

Land Information Memorandum



Property address:

17/45 Dickens Street

LIM number: H09378844

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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

Application details

Date issued 11 November 2025
Date received 30 October 2025

Property details

Property address 17/45 Dickens Street, Addington, Christchurch
Valuation roll number 22631 56713
Valuation information Capital Value: \$640,000
Land Value: \$160,000
Improvements Value: \$480,000
Please note: these values are intended for Rating purposes
Legal description Lot 13 DP 578430
Lot 33 DP 578430
Existing owner Martin William Berney
Glenda Anne Berney
17/45 Dickens Street
Christchurch 8024

Council references

Rate account ID 73207121
LIM number H09378844
Property ID 1199062

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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. It is essential that the applicant undertakes their own due diligence to verify the suitability of the property for their intended use.

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 44(A)(2)(aa) LGOIMA. This is information known to the Council but is not apparent from 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 the likely presence of hazardous contaminants.

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

Natural Hazards

Section 44A(2)(a) LGOIMA. This is information known to the Council about natural hazards that is required by section 44B LGOIMA. This section may also include natural hazard information provided by Environment Canterbury. Christchurch City Council is required to include such information in LIMs where Environment Canterbury considers it meets the criteria under section 44C of LGOIMA.

The following statement has been provided by Environment Canterbury:

This Land Information Memorandum includes natural hazard information deemed by Environment Canterbury to be the most up to date, useful, and relevant, and is provided in accordance with the Local Government (Natural Hazard Information in Land Information Memoranda) Regulations 2025. All due care has been taken to ensure current information required to be provided under the regulations is presented below.

Environment Canterbury may hold superseded or less reliable natural hazards information relating to the land that has not been included in this Land Information Memorandum. Please contact Environment Canterbury if you would like to enquire about this information.

(a) Coastal Hazards

As at the date of this LIM, Council research found no information under this heading.

(b) Earthquakes

- Liquefaction Assessment

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.

- Regional Liquefaction Information

Areas where there was evidence of liquefaction were mapped following the 2010/11 Canterbury earthquakes by Tonkin & Taylor for the Earthquake Commission (urban areas) and by a group of researchers for Environment Canterbury (rural, commercial and industrial areas). These are available in the Christchurch Liquefaction Viewer at <https://apps.canterburymaps.govt.nz/ChristchurchLiquefactionViewer/>.

Technical report information:

Title: Review of liquefaction hazard information in eastern Canterbury, including Christchurch City and parts of Selwyn, Waimakariri and Hurunui Districts.

Date: December 2012.

Author: H Brackley (compiler).

Commissioned by: Environment Canterbury.

Purpose of report: To collate liquefaction occurrence during the 2010/11 Canterbury earthquakes, and to determine liquefaction vulnerability. For use in land use planning, subdivision and building consenting.

Study area: Coastal Canterbury from the Waipara River mouth to the Rakaia River mouth, including Banks Peninsula, and inland to Rangiora, Aylesbury, Selwyn and Southbridge.

Accessible at: <https://www.ecan.govt.nz/document/download?uri=1702192>.

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(c) Flooding

- Regional Hazard Information: Flood Photographs
Photographs showing the property during or following past flood events may be available. Flood photographs are available on Environment Canterbury's flood imagery register at <https://apps.canterburymaps.govt.nz/FIR>.
- Regional Hazard Information: Flood Assessment Request
You can request a new site-specific flood hazard assessment for the property from Environment Canterbury at: <https://www.ecan.govt.nz/do-it-online/property-information/flood-hazard-assessments>.

(d) Landslides

As at the date of this LIM, Council research found no information under this heading.

(e) Subsidence

- 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> and search Information for Canterbury Surveyors.

(f) Tsunamis

As at the date of this LIM, Council research found no information under this heading.

(g) Volcanic and Geothermal Hazards

As at the date of this LIM, Council research found no information under this heading.

(h) Wind

As at the date of this LIM, Council research found no information under this heading.

(i) Any Other Natural Hazards

As at the date of this LIM, Council research found no information under this heading.

(j) District Plan Natural Hazard Information

Please refer to *Section 8. Land use and conditions* of this report for District Plan related natural hazard information.

(k) Building Notices

Please refer to *Section 5. Consents, certificates, notices, orders, or requisitions affecting the land and buildings* of this report for Building Act notice information.

Other Special Features or Characteristics of the Land

- Pool
PoolID Number: 934. This property has a Private Above Ground Swimming Pool which has been Removed.

Related Information

- The latest soil investigation report for this property is attached for your information

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.

Related Information

- This property is shown to be served by Christchurch City Council Sewer and Stormwater.
- Attached are all drainage plans that Council hold for details of private and public drainage. Not all plans provided are verified by Council, and therefore Council cannot be liable for inaccuracies. Site investigation will be required by owners to determine exact layouts.

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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 and Wastewater Bylaw (2022), refer to 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 30/06/2026: \$3,934.37

	Instalment Amount	Date Due
Instalment 1	\$983.52	15/08/2025
Instalment 2	\$983.52	15/11/2025
Instalment 3	\$983.52	15/02/2026
Instalment 4	\$983.81	15/05/2026

Rates owing as at 11/11/2025: \$4,313.01

(b) Excess water charges

For excess water charge enquiries, please phone (03) 941 8999 or visit www.ccc.govt.nz/contact-us

(c) Final water meter reading required at settlement?

Property settlements must now ensure all water usage and outstanding debts are accurately accounted for.

To advise of a commercial property settlement, please complete the request for settlement information form at www.ccc.govt.nz/services/rates-and-valuations/solicitors-request

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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.

Sections 71 to 74 of the Building Act 2004 require the Building Consent Authority to consider natural hazards when it receives a building consent application for the construction or major alteration of a building on land that is subject to, or likely to be subject to, a natural hazard. A building consent for this property may have been issued subject to a section 72 or 73 notice. This means at the time of building consent the Building Consent Authority was not satisfied that adequate provision would be made to protect the building and land from the natural hazard and was subsequently required to notify the Registrar-General of Land to record the natural hazard on the Record of Title. The Building Act 2004 defines natural hazards as erosion (including coastal erosion, bank erosion, and sheet erosion), falling debris (including soil, rock, snow, and ice), subsidence, inundation (including flooding, overland flow, storm surge, tidal effects, and ponding), and slippage.

If your property contains a notice under s73 of the Building Act 2004, this will be identified on the building consent decision below (decision under s72 of the Building Act 2004) and on the properties' Record of Title. The Record of Title may also record this as a s36 notice under the Building Act 1991, or a s641A notice under the Local Government Act 1974.

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

(a) Consents

- BCN/1962/4276 Applied: 14/08/1962 Status: Completed
6/45 Dickens Street Addington
Permit granted 28/08/1962
Permit issued 28/08/1962
DWELLING GARAGE- Historical Reference PER62650388- No plans/information held on property file
- BCN/1964/944 Applied: 26/02/1964 Status: Completed
6/45 Dickens Street Addington
Permit granted 30/04/1964
Permit issued 30/04/1964
SWIMMING POOL- Historical Reference PER64670653- No plans/information held on property file
- BCN/1964/1226 Applied: 10/03/1964 Status: Completed
4/43 Dickens Street Addington
Permit issued 19/03/1964
STUCCO- Historical Reference PER63640845 - No plans/additional information held on property file
- BCN/1968/4737 Applied: 30/09/1968 Status: Completed
1/43 Dickens Street Addington
Permit issued 14/10/1968
STUCCO DWELLING- Historical Reference PER68690739
- BCN/1973/1591 Applied: 16/03/1973 Status: Completed
4/43 Dickens Street Addington
Permit issued 23/03/1973
SHED- Historical Reference PER72300327

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- BCN/1975/2422 Applied: 06/05/1975 Status: Completed
1/43 Dickens Street Addington
Permit issued 13/05/1975
GARAGE- Historical Reference PER75760831
- BCN/1990/2600 Applied: 10/04/1990 Status: Completed
6/45 Dickens Street Addington
Permit granted 30/04/1990
Permit issued 30/04/1990
SPACEHEATER - WOODSMAN ASHLEY- Historical Reference PER90095206
- BCN/1996/4745 Applied: 11/06/1996 Status: Completed
4/43 Dickens Street Addington
Accepted for processing 11/06/1996
Building consent granted 19/06/1996
Building consent issued 25/06/1996
Code Compliance Certificate Granted 09/05/1997
Code Compliance Certificate Issued 09/05/1997
Garage outbuildings/ garage- Historical Reference CON96005201
- BCN/2005/10252 Applied: 15/12/2005 Status: Completed
6/45 Dickens Street Addington
Accepted for processing 15/12/2005
Building consent granted 15/12/2005
Building consent issued 15/12/2005
PIM Granted 15/12/2005
PIM Issued 15/12/2005
Code Compliance Certificate Granted 11/04/2006
Code Compliance Certificate Issued 11/04/2006
NATURES FLAME SOLID FUEL HEATER EF2 INBUILT CLEAN AIR CERT.NO.04008- Historical Reference ABA10061742
- BCN/2021/8878 Applied: 27/10/2021 Status: Completed
1/9 Grove Road Addington
Accepted for processing 03/11/2021
PIM Granted 19/11/2021
PIM Issued 24/11/2021
Construction of 34 units
- BCN/2021/10280 Applied: 14/12/2021 Status: Completed
1/9 Grove Road Addington
Accepted for processing 20/12/2021
Building consent granted 14/03/2022
Building consent granted s77 Building Act 2004 14/03/2022
Building consent issued 16/03/2022
Code Compliance Certificate Issued 24/07/2023
Construction of 32 attached dwellings in 4 blocks subject to section 77 certificate

(b) Certificates

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

(c) Notices

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(d) Orders

(e) Requisitions

Related Information

- Please find an electrical certificate/s attached relating to works that have been carried out on the current building/dwelling at this address.

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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 may be 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).

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

(ii) Christchurch District Plan

- **Christchurch International Airport Protection Sfc.**

Property or part of property within the Christchurch International Airport Protection Surfaces overlay, which is operative.

- **Liquefaction Management Area (LMA)**

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

- **District Plan Zone**

Property or part of property within the Medium density residential 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/2022/1074 - Subdivision Consent**
Subdivision - Fee simple - 32 lots with associated land use
Status: Processing complete
Applied 07/04/2022
s223 Certificate issued 16/09/2022
s224 Certificate issued 19/04/2023
s224 Certificate issued 19/04/2023
Granted 25/05/2022
Decision issued 25/05/2022

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- RMA/2021/2811 - Land Use Consent
43 Dickens Street Addington
Establish multi-unit residential complex comprised of 33 residential units
Status: Processing complete
Applied 27/08/2021
24/12/2021
Granted 24/12/2021
Decision issued 24/12/2021

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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.

- **None recorded for this property**

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

(b) Other

• Floor Levels Information

Council holds a variety of information on requirements for building or property development. This includes:

- required minimum finished floor levels, which 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 property, you can view it online at <https://ccc.govt.nz/flooding-and-floor-levels>.

Otherwise, if you are building or developing on this land, you can request a calculation on required finished floor levels for your proposed building by emailing us at floorlevels@ccc.govt.nz.

• 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/>.

• Community Board

Property located in Spreydon-Cashmere-Heathcote Community Board.

• 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-evacuation-zones-and-routes/>

• Electoral Ward

Property located in Spreydon Electoral Ward

• Listed Land Use Register

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

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- **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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**Multi-Unit Development at 69 Poulson Street,45
Dickens Street & 9 Grove Road Addington,
Christchurch**

Geotechnical Report

Revision: 2

Date:

07 December 2021

DOCUMENT CONTROL

Project Reference	21139	
Project Name	Multi-Unit Development at 69 Poulson Street, 45 Dickens Street & 9 Grove Road Addington, Christchurch	
Revision	2	
Prepared For	Citrus Living Limited	
Prepared By		Callum Nish B.E. Hons (Civil), Graduate Engineer
Reviewed By		Steven Roberts CPEng (Geotechnical), CMEngNZ, IntPE(NZ)
Limitations	<i>This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in accordance with the agreement between the Client and Tetrad Consulting Ltd. Tetrad Consulting Limited Ltd accepts no liability or responsibility whatsoever for any use of or reliance upon this report by any third party. Any copying of this report to external parties requires the permission of the Client and Tetrad Consulting Limited.</i>	

Report Distribution:		
Recipient	Release Date	Document Type
Marcus Stufkens	07 December 2021	PDF



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Executive Summary

Geotechnical information sourced from the New Zealand Geotechnical Database, show the site has performed reasonably well during the 2010 to 2011 Canterbury earthquake sequence, with negligible ground surface damage recorded from EQC observations after the February 2011 event.

The geotechnical investigation completed at the site comprised eight CPT, four hand auger and Scala penetrometer tests which returned an inferred subsurface soil profile of silt and sands to 1.6 – 3.0 m depth, overlying dense gravels and dense sands to 6.4 m before transitioning to medium dense sands to approximately 7.0 - 8.0 m depth underlain by weak silts and clays to at least 10 m depth. The silt and sand deposits below the water table are susceptible to liquefaction-induced settlement with settlement up to 25 mm predicted for 25-year (SLS1) event increasing to 60 mm for a 500-year (ULS) event.

Minor ground surface damage can be expected over the developed site area as supported by the property specific observations and low LPI values of CPT01 and CPT02 as discussed in Section 4.4 of this report. This suggests relatively small differential settlements can be expected during a SLS1 and SLS2 event.

Accordingly, an Option 4 waffle slab foundation system on a specifically designed reinforced gravel raft is required for each unit block as discussed in Section 9.2 of this report. The foundation system is required to meet the performance objectives of the MBIE guidelines, which requires the foundation to provide enough stiffness to support the imposed building weight under a 2m loss of edge ground support and 4 m loss of internal ground support.

During a 500-year earthquake event, the foundation system is expected to be sufficiently stiff to prevent irreparable damage to the building units.



1 Introduction

Tetrad Consulting Ltd has been engaged by Citrus Living Ltd to undertake a geotechnical investigation at the combined site of 69 Poulson Street, 45 Dickens Street & 9 Grove Road in Addington for a multi-unit residential development.

This report presents the results of a geotechnical investigation to characterize the subsurface soil profile and strength properties for foundation design and discussion of the following:

- Quantify liquefaction susceptibility for a design basis seismic event.
- Confirmation of Ministry of Business, Innovation and Employment land classification for the site.
- Provide foundation recommendations for the proposed development.

The scope of this geotechnical report does not include commentary on site-specific environmental issues, which is beyond the scope of our geotechnical engagement.

Site Description

The setting is a flat combined site located between Dickens street, Poulson street and Grove Road with a total land area of about 4595 m² with a planned building footprint of 1275 m². Four blocks of units and one solitary unit (unit 34) are to be constructed.

The site is currently developed by several single storey dwellings with detached garages.



Figure 1: Approximate location of combined subject site between Dickens street, Poulson street and Grove Road

2 Ground Investigation

2.1 Previous Geotechnical Investigation

Nearby testing in the form of several nearby Cone penetrometer tests (CPT's) were found using the New Zealand geotechnical Database (NZGD).

Nearby CPT's showed shallow refusal in dense sands or gravels from 2 - 5 m depth. CPT73077, 5 m north of the subject site, showed shallow refusal at 2 m depth. CPT28895, 170 m southeast of the site showed refusal at 2.1 m depth. CPT1020 which was 100 m northeast showed CPT refusal at 5 m depth. Therefore, it can be inferred that the area has a consistent profile of shallow soils underlain by a dense gravel layer. HA90262, 125 m southeast showed a ground water table at approximately 2.2 m depth.

2.2 Geotechnical Investigation

Deep ground testing was carried out on the 30th of November 2021 by McMillan Drilling Ltd and comprised three Cone Penetrometer, 3 Scala penetrometer and 3 hand auger Tests. The CPT's were pushed to a target depth of 10 m complete with excess pore pressure measurement. The CPT, Scala penetrometer and hand auger test locations and results are shown in Appendix A and summarized in Table 1 below.

Table 1: Summary of CPT investigation

Test type	Depth of test (m)	Comments
CPT01 / DPSH01	10.0 m	DPSH test between 3.3 and 7.4 m
CPT02 / DPSH02	10.0 m	DPSH test between 2.5 and 6.4 m
CPT03 / DPSH03	10.0 m	DPSH test from 3.1 m
CPT04 / DPSH04	10.0 m	DPSH test from 1.7 m
CPT05 / DPSH05	10.0 m	DPSH test from 1.7 m
CPT06 / DPSH06	10.0 m	DPSH test from 2.1 m
CPT07 / DPSH07	10.0 m	DPSH test from 2.7 m
CPT08 / DPSH08	10.0 m	DPSH test from 1.9 m
SP01	2.0 m	Target depth
SP02	1.5 m	Effective refusal
SP03	2.0 m	Target depth
SP04	1.9 m	Effective refusal
HA01	1.50 m	Effective refusal
HA02	1.40 m	Effective refusal
HA03	1.65 m	Effective refusal
HA04	1.65 m	Effective refusal

3 Subsurface Conditions

3.1 Geology

A geological map of the area (Brown and Weeber, 1992) shows the site area as underlain with soils of the Springston Formation comprising alluvial sand and silt over bank deposits and alluvial gravels to approximately 15 m depth. This is underlain by the Riccarton gravels to 20 m depth.

3.1.1 From hand auger/Scala tests

Four site specific hand auger and Scala penetrometer tests were performed across the combined site.

The shallow soil profile observed by Hand auger tests is shown below:

- TOPSOIL to 0.4 m
- Silty SAND to 0.95 m
- SAND to 1.5 – 1.7 m

HA01, HA02 and HA04 inferred sand/silty sand to 1.50 - 1.70 m depth, while HA03 showed silt to 0.95 m depth underlain by sand to 1.65 m depth.

Scala penetrometer blow counts ranging from 1.5 – 3.5 blows per 100 mm were returned to 1.2 m depth where blow counts increased to 4 – 13 blows to 1.9 m depth. From 0.60 m depth, averaged blow counts consistently above 3 blows / 100 mm penetration were returned and from 1.2 m depth averaged blow counts above 4 blows/100mm were inferred.

3.1.2 From Cone Penetrometer Tests

The CPT's returned an inferred subsurface soil profile comprising sandy silt to silty sand to 1.3 – 1.7 m depth, underlain by sand to refusal in inferred gravels/dense sands. This correlated reasonably well with the profile of silt to 0.4 – 0.95 m underlain by silty sand and sand to 1.5 – 1.7 m from hand auger tests.

It can be seen from Figure 2 that from 1.3 – 1.7 m depth, the qc values range from 1.5 – 4.0 MPa. This translates to silty sand to sandy silt. Past this depth, the profile generally becomes abruptly denser with values increasing to beyond 40 MPa, implying refusal in gravel/ dense sand material.

CPT01, CPT02, CPT03 and CPT07 each briefly encounter a dense layer and then have interbedded weak layers until refusal is finally met at 2.5 – 3.0 m depth, implying a deeper gravel layer after some interbedded gravel and medium dense sands. These results show the gravel/dense sand layer lies at a greater depth relative to the rest of the site, from the east to the centre of the proposed development's combined site stretching from 9 Grove Road, through the middle of 69 Poulson Street and to the northeast end of 43 and 45 Dickens Street. This gravel/dense sand layer lies deeper relative to the rest of the combined site, at between 2.5 - 3.0 m depth. The remaining area of the combined site is predicted to have this dense gravel layer from 1.5 – 2.2 m depth.

Figure 2 below shows the site-specific CPT test profiles to refusal between 1.63 – 3.0 m depth.



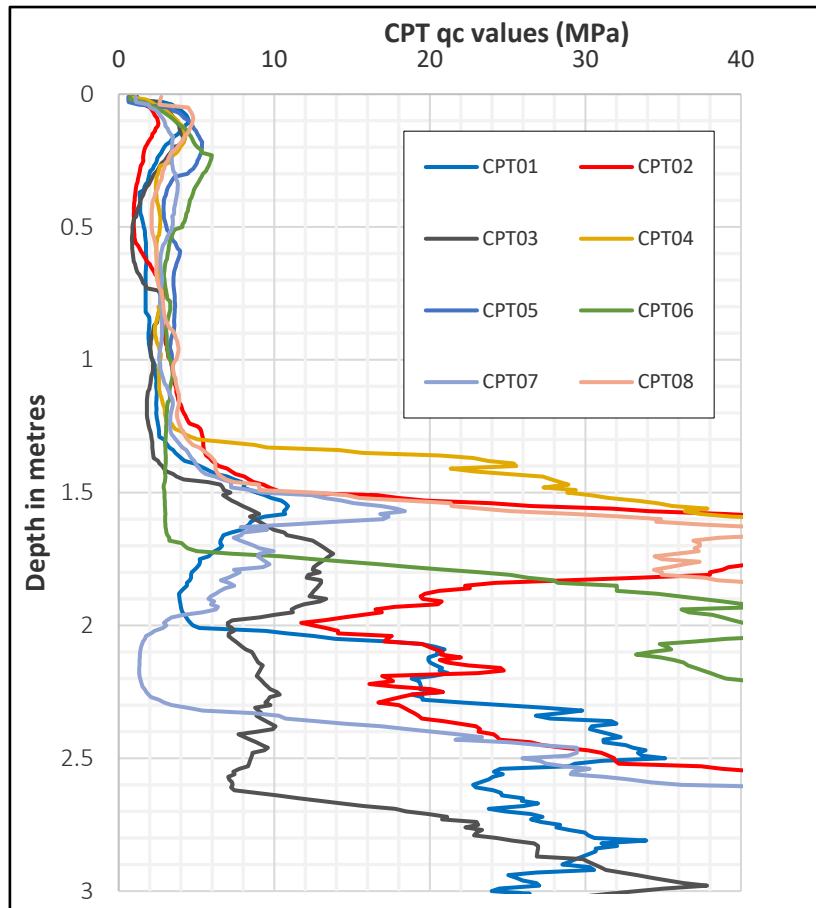


Figure 2: CPT values until refusal in shallow gravel

The CPT testing methodology was changed after CPT01 and CPT02. For CPT01 and CPT02 after CPT refusal, a DPSH test was undertaken, this was then switched to a CPT in suitable soils until 10 m depth. However, for all other CPT's following CPT refusal, a DPSH test was performed until 10 m depth. Figure 3 shows the profile past the gravel/dense sand layer. From the end of the gravel/dense sand layer, qc values ranged from 10 to 30 MPa to 8.4 - 8.9 m depth. From this depth, qc values decreased significantly to between 0 – 10 MPa, generally ranging from 1- 5 MPa. This shows that a transition to weaker silts and clayey silts from 8 -10 m depth, as inferred by the soil behaviour type index.

The testing methodology was changed between CPT01 and CPT02 and the rest of the CPT's. Figure 3 below shows the site-specific CPT test profiles to refusal between 1.63 – 3.0 m depth.

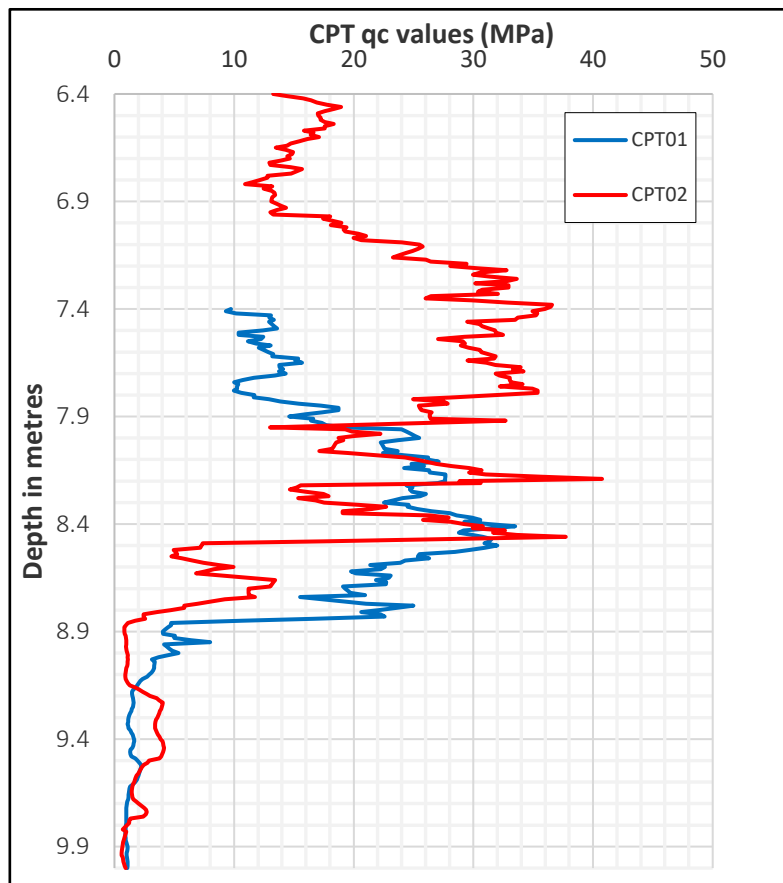


Figure 3: CPT01 and CPT02 resumed past the gravel layer

3.1.3 From Dynamic Probe Super Hard Tests (DPSH)

Dynamic Probe Super Hard (DPSH) testing was carried out in the dense soils from 1.6 – 3.0 m to 10 m depth below ground level (bgl) within the same test holes as the CPT's, following CPT refusal.

The DPSH tests returned variable uncorrected N_{10} values generally ranging between 5 – 12 blows per 100 mm penetration from 3.0 – 8.0 m depth. This implies a medium dense to dense material, suspected as dense sands and gravels with interbedded medium dense sands.

DPSH04 shows a sharp decrease in density after CPT refusal, implying the consistent gravel layer is encountered at around 2.6 m depth rather than 1.7 m depth as implied by CPT refusal. This suggests the deeper gravel layer cuts through the middle of the combined site from the northeast corner of the site as well as from the east side of the site (as was inferred by CPT's).

Between 3 – 5.5 m depth DPSH02, DPSH07 and DPSH08 all have interbedded layers of significantly denser material with a DPSH blow count of approximately 15. DPSH04 and DPSH06 reach layers of a similar density of 15 blows per 100 mm penetration from 7.9 – 8.9 m depth until 9.5 m depth. This implies dense sands could give way to dense gravels at these depths and locations. From 8.0 m depth, DPSH03, DPSH06, DPSH07 and DPSH08 show decreases in density to qc values between 3 – 5 blows per 100 mm penetration. This implies that these tests, along with CPT01 and CPT02, potentially transition to weaker silts and clays from this depth as was inferred observed at CPT01 and CPT02 in section 3.1.2.

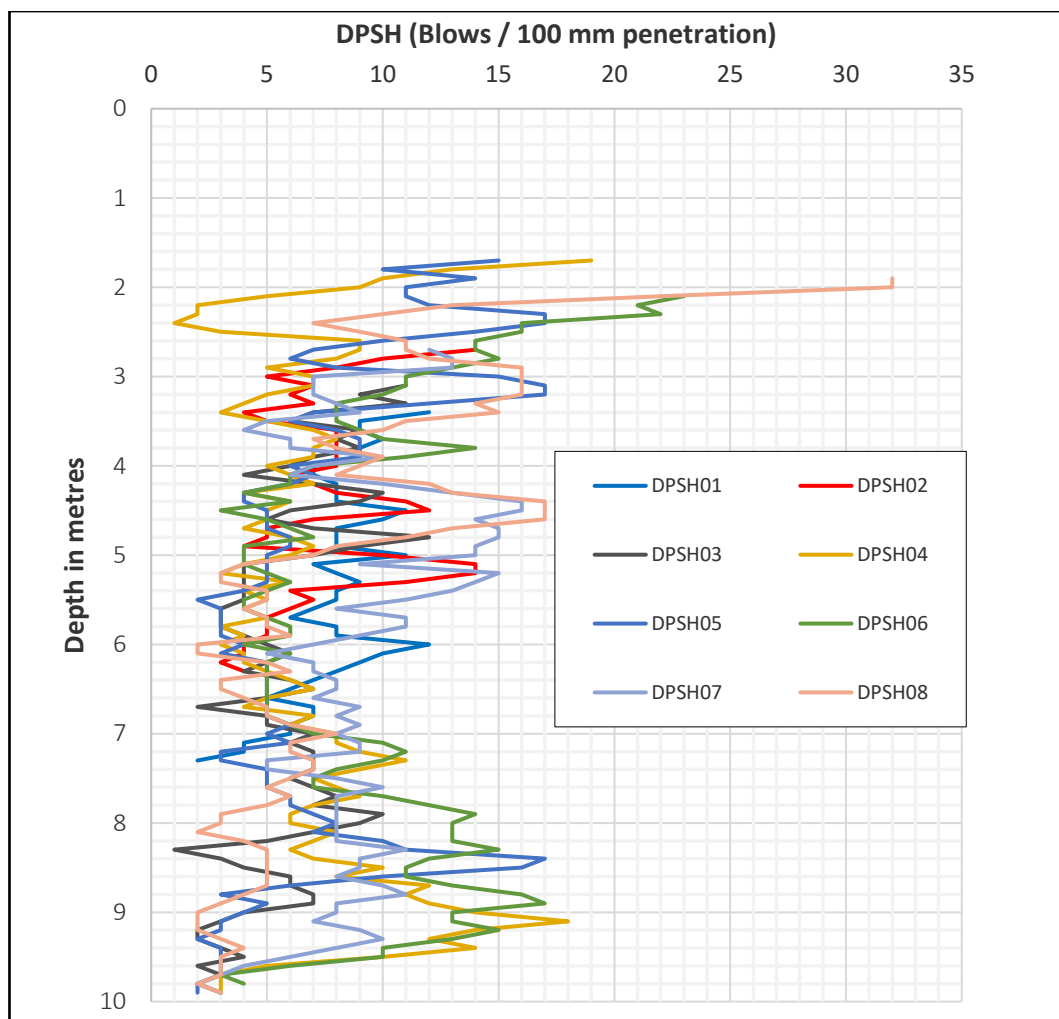


Figure 4: DPSH profile to 10 m depth

3.2 Ground Water Table

To assess the ground water table depth, reference had been made to the GNS Science Median Groundwater Surface Elevations from the NZGD which indicate the water surface contour range based on long term observation records at each site. The water surface contours are stated in terms of the LVD 1937 datum, which is set at 9.043 m above the Christchurch Drainage Datum (CDD). Table 2 below shows the water surface contours for the 15th and 85th percentile in terms of the LVD datum.

Table 2: Water surface contour levels from NZGD

	15th Percentile	Mean	85th Percentile
Water surface Depth (m)	8.20	8.40	8.60

When referenced to the CDD, the 15th Percentile water surface contour level translates to a water table depth of 3.8 m based on an average site ground level of RL 21.04 m as sourced from the Christchurch City Council Flood Management website. The 85th Percentile water surface contour level translates to a water table depth of 3.0 m, based on the lowest ground level.

Hand auger testing conducted onsite did not encounter the ground water table to 1.7 m depth. A water level measurement was taken at CPT07, inferring a ground water table at 2.2 m depth. Nearby Hand auger test HA90262, 125 m southeast showed a ground water table also at 2.2 m depth. For liquefaction

assessment, an elevated ground water depth of 2.2 m below the lowest ground level (bgl) is considered appropriate at this site.

4 Seismic Assessment

4.1 Previous Earthquake Performance

The site has been subjected to repeated ground shaking from the Canterbury earthquake sequence. Reference to the New Zealand Geotechnical Database shows the conditional peak ground accelerations based on the method by Bradley et al (2012). The method combines the empirical strong motion attenuation with distance model, with the actual observation to produce conditional peak ground accelerations. Table 3 below summarises the PGA values for the 2010/2011 earthquake events.

Table 3: Conditional PGA for recent earthquakes (Bradley et al)

Earthquake	Magnitude- M _w	PGA mean	Equivalent M _{7.5} PGA			
			To MBIE	PGA _{16_7.5}	PGA _{50_7.5}	PGA _{84_7.5}
4 Sep 2010	7.1	0.21	0.12	0.14	0.19	0.26
22 February 2011	6.2	0.41	0.16	0.21	0.29	0.41
13 June 2011	6.0	0.21	0.08	0.10	0.14	0.20
23 Dec 2011	5.9	0.18	0.09	0.09	0.12	0.17

PGA_{16_7.5} represents the 16th percentile (i.e 84% probability of exceedance) scaled to a M7.5 earthquake.

PGA_{84_7.5} represents the 84th percentile (i.e 16% probability of exceedance) scaled to a M7.5 earthquake.

The predicted mean PGA for each earthquake has been converted to an equivalent PGA for magnitude M7.5 earthquake in accordance with MBIE guideline recommendations by the method of Boulanger & Idriss 2014.

The adjusted PGA values are also shown with an 84% and 16% probability of being exceeded. The MBIE value in the table represents the 90% exceedance PGA which is accepted as being “well tested” for an SLS1 event. In this case, the site has been well tested to SLS1 and SLS2 levels of ground shaking from the September 2010 and February 2011 events with a mean PGA_{50_7.5} value of 0.19g and 0.29g, respectively.

4.2 Liquefaction tests

4.2.1 Liquefaction from CPT tests

Liquefaction assessment of the CPT tests has been completed by the method of Idriss and Boulanger (2014). In applying this method, a water level at 2.2 m was used for triggering of liquefaction in the alluvial deposits.

A ‘fines correction’ coefficient (CFC) of 0.0¹ was adopted for the liquefaction analysis in the Idriss and Boulanger method. Liquefaction induced settlement has been quantified by the method of Zhang et al (2002). Table 4 below summarises the predicted liquefaction settlements rounded up to the nearest 5 mm to a test depth of 10 m for a SLS1 and ULS event with PGA’s of 0.13g and 0.35g, respectively. A second serviceability earthquake event (SLS2) has also been considered with a PGA of 0.19g and Magnitude M6.0.

Between 15 mm and 20 mm of liquefaction settlement is predicted for a SLS1 and SLS2 event respectively, increasing to approximately 30 mm for an ULS event.

¹ Leeves, J., van Ballegooy, S., Lees, J., Wentz; 2015. *Effect of fines content correlations and liquefaction susceptibility thresholds on liquefaction consequence*, 6th International Conference on Earthquake Geotechnical Engineering, November 2015, New Zealand

The CPT testing methodology was changed after CPT01 and CPT02. For CPT01 and CPT02 after CPT refusal, a DPSH test was undertaken, and CPT testing resumed once the soil profile was deemed appropriate. For all other CPT's, a DPSH test was performed once CPT refusal was met.

Therefore, as the ground water table was assumed at 2.2 m depth, liquefaction above the depth of CPT refusal was generally negligible as it was above the ground water table. CPT01 and CPT02 show liquefaction in saturated soils between 6.4 and 10 m depth. This accounts for the large difference seen between CPT01 and CPT02 in comparison to the other tests. Accordingly, liquefaction from DPSH tests in section 4.2.2 will be lesser in CPT01 and CPT02 as compared to the other six tests as less of the profile was assessed by DPSH testing. The below settlement values have been rounded to the nearest 5 mm.

Table 4: Liquefaction settlements to CPT refusal depth

Test Location	SLS1 (M7.5)	SLS2(M6.0)	ULS (M7.5)
CPT01	0	5	15
CPT02	15	20	30
CPT03	0	0	0
CPT04	0	0	0
CPT05	0	0	0
CPT06	0	0	0
CPT07	0	0	0
CPT08	0	0	0

4.2.2 Liquefaction from DPSH tests

Between 25 mm to 60 mm of liquefaction settlement is predicted for a SLS1 and ULS event, respectively. The below settlement values have been rounded to the nearest 5 mm. Note that the inferred weak silt and clayey silt layers inferred at CPT01 and CPT02 mean the DPSH inferred settlement values will likely be overestimates. This is as the DPSH derived settlement calculation does not account for the proportion of fines in the profile, which would otherwise reduce settlement. This means the settlement values below are likely to be conservative.

Table 5: Liquefaction settlements to CPT refusal depth

Test location	SLS1	SLS2	ULS
DPSH01	5	5	5
DPSH02	5	5	15
DPSH03	20	35	55
DPSH04	5	20	45
DPSH05	20	35	60
DPSH06	5	5	25
DPSH07	5	10	15
DPSH08	25	40	60

4.2.3 Liquefaction from CPT and DPSH tests combined

When the liquefaction data from both CPT and DPSH testing is combined, settlement up to 25 mm and 60 mm of liquefaction settlement is predicted for a SLS1 and ULS event respectively. The settlement values below have been rounded to the nearest 5 mm.

Test location	SLS1	SLS2	ULS
DPSH/CPT01	5	10	20



DPSH/CPT02	20	25	45
DPSH/CPT03	20	35	55
DPSH/CPT04	5	20	45
DPSH/CPT05	20	35	60
DPSH/CPT06	5	5	25
DPSH/CPT07	5	10	15
DPSH/CPT08	25	40	60

At block D, 20 mm of SLS1 differential settlement over a 14 m span is inferred between the closest CPT tests (CPT02 & CPT03), which translates to about 15 mm of differential settlement over a 6 m span. At blocks A, B and C, 30 mm of SLS2 differential settlement is inferred over a 14 m span which translates to about 15 mm of differential settlement over a 6 m span based on Section B1/VM4's definition of differential settlement.

The predicted settlements are an index only of settlement damage at the site with a +/-50% probability of occurring during seismic shaking. The predicted settlements are 'free field' and do not consider additional settlement damage due to ground interaction with foundations which may lead to an increase in foundation settlement from foundation bearing failure, if not mitigated by specific foundation design. Refer to Appendix C for liquefaction settlement profiles.

4.3 Previous Earthquake Damage from EQC Observations

Table 6 below summarises the liquefaction observations sourced from EQC records obtained from the NZGD and only returned ground surface damage from the February 2011 event. The EQC records suggest the site is susceptible to negligible ground surface damage for earthquake events up to Magnitude M6.2.

Table 6: Summary of EQC liquefaction interpreted from EQC observations

Earthquake Event	Ground surface Damage Observation
September 2010	No observations
February 2011	No observed ground cracking or ejected liquefied material
June 2011	No observations
December 2011	No observations

4.4 Liquefaction Potential

We have assessed the 'Liquefaction Potential Indices' number for each of the liquefaction cases identified in Section 4.2 above. The LPI number provides a performance-based assessment of liquefaction ground surface damage and is influenced by the ratio of the non-liquefiable crust layer to the total thickness of liquefiable soil deposit.

The LPI values should be considered in the context of both the ground conditions and structure of interest. The ranges provided in Table 7 below are based on triggering calculations using Boulanger and Idriss (2014) method, and analysis and interpretation of liquefaction effects in the 2010-2011 Christchurch earthquake sequence. Table 7 below has been reproduced from, 'Module 3: Identification, Assessment and Mitigation of Liquefaction Hazards': dated May 2016.

Table 7: General performance levels for liquefied deposits

Performance Level	Effects	Characteristics and Consequences	Characteristic LPI
L0	Insignificant	No significant excess pore water pressures (no liquefaction)	LPI = 0
L1	Mild	Limited excess pore water pressures; negligible deformation of the ground, and small settlements	LPI = 0



L2	Moderate	Liquefaction occurs in layers of limited thickness (small proportion of the deposit, say 10 percent or less) and lateral extent; ground deformation results in relatively small differential settlements	LPI < 5
L3	High	Liquefaction occurs in significant portion of the deposit thickness (30 to 50 percent) resulting in transient lateral displacements, moderate differential movements, and settlement of the ground in the order of 100mm to 200mm.	LPI = 5-15
L4	Severe	Complete liquefaction develops in most of the deposit resulting in large lateral displacements of the ground, excessive differential settlement, and total settlement of over 200mm.	LPI > 15
L5	Very severe	Liquefaction resulting in lateral spreading (flow), large permanent lateral ground displacements and/or significant ground distortion (lateral strains/stretch, vertical offsets and angular distortion).	LPI > 20

As a significant amount of settlement is predicted to occur in the deeper layers at approximately 6.5 m depth, the CPT-derived liquefaction potential indices underestimate the expected ground surface damage, with corresponding LPI numbers of up to 0.5 under a SLS1 event and to 2.5 under an ULS event. Accounting for the predicted liquefaction in the deeper soil layers from 6.5 m, *Mild to Moderate* ground surface damage is expected under SLS1 to ULS events respectively. For the intermediate SLS2 event, Moderate ground surface damage is expected and translates to relatively small differential settlements.

4.5 Lateral Spread

Lateral spread risk has been assessed according to site and ground conditions, as well as proximity to significant waterways or steep changes in ground level. The subject property is generally flat and level with no significant ground elevation over the site.

Ground surface observations presented on the New Zealand Geotechnical Database (NZGD) indicates no observed ground cracking for any of the seismic events on the site. Based on this lateral spread damage is not considered a significant geotechnical risk at this site.

4.6 Technical Land Category Classification

Reference to the MBIE Technical Foundation Category Classification off the NZGD website indicates the site is TC2 rated land for the purpose of foundation design. Liquefaction analysis in Section 4.2 predicts total *free-field* liquefaction between 5 – 25 mm for a SLS1 and up to 60 mm for an ULS event.

These settlement values are consistent for a TC2 rating to MBIE's guidelines; therefore, we recommend a Technical Category 2 Classification for the purpose of foundation design.

4.7 Seismic Category

The thickness of the alluvial deposits beneath this area of the Christchurch area defines the site as Class D, 'Deep Soils', in terms of the seismic design requirements of NZS 1170.5.

5 Environmental Issues



Environmental engineering is beyond the scope of our expertise; however, we have checked the Environment Canterbury 'Listed Land Use Register' (LLUR) (<http://llur.ecan.govt.nz/>) and found that (on the day accessed, 30th November 2021) it advises the following for each of the sites this development spans:

"The Listed Land Use Register does not currently have any information about a Hazardous Activities and Industries List site on this land parcel".

6 Flood levels

The Christchurch City Council flood hazard maps at:

<https://www.ccc.govt.nz/services/stormwater-and-drainage/flooding/floorlevelmap> were accessed on 30th November 2021. The CCC system shows that none of the sites this development will span are in a flood management area, and accordingly interim flood floor level may not be required before lodging a building consent application.

7 Bearing Capacity

Ultimate bearing capacity in the shallow soil deposits has been quantified from CPT cone tip resistance values based on the following empirical relationships² for shallow foundations bearing on cohesionless (sandy) soils and/or sandy silt deposits as encountered from the CPT's to 3.0 m depth.

For shallow foundations bearing on cohesionless soils, Q_{ult} is calculated from:

$$Q_{ult} = 48 - 0.009(300 - q_c)^{1.5} - \text{in units of kg/cm}^2 \quad \text{- Equation 1}$$

For shallow foundations bearing on sandy silt soils, Q_{ult} is calculated from:

$$Q_{ult} = 28 - 0.0052(300 - q_c)^{1.5} - \text{in units of kg/cm}^2 \quad \text{- Equation 2}$$

The above relationships require the q_c values from the CPT tests to be converted to units of kg/m^2 before calculation of Q_{ult} .

The ultimate bearing capacities were determined by the lower bound values calculated from equations 1 & 2 at test locations CPT01 to CPT08. To 3.0 m depth bgl, bearing capacities vary between 118 kPa to 280 kPa according to the lower bound equation 2.0 values. From 0.60 m depth an ultimate geotechnical bearing capacity of at least 200 kPa was inferred from the lower bound equation 2.0 (for sandy silt soils) at all CPT's except CPT03, which returned an ultimate bearing capacity of 200 kPa from 0.7m depth.

Five Scala tests completed on the 29th of November 2021 confirmed a bearing capacity of at least 200 kPa from 0.6 m depth bgl for an average Scala test result of 3 blows per 100 mm of ground penetration, increasing to 300kPa from 1.2 m with blow-counts of 4 blows per 100 mm of penetration. Generally, the CPT tests returned similar bearing capacity values to 1.45 m depth when compared to the Scala penetrometer test derived values.

Therefore, an ultimate bearing capacity of 200 kPa from 0.7 m depth is recommended for all unit blocks.

2. See Section 4_11 from Foundation Analysis And Design, Fifth Edition; Joseph E. Bowles

8 Foundation Settlements

Calculation of static settlement is from the one-dimensional consolidation method applied to the upper silt and sand layers and for a soil elastic modulus of 5.3 MPa. The elastic modulus has been assessed from the following empirical relationship of CPT tip resistance versus elastic modulus (E_s). In this case, the following relationship was adopted with an average q_c value of 2.1 MPa.

$$E_s = 2.5q_c - \text{in MPa}$$

Static settlement of up to 5 mm is predicted in the loose silt and sand deposits to 1.4 m bgl, overlying denser soils and a dense sand gravel layer, and based on an applied foundation load of 20 kPa from the combined self-weight of the building and foundation.

We anticipate up to 5 mm of differential static settlement over a 6 m span due to the imposed foundation loading from the combined structure and foundation. As discussed in section 4.2.3, 15 mm of differential settlement over a 6 m span is expected during a SLS1 event, therefore approximately 20 mm of combined differential settlement from combined static and SLS1 seismic is expected over a 6 m span and satisfies the foundation performance requirement in Section B1/VM4 of the NZBC.

9 Foundations

9.1 Discussion

The proposed development comprises 34, two-storey residential units constructed of light-weight materials in accordance with NZS 3604 type construction. As such, we have considered foundation options outlined in MBIE's Part B: "Repairing and rebuilding houses affected by the Canterbury earthquakes", December 2012, consistent with the TC2 Classification as discussed in Section 4.6 above.

The soil column from 2.2 m depth is susceptible to liquefaction-induced settlement during earthquake loading. Therefore, the liquefaction susceptible region of the soil profile lies over the gravel/dense sand profile to around 6 - 7 m depth, and the loose sands and silts thereafter. Under a SLS1 seismic event, 5 – 25mm of settlement is expected, increasing to 60 mm for a ULS event. Therefore, under both a SLS1 and an ULS event, most of the liquefaction is expected within the alluvial deposits from 6.8 – 9.4 m.

Mild to ground surface damage can be expected at this site during SLS1 and SLS2 ground shaking, and *Moderate* ground surface damage for ULS ground shaking. Most of the liquefaction is predicted in the deeper soil layers from 4.9 to 9.7m bgl. Total free-field settlements from combined CPT and DPSH tests show significant variation, which can be attributed to the general uncertainty associated with predicting settlements from DPSH tests.

All unit blocks except block A and E, have aspect ratio's exceeding the recommended value of 3.0 by MBIE guidelines for regular foundations. Blocks B, C and D are irregular foundations, with aspect ratios of 4.0, 5.0 and 5.1, respectively. Specific design of the reinforced gravel raft to each Block has been considered based on the irregularity of each foundation size and the required stiffness to moderate predicted differential settlement from the relevant CPT/DPSH locations.

During a ULS event *Moderate* ground surface damage can be expected, with small differential settlement, accordingly shallow surface foundations as described in Section 9.2 below would be suitable for the proposed multi-unit developments, with the reinforced gravel raft and stiff concrete slab foundations



expected to suppress differential settlement damage during SLS1 and SLS2 ground shaking, whilst mitigating irreparable damage to the units during an ULS event.

9.2 Reinforced Gravel Raft with an Option 4 MBIE foundation

The Option 4 shallow foundation system is required to meet the performance objectives of the MBIE guidelines, which would otherwise require the foundations to provide enough stiffness to support the imposed reduced gravity load of the buildings under a 2m loss of edge ground support and 4 m loss of internal ground support. The waffle slab foundation system is expected to tolerate up to 25 mm of static differential settlement over a 6 m span. This is greater than the estimated maximum differential combined static and SLS1 event settlement of 20 mm over a 6 m span at any unit block.

A minimum geotechnical ultimate bearing capacity of 200 kPa is adopted from 0.70 m depth. As the unit blocks have varying aspect ratios ranging from 2.5 – 5.1 and the combined CPT and DPSH tests showed varying predicted settlements, the unit block foundations require different gravel raft thicknesses. This is to ensure each gravel raft provides sufficient stiffness to moderate potential liquefaction induced differential settlement. Table 8 below shows the specific foundation recommendations for unit blocks A to E (unit 34) as specified in the architectural drawings shown in Appendix D.

Table 8: Foundation details for each unit block

Block	Aspect ratio	Gravel raft thickness (m)	Excavation depth bgl (mm)	Geotechnical ultimate bearing Capacity at bearing layer - kPa	Extent of gravel raft beyond foundation edge
A	2.5	0.6	0.7	200 kPa	0.3 m
B	4.0	0.8	0.9	200 kPa	0.4 m
C	5.1	1.0	1.1	200 kPa	0.5 m
D	5.0	1.0	1.1	200 kPa	0.5 m
E (Unit 34)	2.5	0.6	0.7	200 kPa	0.4 m

For ultimate limit state design of the foundation systems a gravel raft of thickness prescribed in Table 8 is recommended to provide a stable building platform for construction of the waffle slab foundation. The gravel raft shall be designed to *moderate* SLS1 and SLS2 liquefaction-induced settlement at the base of the reinforced gravel raft by suppressing ground surface damage.

Excavation for the reinforced gravel raft is required to the prescribed excavation depth from Table 8 above the lowest adjacent ground level followed by placement of Bidim A19 geo-cloth over the exposed soils. The gravel raft shall extend beyond the foundation footprint as shown in Table 8 and shall be constructed as follows:

- The gravel raft shall be constructed from a well graded fill material comprising stone with at least two subangular faces as per MBIE guideline recommendations.
- The gravel material shall be placed in 150mm thick layers and compacted to 98 % of the MDD value in accordance with NZS 4431:1989.
- After placement of each of the first two layers of compacted fill, a layer of TriAx-160 geogrid (or similar) should be laid before placement of the next gravel layer (2 layers of geogrid required in total for gravel rafts thicker than 0.6 m, 1 layer otherwise).
- The compacted fill density should be confirmed via NDM testing at random intervals not exceeding 3 m in each direction on the first and last layer of compacted material.

Refer to Appendix E for the gravel raft material specification.

10 Further Geotechnical Considerations

10.1 Earthworks

During development of the site appropriate stormwater and erosion control measures should be implemented and monitored throughout construction. Erosion control is likely to require the introduction of silt fences, or other similar devices, to intercept soil run-off and improve the quality of the stormwater that will be discharged from site.

10.2 Review of Foundation Design

To ensure the recommendations in this report have been interpreted correctly, we recommend that Tetrad Consulting Ltd is provided with the final foundation design drawings for an independent review. At the time of construction an appropriate level of construction monitoring will be required to confirm that the inferred near-surface soil profile from the CPT and Hand auger tests are consistent with the observed soil profile during foundation excavation. Any notable variation (organic material, soft spots etc.) of the exposed soil, identified during construction should be brought to the attention of the geotechnical engineer before commencing foundation works.

Table 9 below summarises the geotechnical site inspections to be carried out by a suitably qualified geotechnical engineer during the construction phase of the shallow ground improvement phase:

Table 9: Geotechnical site inspections

Inspection type	Quantity
Gravel raft excavation	1
1 st layer of compacted fill to gravel raft	1
Placement of geogrid reinforcement	2
Review of NDM test results of compacted fill	1

The above inspections cannot be completed unless the consented plans have been approved by the local council. The consent-approved plans shall be made available by the client or the clients' nominated earthworks contractor at the time of the first site inspection

10.3 Pavement Design

For design of flexible pavement areas, we recommend a CBR value of 6%, based on interpretation of the Scala penetrometer blow count values at 0.35 m depth.



11 Limitations

This report has been prepared for Citrus Living Ltd and the Christchurch City Council for the purpose of supporting a building consent application for the proposed multi-unit residential development at the subject property.

No liability is accepted by this company or any employee of this company with respect to its intended use by any other person or persons.

This report has been based on the results of cone penetrometer, Scala penetrometer and hand auger tests completed at discrete locations; therefore, subsurface soil conditions are 'inferred' based on interpreted data and could vary from the test locations at the time of the geotechnical assessment. Should exposed soil conditions vary from those described herein Tetrad Consulting Ltd requests that it be notified immediately.

The geotechnical investigation was confined to geotechnical aspects of the site only and did not involve the assessment for environmental contaminants.



12 References

- Brown, L.J.; Weeber, J.H. (1992): *Geology of the Christchurch Urban Area*. Institute of Geological & Nuclear Sciences 1:25,000 geological map 1.
- Boulanger, R.W., & Idriss I.M., 2014, *CPT and SPT Based liquefaction triggering procedures*. Centre for Geotechnical Modelling Report No. UCD/CGM-14/01
- Bradley and Hughes (2012a) *Conditional Peak Ground Accelerations in the Canterbury Earthquakes for Conventional Liquefaction Assessment*. Technical Report for the Ministry of Business, Innovation and Employment, April 2012. 22p.
- Ministry of Building Innovation and Employment (MBIE), December 2012: *Guidance on repairing and rebuilding houses affected by the Canterbury earthquakes*.
- New Zealand Geotechnical Database (2014) "GNS Science Median Groundwater Surface Elevations", Map Layer CGD5160 – 10 June 2014, retrieved December 2021 from <https://canterburygeotechnicaldatabase.projectorbit.com/>
- New Zealand Geotechnical Database (2012) "Observed Ground Crack Locations", Map Layer CGD0400 – 23 July 2012, retrieved December 2021 from <https://canterburygeotechnicaldatabase.projectorbit.com/>
- New Zealand Geotechnical Database (2012) "Vertical Ground Surface Movements", Map Layer CGD0600 – 23 July 2012, retrieved December 2021 from <https://canterburygeotechnicaldatabase.projectorbit.com/>
- New Zealand Geotechnical Database (2013) "Conditional PGA for Liquefaction Assessment", Map Layer CGD5110 – 21 Feb 2013, retrieved December 2021 from <https://canterburygeotechnicaldatabase.projectorbit.com/>



Appendix A

- Site Investigation Plan
- Site specific hand auger, Scala penetrometer and CPT results



Appendix B

- Liquefaction analysis results for:
 - SLS1 0.13g
 - SLS2 0.19g
 - ULS 0.35 g



Appendix D

- Site plan for proposed 33 - unit residential development



Appendix E

GRAVEL RAFT MATERIAL SPECIFICATION

All material incorporated in the works shall be new unless otherwise specified and shall comply with the relevant standard specifications. Product manufacturer's data sheets of alternative material shall be submitted to the engineer for approval prior to use. A written statement regarding the origin, composition and manufacture of material should be supplied by contractors if required by the design engineer.

Granular material supplied for gravel raft construction shall be hard, free from deleterious material and chemically inert and shall have at least two subangular faces. The material shall have a grading appropriate for compaction to form a dense fully interlocked material with the surrounding ground. Material should be compatible with the compaction plant used.

Specific test shall be carried out on the material supplied for stone column construction in accordance with NZS 4407:1991. Refer to Table 2.1 and Table 2.2 for specification.

SPECIFIC GRAVITY (NZS 4407.3.7.1/2)	>2.6
WEATHERING INDEX (NZS 4407.3.11)	AA or BA
CRUSHING RESISTANCE (NZS 4407.3.10)	<10% fines passing 2.36mm sieve under a load of 130kN

Table 2.1: Gravel raft hardfill requirements.

SIEVE SIZE (mm)	PERCENT PASSING
65	
37.5	100
19.0	50-80
9.5	45-55
2.36	20-35
0.6	7-20
0.075	0-7

Table 2.2: Grading for gravel raft hardfill.

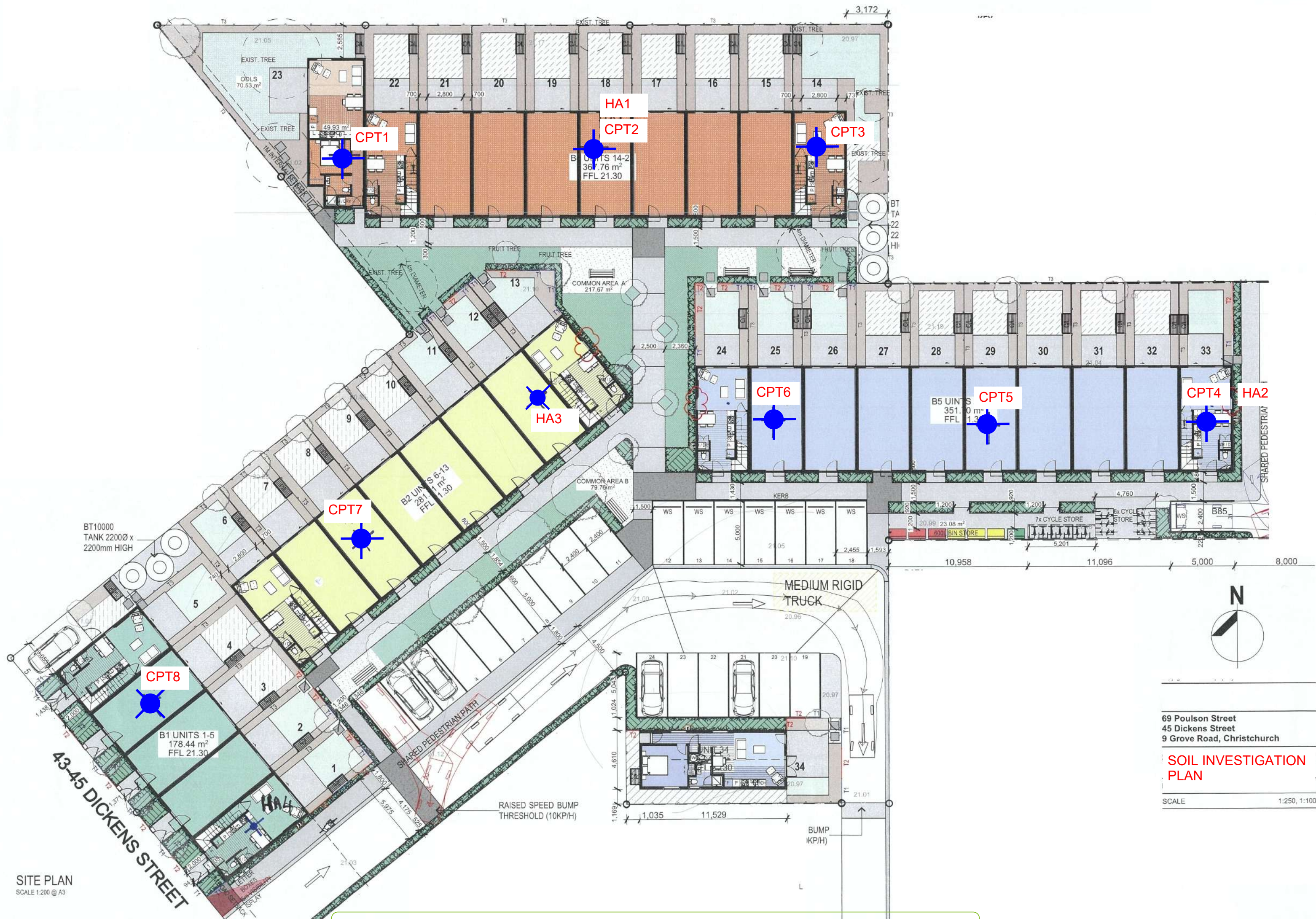
Grading tests in accordance with NZS 4407:1991 should be carried out at a minimum of 1 test for every 200m³ of loose stone column fill material delivered to the site unless directed otherwise by the engineer. Representative samples of the loose structural fill shall be obtained in accordance with NZS 4407:1999.



Appendix A

- Site Investigation Plan
- Site specific hand auger, Scala penetrometer and CPT results





CONE PENETRATION TEST (CPT) REPORT



Client: Tetrad Consulting

Location: Various locations, Christchurch

Printed: 30/11/2021

Site Location: 9 Grove Road, Christchurch

Date: 25/11/2021

Grid Reference: 1569085.05m E, 5178749.18m N (NZTM) - Map or aerial photograph

Rig Operator: C. Whitau

Elevation: 0.00m

Datum: Ground

Equipment: Pagani TG63-150

RAW DATA						SOIL BEHAVIOUR TYPE (NON-NORMALISED)		ESTIMATED PARAMETERS		
Predrill	Tip Resistance (MPa) DPSH Blows / 100mm (Uncorrected - energy ratio 88%)	Friction Ratio (%)	Pore Pressure (kPa)	Inclination (Degrees)	Scale	SBT	SBT Description (filtered)	Dr (%)	Su (kPa)	N ₆₀
							Sand mixtures: silty sand to sandy silt Sand mixtures: silty sand to sandy silt Sands: clean sands to silty sands Sands: clean sands to silty sands Sands: clean sands to silty sands Sands: clean sands to silty sands Silt mixtures: clayey silt & silty clay			

EOH: 10m

Cone Type: Pagani Piezocone - Compression

Cone Reference: MKS332

Cone Area Ratio: 0.79

Standards: ISO 22476-1:2012

Predrill: 7.40m

Water Level: -

Collapse: 2.80m

Termination

Target Depth | ✓

Effective Refusal

Tip	
-----	--

Gauge

Inclinometer

Other

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

0 Undefined

☐ **Yes**
☐ **No**

1 Sensitive fine-gra

2 Clay - organic soil

□ □ □ □ □

3 Clays: clay to silty clay

4 Silt mixtures: clayey silt
silty clay

2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 2681, 26

5 Sand mixtures: silty

 sand to sandy silt
 Sands: clean sands to

6 silty sands

7 Dense sand to gravel

 sand
 Stiff sand to clayey

8 sand

9 Stiff fine-grained

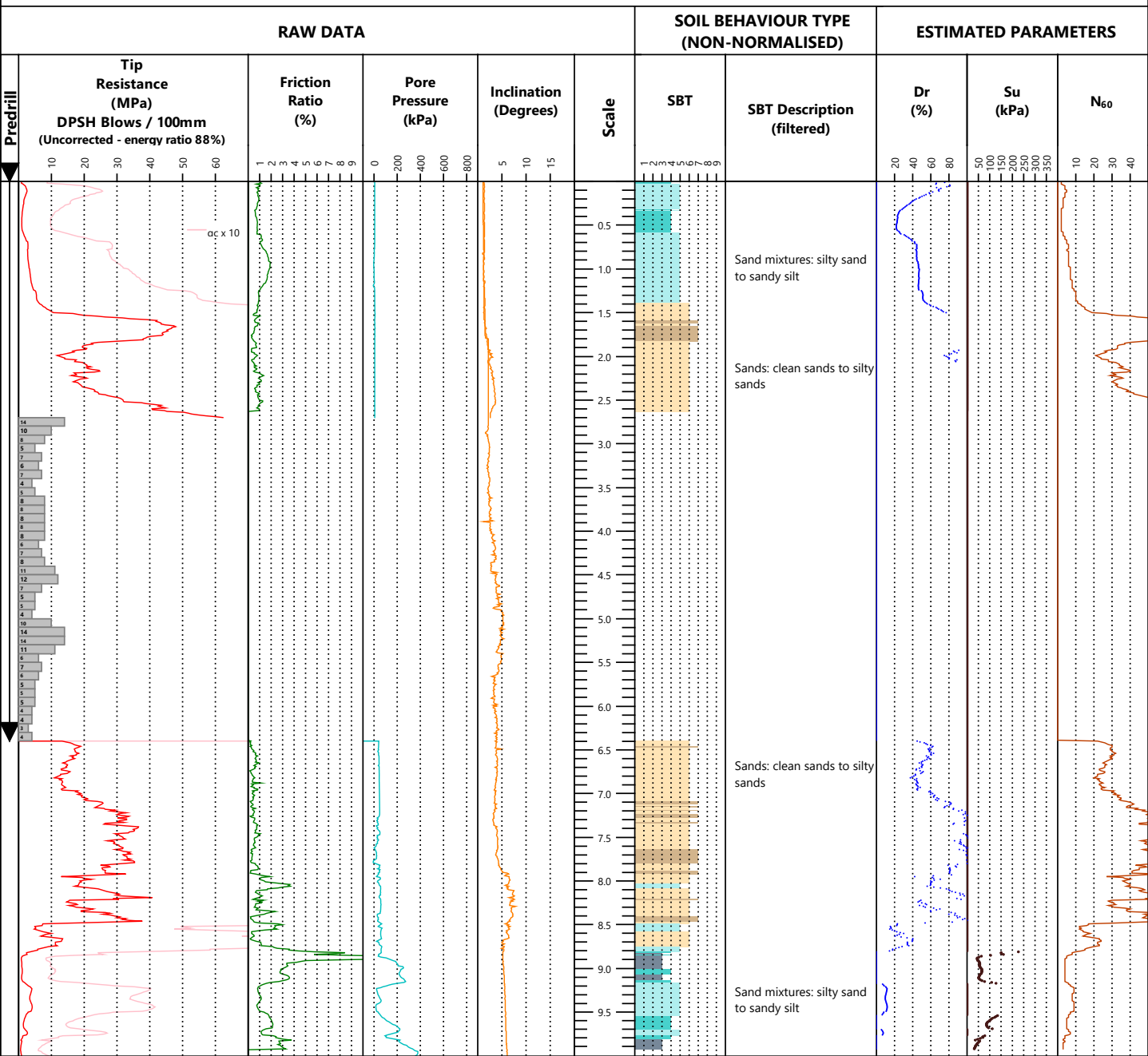
Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various 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

Client:	Tetrad Consulting	Bore No.:	CPTu002
Project:	Various locations, Christchurch	Job No.:	20469

Site Location: 9 Grove Road, Christchurch **Date:** 25/11/2021
Grid Reference: 1569067.74m E, 5178754.58m N (NZTM) - Map or aerial photograph **Rig Operator:** C. Whitau
Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



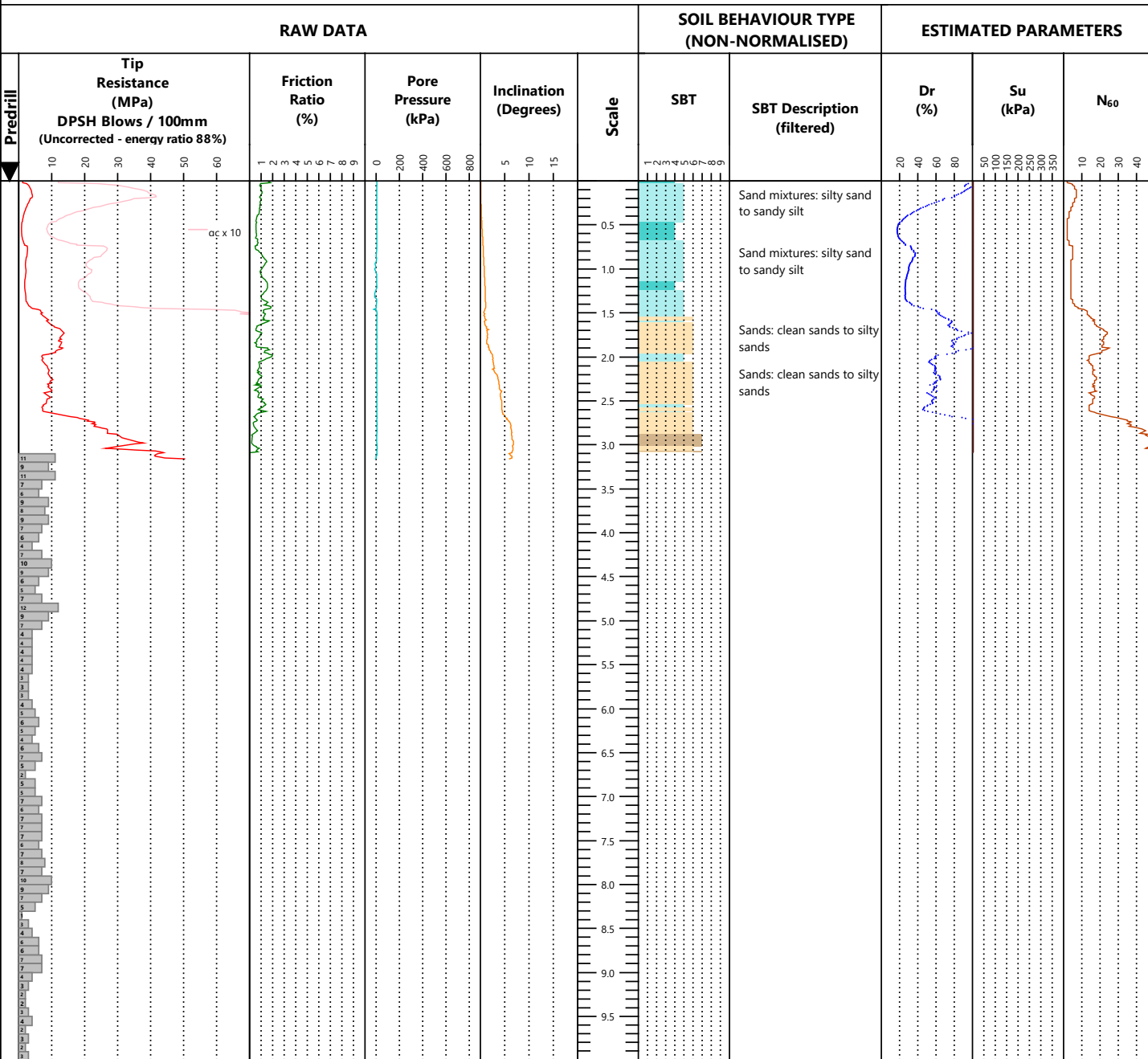
EOH: 10m

Cone Type: Pagani Piezocone - Compression Cone Reference: MKS332 Cone Area Ratio: 0.79 Standards: ISO 22476-1:2012	Predrill: 6.40m Water Level: - Collapse: 2.80m	Termination Target Depth ☒ Effective Refusal Tip ☐ Gauge ☐ Inclinometer ☐ Other ☐	Soil Behaviour Type (SBT) - Robertson et al. 1986 0 Undefined 1 Sensitive fine-grained 2 Clay - organic soil 3 Clays: clay to silty clay 4 Silt mixtures: clayey silt & silty clay 5 Sand mixtures: silty sand to sandy silt 6 Sands: clean sands to silty sands 7 Dense sand to gravelly sand 8 Stiff sand to clayey sand 9 Stiff fine-grained
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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 Sheet 1 of 1
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Client:	Tetrad Consulting	Bore No.:	CPTu003
Project:	Various locations, Christchurch	Job No.:	20469

Site Location: 9 Grove Road, Christchurch	Date: 26/11/2021
Grid Reference: 1569049.82m E, 5178759.78m N (NZTM) - Map or aerial photograph	Rig Operator: C. Whitau
Elevation: 0.00m	Equipment: Pagani TG63-150
Datum: Ground	



EOH: 10m

Cone Type: Pagani Piezocone - Compression Cone Reference: MKS332 Cone Area Ratio: 0.79 Standards: ISO 22476-1:2012	Predrill: Water Level: Collapse: 2.70m	Termination Target Depth ☐ Effective Refusal Tip ☒ Gauge ☐ Inclinometer ☐ Other ☐	Soil Behaviour Type (SBT) - Robertson et al. 1986 0 Undefined 1 Sensitive fine-grained 2 Clay - organic soil 3 Clays: clay to silty clay 4 Silt mixtures: clayey silt & silty clay 5 Sand mixtures: silty sand to sandy silt 6 Sands: clean sands to silty sands 7 Dense sand to gravelly sand 8 Stiff sand to clayey sand 9 Stiff fine-grained
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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 Sheet 1 of 1
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Client:	Tetrad Consulting	Bore No.:	CPTu004
Project:	Various locations, Christchurch	Job No.:	20469

Site Location: 69 Poulson Street, Christchurch	Date: 26/11/2021
Grid Reference: 1569039.58m E, 5178777.45m N (NZTM) - Map or aerial photograph	Rig Operator: C. Whitau
Elevation: 0.00m	Equipment: Pagani TG63-150
Datum: Ground	

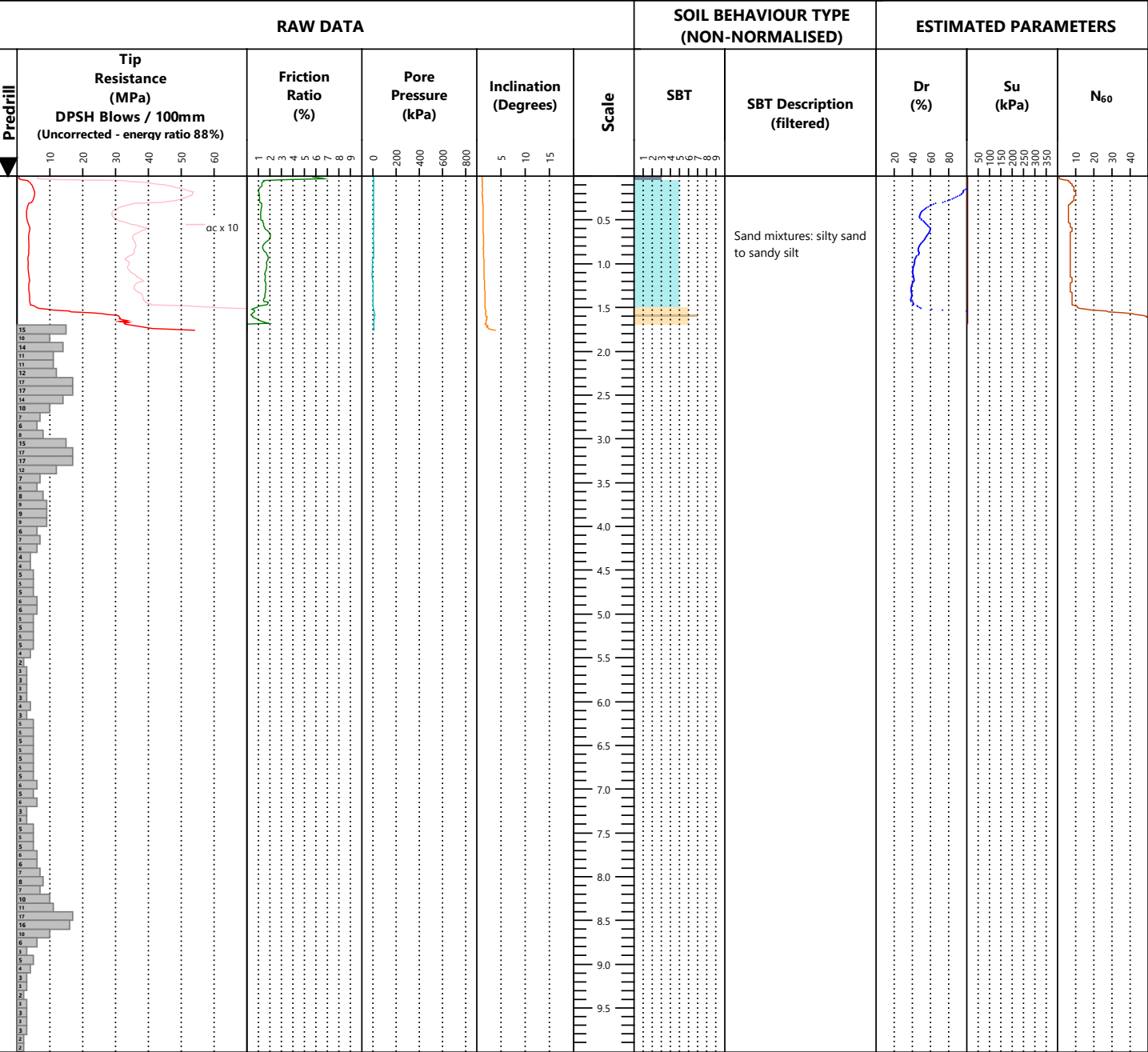
RAW DATA						SOIL BEHAVIOUR TYPE (NON-NORMALISED)		ESTIMATED PARAMETERS		
Predrill ▼	Tip Resistance (MPa) DPSH Blows / 100mm (Uncorrected - energy ratio 88%)	Friction Ratio (%)	Pore Pressure (kPa)	Inclination (Degrees)	Scale	SBT	SBT Description (filtered)	Dr (%)	Su (kPa)	N ₆₀
	10 20 30 40 50 60	1 2 3 4 5 6 7 8 9	0 200 400 600 800	5 10 15		1 2 3 4 5 6 7 8		20 40 60 80	50 100 150 200 250 300 350	10 20 30 40
	 15 13 10 9 5 2 2 1 3 9 8 5 7 2 7 5 4 3 5 7 8 7 6 6 5 5 4 6 7 6 4 3 6 4 5 5 3 5 3 4 4 4 4 5 6 7 5 4 7 6 8 8 9 11 9 7 7 8 9 7 6 6 8 8 7 6 7 10 9 12 11 12 14 18 14 12 14 18 5 3 3 1	 1 2 3 4 5 6 7 8 9	 0 200 400 600 800	 5 10 15	 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5	 1 2 3 4 5 6 7 8	Sand mixtures: silty sand to sandy silt Sand mixtures: silty sand to sandy silt	 20 40 60 80	 50 100 150 200 250 300 350	 10 20 30 40
EOH: 10m										

Cone Type: Pagani Piezocone - Compression Cone Reference: MKS332 Cone Area Ratio: 0.79 Standards: ISO 22476-1:2012			Predrill: - Water Level: - Collapse: 2.40m		Termination Target Depth ☐	Soil Behaviour Type (SBT) - Robertson et al. 1986			
Zero load outputs (MPa) Before test After test			Effective Refusal Tip ☒ Gauge ☐ Inclinometer ☐ Other ☐			0 Undefined 1 Sensitive fine-grained 2 Clay - organic soil 3 Clays: clay to silty clay 4 Silt mixtures: clayey silt & silty clay 5 Sand mixtures: silty sand to sandy silt 6 Sands: clean sands to silty sands 7 Dense sand to gravelly sand 8 Stiff sand to clayey sand 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
	Sheet 1 of 1

Client:	Tetrad Consulting	Bore No.:	CPTu005
Project:	Various locations, Christchurch	Job No.:	20469

Site Location: 69 Poulson Street, Christchurch **Date:** 26/11/2021
Grid Reference: 1569025.44m E, 5178777.2m N (NZTM) - Map or aerial photograph **Rig Operator:** C. Whitau
Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG63-150



EOH: 10m

Cone Type: Pagani Piezocone - Compression Cone Reference: MKS332 Cone Area Ratio: 0.79 Standards: ISO 22476-1:2012	Predrill: Water Level: Collapse: 2.45m	Termination Target Depth ☐ Effective Refusal Tip ☒ Gauge ☐ Inclinometer ☐ Other ☐	Soil Behaviour Type (SBT) - Robertson et al. 1986 0 Undefined 1 Sensitive fine-grained 2 Clay - organic soil 3 Clays: clay to silty clay 4 Silt mixtures: clayey silt & silty clay 5 Sand mixtures: silty sand to sandy silt 6 Sands: clean sands to silty sands 7 Dense sand to gravelly sand 8 Stiff sand to clayey sand 9 Stiff fine-grained
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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
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Site Location: 69 Poulson Street, Christchurch

Date: 26/11/2021

Grid Reference: 1569008.95m E, 5178777.09m N (NZTM) - Map or aerial photograph

Rig Operator: C. Whitau

Elevation: 0.00m

Datum: Ground

Equipment: Pagani TG63-150

RAW DATA						SOIL BEHAVIOUR TYPE (NON-NORMALISED)		ESTIMATED PARAMETERS		
Predrill ▼	Tip Resistance (MPa) DPSH Blows / 100mm (Uncorrected - energy ratio 88%)	Friction Ratio (%)	Pore Pressure (kPa)	Inclination (Degrees)	Scale	SBT	SBT Description (filtered)	Dr (%)	Su (kPa)	N ₆₀
	10 20 30 40 50 60	1 2 3 4 5 6 7 8 9	0 200 400 600 800	5 10 15		1 2 3 4 5 6		20 40 60 80	50 100 150 200 250 300 350	10 20 30 40

EOH: 10m

Cone Type: Pagani Piezocone - Compression

Cone Reference: MKS332

Cone Area Ratio: 0.79

Standards: ISO 22476-1:2012

Predrill: -

Water Level: -

Collapse: 2.50m

Termination

Target Depth	
--------------	--

Effective Refusal

Tip

Gauge

ometer

Other

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

0 Undefined

☐ **QUESTION**
☐ **ANSWER**

1 Sensitive fine-grained

2 Clay - organic soil

☐ ☐

3 Clays: clay to silty clay

4 Silt mixtures: clayey silts and silty clays

 & silty clay

5 Sand mixtures: silty

 sand to sandy silt

6 silty sands

7 Dense sand to gravel

 sand
 Stiff sand to clayey

8 sand

9 Stiff fine-grained

1

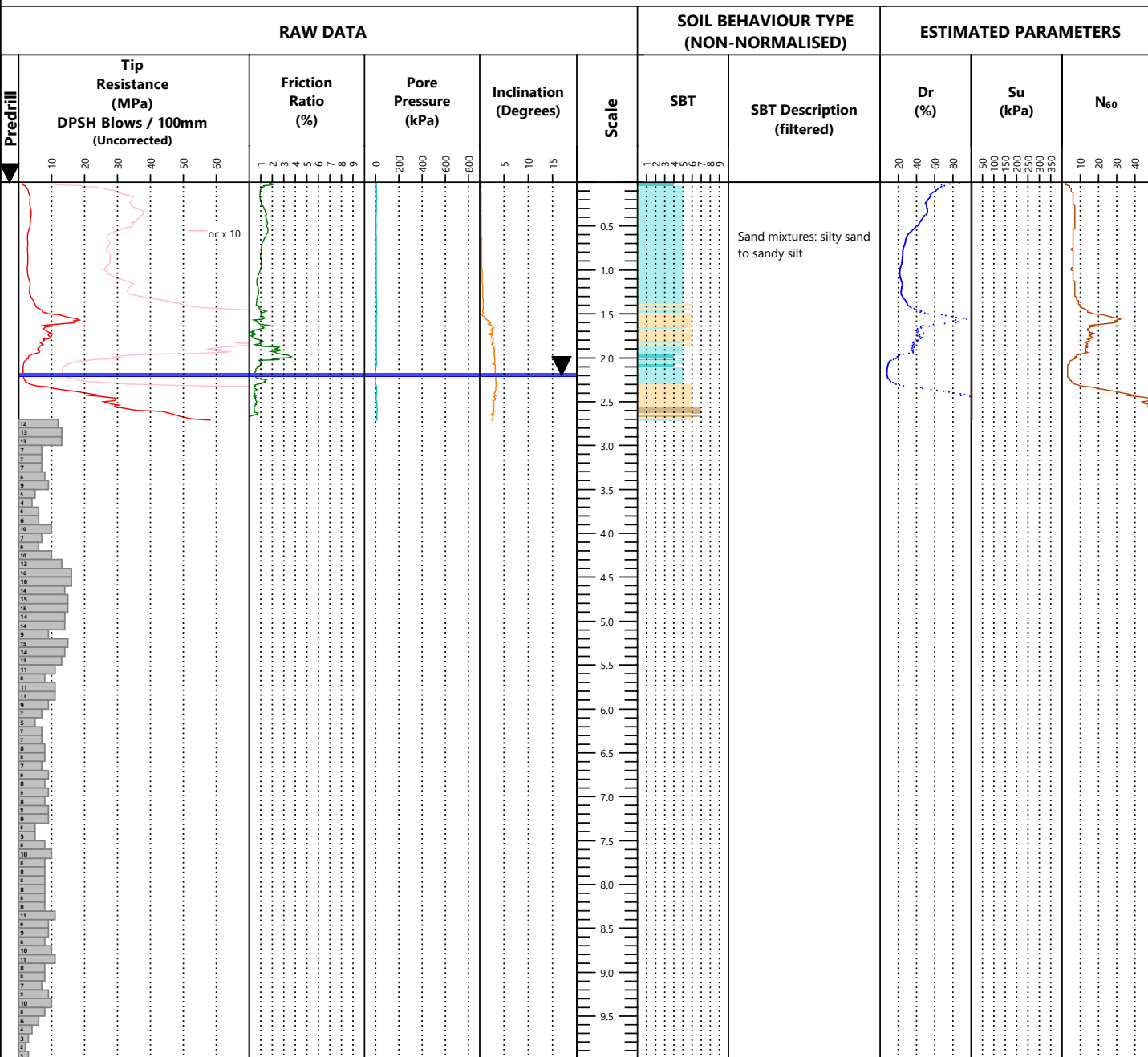
Notes & Limitations

Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various 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

Client:	Tetrad Consulting	Bore No.:	CPTu007
Project:	Various locations, Christchurch	Job No.:	20469

Site Location: 43 Dickens Street, Christchurch **Date:** 26/11/2021
Grid Reference: 1569005.04m E, 5178747.17m N (NZTM) - Map or aerial photograph **Rig Operator:** B. Wilson
Elevation: 0.00m **Datum:** Ground **Equipment:** Pagani TG73-200



EOH: 10m

Cone Type: Pagani Piezocone - Compression Cone Reference: MKS711 Cone Area Ratio: 0.79 Standards: ISO 22476-1:2012	Predrill: Water Level: 2.20m Collapse: 2.50m	Termination Target Depth ☐ Effective Refusal Tip ☒ Gauge ☐ Inclinator ☐ Other ☐	Soil Behaviour Type (SBT) - Robertson et al. 1986 0 Undefined 1 Sensitive fine-grained 2 Clay - organic soil 3 Clays: clay to silty clay 4 Silt mixtures: clayey silt & silty clay 5 Sand mixtures: silty sand to sandy silt 6 Sands: clean sands to silty sands 7 Dense sand to gravelly sand 8 Stiff sand to clayey sand 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 Sheet 1 of 1
--	--------------------------------

Client:	Tetrad Consulting	Bore No.:	CPTu008
Project:	Various locations, Christchurch	Job No.:	20469

Site Location: 43 Dickens Street, Christchurch	Date: 26/11/2021
Grid Reference: 1568991.05m E, 5178731m N (NZTM) - Map or aerial photograph	Rig Operator: B. Wilson
Elevation: 0.00m	Equipment: Pagani TG73-200
Datum: Ground	

RAW DATA						SOIL BEHAVIOUR TYPE (NON-NORMALISED)		ESTIMATED PARAMETERS		
Predrill ▼	Tip Resistance (MPa) DPSH Blows / 100mm (Uncorrected)	Friction Ratio (%)	Pore Pressure (kPa)	Inclination (Degrees)	Scale	SBT	SBT Description (filtered)	Dr (%)	Su (kPa)	N ₆₀
	10 20 30 40 50 60	1 2 3 4 5 6 7 8 9	0 200 400 600 800	5 10 15		1 2 3 4 5 6 7 8		20 40 60 80	50 100 150 200 250 300 350	10 20 30 40
							Sand mixtures: silty sand to sandy silt			
EOH: 10m										

EOH: 10m			
Cone Type: Pagani Piezocone - Compression Cone Reference: MKS711 Cone Area Ratio: 0.79 Standards: ISO 22476-1:2012 Predrill: - Water Level: - Collapse: 2.40m Termination Target Depth Effective Refusal Tip ✓ Gauge Inclinometer Other Soil Behaviour Type (SBT) - Robertson et al. 1986 0 Undefined 1 Sensitive fine-grained 2 Clay - organic soil 3 Clays: clay to silty clay 4 Silt mixtures: clayey silt & silty clay 5 Sand mixtures: silty sand to sandy silt 6 Sands: clean sands to silty sands 7 Dense sand to gravelly sand 8 Stiff sand to clayey sand 9 Stiff fine-grained			
Zero load outputs (MPa) Before test After test Tip Resistance 20.6444 20.5920 Local Friction 0.2523 0.2526 Pore Pressure 3.0882 3.0880			
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
			Sheet 1 of 1

TEST DETAIL

PointID: CPTu001

Sounding: 1

Operator: C. Whitau
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS332
Cone Area Ratio: 0.79

Zero load outputs (MPa)	Before test	After test
Tip Resistance	22.4924	22.3205
Local Friction	0.2721	0.2726
Pore Pressure	3.0070	3.0037

Date: 25/11/2021
Predrill: -
Water Level: -
Collapse: -

Termination

Target Depth ☐

Effective Refusal

Tip	☒
Gauge	☐
Inclinometer	☐
Other	☐

Sounding: 2

Operator: C. Whitau
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS332
Cone Area Ratio: 0.79

Zero load outputs (MPa)	Before test	After test
Tip Resistance	22.4507	22.3882
Local Friction	0.2742	0.2737
Pore Pressure	3.0061	3.0068

Date: 25/11/2021
Predrill: 7.40m
Water Level: -
Collapse: 2.80m

Termination

Target Depth ☒

Effective Refusal

Tip	☐
Gauge	☐
Inclinometer	☐
Other	☐

PointID: CPTu002

Sounding: 1

Operator: C. Whitau
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS332
Cone Area Ratio: 0.79

Zero load outputs (MPa)	Before test	After test
Tip Resistance	22.4924	22.3882
Local Friction	0.2721	0.2720
Pore Pressure	2.9954	2.9951

Date: 25/11/2021
Predrill: -
Water Level: -
Collapse: -

Termination

Target Depth ☐

Effective Refusal

Tip	☒
Gauge	☐
Inclinometer	☐
Other	☐

Sounding: 2

Operator: C. Whitau
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS332
Cone Area Ratio: 0.79

Zero load outputs (MPa)	Before test	After test
Tip Resistance	22.5184	22.3830
Local Friction	0.2738	0.2735
Pore Pressure	2.9948	2.9958

Date: 25/11/2021
Predrill: 6.40m
Water Level: -
Collapse: 2.80m

Termination

Target Depth ☒

Effective Refusal

Tip	☐
Gauge	☐
Inclinometer	☐
Other	☐

PointID: CPTu003

Sounding: 1

Operator: C. Whitau
Cone Type: Pagani Piezocone - Compression
Cone Reference: MKS332
Cone Area Ratio: 0.79

Zero load outputs (MPa)	Before test	After test
Tip Resistance	22.3518	22.3570
Local Friction	0.2715	0.2721
Pore Pressure	2.9962	2.9947

Date: 26/11/2021
Predrill: -
Water Level: -
Collapse: 2.70m

Termination

Target Depth ☐

Effective Refusal

Tip	☒
Gauge	☐
Inclinometer	☐
Other	☐

TEST DETAIL

PointID: CPTu004

Sounding: 1

Operator: C. Whitau

Cone Type: Pagani Piezocone - Compression

Cone Reference: MKS332

Cone Area Ratio: 0.79

Zero load outputs (MPa)	Before test	After test
Tip Resistance	22.5236	22.4247
Local Friction	0.2724	0.2725
Pore Pressure	2.9942	2.9941

Date: 26/11/2021

Predrill: -

Water Level: -

Collapse: 2.40m

Termination

Target Depth ☐

Effective Refusal

Tip	☒
Gauge	☐
Inclinometer	☐
Other	☐

PointID: CPTu005

Sounding: 1

Operator: C. Whitau

Cone Type: Pagani Piezocone - Compression

Cone Reference: MKS332

Cone Area Ratio: 0.79

Zero load outputs (MPa)	Before test	After test
Tip Resistance	22.5236	22.4247
Local Friction	0.2720	0.2726
Pore Pressure	2.9942	2.9942

Date: 26/11/2021

Predrill: -

Water Level: -

Collapse: 2.45m

Termination

Target Depth ☐

Effective Refusal

Tip	☒
Gauge	☐
Inclinometer	☐
Other	☐

PointID: CPTu006

Sounding: 1

Operator: C. Whitau

Cone Type: Pagani Piezocone - Compression

Cone Reference: MKS332

Cone Area Ratio: 0.79

Zero load outputs (MPa)	Before test	After test
Tip Resistance	22.5184	22.5445
Local Friction	0.2722	0.2726
Pore Pressure	3.0078	3.0067

Date: 26/11/2021

Predrill: -

Water Level: -

Collapse: 2.50m

Termination

Target Depth ☐

Effective Refusal

Tip	☒
Gauge	☐
Inclinometer	☐
Other	☐

PointID: CPTu007

Sounding: 1

Operator: B. Wilson

Cone Type: Pagani Piezocone - Compression

Cone Reference: MKS711

Cone Area Ratio: 0.79

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.5868	20.5082
Local Friction	0.2522	0.2525
Pore Pressure	3.0892	3.0883

Date: 26/11/2021

Predrill: -

Water Level: 2.20m

Collapse: 2.50m

Termination

Target Depth ☐

Effective Refusal

Tip	☒
Gauge	☐
Inclinometer	☐
Other	☐

PointID: CPTu008

Sounding: 1

Operator: B. Wilson

Cone Type: Pagani Piezocone - Compression

Cone Reference: MKS711

Cone Area Ratio: 0.79

Zero load outputs (MPa)	Before test	After test
Tip Resistance	20.6444	20.5920
Local Friction	0.2523	0.2526
Pore Pressure	3.0882	3.0880

Date: 26/11/2021

Predrill: -

Water Level: -

Collapse: 2.40m

Termination

Target Depth ☐

Effective Refusal

Tip	☒
Gauge	☐
Inclinometer	☐
Other	☐

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, 10cm²)

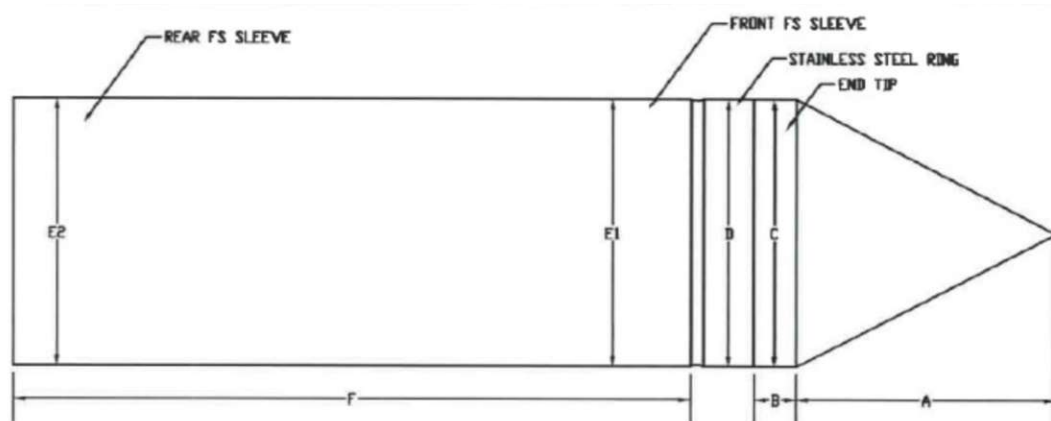
Dimensions

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





CONE CALIBRATION CERTIFICATE N° Z198/20

Calibrated system (Sistema tarato):
 Serial number **Mks332**
 Sensor **TIP RESISTANCE**
 Max. Capacity [MPa]: **100**
 Scaling Factor: **192020**
 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 Zealand
 Applied load measurement system:
 (Sistema di rilevamento del carico applicato)

Load cell:
 Manufacturer AEP transducers
 Model KAL 200 kN
 Serial Number 138913
 Power press: Easydur Italiana
 Manufacturer Aura 20T
 Model 29084
 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**



CONE CALIBRATION CERTIFICATE N° Z198/20

Calibrated system (Sistema tarato):
 Serial number **Mks332**
 Sensor **SLEEVE FRICTION**
 Max. Capacity [kPa]: **1600**
 Scaling Factor: **31096**

Addressee (destinatario):
 McMillan Drilling Ltd
 36 Hickory Place, Islington
 Christchurch 8042, New Zealand
 Applied load measurement system:
 (Sistema di rilevamento del carico applicato)

Load cell:
 Manufacturer AEP transducers
 Model KAL 50 kN
 Serial Number 65495
 Power press: Easydur Italiana
 Manufacturer Aura 10T
 Model 29002
 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 



CONE CALIBRATION CERTIFICATE N° Z198/20

Calibrated system (Sistema tarato):
 Serial number **Mks332**
 Sensor **PORE PRESSURE**
 Max. Capacity [kPa]: **2500**
 Scaling Factor: **10491**
 Sensor **TILT ANGLE**
 Max. Inclination [°]: **20**
 Scaling Factor: **279279**

Addressee (destinatario):
 McMillan Drilling Ltd
 36 Hickory Place, Islington
 Christchurch 8042, New Zealand
 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 41000V3Y

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: 13/02/2020
 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)
 Date of issue 06/11/2020

CONE CERTIFICATES



CONE CALIBRATION CERTIFICATE N° Z243/21

Calibrated system (Sistema tarato) :
 Serial number **Mks711**
 Sensor
 Max. Capacity [MPa]:
 Scaling Factor: **190850**
 Tip net area ratio (a_b):
 Sleeve net ratio (b_b):

Addressee (destinatario) :
 McMillan Drilling Ltd
 36 Hickory Place, Islington
 Christchurch 8042, New Zealand
 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: 22/01/2021
 Certificate N. LAT 091 2021-020
 Temperature of calibration 22°C
 Humidity 45%
 Factory calibration in accordance with **ASTM D5778-12**



CONE CALIBRATION CERTIFICATE N° Z243/21

Calibrated system (Sistema tarato) :
 Serial number **Mks711**
 Sensor
 Max. Capacity [kPa]:
 Scaling Factor: **31381**
 SLEEVE FRICTION

Addressee (destinatario) :
 McMillan Drilling Ltd
 36 Hickory Place, Islington
 Christchurch 8042, New Zealand
 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: 22/01/2021

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 11/10/2021



CONE CALIBRATION CERTIFICATE N° Z243/21

Calibrated system (Sistema tarato) :
 Serial number **Mks711**
 Sensor
 Max. Capacity [kPa]:
 Scaling Factor: **10222**
 PORE PRESSURE
 Sensor
 Max. Inclination [°]:
 Scaling Factor: **279279**
 TILT ANGLE

Addressee (destinatario) :
 McMillan Drilling Ltd
 36 Hickory Place, Islington
 Christchurch 8042, New Zealand
 Applied load measurement system:
 (Sistema di rilevamento del carico applicato)

Pressure Generator:
 Manufacturer MENSOR
 Model CPC 4000
 Serial Number 41000V56
 Sensor Descri 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: 04/05/2021

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 11/10/2021

Client:	Tetrad Consulting	Bore No.:	HA001
Project:	Various locations, Christchurch	Job No.:	20469

Site Location: 9 Grove Road, Christchurch
Grid Reference: 1569080.86m E, 5178749.27m N (NZTM) - Map or aerial photograph
Elevation: 0.00m **Datum:** Ground
Date: 25/11/2021 - 25/11/2021
Operator: G. Cossar
Equipment: Hand auger and Scala Penetrometer

Soil Description Logged to NZGS guidelines by G. Cossar	Legend	Depth (m)	Scala Penetrometer NZS 4402.6.5.2 (Blows / 100mm)	Hand Shear Vane (Uncorrected)	Water
Sandy SILT with trace of organics; light brown. Moist; low plasticity; sand, fine, poorly graded.		0.0 - 0.1	6		
		0.1 - 0.2	6		
		0.2 - 0.3	1		
		0.3 - 0.4	2		
Fine SAND with minor silt; light brown. Wet; poorly graded.		0.4 - 0.5	1		
		0.5 - 0.6	2		
		0.6 - 0.7	3		
		0.7 - 0.8	4		
		0.8 - 0.9	2		
		0.9 - 1.0	3		
		1.0 - 1.1	3		
		1.1 - 1.2	2		
		1.2 - 1.3	3		
Fine to medium SAND; light brown. Wet; moderately graded.		1.3 - 1.4	4		
		1.4 - 1.5	10		
		1.5 - 1.6	6		
		1.6 - 1.7	10		
		1.7 - 1.8	11		
		1.8 - 1.9	15		
		1.9 - 2.0	16		
		2.0 - 2.1			

Remarks
 Termination Hand Auger: Effective refusal
 Termination Scala Test: Target depth

Client:	Tetrad Consulting	Bore No.:	HA002
Project:	Various locations, Christchurch	Job No.:	20469

Site Location: 69 Poulson Street, Christchurch
Grid Reference: 1569028.09m E, 5178775.3m N (NZTM) - Map or aerial photograph
Elevation: 0.00m **Datum:** Ground
Date: 25/11/2021 - 25/11/2021
Operator: G. Cossar
Equipment: Hand auger and Scala Penetrometer

Soil Description Logged to NZGS guidelines by G. Cossar	Legend	Depth (m)	Scala Penetrometer NZS 4402.6.5.2 (Blows / 100mm)	Hand Shear Vane (Uncorrected)	Water
SILT with minor sand, trace of organics and brick fragments; greyish brown. Soft; dry; low plasticity; sand, fine, poorly graded.		0.1 0.2 0.3	5 3 3		
Fine to medium SAND with minor silt; light brown. Moist; moderately graded.		0.4 0.5 0.6	1 1 2		
Fine SAND with trace of silt; grey. Moist to wet; poorly graded.		0.7 0.8 0.9 1.0 1.1 1.2 1.3	3 2 2 2 3 4 3		
		1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1	13 20		

Remarks Termination Hand Auger: Effective refusal Termination Scala Test: Effective refusal	
120 High Street, Southbridge 7602, Canterbury, New Zealand ph: (03) 324 2571 fax: (03) 324 2431 web: www.drilling.co.nz	Hole Depth: 1.5m Page 1 of 1

Client:	Tetrad Consulting	Bore No.:	HA003
Project:	Various locations, Christchurch	Job No.:	20469

Site Location: 45 Dickens Street, Christchurch
Grid Reference: 1569019.45m E, 5178747.41m N (NZTM) - Map or aerial photograph
Elevation: 0.00m **Datum:** Ground
Date: 29/11/2021 - 29/11/2021
Operator: G. Cossar
Equipment: Hand auger and Scala Penetrometer

Soil Description Logged to NZGS guidelines by G. Cossar	Legend	Depth (m)	Scala Penetrometer NZS 4402.6.5.2 (Blows / 100mm)	Hand Shear Vane (Uncorrected)	Water
SILT with some sand and trace of organics; dark brown. Very soft; moist; low plasticity; sand, fine, poorly graded.		1 0.1 1 0.2 3 0.3			
SILT with trace of sand; light brown mottled orange. Soft; moist to wet; low plasticity; sand, fine, poorly graded.		3 0.4 2 0.5 2 0.6 5 0.7 4 0.8 4 0.9 6 1.0 4 1.1 5 1.2 7 1.3 5 1.4			
Silty fine to medium SAND; light brownish grey. Wet; poorly graded.		6 1.0 4 1.1 5 1.2 7 1.3 5 1.4			
Medium to coarse SAND; light brown. Wet; moderately graded.		4 1.5 5 1.6 6 1.7 6 1.8 5 1.9 6 2.0			
		1.7 6 1.8 5 1.9 6 2.0 2.1			

Remarks
 Termination Hand Auger: Effective refusal
 Termination Scala Test: Target depth

Client:	Tetrad Consulting	Bore No.:	HA004
Project:	Various locations, Christchurch	Job No.:	20469

Site Location: 45 Dickens Street, Christchurch

Date: 29/11/2021 - 29/11/2021

Grid Reference: 1568993.13m E, 5178722.67m N (NZTM) - Map or aerial photograph

Operator: G. Cossar

Elevation: 0.00m

Datum: Ground

Equipment: Hand auger and Scala Penetrometer

Soil Description Logged to NZGS guidelines by G. Cossar	Legend	Depth (m)	Scala Penetrometer NZS 4402.6.5.2 (Blows / 100mm)	Hand Shear Vane (Uncorrected)	Water
SILT with minor sand and trace of organics; dark brown. Soft; moist; low plasticity; sand, fine, poorly graded.		0.0 - 0.4	4		
Fine to medium SAND; light brownish grey. Moist; moderately graded.		0.4 - 1.0	3		
Fine SAND with minor silt; light brown. Wet; poorly graded.		1.0 - 1.3	4		
Coarse SAND; light brown. Wet; poorly graded.		1.3 - 1.9	4, 5, 8, 10, 15, 20		

Remarks

Termination Hand Auger: Effective refusal
Termination Scala Test: Effective refusal

Appendix B

- Liquefaction analysis results for:
 - SLS1 0.13g
 - SLS2 0.19g
 - ULS 0.35 g



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LIQUEFACTION ANALYSIS REPORT

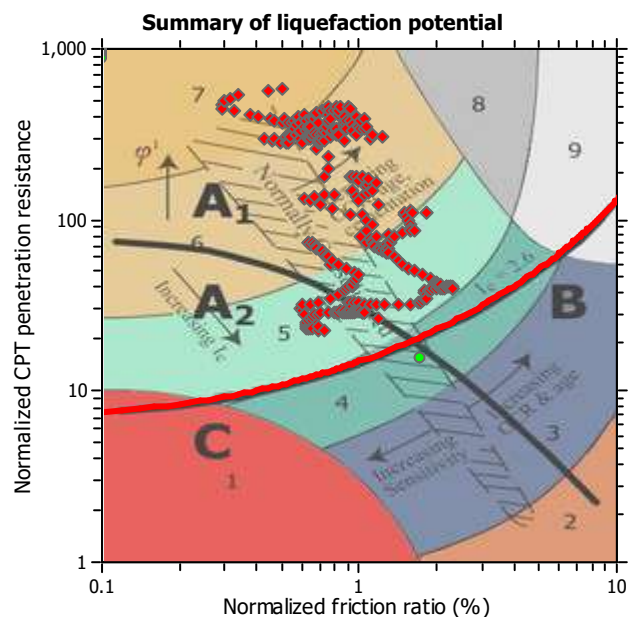
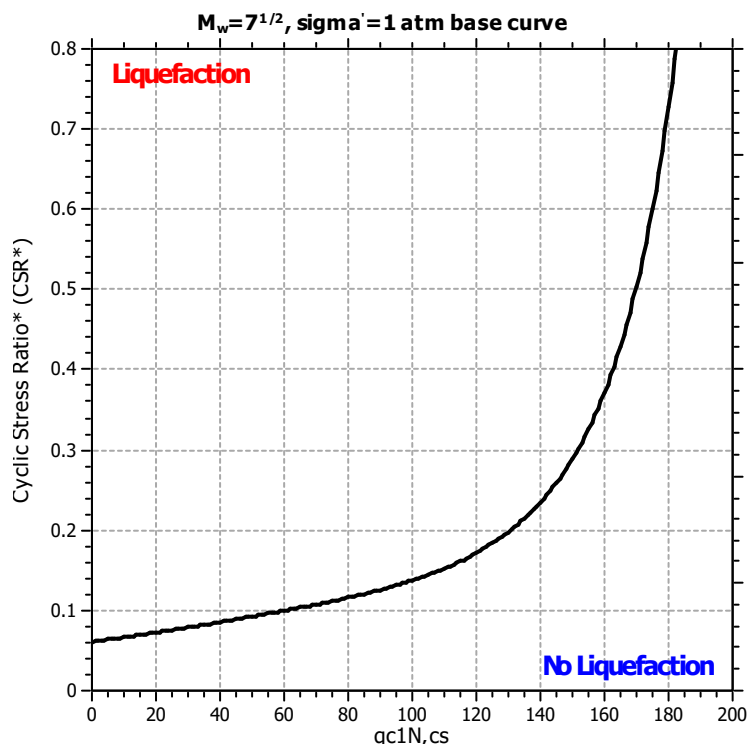
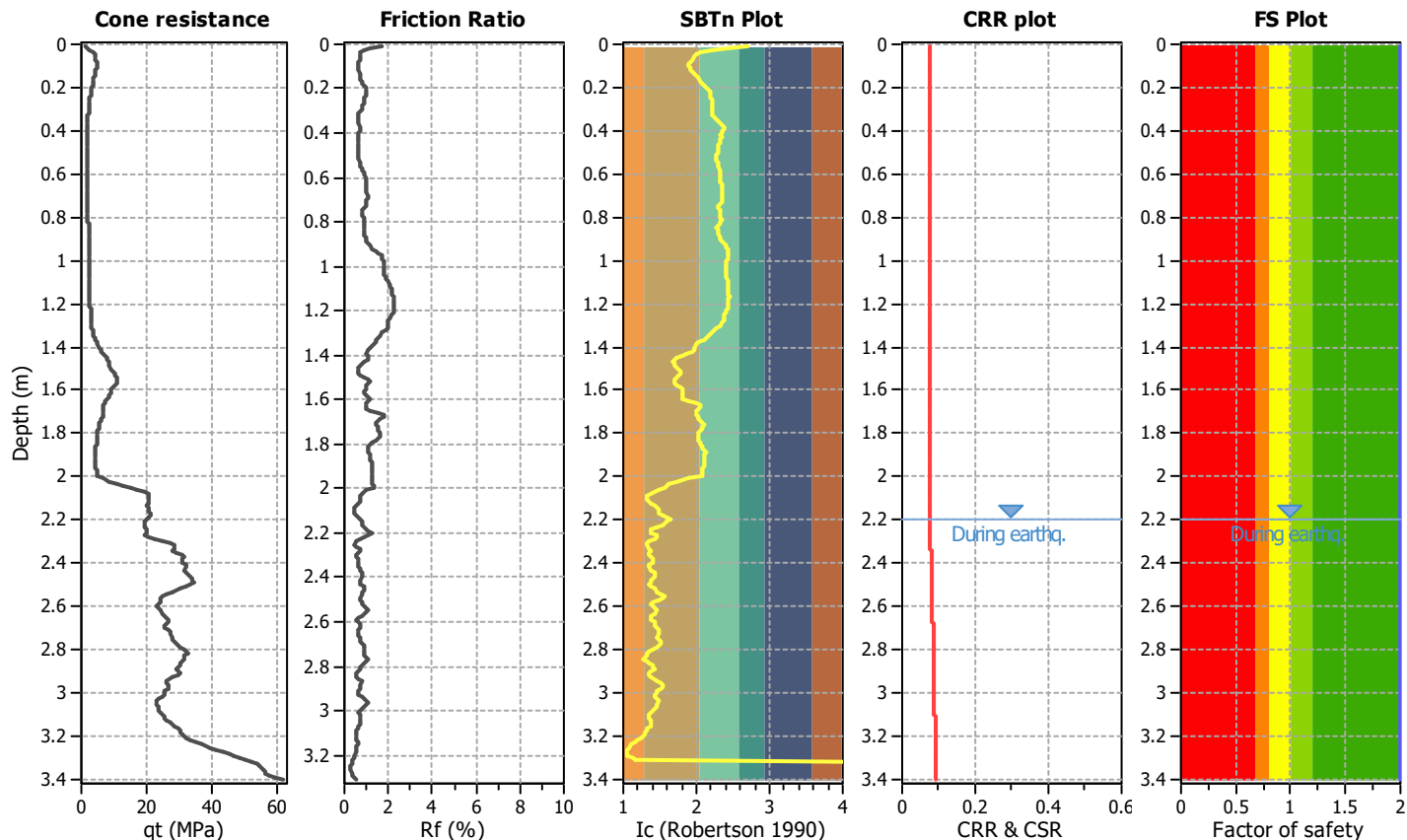
Project title : Multi-unit development

Location : 69 Poulson St, 45 Dickens St and 9 Grove rd, Christchurch

CPT file : CPT01_Top_Component

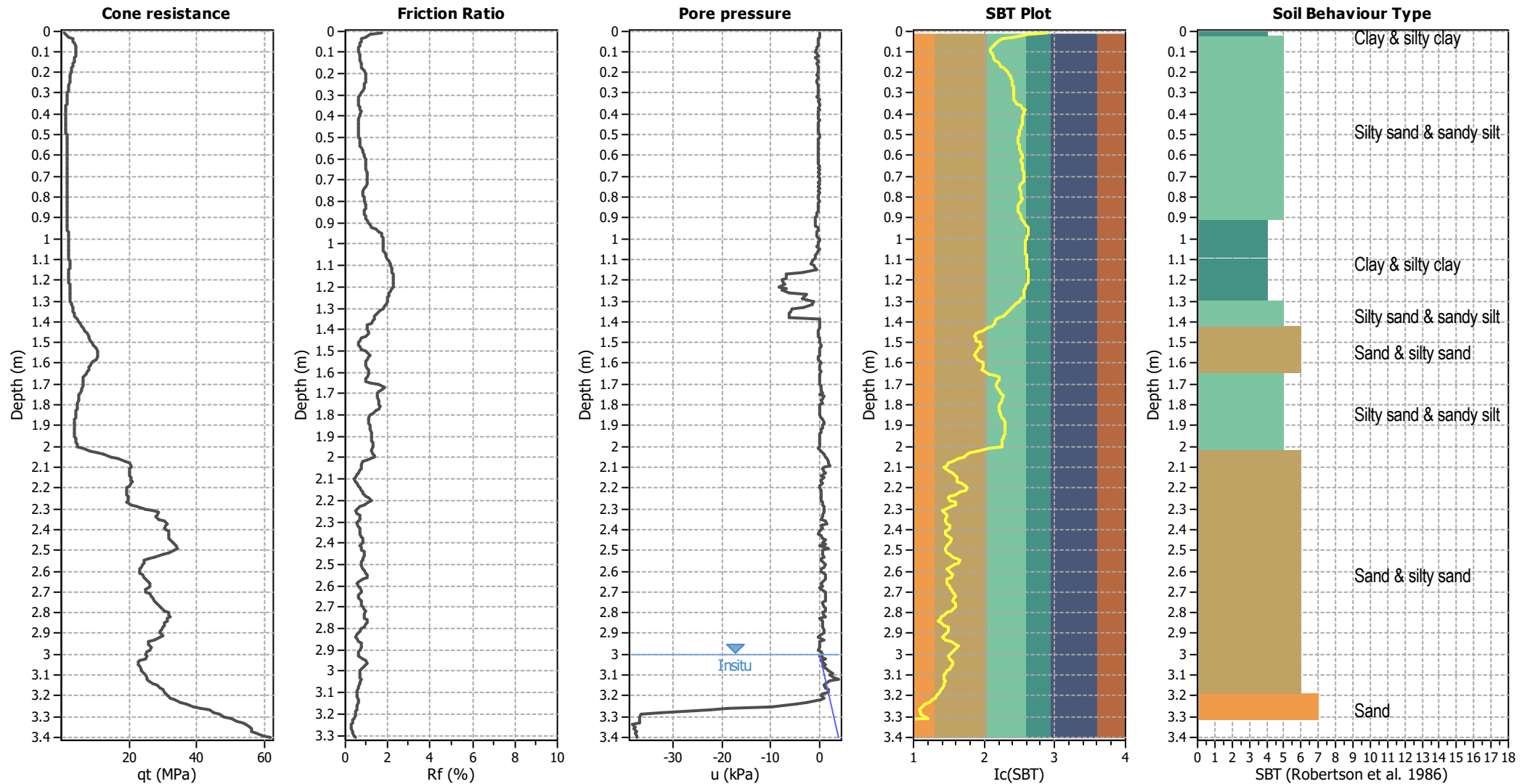
Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.20 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:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



Zone A₁: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A₂: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
 Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
 Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



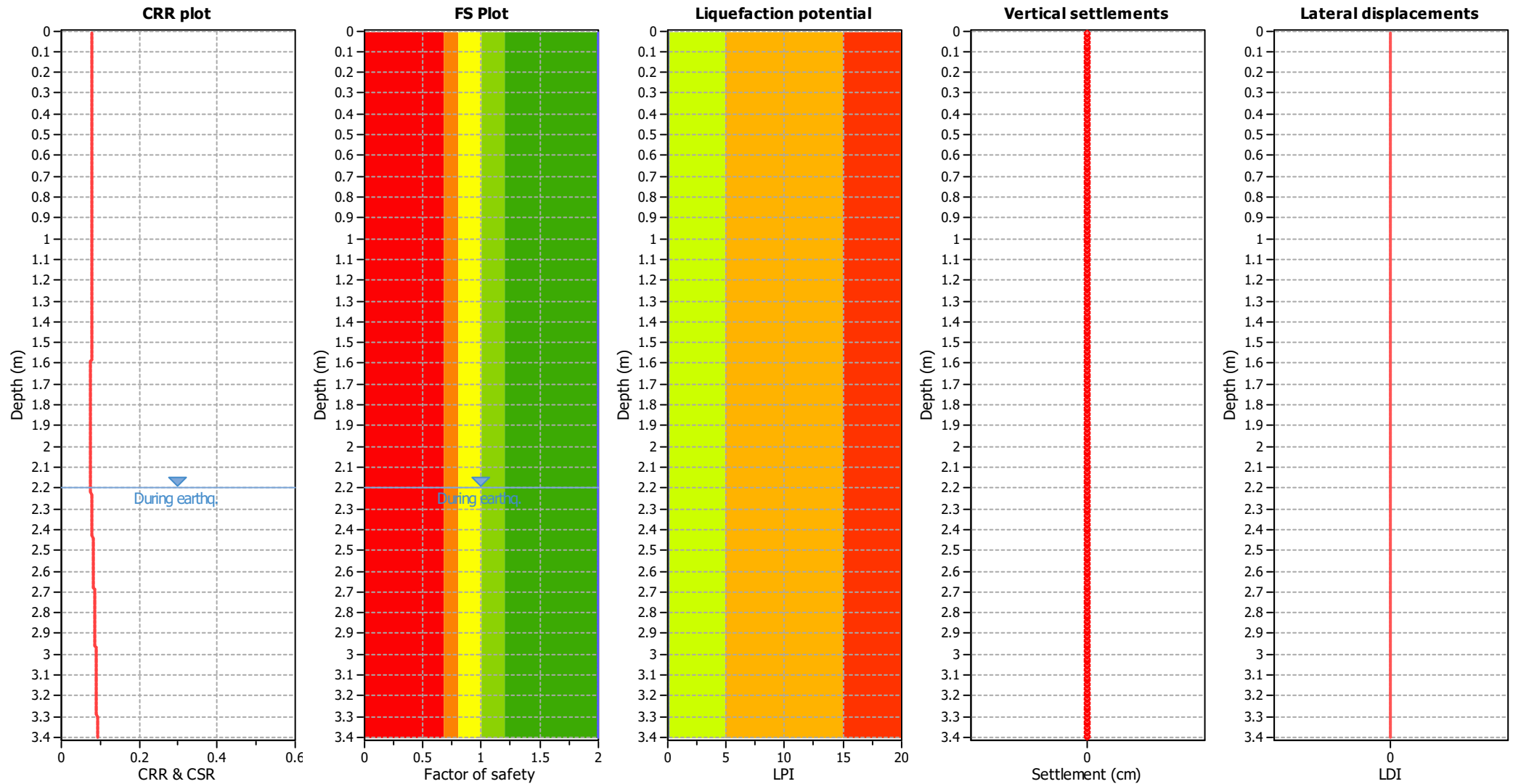
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on I_c value	I_c cut-off value:	2.60	K_0 applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_0 applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

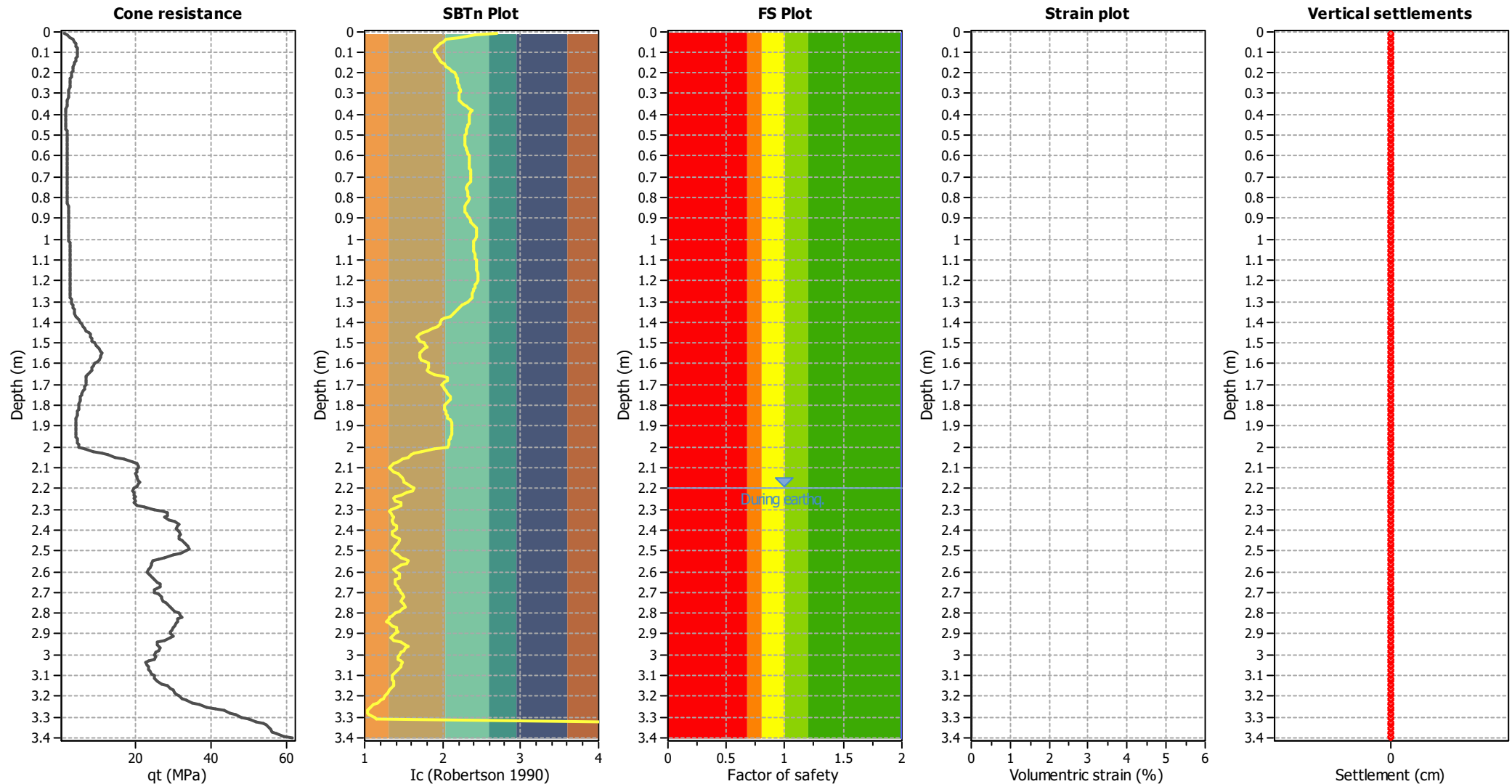
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Light Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LPI color scheme

Red	Very high risk
Orange	High risk
Yellow	Low risk

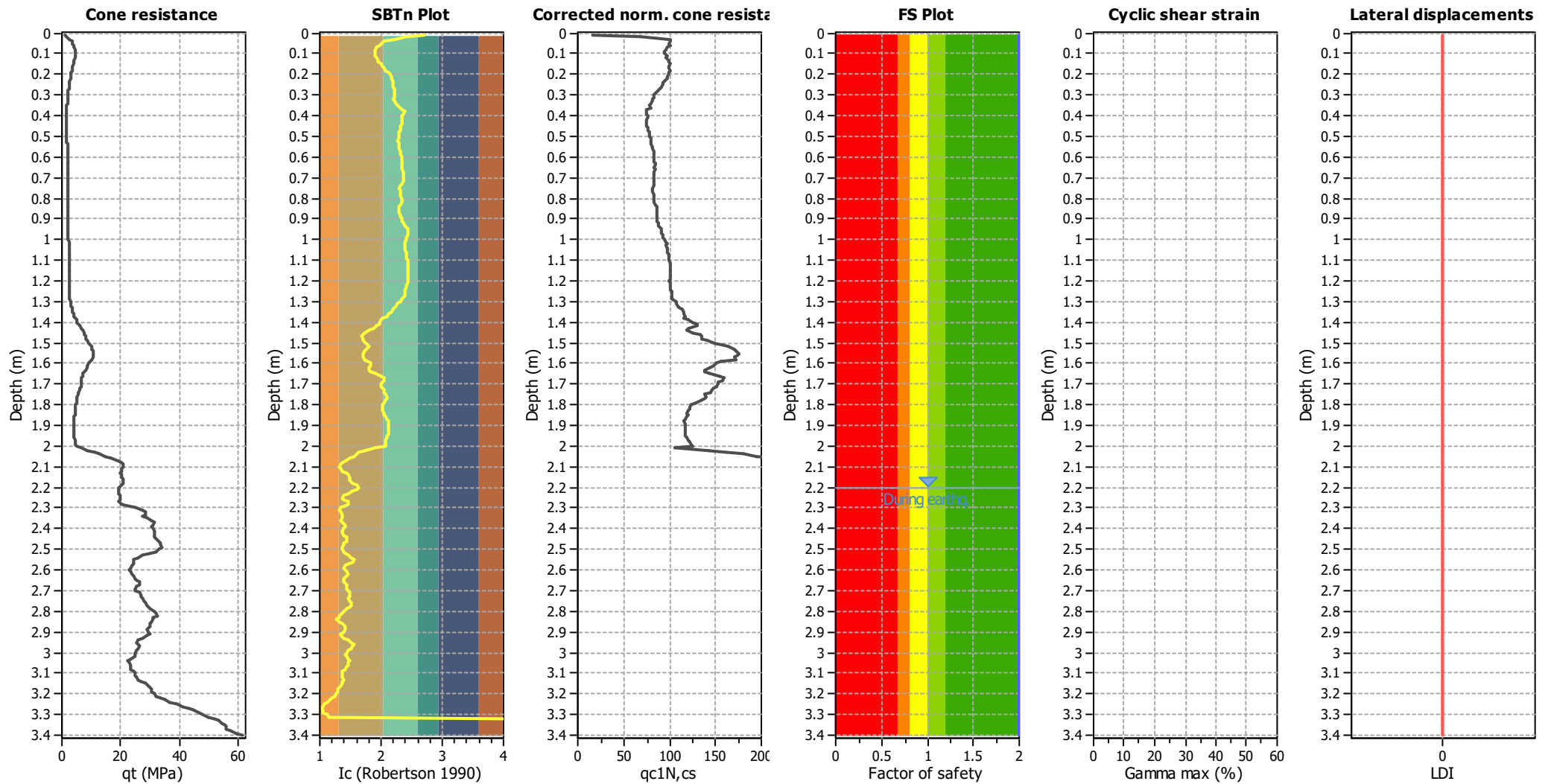
Estimation of post-earthquake settlements



Abbreviations

q_c : Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 FS: Calculated Factor of Safety against liquefaction
 Volumetric strain: Post-liquefaction volumetric strain

Estimation of post-earthquake lateral Displacements



Abbreviations

qt: Total cone resistance (cone resistance q_c corrected for pore water effects)
 Ic: Soil Behaviour Type Index
 qc1N,cs: Equivalent clean sand normalized CPT total cone resistance

F.S.: Factor of safety
 γ_{max} : Maximum cyclic shear strain
 LDI: Lateral displacement index

LIQUEFACTION ANALYSIS REPORT

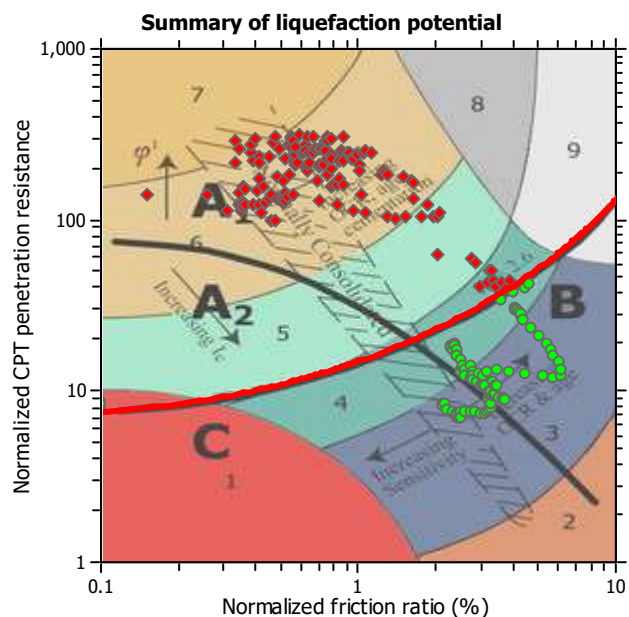
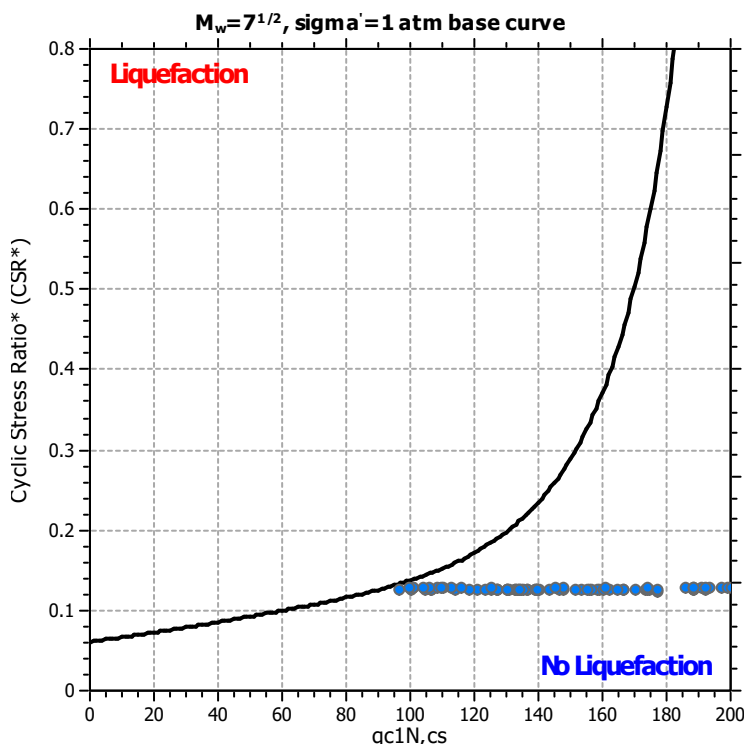
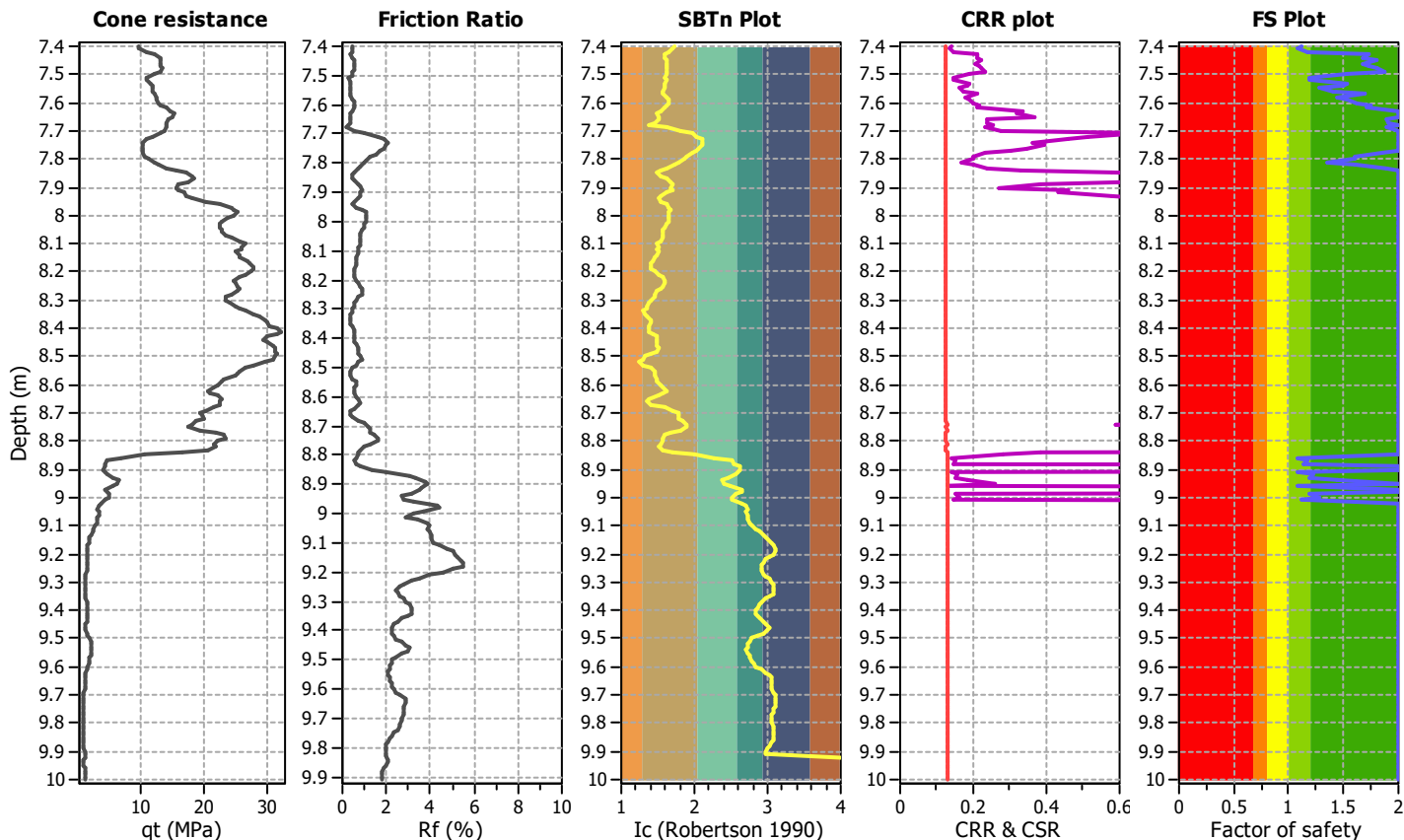
Project title : Multi-unit development

Location : 69 Poulson St, 45 Dickens St and 9 Grove rd, Christchurch

CPT file : CPT-01_Lower_Component

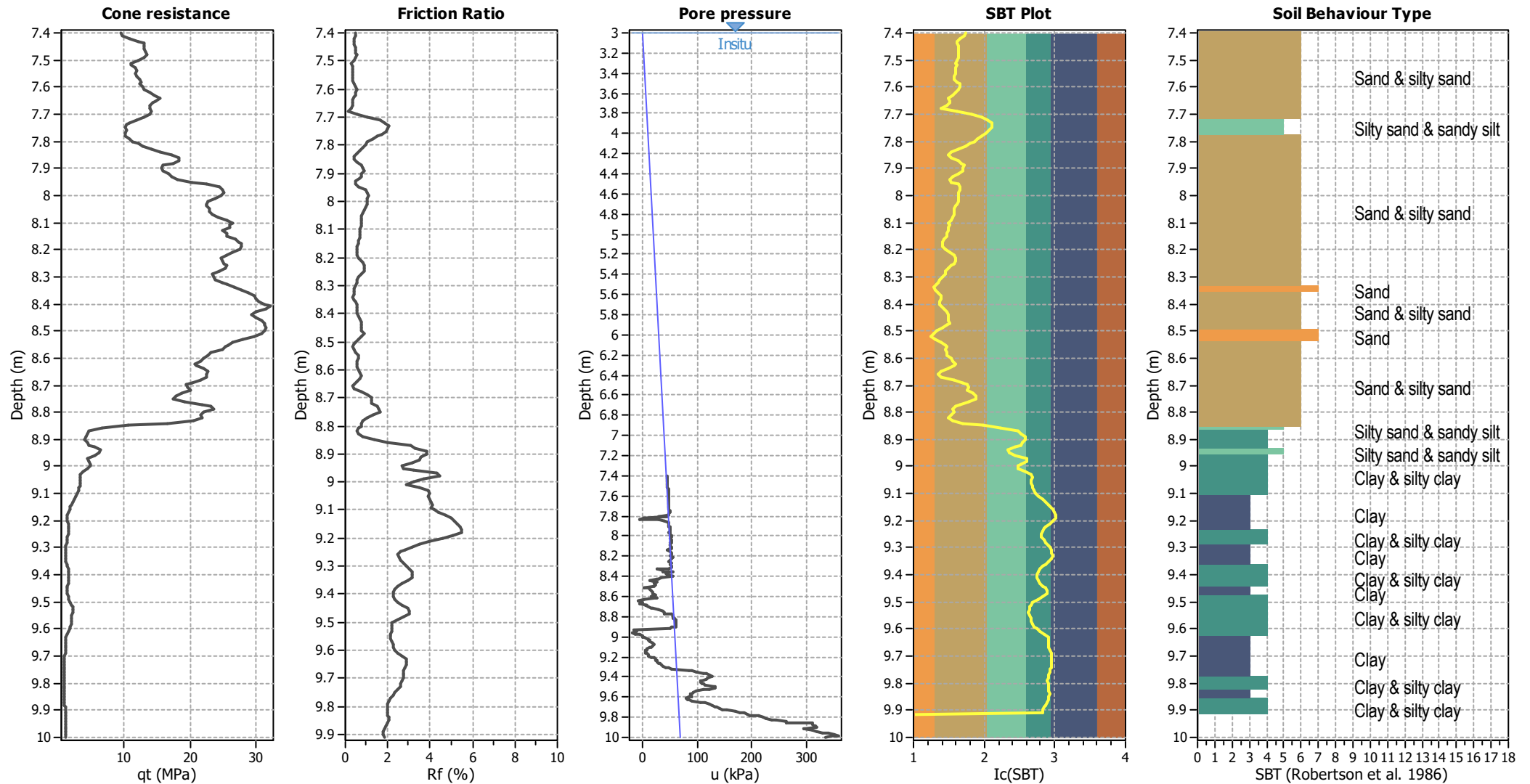
Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.20 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:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



Zone A₁: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A₂: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
 Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
 Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots

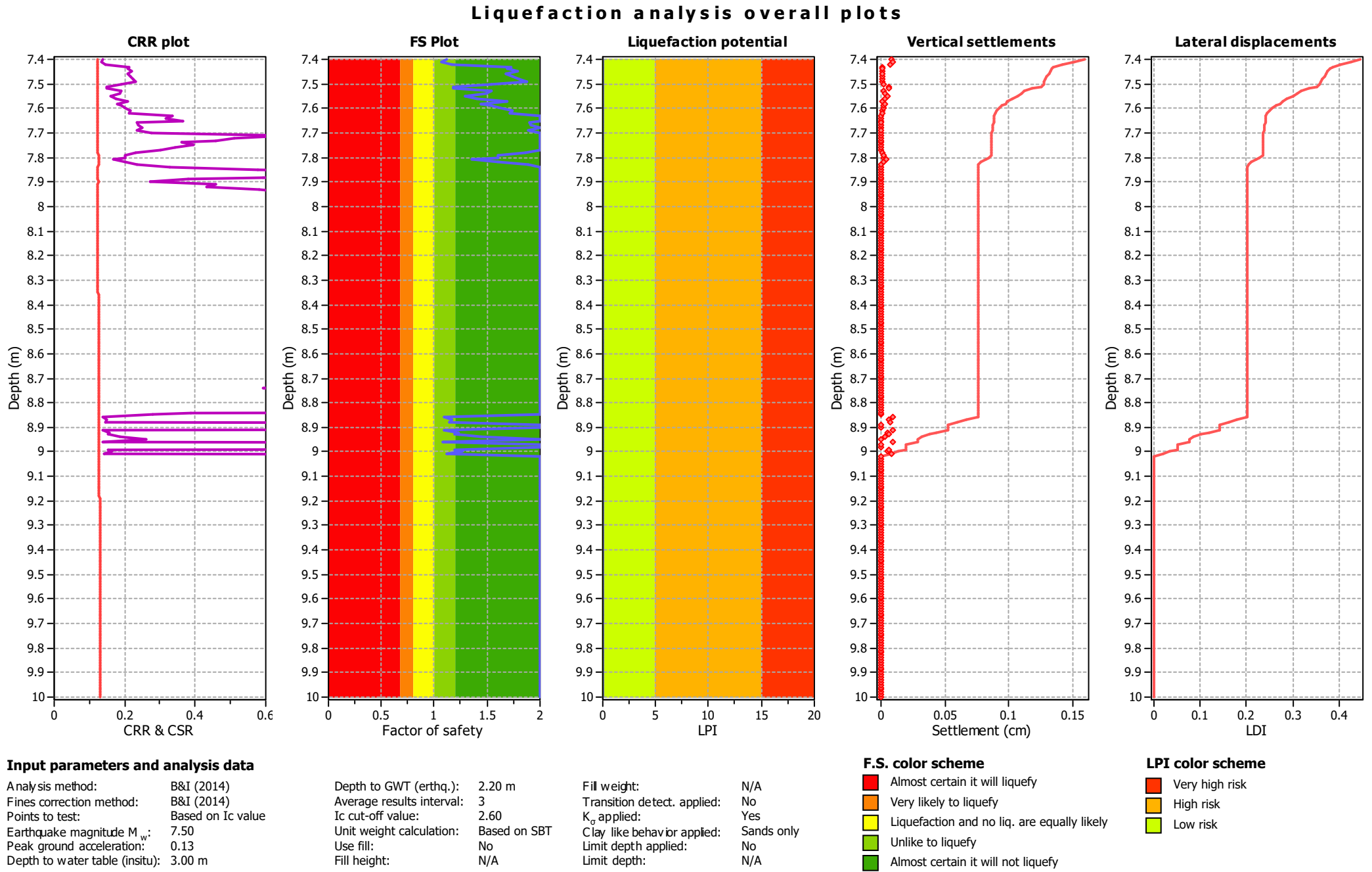


Input parameters and analysis data

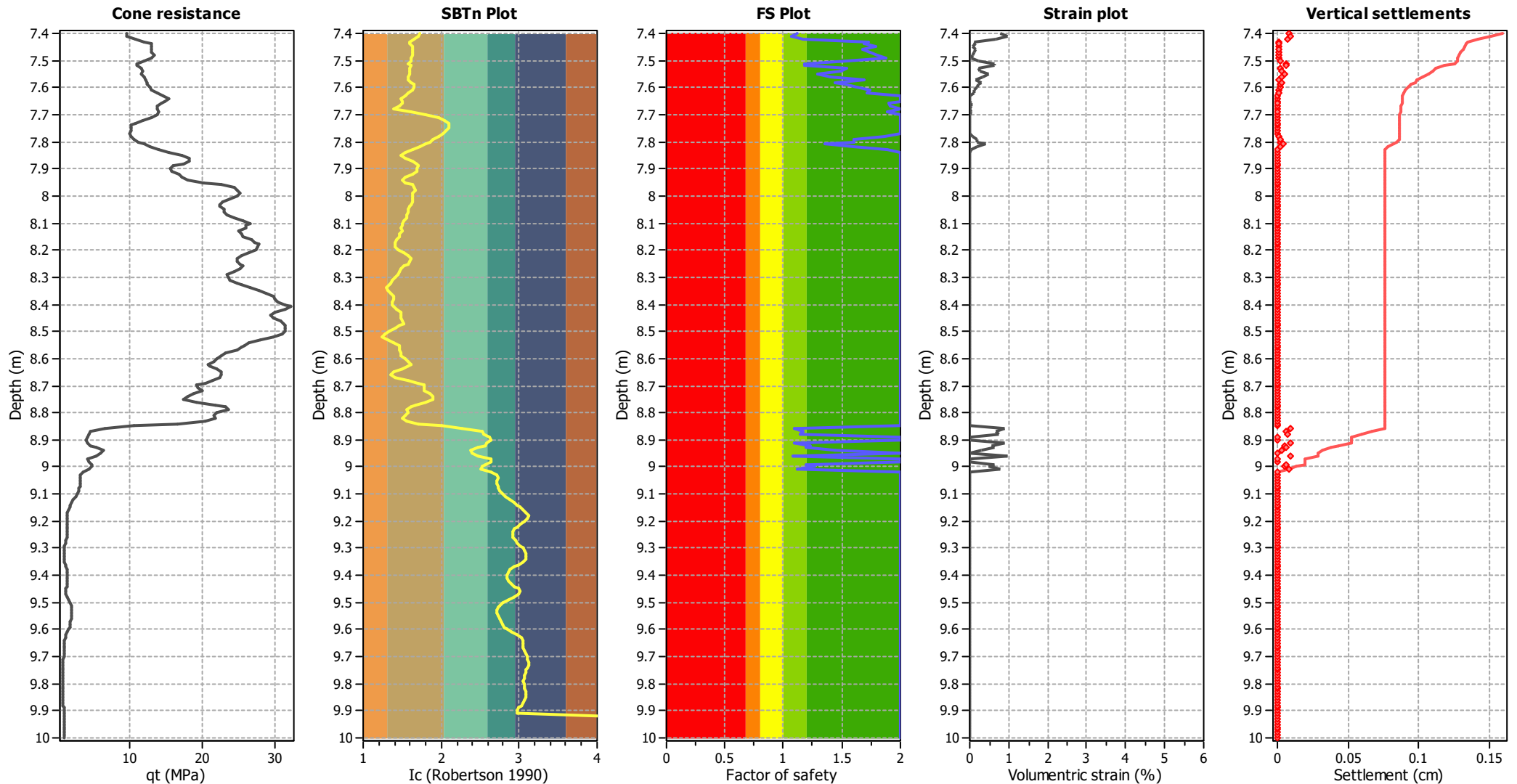
Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on I_c value	I_c cut-off value:	2.60	K_0 applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained



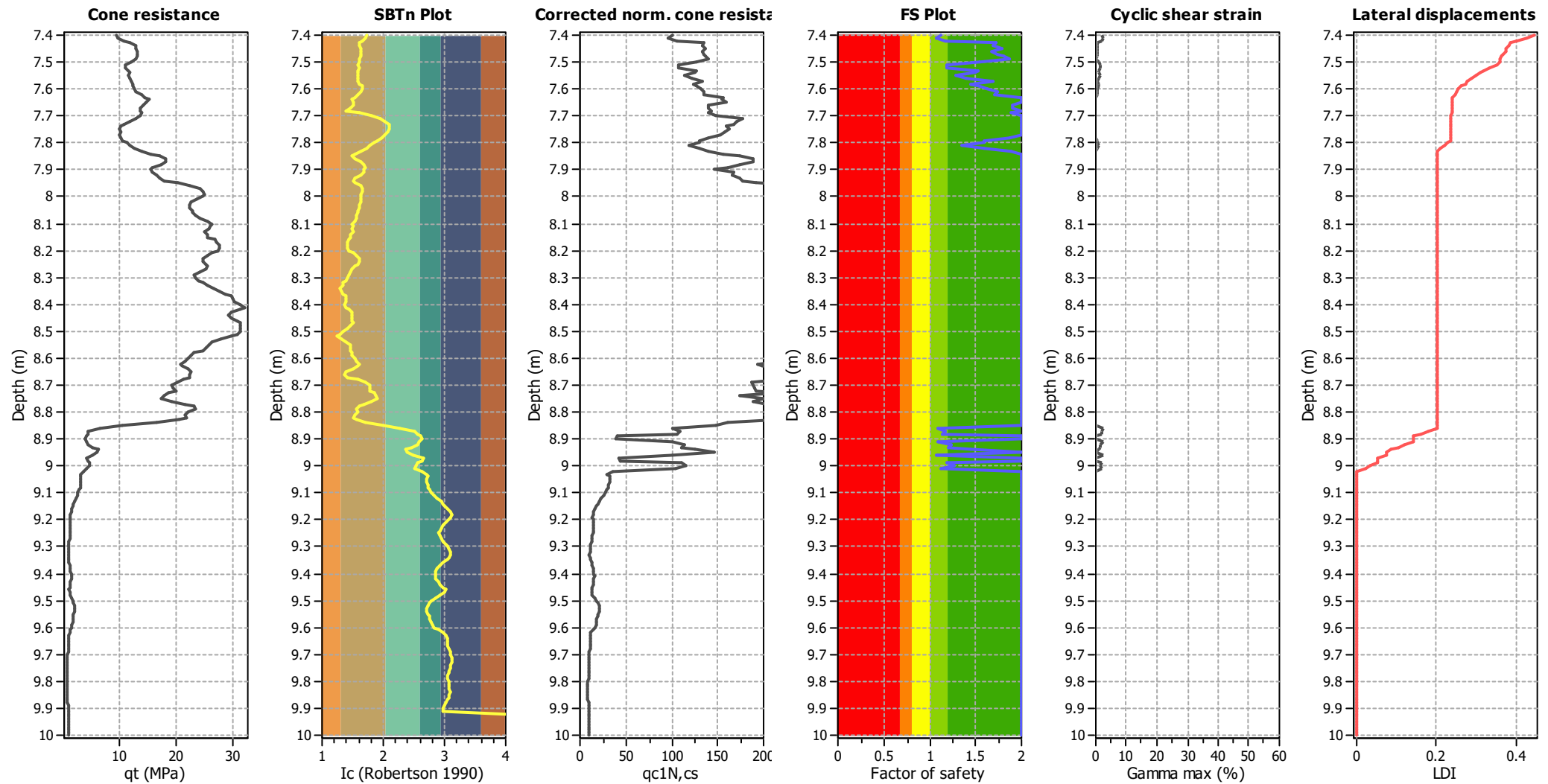
Estimation of post-earthquake settlements



Abbreviations

- q_c: Total cone resistance (cone resistance q_c corrected for pore water effects)
- I_c: Soil Behaviour Type Index
- FS: Calculated Factor of Safety against liquefaction
- Volumetric strain: Post-liquefaction volumetric strain

Estimation of post-earthquake lateral Displacements



Abbreviations

q_t : Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 $q_{c1N,cs}$: Equivalent clean sand normalized CPT total cone resistance

F.S.: Factor of safety
 γ_{max} : Maximum cyclic shear strain
 LDI: Lateral displacement index

LIQUEFACTION ANALYSIS REPORT

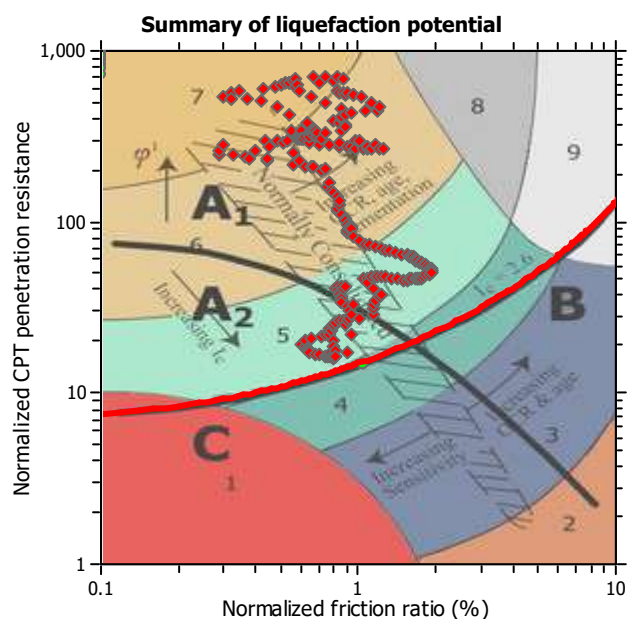
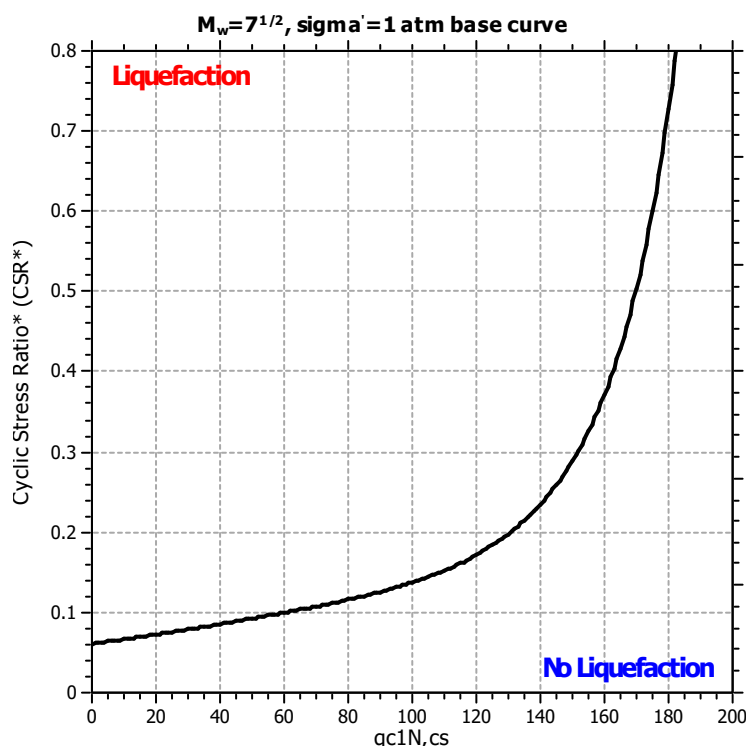
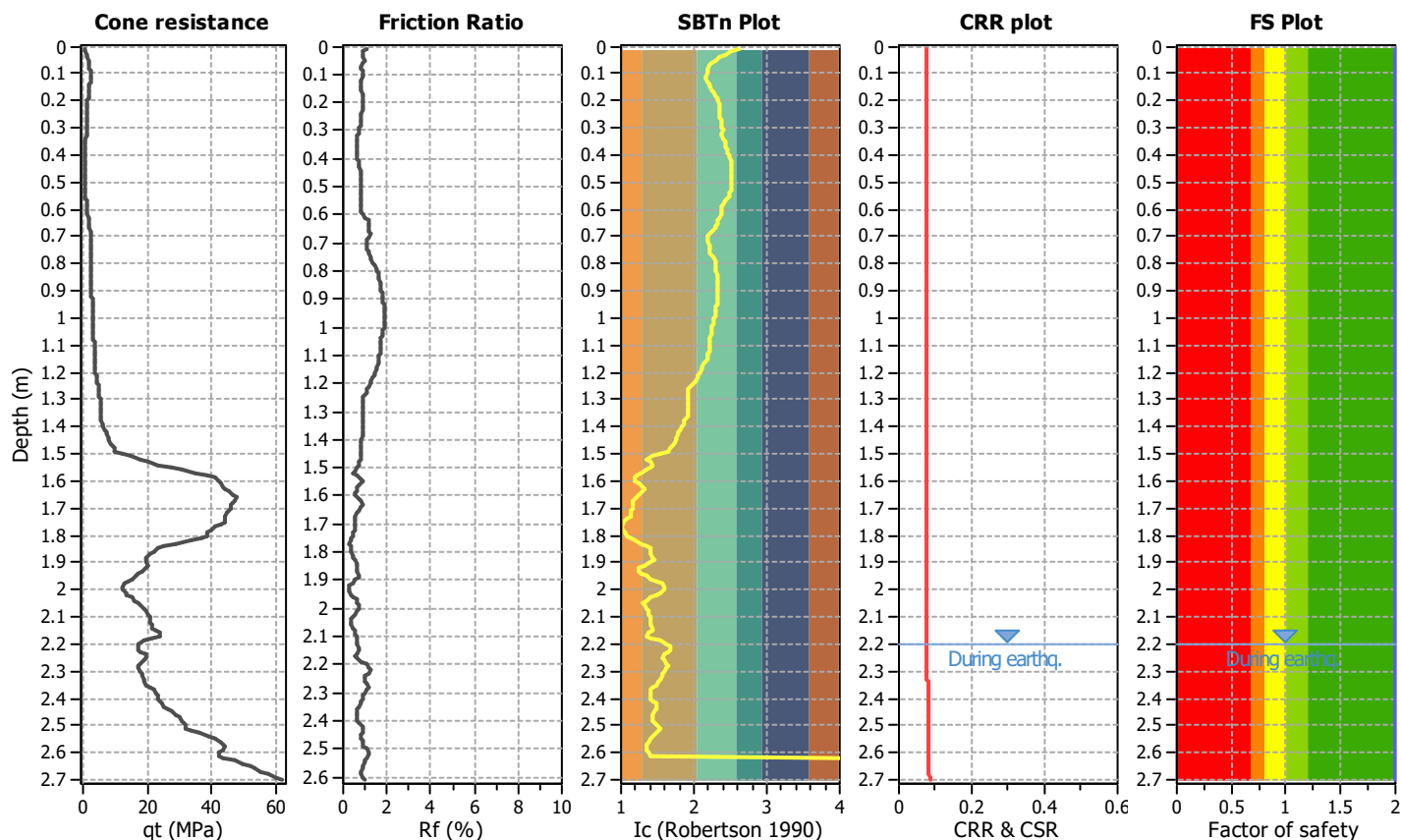
Project title : Multi-unit development

Location : 69 Poulson St, 45 Dickens St and 9 Grove rd, Christchurch

CPT file : CPT-02_Top_Component

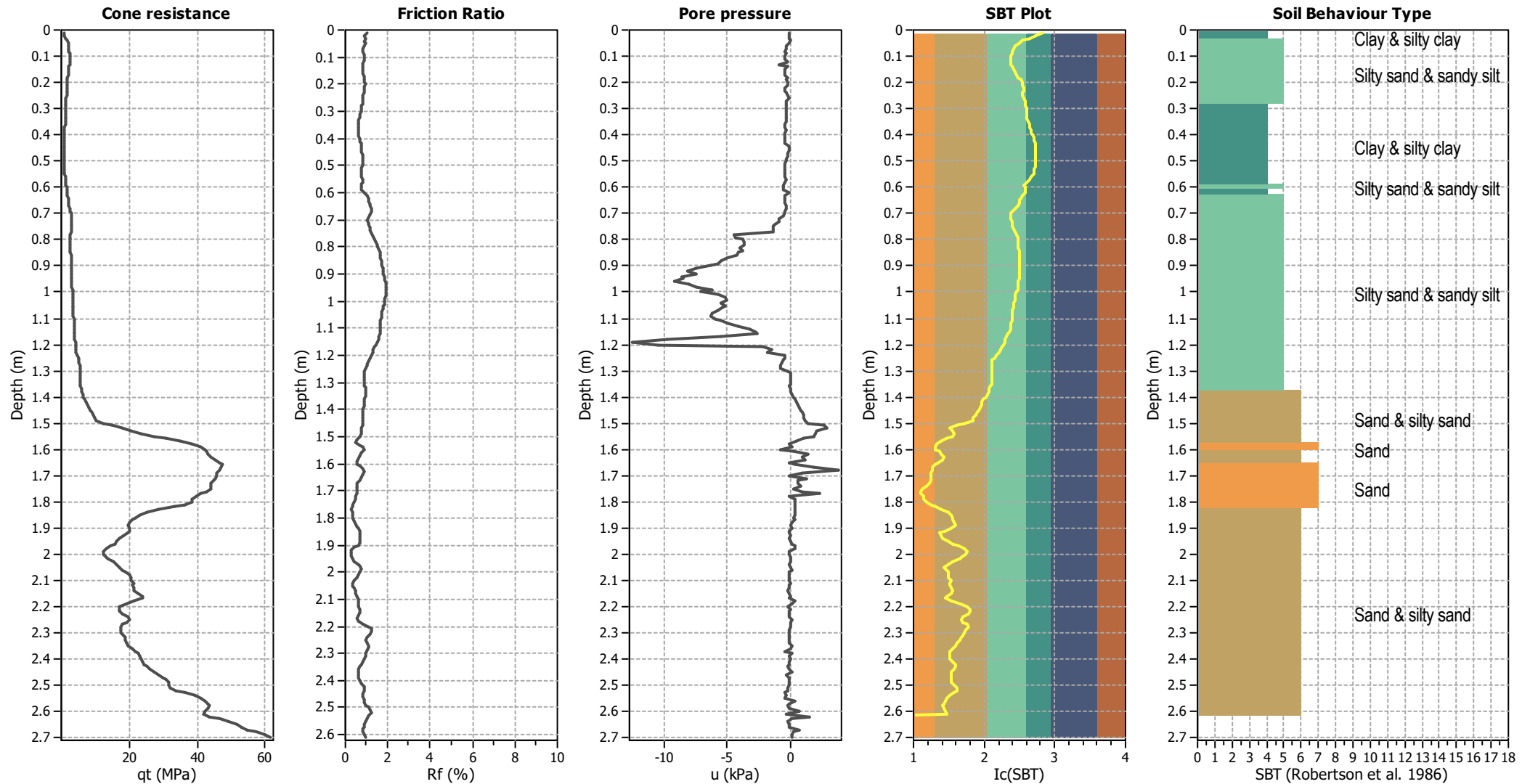
Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.20 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:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



Zone A₁: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A₂: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
 Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
 Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



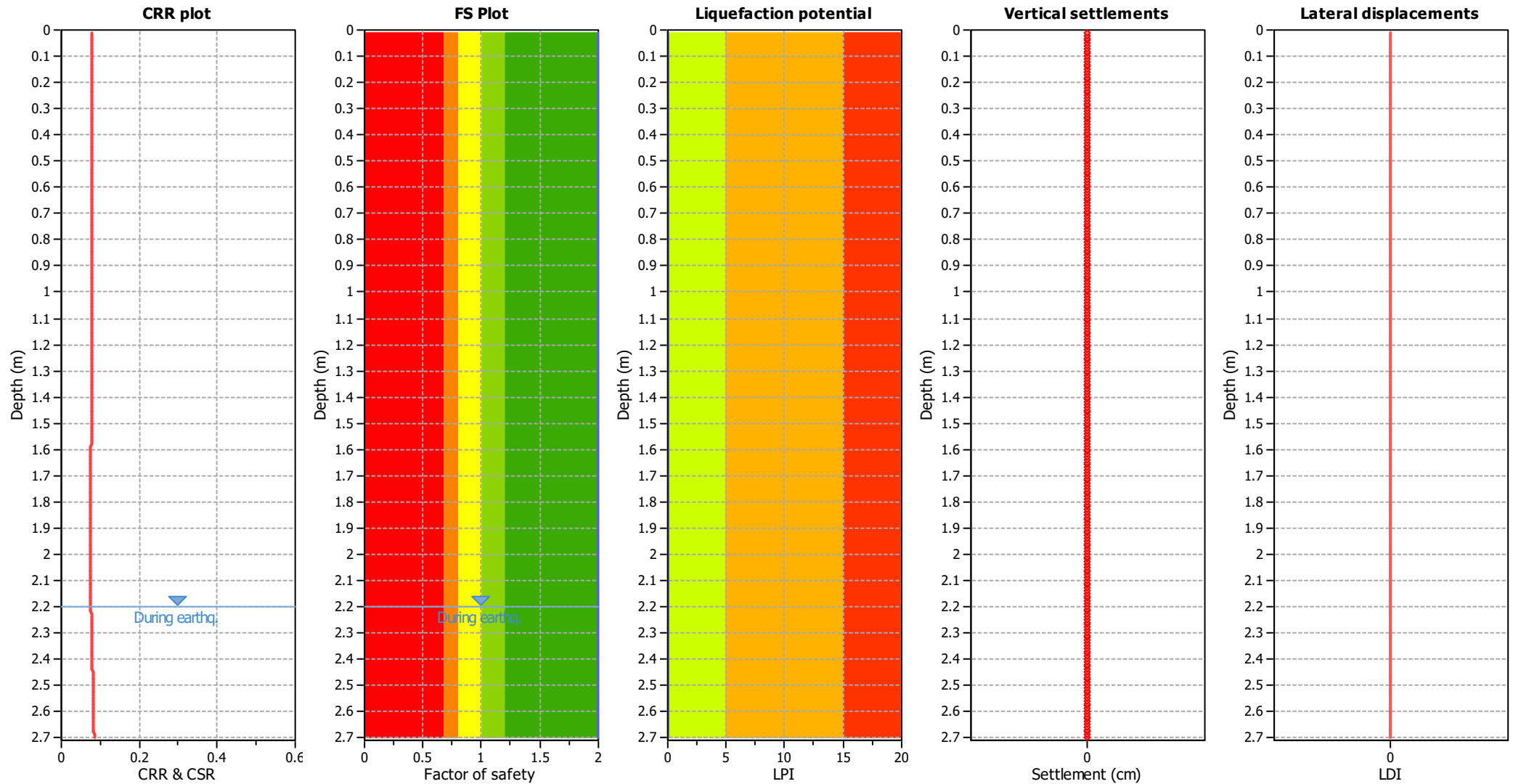
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on I_c value	I_c cut-off value:	2.60	K_0 applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _o applied:	Yes
Earthquake magnitude M _w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

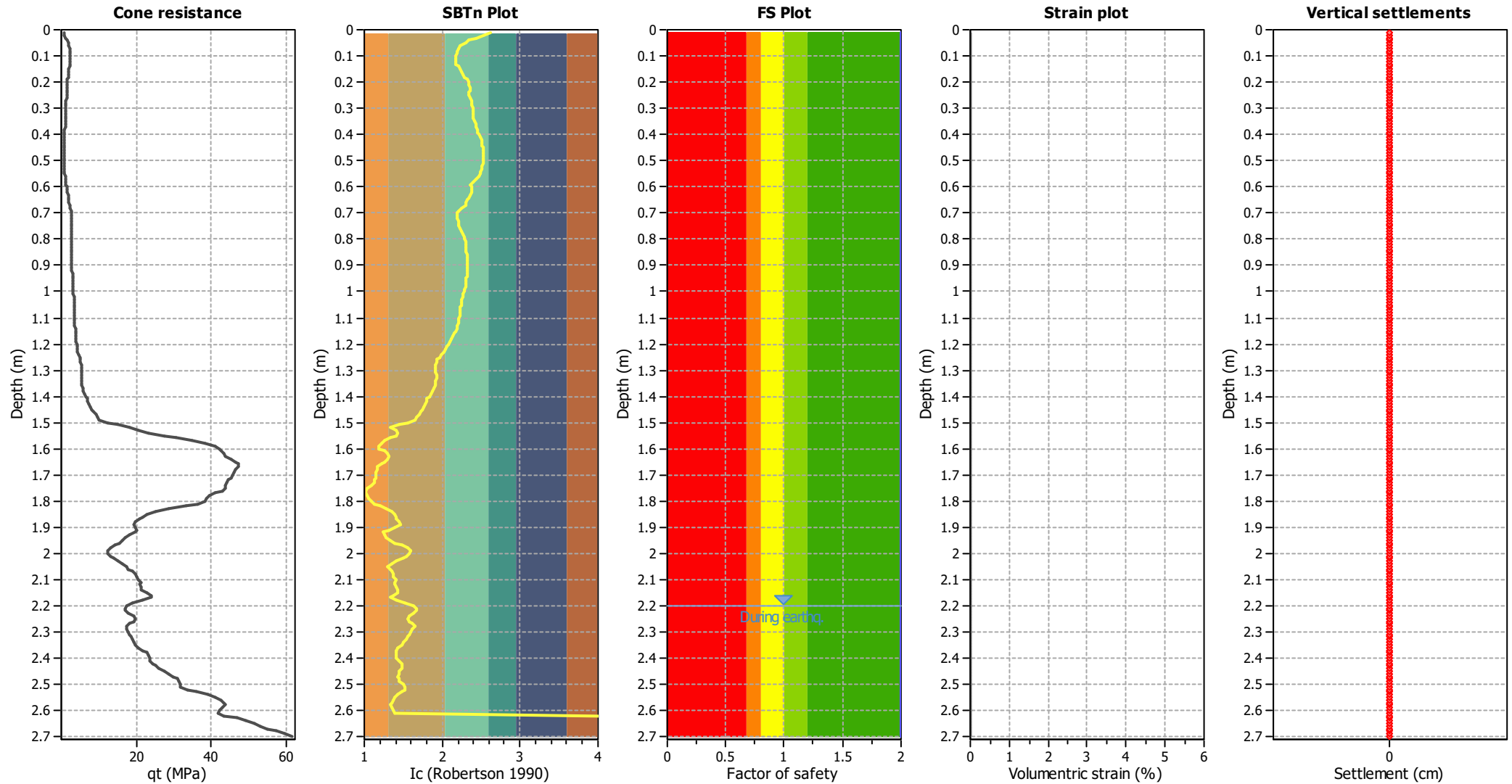
F.S. color scheme

■	Almost certain it will liquefy
■	Very likely to liquefy
■	Liquefaction and no liq. are equally likely
■	Unlike to liquefy
■	Almost certain it will not liquefy

LPI color scheme

■	Very high risk
■	High risk
■	Low risk

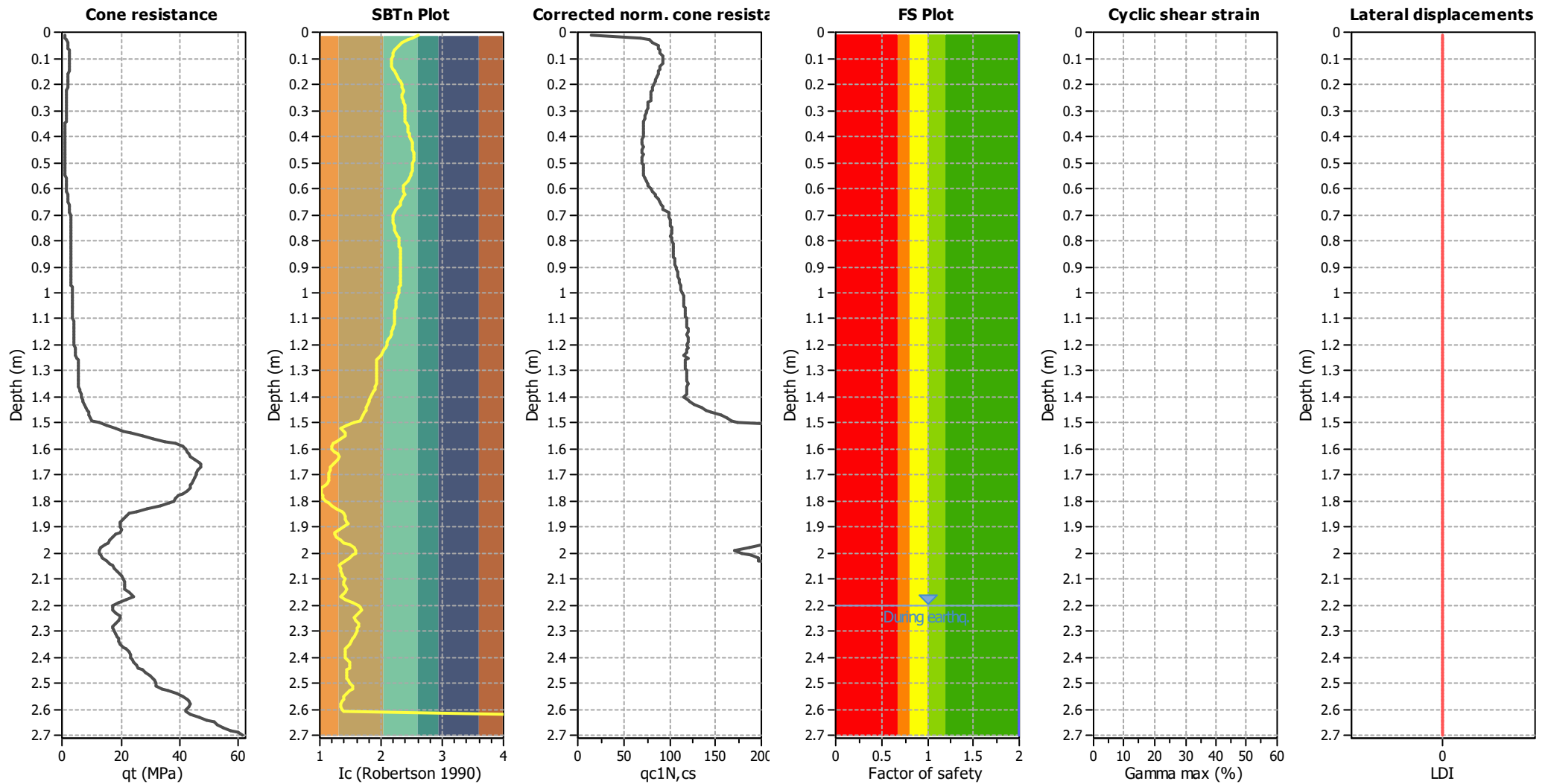
Estimation of post-earthquake settlements



Abbreviations

q_c : Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 FS: Calculated Factor of Safety against liquefaction
 Volumetric strain: Post-liquefaction volumetric strain

Estimation of post-earthquake lateral Displacements



Abbreviations

qt: Total cone resistance (cone resistance q_c corrected for pore water effects)
 Ic: Soil Behaviour Type Index
 qc1N,cs: Equivalent clean sand normalized CPT total cone resistance

F.S.: Factor of safety
 γ_{max} : Maximum cyclic shear strain
 LDI: Lateral displacement index

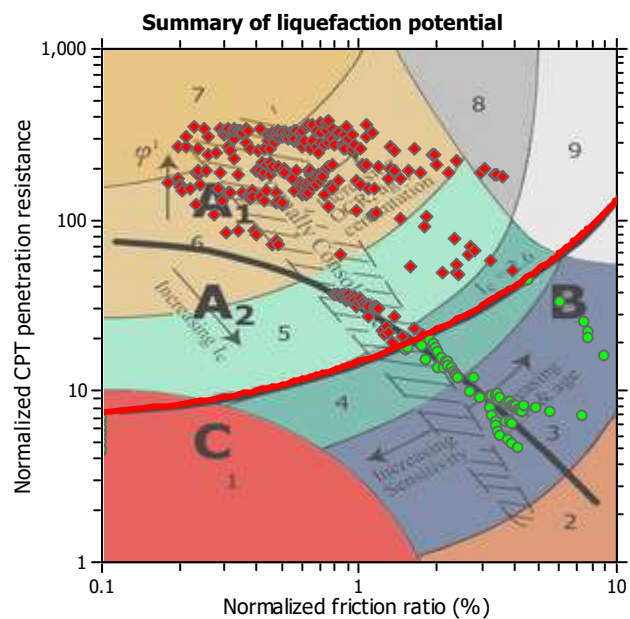
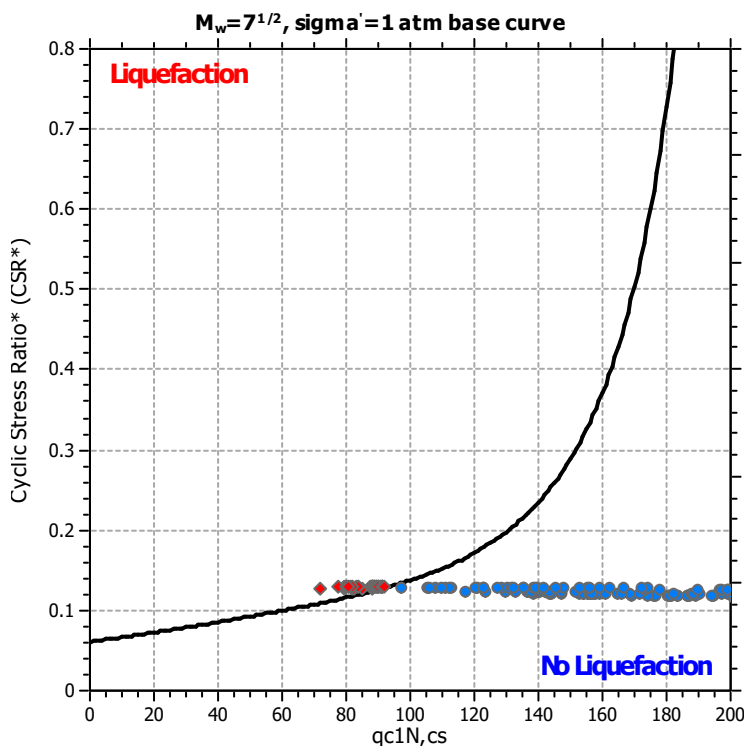
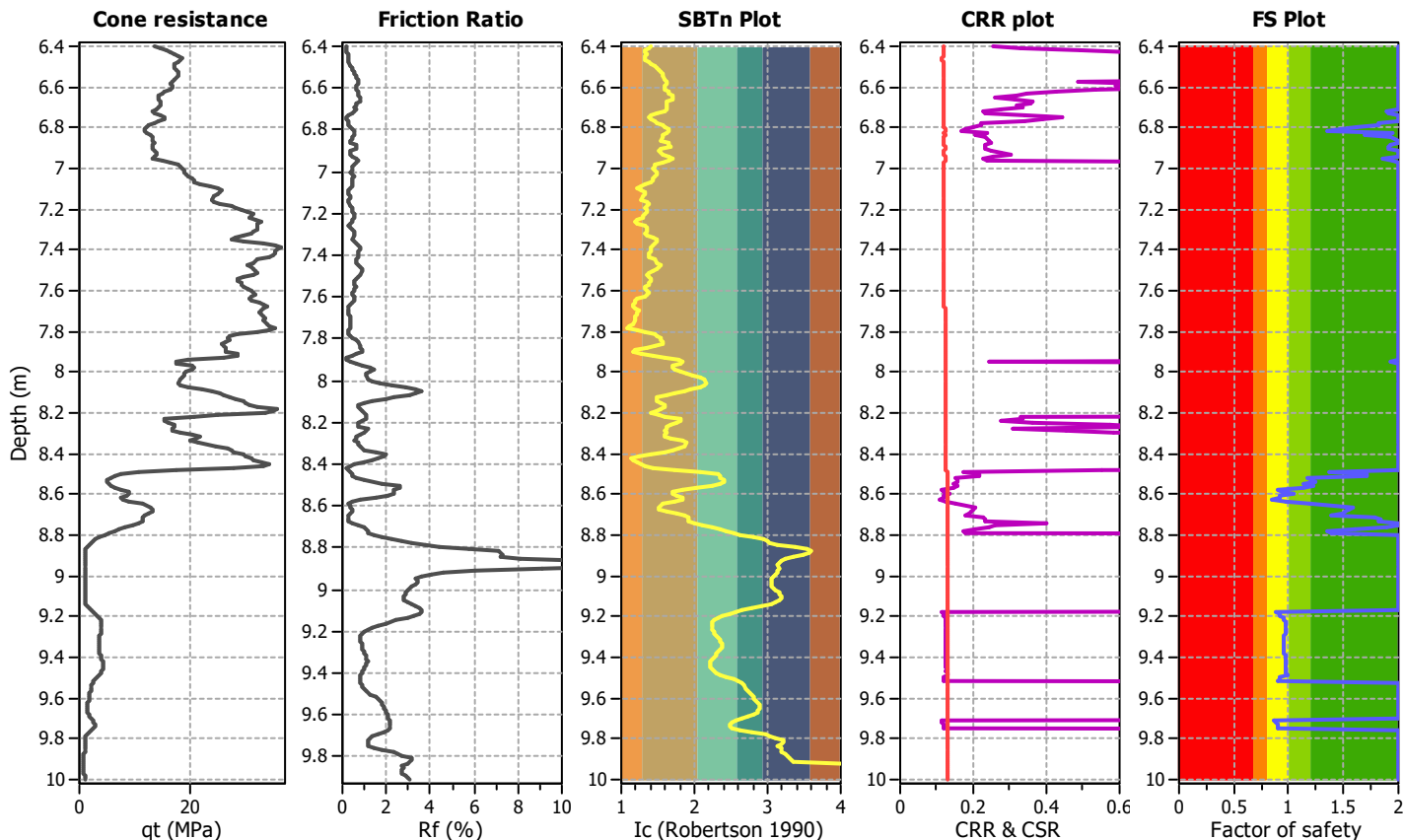
LIQUEFACTION ANALYSIS REPORT

Project title : Multi-unit development
CPT file : CPT-02_Bottom_Component

Location : 69 Poulson St, 45 Dickens St and 9 Grove rd, Christchurch

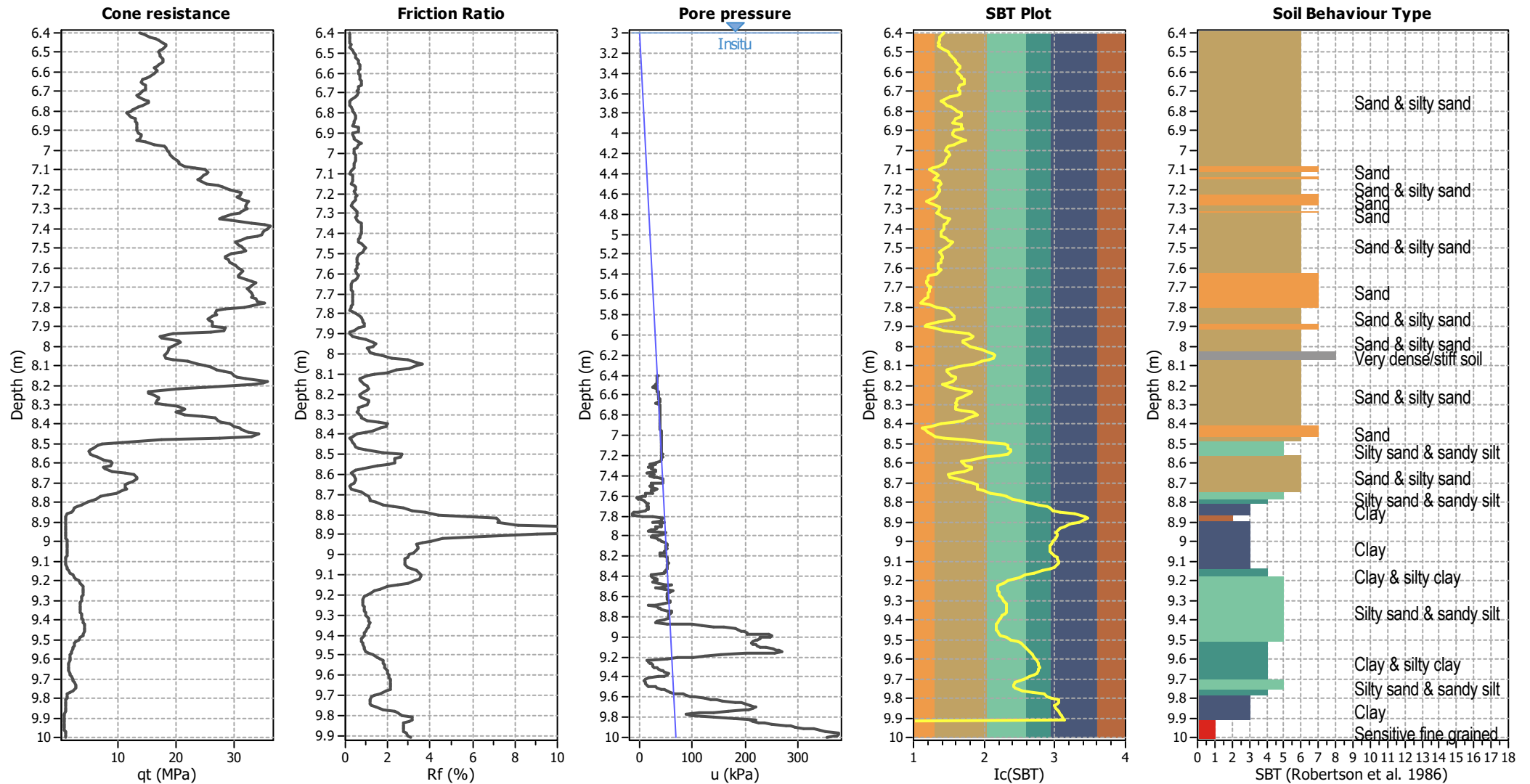
Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.20 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	MSF method:	N/A
Earthquake magnitude M_w :	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	No		
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



Zone A1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



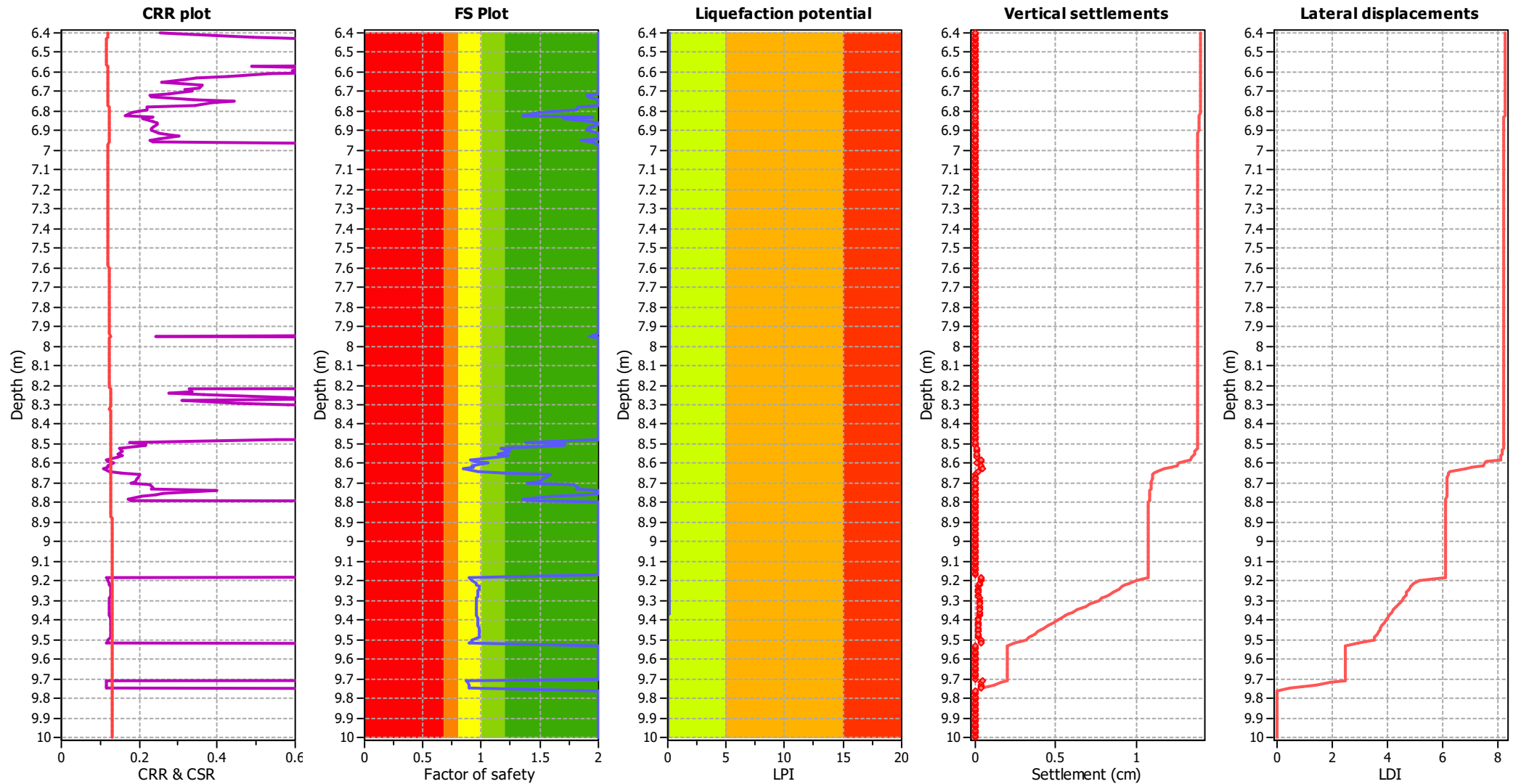
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K ₀ applied:	Yes
Earthquake magnitude M _w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_0 applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

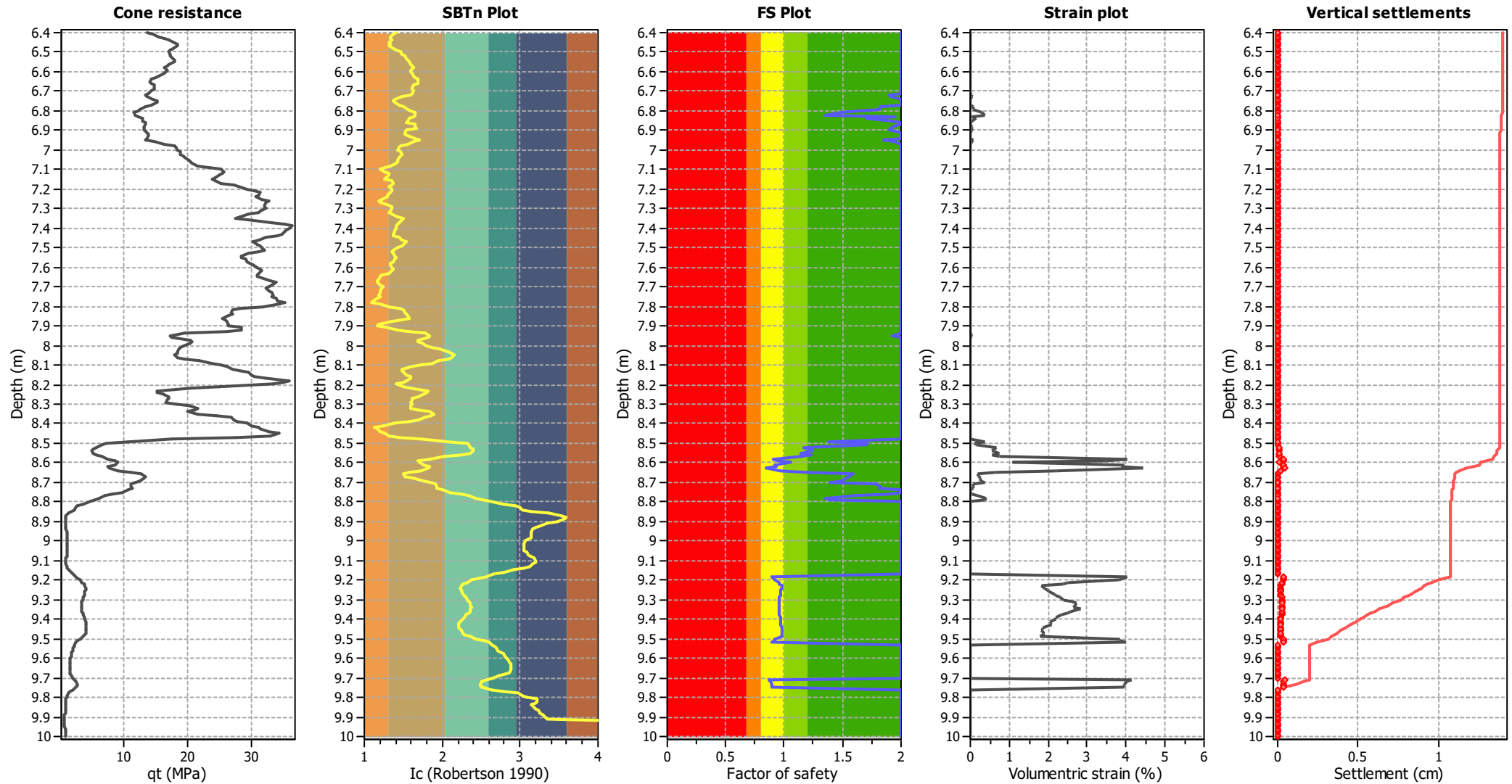
F.S. color scheme

■	Almost certain it will liquefy
■	Very likely to liquefy
■	Liquefaction and no liq. are equally likely
■	Unlike to liquefy
■	Almost certain it will not liquefy

LPI color scheme

■	Very high risk
■	High risk
■	Low risk

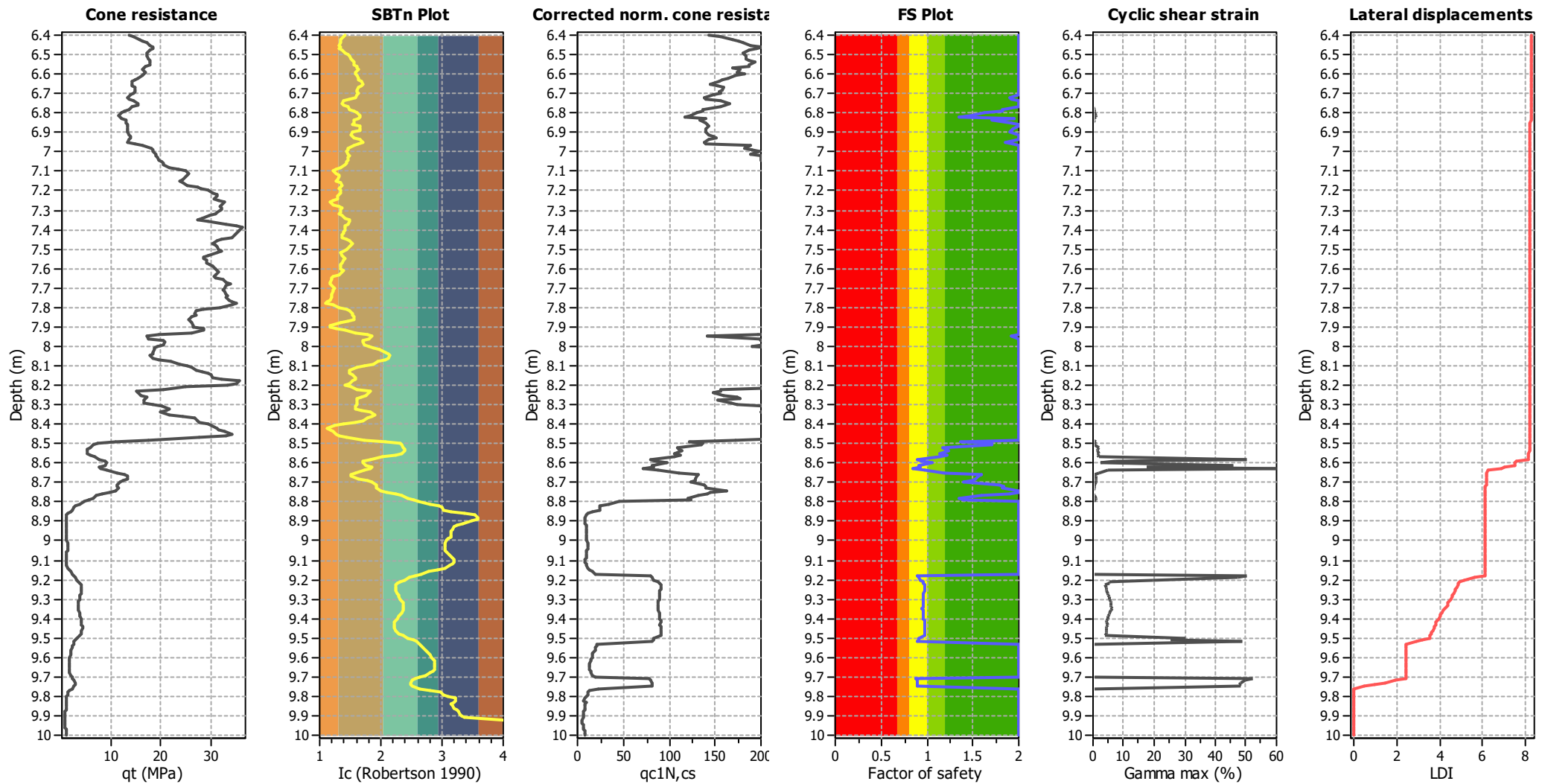
Estimation of post-earthquake settlements



Abbreviations

q_c : Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 FS: Calculated Factor of Safety against liquefaction
 Volumetric strain: Post-liquefaction volumetric strain

Estimation of post-earthquake lateral Displacements



Abbreviations

q_t : Total cone resistance (cone resistance q_c corrected for pore water effects)

I_c : Soil Behaviour Type Index

$q_{c1N,cs}$: Equivalent clean sand normalized CPT total cone resistance

F.S.: Factor of safety

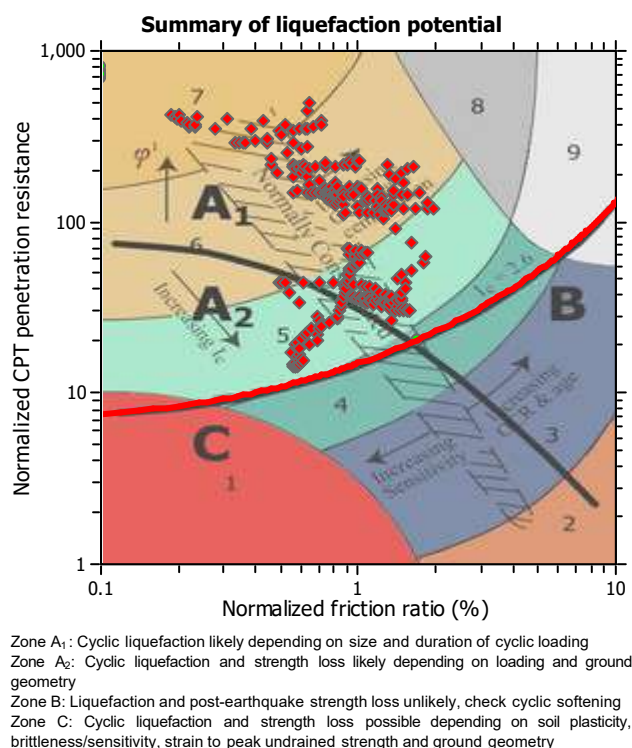
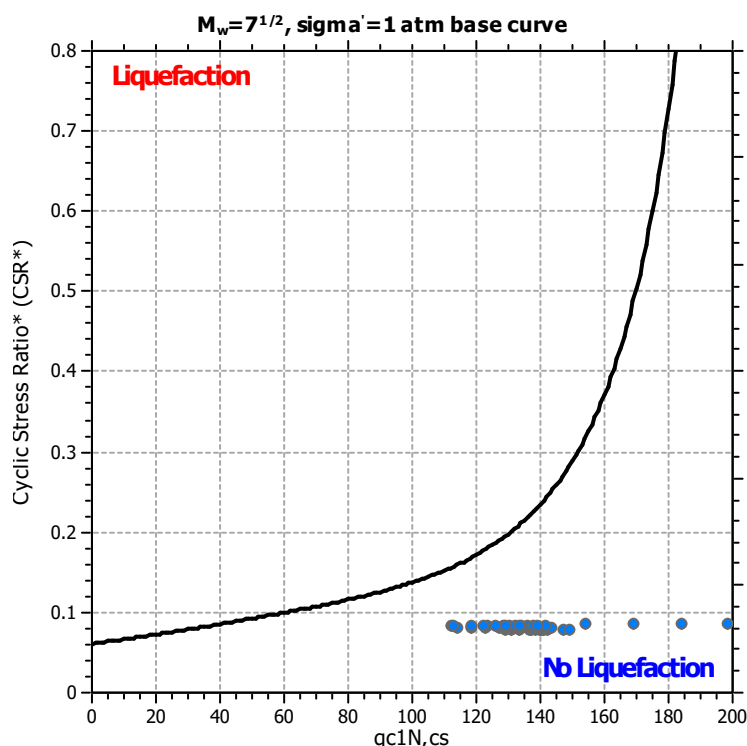
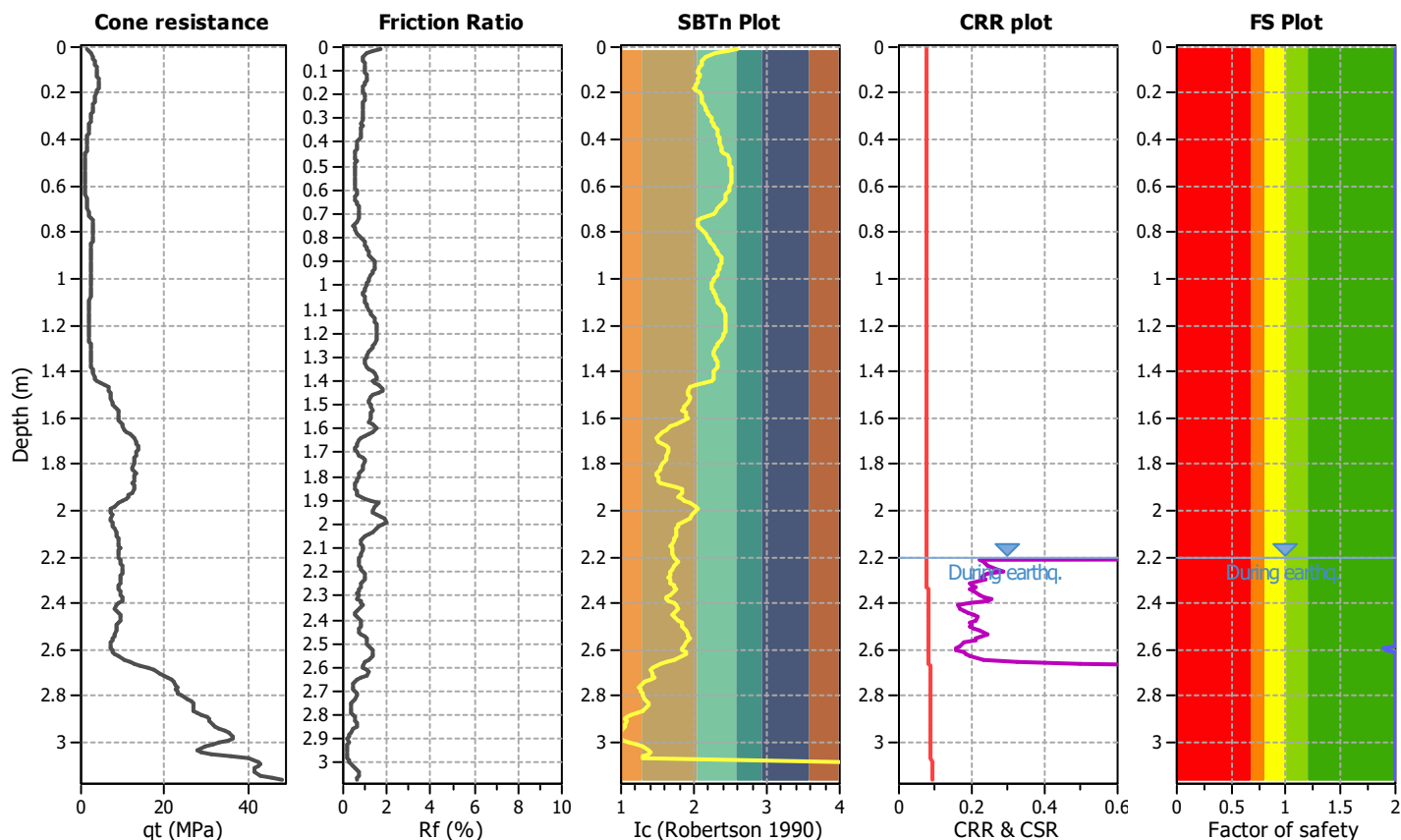
γ_{max} : Maximum cyclic shear strain

LDI: Lateral displacement index

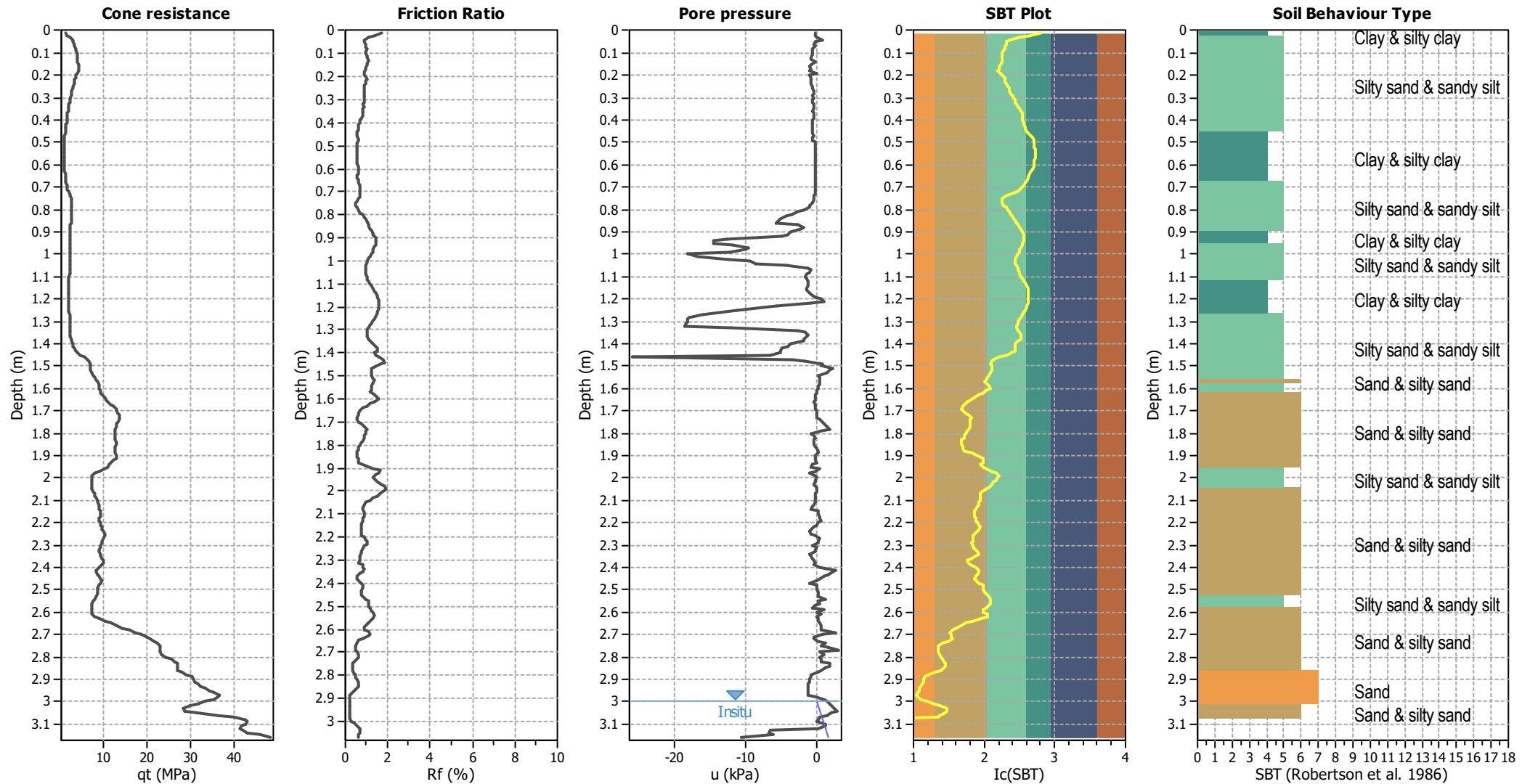
Project title : Multi-unit development
CPT file : CPT-03

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.00 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.20 m	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_v applied:	Yes	MSF method:	Method based



CPT basic interpretation plots



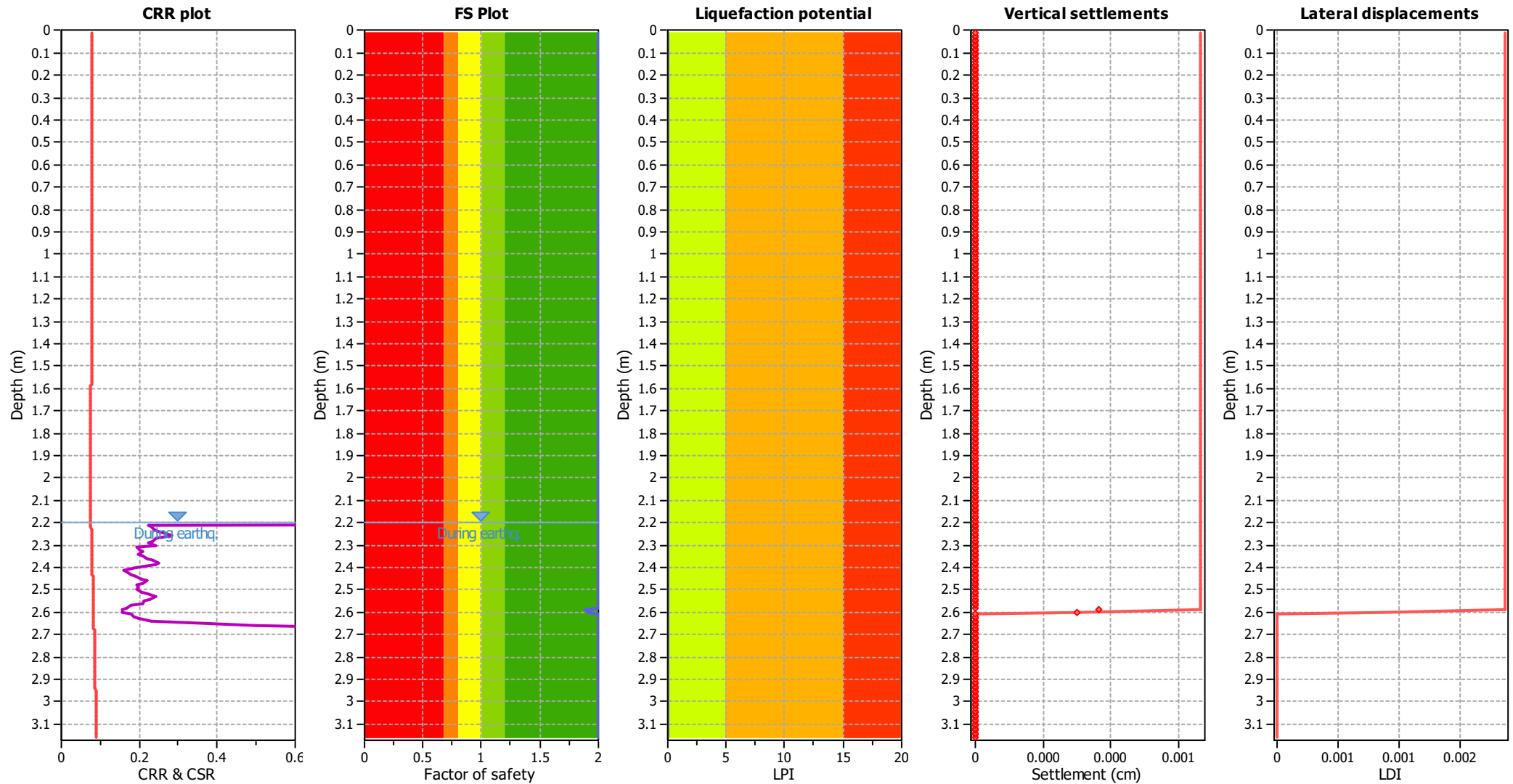
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_0 applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K ₀ applied:	Yes
Earthquake magnitude M _w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

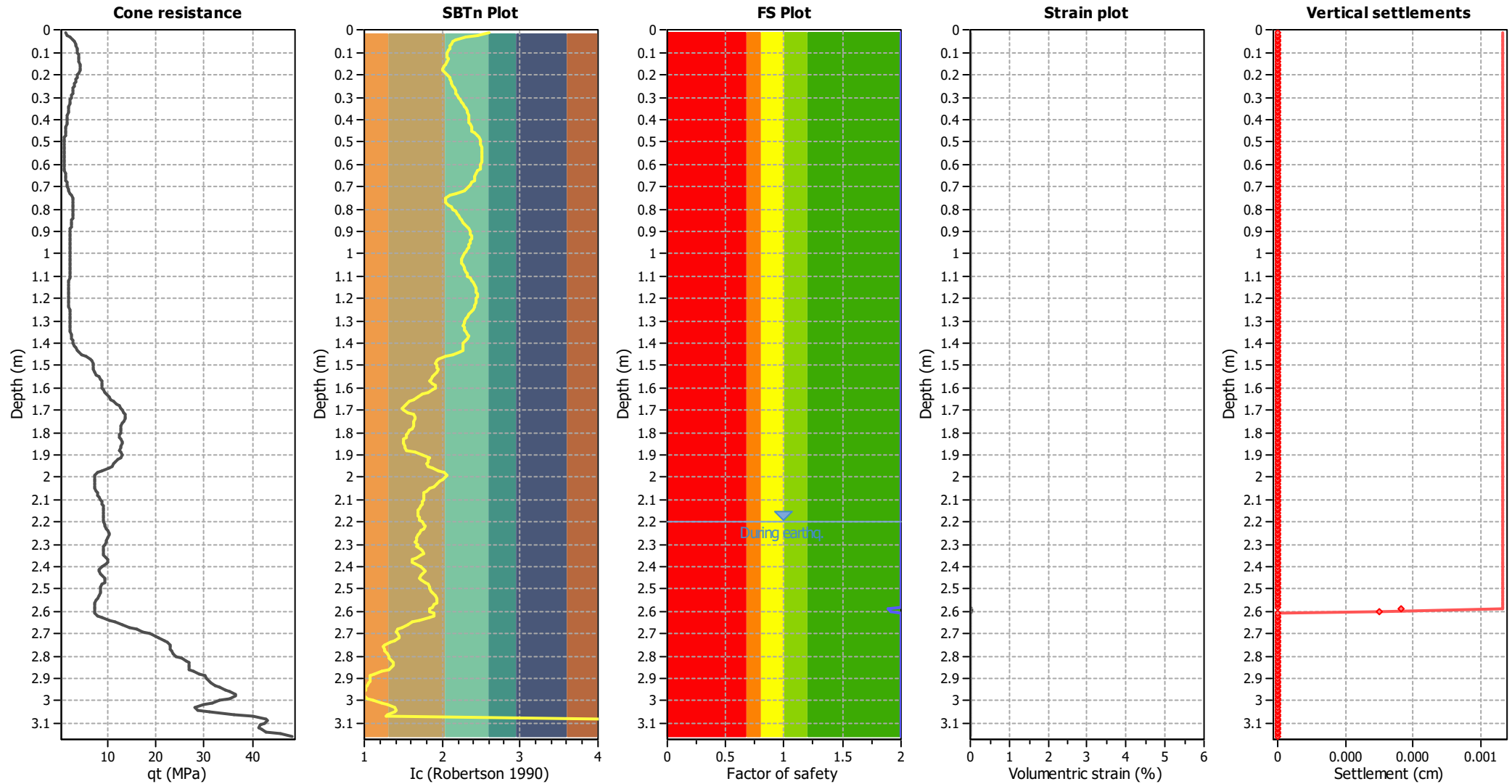
F.S. color scheme

■	Almost certain it will liquefy
■	Very likely to liquefy
■	Liquefaction and no liq. are equally likely
■	Unlike to liquefy
■	Almost certain it will not liquefy

LPI color scheme

■	Very high risk
■	High risk
■	Low risk

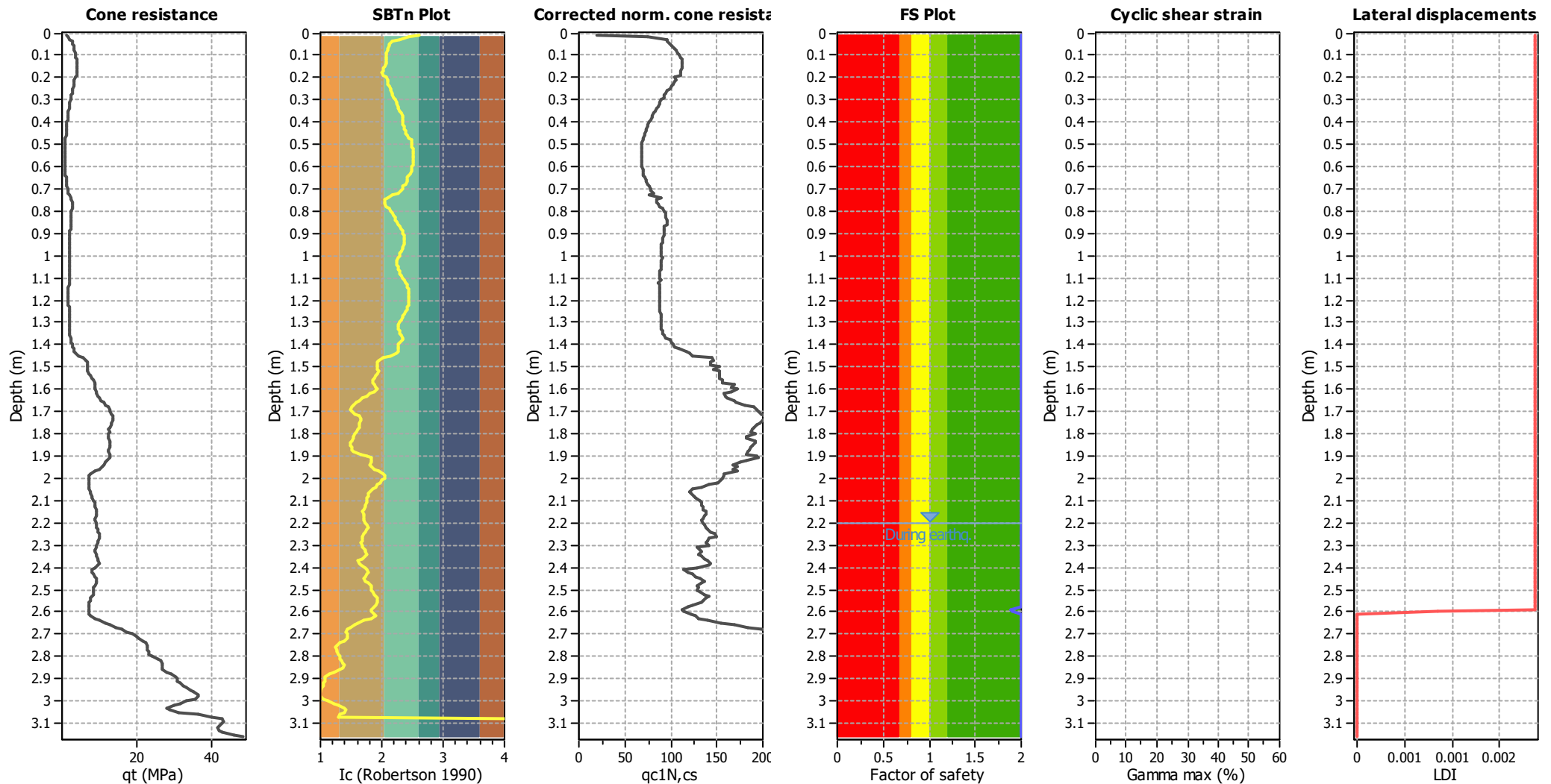
Estimation of post-earthquake settlements



Abbreviations

q_c : Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 FS: Calculated Factor of Safety against liquefaction
 Volumetric strain: Post-liquefaction volumetric strain

Estimation of post-earthquake lateral Displacements



Abbreviations

q_t : Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 $q_{c1N,cs}$: Equivalent clean sand normalized CPT total cone resistance

F.S.: Factor of safety
 γ_{max} : Maximum cyclic shear strain
 LDI: Lateral displacement index

LIQUEFACTION ANALYSIS REPORT

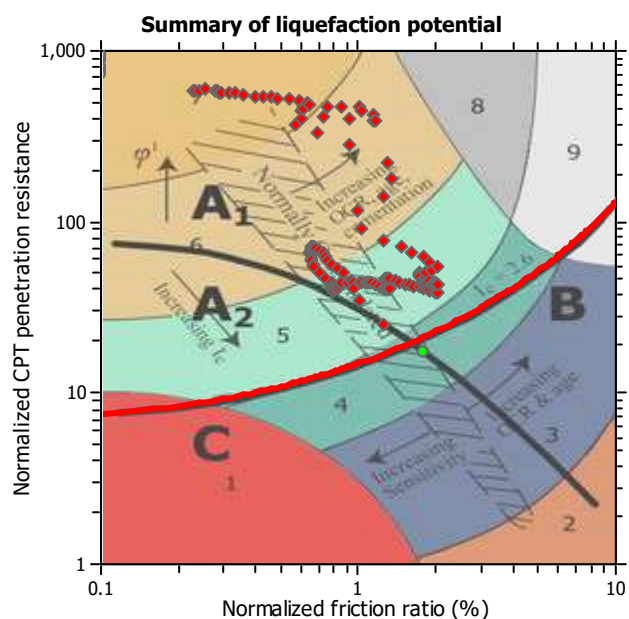
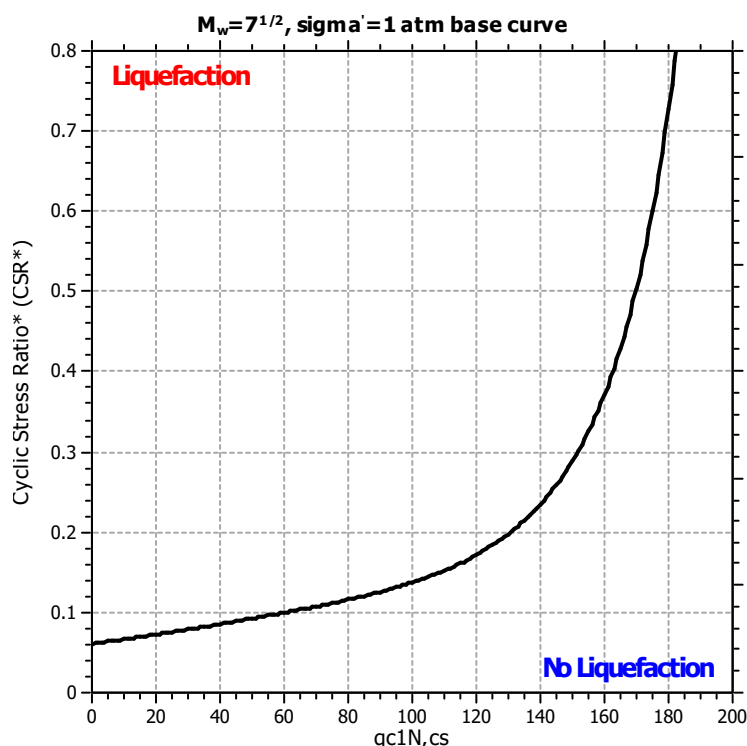
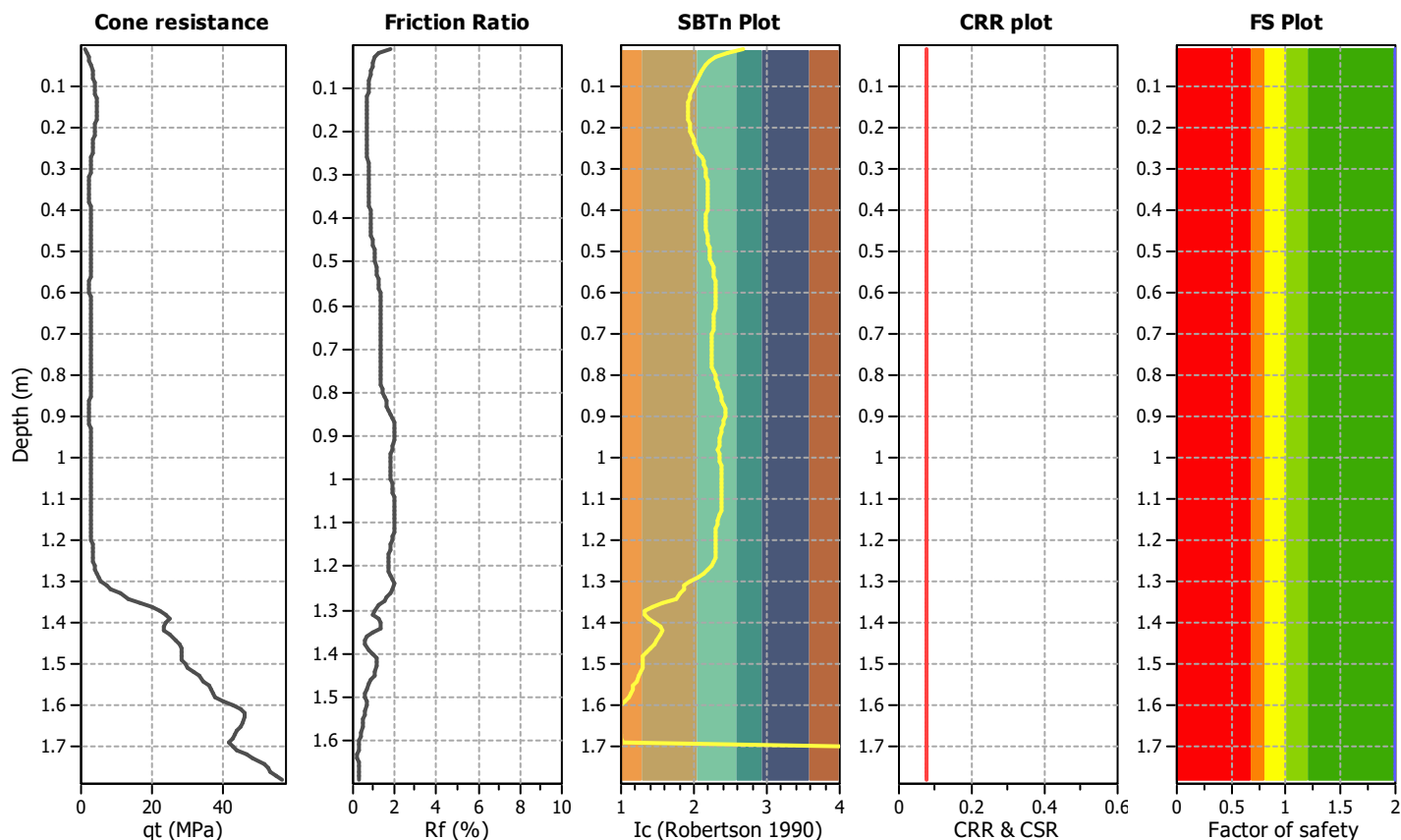
Project title : Multi-unit development

Location : 69 Poulson St, 45 Dickens St and 9 Grove rd, Christchurch

CPT file : CPT-04

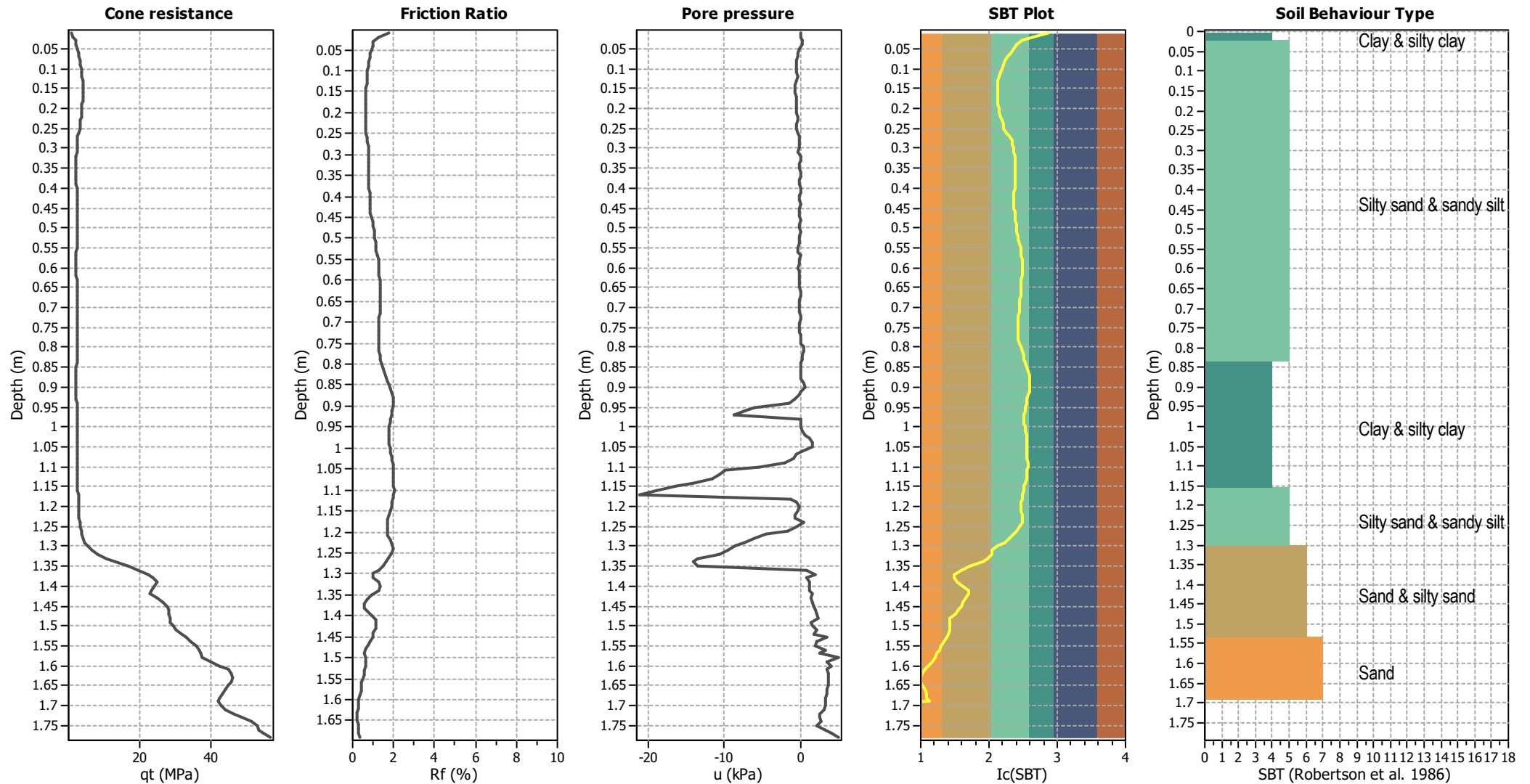
Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.20 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:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



Zone A₁: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A₂: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
 Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
 Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



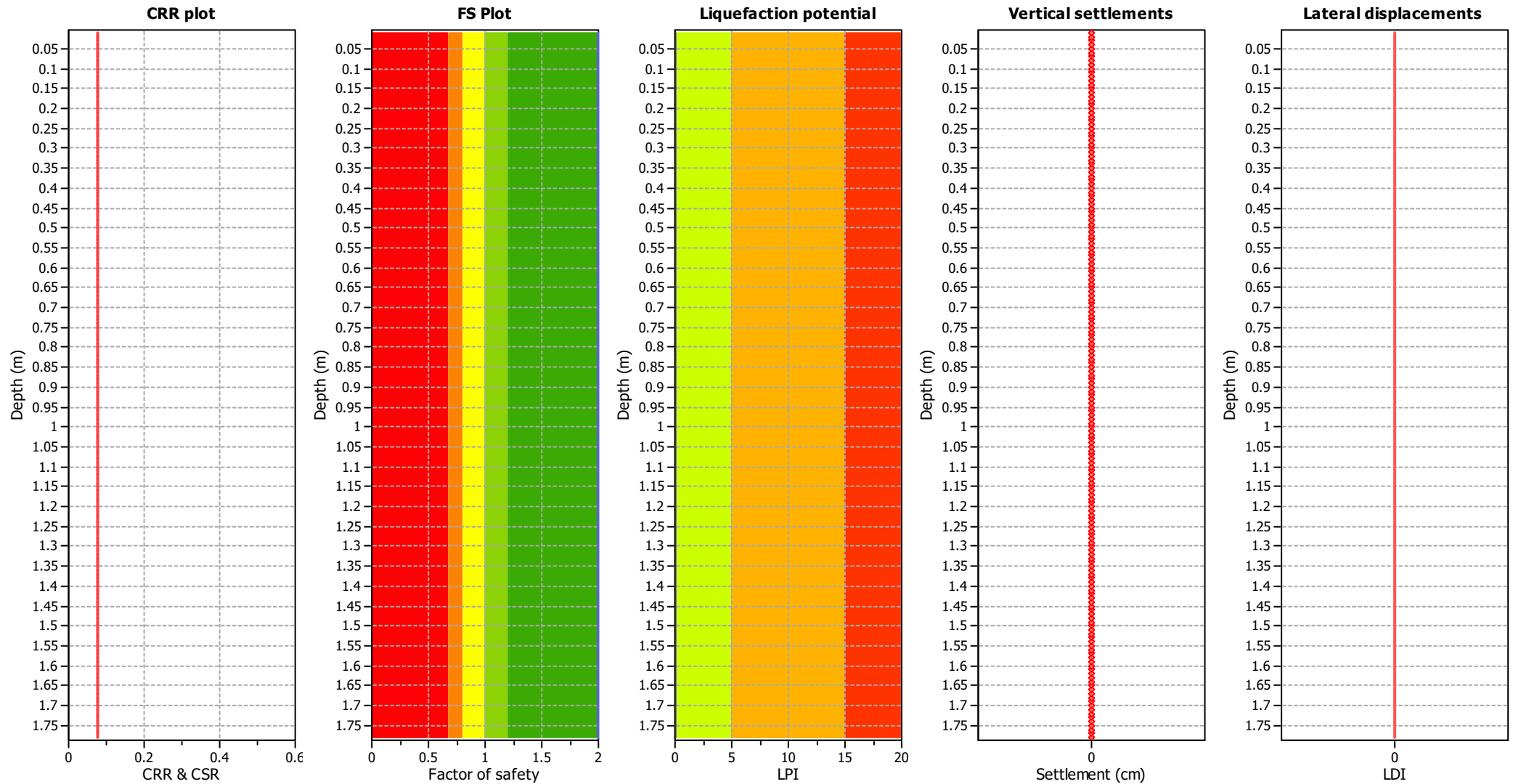
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on I_c value	I_c cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

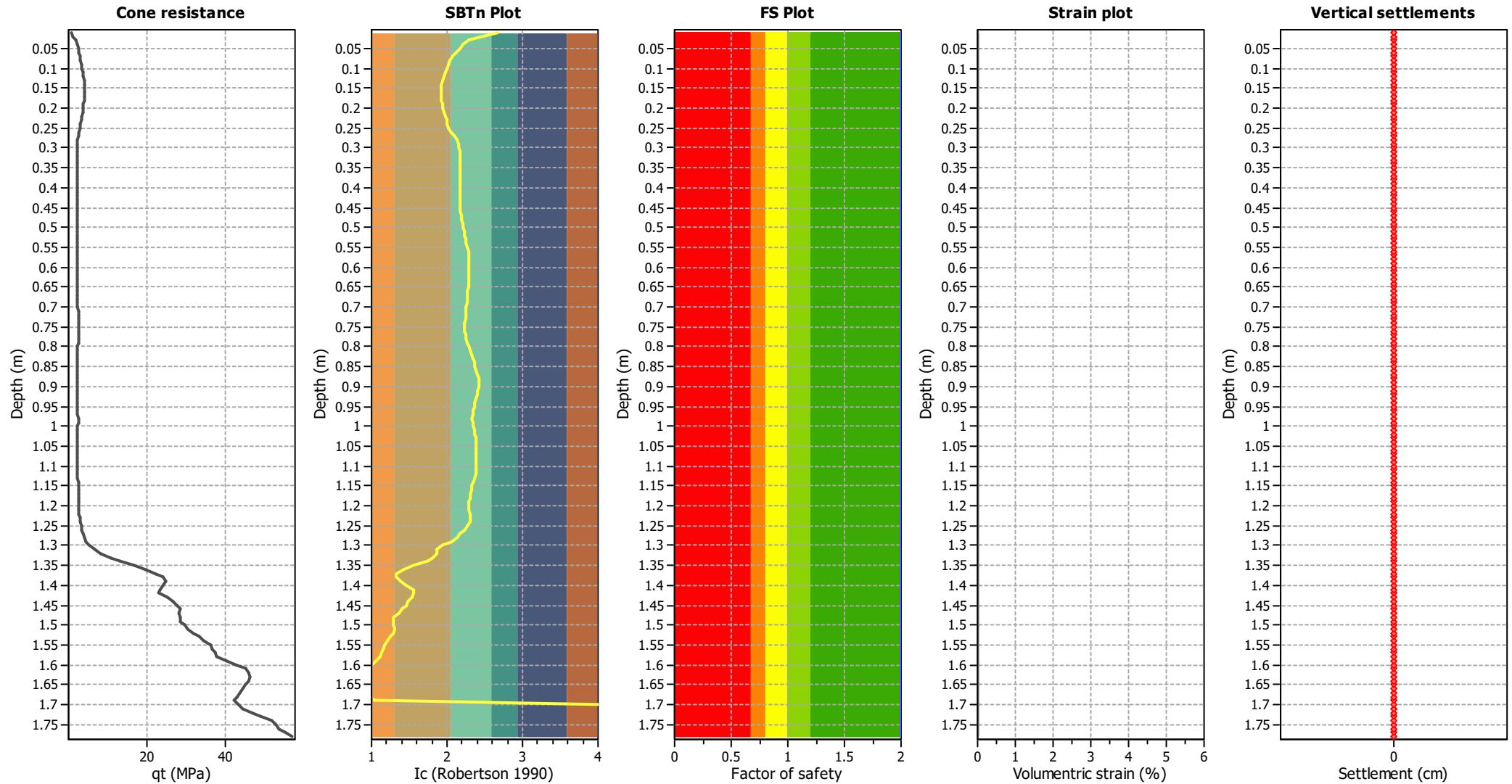
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Light Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LPI color scheme

Red	Very high risk
Orange	High risk
Yellow	Low risk

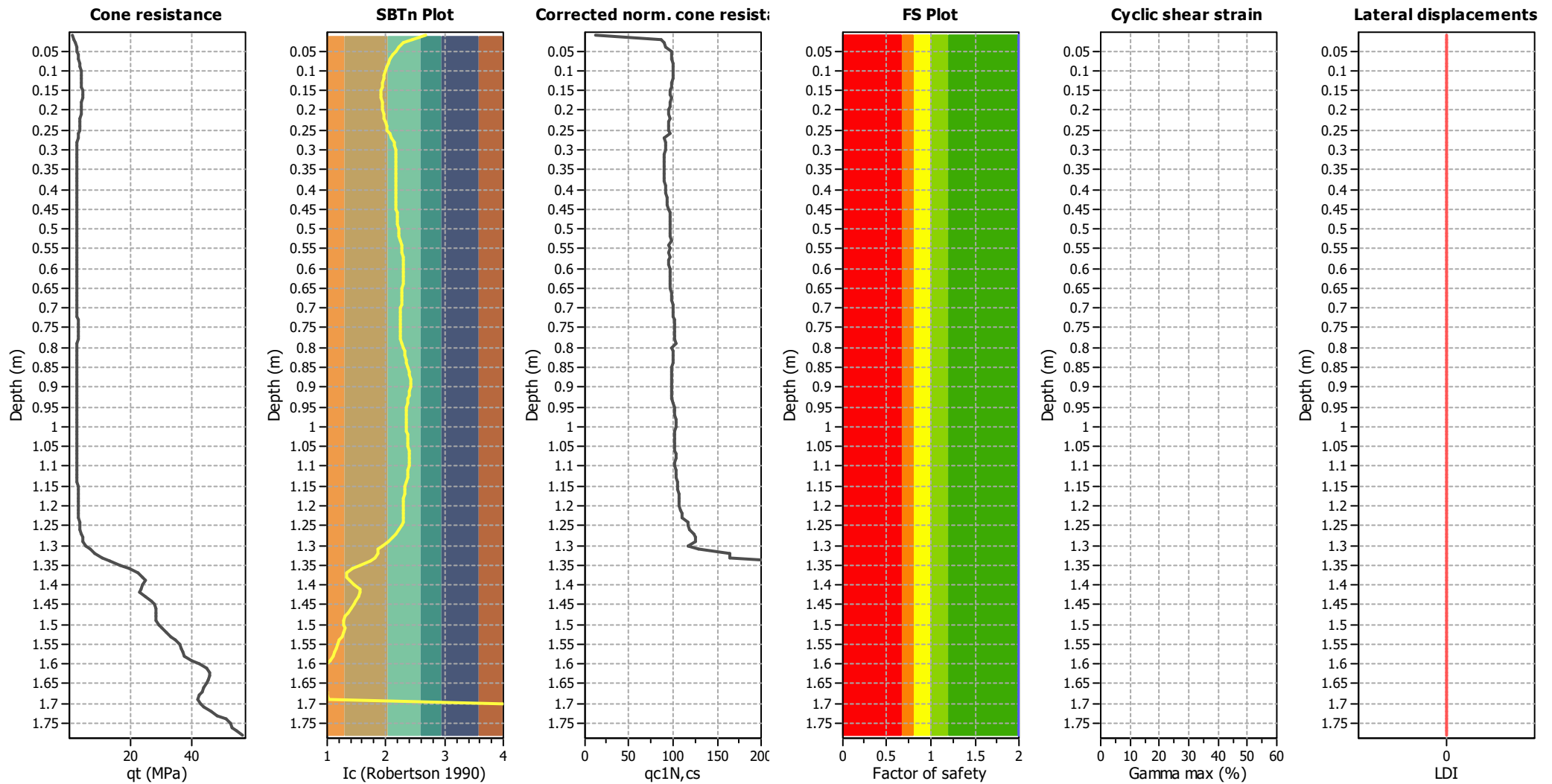
Estimation of post-earthquake settlements



Abbreviations

q_c : Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 FS: Calculated Factor of Safety against liquefaction
 Volumetric strain: Post-liquefaction volumetric strain

Estimation of post-earthquake lateral Displacements



Abbreviations

qt: Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 $q_{c1N,cs}$: Equivalent clean sand normalized CPT total cone resistance

F.S.: Factor of safety
 γ_{max} : Maximum cyclic shear strain
 LDI: Lateral displacement index

LIQUEFACTION ANALYSIS REPORT

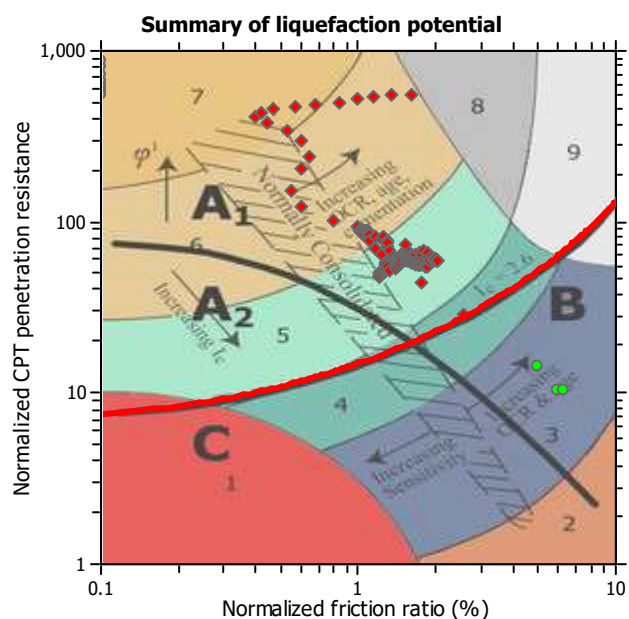
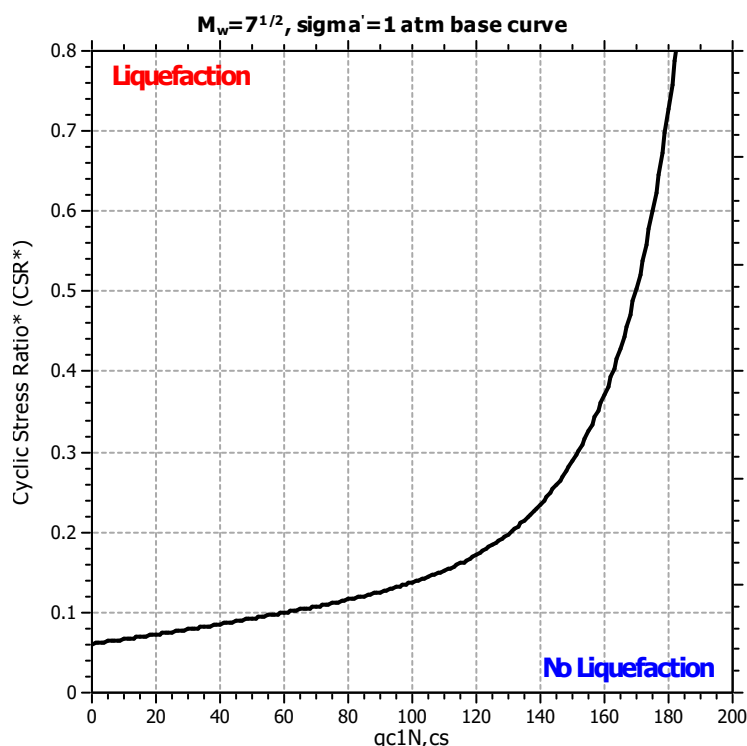
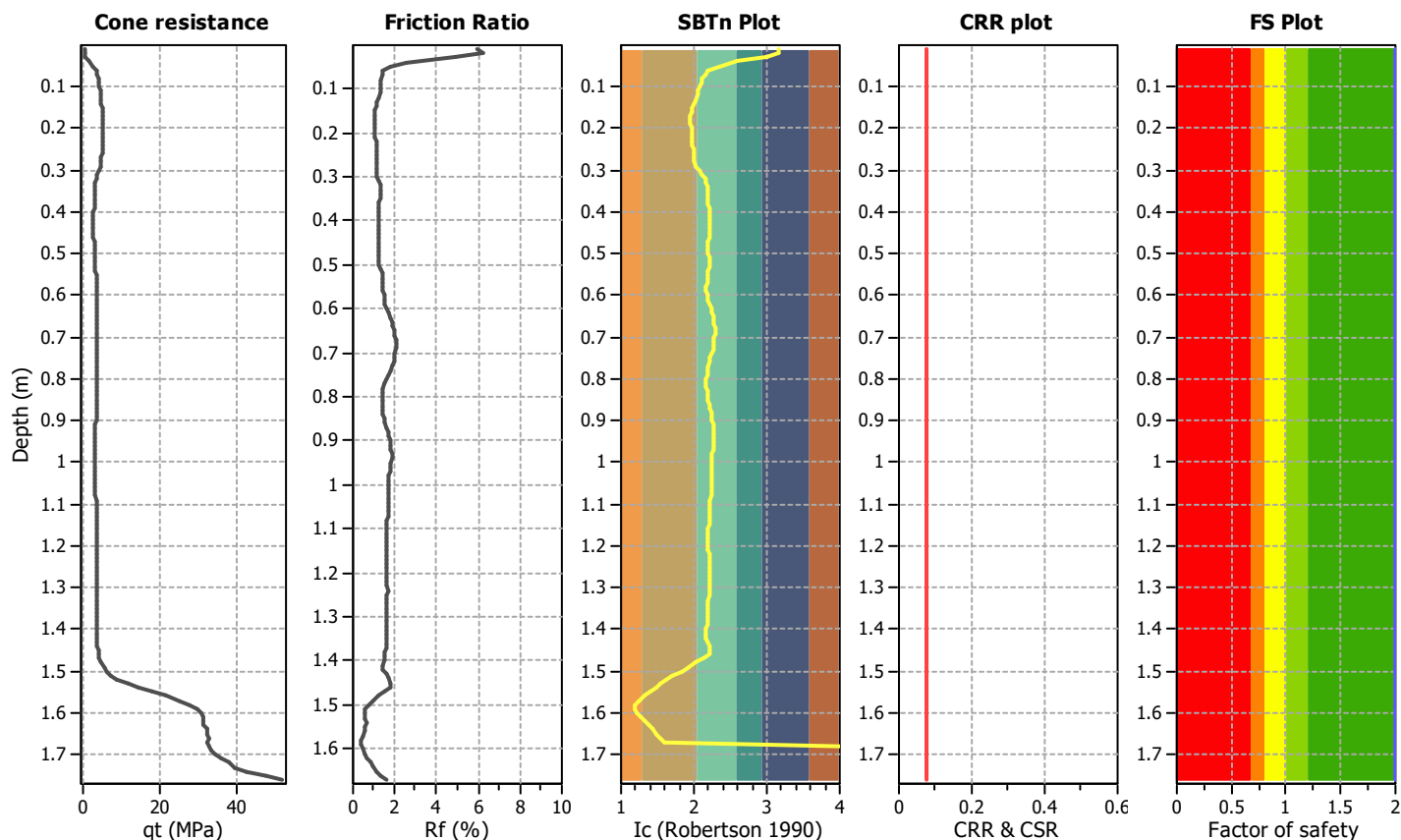
Project title : Multi-unit development

Location : 69 Poulson St, 45 Dickens St and 9 Grove rd, Christchurch

CPT file : CPT-05

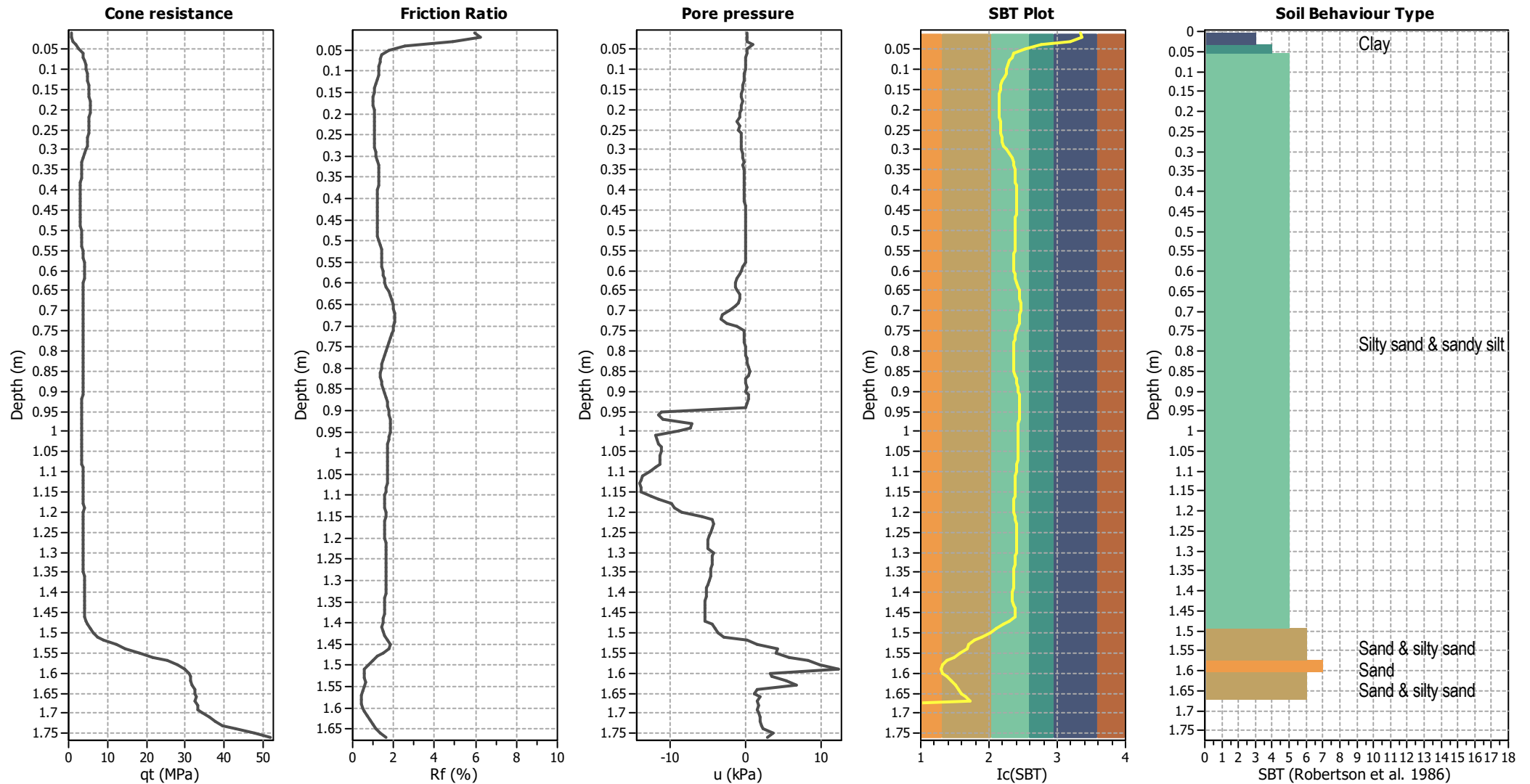
Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.20 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:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



Zone A₁: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A₂: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
 Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
 Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



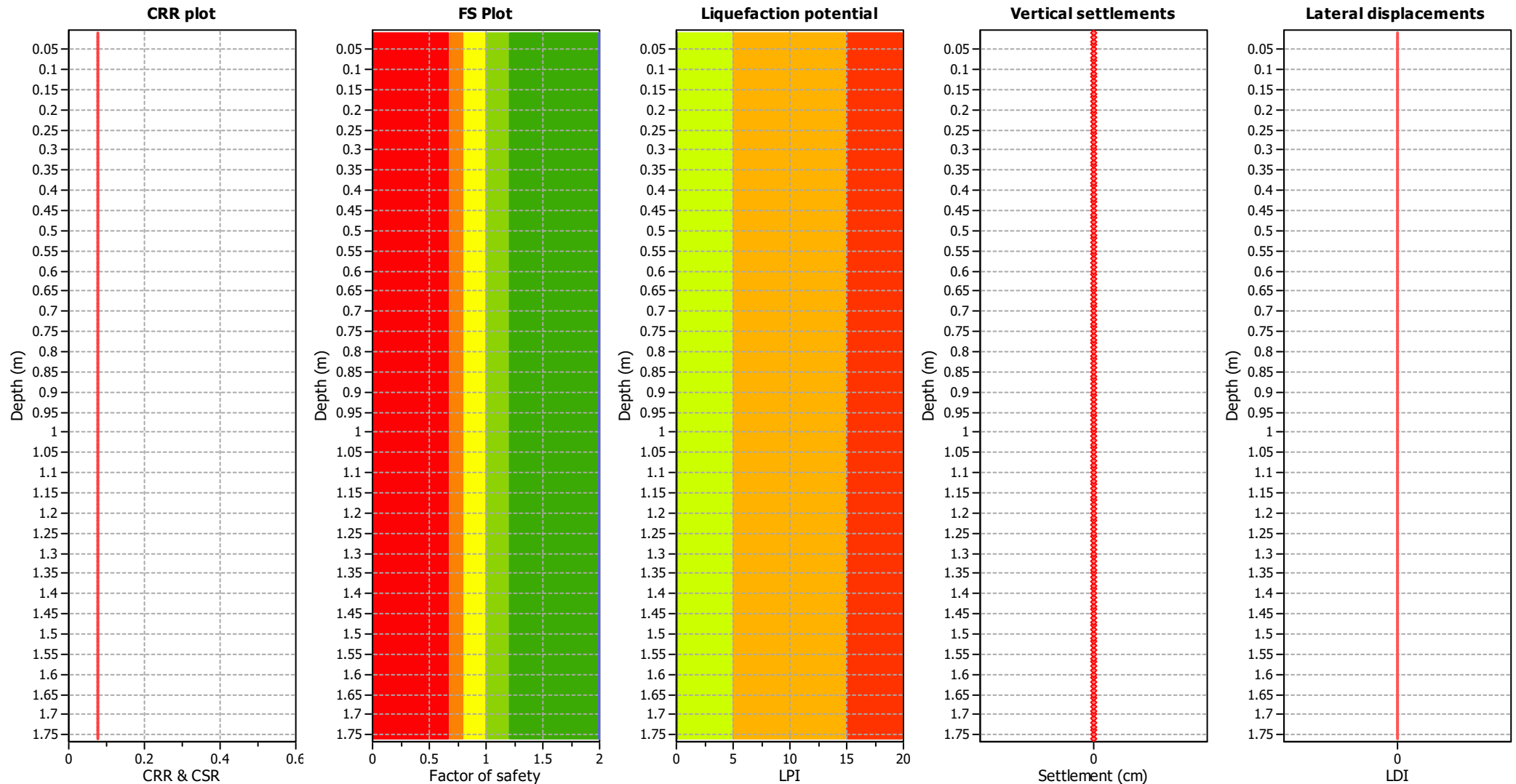
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on I_c value	I_c cut-off value:	2.60	K_0 applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K ₀ applied:	Yes
Earthquake magnitude M _w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

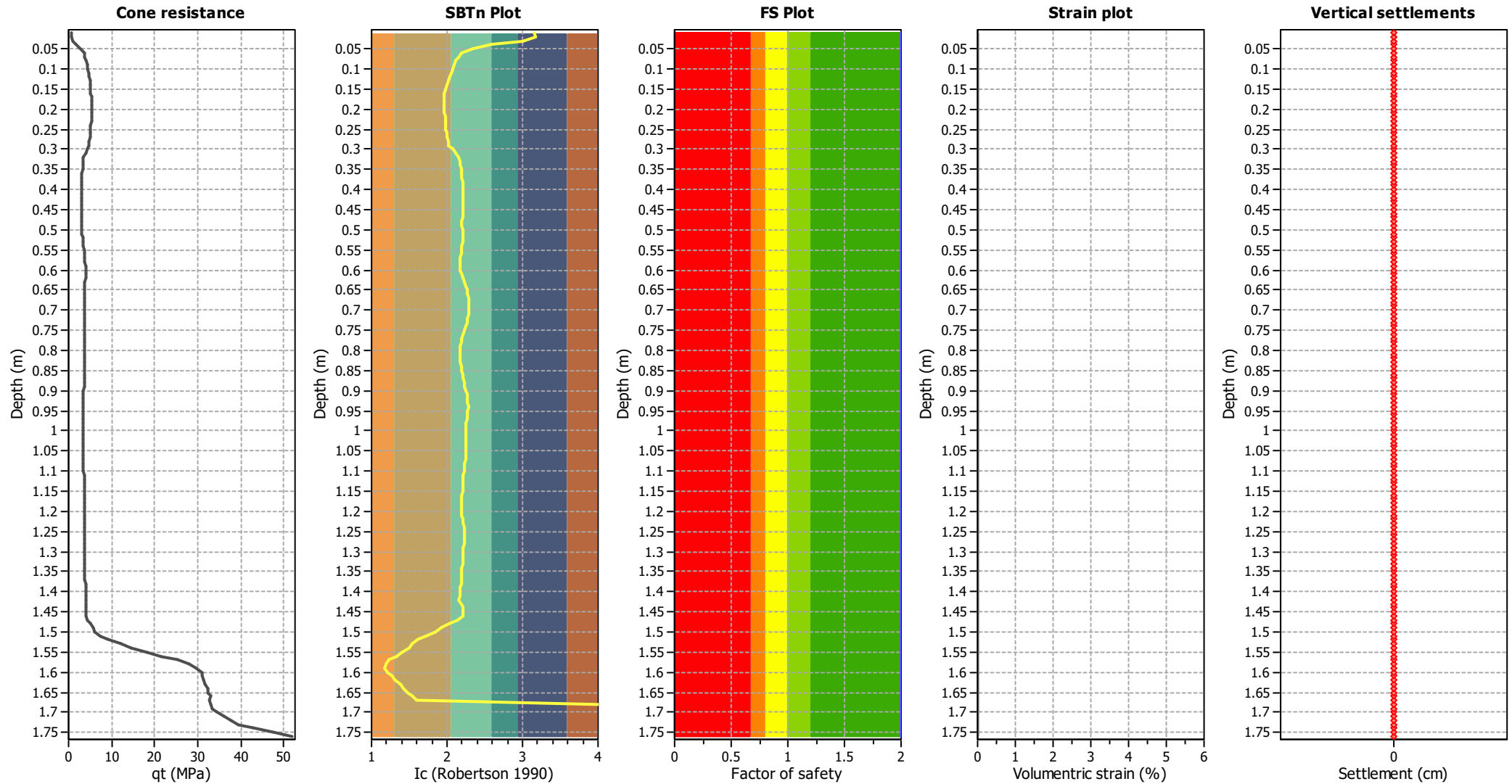
F.S. color scheme

■	Almost certain it will liquefy
■	Very likely to liquefy
■	Liquefaction and no liq. are equally likely
■	Unlike to liquefy
■	Almost certain it will not liquefy

LPI color scheme

■	Very high risk
■	High risk
■	Low risk

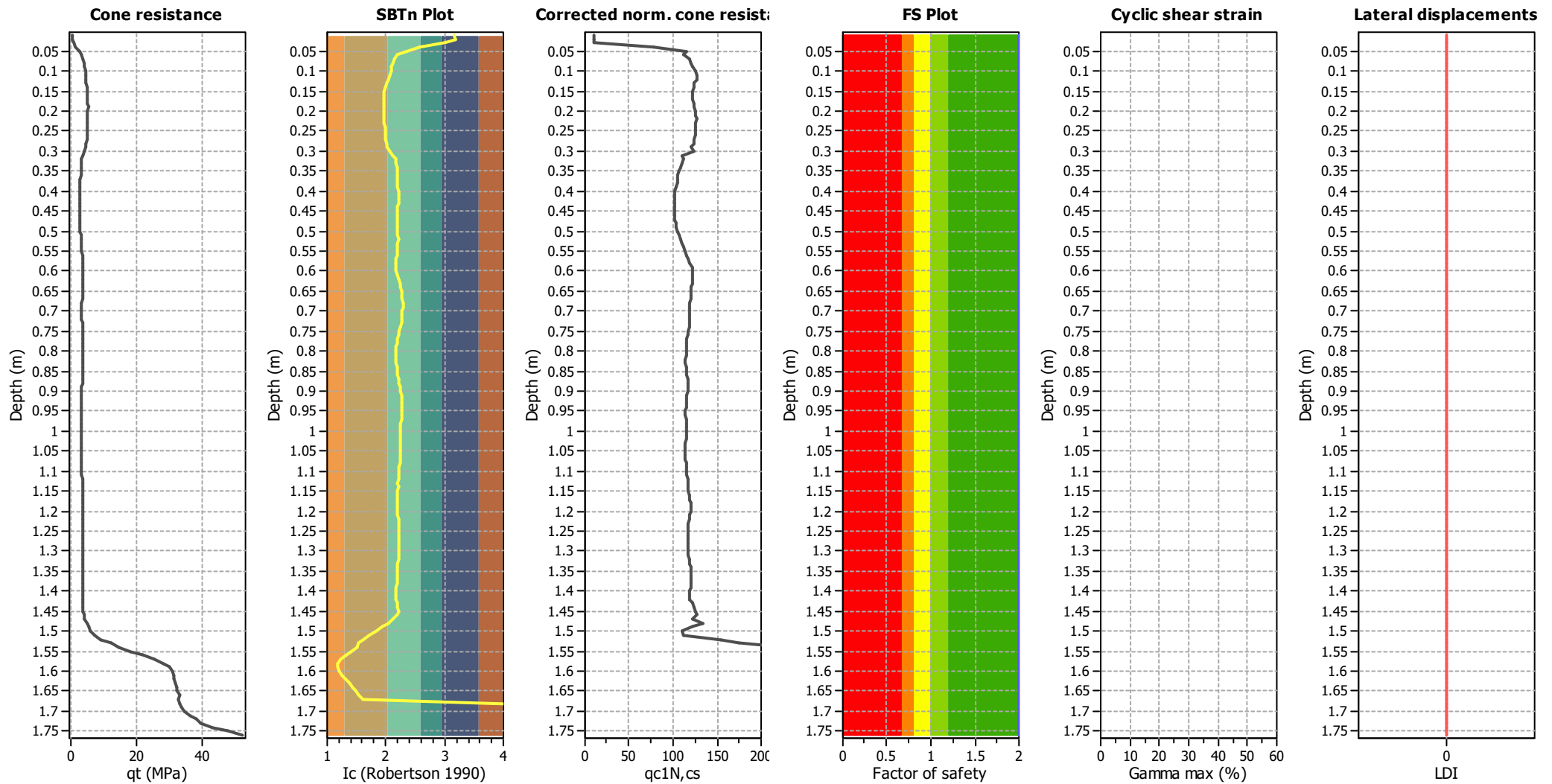
Estimation of post-earthquake settlements



Abbreviations

q_c : Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 FS: Calculated Factor of Safety against liquefaction
 Volumetric strain: Post-liquefaction volumetric strain

Estimation of post-earthquake lateral Displacements



Abbreviations

q_t : Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 $q_{c1N,cs}$: Equivalent clean sand normalized CPT total cone resistance

F.S.: Factor of safety
 γ_{max} : Maximum cyclic shear strain
 LDI: Lateral displacement index

LIQUEFACTION ANALYSIS REPORT

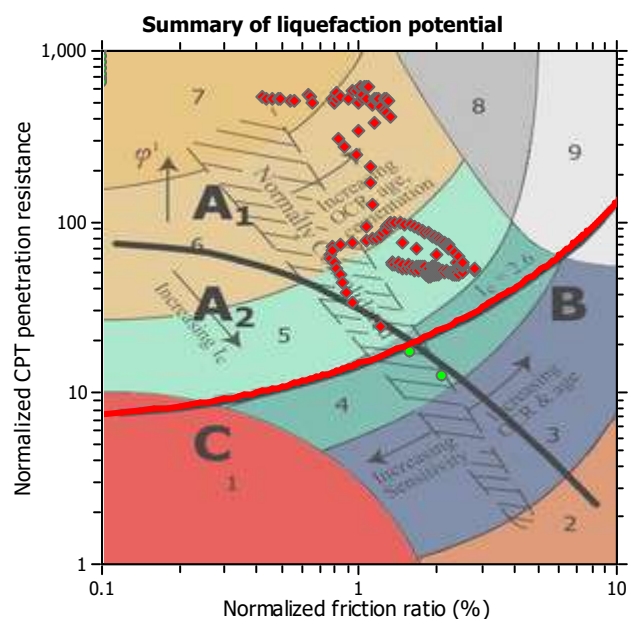
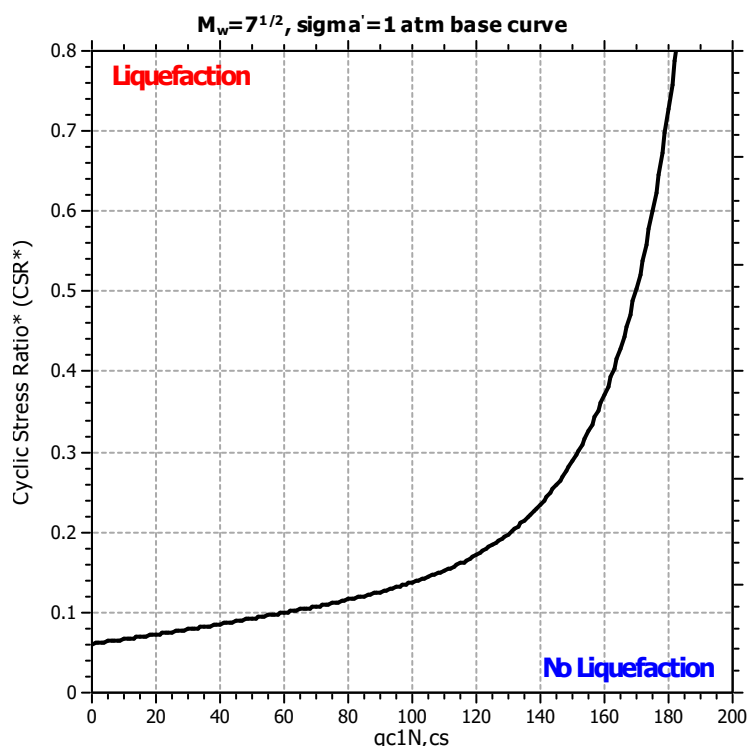
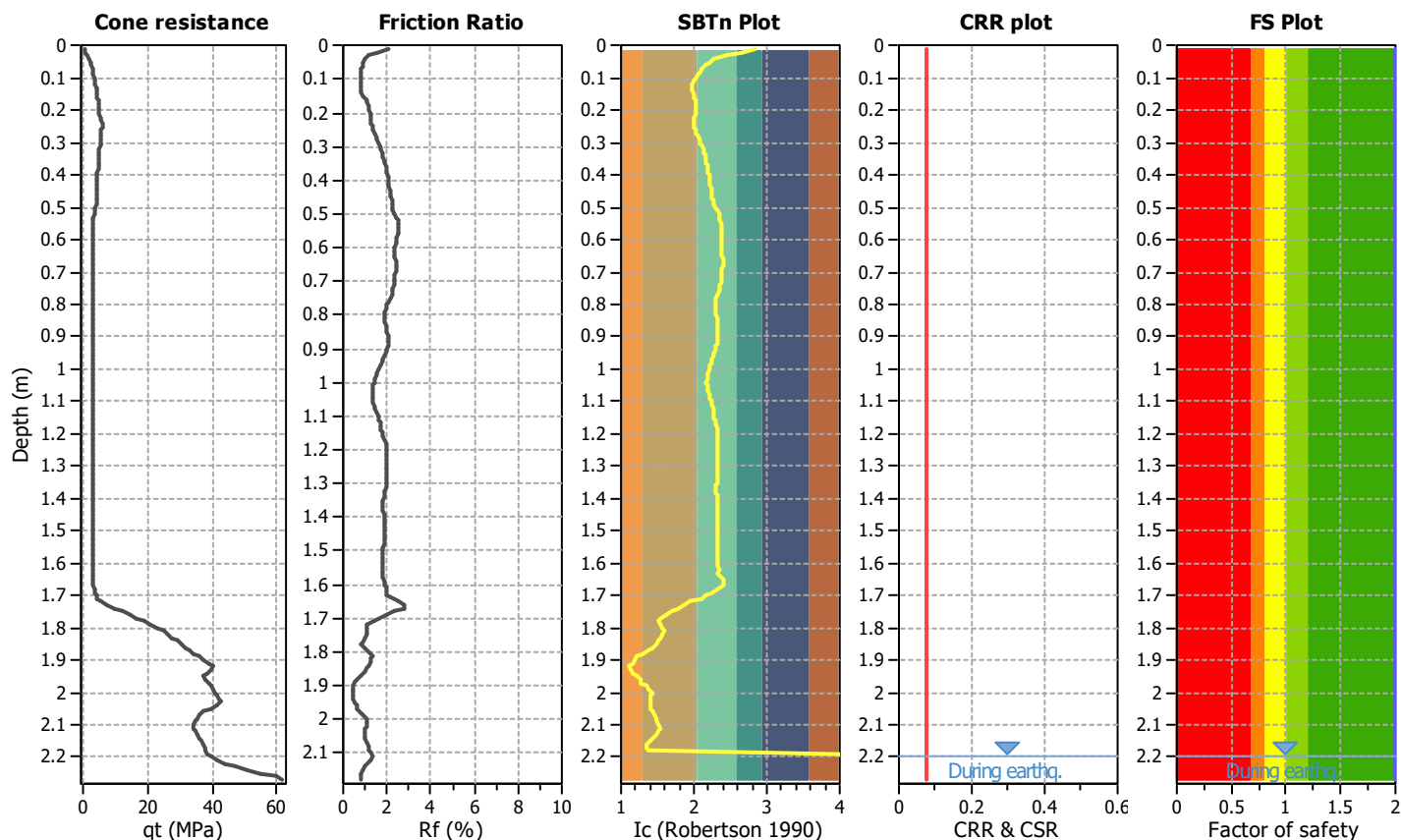
Project title : Multi-unit development

Location : 69 Poulson St, 45 Dickens St and 9 Grove rd, Christchurch

CPT file : CPT-06

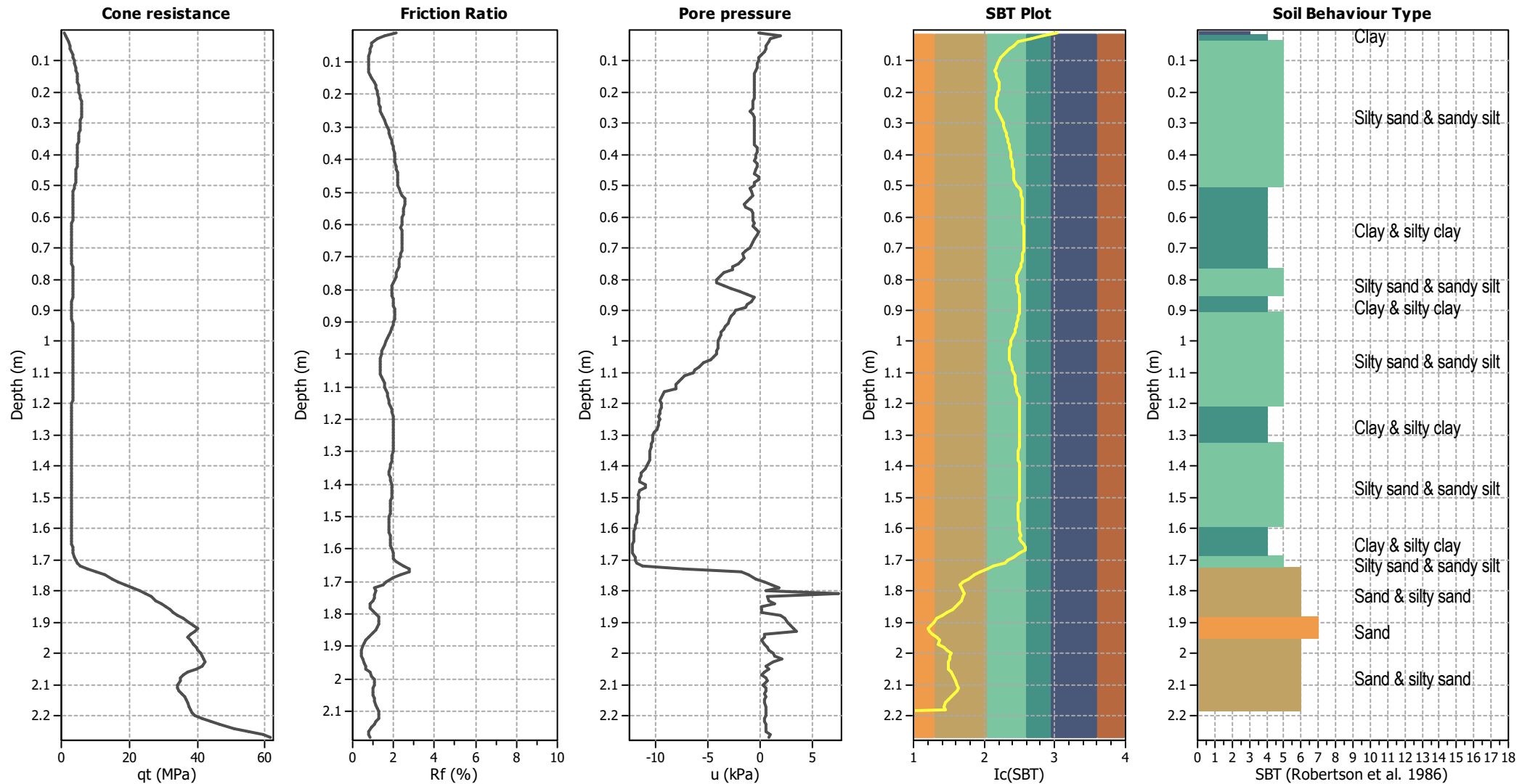
Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.20 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:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



Zone A₁: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A₂: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
 Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
 Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



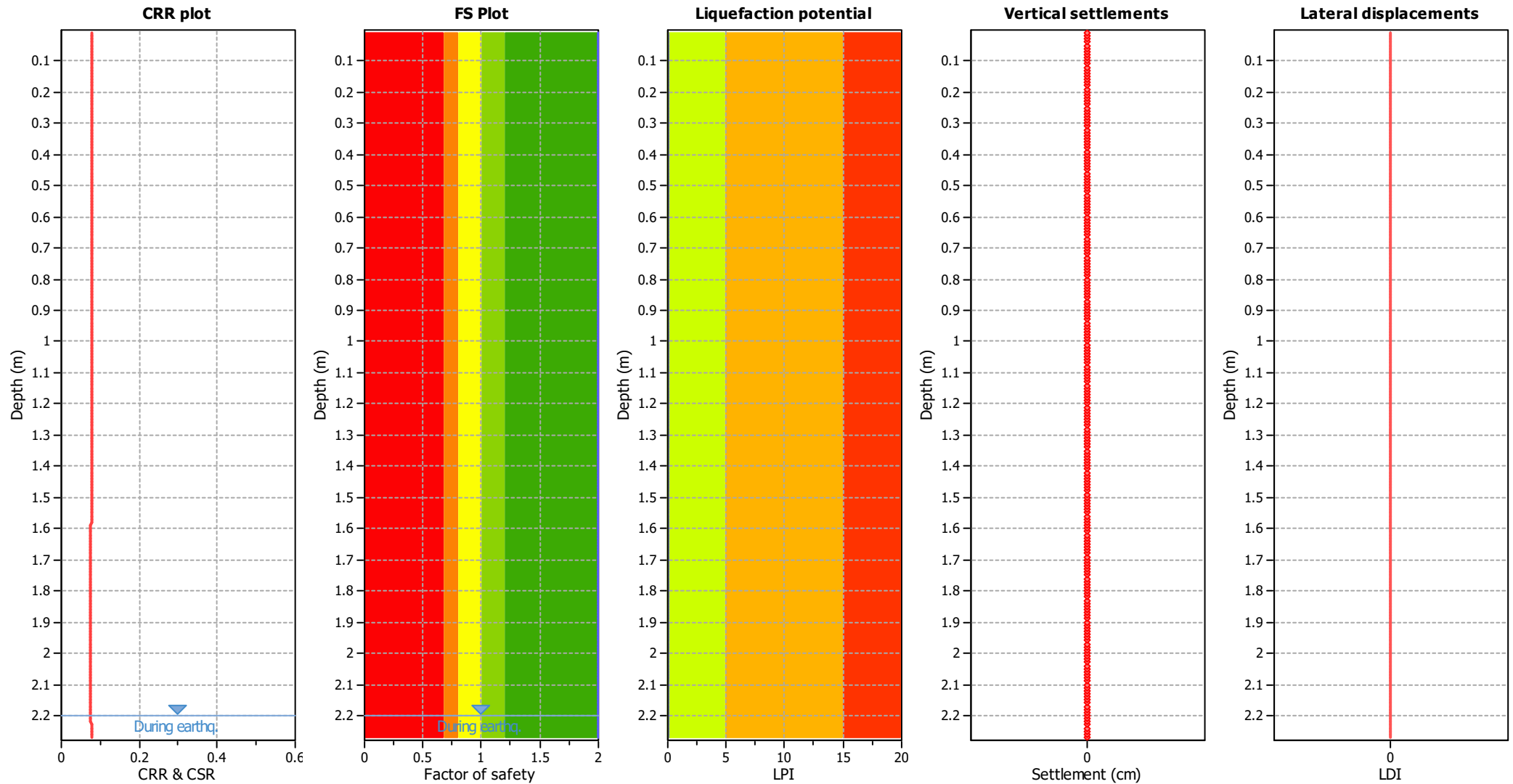
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on I_c value	I_c cut-off value:	2.60	K_o applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_0 applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

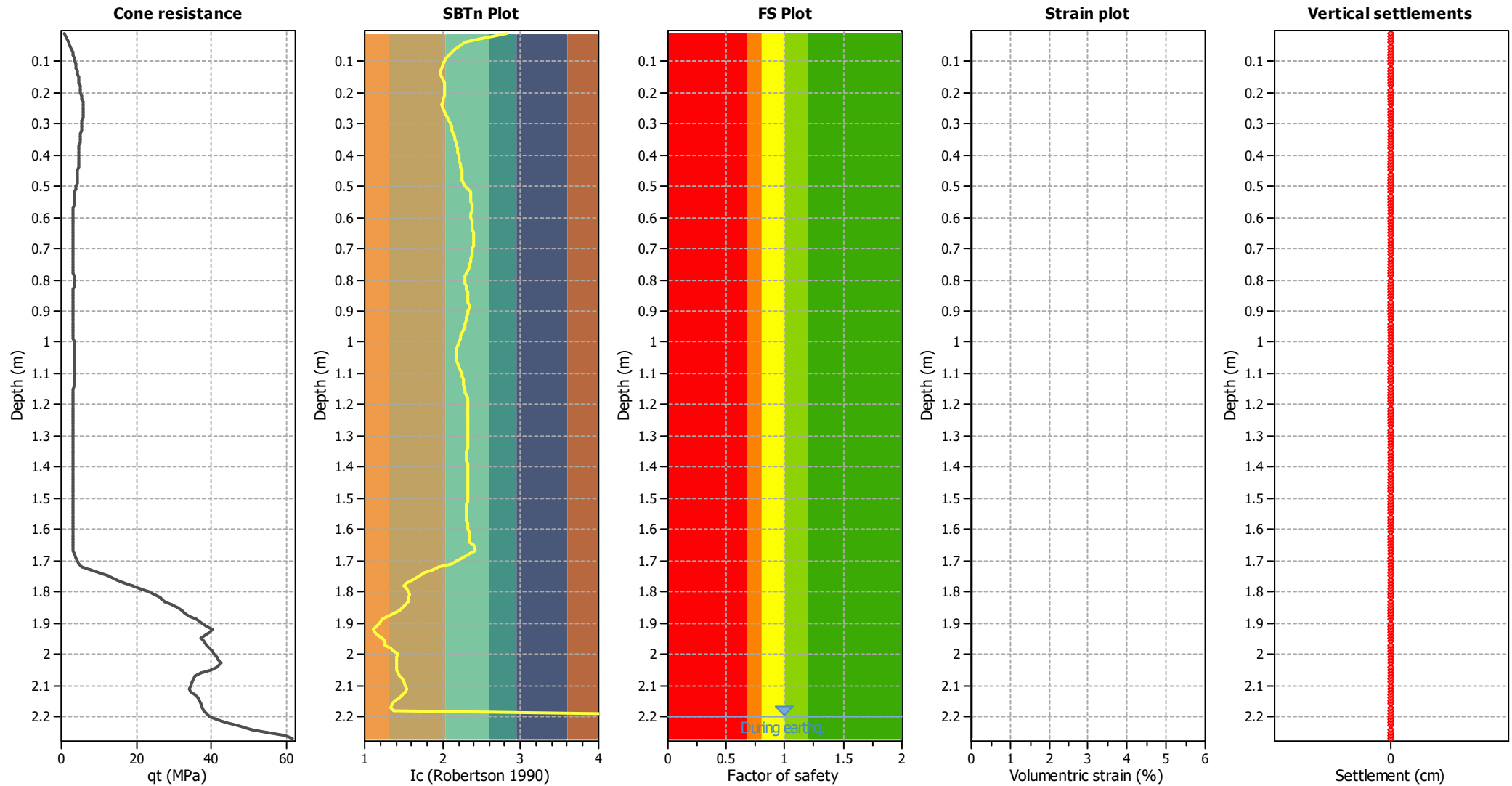
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Light Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LPI color scheme

Red	Very high risk
Orange	High risk
Yellow	Low risk

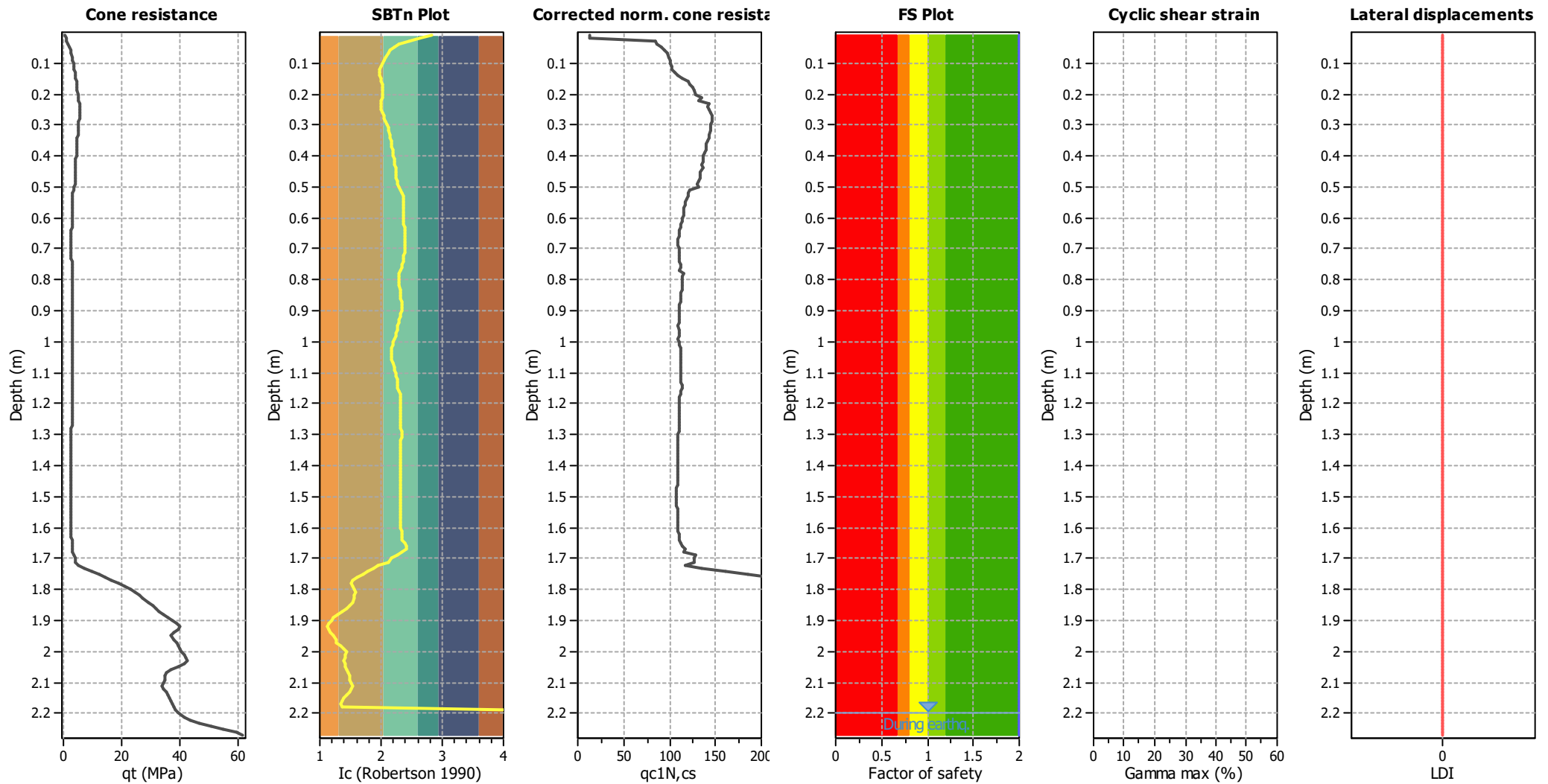
Estimation of post-earthquake settlements



Abbreviations

q_c : Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 FS: Calculated Factor of Safety against liquefaction
 Volumetric strain: Post-liquefaction volumetric strain

Estimation of post-earthquake lateral Displacements



Abbreviations

q_t : Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 $q_{c1N,cs}$: Equivalent clean sand normalized CPT total cone resistance

F.S.: Factor of safety
 γ_{max} : Maximum cyclic shear strain
 LDI: Lateral displacement index

LIQUEFACTION ANALYSIS REPORT

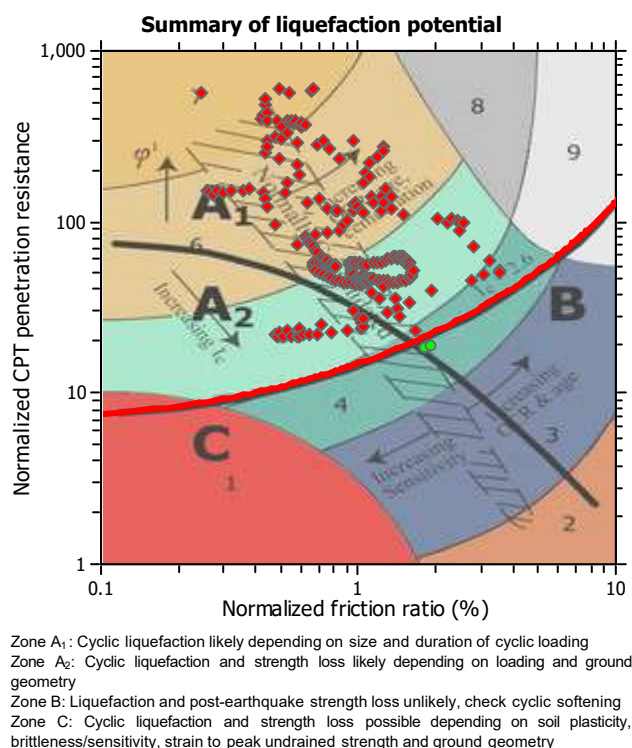
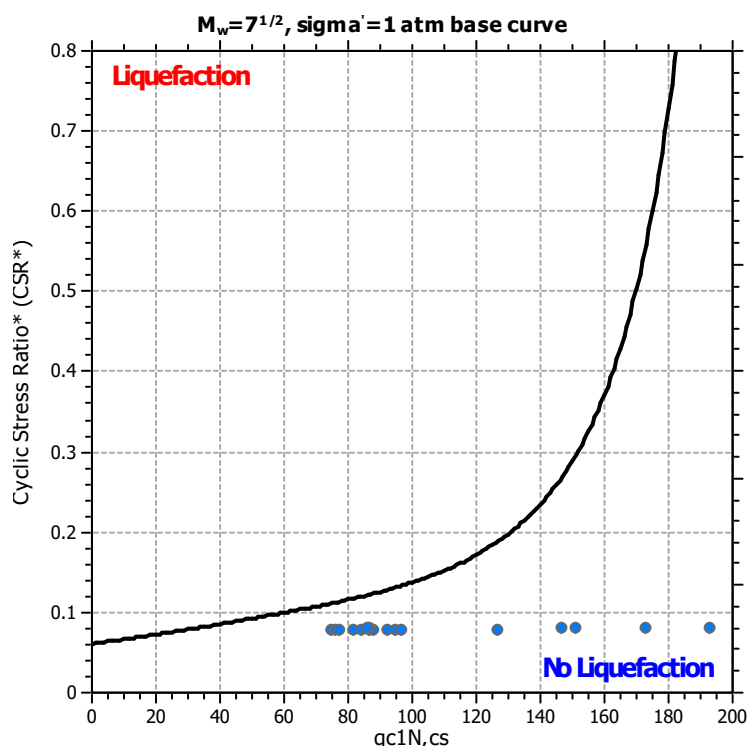
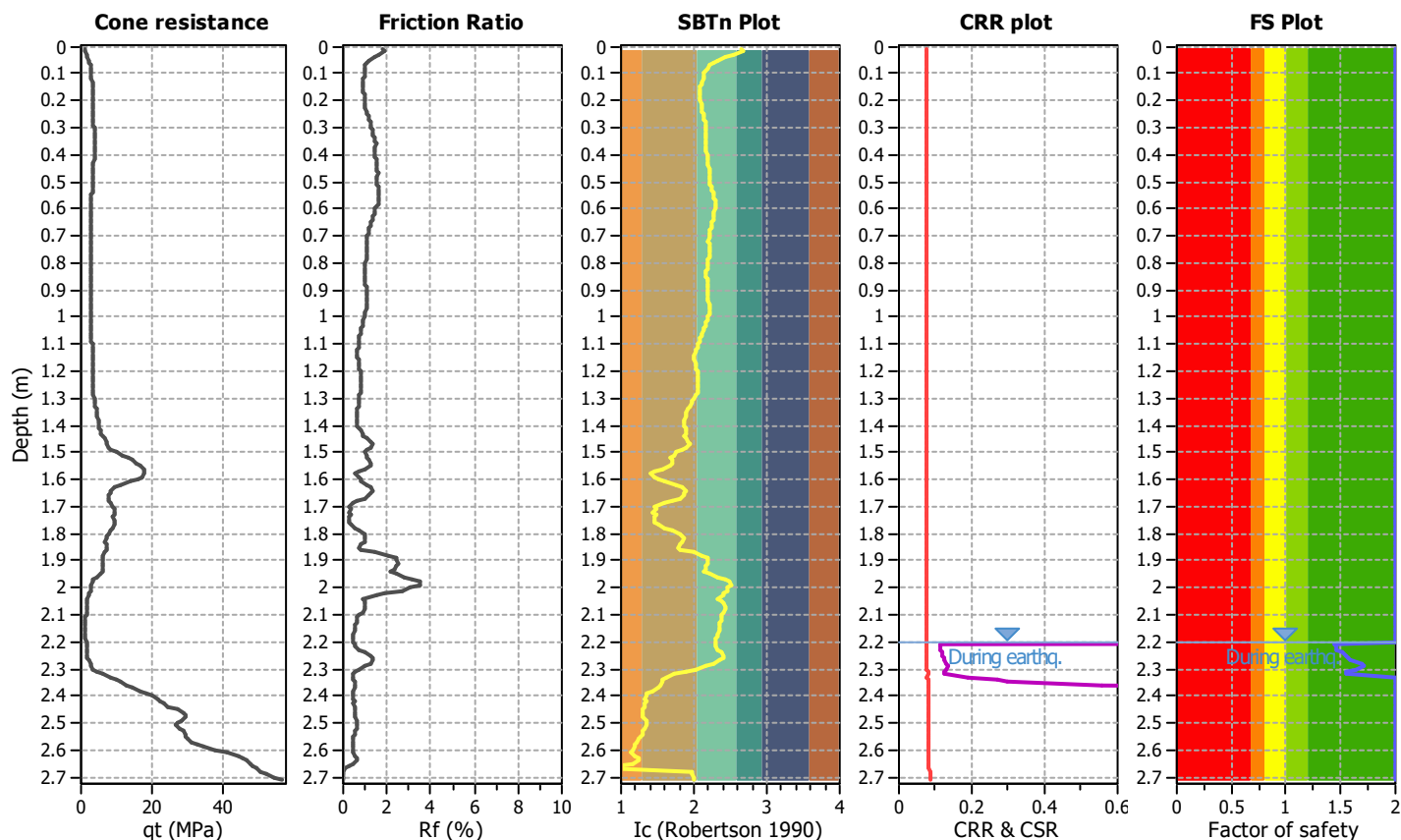
Project title : Multi-unit development

Location : 69 Poulson St, 45 Dickens St and 9 Grove rd, Christchurch

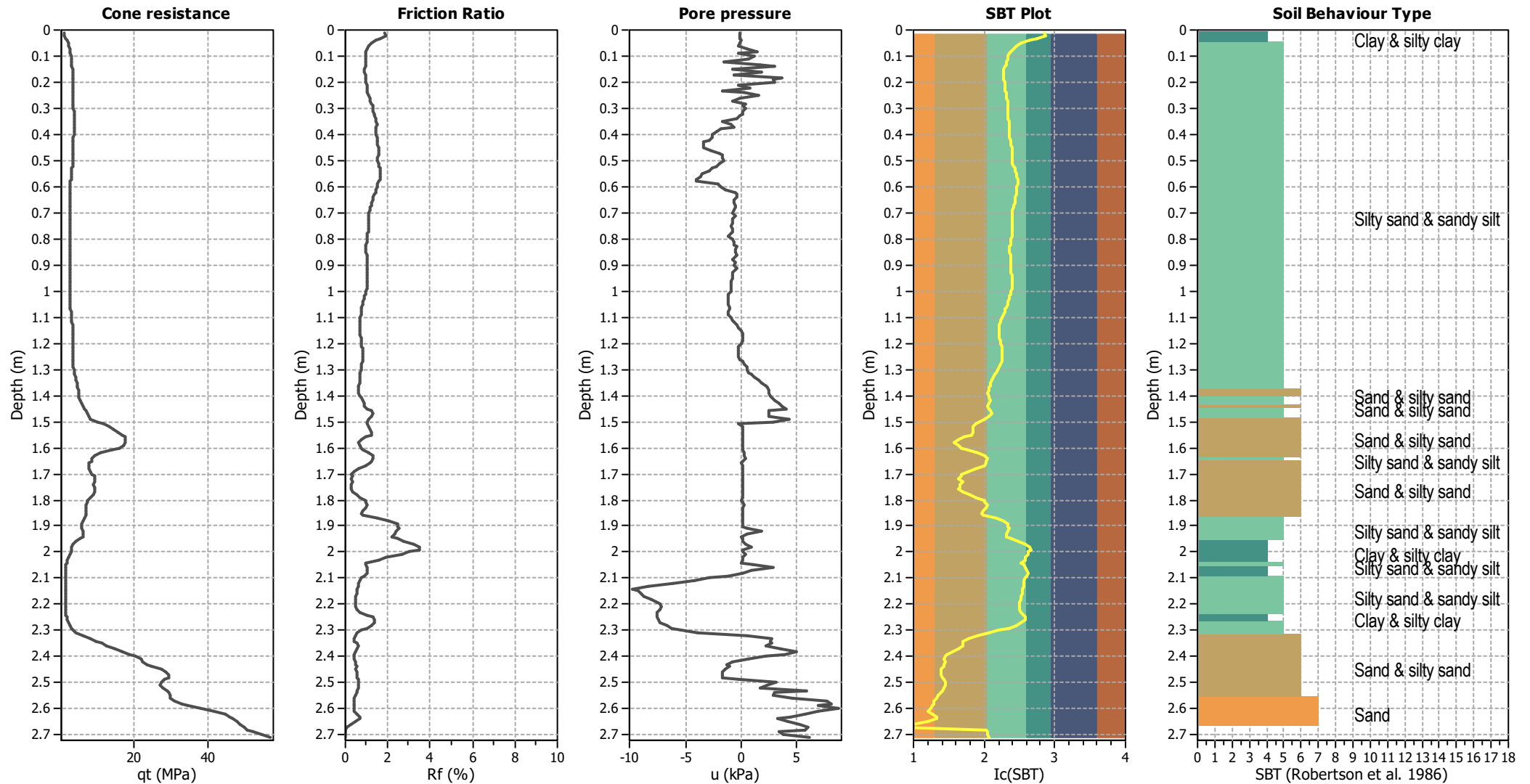
CPT file : CPT-07

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.20 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:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



CPT basic interpretation plots



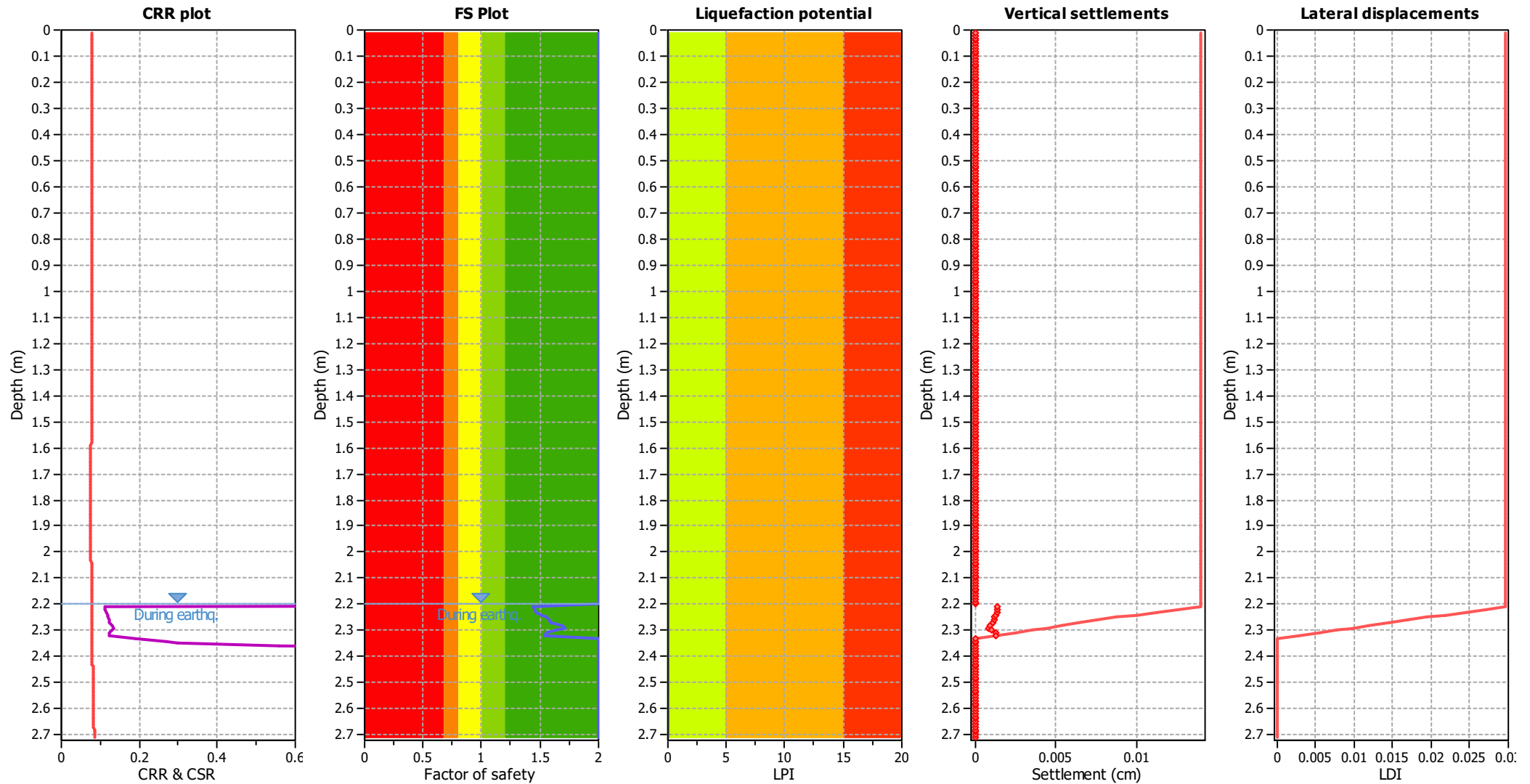
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K ₀ applied:	Yes
Earthquake magnitude M _w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _o applied:	Yes
Earthquake magnitude M _w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

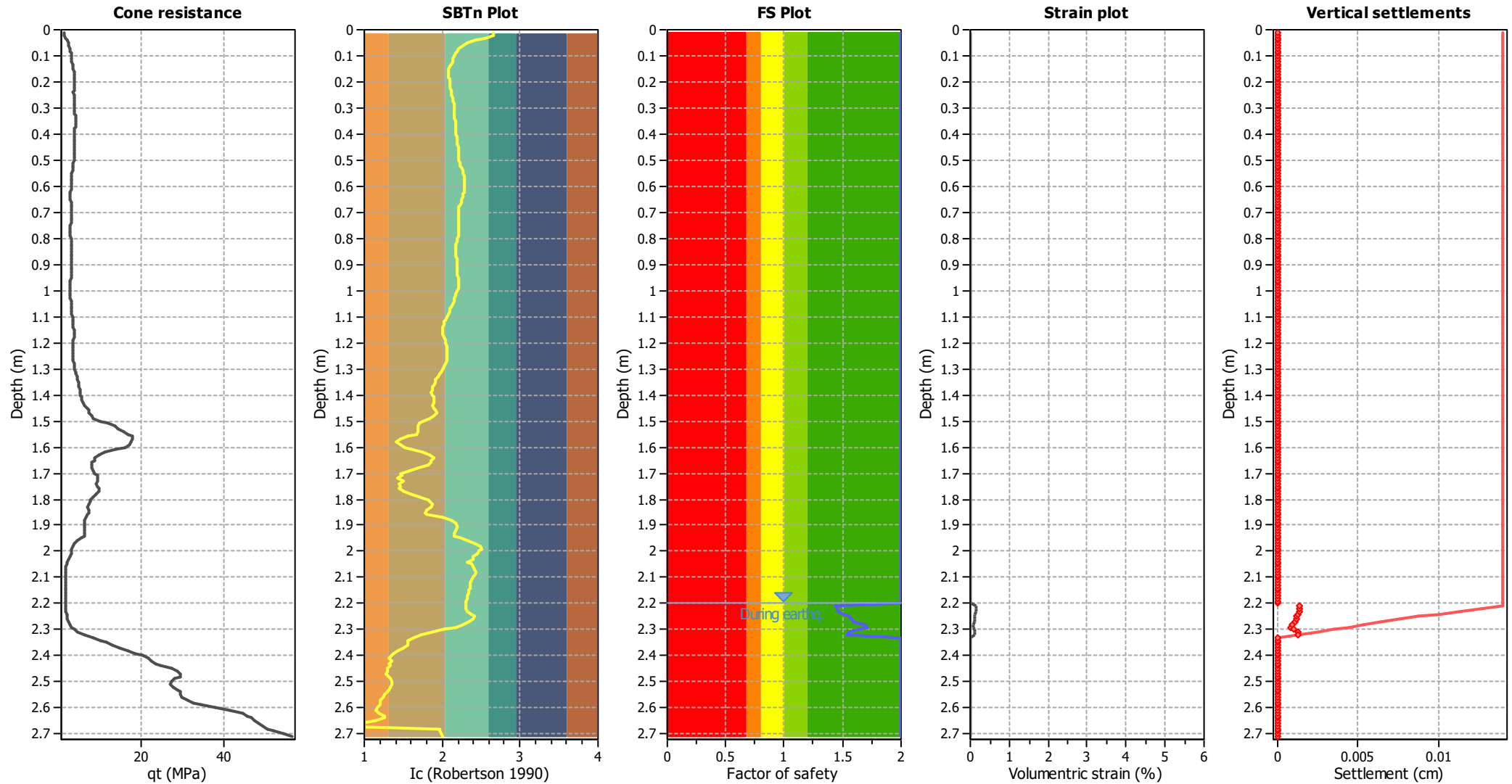
F.S. color scheme

Very high risk	Almost certain it will liquefy
High risk	Very likely to liquefy
Low risk	Liquefaction and no liq. are equally likely
	Unlike to liquefy
	Almost certain it will not liquefy

LPI color scheme

Very high risk	Very high risk
High risk	High risk
Low risk	Low risk

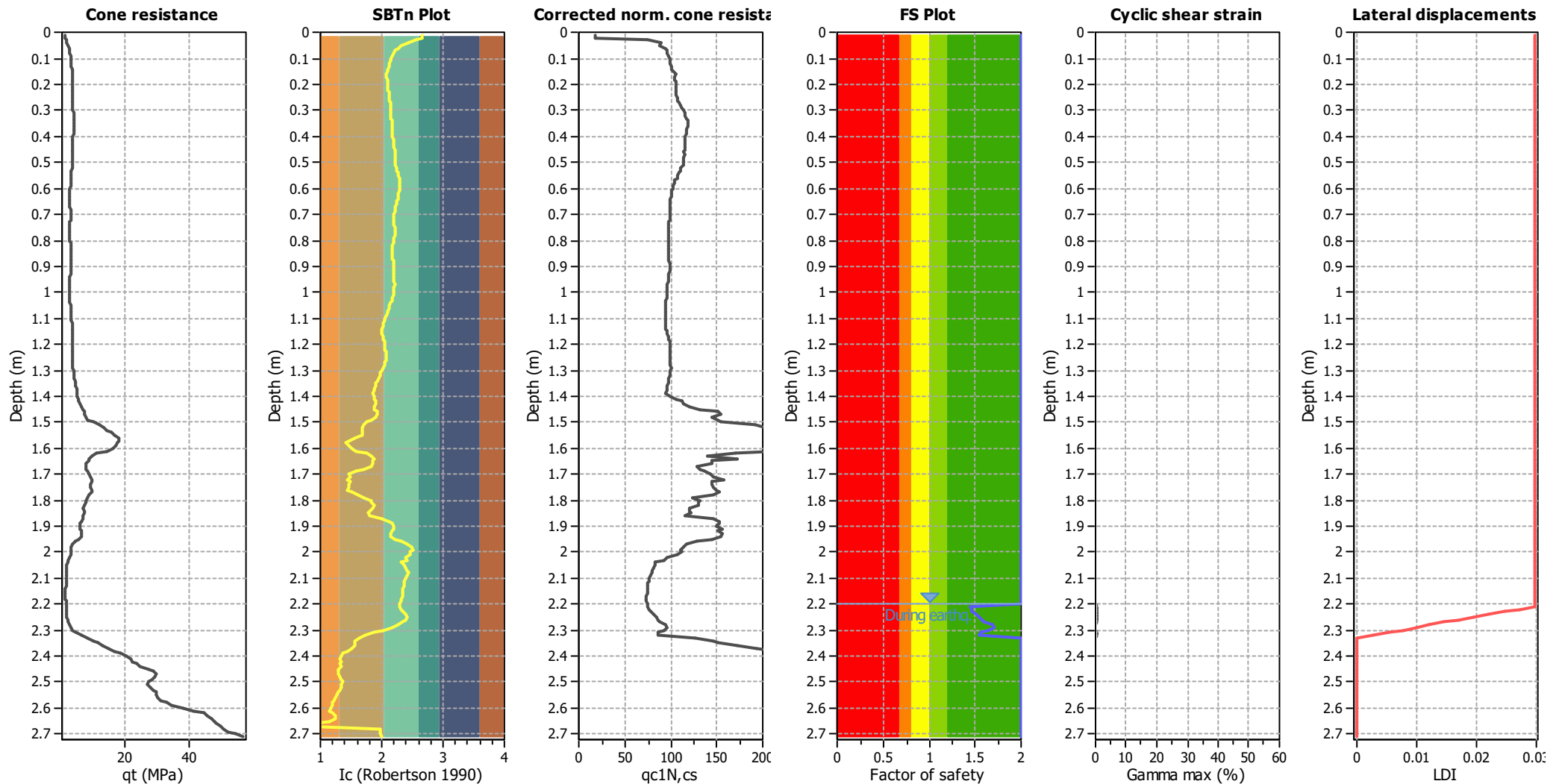
Estimation of post-earthquake settlements



Abbreviations

q_c : Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 FS: Calculated Factor of Safety against liquefaction
 Volumetric strain: Post-liquefaction volumetric strain

Estimation of post-earthquake lateral Displacements



Abbreviations

q_t : Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 $q_{c1N,cs}$: Equivalent clean sand normalized CPT total cone resistance

F.S.: Factor of safety
 γ_{max} : Maximum cyclic shear strain
 LDI: Lateral displacement index

LIQUEFACTION ANALYSIS REPORT

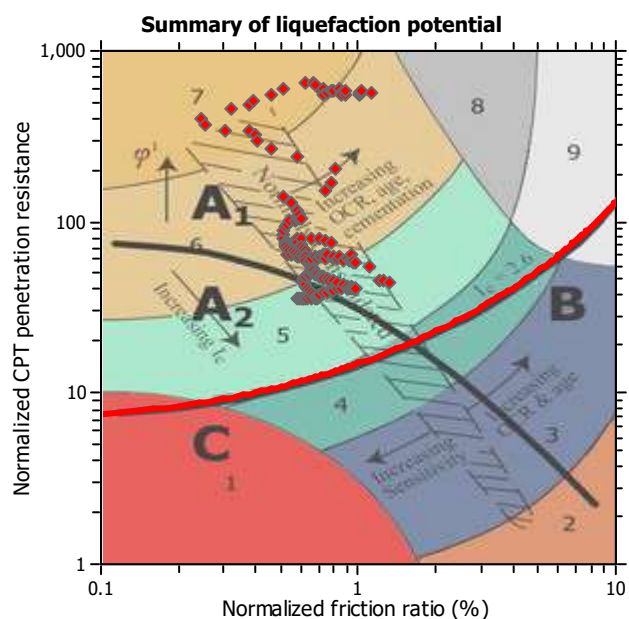
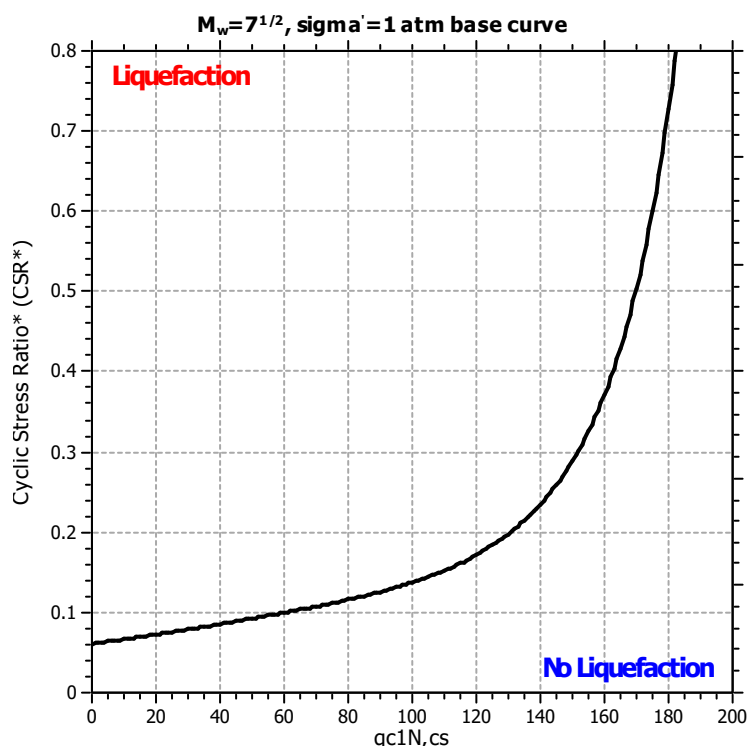
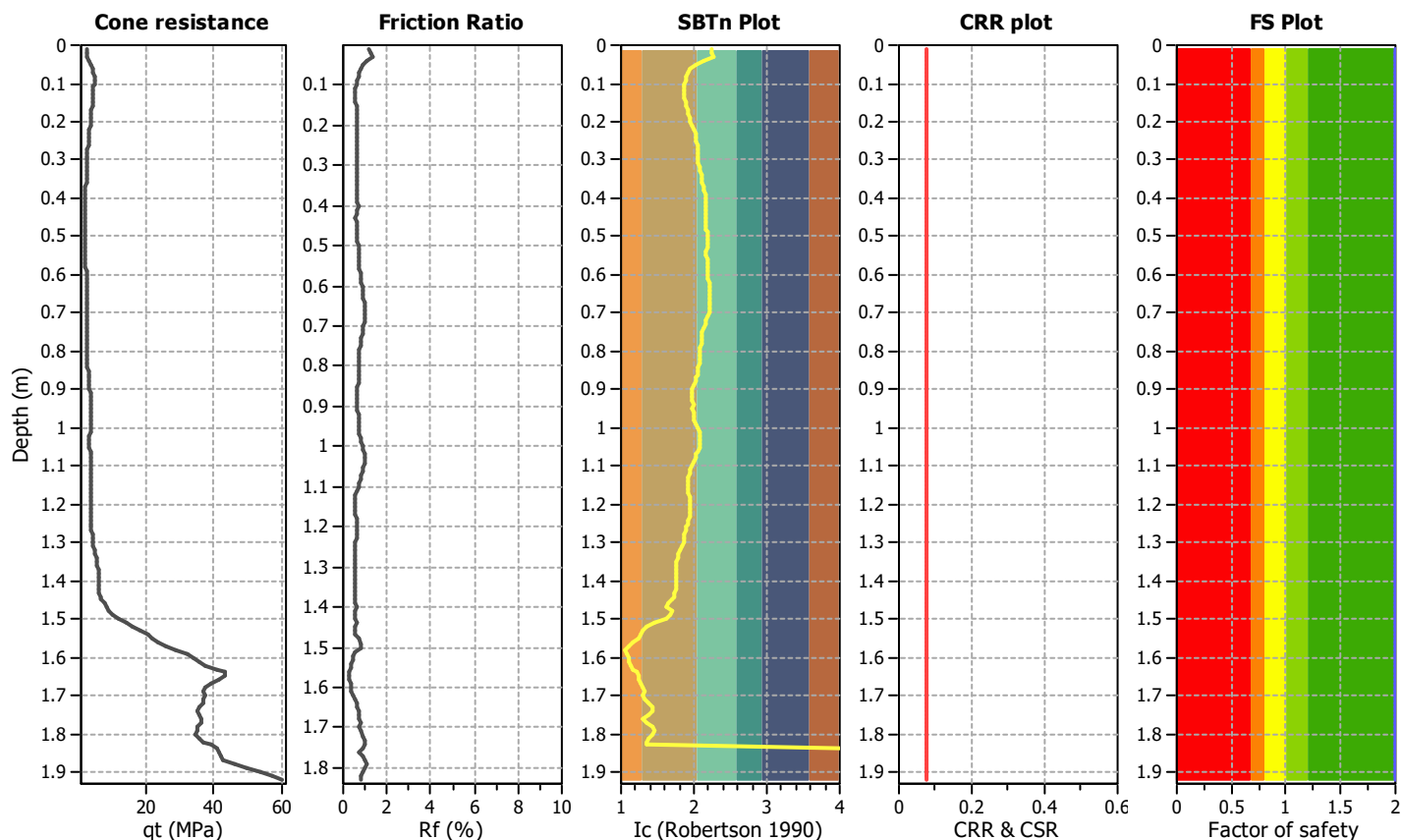
Project title : Multi-unit development

Location : 69 Poulson St, 45 Dickens St and 9 Grove rd, Christchurch

CPT file : CPT-08

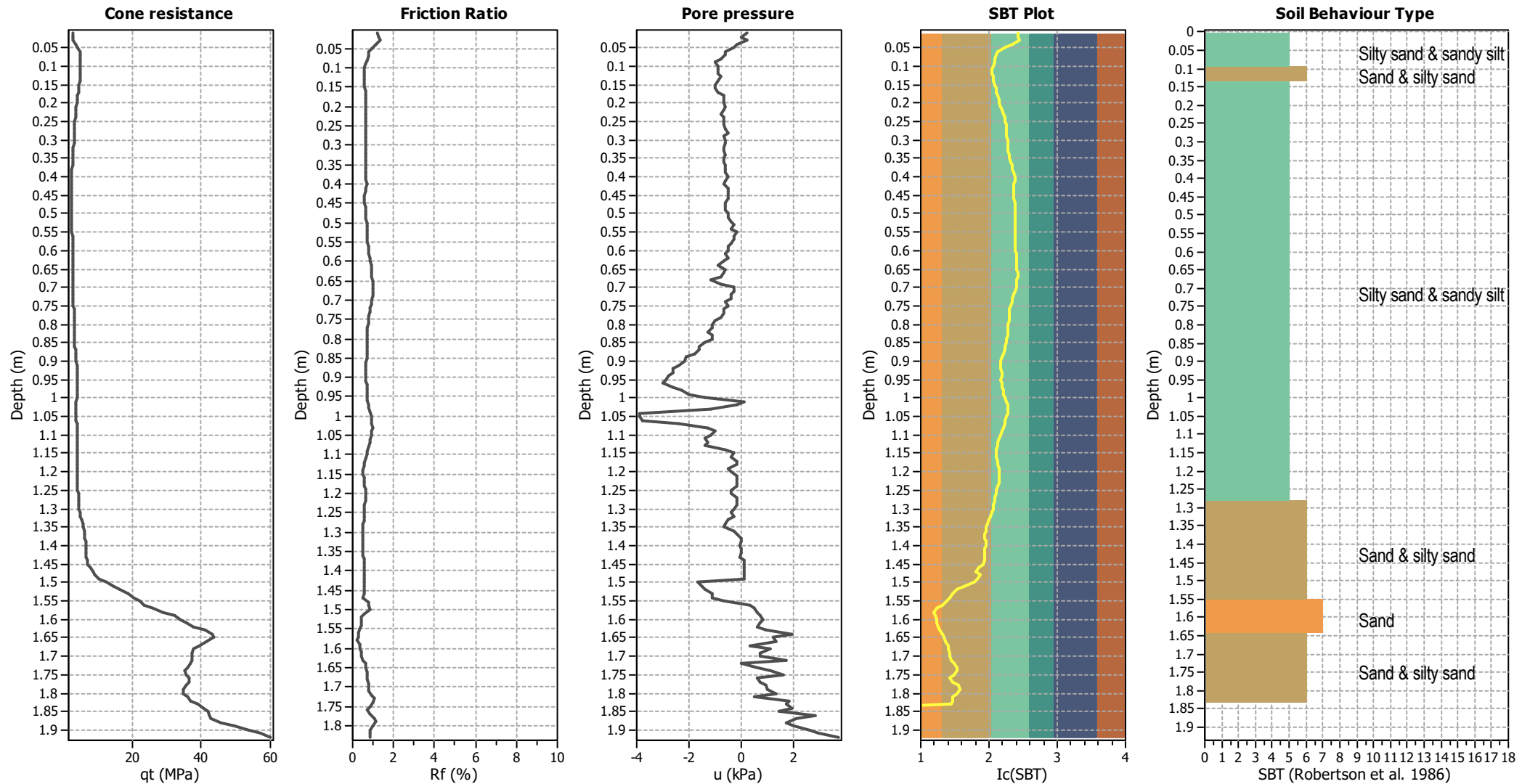
Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.20 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:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



Zone A₁: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A₂: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
 Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
 Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



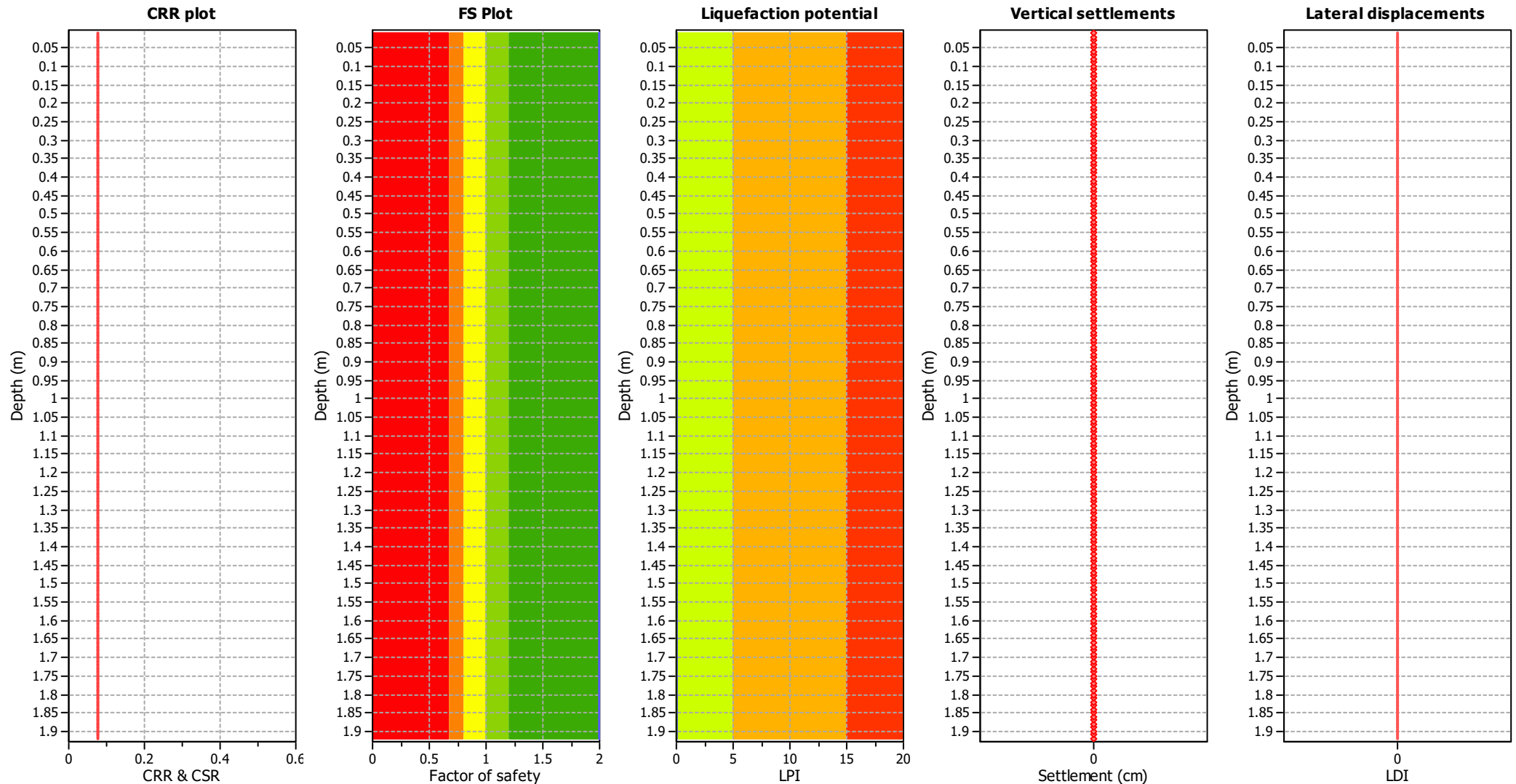
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on I_c value	I_c cut-off value:	2.60	K_0 applied:	Yes
Earthquake magnitude M_w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K ₀ applied:	Yes
Earthquake magnitude M _w :	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

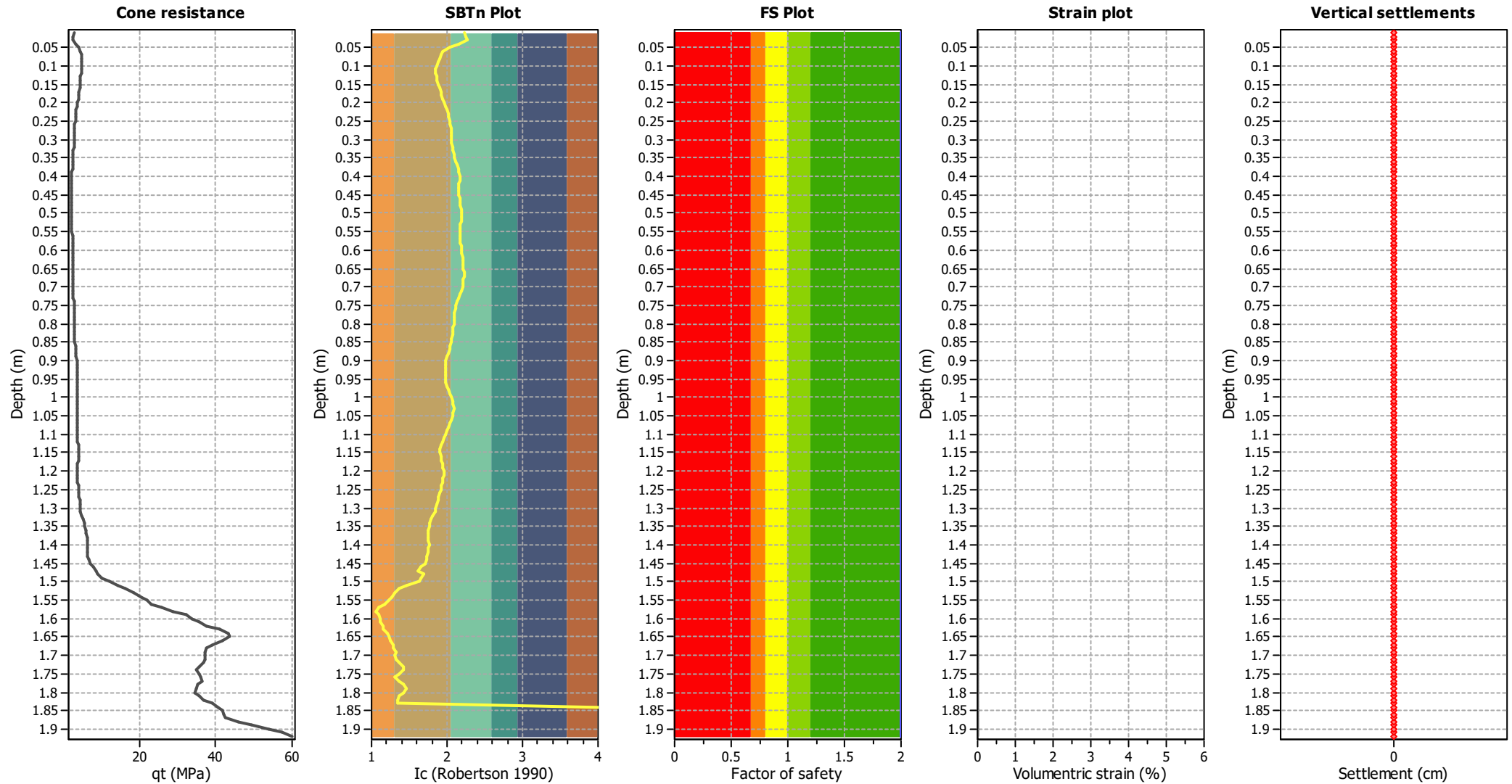
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LPI color scheme

Red	Very high risk
Orange	High risk
Yellow	Low risk

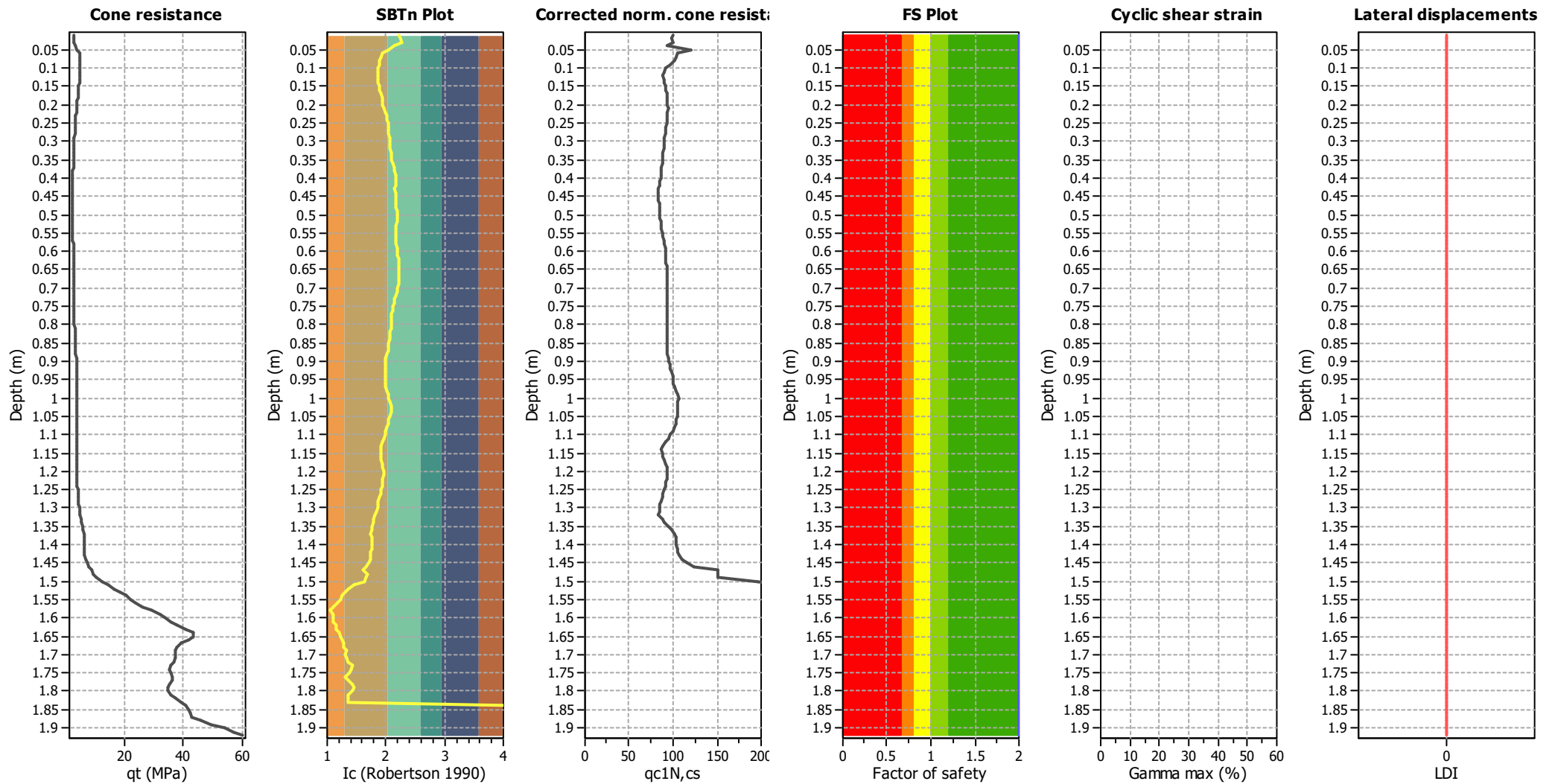
Estimation of post-earthquake settlements



Abbreviations

q_c : Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 FS: Calculated Factor of Safety against liquefaction
 Volumetric strain: Post-liquefaction volumetric strain

Estimation of post-earthquake lateral Displacements

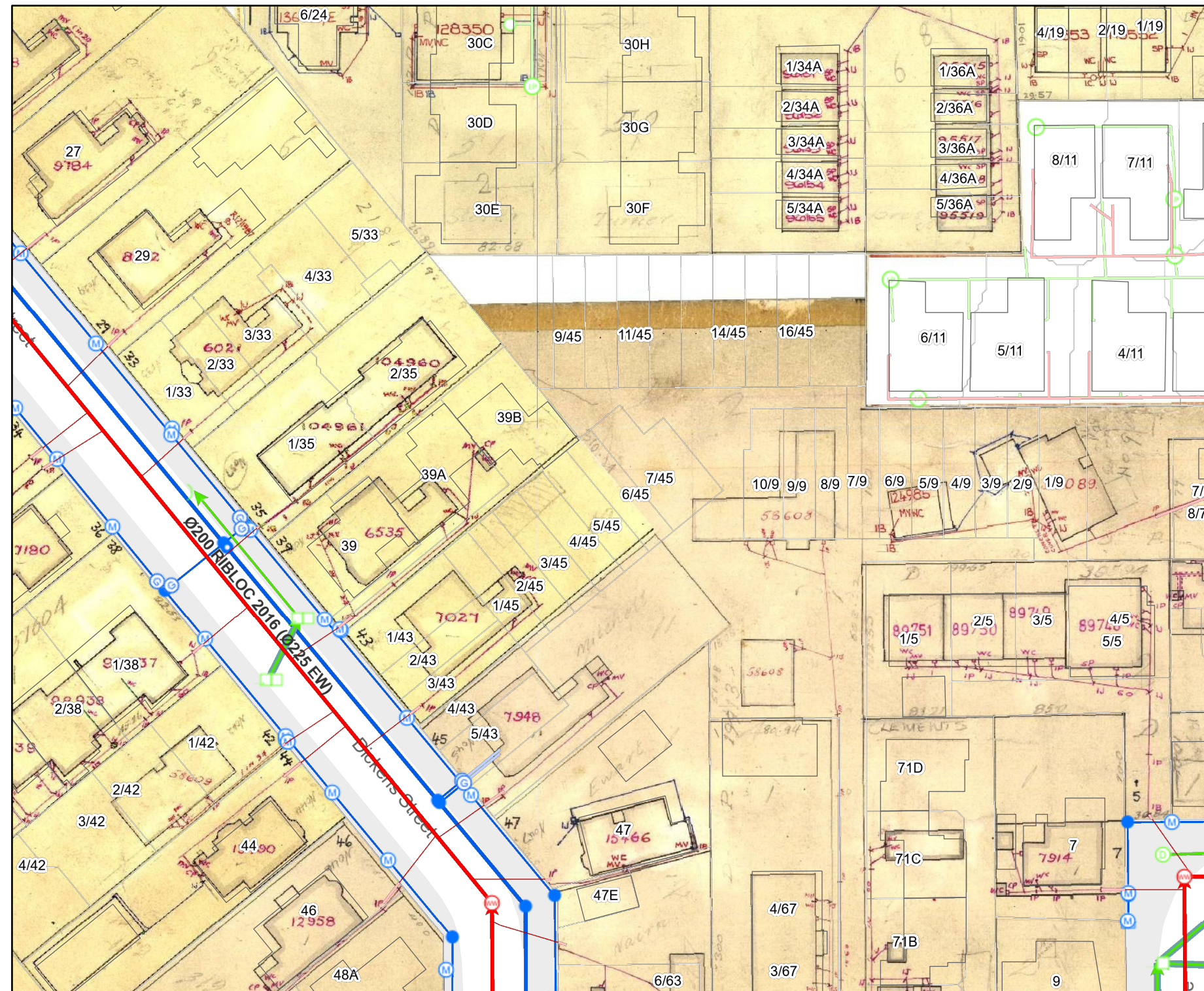


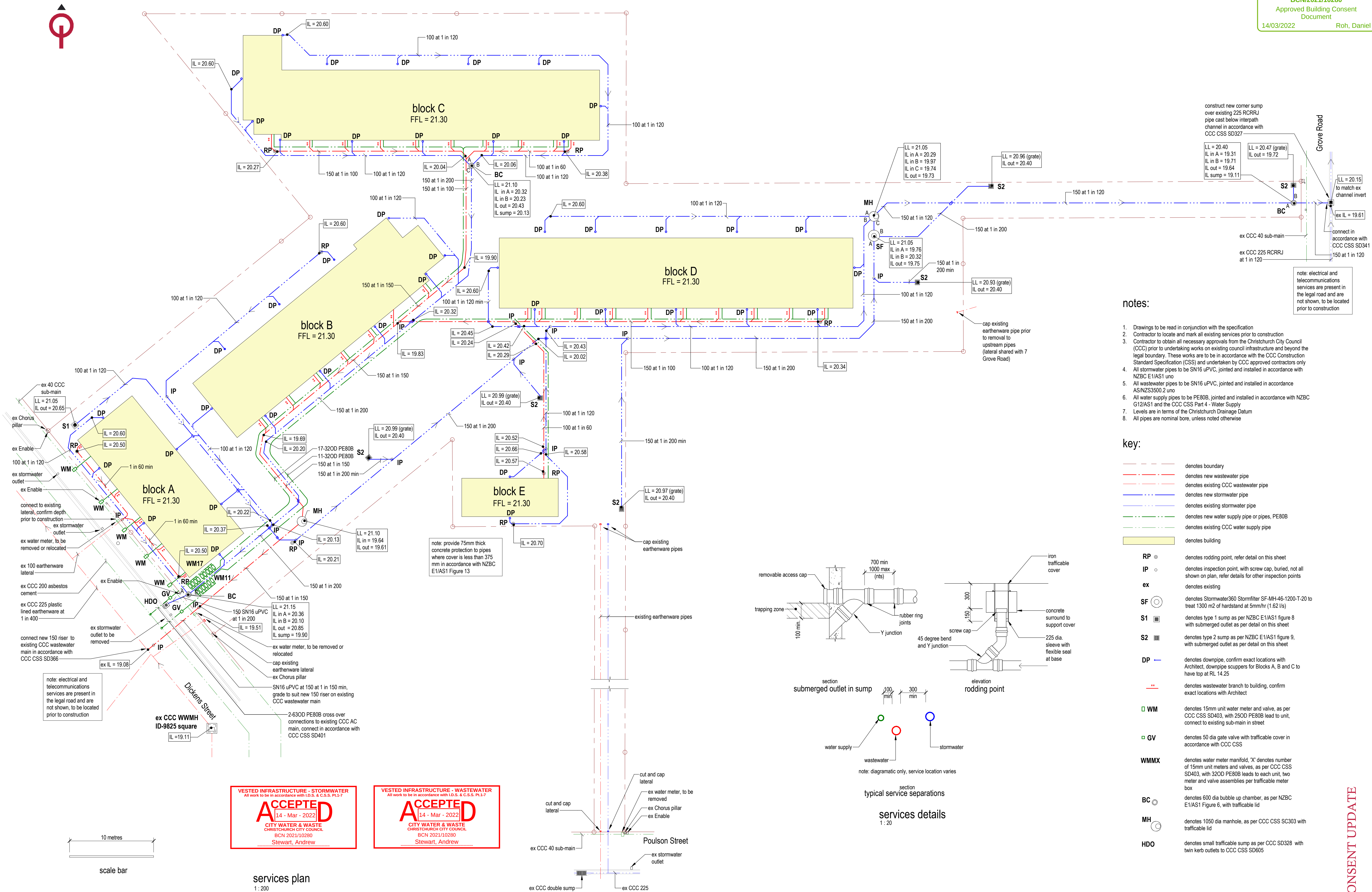
Abbreviations

q_t : Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 $q_{c1N,cs}$: Equivalent clean sand normalized CPT total cone resistance

F.S.: Factor of safety
 γ_{max} : Maximum cyclic shear strain
 LDI: Lateral displacement index

- Buildings
- StreetAddress
- WwAccess
- Standard Manhole
- WwPipeFlowDirection
- WwPipe
- NominalDiameter
 - Diameter is greater than 200mm, up to 450mm
- WwLateral
- WwLateral (non CCC)
 - In Service
- SwAccess
- SwInlet
 - Single Sump
 - Double Sump
- SwOutlet
- SwPipeFlowDirection
- SwLateralFitting
- Inspection Point
- Lateral Fitting
- SwPipe
 - NominalDiameter
 - Diameter is 450mm or smaller
 - SwPipeProtection
 - SwPipe (non CCC)
 - In Service
 - SwLateral (non CCC)
 - In Service
- WsValve
 - Gate
- WsHydrant
- WsConnection
 - Meter
- WsFitting
 - End Cap
 - Connector
 - Connector
 - Connector
 - Connector
- WsPipe
 - NominalDiameter
 - Diameter is 110mm or smaller
 - Diameter is greater than 110mm, up to 225mm
 - WsLateral
 - WsLateral (non CCC)
 - In Service
 - RatingUnit



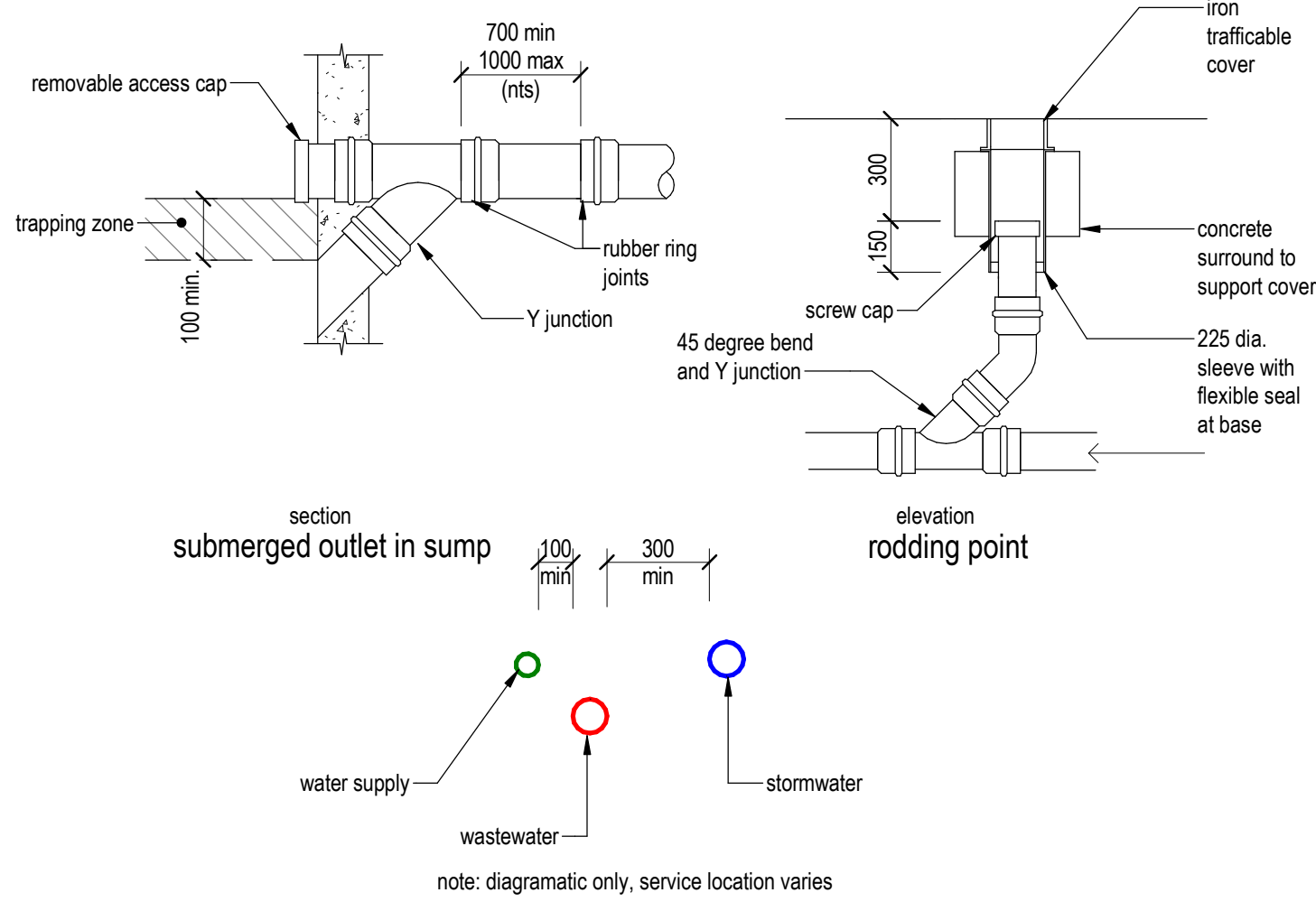


notes:

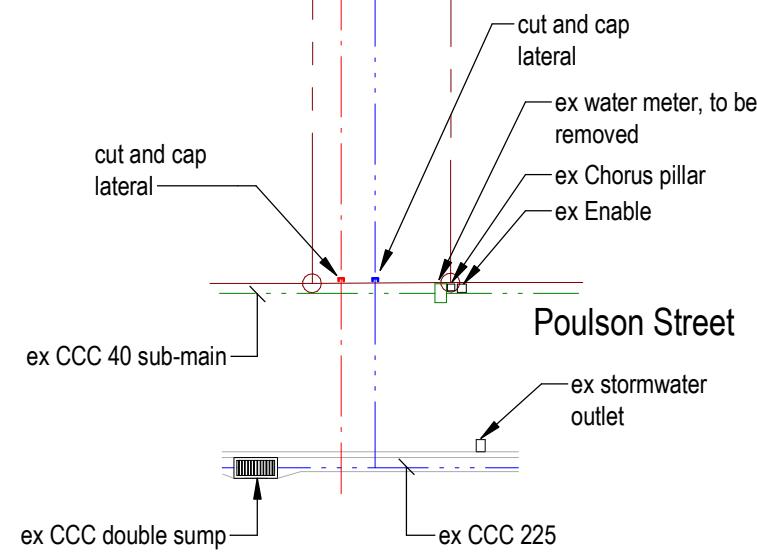
- Drawings to be read in conjunction with the specification
- Contractor to locate and mark all existing services prior to construction
- Contractor to obtain all necessary approvals from the Christchurch City Council (CCC) prior to undertaking works on existing council infrastructure and beyond the legal boundary. These works are to be in accordance with the CCC Construction Standard Specification (CSS) and undertaken by CCC approved contractors only
- All stormwater pipes to be SN16 uPVC, jointed and installed in accordance with NZBC E1/AS1 uno
- All wastewater pipes to be SN16 uPVC, jointed and installed in accordance with AS/NZS3500.2 uno
- All water supply pipes to be PE80B, jointed and installed in accordance with NZBC G12/AS1 and the CCC CSS Part 4 - Water Supply
- Levels are in terms of the Christchurch Drainage Datum
- All pipes are nominal bore, unless noted otherwise

key:

- denotes boundary
- denotes new wastewater pipe
- denotes existing CCC wastewater pipe
- denotes new stormwater pipe
- denotes existing stormwater pipe
- denotes new water supply pipe or pipes, PE80B
- denotes existing CCC water supply pipe
- denotes building
- denotes rodding point, refer detail on this sheet
- denotes inspection point, with screw cap, buried, not all shown on plan, refer details for other inspection points
- denotes existing
- denotes Stormwater/360 Stormfilter SF-MH-46-1200-T-20 to treat 1300 m² of hardstand at 5mm/hr (1.62 l/s)
- denotes type 1 sump as per NZBC E1/AS1 figure 8 with submerged outlet as per detail on this sheet
- denotes type 2 sump as per NZBC E1/AS1 figure 9, with submerged outlet as per detail on this sheet
- denotes downpipe, confirm exact locations with Architect, downpipe scuppers for Blocks A, B and C to have top at RL 14.25
- denotes wastewater branch to building, confirm exact locations with Architect
- denotes 15mm unit water meter and valve, as per CCC CSS SD403, with 250D PE80B lead to unit, connect to existing sub-main in street
- denotes 50 dia gate valve with trafficable cover in accordance with CCC CSS
- denotes water meter manifold, 'X' denotes number of 15mm unit meters and valves, as per CCC CSS SD403, with 320D PE80B leads to each unit, two meter and valve assemblies per trafficable meter box
- denotes 600 dia bubble up chamber, as per NZBC E1/AS1 Figure 6, with trafficable lid
- denotes 1050 dia manhole, as per CCC CSS SC303 with trafficable lid
- denotes small trafficable sump as per CCC SD328 with twin kerb outlets to CCC CSS SD605



typical service separations
1 : 20



VESTED INFRASTRUCTURE - STORMWATER
All work to be in accordance with I.D.S. & C.S.S. PL3-7
ACCEPTED
14 - Mar - 2022
CITY WATER & WASTE
CHRISTCHURCH CITY COUNCIL
BCN 2021/10280
Stewart, Andrew

VESTED INFRASTRUCTURE - WASTEWATER
All work to be in accordance with I.D.S. & C.S.S. PL3-7
ACCEPTED
14 - Mar - 2022
CITY WATER & WASTE
CHRISTCHURCH CITY COUNCIL
BCN 2021/10280
Stewart, Andrew

Quoin Structural Consultants
Level 2, 138 Victoria Street
Christchurch 8013
03 968 4925
quoin.co.nz

Integrity in Design



TOWNHOUSE DEVELOPMENT AT 43-45 DICKENS STREET, 69 POULSON STREET AND 9 GROVE ROAD
for Citrus Living

services plan and details

project no. 13870
drawing no. C1.01
issue 3

		A1 original		As indicated		1 : 400		1 : 40		draughtsman		engineer/s		director	
3	Consent Update	MJ	BG	11.03.22	As indicated	1 : 400	1 : 400	1 : 400	1 : 400	MJ	BG	BG			
2	Consent Update	MJ	BG	19.01.22											
1	Consent	MJ	BG	08.12.21											
Issue	reason	issuer	approved	date	scales at A1	scales at A3									

services plan
1 : 200

CONSENT UPDATE

page 1 of 2

Asbuilts to be returned to: water.connections@ccc.govt.nz

48hrs notice required before pipelaying commences:
phone Andrew Tutt 0272018363

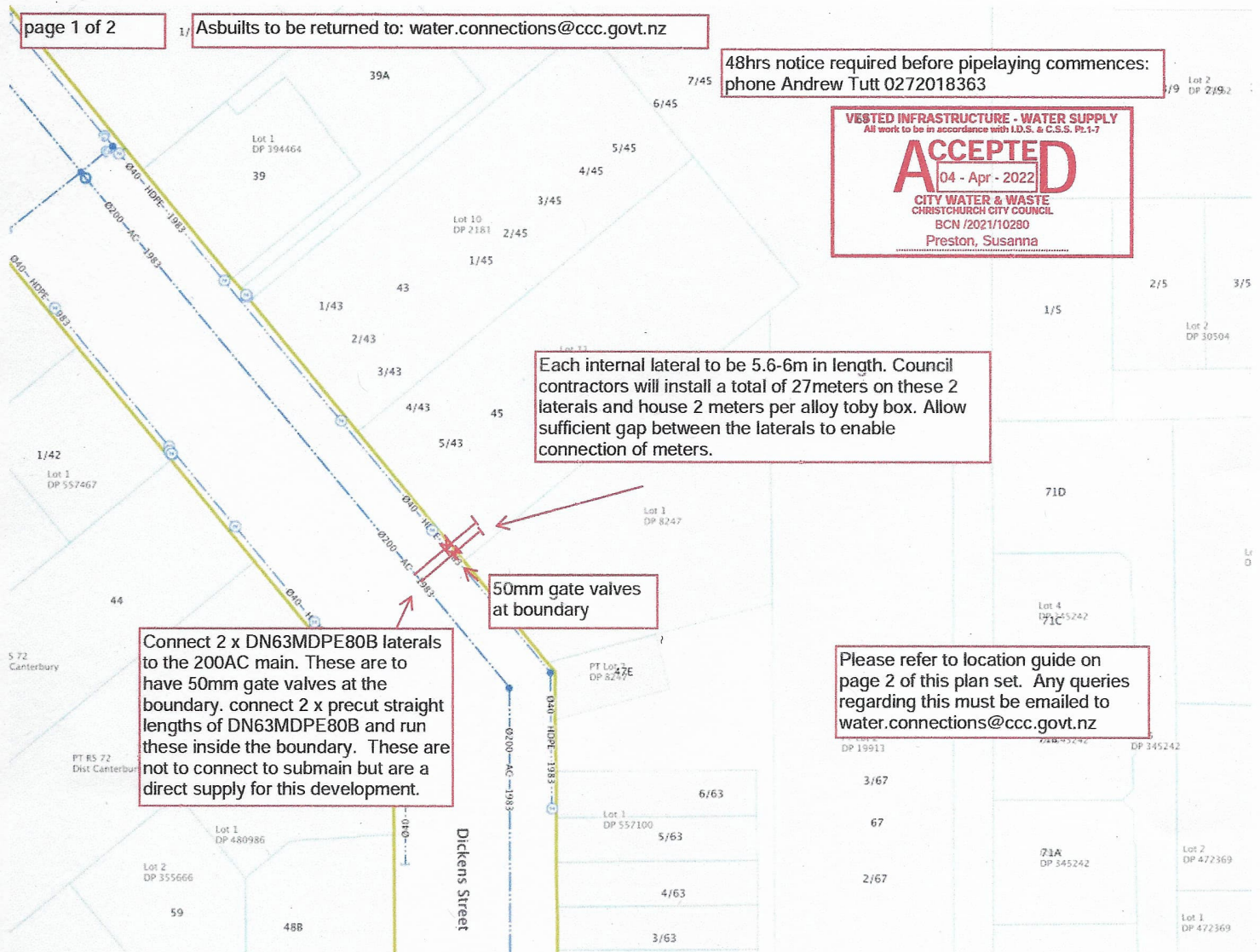


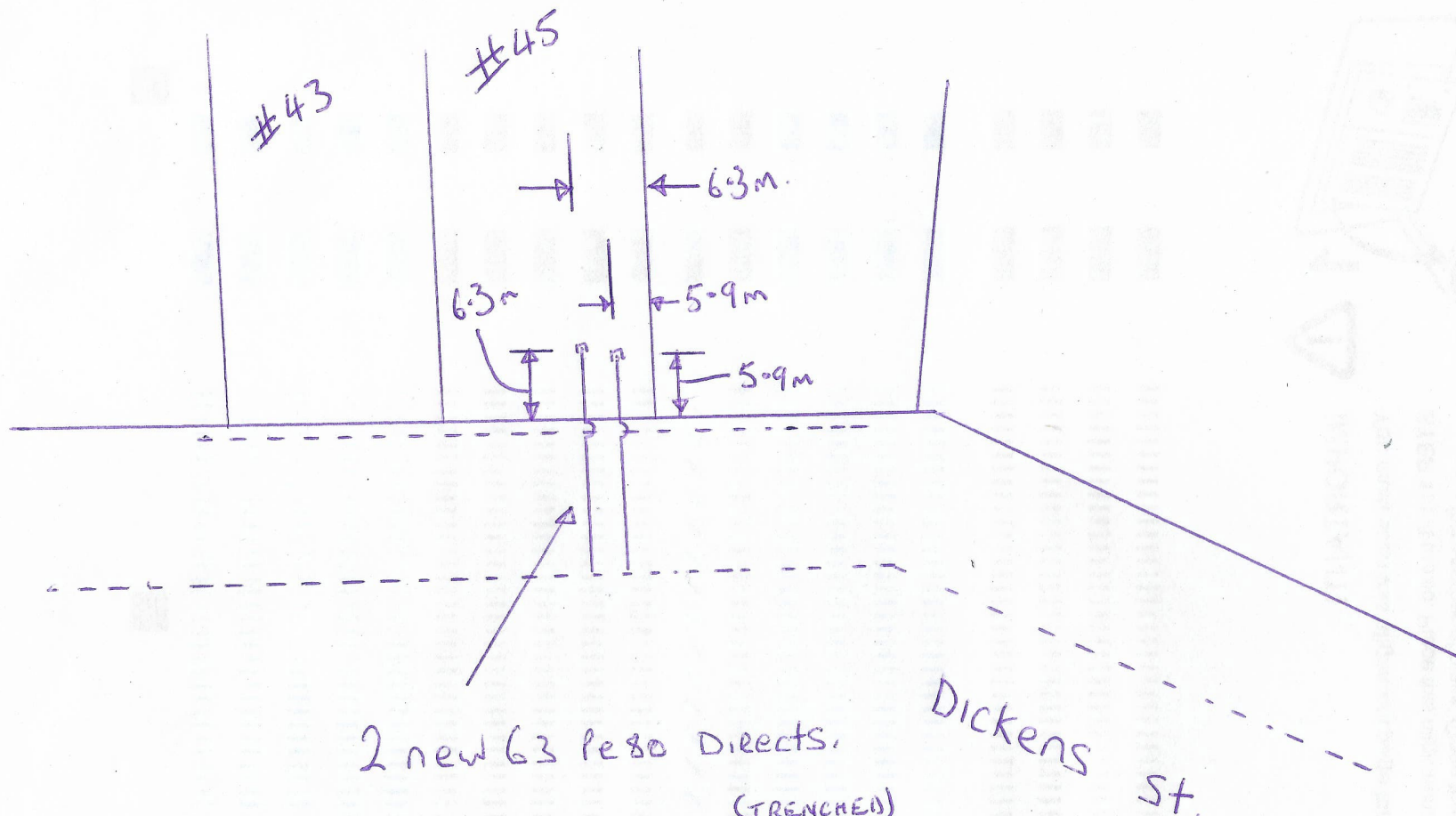
Each internal lateral to be 5.6-6m in length. Council contractors will install a total of 27meters on these 2 laterals and house 2 meters per alloy toby box. Allow sufficient gap between the laterals to enable connection of meters.

50mm gate valves
at boundary

Connect 2 x DN63MDPE80B laterals to the 200AC main. These are to have 50mm gate valves at the boundary. connect 2 x precut straight lengths of DN63MDPE80B and run these inside the boundary. These are not to connect to submain but are a direct supply for this development.

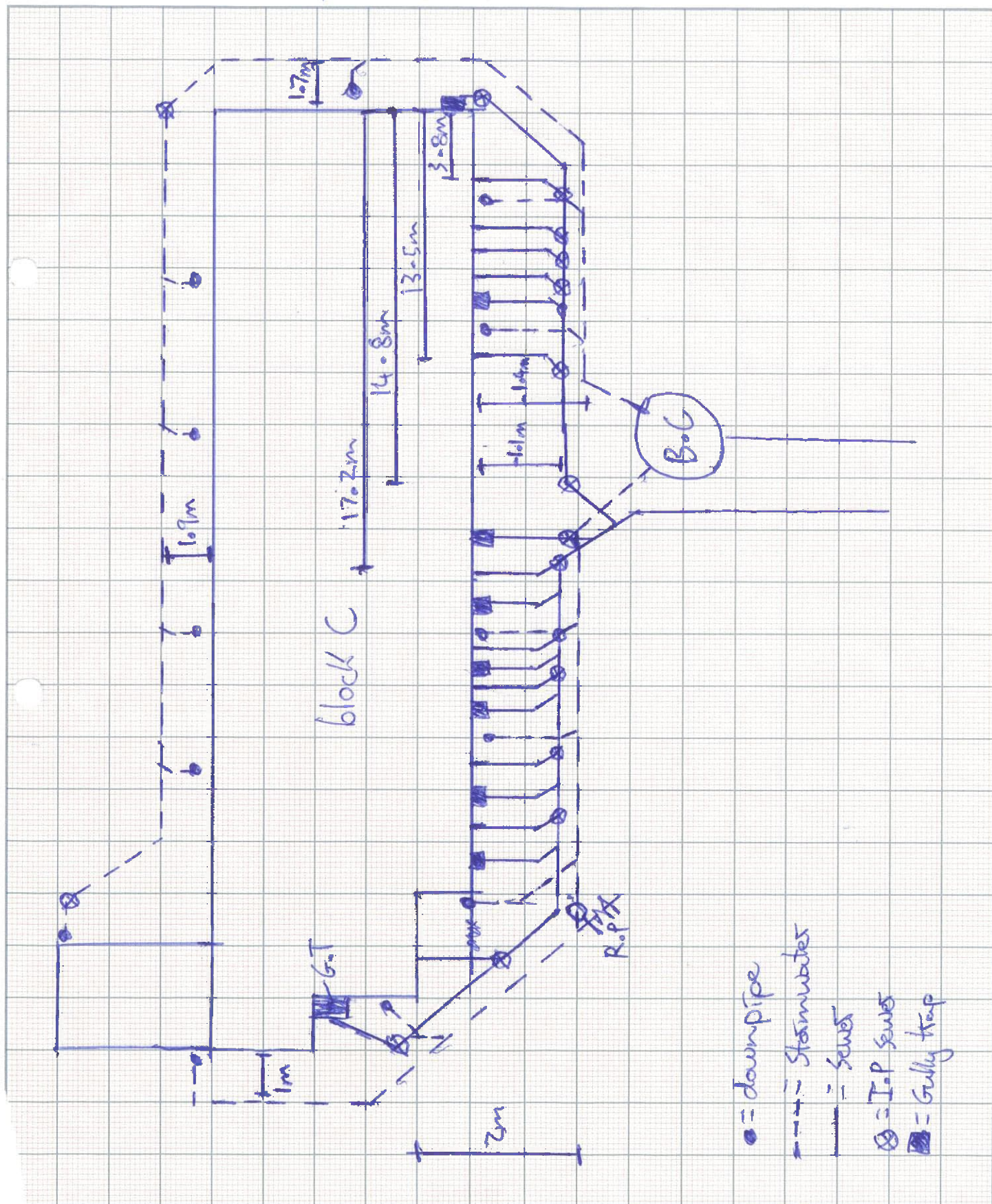
Please refer to location guide on page 2 of this plan set. Any queries regarding this must be emailed to water.connections@ccc.govt.nz





2 new 63 le80 Directs.
(TRENCHED)
7-6-22

Dickens St.



[illegible]

15CN 2021/10280

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Phone 03 384 8111

www.peterdiver.co.nz



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Members

11313

Builder: Citrus

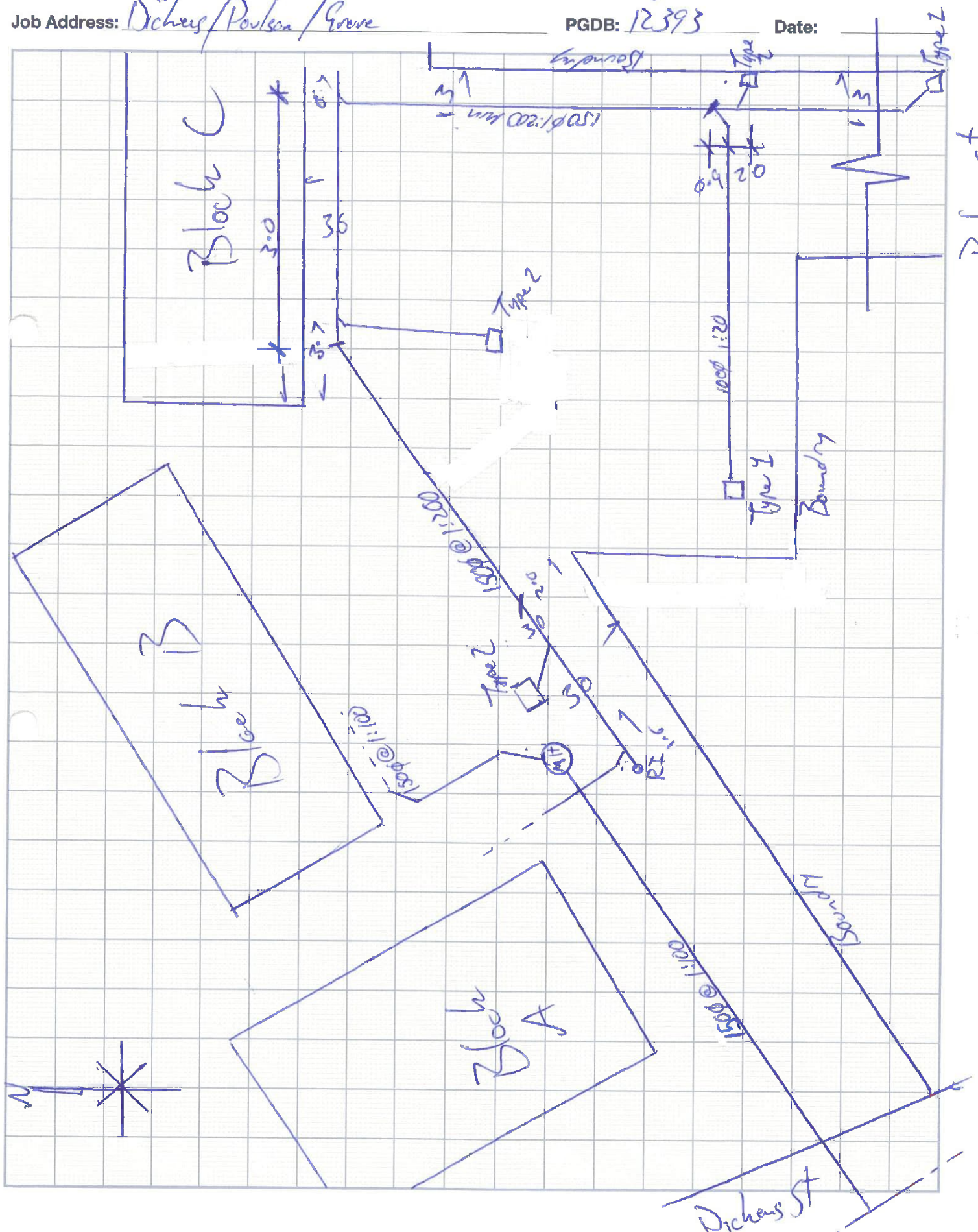
Drainlayer/Plumber:

Job No:

Job Address:

PGDB: 12393

Date:



Drainage As-built

BCN 2021/10280



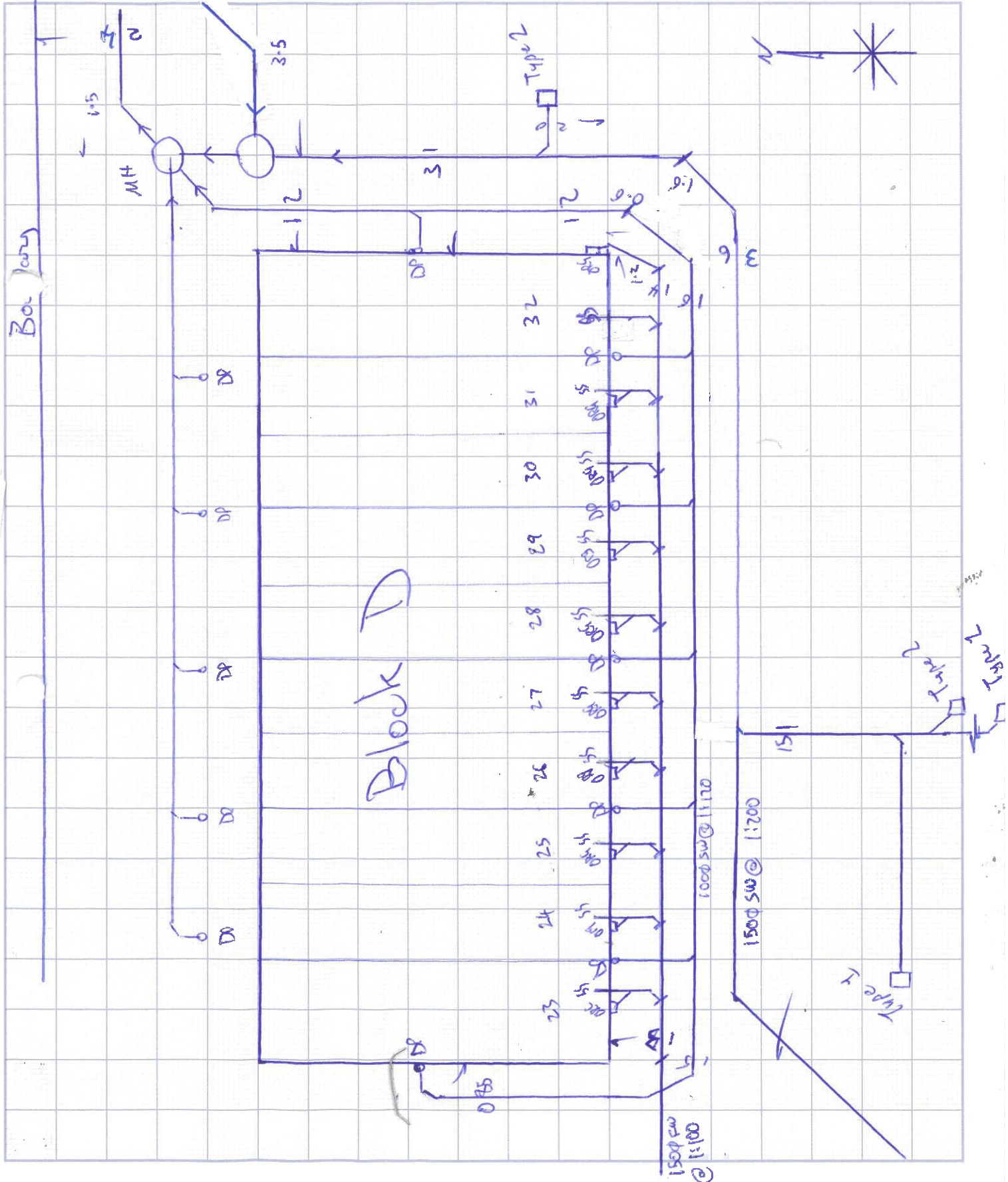
44 Maces Road, Bromley, Christchurch 8062
Phone 03 384 8111
www.peterdiver.co.nz



Master Plumbers
Setting Excellence

11311

Builder: Citrus Drainlayer/Plumber: Michael Diver 15390 Job No: _____
Job Address: Dickens/Grove/Palson St PGDB: 12393 Date: _____



Drainage As-Built

BCN 2021/10280

Peter Diver

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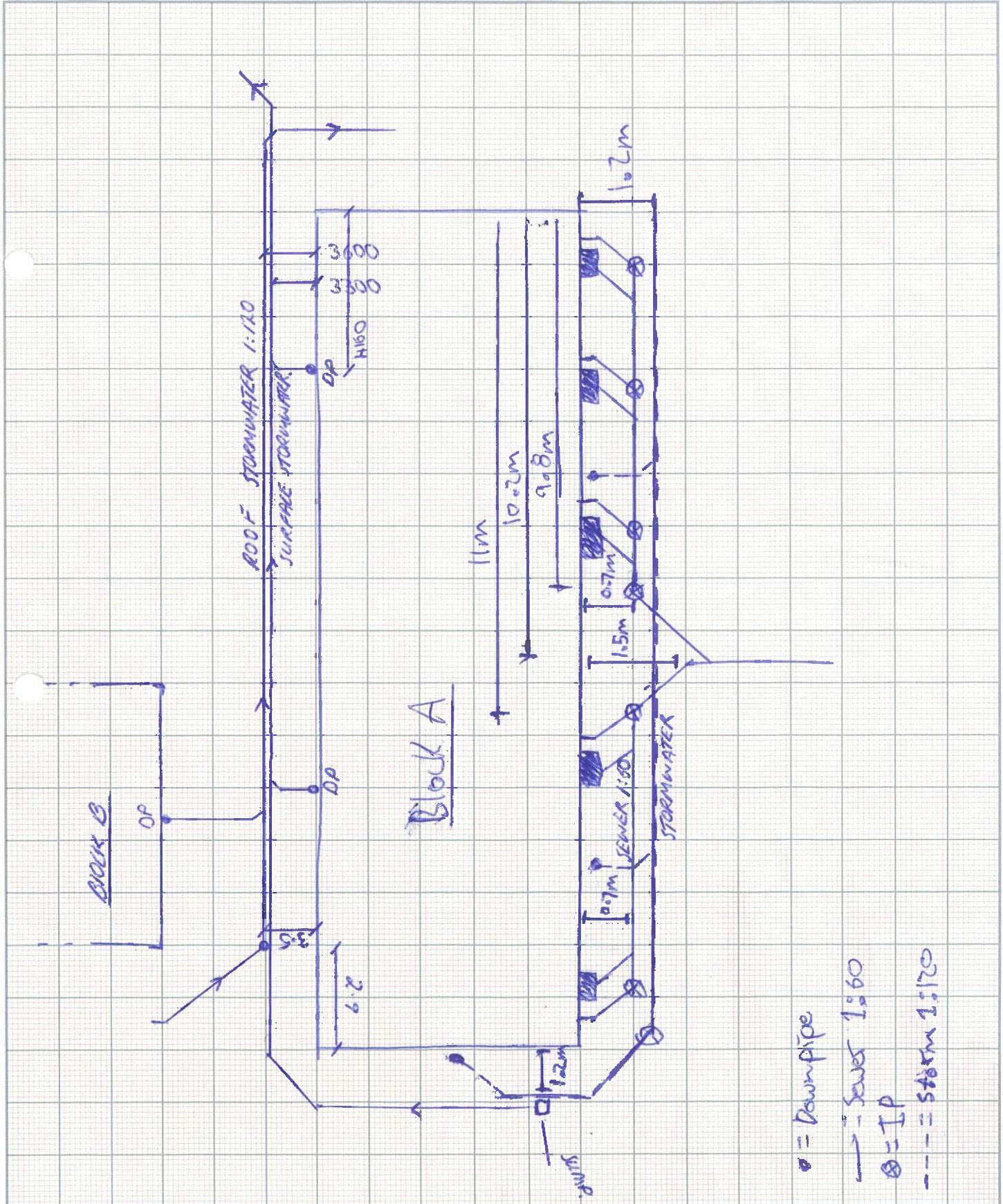
Builder: Citrus

Drainlayer/Plumber: 12393 Wayne Calder
Michael Diver 15398

Job No: 18319
9242

Job Address: 45 Dickens street / Grove / Poulson

PGDB: 11/05/22
Date:



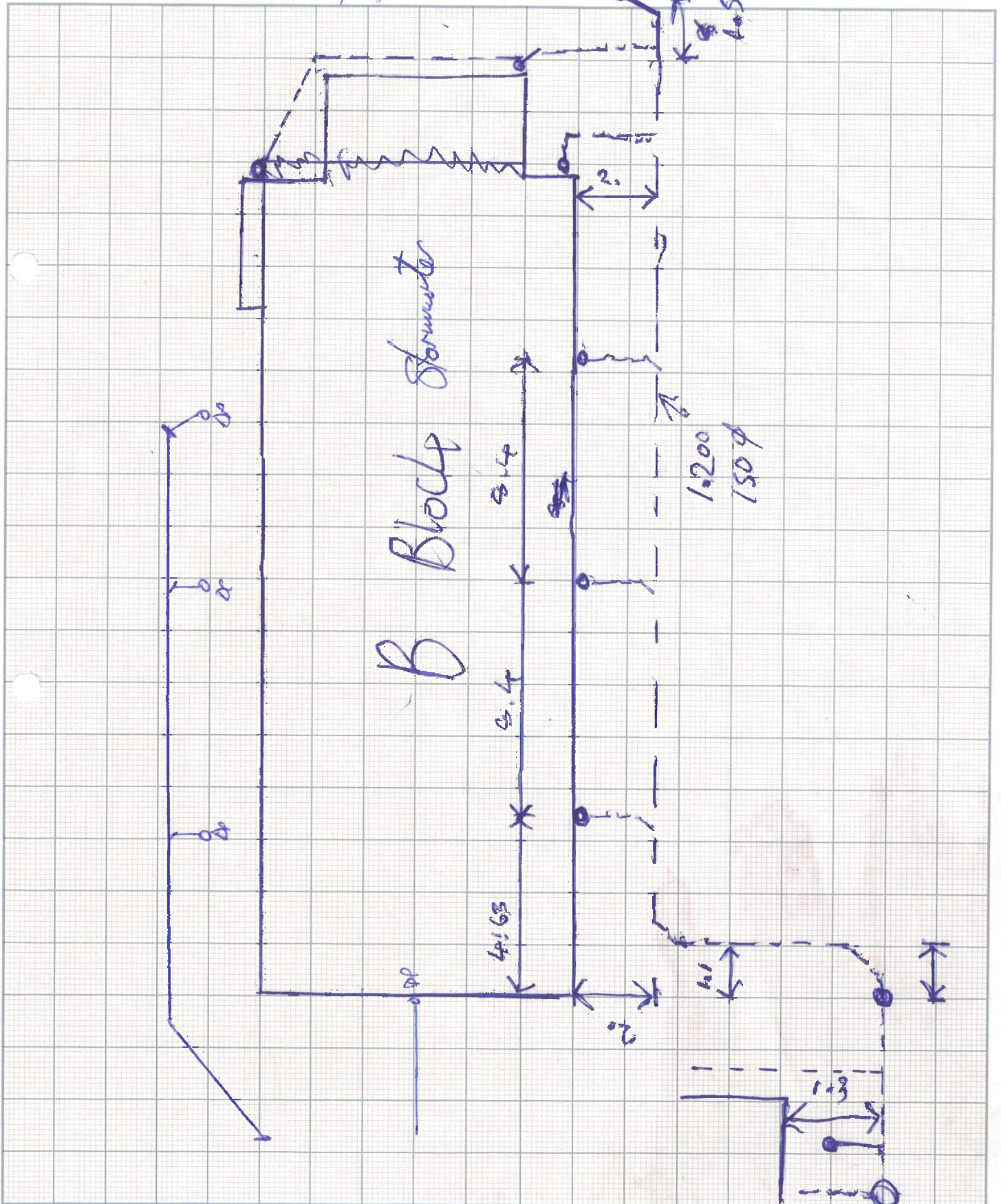
Drainage As-built BCN 2021/10280



44 Maces Road, Bromley, Christchurch 8062
Phone 03 384 8111
www.peterdiver.co.nz



Builder: Citrus Drainlayer/Plumber: Michael Diver 15396 Job No: 9244
Job Address: 9 Grove St./Dickens/Parker PGDB: 12393 Date: _____



Compliance and Electrical Safety Certificate

R. Redpaths



Location Details:

Reference/Certificate ID No:

LL/9 GROVE RD

This form has been designed to be used by licensed electrical workers to certify that installations or Part installations under Part 1 or Part 2 of AS/NZS 3000 are safe to be connected to the specified system of electrical supply.

Contact Details:
(Name and address)

LANDLORDS / 9 GROVE RD, ADDINGTON, CHRISTCHURCH
CITRUS BUILD LTD
35 WATSONS RD, HAREWOOD, CHCH 8051

Name of
Electrical worker:

AMBIKA PRASAD

Registration/Practising
licence number:

E243715

Organisation/company:

AMBIKA PRASAD ELECTRICAL LTD

Phone and email:

021 162 4052 mika-prasad@yahoo.co.nz

Name of person(s)
supervised

CoC

Type of work:

☐ Additions

☐ Alterations

☒ New work

The prescribed electrical work is:

☐ Low risk

☐ General

☐ High risk (Specify):

240V

Reference Standards:

☐ Part 1 of AS/NZS 3000

☒ Part 2 of AS/NZS 3000

☐ Additional Standards:

Description of Work: (including date/s of work and type of supply system)

LANDLORDS POWER SUPPLY WITH MEN SWITCH BOARD,
16mm² IC NS MAINS, 6mm² EARTH AND LIGHTS.

I certify that the completed prescribed electrical work to which this Certificate of Compliance applies has been done lawfully and safely, and the information in the certificate is correct in that the installation, or part of the installation:

- ☐ Has been installed in accordance with a certified design¹
- ☒ Has an earthing system that is correctly rated (where applicable)
- ☒ Contains fittings that are safe to connect to a power supply
- ☒ Relies on a supplier Declaration of Conformity¹
- ☐ Relies on a manufacturer's instructions¹
- ☒ Has been satisfactorily tested in accordance with the Electricity (Safety) Regulations 2010
- ☒ Is safe to connect

Electronic/Other reference:

TELFERS ELECTRICAL

Certifier's signature:

[Signature]

Test Results:

Polarity
(independent earth):

✓

Insulation resistance:

71MΩ

Earth continuity:

20.5Ω

Bonding:

✓

Other (specify):

Date: 04-05-2023

¹ Attach or reference. If it is impractical to attach a copy of a particular manufacturer's instructions, or of any certified design or supplier declaration of conformity, provide a reference to where the documents can be found, in a readily accessible format, by electronic means.

ESC

I certify that the installation, or part of the installation, to which the Electrical Safety Certificate applies is connected to a power supply and is safe to use.

Certifier's
name:

AMBIKA PRASAD

Registration/Practising
licence number:

E243715

Certifier's
signature:

[Signature]

Certificate
Issue Date:

04-05-2023

Connection
Date:

04-05-2023

CUSTOMER COPY - THIS IS AN IMPORTANT DOCUMENT AND SHOULD BE RETAINED FOR A MINIMUM OF 7 YEARS
This certificate also confirms that the electrical work complies with the building code for the purposes of Section 19(1)(e) of the Building Act 2004.

Customer Copy

Compliance and Electrical Safety Certificate

R. Redpaths



Reference/Certificate ID No: 17/45 DICKENS ST

This form has been designed to be used by licensed electrical workers to certify that installations or Part installations under Part 1 or Part 2 of AS/NZS 3000 are safe to be connected to the specified system of electrical supply.

Location Details:

17/45 DICKENS ST, ADDINGTON, CHRIST CHURCH

Contact Details:
(Name and address)

CITRUS BUILD LTD
35 WATSONS RD, HAREWOOD, CHRISTCHURCH

Name of
Electrical worker:

VISHAL KUMAR

Registration/Practising
licence number:

E281244

Organisation/company:

AMBIKA PRASAD ELECTRICAL LTD

Phone and email:

021 0235 9264 vishal.z@hotmail.com

Name of person(s)
supervised

CoC

Type of work:

☐ Additions

☐ Alterations

☒ New work

The prescribed electrical work is:

☐ Low risk

☐ General

☒ High risk (Specify):

240V

Reference Standards:

☐ Part 1 of AS/NZS 3000

☒ Part 2 of AS/NZS 3000

☐ Additional Standards:

Description of Work: (including date/s of work and type of supply system)

NEW UNIT WITH NEW SWITCHBOARD, 25mm² 1C NS MAINS, 6mm² EARTH, LIGHTS, PLUGS, EXTRACTOR FANS, TOWEL RAILS, BATHROOM HEATERS, OVEN, HOB, RANGE HOOD, HOT WATER CYLINDER AND HEAT PUMP.

I certify that the completed prescribed electrical work to which this Certificate of Compliance applies has been done lawfully and safely, and the information in the certificate is correct in that the installation, or part of the installation:

- ☐ Has been installed in accordance with a certified design¹
- ☒ Has an earthing system that is correctly rated (where applicable)
- ☒ Contains fittings that are safe to connect to a power supply
- ☒ Relies on a supplier Declaration of Conformity¹
- ☐ Relies on a manufacturer's instructions¹
- ☒ Has been satisfactorily tested in accordance with the Electricity (Safety) Regulations 2010
- ☒ Is safe to connect

Electronic/Other reference:

TELFERS ELECTRICAL

Certifier's signature:

Vishal

Test Results:

Polarity
(independent earth):

✓

Insulation resistance:

71MΩ

Earth continuity:

<0.5Ω

Bonding:

✓

Other (specify):

Date:

04-05-2023

¹ Attach or reference. If it is impractical to attach a copy of a particular manufacturer's instructions, or of any certified design or supplier declaration of conformity, provide a reference to where the documents can be found, in a readily accessible format, by electronic means.

ESC

I certify that the installation, or part of the installation, to which the Electrical Safety Certificate applies is connected to a power supply and is safe to use.

Certifier's
name:

VISHAL KUMAR

Registration/Practising
licence number:

E281244

Certifier's
signature:

Vishal

Certificate
Issue Date:

04-05-2023

Connection
Date:

04-05-2023

CUSTOMER COPY - THIS IS AN IMPORTANT DOCUMENT AND SHOULD BE RETAINED FOR A MINIMUM OF 7 YEARS

This certificate also confirms that the electrical work complies with the building code for the purposes of Section 19(1)(e) of the Building Act 2004.

Customer Copy

17/45 Dickens Street Land Use Consents



**17/45 Dickens Street
Subdivision Consents**

Fee simple
Lots:8
Application



Land Use Resource Consents within 100 metres of 17/45 Dickens Street

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

1 Grove Road

RMA/1991/371

Extension closer to the boundary than the bylaws allow - Historical Reference RES9206652

Processing complete

Applied 22/03/1991

Decision issued 09/04/1991

Granted 09/04/1991

RMA/2006/2268

Application to carry out additions to an existing dwelling - Historical Reference RMA92006353

Processing complete

Applied 25/09/2006

Decision issued 12/10/2006

Granted 12/10/2006

1/25 Grove Road

RMA/1997/2826

Application for six unit development with various non compliances. - Historical Reference RES973265

Processing complete

Applied 12/11/1997

Decision issued 02/06/1998

Granted 02/06/1998

RMA/1998/1894

Various non-complying matters for a 6 flat Cross lease development under the Proposed Plan. - Historical Reference RES982164

Processing complete

Applied 11/08/1998

Decision issued 01/01/1999

Granted 01/01/1999

RMA/1999/5601

Change to conditions 3 and 4 of RC973265 (southern landscaping to be 3.5m and carparks to be 2.5 x 6.5 for units 1 to 6 and one visitors space). Red - Historical Reference RMA870

Processing complete

Applied 25/03/1999

Decision issued 26/03/1999

Granted 26/03/1999

1/3 Grove Road

RMA/1998/2925

Application to erect 6 three storey townhouses with non compliances. - Historical Reference RES983342

Processing complete

Applied 14/12/1998

Decision issued 04/05/1999

Granted 04/05/1999

RMA/1998/926

Application to erect 6 non-complying three storey townhouses on a 810m2 site. - Historical Reference RES981002

Processing complete

Applied 17/04/1998

Decision issued 14/10/1998

Declined 14/10/1998

RMA/2001/1067

Application to construct 6 adjoining townhouses on a site located at 3 & 5 Grove Road - Historical Reference RMA20004942

Processing complete

Applied 04/05/2001

Decision issued 01/06/2001

Granted 30/05/2001

1/33 Dickens Street

RMA/2021/2694

Fee simple subdivision - 7 Lots (with amalgamation) and Land Use

Processing complete

Applied 18/08/2021

s223 Certificate issued 14/10/2021

s224 Certificate issued 14/10/2021

Decision issued 15/09/2021

Granted 15/09/2021

RMA/2021/366

To construct and establish five two storey residential dwellings

Processing complete

Applied 18/02/2021

Decision issued 29/03/2021

Granted 29/03/2021

RMA/2025/1524

Variation of easement instrument 12271229.3

Processing complete

Applied 20/05/2025

Certificate issued 02/07/2025

1/42 Dickens Street

RMA/2019/1204

Establish four residential units as part of a multi-unit complex

Processing complete

Applied 31/05/2019

Decision issued 02/07/2019

Granted 02/07/2019

1/43 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

1/45 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

1/7 Grove Road

RMA/2023/555

Proposal for seven unit multi-unit residential complex

Processing complete

Applied 08/03/2023

Conditions changed/cancelled - s127 23/01/2024

Decision issued 15/09/2023

Granted 15/09/2023

1/9 Grove Road

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

10/45 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

10/9 Grove Road

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

11 Church Square

RMA/2013/2077

To construct two separate dwellings - Historical Reference RMA92023788

Processing complete

Applied 08/10/2013

Conditions changed/cancelled - s127 01/09/2023

Decision issued 11/11/2013

Granted 11/11/2013

RMA/2015/421

Fee Simple Subdivision - Two Residential Lots Sec223 issued 2/7/15 LT 472369 Sec224 issued 4/9/15 - Historical Reference RMA92028623

Processing complete

Applied 18/02/2015

Decision issued 05/03/2015

Granted 04/03/2015

11/45 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

12/45 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

13/45 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

14/45 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

15 Grove Road

RMA/2006/2224

Retrospective consent for three new residential units - Historical Reference RMA92006307

Processing complete

Applied 19/09/2006

Decision issued 26/10/2006

Granted 26/10/2006

15/45 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

16/45 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

2/24 Harman Street

RMA/1996/400

Application for reduced 5.5m setback from R.O.W. for garages in a six unit development and queuing distance at the above property. - Historical Reference RES960465

Processing complete

Applied 28/02/1996

Decision issued 04/03/1996

Granted 04/03/1996

2/33 Dickens Street

RMA/2021/2694

Fee simple subdivision - 7 Lots (with amalgamation) and Land Use

Processing complete

Applied 18/08/2021

s223 Certificate issued 14/10/2021

s224 Certificate issued 14/10/2021

Decision issued 15/09/2021

Granted 15/09/2021

RMA/2021/366

To construct and establish five two storey residential dwellings

Processing complete

Applied 18/02/2021

Decision issued 29/03/2021

Granted 29/03/2021

RMA/2025/1524

Variation of easement instrument 12271229.3

Processing complete

Applied 20/05/2025

Certificate issued 02/07/2025

2/43 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

2/45 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

2/7 Grove Road

RMA/2023/555

Proposal for seven unit multi-unit residential complex

Processing complete

Applied 08/03/2023

Conditions changed/cancelled - s127 23/01/2024

Decision issued 15/09/2023

Granted 15/09/2023

2/9 Grove Road

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

23 Dickens Street

RMA/2025/3803

To construct 5 residential units

Received

Applied 07/11/2025

28 Harman Street

RMA/2007/1104

Construct 20 three-bedroom townhouses with attached single garages and associated landscaping - Historical Reference RMA92008355

Cancelled

Applied 14/05/2007

RMA/2008/2439

Application to establish four new single level dwellings with attached garages on two sites, comprising two units on each site. - Historical Reference RMA92013352

Processing complete

Applied 19/12/2008

Decision issued 13/01/2009

Granted 09/01/2009

29 Grove Road

RMA/1992/1247

Relocate a dwelling from 32 Bowen street - Historical Reference RES953318

Processing complete

Applied 26/02/1992

Decision issued 09/03/1992

Granted 09/03/1992

RMA/2014/2405

Six Townhouses Rejected under s88 - New application RMA92027172 lodged 22/9/2014 - Historical Reference RMA92027091

Cancelled

Applied 16/09/2014

RMA/2014/2484

Five residential units - Historical Reference RMA92027172

Processing complete

Applied 22/09/2014

Decision issued 19/11/2014

Granted 19/11/2014

3/33 Dickens Street

RMA/2021/2694

Fee simple subdivision - 7 Lots (with amalgamation) and Land Use

Processing complete

Applied 18/08/2021

s223 Certificate issued 14/10/2021

s224 Certificate issued 14/10/2021

Decision issued 15/09/2021

Granted 15/09/2021

RMA/2021/366

To construct and establish five two storey residential dwellings

Processing complete

Applied 18/02/2021

Decision issued 29/03/2021

Granted 29/03/2021

RMA/2025/1524

Variation of easement instrument 12271229.3

Processing complete

Applied 20/05/2025

Certificate issued 02/07/2025

3/43 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

3/45 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

3/63 Poulson Street

RMA/2007/1728

Application to construct four, two-storey attached residential units with attached garaging. - Historical Reference
RMA92009012

Processing complete

Applied 29/06/2007

Decision issued 15/07/2008

Granted 14/07/2008

RMA/2019/2411

To Construct Six Units with Associated Earthworks

Processing complete

Applied 21/10/2019

Decision issued 28/11/2019

Granted 28/11/2019

RMA/2020/2692

Subdivision - Unit title - Six lots

Processing complete

Applied 19/11/2020

s223 Certificate issued 03/02/2021

s224 Certificate issued 12/03/2021

Decision issued 29/01/2021

Granted 29/01/2021

3/7 Grove Road

RMA/2023/555

Proposal for seven unit multi-unit residential complex

Processing complete

Applied 08/03/2023

Conditions changed/cancelled - s127 23/01/2024

Decision issued 15/09/2023

Granted 15/09/2023

3/9 Grove Road

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Granted 24/12/2021

Decision issued 24/12/2021

30A Harman Street

RMA/2008/2355

Erection of 2 single-storey buildings that contain a total of 10 residential units, each with an attached single garage & additional parking space - Historical Reference RMA92013262

Processing complete

Applied 02/12/2008

Decision issued 18/12/2008

Granted 18/12/2008

31 Grove Road

RMA/1992/1247

Relocate a dwelling from 32 Bowen street - Historical Reference RES953318

Processing complete

Applied 26/02/1992

Decision issued 09/03/1992

Granted 09/03/1992

RMA/2014/2405

Six Townhouses Rejected under s88 - New application RMA92027172 lodged 22/9/2014 - Historical Reference RMA92027091

Cancelled

Applied 16/09/2014

RMA/2014/2484

Five residential units - Historical Reference RMA92027172

Processing complete

Applied 22/09/2014

Decision issued 19/11/2014

Granted 19/11/2014

33 Grove Road

RMA/1992/1247

Relocate a dwelling from 32 Bowen street - Historical Reference RES953318

Processing complete

Applied 26/02/1992

Decision issued 09/03/1992

Granted 09/03/1992

RMA/2014/2405

Six Townhouses Rejected under s88 - New application RMA92027172 lodged 22/9/2014 - Historical Reference RMA92027091

Cancelled

Applied 16/09/2014

RMA/2014/2484

Five residential units - Historical Reference RMA92027172

Processing complete

Applied 22/09/2014

Decision issued 19/11/2014

Granted 19/11/2014

35 Grove Road

RMA/1992/1247

Relocate a dwelling from 32 Bowen street - Historical Reference RES953318

Processing complete

Applied 26/02/1992

Decision issued 09/03/1992

Granted 09/03/1992

RMA/2014/2405

Six Townhouses Rejected under s88 - New application RMA92027172 lodged 22/9/2014 - Historical Reference RMA92027091

Cancelled

Applied 16/09/2014

RMA/2014/2484

Five residential units - Historical Reference RMA92027172

Processing complete

Applied 22/09/2014

Decision issued 19/11/2014

Granted 19/11/2014

38 Harman Street

RMA/1976/127

Consent to use property for car parking - Historical Reference RES9207571

Processing complete

Applied 19/01/1976

Decision issued 01/01/1999

Declined 01/01/1999

39 Dickens Street

RMA/2004/2950

Application for the erection of 3 two-storey residential units, each with an attached double garage and manoeuvring, parking and landscaping areas - Historical Reference RMA20018604

Processing complete

Applied 17/11/2004

Decision issued 22/12/2004

Granted 22/12/2004

4/33 Dickens Street

RMA/2021/2694

Fee simple subdivision - 7 Lots (with amalgamation) and Land Use

Processing complete

Applied 18/08/2021

s223 Certificate issued 14/10/2021

s224 Certificate issued 14/10/2021

Decision issued 15/09/2021

Granted 15/09/2021

RMA/2021/366

To construct and establish five two storey residential dwellings

Processing complete

Applied 18/02/2021

Decision issued 29/03/2021

Granted 29/03/2021

RMA/2025/1524

Variation of easement instrument 12271229.3

Processing complete

Applied 20/05/2025

Certificate issued 02/07/2025

4/43 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

4/45 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

4/63 Poulson Street

RMA/2007/1728

Application to construct four, two-storey attached residential units with attached garaging. - Historical Reference RMA92009012

Processing complete

Applied 29/06/2007

Decision issued 15/07/2008

Granted 14/07/2008

RMA/2019/2411

To Construct Six Units with Associated Earthworks

Processing complete

Applied 21/10/2019

Decision issued 28/11/2019

Granted 28/11/2019

RMA/2020/2692

Subdivision - Unit title - Six lots

Processing complete

Applied 19/11/2020

s223 Certificate issued 03/02/2021

s224 Certificate issued 12/03/2021

Decision issued 29/01/2021

Granted 29/01/2021

4/7 Grove Road

RMA/2023/555

Proposal for seven unit multi-unit residential complex

Processing complete

Applied 08/03/2023

Conditions changed/cancelled - s127 23/01/2024

Decision issued 15/09/2023

Granted 15/09/2023

4/9 Grove Road

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

40 Harman Street

RMA/1992/1247

Relocate a dwelling from 32 Bowen street - Historical Reference RES953318

Processing complete

Applied 26/02/1992

Decision issued 09/03/1992

Granted 09/03/1992

RMA/2014/2405

Six Townhouses Rejected under s88 - New application RMA92027172 lodged 22/9/2014 - Historical Reference RMA92027091

Cancelled

Applied 16/09/2014

RMA/2014/2484

Five residential units - Historical Reference RMA92027172

Processing complete

Applied 22/09/2014

Decision issued 19/11/2014

Granted 19/11/2014

44 Dickens Street

RMA/2000/152

Replacement garage wall exceeding 9m in length - Historical Reference RMA20000546

Processing complete

Applied 10/01/2000

Decision issued 09/02/2000

Granted 09/02/2000

47 Dickens Street

RMA/1997/279

Application for a kitchen addition to the rear of the existing dwelling which is within the 1.8m building setback and 3m setback for a living room window i.e. 900mm from the south boundary and 2.7m living window setback from the east boundary. - Historical Reference RES970206

Processing complete

Applied 27/01/1997

Decision issued 22/04/1997

Granted 22/04/1997

48A Dickens Street

RMA/2009/432

Application to erect a dwelling with an attached garage - Historical Reference RMA92013854

Processing complete

Applied 06/04/2009

Decision issued 01/05/2009

Granted 01/05/2009

RMA/2013/817

Additional dwelling with attached garage - Historical Reference RMA92022442

Processing complete

Applied 09/05/2013

Decision issued 23/05/2013

Granted 23/05/2013

5/33 Dickens Street

RMA/2021/2694

Fee simple subdivision - 7 Lots (with amalgamation) and Land Use

Processing complete

Applied 18/08/2021

s223 Certificate issued 14/10/2021

s224 Certificate issued 14/10/2021

Decision issued 15/09/2021

Granted 15/09/2021

RMA/2021/366

To construct and establish five two storey residential dwellings

Processing complete

Applied 18/02/2021

Decision issued 29/03/2021

Granted 29/03/2021

RMA/2025/1524

Variation of easement instrument 12271229.3

Processing complete

Applied 20/05/2025

Certificate issued 02/07/2025

5/43 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

5/45 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

5/5 Church Square

RMA/1995/16

Application to erect conservatory which intrudes recession plane. - Historical Reference RES950170

Withdrawn

Applied 07/02/1995

5/63 Poulson Street

RMA/2007/1728

Application to construct four, two-storey attached residential units with attached garaging. - Historical Reference
RMA92009012

Processing complete

Applied 29/06/2007

Decision issued 15/07/2008

Granted 14/07/2008

RMA/2019/2411

To Construct Six Units with Associated Earthworks

Processing complete

Applied 21/10/2019

Decision issued 28/11/2019

Granted 28/11/2019

RMA/2020/2692

Subdivision - Unit title - Six lots

Processing complete

Applied 19/11/2020

s223 Certificate issued 03/02/2021

s224 Certificate issued 12/03/2021

Decision issued 29/01/2021

Granted 29/01/2021

5/7 Grove Road

RMA/2023/555

Proposal for seven unit multi-unit residential complex

Processing complete

Applied 08/03/2023

Conditions changed/cancelled - s127 23/01/2024

Decision issued 15/09/2023

Granted 15/09/2023

5/9 Grove Road

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

6/11 Grove Road

RMA/2009/1229

Conservatory addition - Historical Reference RMA92014684

Processing complete

Applied 27/08/2009

Decision issued 11/09/2009

Granted 11/09/2009

6/45 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

6/63 Poulson Street

RMA/2007/1728

Application to construct four, two-storey attached residential units with attached garaging. - Historical Reference RMA92009012

Processing complete

Applied 29/06/2007

Decision issued 15/07/2008

Granted 14/07/2008

RMA/2019/2411

To Construct Six Units with Associated Earthworks

Processing complete

Applied 21/10/2019

Decision issued 28/11/2019

Granted 28/11/2019

RMA/2020/2692

Subdivision - Unit title - Six lots

Processing complete

Applied 19/11/2020

s223 Certificate issued 03/02/2021

s224 Certificate issued 12/03/2021

Decision issued 29/01/2021

Granted 29/01/2021

6/7 Grove Road

RMA/2023/555

Proposal for seven unit multi-unit residential complex

Processing complete

Applied 08/03/2023

Conditions changed/cancelled - s127 23/01/2024

Decision issued 15/09/2023

Granted 15/09/2023

6/9 Grove Road

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

67 Poulson Street

RMA/2010/71

Construction of an oversized garage - Historical Reference RMA92015557

Processing complete

Applied 25/01/2010

Decision issued 17/02/2010

Granted 16/02/2010

7 Grove Road

RMA/2023/555

Proposal for seven unit multi-unit residential complex

Processing complete

Applied 08/03/2023

Conditions changed/cancelled - s127 23/01/2024

Decision issued 15/09/2023

Granted 15/09/2023

7/45 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

7/7 Grove Road

RMA/2023/555

Proposal for seven unit multi-unit residential complex

Processing complete

Applied 08/03/2023

Conditions changed/cancelled - s127 23/01/2024

Decision issued 15/09/2023

Granted 15/09/2023

7/9 Grove Road

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

71 Poulson Street

RMA/2000/1830

Relocation of five units with additional non compliances (Cancelled 20-Dec-2001) - Historical Reference RMA20002560

Cancelled

Applied 21/07/2000

RMA/2004/1152

Application for the erection of 5 residential units, each with an attached single garage - Historical Reference RMA20016748

Processing complete

Applied 04/05/2004

Decision issued 10/06/2004

Granted 10/06/2004

8/45 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

8/9 Grove Road

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

9 Church Square

RMA/2013/2077

To construct two separate dwellings - Historical Reference RMA92023788

Processing complete

Applied 08/10/2013

Conditions changed/cancelled - s127 01/09/2023

Decision issued 11/11/2013

Granted 11/11/2013

RMA/2015/421

Fee Simple Subdivision - Two Residential Lots Sec223issued 2/7/15 LT 472369 Sec224 issued 4/9/15 - Historical Reference RMA92028623

Processing complete

Applied 18/02/2015

Decision issued 05/03/2015

Granted 04/03/2015

9/45 Dickens Street

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

9/9 Grove Road

RMA/2021/2811

Establish multi-unit residential complex comprised of 33 residential units

Processing complete

Applied 27/08/2021

Decision issued 24/12/2021

Granted 24/12/2021

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