



Rev.	Date:	Description	Initials
A	17/07/2024	RC and BC	NC
B	24/07/2024	RC and BC	NC
C	18/09/2024	RC and BC	JS

Notes:

## Summary of Site Observations

Element	Description
<b>Date of Visit</b>	4 and 8 July 2024
<b>Vegetation and topography</b>	The property is vegetated with several large trees and grass. The north area of the property has a higher elevation than the south area (up to 2m difference in places), with generally undulating topography.
<b>Site structures (buildings, walls, etc)</b>	There is currently an existing dwelling and garage located on the property. In terms of foundations, the garage has a concrete slab while the dwelling is on piles.
<b>Underground and overhead services</b>	All services are underground on this property.
<b>Soil/ rock exposures</b>	No soil or rock exposures were observed on the property,
<b>Water/ Drainage</b>	No drainage features were observed.

## Summary of Public Data

Source	Source Description	Data Description	Notes
<b>GNS</b>	NZ Geological Webmap (1:50,000)	Holocene windblown deposits	Inactive dunes.
	NZ Active Fault Database	Ohariu Fault ~ 3.5km southeast Gibbs Fault—4.7km southeast	Dextral, RI II >2,000 to <= 3,500 years, slip rate moderate. Dextral, RI III >3,500 to <= 5,000 years, slip rate low.
<b>GWRC</b>	Mapped Hazard	Combined Hazard Ground Shaking Liquefaction Slope	Moderate to high Moderate High Low
<b>KCDC</b>	Flood Hazards	Ponding on site GWRC Flood Hazard Webmap notes a 1%AEP.	Stream corridor shown 120m south-east of the property.
	Historical Aerial Imagery	1940s—One building existing on site 1991—Two buildings added to property.	No major changes to site between 1991 and 2021.
<b>Retrolens</b>	Historical Aerial Images	1942—Single building present on the property. 1964—Small structure added to north end of site. 1966—Northern structure no longer present. 1991—Building added to south end of property, near the existing driveway	
<b>NZGD</b>	Nearby Investigation Records	18 CPTs and 5 hand auger logs have been completed within 300m of the site.	Logs generally indicated sands with gradually increasing soil strength.

## Kaikoura PGAs

Strong motion stations throughout the Wellington region recorded ground motions during the 2016 Kaikoura earthquake which was a 7.8  $M_w$  event. A record for the Paraparaumu Primary School is shown adjacent.

Site	PAPS
<b>Location</b>	Paraparaumu Primary School
<b>Distance from site</b>	~2.6km south
<b>PGA (g)</b>	0.092
<b>Subsoil Class</b>	D

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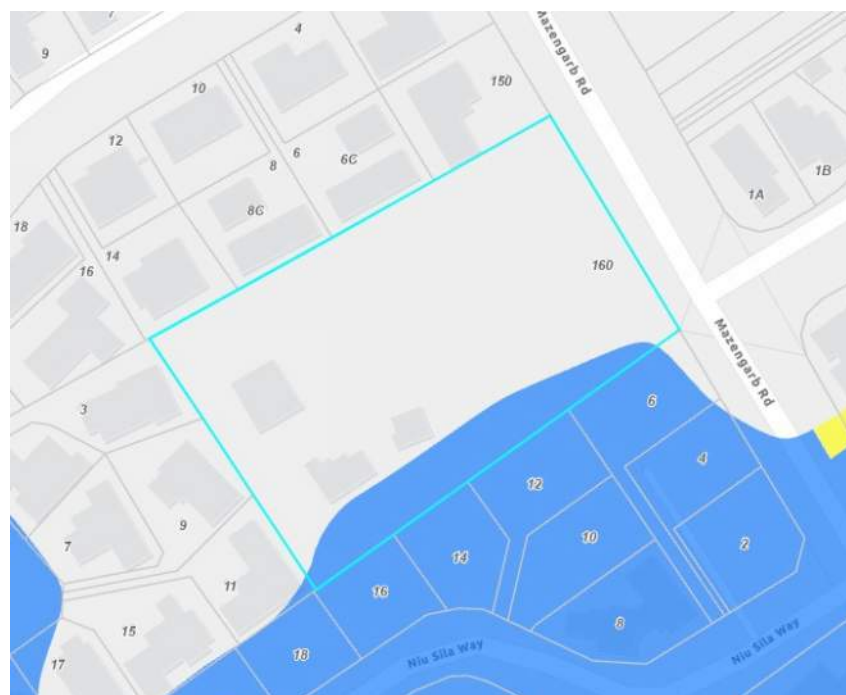


Figure 1: KCDC flood hazard map—Ponding



Figure 2: NZGD test locations



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C	18/09/2024	RC and BC	JS

Notes:

## Ground Investigation

A geotechnical investigation was completed between the 4 and 8 July 2024 and consisted of 6 No. Test Pits to a maximum depth of 3.2m below existing ground level and 10 CPTs to a maximum depth of 15m where refusal was encountered.

- CPT05 was repeated due to early refusal with the second test achieving 12m.
- A DCP was undertaken at each pit location to refusal.
- The test locations are shown on Sketch 1 in Appendix A.
- A full copy of the Test Pit and CPT logs are included in Appendix C.

Based off the above data and our existing knowledge of sites in the area we have developed a ground model which is presented in the adjacent table.

## Site Geotechnical Hazards

Torlesse has undertaken a qualitative assessment of the site geotechnical hazards. For simplicity, we have adopted a three-tiered system (low/moderate/high) to characterise the significance of the risk specific to the proposed development. The risk allocation may differ for any subsequent or additional developments at the site.

Typically risks with a low rating are no longer further assessed, while those with moderate or high are assessed in more detail.

## Ground Motion Parameters

The ground motion parameters for geotechnical analysis are estimated using the MBIE and NZGS Earthquake Geotechnical Engineering Practice Module 1. Two design cases have been considered, all with an assumed 50-year design life. The design peak ground accelerations (PGA) are outlined in the table below.

Design Case	Importance Level	Return Period	M <sub>w</sub>	PGA (g)
SLS1	2	25 years	6.5	0.13
ULS	2	500 years	7.7	0.68



Figure 3: Photo near CPT02, looking South

## Ground Model and Material Properties

Unit	Description	Strength	Depth to top of layer (mbegl)	γ (kN/m <sup>3</sup> )	φ' (°)	c' (kPa)
Beach Deposits	Fine to medium grained sand	Loose to medium dense	0.0	17	30	0
Beach Deposits	Fine to coarse grained sand	Medium dense	0.3–1.1	18	32	0
Beach Deposits	Fine to coarse grained sand	Dense	1.5–2.5	20	36	0
Beach Deposits	Sand	Very dense	3.1–4.8	22	40	0
Beach Deposits	Sand	Dense	6–6.5	20	36	0
Beach Deposits	Sand	Very dense	12–14	20	40	0
Groundwater	Groundwater is estimated to be at 2m RL, approximately 2.5 to 4m below existing ground level (mbegl) based on observations and CPT data.					
Notes	γ bulk unit weight; φ' effective friction angle; c' effective cohesion. Topsoil not shown in ground model.					

## Geotechnical Hazards

Geohazard	Risk category	Notes
Weak or variable soils	Low	The soils were consistent across the property, typically granular in nature and increasing in strength with depth.
Shallow groundwater	Low	Water was encountered at 2.6m bgl in TP05 and some seepage was observed at around 3.0m in other test locations.
Slope instability	Low	The site is flat and is not located near any slopes.
Liquefaction	Moderate	Refer to sheet 4 for a detailed liquefaction assessment.
Lateral spreading	Low	The nearest free face is approximately 50m away, where a pond is present on a neighbouring property. However it is of limited extent and considered to be a low risk. The nearest stream is over 300m away.
Fault rupture	Low	The nearest fault is 3.5km away. The nearest major fault as per NZS1170.5 is the Wellington Fault which is >20km away.



Figure 4: Photo near TP05, looking North



Figure 5: Photo near TP04, looking Southeast



# Ground Motion Parameters

The ground motion parameters are detailed on sheet 3 above and have been utilised for the liquefaction assessment.

# Liquefaction Assessment

An assessment utilising the software CLiq (v.3.4.1.4) has been undertaken. A summary of the assessment is provided below. Descriptions of performance levels are taken from MBIE/ NZGS (Module 3, 2021, p. 24) guidance and presented in the adjacent table.

- The assessment is based on proposed site levels.
- A fines correction value (CFC) is set as 0%.
- A groundwater table at 2.5m RL has been used across the site and the CPTs adjusted based on the proposed fill levels. The values utilised for depth to groundwater from the top of the fill can be seen in the summary table below.
- Note the ground levels at location CPT05 and CPT06 are proposed to be raised 1.2m during development. This will increase the crust thickness to approximately 3.3m.
- Under SLS seismic loading, no liquefaction is predicted. Note the Kaikoura 2016 earthquake event (0.09g/M<sub>w</sub> 7.8) generated similar levels of shaking as SLS loading and we are not aware of any reports of liquefaction in this area.
- Under ULS earthquake conditions, the majority of the liquefaction is occurring between 6 and 11m below proposed site levels. With more variable levels of liquefaction occurring between 4 and 6m below proposed site levels.
- Overall the liquefaction hazard is considered to be moderate due to the proposed crust thickness and the typically increasing density of the ground profile with depth.
- A summary of the results are presented below. A full copy of the assessment is included in Appendix D.

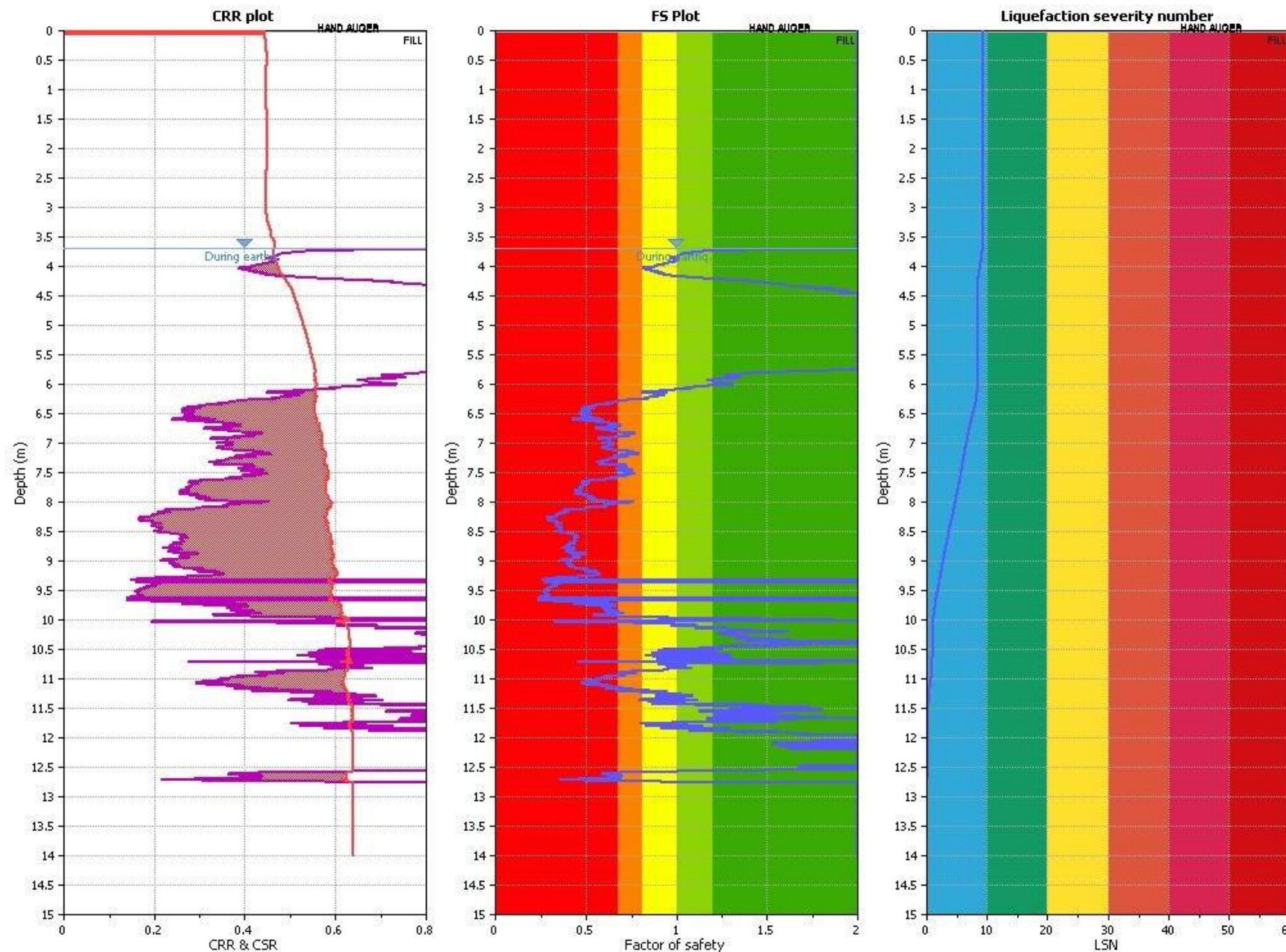


Figure 5: Liquefaction Assessment CPT01

Test ID	Current mRL	Proposed Fill Thickness (m)	Depth to Groundwater (mbgl)	ULS loading condition			
				Free Field Settlement (mm)	LPI (ISH)	LSN	Performance level
CPT01	6.2	0.05	3.90	90	3	9	Moderate/High
CPT02	5.5	0.90	3.90	120	7	10	High
CPT03	6.8	-0.55	3.75	70	3	8	Moderate
CPT04	6.9	-0.60	3.80	80	2	9	Moderate
CPT05 part 2	4.6	1.20	3.30	110	11	15	High
CPT06	4.7	1.20	3.30	90	6	12	Moderate
CPT07	6.0	-0.10	3.40	80	4	7	Moderate
CPT08	6.5	-0.50	3.5	85	3	7	High
CPT09	6.2	0.30	4.0	80	5	8	Moderate
CPT10	4.9	1.1	3.5	45	2	4	Mild

	EFFECTS FROM EXCESS PORE WATER PRESSURE AND LIQUEFACTION	CHARACTERISTICS OF LIQUEFACTION AND ITS CONSEQUENCES	CHARACTERISTIC F <sub>L</sub> , LPI, LSN
L0	Insignificant	No significant excess pore water pressures (no liquefaction).	F <sub>L</sub> > 1.4 LPI=0 LSN <10
L1	Mild	Limited excess pore water pressures; negligible deformation of the ground and small settlements.	F <sub>L</sub> > 1.2 LPI = 0 LSN = 5 – 15
L2	Moderate	Liquefaction occurs in layers of limited thickness (small proportion of the deposit, say 10 percent or less) and lateral extent; ground deformation results in relatively small differential settlements.	F <sub>L</sub> ≈ 1.0 LPI < 5 LSN 10 – 25
L3	High	Liquefaction occurs in significant portion of the deposit (say 30 percent to 50 percent) resulting in transient lateral displacements, moderate-to-large differential movements, and settlement of the ground in the order of 100 mm to 200 mm.	F <sub>L</sub> < 1.0 LPI = 5 – 15 LSN = 15 – 35
L4	Severe	Complete liquefaction develops in most of the deposit resulting in large lateral displacements of the ground, excessive differential settlements and total settlement of over 200 mm.	F <sub>L</sub> << 1.0 LPI > 15 LSN > 30
L5	Very severe	Liquefaction resulting in lateral spreading (flow), large permanent lateral ground displacements and/or significant ground distortion (lateral strains/stretch, vertical offsets and angular distortion).	

Client: Sussex Trust			
Project Name: Geotechnical Assessment Report			
Site Location: 160 Mazengarb Road, Paraparaumu			
Sheet Title: Liquefaction Assessment			
Project/Report No: T0399/02			
Sheet No: 4 of 4			
Author:	L Heaton/N Clendon	Initials:	LH/NC
Reviewed By:	J Spinks	Initials:	JS
Rev.	Date:	Description	Initials
A	17/07/2024	RC and BC	NC
B	24/07/2024	RC and BC	NC
C	18/09/2024	RC and BC	JS

Notes:

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**APPENDIX A: SKETCHES**

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**Legend**

- ▲ CPT
- Test Pit
- Property Boundary

Client:  
Sussex Trust

Project Name:  
Geotechnical Assessment Report

Site Location:  
160 Mazengarb Road, Paraparaumu

Sketch Title:  
Test Location Plan

Project/Report No:  
T0399/02

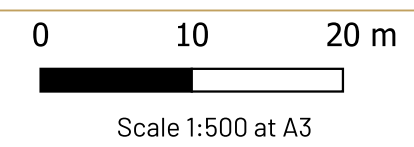
Sketch ID:  
1 of 2

Author: L Heaton	Initials: LH
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Checked By: N Clendon	Initials: NC
--------------------------	-----------------

Rev.	Date	Description	Initials
A	17/07/24	Final	LH

Notes:



Data Courtesy:  
LINZ, OPENMAPS



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**Legend**

- ▲ CPT
- Test Pit
- Property Boundary

Client:  
Sussex Trust

Project Name:  
Geotechnical Assessment Report

Site Location:  
160 Mazengarb Road, Paraparaumu

Sketch Title:  
Proposed Development Plan

Project/Report No:  
T0399/02

Sketch ID:  
2 of 2

Author:	L Heaton	Initials:	LH
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Checked By:	N Clendon	Initials:	NC
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Rev.	Date	Description	Initials
A	17/07/24	Final	LH

Notes:

0 10 20 m



Scale 1:500 at A3

Data Courtesy:  
LINZ, OPENMAPS



**Torlesse**™





## **APPENDIX B: TOPOGRAPHICAL SURVEY AND PROPOSED SITE LEVELS**

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UNITS	
Unit A (1Bed) or Unit B (2Bed) or Unit D (1Bed Acc)	20
Unit C (3Bed)	3
Unit E or E2 (2Bed)	13
Unit B2 (2Bed)	5
<b>TOTAL</b>	<b>41</b>

CARPARKS	
UNIT ADJACENT CARPARK	28
SITE CARPARK	13 (ALLOCATED)
ACCESSIBLE / GUEST	1

#### SITE INFORMATION

Address: 160 Mazengarb Road, Paraparaumu  
 Legal Description: LOT 12 DP 90944  
 District Plan Zone: General Residential Zone  
 Site Area: 7168.6m<sup>2</sup>

#### COMPLIANCE INFORMATION

Building Coverage: 2506.9m<sup>2</sup> (35%)

# RC02 REV.

## MASTERPLAN

THAMES PACIFIC

160 Mazengarb Road, Paraparaumu,  
 WELLINGTON, 5032

## CONCEPT

Contractors shall verify all dimensions on site before commencing work. Do not scale from the drawings. If in doubt ask. Copyright of this drawing is vested in Designgroup Stapleton Elliott.

PROJECT No. **PROJECT NUMBER**

PLOT DATE. **20/06/2024 3:10:29 pm**

NO.	DESCRIPTION	DATE
-----	-------------	------

#### Site Information

Rainfall Intensity: 60 mm/h  
 Climate Zone: 3  
 Corrosion Zone: Zone C  
 Legal Description: Lot 12 DP 90944  
 Wind Zone: Very High  
 NZBC E2 Compliance: Compliance with NZBC E2 is by means of NZBC E2 AS1. Refer Risk Matrix provided.



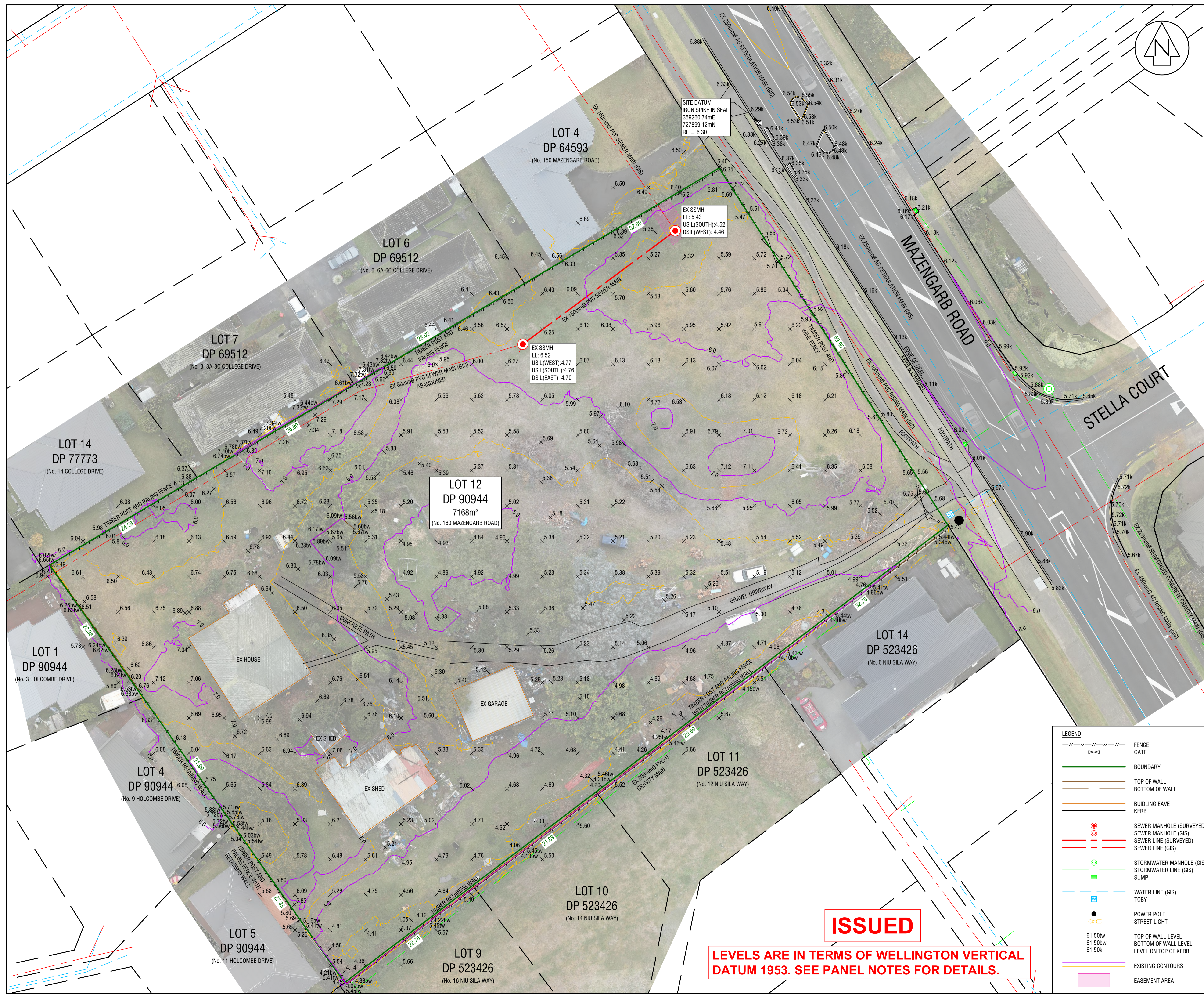
A3 Print Scale 1 : 1  
 A1 Print Scale 1 : 0.5

Wellington	+64 4 920 0032	wn@dgse.co.nz
Palmerston North	+64 6 357 4534	pn@dgse.co.nz
Tauranga	+64 7 925 6238	tr@dgse.co.nz
Napier	+64 6 835 6173	np@dgse.co.nz
Auckland	+64 9 976 8288	ak@dgse.co.nz



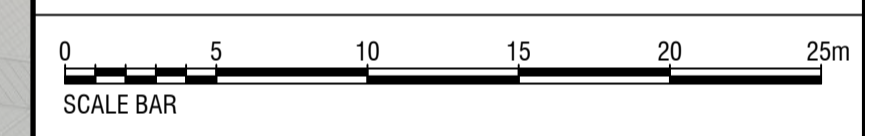
**MASTERPLAN**  
 SCALE @ A3 - 1 : 500 | SCALE @ A1 - DOUBLE SCALE





REVISION DETAILS	NAME	DATE

- NOTES:**
- THIS PLAN DEFINES THE TOPOGRAPHICAL NATURE & FEATURES OF THE SITE & SHOULD NOT TO BE RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE CONSENT OF CUTTRISS CONSULTANTS LIMITED
  - COORDINATES ARE IN TERMS OF NEW ZEALAND GEODETIC DATUM 2000, WANGANUI CIRCUIT
  - LEVELS ARE IN TERMS OF MEAN SEA LEVEL WELLINGTON VERTICAL DATUM 1953. ORIGIN OF LEVELS: SP I DP 77773 (DC8A) RL: 5.414. SOURCED FROM LINZ ELLIPSOIDAL HEIGHT CONVERSION, DECEMBER 2021
  - A DENOTES EXISTING EASEMENT AREAS. NOT ALL INTERESTS ON THE RECORD OF TITLE MAY BE SHOWN ON THIS PLAN, AND SHOULD BE INVESTIGATED FURTHER
  - SERVICES HAVE BEEN LOCATED ON SITE WHERE POSSIBLE, OTHERWISE SHOWN FROM RELEVANT SERVICE AUTHORITIES RECORDS, AND SHOULD BE VERIFIED ON SITE
  - CONTOUR INTERVALS: 0.5m
  - SURVEYED BY: RHIANNOU EVANS & STEPH ROBERTS, 13 OF MAY 2024
  - INSTRUMENT USED: TRIMBLE GPS RTK R10 VRS & TRIMBLE S7 & DJI M300 RTK
  - GROUND LEVELS SHOWN ON THIS PLAN ARE EXISTING GROUND LEVELS AT THE TIME OF SURVEY. LEVELS FOR DETERMINATION OF CRITICAL RECESION PLANES OR DESIGN ELEMENTS MUST BE CONFIRMED PRIOR TO ANY APPLICATION FOR BUILDING CONSENT AND/OR CONSTRUCTION
  - BOUNDARY INFORMATION HAS BEEN DETERMINED BY SURVEY CALCULATION METHODS AND HAS NOT BEEN VERIFIED ON SITE
  - ALL ELECTRONIC CAD DATA MUST BE READ IN CONJUNCTION WITH THESE NOTES



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PROJECT  
**TOPOGRAPHICAL SURVEY  
 LOT 12 DP 90944  
 160 MAZENGARB ROAD,  
 PARAPARAMU**

**TOPOGRAPHICAL PLAN**

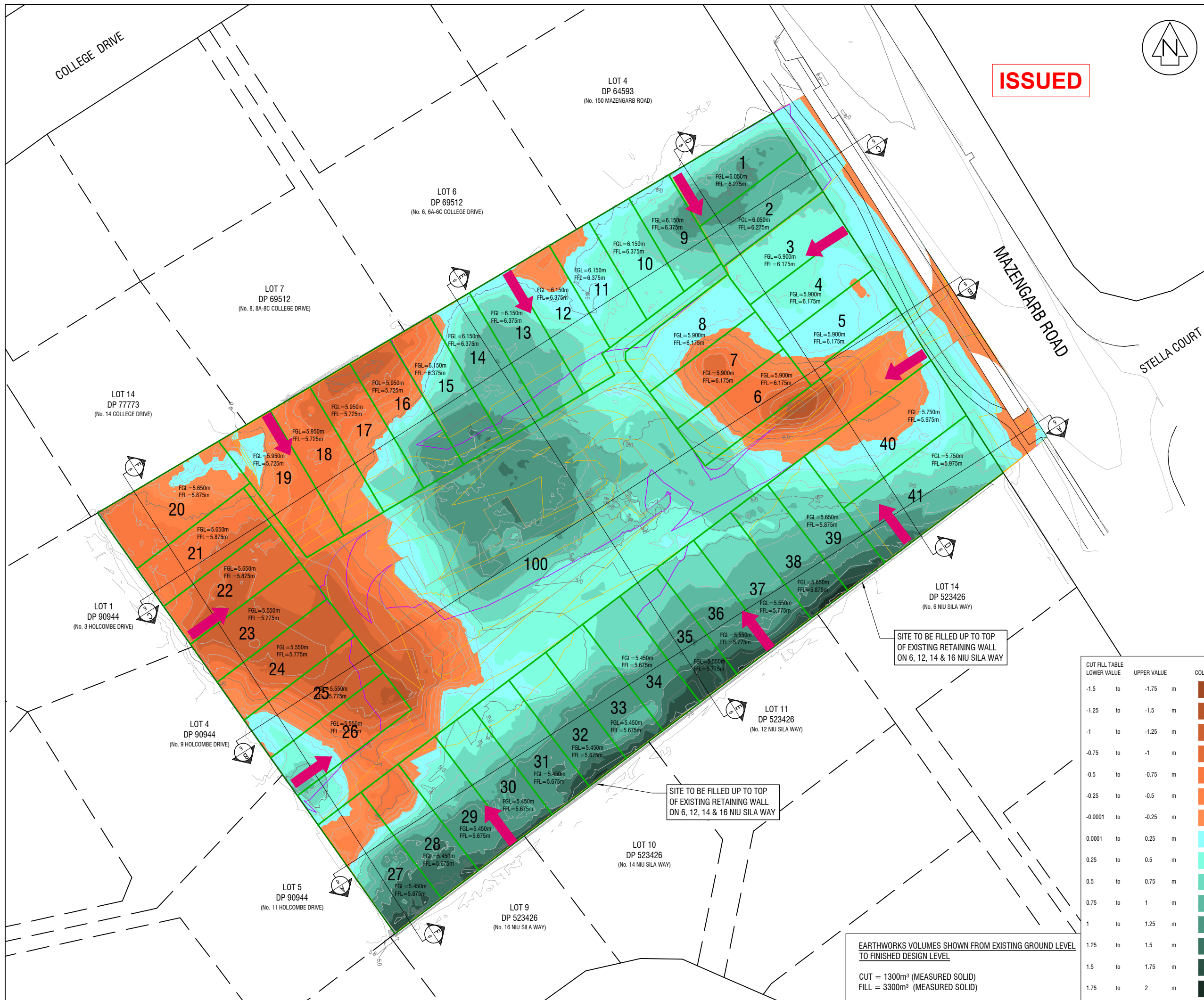
SCALE <b>A1 - 1:250</b>	REDUCED SCALE <b>A3 - (1:500)</b>
FIELDWORK NAME DATE RME 05/24	
DESIGNED - -	
DRAWN CJB 05/24	
CHECKED NKT 05/24	
DRAWING NUMBER <b>23333 TPO</b>	
SHEET <b>1</b> OF <b>1</b> SHEETS	
REVISION -	

**LEGEND**

	FENCE GATE
	BOUNDARY
	TOP OF WALL
	BOTTOM OF WALL
	BUILDING EAVE
	KERB
	SEWER MANHOLE (SURVEYED)
	SEWER MANHOLE (GIS)
	SEWER LINE (SURVEYED)
	SEWER LINE (GIS)
	STORMWATER MANHOLE (GIS)
	STORMWATER LINE (GIS)
	SUMP
	WATER LINE (GIS)
	TOBY
	POWER POLE
	STREET LIGHT
	61.50bw TOP OF WALL LEVEL
	61.50k BOTTOM OF WALL LEVEL
	61.50k LEVEL ON TOP OF KERB
	EXISTING CONTOURS
	EASEMENT AREA

**ISSUED**  
**LEVELS ARE IN TERMS OF WELLINGTON VERTICAL DATUM 1953. SEE PANEL NOTES FOR DETAILS.**





**ISSUED**

REVISION DETAILS		NAME	DATE
A	ADDITIONAL DATA ADDED	NKT	07/24
B	DATA CONVERTED TO VD 2016	NKT	09/24

- NOTES:**
- THIS PLAN IS TO BE USED FOR RESOURCE CONSENT PURPOSES ONLY & IS NOT TO BE RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE CONSENT OF CUTTRISS CONSULTANTS LIMITED.
  - DIMENSIONS AND AREAS SHOWN ON THIS SCHEME PLAN WILL BE SUBJECT TO FINAL LAND TRANSFER SURVEY
  - COORDINATES ARE IN TERMS OF NEW ZEALAND GEODETIC DATUM 2000, WANGANUI CIRCUIT
  - LEVELS ARE IN TERMS OF MEAN SEA LEVEL WELLINGTON VERTICAL DATUM 1953. ORIGIN OF LEVELS: SP 1 DP 7773 (DC8A) RL: 5.414. SOURCED FROM LINZ ELLIPSOIDAL HEIGHT CONVERSION, DECEMBER 2021
  - NOT ALL INTERESTS ON THE RECORD OF TITLE MAY BE SHOWN ON THIS PLAN, AND SHOULD BE INVESTIGATED FURTHER
  - SERVICES HAVE BEEN LOCATED ON SITE WHERE POSSIBLE, OTHERWISE SHOWN FROM KDCDC RECORDS, AND SHOULD BE VERIFIED ON SITE
  - THE SERVICES SHOWN ON THIS PLAN ARE CONCEPTUAL ONLY, AND THE LOCATION AND DEPTHS MAY CHANGE DURING THE DETAILED DESIGN PROCESS
  - CONTOUR INTERVAL: 0.2m
  - SURVEYED BY: R EVANS & S ROBERTS, 13 MAY 2024
  - INSTRUMENT USED: TRIMBLE GPS RTK R10 VRS & TRIMBLE S7 & DJI M300 RTK
  - BOUNDARY LEVELS FOR DETERMINATION OF CRITICAL RECESSION PLANES MUST BE CONFIRMED PRIOR TO ANY APPLICATION FOR BUILDING CONSENT.
  - BOUNDARY INFORMATION HAS BEEN DETERMINED BY SURVEY CALCULATION METHODS AND HAS NOT BEEN VERIFIED ON SITE
  - ALL ELECTRONIC CAD DATA MUST BE READ IN CONJUNCTION WITH THESE NOTES.

**LEGEND**

	BOUNDARY - EXISTING
	BOUNDARY - NEW
	CONTOURS - EXISTING
	CONTOURS - PROPOSED
	DIRECTION OF OVERLAND FLOW POST EARTHWORKS

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**PROJECT**  
PROPOSED SUBDIVISION  
LOT 12 DP 90944  
160 MAZENGARB ROAD,  
PARAPARAUMU

**SCHEME PLAN -  
EARTHWORKS LAYOUT**

SCALE A1 - 1:250		REDUCED SCALE A3 - 1:500	
FIELDWORK	RE	05/24	DRAWING NUMBER <b>23333 SCH</b>
DESIGNED	JTR	07/24	
DRAWN	JAQ	07/24	
CHECKED	JTR	07/24	
SHEET 3 OF 19 SHEETS			REVISION B

**CUT FILL TABLE**

LOWER VALUE	UPPER VALUE	COLOUR
-1.5	-1.75	
-1.25	-1.5	
-1	-1.25	
-0.75	-1	
-0.5	-0.75	
-0.25	-0.5	
-0.0001	-0.25	
0.0001	0.25	
0.25	0.5	
0.5	0.75	
0.75	1	
1	1.25	
1.25	1.5	
1.5	1.75	
1.75	2	

**EARTHWORKS VOLUMES SHOWN FROM EXISTING GROUND LEVEL TO FINISHED DESIGN LEVEL**

CUT = 1300m³ (MEASURED SOLID)  
FILL = 3300m³ (MEASURED SOLID)

SITE TO BE FILLED UP TO TOP OF EXISTING RETAINING WALL ON 6, 12, 14 & 16 NIU SILA WAY

SITE TO BE FILLED UP TO TOP OF EXISTING RETAINING WALL ON 6, 12, 14 & 16 NIU SILA WAY



**APPENDIX C: INVESTIGATION RECORDS**

---



# Test Pit & DCP Log No: TP01

Client: **Sussex Trust**  
 Job No.: **T0399**  
 Job Name: **160 Mazengarb Road, Paraparaumu**

Logged by: **LH**      Co-ordinates **WGS 84**      Contractor: **CPT Elite**      Elevation: **6.5 m**      Page No:  
 Entered by: **LH**      Plunge (Degrees): **90**      Start Date: **2024-07-08**      Northing: **-40.89057**  
 Reviewed by: **NC**      Trend (Degrees): **0**      End Date: **2024-07-08**      Easting: **175.00469**      **1 of 1**

Depth Scale	Lithologic Description	Symbol	Samples	Vane Shear Test (Su)	Pocket Penetrometer	Manual DCP	Comments / Additional Notes
0	Ground Surface						
0	<b>TOPSOIL</b>						
	<b>Fine to coarse SAND</b> Light brown, loose, moist.						
	<b>Fine to medium SAND</b> With trace silt. Dark brown, loose to medium dense, moist. Silt is non-plastic.						
	<b>Fine SAND</b> Light brown, medium dense, moist.						
	<b>Fine to medium SAND</b> Grey, medium dense, moist.						
2	From 2.2m bgl - Medium dense to dense.						
	From 2.5m bgl - Dense.						
3	Test Hole Terminated at 3 m - Target depth.						
4							
5							

**Test Location Information:**

Equipment: **Excavator**  
 Size (m): **0.8 x 2.7m**  
 Water Level (m):  
 Water Level (Elv):

**Test Location Notes:**

**Coordinates obtained from mobile phone GPS.**  
**Elevation estimated from Cuttriss Consultants Topographic Survey.**  
**Groundwater was not encountered.**





TP01 Pit







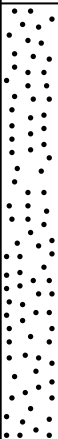
TP01 Stockpile



# Test Pit & DCP Log No: TP02

Client: **Sussex Trust**  
 Job No.: **T0399**  
 Job Name: **160 Mazengarb Road, Paraparaumu**

Logged by: **LH**      Co-ordinates **WGS 84**      Contractor: **CPT Elite**      Elevation: **6 m**      Page No:  
 Entered by: **LH**      Plunge (Degrees): **90**      Start Date: **2024-07-08**      Northing: **-40.89052**      **1 of 1**  
 Reviewed by: **NC**      Trend (Degrees): **0**      End Date: **2024-07-08**      Easting: **175.00427**

Depth Scale	Lithologic Description	Symbol	Samples	Vane Shear Test (Su)	Pocket Penetrometer	Manual DCP	Comments / Additional Notes
						0 5 10 15 20	
0	Ground Surface						
0	<b>TOPSOIL</b>						
	<b>Fine to medium SAND</b> With trace gravel. Dark brown, loose, dry to moist. Gravels are fine to medium, sub-round. (FILL?).						
1	<b>Fine to medium SAND</b> With trace rootlets. Brown, loose, dry to moist.						
	<b>Fine SAND</b> Light brown, medium dense, dry to moist.						
	<b>Fine to coarse SAND</b> Grey brown, medium dense to dense, moist.						
2	From 2.1m bgl - Dense.						
3	Test Hole Terminated at 3.1 m - Target depth.						
4							
5							

**Test Location Information:**

Equipment: **Excavator**  
 Size (m): **0.8 x 2.7m**  
 Water Level (m):  
 Water Level (Elv):

**Test Location Notes:**

**Coordinates obtained from mobile phone GPS.**  
**Elevation estimated from Cuttriss Consultants Topographic Survey.**  
**Groundwater was not encountered.**





TP02 Pit



TP02 Stockpile



# Test Pit & DCP Log No: TP03

Client: **Sussex Trust**  
 Job No.: **T0399**  
 Job Name: **160 Mazengarb Road, Paraparaumu**

Logged by: **LH**      Co-ordinates **WGS 84**      Contractor: **CPT Elite**      Elevation: **5 m**      Page No:  
 Entered by: **LH**      Plunge (Degrees): **90**      Start Date: **2024-07-08**      Northing: **-40.89075**  
 Reviewed by: **NC**      Trend (Degrees): **0**      End Date: **2024-07-08**      Easting: **175.00415**      **1 of 1**

Depth Scale	Lithologic Description	Symbol	Samples	Vane Shear Test (S <sub>u</sub> )	Pocket Penetrometer	Manual DCP	Comments / Additional Notes
0	Ground Surface						
0	<b>TOPSOIL</b>						
0	<b>Fine SAND</b> With minor tree roots. Brown, loose to medium dense, dry.						
0	<b>Fine to coarse SAND</b> With trace rootlets. Light brown, medium dense, dry to moist.						
1	From 1.2m bgl - Medium dense to dense.						
2	From 1.8m bgl - Dense.						
2	From 2.0m bgl - Moist.						
3	<b>Fine to coarse SAND</b> Grey, dense, moist to wet.						
3	Test Hole Terminated at 3.2 m - Target depth and pit wall collapse.						
4							
5							

### Test Location Information:

Equipment: **Excavator**  
 Size (m): **0.8 x 2.7m**  
 Water Level (m):  
 Water Level (Elv):

### Test Location Notes:

**Coordinates obtained from mobile phone GPS.**  
**Elevation estimated from Cuttriss Consultants Topographic Survey.**  
**Groundwater was not encountered.**





TP03 Pit



TP03 Stockpile



# Test Pit & DCP Log No: TP04

Client: **Sussex Trust**  
 Job No.: **T0399**  
 Job Name: **160 Mazengarb Road, Paraparaumu**

Logged by: **LH**      Co-ordinates **WGS 84**      Contractor: **CPT Elite**      Elevation: **6.5 m**      Page No:  
 Entered by: **LH**      Plunge (Degrees): **90**      Start Date: **2024-07-08**      Northing: **-40.89083**      **1 of 1**  
 Reviewed by: **NC**      Trend (Degrees): **0**      End Date: **2024-07-08**      Easting: **175.00359**

Depth Scale	Lithologic Description	Symbol	Samples	Vane Shear Test (S <sub>u</sub> )	Pocket Penetrometer	Manual DCP	Comments / Additional Notes
0	Ground Surface						
0	<b>TOPSOIL</b>						
0	<b>Fine to medium SAND</b> Light brown, loose to medium dense, moist.						
1	<b>Fine to coarse SAND</b> Light brown, loose, moist.						
1	From 1.1m bgl - Medium dense.						
2	From 2.0m bgl - Dense.						
3	Test Hole Terminated at 3 m - Target depth.						
4							
5							

**Test Location Information:**

Equipment: **Excavator**  
 Size (m): **0.8 x 2.7m**  
 Water Level (m):  
 Water Level (Elv):

**Test Location Notes:**

**Coordinates obtained from mobile phone GPS.**  
**Elevation estimated from Cuttriss Consultants Topographic Survey.**  
**Groundwater was not encountered.**



TP04 Pit



TP04 Stockpile



# Test Pit & DCP Log No: TP05

Client: **Sussex Trust**  
 Job No.: **T0399**  
 Job Name: **160 Mazengarb Road, Paraparaumu**

Logged by: **LH**      Co-ordinates **WGS 84**      Contractor: **CPT Elite**      Elevation: **4.5 m**      Page No:  
 Entered by: **LH**      Plunge (Degrees): **90**      Start Date: **2024-07-08**      Northing: **-40.89123**      **1 of 1**  
 Reviewed by: **NC**      Trend (Degrees): **0**      End Date: **2024-07-08**      Easting: **175.00398**

Depth Scale	Lithologic Description	Symbol	Samples	Vane Shear Test (Su)	Pocket Penetrometer	Manual DCP	Comments / Additional Notes
0	Ground Surface						
0	<b>TOPSOIL</b>						
	<b>Fine to coarse SAND</b> Light brown, loose, moist.						
	<b>Sandy SILT</b> With trace gravel and rootlets. Dark brown, stiff, moist. Non-plastic. Sand is fine to medium. Gravels are fine, sub-angular.						
	<b>Fine to medium SAND</b> Dark brown, medium dense, moist.						
1	<b>Silty fine SAND</b> Grey, moist. Silt has low plasticity.						
	<b>Fine to coarse SAND</b> Grey, medium dense, moist.						
	From 1.8m bgl - Strong organic smell.						
2	From 2.5m bgl - Saturated. Organics in base of pit (bark).						
3	Test Hole Terminated at 2.6 m - Refusal on organic material (possible log).						
08 Jul 2024							
3							
4							
5							

### Test Location Information:

Equipment: **Excavator**  
 Size (m): **0.8 x 2.7m**  
 Water Level (m): **2.6 m**  
 Water Level (Elv): **1.9 m**

### Test Location Notes:

Coordinates obtained from mobile phone GPS.  
 Elevation estimated from Cuttriss Consultants Topographic Survey.



TP05 Pit



TP05 Stockpile



# Test Pit & DCP Log No: TP06

Client: **Sussex Trust**  
 Job No.: **T0399**  
 Job Name: **160 Mazengarb Road, Paraparaumu**

Logged by: **LH**      Co-ordinates **WGS 84**      Contractor: **CPT Elite**      Elevation: **5 m**      Page No:  
 Entered by: **LH**      Plunge (Degrees): **90**      Start Date: **2024-07-08**      Northing: **-40.89094**      **1 of 1**  
 Reviewed by: **NC**      Trend (Degrees): **0**      End Date: **2024-07-08**      Easting: **175.0044**

Depth Scale	Lithologic Description	Symbol	Samples	Vane Shear Test (S <sub>u</sub> )	Pocket Penetrometer	Manual DCP	Comments / Additional Notes
0	<b>Ground Surface</b> <b>Fine SAND</b> With trace tree roots. Grey brown, loose to medium dense, dry.						
	<b>Fine SAND</b> Light brown, medium dense to dense, dry.						
1	From 1.1m bgl - Dense.						
	<b>Fine to coarse SAND</b> Grey, dense, moist.						
2							
	From 3.0m bgl - Wet.						
3	Test Hole Terminated at 3.1 m - Target depth and pit wall collapse.						
4							
5							

**Test Location Information:**

Equipment: **Excavator**  
 Size (m): **0.8 x 2.7m**  
 Water Level (m):  
 Water Level (Elv):

**Test Location Notes:**

Coordinates obtained from mobile phone GPS.  
 Elevation estimated from Cuttriss Consultants Topographic Survey.  
 Groundwater was not encountered, however some seepage was observed in the base of the pit.

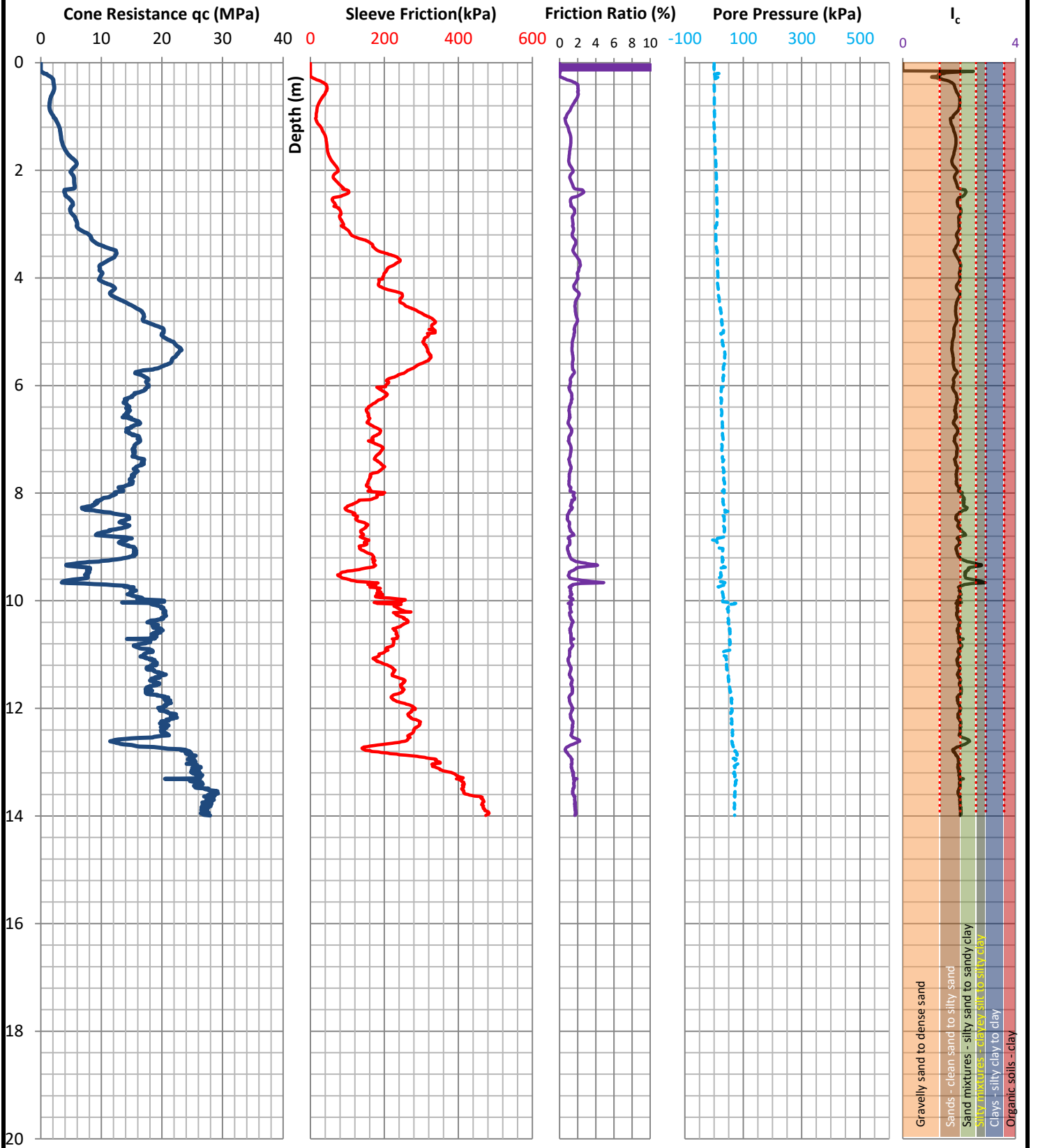


TP06 Pit



TP06 Stockpile





Soil Behavior Type Index  $I_c$

Operator: ross

Remarks: Groundwater level:

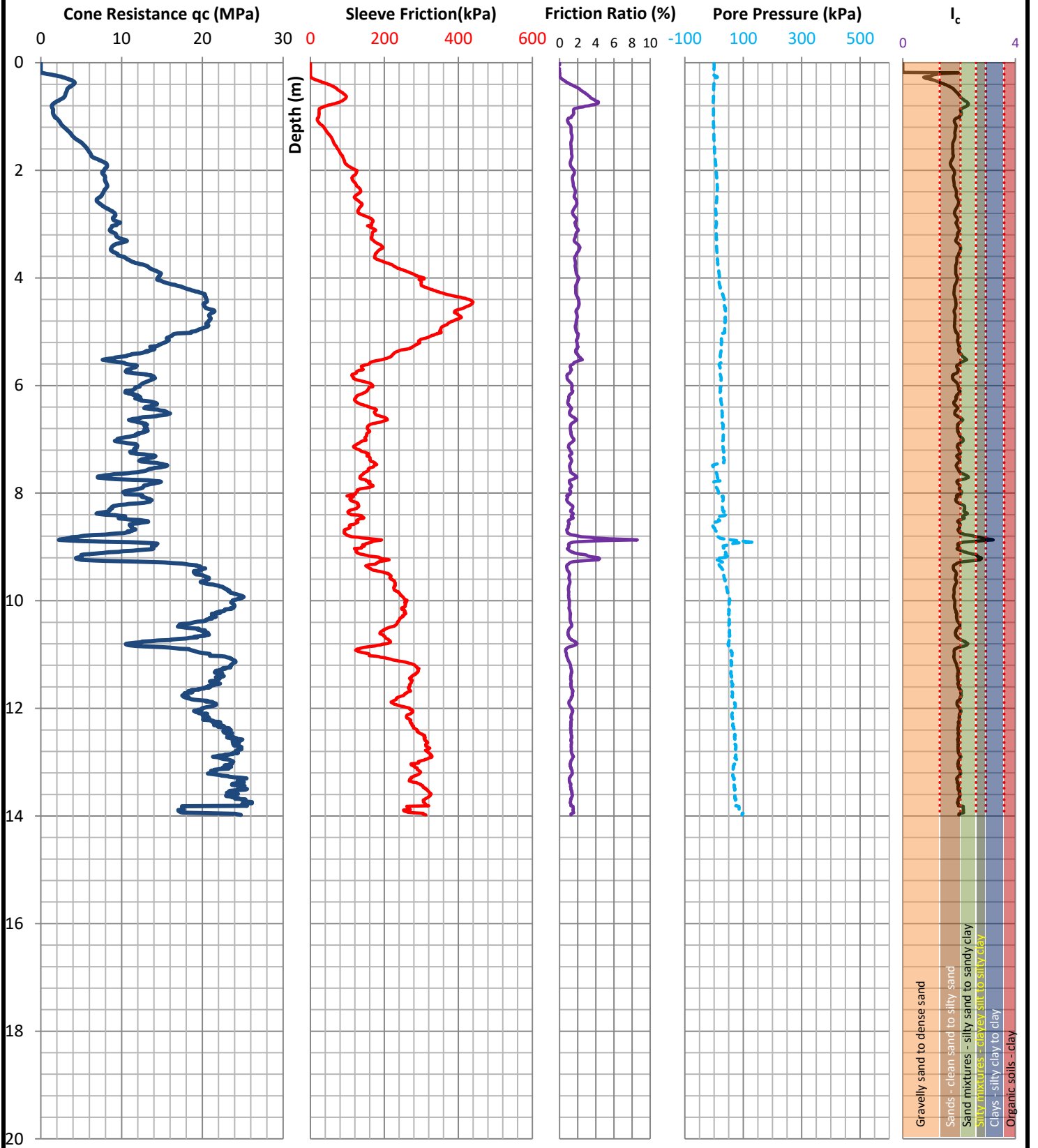
Termination reason:

Probe code: 001045

Holes collapsed 3.5m to 4.5m.  
No GW observed

Hydraulic pressure 15t

Cone type: 15 sqr cm piezocone



Soil Behavior Type Index  $I_c$

Operator: ross

Remarks: Groundwater level:

Termination reason:

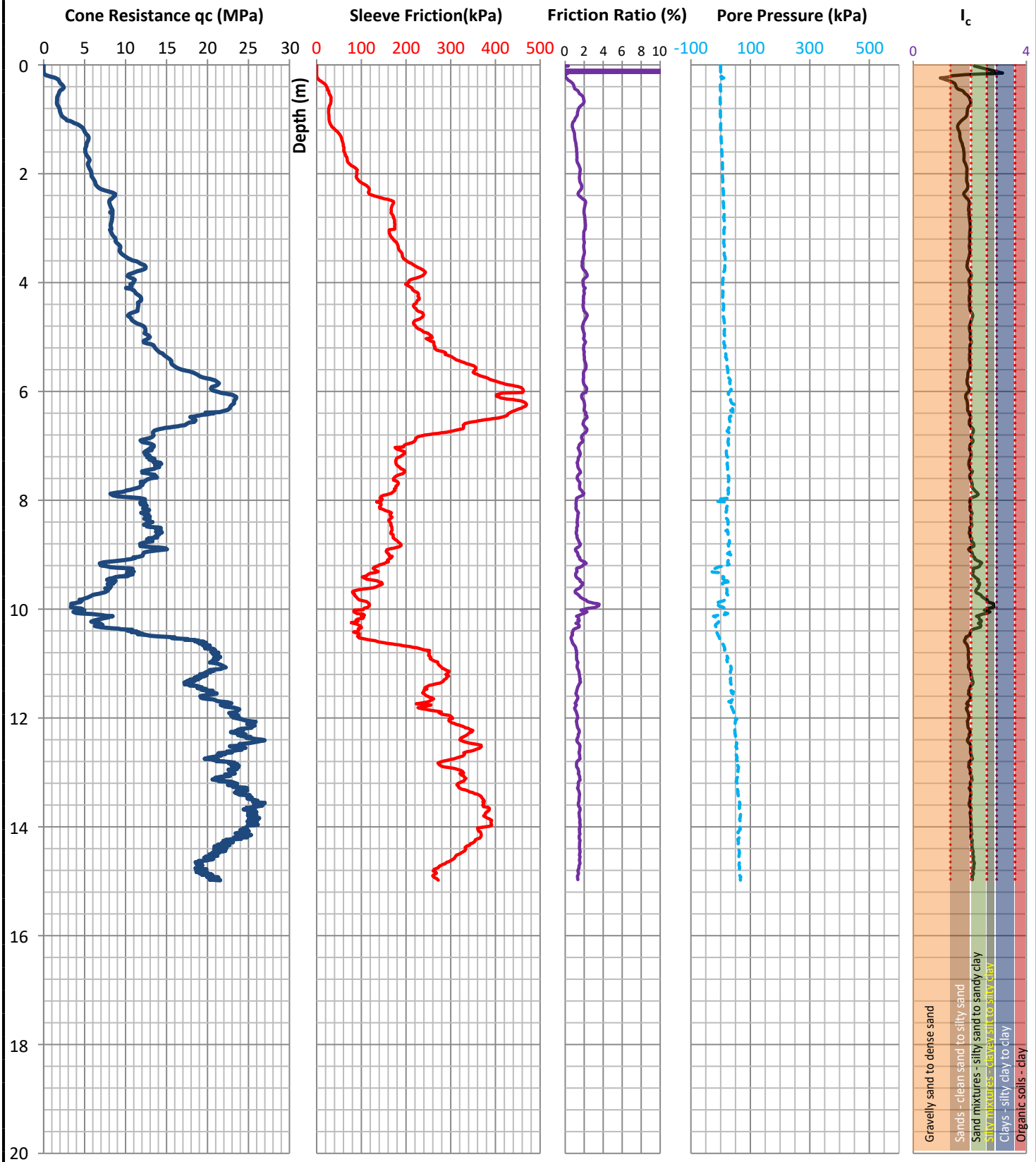
Probe code: 001045

Holes collapsed 3.5m to 4.5m.  
No GW observed

Hydraulic pressure 15t

Cone type: 15 sqr cm piezocone





Soil Behavior Type Index  $I_c$

Operator: ross

Remarks: Groundwater level:

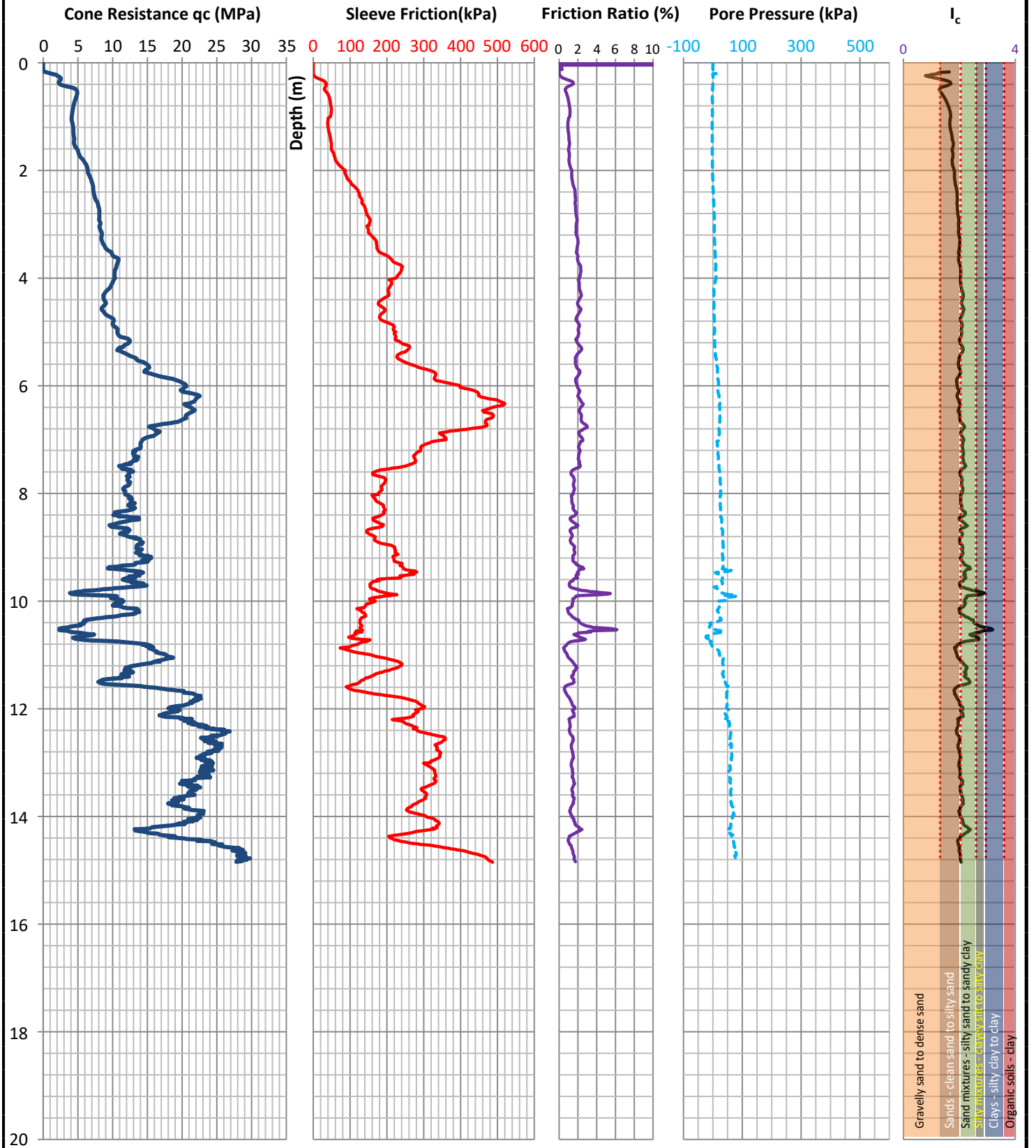
Termination reason:

Probe code: 001045

Holes collapsed 3.5m to 4.5m. No GW observed

Hydraulic pressure 15t

Cone type: 15 sqr cm piezocone



Soil Behavior Type Index  $I_c$

Operator: ross

Remarks: Groundwater level:

Termination reason:

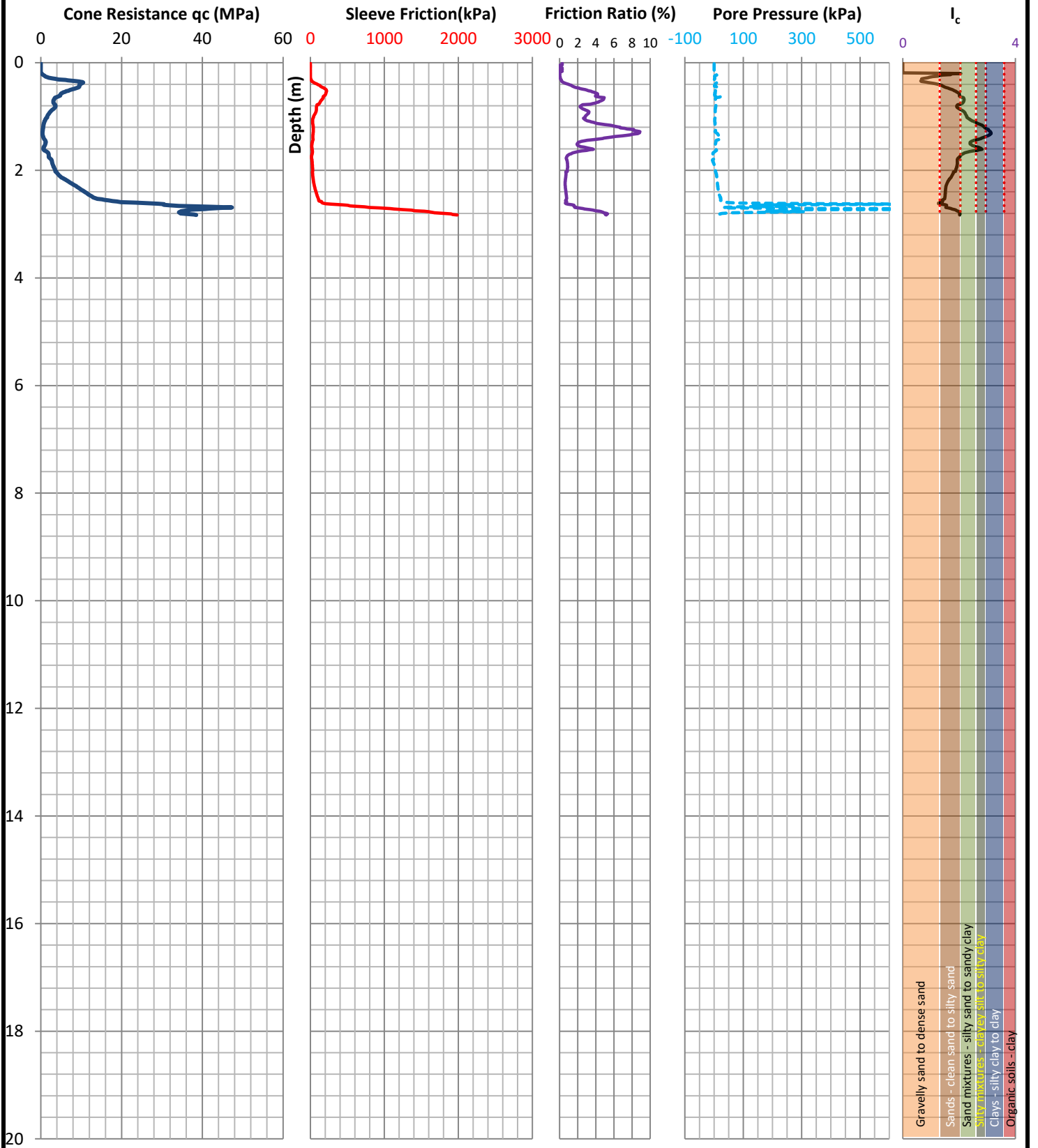
Probe code: 001045

Holes collapsed 3.5m to 4.5m. No GW observed

Hydraulic pressure 15t

Cone type: 15 sqr cm piezocone





Operator: ross

Remarks: Groundwater level:

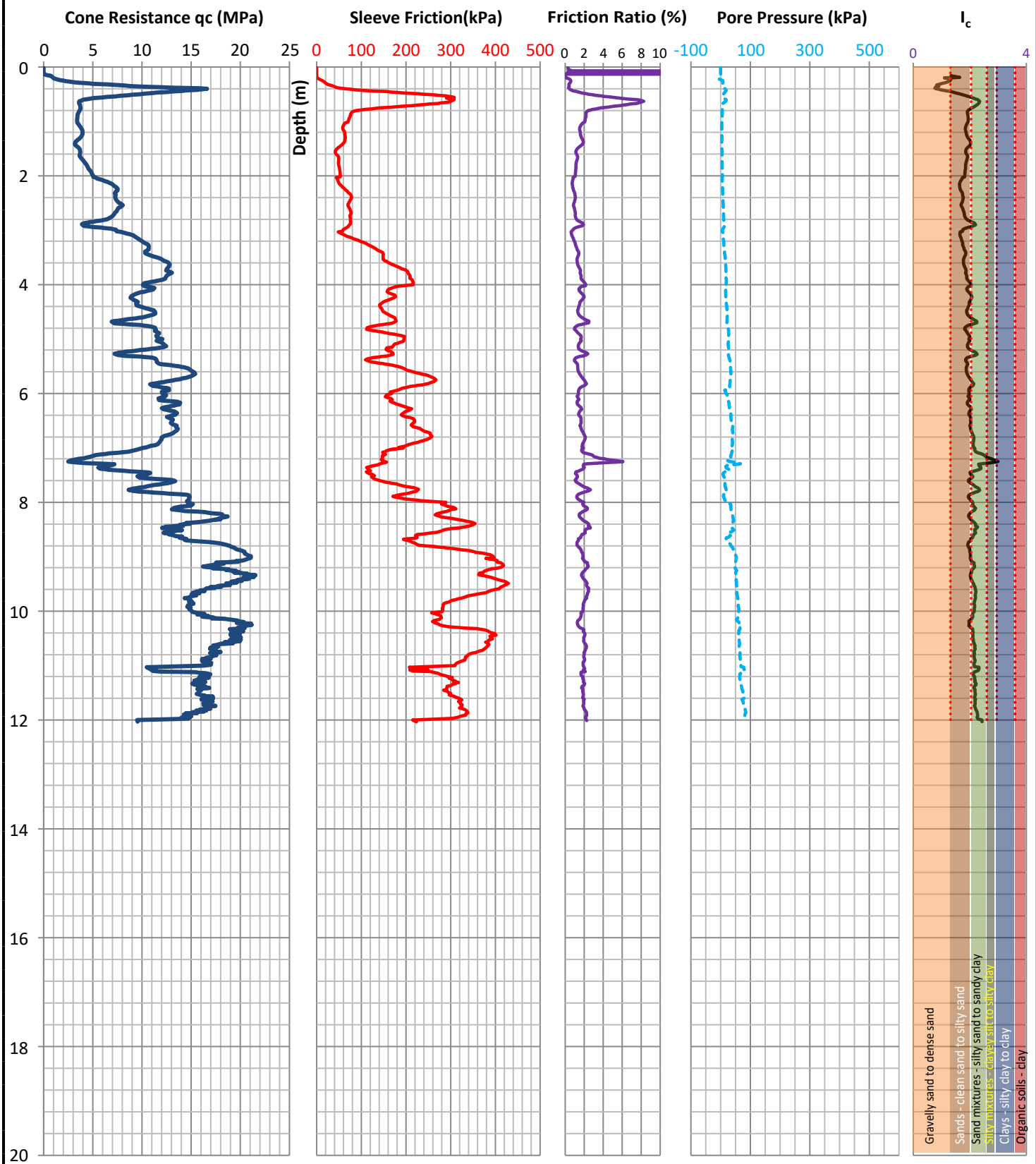
Termination reason:

Probe code: 001045

Holes collapsed 3.5m to 4.5m.  
No GW observed

Tip refusal

Cone type: 15 sqr cm piezocone



Soil Behavior Type Index  $I_c$

Operator: ross

Remarks: Groundwater level:

Termination reason:

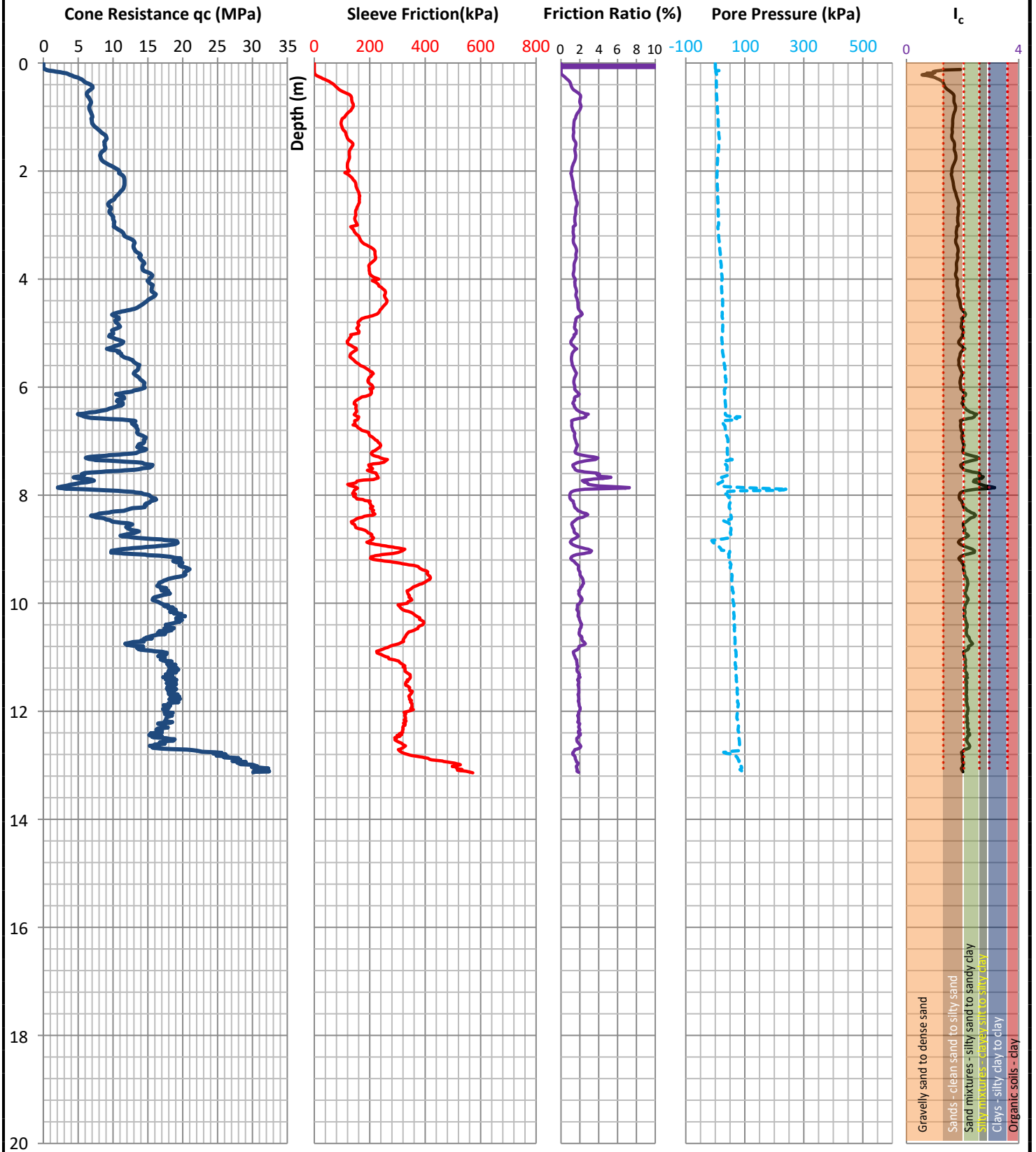
Probe code: 001045

Holes collapsed 3.5m to 4.5m. No GW observed

Hydraulic pressure 15t

Cone type: 15 sqr cm piezocone





Soil Behavior Type Index  $I_c$

Operator: ross

Remarks: Groundwater level:

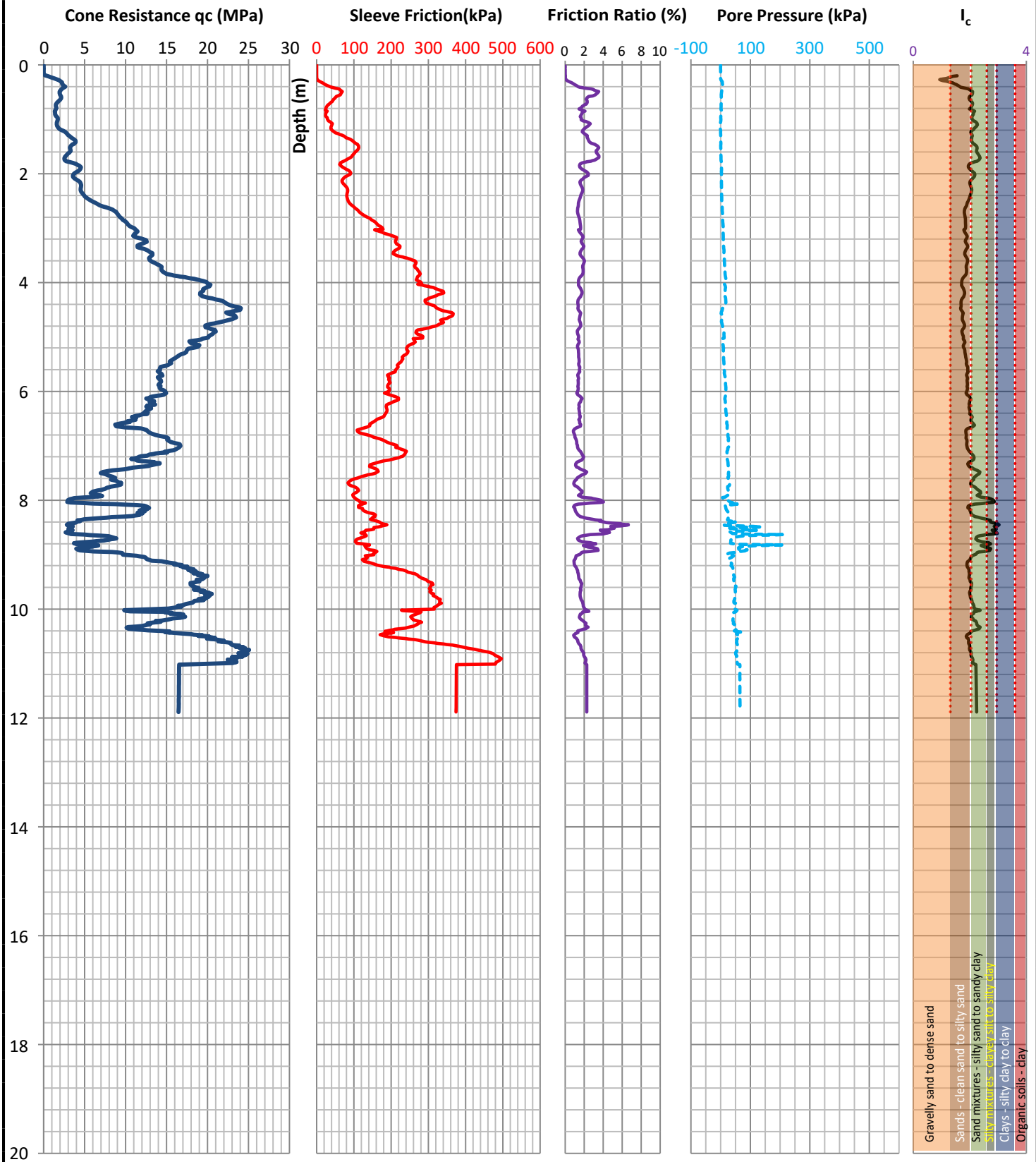
Termination reason:

Probe code: 001045

Holes collapsed 3.5m to 4.5m. No GW observed

Hydraulic pressure 15t

Cone type: 15 sqr cm piezocone



Soil Behavior Type Index  $I_c$

Operator: ross

Remarks: Groundwater level:

Termination reason:

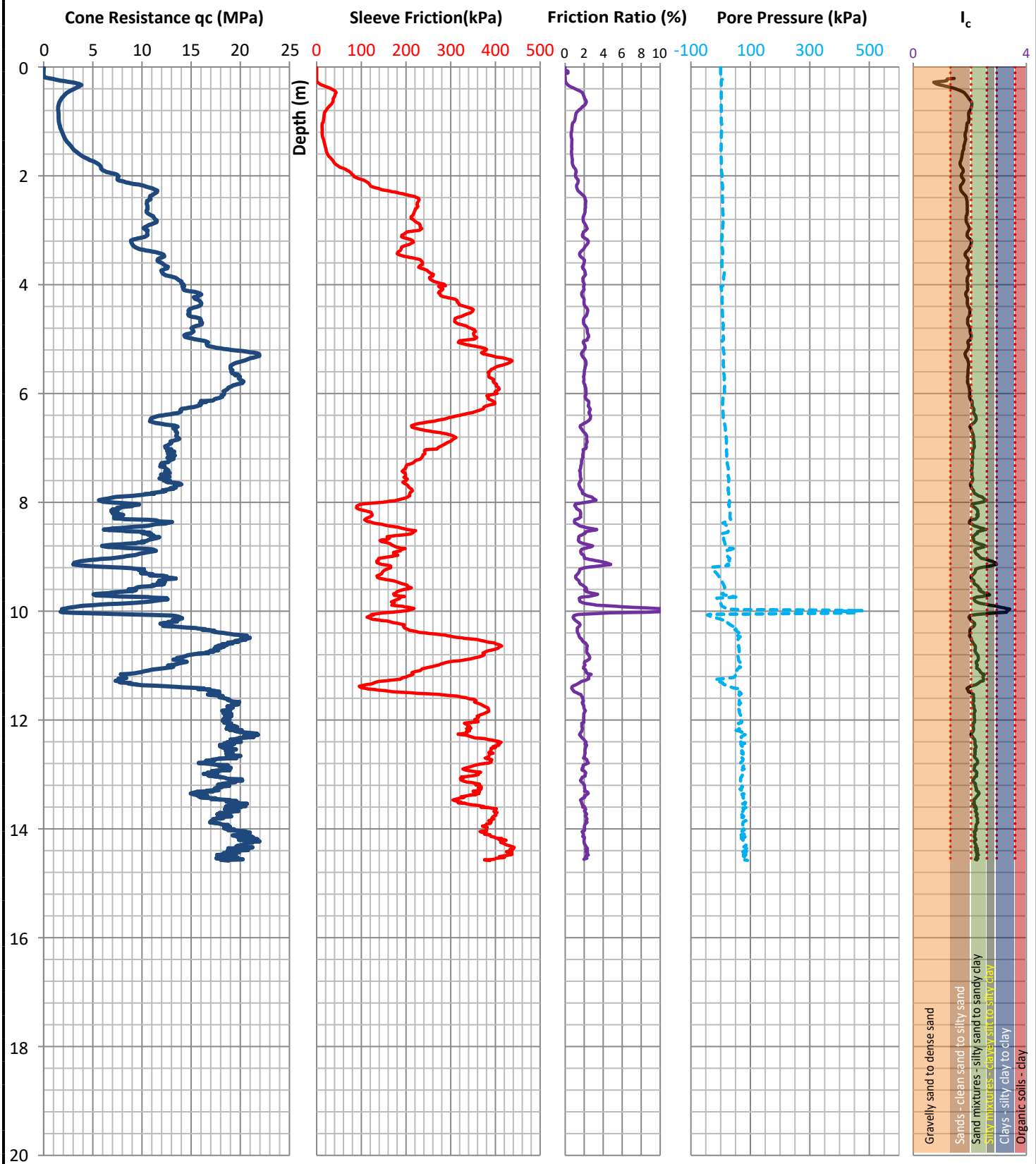
Probe code: 001045

Holes collapsed 3.5m to 4.5m. No GW observed

Hydraulic pressure 15t

Cone type: 15 sqr cm piezocone





Soil Behavior Type Index Ic

Operator: ross

Remarks: Groundwater level:

Termination reason:

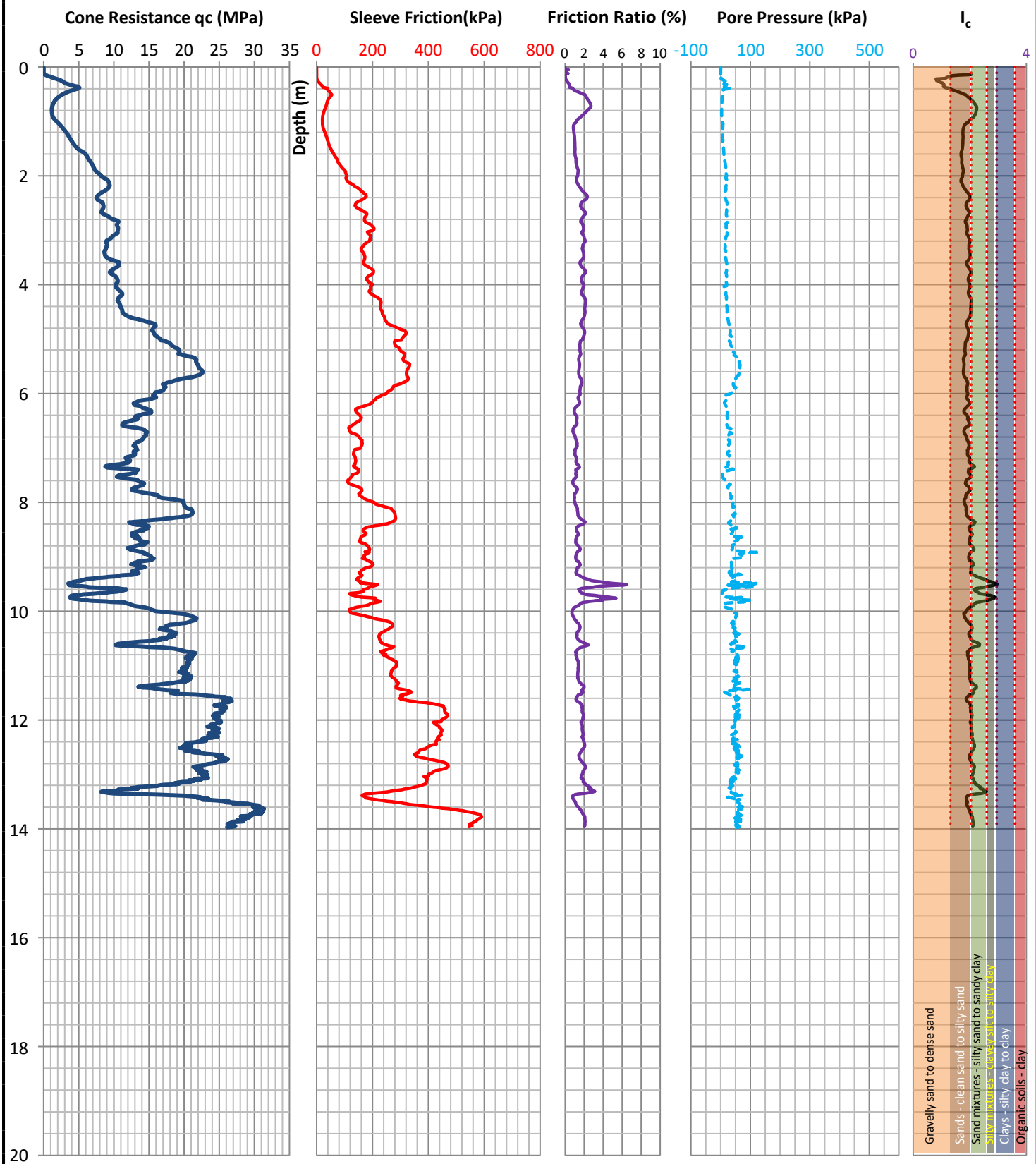
Probe code: 001045

Holes collapsed 3.5m to 4.5m. No GW observed

Hydraulic pressure 15t

Cone type: 15 sqr cm piezocone





Soil Behavior Type Index  $I_c$

Operator: ross

Remarks: Groundwater level:

Termination reason:

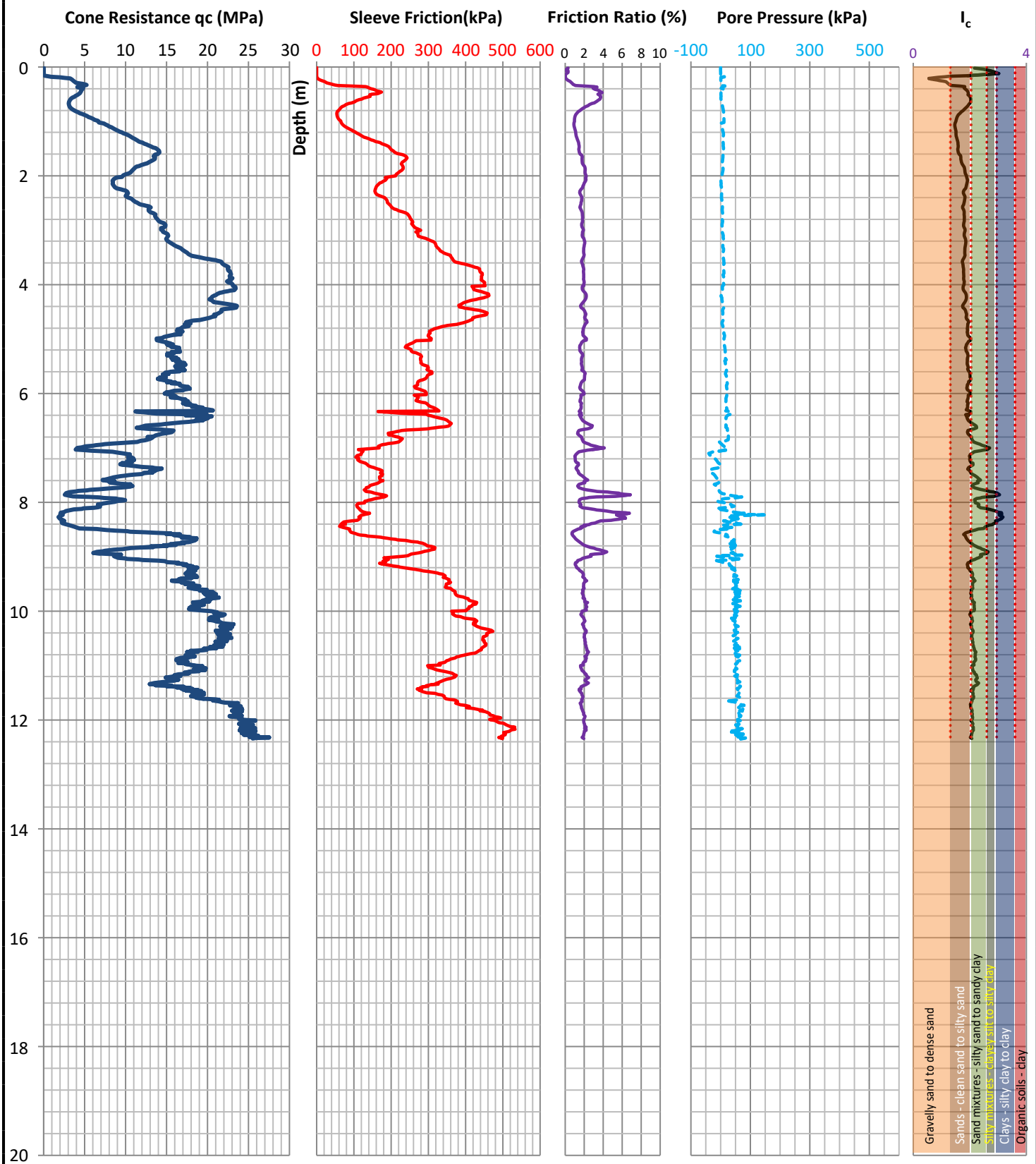
Probe code: 001045

Holes collapsed 3.5m to 4.5m. No GW observed

Hydraulic pressure 15t

Cone type: 15 sqr cm piezocone





Soil Behavior Type Index  $I_c$

Operator: ross

Remarks: Groundwater level:

Termination reason:

Probe code: 001045

Holes collapsed 3.5m to 4.5m. No GW observed

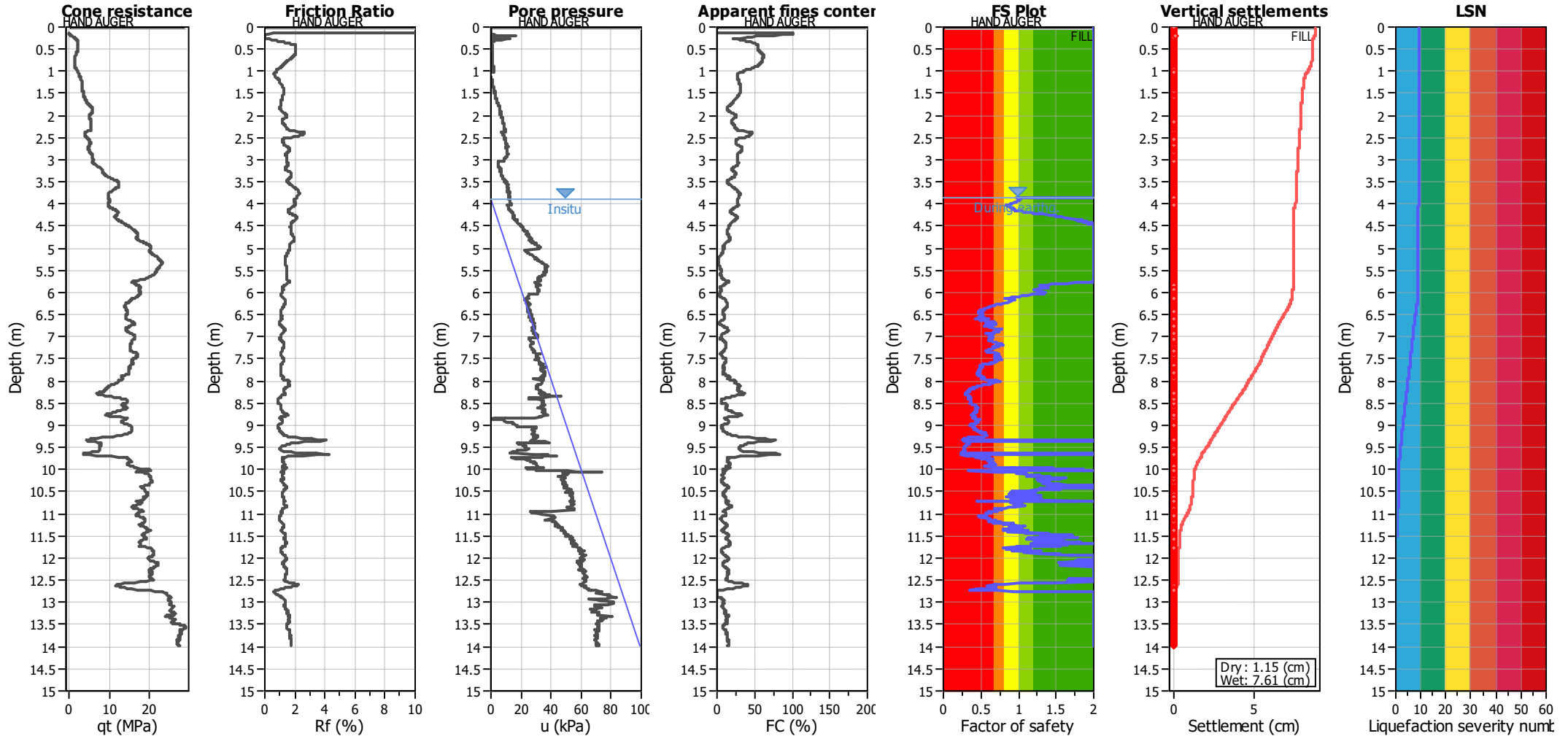
Hydraulic pressure 15t

Cone type: 15 sqr cm piezocone



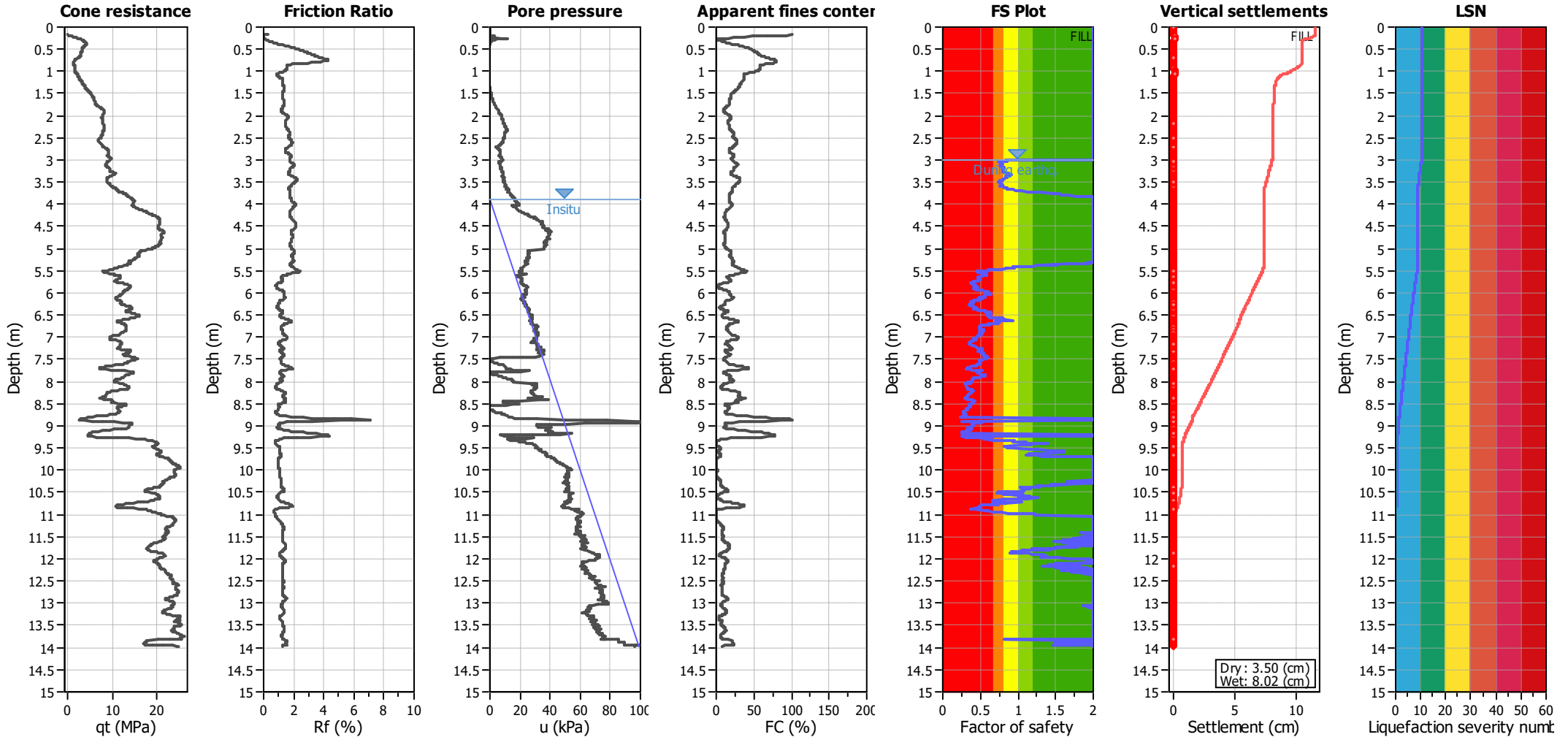
**APPENDIX D: LIQUEFACTION ANALYSIS**

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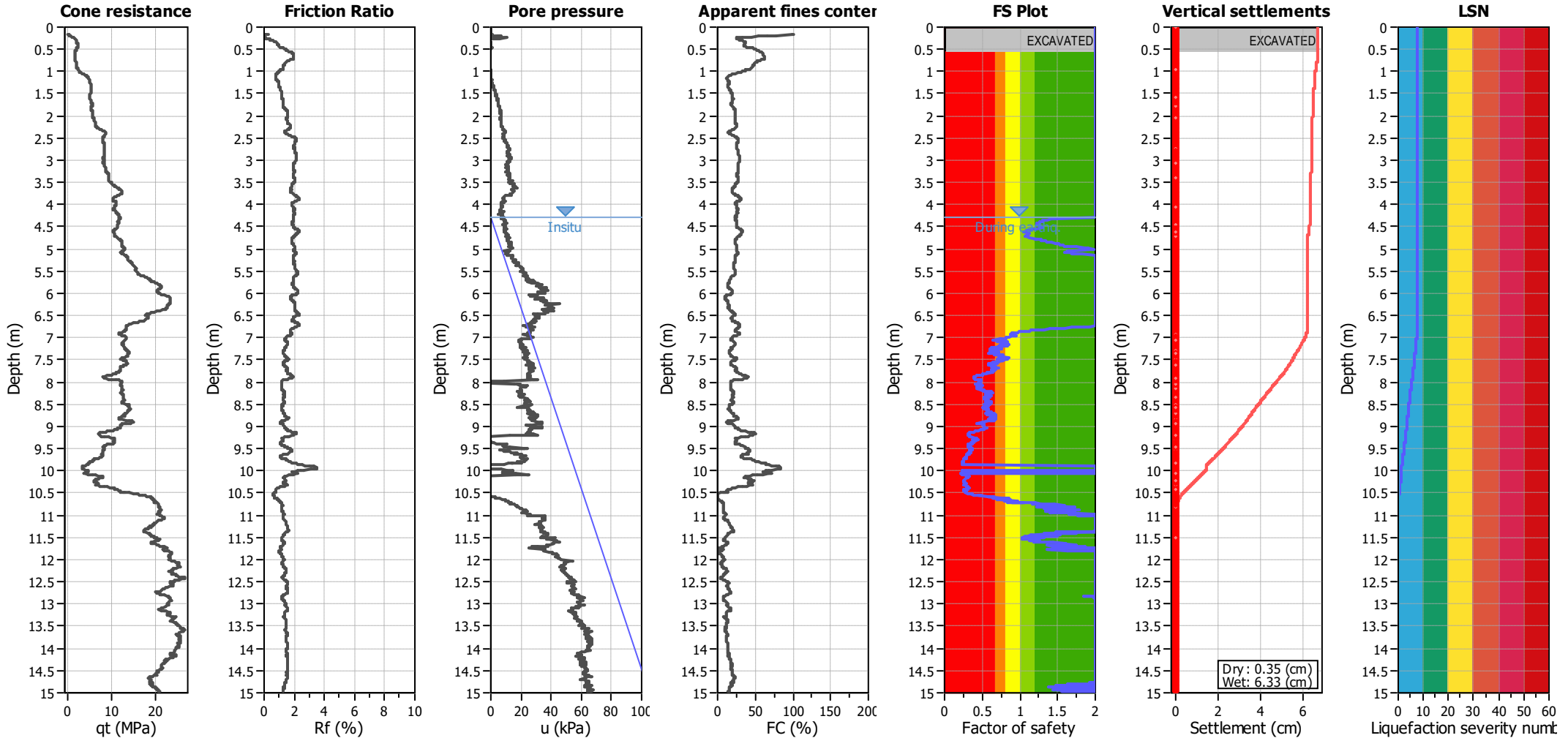


Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.90 m	Use fill:	Yes	Clay like behavior
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	3.90 m	Fill height:	0.05 m	applied:
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	19.00 kN/m <sup>3</sup>	Limit depth applied:
Earthquake magnitude $M_w$ :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	No
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	$K_\sigma$ applied:	No	N/A
						MSF method: Method based



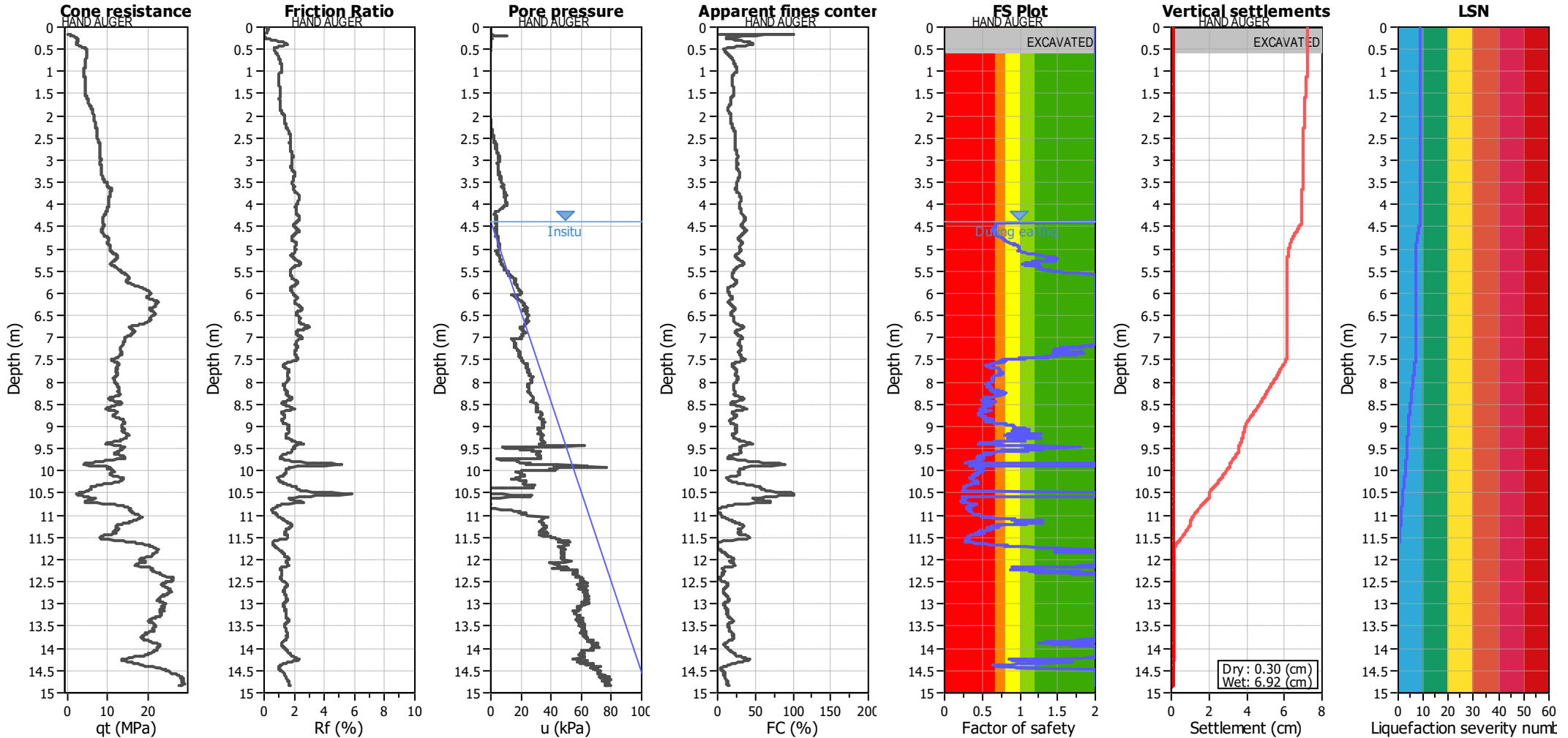


Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.90 m	Use fill:	Yes	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	3.90 m	Fill height:	0.90 m	applied:	
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	19.00 kN/m <sup>3</sup>	Limit depth applied:	No
Earthquake magnitude $M_w$ :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	$K_\sigma$ applied:	No	MSF method:	Method based

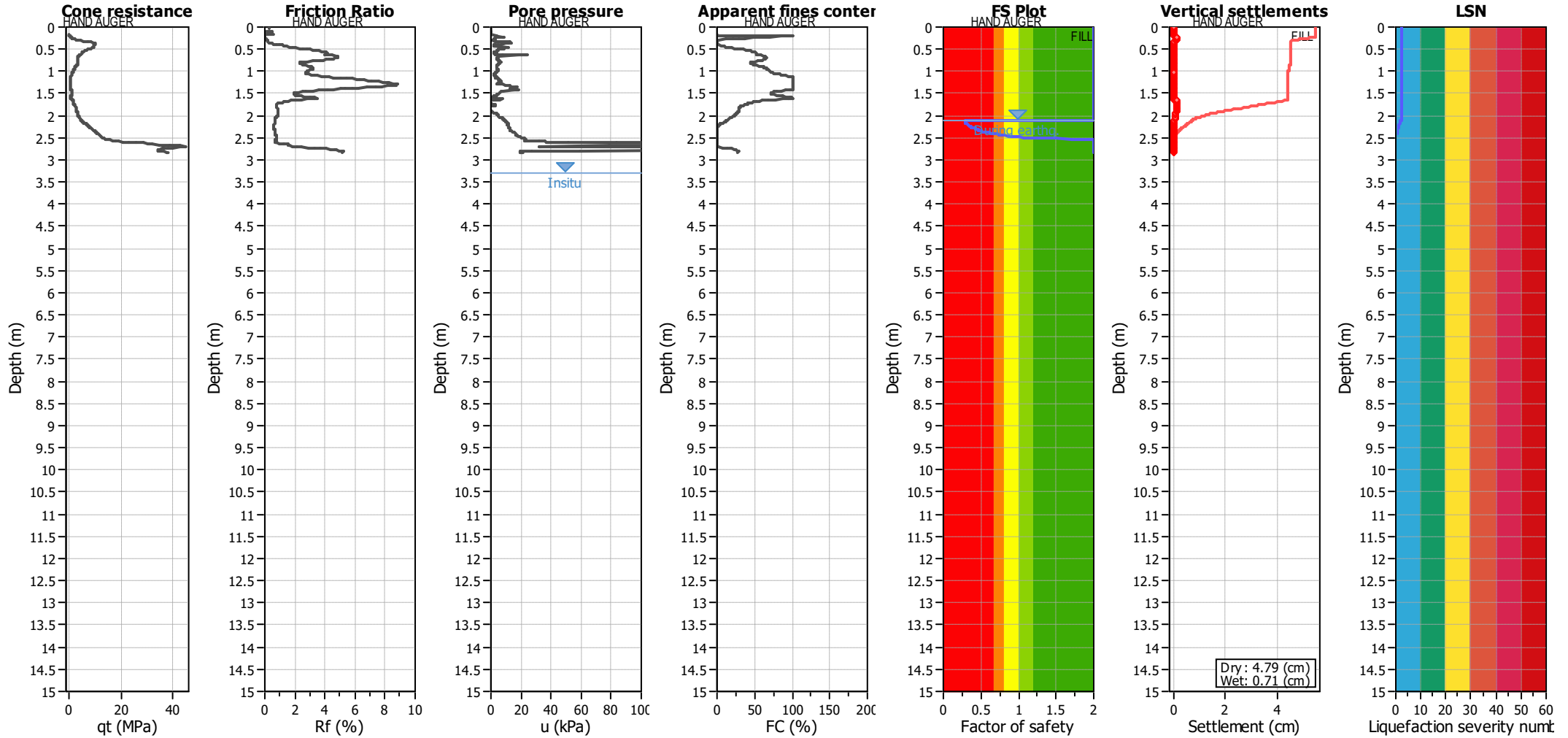


Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.30 m	Excavation:	Yes	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.30 m	Excavation depth:	0.55 m	applied:	
Points to test:	Based on Ic value	Average results interval:	3	Footing load:	10.00 kPa	Limit depth applied:	No
Earthquake magnitude $M_w$ :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	$K_\sigma$ applied:	No	MSF method:	Method based



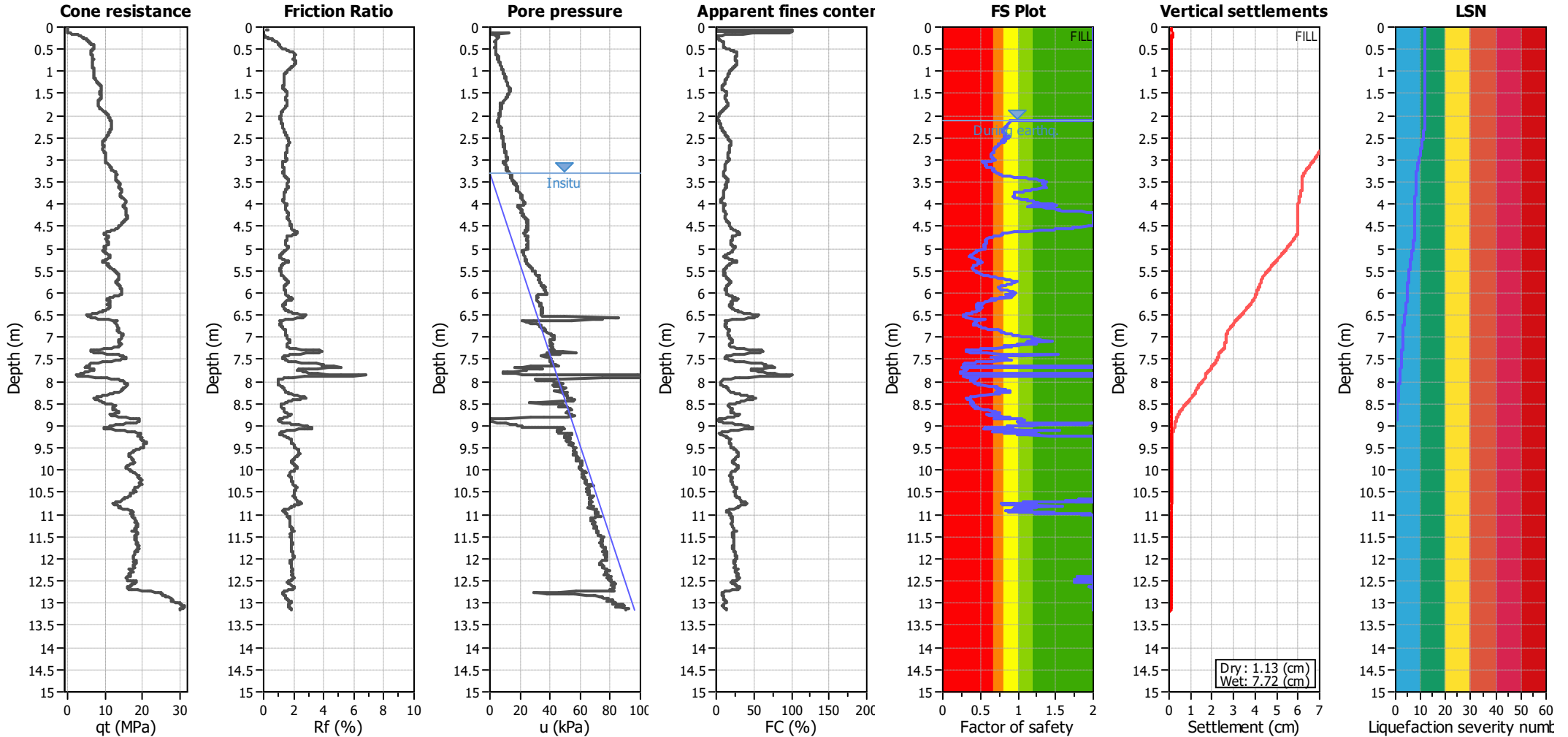


Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.40 m	Excavation:	Yes	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.40 m	Excavation depth:	0.60 m	applied:	
Points to test:	Based on Ic value	Average results interval:	3	Footing load:	10.00 kPa	Limit depth applied:	No
Earthquake magnitude $M_w$ :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	$K_{\sigma}$ applied:	No	MSF method:	Method based

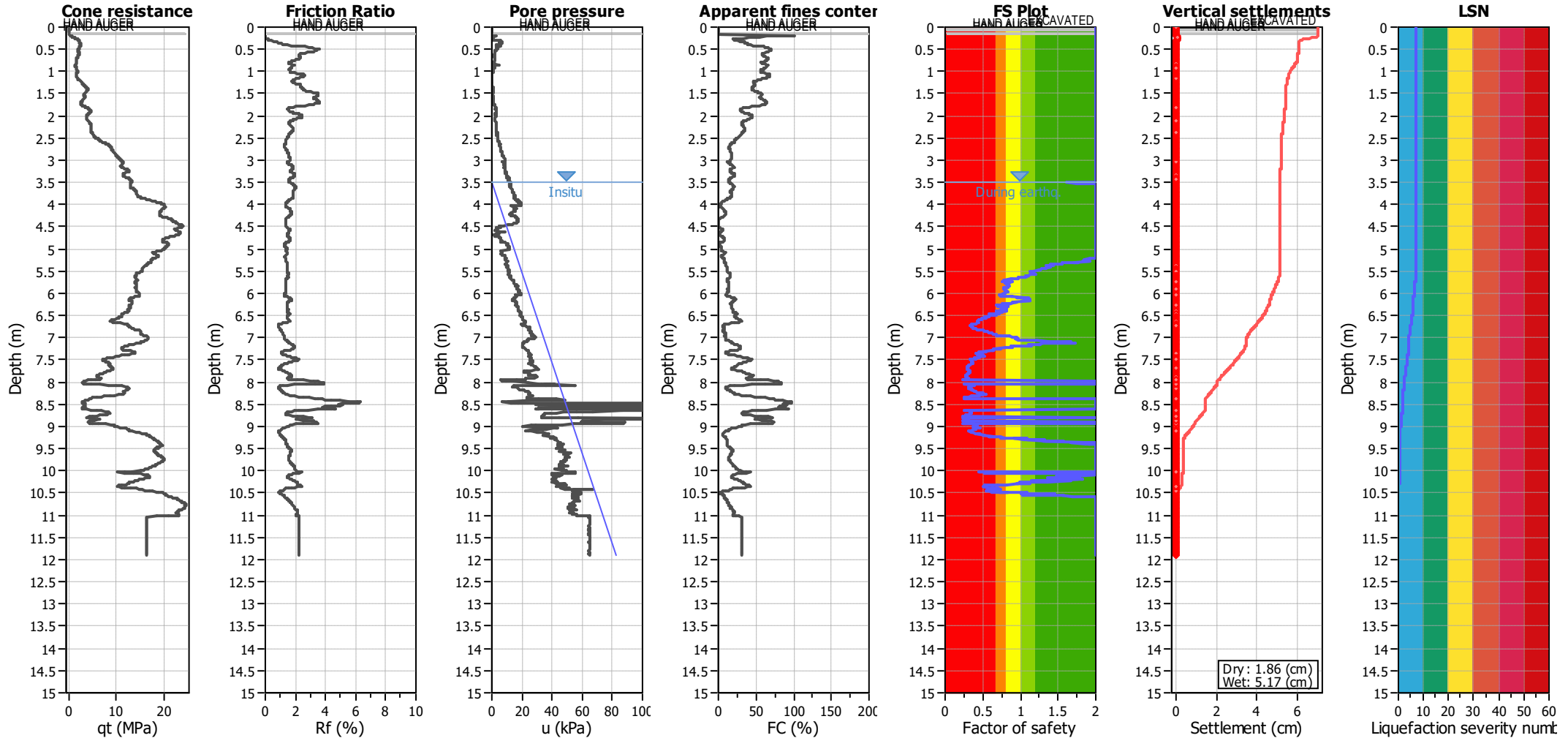


Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.30 m	Use fill:	Yes	Clay like behavior
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	3.30 m	Fill height:	1.20 m	applied:
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	19.00 kN/m <sup>3</sup>	Limit depth applied:
Earthquake magnitude $M_w$ :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	No
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	$K_{\sigma}$ applied:	No	N/A
						MSF method: Method based



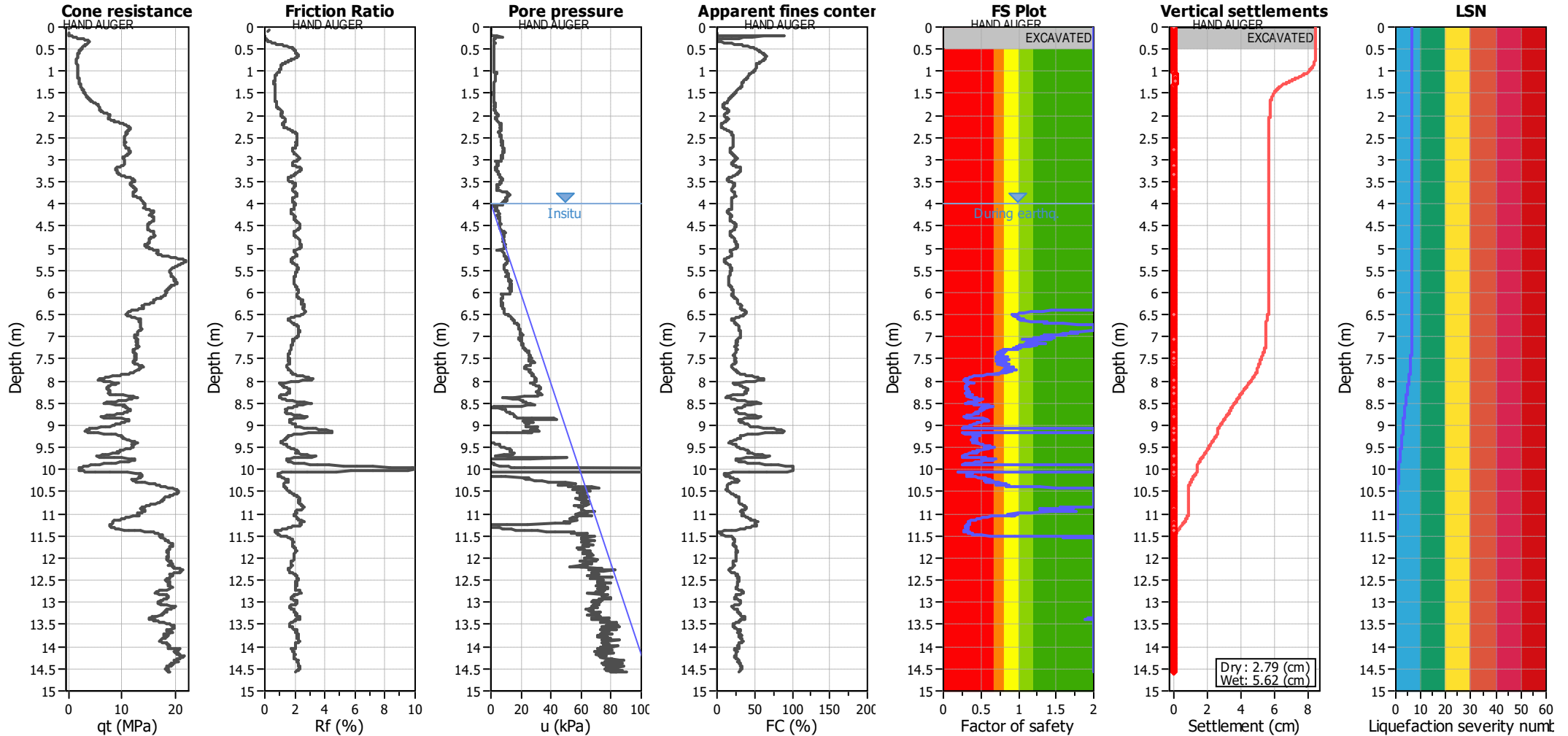


Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.30 m	Use fill:	Yes	Clay like behavior
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	3.30 m	Fill height:	1.20 m	applied:
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	19.00 kN/m <sup>3</sup>	Limit depth applied:
Earthquake magnitude $M_w$ :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	No
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	$K_{\sigma}$ applied:	No	N/A
						MSF method: Method based

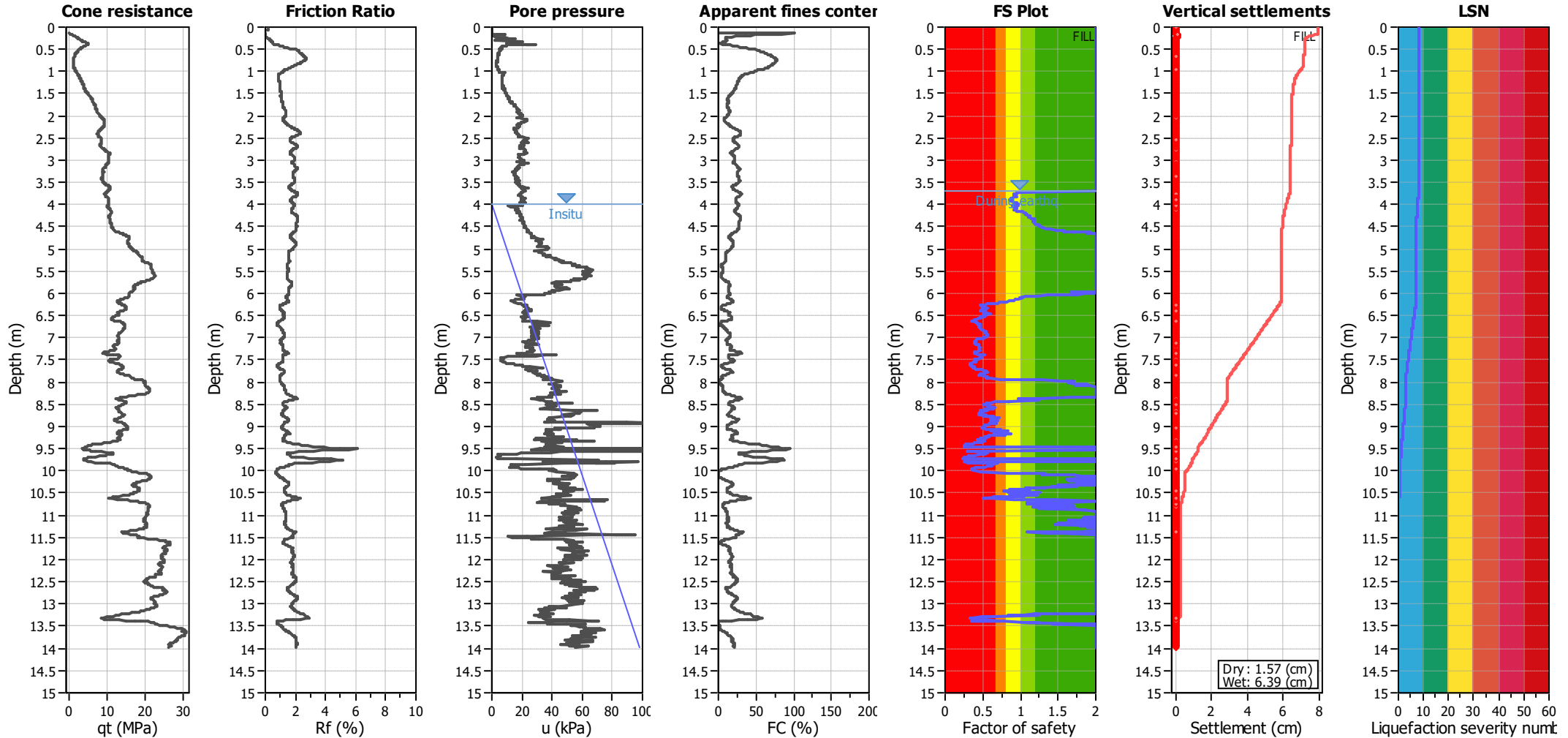


Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.50 m	Excavation:	Yes	Clay like behavior
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	3.50 m	Excavation depth:	0.10 m	applied:
Points to test:	Based on Ic value	Average results interval:	3	Footing load:	10.00 kPa	Limit depth applied:
Earthquake magnitude $M_w$ :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	$K_{\sigma}$ applied:	No	MSF method:
						Method based



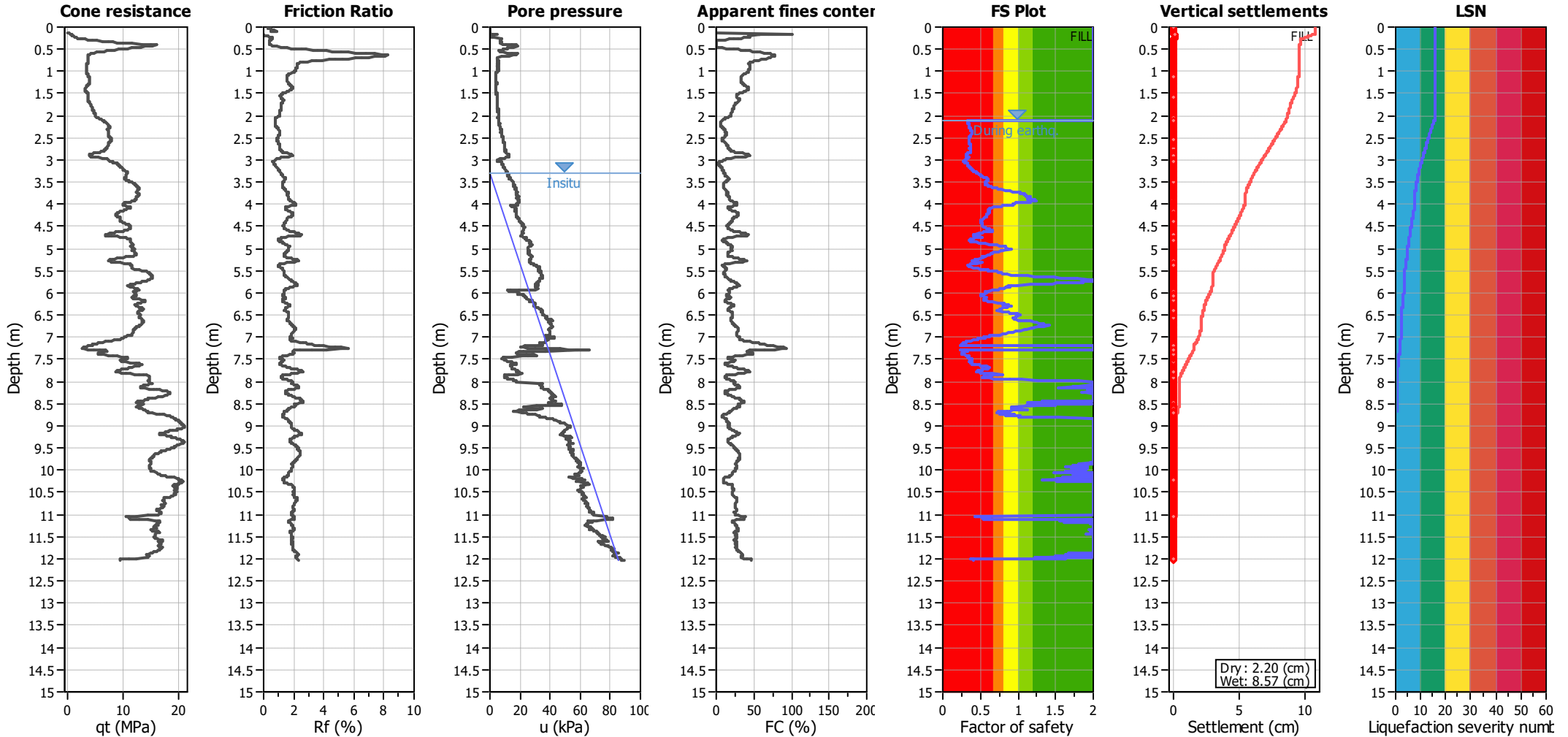


Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.00 m	Excavation:	Yes	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.00 m	Excavation depth:	0.50 m	applied:	
Points to test:	Based on Ic value	Average results interval:	3	Footing load:	10.00 kPa	Limit depth applied:	No
Earthquake magnitude $M_w$ :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	$K_\sigma$ applied:	No	MSF method:	Method based

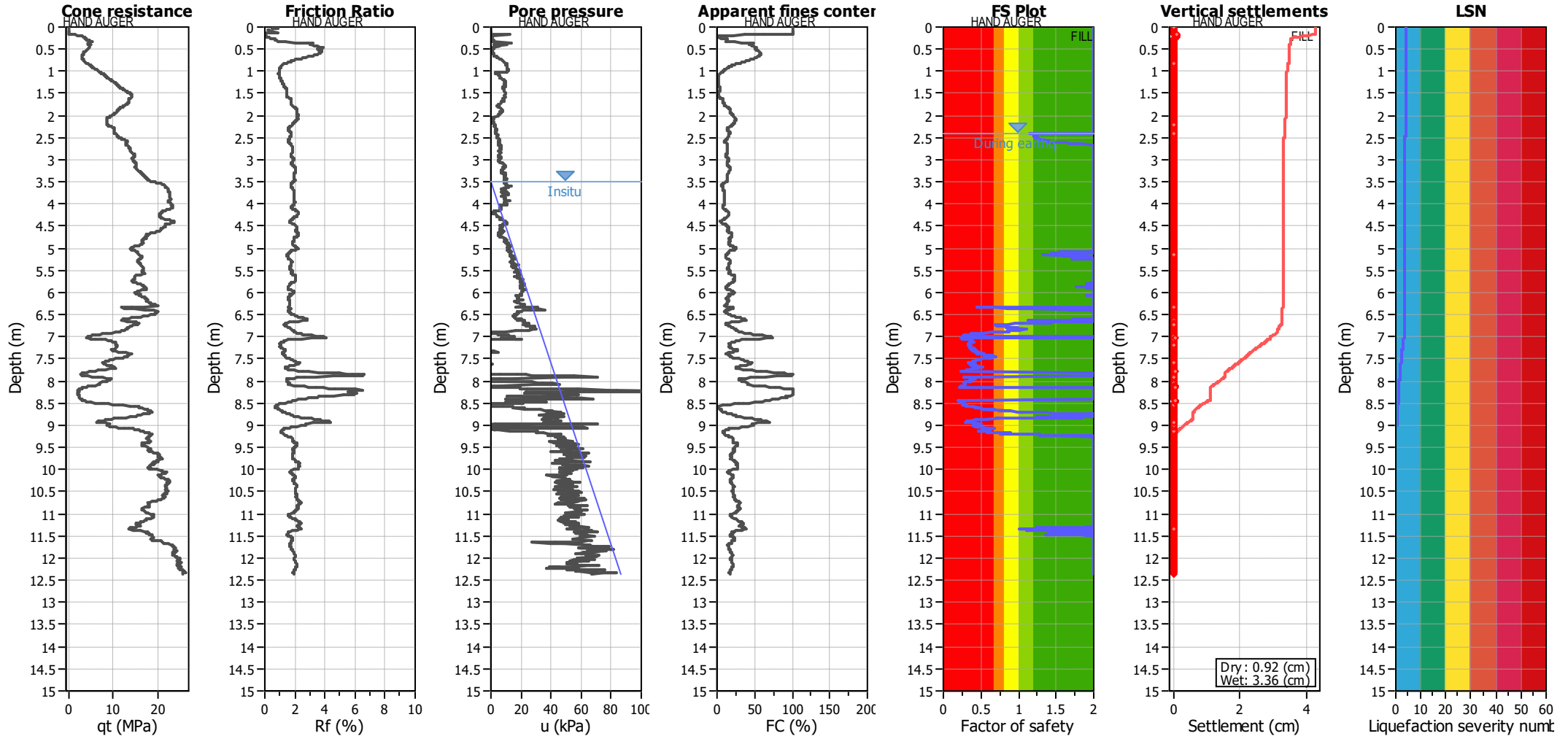


Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.00 m	Use fill:	Yes	Clay like behavior
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.00 m	Fill height:	0.30 m	applied:
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	19.00 kN/m <sup>3</sup>	Limit depth applied:
Earthquake magnitude $M_w$ :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	No
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	$K_{\sigma}$ applied:	No	N/A
						MSF method: Method based





Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.30 m	Use fill:	Yes	Clay like behavior
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	3.30 m	Fill height:	1.20 m	applied:
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	19.00 kN/m <sup>3</sup>	Limit depth applied:
Earthquake magnitude $M_w$ :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	No
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	$K_{\sigma}$ applied:	No	N/A
						MSF method: Method based



Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.50 m	Use fill:	Yes	Clay like behavior
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	3.50 m	Fill height:	1.10 m	applied:
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	19.00 kN/m <sup>3</sup>	Limit depth applied:
Earthquake magnitude $M_w$ :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	No
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	$K_\sigma$ applied:	No	N/A
						MSF method: Method based