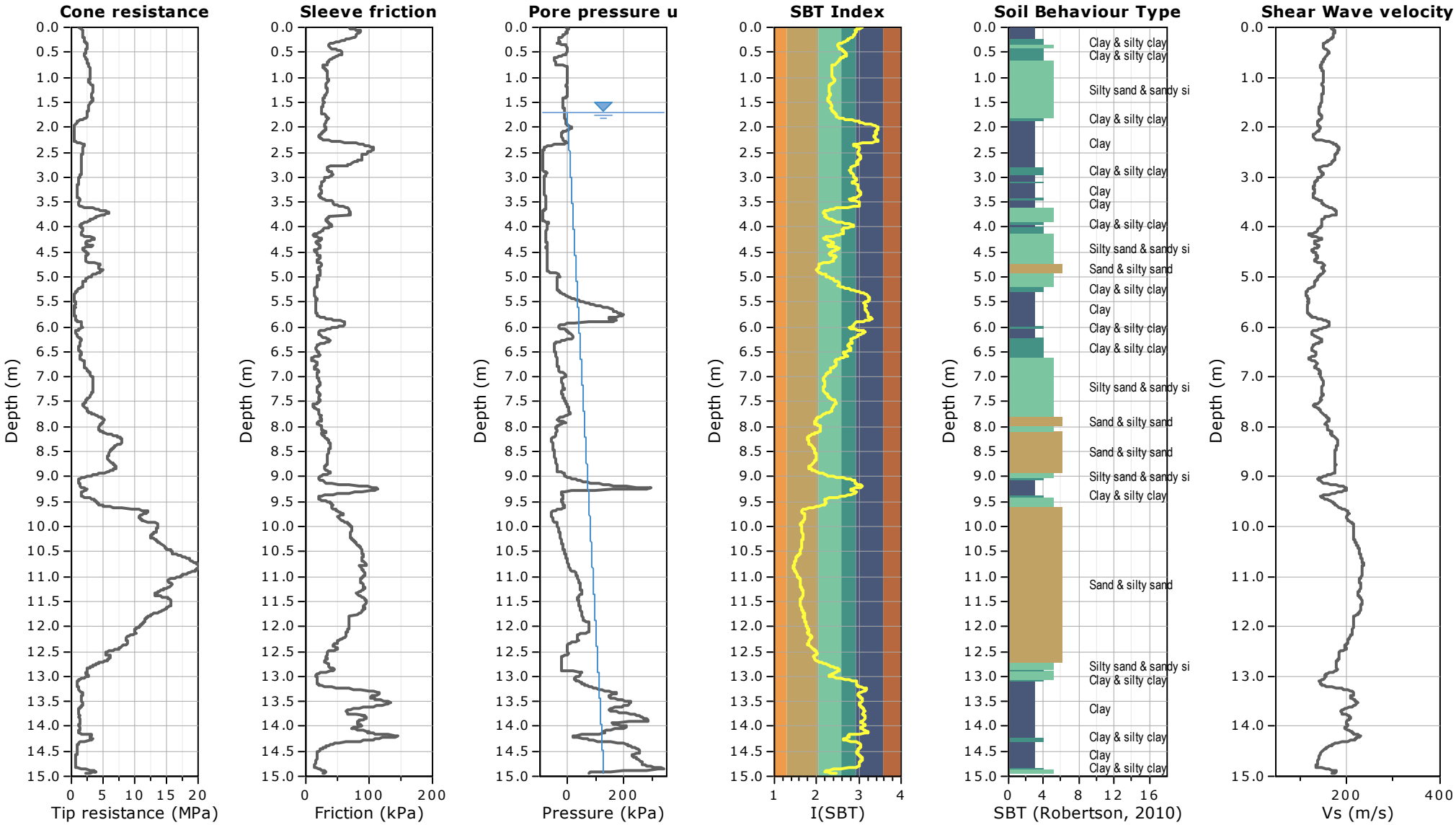
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu009
Total depth: 14.95 m, Date: 1/10/2020
Surface Elevation: 12.80 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

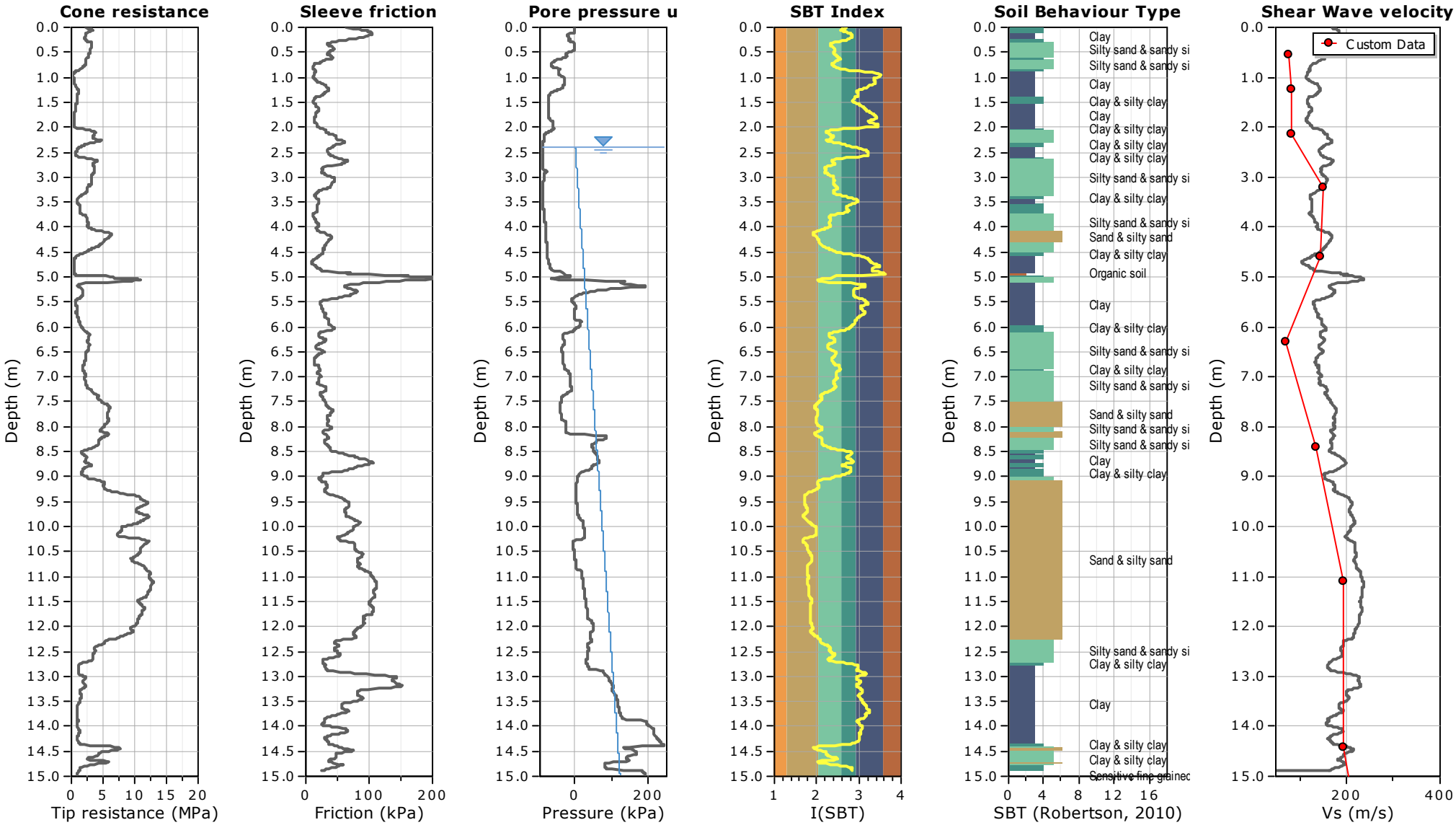
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu010
Total depth: 14.97 m, Date: 1/10/2020
Surface Elevation: 12.30 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

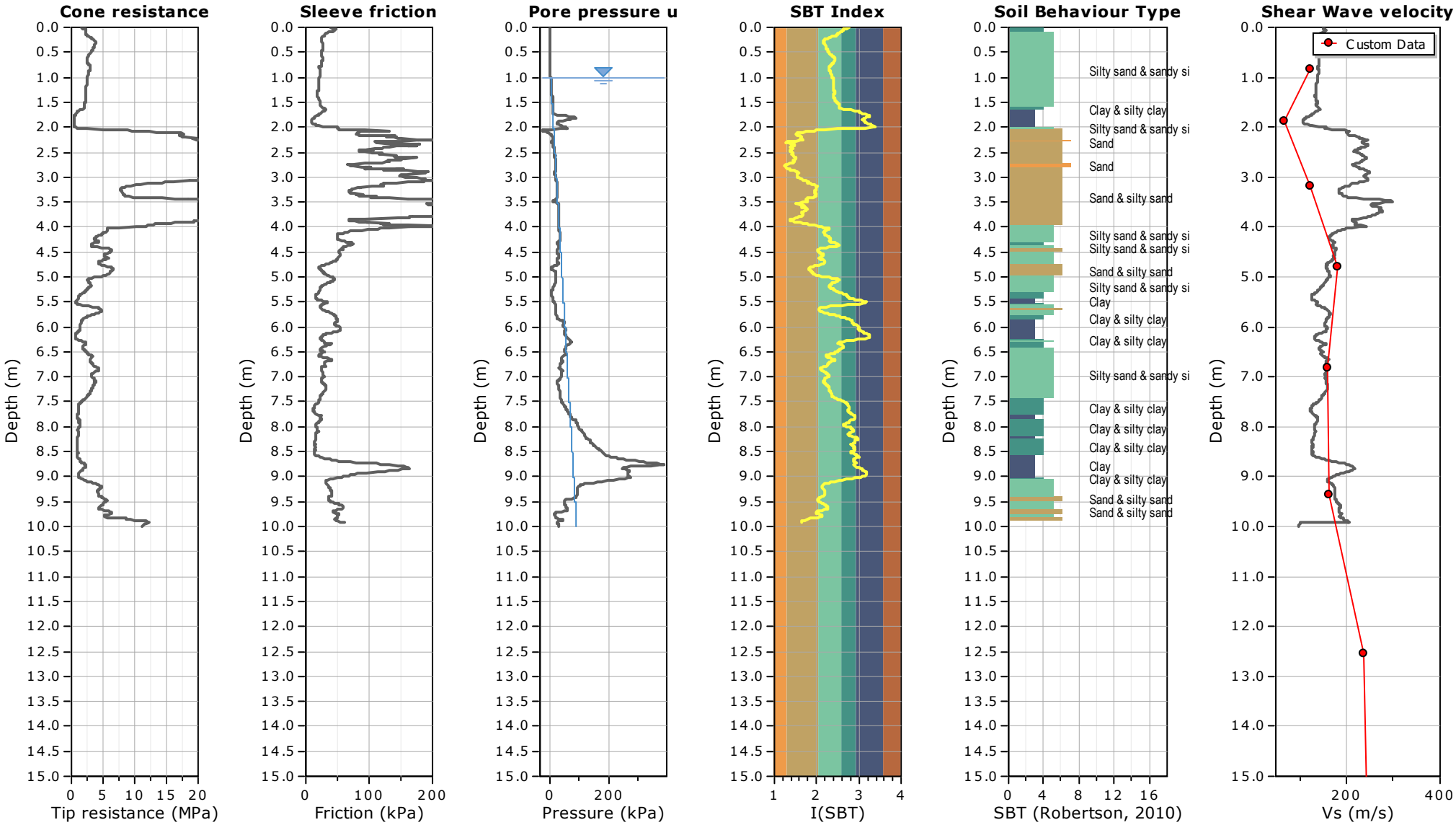
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu011
Total depth: 9.99 m, Date: 1/10/2020
Surface Elevation: 12.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

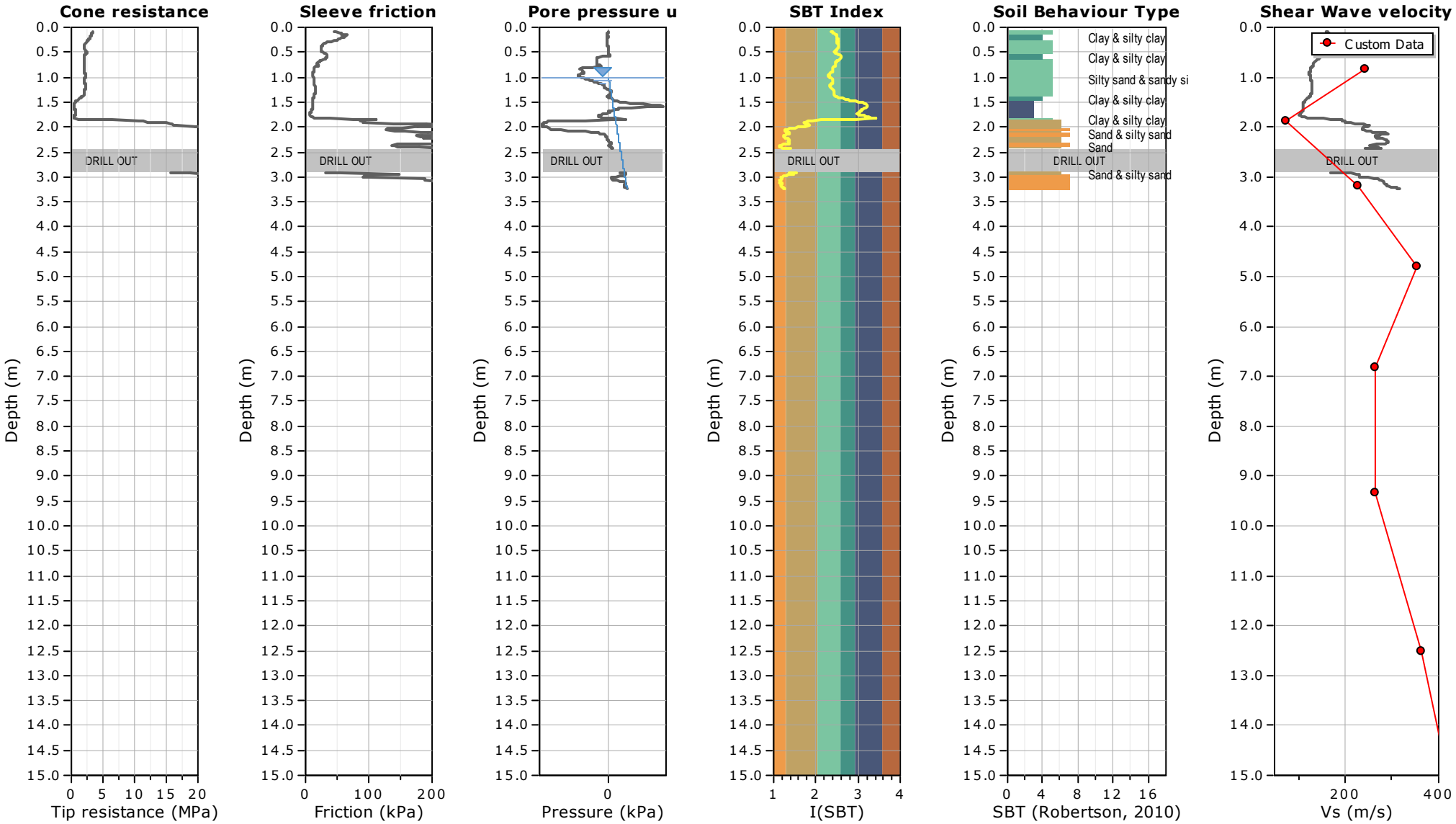
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu012
Total depth: 3.25 m, Date: 1/10/2020
Surface Elevation: 11.90 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



CONE PENETRATION TEST (CPT) REPORT

Client: Miyamoto International NZ

Location: 2 Glovers Road, Christchurch

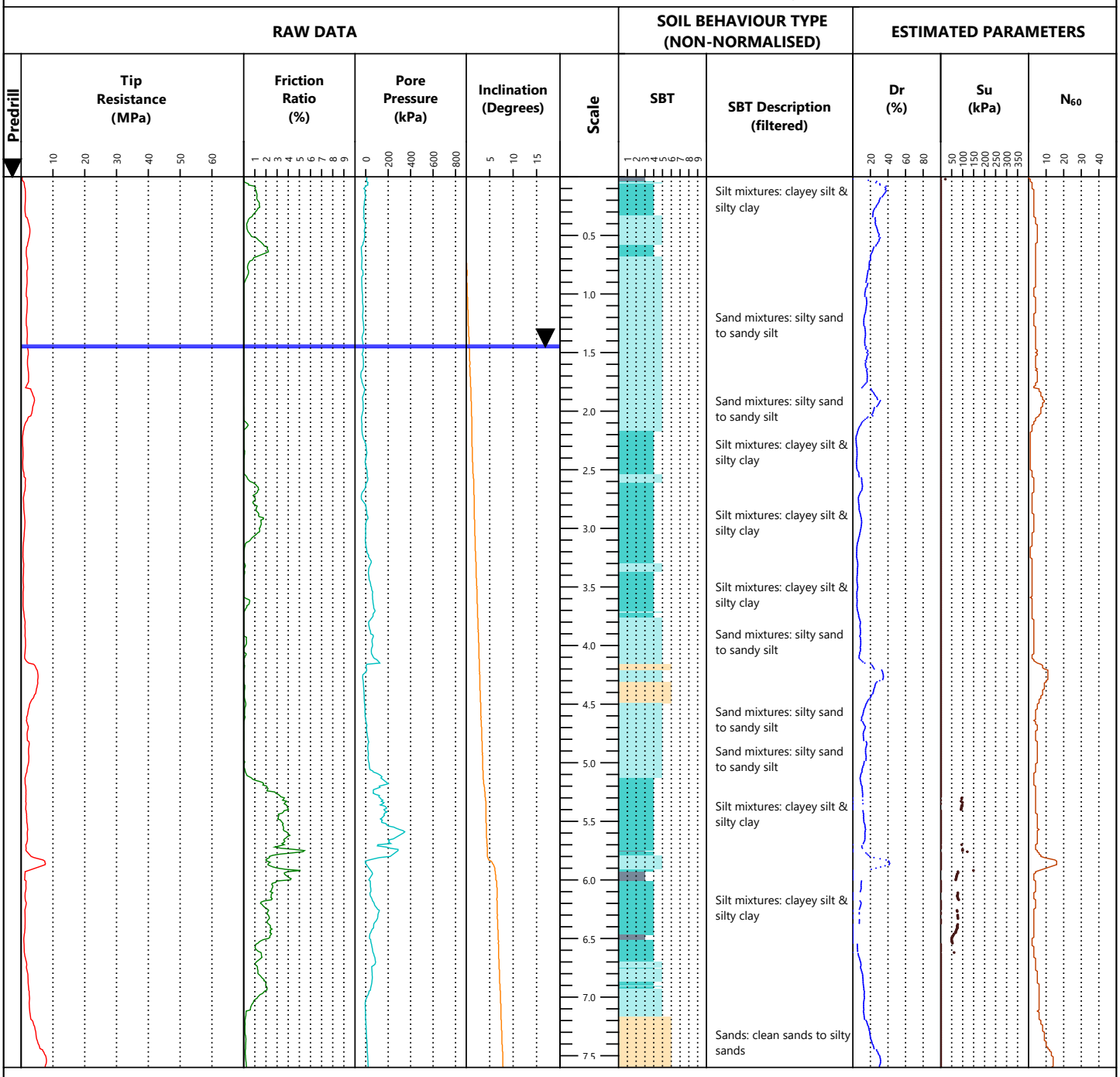
Printed: 20/08/2020

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu001
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 18/8/2020

Grid Reference: 1564920.46m E, 5173116.23m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS711
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.45m
Collapse: 1.60m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.4528	20.369
Local Friction	0.2535	0.2535
Pore Pressure	3.0597	3.0579

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

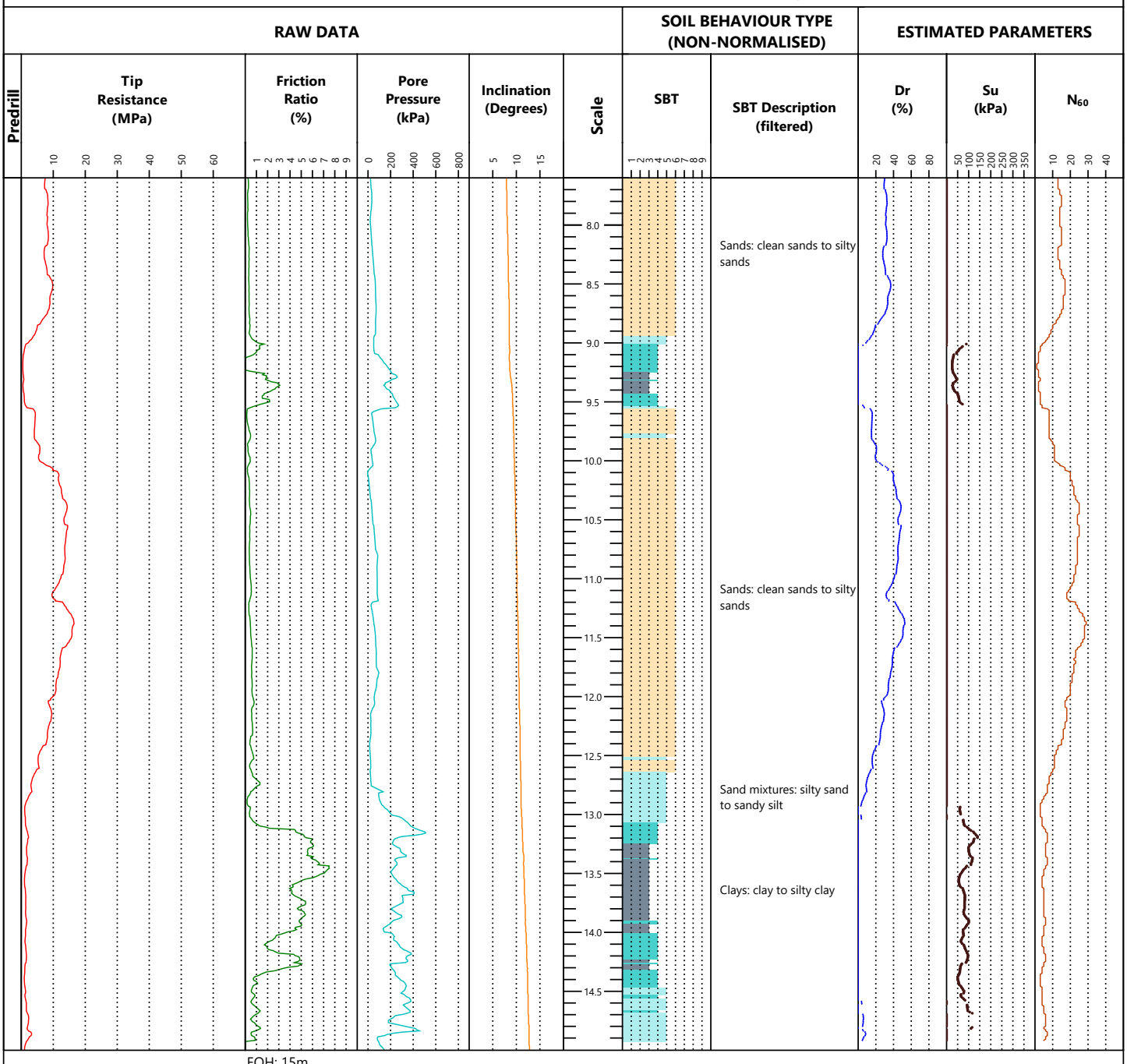
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu001
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 18/8/2020

Grid Reference: 1564920.46m E, 5173116.23m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



EOH: 15m

Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS711
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.45m
Collapse: 1.60m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.4528	20.369
Local Friction	0.2535	0.2535
Pore Pressure	3.0597	3.0579

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

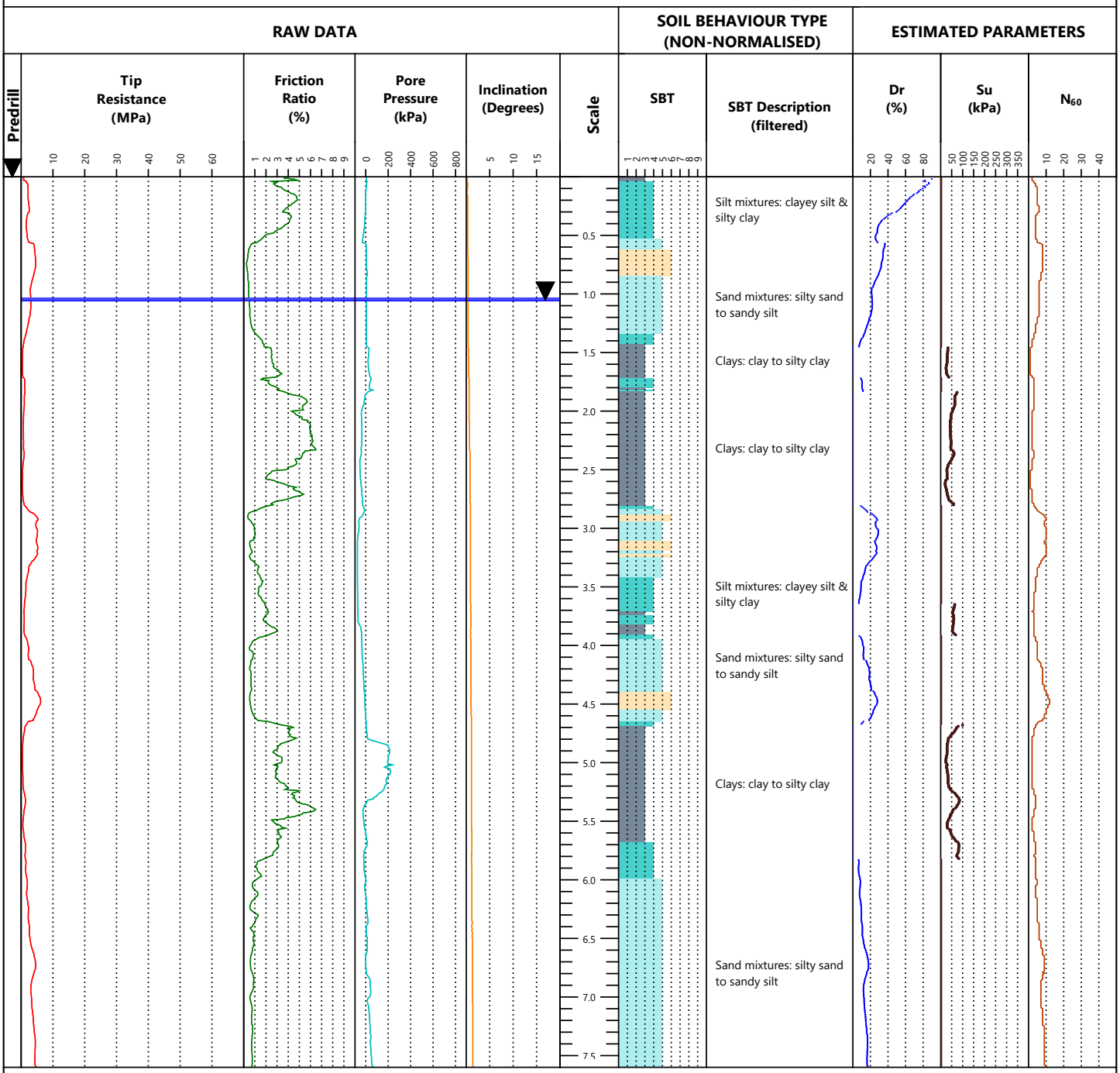
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu002
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 17/8/2020

Grid Reference: 1564969.32m E, 5173033.19m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS711
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.05m
Collapse: 2.45m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.4004	20.348
Local Friction	0.2537	0.2536
Pore Pressure	3.0612	3.0605

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

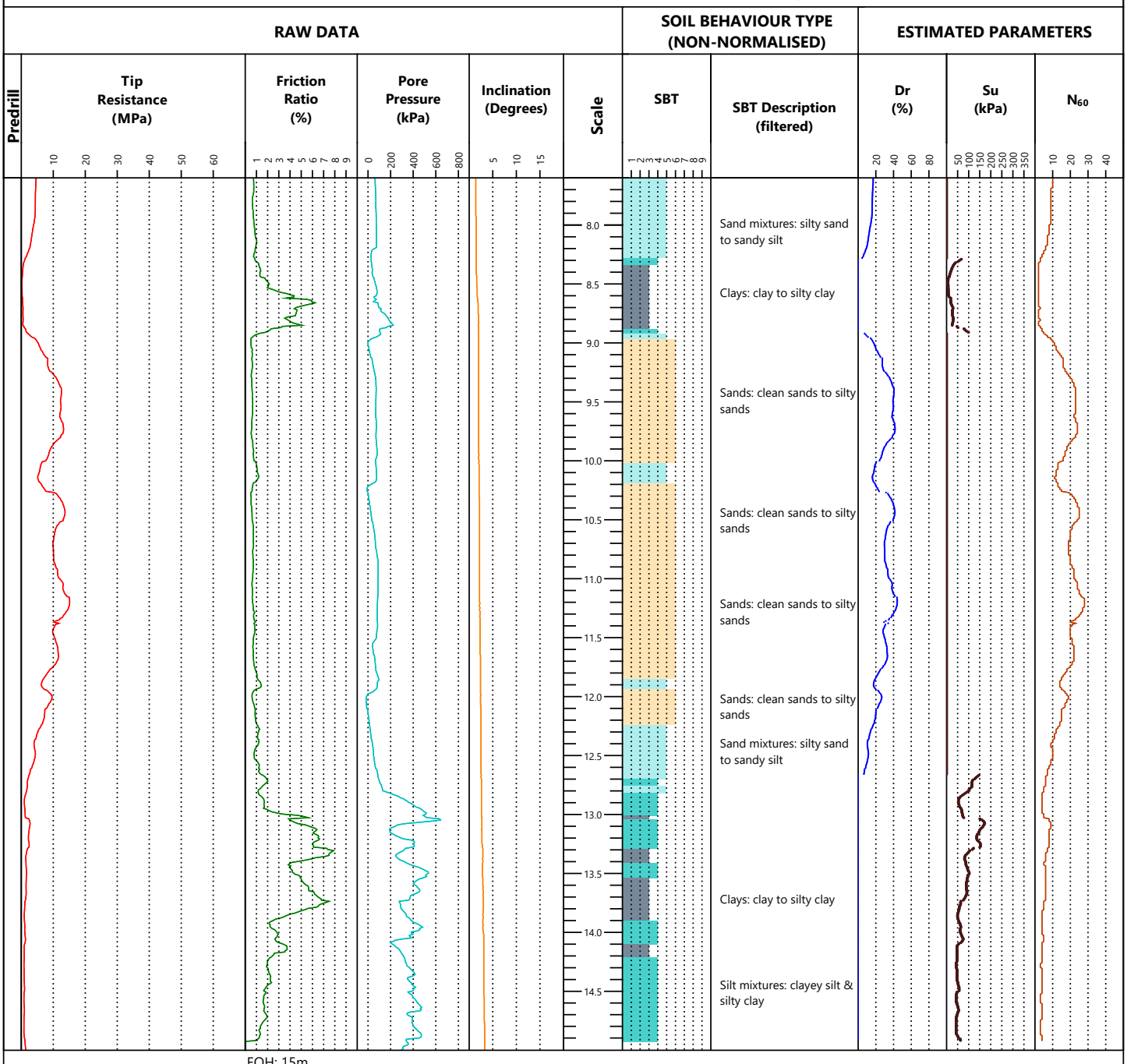
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu002
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 17/8/2020

Grid Reference: 1564969.32m E, 5173033.19m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



EOH: 15m

Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS711
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.05m
Collapse: 2.45m

Termination
Target Depth: ✓

Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.4004	20.348
Local Friction	0.2537	0.2536
Pore Pressure	3.0612	3.0605

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

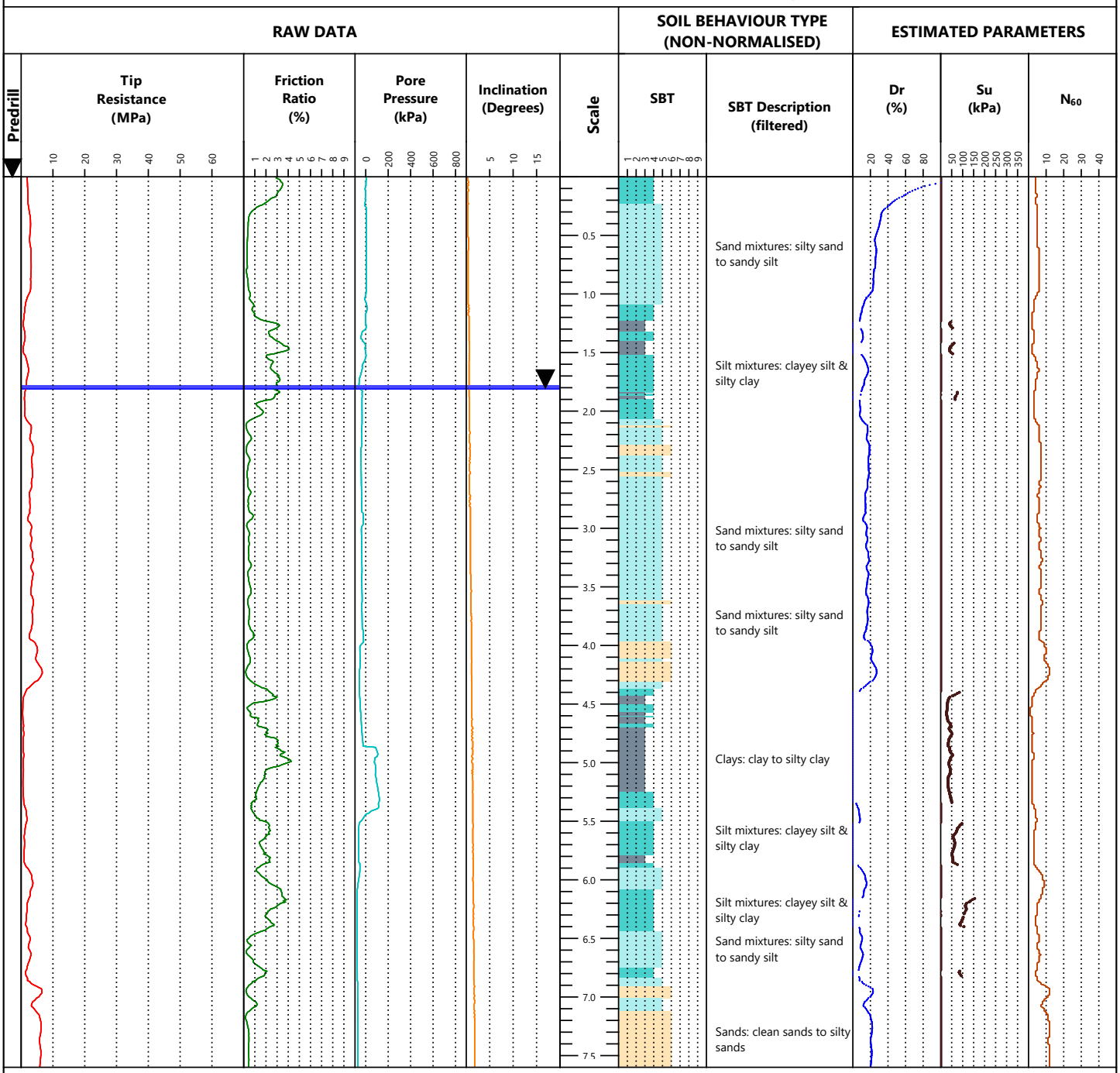
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

McMILLAN Drilling
LandTest

Client: Miyamoto International NZ	**Bore No.:** CPTu003
Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch
Date: 13/8/2020
Grid Reference: 1564902m E, 5172941.77m N (NZTM) - Map or aerial photograph
Rig Operator: B. Wilson
Elevation: 0.00m
Datum: Ground
Equipment: Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.8m
Collapse: 2.70m

Termination
Target Depth: ✓

Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3554	11.3094
Local Friction	0.1187	0.1186
Pore Pressure	0.9596	0.9557

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

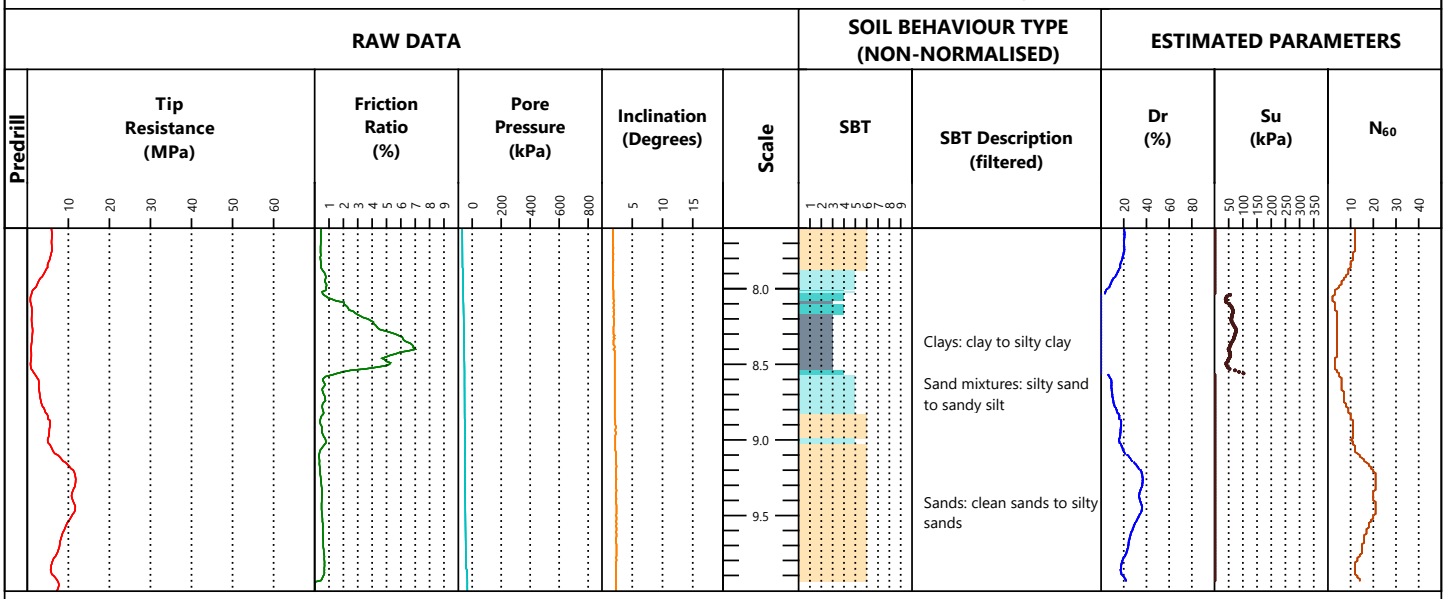
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu003
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 13/8/2020

Grid Reference: 1564902m E, 5172941.77m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.8m
Collapse: 2.70m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3554	11.3094
Local Friction	0.1187	0.1186
Pore Pressure	0.9596	0.9557

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

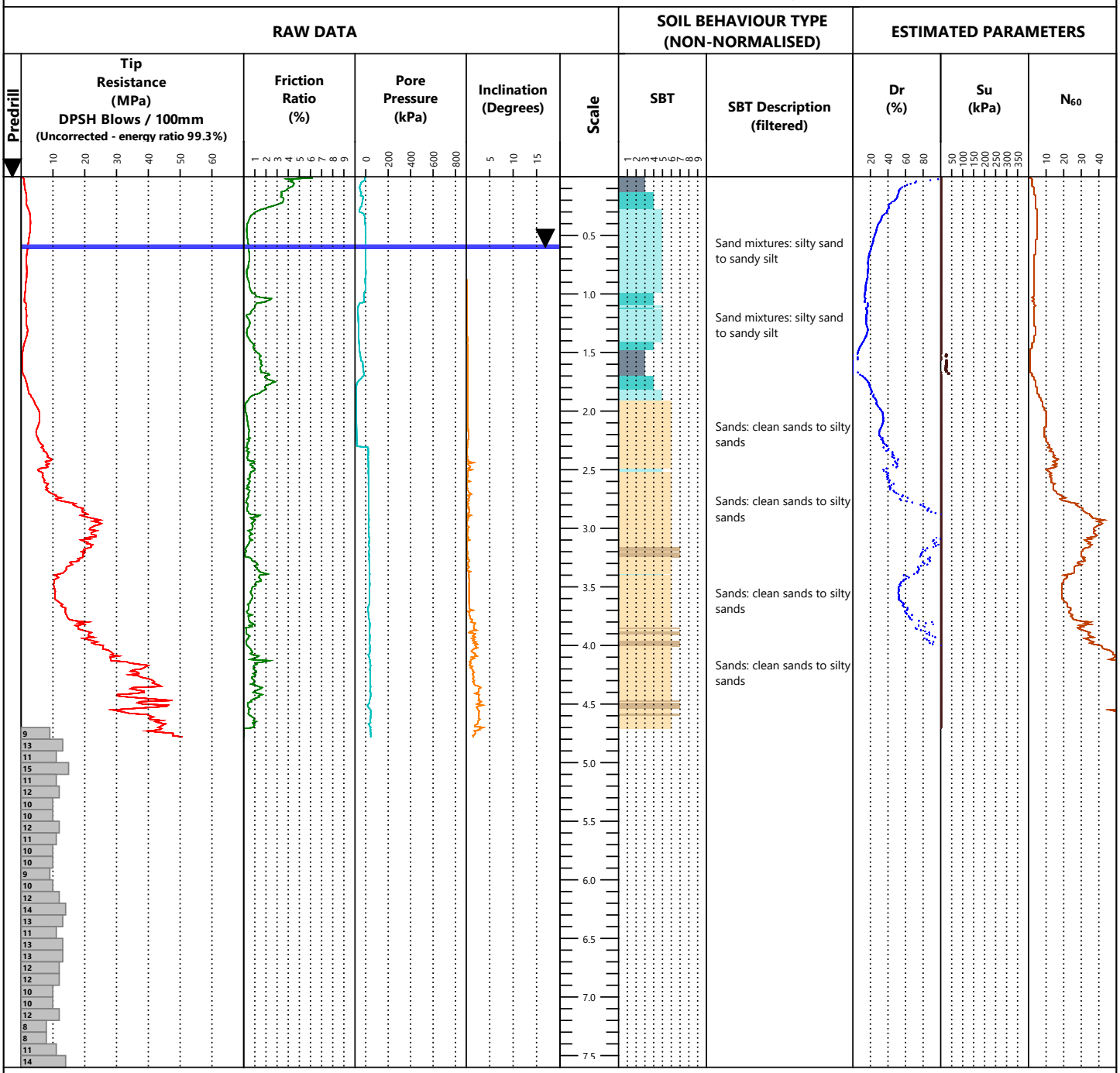
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu004
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 19/8/2020

Grid Reference: 1564993.47m E, 5172892.27m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 0.6m
Collapse: 1.95m

Termination
Target Depth: ☐
Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3452	11.2685
Local Friction	0.1186	0.1191
Pore Pressure	0.9595	0.9554

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

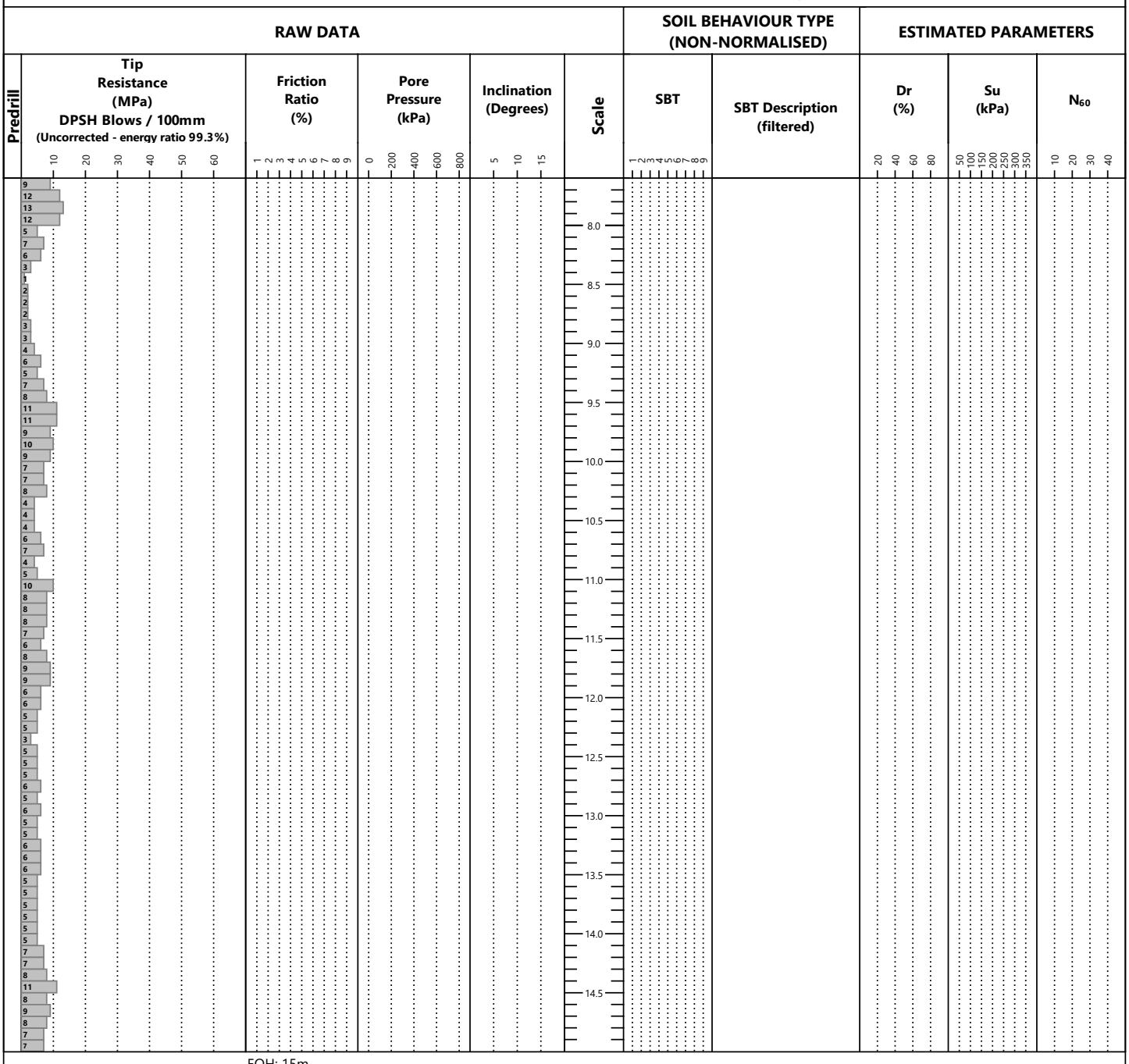
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu004
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 19/8/2020

Grid Reference: 1564993.47m E, 5172892.27m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 0.6m
Collapse: 1.95m

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3452	11.2685
Local Friction	0.1186	0.1191
Pore Pressure	0.9595	0.9554

Termination

Target Depth: ☐

Effective Refusal

Tip: ☑
Gauge: ☐
Inclinometer: ☐

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

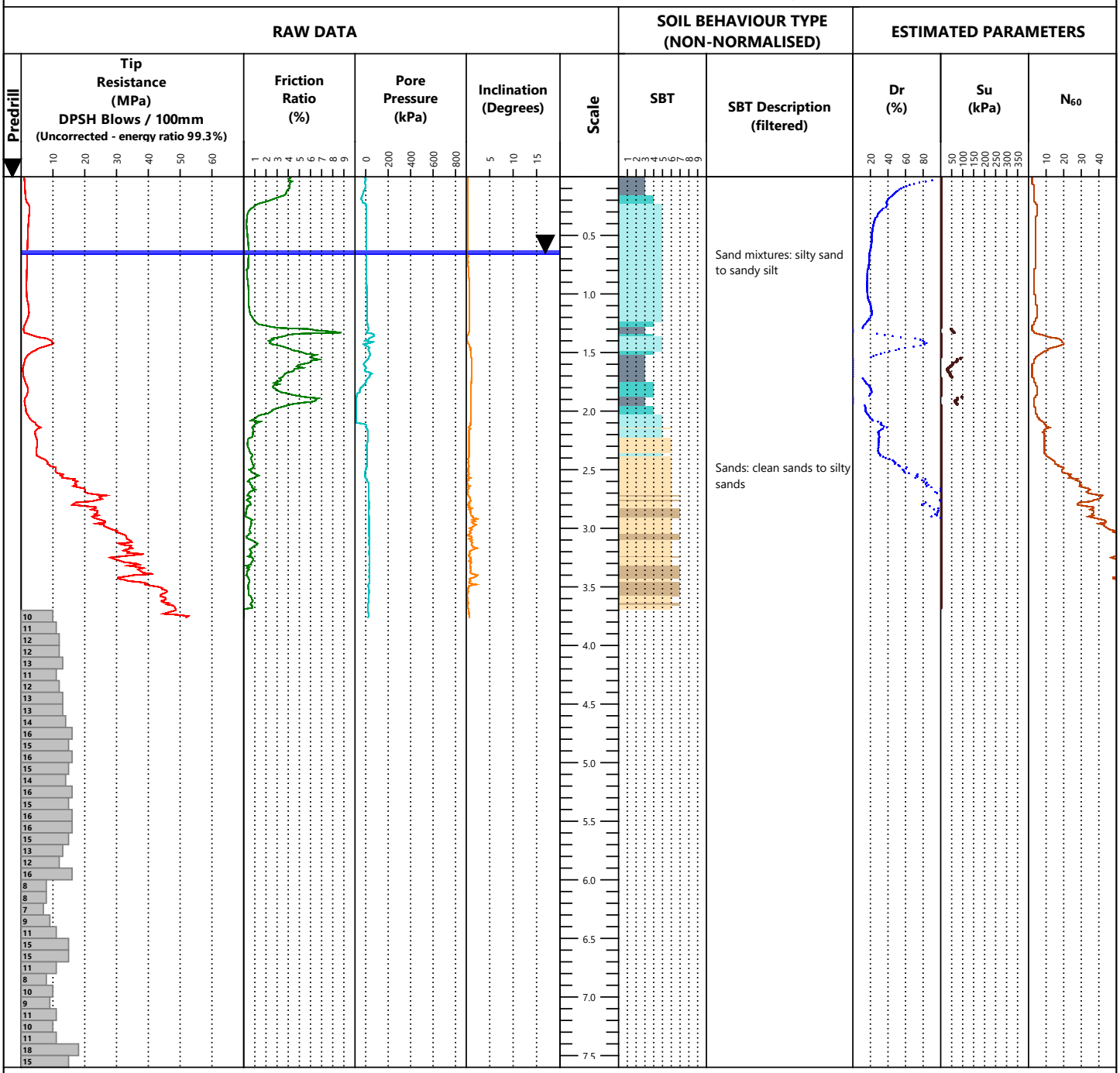
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu005
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 19/8/2020

Grid Reference: 1564945.37m E, 5172828.71m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 0.65m
Collapse: 1.45m

Termination
Target Depth: ☐
Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.4066	11.2583
Local Friction	0.1183	0.1192
Pore Pressure	0.9587	0.9583

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

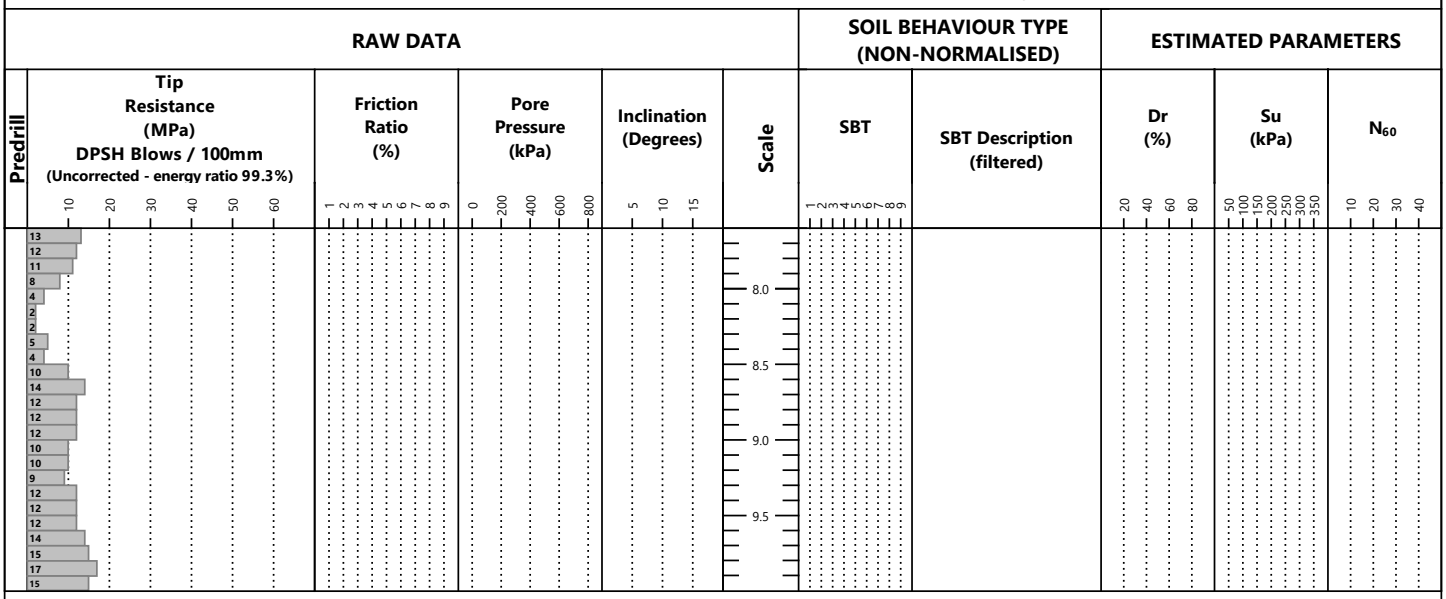
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu005
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 19/8/2020

Grid Reference: 1564945.37m E, 5172828.71m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 0.65m
Collapse: 1.45m

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.4066	11.2583
Local Friction	0.1183	0.1192
Pore Pressure	0.9587	0.9583

Termination

Target Depth: ☐

Effective Refusal

Tip: ☑
Gauge: ☐
Inclinometer: ☐

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

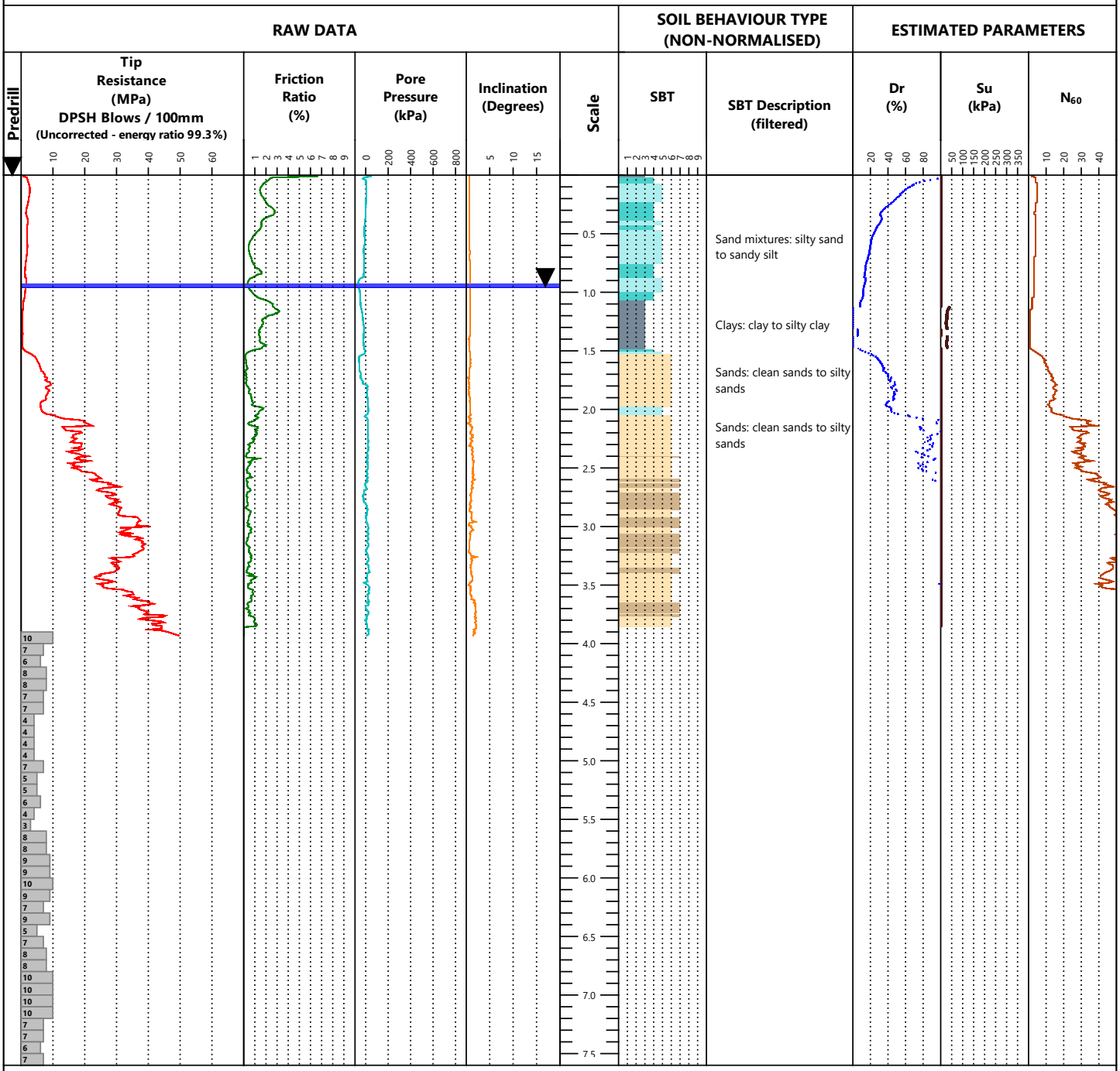
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu006
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 13/8/2020

Grid Reference: 1565008.77m E, 5172744.63m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 0.95m
Collapse: 1.40m

Termination
Target Depth: ☐
Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3708	11.2634
Local Friction	0.1178	0.119
Pore Pressure	0.9592	0.9542

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

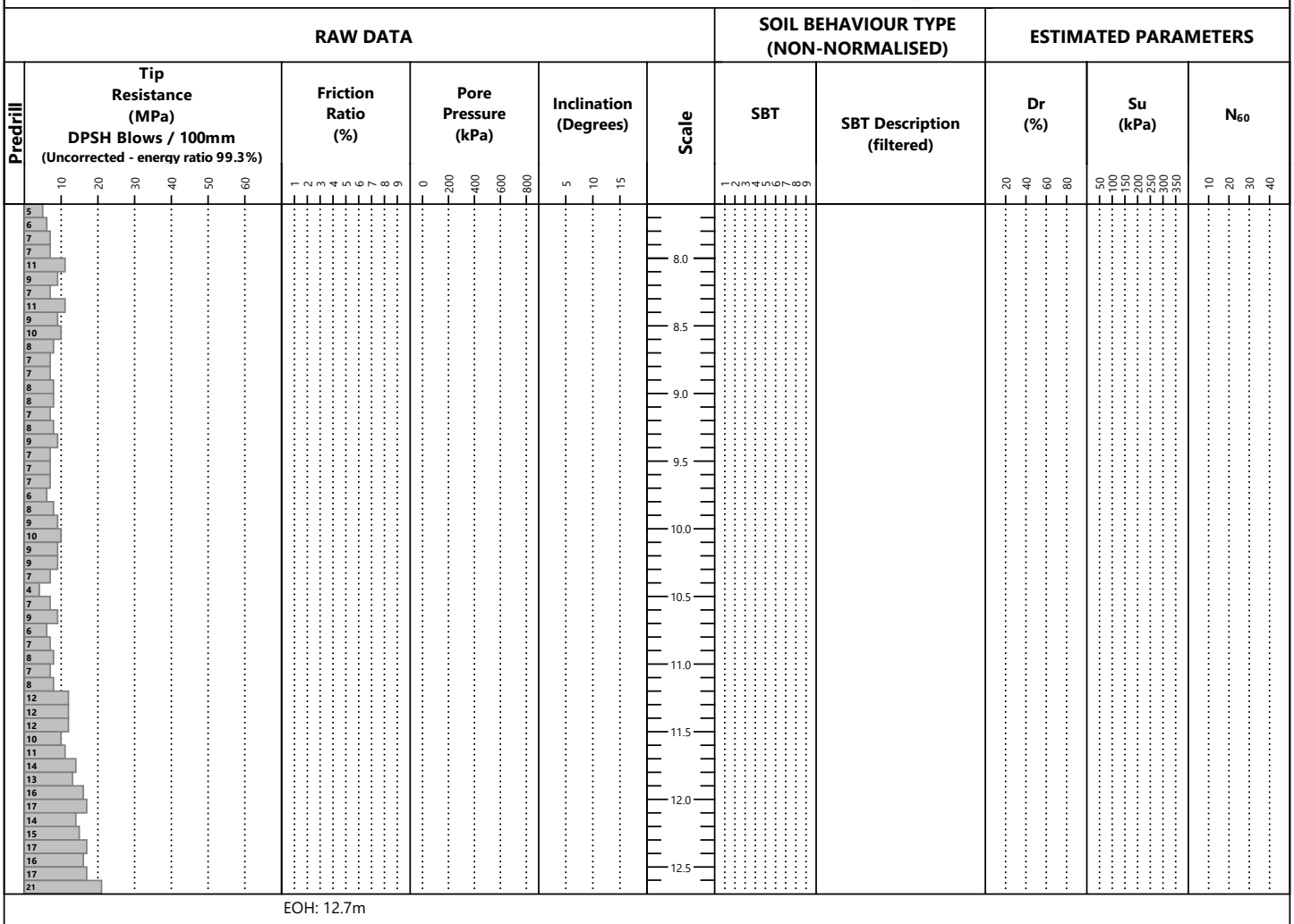
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu006
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 13/8/2020

Grid Reference: 1565008.77m E, 5172744.63m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 0.95m
Collapse: 1.40m

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3708	11.2634
Local Friction	0.1178	0.119
Pore Pressure	0.9592	0.9542

Termination

Target Depth: ☐

Effective Refusal

Tip: ☑
Gauge: ☐
Inclinometer: ☐

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

TEST DETAIL

PointID: CPTu001
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS711
Cone Area Ratio: 0.79

Date: 18/8/2020
Predrill: -
Water Level: 1.45m
Collapse: 1.60m

Termination
Target Depth: ☑
Effective Refusal
Tip: ☐
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.4528	20.369
Local Friction	0.2535	0.2535
Pore Pressure	3.0597	3.0579

PointID: CPTu002
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS711
Cone Area Ratio: 0.79

Date: 17/8/2020
Predrill: -
Water Level: 1.05m
Collapse: 2.45m

Termination
Target Depth: ☑
Effective Refusal
Tip: ☐
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.4004	20.348
Local Friction	0.2537	0.2536
Pore Pressure	3.0612	3.0605

PointID: CPTu003
Sounding: 1

Operator: B. Wilson
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80

Date: 13/8/2020
Predrill: -
Water Level: 1.8m
Collapse: 2.70m

Termination
Target Depth: ☑
Effective Refusal
Tip: ☐
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3554	11.3094
Local Friction	0.1187	0.1186
Pore Pressure	0.9596	0.9557

PointID: CPTu004
Sounding: 1

Operator: B. Wilson
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80

Date: 19/8/2020
Predrill: -
Water Level: 0.6m
Collapse: 1.95m

Termination
Target Depth: ☐
Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3452	11.2685
Local Friction	0.1186	0.1191
Pore Pressure	0.9595	0.9554

PointID: CPTu005
Sounding: 1

Operator: B. Wilson
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80

Date: 19/8/2020
Predrill: -
Water Level: 0.65m
Collapse: 1.45m

Termination
Target Depth: ☐
Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.4066	11.2583
Local Friction	0.1183	0.1192
Pore Pressure	0.9587	0.9583

TEST DETAIL

PointID: CPTu006
Sounding: 1

Operator: B. Wilson
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80

Date: 13/8/2020
Predrill: -
Water Level: 0.95m
Collapse: 1.40m

Termination

Target Depth: ☐

Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3708	11.2634
Local Friction	0.1178	0.119
Pore Pressure	0.9592	0.9542

McMILLAN Drilling
LandTest

CPT CALIBRATION AND TECHNICAL NOTES

These notes describe the technical specifications and associated calibration references pertaining to the Pagani piezocone types measuring cone resistance, sleeve friction, inclination and pore pressure (piezocone, 10cm^2)

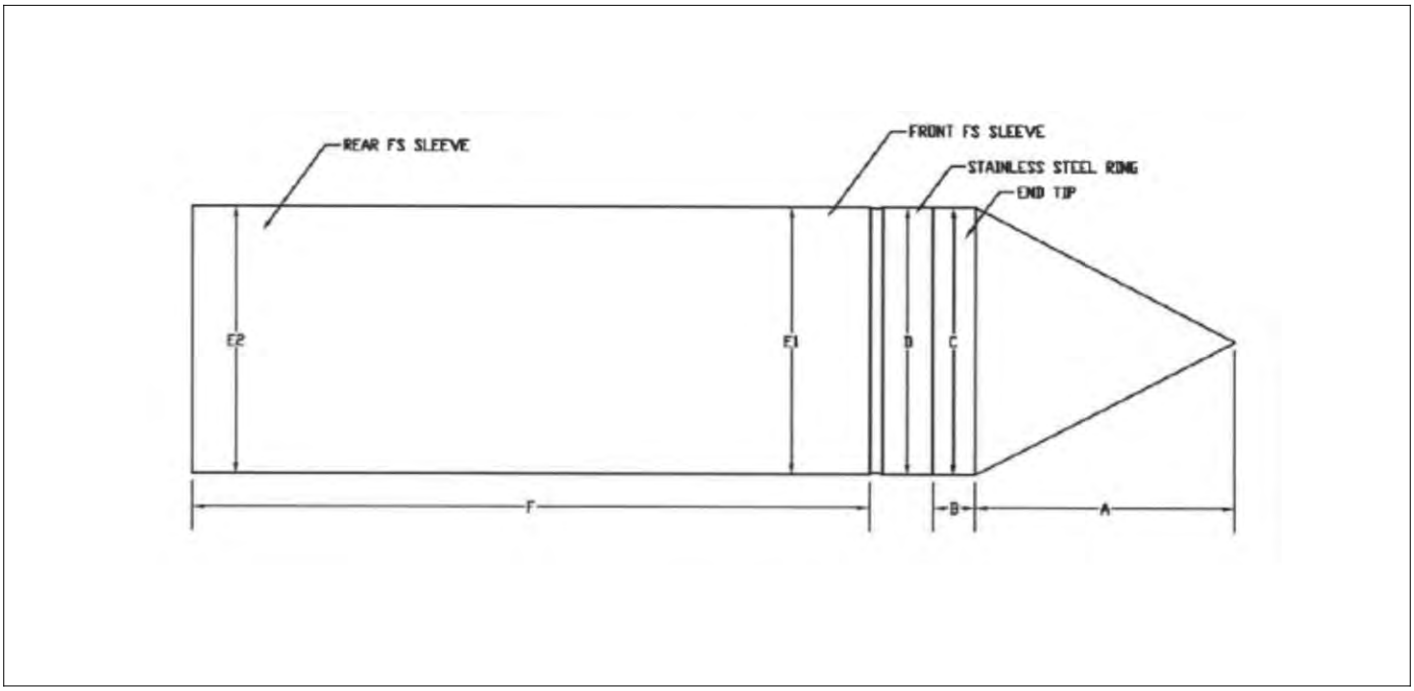
Dimensions

Dimensional specifications are detailed below. All tolerances are routinely checked prior to testing and measurements taken are electronically recorded. All records are kept on file and available on request.

Technical specifications

	Tip	Friction	Pore Pressure	Inclination
Maximum Measuring Range:	50 - 100 MPa	1.60 MPa	2.50 MPa	0° - 20°
Resolution:	24 bit	24 bit	24 bit	12 bit
Accuracy:	0.005 MPa	0.04 MPa	0.04 MPa	0.5°

Length:	320 mm	**Weight:**	1.8 kg
Diameter:	35.8 mm	**Opening angle of bit:**	60°
Cone base area:	10 cm^2	**Side sleeve surfaces:**	150 cm^2
Cone area ratio:	0.80	**Tip and Local Friction sensor displacement:**	80 mm



LandTest McMILLAN Drilling

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z087/19

Calibrated system *(Sistema tarato)* :

Serial number	Mkj328
Sensor	TIP RESISTANCE
Max. Capacity [MPa]:	100
Scaling Factor:	195500
Tip net area ratio (a_n):	0,80
Sleeve net ratio (b_n):	0,00

Addressee *(destinatario)* :
LANDTEST
307 Cashel street, Christchurch
New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 200 kN
Serial Number	138913

Power press:

Manufacturer	Easydur Italiana
Model	Aura 20T
Serial Number	29084

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

Last verification date:	15/01/2019
Certificate N.	LAT 091 2019-014
Temperature of calibration	22°C
Humidity	53%

Factory calibration in accordance with ASTM D5778-12

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z087/19

Calibrated system *(Sistema tarato)* :

Serial number	Mkj328
Sensor	SLEEVE FRICTION
Max. Capacity [kPa]:	1600
Scaling Factor:	30696

Addressee *(destinatario)* :
LANDTEST
307 Cashel street, Christchurch
New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 50 kN
Serial Number	65495

Power press:

Manufacturer	Easydur Italiana
Model	Aura 10T
Serial Number	29002

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z087/19

Calibrated system *(Sistema tarato)* :

Serial number	Mkj328
Sensor	PORE PRESSURE
Max. Capacity [kPa]:	2500
Scaling Factor:	16963
Sensor	TILT ANGLE
Max. Inclination [°]:	20
Scaling Factor:	140137

Addressee *(destinatario)* :
LANDTEST
307 Cashel street, Christchurch
New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Pressure Generator:

Manufacturer	AEP transducers
Model	GPM500

Digital Indicator:

Manufacturer	AEP transducers
Model	LAB DMM
Serial Number	301796

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

The adopted calibration procedure has been developed according to the suggestions given by Prof. Paul W. Mayne (Georgia Institute of Technology) and Prof. Diego Lo Presti (University of Pisa)

Cone calibrated by Claudio C.

Date of issue 27/06/2019

Land Test McMILLAN Drilling

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z024/20

Calibrated system *(Sistema tarato)* :

Serial number	Mks711
Sensor	TIP RESISTANCE
Max. Capacity [MPa]:	100
Scaling Factor:	190780
Tip net area ratio (a_n):	0,79
Sleeve net ratio (b_n):	0,00

Addressee *(destinatario)* :
McMillan Drilling Ltd
36 Hickory Place,Islington
Christchurch 8042,New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 200 kN
Serial Number	138913

Power press:

Manufacturer	Easydur Italiana
Model	Aura 20T
Serial Number	29084

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

Last verification date:	16/01/2020
Certificate N.	LAT 091 2020-015
Temperature of calibration	22°C
Humidity	45%

Factory calibration in accordance with ASTM D5778-12

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z024/20

Calibrated system *(Sistema tarato)* :

Serial number	Mks711
Sensor	SLEEVE FRICTION
Max. Capacity [kPa]:	1600
Scaling Factor:	31343

Addressee *(destinatario)* :
McMillan Drilling Ltd
36 Hickory Place,Islington
Christchurch 8042,New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 50 kN
Serial Number	65495

Power press:

Manufacturer	Easydur Italiana
Model	Aura 10T
Serial Number	29002

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

Last verification date: 16/01/2020

The adopted calibration procedure has been developed acc
Prof. Paul W. Mayne (Georgia Institute of technology) and

Cone calibrated by

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z024/20

Calibrated system *(Sistema tarato)* :

Serial number	Mks711
Sensor	PORE PRESSURE
Max. Capacity [kPa]:	2500
Scaling Factor:	10298
Sensor	TILT ANGLE
Max. Inclination [°]:	20
Scaling Factor:	280277

Addressee *(destinatario)* :
McMillan Drilling Ltd
36 Hickory Place,Islington
Christchurch 8042,New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Pressure Generator:

Manufacturer	MENSOR
Model	CPC 4000
Serial Number	41000V56
Sensor Descr	Silicon Pressure Transducer
Sensor Serial Number	41000SYF

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

Last verification date:	28/02/2019
Certificate N.	162632
Temperature of calibration	22°C
Humidity	45%

Factory calibration in accordance with ASTM D5778-12

CONE PENETRATION TEST (CPT) REPORT

McMILLAN Drilling

LandTest

Client: Miyamoto International NZ

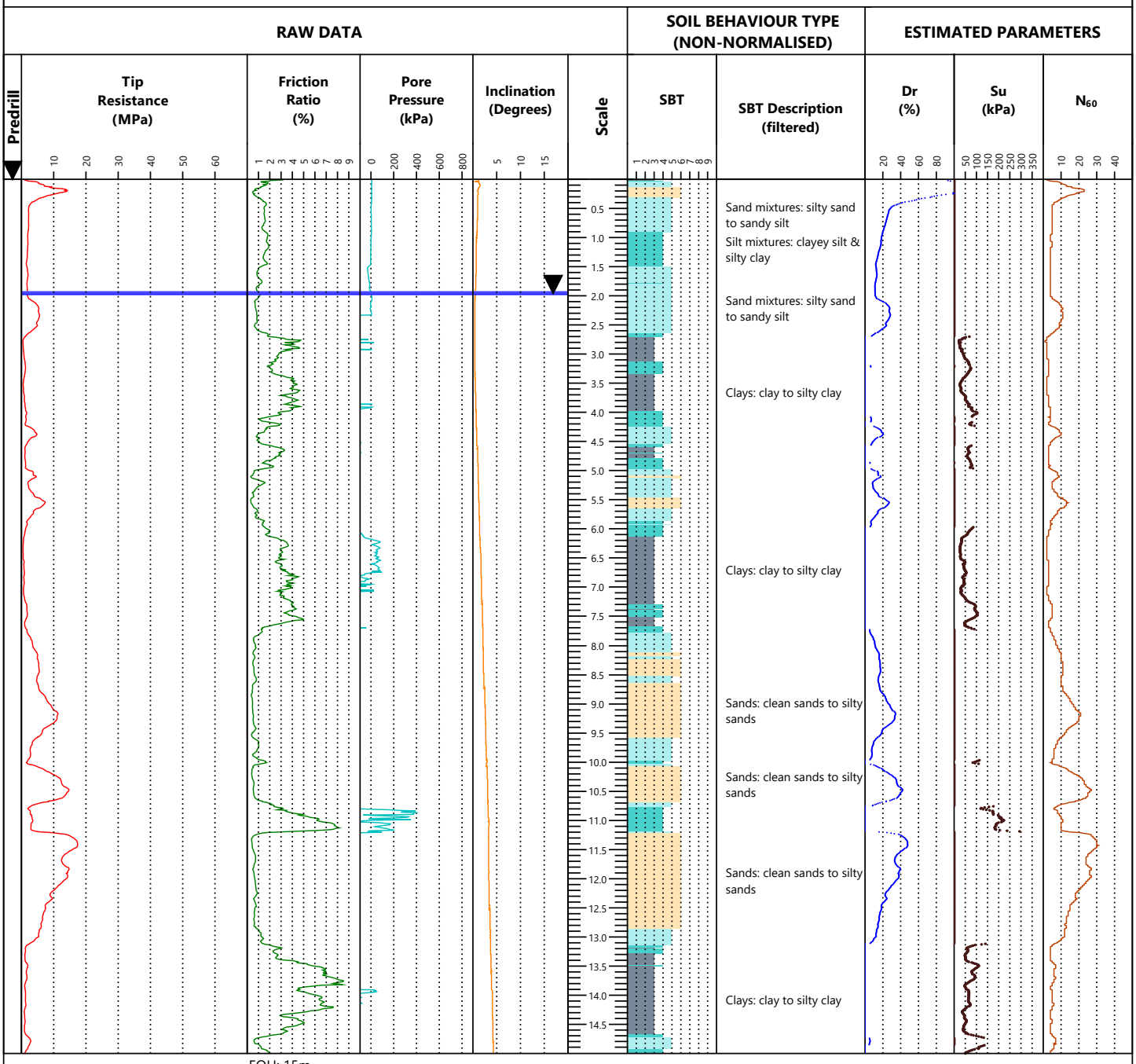
Location: 2-4 Glovers Road, Christchurch

Printed: 29/09/2020

McMILLAN Drilling
LandTest

Client: Miyamoto International NZ	**Bore No.:** CPTu007
Project: 2-4 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2-4 Glovers Road, Christchurch
Date: 24/9/2020
Grid Reference: 1564970.4m E, 5173158.32m N (NZTM) - Map or aerial photograph
Rig Operator: E. Diaz
Elevation: 0.00m
Datum: Ground
Equipment: Pagani TG63-150



EOH: 15m

Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.96m
Collapse: 2.0m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9412	11.8737
Local Friction	0.1606	0.161
Pore Pressure	1.4594	1.262

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

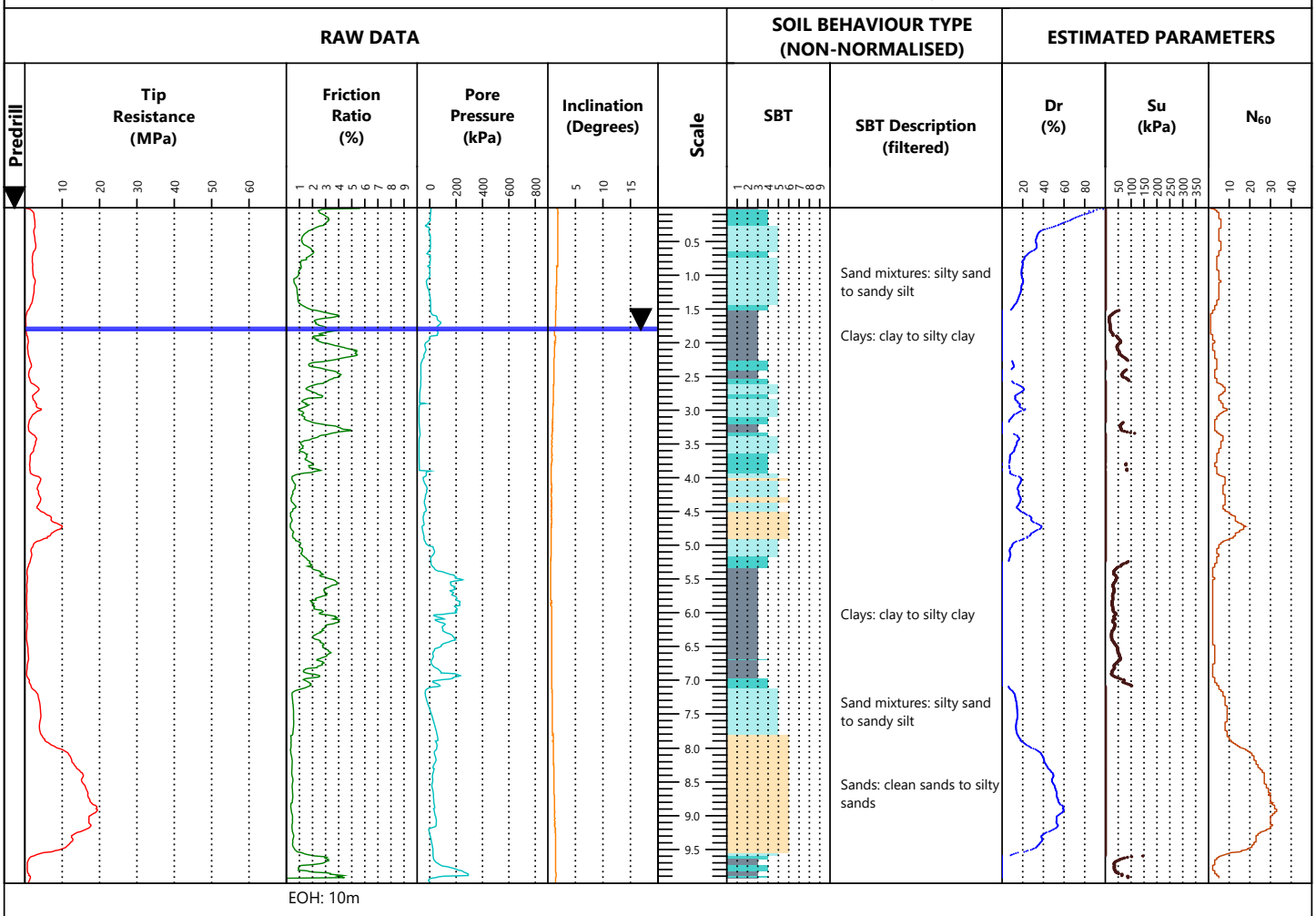
Remarks
Invalid pore water pressure data from 2.33m.

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu008
	Project: 2-4 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2-4 Glovers Road, Christchurch **Date:** 24/9/2020

Grid Reference: 1565034.78m E, 5173124.87m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.8m
Collapse: 2.2m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9516	11.8425
Local Friction	0.1609	0.1614
Pore Pressure	1.459	1.4561

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

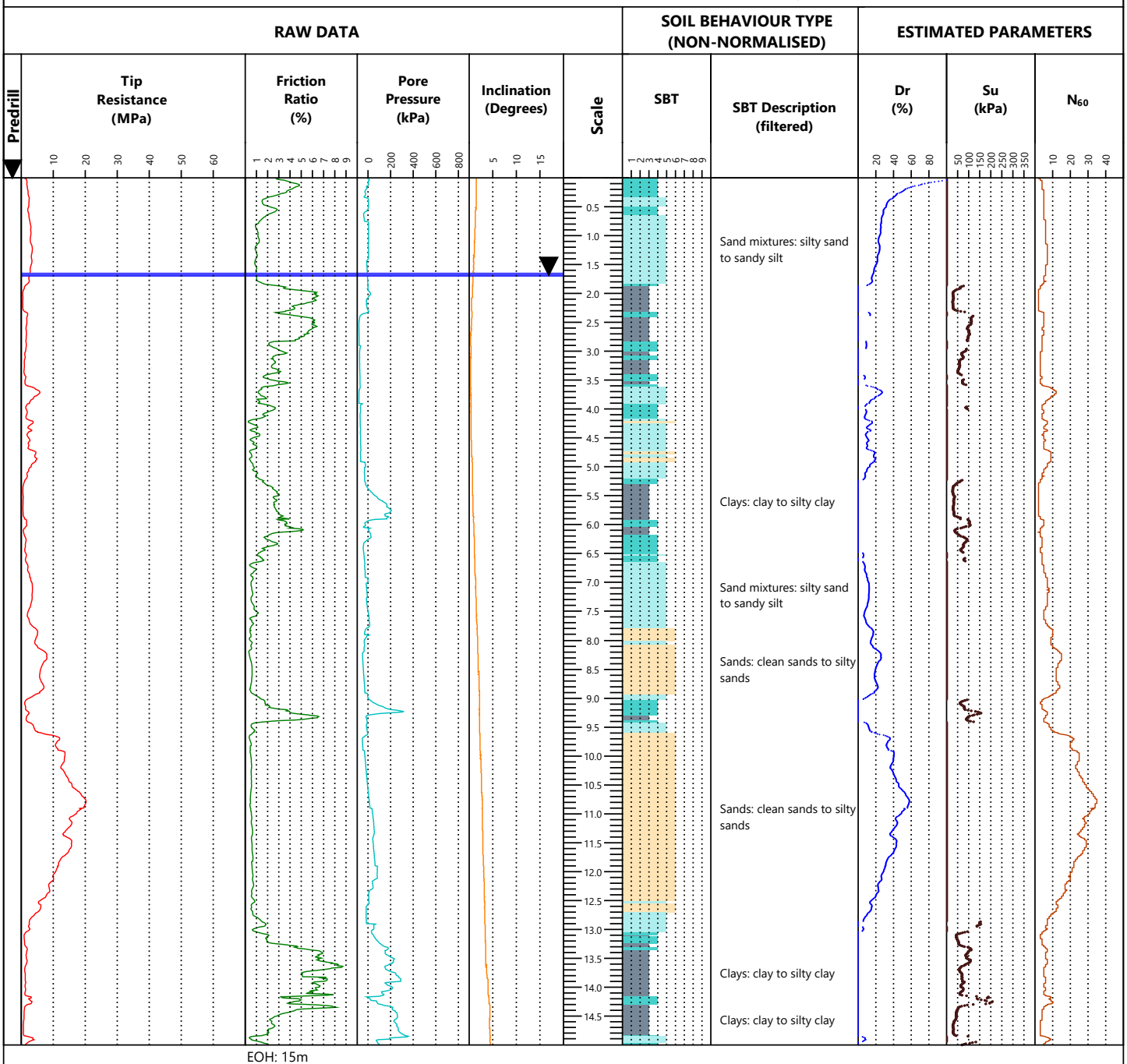
McMILLAN Drilling
LandTest

Client: Miyamoto International NZ		**Bore No.:** CPTu009
Project: 2-4 Glovers Road, Christchurch		**Job No.:** 19096

Site Location: 2-4 Glovers Road, Christchurch **Date:** 24/9/2020

Grid Reference: 1564969.64m E, 5173086.81m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



EOH: 15m

Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.68m
Collapse: 1.80m

Termination
Target Depth: ✓

Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9464	11.801
Local Friction	0.1604	0.1611
Pore Pressure	1.4592	1.4568

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

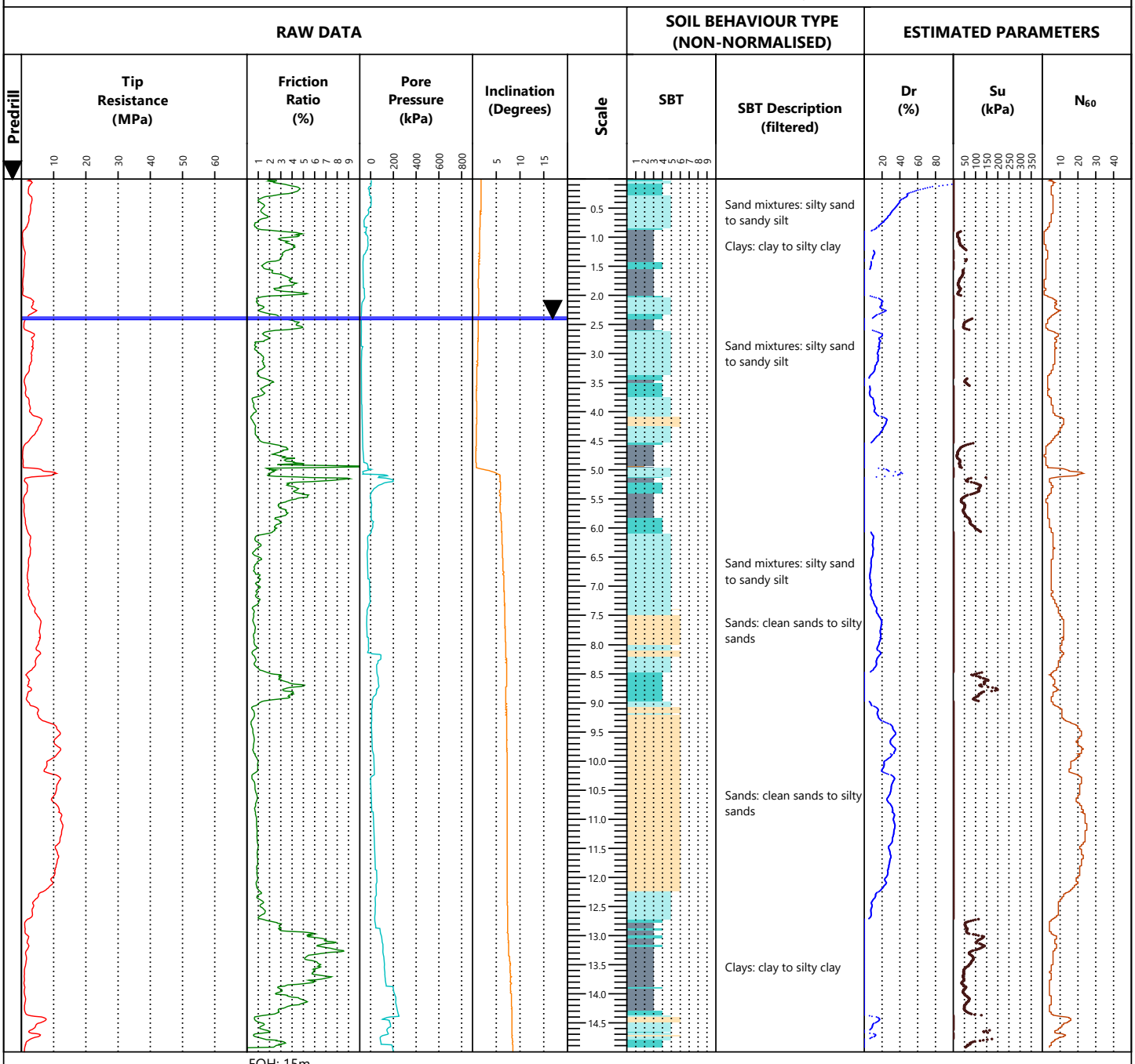
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu010
	Project: 2-4 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2-4 Glovers Road, Christchurch **Date:** 25/9/2020

Grid Reference: 1565043.16m E, 5173036.65m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



EOH: 15m

Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 2.4m
Collapse: 2.50m

Termination
Target Depth: ✓

Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9568	11.8166
Local Friction	0.1618	0.1622
Pore Pressure	1.4599	1.4582

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

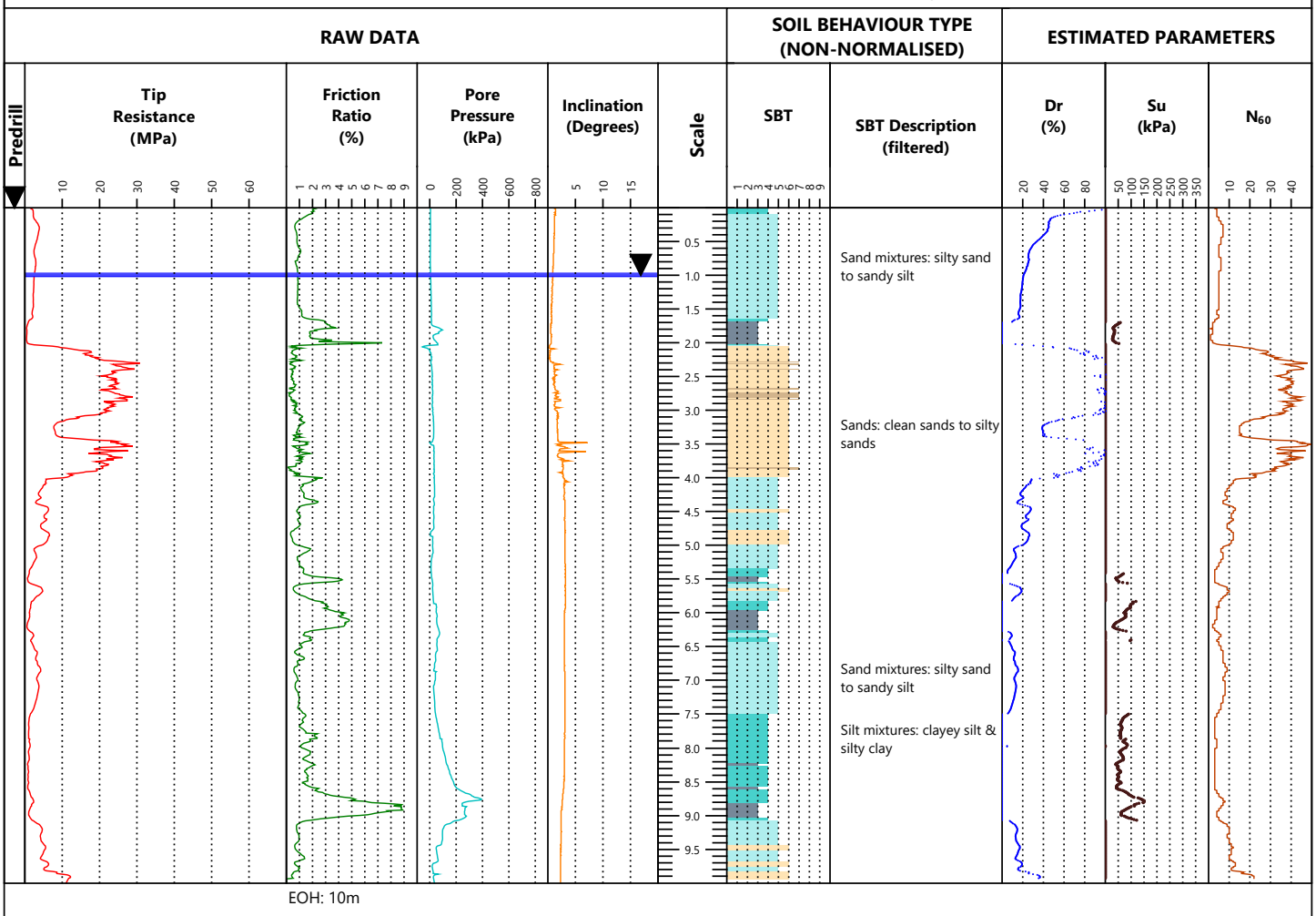
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu011
	Project: 2-4 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2-4 Glovers Road, Christchurch **Date:** 25/9/2020

Grid Reference: 1565055.15m E, 5172937.04m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1m
Collapse: 5.1m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9464	11.8166
Local Friction	0.1615	0.1621
Pore Pressure	1.4598	1.455

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

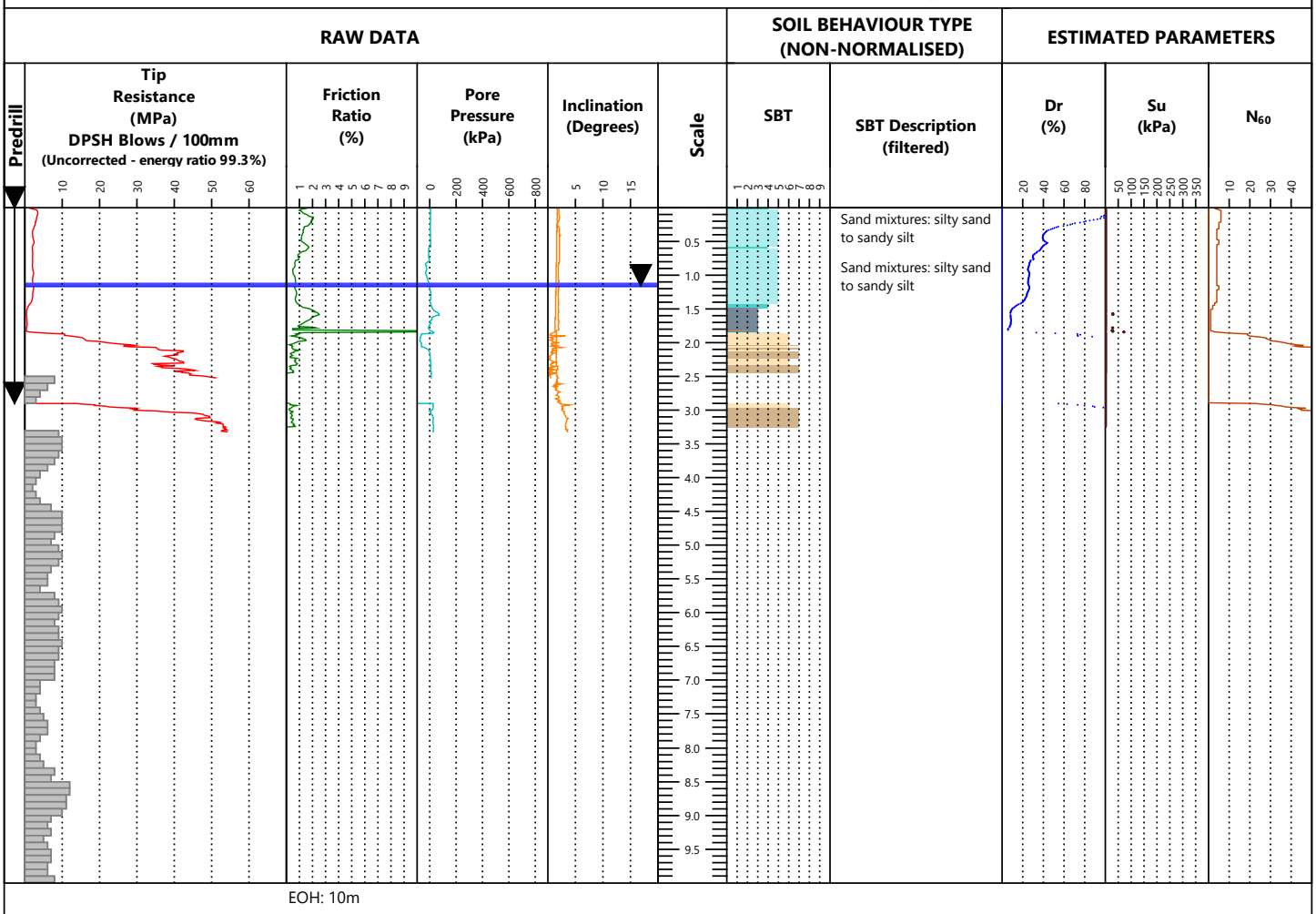
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu012
	Project: 2-4 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2-4 Glovers Road, Christchurch **Date:** 29/9/2020

Grid Reference: 1565058.83m E, 5172852.91m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: 2.9m
Water Level: 1.15m
Collapse: 2.2m

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.8737	11.8321
Local Friction	0.1612	0.1611
Pore Pressure	1.4542	1.4556

Termination

Target Depth: ☐

Effective Refusal

Tip: ✓
Gauge: ☐
Inclinometer: ☐

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

TEST DETAIL

PointID: CPTu007
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 24/9/2020
Predrill: -
Water Level: 1.96m
Collapse: 2.0m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9412	11.8737
Local Friction	0.1606	0.161
Pore Pressure	1.4594	1.262

PointID: CPTu008
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 24/9/2020
Predrill: -
Water Level: 1.8m
Collapse: 2.2m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9516	11.8425
Local Friction	0.1609	0.1614
Pore Pressure	1.459	1.4561

PointID: CPTu009
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 24/9/2020
Predrill: -
Water Level: 1.68m
Collapse: 1.80m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9464	11.801
Local Friction	0.1604	0.1611
Pore Pressure	1.4592	1.4568

PointID: CPTu010
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 25/9/2020
Predrill: -
Water Level: 2.4m
Collapse: 2.50m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9568	11.8166
Local Friction	0.1618	0.1622
Pore Pressure	1.4599	1.4582

PointID: CPTu011
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 25/9/2020
Predrill: -
Water Level: 1m
Collapse: 5.1m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9464	11.8166
Local Friction	0.1615	0.1621
Pore Pressure	1.4598	1.455

TEST DETAIL

PointID: CPTu012
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 29/9/2020
Predrill: -
Water Level: -
Collapse: -

Termination

Target Depth: ☐

Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9568	11.8062
Local Friction	0.1607	0.1609
Pore Pressure	1.4567	1.4562

Sounding: 2

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 29/9/2020
Predrill: 2.9m
Water Level: 1.15m
Collapse: 2.2m

Termination

Target Depth: ☐

Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.8737	11.8321
Local Friction	0.1612	0.1611
Pore Pressure	1.4542	1.4556

McMILLAN Drilling
LandTest

CPT CALIBRATION AND TECHNICAL NOTES

These notes describe the technical specifications and associated calibration references pertaining to the Pagani piezocone types measuring cone resistance, sleeve friction, inclination and pore pressure (piezocone, 10cm^2)

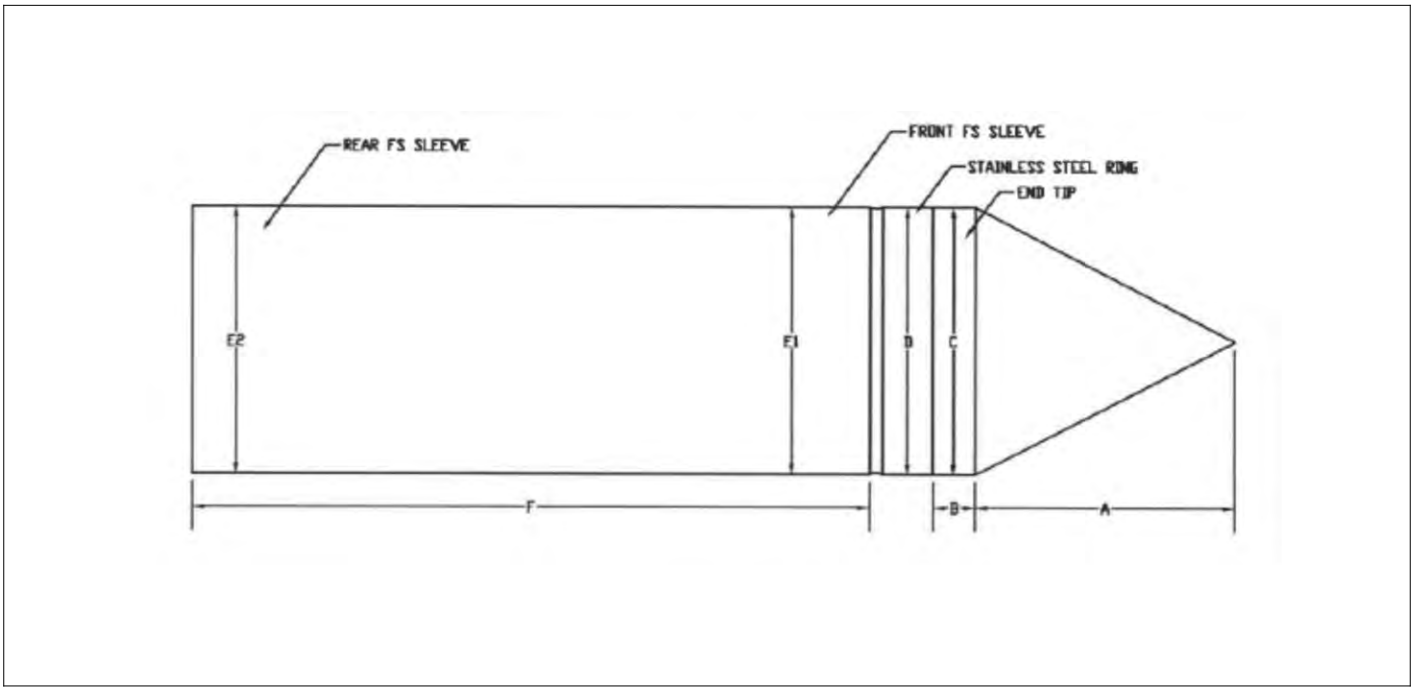
Dimensions

Dimensional specifications are detailed below. All tolerances are routinely checked prior to testing and measurements taken are electronically recorded. All records are kept on file and available on request.

Technical specifications

	Tip	Friction	Pore Pressure	Inclination
Maximum Measuring Range:	50 - 100 MPa	1.60 MPa	2.50 MPa	0° - 20°
Resolution:	24 bit	24 bit	24 bit	12 bit
Accuracy:	0.005 MPa	0.04 MPa	0.04 MPa	0.5°

Length:	320 mm	**Weight:**	1.8 kg
Diameter:	35.8 mm	**Opening angle of bit:**	60°
Cone base area:	10 cm^2	**Side sleeve surfaces:**	150 cm^2
Cone area ratio:	0.80	**Tip and Local Friction sensor displacement:**	80 mm



Land Test — McMILLAN Drilling

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z023/20

Calibrated system *(Sistema tarato)* :

Serial number	Mkj329
Sensor	TIP RESISTANCE
Max. Capacity [MPa]:	100
Scaling Factor:	192610
Tip net area ratio (a_n):	0,79
Sleeve net ratio (b_n):	0,00

Addressee *(destinatario)* :
McMillan Drilling Ltd
36 Hickory Place,Islington
Christchurch 8042,New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 200 kN
Serial Number	138913

Power press:

Manufacturer	Easydur Italiana
Model	Aura 20T
Serial Number	29084

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

Last verification date:	16/01/2020
Certificate N.	LAT 091 2020-015
Temperature of calibration	22°C
Humidity	45%

Factory calibration in accordance with ASTM D5778-12

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z023/20

Calibrated system *(Sistema tarato)* :

Serial number	Mkj329
Sensor	SLEEVE FRICTION
Max. Capacity [kPa]:	1600
Scaling Factor:	30794

Addressee *(destinatario)* :
McMillan Drilling Ltd
36 Hickory Place,Islington
Christchurch 8042,New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 50 kN
Serial Number	65495

Power press:

Manufacturer	Easydur Italiana
Model	Aura 10T
Serial Number	29002

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*
Last verification date: 16/01/2020

The adopted calibration procedure has been developed according to the suggestions given by Prof. Paul W. Mayne (Georgia Institute of technology) and Prof. Diego Lo Presti (University of Pisa)

Cone calibrated by _____

Date of issue 05/02/2020

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z023/20

Calibrated system *(Sistema tarato)* :

Serial number	Mkj329
Sensor	PORE PRESSURE
Max. Capacity [kPa]:	2500
Scaling Factor:	10657
Sensor	TILT ANGLE
Max. Inclination [°]:	20
Scaling Factor:	151152

Addressee *(destinatario)* :
McMillan Drilling Ltd
36 Hickory Place,Islington
Christchurch 8042,New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Pressure Generator:

Manufacturer	MENSOR
Model	CPC 4000
Serial Number	41000V56
Sensor Descr	Silicon Pressure Transducer
Sensor Serial Number	41000SYF

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*
Last verification date: 28/02/2019

D. Southern Geophysical MASW and GPR Report

October 2020

GEOPHYSICAL REPORT

Geophysical Site Investigation:

2-4 Glovers Road, Christchurch

Report prepared for Miyamoto International NZ Ltd

Southern Geophysical

3/28 Tanya St, Bromley, Christchurch 8062

Ph: 03 384 4302

Web: www.southerngeophysical.com

Data collected and report prepared for Southern Geophysical Ltd by:

Christian Ruegg, MSc, Geophysicist

Nick McConachie, BSc, Geologist

Report internally reviewed for Southern Geophysical by:
Mike Finnemore, PhD, Senior Geophysicist

Table of Contents

SGL Reference: 2050

Report Version 1

Summary:

Southern Geophysical Ltd was contracted to undertake a geophysical survey using Multi-channel Analysis of Surface Waves (MASW) at 2-4 Glovers Road, Christchurch. The geophysical survey was conducted on September 24th, 2020 and includes three MASW lines (Figure 1). The aim of the survey was to assess the shear-wave velocities and structure of the subsurface to a depth of over 20 m. The MASW results show low shear-wave velocities to a depth of 10 m in the northern part of the site (100 m/s to 150 m/s), with higher velocities to the south (100 m/s to 300 m/s). The boundary between these two zones is a feature characteristic of the edge of a paleochannel, buried valley, or dipping volcanic strata, crossing the site east to west and dipping to the north. It is possible that high velocities imaged by the MASW survey to the south (>500 m/s from approximately 20 m depth) are associated with volcanic rock, but there are no boreholes available for ground truthing to that depth.

Methodology:

MASW is a geophysical technique that uses the dispersive nature of surface waves to model shear-wave velocity versus depth.

A MASW survey is undertaken as a series of lines or points across the surface of the site. The MASW points in this survey were collected using a 24-channel towed seismic array, with 4.5 Hz geophones. The geophone spacing was 1 m and the source offset was 10 m. The seismic source was a 16 lb sledgehammer impacting an aluminium plate. Recording parameters for the MASW survey were set with a 0.125 ms sample interval, 1.5 s record length, 24 dB gains, and a geophone trigger system.

The field records were processed using the Kansas Geological Survey software package SurfSeis6++ ©. The geometry for each point was set according to the survey parameters and the dispersion curves were generated and edited. The inversions were run using a 10 layer variable depth model. The velocity data was interpolated into 2D profiles showing V_s variations with depth (Figures 2 to 3). The output shear-wave velocity data is included as data files (CSV format), supplementary to this report.

Supplementary to the MASW profiles, a series of Ground Penetrating Radar lines were acquired with a GSSI 200 MHz antenna (Figure 1). The radargrams are included in (Figures 4 and 5).

Survey positions were recorded using a Geo 7X Trimble GNSS system with a Tornado antenna. The GNSS positions were differentially corrected using a local GeoNet base station. The GNSS points were output in NZTM2000, with heights in Mean Sea Level (MSL). The accuracy of the survey positions is +/- 0.1 m. The site had no significant topographic changes, and the lines have not been corrected for elevation.

Results:

A total of three MASW lines were acquired at the site with a total MASW survey length of approximately 1 km (Figure 1). The ground surface was well compacted farm tracks and farm yards. A series of GPR lines were acquired along each MASW line to provide a high resolution image of the substrate (Figures 4 and 5).

In homogenous soils, with gradually increasing shear-wave velocities and no sharp lateral discontinuities, the accuracy of the shear-wave velocities derived from the MASW processing is considered to be +/- 10%.[1] The quality of the seismic data and the dispersion curves used in this report is very good, with a good signal-to-noise ratio. If there is a velocity inversion present in the shear-wave profile (decreasing velocity with depth), the shear-wave velocity of the reduced velocity zone and the thickness of that zone can often be underestimated by the inversion process.

Conclusions:

The MASW survey was considered to be of good quality, with modelled shear-wave velocities accurate to +/- 10%. The velocities in the top 5 m are likely to be more accurate then the deeper velocities, due to the presence of multiple velocity inversions. The MASW survey indicates a horizontal layer defined by a sharp increase in shear-wave velocity (180 m/s to 220 m/s) at around 5 m depth in the southern part of the site, consistent with the surface of dense gravels or sands. In the northern part of the site a similar 180 m/s to 220 m/s surface was observed at 20 m depth. There is a well-defined dipping surface dividing the south and the north, possibly associated with a buried valley edge, paleochannel, or

[1] Stephenson, W.J., Louie, J.N., Pullammanappallil, S., Williams, R.A., and Odum, J.K. 2005. Blind Shear-wave Velocity Comparison of ReMi and MASW Results with Boreholes to 200 m in Santa Clara Valley: Implications for Earthquake Ground-Motion Assessment. *Bulletin of the Seismological Society of America*, Vol. 95, pp. 2506-2516.

bedrock interface. This edge feature is apparent in both MASW 1 and MASW 3, as well as GPR 4 and GPR 10.

While the limitations of the MASW method should be considered when evaluating these results, the quality of the data collected at the site and the confidence in the shear-wave velocities derived from the MASW data is good.

Disclaimer:

This document has been provided by Southern Geophysical Ltd subject to the following:

Non-invasive geophysical testing has limitations and is not a complete source of testing. Often there is a need to couple non-invasive methods with invasive testing methods, such as drilling, especially in cases where the non-invasive testing indicates anomalies.

This document has been prepared for the particular purpose outlined in the project proposal and no responsibility is accepted for the use of this document, in whole or in part, in other contexts or for any other purpose. Southern Geophysical Ltd did not perform a complete assessment of all possible conditions or circumstances that may exist at the site. Conditions may exist which were undetectable given the limited nature of the enquiry Southern Geophysical Ltd was retained to undertake with respect to the site. Variations in conditions often occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account. Accordingly, additional studies and actions may be required by the client.

We collected our data and based our report on information which was collected at a specific point in time. The passage of time affects the information and assessment provided by Southern Geophysical Ltd. It is understood that the services provided allowed Southern Geophysical Ltd to form no more than an opinion of the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes for whatever reason. Where data is supplied by the client or other sources, including where previous site investigation data have been used, it has been assumed that the information is correct. No responsibility is accepted by Southern Geophysical Ltd for incomplete or inaccurate data supplied by others. This document is provided for sole use by the client and is confidential to that client and its professional advisers. No responsibility whatsoever for the contents of this document will be accepted to any person other than the client. Any use which a third party makes of this document, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. Southern Geophysical Ltd accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this document.

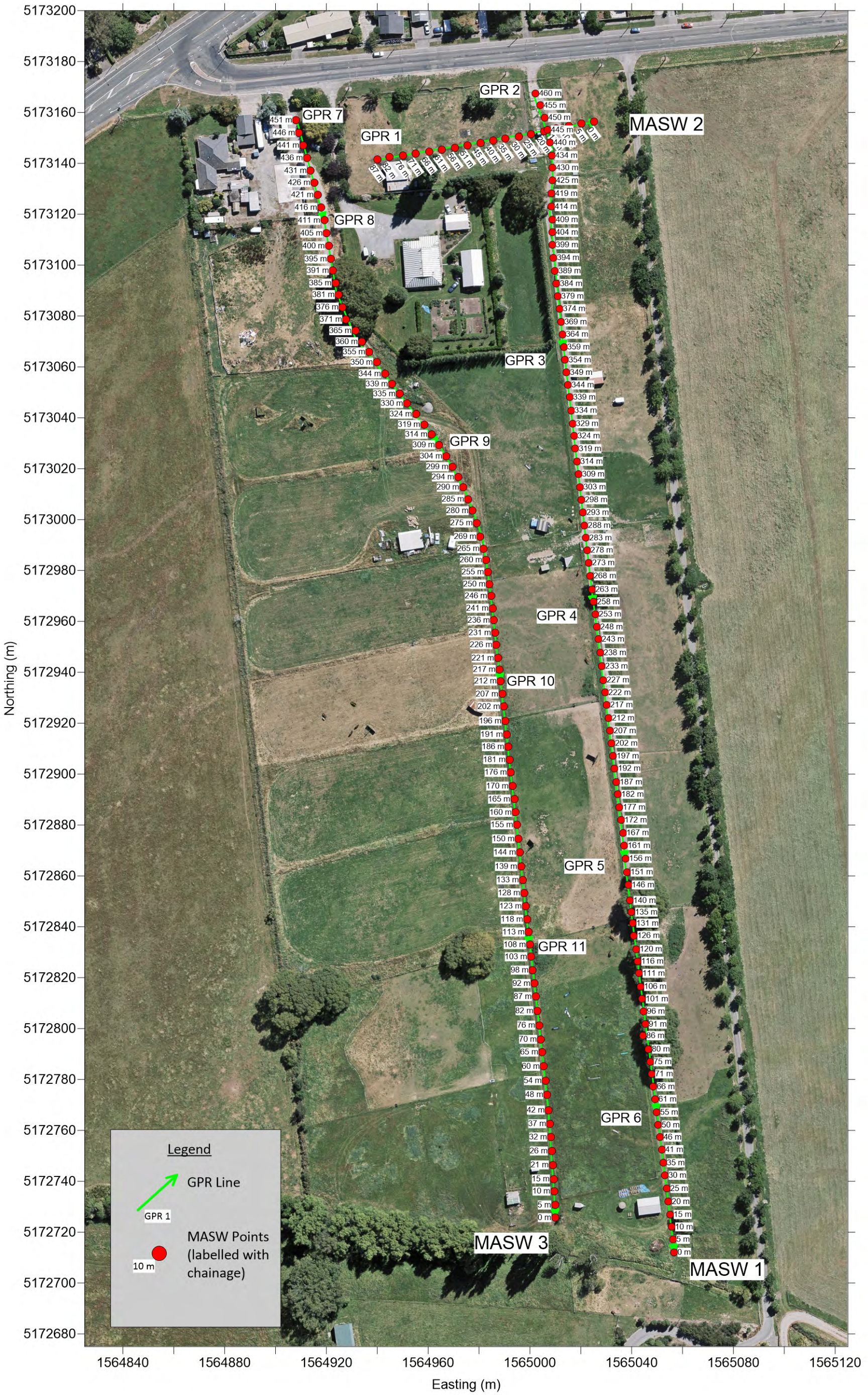


Figure 1: Site Map

2-4 Glovers Road, Christchurch

NOTES- Coordinates NZ2000 TM Grid.
Aerial photograph sourced from LINZ, Crown Copyright ©

SCALE (m)

0 25 50 75 100 125

A3

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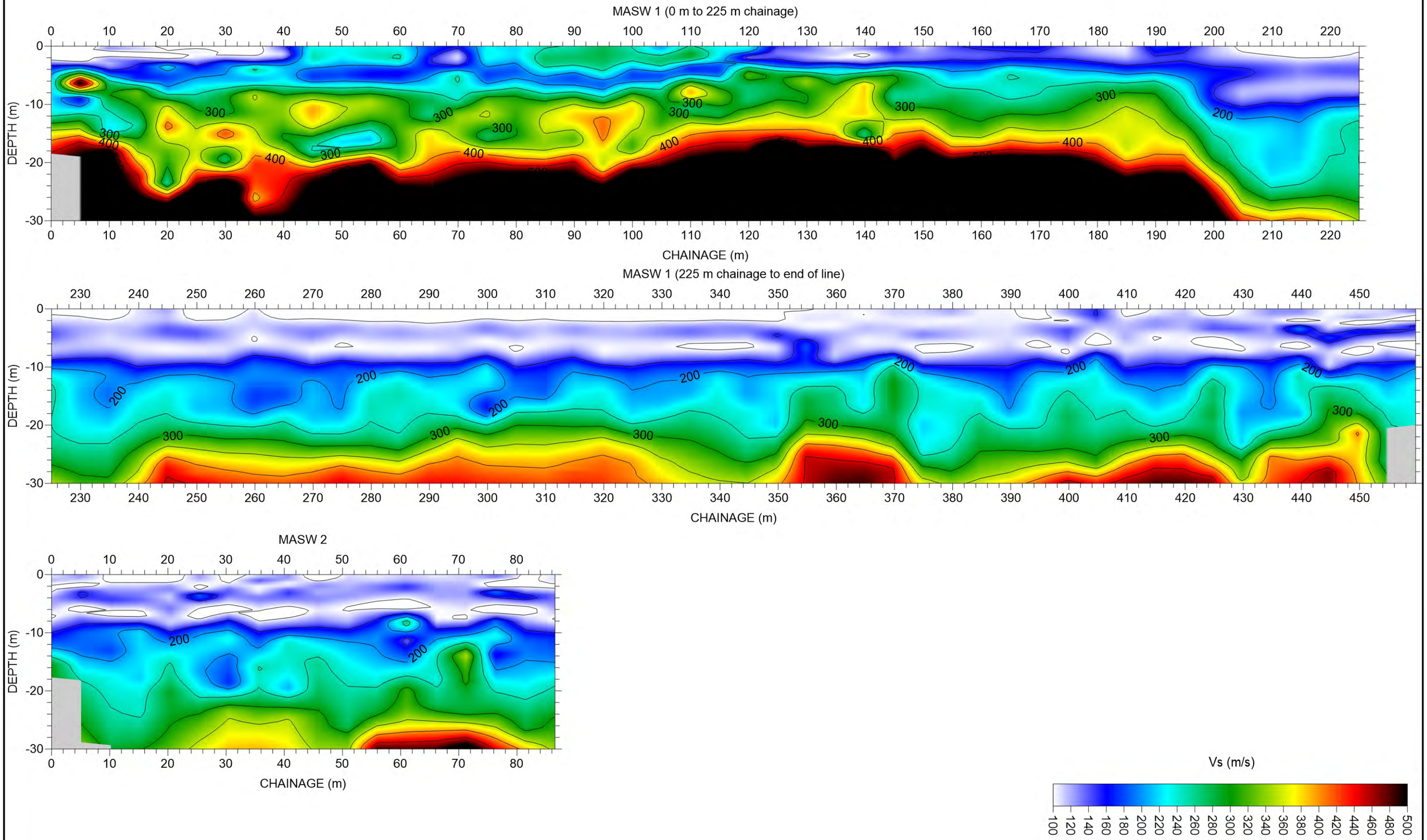

DRAWING- **Figure 2: MASW 1 and 2**

LOCATION- **2-4 Glovers Road, Christchurch**

NOTES MASW Vs profile has contour intervals of 50 m/s (Vs).

See site map for location of points.

A3

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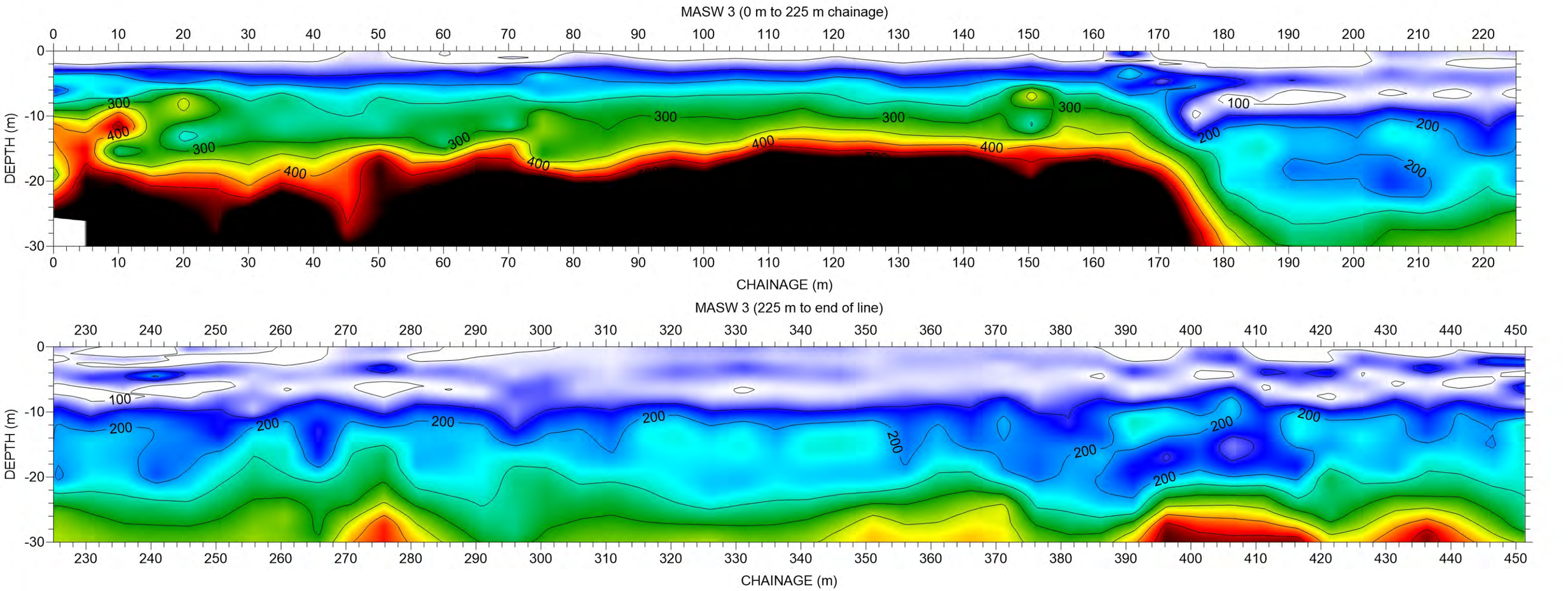

DRAWING- **Figure 3: MASW 3**

LOCATION- **2-4 Glover Street, Christchurch**

NOTES MASW Vs profile has contour intervals of 50 m/s (Vs).

See site map for location of points.

A3

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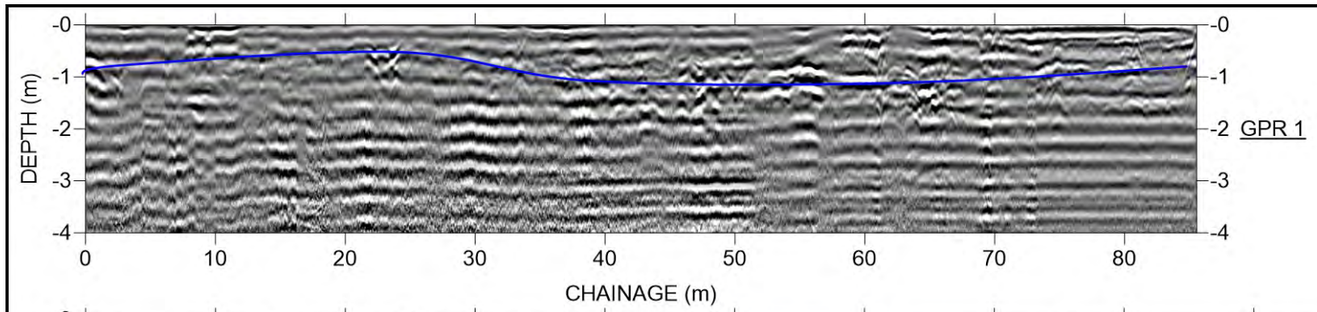

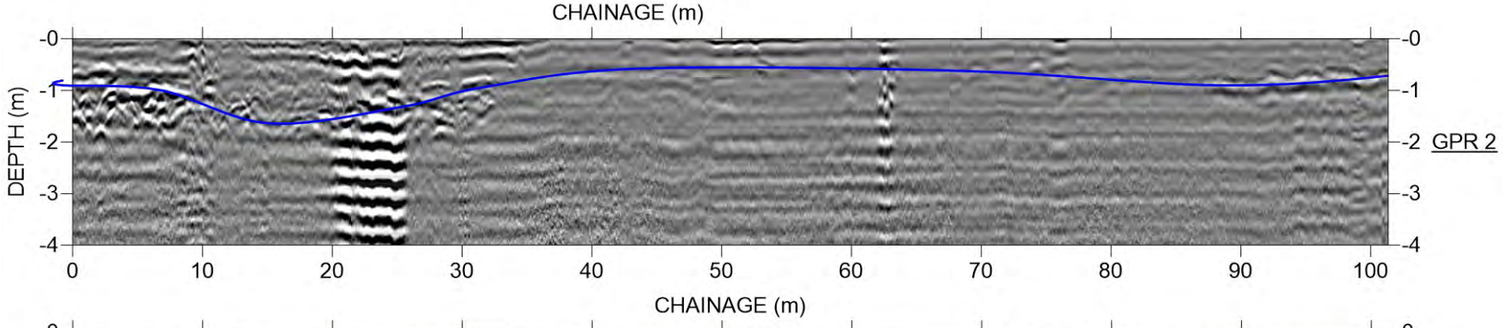

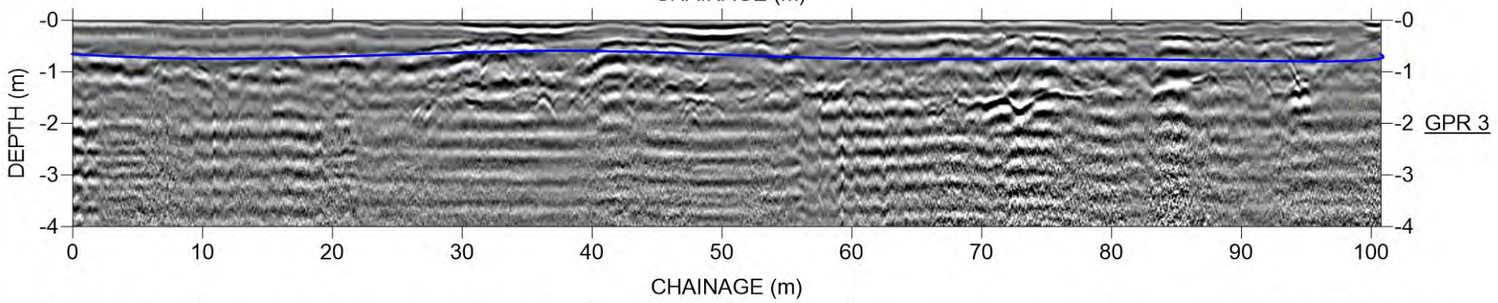

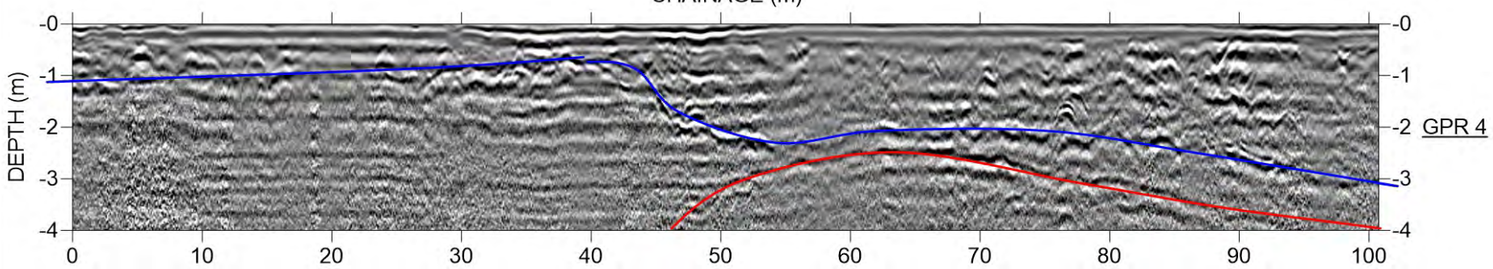

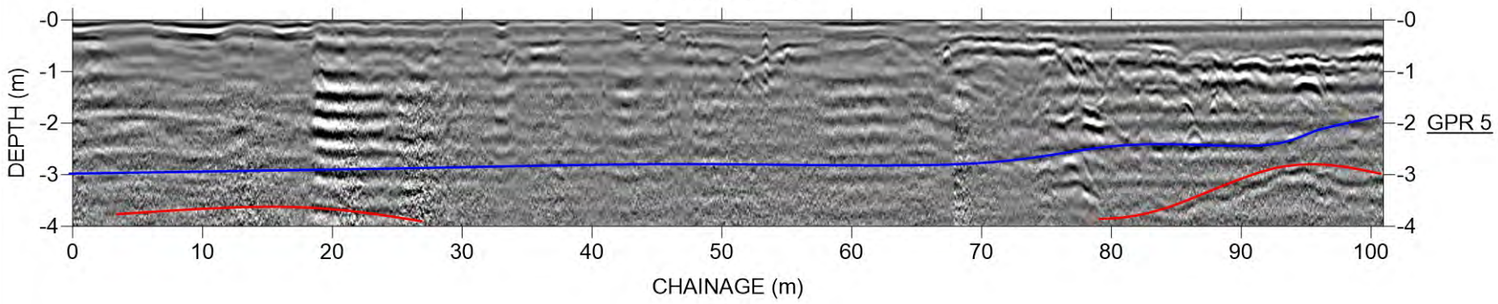

Some reflectors are annotated for reference. Note the profiles have been plotted with a 4:1 vertical exaggeration. See site map for line locations.

DRAWING- **Figure 4: GPR Radargrams 1 to 5**

LOCATION- **2-4 Glover Street, Christchurch**

NOTES

A3

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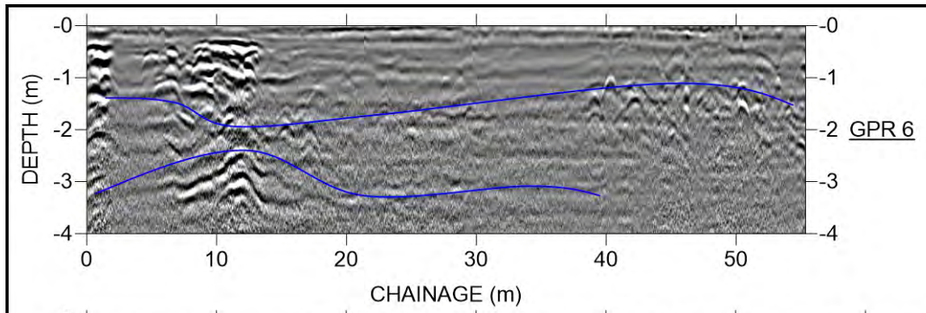
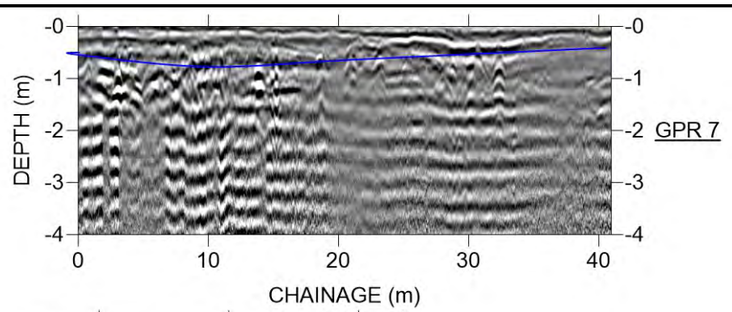
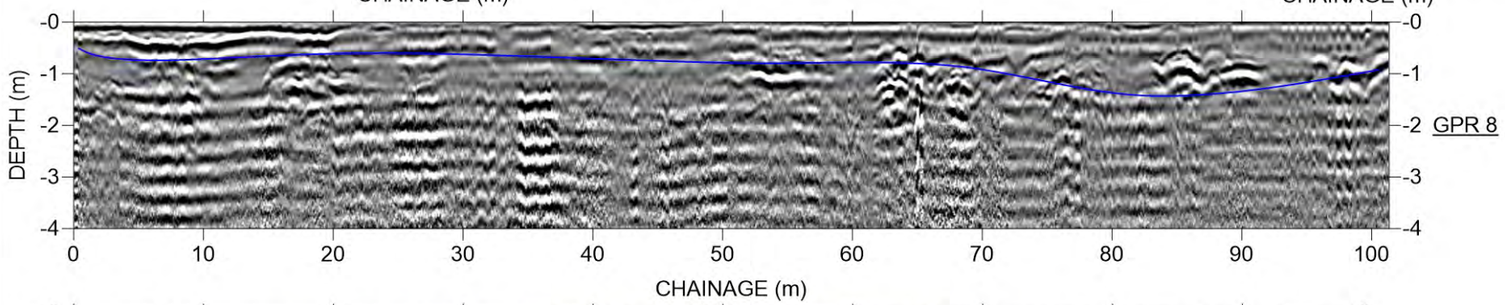
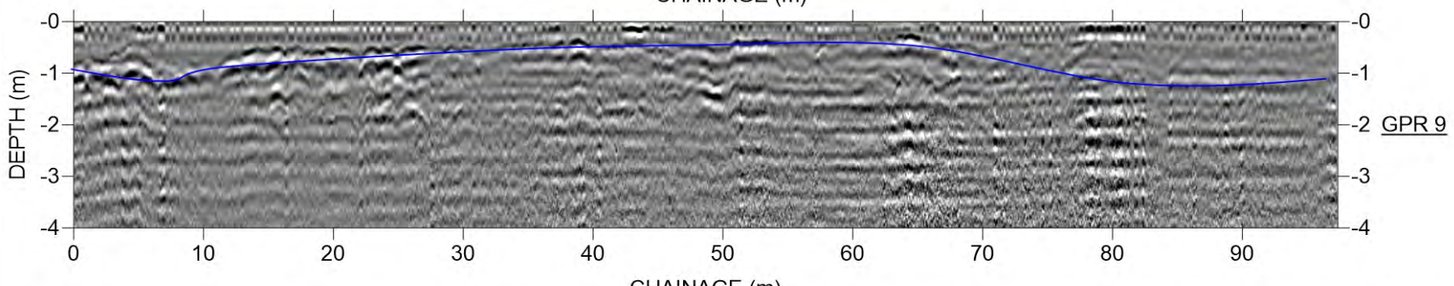
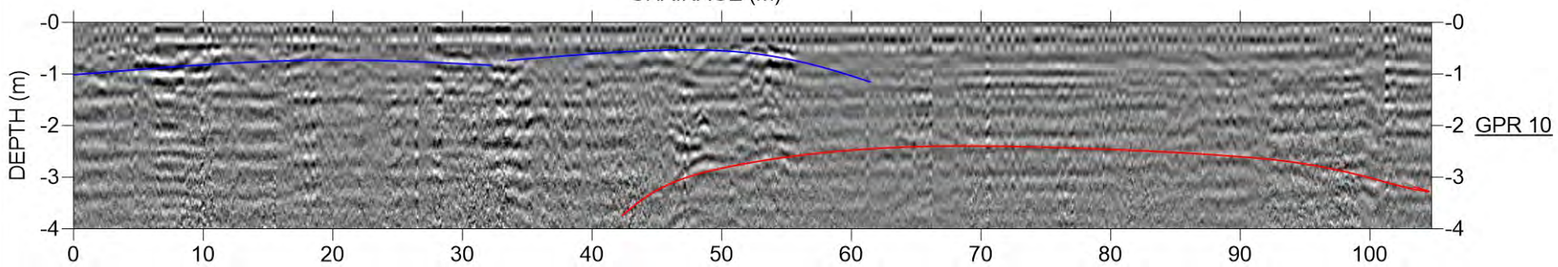
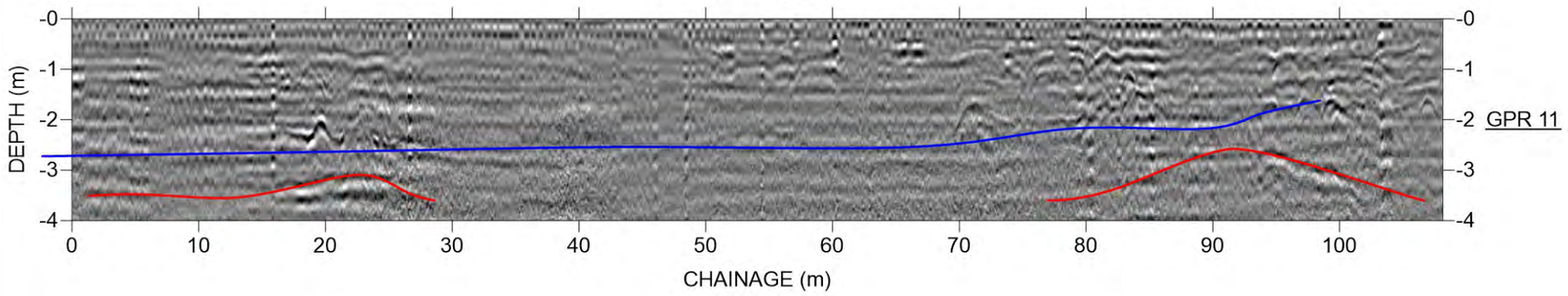












Some reflectors are annotated for reference. Note the profiles have been plotted with a 4:1 vertical exaggeration. See site map for line locations.

DRAWING- **Figure 5: GPR Radargrams 6 to 11**

LOCATION- **2-4 Glover Street, Christchurch**

NOTES

A3

Southern Geophysical Ltd

www.southerngeophysical.com

E. Geotechnical Cross Sections

miyamoto.

236 Hereford Street,
PO BOX 137 Cashel Street
Christchurch 8011

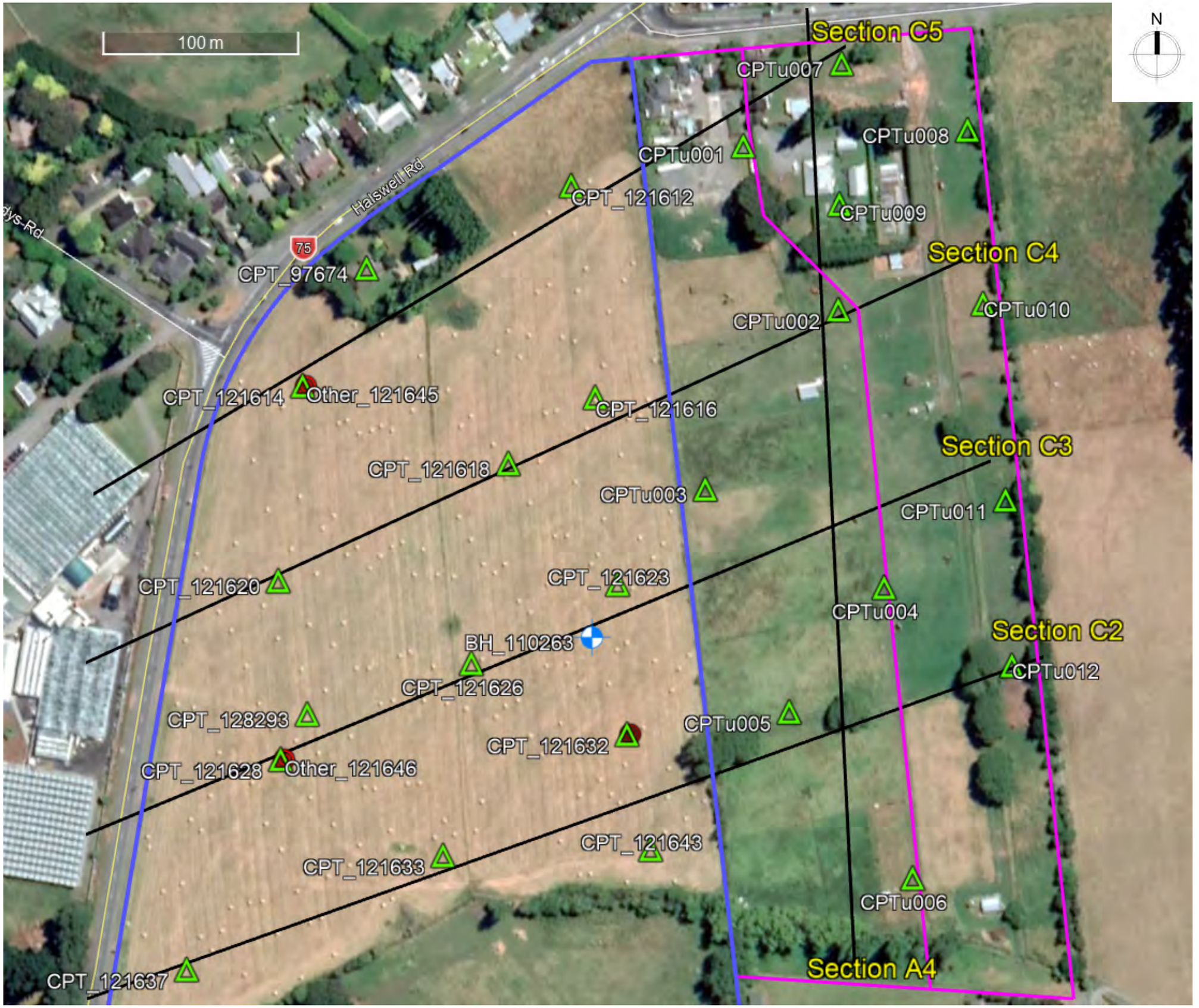
T: 64 03 377 4095
miyamoto.nz
projects@miyamoto.nz

PROJECT No: 200357
GEOTECHNICAL CROSS SECTIONS FOR 2&4 GLOVERS ROAD, HALSWELL, CHRISTCHURCH 8025

ISSUE DATE: 19/10/20 REV: 1

SHEET LIST

SHEET N°	SHEET NAME	REV.
S1	LOCATION PLAN	1
S2.1	GEOTECHNICAL CROSS-SECTION 1	1
S2.2	GEOTECHNICAL CROSS-SECTION 2	1
S2.3	GEOTECHNICAL CROSS-SECTION 3	1



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SITE SURVEY DRAWINGS FOR
2&4 GLOVERS ROAD,
HALSWELL,
CHRISTCHURCH 8025

REVISION HISTORY

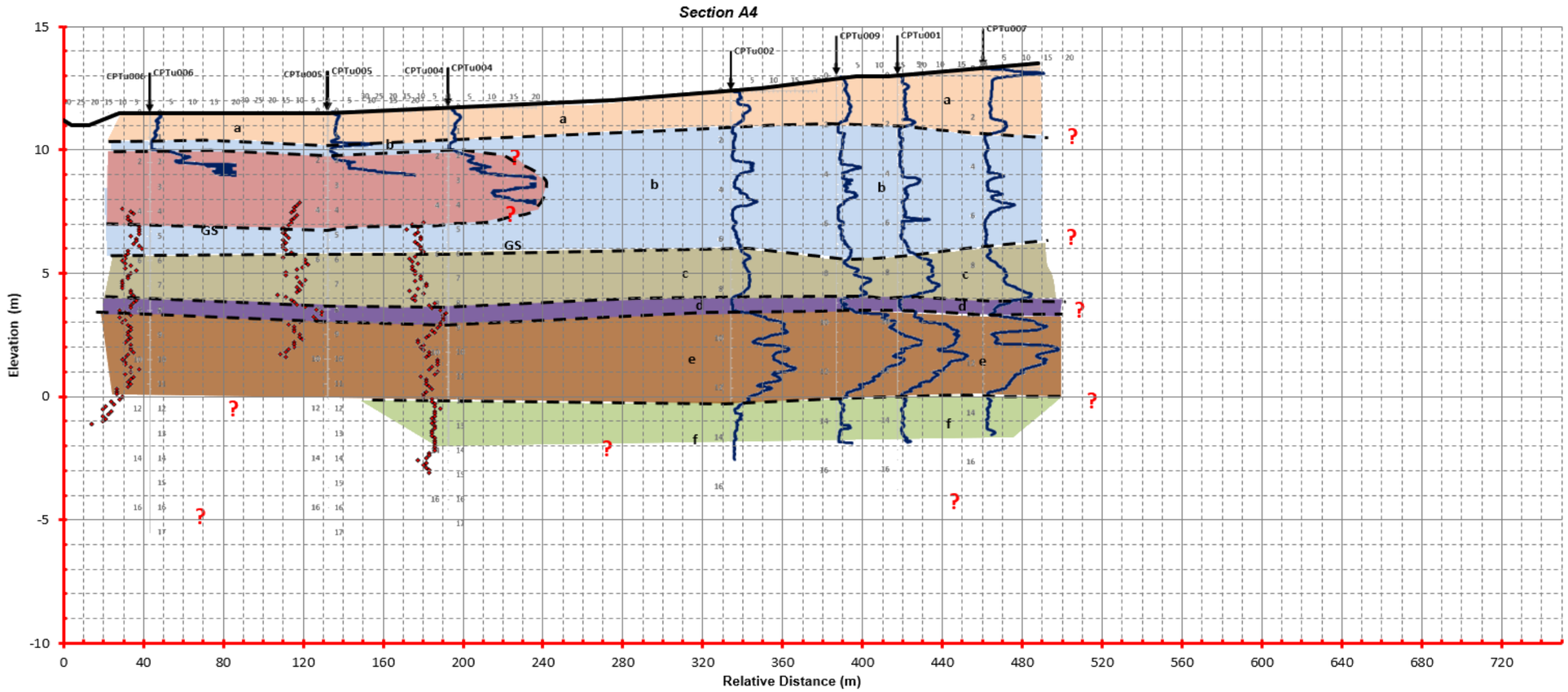
REV	DATE	DESCRIPTION
1	19/10/20	FINAL

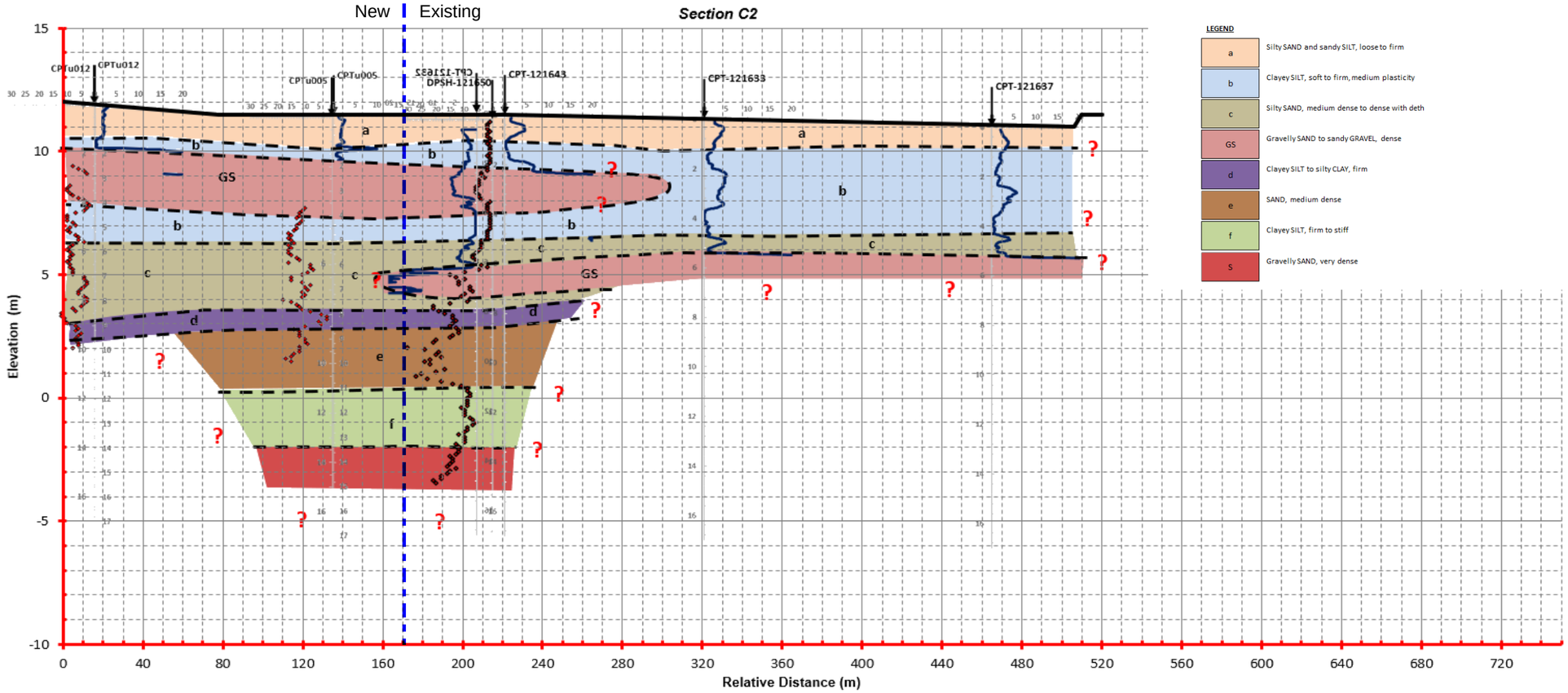
CLIENT:	YOURSECTION LTD
PROJECT No.:	200357
VERSION DATE:	16/10/2020
DRAWN:	CG
ENGINEER:	CG
APPROVED:	AG

SIZE: A3

LOCATION PLAN

SHEET No.: S1 REV. 1





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SITE SURVEY DRAWINGS FOR 2&4 GLOVERS ROAD, HALSWELL, CHRISTCHURCH 8025

REVISION HISTORY

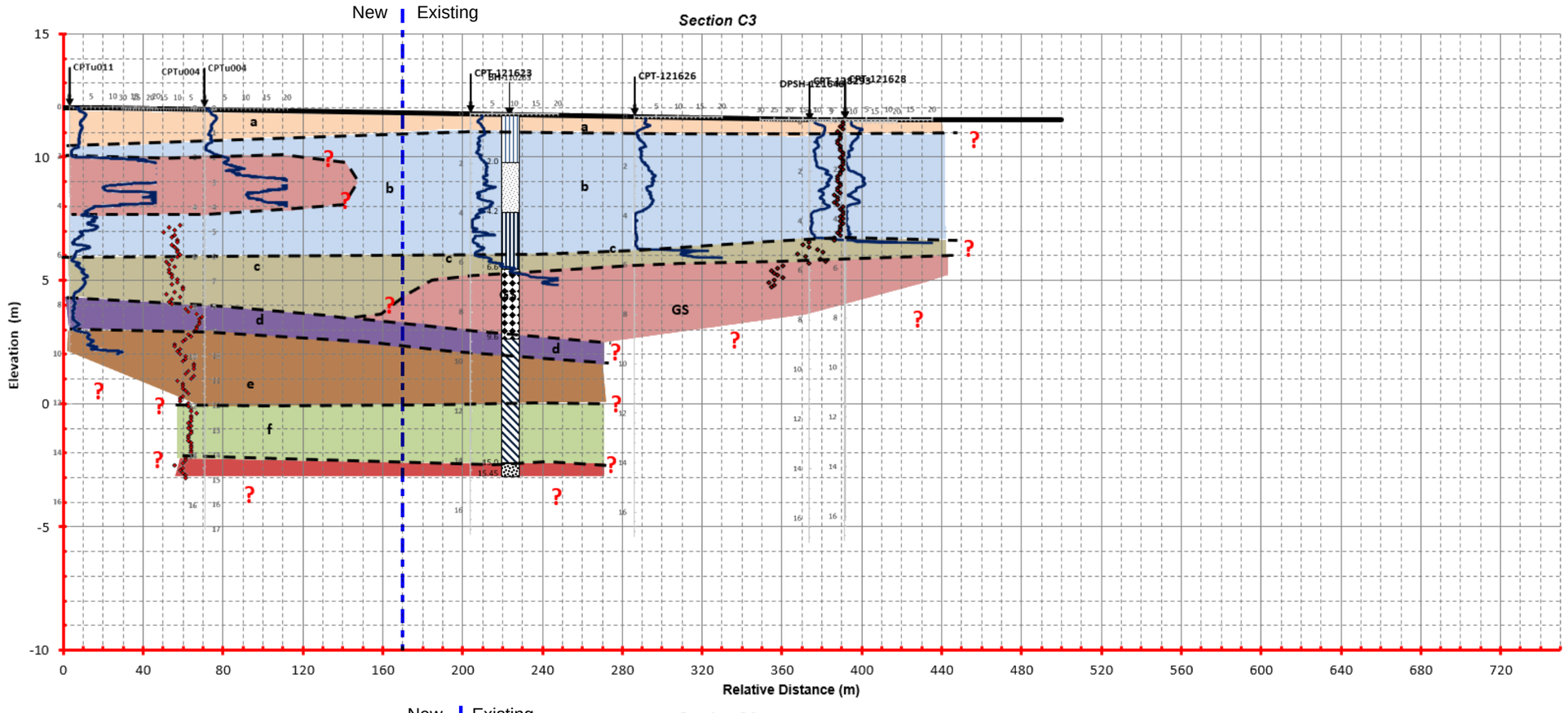
REV	DATE	DESCRIPTION
1	19/10/20	FINAL

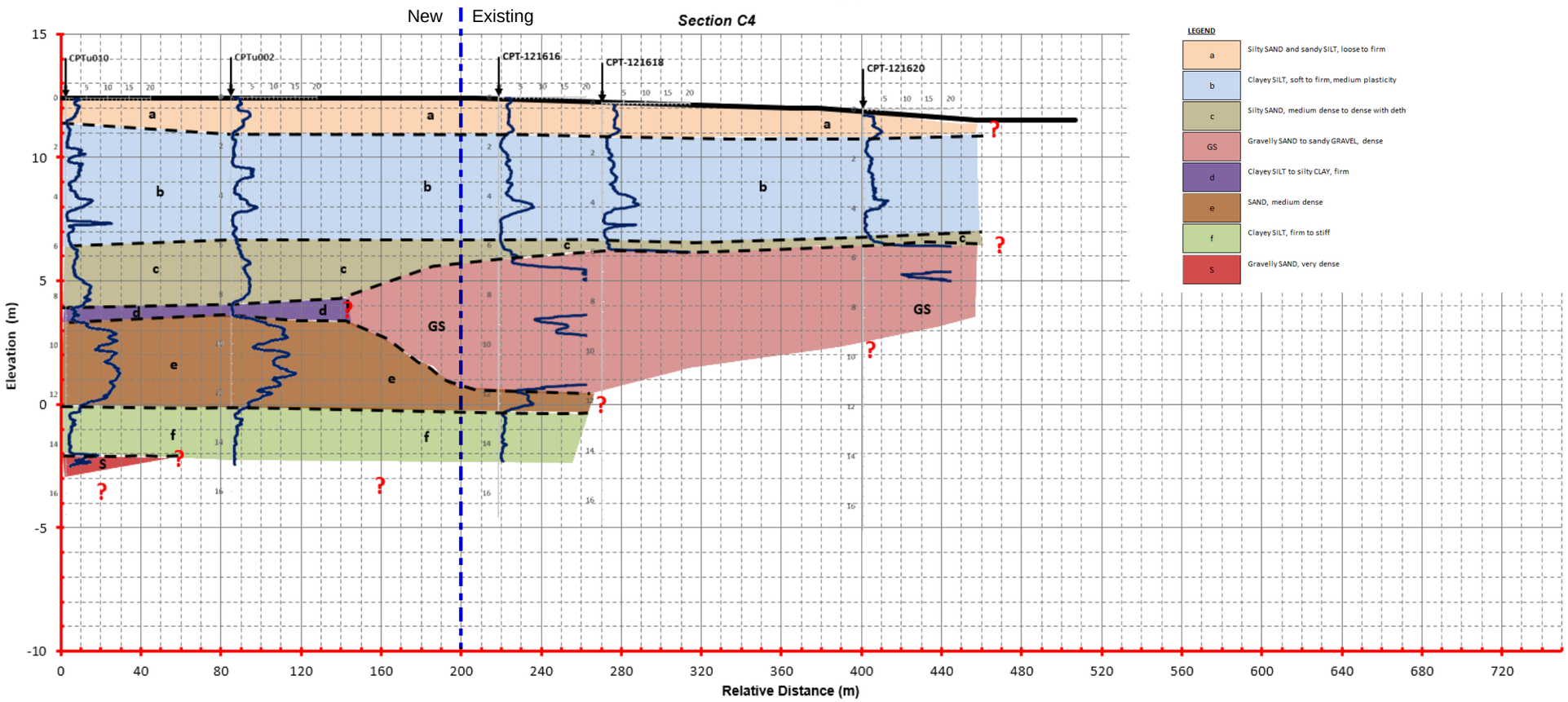
CLIENT:	YOURSECTION LTD
PROJECT No.:	200357
VERSION DATE:	16/10/2020
DRAWN:	CG
ENGINEER:	CG
APPROVED:	AG

SIZE: A3

GROUND MODEL SHEET 1

SHEET No.: S2.1 REV. 1





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miyamoto.nz
projects@miyamoto.nz

SITE SURVEY DRAWINGS FOR 2&4 GLOVERS ROAD, HALSWELL, CHRISTCHURCH 8025

REVISION HISTORY

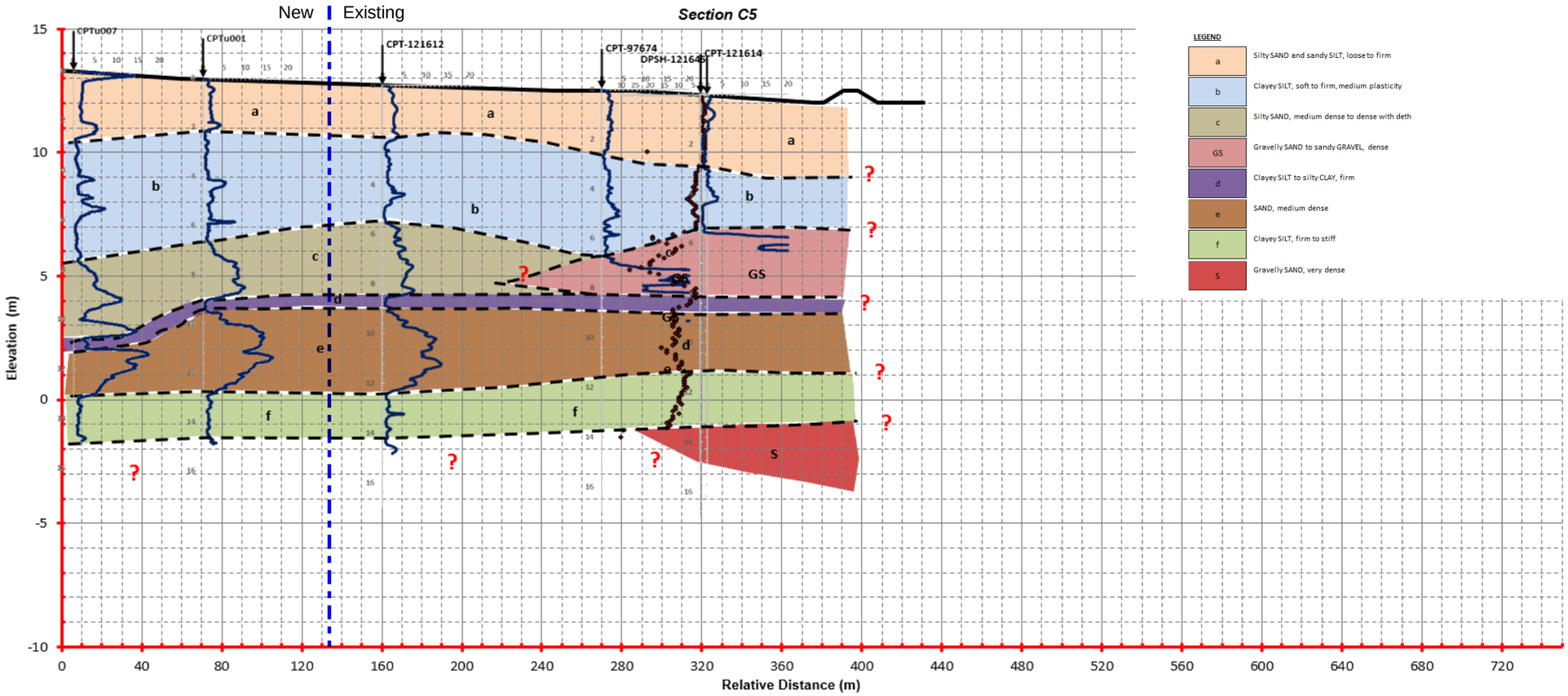
REV	DATE	DESCRIPTION
1	19/10/20	FINAL

CLIENT:	YOURSECTION LTD
PROJECT No.:	200357
VERSION DATE:	16/10/2020
DRAWN:	CG
ENGINEER:	CG
APPROVED:	AG

SIZE: A3

GROUND MODEL
SHEET 2

SHEET No.: S2.2 REV. 1



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miyamoto.nz
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SITE SURVEY DRAWINGS FOR 2&4 GLOVERS ROAD, HALSWELL, CHRISTCHURCH 8025

REVISION HISTORY

REV	DATE	DESCRIPTION
1	19/10/20	FINAL

CLIENT: YOURSECTION LTD

PROJECT No.: 200357

VERSION DATE: 16/10/2020

DRAWN: CG

ENGINEER: CG

APPROVED: AG

SIZE: A3

GROUND MODEL
SHEET 3

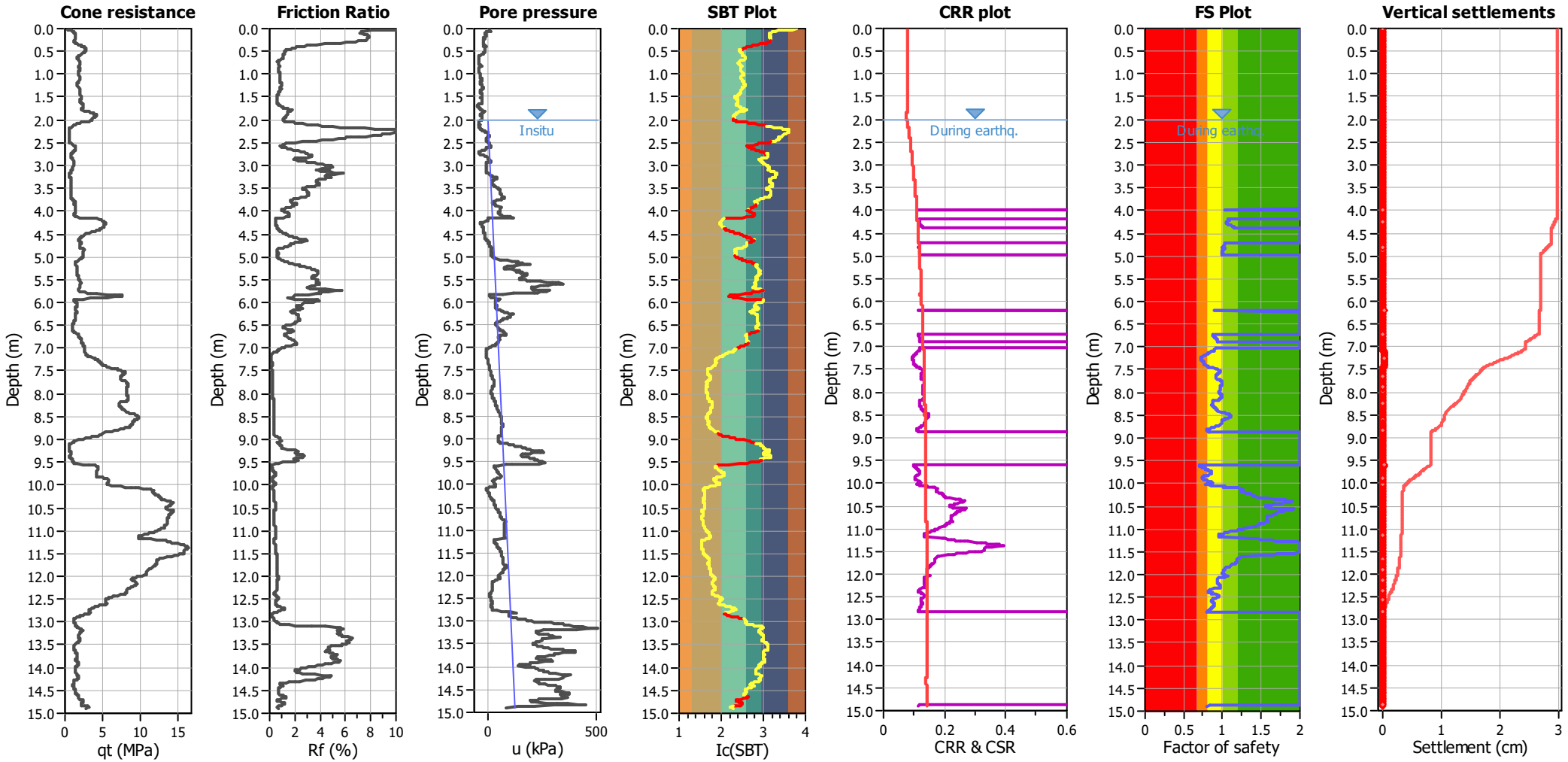
SHEET No.: S2.3 REV. 1

F. Liquefaction Analyses

Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

Project: MINZ200357 - Geotechnical Investigation and Assessment
Location: 2 Glovers Road Subdivision, Halswell, Christchurch

CPT: CPTu001 SLS
Total depth: 14.89 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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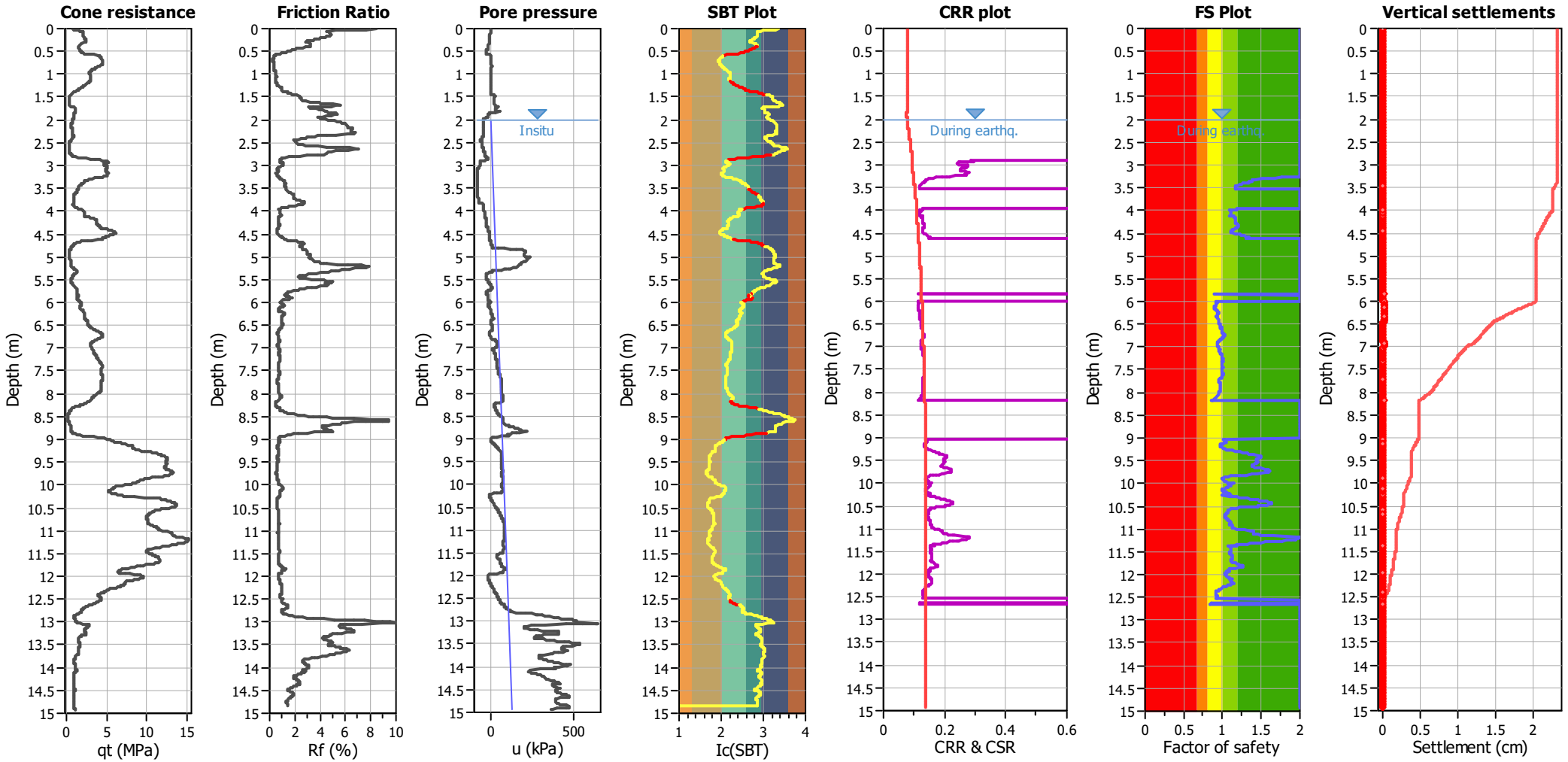
Project: MINZ200357 - Geotechnical Investigation and Assessment
Location: 2 Glovers Road Subdivision, Halswell, Christchurch

CPT: CPTu002 SLS
Total depth: 14.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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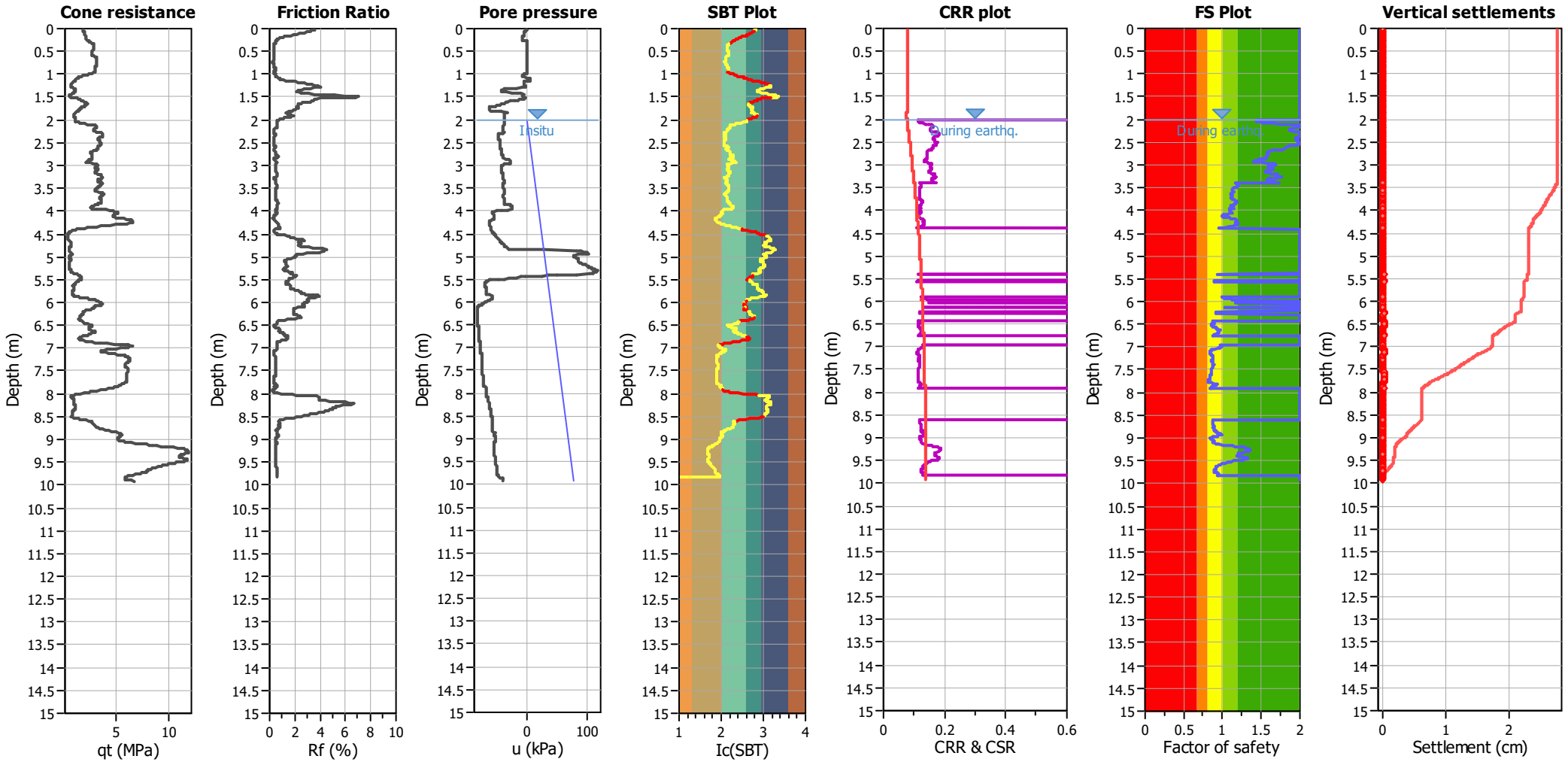
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu003 SLS
Total depth: 9.91 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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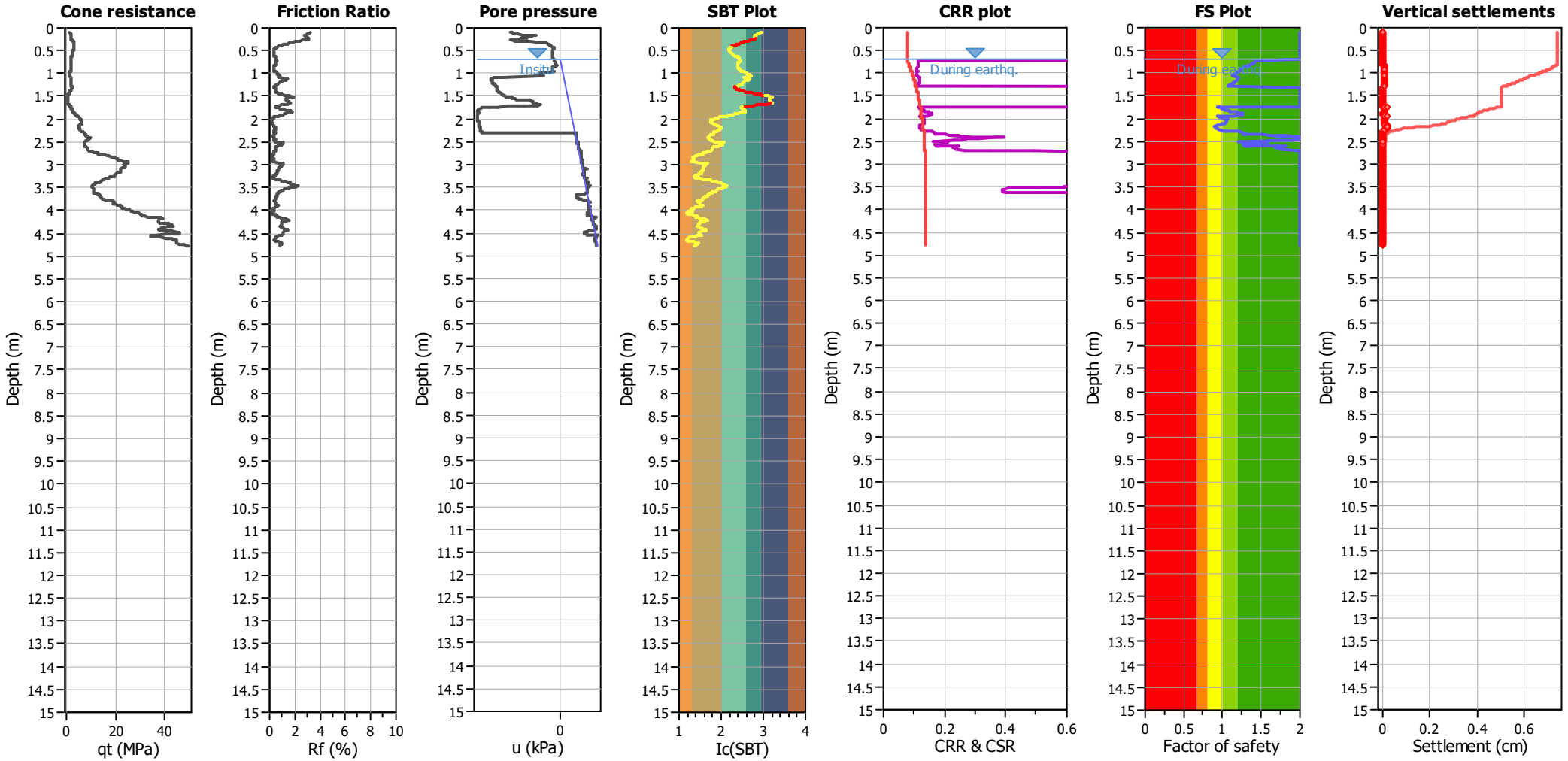
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu004 SLS
Total depth: 4.78 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.70 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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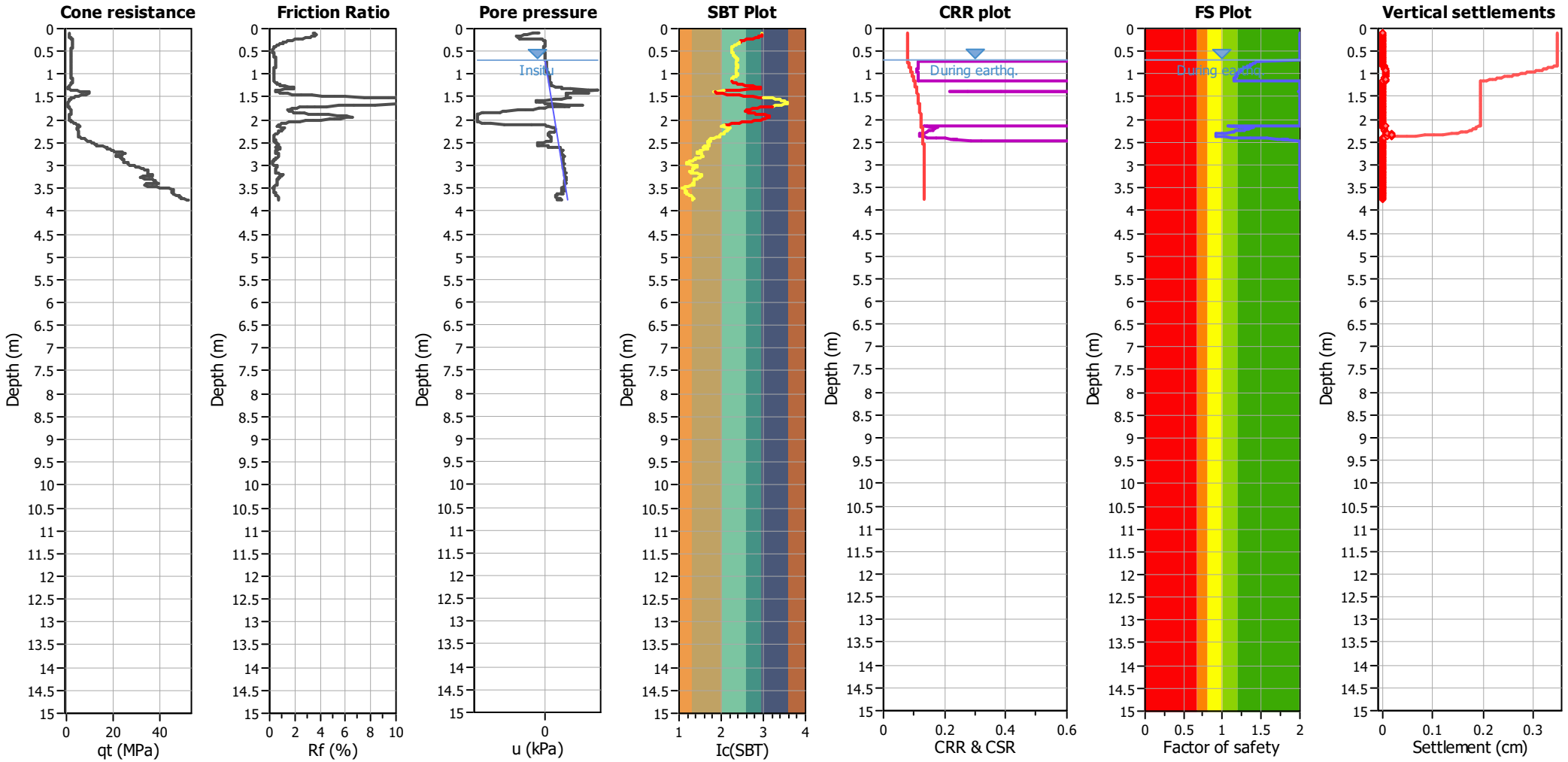
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu005 SLS
Total depth: 3.76 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.70 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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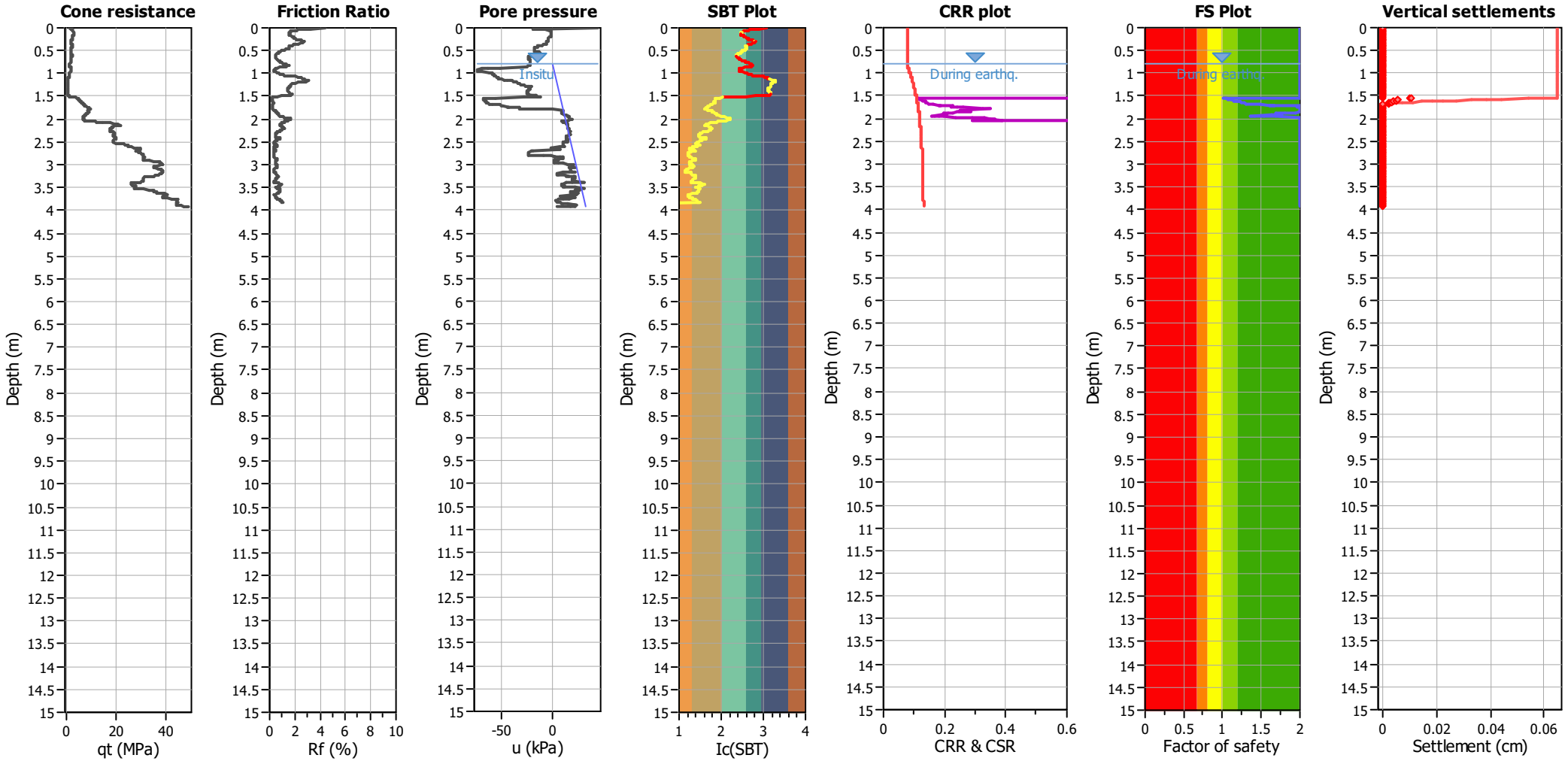
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu006 SLS
Total depth: 3.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.80 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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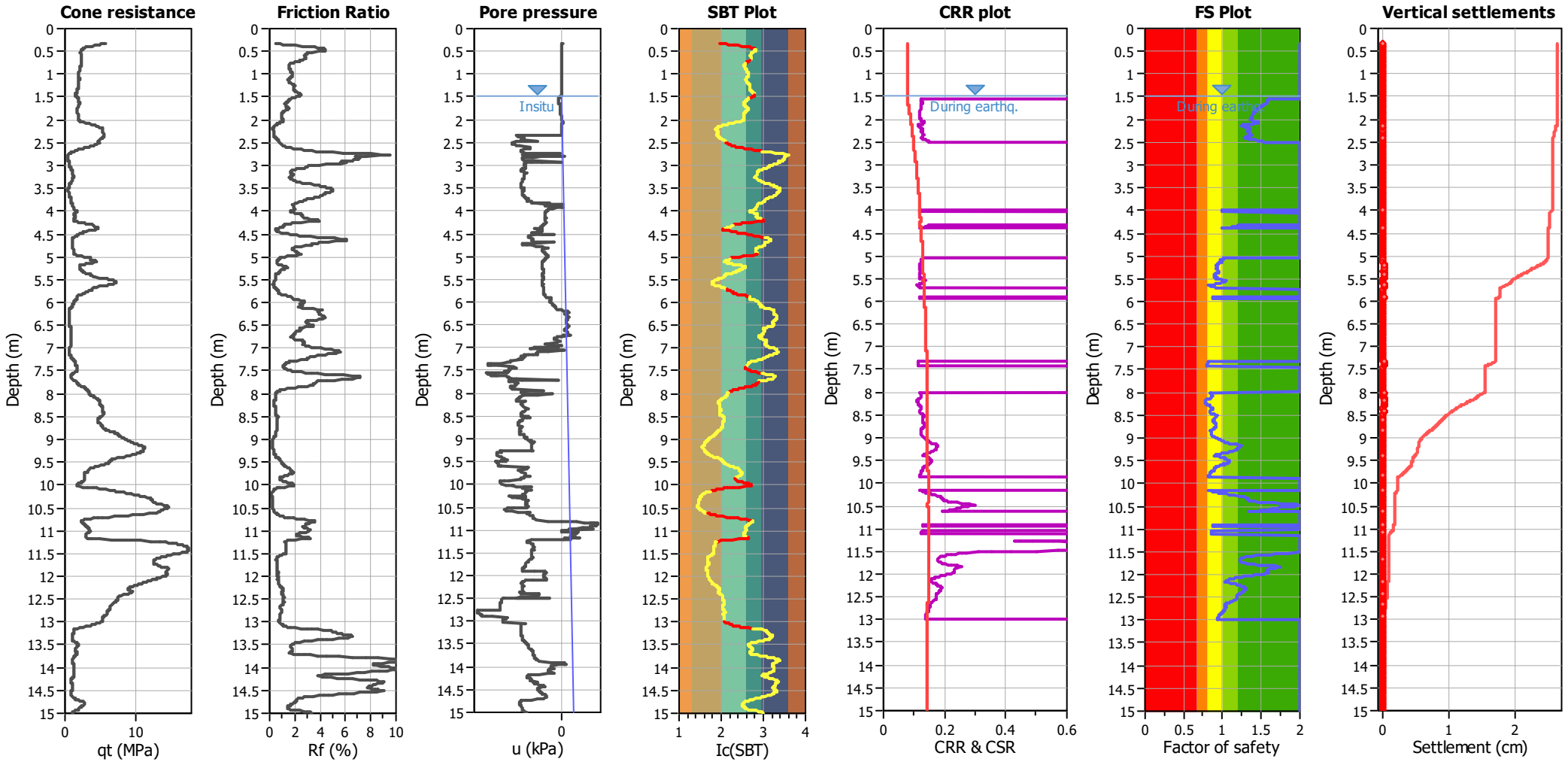
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu007 SLS
Total depth: 15.00 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.50 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.50 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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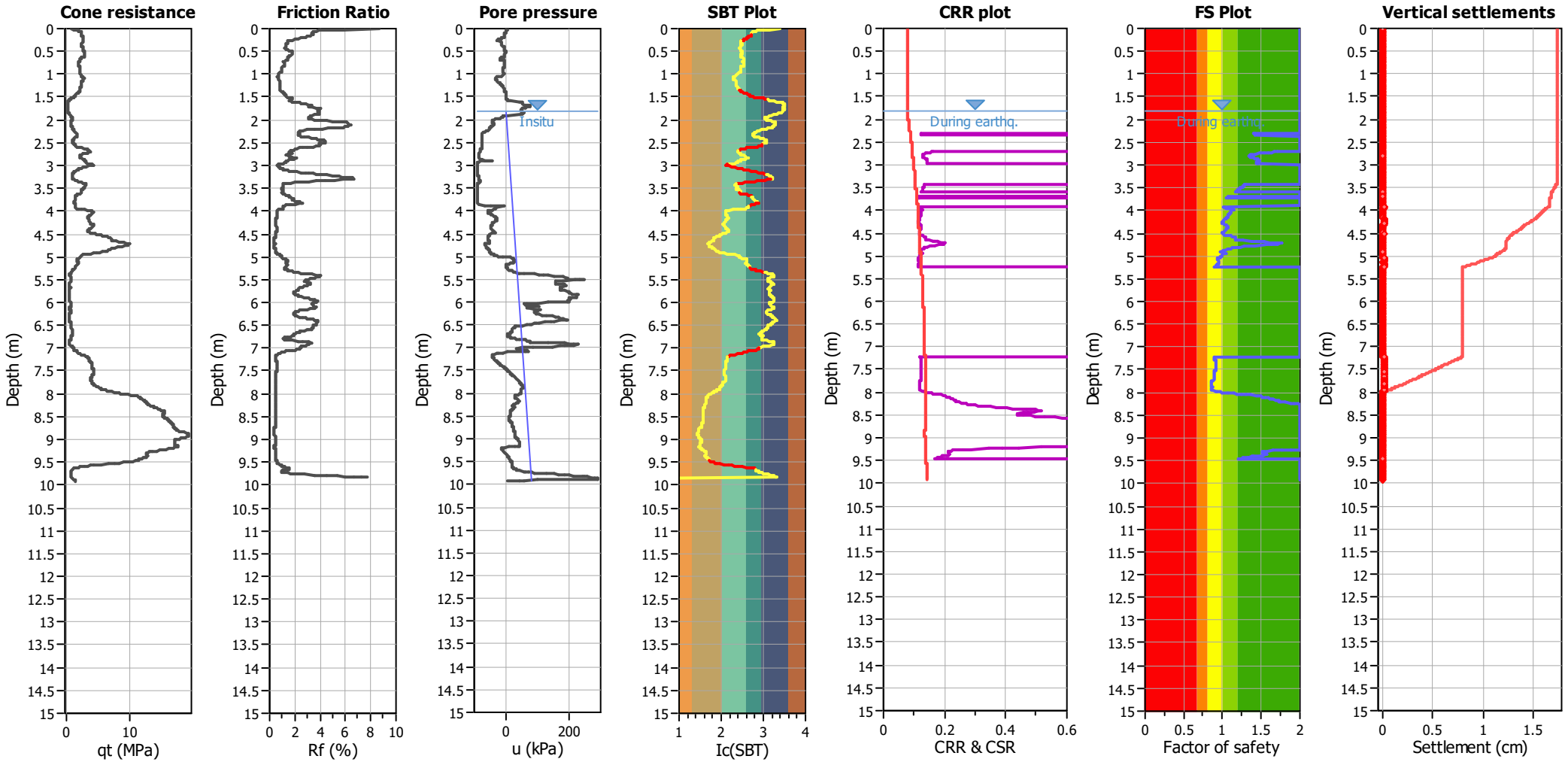
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu008 SLS
Total depth: 9.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.80 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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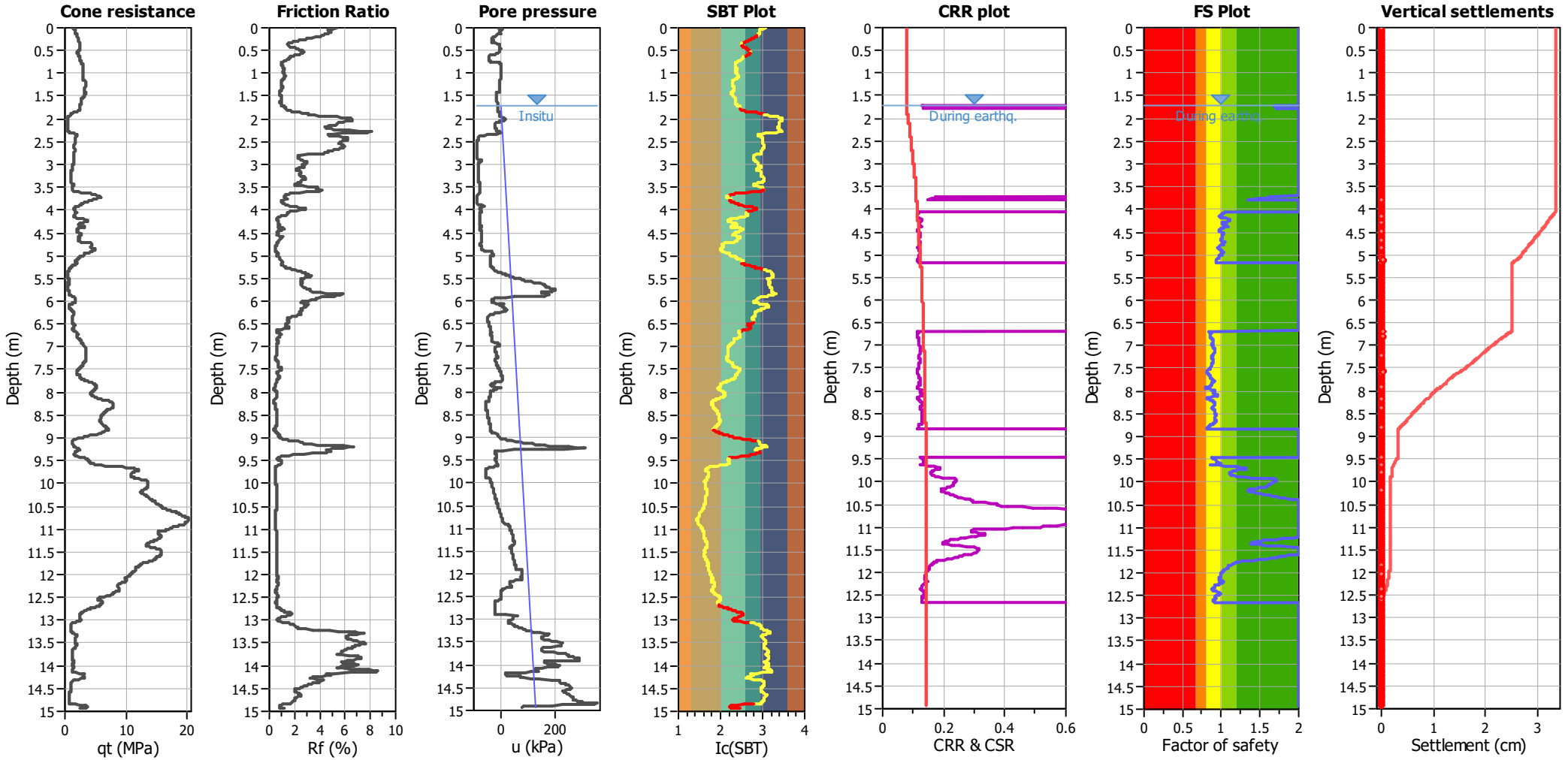
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu009 SLS
Total depth: 14.95 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.70 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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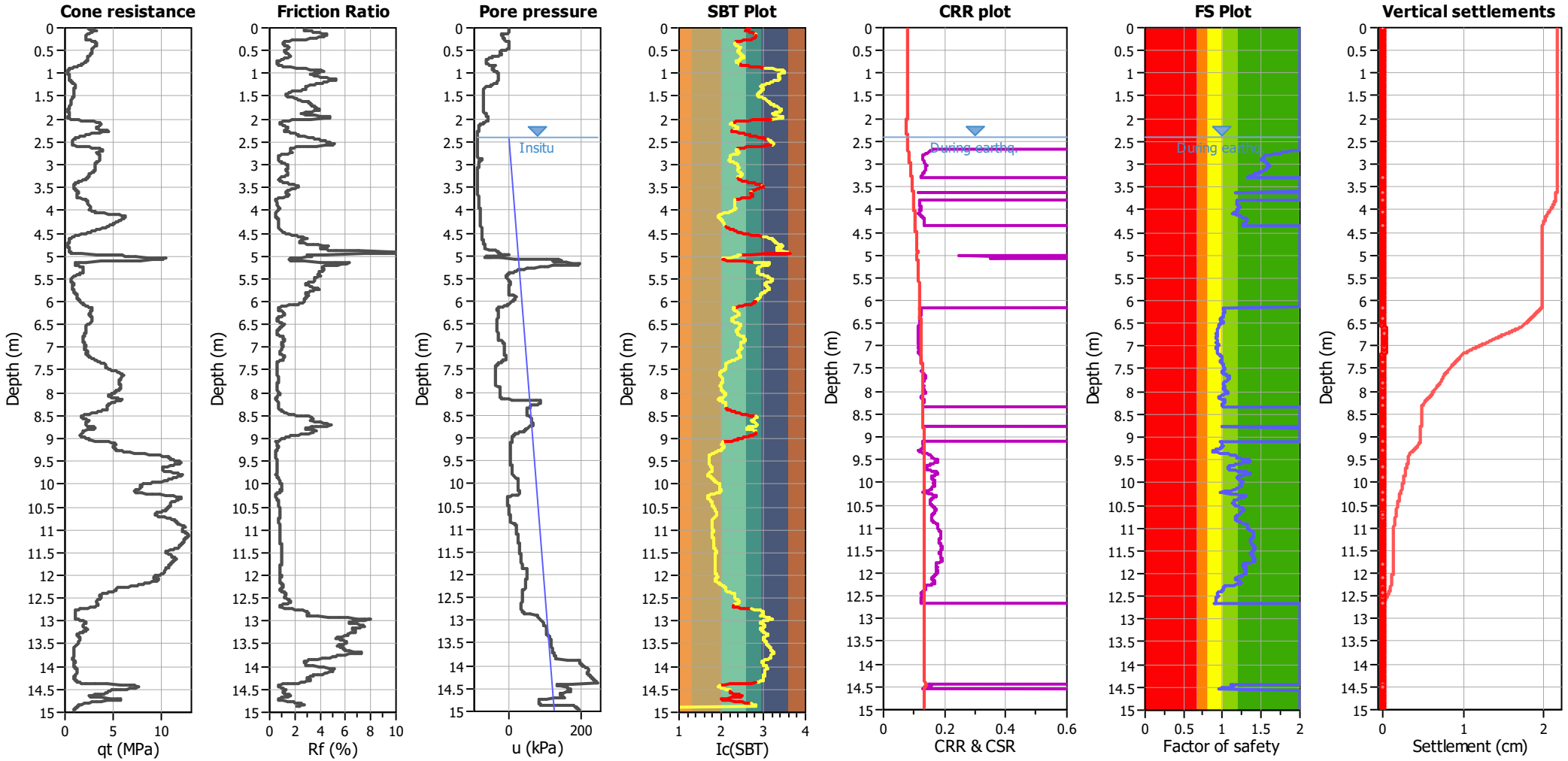
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu010 SLS
Total depth: 14.97 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.40 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.40 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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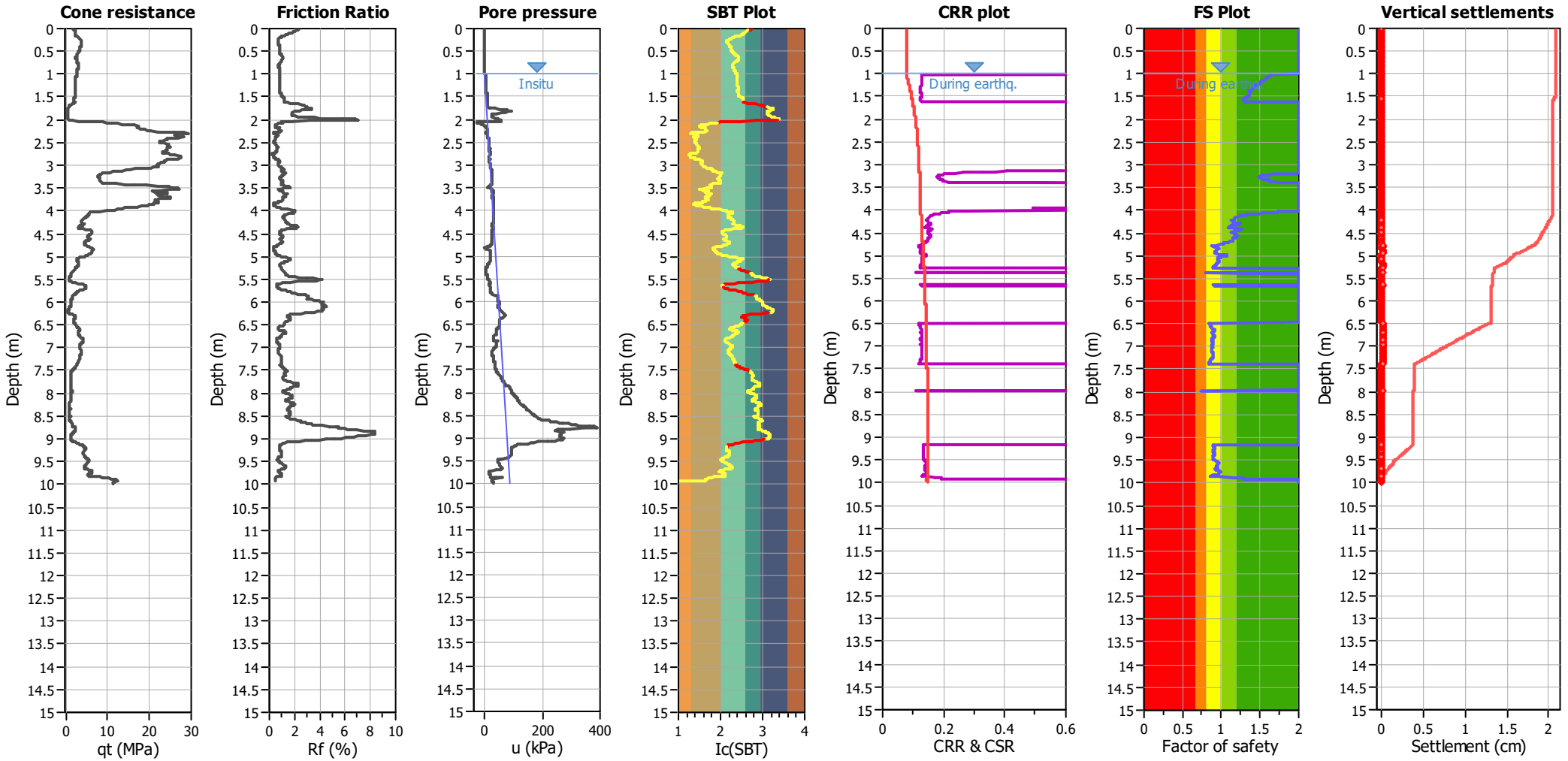
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu011 SLS
Total depth: 9.99 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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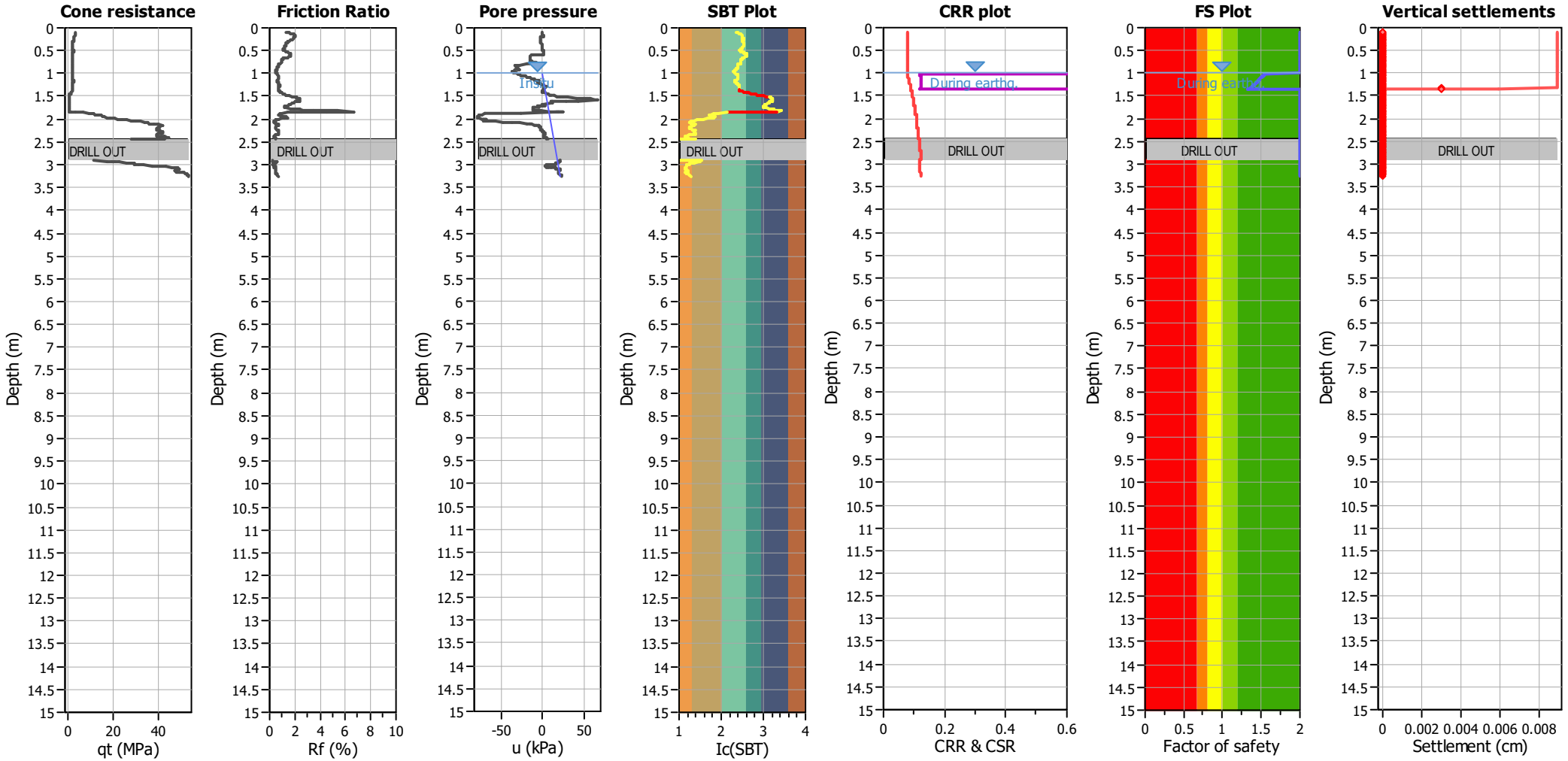
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu012 SLS
Total depth: 3.25 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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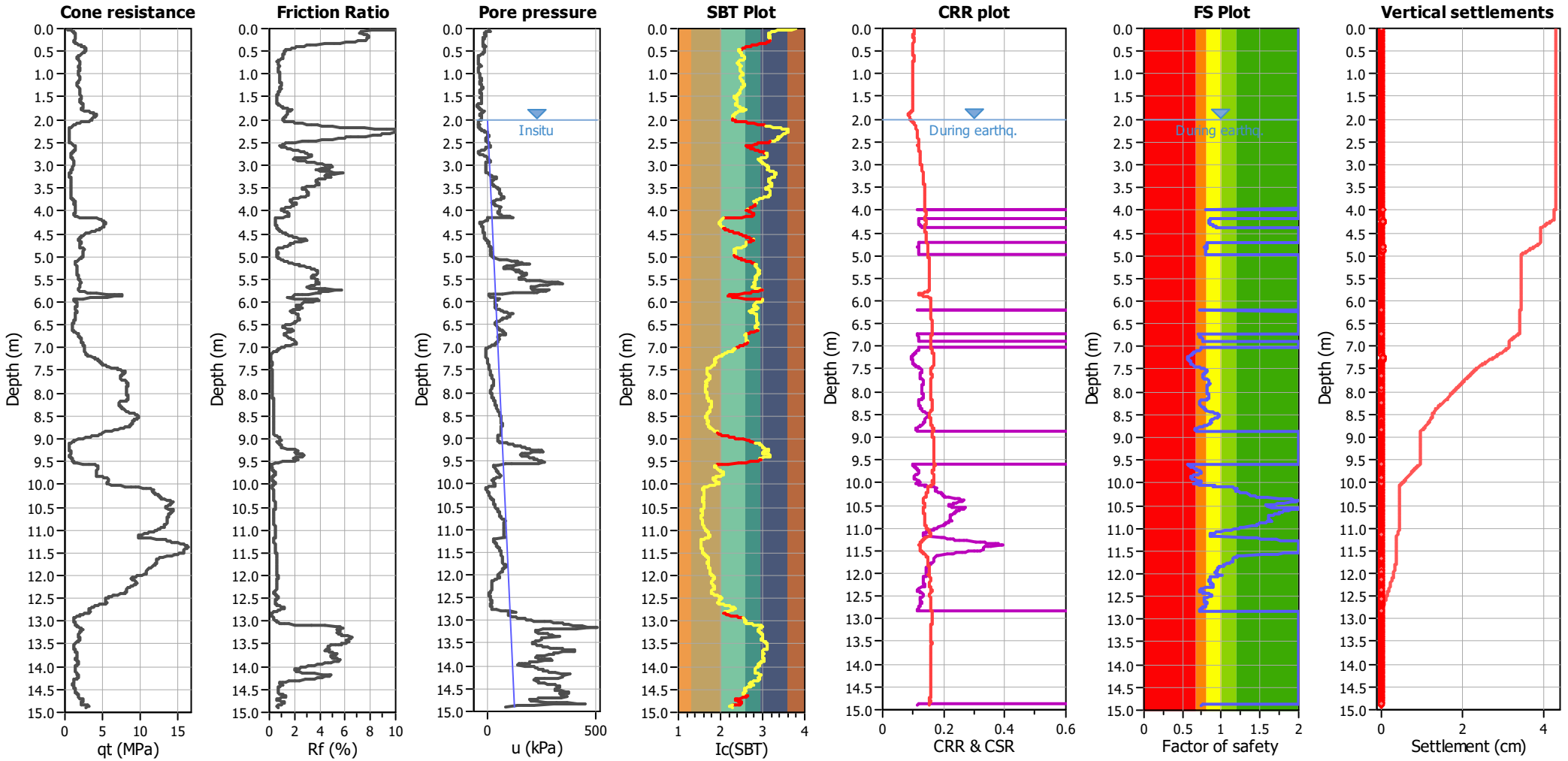
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu001 SLS2
Total depth: 14.89 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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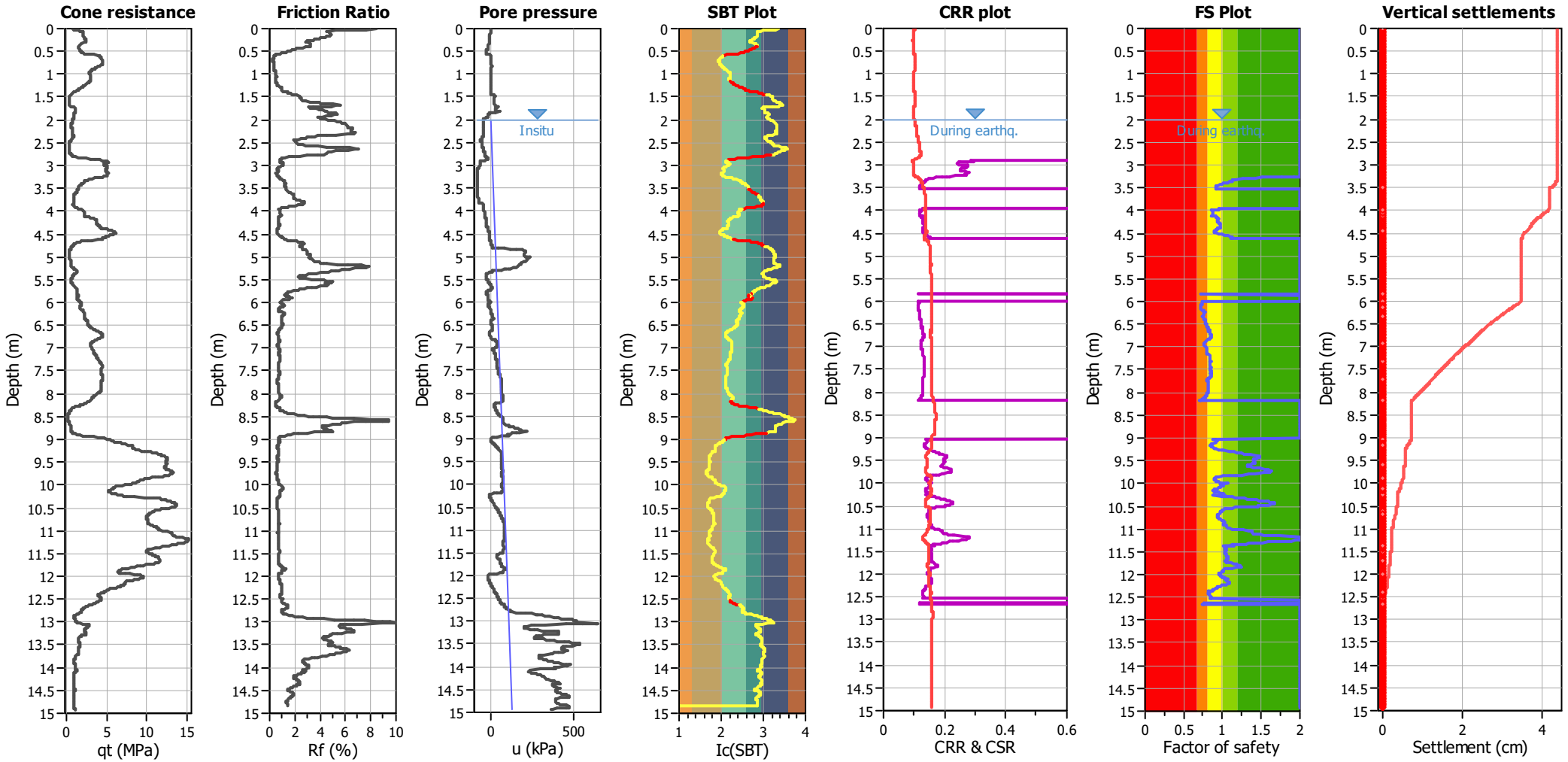
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu002 SLS2
Total depth: 14.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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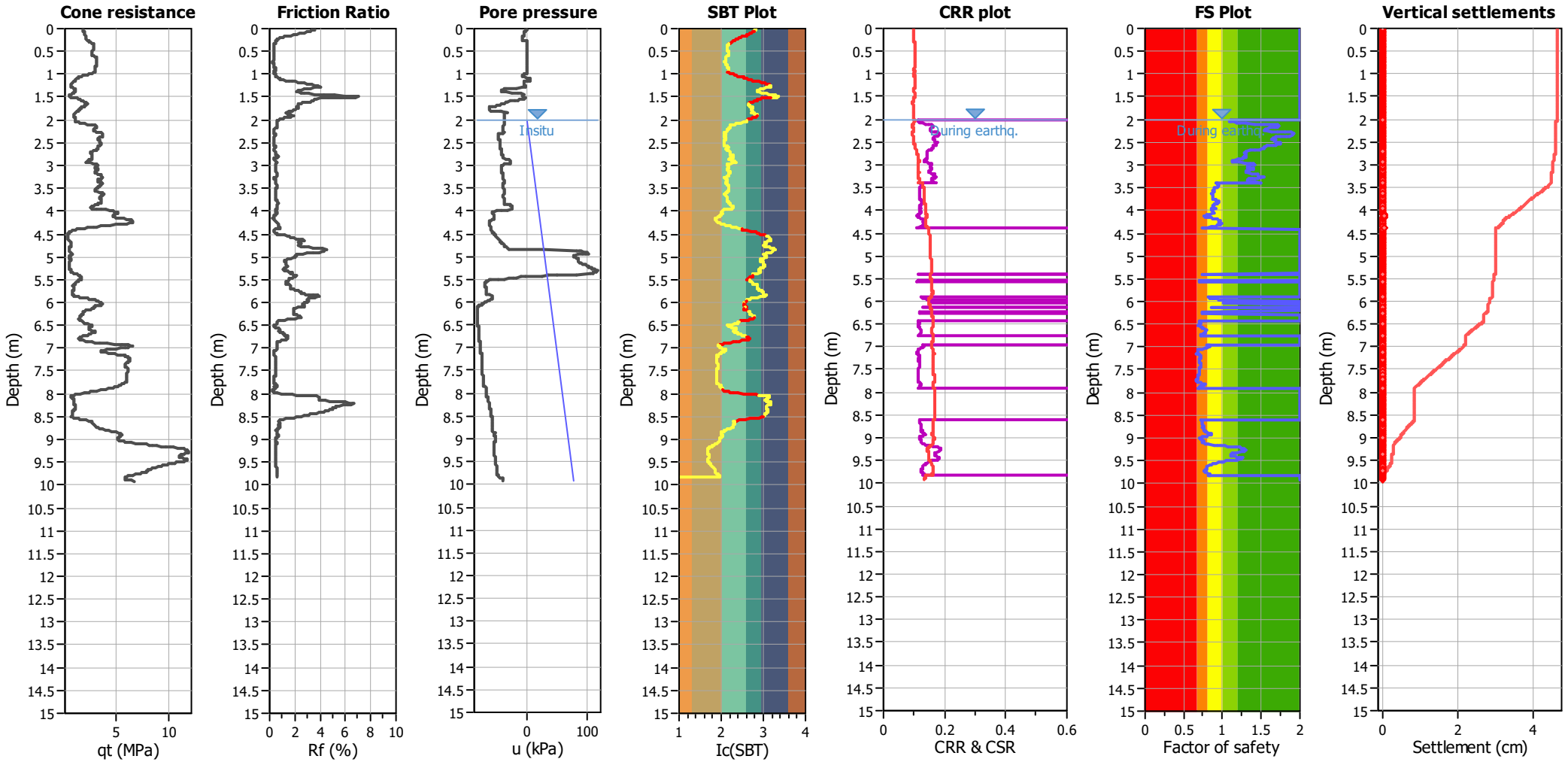
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu003 SLS2
Total depth: 9.91 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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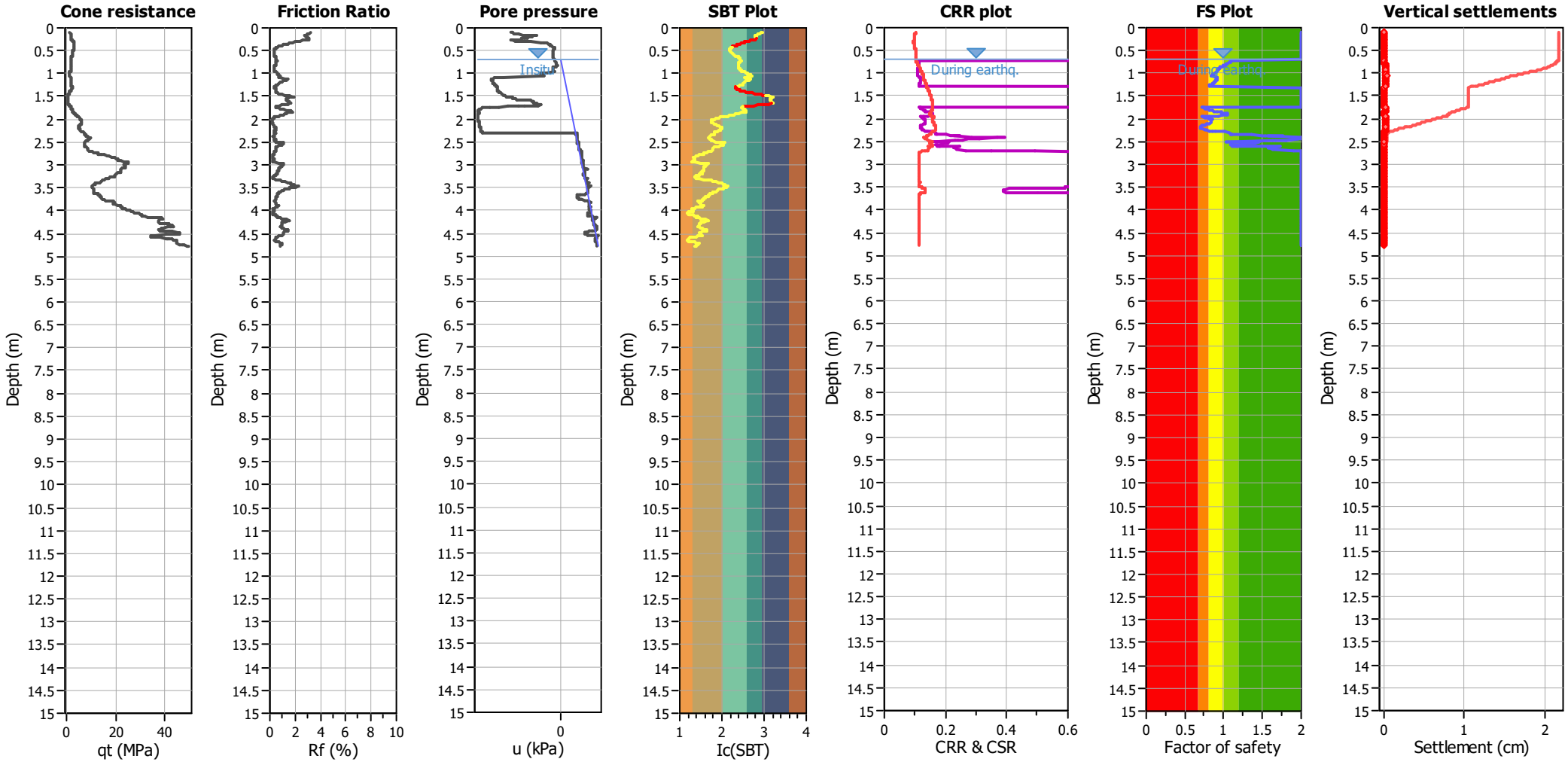
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu004 SLS2
Total depth: 4.78 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.70 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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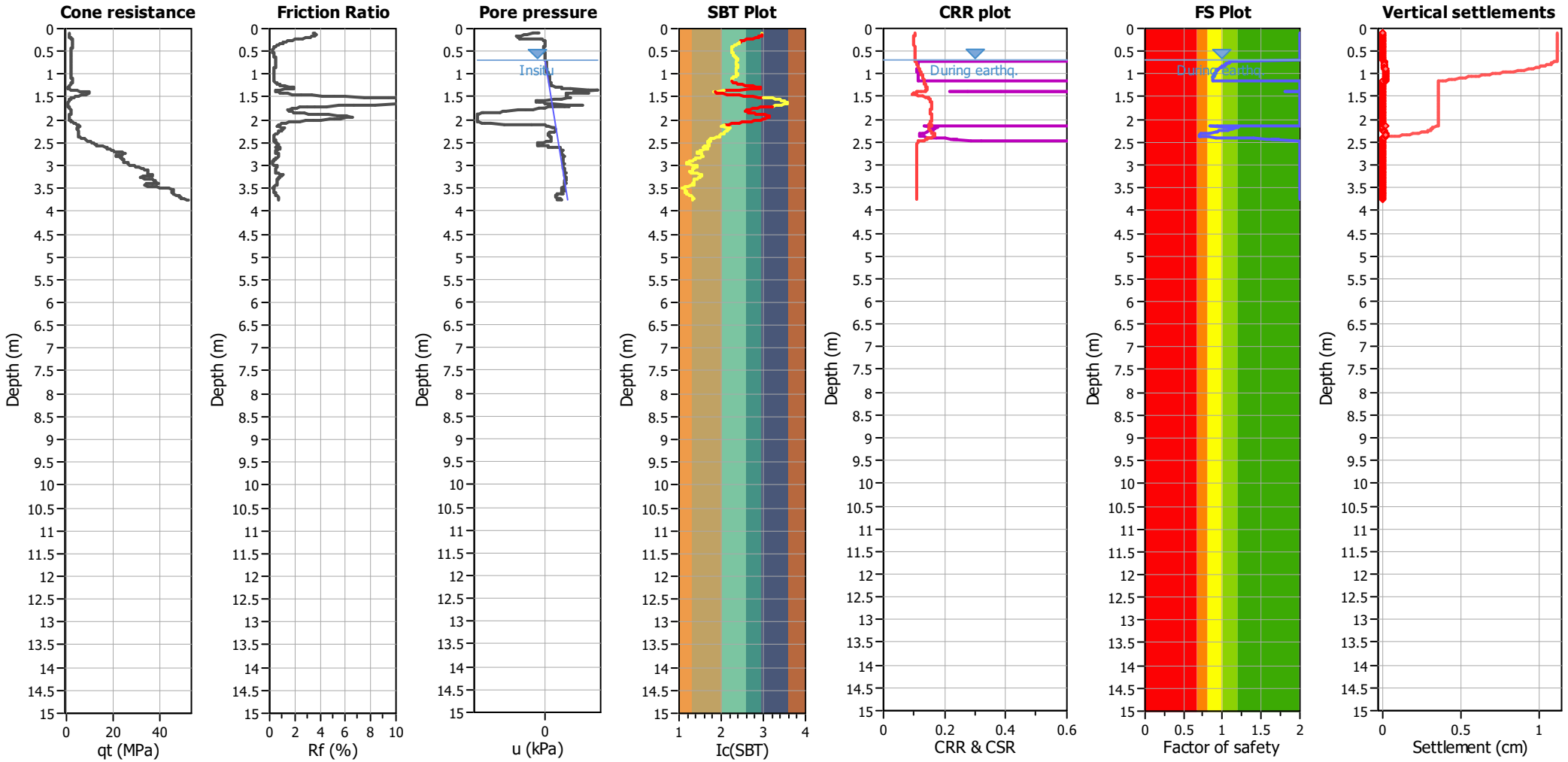
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu005 SLS2
Total depth: 3.76 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.70 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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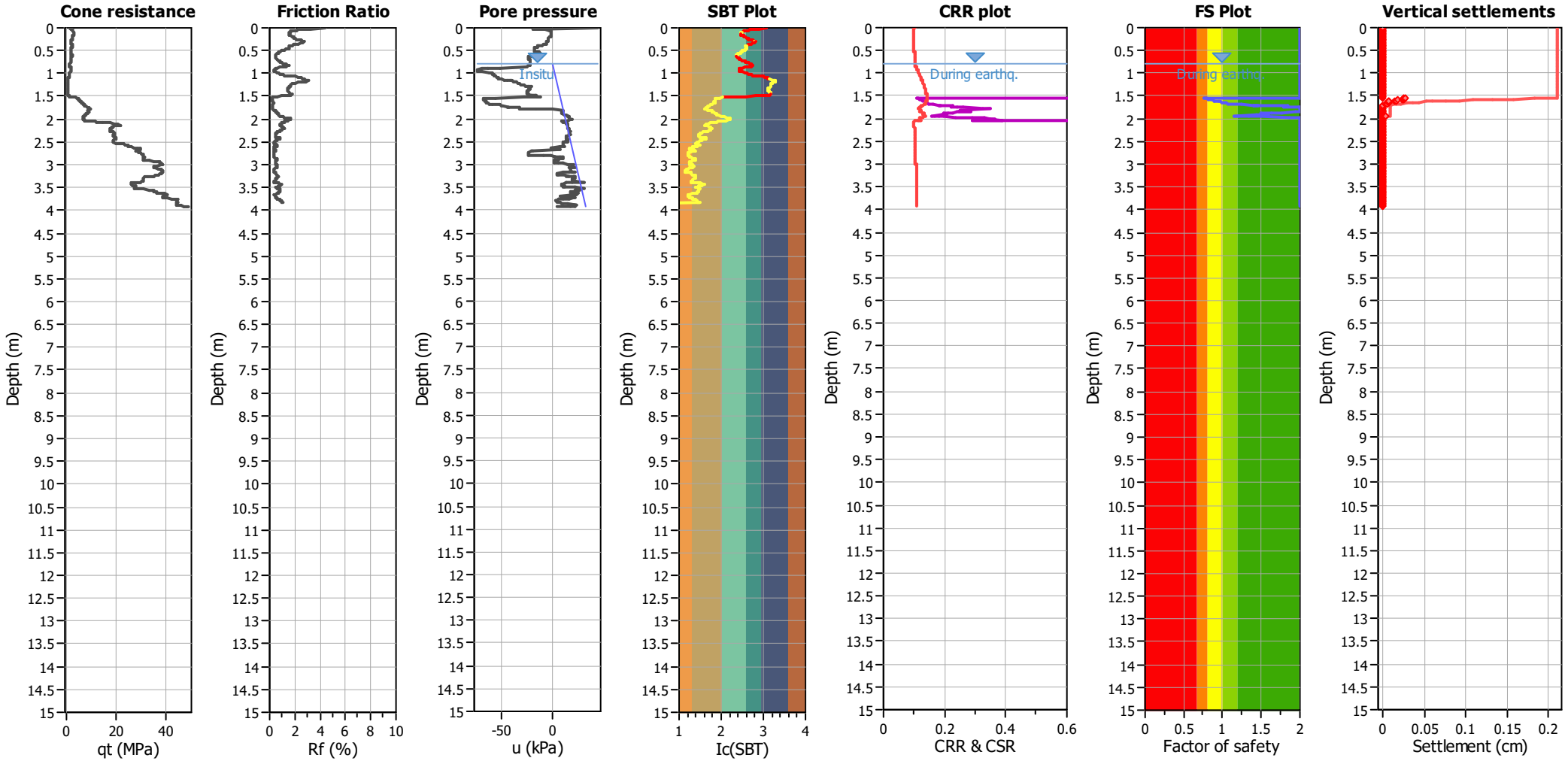
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu006 SLS2
Total depth: 3.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.80 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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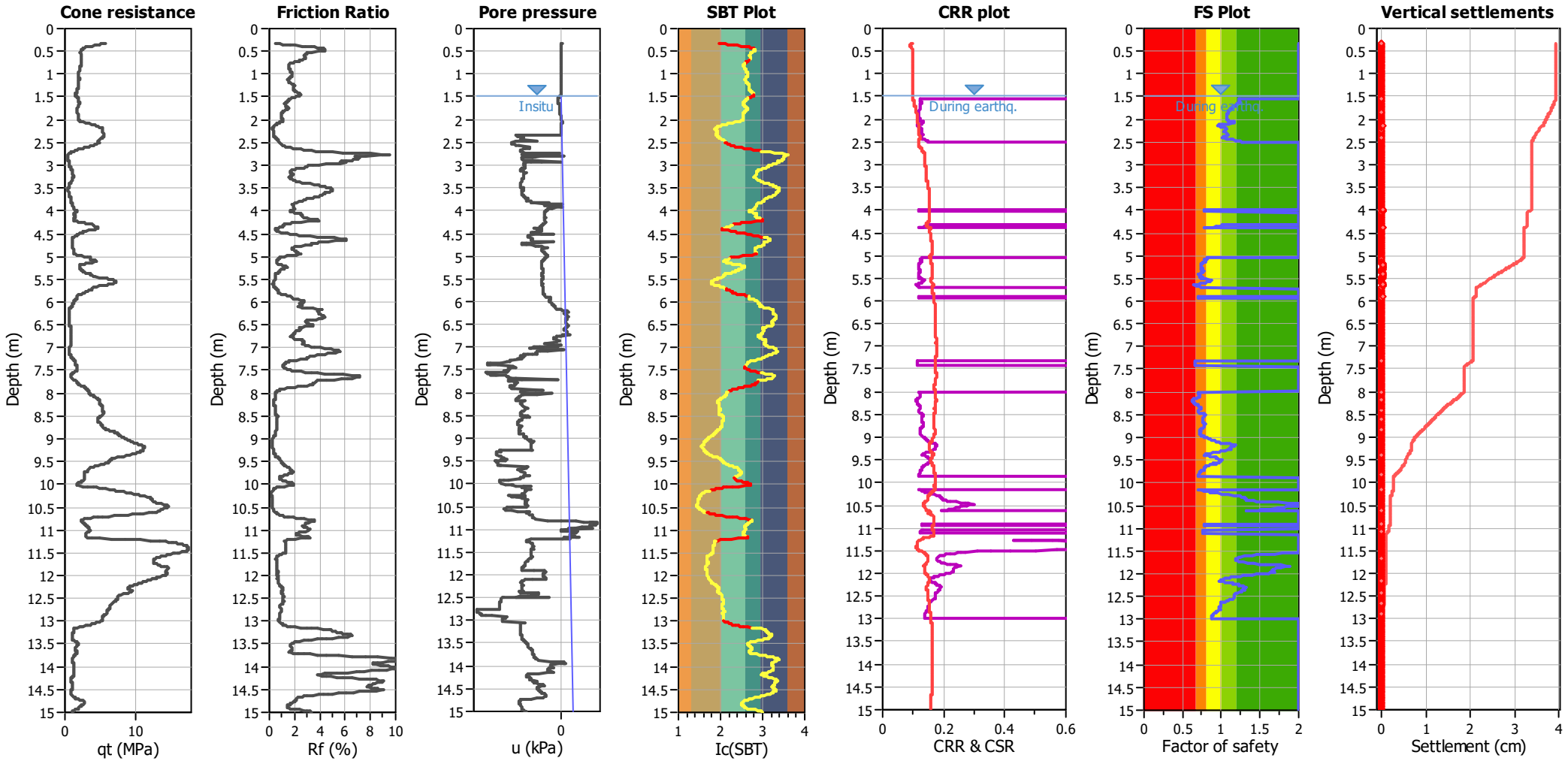
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu007 SLS2
Total depth: 15.00 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.50 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.50 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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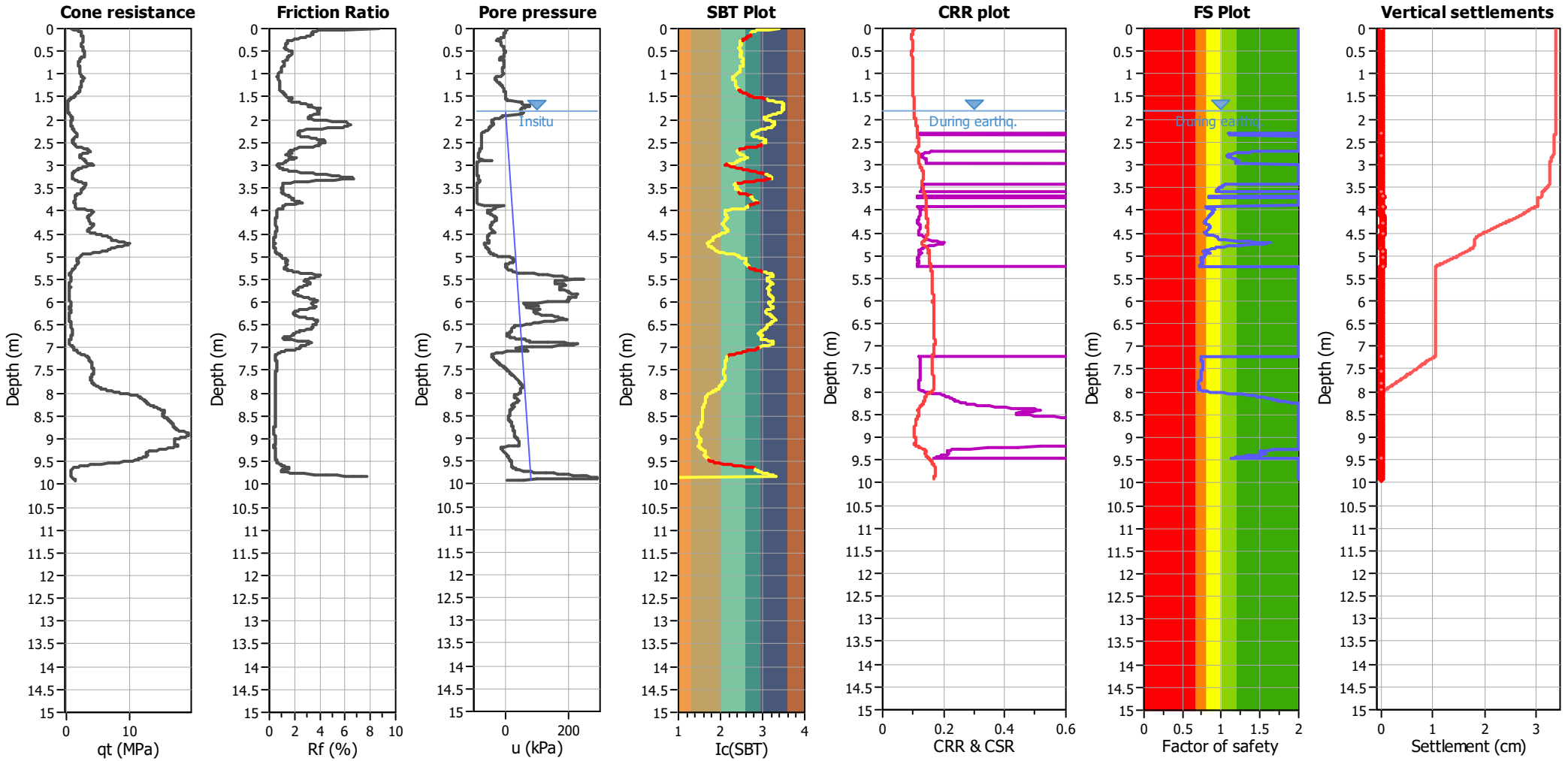
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu008 SLS
Total depth: 9.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.80 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.80 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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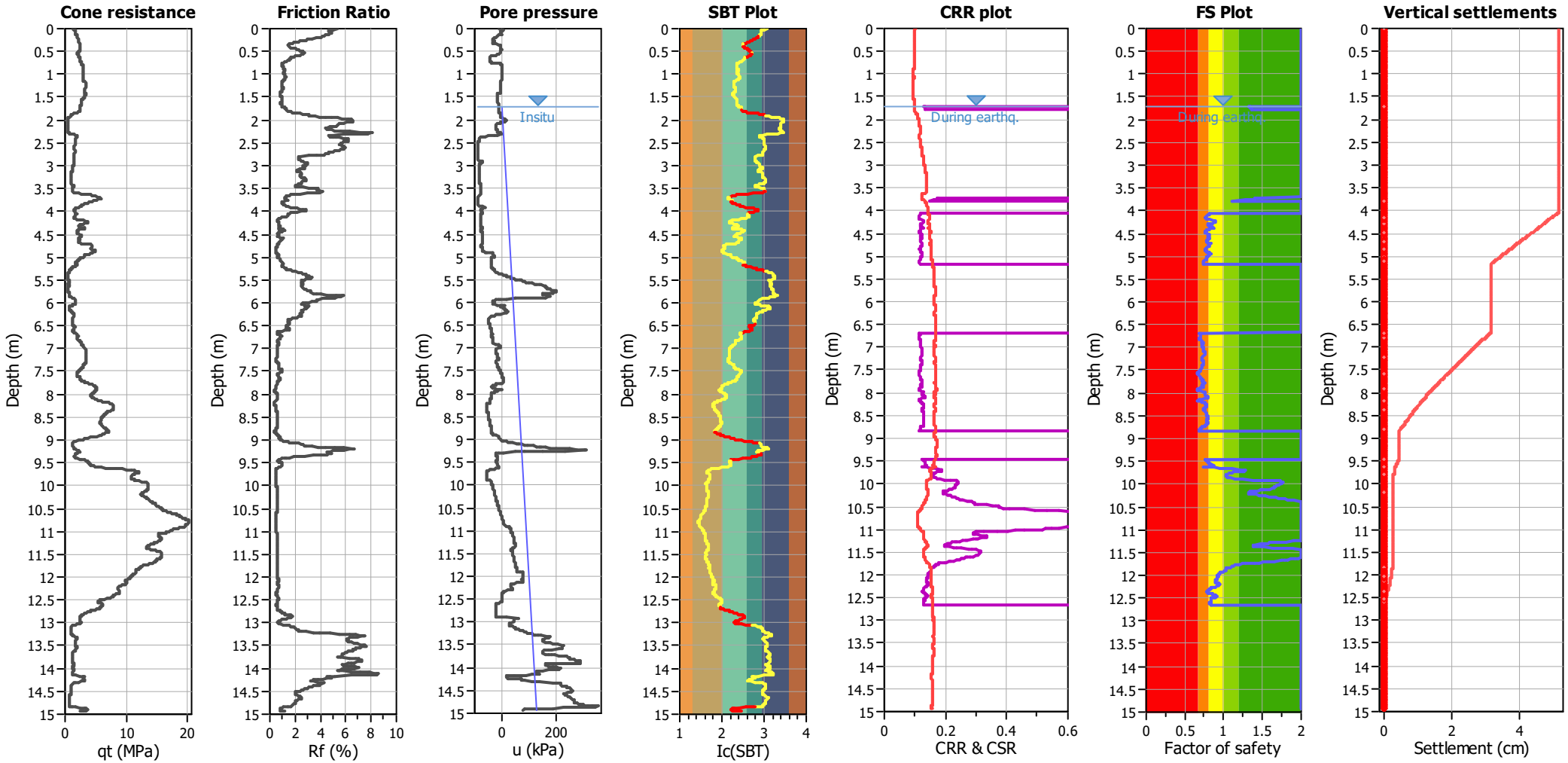
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu009 SLS2
Total depth: 14.95 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.70 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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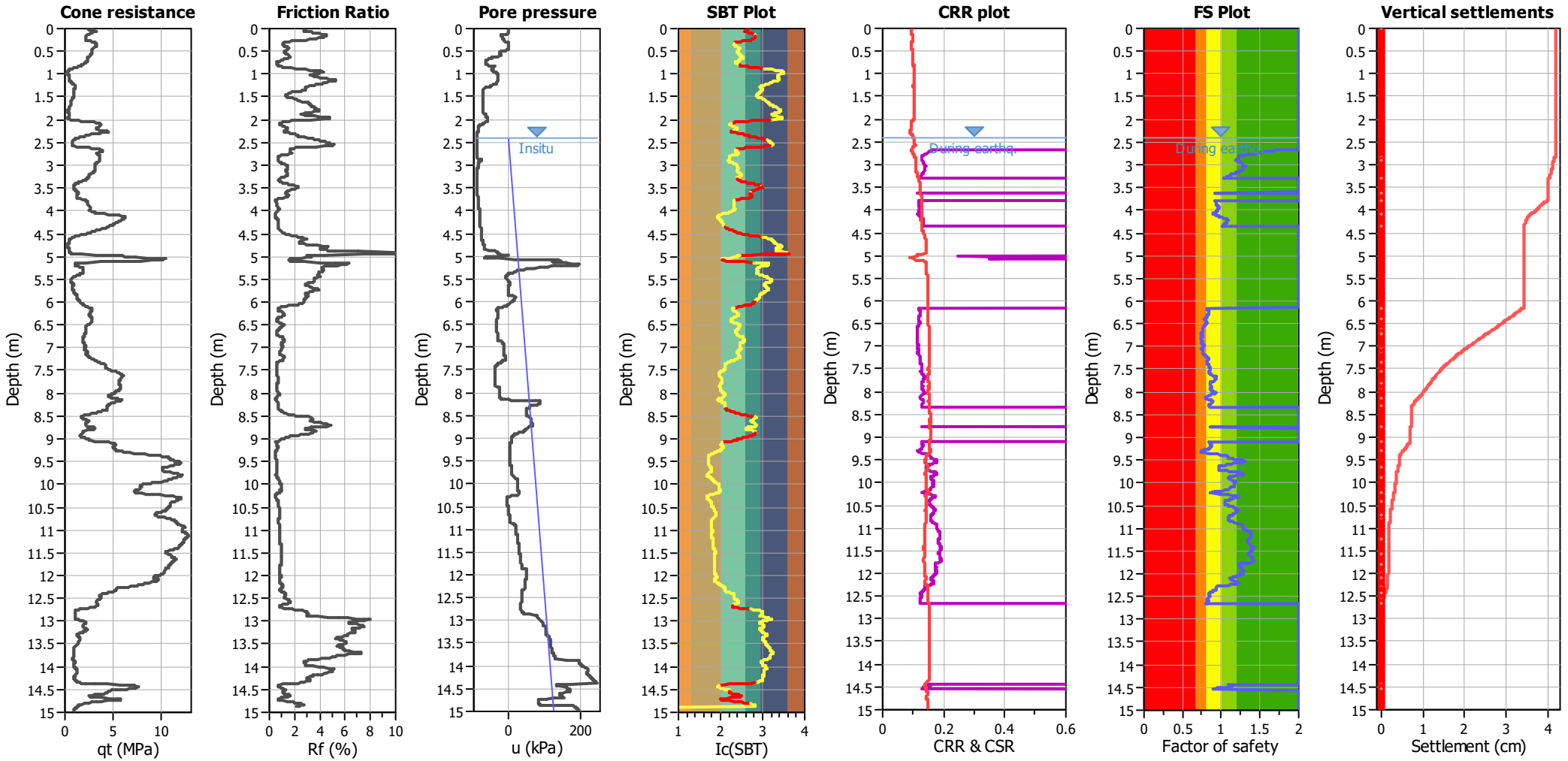
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu010 SLS2
Total depth: 14.97 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.40 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.40 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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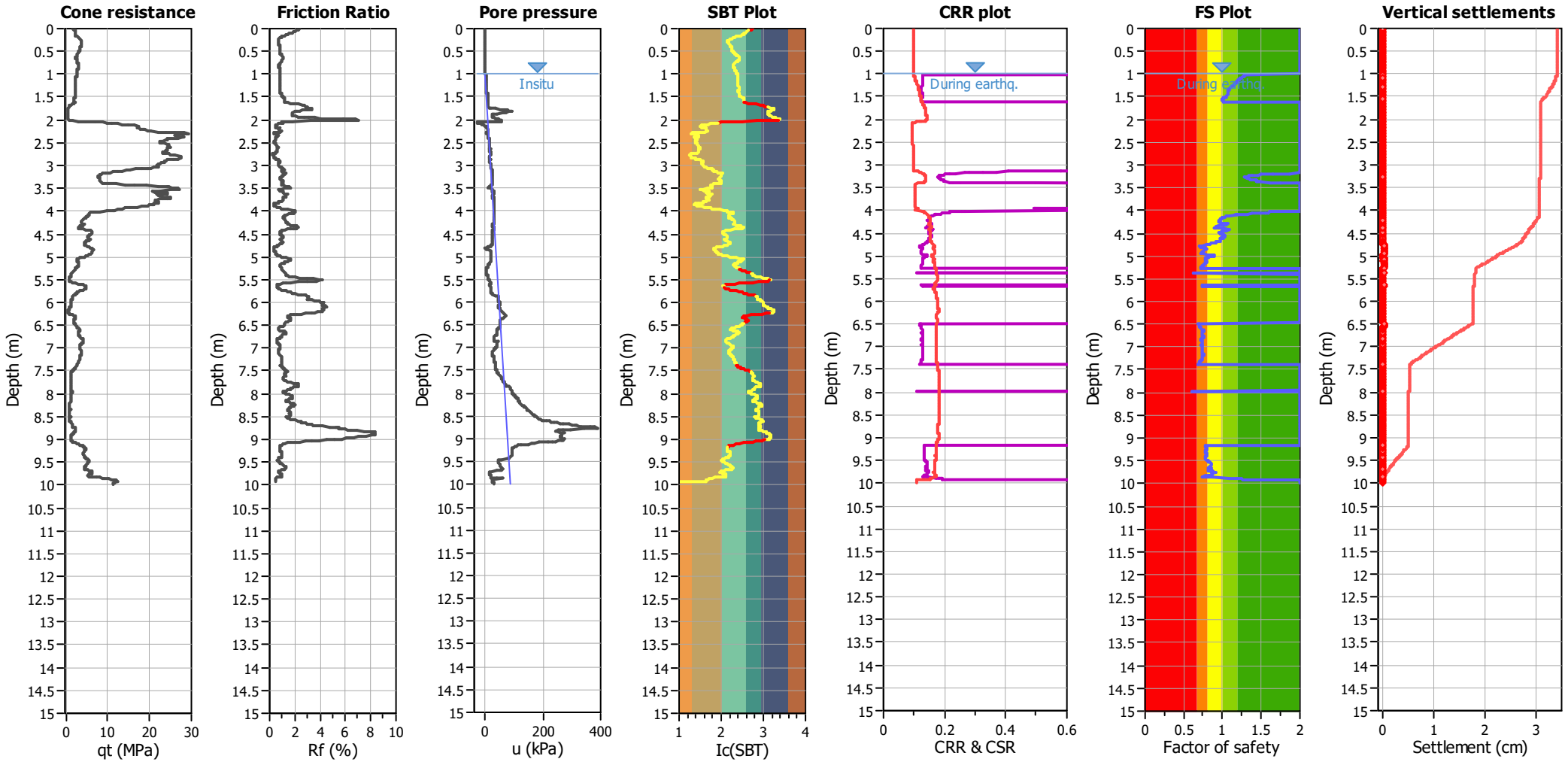
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu011 SLS2
Total depth: 9.99 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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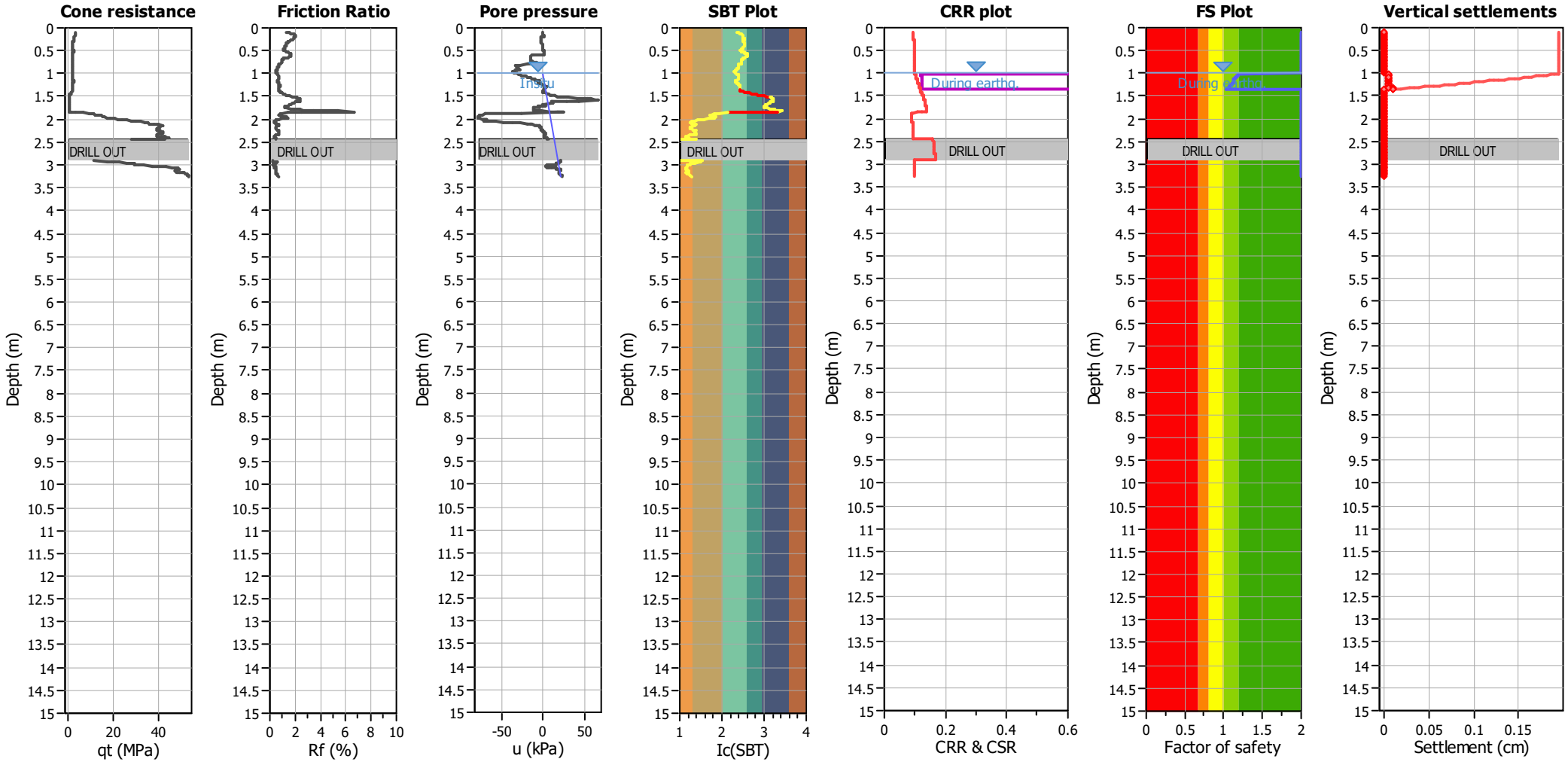
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu012 SLS2
Total depth: 3.25 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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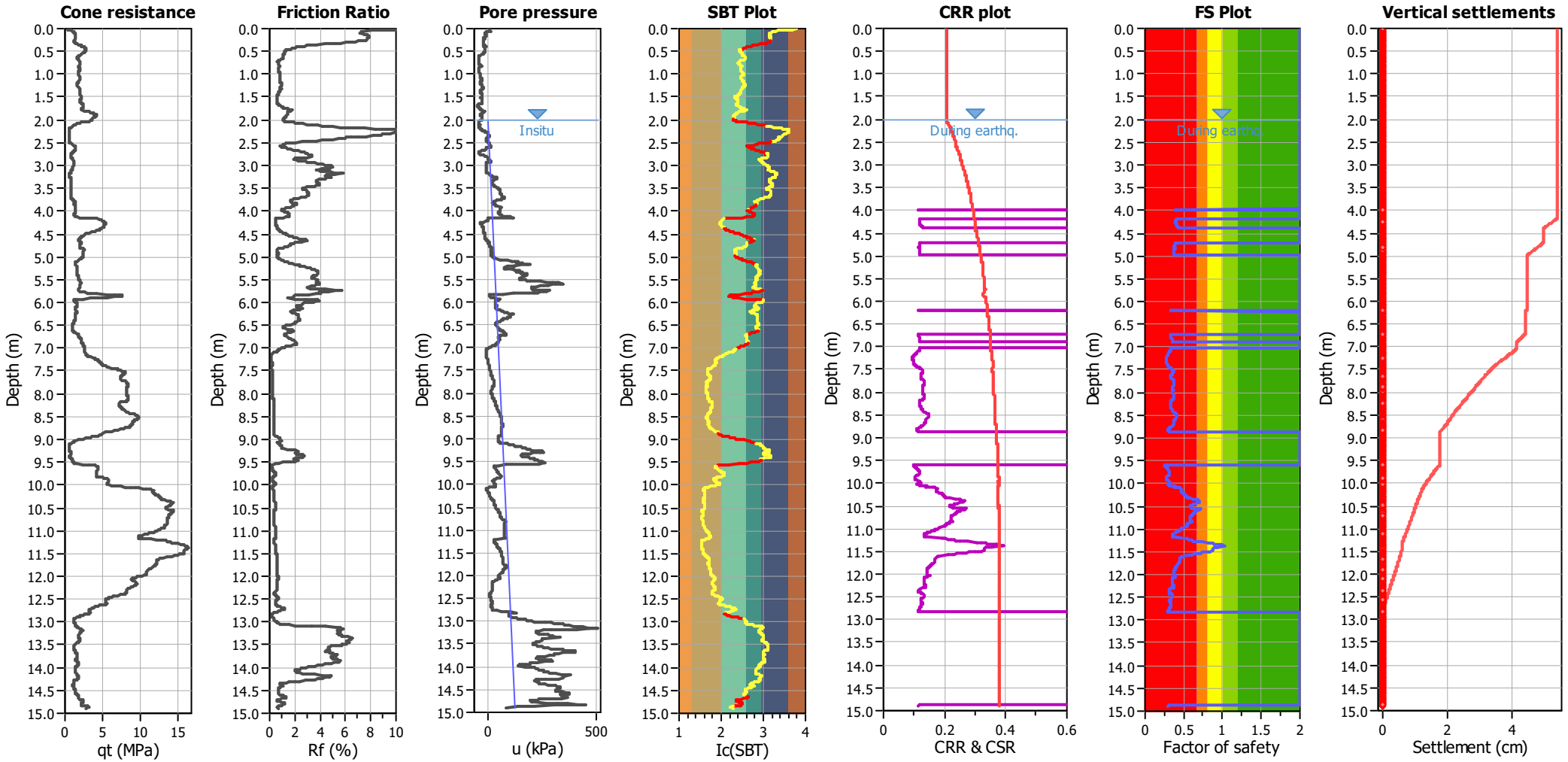
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu001 ULS
Total depth: 14.89 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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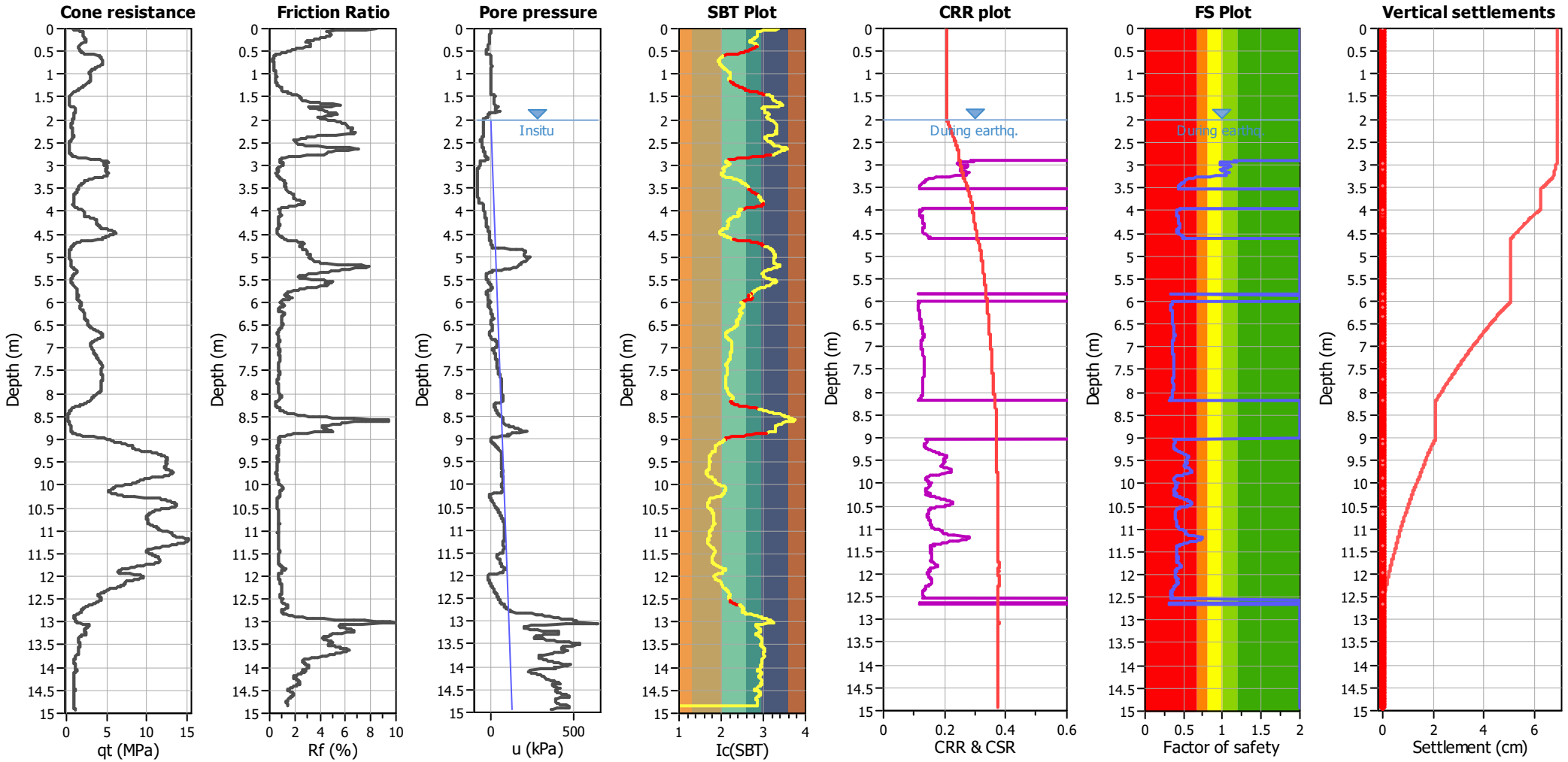
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu002 ULS
Total depth: 14.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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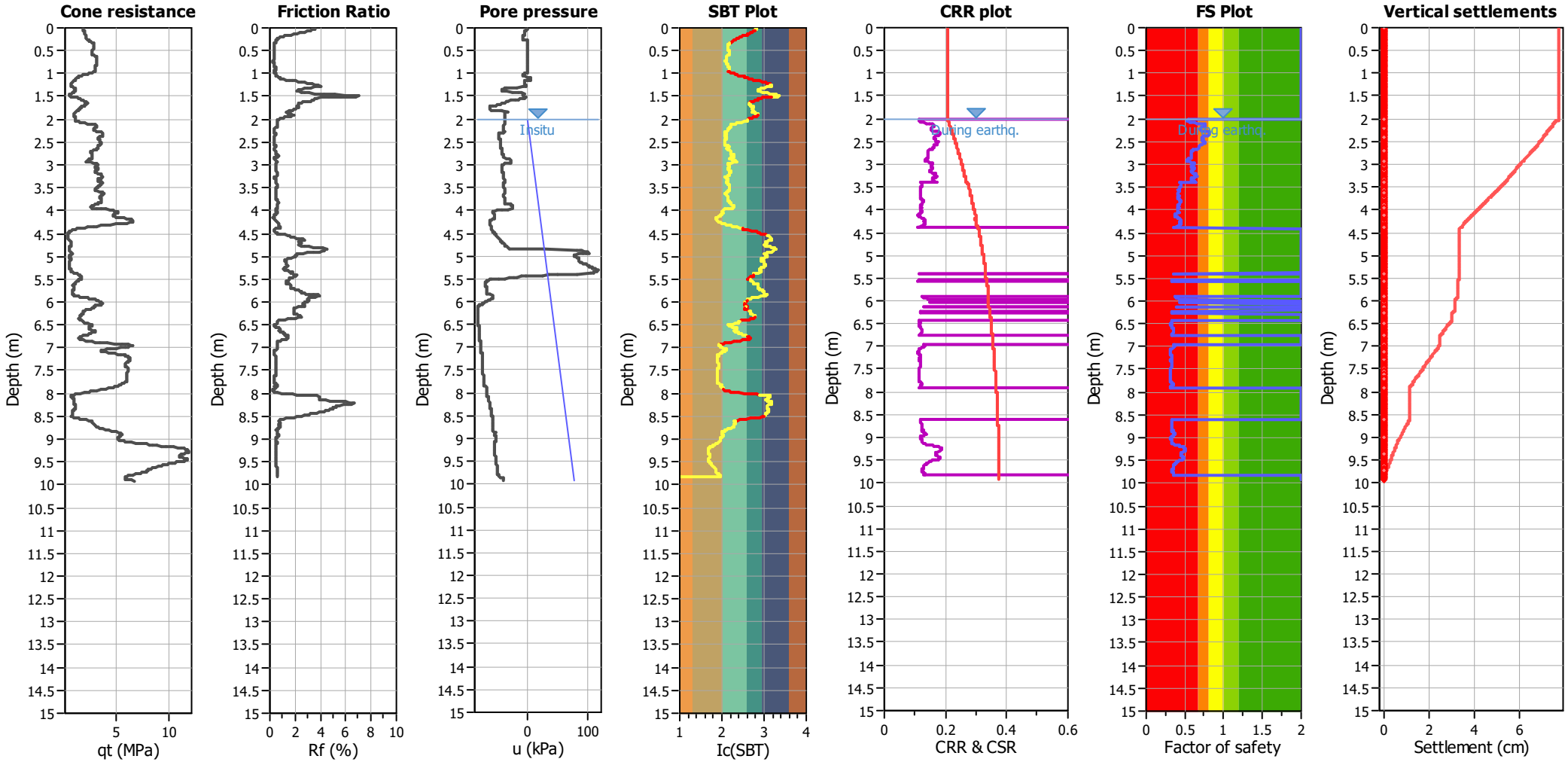
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu003 ULS
Total depth: 9.91 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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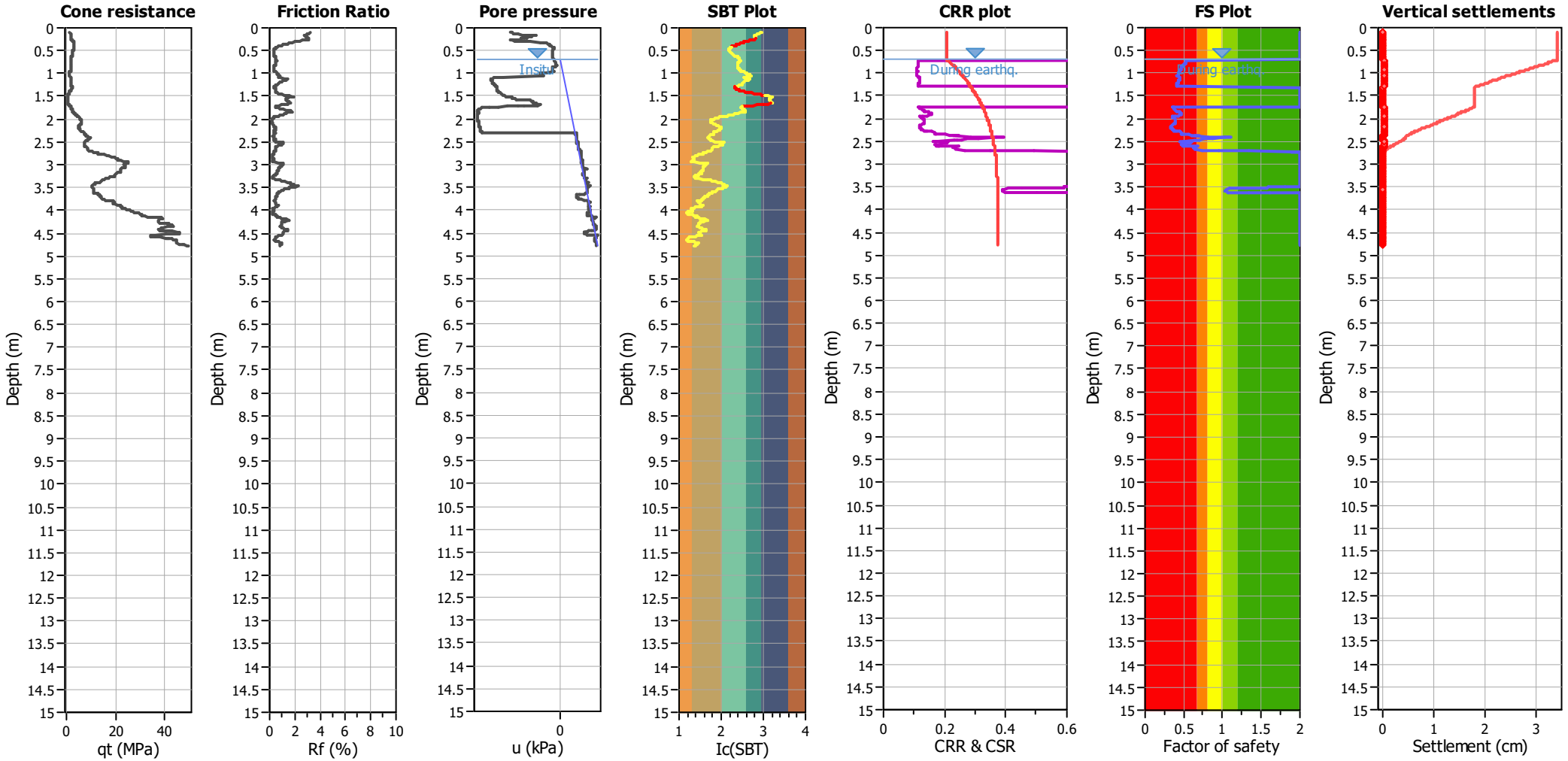
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu004 ULS
Total depth: 4.78 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.70 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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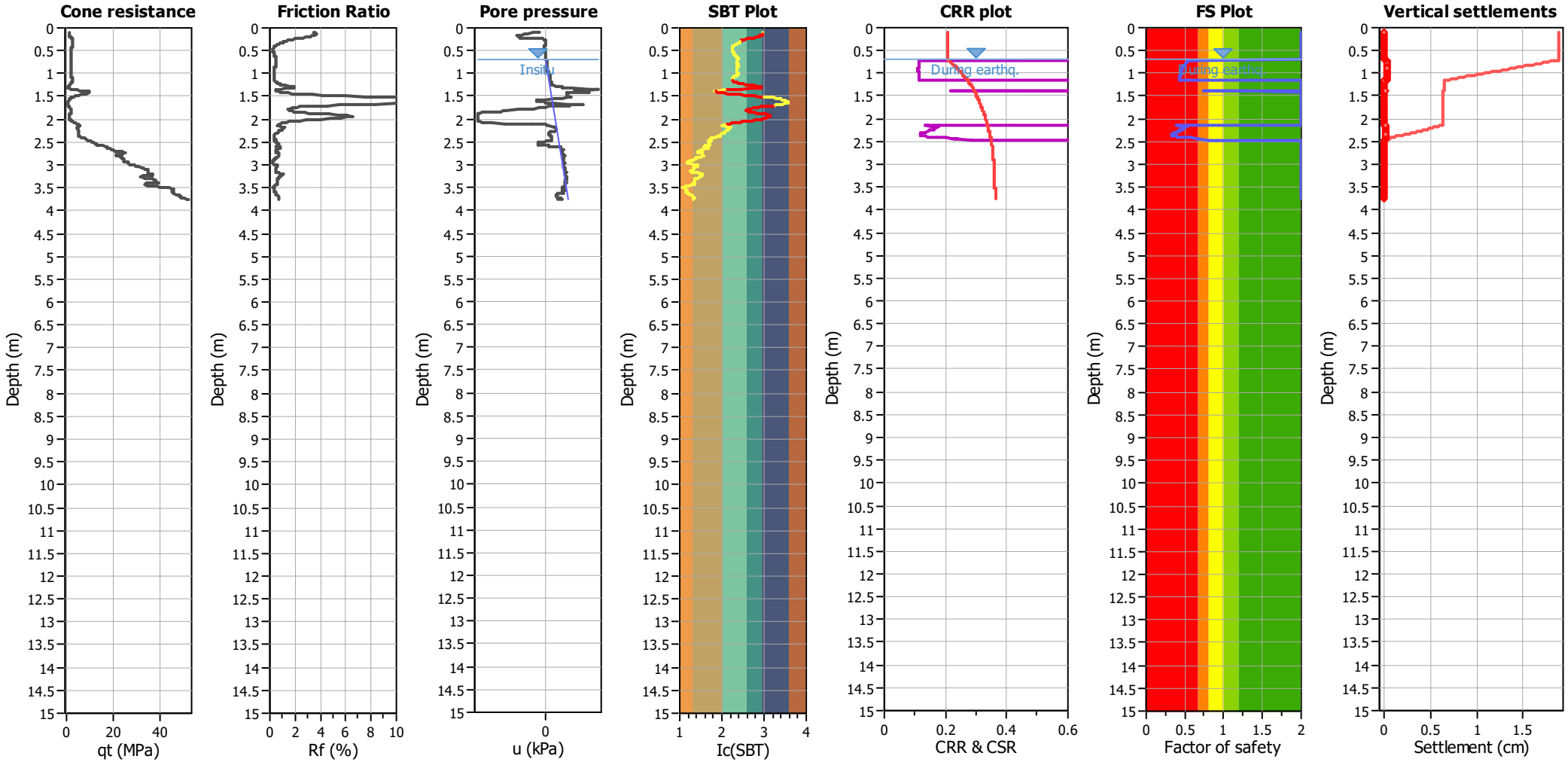
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu005 ULS
Total depth: 3.76 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.70 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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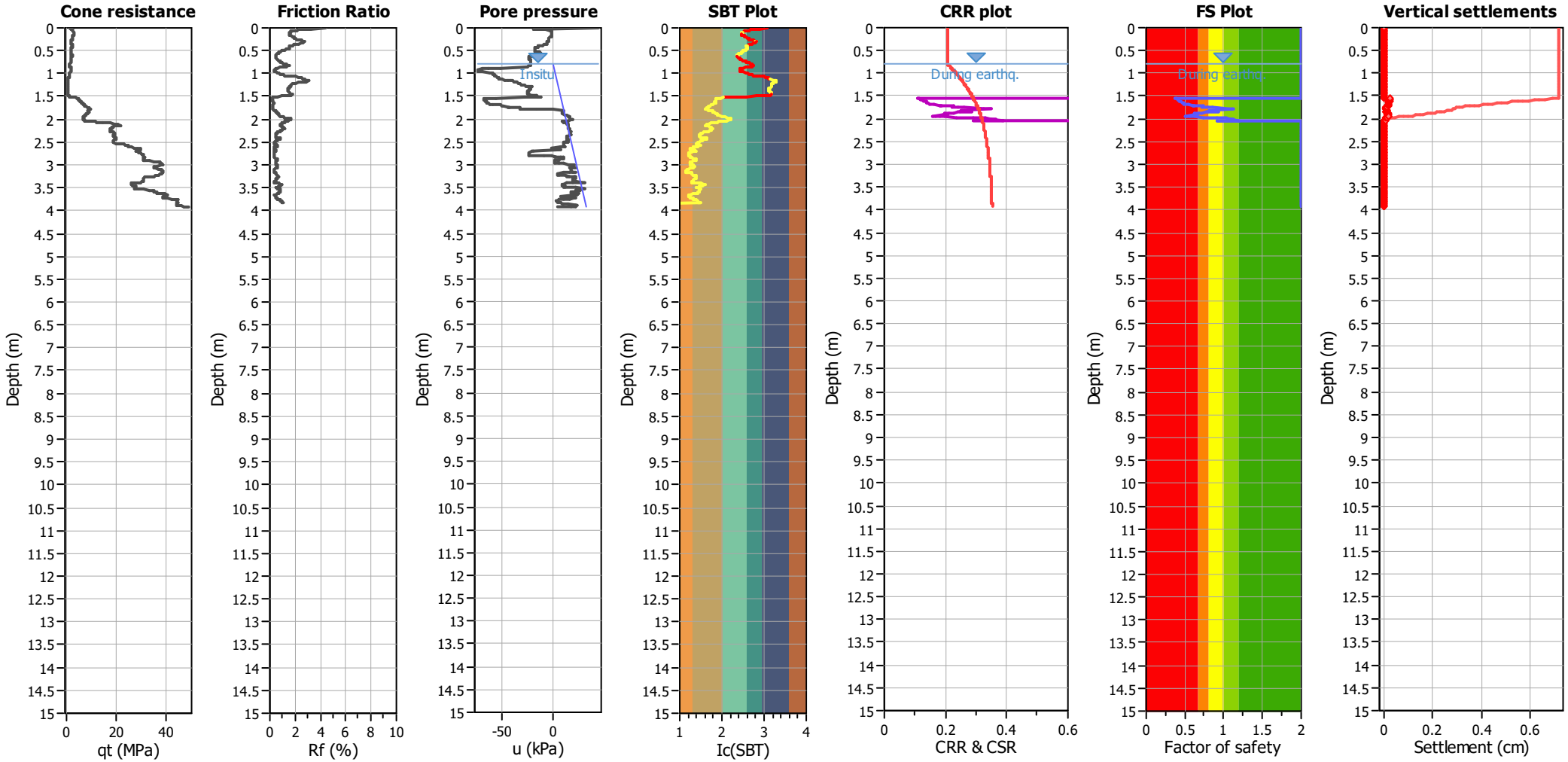
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu006 ULS
Total depth: 3.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.80 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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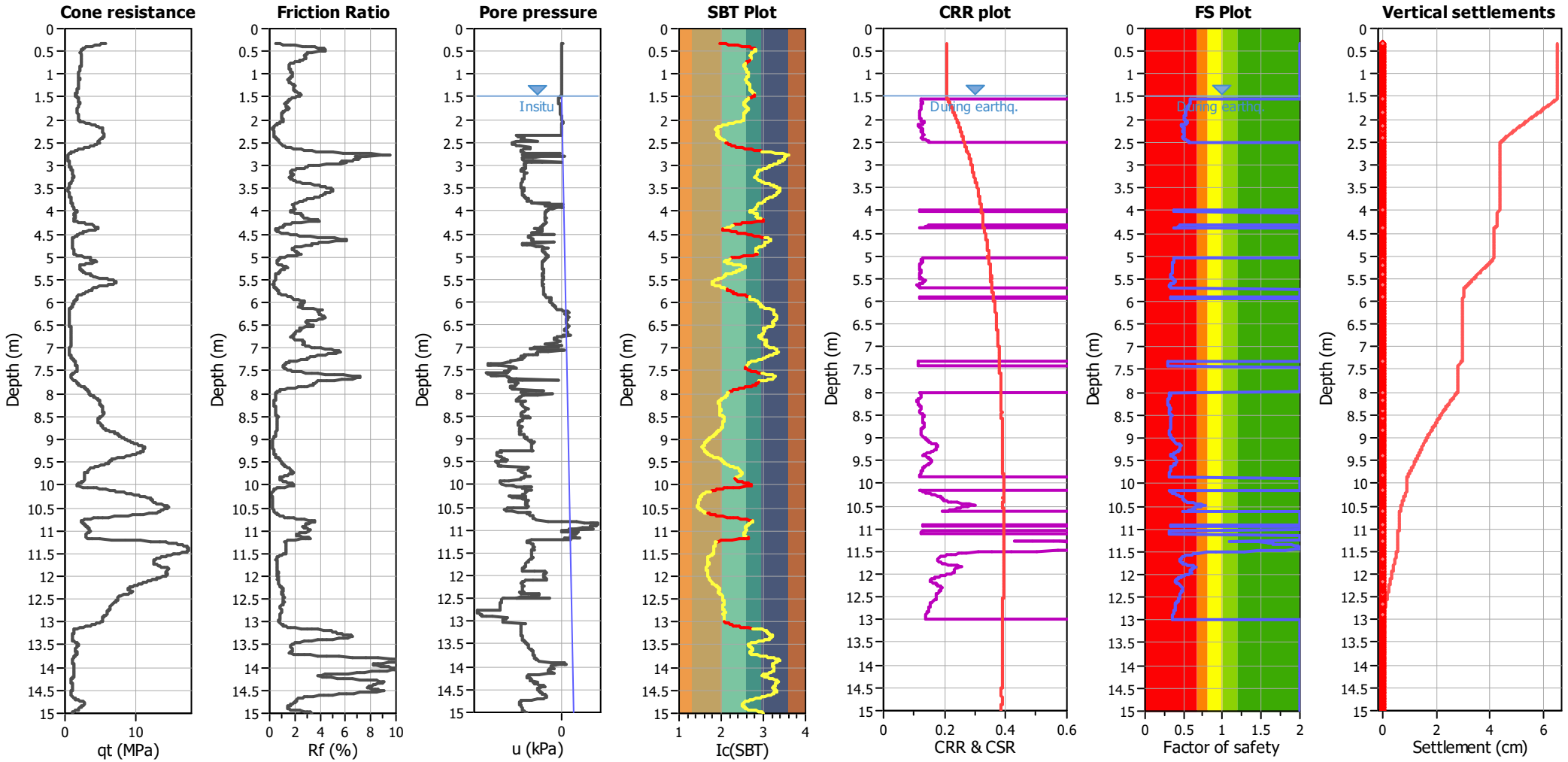
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu007 ULS
Total depth: 15.00 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.50 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.50 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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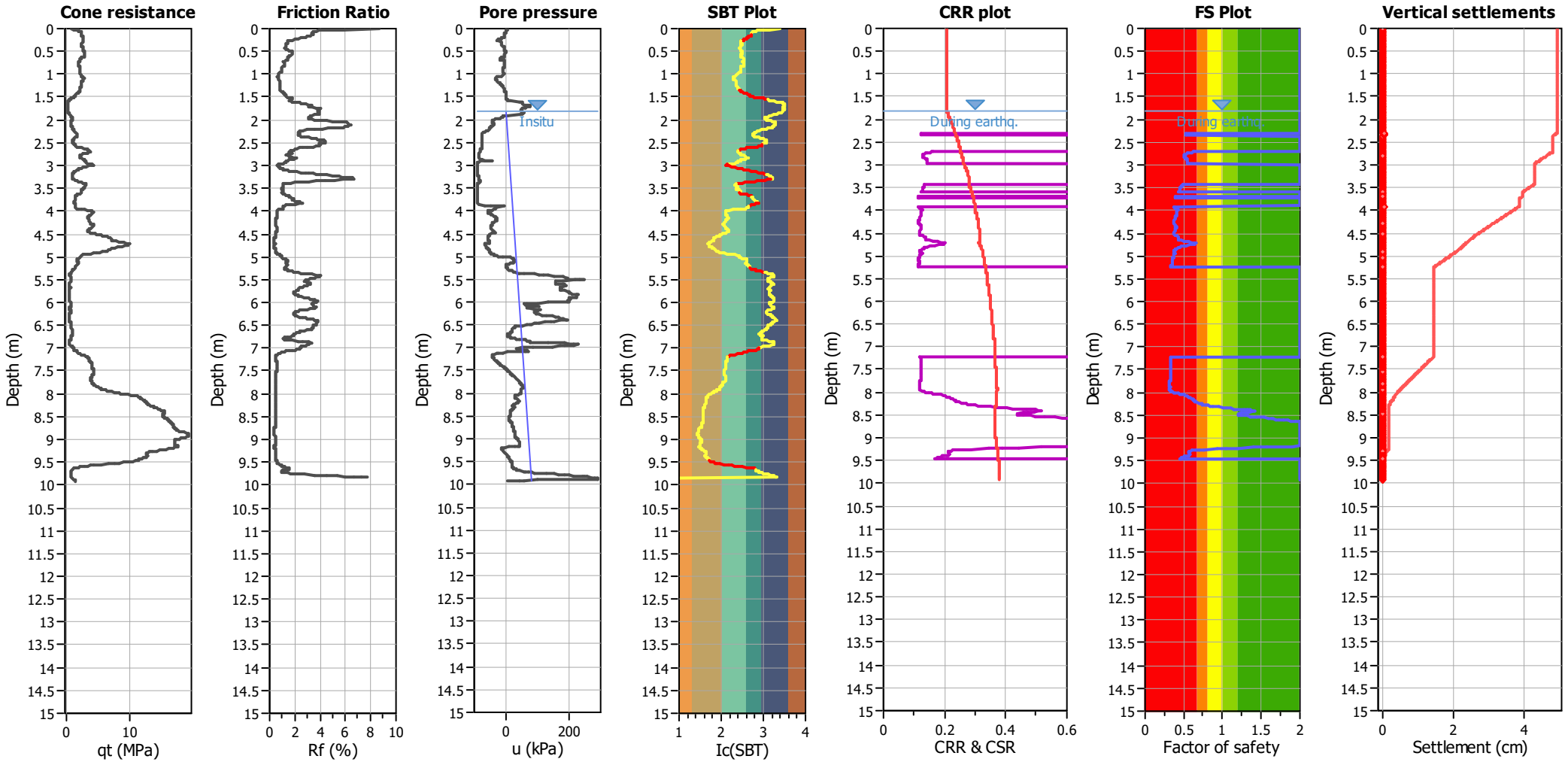
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu008 ULS
Total depth: 9.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.80 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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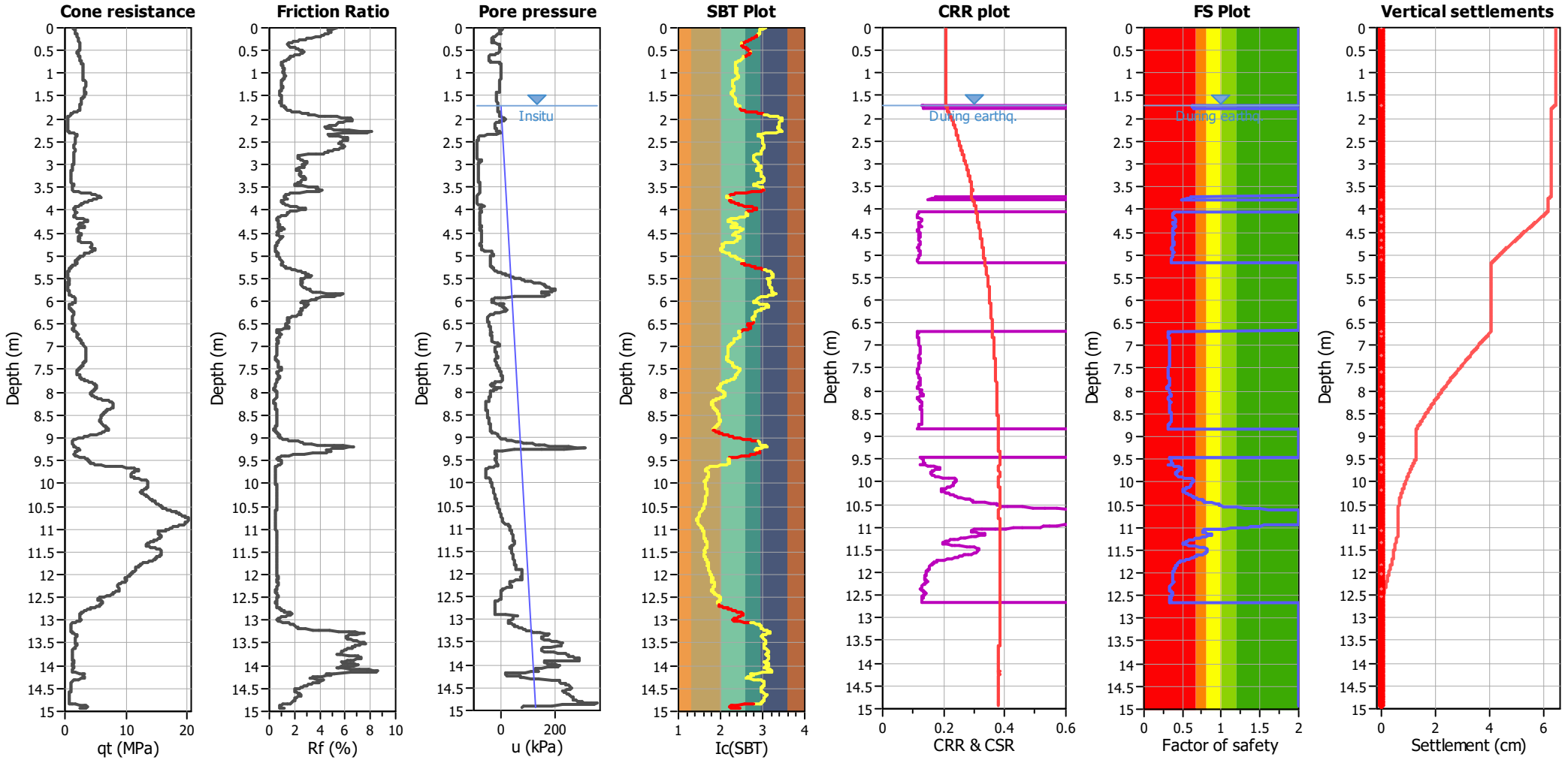
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu009 ULS
Total depth: 14.95 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.70 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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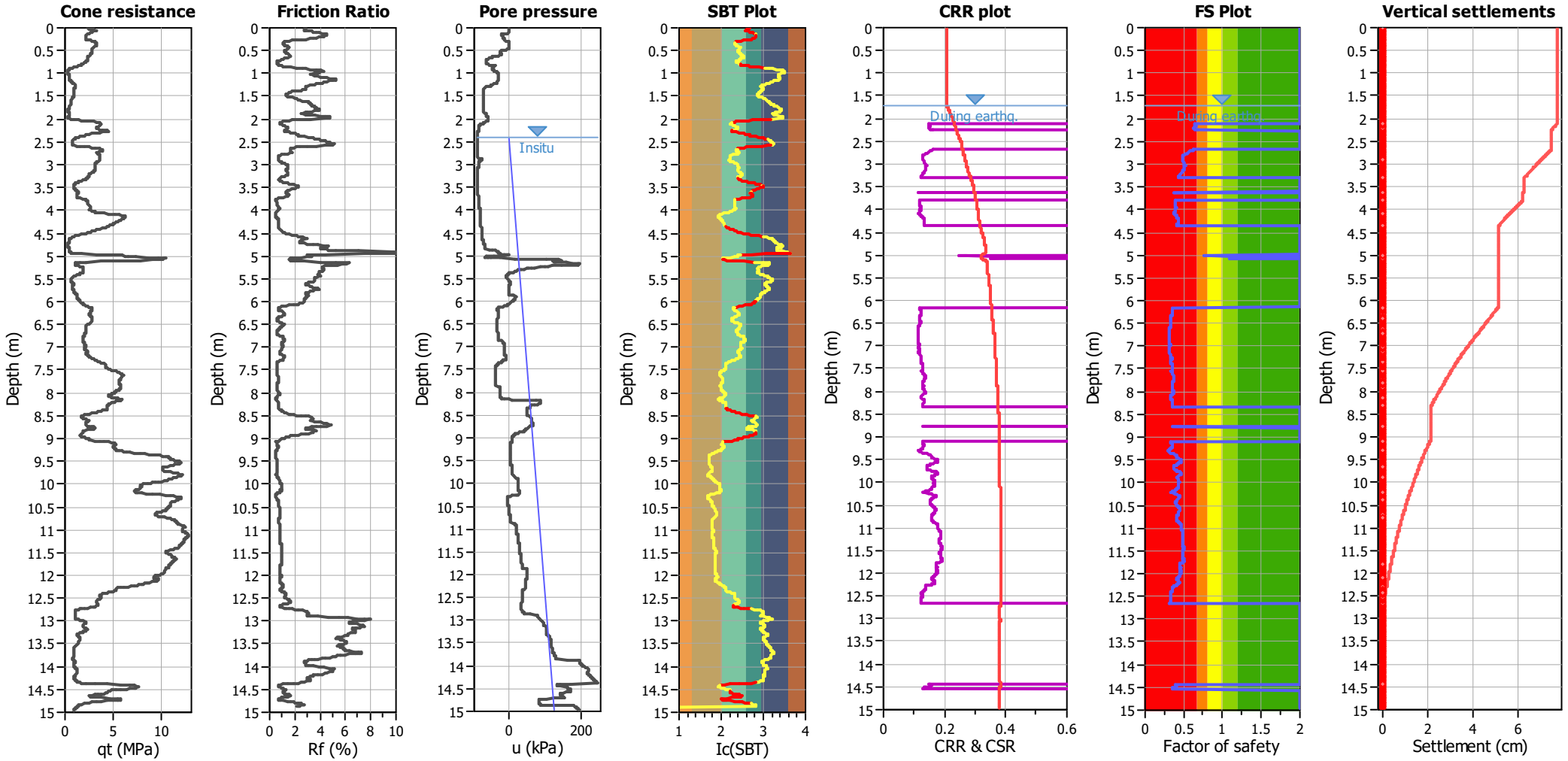
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu010 ULS
Total depth: 14.97 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.40 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.70 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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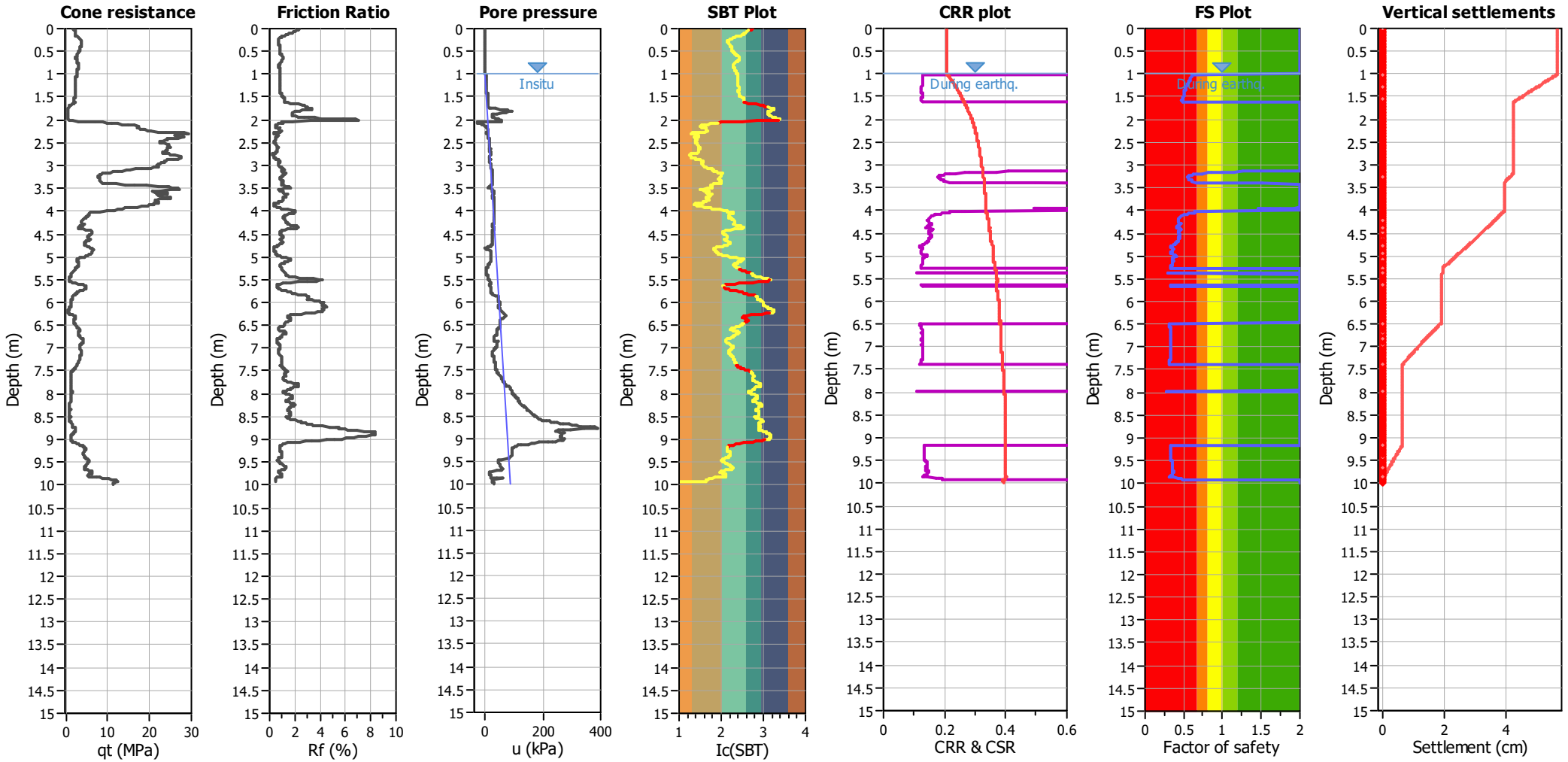
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu011 ULS
Total depth: 9.99 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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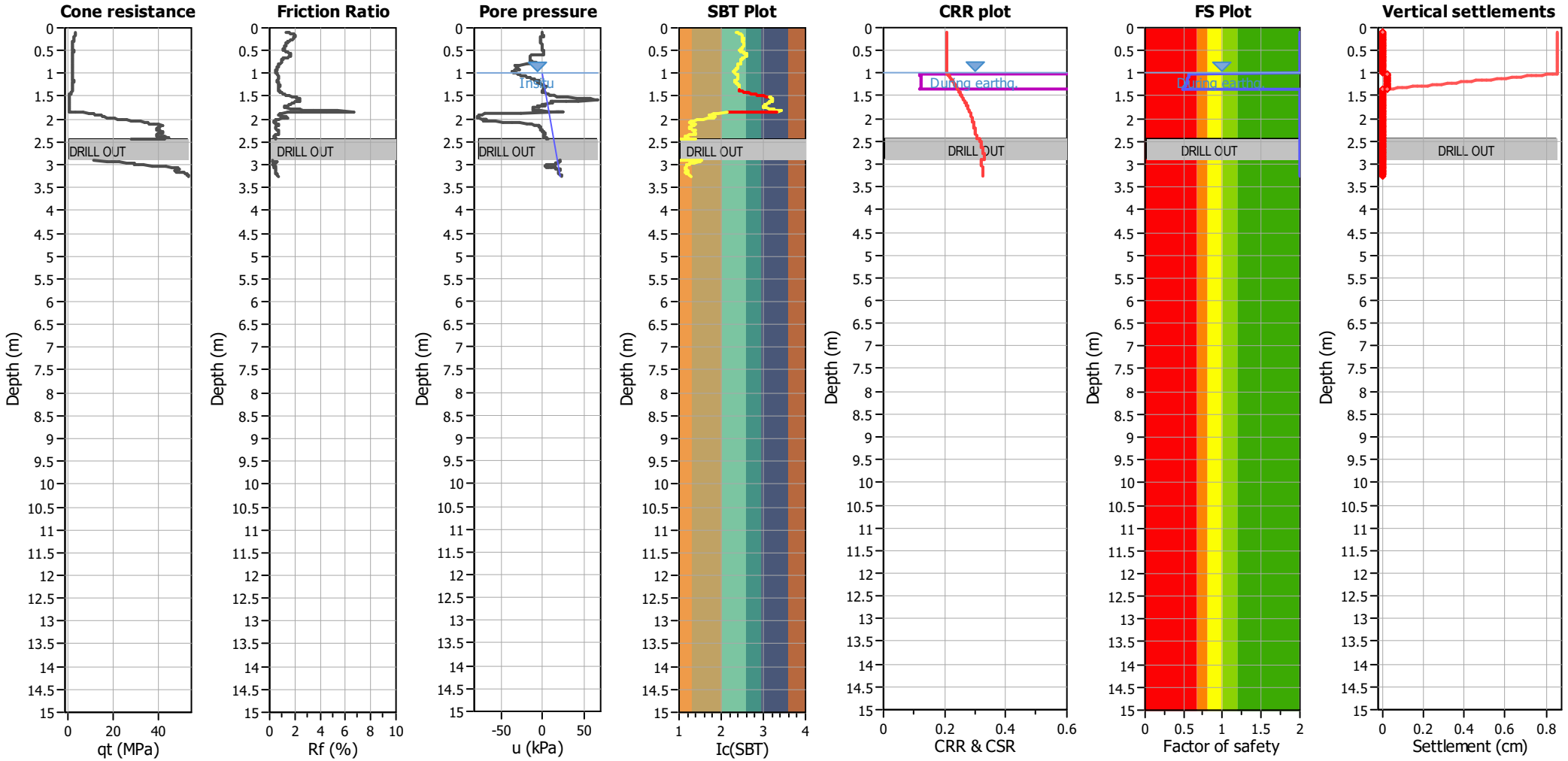
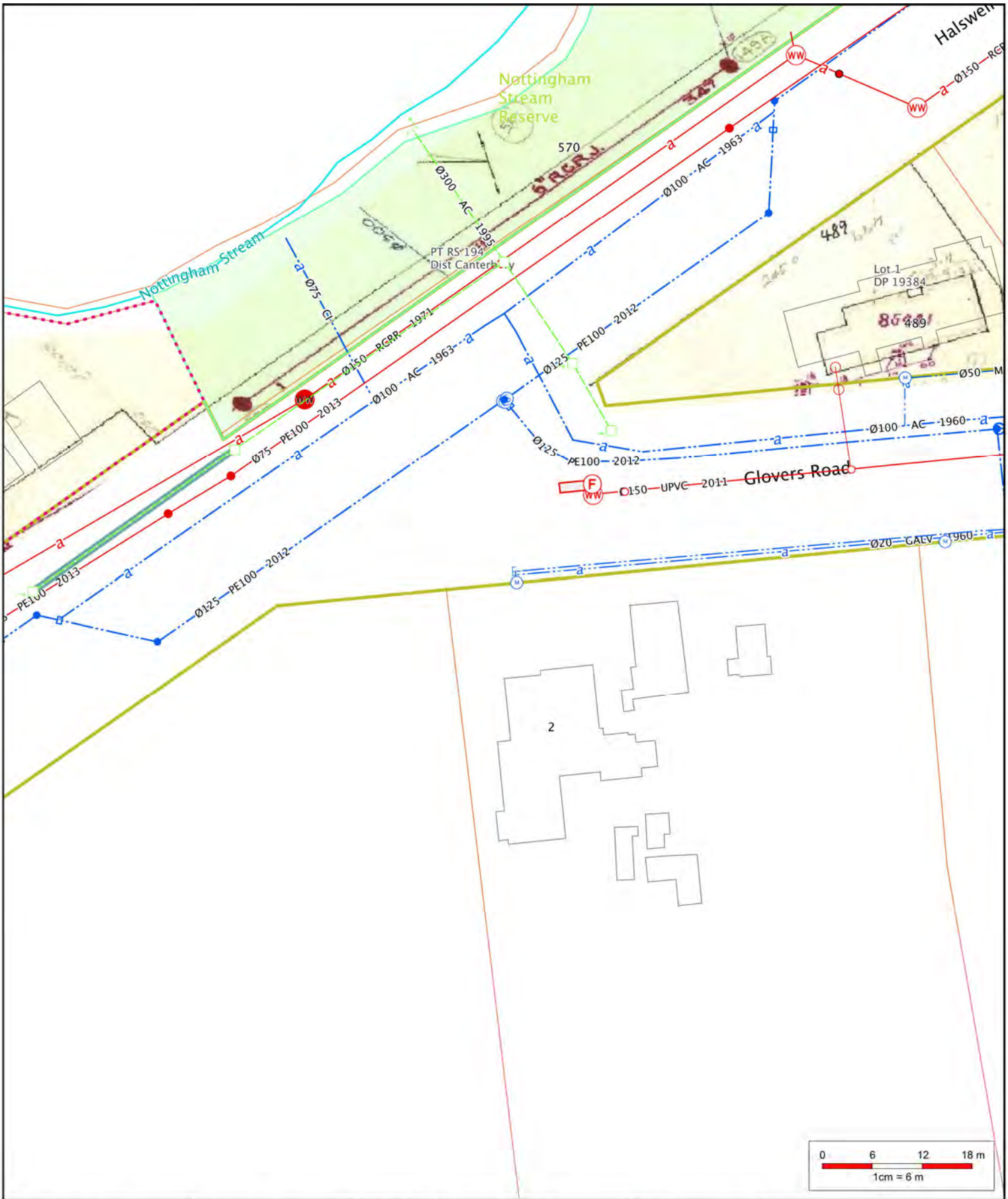
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu012 ULS
Total depth: 3.25 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



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18/06/2021 9:21:04 AM

Christchurch City Council

ph: 941-8300 fax: 941-8385

Accuracy not guaranteed. Onsite verification required. Display of data scale dependent, full detail available at 1:500.

Private Drainage

Standard Infrastructure
- Bio Gas
- Condensate Trap
- End Cap
- Inlet
- Outlet
- Valve
- Main
- Cable

Water Intake/Supply
- Connector
- Bellows
- Connector
- Hydrant

Water Intake/Supply
- Inlet
- Meter
- Outlet
- Pump
- Restrictor
- Valve
- Air Release
- Butterfly
- Flow restriction
- Gate
- Pressure Activated
- Sluice
- Valve
- Reservoir
- Structure
- Lateral
- Main
- Sub Main

Wastewater
- End Cap
- Valve
- Air Gap Separator
- Vent
- Eye
- Eye (Vertical)
- Outfall
- Pump
- Junction
- Access
- Flush Manhole
- Inspection Point
- Standard Manhole
- Trap
- Vented Manhole
- Lateral
- Main
- Pressure Main

Wastewater
- Lateral Fitting

Local Pressure
- CP Control Panel
- BK Boundary Kit
- T Tank System
- Site
- V Vacuum Chamber
- BU Vacuum Breather

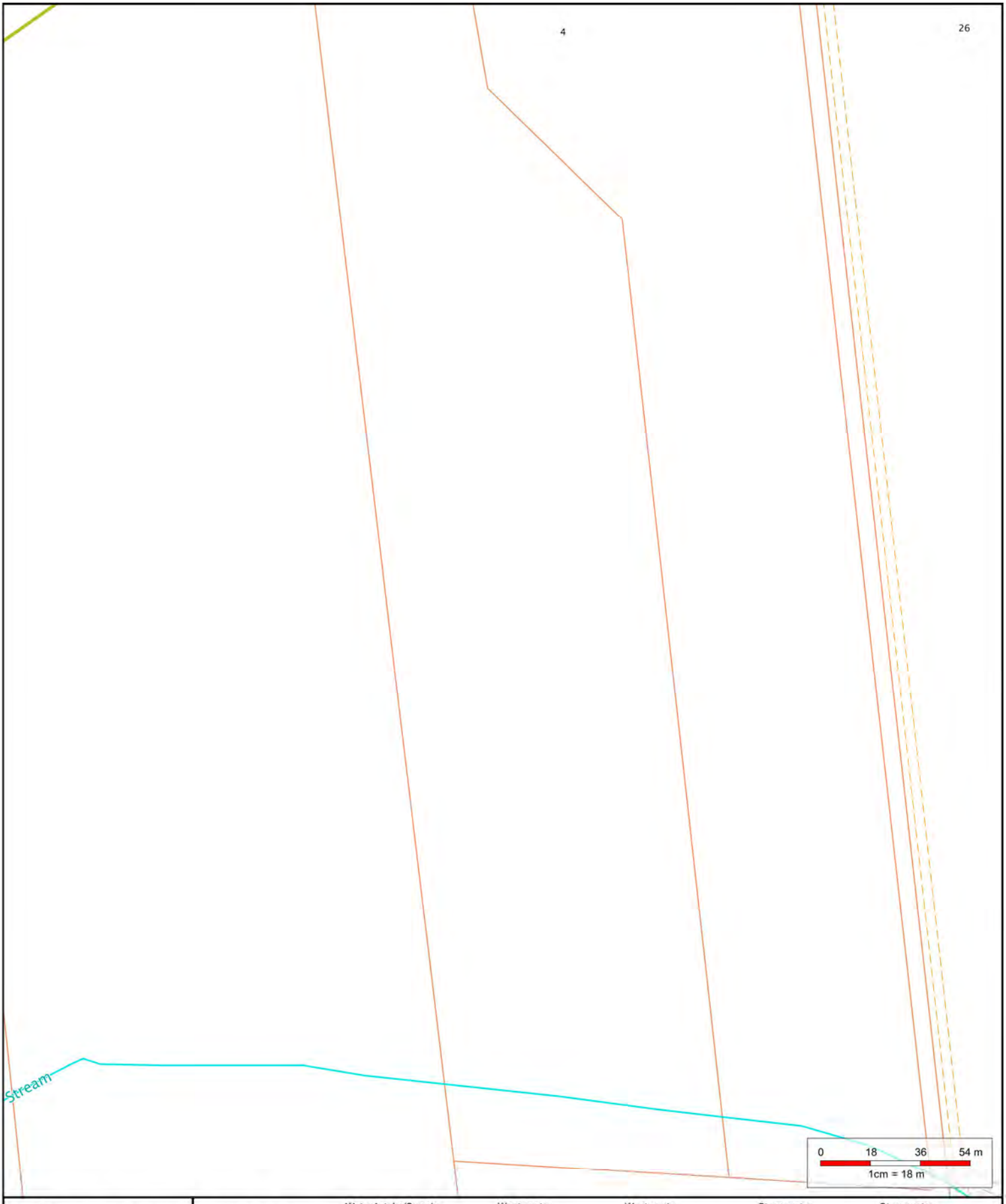
Stormwater
- Bend
- Change
- Eye
- Flow Restriction
- Inlet
- Dome Sump
- Double Sump
- Gross Debris Trap

Stormwater
- Inlet
- Inlet
- Inlet Headwall
- Pipe End
- Silt Trap
- Single Sump
- Soak Pit
- Triple Sump
- Junction
- Standard Manhole
- Outlet
- Pump
- Structure
- Basin
- Lateral
- Main
- Lateral Fitting
- Double Sump

Stormwater
- Lateral Fitting
- Single Sump
- Soak Pit
- Inspection point
- Manhole

All services
- Pipe Protection
- —a— Abandoned
- —p— Proposed
- —os— Out of service

Landbase
- Easement



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18/06/2021 9:23:37 AM

Christchurch City Council

ph: 941-8300 fax: 941-8385

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Private Drainage

Standard Infrastructure
- Bio Gas
- Condensate Trap
- End Cap
- Inlet
- Outlet
- Valve
- Main
- Cable

Water Intake/Supply
- Connector
- Bellows
- Connector
- Hydrant

Water Intake/Supply
- Inlet
- Meter
- Outlet
- Pump
- Restrictor
- Valve
- Air Release
- Butterfly
- Flow restriction
- Gate
- Pressure Activated
- Sluice
- Valve
- Reservoir
- Structure
- Lateral
- Main
- Sub Main

Wastewater
- End Cap
- Valve
- Air Gap Separator
- Vent
- Eye
- Eye (Vertical)
- Outfall
- Pump
- Junction
- Access
- Flush Manhole
- Inspection Point
- Standard Manhole
- Trap
- Vented Manhole
- Lateral
- Main
- Pressure Main

Wastewater
- Lateral Fitting

Local Pressure
- CP Control Panel
- BK Boundary Kit
- T Tank System
- Site
- V Vacuum Chamber
- BU Vacuum Breather

Stormwater
- Bend
- Change
- Eye
- Flow Restriction
- Inlet
- Dome Sump
- Double Sump
- Gross Debris Trap

Stormwater
- Inlet
- Inlet
- Inlet Headwall
- Pipe End
- Silt Trap
- Single Sump
- Soak Pit
- Triple Sump
- Junction
- Standard Manhole
- Outlet
- Pump
- Structure
- Basin
- Lateral
- Main
- Lateral Fitting
- Double Sump

Stormwater
- Lateral Fitting
- Single Sump
- Soak Pit
- Inspection point
- Manhole

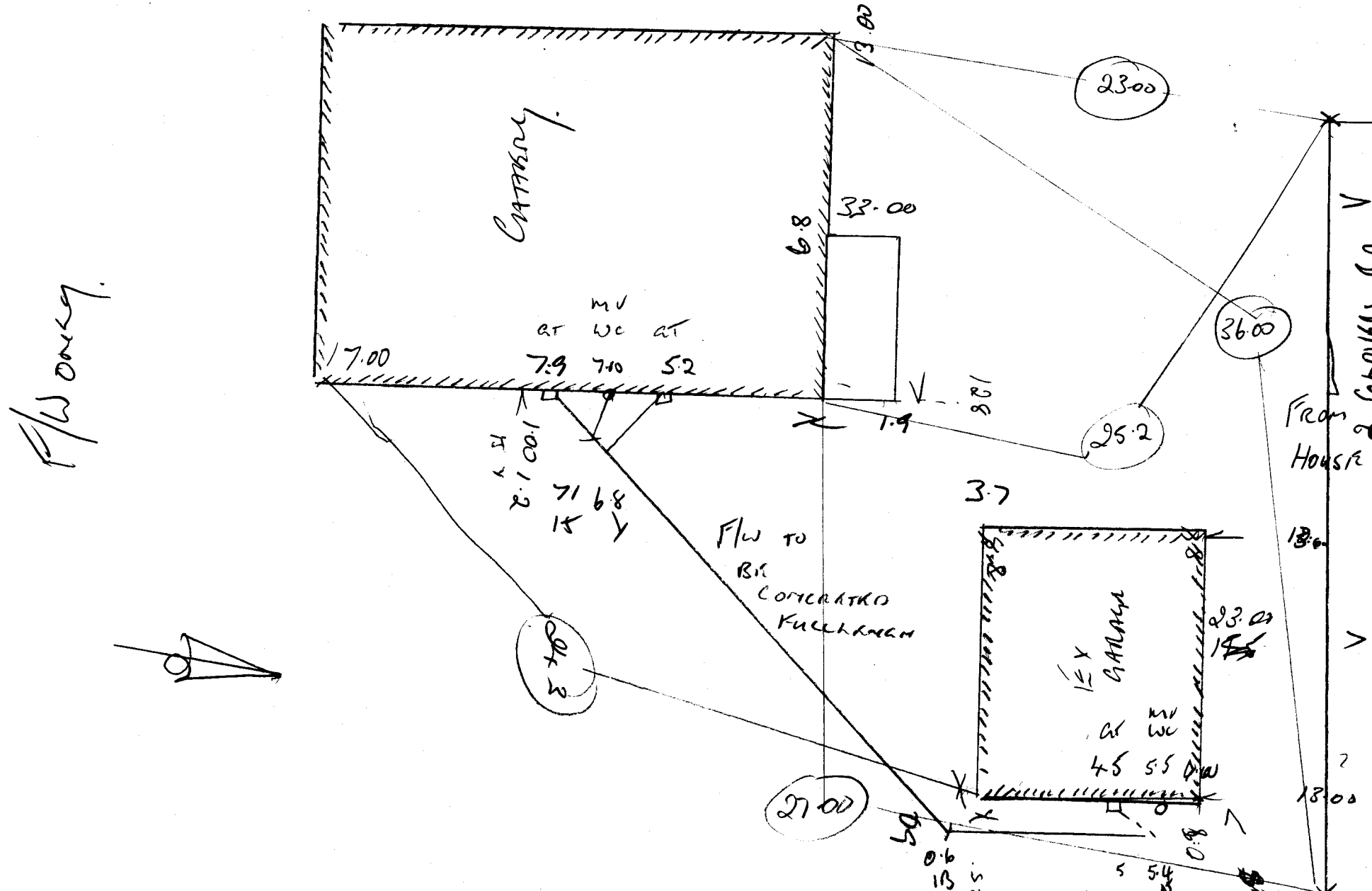
All services
- Pipe Protection
- —a— Abandoned
- —p— Proposed
- —os— Out of service

Landbase
- Easement

CHRISTCHURCH CITY COUNCIL – DRAINAGE PICK UP

CHRISTCHURCH
THE GARDEN CITY
The city that shines

ADDRESS: 2 Glouras Rd	OWNER: BLAIR	RECEIVED: 21 NOV 1994	
LEGAL DESCRIPTION:	DRAINLAYER: M. Spain	BLOCK PLAN: HAL 43	
PROJECT No.: 94 00 64 54	PLUMBER:	PLOTTED: / /	CONNECTION NUMBER
DATE: 8 - 11 - 94	FIELD OFFICER: O Hall	EYE BOOK:	



CHRISTCHURCH CITY COUNCIL – DRAINAGE PICK UP

74

CHRISTCHURCH
THE GARDEN CITY
The city that shines

ADDRESS: 2 GLOVERS	OWNER:	RECEIVED: 30 SEP 1998	
LEGAL DESCRIPTION:	DRAINLAYER: T McKAY	BLOCK PLAN: HALL 43	
PROJECT No.: 98003663	PLUMBER:	PLOTTED: / /	CONNECTION NUMBER
DATE: 14·9·98	FIELD OFFICER: STUBBS	EYE BOOK:	

15630

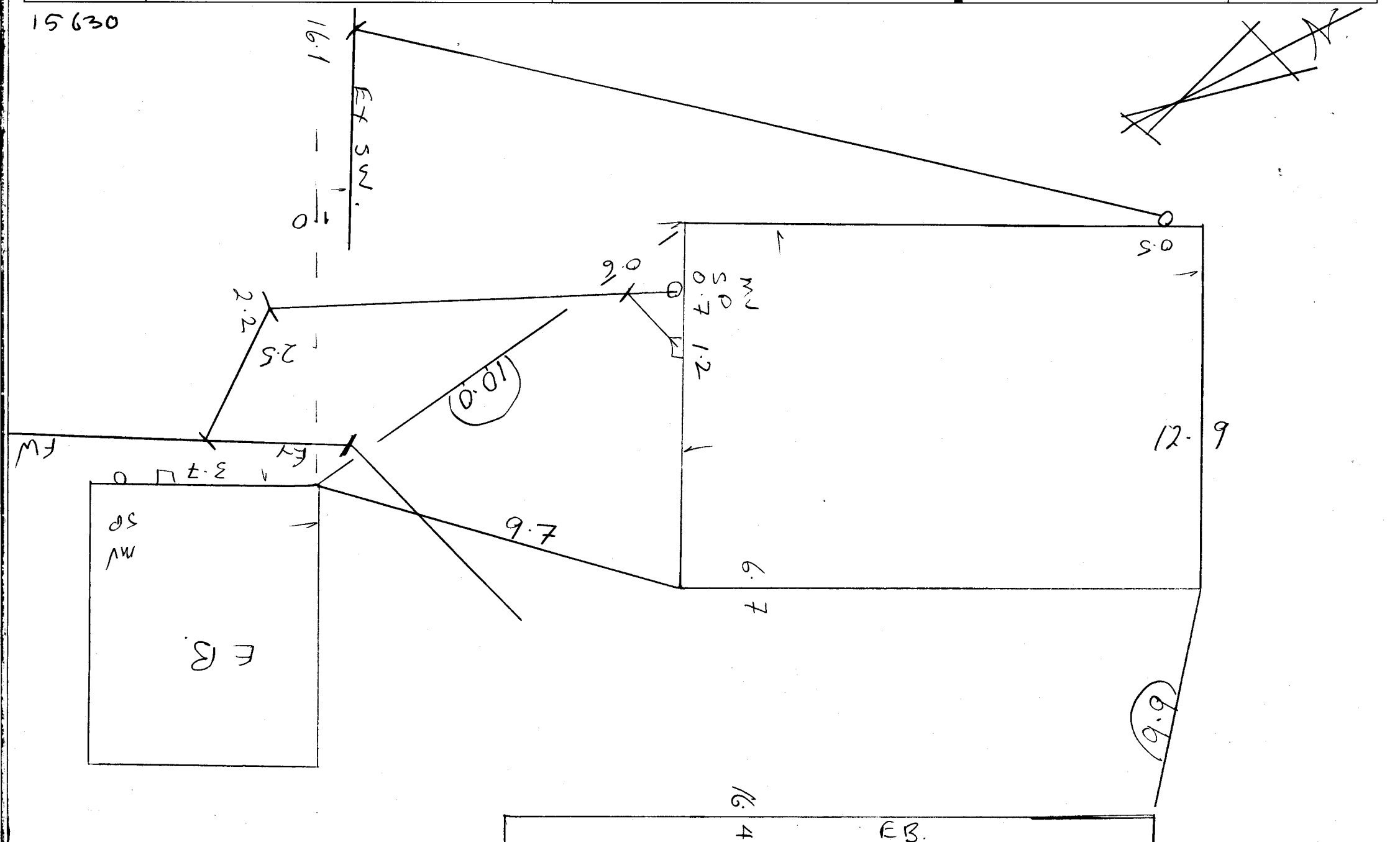


Diagram of Lot 1 Showing Distances from Boundrys & Nearest Buildin

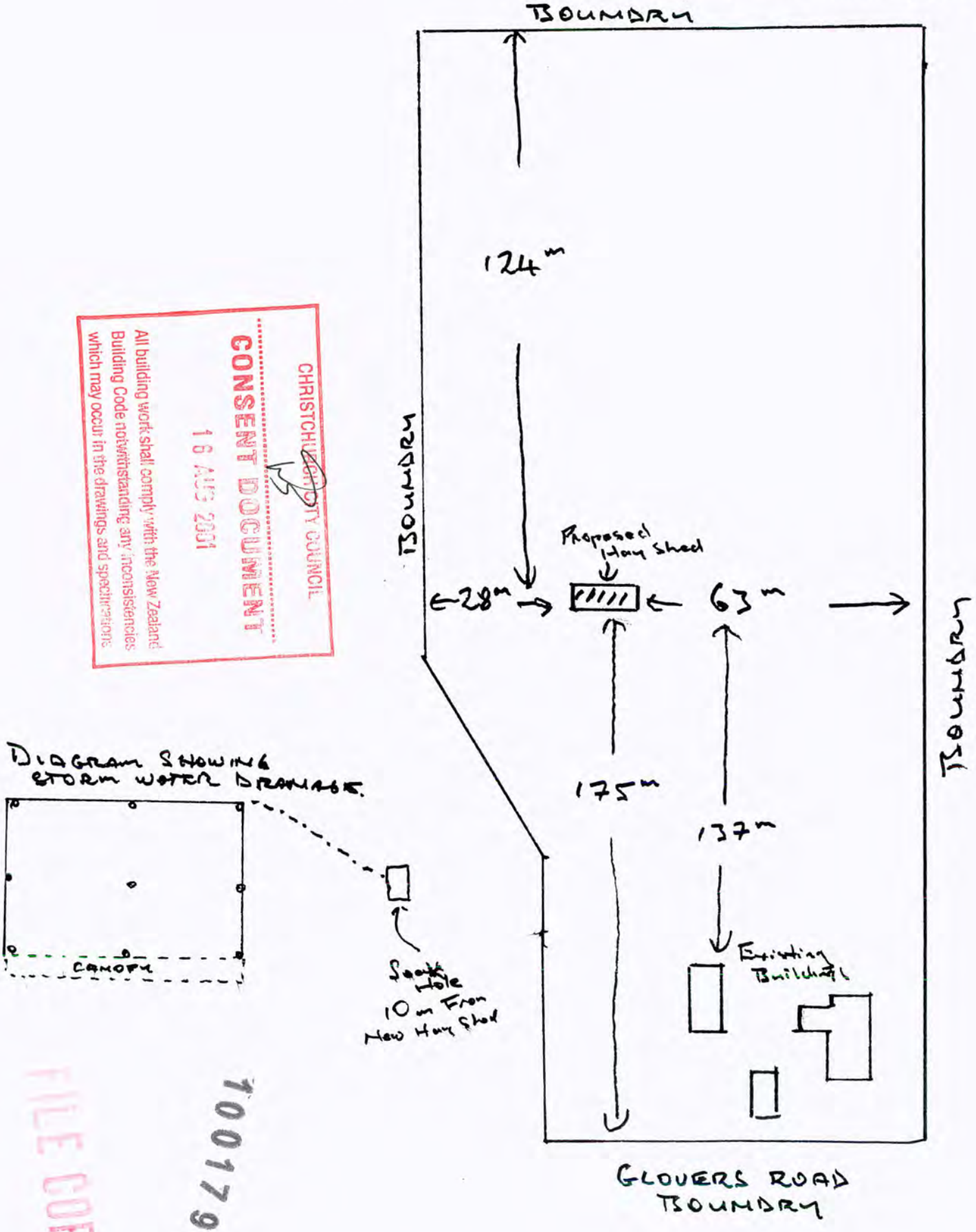
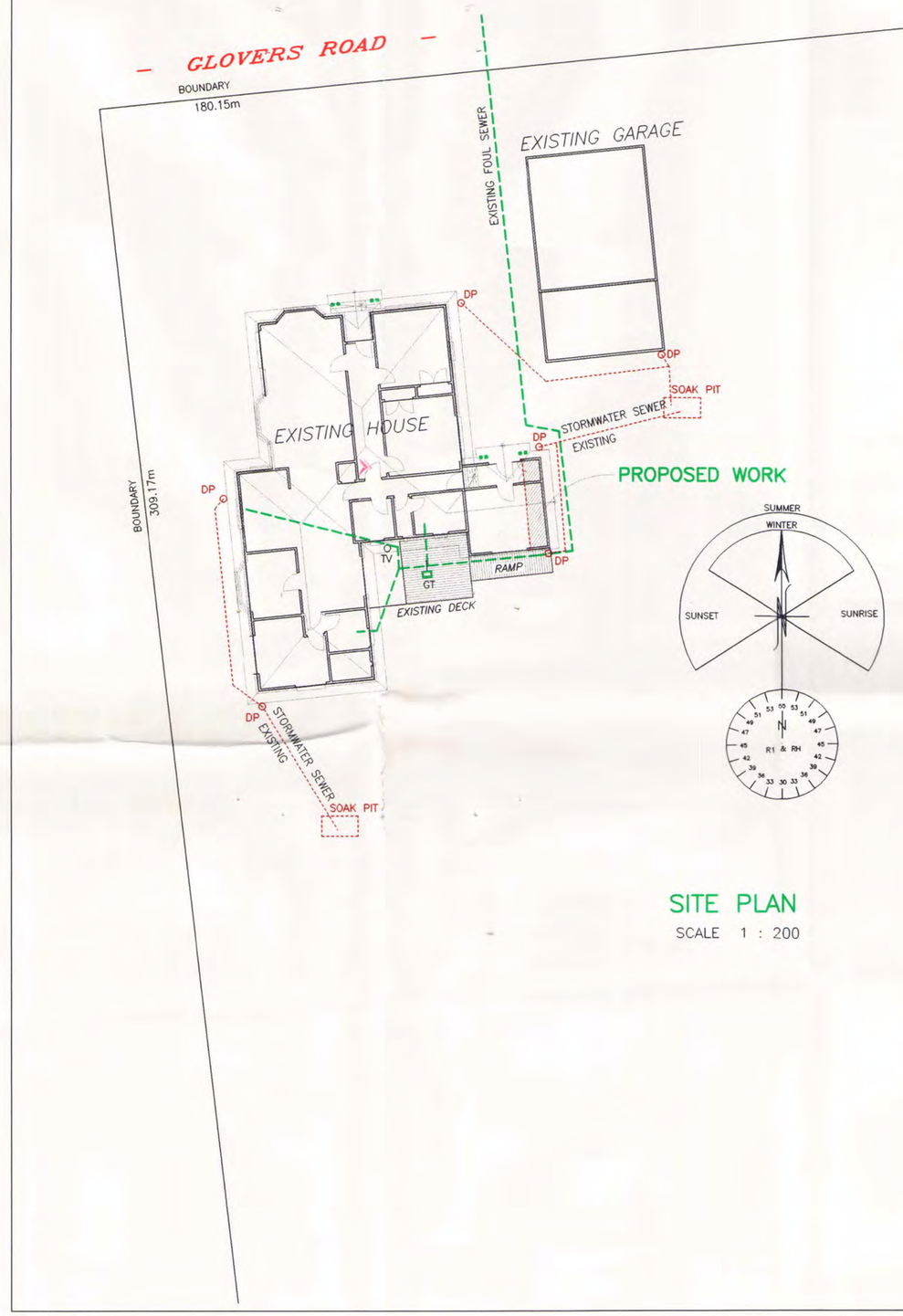


DIAGRAM SHOWING STORM WATER DRAINAGE.

LOCATION PLAN

SCALE 1 : 2000



SITE PLAN

SCALE 1 : 200

LEGAL DESCRIPTION

2 GLOVERS ROAD, CHCH3
LOT. 1
RS. 1592
CT. 8K/1392

LAND AREA	12.9499Ha
AREA EXIST SITE COVER	.m²
AREA PROPOSED SITE COVER	.m²
FLOOR AREA INCREASE	4.7m²

LEGEND

- DP — DOWNPIPE
- STORMWATER SEWER
- TV GT — TERMINAL VENT, GULLY TRAP
- FOUL SEWER
- CWT — COLD WATER TANK
- HT — HOSE TAP
- WATER SUPPLY

NOTE: STORMWATER TO CONNECT TO EXISTING AND THEN TO SOAK PIT BY EXISTING SYSTEM WHICH IS OPERATING SATISFACTORILY

DAVE BARLOW

CHRISTCHURCH CITY COUNCIL
CONSENT DOCUMENT
19 JAN 1999
All building work shall comply with the New Zealand Building Code notwithstanding any inconsistencies which may occur in the drawings and specifications

CHRISTCHURCH CITY COUNCIL
CONSENT/PIM
APPLICATION/INFO REC'D
Rec'd 23 DEC 1998
Sockburn Service Centre
PROJECT No.....
98010198

FILE COPY

BUILDER TO CHECK ALL DIMENSIONS

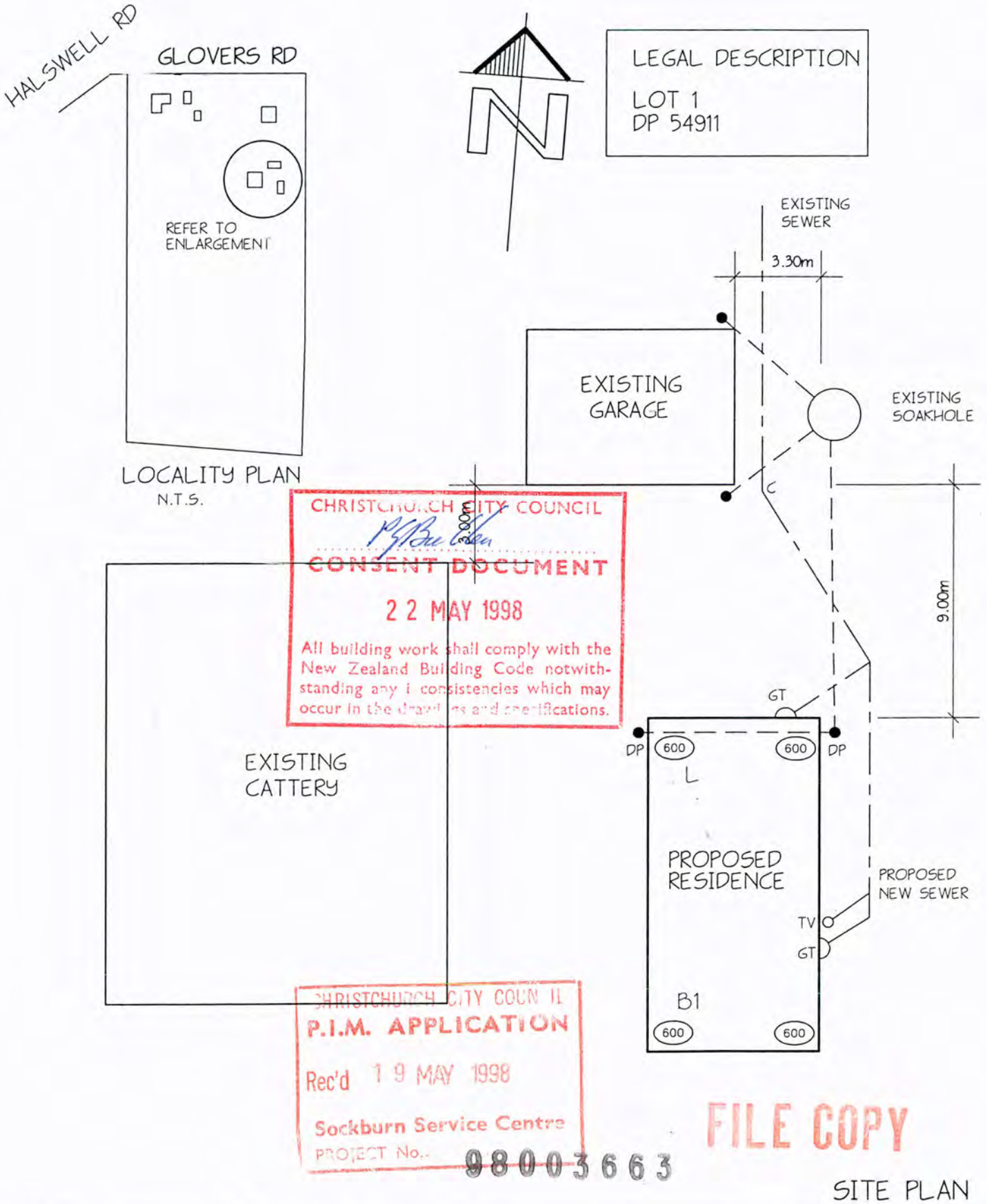
ON-LINE DRAUGHTING LTD
Tel & Fax 322-8240

SITE PLAN
SCALE 1 : 200

PROPOSED KELLY DWELLING ALTERATIONS
GORDAN & HEATHER KELLY
2 GLOVERS ROAD HALSWELL

DRAWN	M.J.M	JOB No.	419-KELLY
DATE	17-12-98	SHEET	1
CHECKED		Amdt.	

ON-LINE DRAUGHTING Ltd 68.A KENNEDYS BUSH ROAD. HALSWELL. CHRISTCHURCH 3.
— ARCHITECTURAL DESIGN — STRUCTURAL — ALTERATIONS — CITY & RURAL



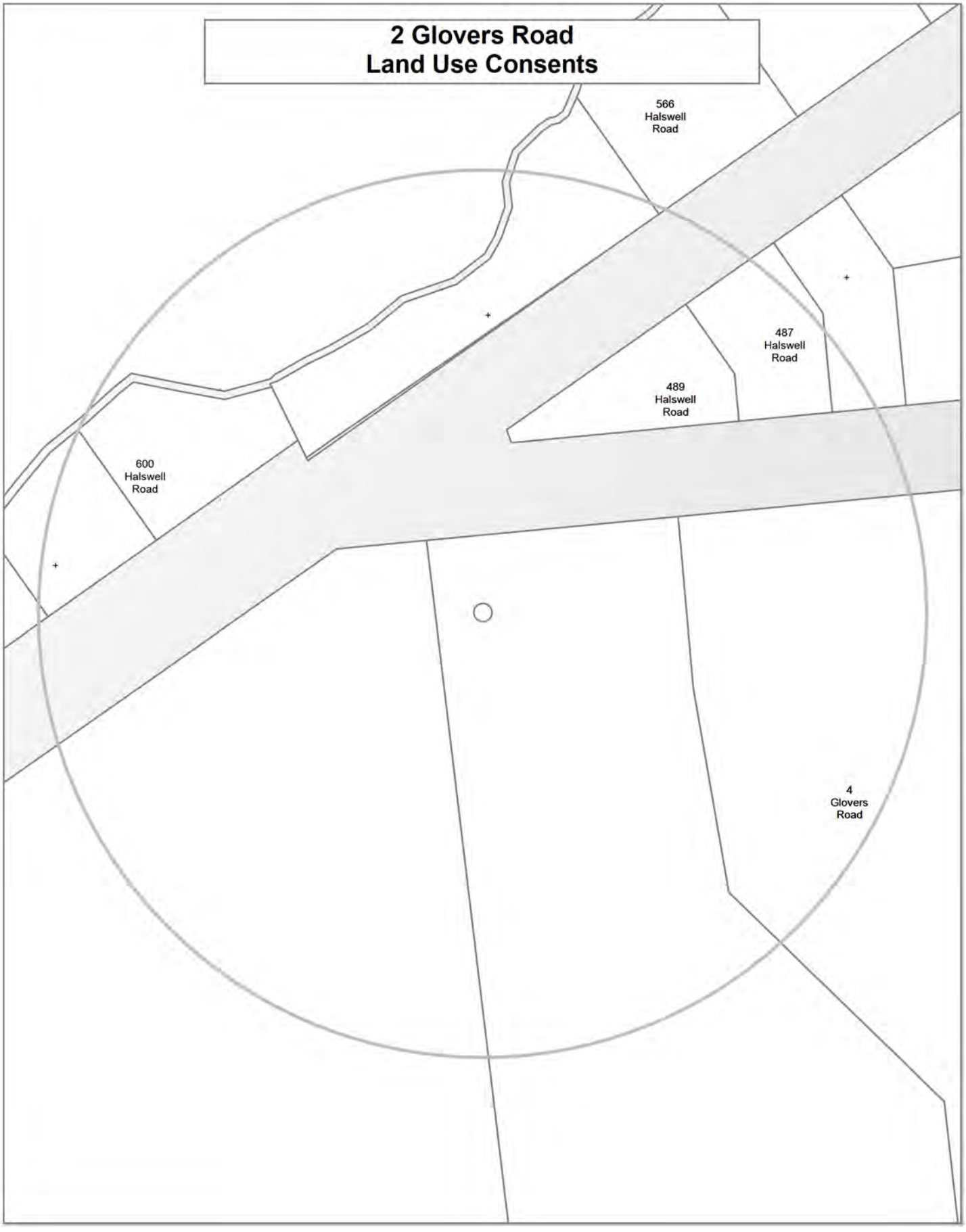
SITE PLAN

DRAWN KB	KEITH HAY HOMES	CUSTOMER.....CONTRACTOR.....			
DATE 17/04/98		NAME A. & L. BLAIR			
CHECKED DB.	©COPYRIGHT 1997	AREA	SCALES 1:200	PLAN REF. 01/359	1

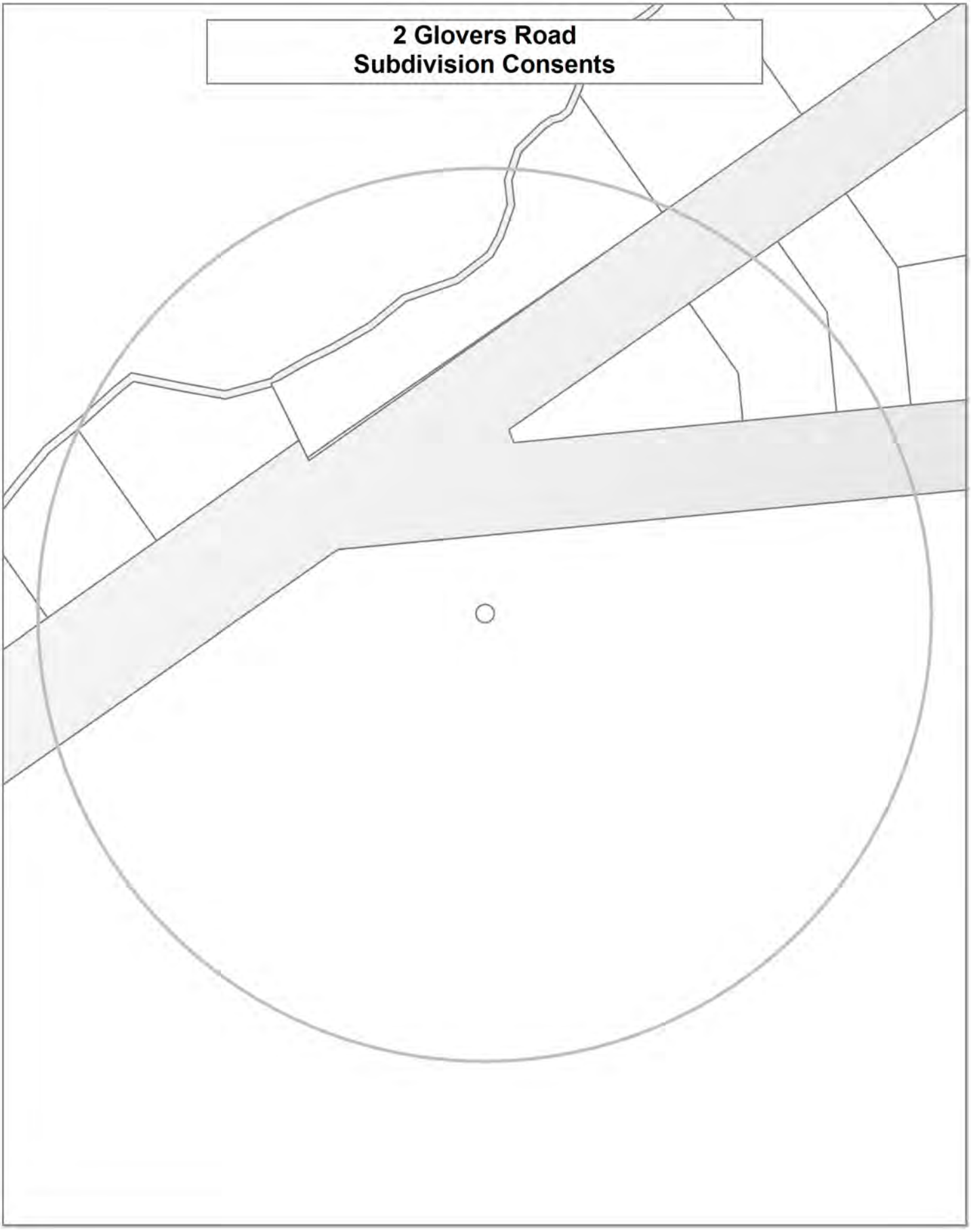
C:\CAD\BRANCHES

Spatial Query Report

Christchurch City Council



Christchurch City Council



Spatial Query Report

Land Use Resource Consents within 100 metres of 2 Glovers Road

Note:This list does not include subdivision Consents and Certificates of Compliance issued under the Resource Management Act.

4 Glovers Road

RMA/2003/1909

Application to convert an existing studio into a family flat - Historical Reference RMA20014216

Processing complete

Applied 25/07/2003

Decision issued 13/08/2003

Granted 13/08/2003

RMA/2017/1463

To establish a Temporary Storage Yard

Processing complete

Applied 26/06/2017

Decision issued 13/02/2019

Granted 13/02/2019

RMA/2020/2557

Remediation of contaminated soils

Processing complete

Applied 06/11/2020

Decision issued 09/12/2020

Granted 09/12/2020

RMA/2020/2770

To conduct earthworks and stockpiling on site

Processing complete

Applied 27/11/2020

Decision issued 27/01/2021

Granted 27/01/2021

RMA/2020/3076

To subdivide 4 allotments to create 87 residential allotments. Land use consent for earthworks and under the NES for contaminated land.

On hold - waiting for response from applicant

Applied 22/12/2020

487 Halswell Road

RMA/1994/527

Consent to erect a garage over 40m2 in the front yard, and to erect a studio in the front yard. - Historical Reference RES94001092

Processing complete

Applied 30/06/1994

Decision issued 25/07/1994

Granted 25/07/1994

489 Halswell Road

RMA/1995/2290

Application for reduced setback for garage - Historical Reference RES953485

Processing complete

Applied 16/08/1995

Decision issued 07/09/1995

Granted 07/09/1995

RMA/2001/351

Appication for a garage addition to be attached to the existing dwelling with non compliances with street setback; length of wall and queuing space - Historical Reference RMA20004203

Processing complete

Applied 09/02/2001

Decision issued 01/03/2001

Granted 01/03/2001

511 Halswell Road

RMA/2020/163

Earthworks for residential development

Processing complete

Applied 29/01/2020

Decision issued 10/02/2020

Granted 10/02/2020

RMA/2020/2770

To conduct earthworks and stockpiling on site

Processing complete

Applied 27/11/2020

Decision issued 27/01/2021

Granted 27/01/2021

RMA/2020/3076

To subdivide 4 allotments to create 87 residential allotments. Land use consent for earthworks and under the NES for contaminated land.

On hold - waiting for response from applicant

Applied 22/12/2020

RMA/2021/733

Earthworks - Associated with the formation of vehicle crossings

Processing complete

Applied 24/03/2021

Decision issued 11/06/2021

Granted 11/06/2021

566 Halswell Road

RMA/1998/3055

A site which does not comply with number of vehicle crossings allowed under the Proposed District Plan. - Historical Reference RES990037

Processing complete

Applied 06/12/1998

Decision issued 12/01/1999

Granted 12/01/1999

RMA/1998/891

Application to erect a dwelling within 15m setback required from the Nottingham Stream in terms of the Proposed Plan. - Historical Reference RES980953

Processing complete

Applied 14/04/1998

Decision issued 03/06/1998

Granted 03/06/1998

600 Halswell Road

RMA/1985/400

Carport adjoining existing shed - Historical Reference RES9207116

Processing complete

Applied 12/06/1985

Decision issued 20/06/1985

Granted 20/06/1985

604 Halswell Road

RMA/2000/2667

Application for alterations to and the erection of additions to a dwelling to create a family flat and alterations to an existing garage - Historical Reference RMA20003424

Processing complete

Applied 25/10/2000

Decision issued 09/11/2000

Granted 08/11/2000

Data Quality Statement

Land Use Consents

All resource consents are shown for sites that have been labelled with an address. For sites that have been labelled with a cross (+) no resource consents have been found. Sites that have no label have not been checked for resource consents. This will be particularly noticeable on the margins of the search radius. If there are such sites and you would like them included in the check, please ask for the LIM spatial query to be rerun accordingly. This will be done free of charge although there may be a short delay. Resource consents which are on land occupied by roads, railways or rivers are not, and currently cannot be displayed, either on the map or in the list. Resource consents that relate to land that has since been subdivided, will be shown in the list, but not on the map. They will be under the address of the land as it was at the time the resource consent was applied for. Resource consents that are listed as Non-notified and are current, may in fact be notified resource consents that have not yet been through the notification process. If in doubt. Please phone (03)941 8999.

The term “resource consents” in this context means land use consents. Subdivision consents and certificates of compliance are excluded.

Subdivision Consents

All subdivision consents are shown for the sites that have been labelled with consent details. For Sites that have been labelled with a cross (+) no records have been found. Sites that have no label have not been checked for subdivision consents. This will be particularly noticeable on the margins of the search radius. If there are such sites and you would like them included in the check, please ask for the LIM spatial query to be rerun accordingly. This will be done free of charge although there may be a short delay.

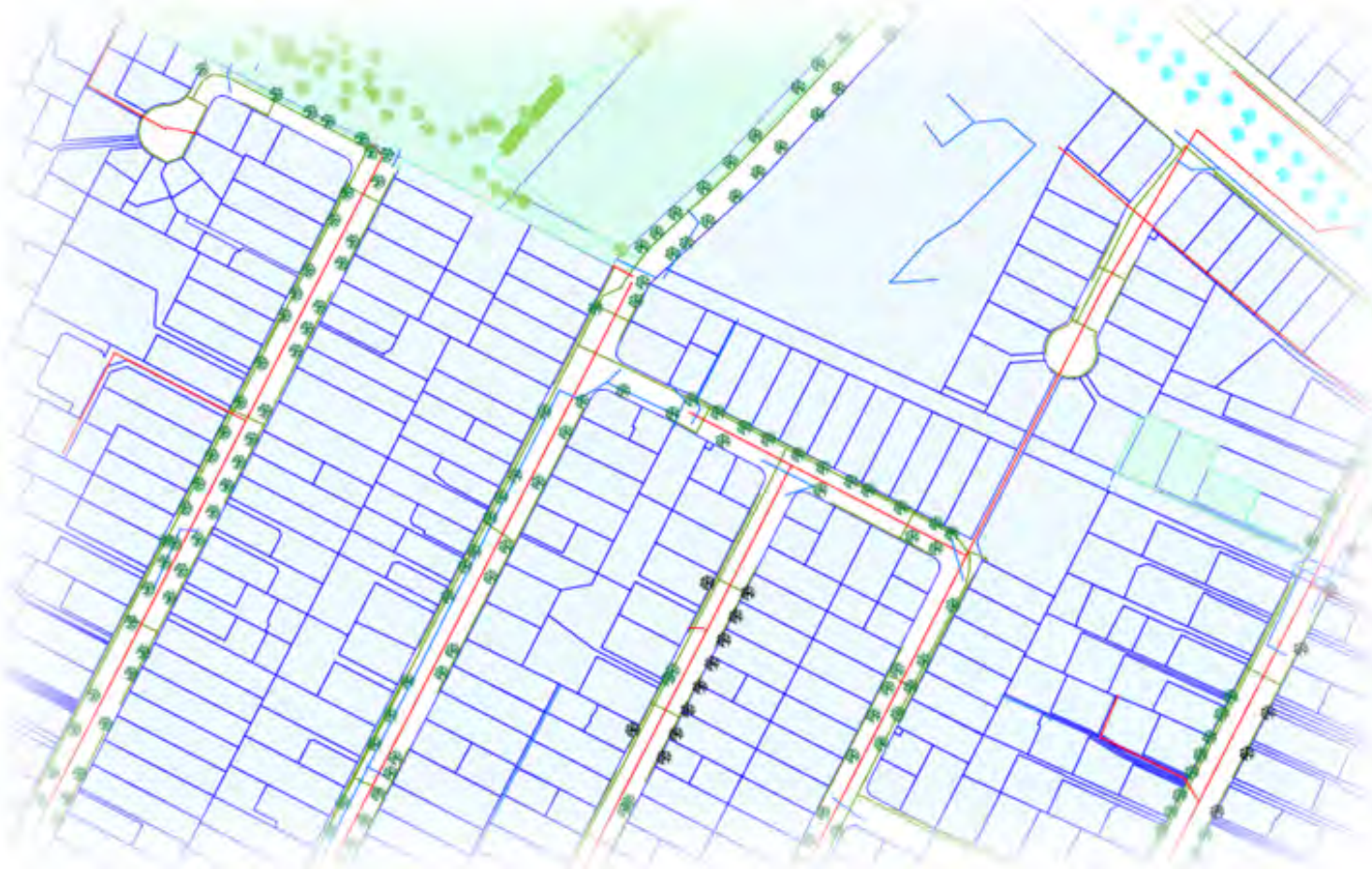
The term “subdivision consents” in this context means a resource consent application to subdivide land. Non subdivision land use resource consents and certificates of compliance are excluded.

This report will only record those subdivision applications which have not been completed i.e once a subdivision has been given effect to and the new lots/properties have been established the application which created those lots will not be shown

All subdivision consent information is contained on the map and no separate list is supplied

Christchurch City Council

Land Information Memorandum



Property address:
4 Glovers Road

Christchurch City Council
53 Hereford Street, PO Box 73015
Christchurch 8154, New Zealand
Tel 64 3 941 8999
Fax 64 3 941 8984
www.ccc.govt.nz

LIM number: 70247283

Land Information Memorandum

Application details

Please supply to	YOURSECTION RS LTD
Client reference	RIVERSTONE
Phone number	
Fax number	
Date issued	18 June 2021
Date received	10 June 2021

Property details

Property address	4 Glovers Road
Valuation roll number	23562 09301
Valuation information	Capital Value: $3000000 Land Value: $2300000 Improvements Value: $700000 *Please note: these values are intended for Rating purposes*
Legal description	Lot 2 DP 83635
Existing owner	Yoursection RS Limited PO Box 9301 TOWER JUNCTION CHRISTCHURCH 8149

Council references

Debtor number	4188171
Rate account ID	73049823
LIM number	70247283
Property ID	1020795

Christchurch City Council
53 Hereford Street, PO Box 73015
Christchurch 8154, New Zealand
Tel 64 3 941 8999
Fax 64 3 941 8984
www.ccc.govt.nz

Land Information Memorandum

Document information

This Land Information Memorandum (LIM) has been prepared for the purpose of section 44A of the Local Government Official Information and Meetings Act 1987 (LGOIMA). It is a summary of the information that we hold on the property. Each heading or "clause" in this LIM corresponds to a part of section 44A.

Sections 1 to 10 contain all of the information known to the Christchurch City Council that must be included under section 44A(2) LGOIMA. Any other information concerning the land as the Council considers, at its discretion, to be relevant is included at section 11 of this LIM (section 44A(3) LGOIMA). If there are no comments or information provided in these sections this means that the Council does not hold information on the property that corresponds to that part of section 44A.

The information included in this LIM is based on a search of Council records only and there may be other information relating to the land which is unknown to the Council. Please note that other agencies may also hold information relevant to the property, or administer legislation relevant to the use of the land, for example, the Regional Council (Ecan), Heritage New Zealand Pouhere Taonga, and Land Information New Zealand.

Council records may not show illegal or unauthorised building or works on the property. The applicant is solely responsible for ensuring that the land is suitable for a particular purpose.

A LIM is only valid at the date of issue as information is based only upon information the Council held at the time of that LIM request being made.

Property file service

This Land Information Memorandum does not contain all information held on a property file. Customers may request property files by phoning the Council's Customer Call Centre on (03) 941 8999, or visiting any of the Council Service Centres. For further information please visit www.ccc.govt.nz .

To enable the Council to measure the accuracy of this LIM document based on our current records, we would appreciate your response should you find any information contained therein which may be considered to be incorrect or omitted. Please telephone the Customer Call Centre on (03) 941 8999.

Christchurch City Council
53 Hereford Street, PO Box 73015
Christchurch 8154, New Zealand
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Fax 64 3 941 8984
www.ccc.govt.nz

Land Information Memorandum

A search of records held by the Council has revealed the following information:

1. Special features and characteristics of the land

Section 44A(2)(a) LGOIMA. This is information known to the Council but not apparent from the district scheme under the Town and Country Planning Act 1977 or a district plan under the Resource Management Act 1991. It identifies each (if any) special feature or characteristic of the land concerned, including but not limited to potential erosion, avulsion, falling debris, subsidence, slippage, alluvion, or inundation, or likely presence of hazardous contaminants.

(For enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

- **Consultant Report Available**

  Land Information New Zealand (LINZ) engaged Tonkin and Taylor to provide a Geotechnical Report on Ground Movements that occurred as a result of the Canterbury Earthquake Sequence. The report indicates this property may have been effected by a degree of earthquake induced subsidence. The report obtained by LINZ can be accessed on their website at https://www.linz.govt.nz/land/surveying/earthquakes/canterbu ry-earthquakes/information-for-canterbury-surveyors

- **Liquefaction Vulnerability**

  Christchurch City Council holds indicative information on liquefaction hazard for Christchurch. Information on liquefaction, including an interactive web tool, can be found on the Council website at ccc.govt.nz/liquefaction. Depending on the liquefaction potential of the area that the property is in, the Council may require site-specific investigations before granting future subdivision or building consent for the property.

- **Softground**

  Council records show that site contains Soft Ground. Predominant Ground Material: N/A Reason for Assessment: Subdivision Should further buildings be proposed on this site, specific foundation design may be required.

Related information

- There is attached a sub division soil investigation report covering this property.

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53 Hereford Street, PO Box 73015
Christchurch 8154, New Zealand
Tel 64 3 941 8999
Fax 64 3 941 8984
www.ccc.govt.nz

2. Private and public stormwater and sewerage drains

Section 44A(2)(b) LGOIMA. This is information about private and public stormwater and sewerage drains as shown in the Council's records.

(For stormwater and sewerage enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

- **Property within Local Pressurised Sewer System Zone**

  This property is in a local pressure sewer system catchment within the Christchurch wastewater network. If there is a house on the property, there will already be a wastewater pressure pump and tank. If a house is yet to be built, a new wastewater pressure pump and tank will need to be installed. General information about pressure sewer systems can be found on the Council website. More detailed information can be obtained by contacting Council Customer Services on 03 941 8999.

Related information

- The property is shown to be served by an on-site septic tank disposal system.
- No details of the private stormwater system serving this property are shown on the plan or on Council records.
- This property has been identified as being in a pressurised wastewater system zone and attached is a copy of the systems user guide. For more information you can refer to https://ccc.govt.nz/services/water-and-drainage/wastewater/about-wastewater/types-of-wastewater-systems or contact Christchurch City Councils 3 waters unit on (03) 941-8999.

Christchurch City Council
53 Hereford Street, PO Box 73015
Christchurch 8154, New Zealand
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Fax 64 3 941 8984
www.ccc.govt.nz

3. Drinking Water Supply

Section 44A(2)(ba) and (bb) LGOIMA. This is information notified to the Council about whether the land is supplied with drinking water, whether the supplier is the owner of the land or a networked supplier, any conditions that are applicable, and any information the Council has about the supply.

Please note the council does not guarantee a particular water quality to its customers. If you require information on current water quality at this property please contact the Three Waters & Waste Unit.

(For water supply queries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

Water Supply

Christchurch City Council is the networked supplier of water to this property. This property is connected to the Christchurch City Council Water Supply. The conditions of supply are set out in the Christchurch City Council Water Supply, Wastewater & Stormwater Bylaw (2014), refer to www.ccc.govt.nz.

Christchurch City Council
53 Hereford Street, PO Box 73015
Christchurch 8154, New Zealand
Tel 64 3 941 8999
Fax 64 3 941 8984
www.ccc.govt.nz

4. Rates

Section 44A(2)(c) LGOIMA. This is information on any rates owing in relation to the land.

(For rates enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

(a) Annual rates

Annual rates to 30/06/2021: $ 18,496.32

	Instalment Amount	Date Due
Instalment 1	$ 4,623.98	31/08/2020
Instalment 2	$ 4,623.98	30/11/2020
Instalment 3	$ 4,623.98	28/02/2021
Instalment 4	$ 4,624.38	31/05/2021

Rates owing as at 18/06/2021: $ 0.00

(b) Excess water charges

$ 0.00

(For water charge enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

(c) Final water meter reading required?

No Reading Required

(To arrange a final water meter reading, please phone (03) 941 8999 or visit www.ccc.govt.nz.

Christchurch City Council
53 Hereford Street, PO Box 73015
Christchurch 8154, New Zealand
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Fax 64 3 941 8984
www.ccc.govt.nz

5. Consents, certificates, notices, orders, or requisitions affecting the land and buildings

*Section 44A(2)(d) LGOIMA. This is information concerning any consent, certificate, notice, order, or requisition, affecting the land or any building on the land, previously issued by the Council.*The information in this section may also cover building consent and/or code compliance information issued by building certifiers under the Building Act 1991 and building consent authorities that are not the Council under the Building Act 2004.

You can check the property file to identify whether any consent or certificate was issued by a building certifier under the Building Act 1991.

Section 44A(2)(da) LGOIMA. The information required to be provided to a territorial authority under section 362T(2) of the Building Act 2004. There is currently no information required to be provided by a building contractor to a territorial authority under section 362T(2) of the Building Act 2004. The Building (Residential Consumer Rights and Remedies) Regulations 2014 only prescribed the information that must be given to the clients of a building contractor.

(For building enquiries, please phone (03) 941 8999, email EPADutyBCO@ccc.govt.nz or visit www.ccc.govt.nz.

(a) Consents

- BCN/2003/2479 Applied: 07/04/2003 Status: Completed
  4 Glovers Road Halswell
  Accepted for processing 07/04/2003
  PIM Granted 22/04/2003
  PIM Issued 22/04/2003
  Building consent granted 22/08/2003
  Building consent issued 02/09/2003
  Code Compliance Certificate Granted 30/10/2003
  Code Compliance Certificate Issued 30/10/2003
  ALTER TO FAMILY FLAT- Historical Reference ABA10033765

(b) Certificates

Note: Code Compliance Certificates were only issued by the Christchurch City Council since January 1993.

(c) Notices

(d) Orders

(e) Requisitions

Related information

- Council holds no record of building permit/consent for dwelling at this address. No information is held by Council relating to the materials, construction or year the dwelling was built.
- The Council has previously issued other consents, certificates, notices, orders, and/ or requisitions for this property that have been resolved or are no longer current or relate to a building that is no longer on the land. For further information pleasecontact the compliance and investigation team on 941 8999 and reference CSR92185809.

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Christchurch 8154, New Zealand
Tel 64 3 941 8999
Fax 64 3 941 8984
www.ccc.govt.nz

6. Certificates issued by a building certifier

Section 44A(2)(e) LGOIMA. This is information notified to the Council concerning any certificate issued by a building certifier pursuant to the Building Act 1991 or the Building Act 2004.

(For building enquiries, please phone (03) 941 8999, email EPADutyBCO@ccc.govt.nz or visit www.ccc.govt.nz.

Christchurch City Council
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www.ccc.govt.nz

7. Weathertightness

Section 44A(2)(ea) LGOIMA. This is information notified to the Council under section 124 of the Weathertight Homes Resolution Services Act 2006.

(For weathertight homes enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

If there is no information below this means Council is unaware of any formal Weathertight Homes Resolution Services claim lodged against this property.

Christchurch City Council
53 Hereford Street, PO Box 73015
Christchurch 8154, New Zealand
Tel 64 3 941 8999
Fax 64 3 941 8984
www.ccc.govt.nz

8. Land use and conditions

Section 44A(2)(f) LGOIMA. This is information relating to the use to which the land may be put and conditions attached to that use. The planning information provided below is not exhaustive and reference to the Christchurch District Plan and any notified proposed changes to that plan is recommended: https://ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/plans/christchurch-district-plan/.

There maybe some provisions of the Christchurch City Plan or Banks Peninsula District Plan that affect this property that are still operative.

(For planning queries, please phone (03) 941 8999, email DutyPlanner@ccc.govt.nz or visit www.ccc.govt.nz.

- **Regional plan or bylaw**

There may be objectives, policies or rules in a regional plan or a regional bylaw that regulate land use and activities on this site. Please direct enquiries to Canterbury Regional Council (Environment Canterbury).

- **Waterway Provisions for Other Councils**

A resource consent or permit may also be required from the Canterbury Regional Council or other territorial authority, particularly with respect to water bodies managed by those authorities. Please refer to the relevant regional plan and any relevant bylaws, and contact the Christchurch City Council if you are uncertain which authority manages the water body in question.

(a)(i)Christchurch City Plan & Banks Peninsula District Plan

(ii)Christchurch District Plan

- **Liquefaction Management Area (LMA)**

  Property or part of property within the Liquefaction Management Area (LMA) Overlay which is operative.

- **Outline Development Plan**

  Property or part of property is within an Outline Development Plan area which is affected by specific provisions that are operative.

- **Remainder Slope Instability Management Area**

  Property or part of property within the Christchurch District Plan Remainder of Port Hills and Banks Peninsula Slope Instability Management Area overlay.

- **Waterway Provisions**

  This property or part of this property is close to at least one waterway. It may be within the setback for an Environmental Asset Waterway. Within that setback, District Plan rules apply to activities including buildings, earthworks, fences and impervious surfacing. Any part of the property within the setback will be affected by those rules.

- **Development Constraint Conditions**

  Council records show there is a specific condition on the use of this site: Well on Property

- **Development Constraint Conditions**

  Council records show there is a specific condition on the use of this site: Specific Site Level required

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- **Flood Management Area**

  Property or part of property within the Flood Management Area (FMA) Overlay which is operative.

- **District Plan Zone**

  Property or part of property within the Residential New Neighbourhood Zone which is operative.

(b) Resource consents

If there are any land use resource consents issued for this property the Council recommends that you check those resource consents on the property file. There may be conditions attached to those resource consents for the property that are still required to be complied with.

- RMA/2003/1909 - Land Use Consent
  4 Glovers Road Halswell
  Application to convert an existing studio into a family flat - Historical Reference RMA20014216
  Status: Processing complete
  Applied 25/07/2003
  Decision issued 13/08/2003
  Granted 13/08/2003

- RMA/2017/1463 - Land Use Consent
  4 Glovers Road Halswell
  To establish a Temporary Storage Yard
  Status: Processing complete
  Applied 26/06/2017
  Granted 13/02/2019
  Decision issued 13/02/2019

- RMA/2020/2557 - Land Use Consent
  2 Glovers Road Halswell
  Remediation of contaminated soils
  Status: Processing complete
  Applied 06/11/2020
  Granted 09/12/2020
  Decision issued 09/12/2020

- RMA/2020/2770 - Land Use Consent
  511 Halswell Road Halswell
  To conduct earthworks and stockpiling on site
  Status: Processing complete
  Applied 27/11/2020
  Granted 27/01/2021
  Decision issued 27/01/2021

Christchurch City Council
53 Hereford Street, PO Box 73015
Christchurch 8154, New Zealand
Tel 64 3 941 8999
Fax 64 3 941 8984
www.ccc.govt.nz

- RMA/2020/3076 - Combined subdivision / land use consent
  511 Halswell Road Halswell
  To subdivide 4 allotments to create 87 residential allotments. Land use consent for earthworks and under the NES for contaminated land.
  Status: On hold - waiting for response from applicant
  Applied 22/12/2020

- RMA/1999/5158 - Subdivision Consent
  Fee Simple SUBDIVISION - Historical Reference RMA4366
  Status: Processing complete
  Applied 30/04/1999

- RMA/2000/1933 - Subdivision Consent
  2 LOT FEE SIMPLE APP 223 recieved 29/9/00 certified 9/10/00 224 REQUESTED 08/03/01 Issued 13/3/01 DP 83635 - Historical Reference RMA20002667
  Status: Processing complete
  Applied 02/08/2000
  Granted 22/08/2000
  Decision issued 22/08/2000

Related information

- Council records show that there is a current/on hold monitoring job in our system. This monitoring is to ensure that the resource consent conditions have been met. For further information you can contact the Compliance & Investigation team A on 941 8999 or email: rcmon@ccc.govt.nz and reference to resource consent RMA/2020/2770 - RMA/2020/2557.

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9. Other land and building classifications

Section 44A(2)(g) LGOIMA. This is information notified to the Council by any statutory organisation having the power to classify land or buildings for any purpose.

(For land and building enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

Please refer to Section 1 for details

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www.ccc.govt.nz

10. Network utility information

Section 44A(2)(h) LGOIMA. This is information notified to the Council by any network utility operator pursuant to the Building Act 1991 or the Building Act 2004.

(For network enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

l **None recorded for this property**

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Fax 64 3 941 8984
www.ccc.govt.nz

11. Other information

Section 44A(3) LGOIMA. This is information concerning the land that the Council has the discretion to include if it considers it to be relevant.

(For any enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz.

(a) Kerbside waste collection

- Your recycling is collected Fortnightly on the Week 2 collection cycle on a Tuesday. Please leave your recycling at the Kerbside by 6:00 a.m. Your nearest recycling depot is the Parkhouse Road EcoDrop.

- Your refuse is collected Fortnightly on the Week 2 collection cycle on a Tuesday. Please leave your rubbish at the Kerbside by 6:00 a.m. Your nearest rubbish depot is the Parkhouse Road EcoDrop.

- Your organics are collected Weekly on Tuesday. Please leave your organics at the Kerbside by 6:00 a.m.

(b) Other

- **Floor Levels Information**

  Christchurch City Council holds a variety of information relevant to building/property development across the city. This includes minimum finished floor levels that need to be set to meet the surface water requirements in clause E1.3.2 of the building code (where this applies), and the requirements of the Christchurch District Plan (where a property is in the Flood Management Area). Where this information has been processed for your site, it can be viewed at https://ccc.govt.nz/floorlevelmap/, otherwise site specific advice can be obtained by emailing floorlevels@ccc.govt.nz.

- **Community Board**

  Property located in Halswell-Hornby-Riccarton Community Board.

- **Guest Accommodation**

  Guest accommodation (including whole unit listings on Airbnb; BookaBach; etc.) generally requires a resource consent in this zone when the owner is not residing on the site. For more information, please refer to: https://ccc.govt.nz/providing-guest-accommodation/.

- **Tsunami Evacuation Zone**

  This property is not in a tsunami evacuation zone. It is not necessary to evacuate in a long or strong earthquake or during an official Civil Defence tsunami warning. Residents may wish to offer to open their home to family or friends who need to evacuate from a tsunami zone, and should plan with potential guests to do so in advance.More information can be found at https://ccc.govt.nz/services/civil-defence/hazards/tsunami-e vacuation-zones-and-routes/

- **Electoral Ward**

  Property located in Halswell Electoral Ward

- **Listed Land Use Register**

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Hazardous activities and industries involve the use, storage or disposal of hazardous substances. These substances can sometimes contaminate the soil. Environment Canterbury identifies land that is used or has been used for hazardous activities and industries. This information is held on a publically available database called the Listed Land Use Register (LLUR). The Christchurch City Council may not hold information that is held on the LLUR Therefore, it is recommended that you check Environment Canterbury's online database at www.llur.ecan.govt.nz

- **Spatial Query Report**

  A copy of the spatial query report is attached at the end of this LIM. The spatial query report lists land use resource consents that have been granted within 100 metres of this property.

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Geotechnical Investigation and Assessment Report for Subdivision

Riverstone Subdivision, 2 & 4 Glovers Road, Halswell, Christchurch

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Issue Date: **20 October 2020**

Document Ref: **200357-RP-001[A]**

Prepared for: **Yoursection Ltd**

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Report Tracking - 2 & 4 Glovers Road, Halswell, Christchurch

Revision	Status	Date	Prepared by	Reviewed by
A	Final	20 October 2020	C. Gibbens	A. Giannakogiorgos

Authorisation

Author's Signature		**Approver's Signature**	
Name	Clem Gibbens	**Name**	Andreas Giannakogiorgos
Title	Engineering Geologist BSc MSc (Hons) MEngNZ	**Title**	Chartered Professional Engineer (Geotechnical) BSc MSc DIC CMEngNZ CPEng IntPE (NZ)

Miyamoto International New Zealand Ltd
Level 1, 236 Hereford Street | Christchurch 8011

www.miyamoto.nz

Executive Summary

Miyamoto International NZ Ltd (MINZ) has been engaged by Yoursection Ltd to undertake a geotechnical land suitability assessment for the proposed residential subdivision at 2 & 4 Glovers Road, Halswell, Christchurch. The key findings of our evaluation and assessment are outlined below.

GROUND CONDITIONS	**Ground profile**	The sub-surface conditions comprise mainly topsoil over sand-silt mixtures underlain by soft clayey silts and shallow gravel. The ground conditions are variable in horizontal and vertical spread.	
	Soil classification as per NZS 1170.5:2004	Residential Subdivision Area: Class 'D' (deep or soft soil site)	
	Depth to water table	Perched water tables and shallow saturated soils were encountered within the top 1.0 to 2.0m bgl. Permanent ground water is anticipated below the soft silts within the underlying sands and gravels.	
SEISMIC ASSESSMENT	**Design Earthquake Event**	**SLS/SLS2**	**ULS**
	Estimated "free-field" Index post-liquefaction volumetric settlements	< 50mm	< 80mm
	Liquefaction Severity Number (LSN) Value	< 15 Little to minor expression of liquefaction	< 25 Little to moderate expression of liquefaction
	MBIE Technical Categorization (TC)	**Mapped MBIE**	Rural & Unmapped
		Site Specific Foundation TC	TC2
GEOTECHNICAL CONSIDERATIONS	Our assessment of the site under RMA Section 106 found that the subsidence hazard is present on-site due to presence of soft/loose soil layers and liquefiable deposits, though these hazards can be mitigated by the options listed in this report. As the site is located within an FMA set out by CCC, a portion of the site will require filling to raise the ground level to a suitable level for the proposed development by around 1.0m close to Green's Stream. Filling of the site will likely cause static some consolidation settlements in the soft compressible soils underlying the site, though this is not expected to be a significant risk to the development, based on the pre-loading trial undertaken by MINZ previously. A period of monitoring of the site filling works during the raising of the site levels and for a period (~6 months) is advised to be safeguard against the anticipated static settlements.		

Table of Contents

1. Introduction

Miyamoto International NZ Ltd (Miyamoto) has been engaged by Yoursection Ltd to undertake a geotechnical evaluation and assessment as part of a land suitability assessment for the proposed new extension of the residential Riverstone Subdivision at 2 & 4 Glovers Road, Halswell, Christchurch.

Miyamoto have previously completed a geotechnical assessment for resource consenting purposes for the initial stage of the Riverstone Subdivision located at 511 Halswell Road, Christchurch (190666-RP-001[A] – 511 Halswell Road, dated 10 October 2019), as well as undertaking a trial pre-load assessment for the same property (190666-TM-001[A]_511 Halswell Road_Pre-load Trial, dated 28 January 2020). Both documents are referenced as part of this assessment, with this report supplementing and expanding on the work already undertaken.

The scope of this geotechnical engineering assessment was to evaluate the geotechnical conditions at the site and to provide preliminary recommendations for development of the sections. This assessment comprised the following:

- Research of the available information from the New Zealand Geotechnical Database (NZGD), Christchurch City Council (CCC) and Environment Canterbury (ECan);
- Site walkover inspection of the land;
- Shallow field investigation comprising hand-augered boreholes (HA) with associated dynamic cone penetrometer (DCP) and shear vane (SV) tests;
- Deep field investigation comprising Cone Penetration Tests (CPT) with accompanying Dynamic Probe Super Heavy (DPSH) testing;
- Multichannel Analysis of Surface Waves (MASW) geophysical survey;
- Ground Penetrating Radar (GPR) geophysical survey;
- Liquefaction analyses using CPT-based liquefaction triggering procedures;
- Reporting of the findings.

The geotechnical investigation and assessment were carried out considering the Ministry of Business, Innovation & Employment (MBIE) Guidance documents “Planning and engineering guidance for potentially liquefaction-prone land” - Version 1, dated September 2017, “Repairing and rebuilding houses affected by the Canterbury earthquakes” - Version 3, dated December 2012, and “Earthquake geotechnical engineering practice - Modules 2 & 3”. This report presents our findings and conclusions which are provided to facilitate the development of the extended subdivision plan for the site.

2. Site Description

The site, legally described as Lot 1 (2 Glovers) and Lot 2 (4 Glovers) DP 83635, is in Halswell, Christchurch and is approximately 8.3 hectares (ha) in total area. There is an approximate elevation change of 2.0m over 460m at an average gradient of 0.4%. The site generally slopes from north to south, with the low point at the southern boundary of both sections. The property is bound by Glovers Road along the northern boundaries and is bound by rural

properties on the south and east boundaries, and the 511 Halswell Road section to the west. Green's Stream runs through the southern end of both sections.

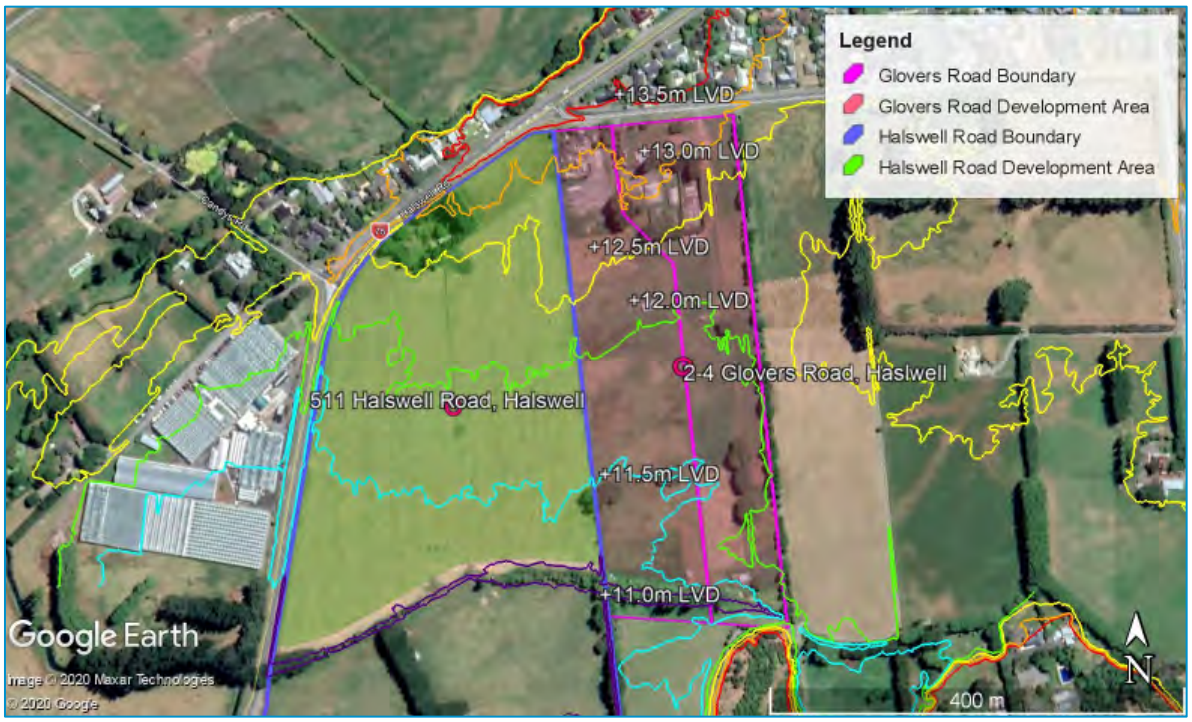

Figure 1: Proposed Site Layout with (Scale as Shown)

The property is located within the "Rural and Unmapped" category listed under the MBIE Technical Categories Map. The site location with reference to the MBIE Technical Categories is shown in Figure 2.

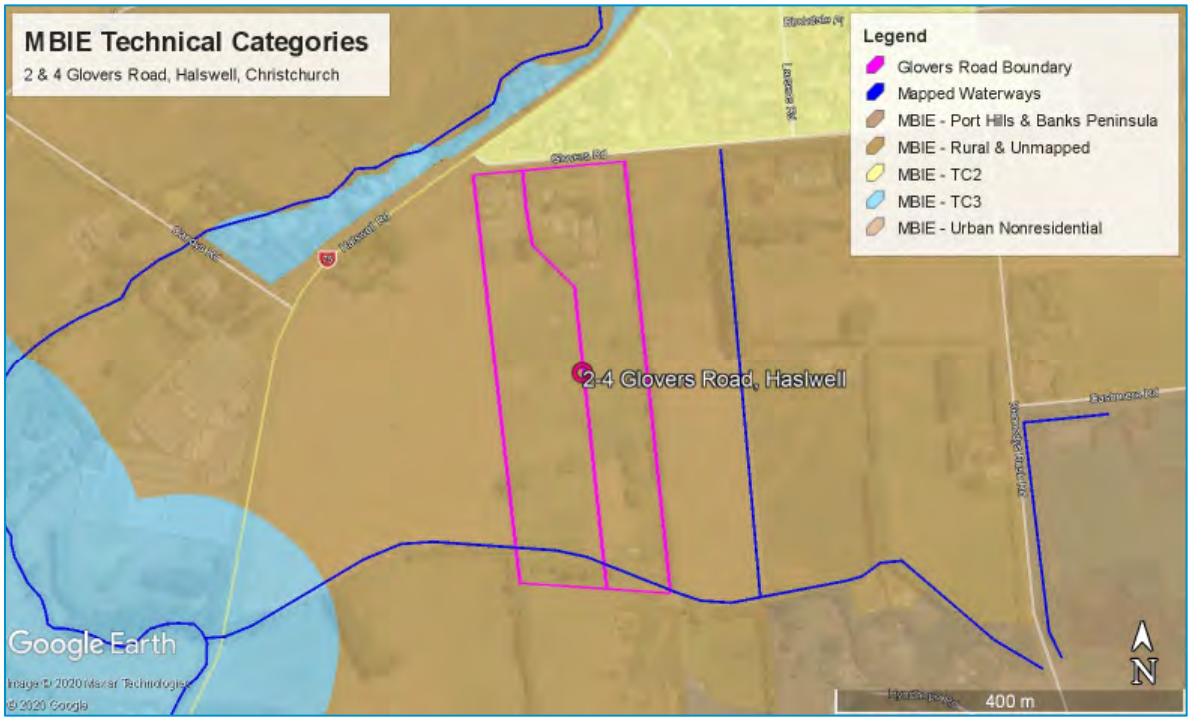

Figure 2: Site Location Plan Showing MBIE Technical Categories and Mapped Waterways (Scale as Shown)

The Riverstone Subdivision is proposed to, currently, be comprised of 239 residential lots with reserves located throughout. A draft plan of the subdivision, including the Glovers Road properties, is presented in Appendix A.

3. Desk Study

The following sources of third-party information were considered and are referenced in this report:

- New Zealand Geotechnical Database (NZGD);
- Environment Canterbury (ECan);
- Christchurch City Council (CCC).

New Zealand Geotechnical Database

The NZGD website was reviewed to identify any additional information related to the extent of land damage after the CES on the site and in the immediate surrounding areas. The results of this review indicate that no significant land damage was observed across the site. Table 1 provides a summary of the information obtained from our review of the NZGD.

Table 1: Desk Study Information Summary (NZGD)

	September 2010 (M_w 7.1)	February 2011 (M_w 6.2)	June 2011 (M_w 6.0)	December 2011 (M_w 5.9)
Aerial Photography Review	Outside of photographed area	Areas of likely ejecta identified in the central and northern areas of both properties, though mainly confined to 2 Glovers Road	Outside of photographed area	Outside of photographed area
Land damage observations	Minor ground cracking but no observed ejected liquefied material was recorded on the properties on the opposite side of Glovers Road in the September 2010 CES event and along Halswell Road and sections of Glovers Road during the June 2011 CES event.			
Observed ground cracking	No cracks mapped on the properties, 10mm – 200mm ground cracks mapped ~65m west of the northernmost boundary of the site within the residential area on the opposite side of Halswell Road			
PGA (g) ± SD	0.294 ± 0.390	0.356 ± 0.435	0.145 ± 0.465	0.139 ± 0.250
Scaled $PGA_{7.5}$ $PGA_{16\%ile}$ to $PGA_{84\%ile}$[(I)] (g)	0.179 to 0.394	0.164 to 0.391	0.061 to 0.156	0.071 to 0.117

(I) Scaled to M7.5 using Idriss and Boulanger recommendations (2008); 68% confidence $PGA_{7.5}$ range

Contaminated Land Considerations

The ECan Listed Land Use Register (LLUR) was reviewed and holds records of potentially Hazardous Activities and Industrial List (HAIL) sites. At this time, a small area that intersects the southern end of both sections is listed as a potential HAIL site. The LLUR lists this small area (in the vicinity of a storage shed) as an A10-classified area, which relates to "persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glass houses or spray sheds", though this has not been investigated by ECan. The property reports for both sections are included in Appendix B.

An environmental assessment is outside the scope of this assessment and has been undertaken by others.

Flood Hazard

Christchurch is a low-lying city and there have always been areas that are prone to flooding during heavy rainfall. The CES has worsened flood risk in many areas of the city through damage to waterways and land. Flood Management Areas (FMAs) have been identified by CCC in the District Plan and take into consideration the impacts of the CES.

At the time of writing this report the site is located within a FMA as indicated by the CCC District Plan.

It is understood that a Finished Floor Level (FFL) of 21.25m above Christchurch Drainage Datum (CDD) is a requirement for development of the site.

Ground Motion

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 and February 2011 events of the CES. This indicates that land and building damage in a future SLS event is likely to be similar to these individual events.

Additionally, based on the SLS2 level of shaking (M_w 6.0 and PGA of 0.19g) which was introduced by MBIE following the updated liquefaction triggering CPT-based procedure by Boulanger & Idriss (2014), it is our opinion the site was "sufficiently tested" to the SLS2 level of earthquake demand during the September 2010 and February 2011 events of the CES.

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. Subsurface Conditions

Geological Setting

The geological map of the area (GNS 1:250,000 QMap) indicates that most of the site has surface geology consisting of "modern (Quaternary) river floodplain and low-level degradation terraces (<2° slopes) comprised of unweathered, variably sorted gravel/sand/silt/clay".

Field Investigations

The NZGD website was reviewed to identify relevant geotechnical investigations completed within the site vicinity, additional to the data identified for use in the original site assessment for the neighbouring section, though nothing for inclusion was identified.

Miyamoto undertook the following site-specific ground investigations and testing:

- Five (5) hand-augered boreholes (referenced HA1 to HA5) with in-situ shear vane testing;
- Five (5) Dynamic Cone Penetrometer (DCP) tests (referenced DCP1 to DCP5);
- Laboratory testing including fines content (FC) and Atterberg Limits;
- Twelve (12) Cone Penetration Tests (CPTu) with porewater pressure measurements;
- Multichannel Analysis of Surface Waves (MASW) geophysical survey;
- Ground Penetrating Radar (GPR) geophysical survey.

The general details of the ground investigations are summarised in Table 2, the test locations are shown in Figure 3 and Figure 4, and the HA/DCP logs and CPT plots are presented in Appendix C and the geophysical survey report is presented in Appendix D.

Table 2: Summary of Ground Investigations

Test Ref.	Source	Source Ref.	Test Type	Depth (m bgl)
HA1/DCP1 to HA5/DCP5	MINZ	200357	Hand Auger/ DCP	1.8 to 3.9
CPTu001 to CPTu012	LandTest	19096	CPT	10.0 to 15.0
MASW 1 to MASW 3	Southern Geophysical Ltd	2050	MASW	Up to 40.0
GPR 1 to GPR 11			GPR	Up to 4.0

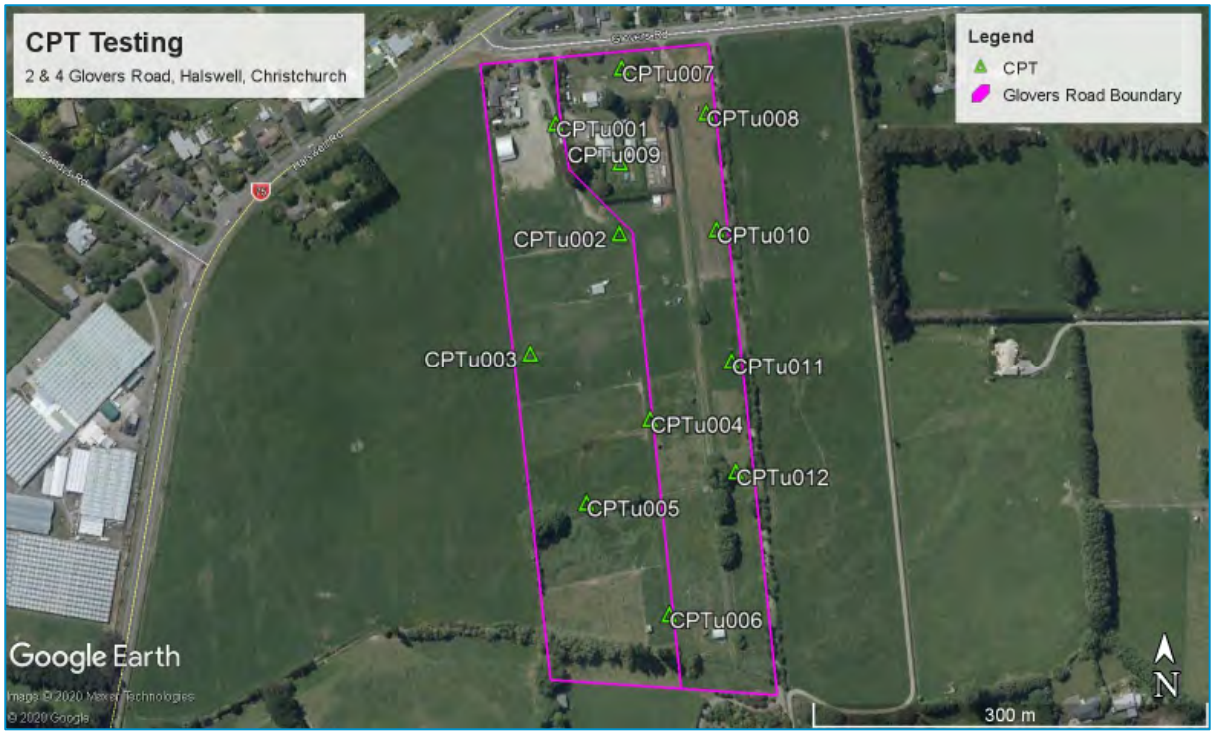

Figure 3: CPT Investigation Location Plan (Scale as Shown)

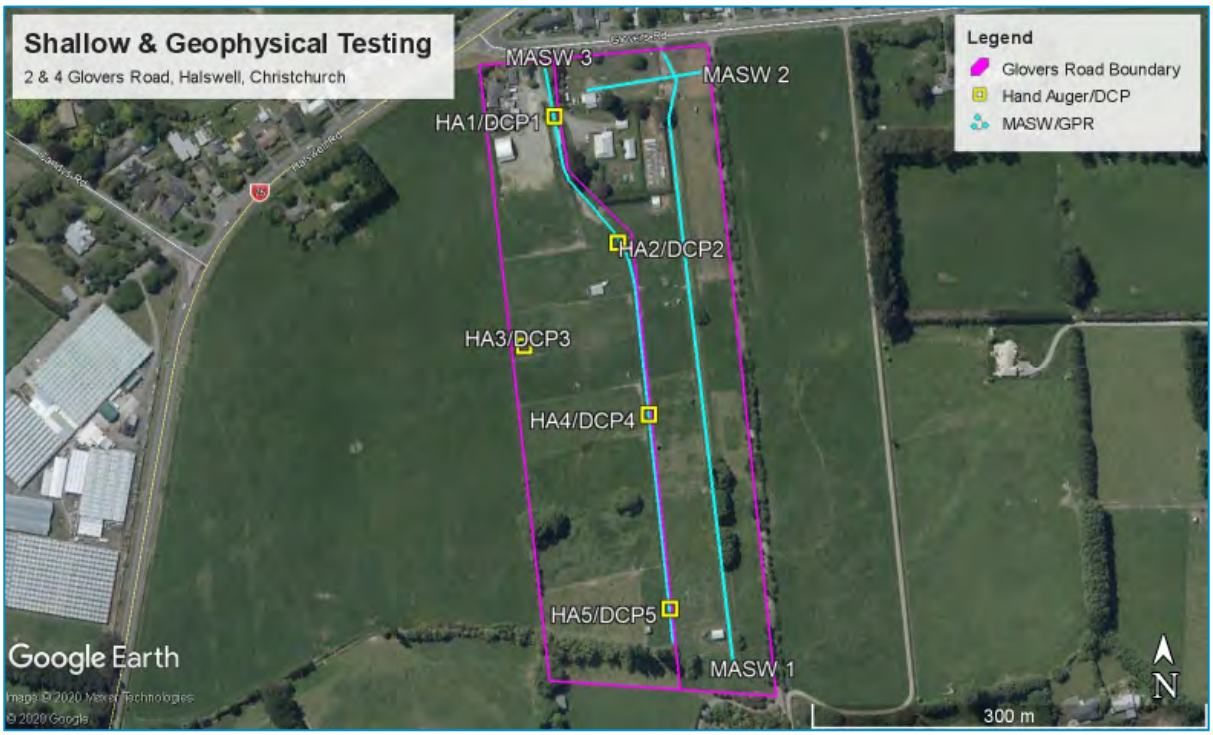

Figure 4: Other Geotechnical Investigation Location Plan (Scale as Shown)

Laboratory Test Results

Laboratory testing was undertaken on samples obtained from our shallow ground investigation to assess the soil characteristics across the site. The testing undertaken includes wet sieving to determine the fines content, and Atterberg limits tests to determine the plastic and liquid limits. A summary of the test results is presented in Table 3, with the full results presented in Appendix C.

Table 3: Laboratory Test Results

Sample Ref.	Depth of sample (m)	Soil Description	Plasticity Index	% Passing		
				0.3 mm	0.15 mm	0.063 mm
C20-319	HA1 1.5m – 2.3m	Silty SAND, brownish grey, wet, non-plastic	-	100	90	49
C20-320	HA1 2.3m – 3.8m	Silty SAND, brownish grey, saturated, non-plastic	-	100	91	49
C20-321	HA2 2.7m – 4.0m	Silty CLAY, some sand, dark grey, saturated, low plasticity	9	99	96	85
C20-312	HA3 2.0m – 3.4m	Sandy SILT, dark grey, saturated, non-plastic	NP	100	99	59
C20-323	HA5 1.5m – 1.8m	Silty SAND, brownish grey, wet, non-plastic	-	99	77	42

Ground Conditions

The ground conditions interpreted from the existing data and investigations undertaken as part of this assessment are presented graphically in the geotechnical cross sections included in Appendix E and the basic soil descriptions are outlined in Table 4.

A near-surface paleo-feature (old river terrace or paleochannel) was identified during the site testing with the CPT's completed at the southern end of the site (CPTu004 to CPTu006 and CPTu012) refusing in dense soils within the upper 5m, before testing was continued with the DPSH. The shallow investigation (HA5/DCP5) also refused at a shallow depth due to dense soils. The testing at the northern end of the site all reached the target depths and were consistent in their findings.

Table 4: Ground Conditions Summary

Layer	Soil Name
a	Silty SAND and Sandy SILT, loose to firm
b	Clayey SILT, soft to firm, medium plasticity
c	Silty SAND, medium dense to dense with increasing depth
GS	Gravelly SAND to Sandy GRAVEL, dense
d	Clayey SILT to silty CLAY, firm
e	Medium dense SAND with silt and gravels
f	Clayey SILT, firm to stiff
S	Silty SAND to Sandy SILT, medium dense to very stiff

MASW & GPR Geophysical Survey

The shear wave velocity (V_S) measurement was assessed with a MASW survey. The results of the survey were used to refine the boundaries and extents between the shallow, softer soils and denser sandy/gravelly layers with the MASW survey reflecting the findings of the intrusive investigations, with 2 clearly defined areas for the north and south of the site. The soils in the northern part of the site had a generally lower shear wave velocity (V_S < 180m/s) to approximately 20.0m depth, though discrete layers of denser, higher V_S soils were identified above this depth before becoming lower velocity again. For the southern part of the site, the lower V_S soils are generally terminated shallower (<5m depth) before the V_S increased in the gravelly dense material.

Additionally, the measured cone tip resistance (q_c) and interpreted shear wave velocity from the CPT data generally shows a consistent pattern with the recorded values from the MASW survey as seen in the CPT profiles in Appendix C. It should be noted that due to the high velocity layers towards the south, thin lower velocity layers were not picked up as seen in the DPSH data. This is reflected in the cross sections presented in Appendix E.

The GPR survey was undertaken to further supplement the MASW surveys for the near-surface soils. The primary objective of this survey was to assist in identifying softer or denser layers that may not have been picked up in the MASW survey. The results generally show a consistent correlation with the MASW survey. The softer soils generally had a poor reflection, with denser material showing a clearer reflection. The shallow gravelly soils at the southern end of the site were also clear within the upper 4.0m of the soil profile.

Groundwater

Our site-specific shallow investigation encountered groundwater levels between 1.0m and 1.8m bgl, however the cohesive soils below the recorded depth were noted to not be saturated, indicating that a perched water table is likely present on-site. The CPT data shows variable piezometric conditions indicating a groundwater table depth between 0.7m and 2.4m bgl, due to the differing depth of cohesive soils in the upper soil profile and different elevations. The shallower groundwater depths were generally confined to the lower elevations of the property.

Based on the above, a groundwater depth range of between 0.7m to 2.4m bgl was adopted for the liquefaction triggering and free-field settlement assessment, depending on the location of the test across the site.

Site Subsoil Class

Based on the site-specific investigation, geological maps and other available information, the site is classified as a Class D (deep or soft soil) site.

Shallow Soils

The geotechnical investigations indicate the existence of low velocity ($V_s \leq 180$m/s), soils between approximately 4.0m and 20.0m depth, with the lower V_S soils encountered at greater depths towards the north of the sections. There are also locations where denser pockets of material were identified within these lower V_S layers. Those layers have lower strength and have the potential for long-term consolidation settlements from loads, such as residential dwellings. This is further discussed later in this report.

5. Liquefaction Assessment

Methodology

An assessment of the earthquake-induced free-field post-liquefaction volumetric settlement at the site has been carried out in accordance with the MBIE Guidance and using proprietary liquefaction assessment software, for SLS and ULS earthquake scenarios.

The seismic design requirements adopted for use in the analyses are defined in MBIE/NZGS Earthquake Geotechnical Engineering Practice Module 3 (May 2016), and Part C of the MBIE Guidelines “Repairing and rebuilding houses affected by the Canterbury earthquakes” and its subsequent updates - clarifications. These are:

- Buildings of normal use (Importance Level 2);
- Deep or soft soil sites (Class D) as specified previously;

- Boulanger and Idriss (2014) methodology for liquefaction triggering, as per the MBIE Guidance subsequent updates (Issue 7, October 2014);
- Zhang et al. (2002) post-liquefaction volumetric strain calculation for estimating the free-field settlements;

Calculations were performed for the full depth of the CPTs and the upper 10m of the soil profile (as per the MBIE Guidance "index value" estimations). It should be noted that the settlement estimates only account for the free-field component of the expected settlement. Actual total settlements under SLS or ULS earthquake loading may be greater or less.

The Liquefaction Severity Number (LSN[1]) has been calculated and used in our assessment as it tends to better reflect the more damaging effects of shallow liquefaction, which is more critical for shallow founded structures. The level of ground damage associated with LSN is summarised in Table 5.

Table 5: Liquefaction Severity Number Ranges and Related Effects

LSN Value	Observed Performance
<10	Little to no expression of liquefaction, minor effects
10 – 20	Minor expression of liquefaction, some sand boils
20 – 30	Moderate expression of liquefaction, with sand boils and some structural damage
30 – 40	Moderate to severe expression of liquefaction, settlement can cause structural damage
40 – 50	Major expression of liquefaction, undulations and damage to ground surface, sever total and differential settlement of structures
>50	Severe damage, extensive evidence of liquefaction at surface, sever total and differential settlements affecting structures, damage to services

Liquefaction Assessment Results

Due to the rapid changes at the interface between fine and coarse-grained soils, a layer correction was applied. The cone tip penetration, and subsequently, the ability to resist liquefaction of a sandy material, is reduced by the surrounding silty layers, while the I_c[2] of the silt layers is reduced due to the presence of the surrounding sandy layers and hence the susceptibility of the fine layers is overestimated. For our analysis, an I_c change of >0.05 per 10mm has been adopted, which eliminates the liquefaction potential for the layer.

The results of our liquefaction triggering analyses utilising the CPT data are presented in Appendix F and summarised in Table 6.

[1] **LSN = Liquefaction Severity Number**. LSN (van Ballegooy et al., 2014) is a vulnerability indicator (damage index) quantifying liquefaction-induced damage developed to reflect more damaging effects of shallow liquefaction on residential land and foundations following the Canterbury Earthquakes (2010-11). LSN considers depth weighted calculated volumetric densification strain within soil layers as a proxy for the severity of liquefaction land damage likely at the ground surface.

[2] **I_c = Soil Behaviour Classification Index -** Robertson & Wride 1998.

Table 6: Estimated "Free-Field" Post-Liquefaction Volumetric Ground Surface Settlements

Earthquake scenario	Moment magnitude (M_w) / PGA (g)	MBIE "Index Value" (mm)	MBIE Technical Category	LSN Values
GWD = varying (in-situ) and 0.5m to 1.2m (earthquake); Layer transition applied				
SLS SLS2	7.5/0.13 6.0/0.19	< 35 5 – 50	TC2 TC2	1 – 5 2 – 16
ULS	7.5/0.35	5 – 80	TC2	5 – 25

In accordance with the MBIE Guidance, the analysis indicates that under SLS and ULS loading conditions the predicted index value settlements fall within the expected future land performance values for a TC2 category site. The higher settlements were located on the land at the northern area of the 2 Glovers Road section, which generally correlates with observed liquefaction ejecta in the aerial photographs.

Based on the LSN estimated for the design events, 'little to minor' expression of liquefaction may be expected for a future SLS design event, and 'little to moderate' expression of liquefaction may be expected for a future ULS design event. The values of LSN at the upper end of the ranges estimated are generally located in the central portion of the development area (where ejecta has been observed following the CES events).

Lateral Spreading

Given the generally flat topography of the site, and the assumption that the site will be levelled further during the development of the subdivision, there is unlikely to be significant height differences, apart from the area immediately adjacent to Green's Stream. As the area needs to be developed with the FMA in mind, and land levels lifted, there is the potential for a more pronounced 'free-face' that could create a risk of lateral spreading. Options to address this are discussed later in the report.

6. Site Designation Assessment

Based on the findings of our desk study, our site-specific ground investigation and observations, and assessment of the performance of the land, we consider the MBIE TC2 category generally appropriate for the site. Despite the deformation characteristics of TC2, the land does not meet the definition of 'Good Ground' as per the New Zealand Standards without modification to standard foundation systems and specific engineering design to account for this due to the soft soils.

7. Geotechnical Considerations for Subdivision

Geotechnical Hazards

The most significant geotechnical hazards at the site comprise the potential for earthquake-induced soil liquefaction and potential static subsidence of the soft compressible soils. These hazards can be partly mitigated by providing strengthened foundations, which reduce the potential for differential settlement of the buildings and are designed to be re-levellable.

However, as part of the land development it is understood that, in order to meet the CCC FFL requirements, the site grade will need to be raised by filling. Site filling works can induce

additional loading of the underlying soft compressible deposits and potentially lead to consolidation settlement of the fill and / or construction above. To assess the likely influence of filling, a pre-load trial was undertaken by Miyamoto. This trial indicates that static settlements are not believed to pose a significant risk to the Halswell Road section of the development. Given the similar soil conditions found, it is our professional opinion that this statement also applies to the Glovers Road properties. It is still recommended that settlement plates are installed during the site filling works and these should be founded at the base of the fill with upstands extending through the top of the fill. It is advised that the settlement plates are monitored during the raising of the site levels and for a period (up to 6 months) to assess any static settlements and ensure performance is in line with the pre-loading trial findings.

The current subdivision plan for the entire site is not currently finalised and until it is further developed, specific detailed recommendations cannot be provided, however, the following sections outline general considerations for future development.

Development Considerations

Based on the land survey data (provided by others), a maximum level of approximately 22.3m CDD was identified at the northern extent of property. The land drops to approximately 19.6m CDD next to Green's Stream, though the development does not extend to this point. The low point of the development area is at approximately 20.4m CDD. As discussed above, the site will require filling to meet the CCC FFL requirements (FFL = 21.25m CDD based on the Halswell Road site), particularly if the preferred foundation options comprise concrete slab foundations. It is anticipated that maximum filling would be in the proximity of 1.2m.

Currently, there is no indication of cutting or removal of material to the north of the site. All earthworks should be undertaken in accordance with NZS 4431:1989 (code of practice for earth fill for residential development) prior to the construction of any foundations. The monitoring scheme (mentioned earlier) should be fully developed once the final details of the proposed earthworks are known.

The southern extent of the filling (in proximity of Green's Stream) will be the maximum height of fill required and will require detailed design to ensure stability. It is our understanding the development area is to extend to within 15m of Green's Stream. A shallow vegetated slope is considered suitable given the height of filling is not likely to exceed 1.2m, and provided the slope is not at a gradient exceeding 1.0m vertical to 2.0m horizontal.

Based on the above and the previously completed works, the following foundation solutions would be considered suitable for the construction of NZS3604 compliant structures for the subdivision:

- MBIE TC2 (Options 1 to 4) enhanced foundation slab;
- Specifically designed, enhanced NZS 3604 perimeter foundation wall and shallow piles.

Based on development works proposed, a geotechnical ultimate bearing capacity of 200kPa can be assumed at a high level, though this value is indicative only. The available bearing capacity must be confirmed on-site prior to construction works at the time of any building consent application.

The foundation types detailed above are also preliminary and should be further developed and optimised in collaboration with the structural engineer once further details of any proposed structure are finalised.

Stormwater Management

Stormwater management is outside the scope of our works. However, it is understood the southern section of the Halswell Road site (area south of Green's Stream) will be utilised for stormwater detention and treatment for the Riverstone subdivision as a whole, with shallow basins excavated through this area. As mentioned in the initial assessment undertaken, this material is unlikely to be suitable for filling of the development area.

Services

Buried services are vulnerable to ground deformations when located within and/or in proximity of potentially liquefiable and compressible soils. Services for the residential development should be designed by a suitably qualified person in collaboration with the geotechnical engineers to accommodate the likelihood of future ground deformations.

Pavement/Roading Infrastructure

As for the services at the site, pavements will require detailed design by a suitably experienced person in collaboration with the geotechnical engineer, the finished ground levels and compaction characteristics of the filling material.

It is currently understood that the new areas of development will link into the Halswell Road property as well as having its own access onto Glovers Road, and it is assumed that filling in this area will be required to raise the grade. The underlying soils in this area are generally typical for the site with the upper 1.0m comprising topsoil over soft silt (loosely corresponding to a CBR of ~2 to 3 below the topsoil).

8. Assessment Against RMA Section 106

As per the requirements of Section 106 of the Resource Management Act (RMA) (2017), we have undertaken a high-level assessment of the significant geotechnical hazards that may affect the site, outside of the hazards already discussed in this report (i.e. static and earthquake-induced subsidence, and lateral spreading). These hazards include, but are not limited to:

- Erosion;
- Falling debris;
- Slippage;
- Inundation.

At the time of our site visit, there was no evidence of erosion. Likewise, no evidence was observed to suggest that lateral movement is an issue on the site, given the site is generally

flat. Rock Fall or slope movement are also not considered a risk to this area of the development.

As part of the site is identified as being within a Flood Management Area (FMA) as defined by the CCC, inundation is likely to be a risk, as the site currently stands. If the site is built up to ensure the FFLs set by the CCC are met and suitable stormwater drainage is in place, then inundation is not considered an imminent risk to the development.

Based on our assessment, we consider that the "significant" geotechnical hazards may be mitigated to an acceptable standard, provided that the geotechnical recommendations given in this report are followed, and the appropriate engineering measures implemented, we consider that the development is unlikely to be affected nor worsen, accelerate or result in material damage.

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.
- 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 Client is responsible for ensuring that the design of any foundations ensures the functionality of the building under SLS level loads.
- 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 as a result of any such changes.
- This report is not to be reproduced, either wholly or in part, without our prior written permission.

If you have any queries or you require any further clarification on any aspects of this report, please do not hesitate to contact Miyamoto International (NZ) Ltd.

10. References

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Appendices

A. Updated Indicative Subdivision Plan (Davie Lovell Smith)

AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION

NOTES :

1. Areas and dimensions are approximate only and are subject to final survey and deposit of plans.
2. Service easements to be created as required.
3. This plan has been prepared for discussion purposes only. No liability is accepted if the plan is used for any other purposes.
4. The position of Greens Drain is approximate and subject to survey.

Total Area : 23.1161 ha

Comprised in: RT's CB10B/654, CB48C/117 & CB48C/118

DAVIE LOVELL-SMITH
PLANNING SURVEYING ENGINEERING

116 Wrights Road P O Box 679 Christchurch 8140. New Zealand
Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:

Halswell Road

SHEET TITLE:

Proposed Subdivision of Pt RS 1593, RS 772 & Lots 1 & 2 DP 83635

DRAWING STATUS

For Discussion Purposes

SCALE : 1:1000@A1 1:2000@A3

DATE : October 2020

CAD FILE : J:\2017\Concept_R6.dwg

REVISION : R6

DRAWING No : C20017

SHEET No: 1 OF 1

B. ECan Listed Land Use Register Files

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Dear Sir/Madam

Thank you for submitting your property enquiry in regards to our Listed Land Use Register (LLUR) which holds information about sites that have been used, or are currently used for activities which have the potential to have caused contamination.

The LLUR statement provided indicates the location of the land parcel(s) you enquired about and provides information regarding any LLUR sites within a radius specified in the statement of this land.

Please note that if a property is not currently entered on the LLUR, it does not mean that an activity with the potential to cause contamination has never occurred, or is not currently occurring there. The LLUR is not complete, and new sites are regularly being added as we receive information and conduct our own investigations into current and historic land uses.

The LLUR only contains information held by Environment Canterbury in relation to contaminated or potentially contaminated land; other information relevant to potential contamination may be held in other files (for example consent and enforcement files).

If your enquiry relates to a farm property, please note that many current and past activities undertaken on farms may not be listed on the LLUR. Activities such as the storage, formulation and disposal of pesticides, offal pits, foot rot troughs, animal dips and underground or above ground fuel tanks have the potential to cause contamination.

Please contact and Environment Canterbury Contaminated Sites Officer if you wish to discuss the contents of the LLUR statement, or if you require additional information.
For any other information regarding this land please contact Environment Canterbury Customer Services.

Yours sincerely

Contaminated Sites Team

Property Statement
from the Listed Land Use Register

Visit www.ecan.govt.nz/HAIL for more information about land uses.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Date:	13 October 2020
Land Parcels:	Lot 1 DP 83635 Valuation No(s): 2356209300

The information presented in this map is specific to the property you have selected. Information on nearby properties may not be shown on this map, even if the property is visible.

Summary of sites:

Site ID	Site Name	Location	HAIL Activity(s)	Category
26587	26587	Halswell West	A10 - Persistent pesticide bulk storage or use;	Not Investigated

Please note that the above table represents a summary of sites and HAILs intersecting the area of enquiry only.

Information held about the sites on the Listed Land Use Register

Site 26587: 26587 (Intersects enquiry area.)

Site Address:	Halswell West
Legal Description(s):	Lot 1 DP 83635,Lot 2 DP 83635

Site Category:	Not Investigated
Definition:	Verified HAIL has not been investigated.

Land Uses (from HAIL):

Period From	Period To	HAIL land use
Pre 1994	Pre 2004	Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glass houses or spray sheds

Notes:

17 Oct 2013 Area defined from: 1994-2004 ECan Aerial Photographs

Note: Multiple glass houses were noted in aerial photographs reviewed.

Investigations:

There are no investigations associated with this site.

Information held about other investigations on the Listed Land Use Register

For further information from Environment Canterbury, contact Customer Services and refer to enquiry number ENQ265562.

Disclaimer:

The enclosed information is derived from Environment Canterbury's Listed Land Use Register and is made available to you under the Local Government Official Information and Meetings Act 1987 and Environment Canterbury's Contaminated Land Information Management Strategy (ECan 2009).

The information contained in this report reflects the current records held by Environment Canterbury regarding the activities undertaken on the site, its possible contamination and based on that information, the categorisation of the site. Environment Canterbury has not verified the accuracy or completeness of this information. It is released only as a copy of Environment Canterbury's records and is not intended to provide a full, complete or totally accurate assessment of the site. It is provided on the basis that Environment Canterbury makes no warranty or representation regarding the reliability, accuracy or completeness of the information provided or the level of contamination (if any) at the relevant site or that the site is suitable or otherwise for any particular purpose. Environment Canterbury accepts no responsibility for any loss, cost, damage or expense any person may incur as a result of the use, reference to or reliance on the information contained in this report.

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Please note that if a property is not currently entered on the LLUR, it does not mean that an activity with the potential to cause contamination has never occurred, or is not currently occurring there. The LLUR is not complete, and new sites are regularly being added as we receive information and conduct our own investigations into current and historic land uses.

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Yours sincerely

Contaminated Sites Team

Property Statement
from the Listed Land Use Register

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PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Date:	13 October 2020
Land Parcels:	Lot 2 DP 83635 Valuation No(s): 2356209301

The information presented in this map is specific to the property you have selected. Information on nearby properties may not be shown on this map, even if the property is visible.

Summary of sites:

Site ID	Site Name	Location	HAIL Activity(s)	Category
26587	26587	Halswell West	A10 - Persistent pesticide bulk storage or use;	Not Investigated

Please note that the above table represents a summary of sites and HAILs intersecting the area of enquiry only.

Information held about the sites on the Listed Land Use Register

Site 26587: 26587 (Intersects enquiry area.)

Site Address:	Halswell West
Legal Description(s):	Lot 1 DP 83635,Lot 2 DP 83635

Site Category:	Not Investigated
Definition:	Verified HAIL has not been investigated.

Land Uses (from HAIL):

Period From	Period To	HAIL land use
Pre 1994	Pre 2004	Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glass houses or spray sheds

Notes:

17 Oct 2013 Area defined from: 1994-2004 ECan Aerial Photographs

Note: Multiple glass houses were noted in aerial photographs reviewed.

Investigations:

There are no investigations associated with this site.

Information held about other investigations on the Listed Land Use Register

For further information from Environment Canterbury, contact Customer Services and refer to enquiry number ENQ265560.

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C. Geotechnical Investigation Results

MINZ Shallow Investigation Logs

Laboratory Soil Sample Test Results

LandTest CPT/DPSH Plot

miyamoto. ENGINEERS + CONSTRUCTION CONSULTANTS

PROJECT NUMBER:	**200357**
CLIENT:	**Yoursection Ltd.**
TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA1/DCP1

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**				
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**2.9 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**	*SHEAR VANE NUMBER:*	**2102**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.65 mbgl**	This report may only be reproduced in full	

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
0.0	1			SILT: low plasticity, dark brown, moist, with minor rootlets (TOPSOIL)											
	1														
	1														
	1														
0.5	3			SILT: low plasticity, brown, moist, with minor fine sand											
	2														
	1														
	2														
	1														
1.0	2														
	2														
	2														
	2														
	2														
	1														
1.5	2			Silty SAND: fine to medium, brown-grey, wet											
	2	▽													
	2														
	2														
	2					DIST. SAMPLE					51%	49%			
2.0	3			at 2.0m: becomes blue-grey, saturated											
	3														
	2														
	1														
	1														
2.5	2					DIST. SAMPLE					51%	49%			
	2														
	3														
	4														
	5			...contd on next page											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	HA	HAND AUGER	LL	LIQUID LIMIT	Gr	GRAVEL
GWL	GROUNDWATER LEVEL	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	Sa	SAND
mbgl	METERS BELOW GROUND LEVEL	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
WC	WATER CONTENT	UW	UNIT WEIGHT (kN/m^3)	NE	NOT ENCOUNTERED	▽	STANDING GWL

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA1/DCP1 (contd.)

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**						
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**3.9**	**mbgl**	*HOLE DIAMETER:*	**50 mm**	
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**		*SHEAR VANE NUMBER:*	**2102**	
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.65**	**mbgl**	This report may only be reproduced in full		

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
	9	1.65m bgl --->		Silty SAND: fine to medium, blue-grey, saturated (contd.)		DIST. SAMPLE					51%	49%			
	9														
	9														
	9														
3.5	7														
	6														
	6														
	7														
	7			SILT: low plasticity, blue-grey, saturated											
4.0				**EOH (Target Depth Reached)**											
4.5															
5.0															
5.5															

LEGEND

ABBREVIATIONS

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

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA2/DCP2

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**				
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**3.9 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**	*SHEAR VANE NUMBER:*	**2102**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.3 mbgl**	This report may only be reproduced in full	

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
0	1			SILT: non-plastic, dark brown, moist, with some sand and rootlets (TOPSOIL)											
	2														
	1														
	2			SILT: low plasticity, yellow-brown, moist, with some sand											66 / 16
0.5	2														
	3														
	3			SAND: fine to medium, orange-brown, moist, with trace of silt											
	3														
	2														
	2														
1.0	4														
	3														
	2	▽													
	3														
	2														
1.5	2			Clayey SILT: low to medium plasticity, grey, moist, with some sand											
	3														
	4														
	3			at 1.9m: becomes wet, mottled orange											
	Self Weight														63 / 16
2.0	1														
	3			at 2.2m: mottling absent											
	3														
	3			at 2.3m: becomes saturated											
	4														
2.5	4														
	5														
	5														
	7						DIST. SAMPLE	29	20	9	-	15%	85%		
	7			...contd on next page											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	HA	HAND AUGER	LL	LIQUID LIMIT	Gr	GRAVEL
GWL	GROUNDWATER LEVEL	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	Sa	SAND
mbgl	METERS BELOW GROUND LEVEL	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
WC	WATER CONTENT	UW	UNIT WEIGHT (kN/m^3)	NE	NOT ENCOUNTERED	▽	STANDING GWL

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA2/DCP2 (contd.)

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**						
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**3.9**	**mbgl**	*HOLE DIAMETER:*	**50 mm**	
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**		*SHEAR VANE NUMBER:*	**2102**	
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.3**	**mbgl**	This report may only be reproduced in full		

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
	7	1.3m bgl -->		Clayey SILT: low to medium plasticity, grey, saturated, with some sand (contd.)											
	7														
	8														
	7														
3.5	7					DIST. SAMPLE	29	20	9	-	15%	85%			
	6														
	7														
	8														
	7														
4.0				**EOH (Target Depth Reached)**											
4.5															
5.0															
5.5															

LEGEND

ABBREVIATIONS

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

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA3/DCP3

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**						
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**4.1**	**mbgl**	*HOLE DIAMETER:*	**50 mm**	
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**		*SHEAR VANE NUMBER:*	**2102**	
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.8**	**mbgl**	This report may only be reproduced in full		

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
0.0	2			SILT: non-plastic, dark brown, dry, with some sand and rootlets (TOPSOIL)											
	1														
	2														
	2														
	2			SILT: low plasticity, light brown, moist											
0.5	2														
	2			SAND: fine to medium, orange brown, moist											
	2														
	2														
	2														
1.0	2														
	2														
	3														
	1			Sandy SILT: low plasticity, orange brown, wet											
	2														
1.5	3			SILT: medium plasticity, brown, wet											
	3														
	3	▽													
	5														
	2														
2.0	2			Sandy SILT: non-plastic, dark grey, saturated			DIST. SAMPLE	Non-Plastic		-	41%	59%			
	2														
	3														
	4														
	4														
2.5	5														
	5														
	2														
	4														
	5			...contd on next page											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	HA	HAND AUGER	LL	LIQUID LIMIT	Gr	GRAVEL
GWL	GROUNDWATER LEVEL	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	Sa	SAND
mbgl	METERS BELOW GROUND LEVEL	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
WC	WATER CONTENT	UW	UNIT WEIGHT (kN/m^3)	NE	NOT ENCOUNTERED	▽	STANDING GWL

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA3/DCP3 (contd.)

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**						
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**4.1**	**mbgl**	*HOLE DIAMETER:*	**50 mm**	
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**		*SHEAR VANE NUMBER:*	**2102**	
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.8**	**mbgl**	This report may only be reproduced in full		

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
			USC	*Soil Characteristics*	*Graphic Log*		*Atterberg Limits*			*Grain Size*			*WC (%)*	*UW*	
							LL	*PL*	*PI*	*Gr*	*Sa*	*FC*			
	5	1.8m bgl ⟶		Sandy SILT: non-plastic, dark grey, saturated (contd.)		DIST. SAMPLE	Non-Plastic			-	41%	59%			
	7														
	8														
	8														
3.5	8														
	7														
	8														
	9														
4.0	10														
				EOH (Target Depth Reached)											
4.5															
5.0															
5.5															

LEGEND

ABBREVIATIONS

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

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA4/DCP4

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**				
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**2.9 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**	*SHEAR VANE NUMBER:*	**2102**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.2 mbgl**	This report may only be reproduced in full	

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
0	2			Sandy SILT: non-plastic, brown, moist, with minor rootlets (TOPSOIL)											
	1														
	2														
	2			SAND: fine to medium, grey, moist, with some silt											
	2														
0.5	2														
	1														
	1			at 0.8m: becomes wet											
	1														
	2														
1.0	3			Sandy SILT: low plasticity, brown-grey, wet, sand is fine											
	3	▽													
	3			at 1.2m: becomes saturated											
	3														
1.5	2														
	2														
	2														
	3														
	3														
	3														
2.0	3			SILT: low to medium plasticity, blue-grey, saturated											
	3														
	4														
	3														
	4			Silty SAND: fine to medium, grey, saturated											
2.5	4														
	5														
	4														
	4														
				EOH (Target Depth Reached)											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	HA	HAND AUGER	LL	LIQUID LIMIT	Gr	GRAVEL
GWL	GROUNDWATER LEVEL	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	Sa	SAND
mbgl	METERS BELOW GROUND LEVEL	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
WC	WATER CONTENT	UW	UNIT WEIGHT (kN/m^3)	NE	NOT ENCOUNTERED	▽	STANDING GWL

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**

SHALLOW GROUND INVESTIGATION LOG

HA5/DCP5

PROJECT:	**2 & 4 Glovers Road, Halswell, Christchurch**						
LOGGED BY:	**CG**	*TOTAL DEPTH OF HOLE:*	**1.9**	**mbgl**	*HOLE DIAMETER:*	**50 mm**	
PROCESSED BY:	**CG**	*DRILLING METHOD:*	**Hand Auger**		*SHEAR VANE NUMBER:*	**2102**	
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**1.0**	**mbgl**	This report may only be reproduced in full		

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Vane shear strength (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*Gr*	*Sa*	*FC*			
0.0	2			SILT: low plasticity, brown, moist, with minor fine sand (TOPSOIL)											
	1														
	2														
	2														
	2														
0.5	3			Sandy SILT: low plasticity, grey, moist, sand is fine											
	2														
	2														
	2														
	1	▽													
1.0	1			at 1.0m: becomes wet											
	2														
	3			at 1.2m: becomes saturated											
	3														
	3														
1.5	2			Silty SAND: fine to medium, grey, saturated		DIST. SAMPLE				-	58%	42%			
	2														
	5			at 1.8m: with minor fine to medium gravel											
2.0	11			**EOH (Practical Refusal on Gravel)**											
2.5															

LEGEND

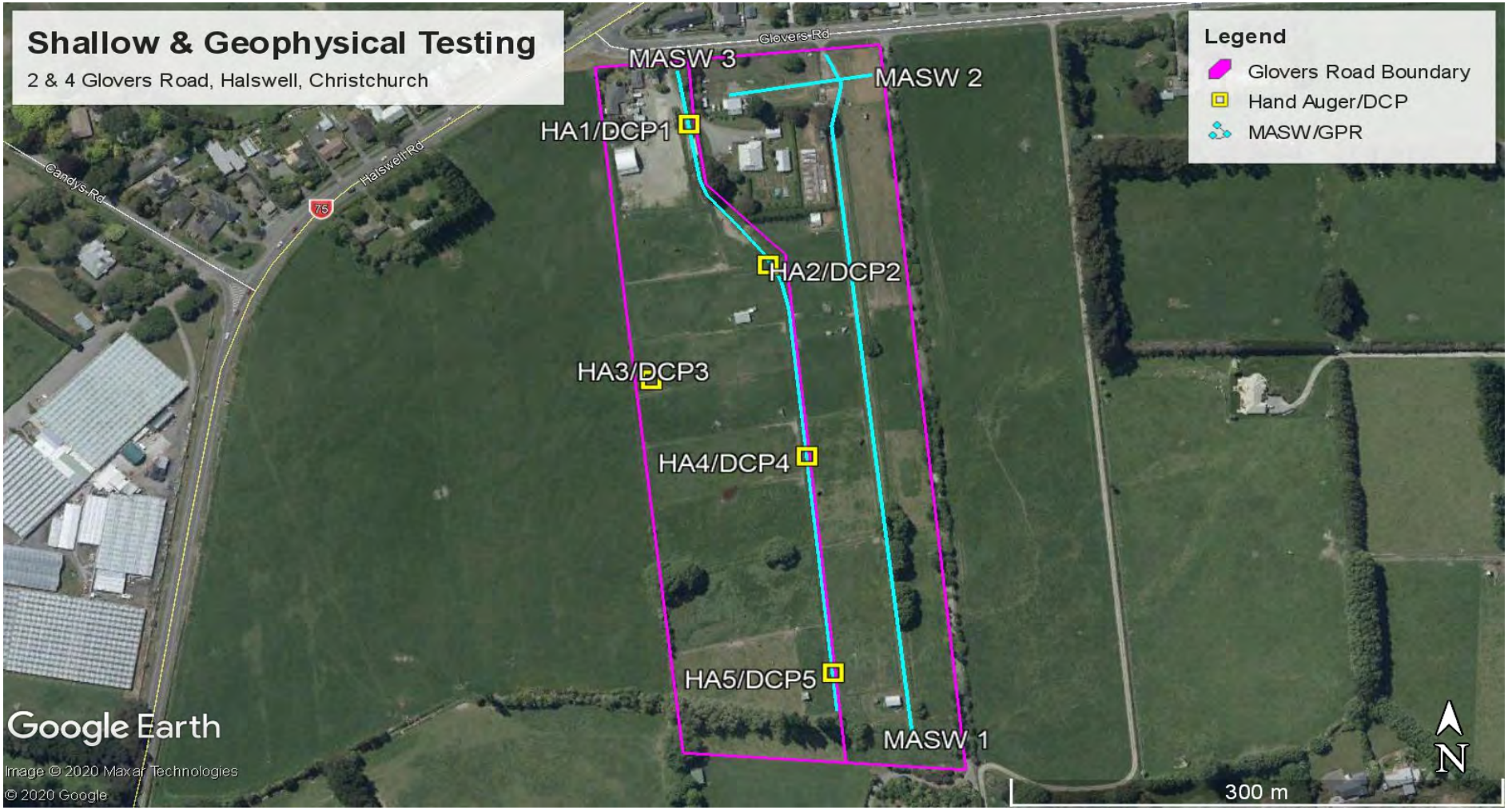
ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	HA	HAND AUGER	LL	LIQUID LIMIT	Gr	GRAVEL
GWL	GROUNDWATER LEVEL	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	Sa	SAND
mbgl	METERS BELOW GROUND LEVEL	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
WC	WATER CONTENT	UW	UNIT WEIGHT (kN/m^3)	NE	NOT ENCOUNTERED	▽	STANDING GWL

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**
	CLIENT:	**Yoursection Ltd.**
	TESTING COMPLETED:	**3 September 2020**
SITE INVESTIGATION PLAN	**2 & 4 Glovers Road, Halswell, Christchurch**	



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18B Birmingham Drive
Middleton
Christchurch
E: info@geocivil.co.nz
M: 027 6565 317

TEST REPORT

Lab Job No: 8378-032

Your ref.: -

Date of Issue: 14/09/2020

Date of Re-Issue: -

Page: 1 of 8

Test Report

C20-450

PROJECT:	2 Glovers Road – Laboratory Testing
CLIENT:	Miyamoto International NZ Ltd, 518 Colombo Street, Christchurch, 8011
ATTENTION:	Clem Gibbens
INSTRUCTIONS:	Determination of Particle-Size Distribution-Wet Sieving method Determination of the Liquid & Plastic Limits, Plasticity Index and Water Content Determination of the Water Content of Soils
TEST METHOD:	NZS 4402:1986 Test 2.8.1 NZS 4402:1986 Tests 2.2, 2.3, 2.4 NZS 4402:1986 Test 2.1
SAMPLING METHOD:	Client - SNA
TEST RESULTS:	As per Laboratory sheets attached

Jeremy Brokenshire
Laboratory Technician

Nick van Warmerdam
Approved Signatory

ACCREDITED
IANZ
TESTING LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

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18B Birmingham Drive
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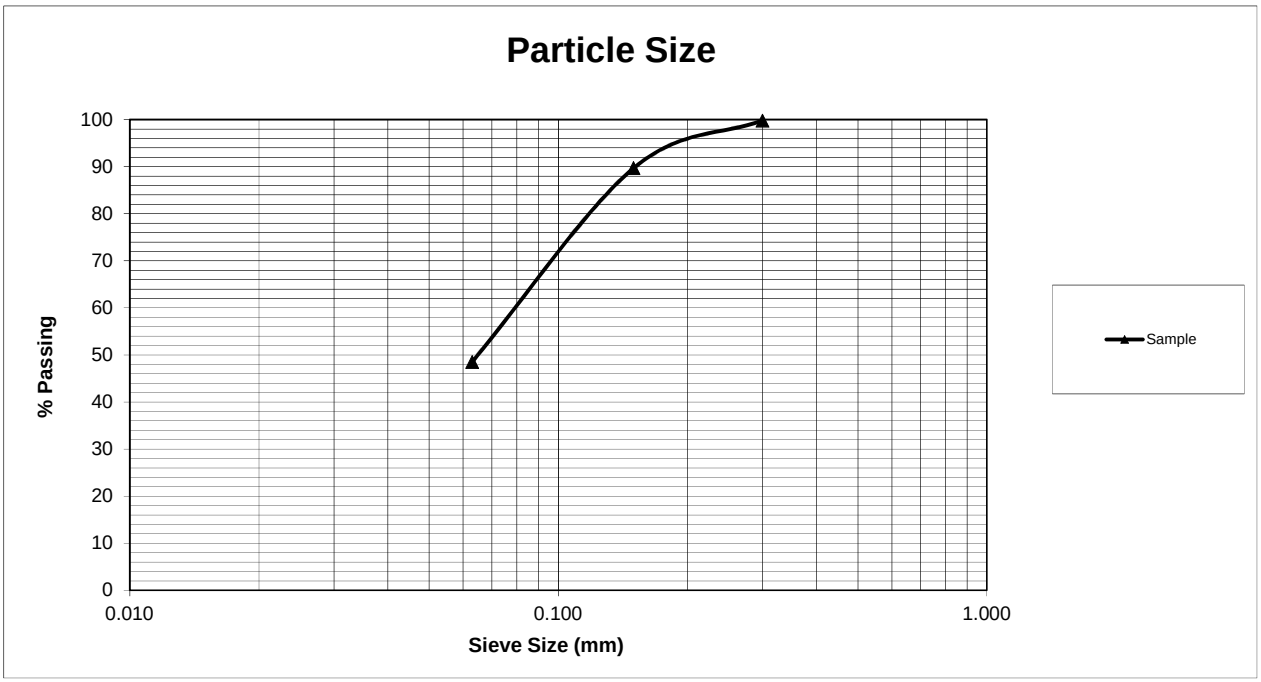
DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - GRAPH

NZS 4402: 1986 Test 2.8.1, 2.8.2

Lab Job No:	8378-032	**Sample No:**	C20-319
Client:	Miyamoto International NZ Ltd	**Tested By:**	D.P
Location:	2 Glovers Road HA01 (1.5-2.3m)	**Date:** **Checked By:**	9/09/2020 J.B
Date Received:	8/09/2020	**Date:**	14/09/2020
Report No:	C20-450	**Page:**	2 of 8
REF:	-		
Sampling Method: **Date Sampled:**	Sampled by client - SNA 4/09/2020	**Sampled By:**	Client
Test Details:	Wet sieving method		
History:	Natural		
Description of Sample:	Silty SAND, brownish grey, wet, no plasticity		

	% Passing		
Sieve Size	**Max**	**Min**	**Sample**
0.300	-	-	100
0.150	-	-	90
0.063	-	-	49



The percentage passing the finest sieve was obtained by difference.

N. van Warmerdam
Approved Signatory

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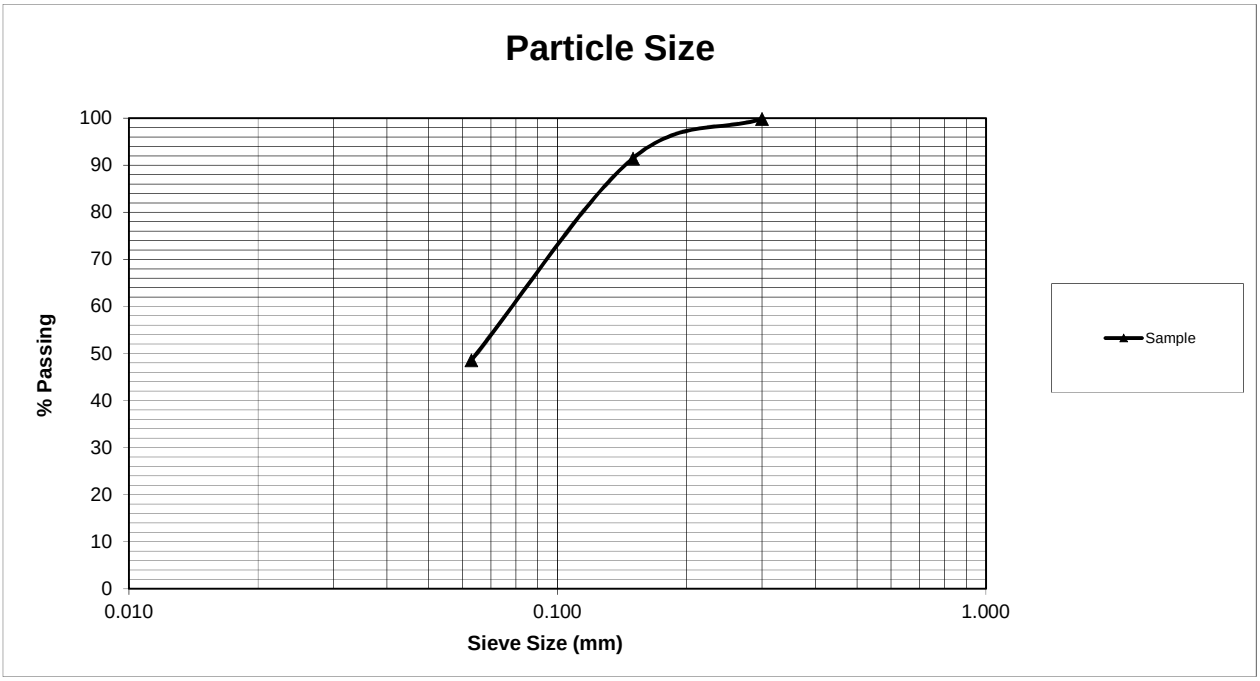
DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - GRAPH

NZS 4402: 1986 Test 2.8.1, 2.8.2

Lab Job No:	8378-032	**Sample No:**	C20-320
Client:	Miyamoto International NZ Ltd	**Tested By:**	D.P
Location:	2 Glovers Road HA01 (2.3-3.8m)	**Date:** **Checked By:**	9/09/2020 J.B
Date Received:	8/09/2020	**Date:**	14/09/2020
Report No:	C20-450	**Page:**	3 of 8
REF:	-		
Sampling Method:	Sampled by client - SNA	**Sampled By:**	Client
Date Sampled:	4/09/2020		
Test Details:	Wet sieving method		
History:	Natural		
Description of Sample:	Silty SAND, brownish grey, saturated, no plasticity		

	% Passing		
Sieve Size	**Max**	**Min**	**Sample**
0.300	-	-	100
0.150	-	-	91
0.063	-	-	49



The percentage passing the finest sieve was obtained by difference.

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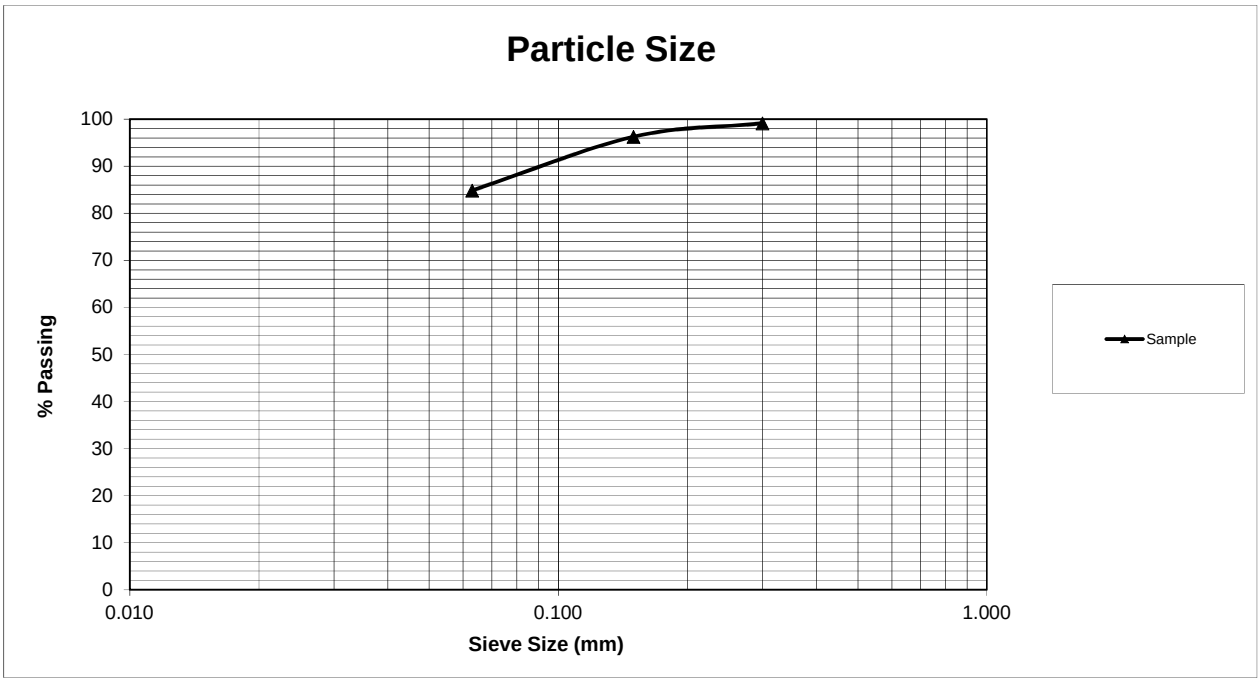
DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - GRAPH

NZS 4402: 1986 Test 2.8.1, 2.8.2

Lab Job No:	8378-032	**Sample No:**	C20-321
Client:	Miyamoto International NZ Ltd	**Tested By:**	D.P
Location:	2 Glovers Road HA02 (2.7-4.0m)	**Date:** **Checked By:**	9/09/2020 J.B
Date Received:	8/09/2020	**Date:**	14/09/2020
Report No:	C20-450	**Page:**	4 of 8
REF:	-		
Sampling Method:	Sampled by client - SNA	**Sampled By:**	Client
Date Sampled:	4/09/2020		
Test Details:	Wet sieving method		
History:	Natural		

Description of Sample: Silty CLAY, some sand, dark grey saturated, low plasticity

	% Passing		
Sieve Size	**Max**	**Min**	**Sample**
0.300	-	-	99
0.150	-	-	96
0.063	-	-	85



The percentage passing the finest sieve was obtained by difference.

N. van Warmerdam
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DETERMINATION OF THE LIQUID & PLASTIC LIMITS, PLASTICITY INDEX & WATER CONTENT

NZS 4402: 1986 Test 2.2, 2.3, 2.4

Lab Job No:	8378-032	**Sample No.:**	C20-321
Client:	Miyamoto International NZ Ltd	**Tested By:**	S.P.S
Location:	2 Glovers Road HA02 (2.7-4.0m)	**Date Tested:**	11/09/2020
		Checked By:	J.B
Date Received:	8/09/2020	**Date Checked:**	14/09/2020
Report No:	C20-450	**Page:**	5 of 8
REF:	-		
Sampling Method:	Sampled by client - SNA	**Sampled By:**	Client
Date Sampled:	4/09/2020		

Test Details:

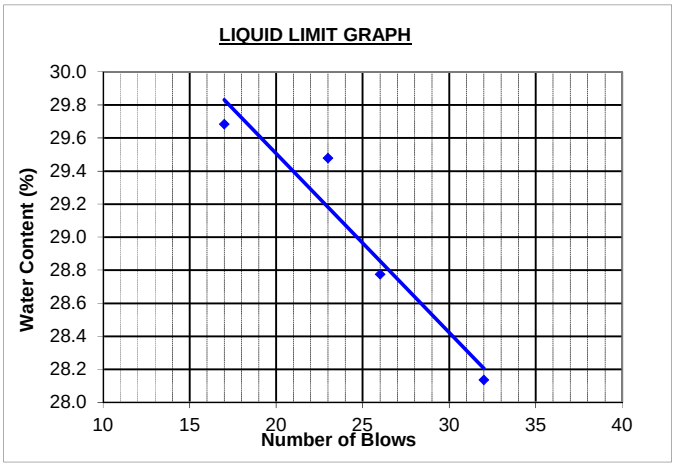
Test performed on: Fraction passing 425mm sieve

Sample history: Natural state

Description of Sample: Silty CLAY, some sand, dark grey saturated, low plasticity

	Liquid Limit				Plastic Limit	
No. of blows	17	23	26	32		
Water content (%)	29.7	29.5	28.8	28.1	20.0	19.2

NWC	**30.5**
Liquid Limit	**29**
Plastic Limit	**20**
Plasticity Index	**9**



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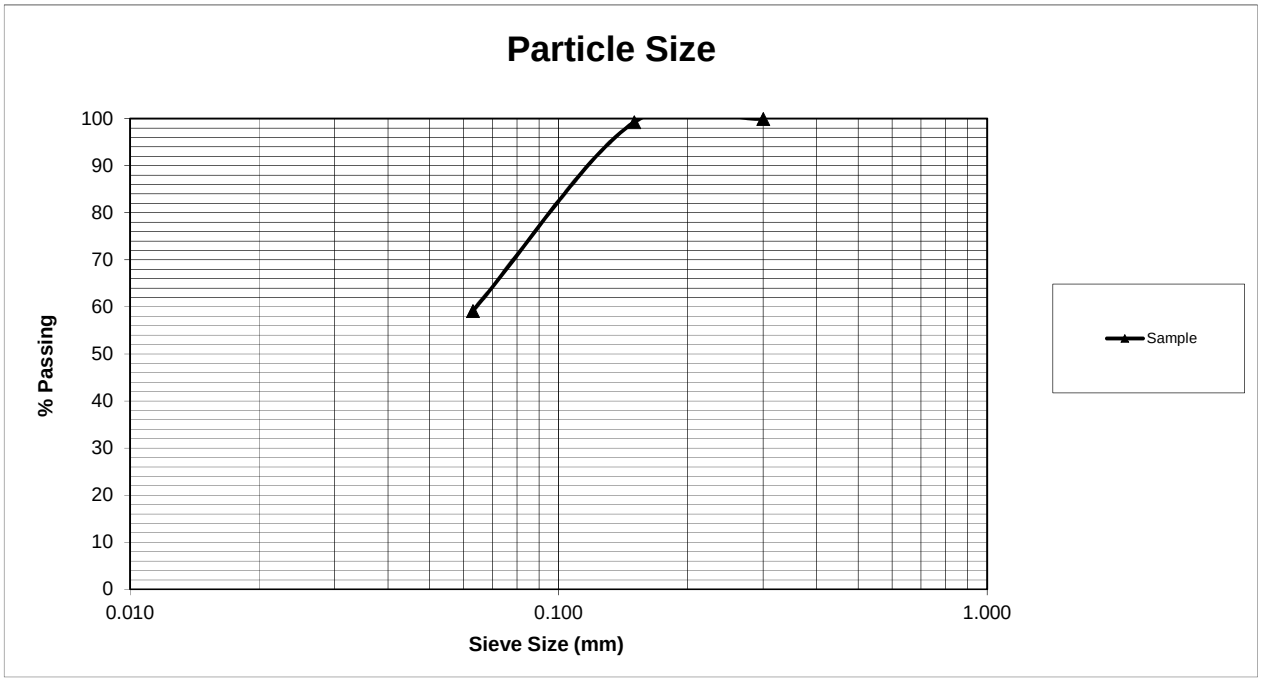
DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - GRAPH

NZS 4402: 1986 Test 2.8.1, 2.8.2

Lab Job No:	8378-032	**Sample No:**	C20-322
Client:	Miyamoto International NZ Ltd	**Tested By:**	D.P
Location:	2 Glovers Road HA03 (2.0-3.4m)	**Date:** **Checked By:**	9/09/2020 J.B
Date Received:	8/09/2020	**Date:**	14/09/2020
Report No:	C20-450	**Page:**	6 of 8
REF:	-		
Sampling Method:	Sampled by client - SNA	**Sampled By:**	Client
Date Sampled:	4/09/2020		
Test Details:	Wet sieving method		
History:	Natural		
Description of Sample:	Sandy SILT, dark grey, saturated, no plasticity		

	% Passing		
Sieve Size	**Max**	**Min**	**Sample**
0.300	-	-	100
0.150	-	-	99
0.063	-	-	59



The percentage passing the finest sieve was obtained by difference.

N. van Warmerdam
Approved Signatory

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DETERMINATION OF THE LIQUID & PLASTIC LIMITS, PLASTICITY INDEX & WATER CONTENT

NZS 4402: 1986 Test 2.2, 2.3, 2.4

Lab Job No:	8378-032	**Sample No.:**	C20-322
Client:	Miyamoto International NZ Ltd	**Tested By:**	S.P.S
Location:	2 Glovers Road HA03 (2.0-3.4m)	**Date Tested:**	11/09/2020
		Checked By:	J.B
Date Received:	8/09/2020	**Date Checked:**	14/09/2020
Report No:	C20-450	**Page:**	7 of 8
REF:	-		
Sampling Method:	Sampled by client - SNA	**Sampled By:**	Client
Date Sampled:	4/09/2020		

Test Details:

Test performed on: Fraction passing 425mm sieve

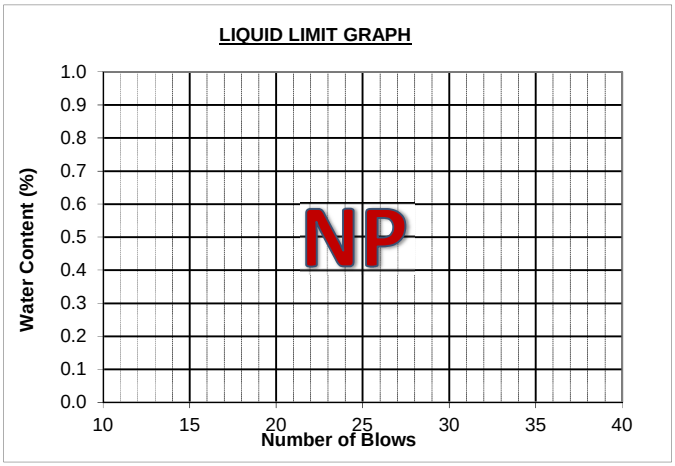
Sample history: Natural state

Description of Sample: Sandy SILT, dark grey, saturated, no plasticity

	Liquid Limit
No. of blows	NP
Water content (%)	

Plastic Limit
NP

NWC	**28.9**
Liquid Limit	**-**
Plastic Limit	**-**
Plasticity Index	**-**



Unable to obtain Liquid Limit or Plastic Limit.

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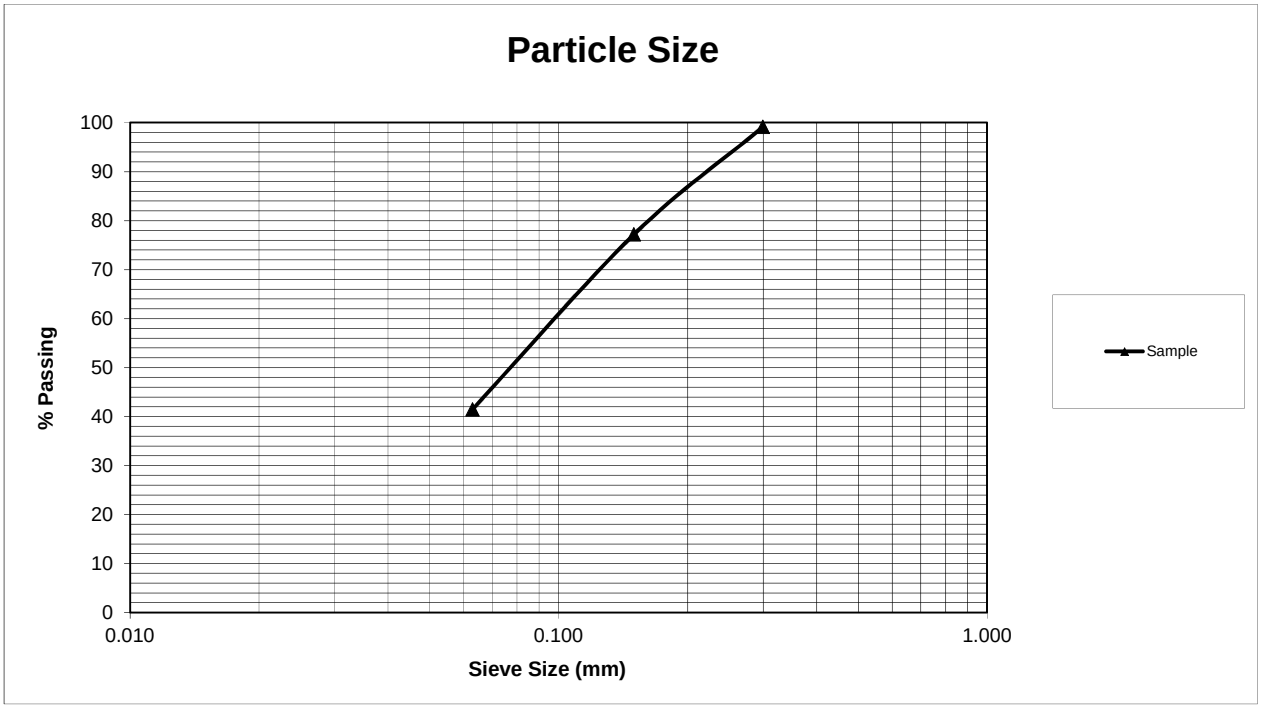
DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - GRAPH

NZS 4402: 1986 Test 2.8.1, 2.8.2

Lab Job No:	8378-032	**Sample No:**	C20-323
Client:	Miyamoto International NZ Ltd	**Tested By:**	D.P
Location:	2 Glovers Road HA05 (1.5-1.8m)	**Date:** **Checked By:**	9/09/2020 J.B
Date Received:	8/09/2020	**Date:**	14/09/2020
Report No:	C20-450	**Page:**	8 of 8
REF:	-		
Sampling Method:	Sampled by client - SNA	**Sampled By:**	Client
Date Sampled:	4/09/2020		
Test Details:	Wet sieving method		
History:	Natural		
Description of Sample:	Silty SAND, brownish grey, wet, no plasticity		

	% Passing		
Sieve Size	**Max**	**Min**	**Sample**
0.300	-	-	99
0.150	-	-	77
0.063	-	-	42



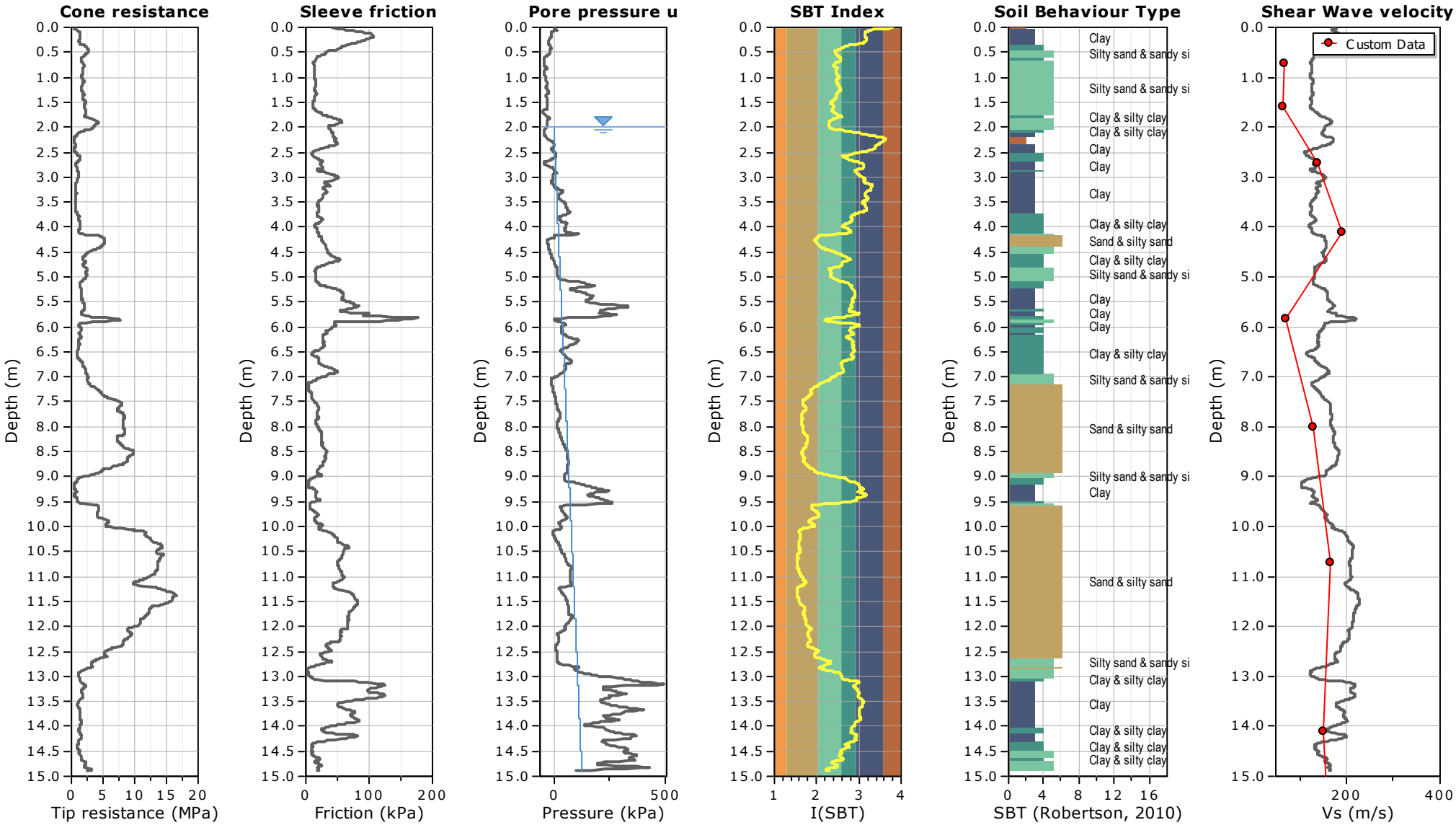
The percentage passing the finest sieve was obtained by difference.

N. van Warmerdam
Approved Signatory

Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu001 Edited
Total depth: 14.89 m, Date: 7/10/2020
Surface Elevation: 12.90 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

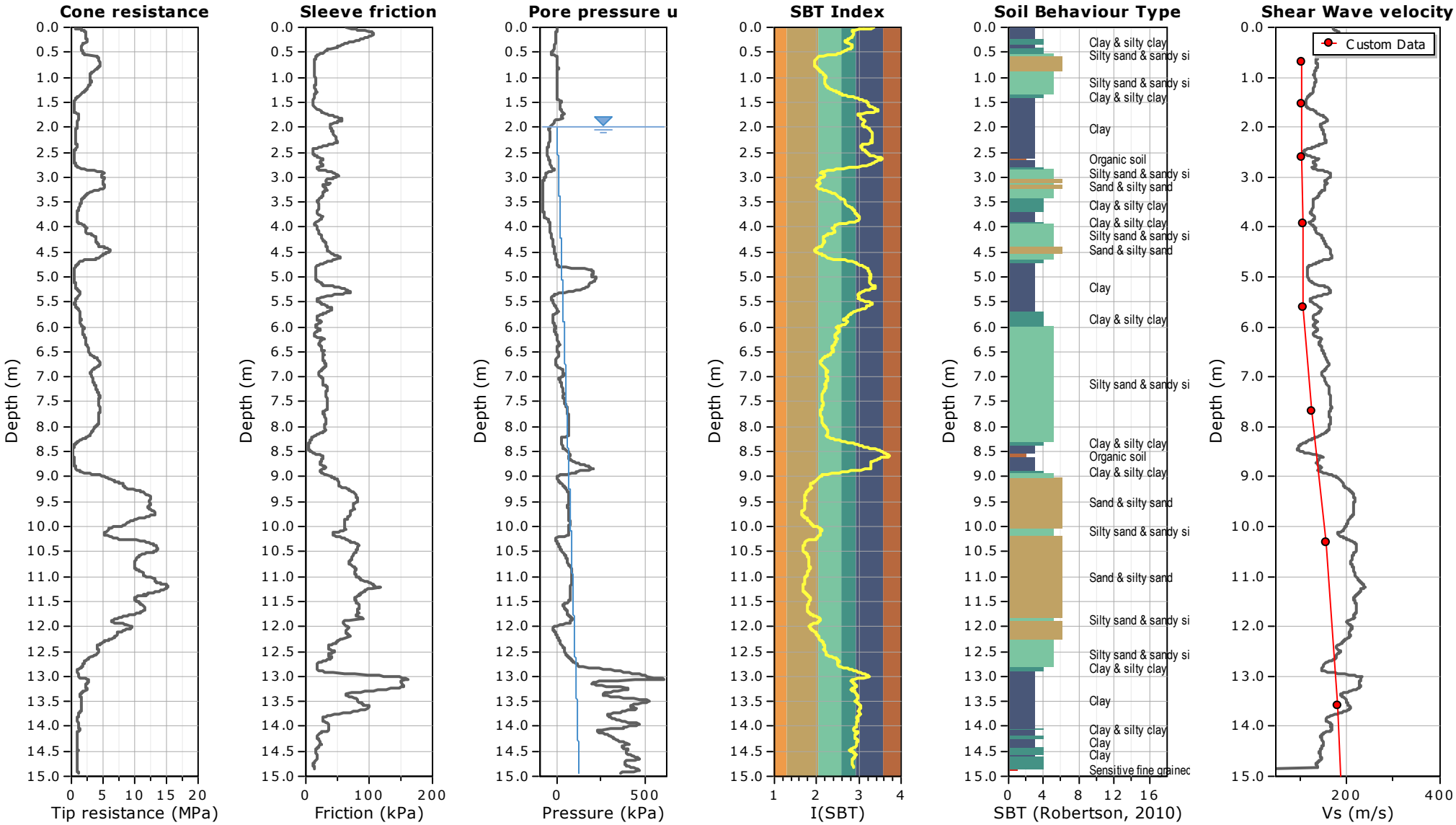
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu002
Total depth: 14.93 m, Date: 24/08/2020
Surface Elevation: 12.40 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

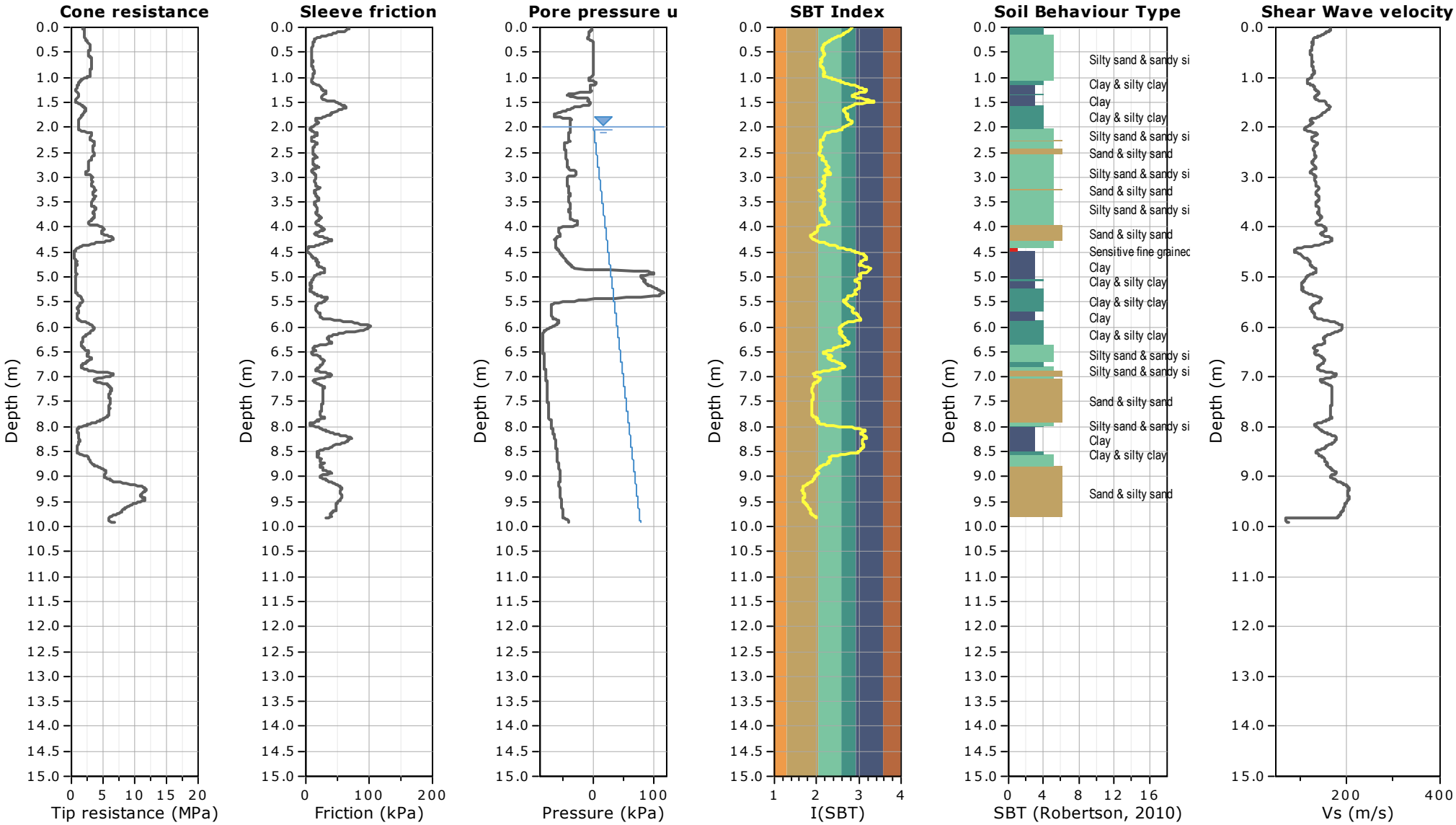
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu003
Total depth: 9.91 m, Date: 24/08/2020
Surface Elevation: 12.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
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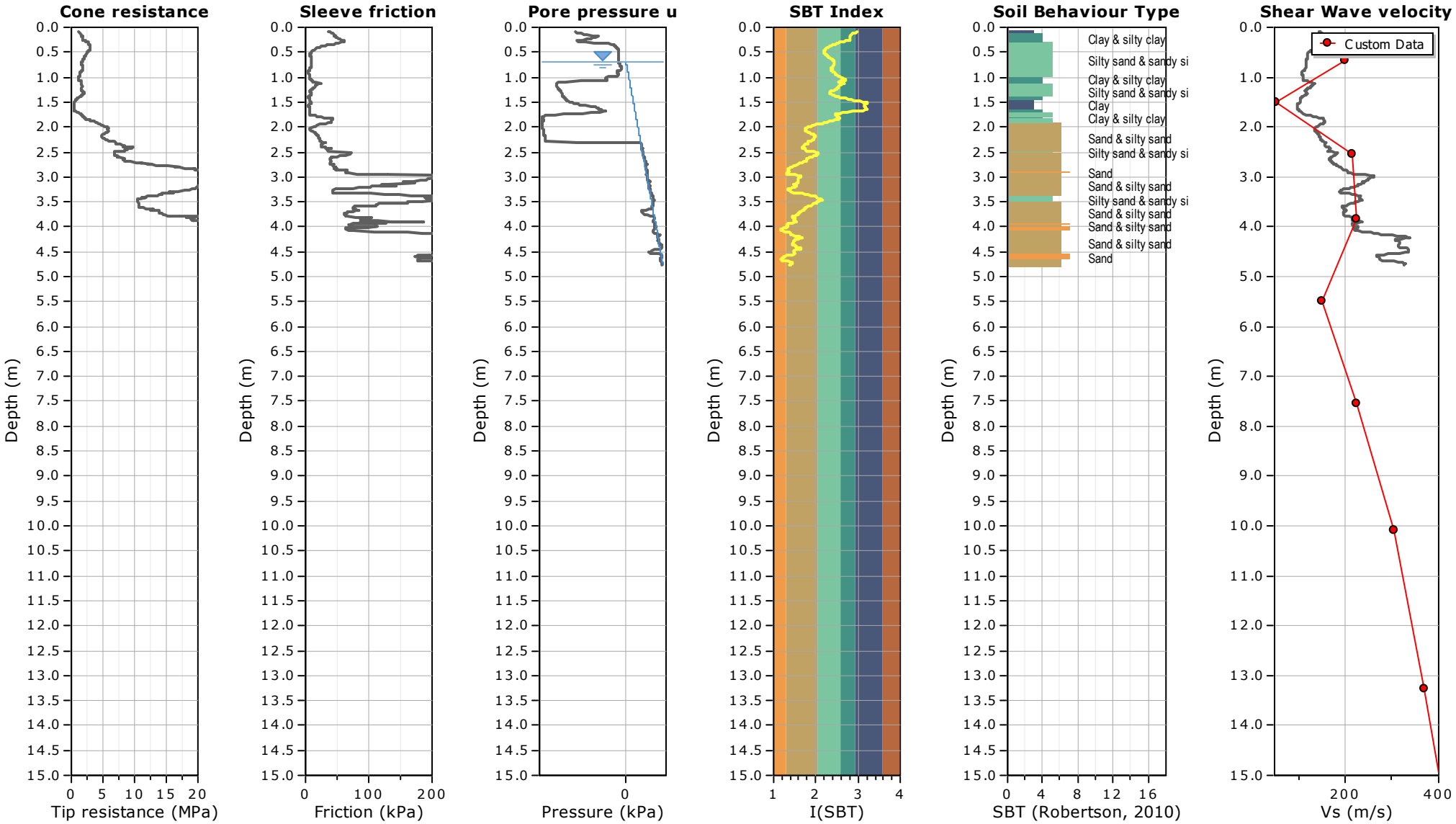
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu004
Total depth: 4.78 m, Date: 24/08/2020
Surface Elevation: 11.70 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

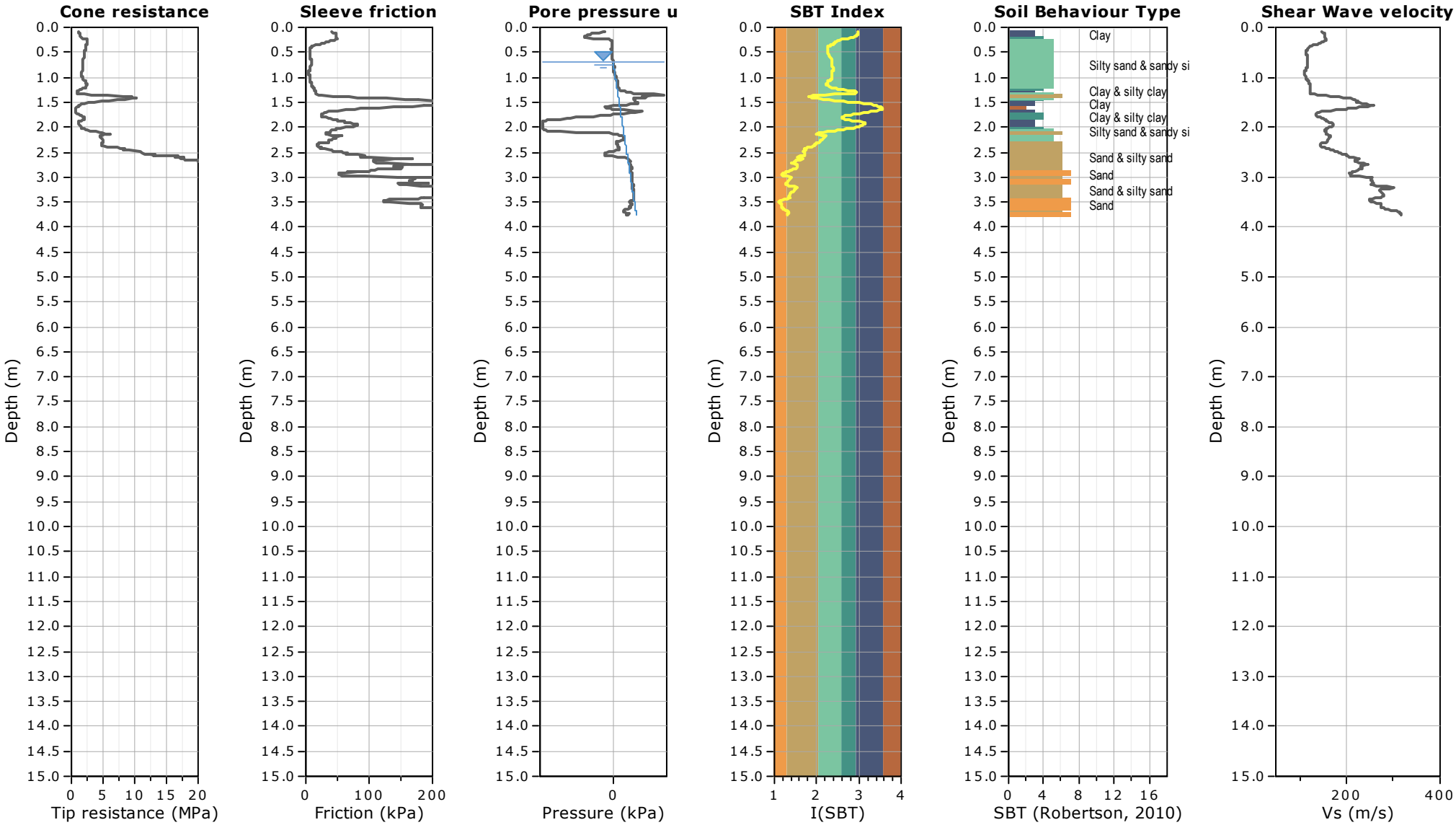
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu005
Total depth: 3.76 m, Date: 24/08/2020
Surface Elevation: 11.50 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

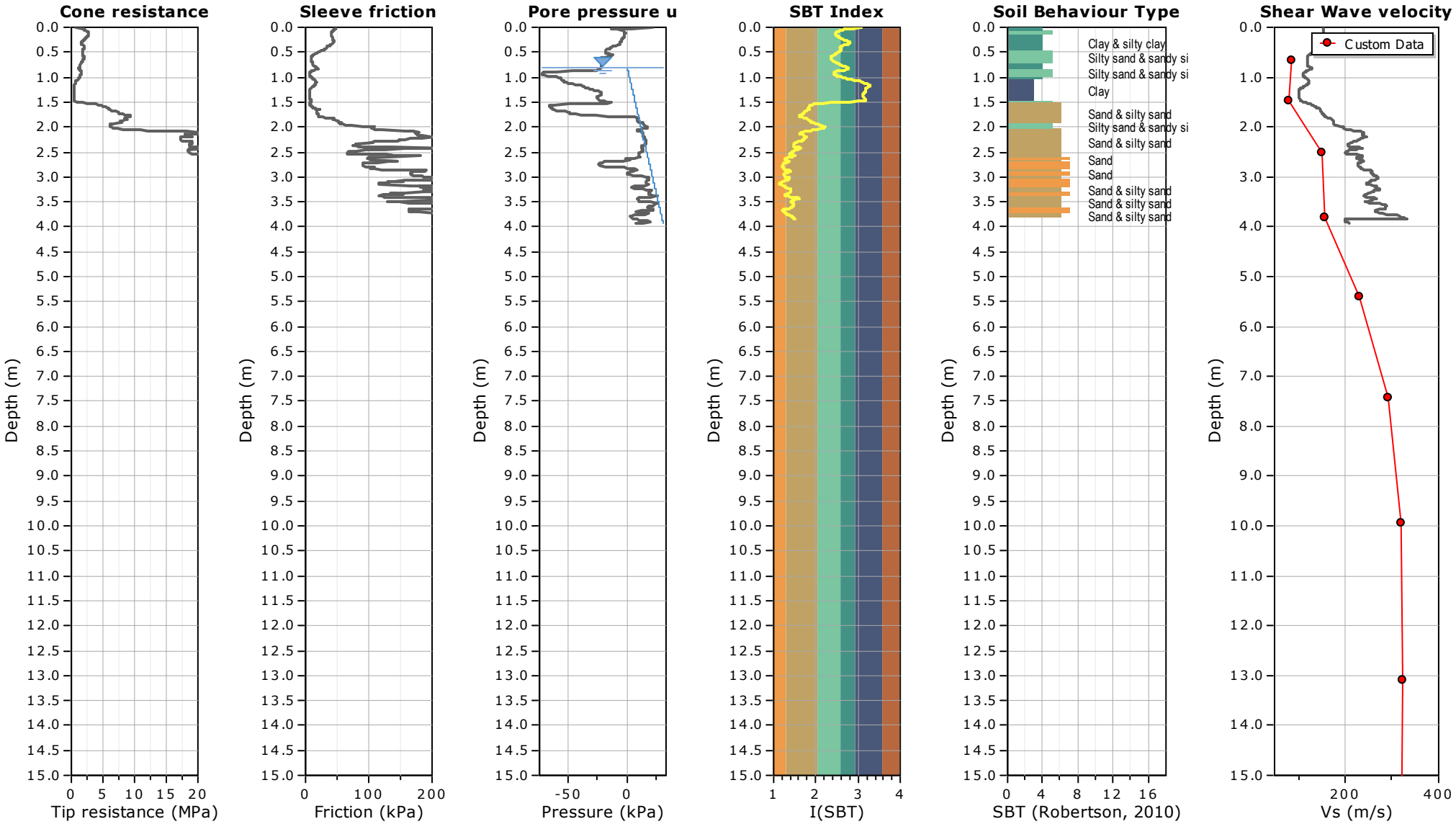
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu006
Total depth: 3.93 m, Date: 24/08/2020
Surface Elevation: 11.70 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

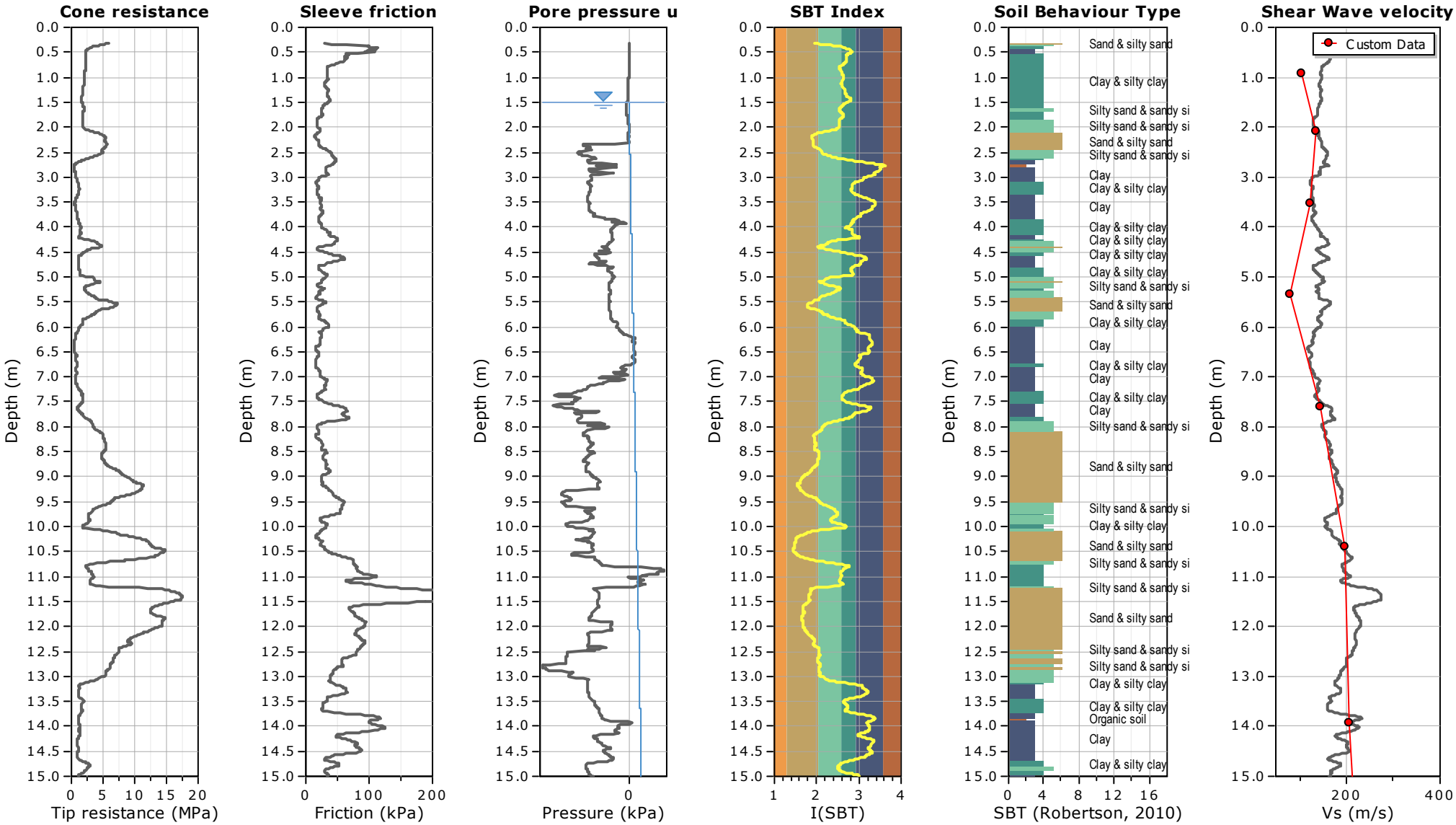
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu007
Total depth: 15.00 m, Date: 1/10/2020
Surface Elevation: 13.20 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

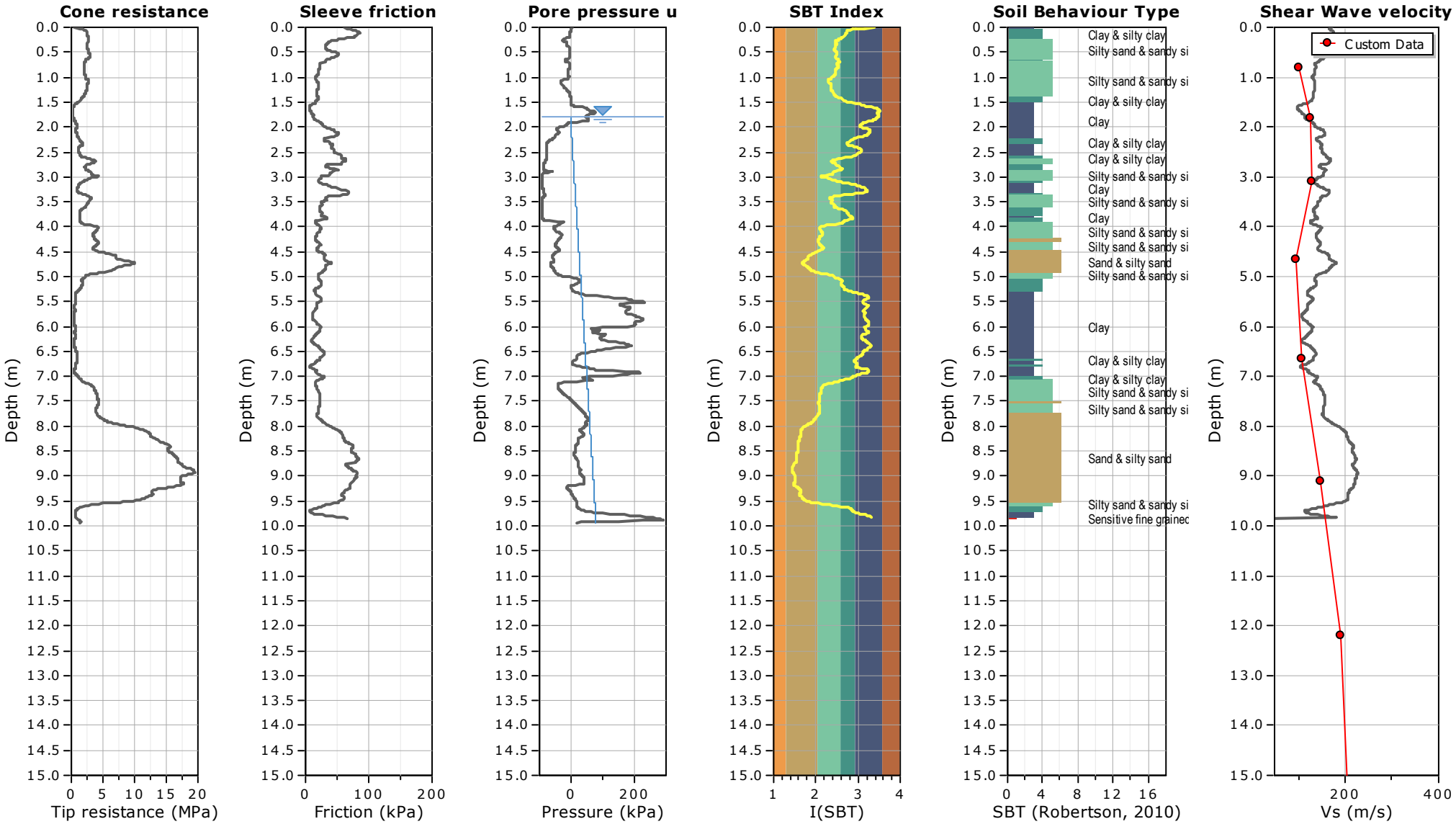
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu008
Total depth: 9.93 m, Date: 1/10/2020
Surface Elevation: 12.60 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

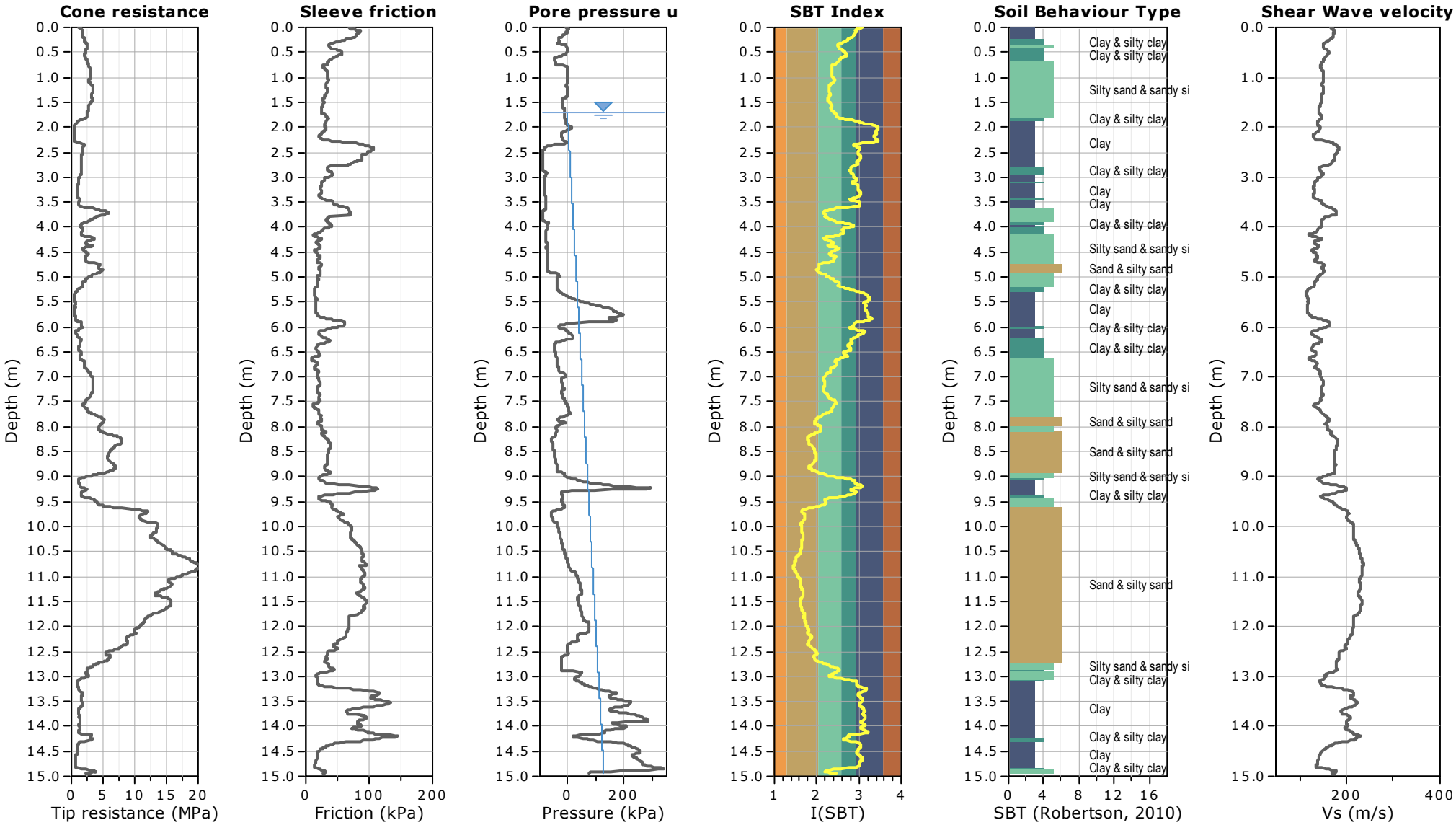
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu009
Total depth: 14.95 m, Date: 1/10/2020
Surface Elevation: 12.80 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

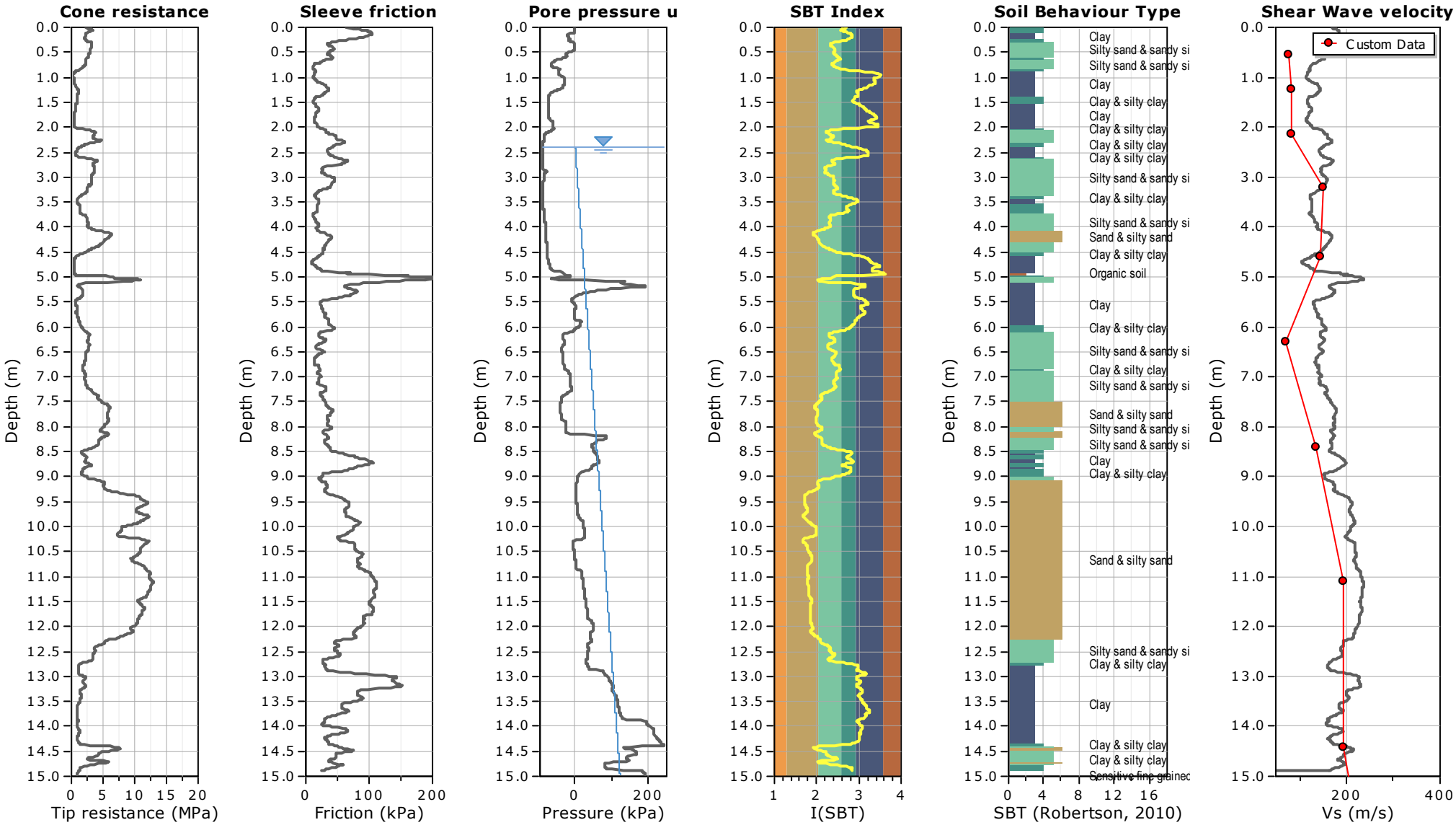
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu010
Total depth: 14.97 m, Date: 1/10/2020
Surface Elevation: 12.30 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

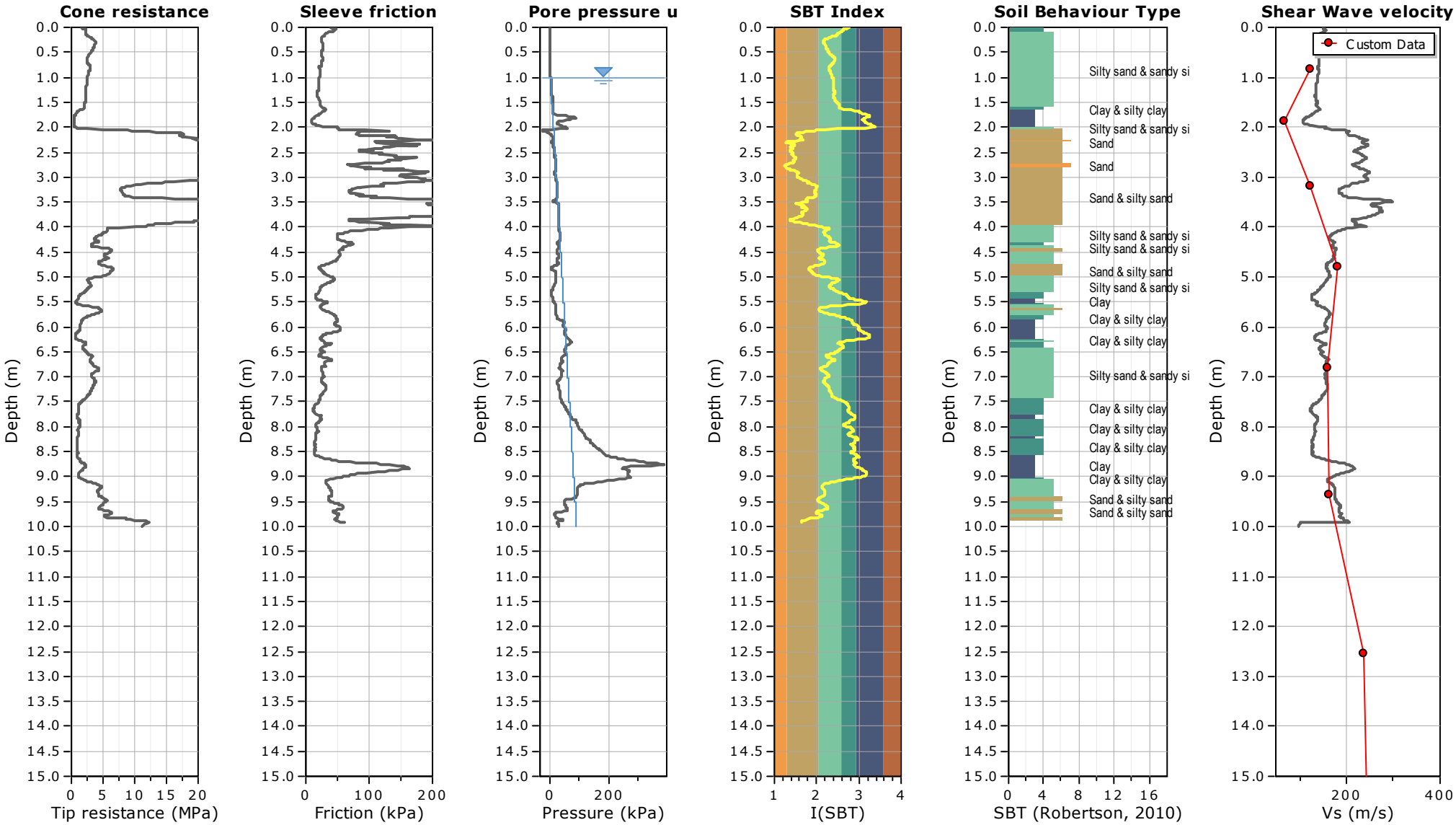
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu011
Total depth: 9.99 m, Date: 1/10/2020
Surface Elevation: 12.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

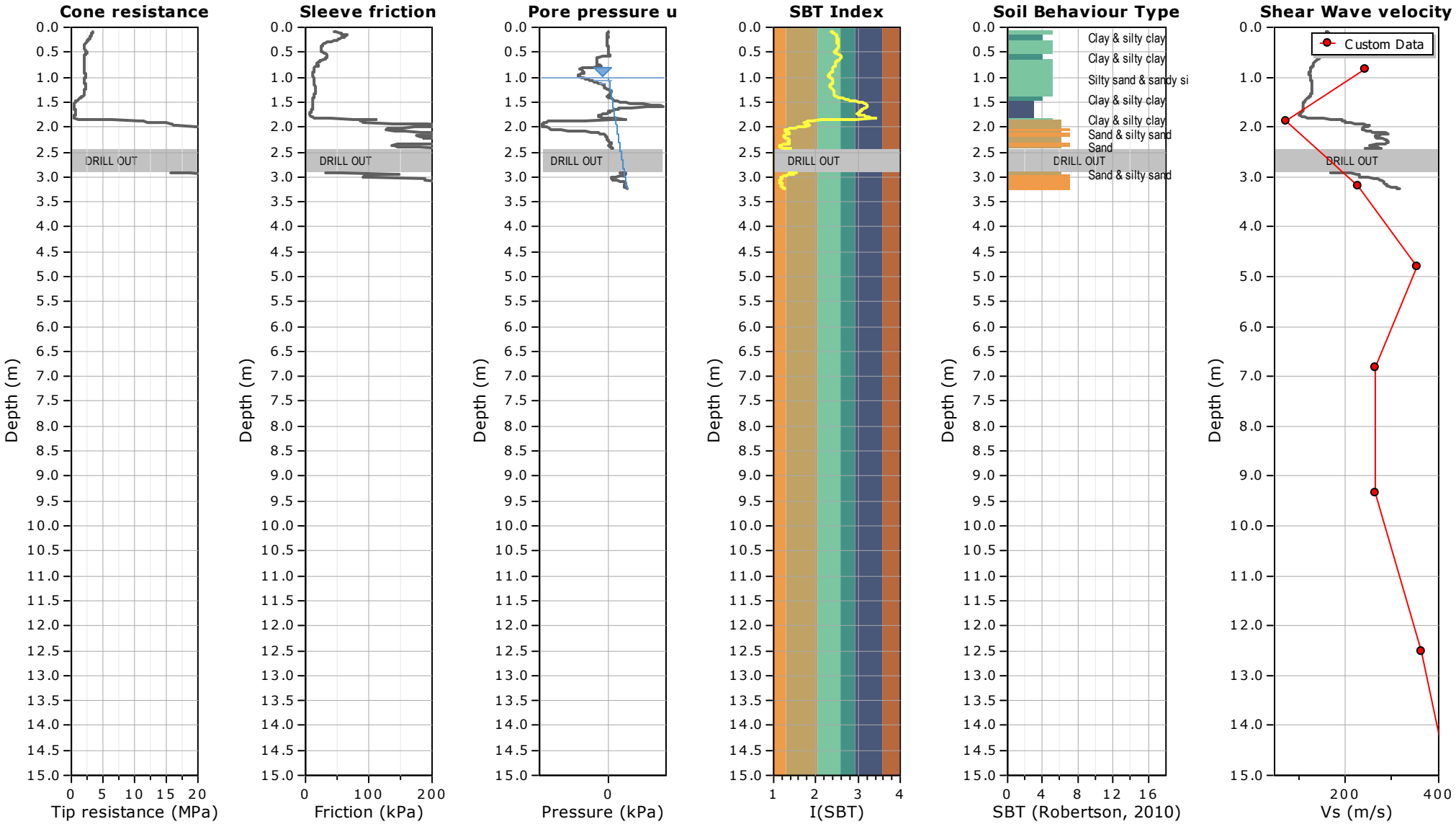
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



Miyamoto International NZ Ltd
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

CPT: CPTu012
Total depth: 3.25 m, Date: 1/10/2020
Surface Elevation: 11.90 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 & 4 Glovers Road Subdivision, Halswell, Christchurch**



CONE PENETRATION TEST (CPT) REPORT

Client: Miyamoto International NZ

Location: 2 Glovers Road, Christchurch

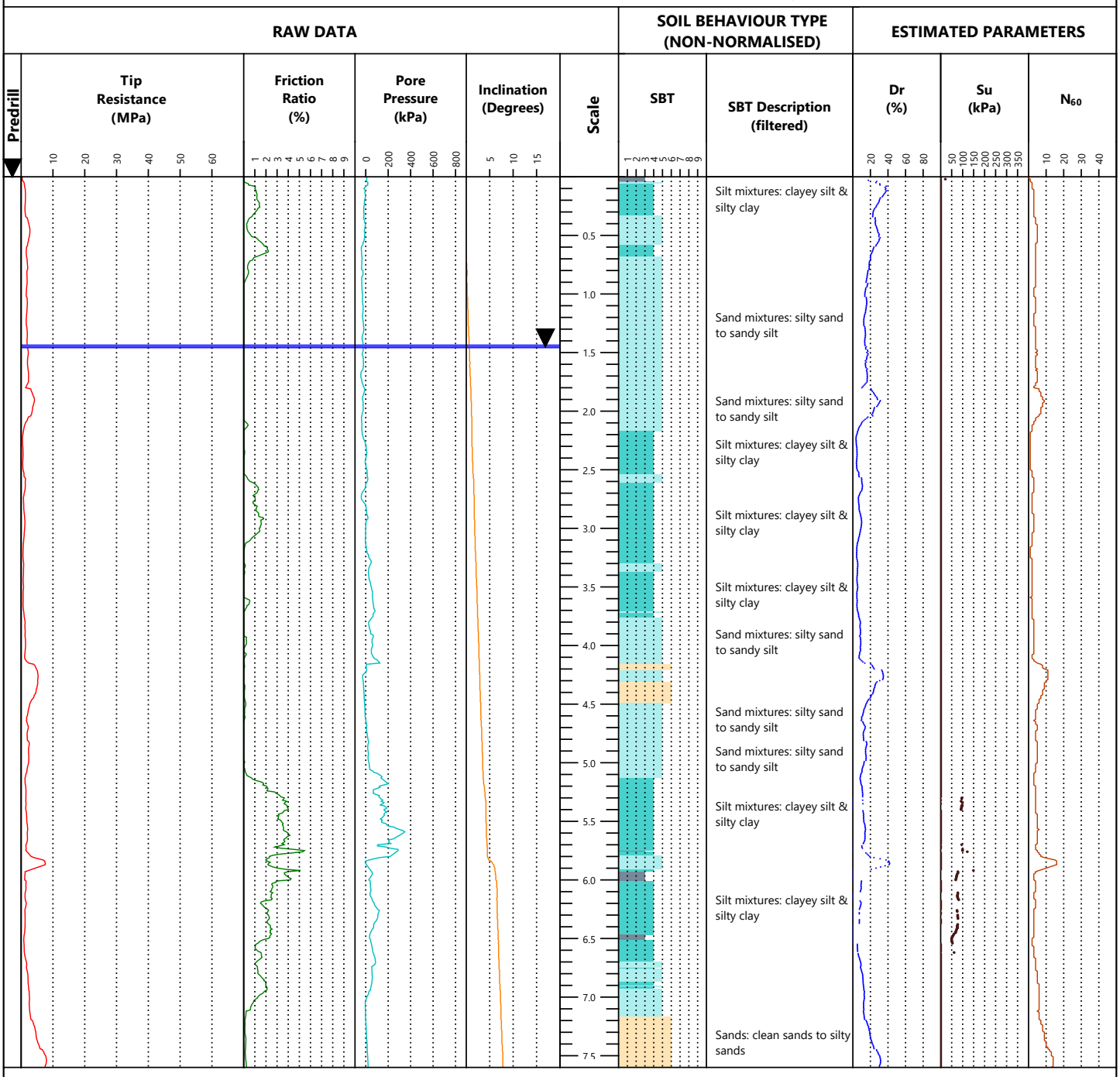
Printed: 20/08/2020

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu001
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 18/8/2020

Grid Reference: 1564920.46m E, 5173116.23m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS711
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.45m
Collapse: 1.60m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.4528	20.369
Local Friction	0.2535	0.2535
Pore Pressure	3.0597	3.0579

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

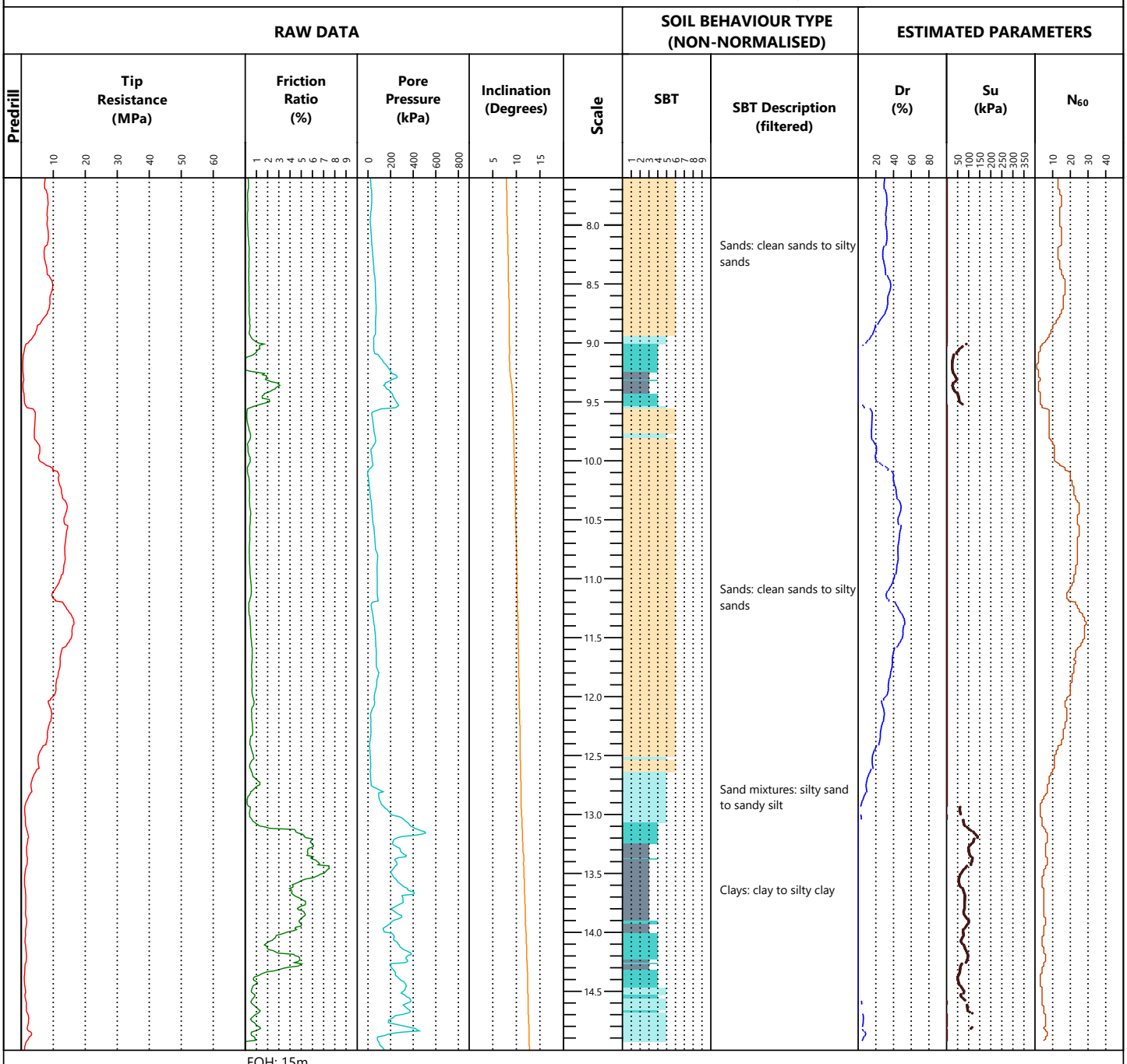
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu001
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 18/8/2020

Grid Reference: 1564920.46m E, 5173116.23m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



EOH: 15m

Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS711
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.45m
Collapse: 1.60m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.4528	20.369
Local Friction	0.2535	0.2535
Pore Pressure	3.0597	3.0579

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

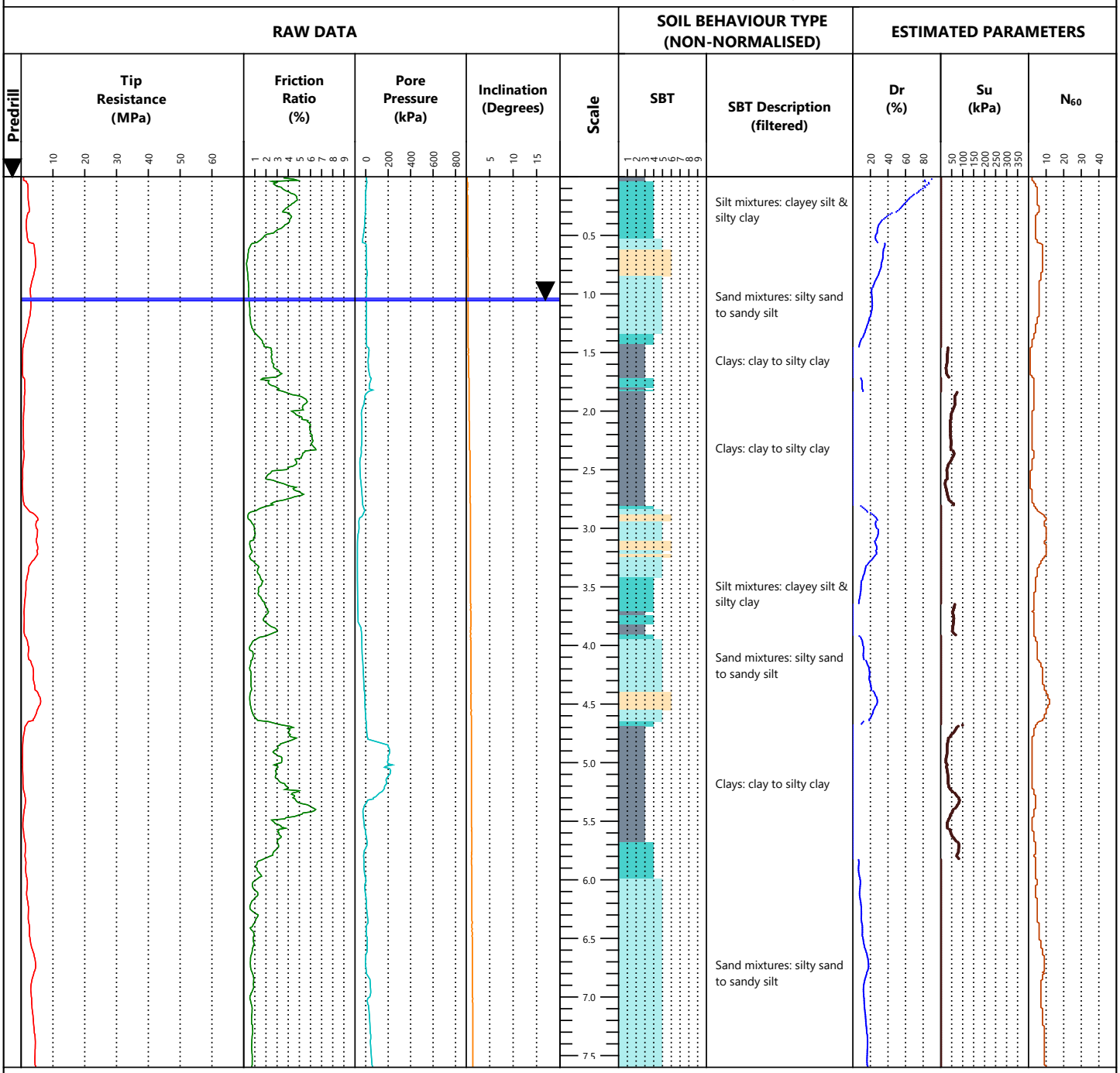
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu002
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 17/8/2020

Grid Reference: 1564969.32m E, 5173033.19m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS711
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.05m
Collapse: 2.45m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.4004	20.348
Local Friction	0.2537	0.2536
Pore Pressure	3.0612	3.0605

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

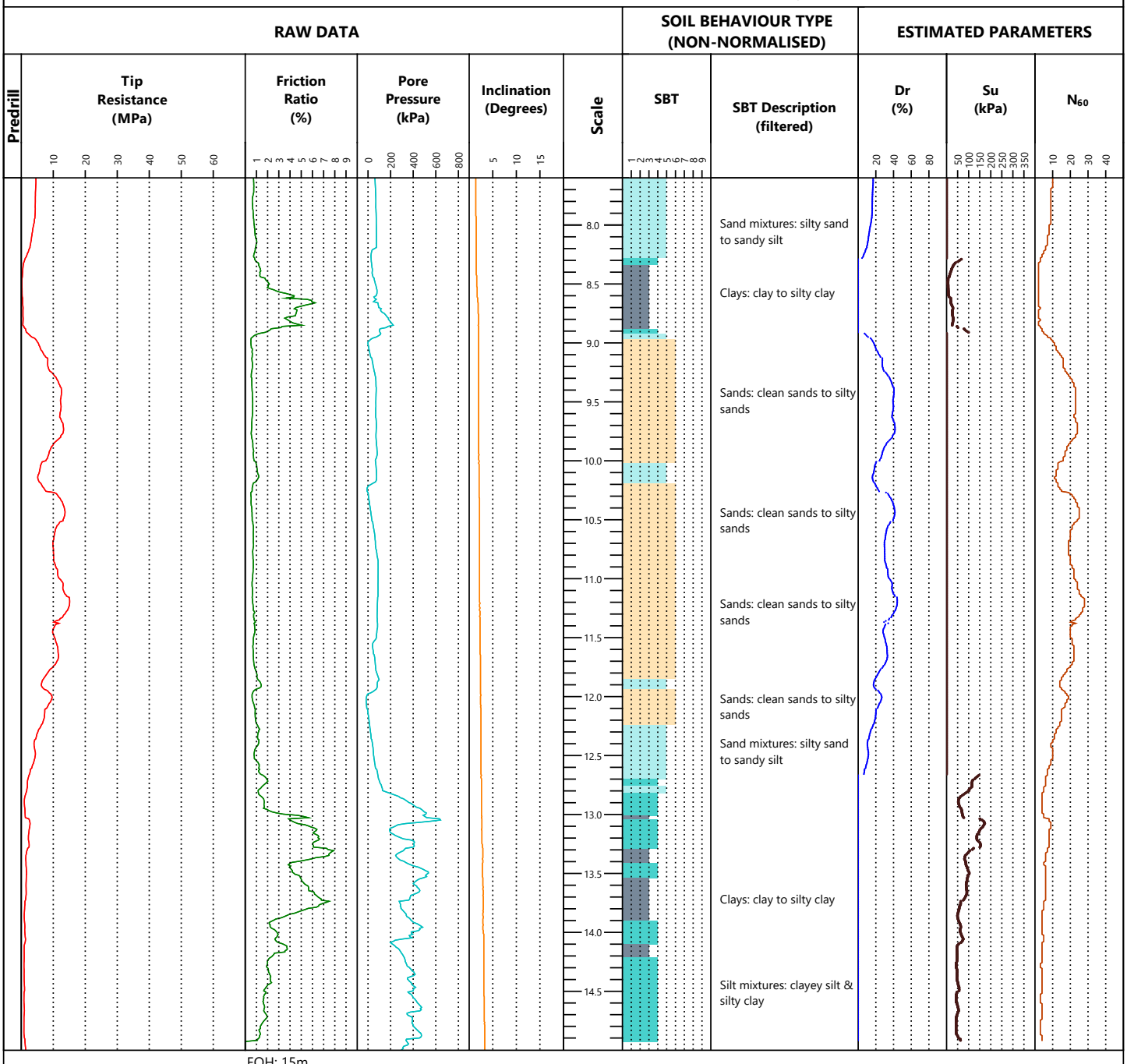
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu002
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 17/8/2020

Grid Reference: 1564969.32m E, 5173033.19m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



EOH: 15m

Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS711
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.05m
Collapse: 2.45m

Termination
Target Depth: ✓

Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.4004	20.348
Local Friction	0.2537	0.2536
Pore Pressure	3.0612	3.0605

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

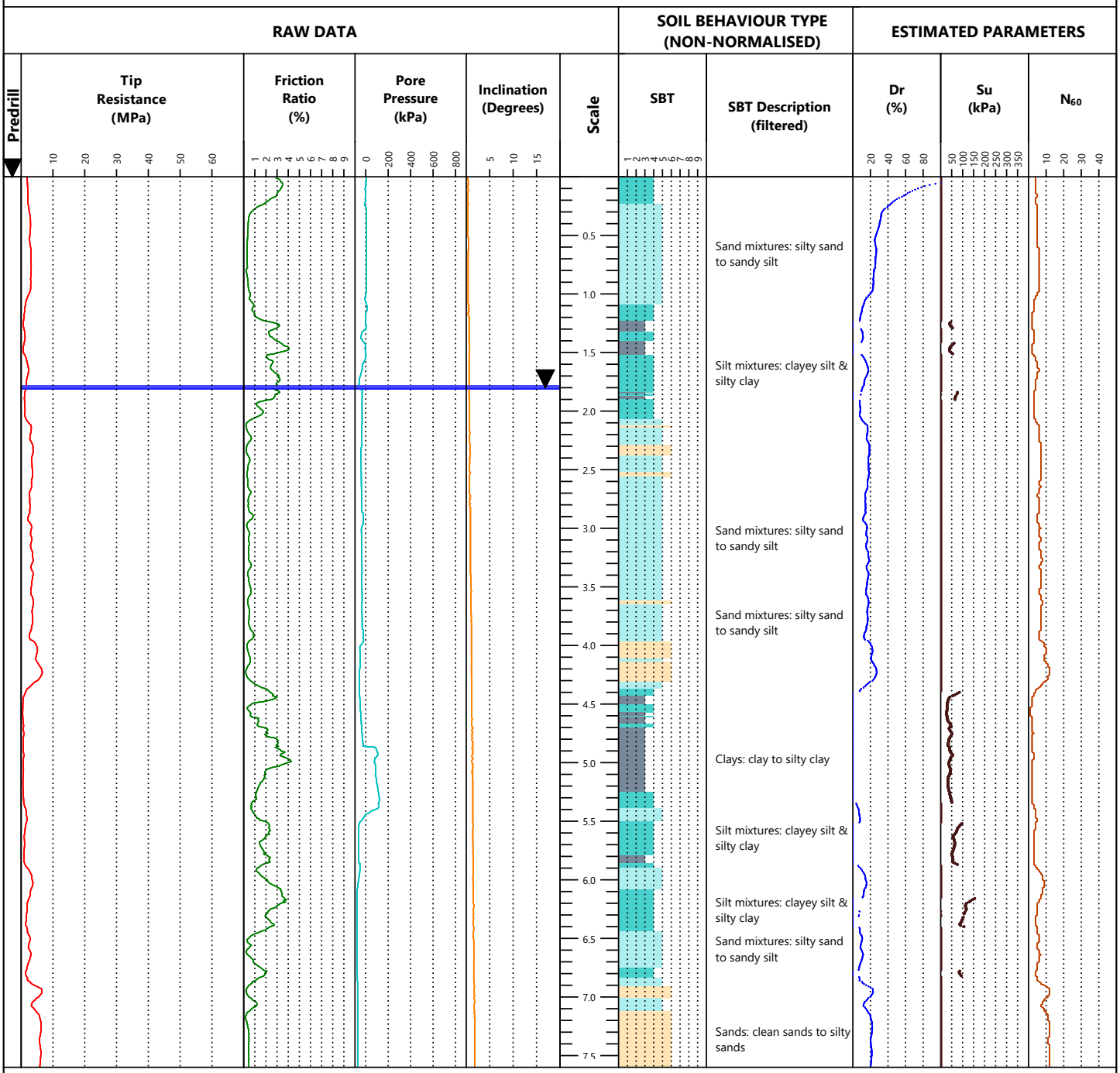
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

McMILLAN Drilling
LandTest

Client: Miyamoto International NZ	**Bore No.:** CPTu003
Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch
Date: 13/8/2020
Grid Reference: 1564902m E, 5172941.77m N (NZTM) - Map or aerial photograph
Rig Operator: B. Wilson
Elevation: 0.00m
Datum: Ground
Equipment: Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.8m
Collapse: 2.70m

Termination
Target Depth: ✓

Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3554	11.3094
Local Friction	0.1187	0.1186
Pore Pressure	0.9596	0.9557

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

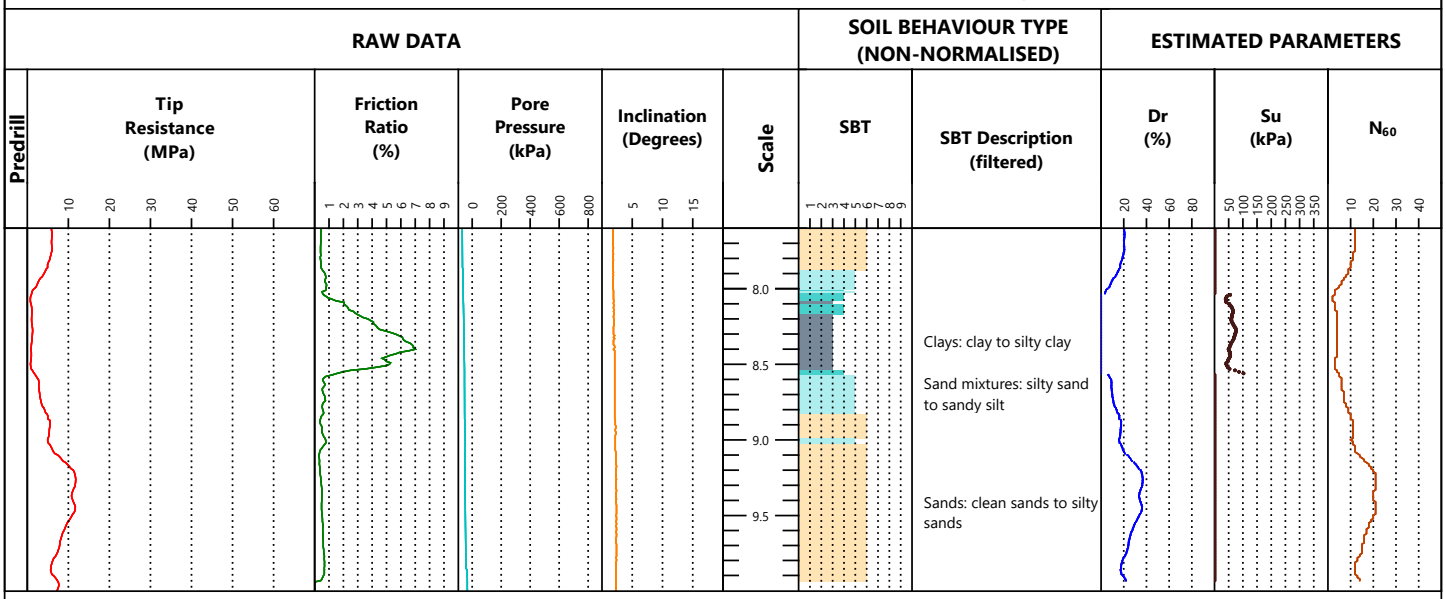
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu003
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 13/8/2020

Grid Reference: 1564902m E, 5172941.77m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.8m
Collapse: 2.70m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3554	11.3094
Local Friction	0.1187	0.1186
Pore Pressure	0.9596	0.9557

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

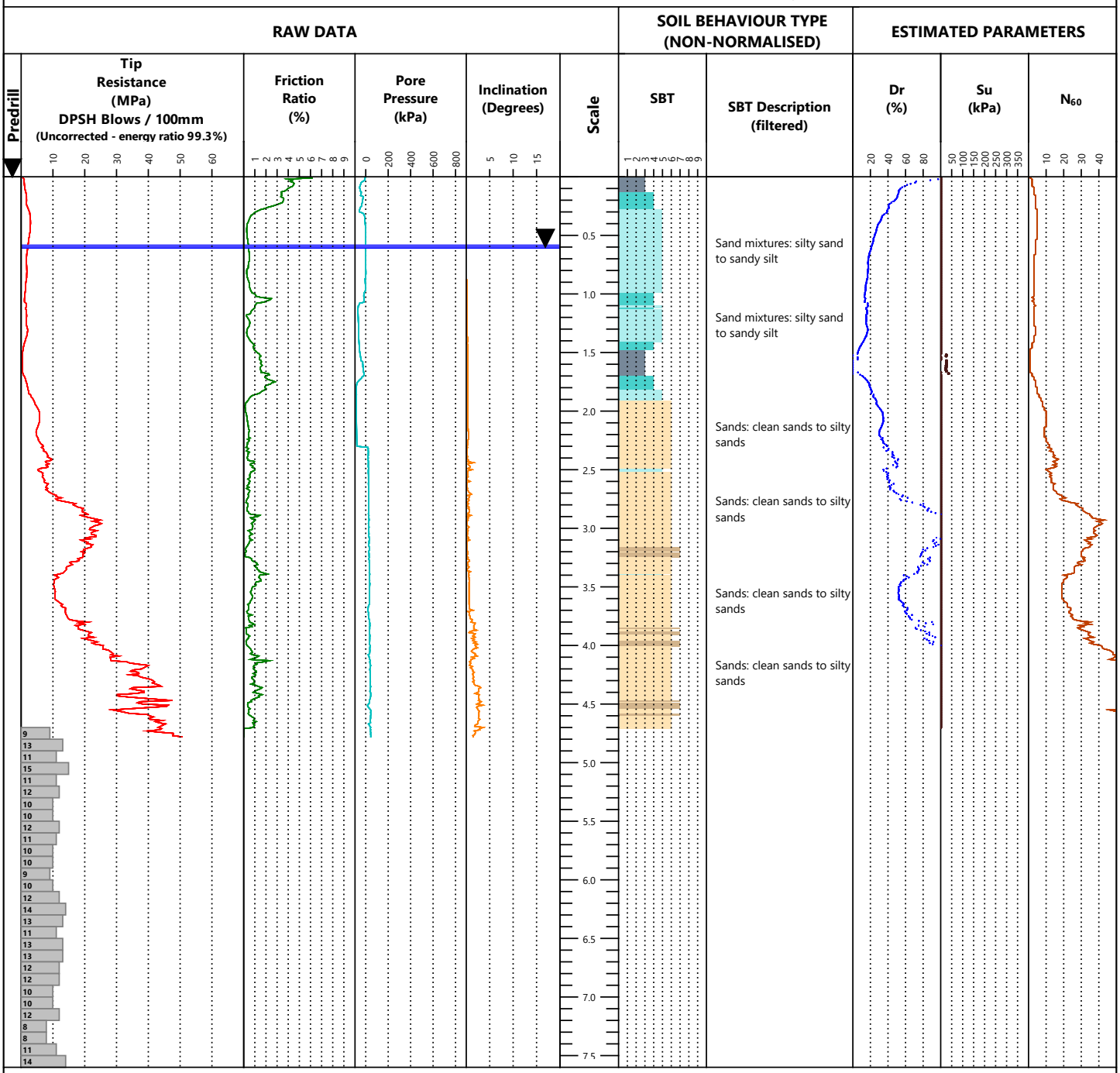
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu004
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 19/8/2020

Grid Reference: 1564993.47m E, 5172892.27m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 0.6m
Collapse: 1.95m

Termination
Target Depth: ☐
Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3452	11.2685
Local Friction	0.1186	0.1191
Pore Pressure	0.9595	0.9554

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

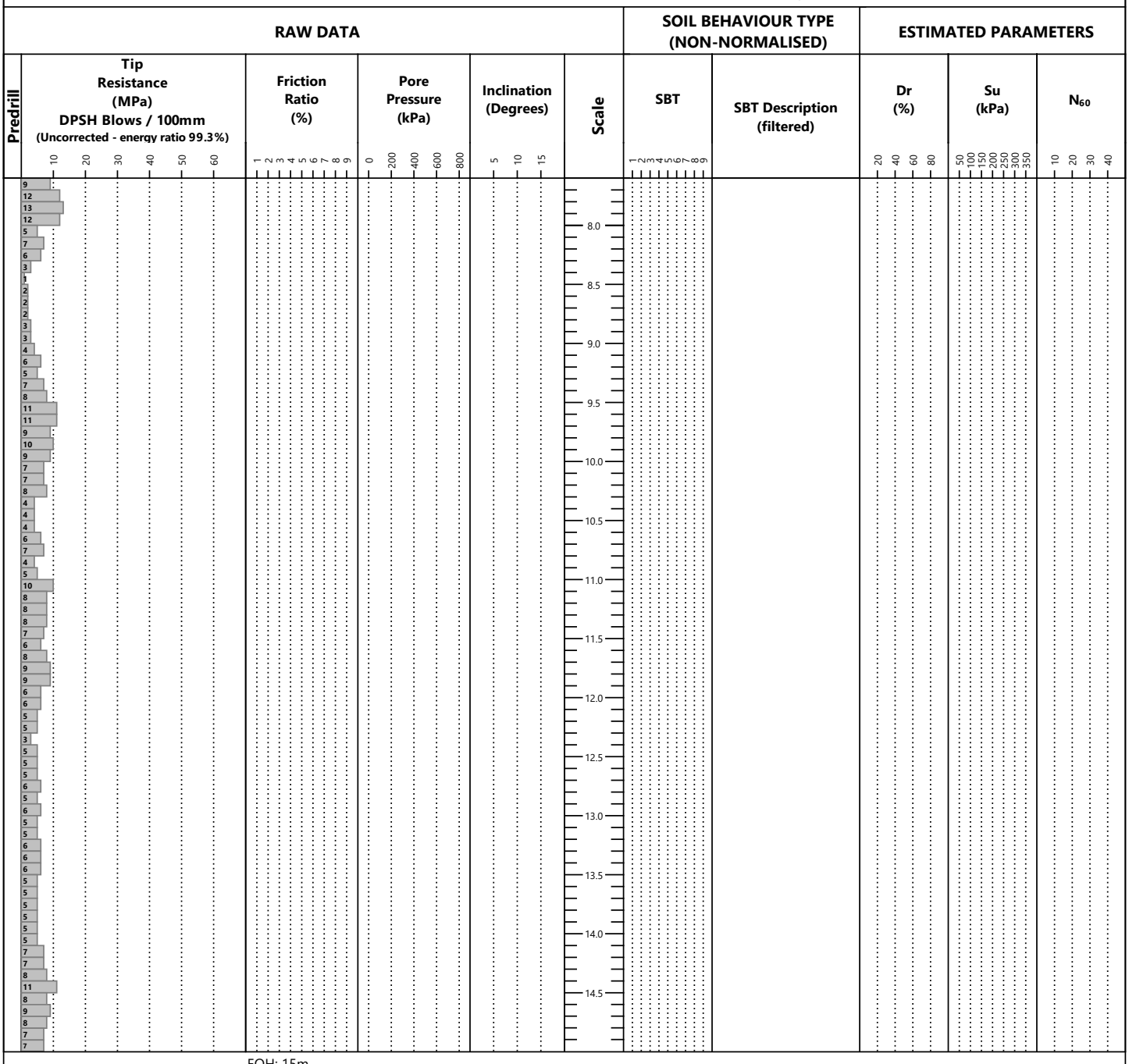
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu004
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 19/8/2020

Grid Reference: 1564993.47m E, 5172892.27m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 0.6m
Collapse: 1.95m

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3452	11.2685
Local Friction	0.1186	0.1191
Pore Pressure	0.9595	0.9554

Termination

Target Depth: ☐

Effective Refusal

Tip: ☑
Gauge: ☐
Inclinometer: ☐

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

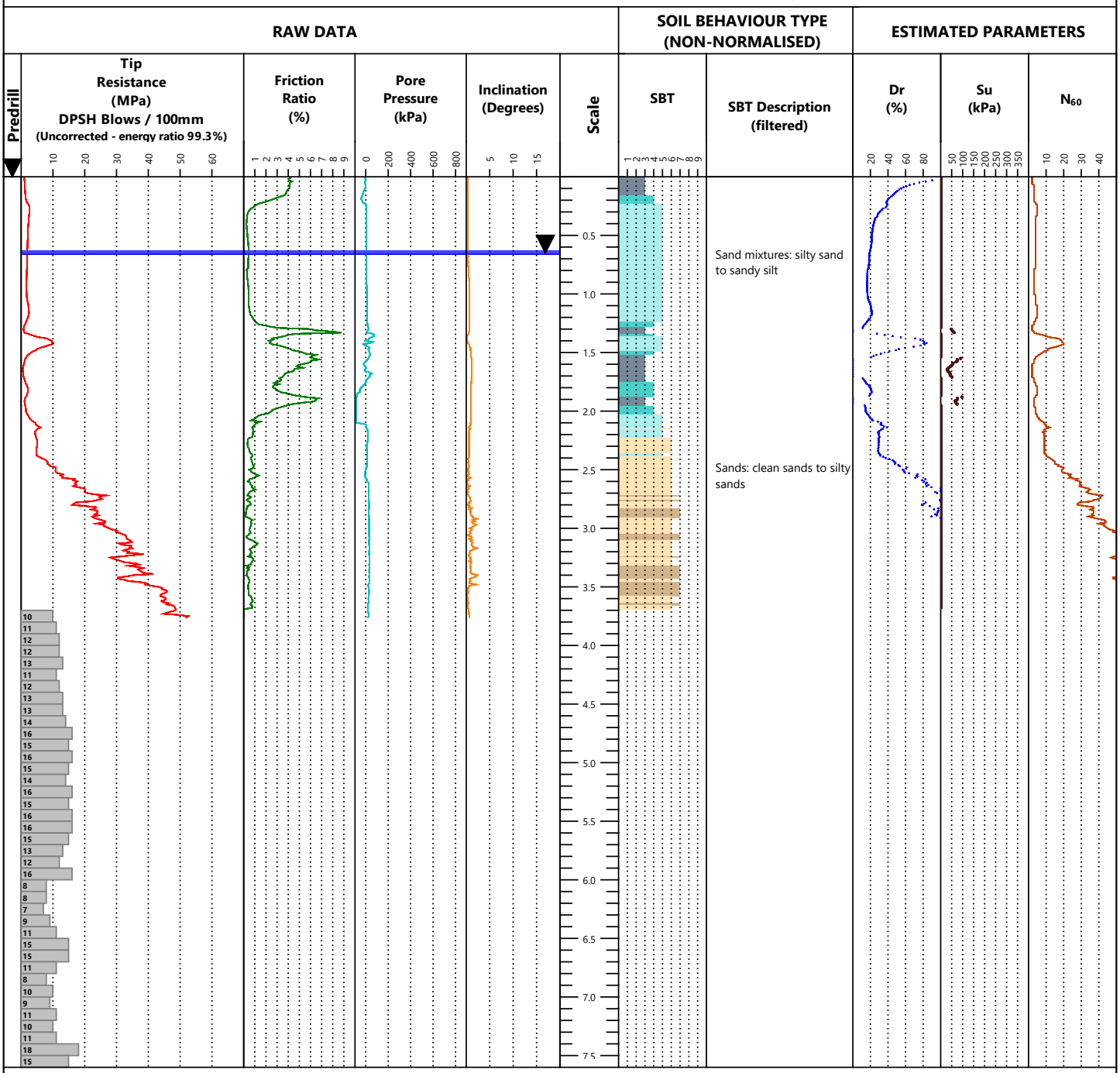
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu005
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 19/8/2020

Grid Reference: 1564945.37m E, 5172828.71m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 0.65m
Collapse: 1.45m

Termination
Target Depth: ☐
Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.4066	11.2583
Local Friction	0.1183	0.1192
Pore Pressure	0.9587	0.9583

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

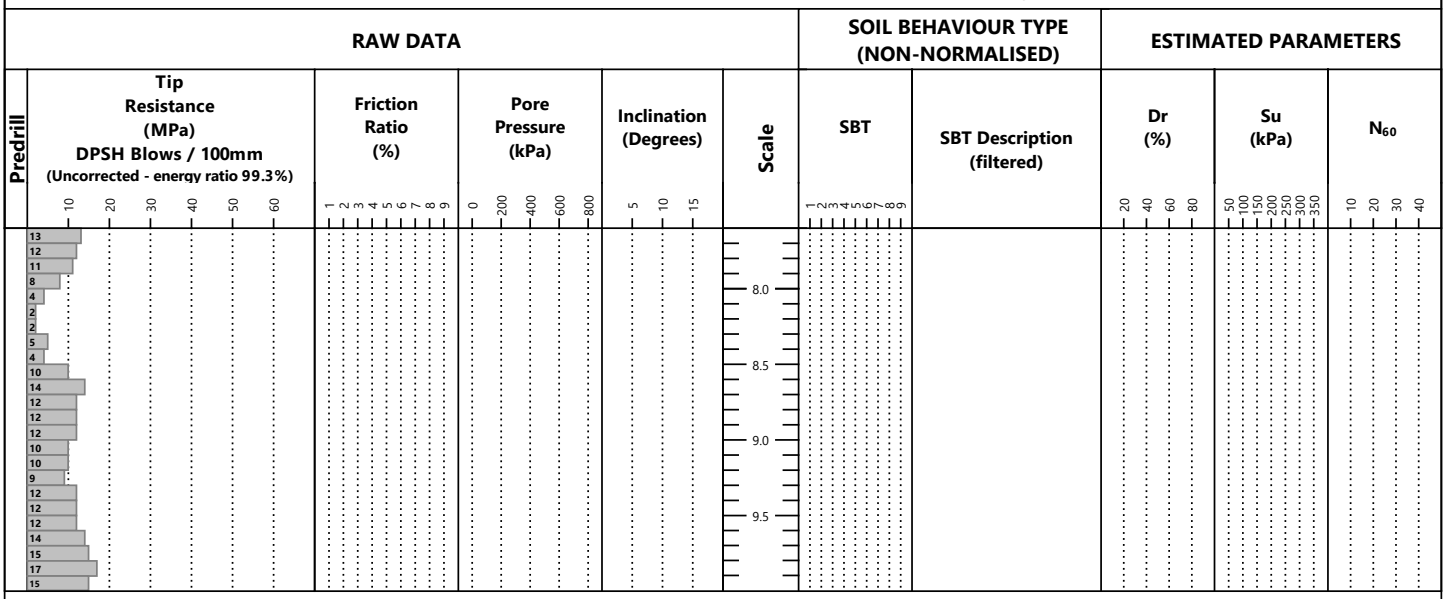
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu005
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 19/8/2020

Grid Reference: 1564945.37m E, 5172828.71m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 0.65m
Collapse: 1.45m

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.4066	11.2583
Local Friction	0.1183	0.1192
Pore Pressure	0.9587	0.9583

Termination

Target Depth: ☐

Effective Refusal

Tip: ☑
Gauge: ☐
Inclinometer: ☐

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

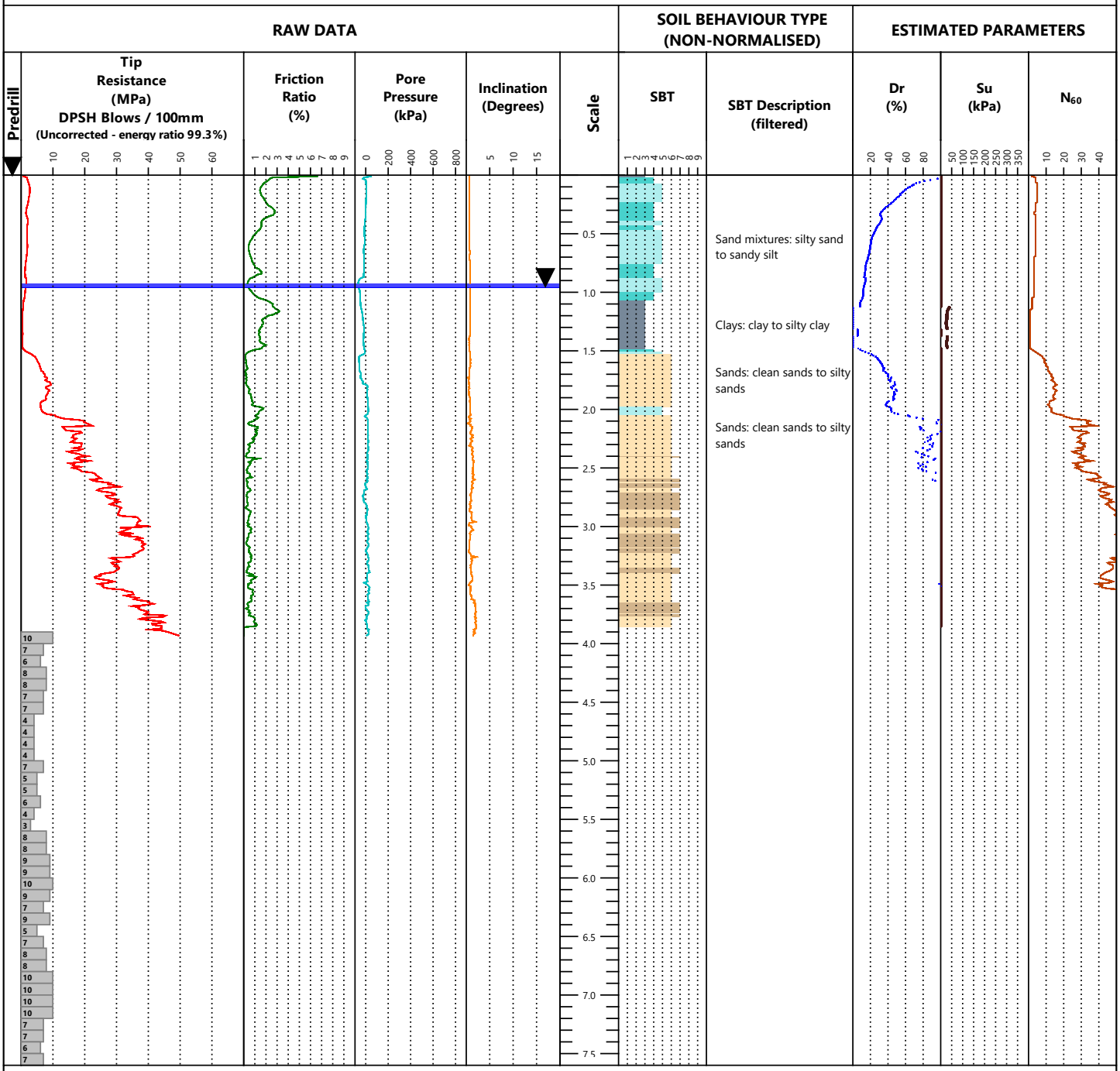
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu006
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 13/8/2020

Grid Reference: 1565008.77m E, 5172744.63m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 0.95m
Collapse: 1.40m

Termination
Target Depth: ☐
Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3708	11.2634
Local Friction	0.1178	0.119
Pore Pressure	0.9592	0.9542

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

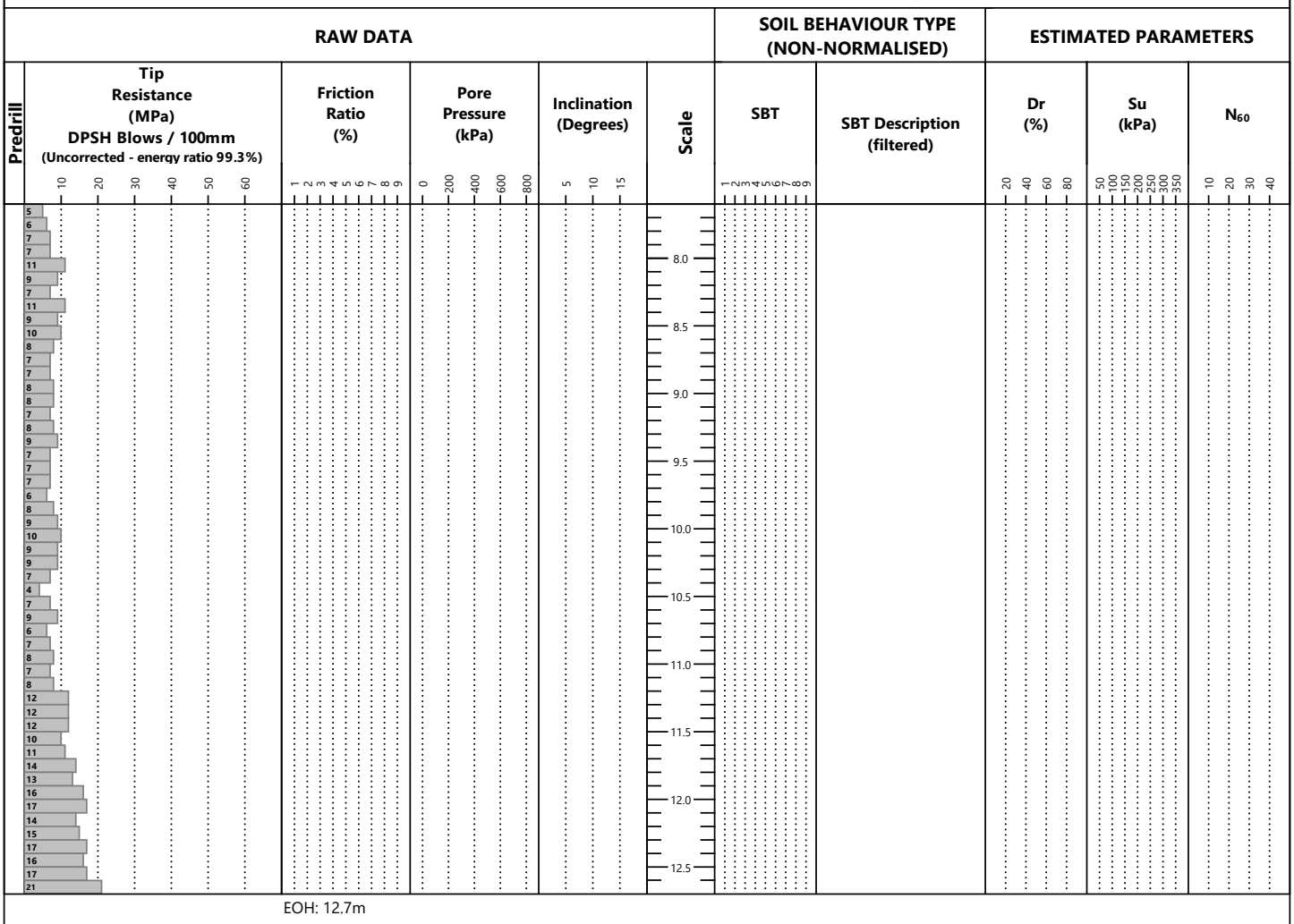
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu006
	Project: 2 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2 Glovers Road, Christchurch **Date:** 13/8/2020

Grid Reference: 1565008.77m E, 5172744.63m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 0.95m
Collapse: 1.40m

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3708	11.2634
Local Friction	0.1178	0.119
Pore Pressure	0.9592	0.9542

Termination

Target Depth: ☐

Effective Refusal

Tip: ☑
Gauge: ☐
Inclinometer: ☐

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

TEST DETAIL

PointID: CPTu001
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS711
Cone Area Ratio: 0.79

Date: 18/8/2020
Predrill: -
Water Level: 1.45m
Collapse: 1.60m

Termination
Target Depth: ☑
Effective Refusal
Tip: ☐
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.4528	20.369
Local Friction	0.2535	0.2535
Pore Pressure	3.0597	3.0579

PointID: CPTu002
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS711
Cone Area Ratio: 0.79

Date: 17/8/2020
Predrill: -
Water Level: 1.05m
Collapse: 2.45m

Termination
Target Depth: ☑
Effective Refusal
Tip: ☐
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.4004	20.348
Local Friction	0.2537	0.2536
Pore Pressure	3.0612	3.0605

PointID: CPTu003
Sounding: 1

Operator: B. Wilson
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80

Date: 13/8/2020
Predrill: -
Water Level: 1.8m
Collapse: 2.70m

Termination
Target Depth: ☑
Effective Refusal
Tip: ☐
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3554	11.3094
Local Friction	0.1187	0.1186
Pore Pressure	0.9596	0.9557

PointID: CPTu004
Sounding: 1

Operator: B. Wilson
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80

Date: 19/8/2020
Predrill: -
Water Level: 0.6m
Collapse: 1.95m

Termination
Target Depth: ☐
Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3452	11.2685
Local Friction	0.1186	0.1191
Pore Pressure	0.9595	0.9554

PointID: CPTu005
Sounding: 1

Operator: B. Wilson
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80

Date: 19/8/2020
Predrill: -
Water Level: 0.65m
Collapse: 1.45m

Termination
Target Depth: ☐
Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.4066	11.2583
Local Friction	0.1183	0.1192
Pore Pressure	0.9587	0.9583

TEST DETAIL

PointID: CPTu006
Sounding: 1

Operator: B. Wilson
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ328
Cone Area Ratio: 0.80

Date: 13/8/2020
Predrill: -
Water Level: 0.95m
Collapse: 1.40m

Termination

Target Depth: ☐

Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.3708	11.2634
Local Friction	0.1178	0.119
Pore Pressure	0.9592	0.9542

McMILLAN Drilling
LandTest

CPT CALIBRATION AND TECHNICAL NOTES

These notes describe the technical specifications and associated calibration references pertaining to the Pagani piezocone types measuring cone resistance, sleeve friction, inclination and pore pressure (piezocone, 10cm^2)

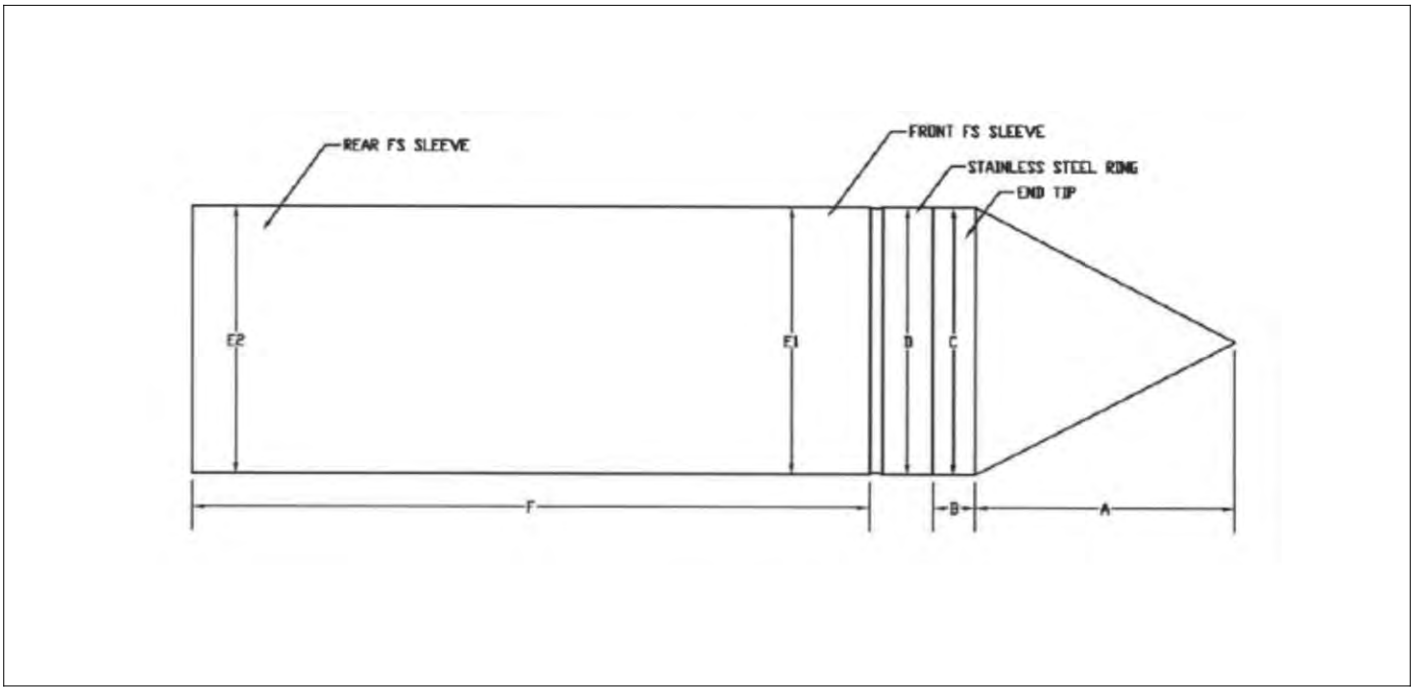
Dimensions

Dimensional specifications are detailed below. All tolerances are routinely checked prior to testing and measurements taken are electronically recorded. All records are kept on file and available on request.

Technical specifications

	Tip	Friction	Pore Pressure	Inclination
Maximum Measuring Range:	50 - 100 MPa	1.60 MPa	2.50 MPa	0° - 20°
Resolution:	24 bit	24 bit	24 bit	12 bit
Accuracy:	0.005 MPa	0.04 MPa	0.04 MPa	0.5°

Length:	320 mm	**Weight:**	1.8 kg
Diameter:	35.8 mm	**Opening angle of bit:**	60°
Cone base area:	10 cm^2	**Side sleeve surfaces:**	150 cm^2
Cone area ratio:	0.80	**Tip and Local Friction sensor displacement:**	80 mm



LandTest McMILLAN Drilling

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z087/19

Calibrated system *(Sistema tarato)* :

Serial number	Mkj328
Sensor	TIP RESISTANCE
Max. Capacity [MPa]:	100
Scaling Factor:	195500
Tip net area ratio (a_n):	0,80
Sleeve net ratio (b_n):	0,00

Addressee *(destinatario)* :
LANDTEST
307 Cashel street, Christchurch
New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 200 kN
Serial Number	138913

Power press:

Manufacturer	Easydur Italiana
Model	Aura 20T
Serial Number	29084

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

Last verification date:	15/01/2019
Certificate N.	LAT 091 2019-014
Temperature of calibration	22°C
Humidity	53%

Factory calibration in accordance with ASTM D5778-12

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z087/19

Calibrated system *(Sistema tarato)* :

Serial number	Mkj328
Sensor	SLEEVE FRICTION
Max. Capacity [kPa]:	1600
Scaling Factor:	30696

Addressee *(destinatario)* :
LANDTEST
307 Cashel street, Christchurch
New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 50 kN
Serial Number	65495

Power press:

Manufacturer	Easydur Italiana
Model	Aura 10T
Serial Number	29002

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z087/19

Calibrated system *(Sistema tarato)* :

Serial number	Mkj328
Sensor	PORE PRESSURE
Max. Capacity [kPa]:	2500
Scaling Factor:	16963
Sensor	TILT ANGLE
Max. Inclination [°]:	20
Scaling Factor:	140137

Addressee *(destinatario)* :
LANDTEST
307 Cashel street, Christchurch
New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Pressure Generator:

Manufacturer	AEP transducers
Model	GPM500

Digital Indicator:

Manufacturer	AEP transducers
Model	LAB DMM
Serial Number	301796

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

The adopted calibration procedure has been developed according to the suggestions given by Prof. Paul W. Mayne (Georgia Institute of Technology) and Prof. Diego Lo Presti (University of Pisa)

Cone calibrated by Claudio C.

Date of issue 27/06/2019

Land Test McMILLAN Drilling

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z024/20

Calibrated system *(Sistema tarato)* :

Serial number	Mks711
Sensor	TIP RESISTANCE
Max. Capacity [MPa]:	100
Scaling Factor:	190780
Tip net area ratio (a_n):	0,79
Sleeve net ratio (b_n):	0,00

Addressee *(destinatario)* :
McMillan Drilling Ltd
36 Hickory Place,Islington
Christchurch 8042,New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 200 kN
Serial Number	138913

Power press:

Manufacturer	Easydur Italiana
Model	Aura 20T
Serial Number	29084

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

Last verification date:	16/01/2020
Certificate N.	LAT 091 2020-015
Temperature of calibration	22°C
Humidity	45%

Factory calibration in accordance with ASTM D5778-12

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z024/20

Calibrated system *(Sistema tarato)* :

Serial number	Mks711
Sensor	SLEEVE FRICTION
Max. Capacity [kPa]:	1600
Scaling Factor:	31343

Addressee *(destinatario)* :
McMillan Drilling Ltd
36 Hickory Place,Islington
Christchurch 8042,New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 50 kN
Serial Number	65495

Power press:

Manufacturer	Easydur Italiana
Model	Aura 10T
Serial Number	29002

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

Last verification date: 16/01/2020

The adopted calibration procedure has been developed acc
Prof. Paul W. Mayne (Georgia Institute of technology) and

Cone calibrated by

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z024/20

Calibrated system *(Sistema tarato)* :

Serial number	Mks711
Sensor	PORE PRESSURE
Max. Capacity [kPa]:	2500
Scaling Factor:	10298
Sensor	TILT ANGLE
Max. Inclination [°]:	20
Scaling Factor:	280277

Addressee *(destinatario)* :
McMillan Drilling Ltd
36 Hickory Place,Islington
Christchurch 8042,New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Pressure Generator:

Manufacturer	MENSOR
Model	CPC 4000
Serial Number	41000V56
Sensor Descr	Silicon Pressure Transducer
Sensor Serial Number	41000SYF

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

Last verification date:	28/02/2019
Certificate N.	162632
Temperature of calibration	22°C
Humidity	45%

Factory calibration in accordance with ASTM D5778-12

CONE PENETRATION TEST (CPT) REPORT

McMILLAN Drilling

LandTest

Client: Miyamoto International NZ

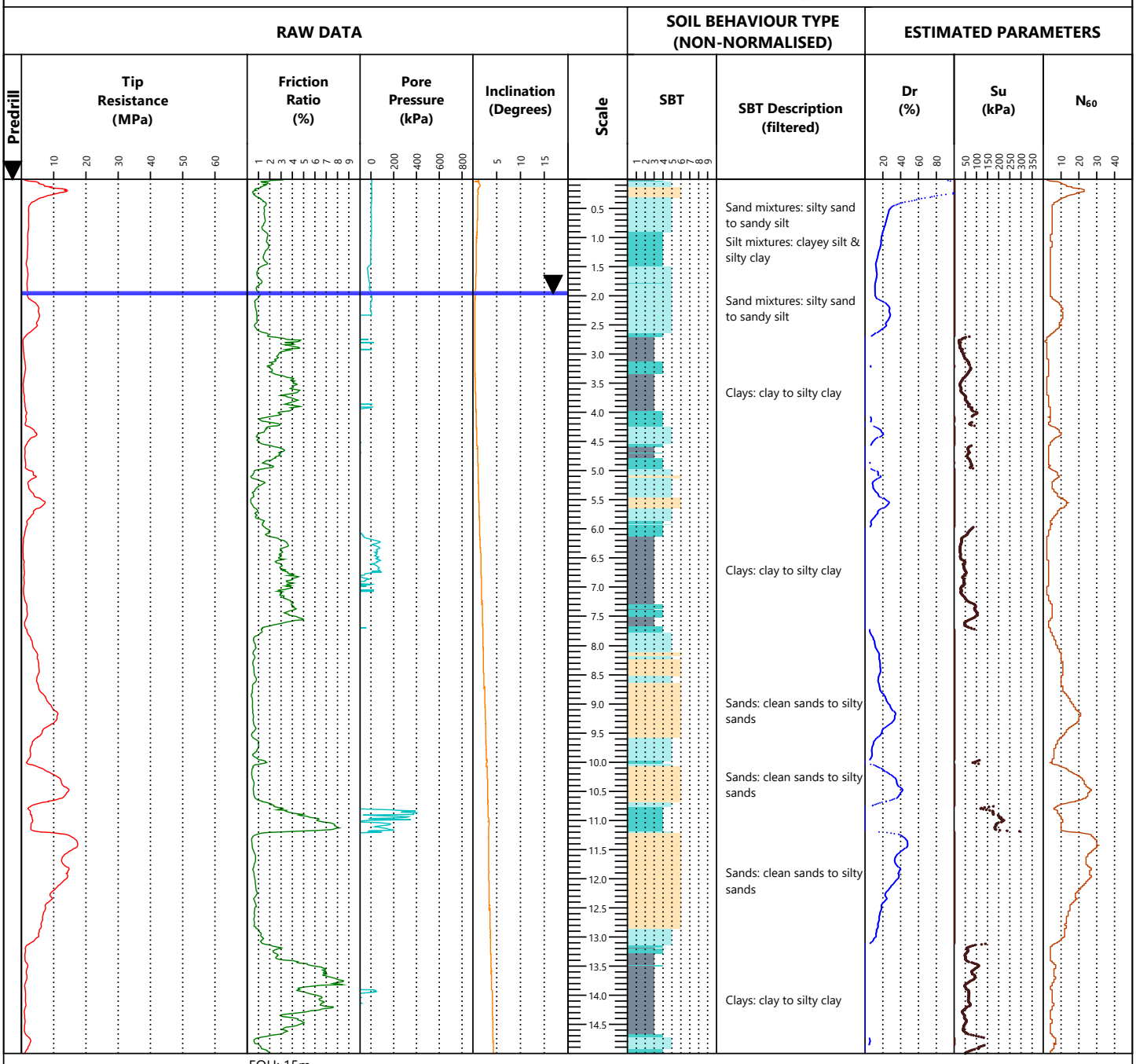
Location: 2-4 Glovers Road, Christchurch

Printed: 29/09/2020

McMILLAN Drilling
LandTest

Client: Miyamoto International NZ	**Bore No.:** CPTu007
Project: 2-4 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2-4 Glovers Road, Christchurch
Date: 24/9/2020
Grid Reference: 1564970.4m E, 5173158.32m N (NZTM) - Map or aerial photograph
Rig Operator: E. Diaz
Elevation: 0.00m
Datum: Ground
Equipment: Pagani TG63-150



EOH: 15m

Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.96m
Collapse: 2.0m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9412	11.8737
Local Friction	0.1606	0.161
Pore Pressure	1.4594	1.262

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

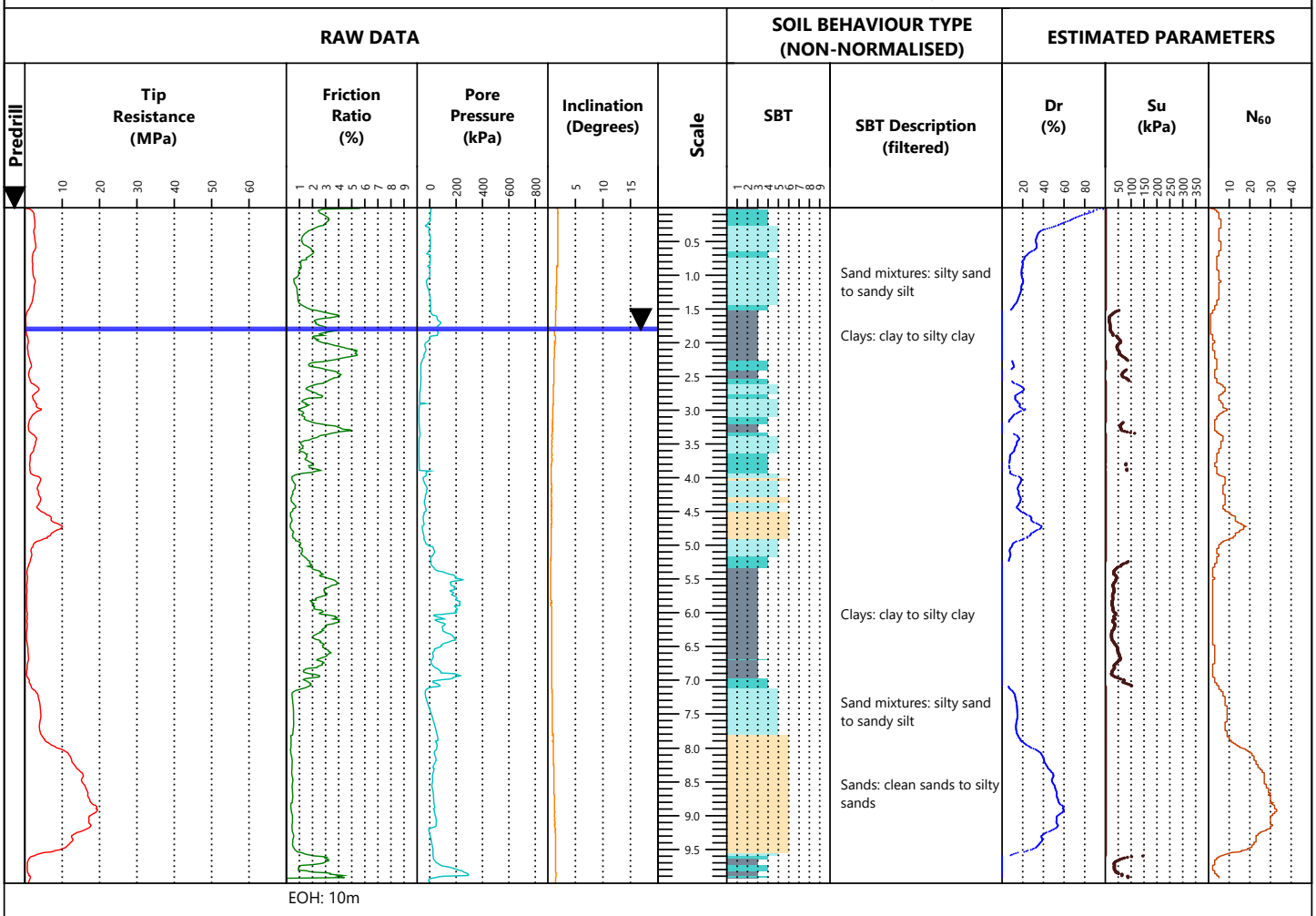
Remarks
Invalid pore water pressure data from 2.33m.

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu008
	Project: 2-4 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2-4 Glovers Road, Christchurch **Date:** 24/9/2020

Grid Reference: 1565034.78m E, 5173124.87m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.8m
Collapse: 2.2m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9516	11.8425
Local Friction	0.1609	0.1614
Pore Pressure	1.459	1.4561

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

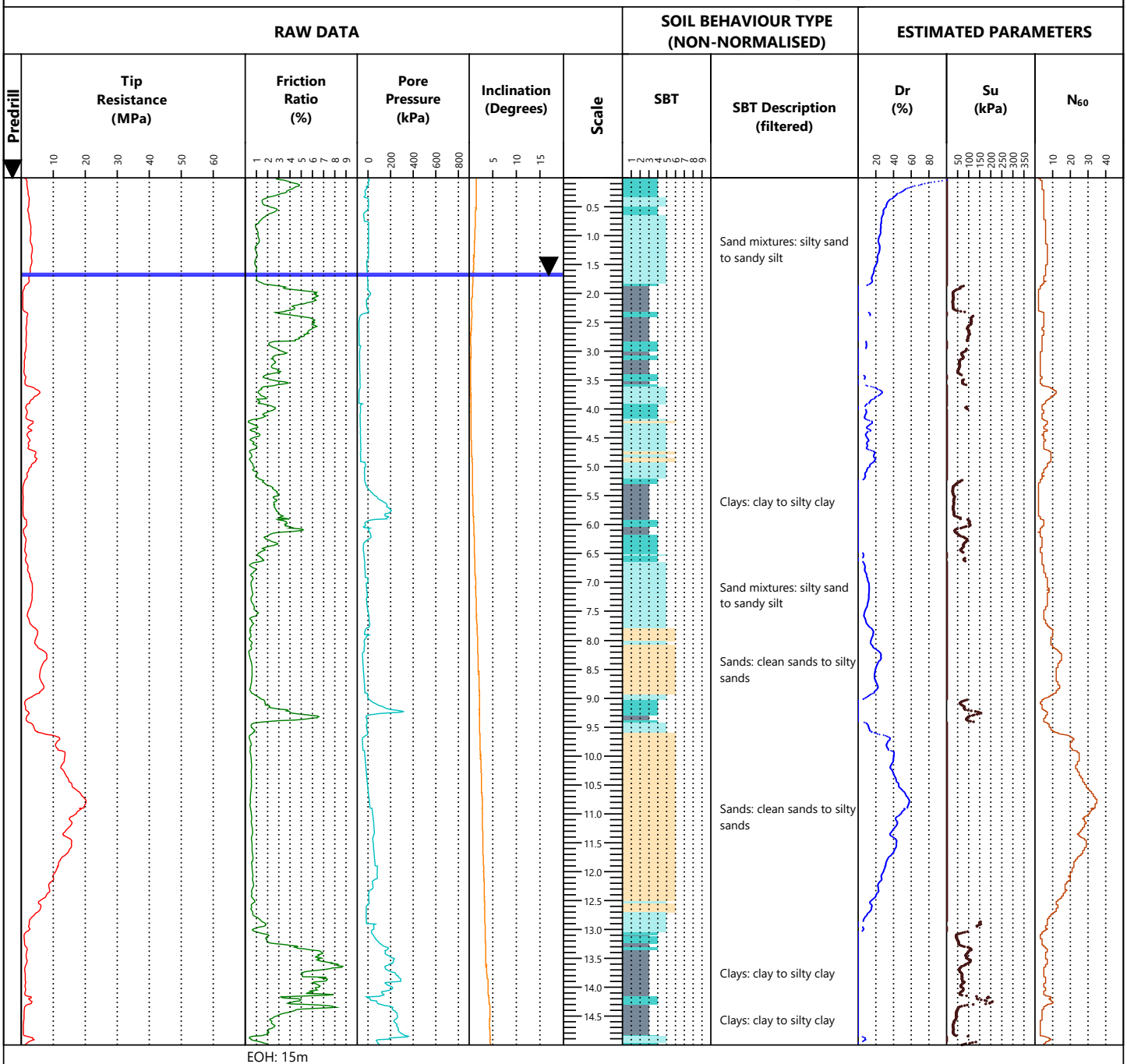
McMILLAN Drilling
LandTest

Client: Miyamoto International NZ		**Bore No.:** CPTu009
Project: 2-4 Glovers Road, Christchurch		**Job No.:** 19096

Site Location: 2-4 Glovers Road, Christchurch **Date:** 24/9/2020

Grid Reference: 1564969.64m E, 5173086.81m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



EOH: 15m

Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1.68m
Collapse: 1.80m

Termination
Target Depth: ✓

Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9464	11.801
Local Friction	0.1604	0.1611
Pore Pressure	1.4592	1.4568

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

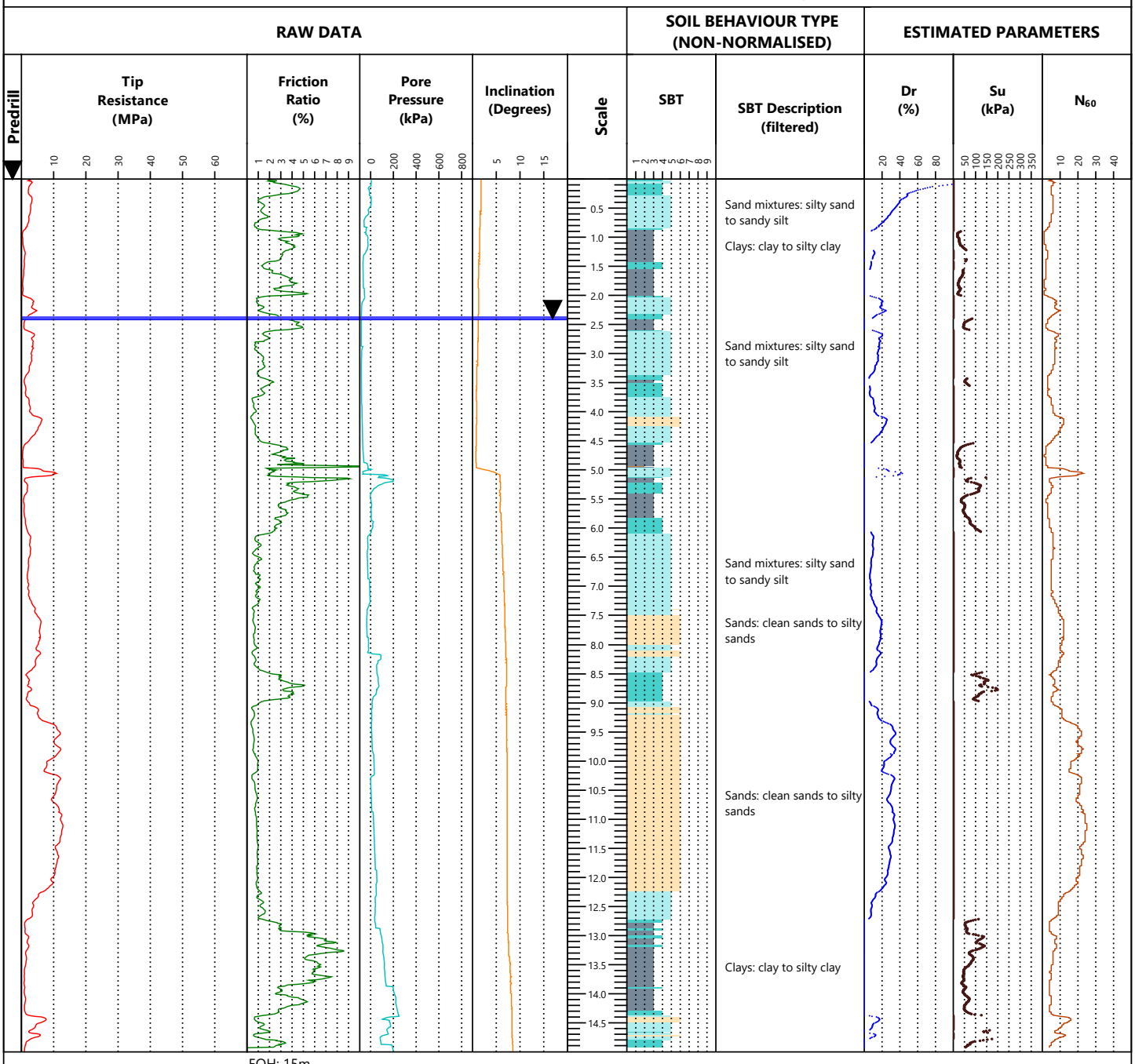
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu010
	Project: 2-4 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2-4 Glovers Road, Christchurch **Date:** 25/9/2020

Grid Reference: 1565043.16m E, 5173036.65m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



EOH: 15m

Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 2.4m
Collapse: 2.50m

Termination
Target Depth: ✓

Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9568	11.8166
Local Friction	0.1618	0.1622
Pore Pressure	1.4599	1.4582

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

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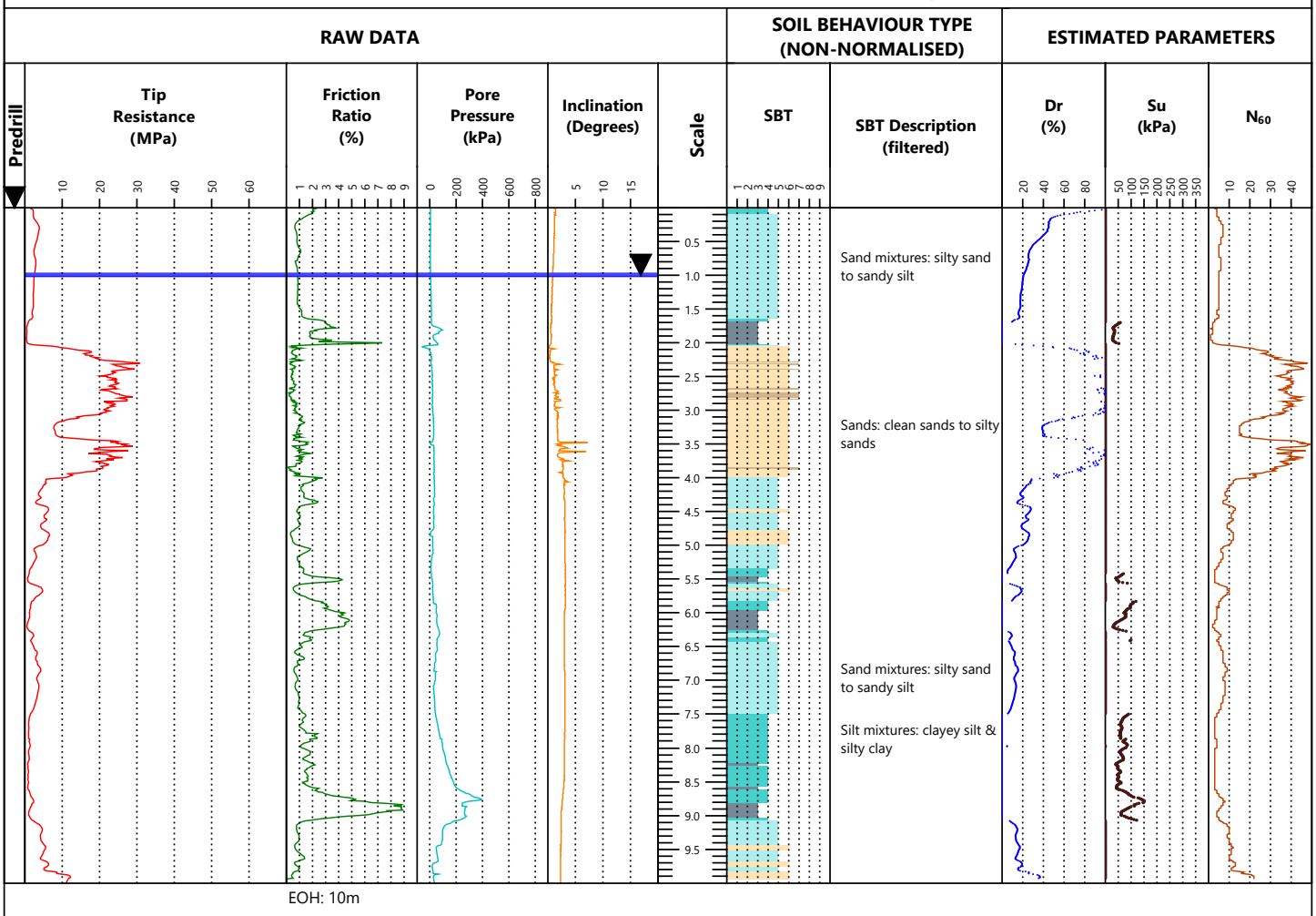
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu011
	Project: 2-4 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2-4 Glovers Road, Christchurch **Date:** 25/9/2020

Grid Reference: 1565055.15m E, 5172937.04m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: -
Water Level: 1m
Collapse: 5.1m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9464	11.8166
Local Friction	0.1615	0.1621
Pore Pressure	1.4598	1.455

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

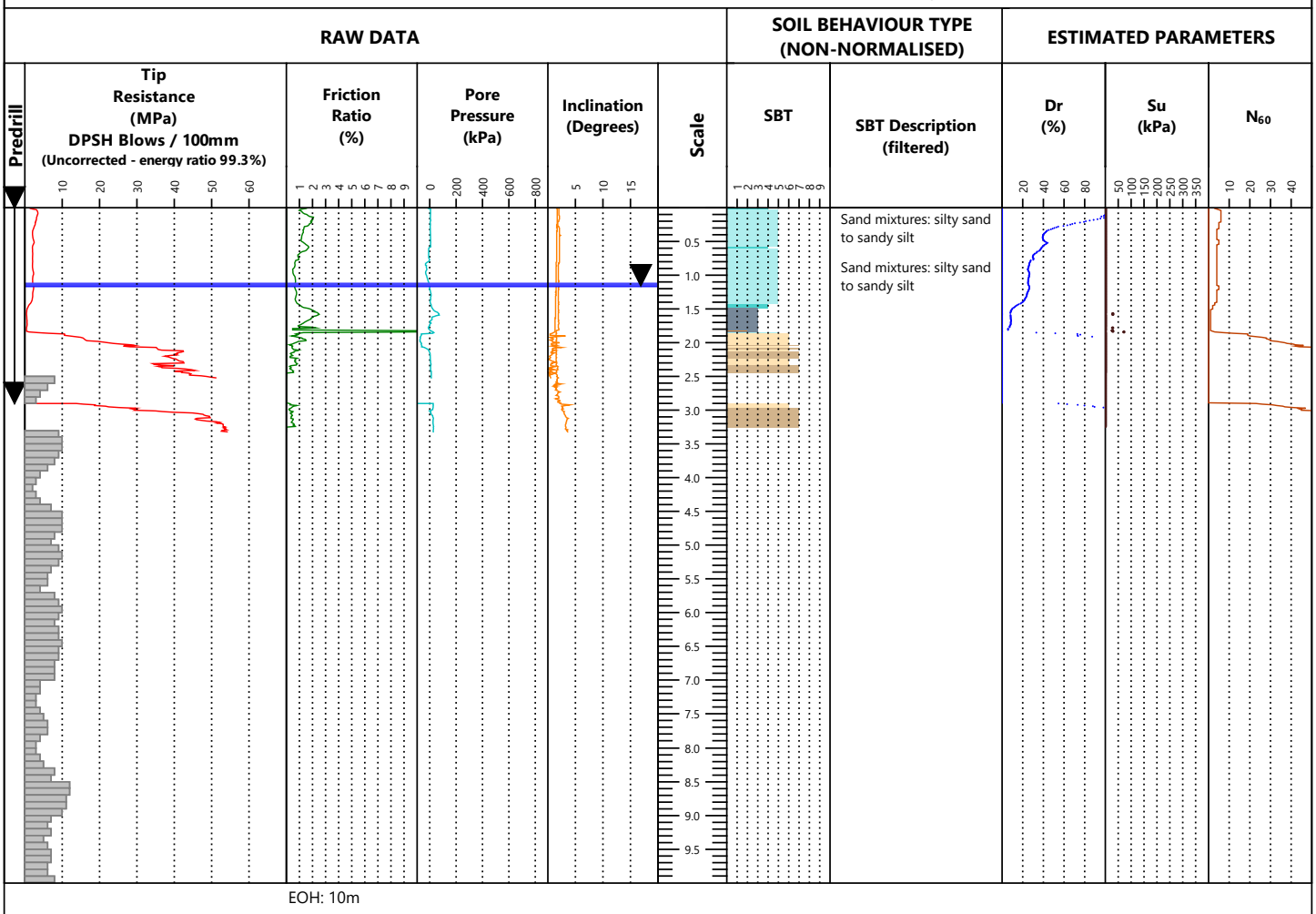
Remarks

McMILLAN Drilling LandTest	**Client:** Miyamoto International NZ	**Bore No.:** CPTu012
	Project: 2-4 Glovers Road, Christchurch	**Job No.:** 19096

Site Location: 2-4 Glovers Road, Christchurch **Date:** 29/9/2020

Grid Reference: 1565058.83m E, 5172852.91m N (NZTM) - Map or aerial photograph **Rig Operator:** E. Diaz

Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79
Standards: ISO 22476-1:2012

Predrill: 2.9m
Water Level: 1.15m
Collapse: 2.2m

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.8737	11.8321
Local Friction	0.1612	0.1611
Pore Pressure	1.4542	1.4556

Termination

Target Depth: ☐

Effective Refusal

Tip: ✓
Gauge: ☐
Inclinometer: ☐

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P. K. Robertson and K.L. Cabal (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 4th Edition. The interpretations are presented only as a guide for geotechnical use, and should be carefully reviewed by the user. No warranty is provided as to the correctness or the applicability of any of the geotechnical soil and design parameters shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

Remarks

TEST DETAIL

PointID: CPTu007
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 24/9/2020
Predrill: -
Water Level: 1.96m
Collapse: 2.0m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9412	11.8737
Local Friction	0.1606	0.161
Pore Pressure	1.4594	1.262

PointID: CPTu008
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 24/9/2020
Predrill: -
Water Level: 1.8m
Collapse: 2.2m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9516	11.8425
Local Friction	0.1609	0.1614
Pore Pressure	1.459	1.4561

PointID: CPTu009
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 24/9/2020
Predrill: -
Water Level: 1.68m
Collapse: 1.80m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9464	11.801
Local Friction	0.1604	0.1611
Pore Pressure	1.4592	1.4568

PointID: CPTu010
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 25/9/2020
Predrill: -
Water Level: 2.4m
Collapse: 2.50m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9568	11.8166
Local Friction	0.1618	0.1622
Pore Pressure	1.4599	1.4582

PointID: CPTu011
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 25/9/2020
Predrill: -
Water Level: 1m
Collapse: 5.1m

Termination
Target Depth: ✓
Effective Refusal
Tip:
Gauge:
Inclinometer:

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9464	11.8166
Local Friction	0.1615	0.1621
Pore Pressure	1.4598	1.455

TEST DETAIL

PointID: CPTu012
Sounding: 1

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 29/9/2020
Predrill: -
Water Level: -
Collapse: -

Termination

Target Depth: ☐

Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.9568	11.8062
Local Friction	0.1607	0.1609
Pore Pressure	1.4567	1.4562

Sounding: 2

Operator: E. Diaz
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKJ329
Cone Area Ratio: 0.79

Date: 29/9/2020
Predrill: 2.9m
Water Level: 1.15m
Collapse: 2.2m

Termination

Target Depth: ☐

Effective Refusal
Tip: ☑
Gauge: ☐
Inclinometer: ☐

Zero load outputs (MPa)	Before test	After test
Tip Resistance	11.8737	11.8321
Local Friction	0.1612	0.1611
Pore Pressure	1.4542	1.4556

McMILLAN Drilling
LandTest

CPT CALIBRATION AND TECHNICAL NOTES

These notes describe the technical specifications and associated calibration references pertaining to the Pagani piezocone types measuring cone resistance, sleeve friction, inclination and pore pressure (piezocone, 10cm^2)

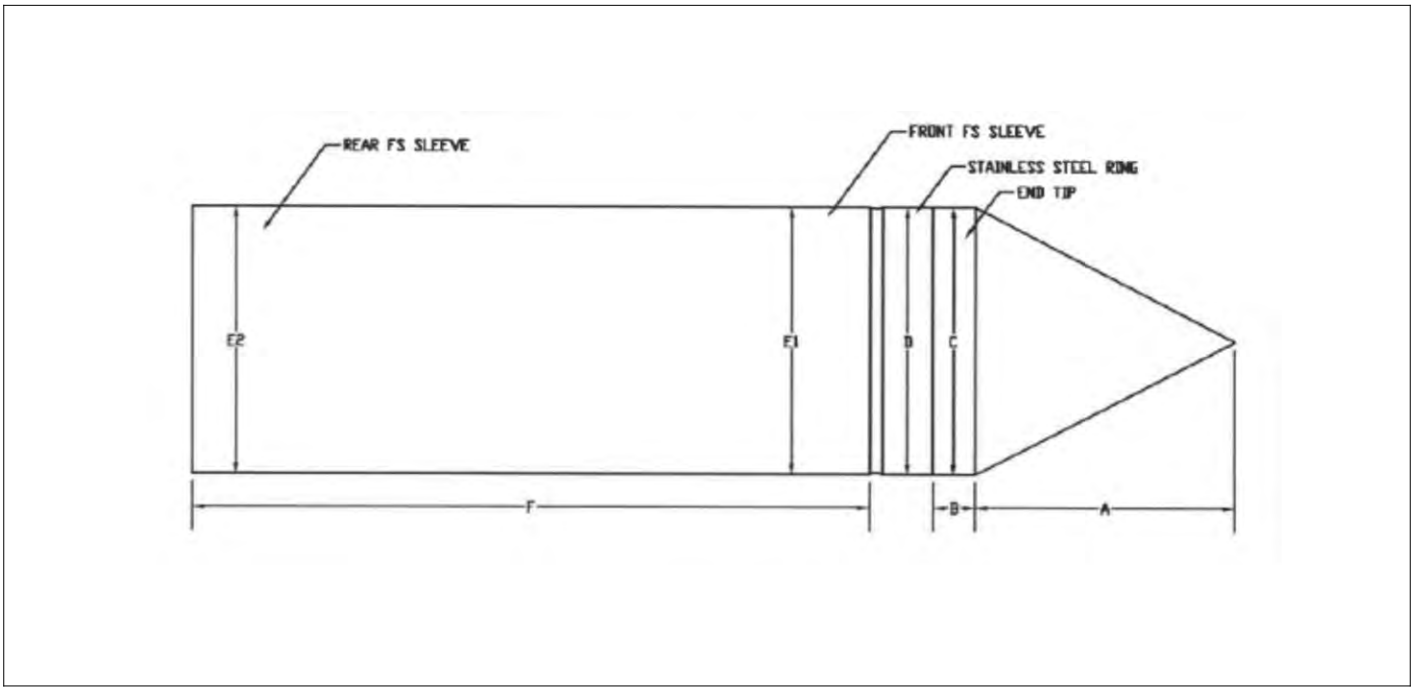
Dimensions

Dimensional specifications are detailed below. All tolerances are routinely checked prior to testing and measurements taken are electronically recorded. All records are kept on file and available on request.

Technical specifications

	Tip	Friction	Pore Pressure	Inclination
Maximum Measuring Range:	50 - 100 MPa	1.60 MPa	2.50 MPa	0° - 20°
Resolution:	24 bit	24 bit	24 bit	12 bit
Accuracy:	0.005 MPa	0.04 MPa	0.04 MPa	0.5°

Length:	320 mm	**Weight:**	1.8 kg
Diameter:	35.8 mm	**Opening angle of bit:**	60°
Cone base area:	10 cm^2	**Side sleeve surfaces:**	150 cm^2
Cone area ratio:	0.80	**Tip and Local Friction sensor displacement:**	80 mm



Land Test — McMILLAN Drilling

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z023/20

Calibrated system *(Sistema tarato)* :

Serial number	Mkj329
Sensor	TIP RESISTANCE
Max. Capacity [MPa]:	100
Scaling Factor:	192610
Tip net area ratio (a_n):	0,79
Sleeve net ratio (b_n):	0,00

Addressee *(destinatario)* :
McMillan Drilling Ltd
36 Hickory Place,Islington
Christchurch 8042,New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 200 kN
Serial Number	138913

Power press:

Manufacturer	Easydur Italiana
Model	Aura 20T
Serial Number	29084

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*

Last verification date:	16/01/2020
Certificate N.	LAT 091 2020-015
Temperature of calibration	22°C
Humidity	45%

Factory calibration in accordance with ASTM D5778-12

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z023/20

Calibrated system *(Sistema tarato)* :

Serial number	Mkj329
Sensor	SLEEVE FRICTION
Max. Capacity [kPa]:	1600
Scaling Factor:	30794

Addressee *(destinatario)* :
McMillan Drilling Ltd
36 Hickory Place,Islington
Christchurch 8042,New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 50 kN
Serial Number	65495

Power press:

Manufacturer	Easydur Italiana
Model	Aura 10T
Serial Number	29002

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*
Last verification date: 16/01/2020

The adopted calibration procedure has been developed according to the suggestions given by Prof. Paul W. Mayne (Georgia Institute of technology) and Prof. Diego Lo Presti (University of Pisa)

Cone calibrated by _____

Date of issue 05/02/2020

PAGANI® GEOTECHNICAL EQUIPMENT

CONE CALIBRATION CERTIFICATE
N° Z023/20

Calibrated system *(Sistema tarato)* :

Serial number	Mkj329
Sensor	PORE PRESSURE
Max. Capacity [kPa]:	2500
Scaling Factor:	10657
Sensor	TILT ANGLE
Max. Inclination [°]:	20
Scaling Factor:	151152

Addressee *(destinatario)* :
McMillan Drilling Ltd
36 Hickory Place,Islington
Christchurch 8042,New Zeland

Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Pressure Generator:

Manufacturer	MENSOR
Model	CPC 4000
Serial Number	41000V56
Sensor Descr	Silicon Pressure Transducer
Sensor Serial Number	41000SYF

The measurement system is periodically checked in a SIT calibration center. *(Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)*
Last verification date: 28/02/2019

D. Southern Geophysical MASW and GPR Report

October 2020

GEOPHYSICAL REPORT

Geophysical Site Investigation:

2-4 Glovers Road, Christchurch

Report prepared for Miyamoto International NZ Ltd

Southern Geophysical

3/28 Tanya St, Bromley, Christchurch 8062

Ph: 03 384 4302

Web: www.southerngeophysical.com

Data collected and report prepared for Southern Geophysical Ltd by:

Christian Ruegg, MSc, Geophysicist

Nick McConachie, BSc, Geologist

Report internally reviewed for Southern Geophysical by:
Mike Finnemore, PhD, Senior Geophysicist

Table of Contents

SGL Reference: 2050

Report Version 1

Summary:

Southern Geophysical Ltd was contracted to undertake a geophysical survey using Multi-channel Analysis of Surface Waves (MASW) at 2-4 Glovers Road, Christchurch. The geophysical survey was conducted on September 24th, 2020 and includes three MASW lines (Figure 1). The aim of the survey was to assess the shear-wave velocities and structure of the subsurface to a depth of over 20 m. The MASW results show low shear-wave velocities to a depth of 10 m in the northern part of the site (100 m/s to 150 m/s), with higher velocities to the south (100 m/s to 300 m/s). The boundary between these two zones is a feature characteristic of the edge of a paleochannel, buried valley, or dipping volcanic strata, crossing the site east to west and dipping to the north. It is possible that high velocities imaged by the MASW survey to the south (>500 m/s from approximately 20 m depth) are associated with volcanic rock, but there are no boreholes available for ground truthing to that depth.

Methodology:

MASW is a geophysical technique that uses the dispersive nature of surface waves to model shear-wave velocity versus depth.

A MASW survey is undertaken as a series of lines or points across the surface of the site. The MASW points in this survey were collected using a 24-channel towed seismic array, with 4.5 Hz geophones. The geophone spacing was 1 m and the source offset was 10 m. The seismic source was a 16 lb sledgehammer impacting an aluminium plate. Recording parameters for the MASW survey were set with a 0.125 ms sample interval, 1.5 s record length, 24 dB gains, and a geophone trigger system.

The field records were processed using the Kansas Geological Survey software package SurfSeis6++ ©. The geometry for each point was set according to the survey parameters and the dispersion curves were generated and edited. The inversions were run using a 10 layer variable depth model. The velocity data was interpolated into 2D profiles showing V_s variations with depth (Figures 2 to 3). The output shear-wave velocity data is included as data files (CSV format), supplementary to this report.

Supplementary to the MASW profiles, a series of Ground Penetrating Radar lines were acquired with a GSSI 200 MHz antenna (Figure 1). The radargrams are included in (Figures 4 and 5).

Survey positions were recorded using a Geo 7X Trimble GNSS system with a Tornado antenna. The GNSS positions were differentially corrected using a local GeoNet base station. The GNSS points were output in NZTM2000, with heights in Mean Sea Level (MSL). The accuracy of the survey positions is +/- 0.1 m. The site had no significant topographic changes, and the lines have not been corrected for elevation.

Results:

A total of three MASW lines were acquired at the site with a total MASW survey length of approximately 1 km (Figure 1). The ground surface was well compacted farm tracks and farm yards. A series of GPR lines were acquired along each MASW line to provide a high resolution image of the substrate (Figures 4 and 5).

In homogenous soils, with gradually increasing shear-wave velocities and no sharp lateral discontinuities, the accuracy of the shear-wave velocities derived from the MASW processing is considered to be +/- 10%.[1] The quality of the seismic data and the dispersion curves used in this report is very good, with a good signal-to-noise ratio. If there is a velocity inversion present in the shear-wave profile (decreasing velocity with depth), the shear-wave velocity of the reduced velocity zone and the thickness of that zone can often be underestimated by the inversion process.

Conclusions:

The MASW survey was considered to be of good quality, with modelled shear-wave velocities accurate to +/- 10%. The velocities in the top 5 m are likely to be more accurate then the deeper velocities, due to the presence of multiple velocity inversions. The MASW survey indicates a horizontal layer defined by a sharp increase in shear-wave velocity (180 m/s to 220 m/s) at around 5 m depth in the southern part of the site, consistent with the surface of dense gravels or sands. In the northern part of the site a similar 180 m/s to 220 m/s surface was observed at 20 m depth. There is a well-defined dipping surface dividing the south and the north, possibly associated with a buried valley edge, paleochannel, or

[1] Stephenson, W.J., Louie, J.N., Pullammanappallil, S., Williams, R.A., and Odum, J.K. 2005. Blind Shear-wave Velocity Comparison of ReMi and MASW Results with Boreholes to 200 m in Santa Clara Valley: Implications for Earthquake Ground-Motion Assessment. *Bulletin of the Seismological Society of America*, Vol. 95, pp. 2506-2516.

bedrock interface. This edge feature is apparent in both MASW 1 and MASW 3, as well as GPR 4 and GPR 10.

While the limitations of the MASW method should be considered when evaluating these results, the quality of the data collected at the site and the confidence in the shear-wave velocities derived from the MASW data is good.

Disclaimer:

This document has been provided by Southern Geophysical Ltd subject to the following:

Non-invasive geophysical testing has limitations and is not a complete source of testing. Often there is a need to couple non-invasive methods with invasive testing methods, such as drilling, especially in cases where the non-invasive testing indicates anomalies.

This document has been prepared for the particular purpose outlined in the project proposal and no responsibility is accepted for the use of this document, in whole or in part, in other contexts or for any other purpose. Southern Geophysical Ltd did not perform a complete assessment of all possible conditions or circumstances that may exist at the site. Conditions may exist which were undetectable given the limited nature of the enquiry Southern Geophysical Ltd was retained to undertake with respect to the site. Variations in conditions often occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account. Accordingly, additional studies and actions may be required by the client.

We collected our data and based our report on information which was collected at a specific point in time. The passage of time affects the information and assessment provided by Southern Geophysical Ltd. It is understood that the services provided allowed Southern Geophysical Ltd to form no more than an opinion of the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes for whatever reason. Where data is supplied by the client or other sources, including where previous site investigation data have been used, it has been assumed that the information is correct. No responsibility is accepted by Southern Geophysical Ltd for incomplete or inaccurate data supplied by others. This document is provided for sole use by the client and is confidential to that client and its professional advisers. No responsibility whatsoever for the contents of this document will be accepted to any person other than the client. Any use which a third party makes of this document, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. Southern Geophysical Ltd accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this document.

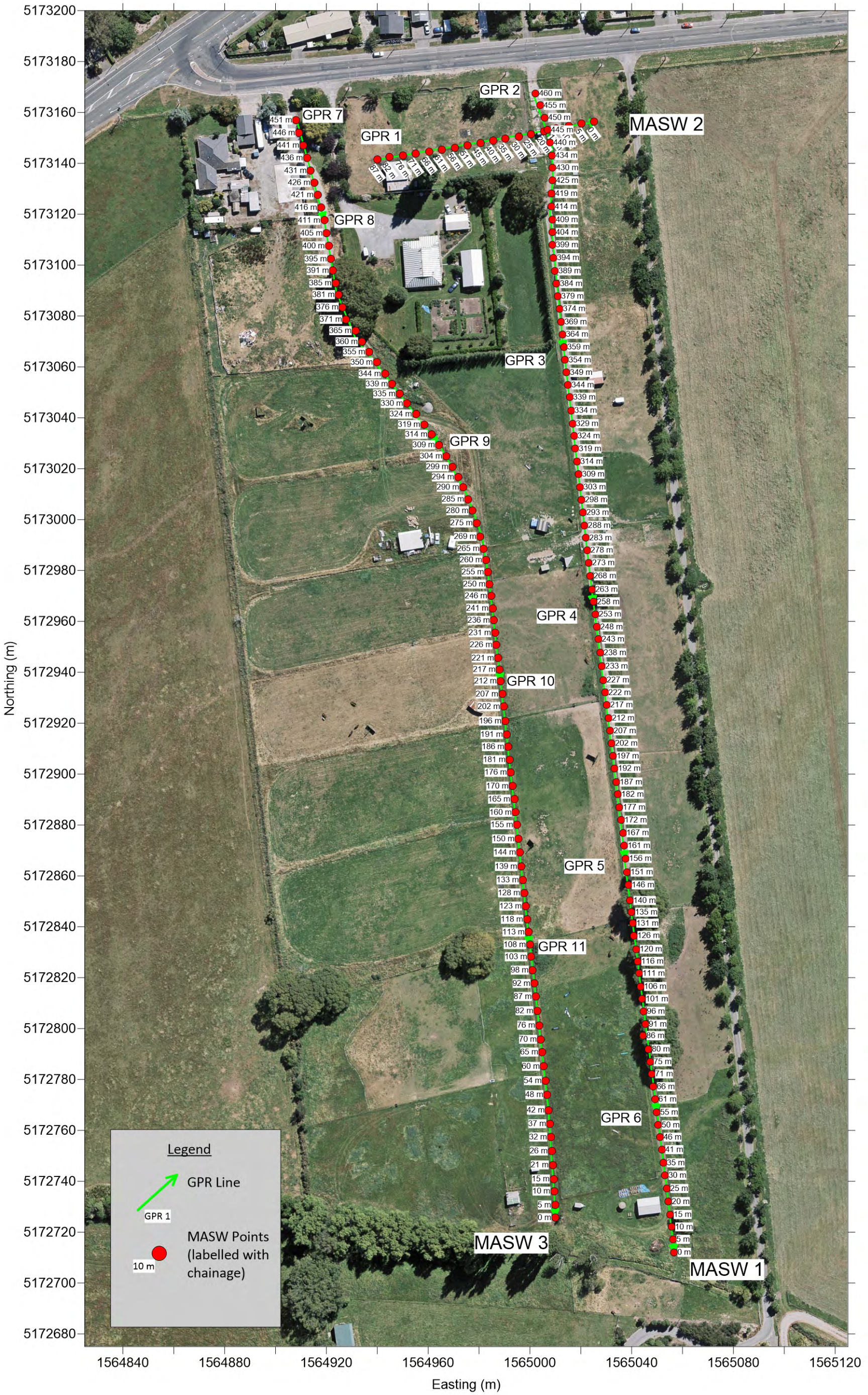


Figure 1: Site Map

2-4 Glovers Road, Christchurch

NOTES- Coordinates NZ2000 TM Grid.
Aerial photograph sourced from LINZ, Crown Copyright ©

SCALE (m)

0 25 50 75 100 125

A3

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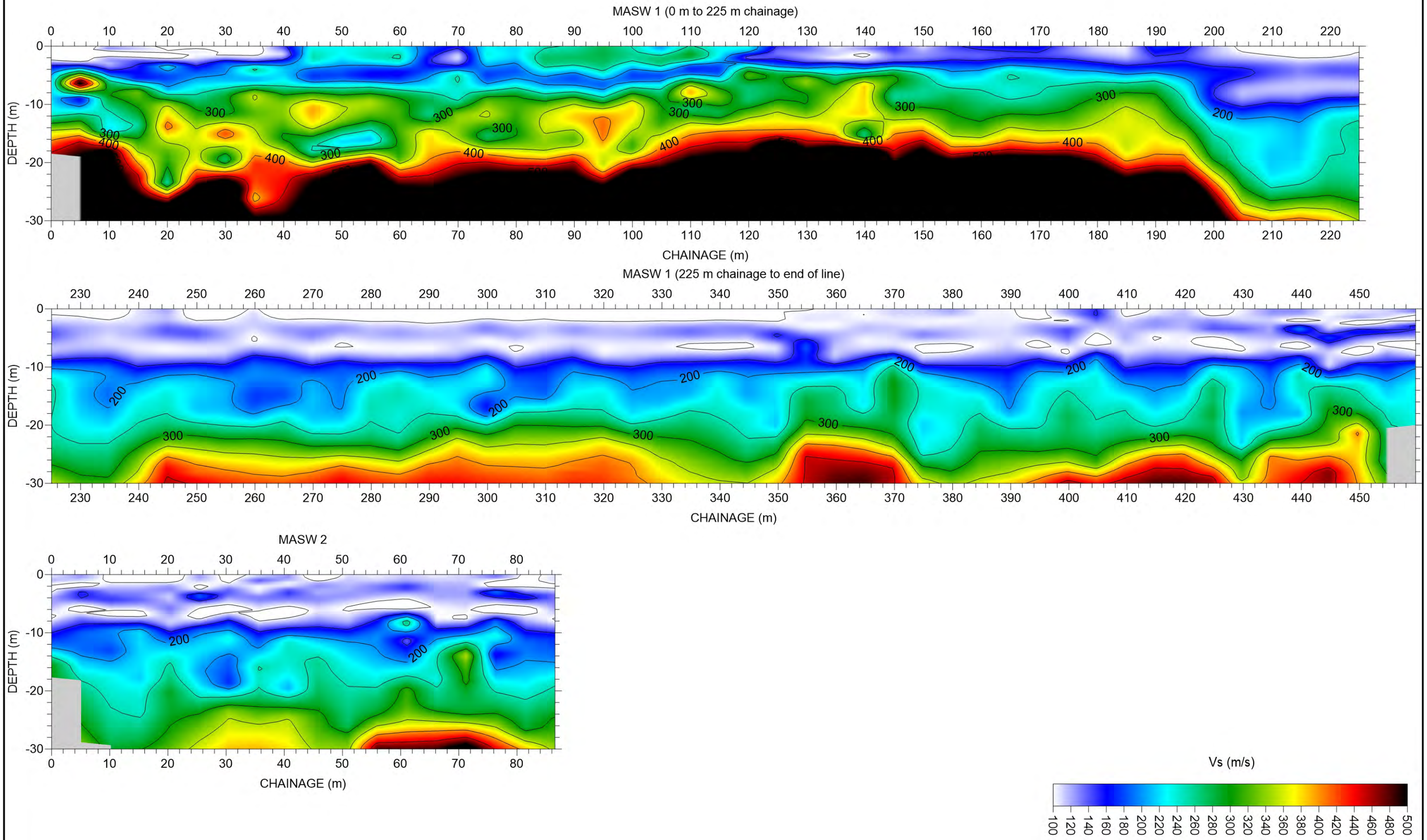

DRAWING- **Figure 2: MASW 1 and 2**

LOCATION- **2-4 Glovers Road, Christchurch**

NOTES MASW Vs profile has contour intervals of 50 m/s (Vs).

See site map for location of points.

A3

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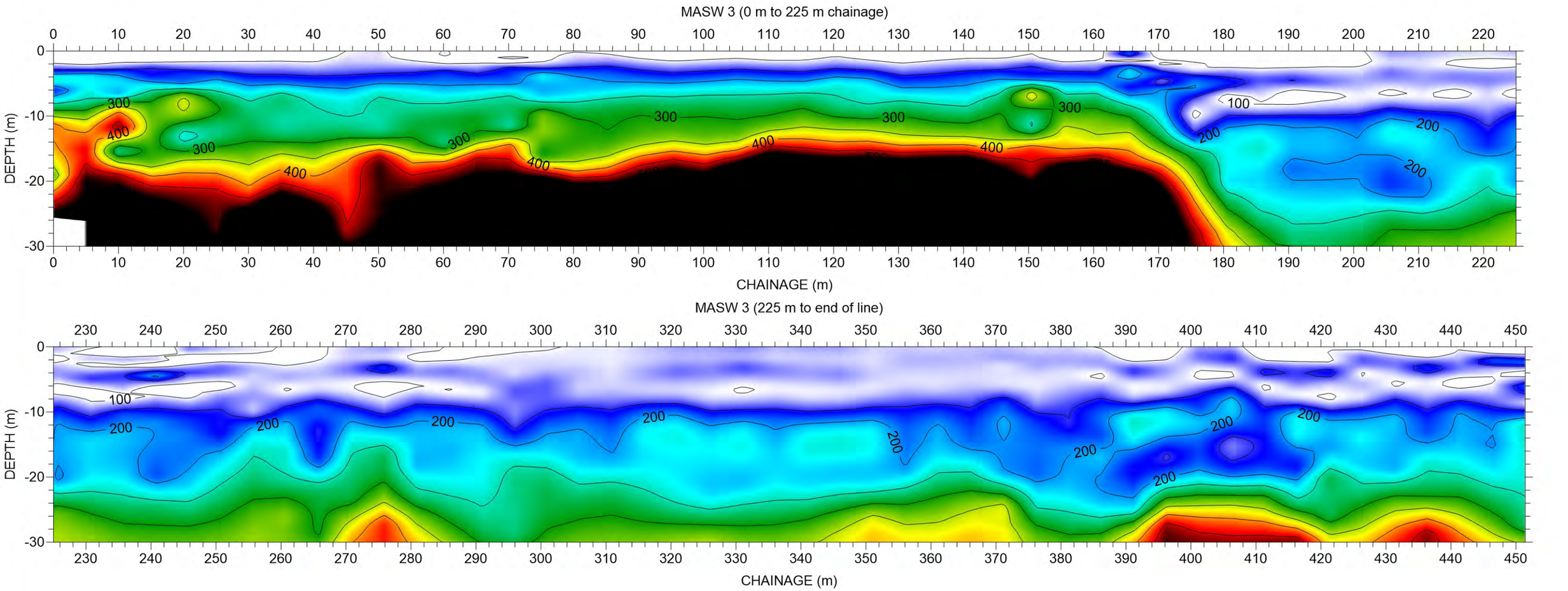

DRAWING- **Figure 3: MASW 3**

LOCATION- **2-4 Glover Street, Christchurch**

NOTES MASW Vs profile has contour intervals of 50 m/s (Vs).

See site map for location of points.

A3

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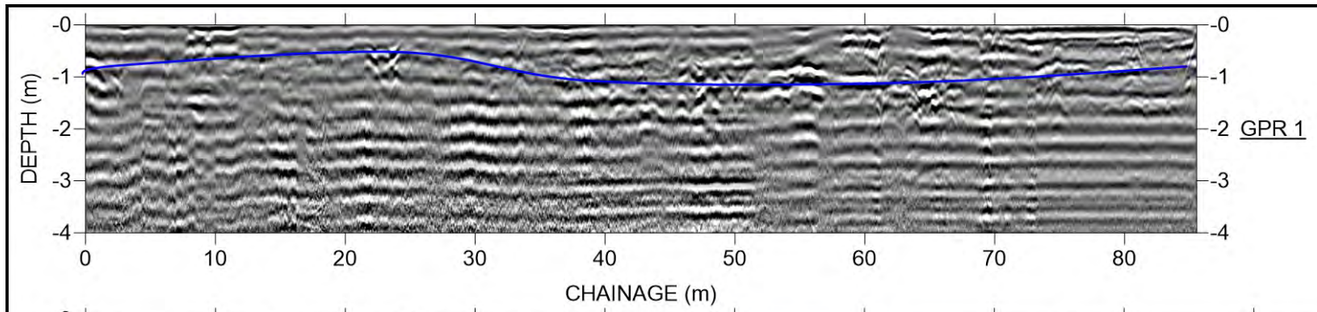

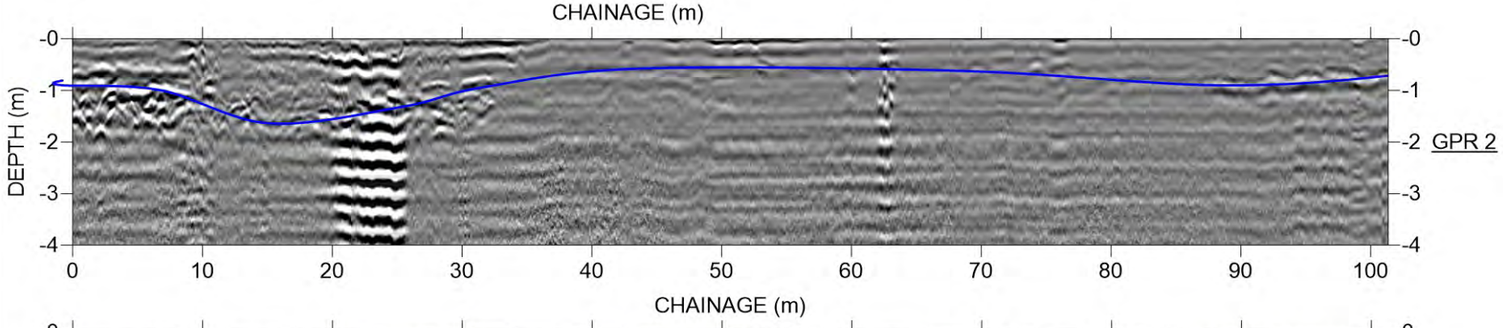

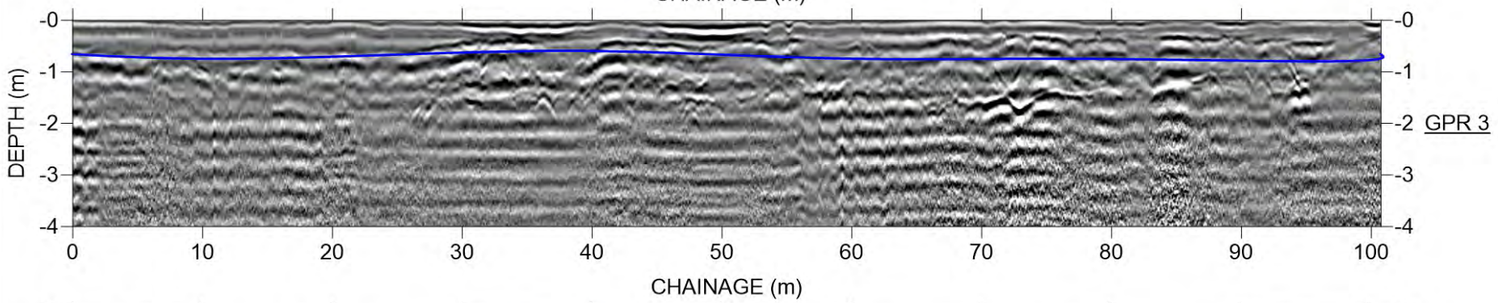

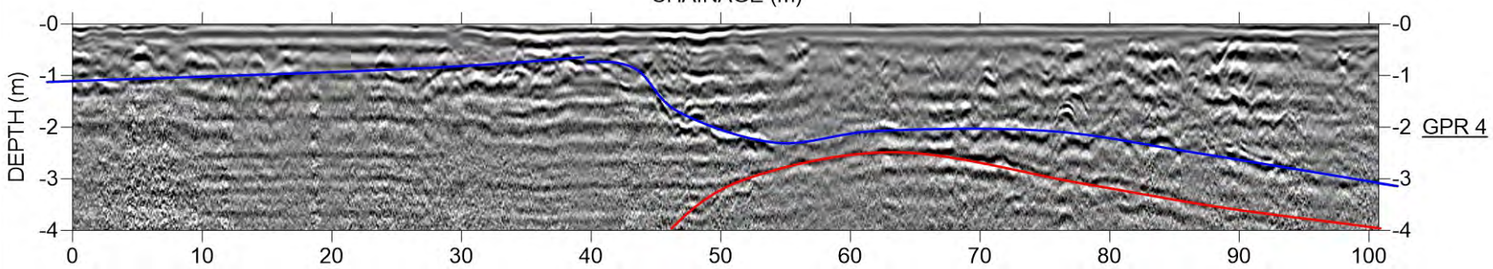

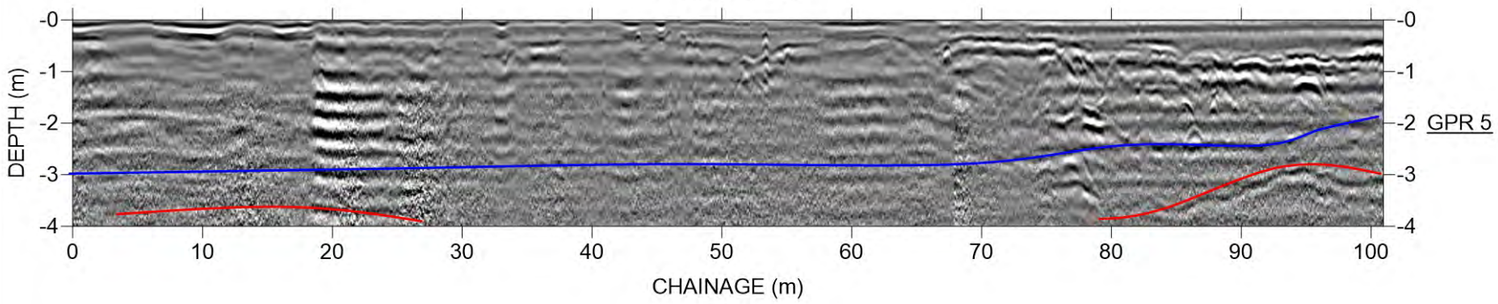

Some reflectors are annotated for reference. Note the profiles have been plotted with a 4:1 vertical exaggeration. See site map for line locations.

DRAWING- **Figure 4: GPR Radargrams 1 to 5**

LOCATION- **2-4 Glover Street, Christchurch**

NOTES

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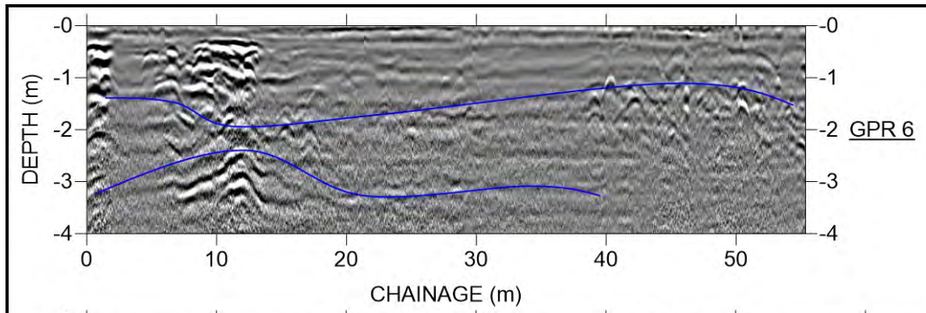

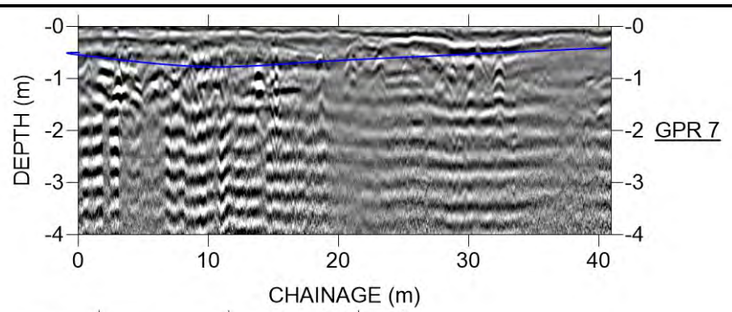

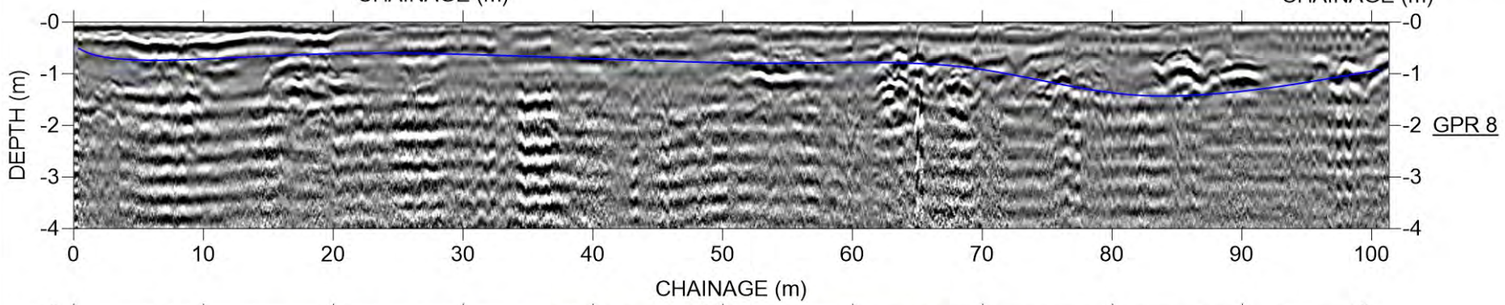

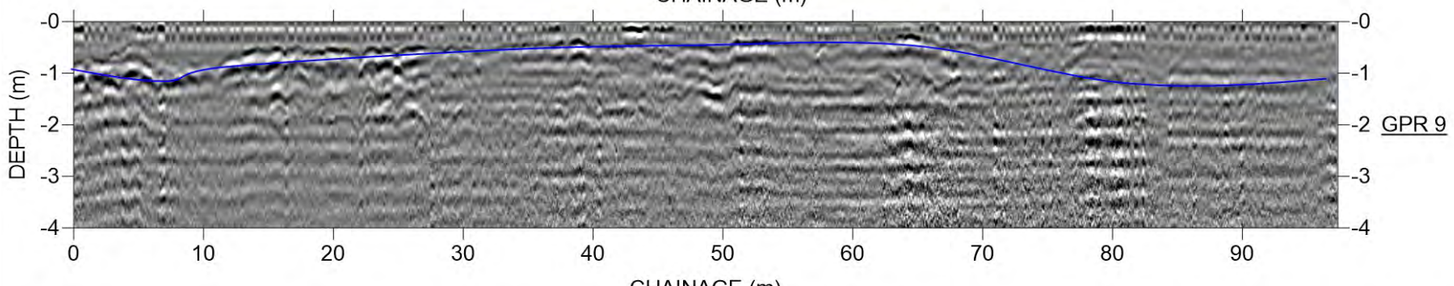

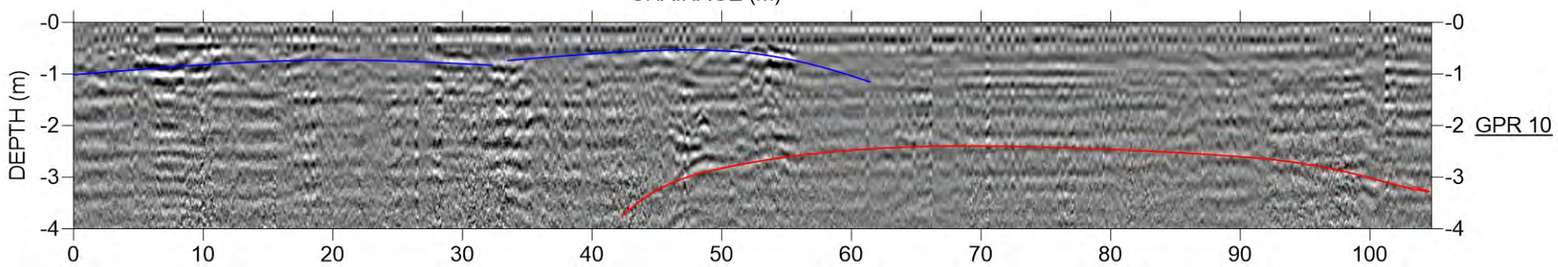

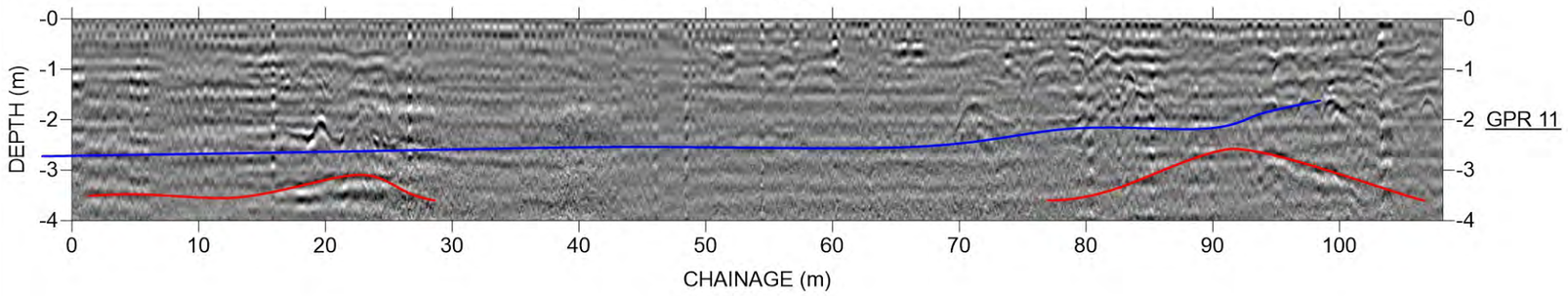

Some reflectors are annotated for reference. Note the profiles have been plotted with a 4:1 vertical exaggeration. See site map for line locations.

DRAWING- **Figure 5: GPR Radargrams 6 to 11**

LOCATION- **2-4 Glover Street, Christchurch**

NOTES

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E. Geotechnical Cross Sections

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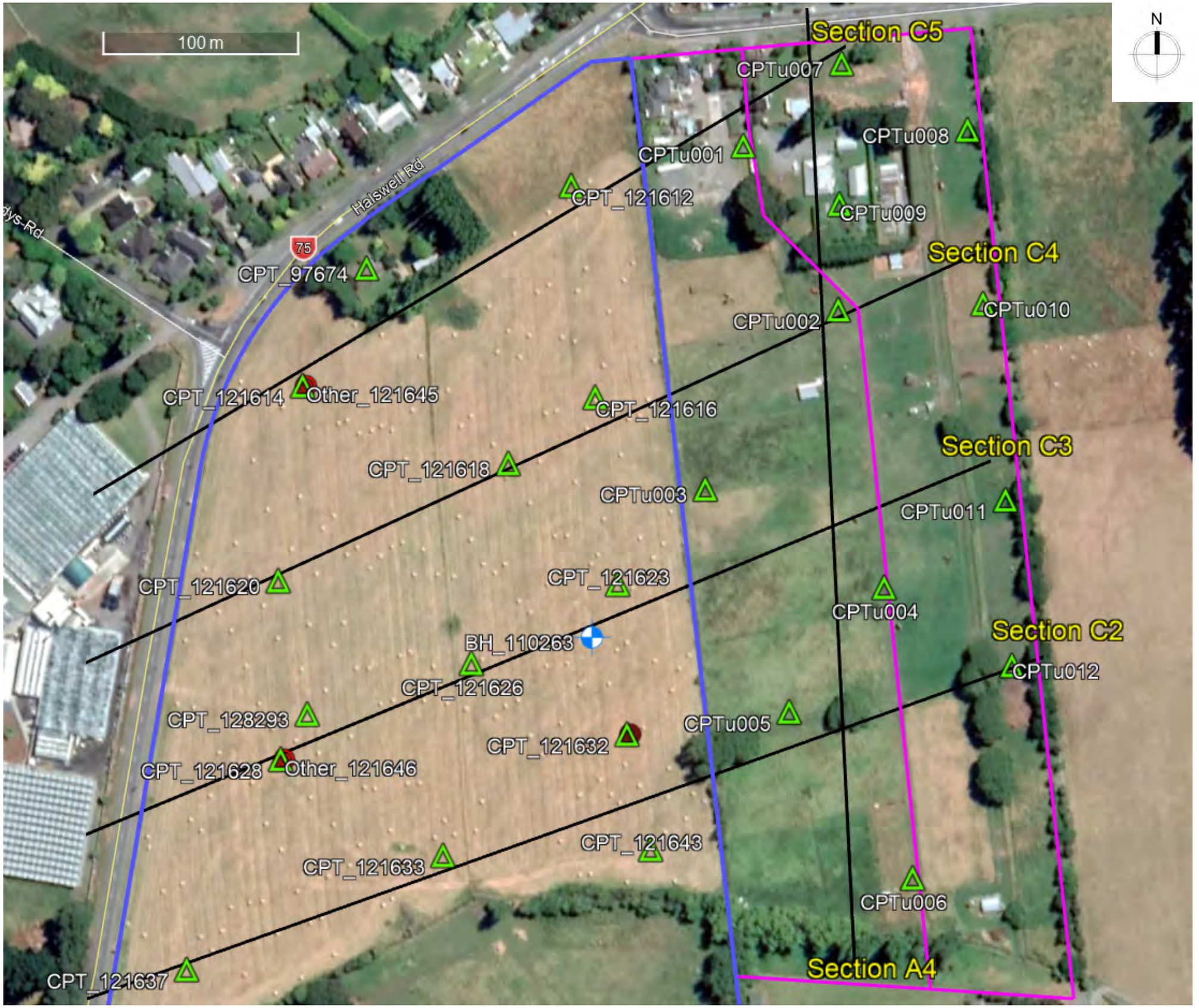
projects@miyamoto.nz

PROJECT No: 200357
GEOTECHNICAL CROSS SECTIONS FOR 2&4 GLOVERS ROAD, HALSWELL, CHRISTCHURCH 8025

ISSUE DATE: 19/10/20 REV: 1

SHEET LIST

SHEET N°	SHEET NAME	REV.
S1	LOCATION PLAN	1
S2.1	GEOTECHNICAL CROSS-SECTION 1	1
S2.2	GEOTECHNICAL CROSS-SECTION 2	1
S2.3	GEOTECHNICAL CROSS-SECTION 3	1



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SITE SURVEY DRAWINGS FOR
2&4 GLOVERS ROAD,
HALSWELL,
CHRISTCHURCH 8025

REVISION HISTORY

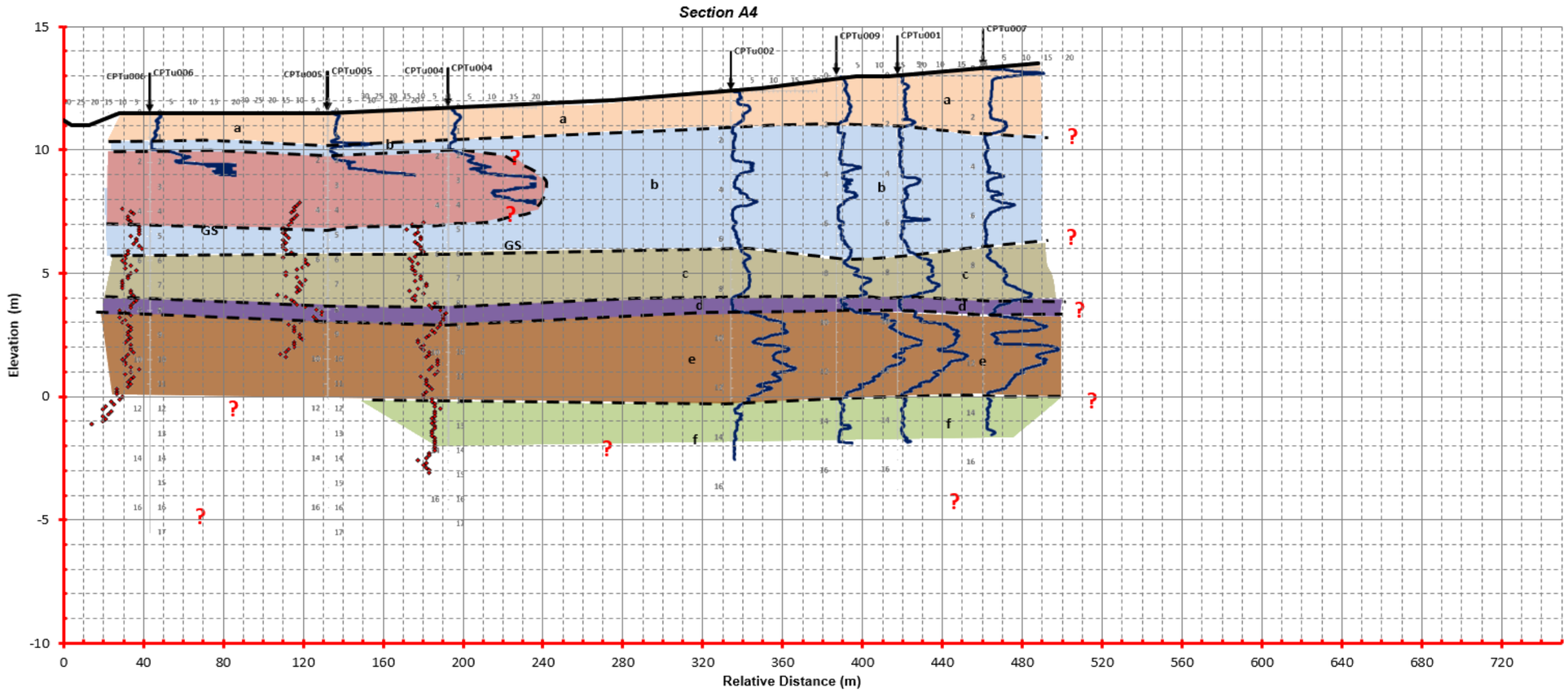
REV	DATE	DESCRIPTION
1	19/10/20	FINAL

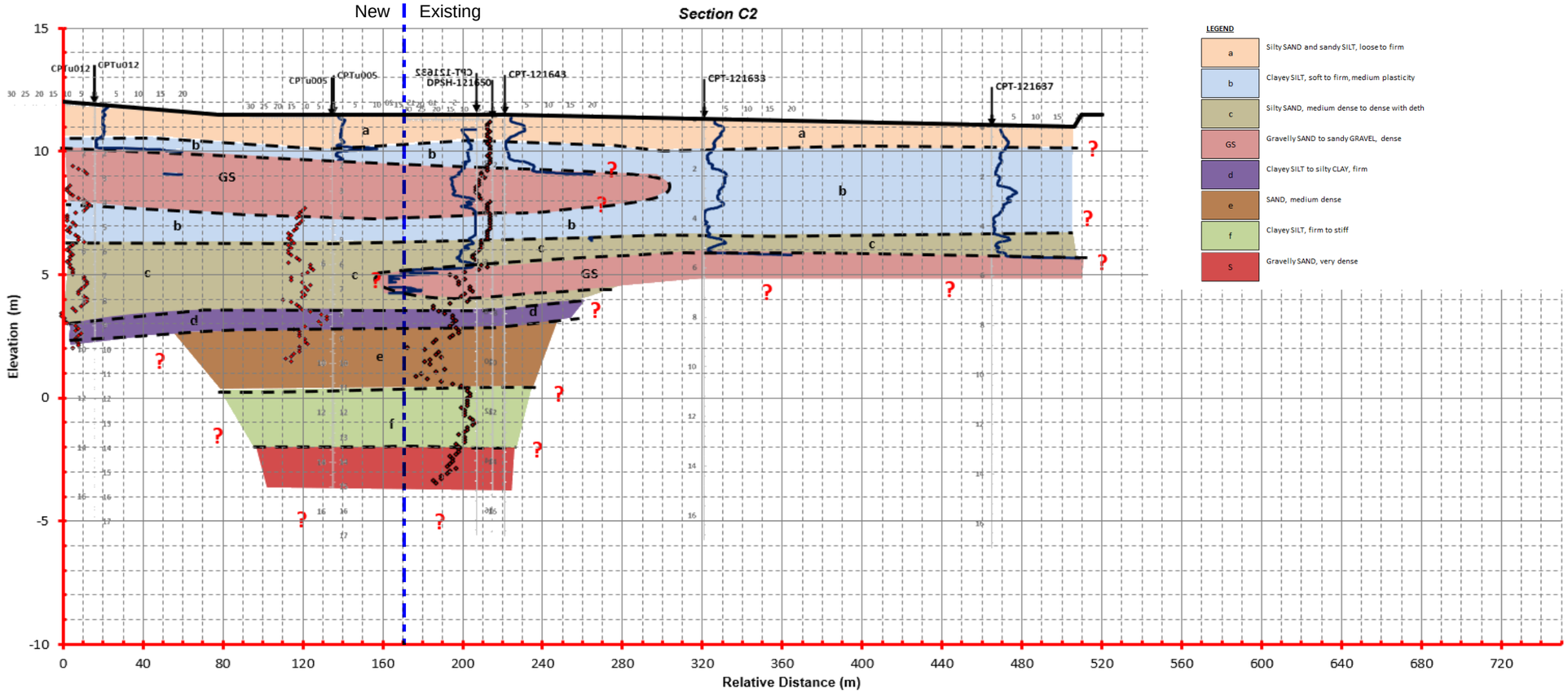
CLIENT:	YOURSECTION LTD
PROJECT No.:	200357
VERSION DATE:	16/10/2020
DRAWN:	CG
ENGINEER:	CG
APPROVED:	AG

SIZE: A3

LOCATION PLAN

SHEET No.: S1 REV. 1





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SITE SURVEY DRAWINGS FOR 2&4 GLOVERS ROAD, HALSWELL, CHRISTCHURCH 8025

REVISION HISTORY

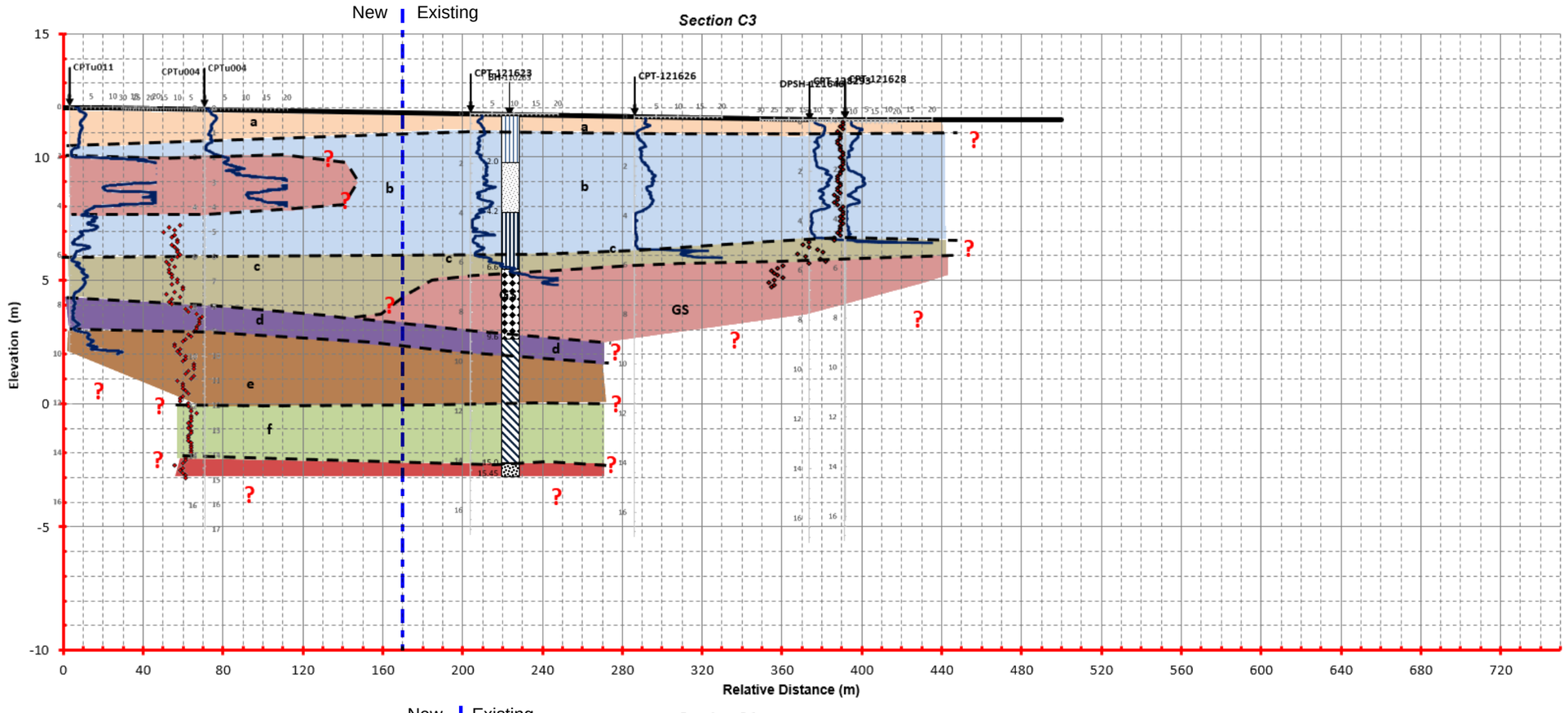
REV	DATE	DESCRIPTION
1	19/10/20	FINAL

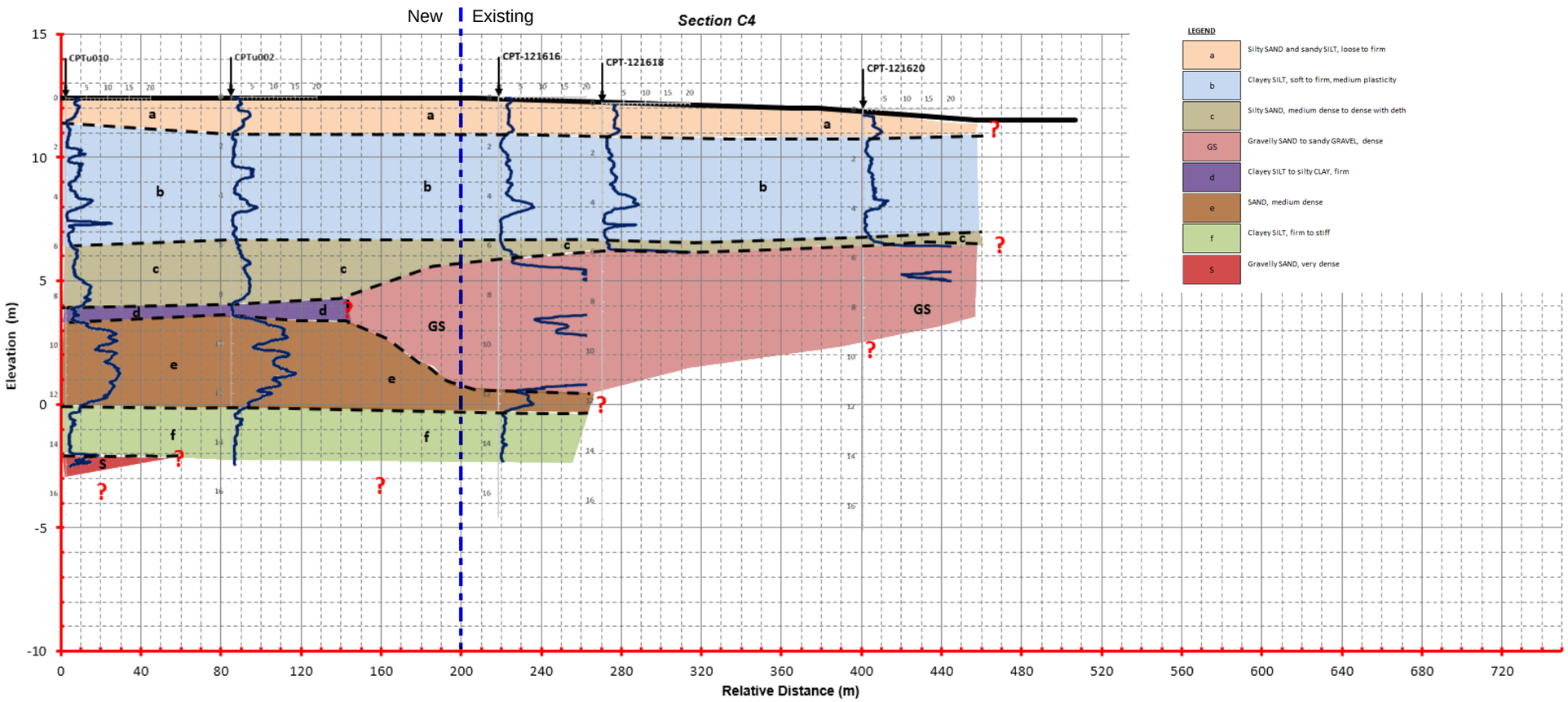
CLIENT:	YOURSECTION LTD
PROJECT No.:	200357
VERSION DATE:	16/10/2020
DRAWN:	CG
ENGINEER:	CG
APPROVED:	AG

SIZE: A3

GROUND MODEL SHEET 1

SHEET No.: S2.1 REV. 1





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SITE SURVEY DRAWINGS FOR 2&4 GLOVERS ROAD, HALSWELL, CHRISTCHURCH 8025

REVISION HISTORY

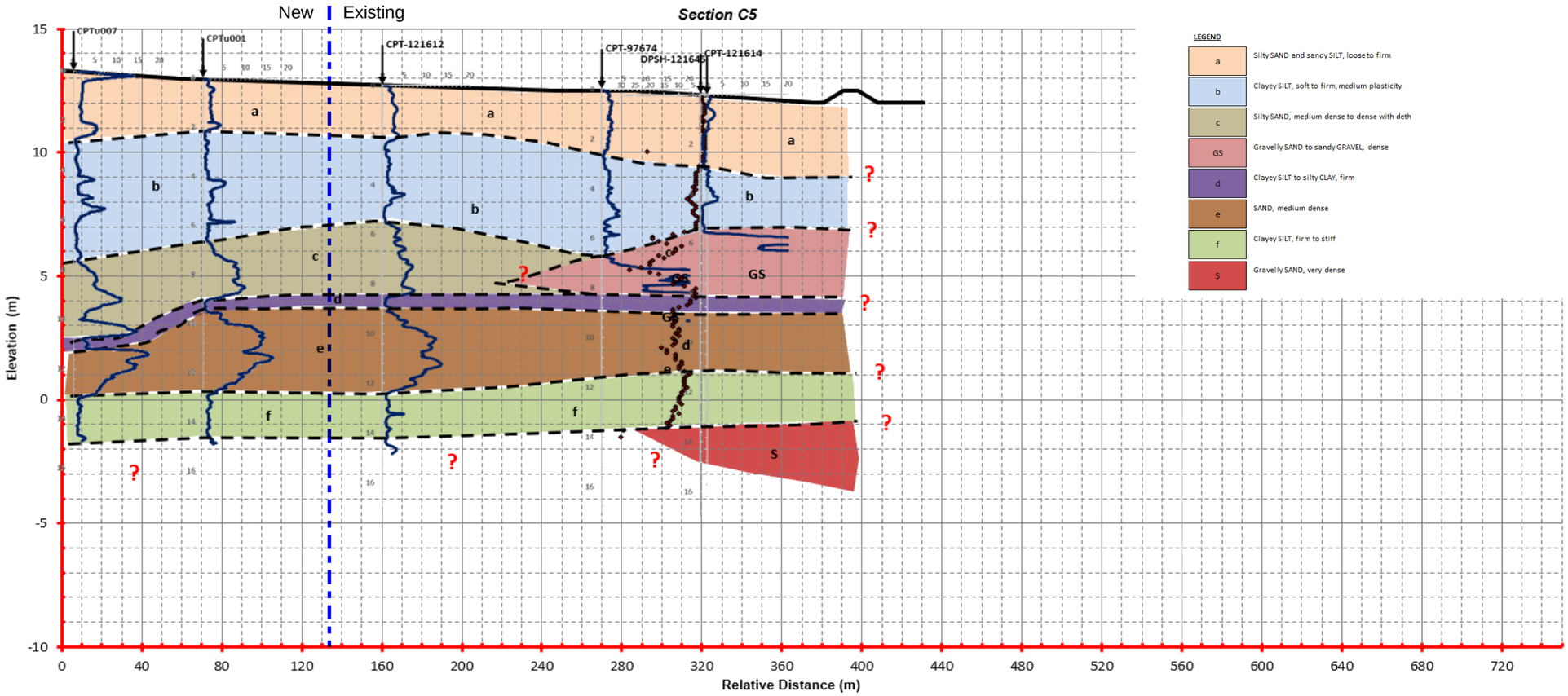
REV	DATE	DESCRIPTION
1	19/10/20	FINAL

CLIENT:	YOURSECTION LTD
PROJECT No.:	200357
VERSION DATE:	16/10/2020
DRAWN:	CG
ENGINEER:	CG
APPROVED:	AG

SIZE: A3

GROUND MODEL
SHEET 2

SHEET No.: S2.2 REV. 1



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REVISION HISTORY

REV	DATE	DESCRIPTION
1	19/10/20	FINAL

CLIENT: YOURSECTION LTD

PROJECT No.: 200357

VERSION DATE: 16/10/2020

DRAWN: CG

ENGINEER: CG

APPROVED: AG

SIZE: A3

GROUND MODEL
SHEET 3

SHEET No.: S2.3 REV. 1

F. Liquefaction Analyses

Miyamoto International NZ Ltd
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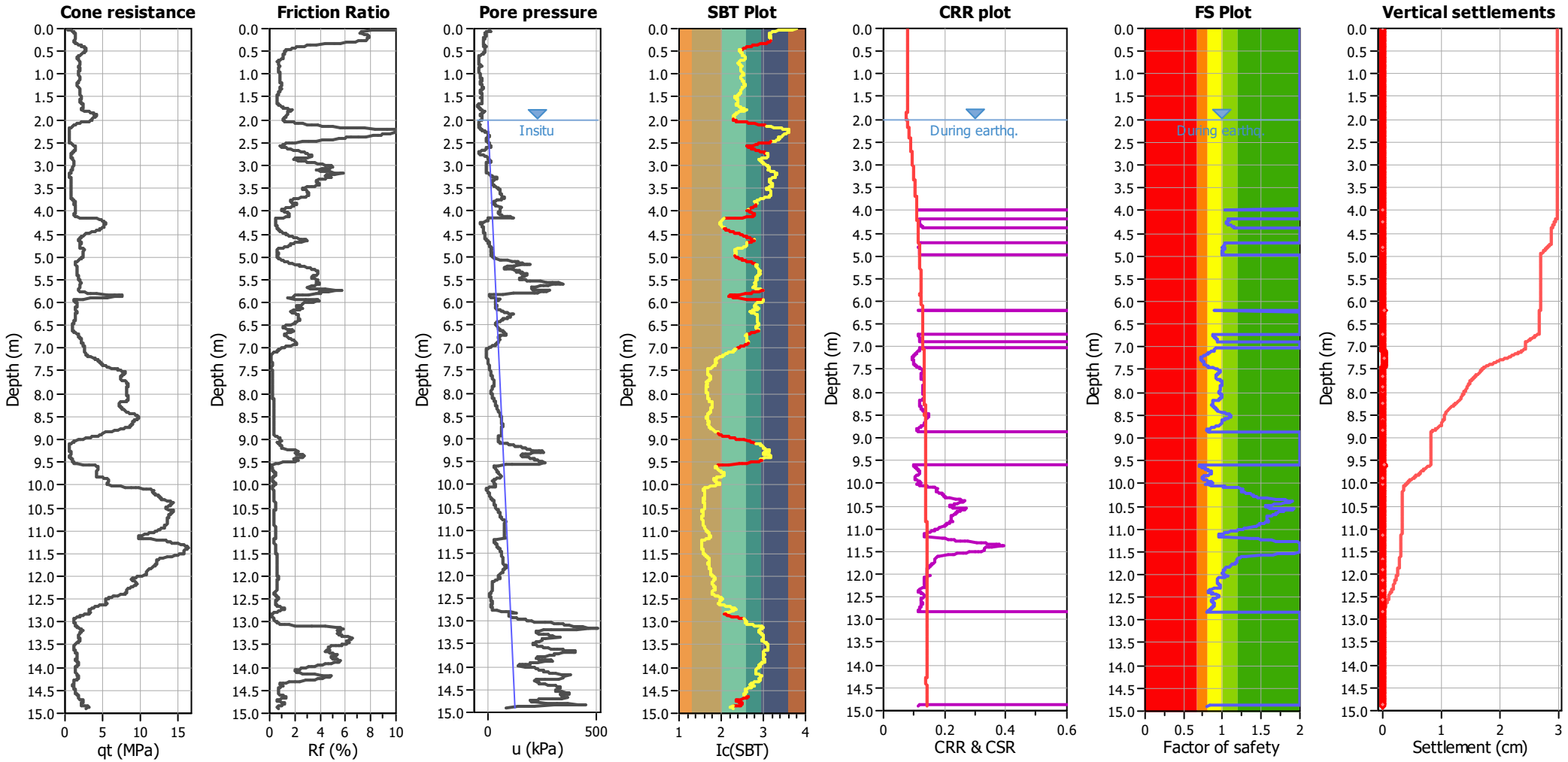
Christchurch Central, Christchurch
http://www.miyamoto.nz

Project: MINZ200357 - Geotechnical Investigation and Assessment
Location: 2 Glovers Road Subdivision, Halswell, Christchurch

CPT: CPTu001 SLS
Total depth: 14.89 m



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Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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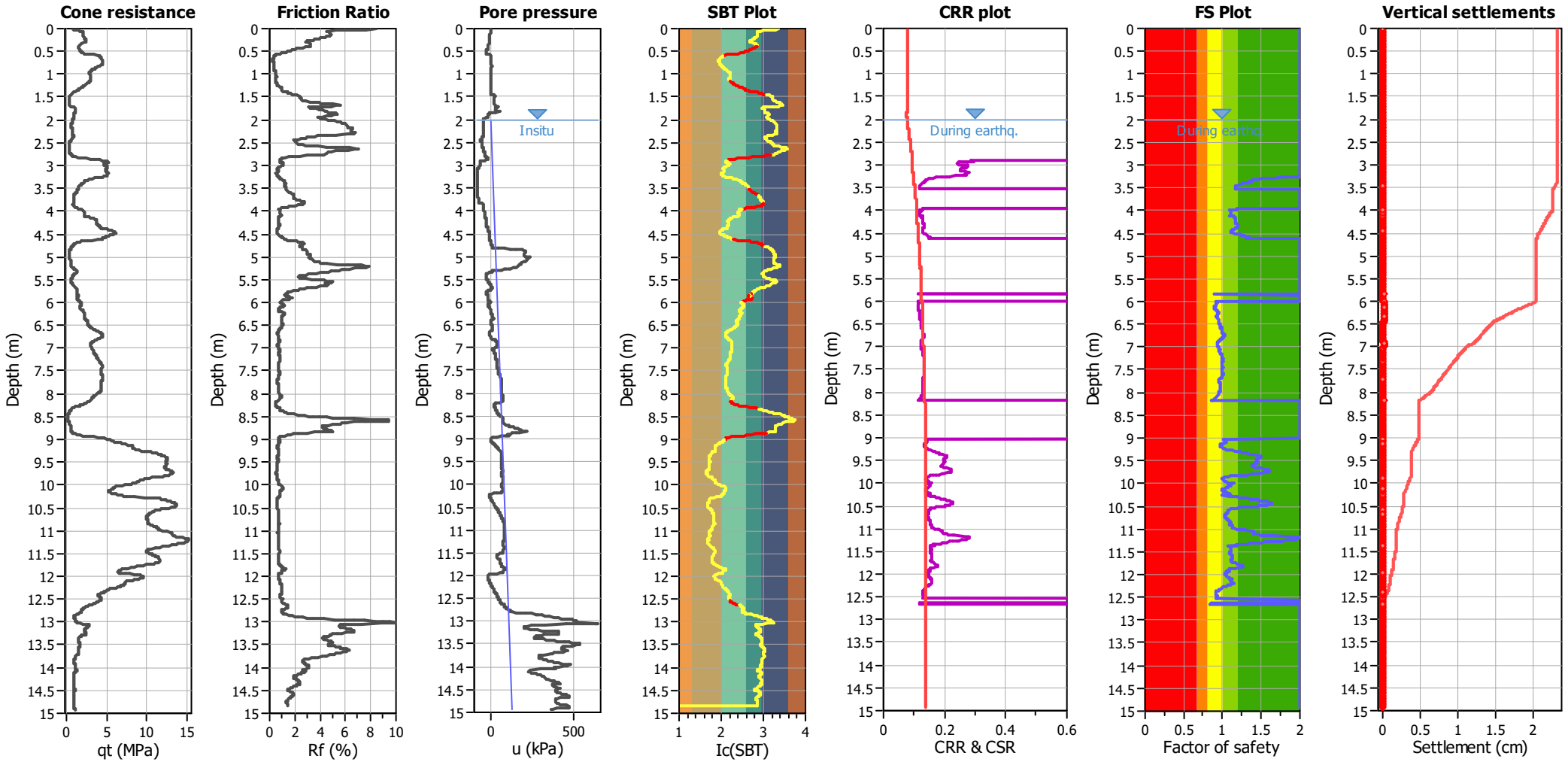
Project: MINZ200357 - Geotechnical Investigation and Assessment
Location: 2 Glovers Road Subdivision, Halswell, Christchurch

CPT: CPTu002 SLS
Total depth: 14.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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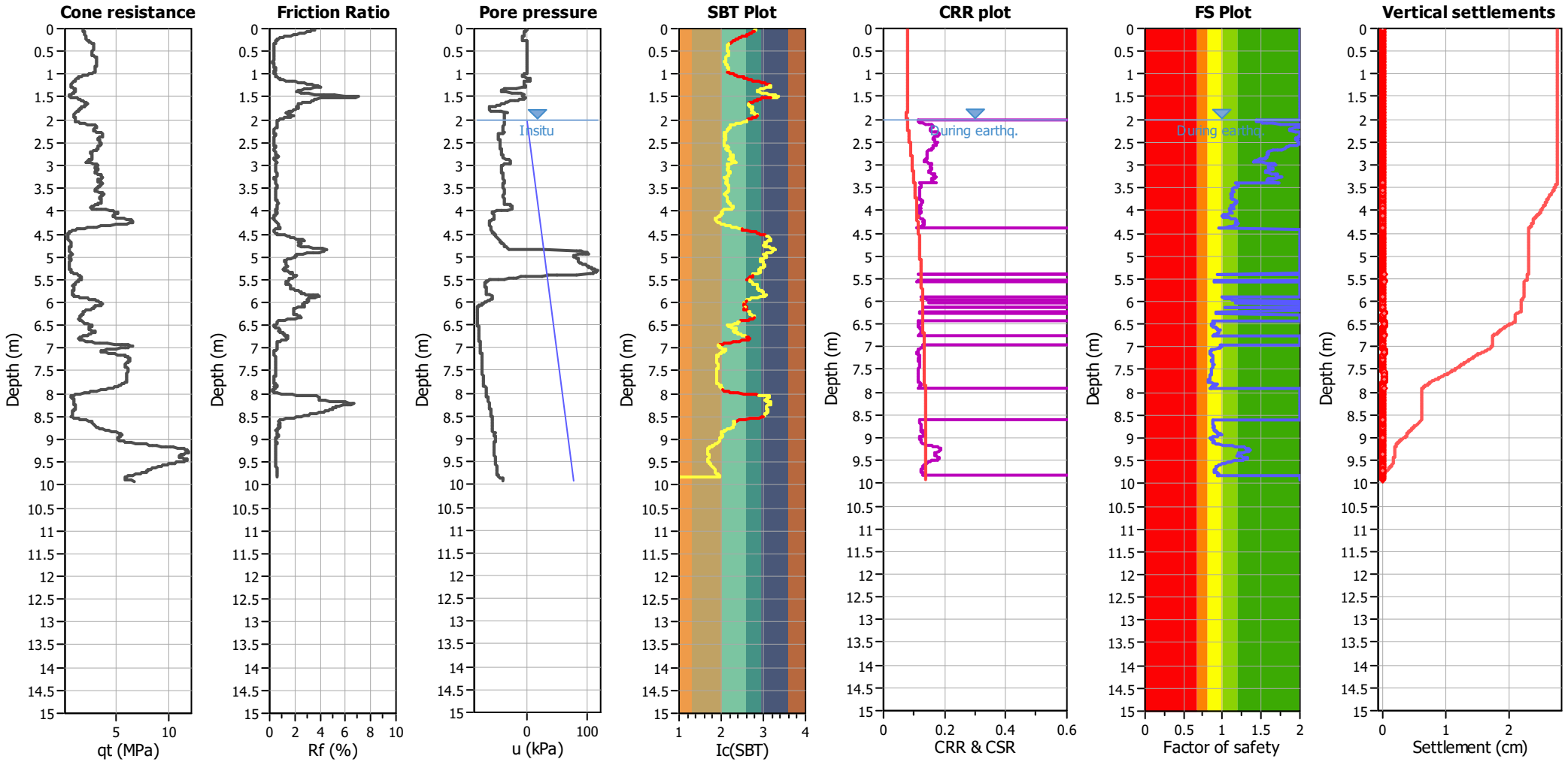
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu003 SLS
Total depth: 9.91 m



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Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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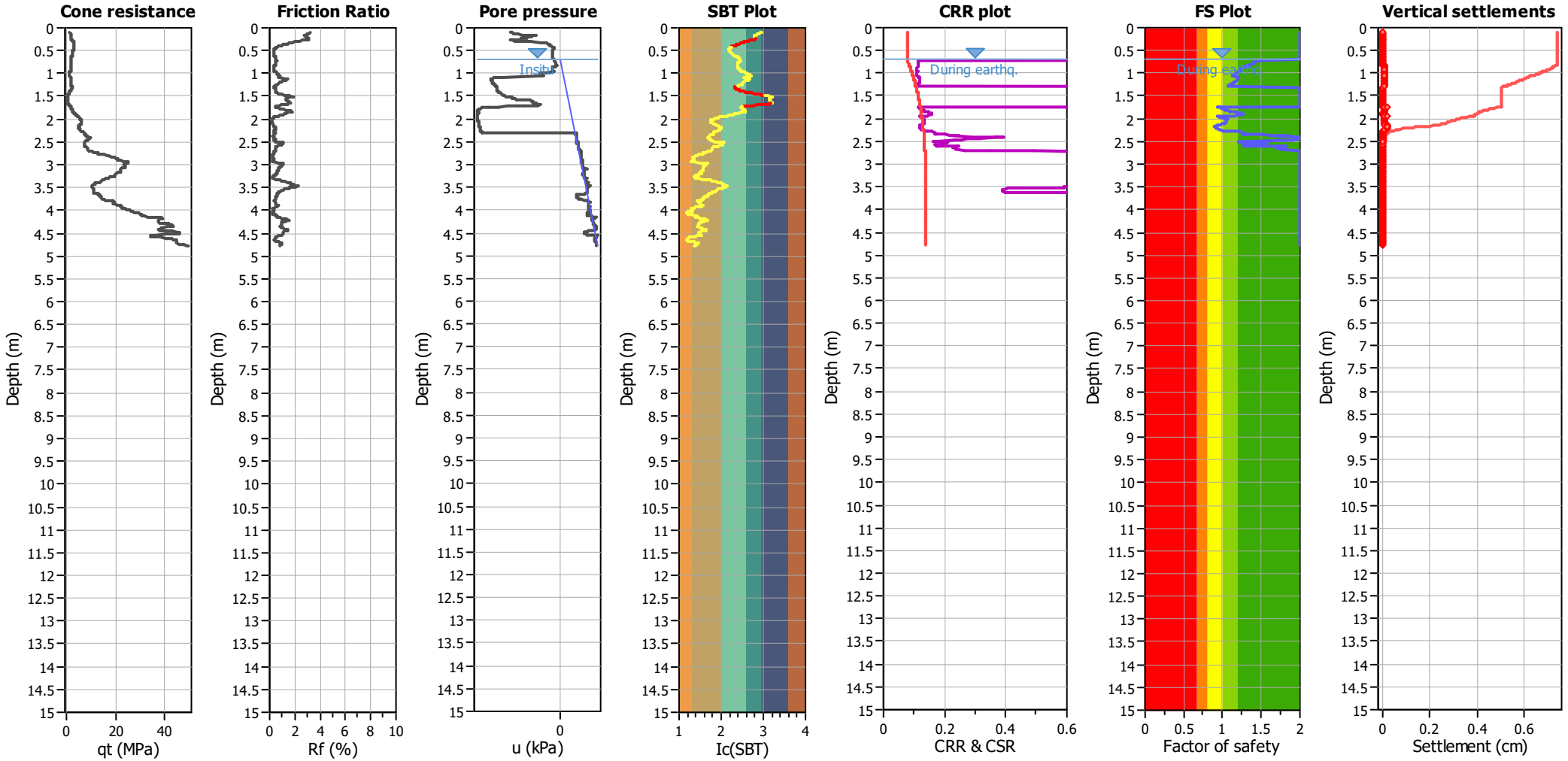
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu004 SLS
Total depth: 4.78 m



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Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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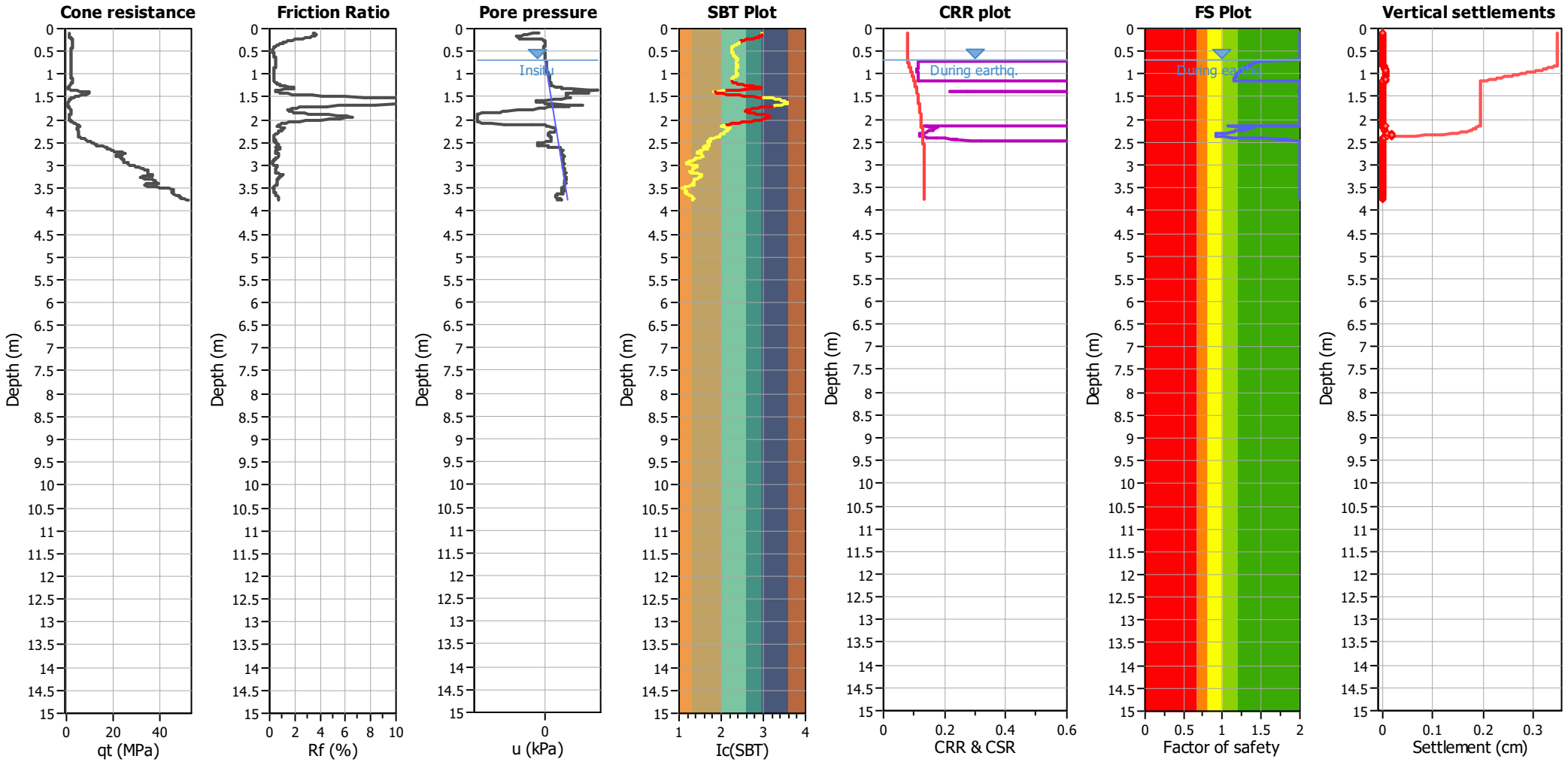
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu005 SLS
Total depth: 3.76 m



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Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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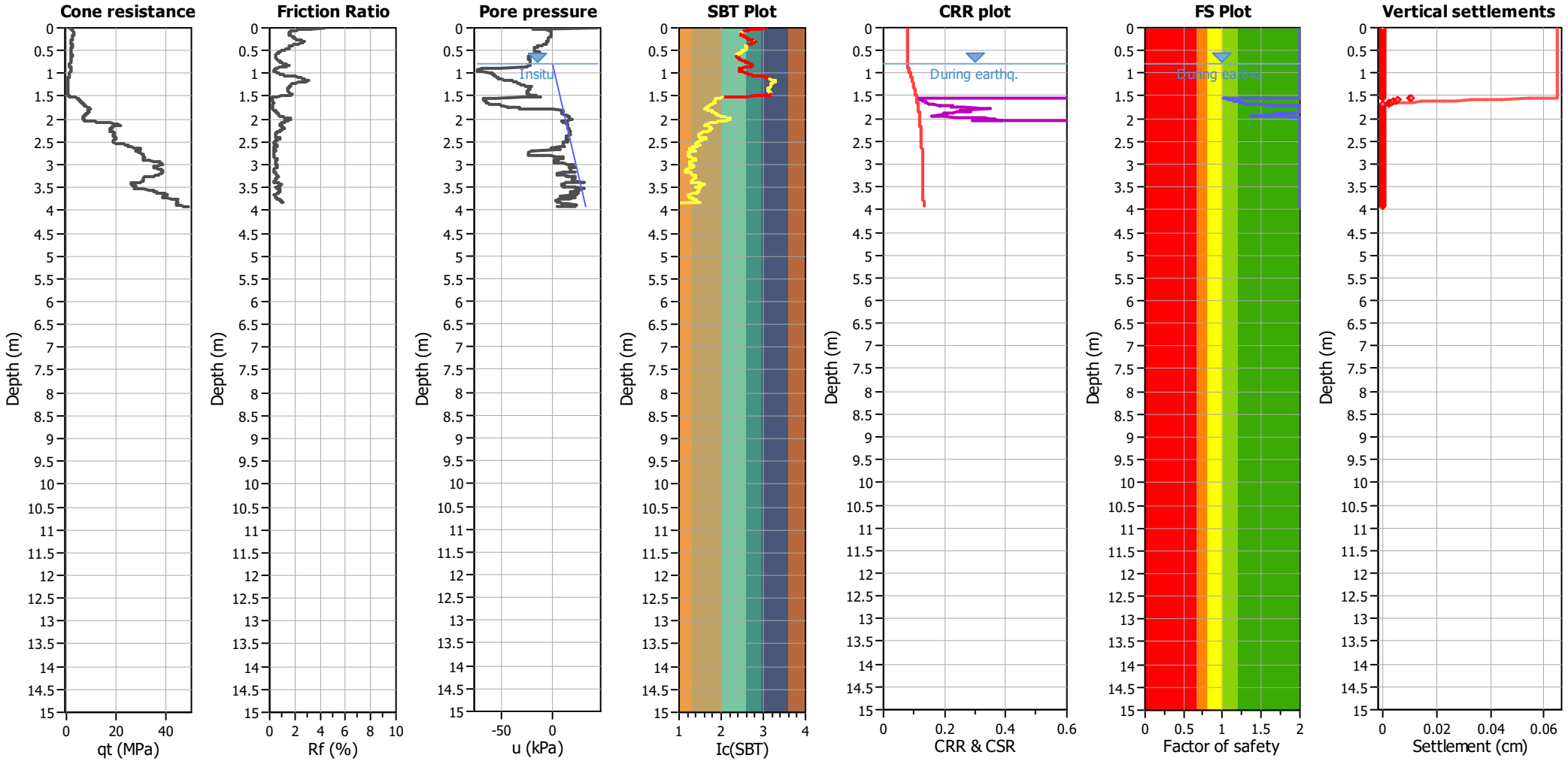
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu006 SLS
Total depth: 3.93 m



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Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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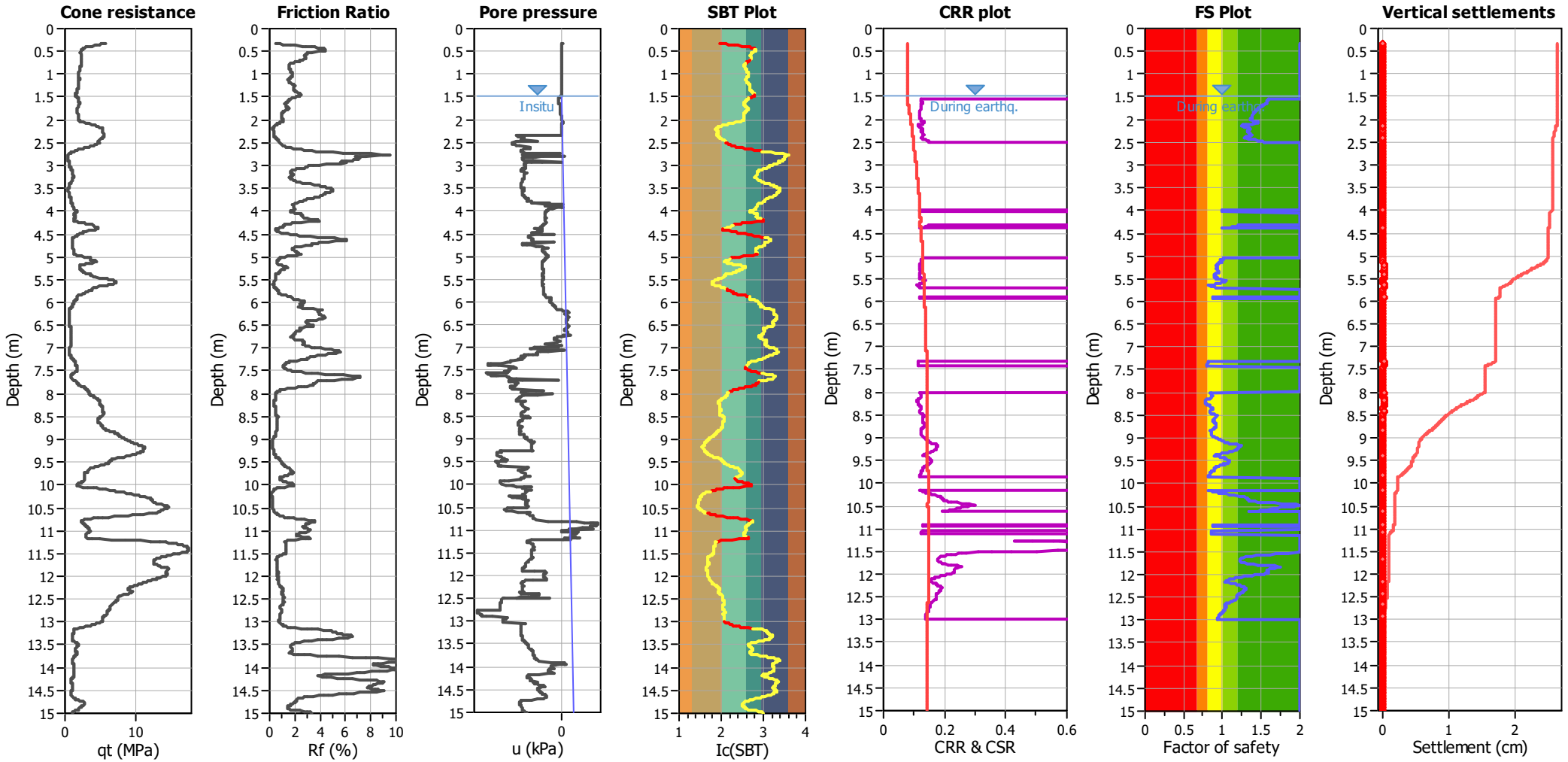
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu007 SLS
Total depth: 15.00 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.50 m	Use fill:	No	Clay like behavior applied:	.
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Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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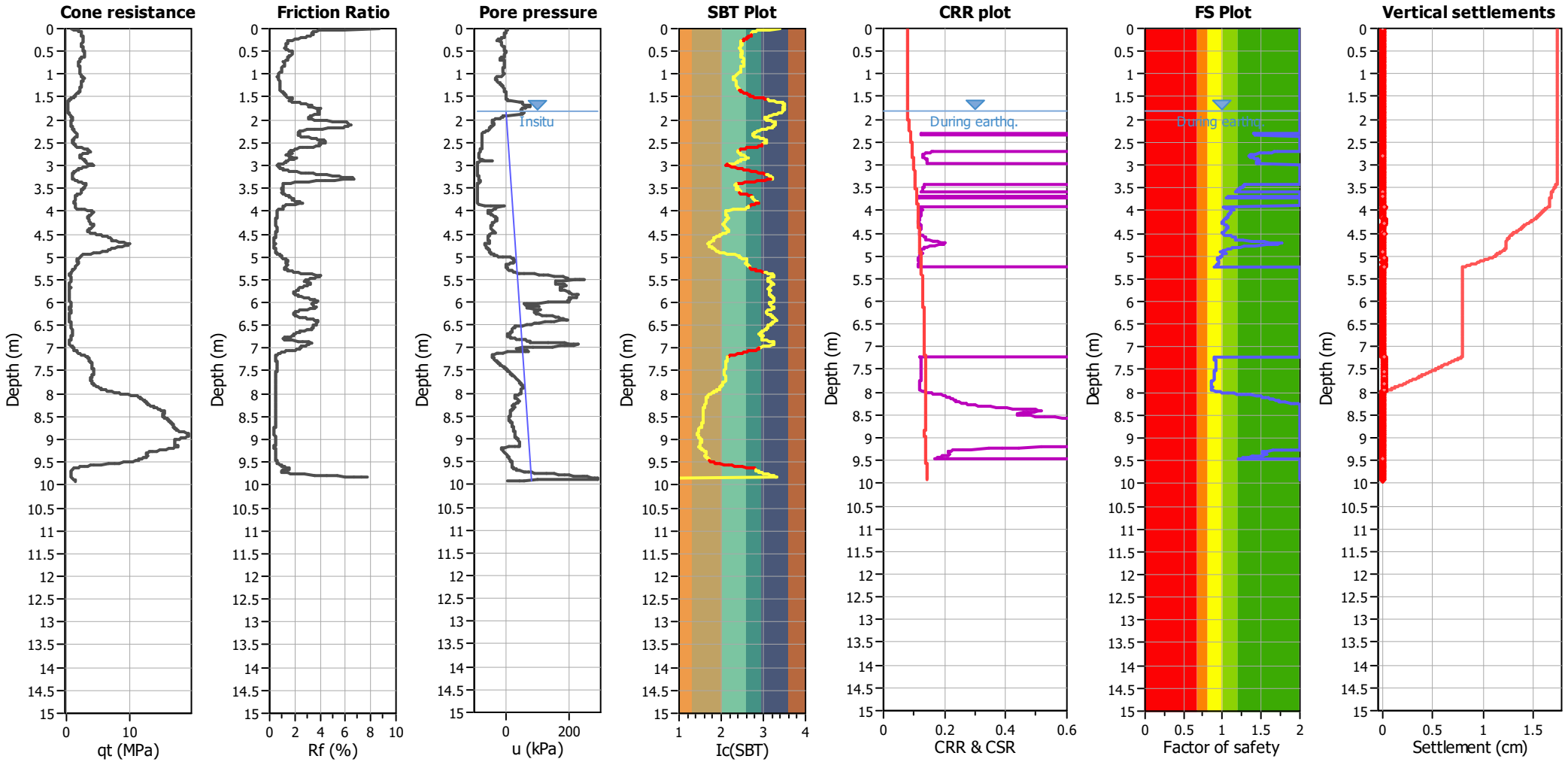
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu008 SLS
Total depth: 9.93 m



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Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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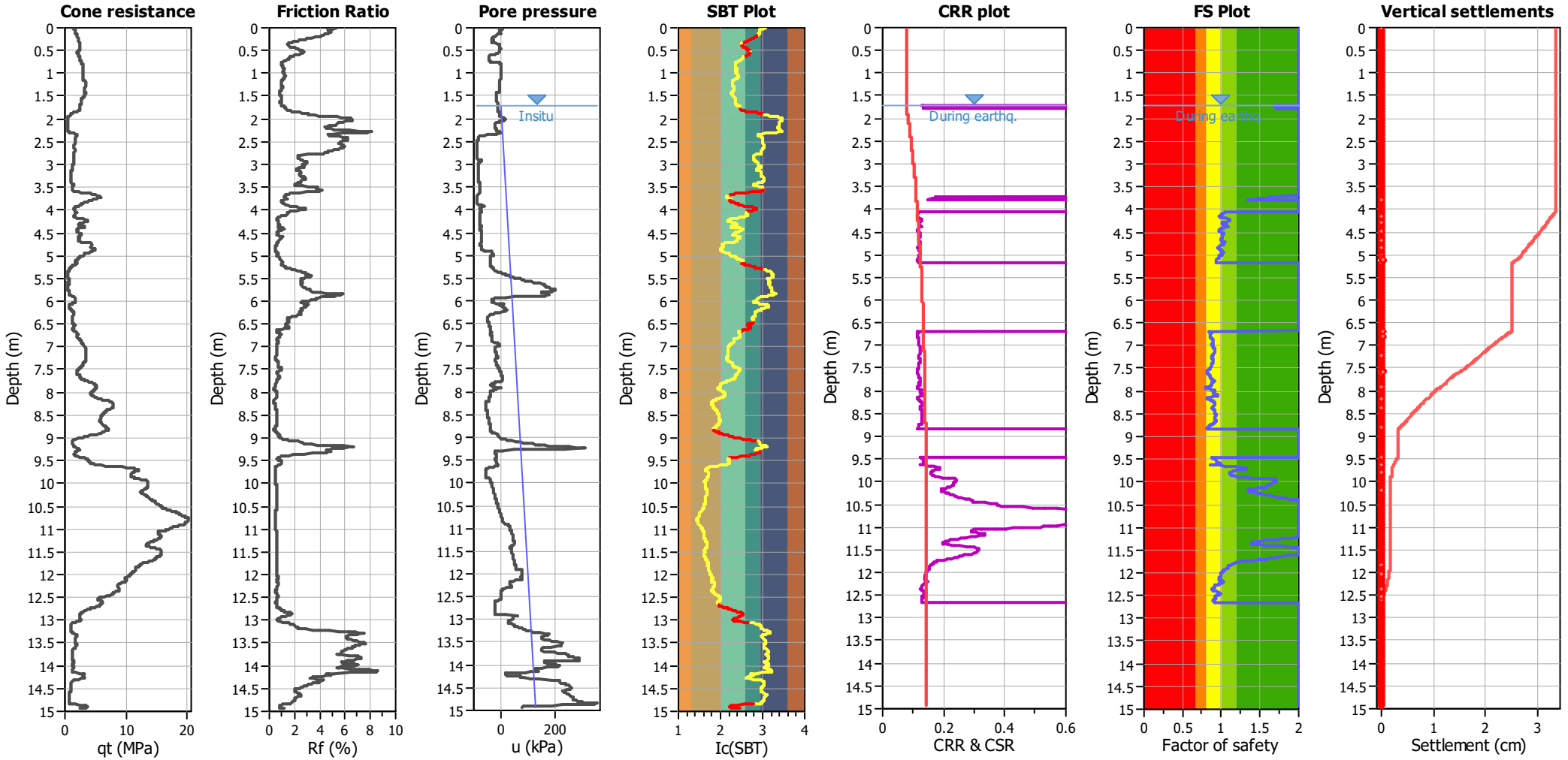
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu009 SLS
Total depth: 14.95 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.70 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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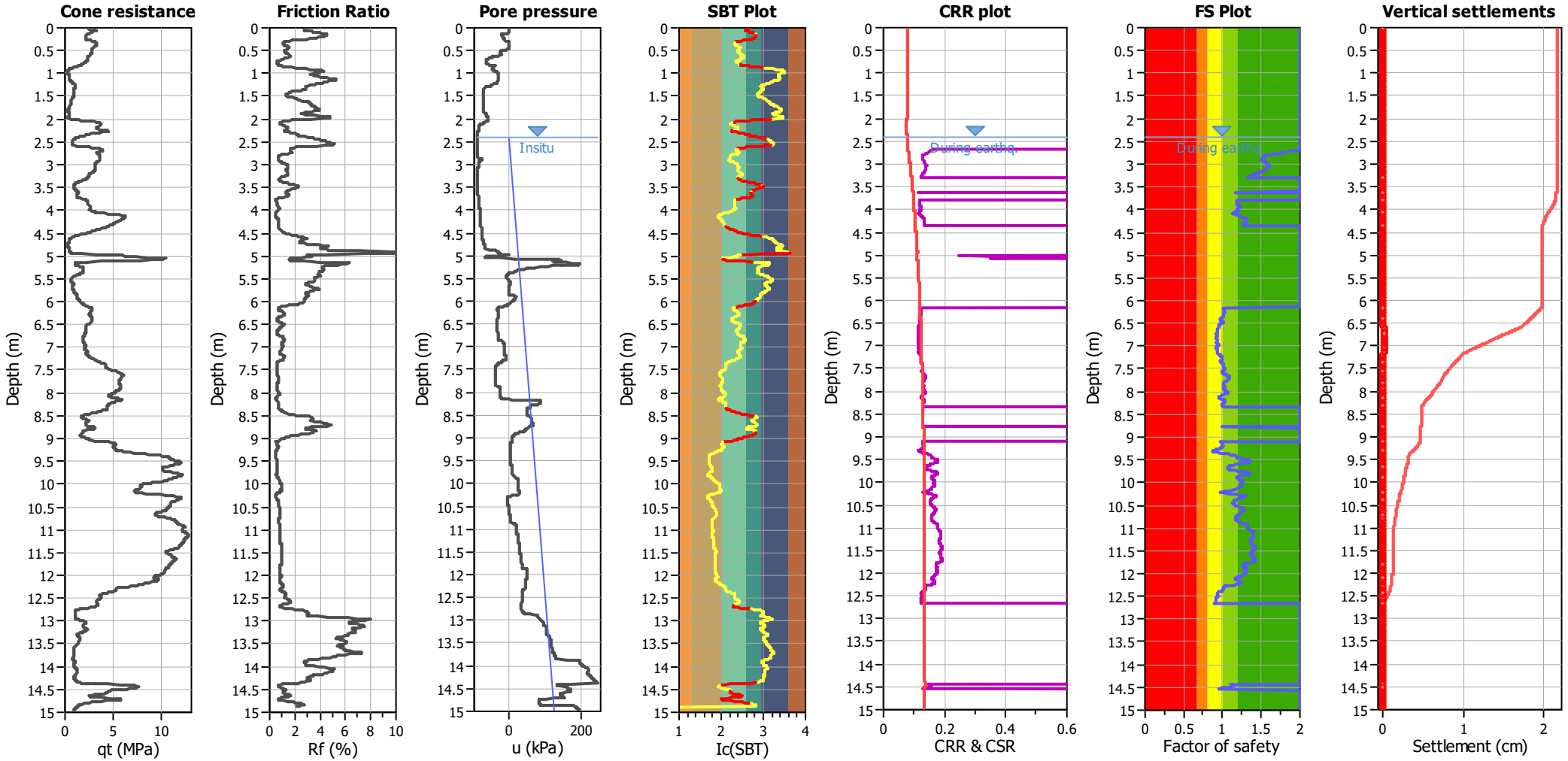
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu010 SLS
Total depth: 14.97 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.40 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.40 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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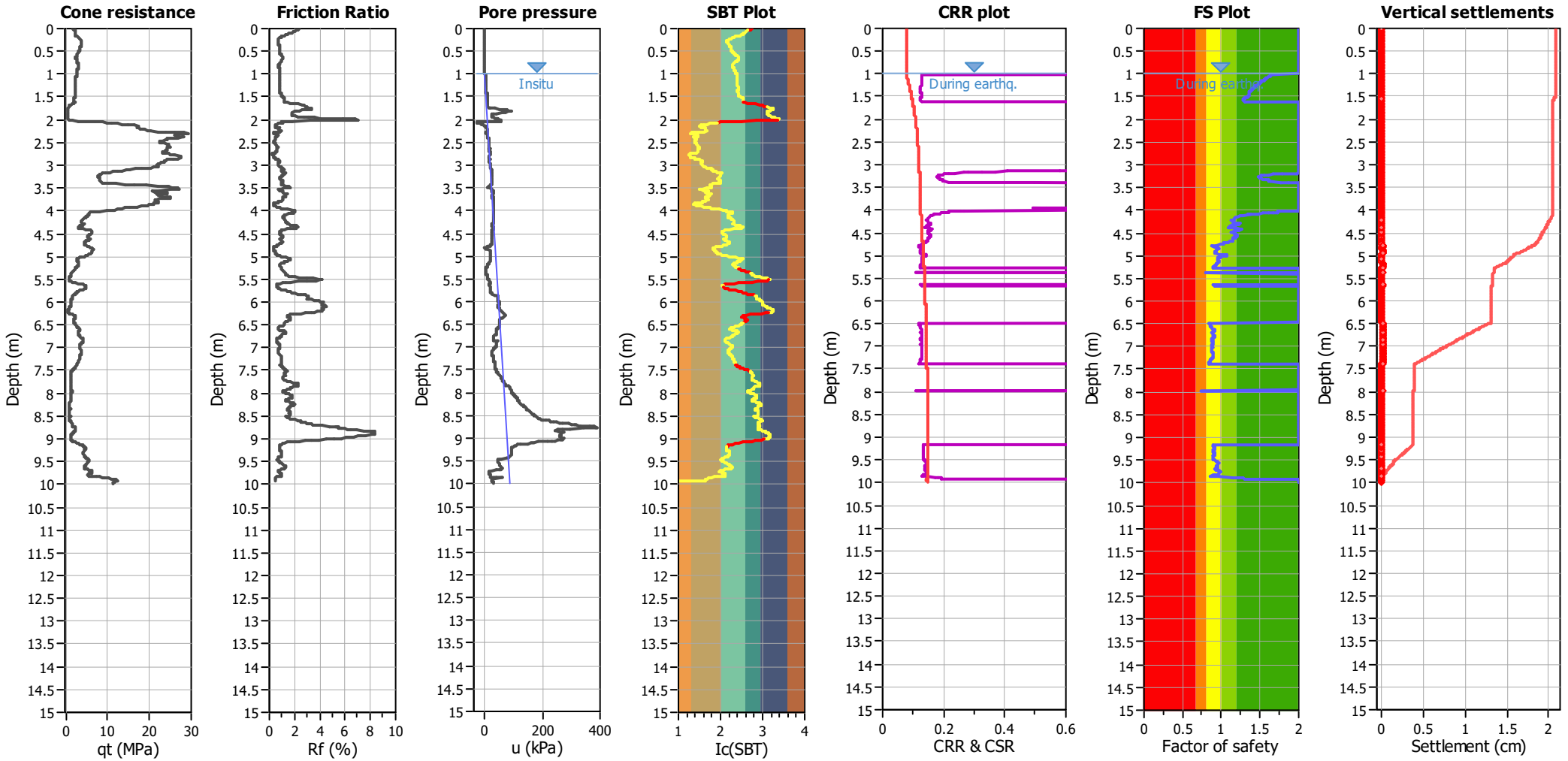
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu011 SLS
Total depth: 9.99 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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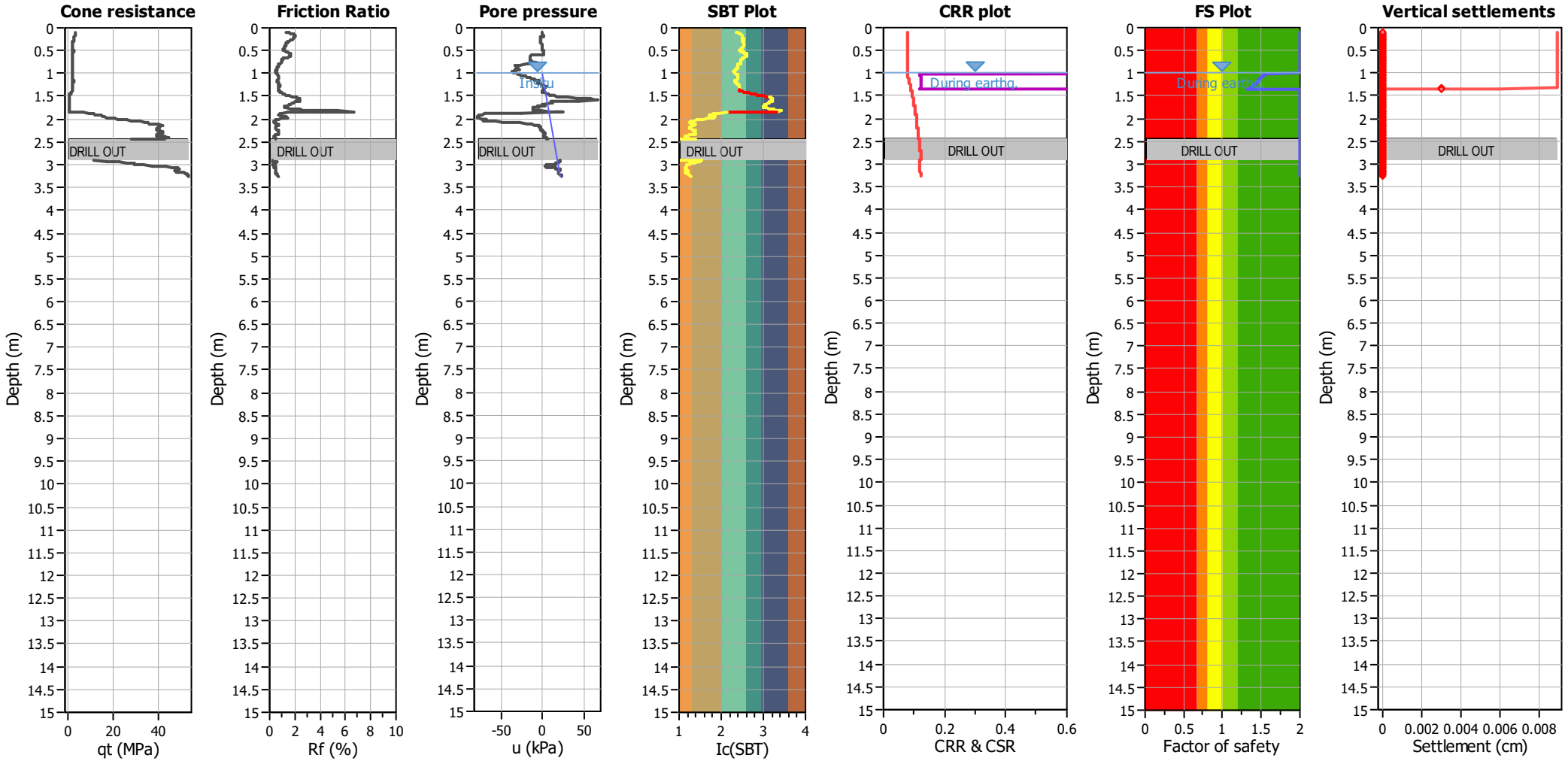
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu012 SLS
Total depth: 3.25 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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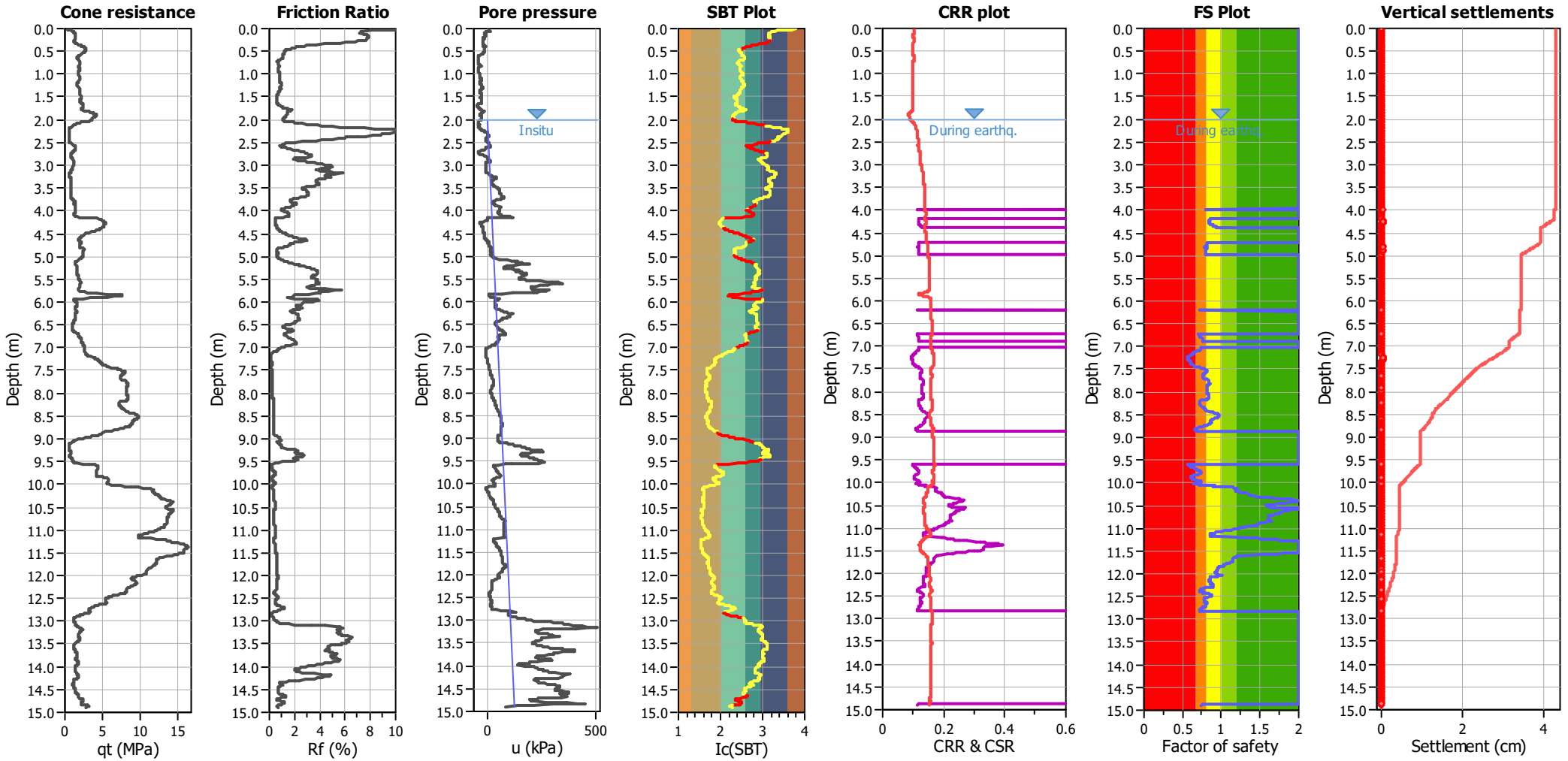
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu001 SLS2
Total depth: 14.89 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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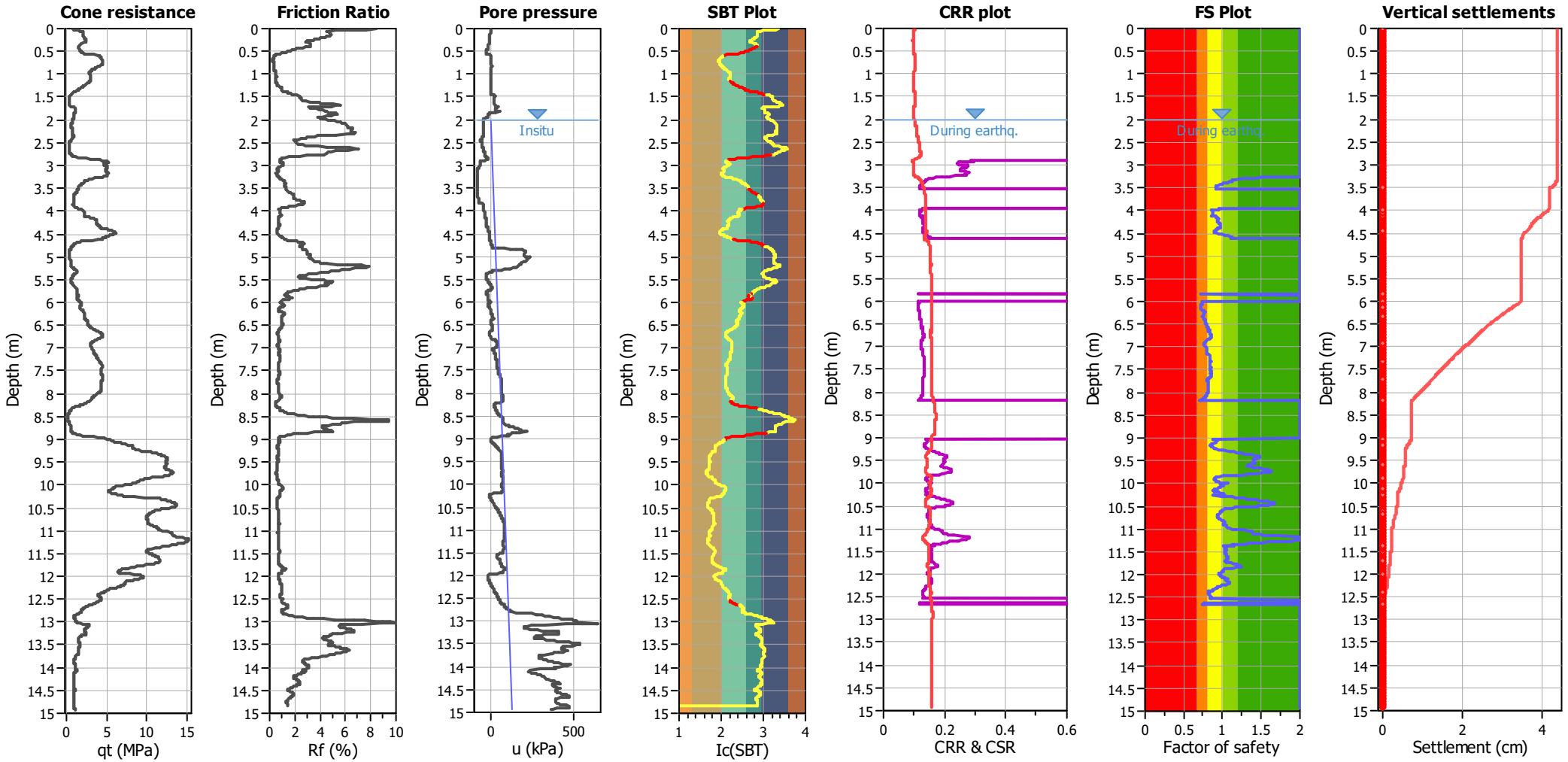
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu002 SLS2
Total depth: 14.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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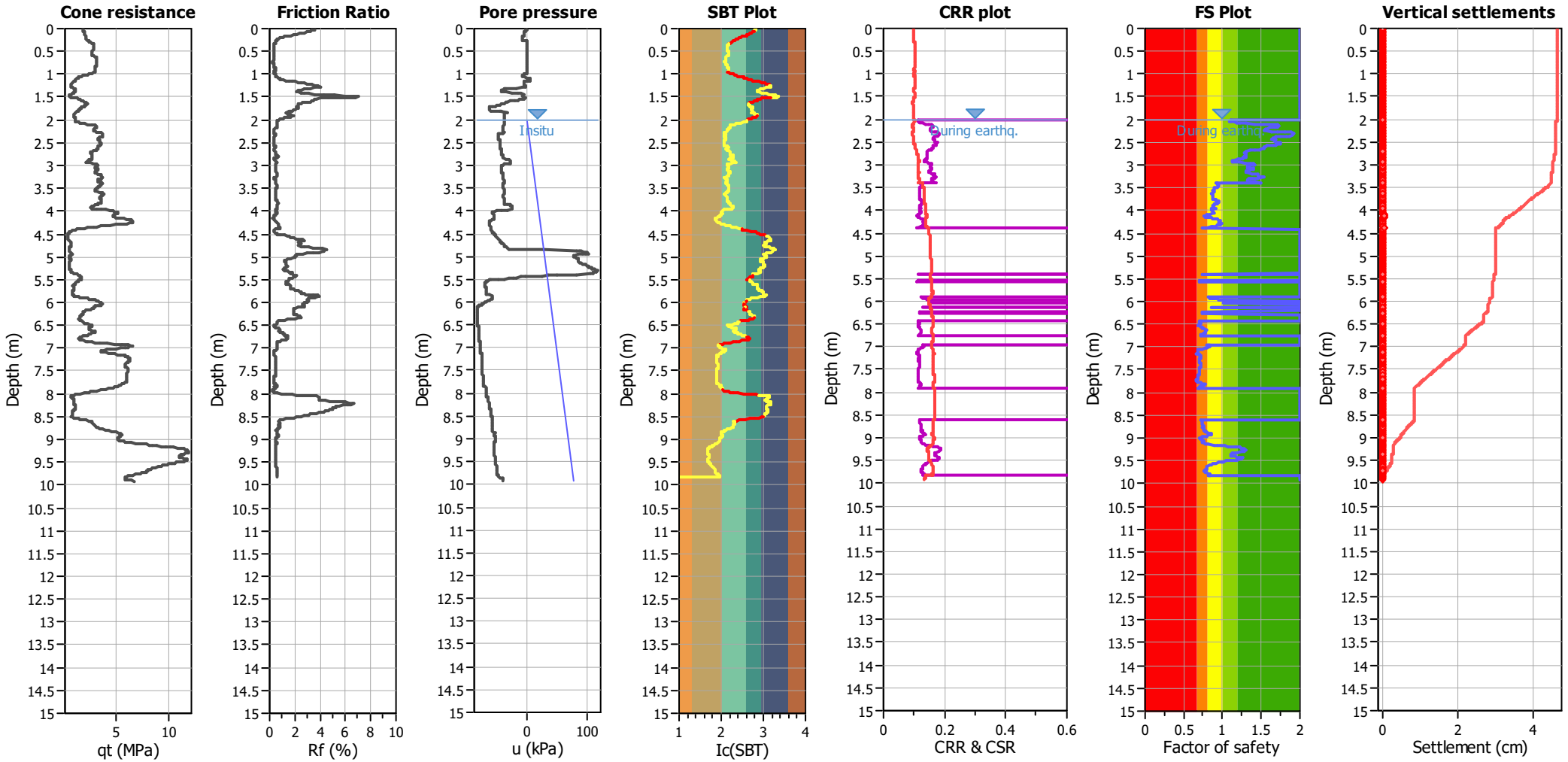
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu003 SLS2
Total depth: 9.91 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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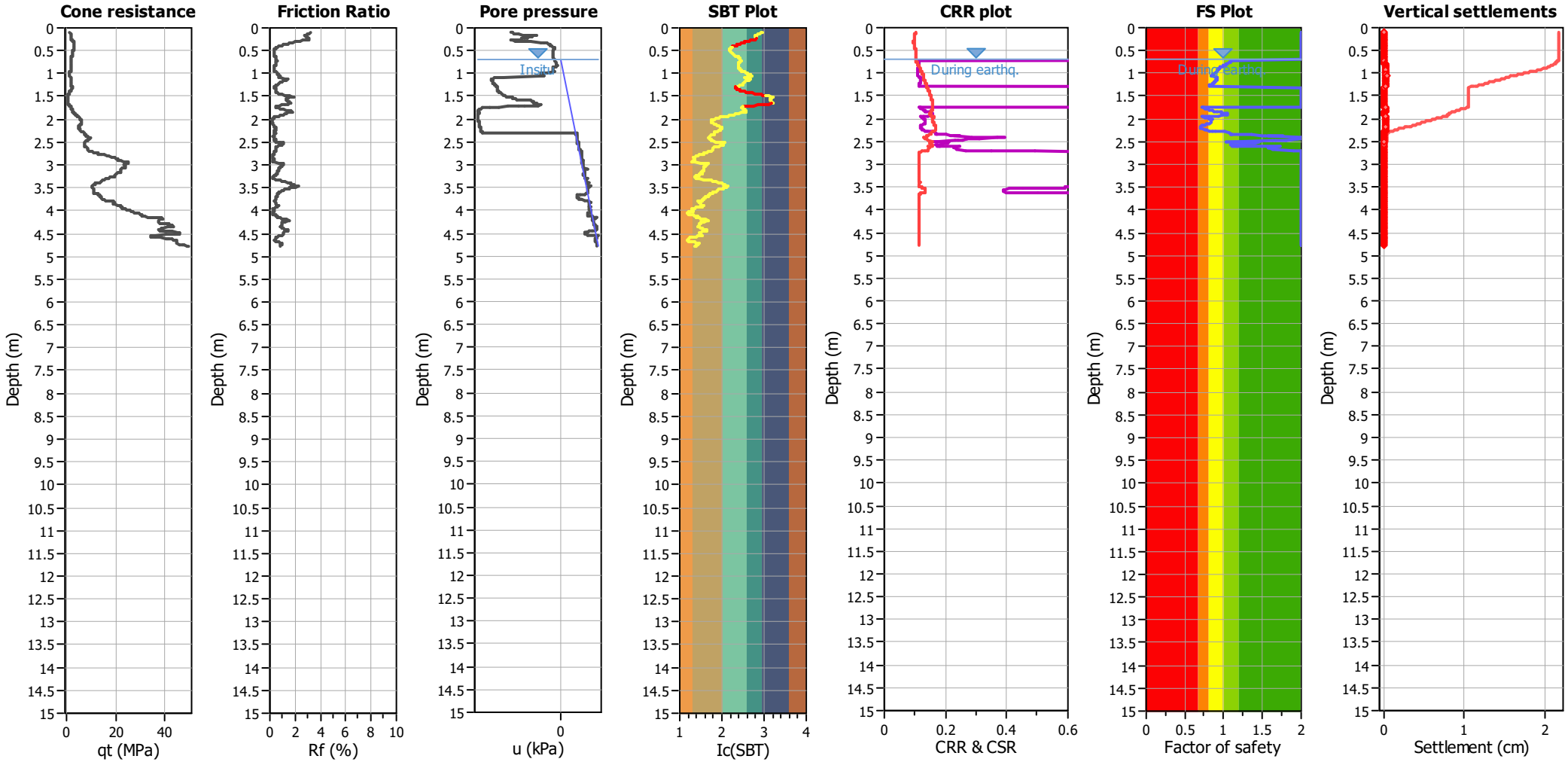
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu004 SLS2
Total depth: 4.78 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.70 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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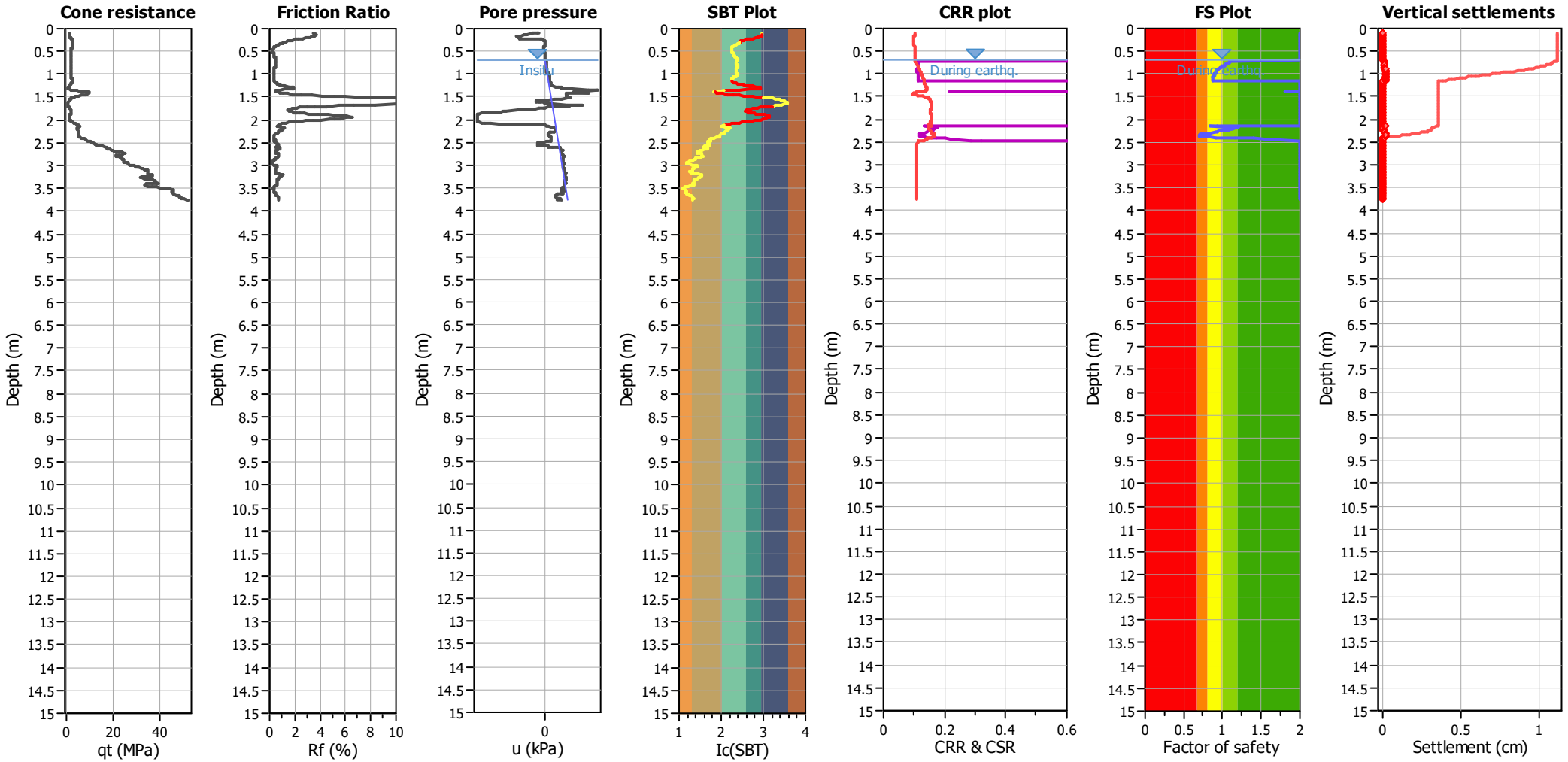
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu005 SLS2
Total depth: 3.76 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.70 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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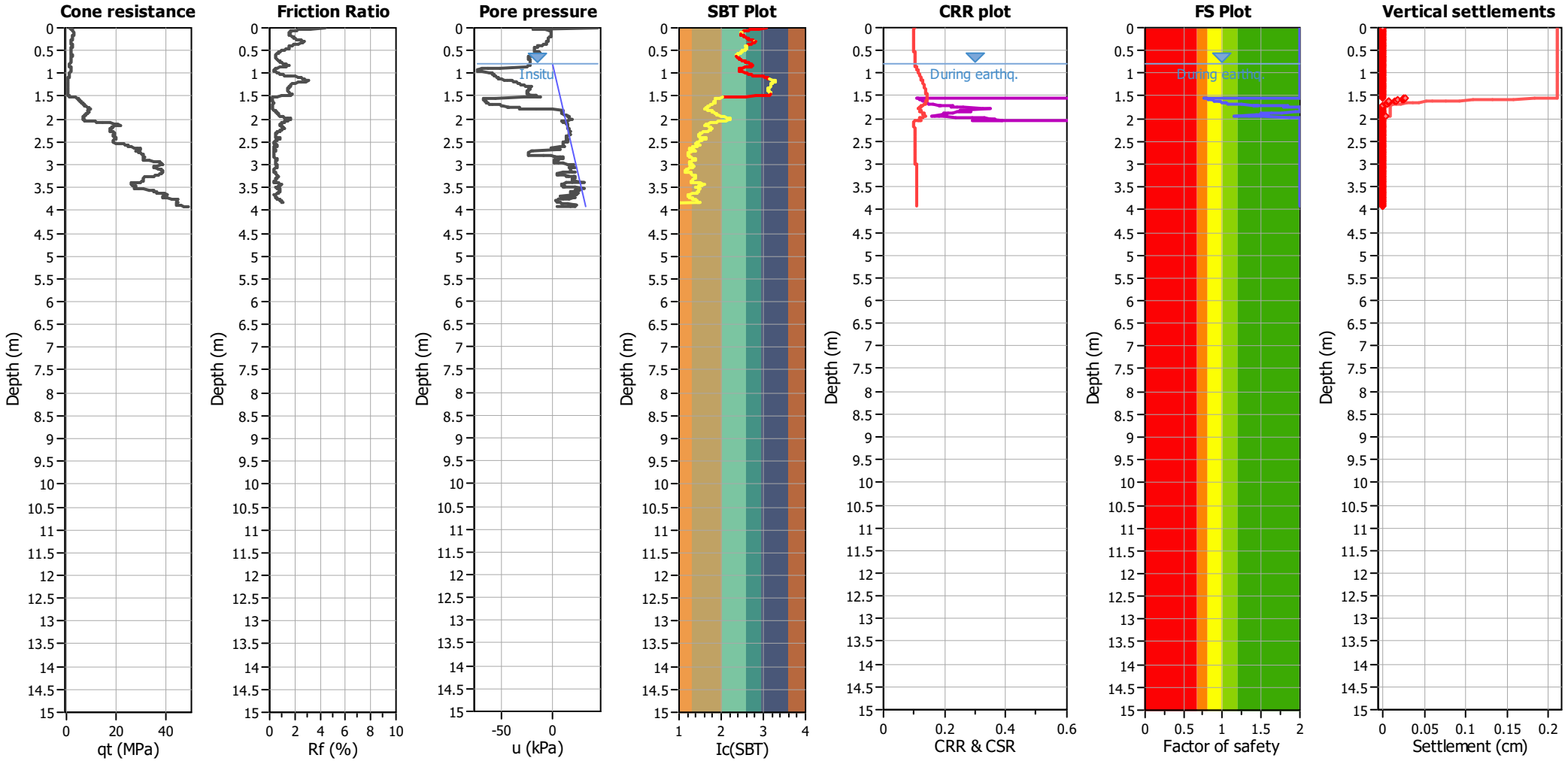
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu006 SLS2
Total depth: 3.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.80 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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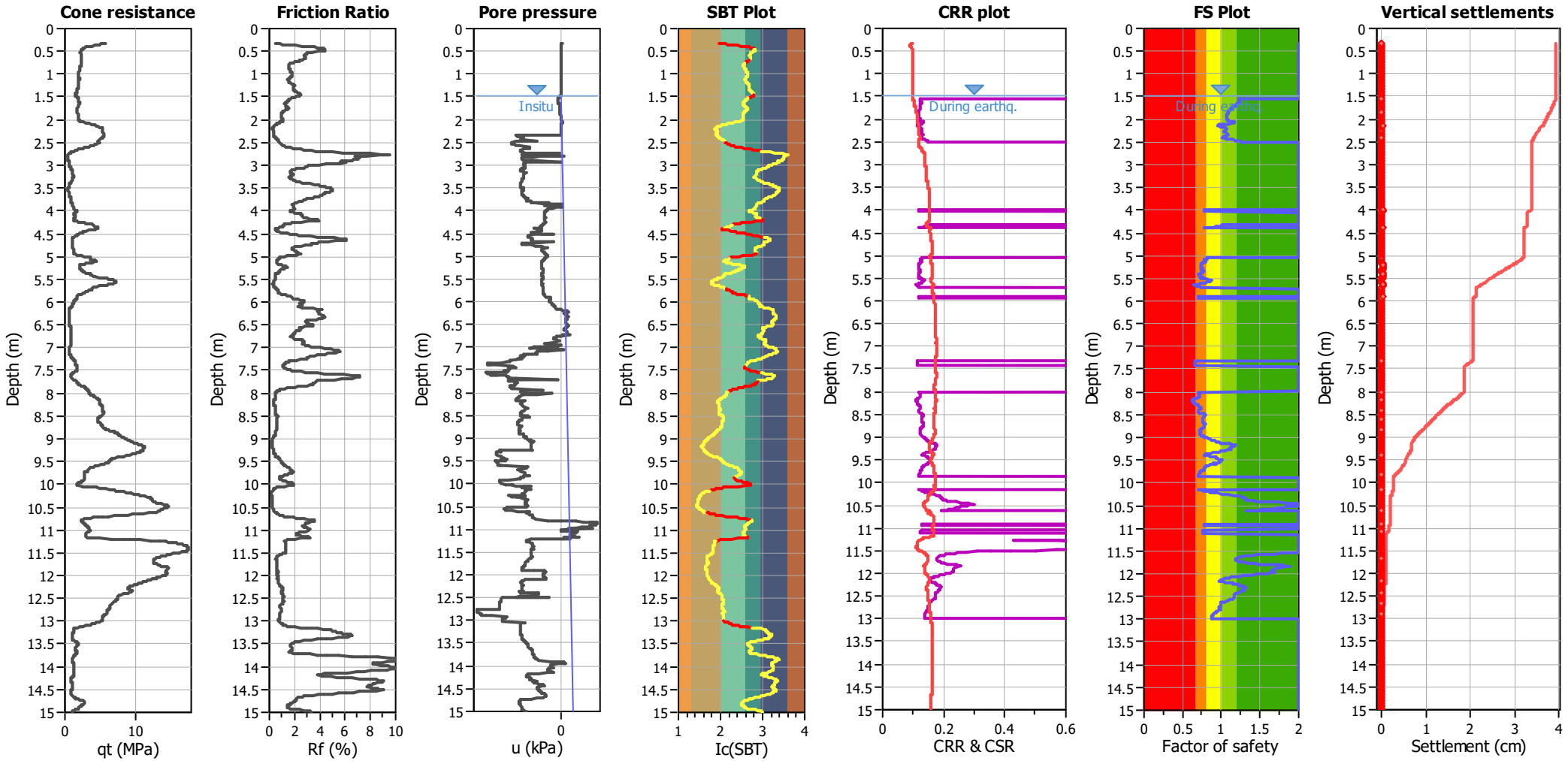
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu007 SLS2
Total depth: 15.00 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.50 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.50 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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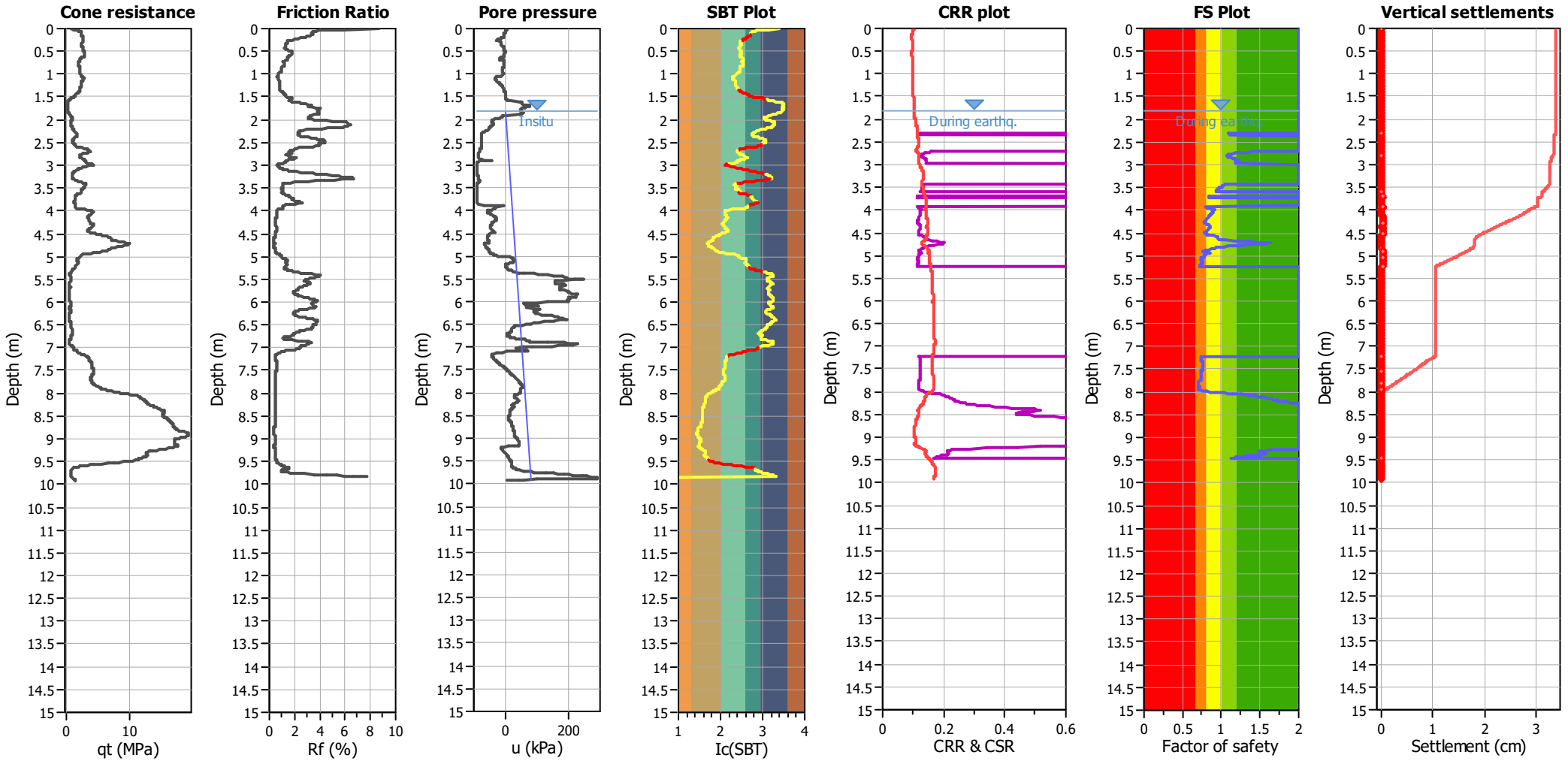
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu008 SLS
Total depth: 9.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.80 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.80 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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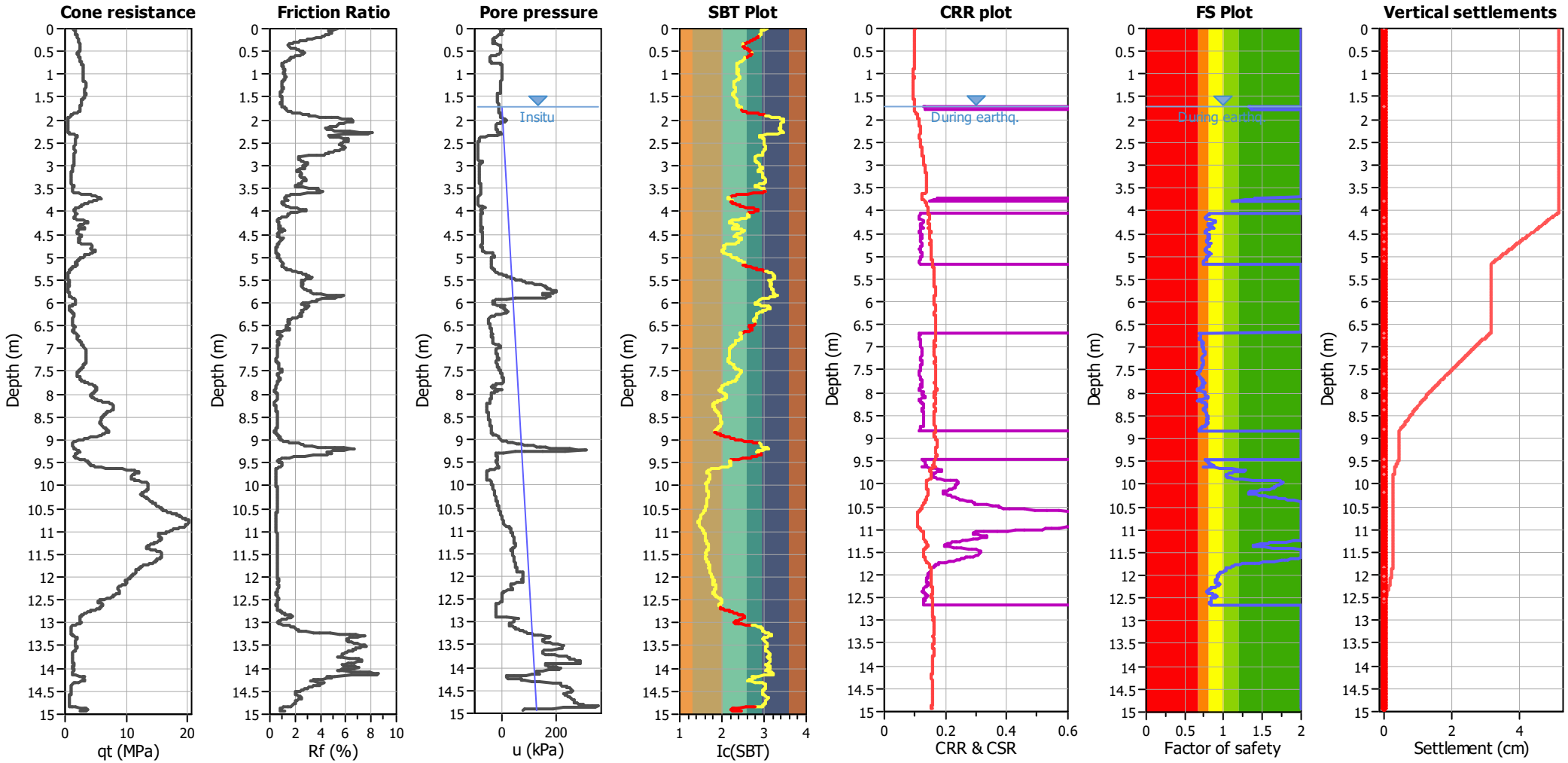
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu009 SLS2
Total depth: 14.95 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.70 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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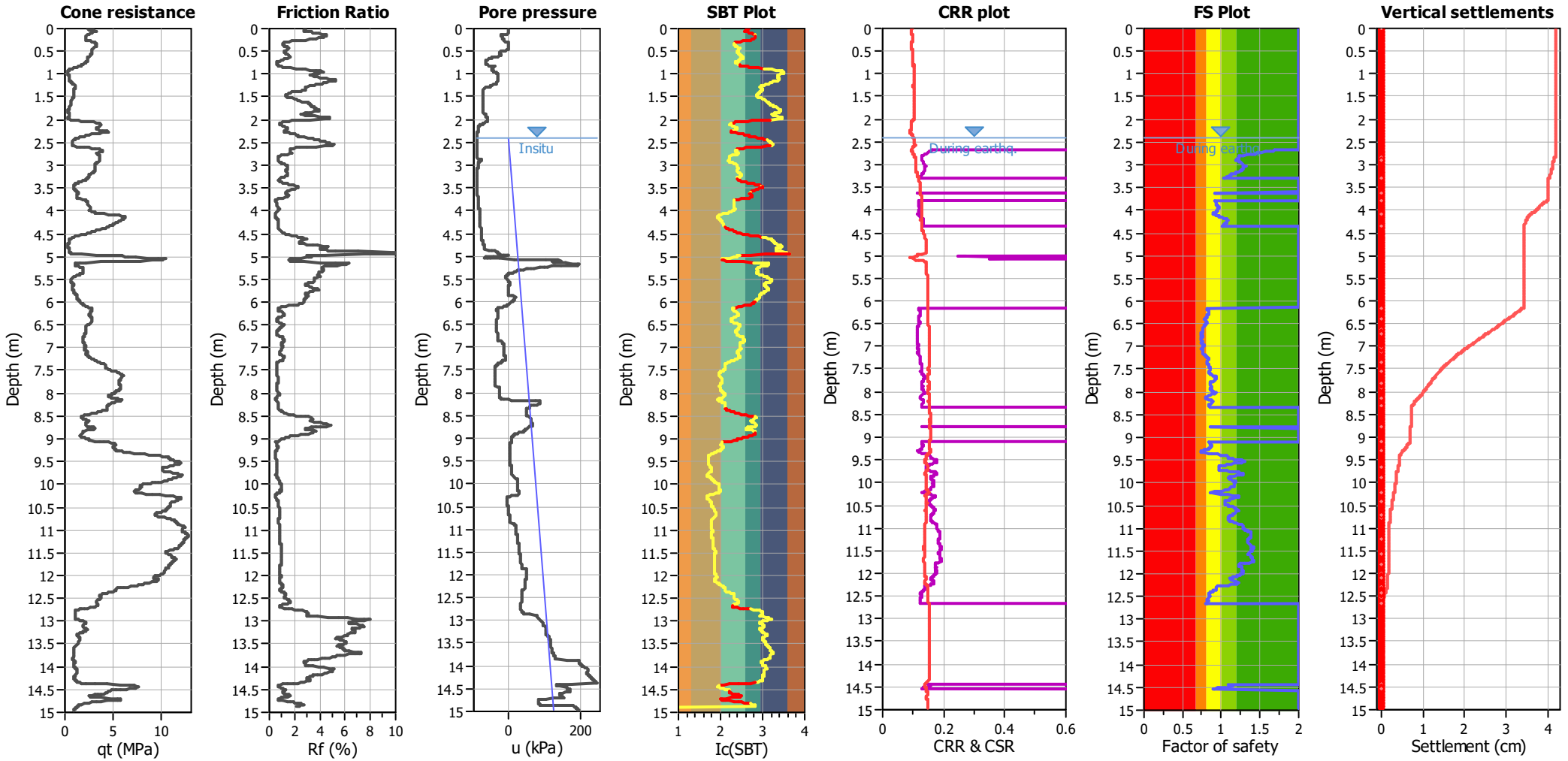
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu010 SLS2
Total depth: 14.97 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.40 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.40 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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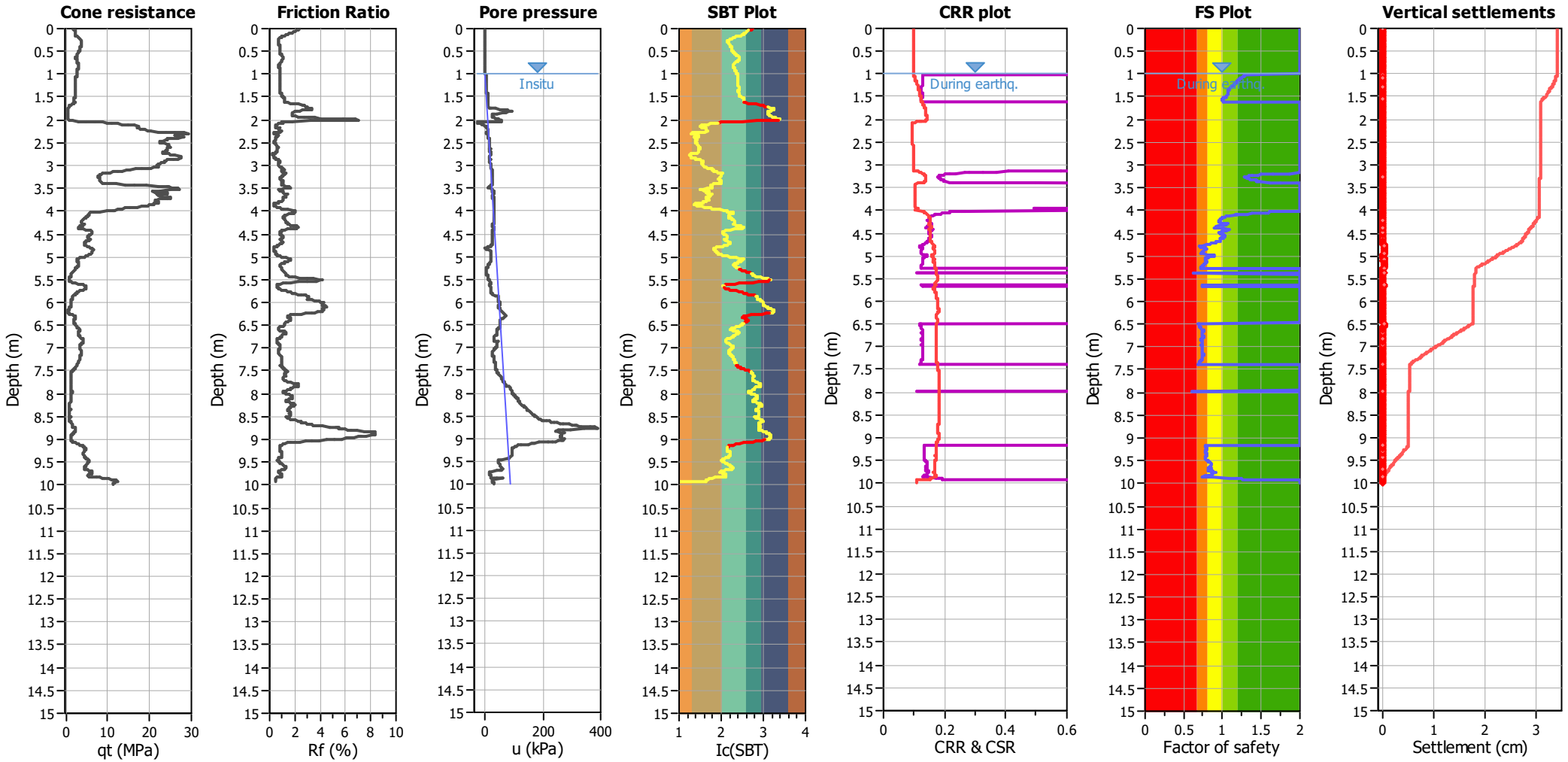
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu011 SLS2
Total depth: 9.99 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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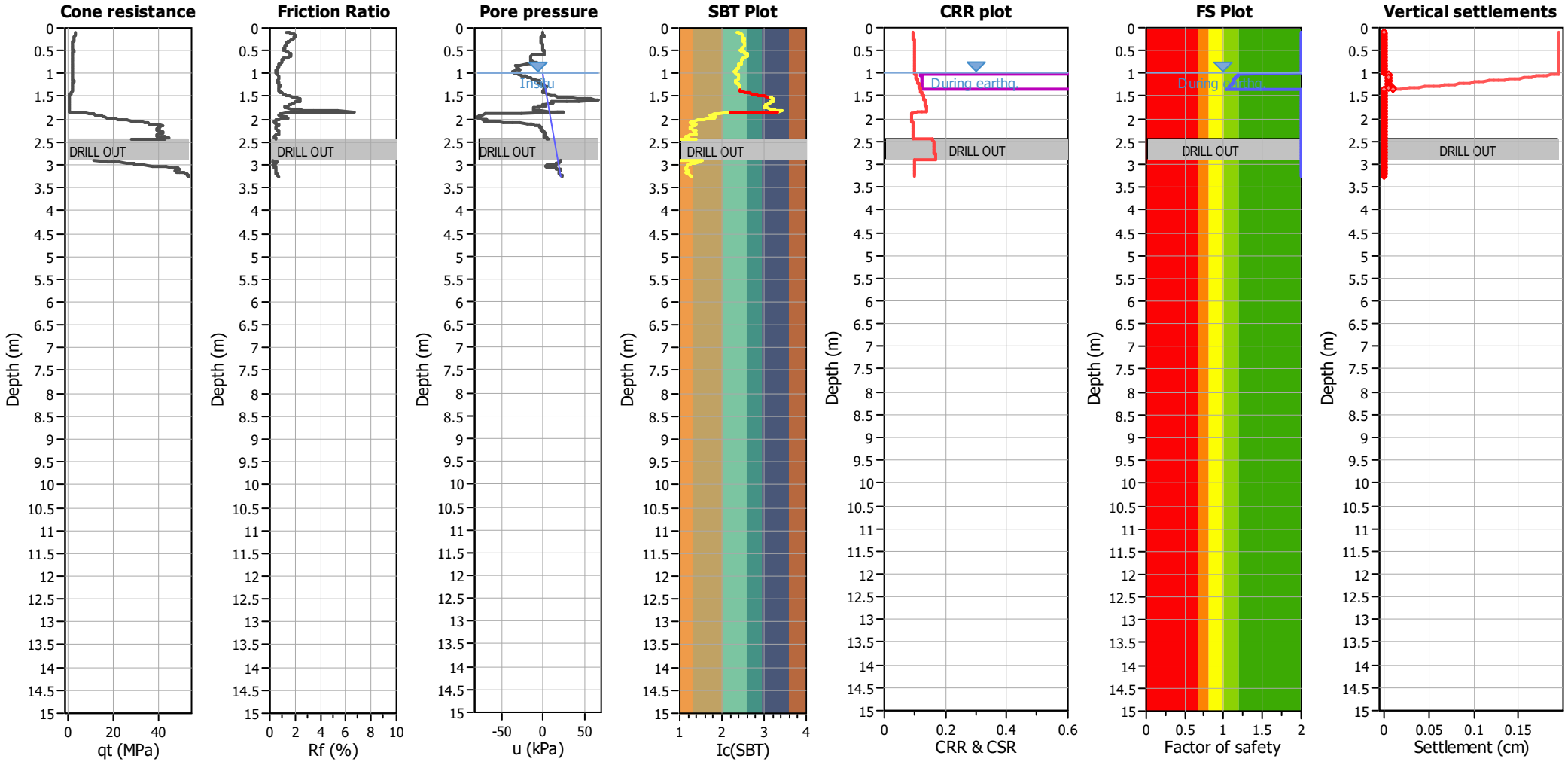
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu012 SLS2
Total depth: 3.25 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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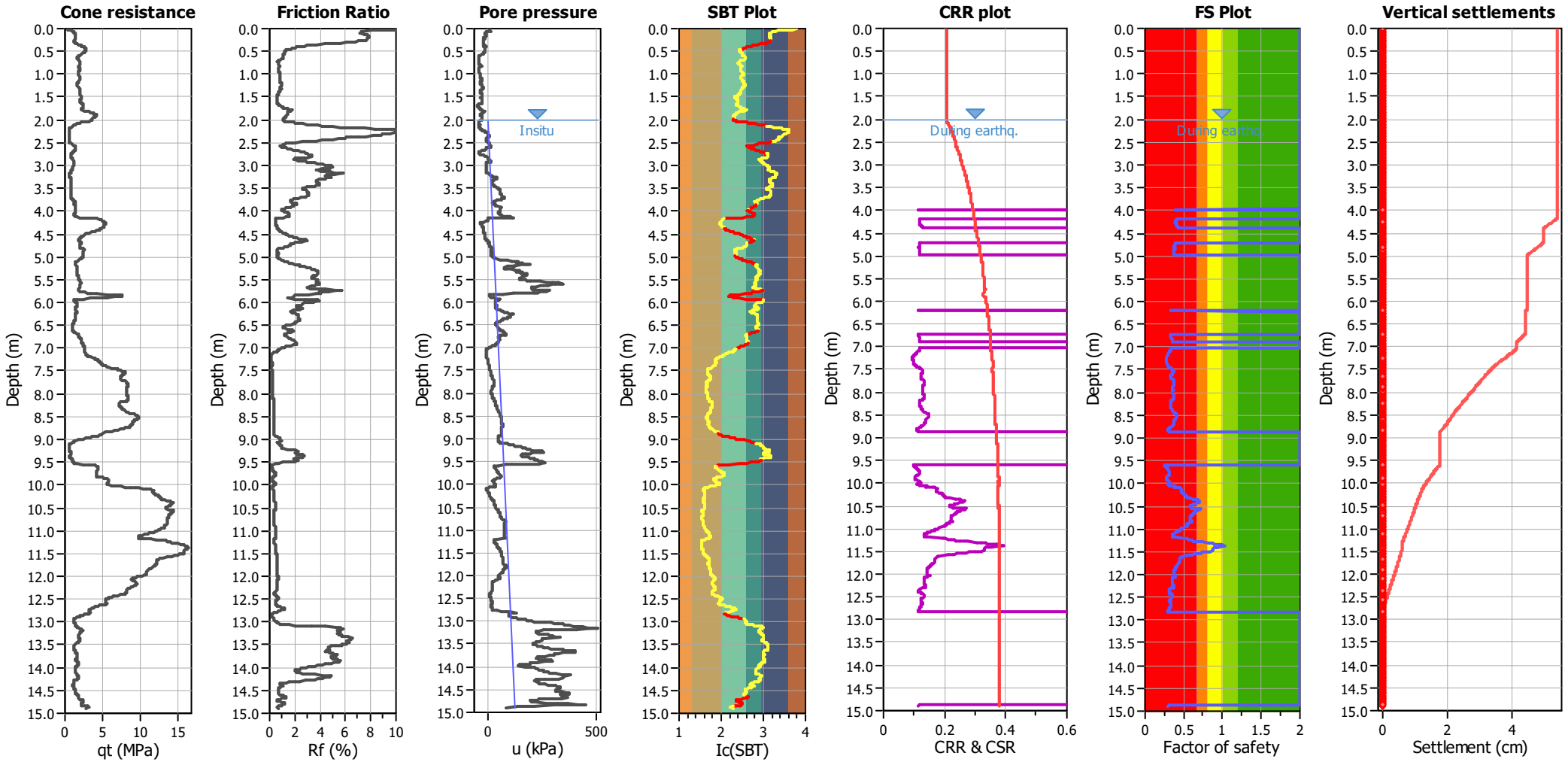
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu001 ULS
Total depth: 14.89 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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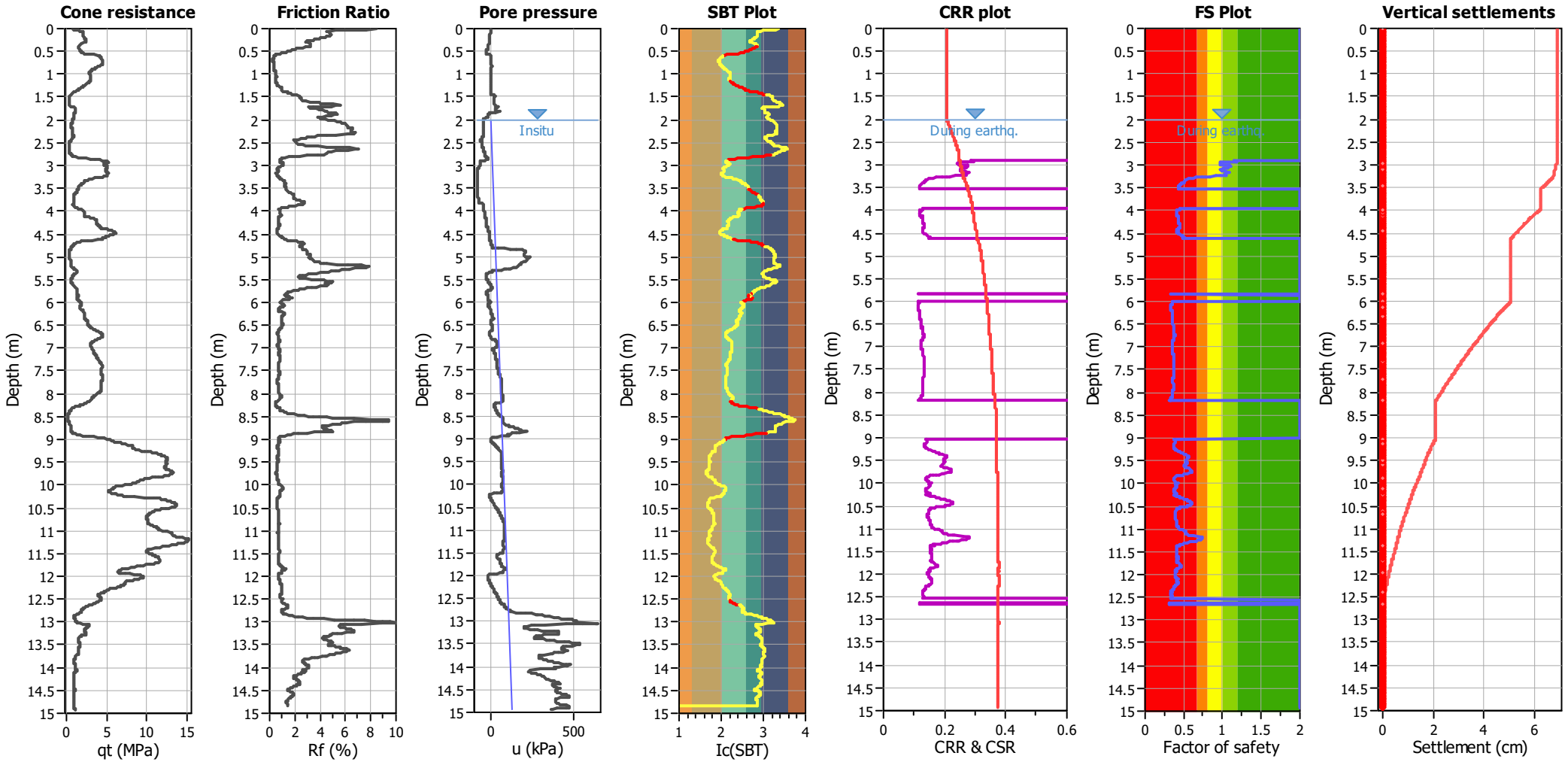
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu002 ULS
Total depth: 14.93 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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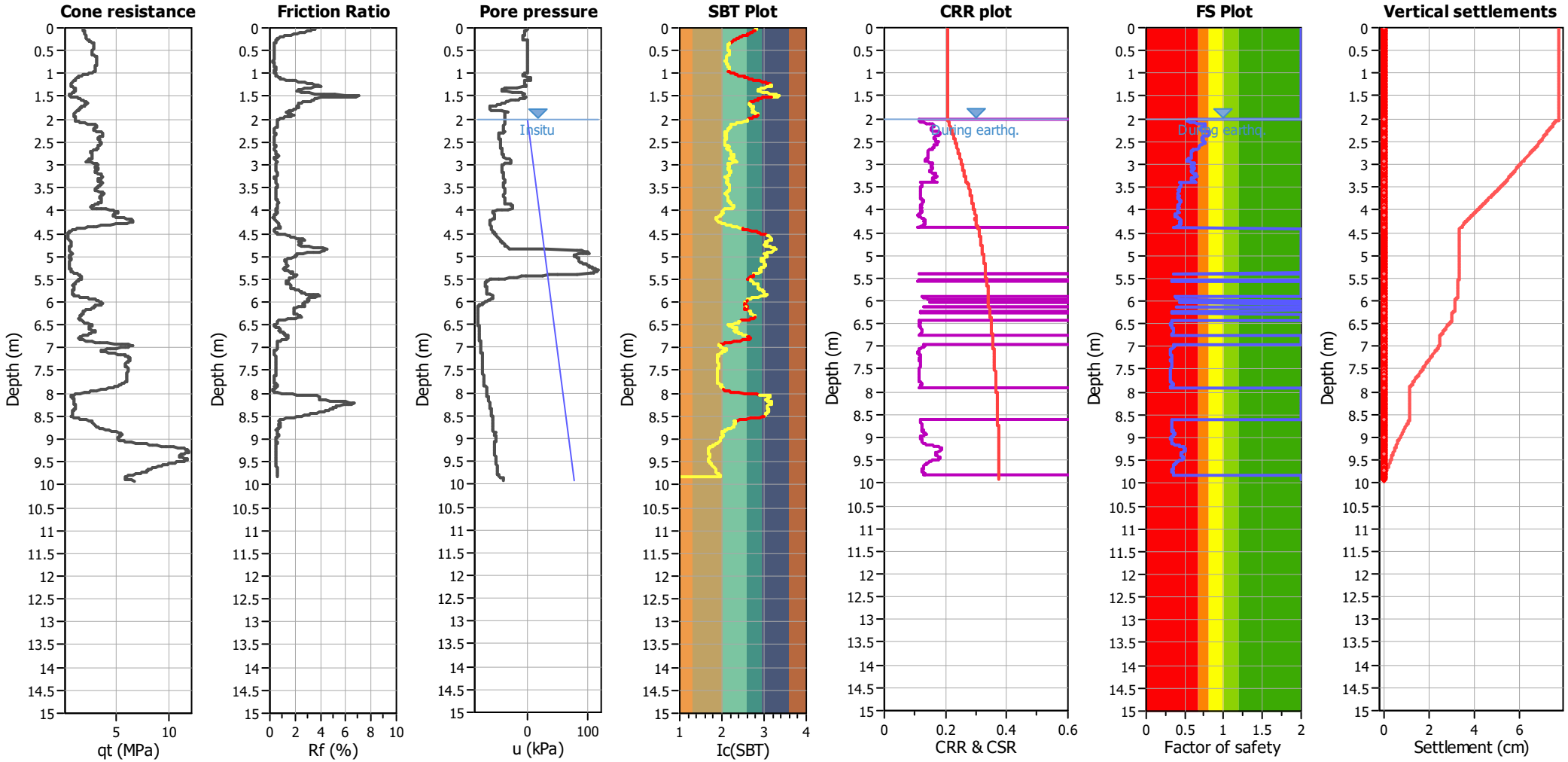
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu003 ULS
Total depth: 9.91 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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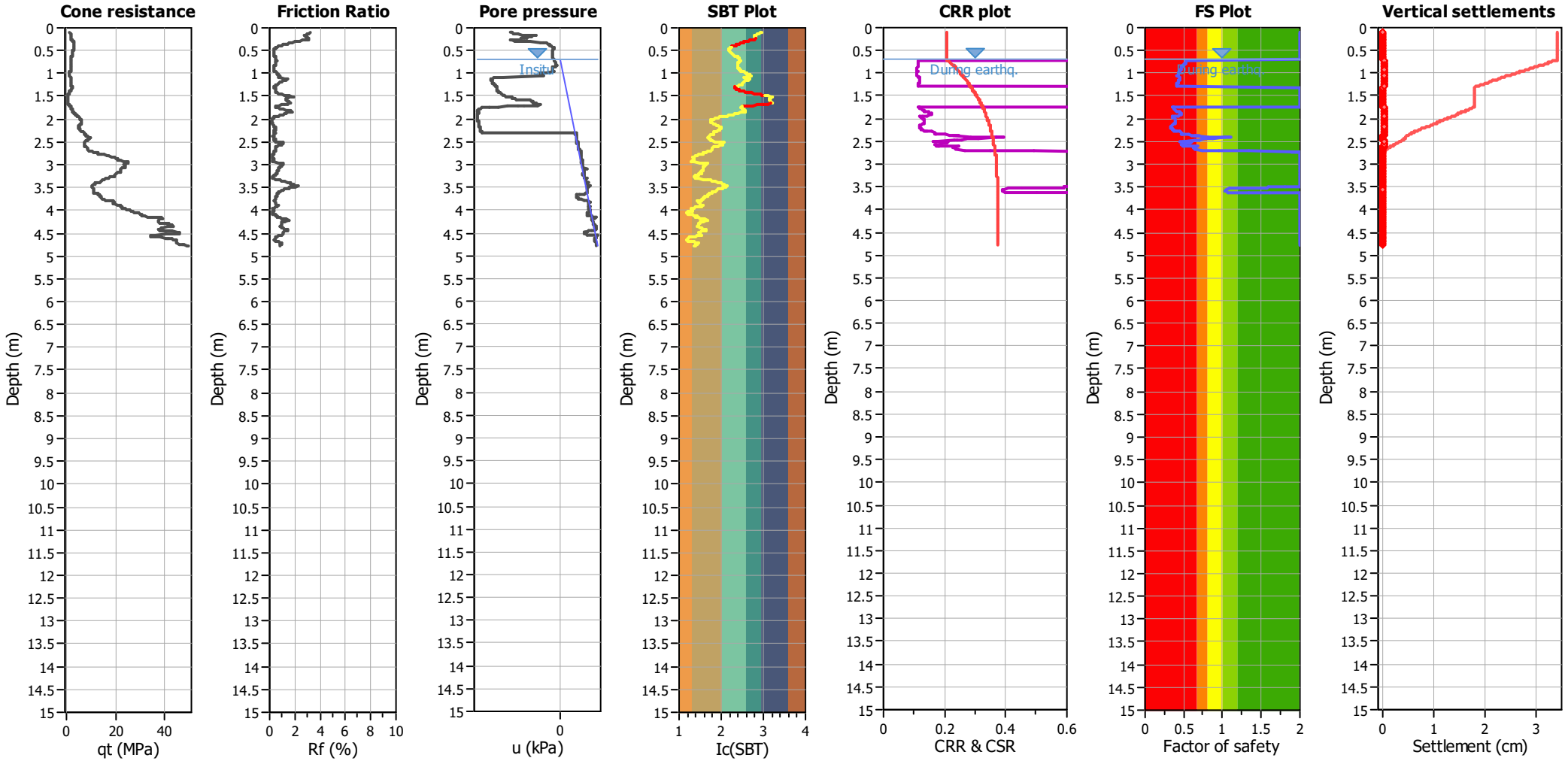
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu004 ULS
Total depth: 4.78 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.70 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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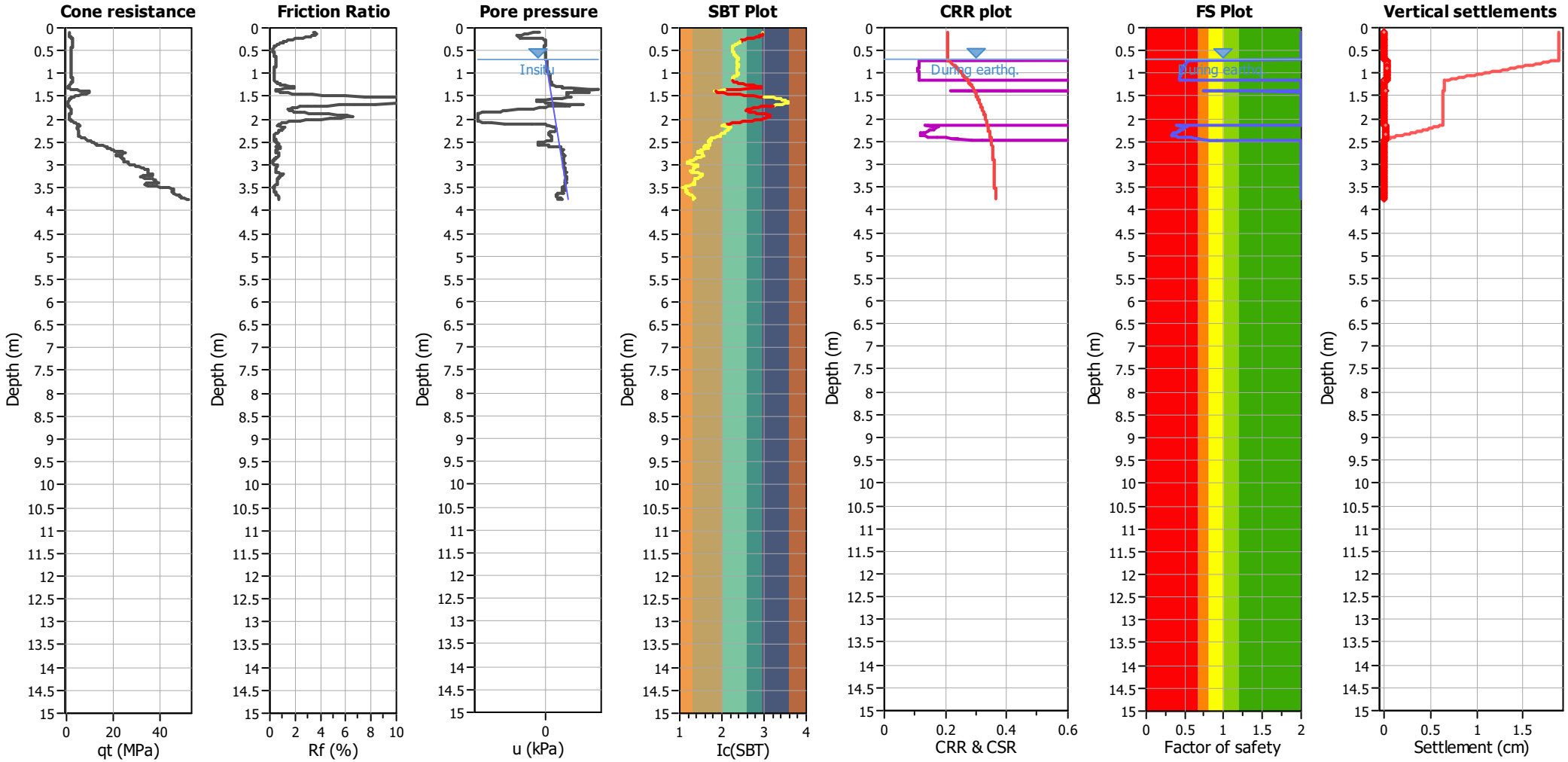
Level 1, 236 Hereford Street
Christchurch Central, Christchurch
http://www.miyamoto.nz

Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu005 ULS
Total depth: 3.76 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.70 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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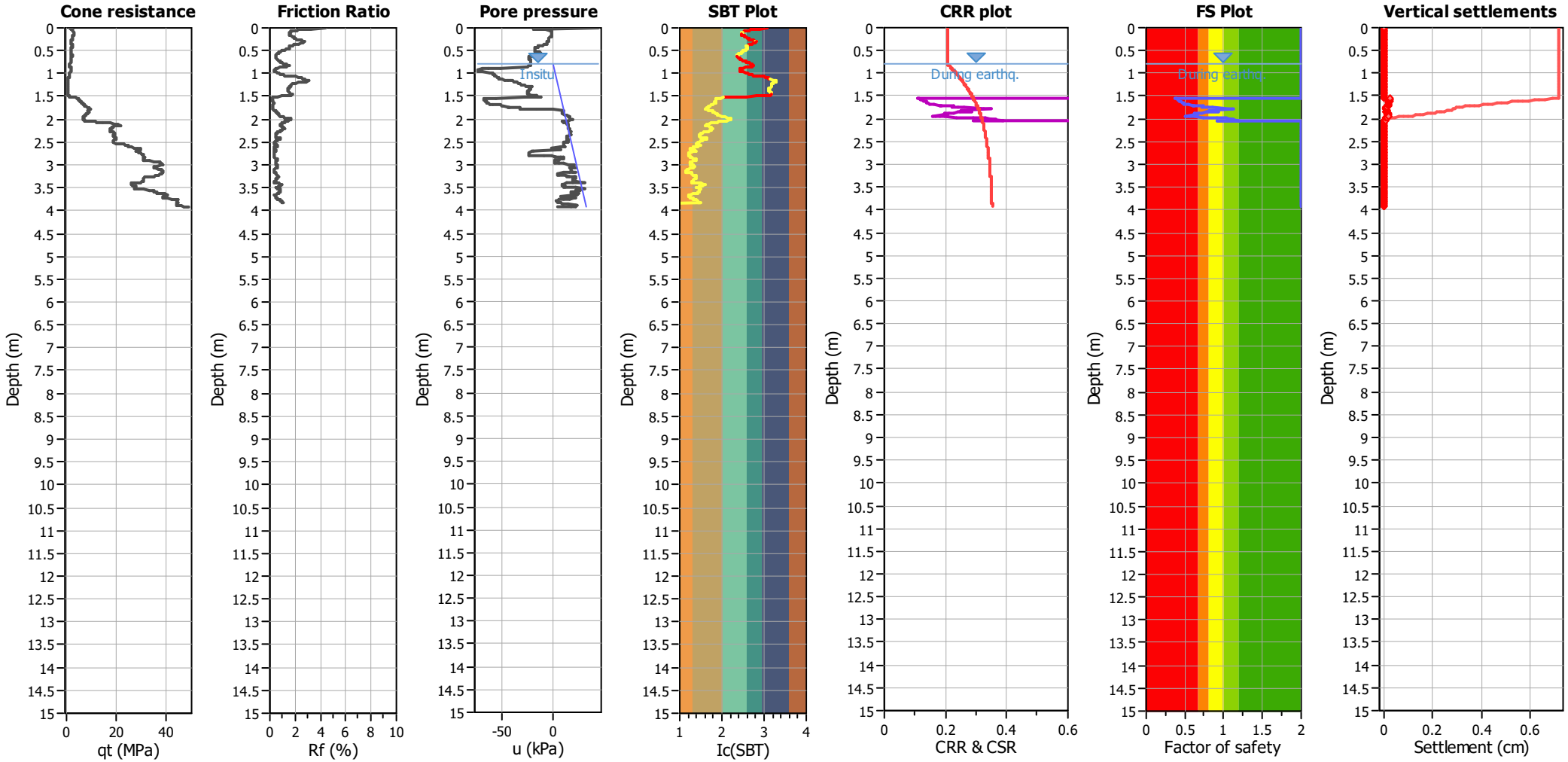
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu006 ULS
Total depth: 3.93 m



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Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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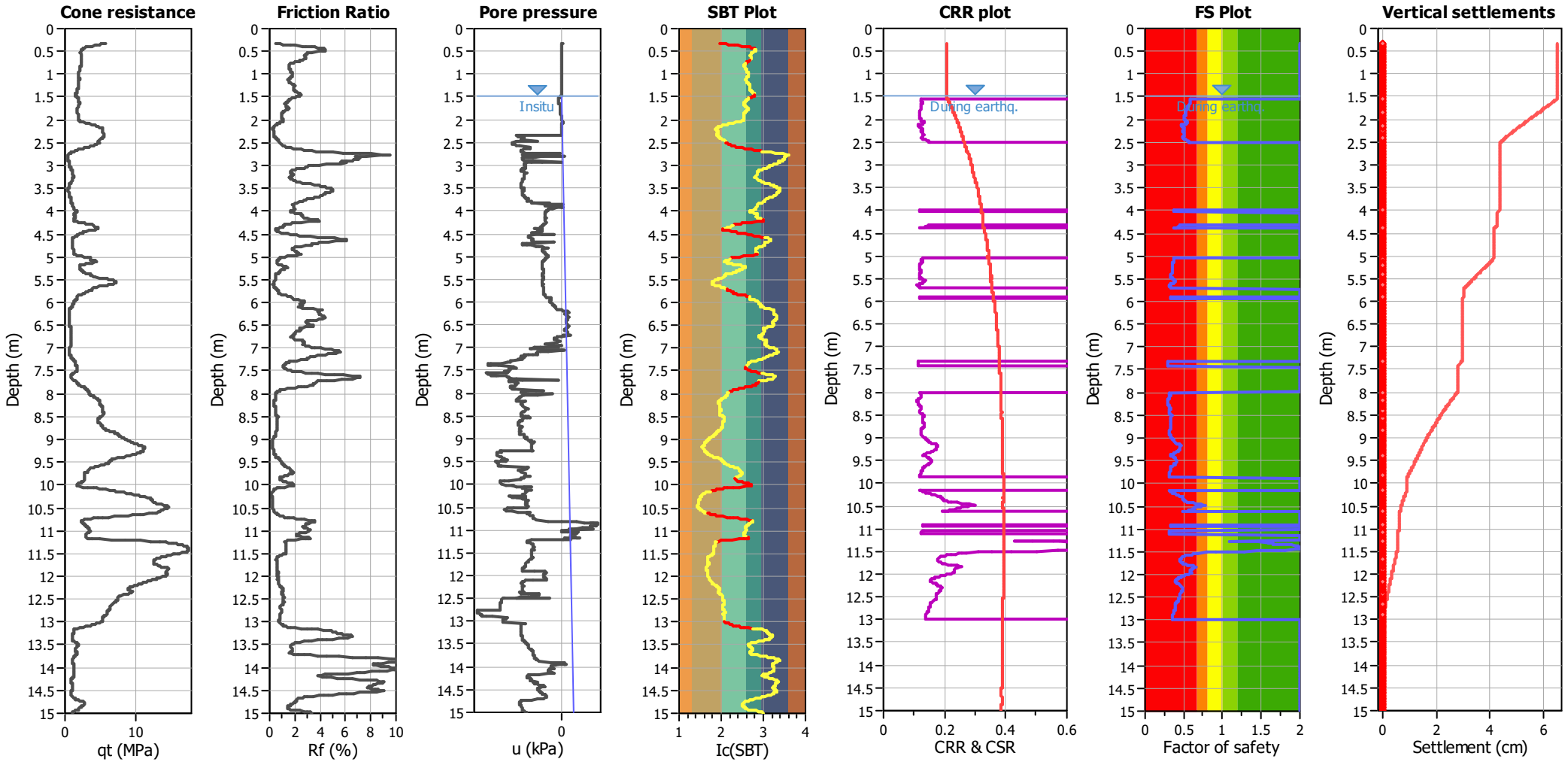
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu007 ULS
Total depth: 15.00 m



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Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.50 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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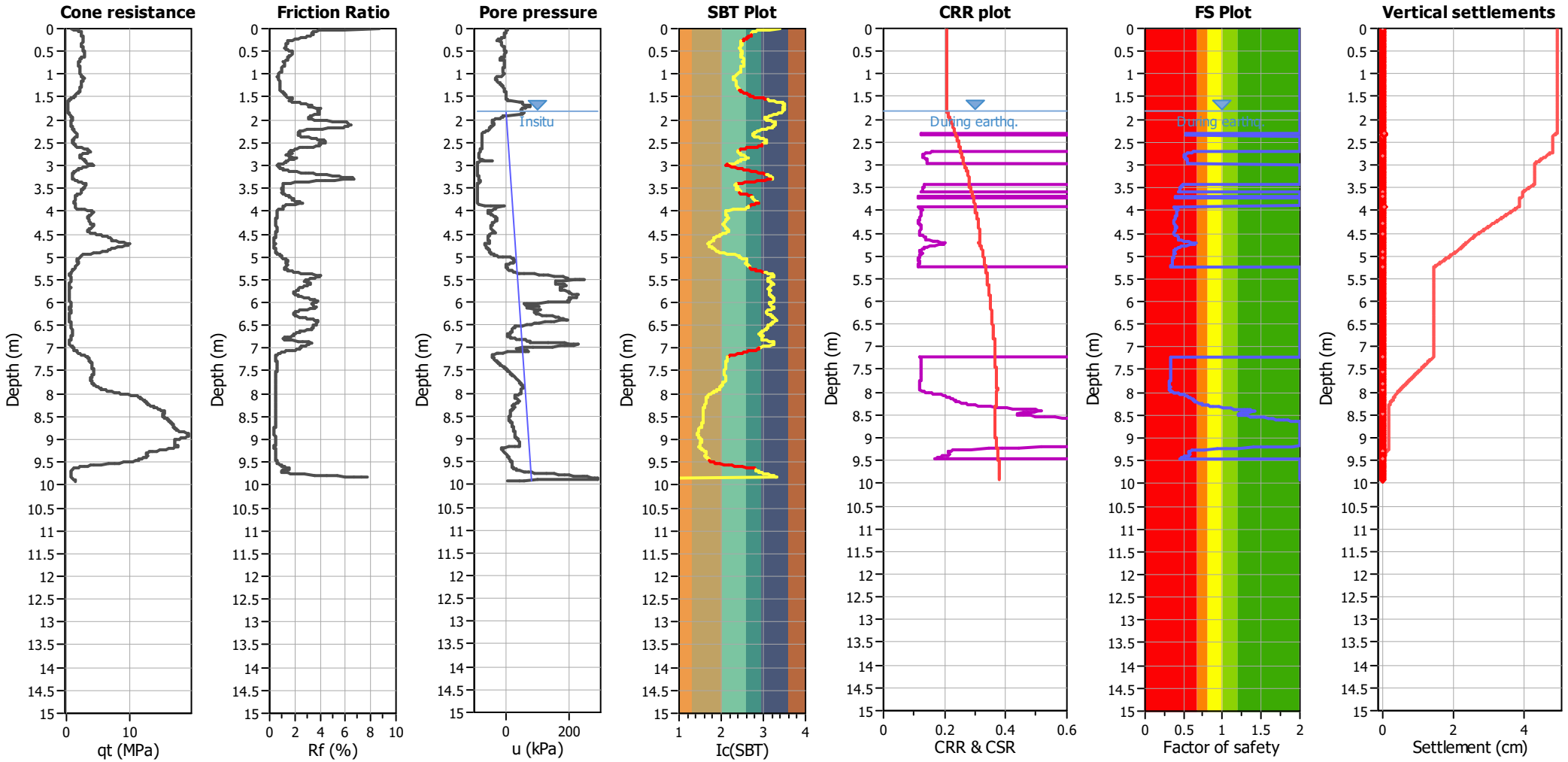
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu008 ULS
Total depth: 9.93 m



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Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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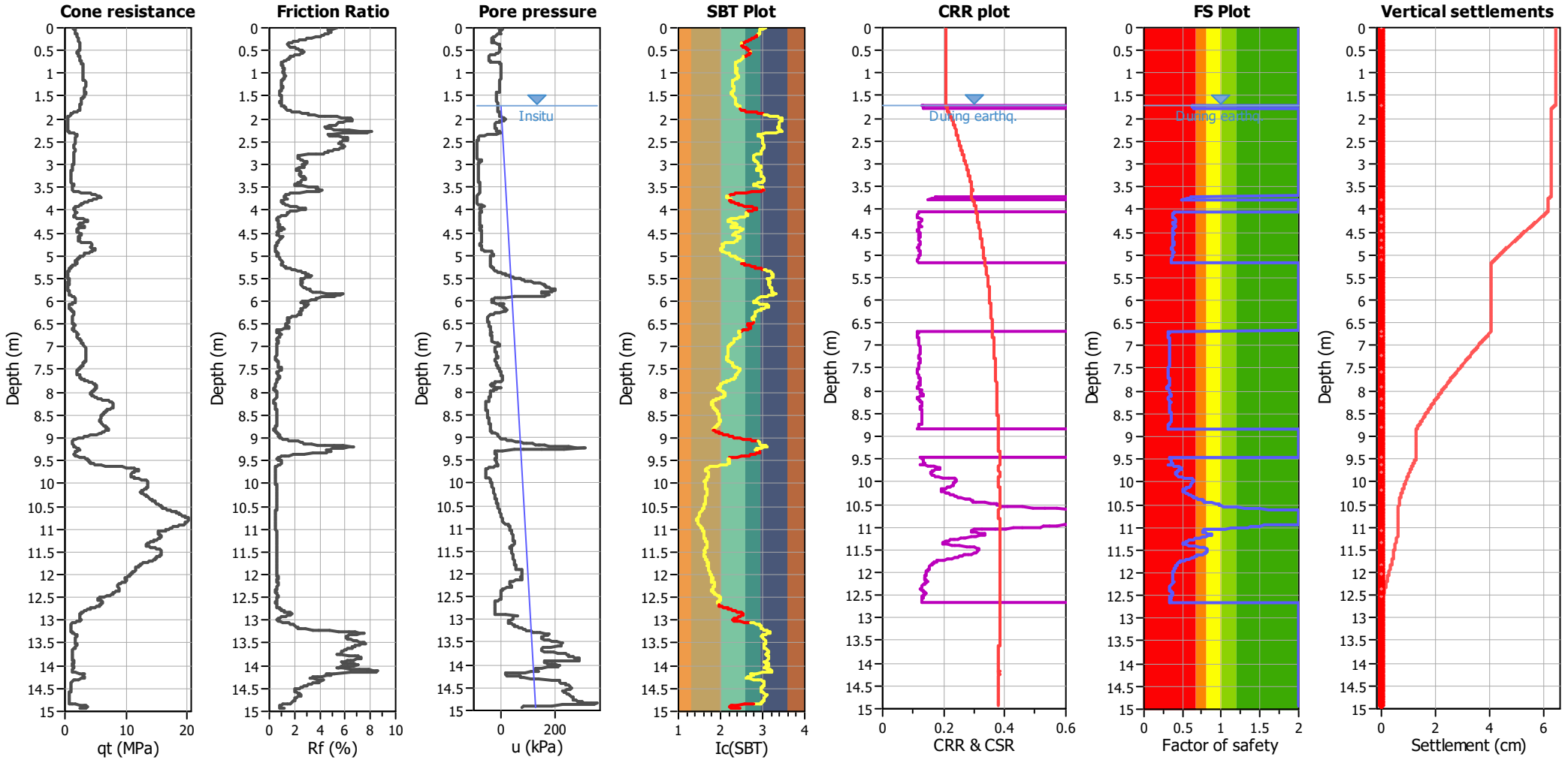
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu009 ULS
Total depth: 14.95 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.70 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.70 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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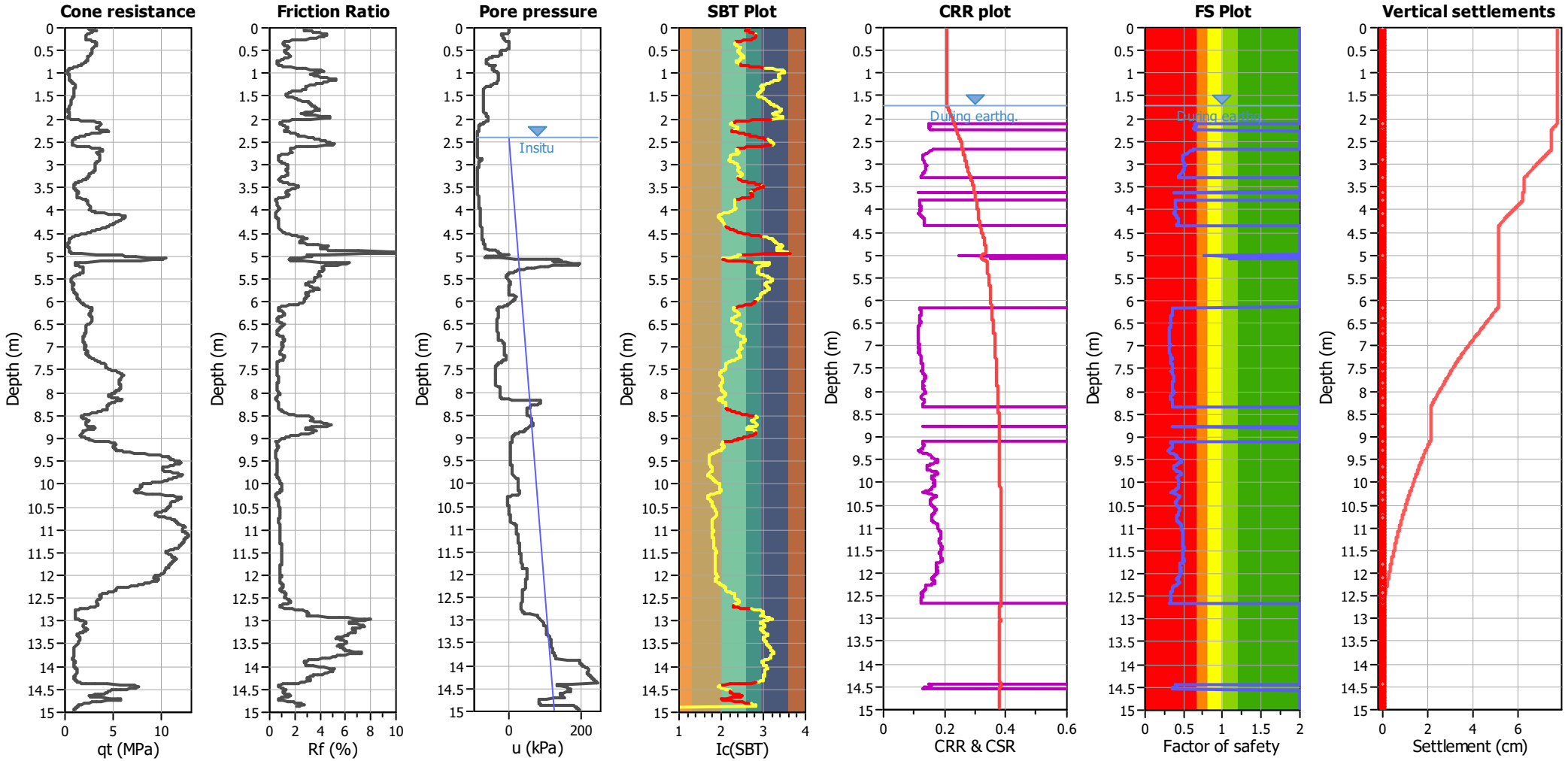
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu010 ULS
Total depth: 14.97 m



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Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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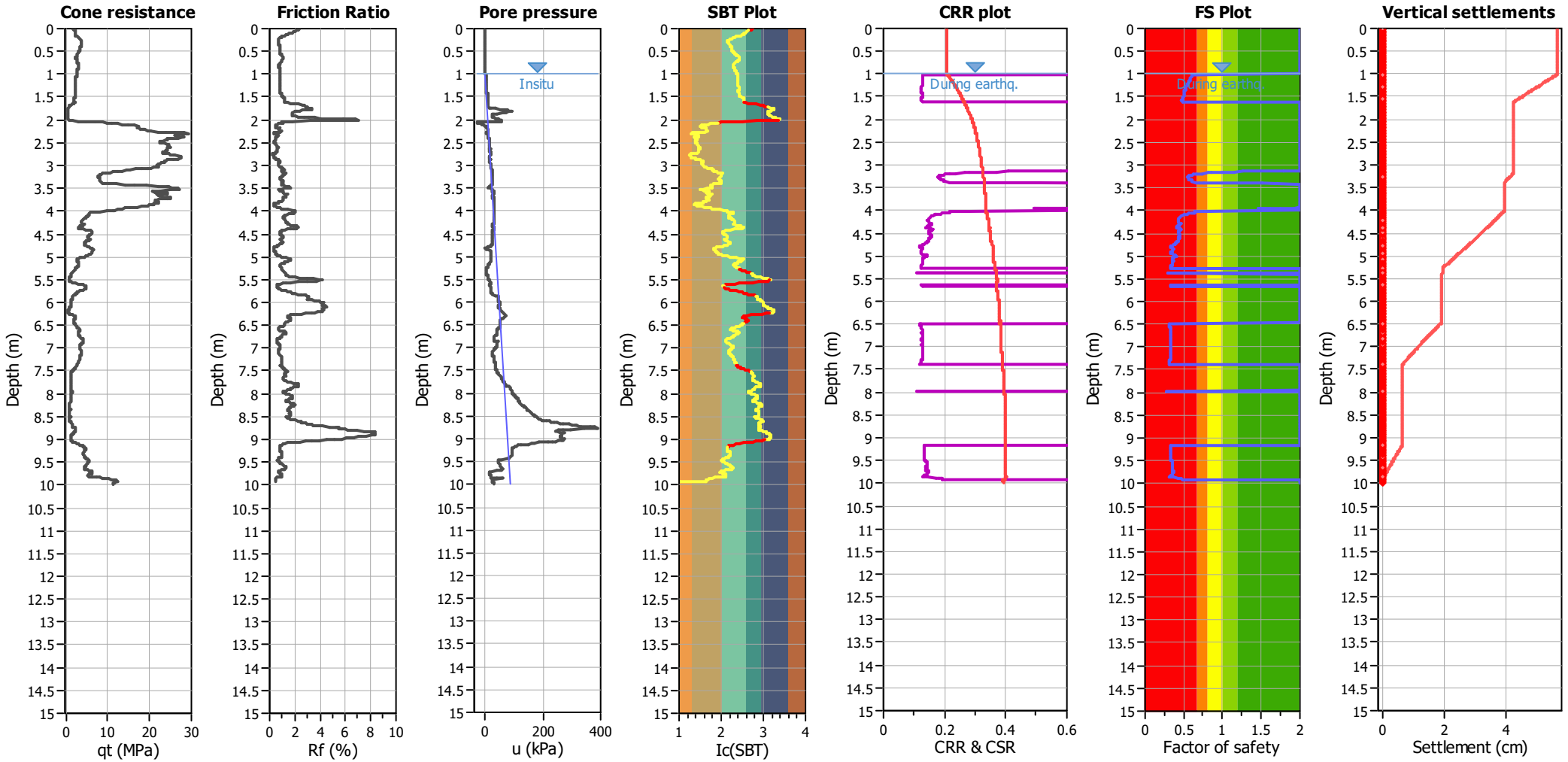
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu011 ULS
Total depth: 9.99 m



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Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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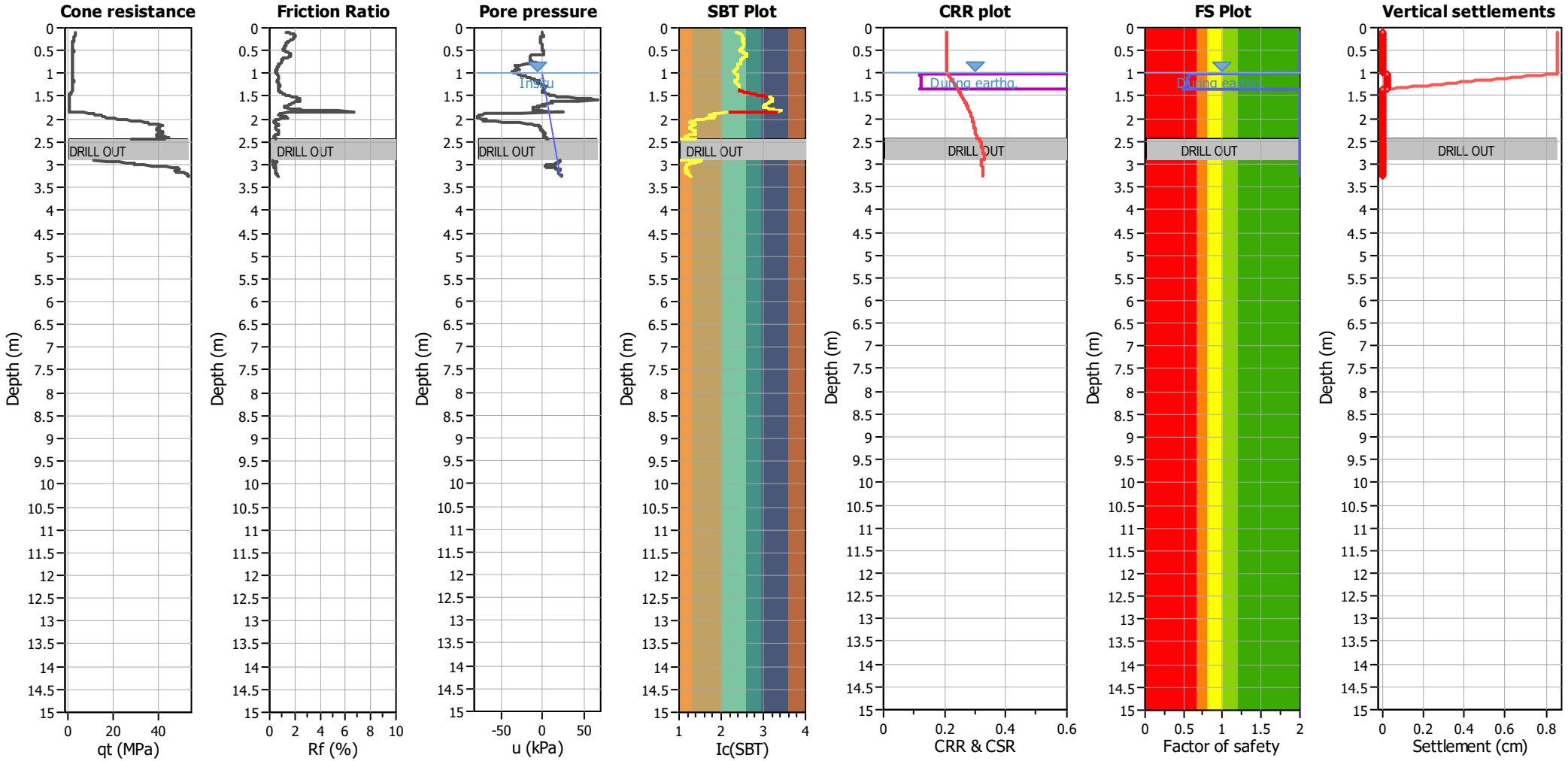
Project: **MINZ200357 - Geotechnical Investigation and Assessment**
Location: **2 Glovers Road Subdivision, Halswell, Christchurch**

CPT: CPTu012 ULS
Total depth: 3.25 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.35	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

1 : 800 on A4

18/06/2021 10:43:50 AM

Christchurch City Council

ph: 941-8300 fax: 941-8385

Accuracy not guaranteed. Onsite verification required. Display of data scale dependent, full detail available at 1:500.

Private Drainage

Standard Infrastructure
- Bio Gas
- Condensate Trap
- End Cap
- Inlet
- Outlet
- Valve
- Main
- Cable

Water Intake/Supply
- Connector
- Bellows
- Connector
- Hydrant

Water Intake/Supply
- Inlet
- Meter
- Outlet
- Pump
- Restrictor
- Valve
- Air Release
- Butterfly
- Flow restriction
- Gate
- Pressure Activated
- Sluice
- Valve
- Reservoir
- Structure
- Lateral
- Main
- Sub Main

Wastewater
- End Cap
- Valve
- Air Gap Separator
- Vent
- Eye
- Eye (Vertical)
- Outfall
- Pump
- Junction
- Access
- Flush Manhole
- Inspection Point
- Standard Manhole
- Trap
- Vented Manhole
- Lateral
- Main
- Pressure Main

Wastewater
- Lateral Fitting

Local Pressure
- CP Control Panel
- BK Boundary Kit
- T Tank System
- Site
- V Vacuum Chamber
- BU Vacuum Breather

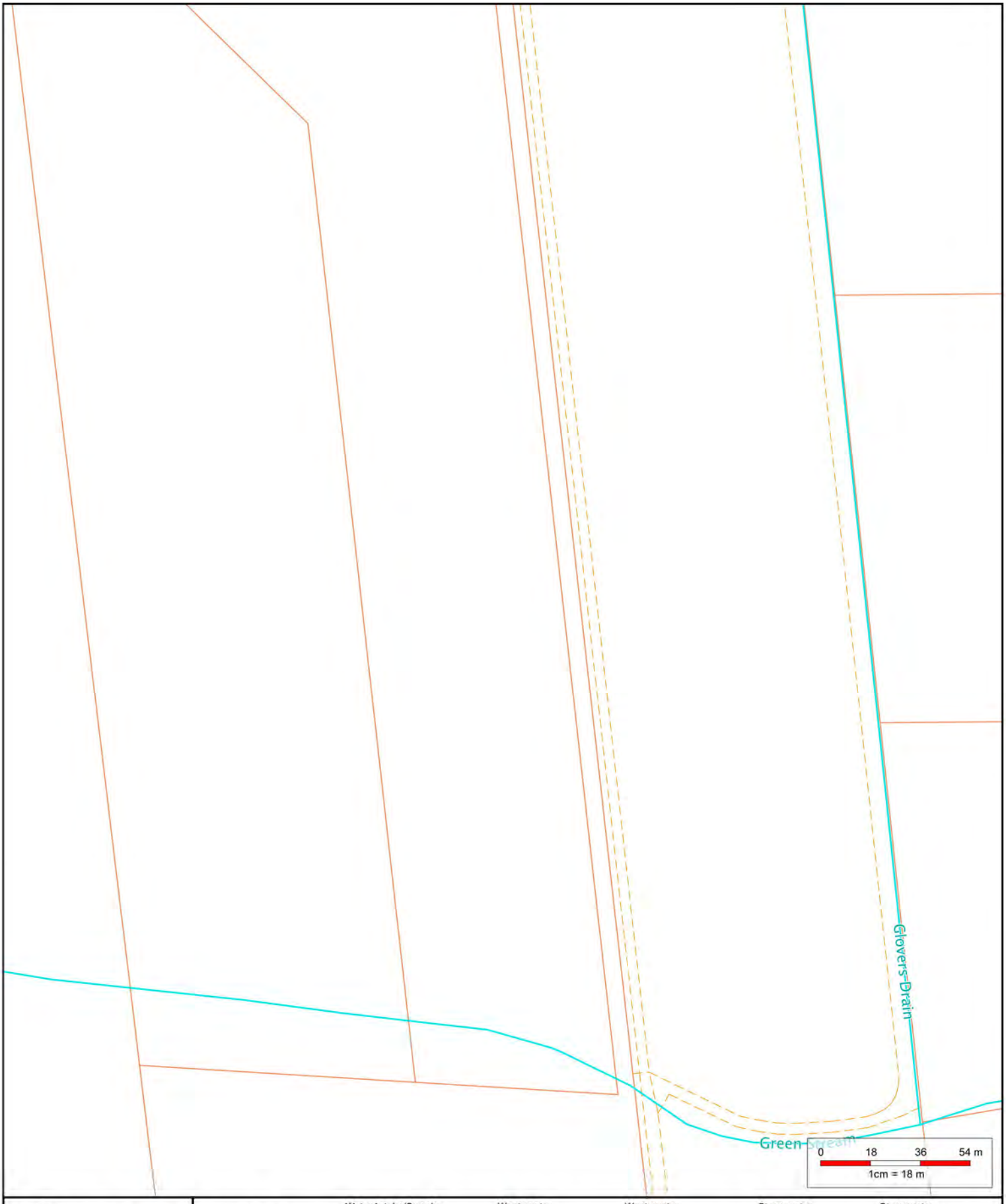
Stormwater
- Bend
- Change
- Eye
- Flow Restriction
- Inlet
- Dome Sump
- Double Sump
- Gross Debris Trap

Stormwater
- Inlet
- Inlet
- Inlet Headwall
- Pipe End
- Silt Trap
- Single Sump
- Soak Pit
- Triple Sump
- Junction
- Standard Manhole
- Outlet
- Pump
- Structure
- Basin
- Lateral
- Main
- Lateral Fitting
- Double Sump

Stormwater
- Lateral Fitting
- Single Sump
- Soak Pit
- Inspection point
- Manhole

All services
- Pipe Protection
- —a— Abandoned
- —p— Proposed
- —os— Out of service

Landbase
- Easement



1 : 1,800 on A4

18/06/2021 10:45:41 AM

Christchurch City Council

ph: 941-8300 fax: 941-8385

Accuracy not guaranteed. Onsite verification required. Display of data scale dependent, full detail available at 1:500.

Private Drainage

Standard Infrastructure
- Bio Gas
- Condensate Trap
- End Cap
- Inlet
- Outlet
- Valve
- Main
- Cable

Water Intake/Supply
- Connector
- Bellows
- Connector
- Hydrant

Water Intake/Supply
- Inlet
- Meter
- Outlet
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- Valve
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- Butterfly
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- Pressure Activated
- Sluice
- Valve
- Reservoir
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- Sub Main

Wastewater
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- Valve
- Air Gap Separator
- Vent
- Eye
- Eye (Vertical)
- Outfall
- Pump
- Junction
- Access
- Flush Manhole
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- Standard Manhole
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- Vented Manhole
- Lateral
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- Pressure Main

Wastewater
- Lateral Fitting

Local Pressure
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Stormwater
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- Single Sump
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- Triple Sump
- Junction
- Standard Manhole
- Outlet
- Pump
- Structure
- Basin
- Lateral
- Main
- Lateral Fitting
- Double Sump

Stormwater
- Lateral Fitting
- Single Sump
- Soak Pit
- Inspection point
- Manhole

All services
- Pipe Protection
- —a— Abandoned
- —p— Proposed
- —os— Out of service

Landbase
- Easement

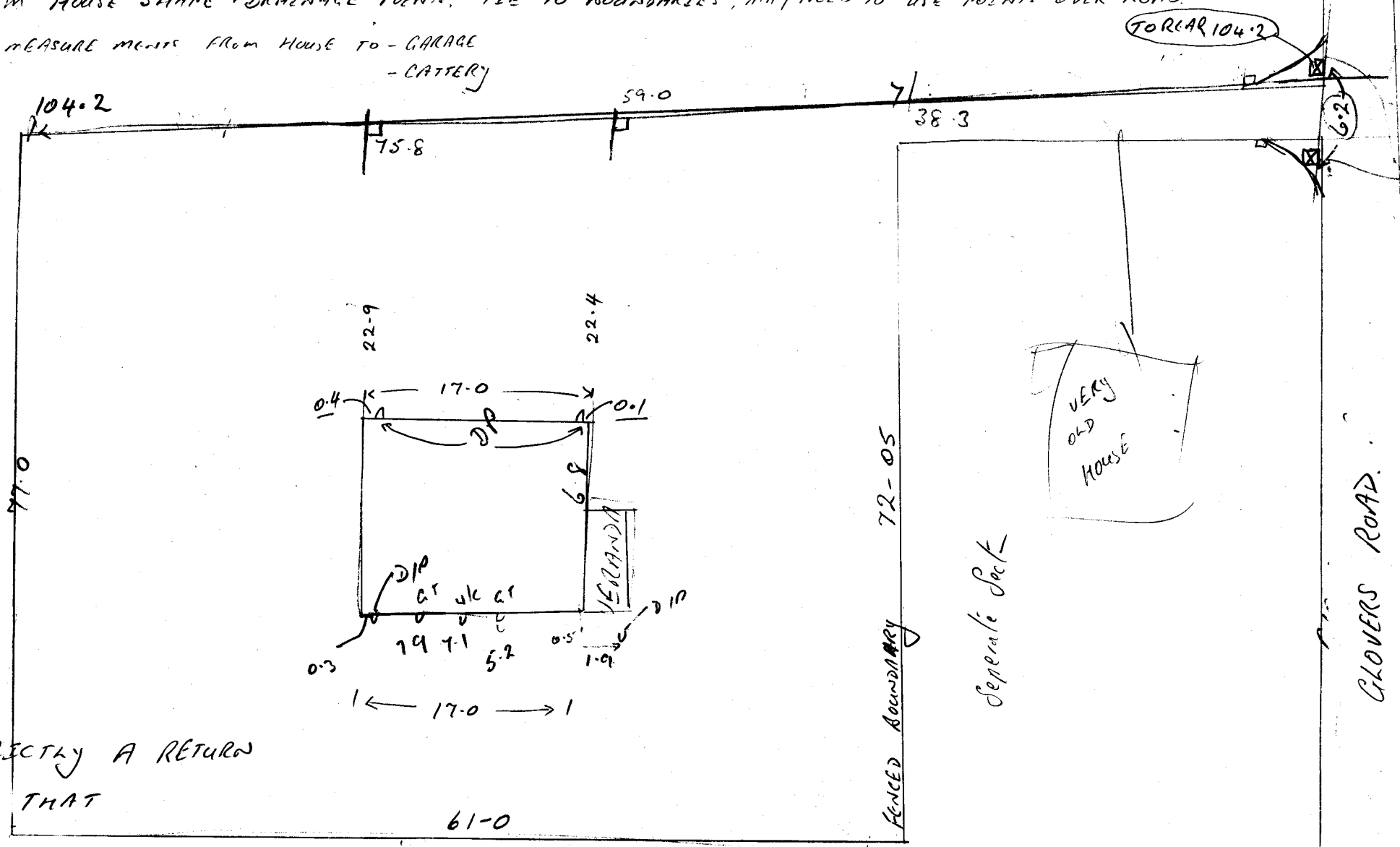
CHRISTCHURCH CITY COUNCIL – DRAINAGE PICK UP

KEN

CHRISTCHURCH
THE GARDEN CITY
The city that shines

ADDRESS: ~~2~~ 4 GLOVERS ROAD	OWNER: CATTERY	RECEIVED:	CONNECTION NUMBER
LEGAL DESCRIPTION:	DRAINLAYER:	BLOCK PLAN:	
PROJECT No.:	PLUMBER:	PLOTTED: / /	
DATE: 3/4/95	FIELD OFFICER:	EYE BOOK:	

- CONFIRM HOUSE SHAPE & DRAINAGE POINTS. TIE TO BOUNDARIES, MAY NEED TO USE POINTS OVER ROAD.
- CHECK MEASUREMENTS FROM HOUSE TO – GARAGE
– CATTERY



NOT STRICTLY A RETURN
JUST THAT

THIS PROPERTY IS OUTSIDE THE AREA COVERED BY OUR BLOCK PLANS

PHONE 898-701 IR.

W. G. GULLEFORD

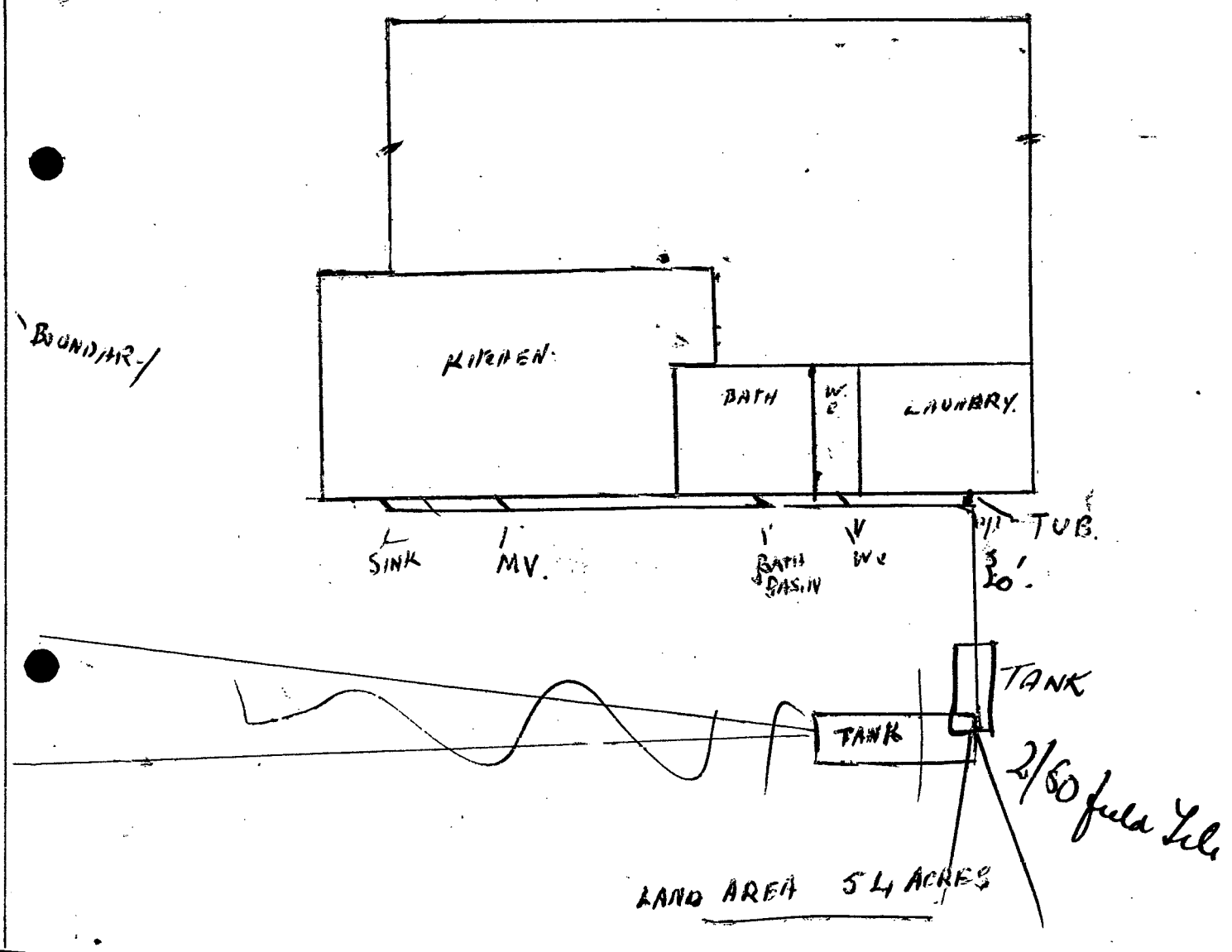
BUILDING CONTRACTOR

448 HALSWELL Rd.
~~63A JERROLD STREET~~,
CHRISTCHURCH
S. W. 1.

HALSWELL RD.

CLOVERS RD.

for. R CAESAR ESQ



Your guide to the pressure wastewater system

For alarms call

Christchurch City Council

(03) 941 8999

Rev 3 - Updated 21/08/2014

If the alarm sounds

1. The alarm noise can be turned off by pressing the button underneath the alarm panel. The alarm light on the panel will remain on.

   If your pressure wastewater system has had a short term build up of wastewater then the system will automatically clean itself and the alarm light will go out.

2. If the alarm light is still on after one hour (1 hr) then call the Christchurch City Council on (03) 941 8999. The Council number is also on the alarm panel.

3. The Council call centre operator will ask you a series of questions to help determine the urgency and nature of any repairs that may be required.

4. The Council call centre operator will ask for your name and contact number so that the maintenance contractor can call you regarding any repairs.

5. The system has a 24hr emergency storage capacity. However, while waiting for any repairs you should try to minimise the amount of wastewater going through the system.

6. If the alarm sounded because of a short term build up of wastewater and then cleared you should consider what might have made this happen (for example flushing inappropriate items) and avoid this happening again.

7. If you notice any irregularity with the system (for example the alarm sounding often), contact the Christchurch City Council on (03) 941 8999.

Press the button located under the alarm panel. This will turn off the sound but the light will remain on.

↓

Wait an hour and then check to see if the light on the alarm panel is still on.

↓

If the light on the alarm panel is no longer lit then no further action is required.

↓

If the light on the alarm panel is still on then call the Christchurch City Council on (03) 941 8999.

↓

The call centre operator will ask for your address, name and contact number.

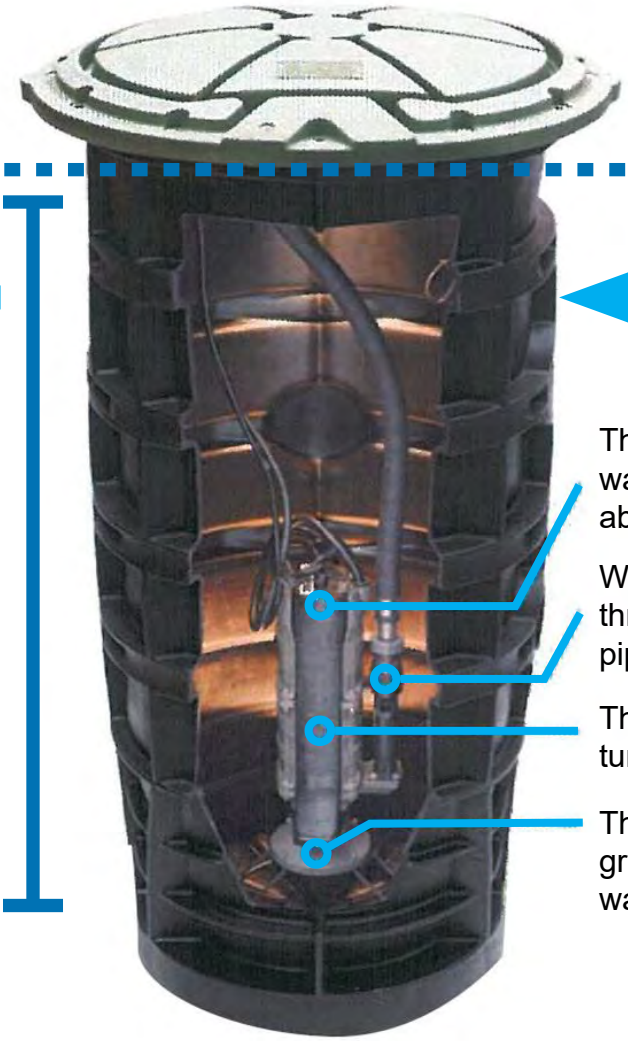
The pressure wastewater system

The wastewater system for this property is a pressure wastewater system.

A pressure wastewater system includes an individual pump and tank. The pump is located within the tank. The tank is located underground and you will only see the lid at the surface. Wastewater from your house flows through a pipe (a private lateral) to the tank. The tank then pumps the wastewater to the pipes in the street. From the street the wastewater goes to the wastewater treatment plant.

The pressure wastewater system is very reliable and robust. There is very little you need to do and very little that can go wrong.

The pressure wastewater system



Using the system

There are a few things you need to know to ensure that the pressure wastewater system runs smoothly. The system operates like a normal wastewater system. It takes wastewater from your toilet, sink, shower, bath, dishwasher, and washing machine and transfers it to the wastewater pipes in the street, and onto the wastewater treatment plant.

To avoid blockages and damage to the pressure wastewater system there are a number of items that should not be disposed of via the system.

The following items should not be flushed down the toilet or sink:

- **glass**
- **metal**
- **gravel or sand, including stone from fish tanks**
- **seafood shells**
- **socks, rags, clothes**
- **plastic**
- **nappies, sanitary napkins, tampons, 'wet' wipes**
- **kitty litter**
- **explosives**
- **flammable materials**
- **lubricating oil and grease**
- **strong chemicals**
- **petol, diesel**
- **stormwater runoff**

Before you go on holiday

Before you go on holiday, even if it is just for a few days, you should flush the pressure wastewater system before you go. This is to avoid the possibility of the system becoming smelly while you are away. **To flush the system simply run a tap in the kitchen or bathroom sink for about five minutes before you go.**

Taking care of the system

- Do not flush any inappropriate items through the system.
- Do not put heavy weights on the lid of the tank. The lid can be walked on, but this should be avoided.
- Do not touch the valves in the boundary kit.
- Do not turn off the power to the pump unless evacuating in an emergency or if there is a broken wastewater pipe.
- Do not cover the unit in any way. This includes covering it with dirt, garden mulch, or concrete.
- Ensure access to the unit is available at all times.
- If you are going on holiday, even for just a few days, you should flush the system before you go. Simply run clean water down your kitchen or bathroom sink for five minutes (5 mins).
- If you do accidentally break a pipe under the ground contact the Christchurch City Council on (03) 941 8999 immediately and tell them what happened. While waiting for the pipe to be repaired minimise the amount of wastewater going through the system.
- Contact the Christchurch City Council on (03) 941 8999 if you install a swimming or spa pool.
- Contact the Christchurch City Council on (03) 941 8999 if you are making any modifications to your home which may affect the system (for example a house addition).
- Do not attempt to repair the system yourself. Always call the Christchurch City Council on (03) 941 8999.

Trouble shooting

What happens if...

1. The system is damaged and needs repair?

The alarm will go off. Follow the alarm procedure on page 2.

2. You notice a bad smell around the tank

When operating normally there should be no noticeable odours coming from the unit. If it is smelly, the unit may just need flushing. Just run clean water down your kitchen or bathroom sink for about five minutes. If the unit remains smelly contact the Christchurch City Council on (03) 941 8999.

3. You notice wet spots around the unit or wastewater pipes

The pumping unit and pipes are sealed. If you notice wet spots and there hasn't been any recent heavy rain contact the Christchurch City Council on (03) 941 8999.

4. The alarm keeps going off when it rains

This means that rainwater may be getting into the system and overloading it. Contact the Christchurch City Council on (03) 941 8999.

5. The neighbours alarm goes and they are away

Do not investigate yourself. Contact the Christchurch City Council on (03) 941 8999.

6. There is a power failure

If there is a power failure the pump will not run. The tank has 24 hours of emergency storage so minimise the amount of wastewater going through the system. When the power comes on again the system will reset itself.

7. There is a flood

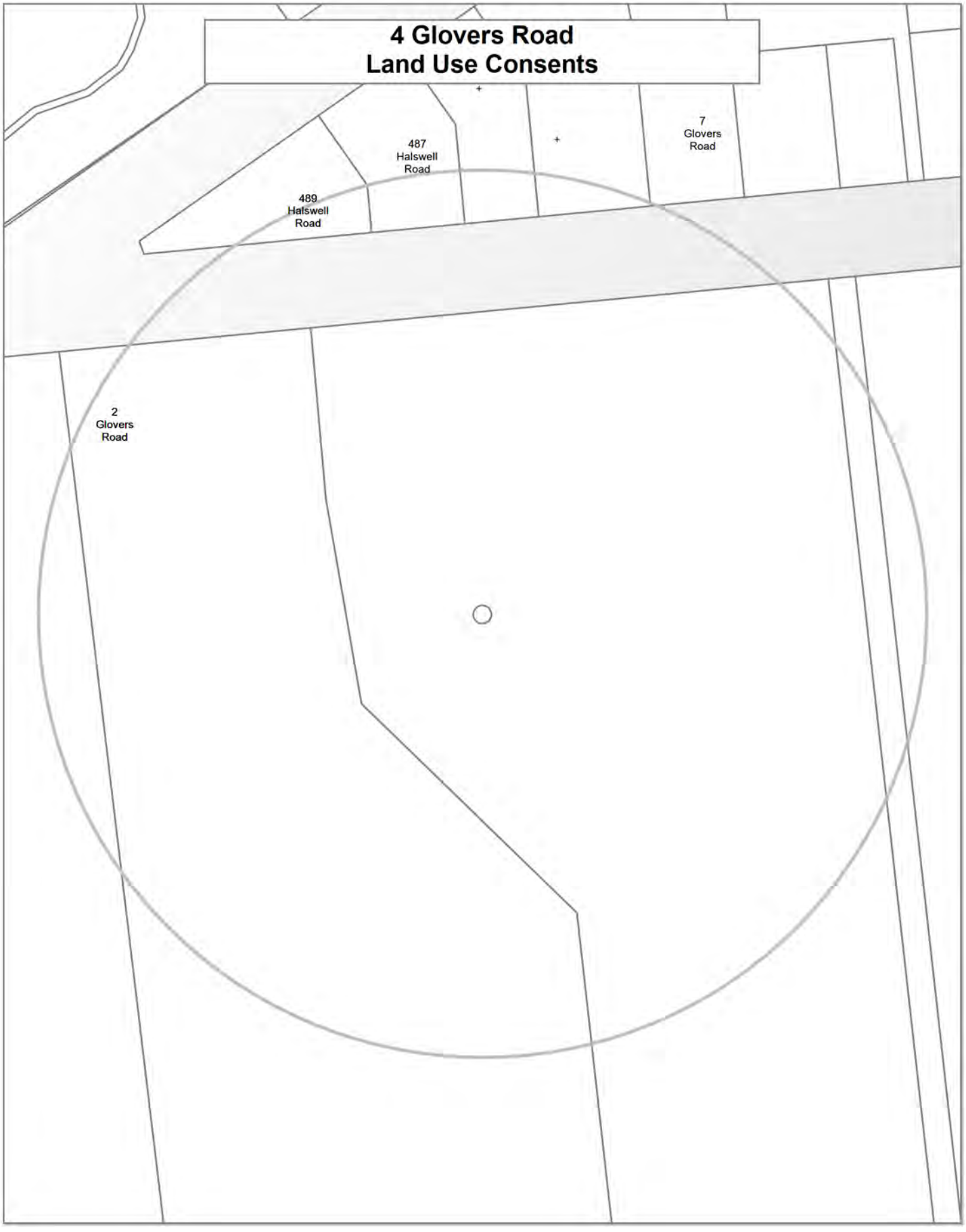
If you can safely stay in your home in a flood then simply minimise the amount of wastewater going through the system.

8. You need to evacuate due to an emergency (such as an earthquake)

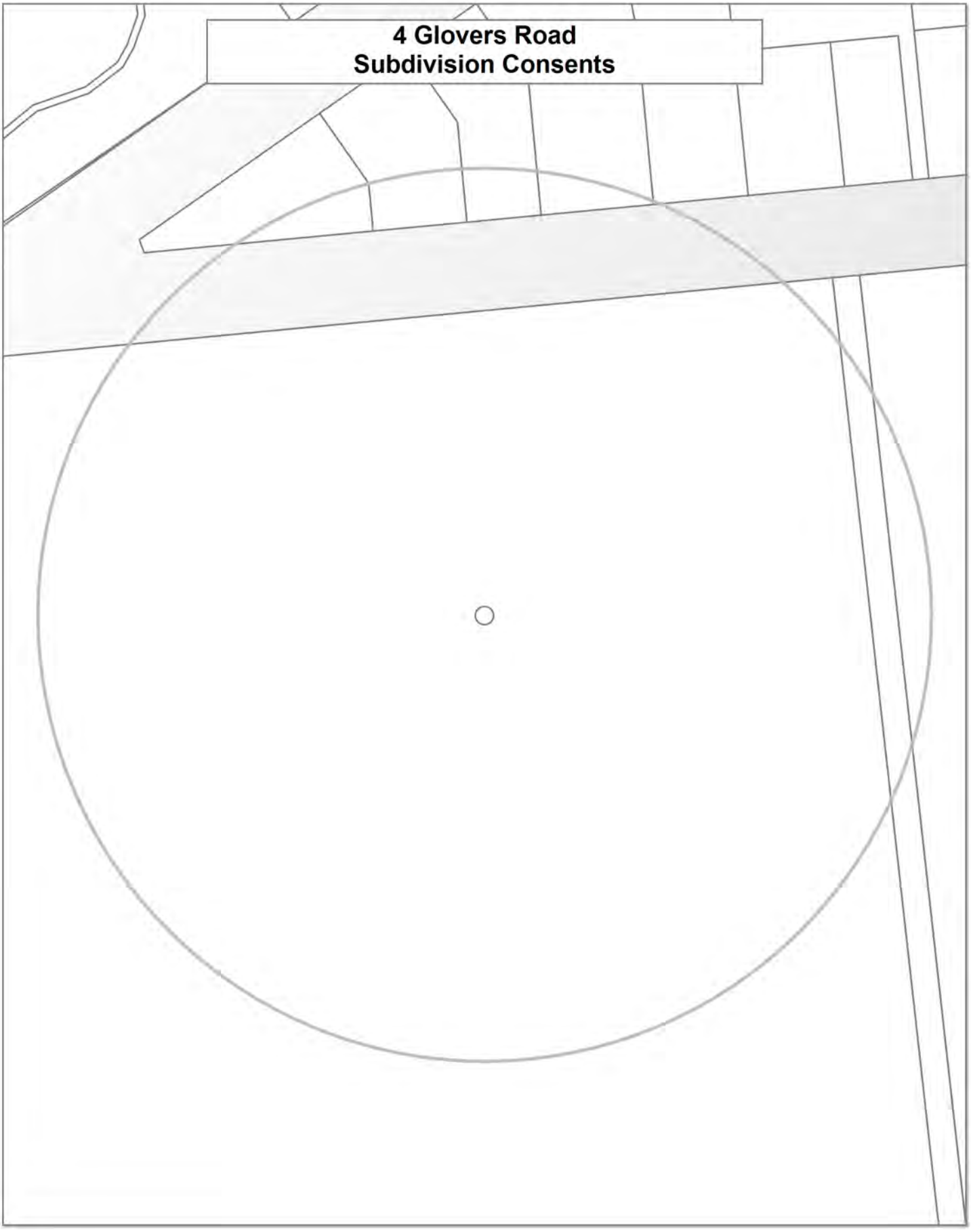
If you can, flush out the system by running water down your kitchen or bathroom sink for about five minutes. Turn off the power to the pump. The on/off switch is located by the alarm panel.

Spatial Query Report

Christchurch City Council



Christchurch City Council



Spatial Query Report

Land Use Resource Consents within 100 metres of 4 Glovers Road

Note:This list does not include subdivision Consents and Certificates of Compliance issued under the Resource Management Act.

10 Glovers Road

RMA/2002/1305

Application to erect a new implement shed - Historical Reference RMA20010309

Processing complete

Applied 06/06/2002

Decision issued 03/07/2002

Granted 02/07/2002

2 Glovers Road

RMA/1974/419

To permit a subdivision less than the area permitted under the District planning scheme. - Historical Reference RES955313

Processing complete

Applied 21/10/1974

Decision issued 21/10/1974

Granted 21/10/1974

RMA/1989/257

4.6m side yard instead of the required 10m - Historical Reference RES9206551

Processing complete

Applied 17/08/1989

Decision issued 23/08/1989

Granted 23/08/1989

RMA/1993/1160

The erection of a boarding cattery in the rural 2 zone at Glovers Road. - Historical Reference RES94101932

Processing complete

Applied 12/03/1993

Decision issued 19/05/1993

Granted 19/05/1993

RMA/1998/1327

Application for a temporary additional rural dwelling a proposed dwelling is to be constructed which is to replace an existing cottage on - Historical Reference RES981500

Processing complete

Applied 08/06/1998

Decision issued 17/07/1998

Granted 17/07/1998

RMA/1998/1529

Application for a dwelling addition which intrudes the 10m setback in terms of both the Proposed and Transitional Plans. - Historical Reference RES981736

Processing complete

Applied 01/07/1998

Decision issued 08/07/1998

Granted 08/07/1998

RMA/1999/2499

Application to subdivide a 5261m2 allotment, including an existing dwelling, garage and cattery, from a 12.3192 ha property. - Historical Reference RES991246

Processing complete

Applied 30/04/1999

Decision issued 09/09/1999

Declined 09/09/1999

RMA/2020/2557

Remediation of contaminated soils

Processing complete

Applied 06/11/2020

Decision issued 09/12/2020

Granted 09/12/2020

RMA/2020/2770

To conduct earthworks and stockpiling on site

Processing complete

Applied 27/11/2020

Decision issued 27/01/2021

Granted 27/01/2021

RMA/2020/3076

To subdivide 4 allotments to create 87 residential allotments. Land use consent for earthworks and under the NES for contaminated land.

On hold - waiting for response from applicant

Applied 22/12/2020

26 Glovers Road

RMA/2004/670

To subdivide a site into 2 allotments of 6.4489ha and 1 .3460ha and to retain an existing dwelling on the small er allotment. - Historical Reference RMA20016252

Processing complete

Applied 04/03/2004

Decision issued 11/10/2004

Granted 07/10/2004

RMA/2012/543

ESTABLISH AND UTILISE A RESIDENTIAL UNIT AND ACCESSORY BUILDINGS FOR 252 LOTS ASSOCIATED TO A SUBDIVISION SUB - RMA92019884 - Historical Reference RMA92019883

On hold - waiting for response from applicant

Applied 17/04/2012

RMA/2021/1513

Global consent for earthworks within 5 metres of a street tree

Processing

Applied 25/05/2021

RMA/2021/199

Fee simple subdivision - 207 lots, eight roads, recreation reserve and three local purpose reserves and associated land use.

On hold - processing suspended by applicant

Applied 02/02/2021

487 Halswell Road

RMA/1994/527

Consent to erect a garage over 40m2 in the front yard, and to erect a studio in the front yard. - Historical Reference RES94001092

Processing complete

Applied 30/06/1994

Decision issued 25/07/1994

Granted 25/07/1994

489 Halswell Road

RMA/1995/2290

Application for reduced setback for garage - Historical Reference RES953485

Processing complete

Applied 16/08/1995

Decision issued 07/09/1995

Granted 07/09/1995

RMA/2001/351

Appication for a garage addition to be attached to the existing dwelling with non compliances with street setback; length of wall and queuing space - Historical Reference RMA20004203

Processing complete

Applied 09/02/2001

Decision issued 01/03/2001

Granted 01/03/2001

511 Halswell Road

RMA/2020/163

Earthworks for residential development

Processing complete

Applied 29/01/2020

Decision issued 10/02/2020

Granted 10/02/2020

RMA/2020/2770

To conduct earthworks and stockpiling on site

Processing complete

Applied 27/11/2020

Decision issued 27/01/2021

Granted 27/01/2021

RMA/2020/3076

To subdivide 4 allotments to create 87 residential allotments. Land use consent for earthworks and under the NES for contaminated land.

On hold - waiting for response from applicant

Applied 22/12/2020

RMA/2021/733

Earthworks - Associated with the formation of vehicle crossings

Processing complete

Applied 24/03/2021

Decision issued 11/06/2021

Granted 11/06/2021

7 Glovers Road

RMA/1978/147

Extension to dwelling with garage less than 3m from dwelling - Historical Reference RES9206552

Processing complete

Applied 19/12/1978

Decision issued 12/01/1979

Declined 12/01/1979

Data Quality Statement

Land Use Consents

All resource consents are shown for sites that have been labelled with an address. For sites that have been labelled with a cross (+) no resource consents have been found. Sites that have no label have not been checked for resource consents. This will be particularly noticeable on the margins of the search radius. If there are such sites and you would like them included in the check, please ask for the LIM spatial query to be rerun accordingly. This will be done free of charge although there may be a short delay. Resource consents which are on land occupied by roads, railways or rivers are not, and currently cannot be displayed, either on the map or in the list. Resource consents that relate to land that has since been subdivided, will be shown in the list, but not on the map. They will be under the address of the land as it was at the time the resource consent was applied for. Resource consents that are listed as Non-notified and are current, may in fact be notified resource consents that have not yet been through the notification process. If in doubt. Please phone (03)941 8999.

The term “resource consents” in this context means land use consents. Subdivision consents and certificates of compliance are excluded.

Subdivision Consents

All subdivision consents are shown for the sites that have been labelled with consent details. For Sites that have been labelled with a cross (+) no records have been found. Sites that have no label have not been checked for subdivision consents. This will be particularly noticeable on the margins of the search radius. If there are such sites and you would like them included in the check, please ask for the LIM spatial query to be rerun accordingly. This will be done free of charge although there may be a short delay.

The term “subdivision consents” in this context means a resource consent application to subdivide land. Non subdivision land use resource consents and certificates of compliance are excluded.

This report will only record those subdivision applications which have not been completed i.e once a subdivision has been given effect to and the new lots/properties have been established the application which created those lots will not be shown

All subdivision consent information is contained on the map and no separate list is supplied