

APPENDIX C

HISTORIC SUBSURFACE INVESTIGATION DATA

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Soil Description

Log Identification: BH01 Page 1 of 3

Geological Unit	Field Description	Depth (meters)	Graphic log	Investigation Method	Rock strength	Field Test Data							Groundwater Level	
						Undrained Shear Strength (kPa) Peak / Residual	Core Recovery (%)	SPT results						
								N60	75 mm	75 mm	75 mm	75 mm		75 mm
TOPSOIL	TOPSOIL; dark brown. Moist.	0.0 - 0.1												
	SAND; brown. Moist.	0.1 - 1.0		HQ		70%								
LATE QUATERNARY BEACH AND TERRACE COVER DEPOSITS	Below 1.0m, trace of charcol.	1.0 - 1.9												
	Below 1.9m, dark grey, moist to wet.	1.9 - 2.1												
	Below 2.1m, trace of shell fragments.	2.1 - 2.5												
	SAND; yellowish grey. Wet to moist.	2.5 - 3.0		HQ		100%								
	Below 2.7m, trace of shell fragments.	3.0 - 3.5												
	SAND, trace of shell fragments; dark grey. Wet.	3.5 - 4.0												
	Fine to medium grain SAND; orangish grey. Moist to wet.	4.0 - 4.5		HQ		90%								
	Fine grain SAND, trace of shell fragments; dark grey to black. Moist to wet.	4.5 - 5.0												
CLAY, trace of organics (fibrous); dark grey. Moist, highly plastic.	5.0 - 5.5													

Notes:


- The stratification lines represent the approximate boundary between soil types and the transition may be gradual.
- Soils have been described in general accordance with NZ Geomechanics Society "Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes", December 2005
- Undrained shear strengths (where reported) have been corrected in general accordance with NZ Geotech Society Inc. "Guideline for Hand Held Shear Vane Test", August 2001.

	Job name: Mangapapa School and Tologa Bay Area School	Job Number: 17-0708
	Site location: Mangapapa School, Gisborne	Shear Vane ID: N/A
	Date of logging: 15/01/2018	Logged By: LH
	Date of investigation: 18/12/2017	Checked By: BM

Soil Description		Depth (meters)	Graphic log	Investigation Method	Rock strength	Field Test Data							Groundwater Level	
Geological Unit	Field Description					Undrained Shear Strength (kPa) Peak / Residual	Core Recovery (%)	SPT results						
								N60	75 mm	75 mm	75 mm	75 mm		75 mm
LATE QUATERNARY BEACH AND TERRACE COVER DEPOSITS	CLAY, trace of organics (fibrous); dark grey. Moist, highly plastic.	6.0	HQ											
	Below 6.4m, trace of shell fragments.	6.5	SPT-O		SPT	1	0	0	1	0	0	0		
	Below 7.2m, lense of SAND for 50mm.	7.5	SPT-O		SPT	1	0	0	1	0	0	0		
	Below 9.5m, lense of organic material for 50mm.	9.5	SPT-O		SPT	1	0	0	1	0	0	0		
		10.0	HQ											
		10.5	SPT-O		SPT	0	0	0	0	0	0	0		
		11.0												

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	Job name: Mangapapa School and Tologa Bay Area School Site location: Mangapapa School, Gisborne Date of logging: 15/01/2018 Date of investigation: 18/12/2017	Job Number: 17-0708 Shear Vane ID: N/A Logged By: LH Checked By:
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Soil Description		Depth (meters)	Graphic log	Investigation Method	Rock strength	Field Test Data							Groundwater Level	
Geological Unit	Field Description					Undrained Shear Strength (kPa) Peak / Residual	Core Recovery (%)	SPT results						
								N60	75 mm	75 mm	75 mm	75 mm		75 mm
LATE QUATERNARY BEACH AND TERRACE COVER DEPOSITS	CLAY, trace of organics (fibrous); dark grey. Moist, highly plastic.	11.5	HQ		100%									
		12.0	SPT-O		SPT	1	0	0	1	0	0	0		
		12.5	HQ											
	Below 13.1m, lense of oragnc material for 20mm.	13.0	HQ											
		13.5	SPT-O		SPT	1	0	0	1	0	0	0		
		14.0	HQ											
	Fine grain SAND; light grey. Moist to wet.	14.5	HQ											
	CLAY; dark bluish grey. Moist, highly plastic.	15.0	SPT-O		SPT	1	0	0	1	0	0	0		
		15.5	HQ											
	End of borehole at 15.0 m. Target depth.	16.0	HQ											
	16.5													

Notes:

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- Undrained shear strengths (where reported) have been corrected in general accordance with NZ Geotech Society Inc. "Guideline for Hand Held Shear Vane Test", August 2001.

	Job name: Mangapapa School and Tologa Bay Area School Site location: Mangapapa School, Gisborne Date of logging: 15/01/2018 Date of investigation: 18/12/2017	Job Number: 17-0708 Shear Vane ID: N/A Logged By: LH Checked By:
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Soil Description			Field Test Data														
Log Identification: HA01			Depth (meters)	Undrained Shear Strength (kPa) Peak / Residual	Scala Penetrometer (blows per 100mm drop)										Groundwater Level		
Investigation method	Geological Unit	Field Description			Blow count	Plot of Scala results											
						Very loose	Loose	Medium Dense		Dense							
				0	1	2	3	4	5	6	7	8	9	10	910		
HAND AUGER	TOPSOIL	Sandy TOPSOIL; dark brown. Very loose to loose, dry.	0.0 - 0.1	1	2												
	HOLOCENE SHORELINE DEPOSITS	Fine grain SAND; light brown. Very loose, dry.	0.1 - 0.3	0.3													
		Fine to medium grain SAND; brown. Very loose, dry.	0.3 - 1.0	0.3	1												
				1.0 - 2.0	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		SAND, with trace of shell fragments; light greyish brown. Medium dense to dense, dry.	2.0 - 2.5	1	3	6	10	13	17	10	13	15					
		End of hand auger at 3.0m - Target depth.	3.0 - 3.5														
			3.5 - 4.0														
			4.0 - 4.5														
			4.5 - 5.0														
			5.0 - 5.5														
			5.5 - 6.0														

Notes:

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- Soils have been described in general accordance with NZ Geomechanics Society "Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes", December 2005
- Undrained shear strengths (where reported) have been corrected in general accordance with NZ Geotech Society Inc. "Guideline for Hand Held Shear Vane Test", August 2001.
- Scala Penetrometer testing (where reported) has been carried out in general accordance with NZS 4402 Test 6.5.2.



Job name: Mangapapa School and Tologa Bay Area School
Site location: 5 Rua St, Mangapapa, Gisborne
Date of investigation: 18/12/17

Job Number: 17-0708
Shear Vane ID: N/A
Logged By: LR
Checked By: BM

Soil Description

Log Identification: HA02

Investigation method	Geological Unit	Field Description	Depth (meters)	Field Test Data										Groundwater Level										
				Undrained Shear Strength (kPa) Peak / Residual	Scala Penetrometer (blows per 100mm drop)																			
					Plot of Scala results																			
Blow count	Very loose	Loose	Medium Dense	Dense	Dense	Dense	Dense	Dense	Dense	Dense	Dense	Dense	Dense											
HAND AUGER	T/S	Gravelly TOPSOIL; light brown. Loose to dense.	0.0 - 0.2																					
		Below 0.2m, moist.	0.2 - 0.5																					
	HOLOCENE SHORELINE DEPOSITS	SAND, with trace silt; light yellowish brown. Very loose to dense, moist.	Below 0.9m, light brown.	0.5 - 0.7																				
				0.7 - 0.9																				
				0.9 - 1.1																				
				1.1 - 1.3																				
				1.3 - 1.5																				
				1.5 - 1.7																				
				1.7 - 1.9																				
				1.9 - 2.0																				
	2.0 - 2.3	Below 2.0m, light yellowish brown.	2.0 - 2.3																					
	2.3 - 2.8	Below 2.3m, dense.	2.3 - 2.8																					
	2.8 - 3.0	Below 2.8m, trace of shell fragments.	2.8 - 3.0																					
		End of hand auger at 3.0m - Target depth.	3.0 - 3.5																					
			3.5 - 4.0																					
			4.0 - 4.5																					
			4.5 - 5.0																					
			5.0 - 5.5																					
			5.5 - 6.0																					

Notes:

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Job name: Mangapapa School and Tologa Bay Area School
Site location: 5 Rua St, Mangapapa, Gisborne
Date of investigation: 18/12/17

Job Number: 17-0708
Shear Vane ID: N/A
Logged By: LH
Checked By: BM

Client: Mangapapa School Board of Trustees	Project: Proposed Hall Extension	LDE Project No.: 9824
Project Location:	Borehole Location: Refer to site plan	Hole started: 13/07/2010 Hole completed: 13/07/2010
Co-ordinates: mN mE	Drill method: 50mm handauger	Drilled by: R.Cumming Logged by: R.Cumming

Depth (m)	Graphic	Moisture	Strength	Soil Description	Geology	Undrained Shear Strength (kPa)
0.00		M	VL-L	SAND, silty, organically stained black, very loose to loose, moist	Topsoil Fill	
0.05						
0.10						
0.15						
0.20						66
0.25						
0.30						
0.35						
0.40						
0.45						
0.50						
0.55		M	VL-L	SAND, light brown with some patches of organic staining, rare silt, medium, very loose to loose, moist	Non-engineered Fill	
0.60						
0.65						
0.70						
0.75						
0.80		M	St	SILT, some clay, rare pumiceous sand, black, slightly organic, stiff, moist	Buried Topsoil	
0.85						
0.90						
0.95						
1.00						
1.05						60
1.10						
1.15						
1.20				pumiceous sand content increasing grading inorganic		
1.25						
1.30						63
1.35						
1.40		M-W	L	SAND, pumiceous, medium with rare coarse, some silt and clay, whitish brown, loose, moist to wet	Pumiceous Sand (alluvial deposit)	
1.45						
1.50						
1.55				some dune sand		
1.60		M	L	SAND, medium, well sorted, light orange brown, loose, moist	Dune Sand	
1.65						
1.70						
1.75						
1.80				some reddish brown iron staining, rare pumiceous sand and lapilli		
1.85						
1.90						
1.95						
2.00						
2.05				End of Borehole @ 2.0m		
2.10				Hole dry on completion		
2.15						
2.20						
2.25						
2.30						
2.35						
2.40						
2.45						
2.50						
2.55						
2.60						
2.65						
2.70						
2.75						
2.80						
2.85						
2.90						
2.95						

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

Client: Mangapapa School Board of Trustees	Project: Proposed Hall Extension	LDE Project No.: 9824
Project Location:	Borehole Location: Refer to site plan	Hole started: 13/07/2010 Hole completed: 13/07/2010
Co-ordinates: mN mE	Drill method: 50mm handauger	Drilled by: R.Cumming Logged by: R.Cumming

Depth (m)	Graphic	Moisture	Strength	Soil Description	Geology	Undrained Shear Strength (kPa)	
						0	40 80 120 160 200 240
0.00		M	VL-L	SAND, silty, organically stained black, very loose to loose, moist	Topsoil Fill		
0.05							
0.10		M	VL	SILT, some clay and pumiceous sand, whitish brown, very loose/ firm to stiff, moist	Non-engineered Fill		
0.15							
0.20							
0.25							
0.30				rare black silt patches			
0.35							
0.40							
0.45							
0.50							
0.55							
0.60							
0.65							
0.70							
0.75							
0.80							
0.85							
0.90		M	St	SILT, some clay, rare pumiceous sand, black, slightly organic, stiff, moist	Buried Topsoil		
0.95							
1.00							
1.05							
1.10							
1.15							
1.20				pumiceous sand content increasing			
1.25				grading inorganic			
1.30							
1.35							
1.40		M-W	L	SAND, pumiceous, medium with rare coarse, some silt and clay, whitish brown, loose, dilatant, moist to wet	Pumiceous Sand (alluvial deposit)		
1.45							
1.50							
1.55				some dune sand			
1.60		M	L	SAND, medium, well sorted, light orange brown, loose, moist	Dune Sand		
1.65							
1.70							
1.75							
1.80							
1.85							
1.90				some reddish brown iron staining, rare pumiceous sand and lapilli			
1.95							
2.00							
2.05				End of Borehole @ 2.0m			
2.10				Hole dry on completion			
2.15							
2.20							
2.25							
2.30							
2.35							
2.40							
2.45							
2.50							
2.55							
2.60							
2.65							
2.70							
2.75							
2.80							
2.85							
2.90							
2.95							

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

Client: Mangapapa School Board of Trustees	Project: Proposed Hall Extension	LDE Project No.: 9824
Project Location:	Borehole Location: Refer to site plan	Hole started: 13/07/2010 Hole completed: 13/07/2010
Co-ordinates: mN mE	Drill method: 50mm handauger	Drilled by: R.Cumming Logged by: R.Cumming

Depth (m)	Graphic	Moisture	Strength	Soil Description	Geology	Undrained Shear Strength (kPa)		
						0	40 80 120 160 200 240	
0.00		M	VL	SAND, silty, some charcoal and brick fragments, organically stained black, very loose, moist	Topsoil Fill			
0.05								
0.10								
0.15								
0.20								
0.25								
0.30								
0.35								
0.40								
0.45								
0.50		M	VL	SAND, light orange brown, rare patches of black sand, medium, well sorted, very loose, moist	Non-engineered fill			
0.55								
0.60								
0.65								
0.70								
0.75								
0.80								
0.85								
0.90								
0.95								
1.00								
1.05								
1.10		M	L	SILT, some clay, rare pumiceous sand, black, slightly organic, loose, moist	Buried Topsoil			
1.15								
1.20				pumiceous sand content increasing				
1.25				grading inorganic				
1.30								
1.35								
1.40								
1.45								
1.50		M-W	L	SAND, pumiceous, medium with rare coarse, some silt and clay, whitish brown, loose, dilatant, moist to wet	Pumiceous Sand (alluvial deposit)			
1.55								
1.60								
1.65								
1.70		M	L	SAND, medium, well sorted, rare fines, light orange brown, loose, moist	Dune Sand			
1.75								
1.80				no fines				
1.85								
1.90								
1.95								
2.00								
2.05				End of Borehole @ 2.0m				
2.10				Hole dry on completion				
2.15								
2.20								
2.25								
2.30								
2.35								
2.40								
2.45								
2.50								
2.55								
2.60								
2.65								
2.70								
2.75								
2.80								
2.85								
2.90								
2.95								

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

Client: Mangapapa School Board of Trustees	Project: Proposed Hall Extension	LDE Project No.: 9824
Project Location:	Borehole Location: Refer to site plan	Hole started: 13/07/2010 Hole completed: 13/07/2010
Co-ordinates: mN mE	Drill method: 50mm handauger	Drilled by: R.Cumming Logged by: R.Cumming

Depth (m)	Graphic	Moisture	Strength	Soil Description	Geology	Undrained Shear Strength (kPa)	
						0	40 80 120 160 200 240
0.00		M	VL-L	SAND, silty, organically stained black, very loose to loose, moist	Topsoil Fill		
0.05							
0.10		M	MD	SAND, some silt, some clay and fine gravel, orange brown, whitish brown and grey, medium dense, moist	Compacted Fill (imported)		
0.15							
0.20							
0.25							
0.30				rare black silt patches			
0.35							
0.40							
0.45							
0.50							
0.55							
0.60		M	MD	SAND, organically stained greyish black, rare fine well rounded gravel, medium dense, moist	Disturbed Fill/Dune sand		
0.65							
0.70							
0.75							
0.80							
0.85							
0.90							
0.95							
1.00							
1.05							
1.10							
1.15							
1.20							
1.25							
1.30							
1.35							
1.40							
1.45							
1.50							
1.55							
1.60							
1.65							
1.70							
1.75				Sharp contact (Boulder or stone) cannot advance.			
1.80				End of Borehole @ 1.8m			
1.85				Hole dry on Completion			
1.90							
1.95							
2.00							
2.05							
2.10							
2.15							
2.20							
2.25							
2.30							
2.35							
2.40							
2.45							
2.50							
2.55							
2.60							
2.65							
2.70							
2.75							
2.80							
2.85							
2.90							
2.95							

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

Client: Mangapapa School Board of Trustees	Project: Proposed Hall Extension	LDE Project No.: 9824
Project Location:	Borehole Location: Refer to site plan	Hole started: 13/07/2010 Hole completed: 13/07/2010
Co-ordinates: mN mE	Drill method: 50mm handauger	Drilled by: R.Cumming Logged by: R.Cumming

Depth (m)	Graphic	Moisture	Strength	Soil Description	Geology	Undrained Shear Strength (kPa)	
						0	40 80 120 160 200 240
0.00		M	VL	SAND, silty, some charcoal and brick fragments, organically stained black, very loose, moist	Topsoil Fill		
0.05							
0.10							
0.15							
0.20		M	VL	SAND, light orange brown, rare patches of black sand, medium, well sorted, very loose, moist	Non-engineered fill		
0.25							
0.30							
0.35							
0.40							
0.45							
0.50							
0.55							
0.60							
0.65							
0.70							
0.75							
0.80							
0.85							
0.90							
0.95							
1.00							
1.05							
1.10							
1.15							
1.20							
1.25							
1.30							
1.35							
1.40		M	VL	SILT, some clay, rare pumiceous sand, black, slightly organic, loose, moist	Buried Topsoil		
1.45							
1.50							
1.55							
1.60							
1.65							
1.70		M-W	VL	SAND, pumiceous, medium with rare coarse, some silt and clay, whitish brown, very loose, dilatant, moist to wet	Pumiceous Sand (alluvial deposit)		
1.75							
1.80							
1.85							
1.90		M	VL	SAND, medium, well sorted, rare fines, light orange brown, loose, moist	Dune Sand		
1.95			L	Loose no fines			
2.00							
2.05				End of Borehole @ 2.0m			
2.10				Hole dry on completion			
2.15							
2.20							
2.25							
2.30							
2.35							
2.40							
2.45							
2.50							
2.55							
2.60							
2.65							
2.70							
2.75							
2.80							
2.85							
2.90							
2.95							

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



BOREHOLE LOG

BOREHOLE No: **BH6**

Client: Mangapapa School Board of Trustees	Project: Proposed Hall Extension	LDE Project No.: 9824
Project Location:	Borehole Location: Refer to site plan	Hole started: 13/07/2010 Hole completed: 13/07/2010
Co-ordinates: mN mE	Drill method: 50mm handauger	Drilled by: R.Cumming Logged by: R.Cumming

Depth (m)	Graphic	Moisture	Strength	Soil Description	Geology	Undrained Shear Strength (kPa)	
						0	40 80 120 160 200 240
0.00		M	VL	SAND, silty, organically stained black with orange brown patches, very loose, moist	Topsoil Fill		
0.05							
0.10							
0.15							
0.20		M	VL	SAND, light orange brown, medium, well sorted, very loose, moist	Dune Sand		
0.25							
0.30							
0.35							
0.40							
0.45							
0.50							
0.55							
0.60							
0.65							
0.70							
0.75							
0.80							
0.85							
0.90							
0.95							
1.00							
1.05							
1.10							
1.15							
1.20			L	loose			
1.25							
1.30							
1.35							
1.40							
1.45							
1.50							
1.55							
1.60				some reddish brown staining			
1.65							
1.70							
1.75							
1.80							
1.85							
1.90							
1.95							
2.00							
2.05				End of Borehole @ 2.0m			
2.10				Hole dry on completion			
2.15							
2.20							
2.25							
2.30							
2.35							
2.40							
2.45							
2.50							
2.55							
2.60							
2.65							
2.70							
2.75							
2.80							
2.85							
2.90							
2.95							

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



PENETROMETER TEST LOG

Project No: 9824

Date: 14/07/2010

Project: Proposed Hall Extension

Operated by: R.Cumming

Location: Mangapapa School,

Logged by: R.Cumming

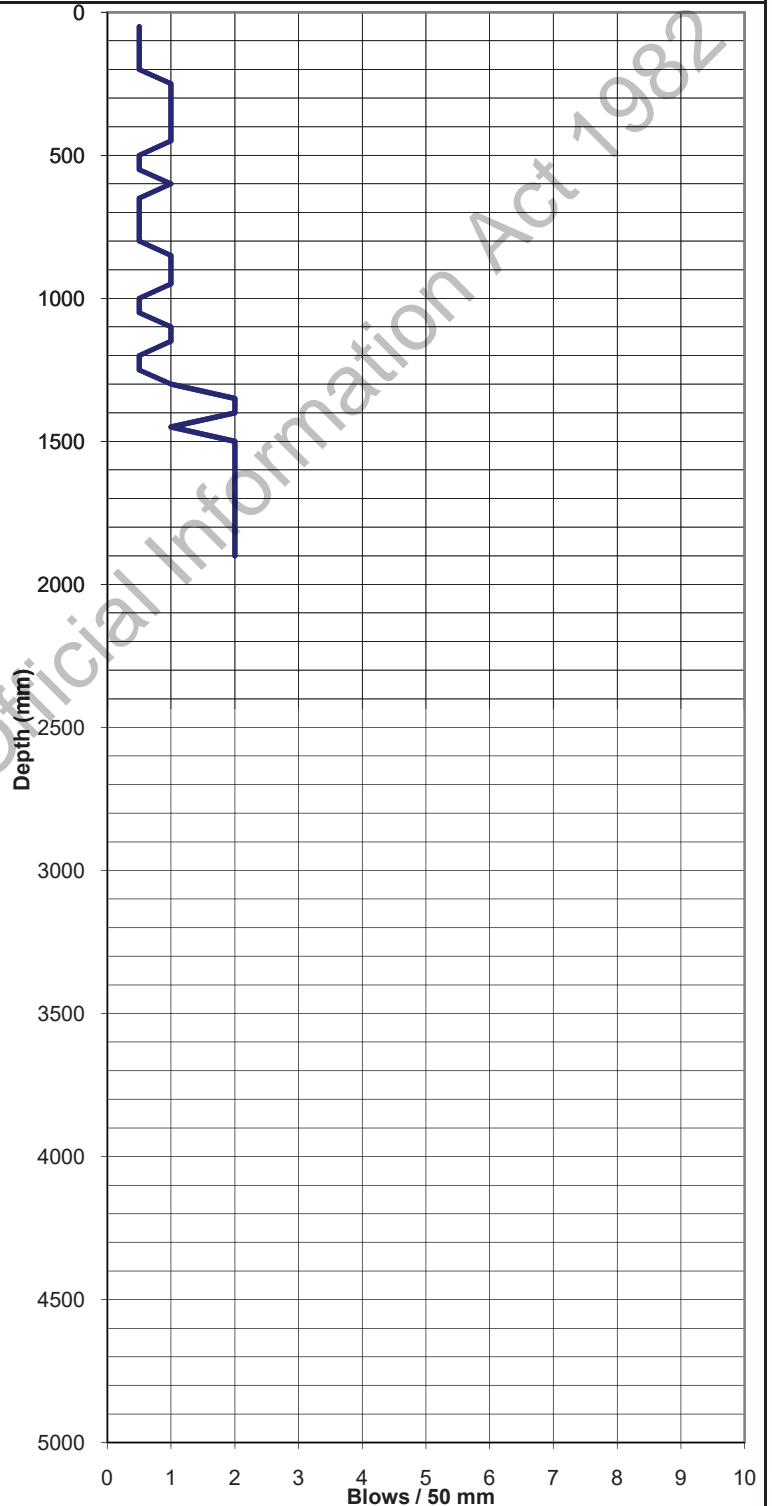
RL: Gisborne

Checked by: G.Winkler

Test No. **P1**

Sheet of **1 1**

mm Driven	No. of Blows	mm Driven	No. of Blows
50	0.5	2550	
100	0.5	2600	
150	0.5	2650	
200	0.5	2700	
250	1.0	2750	
300	1.0	2800	
350	1.0	2850	
400	1.0	2900	
450	1.0	2950	
500	0.5	3000	
550	0.5	3050	
600	1.0	3100	
650	0.5	3150	
700	0.5	3200	
750	0.5	3250	
800	0.5	3300	
850	1.0	3350	
900	1.0	3400	
950	1.0	3450	
1000	0.5	3500	
1050	0.5	3550	
1100	1.0	3600	
1150	1.0	3650	
1200	0.5	3700	
1250	0.5	3750	
1300	1.0	3800	
1350	2.0	3850	
1400	2.0	3900	
1450	1.0	3950	
1500	2.0	4000	
1550	2.0	4050	
1600	2.0	4100	
1650	2.0	4150	
1700	2.0	4200	
1750	2.0	4250	
1800	2.0	4300	
1850	2.0	4350	
1900	2.0	4400	
1950		4450	
2000		4500	
2050		4550	
2100		4600	
2150		4650	
2200		4700	
2250		4750	
2300		4800	
2350		4850	
2400		4900	
2450		4950	
2500		5000	



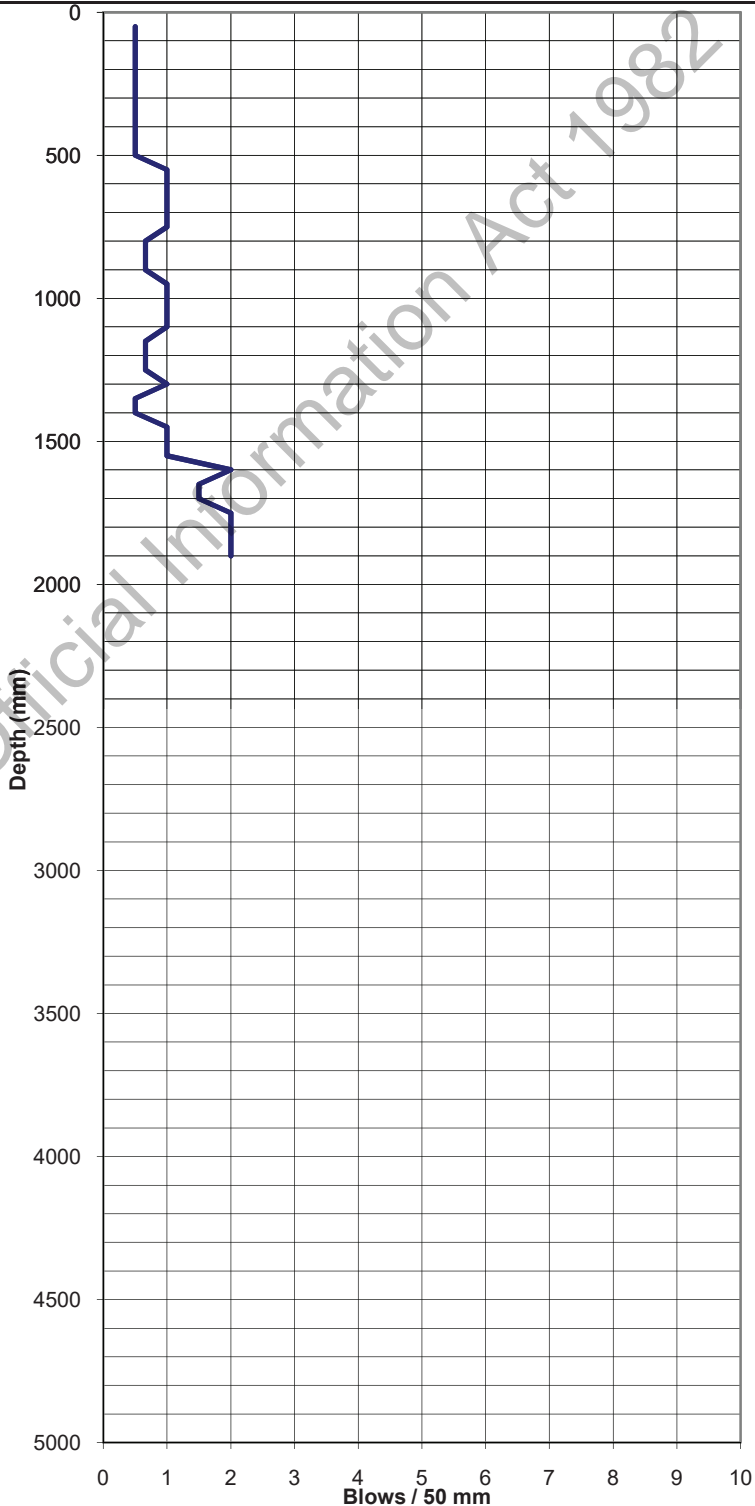
PENETROMETER TEST LOG

Project No: **9824**
 Project: **Proposed Hall Extension**
 Location: **Mangapapa School,**
 RL: **Gisborne**

Date: **14/07/2010**
 Operated by: **R.Cumming**
 Logged by: **R.Cumming**
 Checked by: **G.Winkler**

Test No.	P2
Sheet of	1 / 1

mm Driven	No. of Blows	mm Driven	No. of Blows
50	0.5	2550	
100	0.5	2600	
150	0.5	2650	
200	0.5	2700	
250	0.5	2750	
300	0.5	2800	
350	0.5	2850	
400	0.5	2900	
450	0.5	2950	
500	0.5	3000	
550	1.0	3050	
600	1.0	3100	
650	1.0	3150	
700	1.0	3200	
750	1.0	3250	
800	0.7	3300	
850	0.7	3350	
900	0.7	3400	
950	1.0	3450	
1000	1.0	3500	
1050	1.0	3550	
1100	1.0	3600	
1150	0.7	3650	
1200	0.7	3700	
1250	0.7	3750	
1300	1.0	3800	
1350	0.5	3850	
1400	0.5	3900	
1450	1.0	3950	
1500	1.0	4000	
1550	1.0	4050	
1600	2.0	4100	
1650	1.5	4150	
1700	1.5	4200	
1750	2.0	4250	
1800	2.0	4300	
1850	2.0	4350	
1900	2.0	4400	
1950		4450	
2000		4500	
2050		4550	
2100		4600	
2150		4650	
2200		4700	
2250		4750	
2300		4800	
2350		4850	
2400		4900	
2450		4950	
2500		5000	



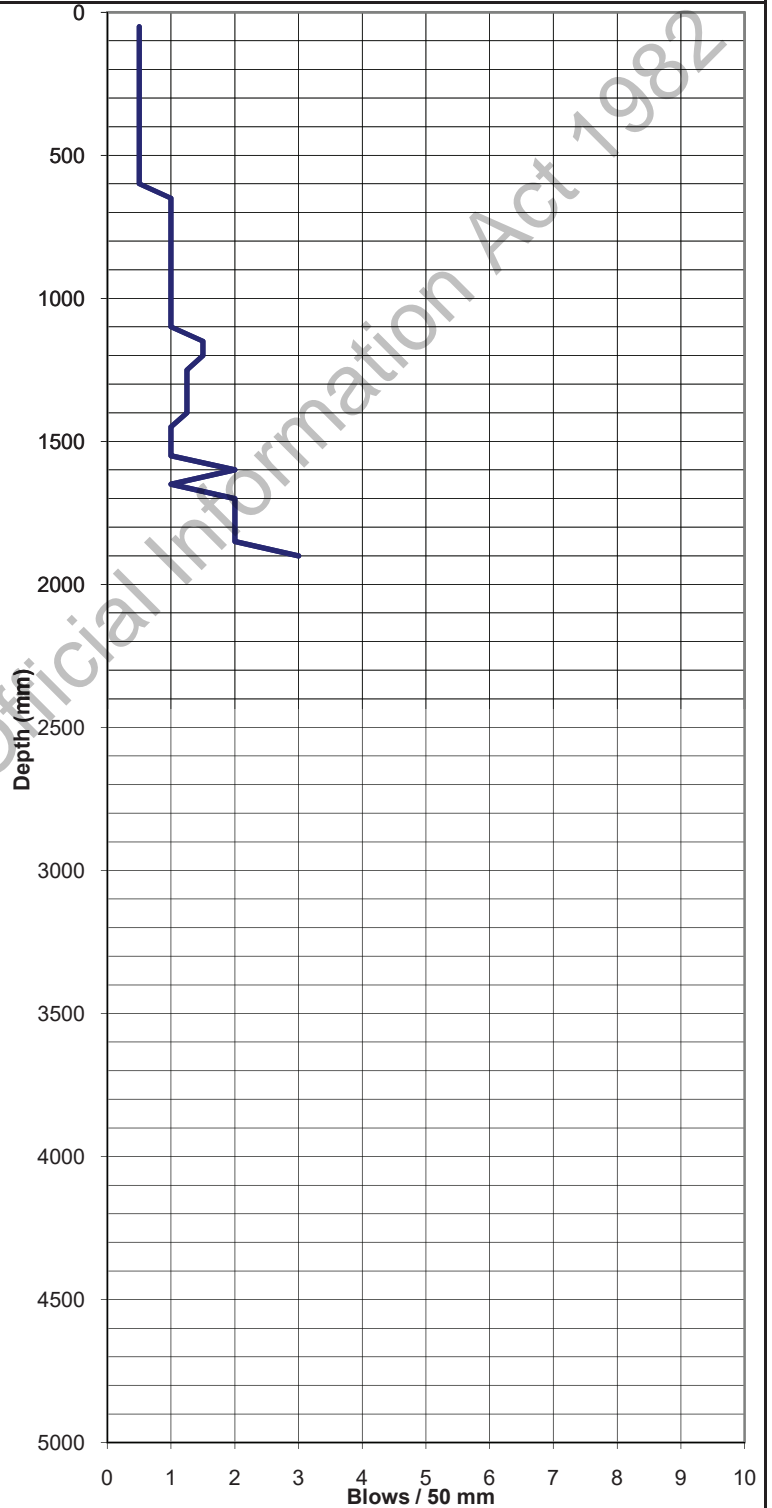
PENETROMETER TEST LOG

Project No: **9824**
 Project: **Proposed Hall Extension**
 Location: **Mangapapa School,**
 RL: **Gisborne**

Date: **14/07/2010**
 Operated by: **R.Cumming**
 Logged by: **R.Cumming**
 Checked by: **G.Winkler**

Test No.	P3
Sheet of	1 / 1

mm Driven	No. of Blows	mm Driven	No. of Blows
50	0.5	2550	
100	0.5	2600	
150	0.5	2650	
200	0.5	2700	
250	0.5	2750	
300	0.5	2800	
350	0.5	2850	
400	0.5	2900	
450	0.5	2950	
500	0.5	3000	
550	0.5	3050	
600	0.5	3100	
650	1.0	3150	
700	1.0	3200	
750	1.0	3250	
800	1.0	3300	
850	1.0	3350	
900	1.0	3400	
950	1.0	3450	
1000	1.0	3500	
1050	1.0	3550	
1100	1.0	3600	
1150	1.5	3650	
1200	1.5	3700	
1250	1.3	3750	
1300	1.3	3800	
1350	1.3	3850	
1400	1.3	3900	
1450	1.0	3950	
1500	1.0	4000	
1550	1.0	4050	
1600	2.0	4100	
1650	1.0	4150	
1700	2.0	4200	
1750	2.0	4250	
1800	2.0	4300	
1850	2.0	4350	
1900	3.0	4400	
1950		4450	
2000		4500	
2050		4550	
2100		4600	
2150		4650	
2200		4700	
2250		4750	
2300		4800	
2350		4850	
2400		4900	
2450		4950	
2500		5000	



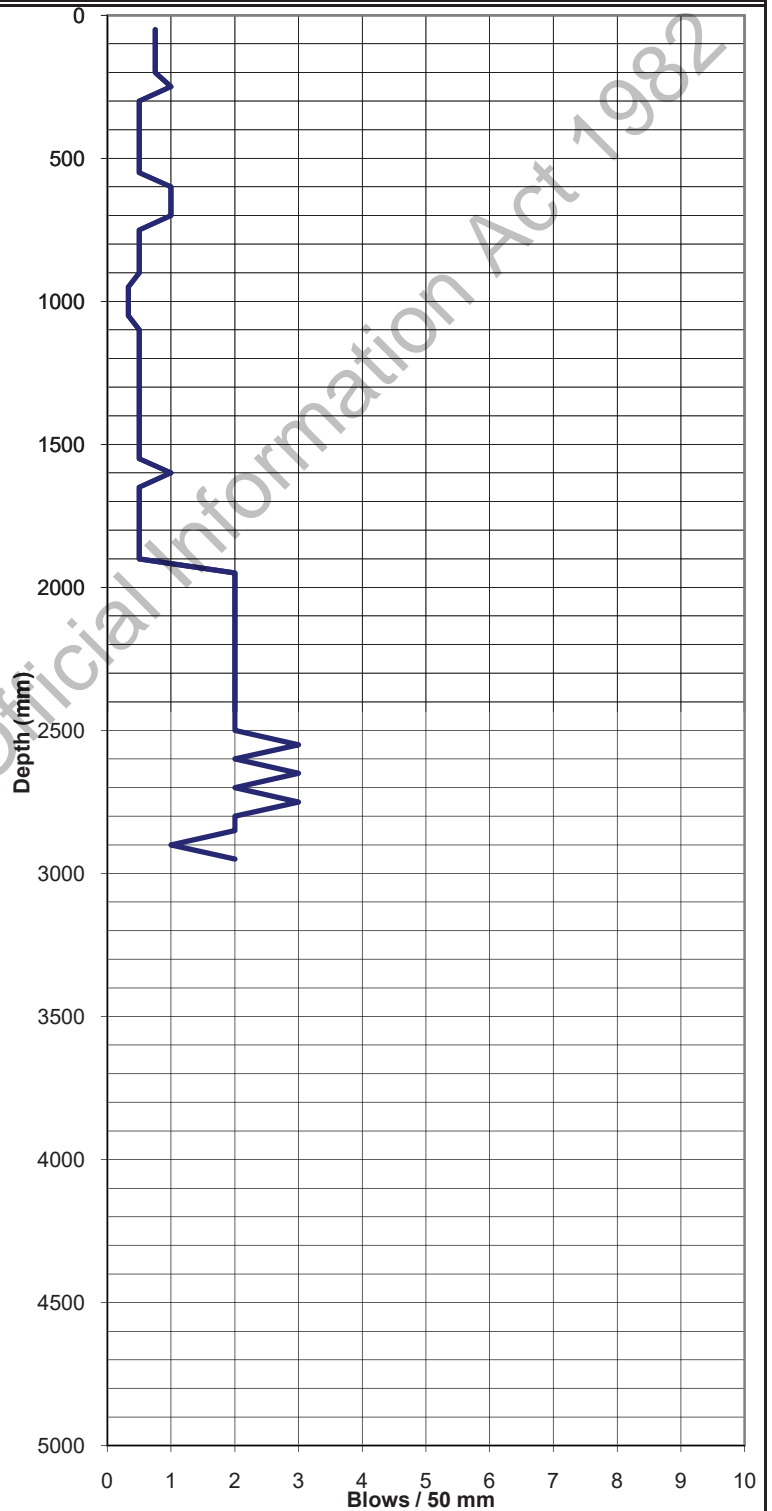
PENETROMETER TEST LOG

Project No: **9824**
 Project: **Proposed Hall Extension**
 Location: **Mangapapa School,**
 RL: **Gisborne**

Date: **14/07/2010**
 Operated by: **R.Cumming**
 Logged by: **R.Cumming**
 Checked by: **G.Winkler**

Test No.	P4
Sheet of	1 / 1

mm Driven	No. of Blows	mm Driven	No. of Blows
50	0.8	2550	3
100	0.8	2600	2
150	0.8	2650	3
200	0.8	2700	2
250	1.0	2750	3
300	0.5	2800	2
350	0.5	2850	2
400	0.5	2900	1
450	0.5	2950	2
500	0.5	3000	
550	0.5	3050	
600	1.0	3100	
650	1.0	3150	
700	1.0	3200	
750	0.5	3250	
800	0.5	3300	
850	0.5	3350	
900	0.5	3400	
950	0.3	3450	
1000	0.3	3500	
1050	0.3	3550	
1100	0.5	3600	
1150	0.5	3650	
1200	0.5	3700	
1250	0.5	3750	
1300	0.5	3800	
1350	0.5	3850	
1400	0.5	3900	
1450	0.5	3950	
1500	0.5	4000	
1550	0.5	4050	
1600	1.0	4100	
1650	0.5	4150	
1700	0.5	4200	
1750	0.5	4250	
1800	0.5	4300	
1850	0.5	4350	
1900	0.5	4400	
1950	2.0	4450	
2000	2.0	4500	
2050	2.0	4550	
2100	2.0	4600	
2150	2.0	4650	
2200	2.0	4700	
2250	2.0	4750	
2300	2.0	4800	
2350	2.0	4850	
2400	2.0	4900	
2450	2.0	4950	
2500	2.0	5000	



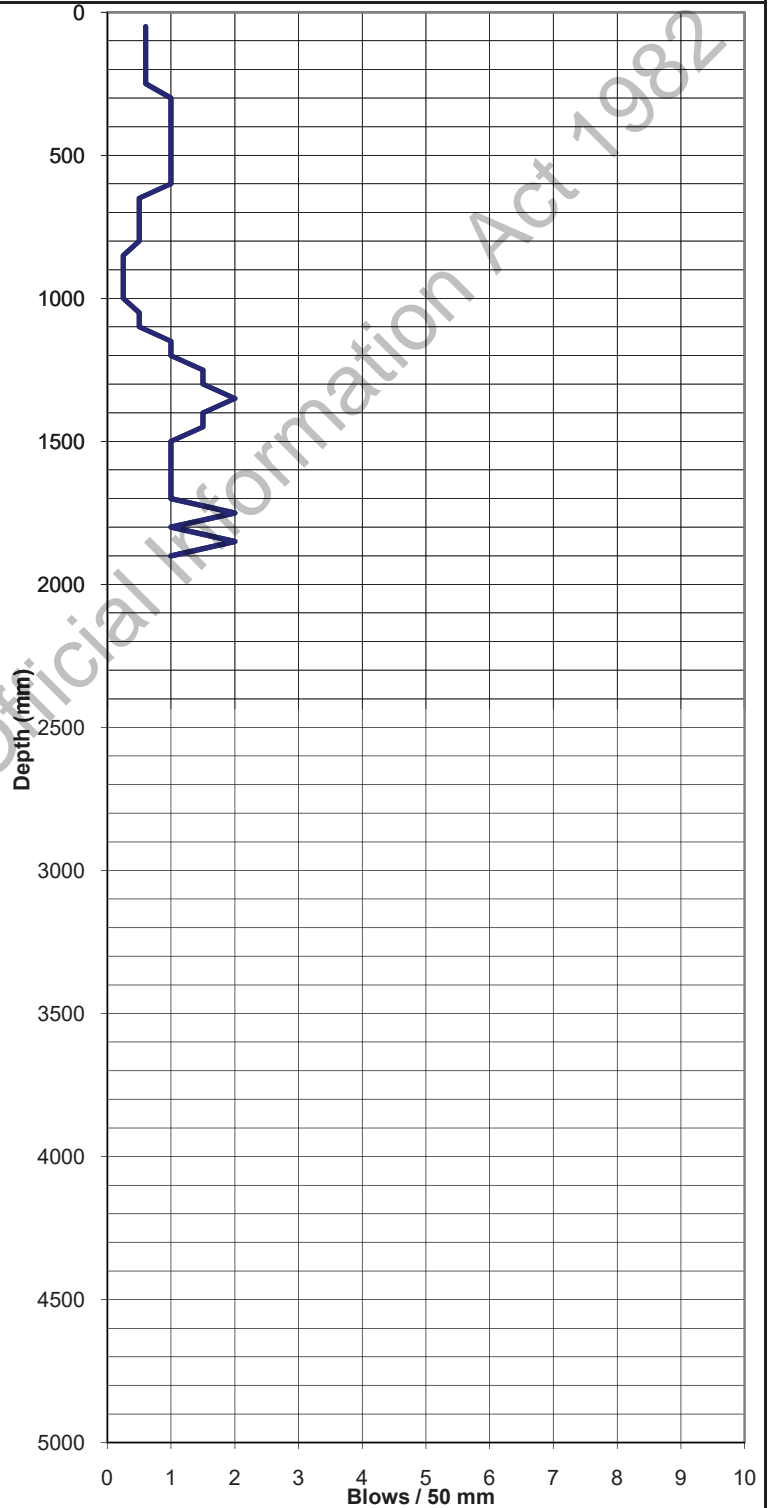
PENETROMETER TEST LOG

Project No: **9824**
 Project: **Proposed Hall Extension**
 Location: **Mangapapa School,**
 RL: **Gisborne**

Date: **14/07/2010**
 Operated by: **R.Cumming**
 Logged by: **R.Cumming**
 Checked by: **G.Winkler**

Test No.	P5
Sheet of	1 / 1

mm Driven	No. of Blows	mm Driven	No. of Blows
50	0.6	2550	
100	0.6	2600	
150	0.6	2650	
200	0.6	2700	
250	0.6	2750	
300	1.0	2800	
350	1.0	2850	
400	1.0	2900	
450	1.0	2950	
500	1.0	3000	
550	1.0	3050	
600	1.0	3100	
650	0.5	3150	
700	0.5	3200	
750	0.5	3250	
800	0.5	3300	
850	0.3	3350	
900	0.3	3400	
950	0.3	3450	
1000	0.3	3500	
1050	0.5	3550	
1100	0.5	3600	
1150	1.0	3650	
1200	1.0	3700	
1250	1.5	3750	
1300	1.5	3800	
1350	2.0	3850	
1400	1.5	3900	
1450	1.5	3950	
1500	1.0	4000	
1550	1.0	4050	
1600	1.0	4100	
1650	1.0	4150	
1700	1.0	4200	
1750	2.0	4250	
1800	1.0	4300	
1850	2.0	4350	
1900	1.0	4400	
1950		4450	
2000		4500	
2050		4550	
2100		4600	
2150		4650	
2200		4700	
2250		4750	
2300		4800	
2350		4850	
2400		4900	
2450		4950	
2500		5000	



**CPT
TEST REPORT**



Client : **BCD Group Ltd**
 Project : **Mangapapa School**
 Location : **5 Rua St - Gisborne**
 Hole Number: **1**
 Tested by : **J Kavanaugh/ N Oosthuizen**
 Date tested : **20/12/17**
 Coordinates : **E: 2036898**
 N: 5710289
 EL: 8m
 Water level : **EOH - Dipped - GWL @ 2.1m**

Project No :	2-68000.00
Lab Ref No :	HA2212_01
Client Ref No :	

Test Results	
Start Time	08:45:00
Time at penetration	00:00:00
End Time	00:00:00
Reference level	0
Ground level	0
Predrill	0
Penetration Depth	20
Remarks	Target Depth
GPS Type	Garmin eTrex 20
GPS Accuracy	+ / - 3m
GPS Reference Grid	NZTM
GPS Datum	MSL
Rig Type	GeoMil Panther 100/ Flex 200
Rig ID	CPT03
Reaction Force	Dead weight 10/22 tonnes
Data Acquisition (Digitizer)	GeoMil GME500
Acquisition Program	GeoMil CPTest
Reporting Program	GeoMil CPTask
Cone Type	C10 (10 Tonne Compression)
Cross Sectional Area	10cm2
Cone Area Ratio	0.8
Fluid Type	Silicone Fluid
Friction Reducer	0.55m behind base of cone
Application Class (ISO 22476-1)	2
Test Type (ISO 22476-1)	TE2 (Measured Cone and Sleeve)
Back Fill Method	Bentonite
Observations During Testing	None

Date tested : 20/12/17
 Date reported : 20/12/17

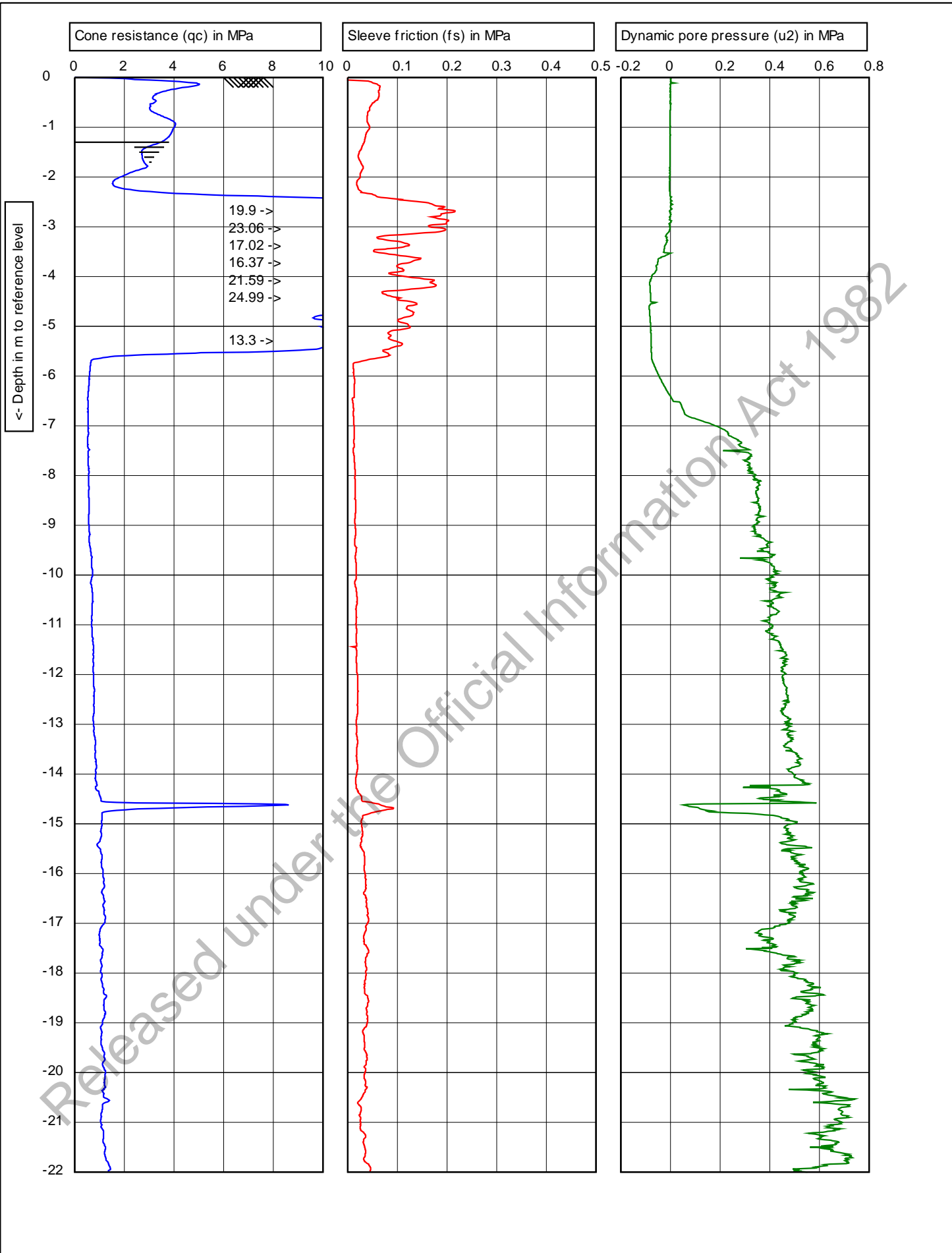
This report may only be reproduced in full, including corresponding calibration data, daily logs, and CPT graphs.

IANZ Approved Signatory



Designation : *CPT North Island Manager*
 Date : 20/12/17



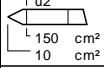
Tests indicated as not accredited are outside the scope of the laboratory's accreditation

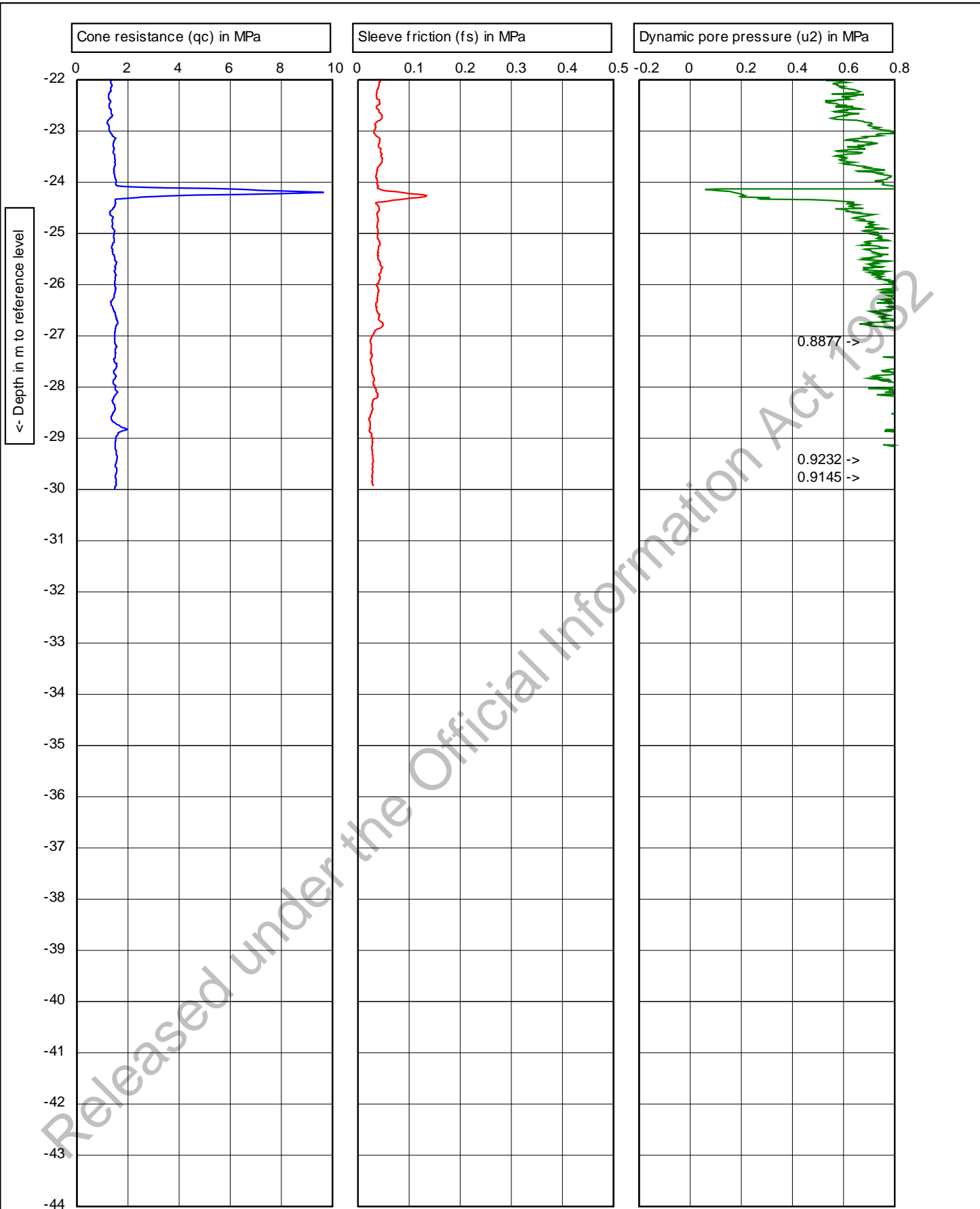


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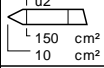
Graphs indicated as not accredited are outside the scope of the laboratory's accreditation

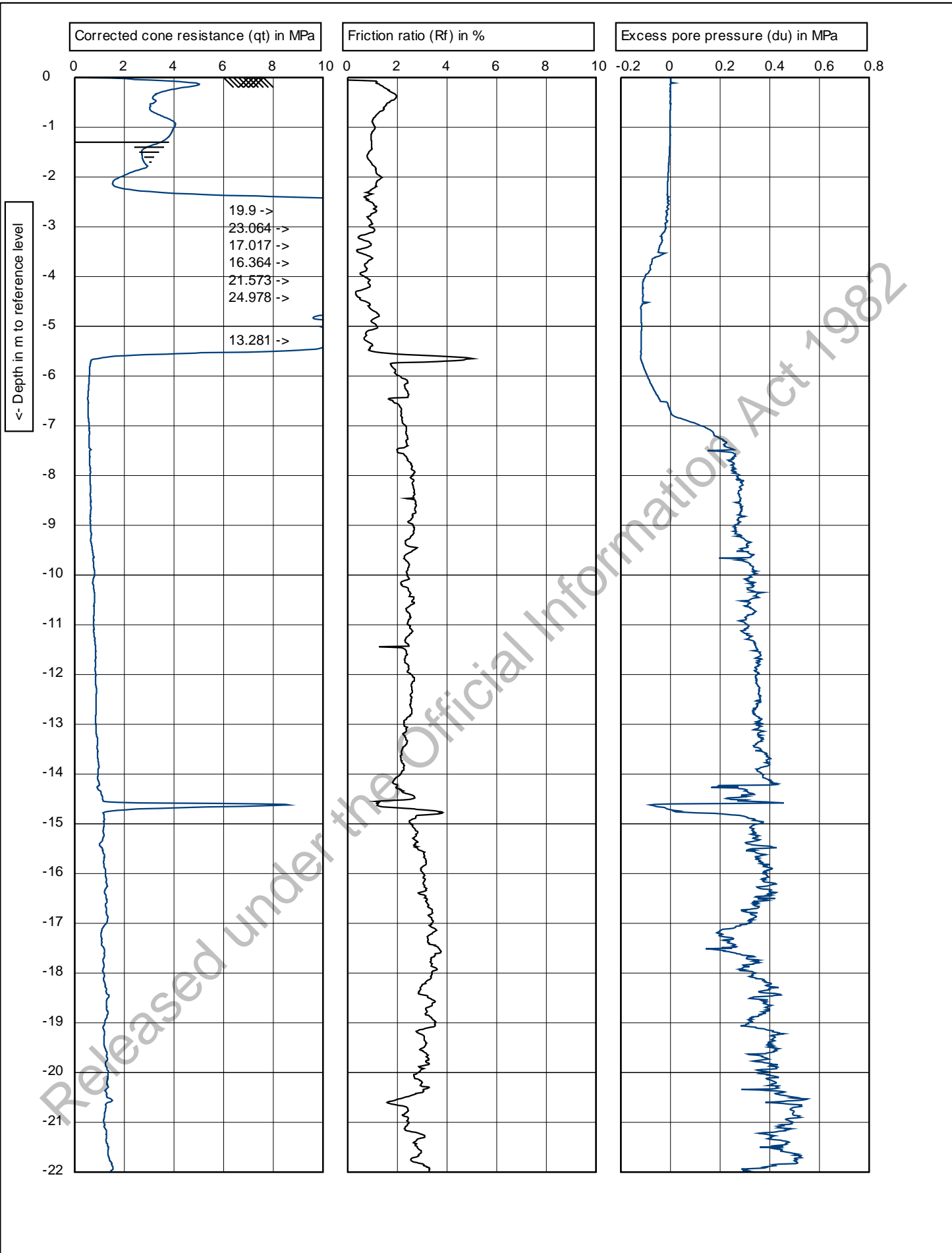
	Test according to ASTM D5778-12 & ISO 22476-1:2012		Predrill: 0.00 m Predrilled	
	G.L.: 0.00 m MSL	W.L.: -1.30 m	Date: 20/12/2017	
Project: Mangapapa School	Location: 5 Rua St - Gisborne		Cone no.: C10CFIIP.C14434	
Position: 2036953, 5710315 NZTM	Project no.: 2-68000.00_HA2212		CPT no.: 04	
				1/12



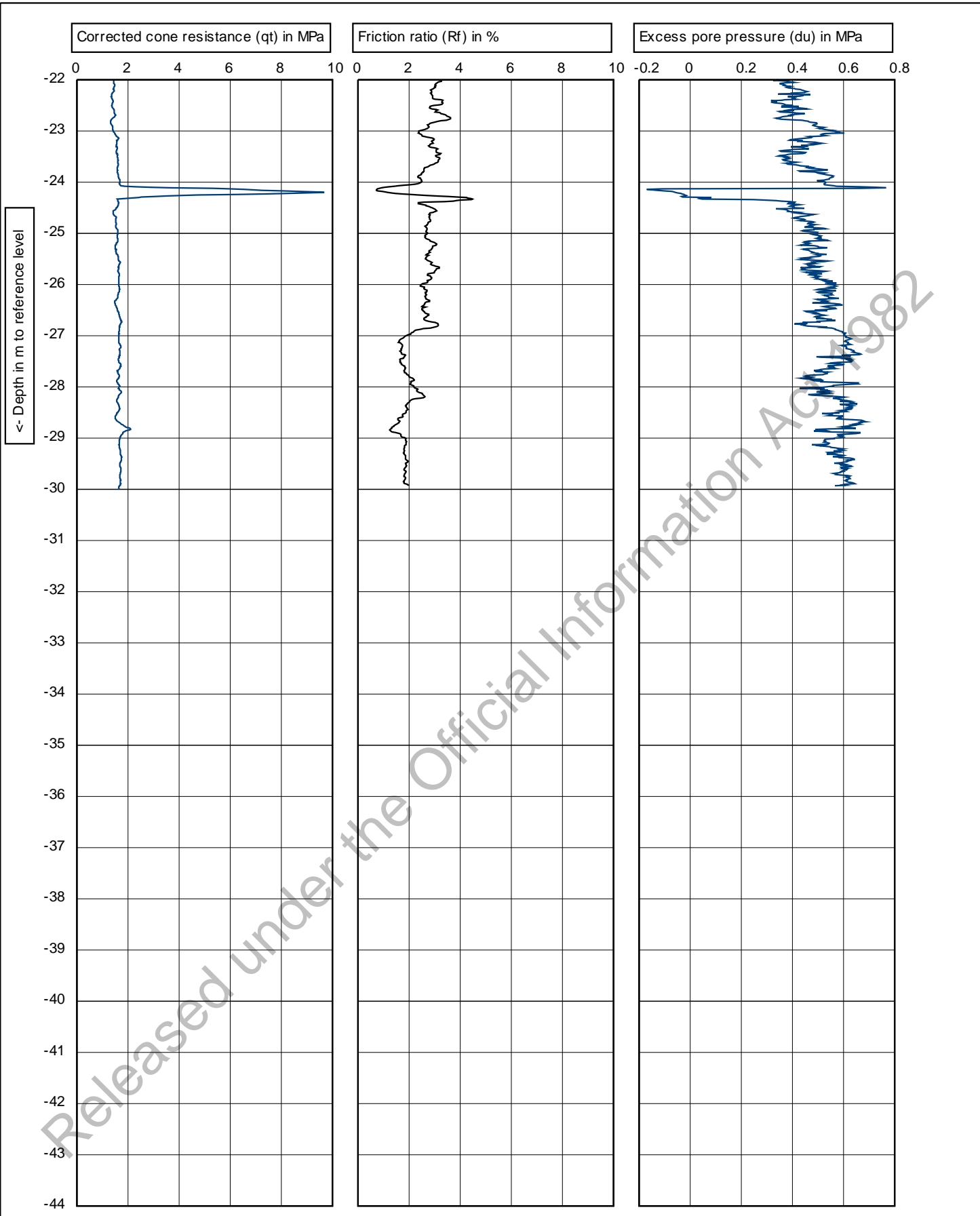
Target Depth _____

EOH - Dipped - GWL @ 1.3m _____

  <small>Graphs indicated as not accredited are outside the scope of the laboratory's accreditation</small>	 <small>150 cm²</small> <small>10 cm²</small>	Test according ASTM D5778-12 & ISO 22476-1:2012 G.L.: 0.00 m MSL W.L.: -1.30 m	Predrill: 0.00 m Predrilled Date: 20/12/2017	
	Project: Mangapapa School Location: 5 Rua St - Gisborne Position: 2036953, 5710315 NZTM	Cone no.: C10CFIIP.C14434 Project no.: 2-68000.00_HA2212	CPT no.: 04	2/12



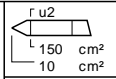
	Test according ASTM D5778-12 & ISO 22476-1:2012		Predrill: 0.00 m Predrilled	
	G.L.: 0.00 m MSL	W.L.: -1.30 m	Date: 20/12/2017	
Project: Mangapapa School			Cone no.: C10CFIIP.C14434	
Location: 5 Rua St - Gisborne			Project no.: 2-68000.00_HA2212	
Position: 2036953, 5710315 NZTM			CPT no.: 04	3/12

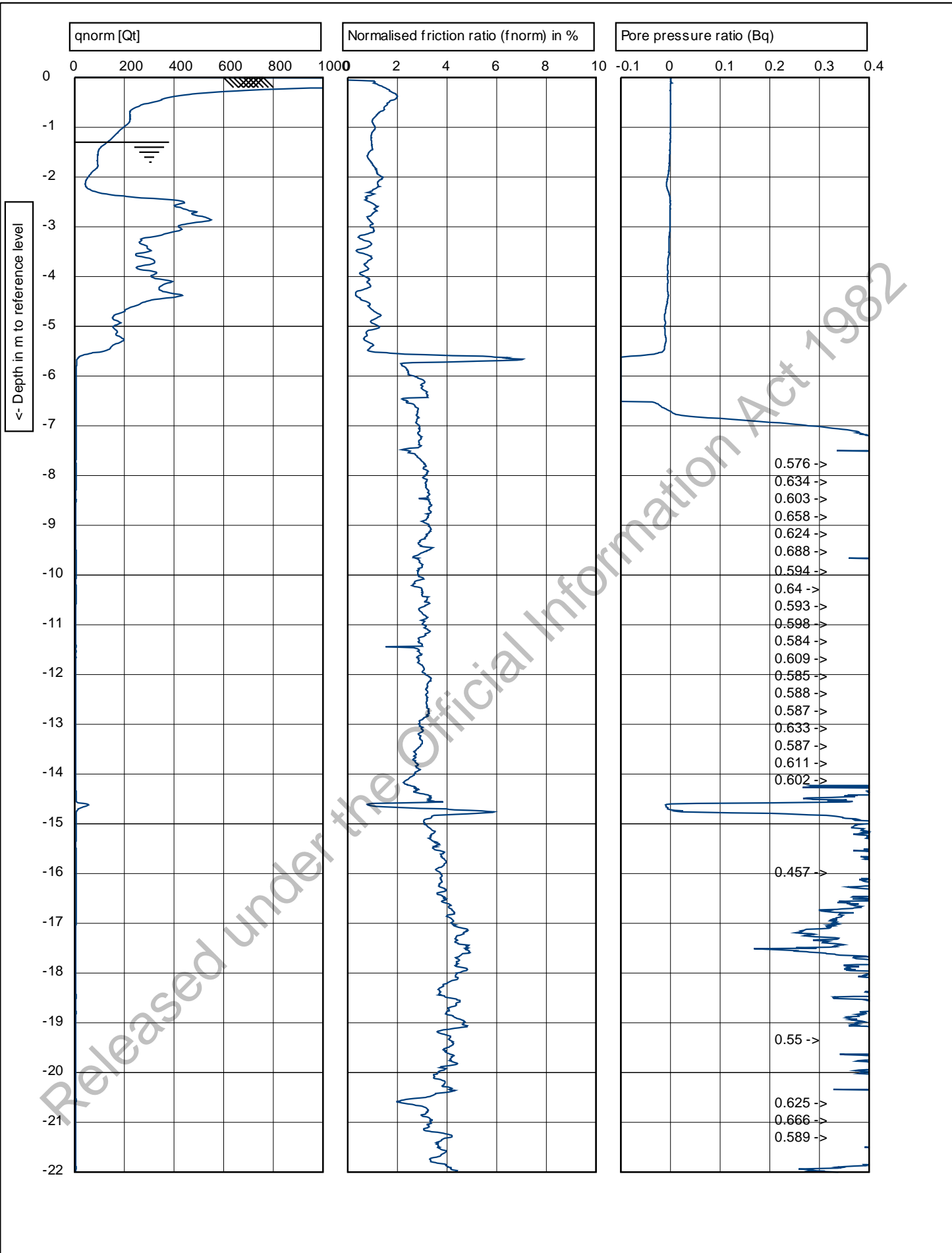


Target Depth _____
 EOH - Dipped - GWL @ 1.3m _____



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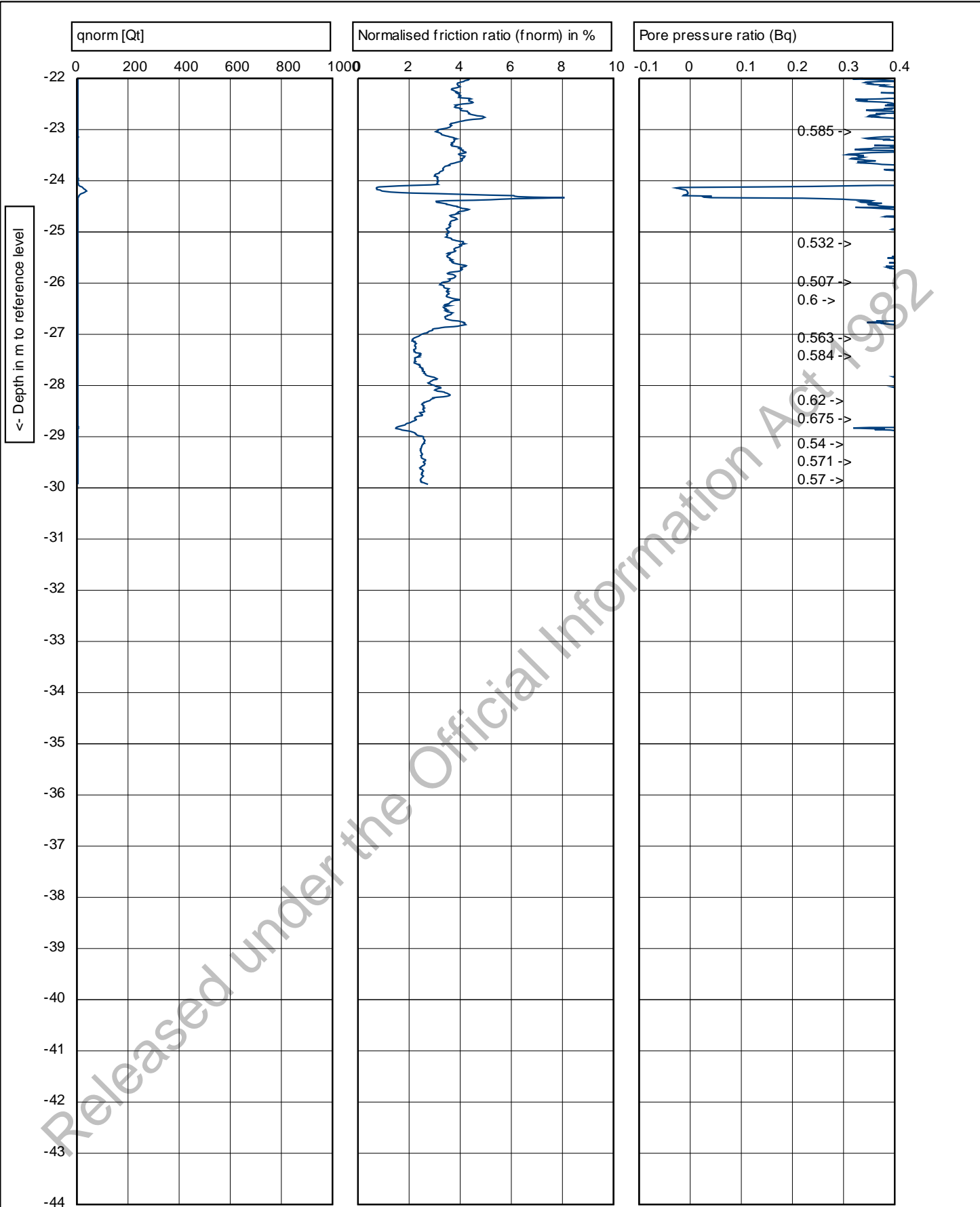
	Test according ASTM D5778-12 & ISO 22476-1:2012		Predrill: 0.00 m Predrilled	
	G.L.: 0.00 m MSL	W.L.: -1.30 m	Date: 20/12/2017	
Project: Mangapapa School		Cone no.: C10CFIIP.C14434		
Location: 5 Rua St - Gisborne		Project no.: 2-68000.00_HA2212		
Position: 2036953, 5710315 NZTM		CPT no.: 04	4/12	



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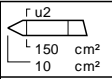
Graphs on this page are not IANZ accredited

	Test according to ASTM D5778-12 & ISO 22476-1:2012		Predrill: 0.00 m Predrilled	
	G.L.: 0.00 m MSL	W.L.: -1.30 m	Date: 20/12/2017	
Project: Mangapapa School			Cone no.: C10CFIIP.C14434	
Location: 5 Rua St - Gisborne			Project no.: 2-68000.00_HA2212	
Position: 2036953, 5710315 NZTM			CPT no.: 04	5/12



Target Depth _____
 EOH - Dipped - GWL @ 1.3m _____

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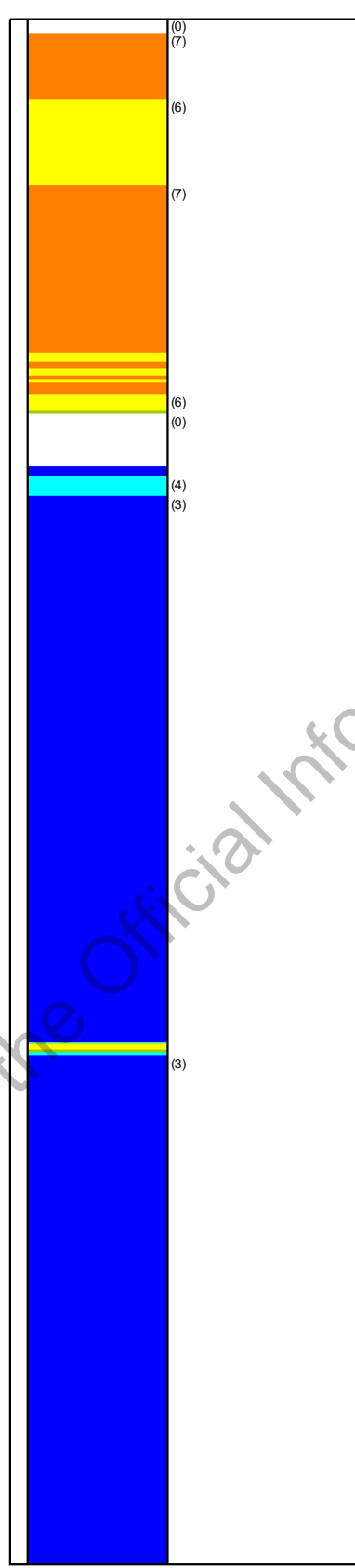
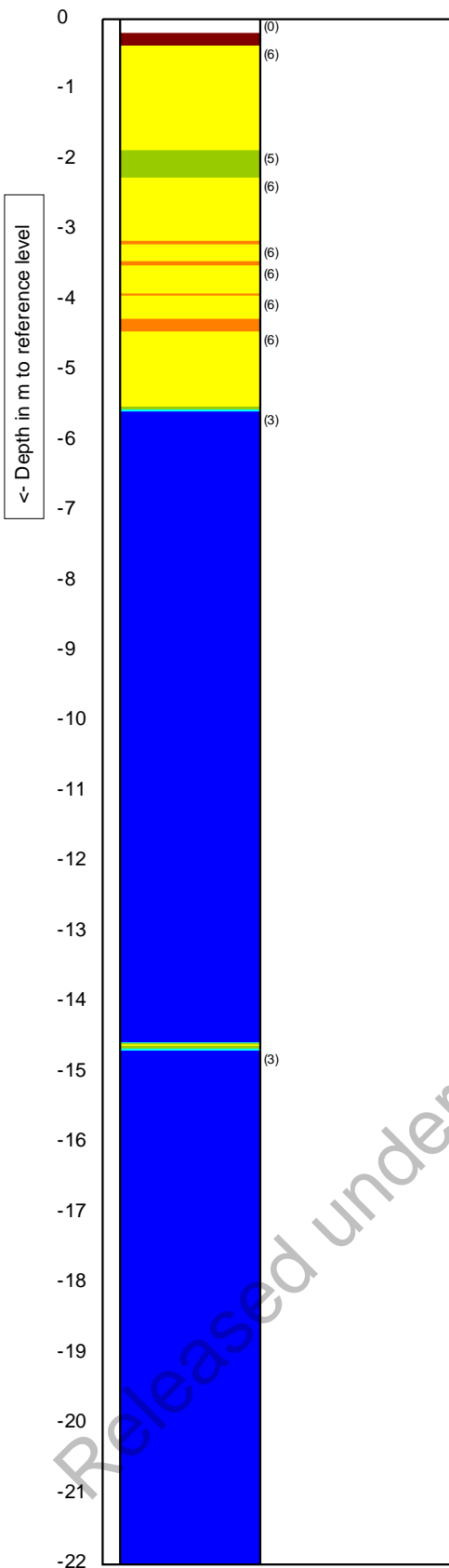
Test according ASTM D5778-12 & ISO 22476-1:2012
 G.L.: 0.00 m MSL W.L.: -1.30 m

Predrill:	0.00 m Predrilled
Date:	20/12/2017
Cone no.:	C10CFIP.C14434
Project no.:	2-68000.00_HA2212
CPT no.:	04
	6/12

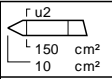
Project: **Mangapapa School**
 Location: **5 Rua St - Gisborne**
 Position: **2036953, 5710315 NZTM**

Soil Classification (using Fr)

Soil Classification (using Bq)



- (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



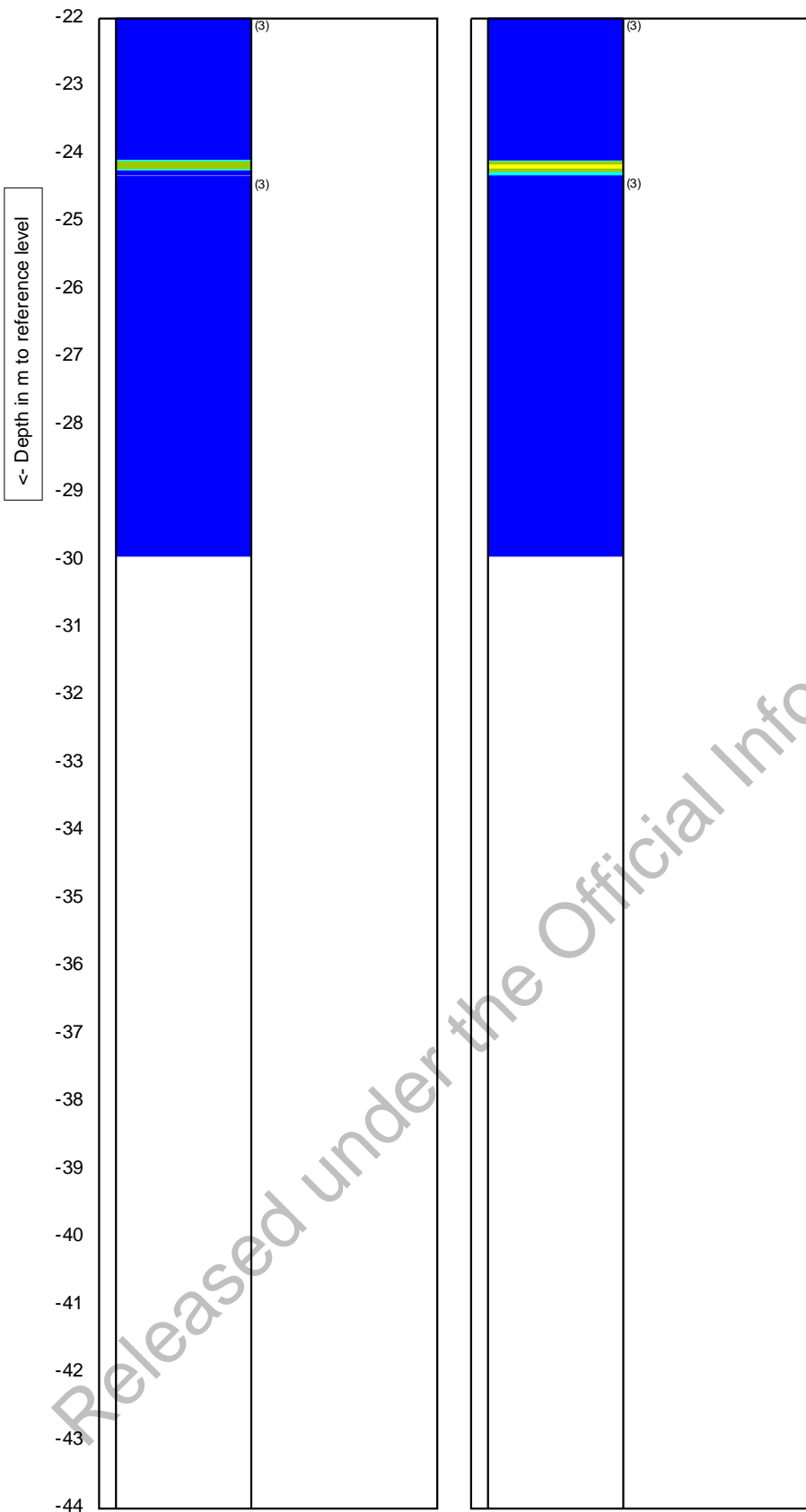
Test according ASTM D5778-12 & ISO 22476-1:2012
 G.L.: 0.00 m MSL W.L.: -1.30 m

Predrill:	0.00 m Predrilled
Date:	20/12/2017
Cone no.:	C10CFIP.C14434
Project no.:	2-68000.00_HA2212
CPT no.:	04

Project: **Mangapapa School**
 Location: **5 Rua St - Gisborne**
 Position: **2036953, 5710315 NZTM**

Soil Classification (using Fr)

Soil Classification (using Bq)

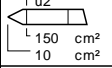


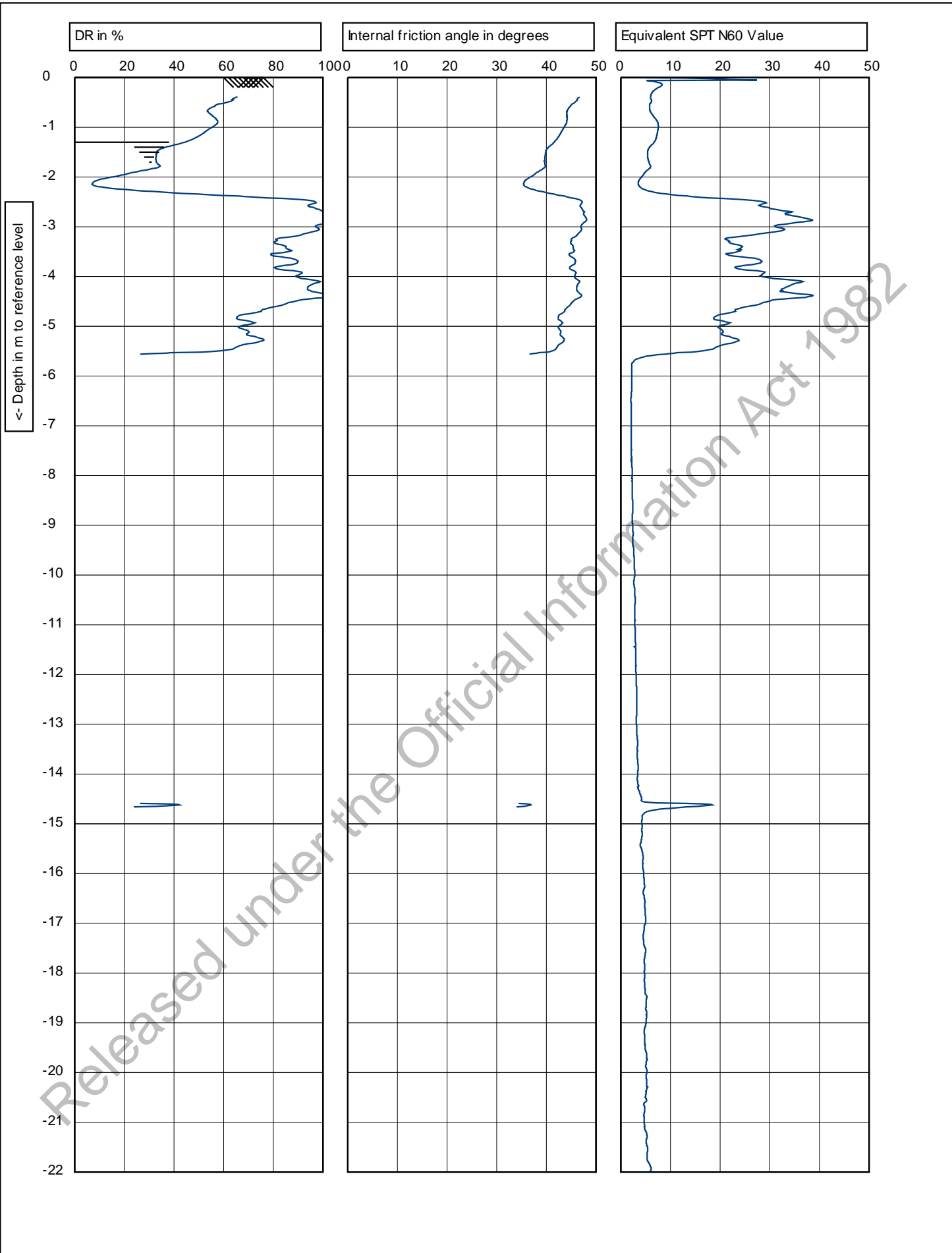
- (0) Not defined
- (1) Sensitive, fine grained
- (2) Organic soils-peats
- (3) Clays-clay to silty clay
- (4) Clayey silt to silty clay
- (5) Sand mixtures
- (6) Sands
- (7) Gravelly sand to sand
- (8) Very stiff sand to clayey sand
- (9) Very stiff fine grained

Depth in m to reference level

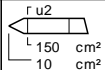


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	Test according ASTM D5778-12 & ISO 22476-1:2012		Predrill: 0.00 m Predrilled	
	G.L.: 0.00 m MSL	W.L.: -1.30 m	Date: 20/12/2017	Cone no.: C10CFIP.C14434
Project: Mangapapa School			Project no.: 2-68000.00_HA2212	
Location: 5 Rua St - Gisborne			CPT no.: 04	8/12
Position: 2036953, 5710315 NZTM				



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Test according to ASTM D5778-12 & ISO 22476-1:2012

G.L.: 0.00 m MSL

W.L.: -1.30 m

Predrill: 0.00 m Predrilled

Date: 20/12/2017

Project: Mangapapa School

Location: 5 Rua St - Gisborne

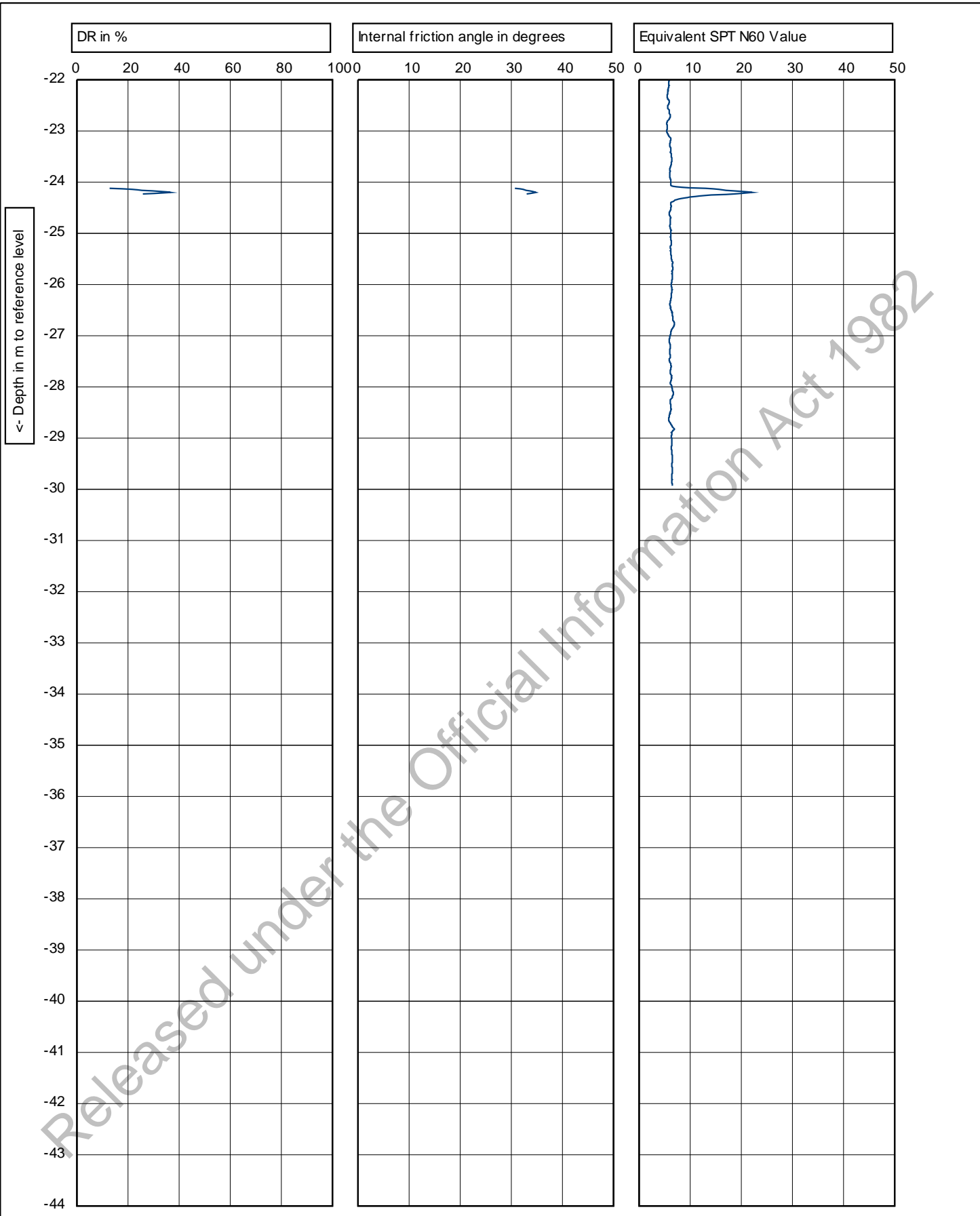
Position: 2036953, 5710315 NZTM

Cone no.: C10CFIIP.C14434

Project no.: 2-68000.00_HA2212

CPT no.: 04

9/12




Target Depth

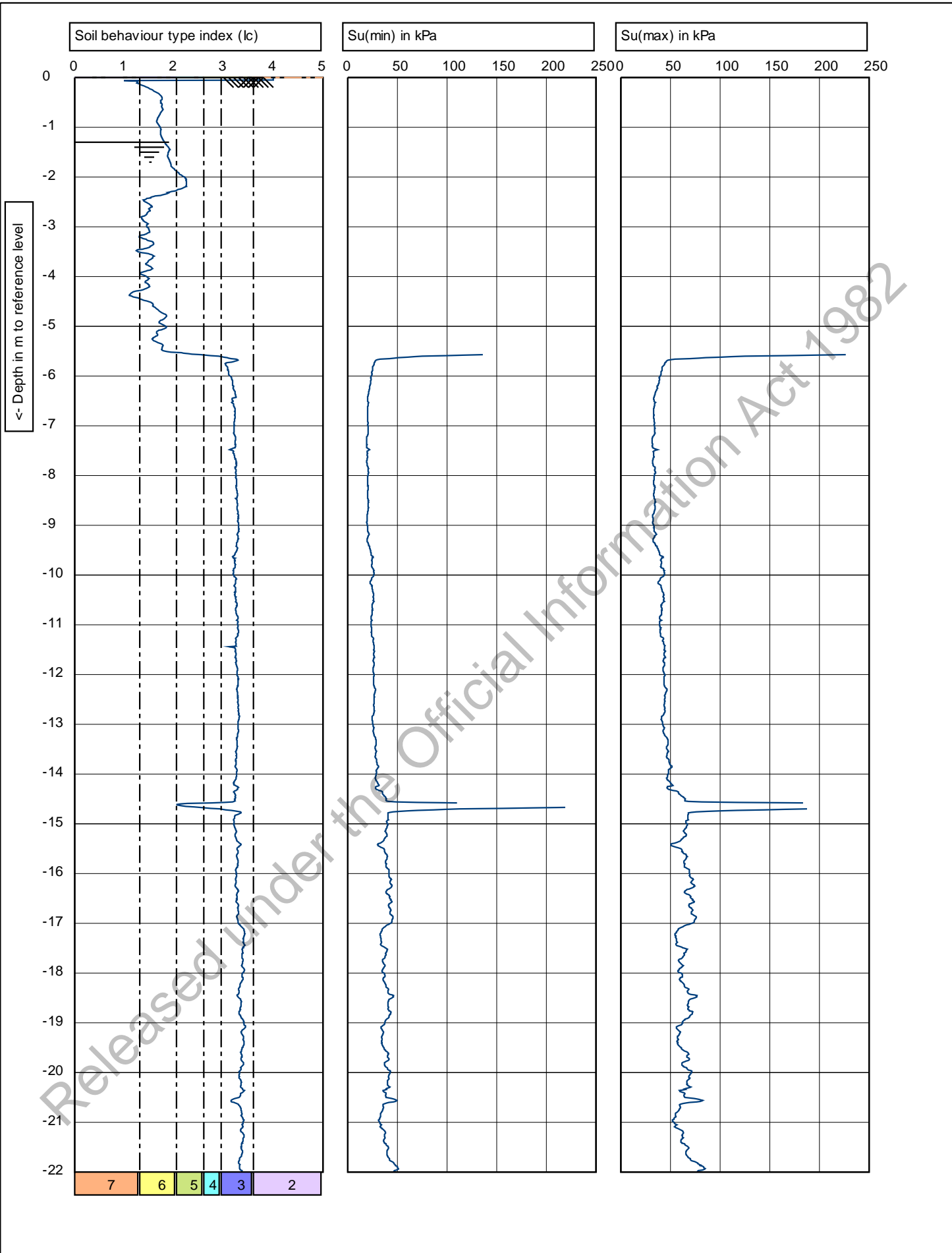
EOH - Dipped - GWL @ 1.3m



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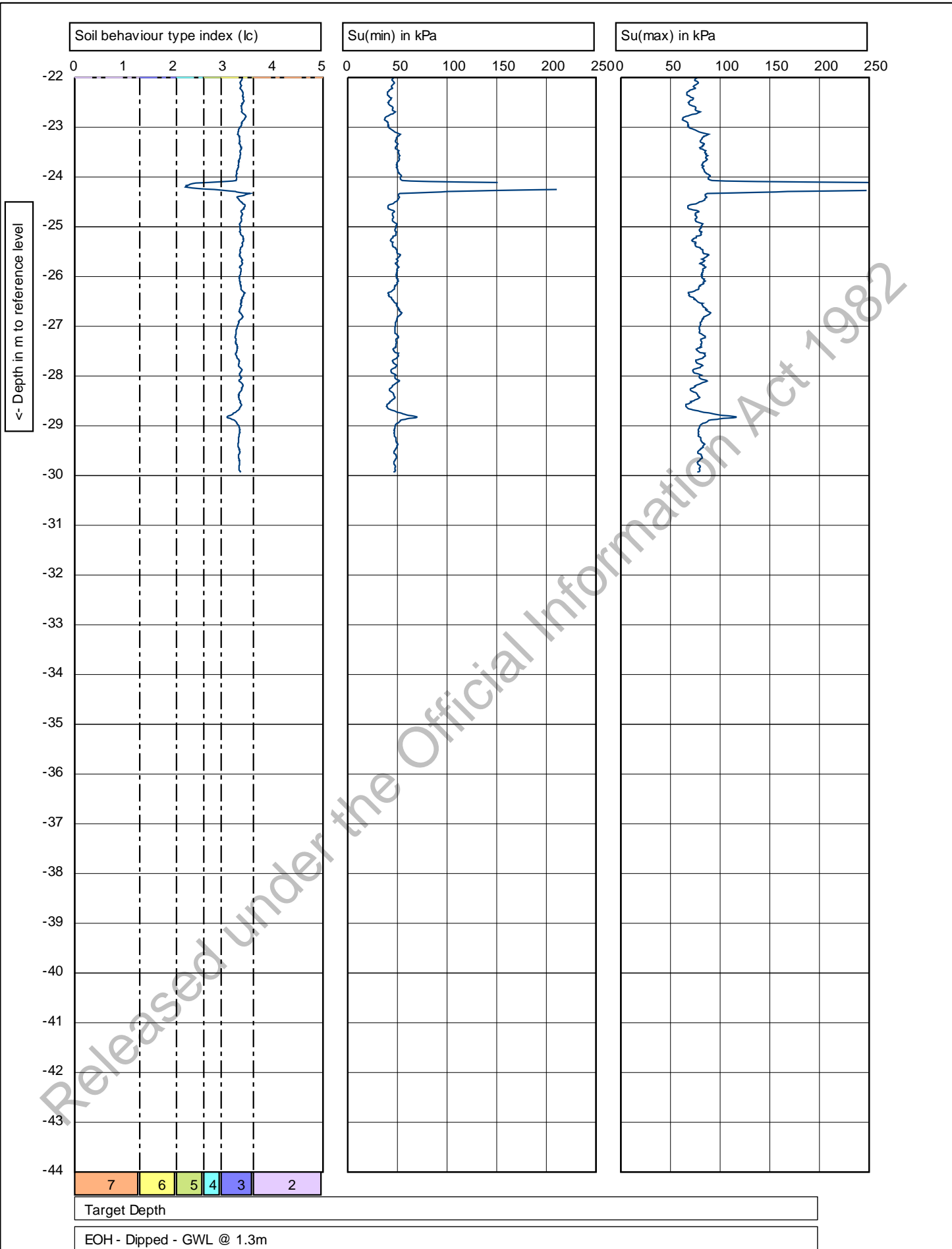
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	G.L.: 0.00 m MSL	W.L.: -1.30 m	Date: 20/12/2017	
Project: Mangapapa School			Cone no.: C10CFIIP.C14434	
Location: 5 Rua St - Gisborne			Project no.: 2-68000.00_HA2212	
Position: 2036953, 5710315 NZTM			CPT no.: 04	10/12




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1.44
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$\frac{\sigma_u}{\sigma_v}$ $\frac{150}{10} \frac{\text{cm}^2}{\text{cm}^2}$		Test according to ASTM D5778-12 & ISO 22476-1:2012	Predrill: 0.00 m Predrilled
G.L.: 0.00 m MSL	W.L.: -1.30 m		Date: 20/12/2017
Project: Mangapapa School		Cone no.: C10CFIP.C14434	
Location: 5 Rua St - Gisborne		Project no.: 2-68000.00_HA2212	
Position: 2036953, 5710315 NZTM		CPT no.: 04	11/12



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Test according to ASTM D5778-12 & ISO 22476-1:2012

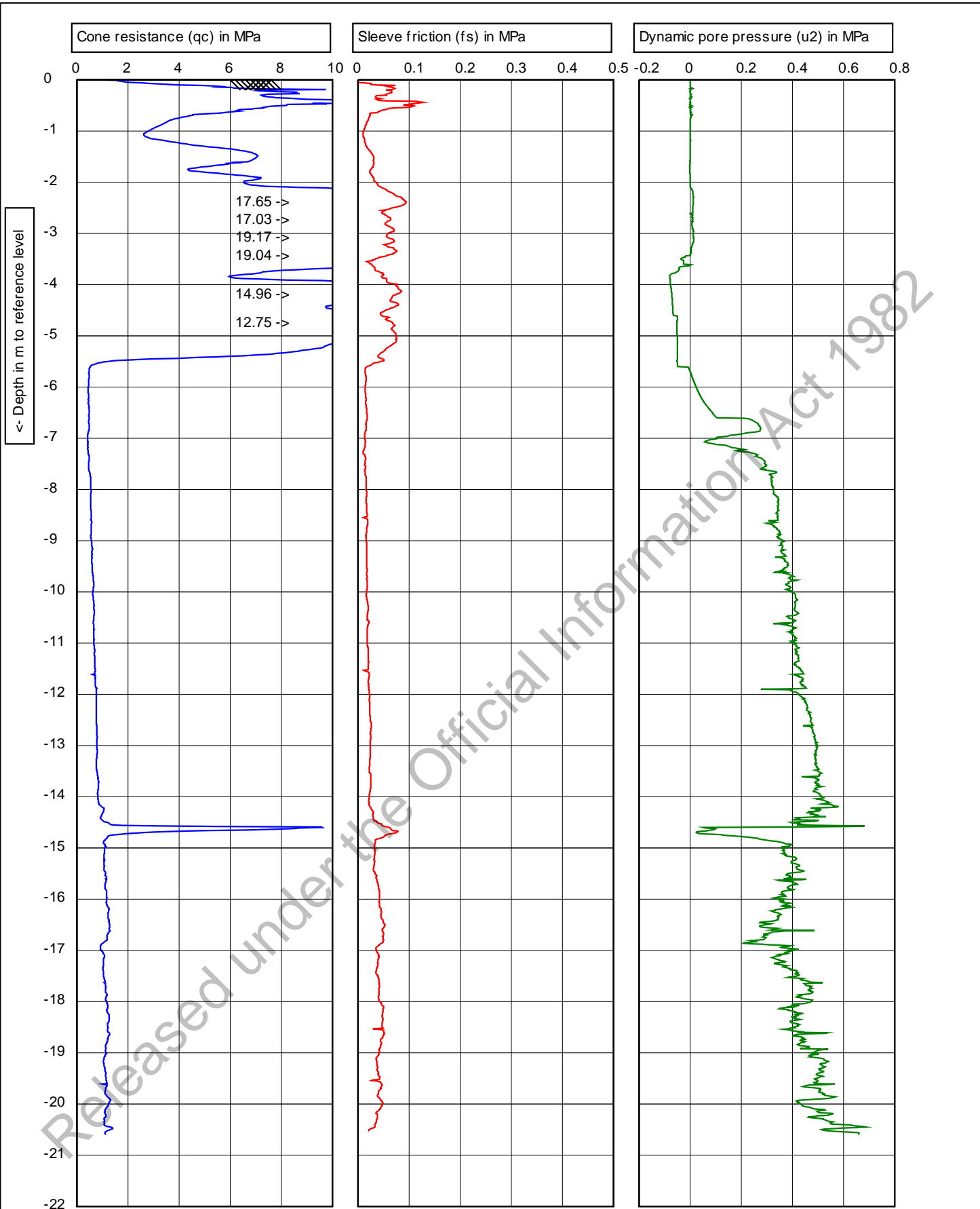
G.L.: 0.00 m MSL W.L.: -1.30 m

Project: **Mangapapa School**

Location: **5 Rua St - Gisborne**



Position: **2036953, 5710315 NZTM**

Predrill:	0.00 m Predrilled
Date:	20/12/2017
Cone no.:	C10CFIIP.C14434
Project no.:	2-68000.00_HA2212
CPT no.:	04
	12/12

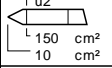


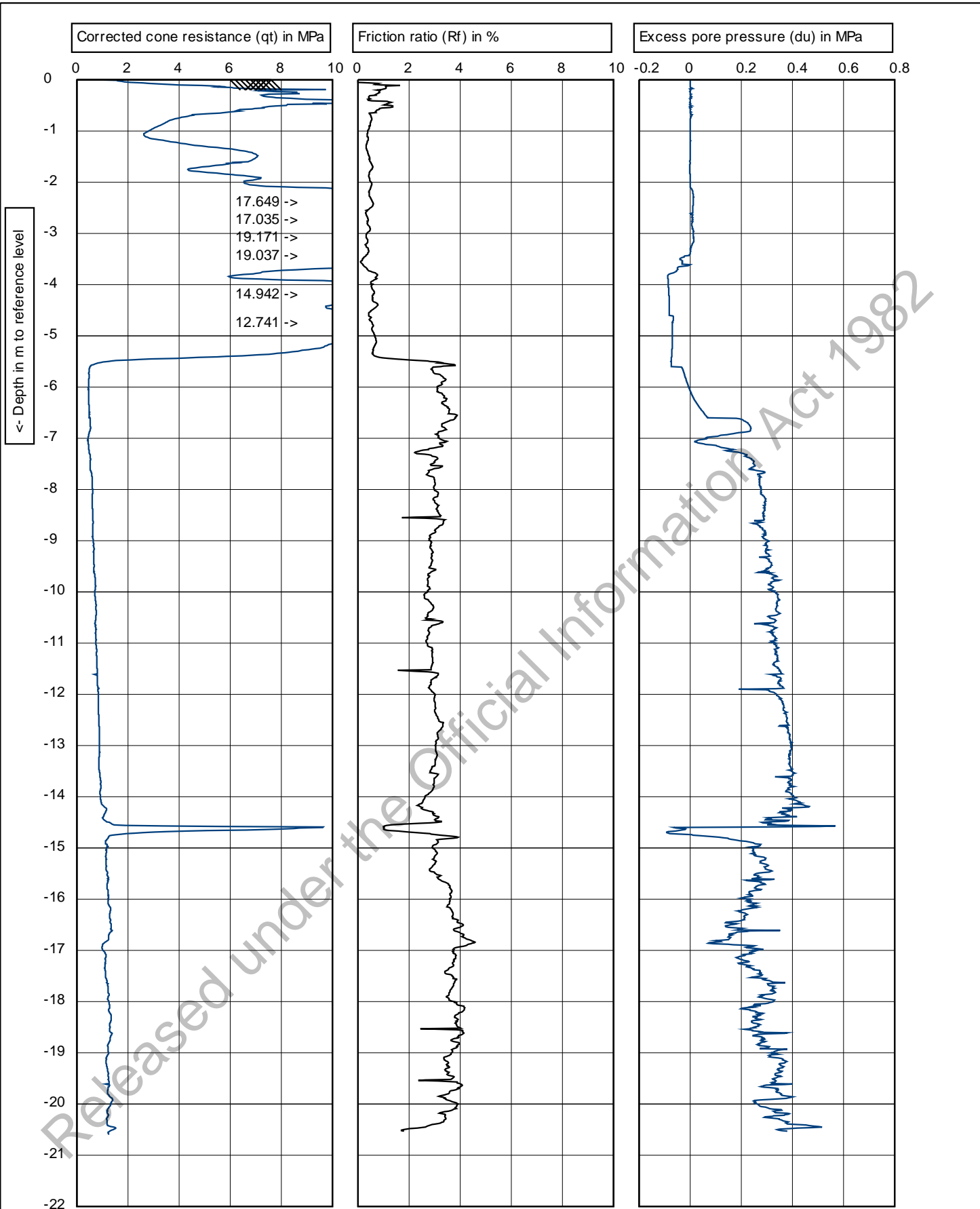
Target Depth

EOH - Dipped - Collapsed dry @ 3.1m

Graphs indicated as not accredited are outside the scope of the laboratory's accreditation

	Test according ASTM D5778-12 & ISO 22476-1:2012		Predrill: 0.00 m Predrilled	
	G.L.: 0.00 m MSL	W.L.: -3.10 m	Date: 18/12/2017	
Project: Mangapapa School	Location: 5 Rua St - Gisborne		Cone no.: C10CFIIP.C14427	
Position: 2036942, 5710286 NZTM	CPT no.: S02		1/6	

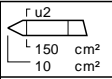


Target Depth

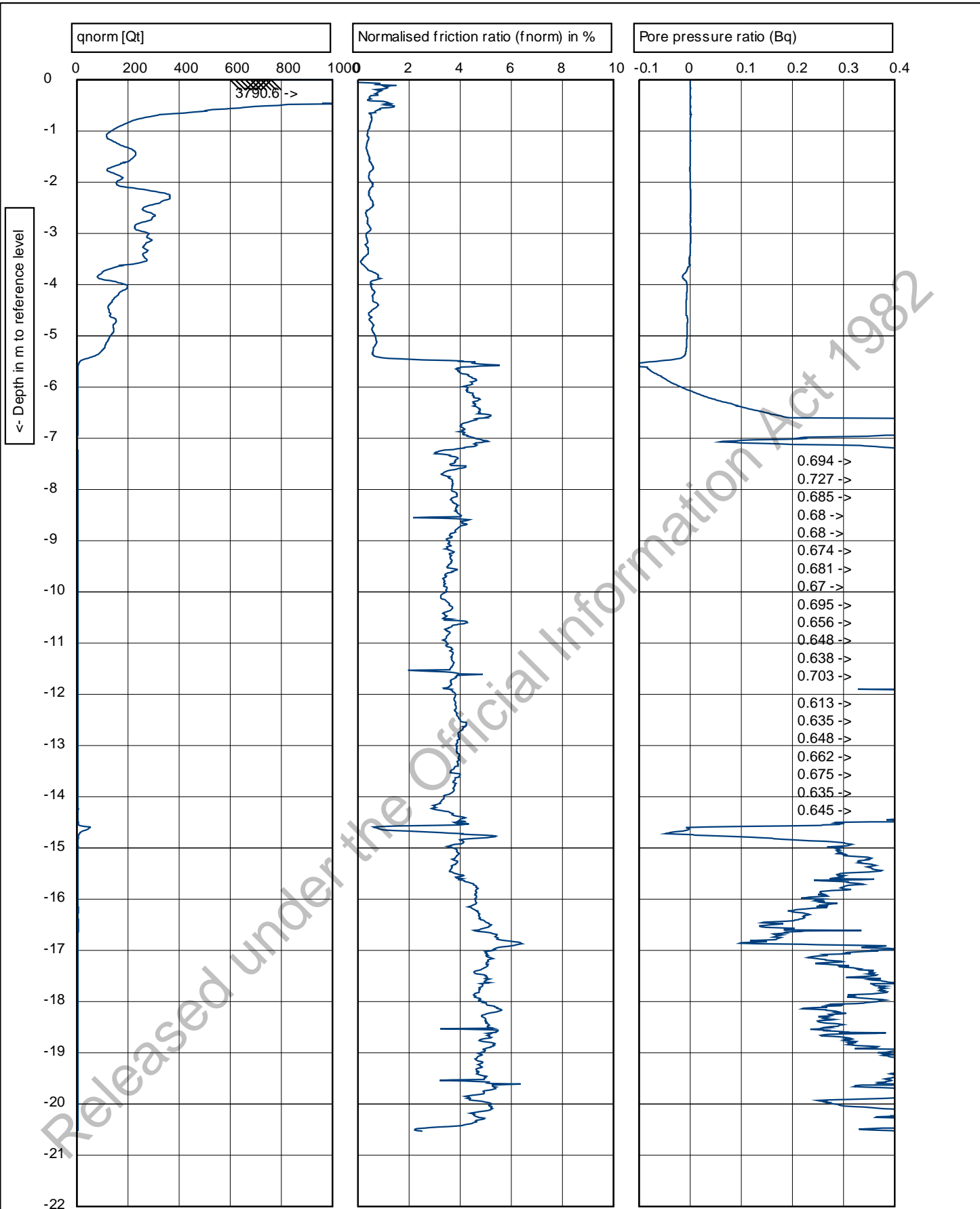
EOH - Dipped - Collapsed dry @ 3.1m



Graphs on this page are not IANZ accredited



Test according ASTM D5778-12 & ISO 22476-1:2012		Predrill: 0.00 m Predrilled	
G.L.: 0.00 m MSL	W.L.: -3.10 m	Date:	18/12/2017
Project: Mangapapa School		Cone no.:	C10CFIP.C14427
Location: 5 Rua St - Gisborne		Project no.:	2-68000.00_HA2212
Position: 2036942, 5710286 NZTM		CPT no.:	S02
			2/6



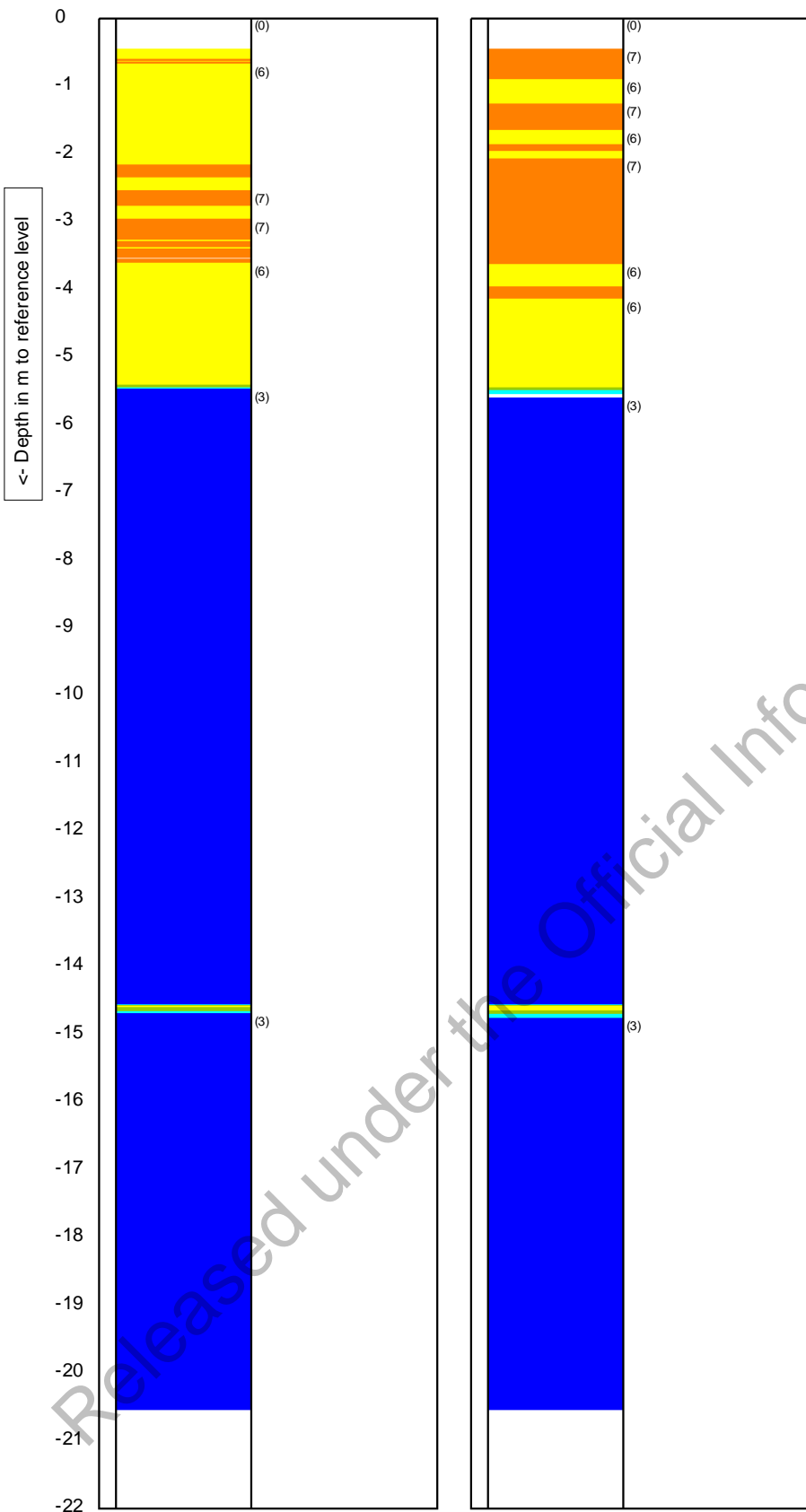
Target Depth _____
 EOH - Dipped - Collapsed dry @ 3.1m



	Test according ASTM D5778-12 & ISO 22476-1:2012		Predrill: 0.00 m Predrilled	
	G.L.: 0.00 m MSL	W.L.: -3.10 m	Date: 18/12/2017	Cone no.: C10CFIIP.C14427
Project: Mangapapa School			Project no.: 2-68000.00_HA2212	
Location: 5 Rua St - Gisborne			CPT no.: S02	
Position: 2036942, 5710286 NZTM			3/6	

Soil Classification (using Fr)

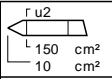
Soil Classification (using Bq)



- (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



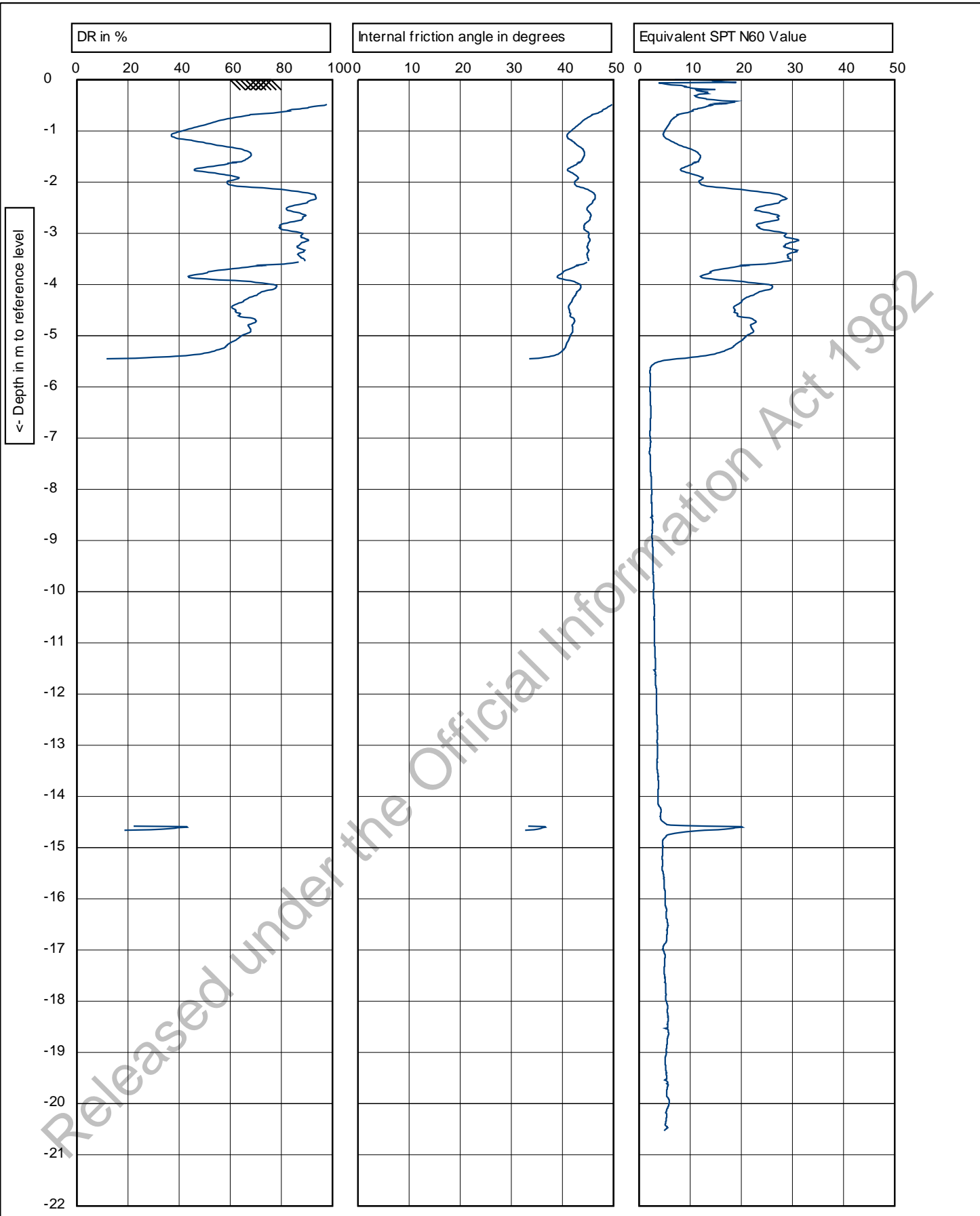
Graphs on this page are not IANZ accredited



Test according ASTM D5778-12 & ISO 22476-1:2012
 G.L.: 0.00 m MSL W.L.: -3.10 m

Predrill:	0.00 m Predrilled	
Date:	18/12/2017	
Cone no.:	C10CFIP.C14427	
Project no.:	2-68000.00_HA2212	
CPT no.:	S02	4/6

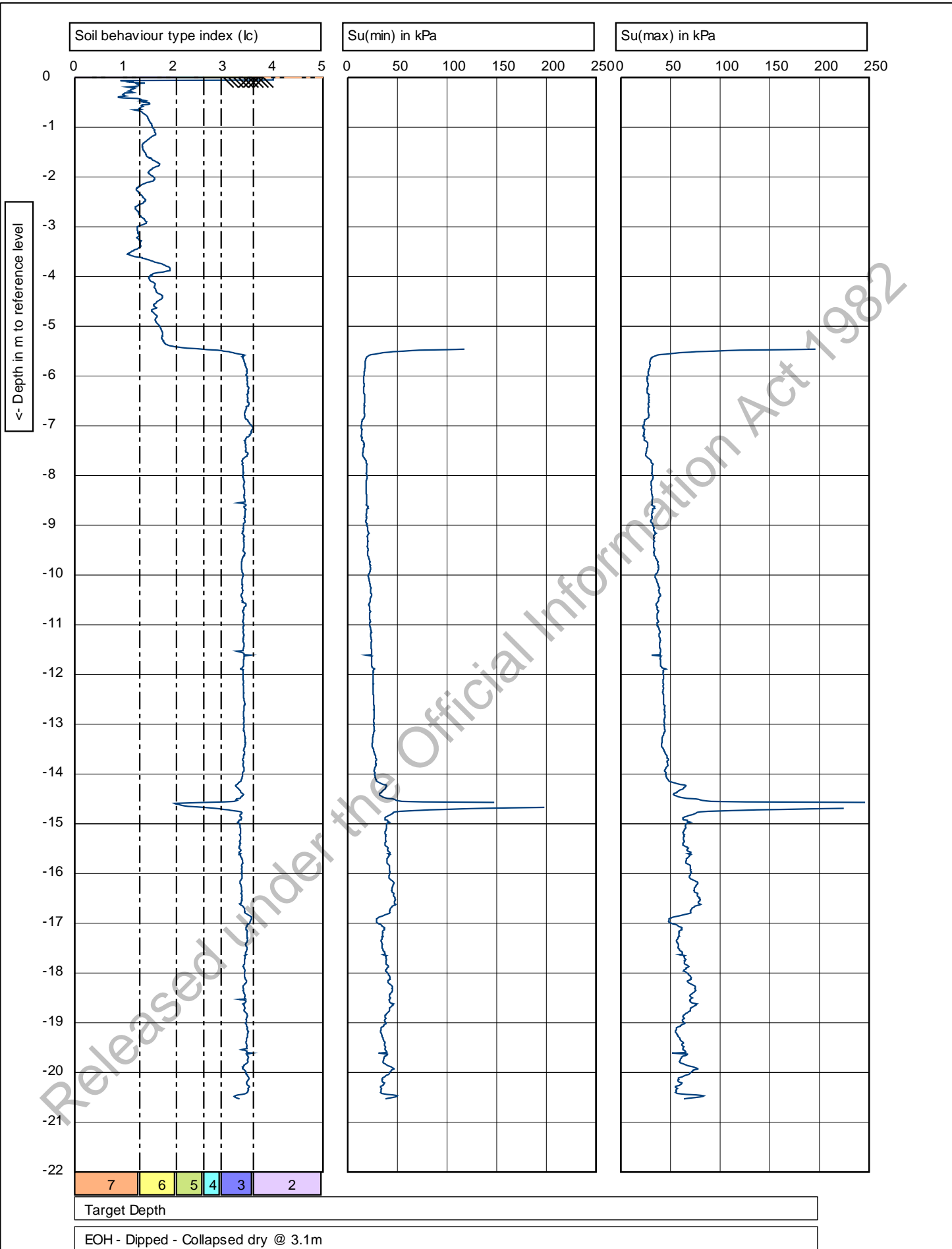
Project: **Mangapapa School**
 Location: **5 Rua St - Gisborne**
 Position: **2036942, 5710286 NZTM**



Target Depth _____
 EOH - Dipped - Collapsed dry @ 3.1m



	Test according ASTM D5778-12 & ISO 22476-1:2012		Predrill: 0.00 m Predrilled	
	G.L.: 0.00 m MSL	W.L.: -3.10 m	Date: 18/12/2017	
Project: Mangapapa School			Cone no.: C10CFIP.C14427	
Location: 5 Rua St - Gisborne			Project no.: 2-68000.00_HA2212	
Position: 2036942, 5710286 NZTM			CPT no.: S02	5/6



	Test according ASTM D5778-12 & ISO 22476-1:2012		Predrill: 0.00 m Predrilled	
	G.L.: 0.00 m MSL	W.L.: -3.10 m	Date: 18/12/2017	
Project: Mangapapa School		Cone no.: C10CFIP.C14427		
Location: 5 Rua St - Gisborne		Project no.: 2-68000.00_HA2212		
Position: 2036942, 5710286 NZTM		CPT no.: S02	6/6	

**CPT
TEST REPORT**



Client : **BCD Group Ltd**
 Project : **Mangapapa School**
 Location : **5 Rua St - Gisborne**
 Hole Number: **4**
 Tested by : **J Kavanaugh/ N Oosthuizen**
 Date tested : **20/12/17**
 Coordinates : **E: 2036953**
 N: 5710315
 EL: 10m
 Water level : **EOH - Dipped - GWL @ 1.3m**

Project No : **2-68000.00**
 Lab Ref No : **HA2212_04**
 Client Ref No :

Test Results	
Start Time	07:39:00
Time at penetration	00:00:00
End Time	00:00:00
Reference level	0
Ground level	0
Predrill	0
Penetration Depth	30
Remarks	Target Depth
GPS Type	Garmin eTrex 20
GPS Accuracy	+ / - 3m
GPS Reference Grid	NZTM
GPS Datum	MSL
Rig Type	GeoMil Panther 100/ Flex 200
Rig ID	CPT03
Reaction Force	Dead weight 10/22 tonnes
Data Acquisition (Digitizer)	GeoMil GME500
Acquisition Program	GeoMil CPTest
Reporting Program	GeoMil CPTask
Cone Type	C10 (10 Tonne Compression)
Cross Sectional Area	10cm²
Cone Area Ratio	0.8
Fluid Type	Silicone Fluid
Friction Reducer	0.55m behind base of cone
Application Class (ISO 22476-1)	2
Test Type (ISO 22476-1)	TE2 (Measured Cone and Sleeve)
Back Fill Method	Bentonite
Observations During Testing	None

Date tested : 20/12/17
 Date reported : 20/12/17

This report may only be reproduced in full, including corresponding calibration data, daily logs, and CPT graphs.

IANZ Approved Signatory

Designation : *CPT North Island Manager*
 Date : 20/12/17



Tests indicated as not accredited are outside the scope of the laboratory's accreditation

**CPT
TEST REPORT**



Client : **BCD Group Ltd**
 Project : **Mangapapa School**
 Location : **5 Rua St - Gisborne**
 Hole Number: **S02**
 Tested by : **J Kavanaugh/ N Oosthuizen**
 Date tested : **18/12/17**
 Coordinates : **E: 2036942**
 N: 5710286
 EL: 12m
 Water level : **EOH - Dipped - Collapsed dry @ 3.1m**

Project No : **2-68000.00**
 Lab Ref No : **HA2212_S02**
 Client Ref No :

Test Results	
Start Time	13:51:00
Time at penetration	00:00:00
End Time	00:00:00
Reference level	0
Ground level	0
Predrill	0
Penetration Depth	20.6
Remarks	Target Depth
GPS Type	Garmin eTrex 20
GPS Accuracy	+ / - 3m
GPS Reference Grid	NZTM
GPS Datum	MSL
Rig Type	GeoMil Panther 100/ Flex 200
Rig ID	CPT03
Reaction Force	Dead weight 10/22 tonnes
Data Acquisition (Digitizer)	GeoMil GME500
Acquisition Program	GeoMil CPTest
Reporting Program	GeoMil CPTask
Cone Type	C10 (10 Tonne Compression)
Cross Sectional Area	10cm²
Cone Area Ratio	0.8
Fluid Type	Silicone Fluid
Friction Reducer	0.55m behind base of cone
Application Class (ISO 22476-1)	2
Test Type (ISO 22476-1)	TE2 (Measured Cone and Sleeve)
Back Fill Method	Bentonite
Observations During Testing	None

Date tested : 18/12/17
 Date reported : 20/12/17

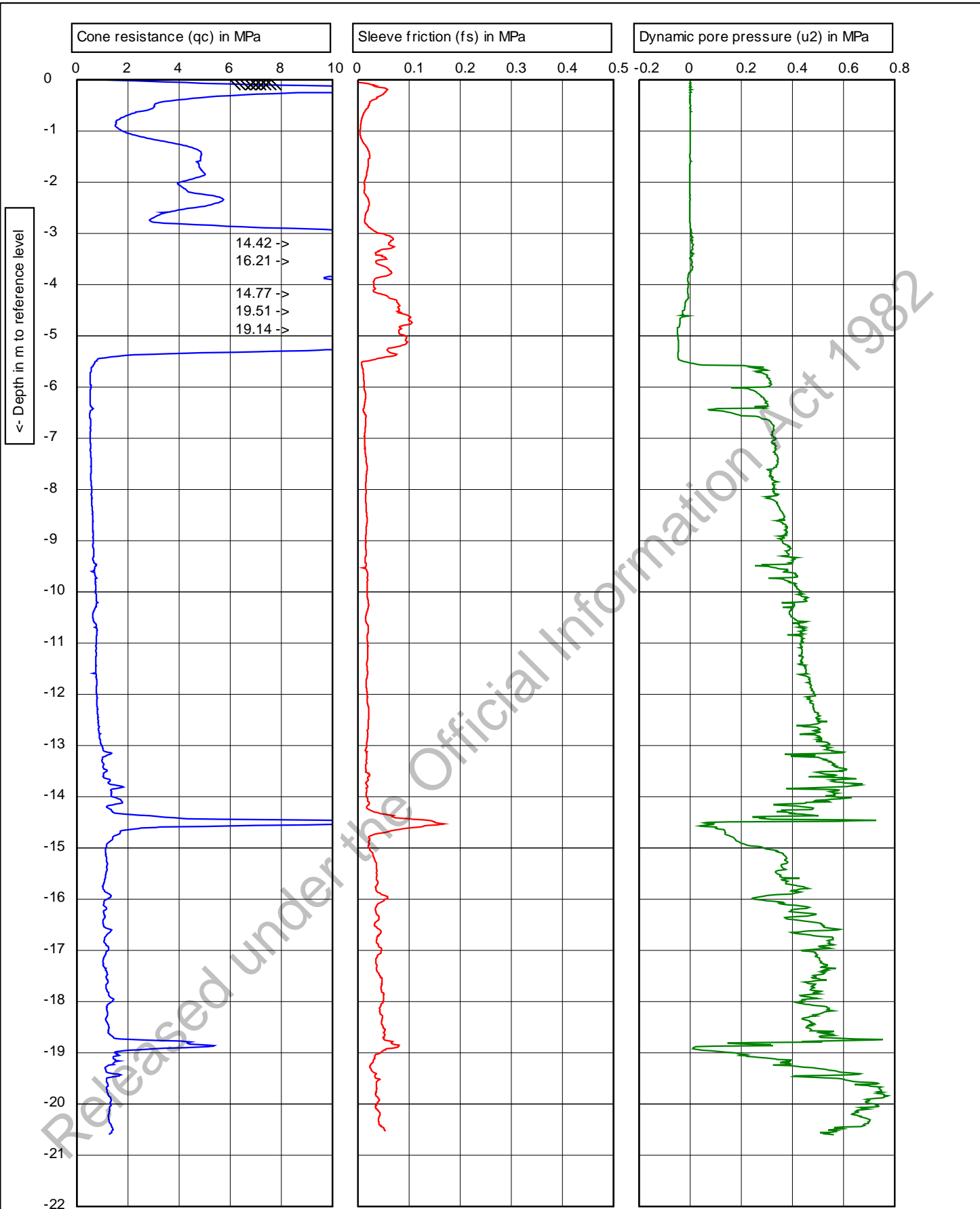
This report may only be reproduced in full, including corresponding calibration data, daily logs, and CPT graphs.

IANZ Approved Signatory

Designation : *CPT North Island Manager*
 Date : 20/12/17



Tests indicated as not accredited are outside the scope of the laboratory's accreditation



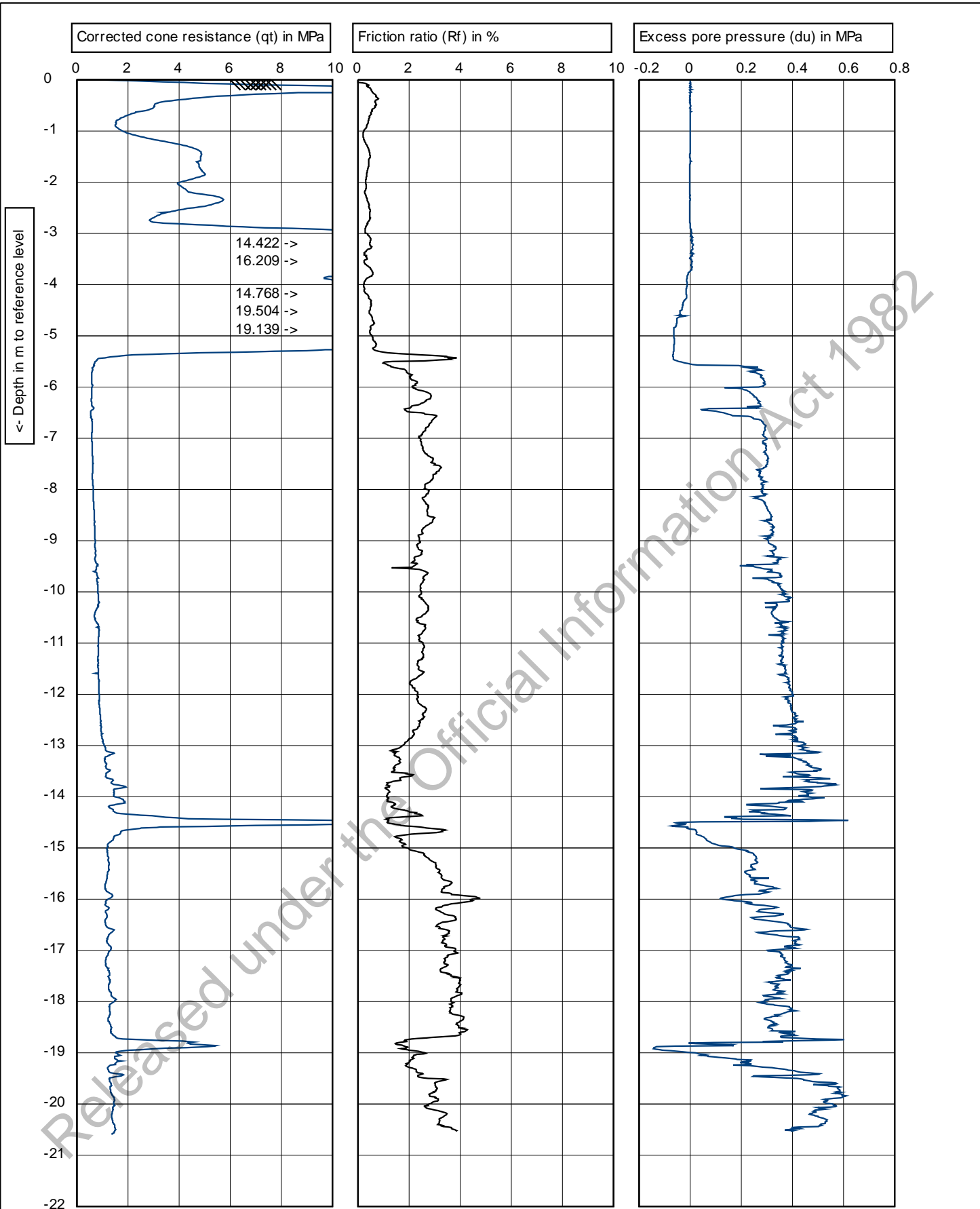
Target Depth

EOH - Dipped - Collapsed dry @ 3.5m

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IANZ ACCREDITED LABORATORY
 Graphs indicated as not accredited are outside the scope of the laboratory's accreditation

Test according ASTM D5778-12 & ISO 22476-1:2012
 G.L.: 0.00 m MSL W.L.: -3.50 m
 Project: **Mangapapa School**
 Location: **5 Rua St - Gisborne**
 Position: **2036865, 5710335 NZTM**

Predrill: **0.00 m Predrilled**
 Date: **18/12/2017**
 Cone no.: **C10CFIP.C14427**
 Project no.: **2-68000.00_HA2212**
 CPT no.: **S03** 1/6



Depth in m to reference level

Corrected cone resistance (qt) in MPa

Friction ratio (Rf) in %

Excess pore pressure (du) in MPa

14.422 ->
16.209 ->

14.768 ->
19.504 ->
19.139 ->

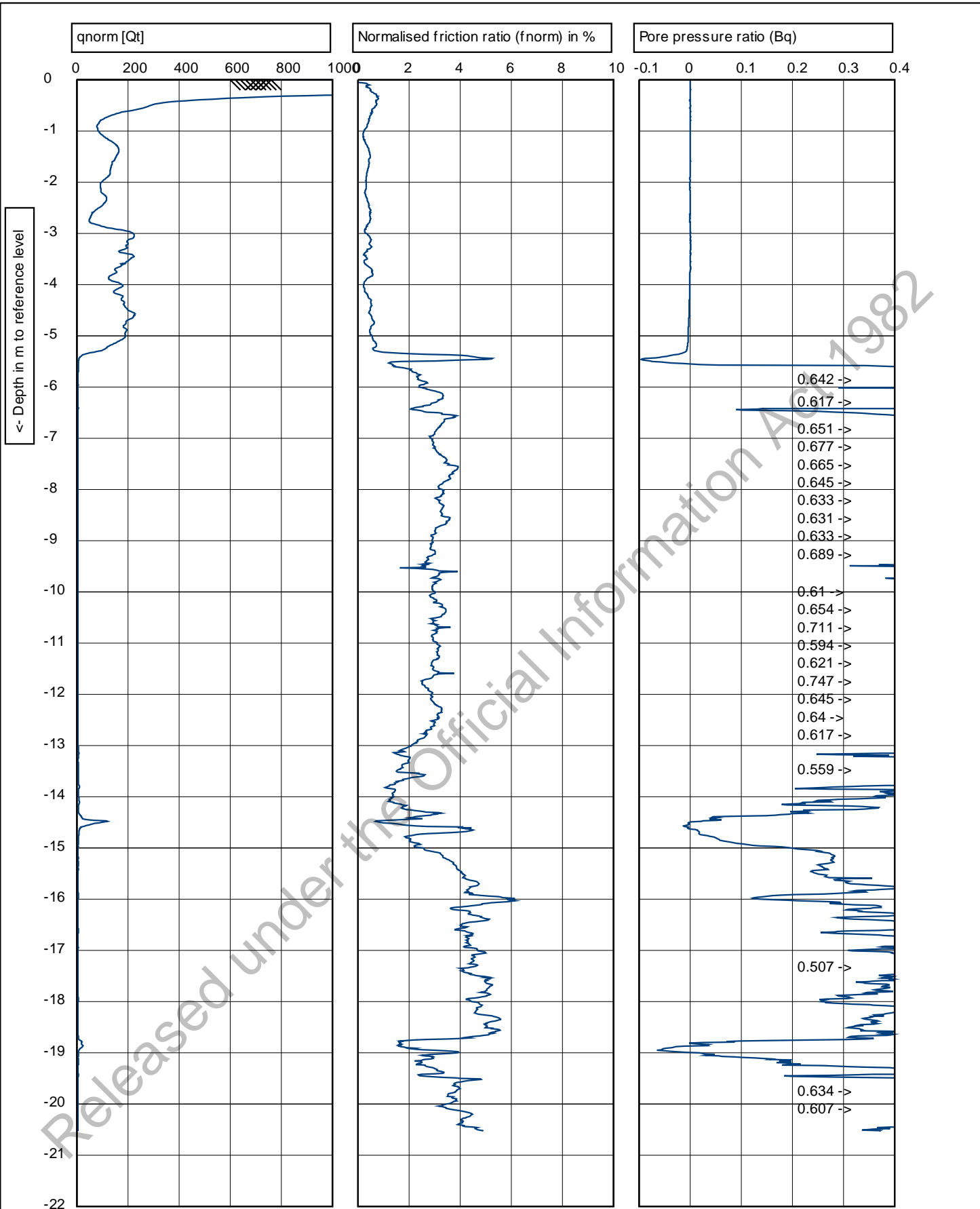
Target Depth

EOH - Dipped - Collapsed dry @ 3.5m

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1.44
Graphs on this page are not IANZ accredited

		Test according ASTM D5778-12 & ISO 22476-1:2012	Predrill: 0.00 m Predrilled
G.L.: 0.00 m MSL	W.L.: -3.50 m		Date: 18/12/2017
Project: Mangapapa School		Cone no.: C10CFIIP.C14427	
Location: 5 Rua St - Gisborne		Project no.: 2-68000.00_HA2212	
Position: 2036865, 5710335 NZTM		CPT no.: S03	2/6



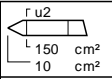
Target Depth

EOH - Dipped - Collapsed dry @ 3.5m



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Test according ASTM D5778-12 & ISO 22476-1:2012

G.L.: 0.00 m MSL W.L.: -3.50 m

Predrill: **0.00 m Predrilled**

Date: **18/12/2017**

Cone no.: **C10CFIIP.C14427**

Project no.: **2-68000.00_HA2212**

CPT no.: **S03** 3/6

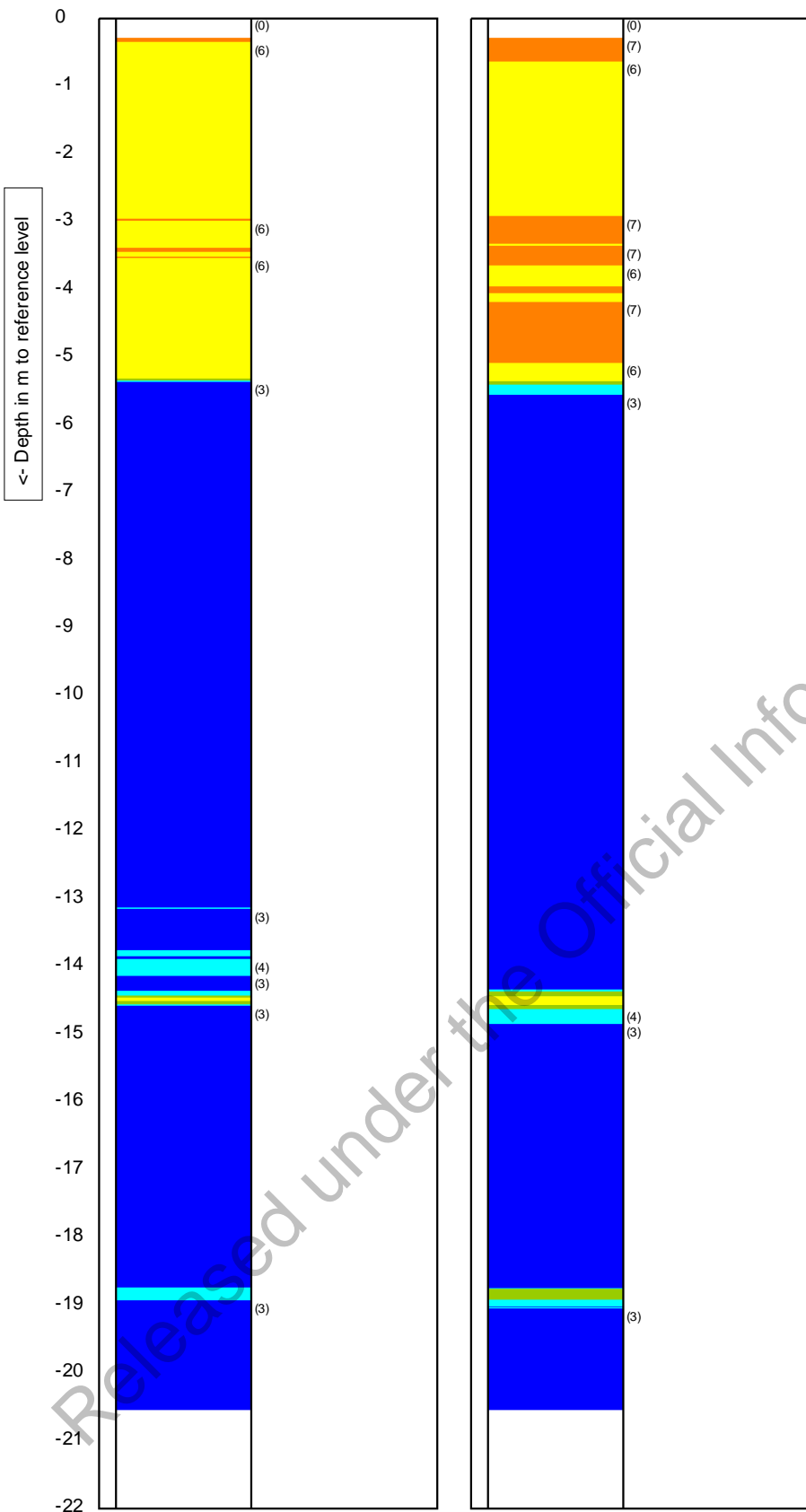
Project: **Mangapapa School**

Location: **5 Rua St - Gisborne**

Position: **2036865, 5710335 NZTM**

Soil Classification (using Fr)

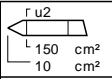
Soil Classification (using Bq)



- (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



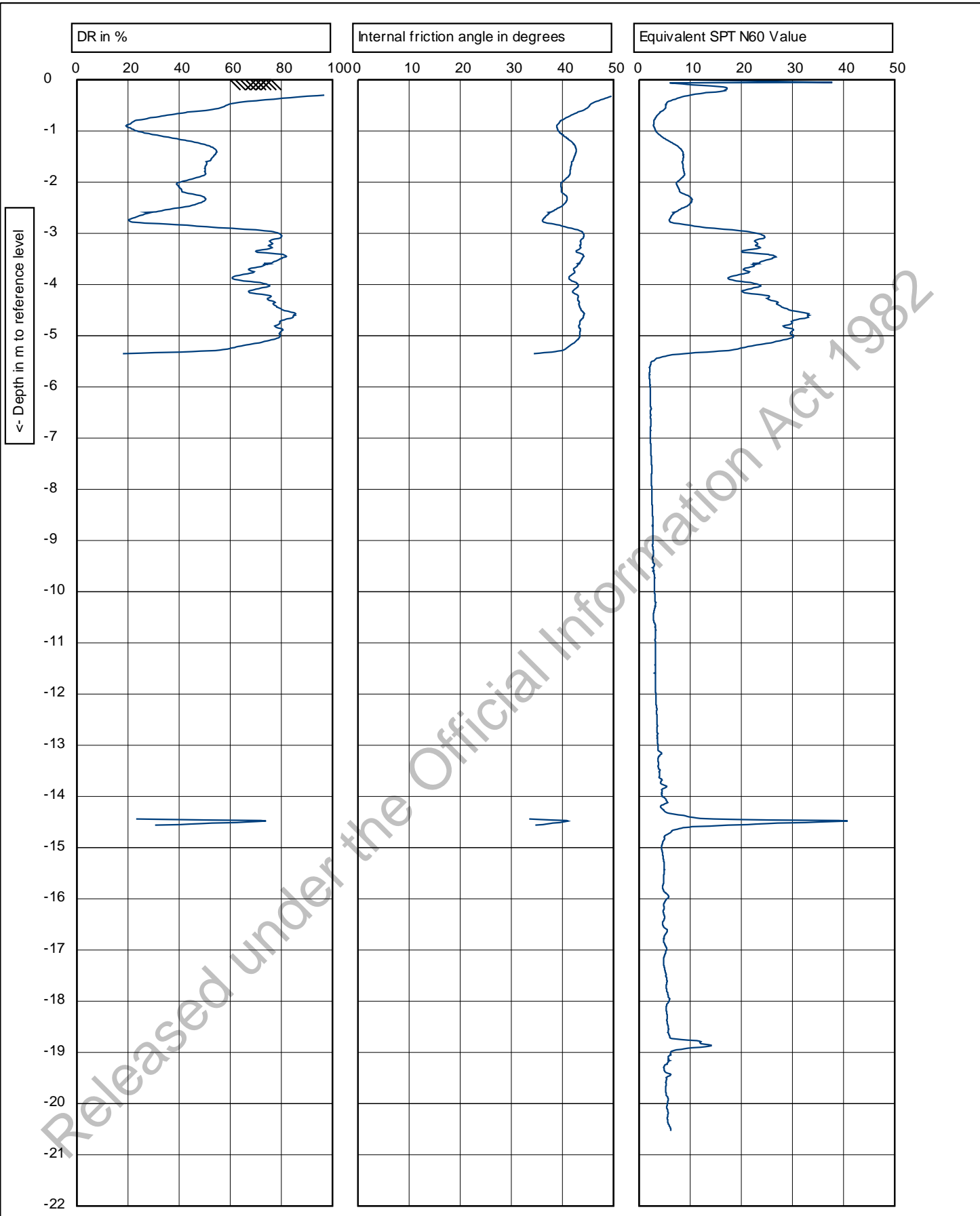
Graphs on this page are not IANZ accredited



Test according ASTM D5778-12 & ISO 22476-1:2012
 G.L.: 0.00 m MSL W.L.: -3.50 m

Predrill:	0.00 m Predrilled
Date:	18/12/2017
Cone no.:	C10CFIP.C14427
Project no.:	2-68000.00_HA2212
CPT no.:	S03

Project: **Mangapapa School**
 Location: **5 Rua St - Gisborne**
 Position: **2036865, 5710335 NZTM**



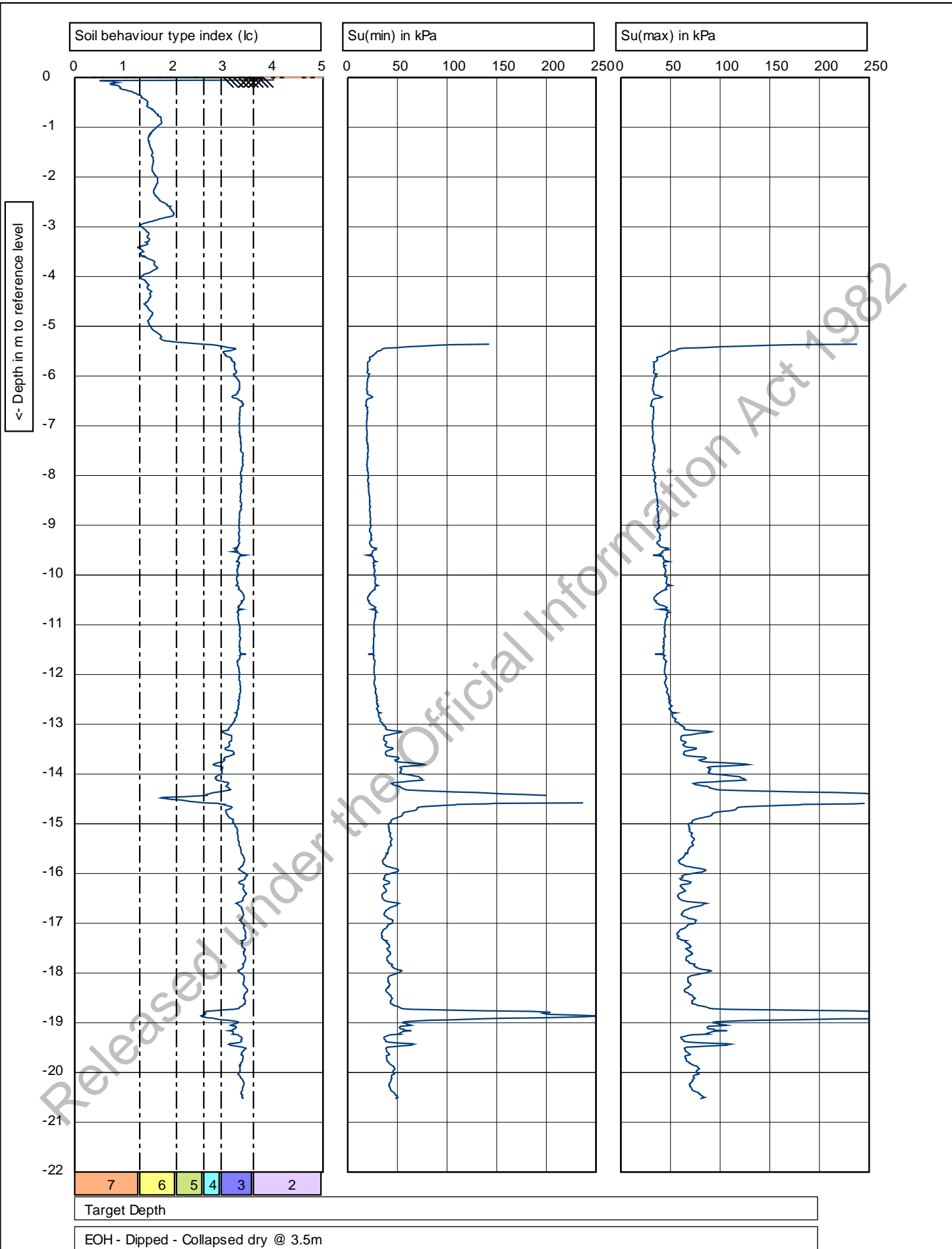
Target Depth

EOH - Dipped - Collapsed dry @ 3.5m

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Graphs on this page are not IANZ accredited

 $\frac{r^2}{10}$ $\frac{150}{10}$ $\frac{cm^2}{cm^2}$	Test according ASTM D5778-12 & ISO 22476-1:2012		Predrill: 0.00 m Predrilled	
	G.L.: 0.00 m MSL	W.L.: -3.50 m	Date: 18/12/2017	Cone no.: C10CFIP.C14427
Project: Mangapapa School	Location: 5 Rua St - Gisborne		Project no.: 2-68000.00_HA2212	
Position: 2036865, 5710335 NZTM	CPT no.: S03	5/6		



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	Test according to ASTM D5778-12 & ISO 22476-1:2012		Predrill: 0.00 m Predrilled	
	G.L.: 0.00 m MSL	W.L.: -3.50 m	Date: 18/12/2017	
Project: Mangapapa School	Location: 5 Rua St - Gisborne		Cone no.: C10CFIP.C14427	
Position: 2036865, 5710335 NZTM	Project no.: 2-68000.00_HA2212		CPT no.: S03	
			6/6	

**CPT
TEST REPORT**



Client : **BCD Group Ltd**
 Project : **Mangapapa School**
 Location : **5 Rua St - Gisborne**
 Hole Number: **S03**
 Tested by : **J Kavanaugh/ N Oosthuizen**
 Date tested : **18/12/17**
 Coordinates : **E: 2036865**
 N: 5710335
 EL: 11m
 Water level : **EOH - Dipped - Collapsed dry @ 3.5m**

Project No : **2-68000.00**
 Lab Ref No : **HA2212_S03**
 Client Ref No :

Test Results	
Start Time	11:54:00
Time at penetration	00:00:00
End Time	00:00:00
Reference level	0
Ground level	0
Predrill	0
Penetration Depth	20.6
Remarks	Target Depth
GPS Type	Garmin eTrex 20
GPS Accuracy	+ / - 3m
GPS Reference Grid	NZTM
GPS Datum	MSL
Rig Type	GeoMil Panther 100/ Flex 200
Rig ID	CPT03
Reaction Force	Dead weight 10/22 tonnes
Data Acquisition (Digitizer)	GeoMil GME500
Acquisition Program	GeoMil CPTest
Reporting Program	GeoMil CPTask
Cone Type	C10 (10 Tonne Compression)
Cross Sectional Area	10cm²
Cone Area Ratio	0.8
Fluid Type	Silicone Fluid
Friction Reducer	0.55m behind base of cone
Application Class (ISO 22476-1)	2
Test Type (ISO 22476-1)	TE2 (Measured Cone and Sleeve)
Back Fill Method	Bentonite
Observations During Testing	None

Date tested : 18/12/17
 Date reported : 20/12/17

This report may only be reproduced in full, including corresponding calibration data, daily logs, and CPT graphs.

IANZ Approved Signatory

Designation : *CPT North Island Manager*
 Date : 20/12/17



Tests indicated as not accredited are outside the scope of the laboratory's accreditation

calibration certificate

GC10CFIIP.C14434 / 006



World's first manufacturer of CPT equipment

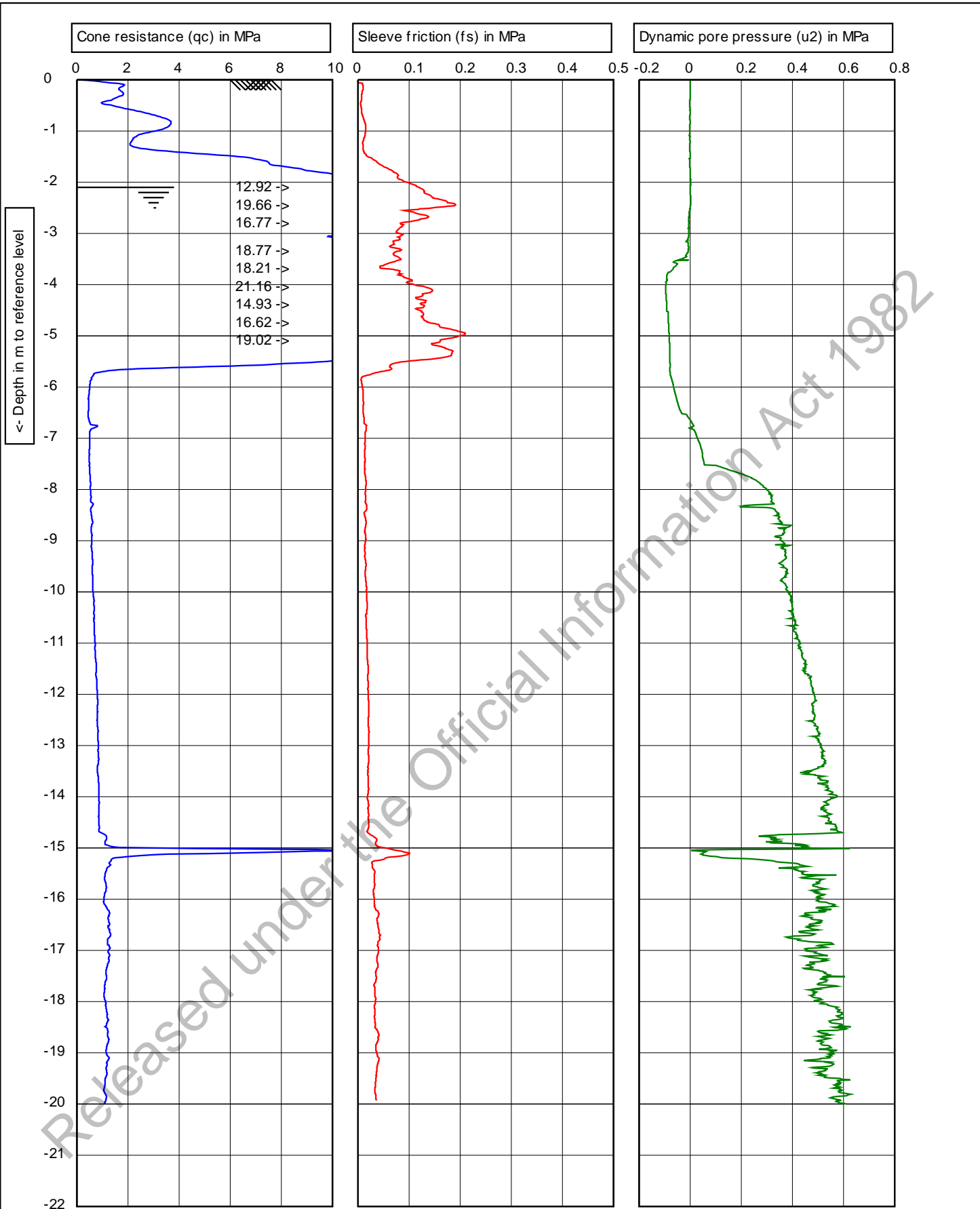
Cone number	GC10CFIIP.C14434	Client	Opus International Consultants Ltd - Hamilton
Kind of cone	Compression		4 Fox Street
Calibration date	02-Aug-2017		3216 Hamilton
Print date	02-Aug-2017		New Zealand

Channel 1			Channel 2			Channel 3		
Cone resistance (q_c)			Local sleeve friction (f_s)			Pore pressure (u)		
$q_c = Q_c / A_c$			$f_s = F_s / A_s$					
Range	0 ... 100 kN		Range	0 ... 22.5 kN		Range	0 ... 50 bar	
A_c	1000 mm ²		A_s	15000 mm ²		Zero load reading	223 mV	
Zero load reading	189 mV		Zero load reading	202 mV				
a-factor	0.8		b-factor	0				
			Offset	80 mm				

Q_c Load (kN)	Eqv. q_c (MPa)	Output (mV)	F_s Load (kN)	Eqv. f_s (MPa)	Output (mV)	Pressure (bar)	Eqv. u (MPa)	Output (mV)
0	0	0	0.00	0.00	0	0	0.0	0
10	10	852	2.25	0.15	816	5	0.5	867
20	20	1704	4.50	0.30	1639	10	1.0	1735
30	30	2553	6.75	0.45	2468	15	1.5	2601
40	40	3399	9.00	0.60	3290	20	2.0	3462
50	50	4248	11.25	0.75	4107	25	2.5	4327
60	60	5095	13.50	0.90	4929	30	3.0	5190
70	70	5940	18.00	1.20	6573	35	3.5	6047
80	80	6783	20.25	1.35	7399	40	4.0	6905
90	90	7627	22.50	1.50	8220	45	4.5	7749
100	100	8469	20.25	1.35	7419	50	5.0	8608
90	90	7626	18.00	1.20	6604			
80	80	6784	13.50	0.90	4972			
70	70	5942	11.25	0.75	4153			
60	60	5095	9.00	0.60	3331			
50	50	4250	6.75	0.45	2502			
40	40	3403	4.50	0.30	1663			
30	30	2555	2.25	0.15	839			
20	20	1706	0.00	0.00	2			
10	10	854						
0	0	0						

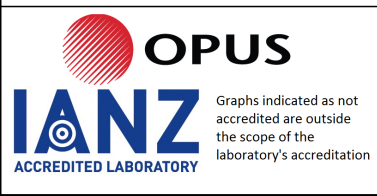
Zero load error	0.00 %	Zero load error	0.02 %	Zero load error	0.02 %
Max. linearity	0.18 %	Max. linearity	0.52 %	Max. linearity	0.29 %
Max. hysteresis	0.05 %	Max. hysteresis	0.56 %		

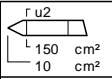


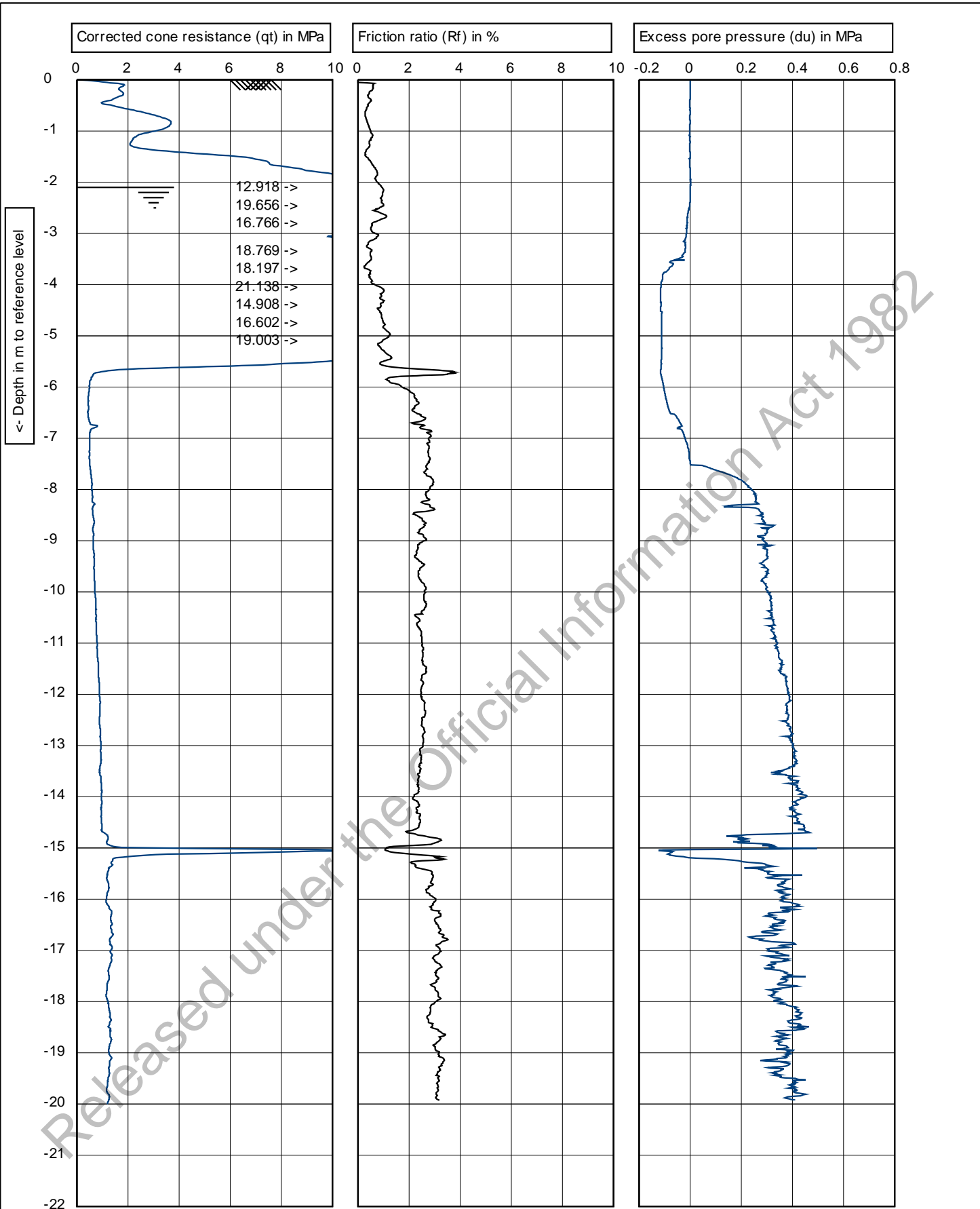


Target Depth

EOH - Dipped - GWL @ 2.1m



	Test according ASTM D5778-12 & ISO 22476-1:2012		Predrill: 0.00 m Predrilled	
	G.L.: 0.00 m MSL	W.L.: -2.10 m	Date: 20/12/2017	Cone no.: C10CFIIP.C14434
Project: Mangapapa School	Location: 5 Rua St - Gisborne		Project no.: 2-68000.00_HA2212	
Position: 2036898, 5710289 NZTM	CPT no.: 01	1/6		



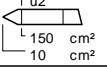
Target Depth

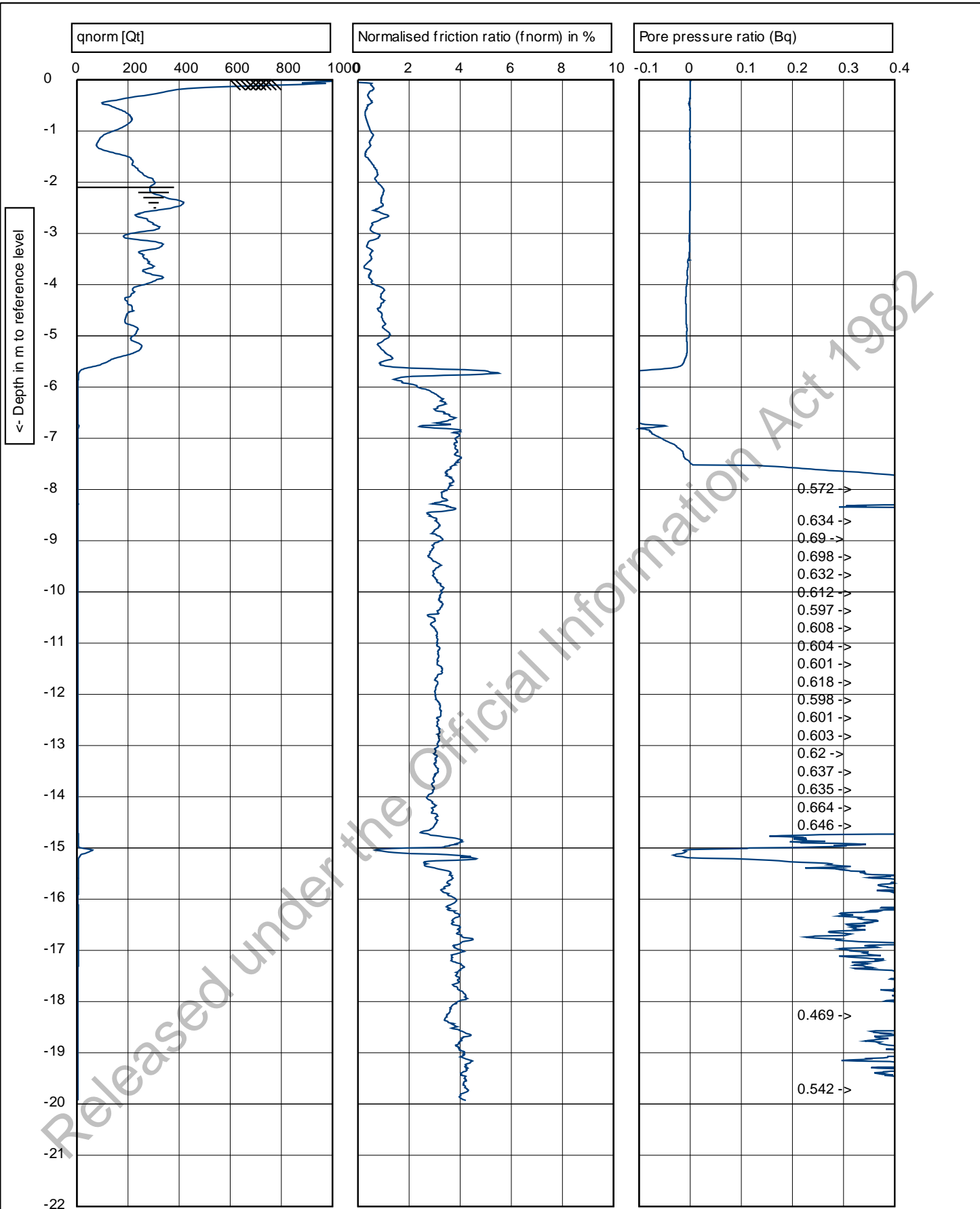
EOH - Dipped - GWL @ 2.1m



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	Test according ASTM D5778-12 & ISO 22476-1:2012		Predrill: 0.00 m Predrilled	
	G.L.: 0.00 m MSL	W.L.: -2.10 m	Date: 20/12/2017	Cone no.: C10CFIIP.C14434
Project: Mangapapa School			Project no.: 2-68000.00_HA2212	
Location: 5 Rua St - Gisborne			CPT no.: 01	
Position: 2036898, 5710289 NZTM			2/6	

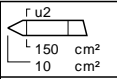


Target Depth

EOH - Dipped - GWL @ 2.1m

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Test according ASTM D5778-12 & ISO 22476-1:2012

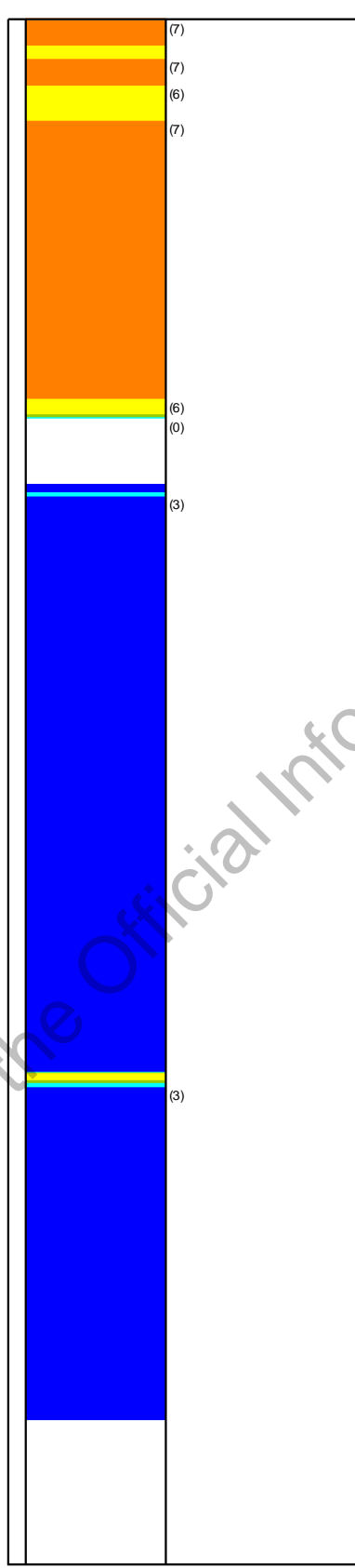
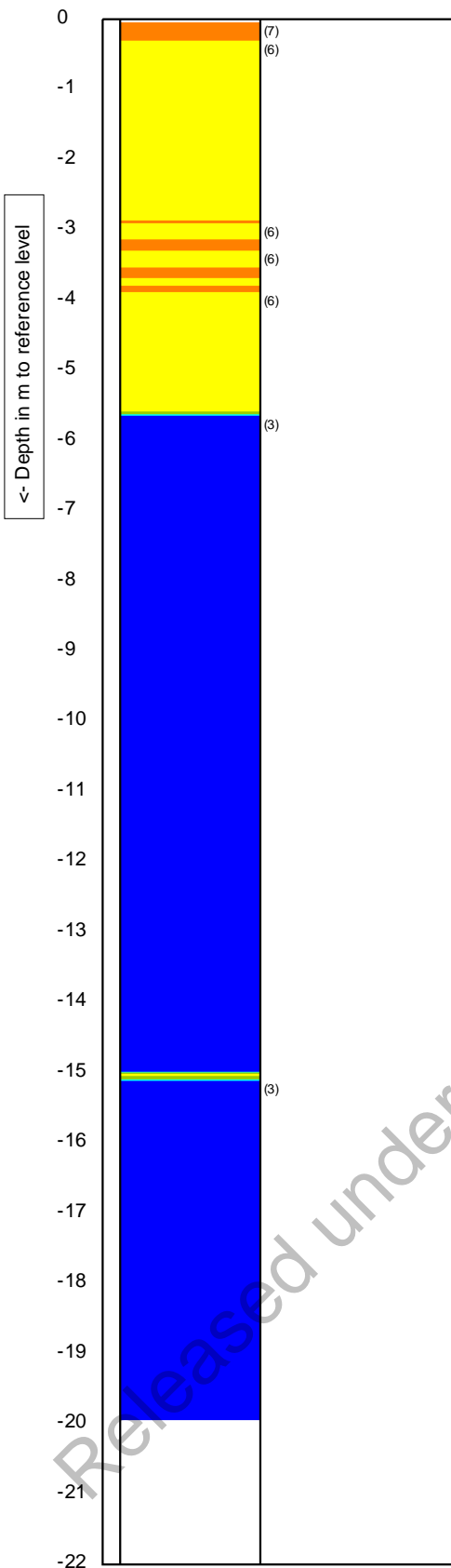
G.L.: 0.00 m MSL W.L.: -2.10 m

Predrill:	0.00 m Predrilled
Date:	20/12/2017
Cone no.:	C10CFIIP.C14434
Project no.:	2-68000.00_HA2212
CPT no.:	01
	3/6

Project: Mangapapa School
 Location: 5 Rua St - Gisborne
 Position: 2036898, 5710289 NZTM

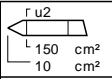
Soil Classification (using Fr)

Soil Classification (using Bq)



- (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

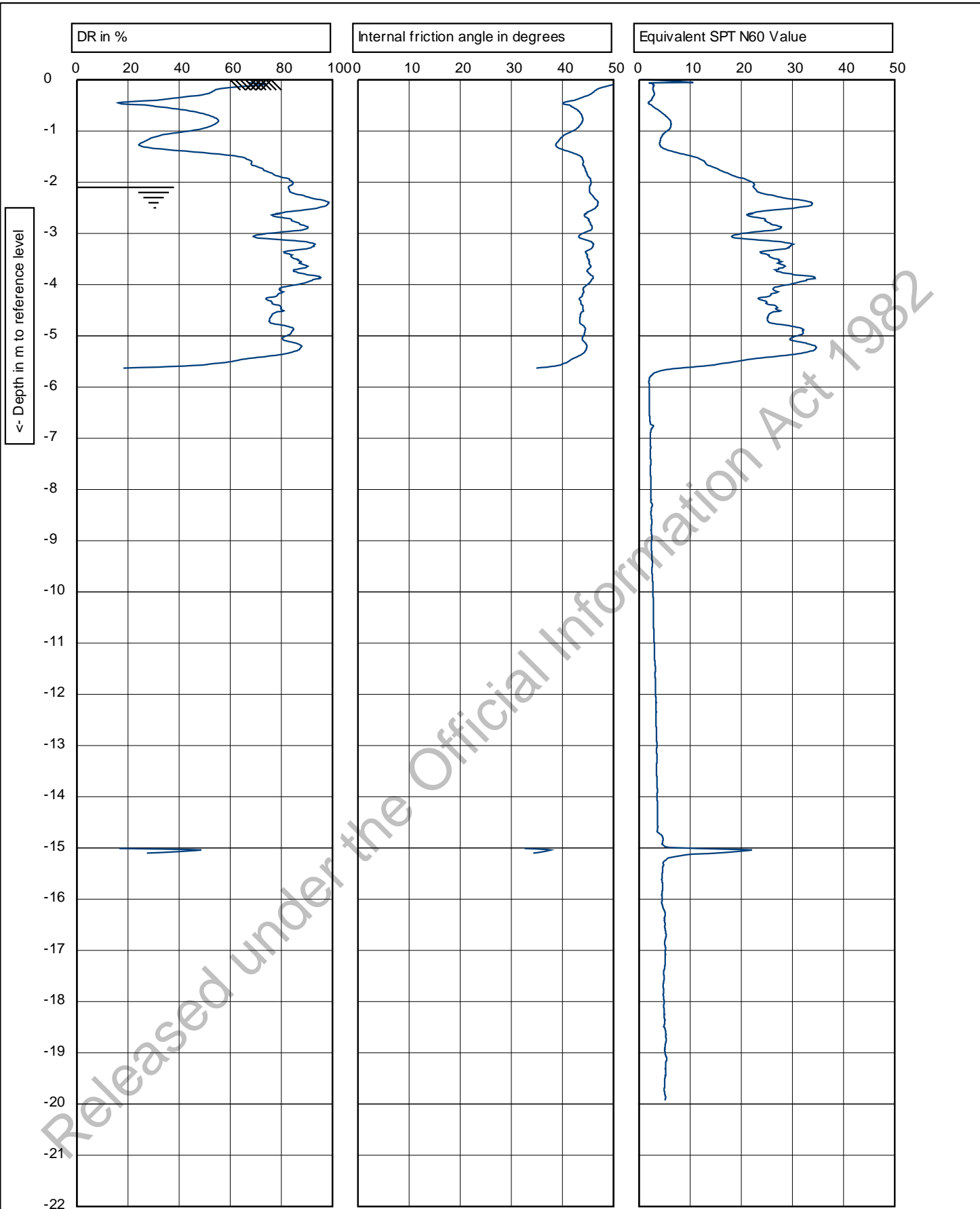
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Test according ASTM D5778-12 & ISO 22476-1:2012
 G.L.: 0.00 m MSL W.L.: -2.10 m

Predrill:	0.00 m Predrilled
Date:	20/12/2017
Cone no.:	C10CFIP.C14434
Project no.:	2-68000.00_HA2212
CPT no.:	01

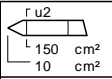
Project: Mangapapa School
 Location: 5 Rua St - Gisborne
 Position: 2036898, 5710289 NZTM



Target Depth _____
 EOH - Dipped - GWL @ 2.1m _____



Graphs on this page are not IANZ accredited

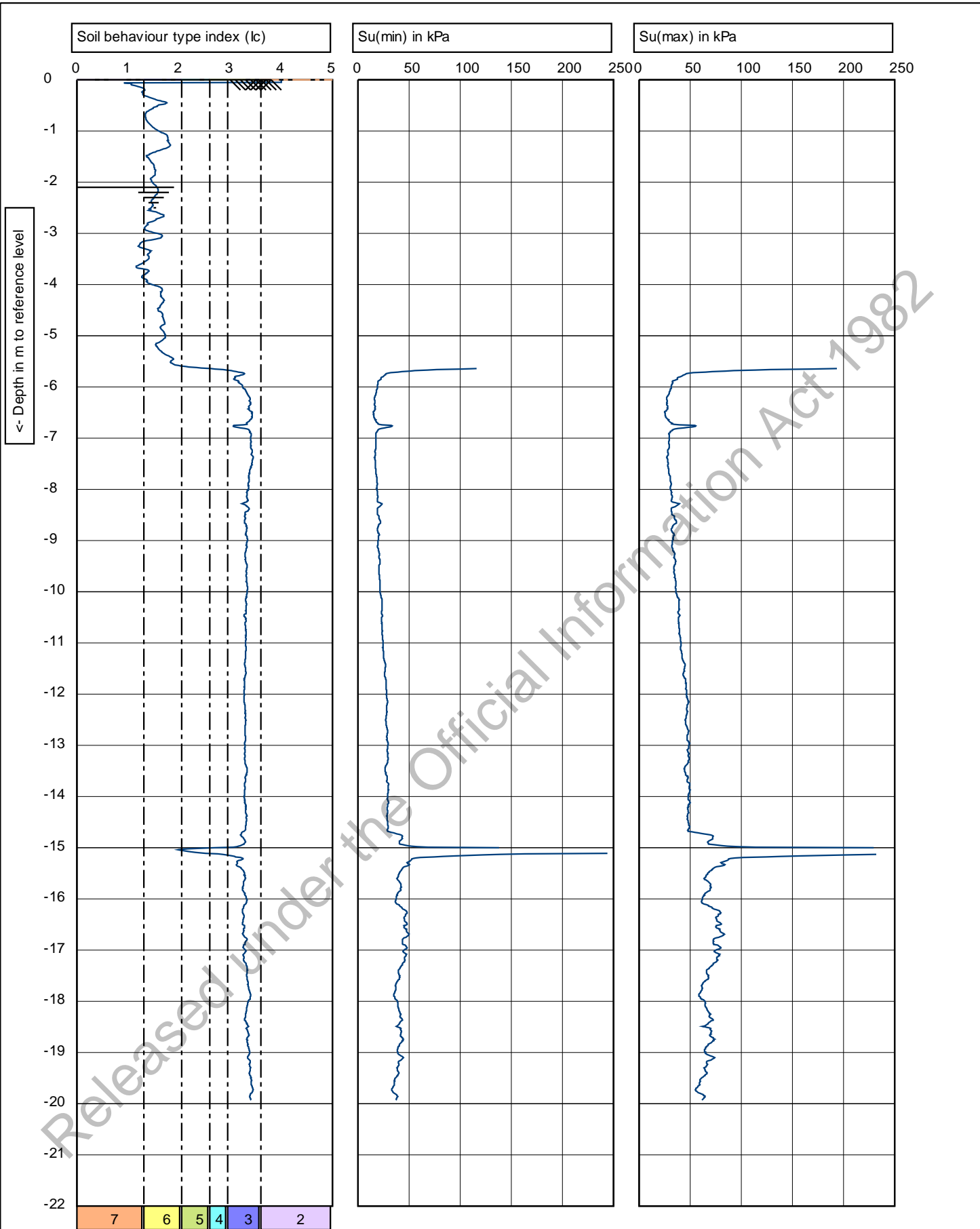


Test according ASTM D5778-12 & ISO 22476-1:2012
 G.L.: 0.00 m MSL W.L.: -2.10 m

Predrill: 0.00 m Predrilled
 Date: 20/12/2017

Project: Mangapapa School
 Location: 5 Rua St - Gisborne
 Position: 2036898, 5710289 NZTM

Cone no.: C10CFIP.C14434
 Project no.: 2-68000.00_HA2212
 CPT no.: 01 5/6



Target Depth

EOH - Dipped - GWL @ 2.1m

OPUS

1.44
Graphs on this page are not IANZ accredited

 $\frac{\sigma_u}{10}$ $\frac{\sigma_u}{150}$ cm ² cm ²	Test according ASTM D5778-12 & ISO 22476-1:2012		Predrill: 0.00 m Predrilled	
	G.L.: 0.00 m MSL	W.L.: -2.10 m	Date: 20/12/2017	
Project: Mangapapa School		Cone no.: C10CFIP.C14434		
Location: 5 Rua St - Gisborne		Project no.: 2-68000.00_HA2212		
Position: 2036898, 5710289 NZTM		CPT no.: 01	6/6	

calibration certificate

GC10CFIIP.C14427 / 002

World's first manufacturer of CPT equipment

Cone number	GC10CFIIP.C14427	Client	Opus International Consultants Ltd - Hamilton
Kind of cone	Compression		4 Fox Street
Calibration date	18-Oct-2017		3216 Hamilton
Print date	18-Oct-2017		New Zealand

Channel 1			Channel 2			Channel 3		
Cone resistance (q_c)			Local sleeve friction (f_s)			Pore pressure (u)		
$q_c = Q_c / A_c$			$f_s = F_s / A_s$					
Range	0 ... 100 kN		Range	0 ... 22.5 kN		Range	0 ... 50 bar	
A_c	1000 mm ²		A_s	15000 mm ²		Zero load reading	211 mV	
Zero load reading	206 mV		Zero load reading	197 mV				
a-factor	0.8		b-factor	0				
Offset			Offset	80 mm				
Q_c Load (kN)	Eqv. q_c (MPa)	Output (mV)	F_s Load (kN)	Eqv. f_s (MPa)	Output (mV)	Pressure (bar)	Eqv. u (MPa)	Output (mV)
0	0	0	0.00	0.00	0	0	0.0	0
10	10	852	2.25	0.15	814	5	0.5	845
20	20	1708	4.50	0.30	1620	10	1.0	1700
30	30	2563	6.75	0.45	2432	15	1.5	2552
40	40	3416	9.00	0.60	3240	20	2.0	3408
50	50	4270	11.25	0.75	4036	25	2.5	4267
60	60	5124	13.50	0.90	4853	30	3.0	5116
70	70	5975	18.00	1.20	6459	35	3.5	5963
80	80	6825	20.25	1.35	7270	40	4.0	6812
90	90	7673	22.50	1.50	8063	45	4.5	7664
100	100	8523	20.25	1.35	7272	50	5.0	8528
90	90	7674	18.00	1.20	6479			
80	80	6826	13.50	0.90	4864			
70	70	5978	11.25	0.75	4056			
60	60	5124	9.00	0.60	3257			
50	50	4274	6.75	0.45	2448			
40	40	3420	4.50	0.30	1645			
30	30	2566	2.25	0.15	827			
20	20	1710	0.00	0.00	0			
10	10	855						
0	0	0						
Zero load error	0.00 %		Zero load error	0.00 %		Zero load error	0.02 %	
Max. linearity	0.15 %		Max. linearity	0.52 %		Max. linearity	0.13 %	
Max. hysteresis	0.05 %		Max. hysteresis	0.31 %				



calibration certificate

GC10CFIIP.C14427 / 002

Channel 4	Inclination X	Channel 5	Inclination Y	Channel 6	None
Range	-20 ... 20 °	Range	-20 ... 20 °		
Angle (°)	Output (mV)	Angle (°)	Output (mV)		
-20	2484	-20	2475		
-15	2542	-15	2534		
-10	2617	-10	2601		
-5	2676	-5	2675		
0	2754	0	2748		
5	2817	5	2820		
10	2894	10	2882		
15	2965	15	2960		
20	3024	20	3012		

Calibration instrument(s)
GCU1000/1-170214-011/1

Certificate number(s)
2012591.06600.1

Date(s)
14-Feb-2017

Remark

We declare that the electrical cone with serial number GC10CFIIP.C14427 has been calibrated and that the specifications are according to the ISO 22476-1:2012 (Geotechnical investigation and testing – Field testing - Part 1: Electrical cone and piezocone penetration test). The calibrations are traceable to national and international standards.

Date
Calibrated by

18-Oct-2017
Marijn Kints

Date
Approved by

18-Oct-2017
Joost Neugebauer

Signature



Signature





Soil Description

Log Identification: BH01 Page 1 of 3

Geological Unit	Field Description	Depth (meters)	Graphic log	Investigation Method	Rock strength	Field Test Data							Groundwater Level	
						Undrained Shear Strength (kPa) Peak / Residual	Core Recovery (%)	SPT results						
								N60	75 mm	75 mm	75 mm	75 mm		75 mm
TOPSOIL	TOPSOIL; dark brown. Moist.	0.0 - 0.1												
LATE QUATERNARY BEACH AND TERRACE COVER DEPOSITS	SAND; brown. Moist.	0.1 - 0.5		HQ		70%								
	Below 1.0m, trace of charcol.	0.5 - 1.0												
	Below 1.9m, dark grey, moist to wet.	1.0 - 1.9												
	Below 2.1m, trace of shell fragments.	1.9 - 2.1												
	SAND; yellowish grey. Wet to moist.	2.1 - 2.5		HQ		100%								
	Below 2.7m, trace of shell fragments.	2.5 - 2.7												
	SAND, trace of shell fragments; dark grey. Wet.	2.7 - 3.5			SPT-O			19	3	2	4	4	5	6
	Fine to medium grain SAND; orangish grey. Moist to wet.	3.5 - 4.0		HQ										
Fine grain SAND, trace of shell fragments; dark grey to black. Moist to wet.	4.0 - 4.5													
		4.5 - 5.0			SPT-O			19	3	2	3	5	5	6
		5.0 - 5.5		HQ		95%								
	CLAY, trace of organics (fibrous); dark grey. Moist, highly plastic.	5.5 - 5.8												

Notes:


- The stratification lines represent the approximate boundary between soil types and the transition may be gradual.
- Soils have been described in general accordance with NZ Geomechanics Society "Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes", December 2005
- Undrained shear strengths (where reported) have been corrected in general accordance with NZ Geotech Society Inc. "Guideline for Hand Held Shear Vane Test", August 2001.

	Job name: Mangapapa School and Tologa Bay Area School	Job Number: 17-0708
	Site location: Mangapapa School, Gisborne	Shear Vane ID: N/A
	Date of logging: 15/01/2018	Logged By: LH
	Date of investigation: 18/12/2017	Checked By: BM

Soil Description		Depth (meters)	Graphic log	Investigation Method	Rock strength	Field Test Data							Groundwater Level	
Geological Unit	Field Description					Undrained Shear Strength (kPa) Peak / Residual	Core Recovery (%)	SPT results						
								N60	75 mm	75 mm	75 mm	75 mm		75 mm
LATE QUATERNARY BEACH AND TERRACE COVER DEPOSITS	CLAY, trace of organics (fibrous); dark grey. Moist, highly plastic.	6.0	HQ											
	Below 6.4m, trace of shell fragments.	6.5	SPT-O		SPT	1	0	0	1	0	0	0		
	Below 7.2m, lense of SAND for 50mm.	7.5	SPT-O		SPT	1	0	0	1	0	0	0		
	Below 9.5m, lense of organic material for 50mm.	9.5	SPT-O		SPT	1	0	0	1	0	0	0		
		10.0	HQ											
		10.5	SPT-O		SPT	0	0	0	0	0	0	0		
		11.0												

Notes:


- The stratification lines represent the approximate boundary between soil types and the transition may be gradual.
- Soils have been described in general accordance with NZ Geomechanics Society "Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes", December 2005
- Undrained shear strengths (where reported) have been corrected in general accordance with NZ Geotech Society Inc. "Guideline for Hand Held Shear Vane Test", August 2001.

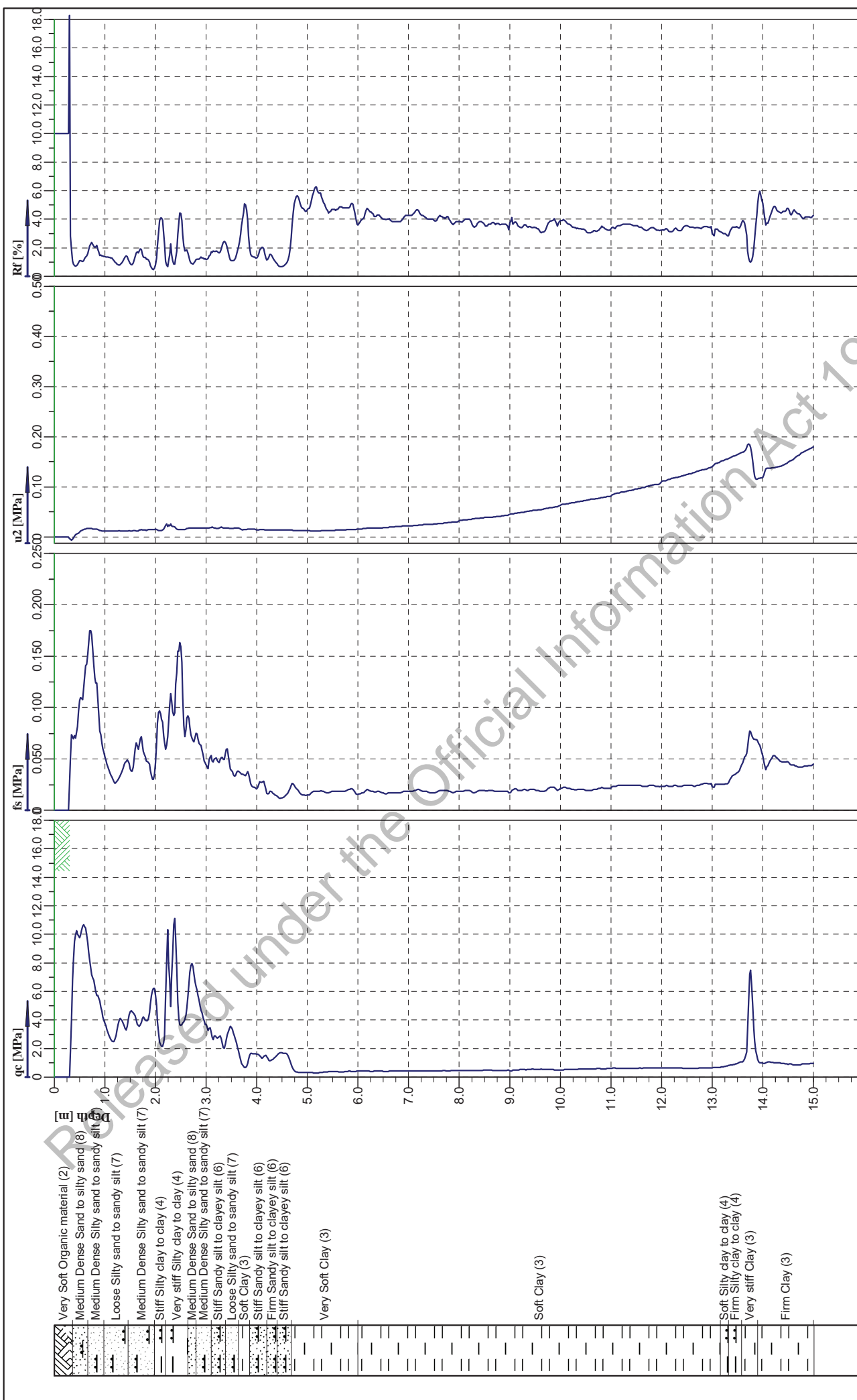
	Job name: Mangapapa School and Tologa Bay Area School Site location: Mangapapa School, Gisborne Date of logging: 15/01/2018 Date of investigation: 18/12/2017	Job Number: 17-0708 Shear Vane ID: N/A Logged By: LH Checked By:
--	--	---

Soil Description		Depth (meters)	Graphic log	Investigation Method	Rock strength	Field Test Data							Groundwater Level	
Geological Unit	Field Description					Undrained Shear Strength (kPa) Peak / Residual	Core Recovery (%)	SPT results						
								N60	75 mm	75 mm	75 mm	75 mm		75 mm
LATE QUATERNARY BEACH AND TERRACE COVER DEPOSITS	CLAY, trace of organics (fibrous); dark grey. Moist, highly plastic.	11.5	HQ		100%									
		12.0	SPT-O		SPT	1	0	0	1	0	0	0		
		12.5	HQ											
	Below 13.1m, lense of oragnc material for 20mm.	13.0	HQ											
		13.5	SPT-O		SPT	1	0	0	1	0	0	0		
		14.0	HQ											
	Fine grain SAND; light grey. Moist to wet.	14.5	HQ											
	CLAY; dark bluish grey. Moist, highly plastic.	15.0	SPT-O		SPT	1	0	0	1	0	0	0		
		15.5	HQ											
	End of borehole at 15.0 m. Target depth.	16.0	HQ											
	16.5													

Notes:

- The stratification lines represent the approximate boundary between soil types and the transition may be gradual.
- Soils have been described in general accordance with NZ Geomechanics Society "Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes", December 2005
- Undrained shear strengths (where reported) have been corrected in general accordance with NZ Geotech Society Inc. "Guideline for Hand Held Shear Vane Test", August 2001.

	Job name: Mangapapa School and Tologa Bay Area School Site location: Mangapapa School, Gisborne Date of logging: 15/01/2018 Date of investigation: 18/12/2017	Job Number: 17-0708 Shear Vane ID: N/A Logged By: LH Checked By:
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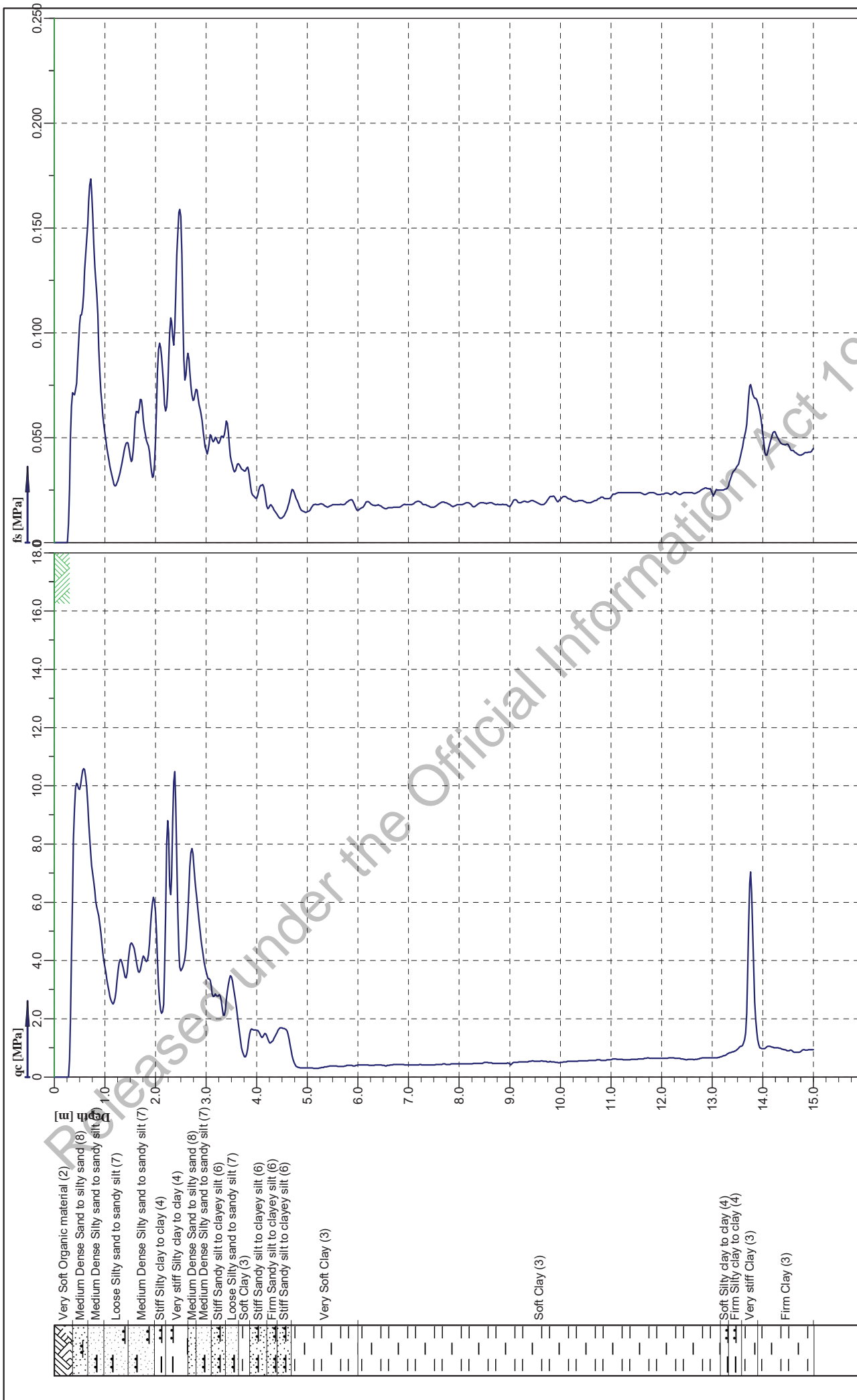
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Project ID:	9824	Client:	LAND DEVELOPMENT AND EXPLORATION LTD	Date:	7/13/2010	Scale:	1 : 100
Project:	MANGAPAPA SCHOOL			Page:	1/1	Fig:	
				File:			cpt01b.001



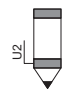
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 Tip area [cm²]: 10
 Sleeve area [cm²]: 150



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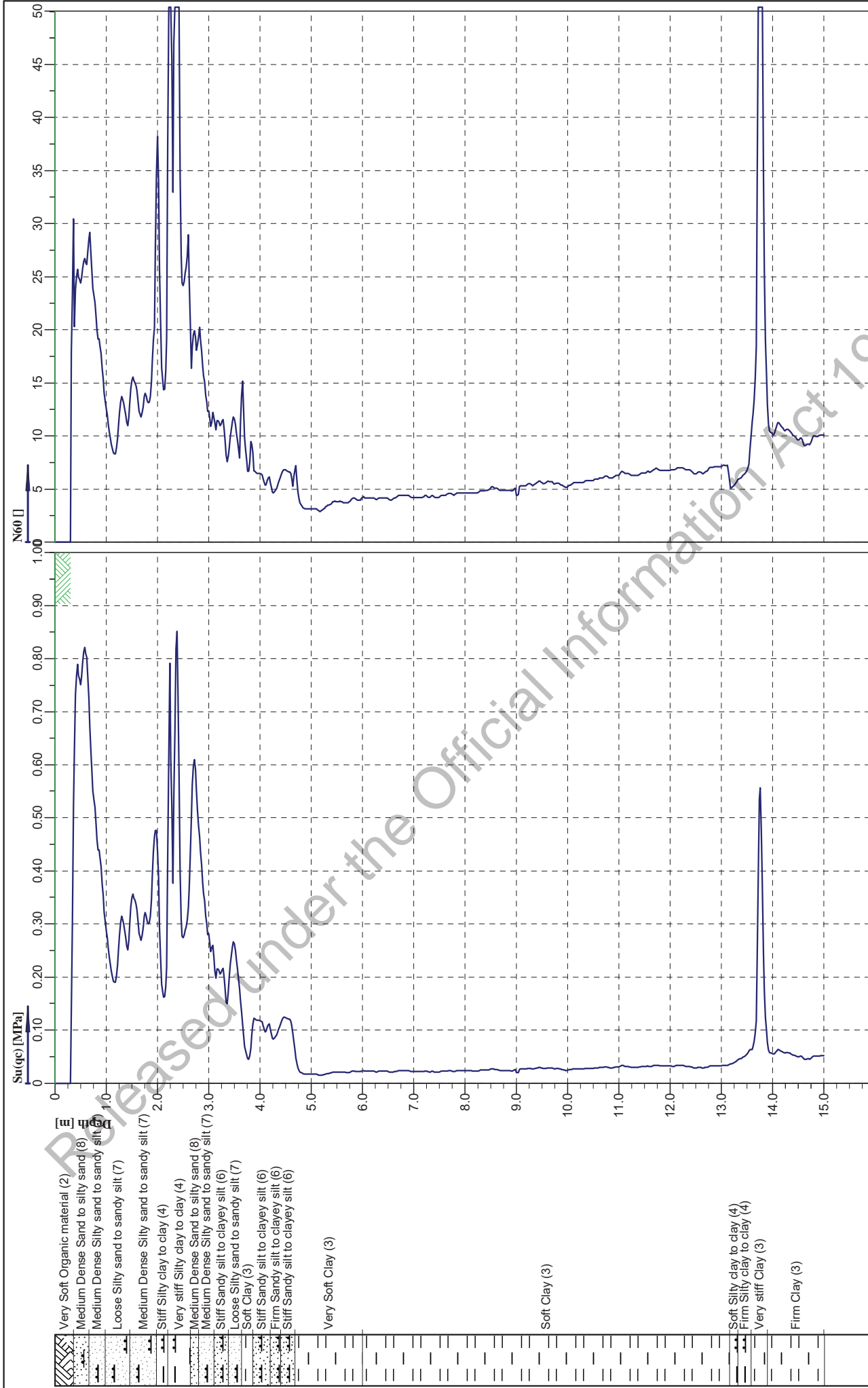
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Project ID:	9824	Client:	LAND DEVELOPMENT AND EXPLORATION LTD	0.00	CPT01B
Project:	MANGAPAPA SCHOOL			Date:	Scale:
				7/13/2010	1 : 100
				Page:	Fig:
				1/1	
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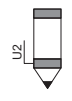
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 Tip area [cm²]: 10
 Sleeve area [cm²]: 150



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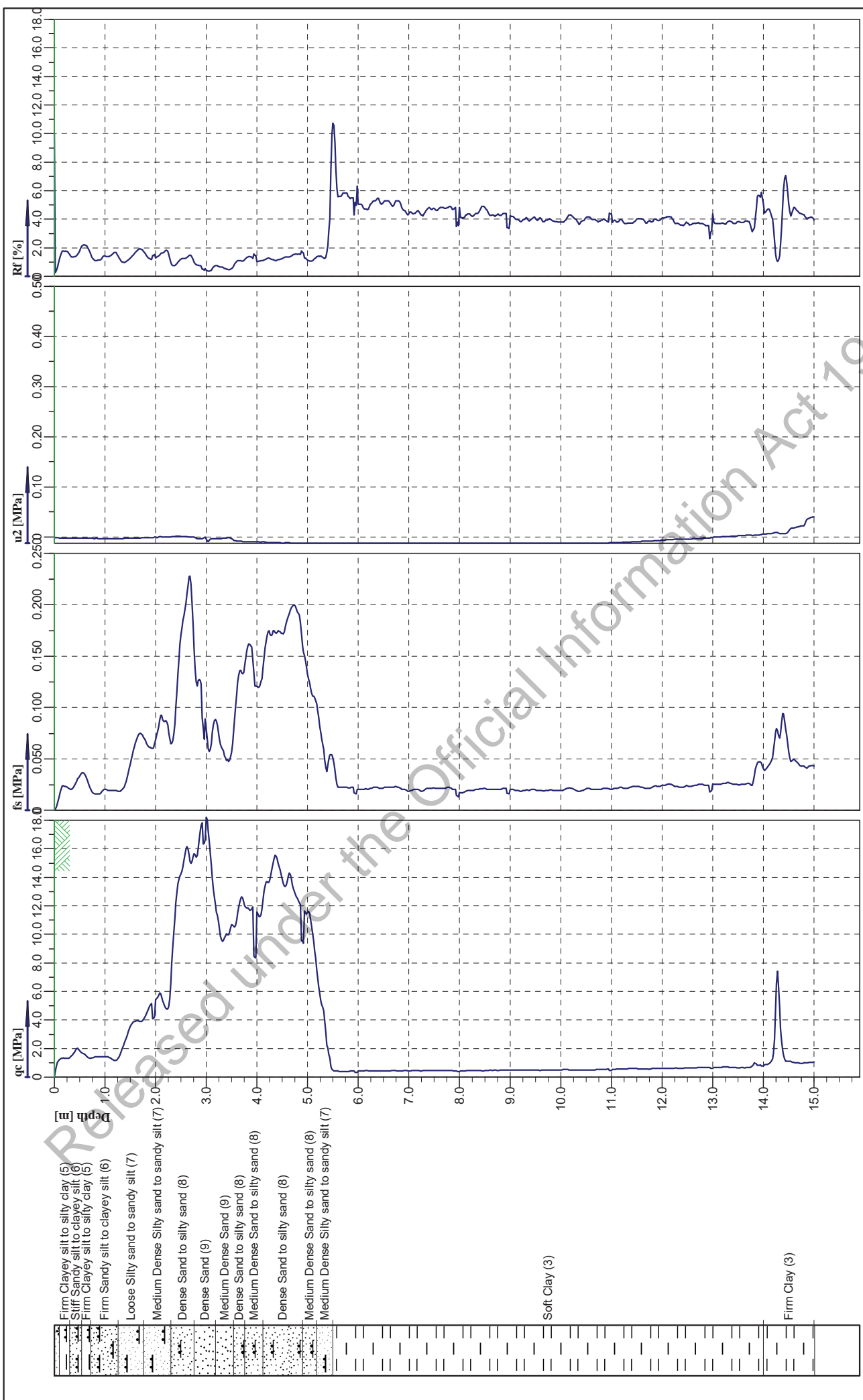


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Project ID:	9824	Client:	LAND DEVELOPMENT AND EXPLORATION LTD	0.00	CPT01B
Project:	MANGAPAPA SCHOOL			Date:	Scale:
				7/13/2010	1 : 100
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				1/1	
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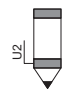


Cone No: 3842
 Tip area [cm²]: 10
 Sleeve area [cm²]: 150





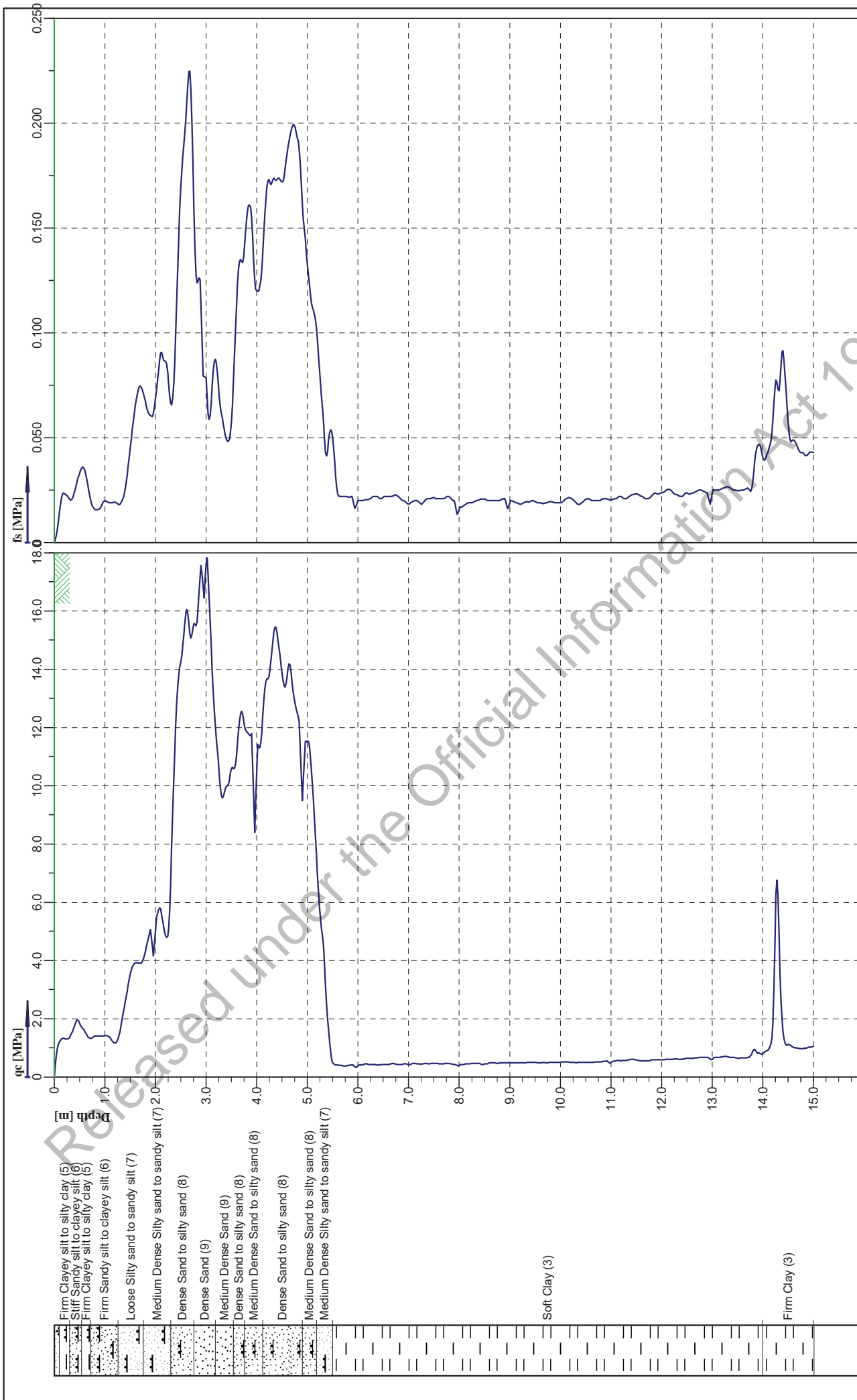
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Project ID:	9824	Client:	LAND DEVELOPMENT AND EXPLORATION LTD	Date:	7/13/2010	Scale:	1 : 100
Project:	MANGAPAPA SCHOOL			Page:	1/1	Fig:	
				File:			cpt02.001



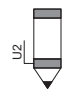
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 Tip area [cm²]: 10
 Sleeve area [cm²]: 150



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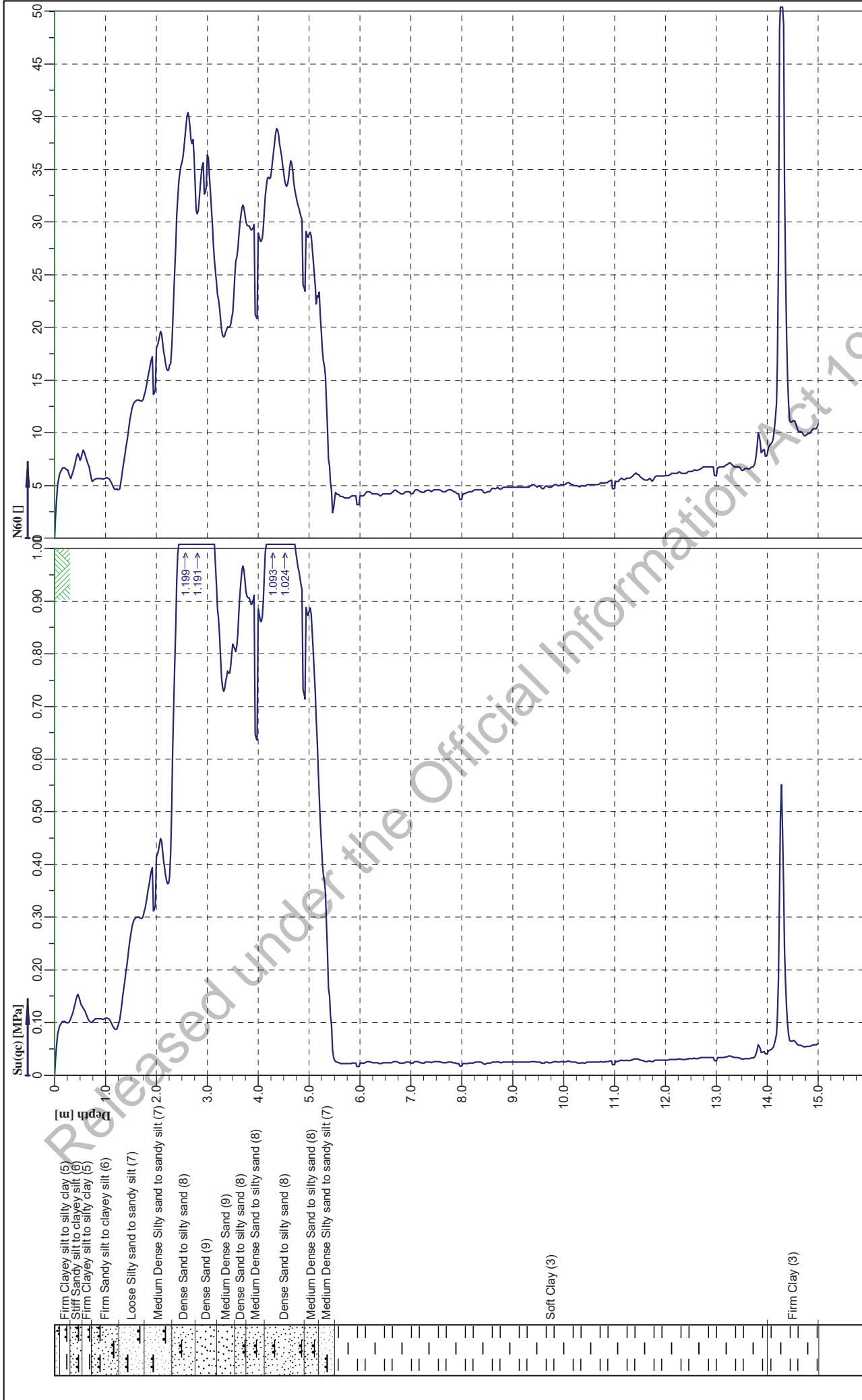
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Project ID:	9824	Client:	LAND DEVELOPMENT AND EXPLORATION LTD	Date:	CPT02
Project:	MANGAPAPA SCHOOL			Date:	7/13/2010
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
Cone No: 3842
 Tip area [cm²]: 10
 Sleeve area [cm²]: 150



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Location:	RUA STREET, MANGAPAPA, GISBORNE	Position:	X: 0.00 m, Y: 0.00 m	Ground level:	Test no:
Project ID:	9824	Client:	LAND DEVELOPMENT AND EXPLORATION LTD	Date:	CPT02
Project:	MANGAPAPA SCHOOL	Scale:	1 : 100	Date:	7/13/2010
		Page:	1/1	Fig:	
		File:	cpt02.001		



 Cone No: 3842

 Tip area [cm²]: 10

 Sleeve area [cm²]: 150



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APPENDIX D
LIQUEFACTION ANALYSIS

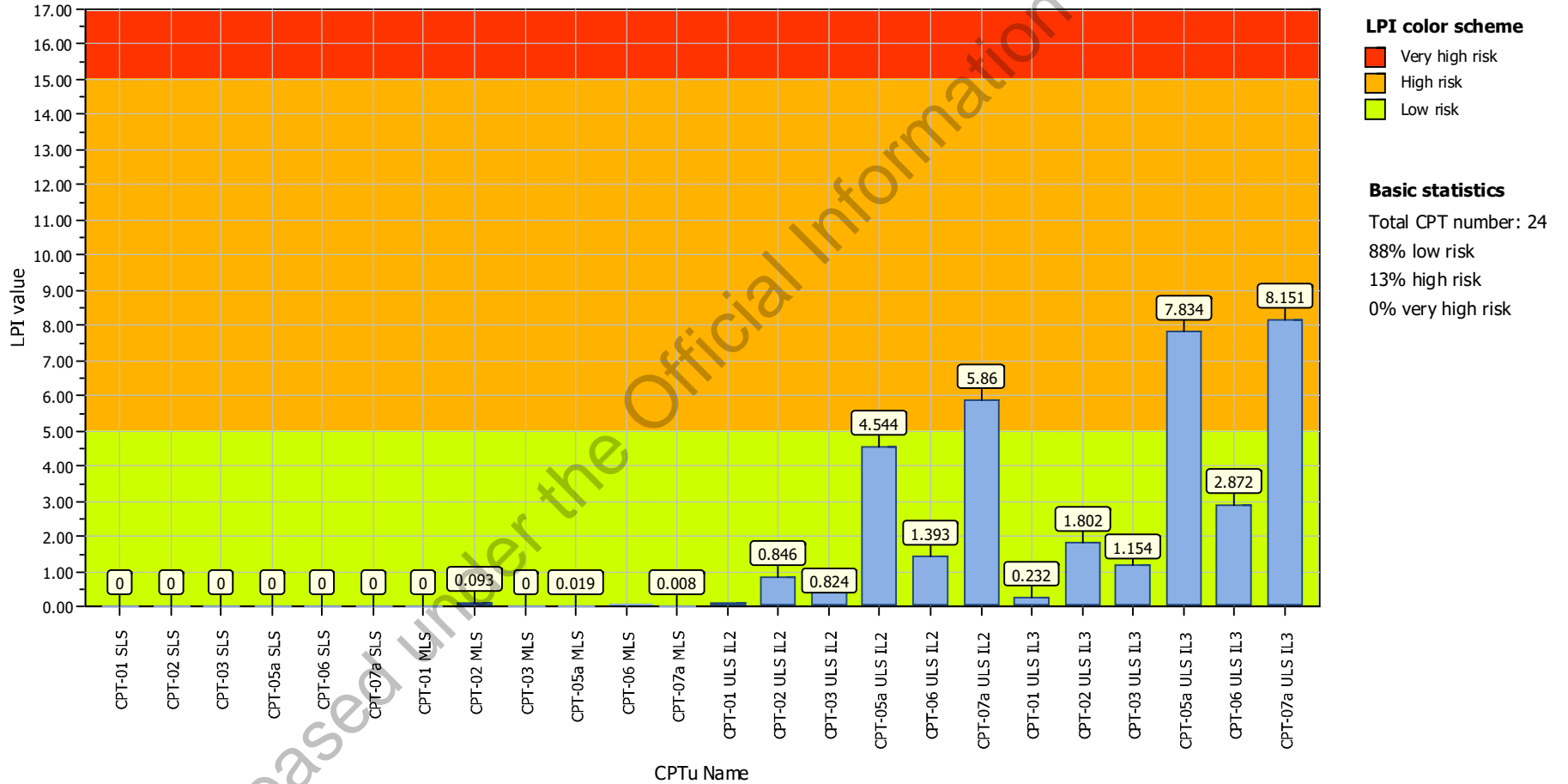
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Project title : Liquefaction Assessment - Mangapapa School

Location : 5 Rua Street, Mangapapa, Gisborne

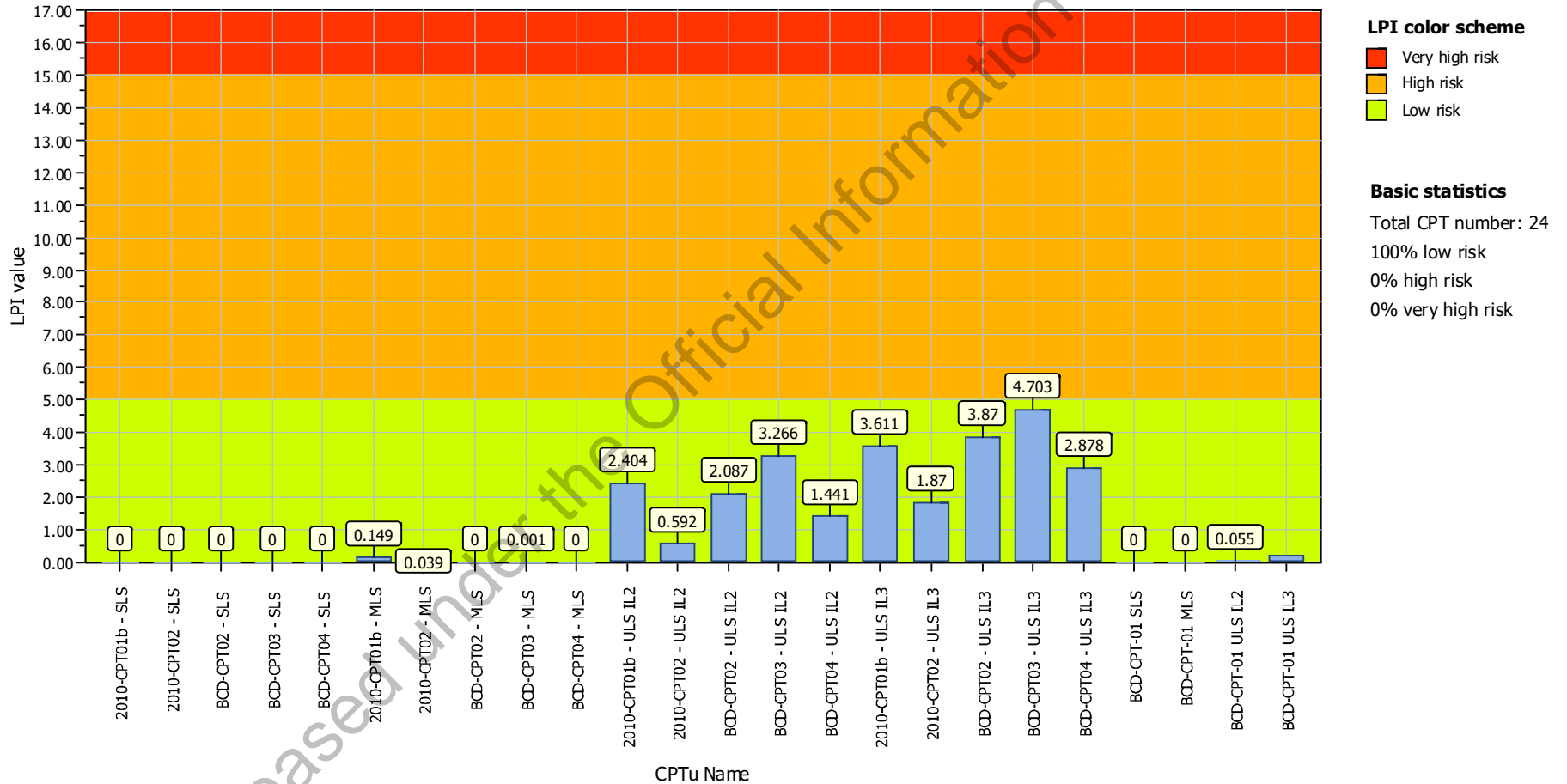
Overall Liquefaction Potential Index report



Project title : Liquefaction Assessment - Mangapapa School

Location : 5 Rua Street, Mangapapa, Gisborne

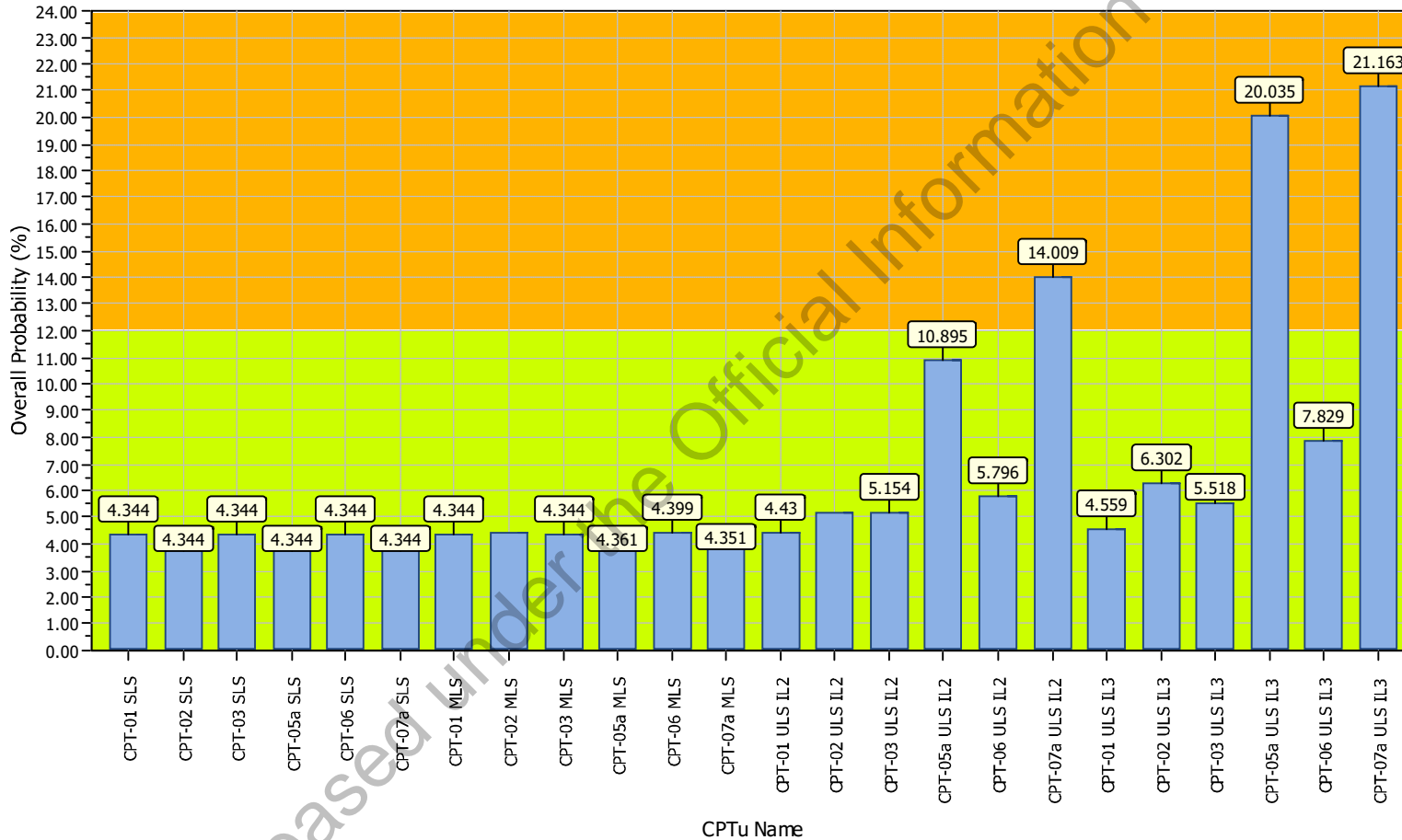
Overall Liquefaction Potential Index report



Project title : Liquefaction Assessment - Mangapapa School

Location : 5 Rua Street, Mangapapa, Gisborne

Overall Probability for Liquefaction report



Probability color scheme

- Very High Probability
- High Probability
- Low Probability

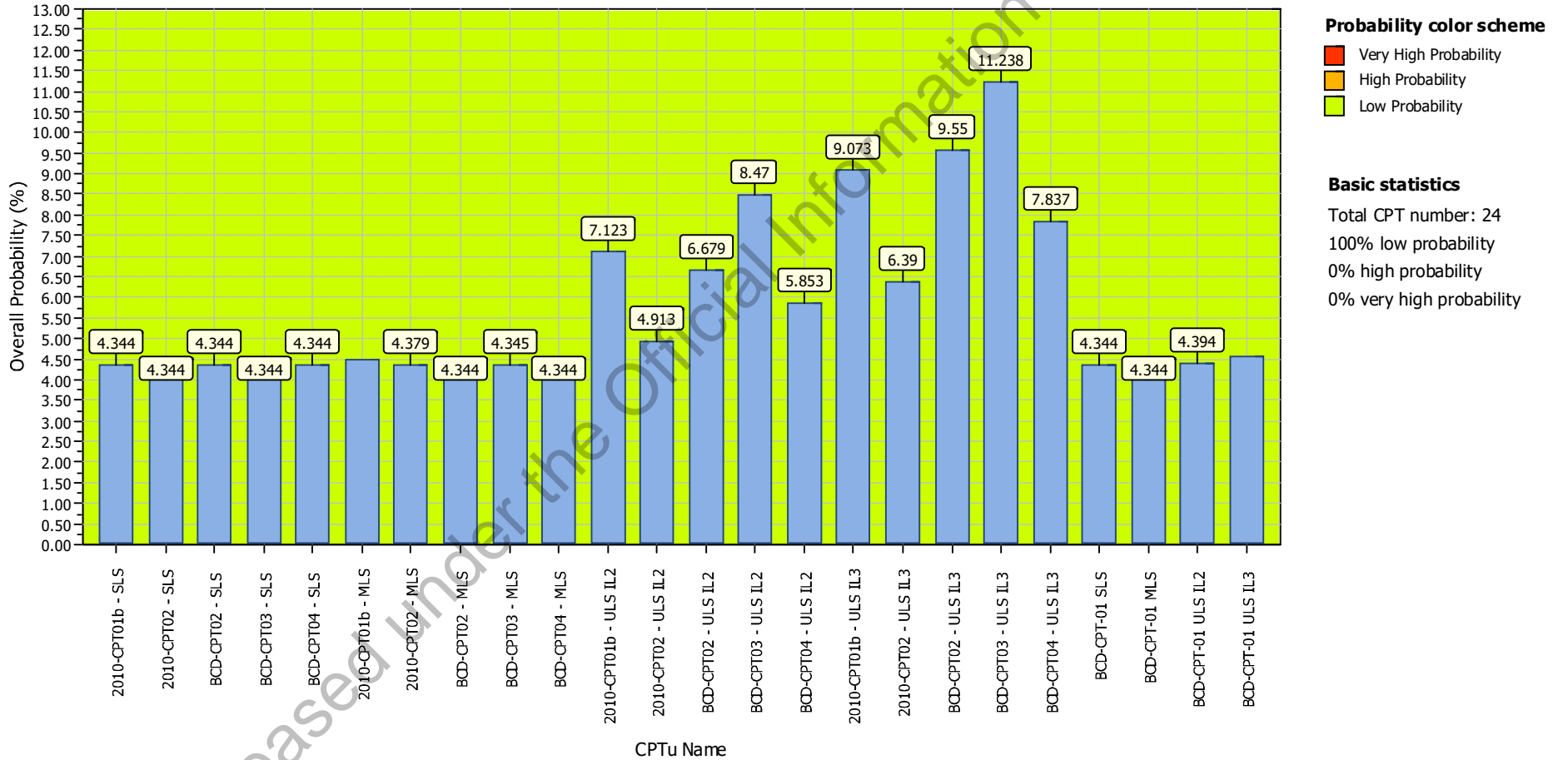
Basic statistics

Total CPT number: 24
 88% low probability
 13% high probability
 0% very high probability

Project title : Liquefaction Assessment - Mangapapa School

Location : 5 Rua Street, Mangapapa, Gisborne

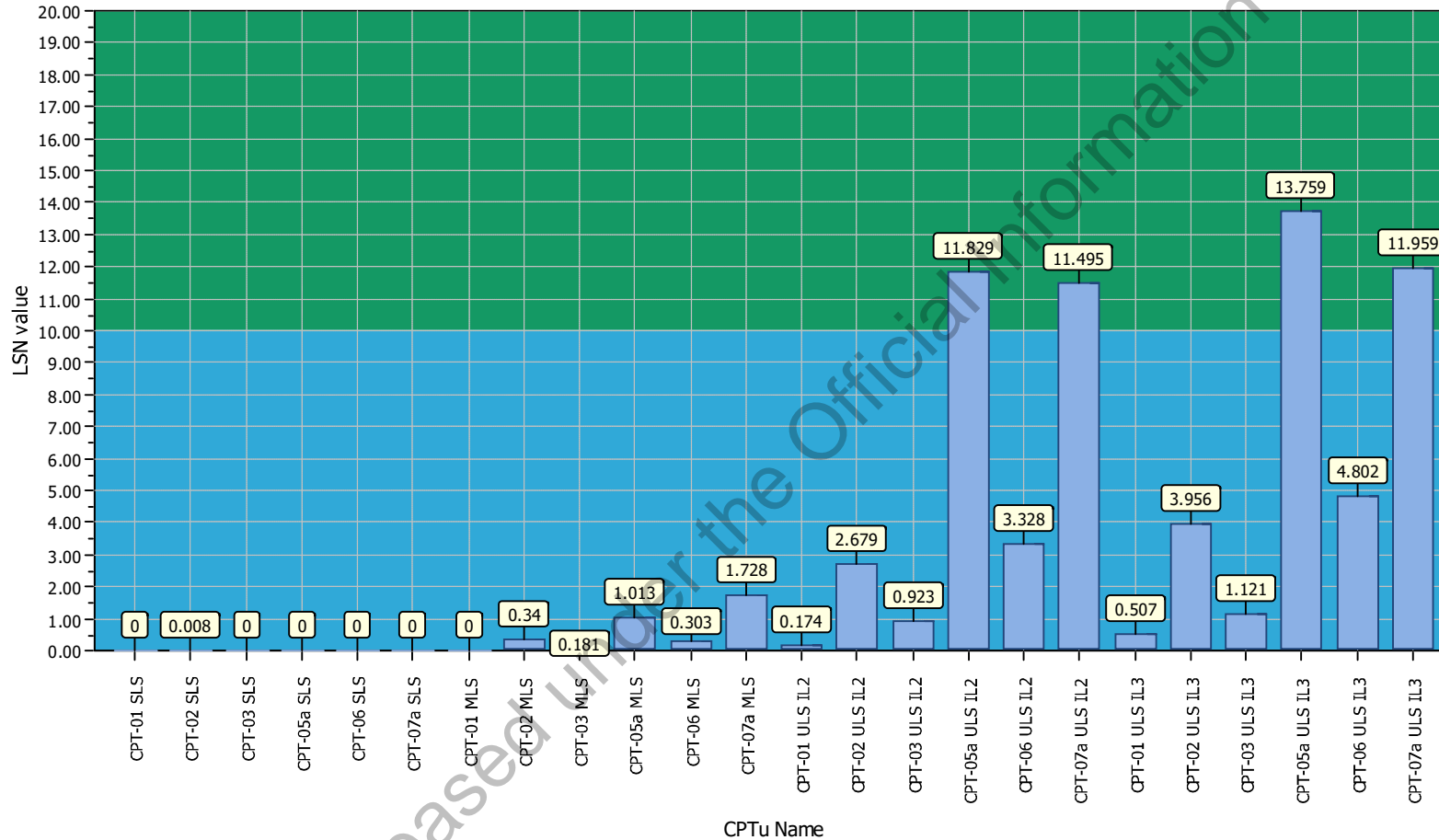
Overall Probability for Liquefaction report



Project title : Liquefaction Assessment - Mangapapa School

Location : 5 Rua Street, Mangapapa, Gisborne

Overall Liquefaction Severity Number report



LSN color scheme

- Severe damage
- Major expression of liquefaction
- Moderate to severe exp. of liquefaction
- Moderate expression of liquefaction
- Minor expression of liquefaction
- Little to no expression of liquefaction

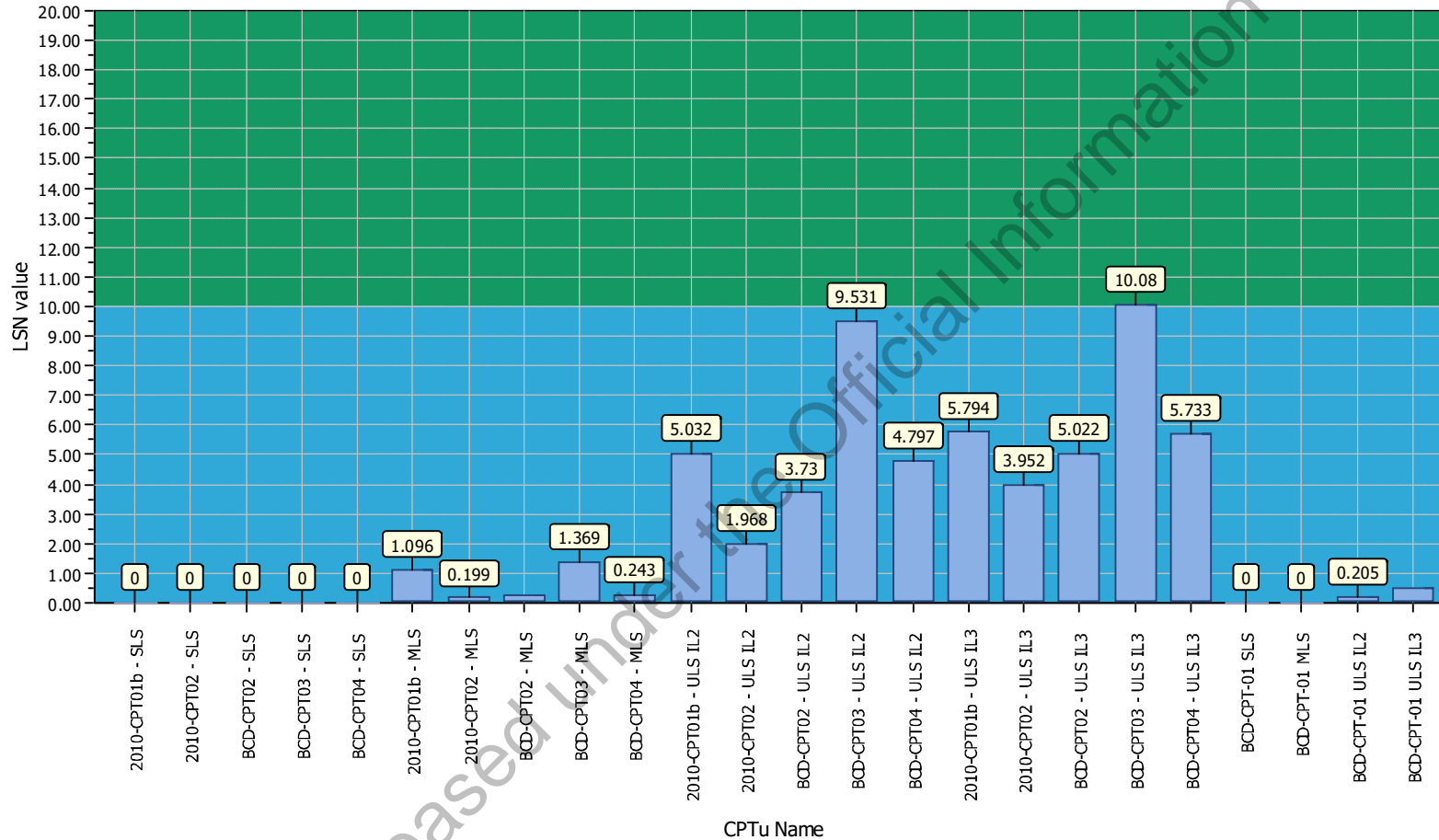
Basic statistics

- Total CPT number: 24
- 83% little liquefaction
- 17% minor liquefaction
- 0% moderate liquefaction
- 0% moderate to major liquefaction
- 0% major liquefaction
- 0% severe liquefaction

Project title : Liquefaction Assessment - Mangapapa School

Location : 5 Rua Street, Mangapapa, Gisborne

Overall Liquefaction Severity Number report



LSN color scheme

- Severe damage
- Major expression of liquefaction
- Moderate to severe exp. of liquefaction
- Moderate expression of liquefaction
- Minor expression of liquefaction
- Little to no expression of liquefaction

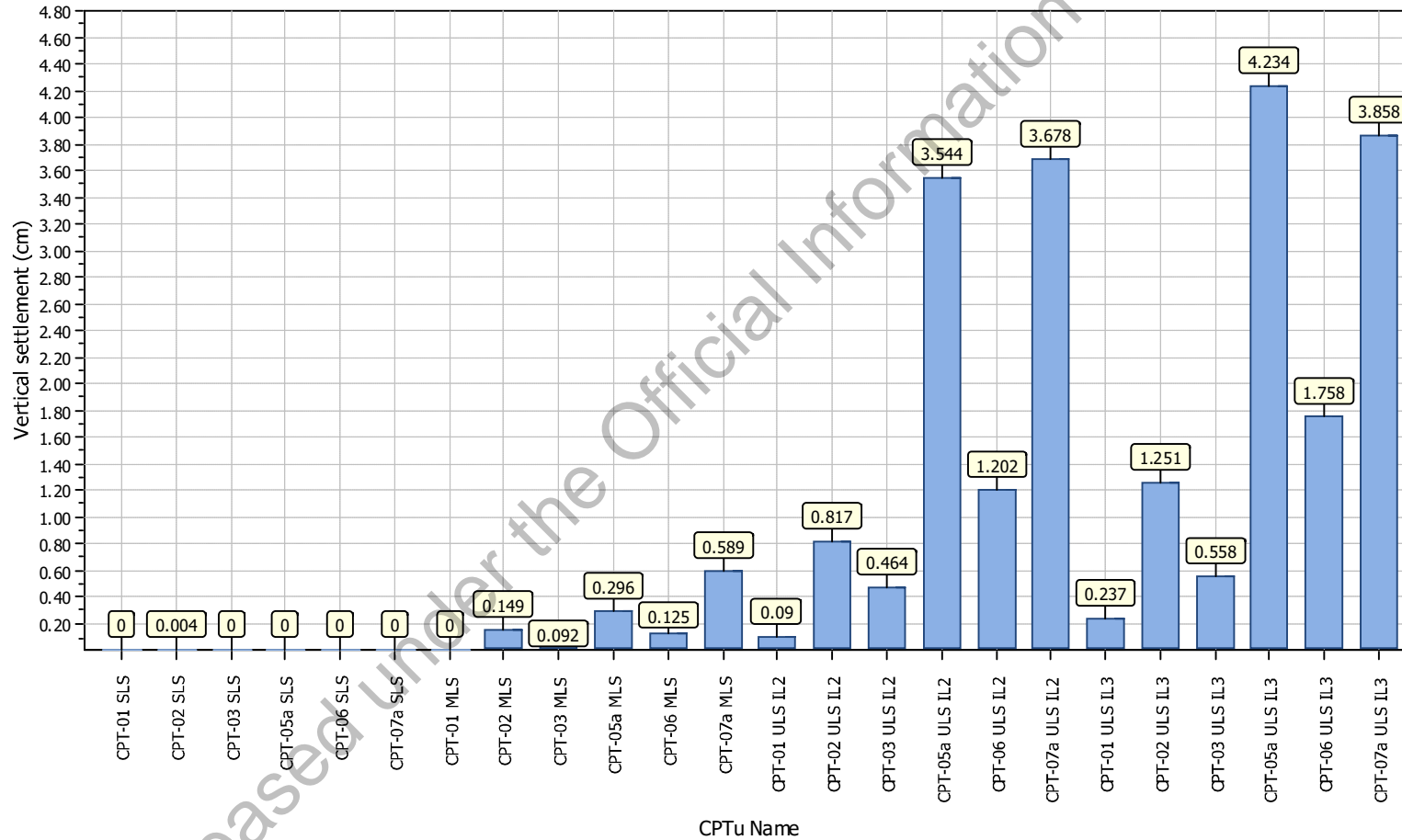
Basic statistics

- Total CPT number: 24
- 96% little liquefaction
- 4% minor liquefaction
- 0% moderate liquefaction
- 0% moderate to major liquefaction
- 0% major liquefaction
- 0% severe liquefaction

Project title : Liquefaction Assessment - Mangapapa School

Location : 5 Rua Street, Mangapapa, Gisborne

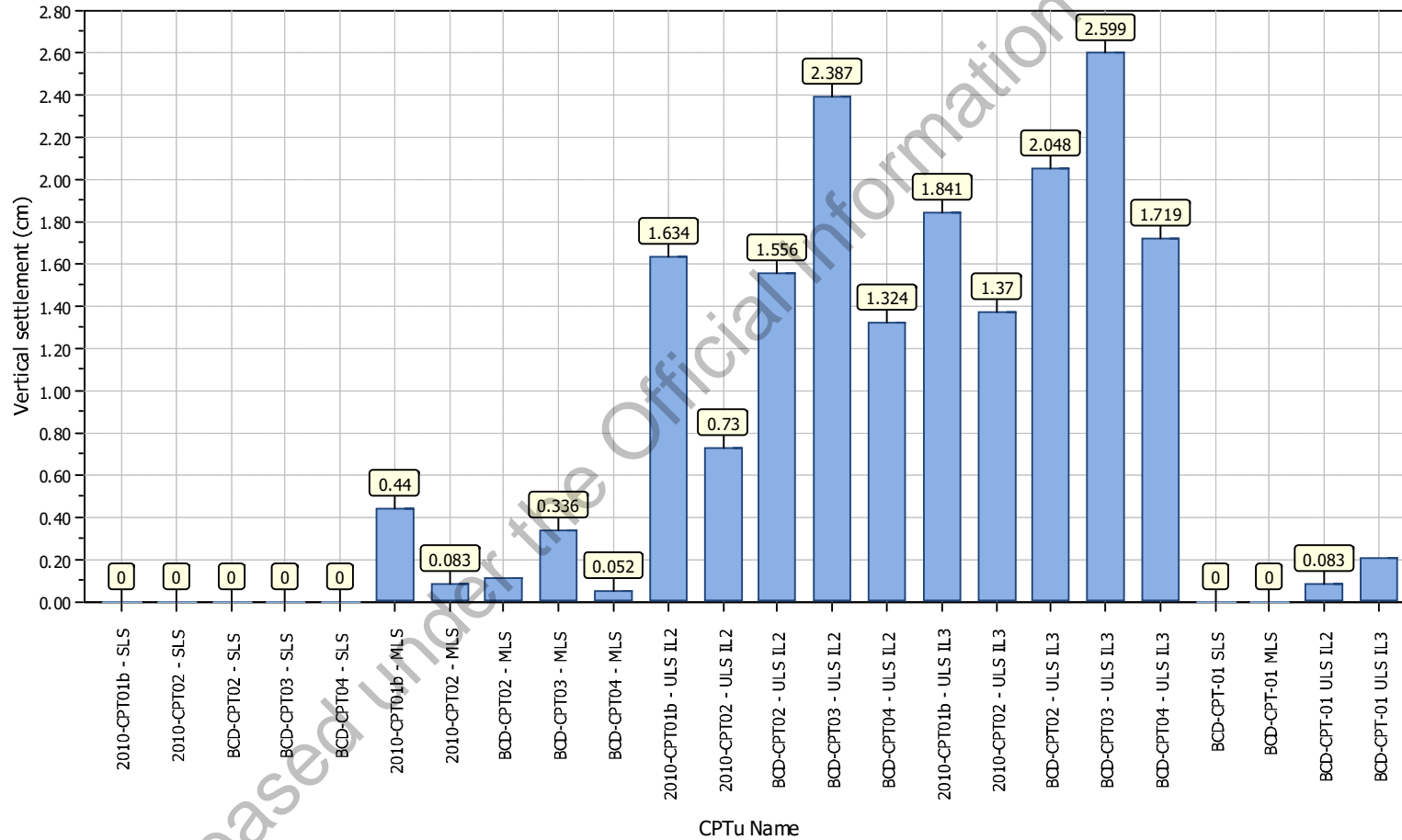
Overall vertical settlements report



Project title : Liquefaction Assessment - Mangapapa School

Location : 5 Rua Street, Mangapapa, Gisborne

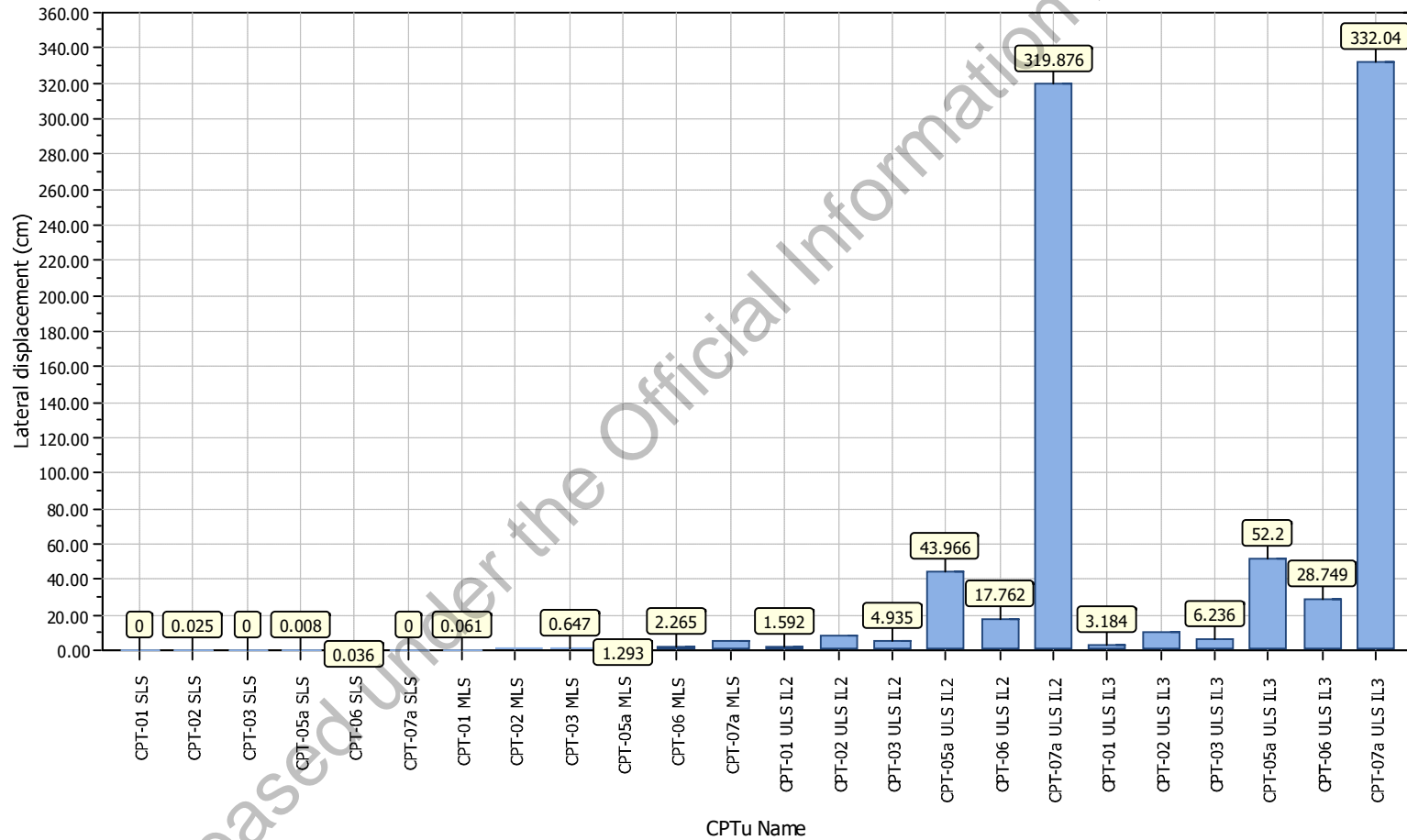
Overall vertical settlements report



Project title : Liquefaction Assessment - Mangapapa School

Location : 5 Rua Street, Mangapapa, Gisborne

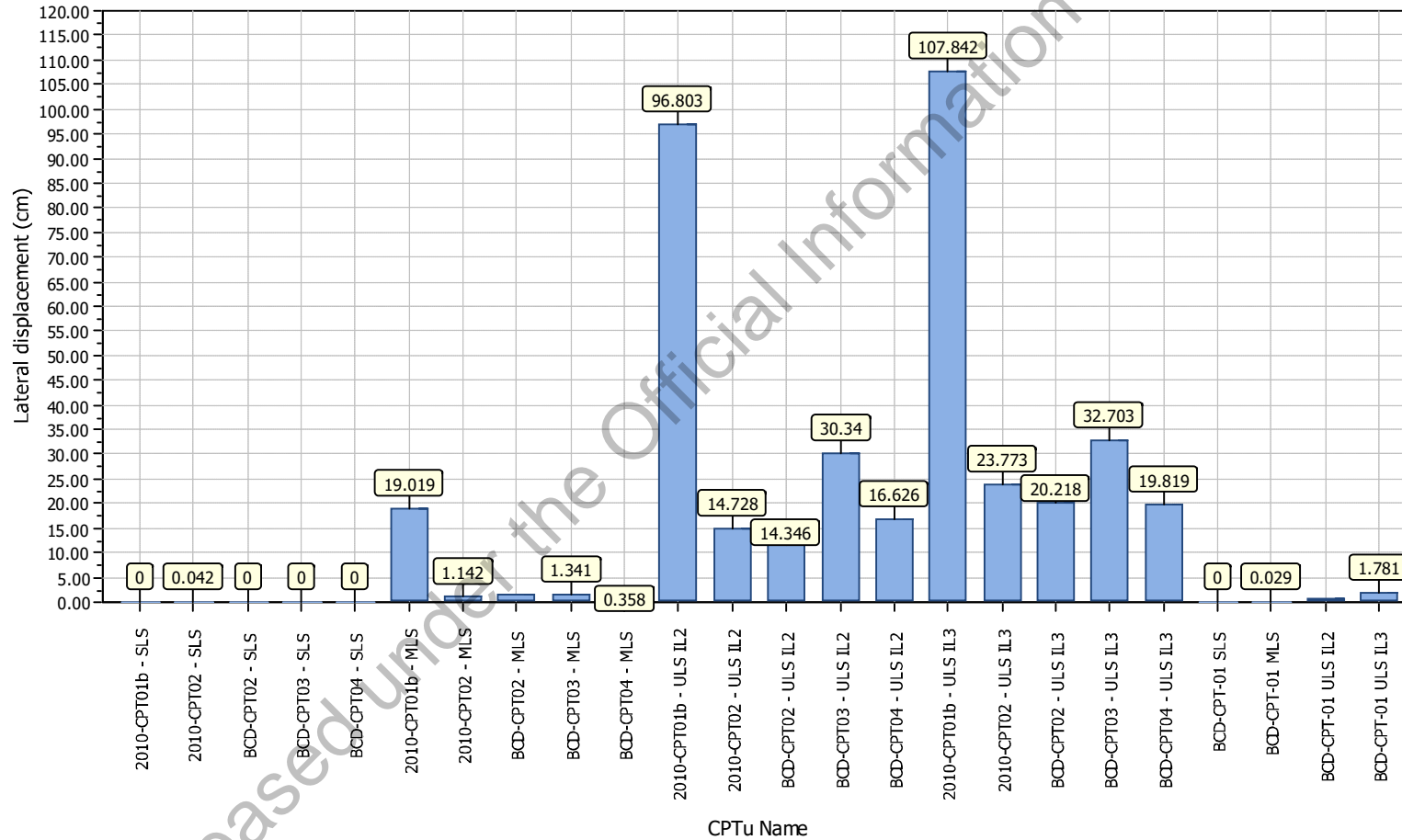
Overall lateral displacements report



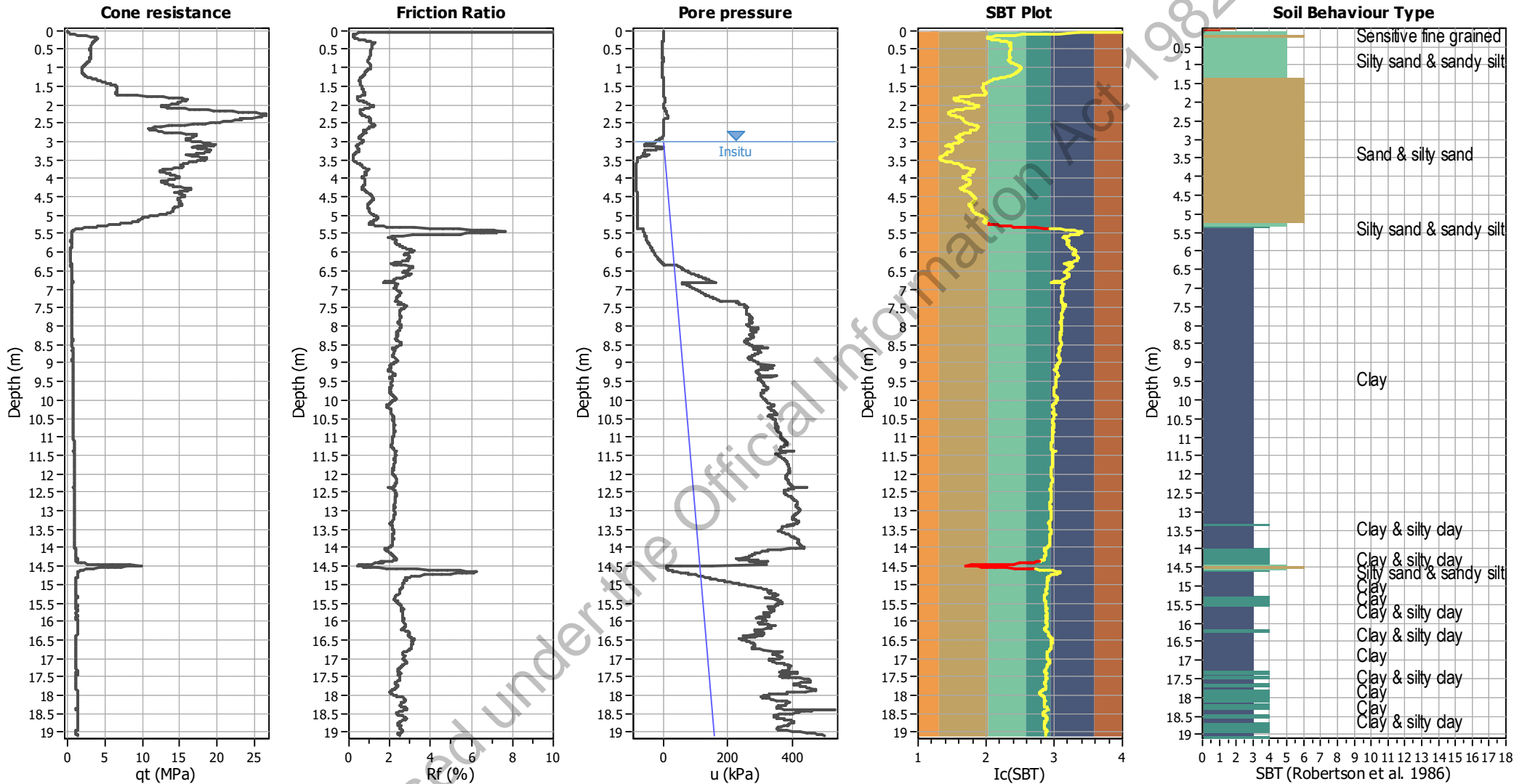
Project title : Liquefaction Assessment - Mangapapa School

Location : 5 Rua Street, Mangapapa, Gisborne

Overall lateral displacements report



CPT basic interpretation plots



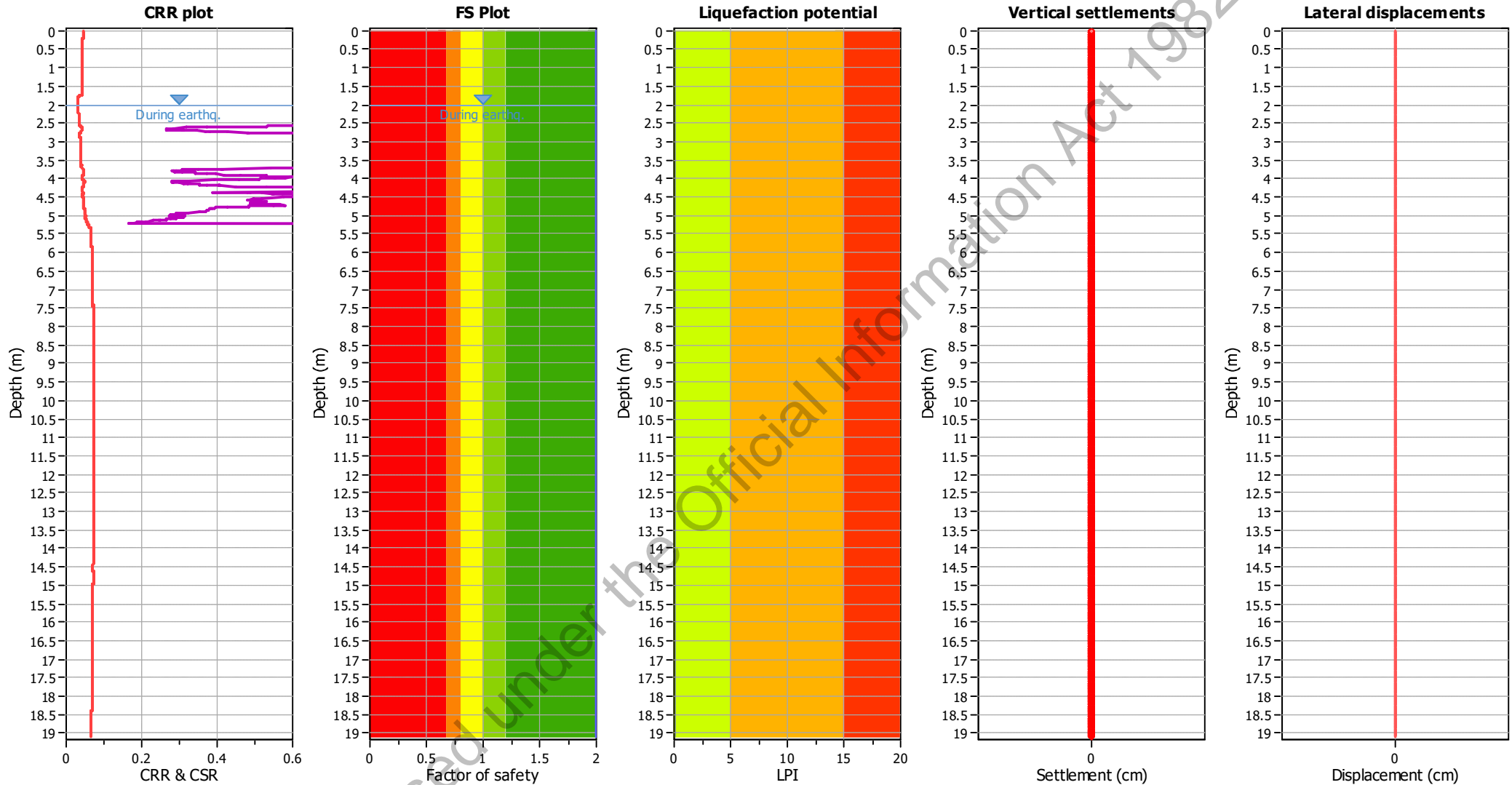
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w :	6.40	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_q applied:	Yes
Earthquake magnitude M_w :	6.40	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

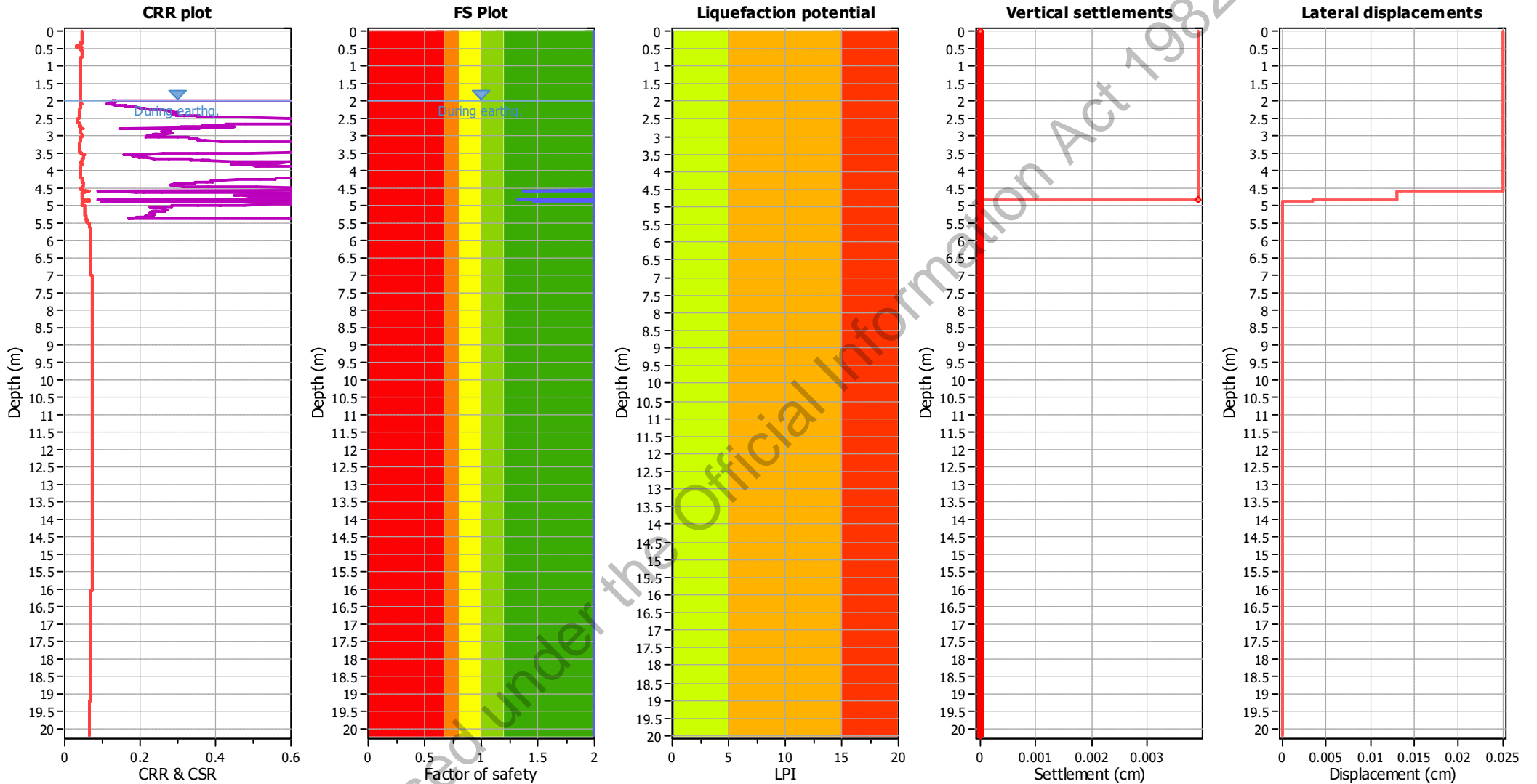
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.00 m
Fines correction method:	B&I (2014)	Average results interval:	3
Points to test:	Based on Ic value	Ic cut-off value:	2.60
Earthquake magnitude M_w :	6.40	Unit weight calculation:	Based on SBT
Peak ground acceleration:	0.08	Use fill:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A

Fill weight:	N/A
Transition detect. applied:	Yes
K_q applied:	Yes
Clay like behavior applied:	Sands only
Limit depth applied:	No
Limit depth:	N/A

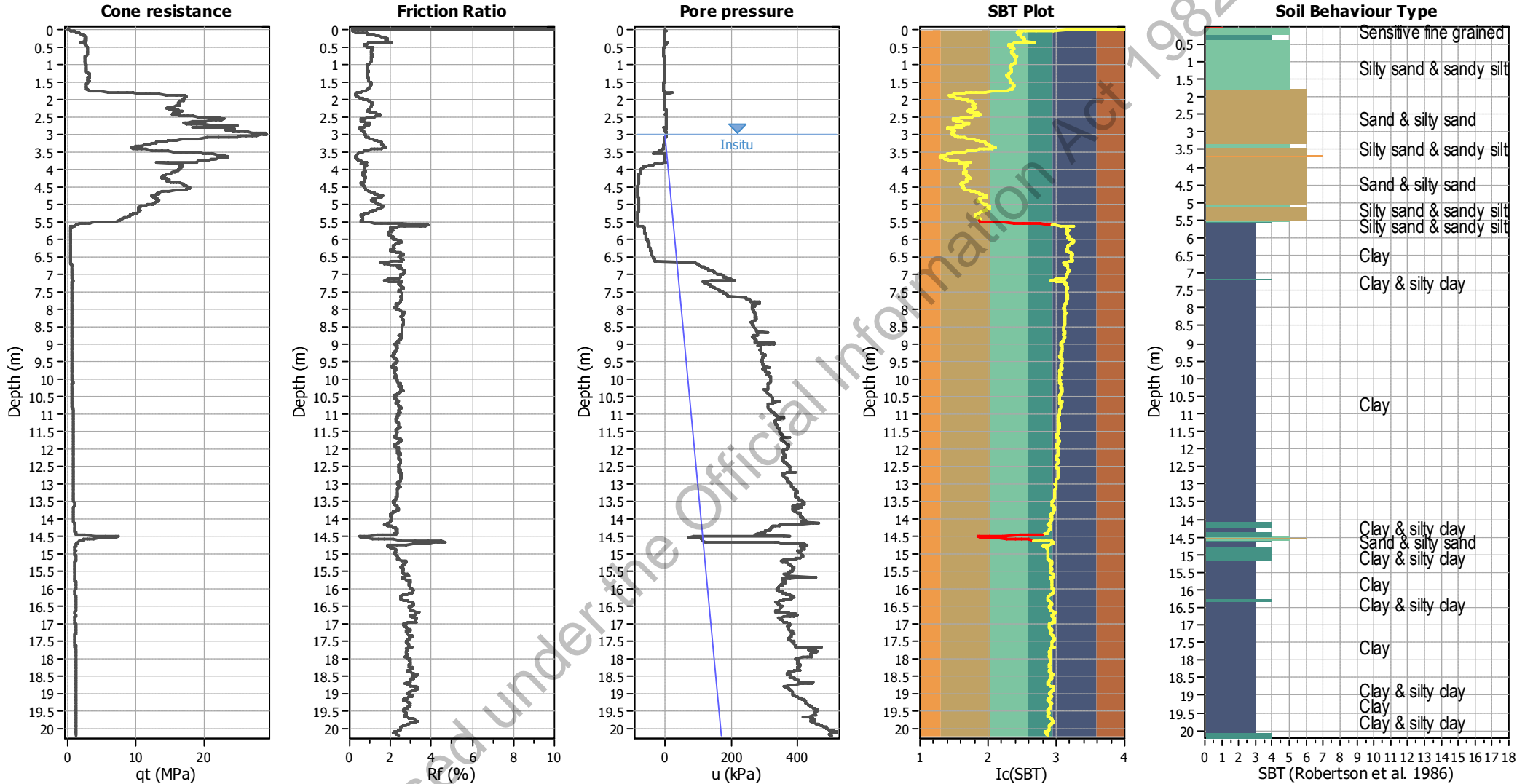
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

CPT basic interpretation plots



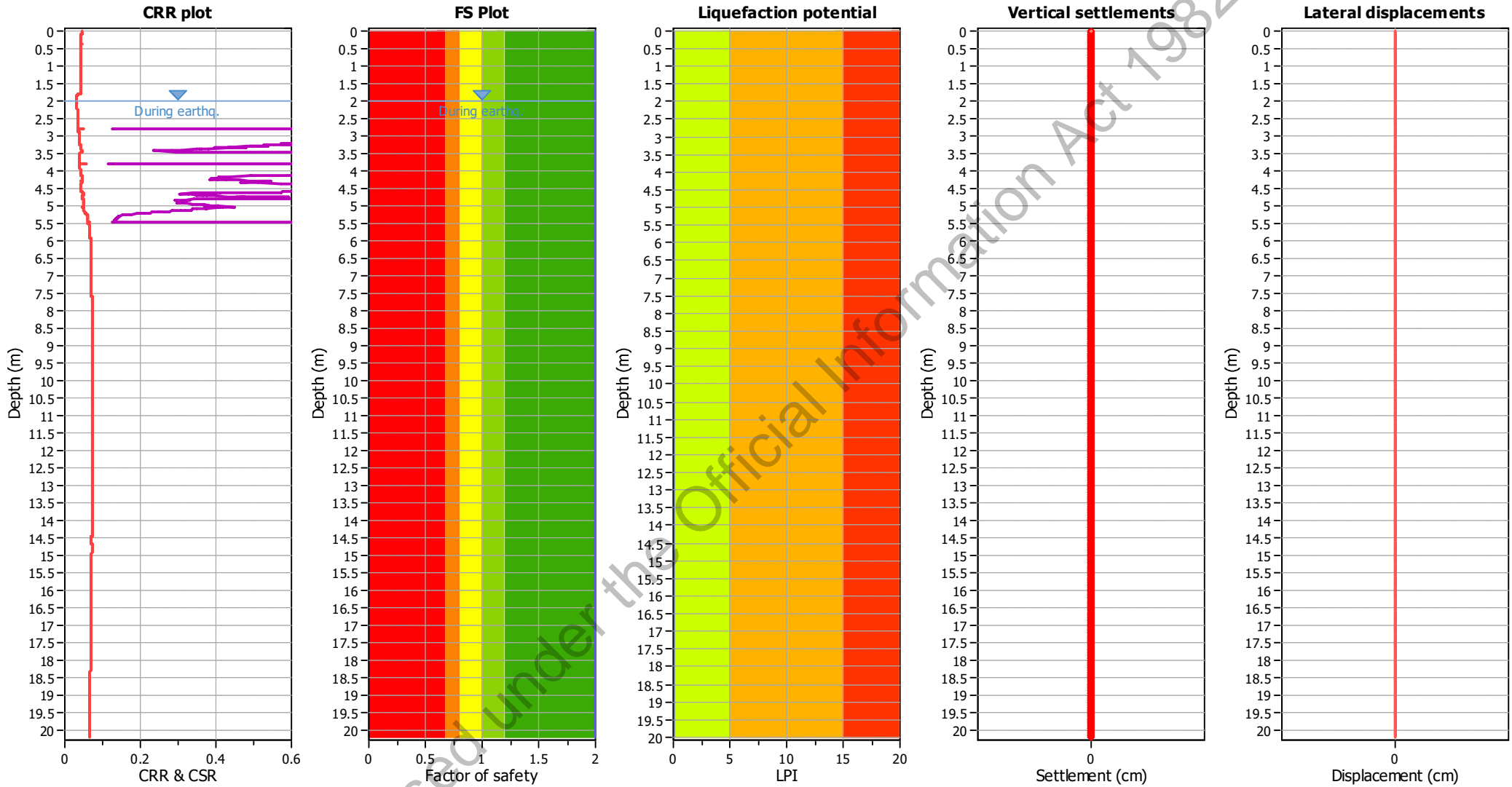
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w :	6.40	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.00 m
Fines correction method:	B&I (2014)	Average results interval:	3
Points to test:	Based on Ic value	Ic cut-off value:	2.60
Earthquake magnitude M_w :	6.40	Unit weight calculation:	Based on SBT
Peak ground acceleration:	0.08	Use fill:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A

Fill weight:	N/A
Transition detect. applied:	Yes
K_q applied:	Yes
Clay like behavior applied:	Sands only
Limit depth applied:	No
Limit depth:	N/A

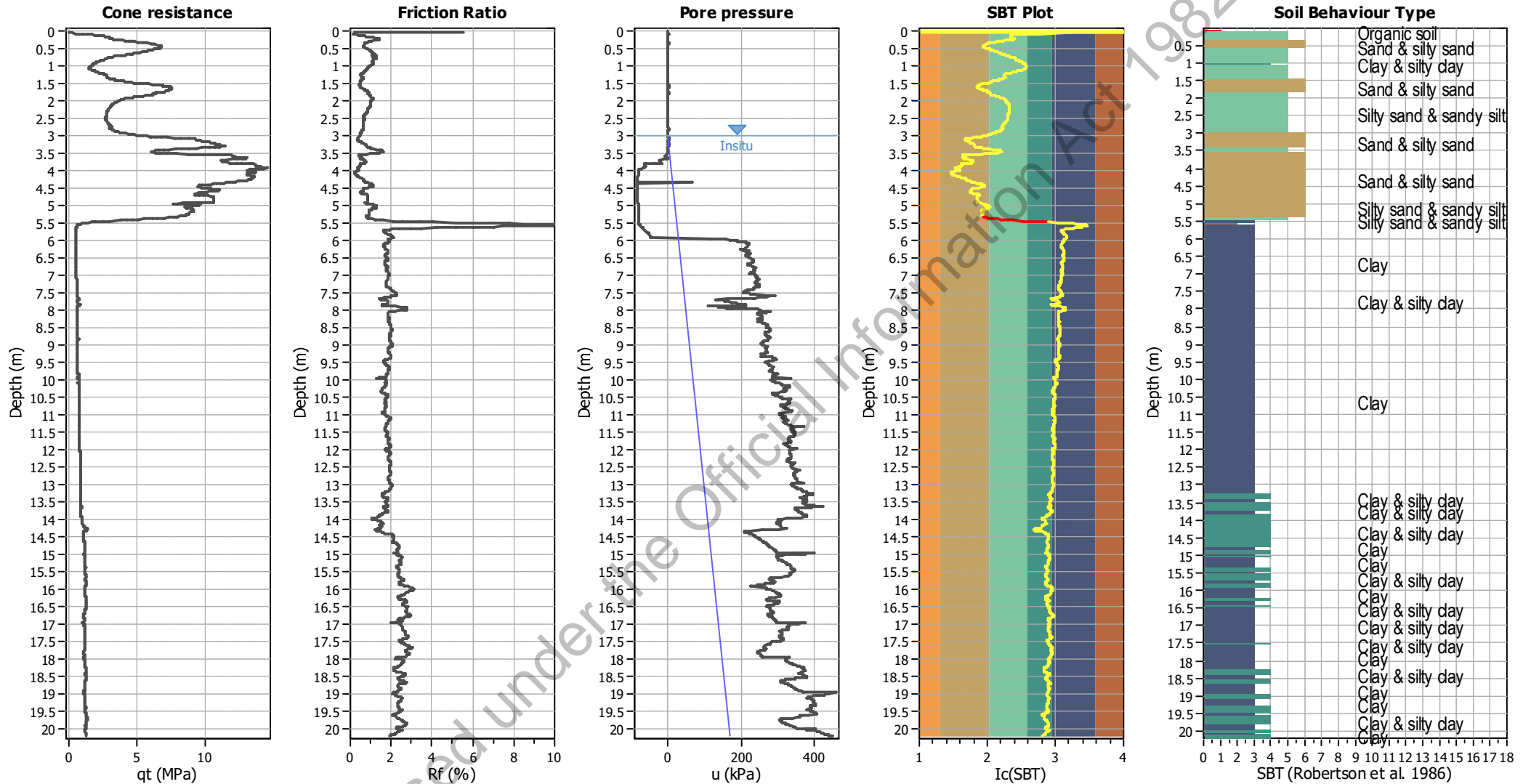
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

CPT basic interpretation plots



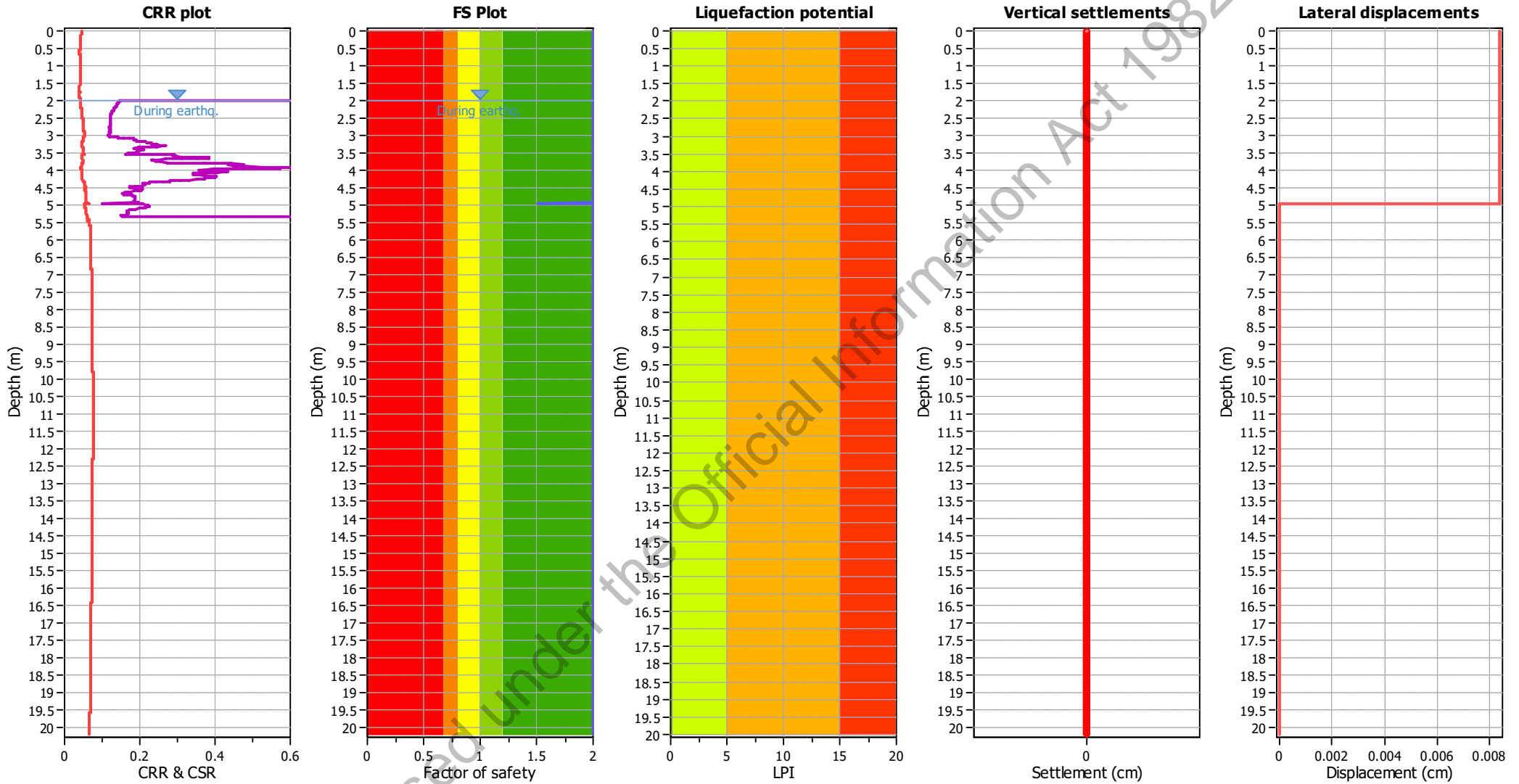
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _q applied:	Yes
Earthquake magnitude M _w :	6.40	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.00 m
Fines correction method:	B&I (2014)	Average results interval:	3
Points to test:	Based on Ic value	Ic cut-off value:	2.60
Earthquake magnitude M_w :	6.40	Unit weight calculation:	Based on SBT
Peak ground acceleration:	0.08	Use fill:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A

Fill weight:	N/A
Transition detect. applied:	Yes
K_q applied:	Yes
Clay like behavior applied:	Sands only
Limit depth applied:	No
Limit depth:	N/A

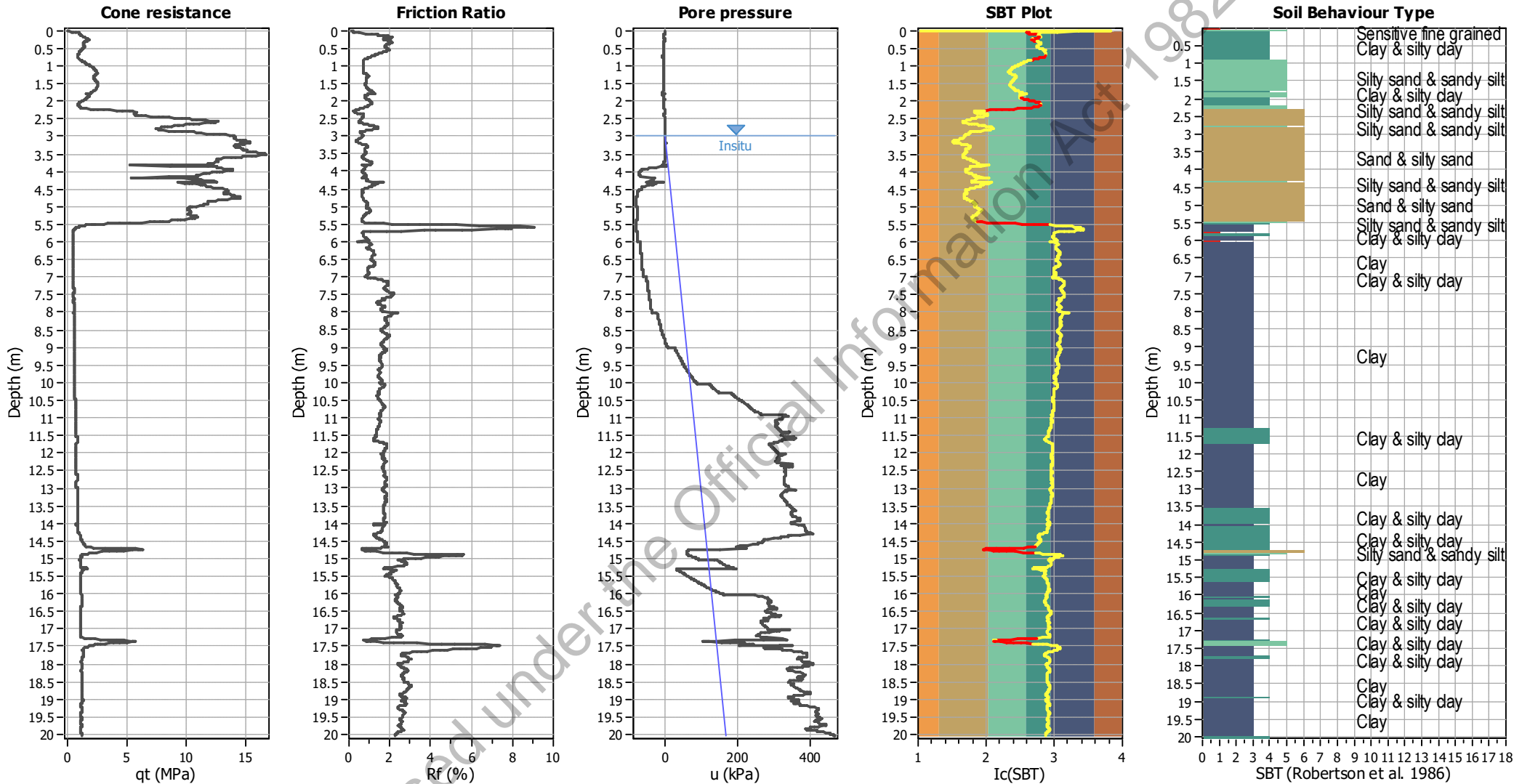
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

CPT basic interpretation plots



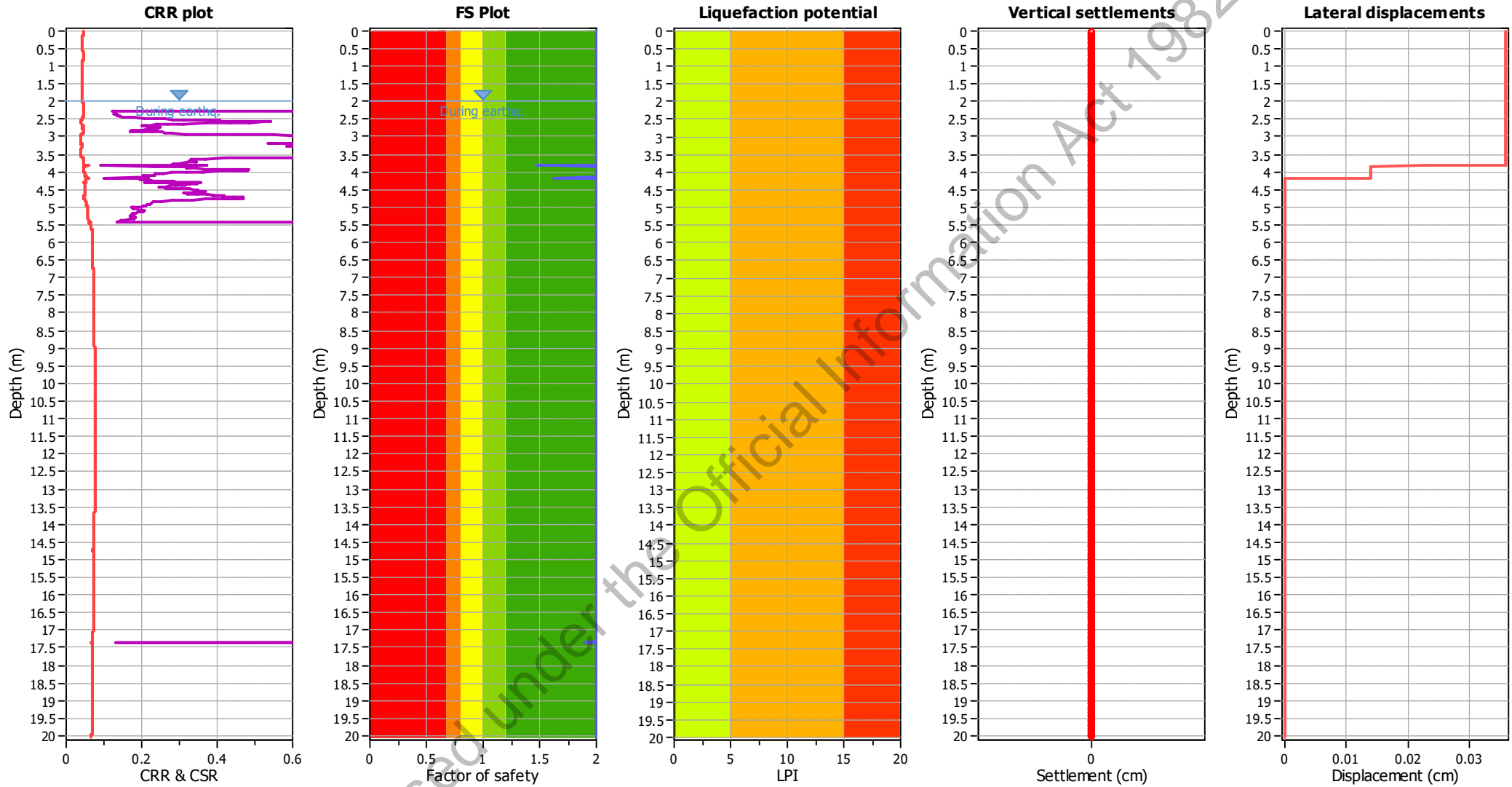
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _q applied:	Yes
Earthquake magnitude M _w :	6.40	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.00 m
Fines correction method:	B&I (2014)	Average results interval:	3
Points to test:	Based on Ic value	Ic cut-off value:	2.60
Earthquake magnitude M_w :	6.40	Unit weight calculation:	Based on SBT
Peak ground acceleration:	0.08	Use fill:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A

Fill weight:	N/A
Transition detect. applied:	Yes
K_q applied:	Yes
Clay like behavior applied:	Sands only
Limit depth applied:	No
Limit depth:	N/A

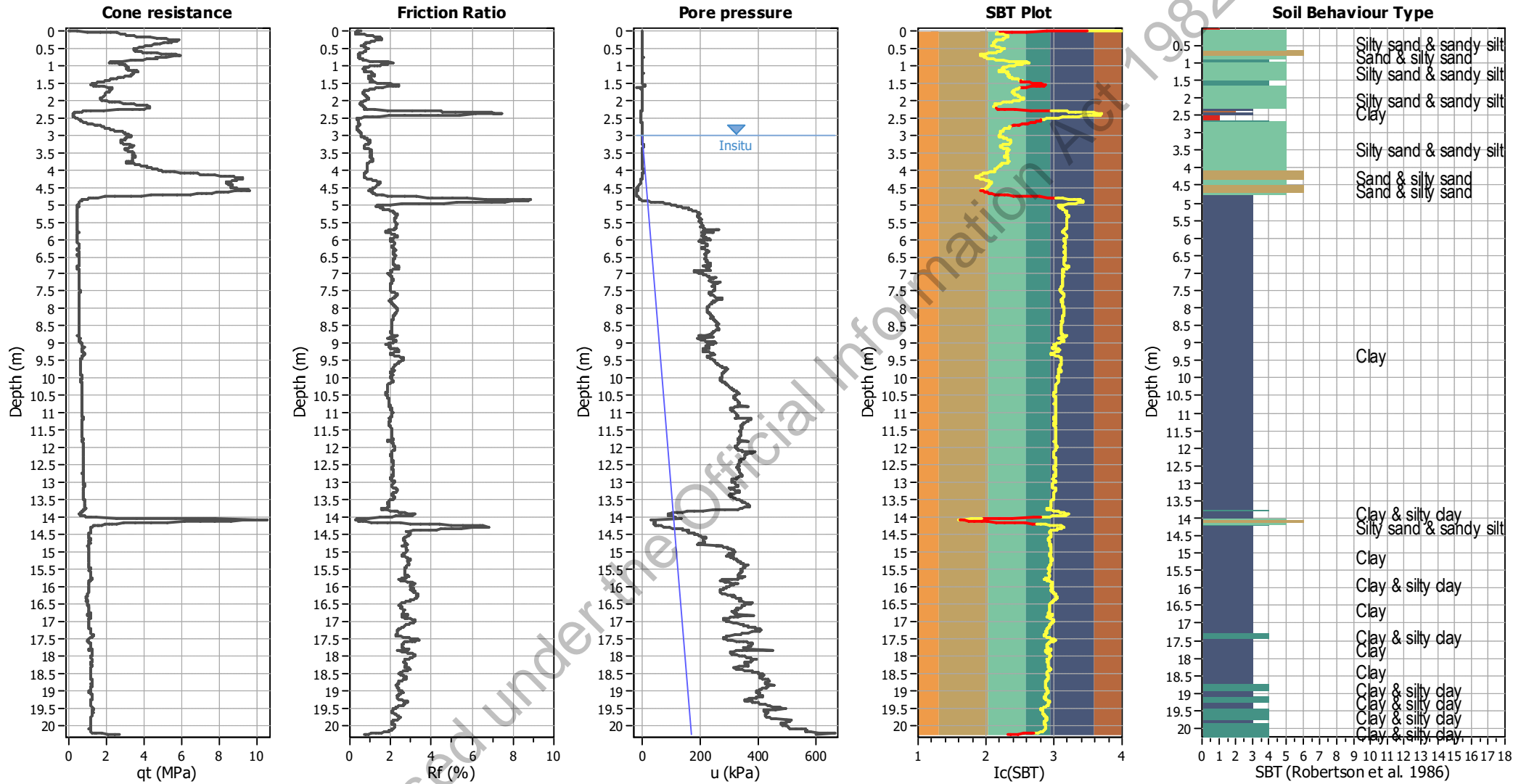
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

CPT basic interpretation plots



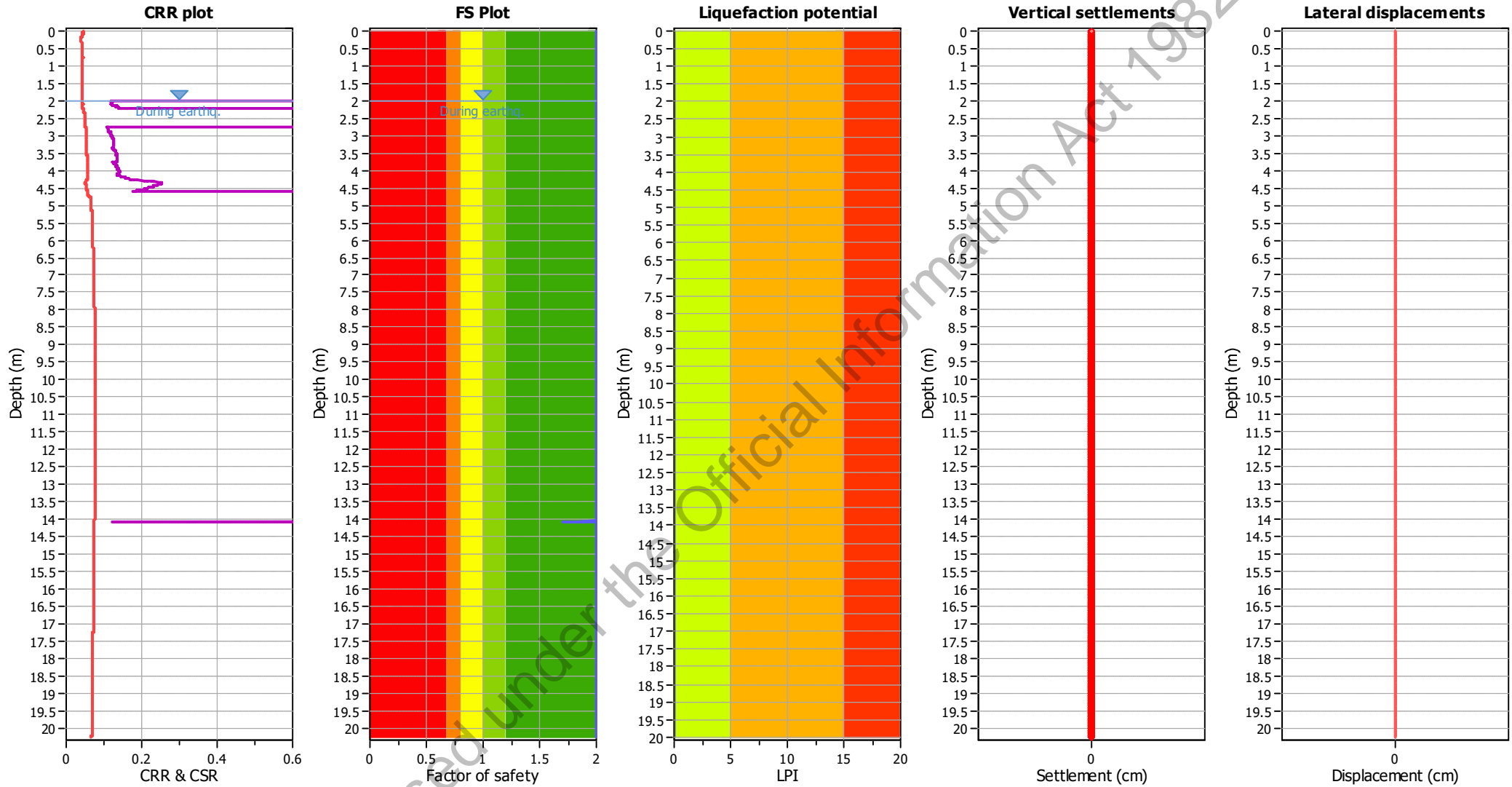
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _q applied:	Yes
Earthquake magnitude M _w :	6.40	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.08	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m
Fines correction method:	B&I (2014)	Average results interval:	3
Points to test:	Based on Ic value	Ic cut-off value:	2.60
Earthquake magnitude M_w :	6.40	Unit weight calculation:	Based on SBT
Peak ground acceleration:	0.08	Use fill:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A

Fill weight:	N/A
Transition detect. applied:	Yes
K_q applied:	Yes
Clay like behavior applied:	Sands only
Limit depth applied:	No
Limit depth:	N/A

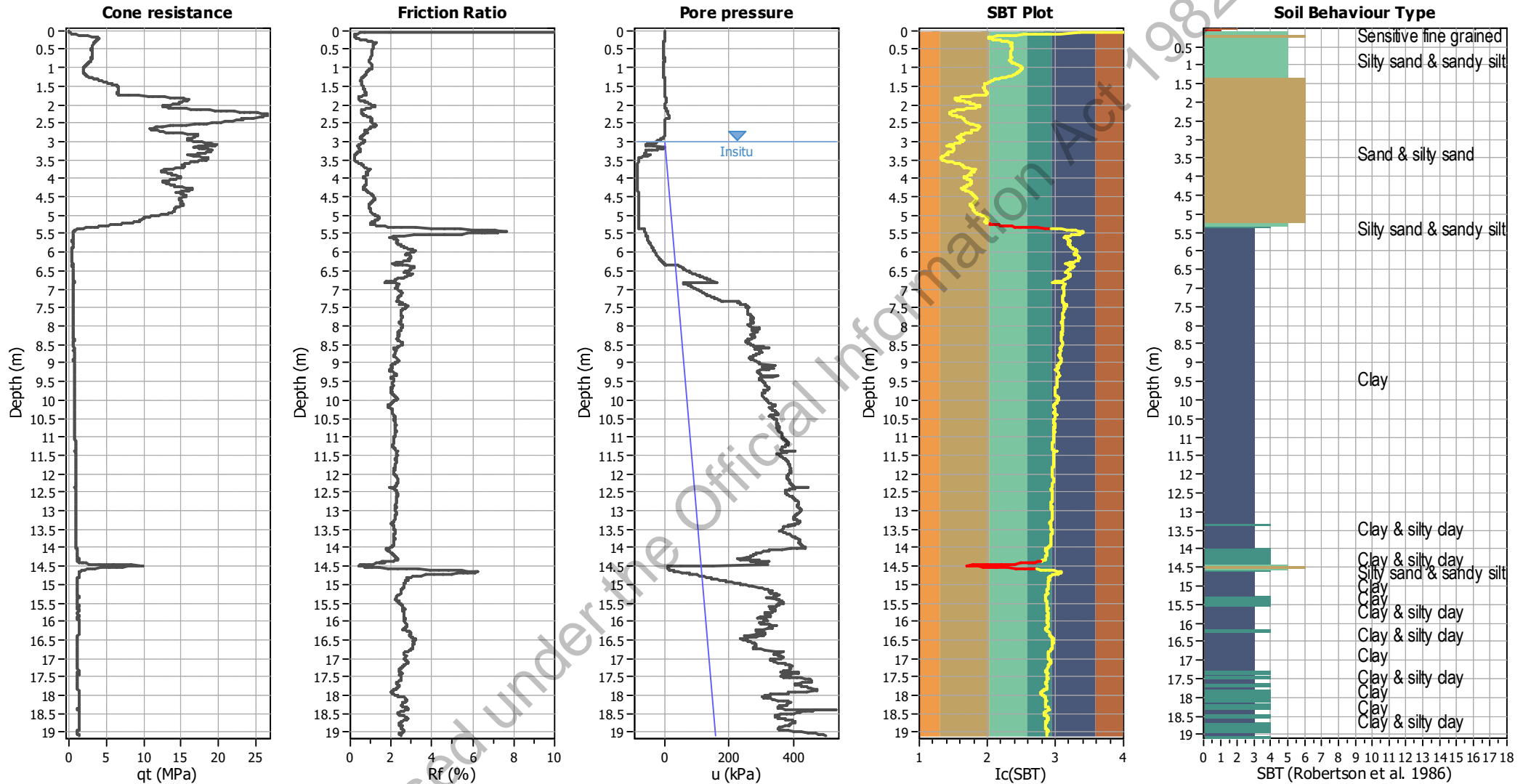
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

CPT basic interpretation plots



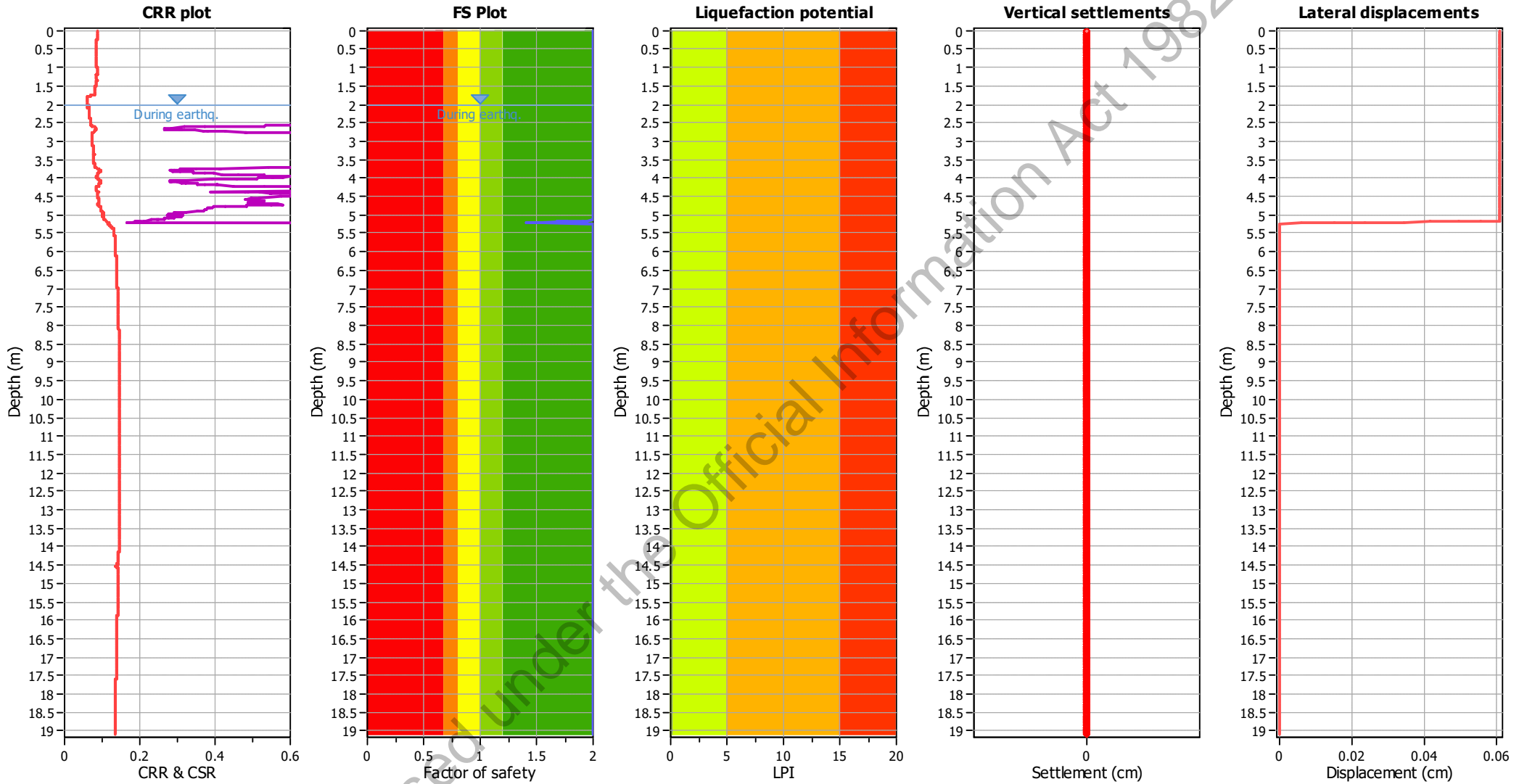
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w :	6.40	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.16	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m
Fines correction method:	B&I (2014)	Average results interval:	3
Points to test:	Based on Ic value	Ic cut-off value:	2.60
Earthquake magnitude M_w :	6.40	Unit weight calculation:	Based on SBT
Peak ground acceleration:	0.16	Use fill:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A

Fill weight:	N/A
Transition detect. applied:	Yes
K_q applied:	Yes
Clay like behavior applied:	Sands only
Limit depth applied:	No
Limit depth:	N/A

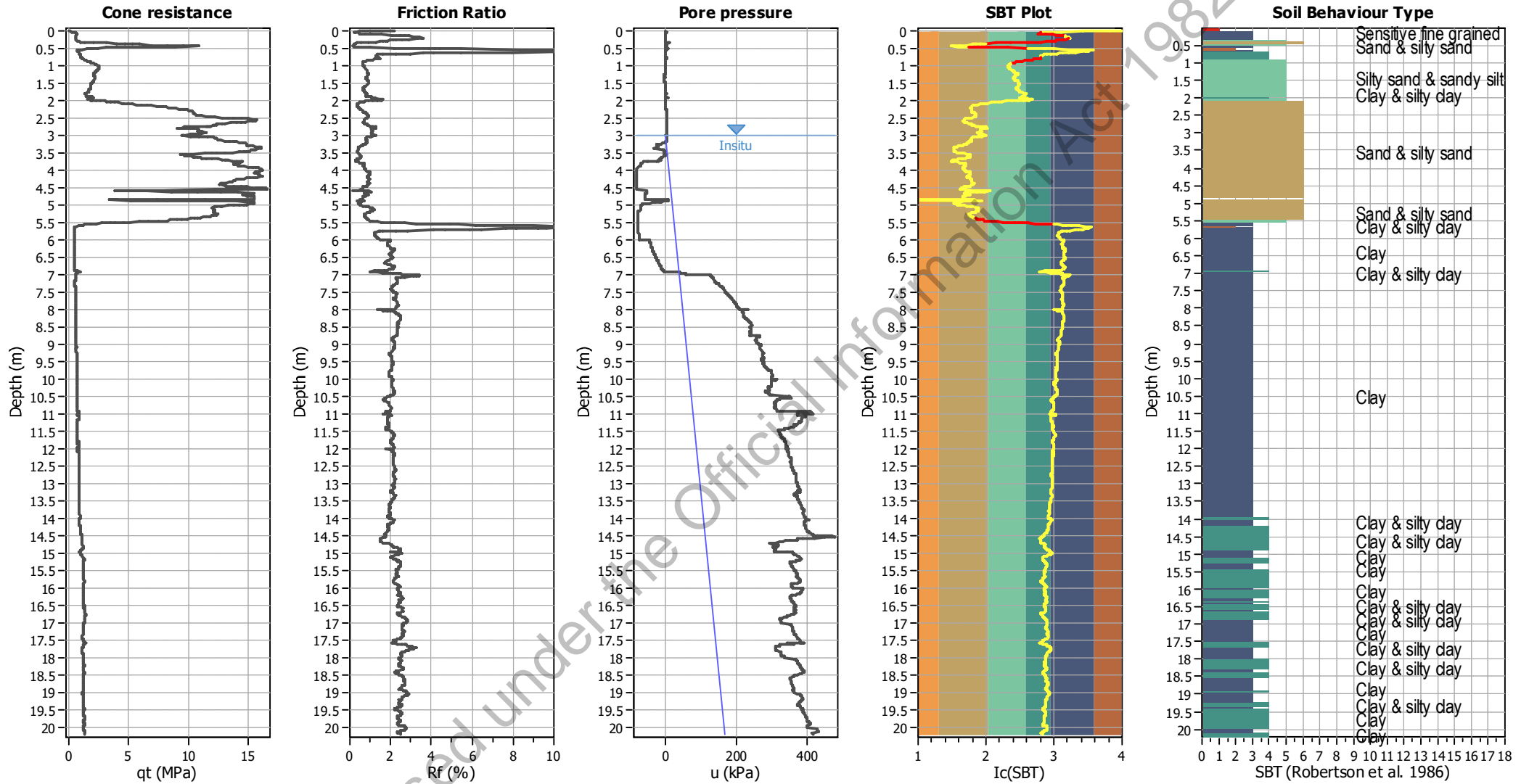
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

CPT basic interpretation plots



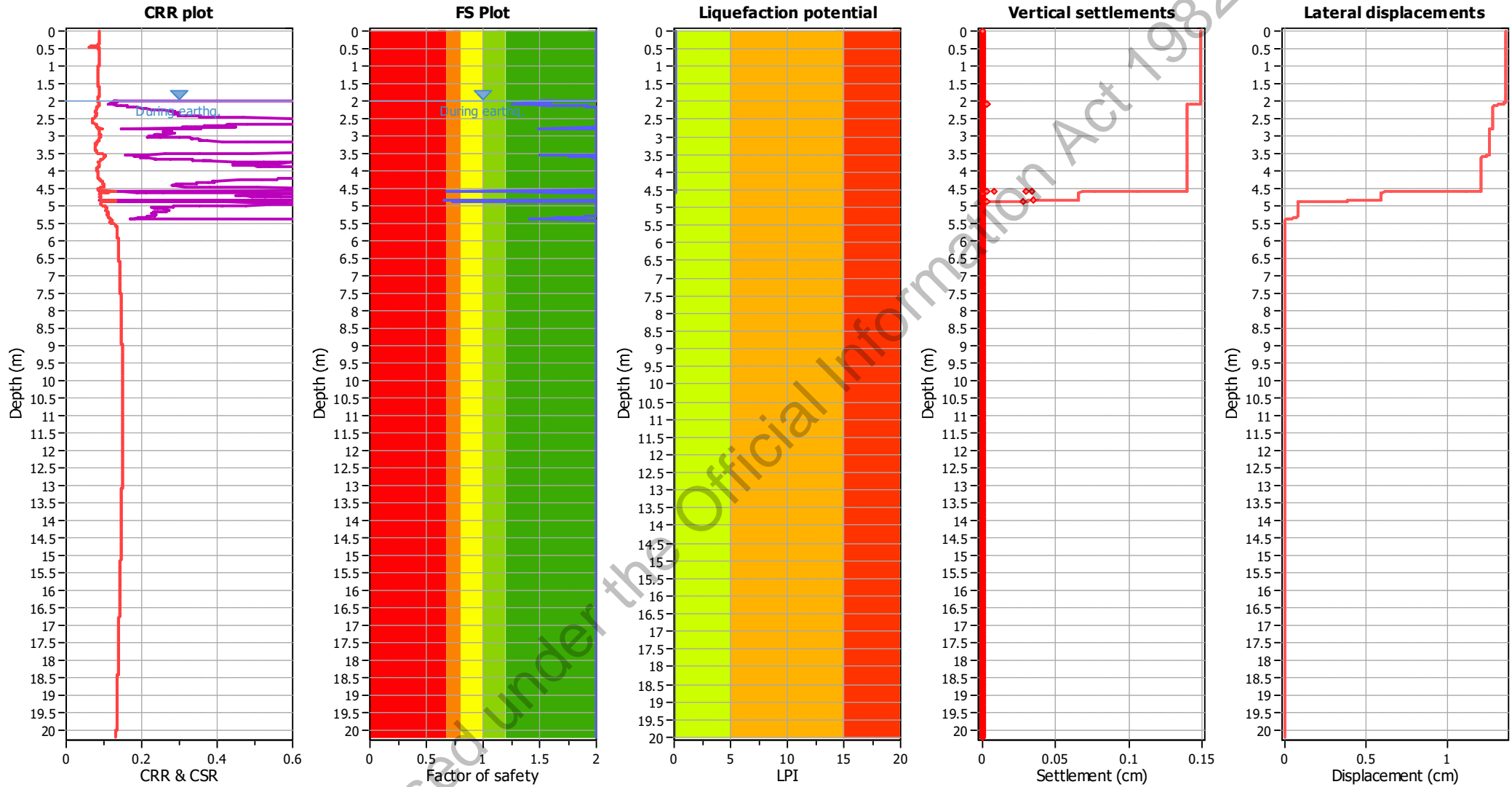
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _q applied:	Yes
Earthquake magnitude M _w :	6.40	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.16	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.00 m
Fines correction method:	B&I (2014)	Average results interval:	3
Points to test:	Based on Ic value	Ic cut-off value:	2.60
Earthquake magnitude M_w :	6.40	Unit weight calculation:	Based on SBT
Peak ground acceleration:	0.16	Use fill:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A

Fill weight:	N/A
Transition detect. applied:	Yes
K_q applied:	Yes
Clay like behavior applied:	Sands only
Limit depth applied:	No
Limit depth:	N/A

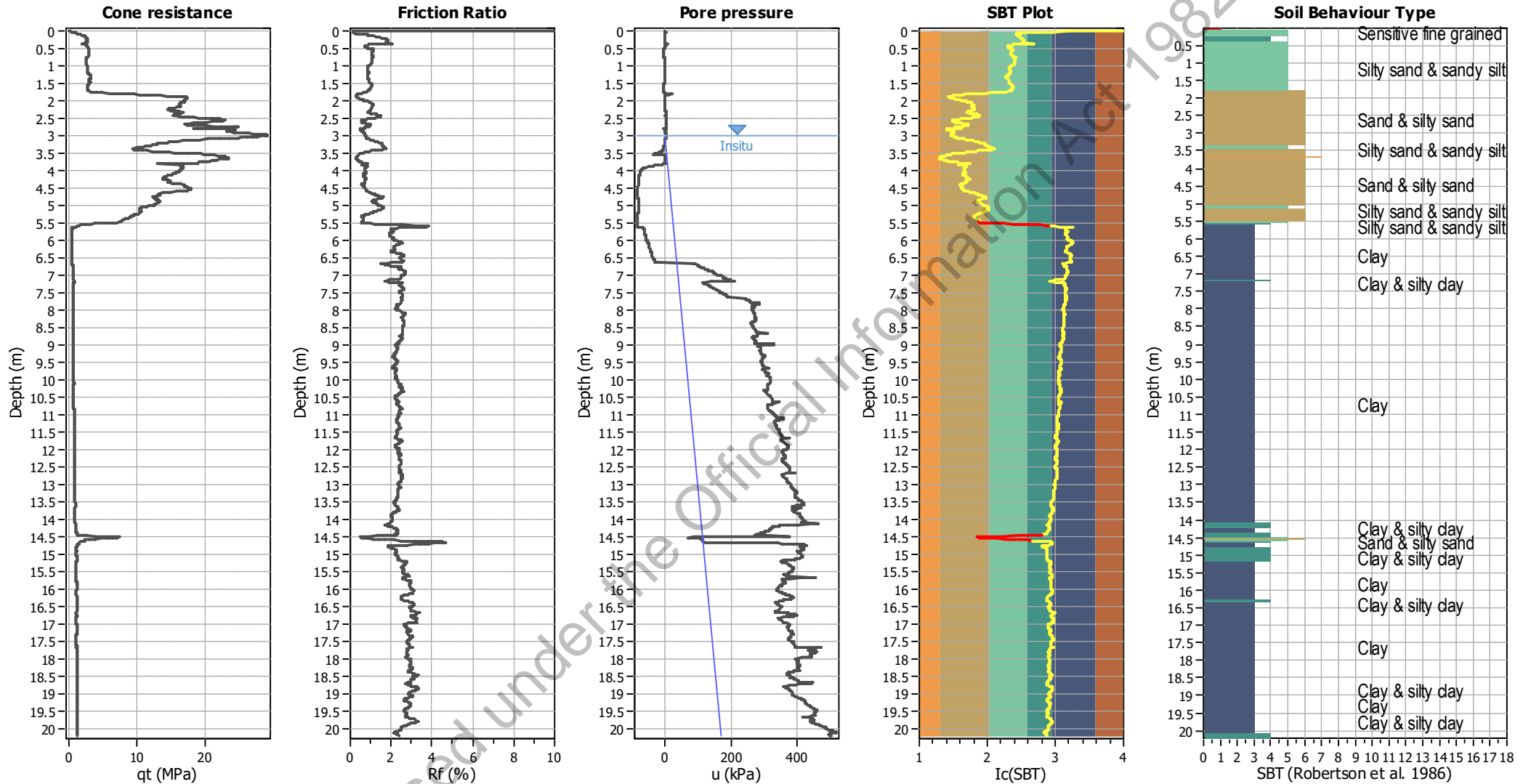
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

CPT basic interpretation plots



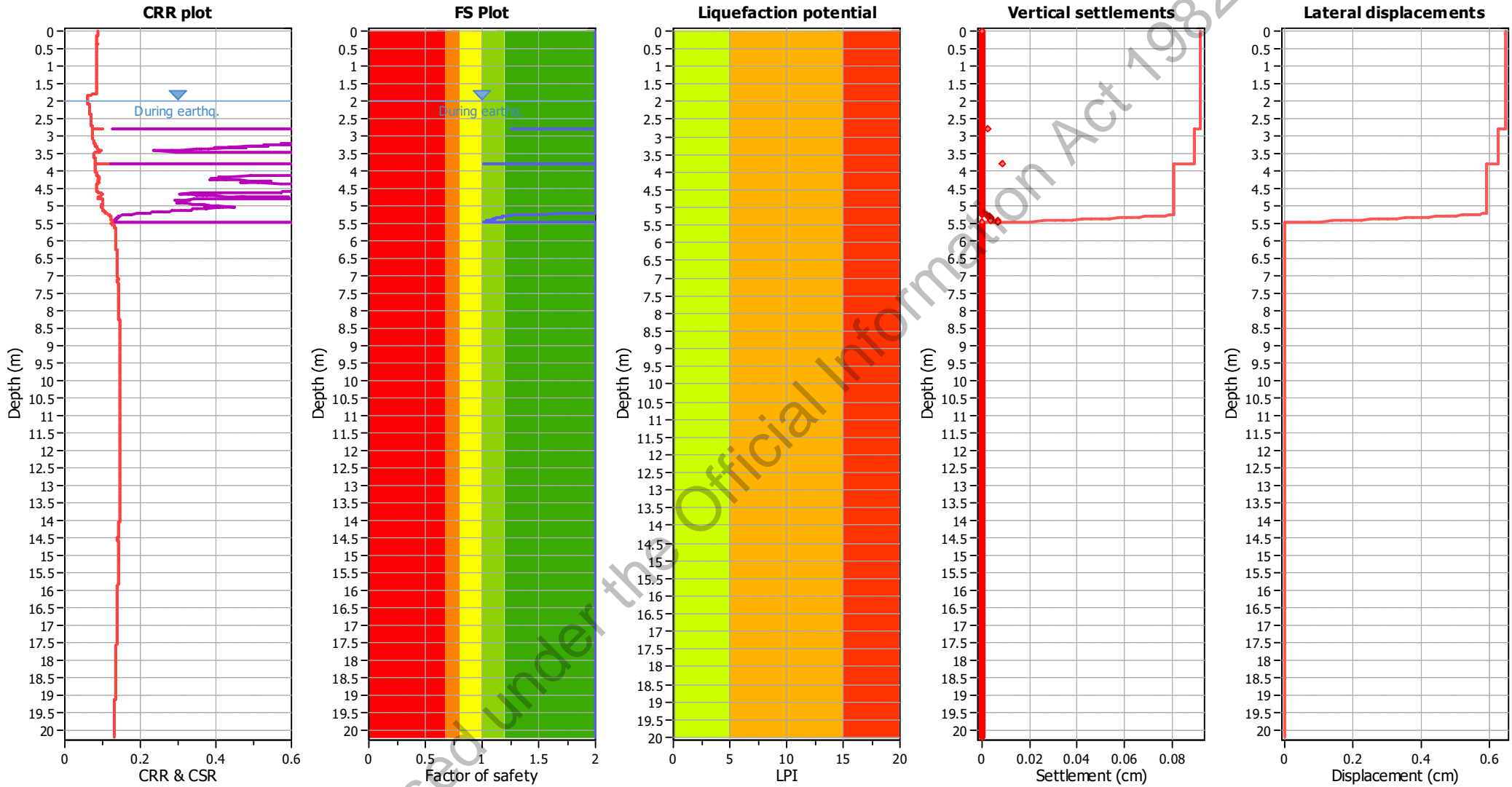
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w :	6.40	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.16	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.00 m
Fines correction method:	B&I (2014)	Average results interval:	3
Points to test:	Based on Ic value	Ic cut-off value:	2.60
Earthquake magnitude M_w :	6.40	Unit weight calculation:	Based on SBT
Peak ground acceleration:	0.16	Use fill:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A

Fill weight:	N/A
Transition detect. applied:	Yes
K_q applied:	Yes
Clay like behavior applied:	Sands only
Limit depth applied:	No
Limit depth:	N/A

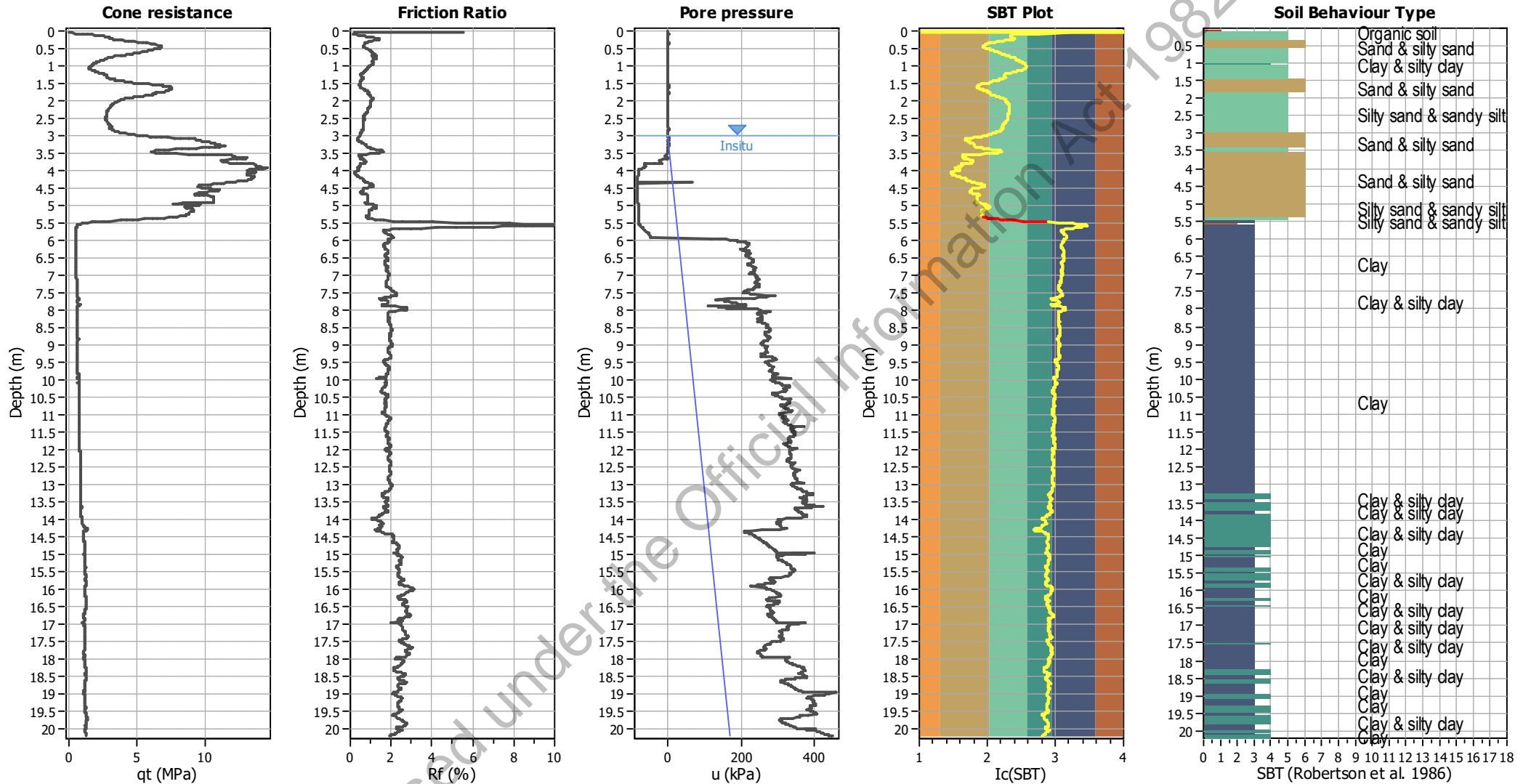
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

CPT basic interpretation plots



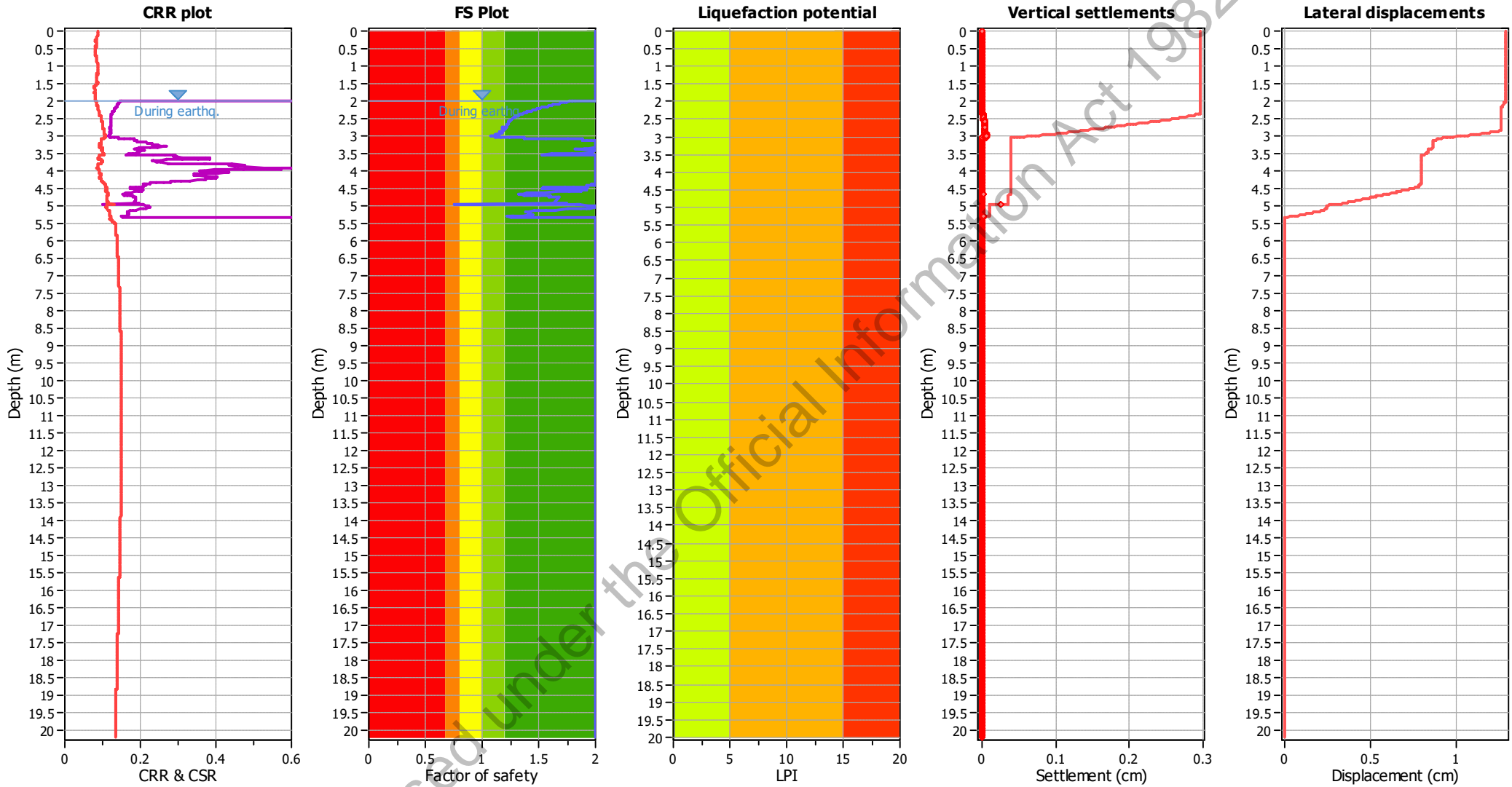
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _q applied:	Yes
Earthquake magnitude M _w :	6.40	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.16	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.00 m
Fines correction method:	B&I (2014)	Average results interval:	3
Points to test:	Based on Ic value	Ic cut-off value:	2.60
Earthquake magnitude M_w :	6.40	Unit weight calculation:	Based on SBT
Peak ground acceleration:	0.16	Use fill:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A

Fill weight:	N/A
Transition detect. applied:	Yes
K_q applied:	Yes
Clay like behavior applied:	Sands only
Limit depth applied:	No
Limit depth:	N/A

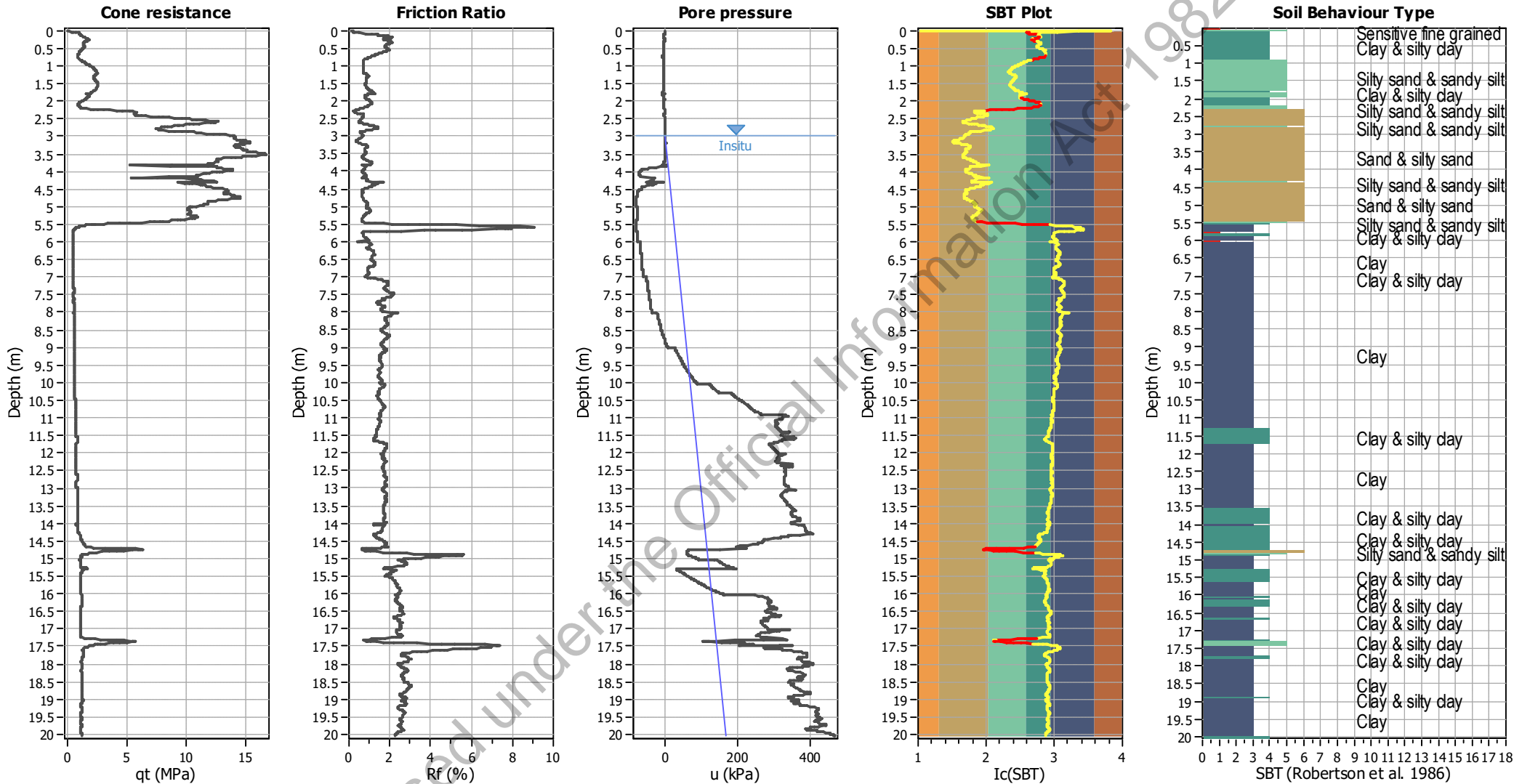
F.S. color scheme

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

LPI color scheme

■	Very high risk
■	High risk
■	Low risk

CPT basic interpretation plots



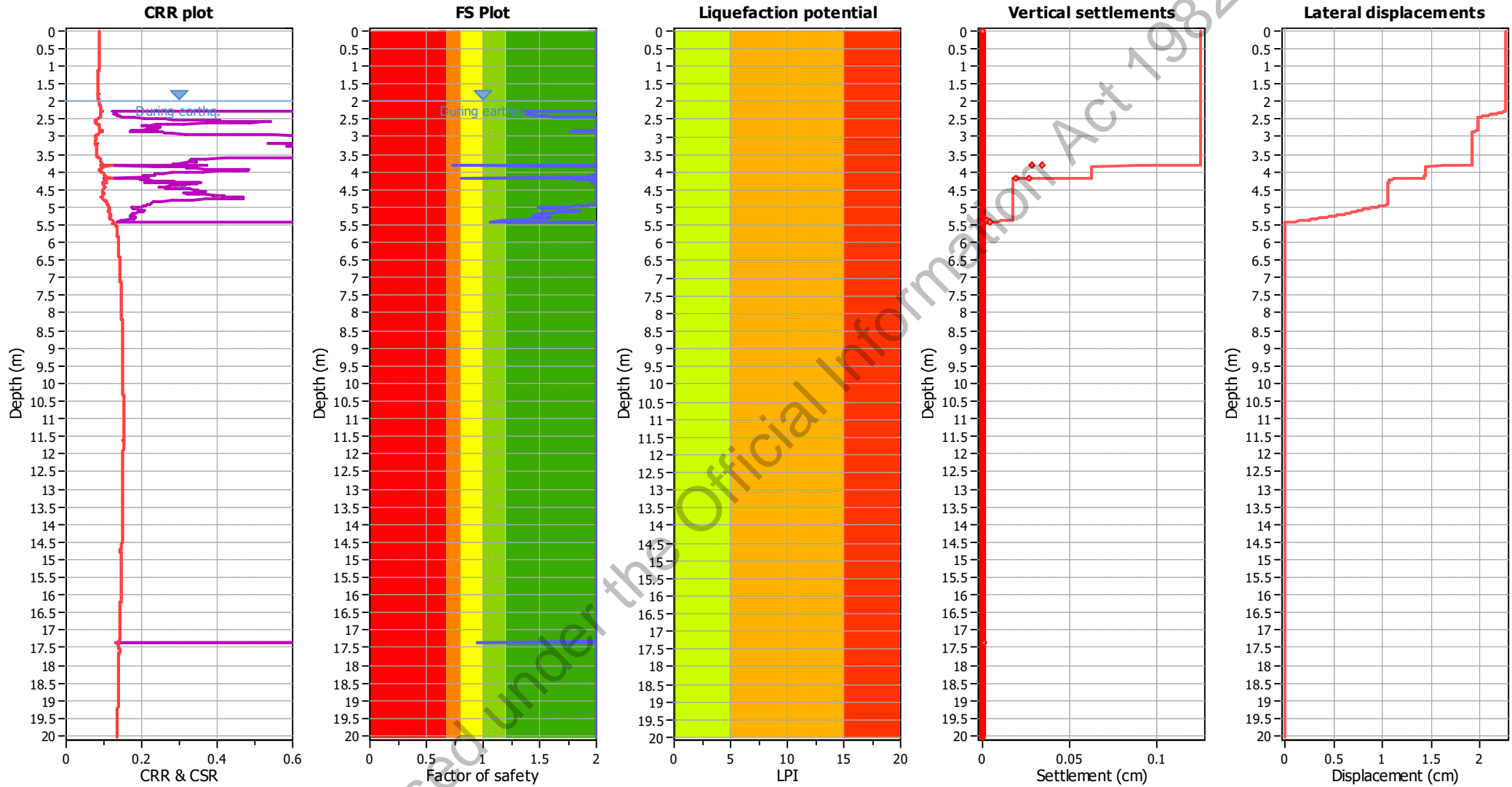
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _q applied:	Yes
Earthquake magnitude M _w :	6.40	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.16	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.00 m
Fines correction method:	B&I (2014)	Average results interval:	3
Points to test:	Based on Ic value	Ic cut-off value:	2.60
Earthquake magnitude M_w :	6.40	Unit weight calculation:	Based on SBT
Peak ground acceleration:	0.16	Use fill:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A

Fill weight:	N/A
Transition detect. applied:	Yes
K_q applied:	Yes
Clay like behavior applied:	Sands only
Limit depth applied:	No
Limit depth:	N/A

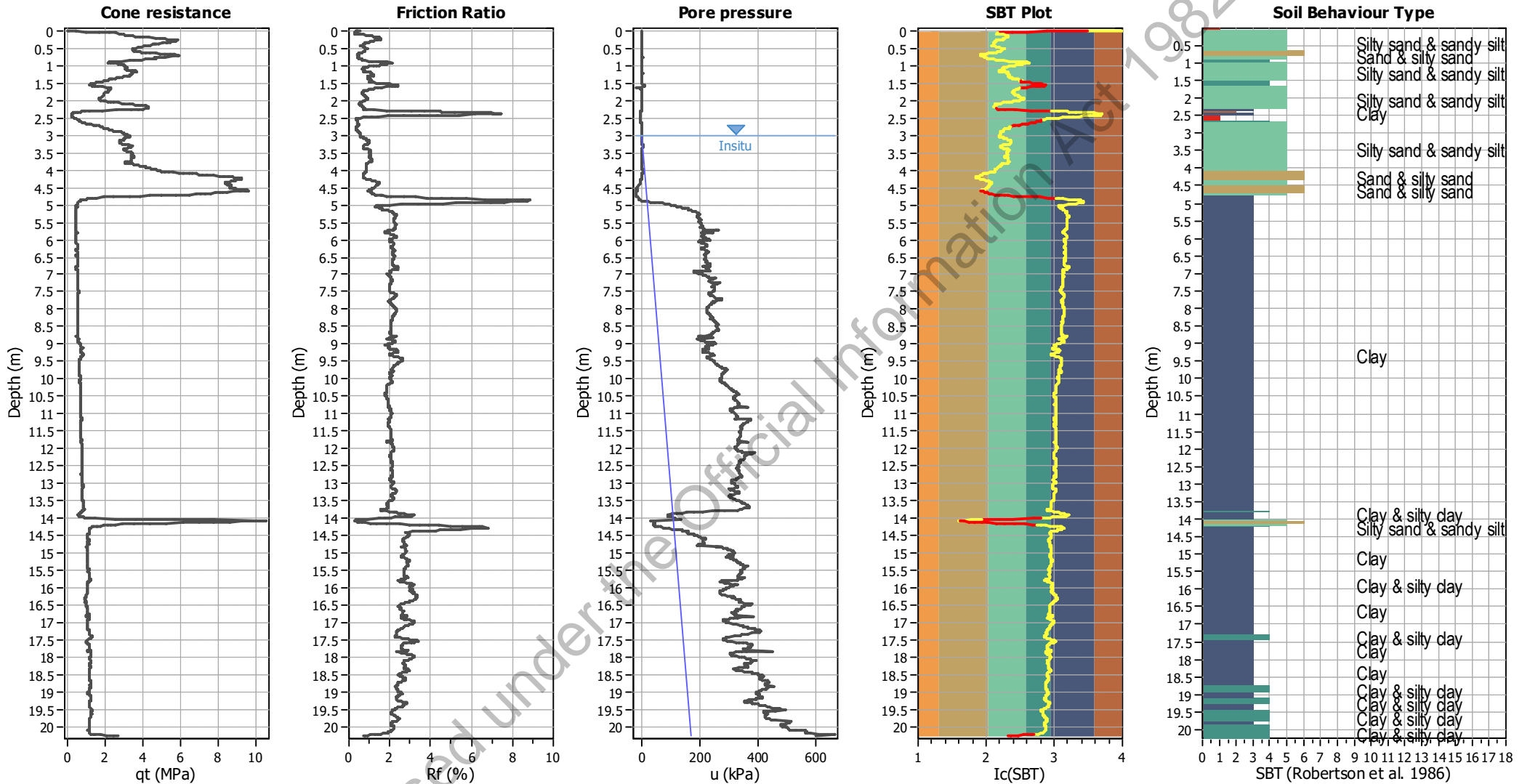
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

CPT basic interpretation plots



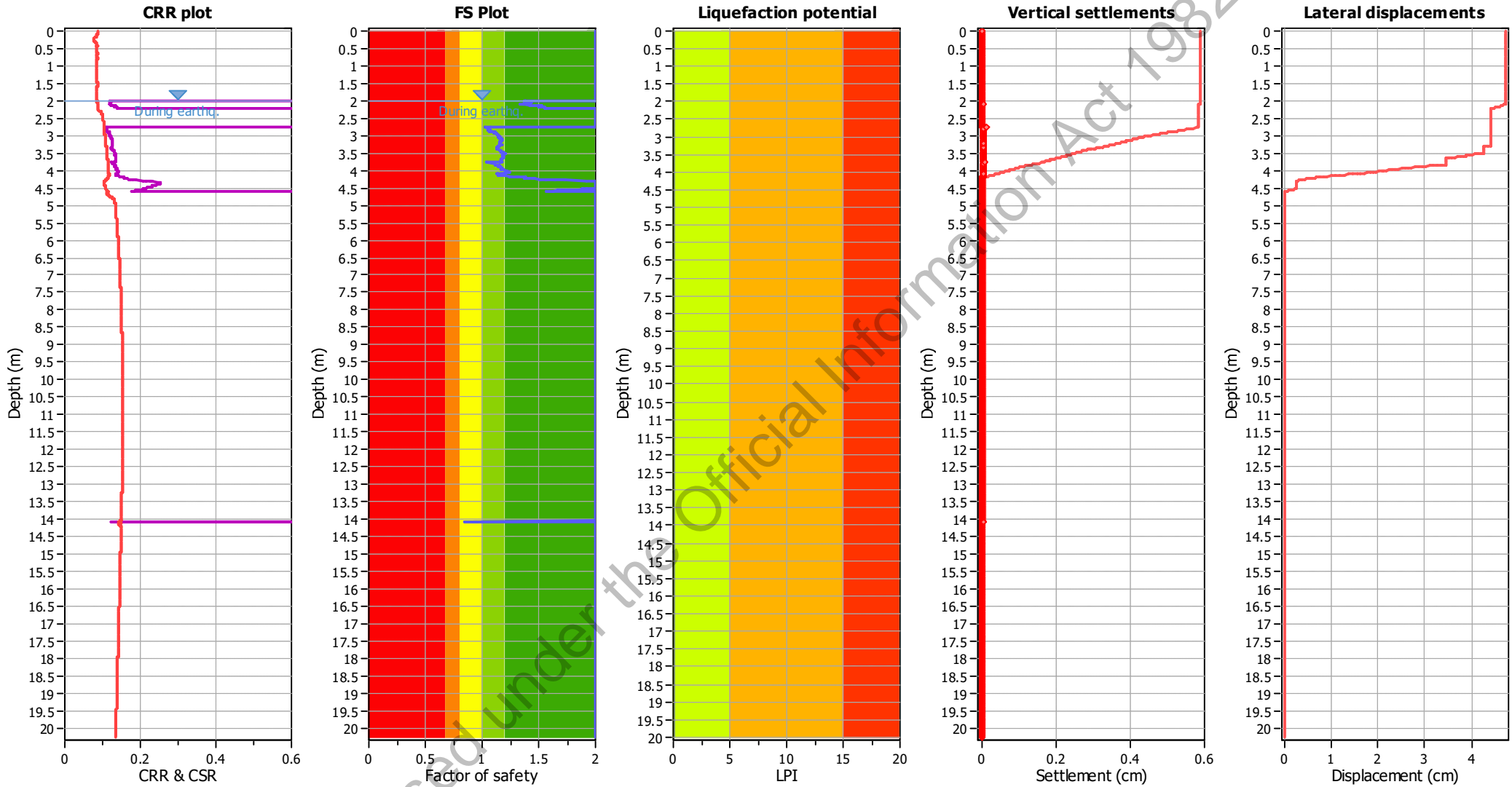
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w :	6.40	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.16	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m
Fines correction method:	B&I (2014)	Average results interval:	3
Points to test:	Based on Ic value	Ic cut-off value:	2.60
Earthquake magnitude M_w :	6.40	Unit weight calculation:	Based on SBT
Peak ground acceleration:	0.16	Use fill:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A

Fill weight:	N/A
Transition detect. applied:	Yes
K_q applied:	Yes
Clay like behavior applied:	Sands only
Limit depth applied:	No
Limit depth:	N/A

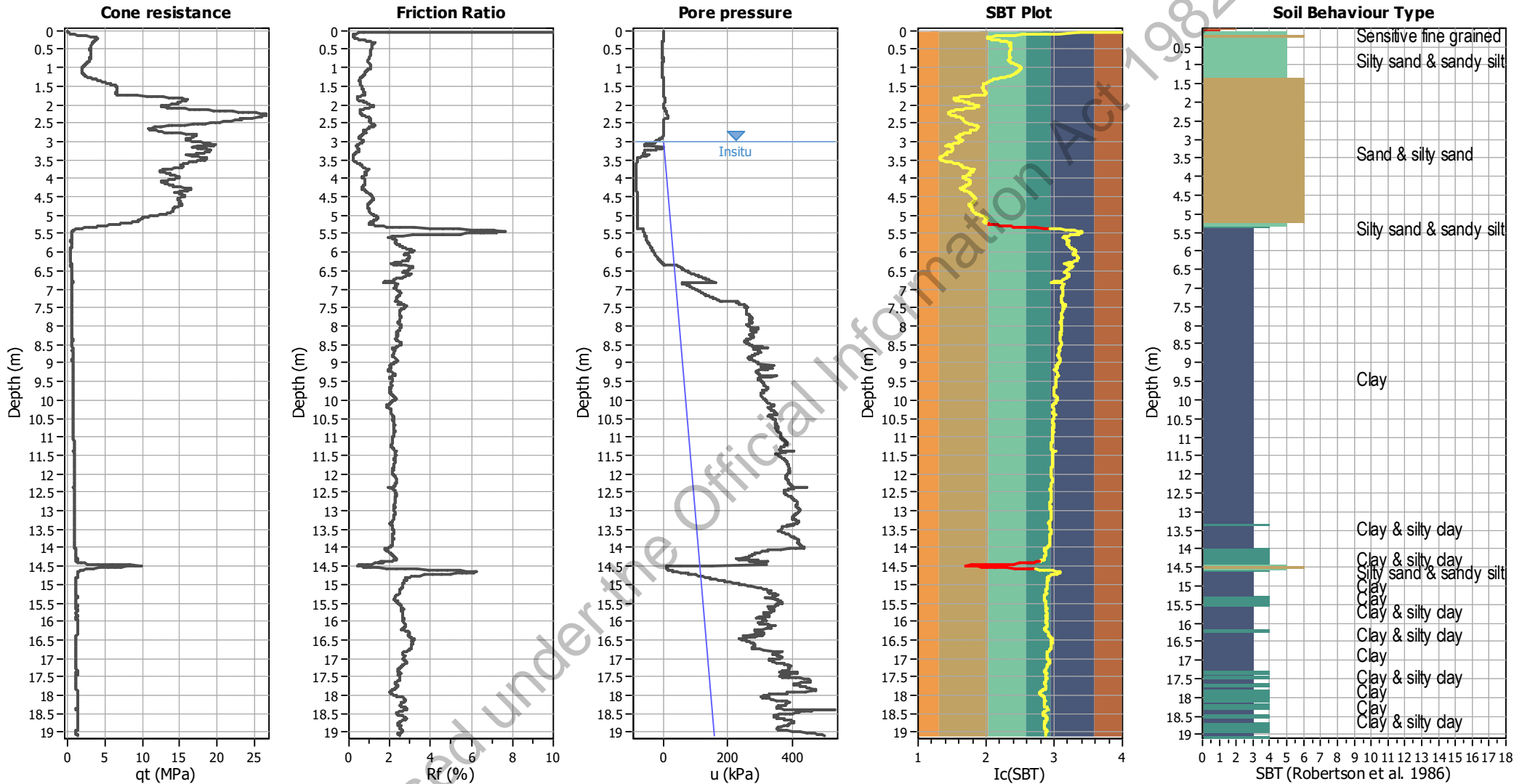
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

CPT basic interpretation plots



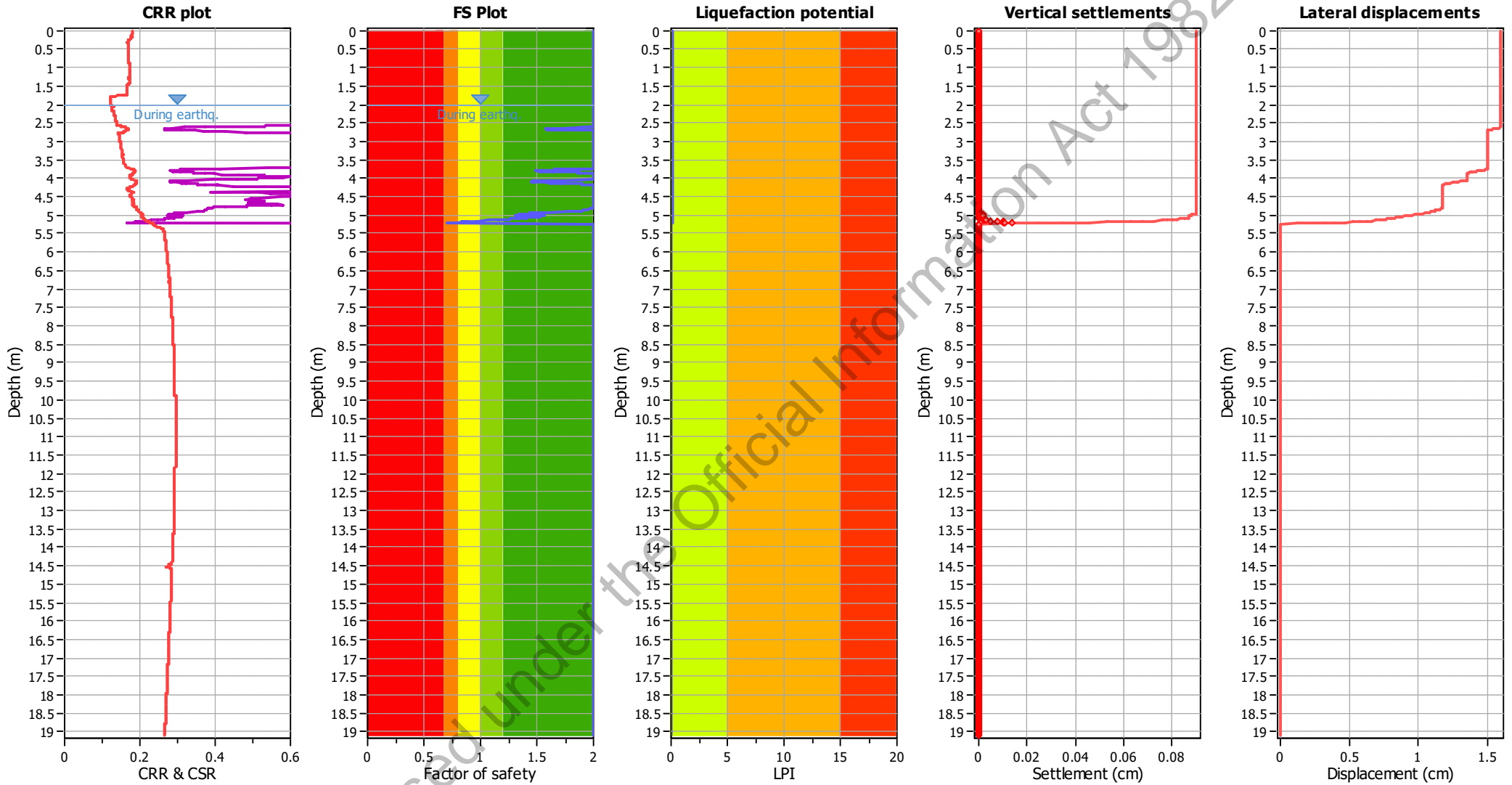
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _q applied:	Yes
Earthquake magnitude M _w :	6.40	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.32	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.00 m
Fines correction method:	B&I (2014)	Average results interval:	3
Points to test:	Based on Ic value	Ic cut-off value:	2.60
Earthquake magnitude M_w :	6.40	Unit weight calculation:	Based on SBT
Peak ground acceleration:	0.32	Use fill:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A

Fill weight:	N/A
Transition detect. applied:	Yes
K_q applied:	Yes
Clay like behavior applied:	Sands only
Limit depth applied:	No
Limit depth:	N/A

F.S. color scheme

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- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk