





APPENDIX B

Responses to Further Information
Request – Tonkin & Taylor

Ryman Healthcare Limited
C/ - Mitchell Daysh Limited
PO Box 300 673
Auckland 0752

Attention: Richard Turner

Dear Richard

**Responses to Further Information Request by Wellington City Council
Service Request Number 471670, WGN 210104
Redevelopment of 26 Donald Street and 37 Campbell Street, Karori, Wellington**

This letter addresses the request by Wellington City Council for further geotechnical information (S92) relating to the development of 26 Donald Street and 37 Campbell Street, Karori, Wellington, as a comprehensive care retirement village (WGN 210104). In this letter we provide the following information requested by you (email Sebastian Barrett/Nicki Williams dated 5 November 2020).

1 Factual geotechnical information (BH logs and CPT results)

Please find our report in Attachment A titled "Proposed Comprehensive Care Retirement Village, 26 Donald Street and 37 Campbell Street, Karori, Wellington, Geotechnical Site Investigation Report", job number 30309 dated March 2019.

Factual geotechnical information is available in Appendices A, C and D of the attached report.

2 Liquefaction analysis output / results

Please see the attached report in Attachment A.

The seismic loading and liquefaction analysis completed in 2019 is summarised in Sections 3.5 and 3.6 of the report. The 2019 analysis output is shown in Appendix F of such report.

The 2019 liquefaction analysis assumed the proposed new buildings are importance level 2 buildings (IM2) and the analysis were completed for the following cases:

- SLS case: 0.11g, Magnitude 6.2
- A 1-in-100 year seismic event: 0.23g, Magnitude 6.2
- ULS case: 0.45g, Magnitude 7.1

Additional liquefaction analysis of CPT2, CPT3, CPT5, CPT9 and CPT10 was carried out on 12 November 2020 for:

- a 1-in-1000 year seismic event: a PGA of 0.59g, Magnitude 7.1 (seismic subsoil class C and IM3)

See response to Item 3 below. The 2020 liquefaction analysis output is enclosed in Attachment B. The results of the 2020 liquefaction analysis conclude that the calculated 'free field' liquefaction induced settlement range for a 1-in-1000 year event is up to 100 mm.

3 The Importance levels and design life of the different structures assumed in the liquefaction analysis

Based on discussion with the project Structural Engineer Mitchell Vranjes (Peter Lisle/Shirley Wang on 11 November 2020), the importance levels and design life of different structures are summarised in Table 1 below.



Table 1: Proposed building importance levels and design life

Building description	Building importance level	Design life
Existing buildings (The Oldershaw block, Allen Ward Hall...etc)	IL2	50
Buildings B01A & B01B	IL3	50
Buildings B02 - B07	IL2	50

The seismic design loadings for the 2019 and 2020 liquefaction analysis are described in Section 2 of this letter.

Yours sincerely,



Shirley Wang
Geotechnical Engineer

Letter reviewed & authorised by John Leeves, Project Director

Attachments: Attachment A: Geotechnical Site Investigation Report
 Attachment B: 2020 Liquefaction Analysis

13-Nov-20
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Attachment A: Geotechnical Site Investigation Report

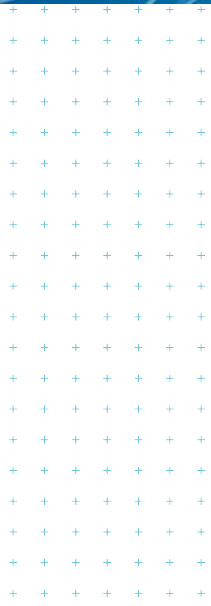
- Proposed Comprehensive Care Retirement Village, 26 Donald Street and 37 Campbell Street, Karori, Wellington, Geotechnical Site Investigation Report”, job number 30309 dated March 2019.



**Proposed Comprehensive
Care Retirement Village, 26
Donald Street and 37
Campbell Street, Karori,
Wellington**

Geotechnical Site Investigation Report

Prepared for
Ryman Healthcare Ltd
Prepared by
Tonkin & Taylor Ltd
Date
March 2019
Job Number
30309



Document Control

Title: Proposed Comprehensive Care Retirement Village, 26 Donald Street and 37 Campbell Street, Karori, Wellington					
Date	Version	Description	Prepared by:	Reviewed by:	Authorised by:
27/10/17	1	Draft Report for Client review	R Graafhuis	P Malan	J Leeves
13/12/17	2	Final Report	R Graafhuis	P Malan	J Leeves
8/02/19	3	Updated Report for Resource Consent	R Graafhuis	P Malan	J Leeves

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Executive Summary

Ryman Healthcare Ltd (Ryman) have engaged Tonkin +Taylor Ltd (T+T) to carry out a geotechnical assessment for a resource consent application for the proposed comprehensive care retirement village at the former Victoria University Karori Campus, Wellington at 26 Donald Street. The proposal includes building new 2 to 6 storey buildings with 2 to 4.5m deep basements. Some existing buildings in the centre of the site are proposed to be retained. The new buildings include the following:

- Buildings B02, B03, B04, B05 and B06 along the southern boundary of the site,
- Building B07 on the eastern boundary, and
- Buildings B01B and B01C in the north western part of the site adjacent to the existing Waghorn building.

Geotechnical investigations undertaken for this report show the site is typically underlain by:

- Up to 0.5 m of fill, overlying
- An intermediate layer comprising interbedded alluvial soils on the lower elevations (up to a depth of 9.5m); and outwash fan deposits on the elevated slopes (to depths in excess of 29m)
- Greywacke bedrock at depths ranging from 5 m to greater than 29m

Hydrostatic and groundwater levels measured in standpipe piezometers indicate groundwater depths at depths ranging from 1.1m to 3.3m. In the northern part of the site, artesian water pressures were recorded in the river gravel layer at a depth of around 16m.

Liquefaction hazards at the site have been assessed by reviewing CPT data and the site geomorphology. The CPT results indicate layers in the upper few metres where liquefaction could potentially occur under 1 in 100 year return period seismic loads. However, the site has recently experienced a peak ground acceleration of around 0.25g, with a Magnitude of M7.8 without consequential liquefaction. We do not consider the effects of liquefaction settlement to be consequential, and expect it will meet New Zealand Building Code requirements.

The site investigations show the site is generally suitable in geotechnical terms for the construction of two to six storey buildings with basements. These are proposed to be founded on base isolated pad foundations, with 2.0 to 4.5m deep basements, with some having sheet pile retention. Our initial geotechnical analyses (to be developed during detailed design) show that there is likely to be a suitable bearing surface raft slabs at buildings B02, B03, B04, B05 and B06. Some localised undercut and replacement with compacted hard fill could be required for B07 to mitigate soft areas. Deeper undercut down to 160mRL (an additional 2m) and replacement with compacted hard fill is likely to be required for up to half of buildings B01B and B01C to mitigate settlement risks associated with organic clay.

The effect of the basements on groundwater drawdown and associated settlement is addressed in a separate report. Design of the basement slabs will need to accommodate the buoyancy effects of groundwater levels that are expected to be encountered above the basements.

The site is considered geotechnically suitable for the proposed development provided that the recommended in this report are followed.

1 Introduction

Ryman Healthcare Ltd (Ryman) have engaged T+T to carry out a geotechnical assessment for the resource consent application for the proposed comprehensive care retirement village at the former Victoria University Karori Campus, Wellington, at 26 Donald Street and 37 Campbell Street. The geotechnical services included the following scope of work:

- 1 Carry out a desktop review of existing information at the site and surrounding areas
- 2 Procure and supervise geotechnical site investigations comprising Cone Penetration Tests (CPT), machine drilled boreholes and hand augers
- 3 Specify and review geotechnical laboratory testing comprising maximum dry density test, particle size distribution test (PSD), unconsolidated compression triaxial test (UC)
- 4 Identify potential geotechnical risks and constraints at the site that may affect the proposed retirement village
- 5 Preparation of this geotechnical investigation report to support a resource consent application.

A contaminated land assessment has also been completed to determine potential contaminated ground effects for the site. An assessment of the proposed basement excavations on groundwater drawdown is presented the assessment of groundwater effects report. These studies are being reported under a separate cover.

2 Background

2.1 Site description

The site was previously occupied by Victoria University. The features and buildings present on the site are shown on the site plan (refer to Figure 1 in Appendix B). Demolition works have begun on site, to date this has included asbestos removal and internal lining strip out; with no removal of any hard structures. The north western portion of the campus was occupied by existing multi-story concrete buildings. They were located on gently to moderately sloping terrain. Unsupported slopes of up to 20° are present, but more typically are around 5° to 10° in the north western area. A concrete retaining wall supports a 4m high slope north of this area. Areas between the buildings were vegetated. A small gully is present in the north eastern corner of the site. This area is elevated from the surrounding playing fields, tennis courts and south eastern gully, which are located to the south west and south of the concrete buildings. These areas are flat to gently sloping, typically less than 10°.

2.2 Proposed Retirement Village

The proposed village including basement levels and elevations are presented in Appendix B. It comprises building 2 to 6 storey buildings with 2 to 4.5m deep basements. The existing buildings in the centre of the site are proposed to be retained. The new buildings include the following:

- Buildings B02, B03, B04, B05 and B06 along the southern boundary of the site (2 to 3 levels),
- Building B07 on the eastern boundary, and
- Buildings B01B and B01C in the north western part of the site surrounding the existing Waghorn Building.

2.3 Review of Existing Information

Historical borehole investigations presented in a 1965 design drawing for the buildings comprising the Teachers Training College (at the Karori campus) are attached in Appendix A. A total of 21 investigations were undertaken across the site from depths ranging from 2m to 17m. The investigations comprised 10 No. hand auger holes, 6 No. machine auger holes, and 5 No. fully cored machine boreholes. Standard Penetration Tests (SPT) at 0.75m intervals were undertaken in the machine auger holes and cored boreholes. The boreholes are wholly within the surficial alluvial and outwash fan soils and do not extend down to the basement greywacke.

Historical aerial photographs are presented in Figure 2 in Appendix A. They indicate the development of the site from 1945 to 1982, the present day site is shown in Figure 1 (Appendix A). The 1945 and 1962 photographs indicate the site prior to development of the university campus. They indicate a broad flat area in the area of the present playing fields and tennis courts, and an east west trending gully in the south eastern corner of the site. There appears to be a drainage channel in the centre of this gully. The northern portion of the site rises up a moderate slope. There are two houses located in this area in 1945 and three in 1960. The 1970 photograph shows the addition of a number of the multi-storey concrete buildings in the northern portion of the site, and ongoing construction around the site. By 1982 the campus is similar to the present day layout prior to recent demolition.

3 Subsurface Conditions

Published geology (Figure 3.1) for the site¹ indicates that the site is underlain by alluvial gravels underlain by “grey sandstone-mudstone sequence and poorly bedded sandstone” of the Rakaia Terrane, commonly referred to as greywacke (indurated sandstone) and argillite (indurated mudstone).

The project area is located within a fault bound valley (graben), which has been infilled by alluvial sediments. The valley is bounded by the Khandallah Fault around 500 m to the north, and the Wellington Fault around 1km to the south. A series of north – south trending normal faults crosses the graben approximately 600m to the west and east of the site.

¹ Begg, J.G., Mazengarb, C., 1996. Geology of the Wellington area. Scale 1:50,000. Institute of Geological & Nuclear Sciences geological map 22. 1 sheet + 128 p. Institute of Geological & Nuclear Sciences Ltd., Lower Hutt, New Zealand.

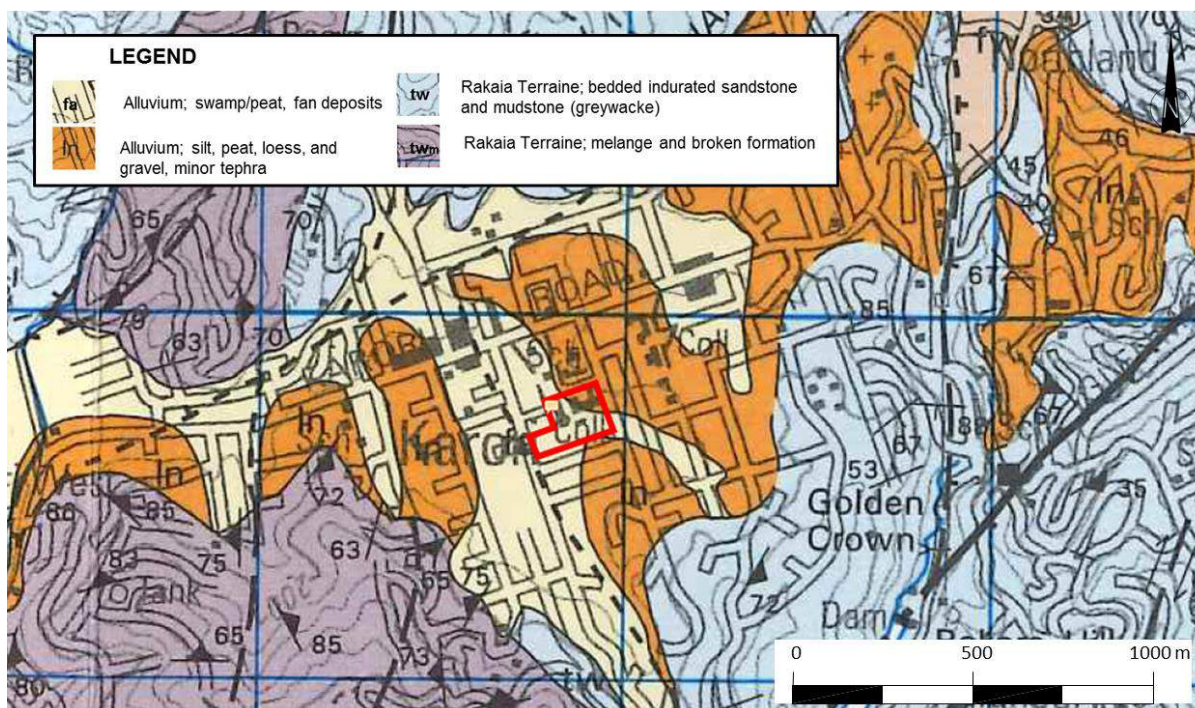


Figure 3.1: Excerpt of the 1:50 000 Geology of the Wellington area map

3.1 Site Investigation and Laboratory Testing

3.1.1 General

Site investigations were undertaken from 9 to 19 October 2017. The test locations are shown in Figure 1 in Appendix A. The results from site investigation testing are attached in Appendix D. The physical borehole drilling and CPT probing works were carried out by Perry Geotech, with site observations and visiting observations provided by T+T representatives. The boreholes were logged in general accordance with the NZGS Logging Guidelines by an Engineering Geologist.

Following the investigations in 2017, monitoring of groundwater levels, rising and falling head permeability testing has been undertaken in January and February 2019. The results of these are presented in the assessment of groundwater effects report.

3.1.2 Results of Investigation

Geotechnical units encountered during the recent investigation are summarised in Table 3-1. A summary of laboratory test results are presented in Table 3-2. Complete laboratory test results are presented in Appendix E.

Table 3-1: Summary of encountered geotechnical units

Investigation Location	Fill	Silt and Recent Alluvium	Lower Alluvium	Colluvium (Outwash Gravel)	River Gravel	CW to HW Greywacke	MW Greywacke
BH01	-	1.6 – 3.75	3.75 – 9.0	-		9.0 – 15.5	15.5 – 20.25
BH02	0 – 0.25	-	0.25 – 14.25	-	14.25 – 16.5	-	-
BH03	0 – 0.45	0.45 – 1.6	-	1.6 – 29.0	25.5 – 29.0	-	-
BH04	0 – 0.5	0.5 – 3.8	-	-		3.8 – 5.0	5.0 – 10.5
BH05	-	0.9 – 5.0	5.0 – 9.5	9.5 – 16.5		-	-
BH06	-	0 – 6.8	-	-		-	6.8 - 10.5

Table 3-2: Summary of laboratory test results

Borehole	Depth (mBGL)	Natural Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organic Content (%)	Allophane Content (%)
BH01	1.50					<5
BH01	2.60	72.6	81	36	14.6	<5
BH01	5.70	55.2	75	27	8.3	
BH02	2.00					<5
BH02	2.20	46.9	33	8	13.7	
BH02	3.40	62.1			12.8	
BH03	2.00	23.1	32	15		
BH03	2.50					<5
BH03	8.35	42.4			13.2	
BH04	1.50	27.4	36	12		
BH05	4.20	57.9			15.8	
BH06	3.30	72.6			17.5	

3.2 Geological Model

Based on the investigation and our experience in the local geological conditions, a geological model has been developed and a section of it is presented on Figure 3.2. This section and additional geological sections through the site are presented in Appendix A.

The site is located on an elevated terrace bound by the Khandallah and Wellington Faults. Investigations indicate that an outwash fan comprising interbedded silts and sands with minor gravel forms the more elevated slopes in the north east of the site. Bedded alluvial soils occur on the flatter terrain below. The surface of the basement greywacke appears to dip down towards the north east.

The ground model generally comprises:

- 0 to 0.5 m of fill
- Interbedded alluvial soils on the lower elevations (up a depth of 9.5m); and outwash fan deposits on the elevated slopes, the base of the outwash fan was not encountered in BH03. Indicating the depth to rock exceeds 29m.
- Greywacke bedrock at depths ranging from 5 to greater than 29m

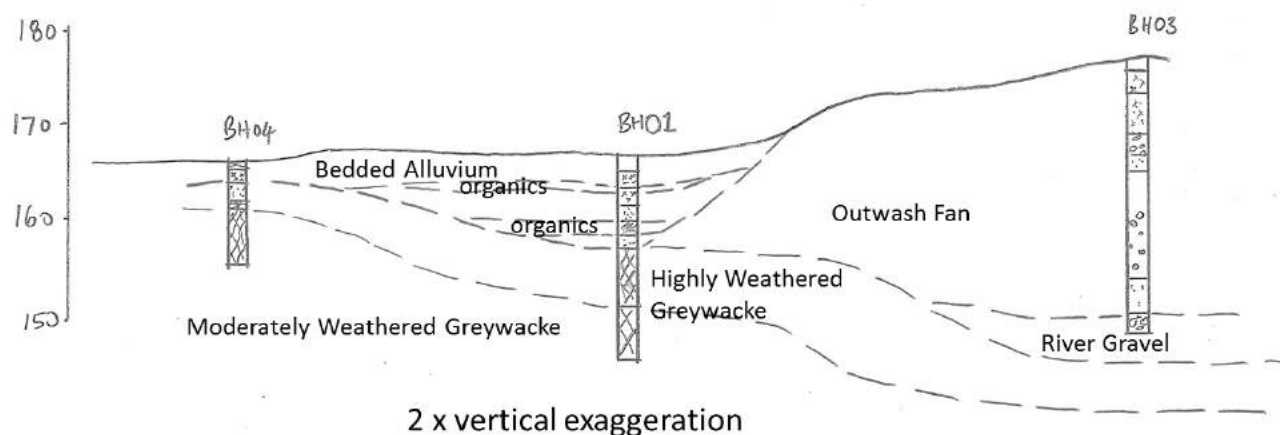


Figure 3.2: Geological section through site

3.3 Groundwater

The groundwater regime at the site has been assessed based on daily drilling fluid levels and monitoring of the piezometers installed around the site. These show that the hydrostatic groundwater level is typically at depths ranging from 2.0 to 3.0m below ground level. Artesian groundwater pressures were measured in BH02 at the contact between the river gravel and underlying weathered greywacke at 16.5m. Groundwater levels measured in standpipe piezometers indicate groundwater levels from the ground surface to 3.0m depth. A summary of measured groundwater readings are presented in Table 3.3.

Rising and falling permeability tests have been undertaken in standpipe piezometers. The results of these tests and assessment of the proposed basement excavations on groundwater drawdown is presented in the Assessment of Groundwater Effects Report (T+T, February 2019).

Table 3.3: Summary of groundwater readings

Borehole	Static water depth (m) – measured following drilling	Screened interval (mBGL)		Measured Piezometer depth (m)			
		From	To	20/10/2017	18/1/2019	25/01/2019	27/02/2019
BH01	1.90	1.6	5.0	0.00 (at surface)	Inaccessible *	1.16	1.06
BH02	Artesian (0.50 while hole at 16.50 m)	Not installed		N/A	N/A	N/A	N/A
BH03	2.0, 2.40	3.0	6.0	2.62	2.72	2.48	3.46
BH04	1.90	2.0	5.0	3.12	Inaccessible *	3.35	3.4
BH05	2.80	Not installed		N/A	N/A	N/A	N/A
BH06	2.10	Not installed		N/A	N/A	N/A	N/A

* Inaccessible due to fencing for demolition works

3.4 Geotechnical Design Parameters

Based on the geotechnical data obtained during the recent geotechnical investigations, the laboratory testing carried out and our experience in similar materials, the preliminary geotechnical design parameters set out in Table 3-5 can be adopted for preliminary design. The values may be modified subject to a specific assessment for a specific purpose (i.e. these are typical site-wide parameters that can be re-assessed for more specific design purposes).

The highly to completely weathered greywacke is logged as having rock strengths from extremely weak to very weak. This indicates an unconfined compressive strength (UCS) of between 1 MPa and 5MPa. The moderately weathered greywacke is described as very weak to weak indicating a UCS of 5 MPa to 20MPa. The rock is expected to perform as a homogenous rock mass and strength parameters have been determined using the Hoek-Brown failure criterion assuming low confining stress (500 kPa). Hoek-Brown parameters for jointed greywacke are provided in Table 3-4

Table 3-4: Greywacke rock mass Hoek-Brown failure criterion parameters

Property	Completely to highly weathered greywacke	Moderately weathered greywacke
Unconfined Compressive Strength	2 MPa	10 MPa
Geological Strength Index	20	30
Mi (greywacke)	18	18
Disturbance factor, D	0 (nil disturbance)	0 (nil disturbance)

Table 3-5: Preliminary geotechnical design parameters

Unit	Unit Weight (kN/m ³)	Friction Angle, ϕ'	Drained cohesion, c' (kPa)	Typical undrained strength range (kPa)	Drained Young's Modulus, E' (MPa)	K_0	K_a
Recent Alluvium	18	30	5	75	20	0.4	0.3
Lower Alluvium	18	32	7	100	30		
Outwash fan	18	34	10	125	50		
Completely to highly weathered greywacke	20	26	20	n/a	50	-	-
Moderately weathered greywacke	20	30	45	n/a	150	-	-

The local variations in the strength profile around the site can be assessed based on specific CPT following the laboratory testing.

3.5 Seismic Subsoil Class

The seismic subsoil class has been determined in terms of NZS1170.5:2004² to be a Class C – Shallow Soil site. This conclusion is based on the results of the investigation data at the southern end of the site. We note that if rock is unusually deep at the northern end of the site it may be Class D – Deep or soft soil. For liquefaction assessment, the Bridge Manual³ has been used to develop the following loading scenarios presented in Table 3-6. The assessed risk of liquefaction is discussed in Section 3.6 below.

We note the site was recently (November 2016) affected by the Kaikoura Earthquake⁴. The record at the adjacent Karori Normal School recorded a peak ground acceleration of 0.25g, with a magnitude of M7.8. We are not aware of any consequential damage to the land or the structures at the site as a result of the shaking.

² NZS 1170.5:2004 Structural Design Actions Part 5: Earthquake Actions, New Zealand

³ The NZ Transport Agency's Bridge Manual SP/M/022 Third Edition, Amendment 1, 2014

⁴ WNKS record downloaded October 2017 from geonet.org.nz

Table 3-6: Seismic design loadings for liquefaction

Loading Case	Return period (years)	Peak Ground Acceleration – PGA (g)	Earthquake Magnitude (m_w)
50 year return period	25	0.11	6.2
100 year return period	100	0.23	6.2
500 year return period	500	0.45	7.1
1000 year return period	1000	0.59	7.1

3.6 Liquefaction Risk

3.6.1 General

The potential for the materials at the site to liquefy under seismic shaking has been assessed quantitatively based on CPT data, and has been supplemented by a qualitative assessment of the site geomorphology, performance under the 2016 Kaikoura Earthquake, and historical borehole logs provided in Appendix C.

3.6.2 Quantitative Assessment

The quantitative assessment uses CPT data, following the Boulanger and Idriss (2014) analysis method and design PGA set out in Table 3-5 above.

A summary of risk from liquefaction in the alluvial soils and liquefaction induced settlement is presented in Table 3.7, and copies of the analyses are presented in Appendix F.

Table 3.7: Summary of liquefaction risk and liquefaction induced settlements

CPT	Depth	Estimated settlement			Liquefaction Risk (1:100 year event)
		SLS S1d (mm)	100yr return period S1d (mm)	ULS S1d (mm)	
CPT02	7.7	5	60	90	High risk from 6.5m depth
CPT03	3.7	0	10	10	Moderate risk from 1.5 to 2.0m
CPT04	4.6	0	0	0	Low risk
CPT05	5	5	35	40	High risk to 5.0m depth
CPT06a	6.1	5	45	65	High risk to 6.5m depth
CPT07	5.6	3	25	40	High risk from 4.5 to 5.5m depth
CPT08a	3.2	0	0	0	Low risk of liquefaction
CPT09	5.8	2	25	50	Moderate risk from 3.0 to 5.0m
CPT10	6.8	0	10	47	Moderate risk within thin beds from 4.5 to 6.0m
CPT11	5.4	0	0	0	Low risk

Notes:

- Top 1.5 m is vacuum excavated and any liquefaction in this layer is ignored.
- High risk = >50% probability; Moderate risk = 15 to 50% probability; Low risk = < 15% probability

The initial analysis of CPT data indicates areas with a high risk of liquefaction under a 1 in 100 year seismic event. The risk of liquefaction is confined to the upper recent alluvial soils with potentially liquefiable beds occurring from the surface to 6.5m depth. The calculated liquefaction induced settlements range from 0 to 10mm under SLS events, 0 to 60mm from a 1 in 100 year event, and from 0 to 100mm for ULS events.

3.6.3 Qualitative Assessment

There is no evidence from the site geomorphology that liquefaction is a significant hazard. There are slopes at the site that would not be present if repeated liquefaction had occurred. In November 2016, the site was affected by shaking from the Kaikoura Earthquake. We have reviewed the ground motion record from the adjacent Karori Normal School. This shows a peak ground acceleration of around 0.25g, with a Magnitude of M7.8. This load is in excess of the Bridge Manual loading (0.25g, M6.2) for a 1 in 100 year event. No evidence of liquefaction has been observed in the site walkover, and we are not aware of any reports of consequences. As a result, we do not consider the site to be at risk of consequential liquefaction effects under 100 year return period seismic loading.

This magnitude of settlement due to liquefaction is considered to meet normally accepted SLS and ULS building performance criteria. However, this should be confirmed with the structural engineering during the detailed design phase.

We have assessed the liquefaction potential based on the 2018 investigations, and a comparison with the 1965 results. BH2 and CPT2 were carried out adjacent to each other approximately 25 m northwest of the Waghorn building. These deposits are predominantly described as sandy (bluish) grey silts. This assessment is consistent with a Plasticity Index of 8% in BH2 that indicates the material is potentially liquefiable.

The 1965 logs describe very similar materials beneath the Waghorn Building, with grey and blue silt, sandy silt and sandy clayey silt. We therefore expect that the materials are similar, and conclude that the potential for liquefaction beneath the building cannot be ruled out at longer (500 year) return period seismic loadings.

For clarity, based on the site performance and data, we do not expect any consequential effects at shorter (100 year) return period seismic loadings. Liquefaction is likely to be triggered somewhere between the two seismic loadings; i.e. between SLS and ULS.

The conclusions on liquefaction are based on a qualitative assessment of borehole logs. If required, further specific investigations can be carried out to refine and update these initial conclusions. For the remainder of this report, we assume that liquefaction is unlikely to have consequential effects at less than 100 year return period seismic loadings. Liquefaction effects could occur at 500 year or longer return period seismic loadings. The effects of liquefaction are discussed below in Section 3.6.4.

3.6.4 Consequences of Liquefaction

This section addresses the potential consequences of liquefaction at the site, and its effects. These are then developed further below, for different foundation options.

The materials at the site that could liquefy are predominantly silts, which are reasonably tightly packed (ie stiff to hard). This assessment is based on the CPT traces (tip resistance consistently more than 3 MPa), and the SPT data (often in the range of 30-40 blows).

Because of the nature of the materials (silty, and dense), under seismic loading we expect the materials to soften, and lose strength. This softening is not as extreme as the liquefaction that has been observed around Christchurch in sandier materials. Little to no liquefaction ejecta is expected.

However, the materials may still experience post-liquefaction settlement, and a reduction in bearing capacity, lateral support and stiffness.

This assessment is consistent with the performance during the November 2016 Kaikoura Earthquake.

4 Geotechnical Considerations

4.1 General

The recommendations and opinions contained within this report are based upon the investigations described in Section 3. These tests were undertaken at point locations across the site. The nature and continuity of subsurface conditions away from the investigation locations is inferred, and it must be appreciated that the actual conditions may vary from the assumed model.

The proposed retirement village is set out in Section 2.2 and presented in Appendix B. It comprises two and six storey buildings with basements. These options are discussed below. The high seismic loadings in Wellington mean that seismic design is likely to dominate the design

4.2 Foundation options

4.2.1 Multi-storey buildings (with basements)

The two to six storey buildings are proposed to be founded on base isolated pad foundations, with 2.0 to 4.5m deep basements. The key geotechnical considerations discussed in this report include the following:

- Foundation bearing capacity assessment
- Groundwater pressure on basement foundations due to the shallow groundwater levels

The following basement considerations are discussed in the assessment of groundwater effects report separately, and not included herein:

- Groundwater drawdown and settlement of surrounding ground
- Groundwater seepage into basement excavations

In general, the buildings are proposed to be base isolated and founded on a basement raft slab. The geotechnical materials that are expected to be encountered beneath a proposed slab are described in Table 4.1 below.

Table 4.1: Basement levels, maximum retained height, groundwater depth and expected geotechnical unit beneath the proposed basement slabs

Building	Basement level (mRL)	Maximum retained height (m)	Groundwater depth (m)	Geotechnical units expected beneath a 1m thick basement slab.
B02	164.6	4.4	3.1 (based on BH04)	1.6m of medium dense gravelly SAND (alluvium) and very dense sandy SILT (residual soils) overlying very weak greywacke
B03	164.6	4.0	3.1 (based on BH04)	
B04	164.6	3.5	3.1 (based on CPT11)	2.0 to 4.0m of medium dense gravelly SAND (alluvium) and very dense sandy SILT (residual soils) overlying very weak greywacke. The surface of greywacke rock appears to be dipping to the north.
B05	164.6	3.8	2.1 (based on BH06)	3.6m of very stiff to hard silty CLAY to clayey SILT overlying very weak greywacke.
B06	164.6	4.7	2.1 (based on BH06)	
B07	170.49	3.5	2.8 (based on BH05)	Alluvial materials likely dip to the south, thereby many alluvial units are likely exposed in the basement subgrade, likely to in very stiff to medium dense materials with pockets of organic materials.
B01B and B01C - north wing	163.17	3.2	1.1m (based on BH01 and CPT09)	Underlain by 2.4m of dense silty sand and soft to firm organic silty CLAY. Very Dense sand and gravel is encountered 2.4m below the underside of the basement slab. The alluvial soils and the surface of the very dense gravel appears to dip the north. This results in a variation of soil strengths and densities beneath the proposed basement.
B01B - southern wing	163.17	3.9	1.1m (based on BH01)	The top of the outwash fan appear to dip to the north. Soft to loose silty CLAY and SILT are expected in the southern part of basement subgrade, with pockets of organics. Elsewhere stiff to medium dense silty SAND, SILT, and gravelly SAND is expected.

Analysis of the bearing capacity and stiffness of each of these basement slabs will need to be undertaken at detailed design stage. The investigations indicate that a 1m basement slab is likely to provide a stiff bearing capacity and provide a suitable bearing surface for a raft slab at buildings B02, B03, B04, B05 and B06. Some localised undercut and replacement with compacted hard fill is likely to be required for building B07 to mitigate soft areas. At this stage, undercut down to 160mRL (an additional 2m) and replacement with compacted hard fill could be required for up to half of the area of the proposed care and ALS wings to mitigate the organic clay risks.

Design of the basement slabs will need to accommodate the buoyancy effects of groundwater levels that are expected to be encountered above the basements.

Construction of a sheet piled wall can be considered to mitigate seepage into basements during excavations. The location of the sheet piled walls to mitigate seepage and groundwater drawdown is discussed in the assessment of groundwater affected report. Should dewatering be required for basement excavations the discharge system would be required to be designed to not have consequential off site effects.

4.3 Retaining Walls

Retaining walls are required to be constructed for flat building platforms and roads across sloping ground. These are indicated by changes in elevation on the Beca Civil Engineering drawing (042-RCT_401_CO_051) attached in Appendix A

Retaining wall options include bored cast insitu concrete piles or timber SED poles, slope reinforcement with soil nails / rock anchors and shotcrete, and cantilevered concrete retaining walls. Depending on the retained height, retaining walls may be required to be anchored with waler beams and anchors. Gravity retaining walls (such as crib walls, gabion baskets, or keystone walls) are not proposed as they could be challenging to design with the high seismic loads at the site.

Preliminary parameters for the design of retaining walls are presented in Table 3-5. Further assessment of retaining wall options is required to be undertaken during detailed design.

4.4 Pavements

Pavements founded on the upper crust of natural material can adopt a preliminary design CBR value of 3% based on the site investigation data (particularly the Scala Penetrometer/DCP). This value may potentially be increased with specific testing onsite during construction, or soil improvement.

4.5 Slope Stability

Unsupported slopes of up to 20° but typically around 5° to 10° occur in the area with existing concrete buildings. Areas of the proposed village outside of the existing concrete buildings are flat to gently sloping (less than 10°). Assessment of these slopes in both areas during the site walk over does not suggest any signs of slope instability. The drawings do not identify any significant cutting or filling. However, if temporary cuts or fills are proposed, a slope stability assessment can be undertaken as required. In general, we did not identify any evidence of significant slope instability at the site that would have consequential effects on the proposed village.

4.6 Settlement

There are static settlement risks present at the site, but they are not expected to have significant effects on site development. Settlements due to drawdown of groundwater or site earthworks are presented in the assessment of groundwater effects report. Settlements beneath the proposed multi-storey buildings are generally expected to be less than 20 mm, and within normally accepted settlement ranges. Specific assessment will be required during detailed design and construction, however, as local areas of material may require undercutting and replacement with granular fill.

Some materials at the site (organic clays) may pose secondary settlement risks. This can be accommodated during detailed design, or by removing the material during construction.

5 Applicability

This Report has been prepared for the exclusive use of our Client Ryman Healthcare Ltd, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our Client, without our prior written agreement.

During excavation and construction, the site should be examined by an engineer or engineering geologist competent to judge whether the exposed subsoils are compatible with the inferred conditions on which the Report has been based. We would be pleased to provide this service to you and believe your project would benefit from such continuity. However, it is important that we be contacted if there is any variation in subsoil conditions from those described in the Report.

Tonkin & Taylor Ltd

Report prepared by:

pp



.....
Pierre Malan
Senior Geotechnical Engineer

Authorised for Tonkin & Taylor Ltd by:



.....
John Leeves
Project Director

TZHL

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Appendix A: T+T Figures

- **Figure 1 – Site plan**
- **Figure 2 – Historical aerial photographs**
- **Figure 3 – Engineering geological cross sections 1 and 2**
- **Figure 4 – Engineering geological cross sections 3 and 4**

LEGEND

1965 Foundation Investigation

- + Borehole
- 3 Machine Auger
- Y Hand Auger

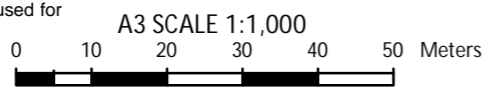
2017 T+T Investigation

- < Borehole
- < Borehole (Standpipe Installation)
- H CPT
- Y Hand Auger
- Wellington City 1m Contours



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, Sourced from the LINZ Data Service and licensed for re-use under the Creative Commons Attribution 3.0 New Zealand licence

Notes: 1) 1m contours obtained from Wellington City Council GIS database. (Based on a DTM created from 2006 LIDAR and updated using 2009 photogrammetry masspoints and breaklines where significant changes in the terrain were detected. WCC generalised the contours by up to 0.2m in order to reduce the number of vertices in the dataset. Contours generated from LIDAR and photogrammetry should not be used for detailed engineering design.)



Tonkin+Taylor
 105 Carlton Gore Rd, Newmarket, Auckland
 www.tonkintaylor.co.nz

DRAWN	MHU	Oct.17
CHECKED		
APPROVED		
ARCFILE		
GroundInvestigation.mxd		
SCALE (AT A3 SIZE)		
1:1,000		
PROJECT No.	30309	

Ryman Healthcare Ltd
 Karori Campus Redevelopment
 Karori, Wellington
 Geotechnical Investigation Plan

FIGURE No. **Figure 1.**

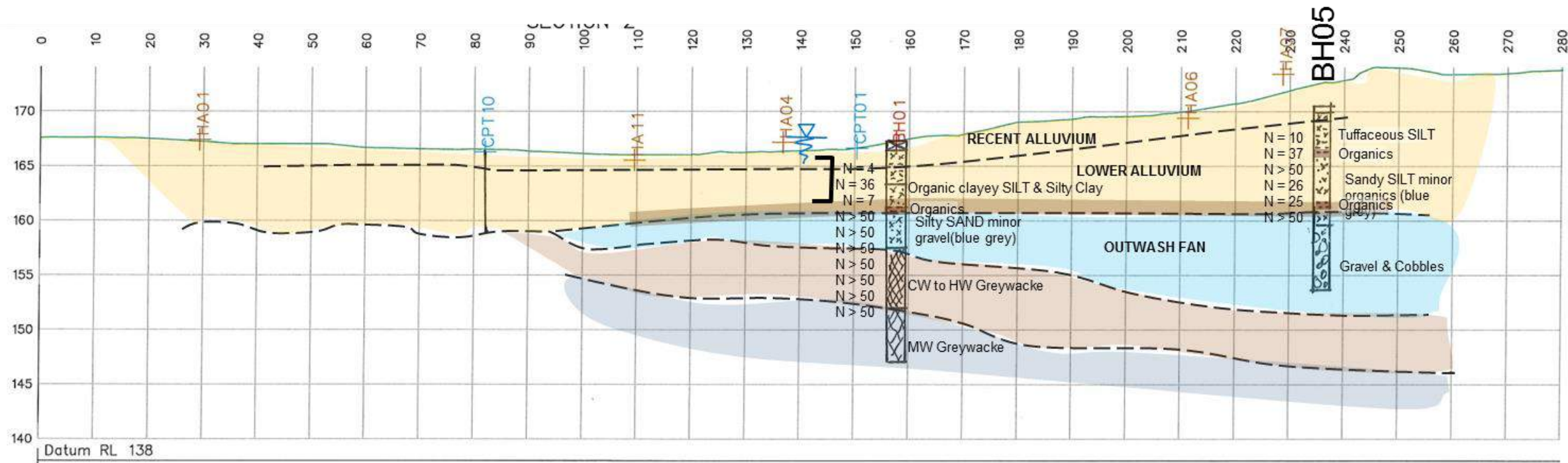
Rev. **0**

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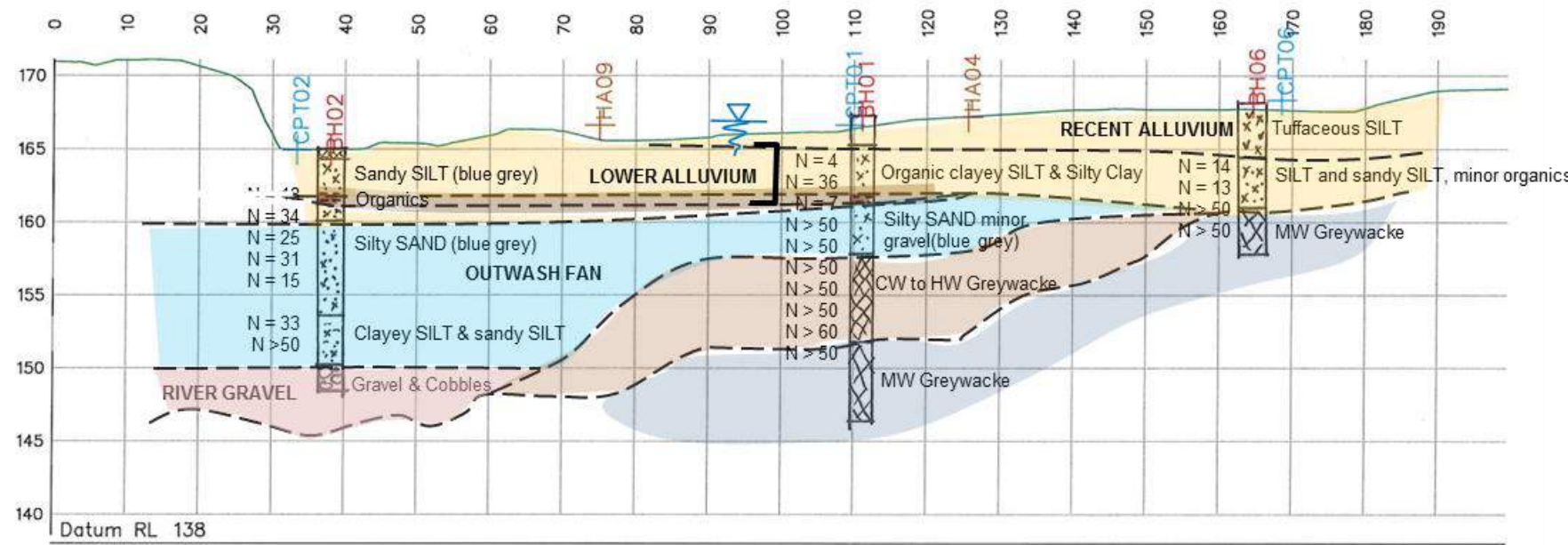


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APPROVED	
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PROJECT No. 30309	FIG. No.
Karori Campus Redevelopment	Figure 2

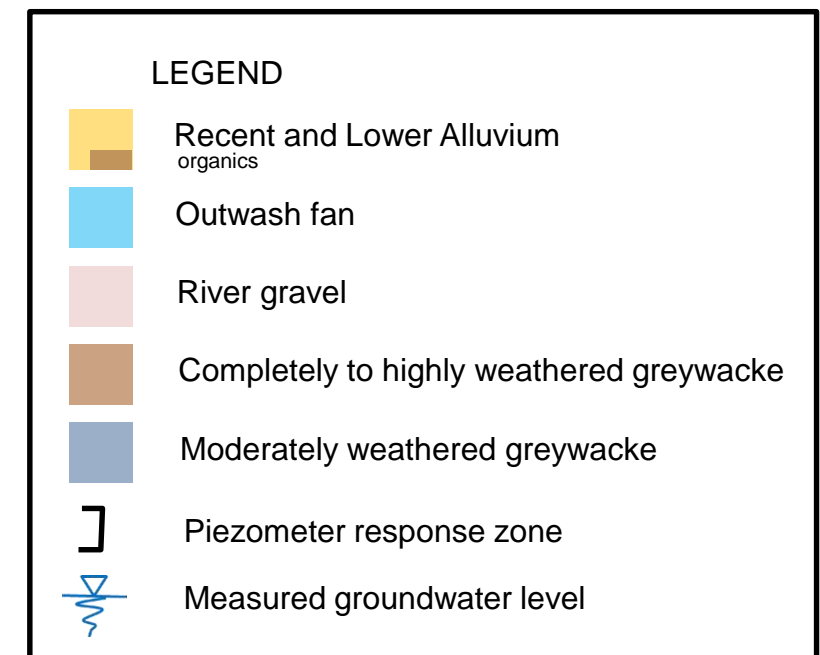
Ryman Healthcare Ltd
 Karori Campus Redevelopment
 Karori, Wellington
 Historical Aerial Photographs

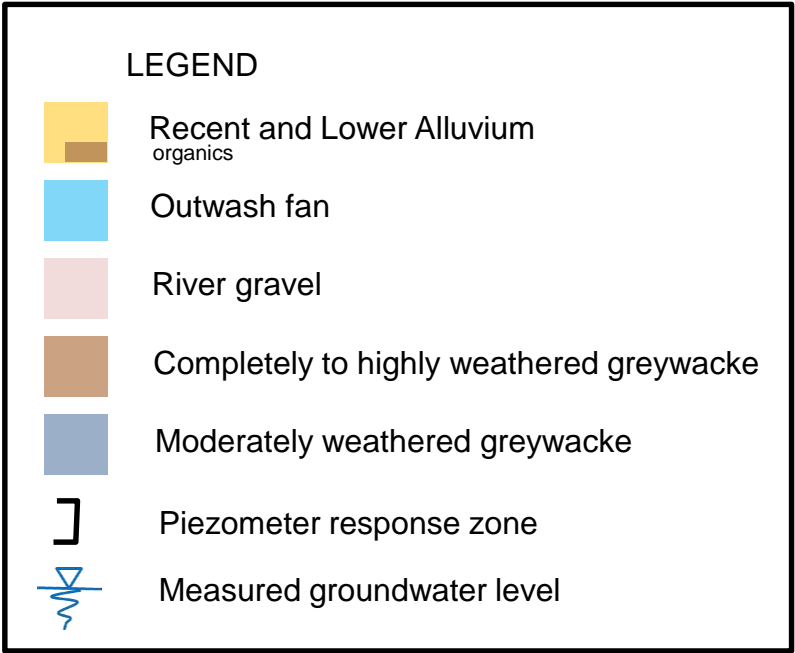
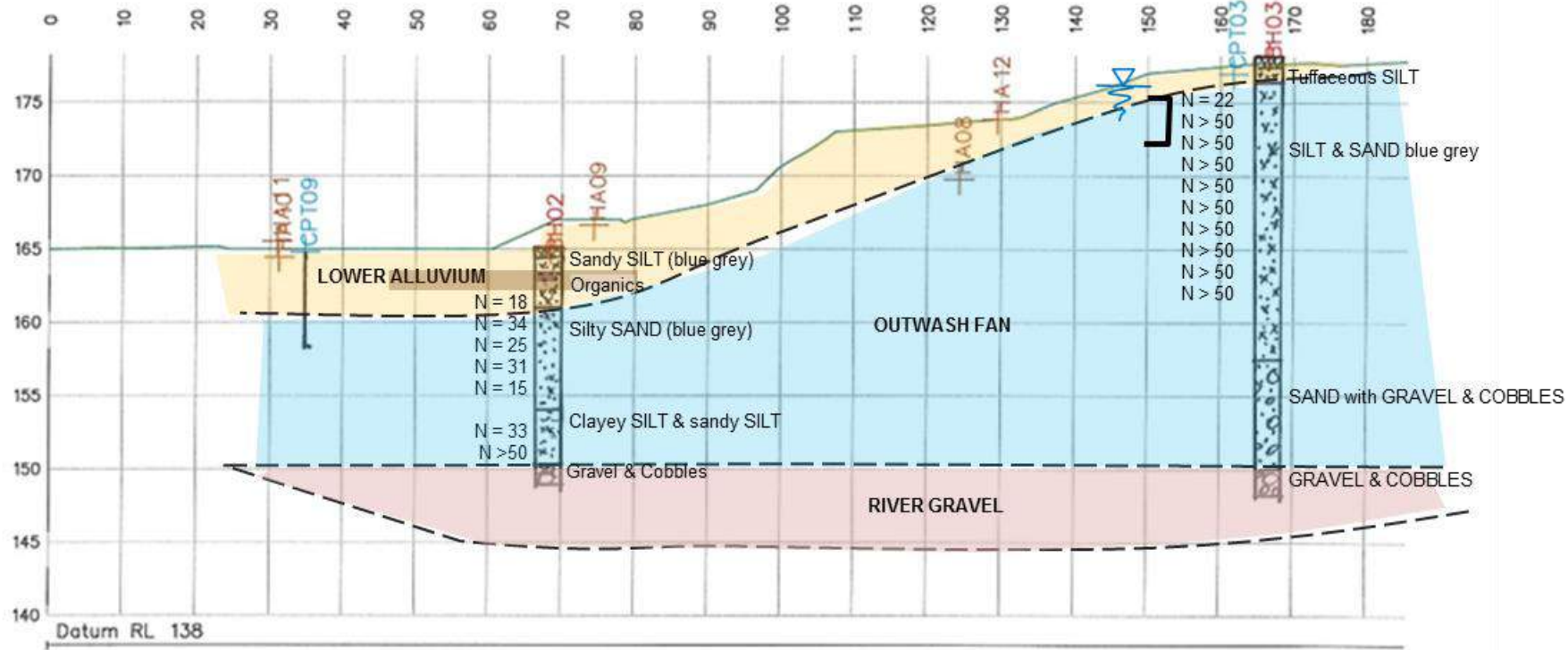


SECTION 1

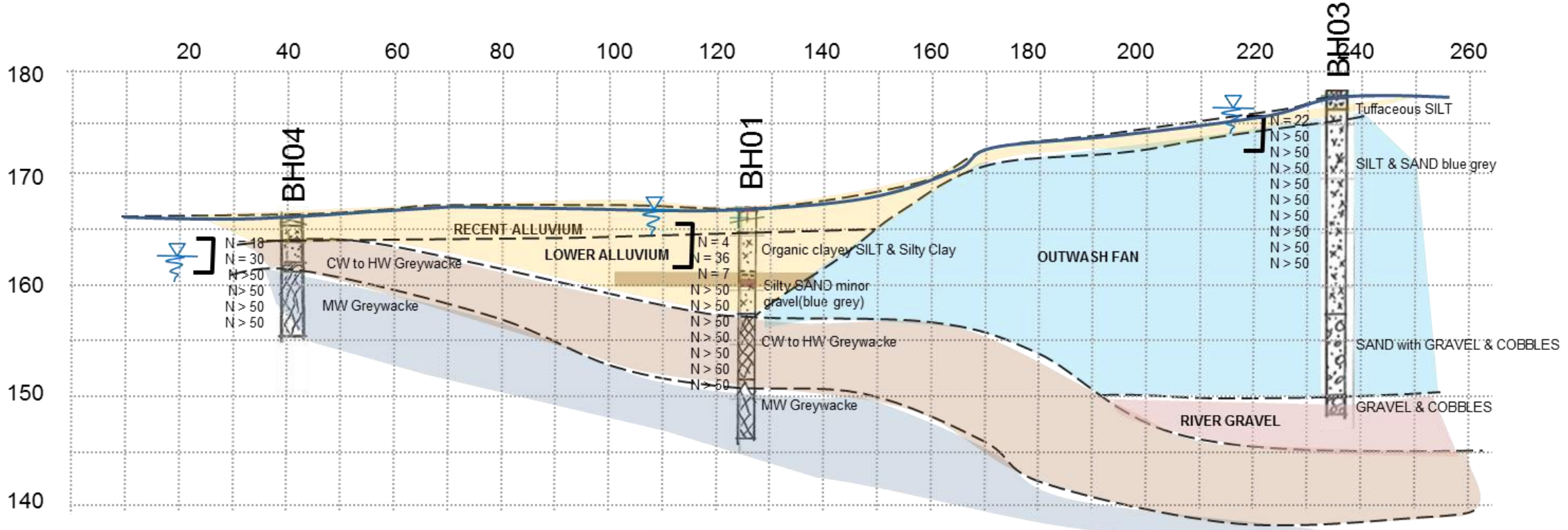


SECTION 2





SECTION 3



SECTION 4



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APPROVED	
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FILE:	
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Horizontal = 1:50 : Vertical = 1:100	
PROJECT No. 30309	
Karori Campus Redevelopment	

Ryman Healthcare Ltd
 Karori Campus Redevelopment
 Karori, Wellington
 Sections 3 to 4

Figure 4

Appendix B: Proposed development

- Proposed development drawings



Location Plan.

Site Coverage Summary:

Total Site Area: 30,575m² or 3.0575ha

Impervious Areas: 15.28%

Building Footprints: 37.84%

Total coverage: 53.12%

Boundaries

APARTMENT UNIT MIX

Rvt Link Name	Count
B01	32
B02	26
B03	26
B04	26
B05	26
B06	26
B07	26
	140

FOOTPRINT AREA

Rvt Link Name	Area
B01	1268.04 m ²
B02	1268.04 m ²
B03	1268.04 m ²
B04	1268.04 m ²
B05	1268.04 m ²
B06	1268.04 m ²
B07	1268.04 m ²
	11340.27 m ²

COVERED PARKING

Rvt Link Name	Type	Count
B01	4400 x 2500 - 40 Bay	32
B02	4400 x 3000 ACC	2
B03	4400 x 2500mm - 40 Bay	32
B04	4400 x 2500mm - 40 Bay	32
B05	4400 x 2500mm - 40 Bay	32
B06	4400 x 2500mm - 40 Bay	32
B07	4400 x 2500mm - 40 Bay	32
	4400x3000 ACC	3
	Overlapping 254	34

IMPERVIOUS AREA

Comments	Area
Impervious	4671.13 m ²

PARKING ON GRADE

Type	Count
B01 - 200 (no wheelchairs)	3
B01 - 200	2
4400x3000 ACC	3
Standard	13

B01 CARE

Rvt Link Name	Count
B01	120
	120

B01 ALS

Rvt Link Name	Count
B01	24
	56

D	25.01.19	PRELIMINARY
C	11.01.19	PRELIMINARY
B	10.01.19	PRELIMINARY
A	18.12.18	PRELIMINARY
5	11.11.18	PRELIMINARY
4	06.11.18	PRELIMINARY
3	18.10.18	PRELIMINARY
2	20/09/18	PRELIMINARY
1	05/09/18	PRELIMINARY

AMENDMENTS



COMPREHENSIVE CARE
RETIREMENT VILLAGE -
DONALD STREET, KARORI,
WELLINGTON

PROPOSED SITE PLAN

S01 .A0-025 D

As indicated BCH
042 - RCT_S01_A0-025_D 042 - RCT
52 Russley Road CHRISTCHURCH NEW ZEALAND
P.O. BOX 771 0334 4400 0001 FAX 0334 4368 0001



PROPOSED SITE PLAN

A1 sheet scale = 1:500
A3 sheet scale is twice scale shown above

25/10/19 2:47:16 PM C:\Users\pjh\Documents\042\RCT_S01_A0-025\RT18_Bldg_Prop.dwg

PRELIMINARY

RC08



▪ CIVIL ENGINEERING

Project No 3124460

KARORI RETIREMENT VILLAGE

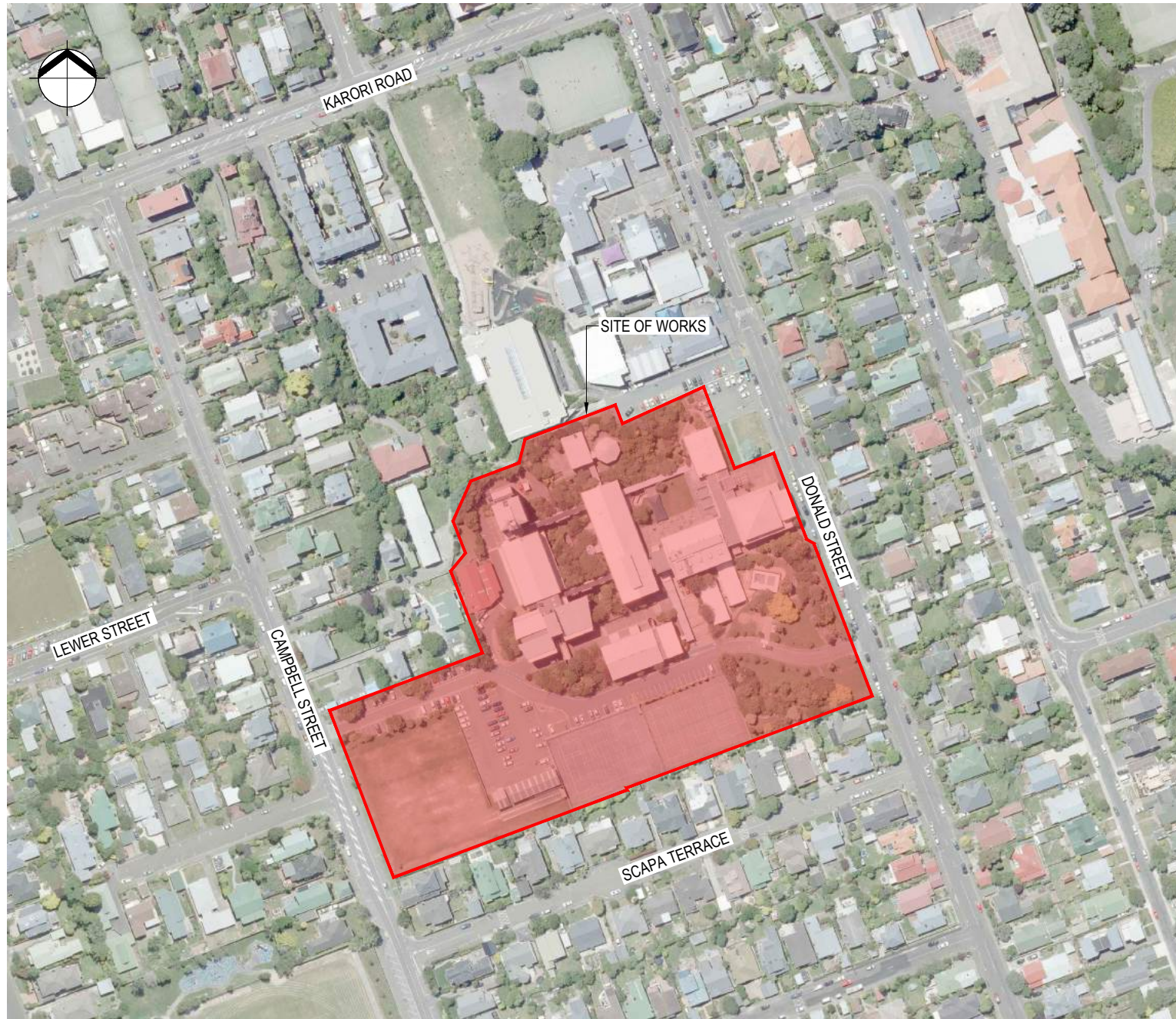
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Prepared for



By
Beca

FEBRUARY 2019



DRAWING LIST		
DRAWING No.	Rev	DRAWING TITLE
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042-RCT_401_C0-001	A	DRAWING LIST
042-RCT_401_C0-002	A	LEGEND AND GENERAL NOTES
042-RCT_401_C0-003	A	EXISTING LAYOUT & DEMOLITION PLAN
042-RCT_401_C0-004	A	EXISTING SERVICES PLAN
042-RCT_401_C0-006	A	PROPOSED LAYOUT PLAN
042-RCT_401_C0-011	A	PROPOSED CATCHMENT PLAN
042-RCT_401_C0-021	A	PROPOSED GRADING & DRAINAGE PLAN
042-RCT_401_C0-031	A	PROPOSED SEWER & WATER PLAN
042-RCT_401_C0-041	A	PROPOSED POWER, COMMS AND GAS PLAN
042-RCT_401_C0-051	A	PROPOSED CUT & FILL PLAN
042-RCT_401_C0-061	A	EROSION AND SEDIMENT CONTROL PLAN
042-RCT_401_C4-062	A	EROSION AND SEDIMENT CONTROL DETAILS

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No.	Revision	By	Chk	Appd	Date
A	FOR INFORMATION	JK	QD		21.02.19

Drawing Originator:



Original Scale (A1)	Design Drawn	JK	04.02.19	Approved For Construction*
Reduced Scale (A3)	Dwg Verifier			Date
	Dwg Check			

* Refer to Revision 1 for Original Signature

Client:



Project: **KARORI RETIREMENT VILLAGE**

Title: **DRAWING LIST**

Discipline	CIVIL ENGINEERING
Drawing No.	042-RCT_401_C0-001
Rev.	A

LEGEND: GENERAL

	SITE BOUNDARY
	RETAINING WALL
	MAJOR DESIGN CONTOUR (1m)
	MINOR DESIGN CONTOUR (0.1m)
	PROPOSED ROAD LAYOUT
	PROPOSED BUILDING
	BUILDING NUMBER
	FINISHED FLOOR LEVEL
	FENCE

LEGEND: EXISTING SERVICES

	EXISTING STORMWATER
	EXISTING SANITARY SEWER
	EXISTING WATERMAIN
	EXISTING GAS
	EXISTING STORMWATER MANHOLE
	EXISTING SANITARY SEWER MANHOLE
	EXISTING SUMP
	EXISTING CESSPIT
	EXISTING WATER METER
	EXISTING WATER HYDRANT
	EXISTING POWER BOX
	EXISTING POWER POLE
	EXISTING POWER TRANSFORMER
	EXISTING STREET LIGHT
	EXISTING TELECOMMUNICATIONS PLINTH
	EXISTING TRAFFIC LIGHT
	EXISTING UNKNOWN MANHOLE

LEGEND: PROPOSED SERVICES

	PROPOSED STORMWATER (PUBLIC)
	PROPOSED STORMWATER (PRIVATE)
	PROPOSED STORMWATER SWALE
	PROPOSED SUBSOIL
	250mm WIDE SLOT DRAIN WITH CLASS 'D' DI GRATE,
	PROPOSED STORMWATER ROOF DISCHARGE
	PROPOSED SANITARY SEWER (PUBLIC)
	PROPOSED LOW PRESSURE SEWER
	PROPOSED FIRE SUPPLY (OD180 PE100 PN12.5)
	PROPOSED WATER MAIN
	PROPOSED GAS (63 OD PE100)
	PROPOSED LV POWER SUPPLY
	PROPOSED MV POWER SUPPLY
	EXISTING SERVICE TO BE ABANDONED
	PROPOSED FIRE HYDRANT
	PROPOSED WATER METER
	PROPOSED SLUICE VALVE
	PROPOSED SUPPLY REDUCER
	PROPOSED STORMWATER / SEWER MANHOLE
	PROPOSED STORMWATER CATCHPIT
	PROPOSED ROOFWATER MANHOLE
	PROPOSED LPS GRINDER PUMP

NOTES:

- ALL MANHOLE LIDS IN TRAFFICABLE AREAS TO BE CLASS D.
- ALL STORMWATER MANHOLES ARE TO CONFORM TO WELLINGTON WATER STANDARD DETAILS WW05, OR AS SHOWN ON LONG SECTIONS.
- ALL STORM PIPES TO BE RC RRJ CLASS 4 UNLESS NOTED OTHERWISE ON LONG SECTIONS.
- ALL PIPE MATERIALS, FITTINGS AND CONSTRUCTION OF STORMWATER DRAINAGE SYSTEMS TO COMPLY WITH WELLINGTON CITY COUNCIL LAND DEVELOPMENT AND SUBDIVISION INFRASTRUCTURE STANDARDS, ALL RELEVANT BUILDING CODES.
- EXISTING MANHOLE INVERT LEVELS ARE BASED ON BEST AVAILABLE SURVEY INFORMATION. CONTRACTOR TO CHECK AND VERIFY EXISTING LEVELS IN ADVANCE OF CARRYING OUT CONNECTIONS TO THE STREET.
- ALL SUBSOIL DRAINS TO BE 150mm Ø SLOTTED AND SOCKED WITH GEOTEXTILE FABRIC UNLESS OTHERWISE SPECIFIED.
- ALL PIPE MATERIALS, FITTINGS AND CONSTRUCTION OF SEWER AND WATER SUPPLY ARE TO COMPLY WITH WELLINGTON CITY COUNCIL LAND DEVELOPMENT AND SUBDIVISION INFRASTRUCTURE STANDARDS, ALL RELEVANT BUILDING CODES.
- ALL STORMWATER PIPE TRENCH INSTALLATION TO BE AS PER STANDARD DETAILS.
- ALL SANITARY SEWER PIPE TRENCH INSTALLATION TO BE AS PER WELLINGTON CITY COUNCIL LAND DEVELOPMENT AND SUBDIVISION INFRASTRUCTURE STANDARDS.
- PROPOSED MANHOLE INVERT LEVELS ARE CALCULATED TO ALLOW GRAVITY DISCHARGE FROM BUILDING. GULLIES LOCATIONS AND DEPTHS TO BE BY OTHERS.
- INVERT LEVELS AND DEPTHS OF EXISTING SEWER MANHOLES ARE TO BE CONFIRMED PRIOR TO COMMENCING CONSTRUCTION.
- THE CONTRACTOR IS RESPONSIBLE FOR LIASING WITH THE SERVICE PROVIDERS.
- EXISTING SERVICES ARE INDICATIVE ONLY AND ARE TO BE CONFIRMED ON SITE PRIOR TO COMMENCING CONSTRUCTION.
- FOR MANHOLE WHERE THE INVERT OF ANY INCOMING PIPELINE IS OVER 1.0m ABOVE THE SOFFIT LEVEL OF THE OUTGOING PIPELINE, MANHOLE HAUNCHING IS TO BE WITH 40MPa CONCRETE.

WATER NOTES:

- WATERMAIN MATERIAL SHALL NOMINALLY BE TO THE DIAMETER STATED AND PE100 PN12.5 SDR 13.6. ALL PE FITTINGS TO BE RATED NO LESS THAN PN16.
- VALVES, METERS, BACKFLOW PREVENTION DEVICES, HYDRANTS AND COUPLINGS SHALL BE RATED TO PN16.
- VALVES SHALL BE RESILIENT SEATED AND FLANGED.
- PIPELINE PRESSURE TEST AND DISINFECTION SHALL BE TO WELLINGTON WATER INFRASTRUCTURE STANDARDS.
- WATER HYDRANTS TO BE IN ACCORDANCE WITH WELLINGTON WATER INFRASTRUCTURE STANDARDS.
- PIPE TRENCH INSTALLATION AND THRUST BLOCK DETAIL TO BE AS PER WELLINGTON WATER INFRASTRUCTURE STANDARDS.

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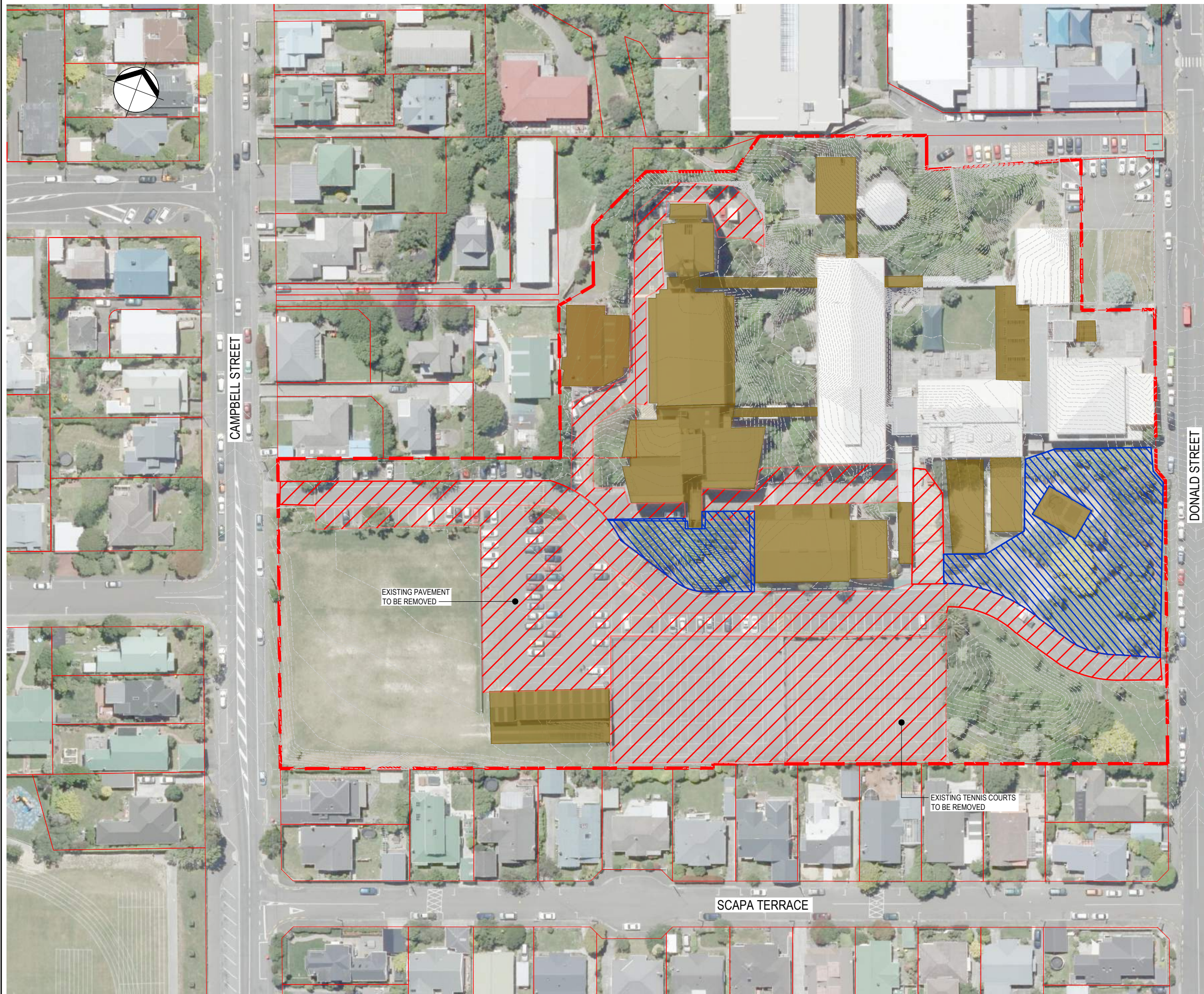
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				JK		04.02.19	
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Client:	
Project:	KARORI RETIREMENT VILLAGE

Title:	LEGEND AND GENERAL NOTES
Discipline:	CIVIL ENGINEERING
Drawing No:	042-RCT_401_C0-002
Rev:	A

Discipline:	CIVIL ENGINEERING
Drawing No:	042-RCT_401_C0-002
Rev:	A



LEGEND

- SITE BOUNDARY
- EXISTING BUILDING TO BE DEMOLISHED
- EXISTING PAVEMENT TO BE DEMOLISHED
- EXISTING VEGETATION TO BE REMOVED

NOTE:

1. NOTWITHSTANDING THE ITEMS THAT HAVE BEEN SPECIFIED ON THE PLANS HERewith FOR DEMOLITION AND REMOVAL, THE CONTRACTOR SHALL DEMOLISH AND REMOVE FROM SITE ALL EXISTING PAVEMENT, KERBS, FENCES, SERVICES (INCLUDING ISOLATING AND CAPPING OFF EXISTING SERVICES AS NECESSARY), STRUCTURES AND FEATURES LOCATED IN THE VICINITY OF THE PROPOSED WORKS AND MADE REDUNDANT BY THE PROPOSED WORKS.

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Reduced Scale (A3)	Design Verifier	Design Check			Date
1:1000	*Refer to Revision 1 for Original Signature				

Client:

RYMAN
HEALTHCARE

Project:

KARORI
RETIREMENT VILLAGE

Title:

EXISTING LAYOUT
& DEMOLITION PLAN

Discipline:

CIVIL ENGINEERING

Drawing No.	Rev.
042-RCT_401_CO-003	A



LEGEND

- SITE BOUNDARY
- EXISTING STORMWATER
- X-X-X- ABANDONED SEWER MAIN
- EXISTING SWALE DRAIN
- EXISTING SEWER MAIN
- X-X-X- ABANDONED SEWER MAIN
- EXISTING PRESSURE SEWER
- EXISTING WATER MAIN
- EXISTING POWER (U/G)
- EXISTING POWER (O/H)
- EXISTING 11KV POWER
- EXISTING 33KV POWER
- EXISTING GAS PIPE
- EXISTING TELECOM
- EXISTING COMMS
- EXISTING FIBRE OPTIC
- EXISTING STORMWATER / SEWER MANHOLE
- EXISTING STORMWATER SUMP
- EXISTING SEWER PUMP STATION
- ⊕ EXISTING FIRE HYDRANT / VALVE / WATER METER
- EXISTING POWER / LIGHT POLE

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A	FOR INFORMATION	JK	QD		21.02.19

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Client: **RYMAN HEALTHCARE**

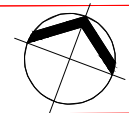
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Title: **EXISTING SERVICES PLAN**

Discipline: **CIVIL ENGINEERING**

Drawing No: **042-RCT_401_C0-004**

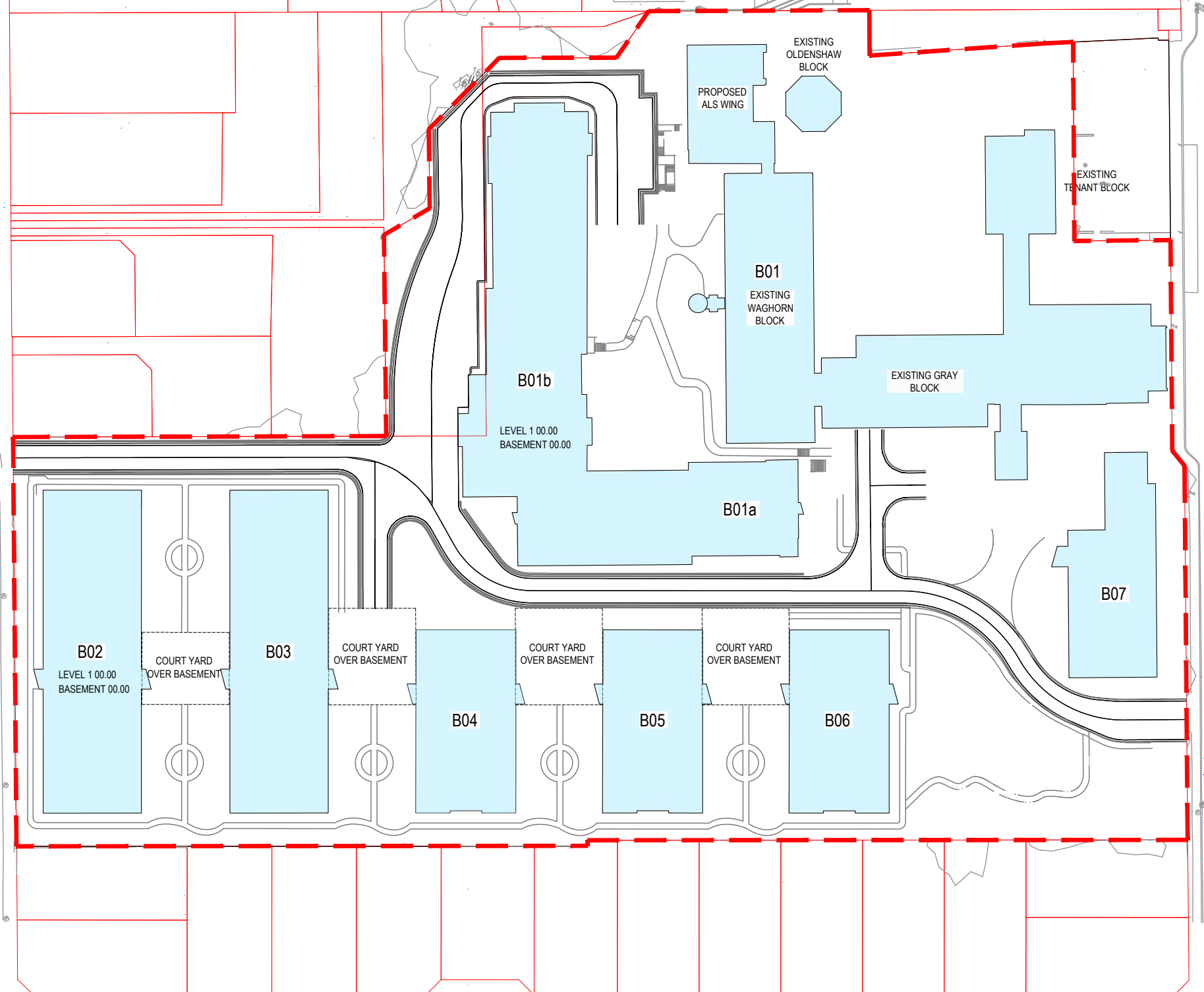
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CAMPBELL STREET

DONALD STREET

SCAPA TERRACE



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PROJECTNAME: 3124460-218		
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A	FOR INFORMATION	JK	QD		21.02.19

Drawing Originator: **Beca**

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* Refer to Revision 1 for Original Signature

Client: **RYMAN HEALTHCARE**

Project: **KARORI RETIREMENT VILLAGE**

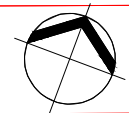
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Discipline: **CIVIL ENGINEERING**

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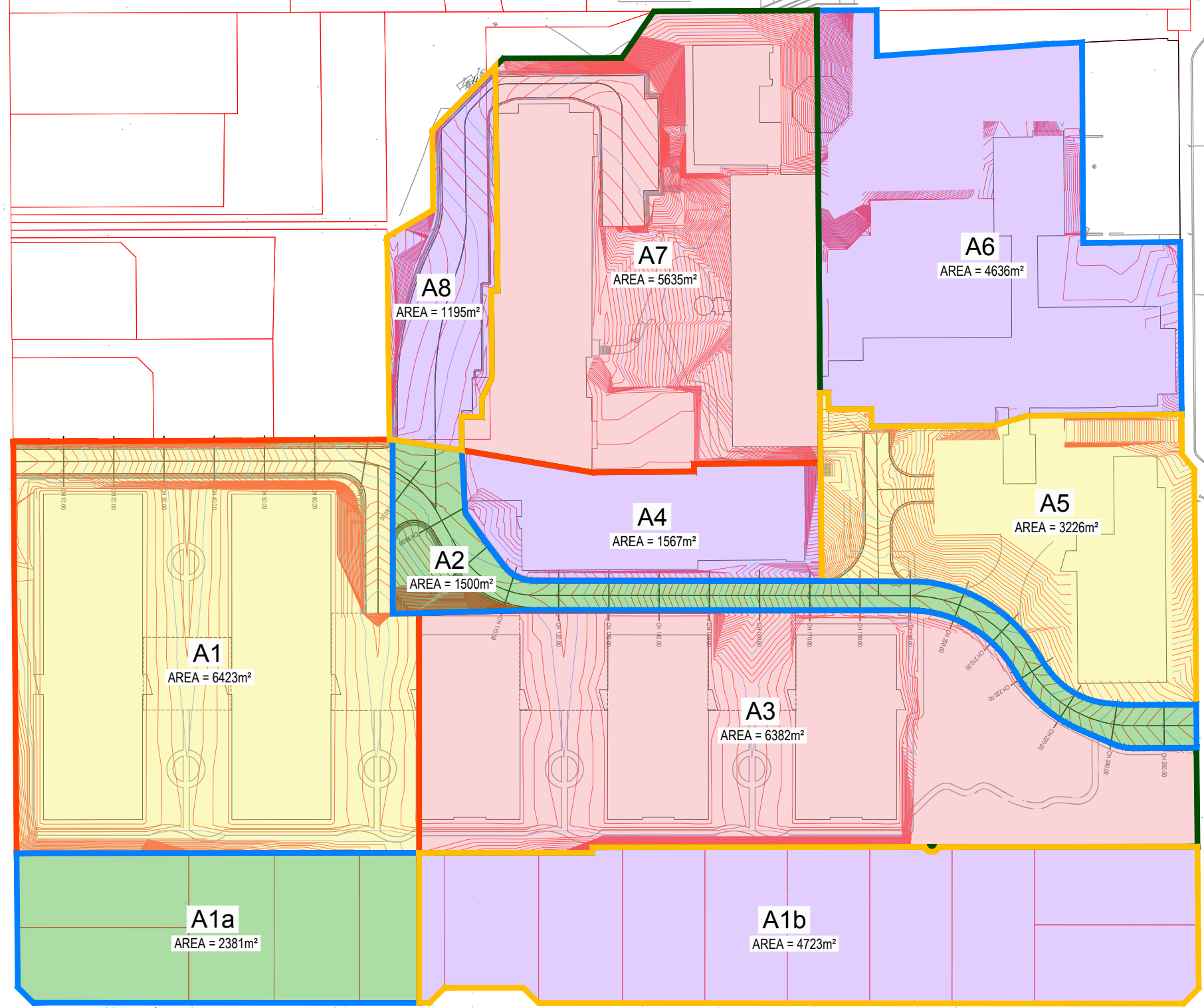
Rev: **A**

NOTE:
 1. ONLY 25% OF THE AREAS FROM CATCHMENTS A1a AND A1b CONTRIBUTED RUN OFF TO THE SITE CATCHMENT



CAMPBELL STREET

DONALD STREET



SCAPA TERRACE

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Client:



Project: **KARORI RETIREMENT VILLAGE**

Title: **PROPOSED CATCHMENT PLAN SHEET 1**

Discipline	CIVIL ENGINEERING
Drawing No.	042-RCT_401_C0-011
Rev.	A



LEGEND

	SITE BOUNDARY
	PROPOSED BUILDING
	PROPOSED FIRE MAIN
	PROPOSED WATERMAIN
	PROPOSED SANITARY SEWER
	PROPOSED SANITARY SEWER (PUBLIC)
	PROPOSED LOW PRESSURE SEWER
	EXISTING STORMWATER
	PROPOSED STORMWATER
	PROPOSED OVERLAND FLOW PATH
	PROPOSED COMMS
	PROPOSED FIBRE OPTIC
	PROPOSED GAS
	PROPOSED LV POWER SUPPLY
	PROPOSED HV POWER SUPPLY
	SUBSTATION
	PROPOSED NON-RETURN VALVE
	PROPOSED WATER METER
	PROPOSED FIRE HYDRANT
	PROPOSED STOP VALVE
	PROPOSED LOW PRESSURE SEWER PUMP STATION
	PROPOSED STORMWATER / SEWER MANHOLE
	PROPOSED STORMWATER SUMP

CHECK PRINT

DRG: 042-RCT_401_C0-021.dwg
 DATE: 21 Feb 2019 3:31 p.m.
 PROJECTNAME: 3124460-218

DISTRIBUTION	SIGN	DATE
ORIGINATOR		
DRAFTER		
CHECKER		

**FOR INFORMATION
NOT FOR CONSTRUCTION**

No.	Revision	By	Chk	Appd	Date
A	FOR INFORMATION	JK	QD		21.02.19

Drawing Originator: **Beca**

Original Scale (A1)	1:500	Design Drawn	JK	18.01.19	Approved For Construction*
Reduced Scale (A3)	1:1000	Design Verified			Date
		Design Check			
		* Refer to Revision 1 for Original Signature			

Client: **RYMAN HEALTHCARE**

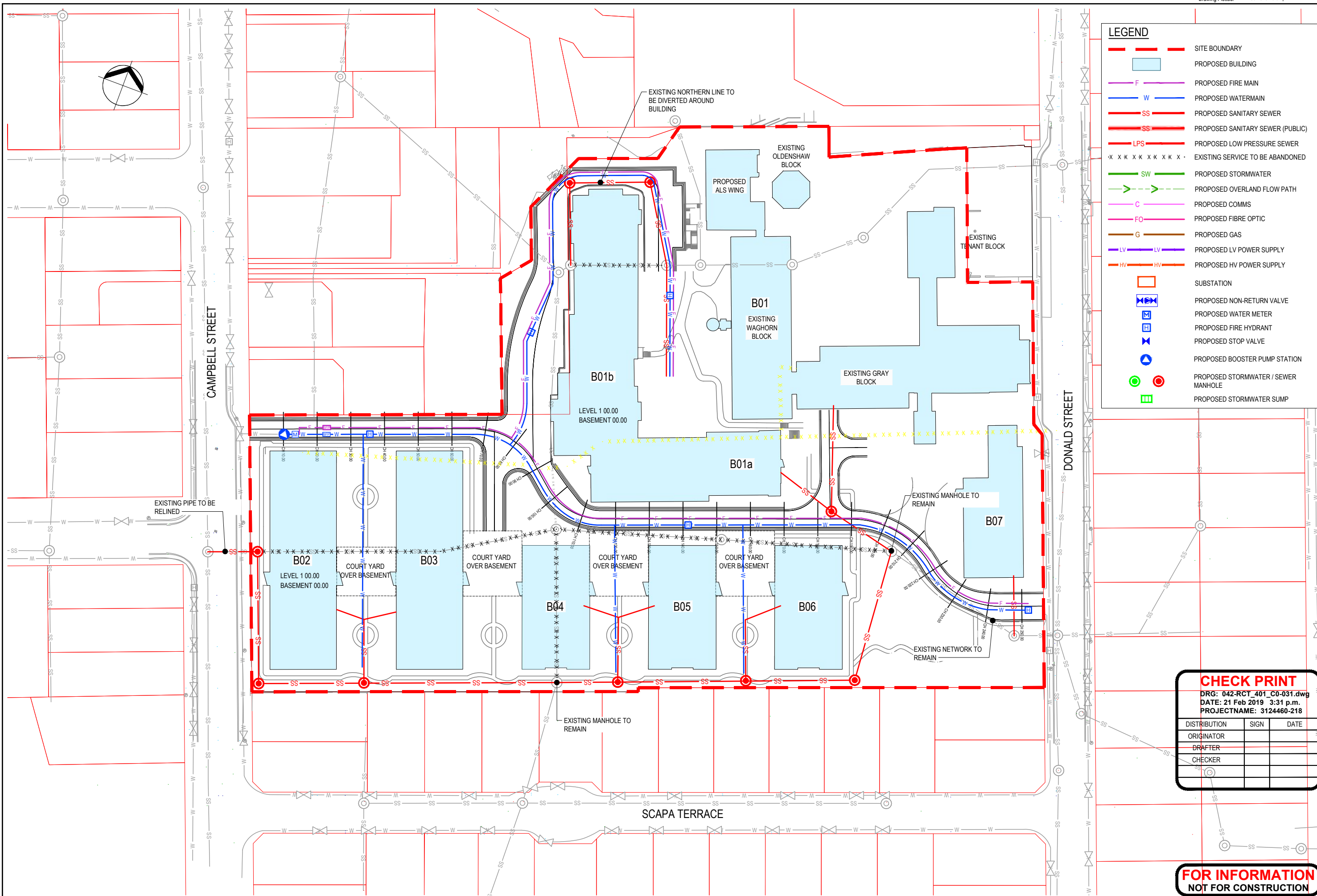
Project: **KARORI RETIREMENT VILLAGE**

Title: **PROPOSED GRADING & DRAINAGE PLAN**

Discipline: **CIVIL ENGINEERING**

Drawing No: **042-RCT_401_C0-021**

Rev: **A**



LEGEND

- SITE BOUNDARY
- PROPOSED BUILDING
- F PROPOSED FIRE MAIN
- W PROPOSED WATERMAIN
- SS PROPOSED SANITARY SEWER
- SS PROPOSED SANITARY SEWER (PUBLIC)
- LPS PROPOSED LOW PRESSURE SEWER
- x x x x x x x x EXISTING SERVICE TO BE ABANDONED
- SW PROPOSED STORMWATER
- > PROPOSED OVERLAND FLOW PATH
- C PROPOSED COMMS
- FO PROPOSED FIBRE OPTIC
- G PROPOSED GAS
- LV PROPOSED LV POWER SUPPLY
- HV PROPOSED HV POWER SUPPLY
- SUBSTATION
- > PROPOSED NON-RETURN VALVE
- M PROPOSED WATER METER
- F PROPOSED FIRE HYDRANT
- X PROPOSED STOP VALVE
- P PROPOSED BOOSTER PUMP STATION
- O PROPOSED STORMWATER / SEWER MANHOLE
- O PROPOSED STORMWATER SUMP

CHECK PRINT
 DRG: 042-RCT_401_C0-031.dwg
 DATE: 21 Feb 2019 3:31 p.m.
 PROJECTNAME: 3124460-218

DISTRIBUTION	SIGN	DATE
ORIGINATOR		
DRAFTER		
CHECKER		

**FOR INFORMATION
 NOT FOR CONSTRUCTION**

No.	Revision	By	Chk	Appd	Date
A	FOR INFORMATION	JK	QD		21.02.19

Drawing Originator: **Beca**

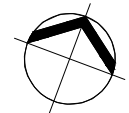
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1:500	Drawn	JK	18.01.19	Date
Reduced Scale (A3)	Design Checker			
1:1000	Refer to Revision 1 for Original Signature			

Client: **RYMAN HEALTHCARE**

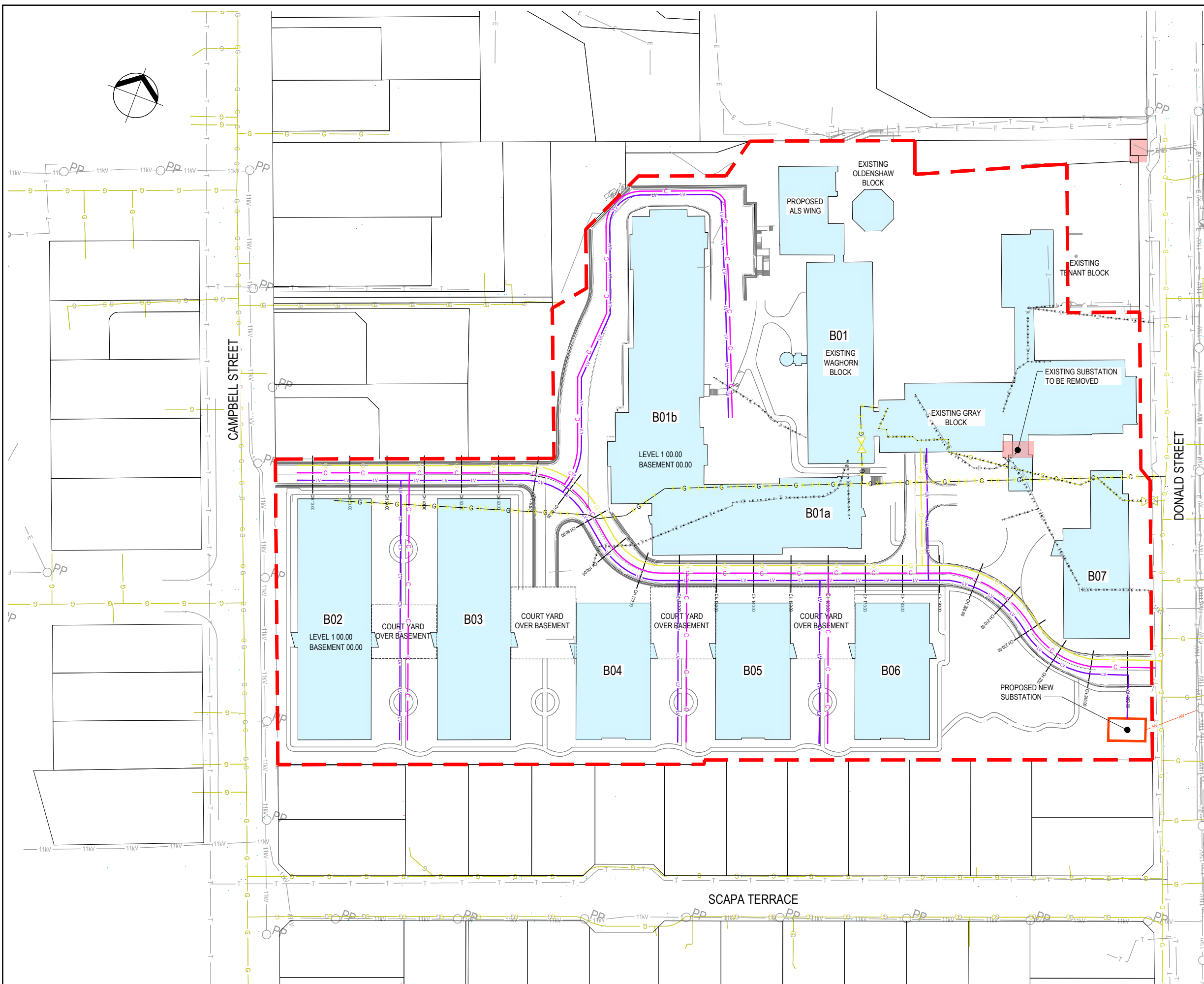
Project: **KARORI RETIREMENT VILLAGE**

Title: **PROPOSED SEWER & WATER PLAN**

Discipline	CIVIL ENGINEERING
Drawing No.	042-RCT_401_C0-031
Rev.	A



LEGEND	
	SITE BOUNDARY
	PROPOSED BUILDING
	PROPOSED FIRE MAIN
	PROPOSED WATERMAIN
	PROPOSED SANITARY SEWER
	PROPOSED SANITARY SEWER (PUBLIC)
	PROPOSED LOW PRESSURE SEWER
	EXISTING SERVICE TO BE ABANDONED
	PROPOSED STORMWATER
	PROPOSED OVERLAND FLOW PATH
	PROPOSED COMMS
	PROPOSED FIBRE OPTIC
	PROPOSED GAS
	PROPOSED LV POWER SUPPLY
	PROPOSED HV POWER SUPPLY
	SUBSTATION
	PROPOSED NON-RETURN VALVE
	PROPOSED WATER METER
	PROPOSED FIRE HYDRANT
	PROPOSED STOP VALVE
	PROPOSED LOW PRESSURE SEWER PUMP STATION
	PROPOSED STORMWATER / SEWER MANHOLE
	PROPOSED STORMWATER SUMP



CHECK PRINT
 DRG: 042-RCT_401_C0-041.dwg
 DATE: 21 Feb 2019 4:11 p.m.
 PROJECTNAME: 3124460-218

DISTRIBUTION	SIGN	DATE
ORIGINATOR		
DRAFTER		
CHECKER		

**FOR INFORMATION
 NOT FOR CONSTRUCTION**

No.	Revision	By	Chk	Appd	Date
A	FOR INFORMATION	JK	QD		21.02.19

Drawing Originator: **Beca**

Original Scale (A1)	Design	JB	11.02.19	Approved For Construction*
1:500	Drawn	JK	18.01.19	Date
Reduced Scale (A3)	Dwg Verifier			
1:1000	Dwg Check			

*Refer to Revision 1 for Original Signature

Client: **RYMAN HEALTHCARE**

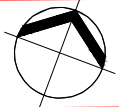
Project: **KARORI RETIREMENT VILLAGE**

Title: **PROPOSED POWER, COMMS & GAS PLAN**

Discipline: **CIVIL ENGINEERING**

Drawing No: **042-RCT_401_C0-041**

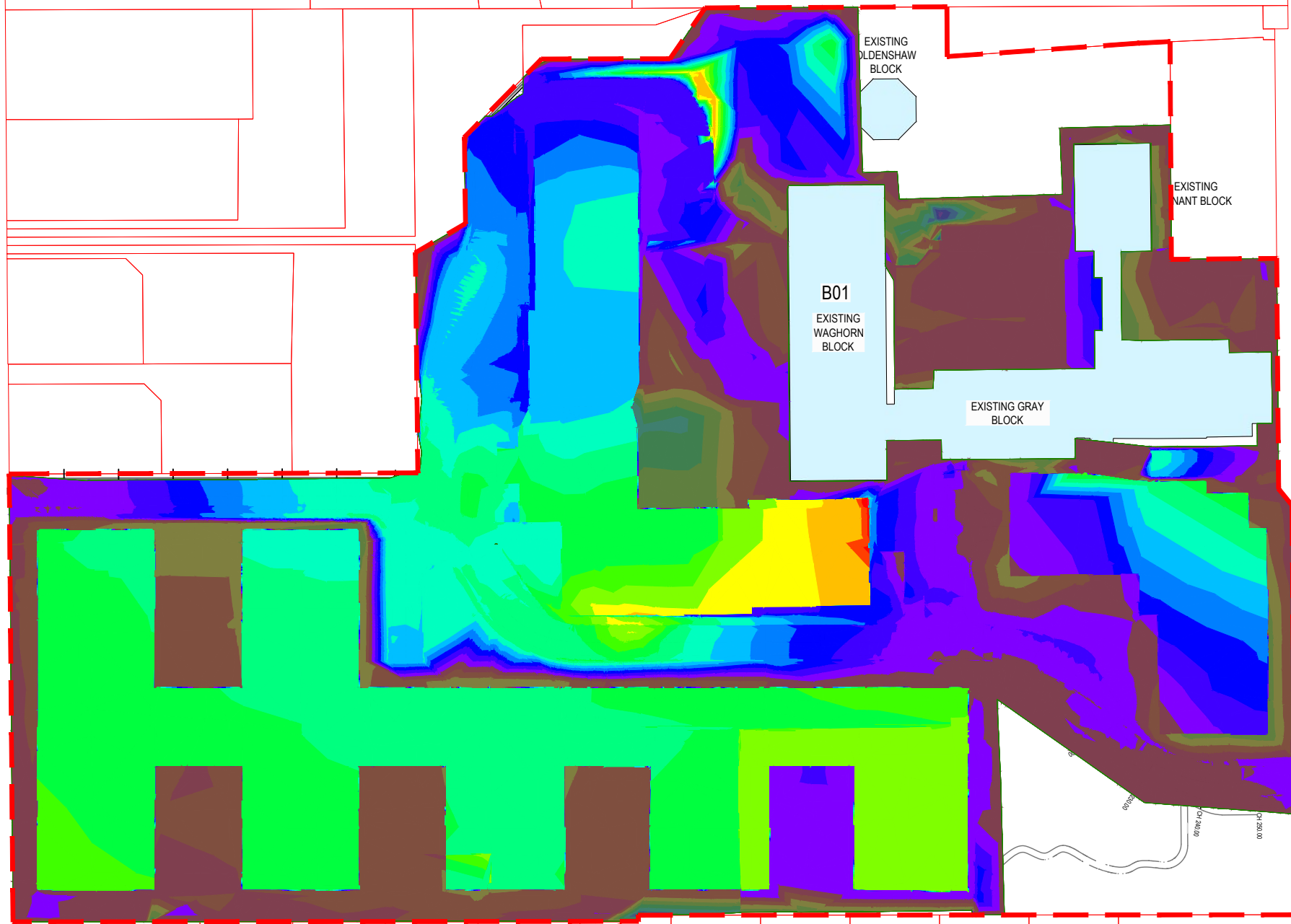
Rev: **A**



CAMPBELL STREET

DONALD STREET

SCAPA TERRACE



Elevations Table

Number	Minimum Elevation	Maximum Elevation	Color
1	-7.500	-7.000	Red
2	-7.000	-6.500	Dark Red
3	-6.500	-6.000	Orange
4	-6.000	-5.500	Yellow-Orange
5	-5.500	-5.000	Yellow
6	-5.000	-4.500	Light Green
7	-4.500	-4.000	Green
8	-4.000	-3.500	Light Green
9	-3.500	-3.000	Green
10	-3.000	-2.500	Light Green
11	-2.500	-2.000	Green
12	-2.000	-1.500	Light Green
13	-1.500	-1.000	Green
14	-1.000	-0.500	Light Green
15	-0.500	0.000	Green
16	0.000	0.500	Light Green
17	0.500	1.000	Green
18	1.000	1.500	Light Green
19	1.500	2.000	Green
20	2.000	2.500	Light Green
21	2.500	3.000	Green
22	3.000	3.500	Light Green
23	3.500	4.000	Green
24	4.000	4.500	Light Green

CHECK PRINT

DRG: 042-RCT_401_C0-051.dwg
 DATE: 21 Feb 2019 3:32 p.m.
 PROJECTNAME: 3124460-218

DISTRIBUTION	SIGN	DATE
ORIGINATOR		
DRAFTER		
CHECKER		

**FOR INFORMATION
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No.	Revision	By	Chk	Appd	Date
A	FOR INFORMATION	JK	QD		21.02.19



Original Scale (A1) 1:500	Design Drawn JK	18.01.19	Approved For Construction*
Reduced Scale (A3) 1:1000	Design Verifier Dag Check		Date

* Refer to Revision 1 for Original Signature



Project: **KARORI RETIREMENT VILLAGE**

Title: **PROPOSED CUT & FILL PLAN**

Discipline	CIVIL ENGINEERING
Drawing No.	042-RCT_401_C0-051
Rev.	A



LEGEND

- SITE BOUNDARY
- EXTENT OF EARTHWORKS
- STABILISED ENTRANCE
- CLEAN WATER DIVERSION
- CLEAN WATER PIPE/CULVERT
- DIRTY WATER DIVERSION
- DIRTY WATER PIPE/CULVERT
- P → DIRTY WATER PUMP
- || SILT FENCE

NOTES

- REFER TO DWG 042-RCT_401_C0-062 FOR DETAILS OF EROSION AND SEDIMENT CONTROL FEATURES
- ALL SEDIMENT AND EROSION CONTROL MEASURES ARE TO COMPLY WITH GREATER WELLINGTON REGIONAL COUNCIL GUIDELINES
- ALL EXISTING CESSPITS IN THE VICINITY OF WORKS AREA TO HAVE INLET PROTECTION TO WELLINGTON REGIONAL COUNCIL REQUIREMENT

DIRTY WATER BUND INSIDE SILT FENCE TO SURROUND SITE

TEMPORARY SILT POND 2
285m³ (143m²)

DISCHARGE TREATED WATER THROUGH EXISTING SW LINE

PUMPING AS REQUIRED

CHECK PRINT

DRG: 042-RCT_401_C0-061.dwg
DATE: 21 Feb 2019 3:32 p.m.
PROJECTNAME: 3124460-218

DISTRIBUTION	SIGN	DATE
ORIGINATOR		
DRAFTER		
CHECKER		

**FOR INFORMATION
NOT FOR CONSTRUCTION**

No.	Revision	By	Chk	Appd	Date
A	FOR INFORMATION	JK	QD		21.02.19

Drawing Originator: **Beca**

Original Scale (A1)	Design	JB	08/02/19	Approved For Construction*
1:500	Drawn	JK	18.01.19	Date
Reduced Scale (A3)	Dwg Verifier			
1:1000	Dwg Check			

*Refer to Revision 1 for Original Signature

Client: **RYMAN HEALTHCARE**

Project: **KARORI RETIREMENT VILLAGE**

Title: **EROSION & SEDIMENT CONTROL PLAN**

Discipline: **CIVIL ENGINEERING**

Drawing No: **042-RCT_401_C0-061**

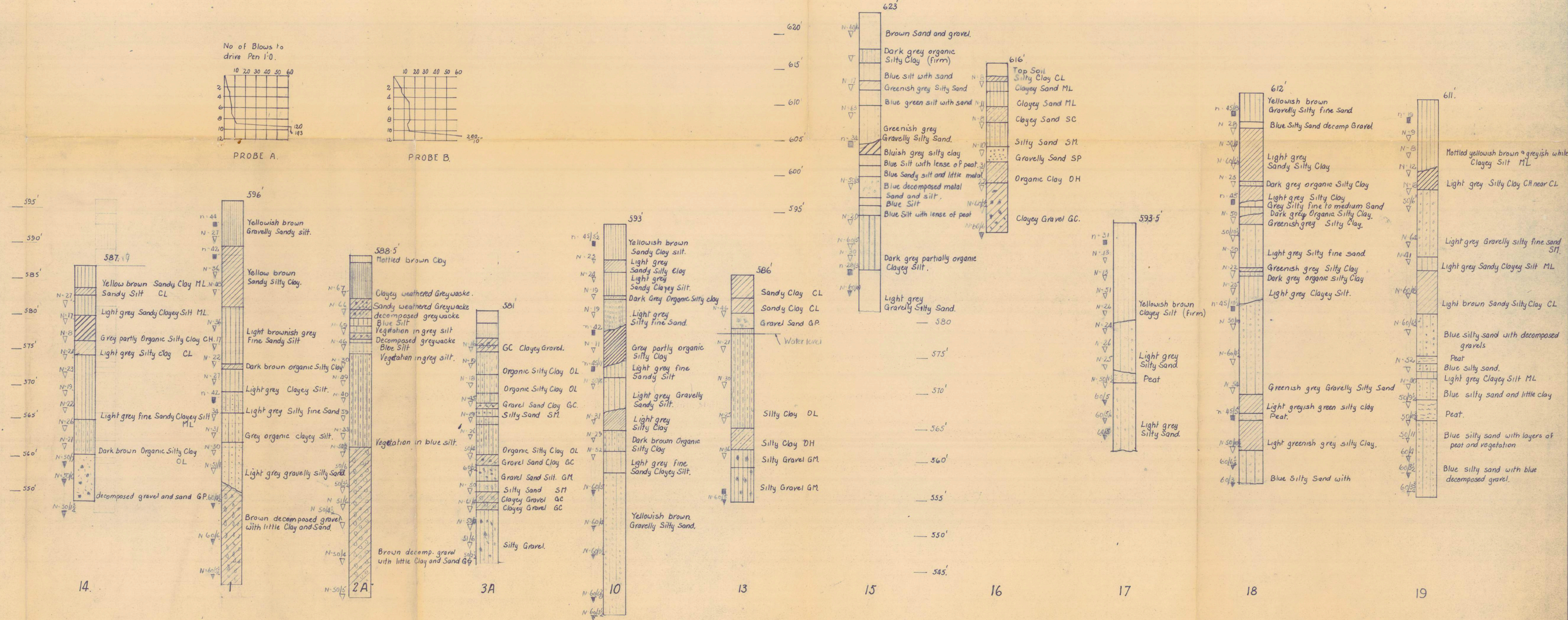
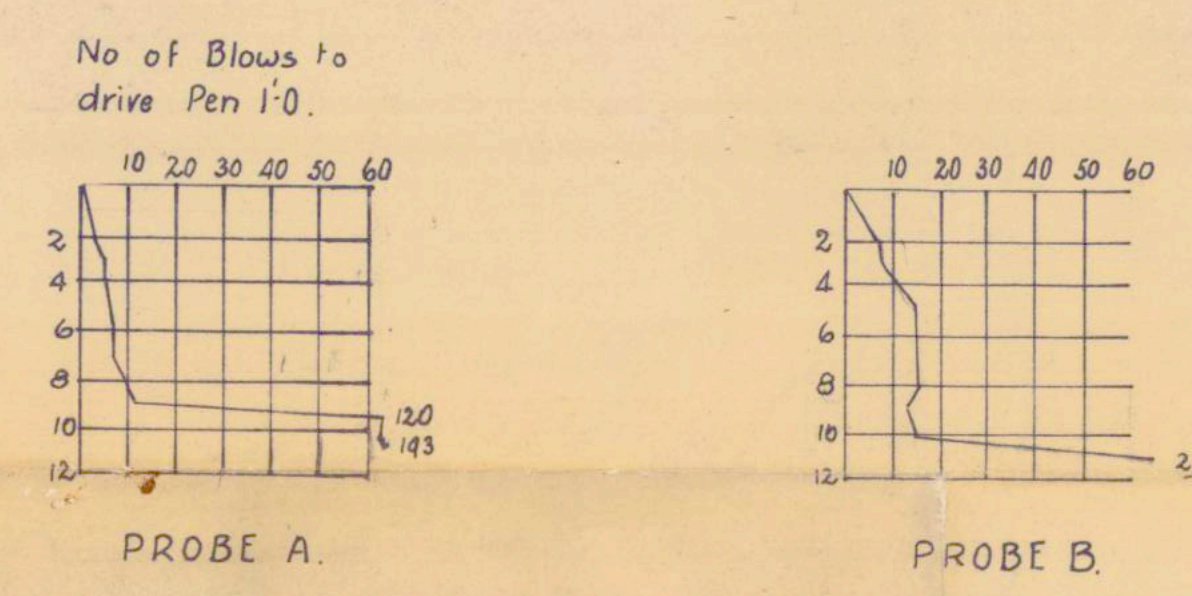
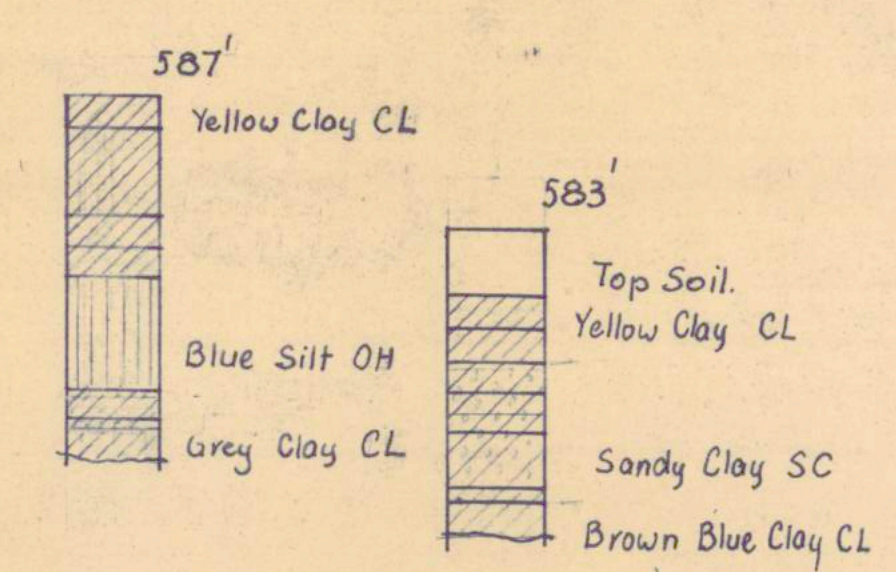
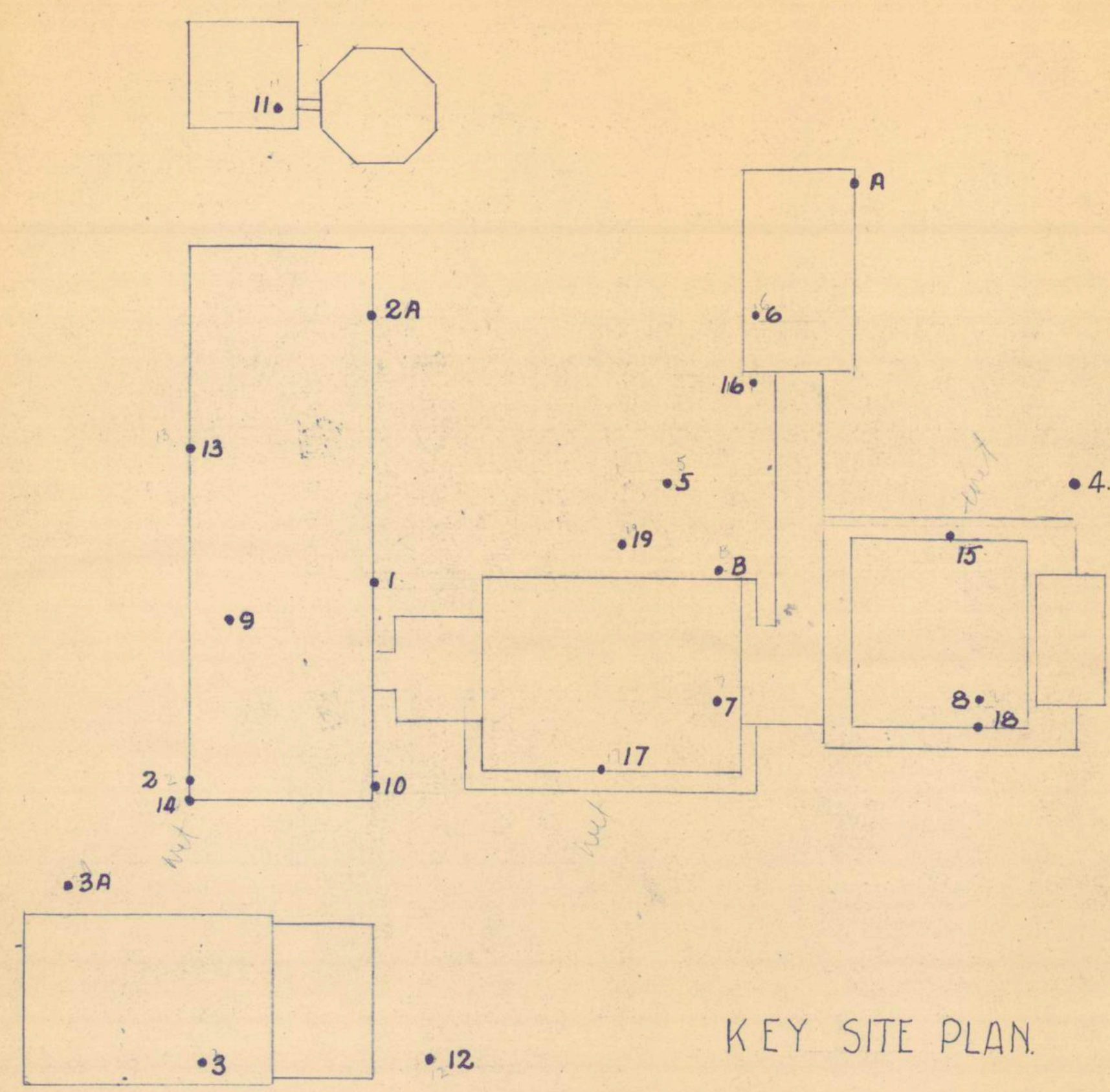
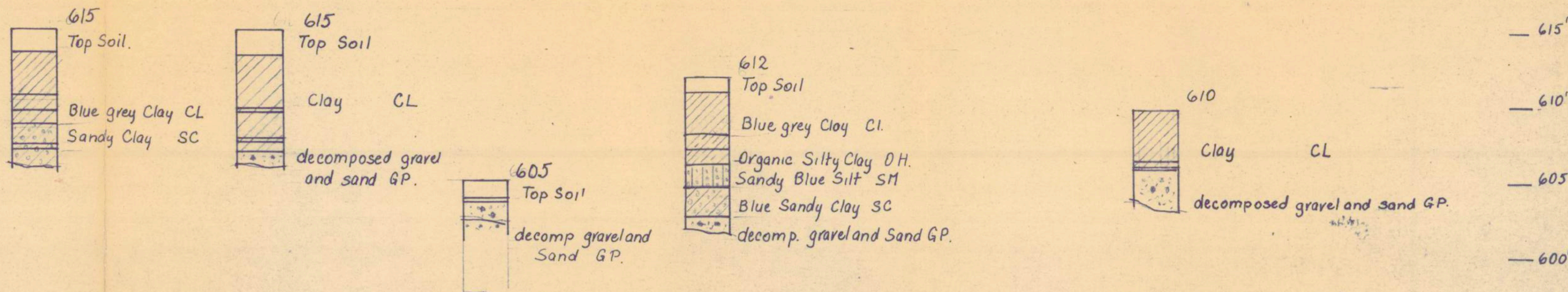
Rev: **A**

Appendix C: Historical investigation results

- **1966 Design drawing with investigations for the Teachers Training College**

622.5
Clay CL
decomposed gravel
and sand GP.

NOTE
 Logs 2A + 3A cased bores drilled
 by A Lemmon Ltd
 Logs 2, 3, 4, 5, 6, 7, 8, 9, 11 and 12 hand
 Auged by S.H.F.
 Logs 1, 10, 13, 14, 15, 16, 17, 18, 19 and Probes A and B
 by T.H. Richardson and Sons
 Logs 1, 10, 15, 17, 18 and 19 12 auged uncased
 Logs 13, 14 and 16 4' cased
 Logs 1, 10, 15, 17, 18 and 19 soil classes and testing
 by Brickell Moss and Partners.



COPYRIGHT OF THIS DRAWING IS VESTED IN SPENCER HOLLINGS & FERNER	
AMENDMENT	DATE

TEACHERS TRAINING COLLEGE
 FOUNDATION INVESTIGATION BORE LOG.

SCALES	6"0" = 1" Vert.	SPENCER HOLLINGS & FERNER CONSULTING CIVIL & STRUCTURAL ENGINEERS 21 EVERTON TERRACE, WELLINGTON, C.I. N.Z.
DRAWN	J.D. 6/65	
DESIGN		
TRACED		
CHECKED		

PLAN No. 361/P41

Appendix D: Geotechnical investigation results

- **Borehole logs**
- **CPT plots**
- **Hand auger hole and scala logs**



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH01

SHEET: 1 OF 5

DRILLED BY: Mark Kelsey

LOGGED BY: BJD / MHU

CHECKED: RHGR

START DATE: 09/10/2017

FINISH DATE: 10/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5428013 mN
(NZTM2000) 1745842 mE

DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 167.00m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Map or aerial photograph

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Description & Additional Observations	Fluid Loss (%)	Water Level	Casing	Installation	Core Box No	
	SOIL: Classification, colour, consistency / density, moisture, plasticity ROCK: Weathering, colour, fabric, name, strength, cementation										Defect Log	Fracture Spacing (mm)	RQD (%)							
Quaternary Alluvium	Hydrovac Excavation: Not logged.		UW MW CW	US MS ES WS EW	HVAC	0		166	1							12/10/2017				
	Silty CLAY, trace gravel; greenish grey, mottled brown and orange brown. Firm, moist, high plasticity. Gravel; fine to coarse, angular, sandstone. 1.80m: gravel grades to fine grained. 2.40m: grades to brown. 2.55m: grades to with some sand and gravel. Sand; greenish grey, fine to medium. Gravel; fine, greenish grey, angular, highly weathered.				HQTT	100		165	2					1.50 - 1.70m: Allophane=less than 5%						
	Organic clayey SILT, trace sand and gravel; brown. Firm, moist, high plasticity. Sand; fine. Gravel; fine. Organics; fibrous, partially decomposed.							164	3					2.60m: NMC=72.6%, LL=81%, PI=36%, Organic Content=14.6%, Allophane=less than 5%						
	Sandy SILT, some organics; greenish grey. Soft, wet, sensitive. Sand; fine to coarse. Organics; fibrous, partially decomposed.				SPT	11														
	Silty SAND; greenish grey. Loose, moist. Sand; fine to coarse. 3.90m: with wood fragments.				HQTT	90		163	4											
	Sandy SILT, minor gravel; blueish grey. Hard, moderately plastic. Gravel; fine. 4.20m: some gravel, trace gravel.																			
Silty SAND, minor gravel; blueish grey. Dense, dry to moist. Sand; fine to coarse. Gravel; fine to coarse.				SPT	88															

COMMENTS: Location estimated from aerial image (+/- 5m). Elevation estimated from 1m LiDAR (2009) contours (Wellington City Council GIS database, 2009 produced from LiDAR, +/- 1m).

Hole Depth
20.25m
Scale 1:25

Box 1, 0.0-5.0m



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH01

SHEET: 2 OF 5

DRILLED BY: Mark Kelsey

LOGGED BY: BJD / MHU

CHECKED: RHGR

START DATE: 09/10/2017

FINISH DATE: 10/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5428013 mN
(NZTM2000) 1745842 mE

DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 167.00m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Map or aerial photograph

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Description & Additional Observations	Fluid Loss (%)	Water Level	Casing	Installation	Core Box No	
	SOIL: Classification, colour, consistency / density, moisture, plasticity	ROCK: Weathering, colour, fabric, name, strength, cementation									Defect Log	Fracture Spacing (mm)	RQD (%)							
Quaternary Alluvium	Silty gravelly fine to coarse SAND, trace fibrous organics; brownish grey. Dense, wet. Gravel; fine to coarse, subangular, sandstone.		UW	US	HQTT	100														
	Sandy SILT some gravel, trace organics; blueish grey. Firm, wet, low plasticity. Sand; fine to coarse. Gravel; fine to medium. Organics; fibrous, dark brown.		UW	US	HQTT	100														
	SILT, trace sand; blueish grey. Stiff, non-plastic, moist. Sand, fine.		UW	US	HQTT	100														
	Interlaminated Organic CLAY; dark brown. Firm, moist, high plasticity and; Organic SILT; dark brown. Firm, moist, low plasticity.		UW	US	SPT	100														
	Clayey SILT, trace organics; greyish brown. Firm to stiff, high plasticity, moist. Organics; dark brown.		UW	US	SPT	100														
	CLAY; greyish brown. Soft to firm, high plasticity, moist.		UW	US	SPT	100														
	Organic SILT; dark brown. Firm to stiff, dry to moist, non-plastic.		UW	US	HQTT	100														
	Silty gravelly fine to coarse SAND; blueish grey. Very dense, moist. Gravel; fine to coarse, moderately weathered, sandstone, weak.		UW	US	HQTT	100														
	Silty fine to coarse SAND, trace gravel; blue grey. Very dense, moist. Gravel; fine to coarse, moderately weathered. 8.45m: cobble; sandstone, moderately weathered. 8.60m: grades to some gravel, increased silt content. 8.90m: cobble; sandstone, dark orange brown with dark staining, moderately strong.		UW	US	HQTT	100														
Silty sandy fine to coarse GRAVEL; orange brown. Very dense, moist, subangular, moderately to highly weathered, moderately strong.		UW	US	SPT	0															

COMMENTS: Location estimated from aerial image (+/- 5m). Elevation estimated from 1m LiDAR (2009) contours (Wellington City Council GIS database, 2009 produced from LiDAR, +/- 1m).

Hole Depth
20.25m

Scale 1:25

Box 2, 5.0-8.3m

Rev.: A



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH01

SHEET: 3 OF 5

DRILLED BY: Mark Kelsey

LOGGED BY: BJD / MHU

CHECKED: RHGR

START DATE: 09/10/2017

FINISH DATE: 10/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5428013 mN
(NZTM2000) 1745842 mE

DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 167.00m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Map or aerial photograph

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Fluid Loss (%)	Water Level	Casing	Installation	Core Box No	
	SOIL: Classification, colour, consistency / density, moisture, plasticity	ROCK: Weathering, colour, fabric, name, strength, cementation									Defect Log	Fracture Spacing (mm)	RQD (%)						Description & Additional Observations
Quaternary Alluvium	Silty sandy GRAVEL (continued).		UW	US	HQTT	33		156	11										
	10.50m - 11.50m: Core Loss.				SPT	0	21 25 for 65mm N>=50 Bouncing												
	Silty gravelly fine to coarse SAND, some cobbles; orange brown with dark orange mottling. Very dense, moist. Gravel; fine to coarse, subangular to angular, moderately to highly weathered, sandstone. Cobbles; moderately to highly weathered, sandstone.				HQTT	42		155	12										
	12.75m - 13.20m: Core Loss.				SPT	0	60 for 120mm N>=50												
	Silty gravelly fine to coarse SAND, some cobbles; orange brown with dark orange mottling. Very dense, moist. Gravel; fine to coarse, subangular to angular, moderately to highly weathered, sandstone. Cobbles; moderately to highly weathered, sandstone.				HQTT	100		154	13										
13.50m - 14.25m: Core Loss.				SPT	0	30 for 80mm N>=50 Solid Bouncing													
Silty gravelly fine to coarse SAND, some cobbles; orange brown with dark orange mottling. Very dense, moist. Gravel; fine to coarse, subangular to angular, moderately to highly weathered, sandstone. Cobbles; moderately to highly weathered, sandstone.				HQTT	80		153	14											

COMMENTS: Location estimated from aerial image (+/- 5m). Elevation estimated from 1m LiDAR (2009) contours (Wellington City Council GIS database, 2009 produced from LiDAR, +/- 1m).

Hole Depth
20.25m
Scale 1:25

Box 3, 8.3-13.5m

General Log - 5/12/2017 12:16:39 PM - Produced with Core-GS by GeRoc

Rev.: A



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH01

SHEET: 4 OF 5

DRILLED BY: Mark Kelsey

LOGGED BY: BJD / MHU

CHECKED: RHGR

START DATE: 09/10/2017

FINISH DATE: 10/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5428013 mN
(NZTM2000) 1745842 mE

DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 167.00m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Map or aerial photograph

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Fluid Loss (%)	Water Level	Casing	Installation	Core Box No
	SOIL: Classification, colour, consistency / density, moisture, plasticity	ROCK: Weathering, colour, fabric, name, strength, cementation									Defect Log	Fracture Spacing (mm)	RQD (%)					
Quaternary Alluvium	Silty gravelly fine to coarse SAND (continued).		UW MW SW CW US MS SS CS US MS SS CS US MS SS CS US MS SS CS		SPT	0	60 for 140mm N>=50 Solid		16		2000 1000 500 200 100 50 20		25 50 75					
Rakaitia Terrane	Sandy fine to coarse GRAVEL, some cobbles; dark grey, mottled orange and limonite staining. Very dense, moist, subangular to angular, slightly weathered, weak. Cobbles; slightly weathered, sandstone, weak to moderately strong (Highly Weathered Greywacke).				HQTT	102			151									
					SPT	0	33 for 85mm N>=50 Solid Bouncing		17									
					HQTT	90			150									
					HQTT	100												
					SPT	0	20 for 45mm N>=50 Solid Bouncing		149									
					HQTT	71												
					HQTT	80			148									

COMMENTS: Location estimated from aerial image (+/- 5m). Elevation estimated from 1m LiDAR (2009) contours (Wellington City Council GIS database, 2009 produced from LiDAR, +/- 1m).

Hole Depth
20.25m
Scale 1:25

Box 4, 13.5-17.3m

General Log - 5/12/2017 12:16:39 PM - Produced with Core-GS by GeRoc

Rev.: A



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH01

SHEET: 5 OF 5

DRILLED BY: Mark Kelsey

LOGGED BY: BJD / MHU

CHECKED: RHGR

START DATE: 09/10/2017

FINISH DATE: 10/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5428013 mN
(NZTM2000) 1745842 mE

DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 167.00m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Map or aerial photograph

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering <small>LW MW SW CW US SS CS EW</small>	Rock Strength <small>US SS CS EW</small>	Sampling Method Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS				Fluid Loss (%) <small>25 50 75</small>	Water Level	Casing	Installation	Core Box No
	SOIL: Classification, colour, consistency / density, moisture, plasticity ROCK: Weathering, colour, fabric, name, strength, cementation									Defect Log	Fracture Spacing (mm) <small>2000 600 200 50 20</small>	RQD (%)	Description & Additional Observations					
<small>Rakia Tere</small>	Sandy fine to coarse GRAVEL (continued).				HQTT 80													<small>Rev. 5. 17. 2017</small>
	20.25m: END OF BOREHOLE						146 21											
							145 22											
							144 23											
							143 24											

COMMENTS: Location estimated from aerial image (+/- 5m). Elevation estimated from 1m LiDAR (2009) contours (Wellington City Council GIS database, 2009 produced from LiDAR, +/- 1m).

Hole Depth
20.25m
Scale 1:25

BH01

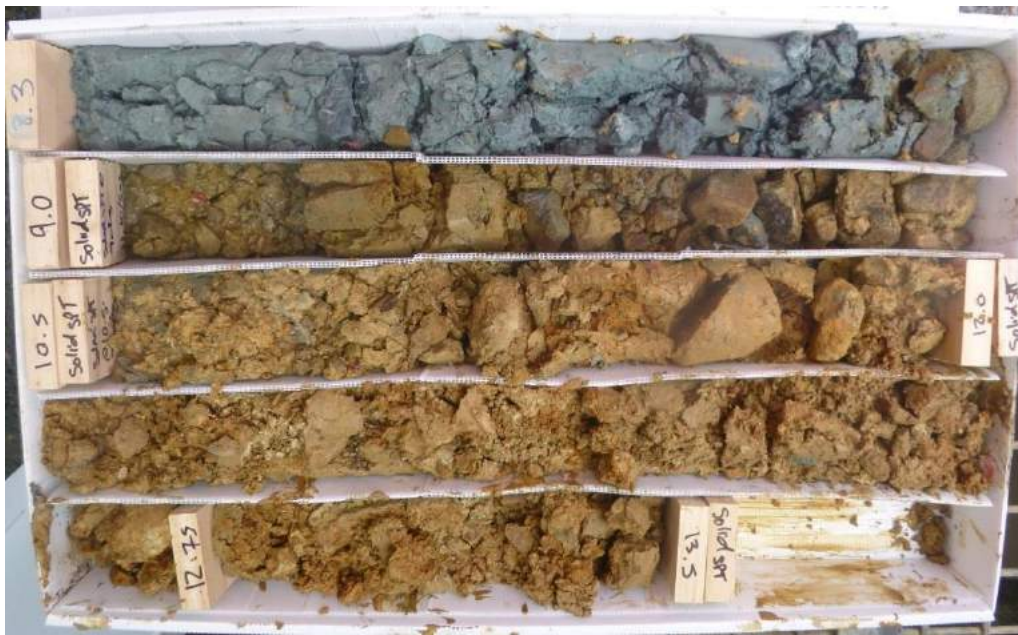


BH01: Box 1 (0.00m – 4.95m)



BH01: Box 2 (4.95m – 8.30m)

BH01 (continued)



BH01: Box 3 (8.30m – 13.50m)



BH01: Box 4 (13.50m – 17.25m)

BH01 (continued)



BH01: Box 5 (17.25m – 20.25m)



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH02

SHEET: 1 OF 4

DRILLED BY: Mark Kelsey

LOGGED BY: BJD

CHECKED: RHGR

START DATE: 11/10/2017

FINISH DATE: 12/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5428086 mN
(NZTM2000) 1745812 mE

R.L. GROUND: 162.70m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

DIRECTION:
ANGLE FROM HORIZ.: -90°

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Fluid Loss (%)	Water Level 12/10/2017: artesian water	Casing	Installation	Core Box No
	SOIL: Classification, colour, consistency / density, moisture, plasticity	ROCK: Weathering, colour, fabric, name, strength, cementation									Defect Log	Fracture Spacing (mm)	RQD (%)					
Quaternary Alluvium	Fine to coarse GRAVEL, trace sand, trace shells; brownish grey. Sand; coarse.		UW	US	HVAC	0	BH02_E 1 @ 0.0m	162										
	Sandy SILT some gravel; blueish grey. Stiff to very stiff, moderately plastic. Gravel; fine to coarse.		UW	US			>203 kPa	1										
	SILT, trace sand; blueish grey. Very stiff, moderately plastic. Sand; fine.		UW	US			BH02_E 2 @ 1.0m											
	SILT, some sand, minor organics, trace clay; blueish grey. Stiff to very stiff, moderate plasticity, moist, thinly bedded. Sand; fine to medium. Organics; fibrous, completely decomposed, fibrous. Sand content and plasticity variable in beds.		UW	US			BH02_G 1 @ 1.3m	2										
	2.90m: grades to moderate plasticity.		UW	US			BH2_E3 @ 2.0m							2.00m: Allophane=less than 5%				
	Organic SILT, minor clay, trace sand; dark brown. Firm to stiff, high plasticity, dry to moist. Sand; fine to medium.		UW	US			BH2_G2 @ 2.2m							2.20m: NMC=46.9%, LL=33%, Pi=8%, Organic Content=13.7%				
SILT, with some clay and organics, trace sand; blueish grey. Firm to stiff, high plasticity, dry to moist, bedded. Sand; fine.		UW	US															
Silty fine SAND; blueish grey. Medium dense, moist, homogenous.		UW	US															
4.85m - 5.20m: Core Loss.		UW	US															
COMMENTS:		UW	US															

COMMENTS:

Hole Depth
16.73m

Scale 1:25

General Log - 5/12/2017 12:16:39 PM - Produced with Core-GS by GeRoc

Box 1, 0.0-3.5m

Rev.: A



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH02

SHEET: 2 OF 4

DRILLED BY: Mark Kelsey

LOGGED BY: BJD

CHECKED: RHGR

START DATE: 11/10/2017

FINISH DATE: 12/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5428086 mN
(NZTM2000) 1745812 mE

DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 162.70m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Fluid Loss (%)	Water Level	Casing	Installation	Core Box No	
	SOIL: Classification, colour, consistency / density, moisture, plasticity	ROCK: Weathering, colour, fabric, name, strength, cementation									Defect Log	Fracture Spacing (mm)	RQD (%)						Description & Additional Observations
Quaternary Alluvium	[CONT] 4.85m - 5.20m: Core Loss.																		
	Silty fine SAND; blueish grey. Medium dense, wet, homogenous.																		
	Silty gravelly fine to coarse SAND; blueish grey. Medium dense, moist to wet. Gravel; fine to medium, subrounded to subangular, moderately to highly weathered.				HQTT	100			157	6									
	6.10m - 6.75m: Core Loss.																		
	Silty fine to coarse SAND, some gravel; grey. Medium dense. Gravel; fine to medium, subrounded to subangular, moderately to highly weathered.				HQTT	81			156	7									
	Silty fine SAND; grey. Medium dense, low plasticity, moist.																		
	Sandy SILT, minor clay, trace gravel; grey with light brown mottling. Medium dense to dense, low plasticity, moist. Sand; fine to coarse. Gravel; fine to medium, sandstone.				SPT	100	17 9/10 7/5 N=31		155	8									
	Silty fine to coarse SAND, some gravel, trace shell and clay; grey. Medium dense to dense, moist to wet. Gravel; fine to medium, subrounded to subangular, moderately weathered to highly weathered.																		
	Sandy SILT, some gravel; greenish grey. Medium dense to dense, low plasticity, moist. Sand; fine to coarse. Gravel; fine to coarse, subrounded to subangular, moderately weathered to highly weathered.				HQTT	100			154	9									
	8.90m: grades to silty sand.																		
SILT, some clay, trace decomposed organics and sand; brownish grey. Soft, low plasticity, moist. Sand; fine.				SPT	100	19 5/2 3/5 N=15		153											
9.45m - 9.70m: Core Loss.																			
SILT, some clay, trace decomposed organics and sand; brownish grey. Soft, low plasticity, moist. Sand; fine.																			

COMMENTS:

Hole Depth
16.73m

Scale 1:25

General Log - 5/12/2017 12:16:39 PM - Produced with Core-GS by GeRoc

Box 2, 3, 5-6, 9m

Rev.: A



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH02

SHEET: 3 OF 4

DRILLED BY: Mark Kelsey

LOGGED BY: BJD

CHECKED: RHGR

START DATE: 11/10/2017

FINISH DATE: 12/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5428086 mN
(NZTM2000) 1745812 mE

DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 162.70m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Fluid Loss (%)	Water Level	Casing	Installation	Core Box No
	SOIL: Classification, colour, consistency / density, moisture, plasticity ROCK: Weathering, colour, fabric, name, strength, cementation										Defect Log	Fracture Spacing (mm)	RQD (%)					
Quaternary Alluvium	Silty gravelly fine to coarse SAND, trace clay; greenish grey. Medium dense to dense, moist to wet. Gravel; fine to coarse, subrounded to subangular, moderately weathered to highly weathered, sandstone.		UW	US	HQTT	80												
	10.50m - 11.10m: Core Loss.				SPT	0	14 24/26 for 70mm N>=50		152									
	Silty gravelly fine to coarse SAND, trace cobbles; blueish grey. Dense to very dense, moist to wet. Gravel; fine to coarse, sandstone.				HQTT	75												
	11.35m: cobble; sandstone, weak, blueish grey.																	
	11.90m: cobble; sandstone, moderately strong, blue grey.																	
	12.00m - 12.30m: Core Loss.				SPT	0	8 5/10 9/9 N=33		151									
	SILT, some sand, minor clay; greenish brown, mottled orange. Very soft to soft, high plasticity; wet; sand fine.																	
	12.40m: grades to blueish grey.																	
	Sandy SILT; blueish grey. Stiff, non-plastic, moist. Sand; fine to medium.																	
	12.65m: trace partially decomposed wood.																	
12.85m: grades to low plasticity, wet.																		
Clayey SILT, trace sand; blueish grey. Soft to firm, high plasticity, moist. Sand; fine to medium.																		
13.15m: grades to stiff, brownish grey.																		
13.17m: grades to brownish grey, stiff.																		
13.50m - 13.75m: Core Loss.				SPT	0	10 10/11 14/15 for 55mm N>=50		149										
Sandy SILT; blueish grey. Very stiff, non-plastic, moist. Sand; fine to medium.																		
14				HQTT	100													
Bouldery COBBLES, trace gravel; orange brown. Very dense. Cobbles; subrounded to subangular, moderately to highly weathered, sandstone, moderately strong. Boulders, subrounded to subangular, sandstone, moderately strong. Gravel; subrounded to subangular, sandstone, dark staining on defect surfaces.																		
148				HQTT	80													

COMMENTS:

Hole Depth
16.73m

Scale 1:25

Box 3, 6.8-10.5m

Box 4, 10.5-14.7m

BOREHOLE LOG

BOREHOLE No.:
BH02

SHEET: 4 OF 4

DRILLED BY: Mark Kelsey
LOGGED BY: BJD
CHECKED: RHGR
START DATE: 11/10/2017
FINISH DATE: 12/10/2017
CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5428086 mN
(NZTM2000) 1745812 mE

DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 162.70m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering <small>UW, MW, CW, SW, EW, US, MS, SS, ES, WS, OS, OS, OS, OS, OS</small>	Rock Strength <small>US, MS, SS, ES, WS, OS, OS, OS, OS, OS</small>	Sampling Method Core Recovery (%)	Testing N	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Fluid Loss (%) <small>25, 50, 75</small>	Water Level	Casing	Installation	Core Box No	
	SOIL: Classification, colour, consistency / density, moisture, plasticity ROCK: Weathering, colour, fabric, name, strength, cementation	[CONT] Bouldery COBBLES, trace gravel; orange brown. Very dense. Cobbles; subrounded to subangular, moderately to highly weathered, sandstone, moderately strong. Boulders, subrounded to subangular, sandstone, moderately strong. Gravel; subrounded to subangular, sandstone, dark staining on defect surfaces.								Description & Additional Observations	Defect Log	Fracture Spacing (mm) <small>2000, 600, 200, 100, 50, 20</small>						RQD (%)
Quaternary Alluvium					SPT 0	60 for 145mm N>=50	147											
					HQTT 51		16											
					SPT 0	28 for 75mm N>=50 Bouncing	146											
	16.73m: END OF BOREHOLE						143											
							144											
							145											
							17											
							18											
							19											

COMMENTS:

Hole Depth
16.73m

BH02



BH02: Box 1 (0.00m – 3.45m)

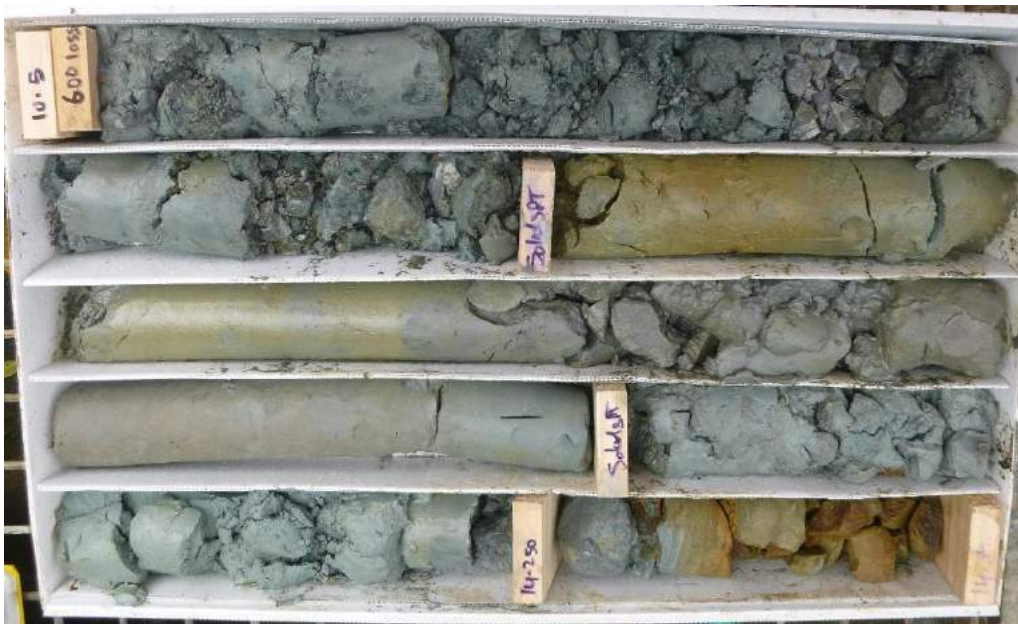


BH02: Box 2 (3.45m – 6.85m)

BH02 (continued)



BH02: Box 3 (6.85m – 10.50m)



BH02: Box 4 (10.50m – 14.70m)

BH02 (continued)



BH02: Box 5 (14.70m – 16.50m)



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH03

SHEET: 1 OF 6

DRILLED BY: Mark Kelsey

LOGGED BY: BJD/VSMI

CHECKED: RHGR

START DATE: 12/10/2017

FINISH DATE: 17/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5428101 mN
(NZTM2000) 1745904 mE

R.L. GROUND: 178.00m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

DIRECTION:
ANGLE FROM HORIZ.: -90°

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Description & Additional Observations	Fluid Loss (%)	Water Level	Casing	Installation	Core Box No	
	SOIL: Classification, colour, consistency / density, moisture, plasticity	ROCK: Weathering, colour, fabric, name, strength, cementation									Defect Log	Fracture Spacing (mm)	RQD (%)							
Top	SILT; dark brown.																			
	Fine to coarse GRAVEL, some cobbles.																			
Quaternary Alluvium	Sandy SILT. Hard.				HVAC	0														
	SILT; orange brown with mottled black. High plasticity, moist.																			
	Clayey SILT, minor sand; grey. Stiff to very stiff, high plasticity, moist. Sand; fine.																			
	2.25 - 2.30m: silty sand with trace fine to coarse gravel. 2.35m: grades to hard.				HQTT	107								2.00m: NMC=23.1%, LL=32%, PI=15%						
	Silty gravelly fine to coarse SAND; blueish grey. Medium dense. Gravel; fine to medium, subangular to angular, sandstone.													2.50m: Allophane=less than 5%						
	3.75m - 6.00m: Core Loss.				SPT	100	8 5/6 5/6 N=22													
					HQTT	166														
					HQTT	13														
					SPT	0	30 for 70mm N>=50 Bouncing													

COMMENTS:

Hole Depth
29m

Scale 1:25

BOREHOLE LOG

BOREHOLE No.:

BH03

SHEET: 2 OF 6

DRILLED BY: Mark Kelsey

LOGGED BY: BJD/VSMI

CHECKED: RHGR

START DATE: 12/10/2017

FINISH DATE: 17/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
 JOB No.: 30309
 LOCATION: VUW Karori Campus

CO-ORDINATES: 5428101 mN
 (NZTM2000) 1745904 mE

DIRECTION:
 ANGLE FROM HORIZ.: -90°

R.L. GROUND: 178.00m
 R.L. COLLAR:
 DATUM: NZVD2016
 SURVEY: Handheld GPS

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Description & Additional Observations	Fluid Loss (%)	Water Level	Casing	Installation	Core Box No	
	SOIL: Classification, colour, consistency / density, moisture, plasticity ROCK: Weathering, colour, fabric, name, strength, cementation										Fracture Spacing (mm)	RQD (%)	Description & Additional Observations							
Quaternary Alluvium	3.75m - 6.00m: Core Loss (Continued).				HQTT	0														
	Silty fine to coarse SAND, some gravel; blueish grey. Very dense, moist to wet. Gravel; fine to medium, subangular to angular, sandstone.				SPT	100	10 12/15 for 45mm N>=50 Bouncing	6												
	SILT, trace clay; blueish grey. Stiff to very stiff, low plasticity, moist.				HQTT	100														
	SILT, some sand; grey. Firm, low plasticity, wet. Sand; fine, sensitive.																			
	Silty fine to coarse SAND, some gravel; blueish grey. Very dense, moist to wet. Gravel, fine to medium, subrounded to subangular.				HQTT	100														
	7.50 - 8.00m: absent of fines and sand content.				SPT	0	25 for 85mm N>=50 Solid Bouncing													
	PEAT; dark brown. Firm, moist, amorphous (H9).				HQTT	85														
	Clayey SILT; brownish grey. Stiff, high plasticity, moist.																			
	SILT, some clay and sand; grey. Firm to stiff; high plasticity; moist; sand, fine to medium.																			
9.00m - 9.65m: Core Loss.				SPT	0	27 30 for 70mm N>=50 Solid Bouncing														
Gravelly fine to coarse SAND, some silt; grey. Dense to very dense, moist to wet. Gravel, fine to coarse, subrounded to subangular, slightly to moderately weathered, sandstone.																				

8.35m: NMC=42.4%, Organic Content=13.2%

Box 2, 3, 8-7m

COMMENTS:

Hole Depth
29m

Scale 1:25



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH03

SHEET: 3 OF 6

DRILLED BY: Mark Kelsey

LOGGED BY: BJD/VSMI

CHECKED: RHGR

START DATE: 12/10/2017

FINISH DATE: 17/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5428101 mN
(NZTM2000) 1745904 mE

DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 178.00m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Fluid Loss (%)	Water Level	Casing	Installation	Core Box No
	SOIL: Classification, colour, consistency / density, moisture, plasticity ROCK: Weathering, colour, fabric, name, strength, cementation										Defect Log	Fracture Spacing (mm)	RQD (%)					
Quaternary Alluvium	[CONT] Gravelly fine to coarse SAND, some silt; grey. Dense to very dense, moist to wet. Gravel, fine to coarse, subrounded to subangular, slightly to moderately weathered, sandstone.		UW		HQTT	65												
	10.50m - 10.80m: Core Loss.				SPT	0	60 for 140mm N>=50 Solid											
	Silty fine to coarse SAND, minor gravel; grey. Dense to very dense, moist. Gravel, fine to coarse, subround to subangular, slightly to moderately weathered, sandstone.				HQTT	88			167	11								
	11.75 - 11.90m: sandy SILT, very stiff.																	
	12.00m - 13.25m: Core Loss.				SPT	0	19 15/20 15 for 45mm N>=50 Solid		166	12								
	Gravelly SILT, minor sand; blueish grey. Soft, high plasticity, moist. Gravel, fine to medium. Sand; fine to medium.				HQTT	21			165	13								
13.50m - 14.15m: Core Loss.				SPT	0	60 for 140mm N>=50 Solid												
SILT, with trace gravel; grey. Stiff to very stiff, high plasticity, moist. Gravel; fine to medium.				HQTT	44			164	14									
								163										

COMMENTS:

Hole Depth 29m

Scale 1:25

Box 3, 8.7-12.0m



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH03

SHEET: 4 OF 6

DRILLED BY: Mark Kelsey

LOGGED BY: BJD/VSMI

CHECKED: RHGR

START DATE: 12/10/2017

FINISH DATE: 17/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5428101 mN
(NZTM2000) 1745904 mE

DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 178.00m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Fluid Loss (%)	Water Level	Casing	Installation	Core Box No	
	SOIL: Classification, colour, consistency / density, moisture, plasticity	ROCK: Weathering, colour, fabric, name, strength, cementation									Defect Log	Fracture Spacing (mm)	RQD (%)						Description & Additional Observations
Quaternary Alluvium	15.00m - 15.75m: Core Loss.				SPT	0	60 for 105mm N>=50 Solid												
	Silty gravelly fine to medium SAND; grey. Dense to very dense, moist. Gravel; medium to coarse, subrounded.				HQTT	50		162	16										
	16.35 - 16.50m: with minor cobbles.																		
	16.50m - 17.20m: Core Loss.				SPT	0	15 35/15 for 8mm N>=50 Solid												
	Gravelly fine SAND, some silt; grey. Dense to very dense, low plasticity, moist. Gravel; fine to coarse, subrounded to subangular.				HQTT	62			161	17									
	18.00m - 18.90m: Core Loss.				SPT	0	18 30 for 65mm N>=50 Solid Bouncing												
SILT, trace sand; blueish grey. Soft to firm, high plasticity, moist. Sand; fine.				HQTT	44			160	18										
Gravelly fine to coarse SAND, some silt; blueish grey. Dense to very dense, moist. Gravel; fine to coarse, subrounded to subangular, slightly to moderately weathered.								159	19										
19.50 - 19.90m: some gravels and cobbles.								158											

COMMENTS:

Hole Depth 29m

Scale 1:25

Box 4, 12.0-18.0m



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH03

SHEET: 5 OF 6

DRILLED BY: Mark Kelsey

LOGGED BY: BJD/VSMI

CHECKED: RHGR

START DATE: 12/10/2017

FINISH DATE: 17/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5428101 mN
(NZTM2000) 1745904 mE

DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 178.00m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Description & Additional Observations	Fluid Loss (%)	Water Level	Casing	Installation	Core Box No	
	SOIL: Classification, colour, consistency / density, moisture, plasticity ROCK: Weathering, colour, fabric, name, strength, cementation										Defect Log	Fracture Spacing (mm)	RQD (%)							
Quaternary Alluvium	[CONT] Gravelly fine to coarse SAND, some silt; blueish grey. Dense to very dense, moist. Gravel; fine to coarse, subrounded to subangular, slightly to moderately weathered.		UW	US	HQTT	100														
	Gravelly fine to coarse SAND, some cobbles; grey. Dense to very dense, moist. Gravel; fine to coarse, subrounded to subangular, moderately weathered. Cobbles; subrounded, slightly to moderately weathered, sandstone.		UW	US	HQTT	60			157	21										
	21.00m - 21.60m: Core Loss.																			
	Gravelly cobbly fine to medium SAND; grey. Very dense, moist. Gravel; fine to coarse, subrounded, slightly to moderately weathered. Cobbles; subrounded, slightly to moderately weathered, sandstone.		UW	US	HQTT	60														
	Gravelly fine to coarse SAND; dark brownish grey. Dense to very dense, moist. Gravel; fine to medium, subrounded to subangular, moderately weathered.		UW	US	HQTT	60														
	22.30 - 22.50m: increasing cobble content.																			
	22.50m - 22.85m: Core Loss.																			
	Gravelly fine to coarse SAND, minor silt; dark brownish grey with mottled orange. Very dense, moist. Gravel; fine to medium, subangular, slightly to moderately weathered.		UW	US	HQTT	76														
	Gravelly fine to coarse SAND; grey. Dense to very dense, moist. Gravel; fine to medium, subangular, slightly weathered.		UW	US	HQTT	76														
	Fine to medium SAND; light brown. Dense, moist.		UW	US	HQTT	76														
Fine SAND, trace gravel; light brown. Very dense, moist. Gravel; fine, subrounded to subangular.		UW	US	HQTT	76															
Fine to medium SAND, trace gravel; light orange		UW	US	HQTT	76															

COMMENTS:

Hole Depth
29m

Scale 1:25

Box 5, 18.0-22.3m

BOREHOLE LOG

BOREHOLE No.:

BH03

SHEET: 6 OF 6

DRILLED BY: Mark Kelsey

LOGGED BY: BJD/VSMI

CHECKED: RHGR

START DATE: 12/10/2017

FINISH DATE: 17/10/2017

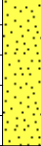
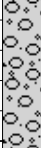
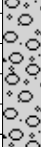

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
 JOB No.: 30309
 LOCATION: VUW Karori Campus

CO-ORDINATES: 5428101 mN
 (NZTM2000) 1745904 mE

DIRECTION:
 ANGLE FROM HORIZ.: -90°

R.L. GROUND: 178.00m
 R.L. COLLAR:
 DATUM: NZVD2016
 SURVEY: Handheld GPS

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Fluid Loss (%)	Water Level	Casing	Installation	Core Box No
	SOIL: Classification, colour, consistency / density, moisture, plasticity	ROCK: Weathering, colour, fabric, name, strength, cementation									Defect Log	Fracture Spacing (mm)	RQD (%)					
Quaternary Alluvium	brown. Very dense, moist. Gravel; fine to medium, subrounded to subangular, slightly to moderately weathered.		UW	US	HQTT	100			26									
	Sandy fine to coarse GRAVEL & COBBLES, minor silt; grey and orange brown. Very dense, dry to moist, subrounded to subangular, moderately to highly weathered, sandstone. Cobbles; subrounded, moderately to highly weathered, sandstone. Sand; medium to coarse.		UW	US	HQTT	43		152	26									
	Medium to coarse GRAVEL & COBBLES, minor sand; grey and orange brown. Very dense, subround to subangular, highly weathered, sandstone. Cobbles; subround to subangular, moderately to highly weathered, sandstone. Sand; medium to coarse.		UW	US	HQTT	60		151	27									
			UW	US	HQTT	50		150	28									
29m: END OF BOREHOLE							149	29										

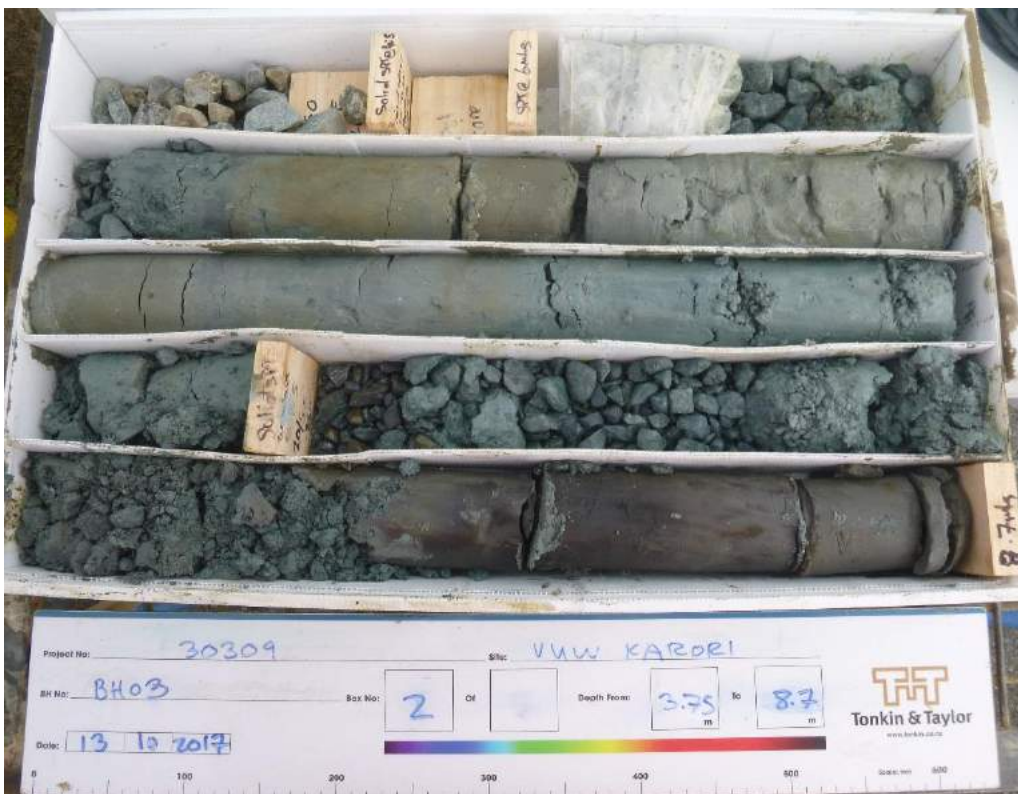
COMMENTS:

Hole Depth
29m

BH03



BH03: Box 1 (0.00m – 3.75m)



BH03: Box 2 (3.75m – 8.70m)

BH03 (continued)



BH03: Box 3 (8.70m – 10.50m)

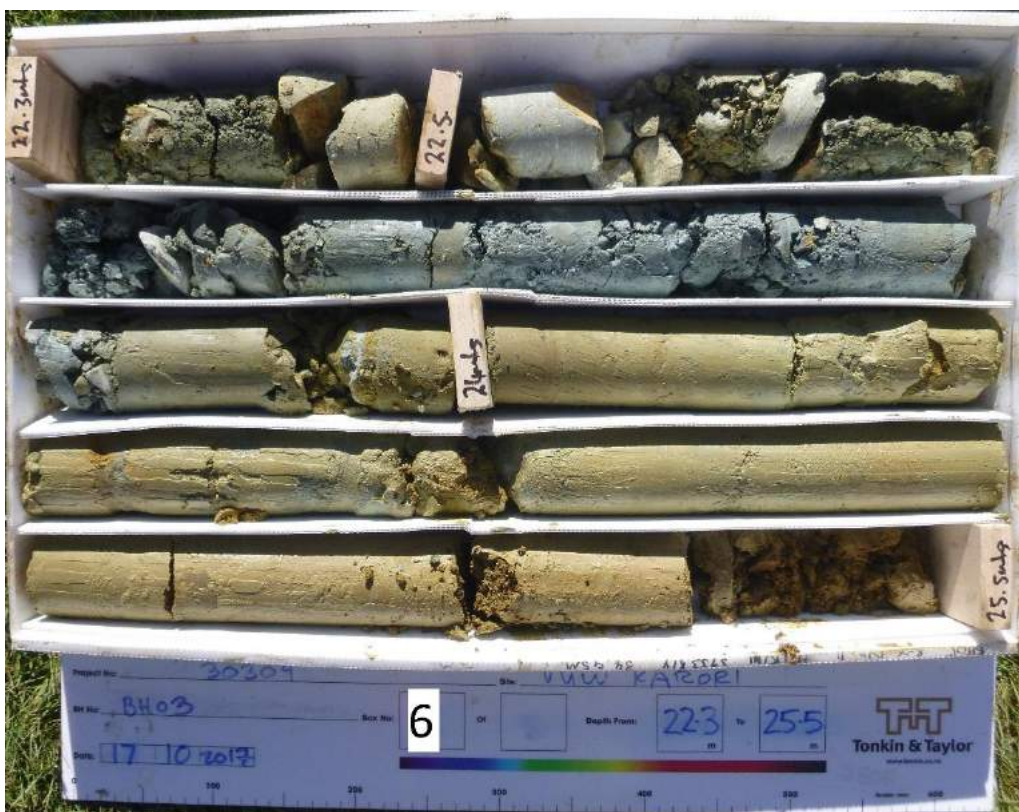


BH03: Box 4 (12.00m – 18.00m)

BH03 (continued)



BH03: Box 5 (18.00m – 22.30m)



BH03: Box 6 (22.30m – 25.50m)

BH03 (continued)



BH03: Box 7 (25.50m – 29.00m)

BOREHOLE LOG

BOREHOLE No.:

BH04

SHEET: 1 OF 3

DRILLED BY: Mark Kelsey

LOGGED BY: VSMI/MHU

CHECKED: RHGR

START DATE: 17/10/2017

FINISH DATE: 18/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
 JOB No.: 30309
 LOCATION: VUW Karori Campus

CO-ORDINATES: 5427954 mN
 (NZTM2000) 1745789 mE

R.L. GROUND: 166.40m
 R.L. COLLAR:
 DATUM: NZVD2016
 SURVEY: Handheld GPS

DIRECTION:
 ANGLE FROM HORIZ.: -90°

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Description & Additional Observations	Fluid Loss (%)	Water Level	Casing	Installation	Core Box No
	SOIL: Classification, colour, consistency / density, moisture, plasticity	ROCK: Weathering, colour, fabric, name, strength, cementation									Defect Log	Fracture Spacing (mm)	RQD (%)						
Fill	Fine to coarse GRAVEL, trace silt; brownish grey. 'Tightly packed', sub-angular to sub-rounded.							166											
	Fine to coarse GRAVEL some sand, trace silt; brown. Subangular to subrounded.							165											
Quaternary Alluvium	Clayey silty SAND; light orange brown. Soft to stiff; low plasticity; moist; poorly graded.				HVAC	0		165											
	Clayey SAND, with minor gravel; light greyish brown. Loose to medium dense; low plasticity; moist; poorly graded; sand, fine; gravel, fine to medium, subround to subangular.				HQTT	100		164											
	Gravelly SAND, with some silt, with minor clay; light greyish brown. Medium dense; non-plastic; moist to wet; sand, fine to medium; gravel, fine to medium, subangular.				SPT	66	10 4/4 5/5 N=18	163											
	Clayey SILT, some sand and minor gravel; light greyish brown. Hard, moist, high plasticity. Sand; fine to coarse. Gravel; fine to medium, slightly weathered, strong.				HQTT	100		162											
Rakaia Terrane	Silty fine to coarse SAND; greyish brown, mottled orange brown. Medium dense.																		
	Sandy SILT minor clay; orange brown. Hard, moist, low plasticity. Sand; fine. 4.20m: sand becomes fine to coarse grained.				SPT	100	16 10/20 for 64mm N>=50	162											
4.80m - 5.05m: Core Loss																			

1.50m: NMC=27.4%, LL=36%,
 PI=12%

18/10/2017

114mm HW

Box 1, 0.0-2.7m

COMMENTS:

Hole Depth
 10.64m

Scale 1:25



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH04

SHEET: 2 OF 3

DRILLED BY: Mark Kelsey

LOGGED BY: VSMI/MHU

CHECKED: RHGR

START DATE: 17/10/2017

FINISH DATE: 18/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5427954 mN
(NZTM2000) 1745789 mE

DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 166.40m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Description & Additional Observations	Fluid Loss (%)	Water Level	Casing	Installation	Core Box No
	SOIL: Classification, colour, consistency / density, moisture, plasticity	ROCK: Weathering, colour, fabric, name, strength, cementation									Defect Log	Fracture Spacing (mm)	RQD (%)						
Rakaia Terrane	[CONT] 4.80m - 5.05m: Core Loss Moderately weathered; light brown; SANDSTONE; very weak.		UW	US	HQTT	78	60 for 135mm N>=50 Solid	161	6	Defect Log	2000	0	0						
	Moderately weathered; light brown; SILTSTONE; very weak.		UW	US	HQTT	100	25 for 130mm N>=50 Solid Bouncing	160	7	Defect Log	600	0	0						
	7.50m - 7.85m: Core Loss		UW	US	SPT	0	25 for 85mm N>=50 Solid Bouncing	159	8	Defect Log	400	0	0						
	Moderately weathered; light brown; SILTSTONE; very weak.		UW	US	HQTT	83	25 for 85mm N>=50 Solid Bouncing	158	9	Defect Log	200	0	0						
	9.00m - 9.70m: Core Loss		UW	US	SPT	0	25 for 85mm N>=50 Solid Bouncing	157	9	Defect Log	100	0	0						
Moderately weathered; light brown; SILTSTONE; very weak.		UW	US					157		Defect Log	50	0	0						

COMMENTS:

Hole Depth 10.64m

Scale 1:25

General Log - 5/12/2017 12:16:40 PM - Produced with Core-GS by GeRoc

Box 2, 2,7-6.0m

Box 3, 6.0-9.3m

Rev.: A



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH04

SHEET: 3 OF 3

DRILLED BY: Mark Kelsey

LOGGED BY: VSMI/MHU

CHECKED: RHGR

START DATE: 17/10/2017

FINISH DATE: 18/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5427954 mN
(NZTM2000) 1745789 mE

R.L. GROUND: 166.40m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

DIRECTION:
ANGLE FROM HORIZ.: -90°

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Description & Additional Observations	Fluid Loss (%)	Water Level	Casing	Installation	Core Box No
	SOIL: Classification, colour, consistency / density, moisture, plasticity ROCK: Weathering, colour, fabric, name, strength, cementation										Defect Log	Fracture Spacing (mm)	RQD (%)						
Rakaitia Terrane	Moderately weathered; light brown; SILTSTONE; very weak.		LW MW SW CW US MS SS GS WS VS VW EW		HQTT	56		156			2000 600 600 600 600 600 20	0							Box 4, 9.3-10.6m
	10.64m: END OF BOREHOLE				SPT	0	60 for N>=50 Solid		11 155 12 154 13 153 14 152										

COMMENTS:

Hole Depth
10.64m

Scale 1:25

BH04

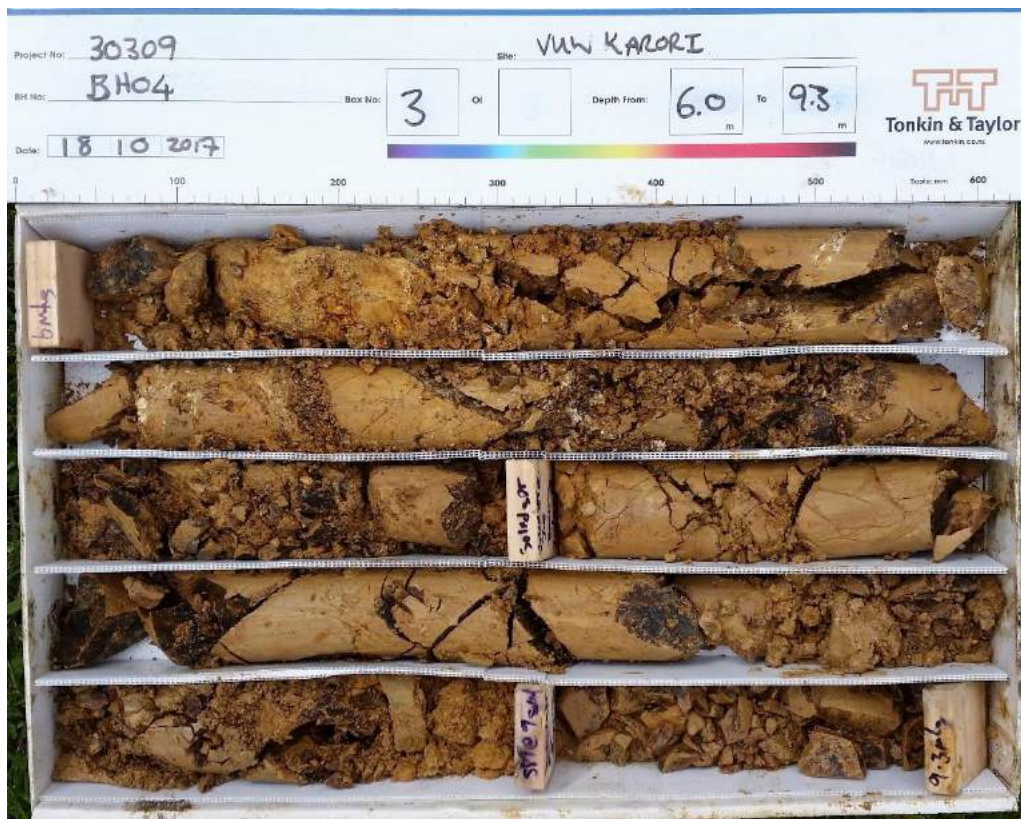


BH04: Box 1 (0.00m – 2.70m)

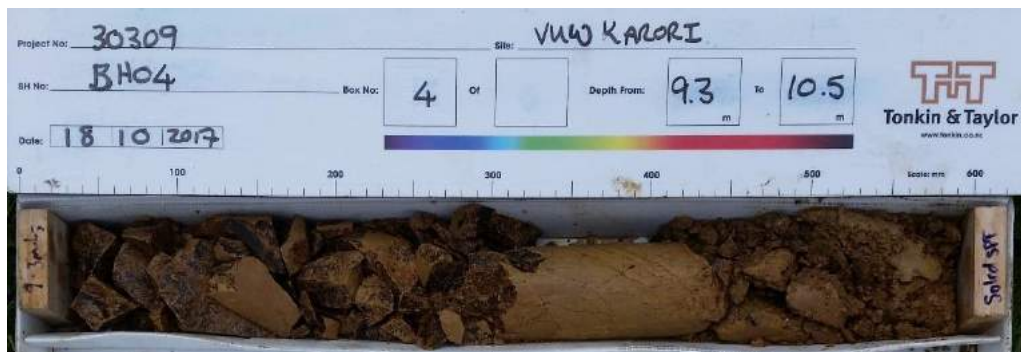


BH04: Box 2 (2.70m – 6.00m)

BH04 (continued)



BH04: Box 3 (6.00m – 9.30m)



BH04: Box 4 (9.30m – 10.50m)



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH05

SHEET: 1 OF 4

DRILLED BY: Mark Kelsey

LOGGED BY: MHU

CHECKED: RHGR

START DATE: 18/10/2017

FINISH DATE: 19/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5428011 mN
(NZTM2000) 1745938 mE

R.L. GROUND: 171.70m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

DIRECTION:
ANGLE FROM HORIZ.: -90°

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Description & Additional Observations	Fluid Loss (%)	Water Level	Casing	Installation	Core Box No		
	SOIL: Classification, colour, consistency / density, moisture, plasticity	ROCK: Weathering, colour, fabric, name, strength, cementation									Defect Log	Fracture Spacing (mm)	RQD (%)								
Quaternary Alluvium	Hydrovac Excavation: Not logged.		UW																		
			UW																		
			UW																		
			UW																		
			UW																		
			UW																		
			UW																		
			UW																		
			UW																		
			UW																		

COMMENTS:

Hole Depth
16.5m

Scale 1:25

General Log - 5/12/2017 12:16:40 PM - Produced with Core-GS by GeRoc

Box 1, 0.0-4.5m

Rev.: A



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH05

SHEET: 2 OF 4

DRILLED BY: Mark Kelsey

LOGGED BY: MHU

CHECKED: RHGR

START DATE: 18/10/2017

FINISH DATE: 19/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5428011 mN
(NZTM2000) 1745938 mE

DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 171.70m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Fluid Loss (%)	Water Level	Casing	Installation	Core Box No	
	SOIL: Classification, colour, consistency / density, moisture, plasticity	ROCK: Weathering, colour, fabric, name, strength, cementation									Defect Log	Fracture Spacing (mm)	RQD (%)						Description & Additional Observations
Quaternary Alluvium	[CONT] Sandy SILT; grey. Hard, weakly cemented, non to low plasticity. Sand; fine to medium. 5.20m: grades to very hard, orange brown mottled grey, moderately cemented.		UW	US	HQTT	100		166	6	25 for 120mm N=50 Bouncing									
	Sandy SILT, trace gravel; greenish grey. Hard, moist, non plastic, moderately cemented.		UW	US	HQTT	100		165	7										
	6.70m: grades to blueish grey.		UW	US	HQTT	100		164	8	UTP ₆ 4/6 7/9 N=26									
	Clayey SILT; brownish grey. Very stiff to hard, moist, high plasticity. 7.70m: grades to with decomposed organic laminations.		UW	US	SPT	100		163	9	221/47 kPa 5/5 6/8 N=24									
	8.25 - 8.40m: Organic SILT; dark brown. Hard, low plasticity, moist. Organics; fibrous, completely decomposed. 8.60m: grades to brown.		UW	US	HQTT	100		162											
	9.30m: grades to grey with black organic flecks. 9.60 - 9.70m: Fine to medium GRAVEL, some sand.		UW	US	SPT	0													
	Gravelly SAND some silt. Fine to coarse, non plastic.		UW	US															

COMMENTS:

Hole Depth
16.5m

Scale 1:25

General Log - 5/12/2017 12:16:40 PM - Produced with Core-GS by GeRoc

Box 2, 4, 5, 7, 2m

Rev.: A



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH05

SHEET: 3 OF 4

DRILLED BY: Mark Kelsey

LOGGED BY: MHU

CHECKED: RHGR

START DATE: 18/10/2017

FINISH DATE: 19/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5428011 mN
(NZTM2000) 1745938 mE

R.L. GROUND: 171.70m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

DIRECTION:
ANGLE FROM HORIZ.: -90°

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Fluid Loss (%)	Water Level	Casing	Installation	Core Box No
	SOIL: Classification, colour, consistency / density, moisture, plasticity	ROCK: Weathering, colour, fabric, name, strength, cementation									Defect Log	Fracture Spacing (mm)	RQD (%)					
Quaternary Alluvium	Sandy SILT, grey. Hard, non plastic, weakly cemented. 10.30m: grades to with some fine to coarse slightly weathered gravel.		UW MW SW CW US MS SS CS US MS SS CS US MS SS CS US MS SS CS		HQTT	100	SPT 0 32 15 for 8mm N>=50 Solid Bouncing	161	11		2000 600 200 100 50 20		25 50 75					Box 3, 7, 2-10, 4m
	11.80m: grades to clayey, low plasticity.				HQTT	93		160	12									
	12.00m to 12.60m: Core Loss.								159	13								
	COBBLES with matrix of silty sand; grey and orange brown. Very dense, moist, subangular to angular, slightly weathered, strong sandstone. Sand; fine to coarse.				HQTT	60			158	14								
	13.50m - 14.30m: Core Loss.								157	15								
	COBBLES with matrix of sandy silt; grey and orange brown. Very dense, moist, subangular to angular, slightly weathered, strong sandstone. Matrix; fine to coarse sand, moderate plasticity fines.				HQTT	46												Box 4, 10, 4-13, 5m

COMMENTS:

Hole Depth
16.5m

Scale 1:25



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH05

SHEET: 4 OF 4

DRILLED BY: Mark Kelsey

LOGGED BY: MHU

CHECKED: RHGR

START DATE: 18/10/2017

FINISH DATE: 19/10/2017

CONTRACTOR: Perry Geotech Lt

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5428011 mN
(NZTM2000) 1745938 mE

DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 171.70m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

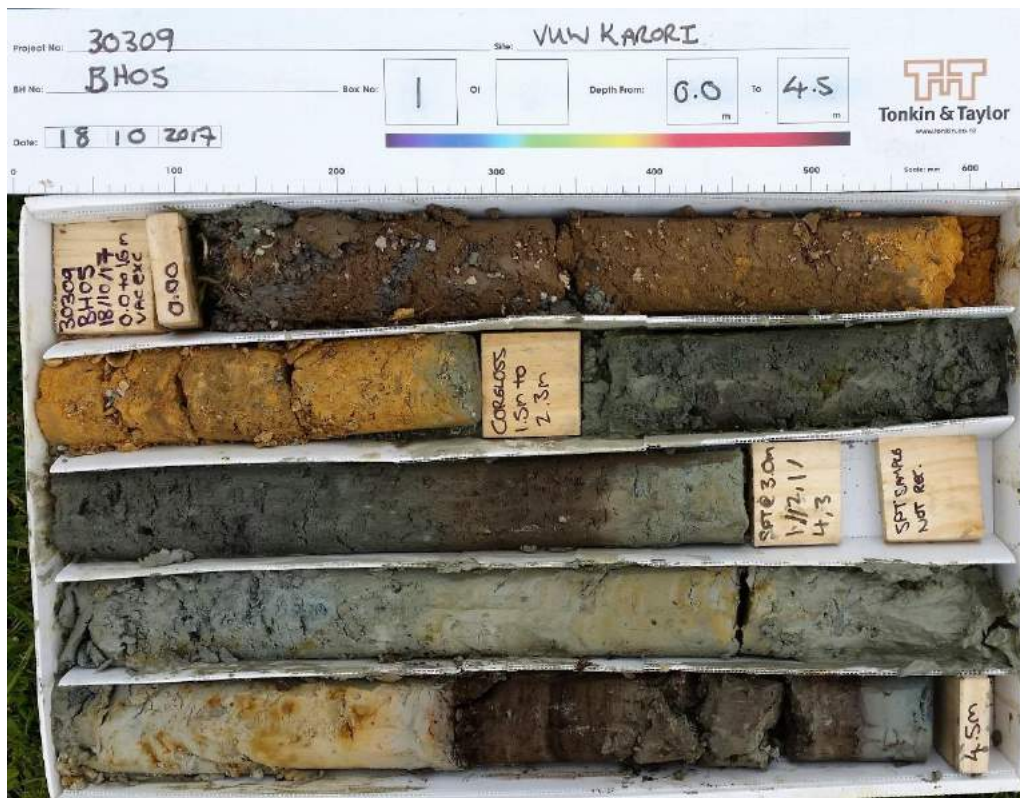
GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Description & Additional Observations	Fluid Loss (%)	Water Level	Casing	Installation	Core Box No	
	SOIL: Classification, colour, consistency / density, moisture, plasticity	ROCK: Weathering, colour, fabric, name, strength, cementation									Defect Log	Fracture Spacing (mm)	RQD (%)							
Quaternary Alluvium	15.00m - 15.15m: Core Loss.		UW	US	HQTT	80		156		X	2000									
	COBBLES with matrix of sandy silt; grey and orange brown. Very dense, moist, subangular to angular, slightly weathered, strong sandstone. Matrix; fine to coarse sand, moderate plasticity fines.		UW	US	HQTT	80		156		X	2000									
	15.75m - 16.25m: Core Loss.		UW	US	HQTT	33		16		X	2000									
	Fine to coarse GRAVEL with cobbles; grey, with black staining. Very, dense, moist, subangular to angular, slightly weathered, strong, sandstone.		UW	US	HQTT	33		16		X	2000									
	16.5m: END OF BOREHOLE		UW	US				155												
			UW	US				17												
			UW	US				154												
			UW	US				18												
			UW	US				163												
			UW	US				19												
			UW	US				152												

COMMENTS:

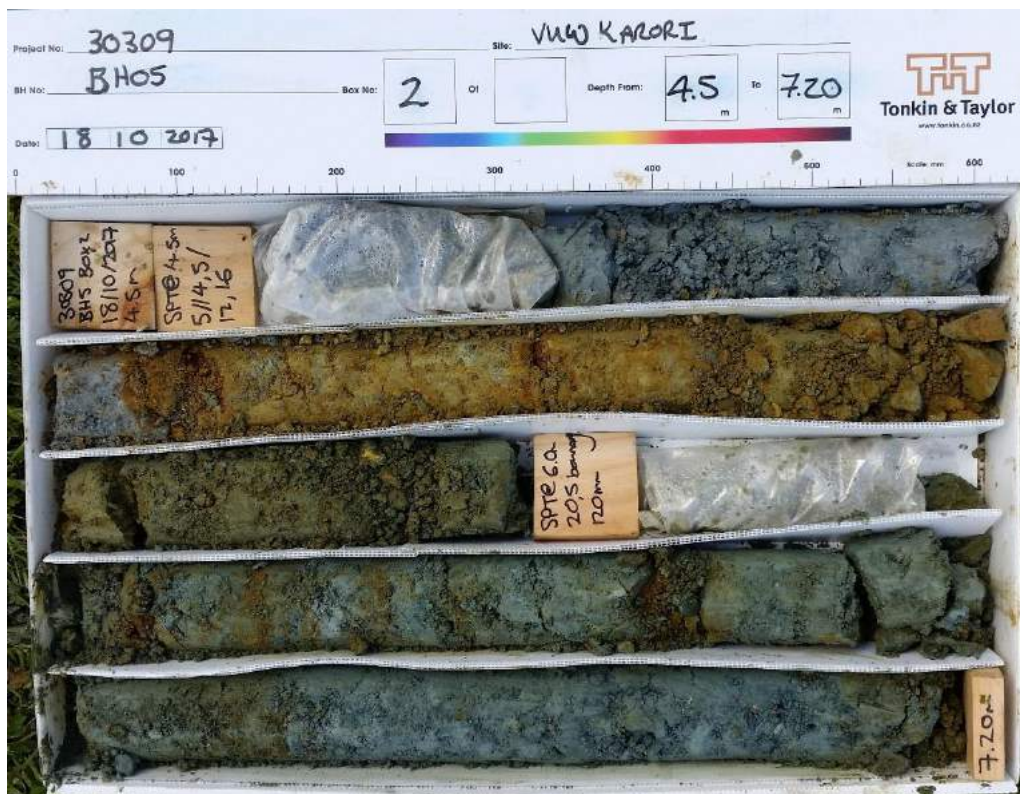
Hole Depth
16.5m

Scale 1:25

BH05

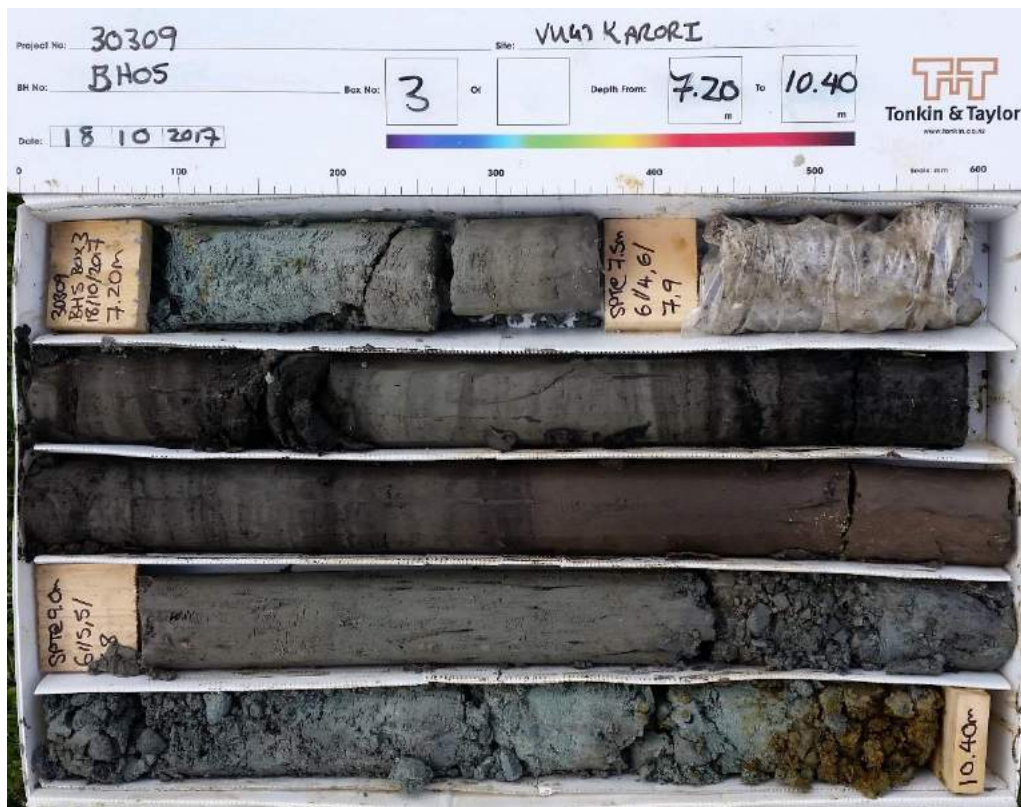


BH05: Box 1 (0.00m – 4.50m)

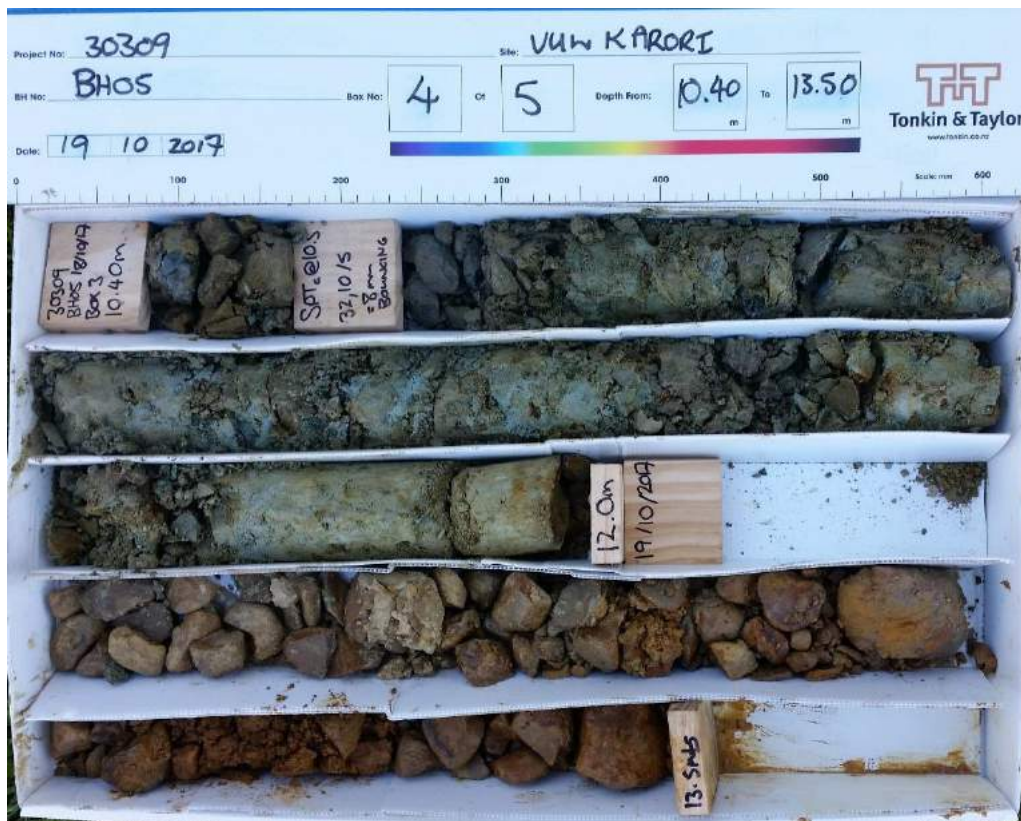


BH05: Box 2 (4.50m – 7.20m)

BH05 (continued)



BH05: Box 3 (7.20m – 10.40m)



BH05: Box 4 (10.40m – 13.50m)

BH05 (continued)



BH05: Box 5 (13.50m – 16.50m)



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH06

SHEET: 1 OF 3

DRILLED BY: Mark Kelsey

LOGGED BY: MHU

CHECKED: RHGR

START DATE: 19/10/2017

FINISH DATE: 19/10/2017

CONTRACTOR: Perry Drilling Ltd

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5427963 mN
(NZTM2000) 1745881 mE

DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 167.70m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS				Fluid Loss (%)	Water Level	Casing	Installation	Core Box No
	SOIL: Classification, colour, consistency / density, moisture, plasticity	ROCK: Weathering, colour, fabric, name, strength, cementation									Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations					
Fill	Hydrovac Excavation: Not logged.		UW																
	1.45m: 20mm recovery of: Sandy SILT; orange brown, low plasticity, moist, some fine gravel. Sand fine to medium. Gravel; fine, slightly weathered.		UW																
Quaternary Alluvium	Cobble; grey. Slightly weathered, moderately strong, sandstone.		UW		HQTT	50		166											
	Sandy SILT some clay trace gravel; orange brown. Very stiff, moist, low plasticity fines. Gravel; fine, angular, slightly weathered, sandstone.		UW		HQTT	100		166											
	Clayey SILT; minor sand. trace gravel; orange brown mottled grey. Very stiff, moist moderately plastic. Sand; fine to medium. Gravel; fine, slightly weathered sandstone. 2.30m: with black organic flecks.		UW		HQTT	50		165											
	2.35m - 3.00m: Core Loss		UW		HQTT	50		165											
	Silty CLAY; brownish grey. Very stiff, moist, high plasticity. With 20mm thick inclusions of decomposed fibrous organics.		UW		SPT	100	UTP ₃ 2/3 4/5 N=14 BH06_G 1 @ 3.3m		164										
	Organic clayey SILT; dark brown. Very stiff, moist, moderate plasticity. Organics; completely decomposed.		UW		HQTT	100		164											
Quaternary Alluvium	Silty CLAY; brownish grey. Very stiff, moist, high plasticity. Inter-laminated with: Organic clayey SILT; dark brown. Very stiff, moist, moderate plasticity.		UW		HQTT	100		163											
	Sandy SILT; bluish grey. Hard, moist, low plasticity, weakly cemented.		UW		HQTT	100		163											
	Silty CLAY; dark brown. Very stiff, moist, high plasticity. 5.00m: grades to grey, flecked black organics, trace fine sand.		UW		SPT	37	UTP ₃ 2/3 3/5 N=13		163										
3.30m: NMC=72.6%, Organic Content=17.5%																			

COMMENTS:

Hole Depth
10.5m

Scale 1:25

General Log - 5/12/2017 12:16:40 PM - Produced with Core-GS by GeRoc

Rev.: A



Tonkin+Taylor

BOREHOLE LOG

BOREHOLE No.:

BH06

SHEET: 2 OF 3

DRILLED BY: Mark Kelsey

LOGGED BY: MHU

CHECKED: RHGR

START DATE: 19/10/2017

FINISH DATE: 19/10/2017

CONTRACTOR: Perry Drilling Ltd

PROJECT: VUW Karori Campus Redevelopment
JOB No.: 30309
LOCATION: VUW Karori Campus

CO-ORDINATES: 5427963 mN
(NZTM2000) 1745881 mE

R.L. GROUND: 167.70m
R.L. COLLAR:

DIRECTION:
ANGLE FROM HORIZ.: -90°

DATUM: NZVD2016
SURVEY: Handheld GPS

GEOLOGICAL UNIT	DESCRIPTION OF CORE		Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Fluid Loss (%)	Water Level	Casing	Installation	Core Box No	
	SOIL: Classification, colour, consistency / density, moisture, plasticity	ROCK: Weathering, colour, fabric, name, strength, cementation									Defect Log	Fracture Spacing (mm)	RQD (%)						Description & Additional Observations
Quaternary Alluvium	[CONT] Silty CLAY; dark brown. Very stiff, moist, high plasticity.		UW	US	HQTT	100		162	6										
	Sandy SILT; grey. Very stiff, moist, non plastic, weakly cemented.		UW	US	SPT	100	15 12/15 for 45mm N>=50 Bouncing	161	7										
Rakaia Terrane	Moderately weathered; grey, laminated orange brown; SILTSTONE; very weak.		UW	US	HQTT	89		160	8										
	Moderately weathered; orange brown, limonite stained; SANDSTONE; very weak.		UW	US	SPT	0	20 15 for 45mm N>=50 Solid Bouncing	159	9										
	Highly weathered; orange brown, limonite stained; SANDSTONE; extremely weak; to very weak.		UW	US	HQTT	100		158	9										
	Moderately weathered; orange brown, limonite stained; SANDSTONE; very weak.		UW	US	HQTT	100		158	9										
	9.00m - 9.40m: Core Loss																		
	Moderately weathered; orange brown, limonite stained; SANDSTONE; very weak.		UW	US															

COMMENTS:

Hole Depth
10.5m

Scale 1:25

Box 2, 5.3-8.3m

Box 1, 0.0-5.3m

BOREHOLE LOG

BOREHOLE No.:

BH06

SHEET: 3 OF 3

DRILLED BY: Mark Kelsey

LOGGED BY: MHU

CHECKED: RHGR

START DATE: 19/10/2017

FINISH DATE: 19/10/2017

CONTRACTOR: Perry Drilling Ltd

PROJECT: VUW Karori Campus Redevelopment
 JOB No.: 30309
 LOCATION: VUW Karori Campus

CO-ORDINATES: 5427963 mN
 (NZTM2000) 1745881 mE
 DIRECTION:
 ANGLE FROM HORIZ.: -90°

R.L. GROUND: 167.70m
 R.L. COLLAR:
 DATUM: NZVD2016
 SURVEY: Handheld GPS

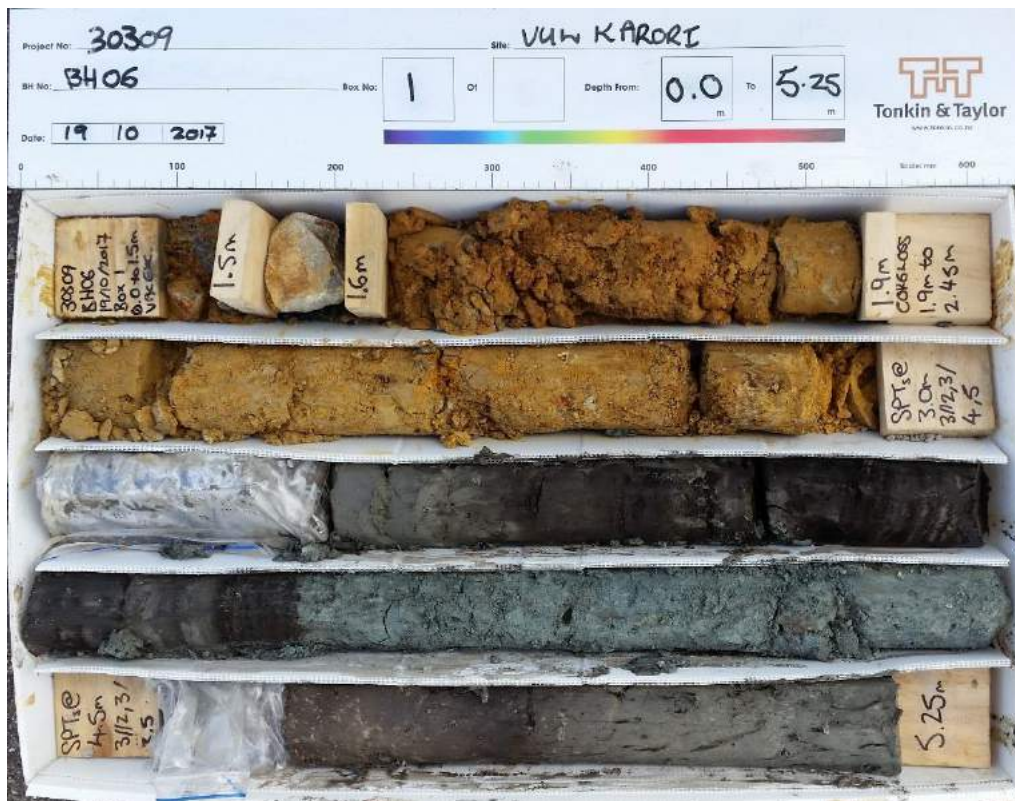
GEOLOGICAL UNIT	DESCRIPTION OF CORE SOIL: Classification, colour, consistency / density, moisture, plasticity ROCK: Weathering, colour, fabric, name, strength, cementation	Rock Weathering <small>UW MW SW CW US OS AS WS EW</small>	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK DEFECTS			Description & Additional Observations	Fluid Loss (%) <small>25 50 75</small>	Water Level	Casing	Installation	Core Box No
										Defect Log	Fracture Spacing (mm) <small>2000 600 400 200 100 20</small>	RQD (%)						
Rakiaia Terrane	Moderately weathered, SANDSTONE (continued).			HQTT	73													Box 3, 8.3-10.5m
	10.5m: END OF BOREHOLE						157	11										
							156	12										
							155	13										
							154	14										
							153											

COMMENTS:

Hole Depth
10.5m

Scale 1:25

BH06



BH06: Box 1 (0.00m – 5.25m)

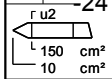
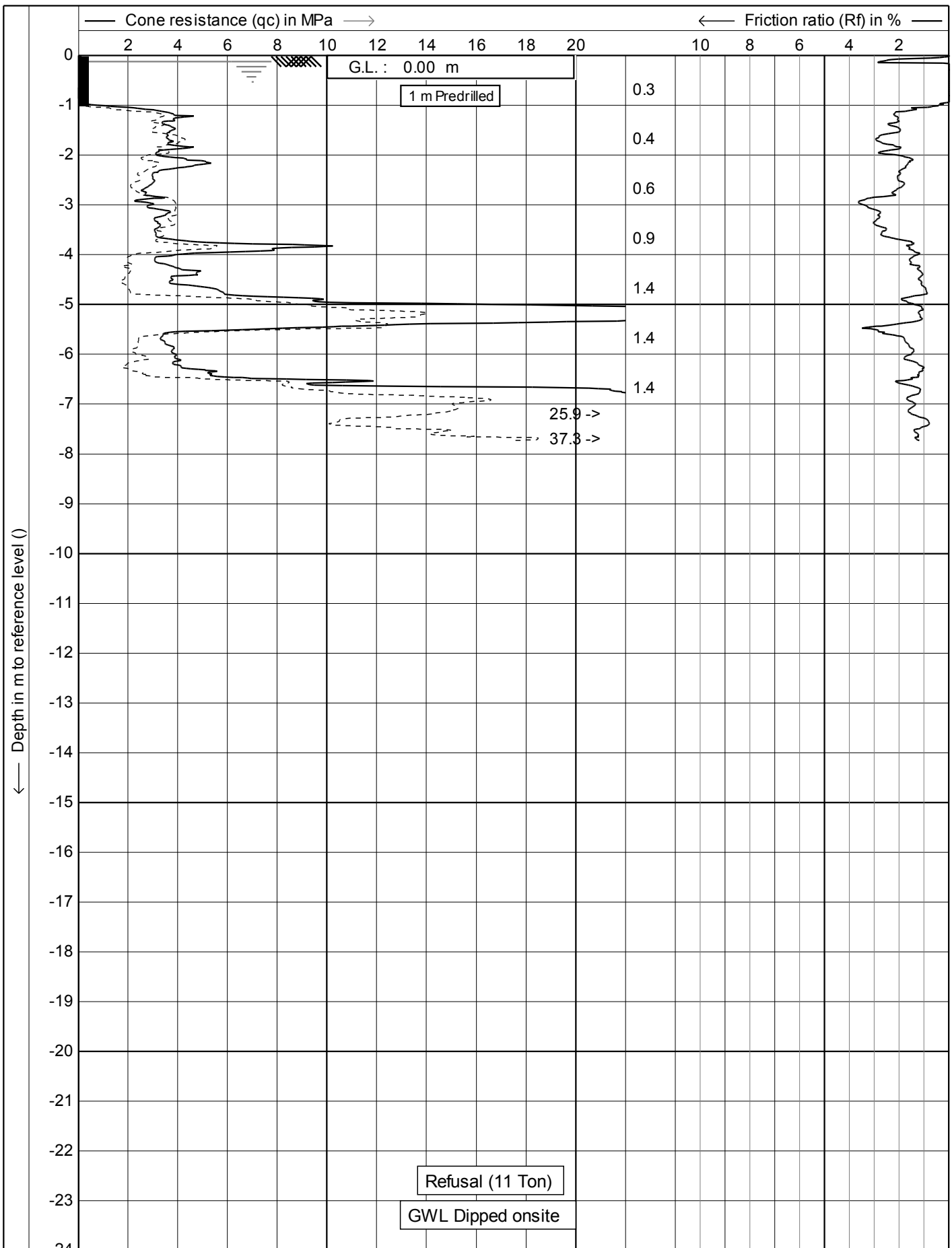


BH06: Box 2 (5.25m – 8.30m)

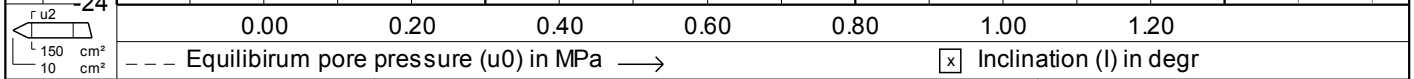
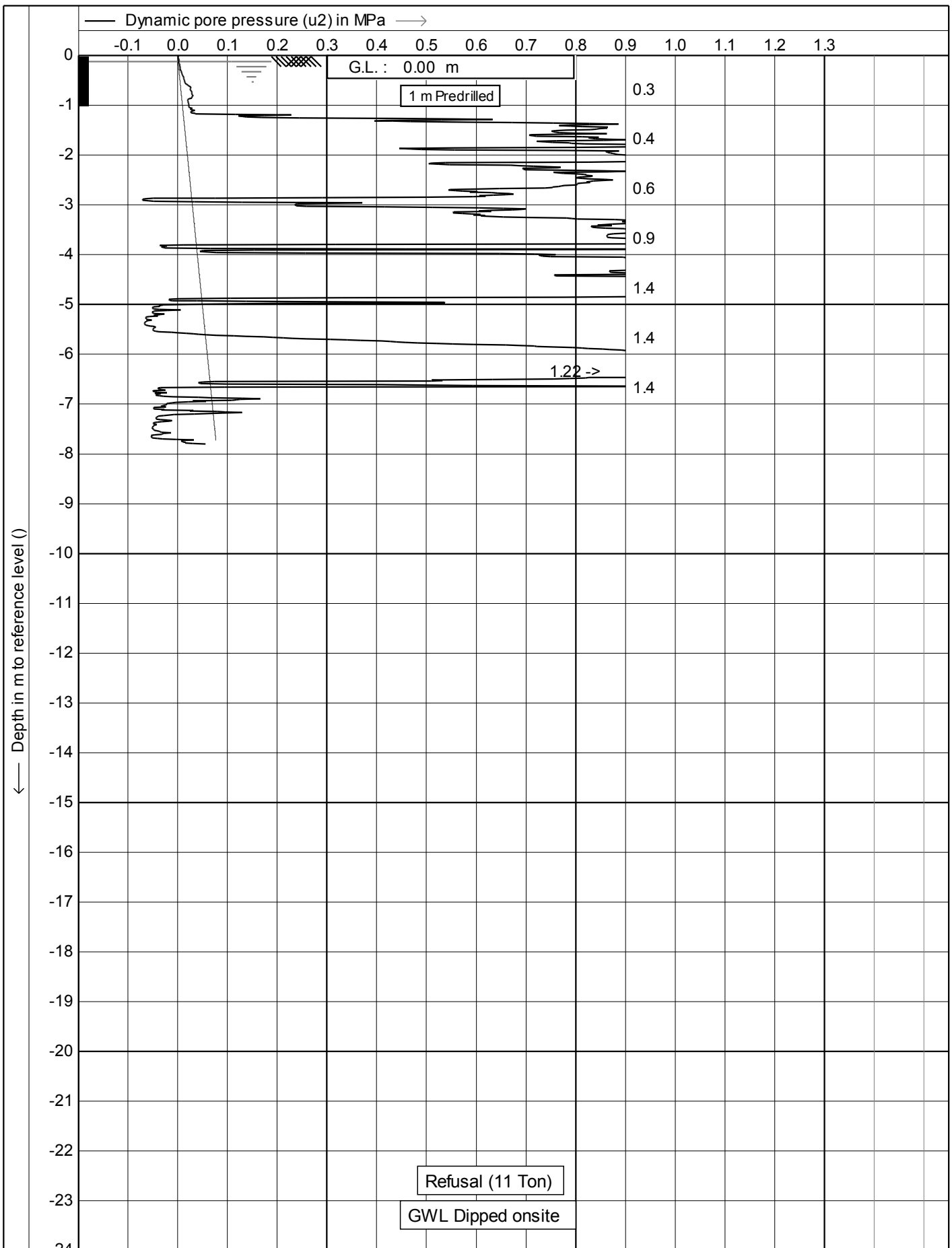
BH06 (continued)



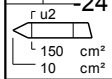
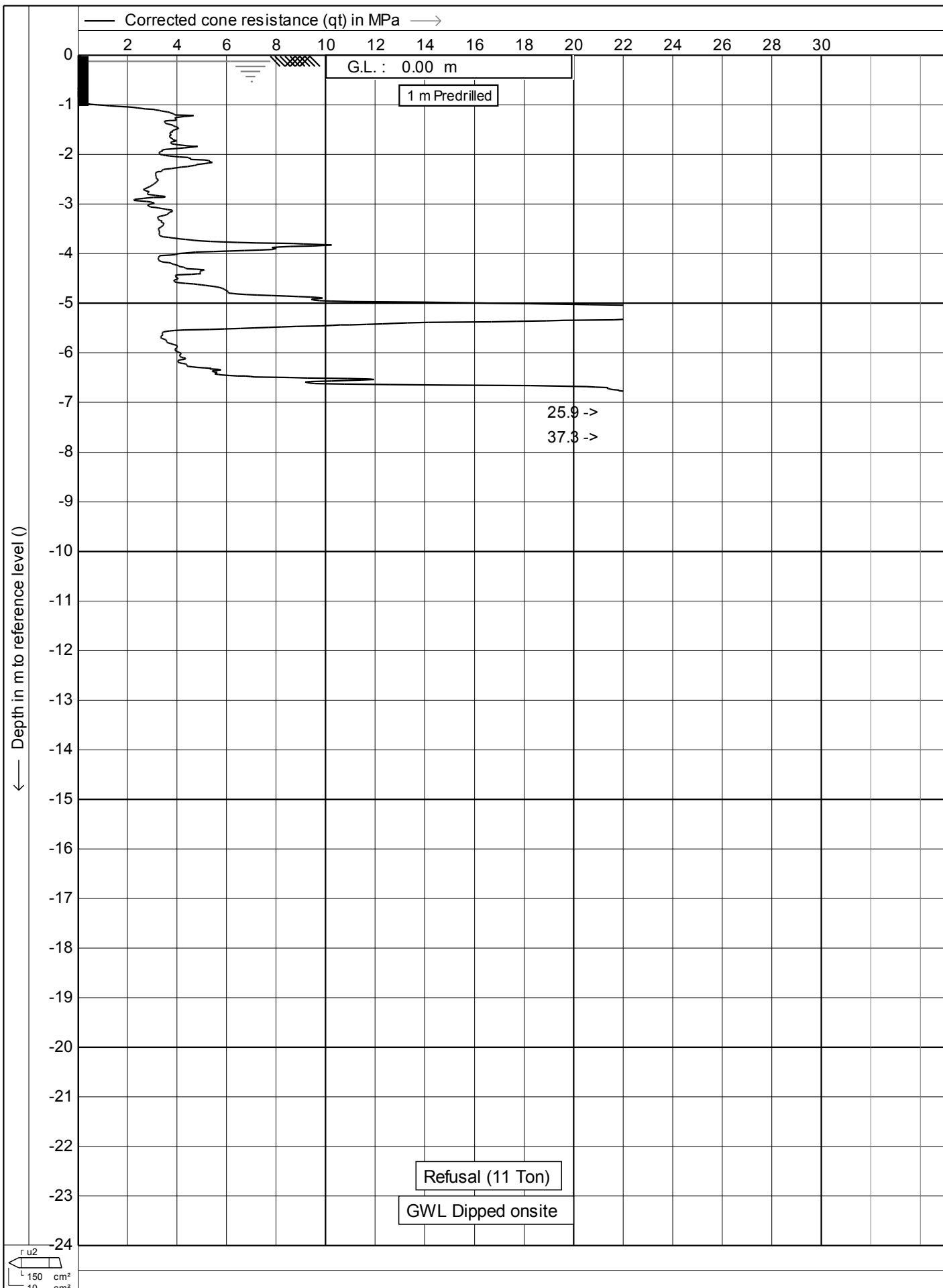
BH06: Box 3 (8.30m – 10.50m)




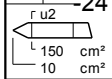
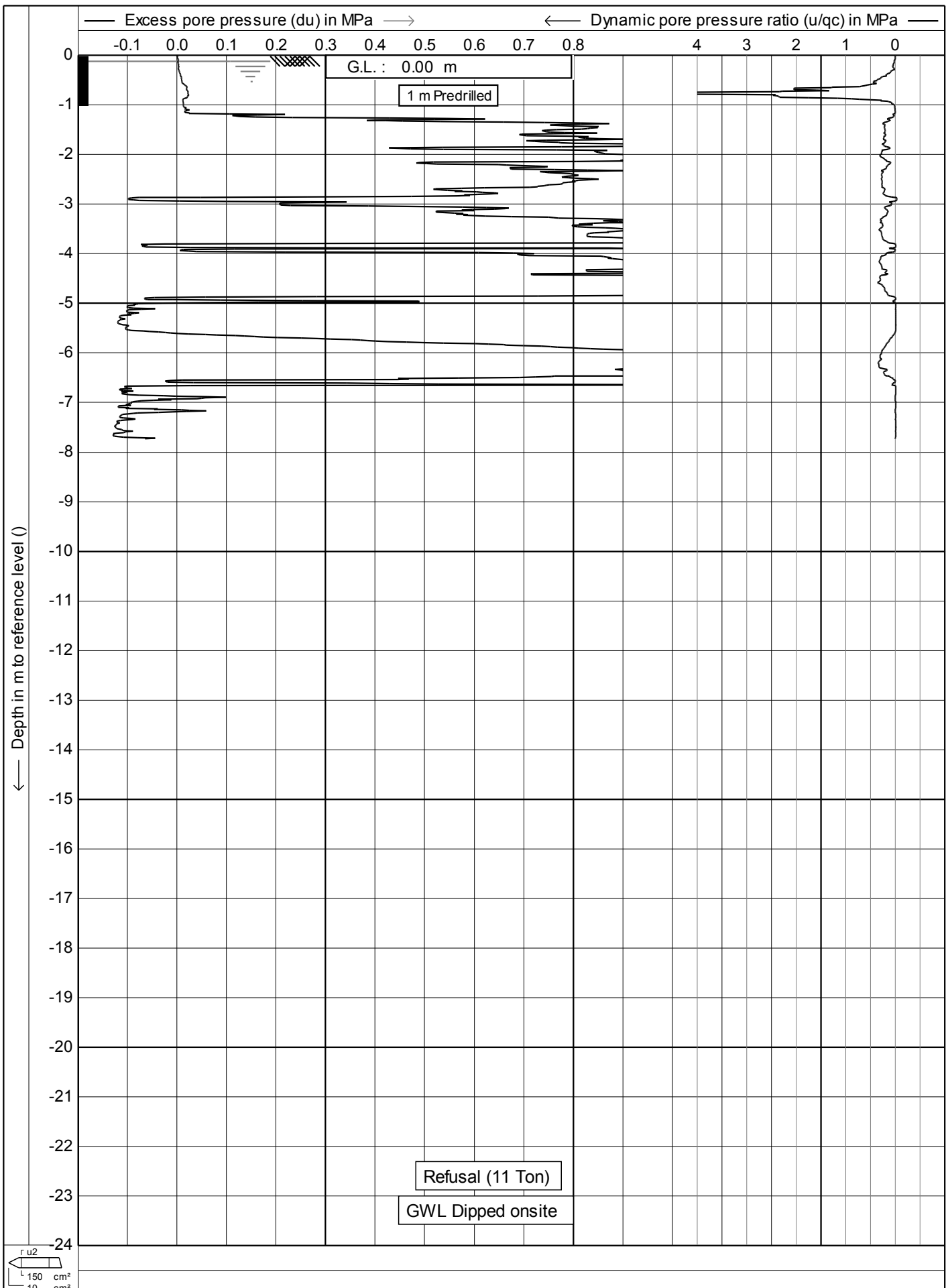
	Test according A.S.T.M Standard D 5778-12		Date : 12/10/2017	
	Project : Site Investigations		Cone no. : C10CFIP.C14433	
	Location: Victoria University - Wellington		Project no. : 05TT12	
	Position: 0, 0 RD		CPT no. : 02	1/14
	Refusal (11 Ton) GWL Dipped onsite			



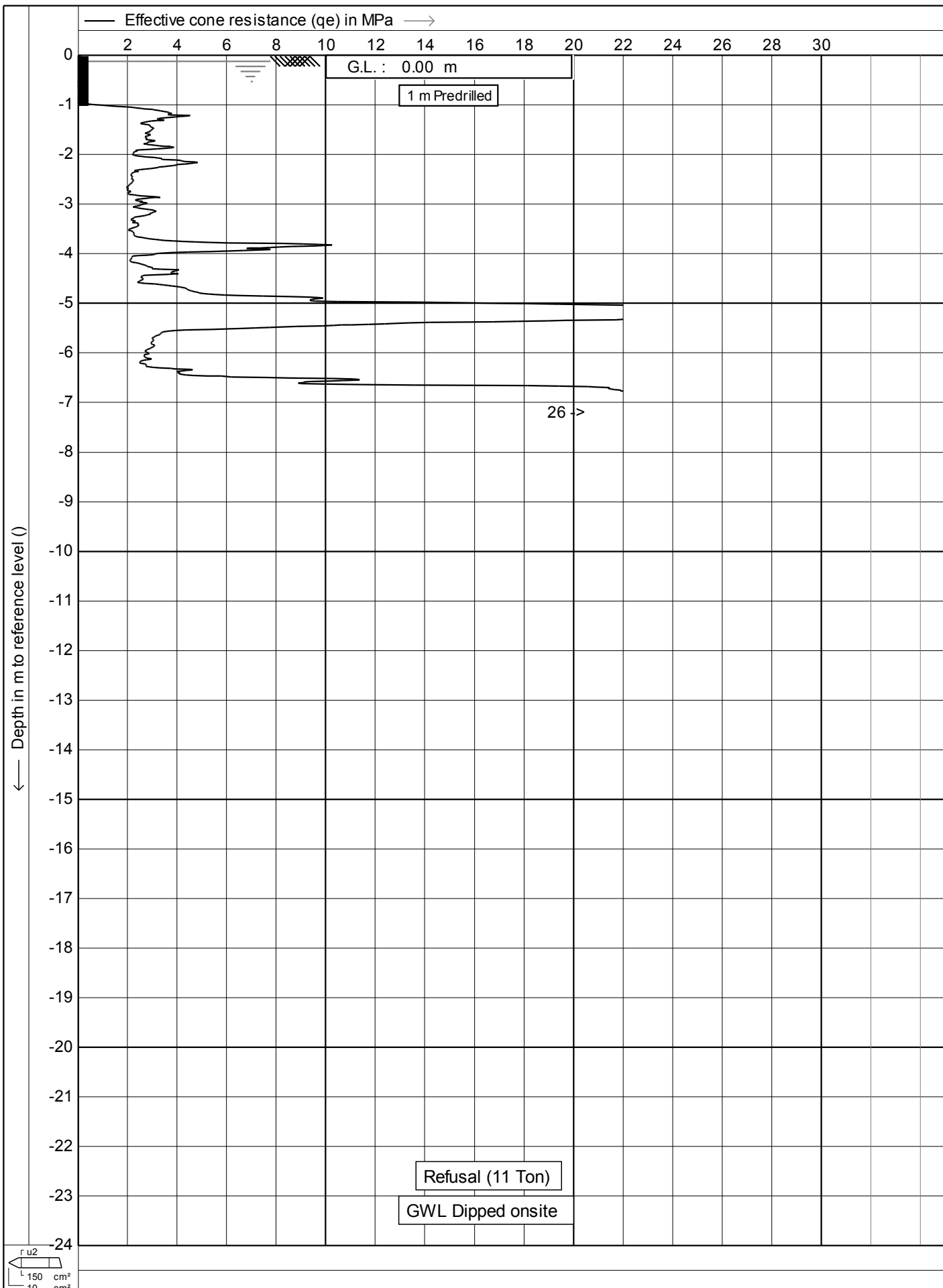
	Test according A.S.T.M Standard D 5778-12		Date : 12/10/2017
	Project : Site Investigations		Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington		Project no. : 05TT12
	Position: 0, 0 RD		CPT no. : 02
			2/14



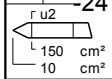
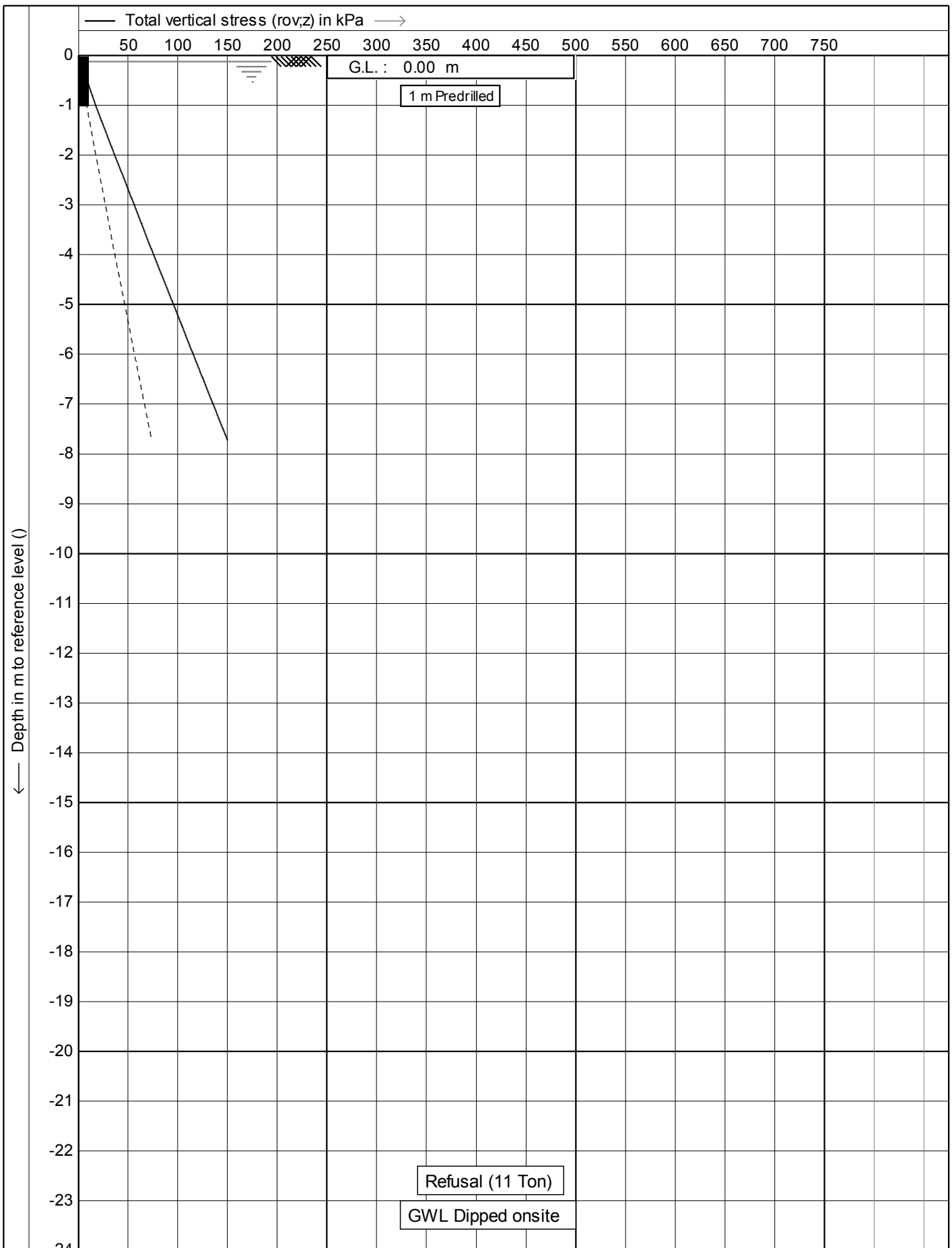
	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 02
		3/14



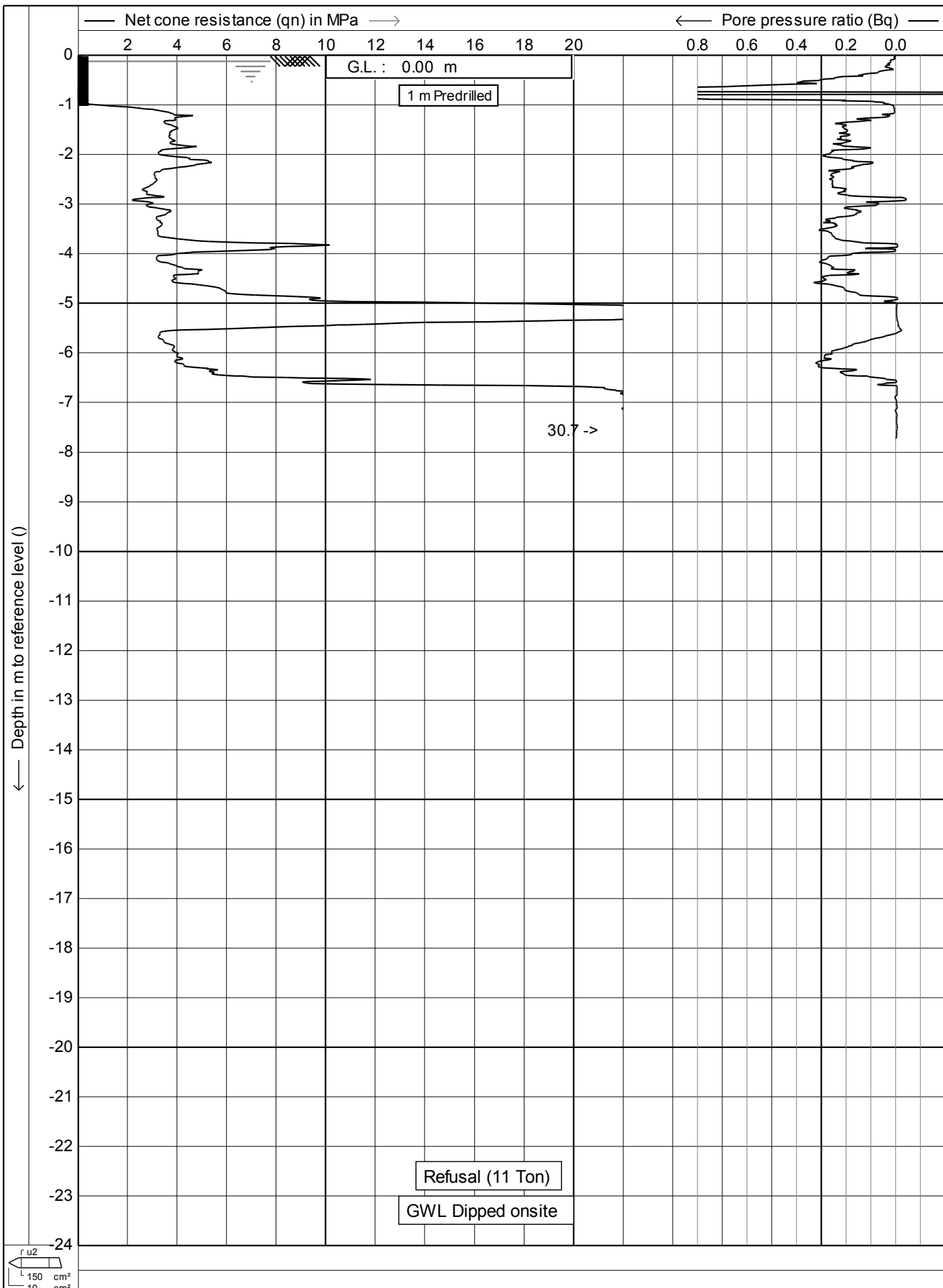
	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 02
		4/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 02
		5/14



	Test according to A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 02
		6/14

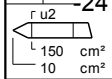
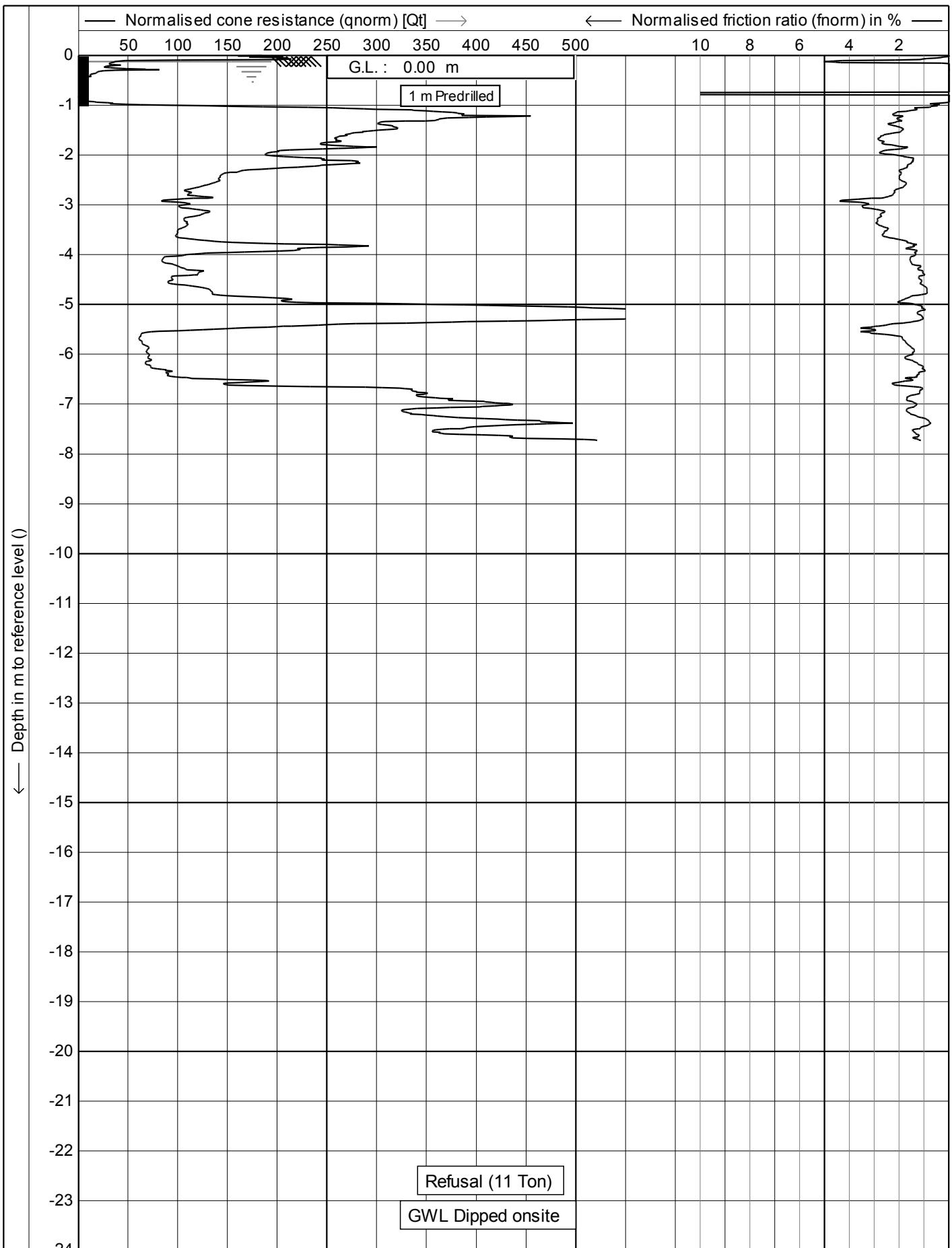


Test according A.S.T.M Standard D 5778-12

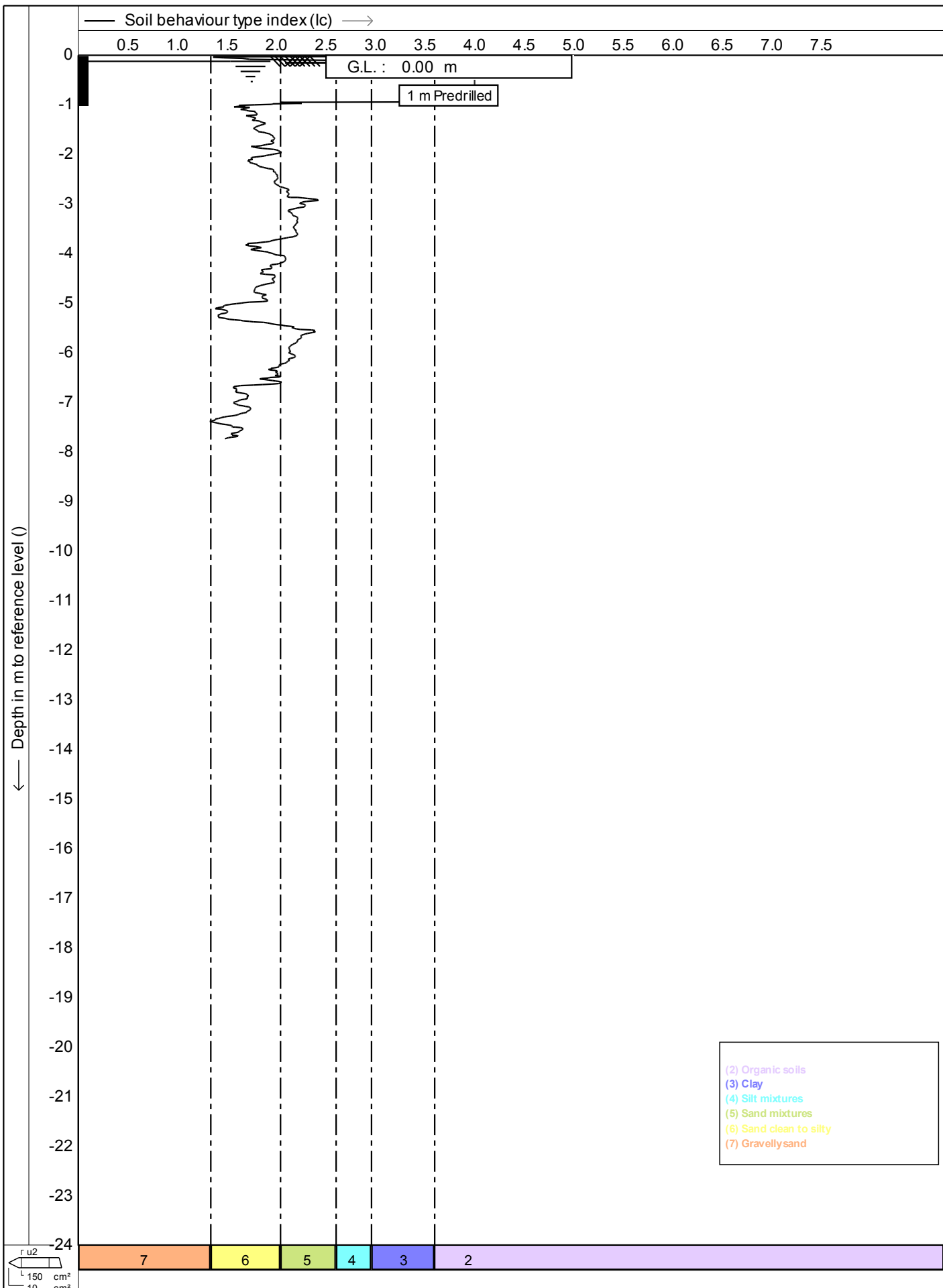
Date : 12/10/2017
 Cone no. : C10CFIP.C14433
 Project no. : 05TT12
 CPT no. : 02

Project : Site Investigations
 Location: Victoria University - Wellington
 Position: 0, 0 RD





	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 02
		8/14

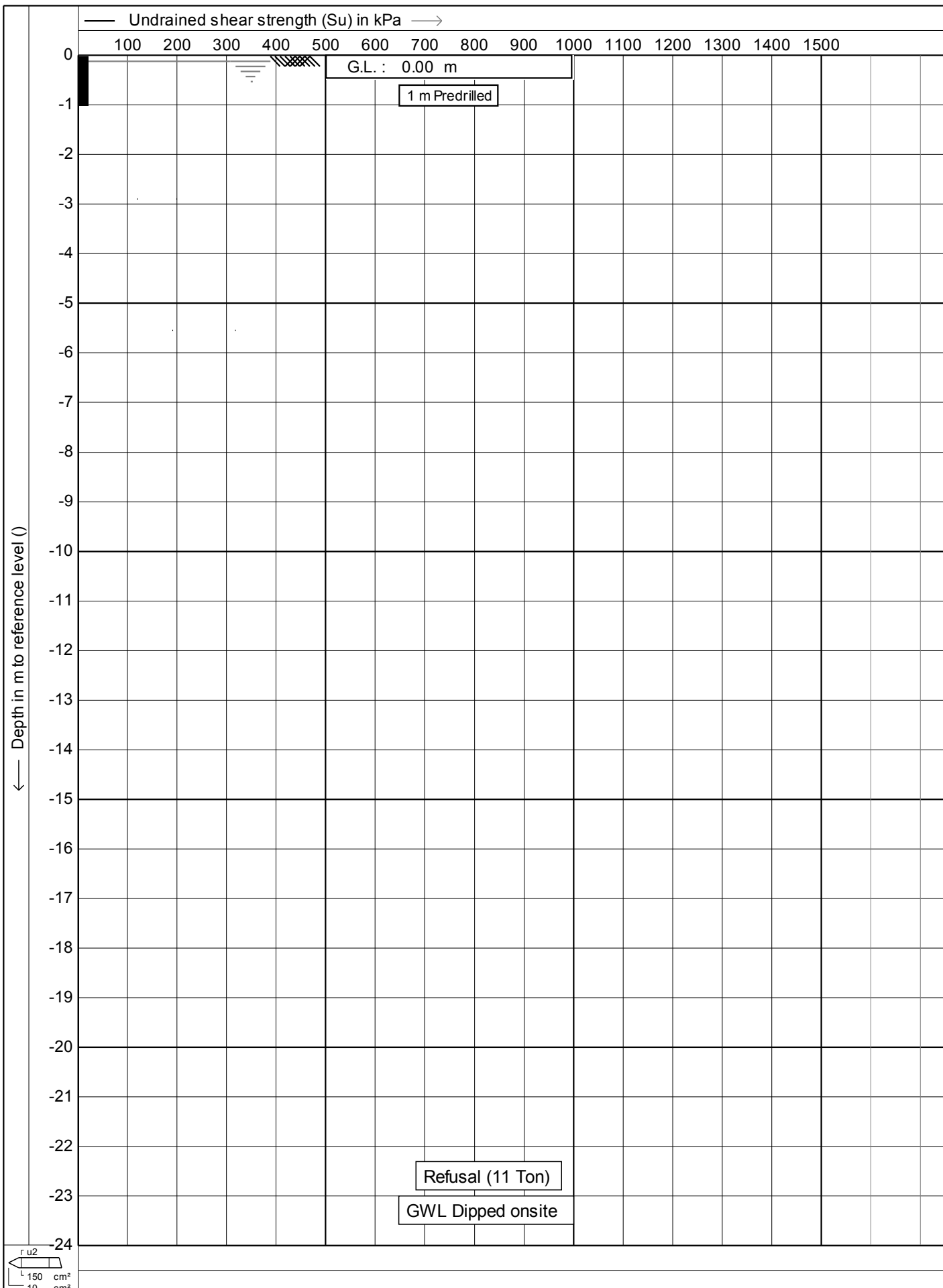


Test according A.S.T.M Standard D 5778-12

Date : 12/10/2017
 Cone no. : C10CFIP.C14433
 Project no. : 05TT12
 CPT no. : 02

Project : Site Investigations
 Location: Victoria University - Wellington
 Position: 0, 0 RD





Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

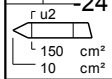
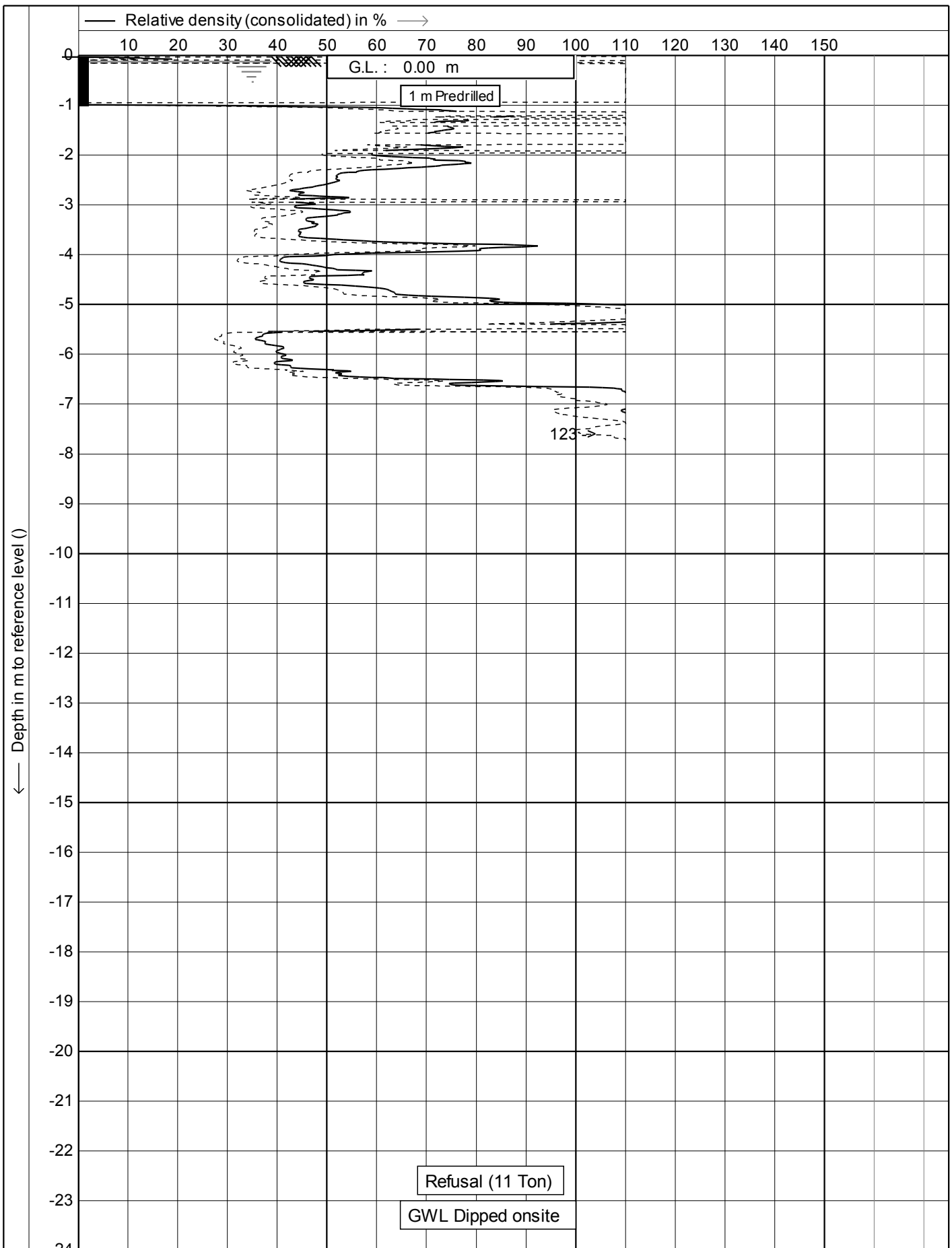
Position: **0, 0 RD**

Date : **12/10/2017**

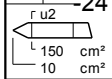
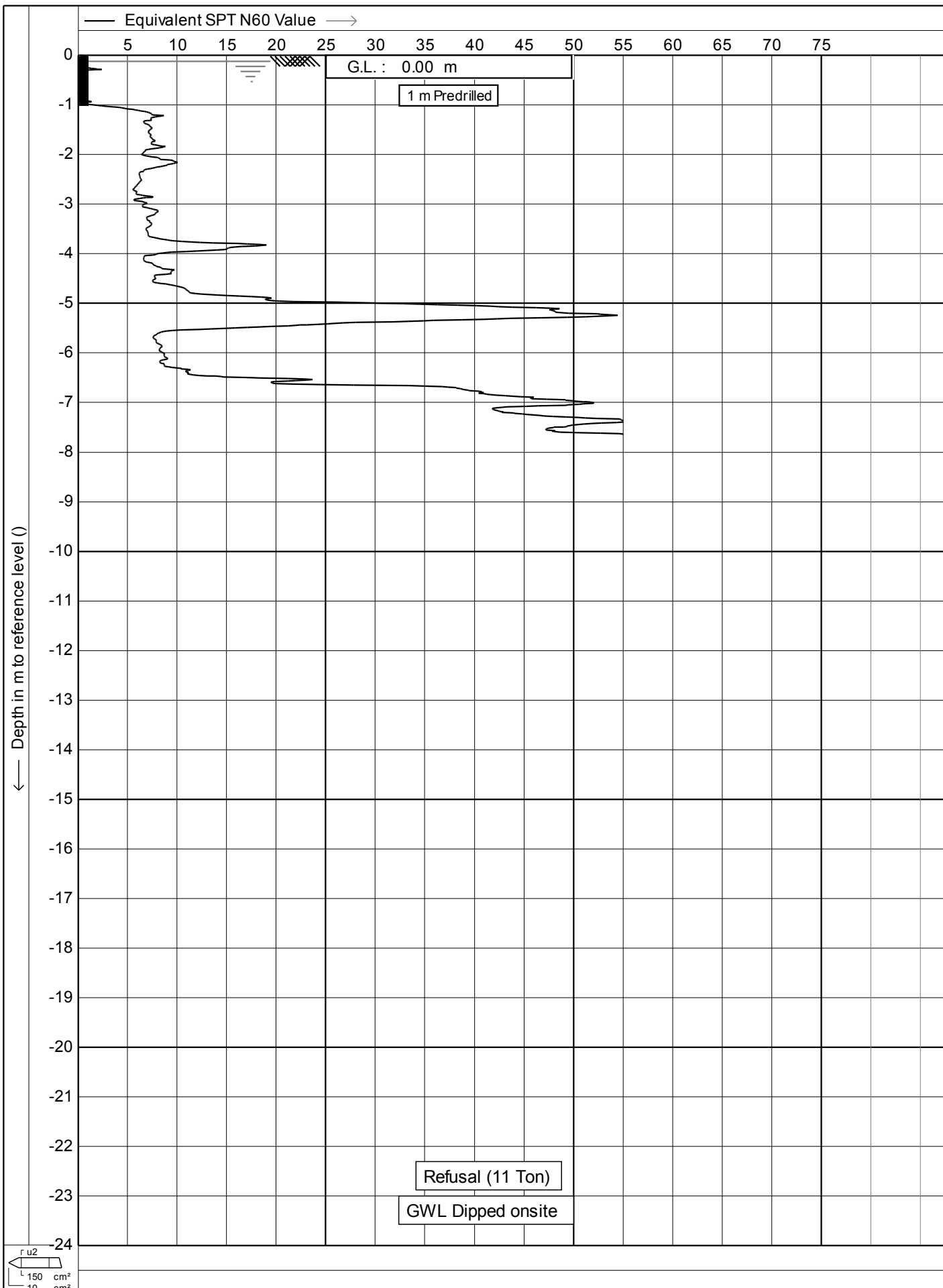
Cone no. : **C10CFIP.C14433**

Project no. : **05TT12**

CPT no. : **02** | 10/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 02
		11/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

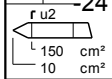
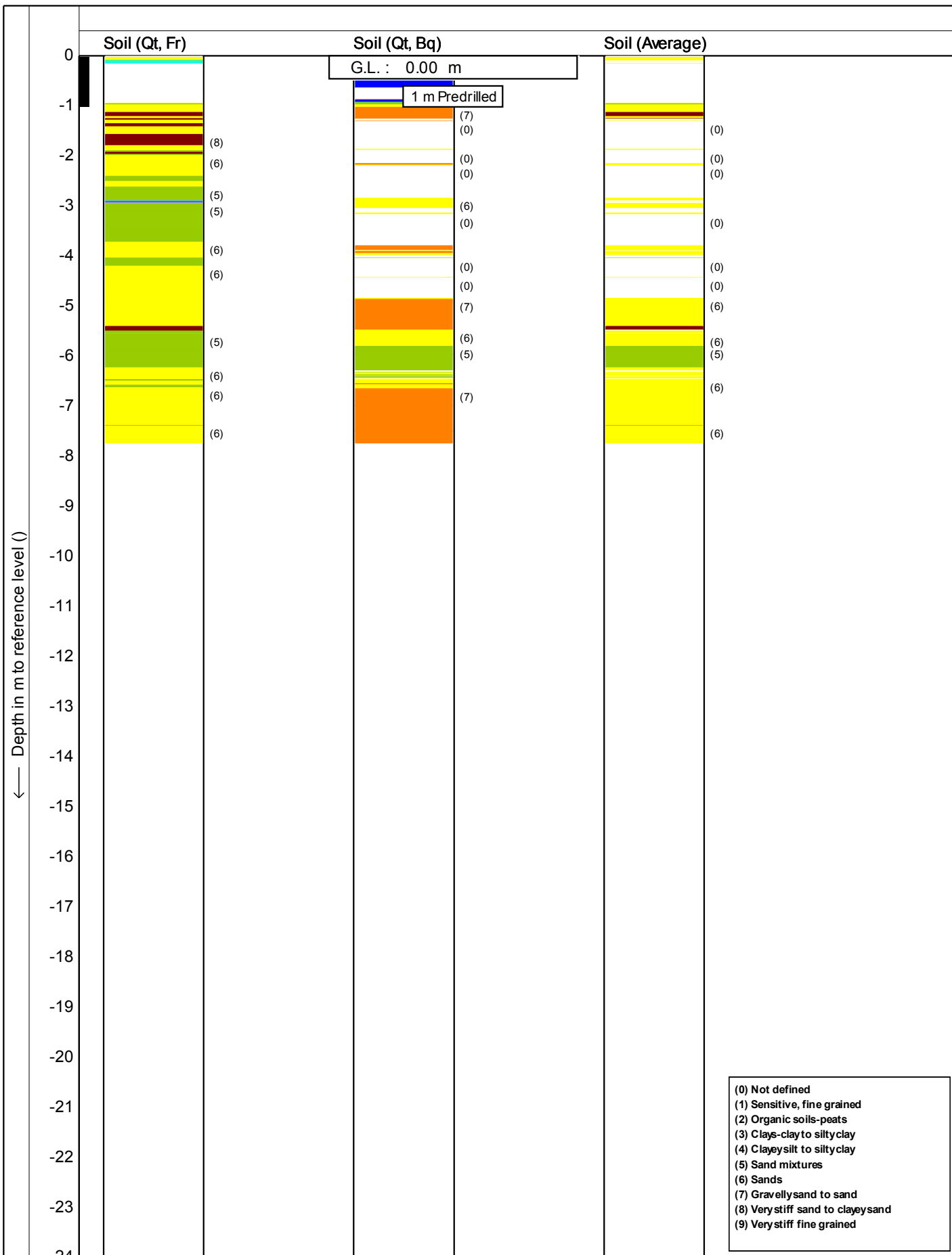
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Date : **12/10/2017**

Cone no. : **C10CFIP.C14433**

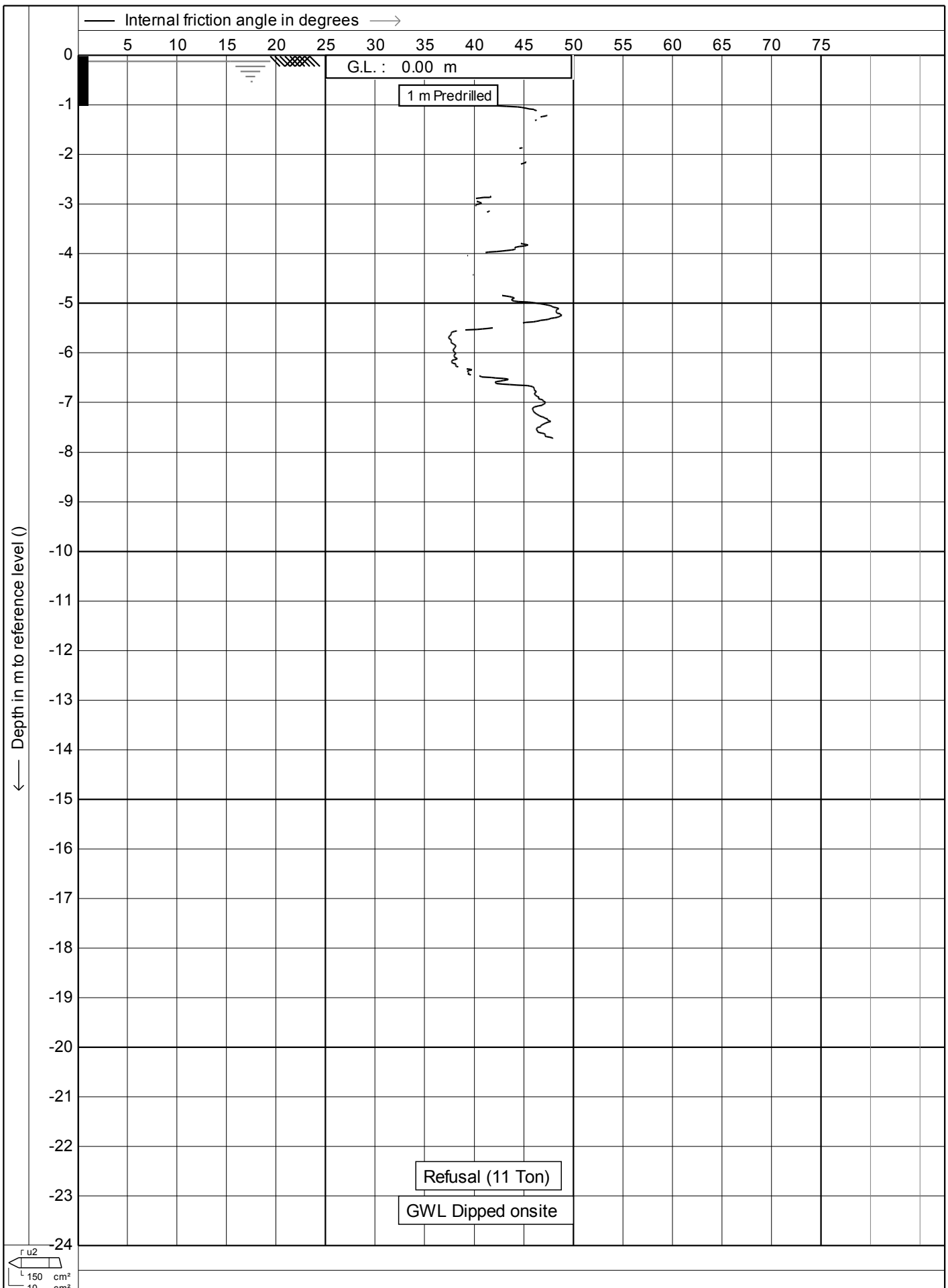
Project no. : **05TT12**

CPT no. : **02** **12/14**

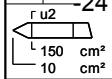
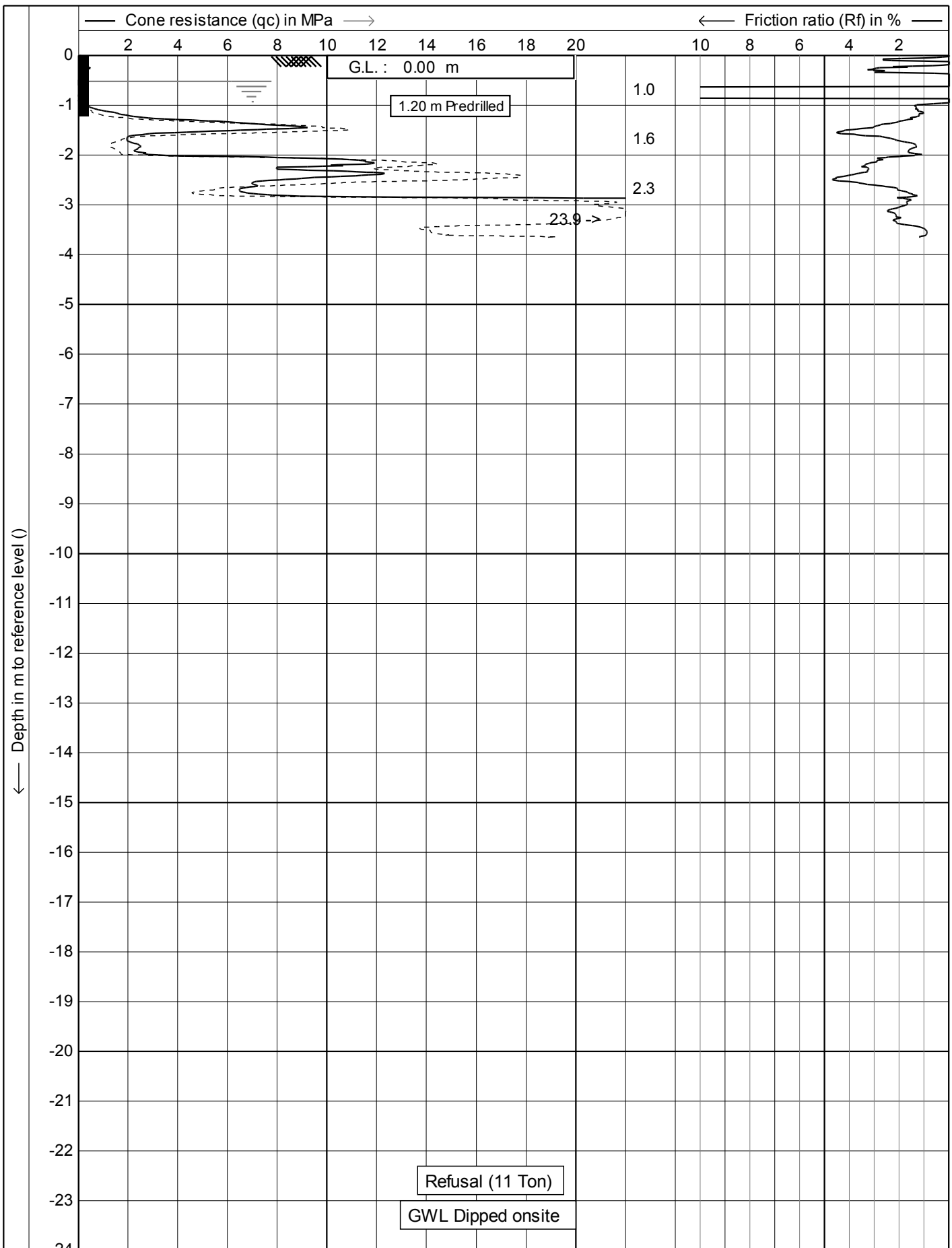


Soil behaviour type classification after Robertson 1990

	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 02

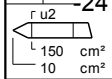
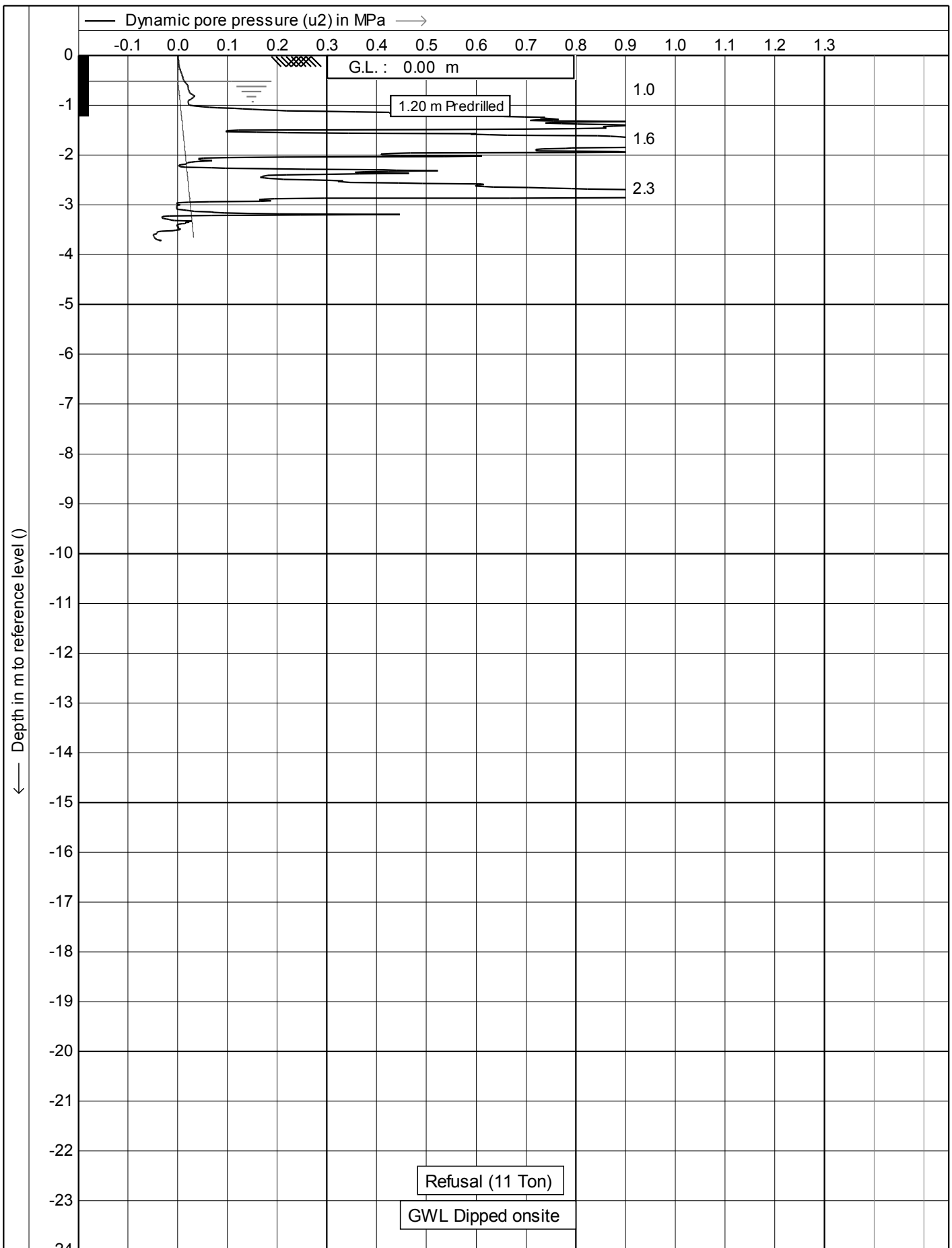


	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 02
		14/14



Test according A.S.T.M Standard D 5778-12
 Project : **Site Investigations**
 Location: **Victoria University - Wellington**
 Position: **0, 0 RD**

Date : **12/10/2017**
 Cone no. : **C10CFIP.C14433**
 Project no. : **05TT12**
 CPT no. : **03**



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

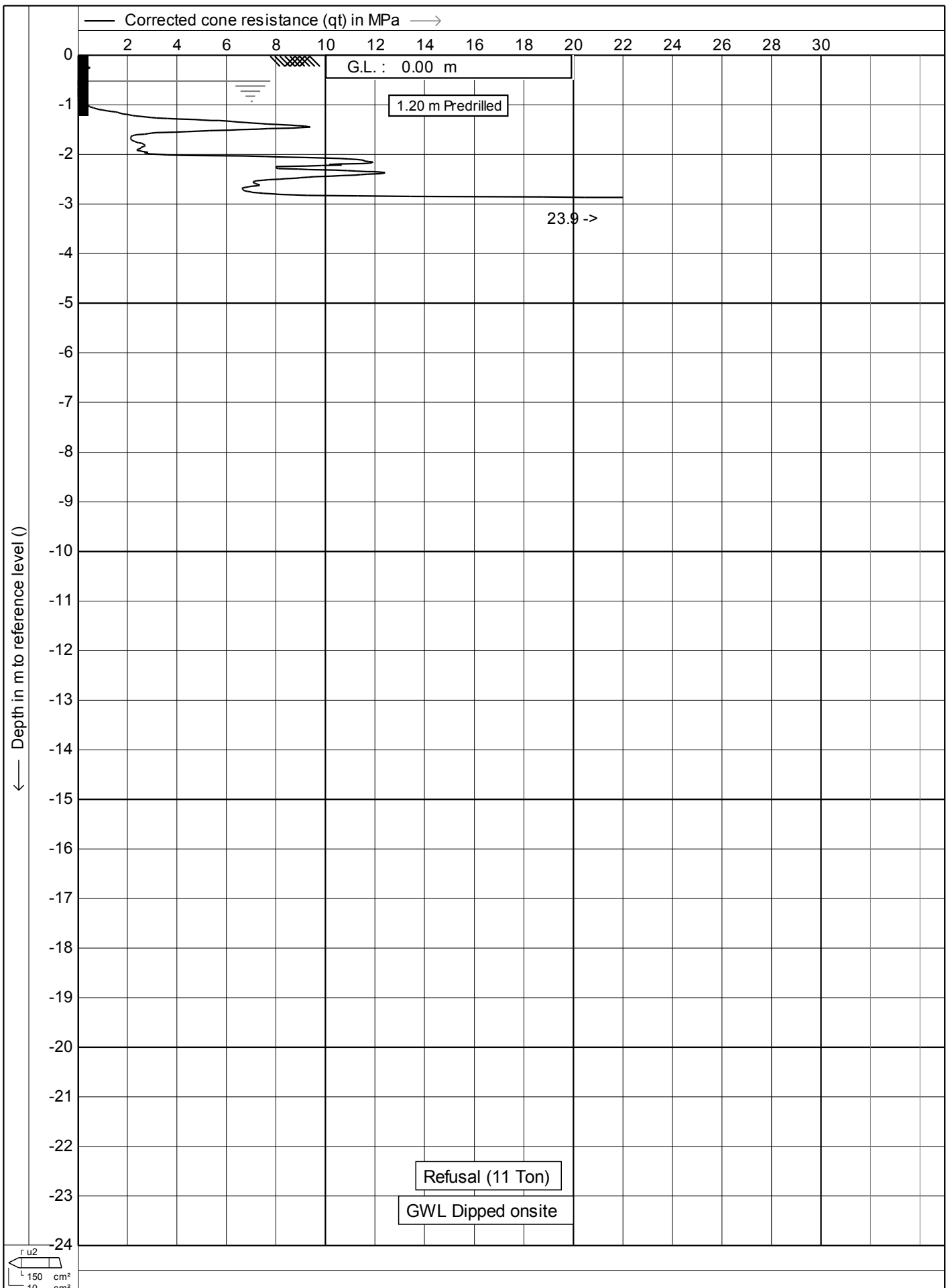
Position: **0, 0 RD**

Date : **12/10/2017**

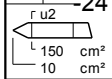
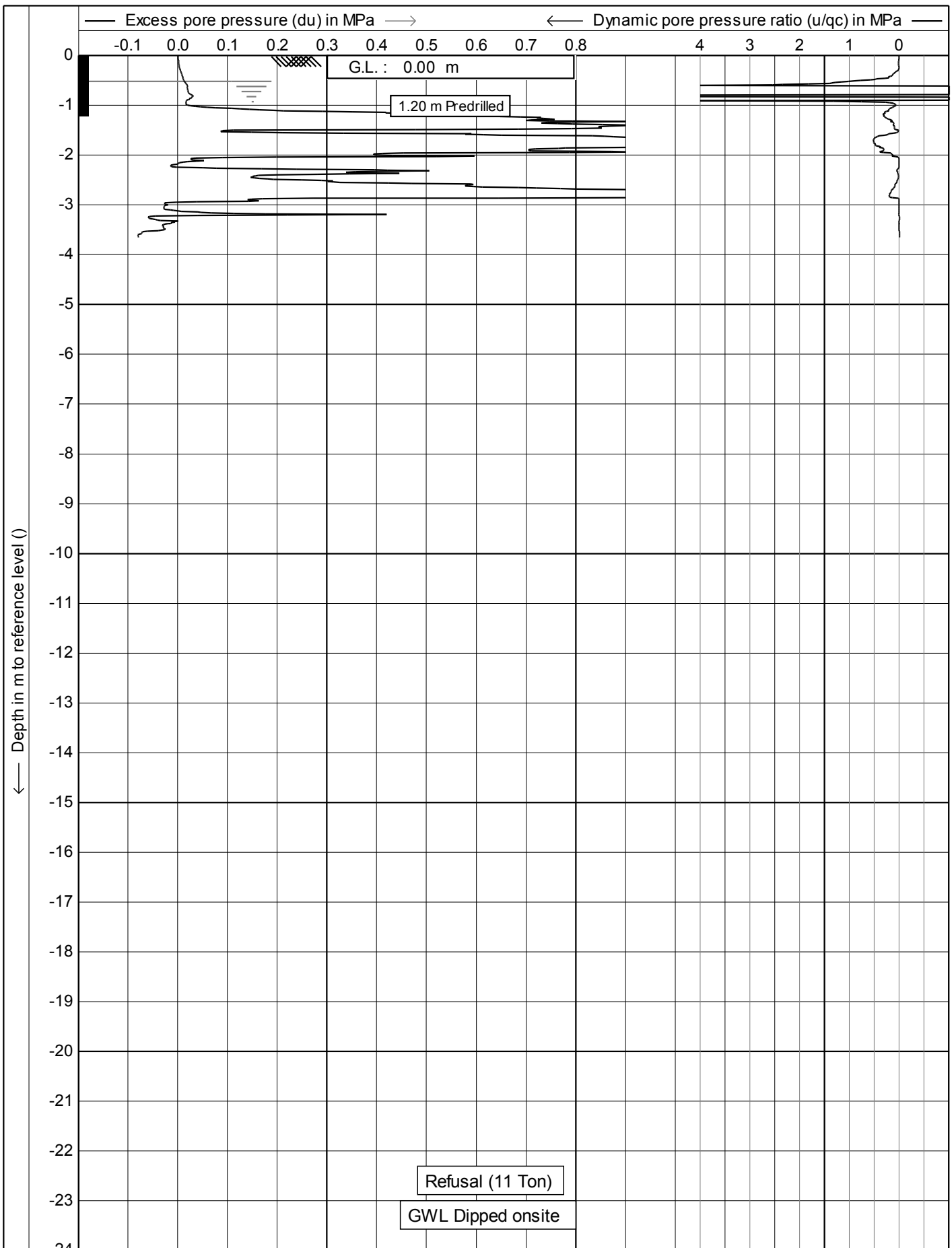
Cone no. : **C10CFIP.C14433**

Project no. : **05TT12**

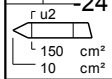
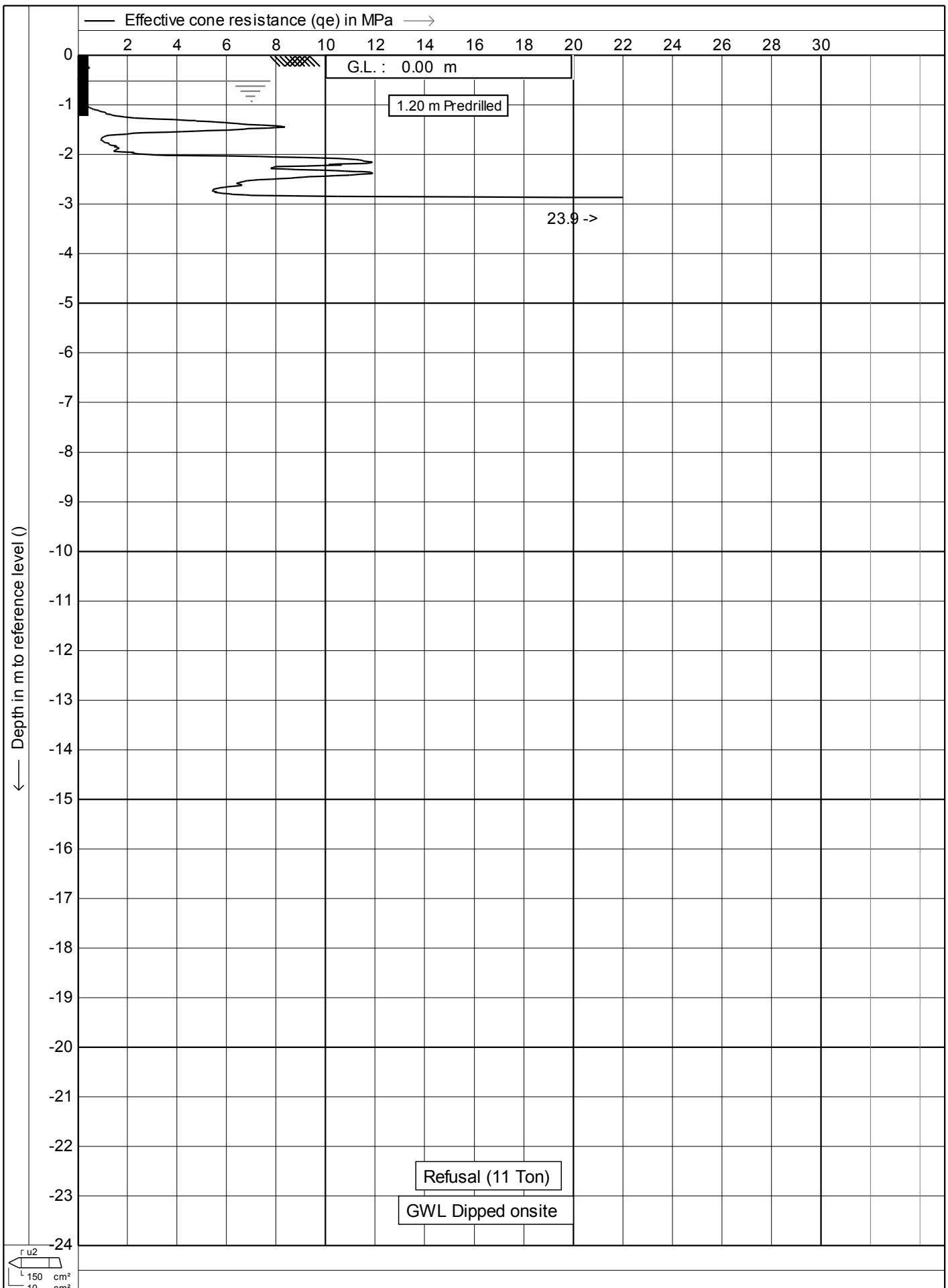
CPT no. : **03** 2/14



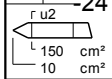
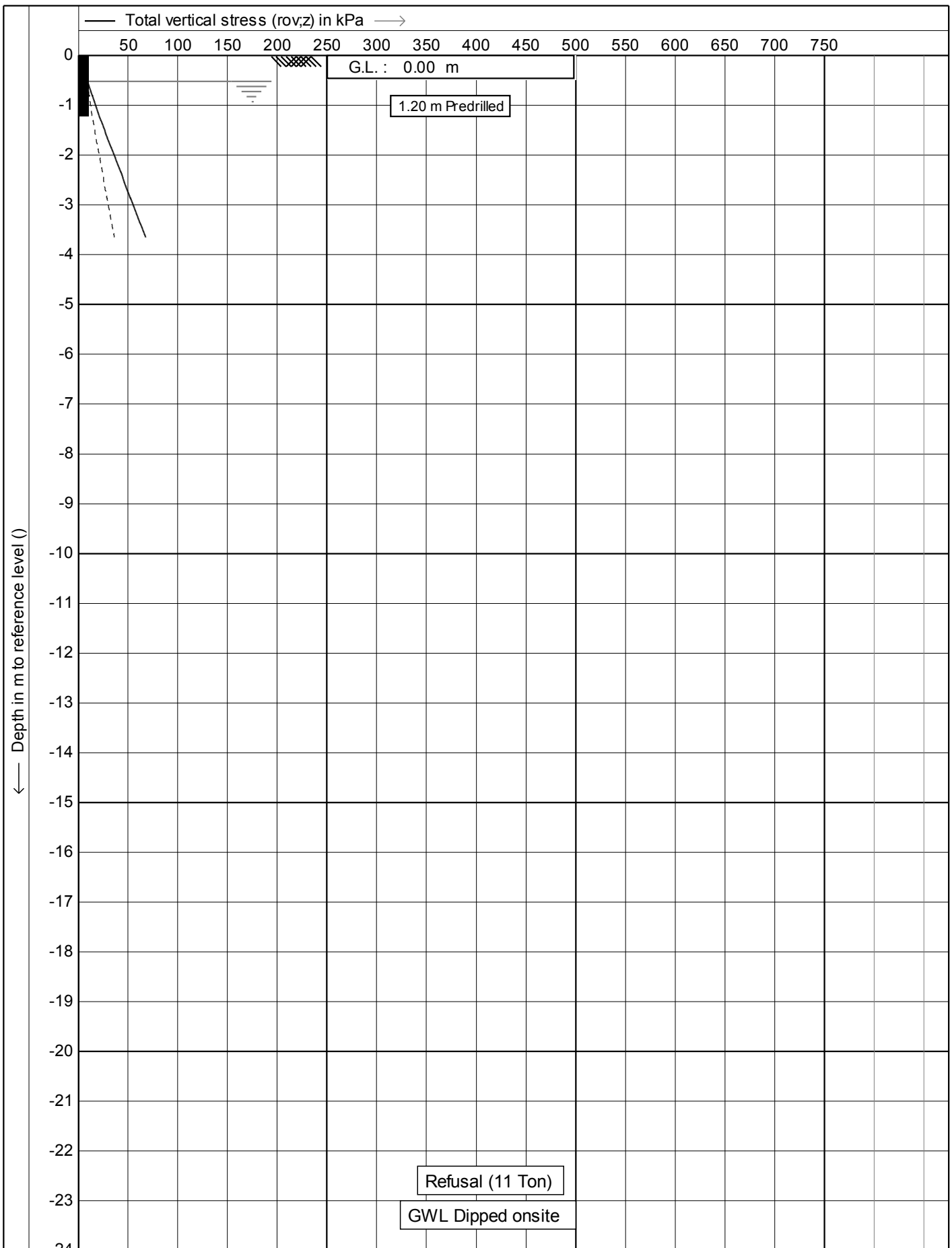
	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 03
		3/14



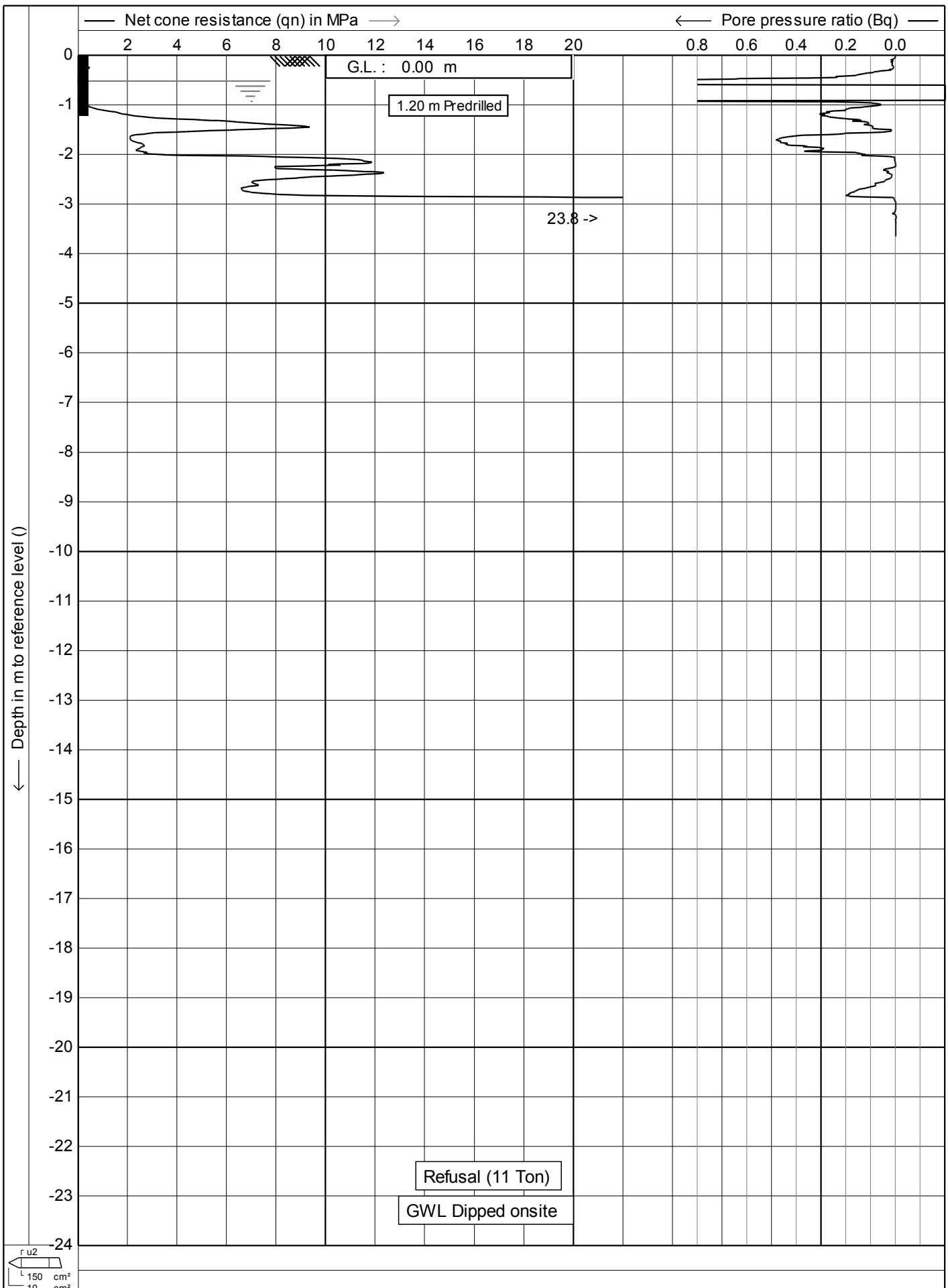
	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 03
		4/14



Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
Project : Site Investigations	Cone no. : C10CFIP.C14433
Location: Victoria University - Wellington	Project no. : 05TT12
Position: 0, 0 RD	CPT no. : 03
	5/14



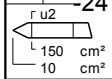
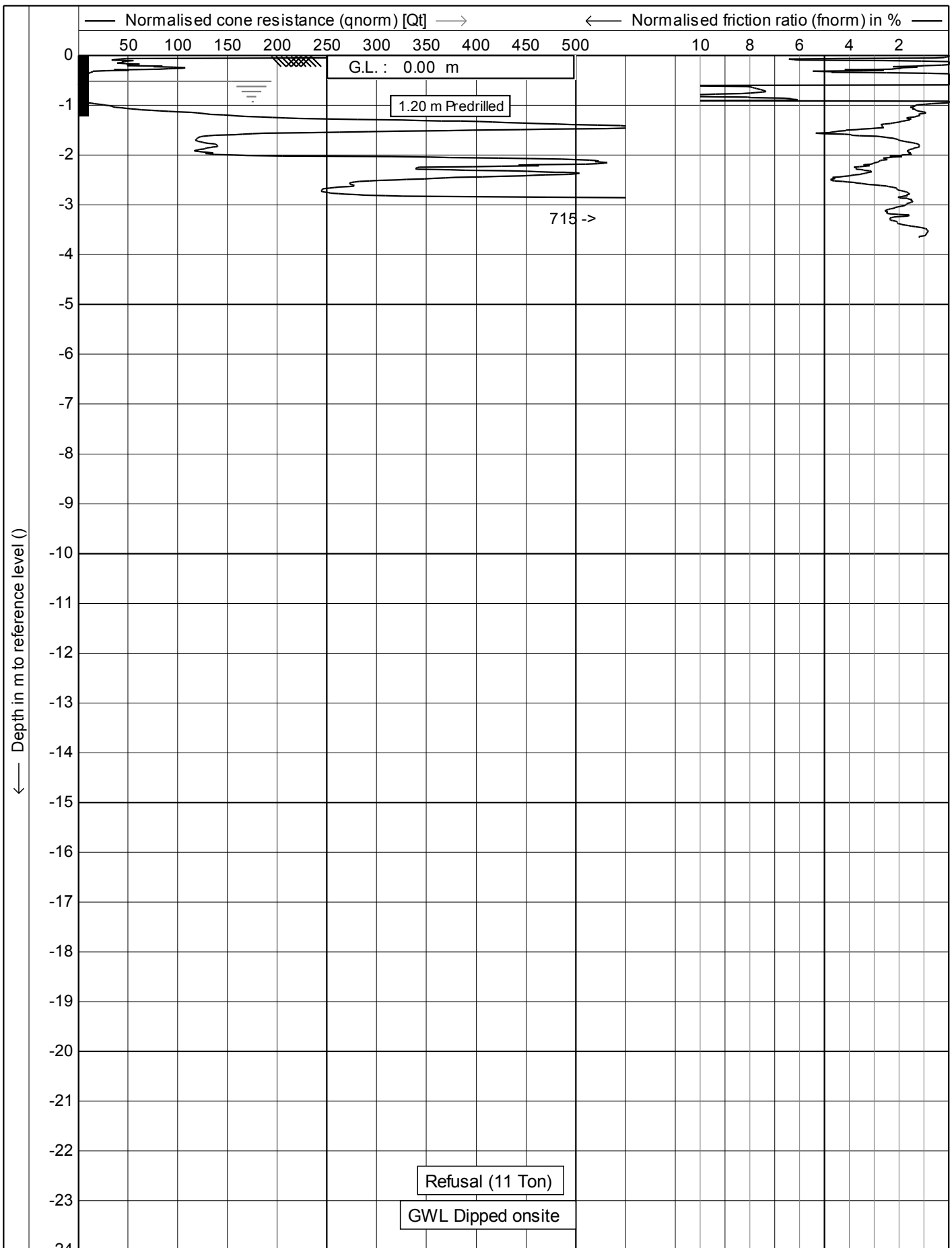
	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 03
		6/14



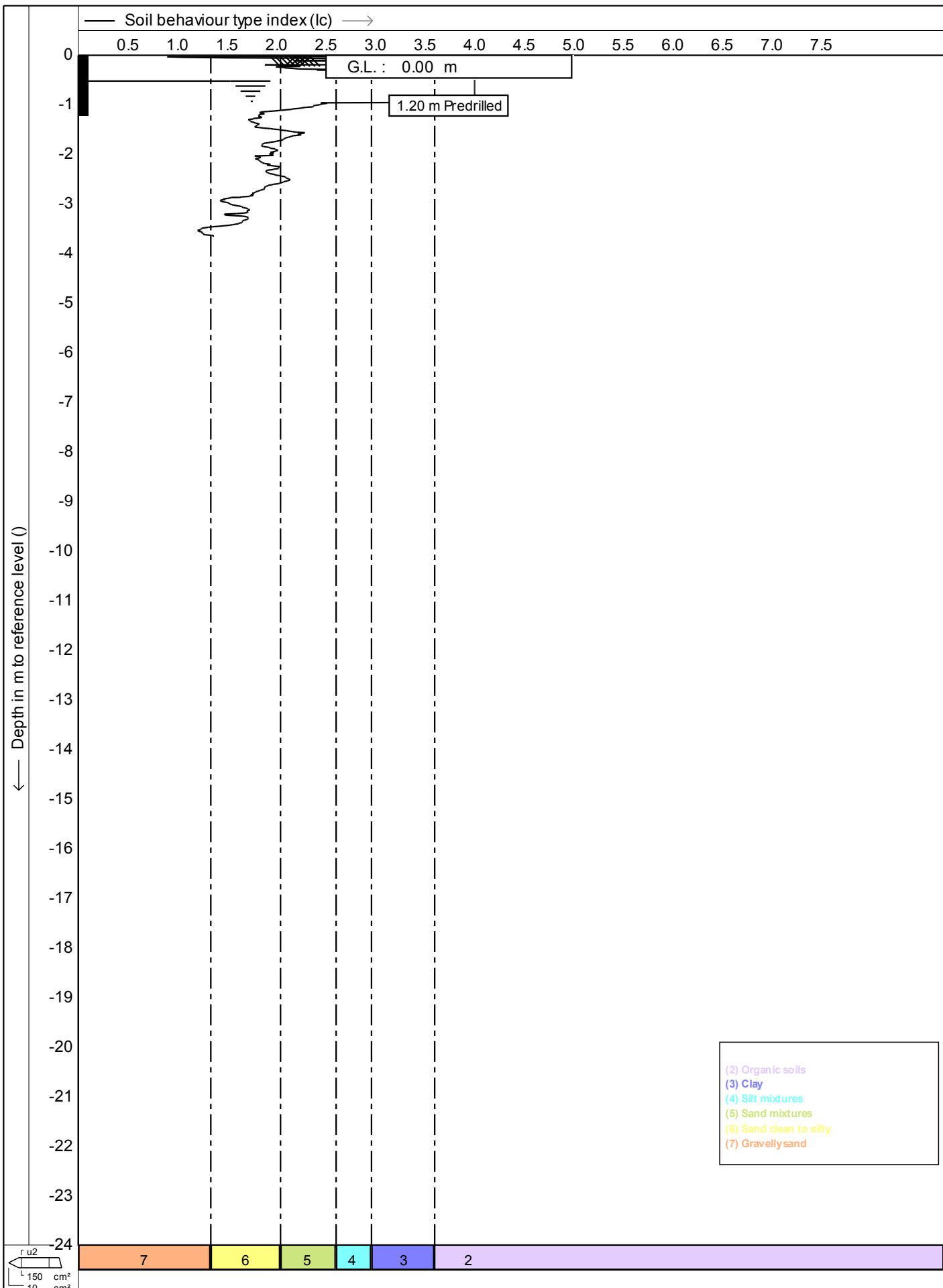
1-43



Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
Project : Site Investigations	Cone no. : C10CFIP.C14433
Location: Victoria University - Wellington	Project no. : 05TT12
Position: 0, 0 RD	CPT no. : 03
	7/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 03 8/14



Test according A.S.T.M Standard D 5778-12

Date : 12/10/2017

Cone no. : C10CFIP.C14433

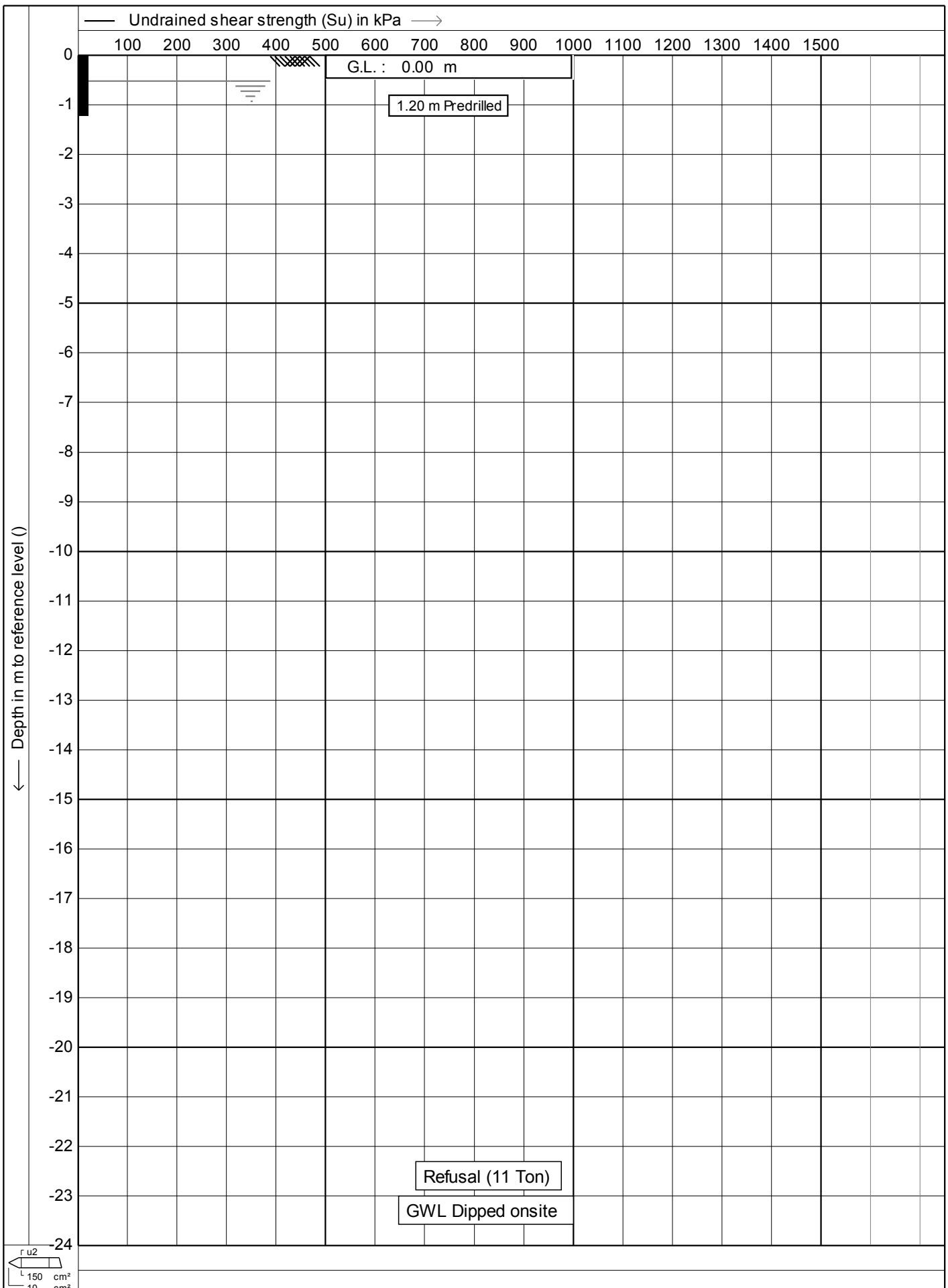
Project no. : 05TT12

CPT no. : 03

9/14



Project : Site Investigations
 Location: Victoria University - Wellington
 Position: 0, 0 RD



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

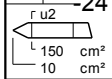
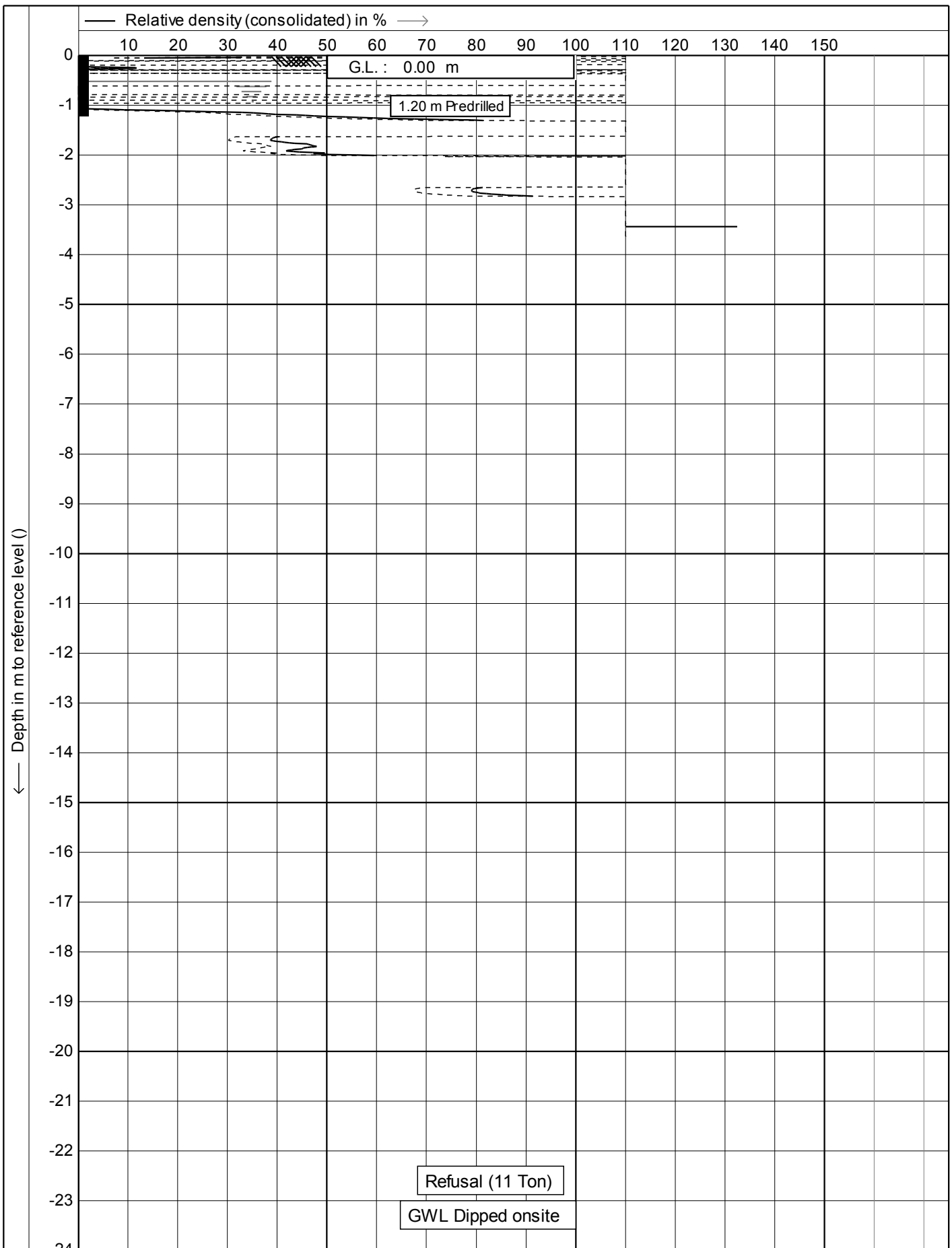
Position: **0, 0 RD**

Date : **12/10/2017**

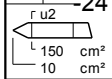
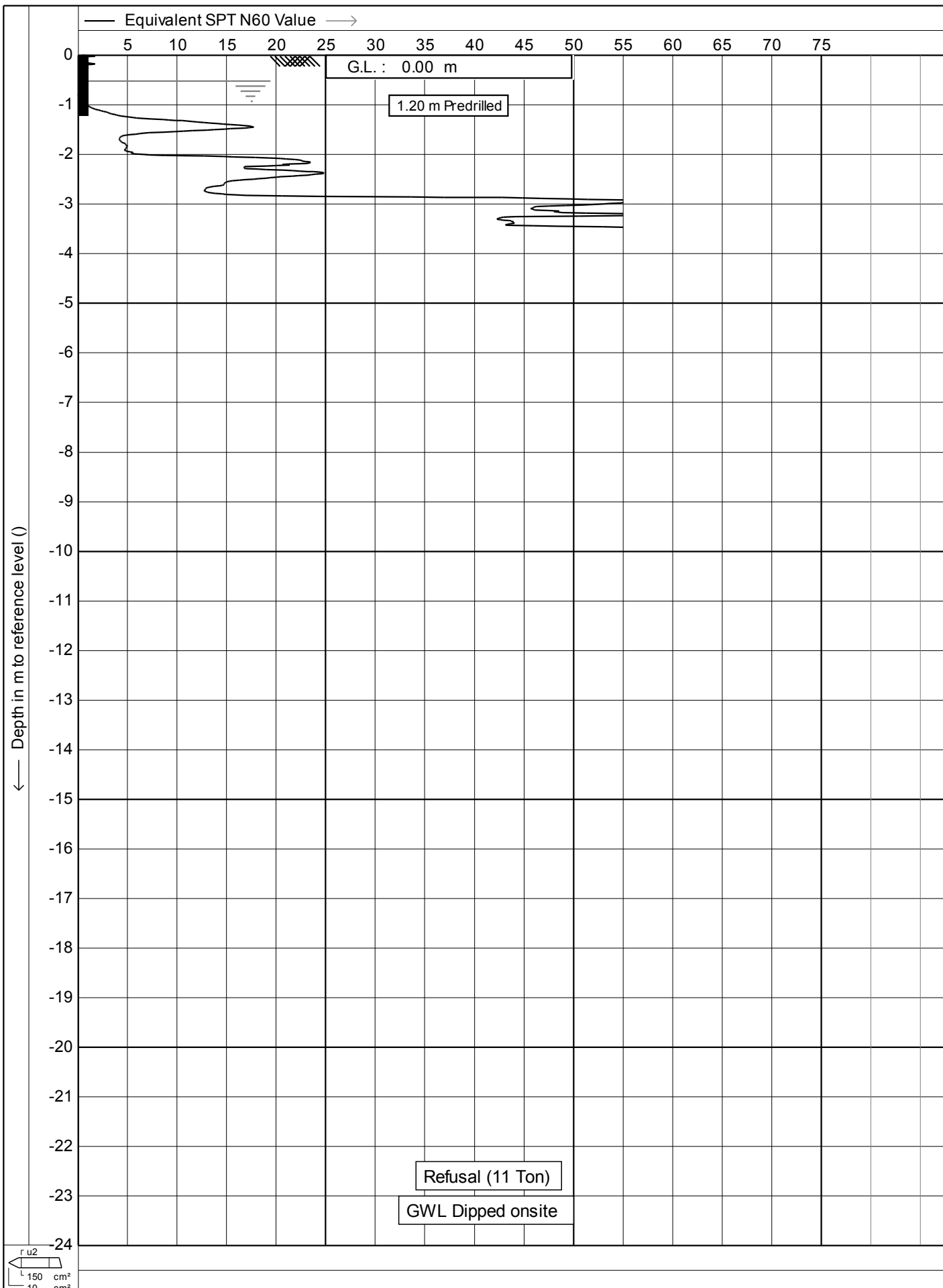
Cone no. : **C10CFIP.C14433**

Project no. : **05TT12**

CPT no. : **03** 10/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 03
		11/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

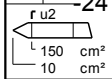
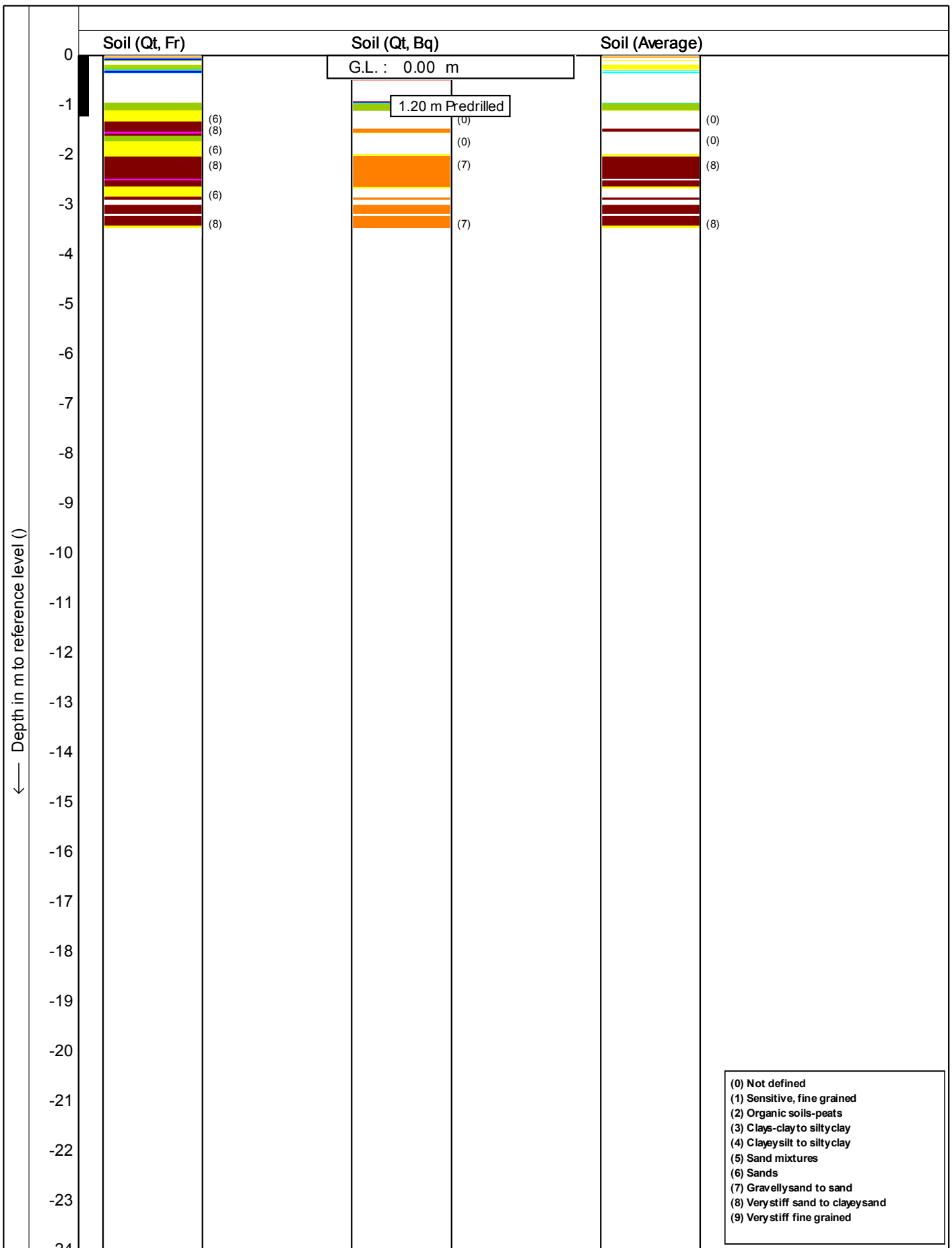
Position: **0, 0 RD**

Date : **12/10/2017**

Cone no. : **C10CFIP.C14433**

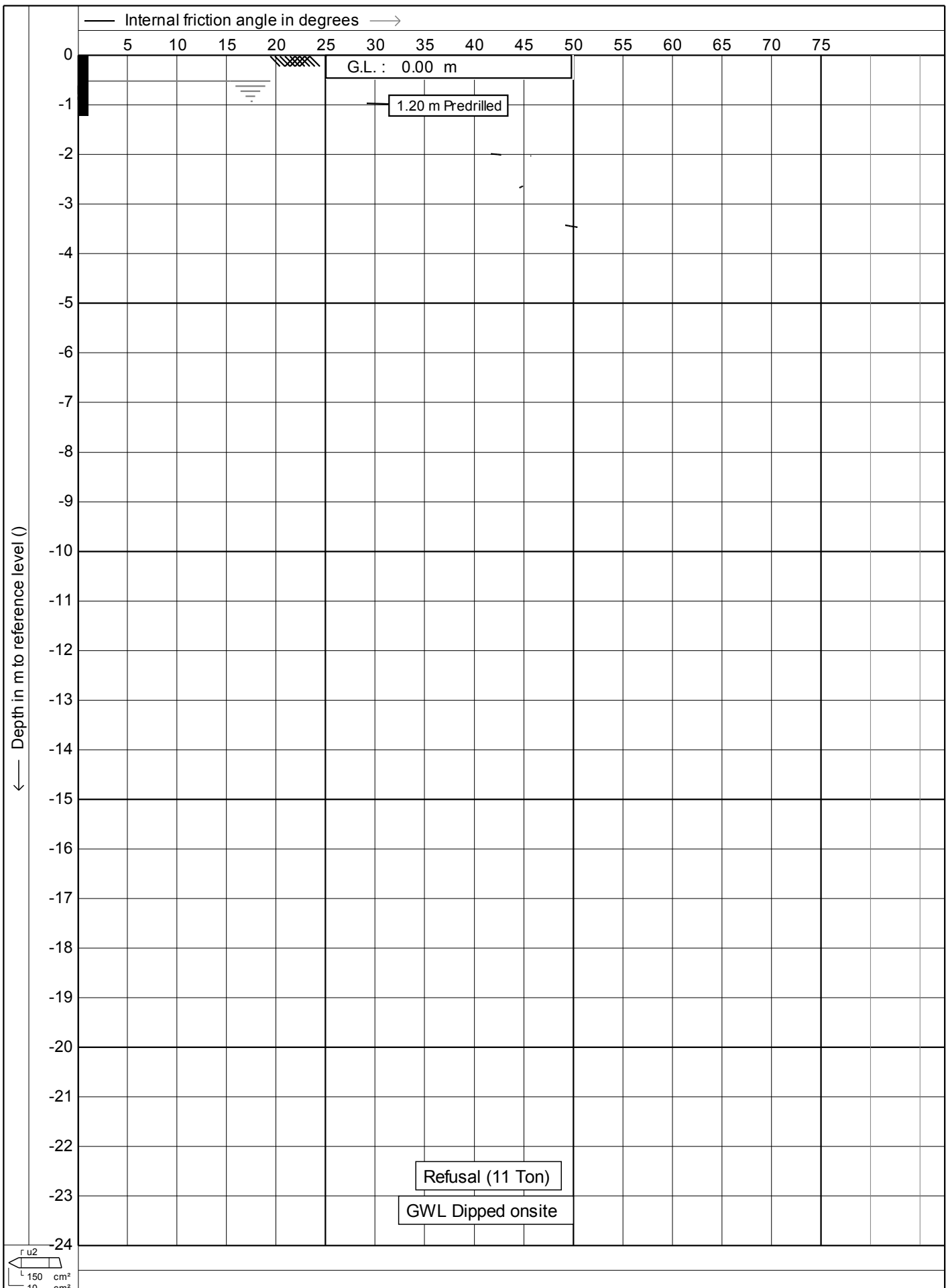
Project no. : **05TT12**

CPT no. : **03** 12/14



Soil behaviour type classification after Robertson 1990

	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 03
		13/14

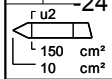
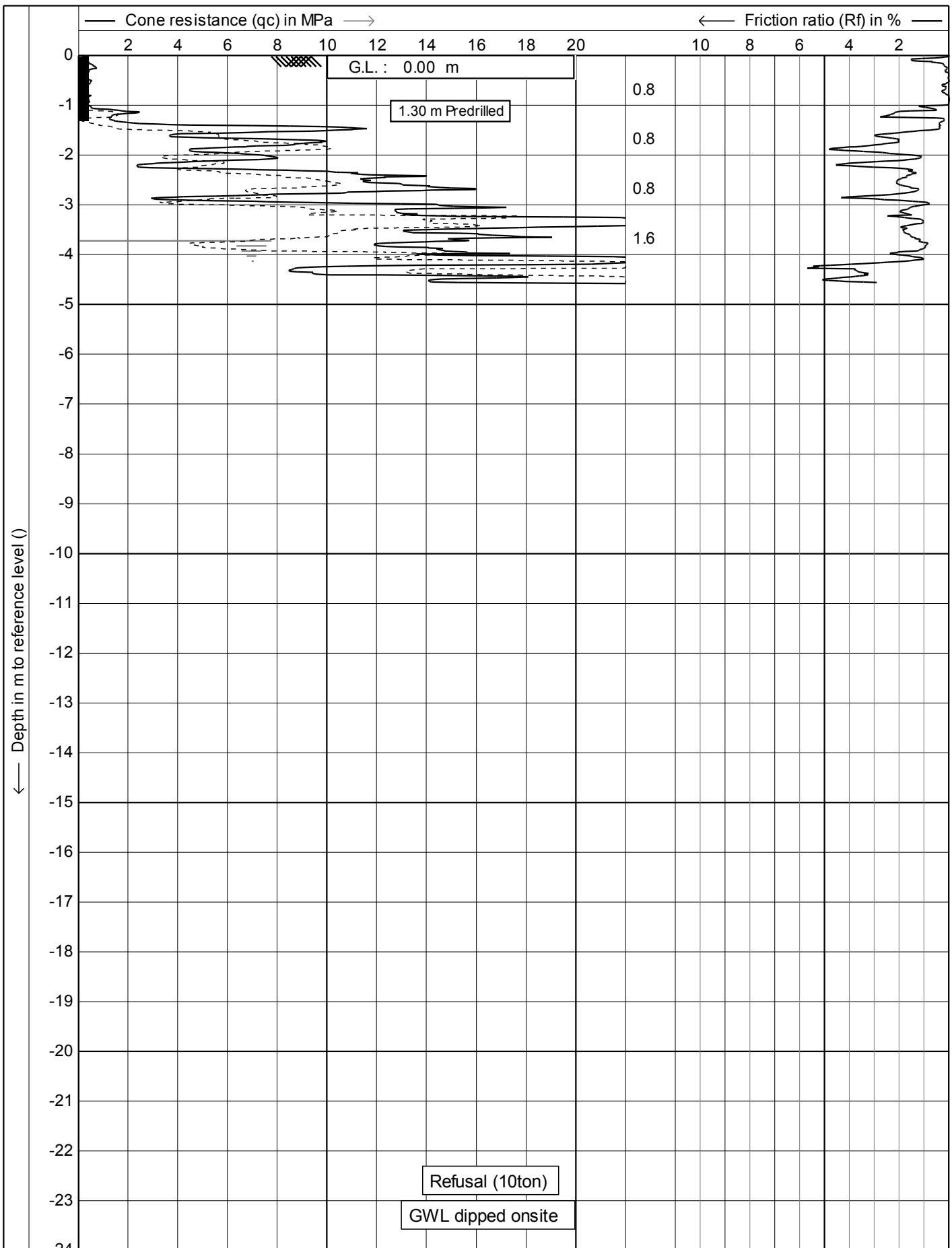


Test according A.S.T.M Standard D 5778-12

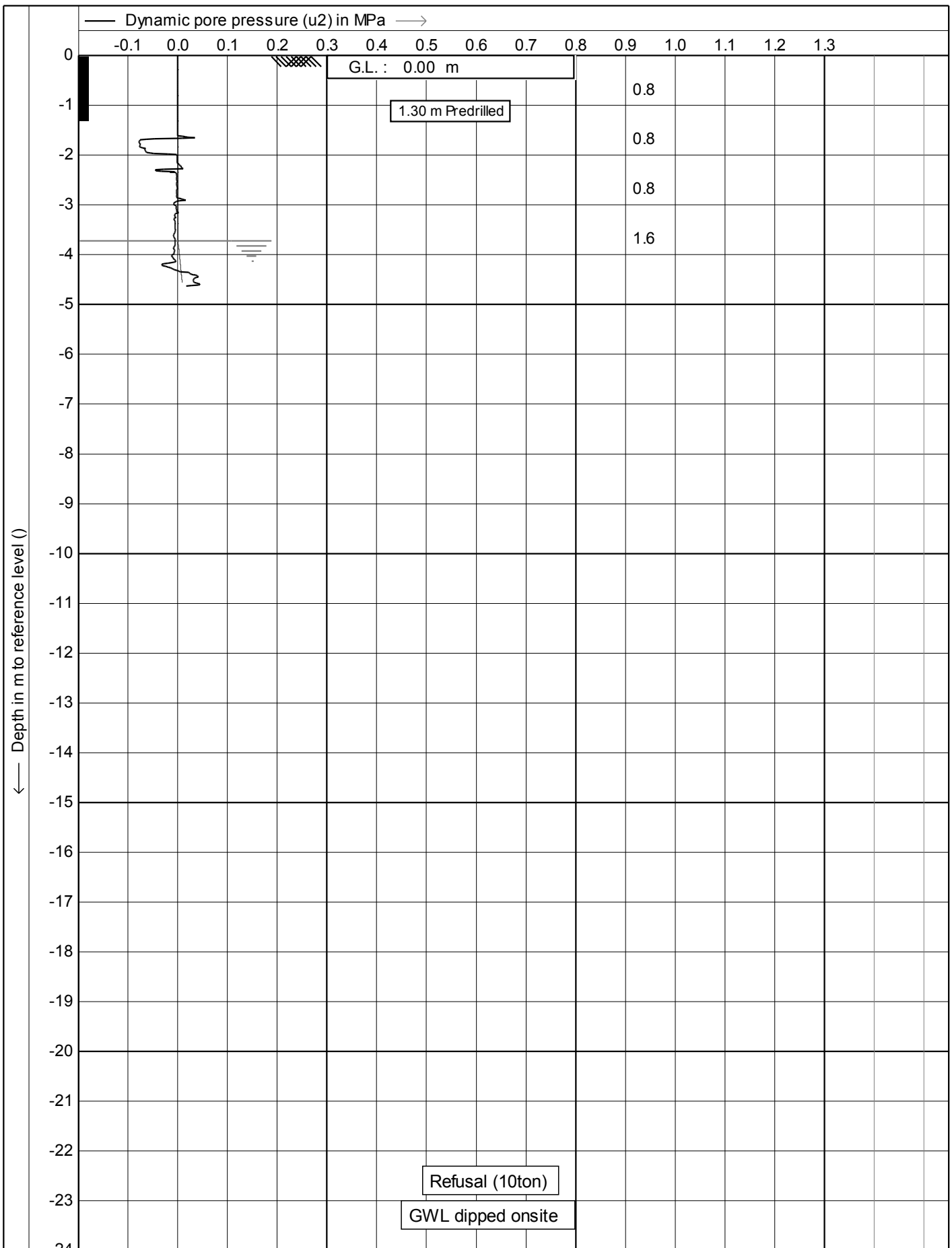
Date : 12/10/2017
 Cone no. : C10CFIP.C14433
 Project no. : 05TT12
 CPT no. : 03



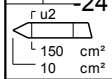
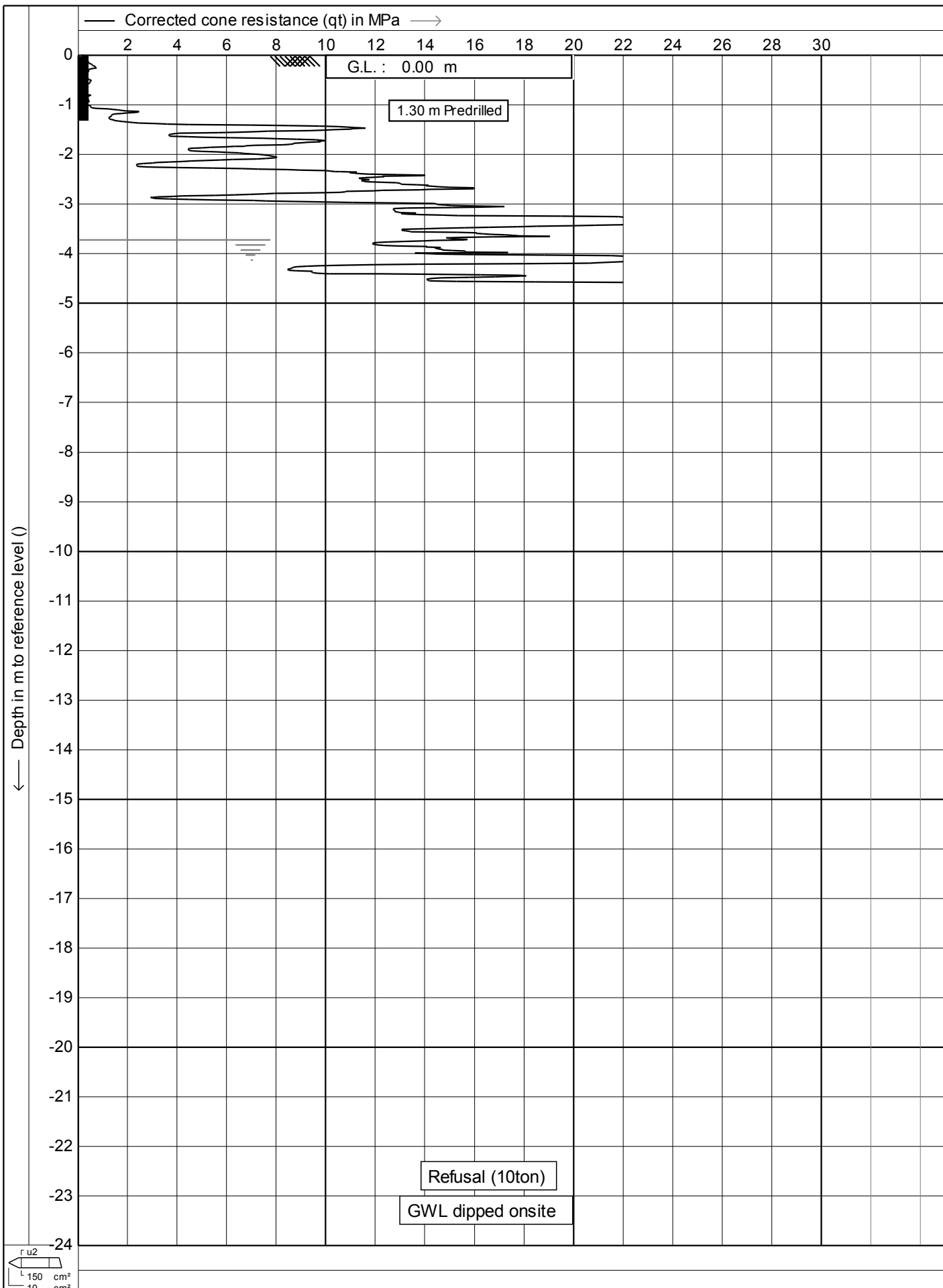
Project : Site Investigations
 Location: Victoria University - Wellington
 Position: 0, 0 RD



	Test according A.S.T.M Standard D 5778-12		Date : 11/10/2017
	Project : Site Investigations		Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington		Project no. : 05TT12
	Position: 0, 0 RD		CPT no. : 04
			1/14



	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 04
		2/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

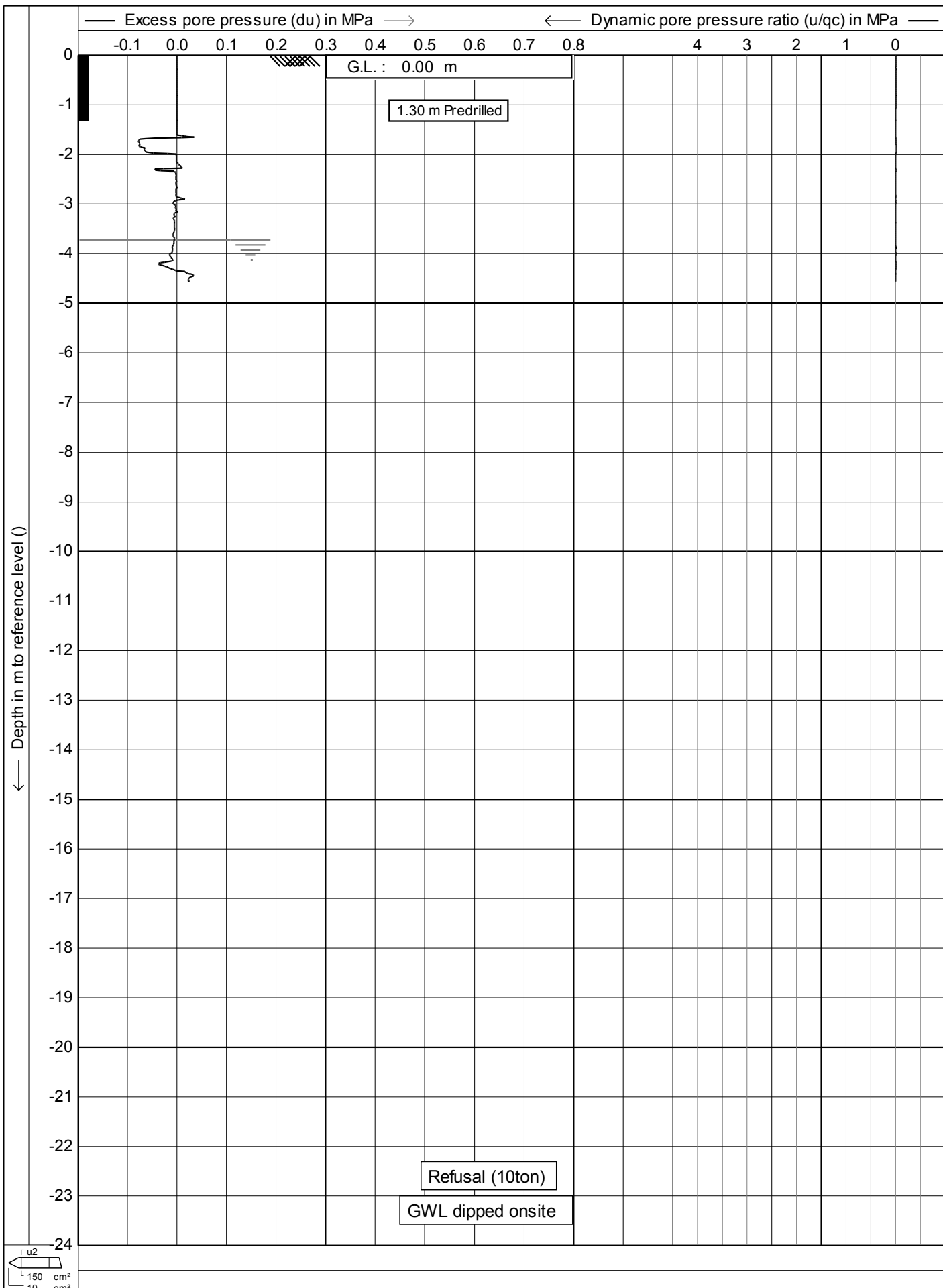
Position: **0, 0 RD**

Date : **11/10/2017**

Cone no. : **C10CFIP.C14433**

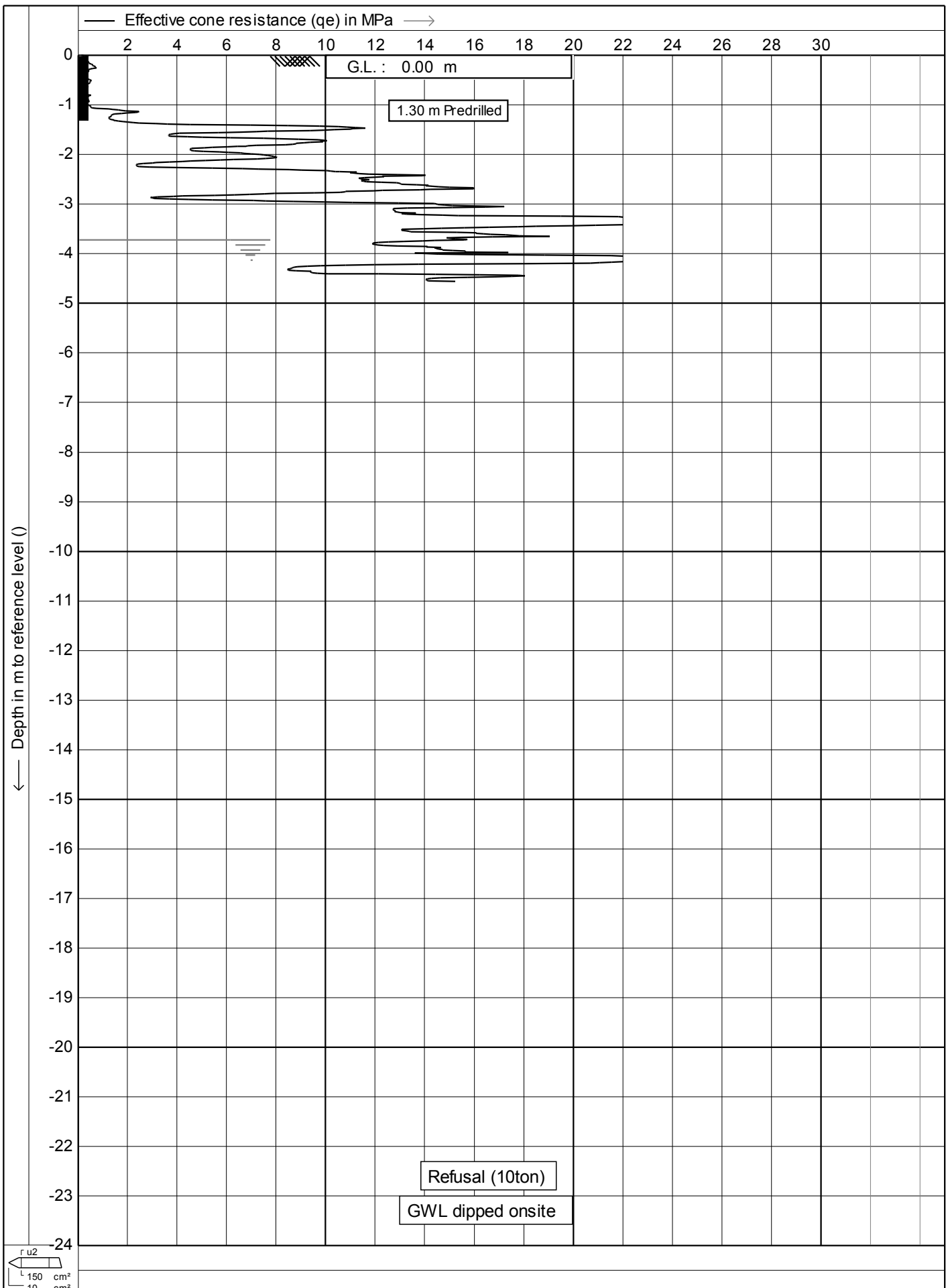
Project no. : **05TT12**

CPT no. : **04** 3/14



Test according A.S.T.M Standard D 5778-12
 Project : **Site Investigations**
 Location: **Victoria University - Wellington**
 Position: **0, 0 RD**

Date : **11/10/2017**
 Cone no. : **C10CFIP.C14433**
 Project no. : **05TT12**
 CPT no. : **04** **4/14**

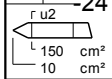
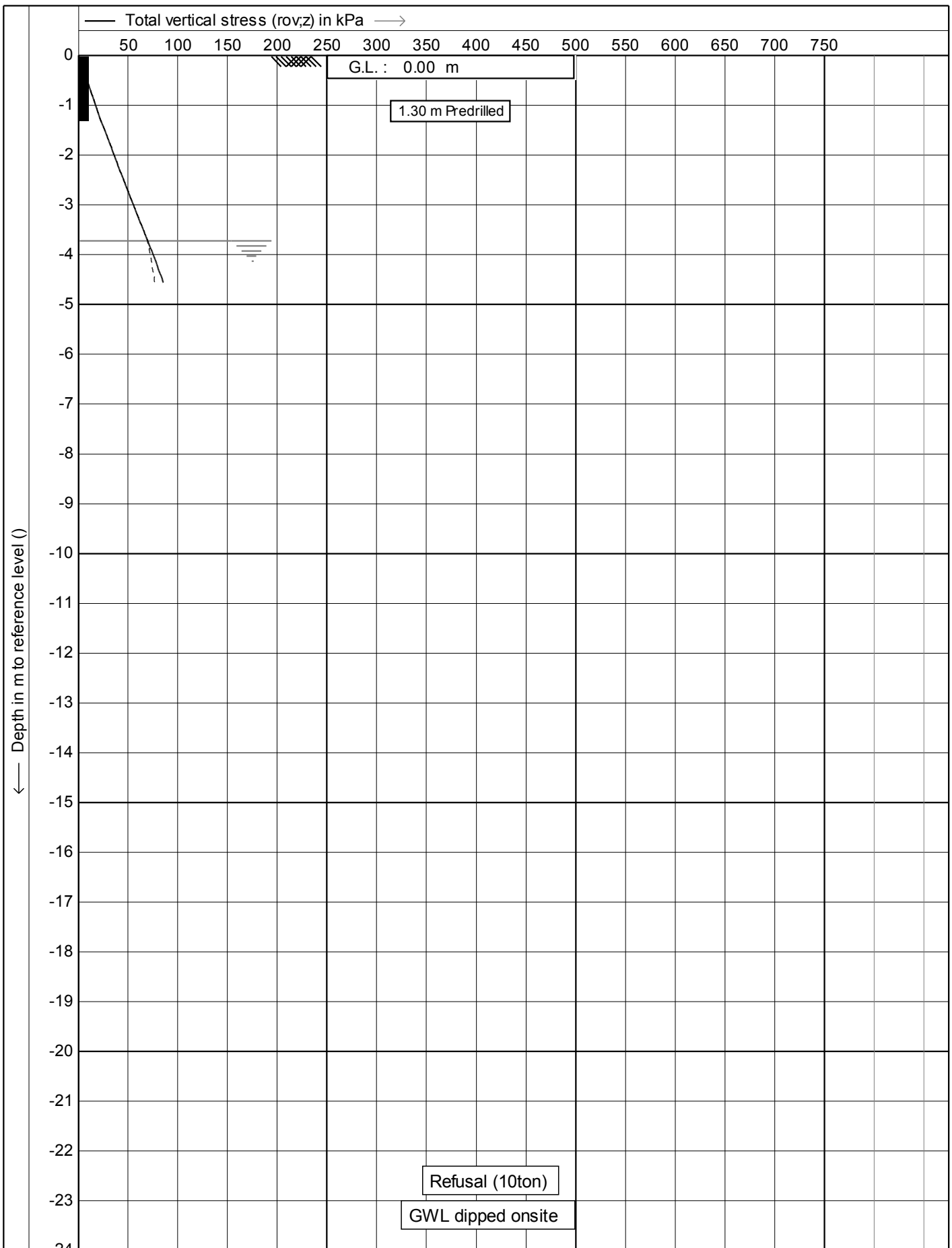


Test according A.S.T.M Standard D 5778-12

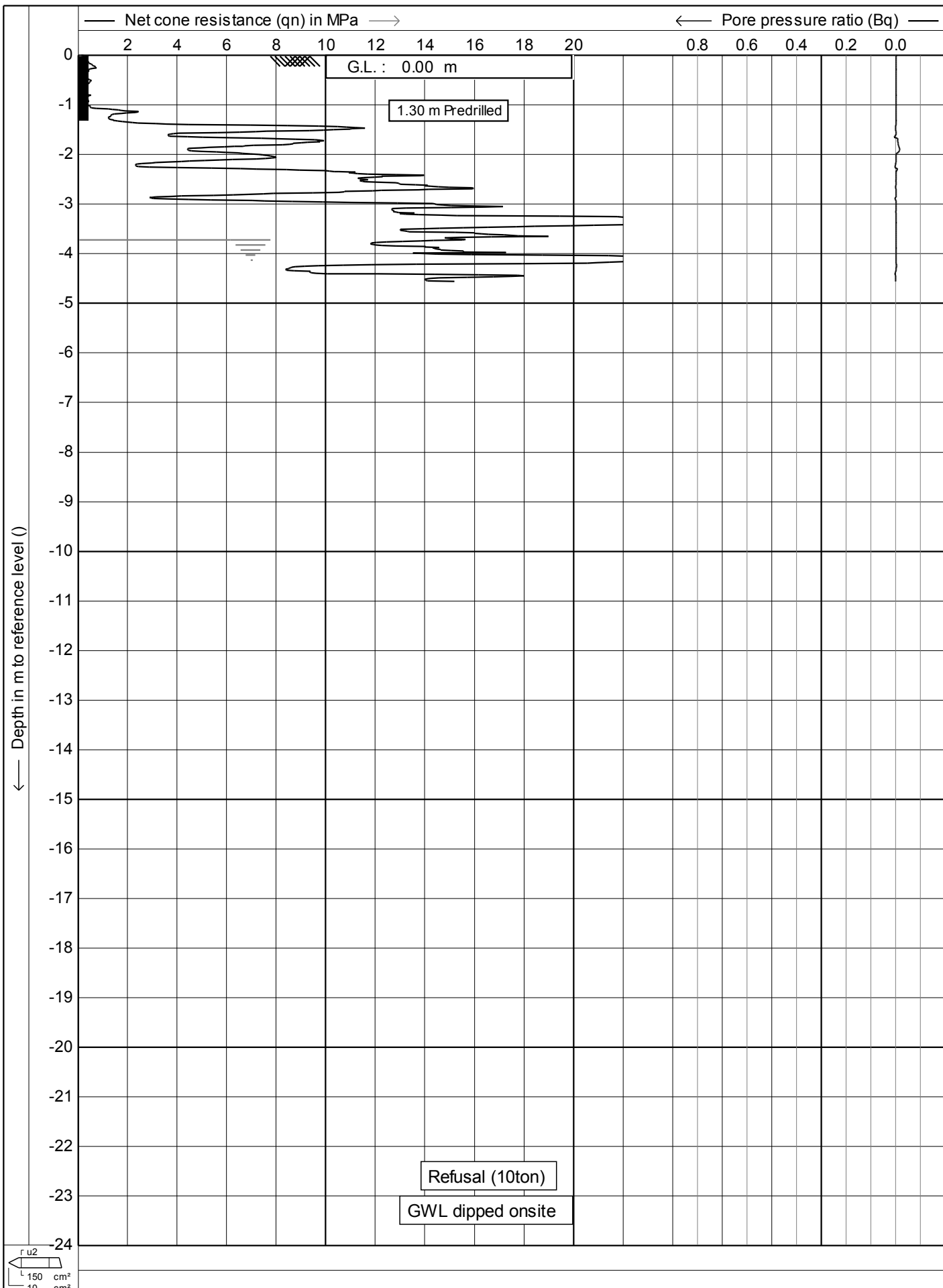
Date : 11/10/2017
 Cone no. : C10CFIP.C14433
 Project no. : 05TT12
 CPT no. : 04

Project : Site Investigations
 Location: Victoria University - Wellington
 Position: 0, 0 RD





	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 04
		6/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

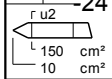
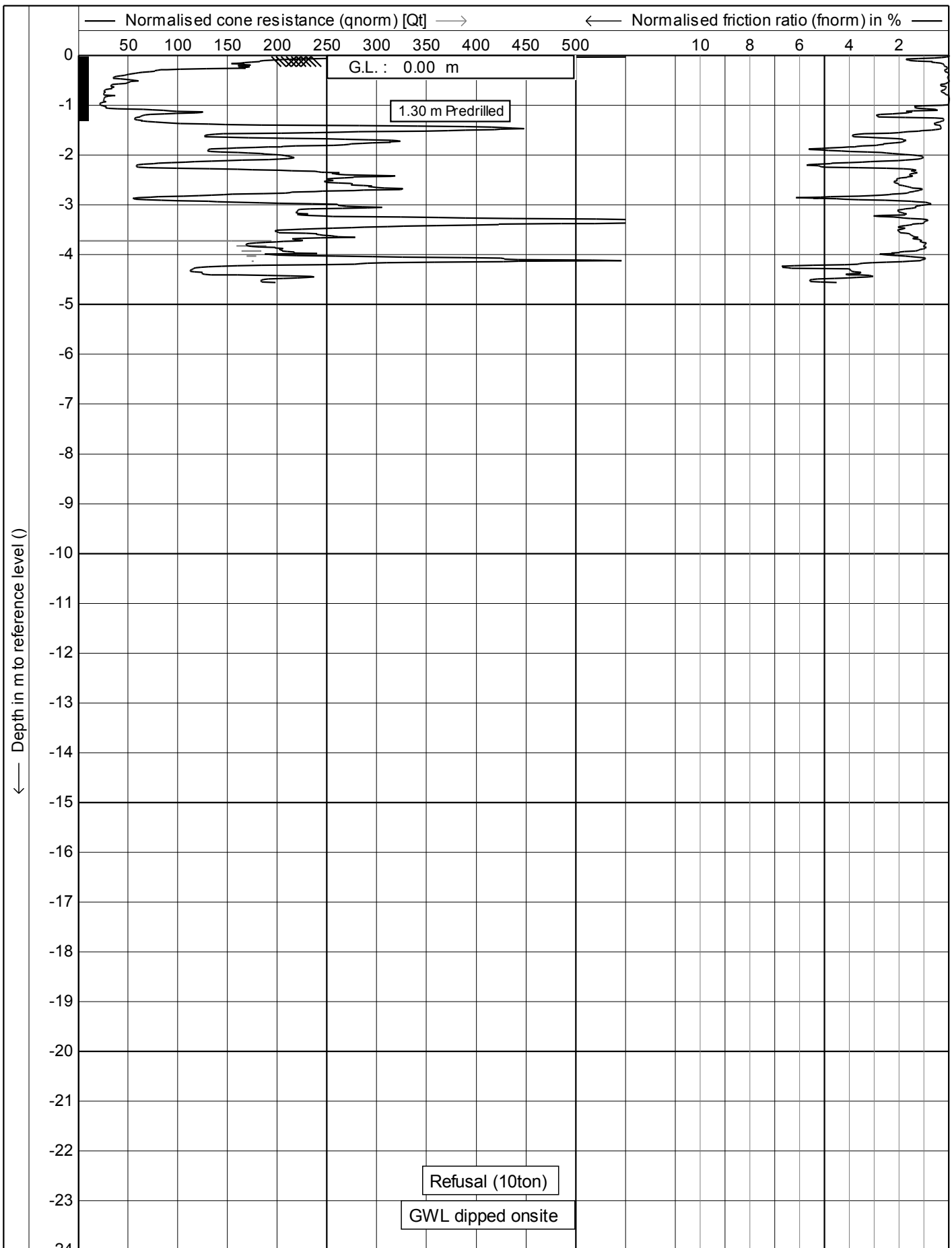
Position: **0, 0 RD**

Date : **11/10/2017**

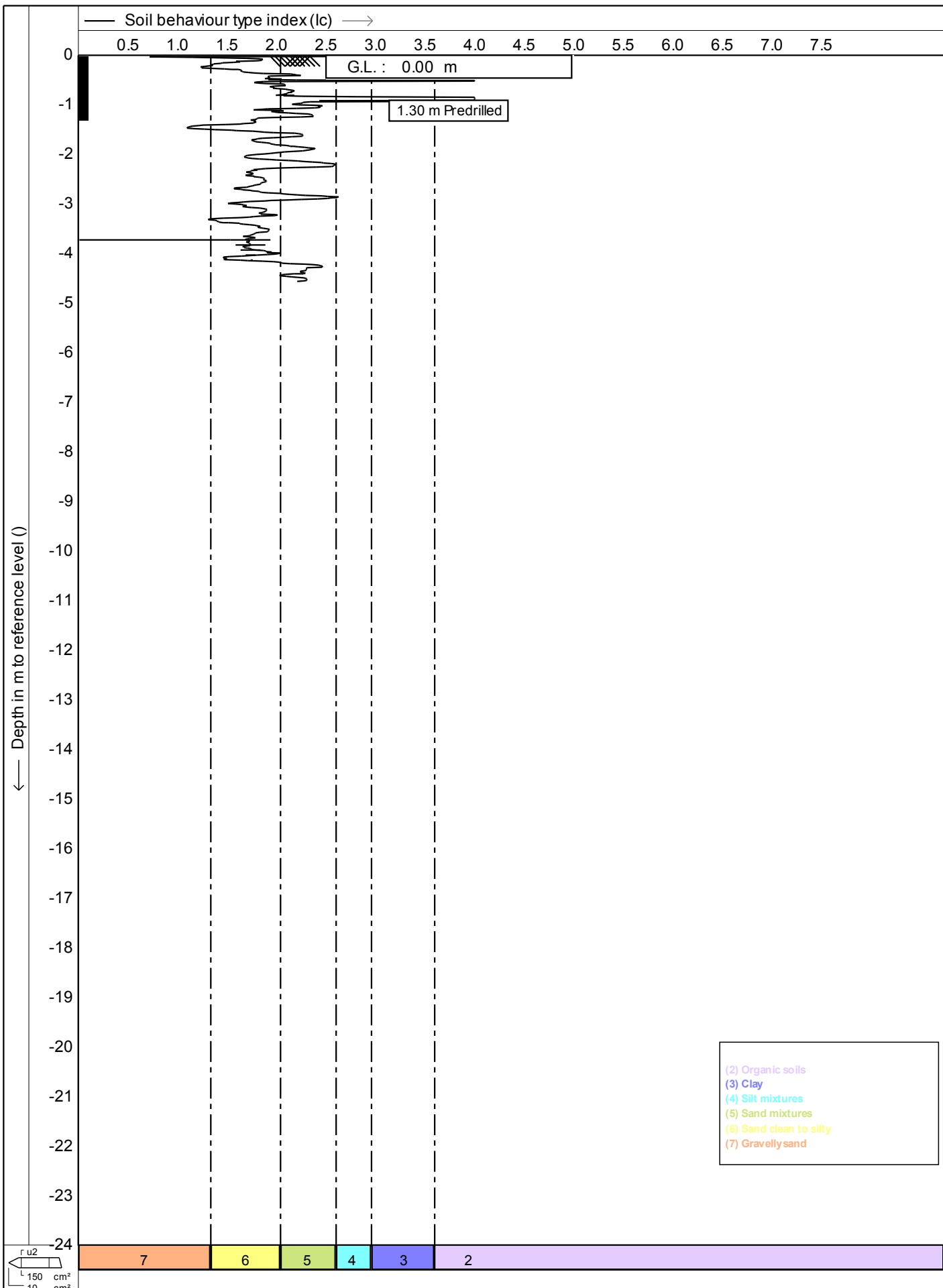
Cone no. : **C10CFIP.C14433**

Project no. : **05TT12**

CPT no. : **04**




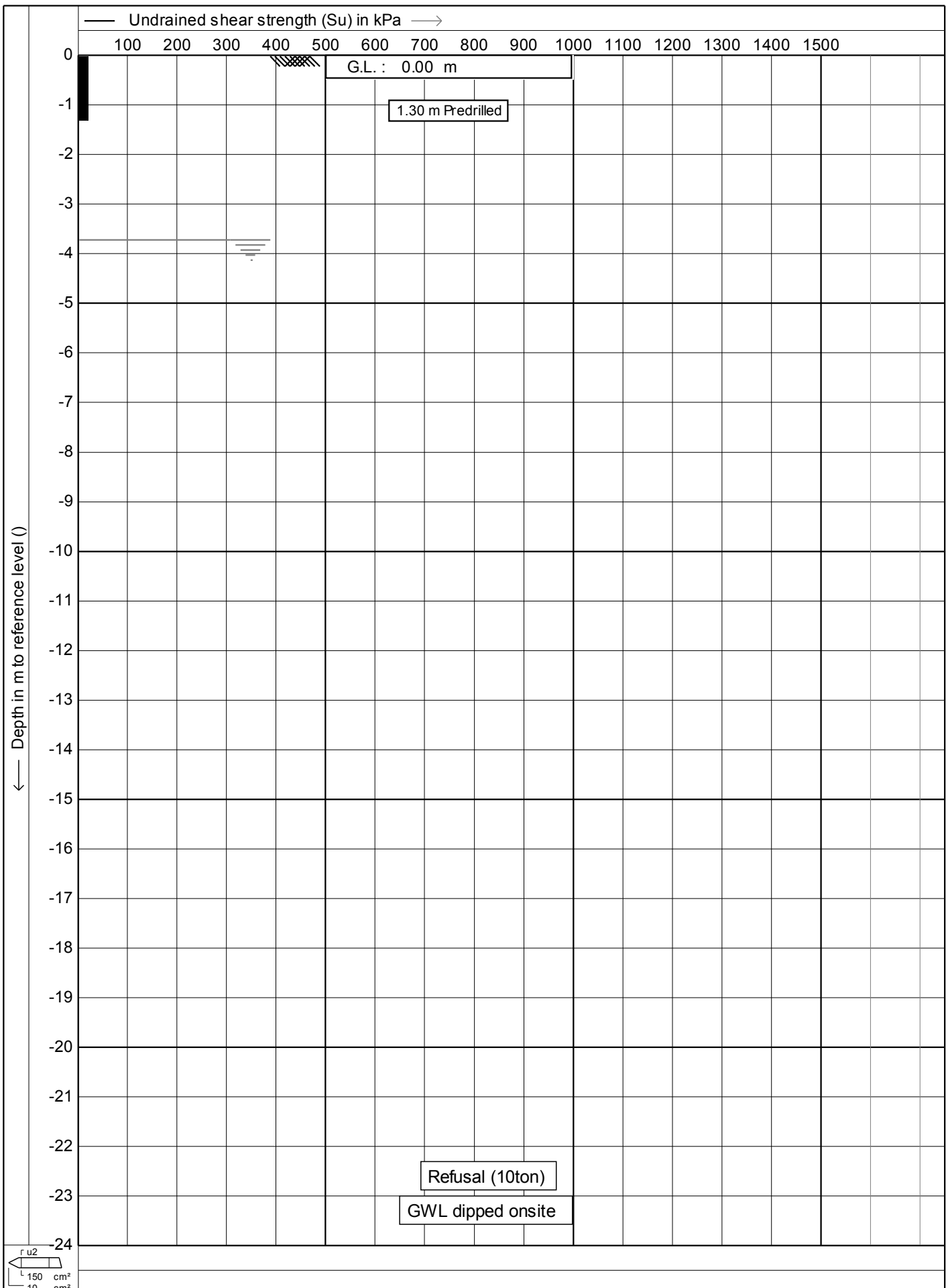
	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 04
		8/14



- (2) Organic soils
- (3) Clay
- (4) Silt mixtures
- (5) Sand mixtures
- (6) Sand clean to silty
- (7) Gravelly sand

r_{u2}
 150 cm²
 10 cm²

	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017	
	Project : Site Investigations	Cone no. : C10CFIP.C14433	
	Location: Victoria University - Wellington	Project no. : 05TT12	
	Position: 0, 0 RD	CPT no. : 04	9/14

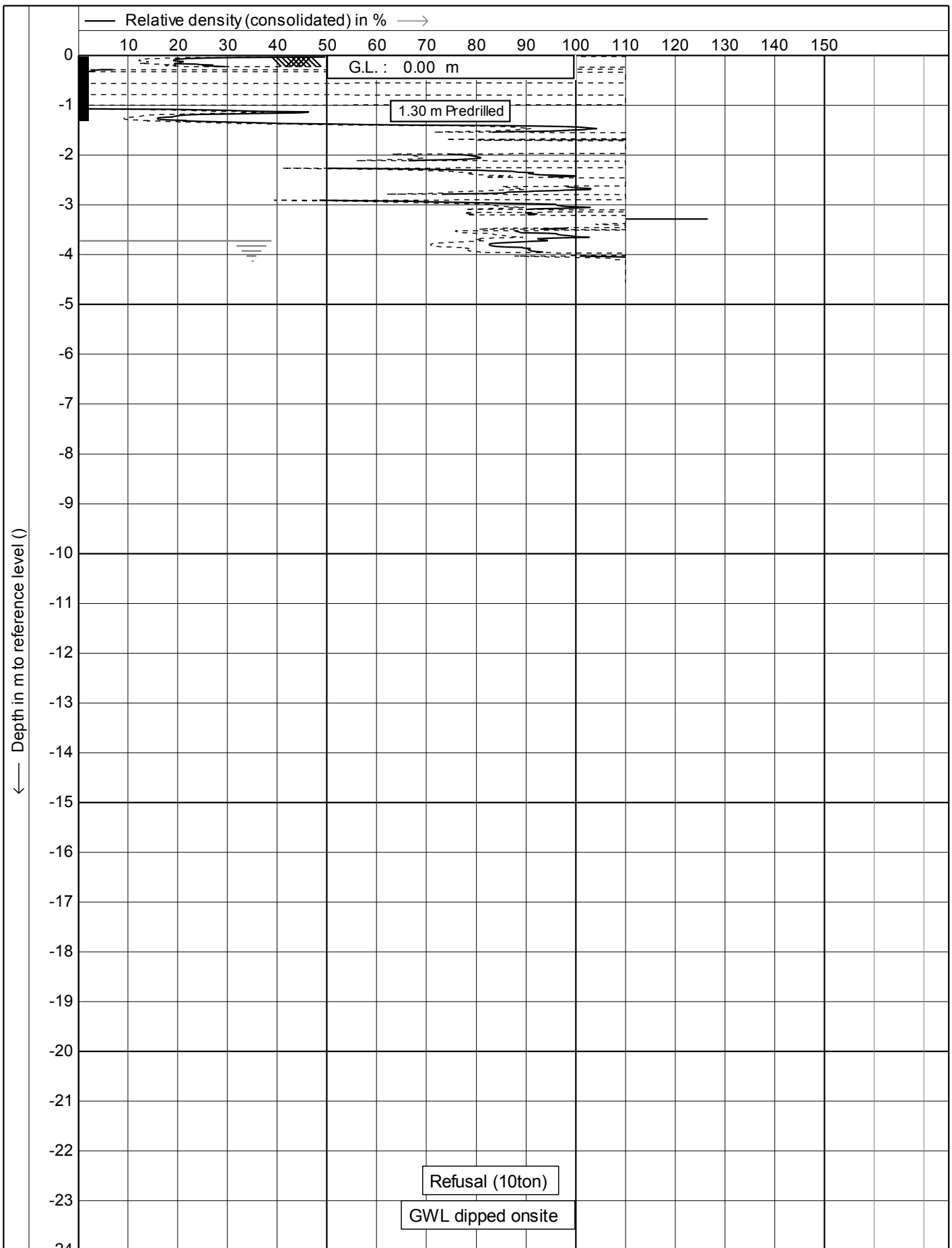


Test according A.S.T.M Standard D 5778-12

Date : 11/10/2017
 Cone no. : C10CFIP.C14433
 Project no. : 05TT12
 CPT no. : 04



Project : Site Investigations
 Location: Victoria University - Wellington
 Position: 0, 0 RD



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

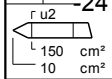
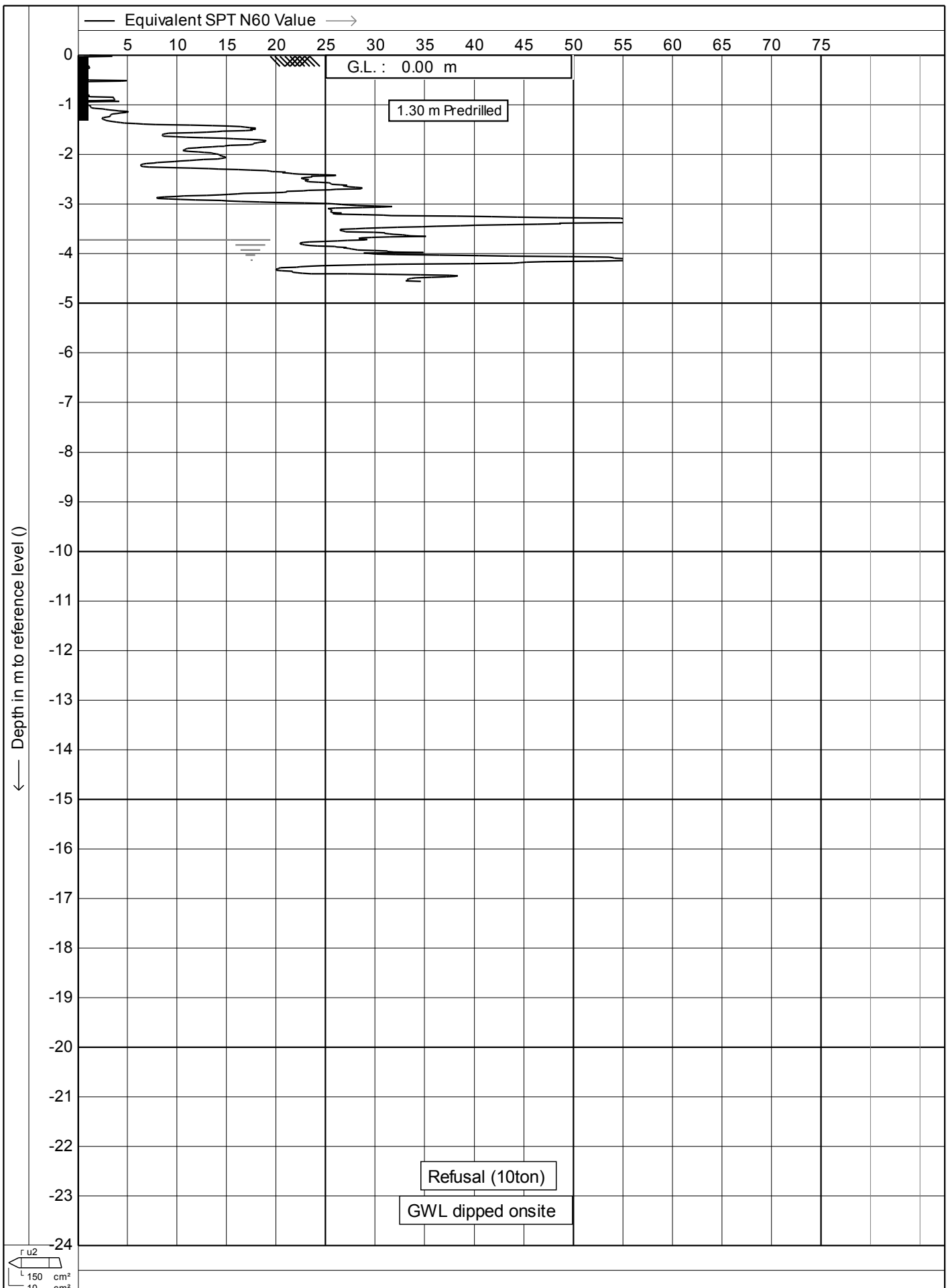
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Date : **11/10/2017**

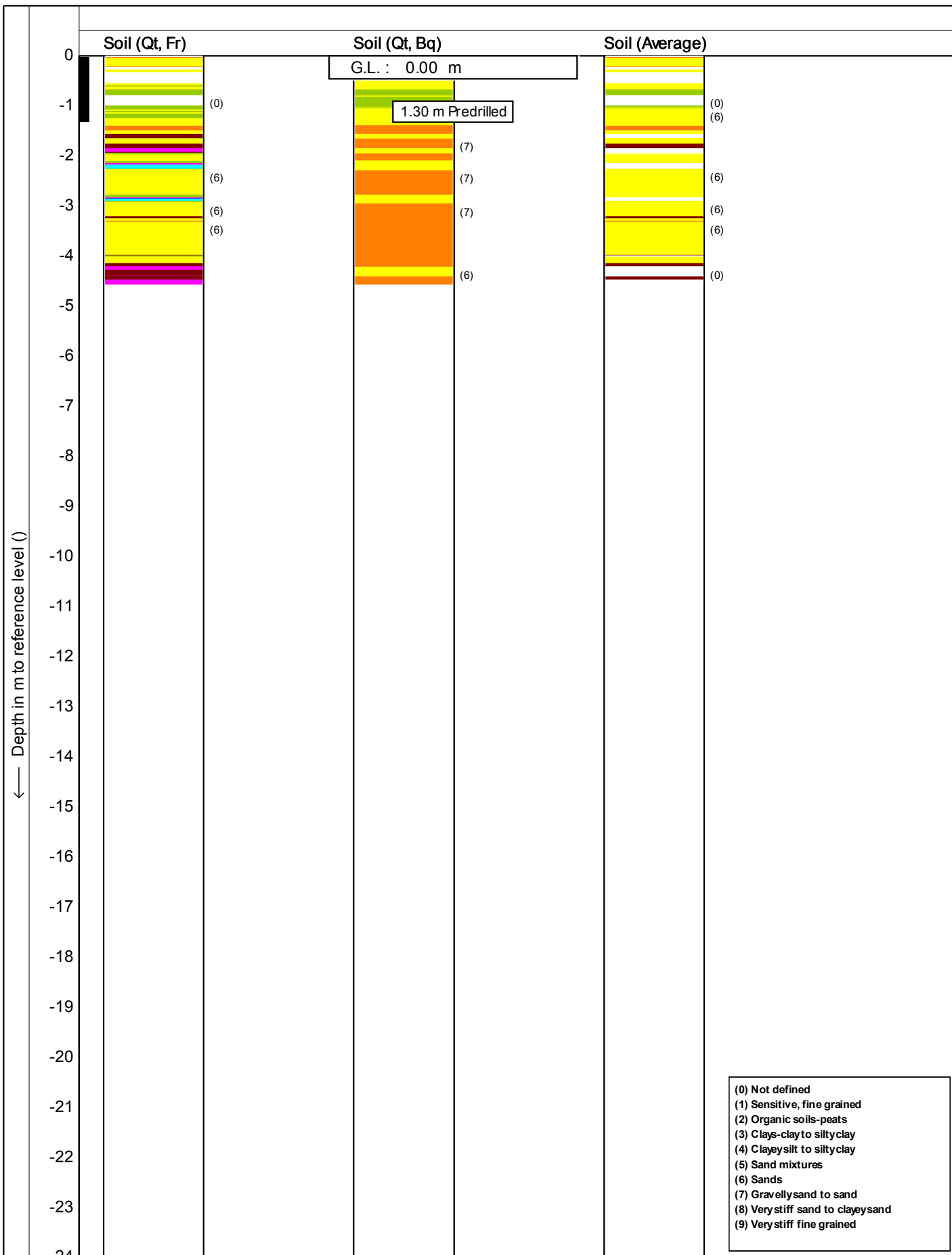
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Project no. : **05TT12**

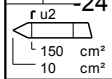
CPT no. : **04** | 11/14



	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 04
		12/14

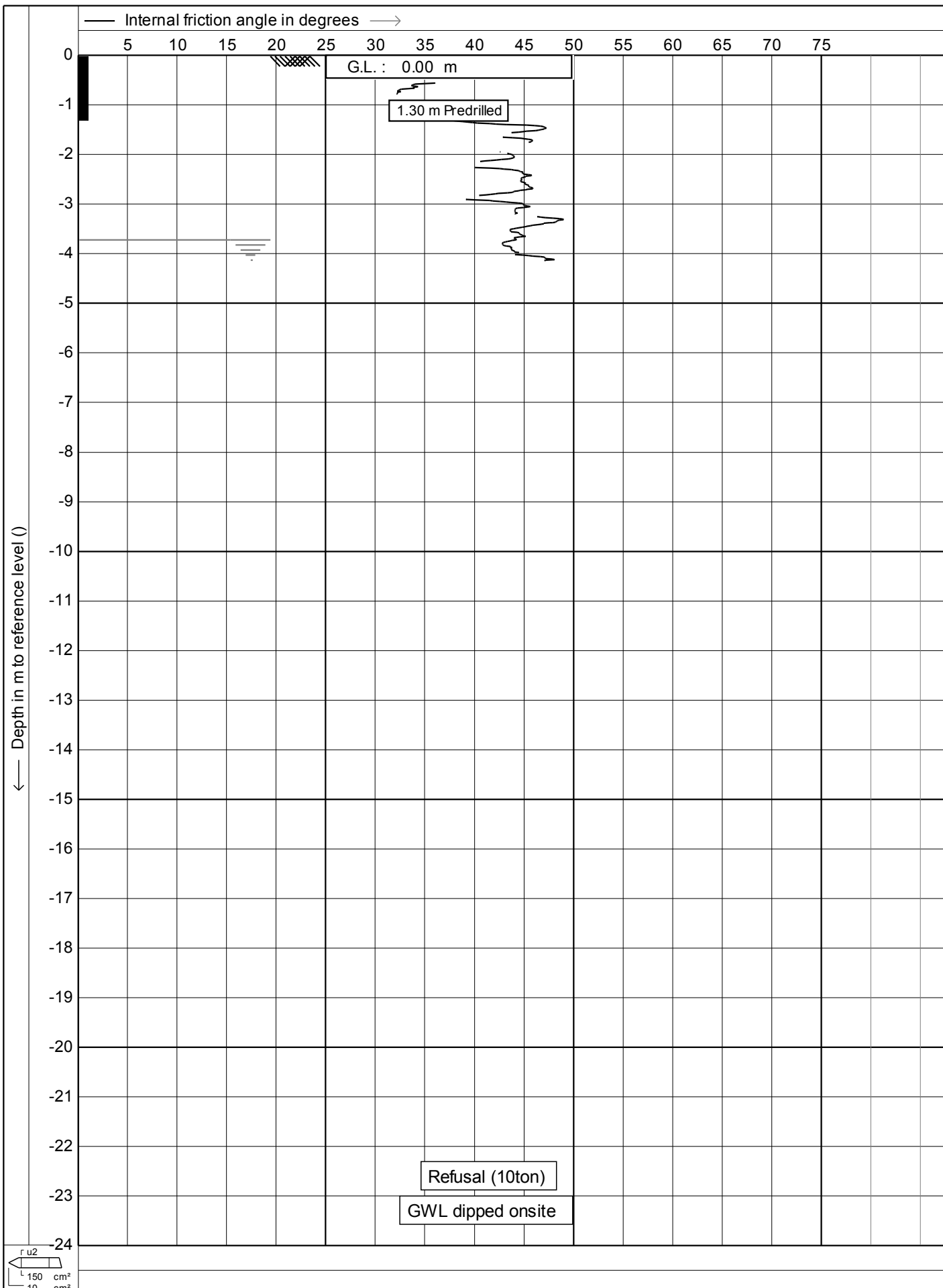


- (0) Not defined
- (1) Sensitive, fine grained
- (2) Organic soils-peats
- (3) Clays-clay to silty clay
- (4) Clayey silt to silty clay
- (5) Sand mixtures
- (6) Sands
- (7) Gravelly sand to sand
- (8) Very stiff sand to clayey sand
- (9) Very stiff fine grained



Soil behaviour type classification after Robertson 1990

	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 04
		13/14

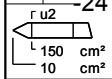
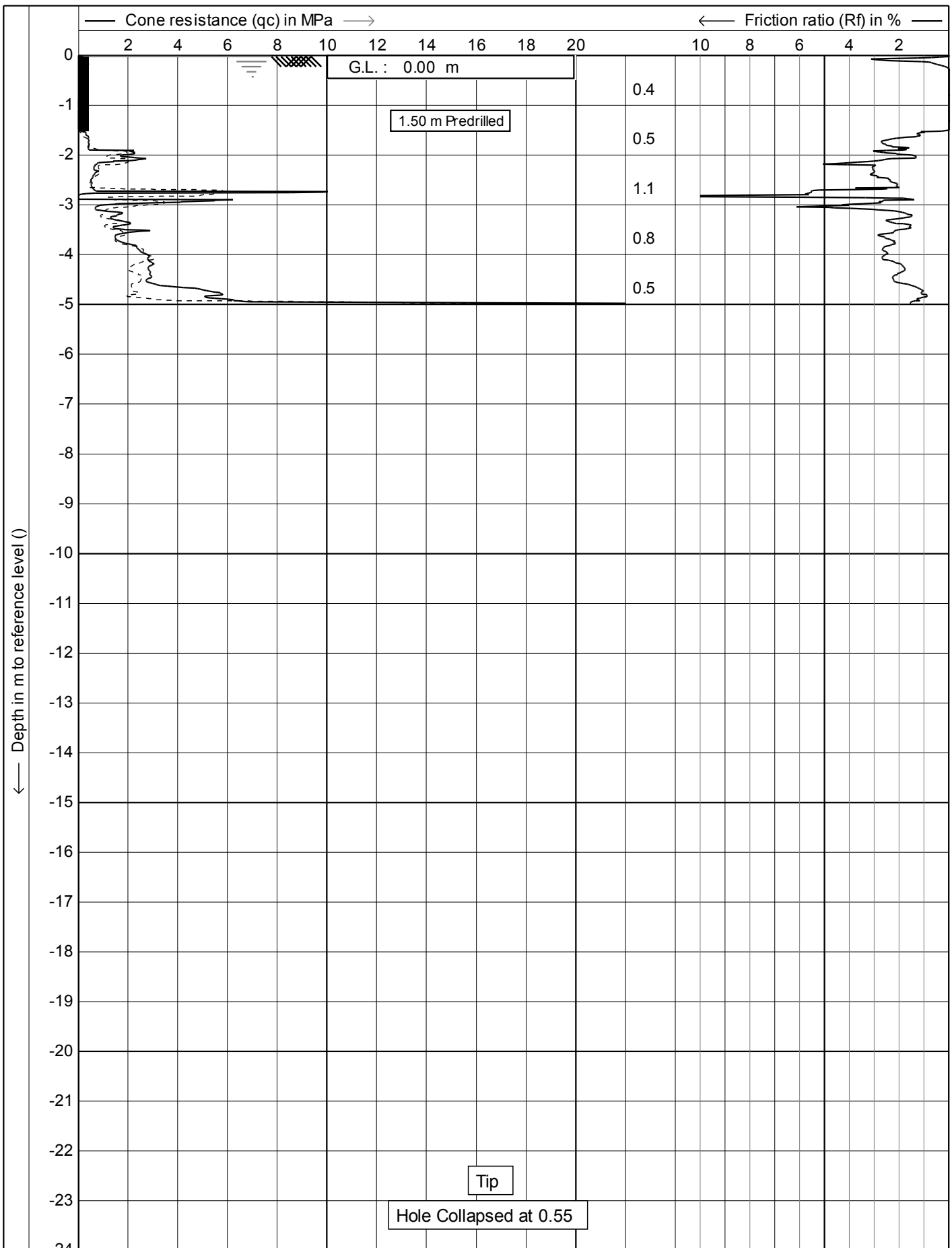


Test according A.S.T.M Standard D 5778-12

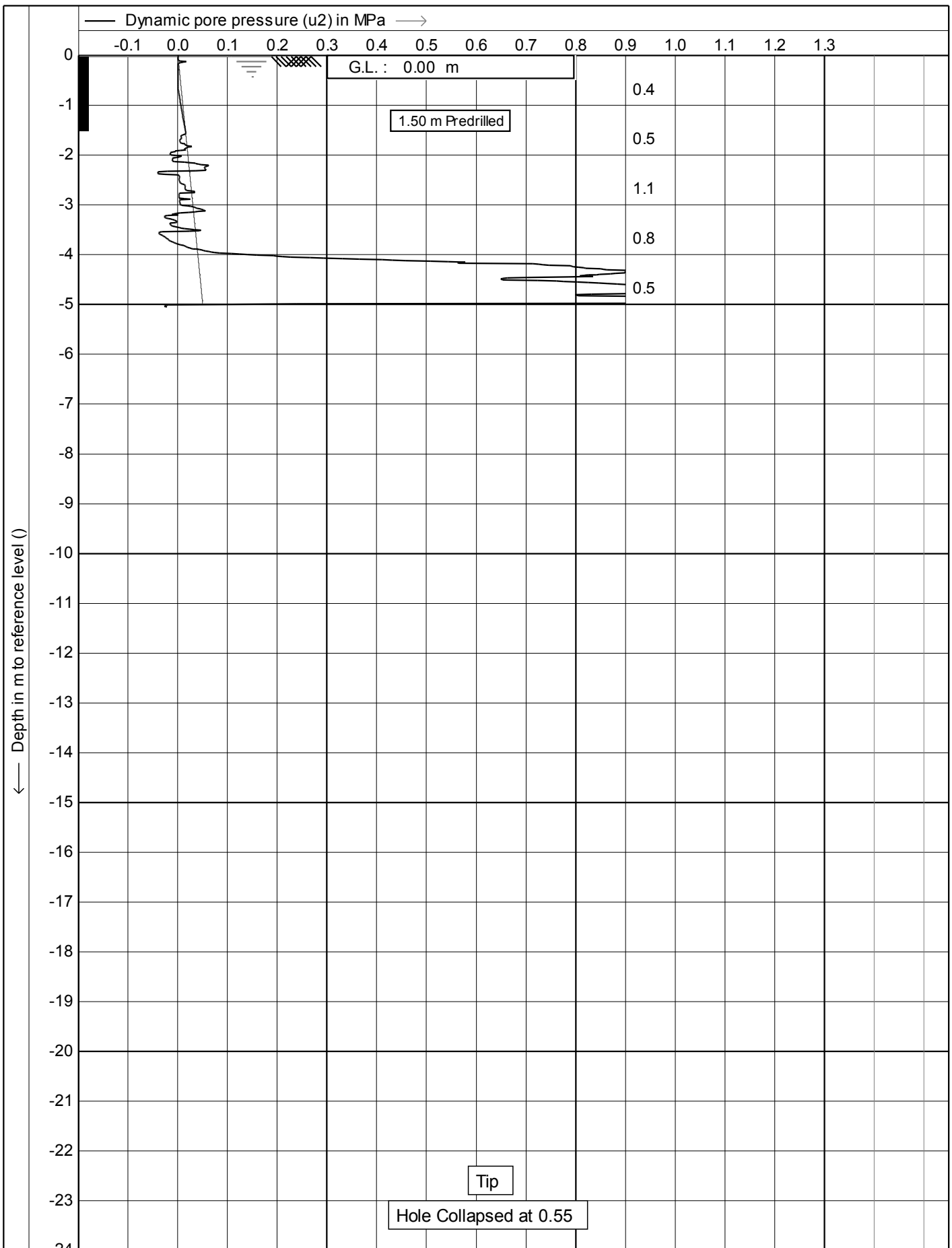
Date : 11/10/2017
 Cone no. : C10CFIP.C14433
 Project no. : 05TT12
 CPT no. : 04



Project : Site Investigations
 Location: Victoria University - Wellington
 Position: 0, 0 RD

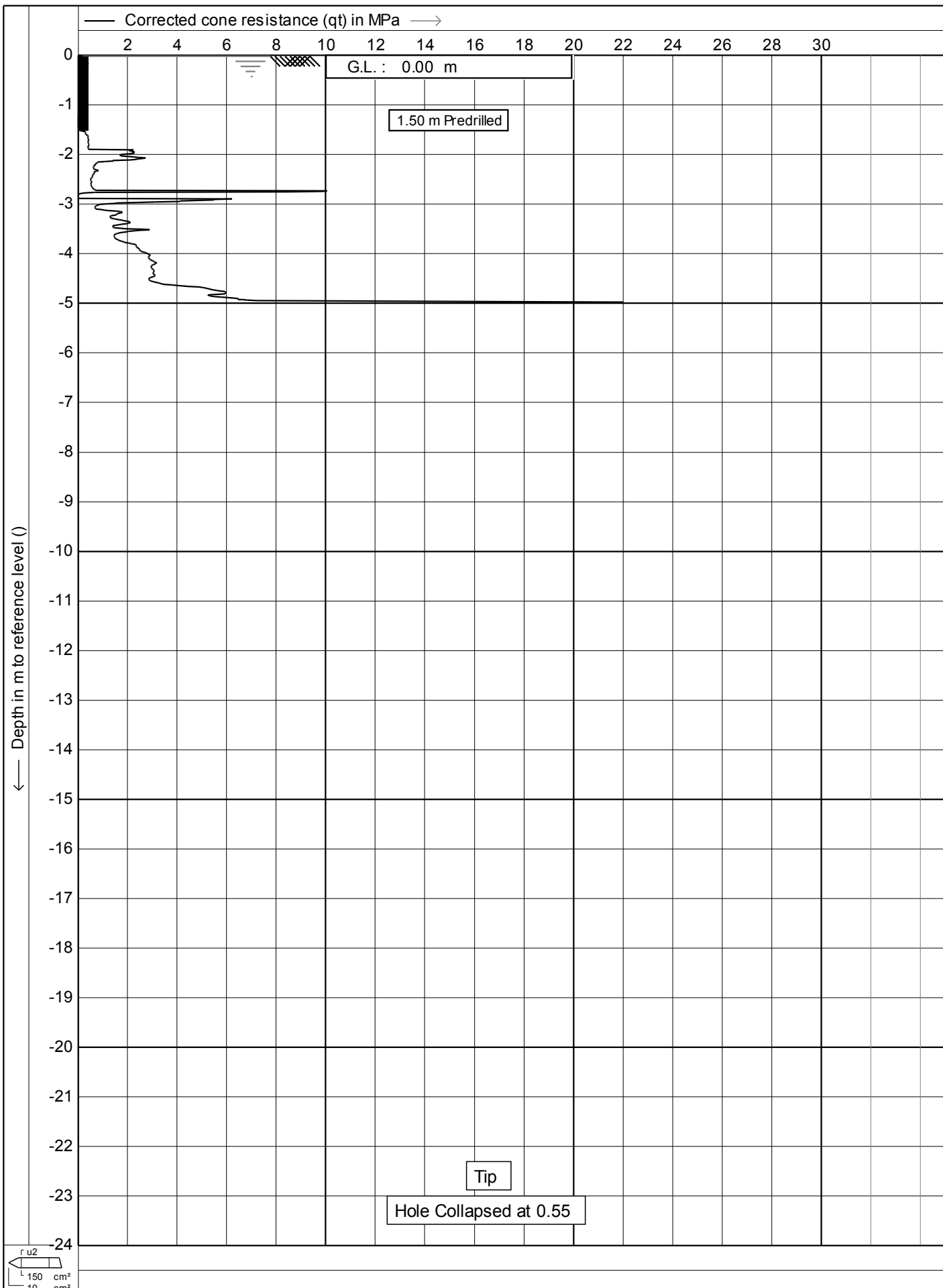


	Test according A.S.T.M Standard D 5778-12		Date : 12/10/2017	
	Project : Site Investigations		Cone no. : C10CFIP.C14433	
	Location: Victoria University - Wellington		Project no. : 05TT12	
	Position: 0, 0 RD		CPT no. : 05	1/14



Equilibrium pore pressure (u_0) in MPa \longrightarrow Inclination (I) in degr

	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 05
		2/14

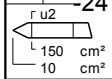
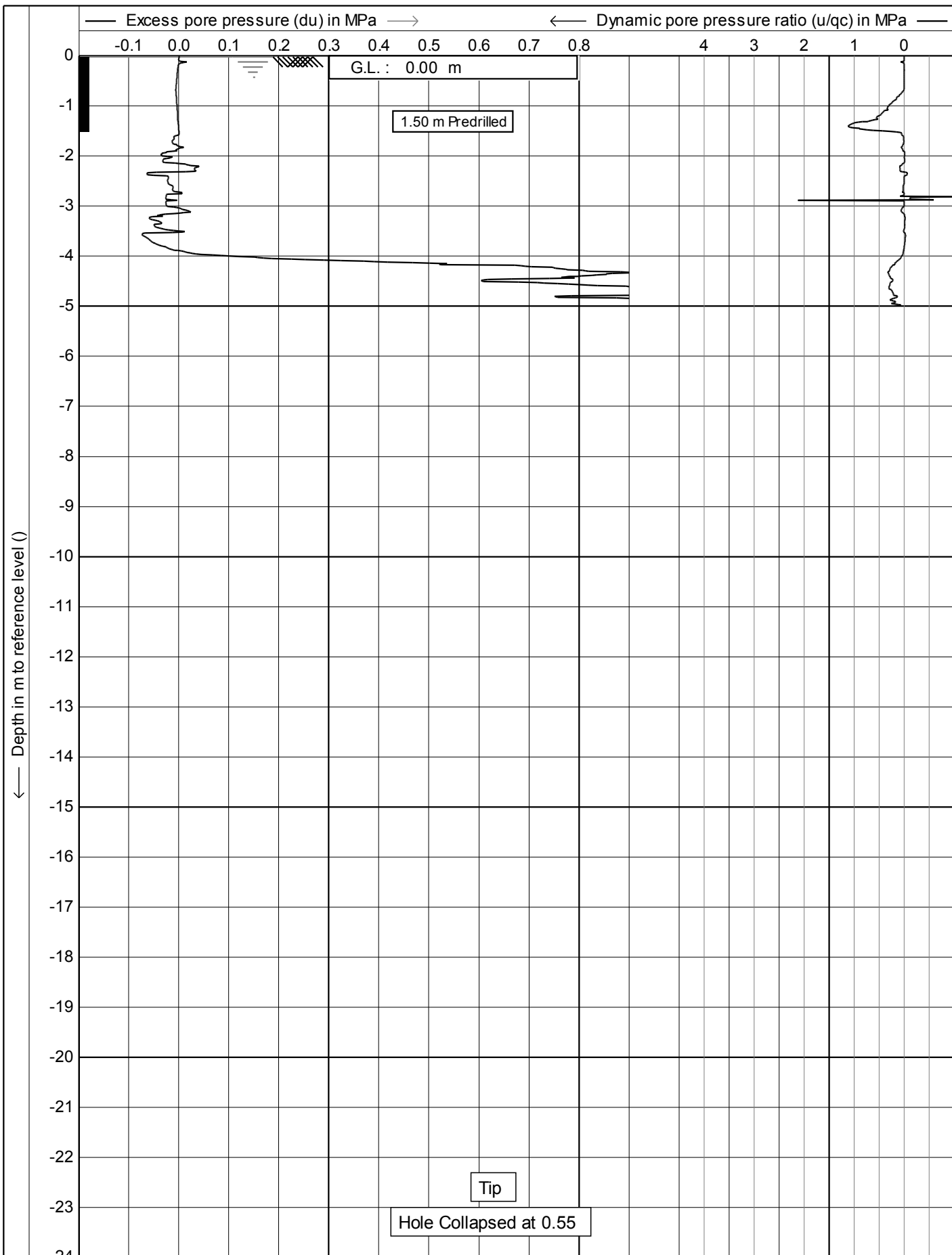


Test according A.S.T.M Standard D 5778-12

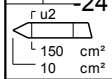
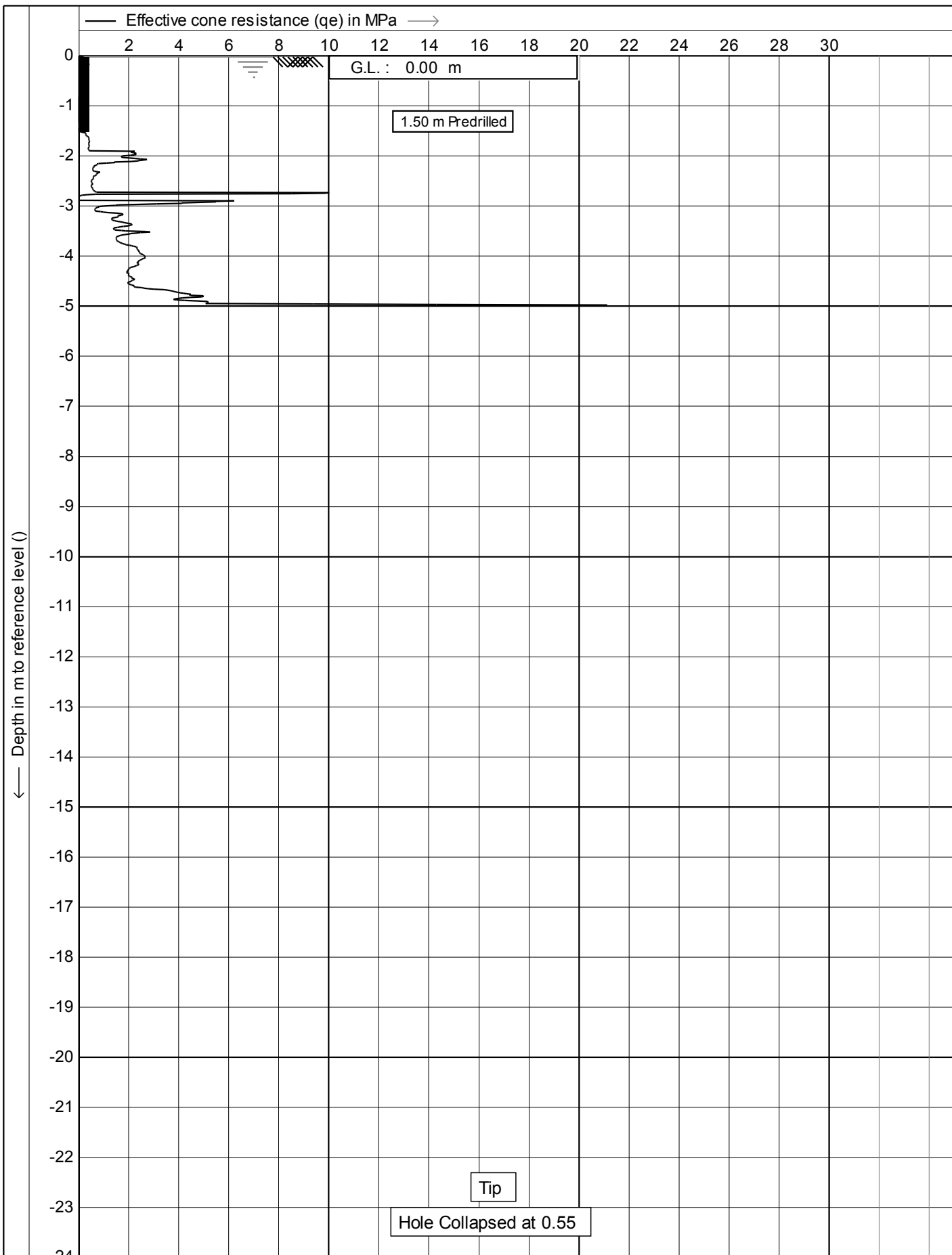
Date : 12/10/2017
 Cone no. : C10CFIP.C14433
 Project no. : 05TT12
 CPT no. : 05

Project : Site Investigations
 Location: Victoria University - Wellington
 Position: 0, 0 RD





	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 05
		4/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

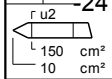
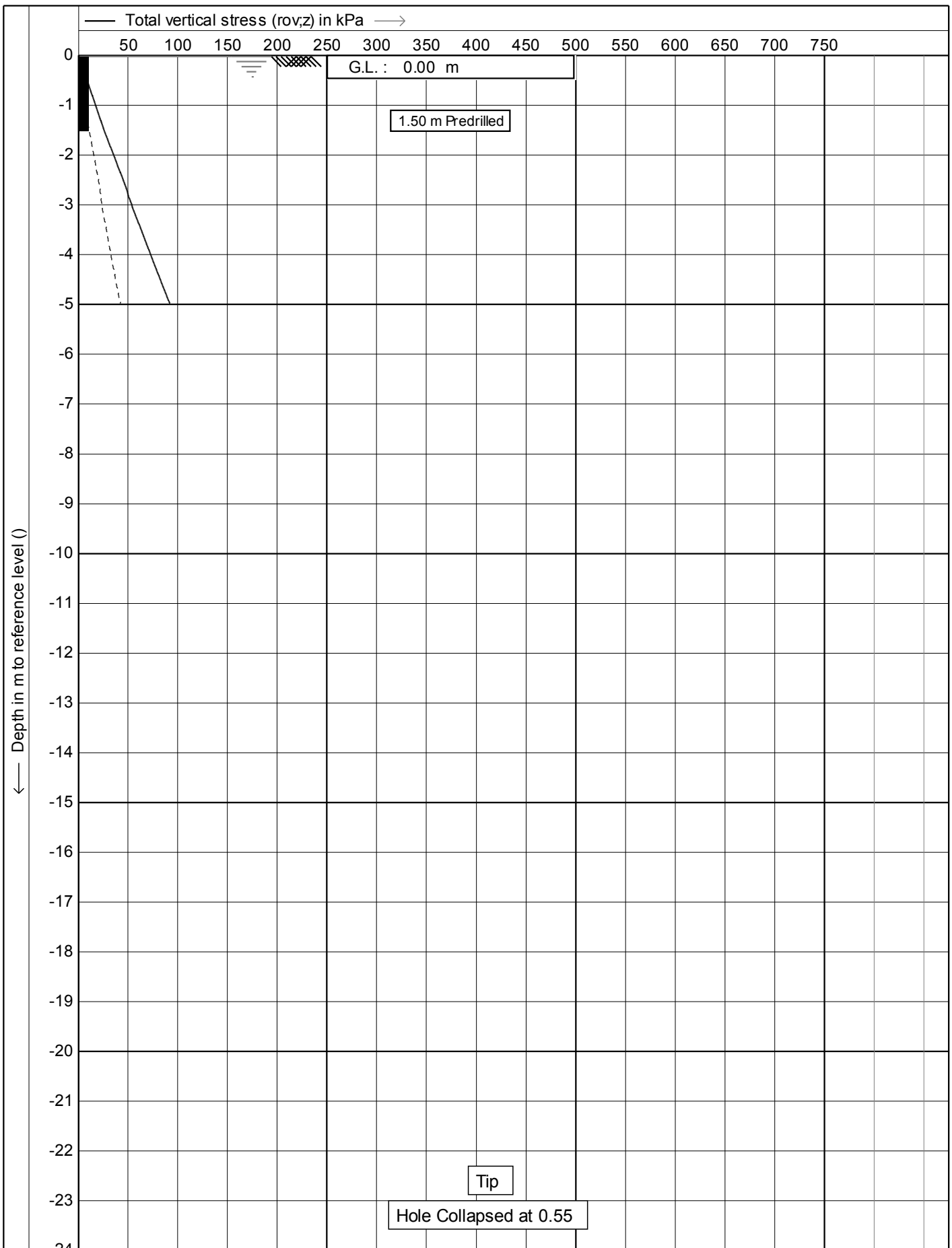
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Date : **12/10/2017**

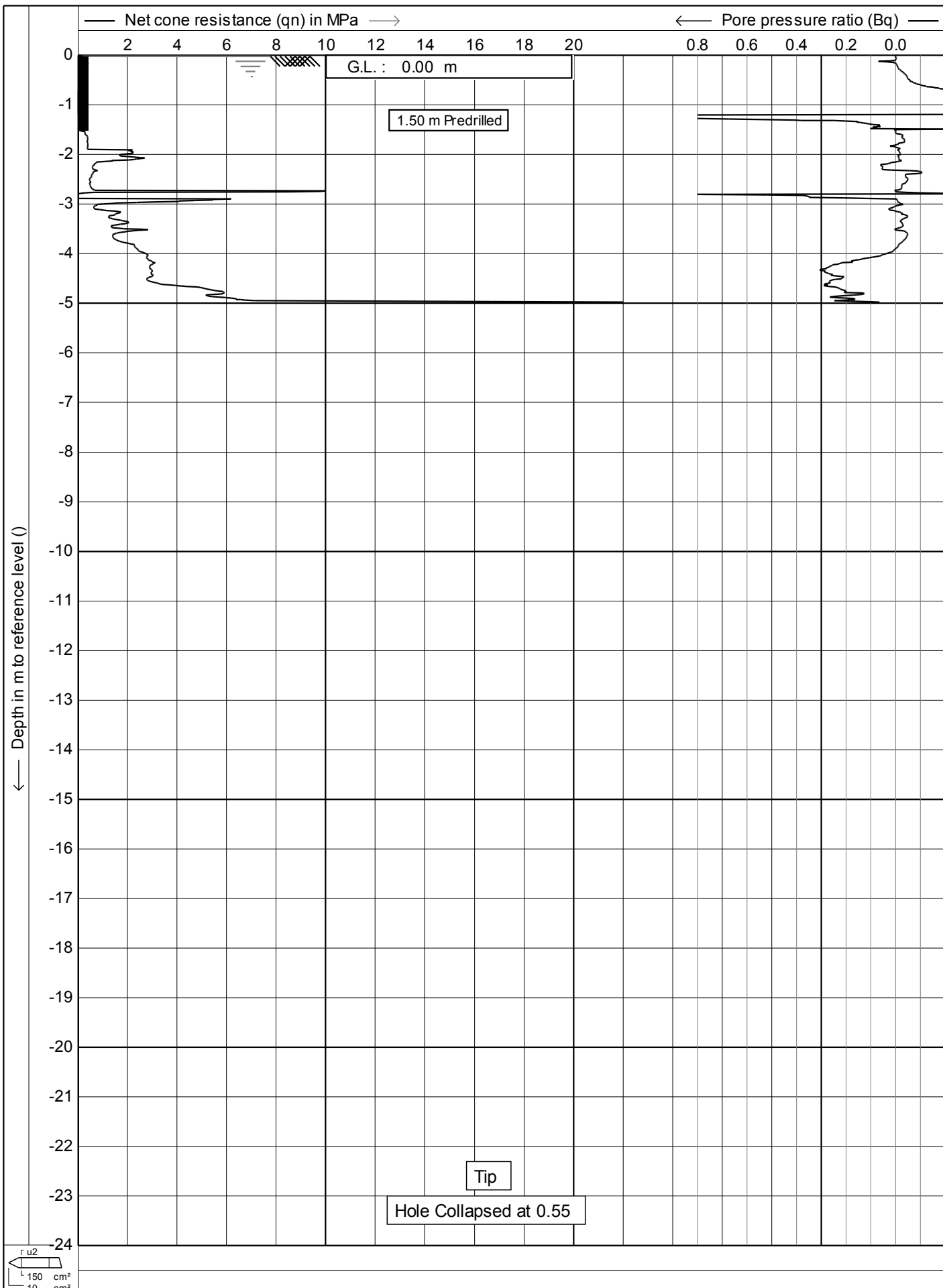
Cone no. : **C10CFIP.C14433**

Project no. : **05TT12**

CPT no. : **05** **5/14**



	Test according A.S.T.M Standard D 5778-12		Date : 12/10/2017	
	Project : Site Investigations		Cone no. : C10CFIP.C14433	
	Location: Victoria University - Wellington		Project no. : 05TT12	
	Position: 0, 0 RD		CPT no. : 05	6/14



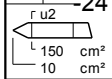
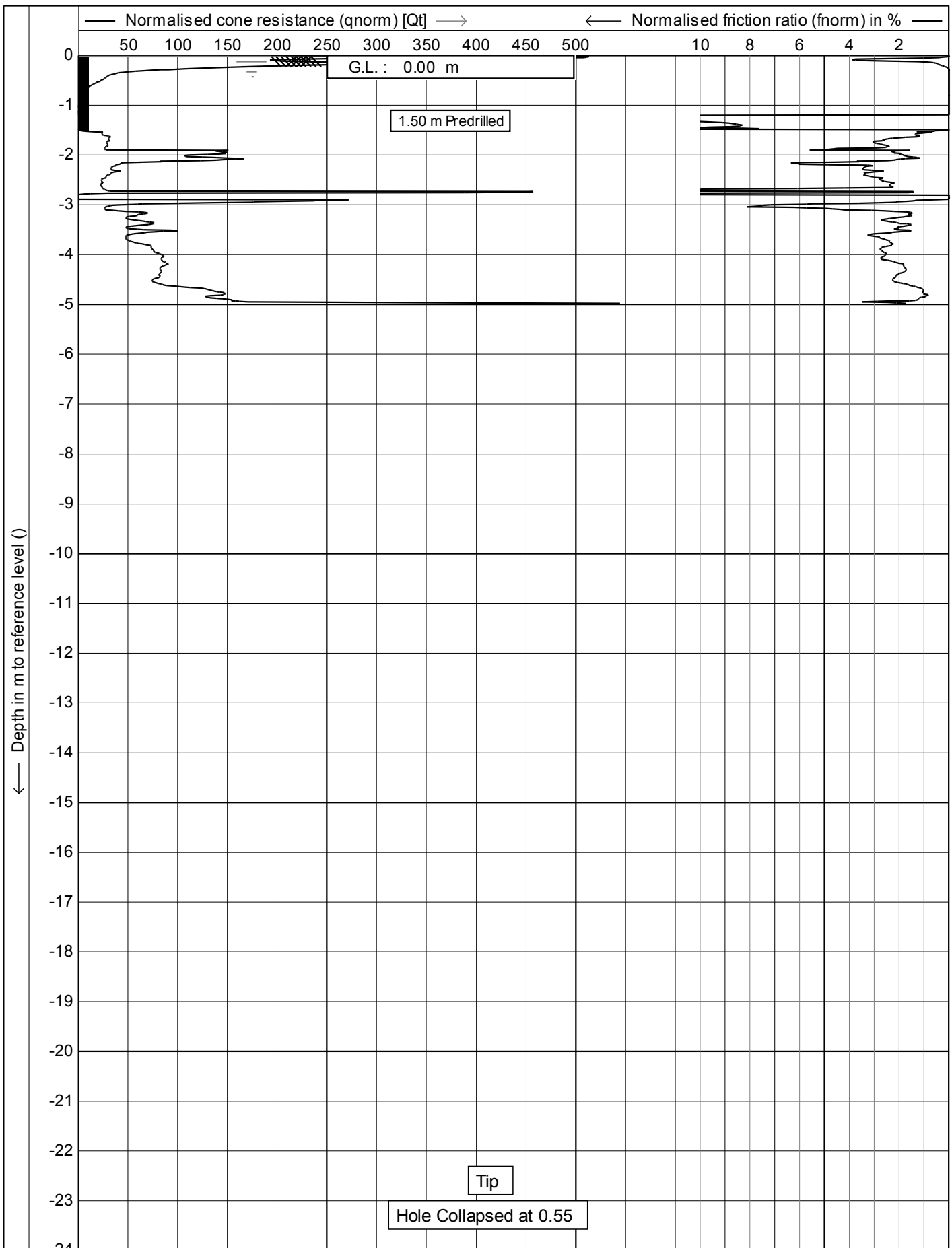
Test according A.S.T.M Standard D 5778-12

Date : 12/10/2017
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 Project no. : 05TT12
 CPT no. : 05

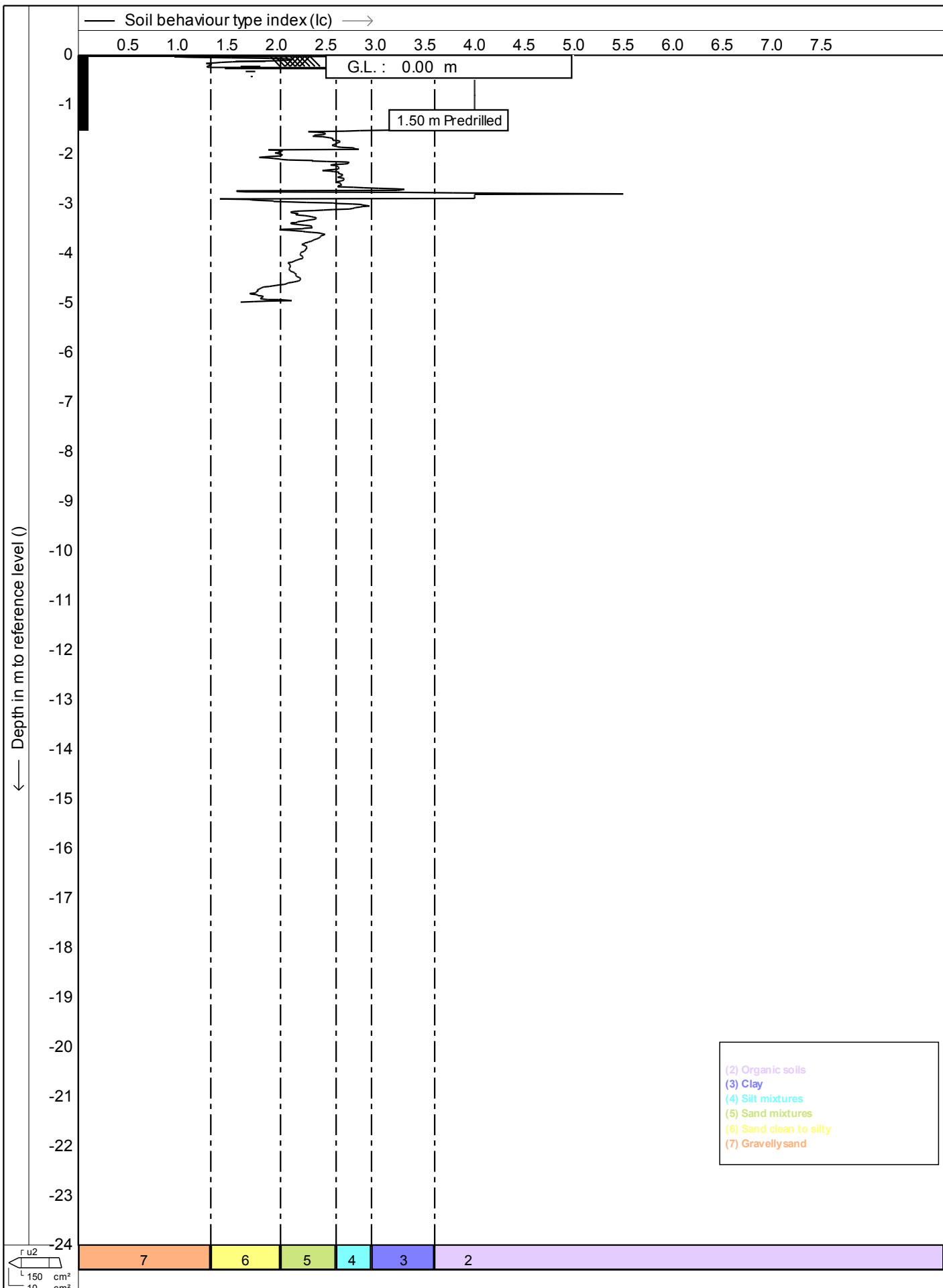
Project : Site Investigations
 Location: Victoria University - Wellington
 Position: 0, 0 RD

7/14



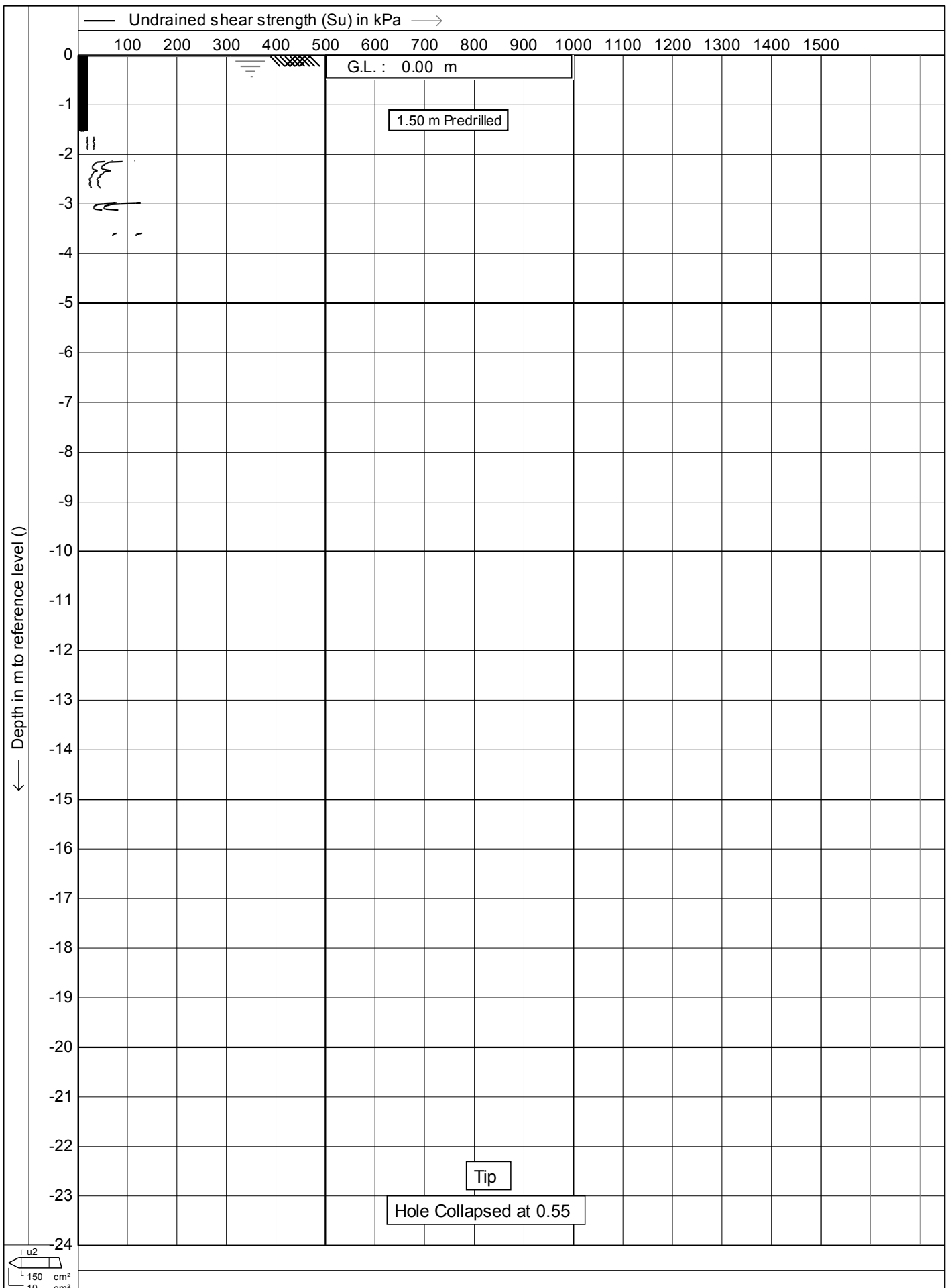


	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 05
		8/14



r_{u2}
 $\frac{1}{150} \text{ cm}^2$
 $\frac{1}{10} \text{ cm}^2$

	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 05
		9/14

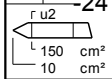
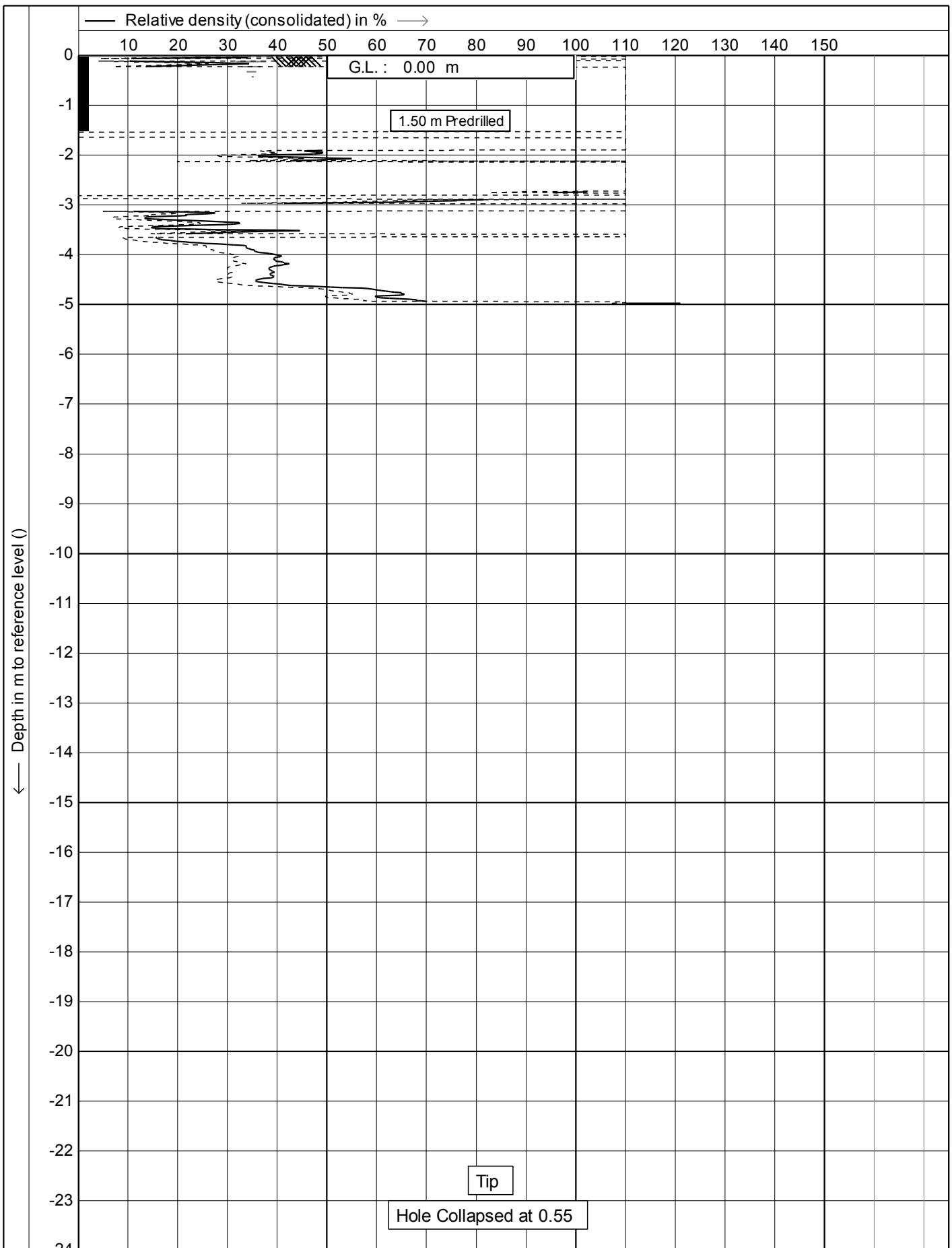


Test according A.S.T.M Standard D 5778-12

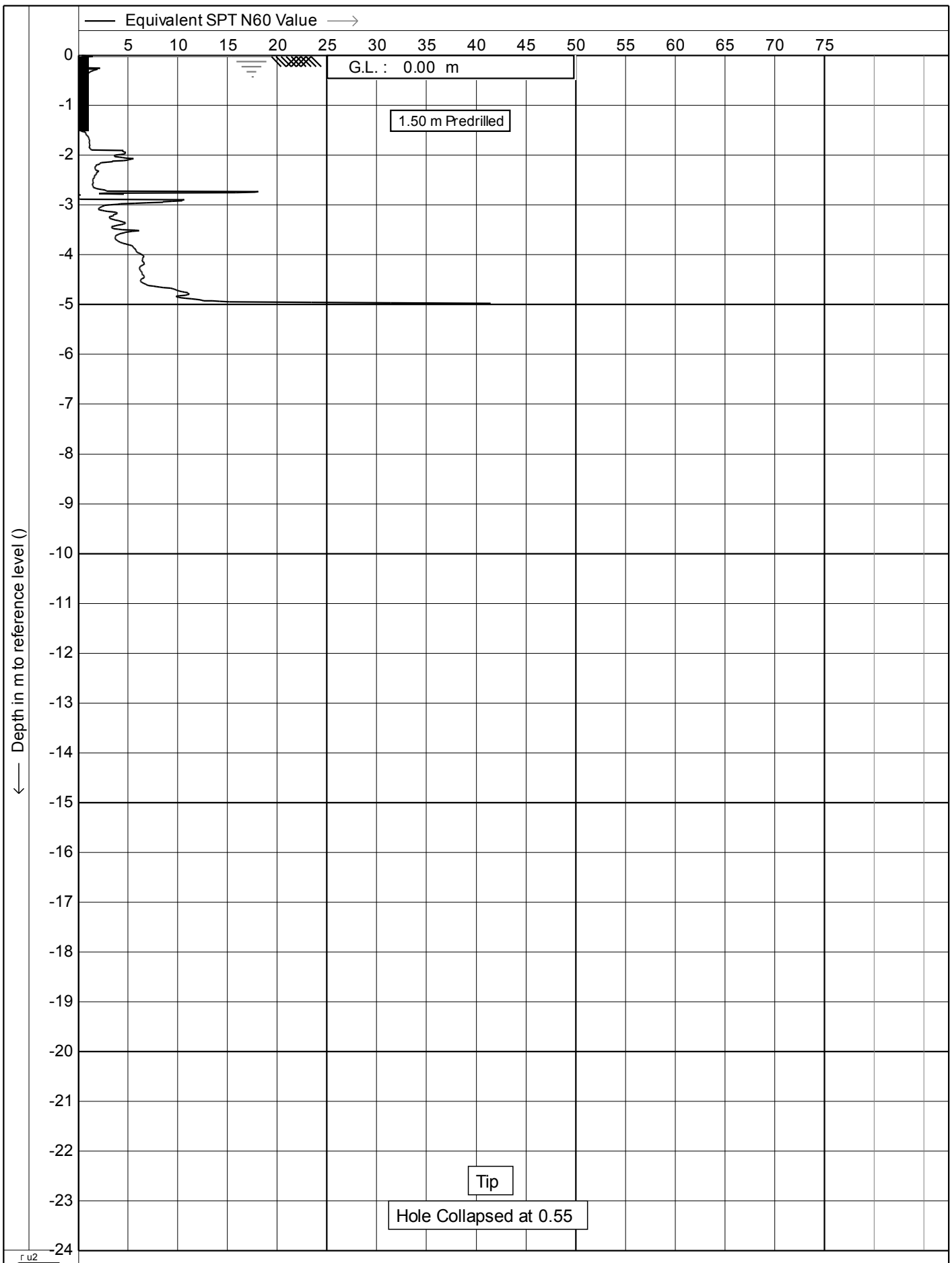
Date : 12/10/2017
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 Project no. : 05TT12
 CPT no. : 05



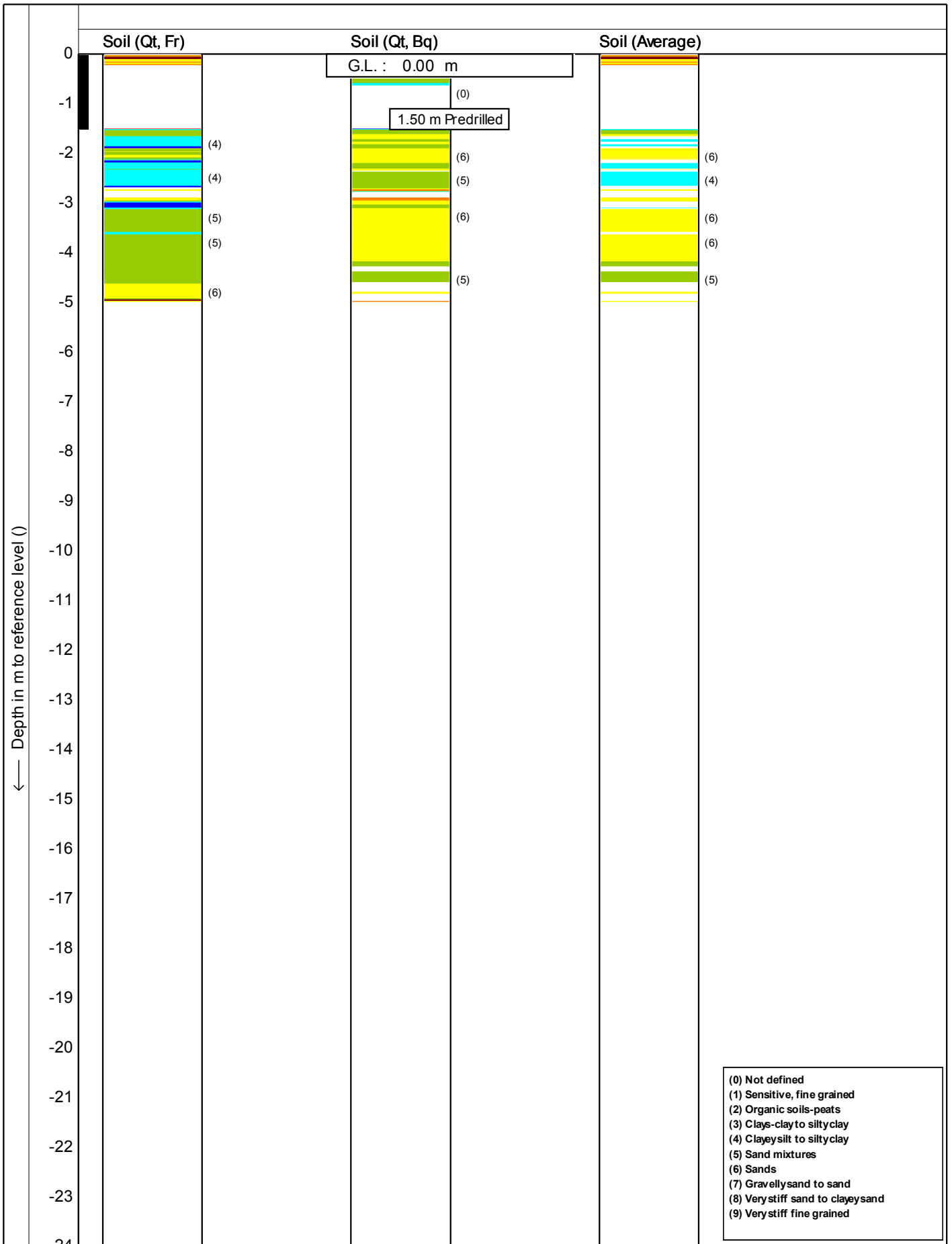
Project : Site Investigations
 Location: Victoria University - Wellington
 Position: 0, 0 RD



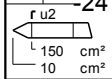
	Test according A.S.T.M Standard D 5778-12		Date : 12/10/2017	
	Project : Site Investigations		Cone no. : C10CFIP.C14433	
	Location: Victoria University - Wellington		Project no. : 05TT12	
	Position: 0, 0 RD		CPT no. : 05	11/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 05
		12/14

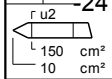
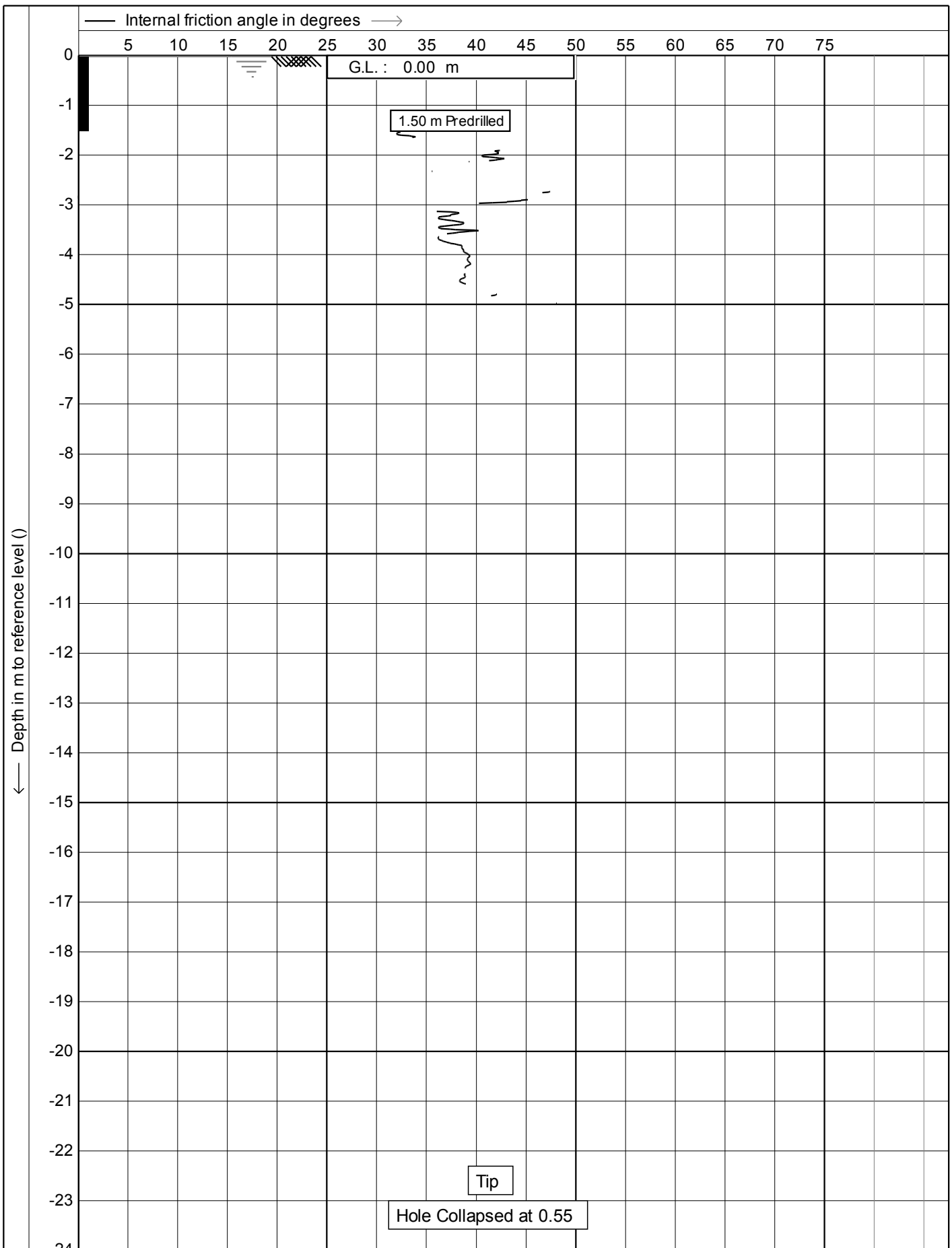



- (0) Not defined
- (1) Sensitive, fine grained
- (2) Organic soils-peats
- (3) Clays-clay to silty clay
- (4) Clayey silt to silty clay
- (5) Sand mixtures
- (6) Sands
- (7) Gravelly sand to sand
- (8) Very stiff sand to clayey sand
- (9) Very stiff fine grained

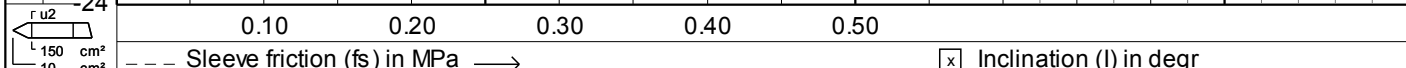
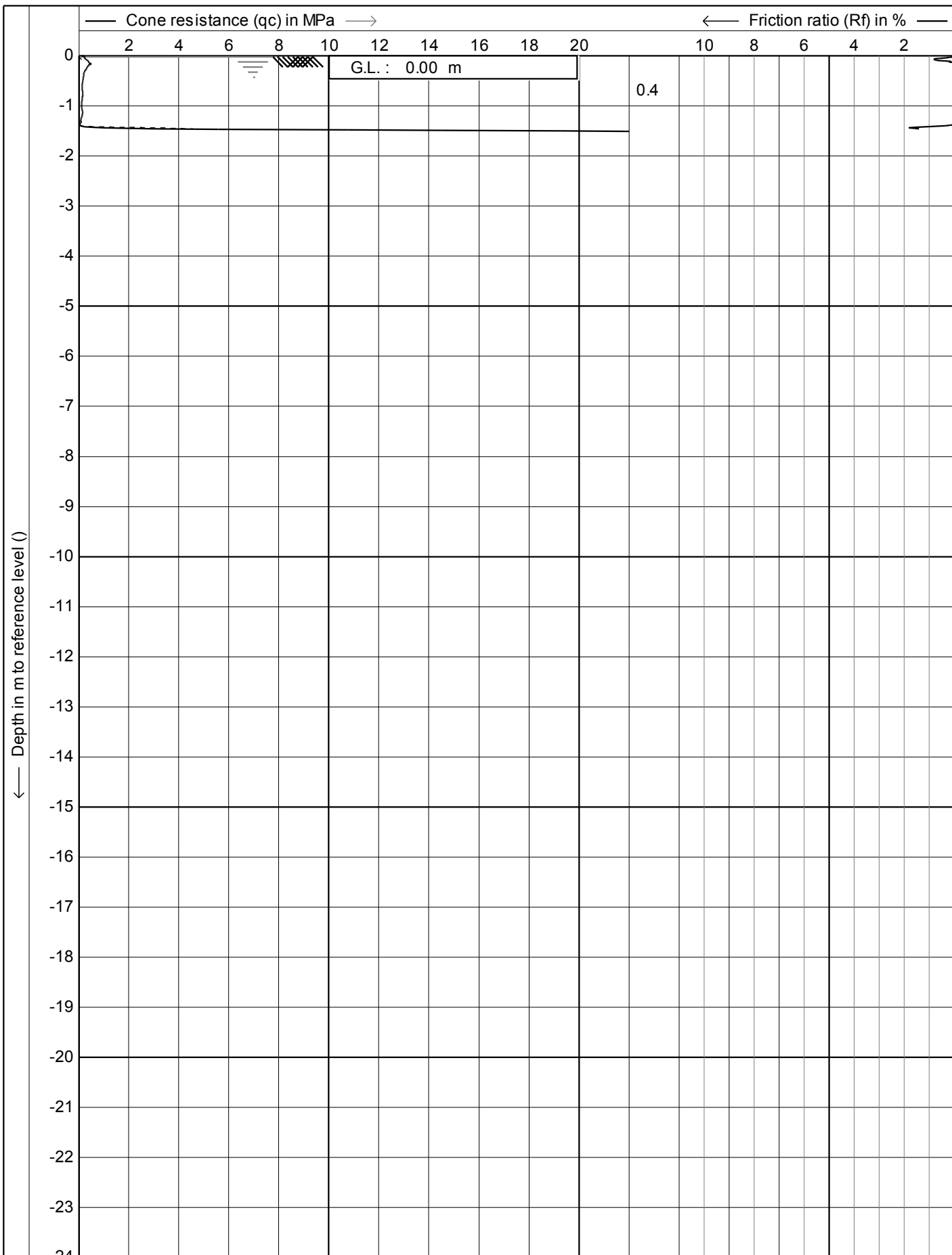


Soil behaviour type classification after Robertson 1990

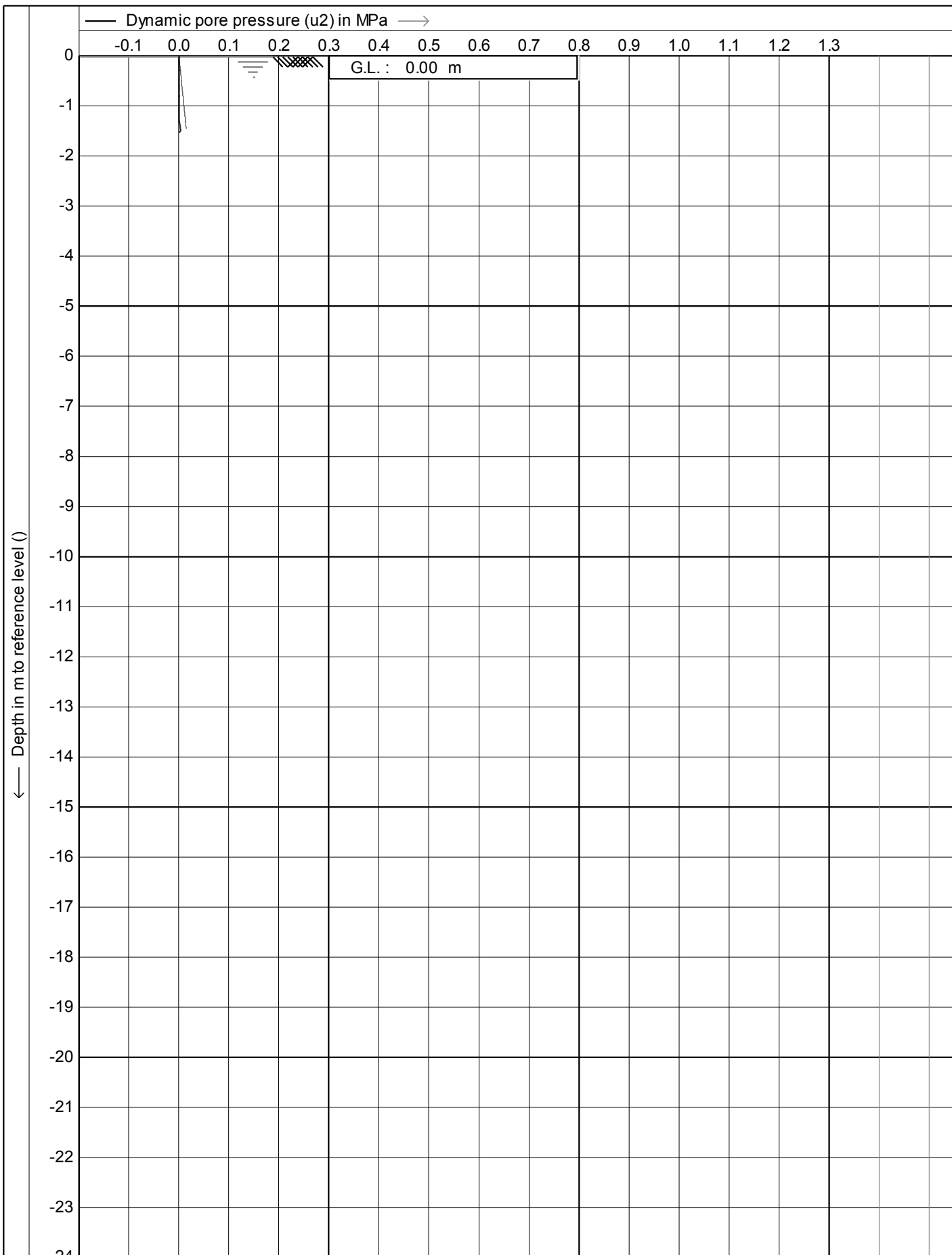
	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017	
	Project : Site Investigations	Cone no. : C10CFIIP.C14433	
	Location: Victoria University - Wellington	Project no. : 05TT12	
	Position: 0, 0 RD	CPT no. : 05	13/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 05
		14/14

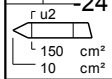
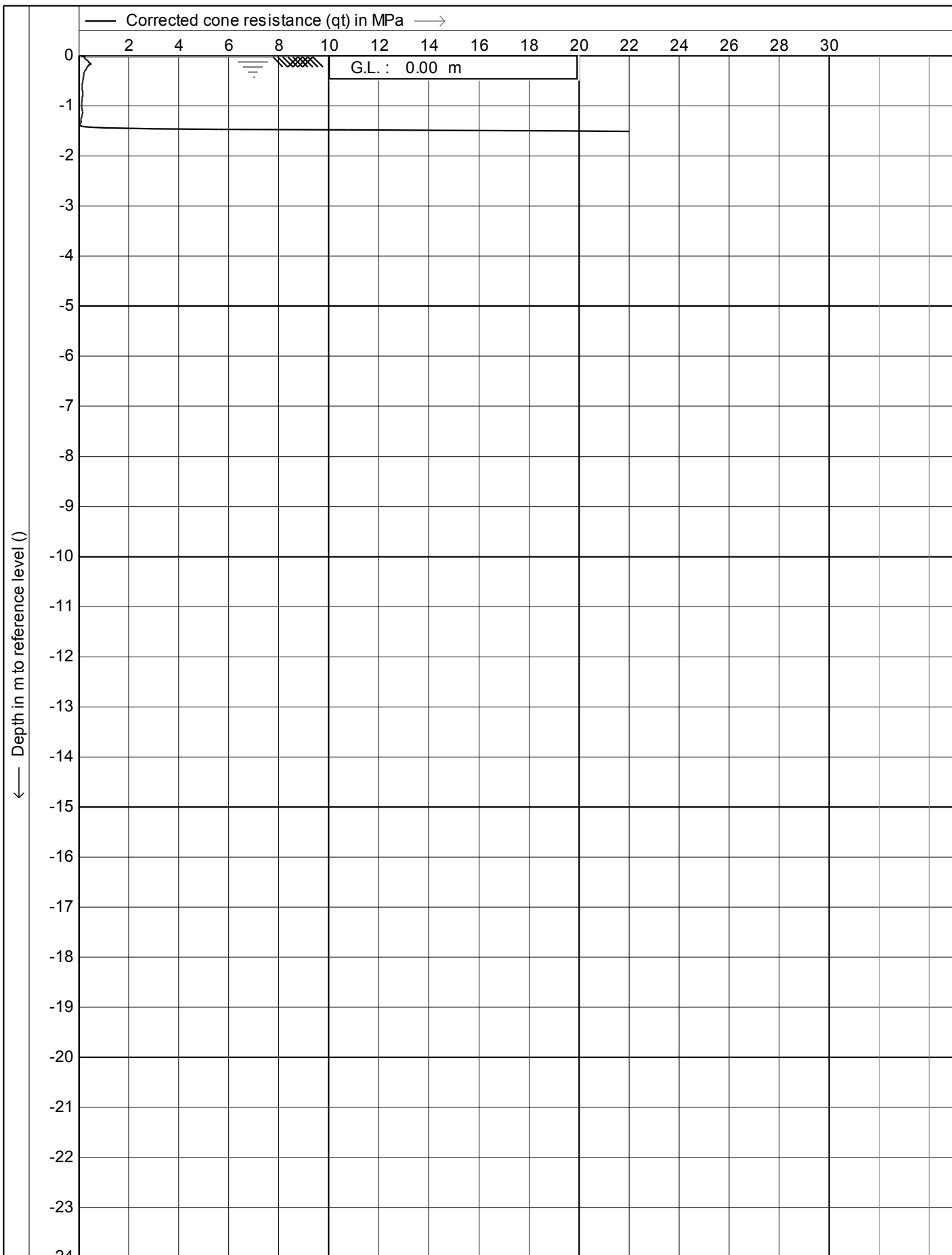


	Test according A.S.T.M Standard D 5778-12		Date : 12/10/2017	
	Project : Site Investigations		Cone no. : C10CFIP.C14433	
	Location: Victoria University - Wellington		Project no. : 05TT12	
	Position: 0, 0 RD		CPT no. : 06	1/14

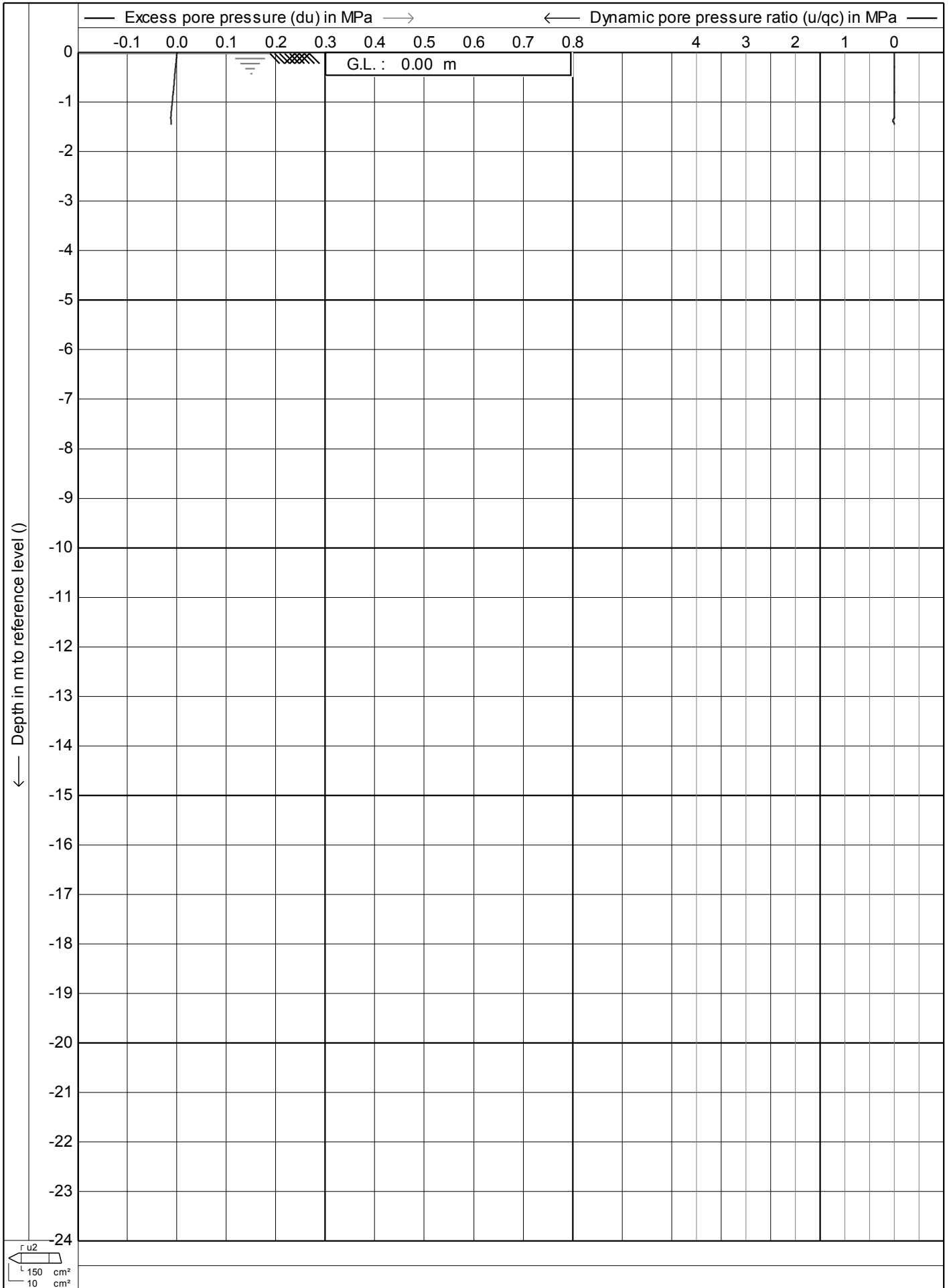


Equilibrium pore pressure (u0) in MPa Inclination (I) in degr

	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 06
		2/14

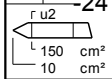
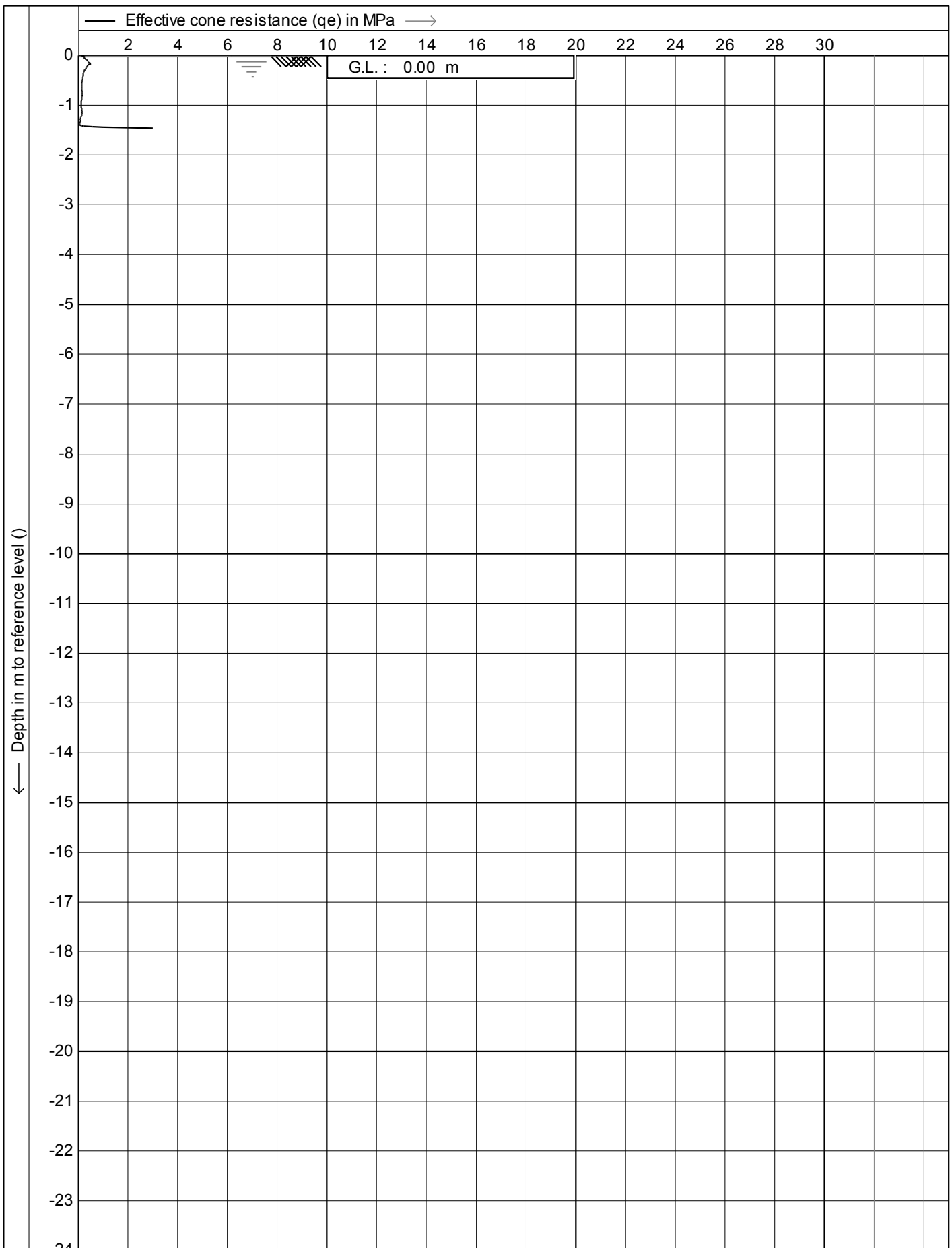


	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 06
		3/14



Test according A.S.T.M Standard D 5778-12
 Project : **Site Investigations**
 Location: **Victoria University - Wellington**
 Position: **0, 0 RD**

Date : **12/10/2017**
 Cone no. : **C10CFIP.C14433**
 Project no. : **05TT12**
 CPT no. : **06** **4/14**



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

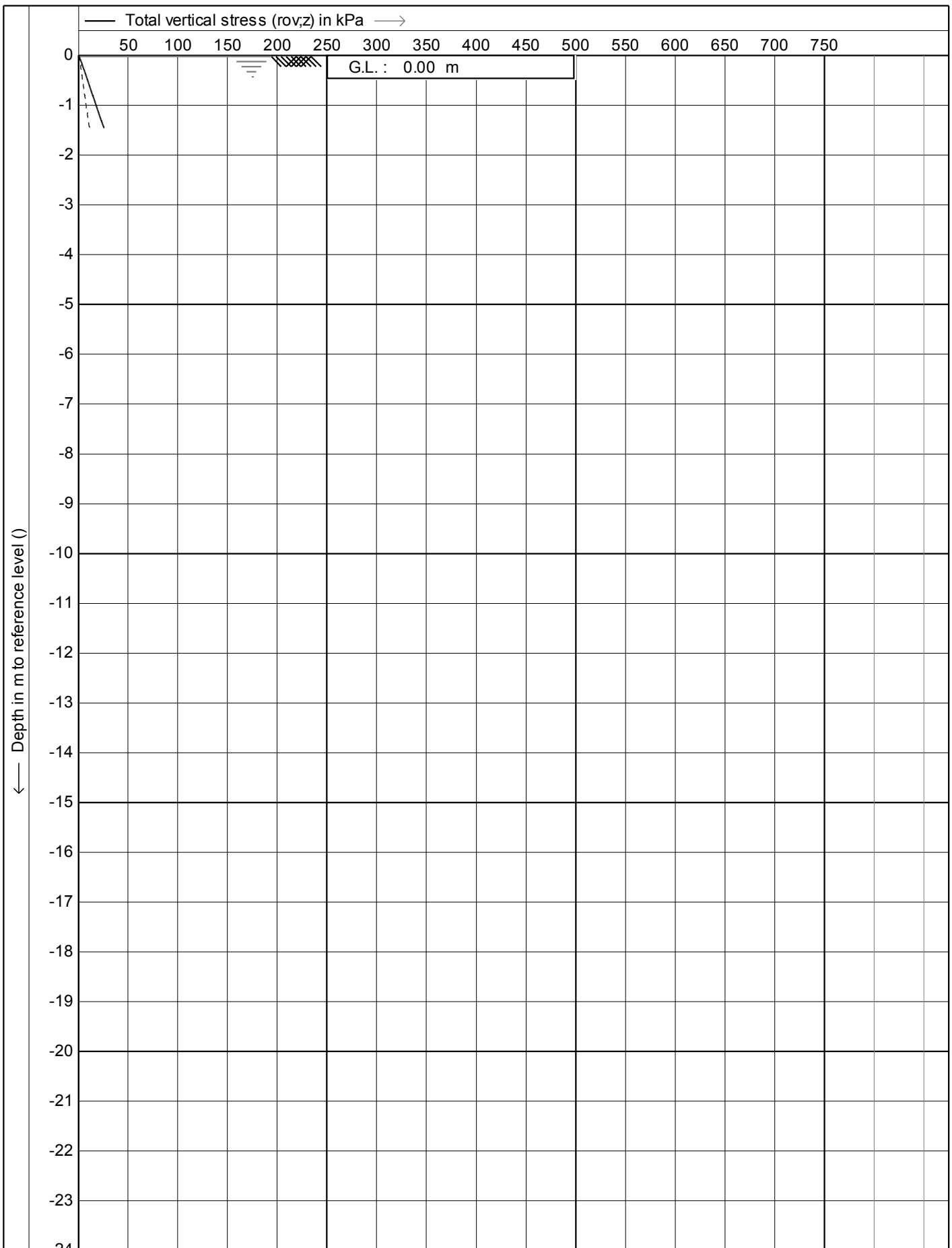
Position: **0, 0 RD**

Date : **12/10/2017**

Cone no. : **C10CFIP.C14433**

Project no. : **05TT12**

CPT no. : **06** **5/14**



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

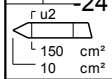
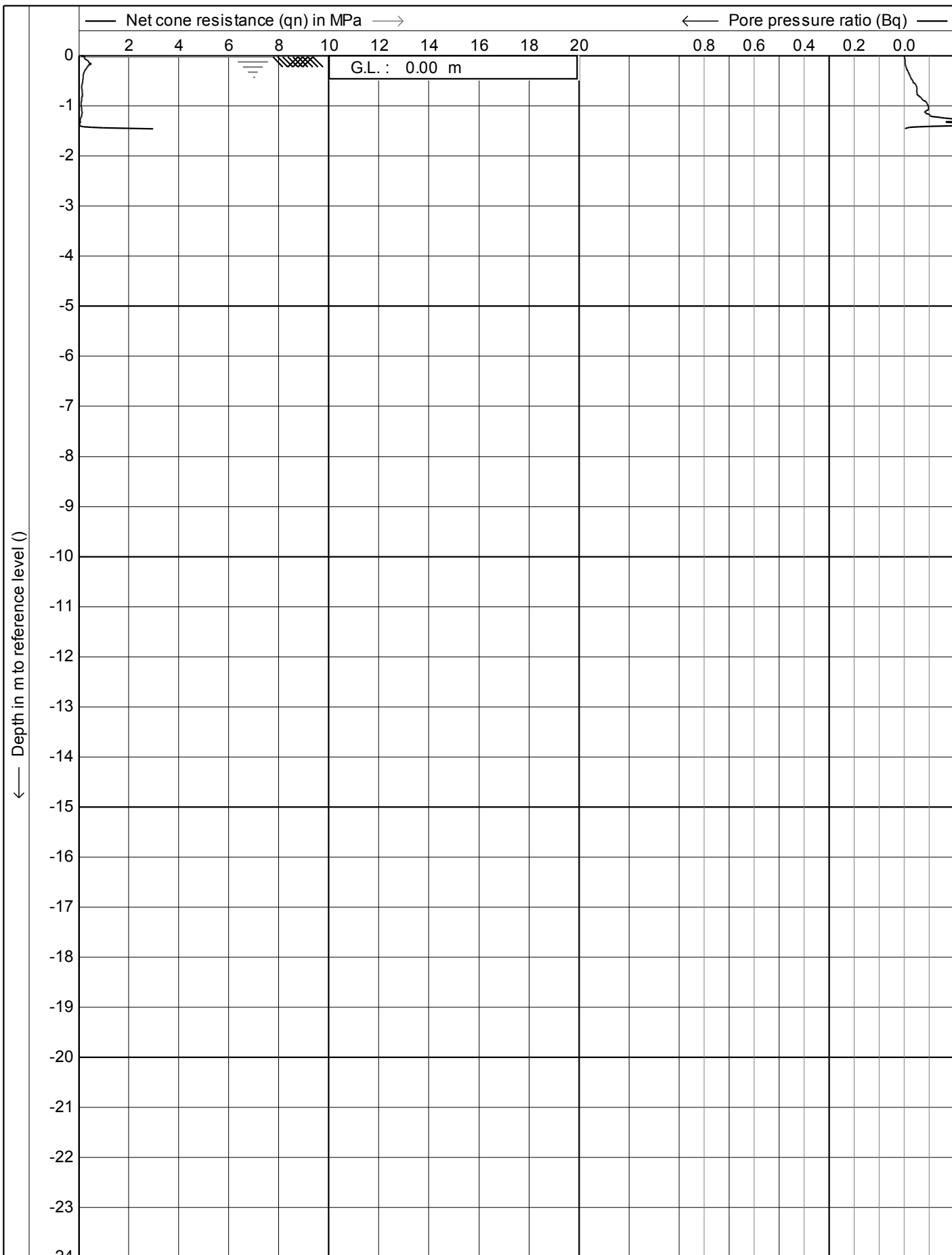
Position: **0, 0 RD**

Date : **12/10/2017**

Cone no. : **C10CFIP.C14433**

Project no. : **05TT12**

CPT no. : **06** **6/14**



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

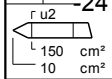
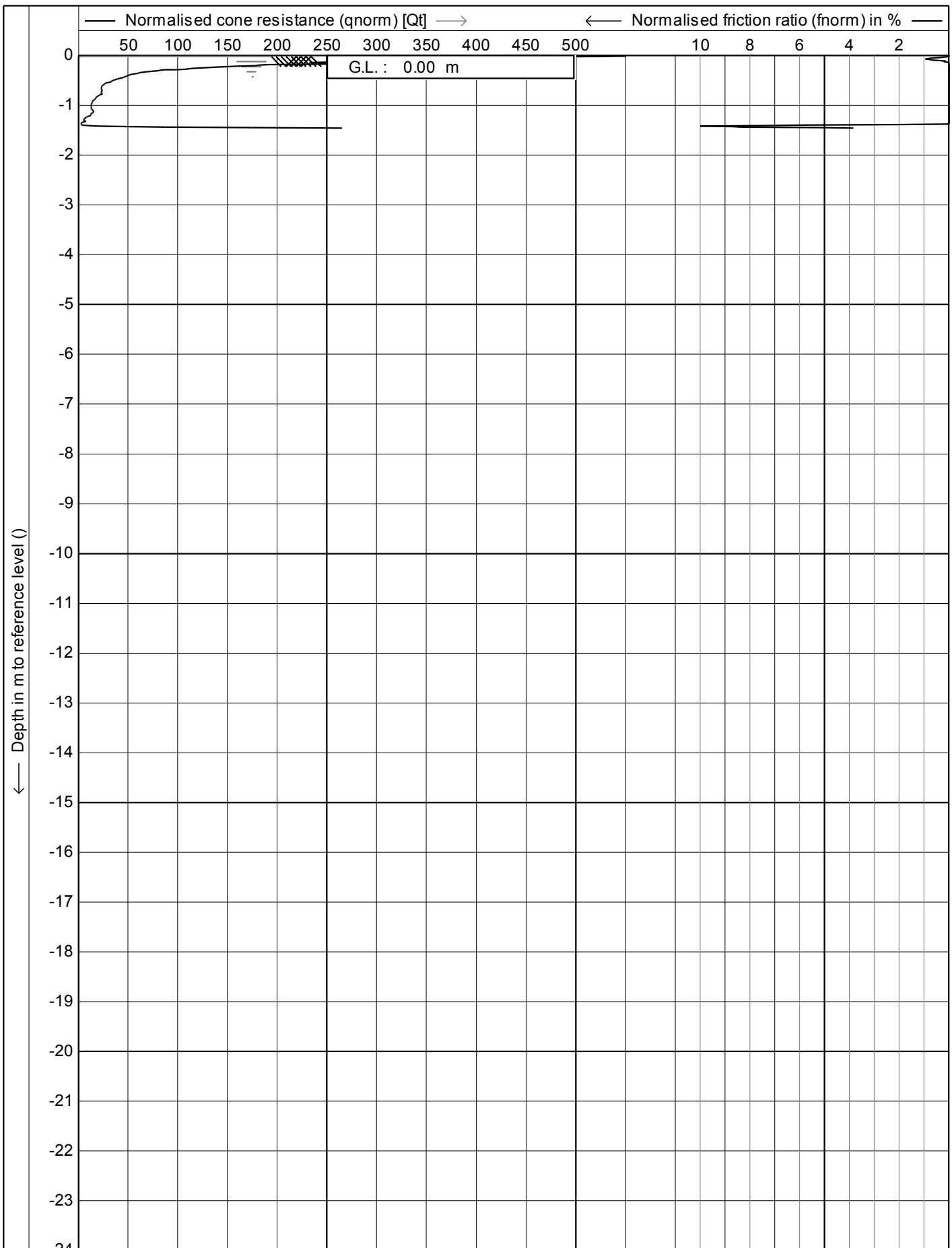
Position: **0, 0 RD**

Date : **12/10/2017**

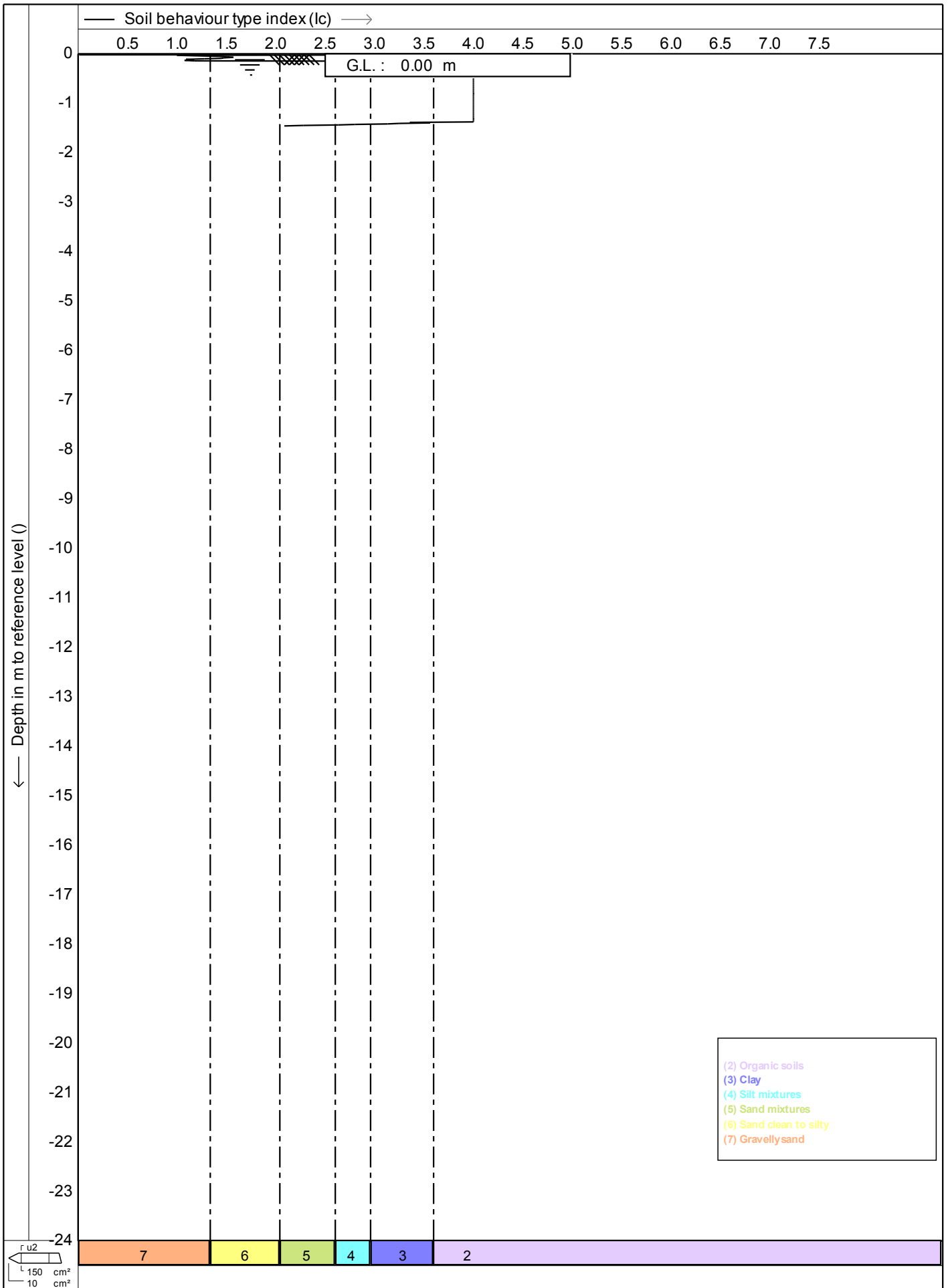
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Project no. : **05TT12**

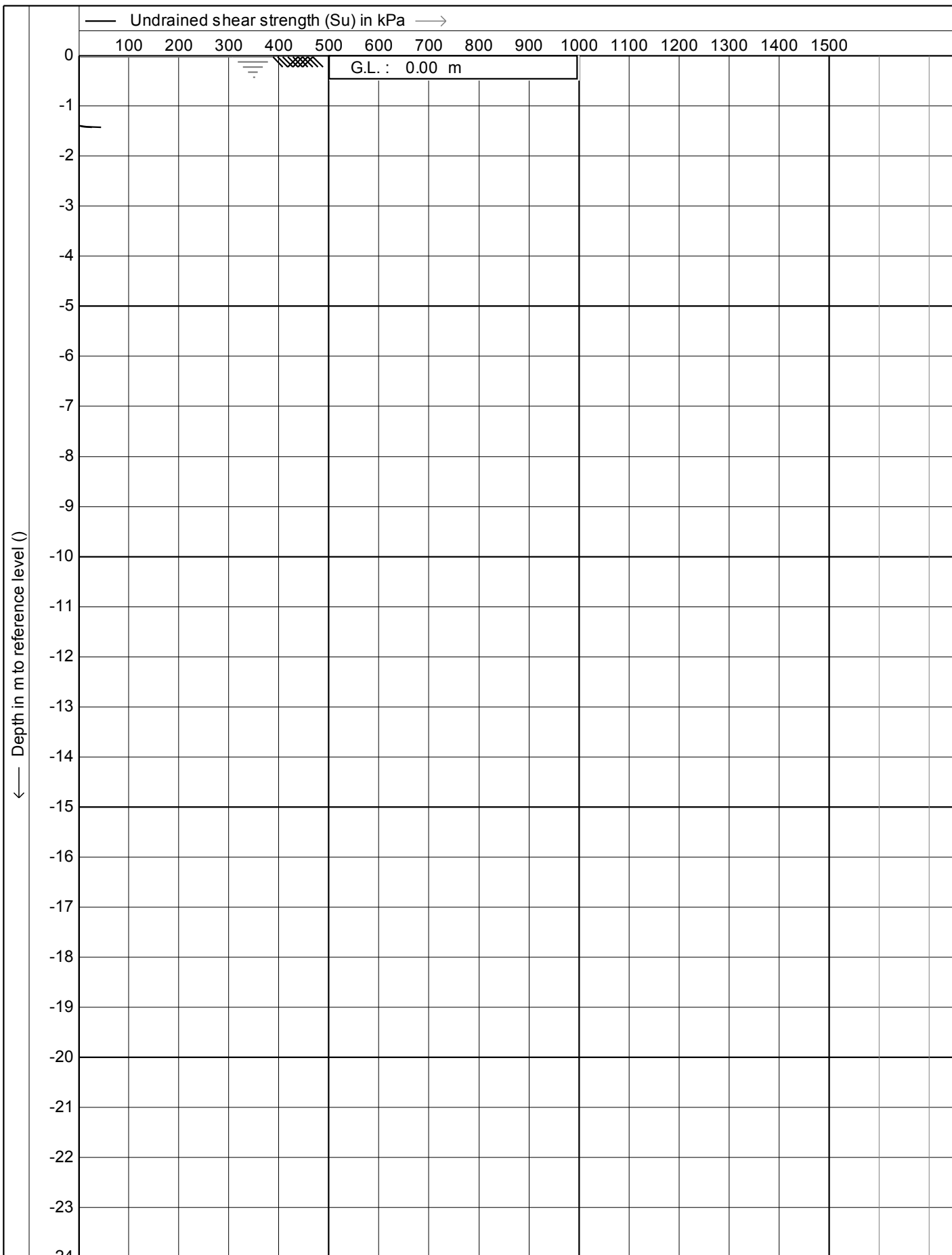
CPT no. : **06**



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 06 8/14



Test according A.S.T.M Standard D 5778-12 Project : Site Investigations Location: Victoria University - Wellington Position: 0, 0 RD	Date : 12/10/2017
	Cone no. : C10CFIP.C14433
	Project no. : 05TT12
	CPT no. : 06
	9/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

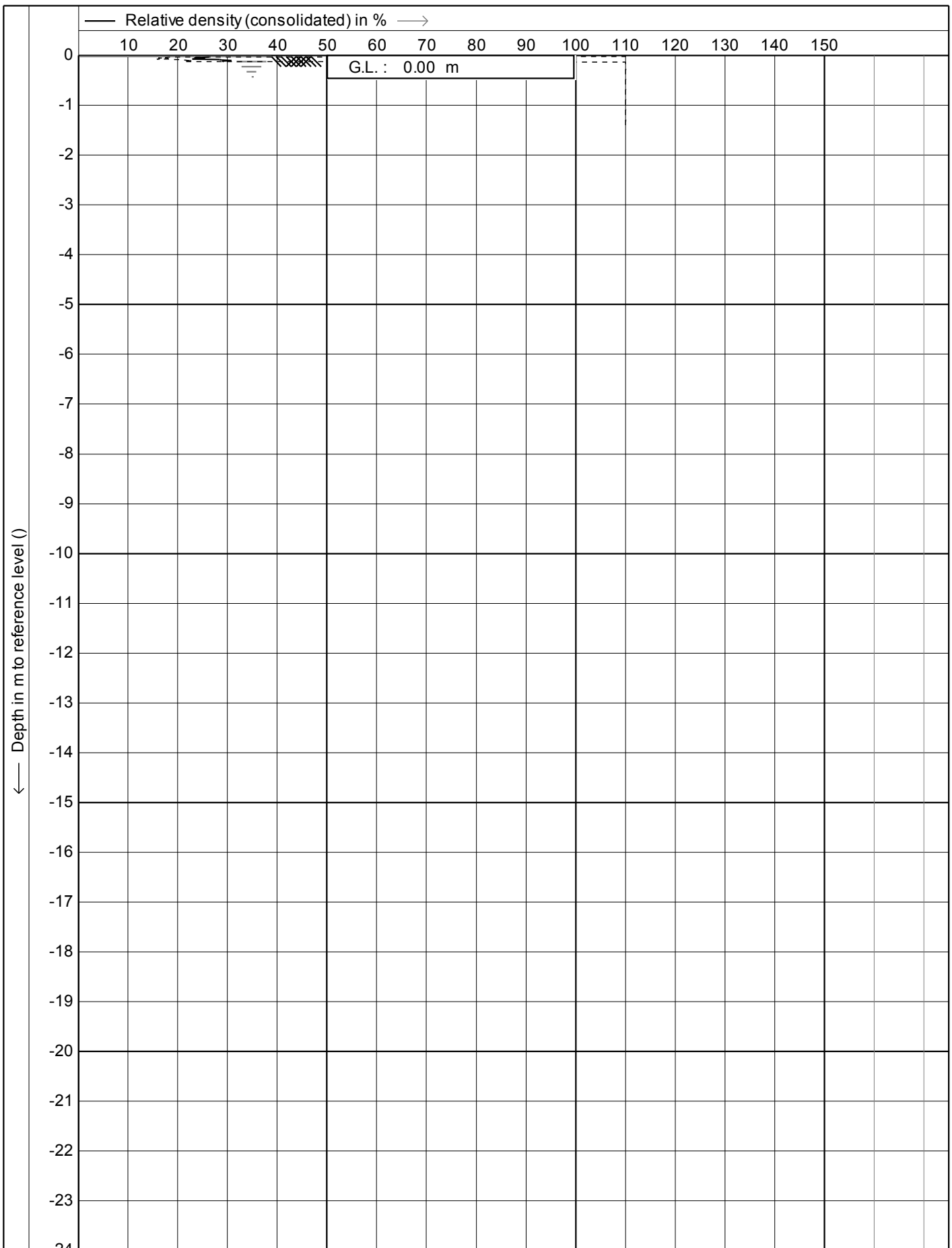
Position: **0, 0 RD**

Date : **12/10/2017**

Cone no. : **C10CFIP.C14433**

Project no. : **05TT12**

CPT no. : **06** 10/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

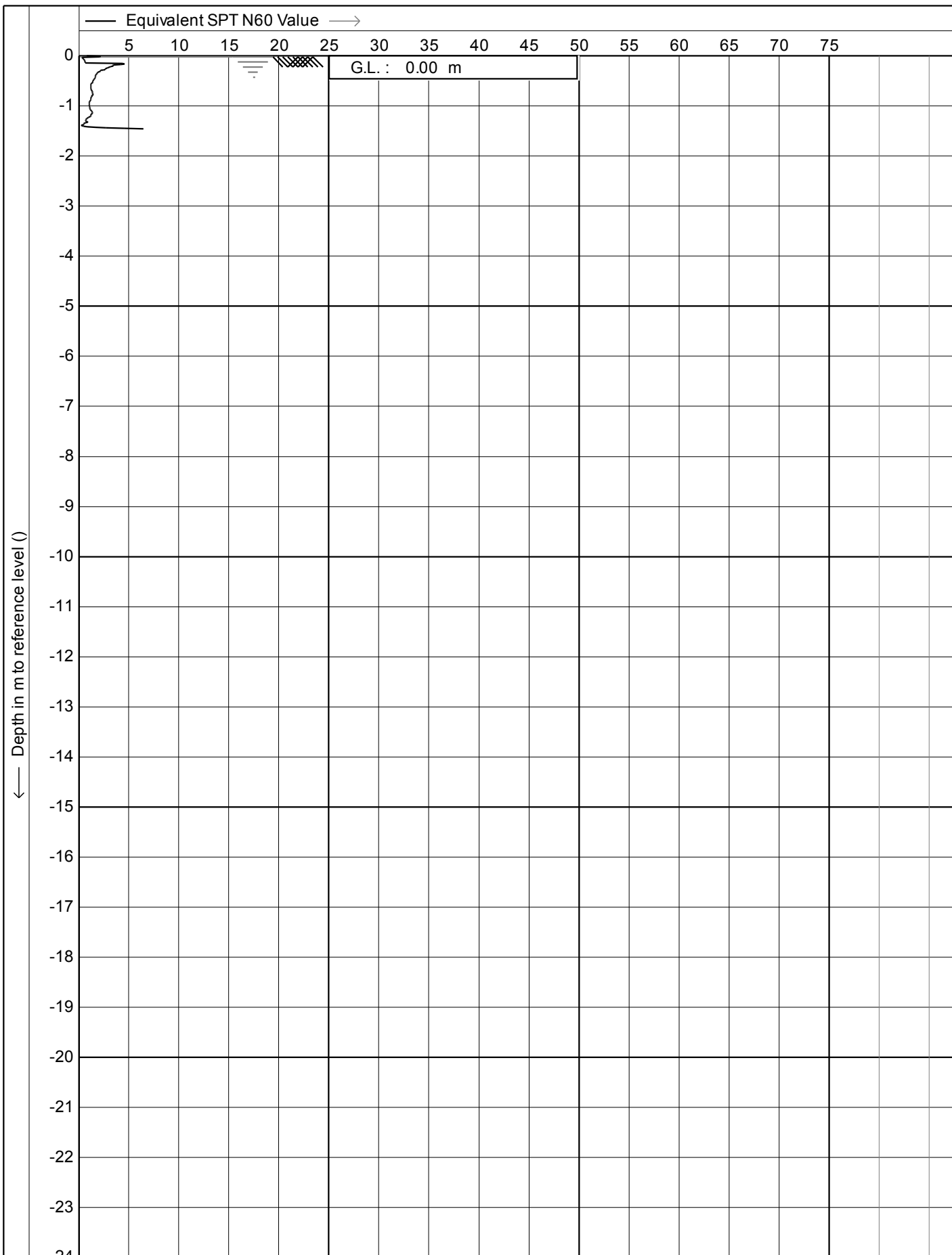
Position: **0, 0 RD**

Date : **12/10/2017**

Cone no. : **C10CFIP.C14433**

Project no. : **05TT12**

CPT no. : **06** | 11/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

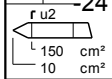
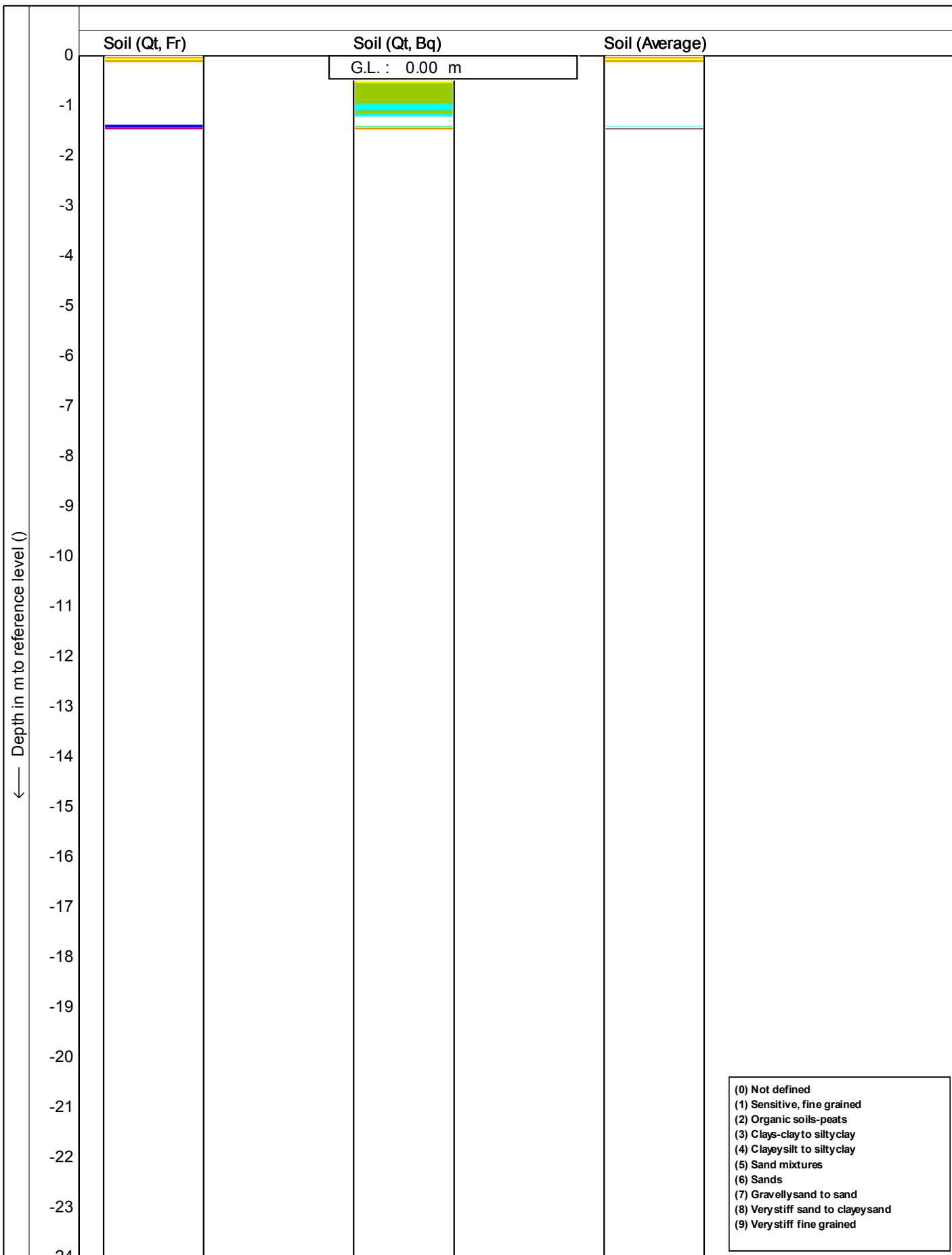
Position: **0, 0 RD**

Date : **12/10/2017**

Cone no. : **C10CFIP.C14433**

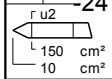
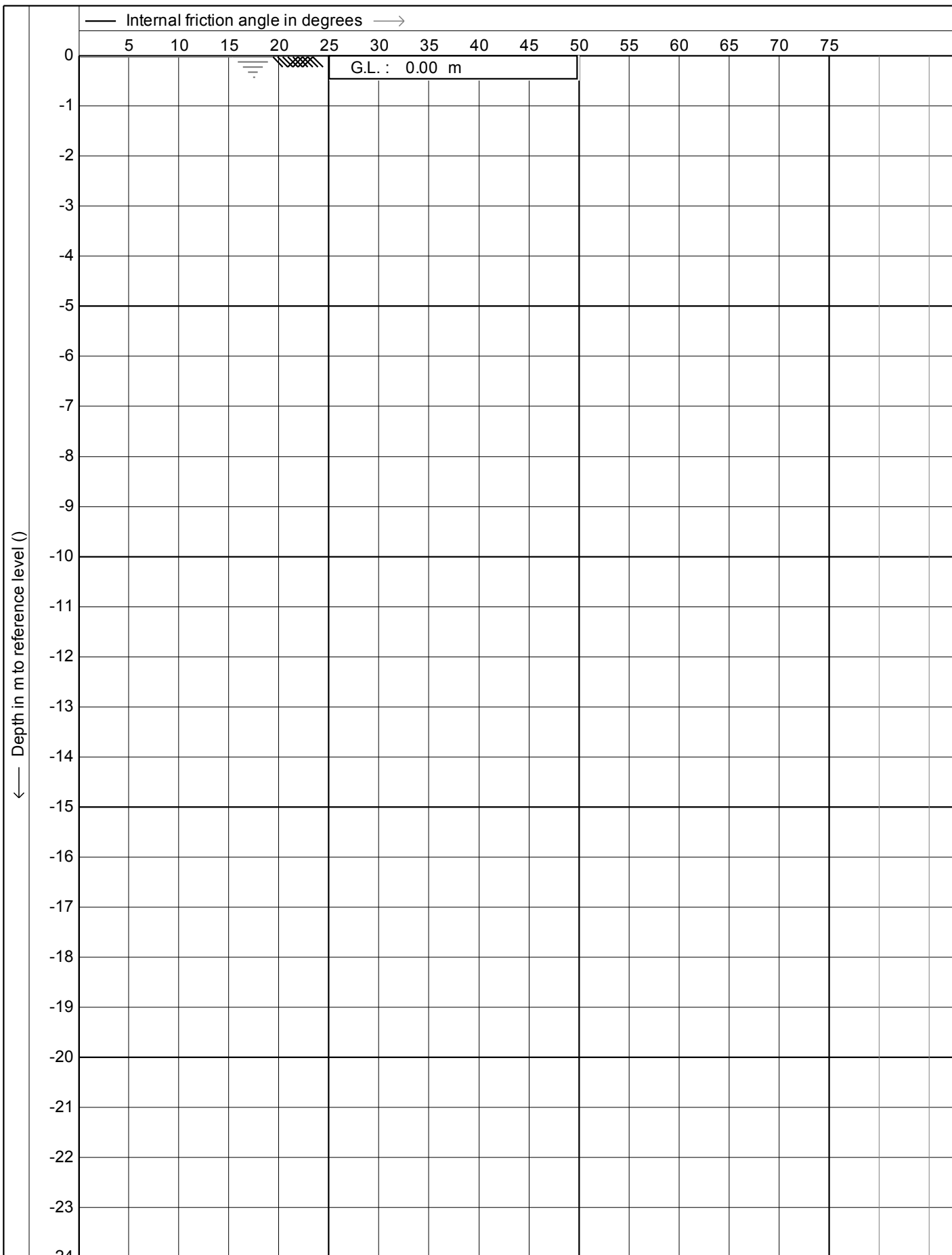
Project no. : **05TT12**

CPT no. : **06** 12/14

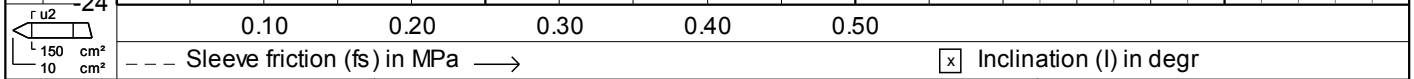
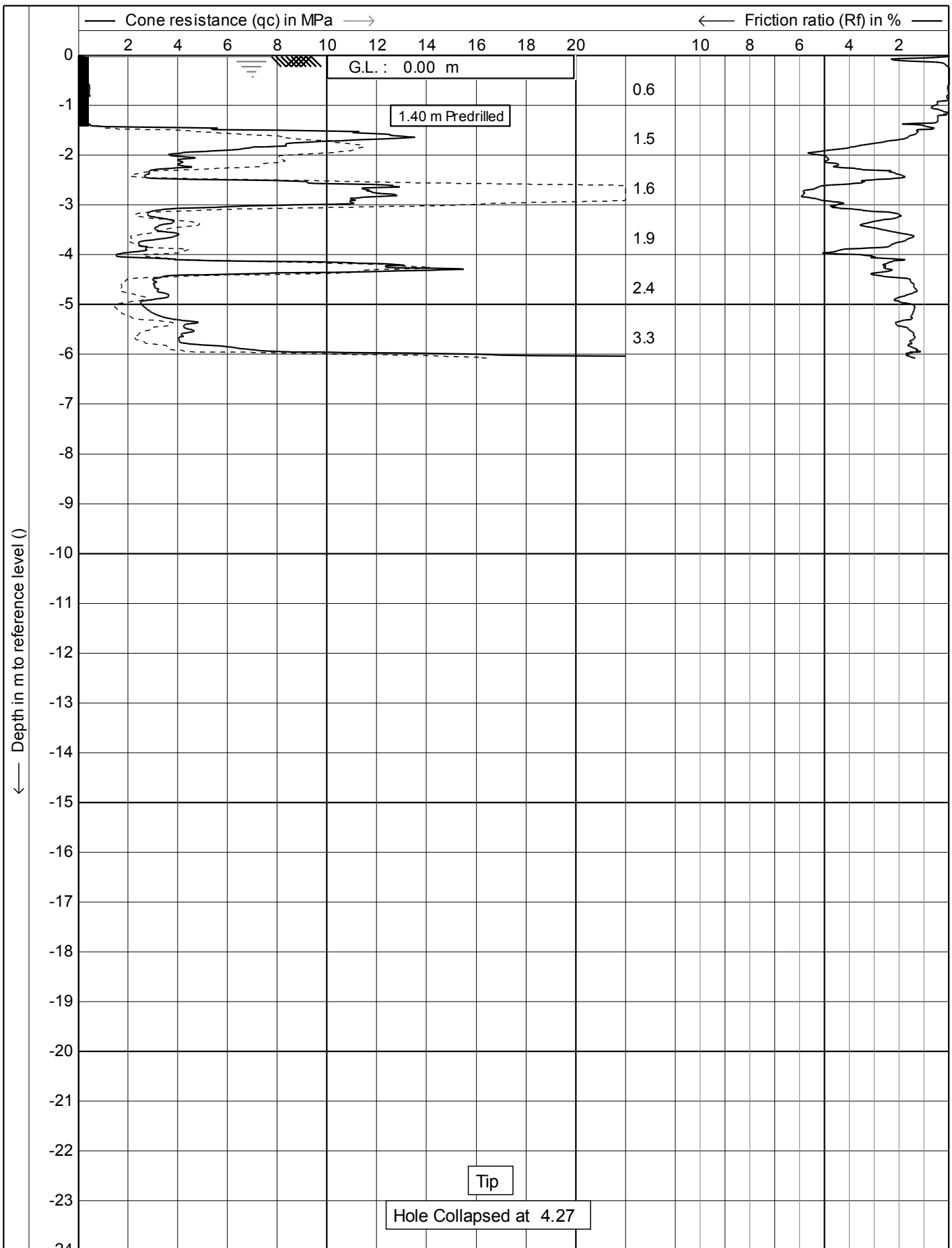


Soil behaviour type classification after Robertson 1990

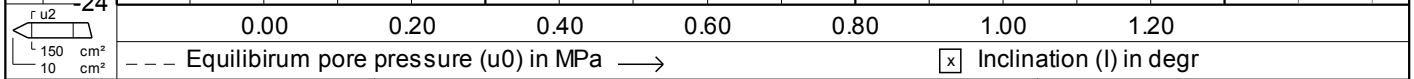
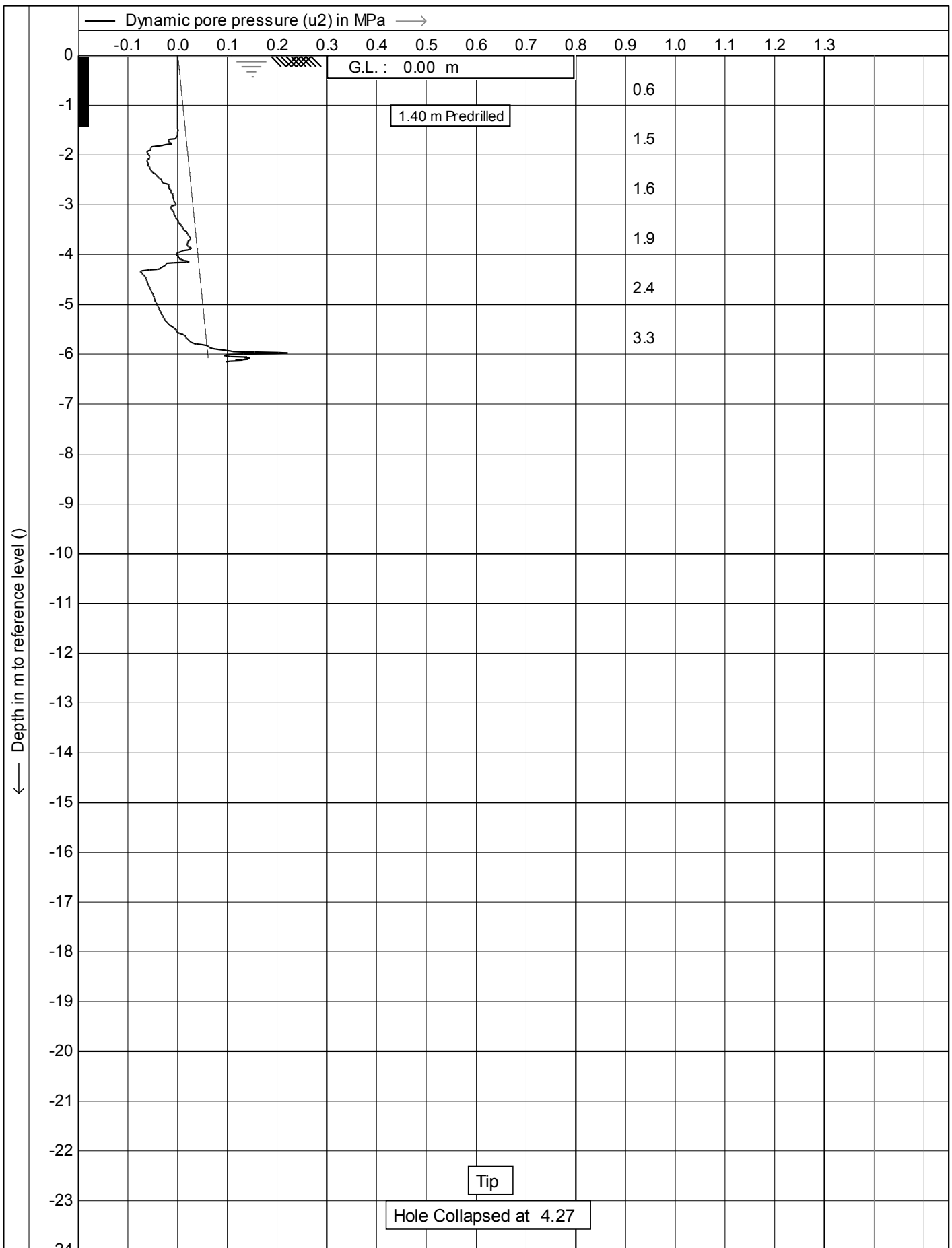
	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 06
		13/14



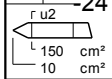
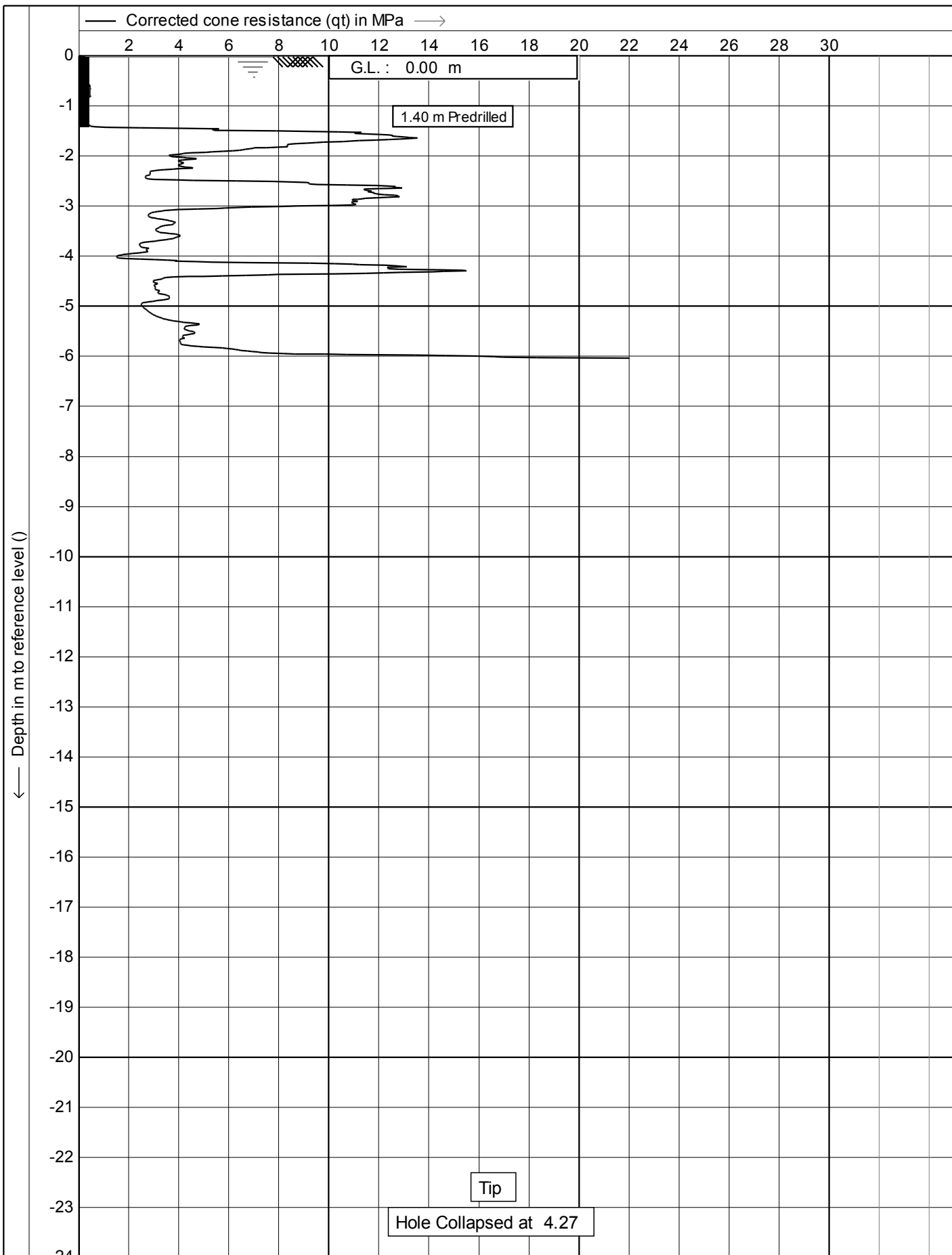
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	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 06 14/14



	Test according A.S.T.M Standard D 5778-12		Date : 12/10/2017	
	Project : Site Investigations		Cone no. : C10CFIP.C14433	
	Location: Victoria University - Wellington		Project no. : 05TT12	
	Position: 0, 0 RD		CPT no. : 06a	1/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 06a
		2/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

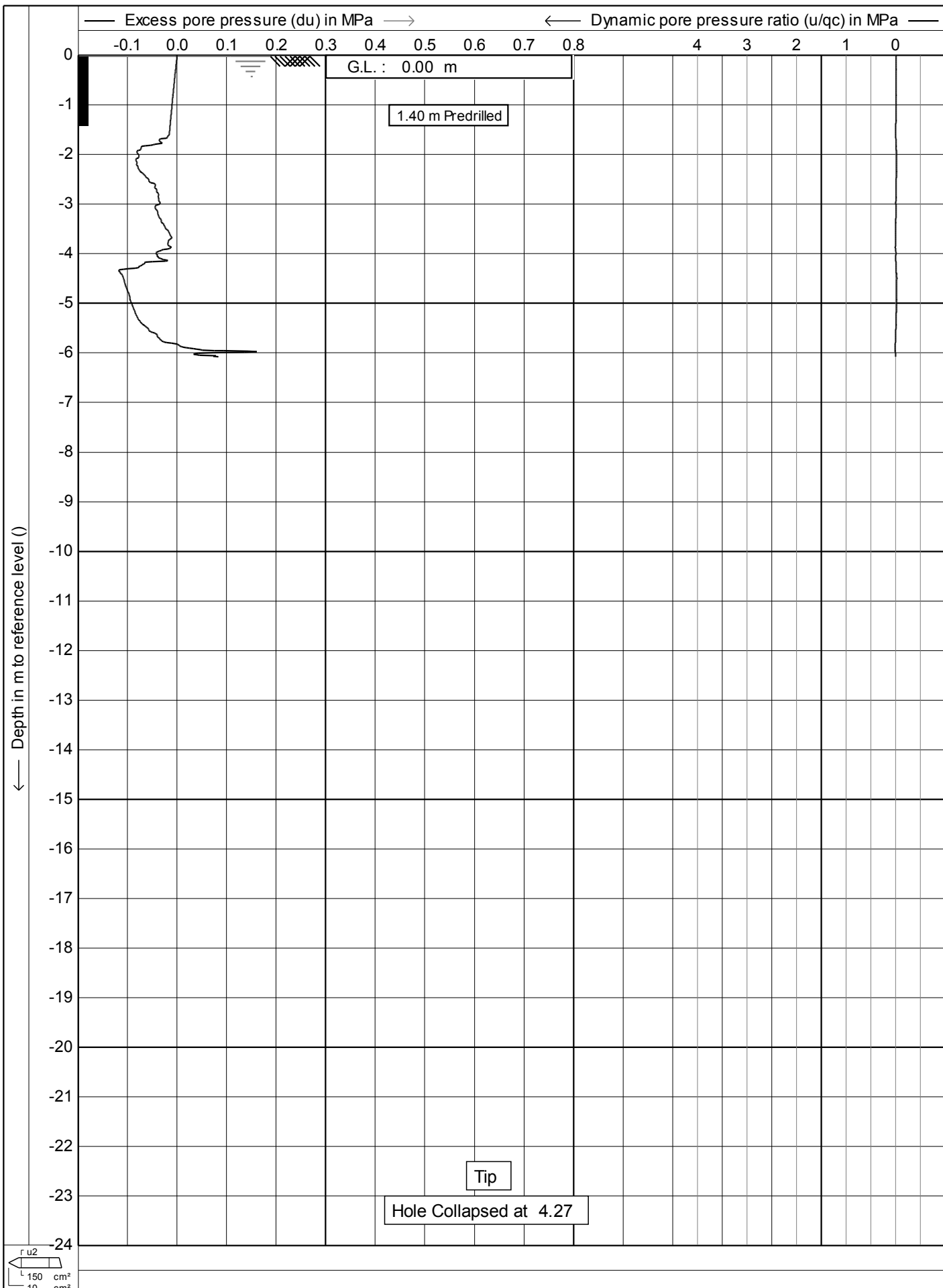
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Date : **12/10/2017**

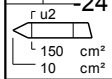
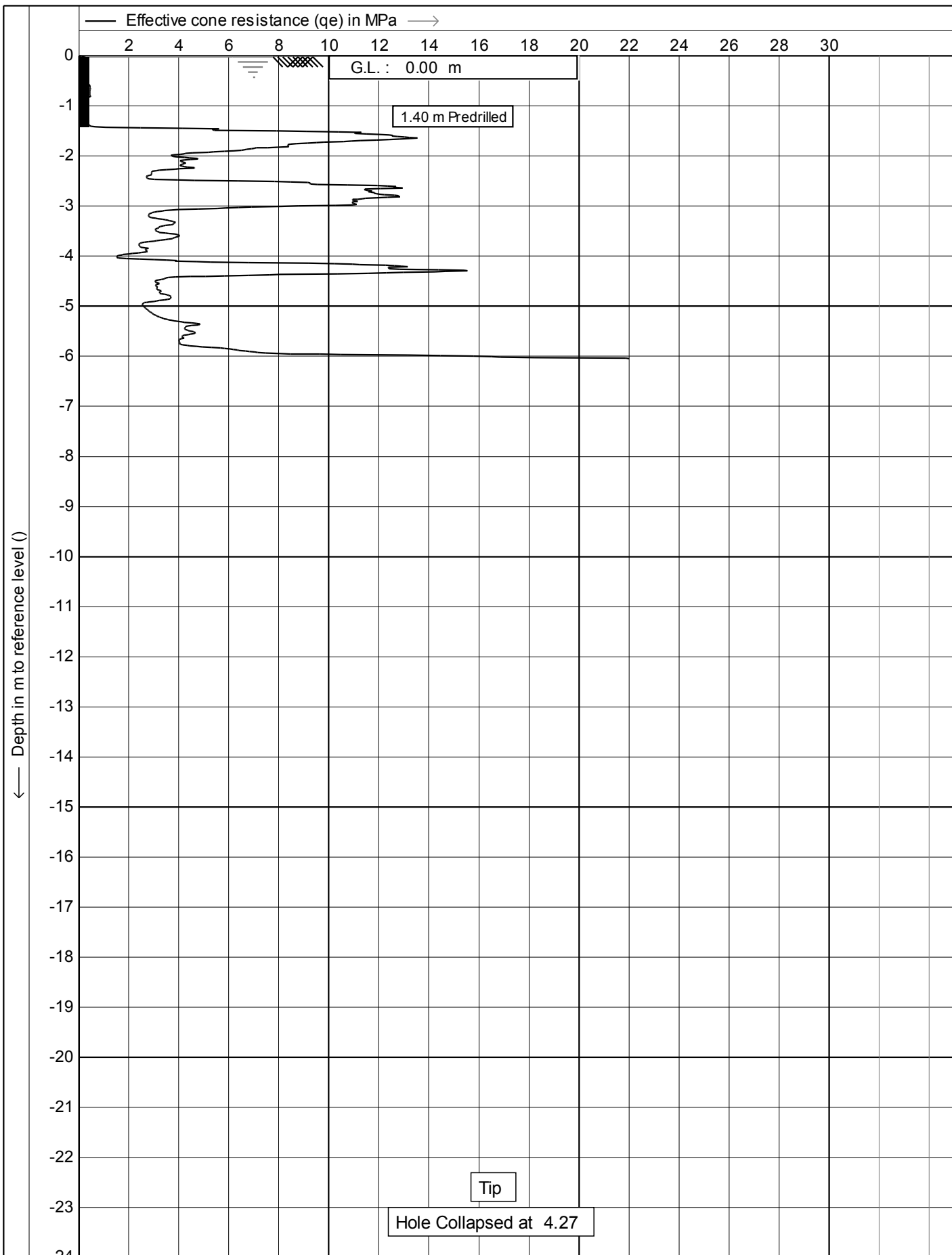
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Project no. : **05TT12**

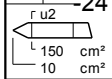
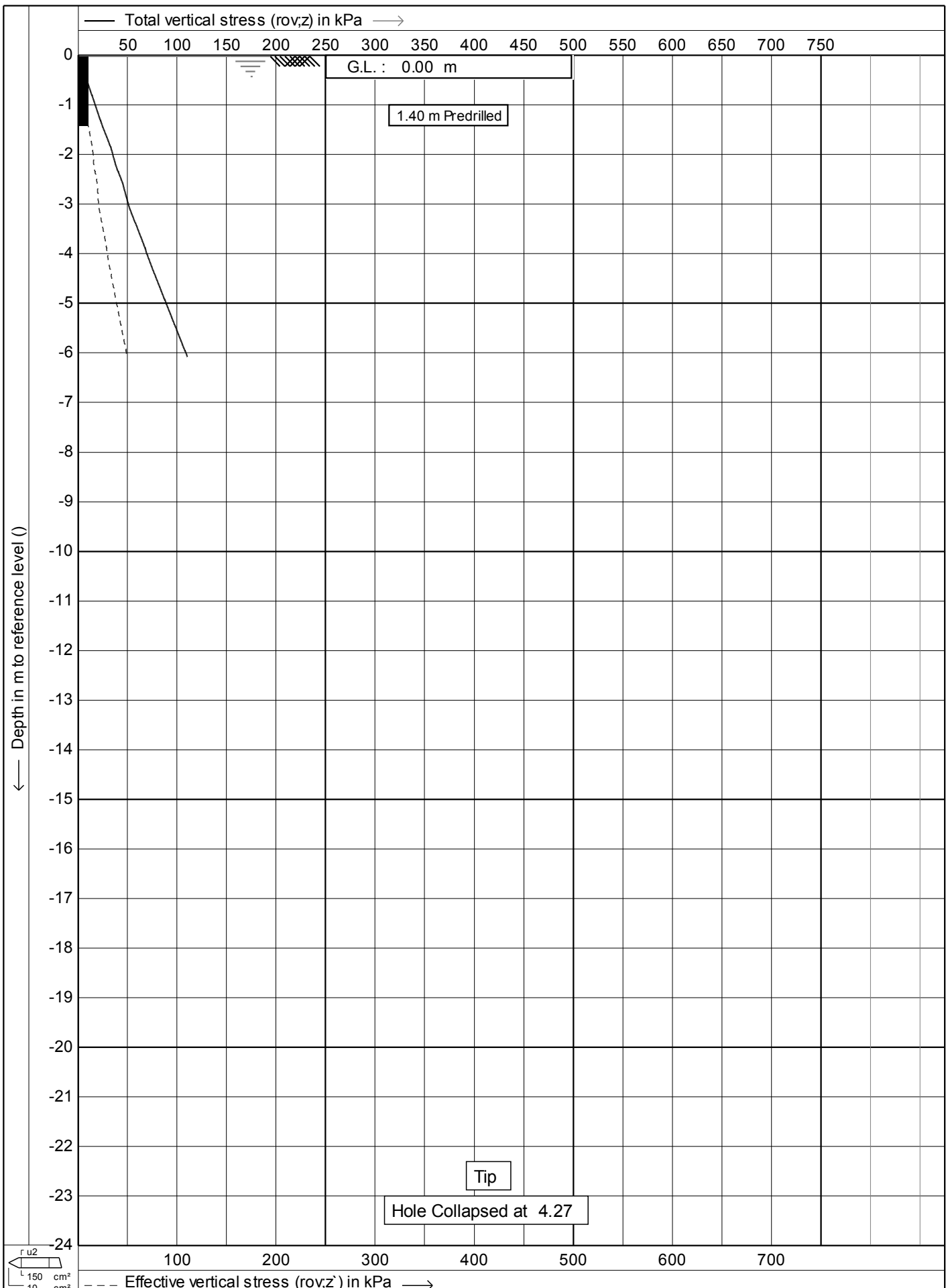
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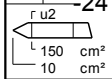
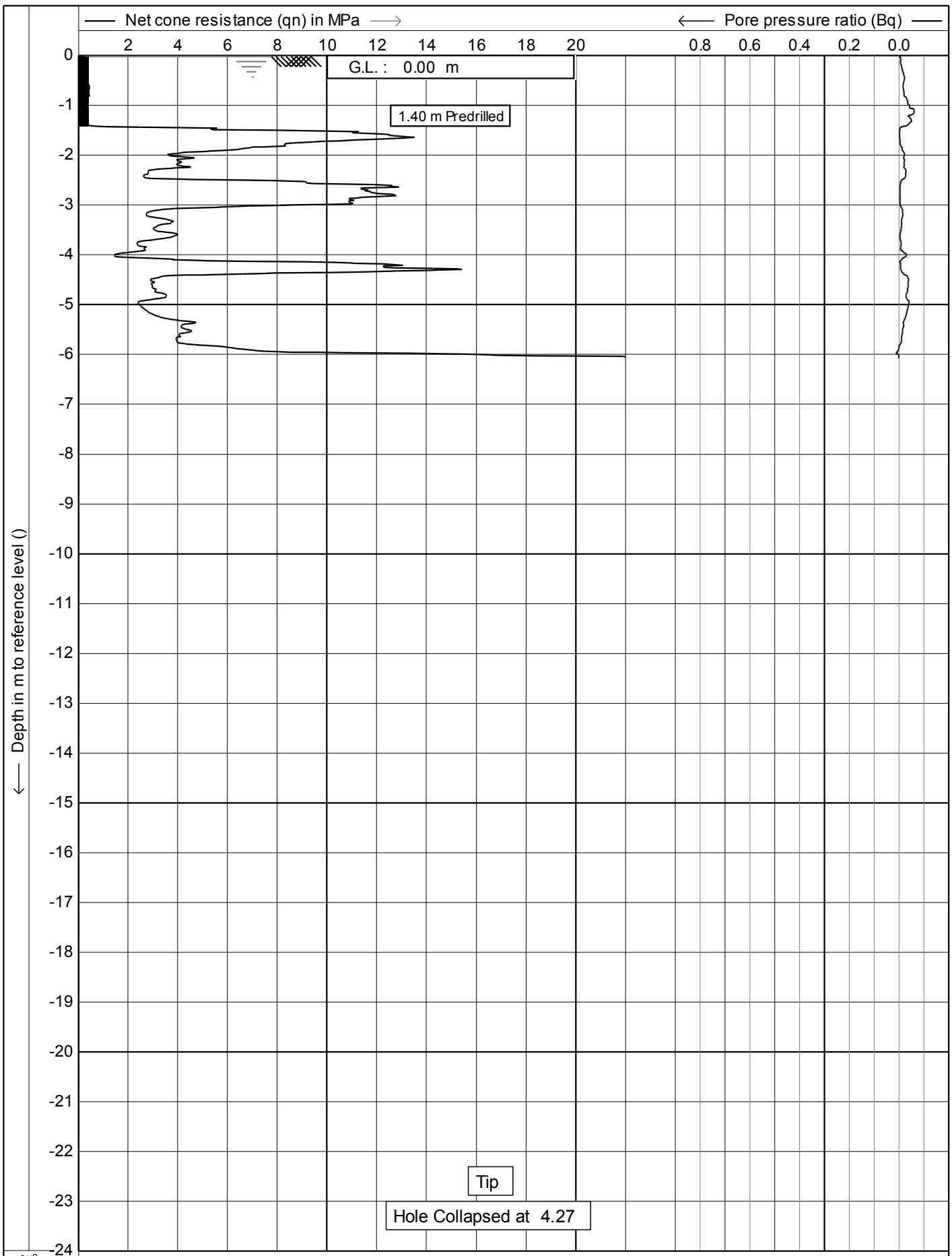
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	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 06a
		4/14



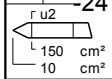
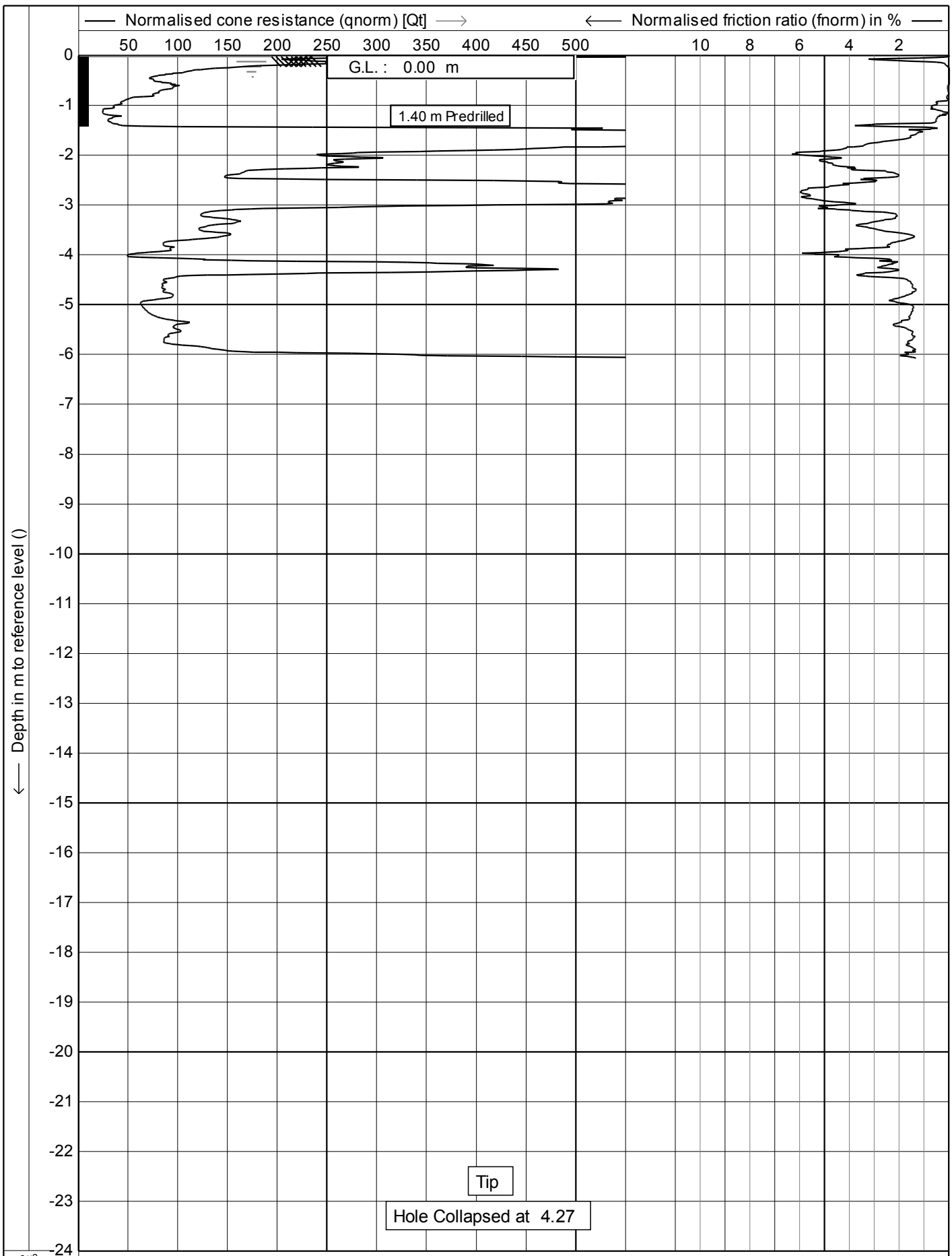
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	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 06a
		5/14



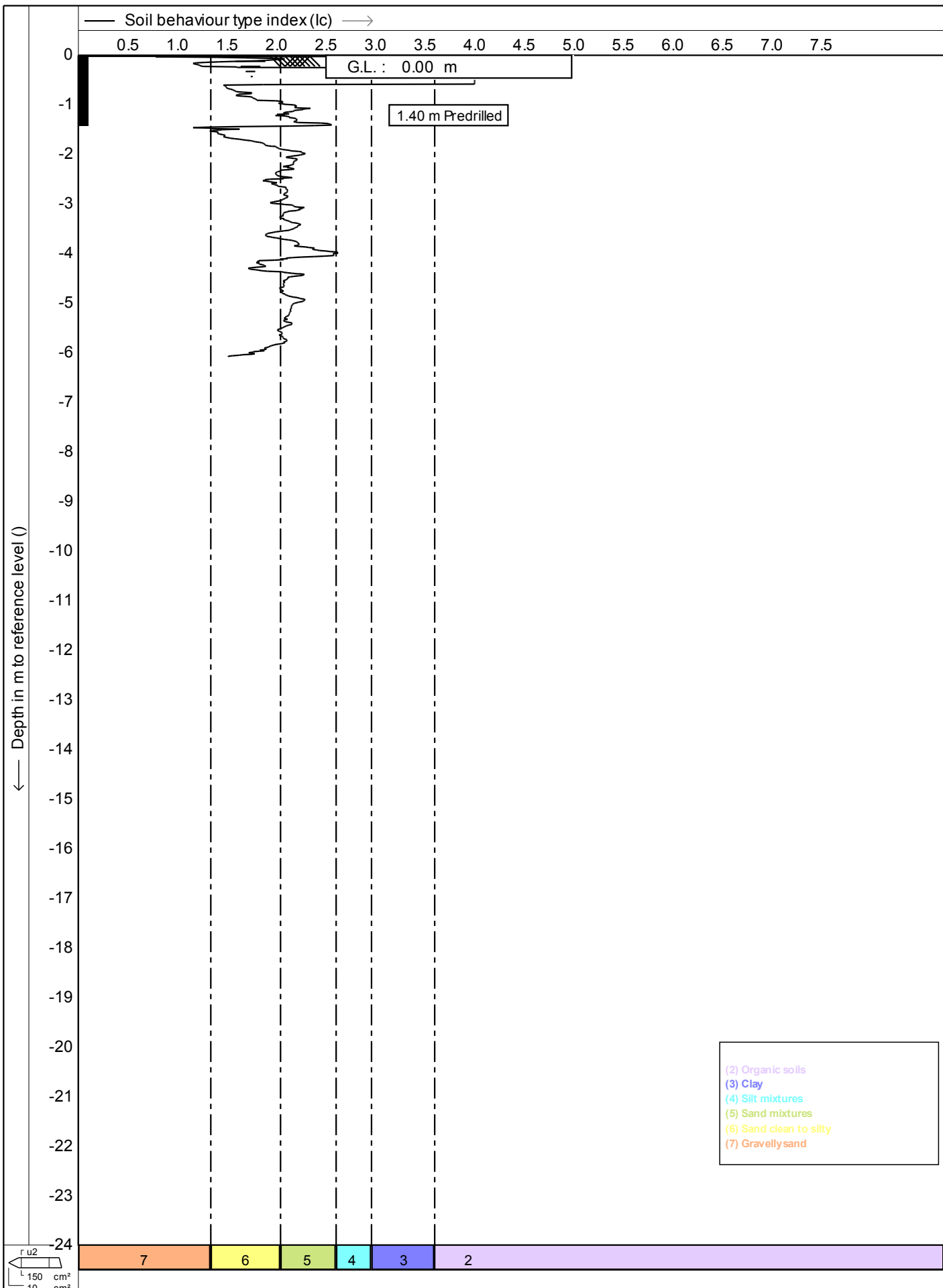
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	Project : Site Investigations		Cone no. : C10CFIP.C14433	
	Location: Victoria University - Wellington		Project no. : 05TT12	
	Position: 0, 0 RD		CPT no. : 06a	6/14



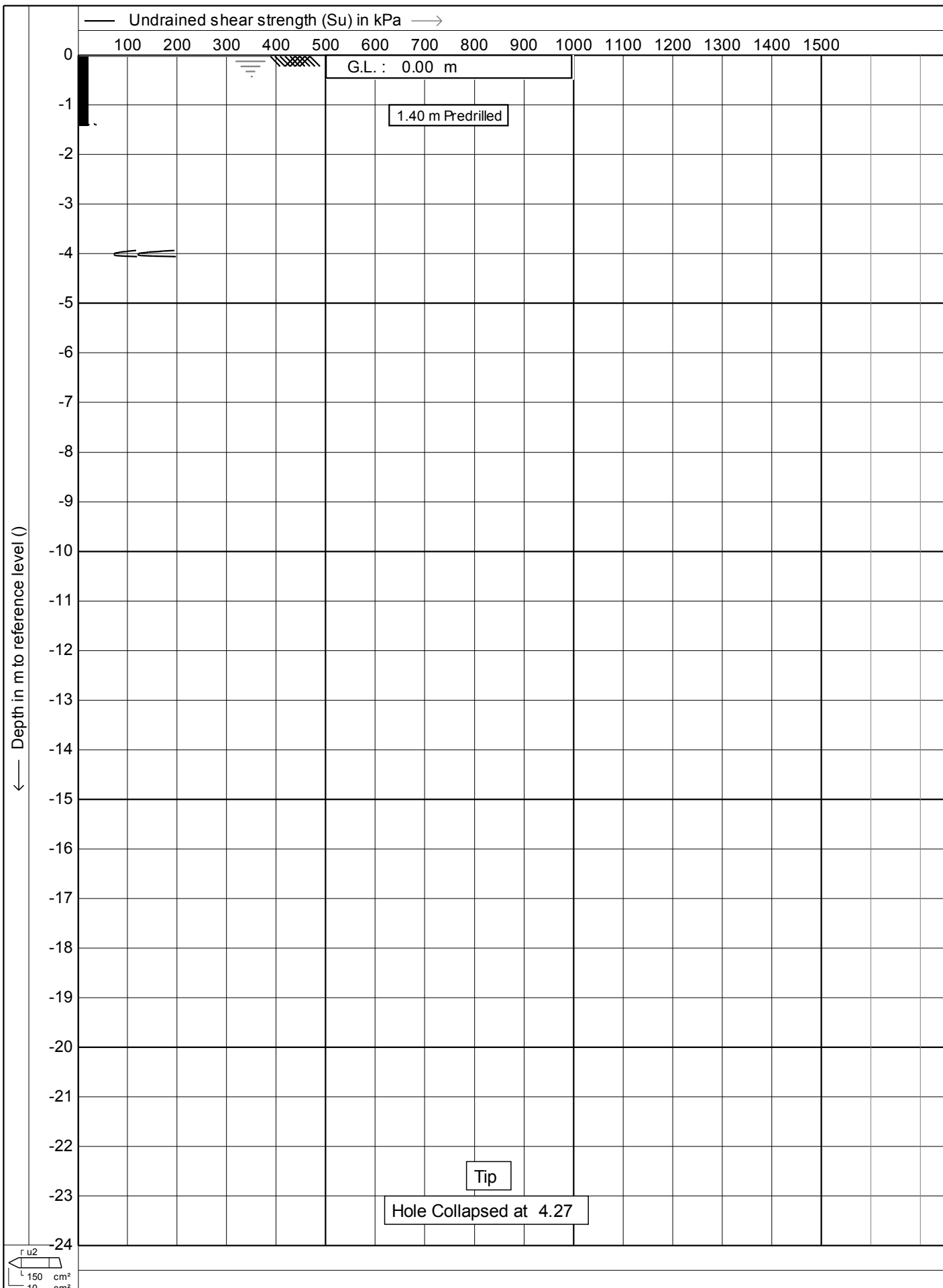
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	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 06a
		7/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 06a 8/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 06a
		9/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

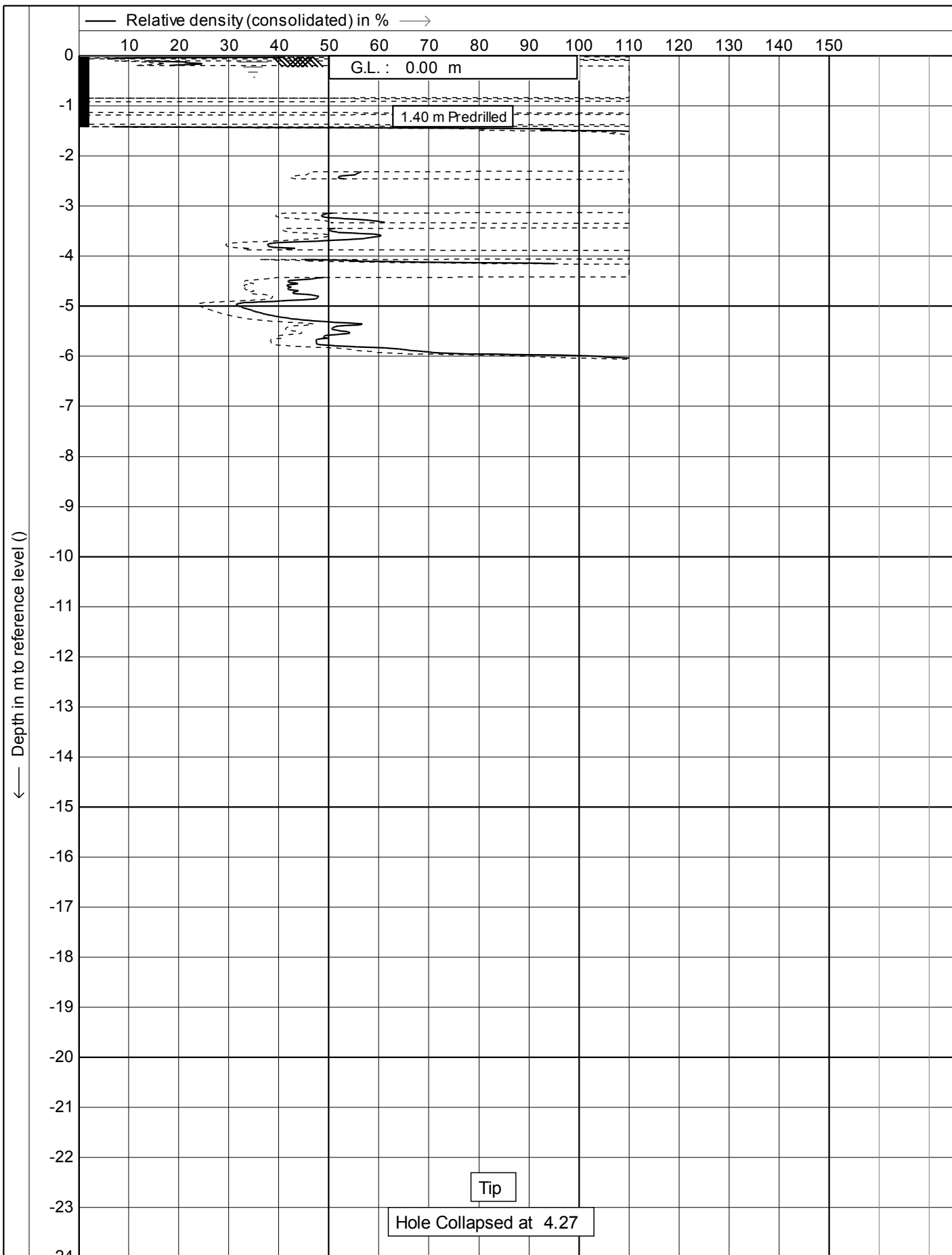
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Date : **12/10/2017**

Cone no. : **C10CFIP.C14433**

Project no. : **05TT12**

CPT no. : **06a** | 10/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

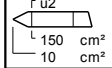
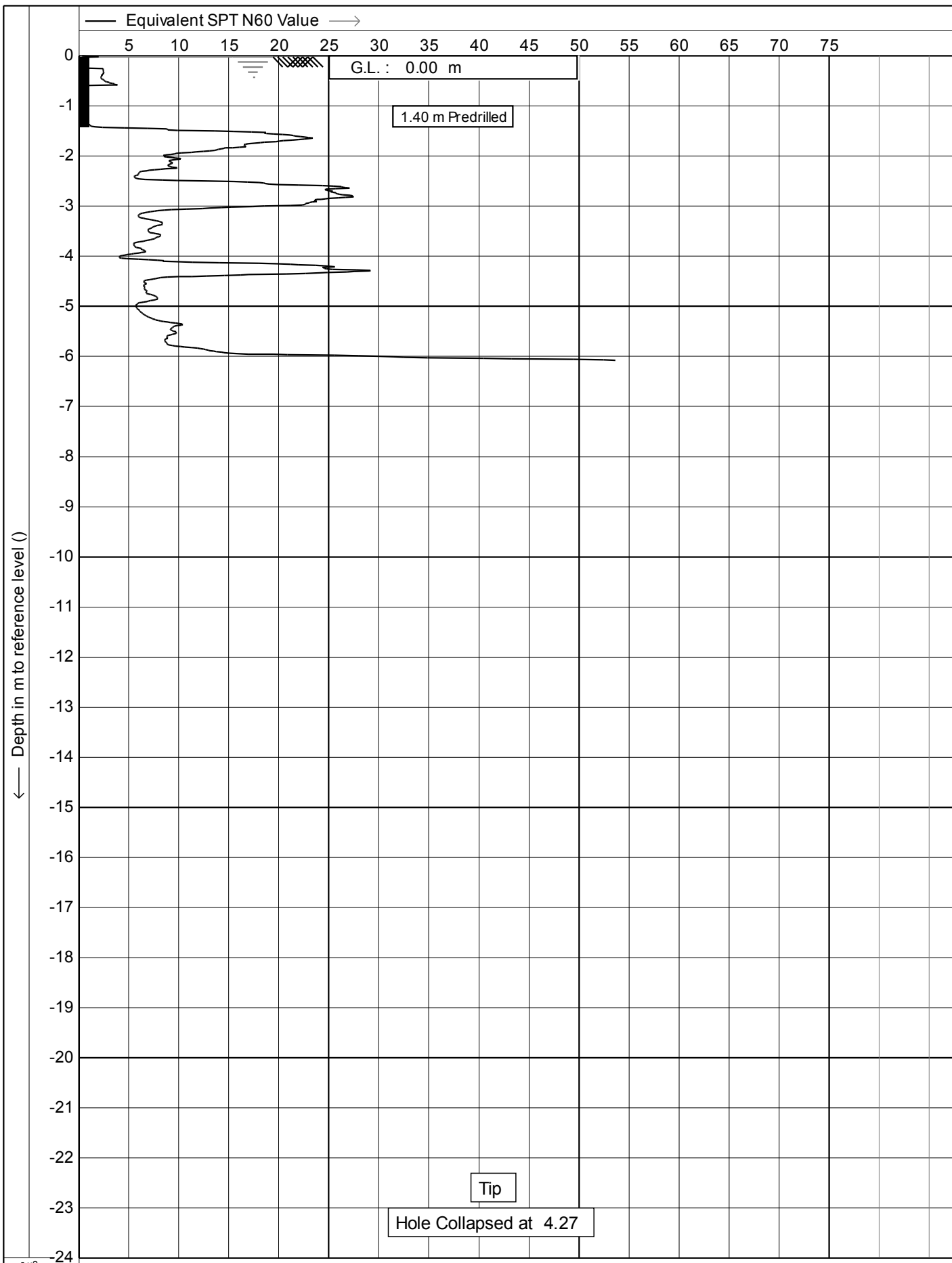
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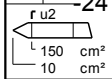
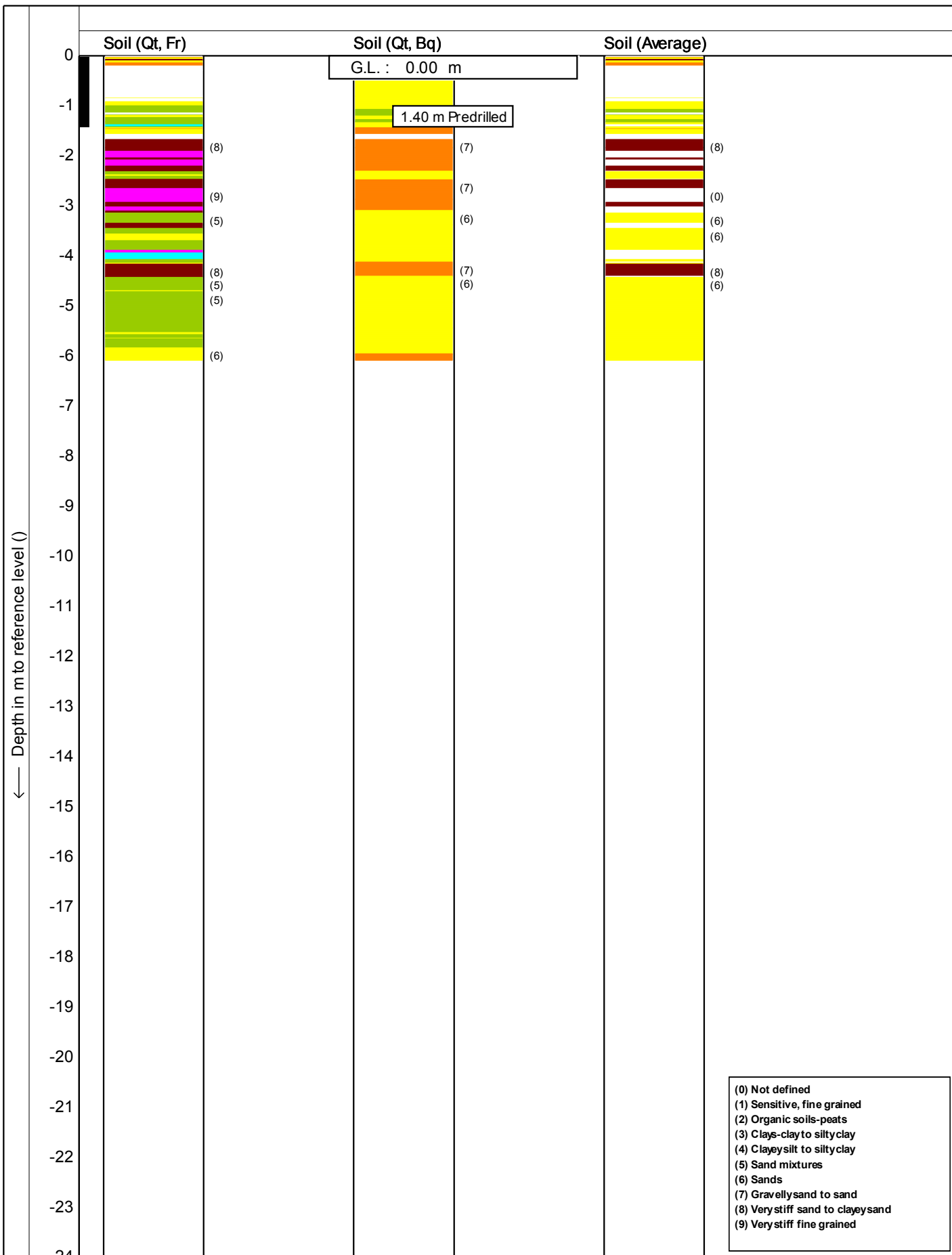
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Project no. : **05TT12**

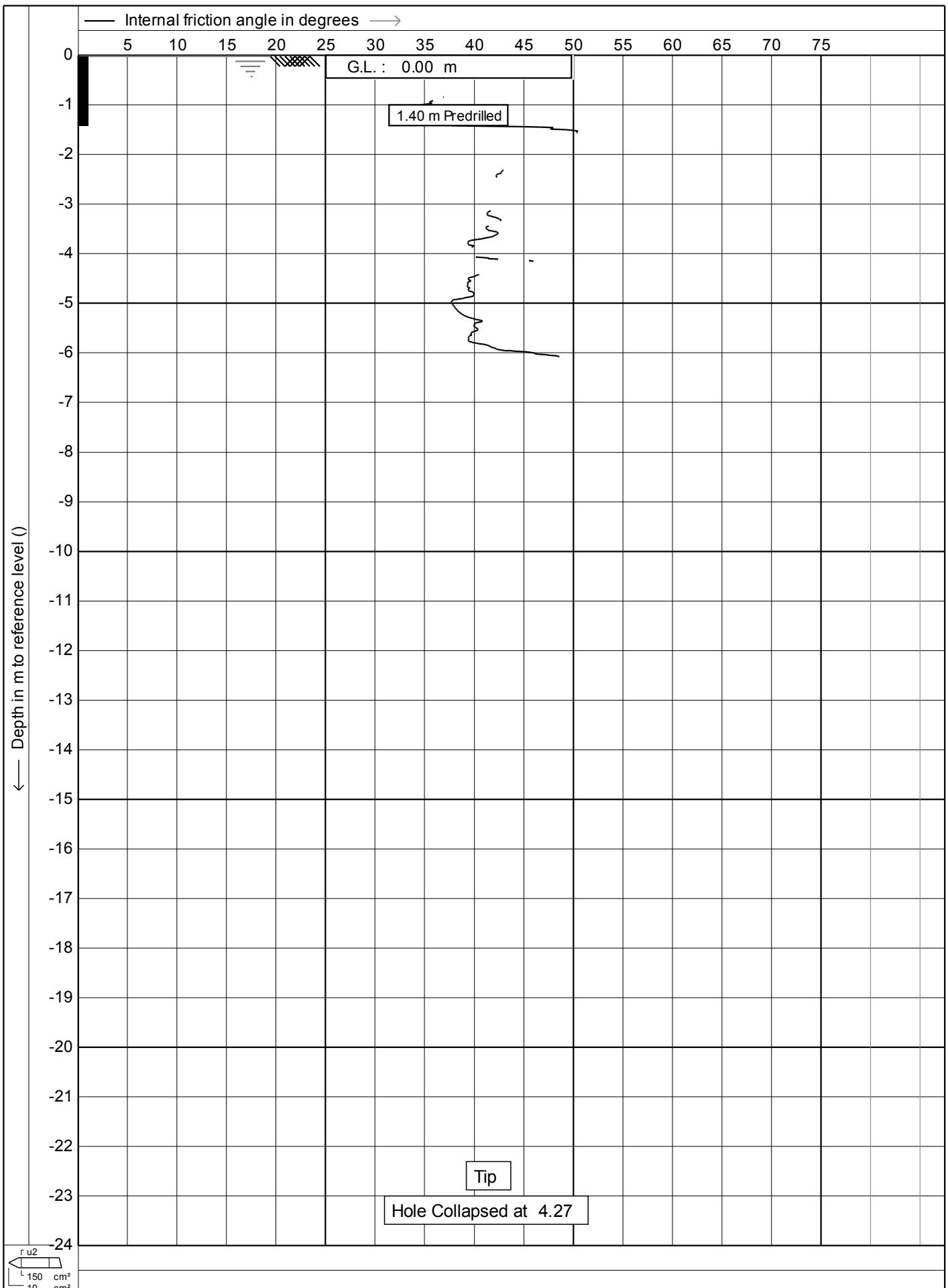
CPT no. : **06a** | 11/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
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	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 06a
		12/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 06a
		13/14

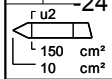
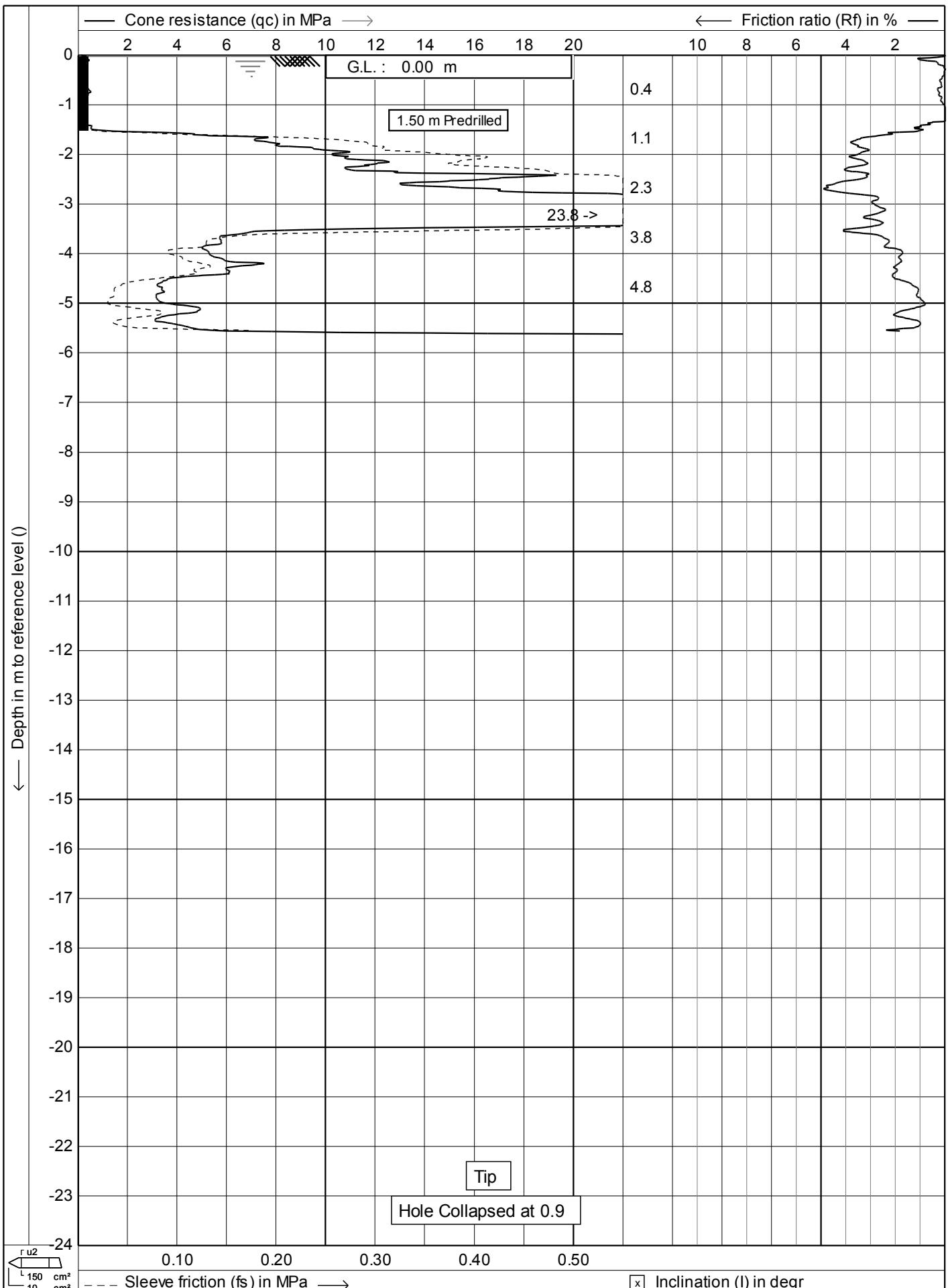


Test according A.S.T.M Standard D 5778-12

Date : 12/10/2017
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 Project no. : 05TT12
 CPT no. : 06a

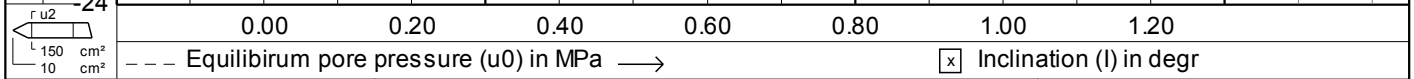
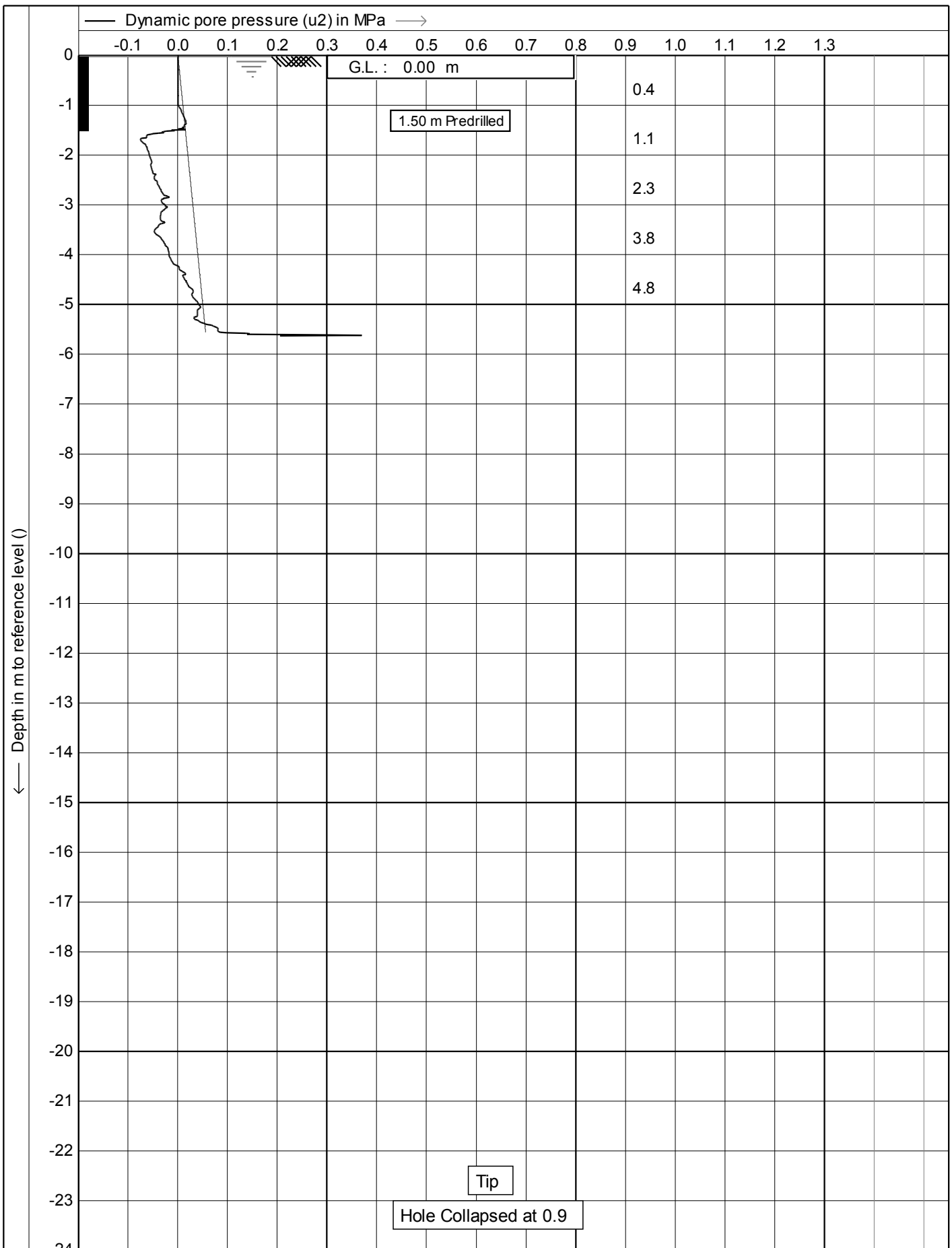
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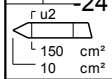
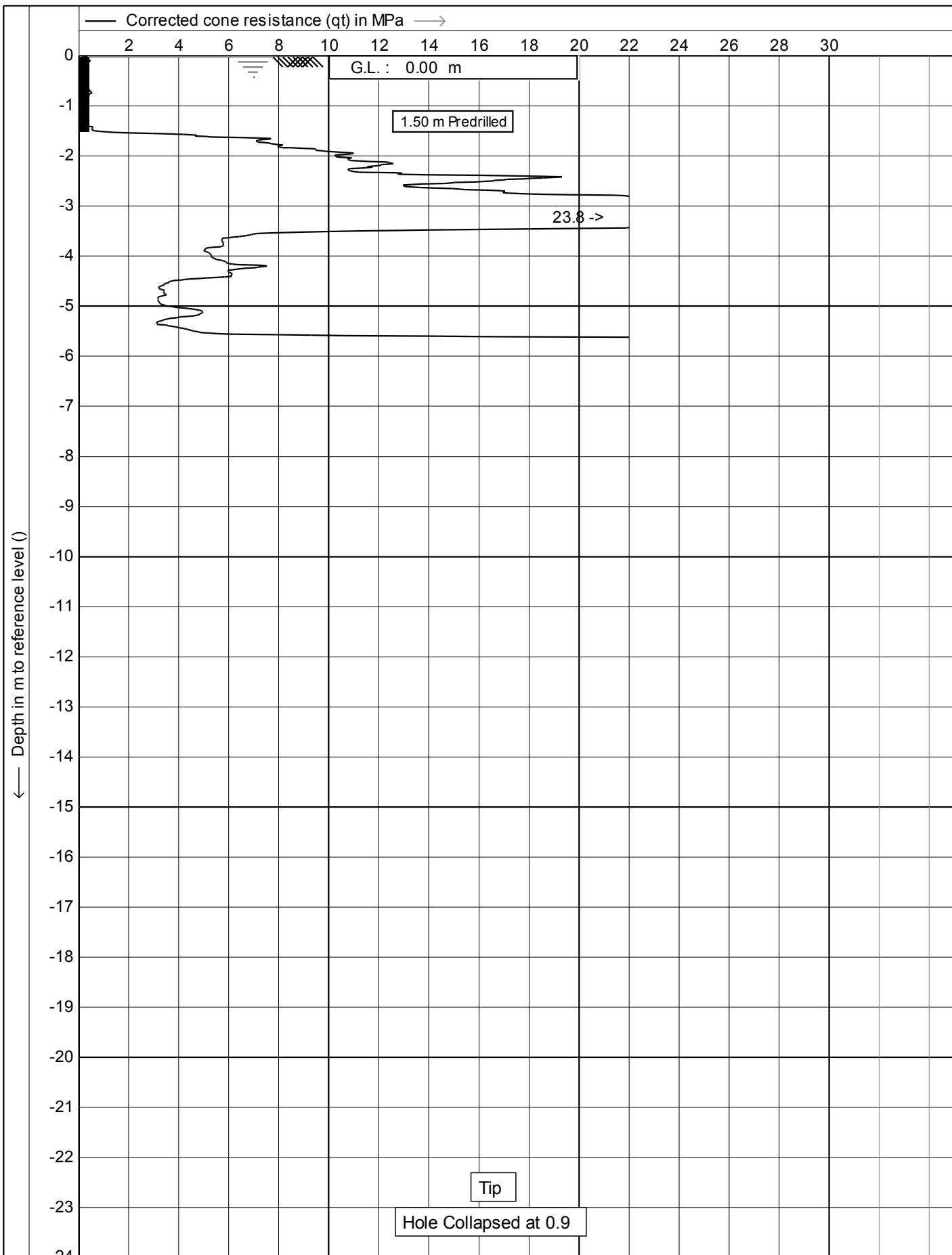


Test according A.S.T.M Standard D 5778-12
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 Position: **0, 0 RD**

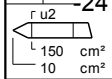
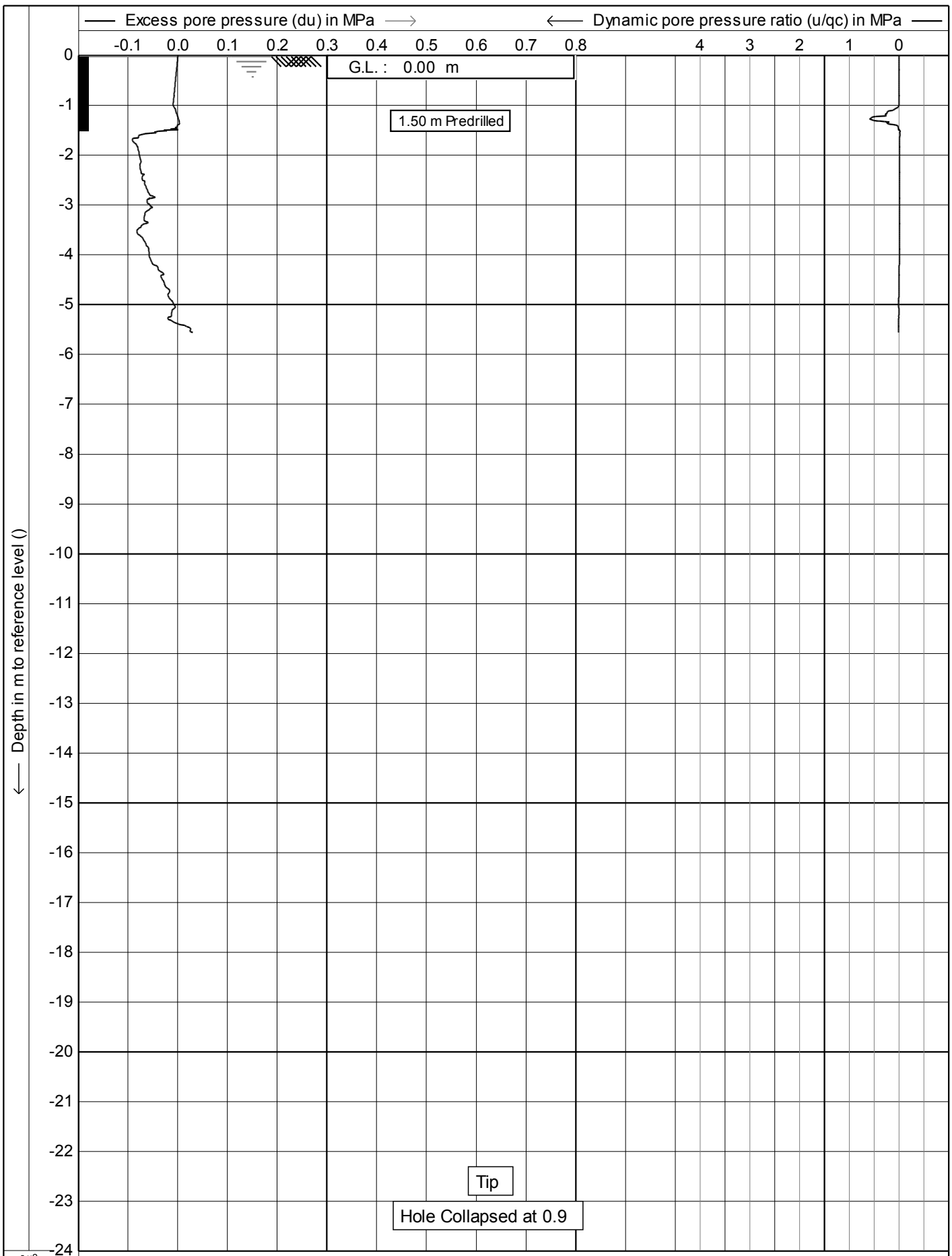
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 Project no. : **05TT12**
 CPT no. : **07** 1/14



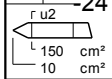
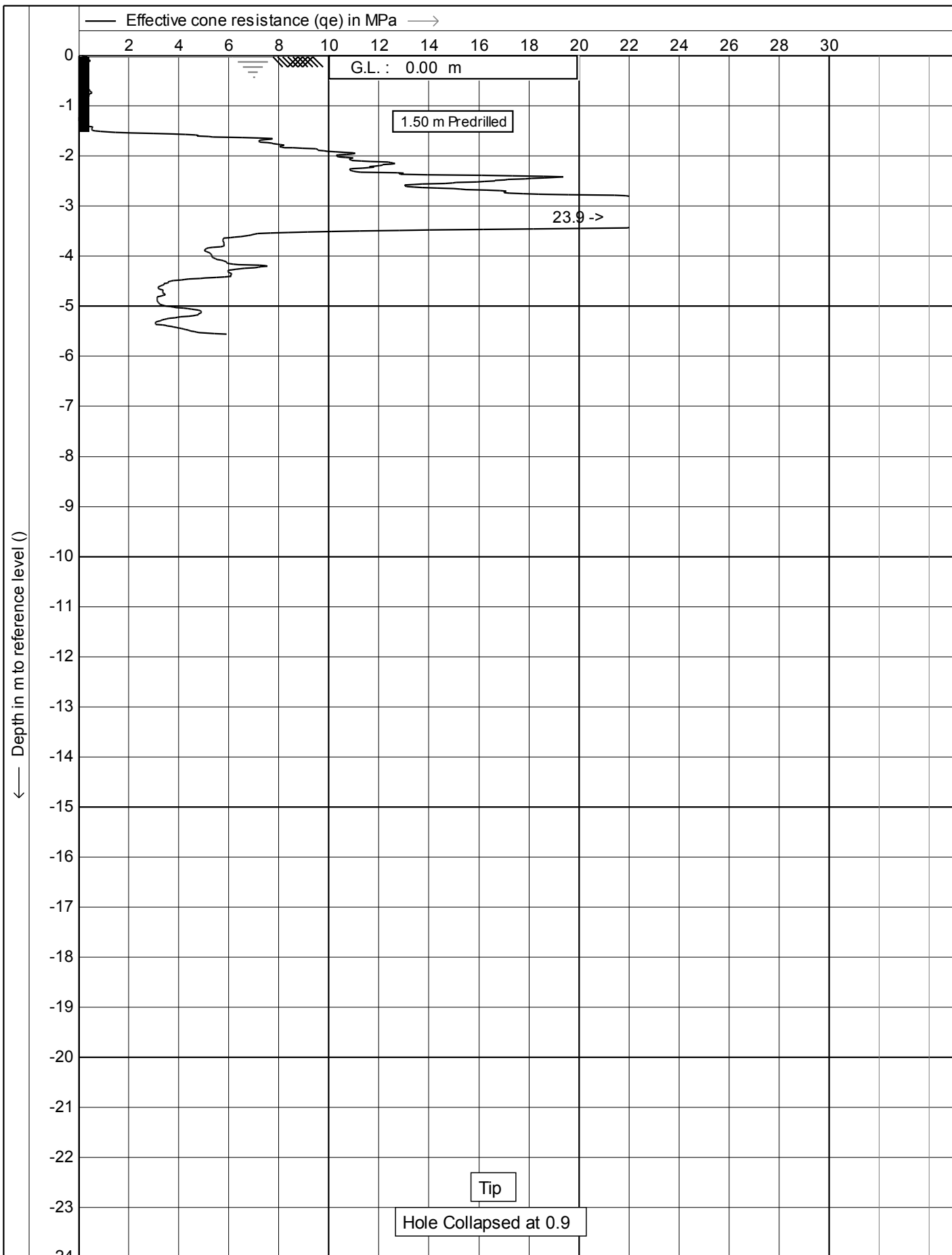
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	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 07
		2/14



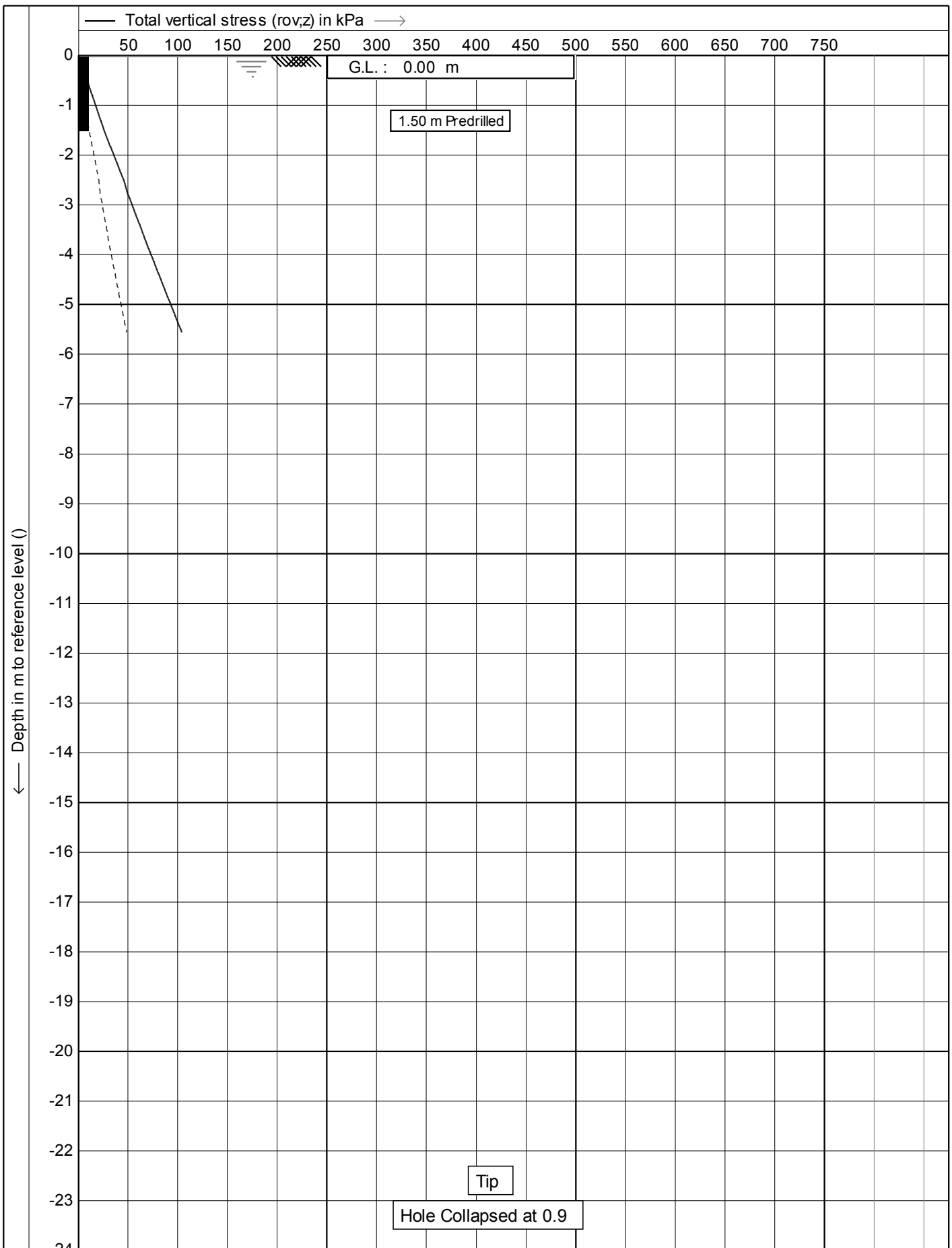
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	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 07
		3/14



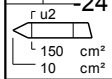
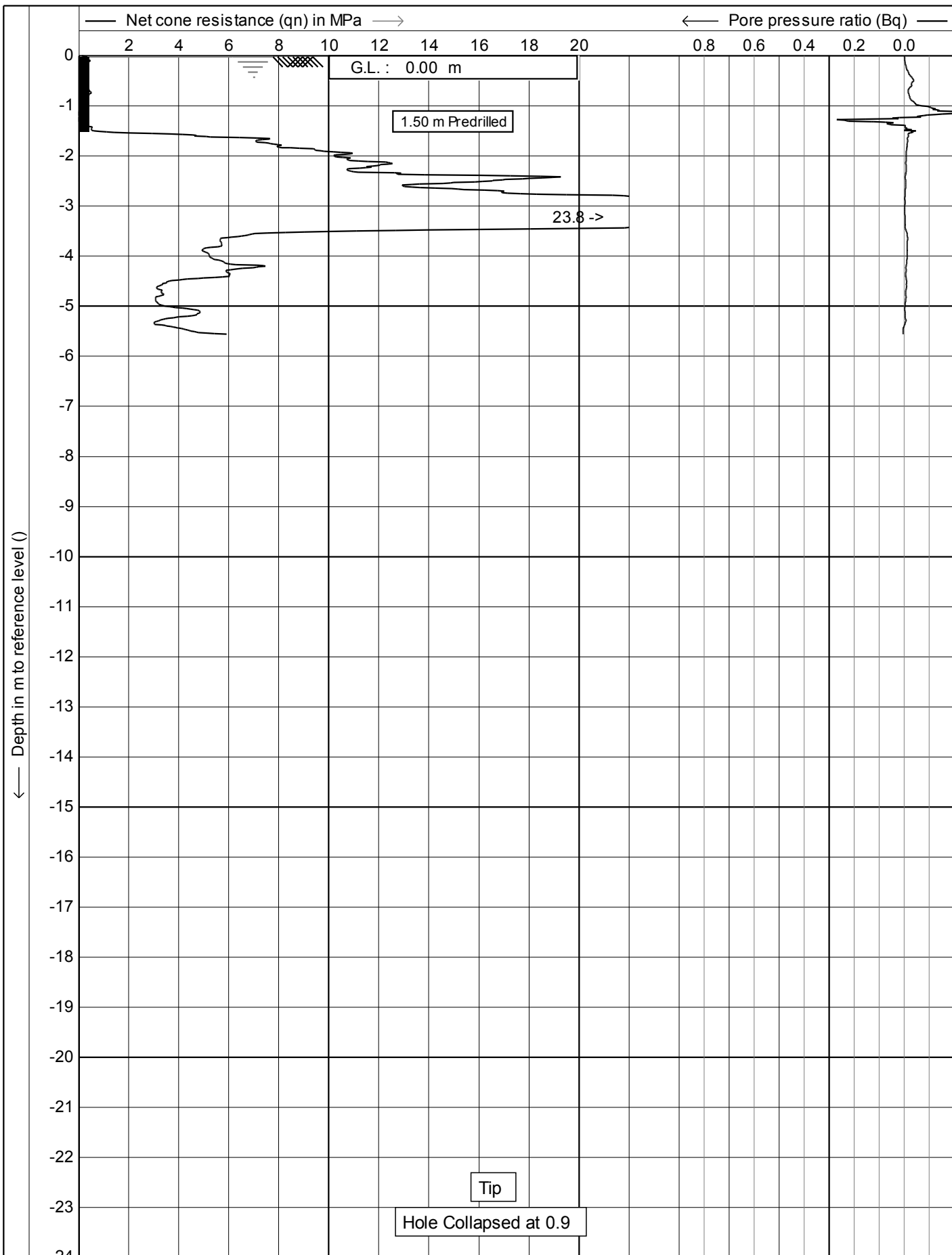
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	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 07
		4/14



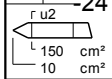
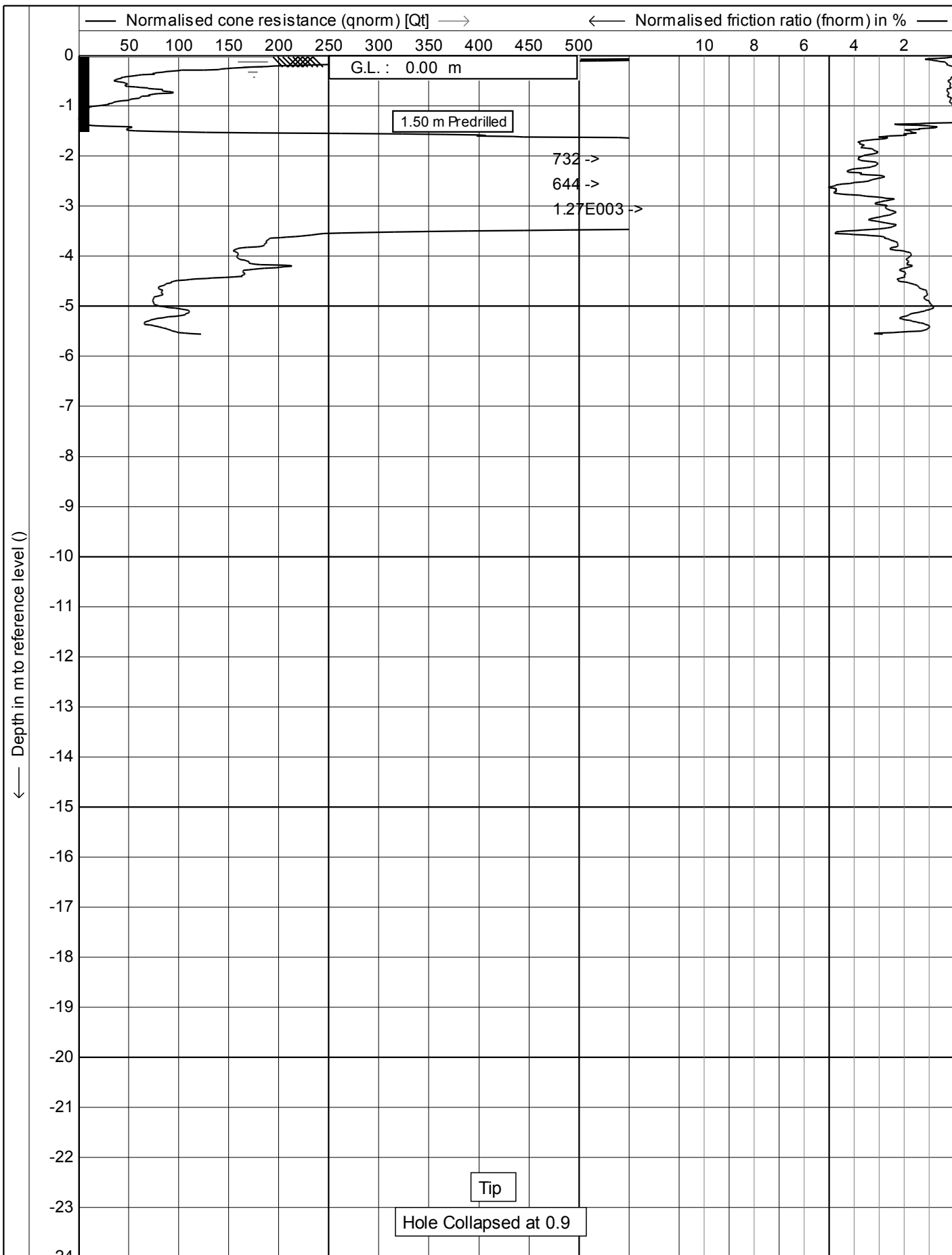
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	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 07
		5/14



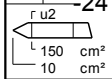
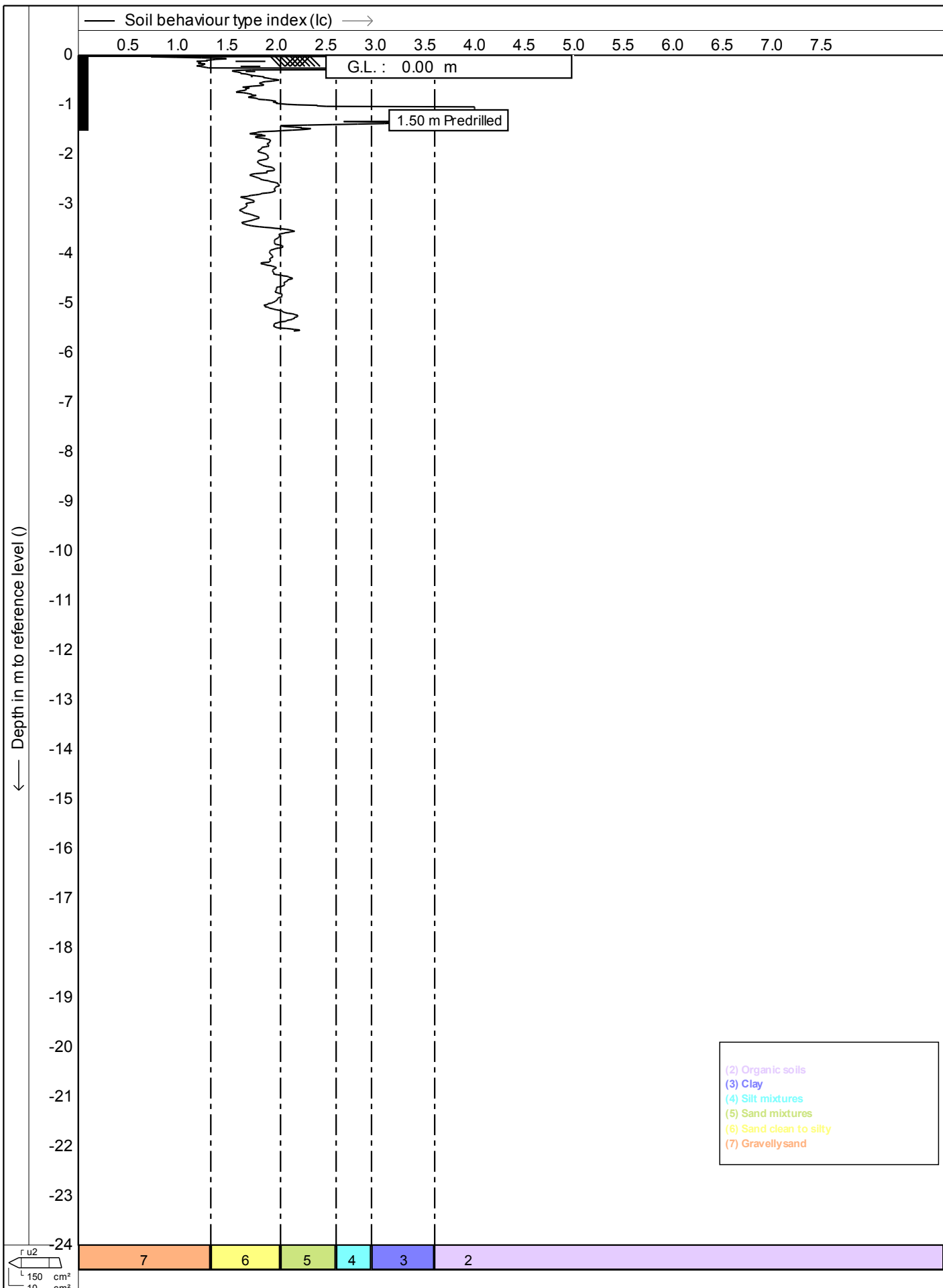
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	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 07
		6/14



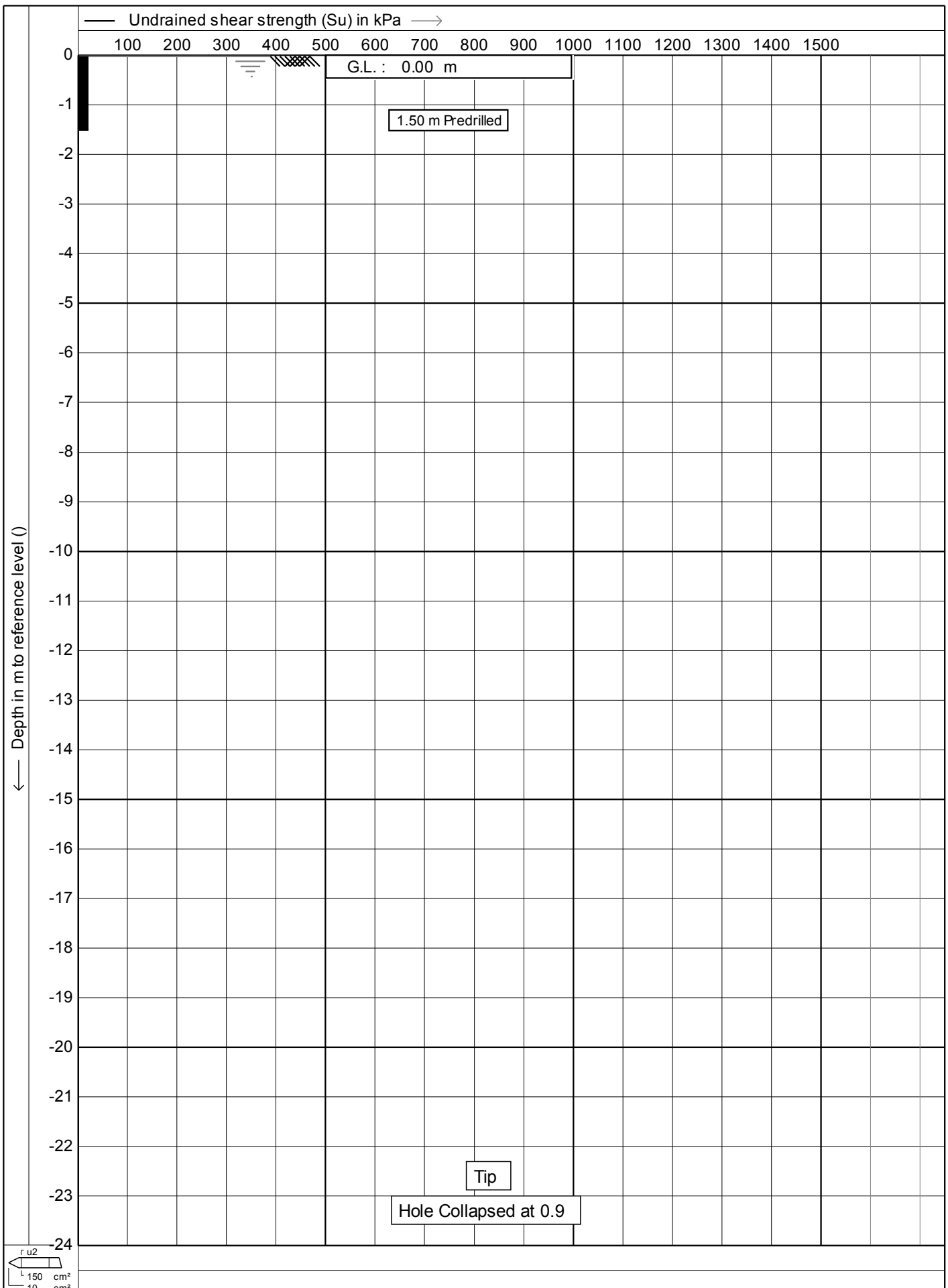
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		7/14



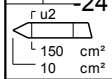
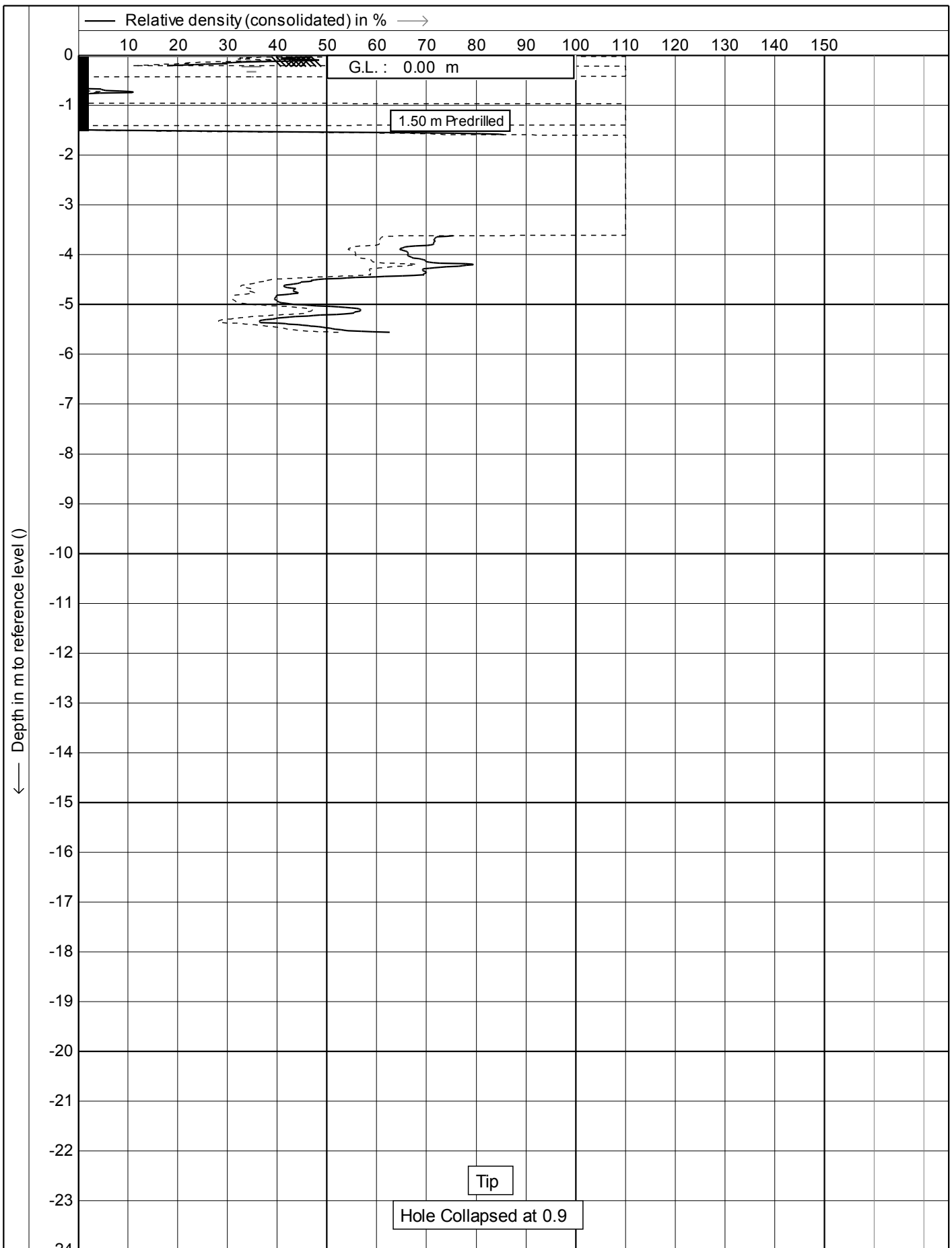
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	Position: 0, 0 RD	CPT no. : 07 8/14



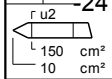
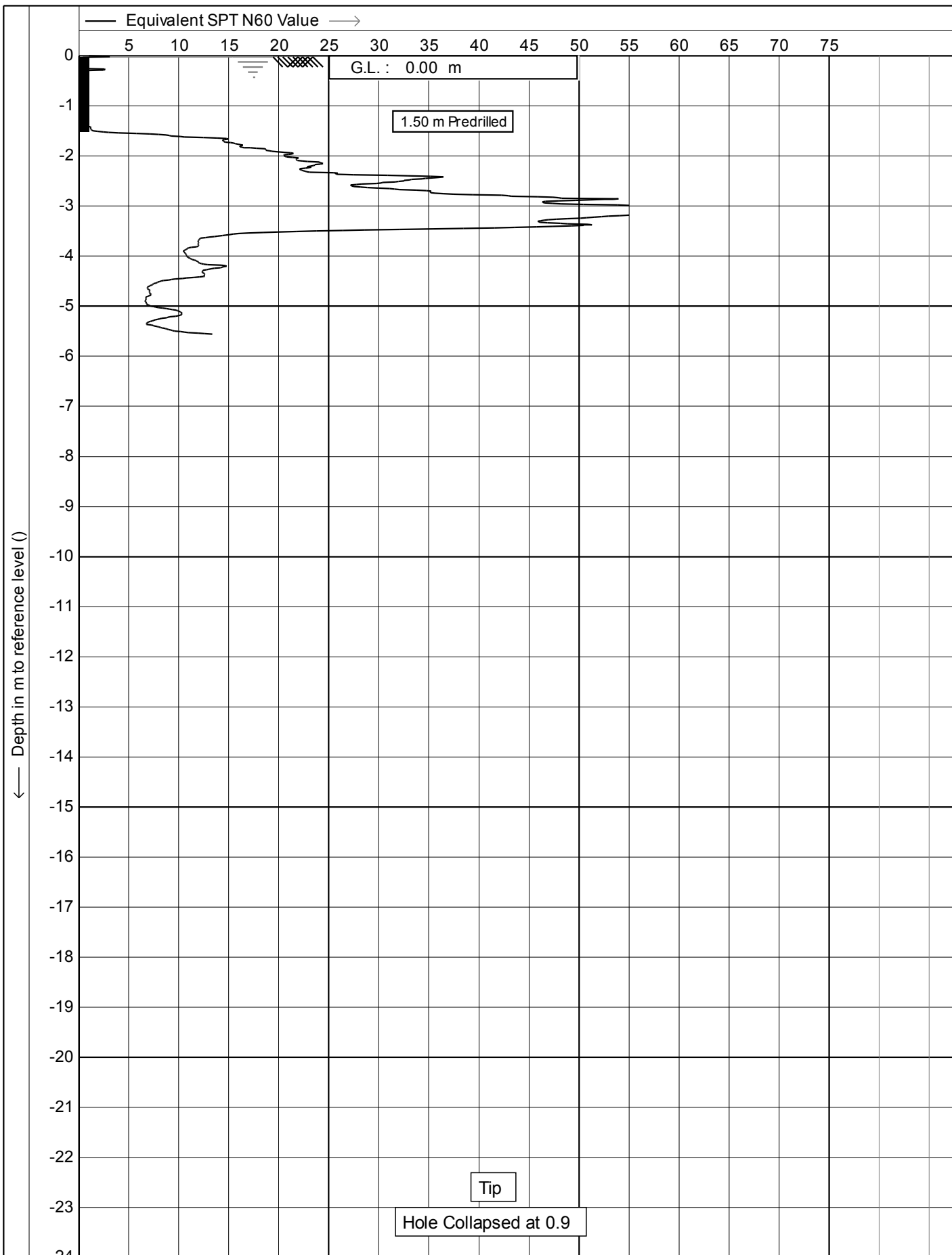
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	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 07
		9/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 07
		10/14



	Test according A.S.T.M Standard D 5778-12		Date : 12/10/2017
	Project : Site Investigations		Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington		Project no. : 05TT12
	Position: 0, 0 RD		CPT no. : 07
			11/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

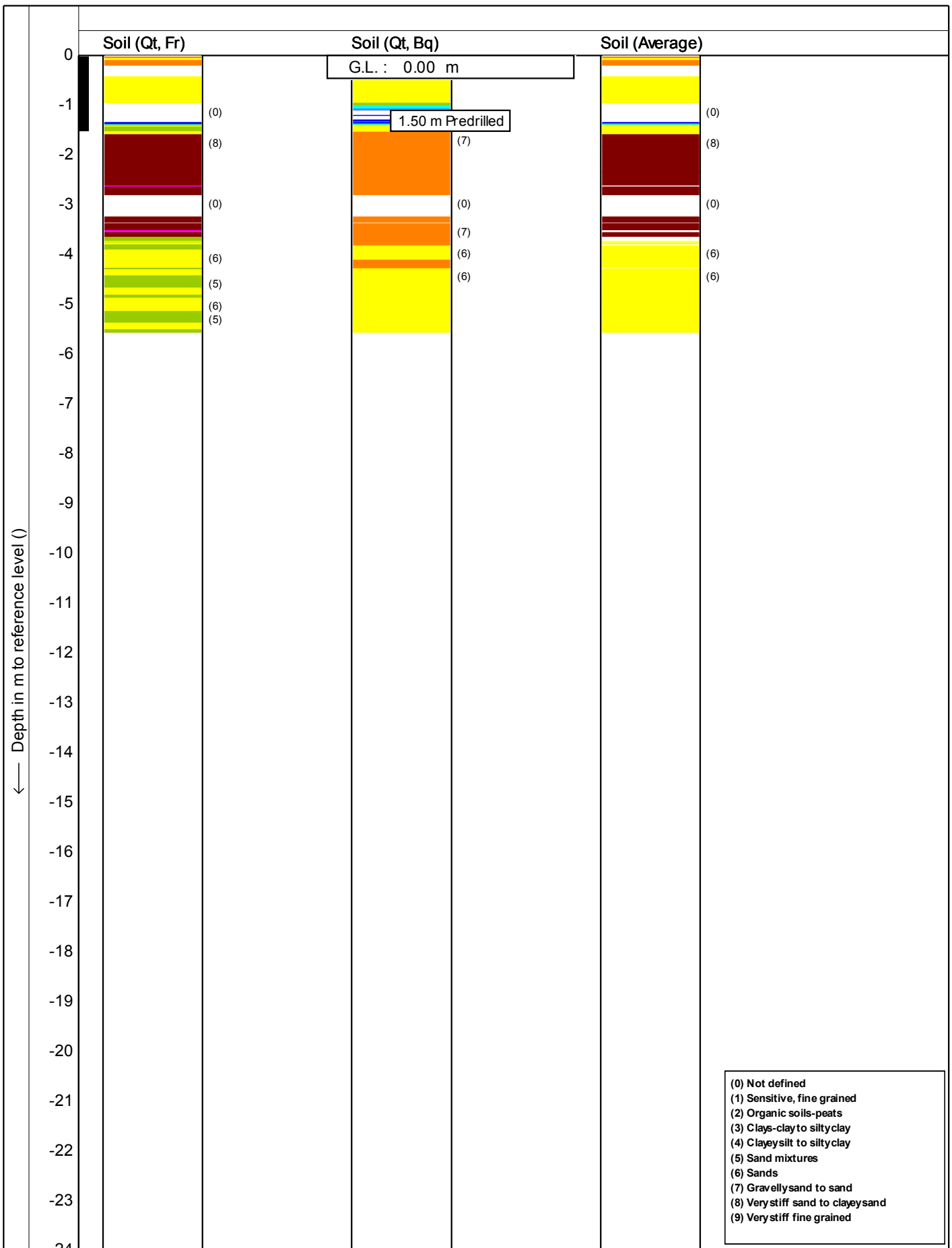
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Date : **12/10/2017**

Cone no. : **C10CFIP.C14433**

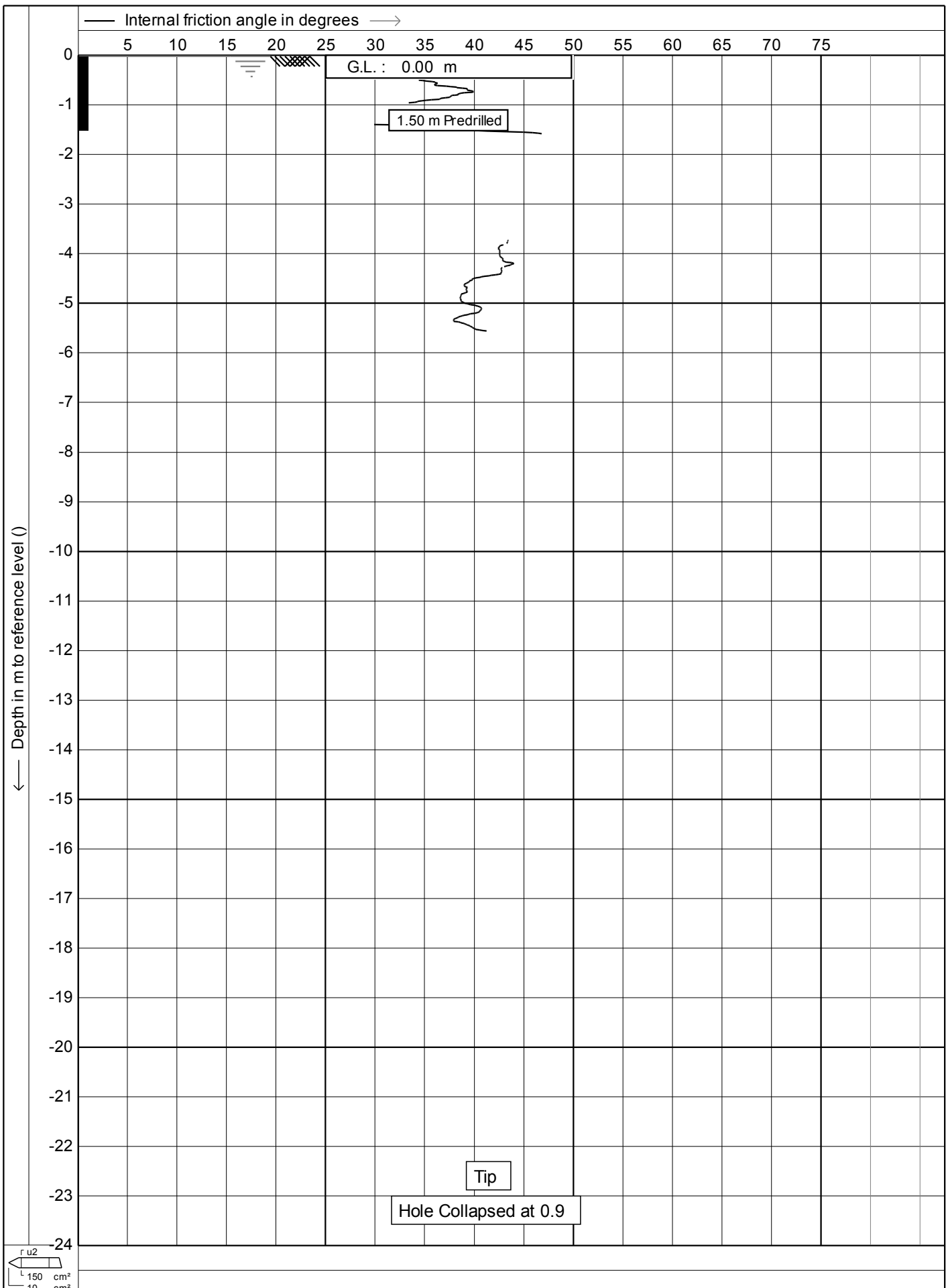
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CPT no. : **07** 12/14

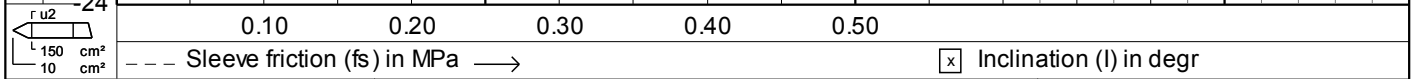
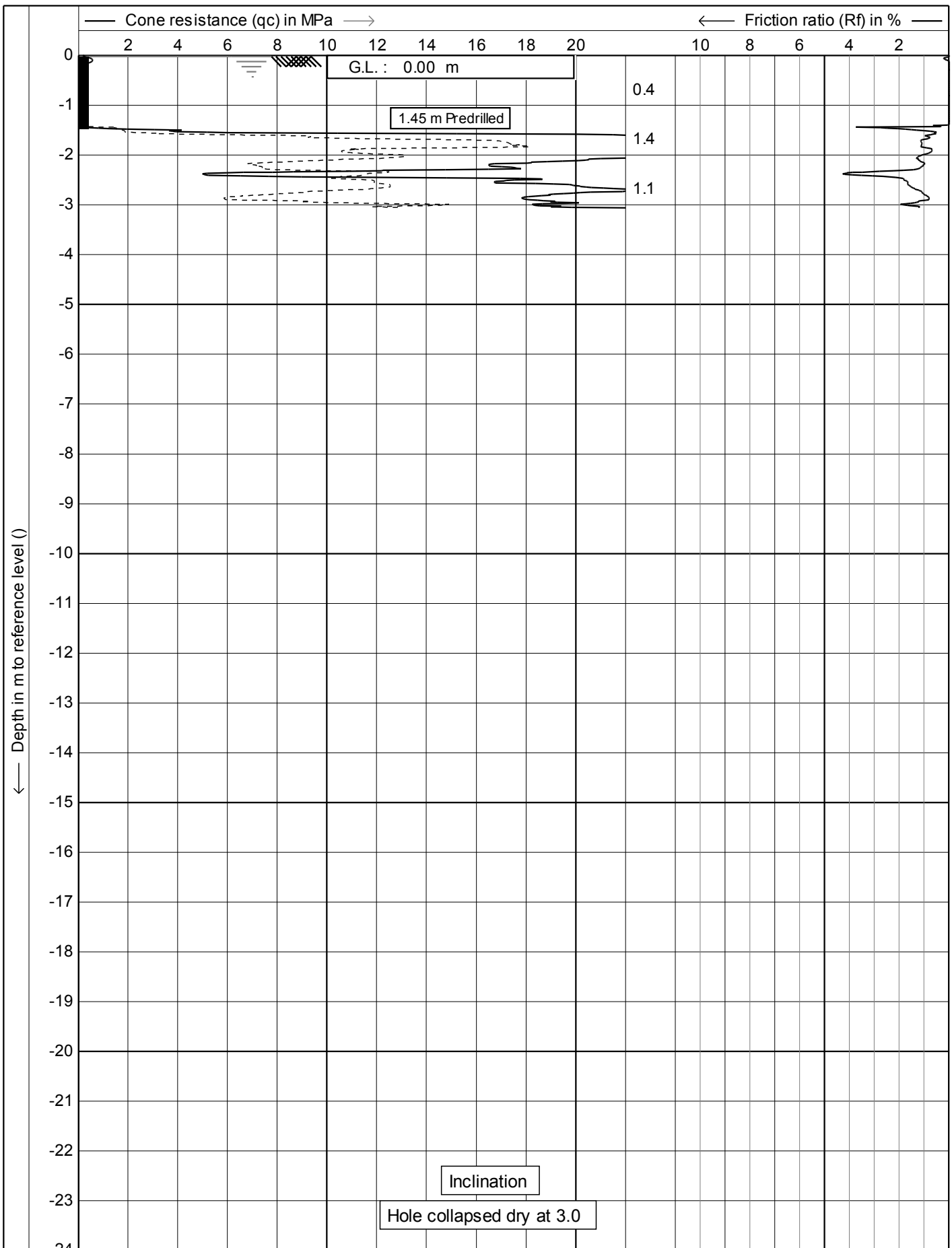


Soil behaviour type classification after Robertson 1990

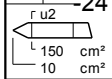
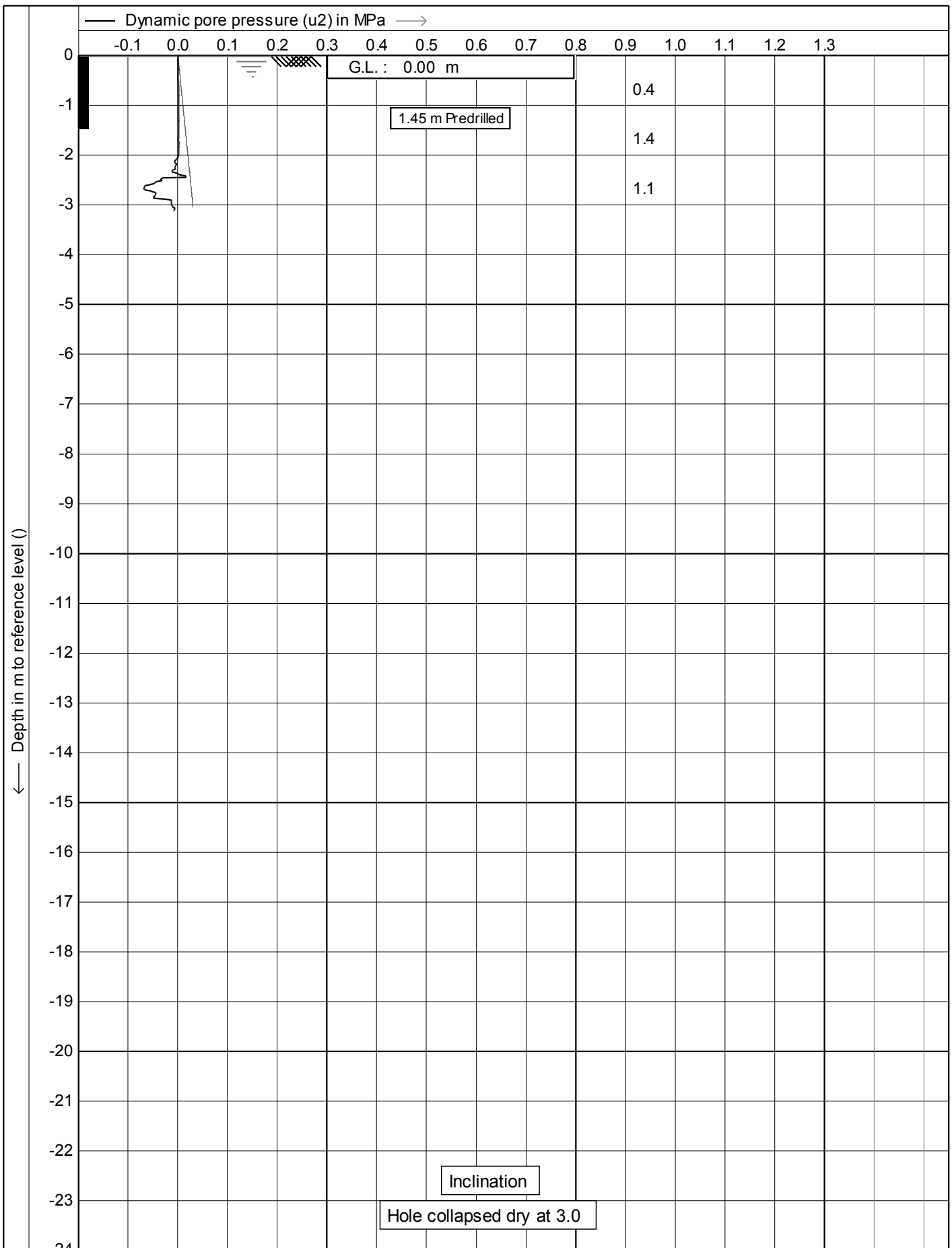
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	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 07
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	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 07
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	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 08a 1/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

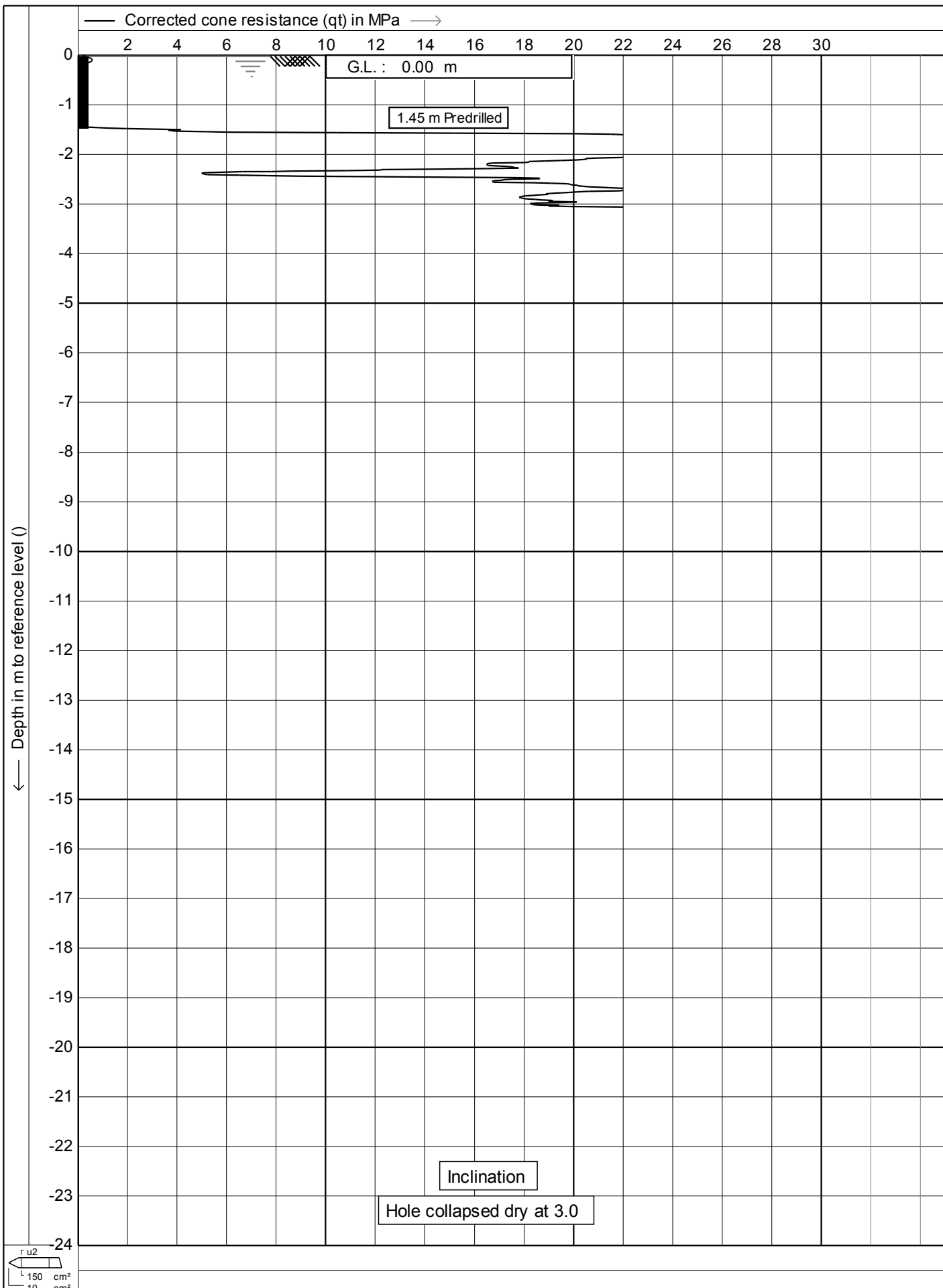
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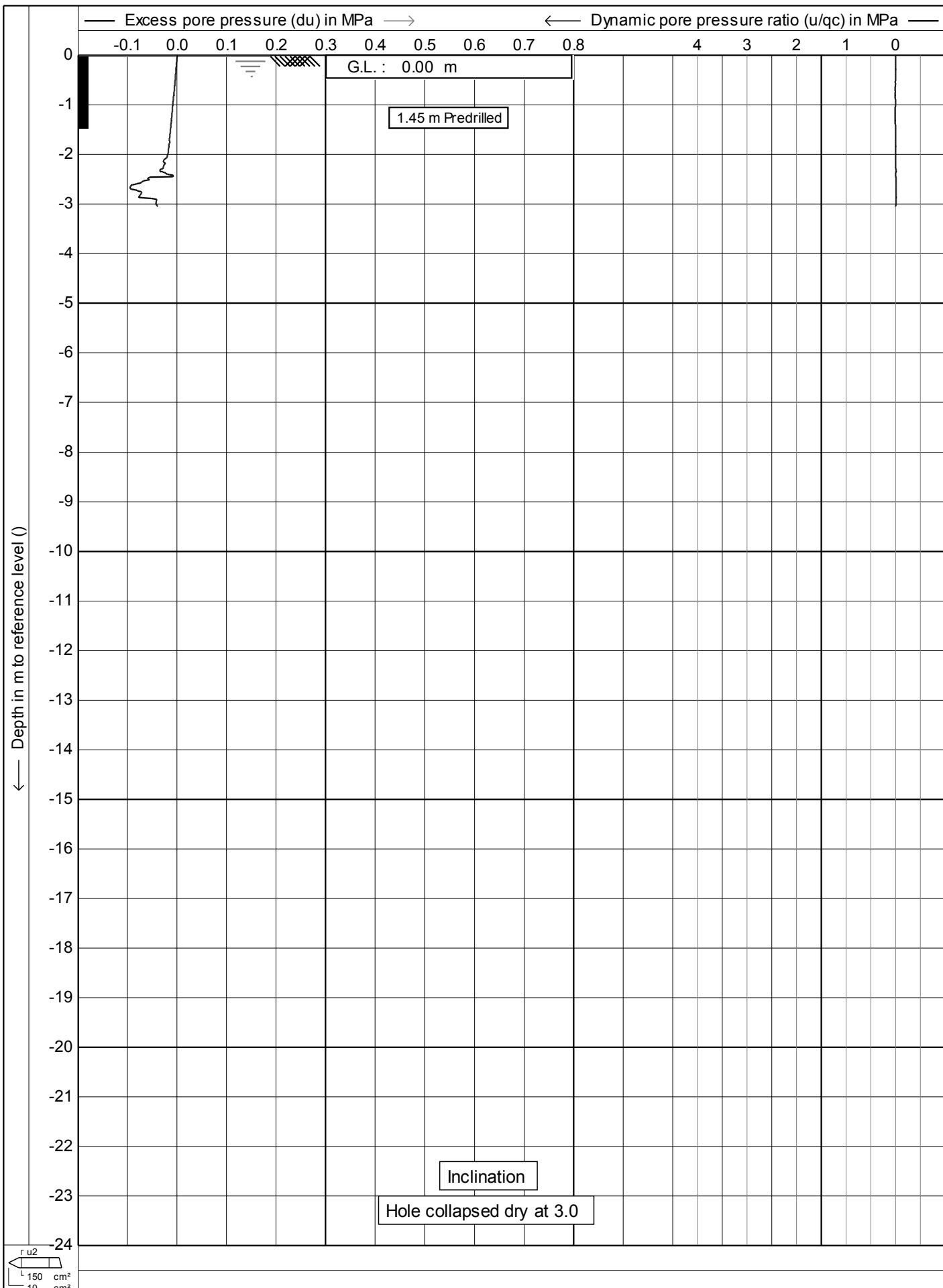
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Project no. : **05TT12**

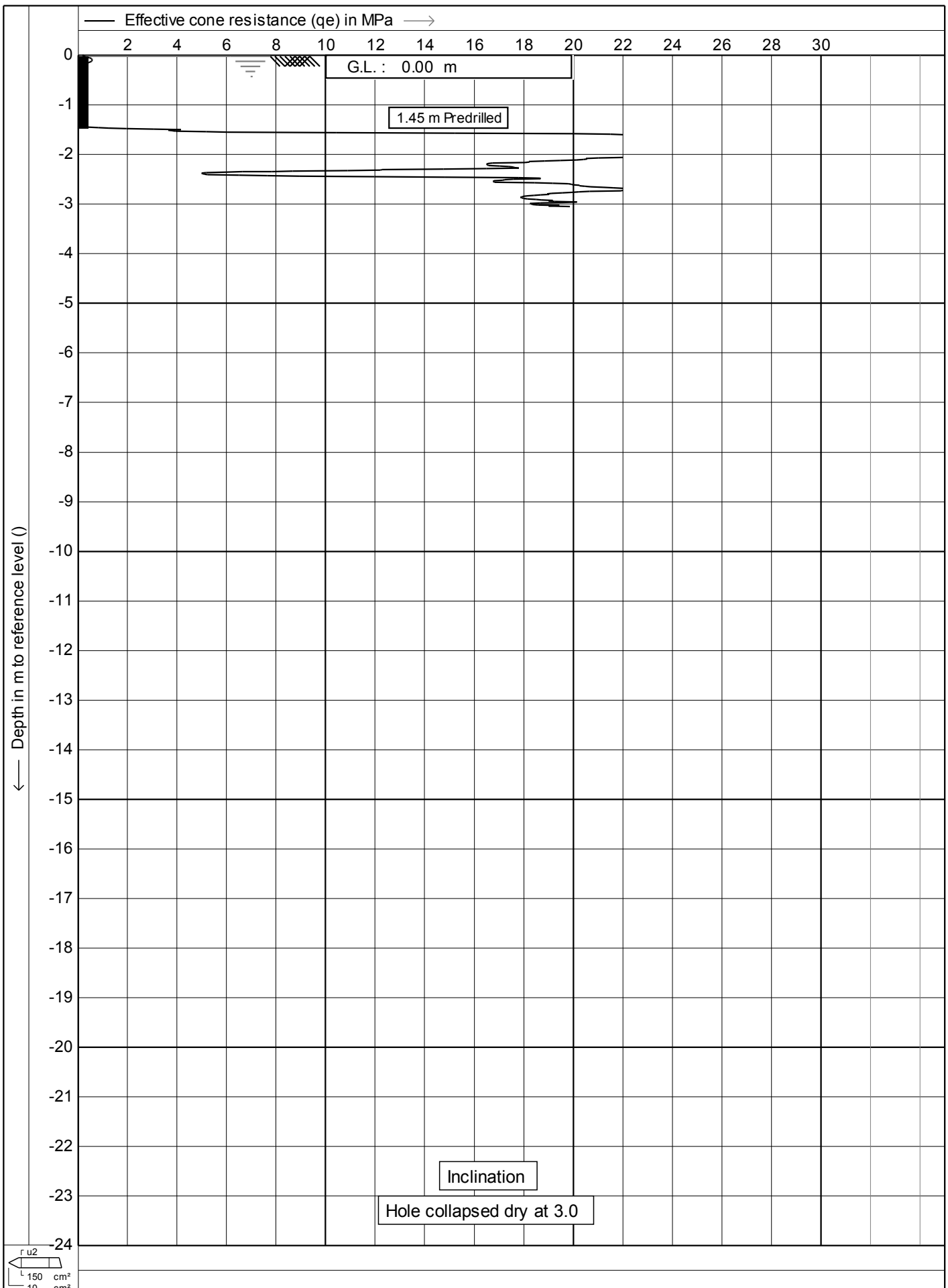
CPT no. : **08a** | **2/14**



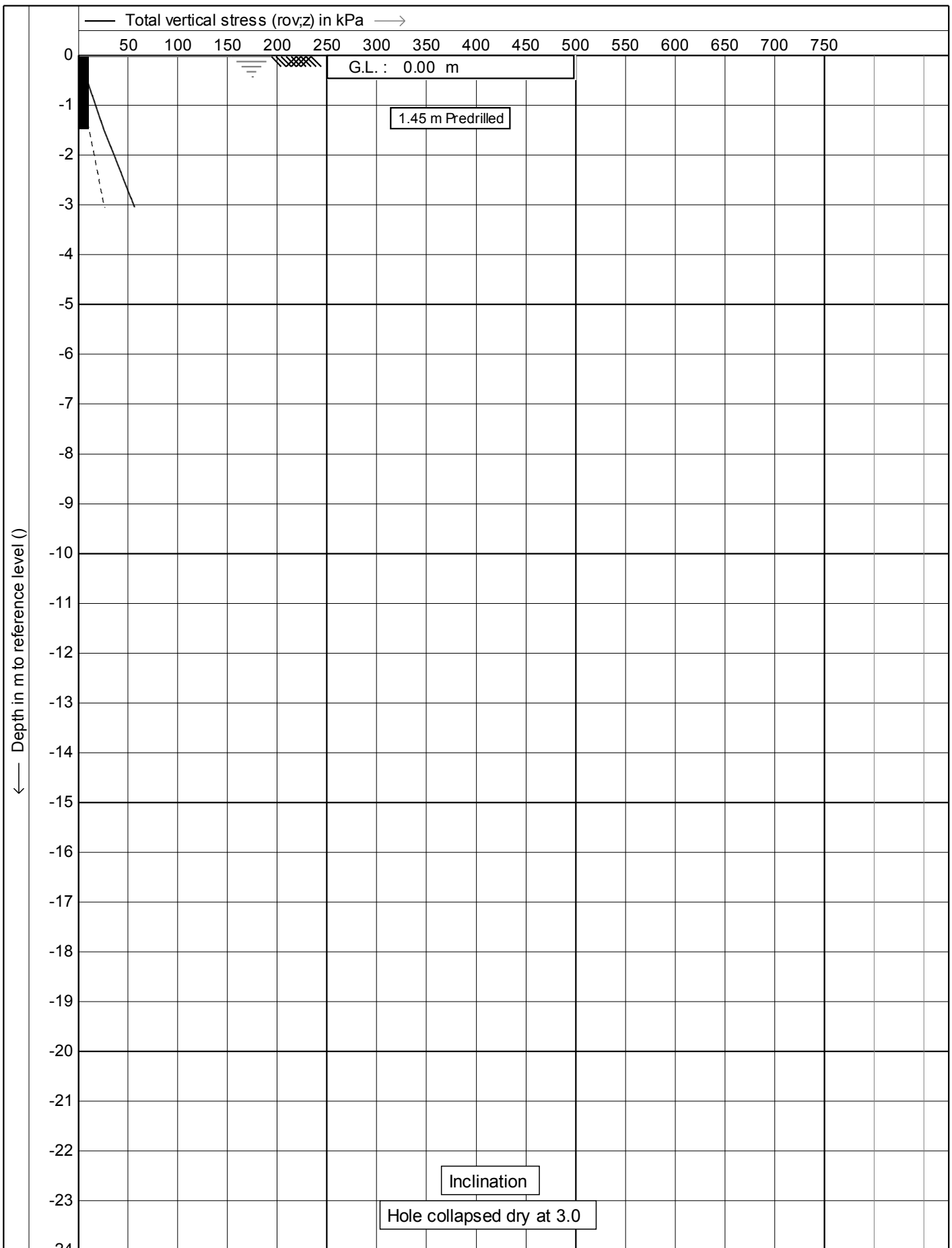
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	Position: 0, 0 RD	CPT no. : 08a
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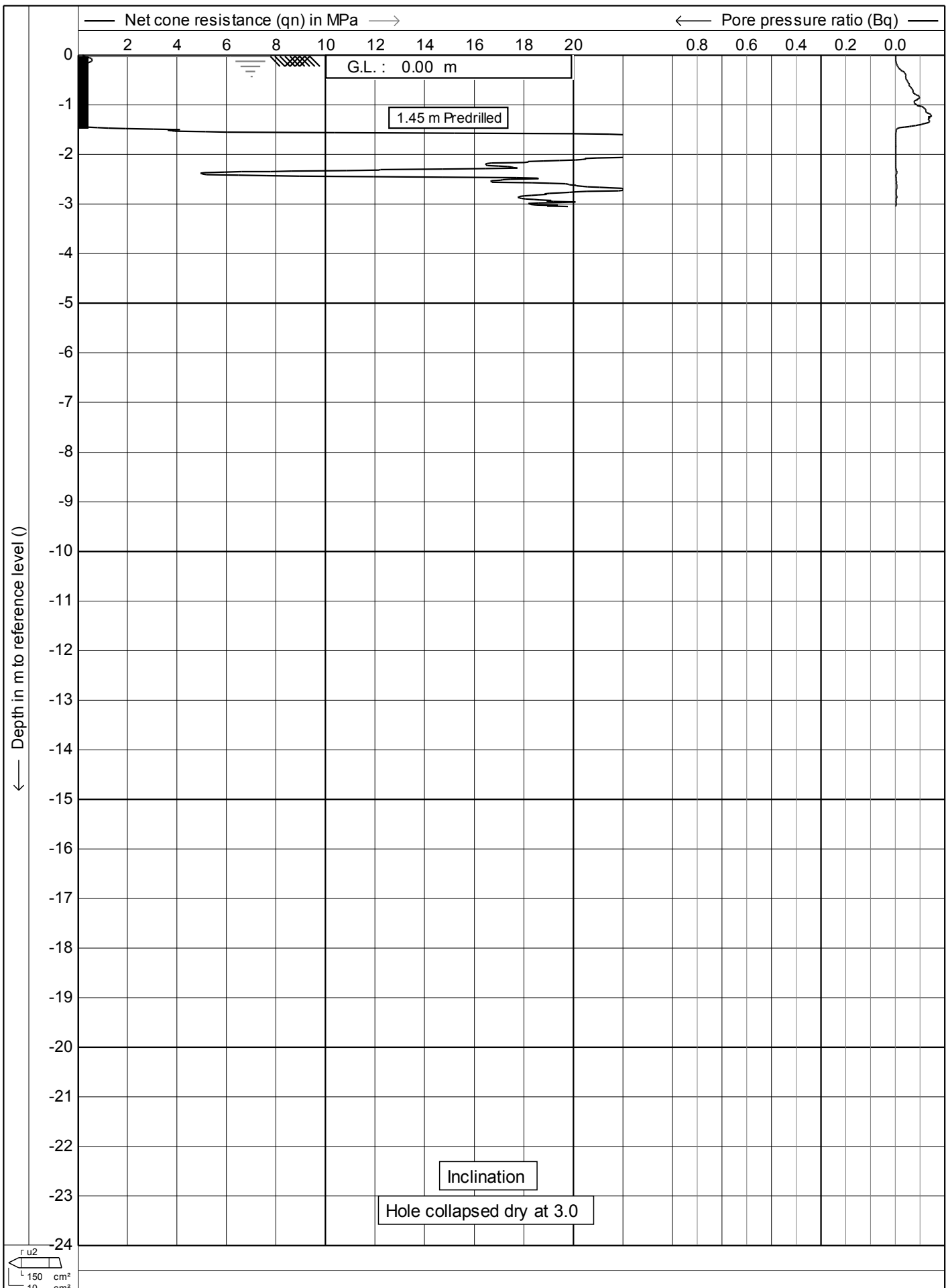
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	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 08a
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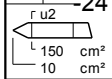
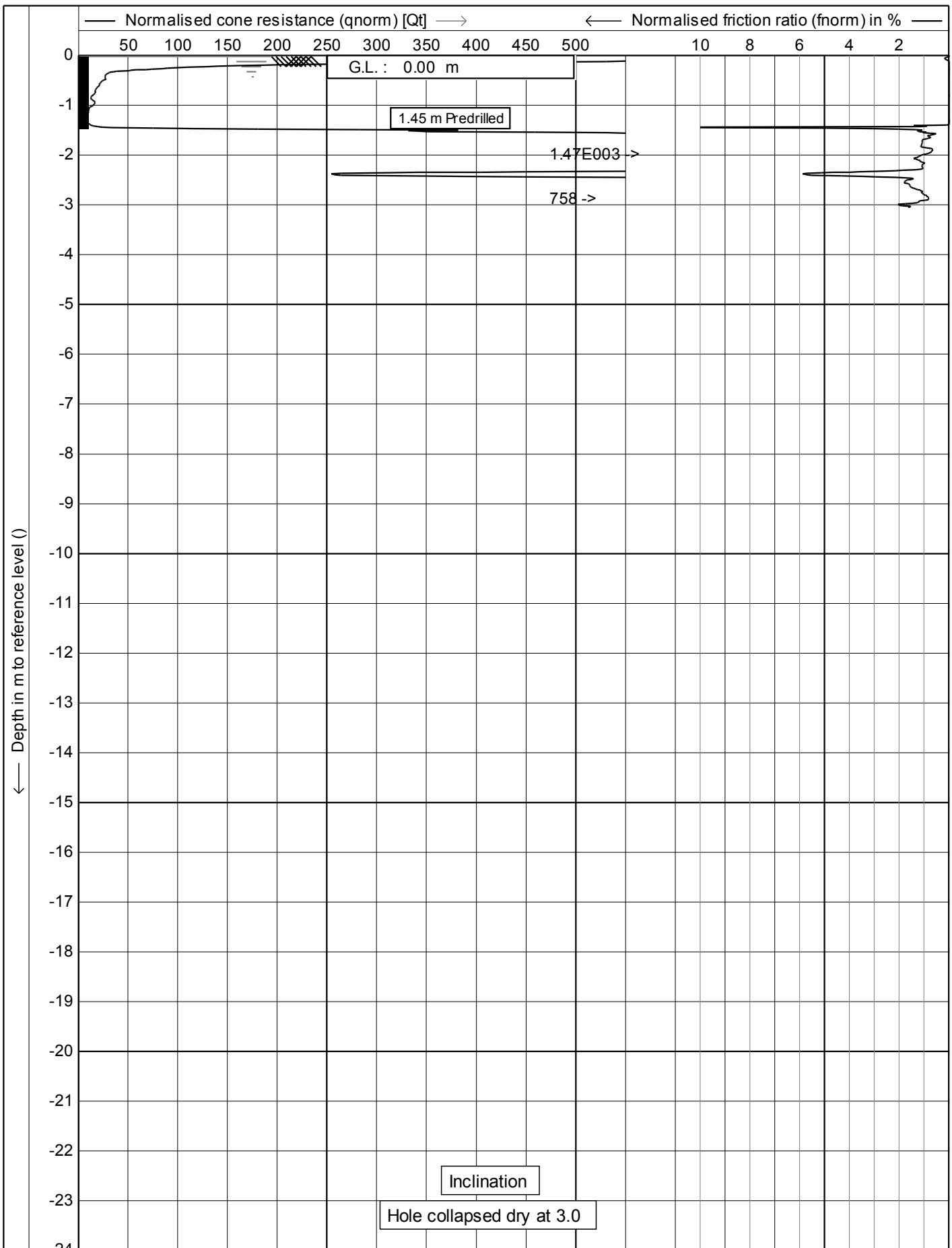
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	Position: 0, 0 RD	CPT no. : 08a
		5/14



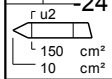
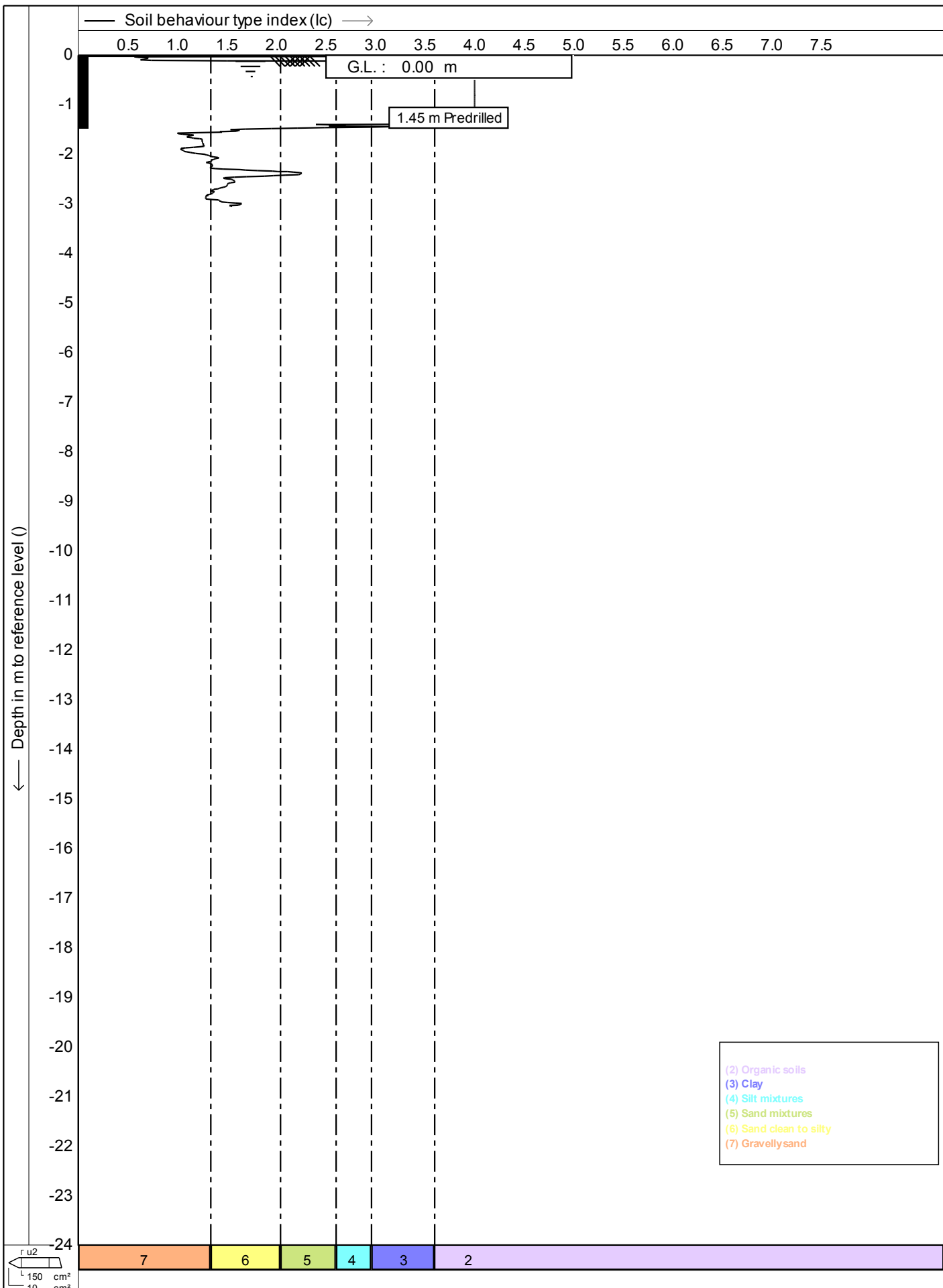
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	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 08a
		6/14



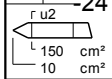
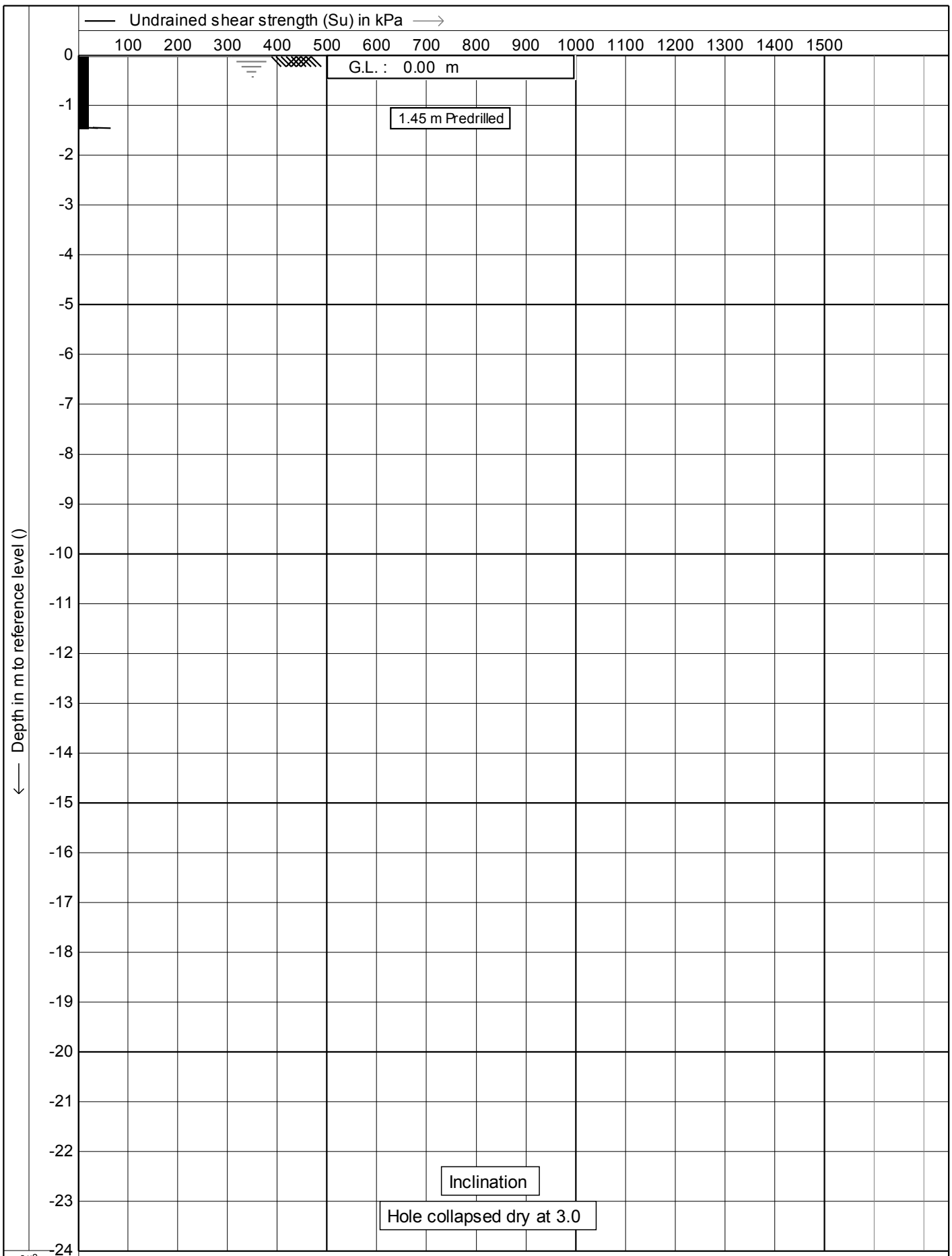
Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
Project : Site Investigations	Cone no. : C10CFIP.C14433
Location: Victoria University - Wellington	Project no. : 05TT12
Position: 0, 0 RD	CPT no. : 08a
	7/14



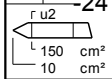
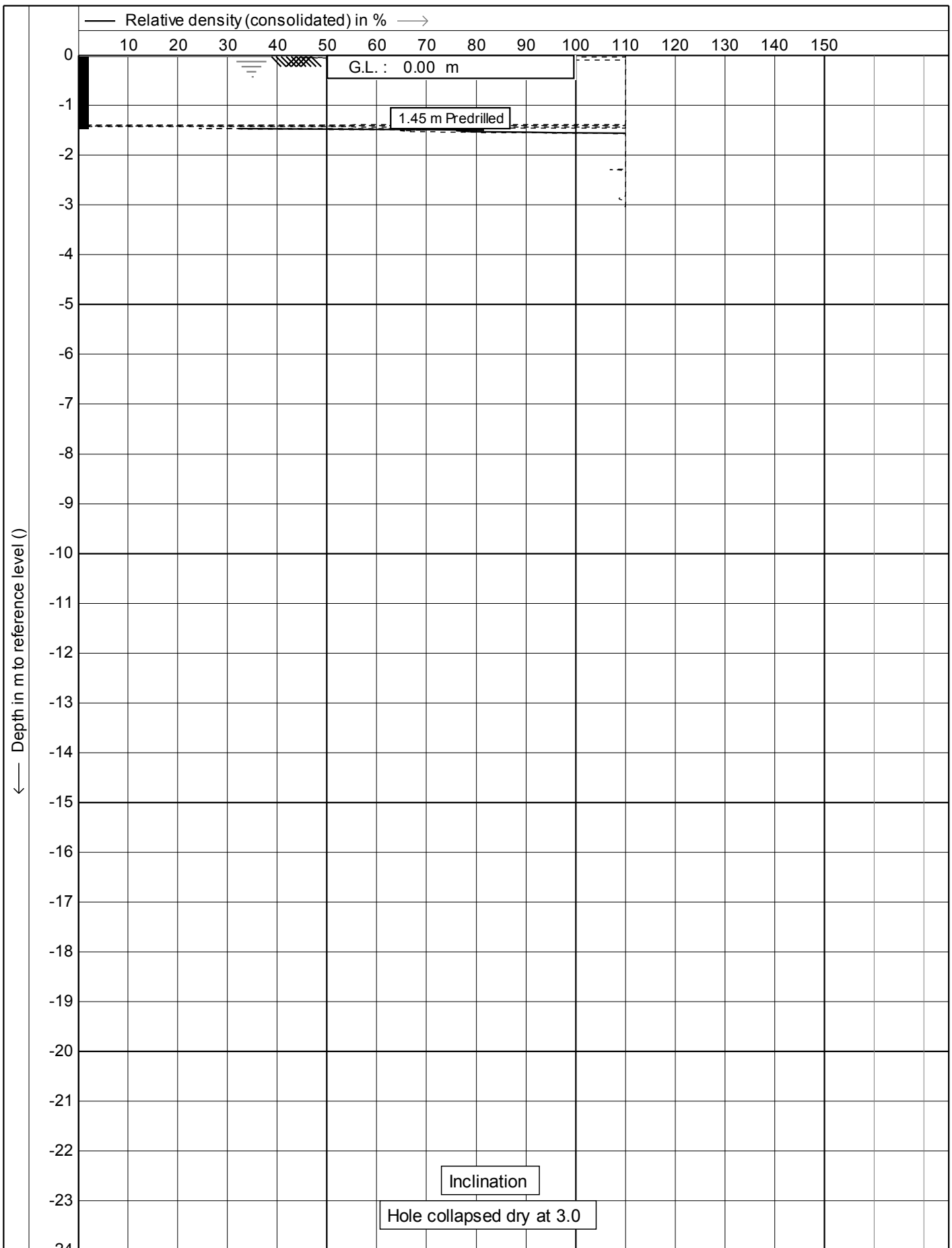
	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 08a 8/14



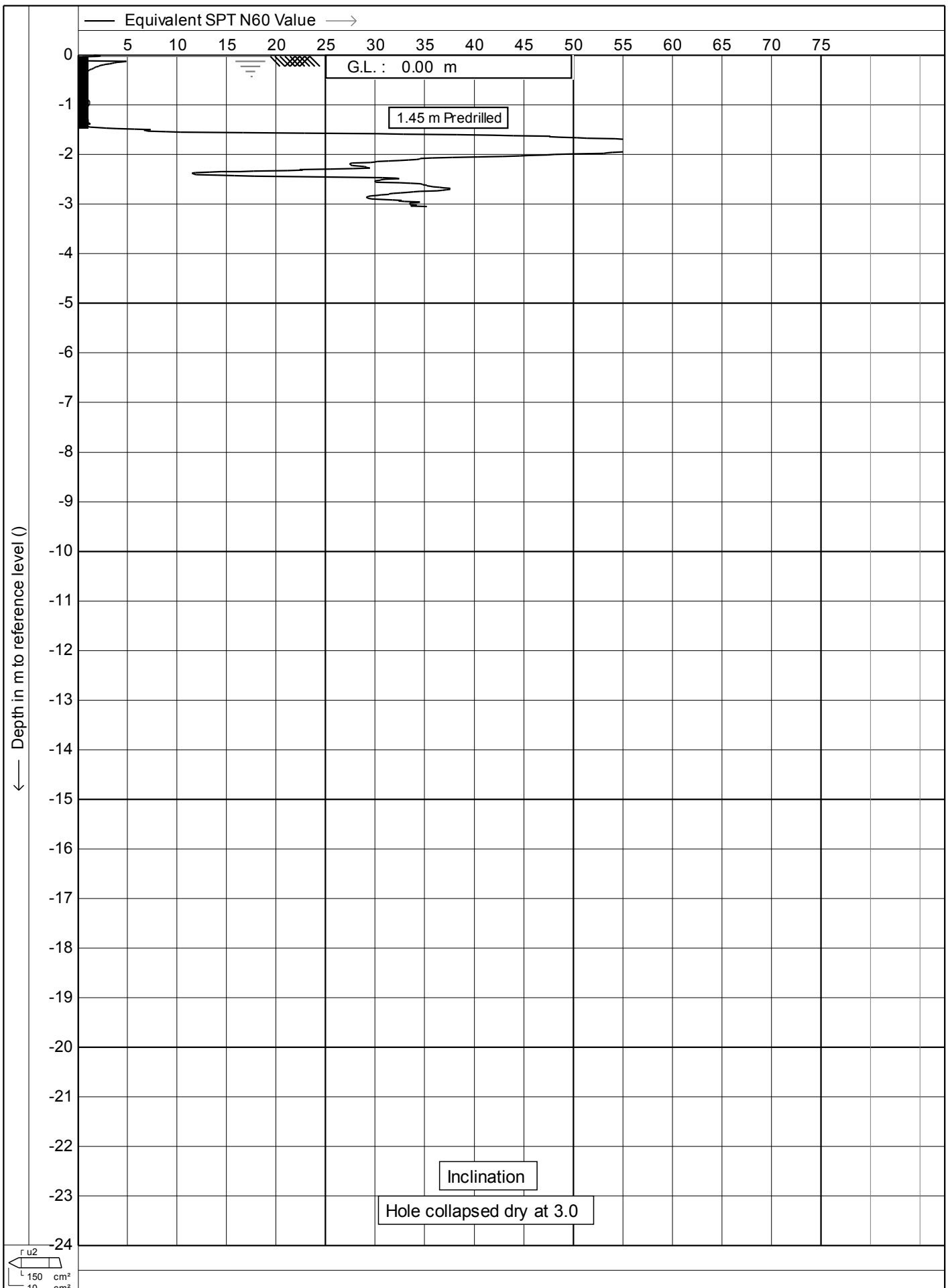
	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 08a
		9/14



	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 08a
		10/14



	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 08a
		11/14

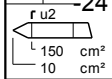
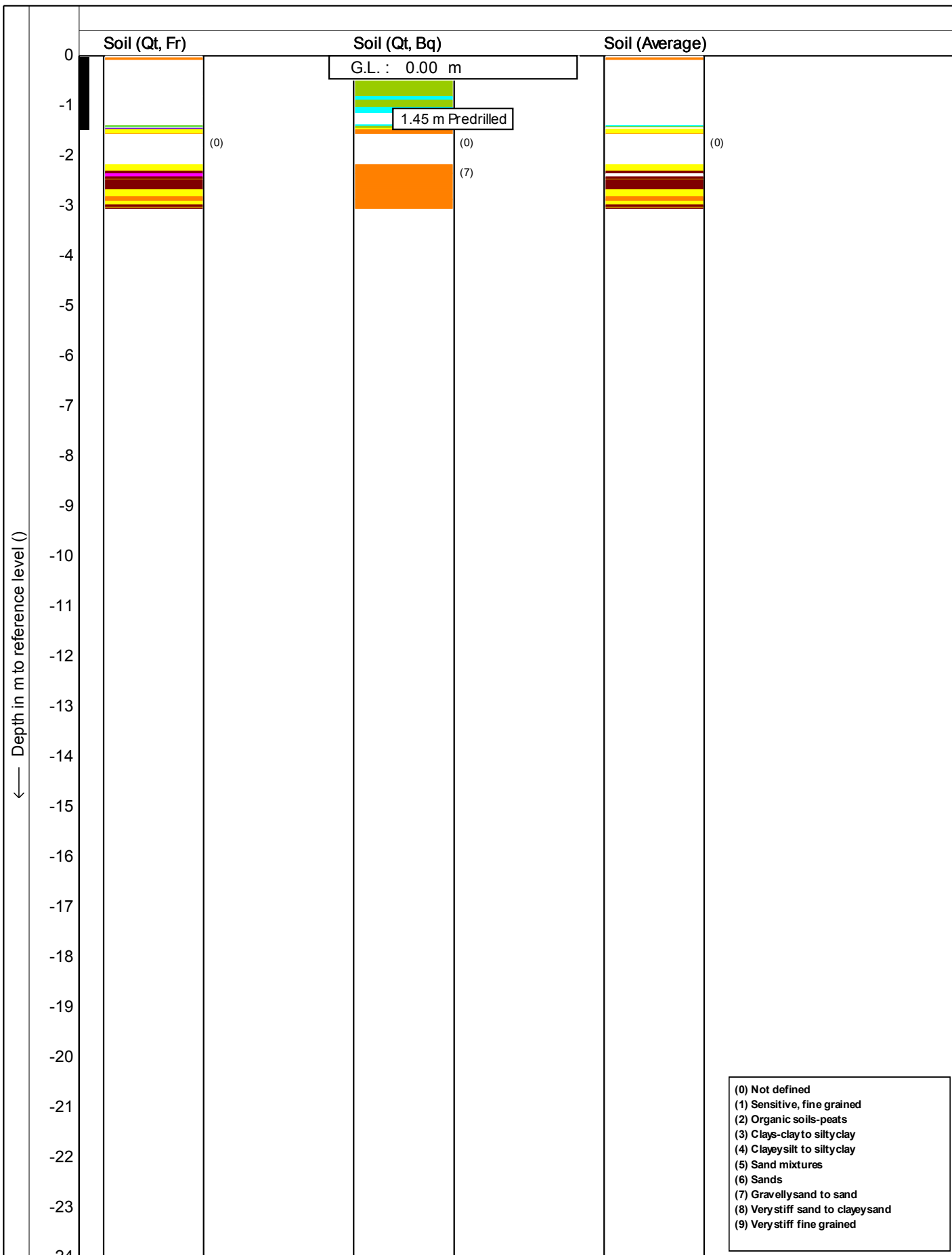


Test according A.S.T.M Standard D 5778-12

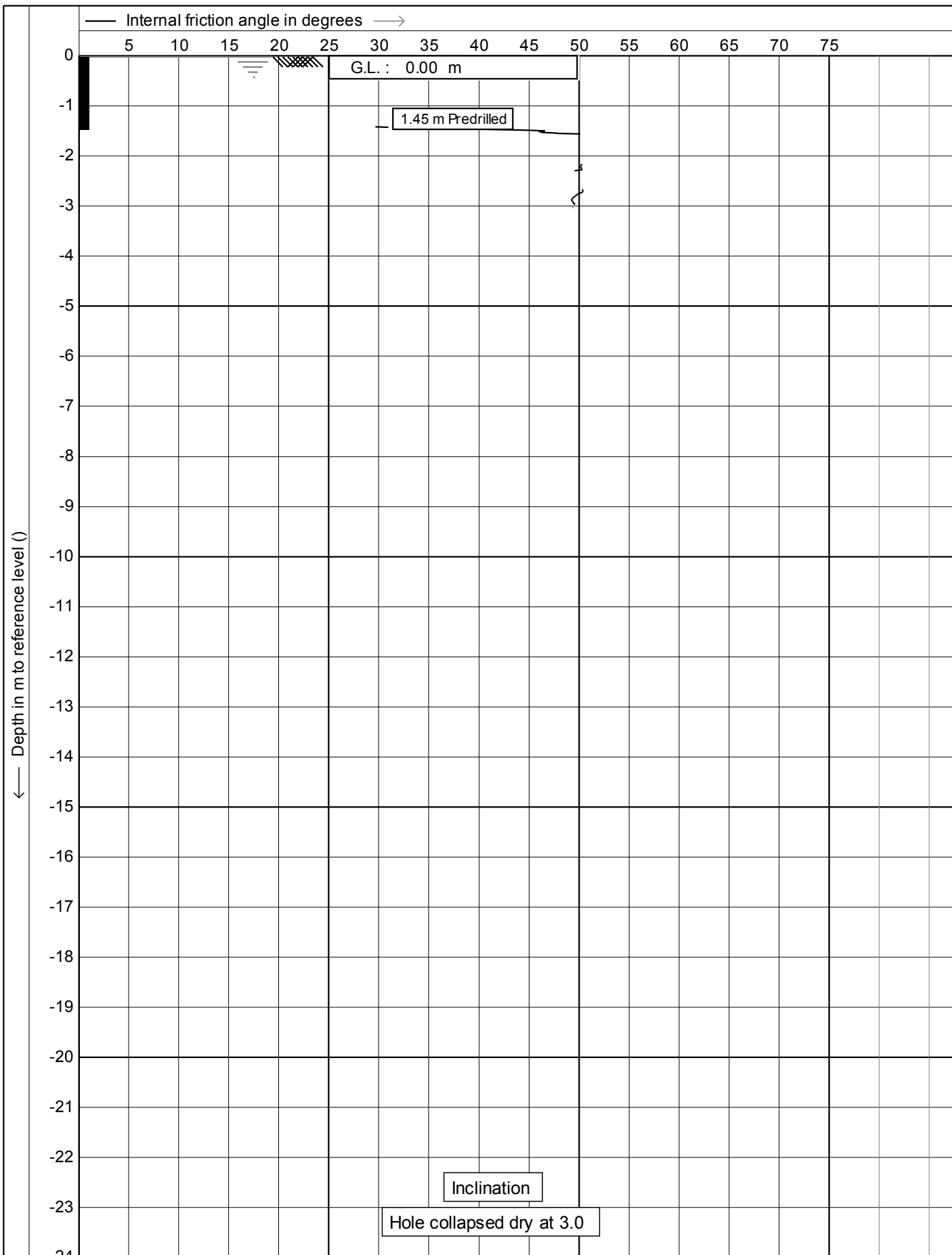
Date : 11/10/2017
 Cone no. : C10CFIP.C14433
 Project no. : 05TT12
 CPT no. : 08a

Project : Site Investigations
 Location: Victoria University - Wellington
 Position: 0, 0 RD





	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 08a 13/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

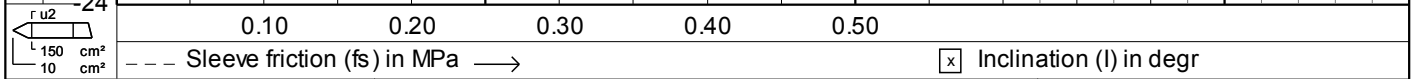
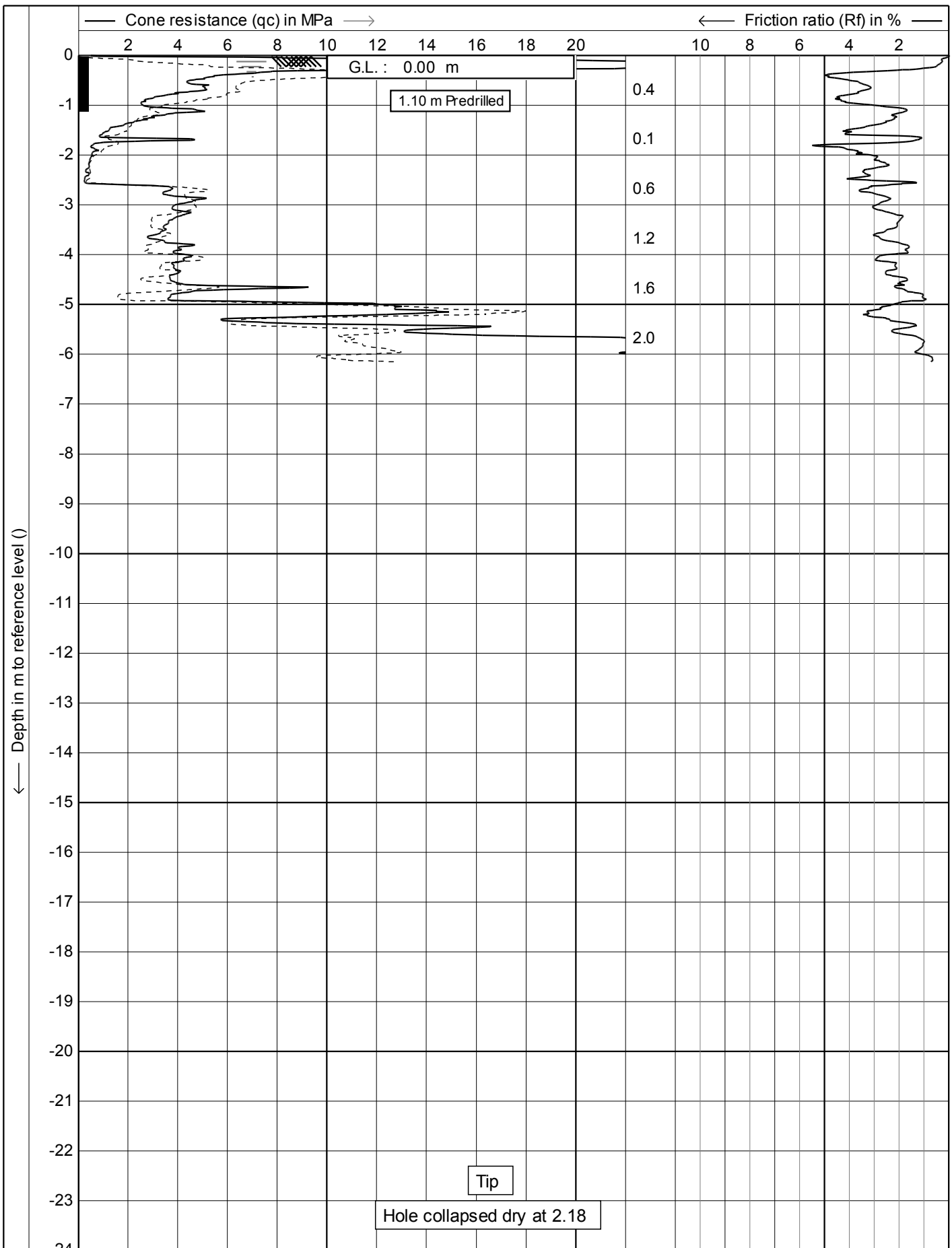
Position: **0, 0 RD**

Date : **11/10/2017**

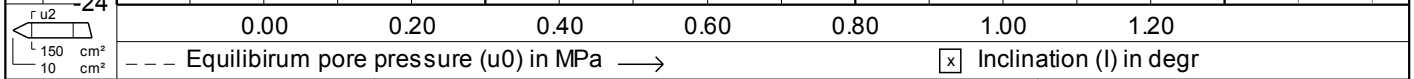
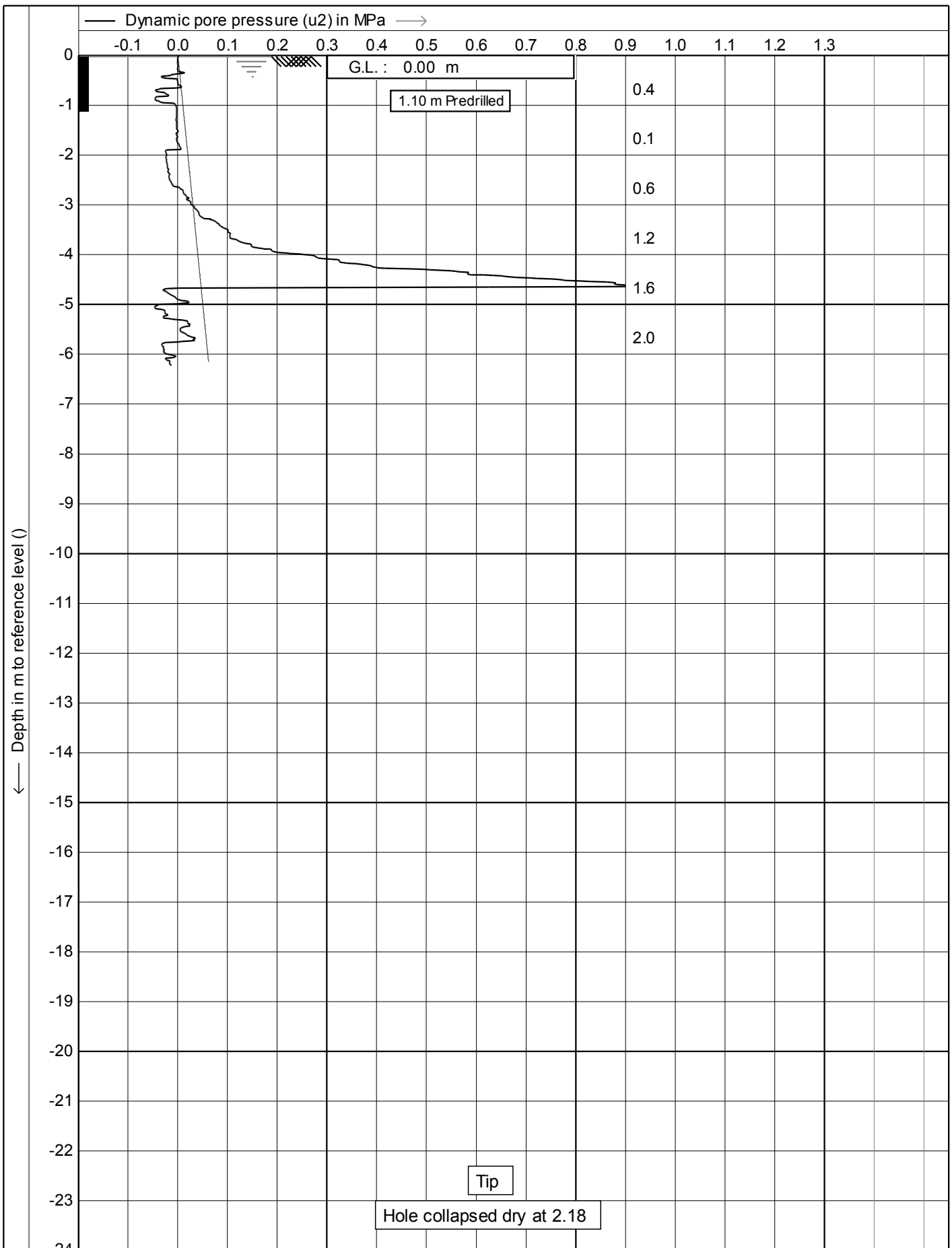
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Project no. : **05TT12**

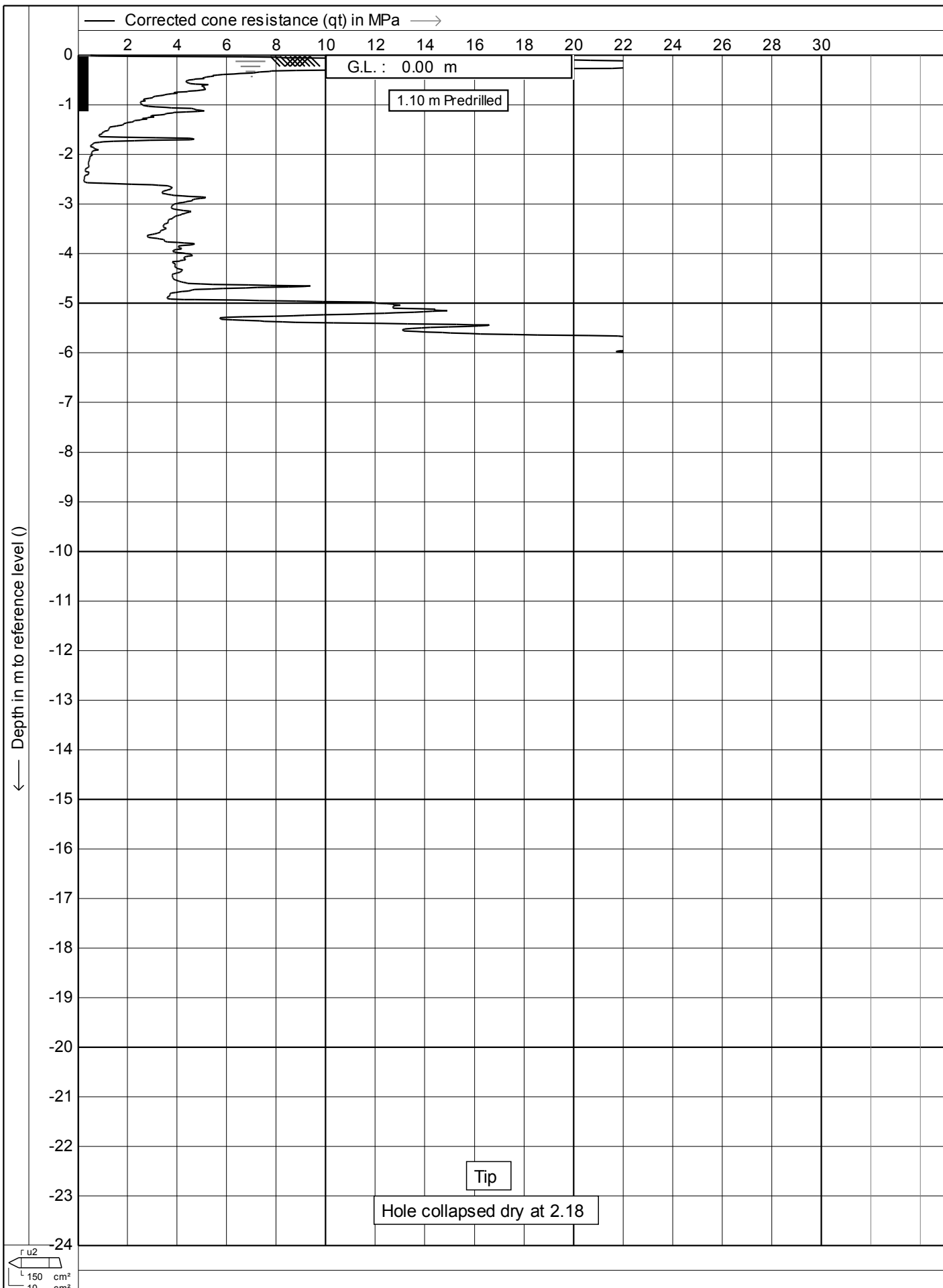
CPT no. : **08a** | 14/14



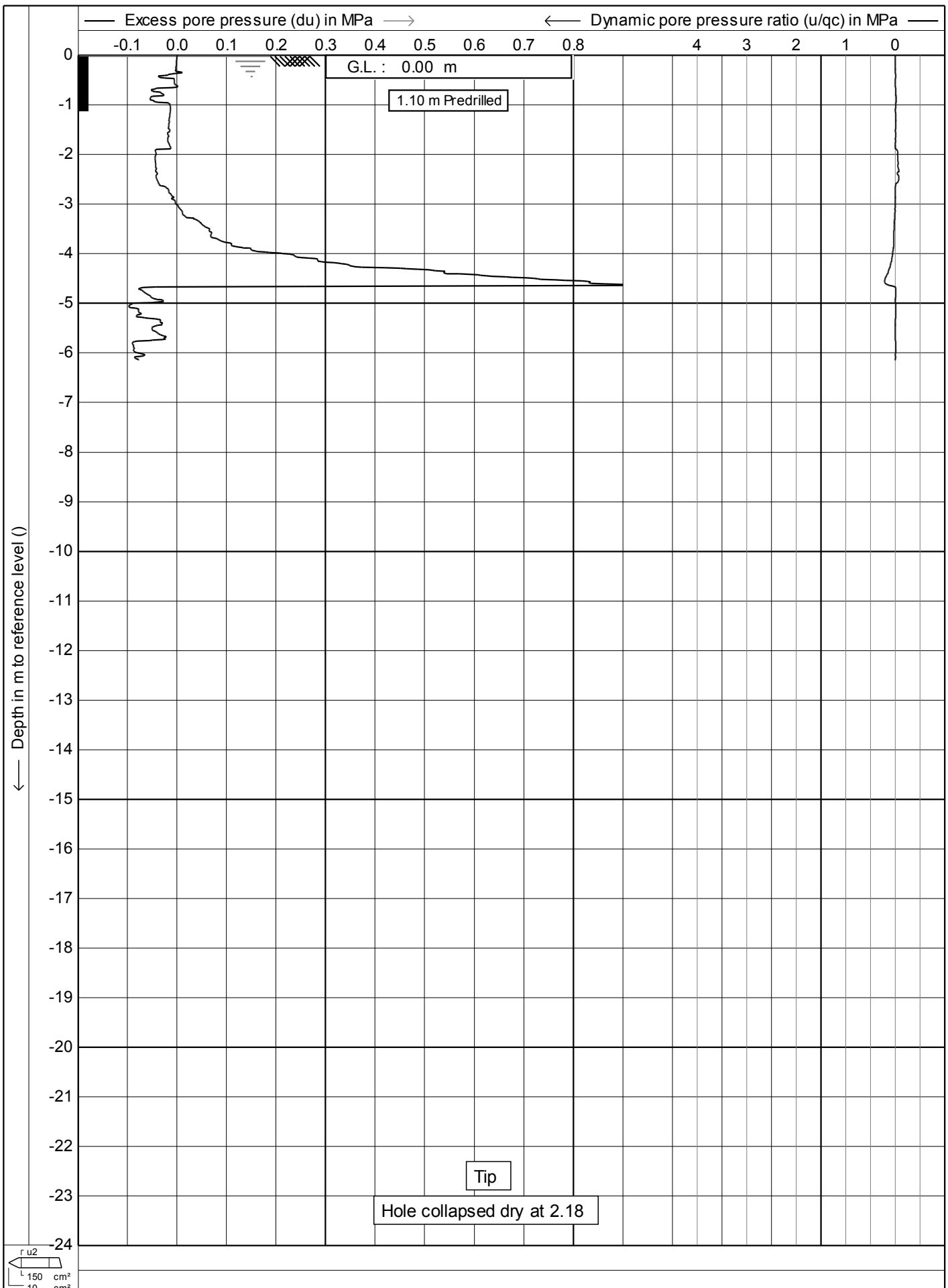
	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 09 1/14



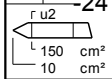
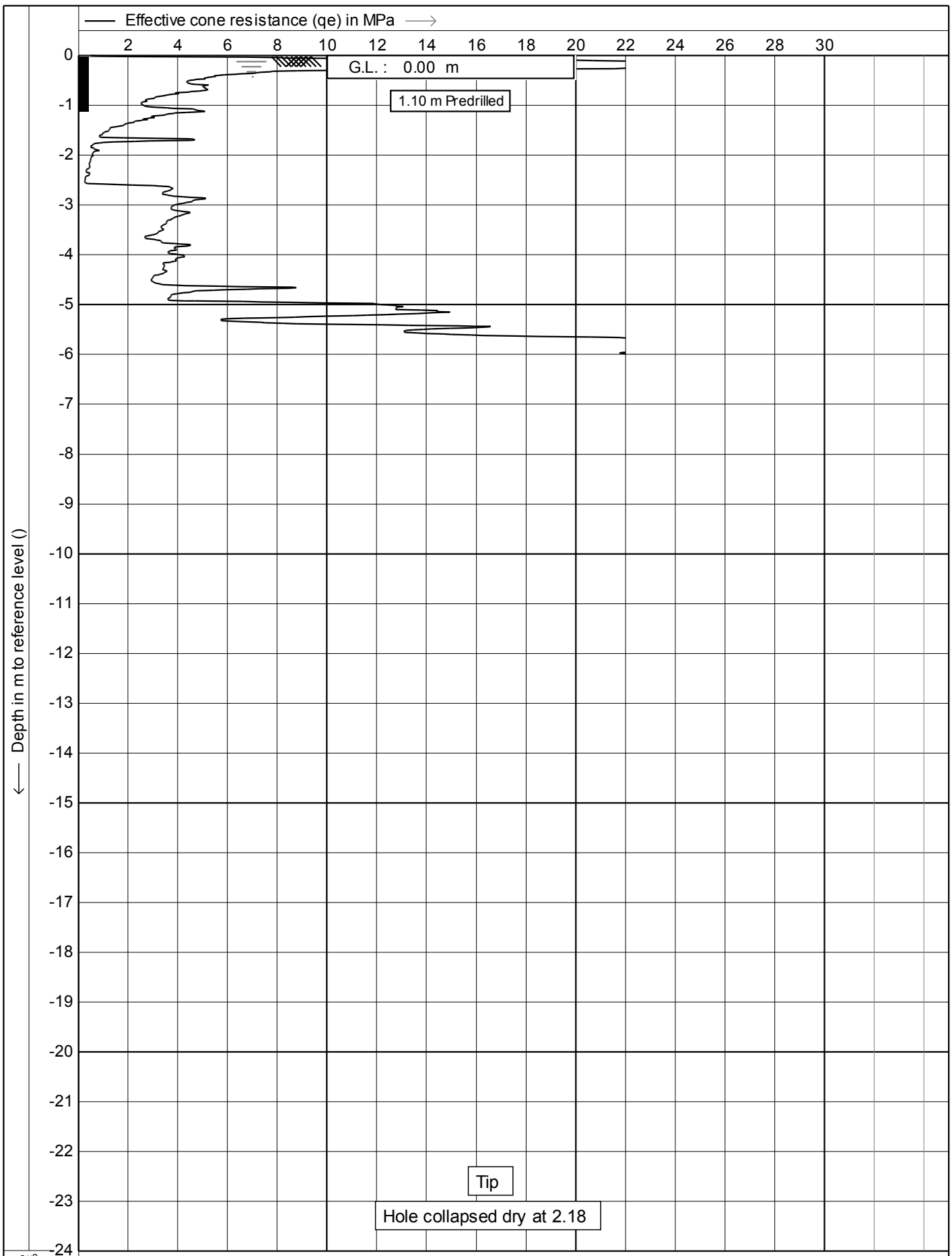
	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 09
		2/14



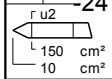
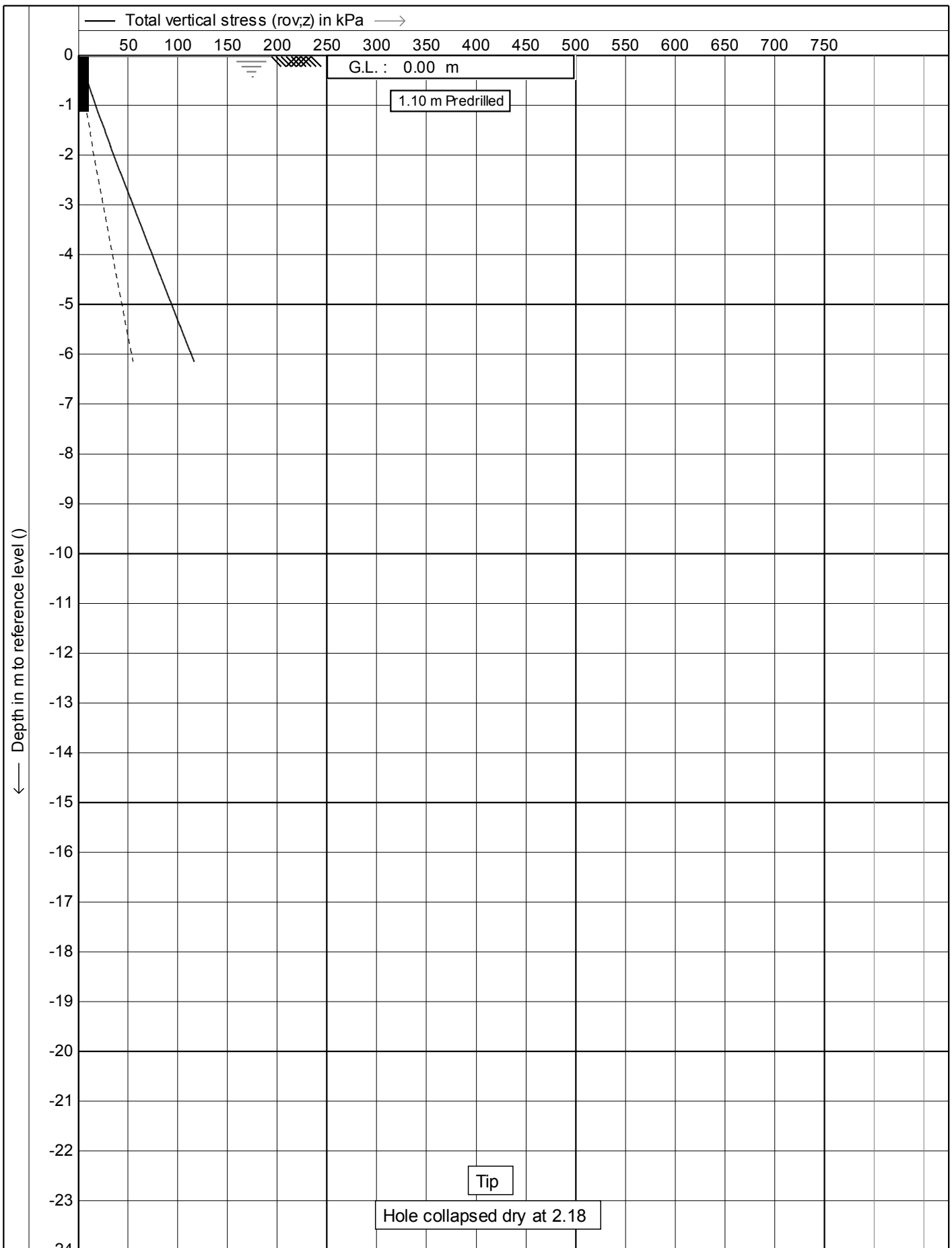
	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 09
		3/14



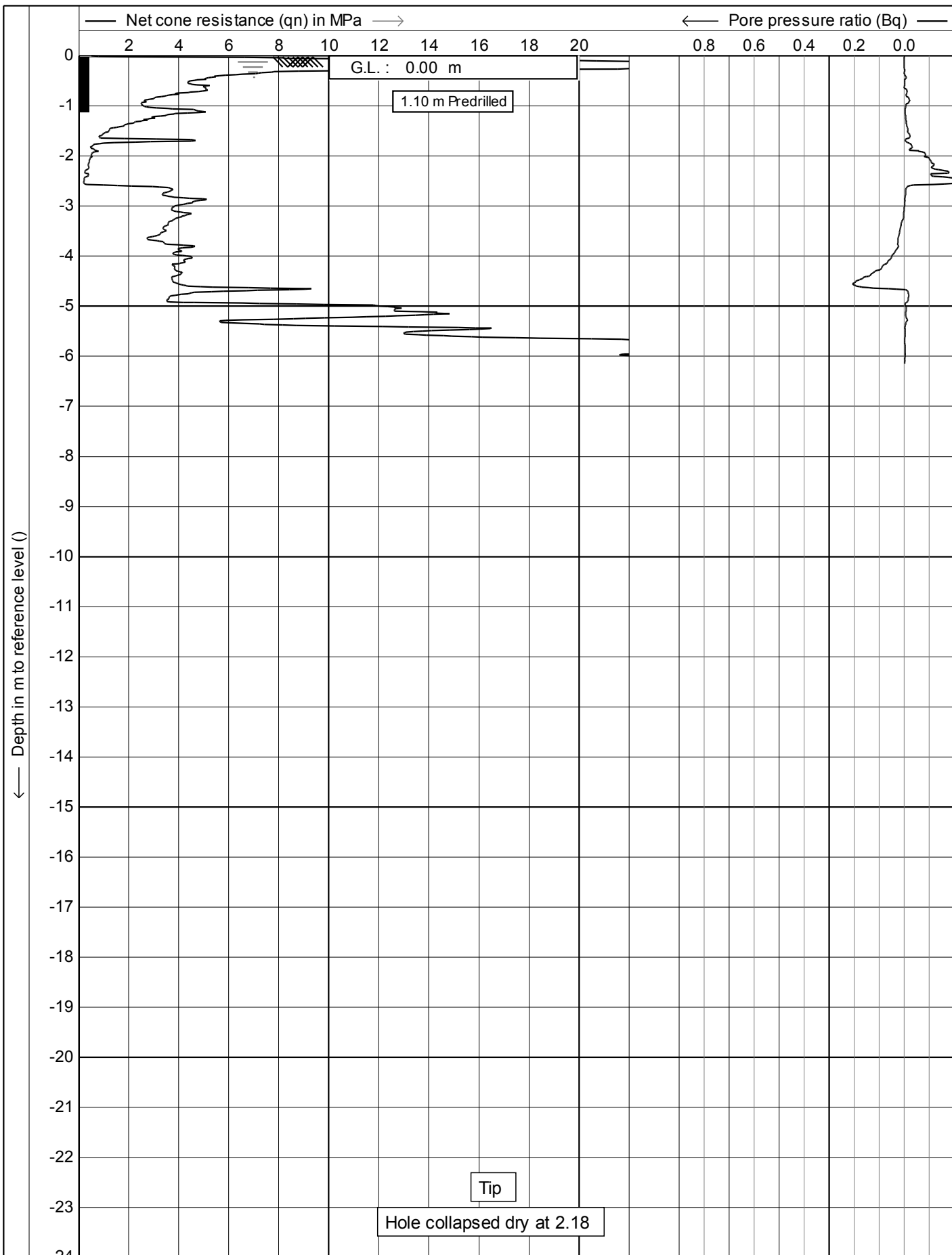
	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 09 4/14



	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 09
		5/14



	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 09
		6/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

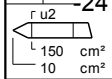
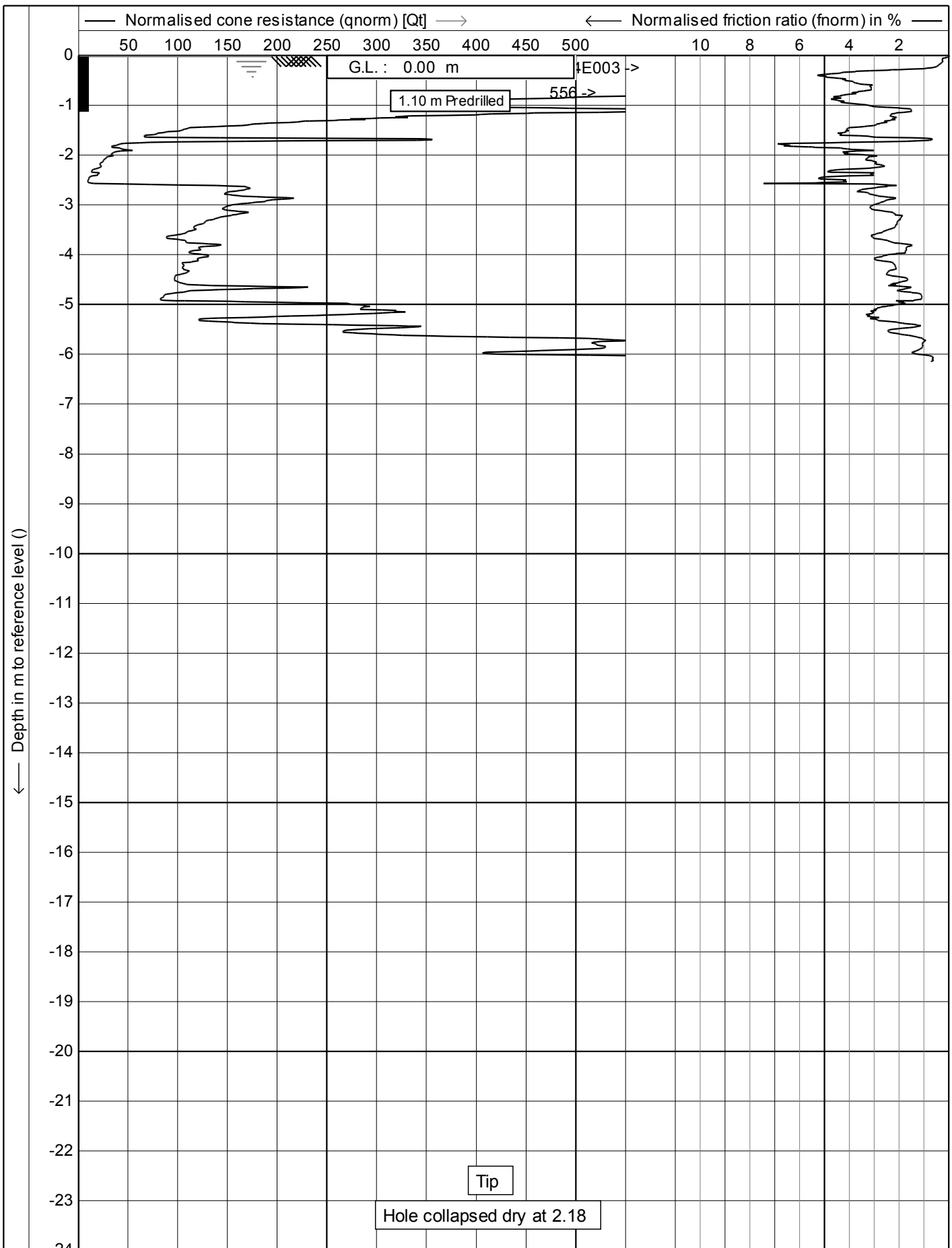
Position: **0, 0 RD**

Date : **11/10/2017**

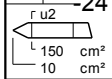
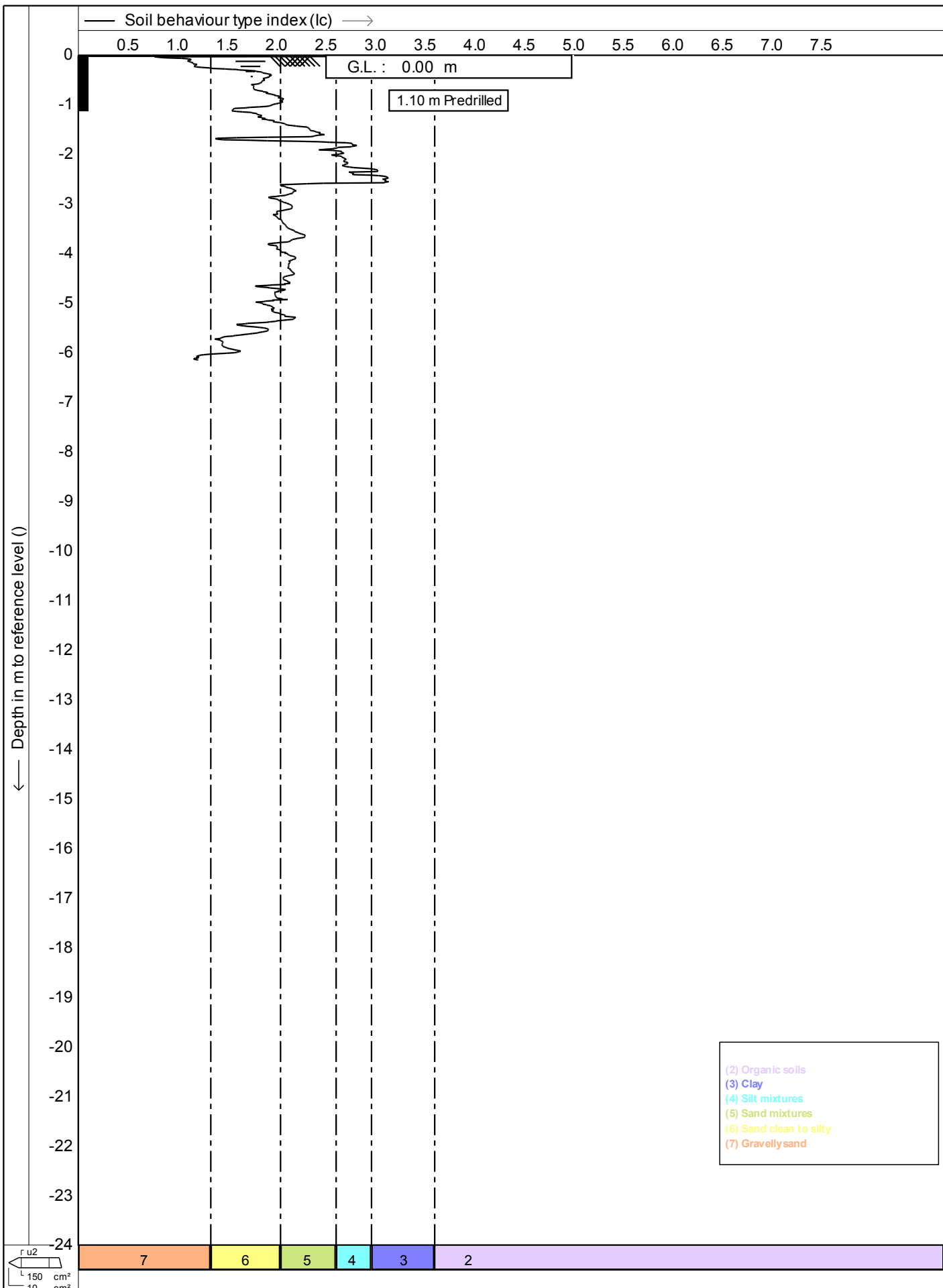
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Project no. : **05TT12**

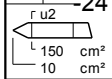
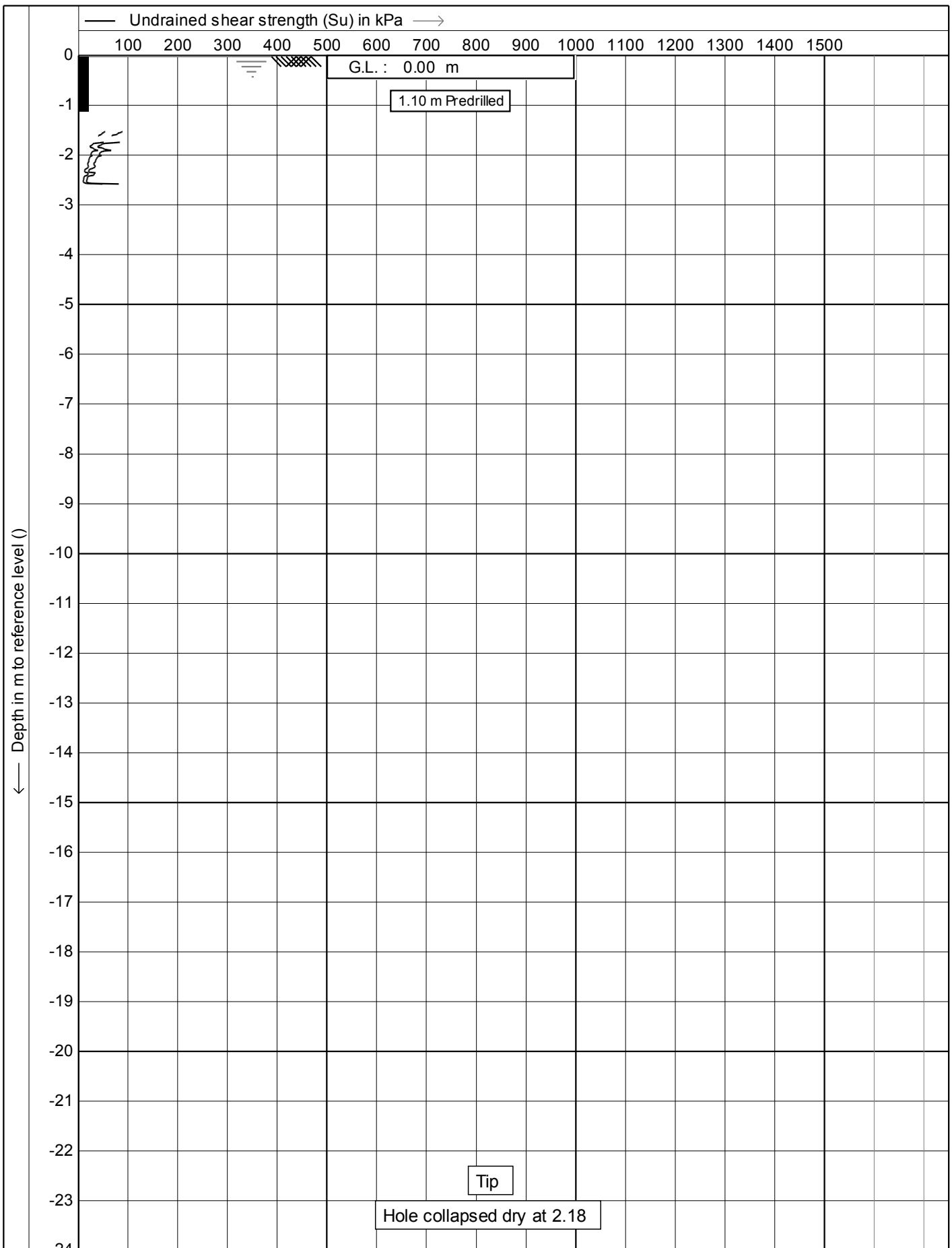
CPT no. : **09**



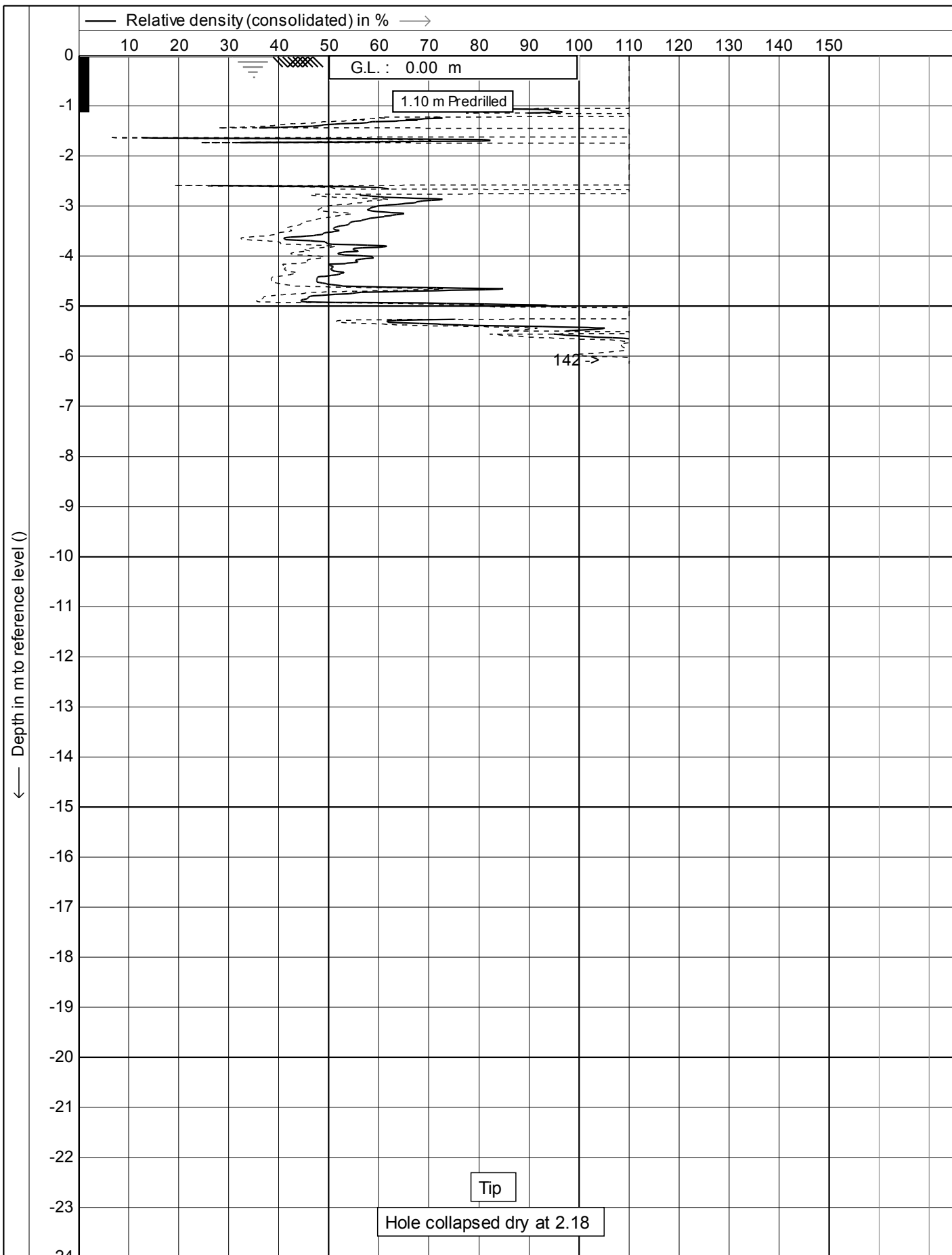
	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 09 8/14



	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 09
		9/14



	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 09
		10/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

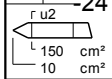
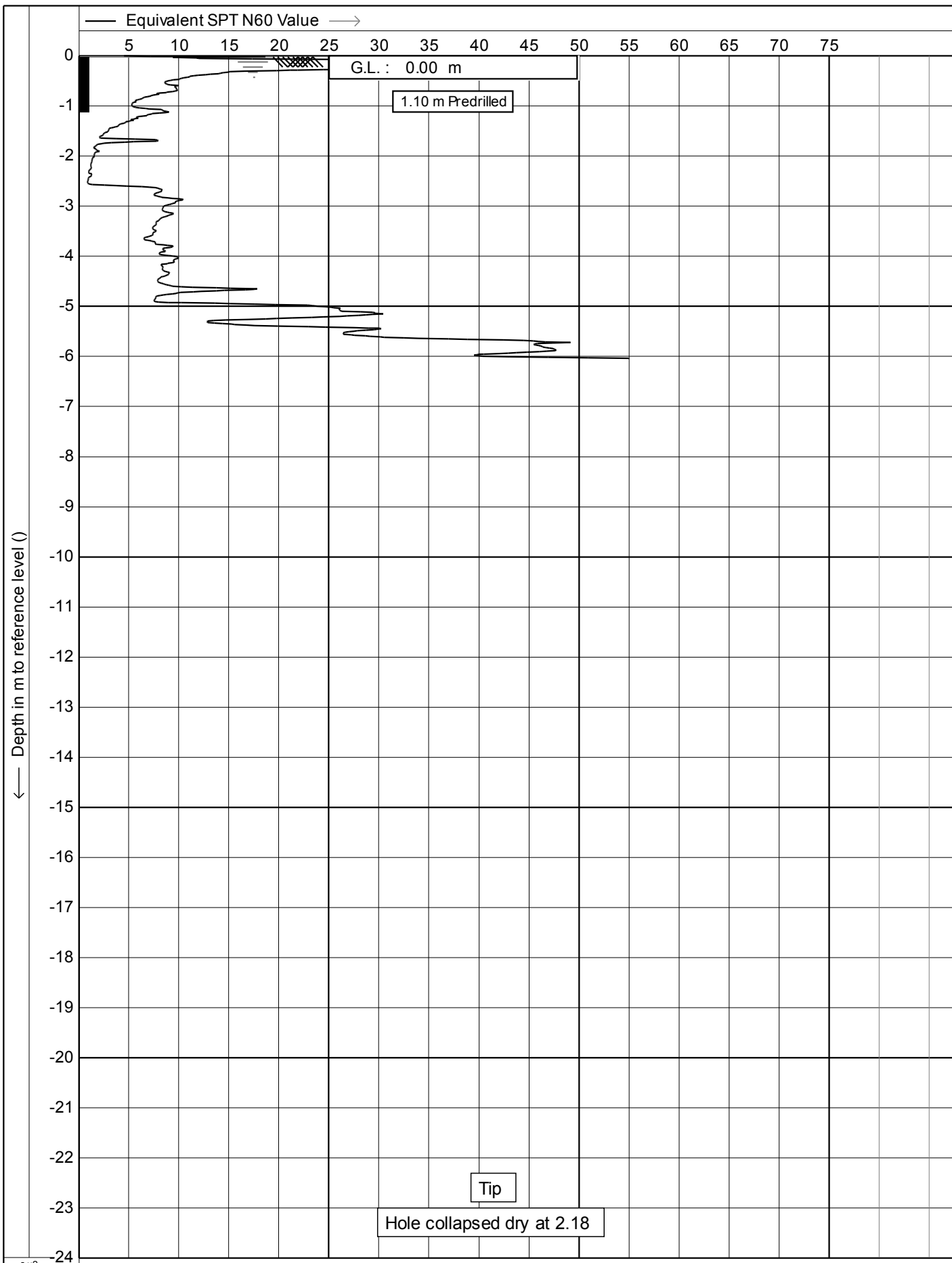
Position: **0, 0 RD**

Date : **11/10/2017**

Cone no. : **C10CFIP.C14433**

Project no. : **05TT12**

CPT no. : **09** | 11/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

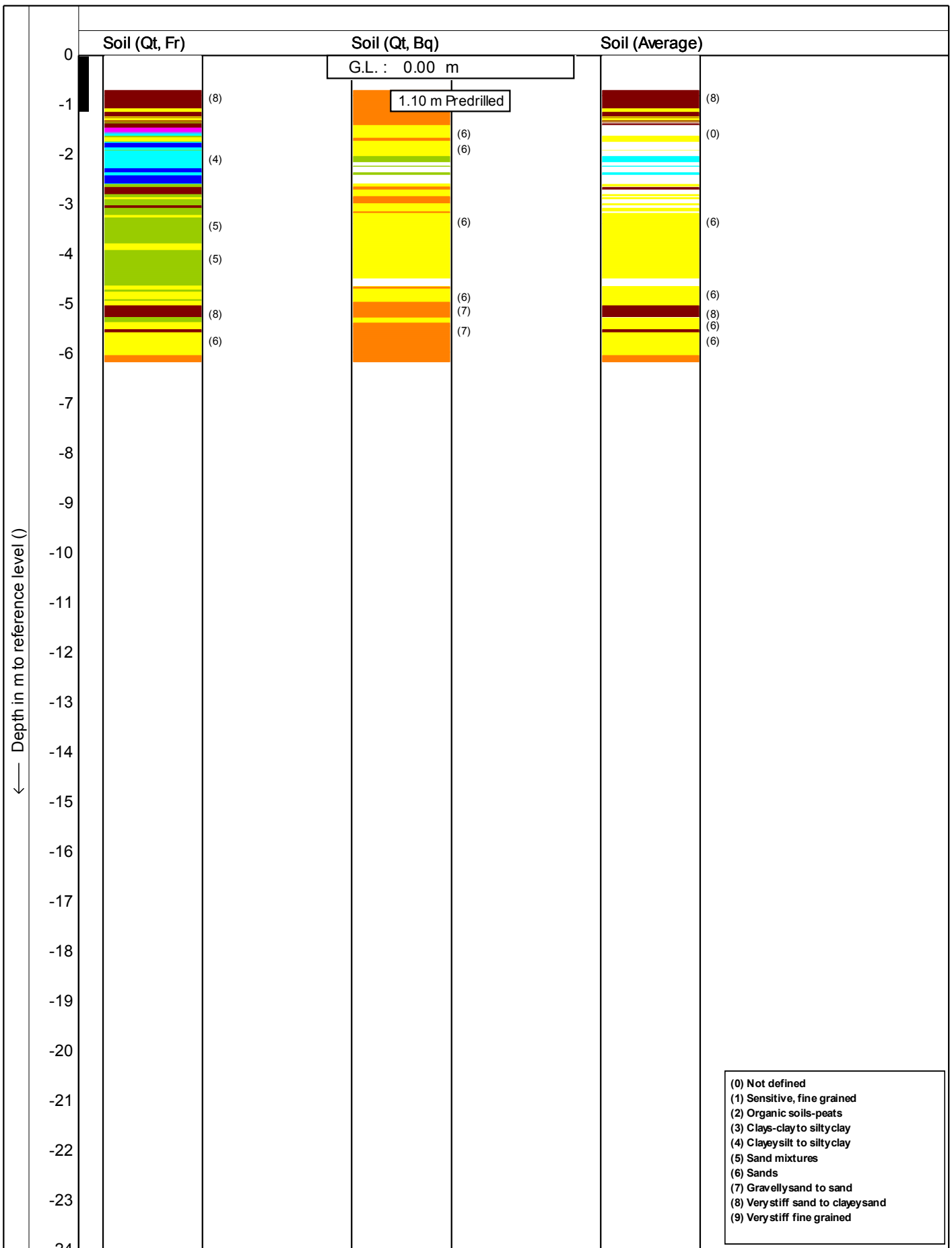
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Date : **11/10/2017**

Cone no. : **C10CFIP.C14433**

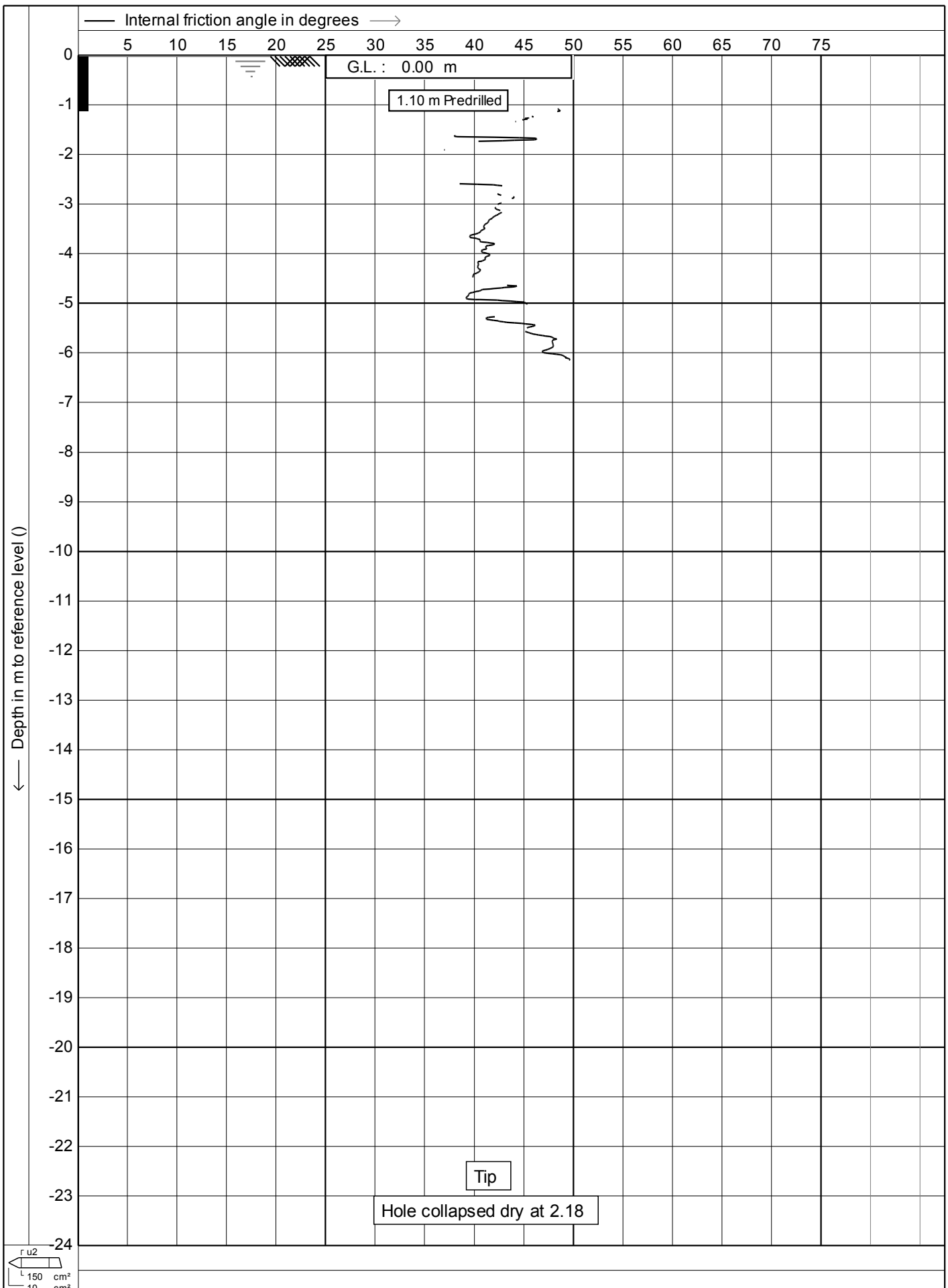
Project no. : **05TT12**

CPT no. : **09** | 12/14



Soil behaviour type classification after Robertson 1990

	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 09 13/14

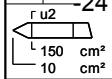
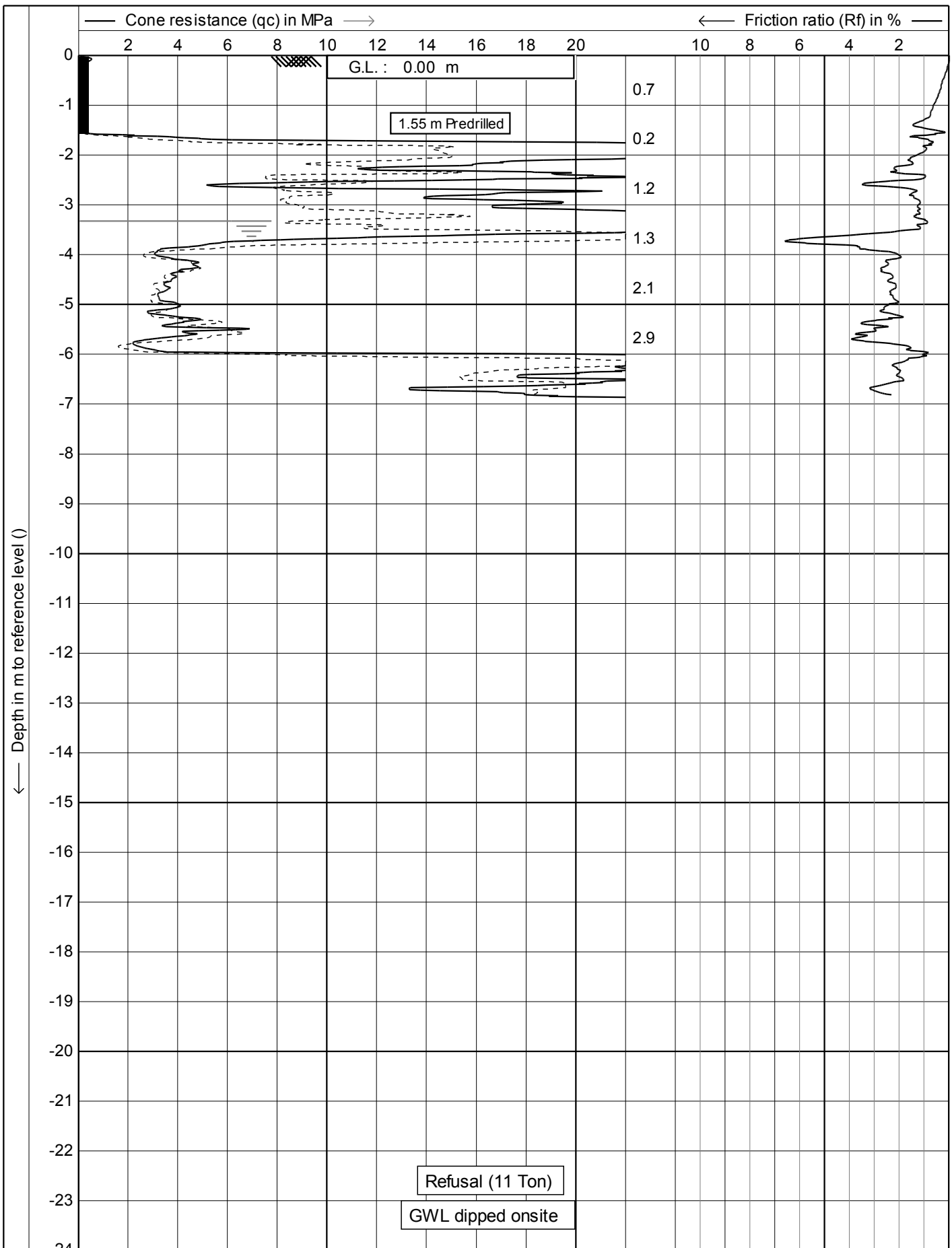


Test according A.S.T.M Standard D 5778-12

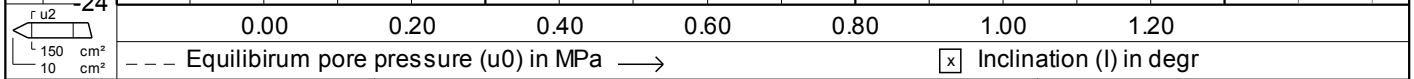
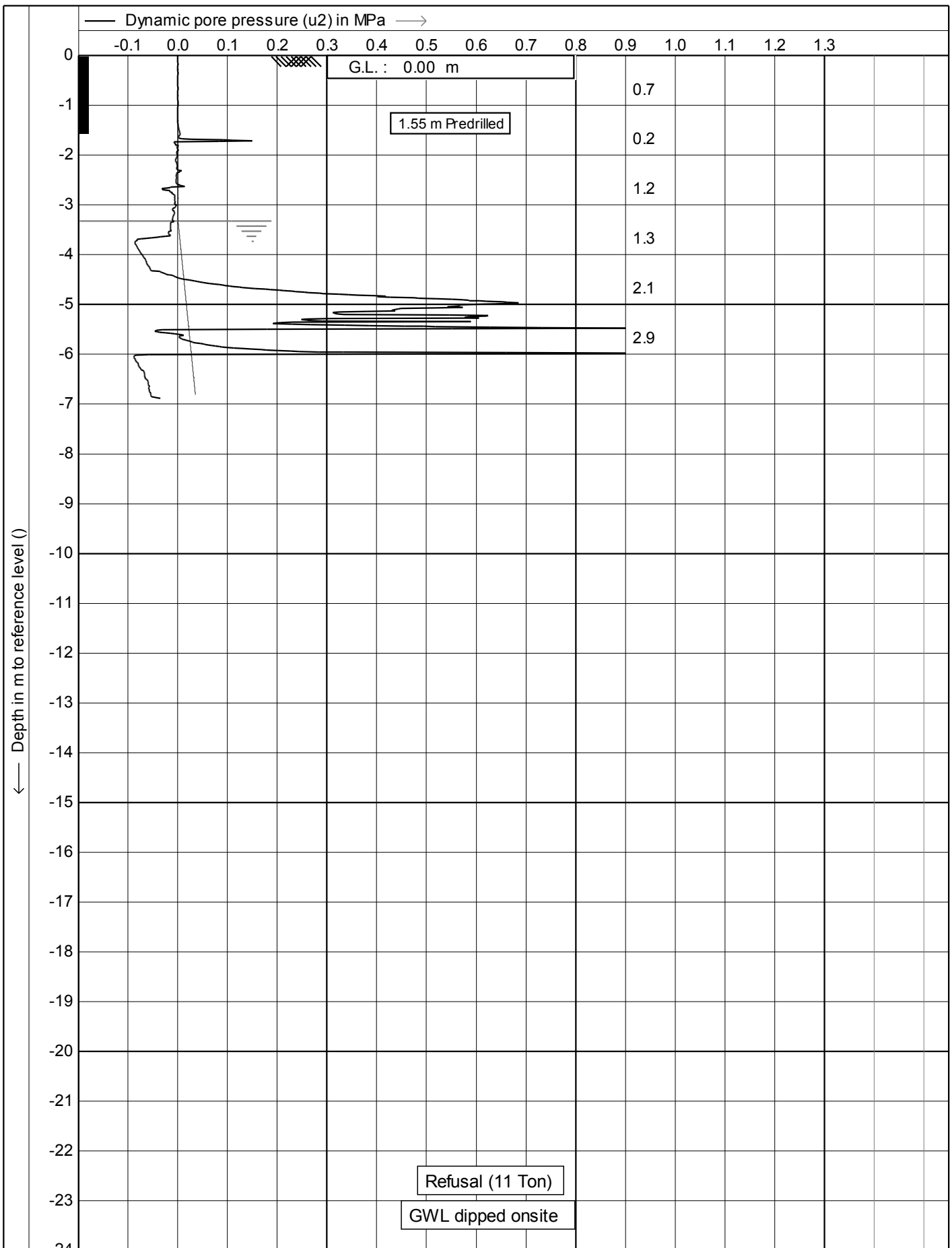
Date : 11/10/2017
 Cone no. : C10CFIP.C14433
 Project no. : 05TT12
 CPT no. : 09

Project : Site Investigations
 Location: Victoria University - Wellington
 Position: 0, 0 RD

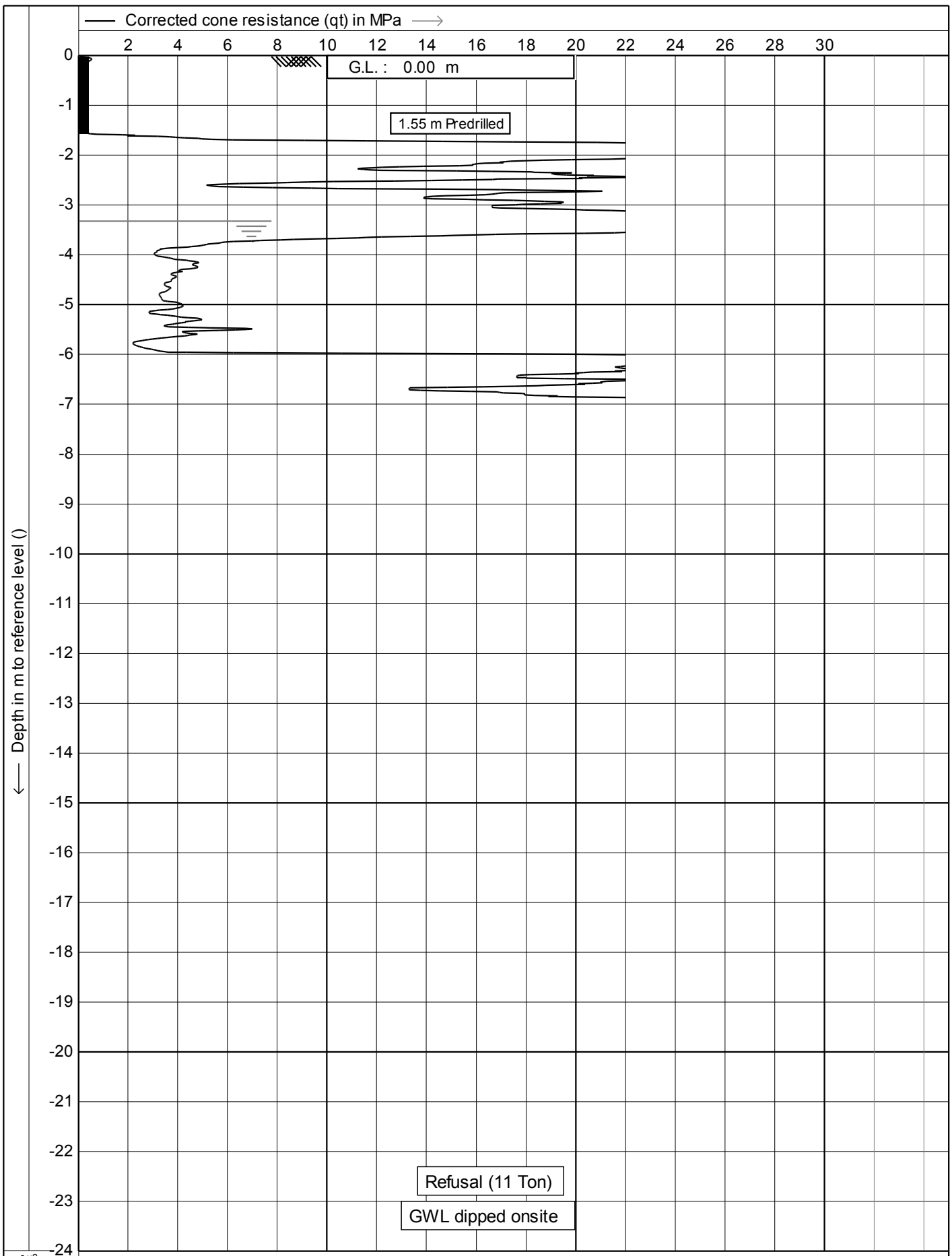




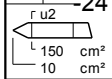
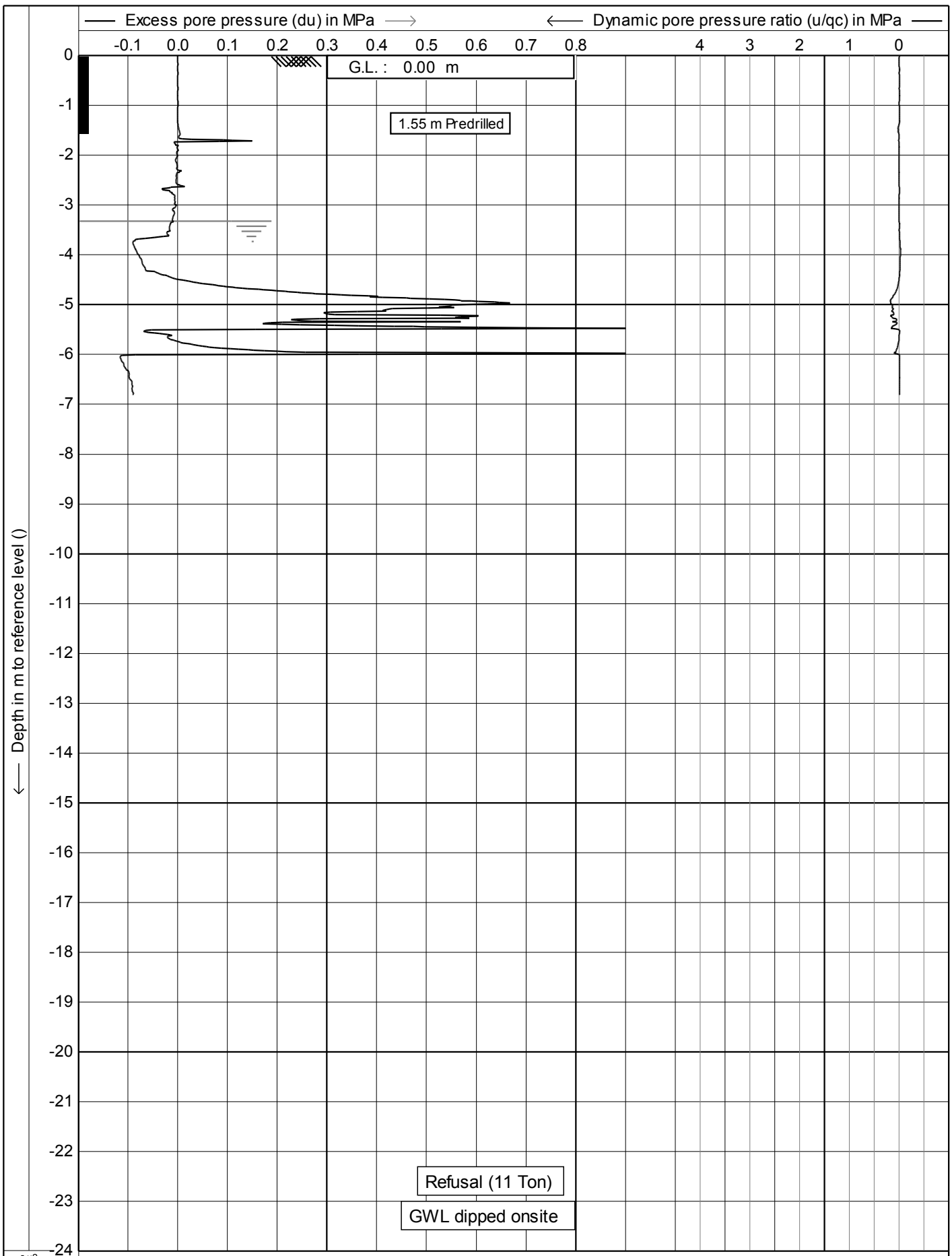
	Test according A.S.T.M Standard D 5778-12		Date : 12/10/2017	
	Project : Site Investigations		Cone no. : C10CFIP.C14433	
	Location: Victoria University - Wellington		Project no. : 05TT12	
	Position: 0, 0 RD		CPT no. : 10	1/14



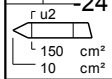
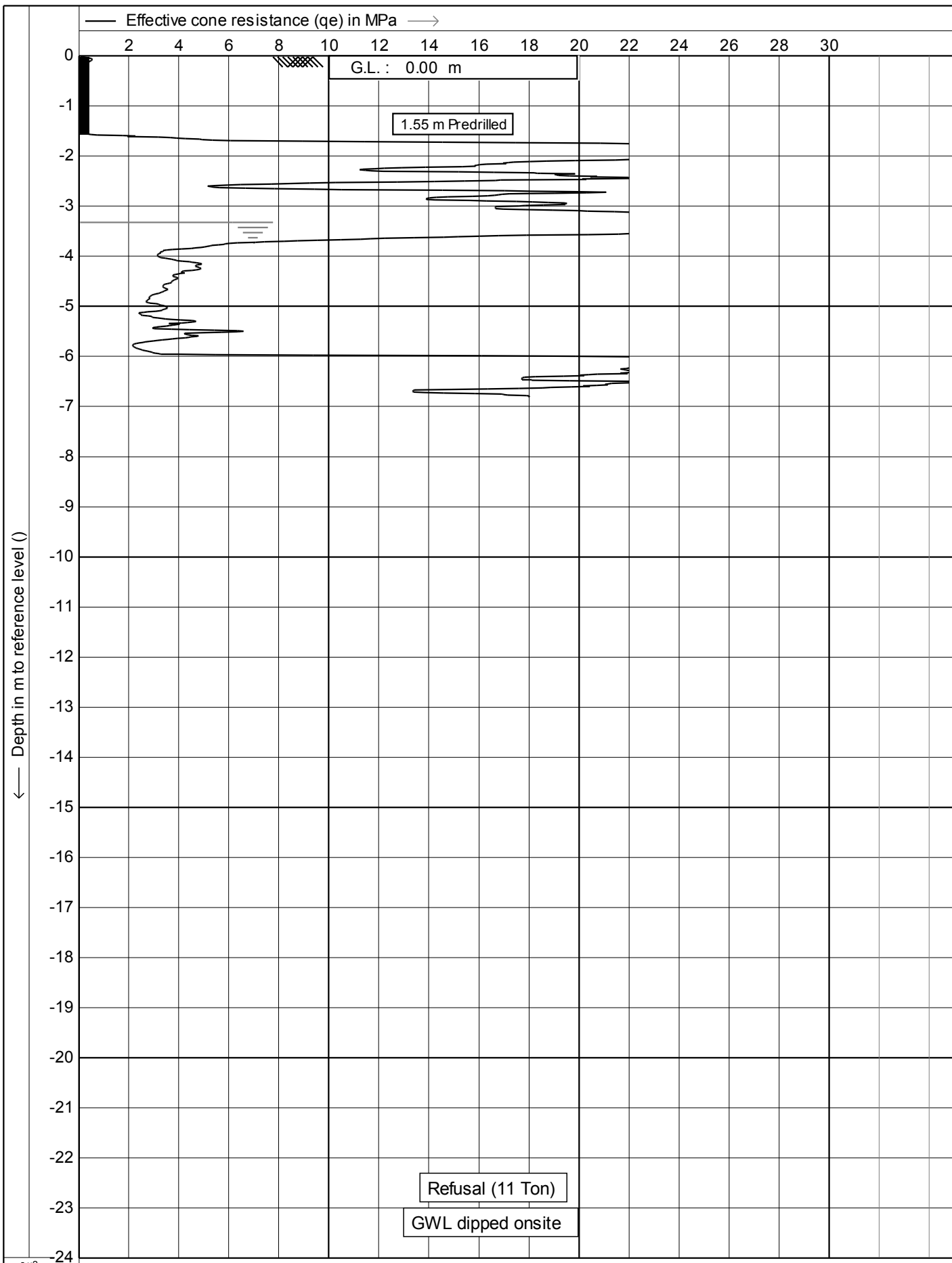
	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10
		2/14



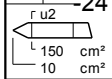
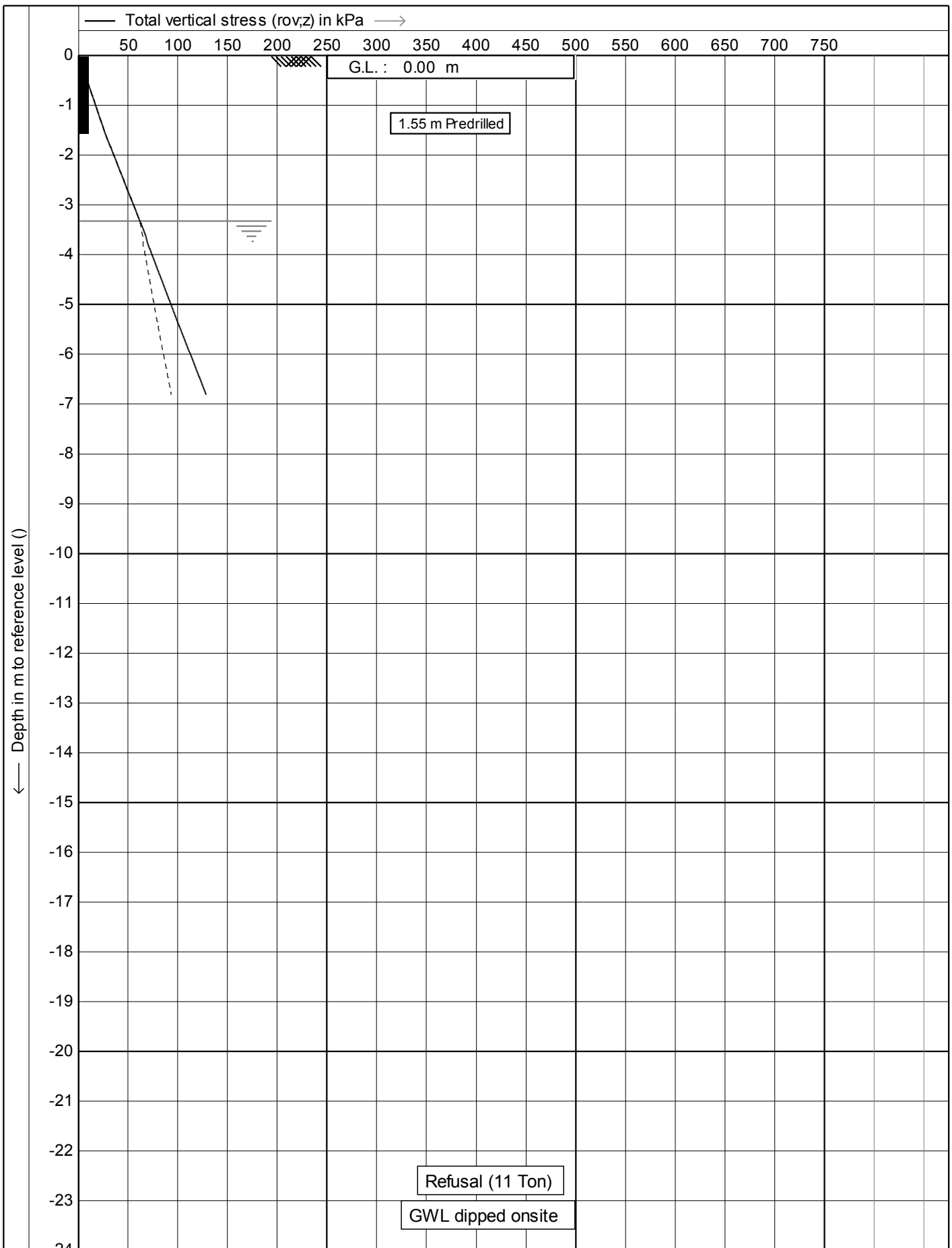
	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10
		3/14



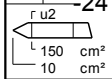
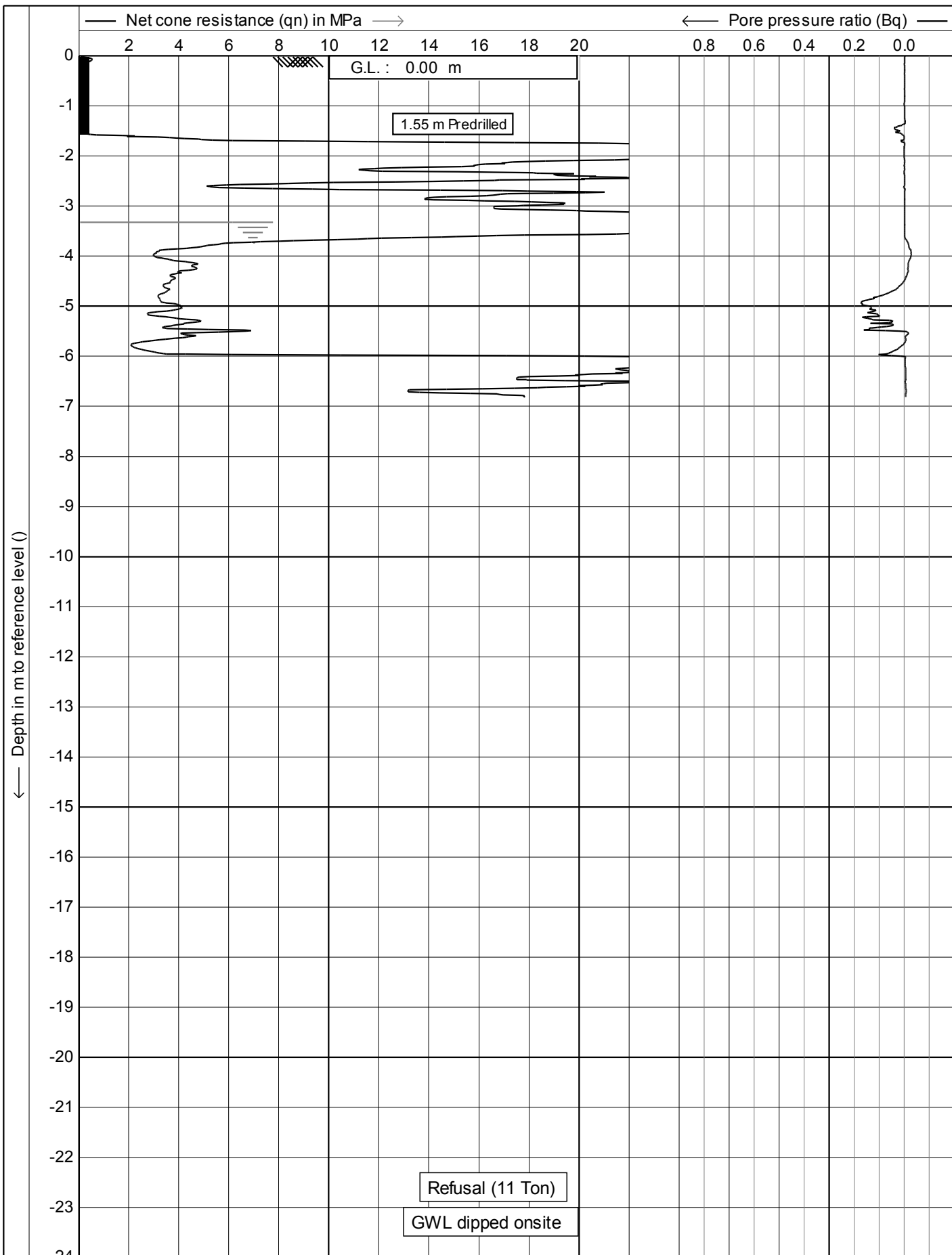
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	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10
		4/14



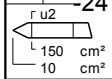
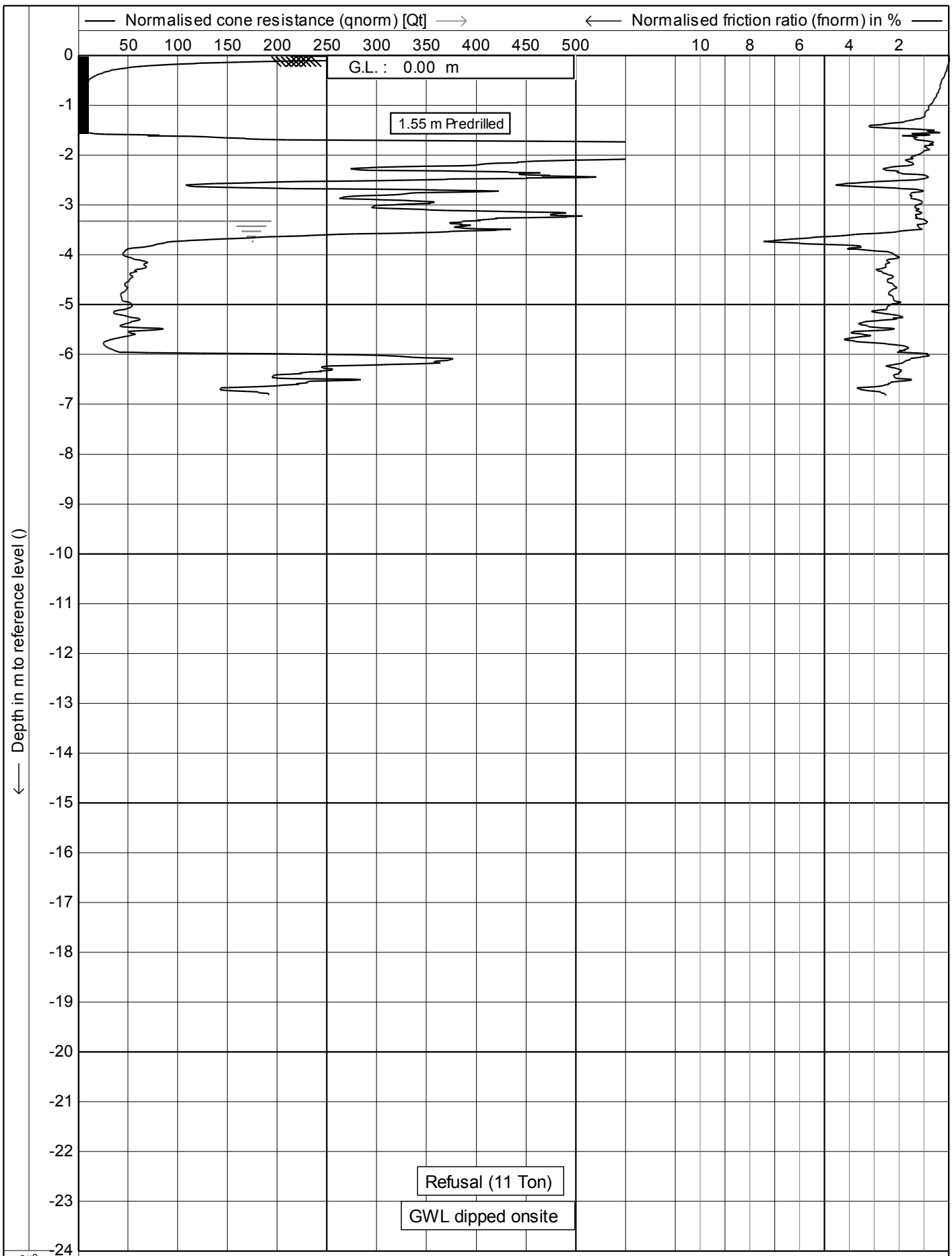
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	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10
		5/14



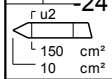
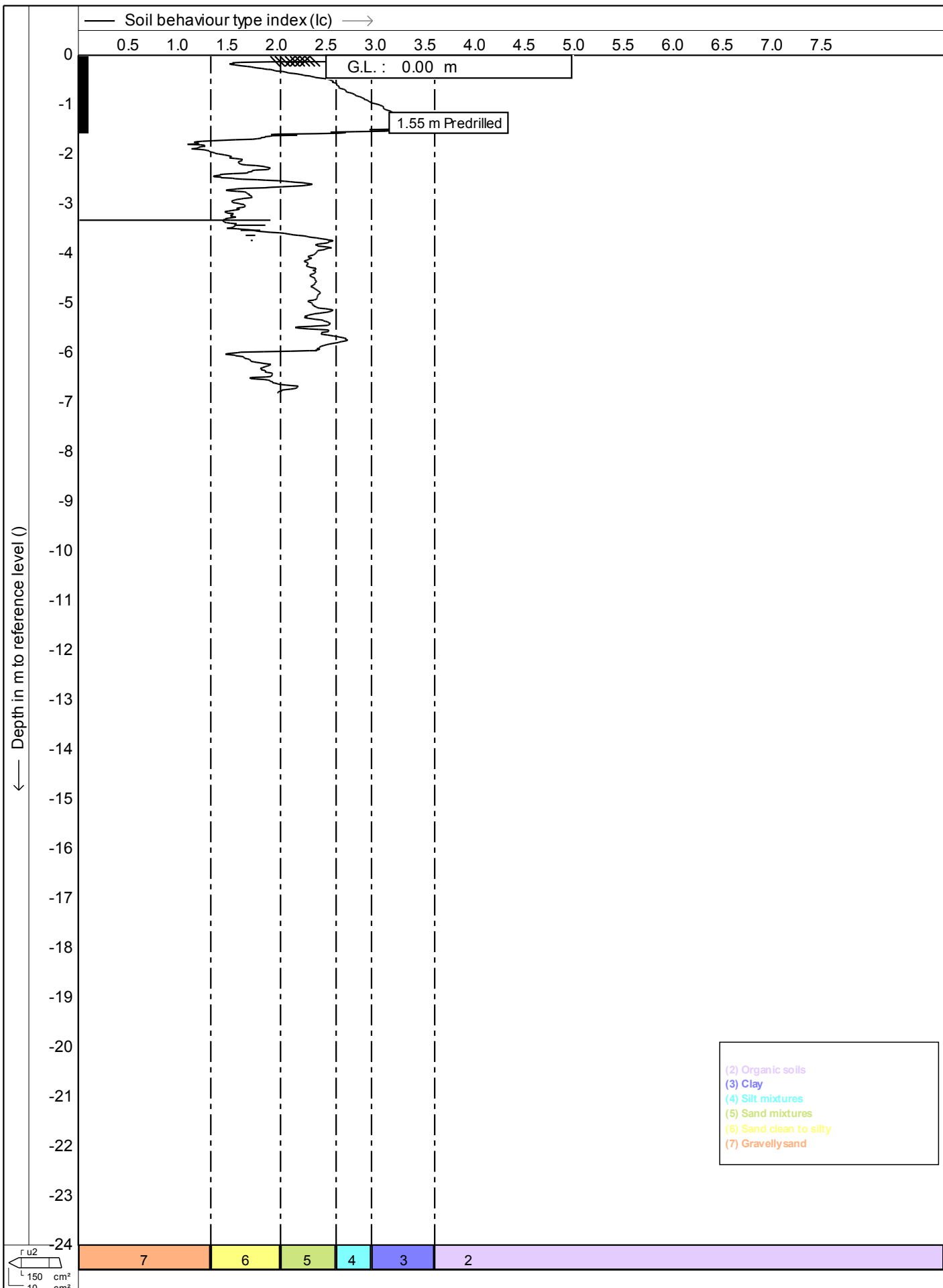
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	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10
		6/14



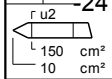
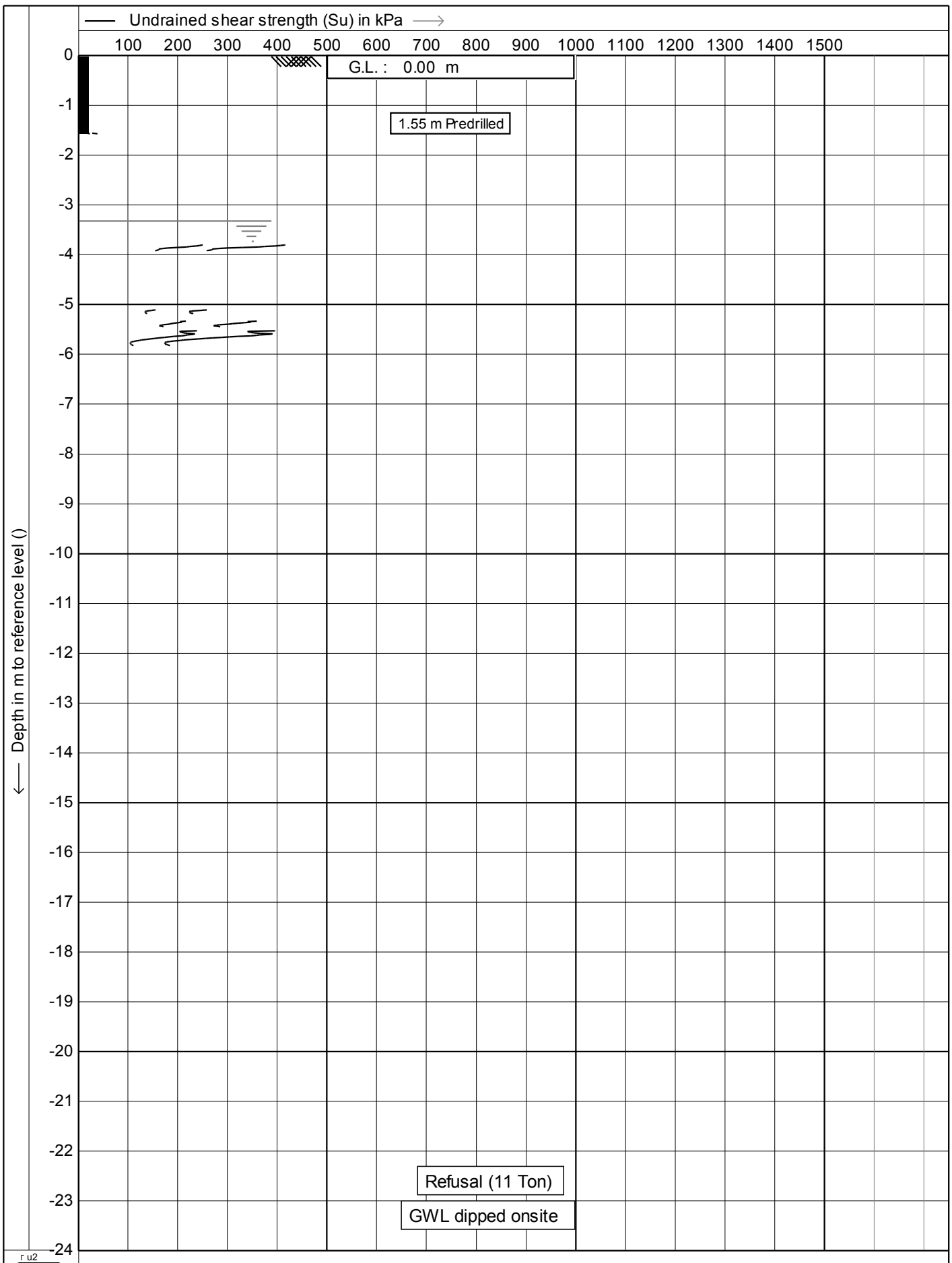
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	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10
		7/14



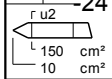
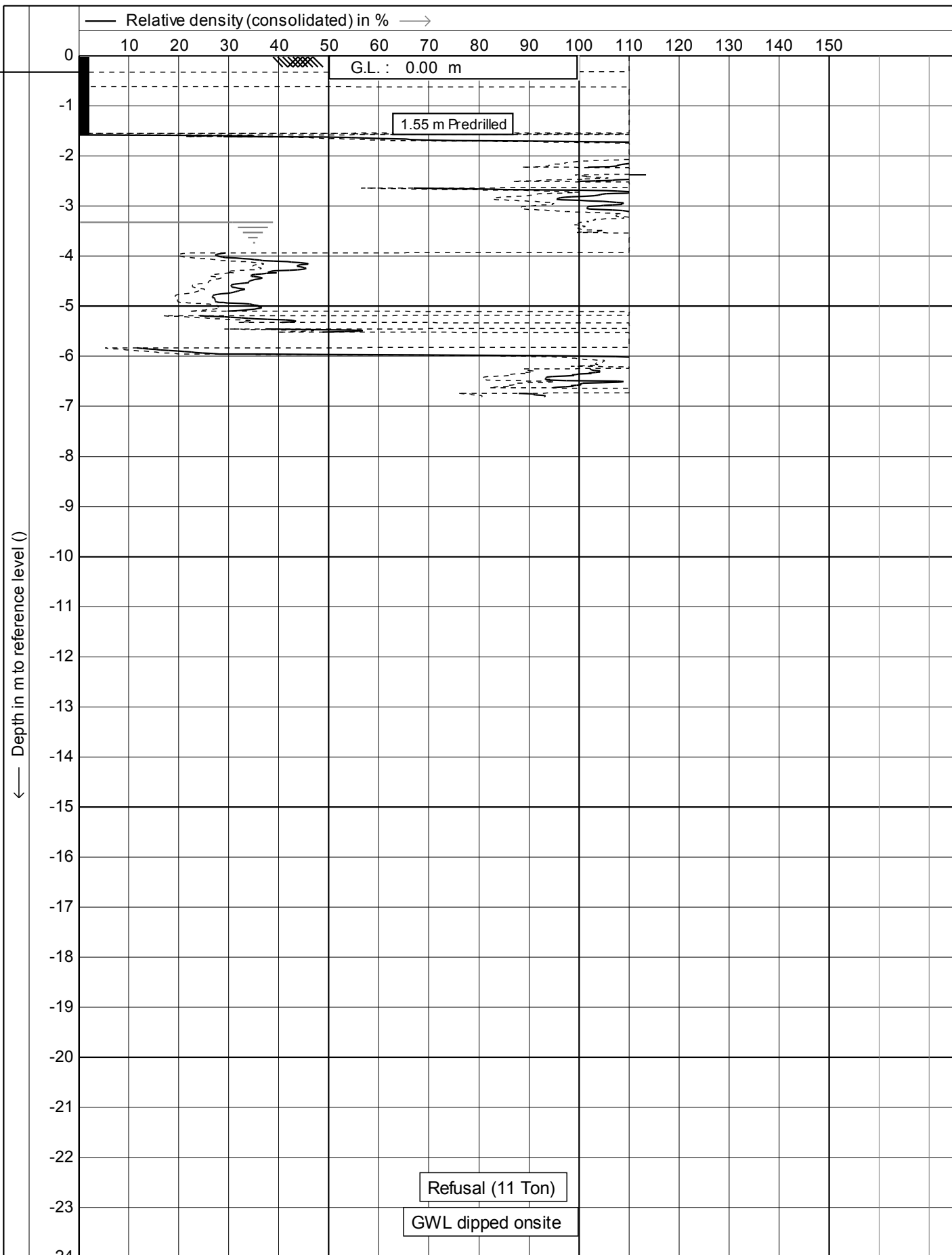
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	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10 8/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10
		9/14

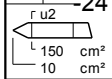
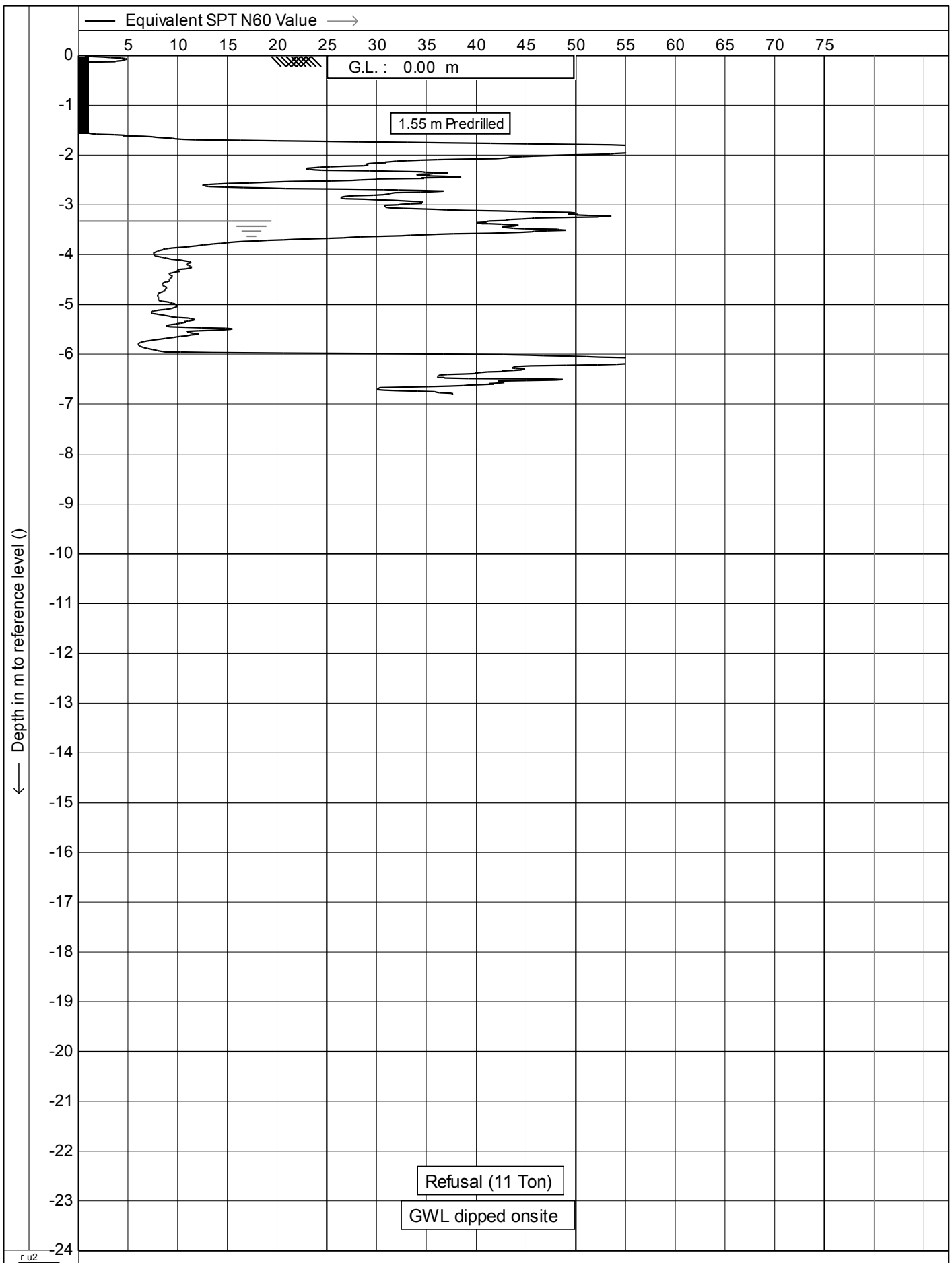


	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10
		10/14

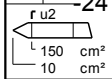
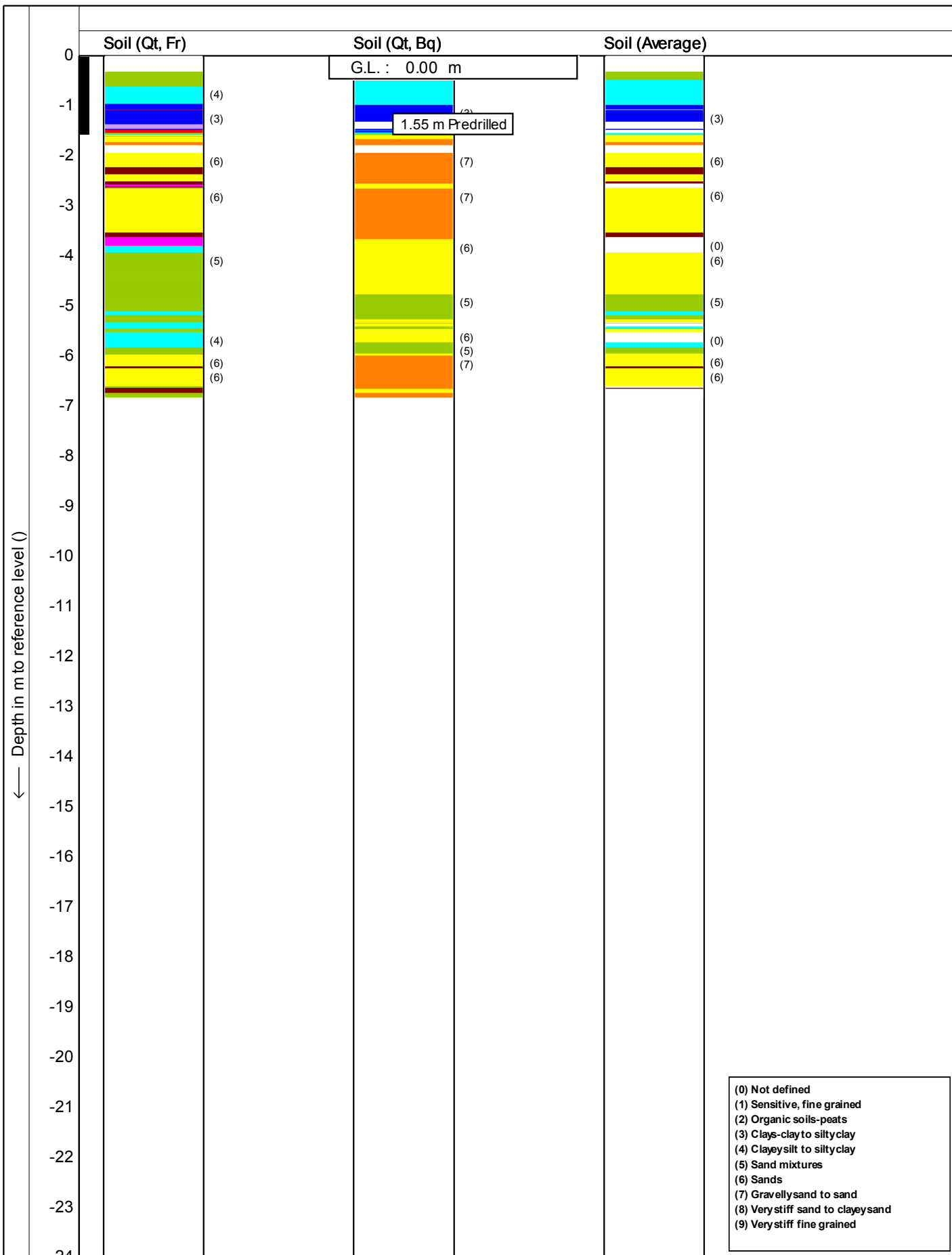


--- Relative density (over-consolidated) in % -->

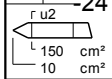
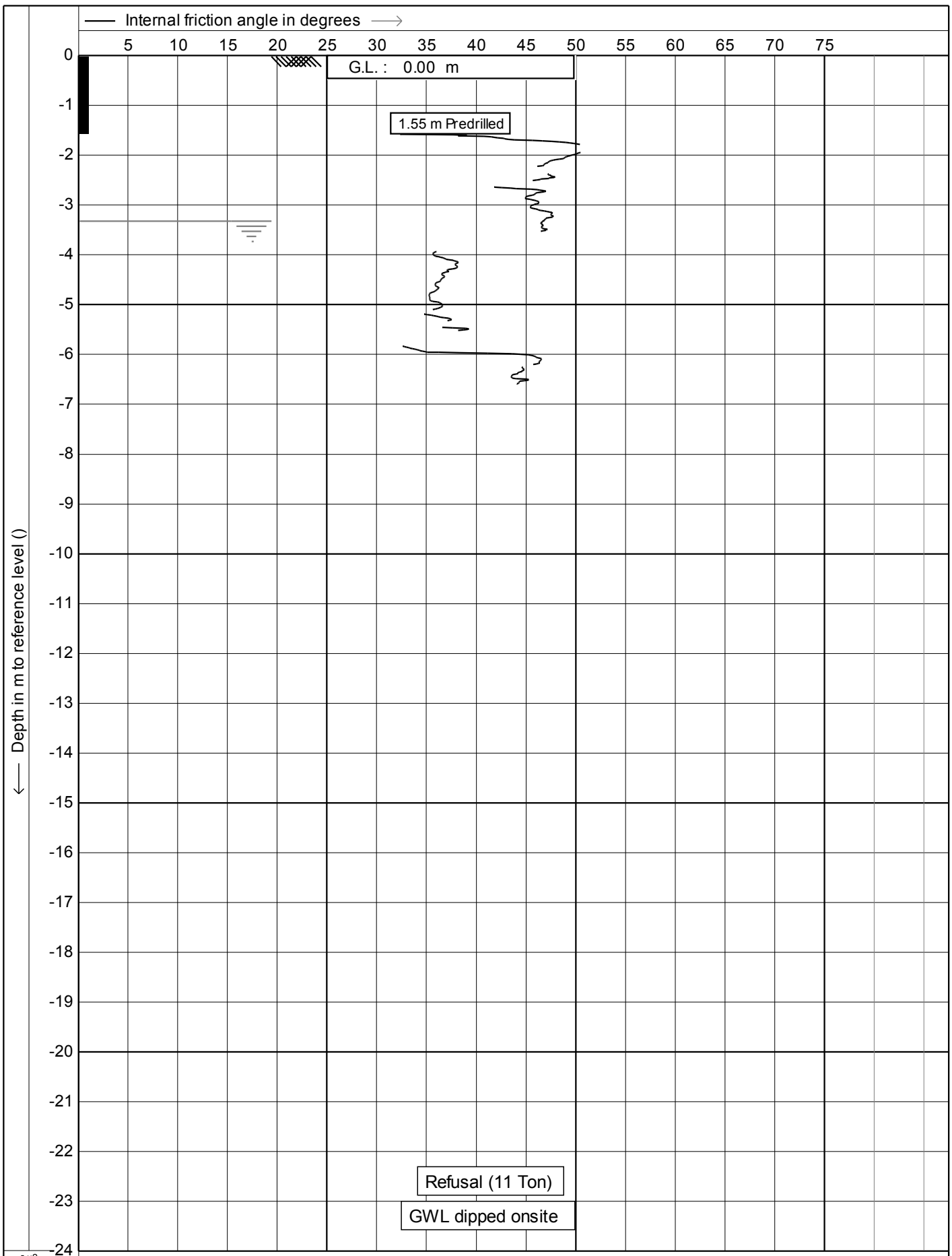
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	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10
		11/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10
		12/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10
		13/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

Position: **0, 0 RD**

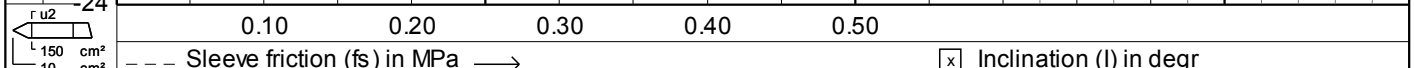
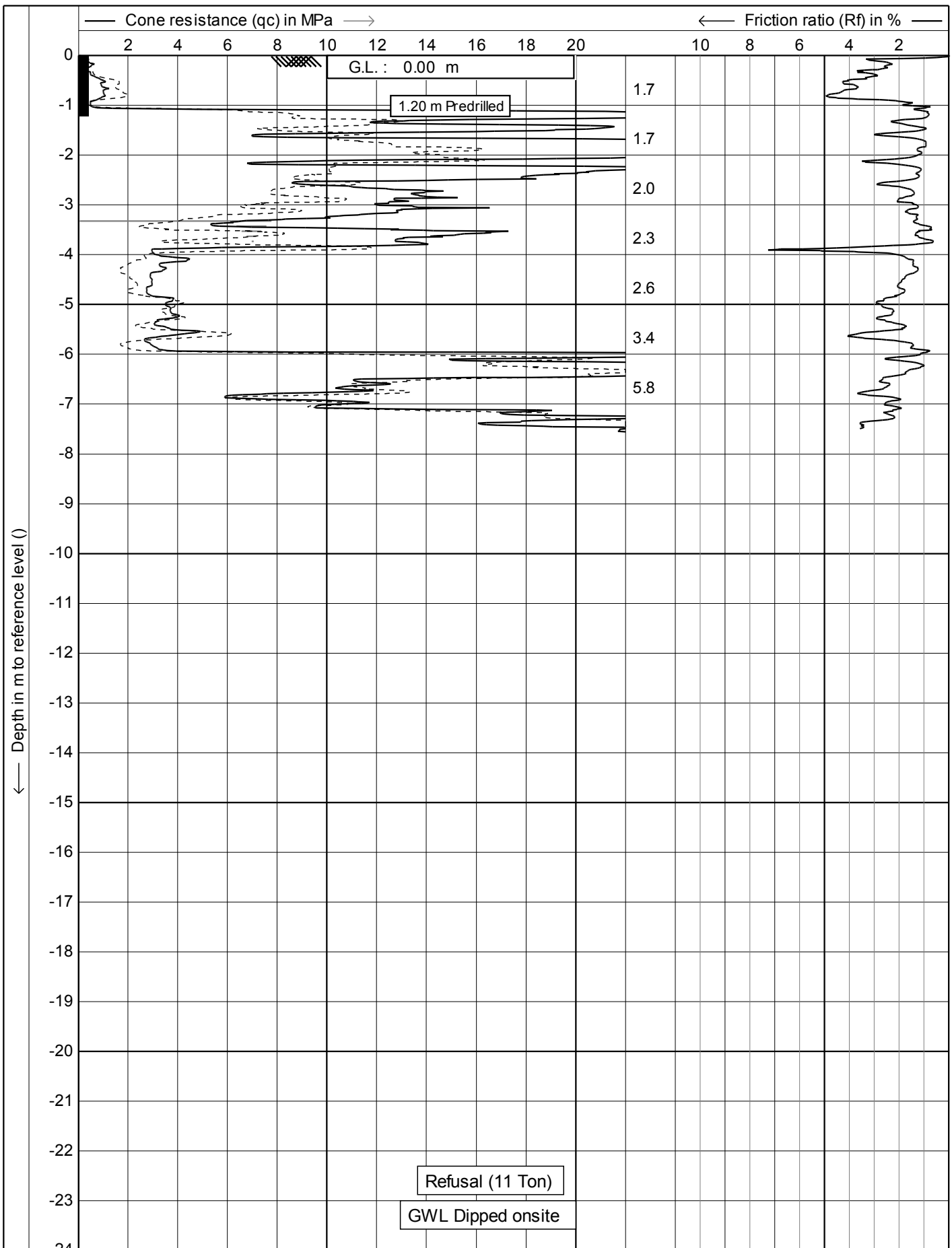
Date : **12/10/2017**

Cone no. : **C10CFIP.C14433**

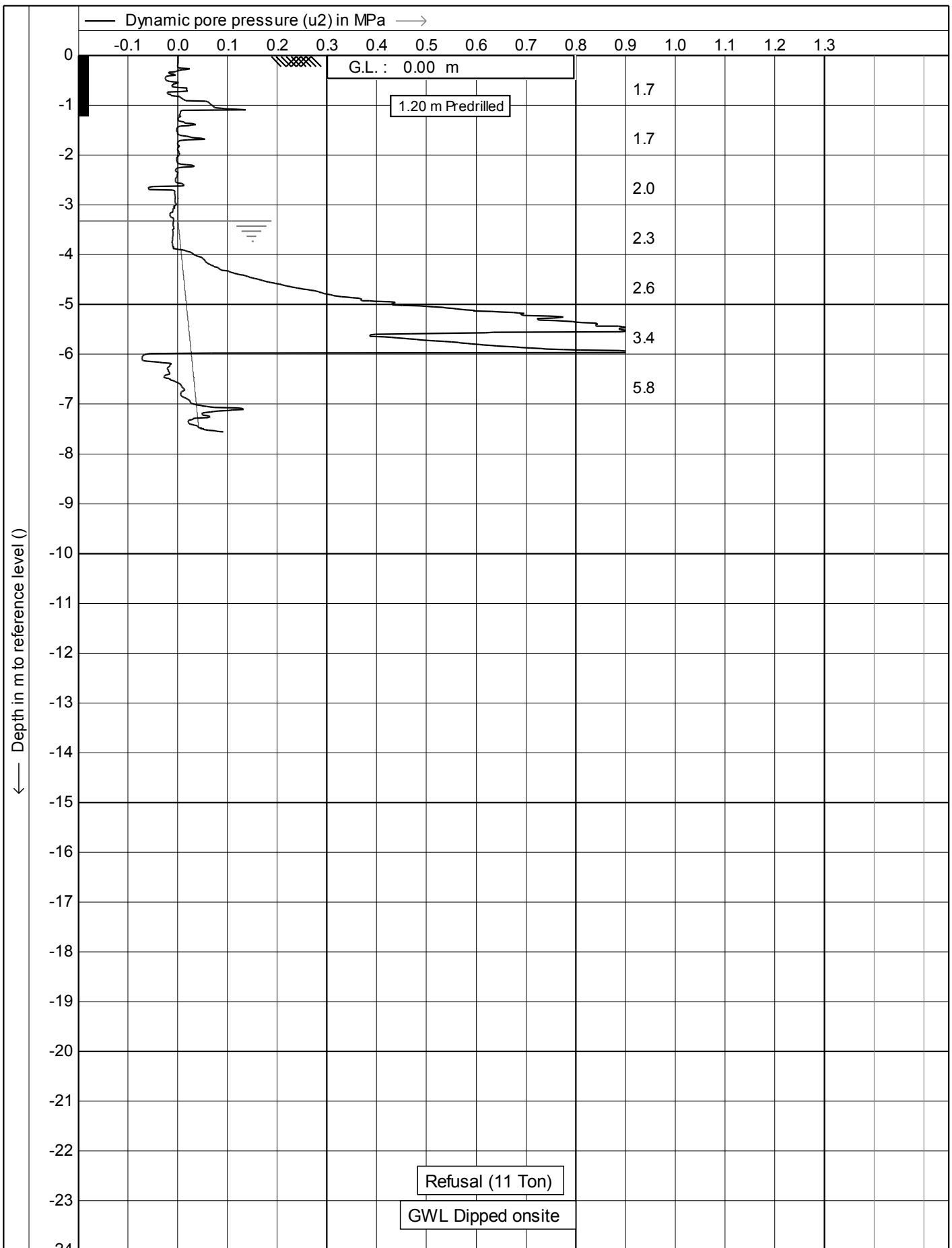
Project no. : **05TT12**

CPT no. : **10**

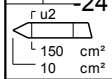
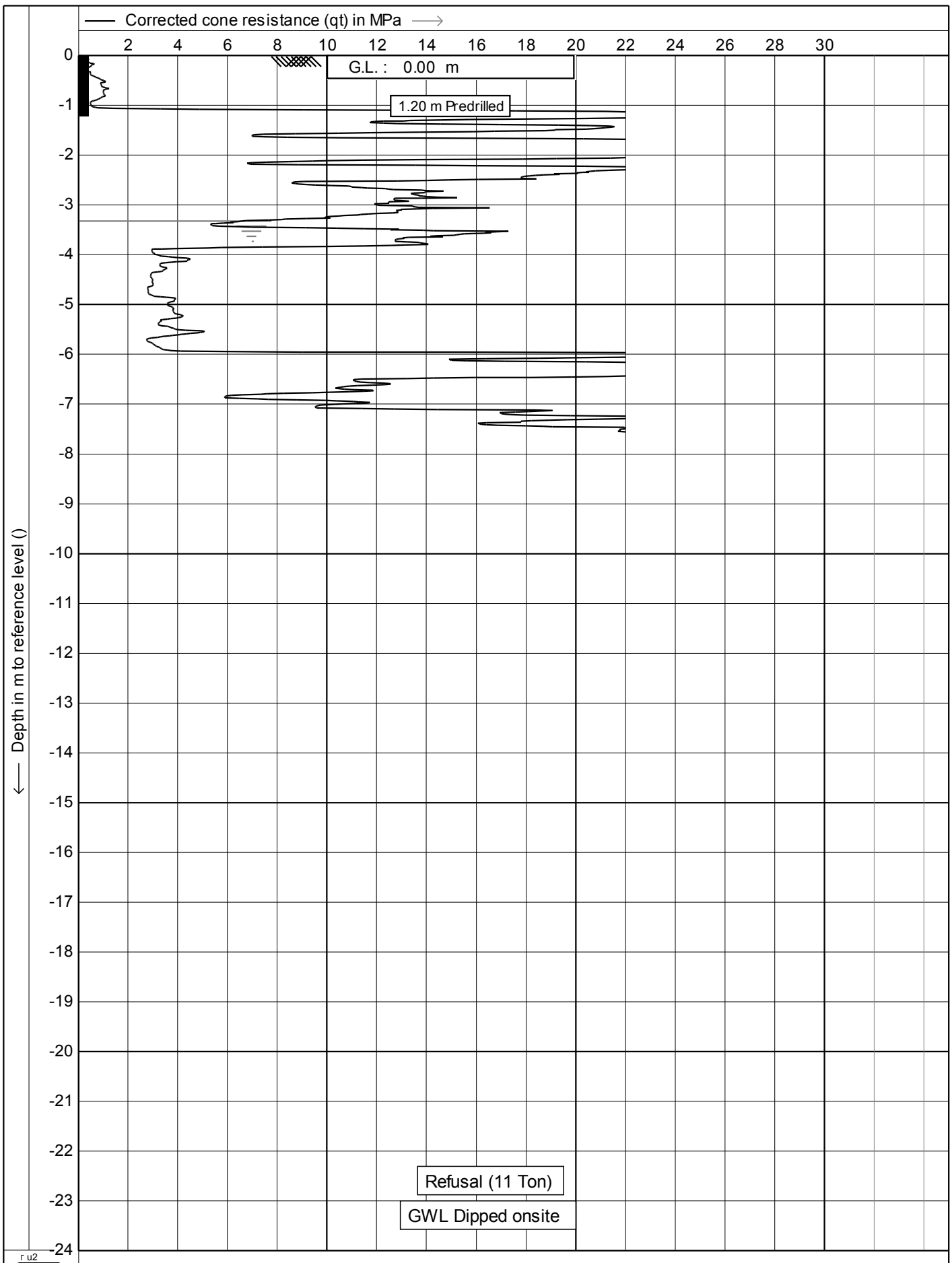
14/14



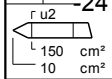
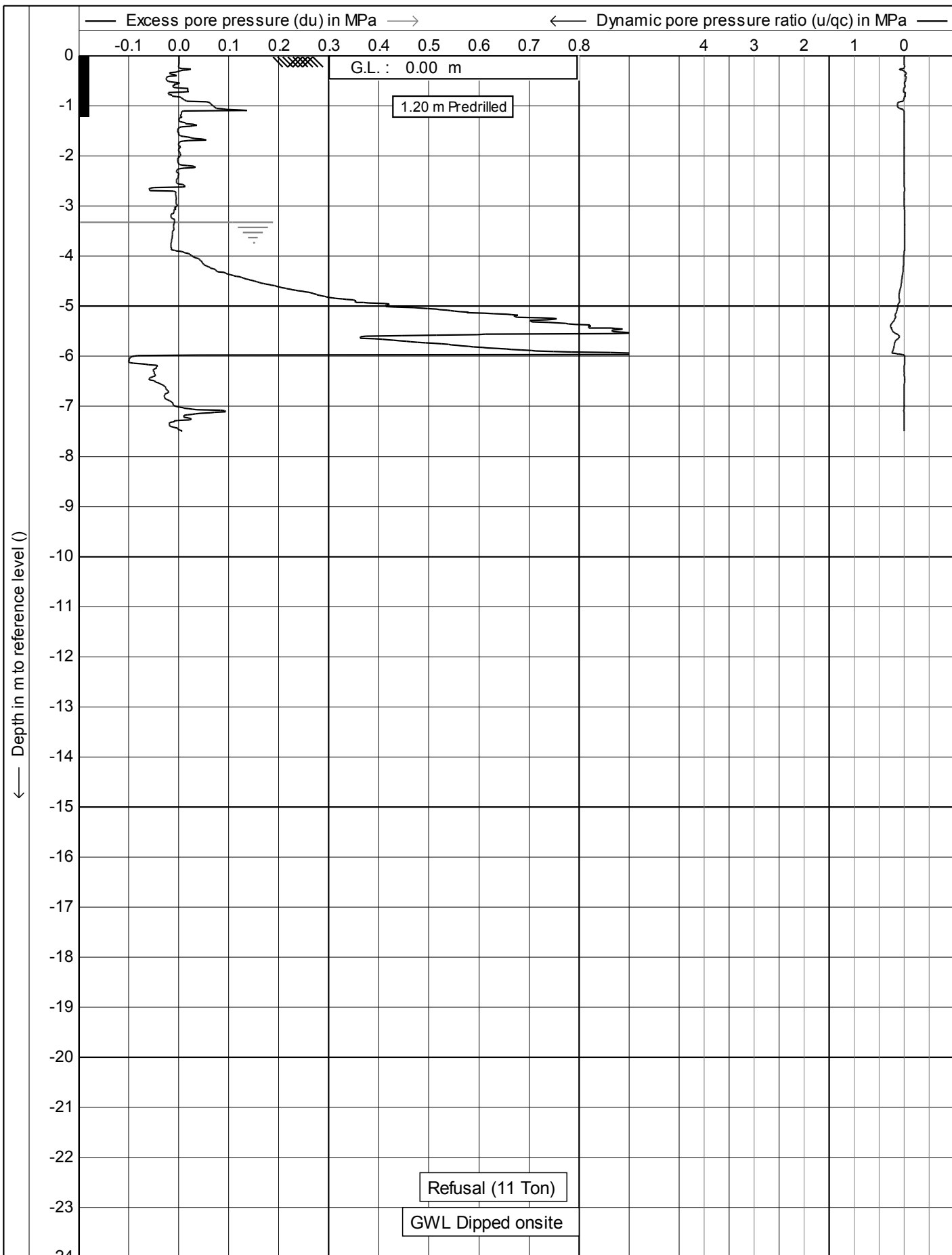
	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10a 1/14



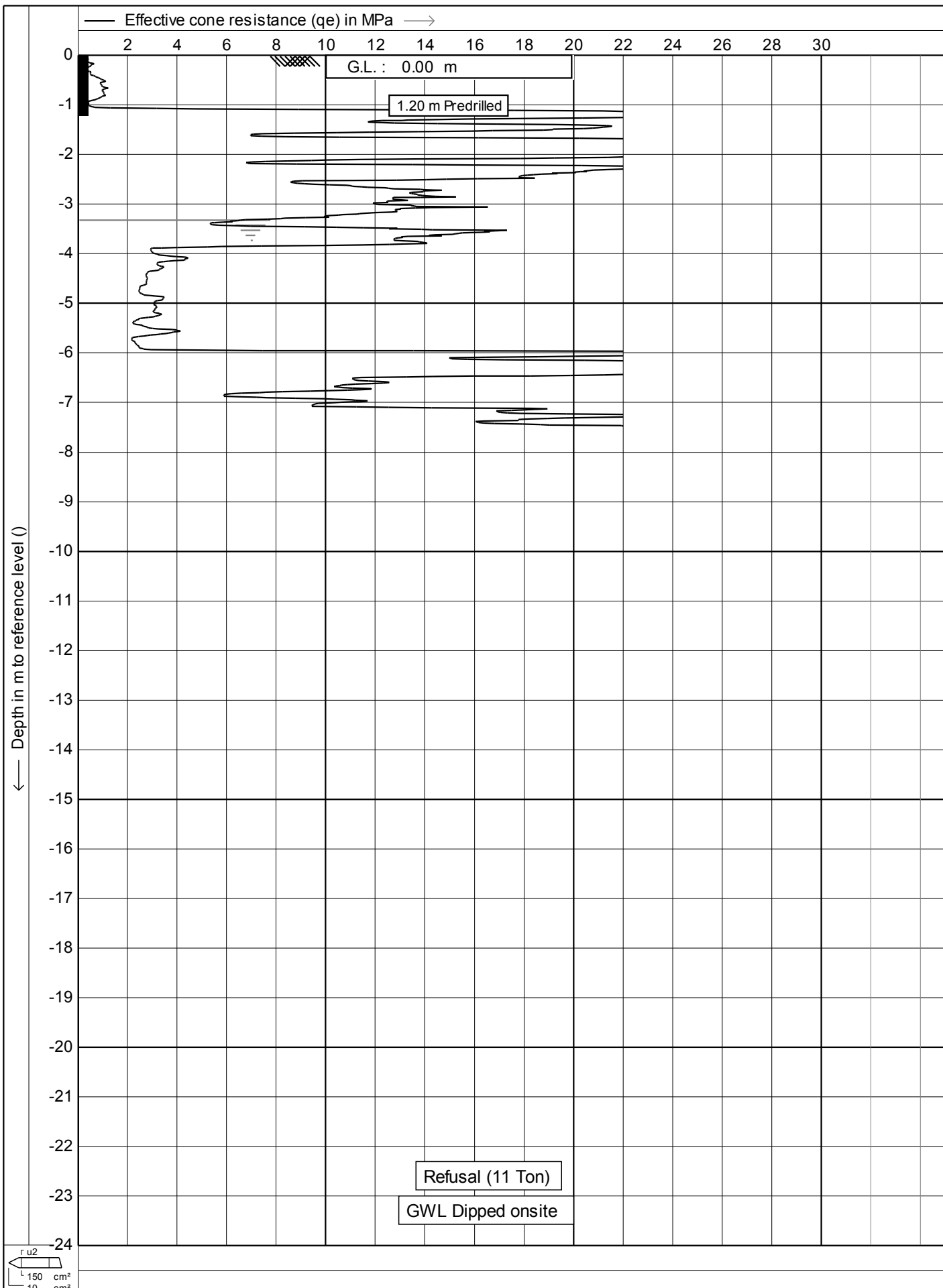
	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10a
		2/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10a
		3/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10a
		4/14

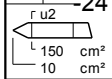
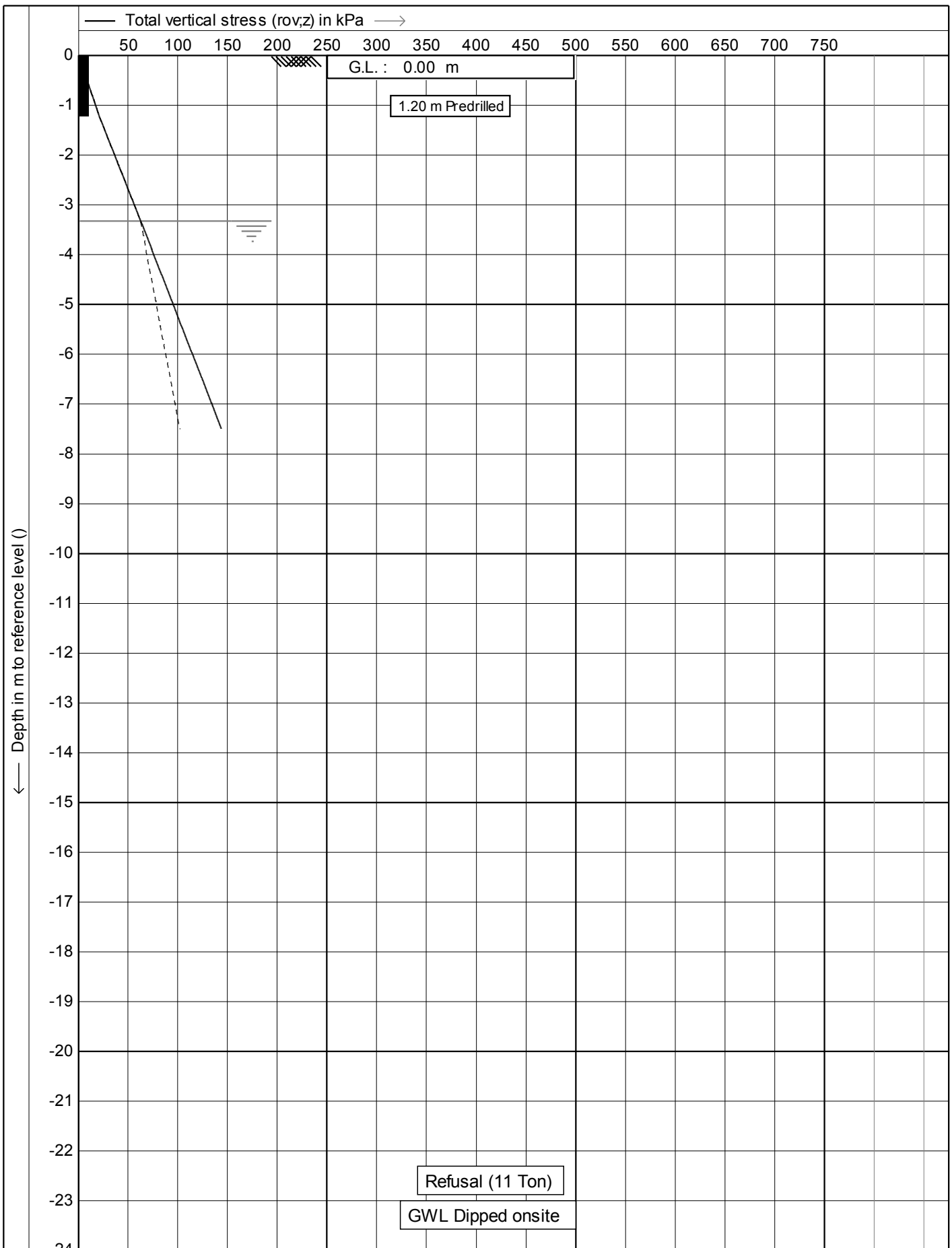


Test according A.S.T.M Standard D 5778-12

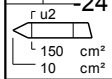
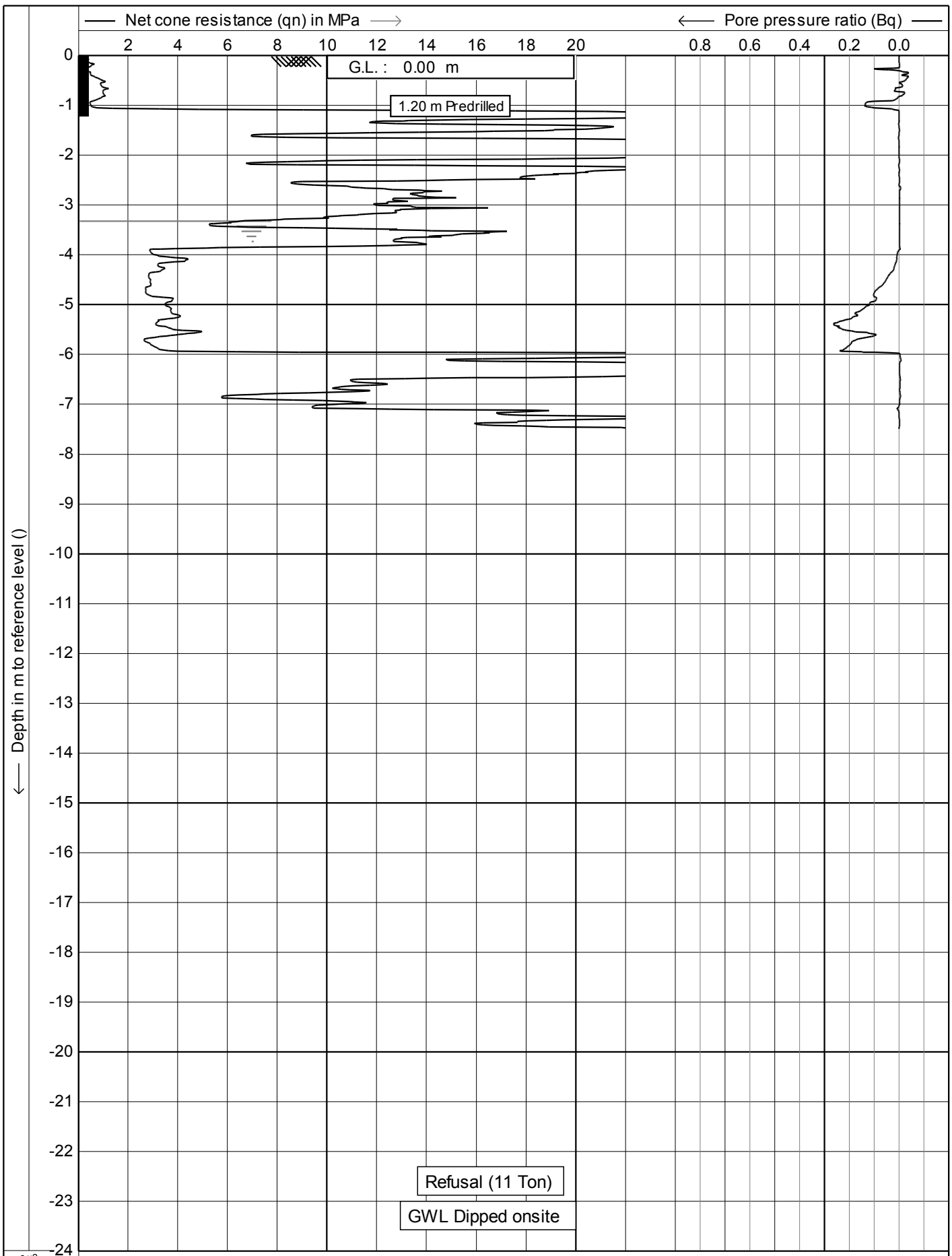
Date : 12/10/2017
 Cone no. : C10CFIP.C14433
 Project no. : 05TT12
 CPT no. : 10a



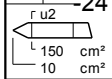
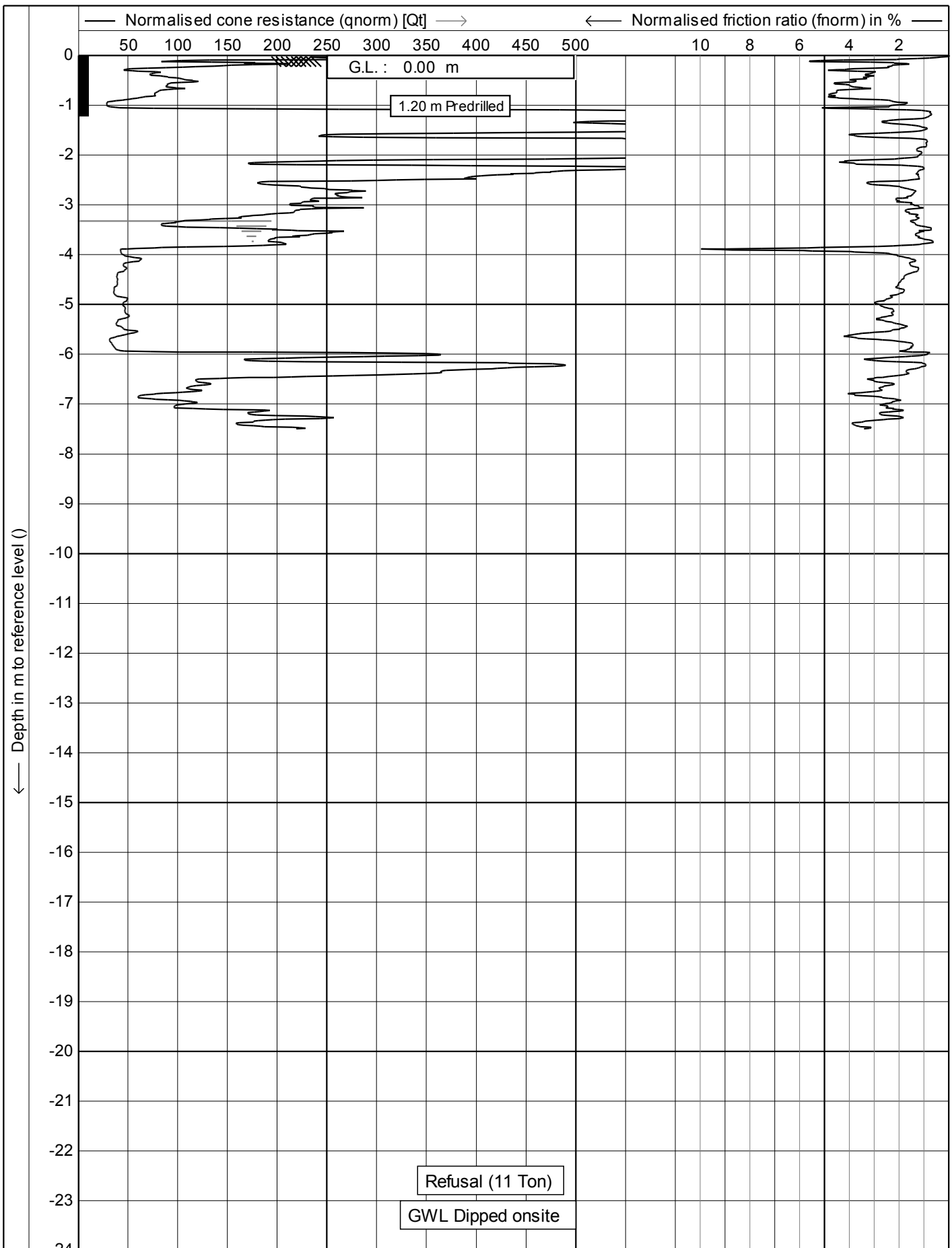
Project : Site Investigations
 Location: Victoria University - Wellington
 Position: 0, 0 RD



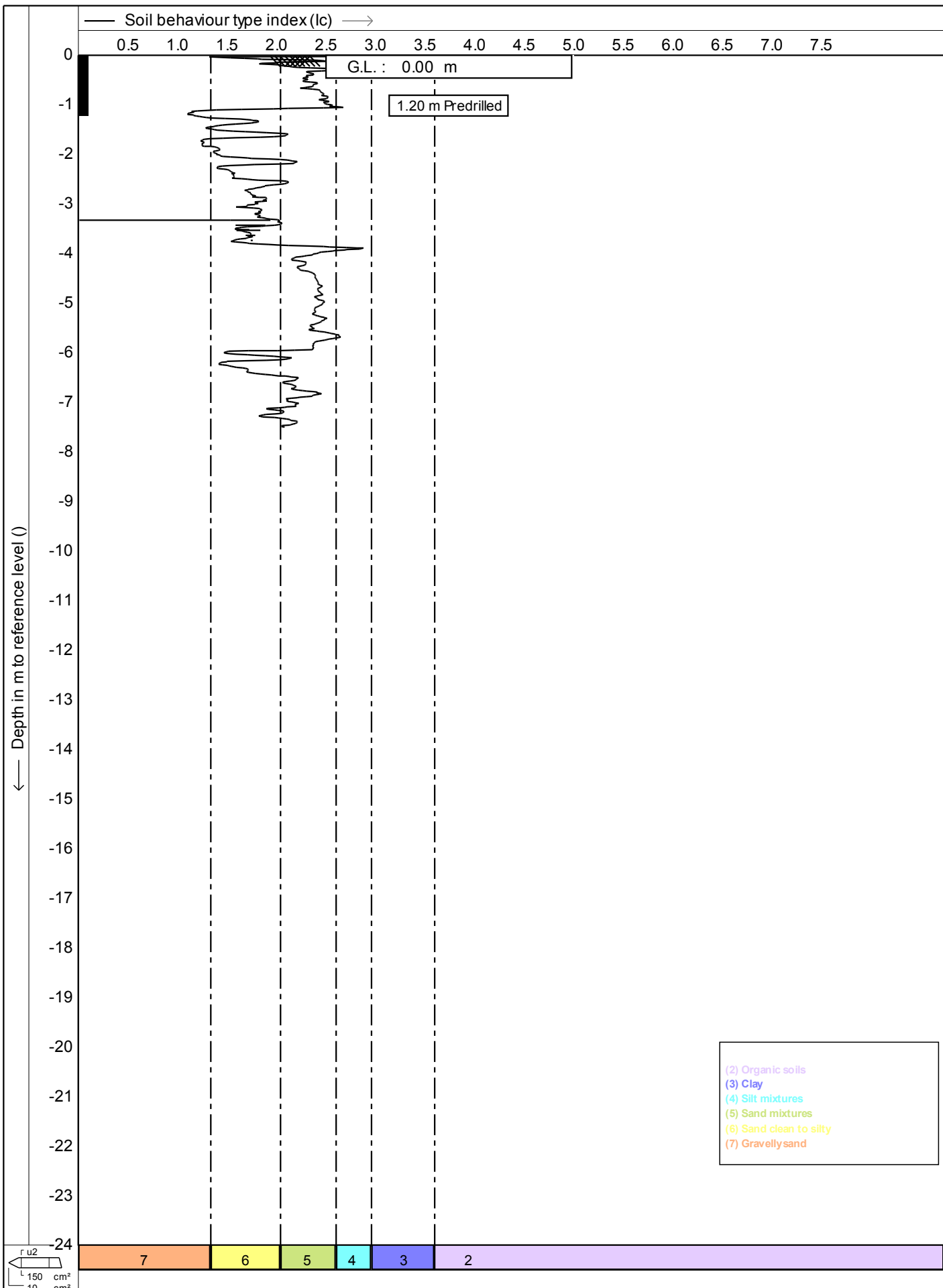
	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10a
		6/14




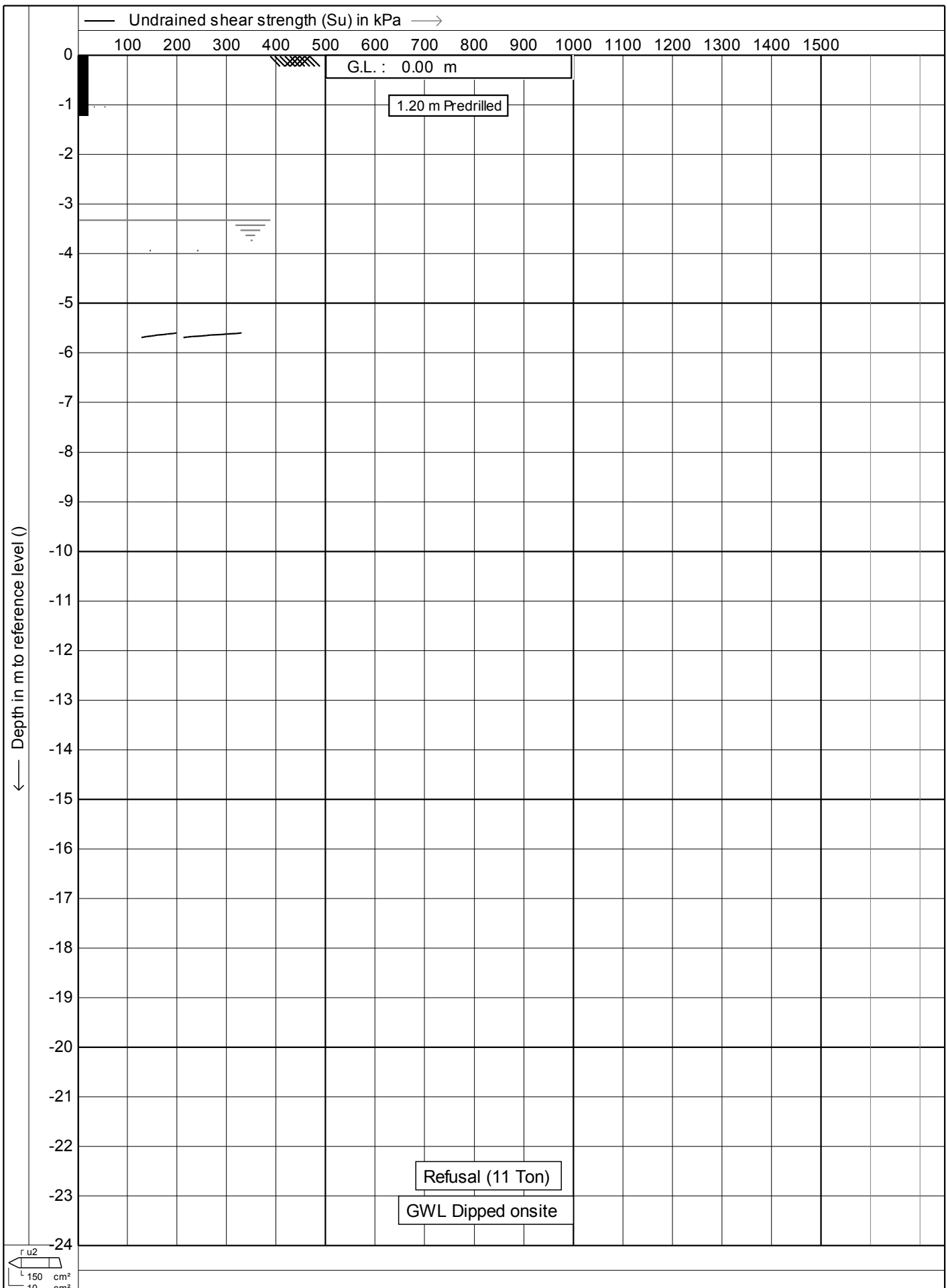
	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10a
		7/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10a 8/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10a



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

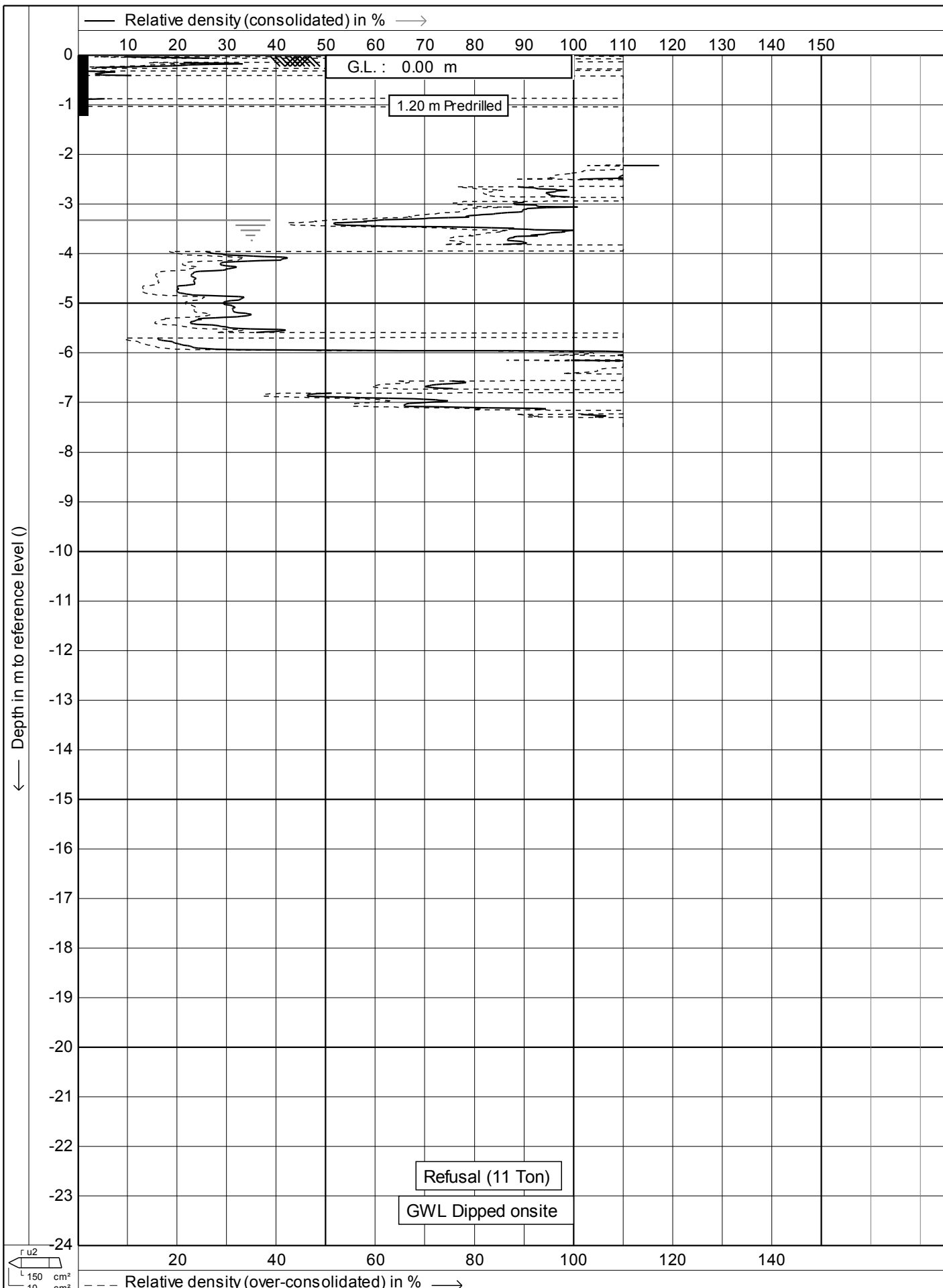
Position: **0, 0 RD**

Date : **12/10/2017**

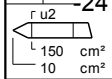
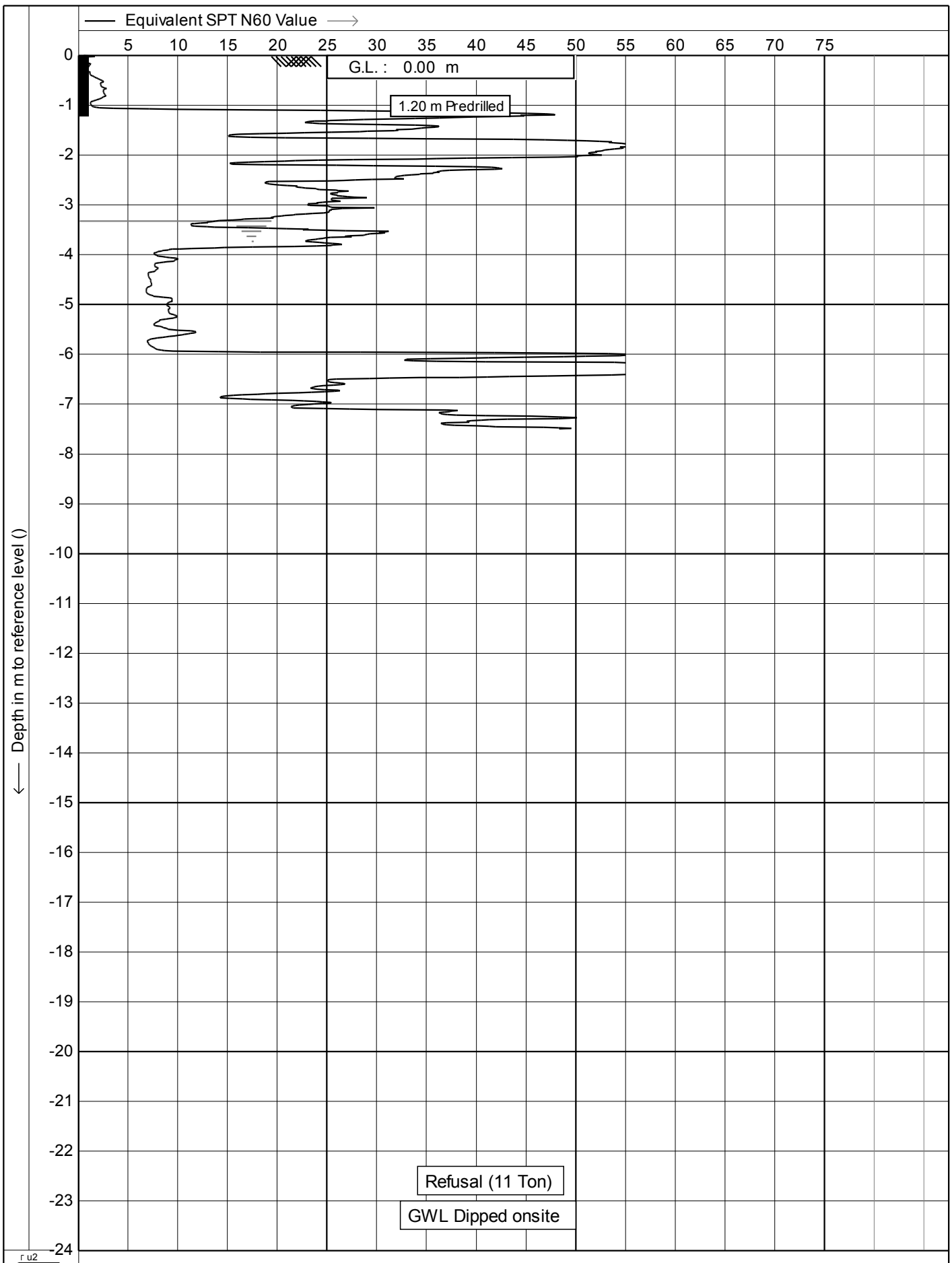
Cone no. : **C10CFIP.C14433**

Project no. : **05TT12**

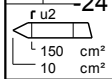
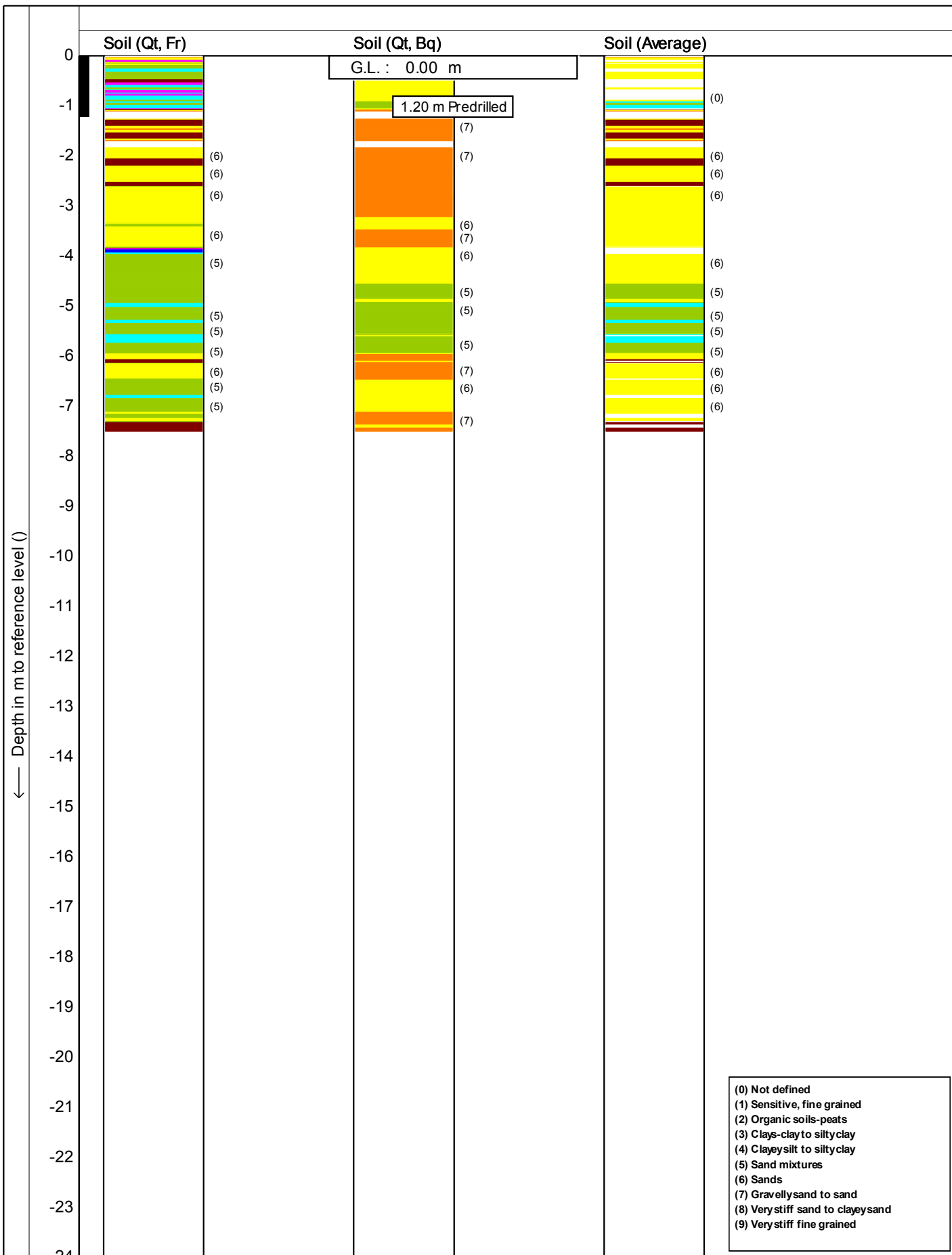
CPT no. : **10a** | 10/14



	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10a
		11/14

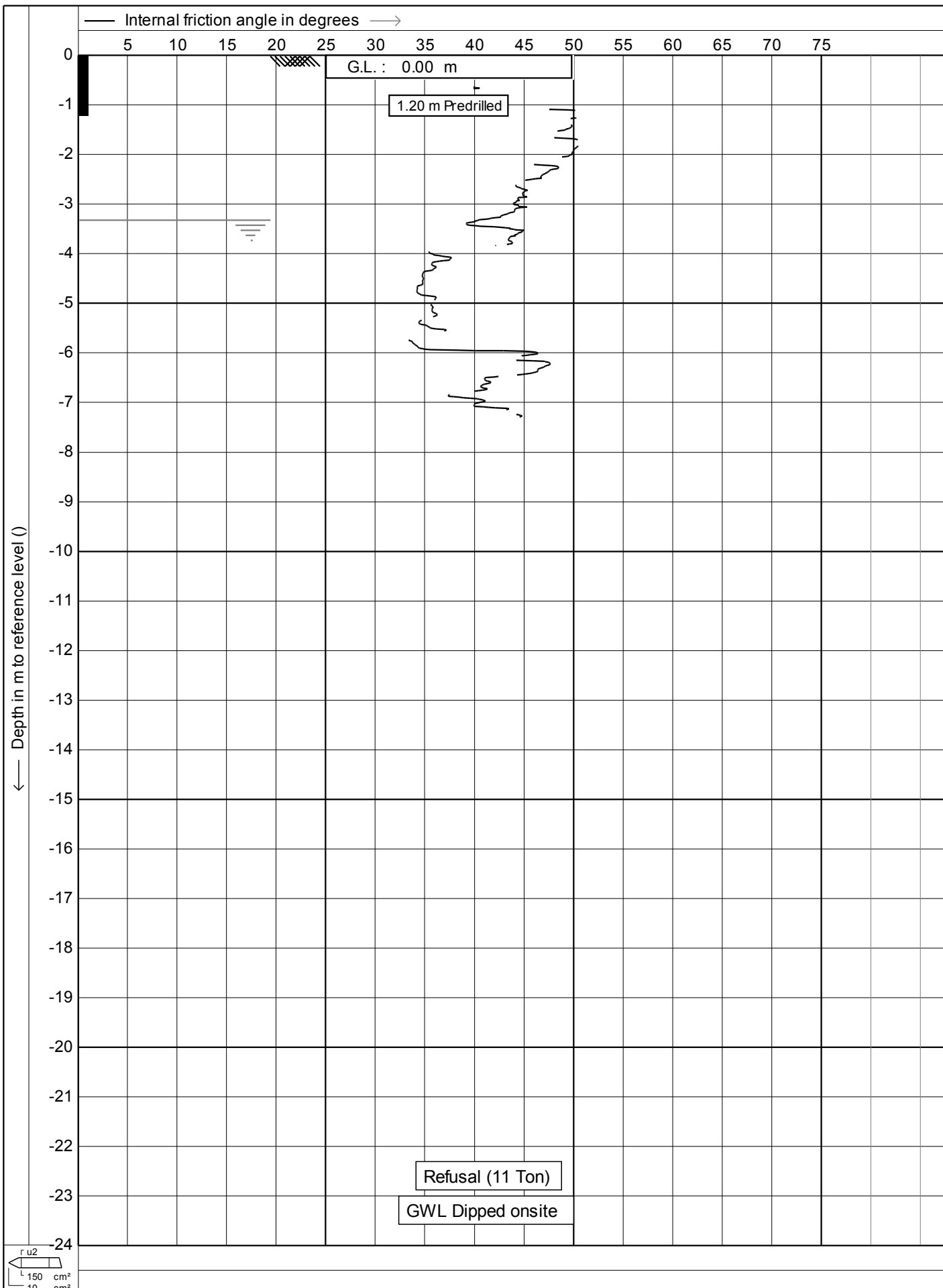


Test according A.S.T.M Standard D 5778-12 Project : Site Investigations Location: Victoria University - Wellington Position: 0, 0 RD	Date : 12/10/2017
	Cone no. : C10CFIP.C14433
	Project no. : 05TT12
	CPT no. : 10a
	12/14

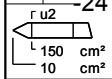
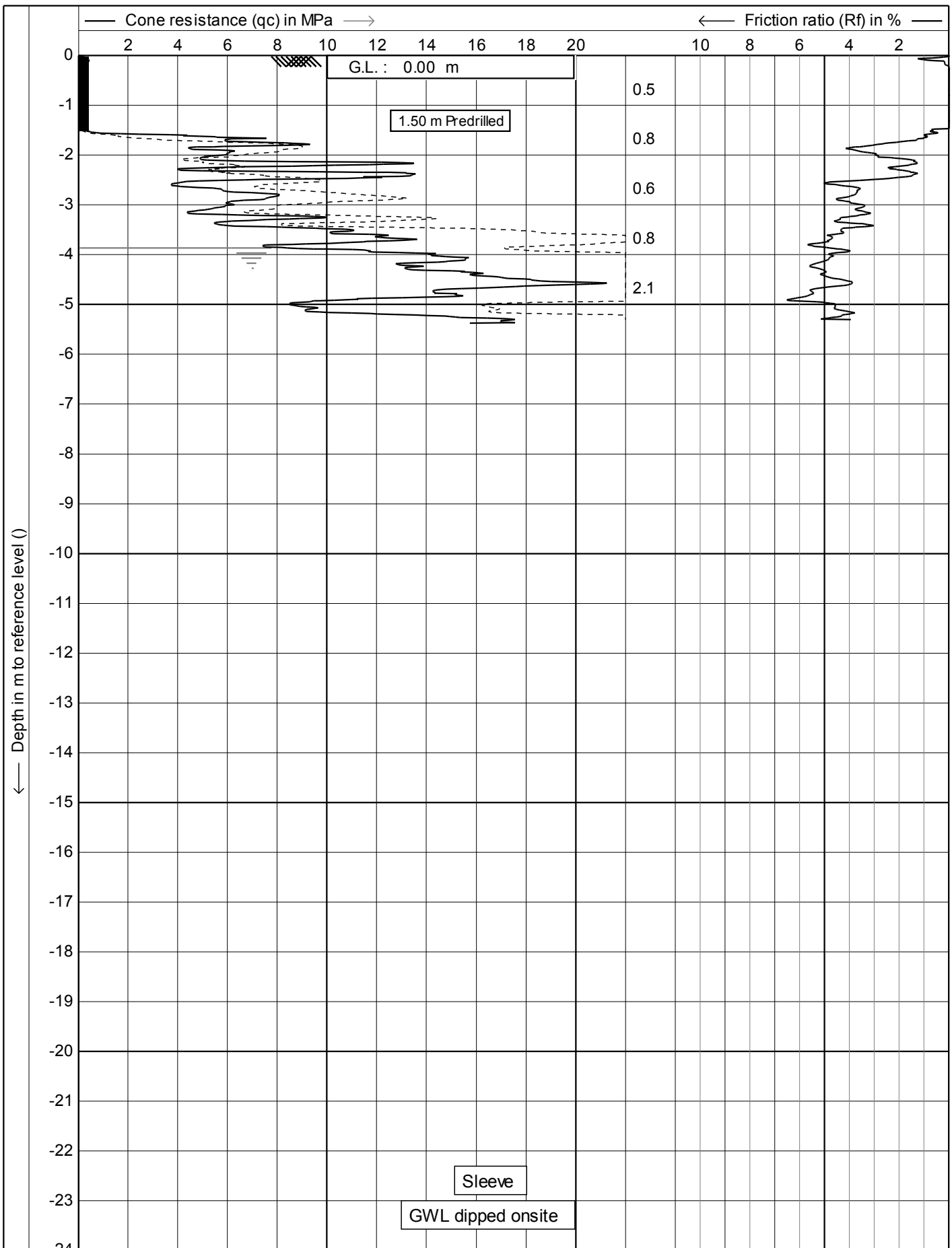


Soil behaviour type classification after Robertson 1990

	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10a
		13/14

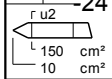
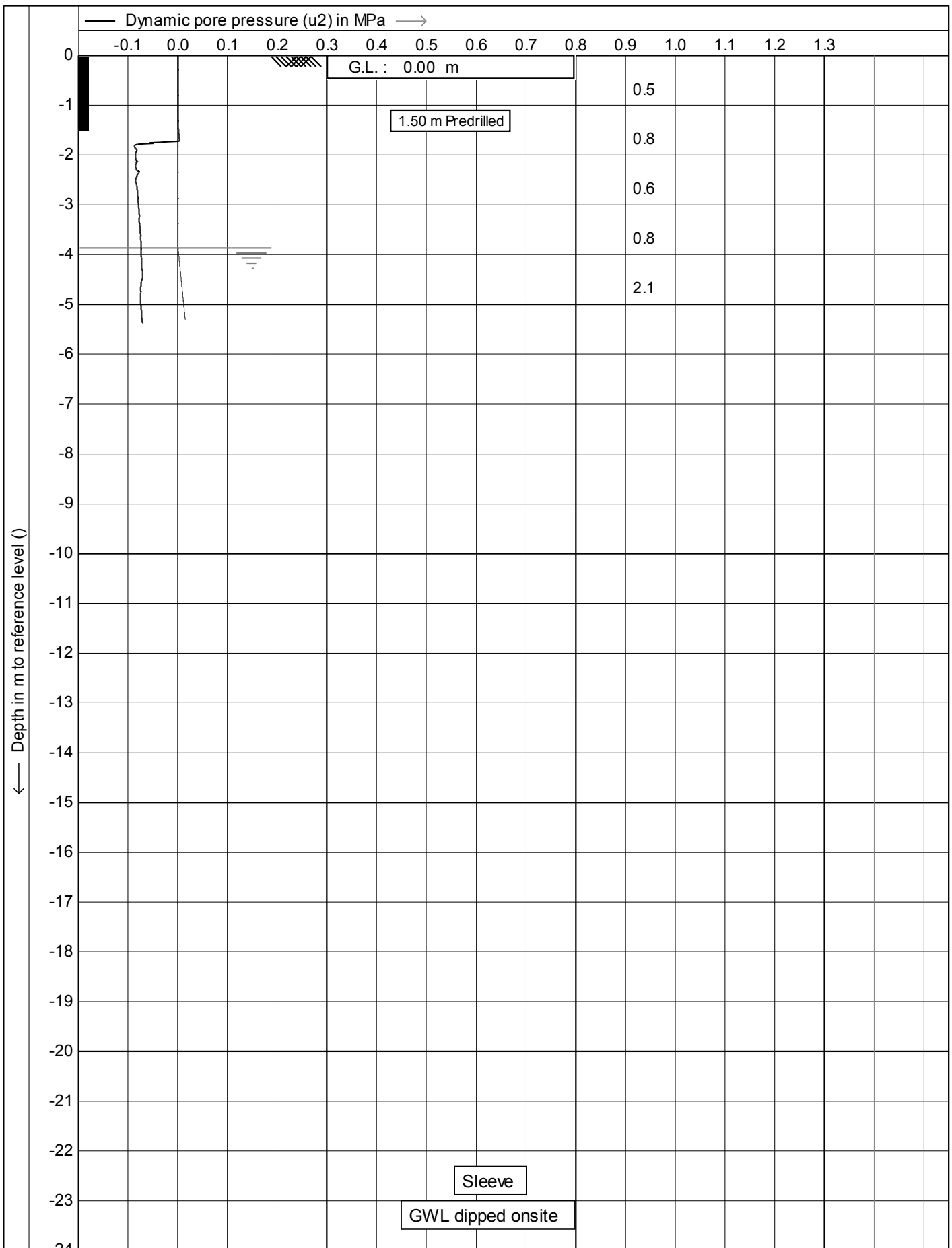


	Test according A.S.T.M Standard D 5778-12	Date : 12/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 10a
		14/14

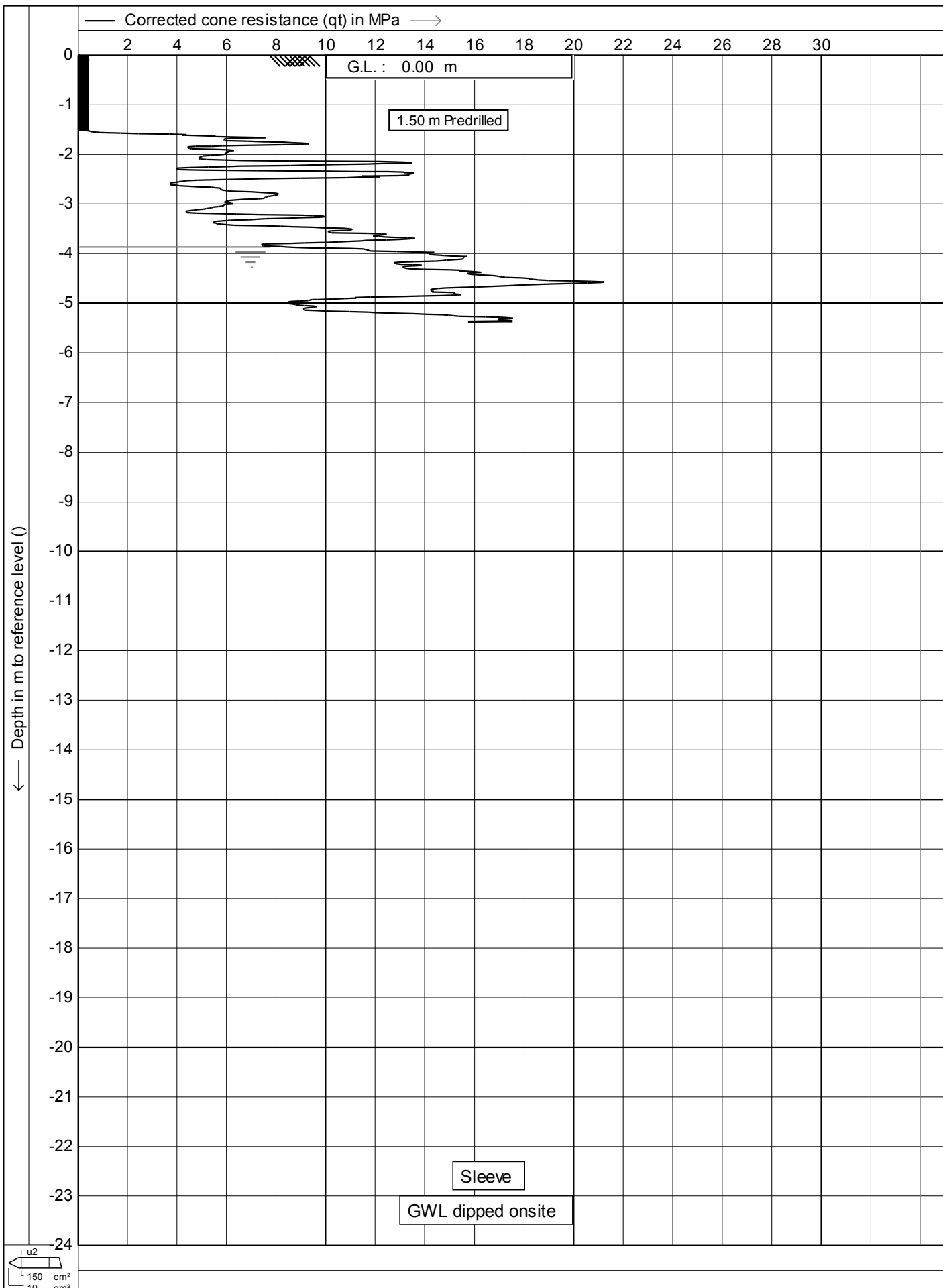


Test according A.S.T.M Standard D 5778-12
 Project : **Site Investigations**
 Location: **Victoria University - Wellington**
 Position: **0, 0 RD**

Date : **11/10/2017**
 Cone no. : **C10CFIP.C14433**
 Project no. : **05TT12**
 CPT no. : **11** 1/14



	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 11
		2/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

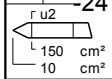
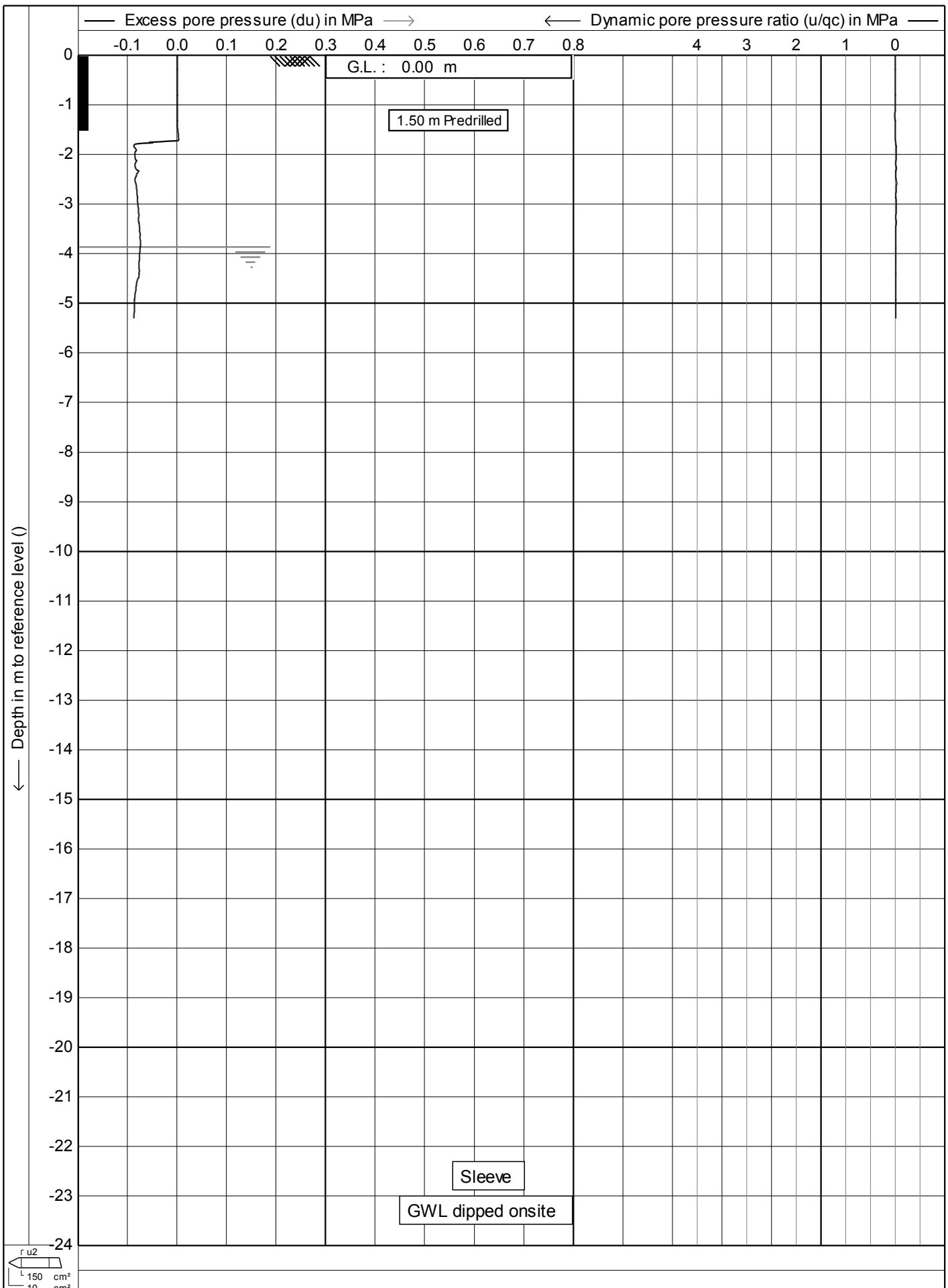
Position: **0, 0 RD**

Date : **11/10/2017**

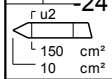
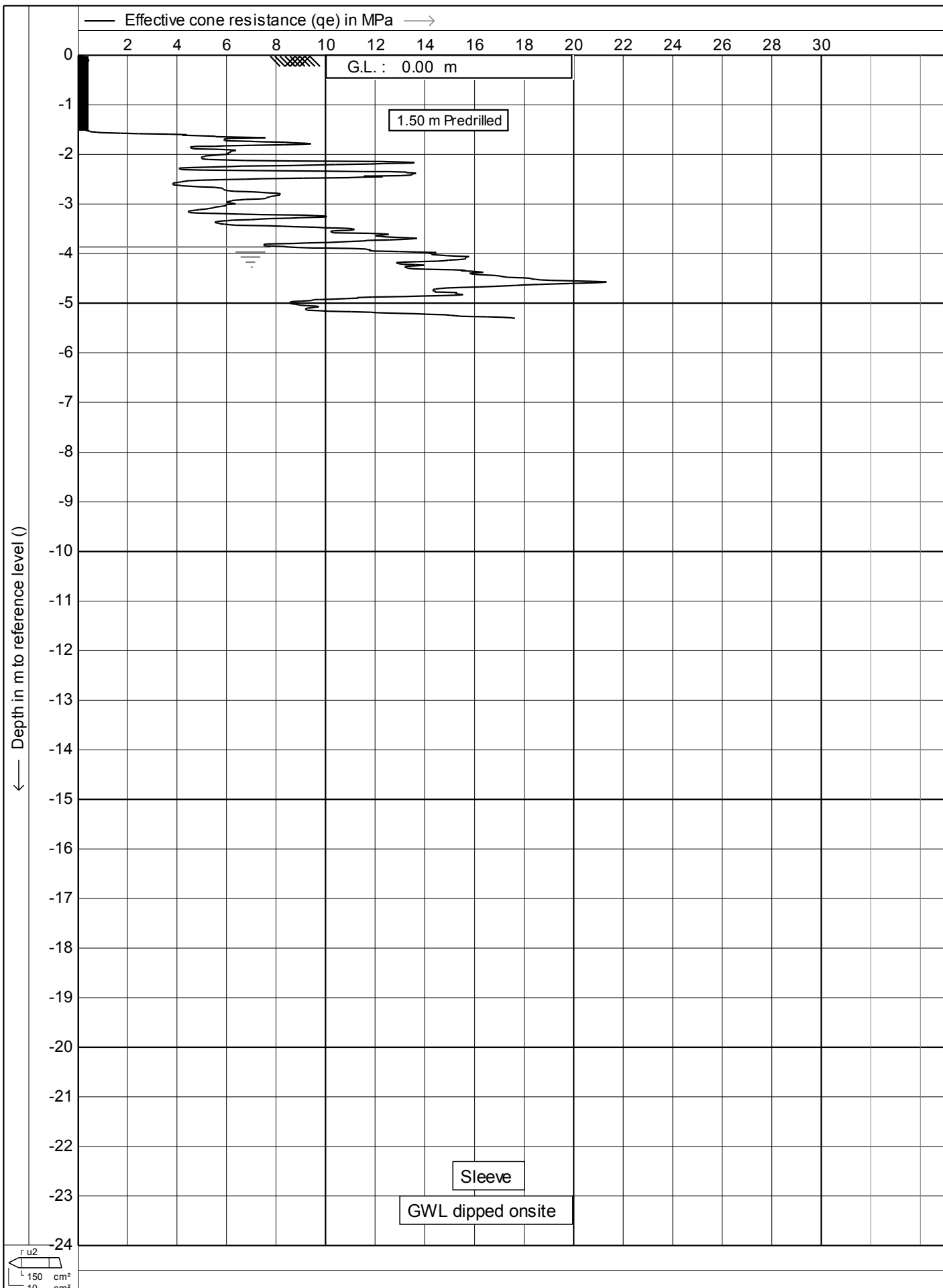
Cone no. : **C10CFIP.C14433**

Project no. : **05TT12**

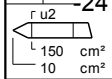
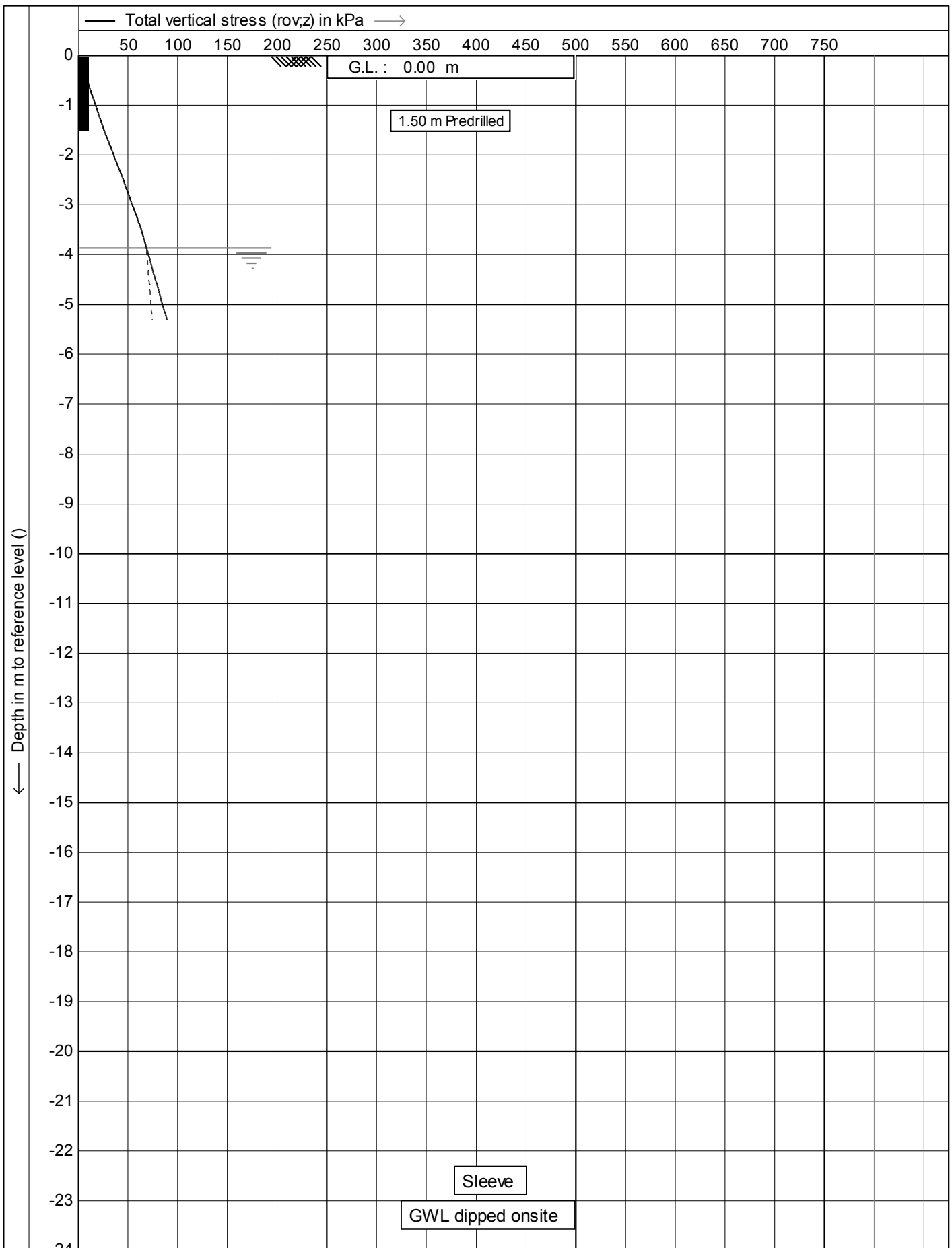
CPT no. : **11** **3/14**



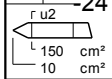
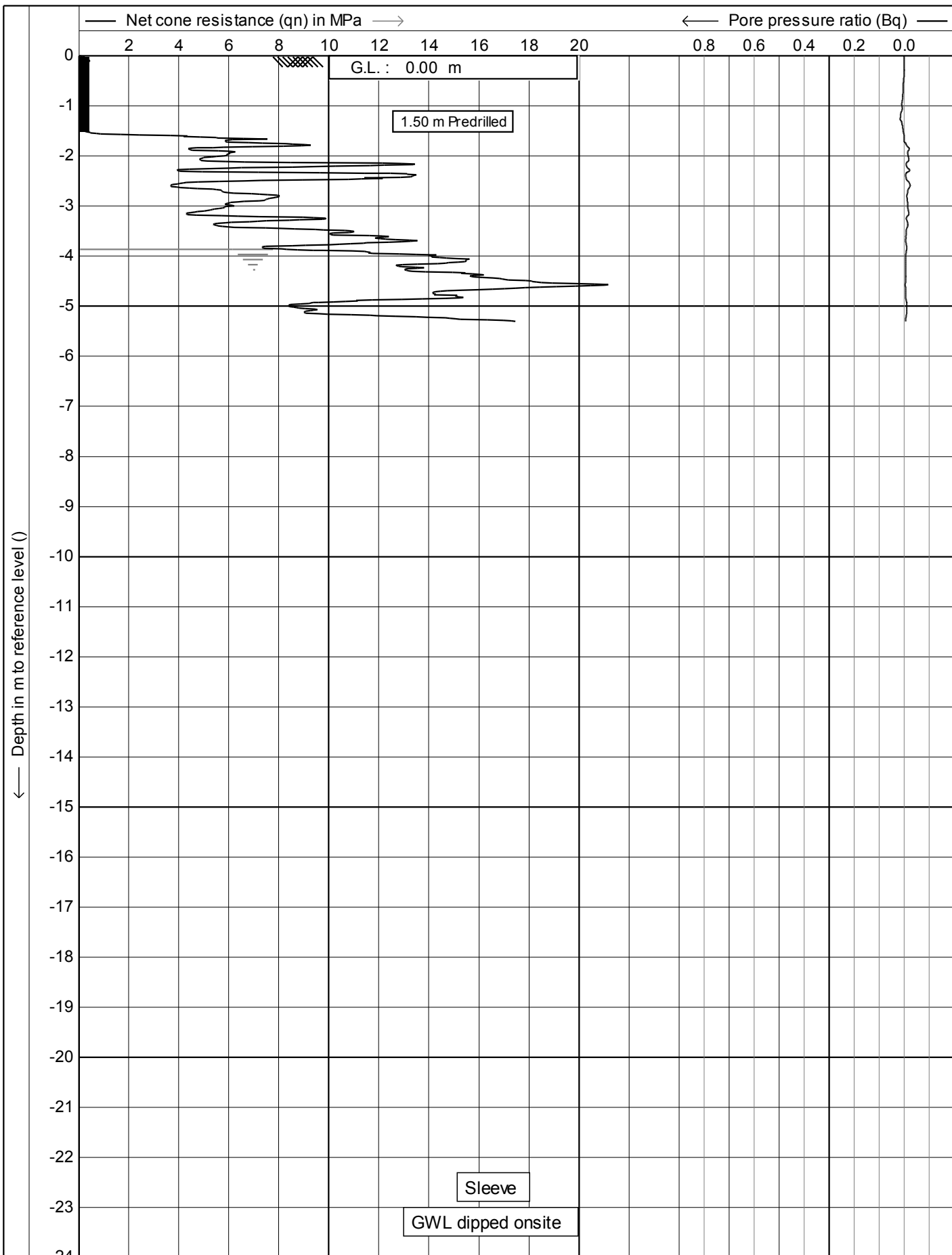
	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 11
		4/14



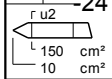
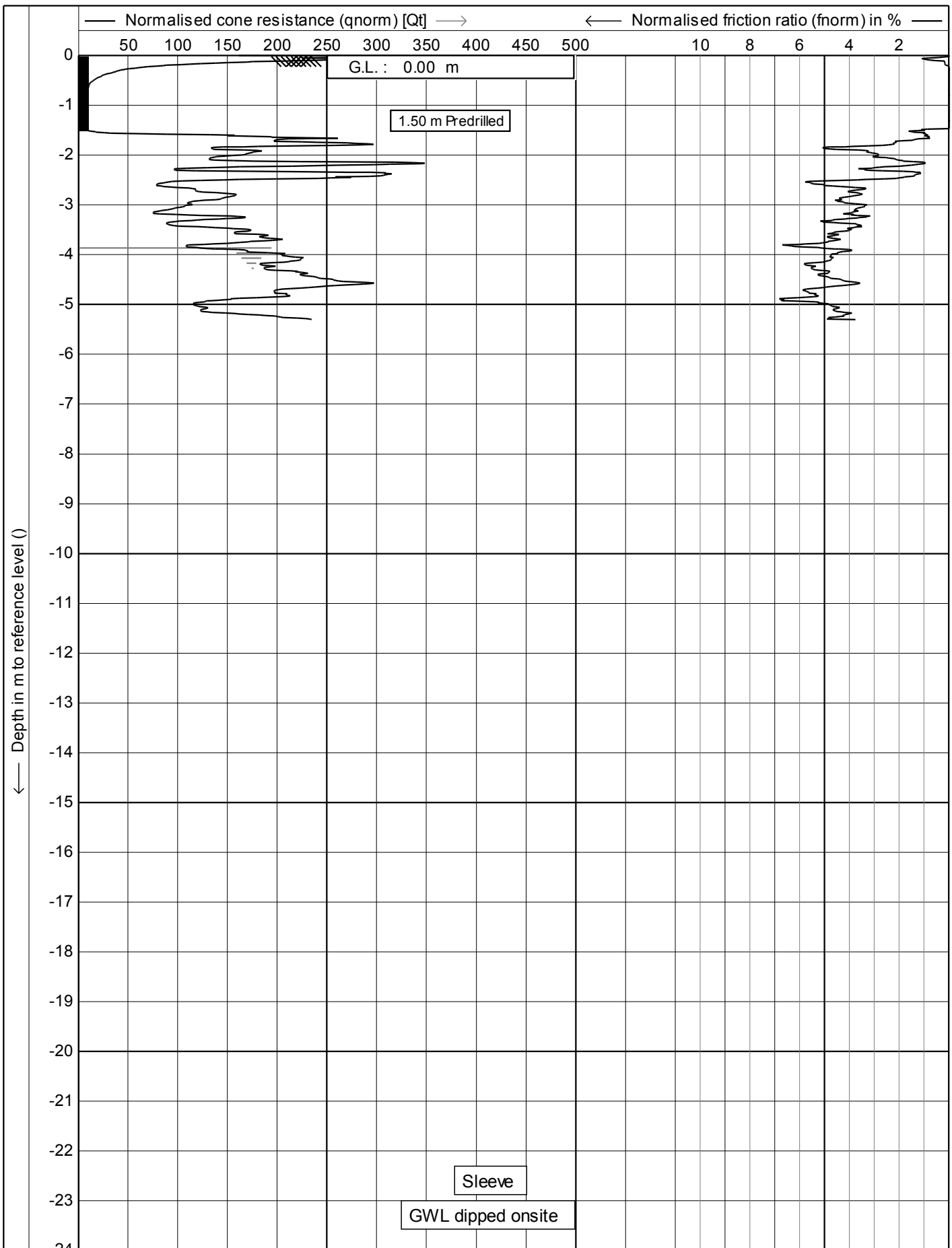
	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 11
		5/14



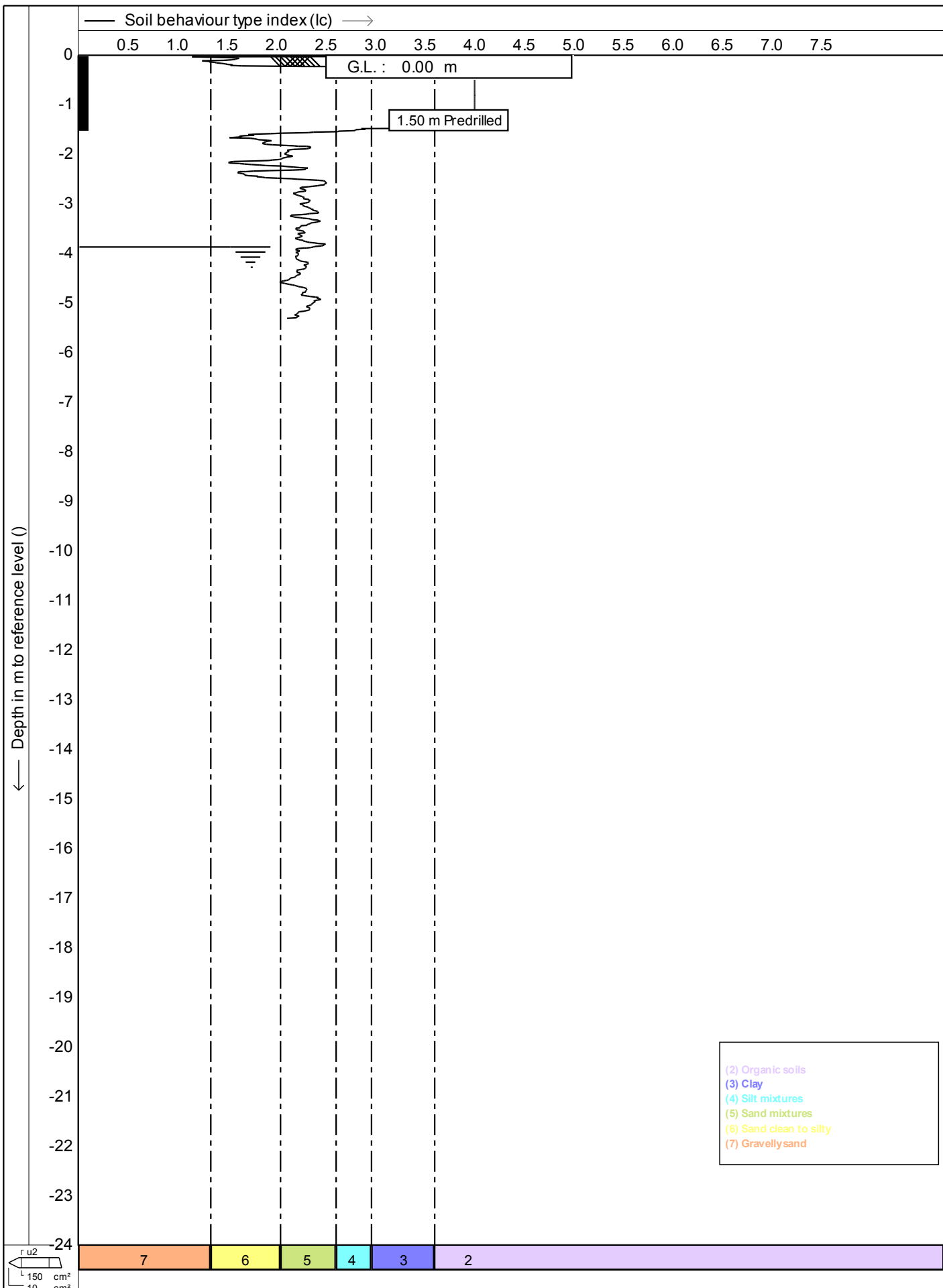
	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 11
		6/14



	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 11
		7/14



	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 11 8/14

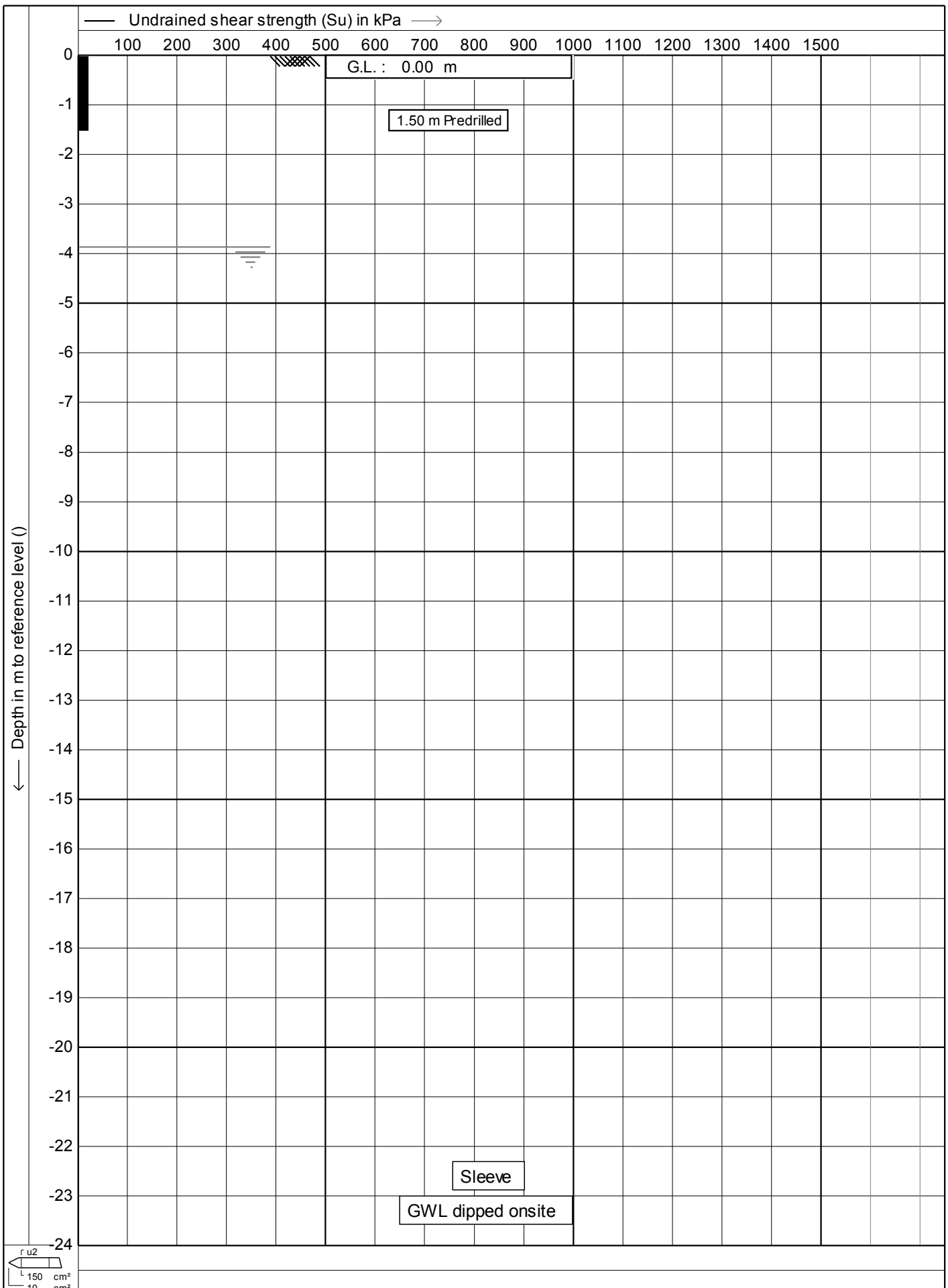


Test according A.S.T.M Standard D 5778-12

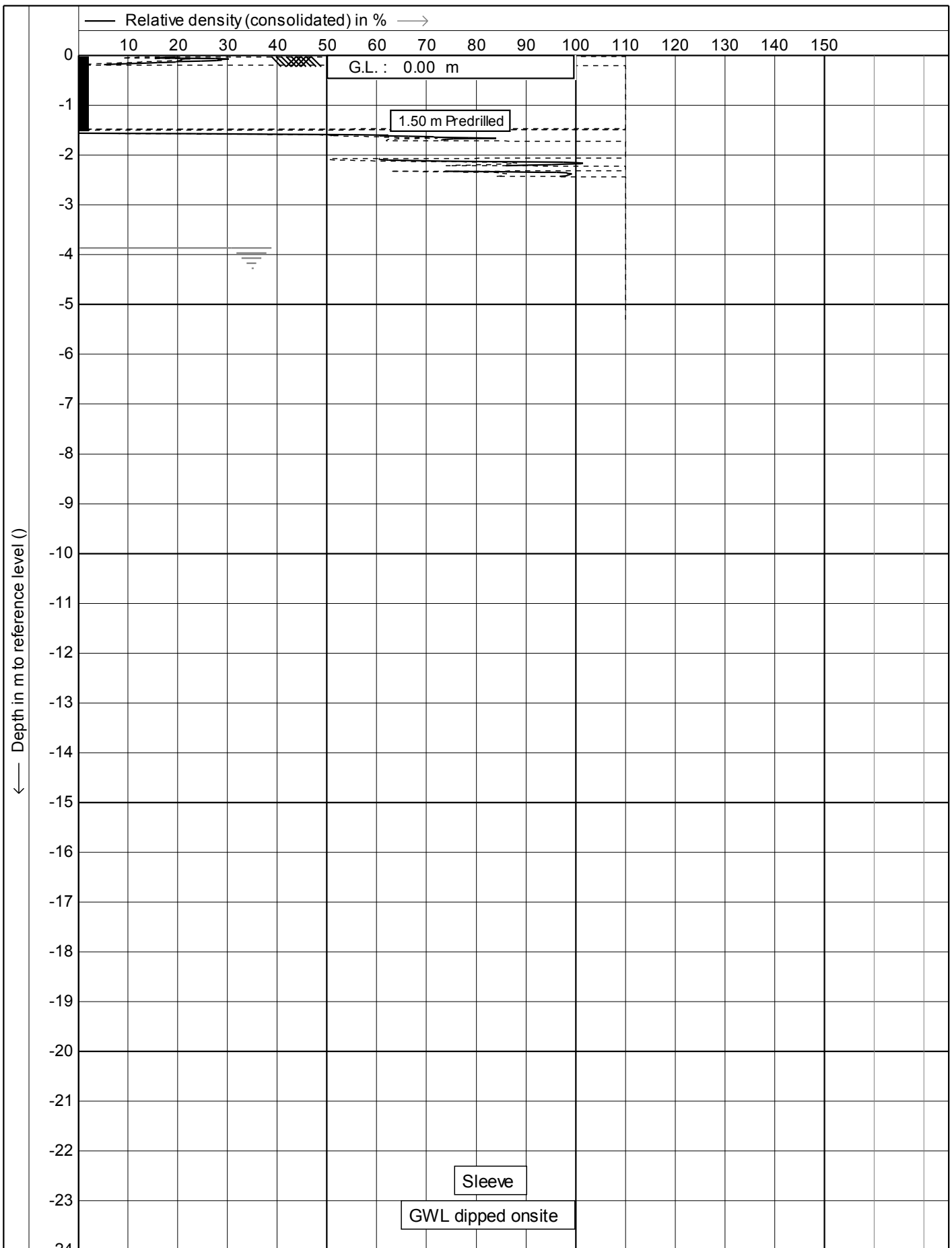
Date : 11/10/2017
 Cone no. : C10CFIP.C14433
 Project no. : 05TT12
 CPT no. : 11

Project : Site Investigations
 Location: Victoria University - Wellington
 Position: 0, 0 RD





	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 11
		10/14



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

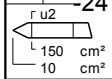
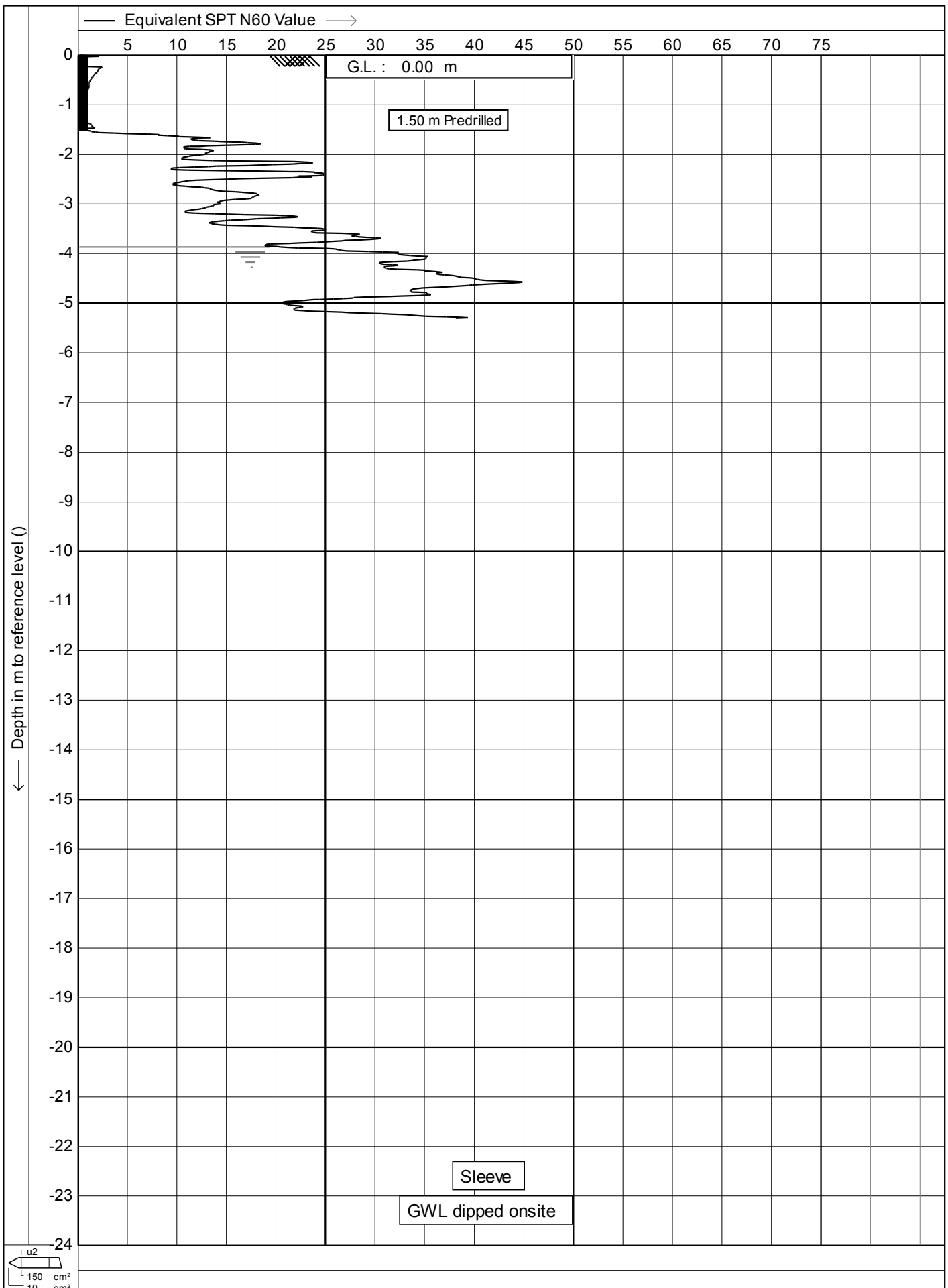
Position: **0, 0 RD**

Date : **11/10/2017**

Cone no. : **C10CFIP.C14433**

Project no. : **05TT12**

CPT no. : **11** | **11/14**



Test according A.S.T.M Standard D 5778-12

Project : **Site Investigations**

Location: **Victoria University - Wellington**

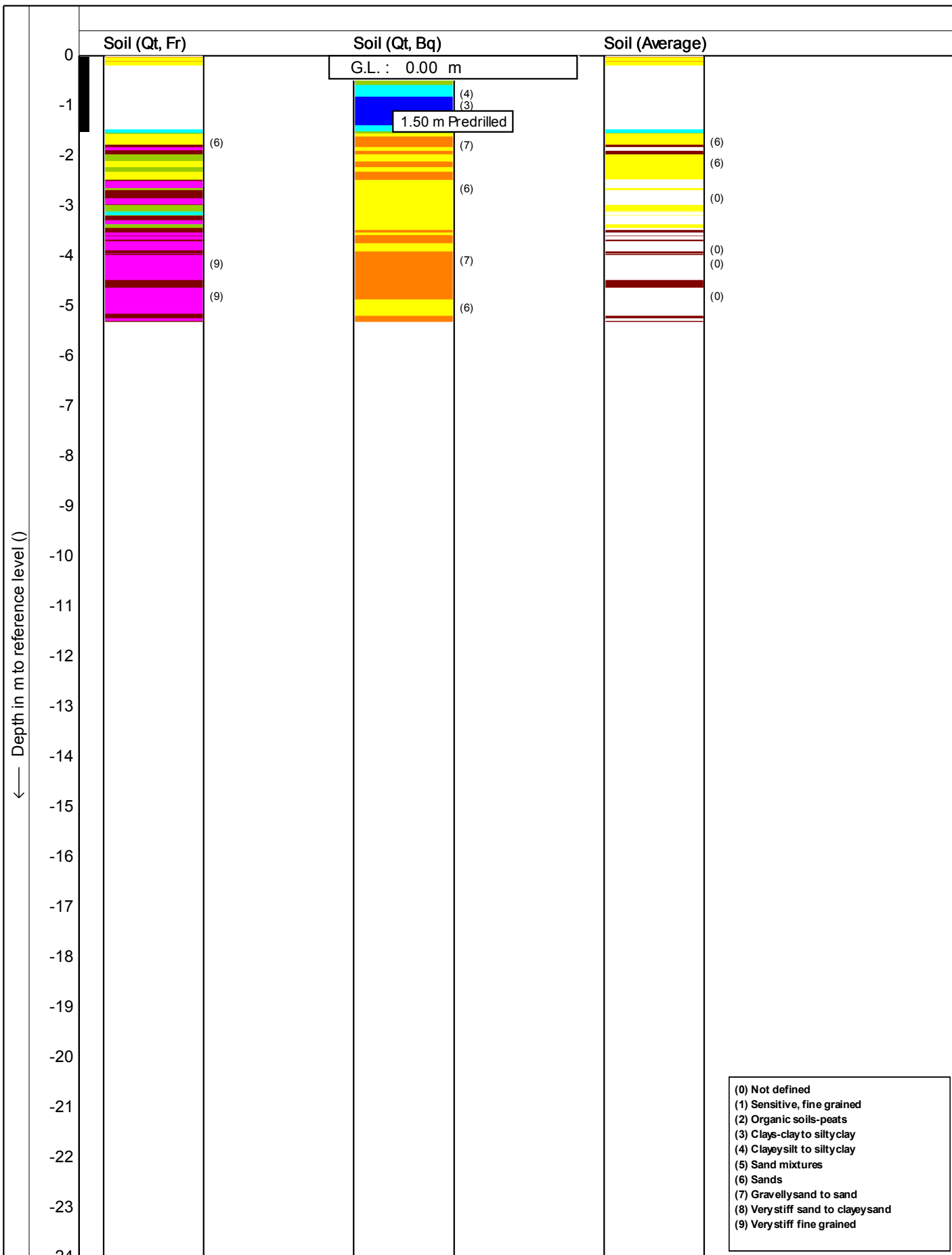
Position: **0, 0 RD**

Date : **11/10/2017**

Cone no. : **C10CFIP.C14433**

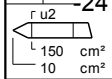
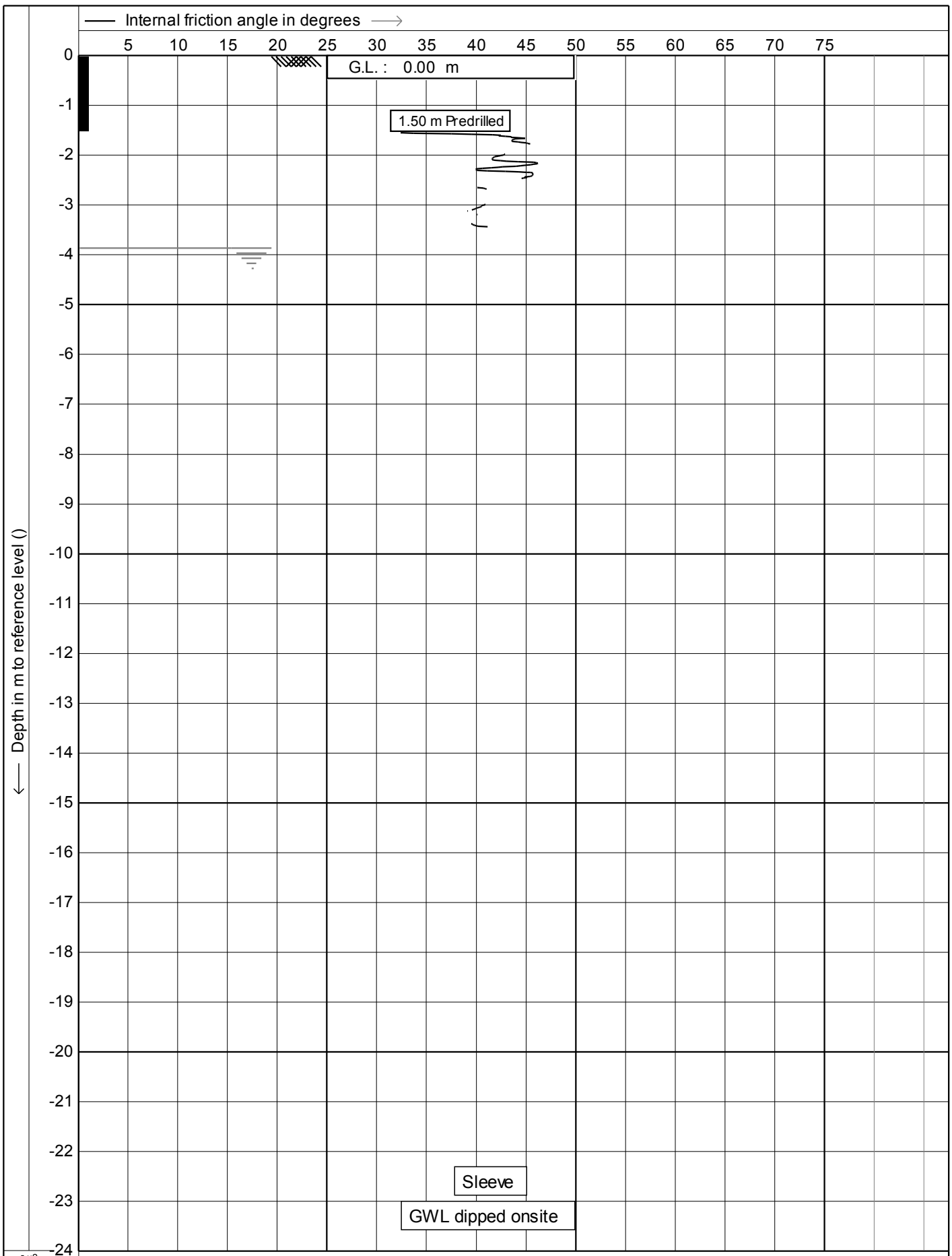
Project no. : **05TT12**

CPT no. : **11** | 12/14



Soil behaviour type classification after Robertson 1990

	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 11
		13/14



	Test according A.S.T.M Standard D 5778-12	Date : 11/10/2017
	Project : Site Investigations	Cone no. : C10CFIP.C14433
	Location: Victoria University - Wellington	Project no. : 05TT12
	Position: 0, 0 RD	CPT no. : 11
		14/14

HAND AUGER LOG

HOLE Id: **HA01**
 Hole Location: Campbell Street Playing Fields
 SHEET: 1 OF 1

PROJECT: VUW Karori Campus Redevelopment	LOCATION: VUW, Karori Campus	JOB No.: 30309
CO-ORDINATES: 5427962 mN (NZTM2000) 1745733 mE	DRILL TYPE:	HOLE STARTED: 24/10/2017
R.L.: 167.50m	DRILL METHOD: HA	HOLE FINISHED: 24/10/2017
DATUM: NZVD2016		DRILLED BY: Geotechnics Ltd
		LOGGED BY: EJWL CHECKED: MHU

GEOLOGICAL				ENGINEERING DESCRIPTION									
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MATERIAL COMPOSITION	WATER	CORE RECOVERY (%)	METHOD	SCALA PENETROMETER (Blows/50mm)	TESTS	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	WEATHERING	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	Description and Additional Observations
Topsoil				1	HA01_E1 @ 0.1m				TS	M	S		SILT; brown. Soft, moist, low plasticity, trace rootlets.
Fill				2	● 133/29 kPa				TS		VSt		0.1m: grades to very stiff.
				6						D-M	D		Gravelly fine to coarse SAND; minor silt; orange brown. Dense, dry to moist. Gravel; fine to coarse, angular to subangular.
				8									0.2m: Refusal
				7									
				5									
				5									
				6									
				6									
				4				167					
				4									
				4									
				5									
				6									
				4									
				5									
				3									
				3									
				1									
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				2									
				2									
				3									
				2									
				2									
				3									
				3									

COMMENTS: Location estimated from aerial image (+/- 5m). Elevation estimated from 1m LiDAR (2009) contours (Wellington City Council GIS database, 2009 produced from LiDAR, +/- 1m).

Hole Depth
0.2m

Scale 1:10

Hand Auger Log - 5/12/2017 12:24:29 PM - Produced with Core-GS by GeRoc

HAND AUGER LOG

HOLE Id: **HA02**
 Hole Location: Campbell Street Playing Fields
 SHEET: 1 OF 1

PROJECT: VUW Karori Campus Redevelopment	LOCATION: VUW, Karori Campus	JOB No.: 30309
CO-ORDINATES: 5427915 mN (NZTM2000) 1745753 mE	DRILL TYPE:	HOLE STARTED: 24/10/2017
R.L.: 168.00m	DRILL METHOD: HA	HOLE FINISHED: 24/10/2017
DATUM: NZVD2016		DRILLED BY: Geotechnics Ltd
		LOGGED BY: EJWL CHECKED: MHU

GEOLOGICAL				ENGINEERING DESCRIPTION									
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MATERIAL COMPOSITION	WATER	CORE RECOVERY (%)	METHOD	SCALA PENETROMETER (Blows/50mm)	TESTS	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	WEATHERING	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	Description and Additional Observations
Topsoil				1	HA02_E1 @ 0.1m ● 97/32 kPa				TS	M	St		SILT; brown. Stiff, moist, low plasticity, trace rootlets.
Fill				10							D		Silty sandy fine to coarse GRAVEL; light brown. Moist, angular.
				12				0.5		W			0.45m: grades to wet.
Quaternary Alluvium											S		SAND some gravel and silt; orange brown. Dense, saturated. Gravel; fine to coarse, subangular to angular.
							167	1.0					1m: Refusal

COMMENTS: Location estimated from aerial image (+/- 5m). Elevation estimated from 1m LiDAR (2009) contours (Wellington City Council GIS database, 2009 produced from LiDAR, +/- 1m).

Hole Depth
1m

Scale 1:10

Rev.: A

Hand Auger Log - 5/12/2017 12:24:30 PM - Produced with Core-GS by GeRoc

HAND AUGER LOG

HOLE Id: **HA03**
 Hole Location: Campbell Street Playing Fields
 SHEET: 1 OF 1

PROJECT: VUW Karori Campus Redevelopment	LOCATION: VUW, Karori Campus	JOB No.: 30309
CO-ORDINATES: 5427930 mN (NZTM2000) 1745792 mE	DRILL TYPE:	HOLE STARTED: 24/10/2017
R.L.: 168.00m	DRILL METHOD: HA	HOLE FINISHED: 24/10/2017
DATUM: NZVD2016		DRILLED BY: Geotechnics Ltd
		LOGGED BY: EJWL CHECKED: MHU

GEOLOGICAL					ENGINEERING DESCRIPTION								
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MATERIAL COMPOSITION	WATER	CORE RECOVERY (%)	METHOD	SCALA PENETROMETER (Blows/50mm)	TESTS	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	WEATHERING MOISTURE CONDITION	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	Description and Additional Observations
Topsoil			1		● 191/10 kPa				TS	D	Vst		SILT trace gravel; brown. Very stiff, dry, low plasticity. Gravel; fine to coarse, angular to subangular. Trace rootlets.
Quaternary Alluvium			2		● 195/54 kPa				X	M	VSt-H		SILT trace gravel and clay; orange brown mottled orange. Very stiff to hard, moist, low plasticity. Gravel; fine to coarse, angular to subangular. Trace rootlets.
			1						X				
			2						X				
			1						X				
			2			● >234 kPa		0.5	X				
			3						X				
0.7m: Refusal			3						X				
			4		● >234 kPa								
			4										
			5										
			6										
			6										
			17										
		20					1.0						
							1.5						
							1.67						

COMMENTS: Location estimated from aerial image (+/- 5m). Elevation estimated from 1m LiDAR (2009) contours (Wellington City Council GIS database, 2009 produced from LiDAR, +/- 1m).

Hole Depth
0.7m

Scale 1:10

Rev.: A

Hand Auger Log - 5/12/2017 12:24:30 PM - Produced with Core-GS by GeRoc

HAND AUGER LOG

HOLE Id: **HA05**
 Hole Location: VUW Karori Campus
 SHEET: 1 OF 1

PROJECT: VUW Karori Campus Redevelopment	LOCATION: VUW, Karori Campus	JOB No.: 30309
CO-ORDINATES: 5427990 mN (NZTM2000) 1745920 mE	DRILL TYPE:	HOLE STARTED: 24/10/2017
R.L.: 167.00m	DRILL METHOD: HA	HOLE FINISHED: 24/10/2017
DATUM: NZVD2016		DRILLED BY: Geotechnics Ltd
		LOGGED BY: EJWL CHECKED: MHU

GEOLOGICAL				ENGINEERING DESCRIPTION										
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MATERIAL COMPOSITION	WATER	CORE RECOVERY (%)	METHOD	SCALA PENETROMETER (Blows/50mm)	TESTS	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	WEATHERING MOISTURE CONDITION	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	Description and Additional Observations	
														2
Topsoil			1		HA05_E1 @ 0.1m ● 83/18 kPa				TS	M	St		SILT trace sand; brownish grey. Stiff, moist, low plasticity. Sand; fine to coarse. Trace rootlets.	
Quaternary Alluvium			1		HA05_E2 @ 0.5m			0.5			F		Sandy SILT trace gravel; orange brown, mottled orange. Firm, moist, low plasticity. Sand; fine to coarse. Gravel; fine to coarse, angular to subangular. 0.5m: grades to mottled grey.	
			1									L		Silty fine to coarse SAND some gravel; grey. Loose, moist. Gravel; fine to coarse, angular to subangular.
			2		HA05_E3 @ 1.0m ● 43/4 kPa		166	1.0			D-M		Fine to coarse SAND, some gravel, minor silt; grey. Medium dense, dry to moist. Gravel; angular to subangular.	
			1								M-W	F		Organic SILT, minor clay; brown. Firm, moist to wet, low to moderate plasticity. Trace rootlets and fibrous organics.
			2			● 22/4 kPa								
			2									MD		Fine SAND, minor silt, trace gravel; light grey. Medium dense, moist to wet. Gravel, angular.
			1											
			2											
			2											
			2											
		3												
		3												
		3												
		2						1.5					1.5m: Target depth	

COMMENTS: Location estimated from aerial image (+/- 5m). Elevation estimated from 1m LiDAR (2009) contours (Wellington City Council GIS database, 2009 produced from LiDAR, +/- 1m).

Hole Depth
1.5m

Scale 1:10

Rev.: A

Hand Auger Log - 5/12/2017 12:24:30 PM - Produced with Core-GS by GeRoc

HAND AUGER LOG

HOLE Id: **HA07**
 Hole Location: VUW Karori Campus
 SHEET: 1 OF 1

PROJECT: VUW Karori Campus Redevelopment	LOCATION: VUW, Karori Campus	JOB No.: 30309
CO-ORDINATES: 5428049 mN (NZTM2000) 1745914 mE	DRILL TYPE:	HOLE STARTED: 24/10/2017
R.L.: 173.50m	DRILL METHOD: HA	HOLE FINISHED: 24/10/2017
DATUM: NZVD2016		DRILLED BY: Geotechnics Ltd
		LOGGED BY: EJWL CHECKED: MHU

GEOLOGICAL				ENGINEERING DESCRIPTION									
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MATERIAL COMPOSITION	WATER	CORE RECOVERY (%)	METHOD	SCALA PENETROMETER (Blows/50mm)	TESTS	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	WEATHERING	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	Description and Additional Observations
Topsoil				1	HA07_E1 @ 0.1m ● 69/18 kPa					M	St		SILT trace gravel; brown. Stiff, moist, low plasticity, trace rootlets. Gravel; fine to coarse, subangular.
Quaternary Alluvium				1	HA07_E2 @ 0.5m		173	0.5			F		Sandy SILT minor gravel; orange brown, mottled orange. Stiff, moist, low plasticity. Gravel; fine to coarse, angular to subangular.
				2									
				2									0.65m: Refusal
				1									
				15									
								1.0					
								1.5					
								1.72					

COMMENTS: Location estimated from aerial image (+/- 5m). Elevation estimated from 1m LiDAR (2009) contours (Wellington City Council GIS database, 2009 produced from LiDAR, +/- 1m).

Hole Depth
0.65m

Scale 1:10

Rev.: A

Hand Auger Log - 5/12/2017 12:24:30 PM - Produced with Core-GS by GeRoc

HAND AUGER LOG

HOLE Id: **HA08**
 Hole Location: VUW Karori Campus
 SHEET: 1 OF 1

PROJECT: VUW Karori Campus Redevelopment	LOCATION: VUW, Karori Campus	JOB No.: 30309
CO-ORDINATES: 5428098 mN (NZTM2000) 1745869 mE	DRILL TYPE:	HOLE STARTED: 24/10/2017
R.L.: 170.00m	DRILL METHOD: HA	HOLE FINISHED: 24/10/2017
DATUM: NZVD2016		DRILLED BY: Geotechnics Ltd
		LOGGED BY: EJWL CHECKED: MHU

GEOLOGICAL				ENGINEERING DESCRIPTION										
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MATERIAL COMPOSITION	WATER	CORE RECOVERY (%)	METHOD	SCALA PENETROMETER (Blows/50mm)	TESTS	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	WEATHERING	MOISTURE CONDITION	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	Description and Additional Observations
Topsoil					HA08_E1 @ 0.1m				TS	M	VS		SILT; brown. Very soft, moist, low plasticity. Trace rootlets.	
Quaternary Alluvium									TS		L		Fine to coarse GRAVEL trace silt; greyish brown. Loose, moist, angular to subangular.	
											F		SILT, minor sand and gravel; greyish brown, mottled orange brown. Firm, moist, low plasticity. Sand; fine to coarse. Gravel; fine to coarse, angular to subangular.	
								0.5					0.7m: grades to grey.	
													0.8m: grades to some gravel.	
					HA08_E2 @ 1.0m		1.0						1m: Refusal	

COMMENTS: Location estimated from aerial image (+/- 5m). Elevation estimated from 1m LiDAR (2009) contours (Wellington City Council GIS database, 2009 produced from LiDAR, +/- 1m).




Hole Depth 1m
Scale 1:10

Hand Auger Log - 5/12/2017 12:24:30 PM - Produced with Core-GS by GeRoc

HAND AUGER LOG

HOLE Id: **HA10**
 Hole Location: VUW Karori Campus
 SHEET: 1 OF 1

PROJECT: VUW Karori Campus Redevelopment	LOCATION: VUW, Karori Campus	JOB No.: 30309
CO-ORDINATES: 5428061 mN (NZTM2000) 1745783 mE	DRILL TYPE:	HOLE STARTED: 24/10/2017
R.L.: 164.50m	DRILL METHOD: HA	HOLE FINISHED: 24/10/2017
DATUM: NZVD2016		DRILLED BY: Geotechnics Ltd
		LOGGED BY: EJWL CHECKED: MHU

GEOLOGICAL					ENGINEERING DESCRIPTION								
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MATERIAL COMPOSITION	WATER	CORE RECOVERY (%)	METHOD	SCALA PENETROMETER (Blows/50mm)	TESTS	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	WEATHERING	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	Description and Additional Observations
Topsoil				1						M	S		SILT trace clay; brown. Soft, moist, low plasticity. Trace rootlets.
Quaternary Alluvium				2						D-M	St		Sandy SILT minor gravel; orange brown. Very stiff, dry to moist, low plasticity. Sand; fine to coarse. Gravel; fine to coarse, angular to subangular.
				2									
				7									
				9									
				7									
				8									
				9									
				11			164	0.5					
				10									
													0.3m: Refusal

COMMENTS: Location estimated from aerial image (+/- 5m). Elevation estimated from 1m LiDAR (2009) contours (Wellington City Council GIS database, 2009 produced from LiDAR, +/- 1m).

Hole Depth
0.3m

Scale 1:10

Hand Auger Log - 5/12/2017 12:24:30 PM - Produced with Core-GS by GeRoc

Rev.: A

Appendix E: Laboratory test results



Our Ref: 1005153.0.1.0/REP1
 Customer Ref: 30309
 24 November 2017

Tonkin + Taylor
 PO Box 5271
 Auckland

Attention: Rhys Graafhuis

Dear Rhys

Karori Wellington Laboratory Test Report

Samples from the above mentioned site have been tested as received according to your instructions. Test results are included in this report.

Samples not destroyed during testing will be retained for one month from the date of this report before being discarded.

Descriptions are enclosed for your information, but are not covered under the IANZ endorsement of this report.

Please reproduce this report in full when transmitting to others or including in internal reports.

If we can be of any further assistance, feel free to get in touch. Contact details are provided at the bottom of this page.

GEOTECHNICS LTD

Report prepared by:

S. Simpson

.....
 Siobhan Simpson
 Business Support Administrator



Authorised for Geotechnics by:

.....
 Paul Burton
 Project Director
 Approved Signatory

Report checked by:

Alan Benton

.....
 Alan Benton
 Wellington Manager



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

24-Nov-17

t:\geotechnicsgroup\projects\1005153\1 wgtm lab\workingmaterial\20171124.ssim.1005153.0.1.0.rep1.docx



2 Hunter Street,
Wellington 6011
New Zealand

p. +64 4 381 8584

Geotechnics Project ID 1005153.0000.1.0
Customer Project ID 30309
Customer Project Name Ryman - Karori pre purchase

DETERMINATION OF WATER CONTENT - NZS 4402:1986 Test 2.1

TEST DETAILS

LOCATION	ID	BH03		
	Description	Karori		
	Data	N/A		
SAMPLE	Geotechnics ID	GEOT201711105	Date Received	9/11/2017
	Reference	BH03_2.0m	Depth	2.00m
	Description	Sandy SILT, with trace gravel; greenish grey. Moist; low plasticity; gravel, fine.		
SPECIMEN	Reference	1	Depth	N/A
	Description	N/A		

TEST RESULT

Natural Water Content **23.1%**

TEST REMARKS

- The material used for testing was natural.

This test result is IANZ accredited.

Approved By ABB **Date** 24/11/2017



2 Hunter Street,
Wellington 6011
New Zealand

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Geotechnics Project ID 1005153.0000.1.0
Customer Project ID 30309
Customer Project Name Ryman - Karori pre purchase

DETERMINATION OF WATER CONTENT - NZS 4402:1986 Test 2.1

TEST DETAILS

LOCATION	ID	BH04		
	Description	Karori		
	Data	N/A		
SAMPLE	Geotechnics ID	GEOT201711107	Date Received	9/11/2017
	Reference	BH04_1.5m	Depth	1.50m
	Description	Sandy SILT, with trace gravel; light brown. Moist; moderate plasticity; sand, fine; gravel, fine.		
SPECIMEN	Reference	1	Depth	N/A
	Description	N/A		

TEST RESULT

Natural Water Content 27.4%

TEST REMARKS

- The material used for testing was natural.

This test result is IANZ accredited.

Approved By ABB **Date** 24/11/2017



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Geotechnics Project ID 1005153.0000.1.0
Customer Project ID 30309
Customer Project Name Ryman - Karori pre purchase

DETERMINATION OF LIQUID & PLASTIC LIMIT, PLASTICITY INDEX - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

TEST DETAILS				
LOCATION	ID	BH01		
	Description	Karori		
	Data	N/A		
SAMPLE	Geotechnics ID	GEOT201711101	Date Received	9/11/2017
	Reference	BH01_2.6m	Depth	2.60m
	Description	Sandy SILT, with some twigs and trace gravel; dark brown. Moist; high plasticity.		
SPECIMEN	Reference	1	Depth	N/A
	Description	N/A		
TEST RESULTS				
Liquid Limit	81			
Plastic Limit	45			
Plasticity Index	36			
TEST REMARKS				
<ul style="list-style-type: none"> The material used for testing was natural, fraction passing a 425um sieve. 				
This test result is IANZ accredited.				
Approved By	ABB	Date	24/11/2017	



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Customer Project ID 30309
Customer Project Name Ryman - Karori pre purchase

DETERMINATION OF LIQUID & PLASTIC LIMIT, PLASTICITY INDEX - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

TEST DETAILS				
LOCATION	ID	BH01		
	Description	Karori		
	Data	N/A		
SAMPLE	Geotechnics ID	GEOT201711102	Date Received	9/11/2017
	Reference	BH01_5.7m	Depth	5.70m
	Description	SILT, with some sand; brownish black. Moist; high plasticity; sand, fine.		
SPECIMEN	Reference	1	Depth	N/A
	Description	N/A		
TEST RESULTS				
Liquid Limit	75			
Plastic Limit	48			
Plasticity Index	27			
TEST REMARKS				
<ul style="list-style-type: none"> The material used for testing was natural, whole soil. 				
This test result is IANZ accredited.				
Approved By	ABB	Date	24/11/2017	



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Geotechnics Project ID 1005153.0000.1.0
Customer Project ID 30309
Customer Project Name Ryman - Karori pre purchase

DETERMINATION OF LIQUID & PLASTIC LIMIT, PLASTICITY INDEX - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

TEST DETAILS				
LOCATION	ID	BH02		
	Description	Karori		
	Data	N/A		
SAMPLE	Geotechnics ID	GEOT201711104	Date Received	9/11/2017
	Reference	BH02_2.2m	Depth	2.20m
	Description	Sandy SILT; greyish brown. Moist; low plasticity; sand, fine to coarse.		
SPECIMEN	Reference	1	Depth	N/A
	Description	N/A		
TEST RESULTS				
Liquid Limit	33			
Plastic Limit	25			
Plasticity Index	8			
TEST REMARKS				
<ul style="list-style-type: none"> The material used for testing was natural, whole soil. 				
This test result is IANZ accredited.				
Approved By	ABB	Date	24/11/2017	



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Geotechnics Project ID 1005153.0000.1.0
Customer Project ID 30309
Customer Project Name Ryman - Karori pre purchase

DETERMINATION OF LIQUID & PLASTIC LIMIT, PLASTICITY INDEX - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

TEST DETAILS

LOCATION	ID	BH03		
	Description	Karori		
	Data	N/A		
SAMPLE	Geotechnics ID	GEOT201711105	Date Received	9/11/2017
	Reference	BH03_2.0m	Depth	2.00m
	Description	Sandy SILT, with trace gravel; greenish grey. Moist; low plasticity; gravel, fine.		
SPECIMEN	Reference	2	Depth	N/A
	Description	N/A		

TEST RESULTS

Liquid Limit	32
Plastic Limit	17
Plasticity Index	15

TEST REMARKS

- The material used for testing was natural, whole soil.

This test result is IANZ accredited.

Approved By ABB **Date** 24/11/2017



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Geotechnics Project ID 1005153.0000.1.0
Customer Project ID 30309
Customer Project Name Ryman - Karori pre purchase

DETERMINATION OF LIQUID & PLASTIC LIMIT, PLASTICITY INDEX - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

TEST DETAILS

LOCATION	ID	BH04		
	Description	Karori		
	Data	N/A		
SAMPLE	Geotechnics ID	GEOT201711107	Date Received	9/11/2017
	Reference	BH04_1.5m	Depth	1.50m
	Description	Sandy SILT, with trace gravel; light brown. Moist; moderate plasticity; sand, fine; gravel, fine.		
SPECIMEN	Reference	2	Depth	N/A
	Description	N/A		

TEST RESULTS

Liquid Limit	36
Plastic Limit	24
Plasticity Index	12

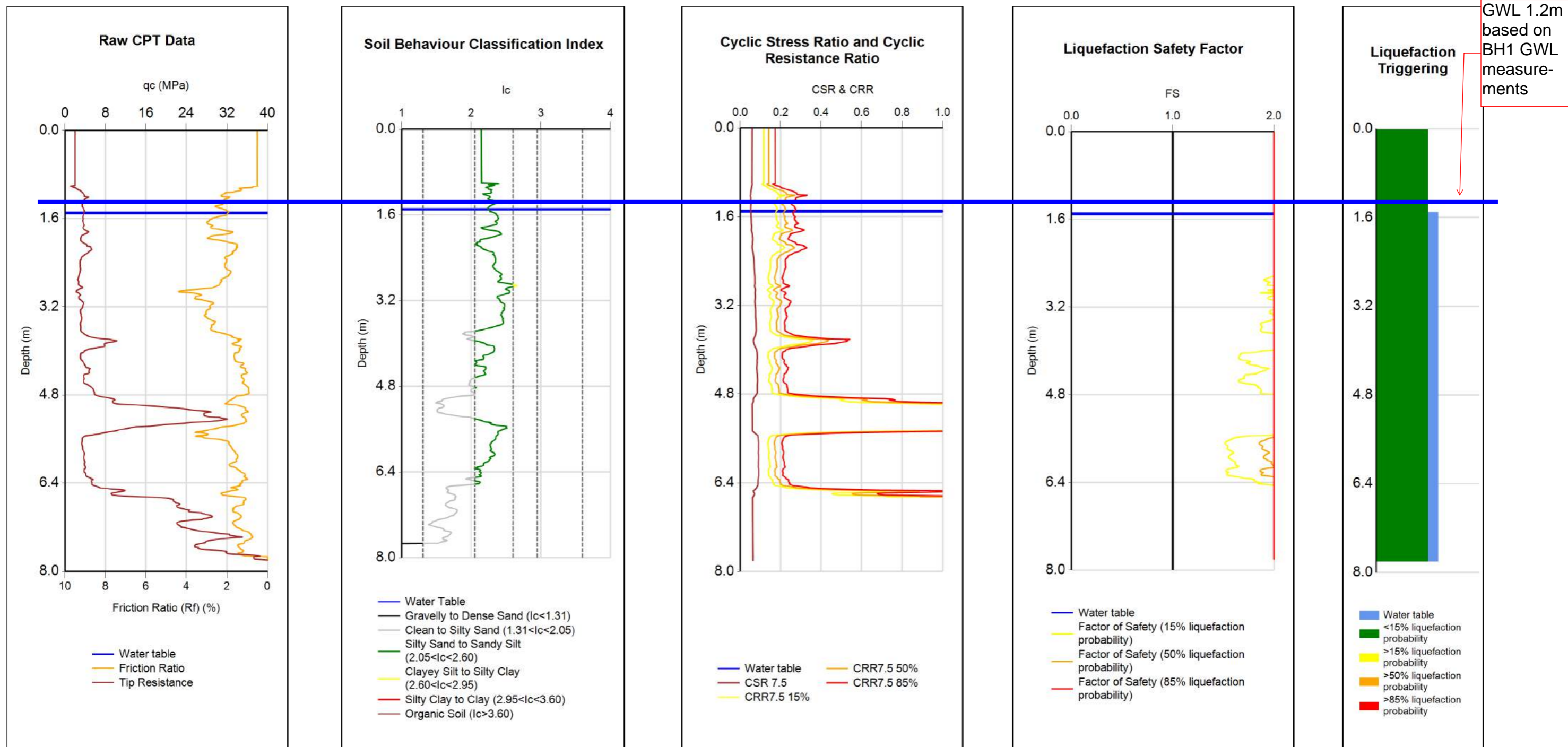
TEST REMARKS

- The material used for testing was natural, whole soil.

This test result is IANZ accredited.

Approved By ABB **Date** 24/11/2017

Appendix F: Liquefaction analysis



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT02	103680	12/10/2017	User Specified	6.2	0.11	1.5	BI-2014	ZRB-2002	1	2	0.01	18
OUTPUT	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
	15%	2	0	0	0	7.8	0						
	50%	0	0	0	0	7.8	0						
	85%	0	0	0	0	7.8	0						

Top 1.5m of this CPT was vacuum excavated and backfilled with sand. Therefore, groundwater is set to 1.5m below ground level (BGL) in order to capture the more realistic liquefaction risk. It is note that the actual measured ground water at 0.1m BGL. Therefore, the liquefaction risk of the top 1.5m layer is unknown.

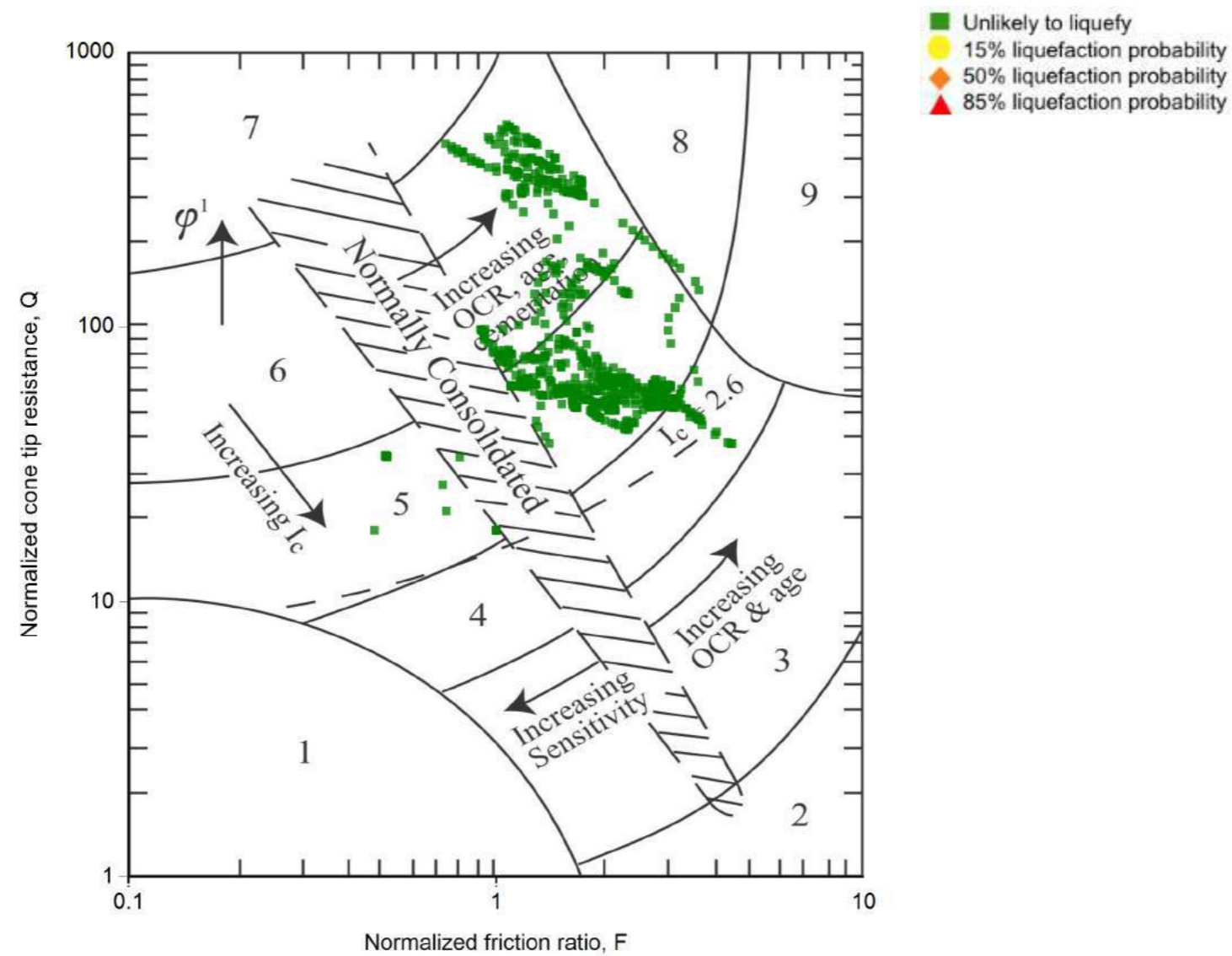


Tonkin + Taylor
Exceptional thinking together
V1.3

CLIENT, PROJECT
Ryman Healthcare Limited
Karori Prepurchase Geotechnical Assessment
TITLE
SLS CPT2, 3, 4 and 5

LOCATION
Victoria University
Karori Campus
JOB NUMBER
30309


DATE 27/10/2017
ANALYSED tzh
CHECKED
PAGE 1 of 12 pages

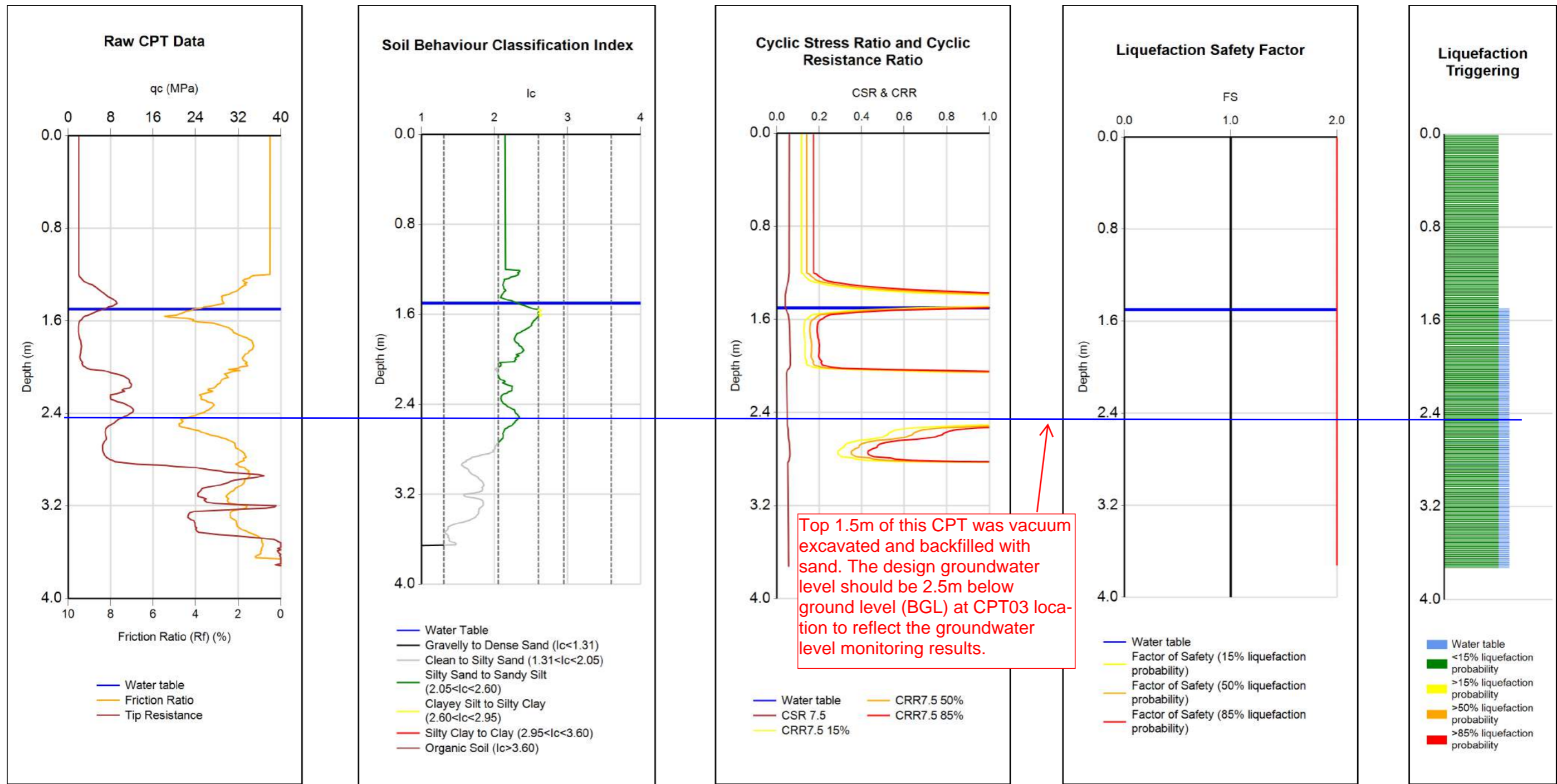


- | | |
|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
| 2. Organic soils - peats | 7. Gravelly sand to dense sand |
| 3. Clays - silty clay to clay | 8. Very stiff sand to clayey sand * |
| 4. Silt mixtures - clayey silt to silty clay | 9. Very stiff, fine grained * |
| 5. Sand mixtures - silty sand to sandy silt | |

*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)

 Tonkin + Taylor Exceptional thinking together V1.3	CLIENT, PROJECT Ryman Healthcare Limited Karori Prepurchase Geotechnical Assessment	LOCATION Victoria University Karori Campus	DATE 27/10/2017
	TITLE SLS CPT2, 3, 4 and 5	JOB NUMBER 30309	ANALYSED tzhl

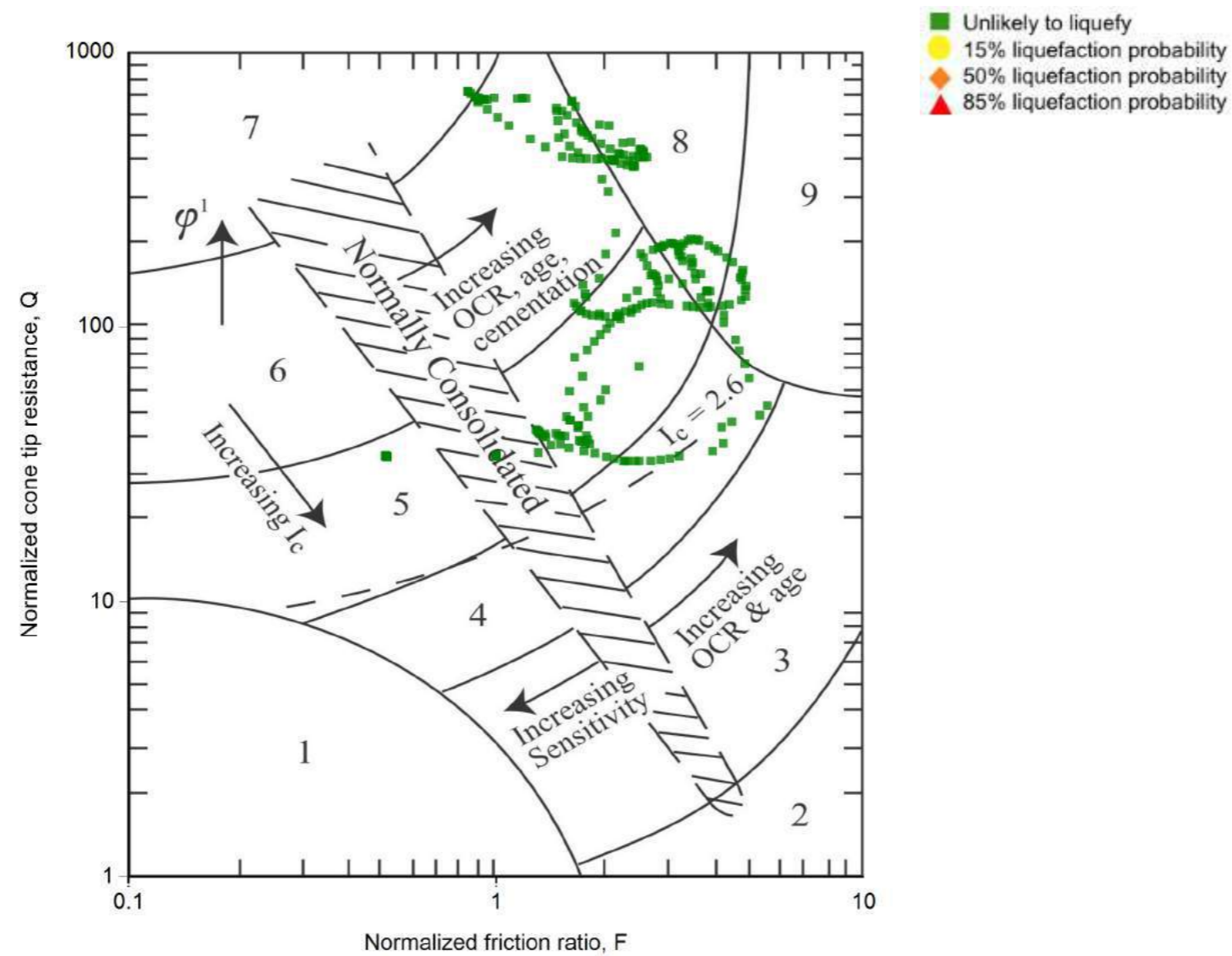


Top 1.5m of this CPT was vacuum excavated and backfilled with sand. The design groundwater level should be 2.5m below ground level (BGL) at CPT03 location to reflect the groundwater level monitoring results.

(Assumed pre-drill values)

INPUT		CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
		CPT03	103681	12/10/2017	User Specified	6.2	0.11	1.5	BI-2014	ZRB-2002	1.2	2	0.01	18
OUTPUT		PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
		15%	0	0	0	0	3.7	0						
		50%	0	0	0	0	3.7	0						
		85%	0	0	0	0	3.7	0						


Top 1.5m of this CPT was vacuum excavated and backfilled with sand. Therefore, groundwater is set to 1.5m below ground level (BGL) in order to capture the more realistic liquefaction risk. It is note that the actual measured ground water at 0.5m BGL. Therefore, the liquefaction risk of the top 1.5m layer is unknown.

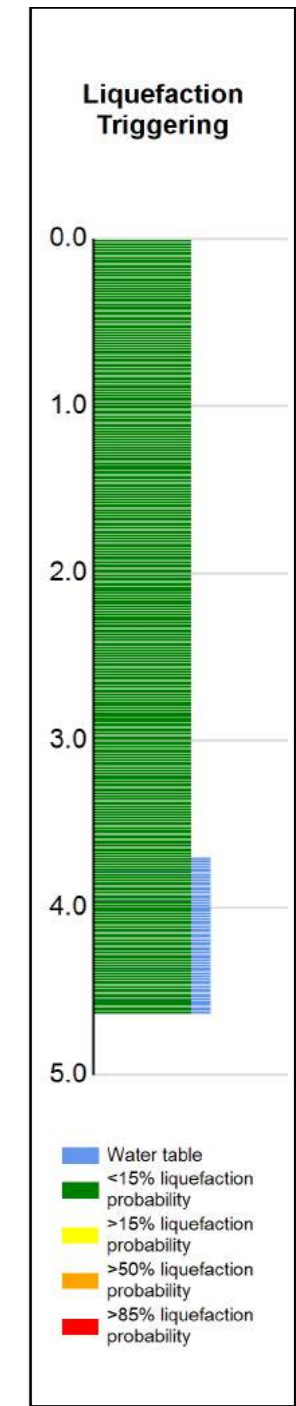
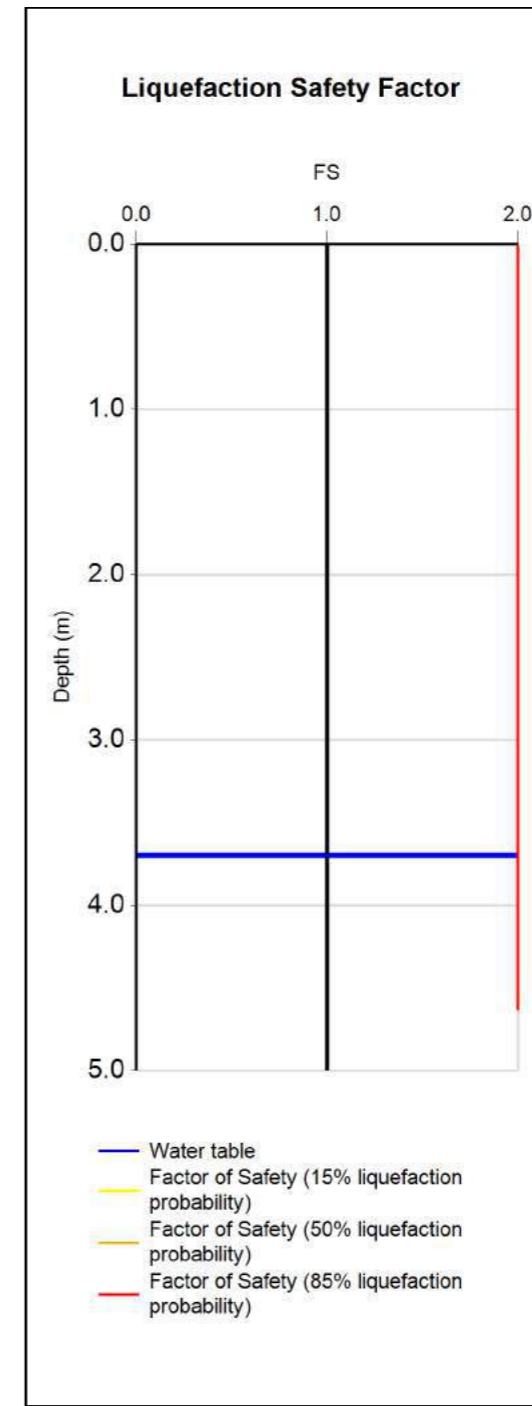
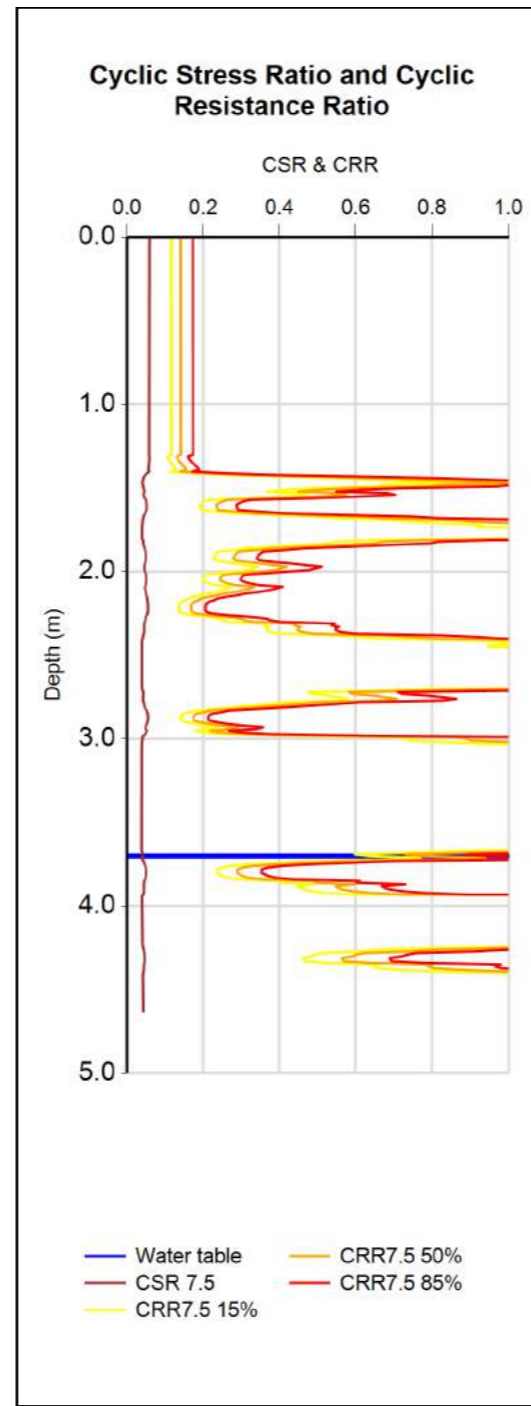
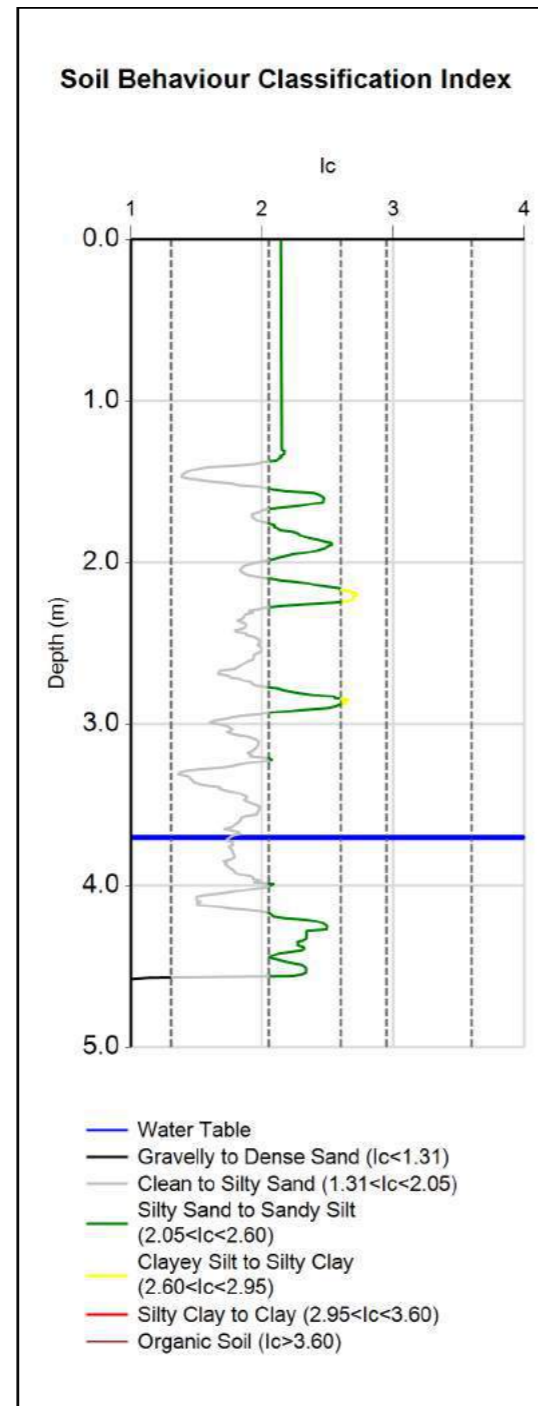
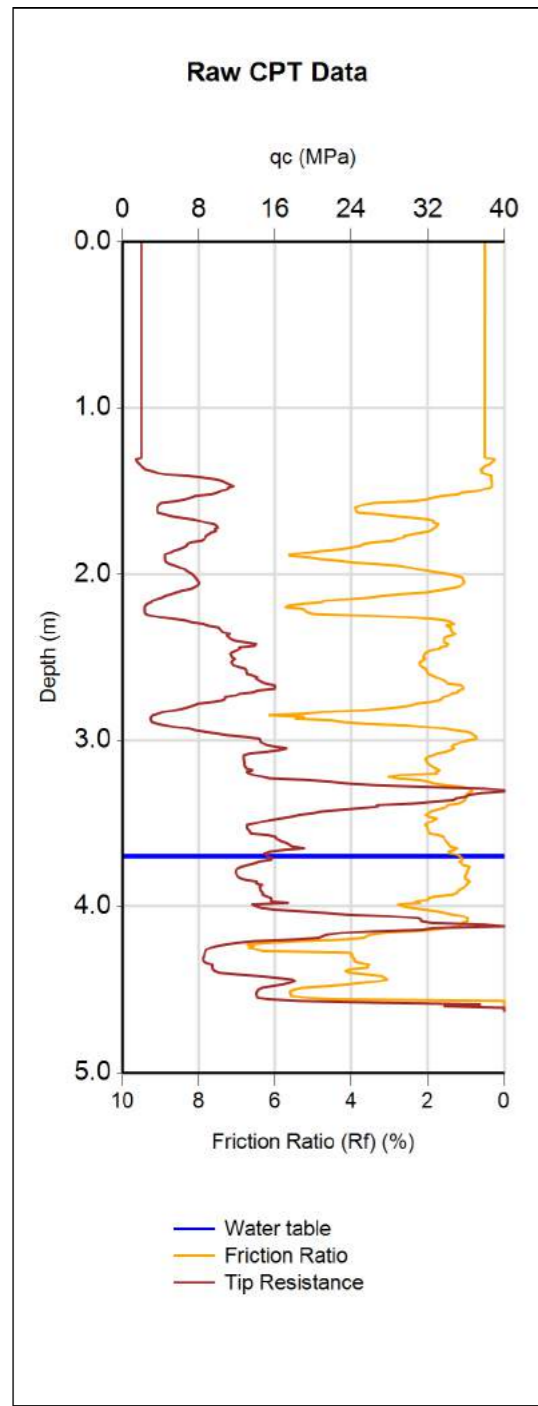


- | | |
|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
| 2. Organic soils - peats | 7. Gravelly sand to dense sand |
| 3. Clays - silty clay to clay | 8. Very stiff sand to clayey sand * |
| 4. Silt mixtures - clayey silt to silty clay | 9. Very stiff, fine grained * |
| 5. Sand mixtures - silty sand to sandy silt | |

*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)

 Tonkin + Taylor Exceptional thinking together V1.3	CLIENT, PROJECT Ryman Healthcare Limited Karori Prepurchase Geotechnical Assessment	LOCATION Victoria University Karori Campus	DATE 27/10/2017
	TITLE SLS CPT2, 3, 4 and 5	JOB NUMBER 30309	ANALYSED tzhl



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT04	103682	11/10/2017	User Specified	6.2	0.11	3.7	BI-2014	ZRB-2002	1.3	2	0.01	18
OUTPUT	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
	15%	0	0	0	0	4.6	0						
	50%	0	0	0	0	4.6	0						
	85%	0	0	0	0	4.6	0						



Tonkin + Taylor
Exceptional thinking together
V1.3

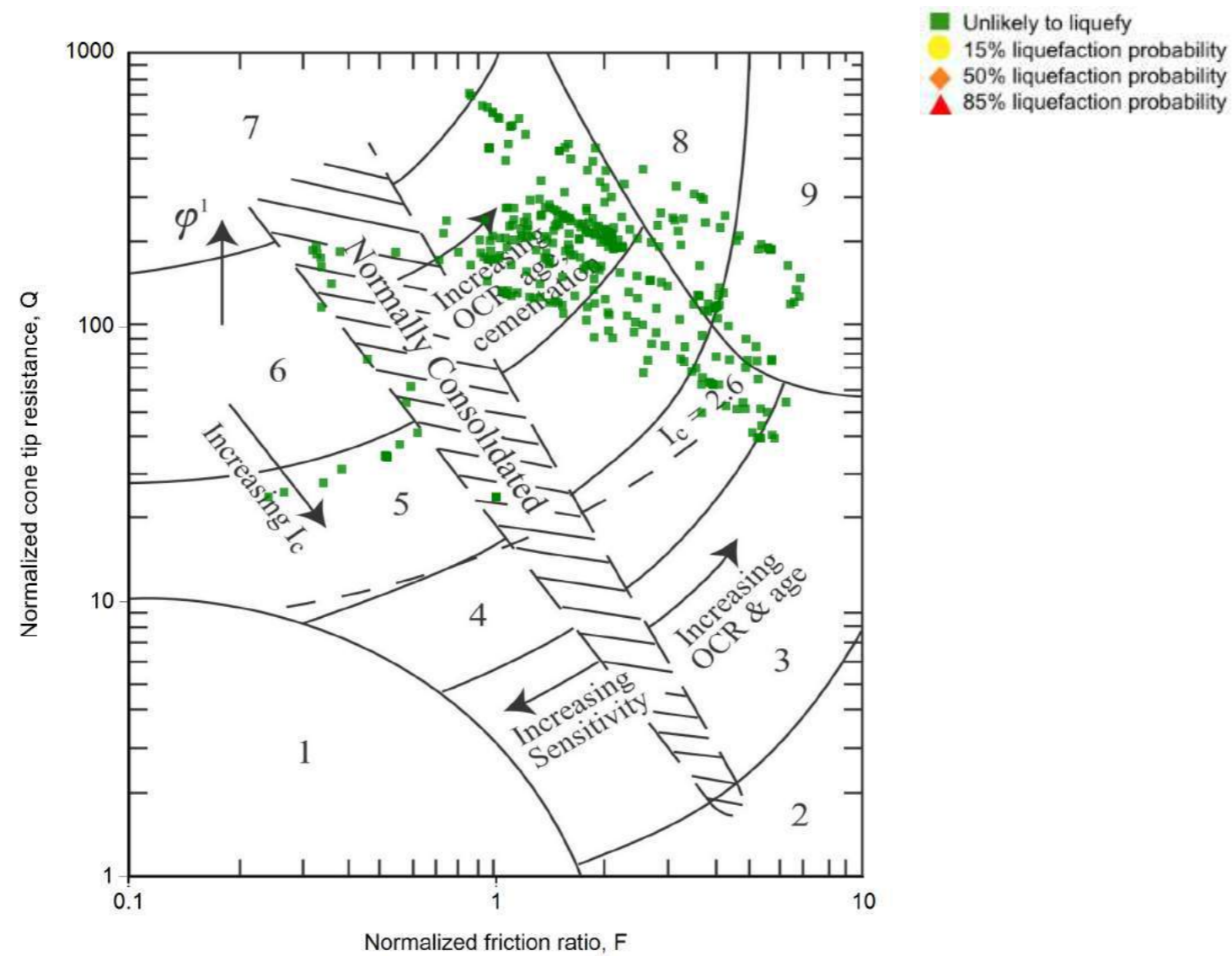
CLIENT, PROJECT
Ryman Healthcare Limited
Karori Prepurchase Geotechnical Assessment

TITLE
SLS CPT2, 3, 4 and 5

LOCATION
Victoria University
Karori Campus

JOB NUMBER
30309


DATE 27/10/2017
ANALYSED tzh
CHECKED
PAGE 5 of 12 pages

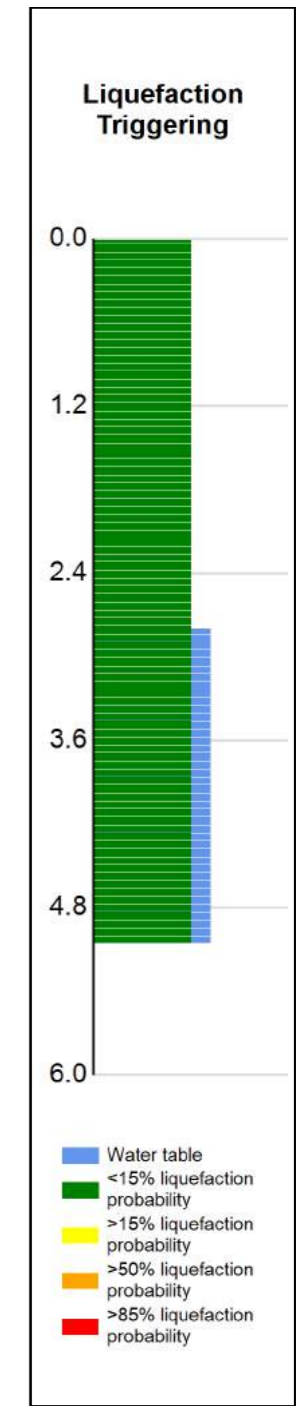
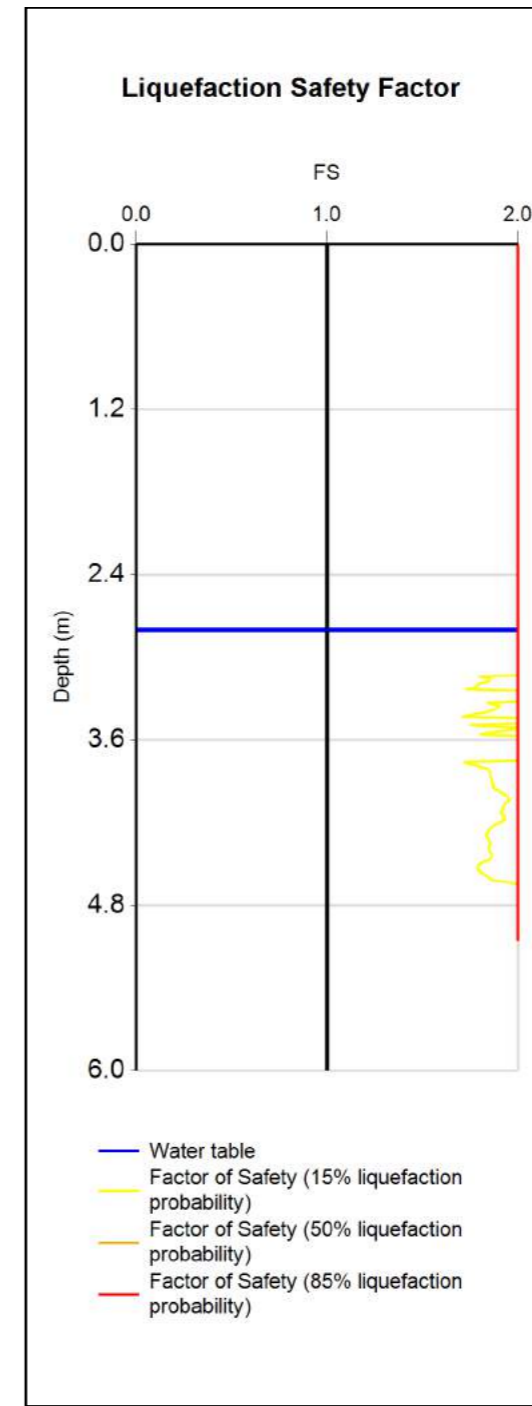
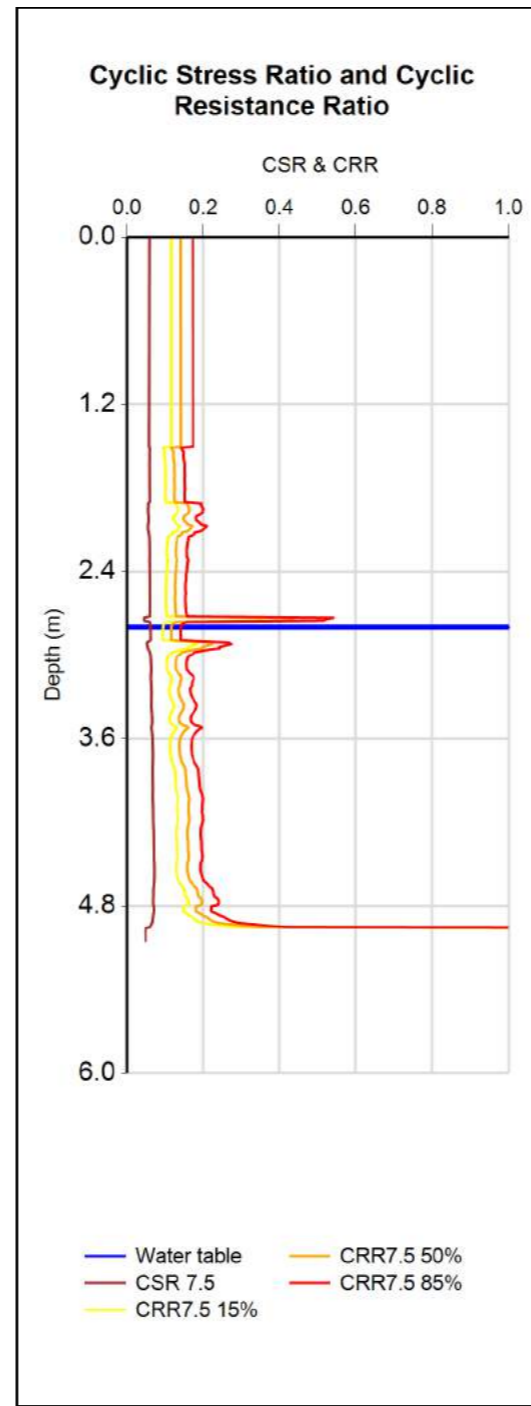
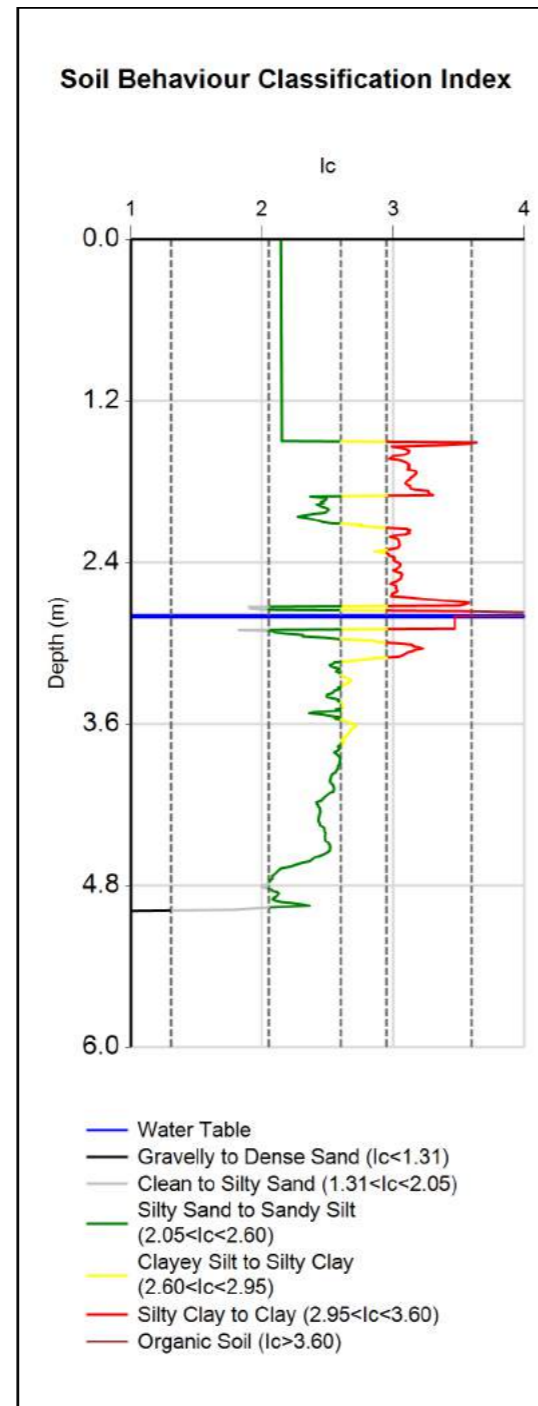
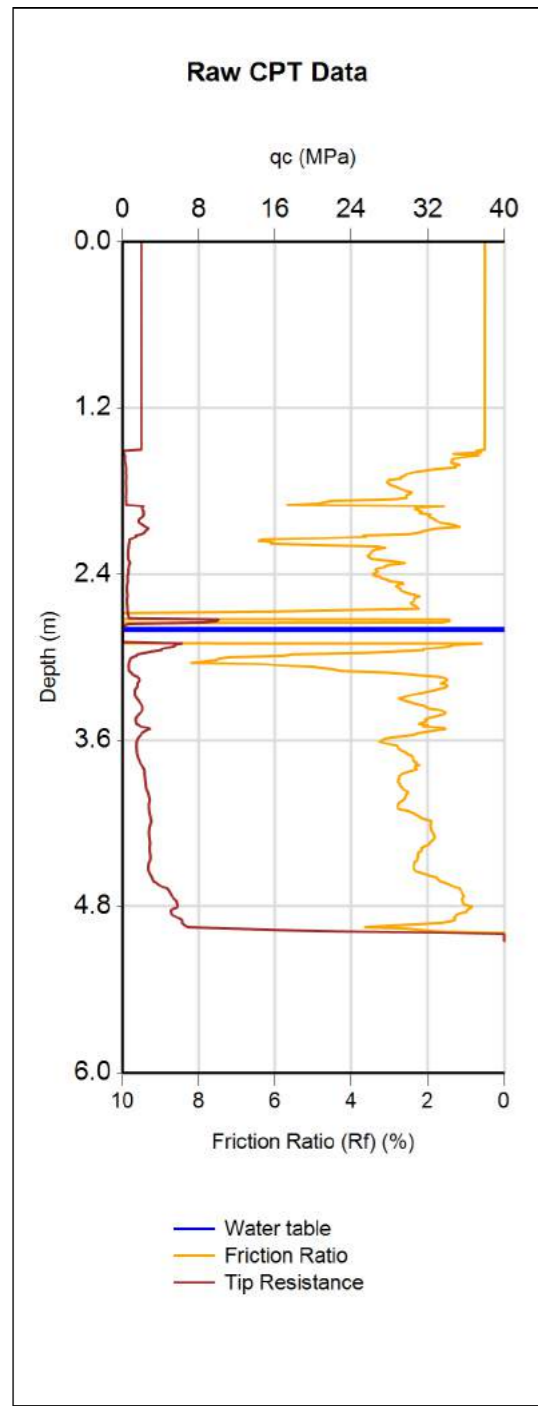


- | | |
|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
| 2. Organic soils - peats | 7. Gravelly sand to dense sand |
| 3. Clays - silty clay to clay | 8. Very stiff sand to clayey sand * |
| 4. Silt mixtures - clayey silt to silty clay | 9. Very stiff, fine grained * |
| 5. Sand mixtures - silty sand to sandy silt | |

*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)

 Tonkin + Taylor Exceptional thinking together V1.3	CLIENT, PROJECT Ryman Healthcare Limited Karori Prepurchase Geotechnical Assessment	LOCATION Victoria University Karori Campus	DATE 27/10/2017
	TITLE SLS CPT2, 3, 4 and 5	JOB NUMBER 30309	ANALYSED tzhl



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT05	103683	12/10/2017	User Specified	6.2	0.11	2.8	BI-2014	ZRB-2002	1.5	2	0.01	18
	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
OUTPUT	15%	1	0	0	0	5	0						
	50%	0	0	0	0	5	0						
	85%	0	0	0	0	5	0						



Tonkin + Taylor
Exceptional thinking together
V1.3

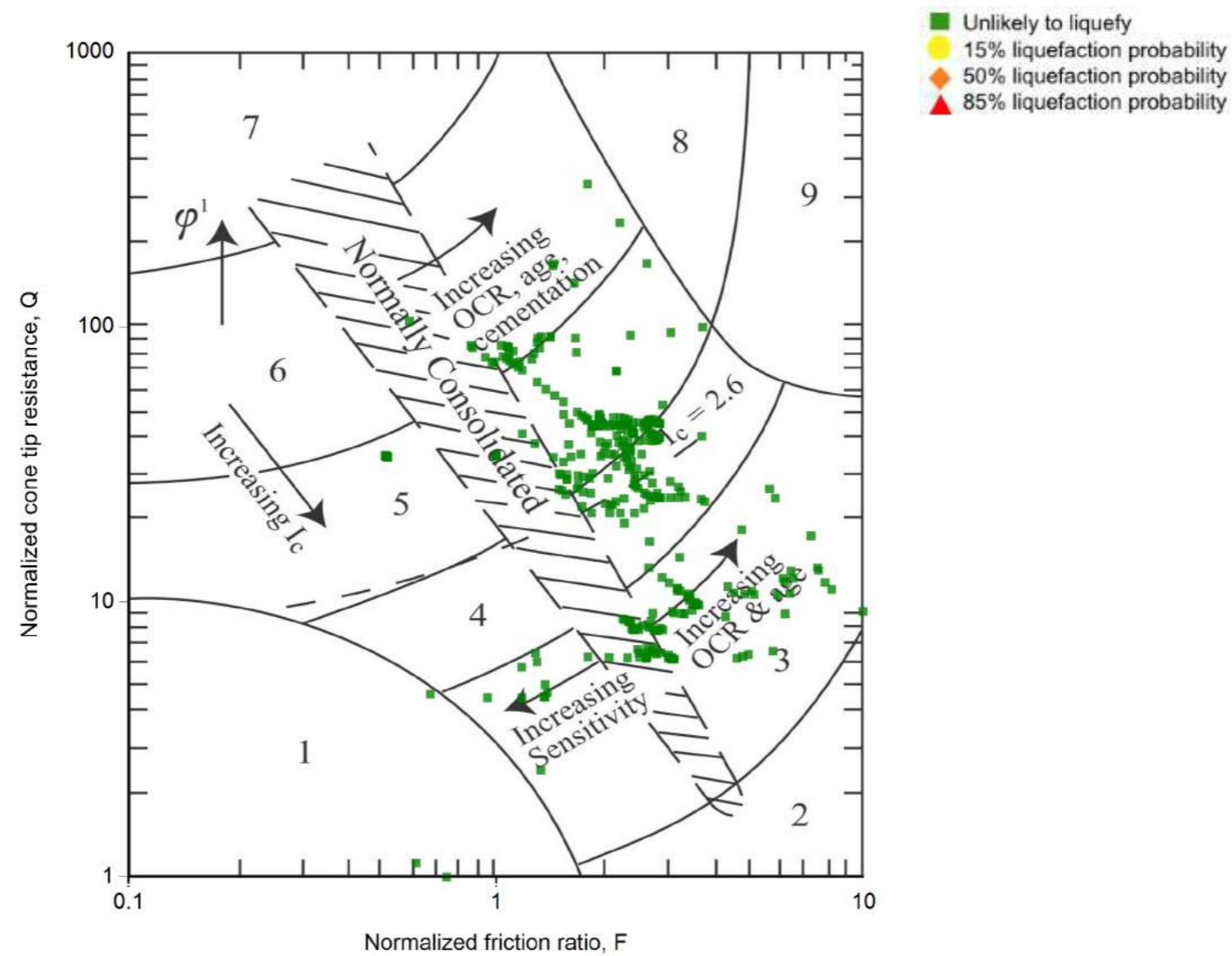
CLIENT, PROJECT
Ryman Healthcare Limited
Karori Prepurchase Geotechnical Assessment

TITLE
SLS CPT2, 3, 4 and 5

LOCATION
Victoria University
Karori Campus

JOB NUMBER
30309


DATE 27/10/2017
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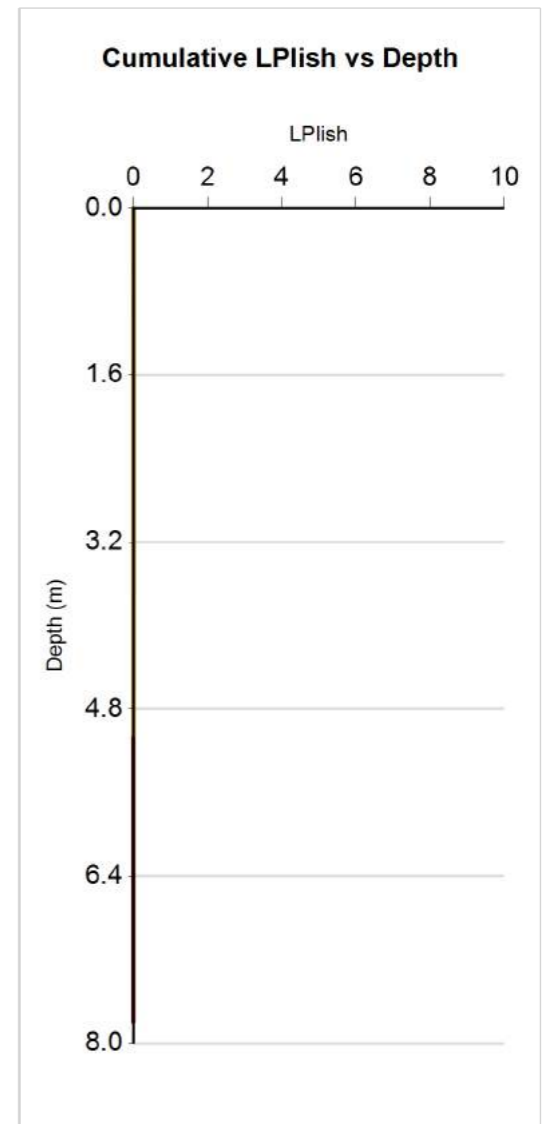
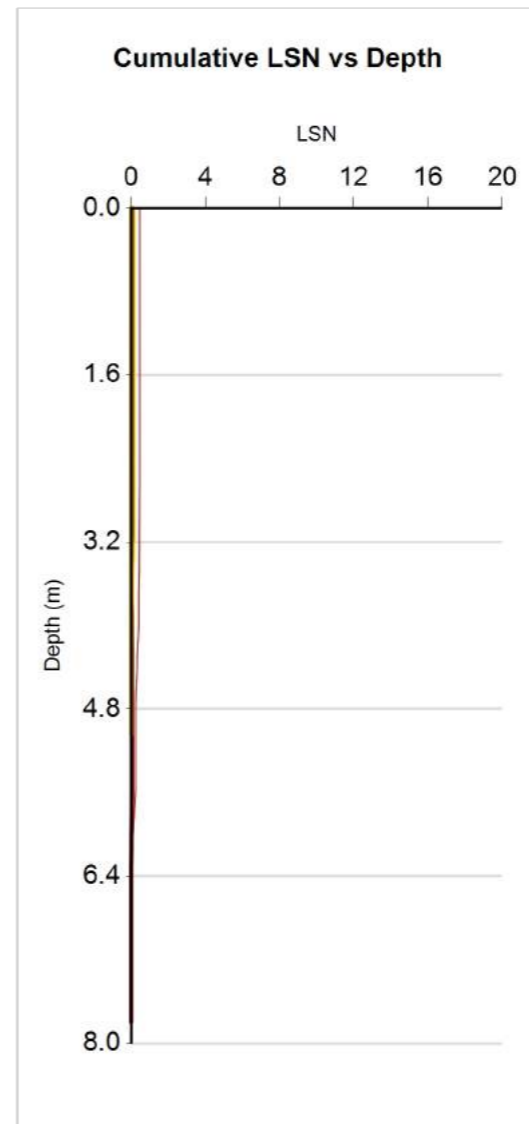
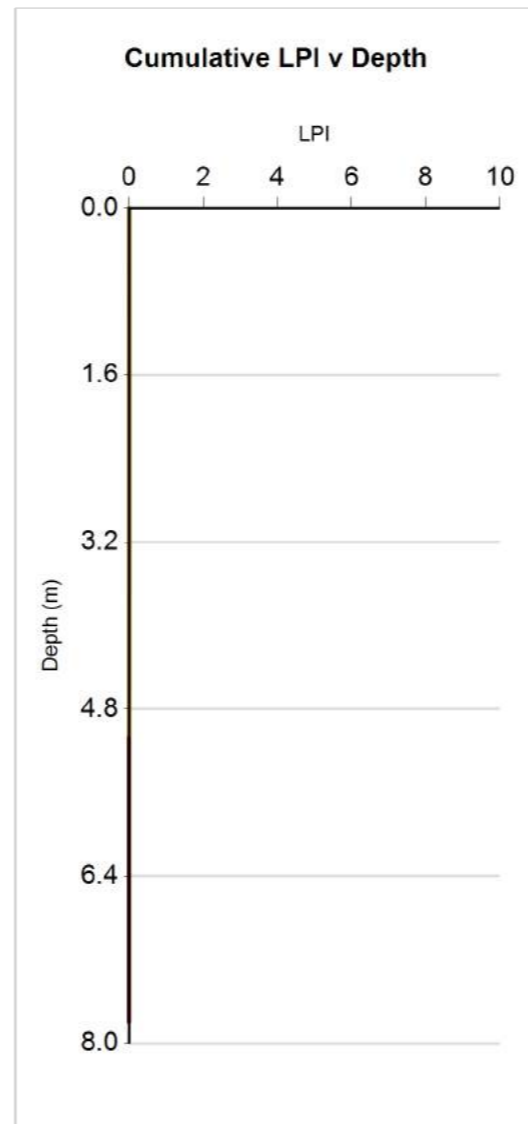
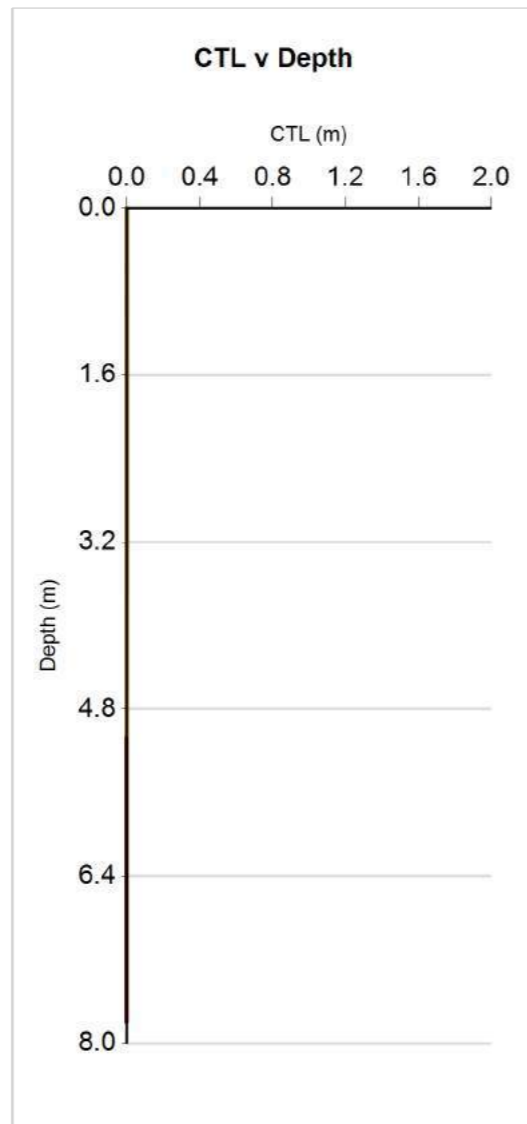
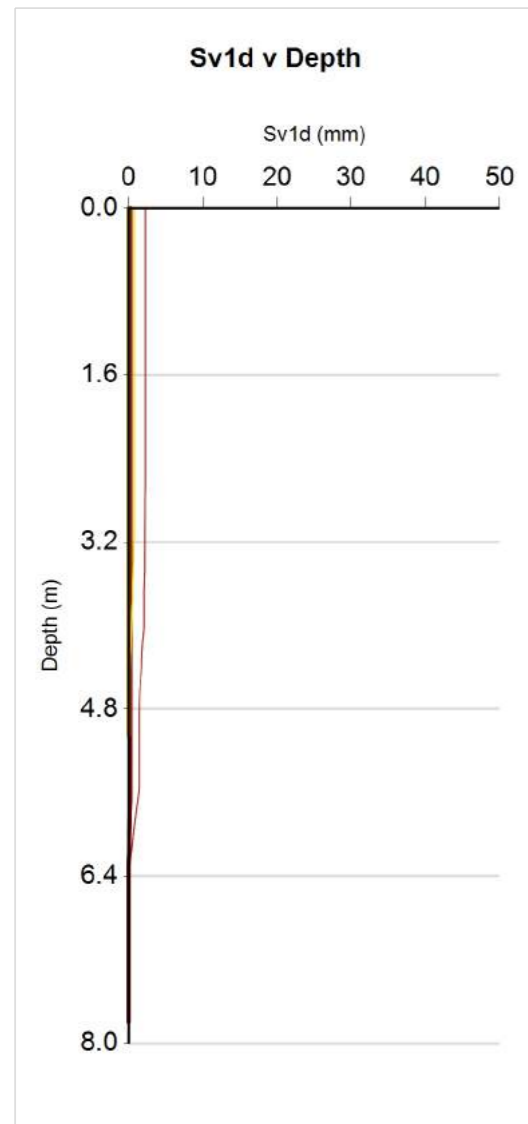


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|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
| 2. Organic soils - peats | 7. Gravelly sand to dense sand |
| 3. Clays - silty clay to clay | 8. Very stiff sand to clayey sand * |
| 4. Silt mixtures - clayey silt to silty clay | 9. Very stiff, fine grained * |
| 5. Sand mixtures - silty sand to sandy silt | |

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CPT-based soil behavior type classification chart by Robertson (1990)

 Tonkin+Taylor Exceptional thinking together V1.3	CLIENT, PROJECT Ryman Healthcare Limited Karori Prepurchase Geotechnical Assessment	LOCATION Victoria University Karori Campus	DATE 27/10/2017
	TITLE SLS CPT2, 3, 4 and 5	JOB NUMBER 30309	ANALYSED tzhl

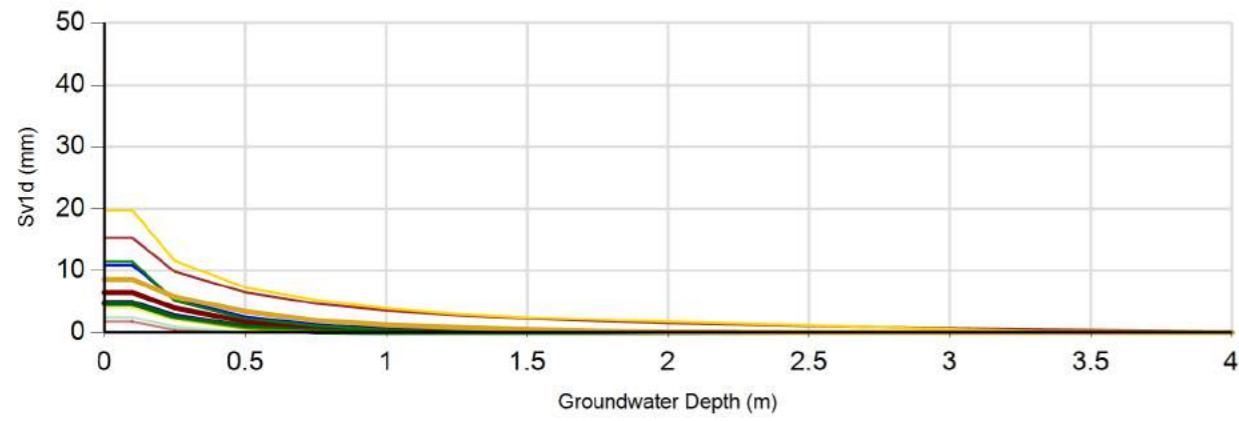


(Assumed pre-drill values)

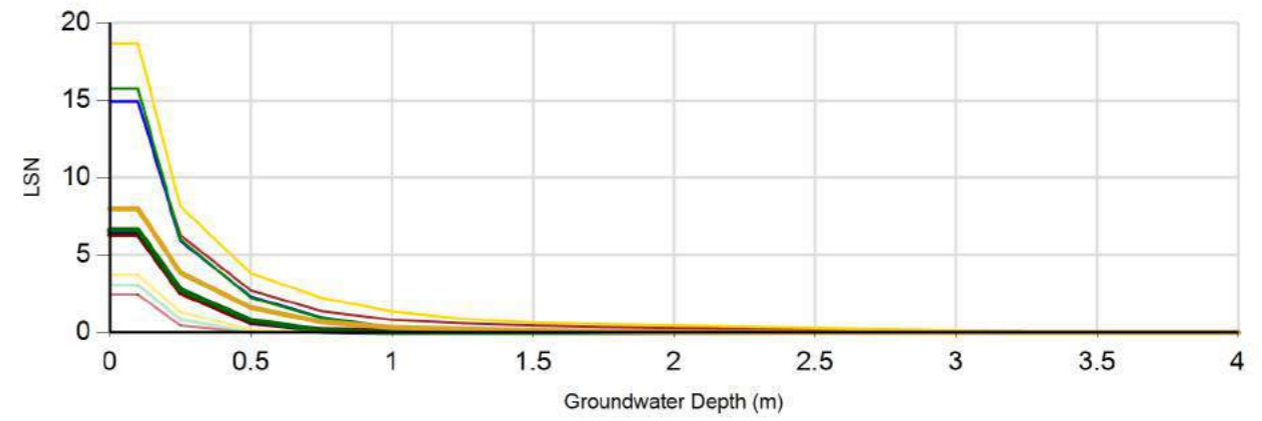
CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m³)
CPT02	103680	12/10/2017	User Specified	6.2	0.11	1.5	BI-2014	ZRB-2002	1	2	0.01	18
CPT03	103681	12/10/2017	User Specified	6.2	0.11	1.5	BI-2014	ZRB-2002	1.2	2	0.01	18
CPT04	103682	11/10/2017	User Specified	6.2	0.11	3.7	BI-2014	ZRB-2002	1.3	2	0.01	18
CPT05	103683	12/10/2017	User Specified	6.2	0.11	2.8	BI-2014	ZRB-2002	1.5	2	0.01	18

Thicker lines represent the 50% probability of exceedance case and the thinner lines to the left and right of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.

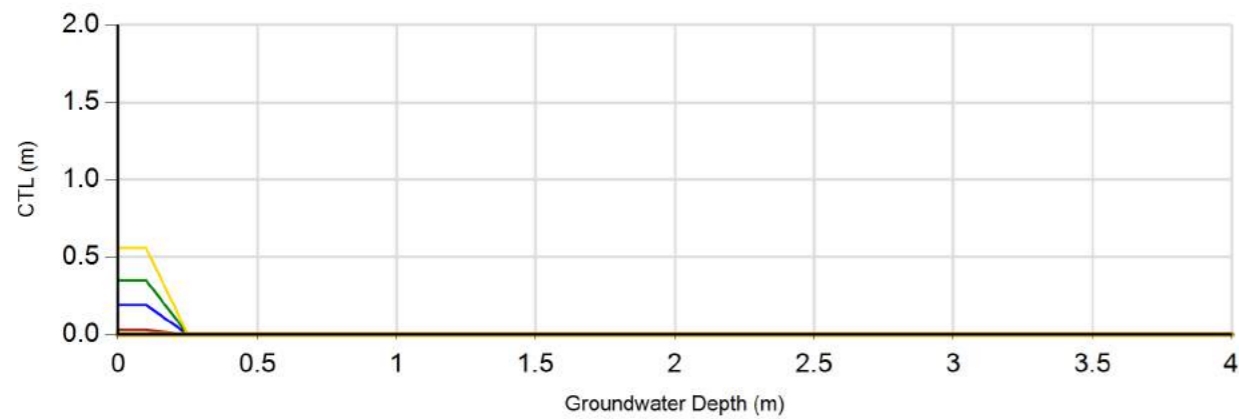
Sv1d response to GWD



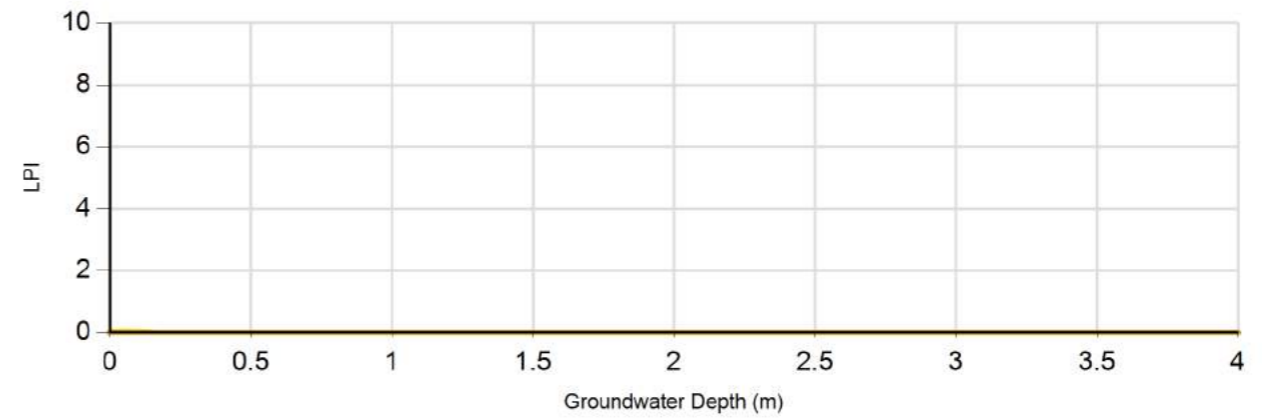
LSN response to GWD



CTL response to GWD



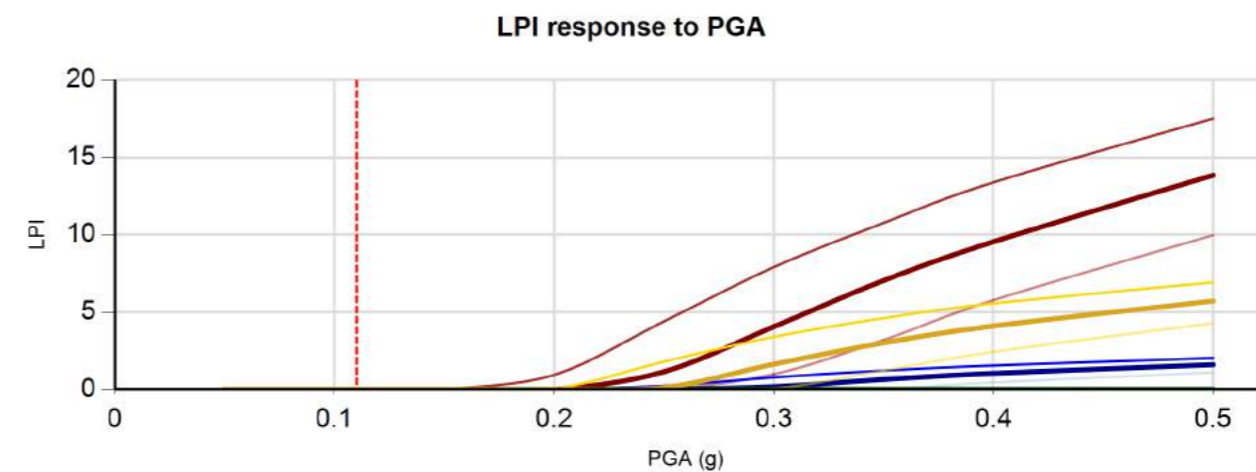
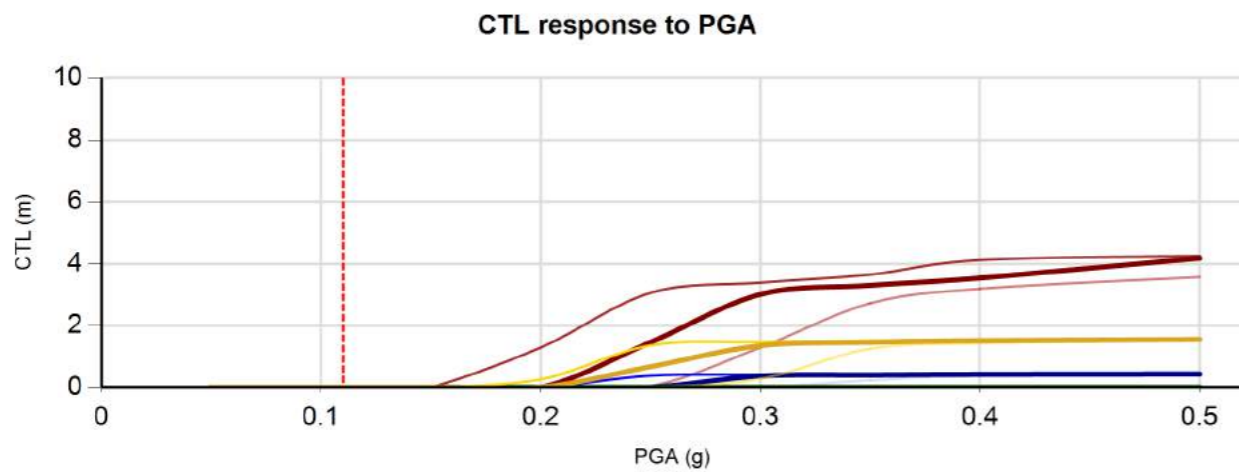
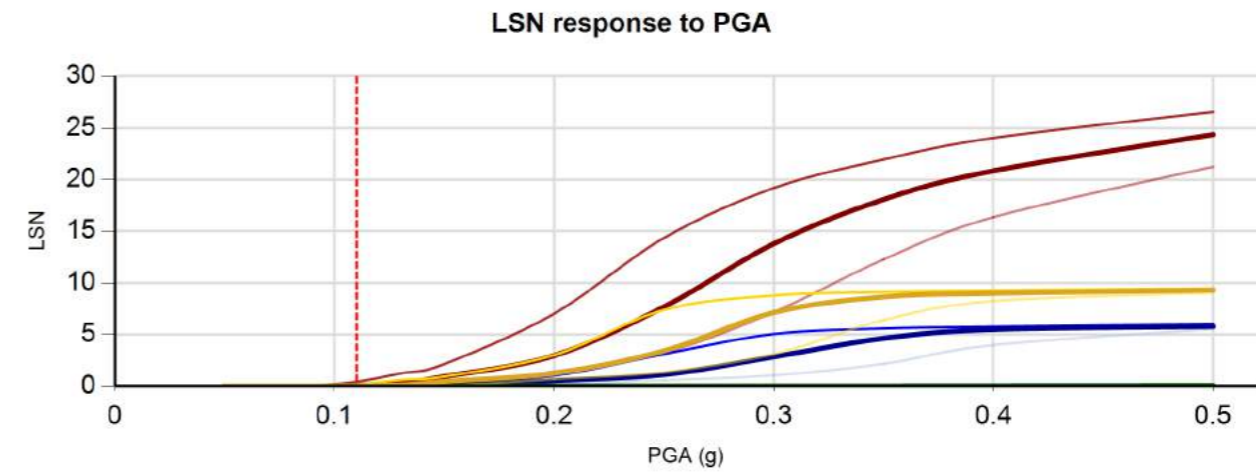
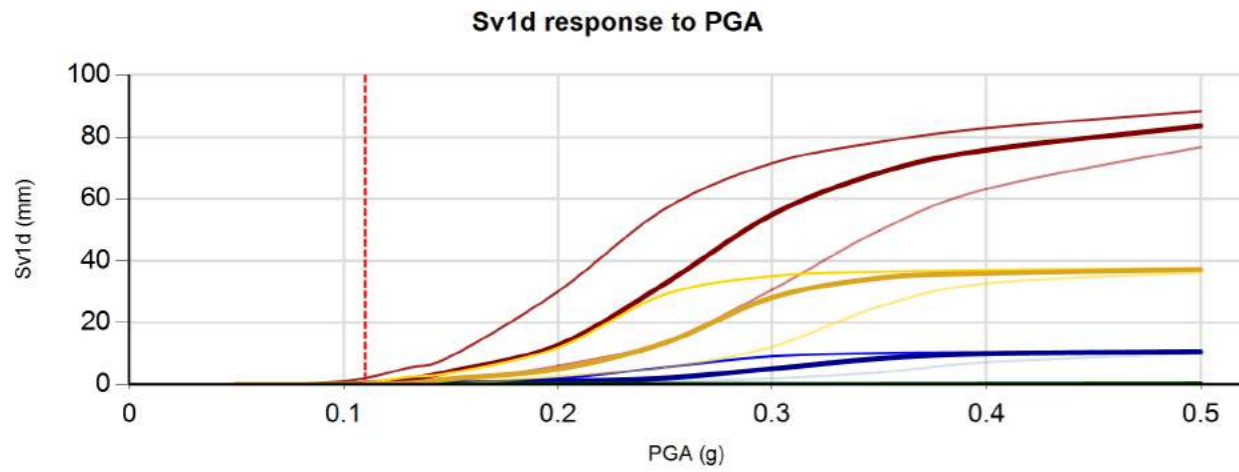
LPI response to GWD



(Assumed pre-drill values)

CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT02	103680	12/10/2017	User Specified	6.2	0.11	1.5	BI-2014	ZRB-2002	1	2	0.01	18
CPT03	103681	12/10/2017	User Specified	6.2	0.11	1.5	BI-2014	ZRB-2002	1.2	2	0.01	18
CPT04	103682	11/10/2017	User Specified	6.2	0.11	3.7	BI-2014	ZRB-2002	1.3	2	0.01	18
CPT05	103683	12/10/2017	User Specified	6.2	0.11	2.8	BI-2014	ZRB-2002	1.5	2	0.01	18

Thicker lines represent the 50% probability of exceedence case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedence cases respectively.



Vertical dotted line/s indicate user specified PGA at the CPT locations. (actual PGA)

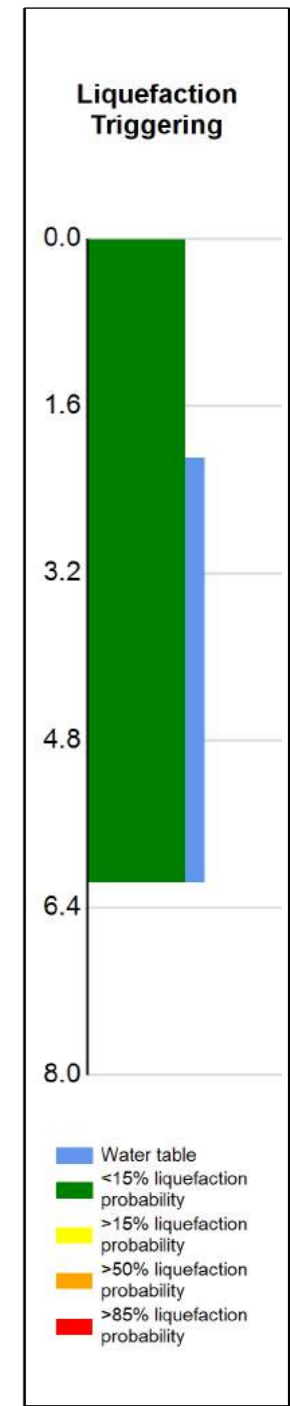
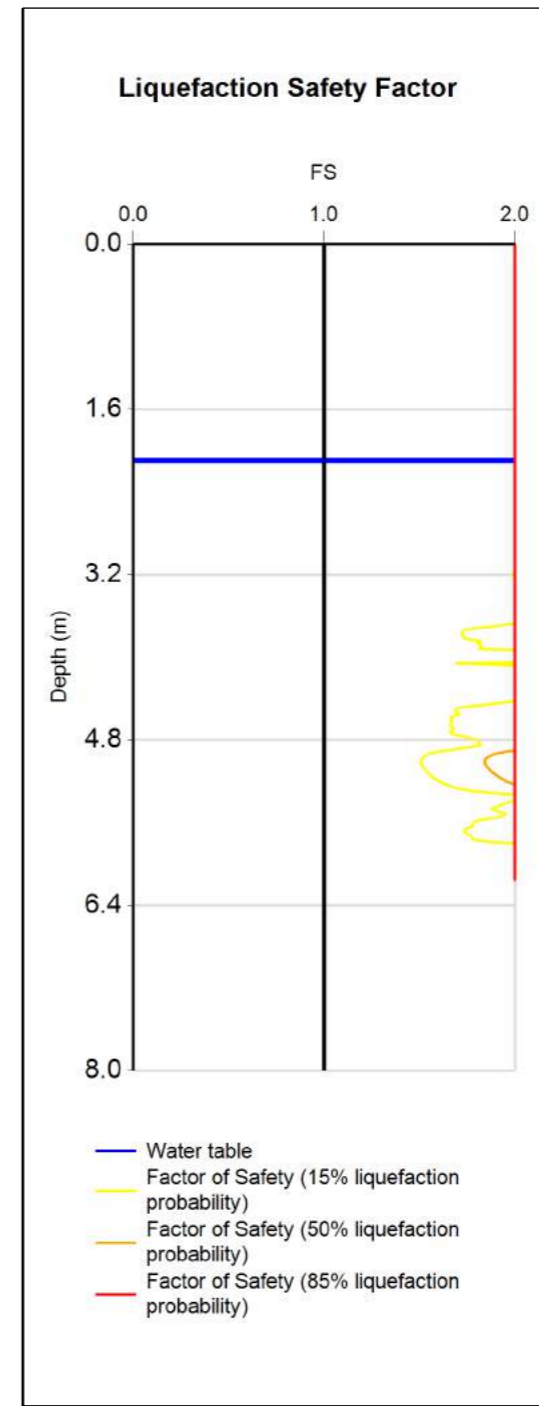
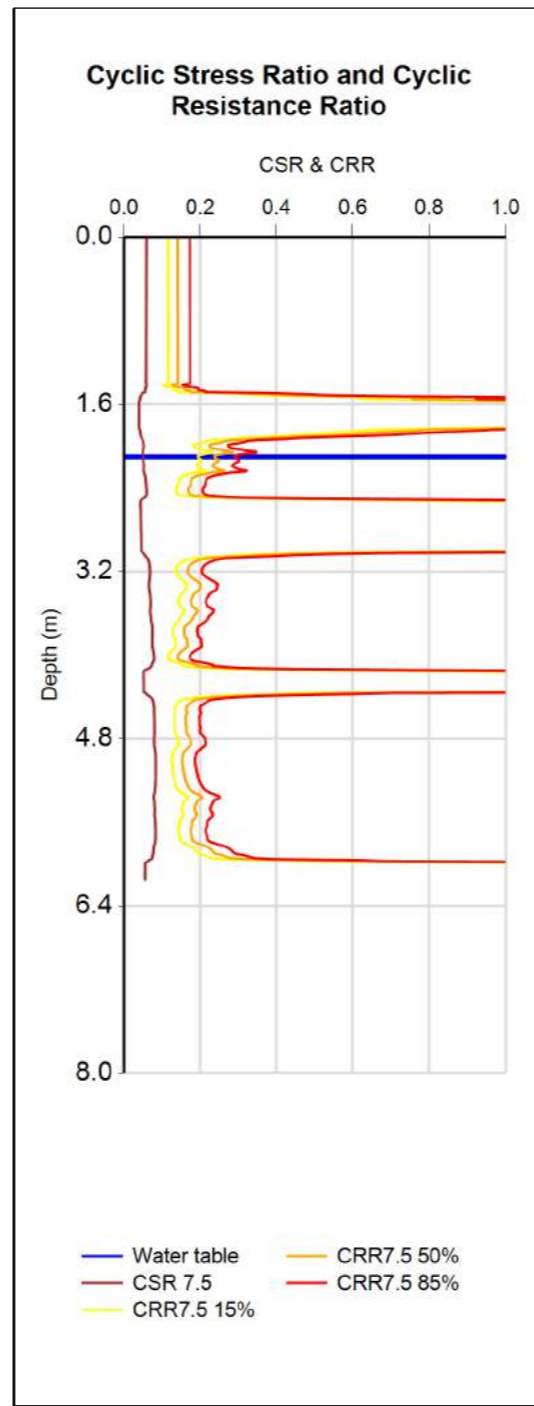
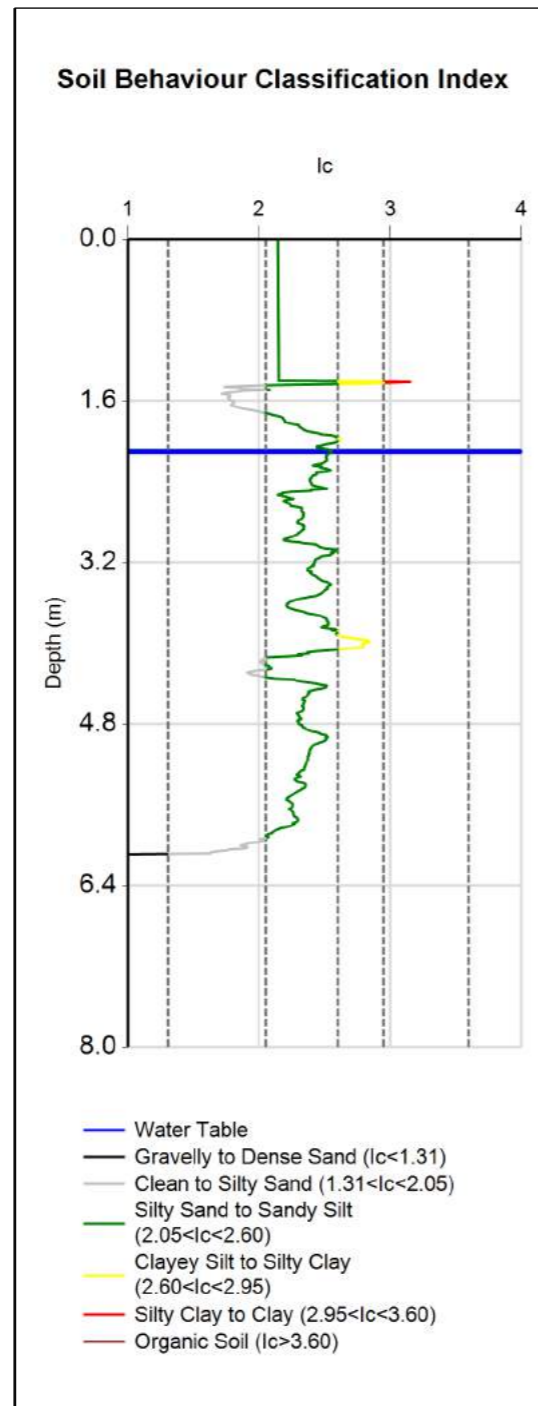
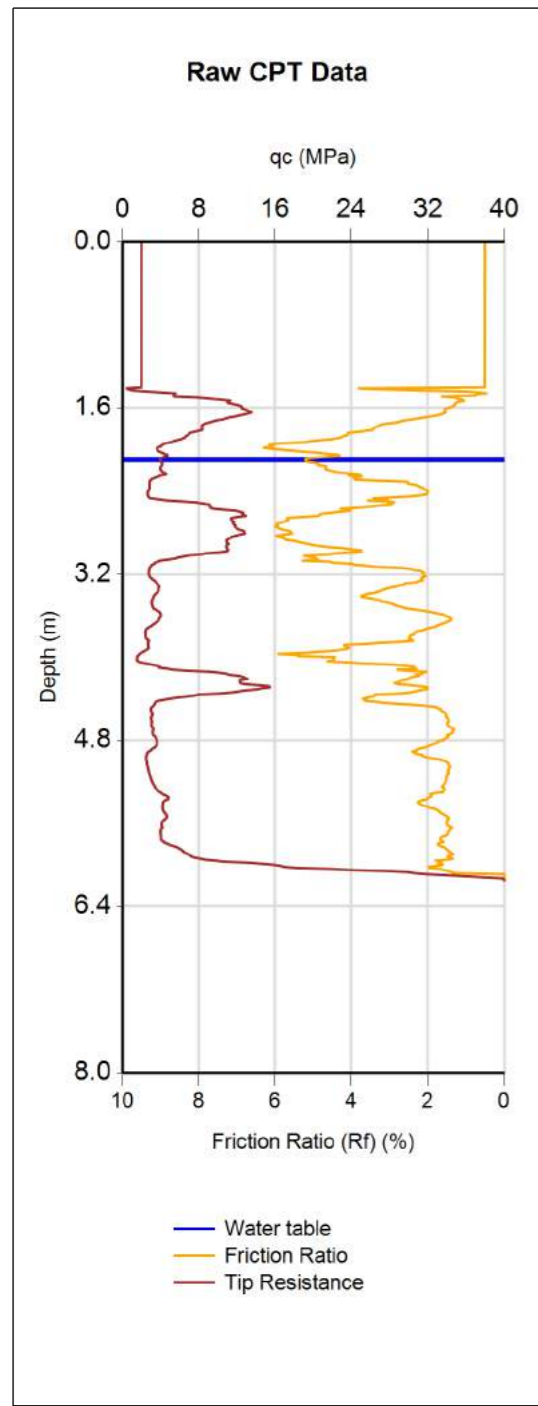
(Assumed pre-drill values)												
CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT02	103680	12/10/2017	User Specified	6.2	0.11	1.5	BI-2014	ZRB-2002	1	2	0.01	18
CPT03	103681	12/10/2017	User Specified	6.2	0.11	1.5	BI-2014	ZRB-2002	1.2	2	0.01	18
CPT04	103682	11/10/2017	User Specified	6.2	0.11	3.7	BI-2014	ZRB-2002	1.3	2	0.01	18
CPT05	103683	12/10/2017	User Specified	6.2	0.11	2.8	BI-2014	ZRB-2002	1.5	2	0.01	18

Thicker lines represent the 50% probability of exceedance case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.

The inputs listed in Table 1.1-1 below have been adopted for the liquefaction analysis.

Table 1.1-1 Summary of inputs for liquefaction analysis

TTGD ID	103680	103681	103682	103683
CPT Name	05TT12_02	05TT12_03	05TT12_04	05TT12_05
PGA	0.11g	0.11g	0.11g	0.11g
Magnitude	6.2	6.2	6.2	6.2
Depth to groundwater	1.5m	1.5m	3.7m	2.8m
Predrill depth	1m	1.2m	1.3m	1.5m
Assumed predrill tip resistance and skin friction	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa
Trigger method	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)
Settlement method	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)
CFC	0	0	0	0
Total depth of CPT	7.8m	3.72m	4.63m	5.05m
Maximum depth of analysis	7.8m	3.72m	4.63m	5.05m
RL	n/a	n/a	n/a	n/a



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT06a	103684	12/10/2017	User Specified	6.2	0.11	2.1	BI-2014	ZRB-2002	1.4	2	0.01	18
	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
OUTPUT	15%	2	0	0	0	6.2	0						
	50%	0	0	0	0	6.2	0						
	85%	0	0	0	0	6.2	0						



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V1.3

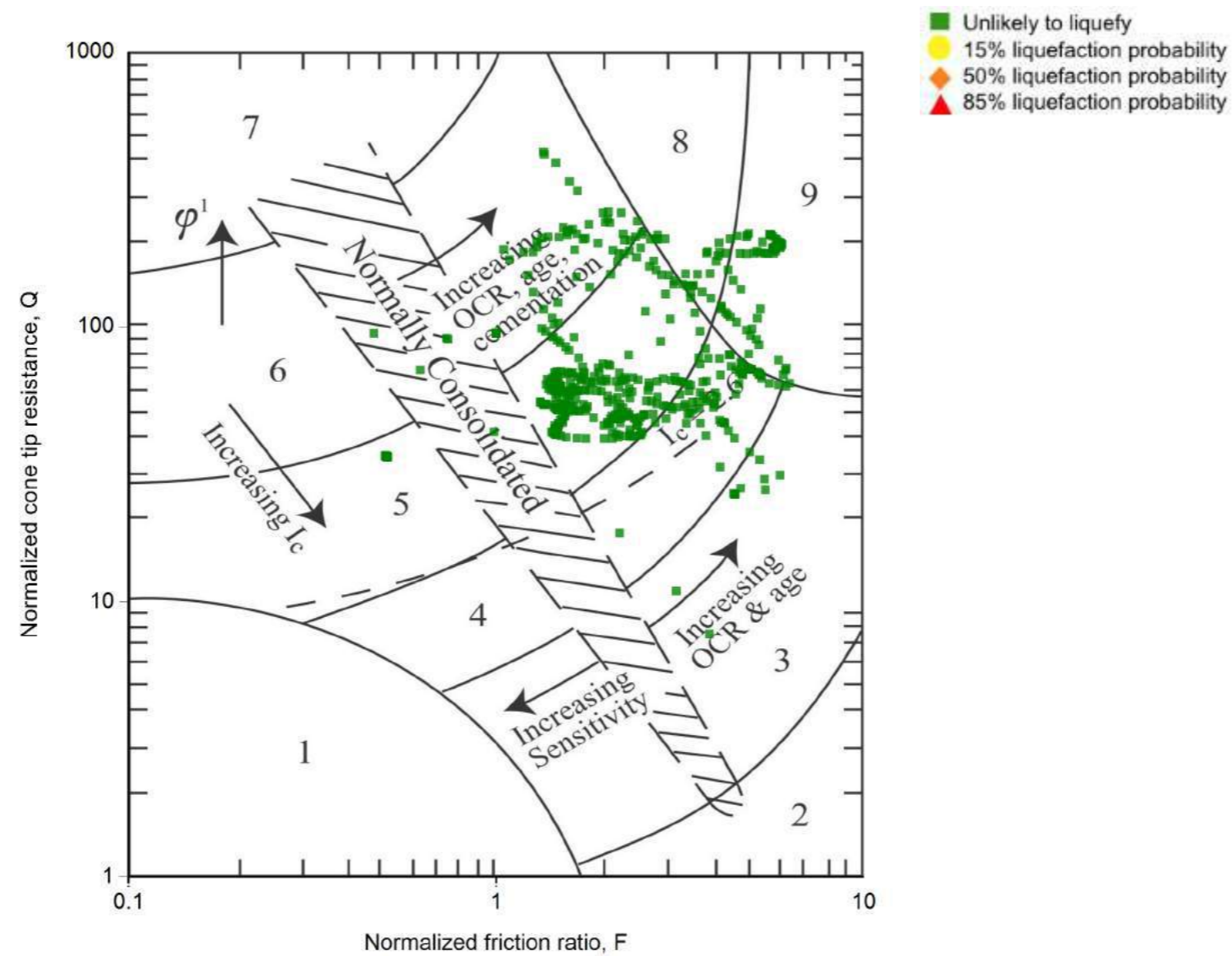
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Karori Prepurchase Geotechnical Assessment

TITLE
SLS CPT6a, 7, 8a and 9

LOCATION
Victoria University
Karori Campus

JOB NUMBER
30309

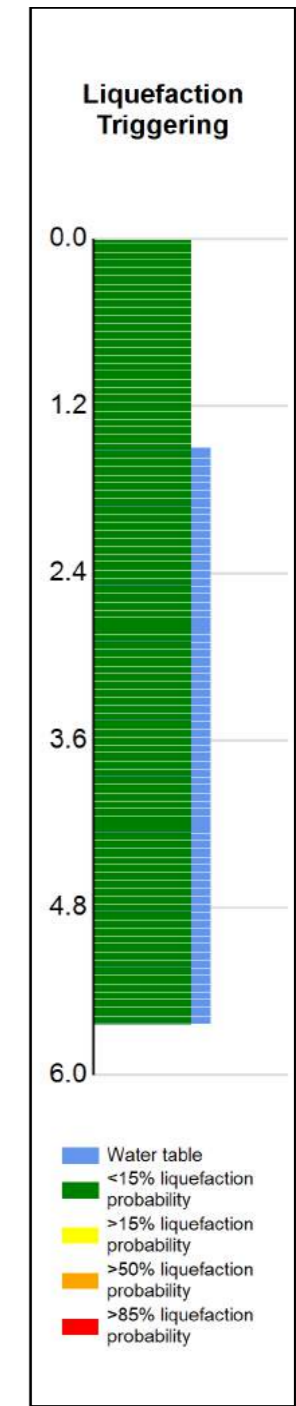
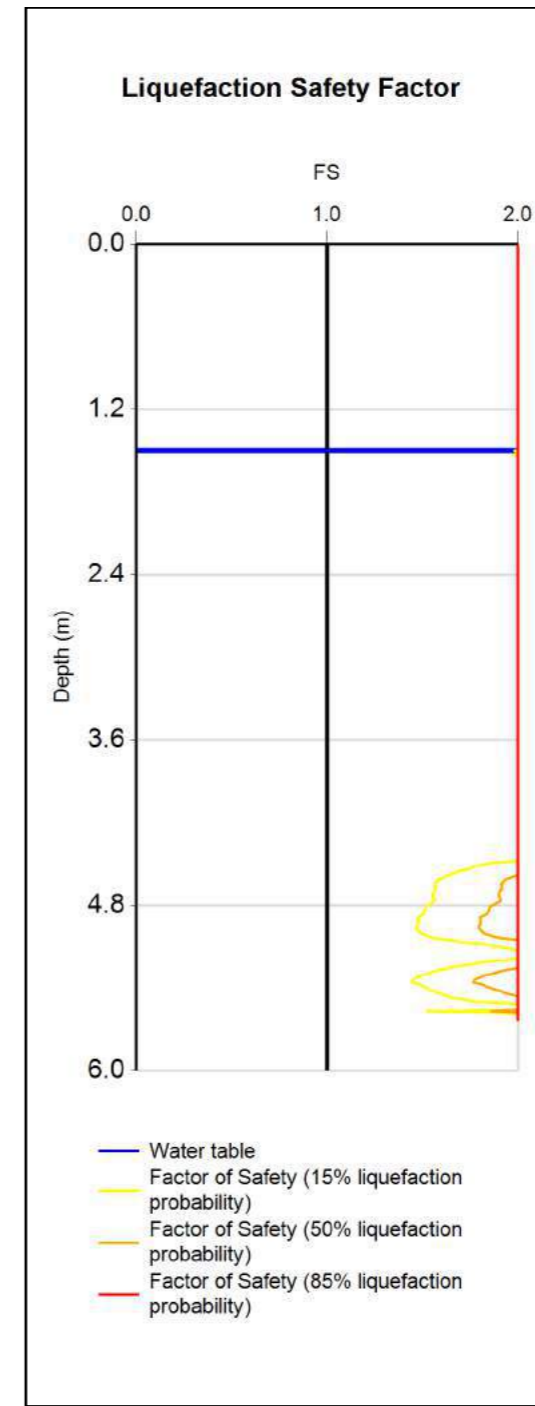
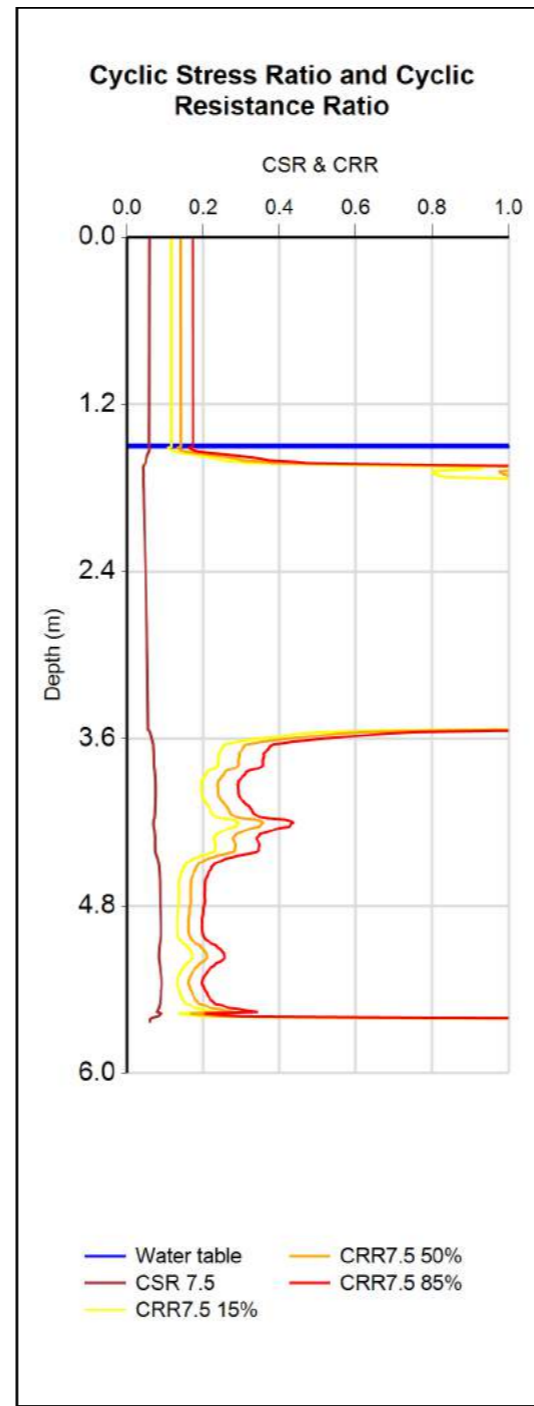
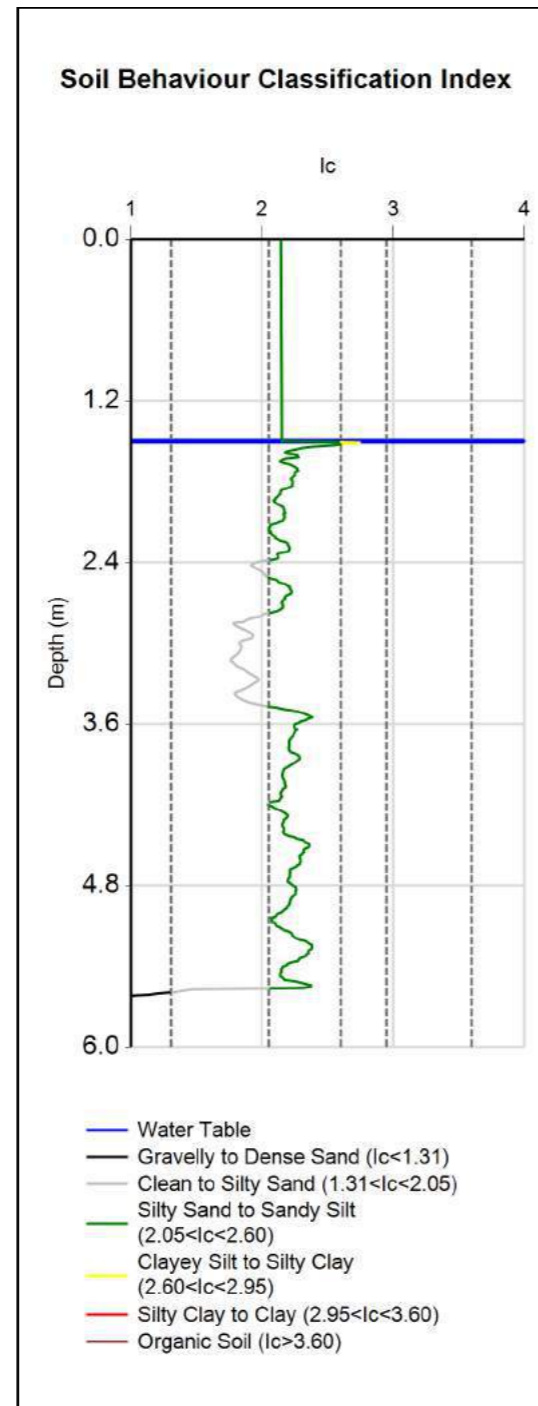
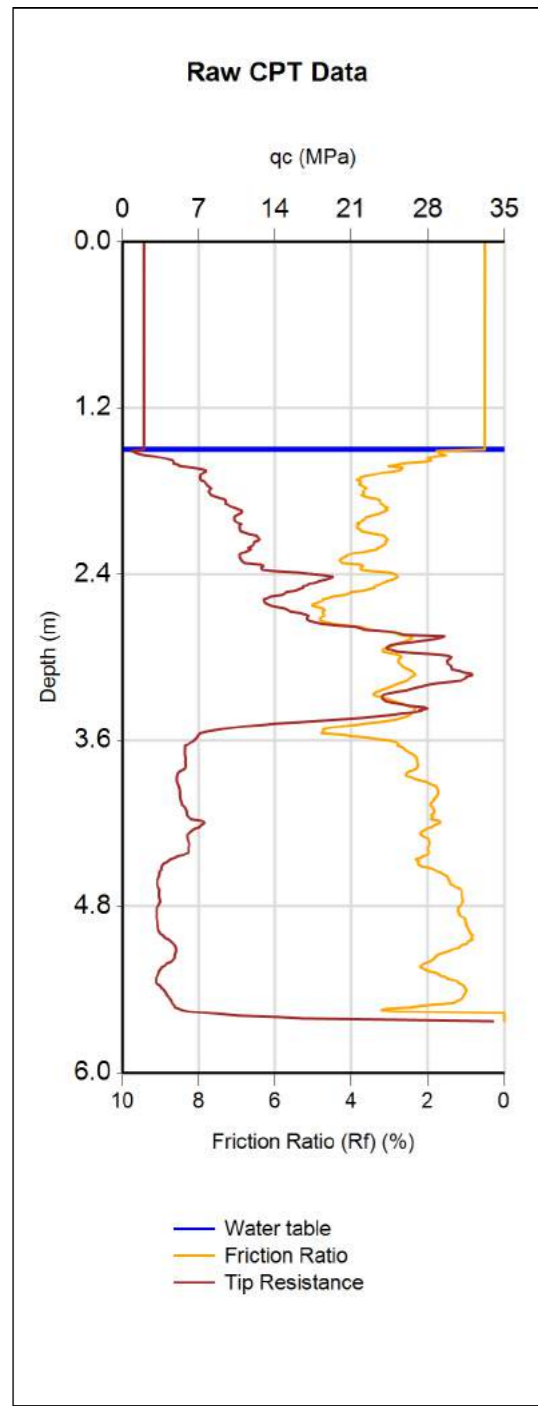
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|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
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CPT-based soil behavior type classification chart by Robertson (1990)



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT07	103685	12/10/2017	User Specified	6.2	0.11	1.5	BI-2014	ZRB-2002	1.5	2	0.01	18
	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
OUTPUT	15%	2	0	0	0	5.6	0						
	50%	0	0	0	0	5.6	0						
	85%	0	0	0	0	5.6	0						



Tonkin + Taylor
Exceptional thinking together
V1.3

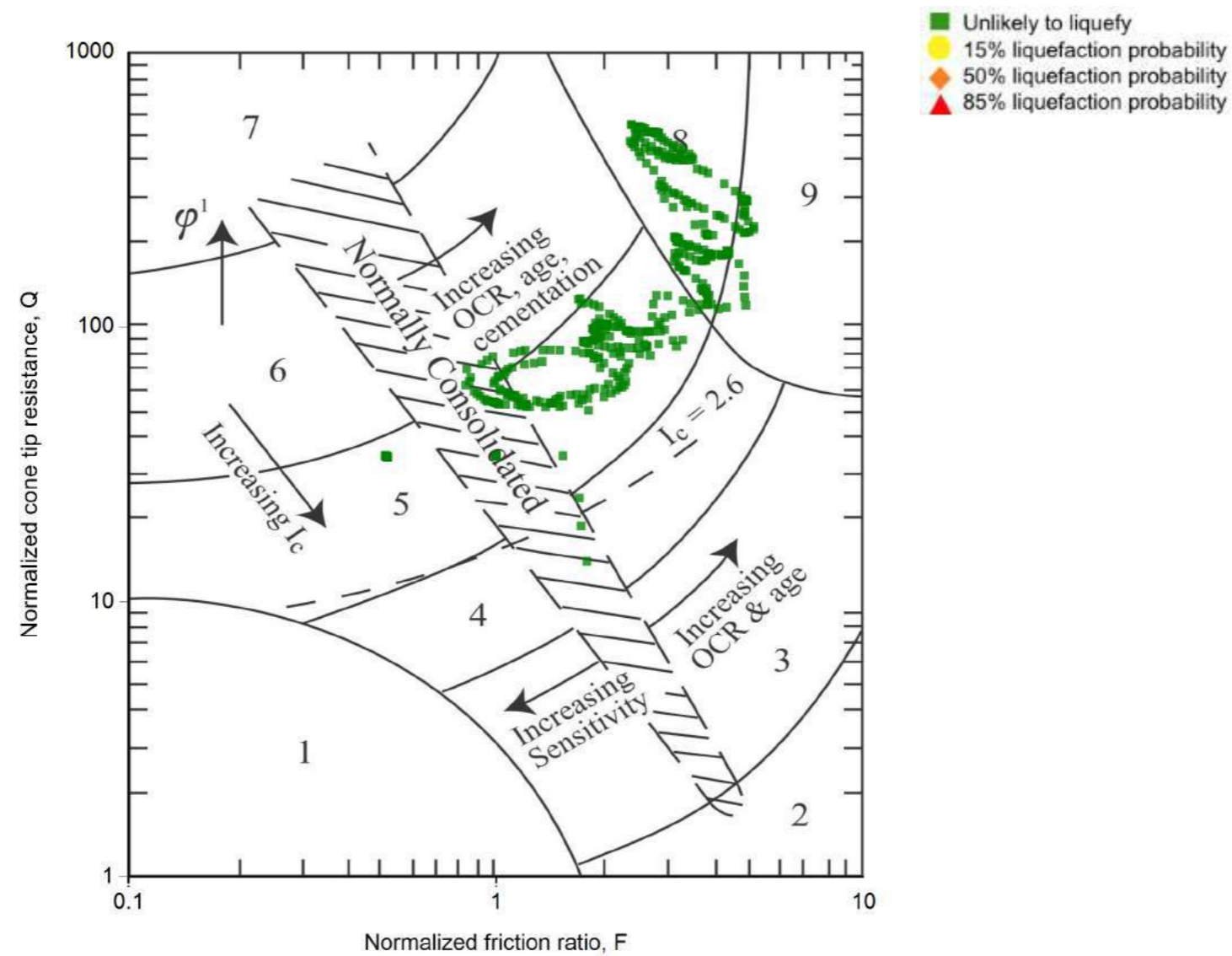
CLIENT, PROJECT
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Karori Prepurchase Geotechnical Assessment

TITLE
SLS CPT6a, 7, 8a and 9

LOCATION
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Karori Campus

JOB NUMBER
30309

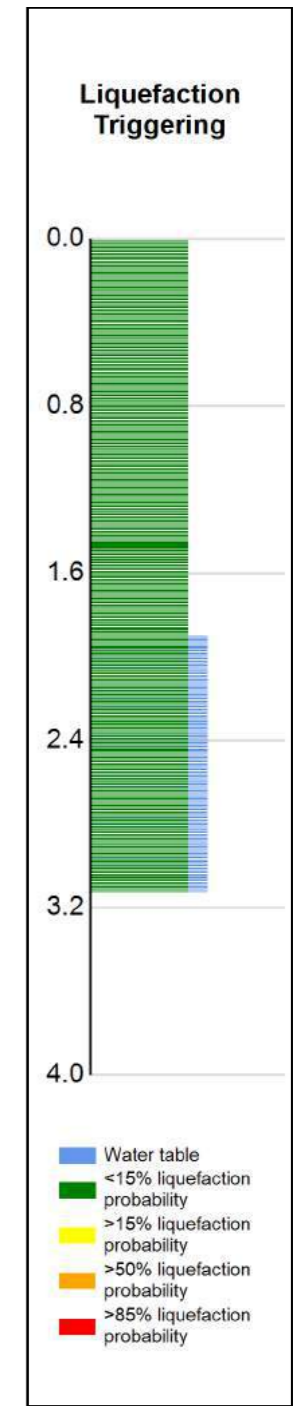
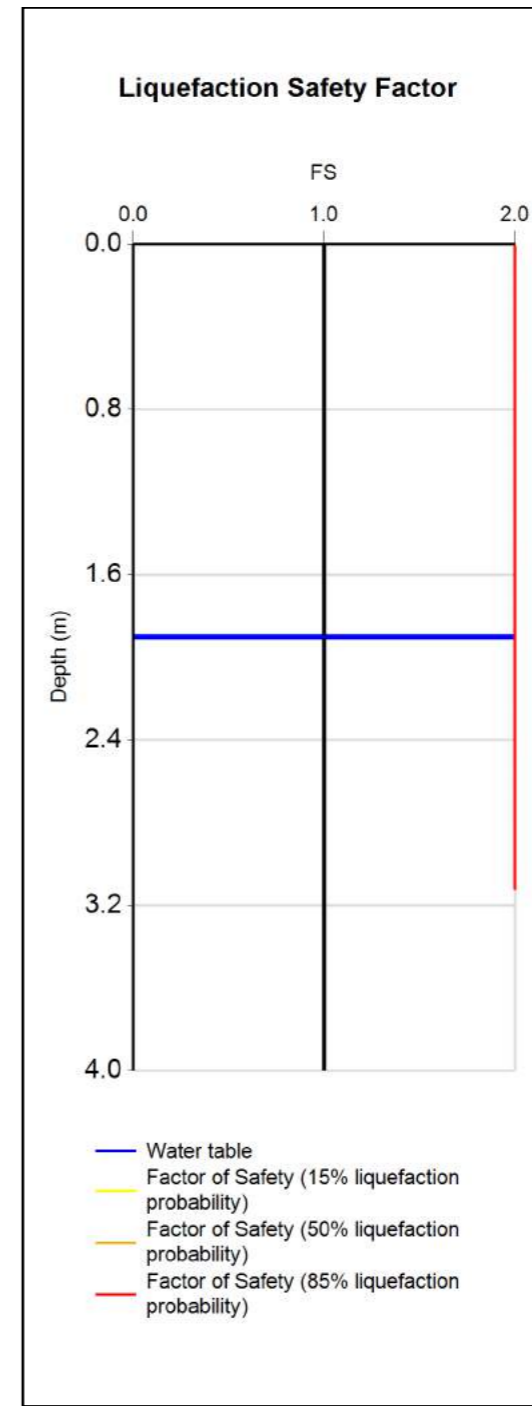
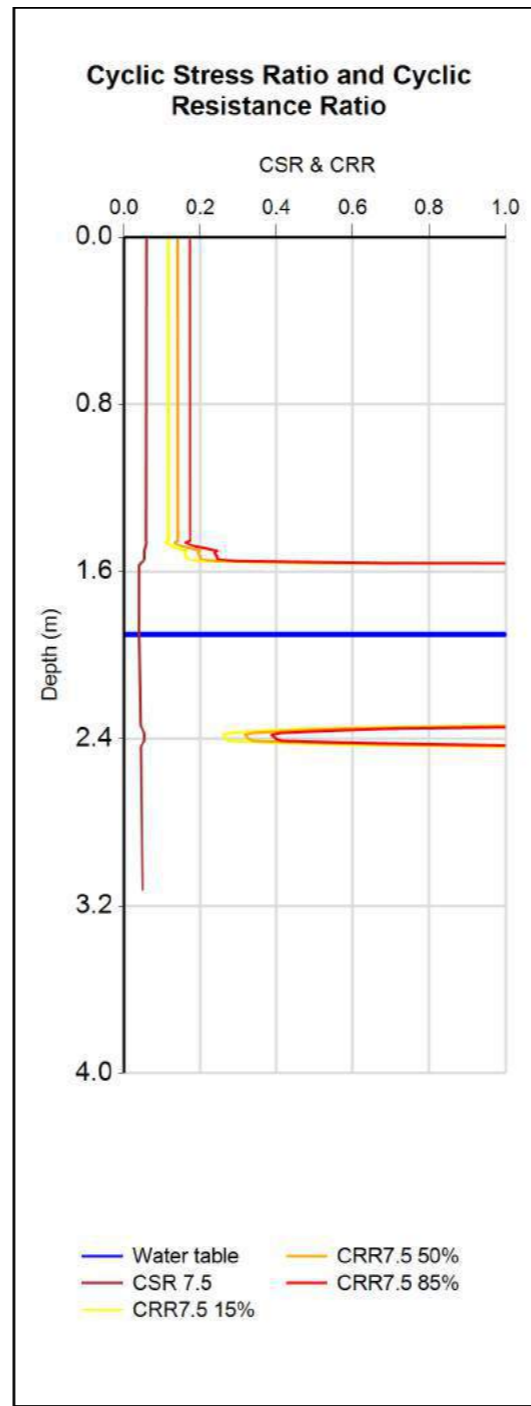
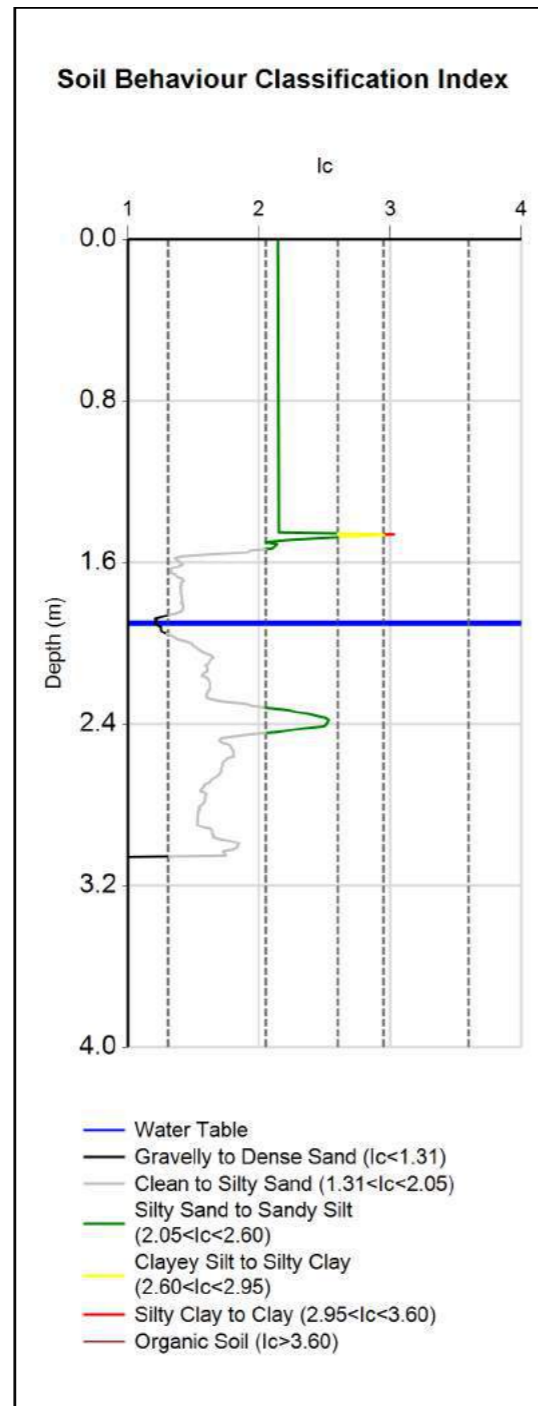
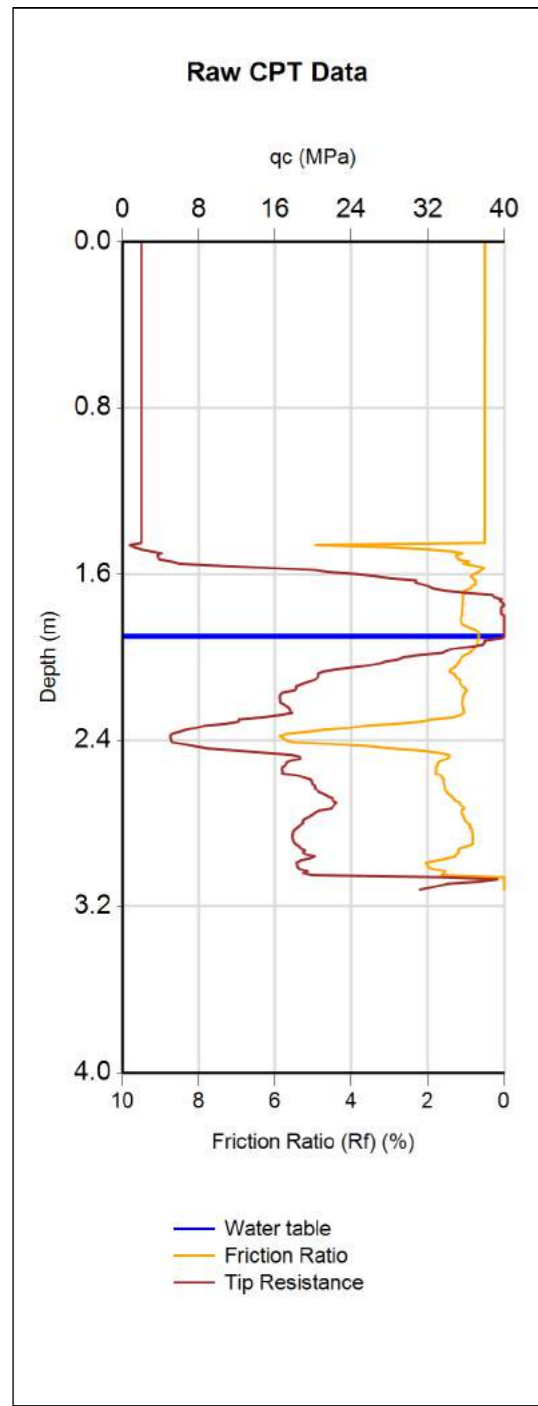
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|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
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CPT-based soil behavior type classification chart by Robertson (1990)



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT08a	103686	11/10/2017	User Specified	6.2	0.11	1.9	BI-2014	ZRB-2002	1.45	2	0.01	18
	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
OUTPUT	15%	0	0	0	0	3.1	0						
	50%	0	0	0	0	3.1	0						
	85%	0	0	0	0	3.1	0						



Tonkin + Taylor
Exceptional thinking together
V1.3

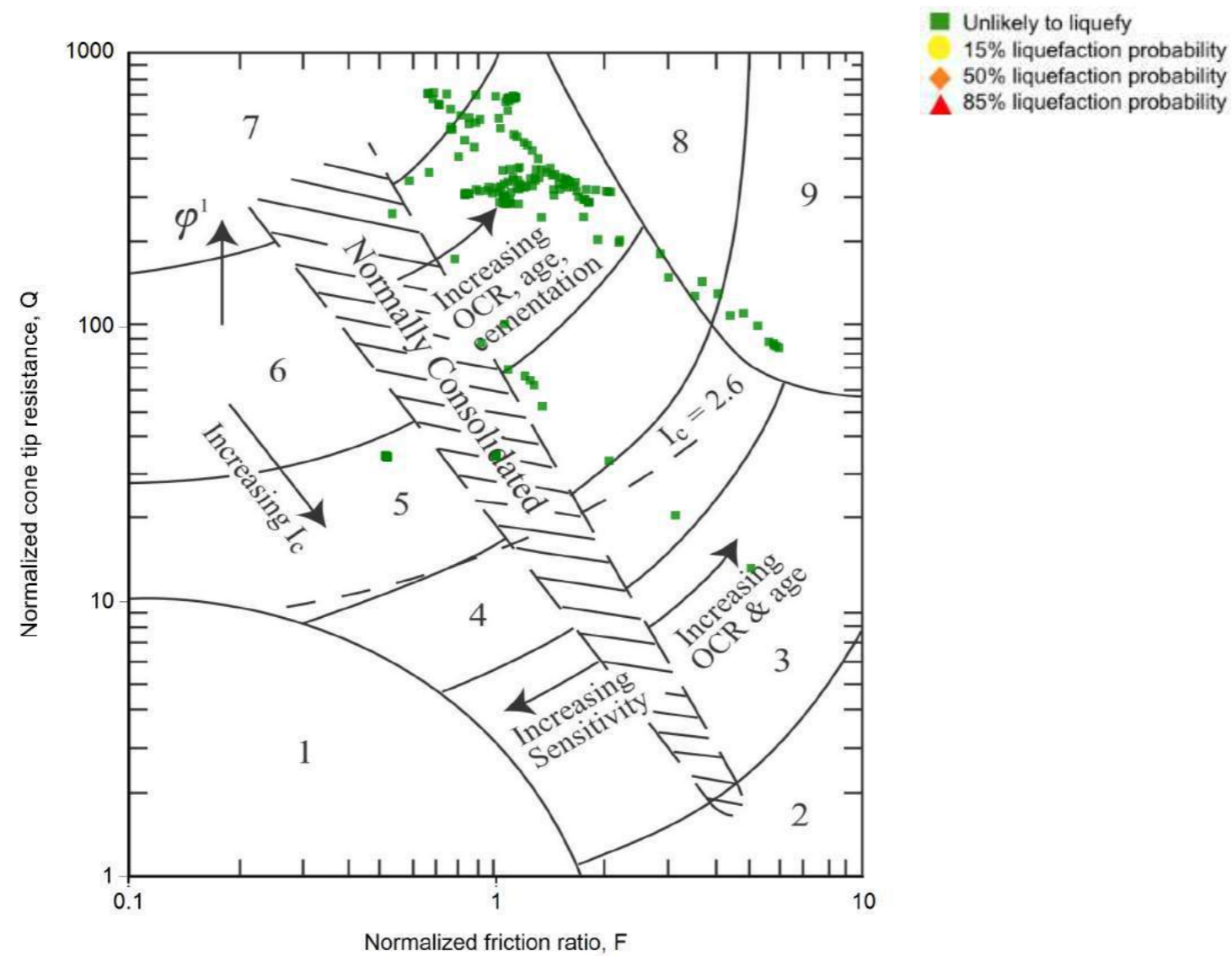
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Ryman Healthcare Limited
Karori Prepurchase Geotechnical Assessment

TITLE
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LOCATION
Victoria University
Karori Campus

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30309


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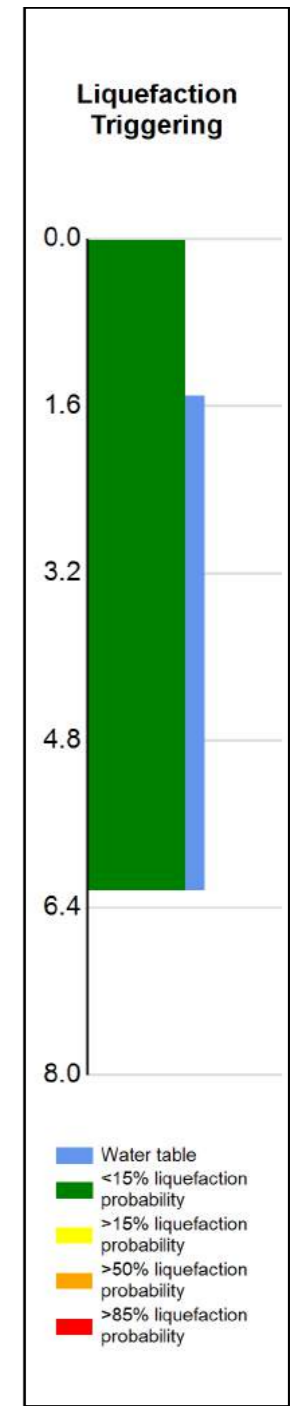
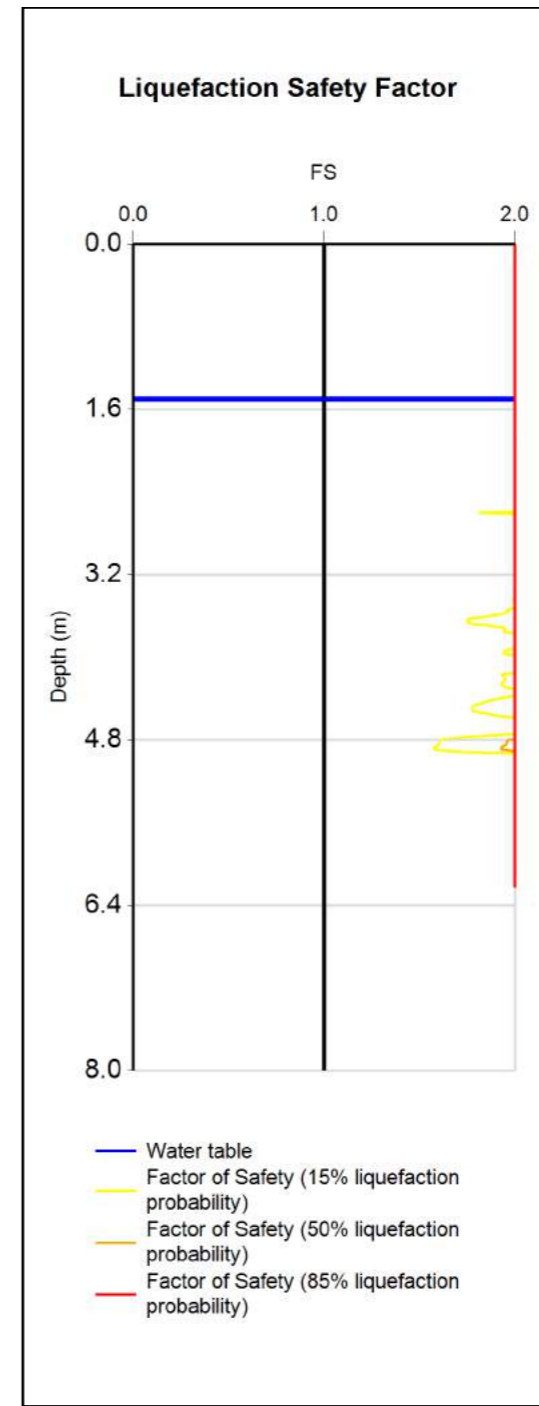
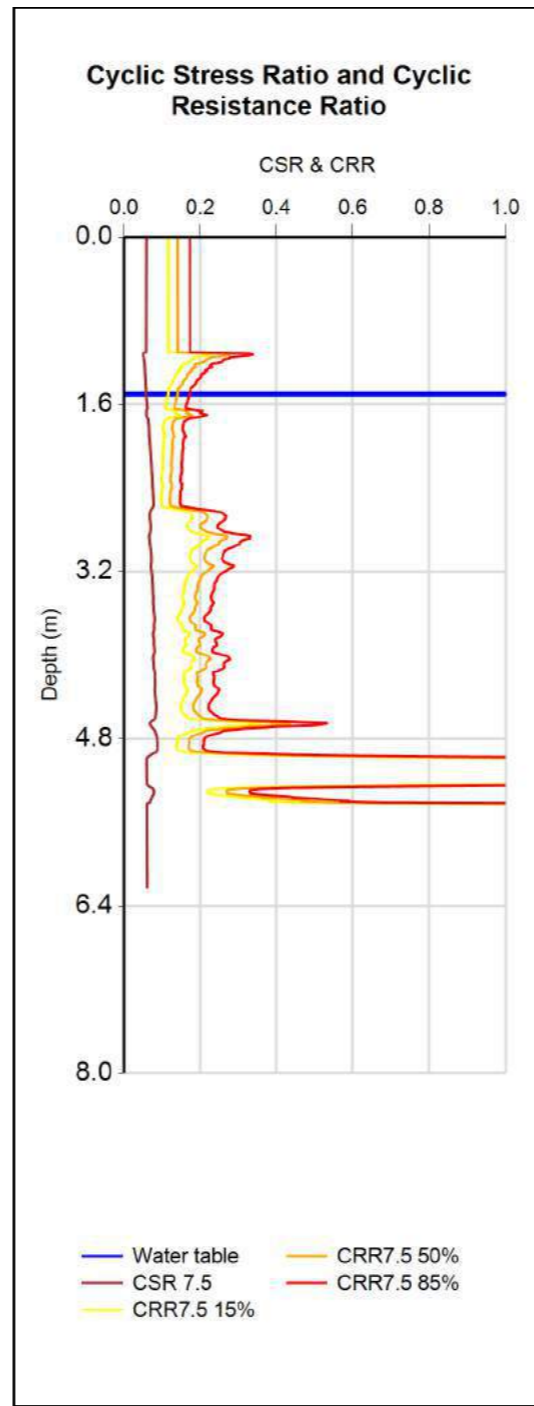
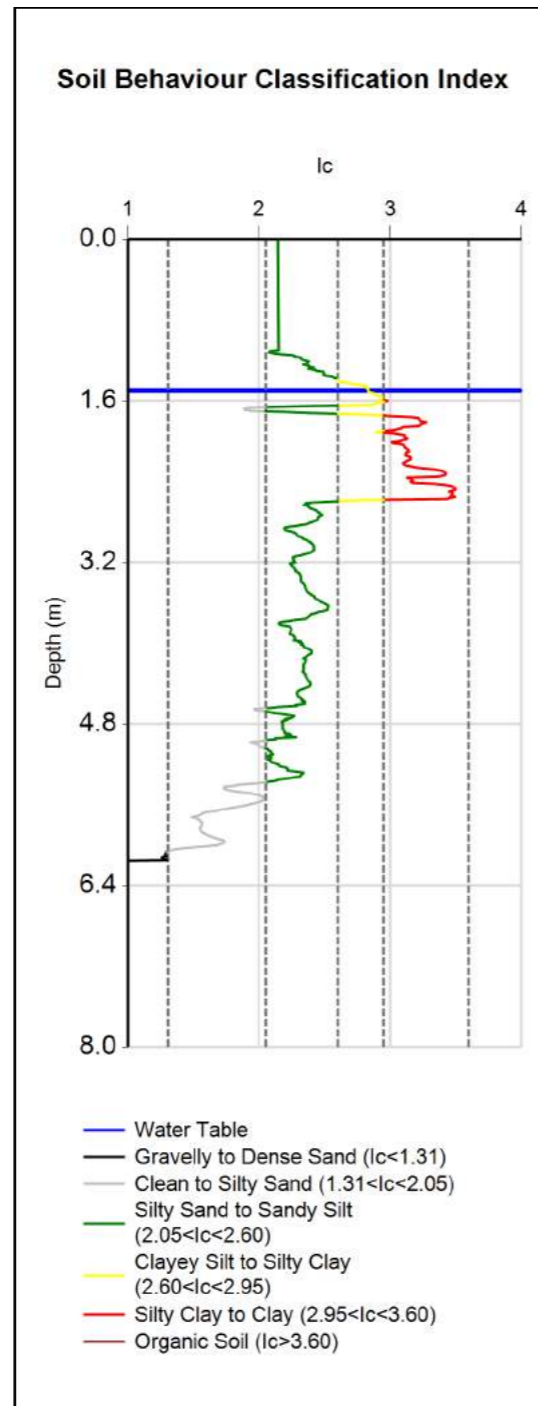
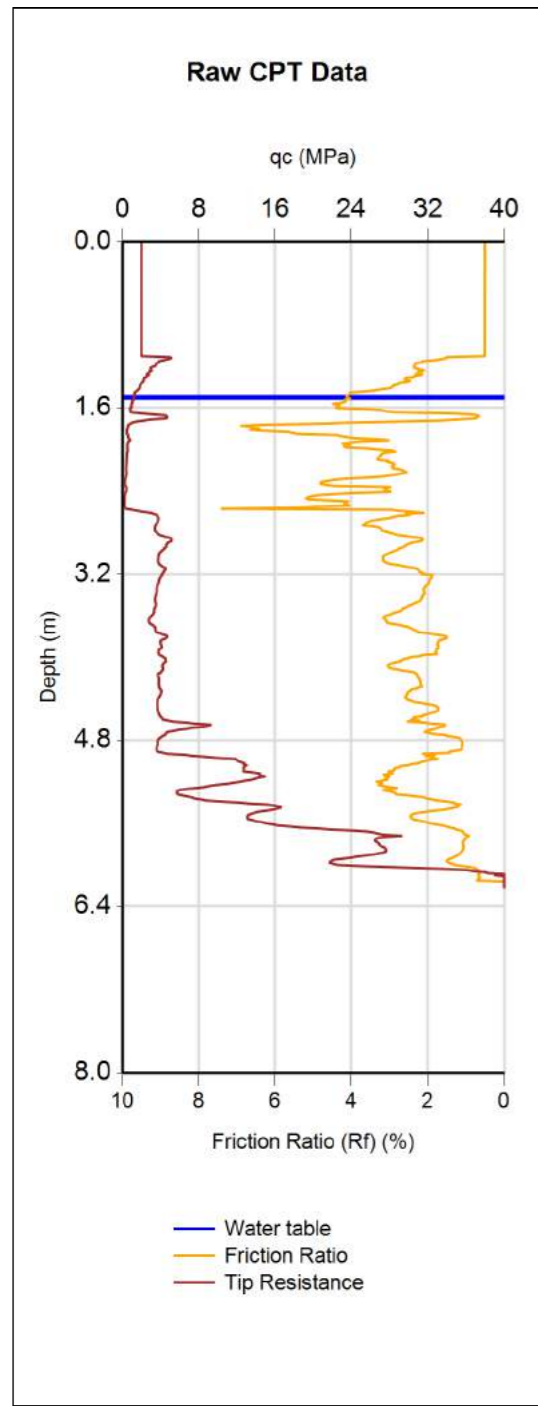


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|--|-------------------------------------|
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CPT-based soil behavior type classification chart by Robertson (1990)

 Tonkin + Taylor Exceptional thinking together V1.3	CLIENT, PROJECT Ryman Healthcare Limited Karori Prepurchase Geotechnical Assessment	LOCATION Victoria University Karori Campus	DATE 27/10/2017
	TITLE SLS CPT6a, 7, 8a and 9	JOB NUMBER 30309	ANALYSED tzhl



(Assumed pre-drill values)

INPUT	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
	CPT09	103687	11/10/2017	User Specified	6.2	0.11	1.5	BI-2014	ZRB-2002	1.1	2	0.01	18
OUTPUT	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
	15%	1	0	0	0	6.2	0						
	50%	0	0	0	0	6.2	0						
	85%	0	0	0	0	6.2	0						

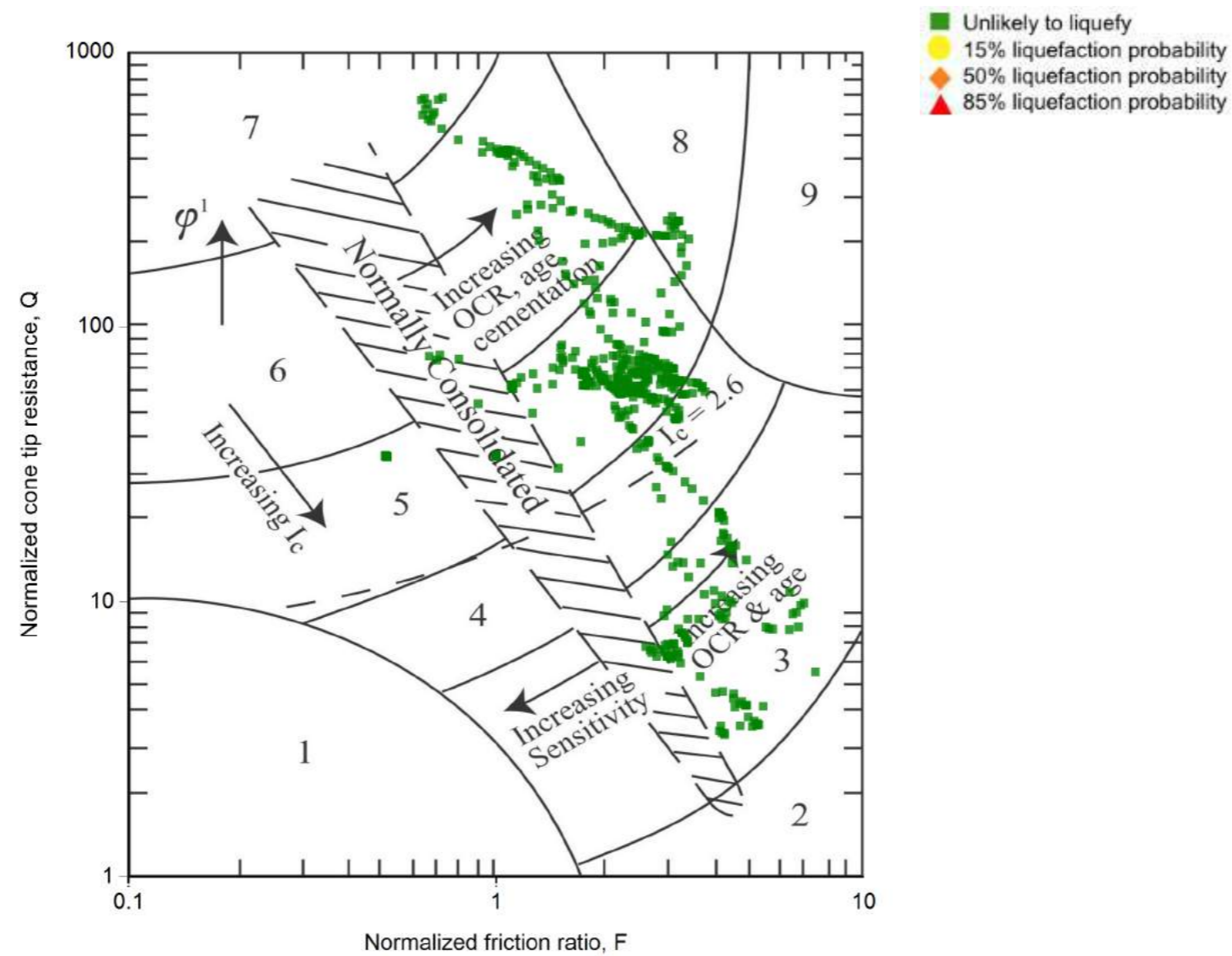


Tonkin + Taylor
Exceptional thinking together
V1.3

CLIENT, PROJECT
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TITLE
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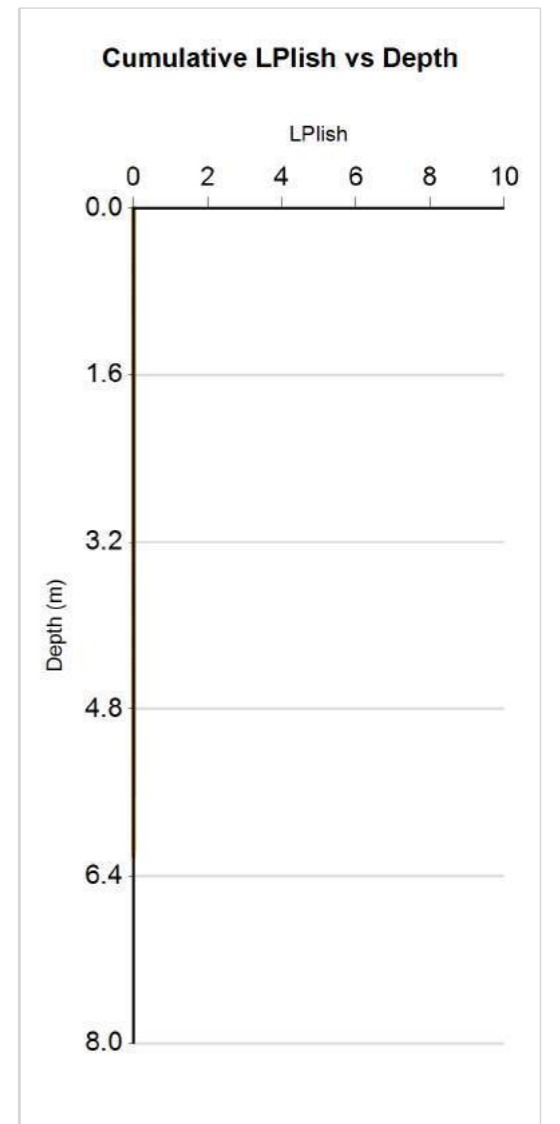
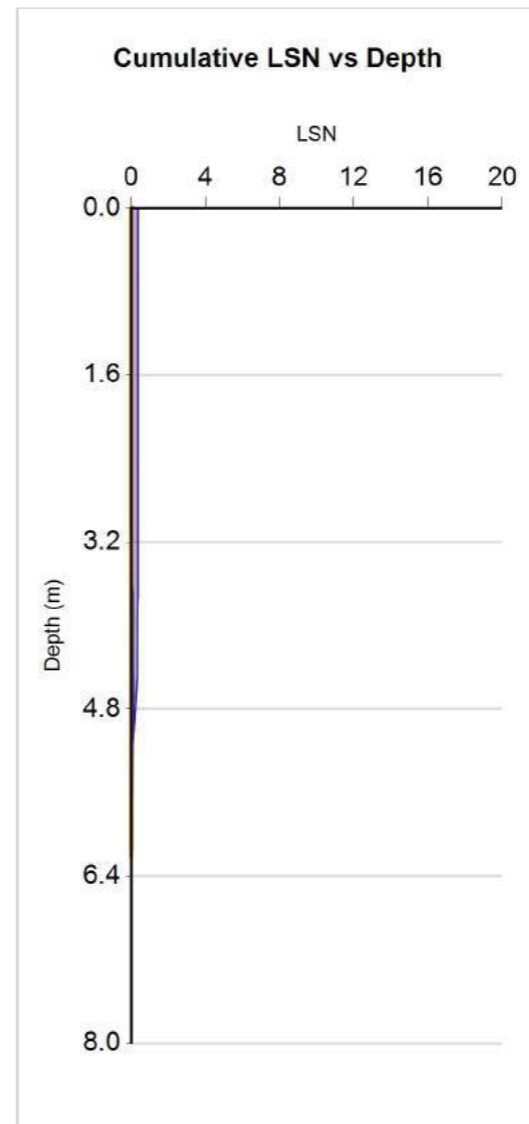
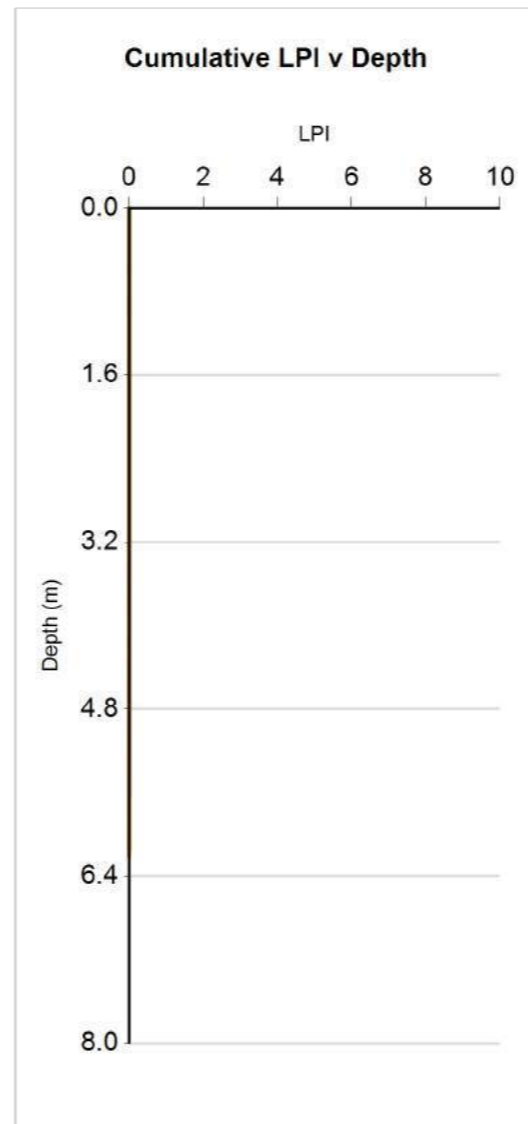
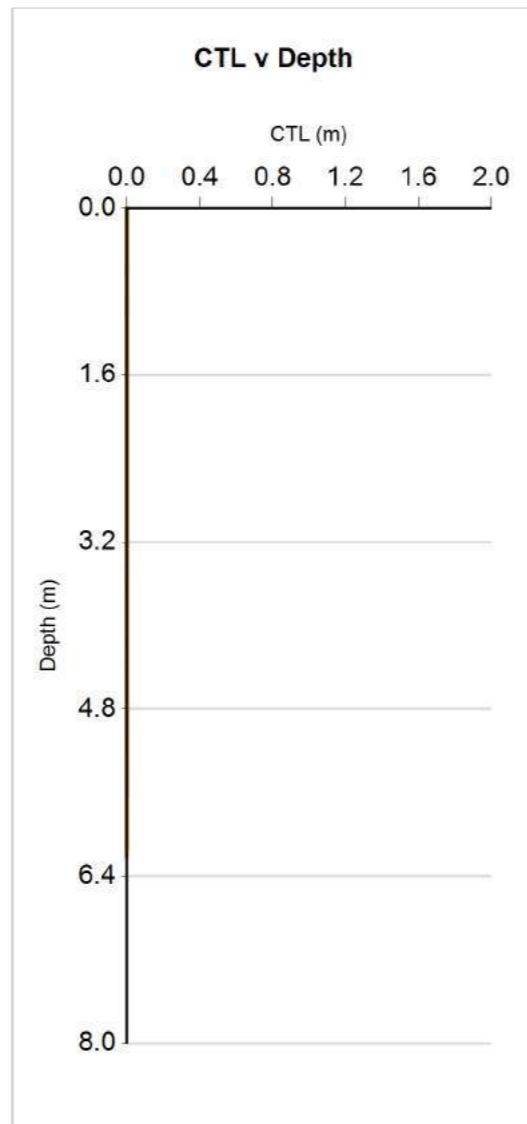
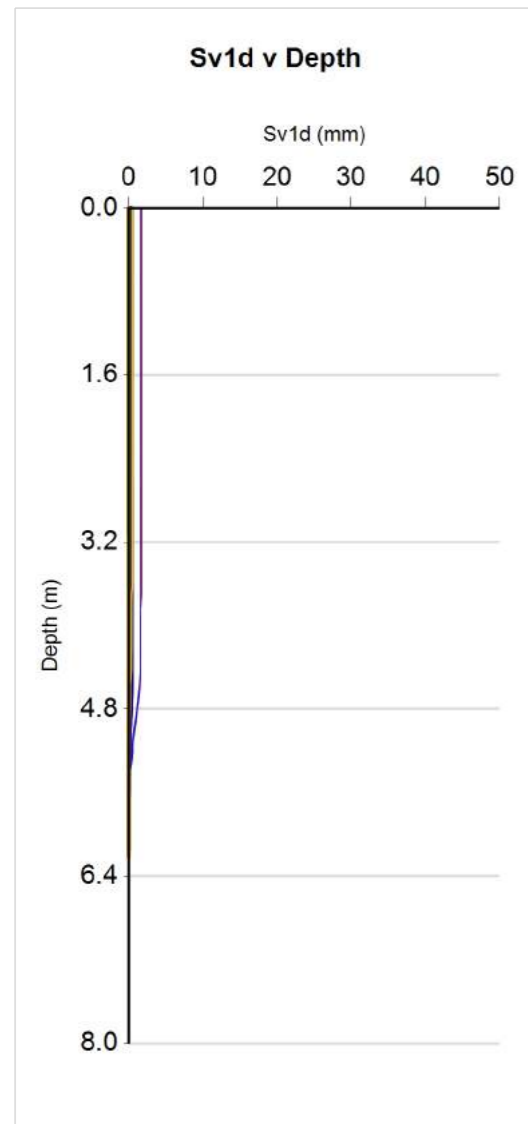


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|--|-------------------------------------|
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CPT-based soil behavior type classification chart by Robertson (1990)

 Tonkin+Taylor Exceptional thinking together V1.3	CLIENT, PROJECT Ryman Healthcare Limited Karori Prepurchase Geotechnical Assessment	LOCATION Victoria University Karori Campus	DATE 27/10/2017
	TITLE SLS CPT6a, 7, 8a and 9	JOB NUMBER 30309	ANALYSED tzhl

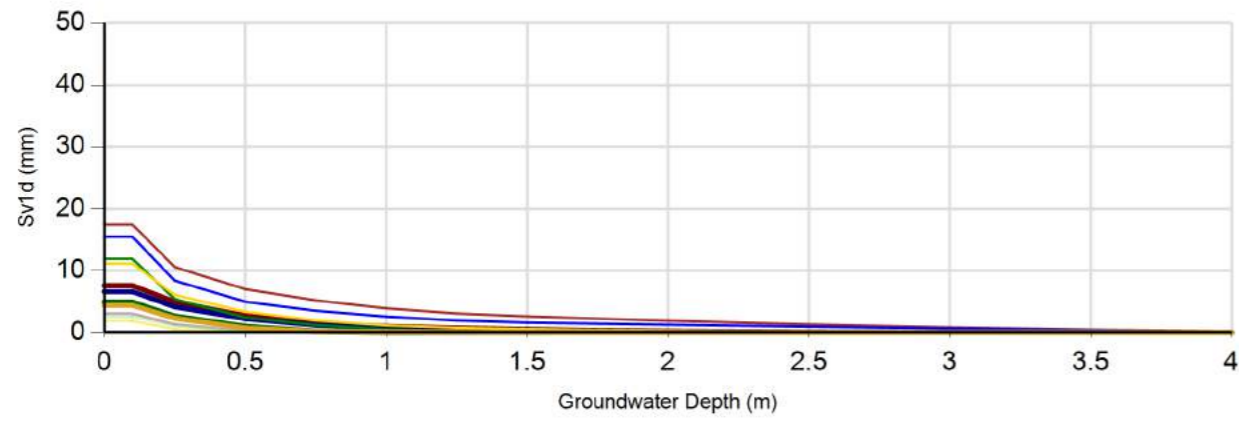


(Assumed pre-drill values)

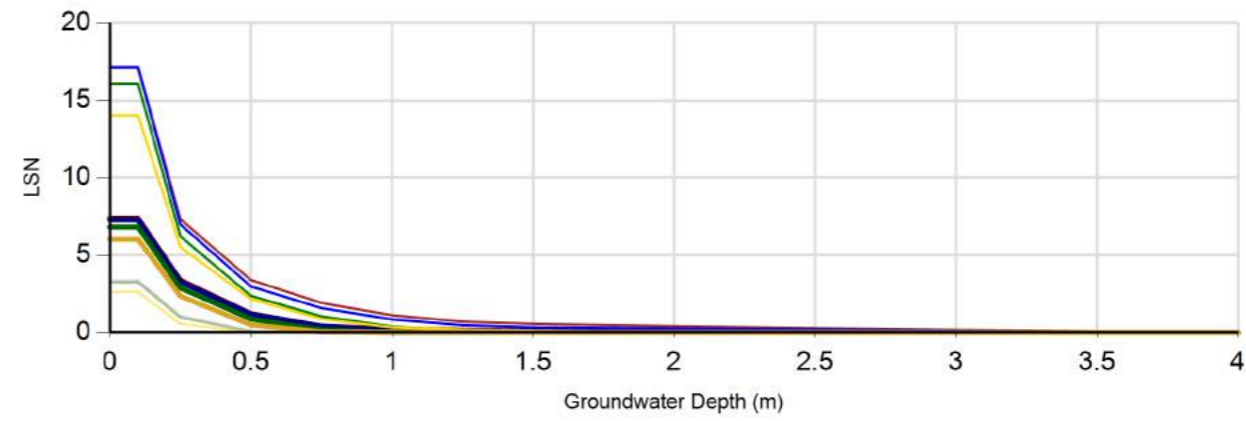
CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m³)
CPT06a	103684	12/10/2017	User Specified	6.2	0.11	2.1	BI-2014	ZRB-2002	1.4	2	0.01	18
CPT07	103685	12/10/2017	User Specified	6.2	0.11	1.5	BI-2014	ZRB-2002	1.5	2	0.01	18
CPT08a	103686	11/10/2017	User Specified	6.2	0.11	1.9	BI-2014	ZRB-2002	1.45	2	0.01	18
CPT09	103687	11/10/2017	User Specified	6.2	0.11	1.5	BI-2014	ZRB-2002	1.1	2	0.01	18

Thicker lines represent the 50% probability of exceedance case and the thinner lines to the left and right of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.

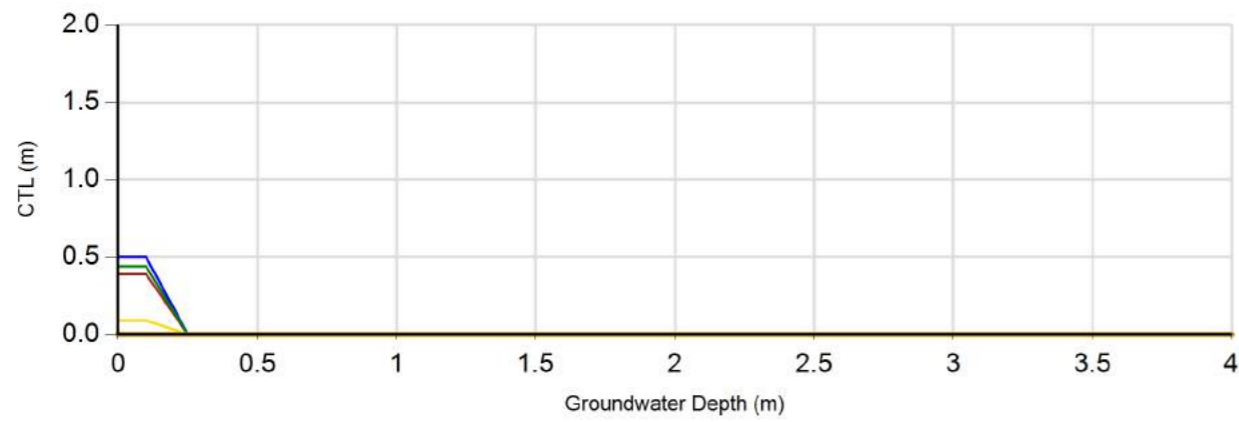
Sv1d response to GWD



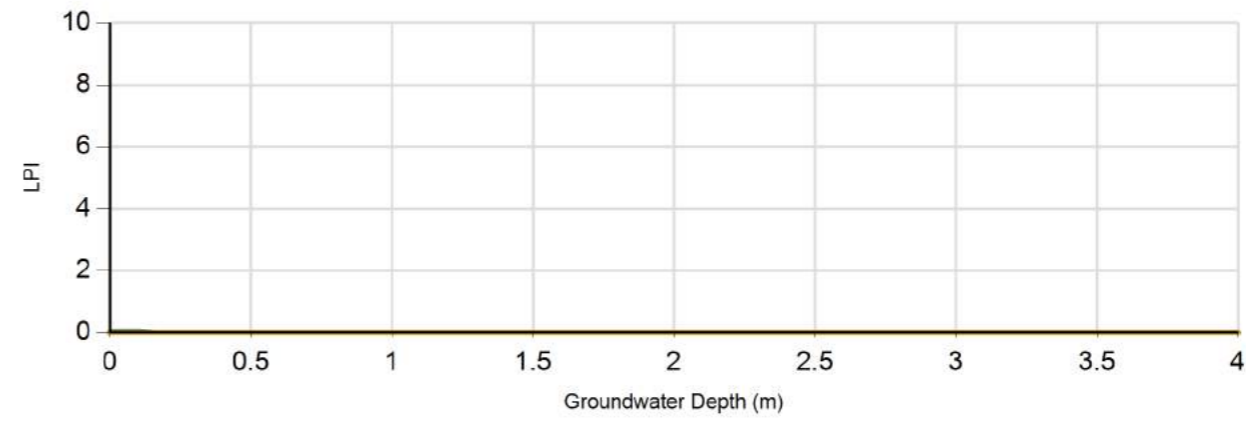
LSN response to GWD



CTL response to GWD



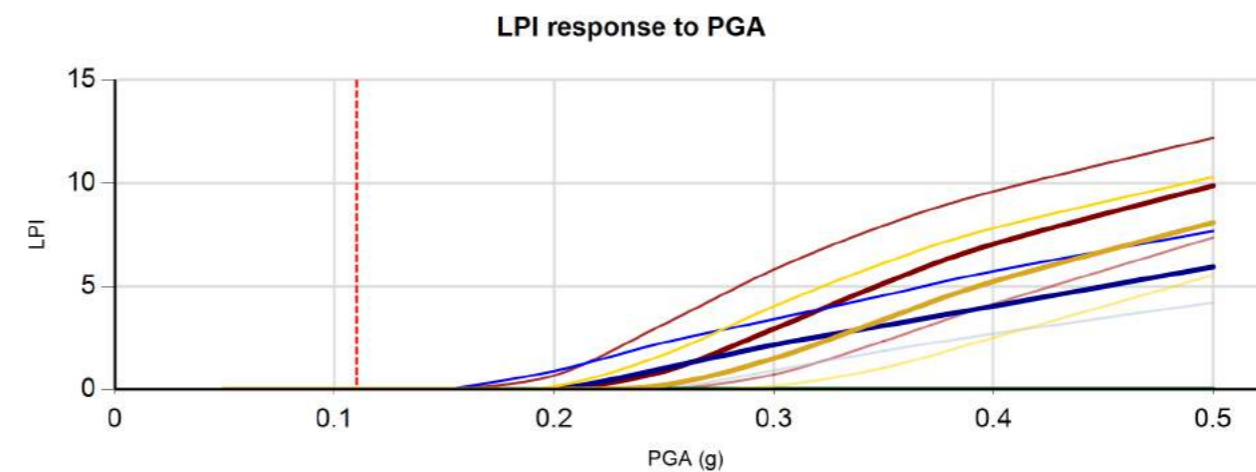
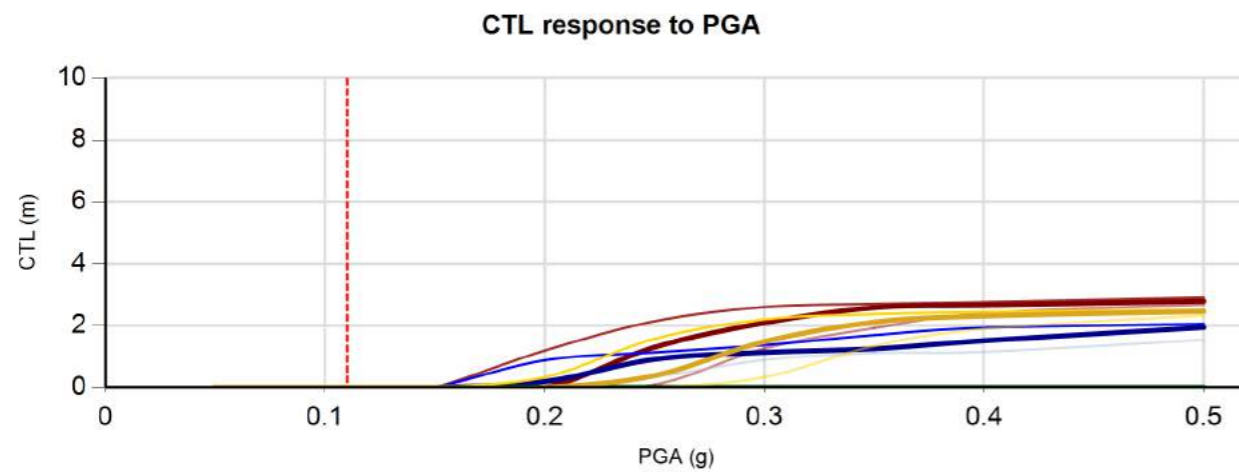
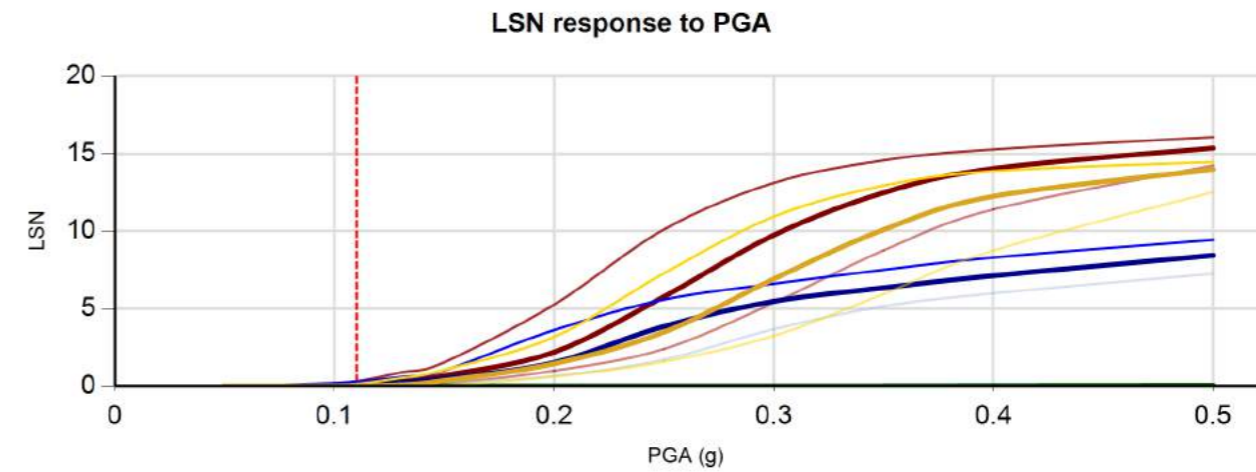
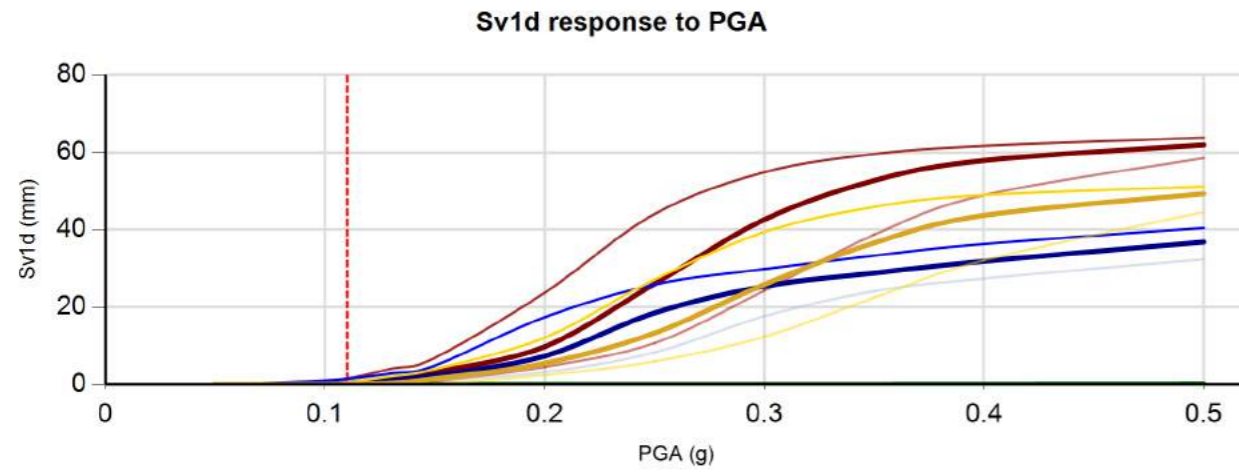
LPI response to GWD



(Assumed pre-drill values)

CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m³)
CPT06a	103684	12/10/2017	User Specified	6.2	0.11	2.1	BI-2014	ZRB-2002	1.4	2	0.01	18
CPT07	103685	12/10/2017	User Specified	6.2	0.11	1.5	BI-2014	ZRB-2002	1.5	2	0.01	18
CPT08a	103686	11/10/2017	User Specified	6.2	0.11	1.9	BI-2014	ZRB-2002	1.45	2	0.01	18
CPT09	103687	11/10/2017	User Specified	6.2	0.11	1.5	BI-2014	ZRB-2002	1.1	2	0.01	18

Thicker lines represent the 50% probability of exceedence case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedence cases respectively.



Vertical dotted line/s indicate user specified PGA at the CPT locations. (actual PGA)

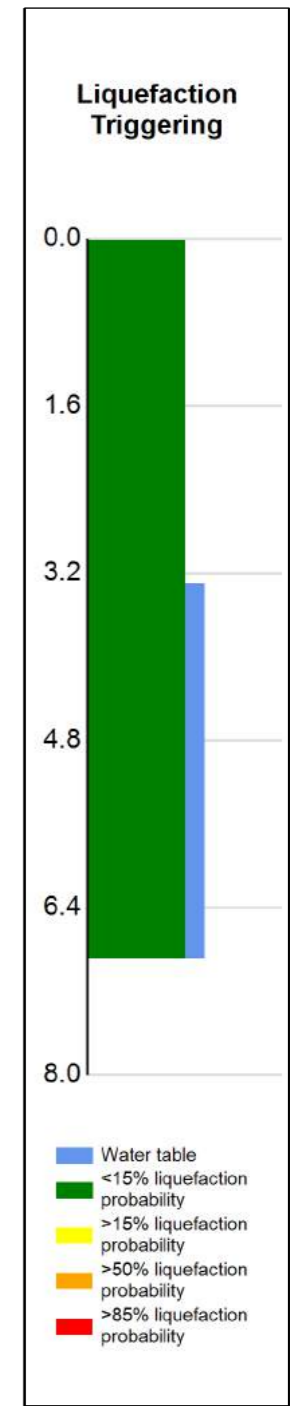
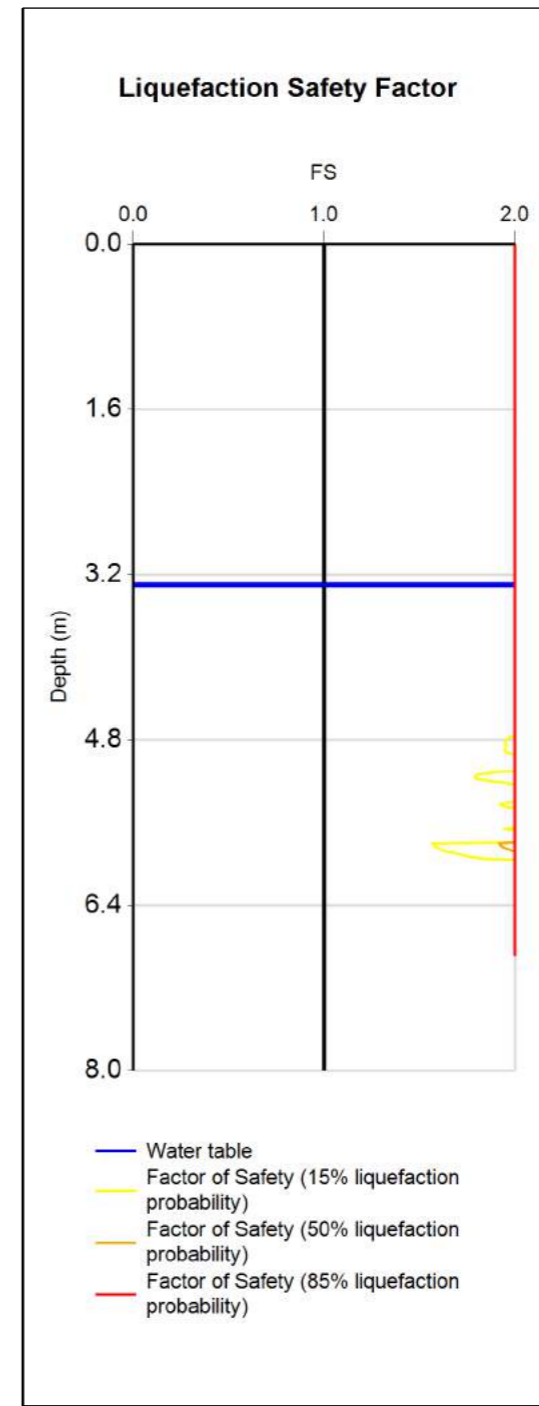
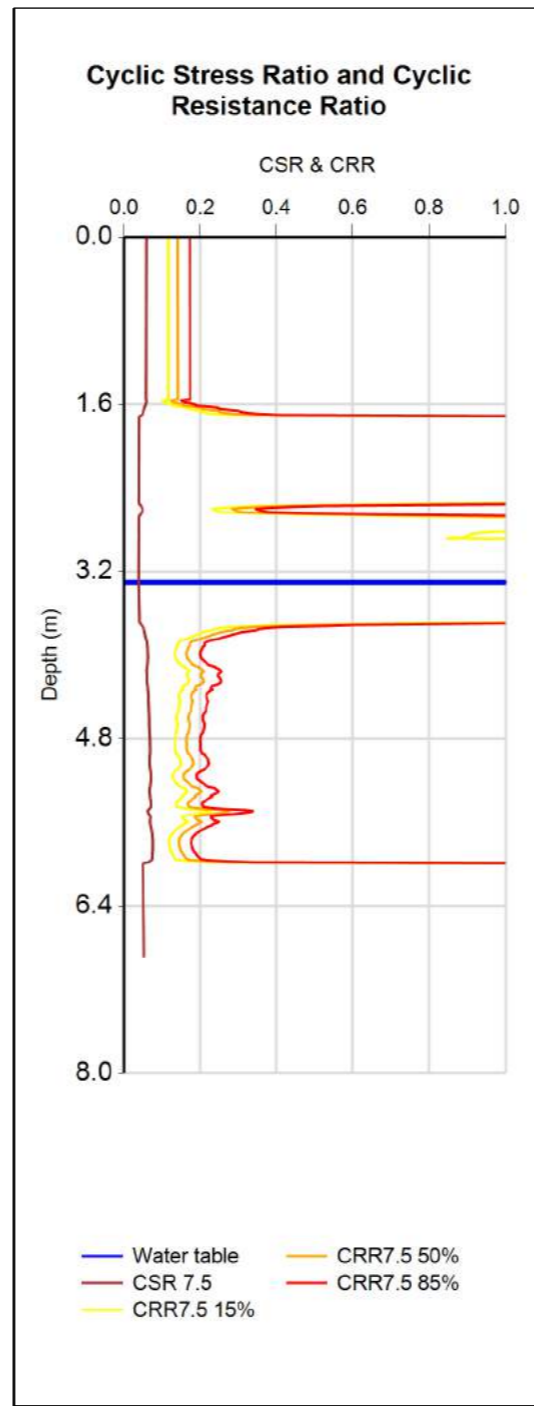
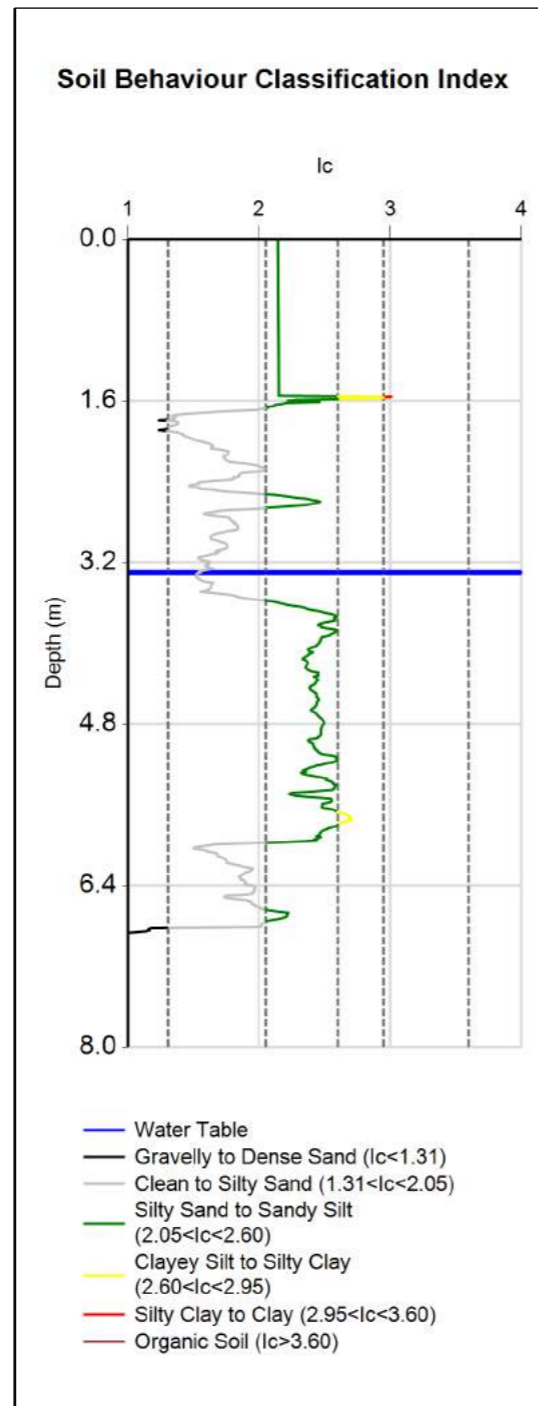
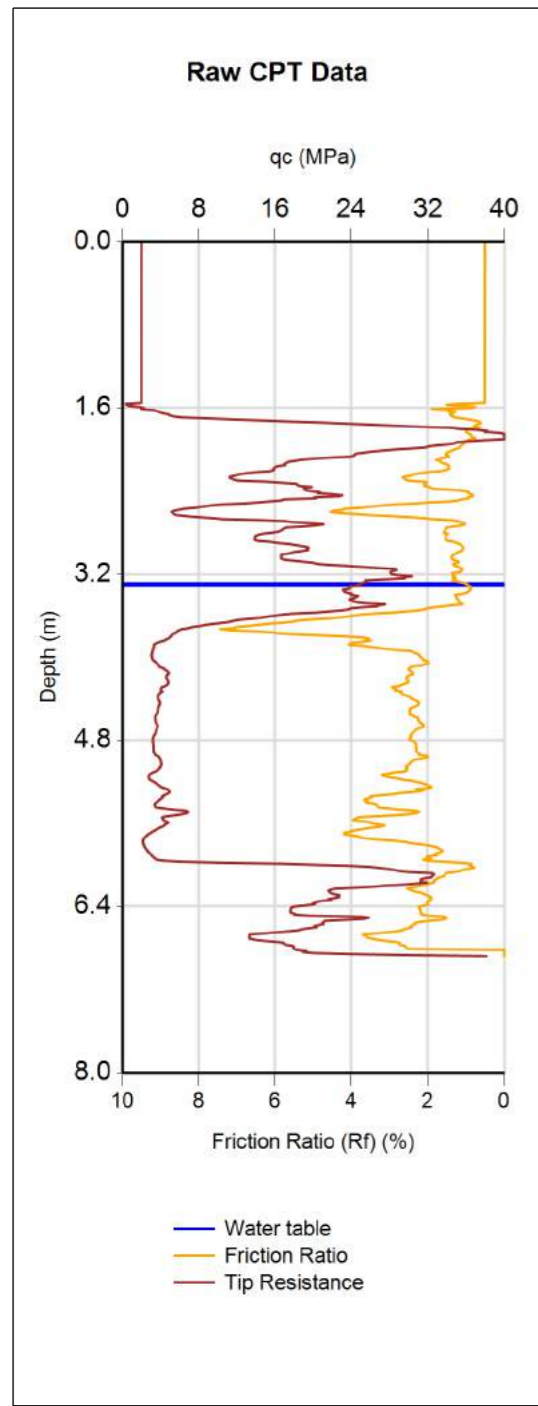
													(Assumed pre-drill values)	
CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)		
CPT06a	103684	12/10/2017	User Specified	6.2	0.11	2.1	BI-2014	ZRB-2002	1.4	2	0.01	18		
CPT07	103685	12/10/2017	User Specified	6.2	0.11	1.5	BI-2014	ZRB-2002	1.5	2	0.01	18		
CPT08a	103686	11/10/2017	User Specified	6.2	0.11	1.9	BI-2014	ZRB-2002	1.45	2	0.01	18		
CPT09	103687	11/10/2017	User Specified	6.2	0.11	1.5	BI-2014	ZRB-2002	1.1	2	0.01	18		

Thicker lines represent the 50% probability of exceedence case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedence cases respectively.

The inputs listed in Table 1.1-1 below have been adopted for the liquefaction analysis.

Table 1.1-1 Summary of inputs for liquefaction analysis

TTGD ID	103684	103685	103686	103687
CPT Name	05TT12_06a	05TT12_07	05TT12_08a	05TT12_09
PGA	0.11g	0.11g	0.11g	0.11g
Magnitude	6.2	6.2	6.2	6.2
Depth to groundwater	2.1m	1.5m	1.9m	1.5m
Predrill depth	1.4m	1.5m	1.45m	1.1m
Assumed predrill tip resistance and skin friction	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa
Trigger method	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)
Settlement method	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)
CFC	0	0	0	0
Total depth of CPT	6.15m	5.63m	3.12m	6.22m
Maximum depth of analysis	6.15m	5.63m	3.12m	6.22m
RL	n/a	n/a	n/a	n/a



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT10	103688	12/10/2017	User Specified	6.2	0.11	3.3	BI-2014	ZRB-2002	1.55	2	0.01	18
	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
OUTPUT	15%	0	0	0	0	6.9	0						
	50%	0	0	0	0	6.9	0						
	85%	0	0	0	0	6.9	0						



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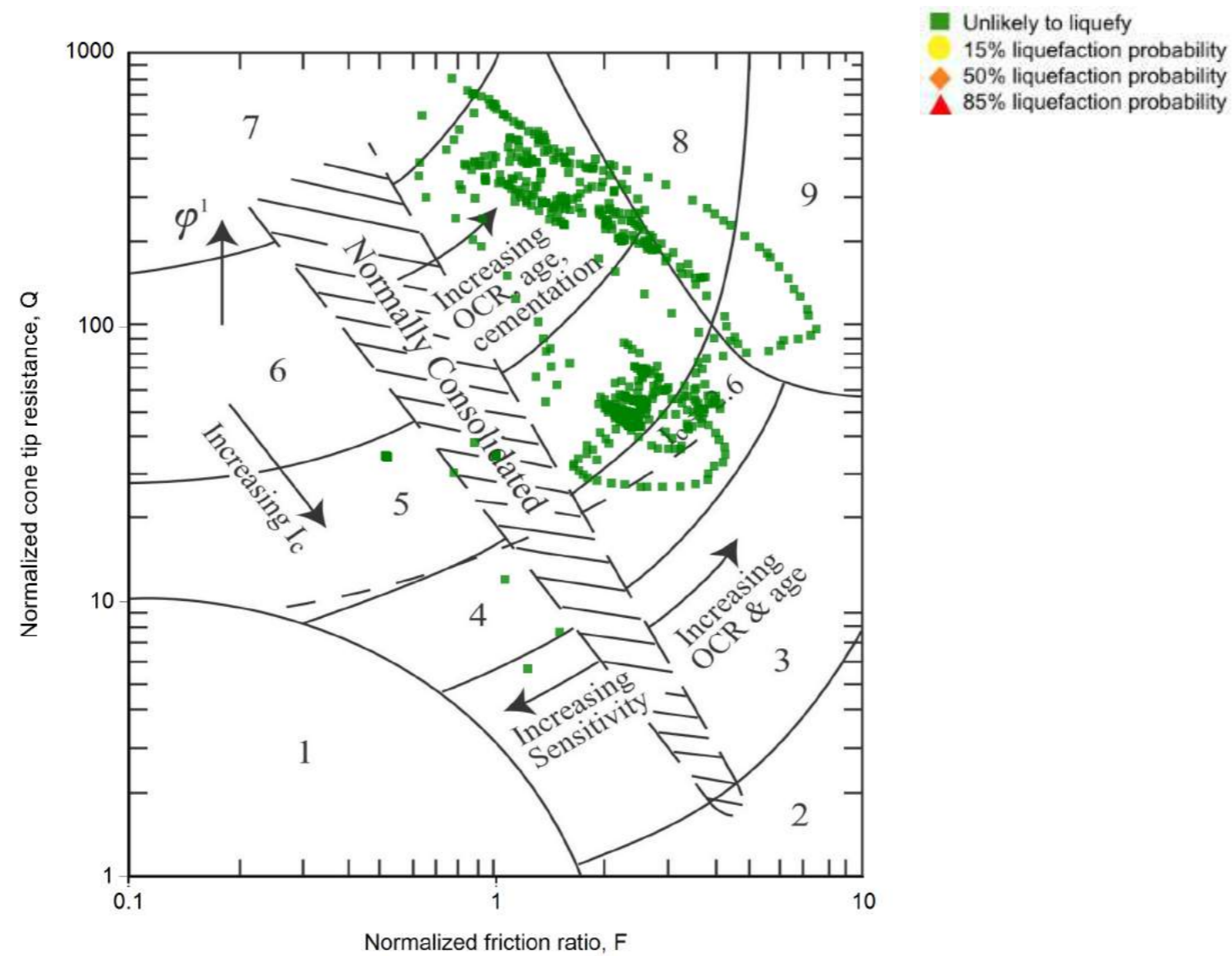
CLIENT, PROJECT
Ryman Healthcare Limited
Karori Prepurchase Geotechnical Assessment

TITLE
SLS - CPT10 and 11

LOCATION
Victoria University
Karori Campus

JOB NUMBER
30309

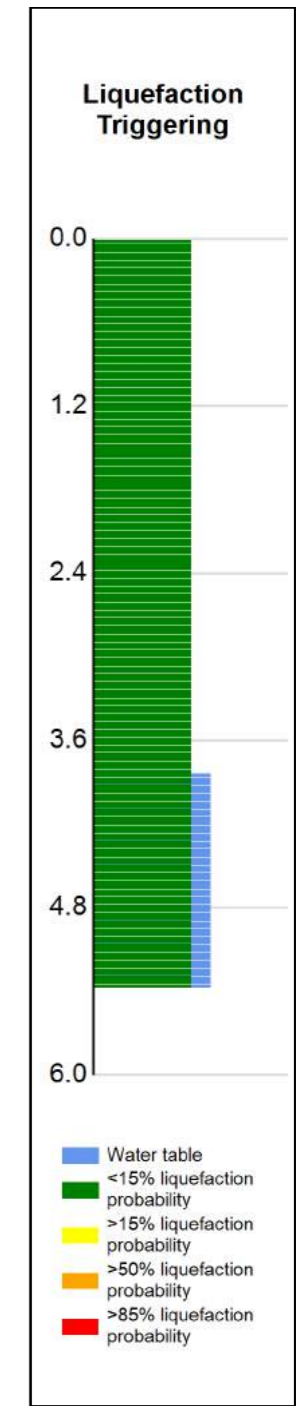
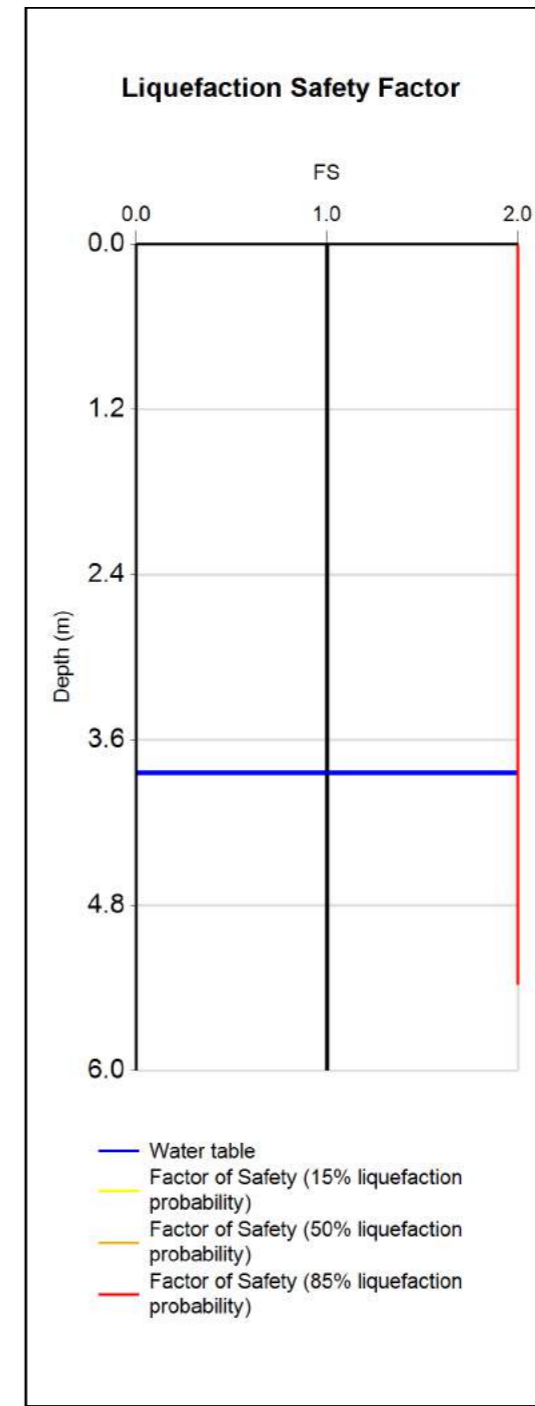
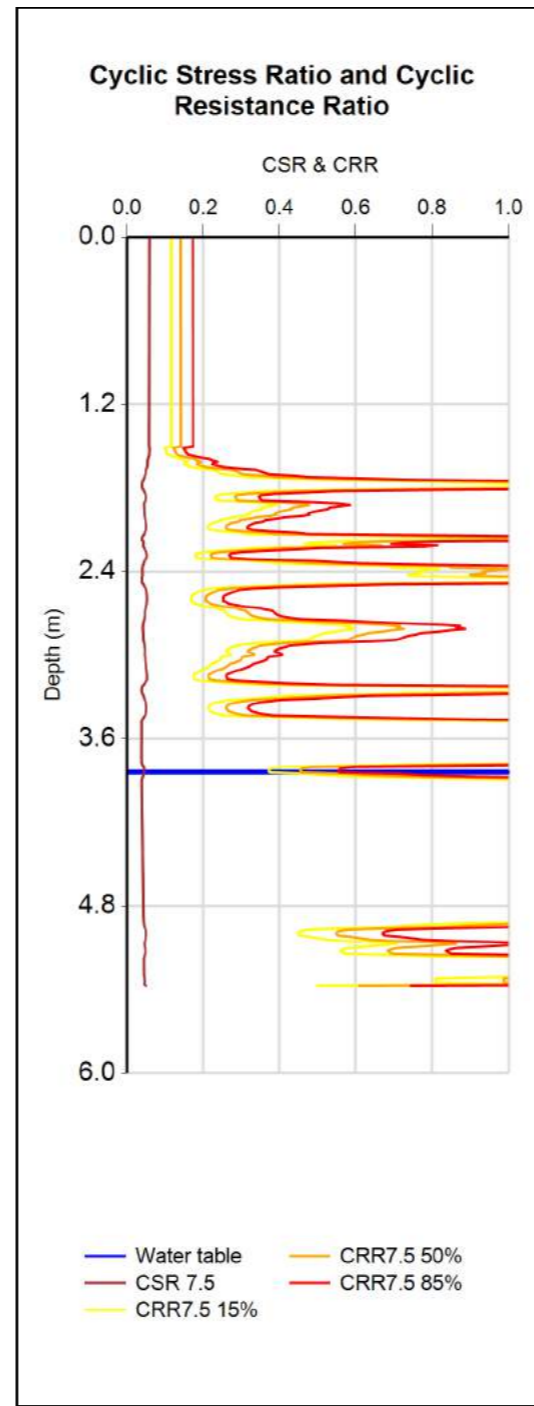
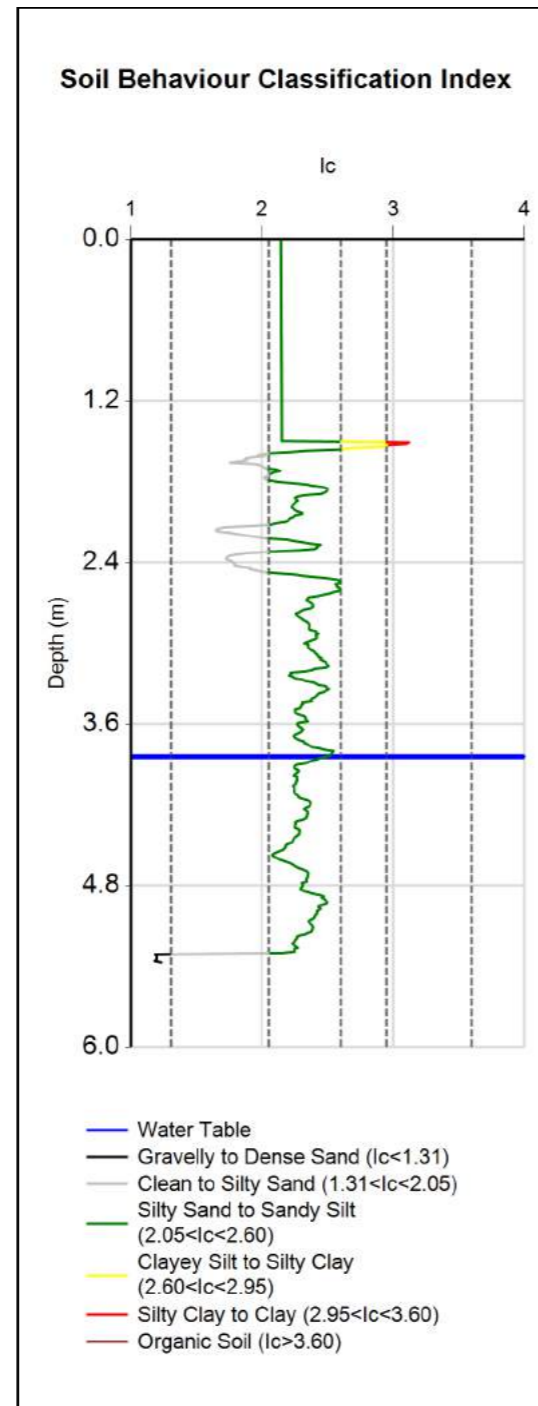
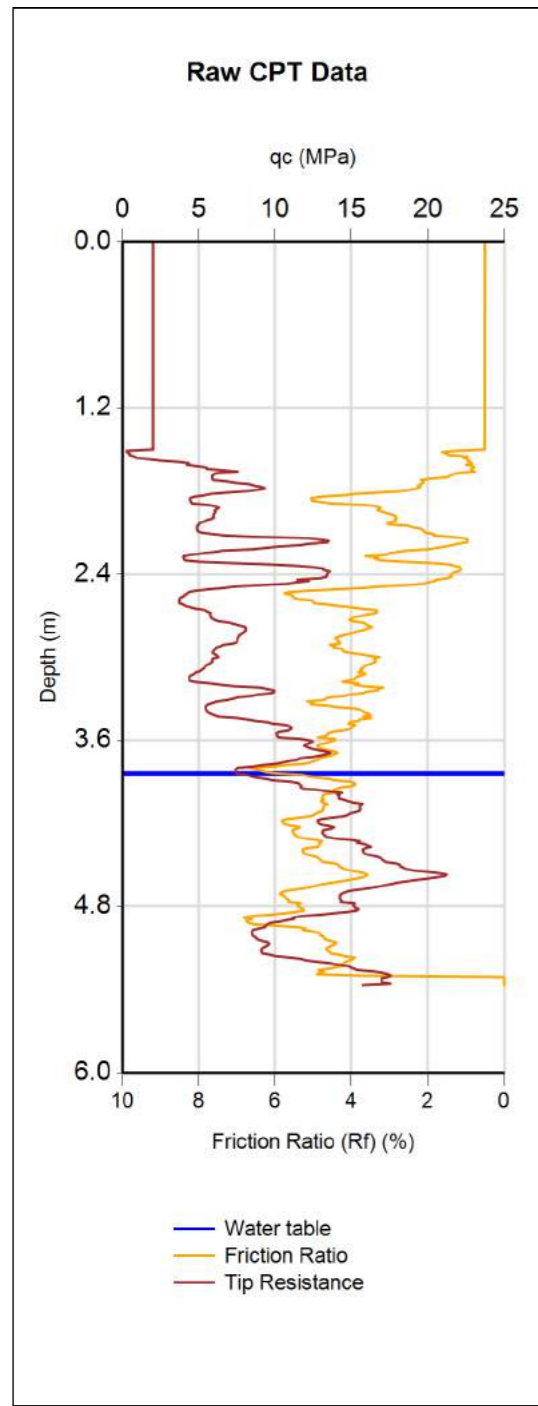
DATE 19/10/2017
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PAGE 1 of 8 pages



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|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
| 2. Organic soils - peats | 7. Gravelly sand to dense sand |
| 3. Clays - silty clay to clay | 8. Very stiff sand to clayey sand * |
| 4. Silt mixtures - clayey silt to silty clay | 9. Very stiff, fine grained * |
| 5. Sand mixtures - silty sand to sandy silt | |

*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT11	103689	11/10/2017	User Specified	6.2	0.11	3.8	BI-2014	ZRB-2002	1.5	2	0.01	18
	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
OUTPUT	15%	0	0	0	0	5.4	0						
	50%	0	0	0	0	5.4	0						
	85%	0	0	0	0	5.4	0						



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Ryman Healthcare Limited
Karori Prepurchase Geotechnical Assessment

TITLE
SLS - CPT10 and 11

LOCATION
Victoria University
Karori Campus

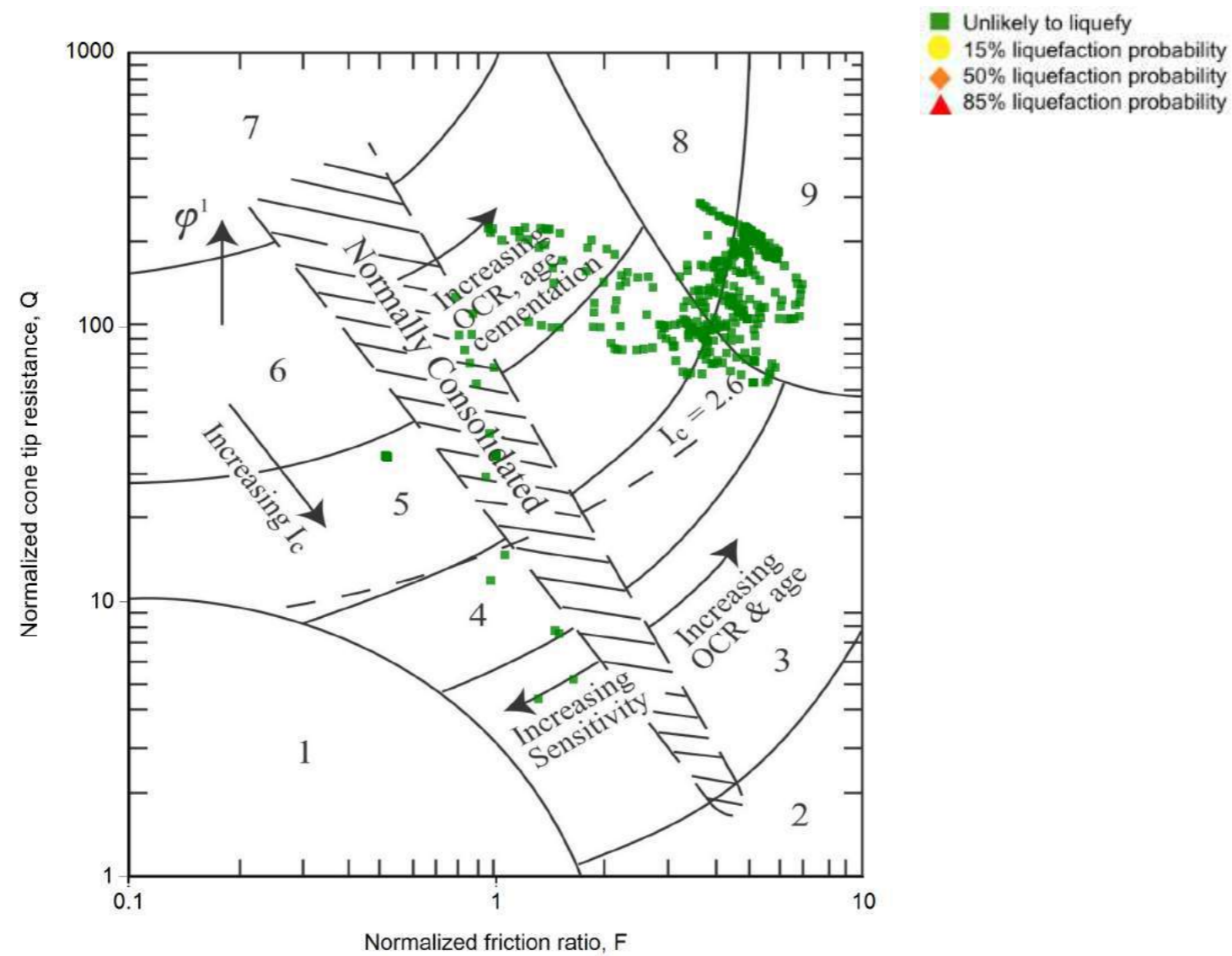
JOB NUMBER
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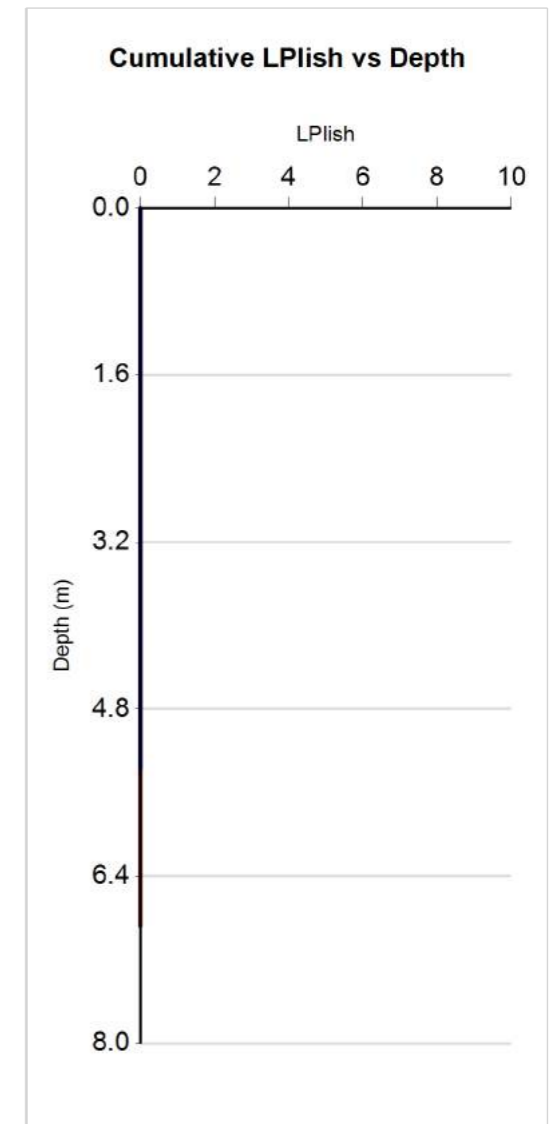
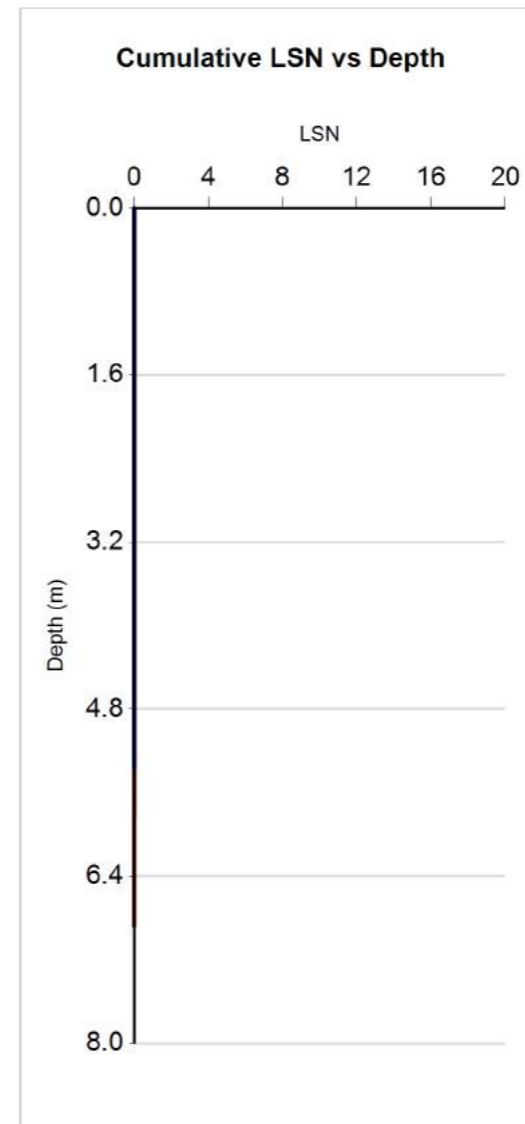
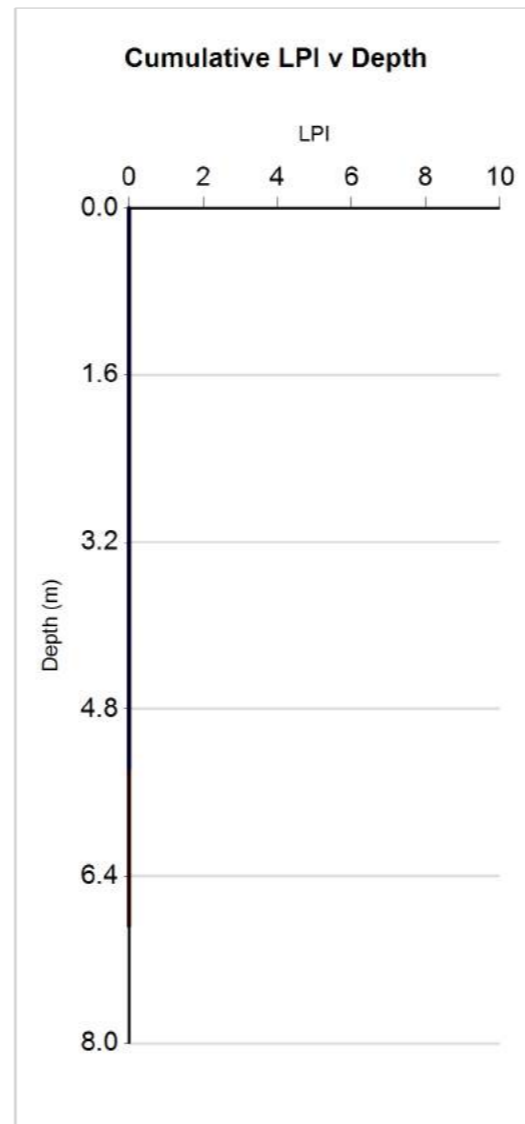
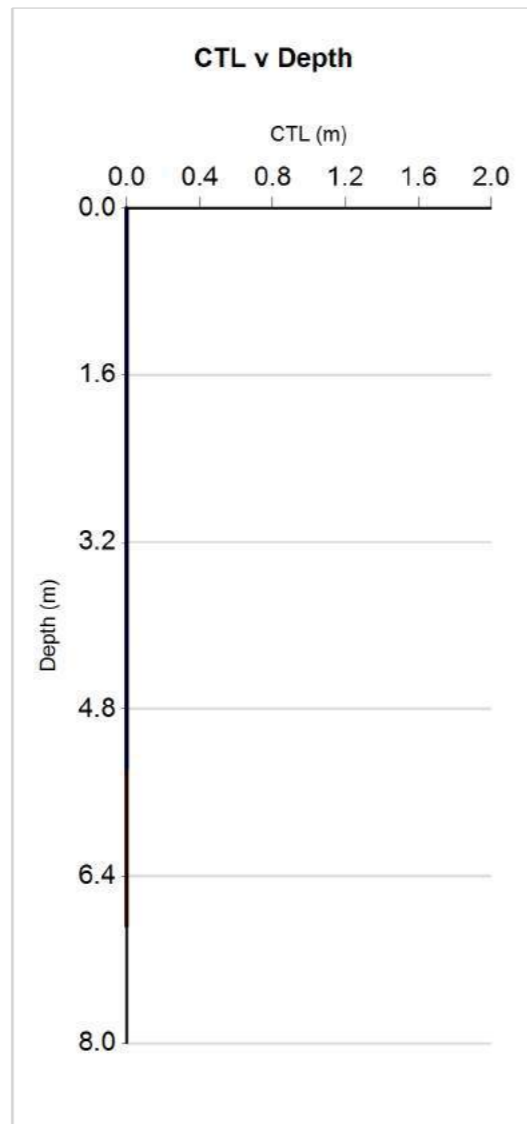
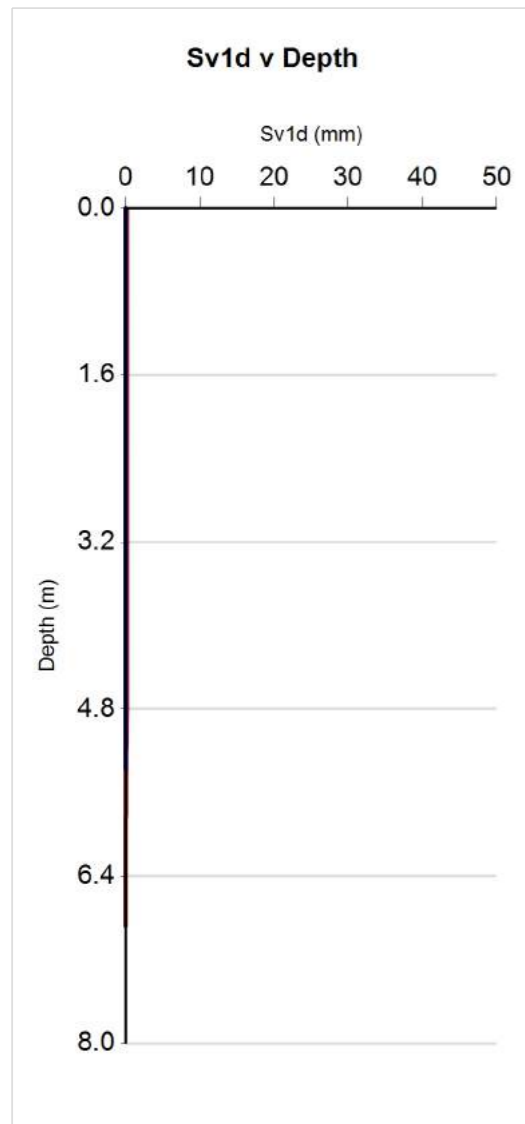
PAGE
3 of 8 pages



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|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
| 2. Organic soils - peats | 7. Gravelly sand to dense sand |
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| 5. Sand mixtures - silty sand to sandy silt | |

*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)

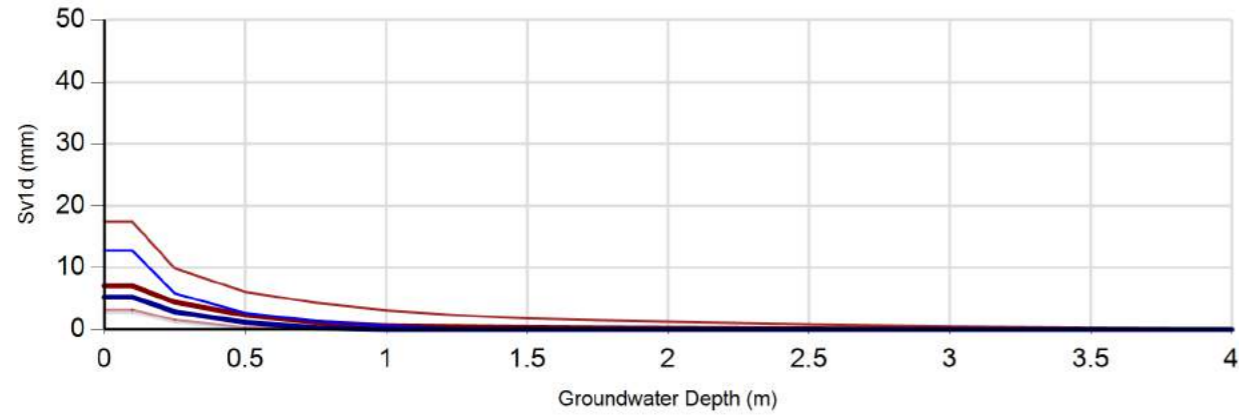


(Assumed pre-drill values)

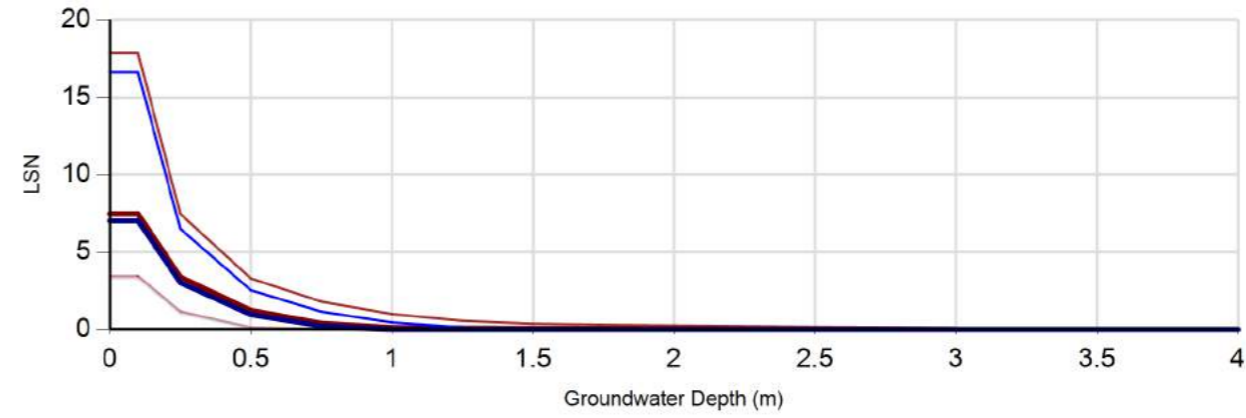
CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT10	103688	12/10/2017	User Specified	6.2	0.11	3.3	BI-2014	ZRB-2002	1.55	2	0.01	18
CPT11	103689	11/10/2017	User Specified	6.2	0.11	3.84	BI-2014	ZRB-2002	1.5	2	0.01	18

Thicker lines represent the 50% probability of exceedance case and the thinner lines to the left and right of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.

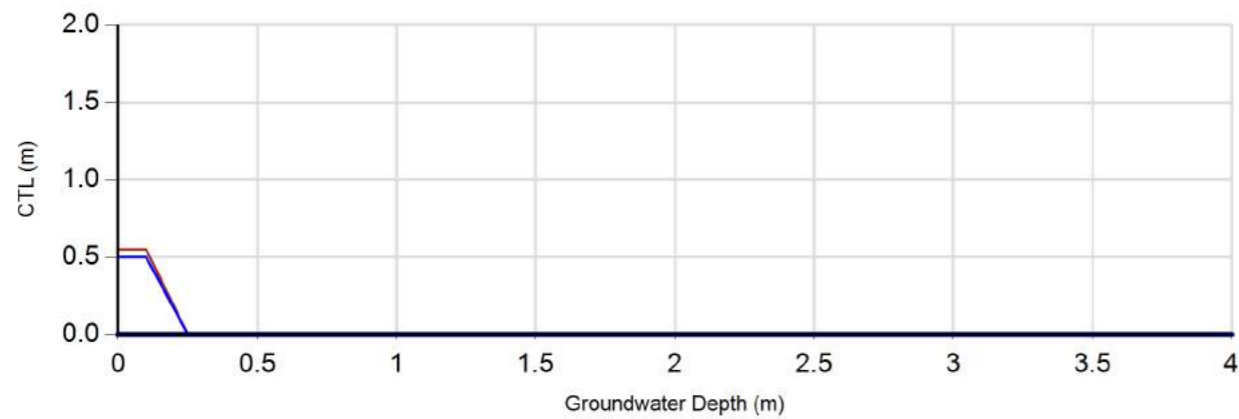
Sv1d response to GWD



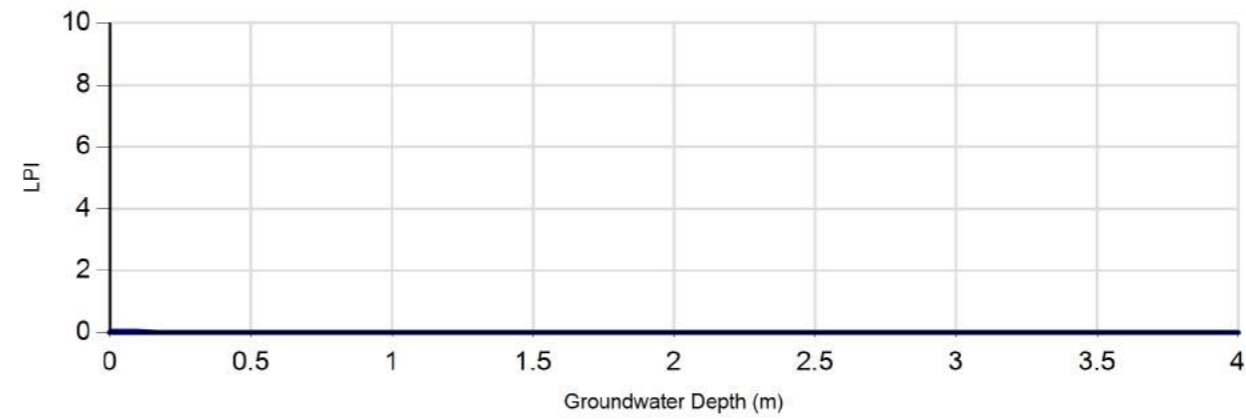
LSN response to GWD



CTL response to GWD



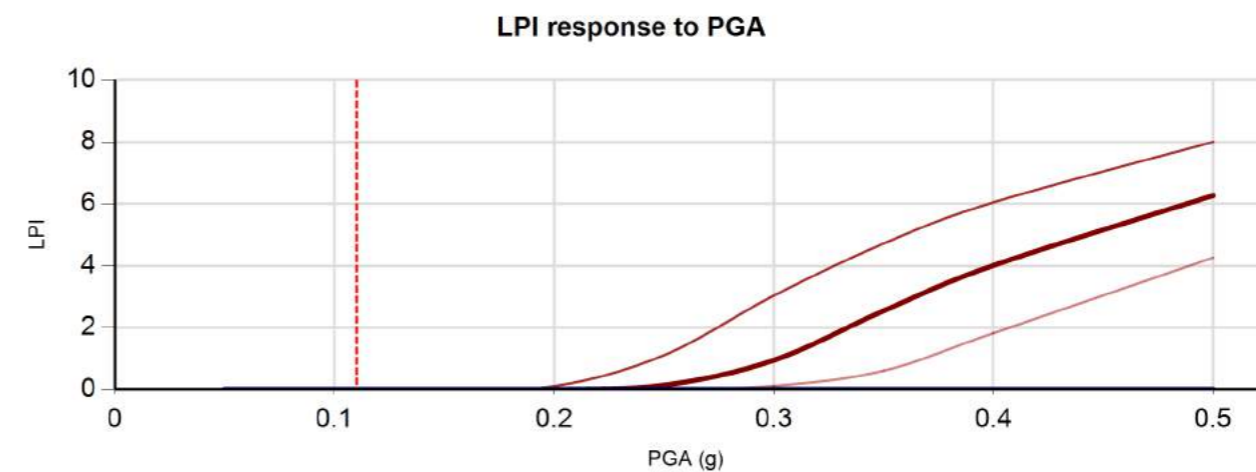
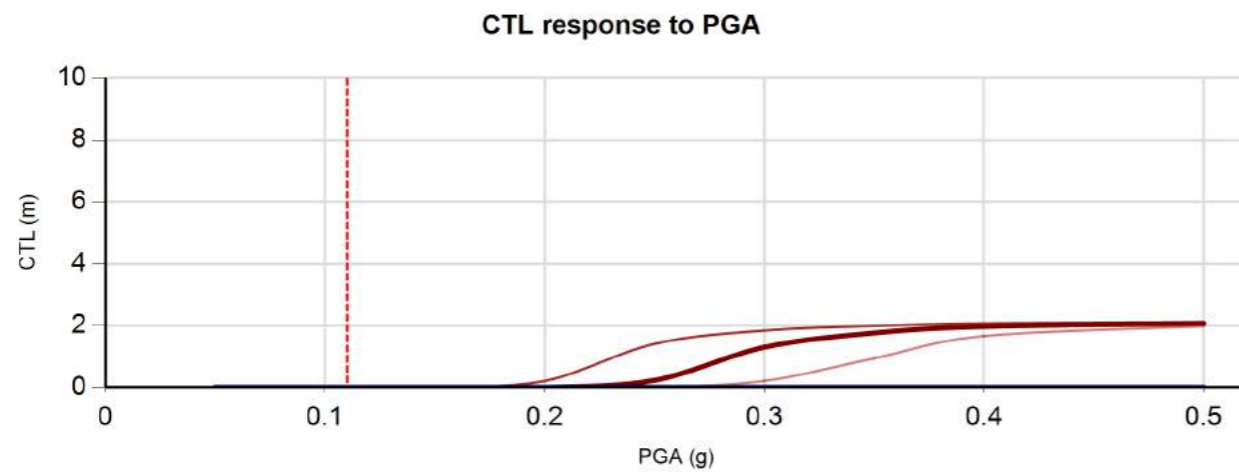
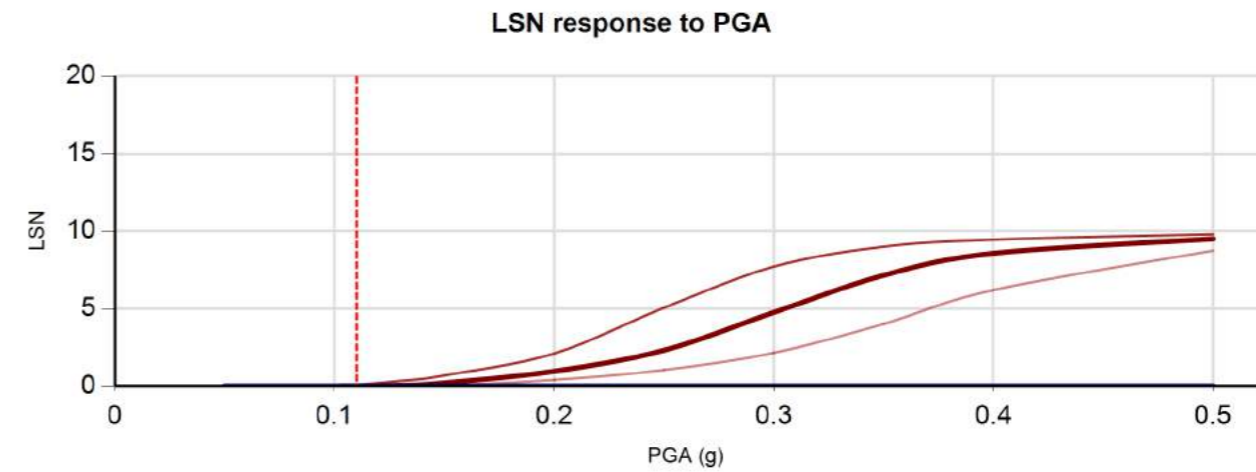
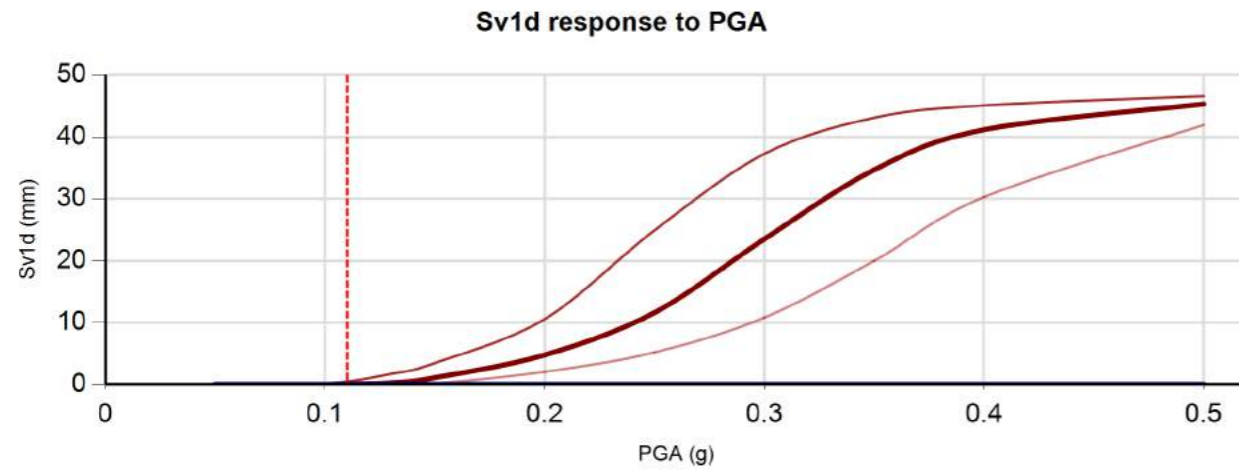
LPI response to GWD



(Assumed pre-drill values)

CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m³)
CPT10	103688	12/10/2017	User Specified	6.2	0.11	3.3	BI-2014	ZRB-2002	1.55	2	0.01	18
CPT11	103689	11/10/2017	User Specified	6.2	0.11	3.84	BI-2014	ZRB-2002	1.5	2	0.01	18

Thicker lines represent the 50% probability of exceedance case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.



Vertical dotted line/s indicate user specified PGA at the CPT locations. (actual PGA)

(Assumed pre-drill values)

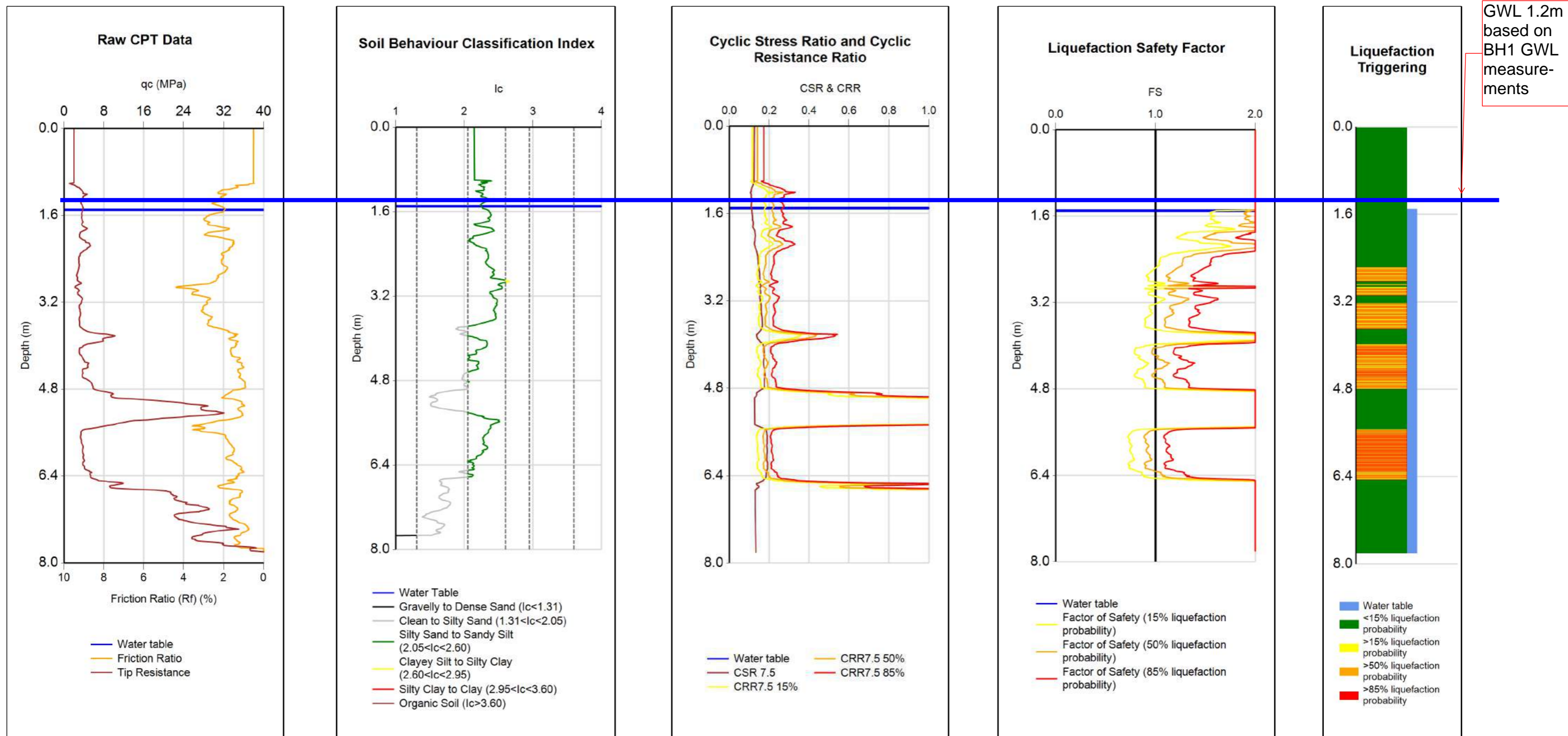
CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT10	103688	12/10/2017	User Specified	6.2	0.11	3.3	BI-2014	ZRB-2002	1.55	2	0.01	18
CPT11	103689	11/10/2017	User Specified	6.2	0.11	3.84	BI-2014	ZRB-2002	1.5	2	0.01	18

Thicker lines represent the 50% probability of exceedance case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.

The inputs listed in Table 1.1-1 below have been adopted for the liquefaction analysis.

Table 1.1-1 Summary of inputs for liquefaction analysis

TTGD ID	103688	103689
CPT Name	05TT12_10	05TT12_11
PGA	0.11g	0.11g
Magnitude	6.2	6.2
Depth to groundwater	3.3m	3.84m
Predrill depth	1.55m	1.5m
Assumed predrill tip resistance and skin friction	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa
Trigger method	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)
Settlement method	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)
CFC	0	0
Total depth of CPT	6.88m	5.37m
Maximum depth of analysis	6.88m	5.37m
RL	n/a	n/a



(Assumed pre-drill values)

INPUT	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
	CPT02	103680	12/10/2017	User Specified	6.2	0.23	1.5	BI-2014	ZRB-2002	1	2	0.01	18
OUTPUT	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
	15%	47	2.6	3	12	2.7	1						
	50%	24	1	0	5	4.1	0						
	85%	10	0	0	2	7.8	0						

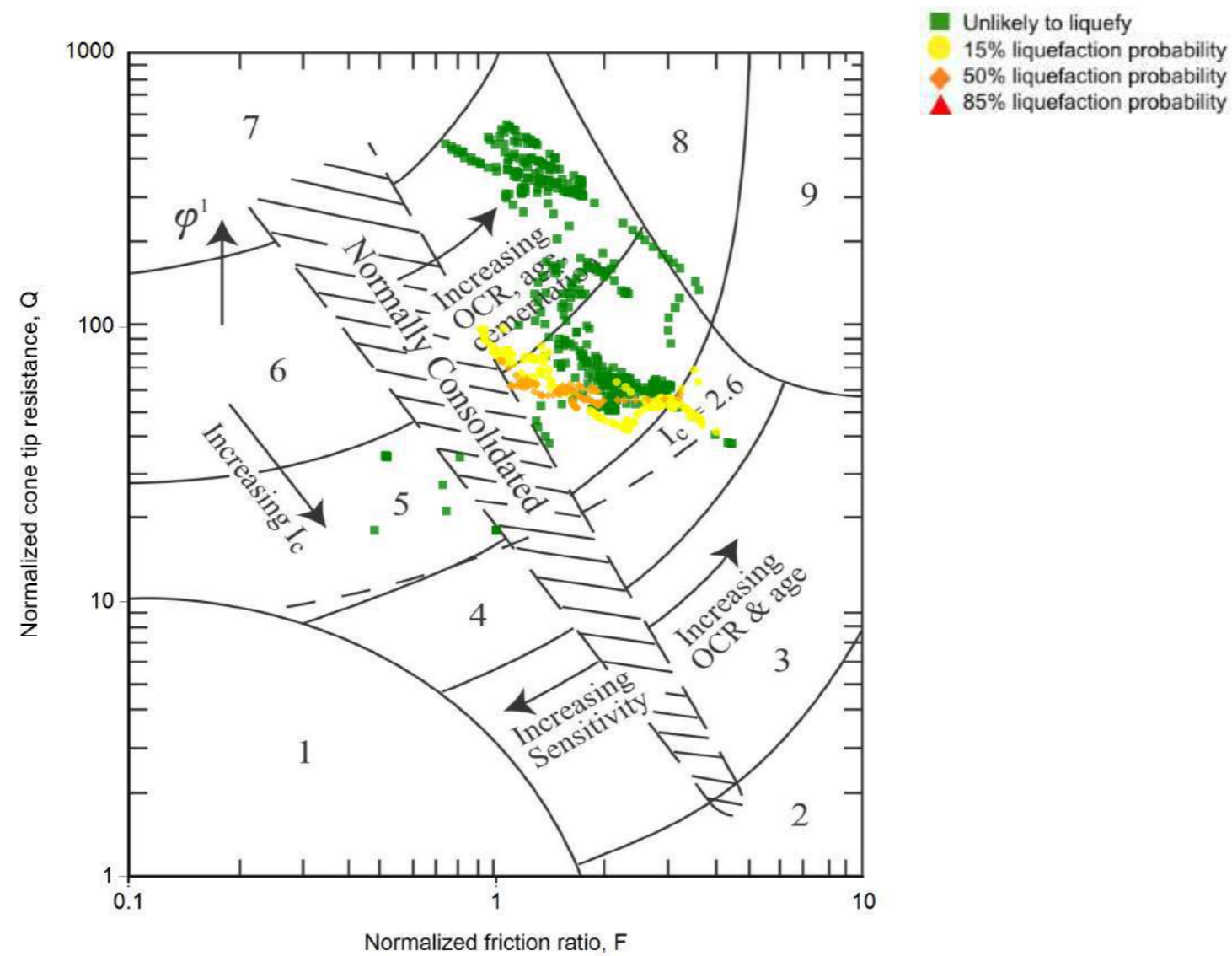
Top 1.5m of this CPT was vacuum excavated and backfilled with sand. Therefore, groundwater is set to 1.5m below ground level (BGL) in order to capture the more realistic liquefaction risk. It is note that the actual measured ground water at 0.1m BGL. Therefore, the liquefaction risk of the top 1.5m layer is unknown.



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Karori Prepurchase Geotechnical Assessment
TITLE
100 year return period CPT2, 3, 4 and 5

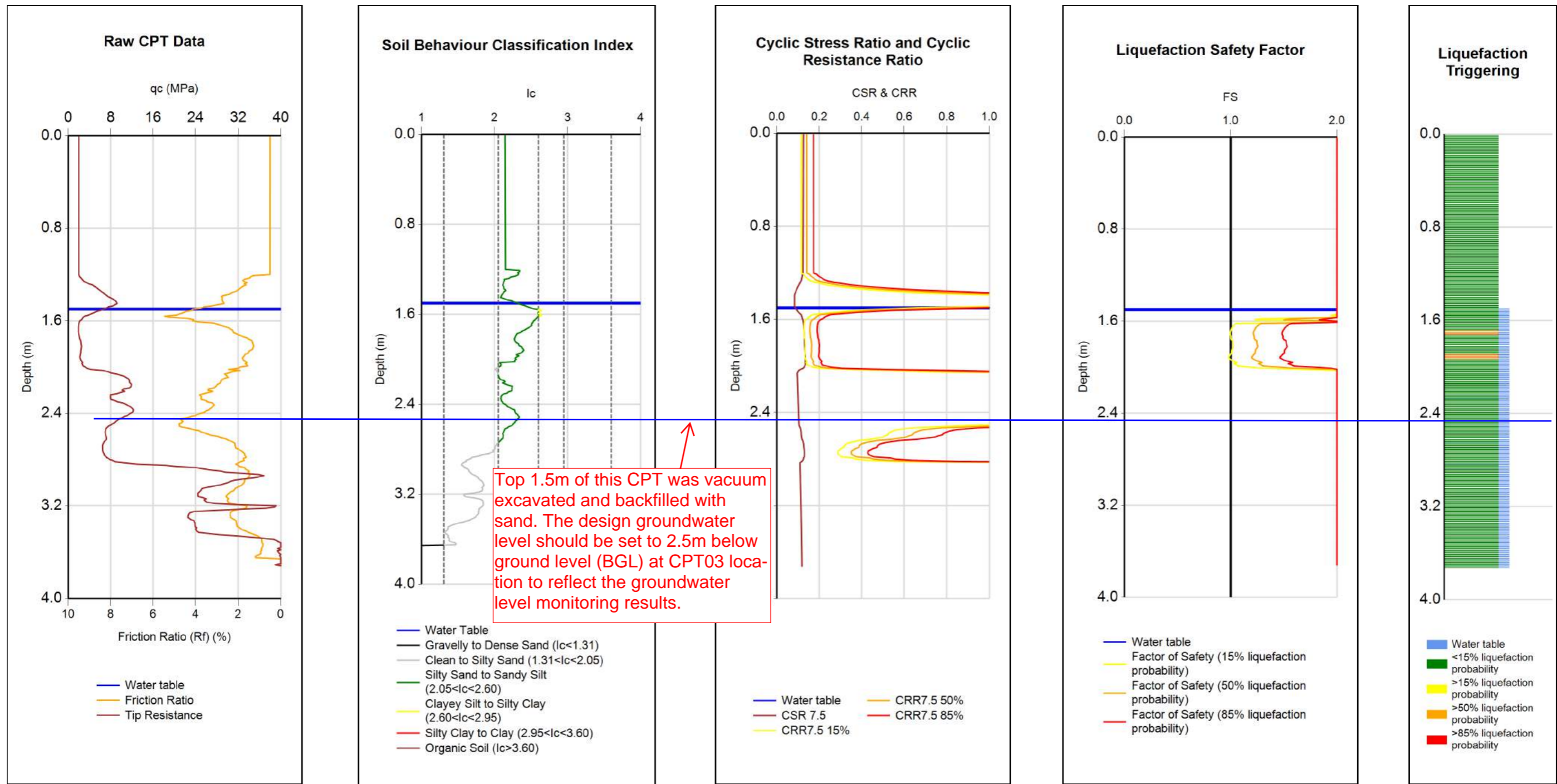
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|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
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*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)

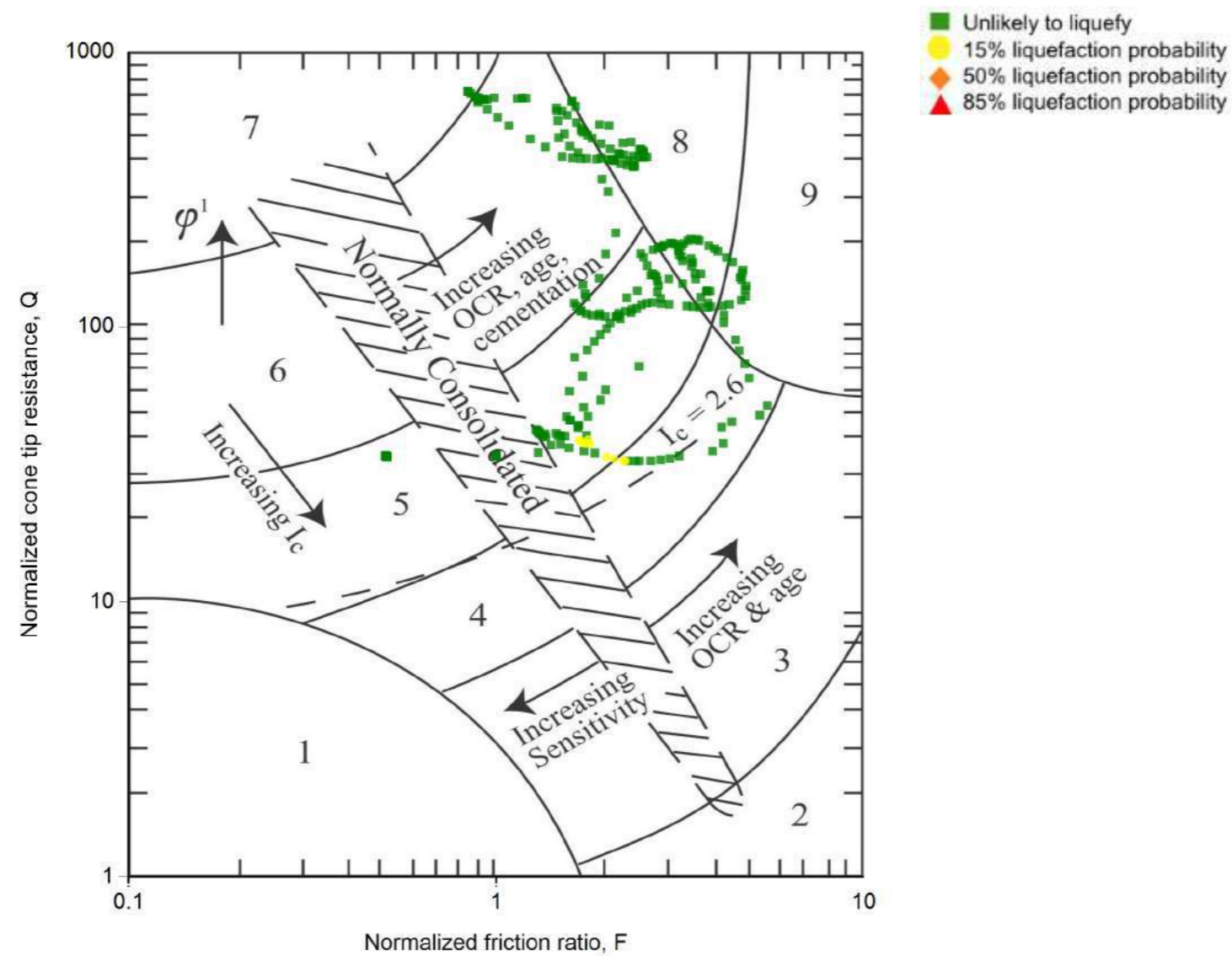


Top 1.5m of this CPT was vacuum excavated and backfilled with sand. The design groundwater level should be set to 2.5m below ground level (BGL) at CPT03 location to reflect the groundwater level monitoring results.

(Assumed pre-drill values)

INPUT	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
	CPT03	103681	12/10/2017	User Specified	6.2	0.23	1.5	BI-2014	ZRB-2002	1.2	2	0.01	18
OUTPUT	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
	15%	3	0.1	0	2	3.7	0						
	50%	1	0	0	1	3.7	0						
	85%	1	0	0	0	3.7	0						

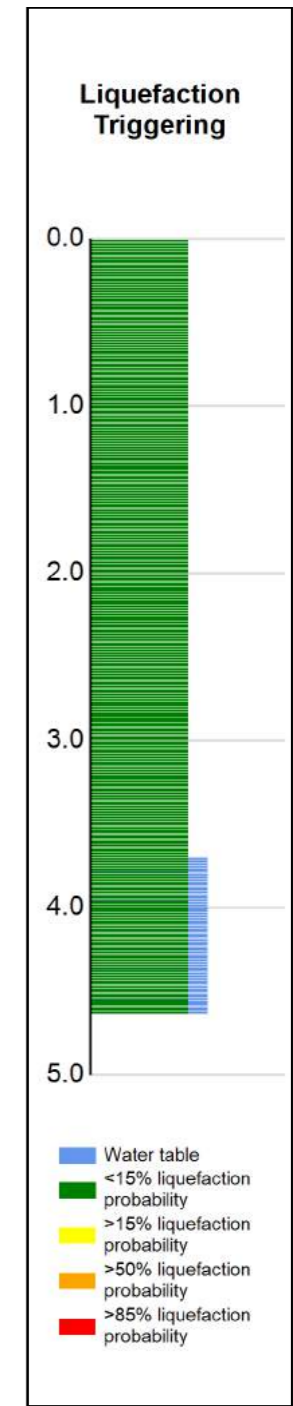
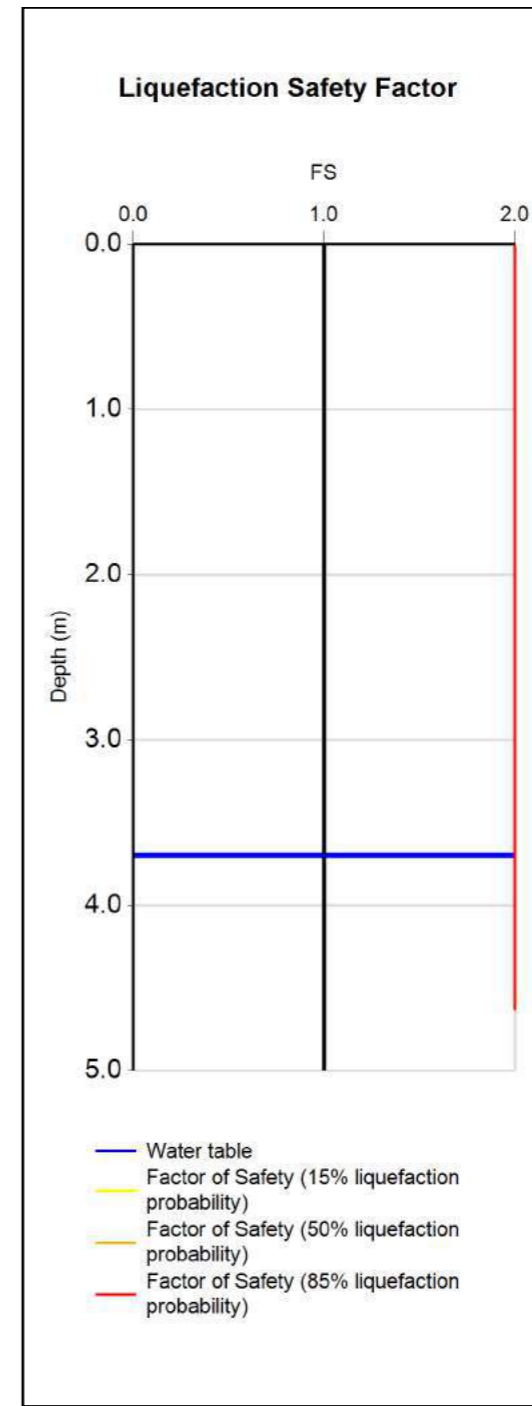
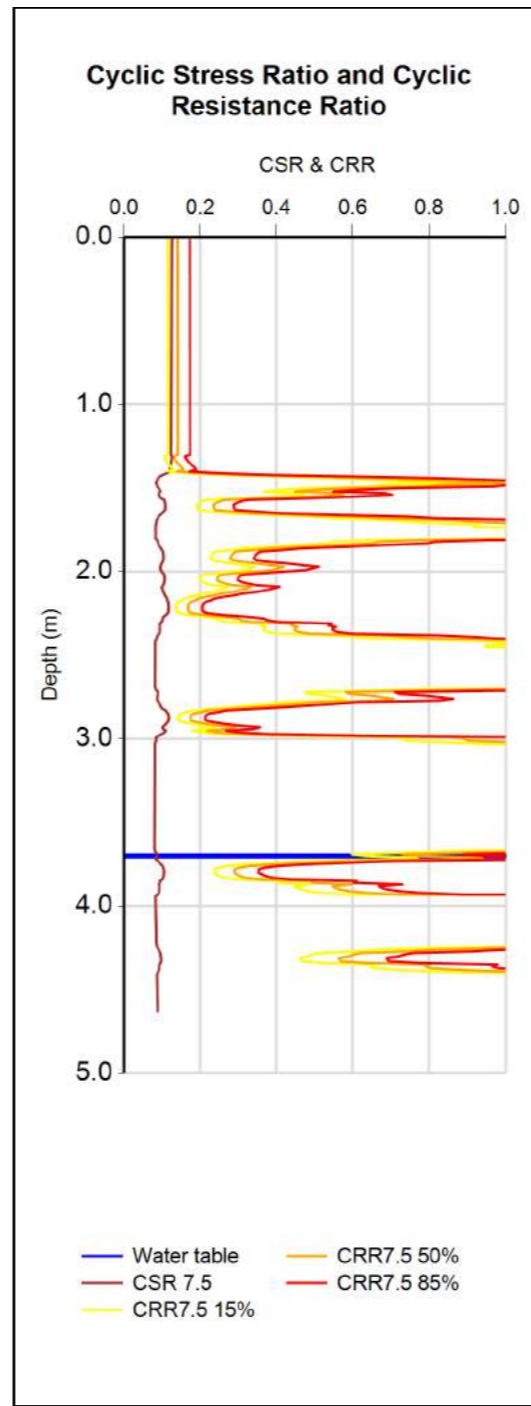
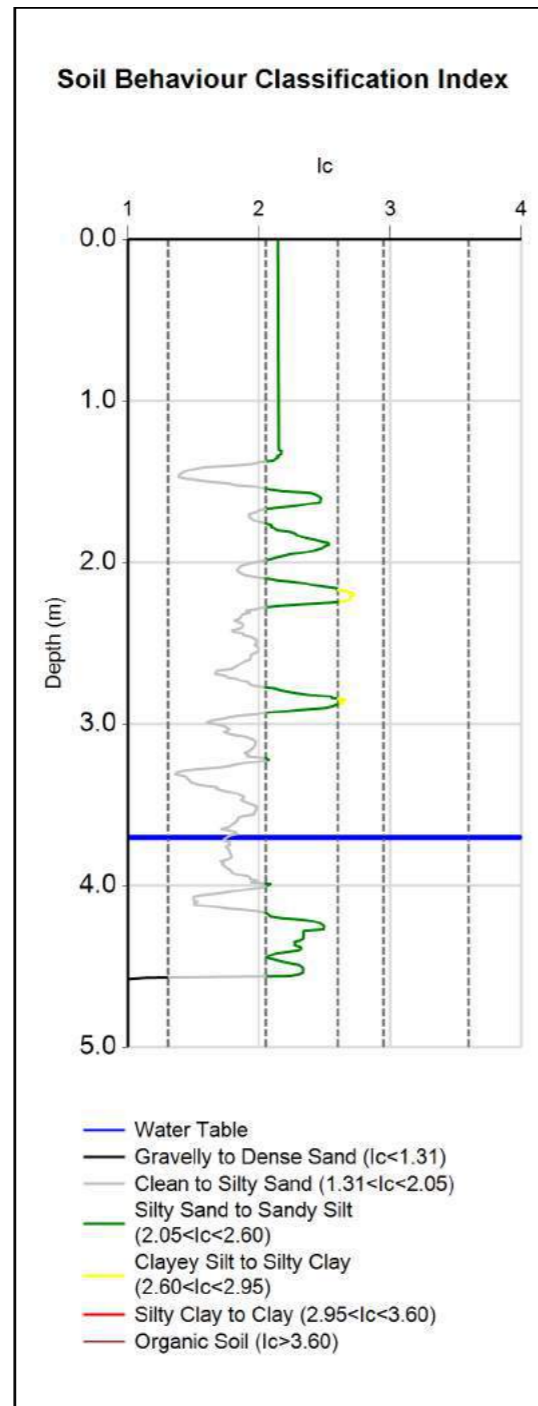
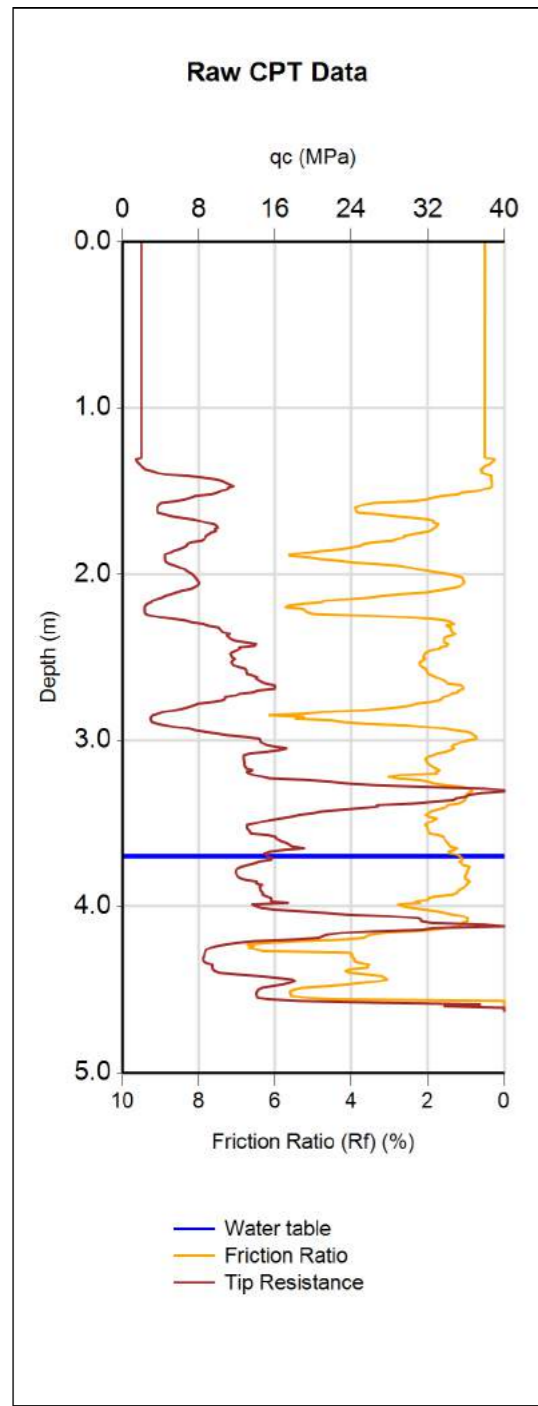
Top 1.5m of this CPT is vacuum excavated and backfilled with sand. Therefore, groundwater is set to 1.5m below ground level (BGL) in order to capture the more realistic liquefaction risk. It is note that the actual measured ground water at 0.5m BGL. The liquefaction risk of the top 1.5m layer is unknown.



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|--|-------------------------------------|
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| 4. Silt mixtures - clayey silt to silty clay | 9. Very stiff, fine grained * |
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*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT04	103682	11/10/2017	User Specified	6.2	0.23	3.7	BI-2014	ZRB-2002	1.3	2	0.01	18
OUTPUT	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
	15%	0	0	0	0	4.6	0						
	50%	0	0	0	0	4.6	0						
	85%	0	0	0	0	4.6	0						



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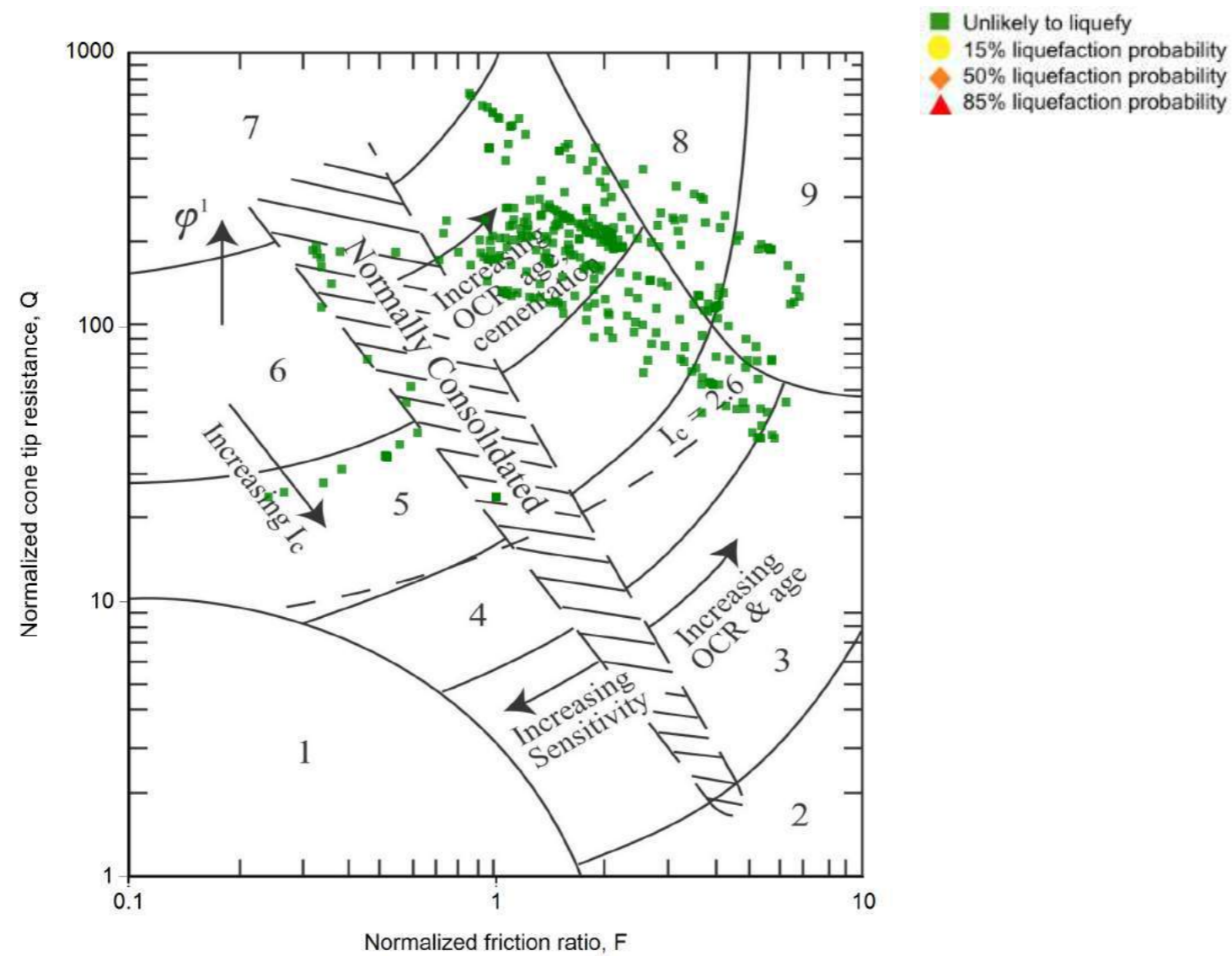
CLIENT, PROJECT
Ryman Healthcare Limited
Karori Prepurchase Geotechnical Assessment

TITLE
100 year return period CPT2, 3, 4 and 5

LOCATION
Victoria University
Karori Campus

JOB NUMBER
30309


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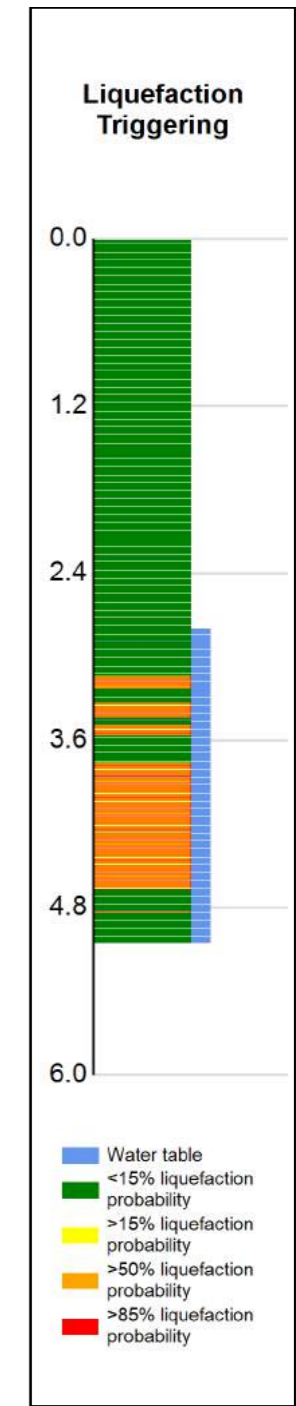
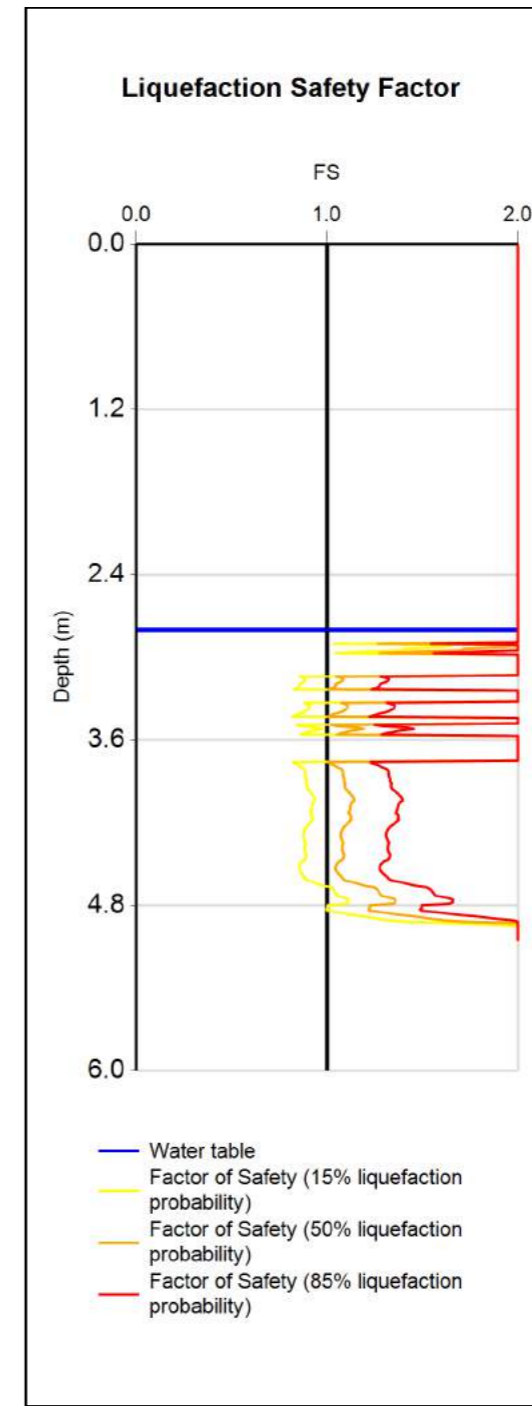
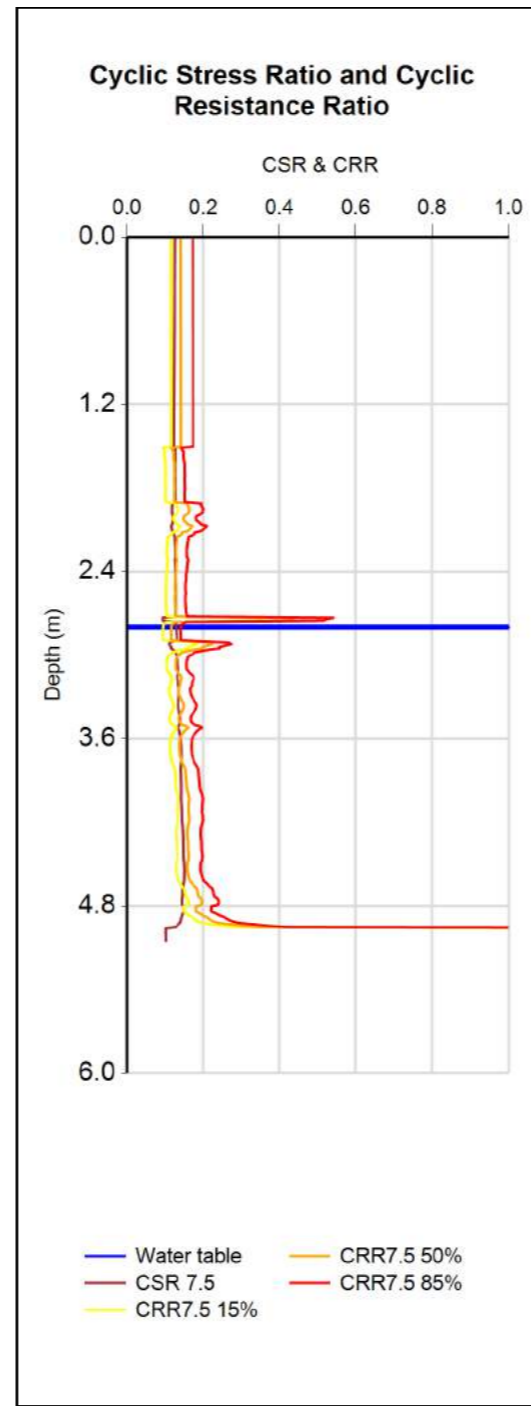
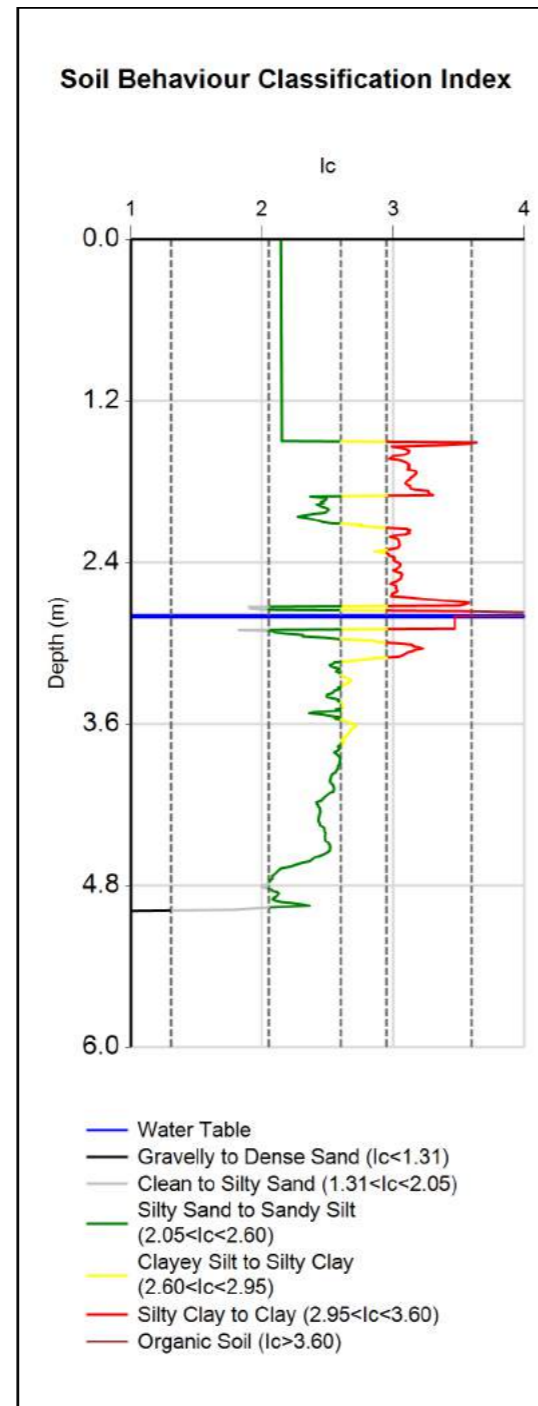
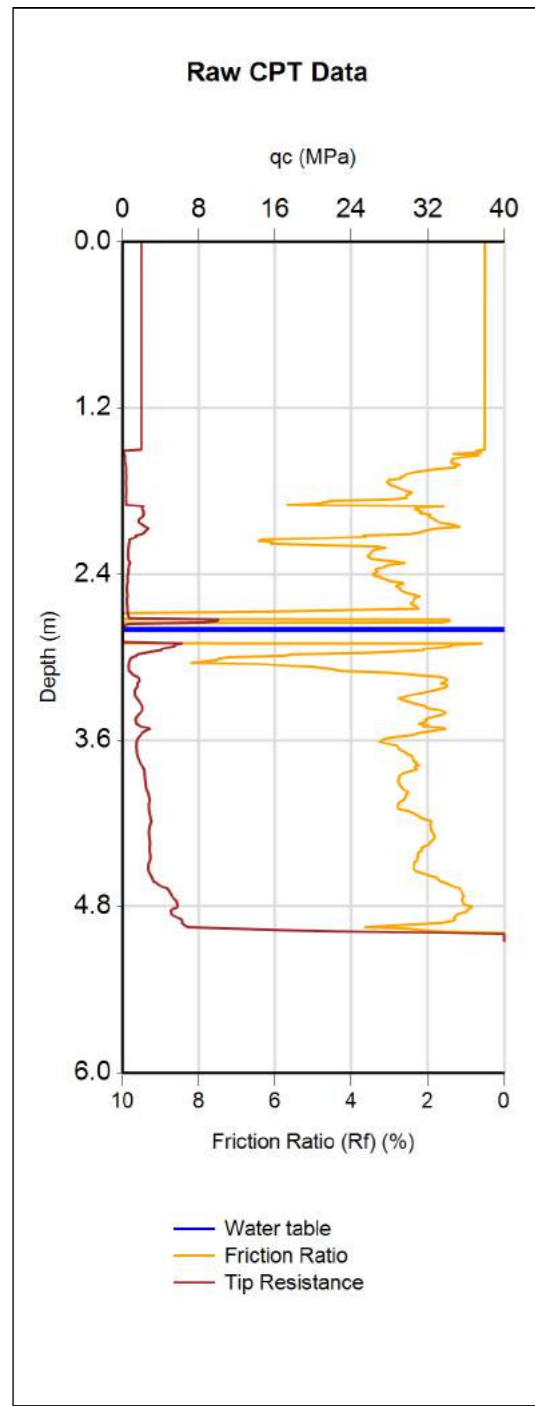


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|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
| 2. Organic soils - peats | 7. Gravelly sand to dense sand |
| 3. Clays - silty clay to clay | 8. Very stiff sand to clayey sand * |
| 4. Silt mixtures - clayey silt to silty clay | 9. Very stiff, fine grained * |
| 5. Sand mixtures - silty sand to sandy silt | |

*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)

 Tonkin+Taylor Exceptional thinking together V1.3	CLIENT, PROJECT Ryman Healthcare Limited Karori Prepurchase Geotechnical Assessment	LOCATION Victoria University Karori Campus	DATE 27/10/2017
	TITLE 100 year return period CPT2, 3, 4 and 5	JOB NUMBER 30309	ANALYSED tzhl



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT05	103683	12/10/2017	User Specified	6.2	0.23	2.8	BI-2014	ZRB-2002	1.5	2	0.01	18
	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
OUTPUT	15%	24	1.2	1	6	3.2	0						
	50%	9	0	0	2	5	0						
	85%	4	0	0	1	5	0						

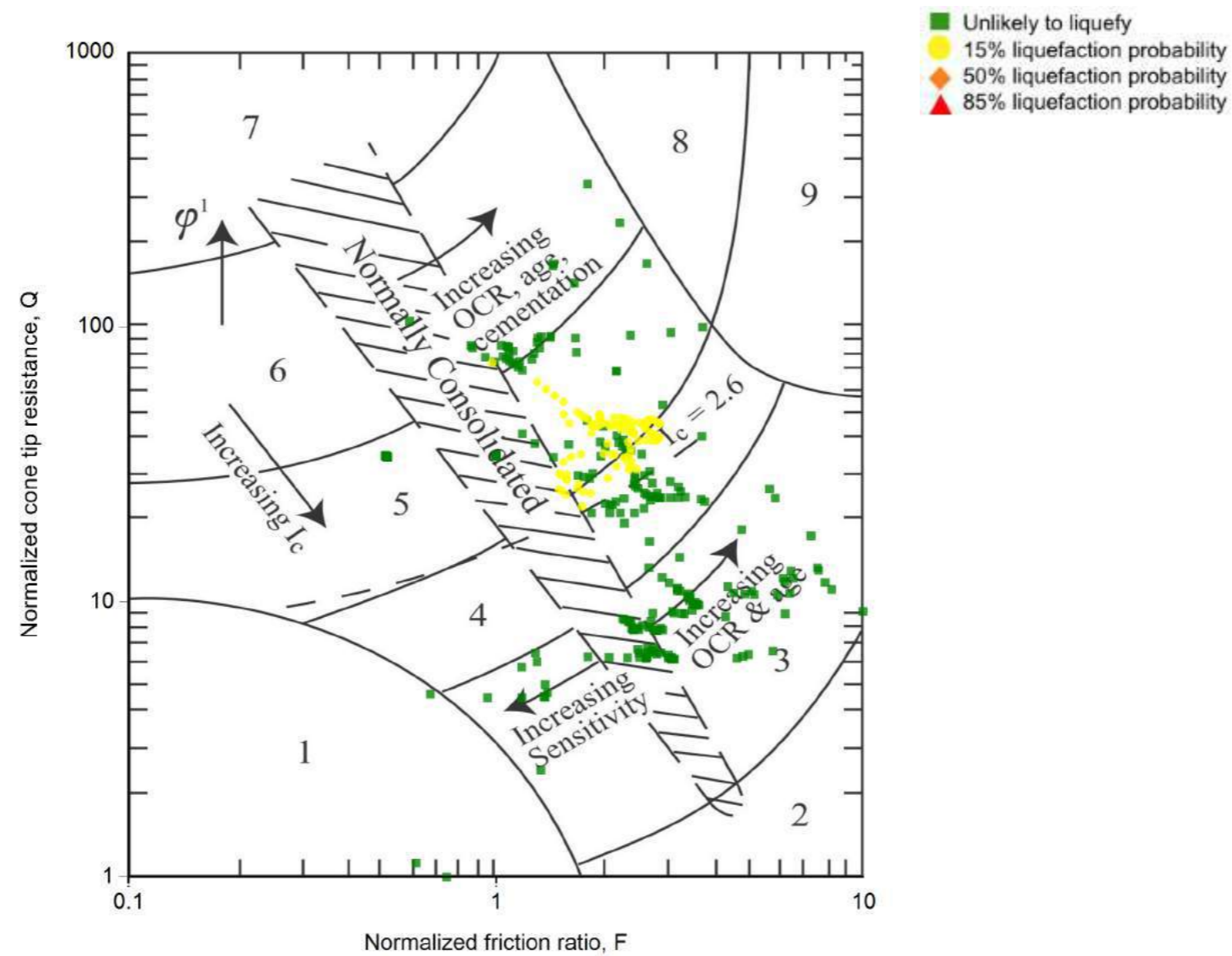


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CLIENT, PROJECT
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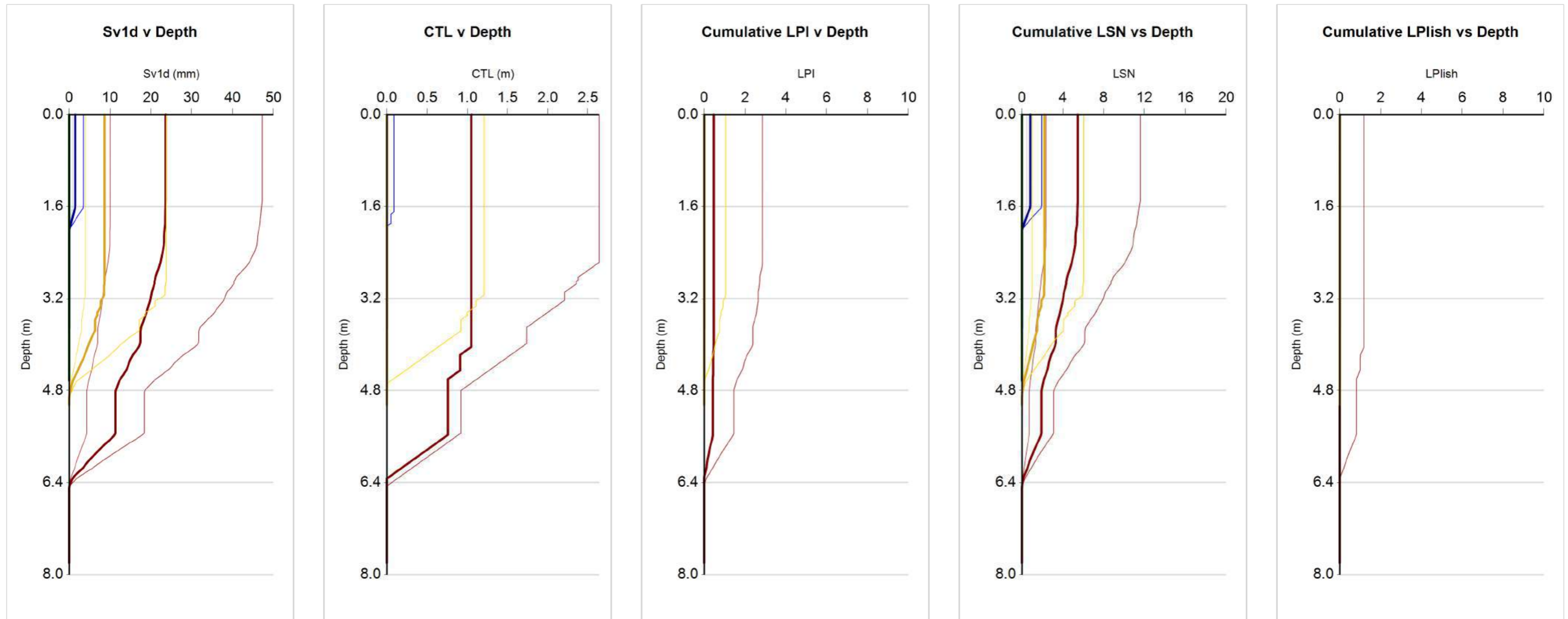


- | | |
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| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
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CPT-based soil behavior type classification chart by Robertson (1990)

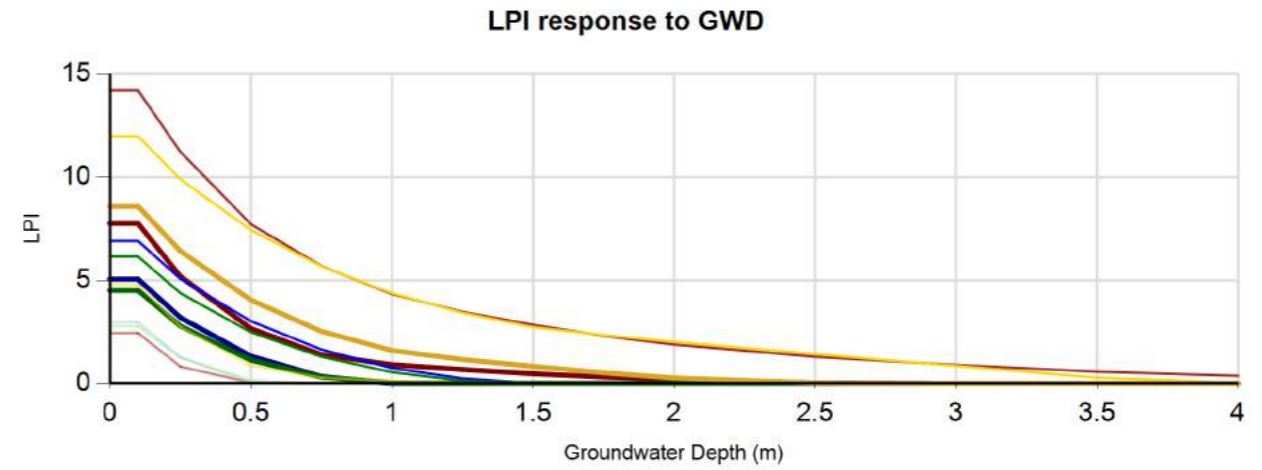
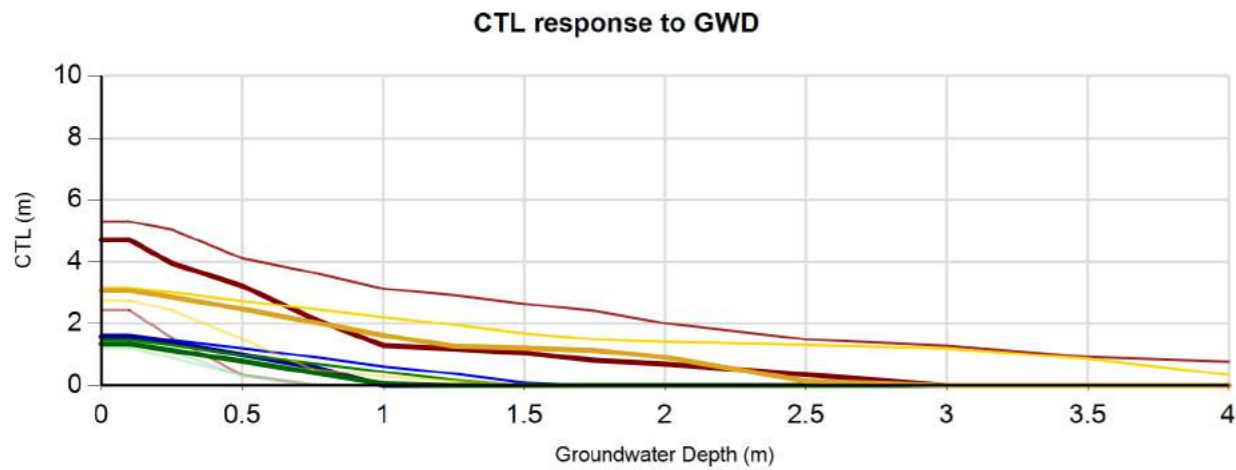
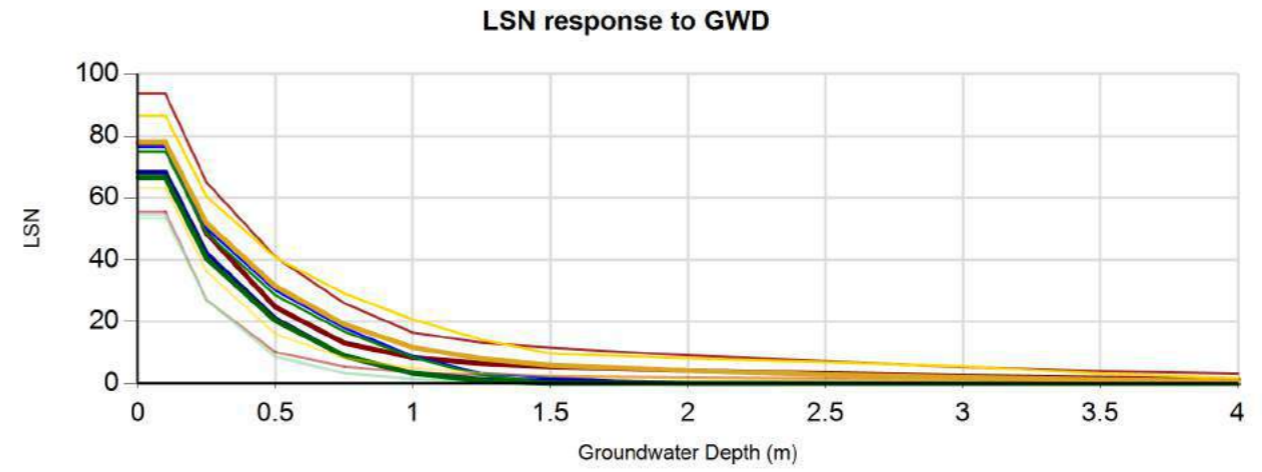
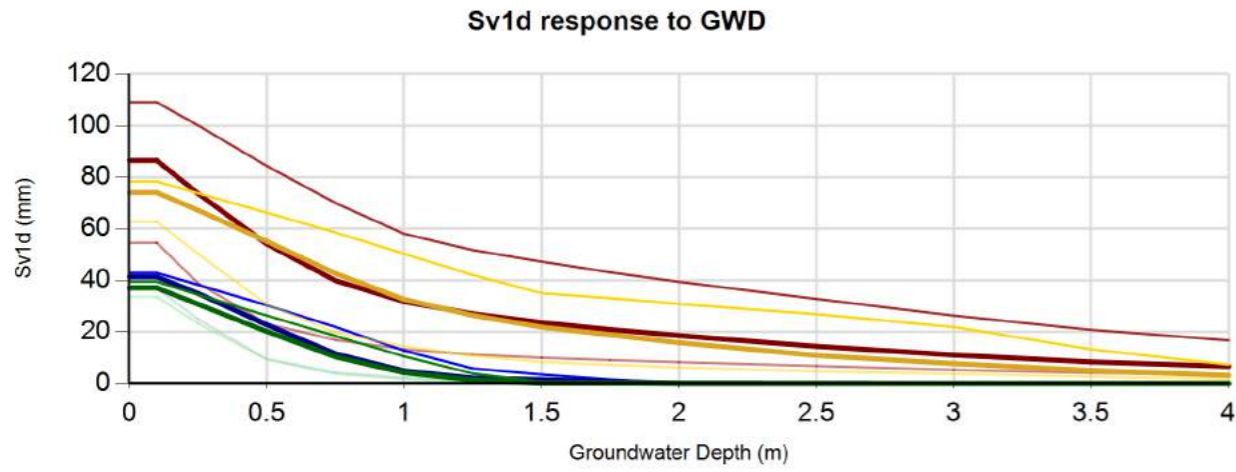
 Tonkin+Taylor Exceptional thinking together V1.3	CLIENT, PROJECT Ryman Healthcare Limited Karori Prepurchase Geotechnical Assessment	LOCATION Victoria University Karori Campus	DATE 27/10/2017
	TITLE 100 year return period CPT2, 3, 4 and 5	JOB NUMBER 30309	ANALYSED tzhl
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(Assumed pre-drill values)

CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT02	103680	12/10/2017	User Specified	6.2	0.23	1.5	BI-2014	ZRB-2002	1	2	0.01	18
CPT03	103681	12/10/2017	User Specified	6.2	0.23	1.5	BI-2014	ZRB-2002	1.2	2	0.01	18
CPT04	103682	11/10/2017	User Specified	6.2	0.23	3.7	BI-2014	ZRB-2002	1.3	2	0.01	18
CPT05	103683	12/10/2017	User Specified	6.2	0.23	2.8	BI-2014	ZRB-2002	1.5	2	0.01	18

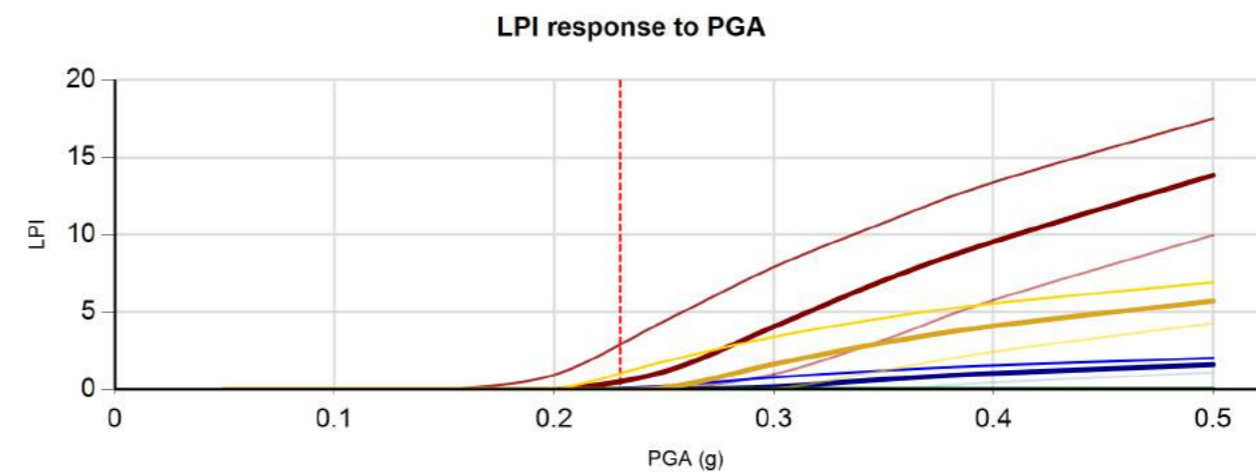
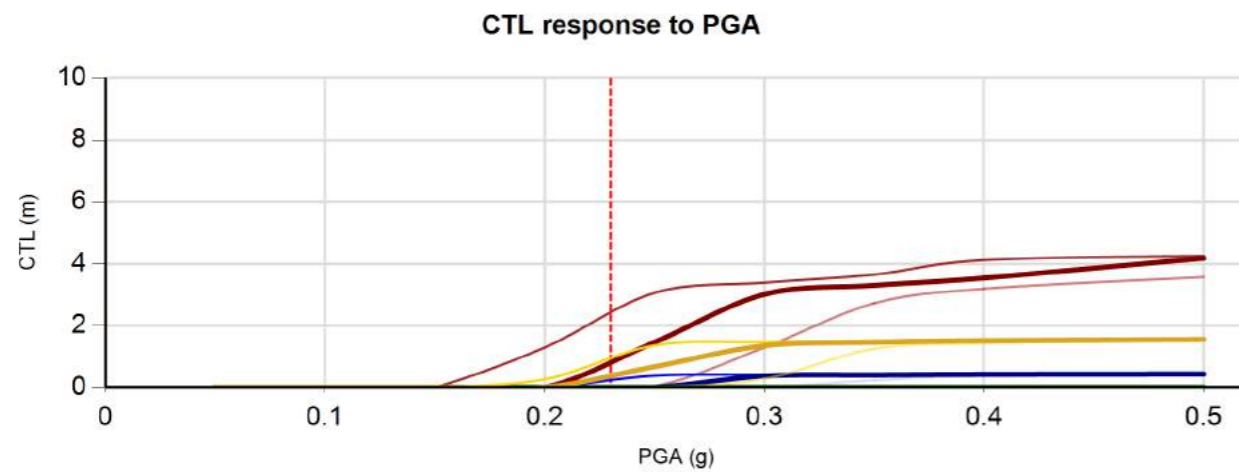
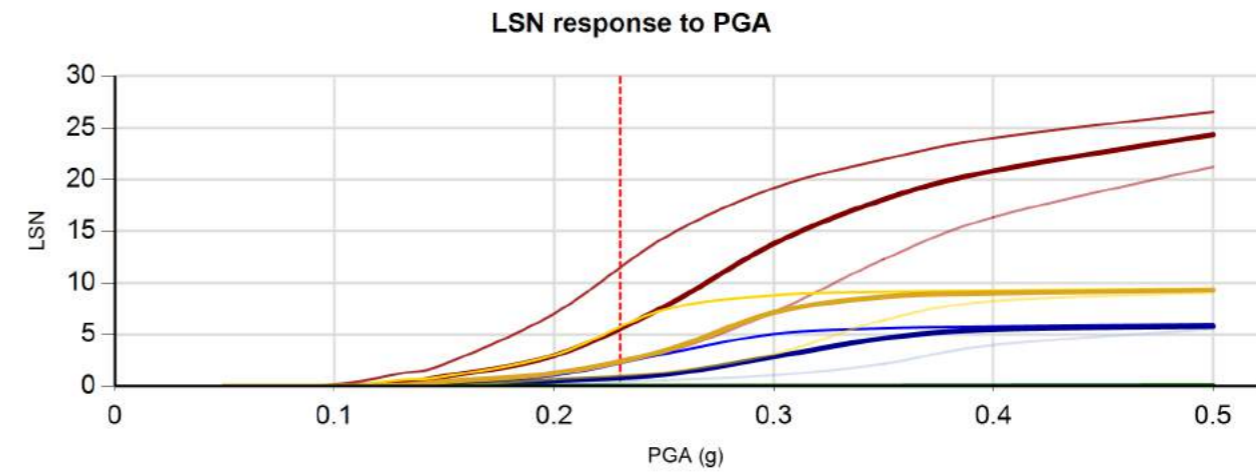
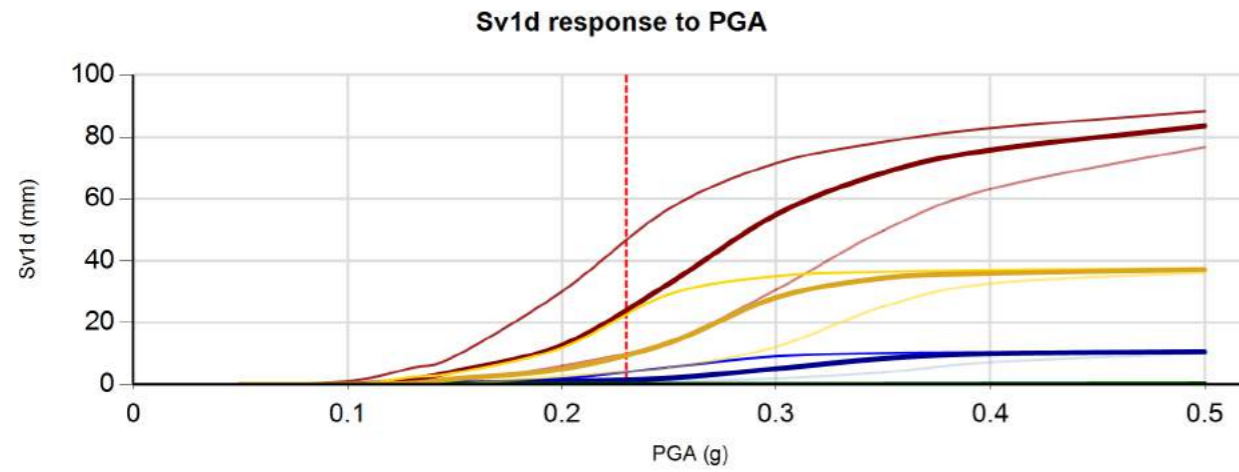
Thicker lines represent the 50% probability of exceedance case and the thinner lines to the left and right of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.



(Assumed pre-drill values)

CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT02	103680	12/10/2017	User Specified	6.2	0.23	1.5	BI-2014	ZRB-2002	1	2	0.01	18
CPT03	103681	12/10/2017	User Specified	6.2	0.23	1.5	BI-2014	ZRB-2002	1.2	2	0.01	18
CPT04	103682	11/10/2017	User Specified	6.2	0.23	3.7	BI-2014	ZRB-2002	1.3	2	0.01	18
CPT05	103683	12/10/2017	User Specified	6.2	0.23	2.8	BI-2014	ZRB-2002	1.5	2	0.01	18

Thicker lines represent the 50% probability of exceedence case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedence cases respectively.



Vertical dotted line/s indicate user specified PGA at the CPT locations. (actual PGA)

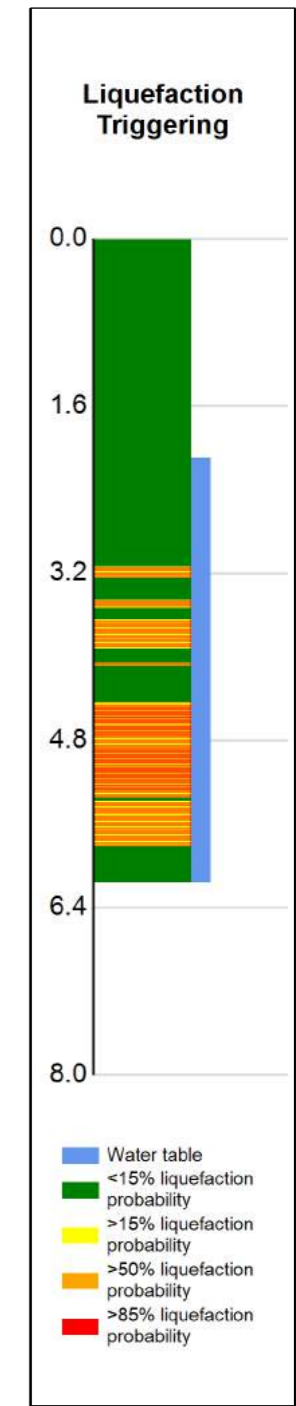
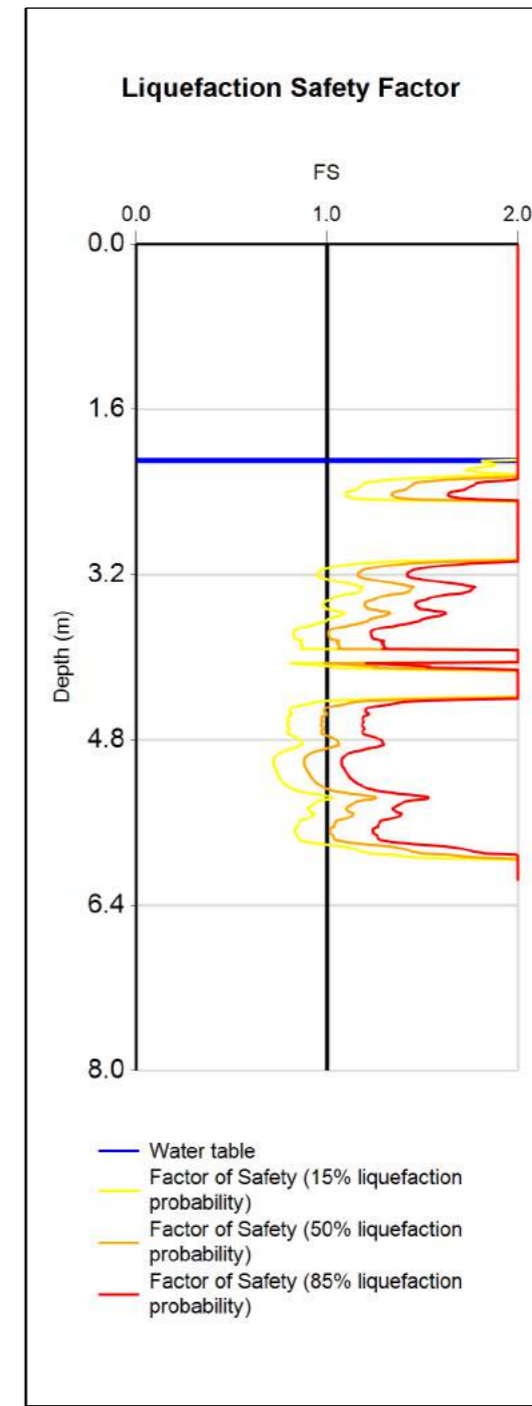
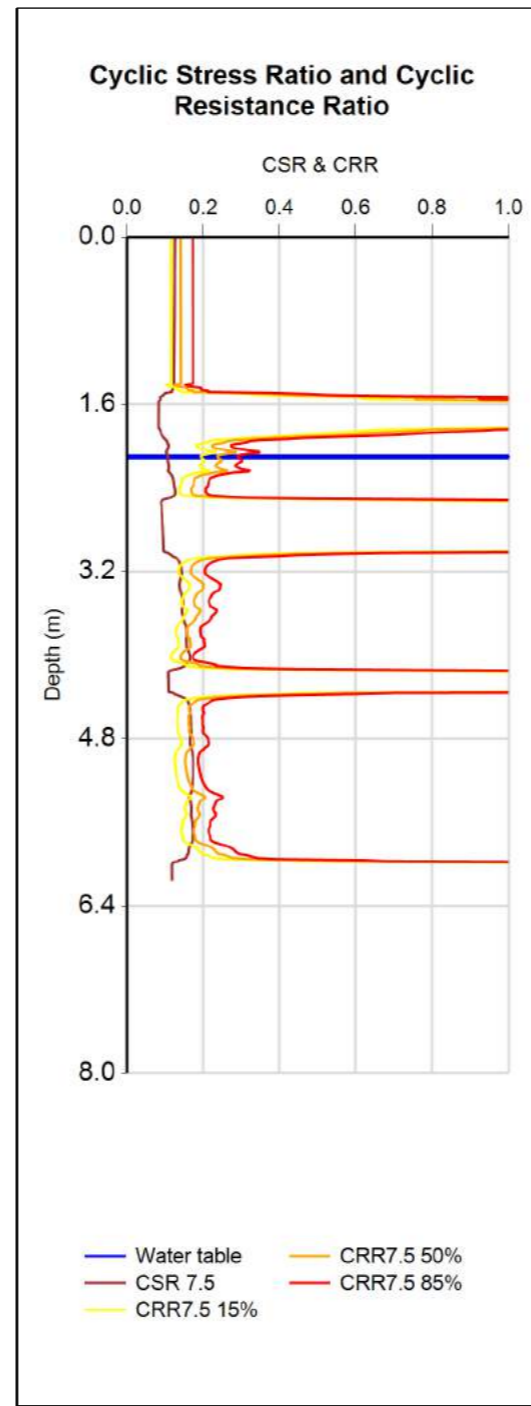
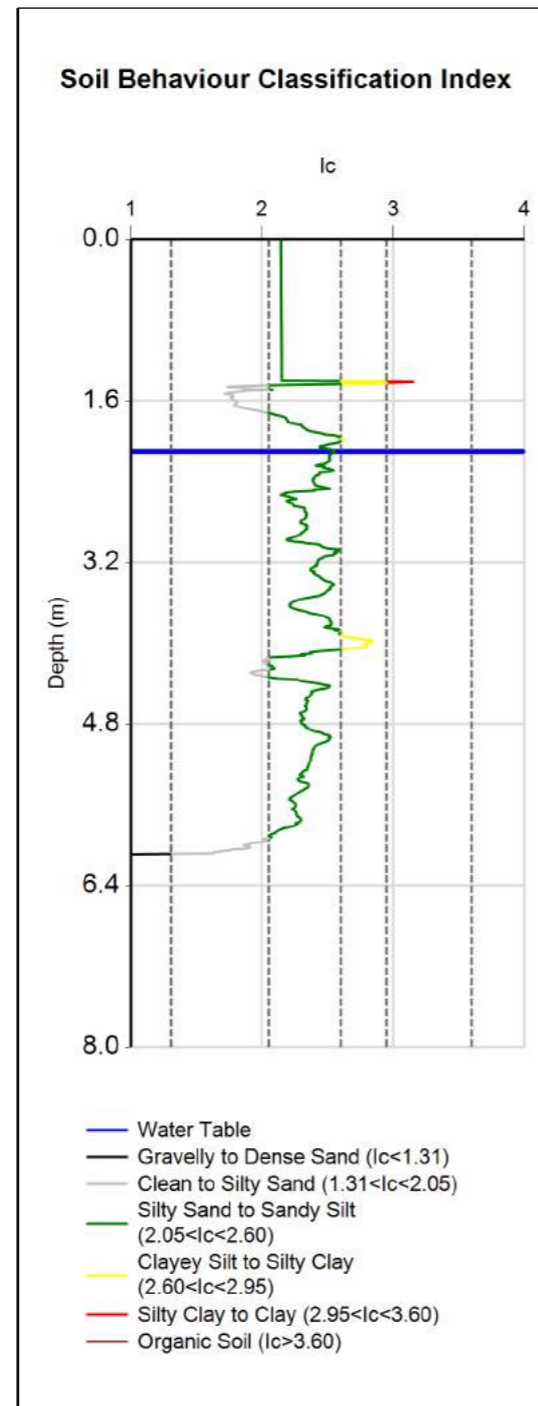
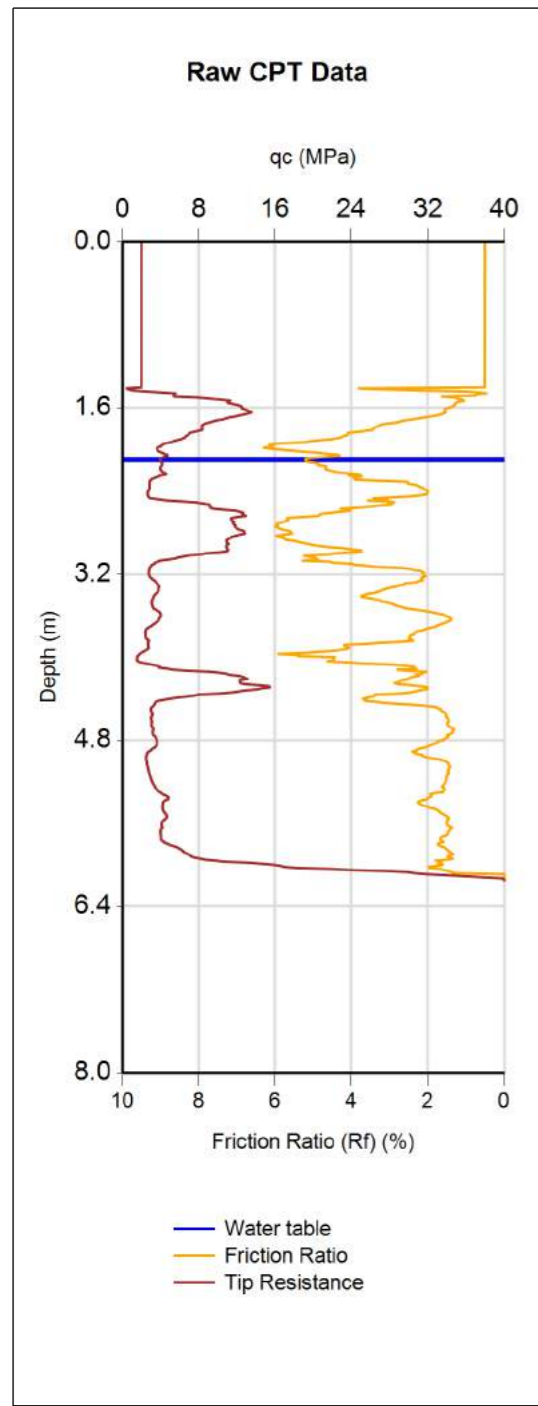
(Assumed pre-drill values)												
CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT02	103680	12/10/2017	User Specified	6.2	0.23	1.5	BI-2014	ZRB-2002	1	2	0.01	18
CPT03	103681	12/10/2017	User Specified	6.2	0.23	1.5	BI-2014	ZRB-2002	1.2	2	0.01	18
CPT04	103682	11/10/2017	User Specified	6.2	0.23	3.7	BI-2014	ZRB-2002	1.3	2	0.01	18
CPT05	103683	12/10/2017	User Specified	6.2	0.23	2.8	BI-2014	ZRB-2002	1.5	2	0.01	18

Thicker lines represent the 50% probability of exceedance case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.

The inputs listed in Table 1.1-1 below have been adopted for the liquefaction analysis.

Table 1.1-1 Summary of inputs for liquefaction analysis

TTGD ID	103680	103681	103682	103683
CPT Name	05TT12_02	05TT12_03	05TT12_04	05TT12_05
PGA	0.23g	0.23g	0.23g	0.23g
Magnitude	6.2	6.2	6.2	6.2
Depth to groundwater	1.5m	1.5m	3.7m	2.8m
Predrill depth	1m	1.2m	1.3m	1.5m
Assumed predrill tip resistance and skin friction	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa
Trigger method	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)
Settlement method	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)
CFC	0	0	0	0
Total depth of CPT	7.8m	3.72m	4.63m	5.05m
Maximum depth of analysis	7.8m	3.72m	4.63m	5.05m
RL	n/a	n/a	n/a	n/a



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT06a	103684	12/10/2017	User Specified	6.2	0.23	2.1	BI-2014	ZRB-2002	1.4	2	0.01	18
	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
OUTPUT	15%	37	1.9	2	8	3.2	0						
	50%	18	0.7	0	4	4.6	0						
	85%	8	0	0	2	6.2	0						



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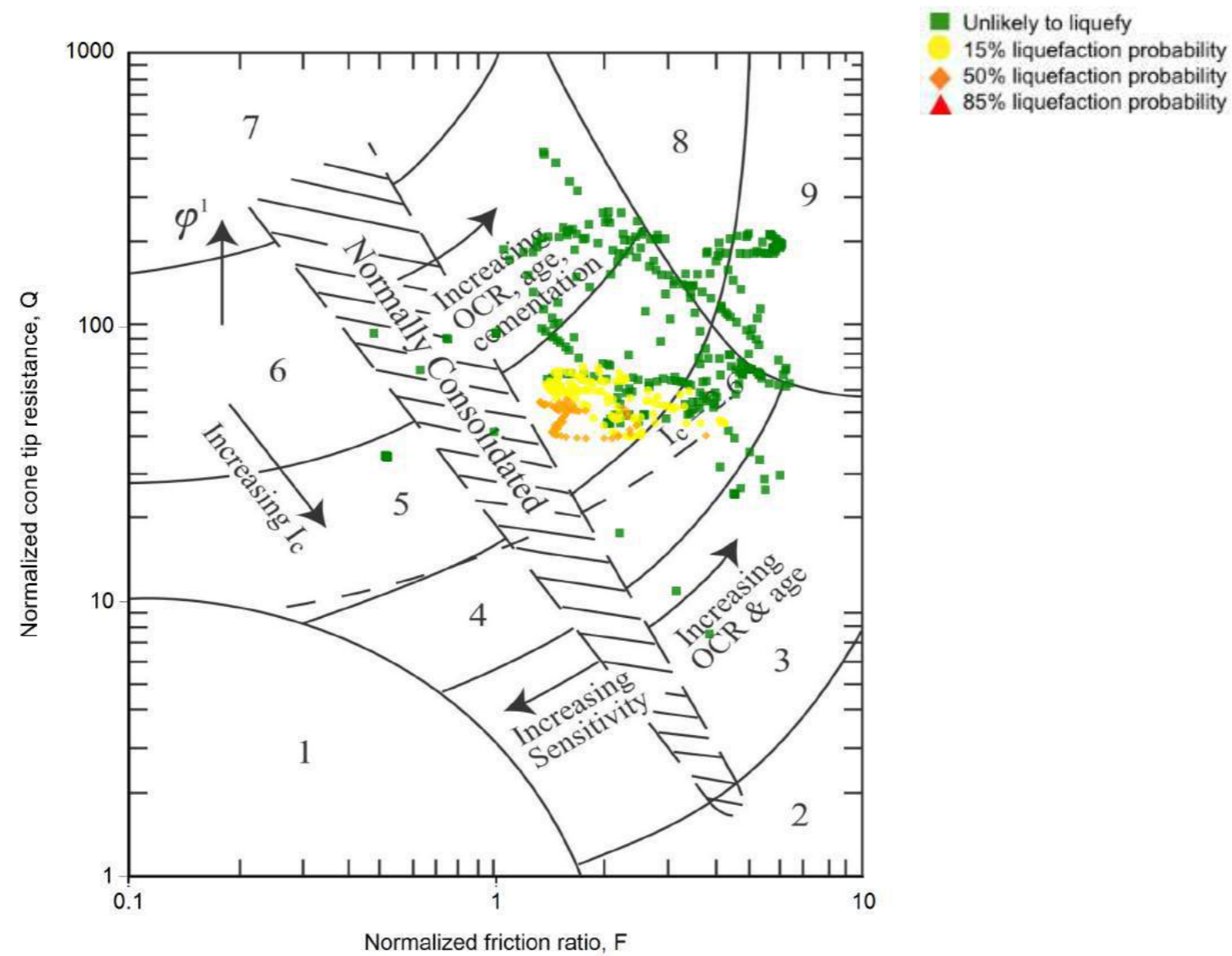
CLIENT, PROJECT
Ryman Healthcare Limited
Karori Prepurchase Geotechnical Assessment

TITLE
100 year return period - CPT6a, 7, 8a and 9

LOCATION
Victoria University
Karori Campus

JOB NUMBER
30309

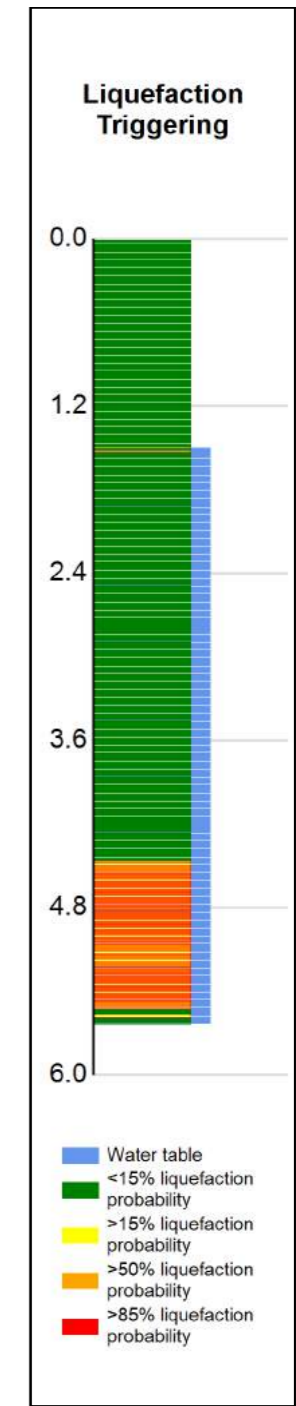
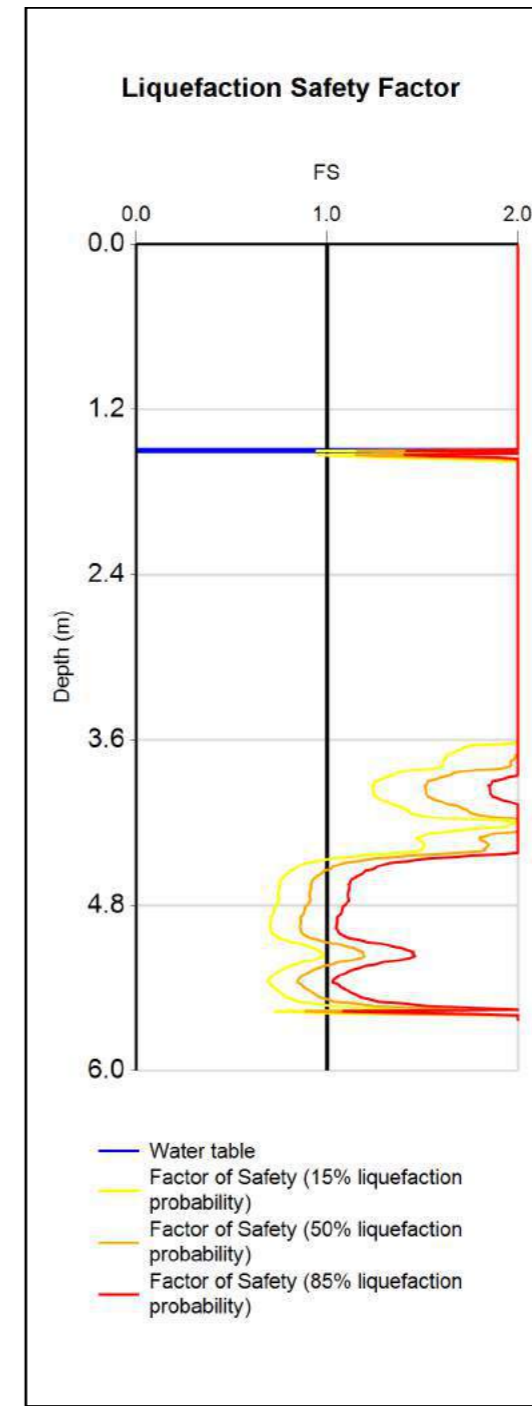
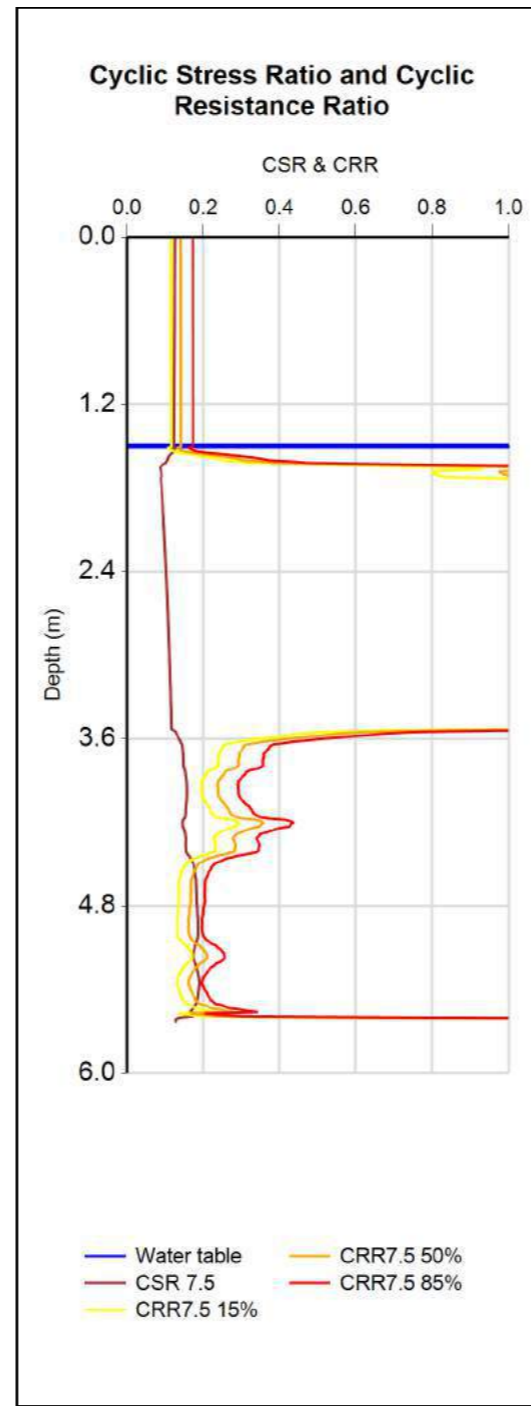
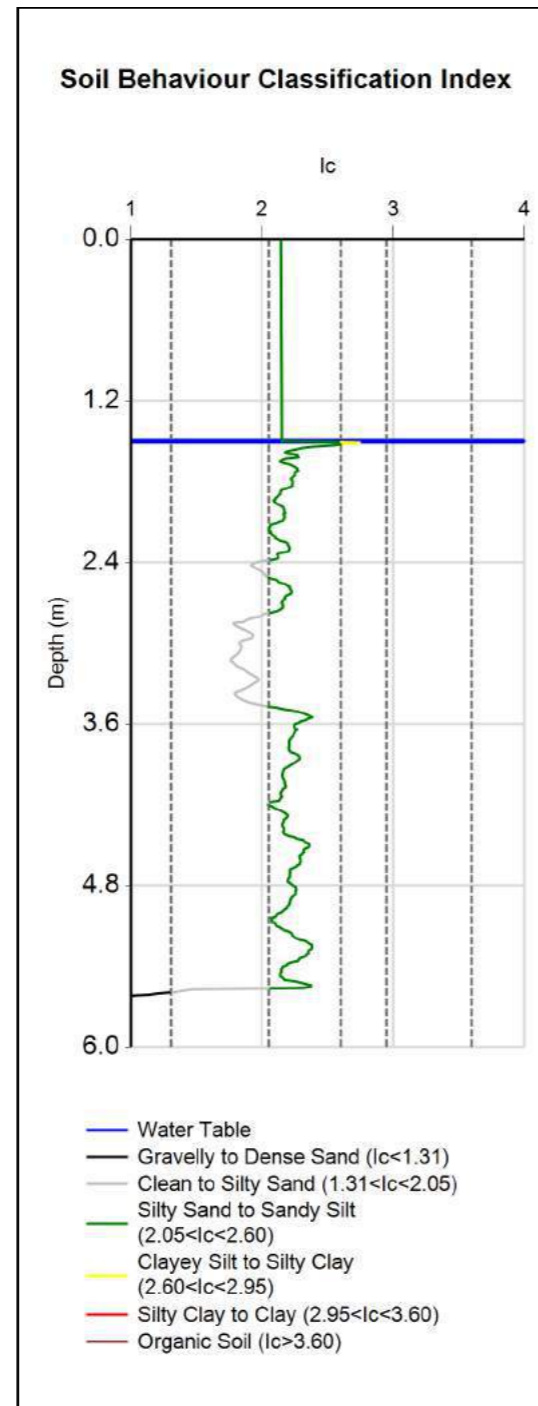
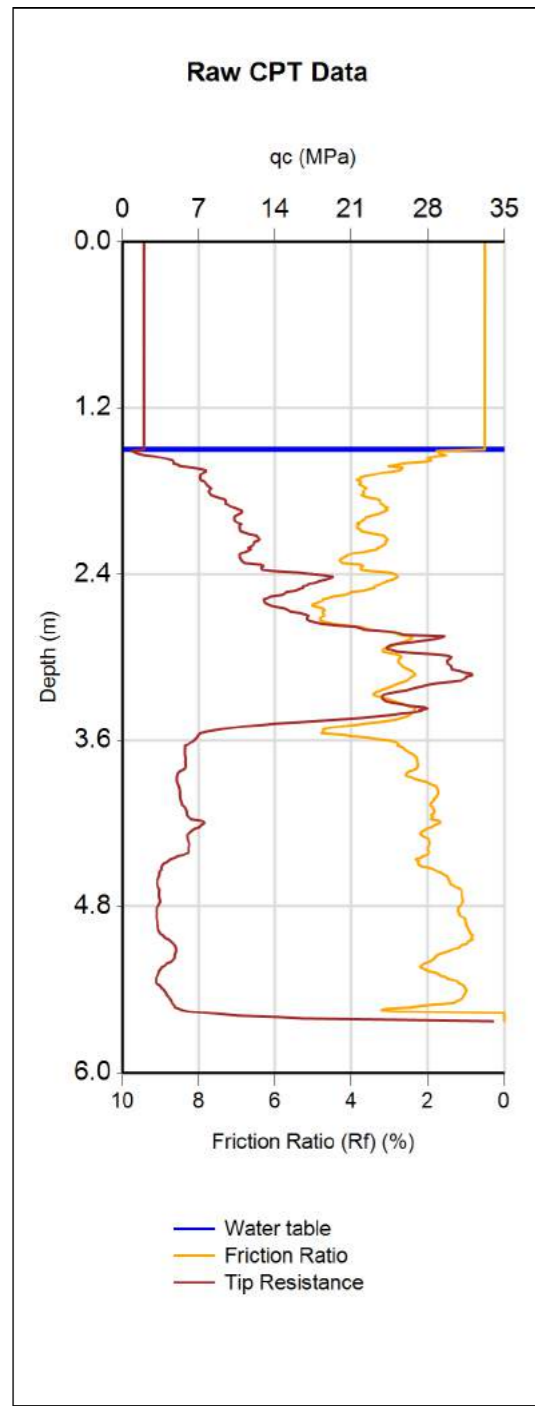
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|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
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*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)



(Assumed pre-drill values)

INPUT	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
	CPT07	103685	12/10/2017	User Specified	6.2	0.23	1.5	BI-2014	ZRB-2002	1.5	2	0.01	18
OUTPUT	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
	15%	23	1.1	2	5	4.6	1						
	50%	14	0.8	1	3	4.6	0						
	85%	6	0	0	1	5.6	0						



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TITLE
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LOCATION
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Karori Campus

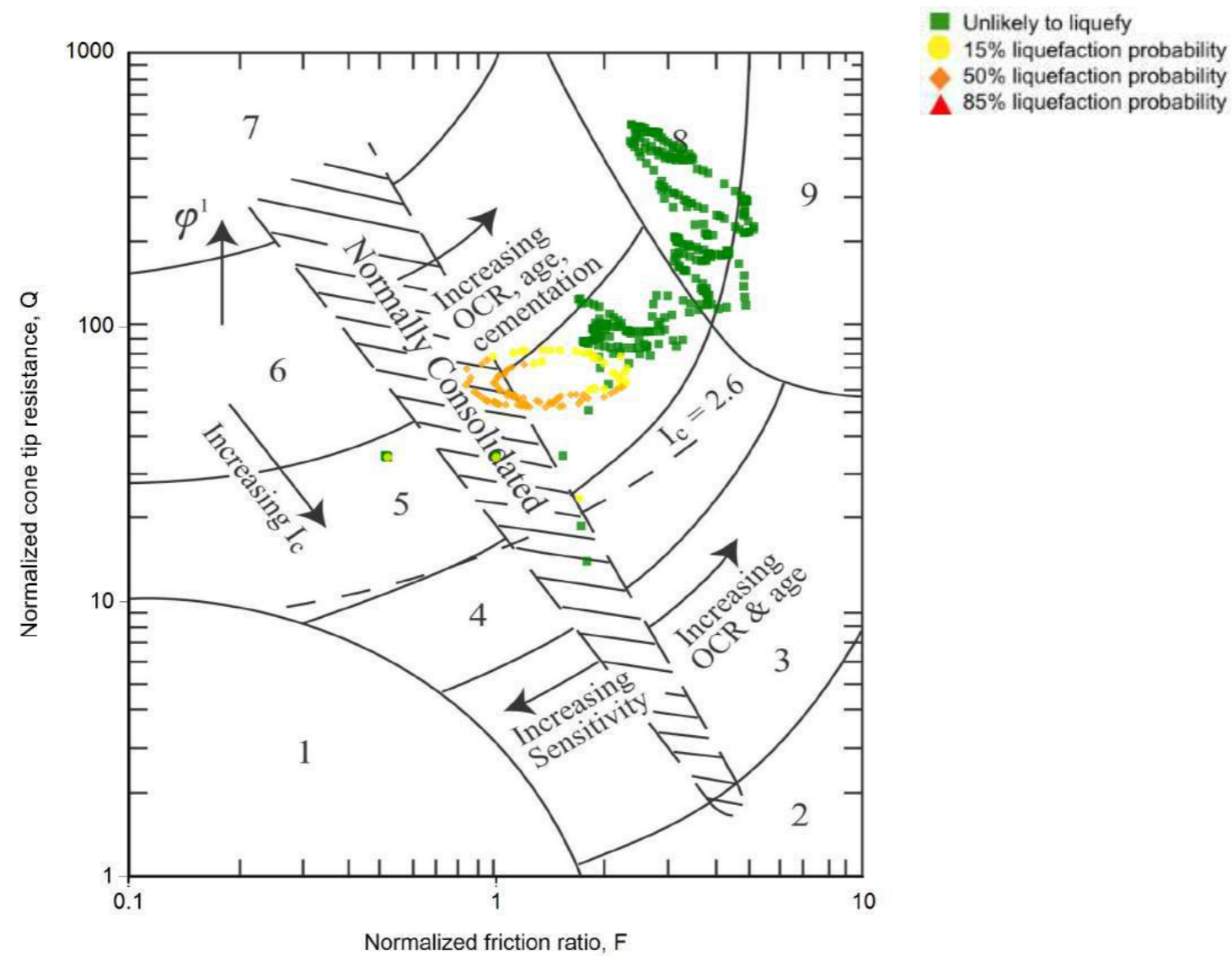
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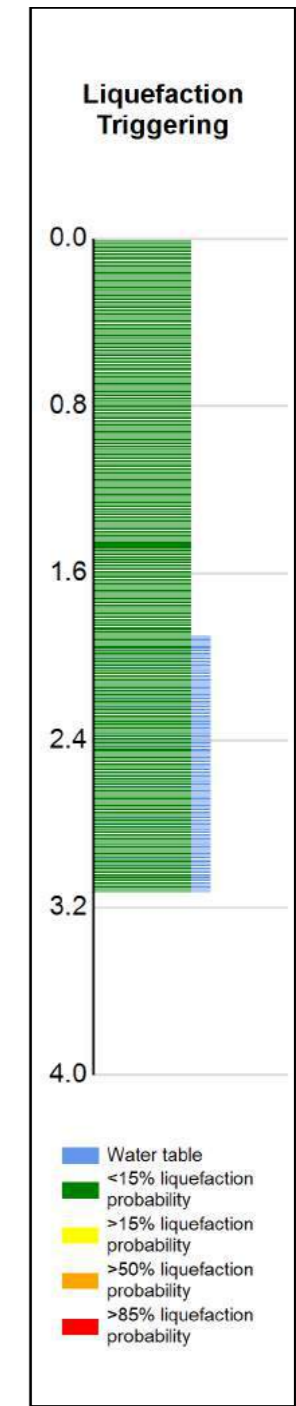
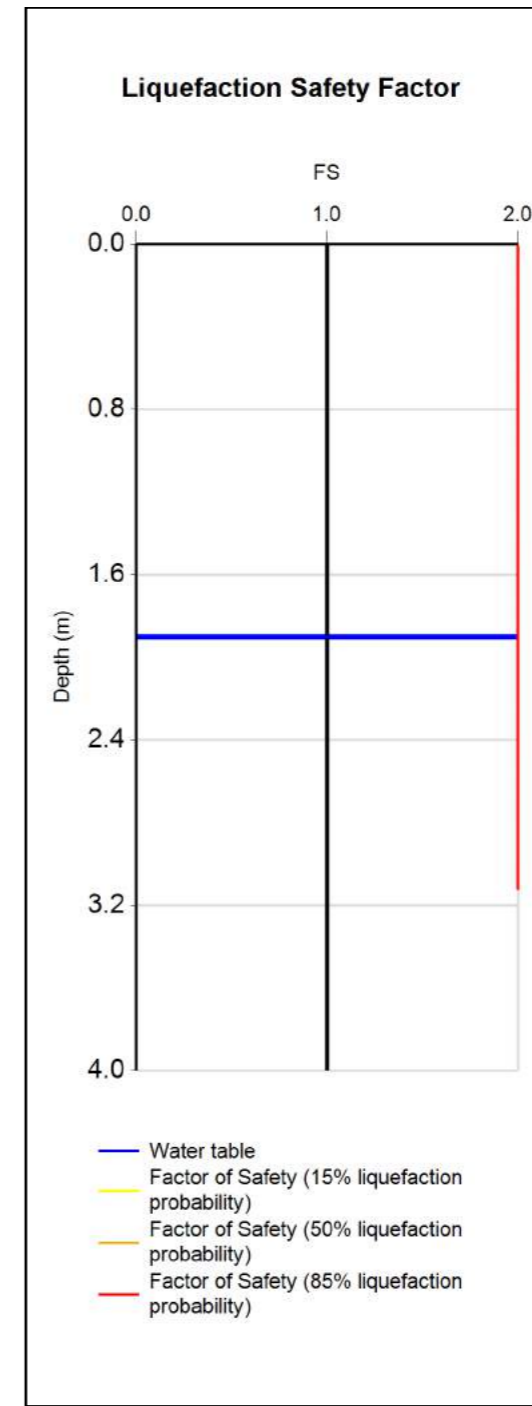
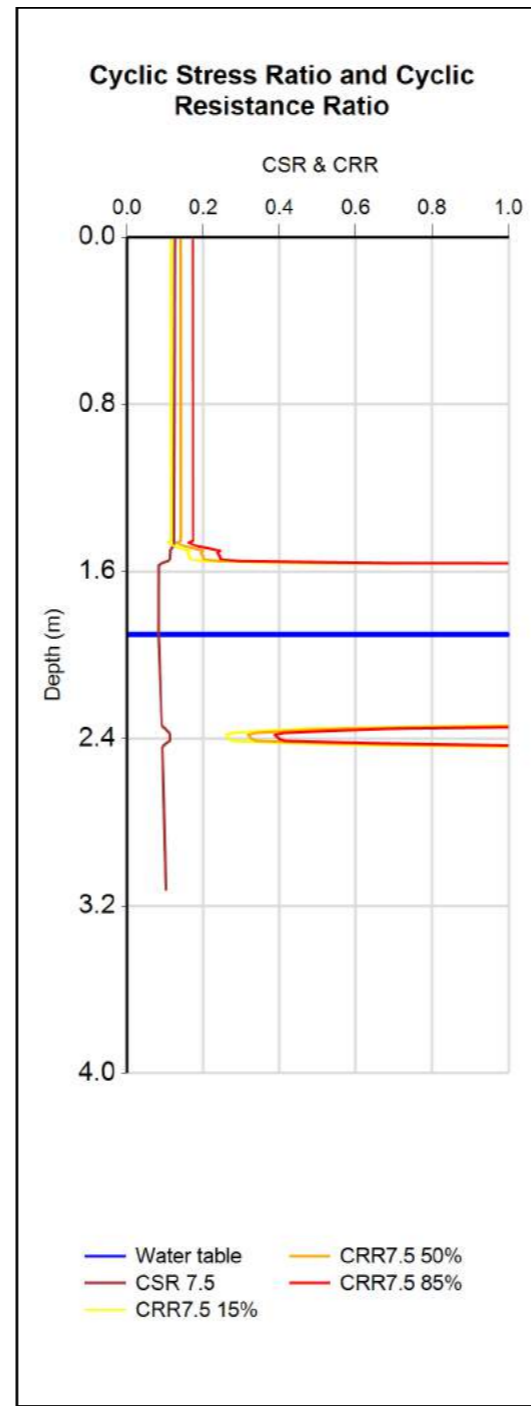
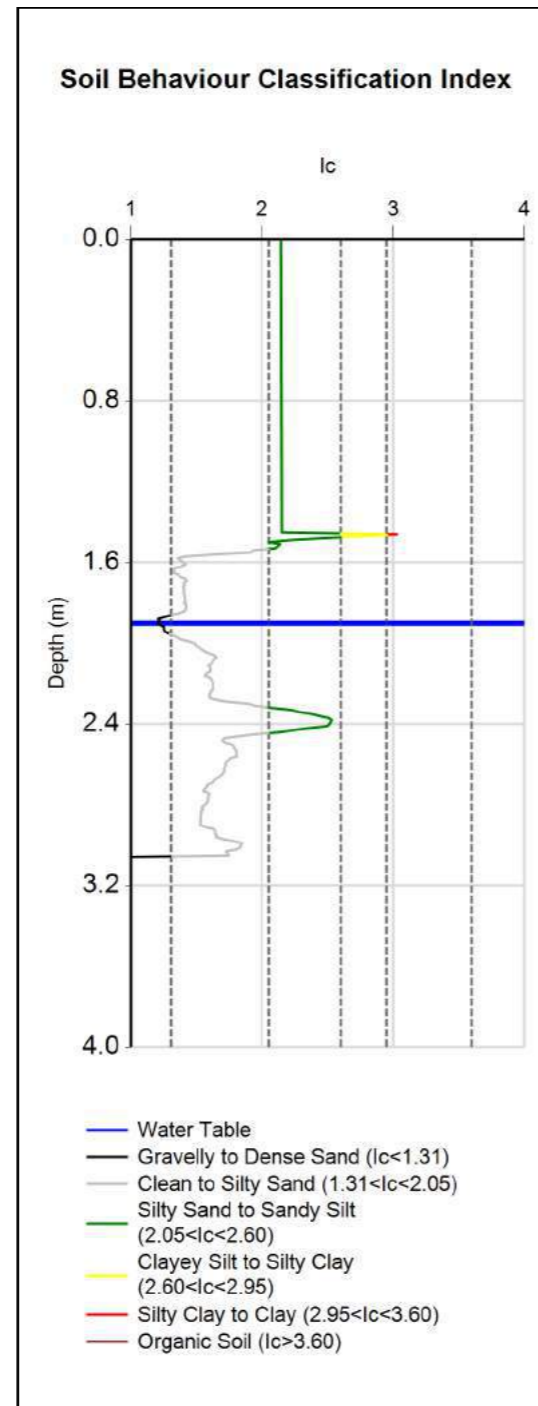
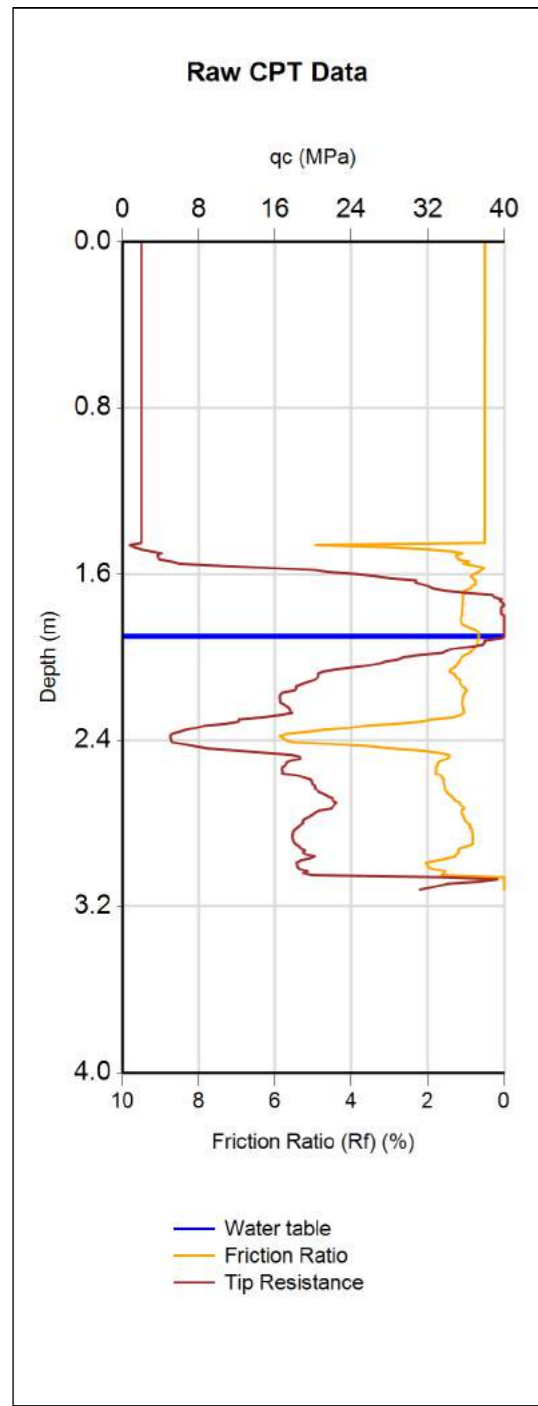


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|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
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CPT-based soil behavior type classification chart by Robertson (1990)

 Tonkin+Taylor Exceptional thinking together V1.3	CLIENT, PROJECT Ryman Healthcare Limited Karori Prepurchase Geotechnical Assessment	LOCATION Victoria University Karori Campus	DATE 27/10/2017
	TITLE 100 year return period - CPT6a, 7, 8a and 9	JOB NUMBER 30309	ANALYSED tzhl



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT08a	103686	11/10/2017	User Specified	6.2	0.23	1.9	BI-2014	ZRB-2002	1.45	2	0.01	18
	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
OUTPUT	15%	0	0	0	0	3.1	0						
	50%	0	0	0	0	3.1	0						
	85%	0	0	0	0	3.1	0						

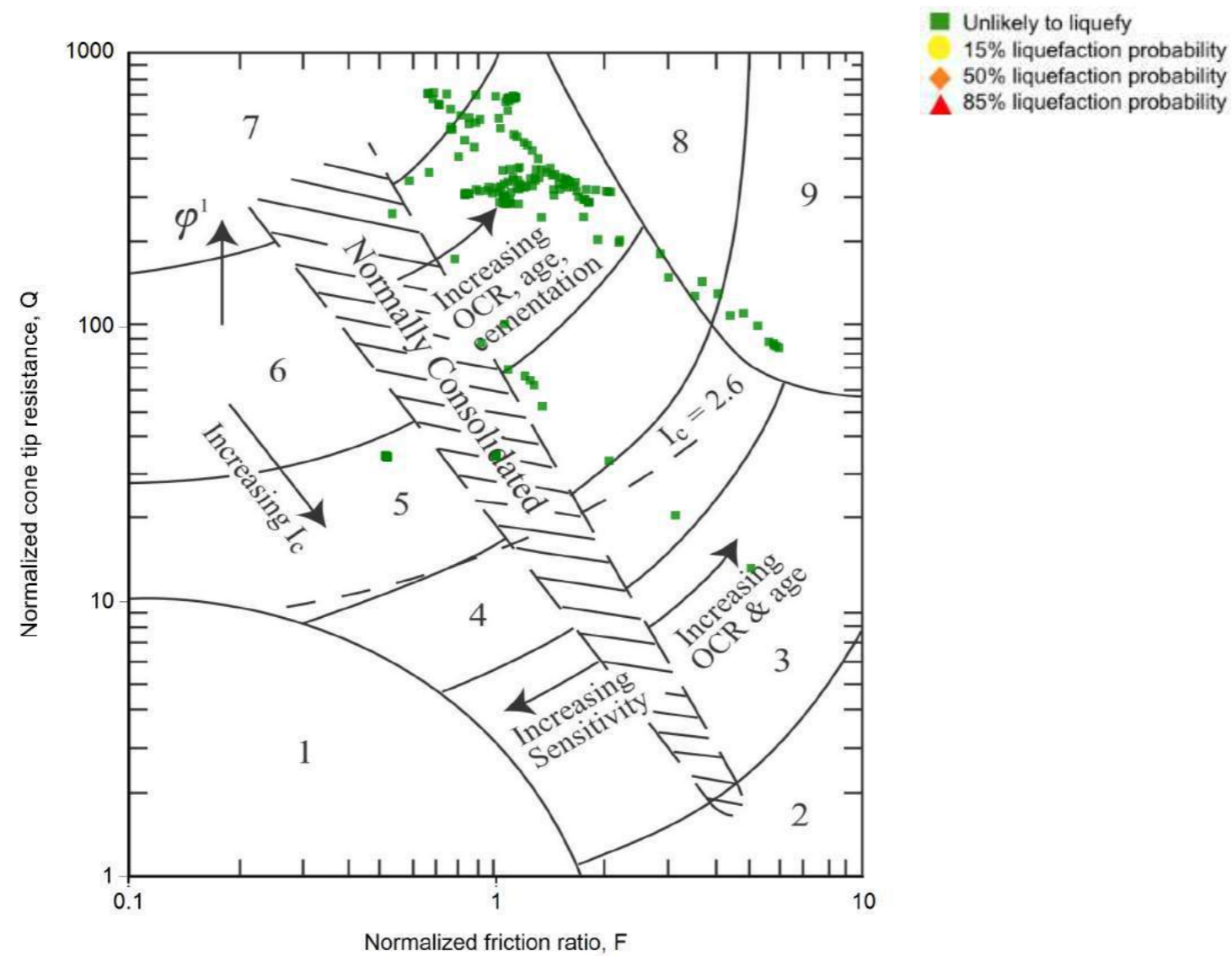


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Karori Prepurchase Geotechnical Assessment
TITLE
100 year return period - CPT6a, 7, 8a and 9

LOCATION
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Karori Campus
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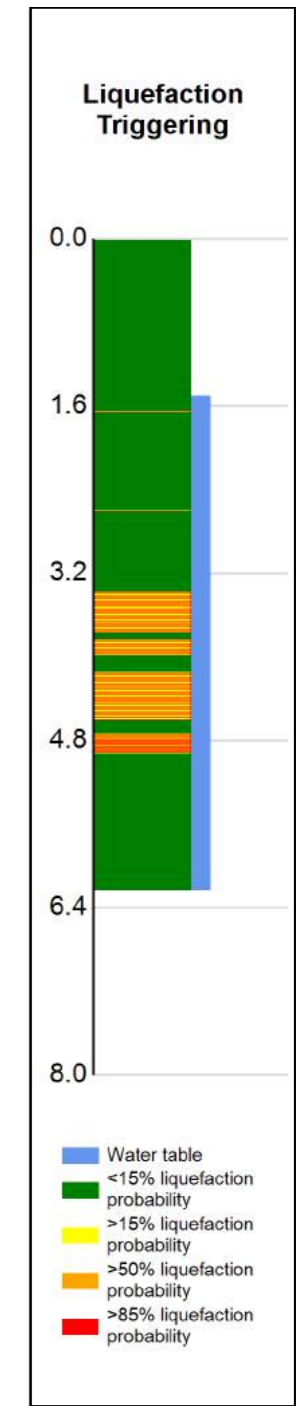
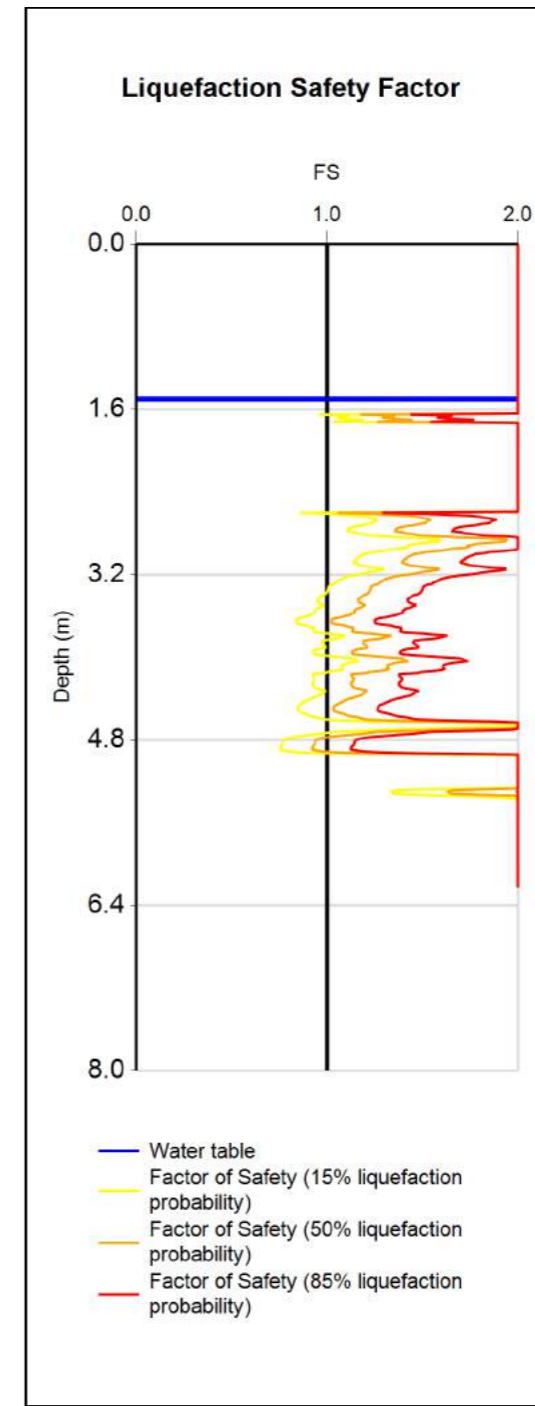
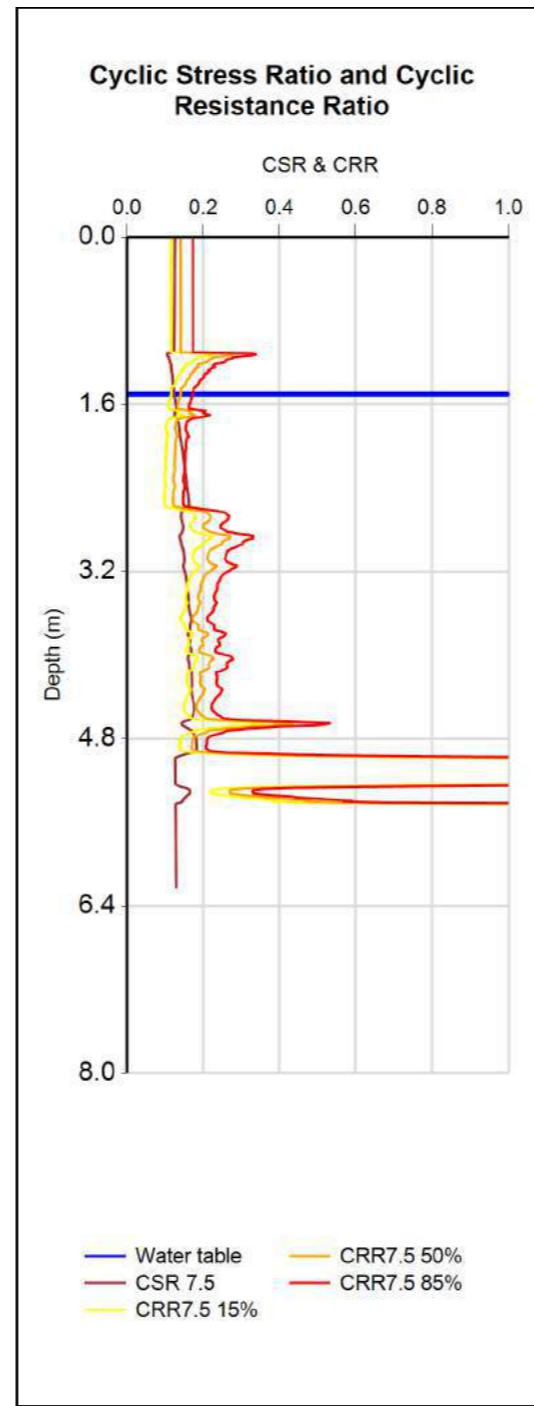
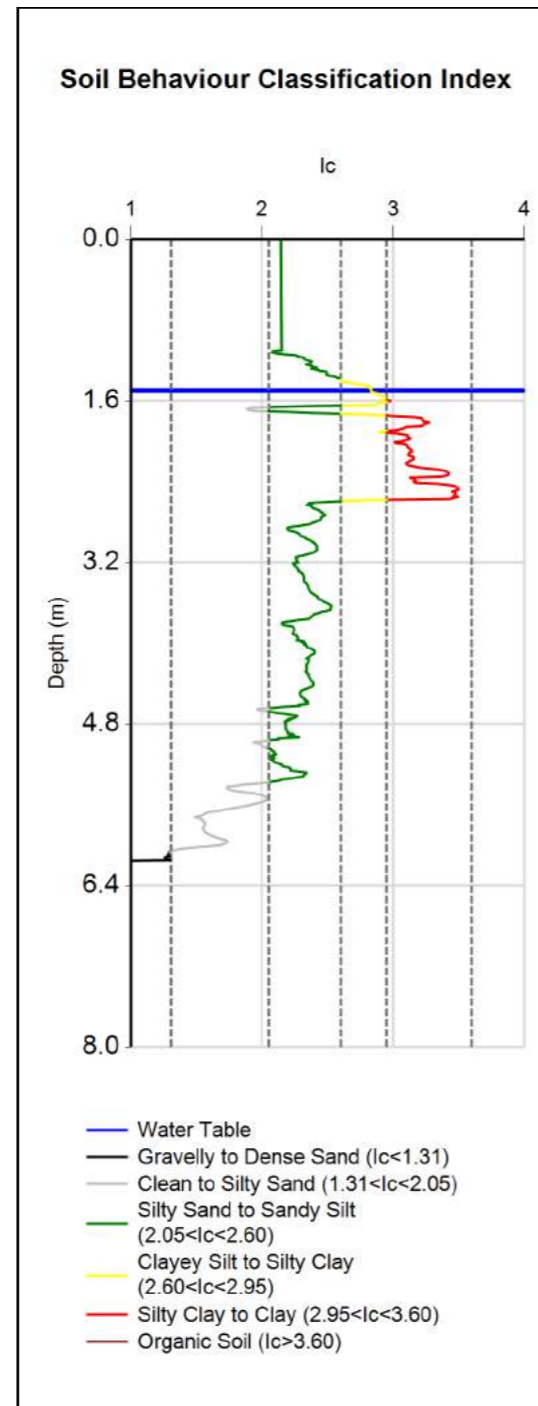
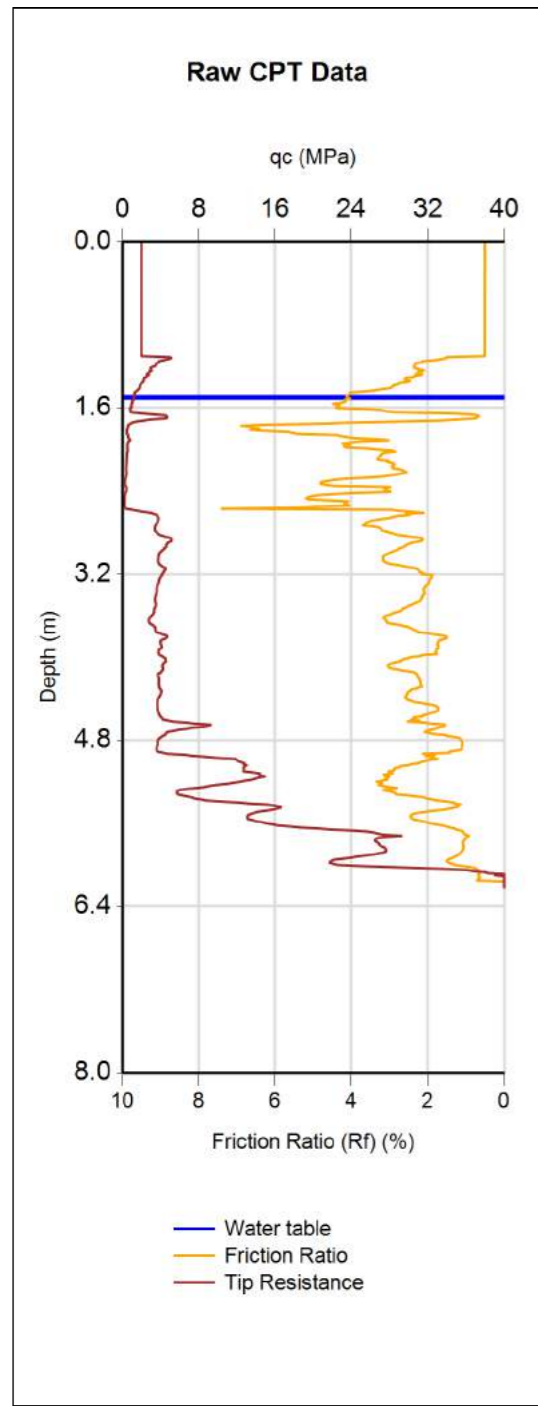


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| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
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CPT-based soil behavior type classification chart by Robertson (1990)

 Tonkin+Taylor Exceptional thinking together V1.3	CLIENT, PROJECT Ryman Healthcare Limited Karori Prepurchase Geotechnical Assessment	LOCATION Victoria University Karori Campus	DATE 27/10/2017
	TITLE 100 year return period - CPT6a, 7, 8a and 9	JOB NUMBER 30309	ANALYSED tzhl



(Assumed pre-drill values)

INPUT		CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
		CPT09	103687	11/10/2017	User Specified	6.2	0.23	1.5	BI-2014	ZRB-2002	1.1	2	0.01	18
OUTPUT		PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
		15%	21	1.2	1	6	3.4	0						
		50%	9	0.1	0	3	4.9	0						
		85%	4	0	0	1	6.2	0						



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Karori Prepurchase Geotechnical Assessment

TITLE
100 year return period - CPT6a, 7, 8a and 9

LOCATION
Victoria University
Karori Campus

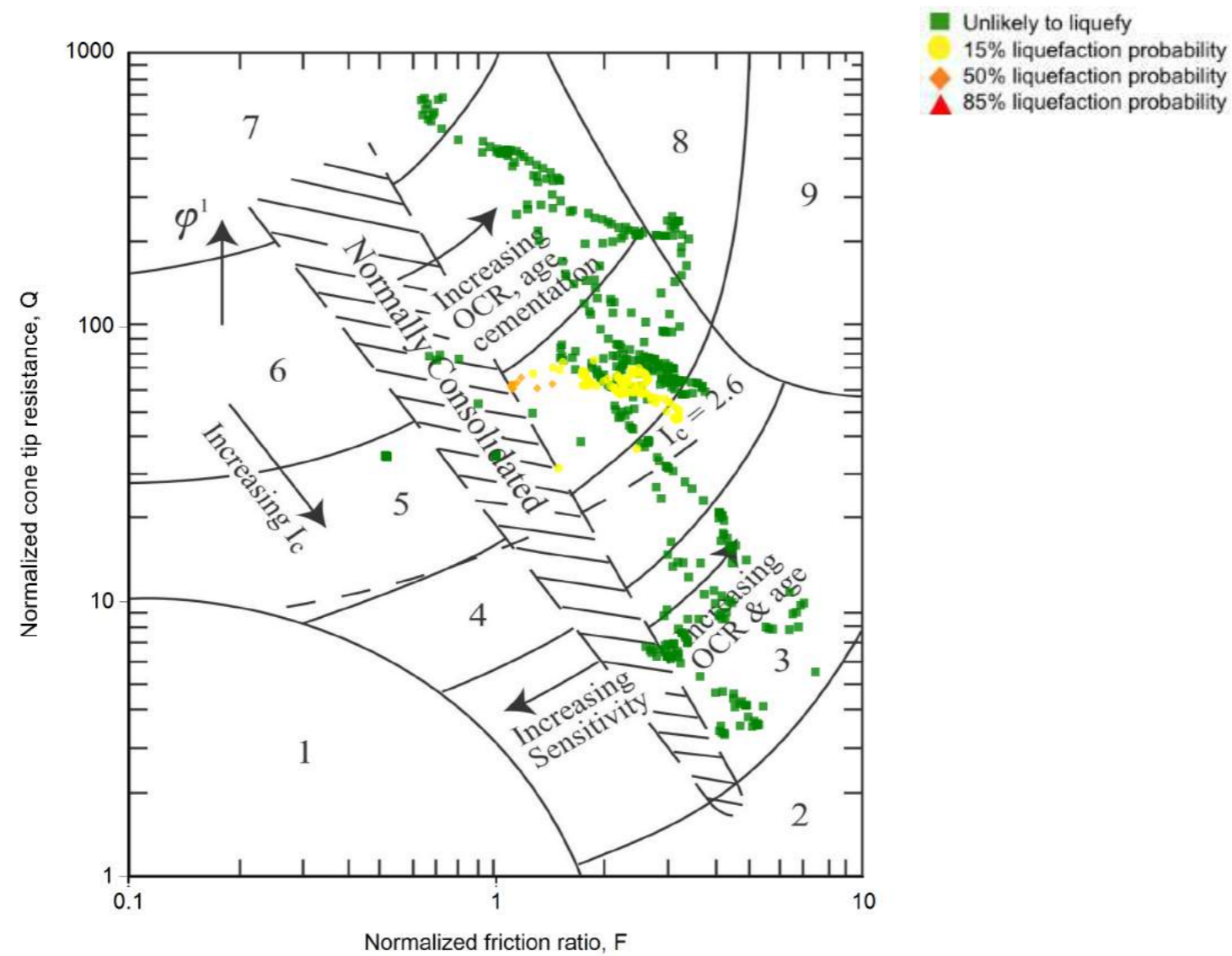
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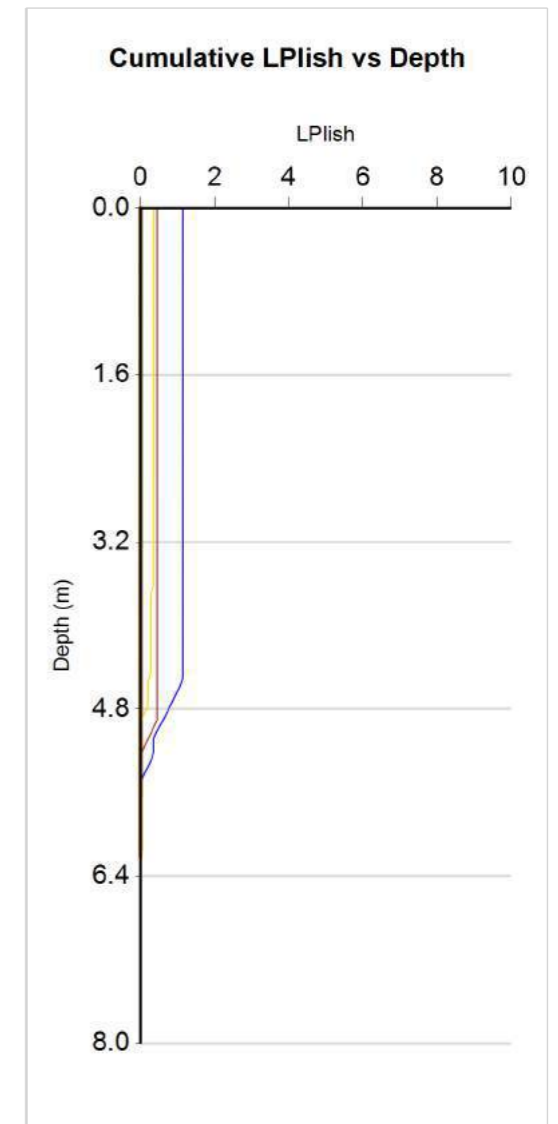
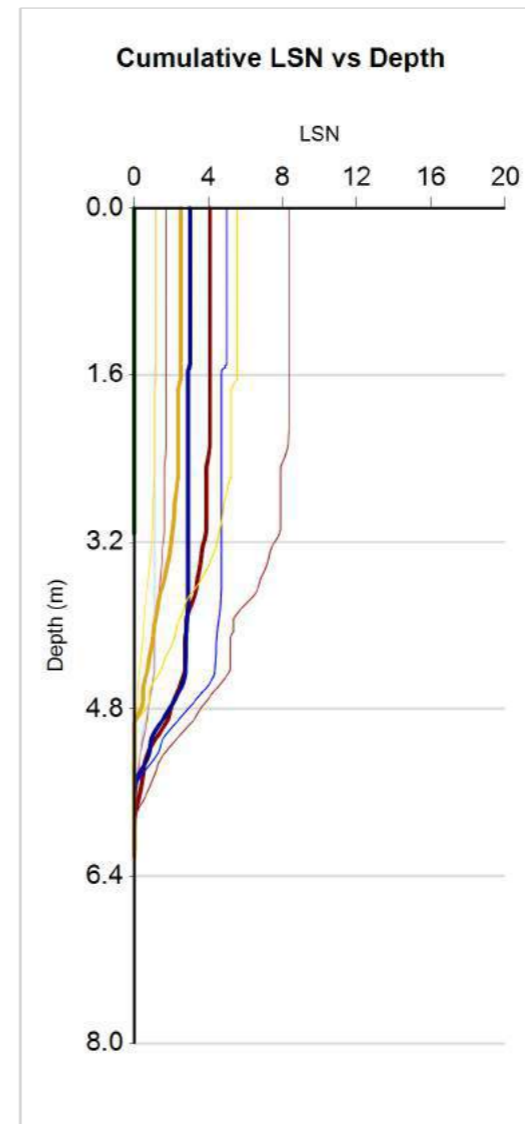
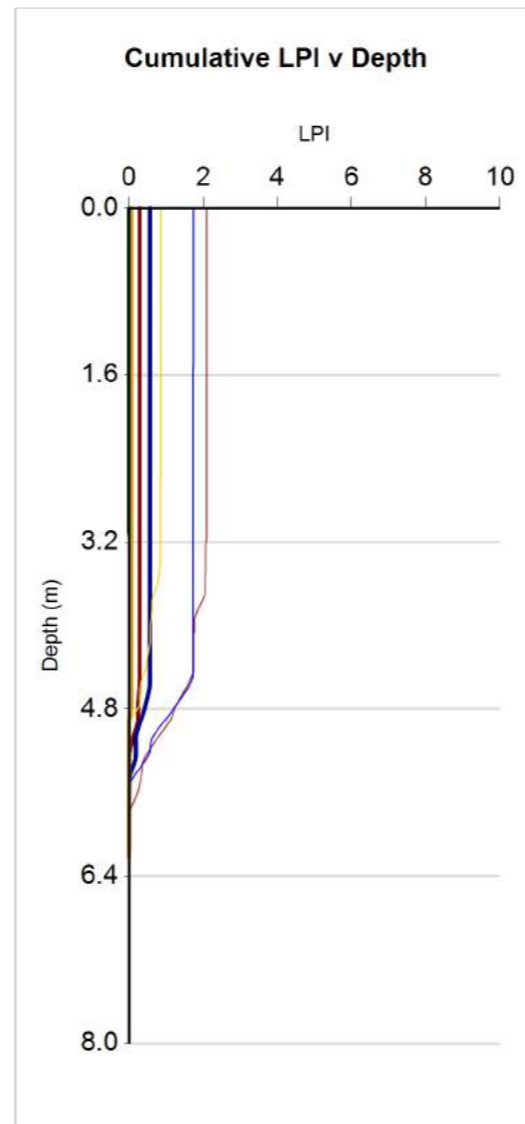
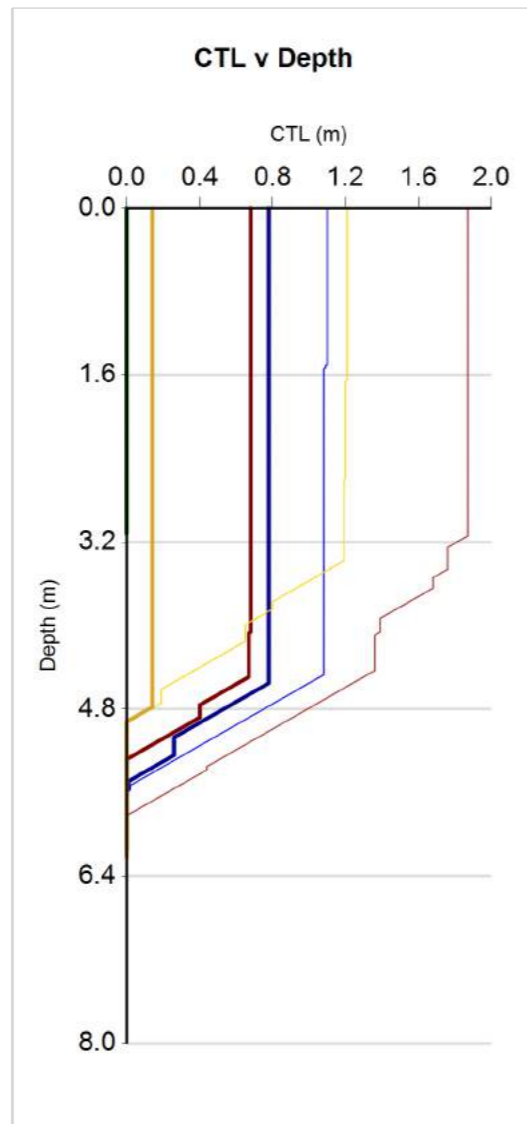
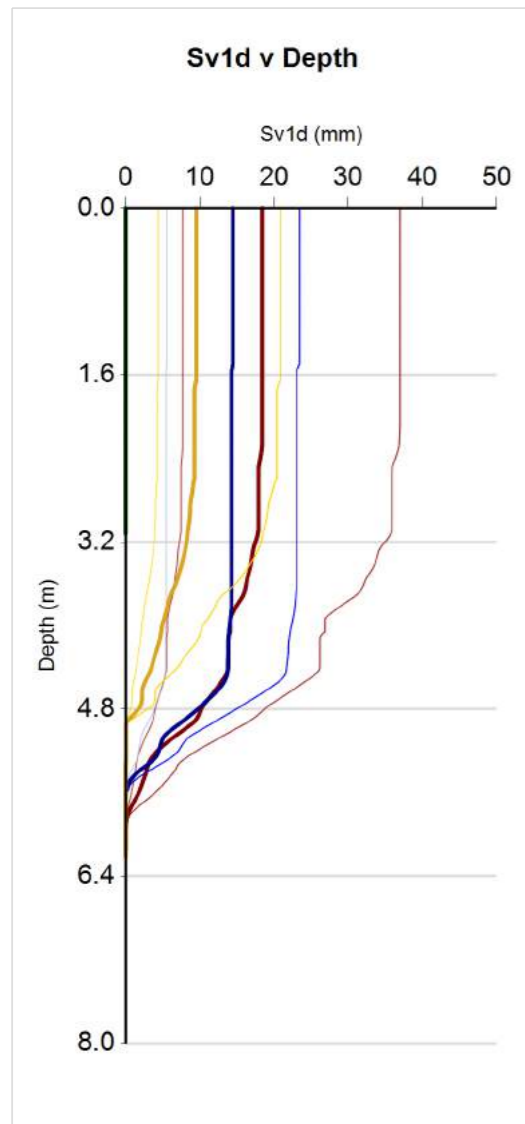
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- 1. Sensitive, fine grained
- 2. Organic soils - peats
- 3. Clays - silty clay to clay
- 4. Silt mixtures - clayey silt to silty clay
- 5. Sand mixtures - silty sand to sandy silt
- 6. Sands - clean sand to silty sand
- 7. Gravelly sand to dense sand
- 8. Very stiff sand to clayey sand *
- 9. Very stiff, fine grained *

*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)



(Assumed pre-drill values)

CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT06a	103684	12/10/2017	User Specified	6.2	0.23	2.1	BI-2014	ZRB-2002	1.4	2	0.01	18
CPT07	103685	12/10/2017	User Specified	6.2	0.23	1.5	BI-2014	ZRB-2002	1.5	2	0.01	18
CPT08a	103686	11/10/2017	User Specified	6.2	0.23	1.9	BI-2014	ZRB-2002	1.45	2	0.01	18
CPT09	103687	11/10/2017	User Specified	6.2	0.23	1.5	BI-2014	ZRB-2002	1.1	2	0.01	18

Thicker lines represent the 50% probability of exceedance case and the thinner lines to the left and right of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.



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Karori Prepurchase Geotechnical Assessment

TITLE

100 year return period - CPT6a, 7, 8a and 9

LOCATION

Victoria University
Karori Campus

JOB NUMBER

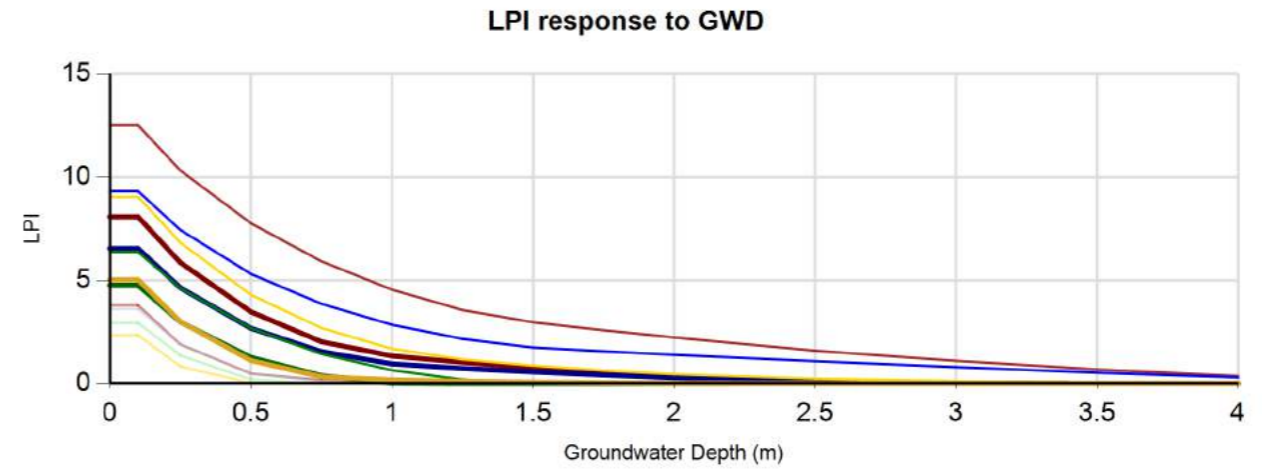
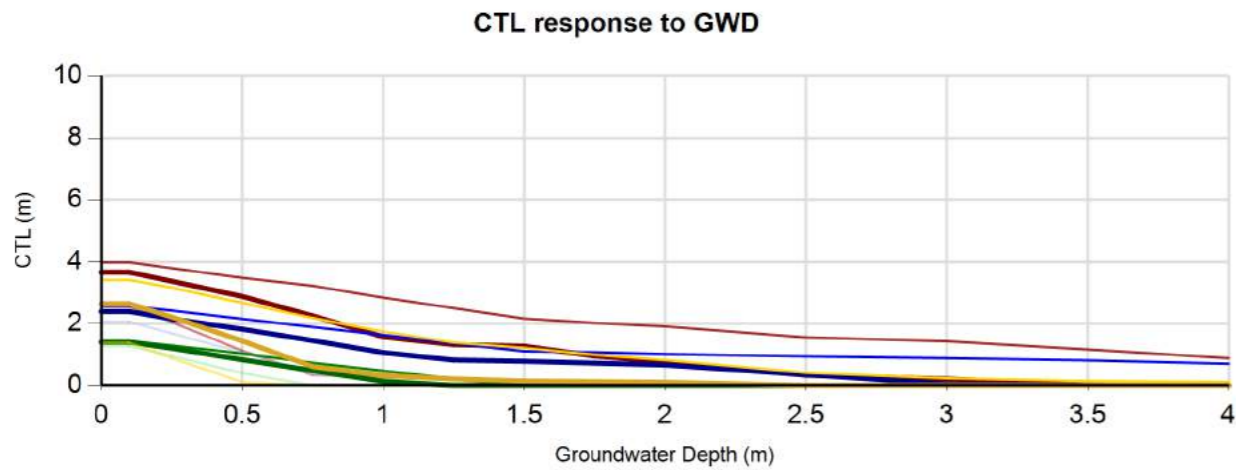
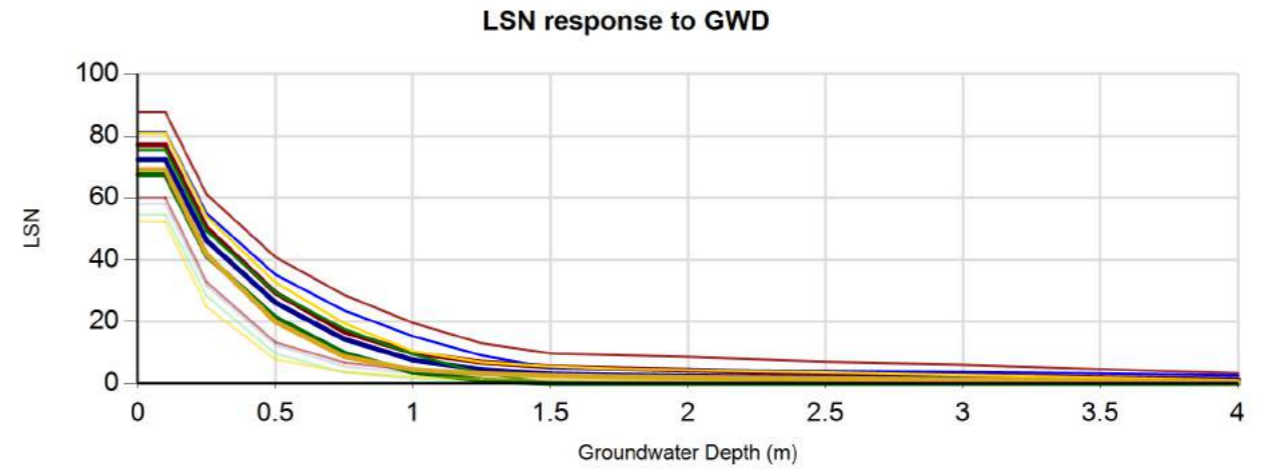
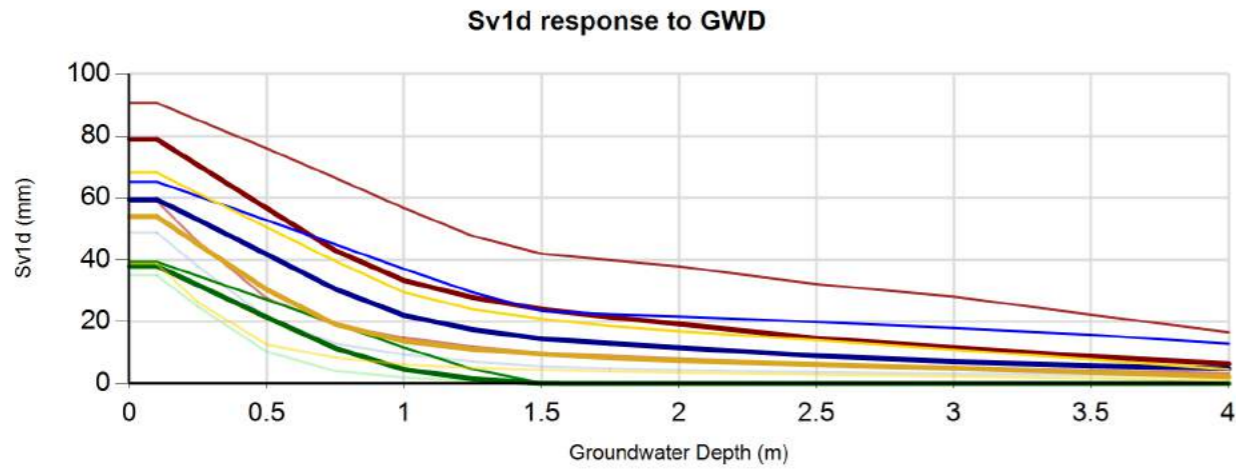
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DATE 27/10/2017

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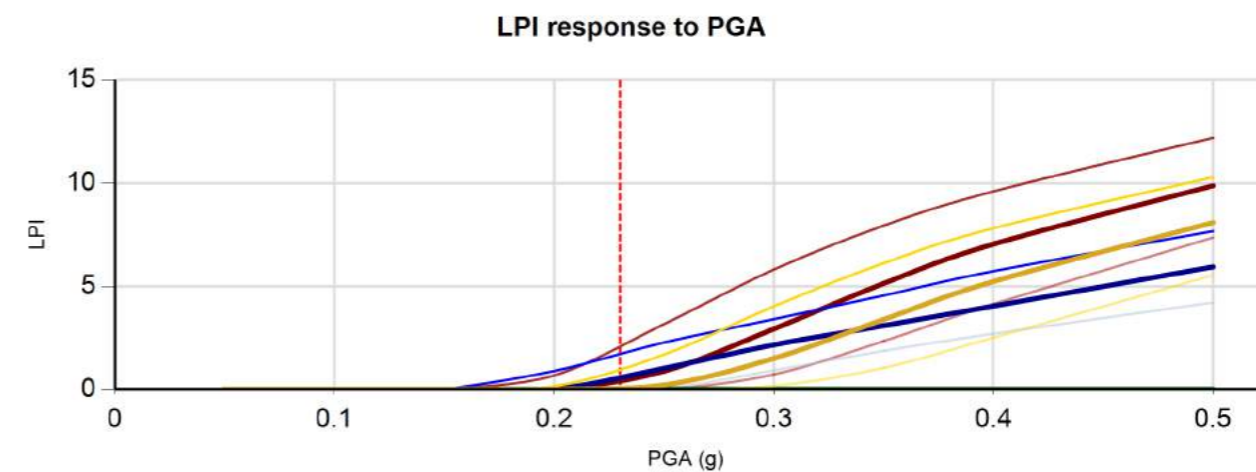
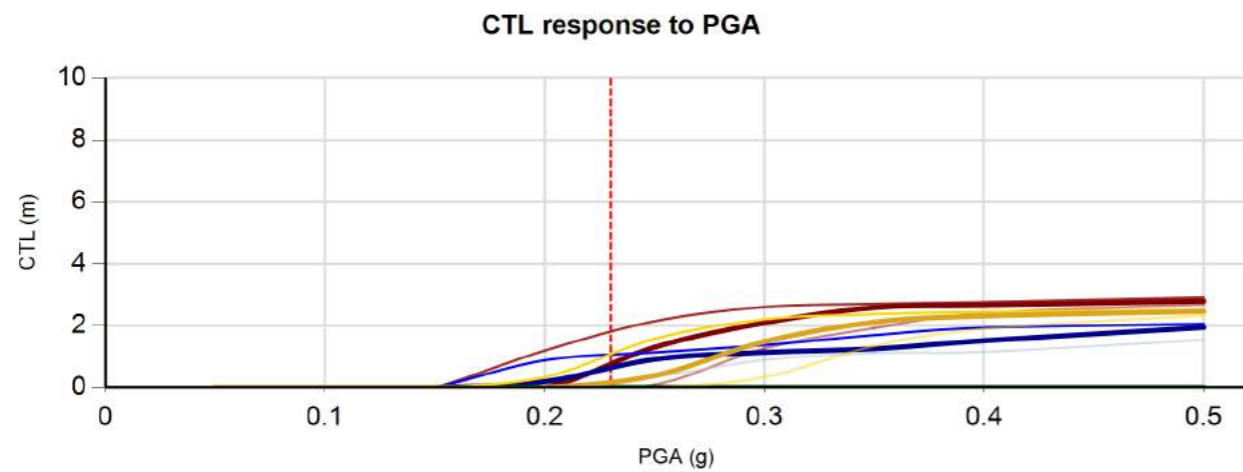
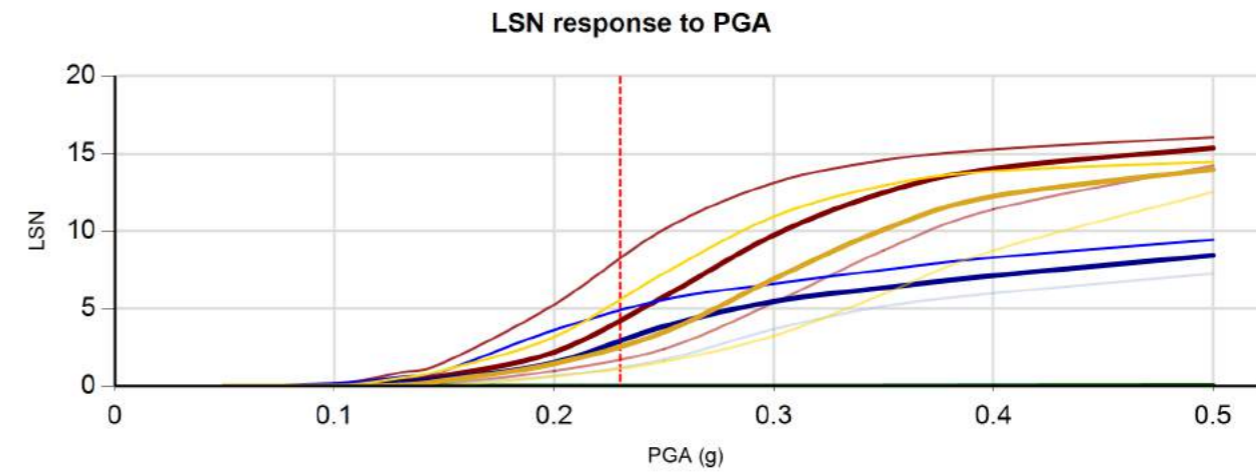
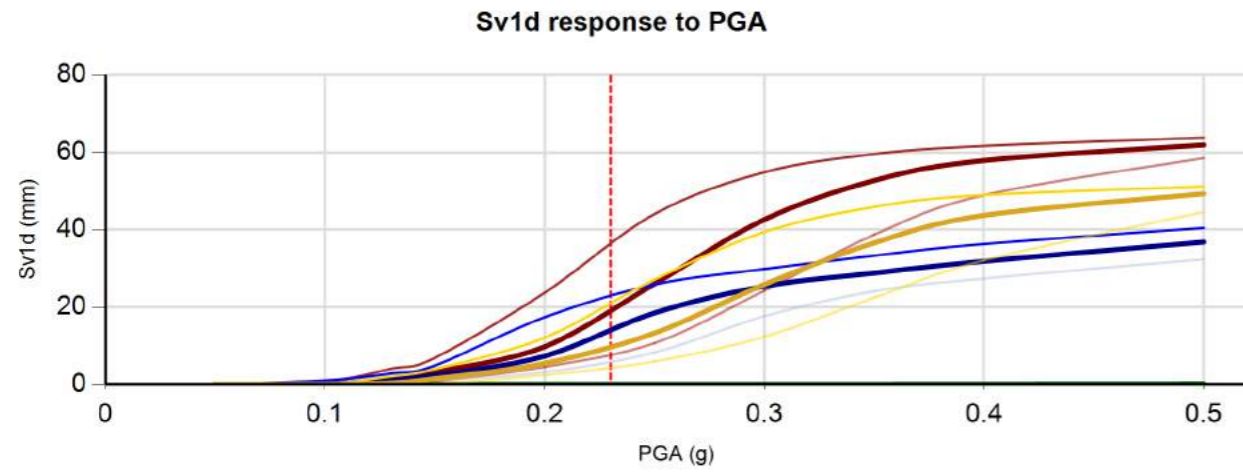
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(Assumed pre-drill values)

CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT06a	103684	12/10/2017	User Specified	6.2	0.23	2.1	BI-2014	ZRB-2002	1.4	2	0.01	18
CPT07	103685	12/10/2017	User Specified	6.2	0.23	1.5	BI-2014	ZRB-2002	1.5	2	0.01	18
CPT08a	103686	11/10/2017	User Specified	6.2	0.23	1.9	BI-2014	ZRB-2002	1.45	2	0.01	18
CPT09	103687	11/10/2017	User Specified	6.2	0.23	1.5	BI-2014	ZRB-2002	1.1	2	0.01	18

Thicker lines represent the 50% probability of exceedence case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedence cases respectively.



Vertical dotted line/s indicate user specified PGA at the CPT locations. (actual PGA)

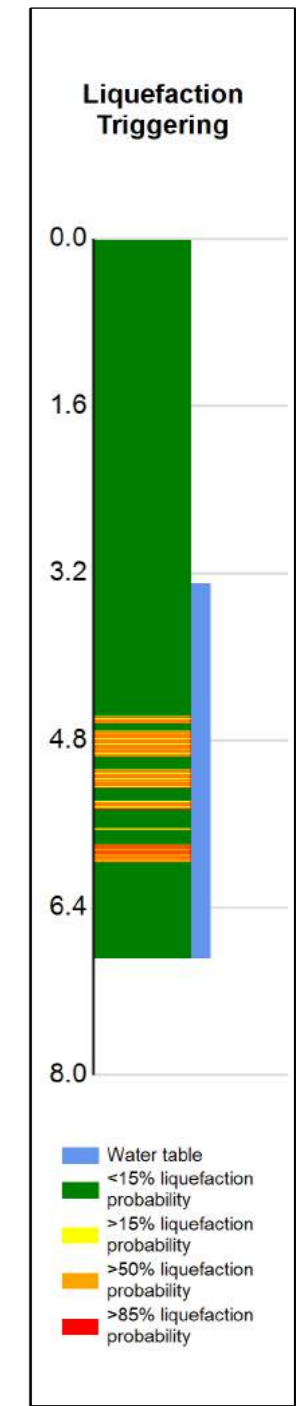
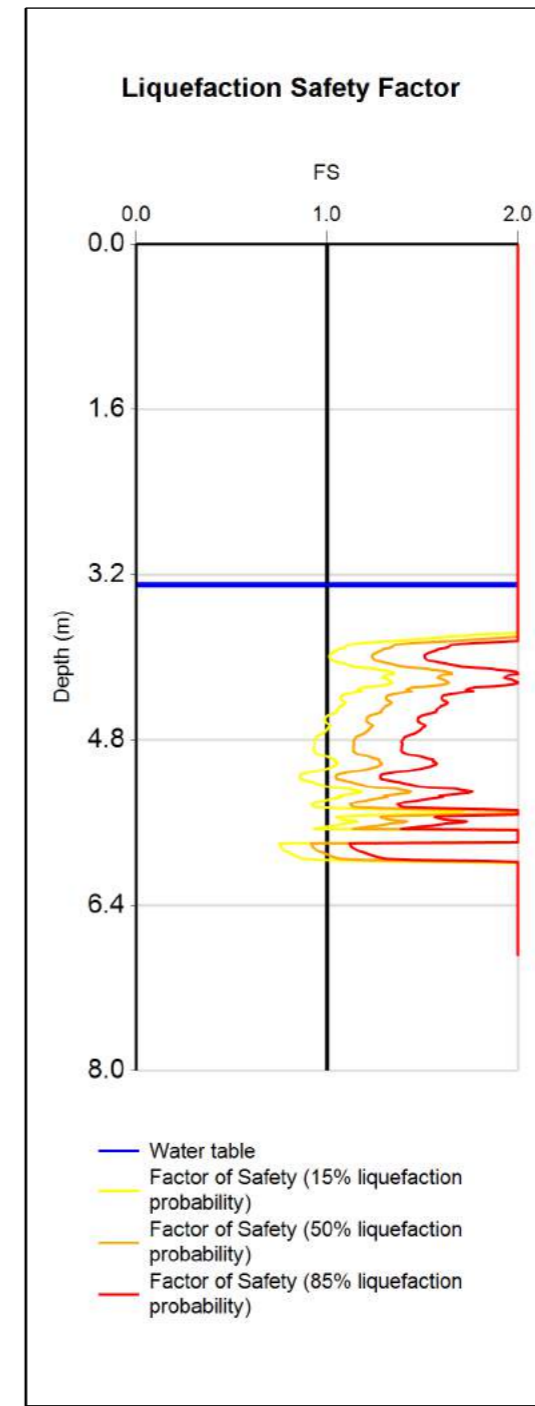
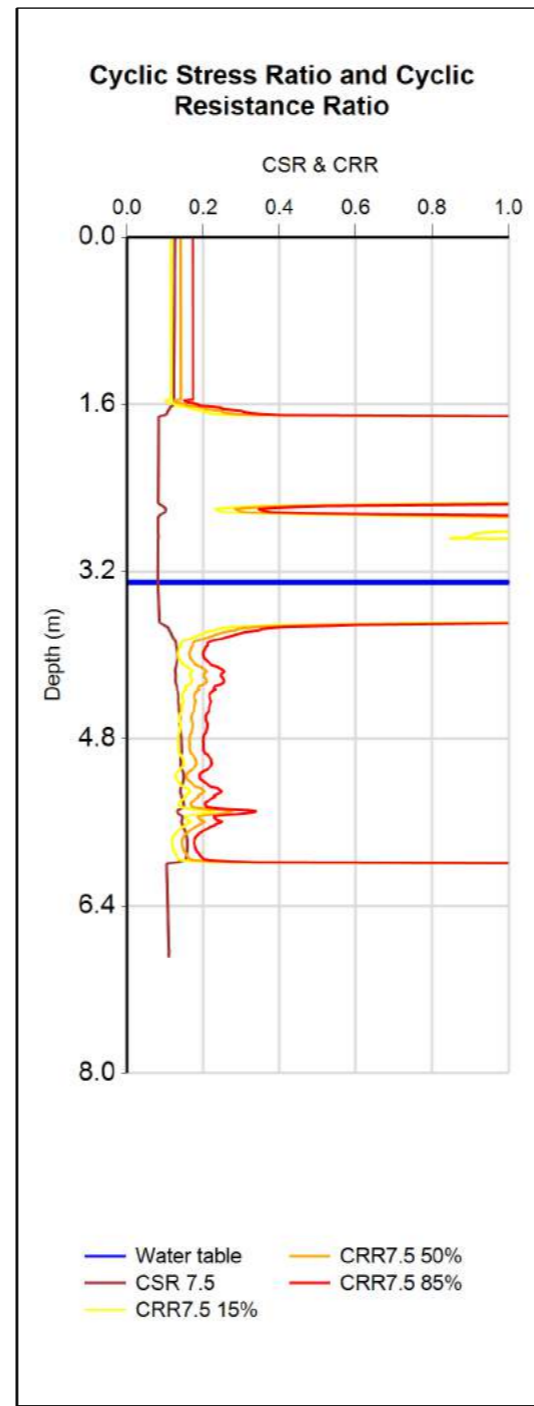
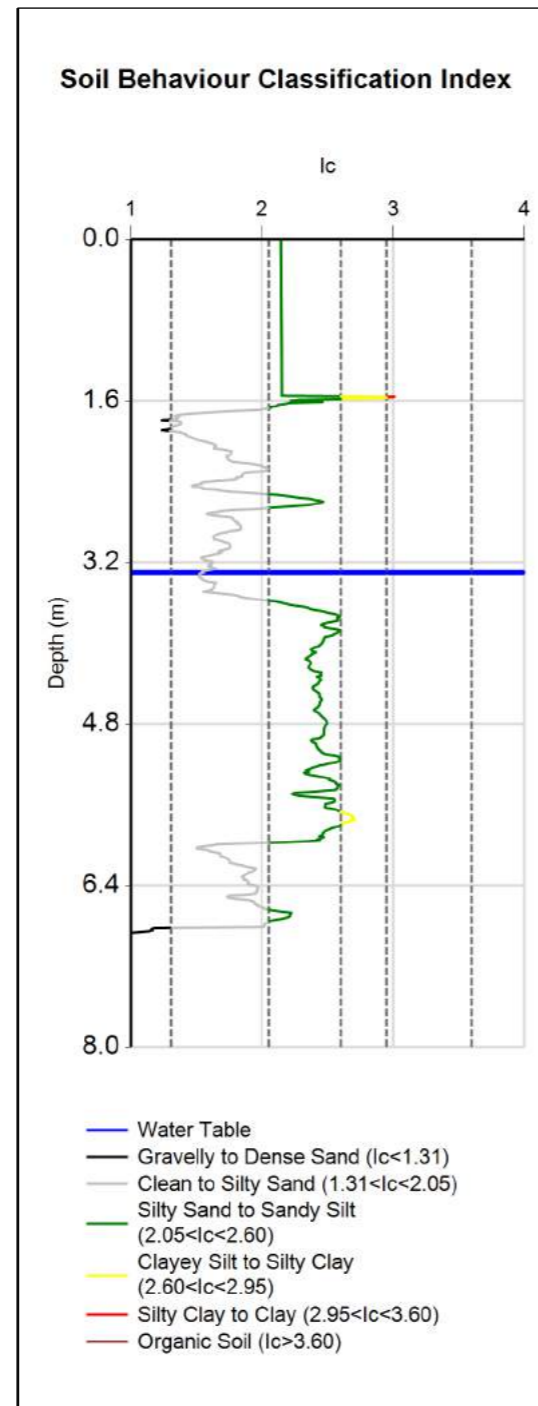
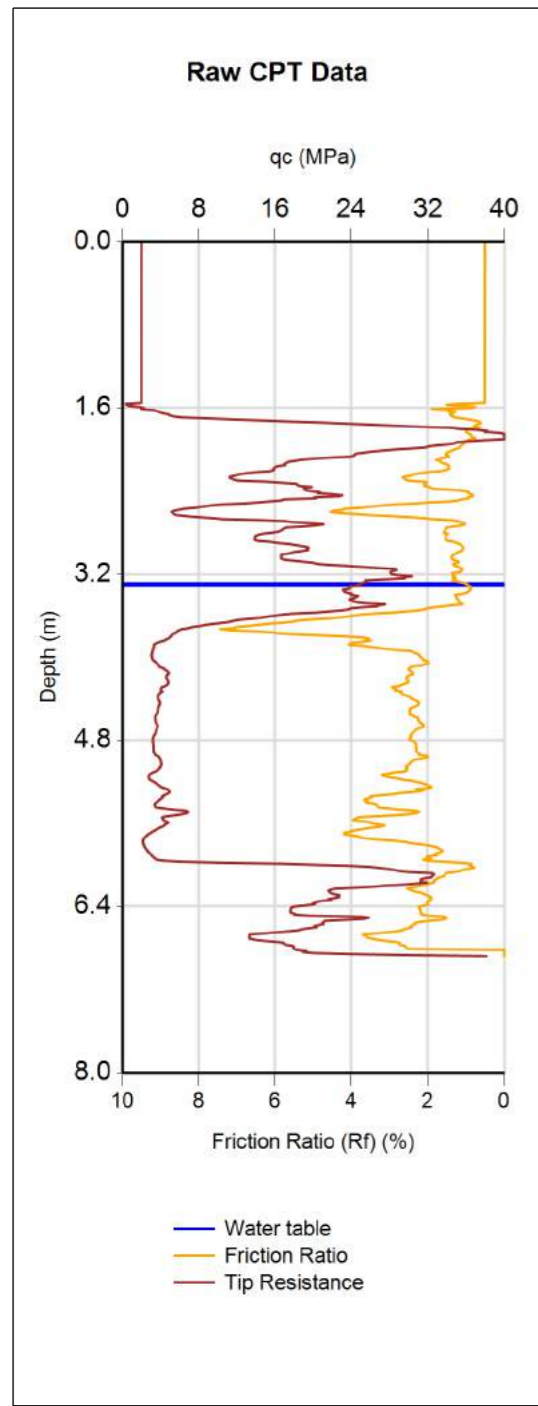
(Assumed pre-drill values)												
CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT06a	103684	12/10/2017	User Specified	6.2	0.23	2.1	BI-2014	ZRB-2002	1.4	2	0.01	18
CPT07	103685	12/10/2017	User Specified	6.2	0.23	1.5	BI-2014	ZRB-2002	1.5	2	0.01	18
CPT08a	103686	11/10/2017	User Specified	6.2	0.23	1.9	BI-2014	ZRB-2002	1.45	2	0.01	18
CPT09	103687	11/10/2017	User Specified	6.2	0.23	1.5	BI-2014	ZRB-2002	1.1	2	0.01	18

Thicker lines represent the 50% probability of exceedance case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.

The inputs listed in Table 1.1-1 below have been adopted for the liquefaction analysis.

Table 1.1-1 Summary of inputs for liquefaction analysis

TTGD ID	103684	103685	103686	103687
CPT Name	05TT12_06a	05TT12_07	05TT12_08a	05TT12_09
PGA	0.23g	0.23g	0.23g	0.23g
Magnitude	6.2	6.2	6.2	6.2
Depth to groundwater	2.1m	1.5m	1.9m	1.5m
Predrill depth	1.4m	1.5m	1.45m	1.1m
Assumed predrill tip resistance and skin friction	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa
Trigger method	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)
Settlement method	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)
CFC	0	0	0	0
Total depth of CPT	6.15m	5.63m	3.12m	6.22m
Maximum depth of analysis	6.15m	5.63m	3.12m	6.22m
RL	n/a	n/a	n/a	n/a



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT10	103688	12/10/2017	User Specified	6.2	0.23	3.3	BI-2014	ZRB-2002	1.55	2	0.01	18
	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
OUTPUT	15%	19	0.8	0	4	4.7	0						
	50%	8	0.1	0	2	5.9	0						
	85%	4	0	0	1	6.9	0						



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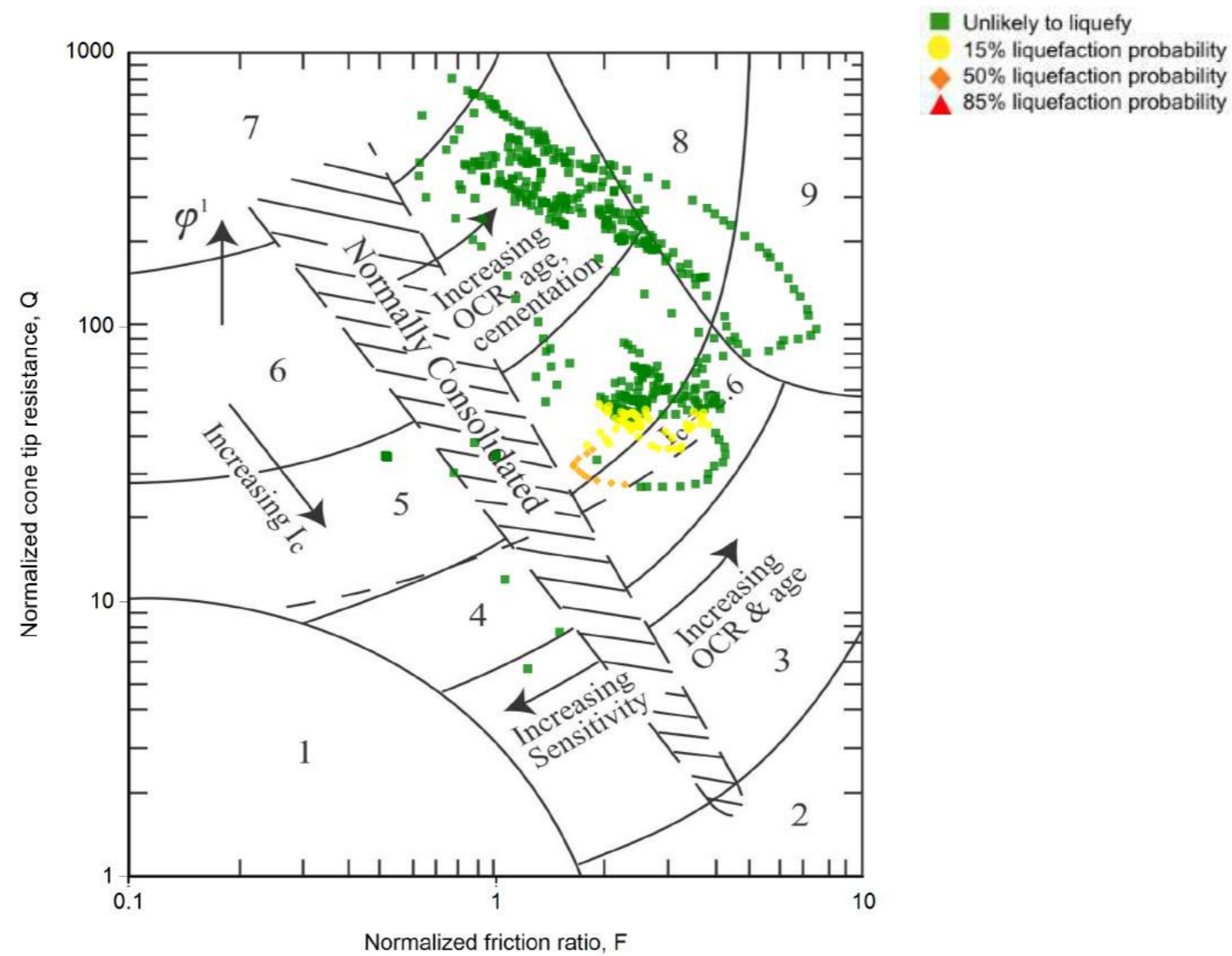
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Ryman Healthcare Limited
Karori Prepurchase Geotechnical Assessment

TITLE
100 year return period - CPT10 and 11

LOCATION
Victoria University
Karori Campus

JOB NUMBER
30309

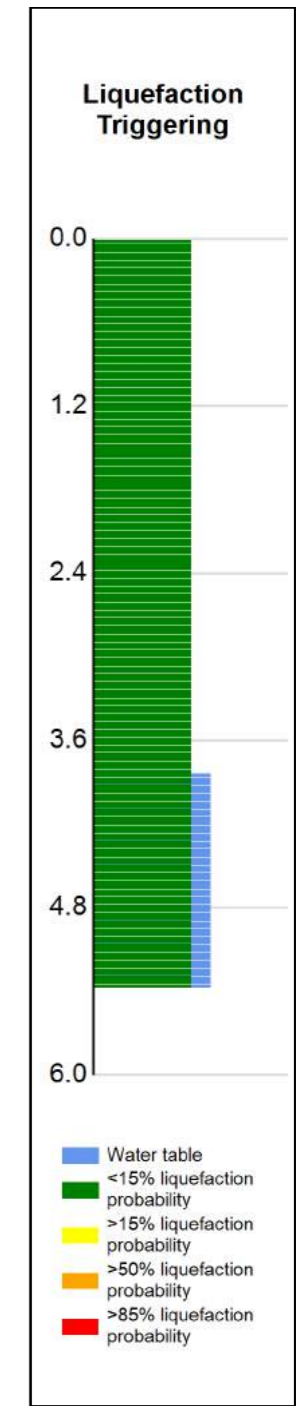
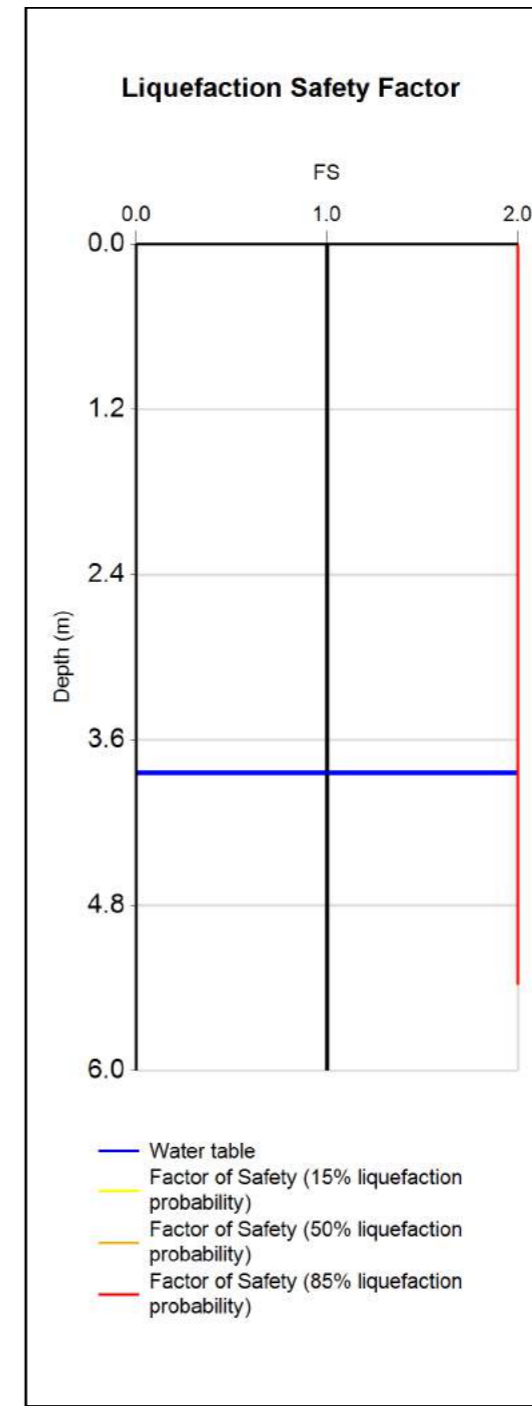
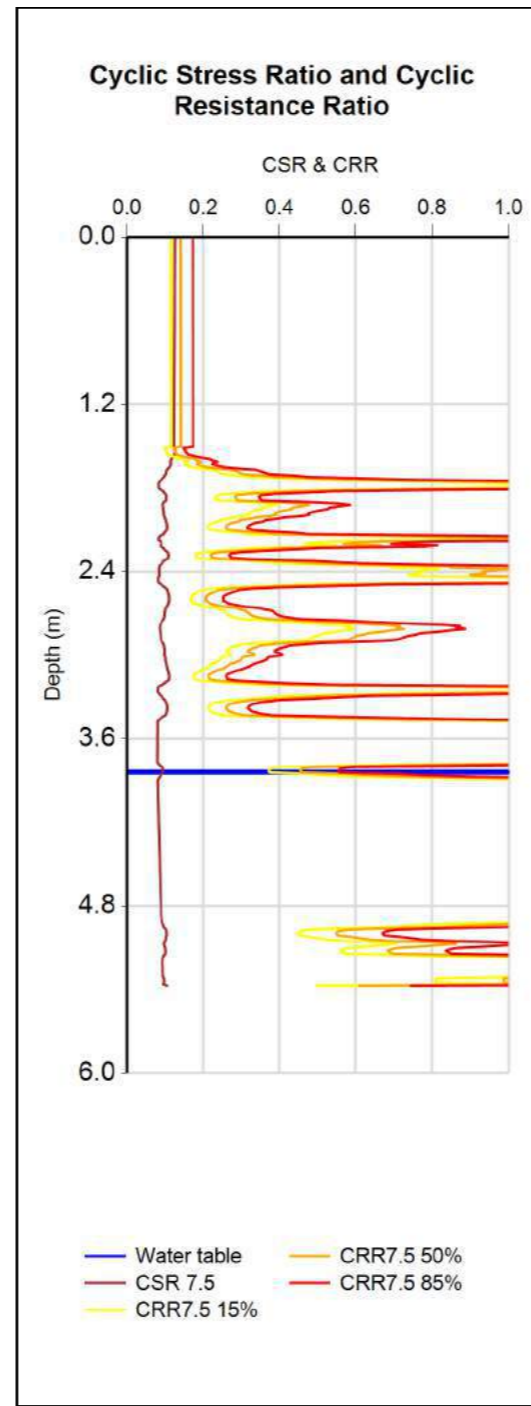
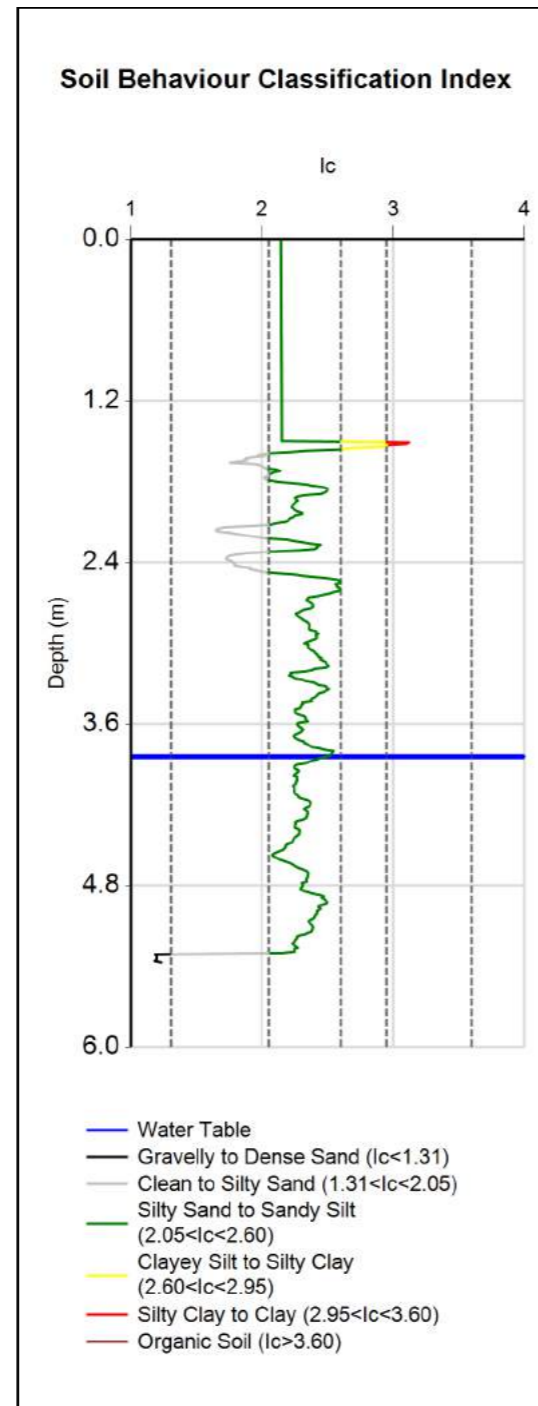
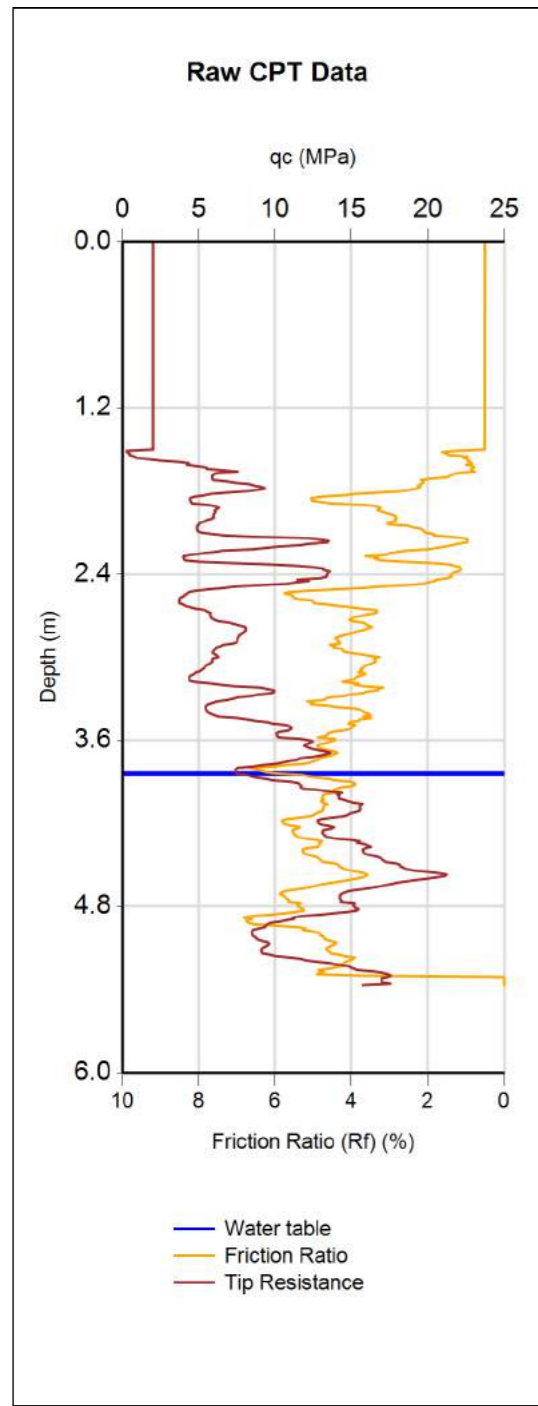
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PAGE 1 of 8 pages



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|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
| 2. Organic soils - peats | 7. Gravelly sand to dense sand |
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*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT11	103689	11/10/2017	User Specified	6.2	0.23	3.8	BI-2014	ZRB-2002	1.5	2	0.01	18
OUTPUT	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
	15%	0	0	0	0	5.4	0						
	50%	0	0	0	0	5.4	0						
	85%	0	0	0	0	5.4	0						



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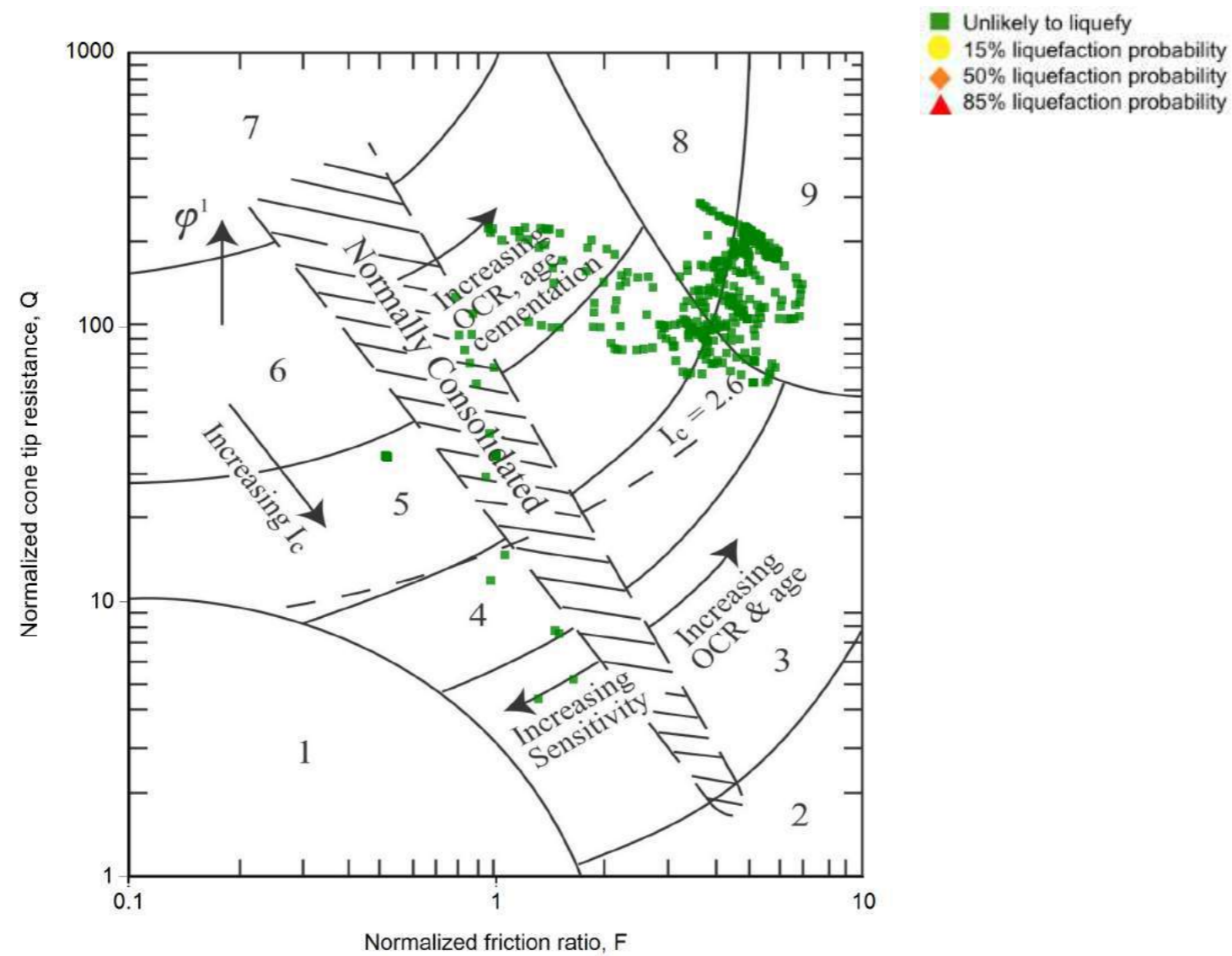
CLIENT, PROJECT
Ryman Healthcare Limited
Karori Prepurchase Geotechnical Assessment

TITLE
100 year return period - CPT10 and 11

LOCATION
Victoria University
Karori Campus

JOB NUMBER
30309


DATE 25/10/2017
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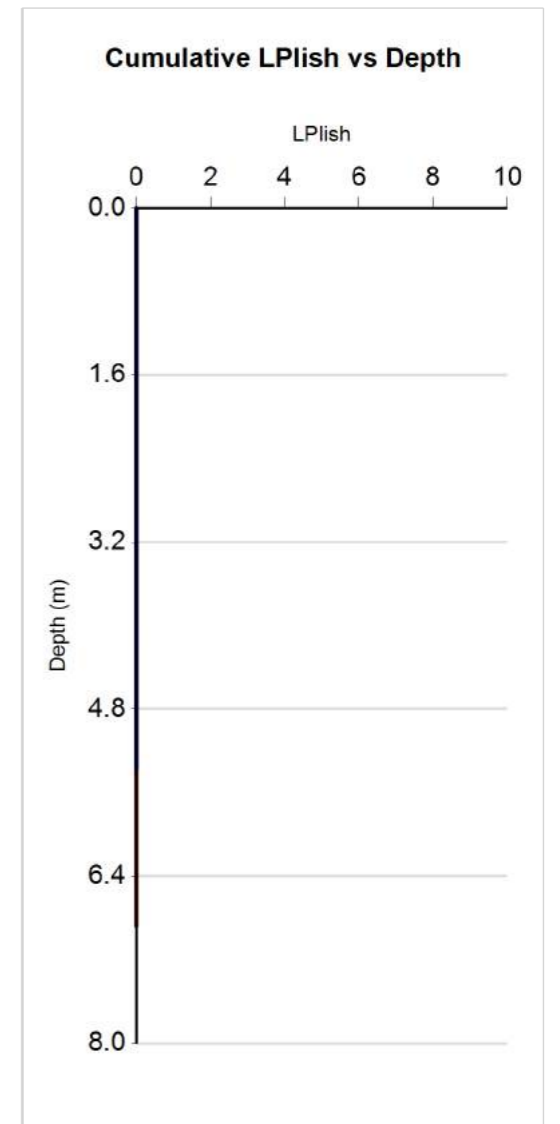
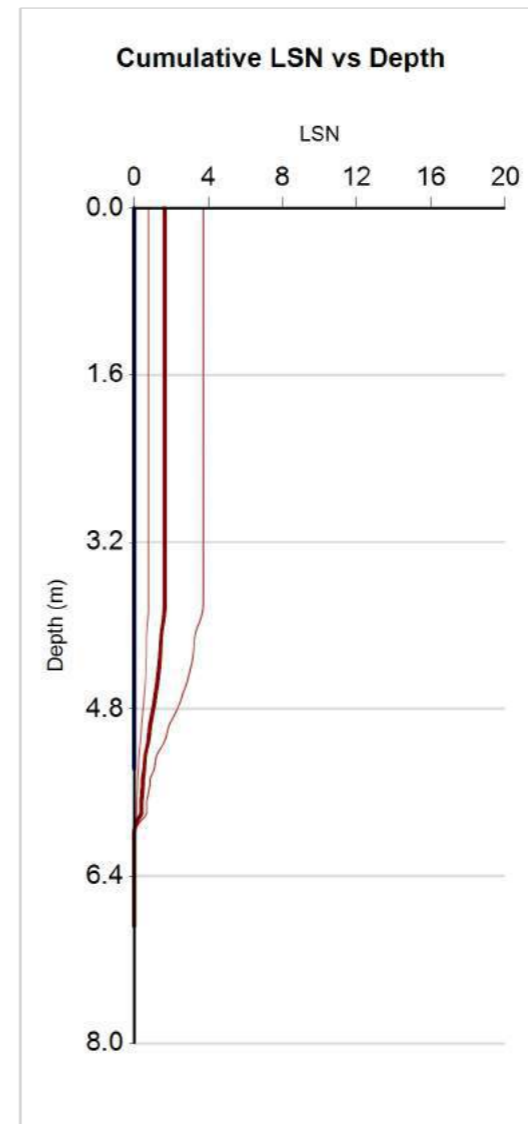
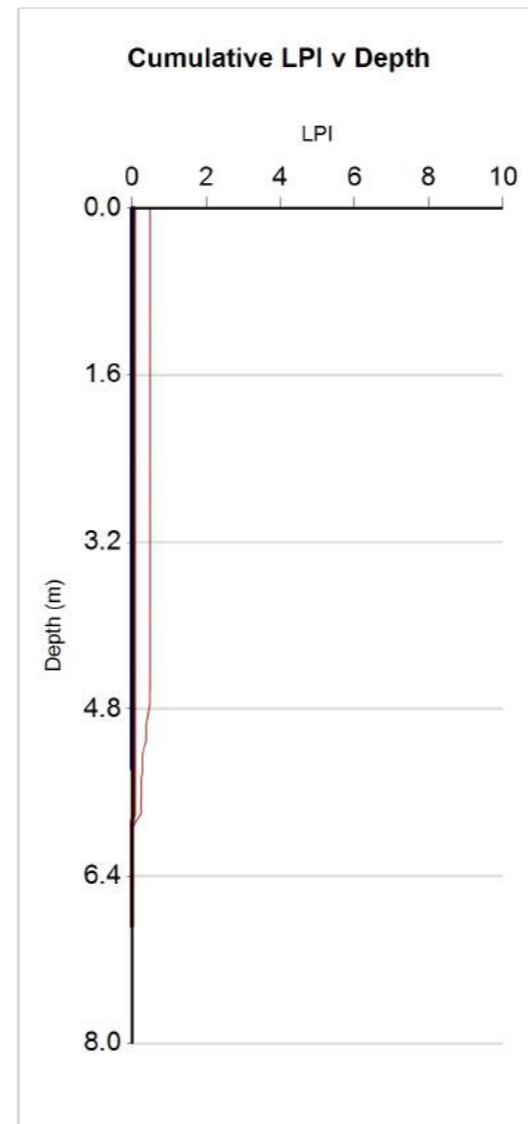
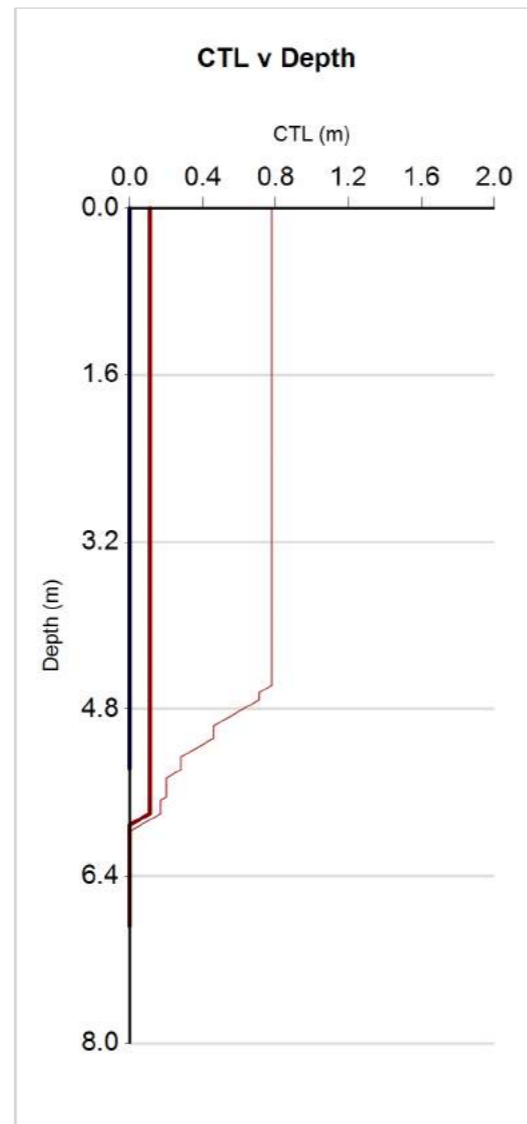
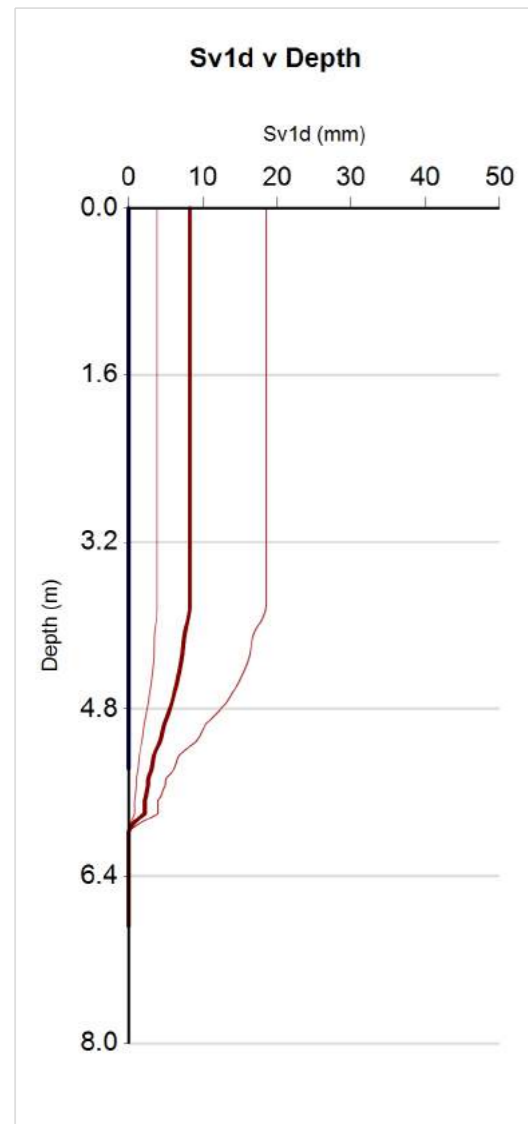


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|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
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| 4. Silt mixtures - clayey silt to silty clay | 9. Very stiff, fine grained * |
| 5. Sand mixtures - silty sand to sandy silt | |

*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)

 <p>Tonkin + Taylor Exceptional thinking together V1.3</p>	<p>CLIENT, PROJECT</p> <p>Ryman Healthcare Limited Karori Prepurchase Geotechnical Assessment</p>	<p>LOCATION</p> <p>Victoria University Karori Campus</p>	<p>DATE</p> <p>25/10/2017</p>
	<p>TITLE</p> <p>100 year return period - CPT10 and 11</p>	<p>JOB NUMBER</p> <p>30309</p>	<p>ANALYSED</p> <p>tzh</p> <p>CHECKED</p> <p>PAGE</p> <p>4 of 8 pages</p>

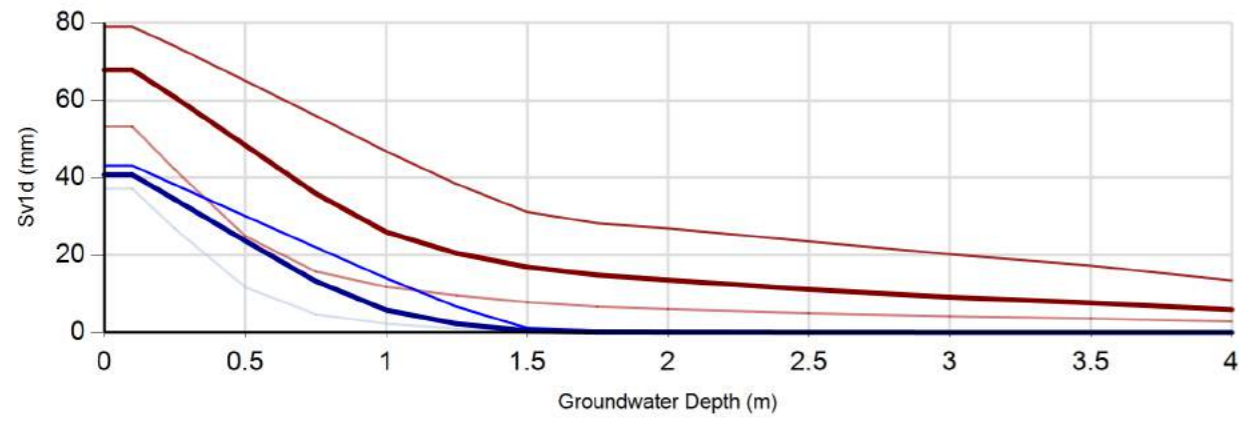


(Assumed pre-drill values)

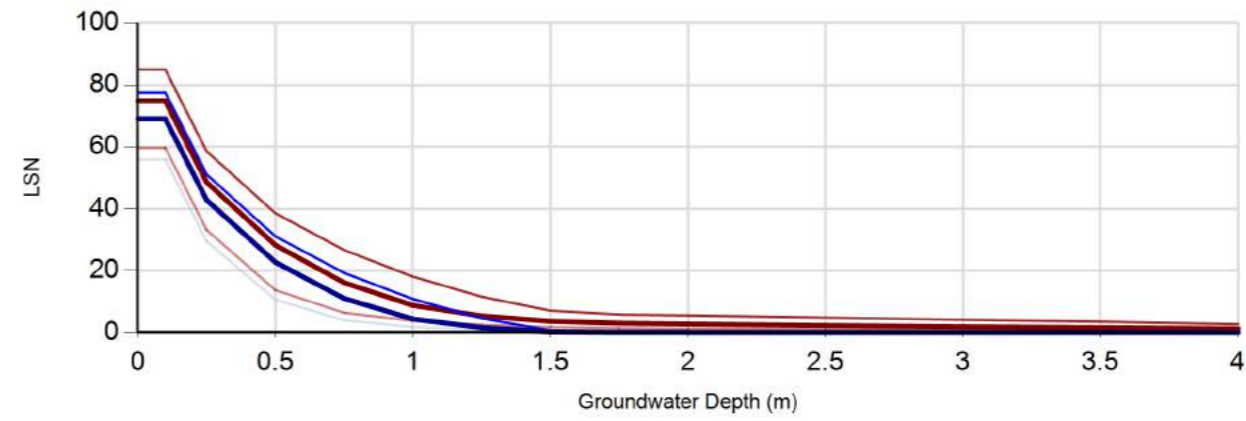
CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT10	103688	12/10/2017	User Specified	6.2	0.23	3.3	BI-2014	ZRB-2002	1.55	2	0.01	18
CPT11	103689	11/10/2017	User Specified	6.2	0.23	3.84	BI-2014	ZRB-2002	1.5	2	0.01	18

Thicker lines represent the 50% probability of exceedance case and the thinner lines to the left and right of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.

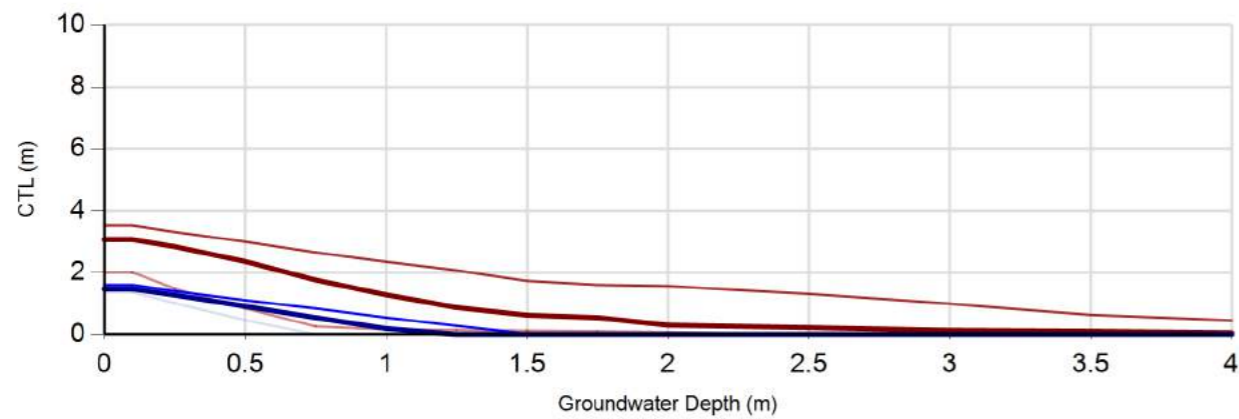
Sv1d response to GWD



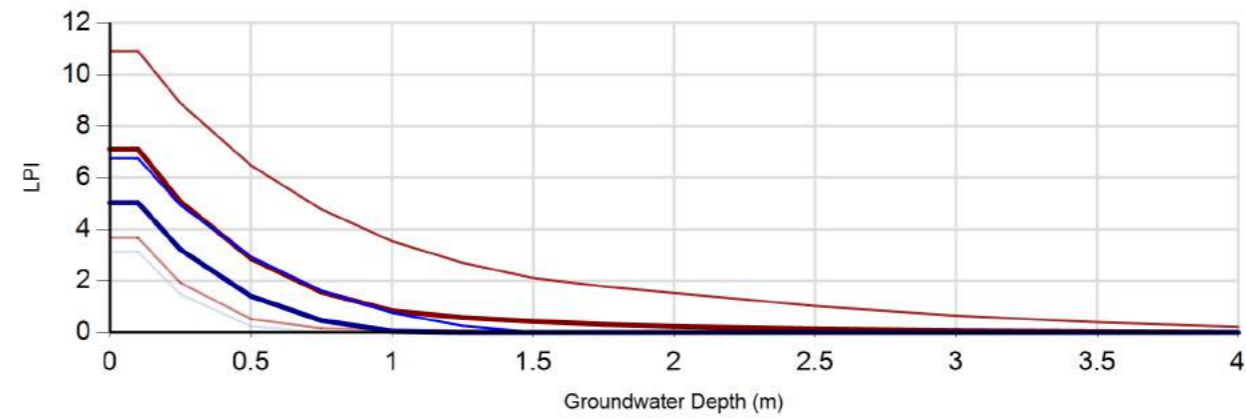
LSN response to GWD



CTL response to GWD



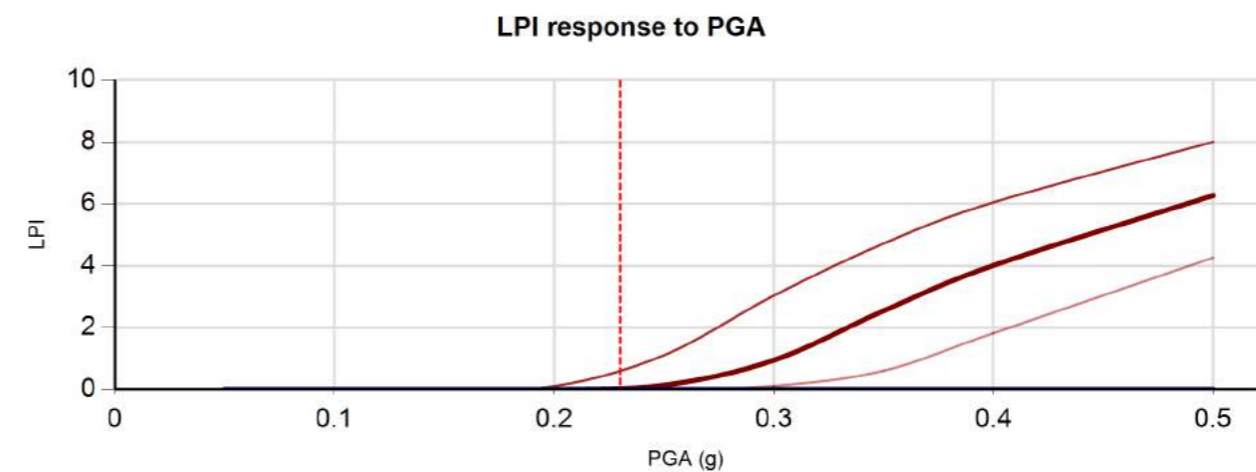
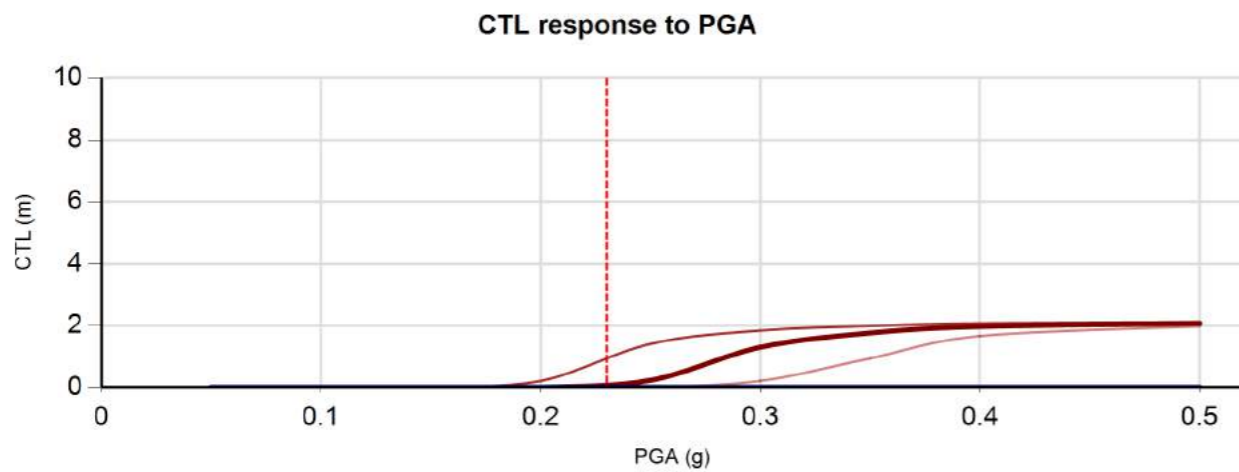
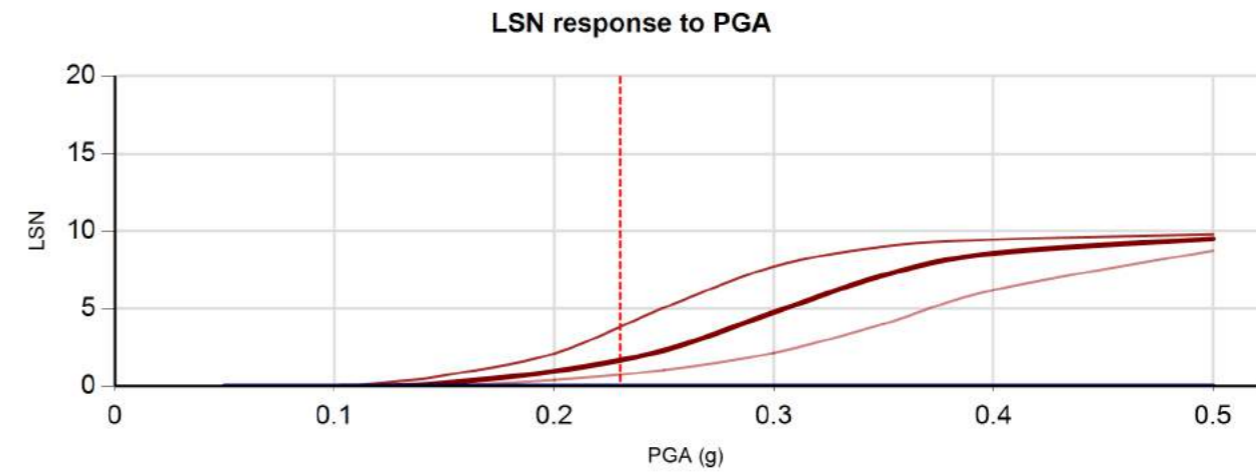
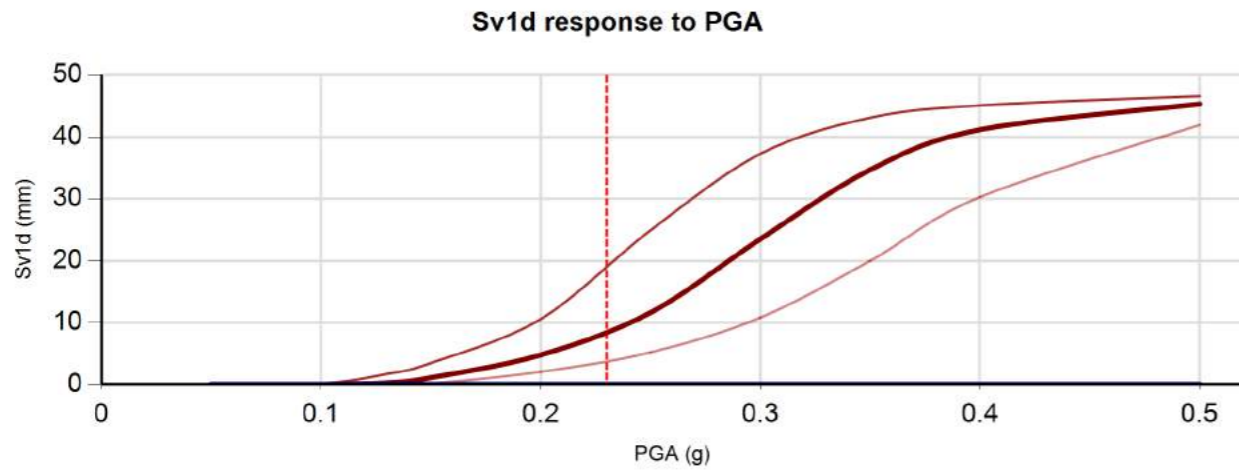
LPI response to GWD



(Assumed pre-drill values)

CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT10	103688	12/10/2017	User Specified	6.2	0.23	3.3	BI-2014	ZRB-2002	1.55	2	0.01	18
CPT11	103689	11/10/2017	User Specified	6.2	0.23	3.84	BI-2014	ZRB-2002	1.5	2	0.01	18

Thicker lines represent the 50% probability of exceedance case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.



Vertical dotted line/s indicate user specified PGA at the CPT locations. (actual PGA)

(Assumed pre-drill values)

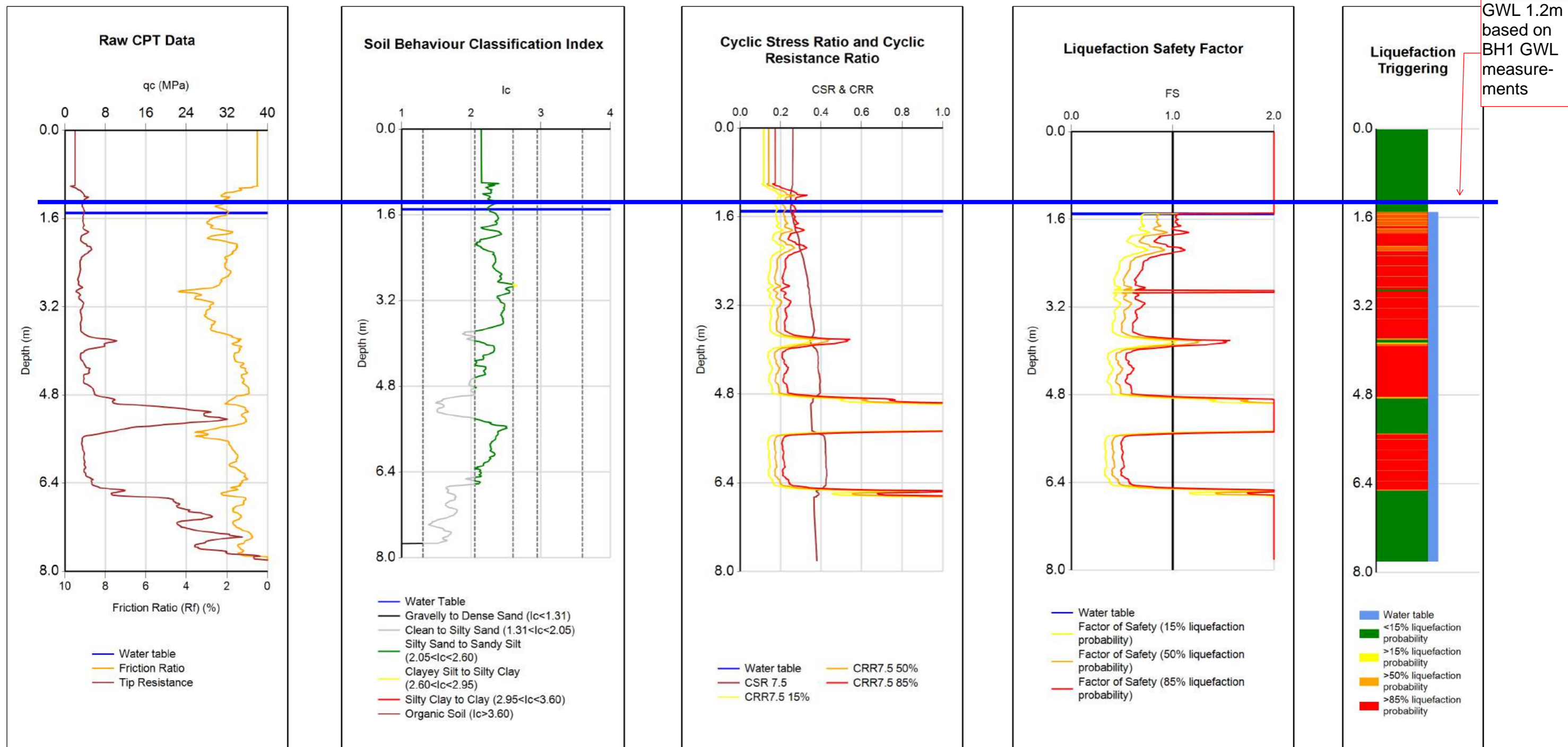
CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT10	103688	12/10/2017	User Specified	6.2	0.23	3.3	BI-2014	ZRB-2002	1.55	2	0.01	18
CPT11	103689	11/10/2017	User Specified	6.2	0.23	3.84	BI-2014	ZRB-2002	1.5	2	0.01	18

Thicker lines represent the 50% probability of exceedance case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.

The inputs listed in Table 1.1-1 below have been adopted for the liquefaction analysis.

Table 1.1-1 Summary of inputs for liquefaction analysis

TTGD ID	103688	103689
CPT Name	05TT12_10	05TT12_11
PGA	0.23g	0.23g
Magnitude	6.2	6.2
Depth to groundwater	3.3m	3.84m
Predrill depth	1.55m	1.5m
Assumed predrill tip resistance and skin friction	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa
Trigger method	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)
Settlement method	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)
CFC	0	0
Total depth of CPT	6.88m	5.37m
Maximum depth of analysis	6.88m	5.37m
RL	n/a	n/a



GWL 1.2m based on BH1 GWL measurements

(Assumed pre-drill values)

INPUT		CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
		CPT02	103680	12/10/2017	User Specified	7.1	0.45	1.5	BI-2014	ZRB-2002	1	2	0.01	18
OUTPUT		PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
		15%	90	4.3	18	27	1.6	17						
		50%	85	4.2	14	25	1.6	13						
		85%	78	3.7	10	22	2	8						

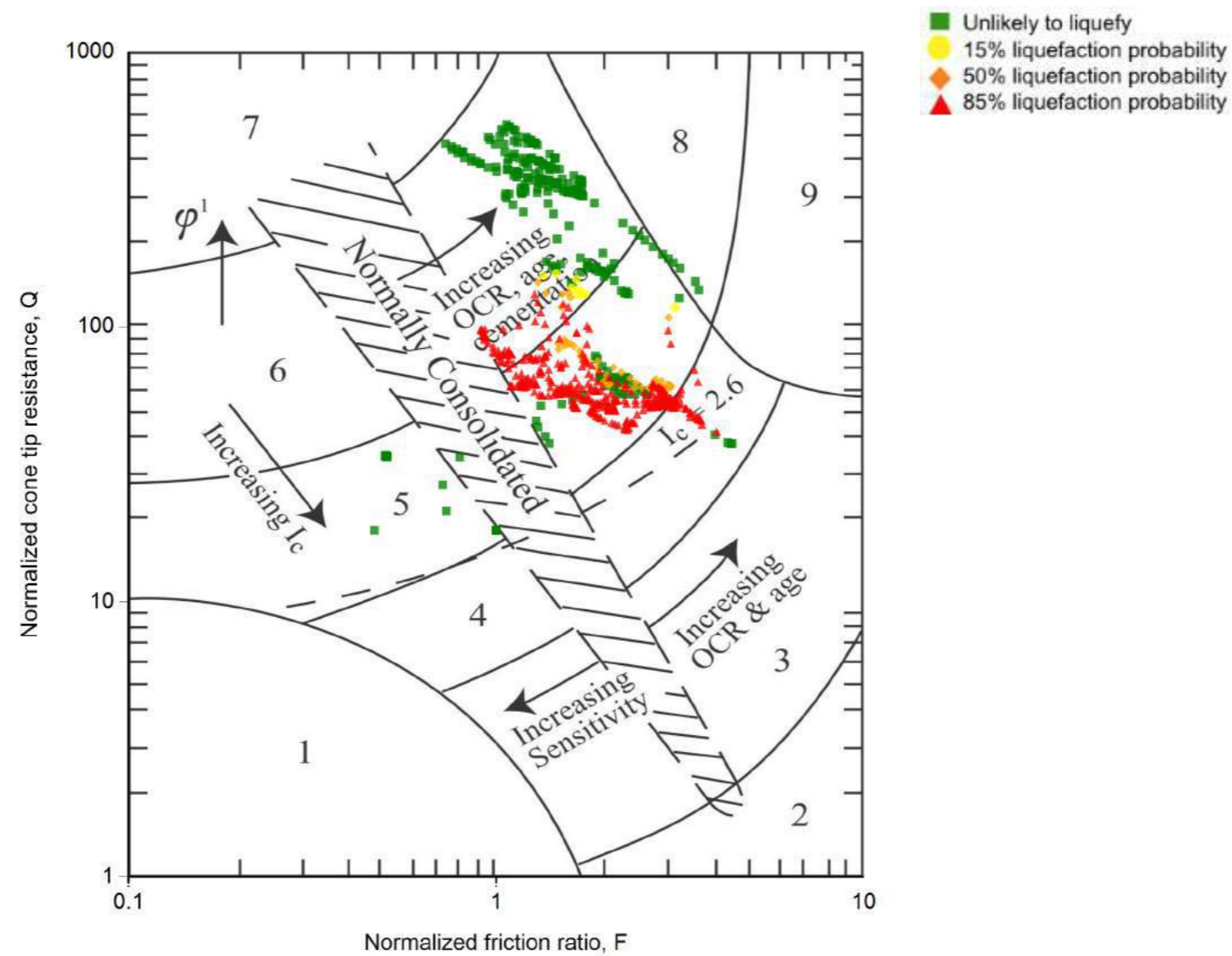
Top 1.5m of this CPT was vacuum excavated and backfilled with sand. Therefore, groundwater is set to 1.5m below ground level (BGL) in order to capture the more realistic liquefaction risk. It is note that the actual measured ground water at 0.1m BGL. Therefore, the liquefaction risk of the top 1.5m layer is unknown.



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ULS CPT2, 3, 4 and 5

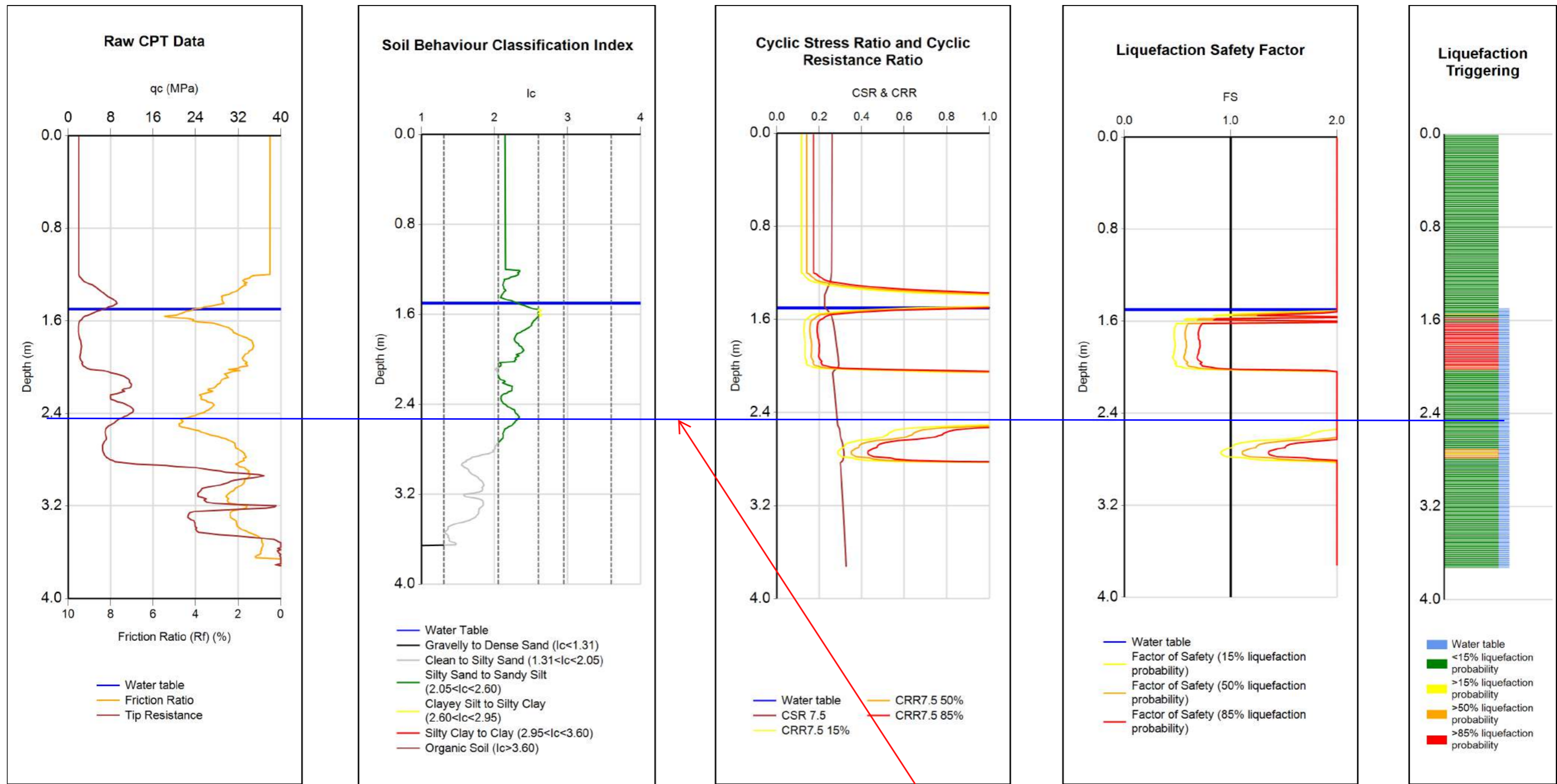
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|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
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*Heavily overconsolidated or cemented

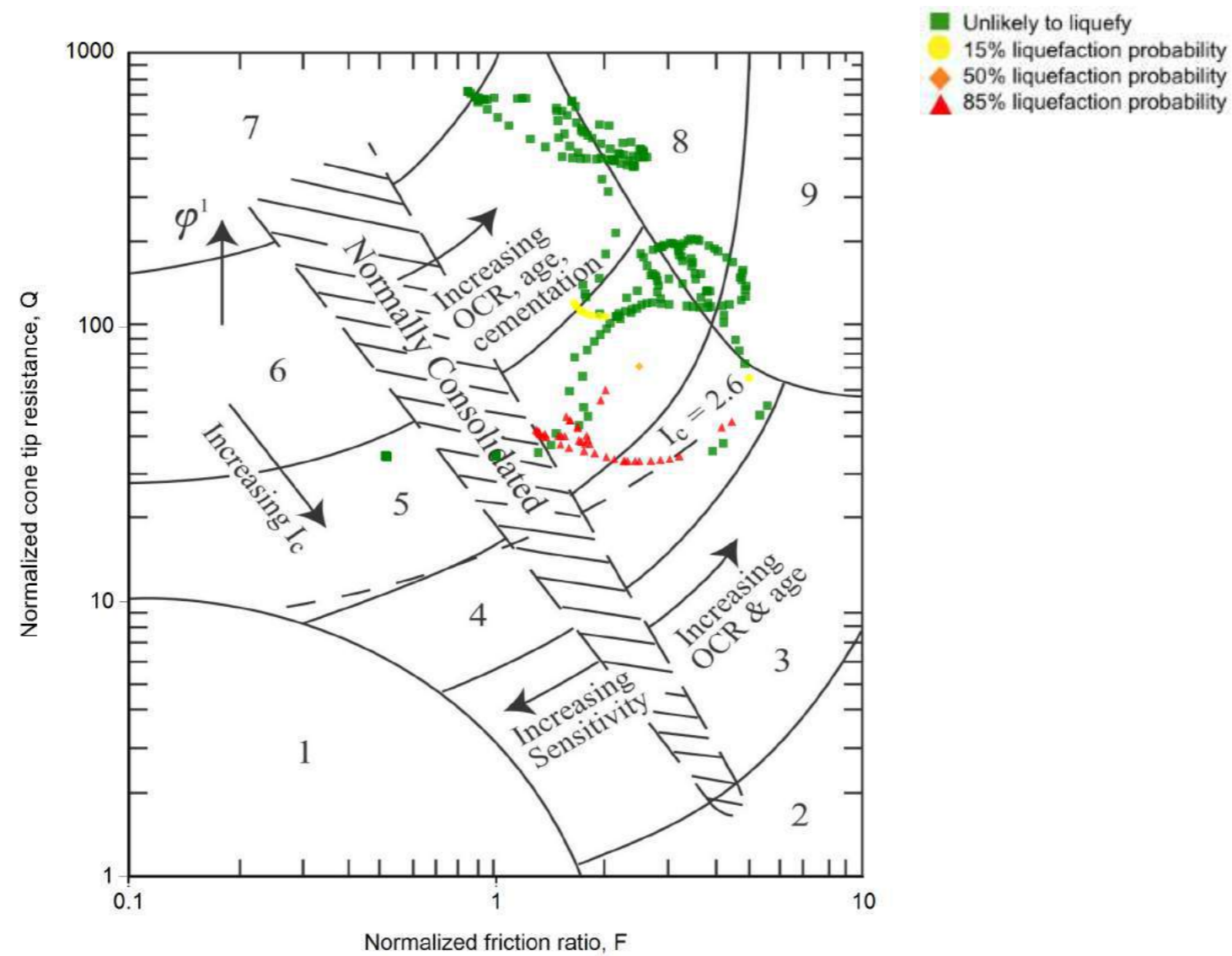
CPT-based soil behavior type classification chart by Robertson (1990)



(Assumed pre-drill values)

INPUT		CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
		CPT03	103681	12/10/2017	User Specified	7.1	0.45	1.5	BI-2014	ZRB-2002	1.2	2	0.01	18
OUTPUT		PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
		15%	12	0.5	2	6	1.7	3						
		50%	11	0.4	2	6	1.7	2						
		85%	10	0.4	1	6	1.7	2						

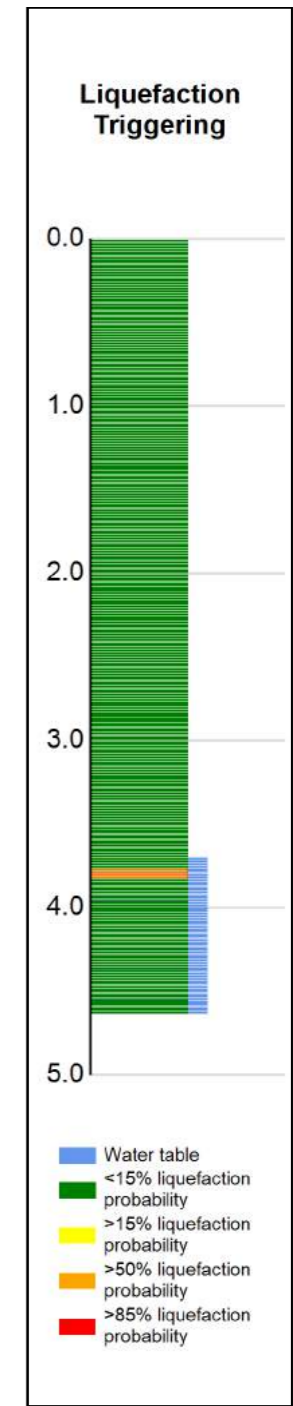
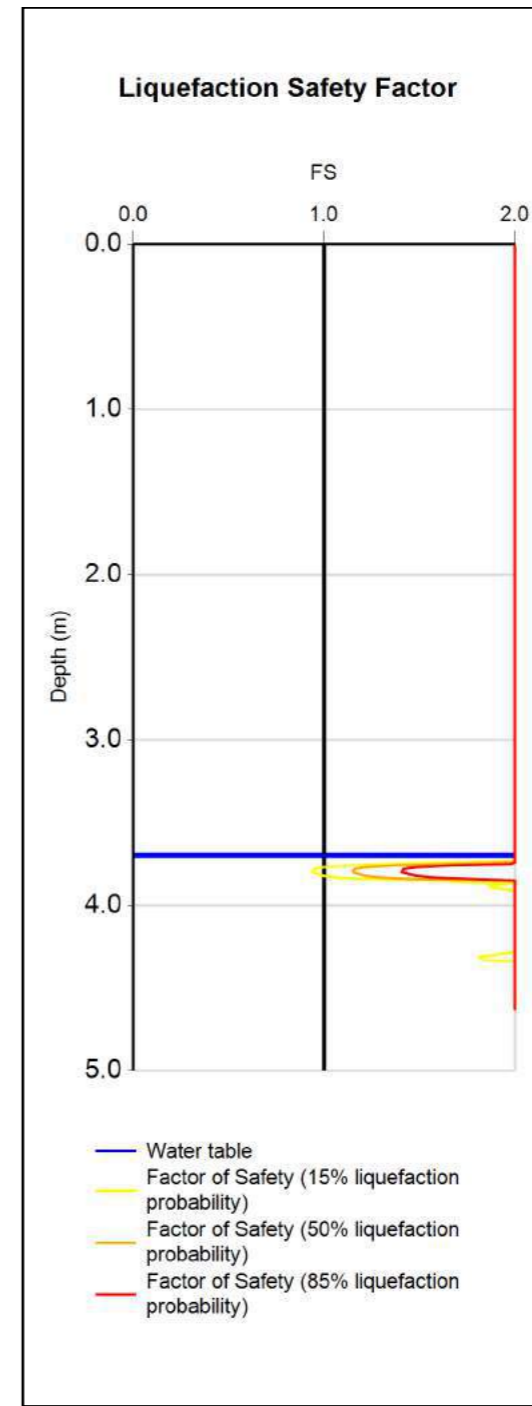
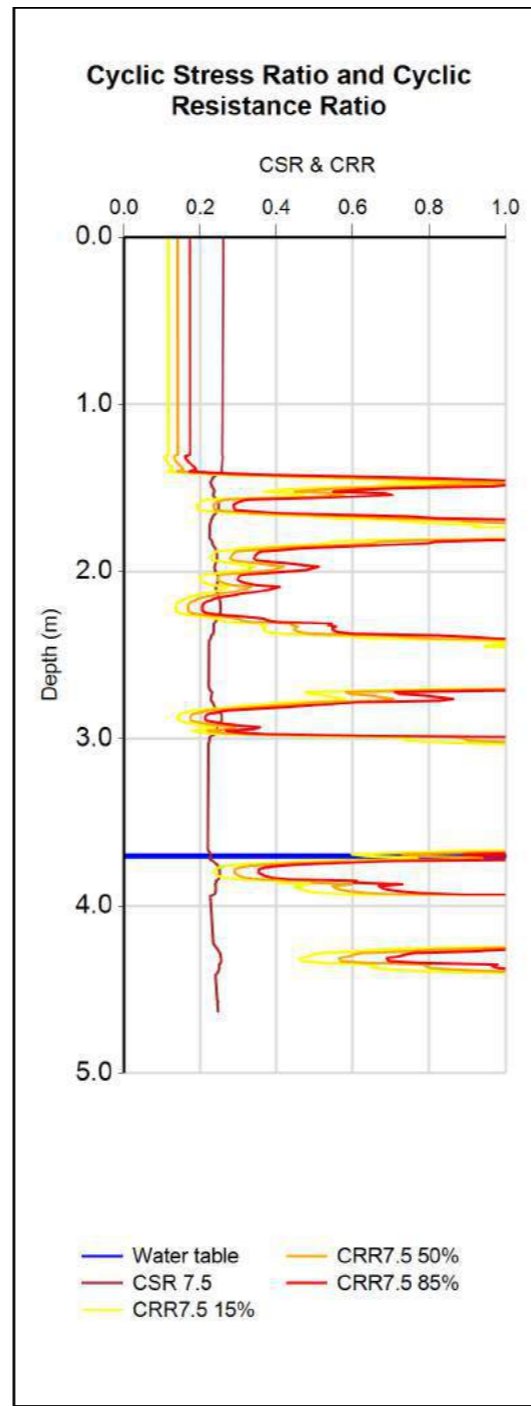
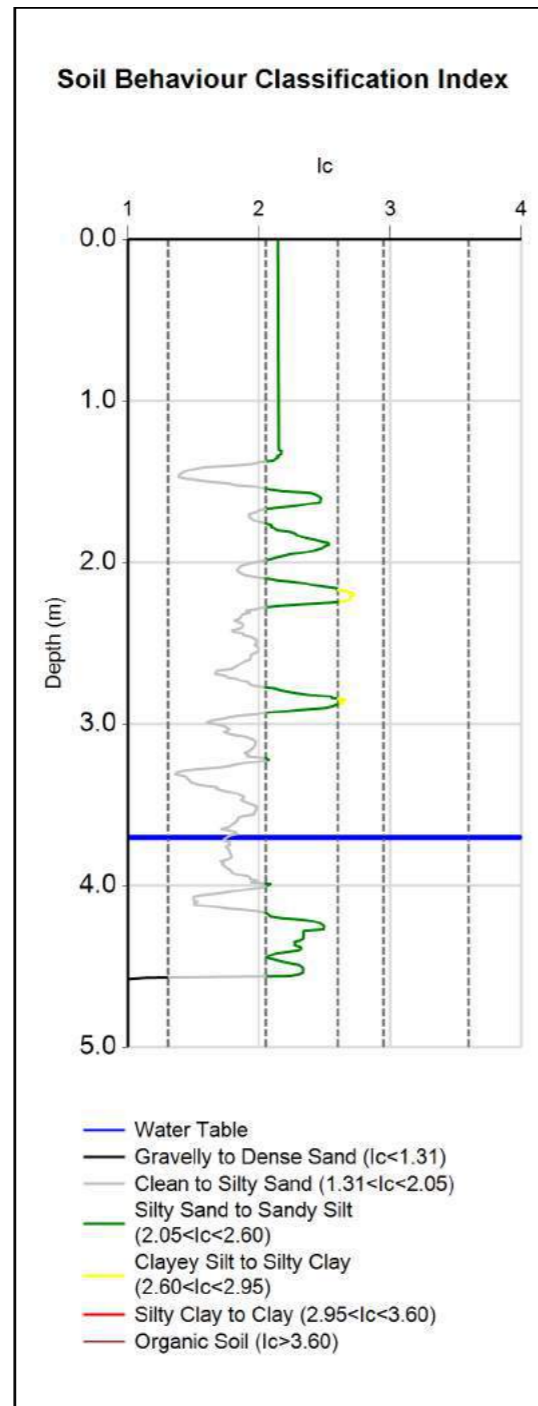
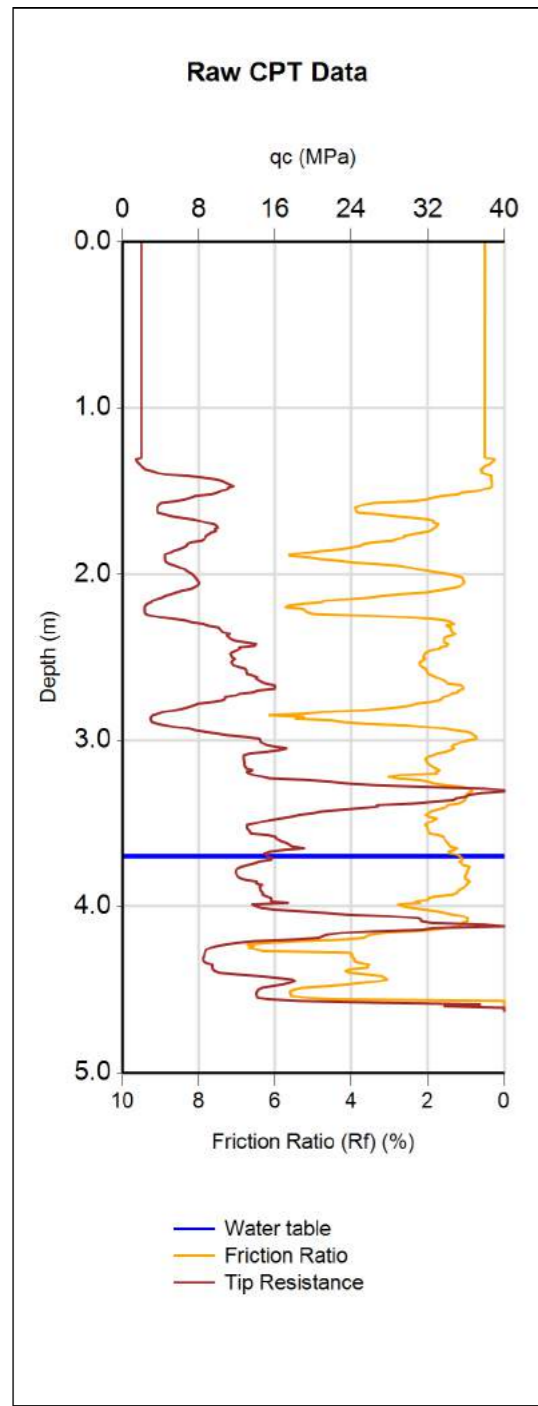
Top 1.5m of this CPT was vacuum excavated and backfilled with sand. Therefore, groundwater level (BGL) in order to capture the most measured ground water layer is unknown. The design groundwater level should be 2.5m below ground level (BGL) at CPT03 location to reflect the groundwater level monitoring results. That the actual measured risk of the top 1.5m



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|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
| 2. Organic soils - peats | 7. Gravelly sand to dense sand |
| 3. Clays - silty clay to clay | 8. Very stiff sand to clayey sand * |
| 4. Silt mixtures - clayey silt to silty clay | 9. Very stiff, fine grained * |
| 5. Sand mixtures - silty sand to sandy silt | |

*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT04	103682	11/10/2017	User Specified	7.1	0.45	3.7	BI-2014	ZRB-2002	1.3	2	0.01	18
OUTPUT	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
	15%	1	0.1	0	0	4.6	0						
	50%	0	0	0	0	4.6	0						
	85%	0	0	0	0	4.6	0						



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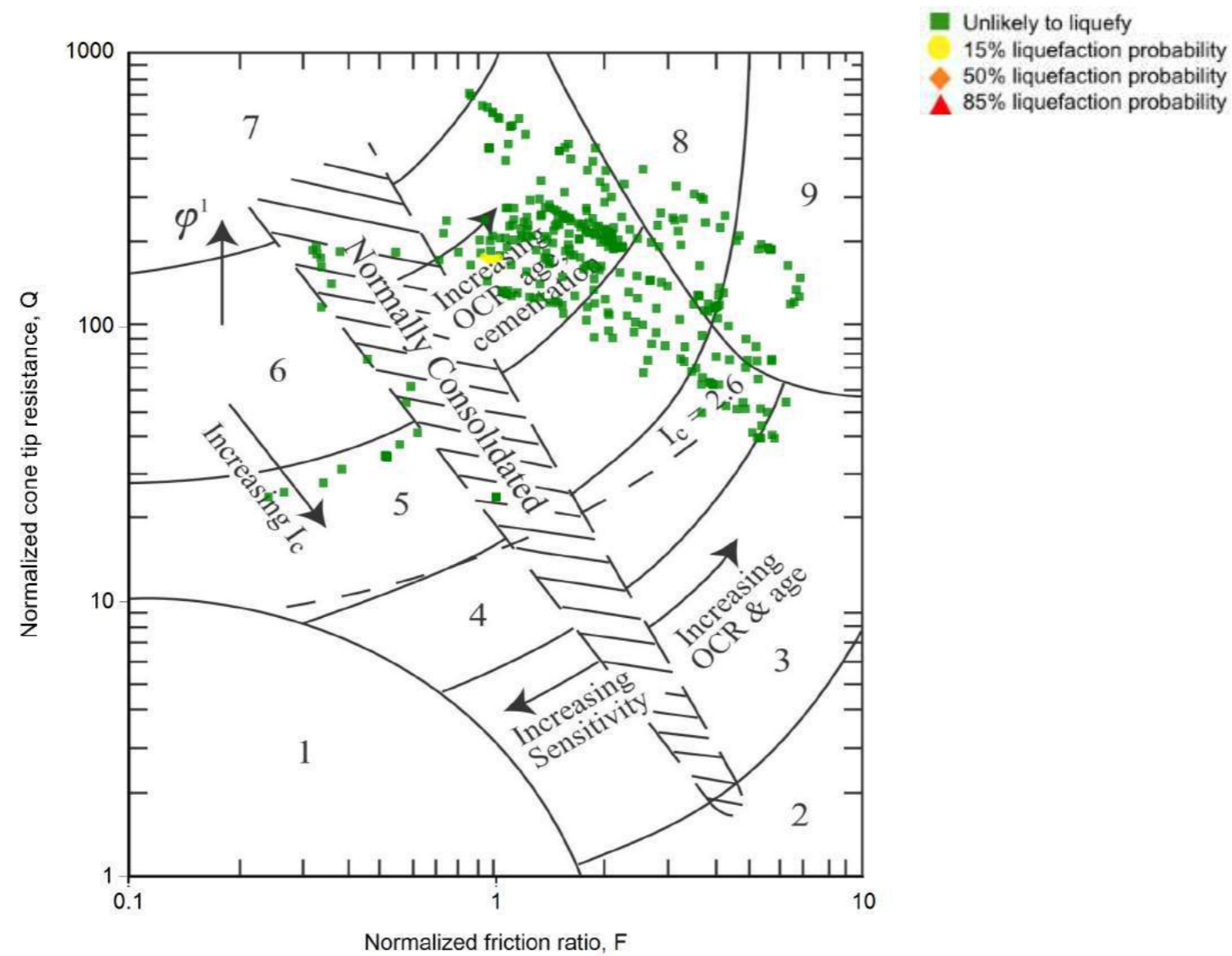
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TITLE
ULS CPT2, 3, 4 and 5

LOCATION
Victoria University
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JOB NUMBER
30309

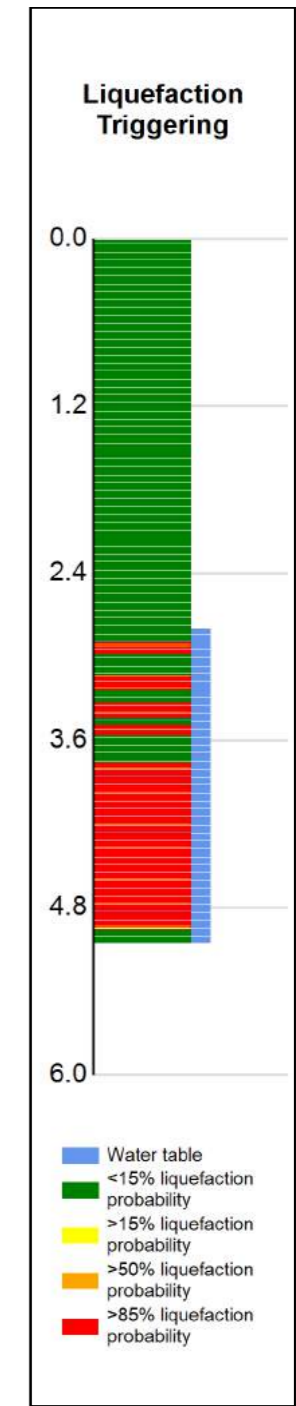
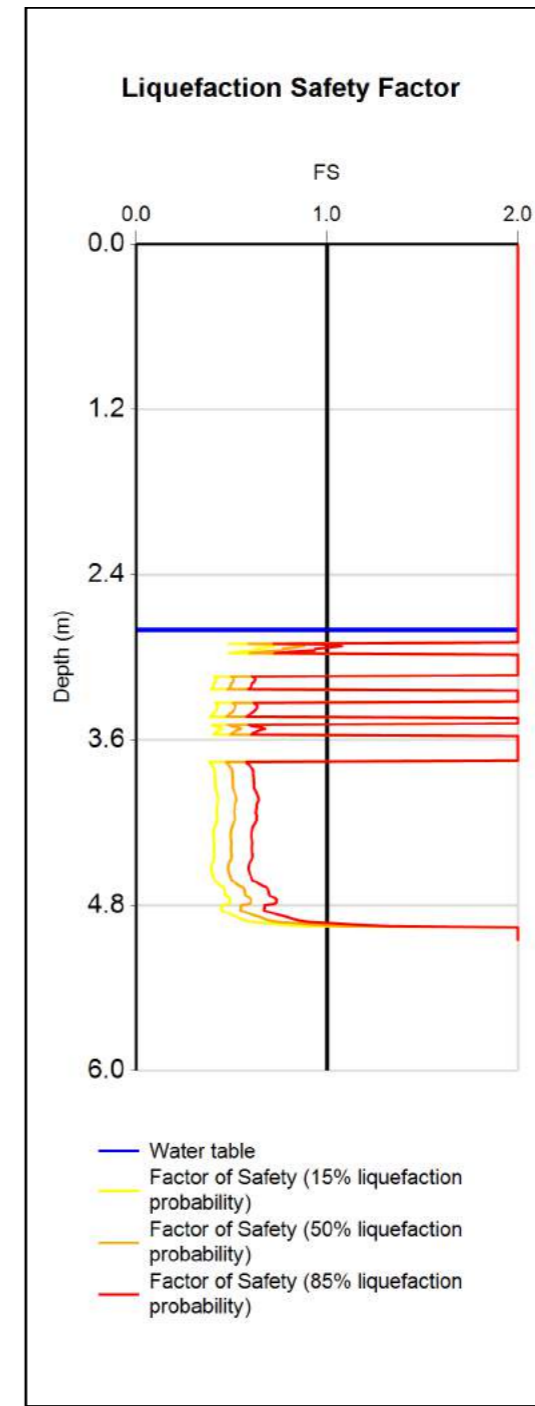
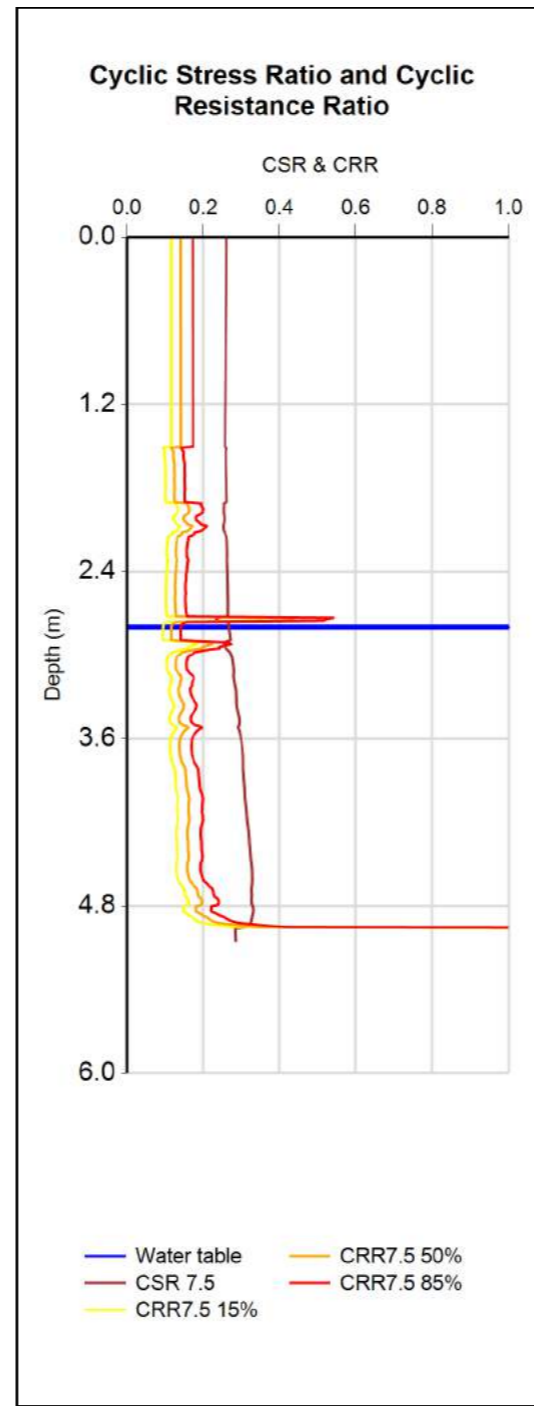
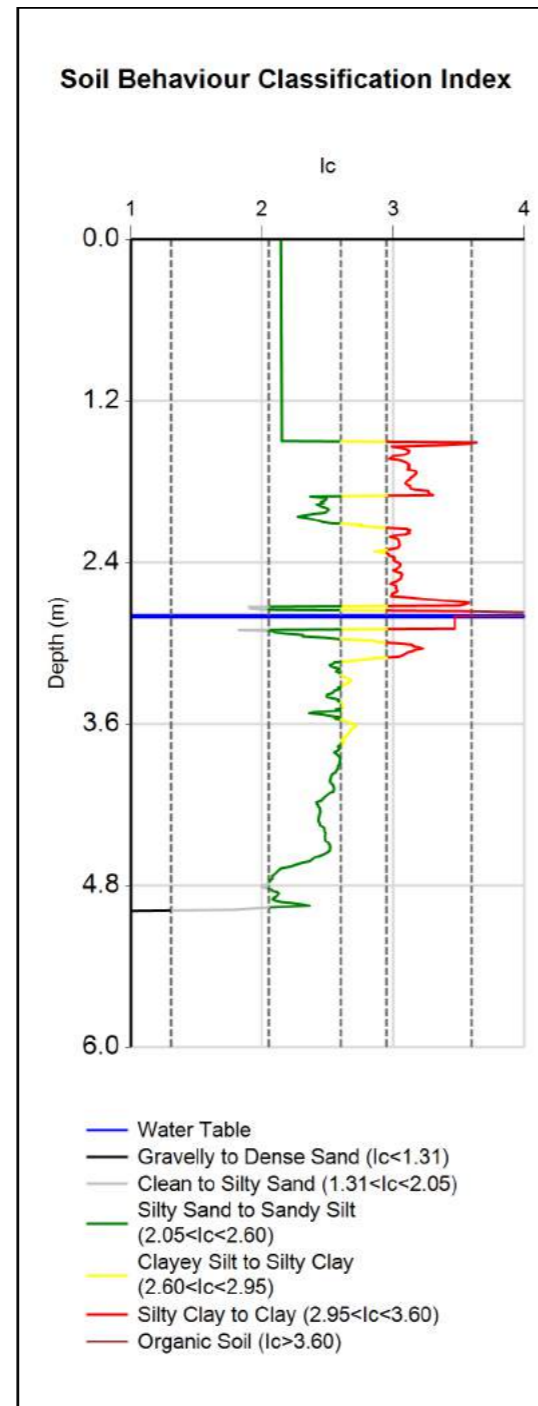
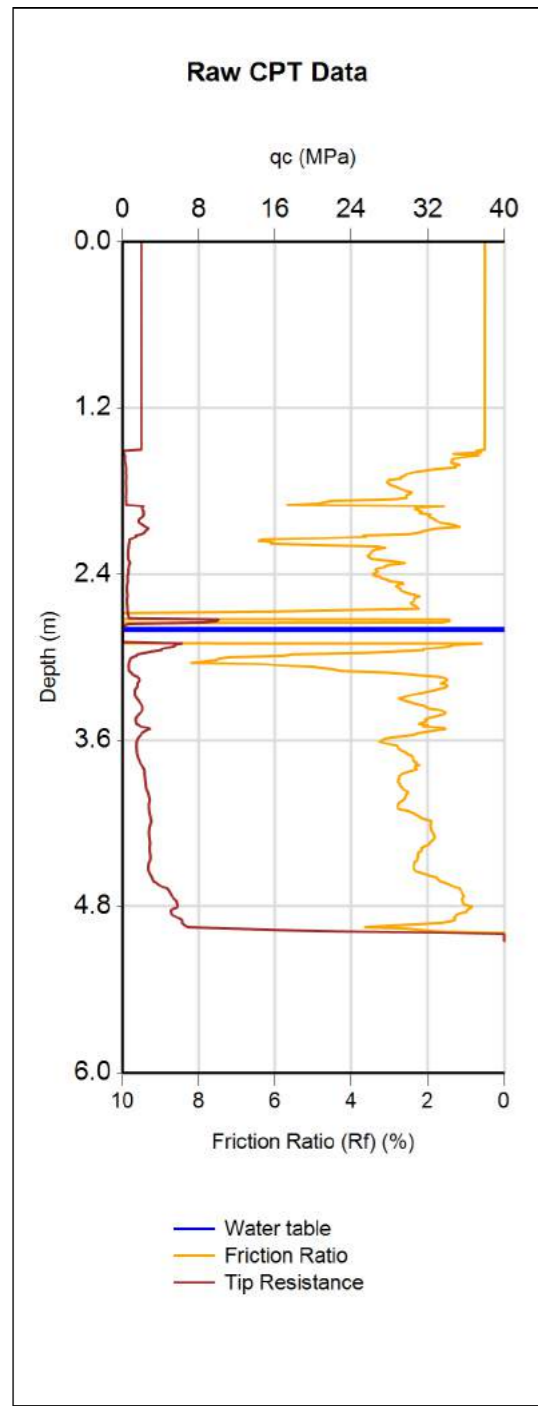
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|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
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*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT05	103683	12/10/2017	User Specified	7.1	0.45	2.8	BI-2014	ZRB-2002	1.5	2	0.01	18
	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
OUTPUT	15%	38	1.6	7	9	3.2	6						
	50%	37	1.6	6	9	3.2	5						
	85%	36	1.5	4	9	3.2	3						



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V1.3

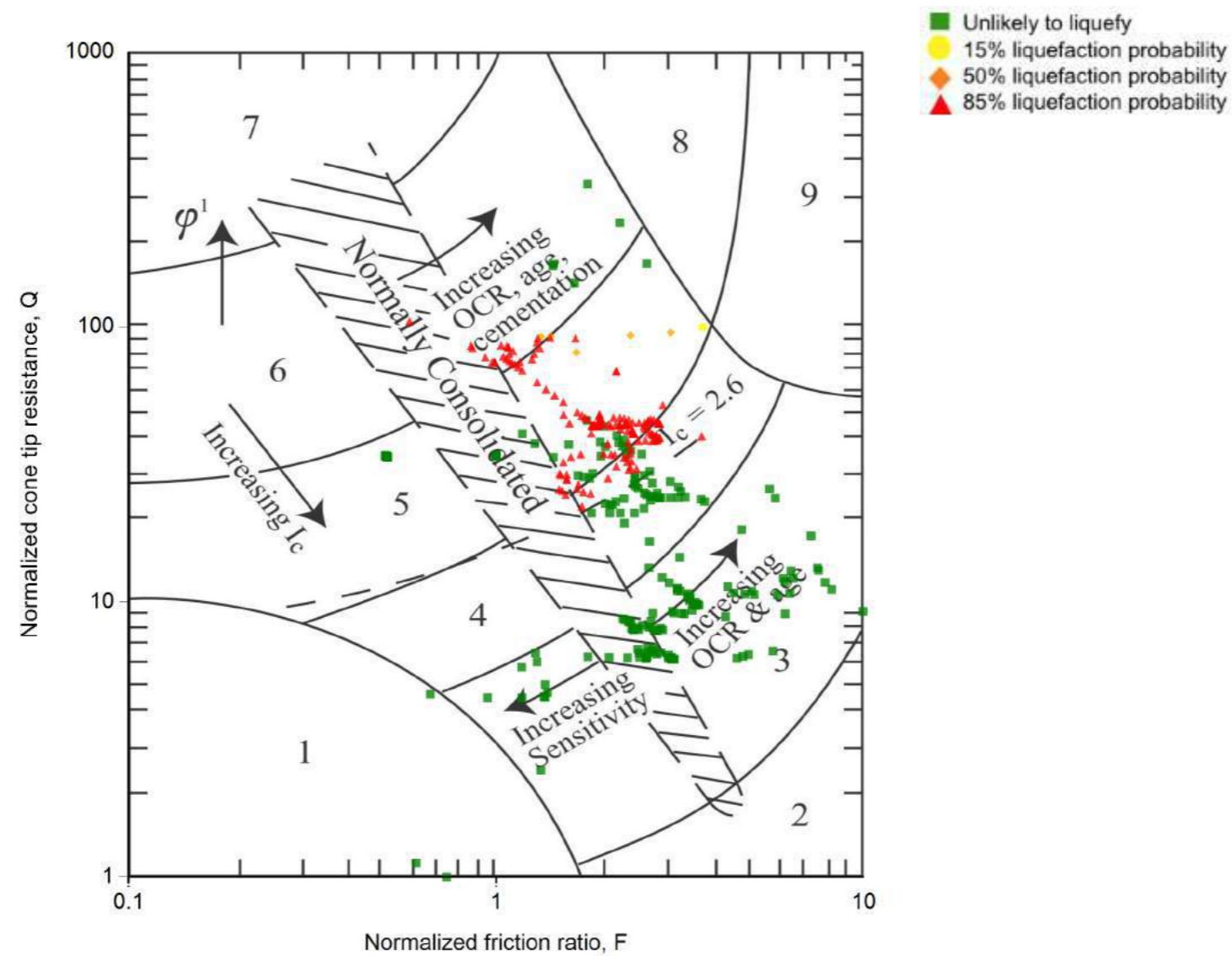
CLIENT, PROJECT
Ryman Healthcare Limited
Karori Prepurchase Geotechnical Assessment

TITLE
ULS CPT2, 3, 4 and 5

LOCATION
Victoria University
Karori Campus

JOB NUMBER
30309


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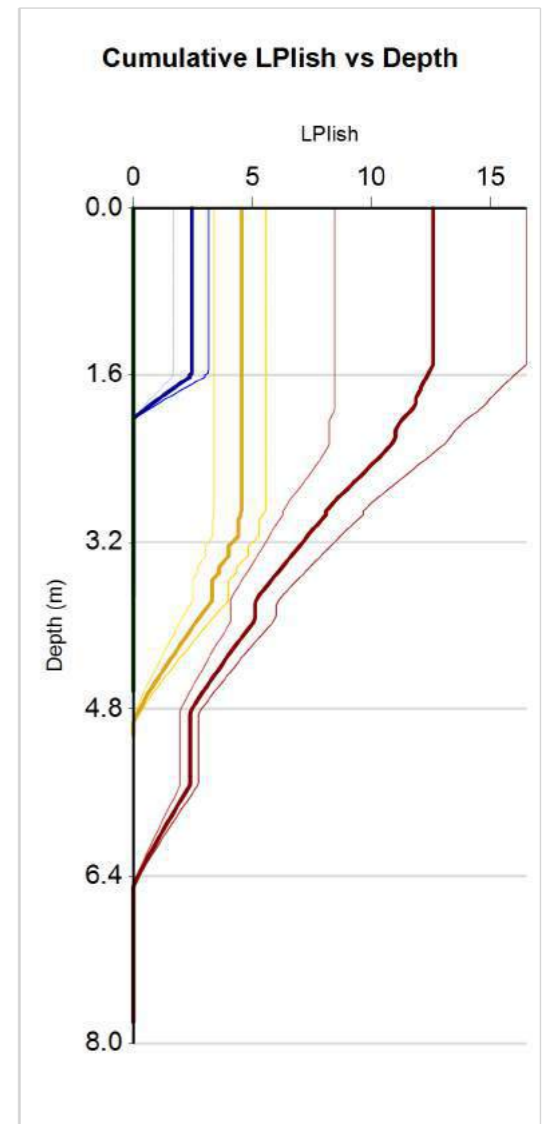
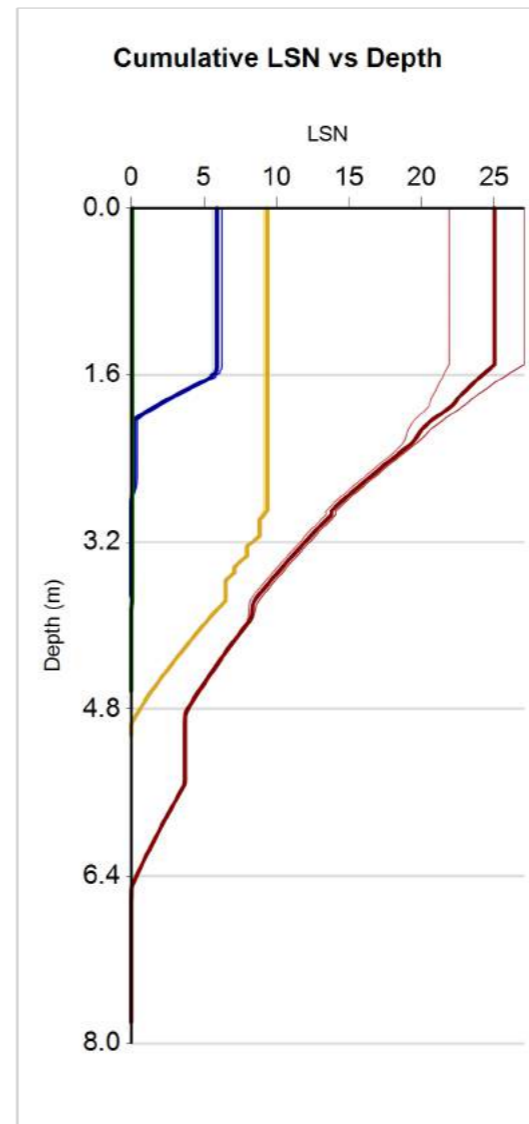
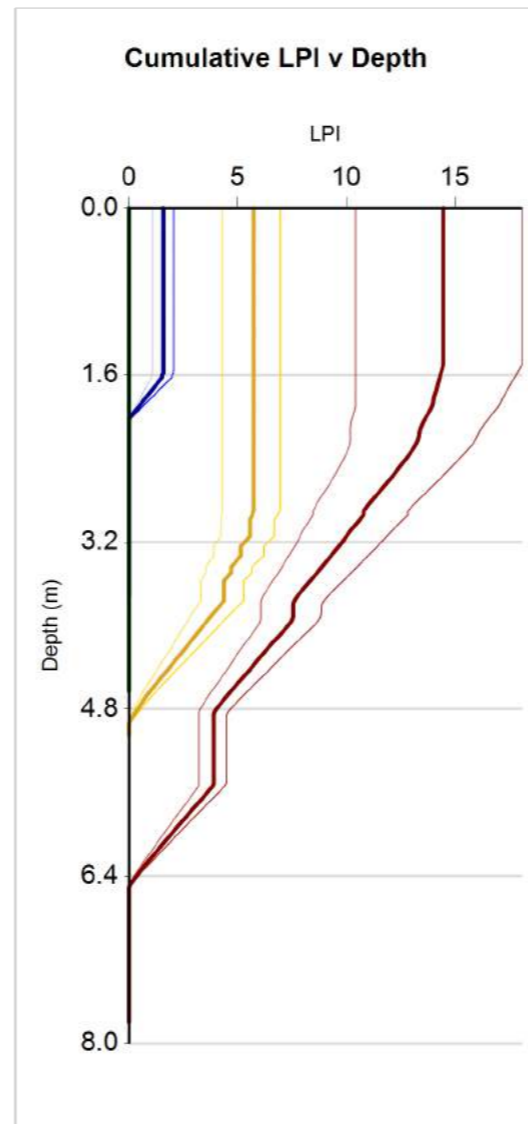
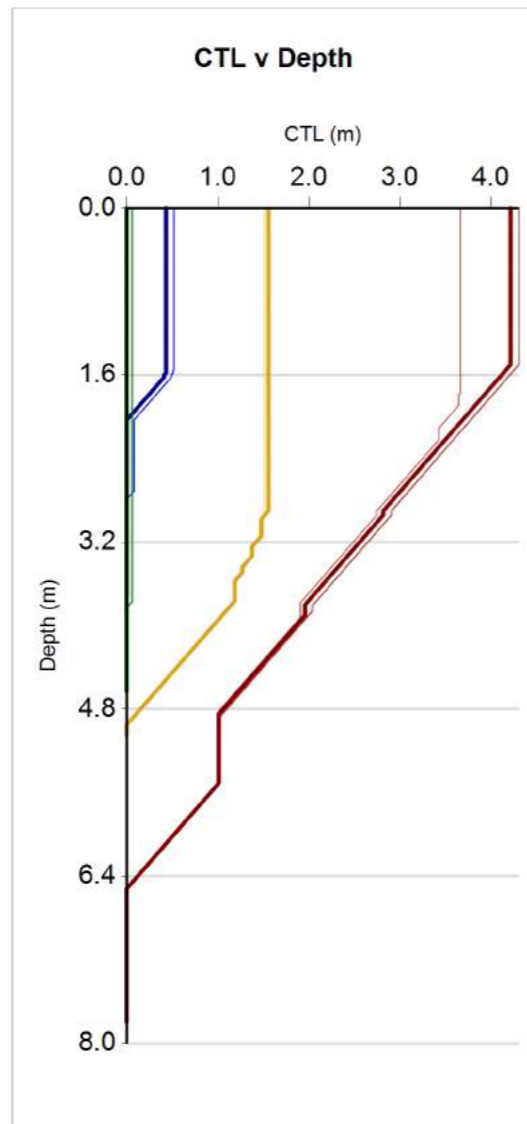
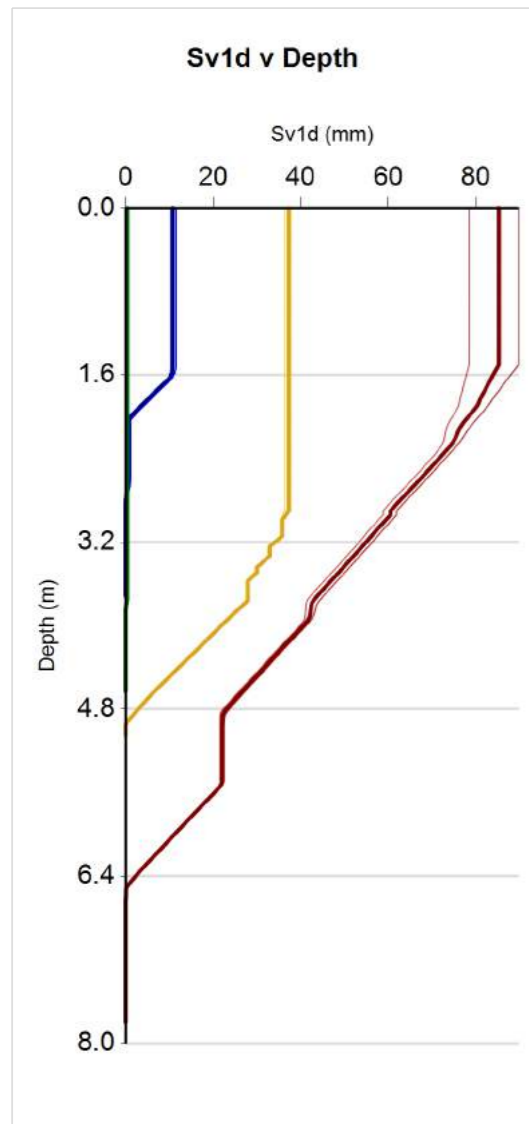


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*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)

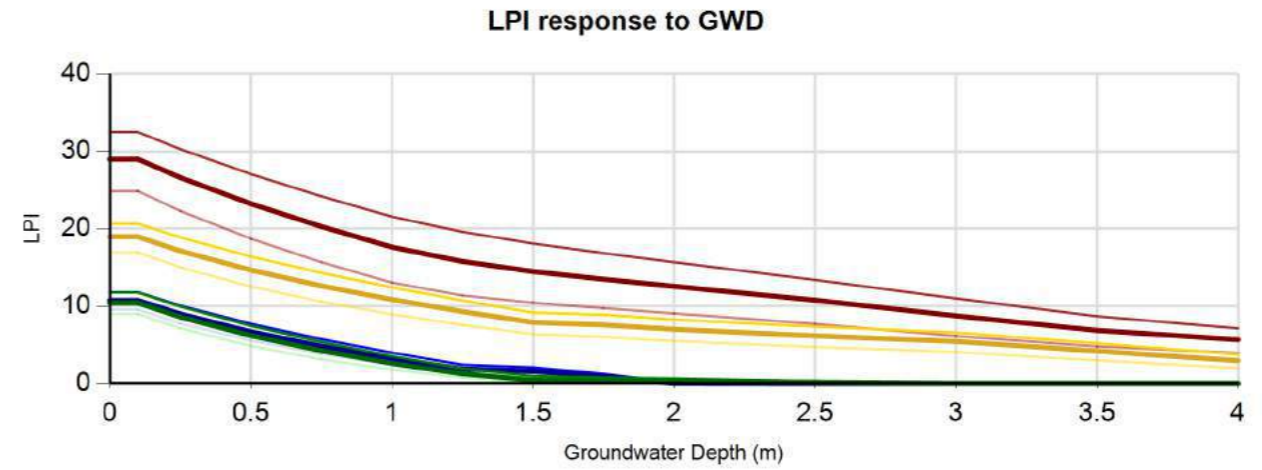
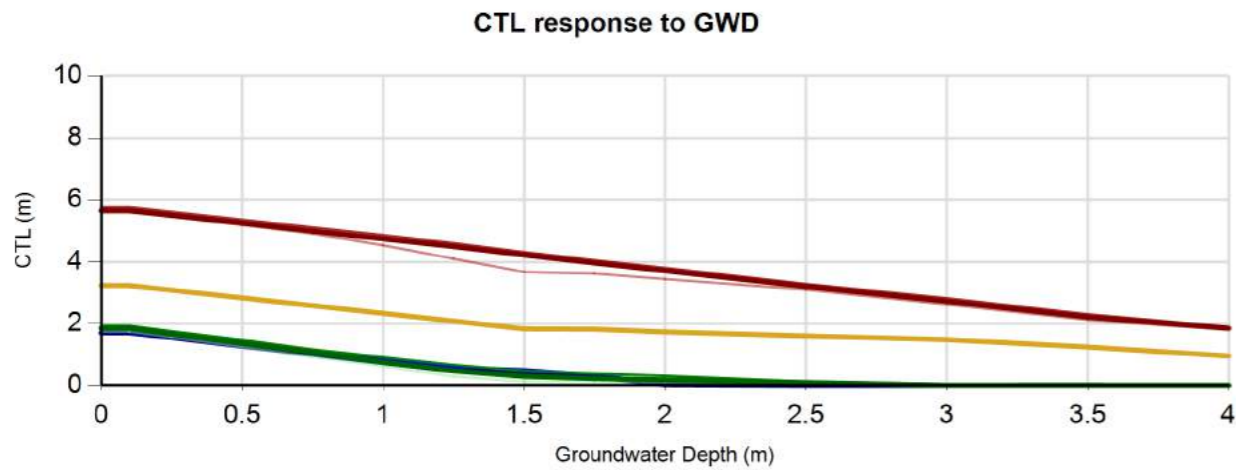
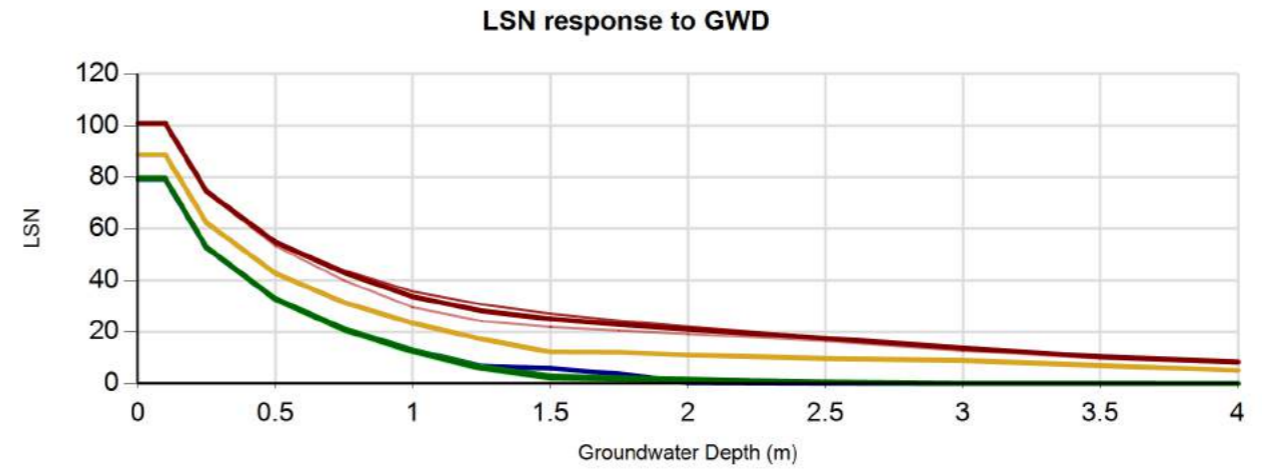
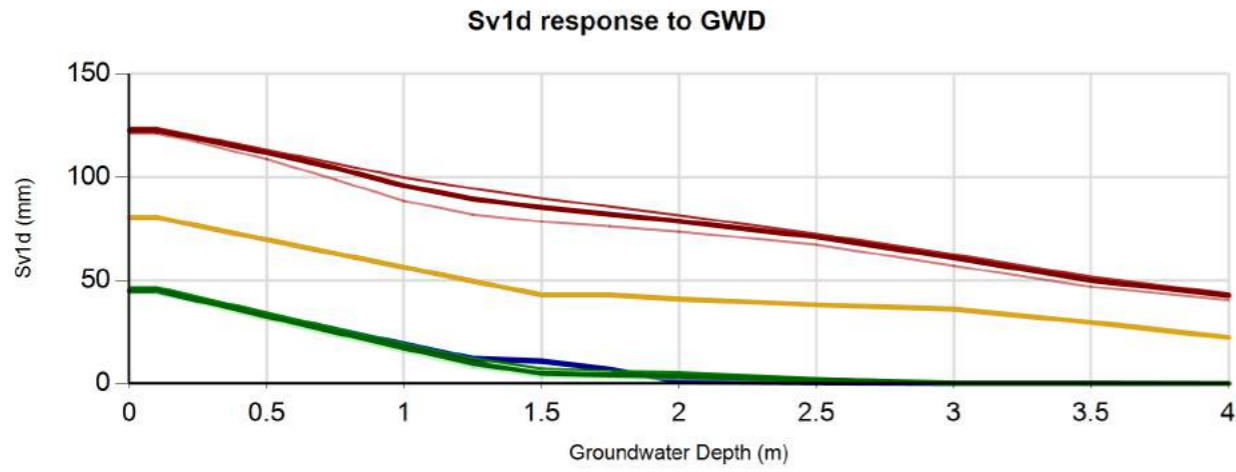
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	TITLE ULS CPT2, 3, 4 and 5	JOB NUMBER 30309	ANALYSED tzhl



(Assumed pre-drill values)

CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT02	103680	12/10/2017	User Specified	7.1	0.45	1.5	BI-2014	ZRB-2002	1	2	0.01	18
CPT03	103681	12/10/2017	User Specified	7.1	0.45	1.5	BI-2014	ZRB-2002	1.2	2	0.01	18
CPT04	103682	11/10/2017	User Specified	7.1	0.45	3.7	BI-2014	ZRB-2002	1.3	2	0.01	18
CPT05	103683	12/10/2017	User Specified	7.1	0.45	2.8	BI-2014	ZRB-2002	1.5	2	0.01	18

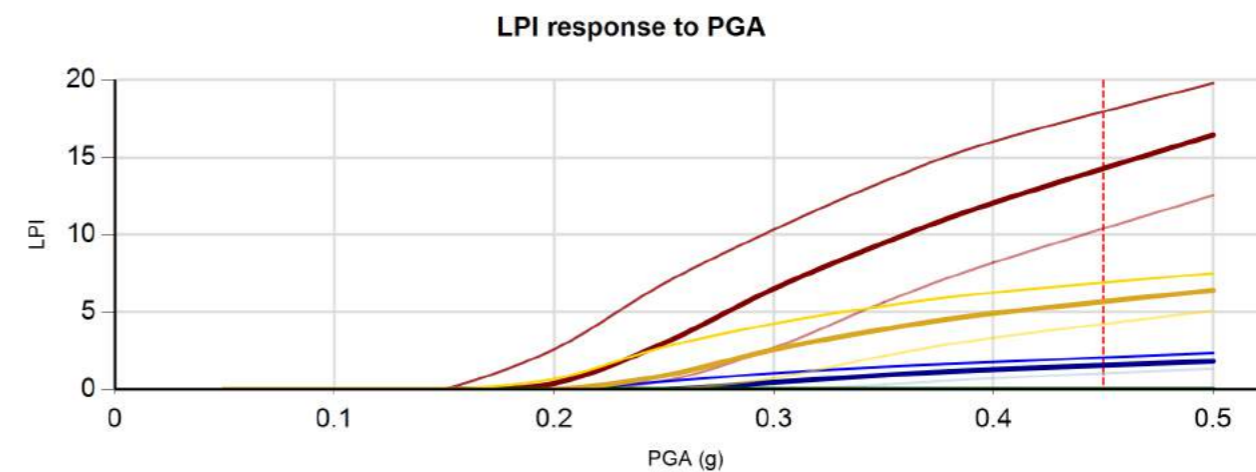
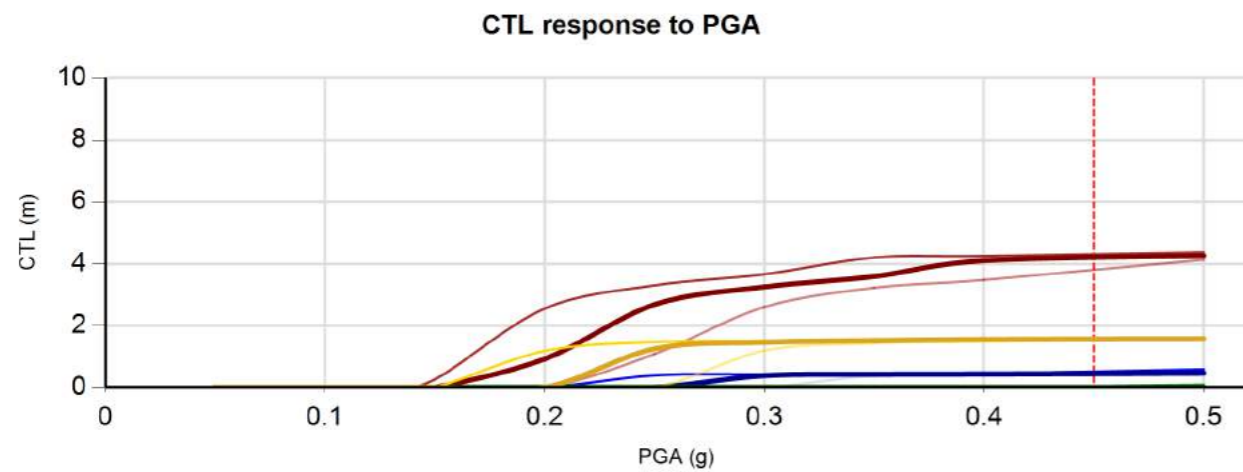
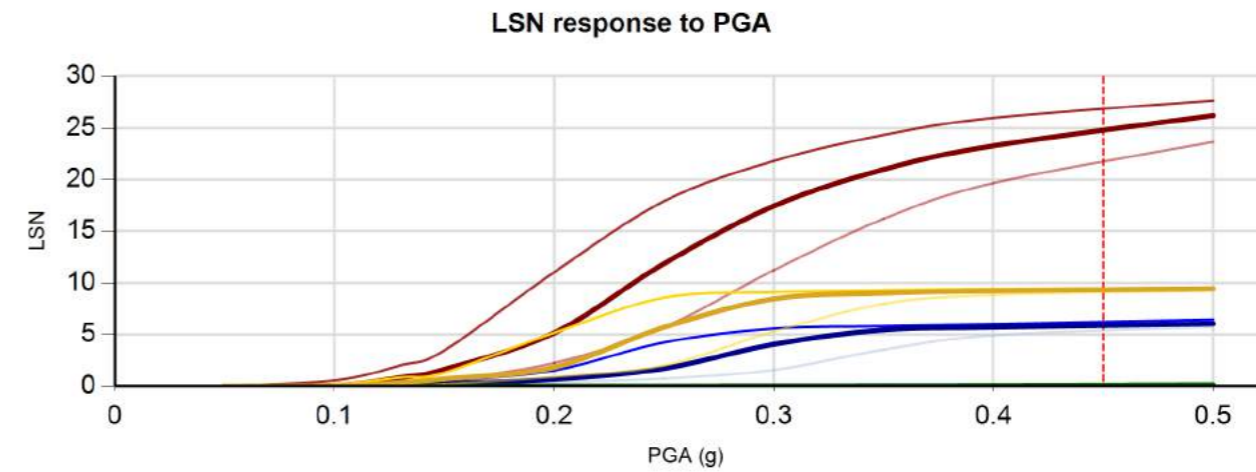
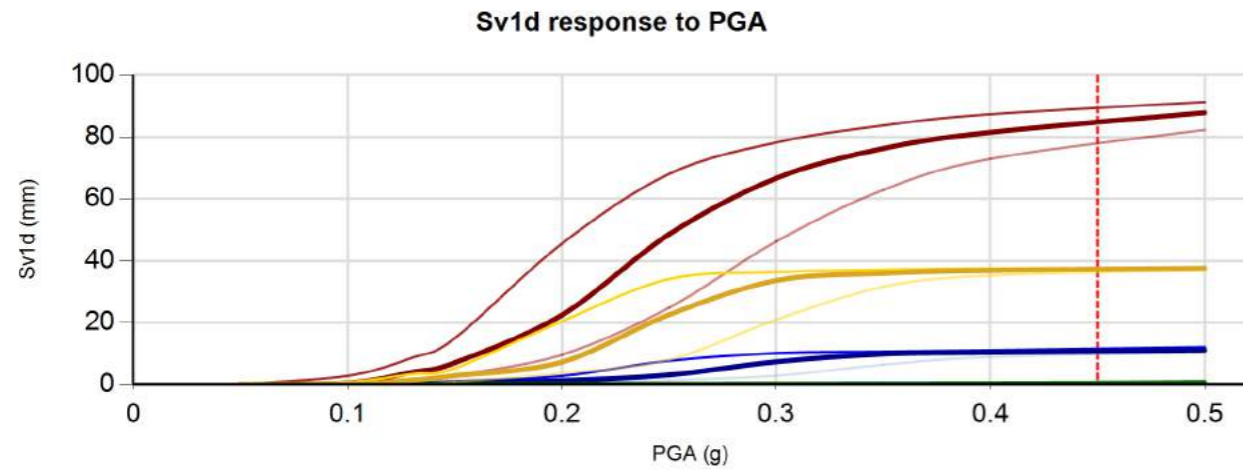
Thicker lines represent the 50% probability of exceedance case and the thinner lines to the left and right of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.



(Assumed pre-drill values)

CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT02	103680	12/10/2017	User Specified	7.1	0.45	1.5	BI-2014	ZRB-2002	1	2	0.01	18
CPT03	103681	12/10/2017	User Specified	7.1	0.45	1.5	BI-2014	ZRB-2002	1.2	2	0.01	18
CPT04	103682	11/10/2017	User Specified	7.1	0.45	3.7	BI-2014	ZRB-2002	1.3	2	0.01	18
CPT05	103683	12/10/2017	User Specified	7.1	0.45	2.8	BI-2014	ZRB-2002	1.5	2	0.01	18

Thicker lines represent the 50% probability of exceedence case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedence cases respectively.



Vertical dotted line/s indicate user specified PGA at the CPT locations. (actual PGA)

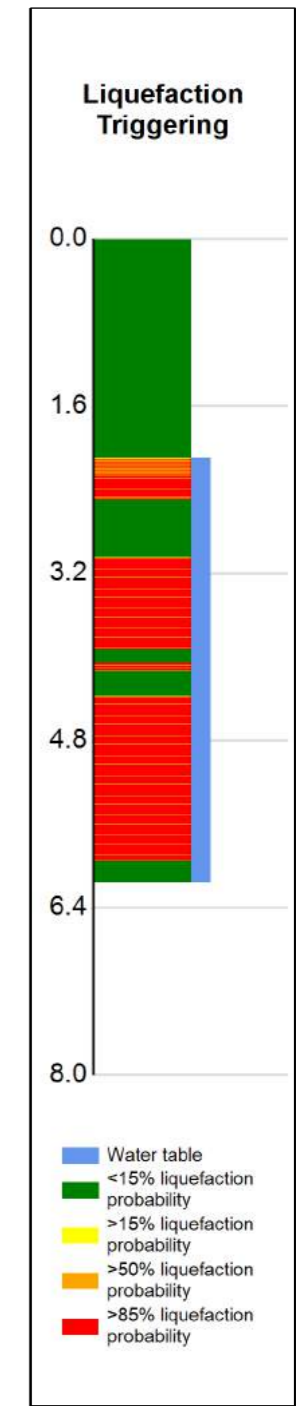
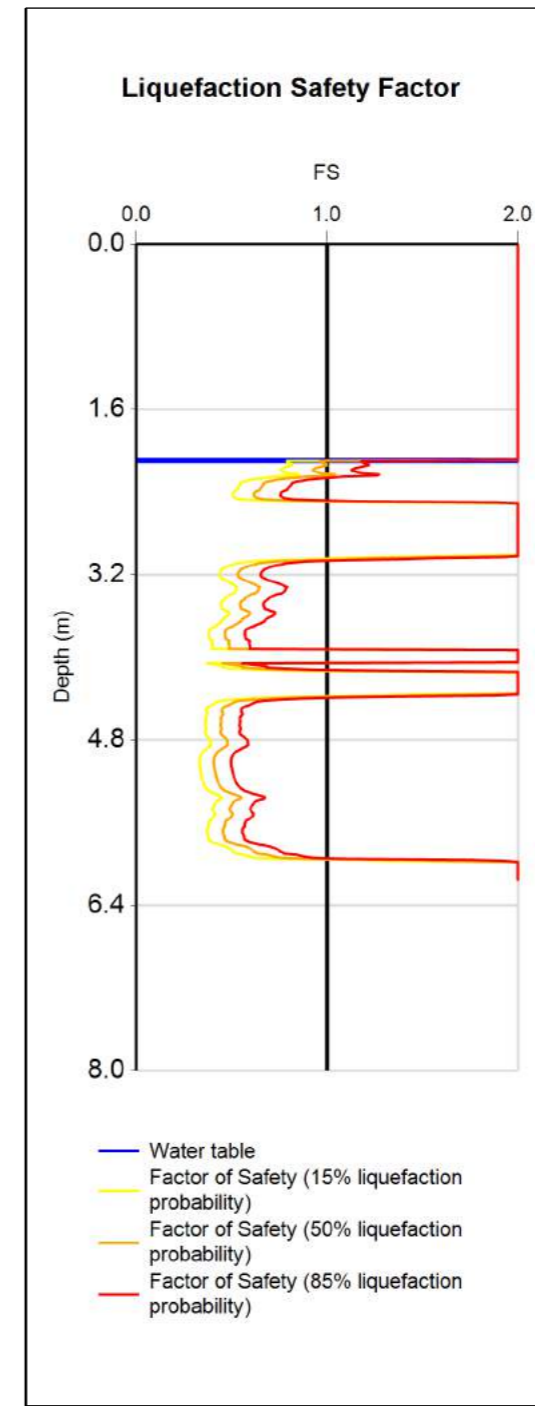
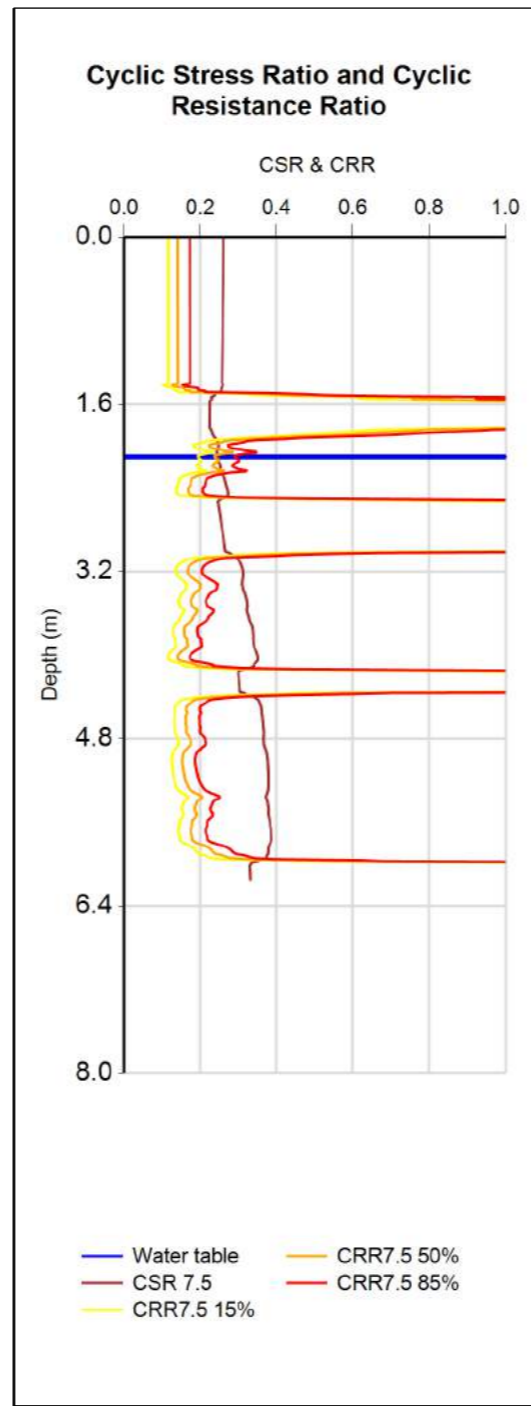
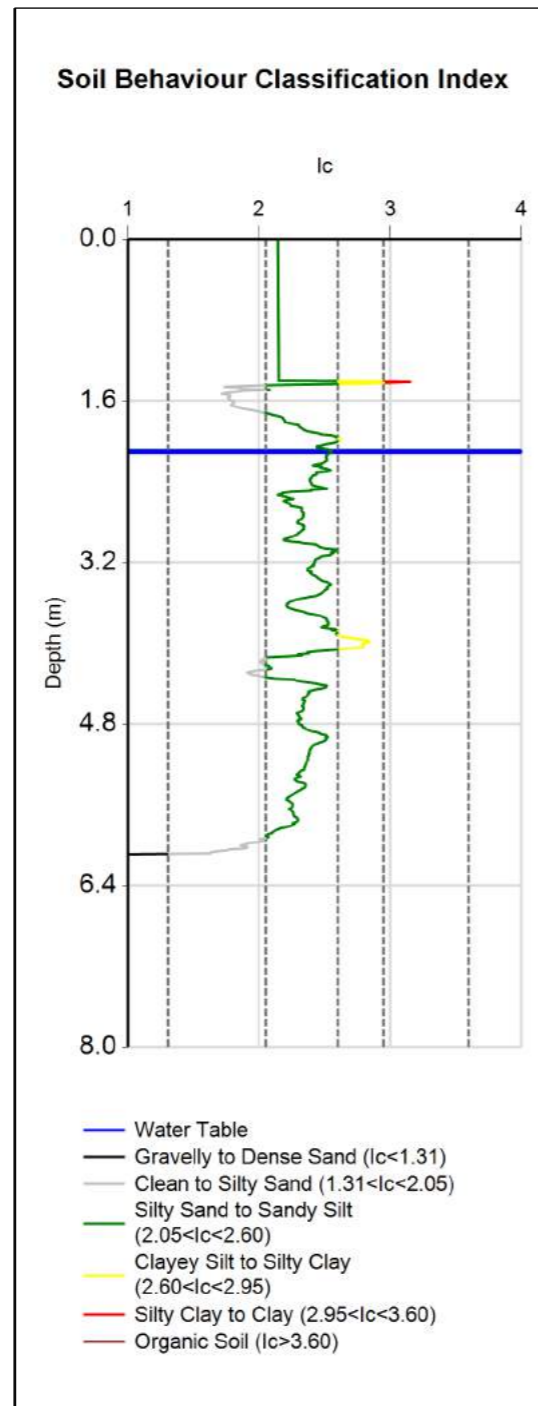
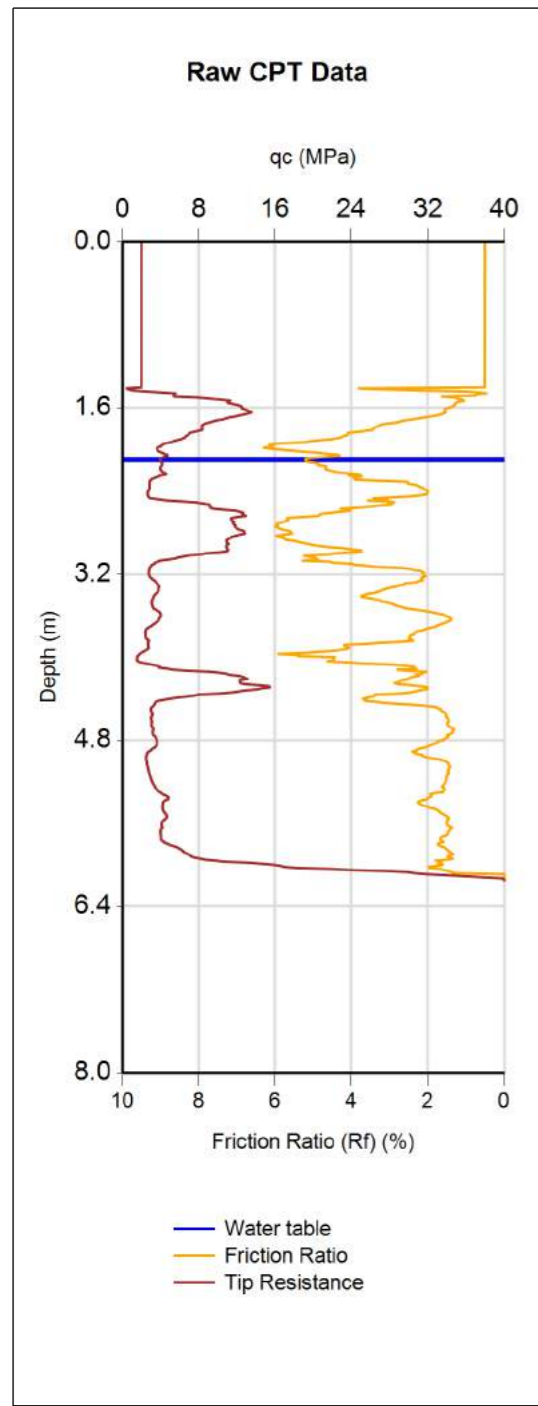
(Assumed pre-drill values)												
CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT02	103680	12/10/2017	User Specified	7.1	0.45	1.5	BI-2014	ZRB-2002	1	2	0.01	18
CPT03	103681	12/10/2017	User Specified	7.1	0.45	1.5	BI-2014	ZRB-2002	1.2	2	0.01	18
CPT04	103682	11/10/2017	User Specified	7.1	0.45	3.7	BI-2014	ZRB-2002	1.3	2	0.01	18
CPT05	103683	12/10/2017	User Specified	7.1	0.45	2.8	BI-2014	ZRB-2002	1.5	2	0.01	18

Thicker lines represent the 50% probability of exceedance case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.

The inputs listed in Table 1.1-1 below have been adopted for the liquefaction analysis.

Table 1.1-1 Summary of inputs for liquefaction analysis

TTGD ID	103680	103681	103682	103683
CPT Name	05TT12_02	05TT12_03	05TT12_04	05TT12_05
PGA	0.45g	0.45g	0.45g	0.45g
Magnitude	7.1	7.1	7.1	7.1
Depth to groundwater	1.5m	1.5m	3.7m	2.8m
Predrill depth	1m	1.2m	1.3m	1.5m
Assumed predrill tip resistance and skin friction	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa
Trigger method	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)
Settlement method	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)
CFC	0	0	0	0
Total depth of CPT	7.8m	3.72m	4.63m	5.05m
Maximum depth of analysis	7.8m	3.72m	4.63m	5.05m
RL	n/a	n/a	n/a	n/a



(Assumed pre-drill values)

INPUT	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
	CPT06a	103684	12/10/2017	User Specified	7.1	0.45	2.1	BI-2014	ZRB-2002	1.4	2	0.01	18
OUTPUT	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
	15%	64	2.9	12	16	2.2	10						
	50%	63	2.9	10	16	2.2	8						
	85%	59	2.7	8	14	2.4	6						



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Karori Prepurchase Geotechnical Assessment

TITLE
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LOCATION
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Karori Campus

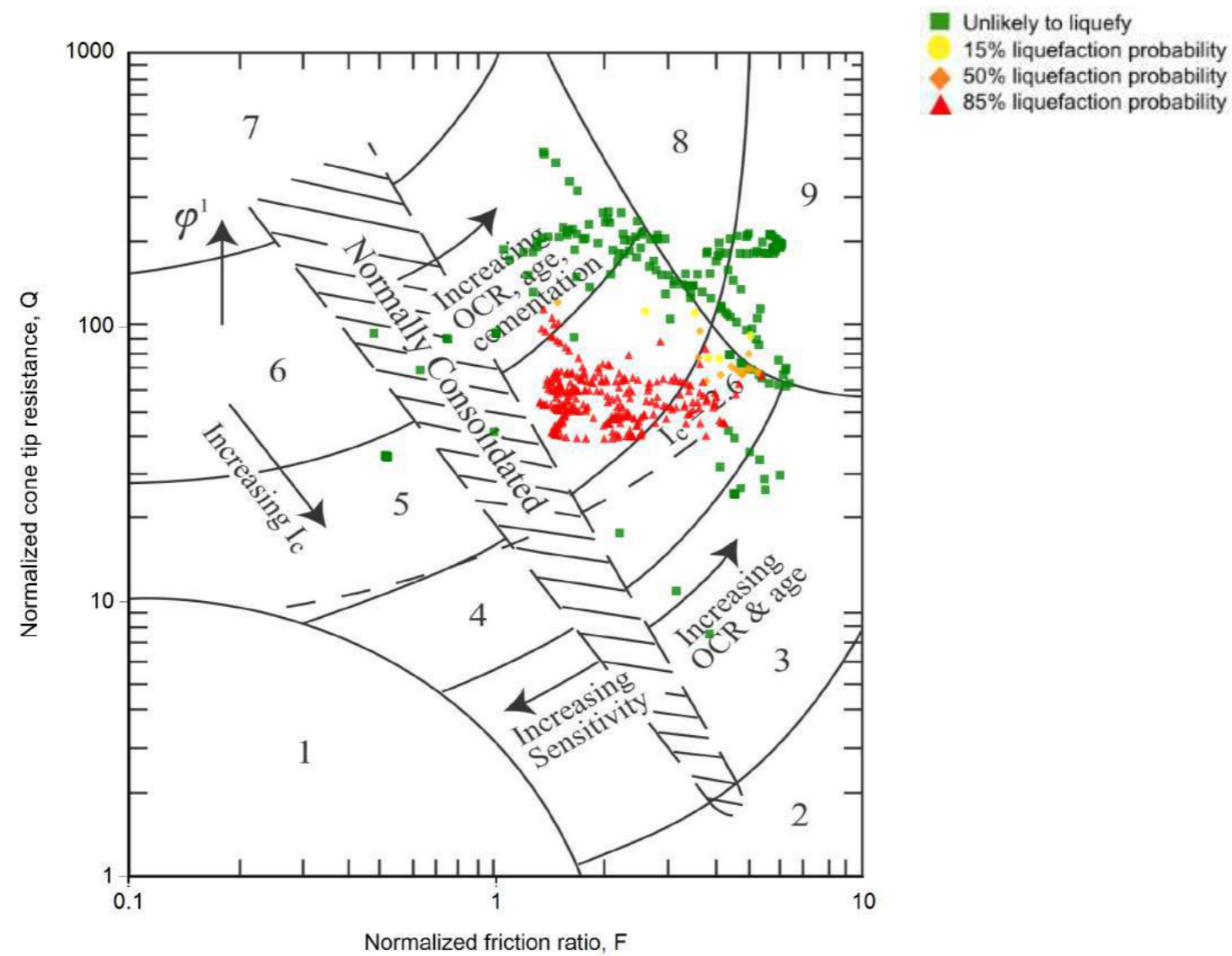
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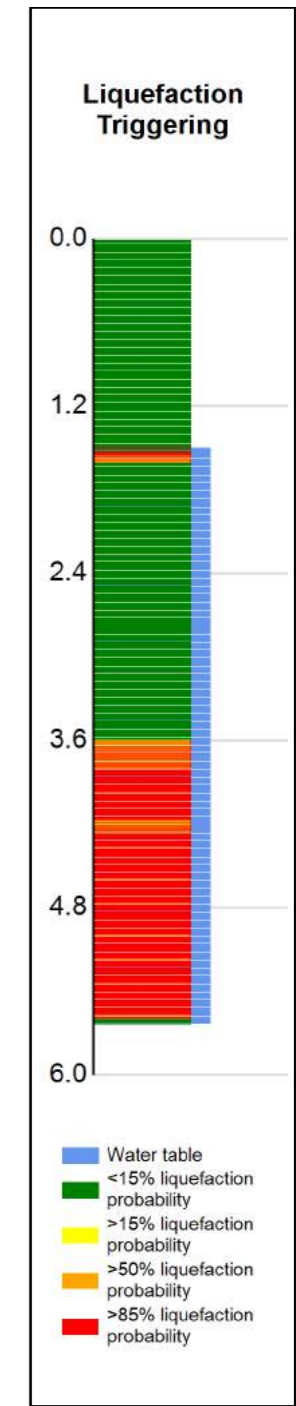
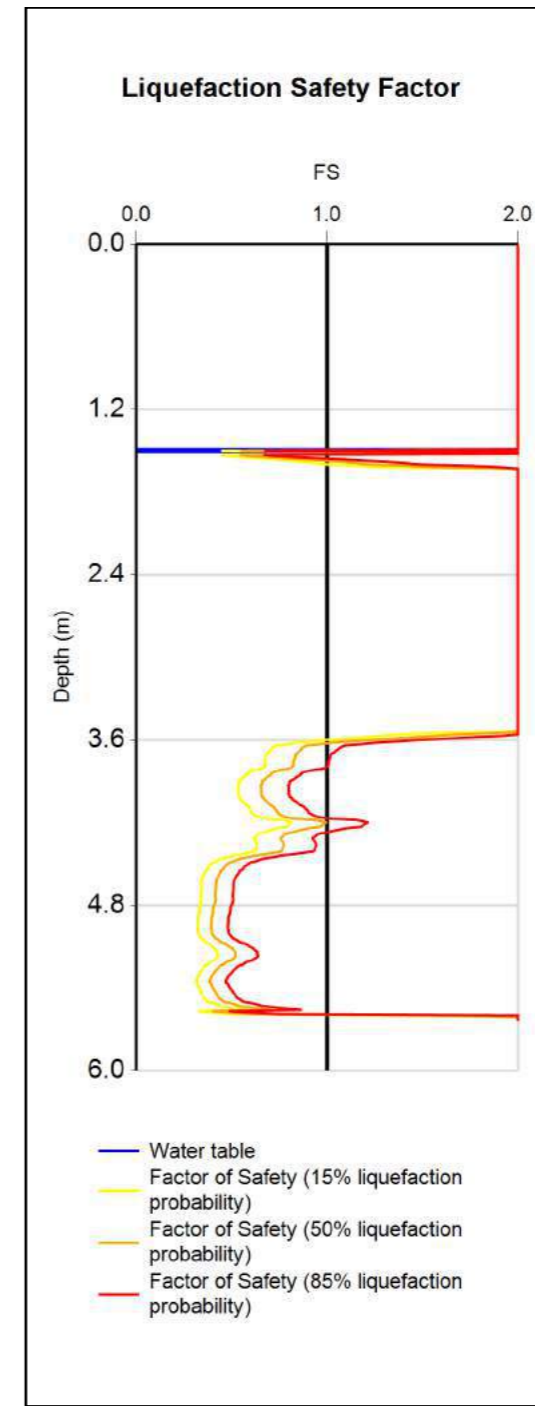
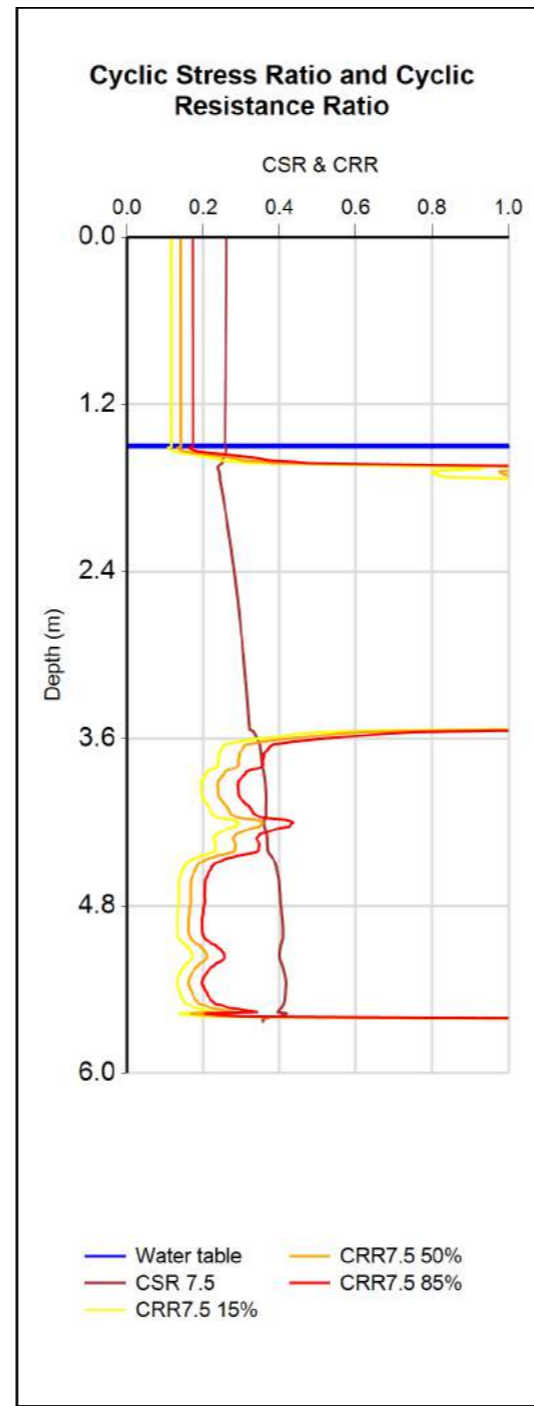
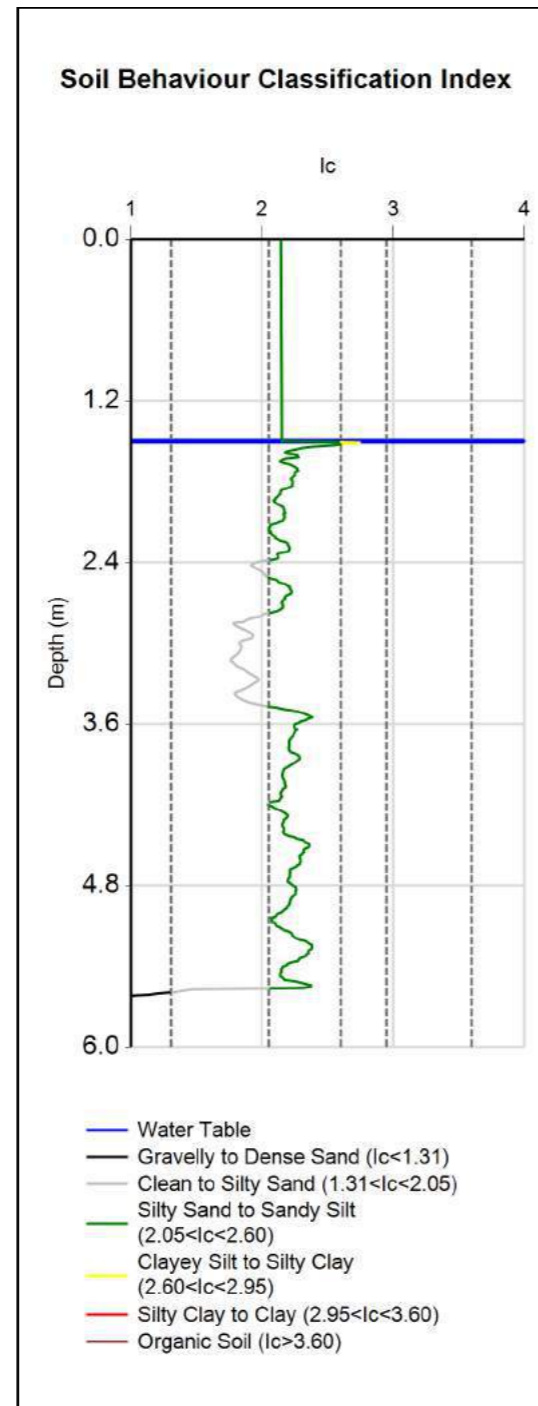
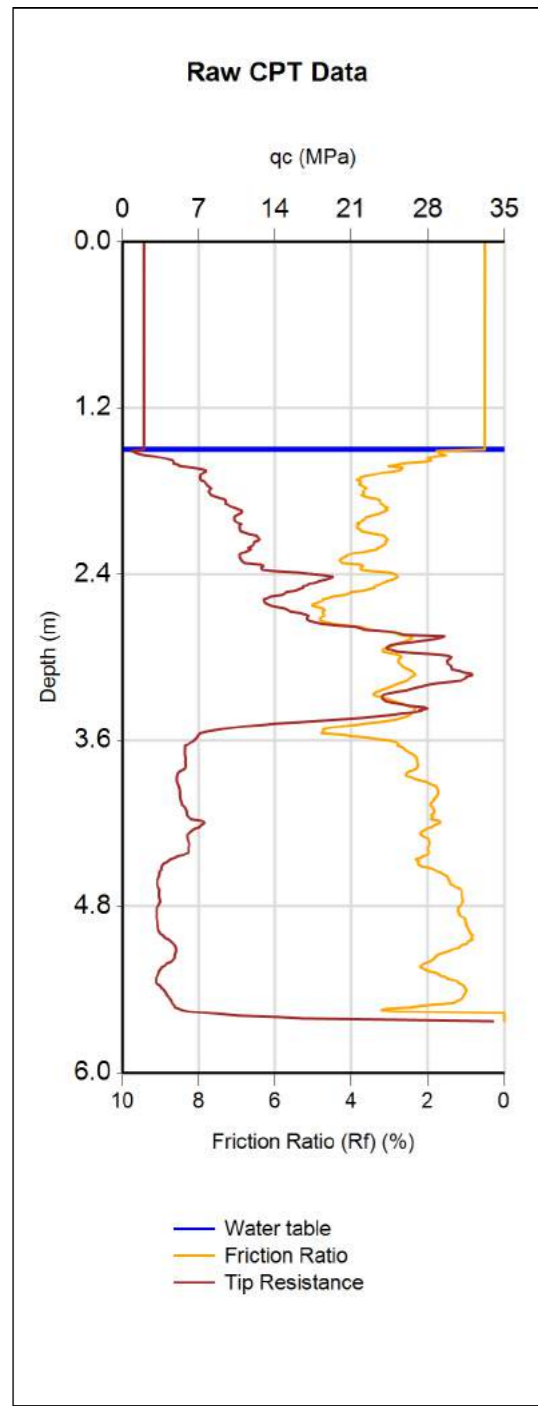


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CPT-based soil behavior type classification chart by Robertson (1990)

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(Assumed pre-drill values)

INPUT	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
	CPT07	103685	12/10/2017	User Specified	7.1	0.45	1.5	BI-2014	ZRB-2002	1.5	2	0.01	18
OUTPUT	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
	15%	42	2.1	8	10	3.6	6						
	50%	39	2	6	9	3.7	5						
	85%	34	1.7	5	8	3.9	3						



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TITLE
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LOCATION
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Karori Campus

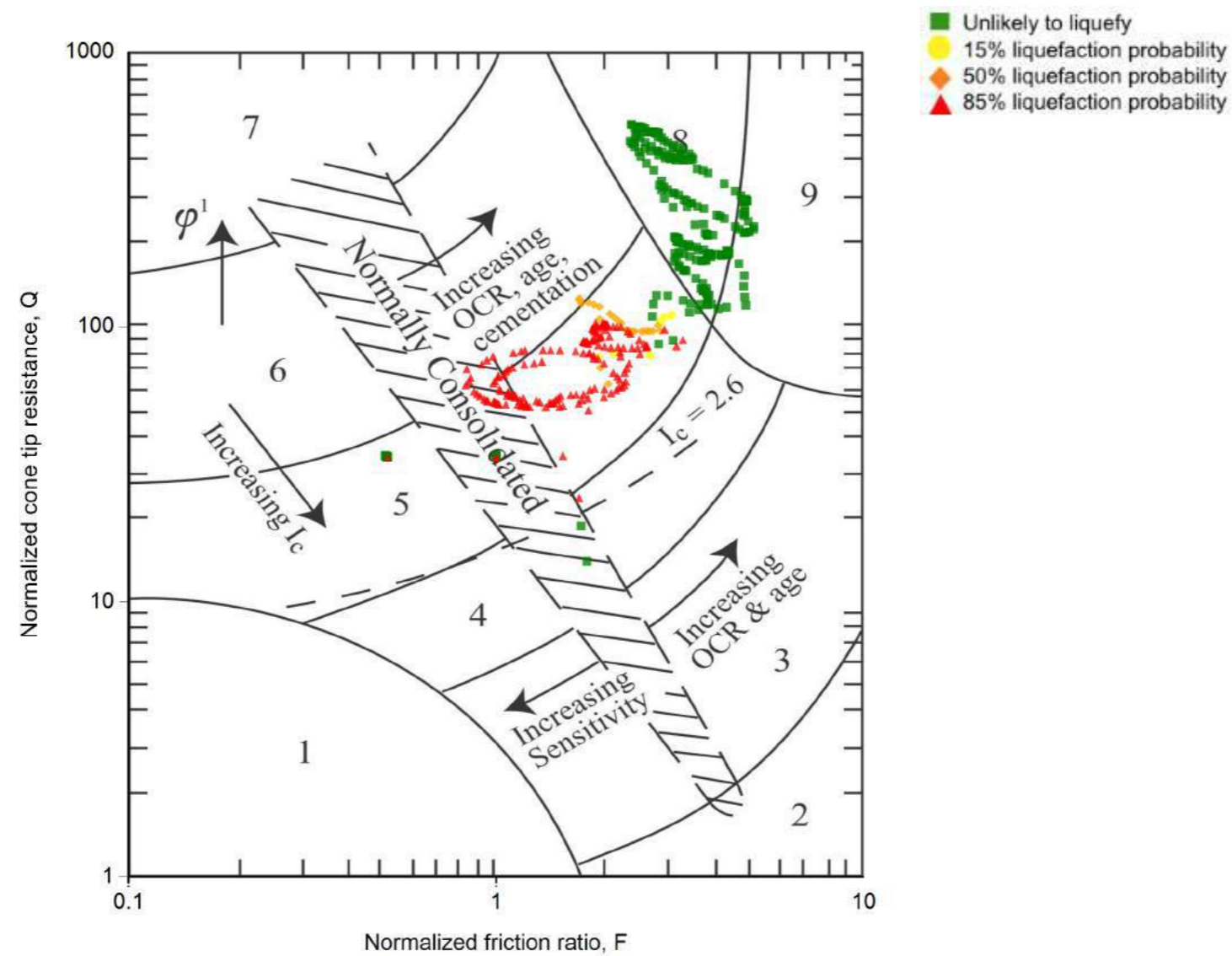
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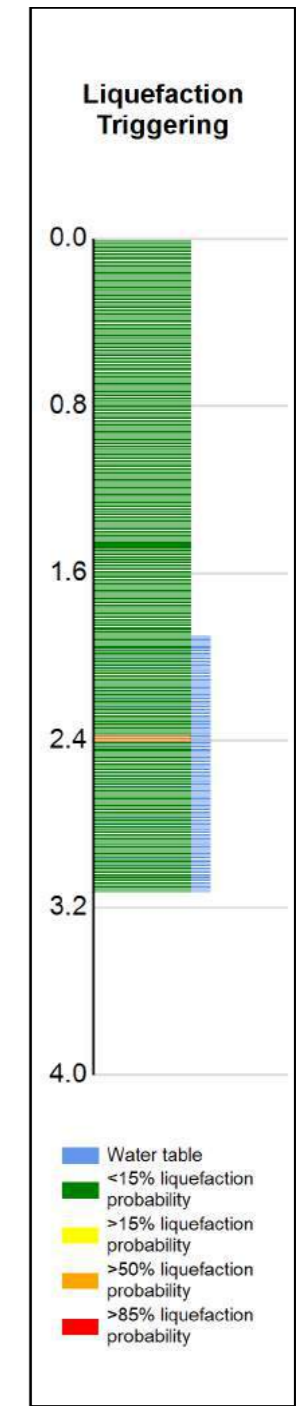
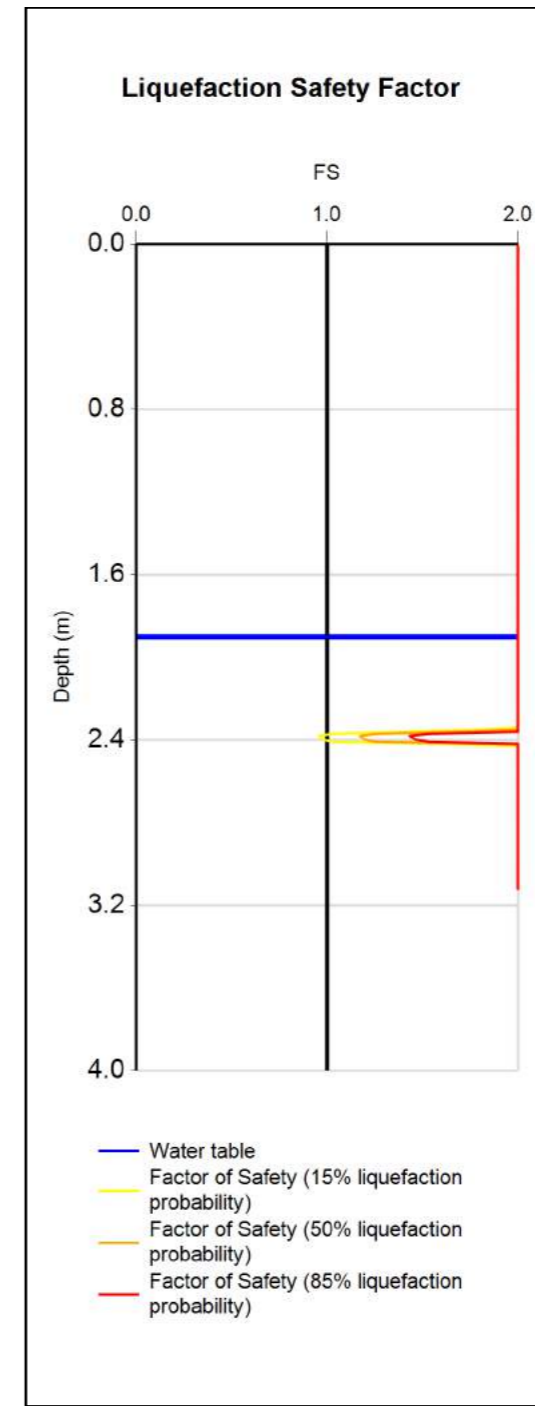
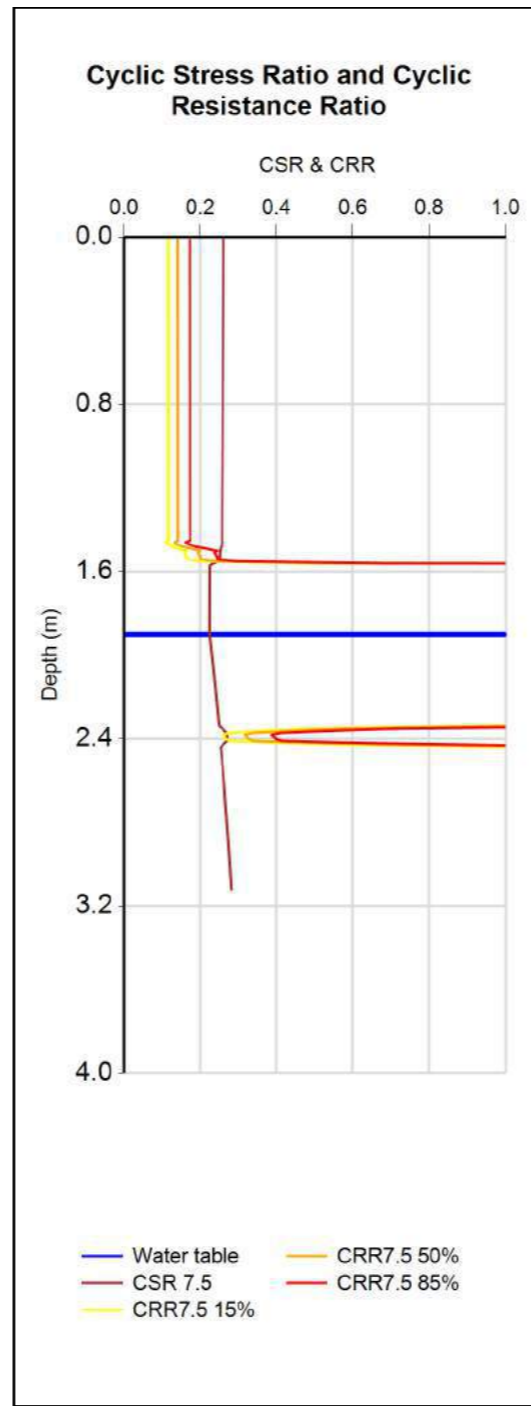
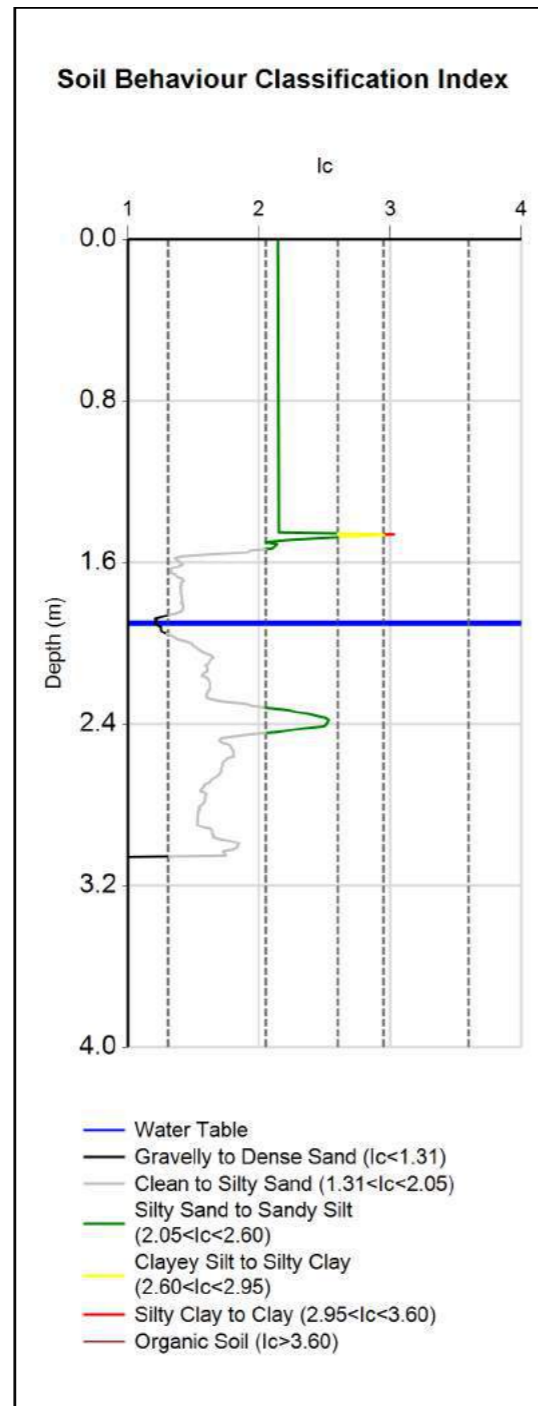
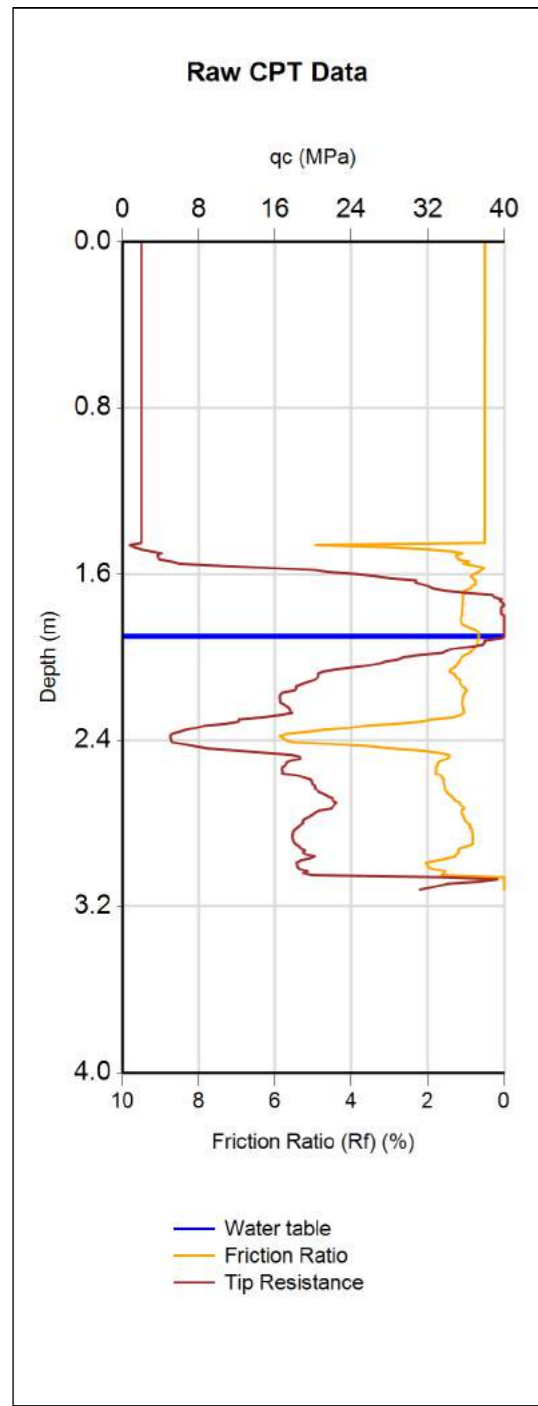
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|--|-------------------------------------|
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CPT-based soil behavior type classification chart by Robertson (1990)



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT08a	103686	11/10/2017	User Specified	7.1	0.45	1.9	BI-2014	ZRB-2002	1.45	2	0.01	18
	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
OUTPUT	15%	0	0	0	0	3.1	0						
	50%	0	0	0	0	3.1	0						
	85%	0	0	0	0	3.1	0						



Tonkin + Taylor
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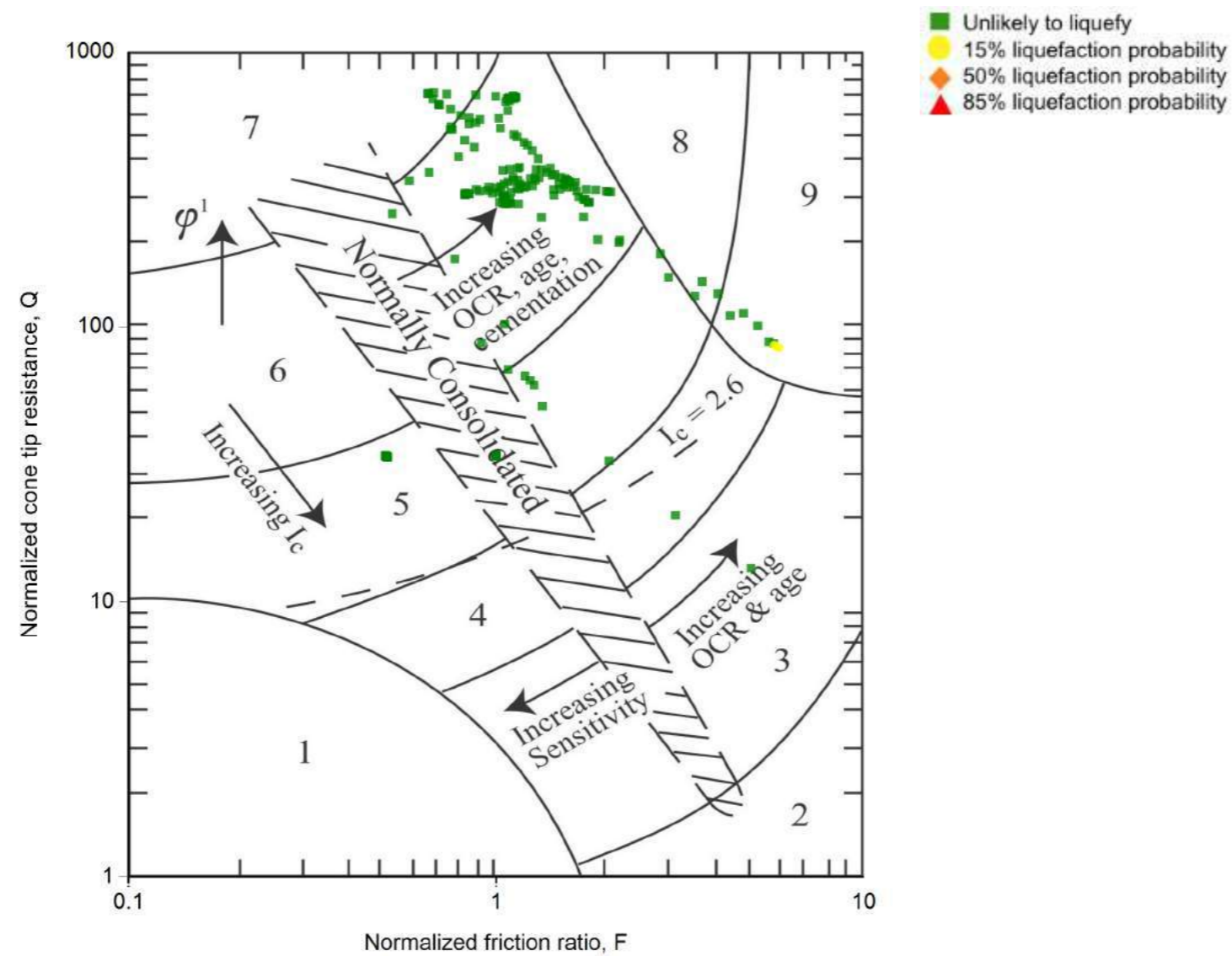
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JOB NUMBER
30309

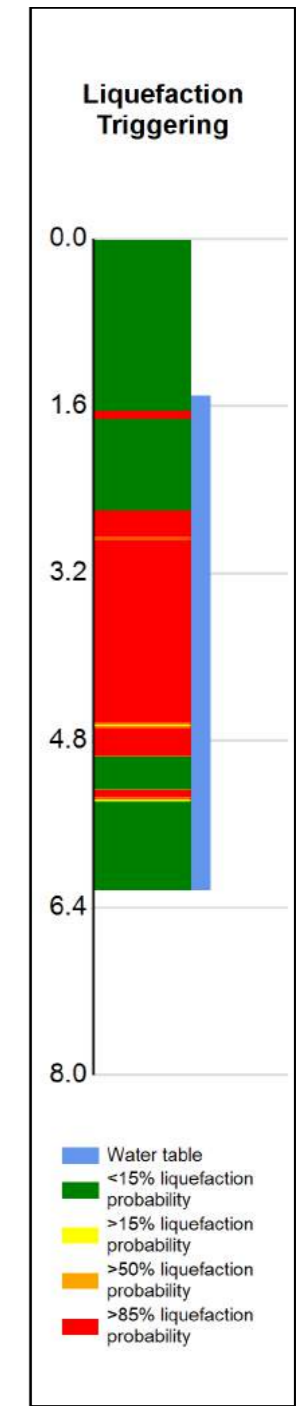
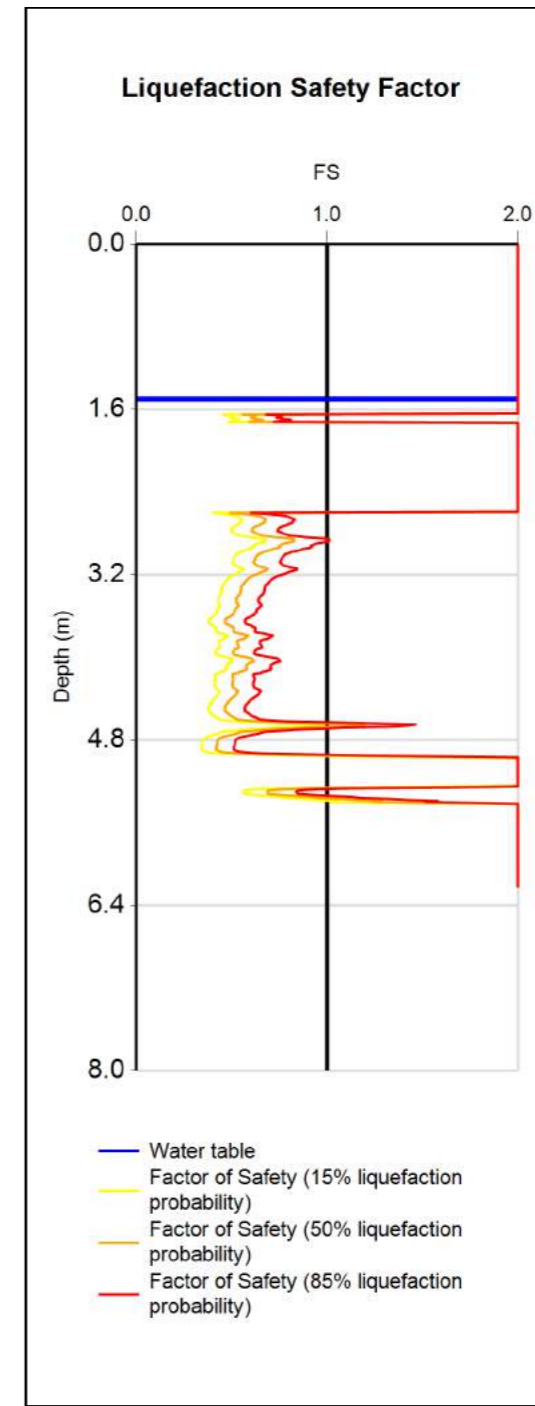
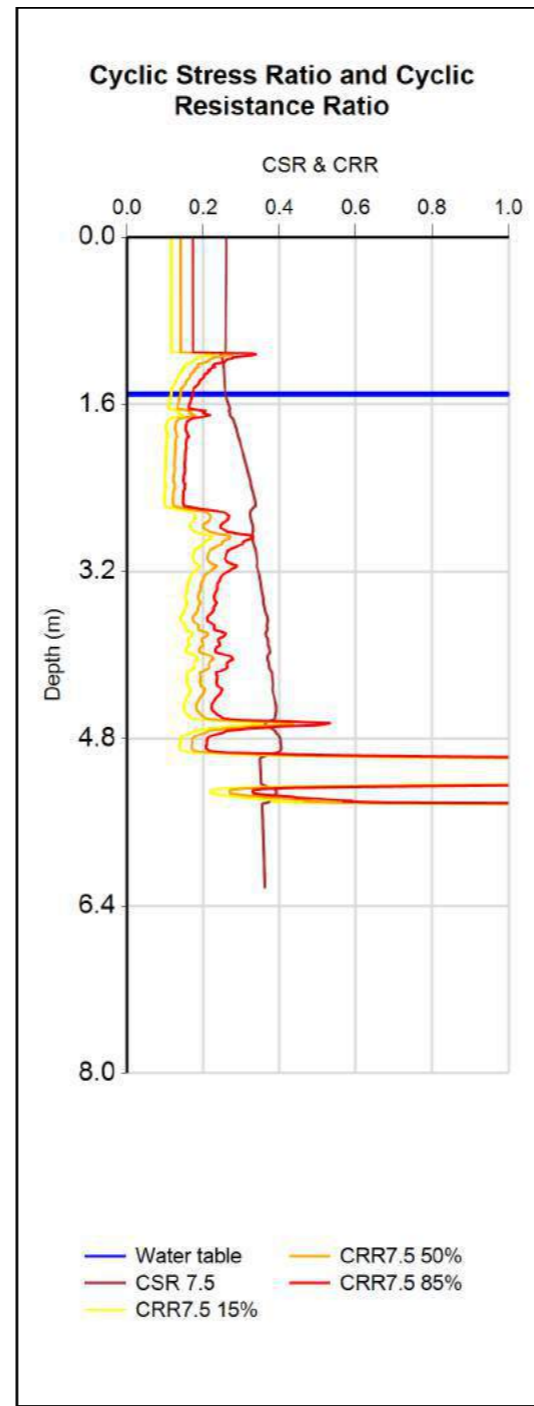
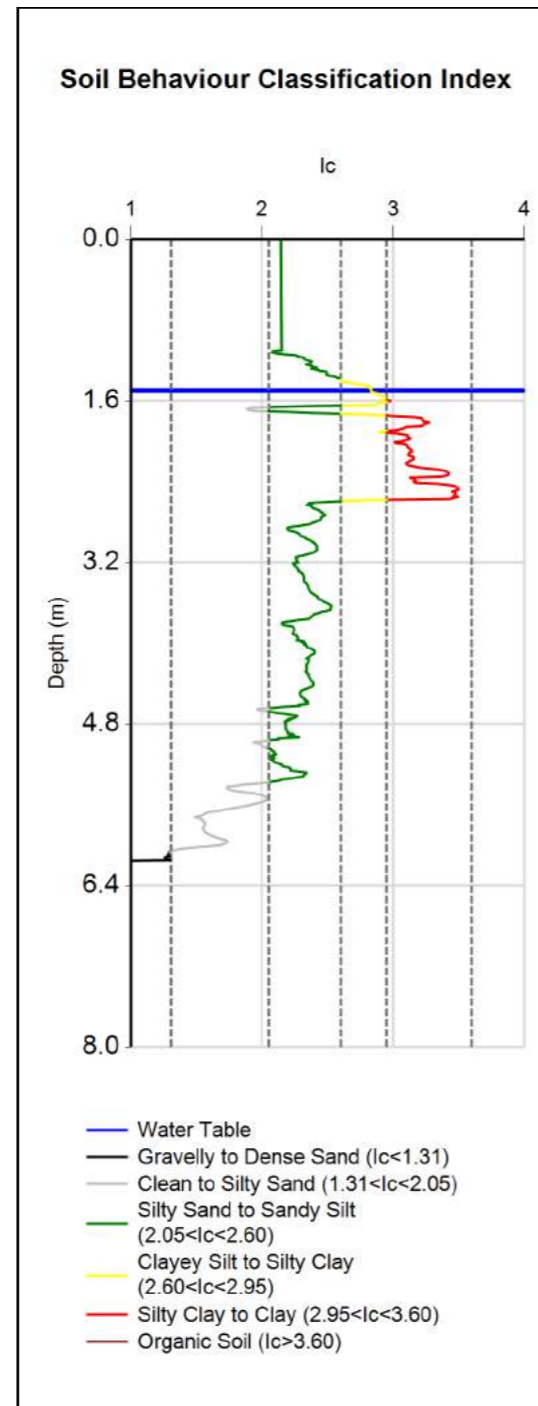
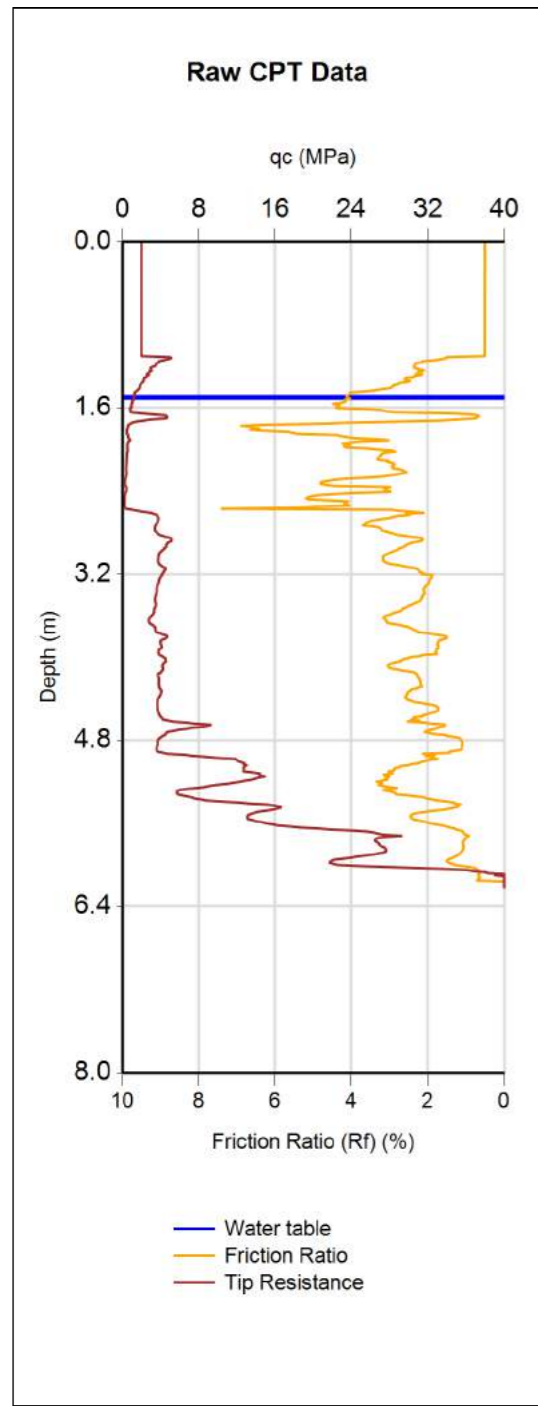
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|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
| 2. Organic soils - peats | 7. Gravelly sand to dense sand |
| 3. Clays - silty clay to clay | 8. Very stiff sand to clayey sand * |
| 4. Silt mixtures - clayey silt to silty clay | 9. Very stiff, fine grained * |
| 5. Sand mixtures - silty sand to sandy silt | |

*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)



(Assumed pre-drill values)

INPUT	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
	CPT09	103687	11/10/2017	User Specified	7.1	0.45	1.5	BI-2014	ZRB-2002	1.1	2	0.01	18
OUTPUT	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
	15%	52	2.6	11	15	2.6	9						
	50%	50	2.5	9	14	2.6	7						
	85%	46	2.4	6	13	2.6	5						



Tonkin + Taylor
Exceptional thinking together
V1.3

CLIENT, PROJECT
Ryman Healthcare Limited
Karori Prepurchase Geotechnical Assessment

TITLE
ULS CPT6a, 7, 8a and 9

LOCATION
Victoria University
Karori Campus

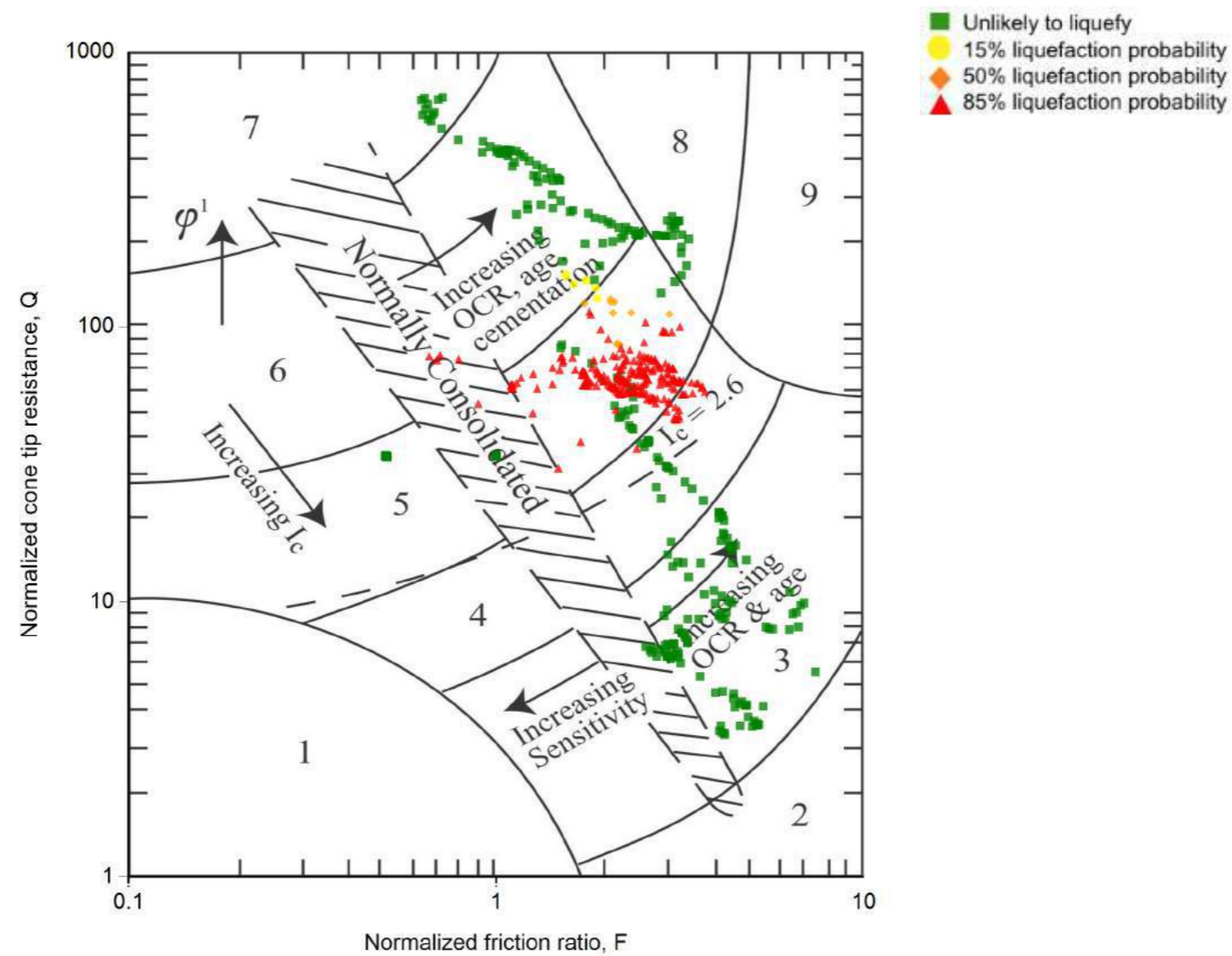
JOB NUMBER
30309

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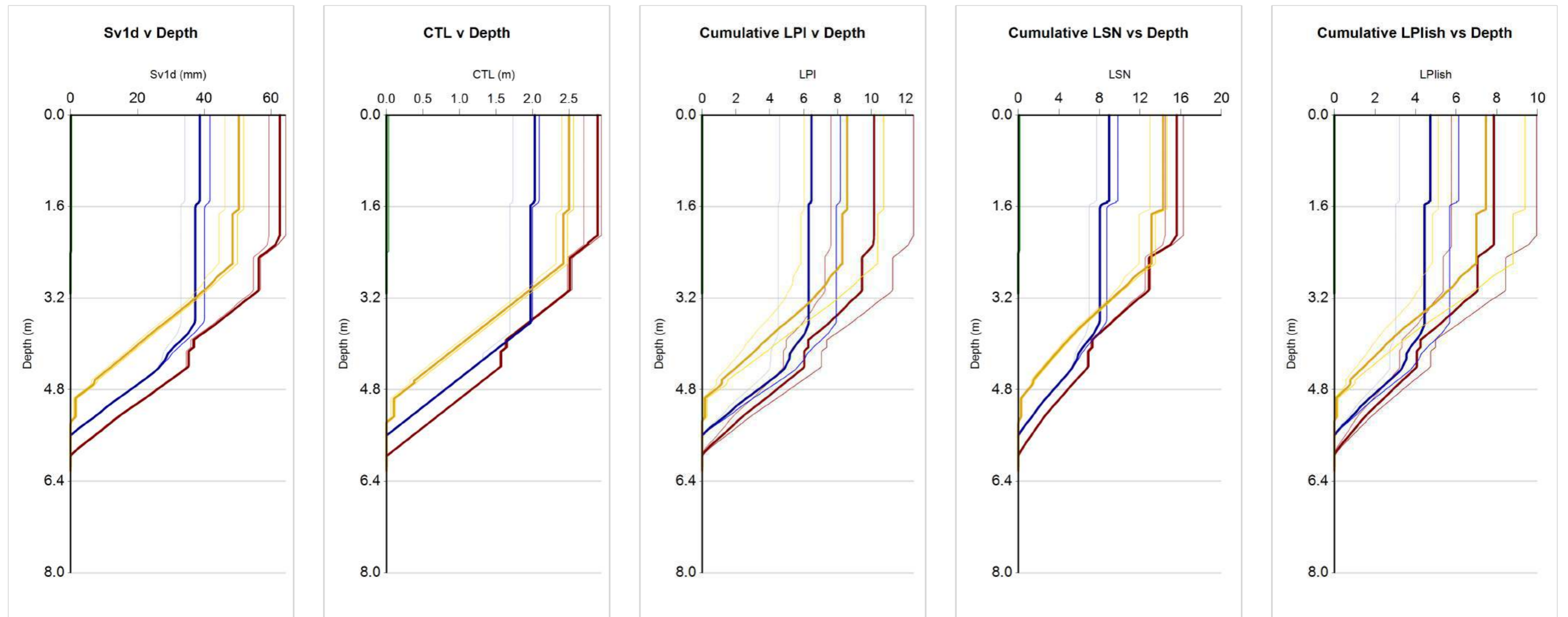


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|--|-------------------------------------|
| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
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*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)

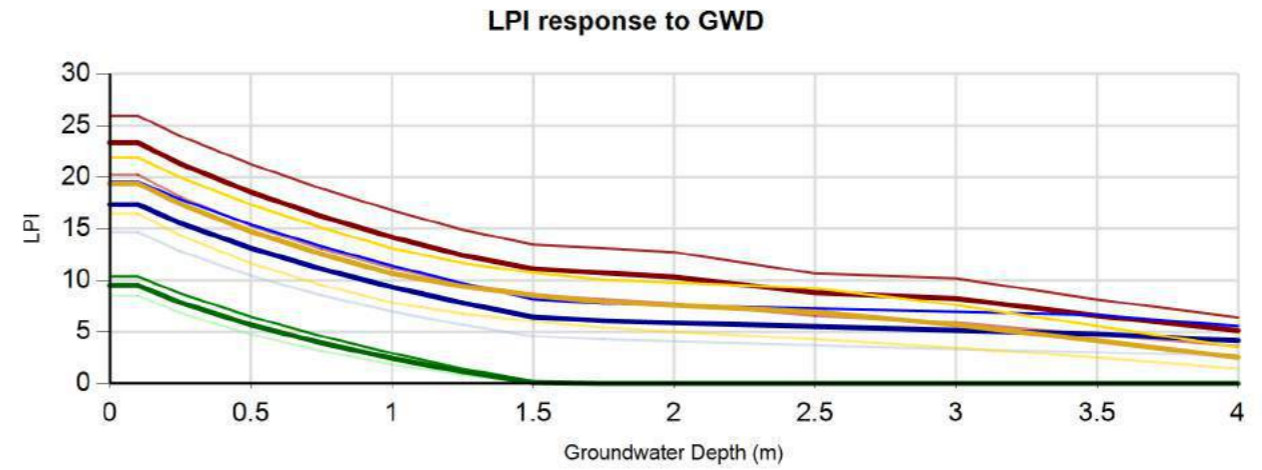
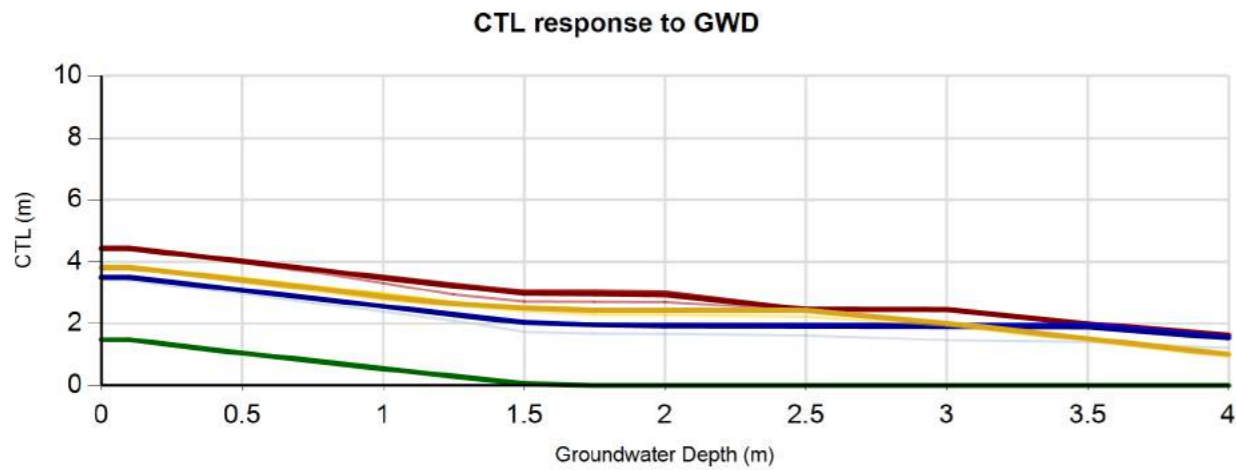
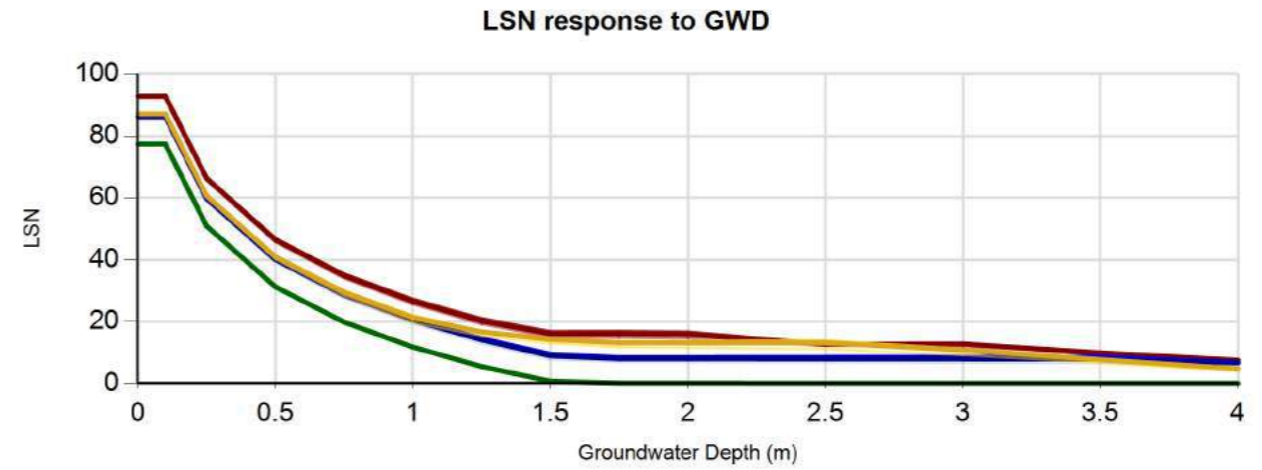
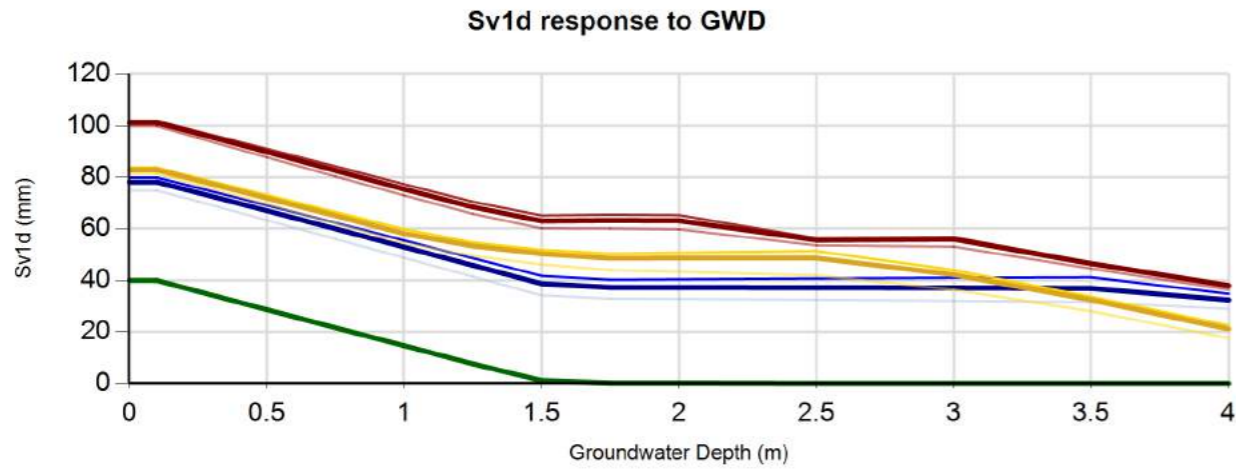
 Tonkin+Taylor Exceptional thinking together V1.3	CLIENT, PROJECT Ryman Healthcare Limited Karori Prepurchase Geotechnical Assessment	LOCATION Victoria University Karori Campus	DATE 27/10/2017
	TITLE ULS CPT6a, 7, 8a and 9	JOB NUMBER 30309	ANALYSED tzhl



(Assumed pre-drill values)

CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT06a	103684	12/10/2017	User Specified	7.1	0.45	2.1	BI-2014	ZRB-2002	1.4	2	0.01	18
CPT07	103685	12/10/2017	User Specified	7.1	0.45	1.5	BI-2014	ZRB-2002	1.5	2	0.01	18
CPT08a	103686	11/10/2017	User Specified	7.1	0.45	1.9	BI-2014	ZRB-2002	1.45	2	0.01	18
CPT09	103687	11/10/2017	User Specified	7.1	0.45	1.5	BI-2014	ZRB-2002	1.1	2	0.01	18

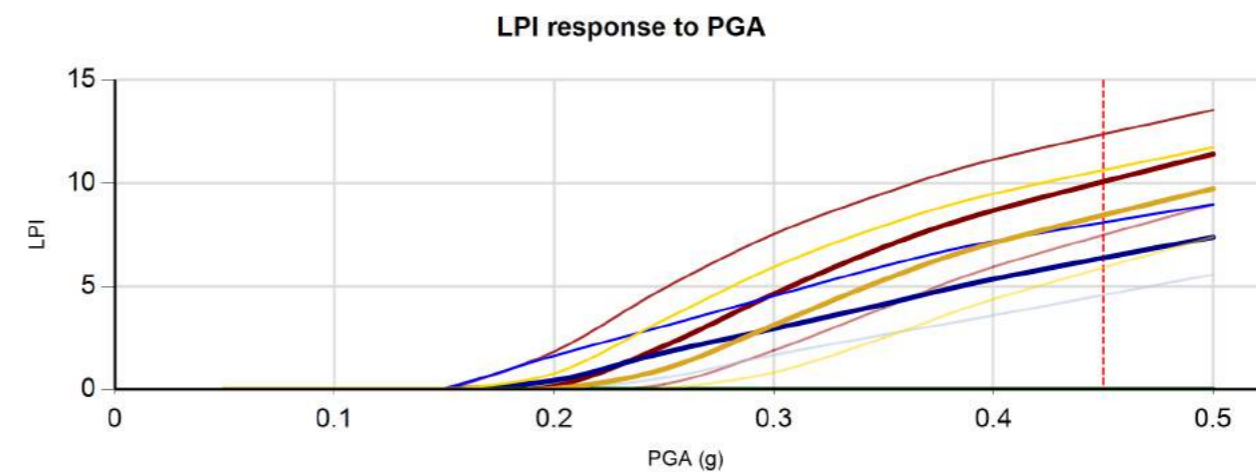
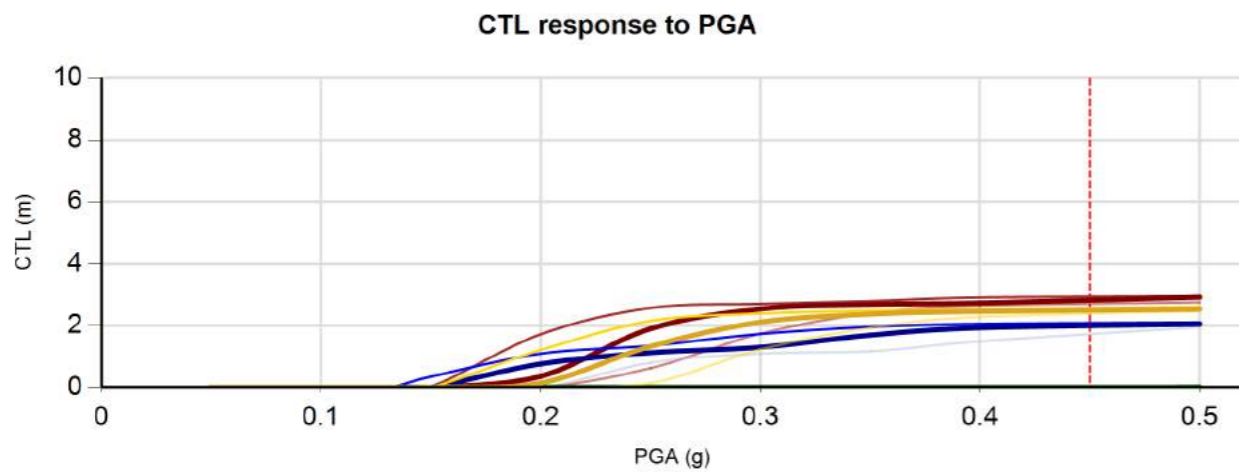
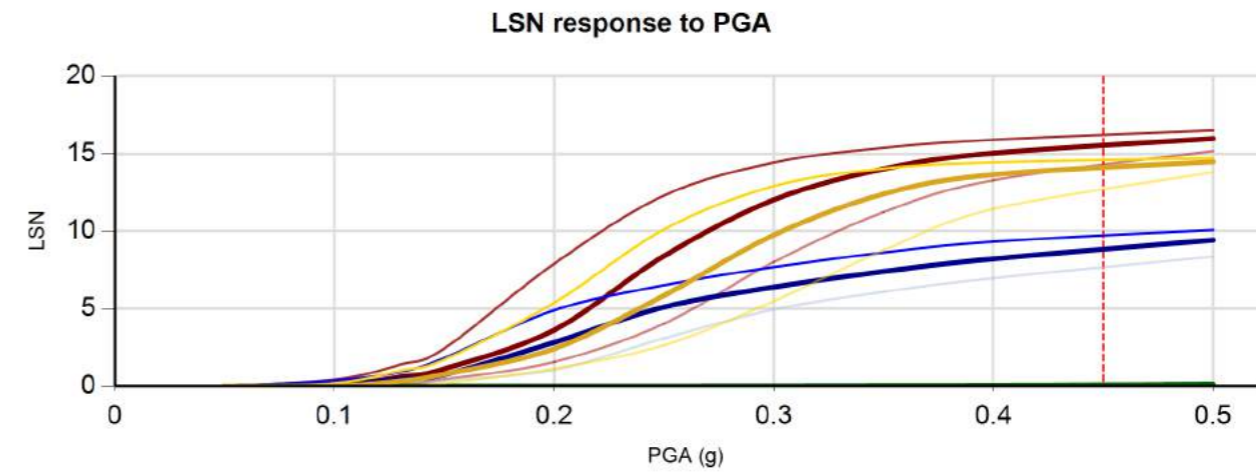
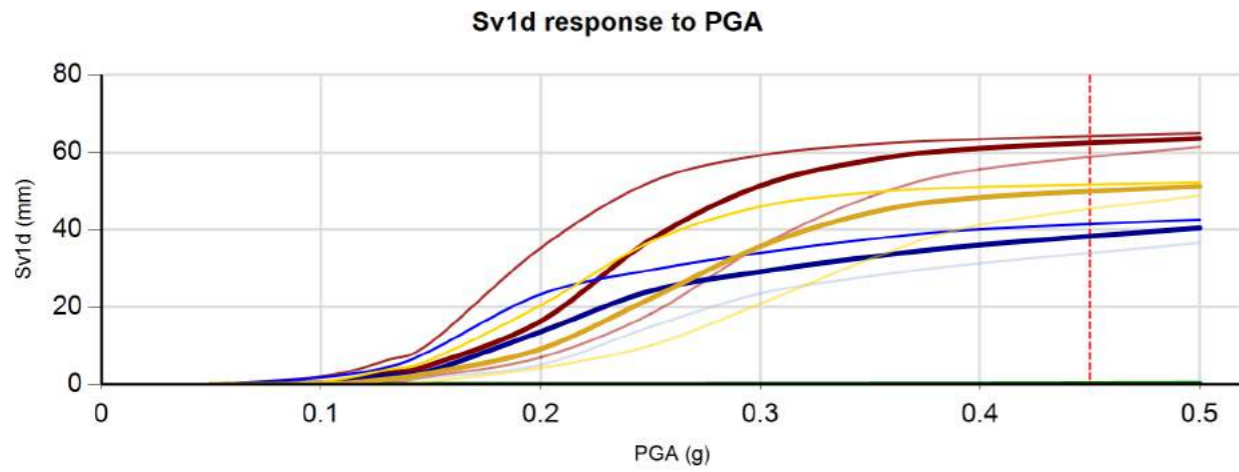
Thicker lines represent the 50% probability of exceedance case and the thinner lines to the left and right of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.



(Assumed pre-drill values)

CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT06a	103684	12/10/2017	User Specified	7.1	0.45	2.1	BI-2014	ZRB-2002	1.4	2	0.01	18
CPT07	103685	12/10/2017	User Specified	7.1	0.45	1.5	BI-2014	ZRB-2002	1.5	2	0.01	18
CPT08a	103686	11/10/2017	User Specified	7.1	0.45	1.9	BI-2014	ZRB-2002	1.45	2	0.01	18
CPT09	103687	11/10/2017	User Specified	7.1	0.45	1.5	BI-2014	ZRB-2002	1.1	2	0.01	18

Thicker lines represent the 50% probability of exceedence case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedence cases respectively.



Vertical dotted line/s indicate user specified PGA at the CPT locations. (actual PGA)

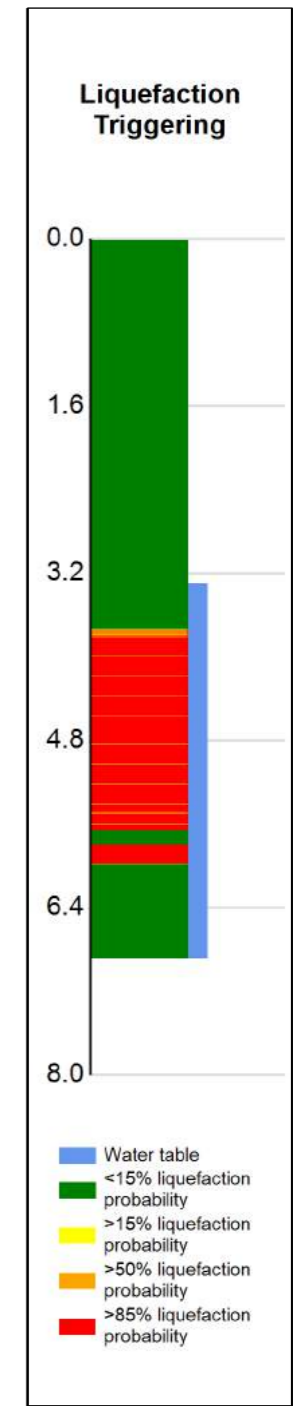
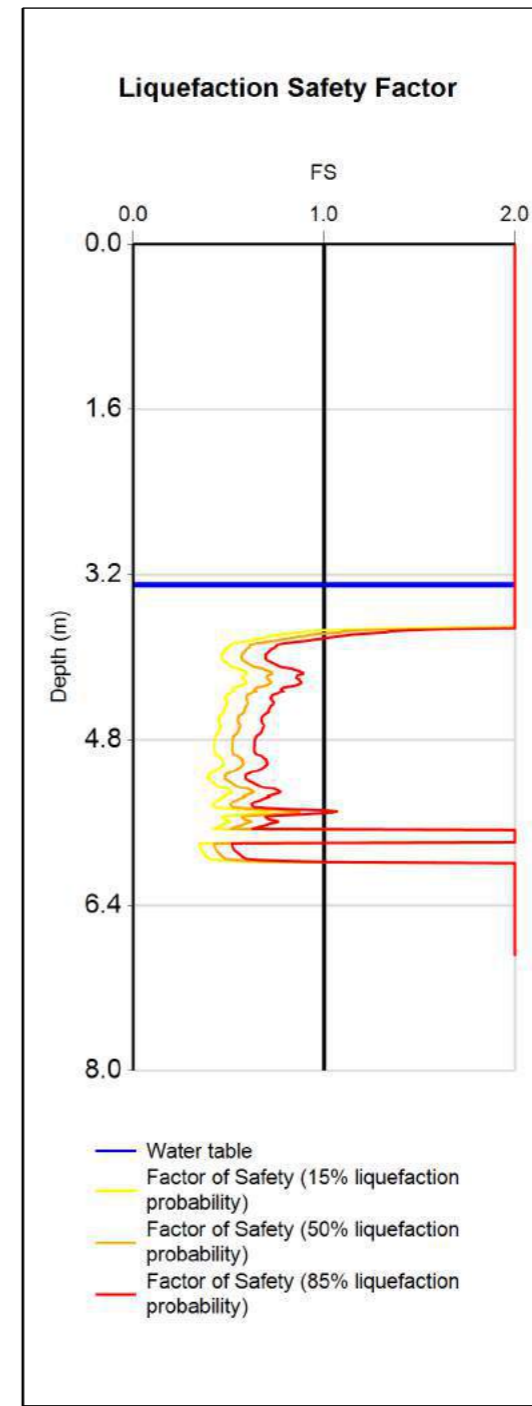
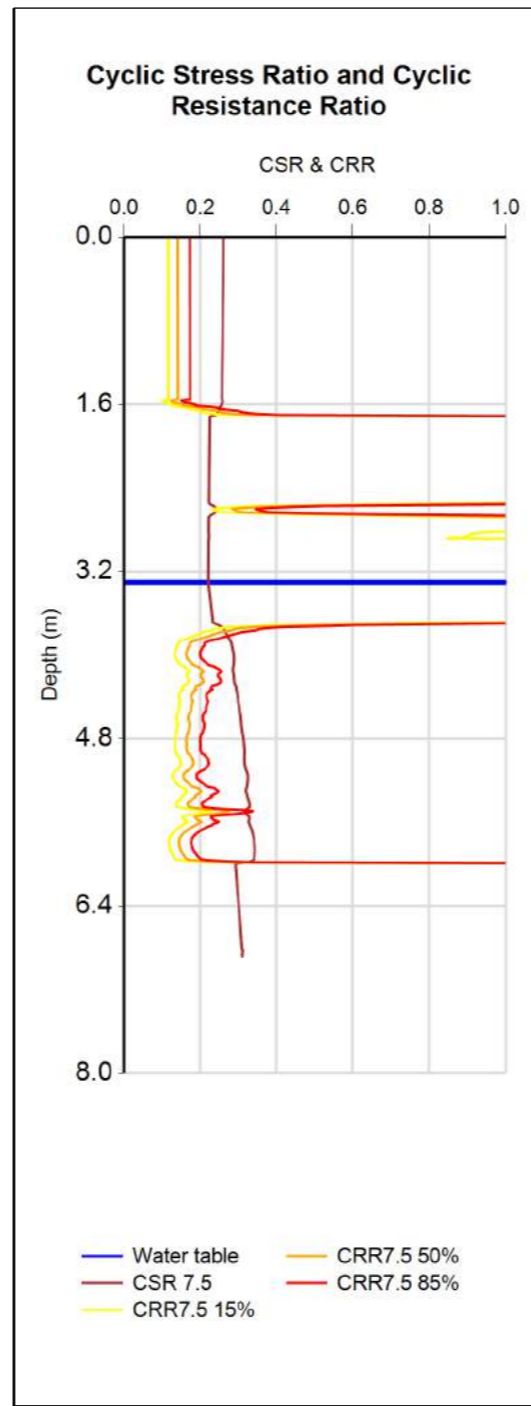
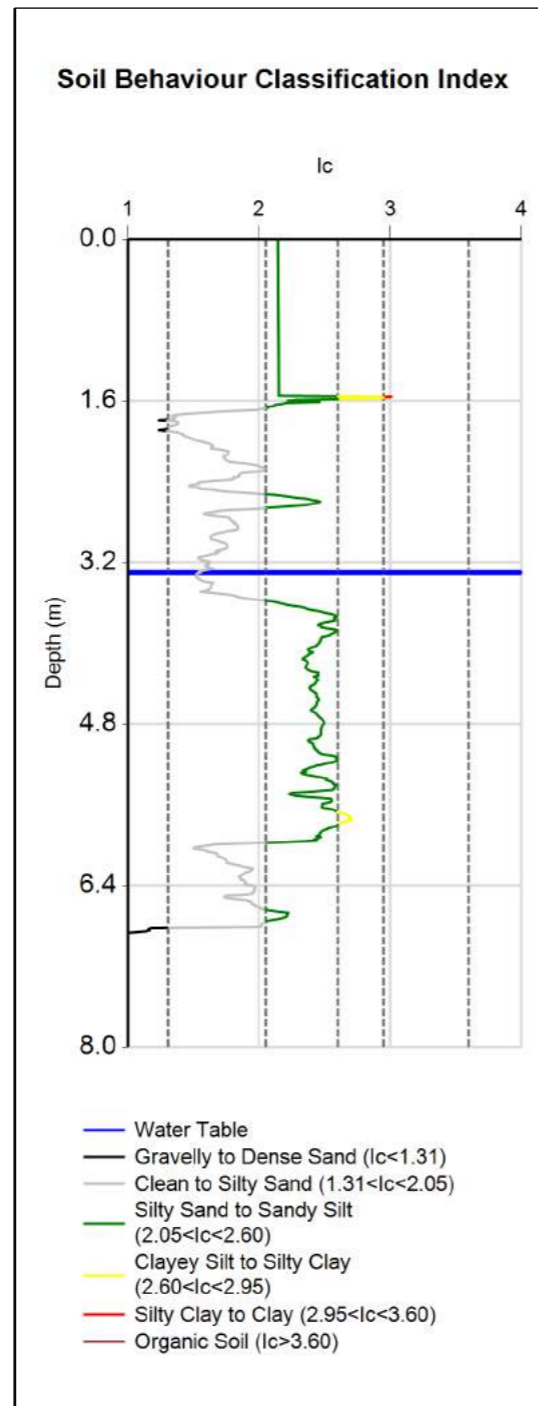
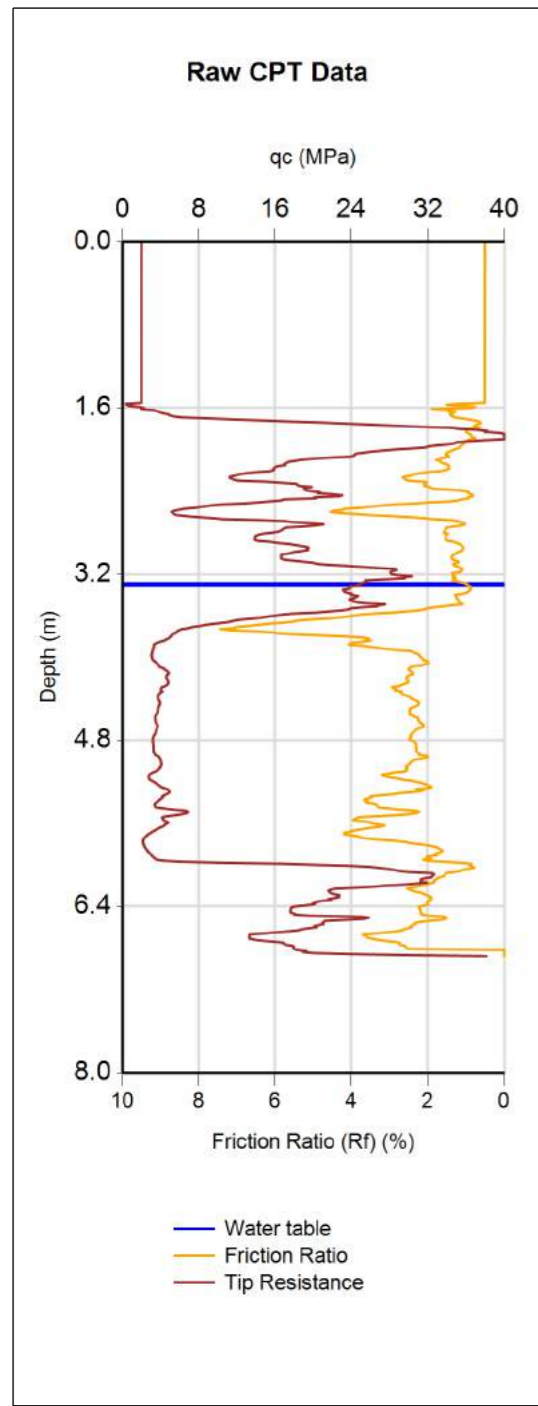
(Assumed pre-drill values)												
CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT06a	103684	12/10/2017	User Specified	7.1	0.45	2.1	BI-2014	ZRB-2002	1.4	2	0.01	18
CPT07	103685	12/10/2017	User Specified	7.1	0.45	1.5	BI-2014	ZRB-2002	1.5	2	0.01	18
CPT08a	103686	11/10/2017	User Specified	7.1	0.45	1.9	BI-2014	ZRB-2002	1.45	2	0.01	18
CPT09	103687	11/10/2017	User Specified	7.1	0.45	1.5	BI-2014	ZRB-2002	1.1	2	0.01	18

Thicker lines represent the 50% probability of exceedence case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedence cases respectively.

The inputs listed in Table 1.1-1 below have been adopted for the liquefaction analysis.

Table 1.1-1 Summary of inputs for liquefaction analysis

TTGD ID	103684	103685	103686	103687
CPT Name	05TT12_06a	05TT12_07	05TT12_08a	05TT12_09
PGA	0.45g	0.45g	0.45g	0.45g
Magnitude	7.1	7.1	7.1	7.1
Depth to groundwater	2.1m	1.5m	1.9m	1.5m
Predrill depth	1.4m	1.5m	1.45m	1.1m
Assumed predrill tip resistance and skin friction	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa
Trigger method	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)
Settlement method	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)
CFC	0	0	0	0
Total depth of CPT	6.15m	5.63m	3.12m	6.22m
Maximum depth of analysis	6.15m	5.63m	3.12m	6.22m
RL	n/a	n/a	n/a	n/a



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT10	103688	12/10/2017	User Specified	7.1	0.45	3.3	BI-2014	ZRB-2002	1.55	2	0.01	18
OUTPUT	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
	15%	47	2.1	8	10	3.8	6						
	50%	46	2.1	6	10	3.9	4						
	85%	43	2	4	9	3.9	3						



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CLIENT, PROJECT
Ryman Healthcare Limited
Karori Prepurchase Geotechnical Assessment

TITLE
ULS - CPT10 and 11

LOCATION
Victoria University
Karori Campus

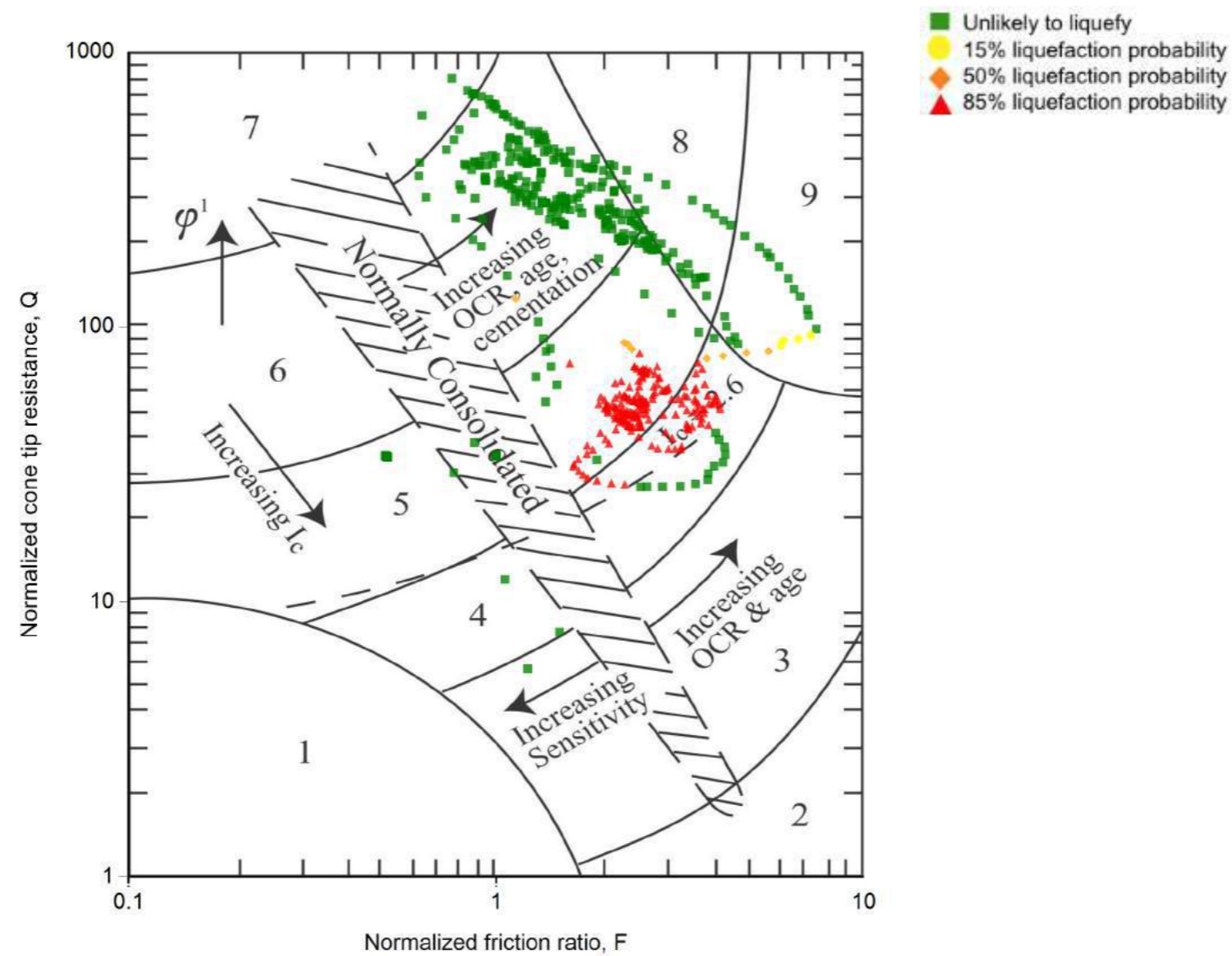
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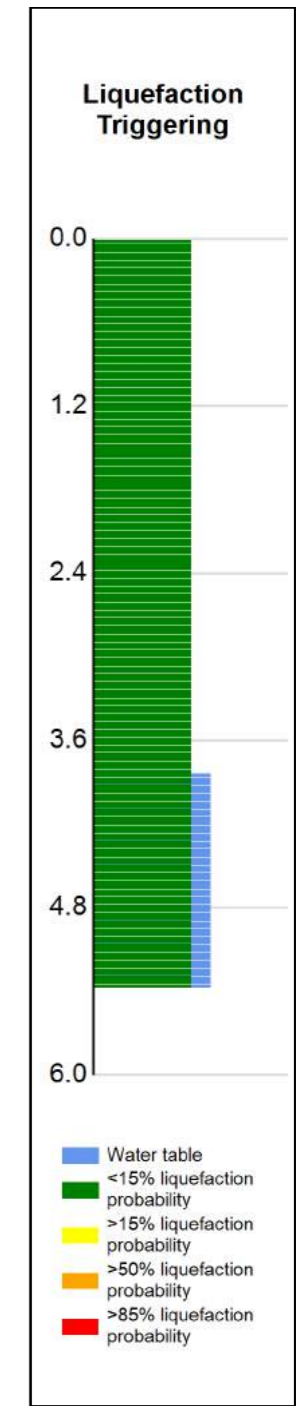
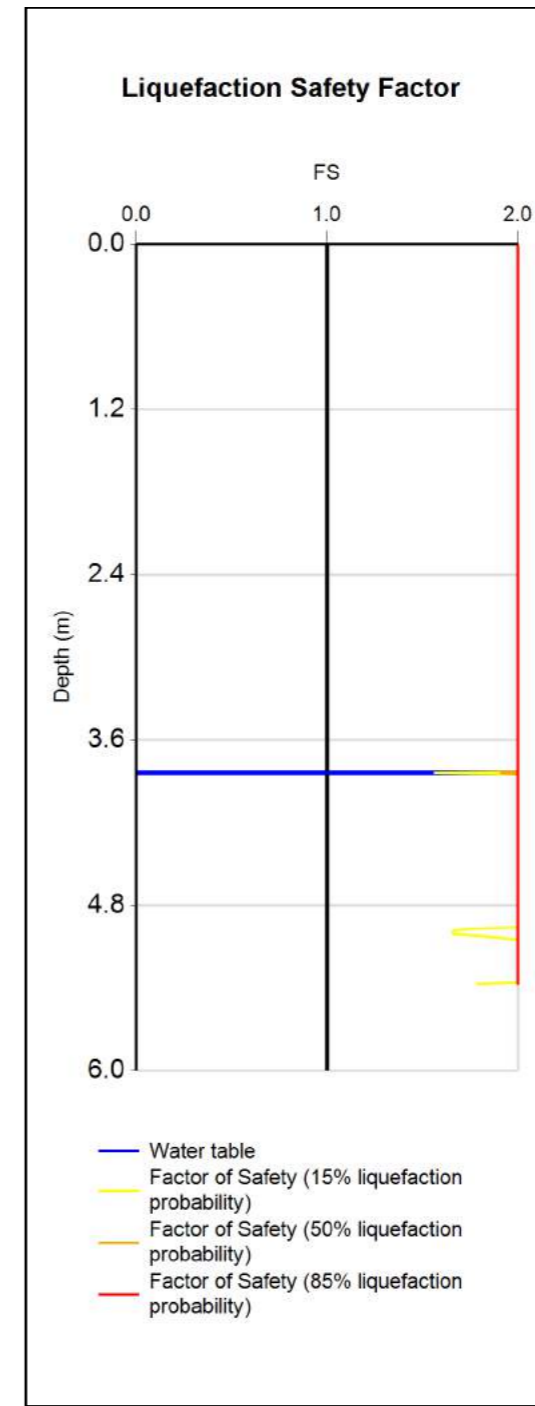
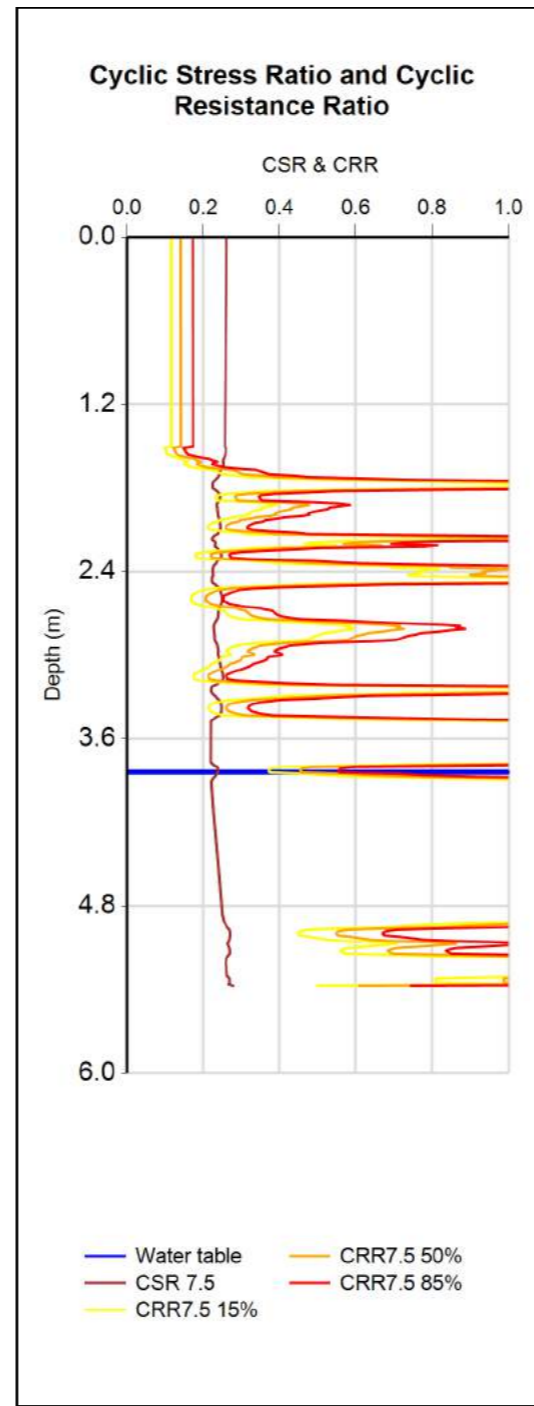
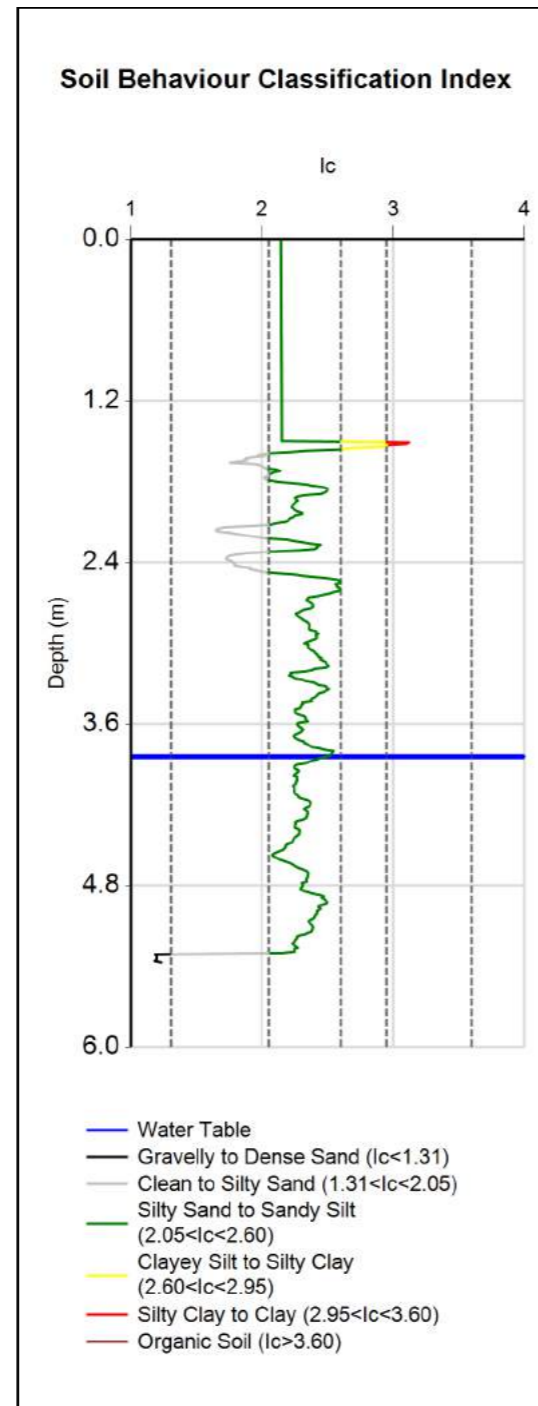
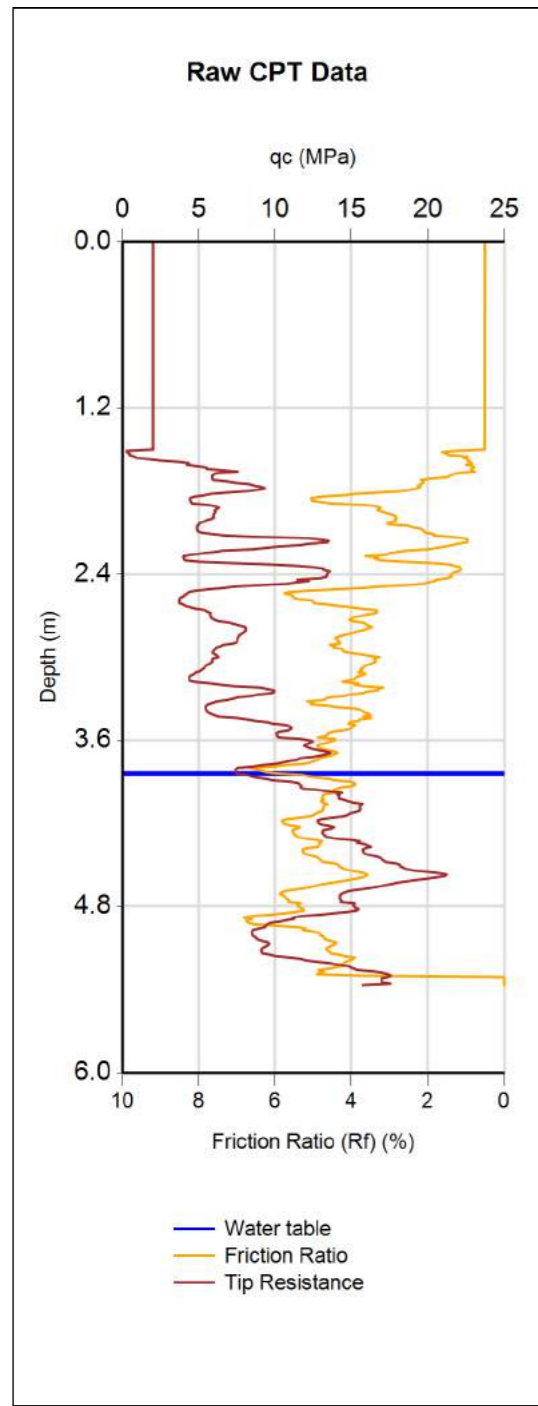


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*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)

 Tonkin+Taylor Exceptional thinking together V1.3	CLIENT, PROJECT Ryman Healthcare Limited Karori Prepurchase Geotechnical Assessment	LOCATION Victoria University Karori Campus	DATE 19/10/2017
	TITLE ULS - CPT10 and 11	JOB NUMBER 30309	ANALYSED tzhl



(Assumed pre-drill values)

	CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
INPUT	CPT11	103689	11/10/2017	User Specified	7.1	0.45	3.8	BI-2014	ZRB-2002	1.5	2	0.01	18
OUTPUT	PL	Sv1d (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish						
	15%	0	0	0	0	5.4	0						
	50%	0	0	0	0	5.4	0						
	85%	0	0	0	0	5.4	0						



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V1.3

CLIENT, PROJECT
Ryman Healthcare Limited
Karori Prepurchase Geotechnical Assessment

TITLE
ULS - CPT10 and 11

LOCATION
Victoria University
Karori Campus

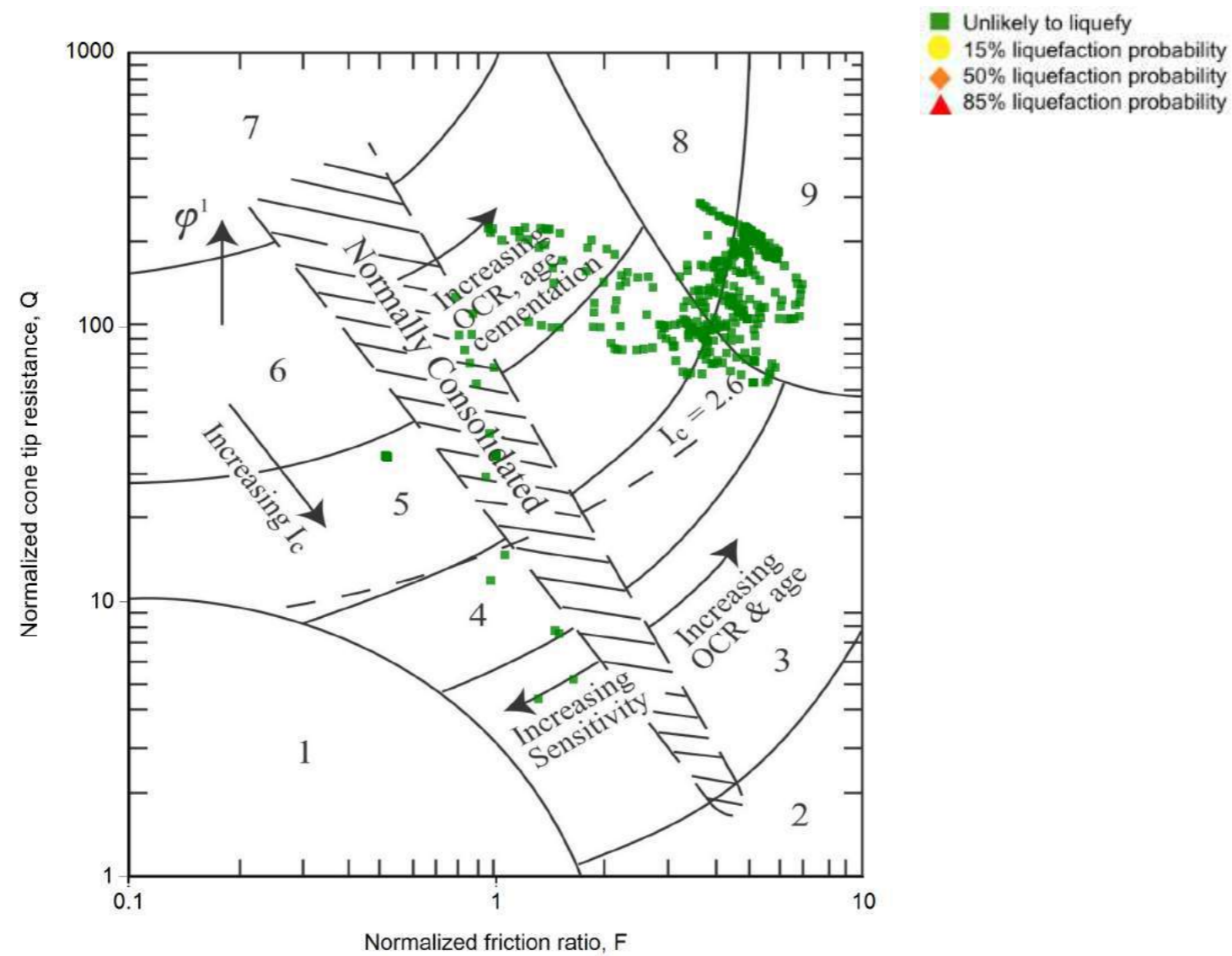
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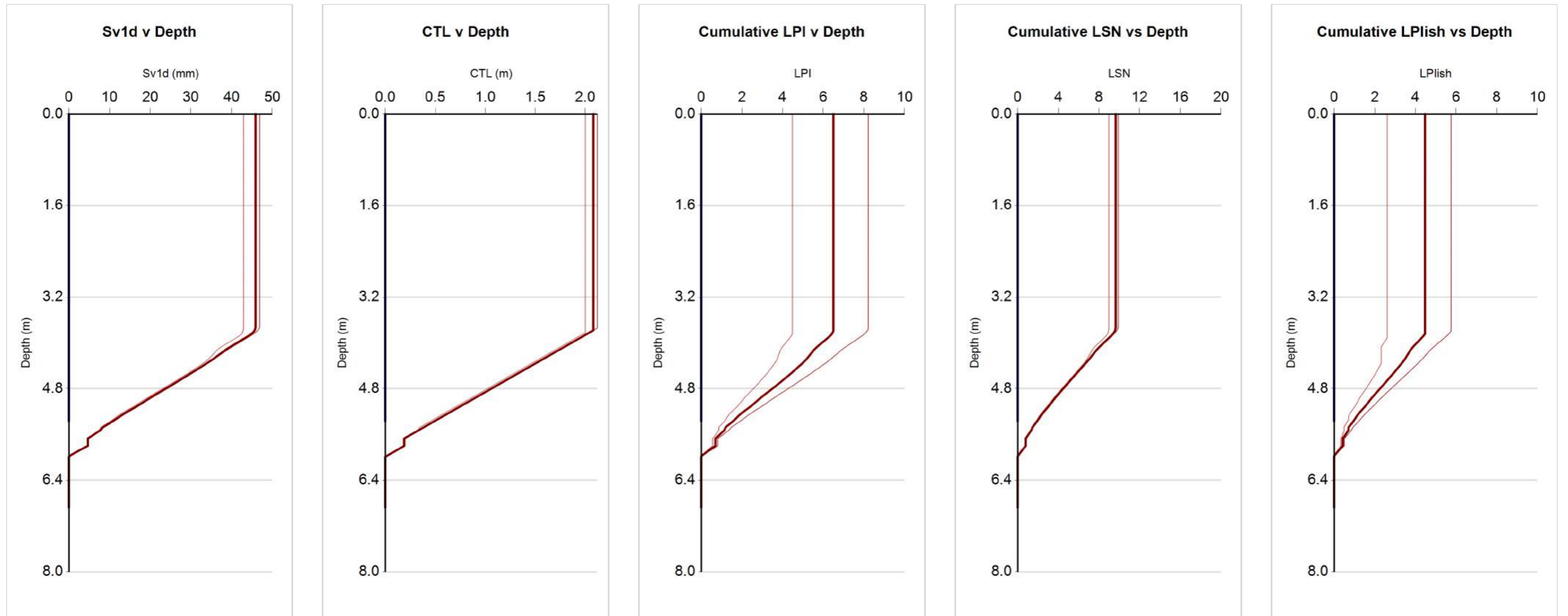


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| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
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CPT-based soil behavior type classification chart by Robertson (1990)

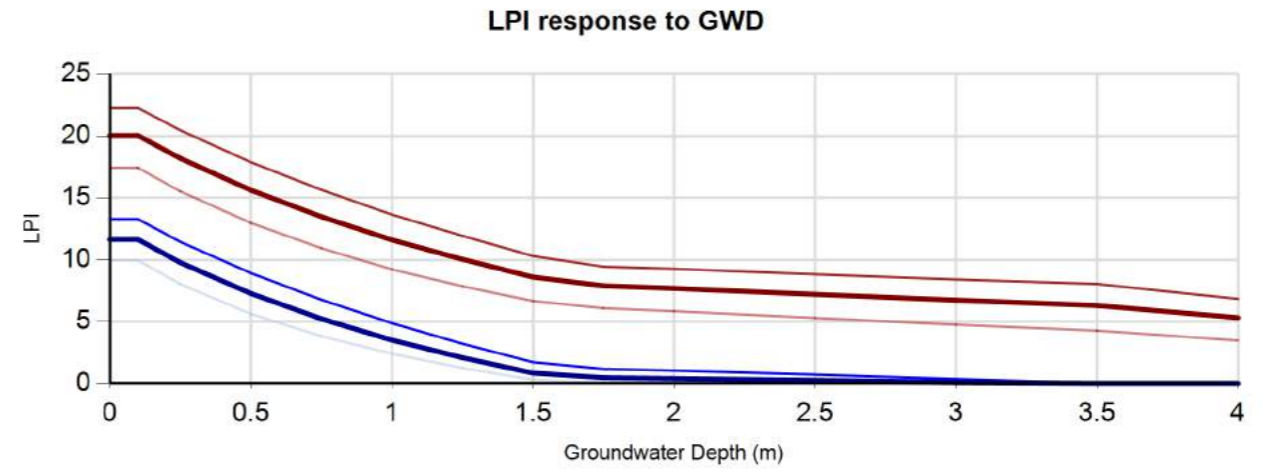
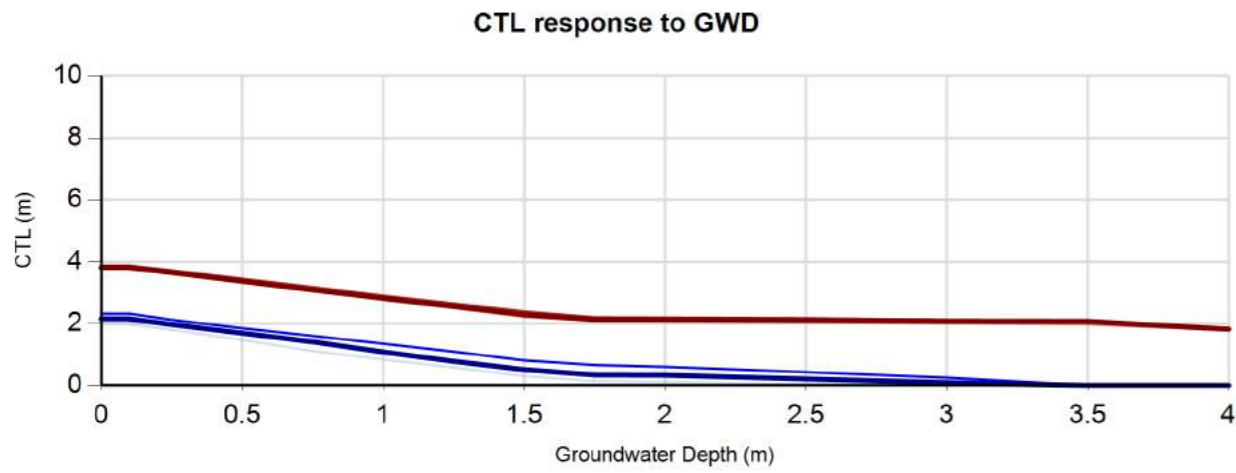
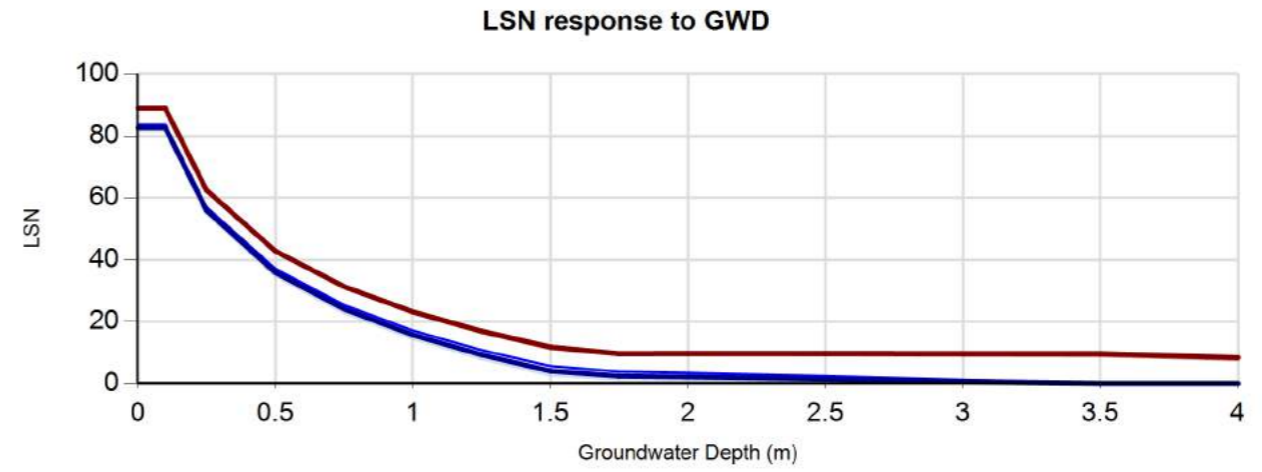
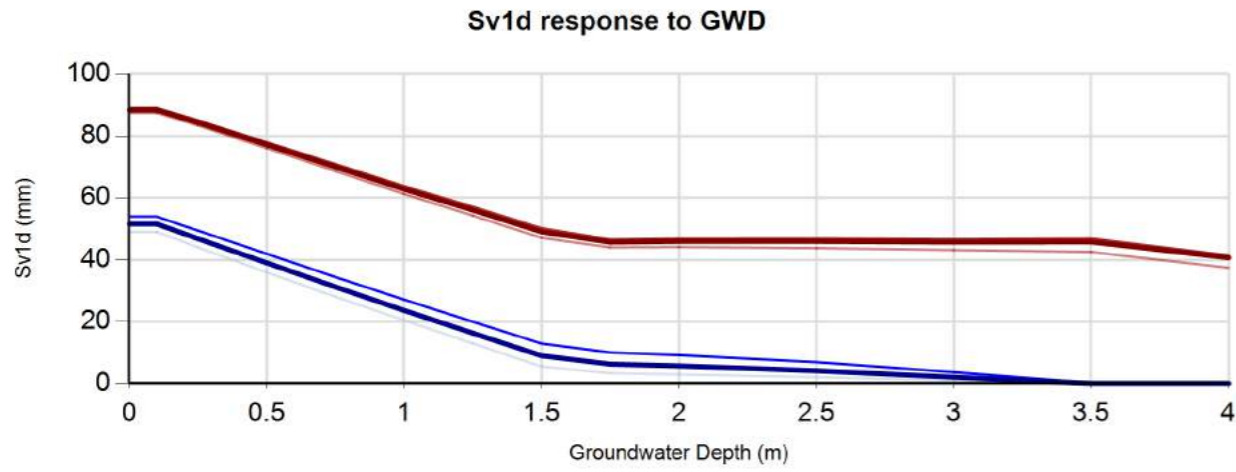
 <p>Tonkin + Taylor Exceptional thinking together V1.3</p>	<p>CLIENT, PROJECT</p> <p>Ryman Healthcare Limited Karori Prepurchase Geotechnical Assessment</p>	<p>LOCATION</p> <p>Victoria University Karori Campus</p>	<p>DATE</p> <p>19/10/2017</p>
	<p>TITLE</p> <p>ULS - CPT10 and 11</p>	<p>JOB NUMBER</p> <p>30309</p>	<p>ANALYSED</p> <p>tzh</p>



(Assumed pre-drill values)

CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT10	103688	12/10/2017	User Specified	7.1	0.45	3.3	BI-2014	ZRB-2002	1.55	2	0.01	18
CPT11	103689	11/10/2017	User Specified	7.1	0.45	3.84	BI-2014	ZRB-2002	1.5	2	0.01	18

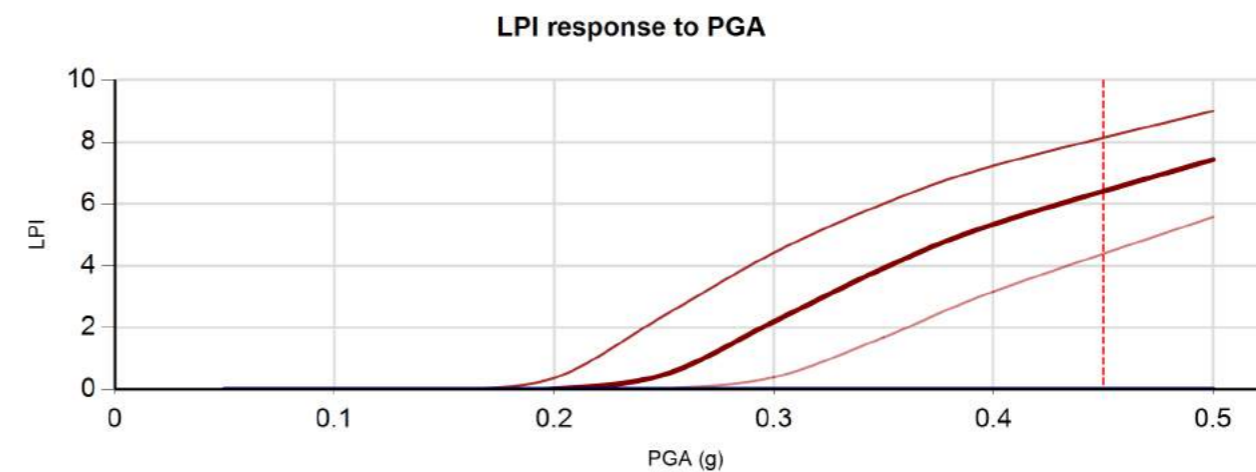
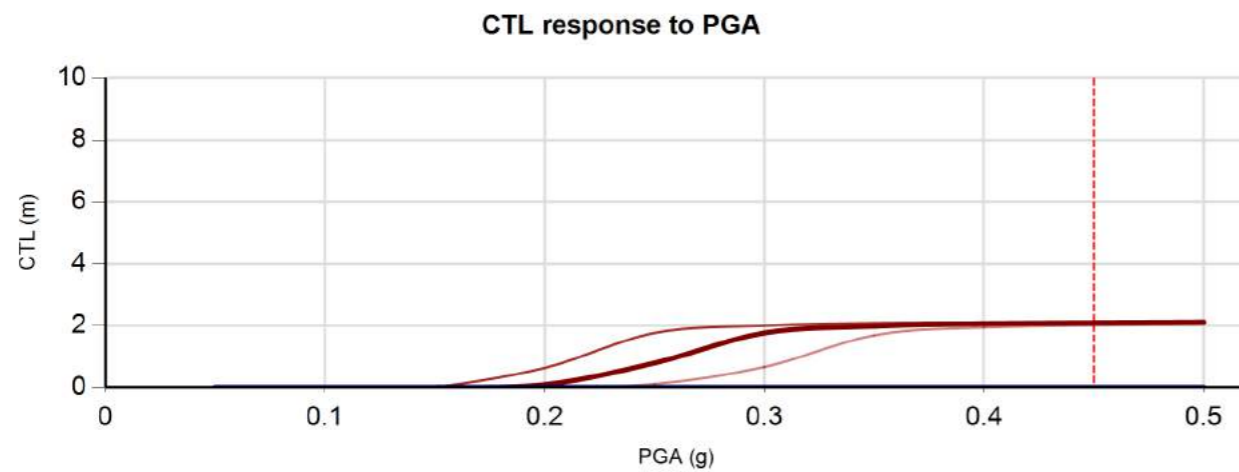
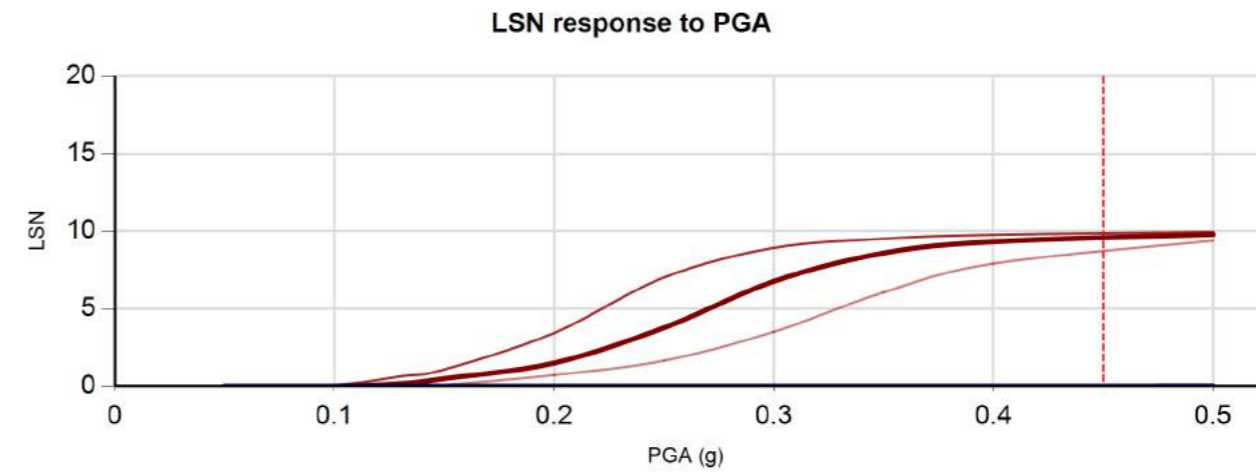
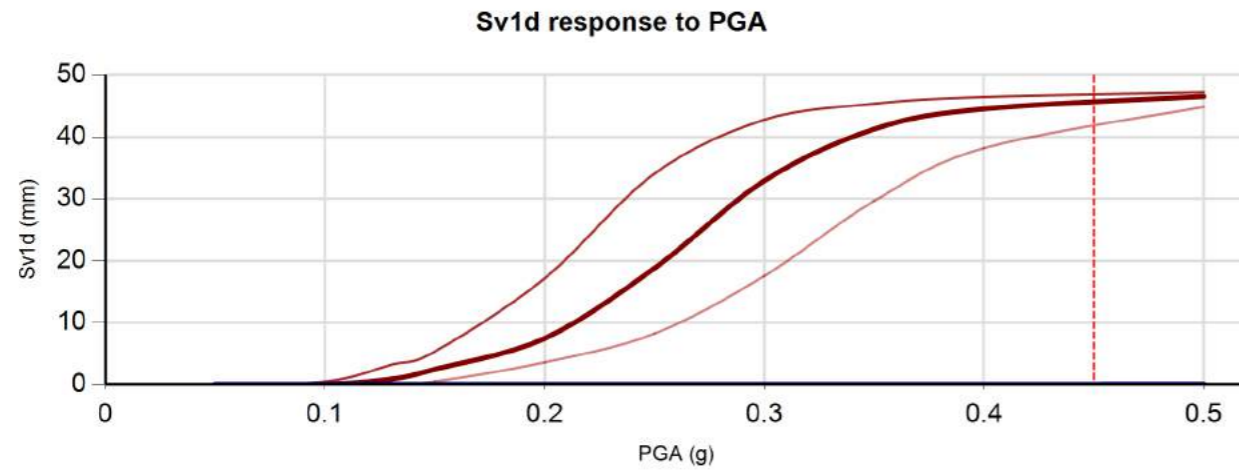
Thicker lines represent the 50% probability of exceedance case and the thinner lines to the left and right of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.



(Assumed pre-drill values)

CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT10	103688	12/10/2017	User Specified	7.1	0.45	3.3	BI-2014	ZRB-2002	1.55	2	0.01	18
CPT11	103689	11/10/2017	User Specified	7.1	0.45	3.84	BI-2014	ZRB-2002	1.5	2	0.01	18

Thicker lines represent the 50% probability of exceedance case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.




Vertical dotted line/s indicate user specified PGA at the CPT locations. (actual PGA)

(Assumed pre-drill values)

CPT Name	TTGD ID	Investigation Date	Event and Model (PGA & GWD)	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	qc (MPa)	Fs (MPa)	γ (kN/m ³)
CPT10	103688	12/10/2017	User Specified	7.1	0.45	3.3	BI-2014	ZRB-2002	1.55	2	0.01	18
CPT11	103689	11/10/2017	User Specified	7.1	0.45	3.84	BI-2014	ZRB-2002	1.5	2	0.01	18

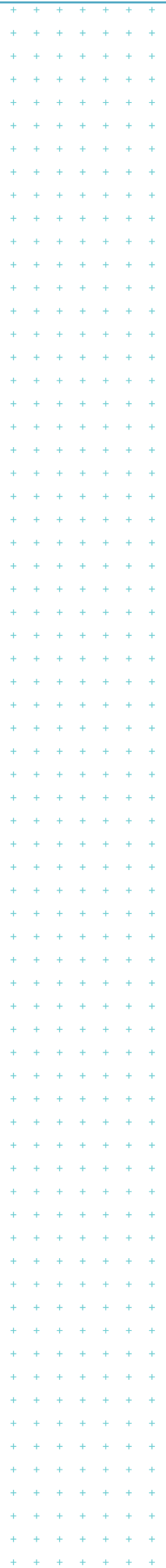
Thicker lines represent the 50% probability of exceedance case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.

 <p>Tonkin + Taylor Exceptional thinking together V1.3</p>	CLIENT, PROJECT	Ryman Healthcare Limited Karori Prepurchase Geotechnical Assessment	LOCATION	Victoria University Karori Campus	DATE	19/10/2017
	TITLE	ULS - CPT10 and 11	JOB NUMBER	30309	ANALYSED	tzhl
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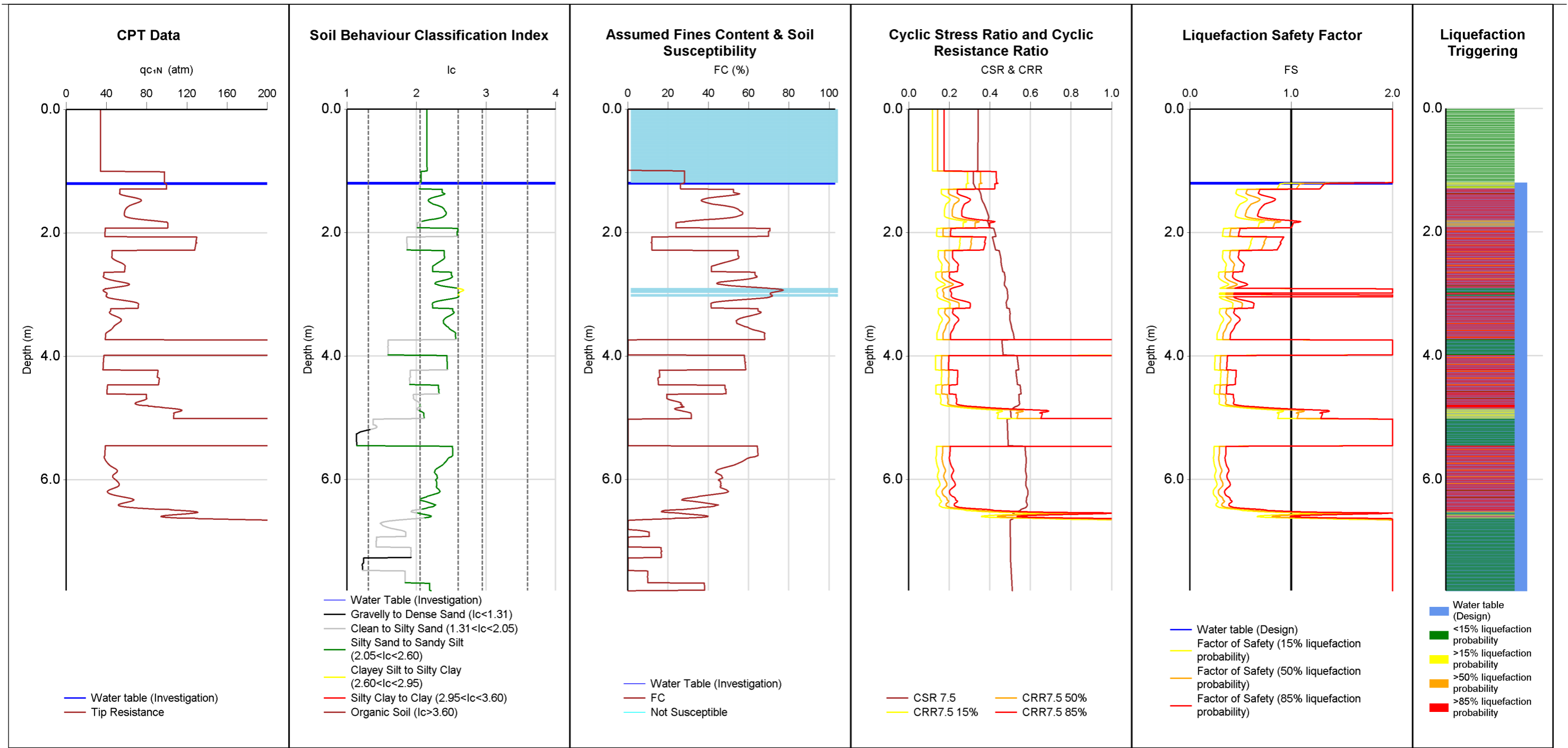
The inputs listed in Table 1.1-1 below have been adopted for the liquefaction analysis.

Table 1.1-1 Summary of inputs for liquefaction analysis

TTGD ID	103688	103689
CPT Name	05TT12_10	05TT12_11
PGA	0.45g	0.45g
Magnitude	7.1	7.1
Depth to groundwater	3.3m	3.84m
Predrill depth	1.55m	1.5m
Assumed predrill tip resistance and skin friction	qc= 2MPa & Fs= 0.01MPa	qc= 2MPa & Fs= 0.01MPa
Trigger method	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)
Settlement method	Zhang, Robertson & Brachman (2002)	Zhang, Robertson & Brachman (2002)
CFC	0	0
Total depth of CPT	6.88m	5.37m
Maximum depth of analysis	6.88m	5.37m
RL	n/a	n/a



Attachment B: 2020 Liquefaction Analysis



Note: Inverse filtered Qc/Fs data (10 cm²) used.

Run Description	TTGD ID	Investigation Date	Pre-drill (m)	Magnitude	PGA (g)	Trigger Method	Settlement Method	γ (kN/m ³)	Surcharge/Cut/Fill	Surcharge (kPa)	Cut/Fill Height (m)
INPUT IM3 CPT2	103680	12/10/2017	1	7.1	0.59	BI-2014	ZRB-2002	18		0	
PL	SV1D (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish					
OUTPUT 15%	94	4.6	23	30	1.3	22					
50%	91	4.3	20	29	1.4	19					
85%	88	4.2	17	27	1.4	15					

Reviewed by:

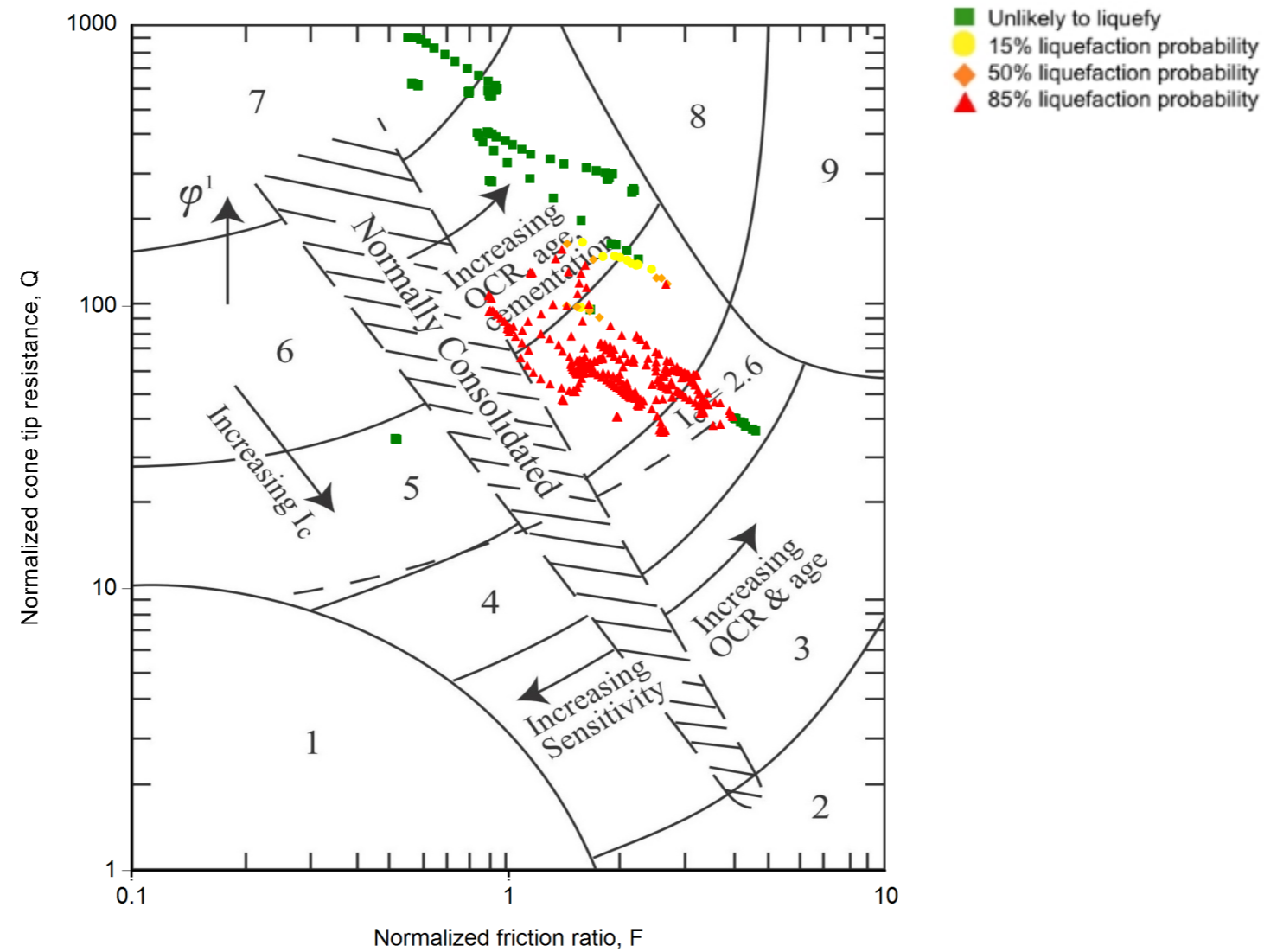
CPT Inversion	cvs
Groundwater	cvs
Susceptibility	cvs
Triggering	cvs
Consequence	cvs



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CLIENT	Ryman Healthcare Limited
PROJECT	Karori Development
TITLE	IM3 ULS
COMMENT	

LOCATION	Victoria University Karori Campus	DATE	12/11/2020
JOB NUMBER	30309.2000	ANALYSED	syw
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- | | |
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| 1. Sensitive, fine grained | 6. Sands - clean sand to silty sand |
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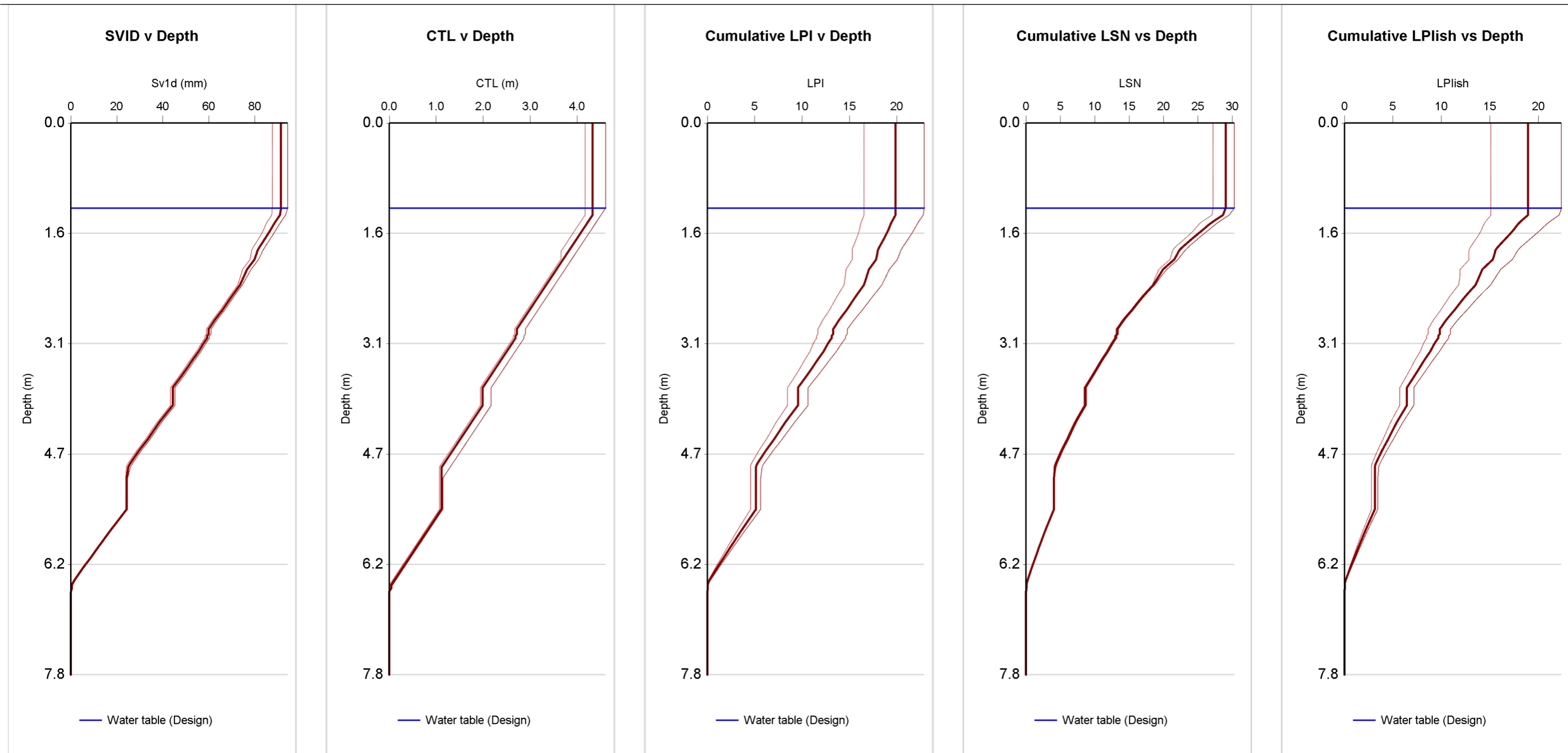
*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)

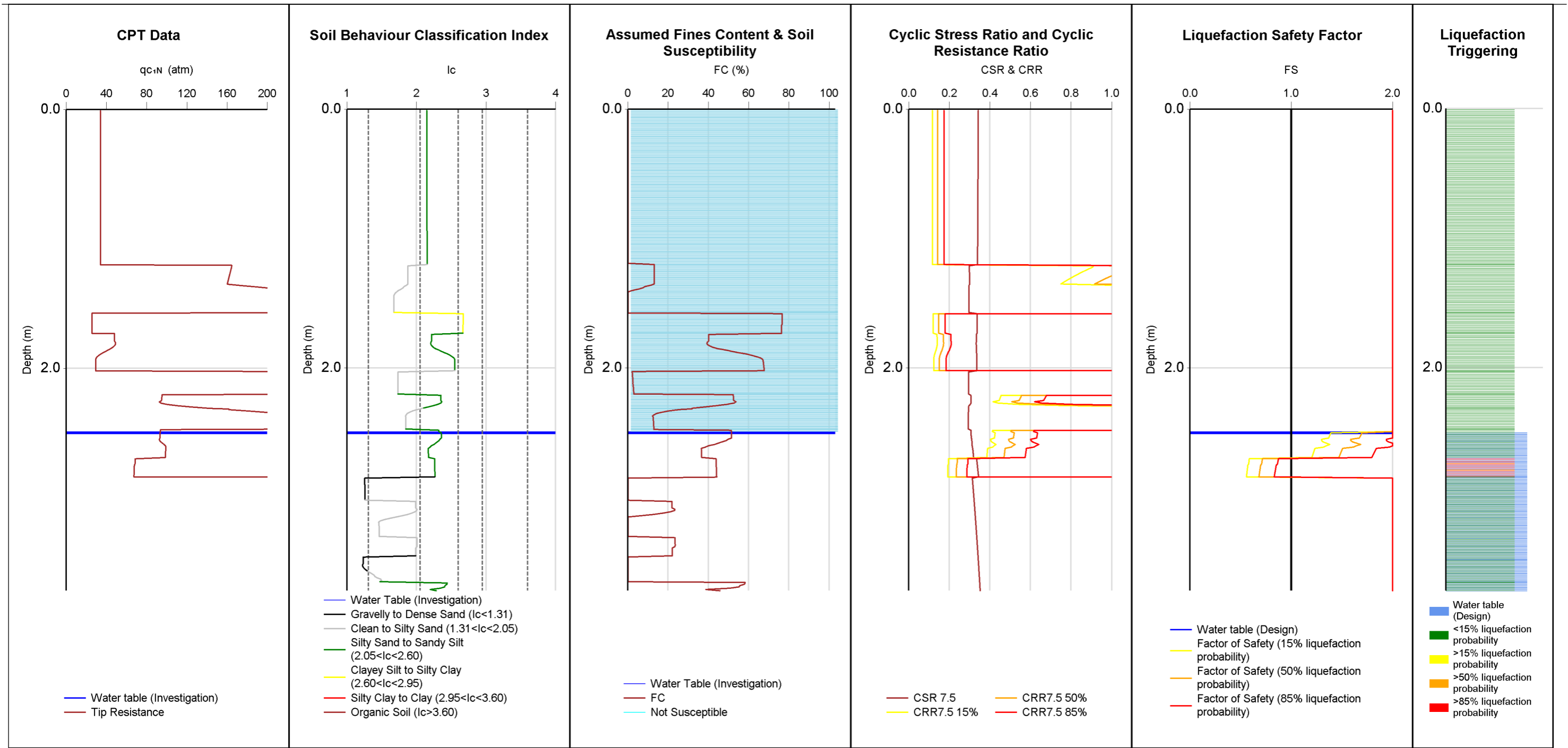


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Run Description	TTGD ID	Investigation Date	Pre-drill (m)	Magnitude	PGA (g)	Trigger Method	Settlement Method	γ (kN/m ³)	Surcharge/Cut/Fill	Surcharge (kPa)	Cut/Fill Height (m)
INPUT IM3 CPT2	103680	12/10/2017	1	7.1	0.59	BI-2014	ZRB-2002	18		0	



Note: Inverse filtered Q_c/F_s data (10 cm²) used.

Run Description	TTGD ID	Investigation Date	Pre-drill (m)	Magnitude	PGA (g)	Trigger Method	Settlement Method	γ (kN/m ³)	Surcharge/Cut/Fill	Surcharge (kPa)	Cut/Fill Height (m)
INPUT IM3 CPT3	103681	12/10/2017	1.2	7.1	0.59	BI-2014	ZRB-2002	18		0	

PL	SV1D (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish
OUTPUT 15%	3	0.1	1	1	2.8	1
50%	3	0.1	0	1	2.8	0
85%	2	0.1	0	1	2.8	0

Reviewed by:

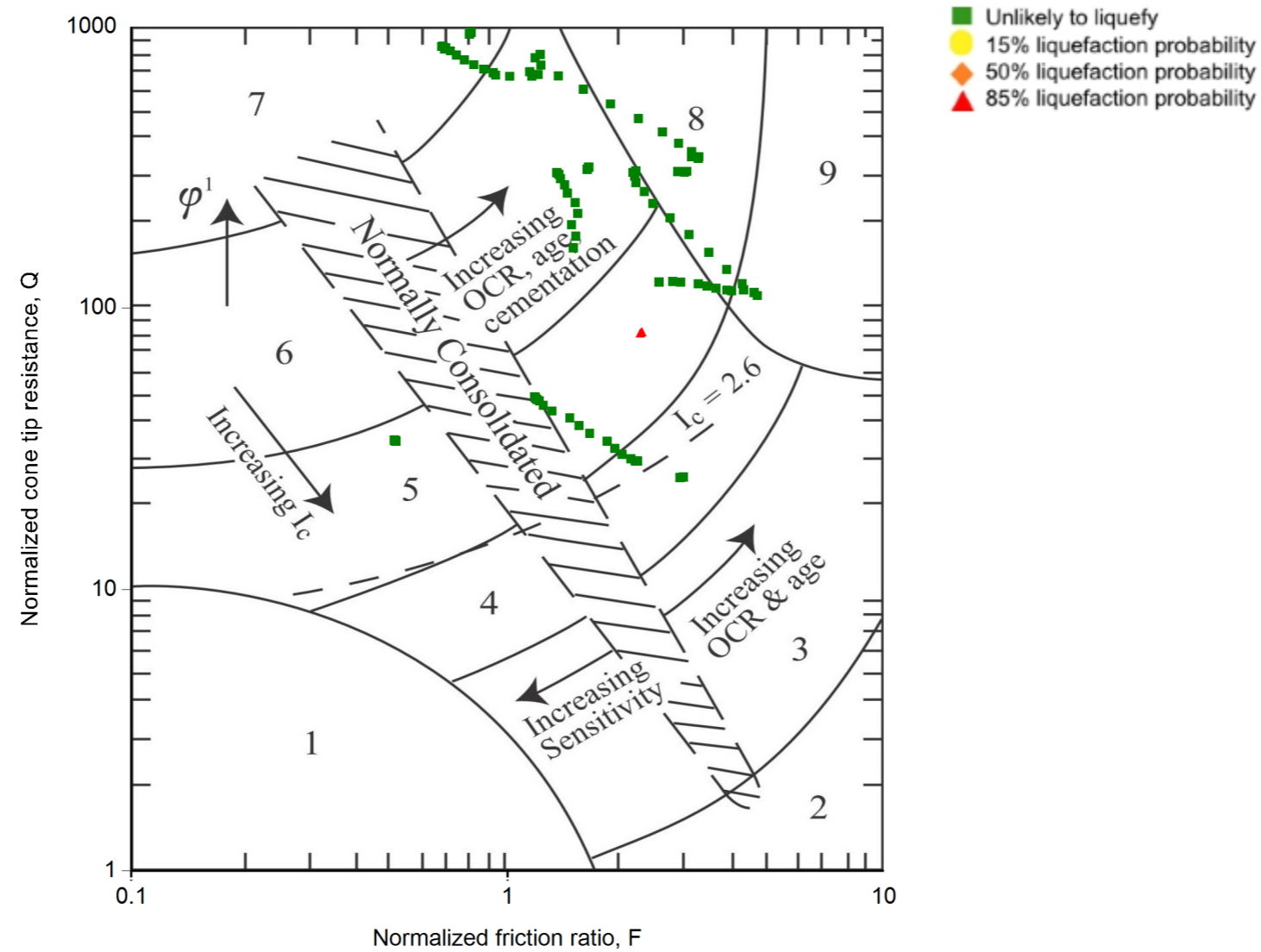
CPT Inversion	cvs
Groundwater	cvs
Susceptibility	cvs
Triggering	cvs
Consequence	cvs



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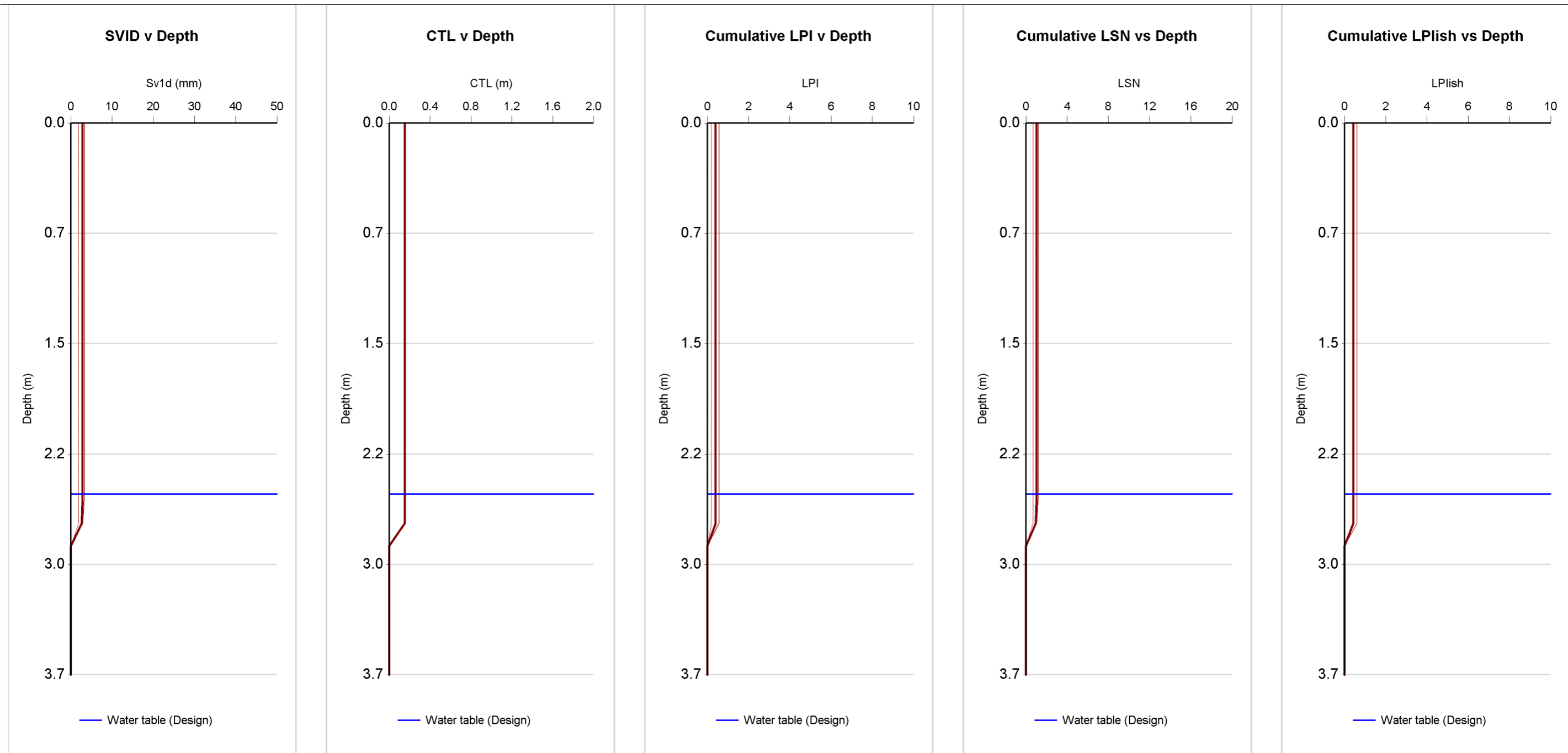
*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)

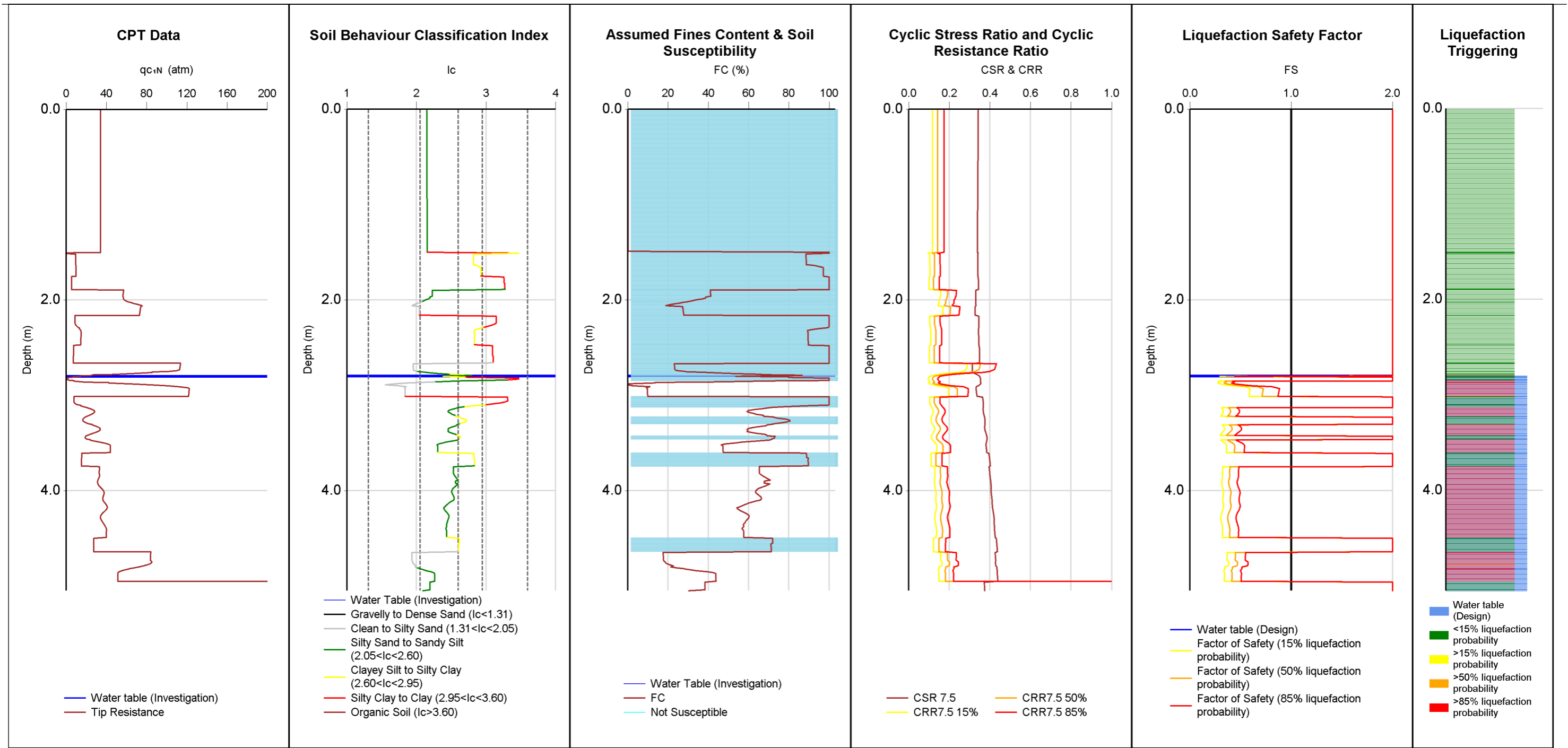


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Run Description	TTGD ID	Investigation Date	Pre-drill (m)	Magnitude	PGA (g)	Trigger Method	Settlement Method	γ (kN/m ³)	Surcharge/Cut/Fill	Surcharge (kPa)	Cut/Fill Height (m)
INPUT IM3 CPT3	103681	12/10/2017	1.2	7.1	0.59	BI-2014	ZRB-2002	18		0	

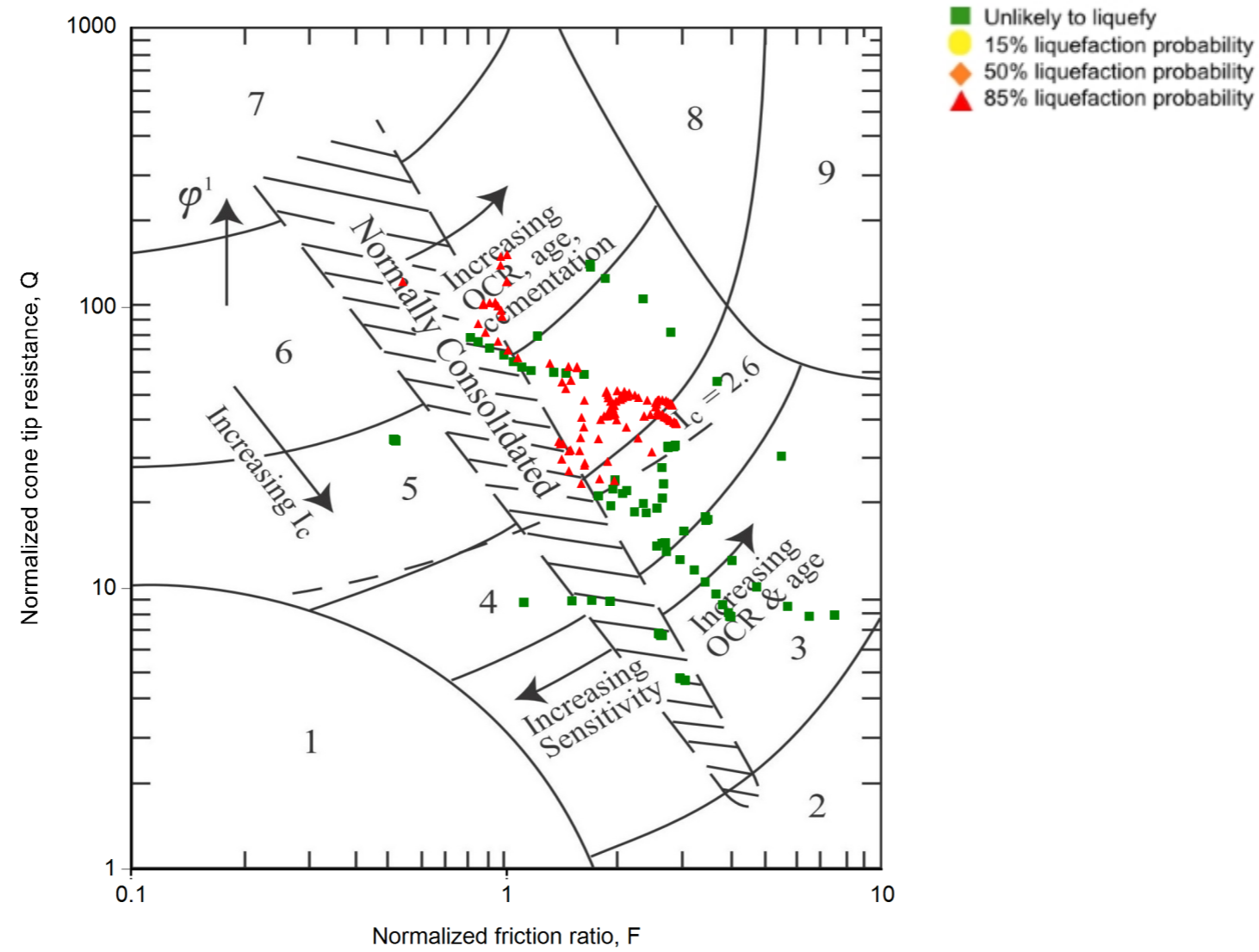


Note: Inverse filtered Q_c/F_s data (10 cm^2) used.

Run Description	TTGD ID	Investigation Date	Pre-drill (m)	Magnitude	PGA (g)	Trigger Method	Settlement Method	γ (kN/m ³)	Surcharge/Cut/Fill	Surcharge (kPa)	Cut/Fill Height (m)
INPUT IM3 CPT5	103683	12/10/2017	1.5	7.1	0.59	BI-2014	ZRB-2002	18		0	
PL	SV1D (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish					
OUTPUT 15%	39	1.6	8	10	2.9	7					
50%	38	1.6	7	10	2.9	6					
85%	38	1.6	6	10	2.9	5					

Reviewed by:


CPT Inversion	cvs
Groundwater	cvs
Susceptibility	cvs
Triggering	cvs
Consequence	cvs

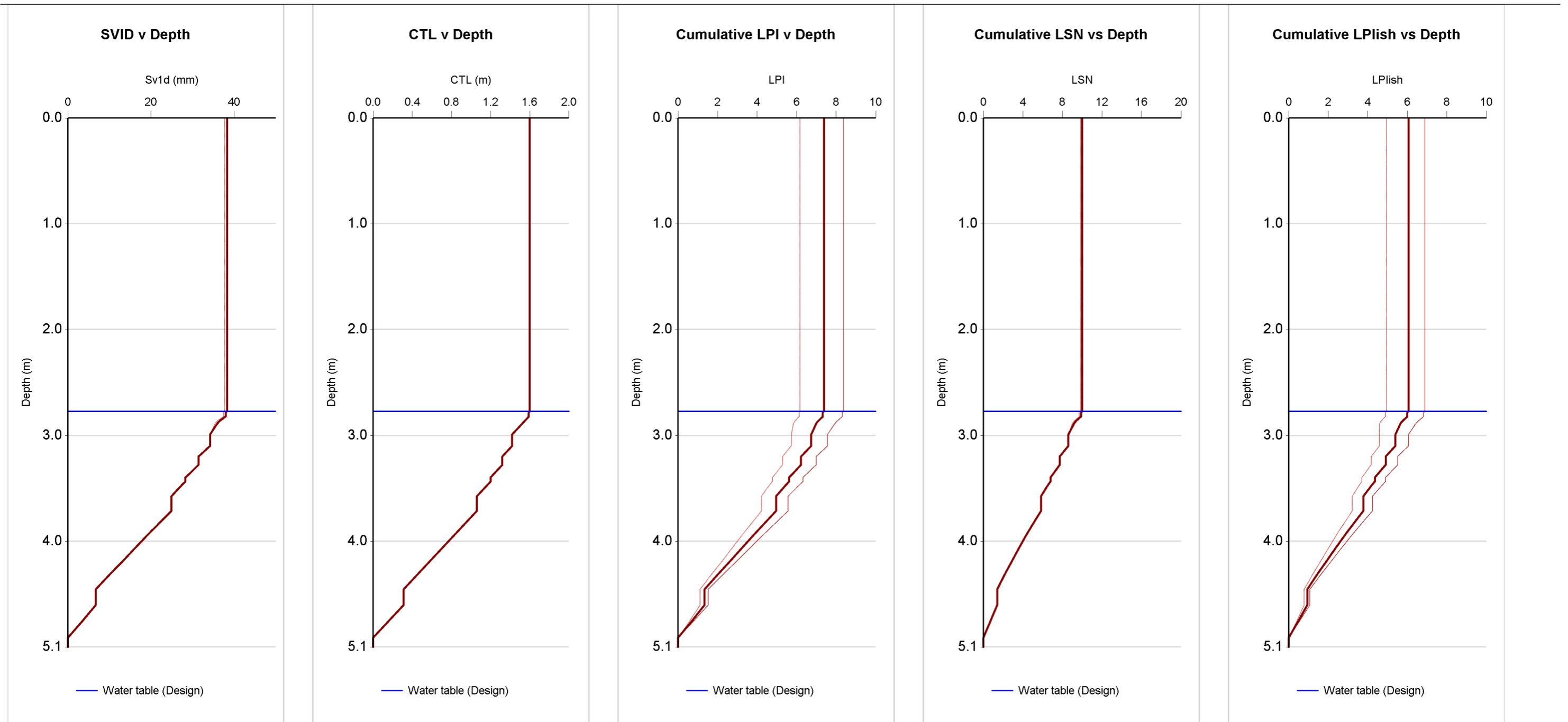


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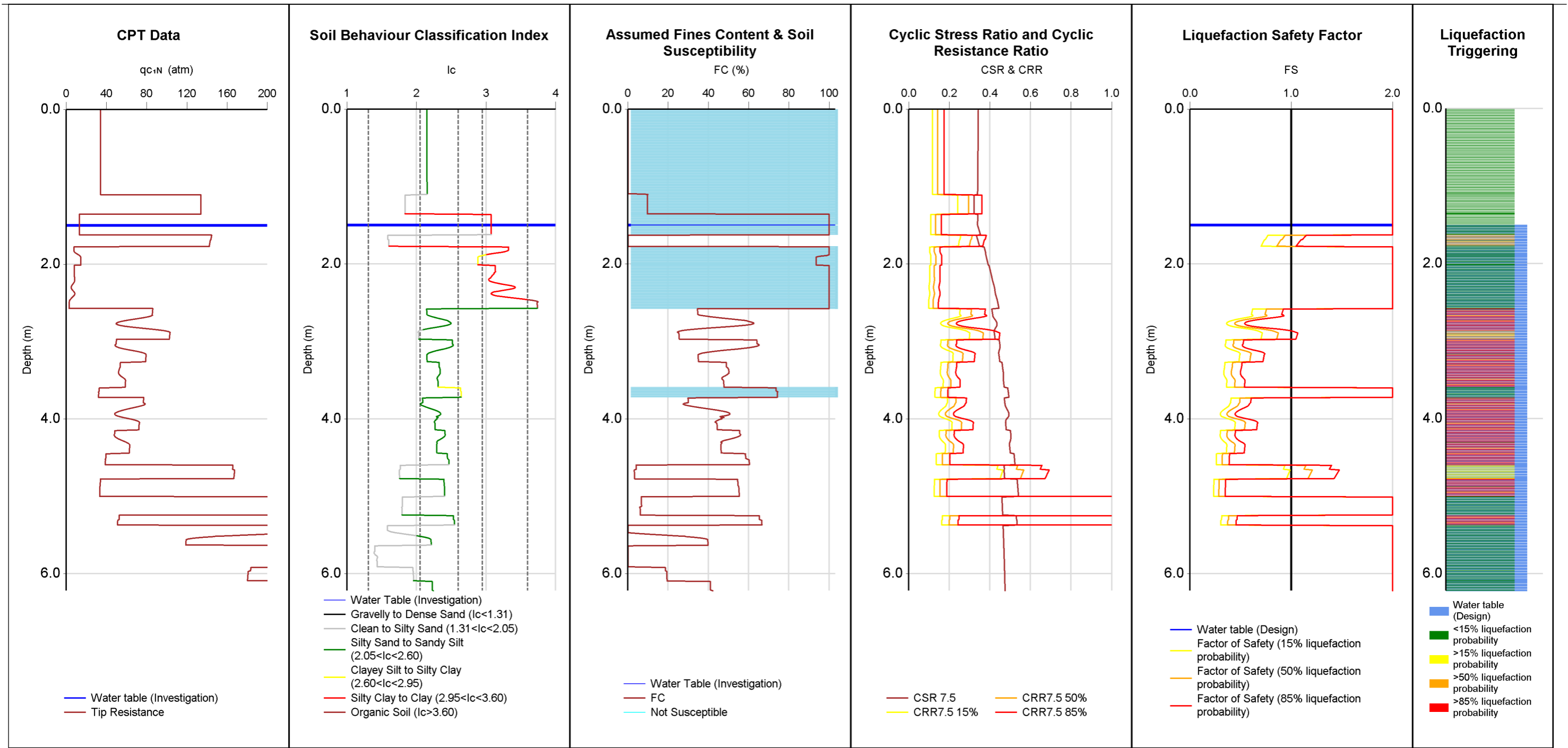
*Heavily overconsolidated or cemented

CPT-based soil behavior type classification chart by Robertson (1990)

 <p>Tonkin + Taylor Exceptional thinking together V2.4.15</p>	CLIENT	Ryman Healthcare Limited	LOCATION	12/11/2020	
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Run Description	TTGD ID	Investigation Date	Pre-drill (m)	Magnitude	PGA (g)	Trigger Method	Settlement Method	γ (kN/m ³)	Surcharge/Cut/Fill	Surcharge (kPa)	Cut/Fill Height (m)
INPUT IM3 CPT5	103683	12/10/2017	1.5	7.1	0.59	BI-2014	ZRB-2002	18		0	



Note: Inverse filtered Q_c/F_s data (10 cm^2) used.

Run Description	TTGD ID	Investigation Date	Pre-drill (m)	Magnitude	PGA (g)	Trigger Method	Settlement Method	γ (kN/m ³)	Surcharge/Cut/Fill	Surcharge (kPa)	Cut/Fill Height (m)
INPUT IM3 CPT9	103687	11/10/2017	1.1	7.1	0.59	BI-2014	ZRB-2002	18		0	
PL	SV1D (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish					
OUTPUT 15%	49	2.6	12	14	1.7	10					
50%	47	2.4	10	13	1.7	8					
85%	44	2.1	8	12	2.7	6					

Reviewed by:

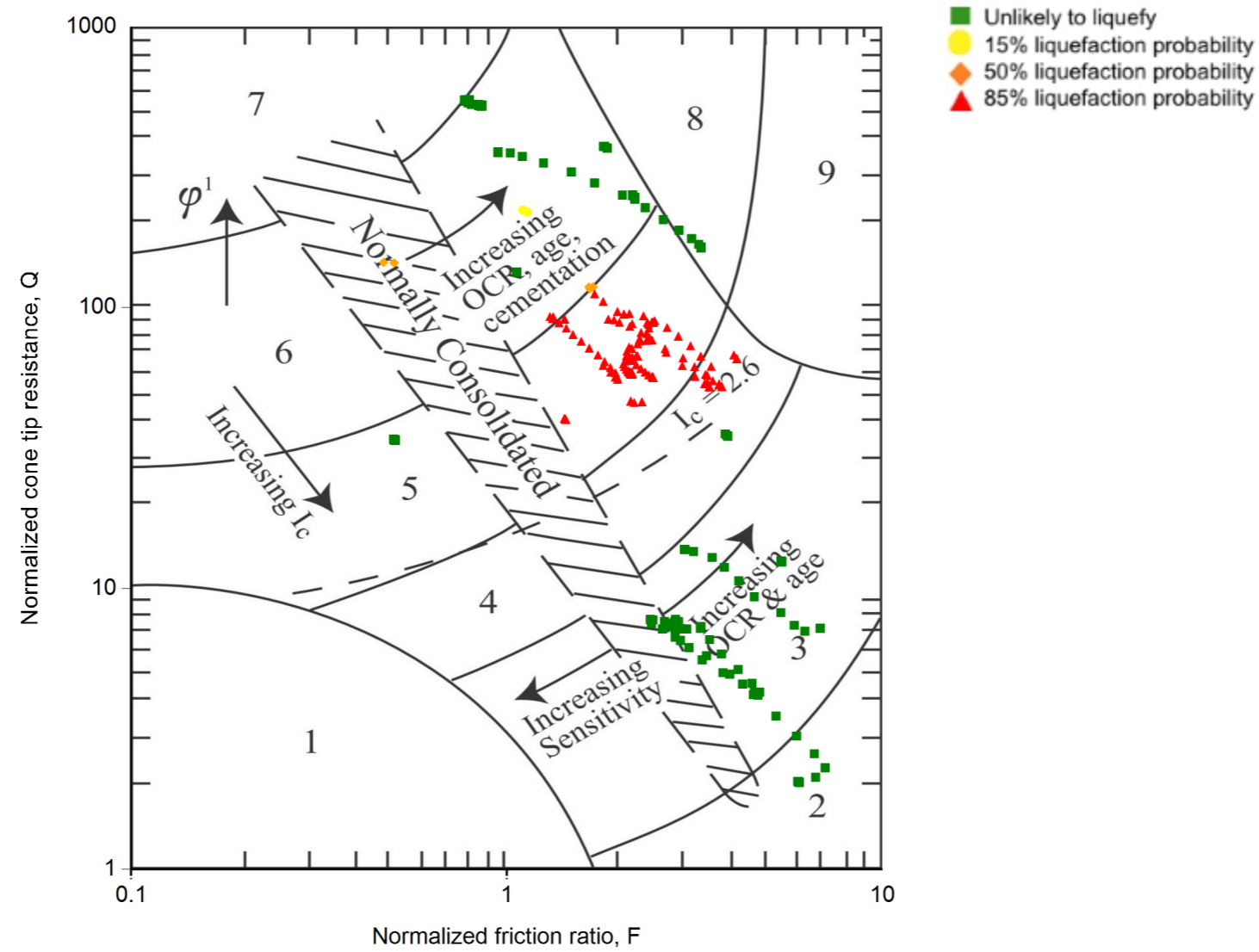
CPT Inversion	cvs
Groundwater	cvs
Susceptibility	cvs
Triggering	cvs
Consequence	cvs



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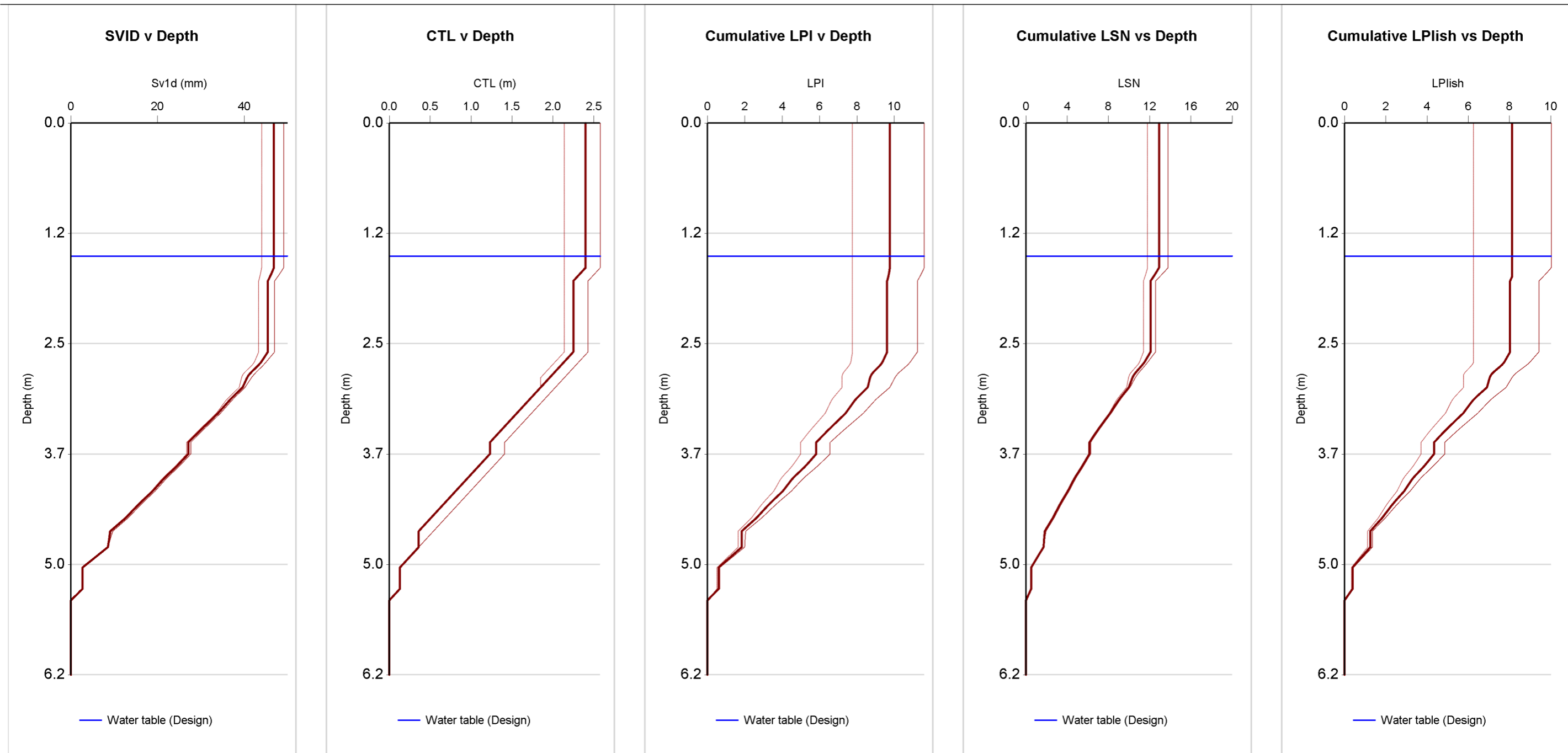
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CPT-based soil behavior type classification chart by Robertson (1990)

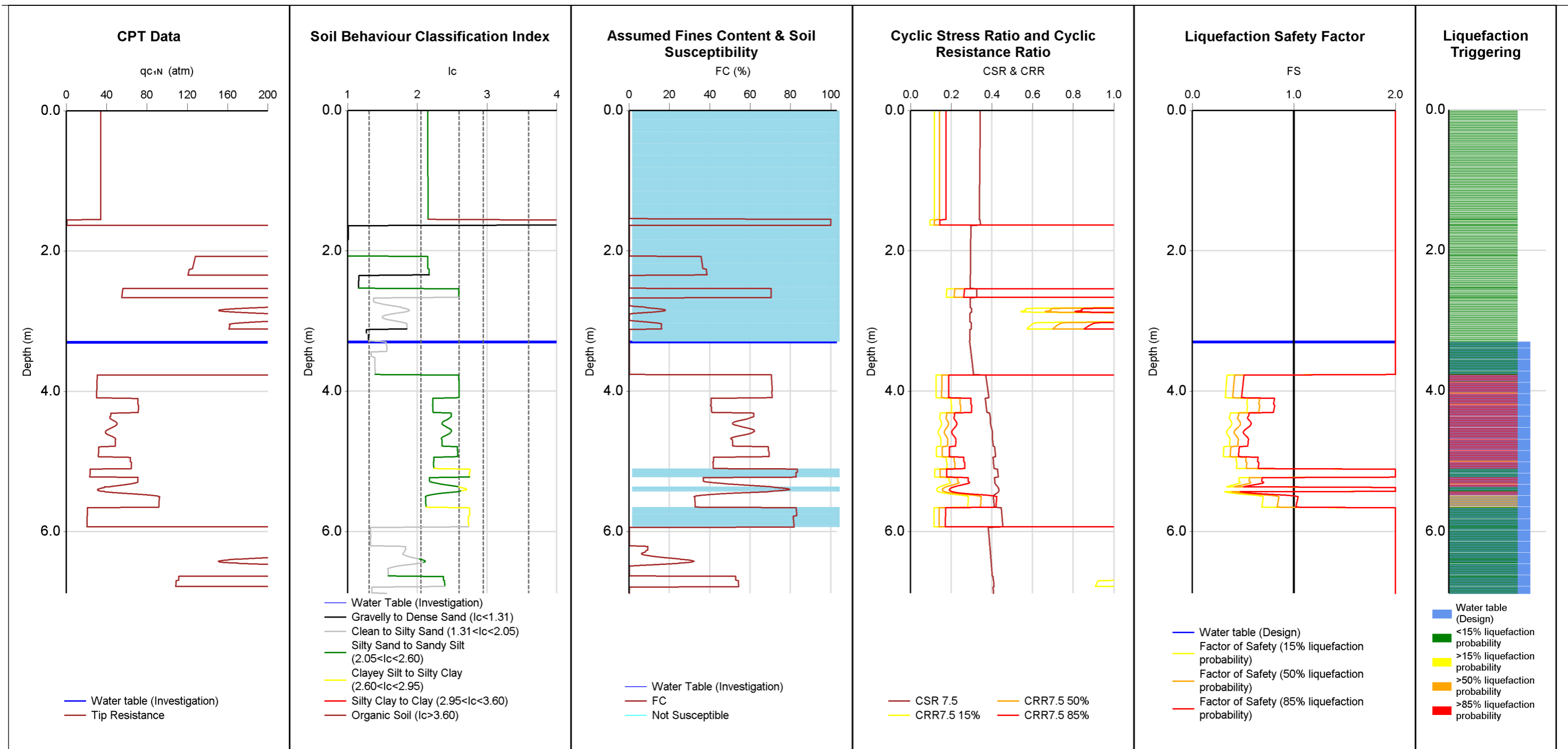


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Run Description	TTGD ID	Investigation Date	Pre-drill (m)	Magnitude	PGA (g)	Trigger Method	Settlement Method	γ (kN/m ³)	Surcharge/Cut/Fill	Surcharge (kPa)	Cut/Fill Height (m)
INPUT IM3 CPT9	103687	11/10/2017	1.1	7.1	0.59	BI-2014	ZRB-2002	18		0	



Note: Inverse filtered Qc/Fs data (10 cm²) used.

Run Description	TTGD ID	Investigation Date	Pre-drill (m)	Magnitude	PGA (g)	Trigger Method	Settlement Method	γ (kN/m ³)	Surcharge/Cut/Fill	Surcharge (kPa)	Cut/Fill Height (m)
INPUT IM3 CPT10	103688	12/10/2017	1.55	7.1	0.59	BI-2014	ZRB-2002	18		0	
PL	SV1D (mm)	CTL (m)	LPI	LSN	CT (m)	LPlish					
OUTPUT 15%	37	1.7	8	8	3.9	6					
50%	36	1.7	6	8	3.9	5					
85%	34	1.5	5	7	3.9	3					

Reviewed by:

CPT Inversion	cvs
Groundwater	cvs
Susceptibility	cvs
Triggering	cvs
Consequence	cvs

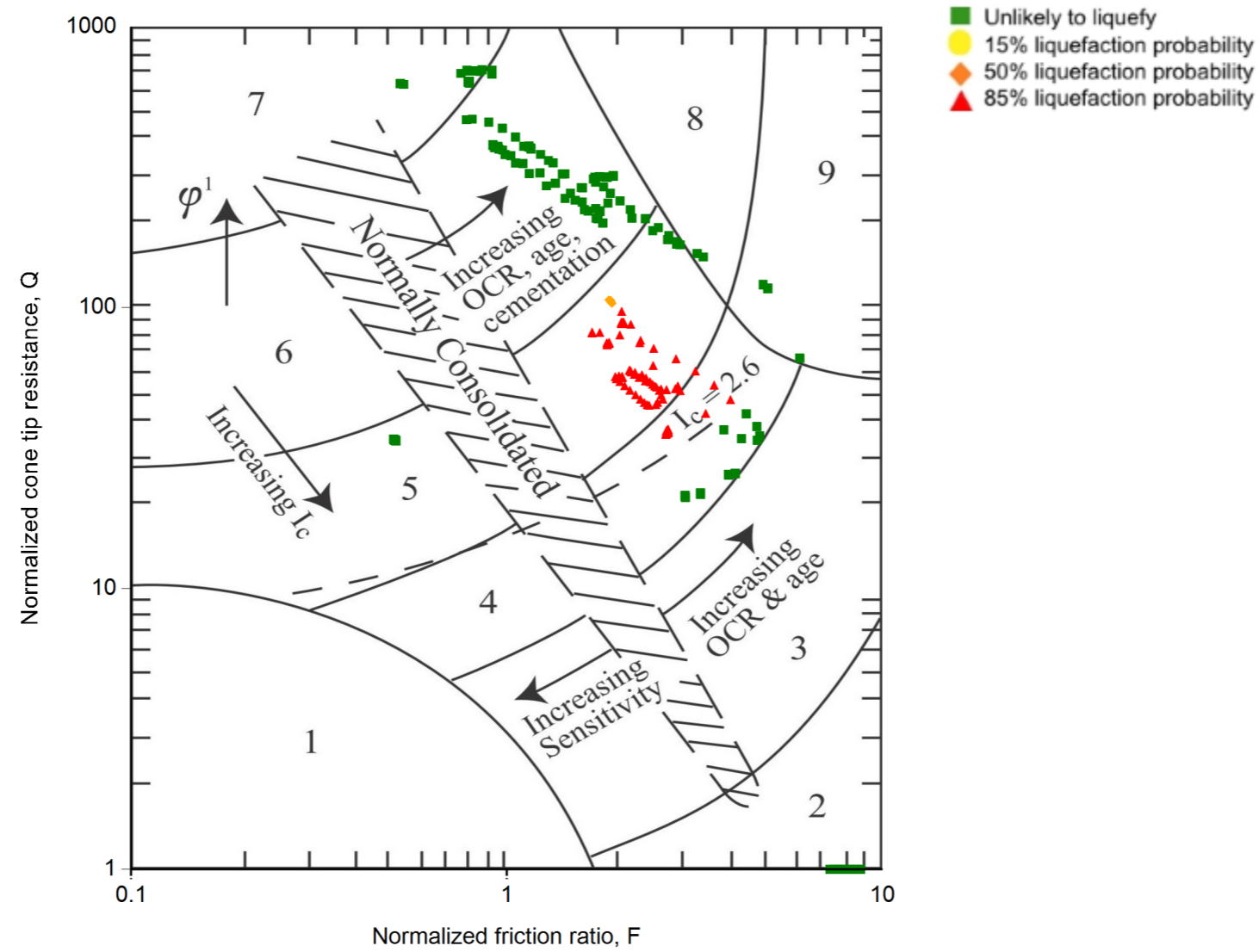


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CLIENT **Ryman Healthcare Limited**
PROJECT **Karori Development**
TITLE **IM3 ULS**
COMMENT

LOCATION **Victoria University Karori Campus**
JOB NUMBER **30309.2000**


DATE **12/11/2020**
ANALYSED **syw**
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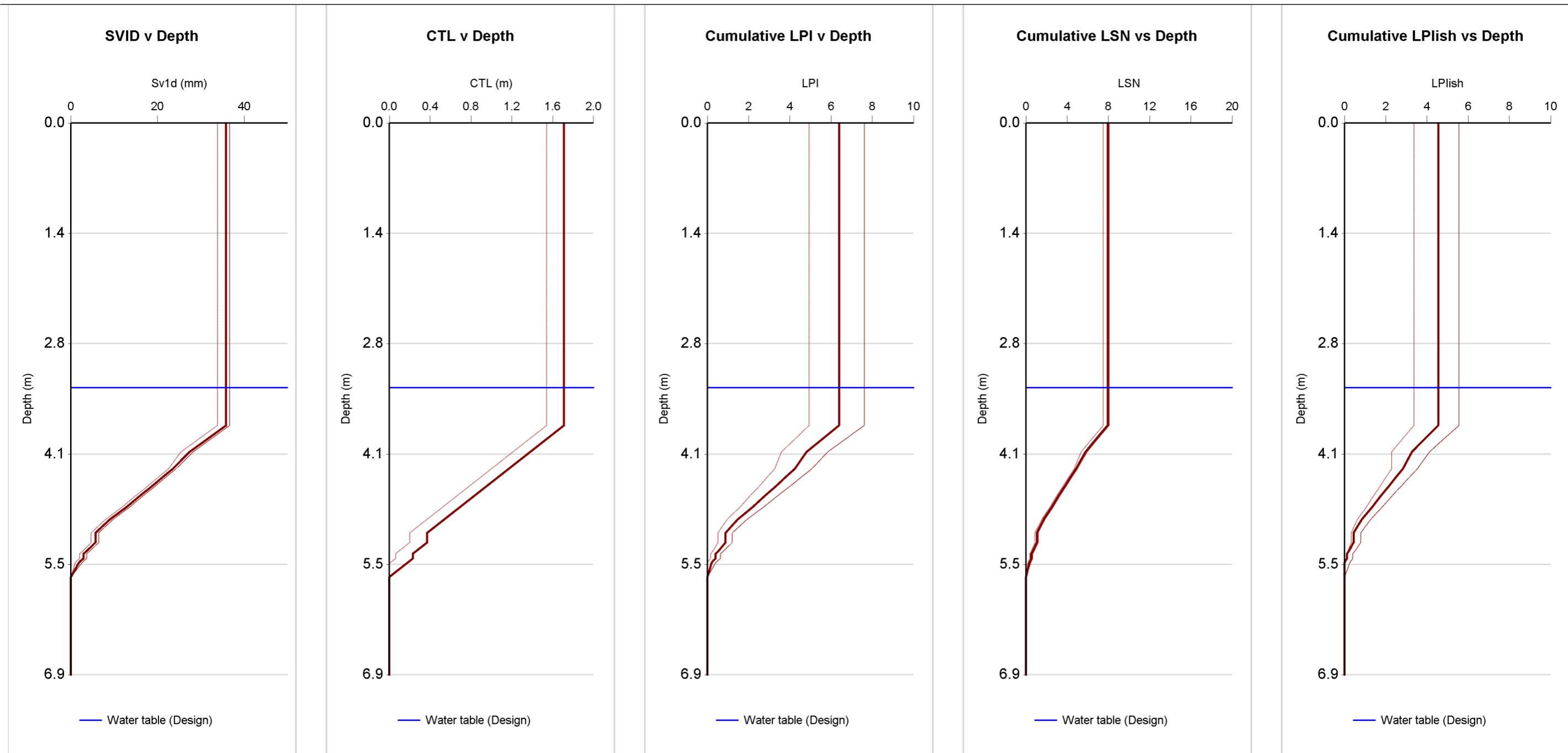


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CPT-based soil behavior type classification chart by Robertson (1990)

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Run Description	TTGD ID	Investigation Date	Pre-drill (m)	Magnitude	PGA (g)	Trigger Method	Settlement Method	γ (kN/m ³)	Surcharge/Cut/Fill	Surcharge (kPa)	Cut/Fill Height (m)
INPUT IM3 CPT10	103688	12/10/2017	1.55	7.1	0.59	BI-2014	ZRB-2002	18		0	

The inputs listed in Table 1.1-1 below have been adopted for the liquefaction analysis.

Table 1.1-1 Summary of inputs for liquefaction analysis

ID	TTGD 103680	TTGD 103681	TTGD 103683	TTGD 103687	TTGD 103688
CPT Name	05TT12_02	05TT12_03	05TT12_05	05TT12_09	05TT12_10
Run description	IM3 CPT2	IM3 CPT3	IM3 CPT5	IM3 CPT9	IM3 CPT10
PGA	0.59g	0.59g	0.59g	0.59g	0.59g
Magnitude	7.1	7.1	7.1	7.1	7.1
Depth to groundwater at time of Investigation (m)	1.2	2.5	2.8	1.5	3.3
Depth to groundwater for design (m)	1.2	2.5	2.8	1.5	3.3
Predrill depth (m)	1	1.2	1.5	1.1	1.55
Assumed predrill tip resistance and skin friction	qc= 2 MPa & Fs= 0.01 MPa	qc= 2 MPa & Fs= 0.01 MPa	qc= 2 MPa & Fs= 0.01 MPa	qc= 2 MPa & Fs= 0.01 MPa	qc= 2 MPa & Fs= 0.01 MPa
Trigger method	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)	Boulanger & Idriss (2014)
Settlement method	ZRB-2002	ZRB-2002	ZRB-2002	ZRB-2002	ZRB-2002
Total depth of CPT (m)	7.8	3.72	5.05	6.22	6.88
Minimum depth of analysis (m)	0	0	0	0	0
Maximum depth of analysis (m)	7.8	3.72	5.05	6.22	6.88
Inverse Filtering applied?	Yes (10 cm ²)	Yes (10 cm ²)	Yes (10 cm ²)	Yes (10 cm ²)	Yes (10 cm ²)

Table 1.1-2 Summary of I_c inputs for liquefaction analysis

ID	Run description	From (m)	To (m)	I _c
TTGD 103680	IM3 CPT2	0	1	0
TTGD 103680	IM3 CPT2	1	1.2	0
TTGD 103680	IM3 CPT2	1.2	7.8	2.6
TTGD 103681	IM3 CPT3	0	1.2	0
TTGD 103681	IM3 CPT3	1.2	2.5	0
TTGD 103681	IM3 CPT3	2.5	3.72	2.6
TTGD 103683	IM3 CPT5	0	1.5	0
TTGD 103683	IM3 CPT5	1.5	2.8	0
TTGD 103683	IM3 CPT5	2.8	5.05	2.6
TTGD 103687	IM3 CPT9	0	1.1	0
TTGD 103687	IM3 CPT9	1.1	1.5	0
TTGD 103687	IM3 CPT9	1.5	6.22	2.6
TTGD 103688	IM3 CPT10	0	1.55	0
TTGD 103688	IM3 CPT10	1.55	3.3	0
TTGD 103688	IM3 CPT10	3.3	6.88	2.6

Table 1.1-3 Summary of F_c inputs for liquefaction analysis

ID	Run description	From (m)	To (m)	F _c
TTGD 103680	IM3 CPT2	1	7.8	0 CFC
TTGD 103681	IM3 CPT3	1.2	7.8	0 CFC
TTGD 103683	IM3 CPT5	1.5	7.8	0 CFC
TTGD 103687	IM3 CPT9	1.1	7.8	0 CFC
TTGD 103688	IM3 CPT10	1.55	7.8	0 CFC