From:	Craig Batchelar
To:	Danielle Petricevich
Cc:	CALEY, Helen; PALMER, Brian
Subject:	Allied Asphalt: Request for further information dated 28 February 2023 Geotechnical Matters
Date:	Thursday, 6 April 2023 2:00:00 pm
Attachments:	Compiled ULS Results.pdf

Kia ora Danielle,

The Request for further information dated 28 February 2023 included the following on geotechnical matters:

> *"Please provide the following information and analysis relating to geotechnical matters:*
> *a. Depth and magnitude of expected liquefaction under SLS and ULS conditions;*
> *b. Approximate expected structural loads and required safe bearing capacity of soils;*
> *c. Settlements as a result of the building loads;*
> *d. Based on the above, the expected foundation type and ground remediation requirements for the asphalt plant;*
> *e. Based on the above, the effect on neighbouring buildings/properties from the storage bins and construction works (ground remediation) for asphalt plant, if applicable, and assess mitigation options; and*
> *f. Approximate revised earthworks volumes to include the expected areas and depths where shallow ground improvements are required."*

Our response is:

a. Attached are example liquefaction result plots for the FH Mt Maunganui site. These are consistent with the stated hazard in the geotechnical assessment. These test results were not available at the time of the original assessment. The results use an estimated PGA that might change to suit the design requirements for the structures. The liquefaction predicted in the attached information may be over-estimated at depth. Good practice is to get lab testing samples to assess the plasticity of soils. This would be done as part of future design.

b. – d Regarding the geotechnical request for information, our team believes this is asking for a lot of design at the resource consent stage given the loads and performance requirements are unknown. Further geotechnical information will be provided following site-specific geotechnical testing and detailed design which will be provided in compliance with the NZ Building Code at the time a Building Consent is applied for. If necessary, these information requests can be included as an Advice Note

e. Settlement effects on adjoining sites appear to be the main issue of concern. This is not a resource consent matter. Large and heavy buildings (i.e. up to 16m in height) and stored materials can be placed up to the boundary of sites in the Industrial Zone without resource consent. These potential effects are not managed under the District Plan and are regulated under the Building Act (Section 72(a)) and through the common law "right of support for the land in its natural state". As above, if necessary, this information request can be included as an Advice Note.

f. Final earthworks areas/depths are not available at this stage of the design. Earthworks

areas/depths/volumes do not affect consent status under the City Plan.

Ngā mihi

Craig Batchelar
Director, Planner
Cogito Consulting Ltd
Member: Te Kokiringa Taumata/New Zealand Planning Institute

5A Wells Avenue, Mount Maunganui 3116
craig@cogitoconsulting.nz
0274 942 318

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Geotechnical Engineers
Merarhias 56
http://www.geologismiki.gr

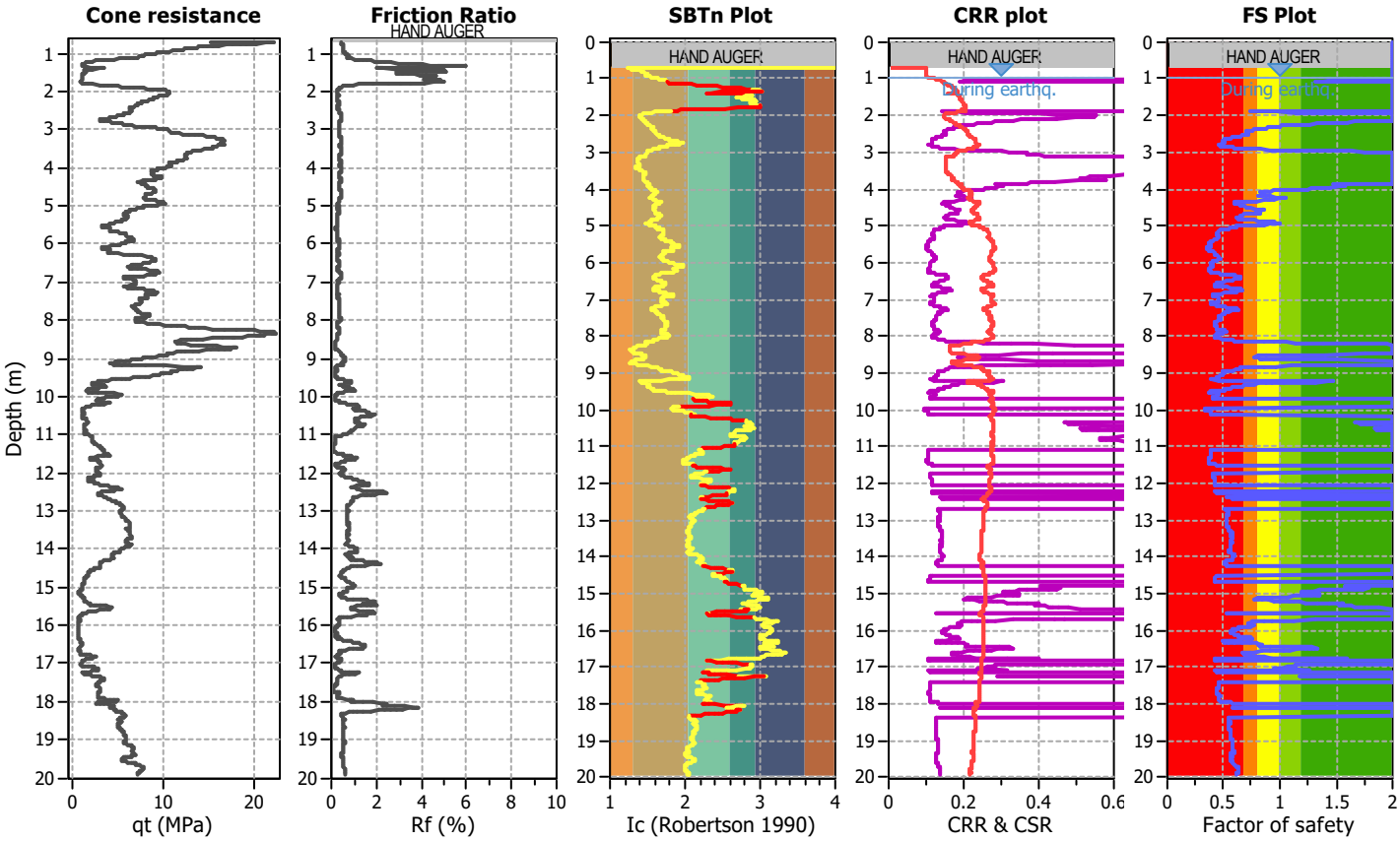
LIQUEFACTION ANALYSIS REPORT

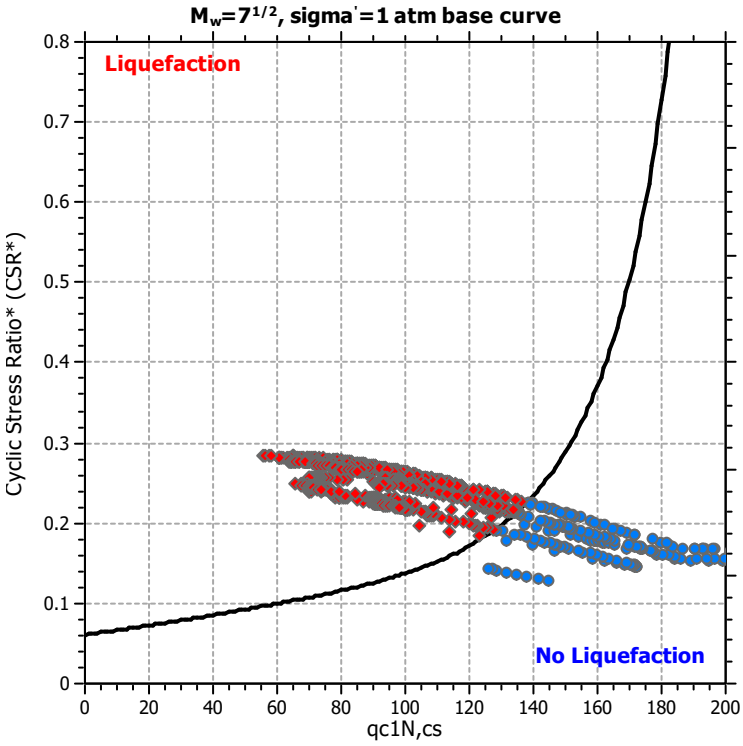
Project title : **Location :**

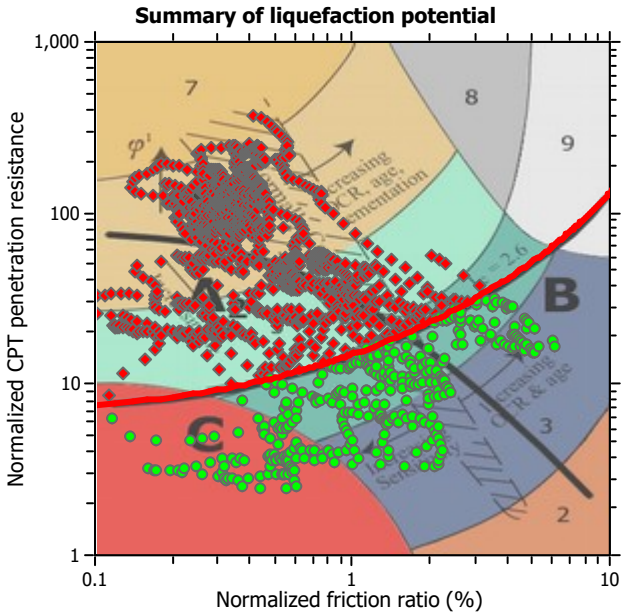
CPT file : CPT-03

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	5.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.30	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

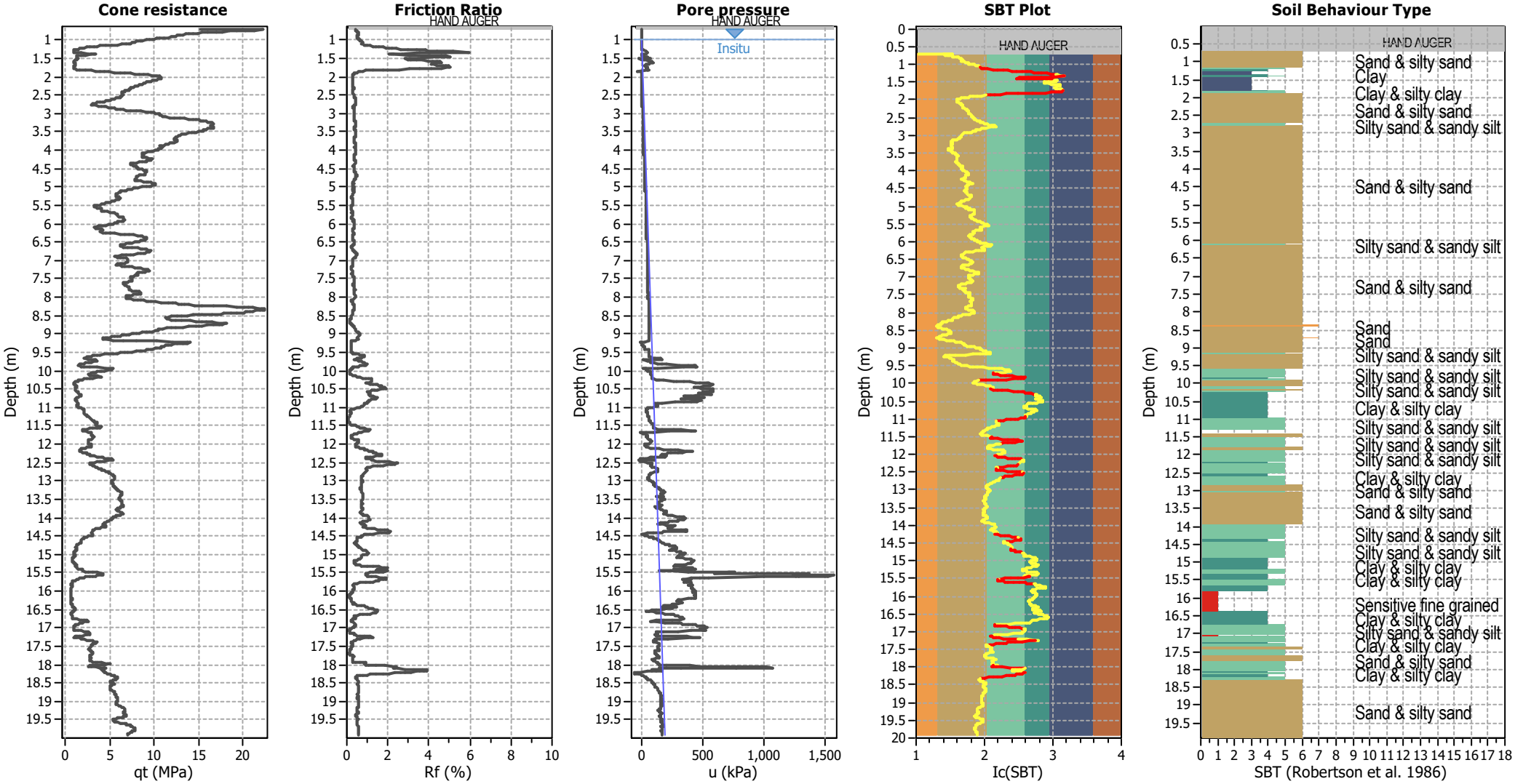






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



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Earthquake magnitude M_w:	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
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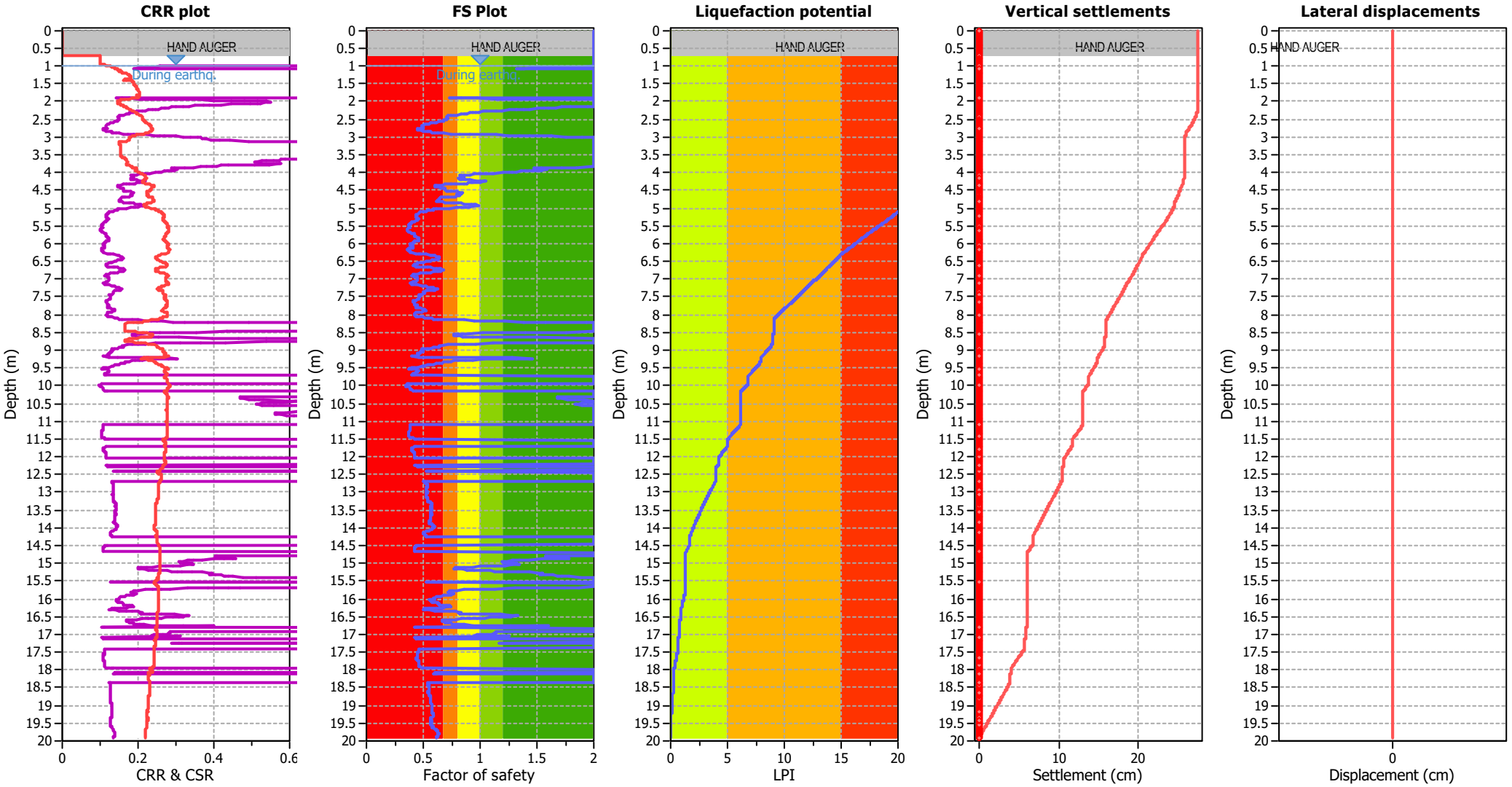
Depth to water table (insitu):	1.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

Liquefaction analysis overall plots



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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

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LIQUEFACTION ANALYSIS REPORT

Project title : **Location :**

CPT file : CPT-05

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	No
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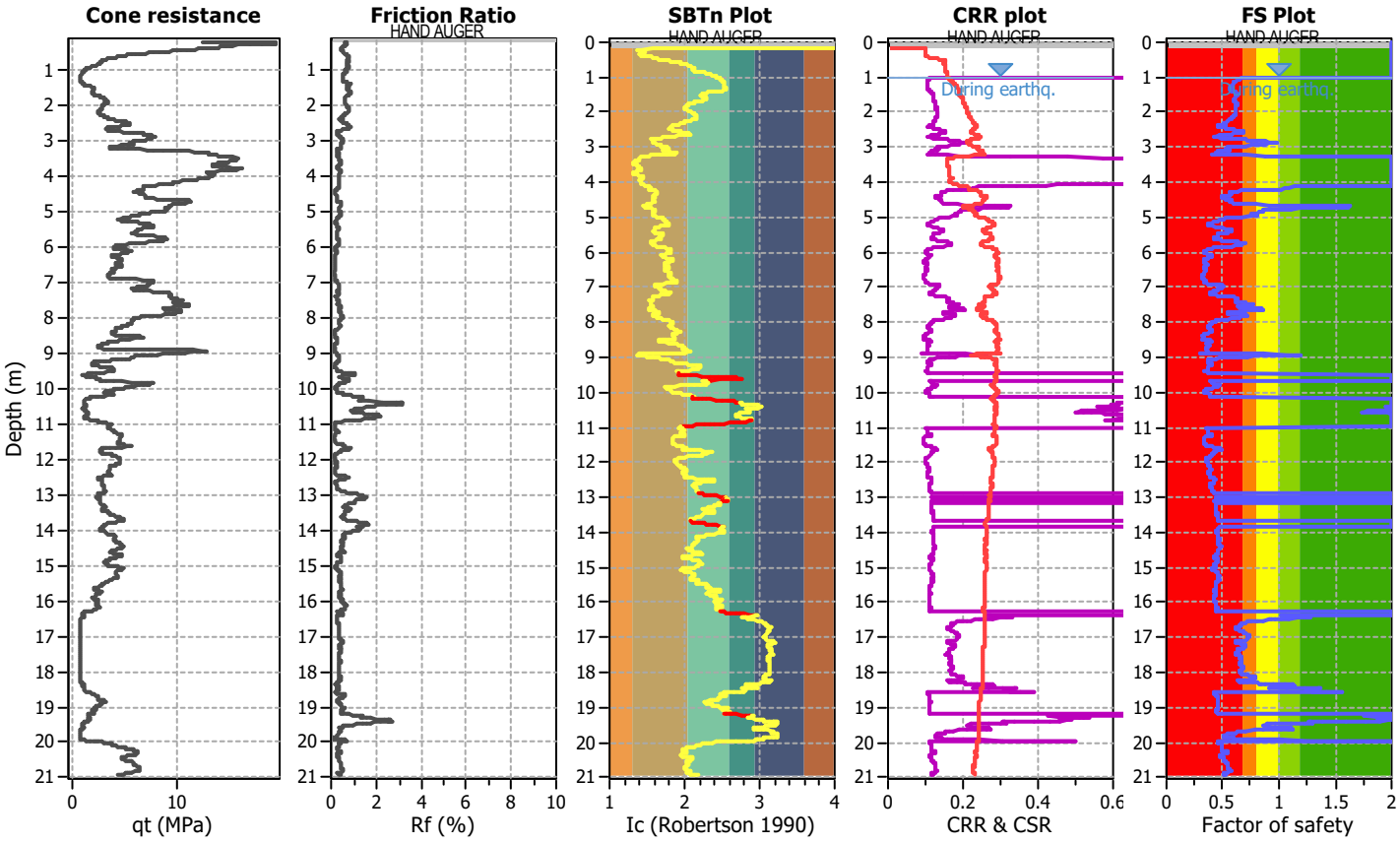

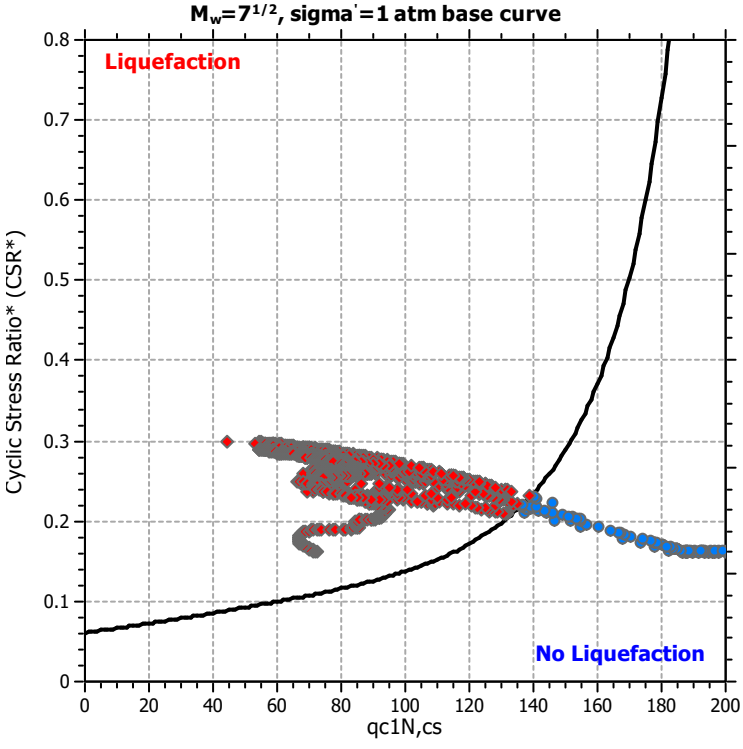

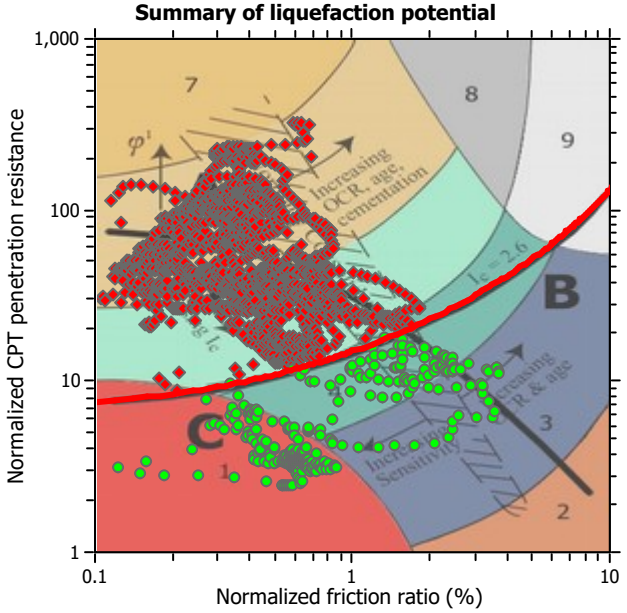

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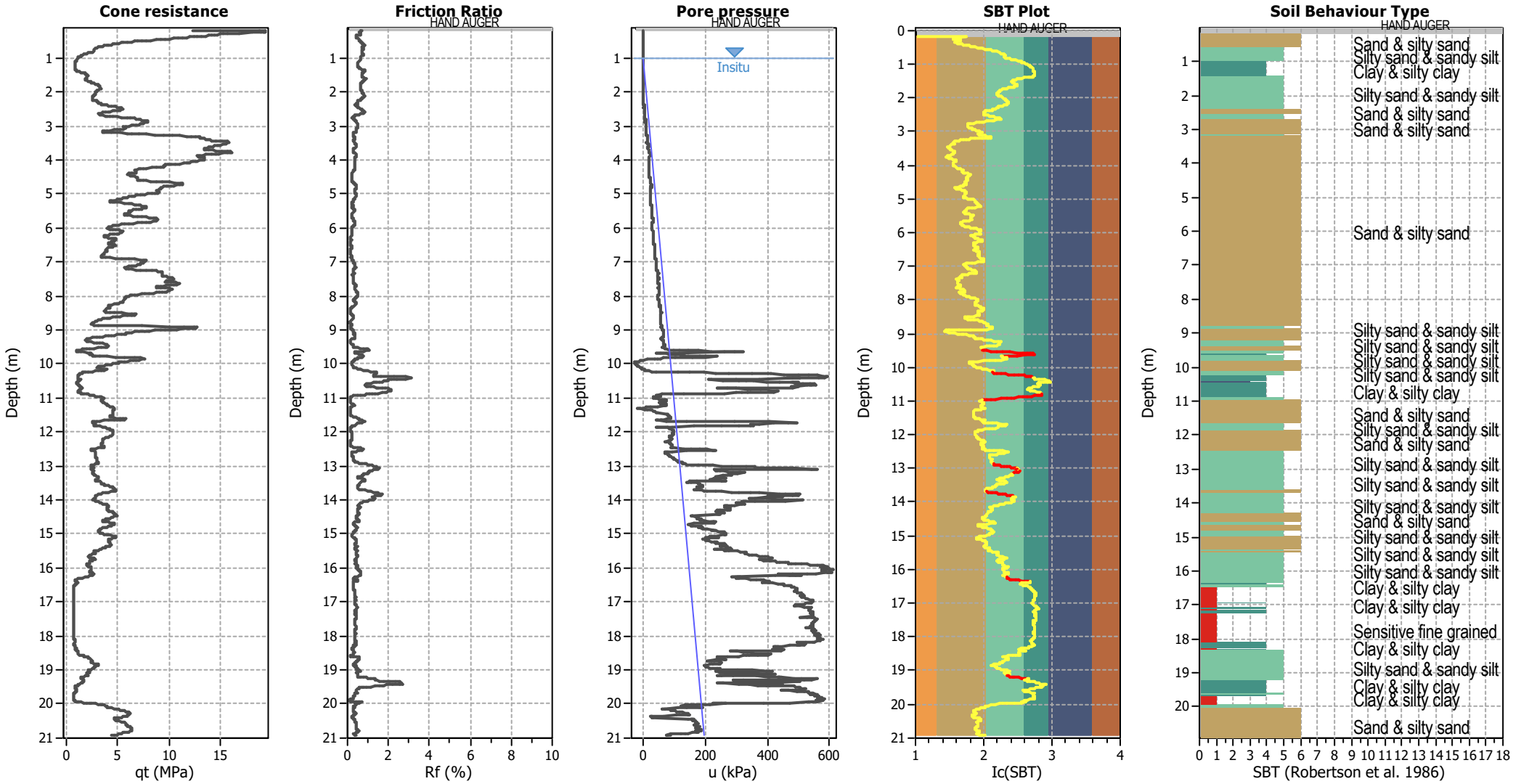

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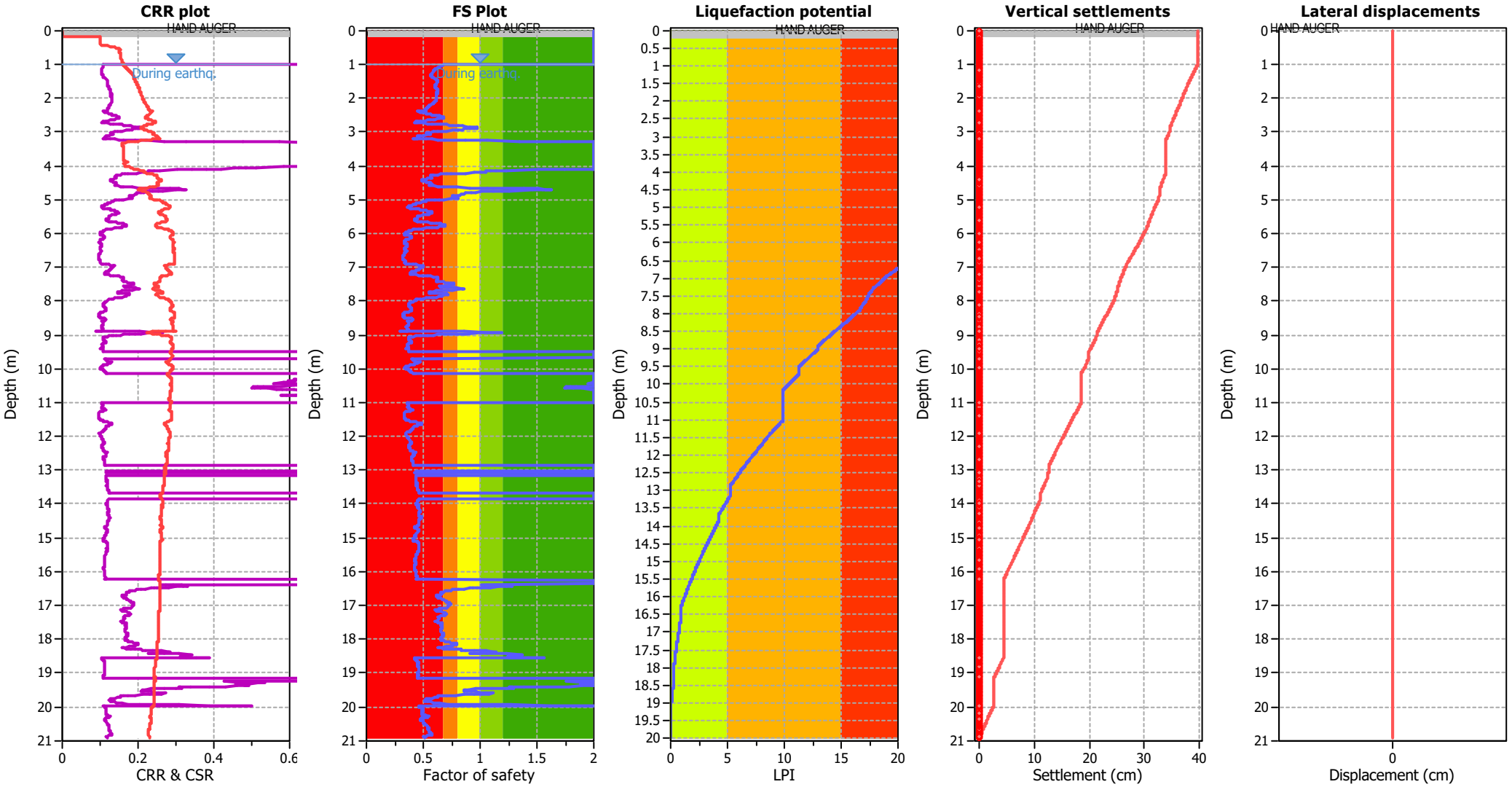

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