



**PROGETTO PER LA REALIZZAZIONE DI UN CAPANNONE  
INDUSTRIALE "BLOCCO D" IN VIA GESSI A LUGO (RA)  
Foglio 101, particelle 393-437-511-686**



**RELAZIONE GEOLOGICA** inerente alle indagini geognostiche eseguite, la definizione delle unità litotecniche, gli eventuali processi geomorfologici al fine della modellazione geologica del sito (6.2.1. D.M. 17/01/18);

**RELAZIONE DI CARATTERIZZAZIONE GEOTECNICA** basata sulle indagini eseguite, fornisce tutti i dati geotecnici necessari per il progetto, la caratterizzazione e la modellazione del volume significativo di terreno interessato (6.2.2. D.M. 17/01/18);

Relazione concernente la "**RISPOSTA SISMICA DEL SITO**" (ai sensi del D.M. 17/01/18), le verifiche agli Stati Limiti Ultimi (SLU) (6.4 del D.M. 17/01/18) al fine della progettazione per azioni sismiche.

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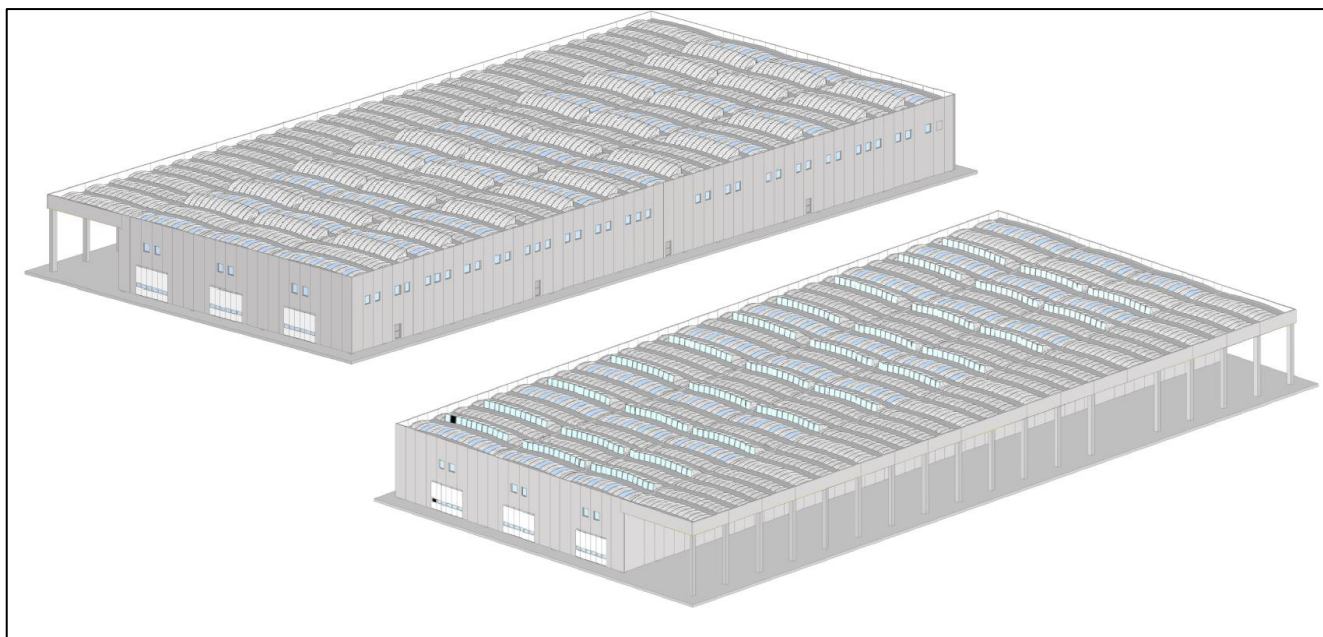
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## 1 Premessa

Il presente documento costituisce la relazione geologica e geotecnica finalizzata al progetto di capannone industriale denominato "BLOCCO D" in via Gessi nel Comune di Lugo (RA).

Il capannone industriale in oggetto avrà una lunghezza di circa 150 m e una larghezza di circa 76 m e verrà realizzato in un'area libera da altri edifici attualmente adibita a seminativo (Figura 1).



**Figura 1 – Prospetto di Progetto (indicativo).**

Le indagini geologiche e geofisiche sono state finalizzate alla determinazione dell'assetto dei terreni di fondazione del primo sottosuolo dell'area.

In relazione alla tipologia di intervento e alle conoscenze pregresse su aree adiacenti sono stati eseguiti i seguenti rilievi geognostici:

- n° 3 CPTu (prova penetrometrica con punta elettrica) fino alla profondità max di circa 20 m dal p.c.;
- rilievo di falda acquifera all'interno dei fori di sondaggio a mezzo di freatimetro elettrico;
- n° 3 CPTu (prova penetrometrica con punta elettrica) fino alla profondità max di circa 15 m dal p.c.;
- rilievo di falda acquifera all'interno dei fori di sondaggio a mezzo di freatimetro elettrico;
- prelievo di 2 campioni indisturbati entro i 3 m dal pc;
- n°2 prova di taglio diretto con scatola di "Casagrande", con valutazione delle deformazioni verticali e trasversali (eseguite su tre provini per ogni tipo di prova), compresa la restituzione dei dati: consolidata drenata (CD);
- n° 1 Misura della Vs30 mediante profilo sismico in array (MASW-ReMi) e 1 misura a stazione singola con tecnica HVSR (Tromografo digitale).
- 

Le indagini di superficie sono state finalizzate alla determinazione delle condizioni di stabilità dell'area e alle caratteristiche del sistema di drenaggio superficiale.



## 2 Riferimenti normativi

La stesura della presente relazione è stata eseguita in ottemperanza alle disposizioni contenute nella normativa di riferimento elencata di seguito:

- **Circolare Consiglio Superiore dei Lavori Pubblici 02.02.2009**  
Istruzioni per l'applicazione delle "Norme tecniche per le costruzioni" di cui al D.M.14 gennaio 2008.
- **Decreto Ministeriale 14.01.2008**  
Testo Unitario -Norme Tecniche per le Costruzioni
- **Consiglio Superiore dei Lavori Pubblici**  
Pericolosità sismica e Criteri generali per la classificazione sismica del territorio nazionale.  
Allegato al voto n.36 del 27.07.2007
- **Decreto Ministeriale 17 gennaio 2018**  
Aggiornamento delle «Norme tecniche per le costruzioni»





### 3 Inquadramento geografico.

L'area in esame è ubicata in via Gessi nel Comune di Lugo in provincia di Ravenna a circa 12 metri sul livello del mare. La superficie su cui è previsto l'intervento edilizio si trova in una un'area di pianura. La posizione del sito viene indicata di seguito sulla foto da satellite (Google Earth), sulla mappa catastale (Foglio 101, particelle 393-437-511-686) e sulla CTR 1:10.000 Sezione 222150.

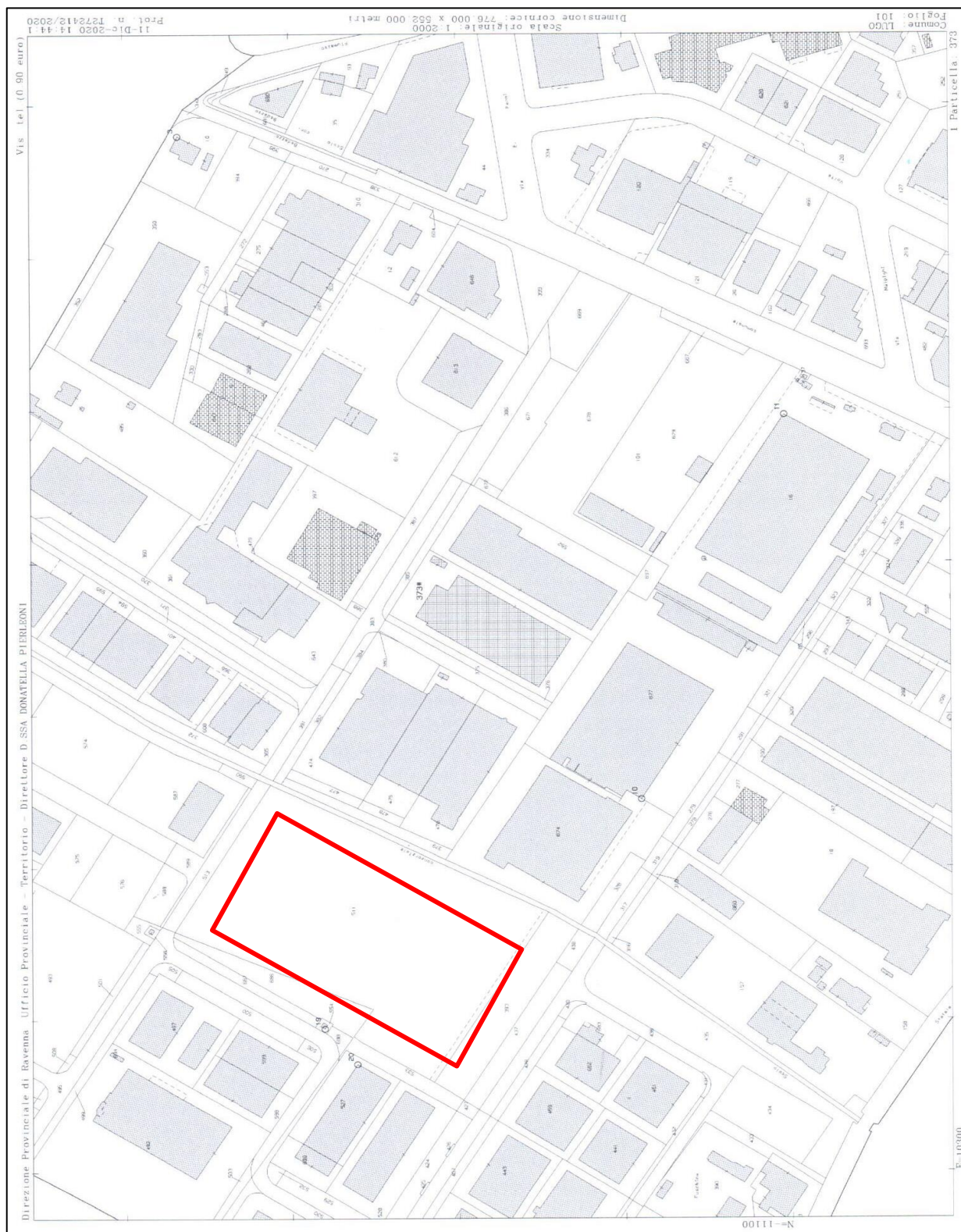


**Figura 2 - Ubicazione dell'area su foto da satellite (Google Earth), in scala libera.**



**Figura 3 - ubicazione dell'area su CTR: Sezione 222150 (in scala libera).**





**Figura 4 – Ubicazione sulla mappa catastale.**





## 4 Inquadramento geologico e geomorfologico dell'area in esame

### 4.1 Geologia e geomorfologia

L'area in esame si trova in una zona di pianura nel comune di Lugo. Si tratta di un'area industriale caratterizzata da una buona stabilità generale per la morfologia e la tipologia di terreni di cui è costituita. Dal punto di vista geologico l'area in oggetto è compresa nella cartografia geologica scala 1:25.000 del Progetto CARG. Tale cartografia è consultabile sul sito del Servizio Geologico Regionale (<http://geo.regione.emilia-romagna.it/>) e di cui si riporta un estratto nella Figura 5.

Dal punto di vista geologico e litologico, l'area entro cui ricade la zona oggetto di studio, risulta essere caratterizzata dalla presenza di depositi di piana alluvionale attribuibili alle unità oloceniche (AES8a – Unità di Modena) più superficiali della potente successione quaternaria di riempimento del bacino padano. Tali sedimenti di origine fluviale sono distribuiti secondo alternanze di litotipi a diversa granulometria (Sabbia Limoso Argillosa), organizzati in strati a geometria variabile, spesso lenticolare, e quindi arealmente discontinui, in cui i rapporti tra le diverse litologie sono da ricondurre all'evolversi di un ambiente caratterizzato da energie di trasporto e da modalità deposizionali variabili nel tempo.

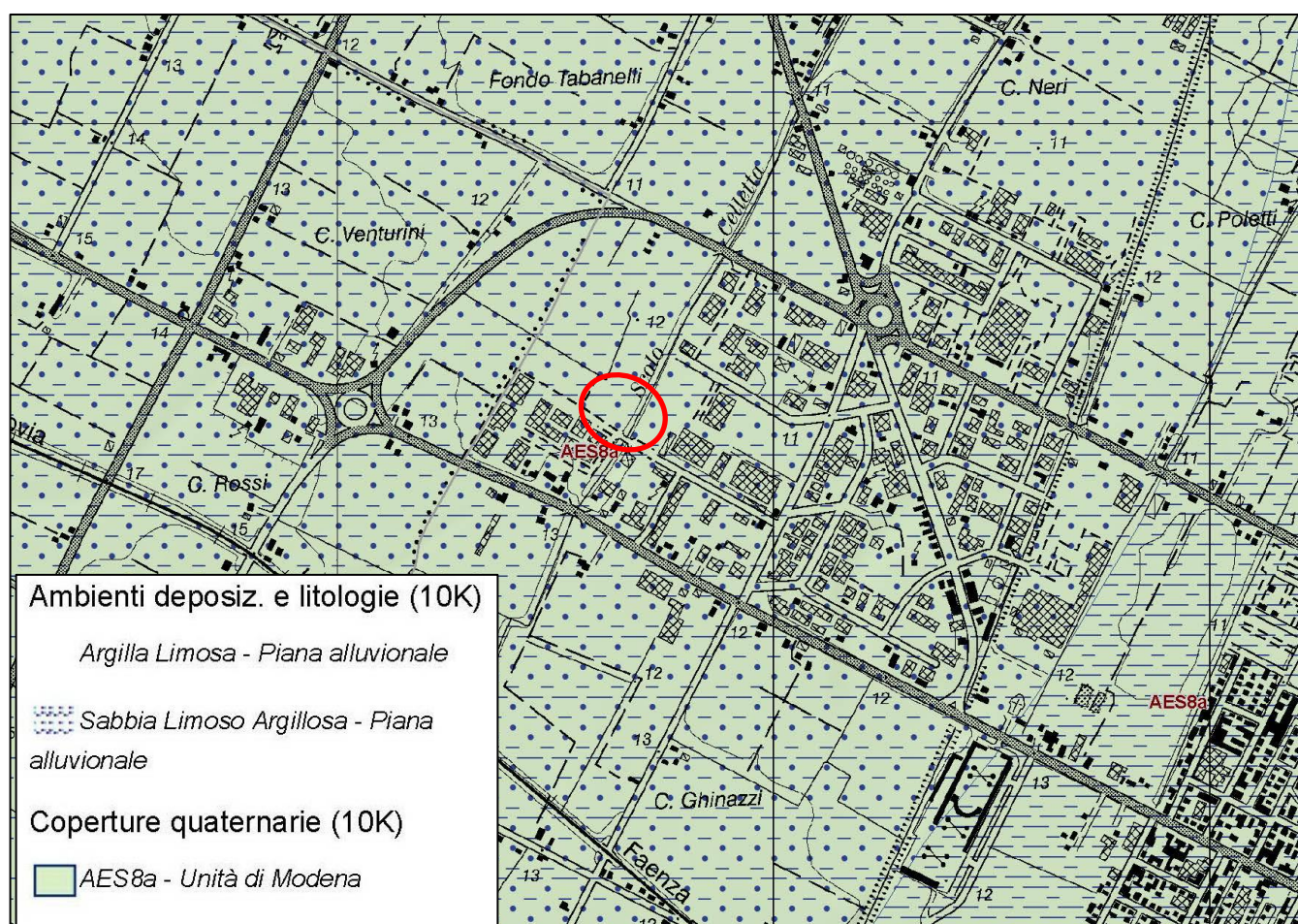


Figura 5 - Carta Geologica Regione Emilia Romagna 1:10.000 (estratto in scala libera)



## 4.1 Coperture Quaternarie

Di seguito sono riportate le descrizioni delle coperture quaternarie presenti (Servizio Geologico Regionale - <http://geo.regione.emilia-romagna.it>) riferite alla carta geologica della Figura 5.

### Successione neogenico - quaternaria del margine appenninico padano

#### **Sintema Emiliano-Romagnolo Superiore (AES)**

*Comprende depositi alluvionali, deltizi, litorali e marini. Nel sottosuolo della pianura è costituito da una successione di cicli trasgressivo - regressivi formati da argille, limi, sabbie e ghiaie di ambiente alluvionale e, limitatamente al settore costiero, da sabbie litorali.*

*In affioramento e nel sottosuolo proximale alla catena il limite inferiore è erosivo e discordante sui depositi marini. Nel sottosuolo di pianura il limite è per discordanza angolare con AEI.*

*Sintema parzialmente suddiviso in subsintemi (AES8, AES7 ed AES6) limitati, in affioramento, dalle principali scarpate di terrazzo fluviale e paleosuoli e, nel sottosuolo della pianura, da bruschi contatti fra depositi trasgressivi marino - marginali e palustri su depositi di conoide e di piana alluvionale. I depositi fini di tracimazione fluviale dei terrazzi del margine appenninico non sono differenziati in subsintemi.*

*Spessore massimo circa 200 m (sottosuolo della pianura).*

*(Pleistocene medio – Olocene)*

#### **Unità di Modena (AES8a) – settore Ravenna**

Ghiaie prevalenti e sabbie, ricoperte da una coltre limoso argillosa discontinua, talora organizzate in corpi a geometrie lenticolari, nastriformi, tabulari e cuneiformi. Depositati alluvionali intravallivi, terrazzati (primo ordine dei terrazzi nelle zone intravallive), deltizi, litorali, di conoide e, localmente, di piana inondabile. Nella costa e nel Mare Adriatico sabbie di cordone litorale e di fronte deltizia passanti ad argille e limi di prodelta e di transizione alla piattaforma. Limite superiore coincidente con il piano topografico dato da un suolo calcareo di colore bruno olivastro e bruno grigiastro. Il profilo di alterazione è di esiguo spessore (meno di 100 cm). Può ricoprire resti archeologici di età romana del VI secolo d.C. Lo spessore massimo dell'unità è generalmente di alcuni metri, talora plurimetrico. (Olocene)

## 4.2 Idrografia – drenaggio dell'area

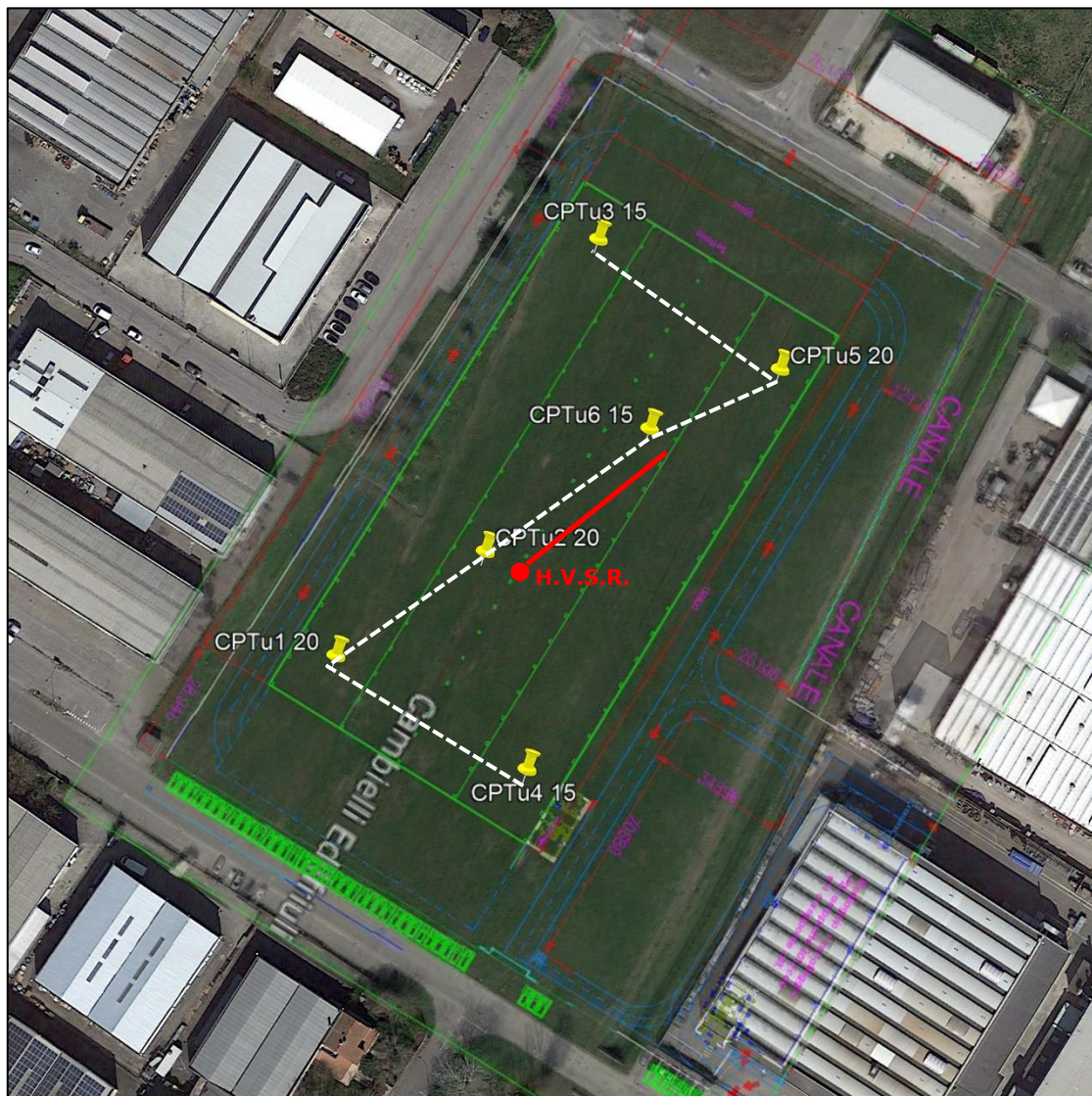
La rete idrografica principale è costituita dal Fiume Santerno a ovest (1,6 km) e dal Torrente Senio a est (circa 4 km) e dallo scolo Tratturo 0,9 km a est e dal canale Mulini di Lugo 1,8 km a est. La rete secondaria locale è costituita da una serie di scoli consortili e modesti fossi e capifossi di drenaggio che recapitano le loro acque nello Scolo Celletta che scorre lungo in confine est dell'area destinata all'intervento. Localmente le acque piovane sono gestite dalle fognature della zona industriale.





## 5 Indagini e caratterizzazione sismica e geotecnica.

Nella figura seguente è riportata l'ubicazione delle indagini eseguite nel sito in esame.



**Figura 6 - Ubicazione delle indagini eseguite (in rosso la traccia della MASW, in bianco tratteggiata la traccia della sezione geologica) di Figura 11).**

nome	Lat.	Long.	Prof. (m dal pc.)	Soggiacenza falda (m dal pc.)
CPTu1	44.434438°	11.883794°	20	1,8
CPTu2	44.434674°	11.884258°	20	2,4
CPTu3	44.435386°	11.884606°	15	1,9
CPTu4	44.434188°	11.884397°	15	2,2
CPTu5	44.435092°	11.885184°	20	2,3
CPTu6	44.434955°	11.884773°	15	1.9

**Tabella 1 - coordinate ubicazione CPTu (WGS 84)**





## 5.1 Indagini Geofisiche

Per la caratterizzazione sismica dei terreni che costituiscono il sottosuolo dell'area in esame è stata effettuata un'indagine geofisica mediante prova in array con tecnica MASW (Multichannel Analysis of Surface Waves), Re.Mi. (Refraction Microtremor) e misura a stazione singola con tecnica HVSr (Horizontal to Vertical Spectral Ratio) al fine di ottenere la classificazione del tipo di suolo presente nel sito, sulla base della velocità media equivalente di propagazione delle onde di taglio S ( $V_{s,eq}$ ), in ottemperanza a quanto riportato nel decreto del Ministero delle Infrastrutture, 17 gennaio 2018.

La presente indagine geofisica è consistita in:

- N. 1 profilo in array con tecnica MASW-REMI
- N. 1 misura a stazione singola con tecnica HVSr



**Figura 7 – Documentazione fotografica: ubicazione traccia dell'indagine MASW-HVSr (Figura 6).**

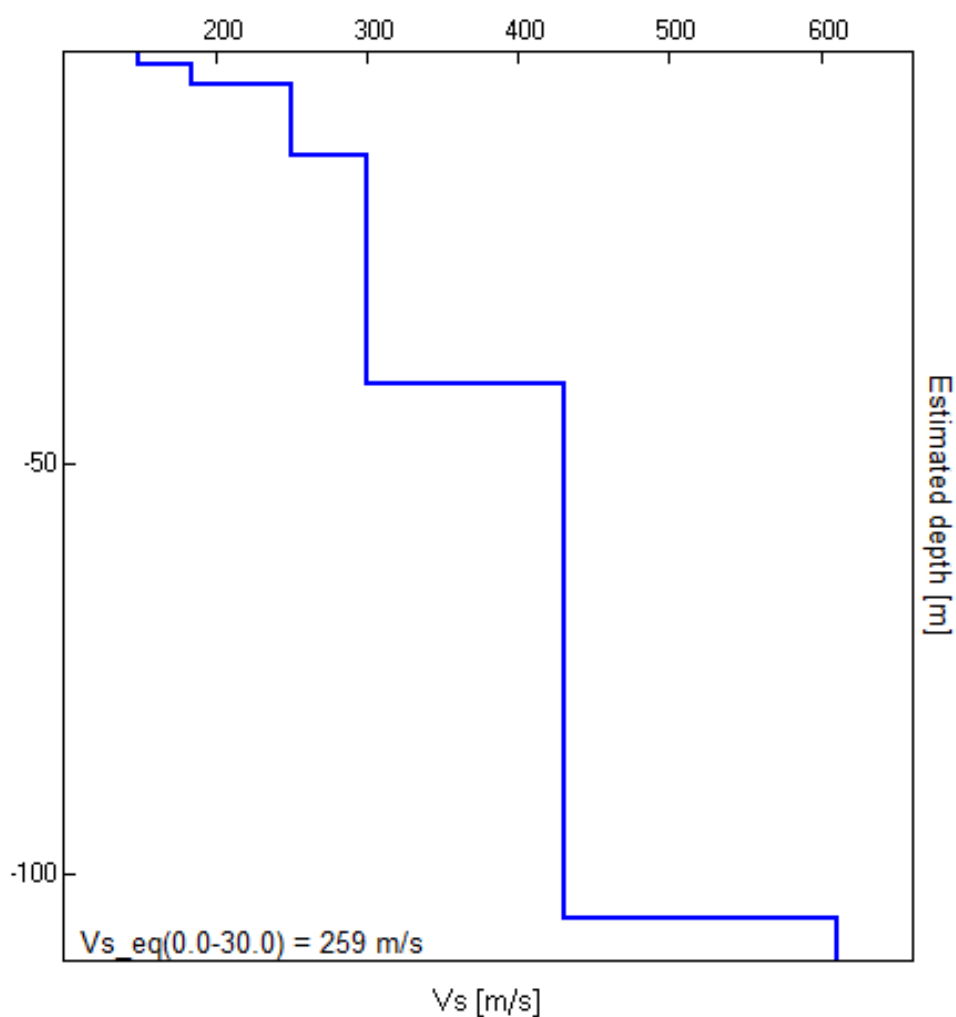


### 5.1.1 Modello di sottosuolo proposto per il sito

Sulla base dei risultati ottenuti e dell'interpretazione dei dati acquisiti il modello di sottosuolo proposto per il sito in studio, in termini di profilo verticale di Vs, è il seguente (fit congiunto masw-hvsr):

**Tabella 2 - Modello di sottosuolo proposto per il sito**

Profondità base strato (m)	Spessore (m)	Vs (m/s)
1.50	1.50	150
4.00	2.50	185
12.50	8.50	250
40.50	28.00	300
105.50	65.00	430
inf.	inf.	610

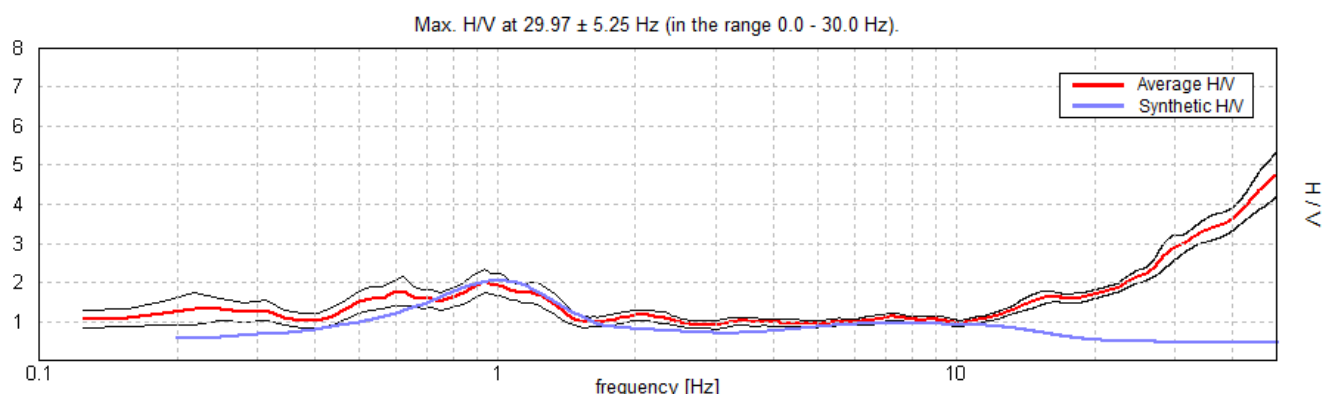


**Figura 8 - Modello di velocità delle onde di taglio S (modello medio).**



**$V_{s,eq}=V_{s30}$  [m/s]** da quota piano campagna su cui è stato eseguito il profilo: **259**.

Nell'intervallo da 0 a 30 Hz, la curva HVSR è caratterizzata da una debole amplificazione locale del moto del suolo per risonanza stratigrafica a basso contrasto di rigidità. Il cui picco maggiormente significativo corrisponde a circa 1 Hz.



**Figura 9 - confronto tra curva HVSR1 sperimentale registrata nel sito e curva teorica (blu) relativa al modello di sottosuolo proposto per il sito.**

Per ulteriori approfondimenti si fa riferimento alla relazione indagini geofisiche in allegato.



## 5.2 Indagini geognostiche - CPTu

Di seguito vengono riportati i risultati delle prove penetrometriche statiche eseguite. La profondità raggiunta da 15 a 20 m dal pc.

### 5.2.1 Modello Geologico e Geotecnico

In base ai risultati delle prove penetrometriche si riscontra come il primo sottosuolo dell'area mostri una buona omogeneità fino alla profondità di 20 m. È costituito principalmente da depositi argillosi, limosi intercalati da livelli decimetrici di argilla limosa e limi argillosi la cui geometria è tipica di ambienti deposizionali di piana alluvionale. La presenza di terreni sabbiosi è limitata al primo metro e mezzo circa dal pc. osservabile in modo continuo su tutte le CPT e a una circa 10 m del pc rilevabile nella CPTu1 (spessore decimetrico) e nella CPTu4 (spessore centimetrico).

La soggiacenza della falda viene rilevata all'interno dei fori di sondaggio mediamente a 2 m dal pc (vedi **Tabella 1**).

CPTU1													
Nr.	Prof,	Tipo	Cu	Eu	Mo	G	OCR	Puv	PuvS	Dr	Fi	Ey	Vs
1	1	I	--	--	8	26,5	<0,5	18,6	21,6	72,6	45	8	334,2
2	9,5	C	75	53,6	7,7	14,7	<0,5	18,8	19,6	--	--	--	229,85
3	10,5	I	--	--	9,6	29,7	<0,5	18,6	21,6	36,3	32,6	9,6	348,77
4	20	C	72	51	8,3	15,4	<0,5	18,7	19,5	--	--	--	233,33
CPTU2													
Nr.	Prof,	Tipo	Cu	Eu	Mo	G	OCR	Puv	PuvS	Dr	Fi	Ey	Vs
1	1	I	--	--	8,8	30,9	<0,5	18,6	21,6	79,5	45	10,3	354,4
2	9,5	C	66	46,9	6,8	13,6	<0,5	18,6	19,4	--	--	--	224,2
3	20	C	66	46,7	7,6	14,7	<0,5	18,6	19,4	--	--	--	229,55
CPTU3													
Nr.	Prof,	Tipo	Cu	Eu	Mo	G	OCR	Puv	PuvS	Dr	Fi	Ey	Vs
1	1	I	--	--	7,8	26	<0,5	18,6	21,6	71,7	45	7,8	331,43
2	9,5	C	61	43,2	6,3	13	<0,5	18,5	19,3	--	--	--	220,79
3	15	C	61	43,6	7	13,9	<0,5	18,5	19,3	--	--	--	225,5
CPTU4													
Nr.	Prof,	Tipo	Cu	Eu	Mo	G	OCR	Puv	PuvS	Dr	Fi	Ey	Vs
1	1	I	--	--	9,6	29,7	<0,5	18,6	21,6	77,6	45	9,6	348,77
2	6,5	C	69	49,4	7	13,9	<0,5	18,7	19,5	--	--	--	225,5
3	15	C	74	52,4	8	15,1	<0,5	18,8	19,6	--	--	--	231,91

**tabella 3 – Modello geotecnico**



CPTU5													
Nr.	Prof,	Tipo	Cu	Eu	Mo	G	OCR	Puv	PuvS	Dr	Fi	Ey	Vs
1	1	I	--	--	8,8	28	<0,5	18,6	21,6	75,1	45	8,8	341,19
2	9,5	C	76	54	7,7	14,8	<0,5	18,8	19,6	--	--	--	230,15
3	20	C	70	50	8,1	15,2	<0,5	18,7	19,5	--	--	--	232,19
CPTU6													
Nr.	Prof,	Tipo	Cu	Eu	Mo	G	OCR	Puv	PuvS	Dr	Fi	Ey	Vs
1	1	I	--	--	8,5	30,4	<0,5	17,7	20,6	78,7	45	10	351,95
2	9,5	C	71	50,3	7,2	14,2	<0,5	18,7	19,5	--	--	--	227,1
3	15	C	72	51	8	15,1	<0,5	18,7	19,5	--	--	--	231,62

**tabella 4 – Modello geotecnico**

Nr: Numero progressivo strato	OCR: Grado di sovraconsolidazione
Prof: Profondità strato (m)	Puv: Peso unità di volume (KN/m <sup>3</sup> )
Cu: Coesione non drenata (KPa)	PuvS: Peso unità di volume saturo (KN/m <sup>3</sup> )
Eu: Modulo di defomazione non drenato (Mpa)	Dr: Densità relativa (%)
Mo: Modulo Edometrico (Mpa)	Fi:Angolo di resistenza al taglio (°)
G: Modulo di deformazione a taglio (Mpa)	Ey: Modulo di Young (Mpa)
Descrizione ..... (Robertson 1990)	Vs: Velocità onde di taglio (m/s)





**Figura 10 – Documentazione fotografica delle CPTu eseguite**

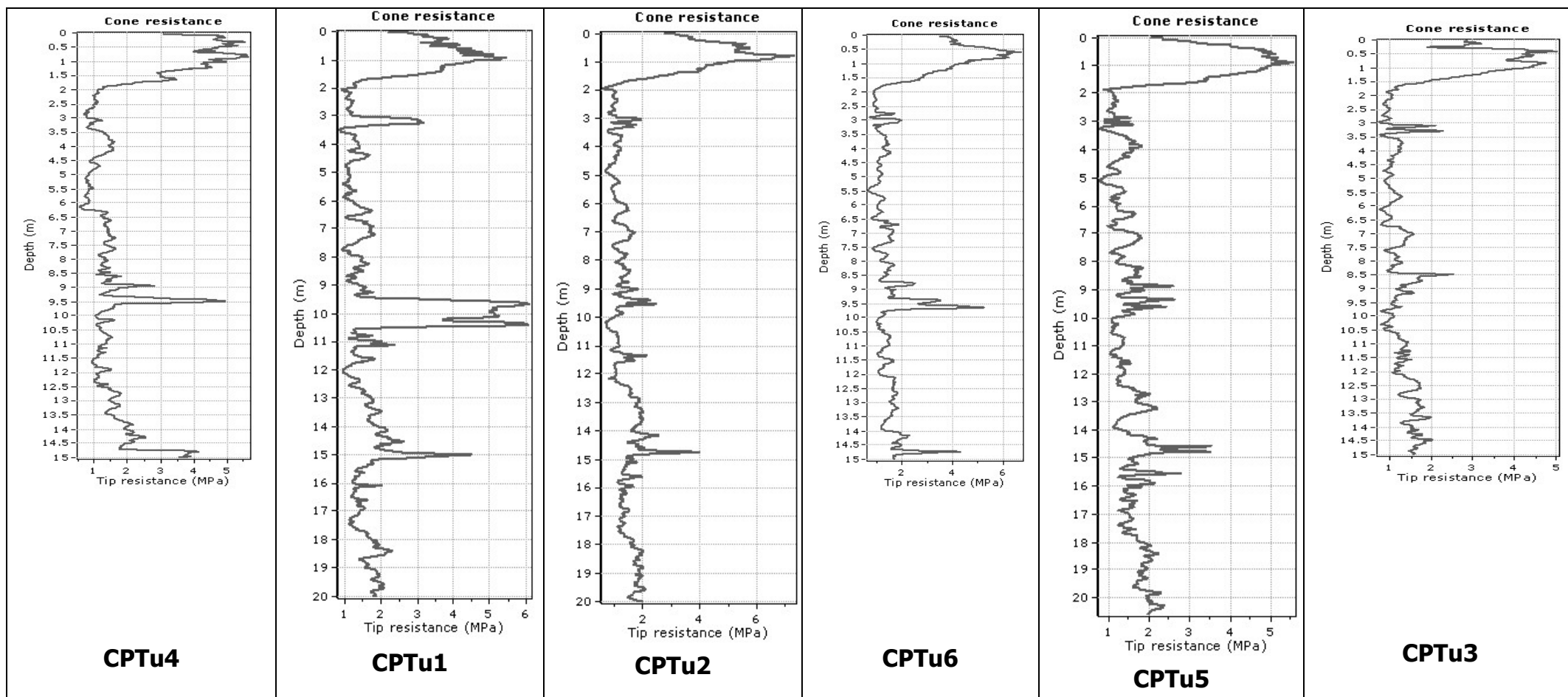
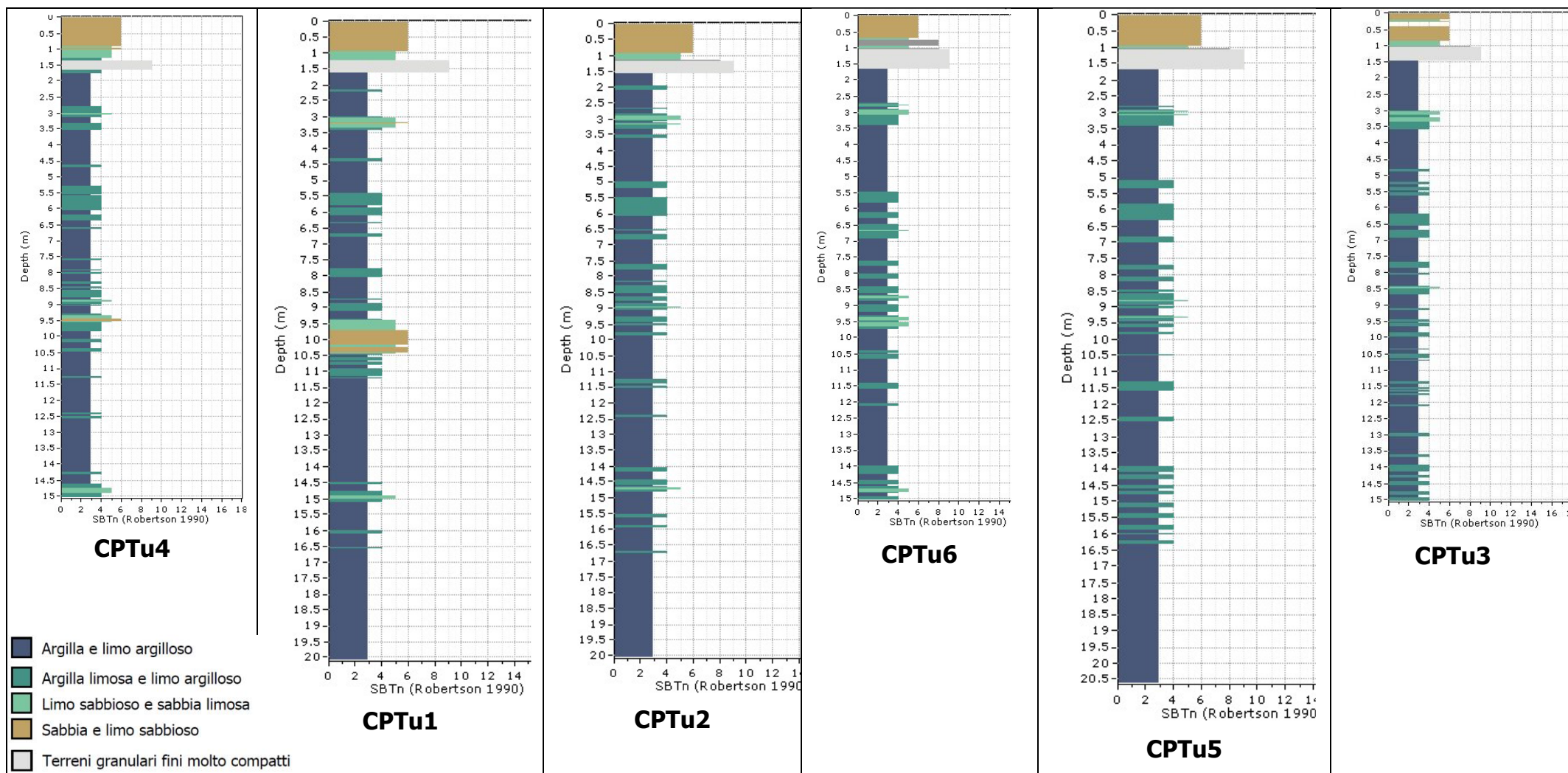


Figura 11 – Confronto dei profili di RP (fare riferimento alla Figura 6 per la posizione in pianta delle CPTu)





**Figura 12 – sezione geologia/litologica (fare riferimento alla Figura 6 per la posizione in pianta delle CPTu).**



### 5.3 Prove di laboratorio

Le prove di laboratorio sono state eseguite sui campioni di terreno indisturbato C1 e C2 prelevati rispettivamente in corrispondenza della CPTu1 e CPTu5 tramite l'infissione di una fustella.

#### 5.3.1 Prova di taglio diretto

- Prova di taglio diretto con scatola di "Casagrande", con valutazione delle deformazioni verticali e trasversali (eseguite su tre provini per ogni tipo di prova), compresa la restituzione dei dati: consolidata drenata (CD).

Risultati:

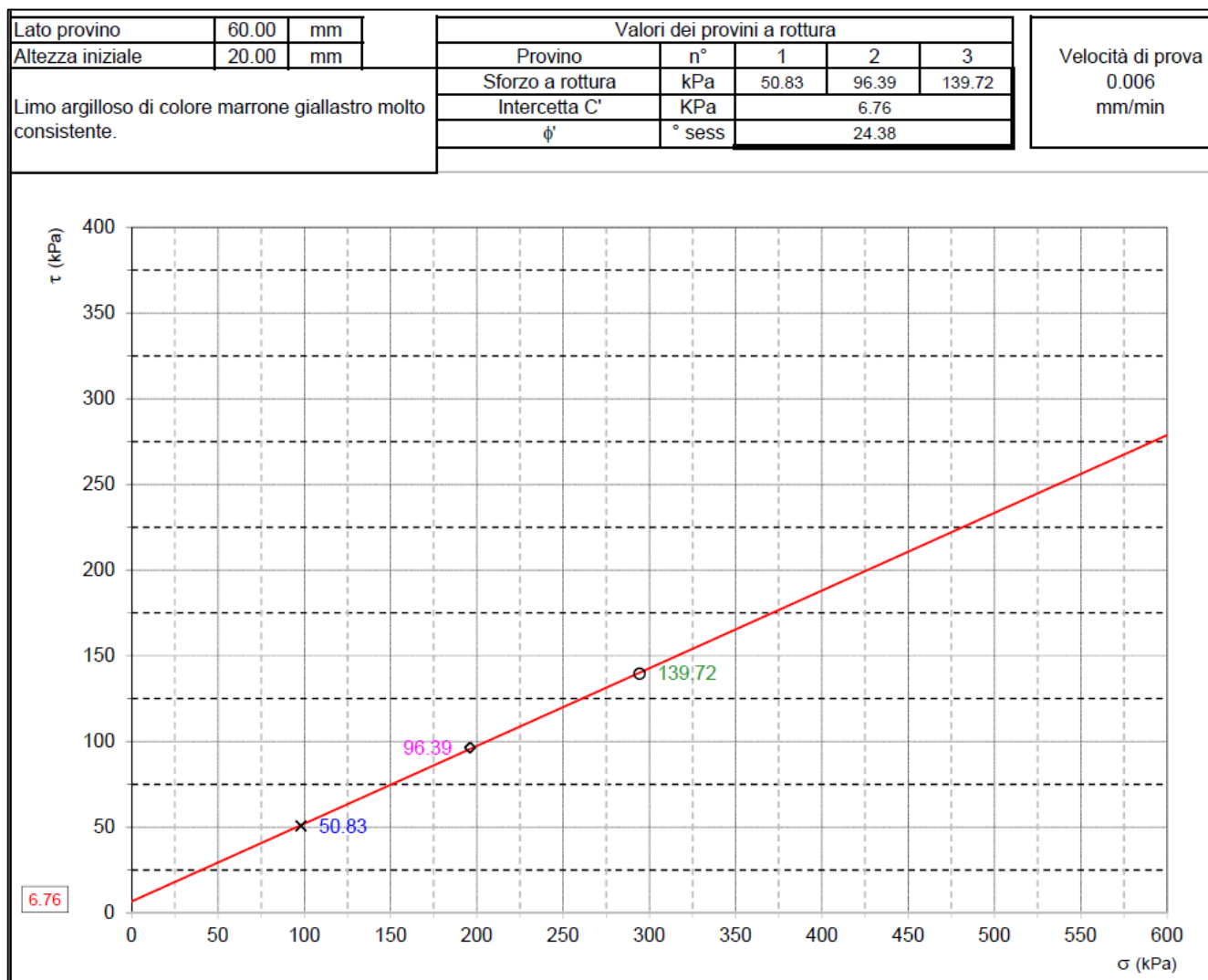


Figura 13 – Risultati della prova di taglio su Campione C1 (prelevato da 1.20 a 1.80 m).

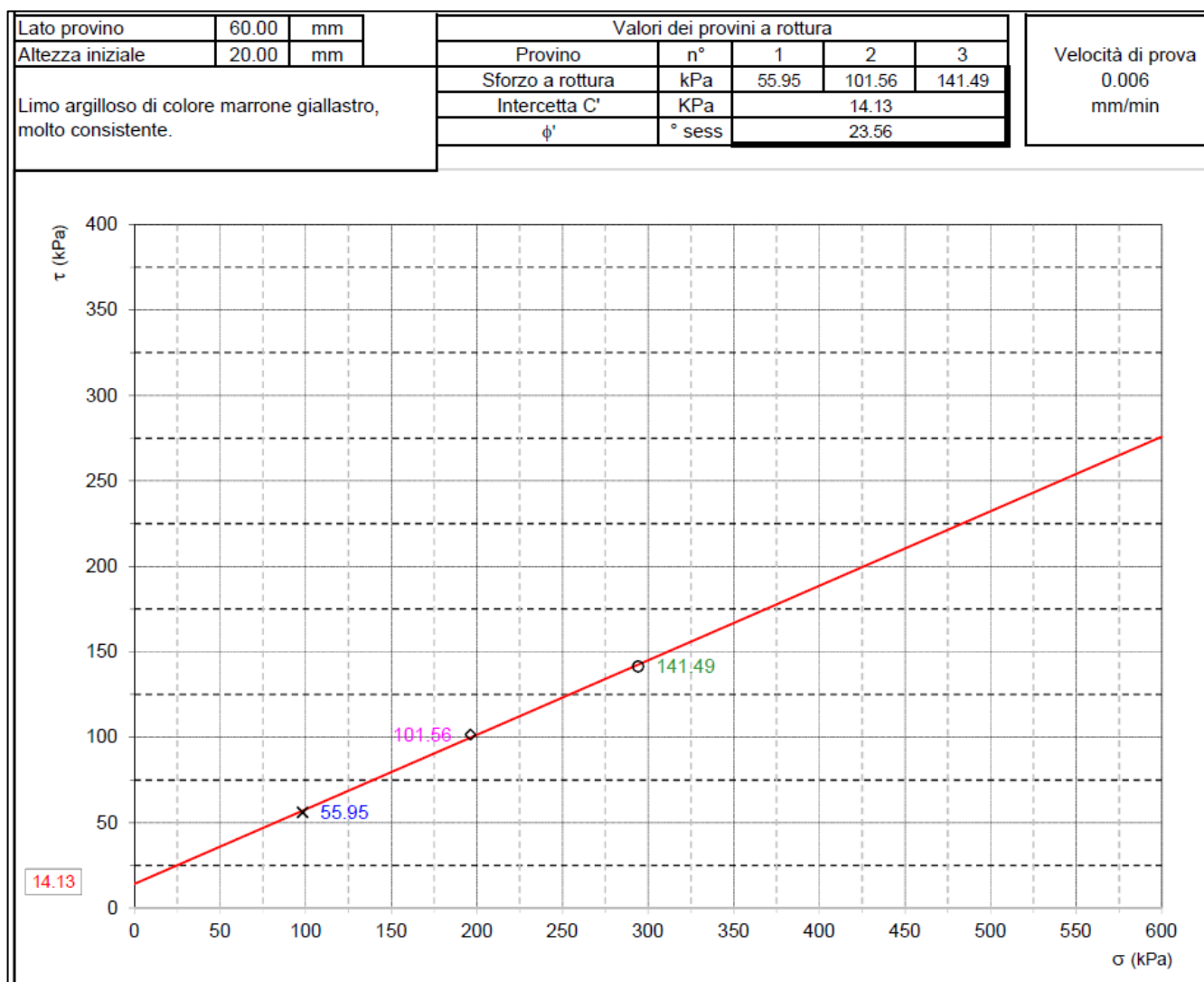


Figura 14 – Risultati della prova di taglio su Campione C2 (prelevato da 1.7 a 2.30 m).





## 6 Microzonazione sismica

Negli studi di microzonazione sismica eseguiti nel territorio del comune di Lugo l'area oggetto d'intervento viene indicata come "Zona suscettibile di instabilità" (ZSIq) che mediamente presenta un indice di liquefazione compreso tra 0 e 2 ( $0 < IL < 2$ ) e un fattore di amplificazione (FaPGA) compreso tra 1,1 e 1,2. (Figura 15).

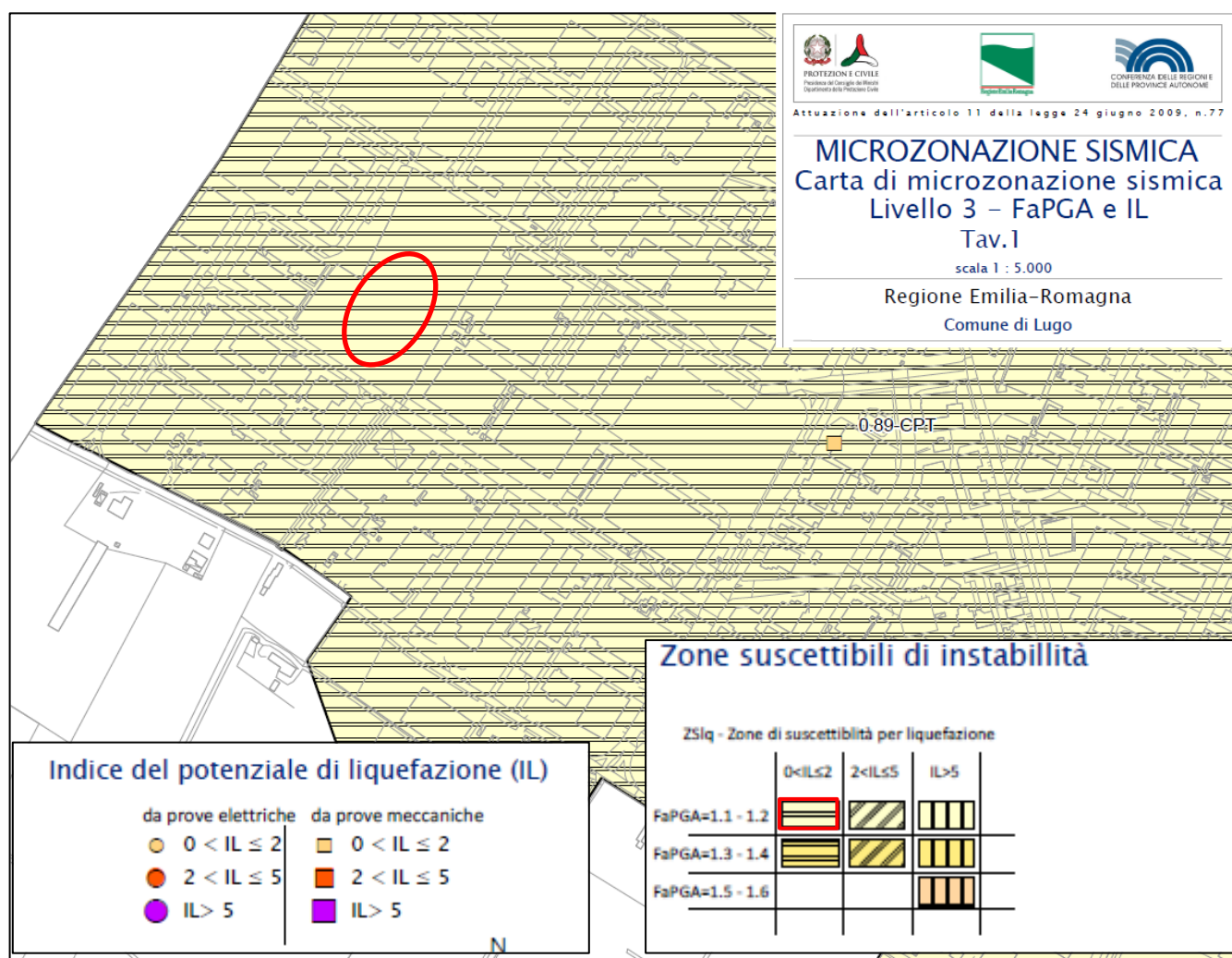
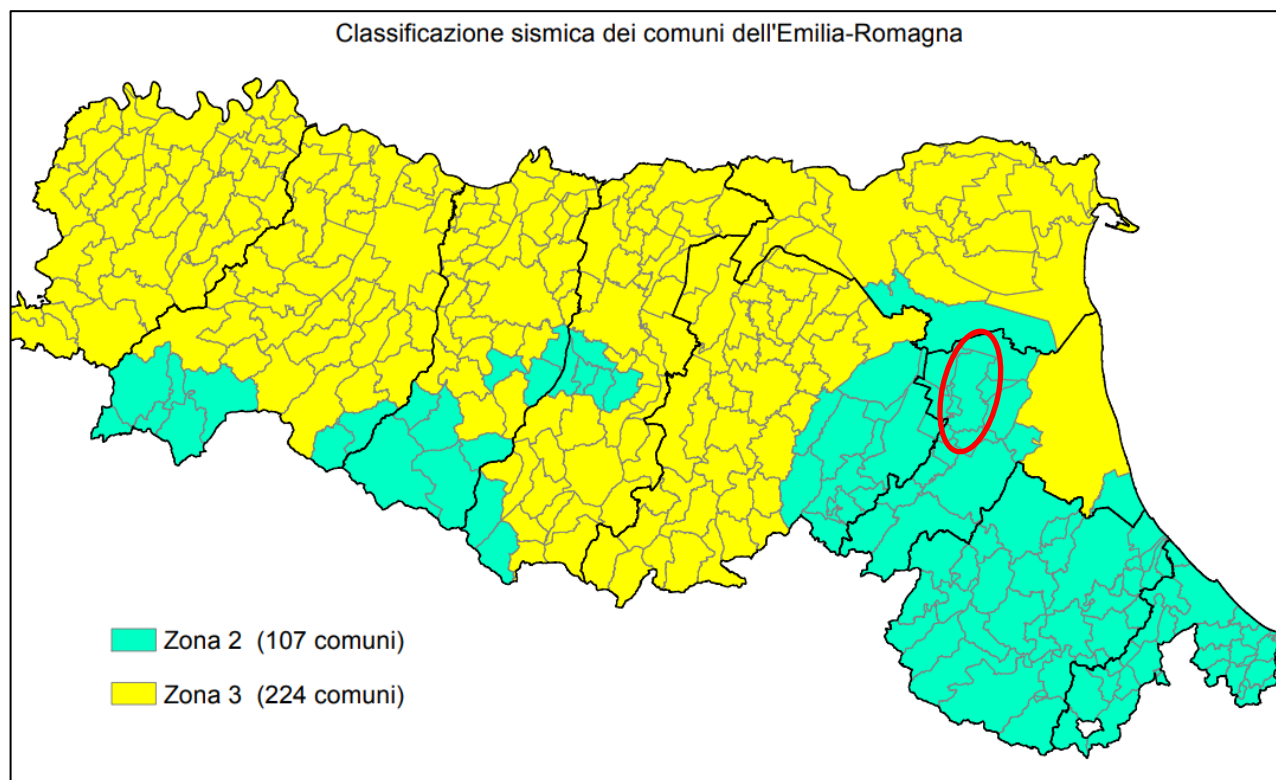


Figura 15 – Carta della microzonazione sismica Livello3 – FaPGA e IL (RER – Comune di Lugo).



## 6.1 Sismicità dell'area

Sulla base della classificazione sismica il Comune di Lugo è considerato in "**zona 2**" equivalente a zona a modesta sismicità: Normativa di riferimento: DGR 1164 del 23/07/2018 aggiornamento della classificazione sismica di prima applicazione dei comuni dell'Emilia-Romagna.



**Figura 16 - La classificazione sismica dei Comuni in Emilia-Romagna aggiornata al luglio 2018 ed ubicazione del territorio comunale di Lugo.**

*Zona 1 - E' la zona più pericolosa, dove possono verificarsi forti terremoti.*

***Zona 2 - Nei comuni inseriti in questa zona possono verificarsi terremoti abbastanza forti.***

*Zona 3 - I Comuni interessati in questa zona possono essere soggetti a scuotimenti modesti.*

*Zona 4 - E' la meno pericolosa. Nei comuni inseriti in questa zona le possibilità di danni sismici sono basse.*

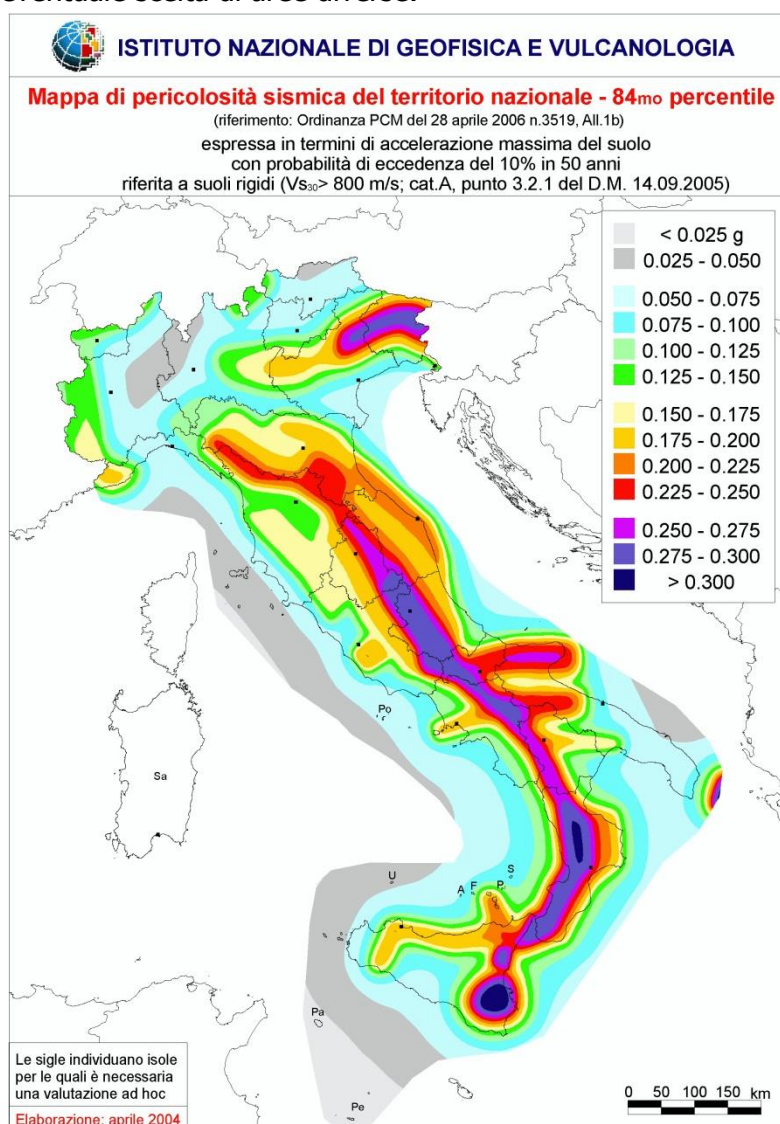
La classificazione sismica non interferisce con la determinazione dell'azione sismica, necessaria per la progettazione e la realizzazione degli interventi di prevenzione del rischio sismico. L'azione sismica è definita per ogni sito dai parametri di pericolosità sismica previsti dalle norme tecniche per le costruzioni NTC 2018. La classificazione sismica costituisce un riferimento tecnico-amministrativo per graduare l'attività di controllo dei progetti e la priorità delle azioni e misure di prevenzione e mitigazione del rischio sismico.



## 6.2 Pericolosità sismica

La pericolosità sismica viene definita come la probabilità che in una data area ed in un certo intervallo di tempo si verifichi un terremoto che superi una soglia di intensità, magnitudo o accelerazione di picco (PGA) di nostro interesse.

Gli studi di pericolosità sismica vengono utilizzati nelle analisi di sito, ovvero nelle valutazioni della pericolosità di un'area ristretta, al fine di localizzare opere critiche dal punto di vista della sicurezza e del rischio. Valutare la pericolosità, in questo caso, significa stabilire la probabilità di occorrenza di un terremoto di magnitudo (o PGA) superiore al valore di soglia stabilito dagli organi politici/decisionali, portando dunque all'eventuale scelta di aree diverse.



**Figura 17 – Valori di pericolosità sismica del territorio nazionale (<http://mi.ingv.it/>)**

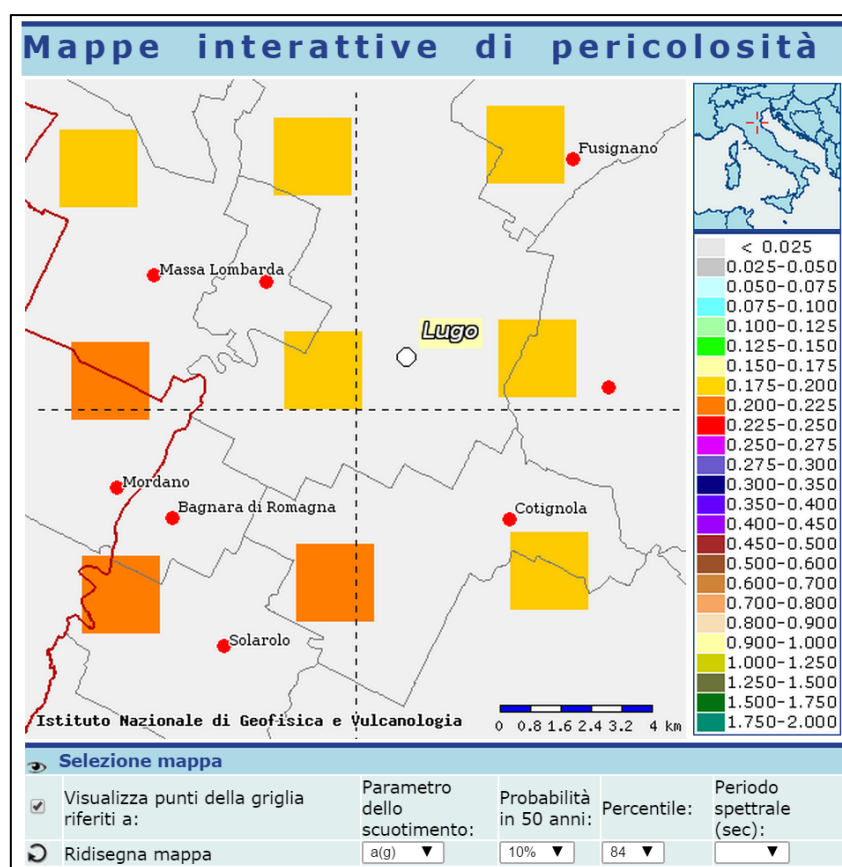
La "pericolosità sismica di base", chiamata semplicemente pericolosità sismica, costituisce l'elemento di conoscenza primario per la determinazione delle azioni sismiche.





Il parametro di pericolosità utilizzato è l'accelerazione orizzontale massima al suolo  $a_{g,475}$ , ossia quella relativa all'84esimo percentile, ad una vita di riferimento di 50 anni e ad una probabilità di superamento del 10%, utilizzata nel modo seguente:

- Zona 1 o a pericolosità alta; ricadono in questa zona i comuni o porzioni di essi per i quali  $a_{g,475} \geq 0,25g$ .
- **Zona 2 o a pericolosità media; ricadono in questa zona i comuni o porzioni di essi per i quali  $0,25g > a_{g,475} \geq 0,15g$ .**
- Zona 3 o a pericolosità bassa; ricadono in questa zona i comuni o porzioni di essi per i quali  $0,15g > a_{g,475} \geq 0,05g$ .
- Zona 4 o a pericolosità molto bassa; ricadono in questa zona i comuni o porzioni di essi per i quali  $a_{g,475} < 0,05g$ .

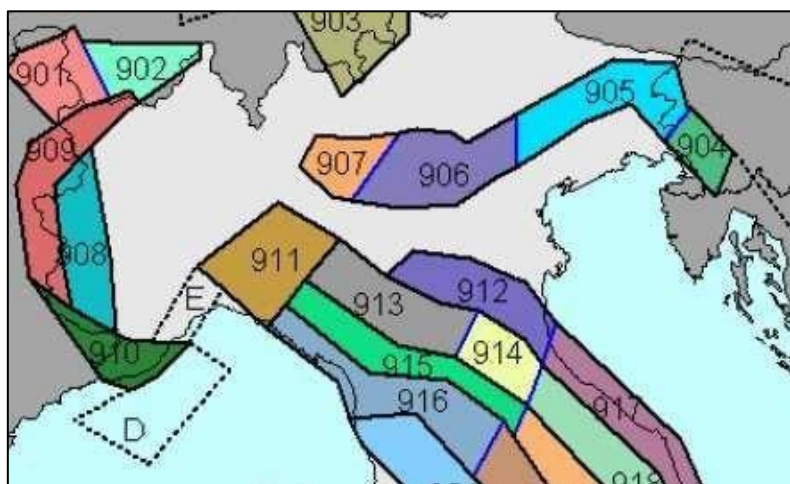


**Figura 18 – Mappa della pericolosità sismica centrata sul Comune di Lugo (<http://esse1-gis.mi.ingv.it/>).**

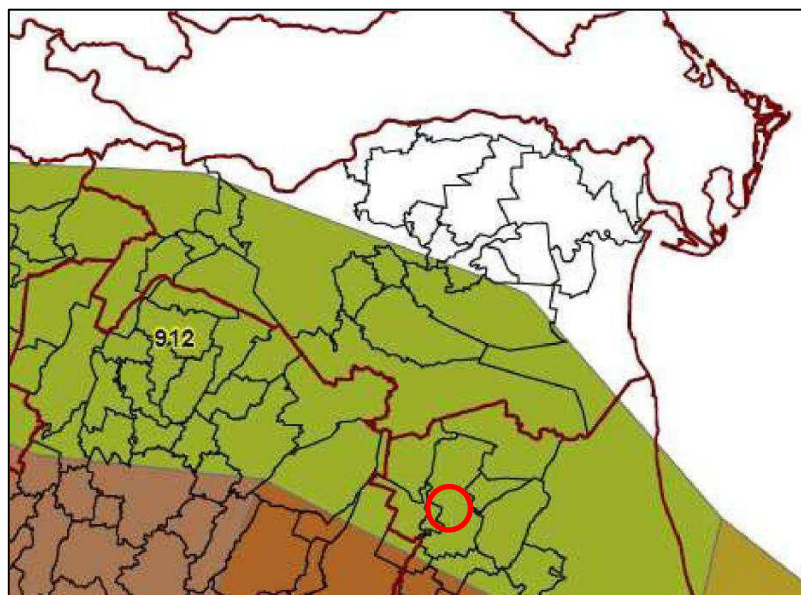


### 6.3 *Magnitudo di progetto*

Secondo la Zonazione sismogenetica del Territorio Italiano - ZS9, prodotta dall'Istituto Nazionale di Geofisica e Vulcanologia (INGV) nel 2004 (Meletti e Valensise, 2004), che rappresenta il riferimento per le valutazioni di pericolosità sismica nel territorio nazionale, l'area in esame ricade entro la Zona 912, caratterizzata da un valore di  $M_w$  max pari a 6.14.



**Figura 19 - Zonazione sismogenetica ZS9**



**Figura 20 - Stralcio della Zona Sorgente 912 tratta dalla Zonazione Sismigenetica ZS9, relativo all'area ferrarese**



## 7 Coefficienti sismici

Le **NTC 2018** calcolano i coefficienti  $K_h$  e  $K_v$  in dipendenza di vari fattori:

$$K_h = \beta \times (a_{\max}/g)$$

$$K_v = \pm 0,5 \times K_h$$

$a_{\max}$  accelerazione orizzontale massima attesa al sito;  $g$  accelerazione di gravità.

Tutti i fattori presenti nelle precedenti formule dipendono dall'accelerazione massima attesa sul sito di riferimento rigido e dalle caratteristiche geomorfologiche del territorio.

$$a_{\max} = S_S S_T a_g$$

$S_S$  (effetto di amplificazione stratigrafica):  $0.90 \leq S_S \leq 1.80$ ; è funzione di  $F_0$  (Fattore massimo di amplificazione dello spettro in accelerazione orizzontale) e della categoria di suolo (A, B, C, D, E).

$S_T$  (effetto di amplificazione topografica) per fondazioni in prossimità di pendii.

Il valore di  $S_T$  varia con il variare delle quattro categorie topografiche introdotte:

$$T1 (S_T = 1.0) \quad T2 (S_T = 1.20)$$

$$T3 (S_T = 1.20)$$

$$T4 (S_T = 1.40)$$

Questi valori sono calcolati come funzione del punto in cui si trova il sito oggetto di analisi. Il parametro di entrata per il calcolo è il tempo di ritorno dell'evento sismico che è valutato come segue:

$$T_R = -V_R / \ln(1 - PVR)$$

Con  $V_R$  vita di riferimento della costruzione e  $PVR$  probabilità di superamento, nella vita di riferimento, associata allo stato limite considerato. La vita di riferimento dipende dalla vita nominale della costruzione e dalla classe d'uso della costruzione (in linea con quanto previsto al punto 2.4.3 delle NTC). In ogni caso  $V_R$  dovrà essere maggiore o uguale a 35 anni. Con l'**OPCM 3274** e successive modifiche, i coefficienti sismici orizzontale  $K_o$  e verticale  $K_v$  che interessano tutte le masse vengono calcolati come:

$$K_o = S \cdot (a_g/g)$$

$$K_v = 0.5 \cdot K_o.$$

$S$ : fattore dipendente dal tipo di suolo secondo lo schema:

**Suolo di tipo A -  $S=1$ ;**

**Suolo di tipo B -  $S=1.25$ ;**

**Suolo di tipo C -  $S=1.25$ ;**

**Suolo di tipo D -  $S=1.25$ ;**

**Suolo di tipo E -  $S=1.35$**

Per fondazioni su pendii con inclinazione  $> 15^\circ$  e dislivello  $> 30$  m, l'azione sismica deve essere incrementata moltiplicandola per il coefficiente di **amplificazione topografica  $S_T$** :

- **$S_T \geq 1,2$**  per siti in prossimità del ciglio superiore di pendii scoscesi isolati;
- **$S_T \geq 1,4$**  per siti prossimi alla sommità di profili topografici aventi larghezza in testa molto inferiore alla larghezza alla base e pendenza media  $> 30^\circ$ ;  $S_T \geq 1,2$  per siti dello stesso tipo ma pendenza media inferiore.

L'applicazione del **D.M. 88** e successive modifiche ed integrazioni è consentito mediante l'inserimento del coefficiente sismico orizzontale  $K_o$  in funzione delle Categorie Sismiche secondo il seguente schema:

CATEGORIA	$K_o$	$K_v$
<b>I</b>	0.1	0
<b>II</b>	0.07	0
<b>III</b>	0.04	0

In accordo a tali disposizioni, il rapporto:  $a_g/g = C \cdot I \cdot R$





**C:** coefficiente di intensità sismica  $C = \frac{S-2}{100}$

**S:** grado di sismicità ( $S \geq 2$ )

**R:** coefficiente di risposta,

**I:** coefficiente di protezione sismica.

Per l'applicazione dell'**Eurocodice 8** (progettazione geotecnica in campo sismico) il coefficiente sismico orizzontale viene così definito:

$$K_o = a_{gR} \cdot Y_I \cdot S / (g)$$

**$a_{gR}$ :** accelerazione di picco di riferimento su suolo rigido affiorante,

**$Y_I$ :** fattore di importanza,

**S:** soil factor e dipende dal tipo di terreno (da A ad E).

$$a_g = a_{gR} \cdot Y_I$$

è la "design ground acceleration on type A ground".

Il coefficiente sismico verticale  **$K_v$**  è definito in funzione di  **$K_o$** , e vale:

$$K_v = \pm 0.5 \cdot K_h$$

## 8 Stati limite e relative probabilità di superamento

Gli stati limite di esercizio (SLE) dinamici sono:

- **Stato Limite di Operatività (SLO)**
- **Stato Limite di Danno (SLD)**

Gli stati limite ultimi (SLU) dinamici sono:

- **Stato Limite di salvaguardia della Vita (SLV)**
- **Stato Limite di prevenzione del Collasso (SLC)**

Le probabilità di superamento nel periodo di riferimento  $P_{Vr}$ , cui riferirsi per individuare l'azione sismica agente in ciascuno degli stati limite considerati, sono riportate nella Tabella seguente.

**Tabella 5 - Probabilità di superamento nel periodo di riferimento  $V_r$**

Stati Limite		$P_{Vr}$ : Probabilità di superamento nel periodo di riferimento $V_r$
Stati limite di esercizio	<b>SLO</b>	81%
	<b>SLD</b>	63%
Stati limite ultimi	<b>SLV</b>	10%
	<b>SLC</b>	5%



## 9 Parametri sismici e categoria sottosuolo determinati con approccio semplificato

Ai fini della classificazione sismica come indicato da NTC 2018, la **Vs,eq=Vs30=259 [m/s]** identifica un suolo di tipo **C**:

	Descrizione del profilo stratigrafico	Vs30 (m/s)	NSPT	Cu (kPa)
C	Depositi di sabbie o ghiaie mediamente addensate o argille di media consistenza con spessori variabili da diverse decine a centinaia di metri, caratterizzati da valori di Vs30 compresi tra 180 e 360 m/s ( $15 < \text{NSPT} < 50$ , $70 < \text{cu} < 250 \text{ kPa}$ )	180 – 360	15 – 50	70 – 250

Sito in esame.

latitudine: 44,435592  
longitudine: 11,885448  
Classe: 2  
Vita nominale: 50

Siti di riferimento

Sito 1	ID: 17182	Lat: 44,4240	Lon: 11,8806	Distanza: 1350,331
Sito 2	ID: 17183	Lat: 44,4249	Lon: 11,9506	Distanza: 5308,201
Sito 3	ID: 16961	Lat: 44,4749	Lon: 11,9493	Distanza: 6687,855
Sito 4	ID: 16960	Lat: 44,4739	Lon: 11,8793	Distanza: 4292,205

Parametri sismici

Categoria sottosuolo: C  
Categoria topografica: T1  
Periodo di riferimento: 50anni  
Coefficiente cu: 1

Operatività (SLO):

Probabilità di superamento: 81 %  
Tr: 30 [anni]  
ag: 0,055 g  
Fo: 2,452  
Tc\*: 0,260 [s]

Danno (SLD):

Probabilità di superamento: 63 %  
Tr: 50 [anni]  
ag: 0,069 g  
Fo: 2,443  
Tc\*: 0,274 [s]

Salvaguardia della vita (SLV):

Probabilità di superamento: 10 %  
Tr: 475 [anni]



ag: 0,180 g  
Fo: 2,434  
Tc\*: 0,301 [s]

Prevenzione dal collasso (SLC):  
Probabilità di superamento: 5 %  
Tr: 975 [anni]  
ag: 0,236 g  
Fo: 2,413  
Tc\*: 0,307 [s]

#### Coefficienti Sismici

SLO:	Ss: 1,500 Cc: 1,640 St: 1,000 Kh: 0,017 Kv: 0,008 Amax: 0,811 Beta: 0,200	SLV:	Ss: 1,440 Cc: 1,560 St: 1,000 Kh: 0,062 Kv: 0,031 Amax: 2,543 Beta: 0,240
SLD:	Ss: 1,500 Cc: 1,610 St: 1,000 Kh: 0,021 Kv: 0,010 Amax: 1,022 Beta: 0,200	SLC:	Ss: 1,360 Cc: 1,550 St: 1,000 Kh: 0,090 Kv: 0,045 Amax: 3,144 Beta: 0,280





## 10 Analisi di terzo livello di approfondimento

### 10.1 Verifica del potenziale di liquefazione

Per liquefazione di un terreno s'intende il quasi totale annullamento della sua resistenza al taglio, con l'assunzione del comportamento meccanico caratteristico dei liquidi. I fenomeni di liquefazione interessano i **depositi sabbiosi saturi** e dipendono da:

- proprietà geotecniche dei terreni;
- caratteristiche delle vibrazioni sismiche e loro durata;
- genesi e storia geologica dei terreni;
- fattori ambientali.

Un **terreno incoerente saturo**, in assenza di sollecitazioni sismiche, è soggetto soltanto alla pressione litostatica, dovuta al peso dei sedimenti sovrastanti (in campo libero e con superficie piana).

Durante una sollecitazione sismica vengono indotte nel terreno delle sollecitazioni cicliche di taglio, dovute alla propagazione delle onde sismiche verso la superficie, mentre la pressione litostatica resta costante. Per tutta la durata della scossa ogni elemento di terreno è soggetto ad una serie di sforzi tangenziali che cambiano ripetutamente verso ed ampiezza.

Nel terreno si possono generare fenomeni di liquefazione se la scossa sismica produce un numero di cicli tale da far sì che la pressione interstiziale uguagli la pressione di confinamento. Nei depositi la pressione di confinamento aumenta con la profondità, mentre l'ampiezza dello sforzo di taglio indotto dal sisma diminuisce. La resistenza alla liquefazione, quindi, è maggiore con la profondità. Di conseguenza, maggiore è la **durata di un terremoto** (maggiore numero di cicli), più alta è la possibilità che si arrivi alla liquefazione. Inoltre, maggiore è l'**ampiezza della vibrazione** e della deformazione indotta e minore è il numero di cicli necessari per giungere a tale condizione.

Il terreno può essere però soggetto a sforzi di taglio statici dovuti alla presenza di strutture in superficie o alla sua particolare posizione (per es. al di sotto di un versante). In questo caso l'instaurarsi del fenomeno della liquefazione dipende, oltre che dalle caratteristiche del sisma, anche dal rapporto che si stabilisce tra le tensioni di taglio indotte da quest'ultimo e quelle statiche preesistenti al terremoto.

La probabilità che un deposito raggiunga le condizioni per la liquefazione dipende anche dallo stato di addensamento, dalla composizione granulometrica, dalle condizioni di drenaggio, dalla storia delle sollecitazioni sismiche e dall'età del deposito stesso.

Tanto minore è il **grado di addensamento** del materiale (elevato indice dei vuoti e bassa densità relativa) tanto maggiore è la probabilità che, a parità di altre condizioni, un deposito raggiunga lo stato di liquefazione.

Anche la **distribuzione**, la **forma delle particelle** e il **grado di uniformità** influenzano notevolmente il fenomeno, per le implicazioni che questi fattori hanno sulla resistenza al taglio e per il modo di dissiparsi della pressione interstiziale in eccesso.

Per quanto riguarda la **storia delle sollecitazioni sismiche**, si può affermare che precedenti deformazioni moderate influiscano positivamente sulla resistenza del deposito, mentre una storia caratterizzata da alti livelli di deformazione (deposito già soggetto a liquefazione) ha effetti negativi sul potenziale di liquefazione.

I depositi sabbiosi con più alto potenziale di liquefazione sono i più recenti. A parità di composizione e di altre condizioni lo stesso deposito, se più antico, avrà sviluppato legami intergranulari e cementazioni



sempre più forti con il tempo.

Inoltre, la struttura di un deposito antico sarà resa più stabile e omogenea per gli effetti delle vibrazioni indotte da precedenti terremoti di piccola entità.

Dopo aver caratterizzato il terreno attraverso l'interpretazione dei dati delle prove penetrometriche eseguite, è stata eseguita una stima del rischio di liquefazione di terreni sottofalda in condizioni sismiche, mediante il metodo di **Boulanger & Idriss (2014)**.

### 10.1.1 Calcolo dell'indice di liquefazione

Una stima del rischio di liquefazione complessivo lungo una verticale di calcolo viene fornita dal parametro indice di liquefazione **IL proposto da Iwasaki (1978)**. Tale indice viene definito dalla seguente relazione:

$$IL = \sum_{i=1}^n FW(z)\Delta z$$

dove:

n = numero degli intervalli di calcolo di Fs lungo la verticale;

F = 1-Fs per Fs<1 e F = 0 per Fs>1;

$\Delta z$  = spessore dell'intervallo di calcolo;

W(z) = 10 - 0,5z, con z = profondità di calcolo (massimo 20 m).

La determinazione del rischio di liquefazione è quindi legata alla determinazione del Fattore di Sicurezza cioè del rapporto: FS liq = CRR/CRS\*MFS

Dove:

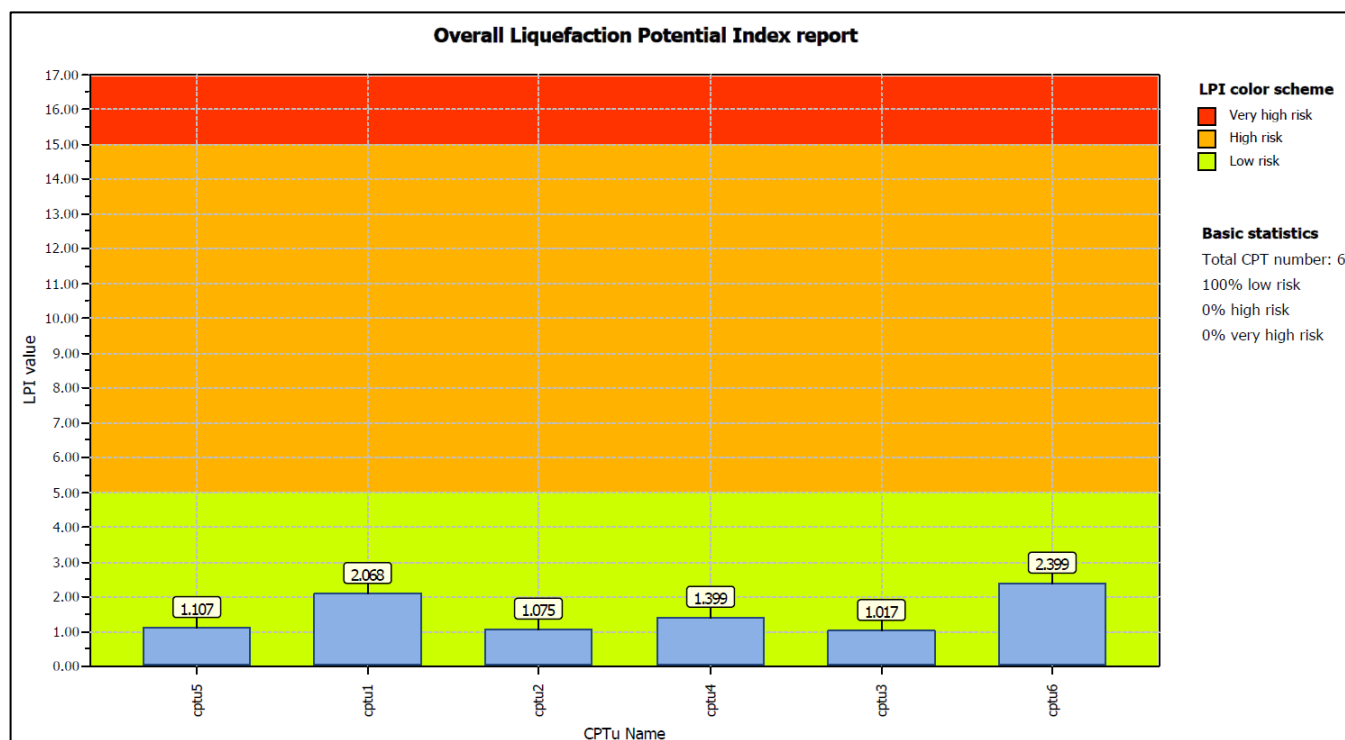
CRR = Cyclic resistance ratio (Rapporto Di Resistenza Ciclica) ovvero la grandezza che definisce la resistenza dell'elemento di terreno esaminato, a resistere alla sollecitazione sismica che tende ad innescare la liquefazione.

CRS = cyclic stress ratio (Rapporto Di Sforzo Ciclico) ovvero la grandezza che definisce lo sforzo deformativo sismico applicato all'elemento di terreno esaminato, e che tende ad innescare la liquefazione  
MFS= Magnitudo Scaling Factor (Fattore di Scala della Magnitudo), Fattore riduttivo della CRS, che normalizza la sollecitazione sismica (Seed e Idriss, 1982).

In base al valore stimato dell'indice del potenziale di liquefazione IL si definiscono le seguenti classi di pericolosità (Sonmez, 2003):

IL	Classi di pericolosità
IL=0	Non liquefacibile (FL $\geq$ 1.2)
0<IL<2	Potenziale basso
2<IL<5	Potenziale moderato
5<IL<15	Potenziale alto
15<IL	Potenziale molto alto

Dalla verifica alla liquefazione effettuata sulle CPTu è stato ottenuto un valore di **IL che varia da un massimo di 2,399 ad un minimo di 1,017 risultato** che indica un rischio di liquefazione mediamente "basso" considerando una magnitudo di riferimento **M = 6,14** una accelerazione sismica di progetto **ag = 0.25g** e la soggiacenza minima della falda freatica alla profondità **Dw = -1,9 m** da p.c..



**Figura 21 – Grafico di comparazione valore LPI e classe di rischio.**





## 10.1 Stima dei cedimenti indotti dall'azione sismica

*La stima dei cedimenti indotti dall'azione sismica è affetta da notevoli incertezze. I valori che si ottengono applicando le procedure nel seguito descritte devono intendersi solo orientativi.*

*Per cedimento si intende l'abbassamento del piano campagna, ovvero l'integrale della deformazione del terreno in direzione verticale, o anche la sommatoria dei prodotti della deformazione verticale media per lo spessore di ciascuno degli strati deformati. In condizioni edometriche, ovvero in presenza di strati di terreno orizzontali ed omogenei, e con tensione costante in direzione orizzontale, le deformazioni laterali sono nulle e pertanto la deformazione verticale coincide con la deformazione volumetrica. Per semplicità e con approssimazione accettabile, salvo casi di morfologia con forti pendenze e stratigrafie molto variabili in direzione orizzontale, per la stima dei cedimenti indotti dall'azione sismica si può fare riferimento alle condizioni edometriche. Il cedimento permanente indotto dall'azione sismica in corrispondenza di una verticale di esplorazione si ottiene dalla somma dei contributi al cedimento stimati per i diversi strati del sottosuolo, fino alla profondità alla quale tali contributi non sono più significativi. Il cedimento permanente post-sismico può dunque essere stimato con l'equazione:*

$$s = \sum_{i=1}^n \varepsilon_{vi} \cdot \Delta z_i$$

*in cui  $\varepsilon_{vi}$  è la deformazione volumetrica (e verticale) dello strato  $i$ -esimo e  $\Delta z_i$  il suo spessore.*

*I cedimenti permanenti indotti dall'azione sismica possono essere dovuti alle deformazioni volumetriche (e quindi verticali) di:*

- B1. terreni granulari saturi,*
- B2. terreni granulari insaturi,*
- B3. terreni coesivi soffici.*

*I cedimenti conseguenti a liquefazione di terreni granulari saturi hanno luogo immediatamente dopo il terremoto o comunque in un tempo non superiore a un giorno, i cedimenti per densificazione di terreni granulari insaturi avvengono durante lo scuotimento sismico, mentre i cedimenti per consolidazione di terreni coesivi molli possono richiedere tempi anche molto lunghi in funzione delle condizioni stratigrafiche e geotecniche. (DGR N. 2193/2015 della Regione Emilia Romagna).*

In base ai risultati della prova penetrometrica i terreni coesivi e incoerenti/coesivi che costituiscono i primi 20 da pc. sono da costituirsi da spessori di sedimenti da ritenersi potenzialmente soggetti a cedimenti post sismici in quanto presentano livelli di sedimenti con valori di  $C_u$  mediamente inferiori a 70KPa (DGR N. 2193/2015 della Regione Emilia Romagna - terreni coesivi soffici:  $c_u \leq 70\text{kPa}$ ; VS < 180m/s e plastici: IP  $\geq 30\%$ , suscettibili di amplificazione e cedimenti) anche se non su tutte le verticali indagata, sono infatti presenti anche spessori con valori maggiori di 70 kPa.

I cedimenti stimati su tutte le verticali variano da un massimo di circa 4 cm (CPTu 6) ad un minimo di circa 1,5 (CPTu 3) (vedi Figura 22, Figura 23, Figura 24 e allegati).

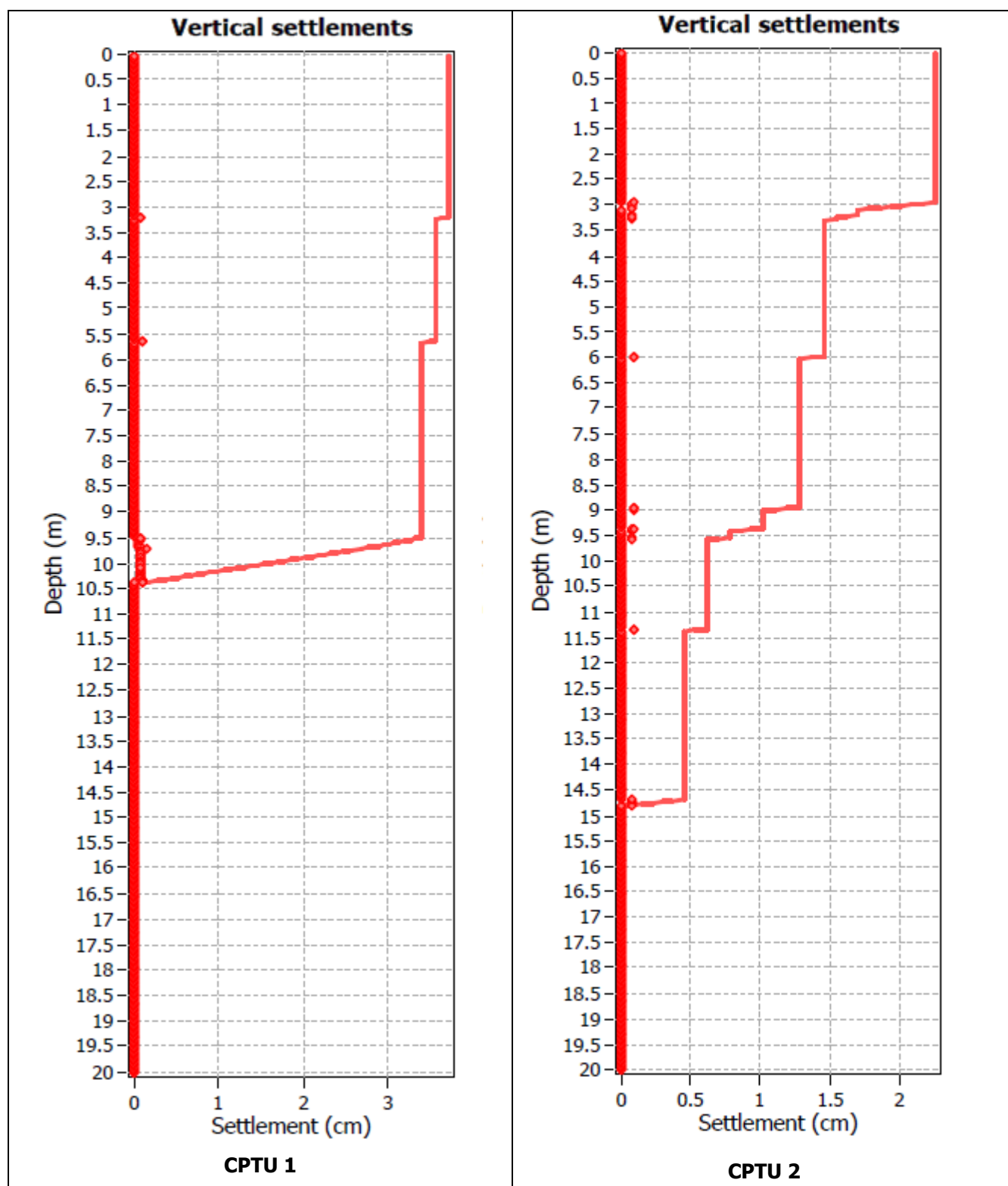
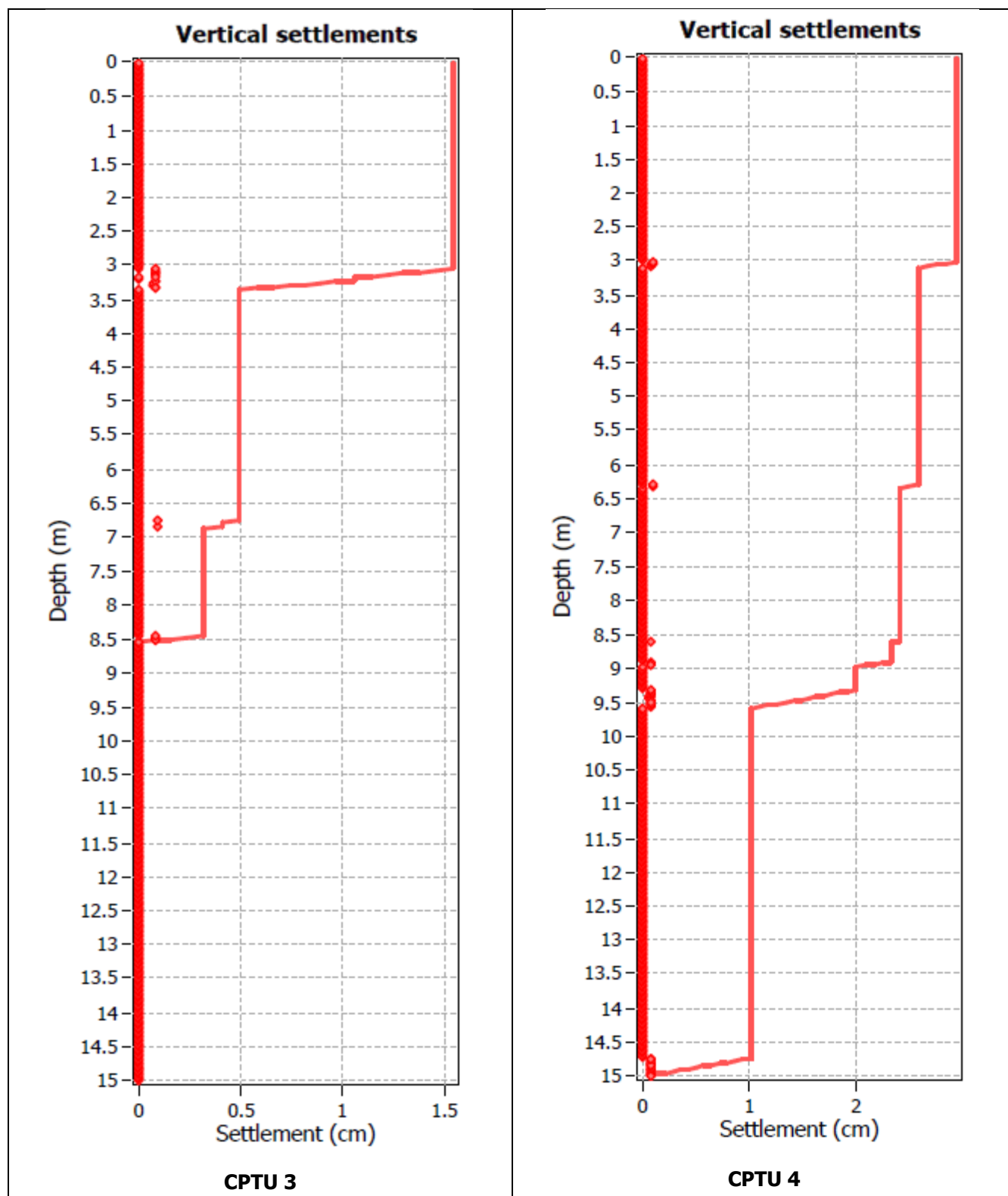


Figura 22 – Grafico della stima dei cedimenti post sismici



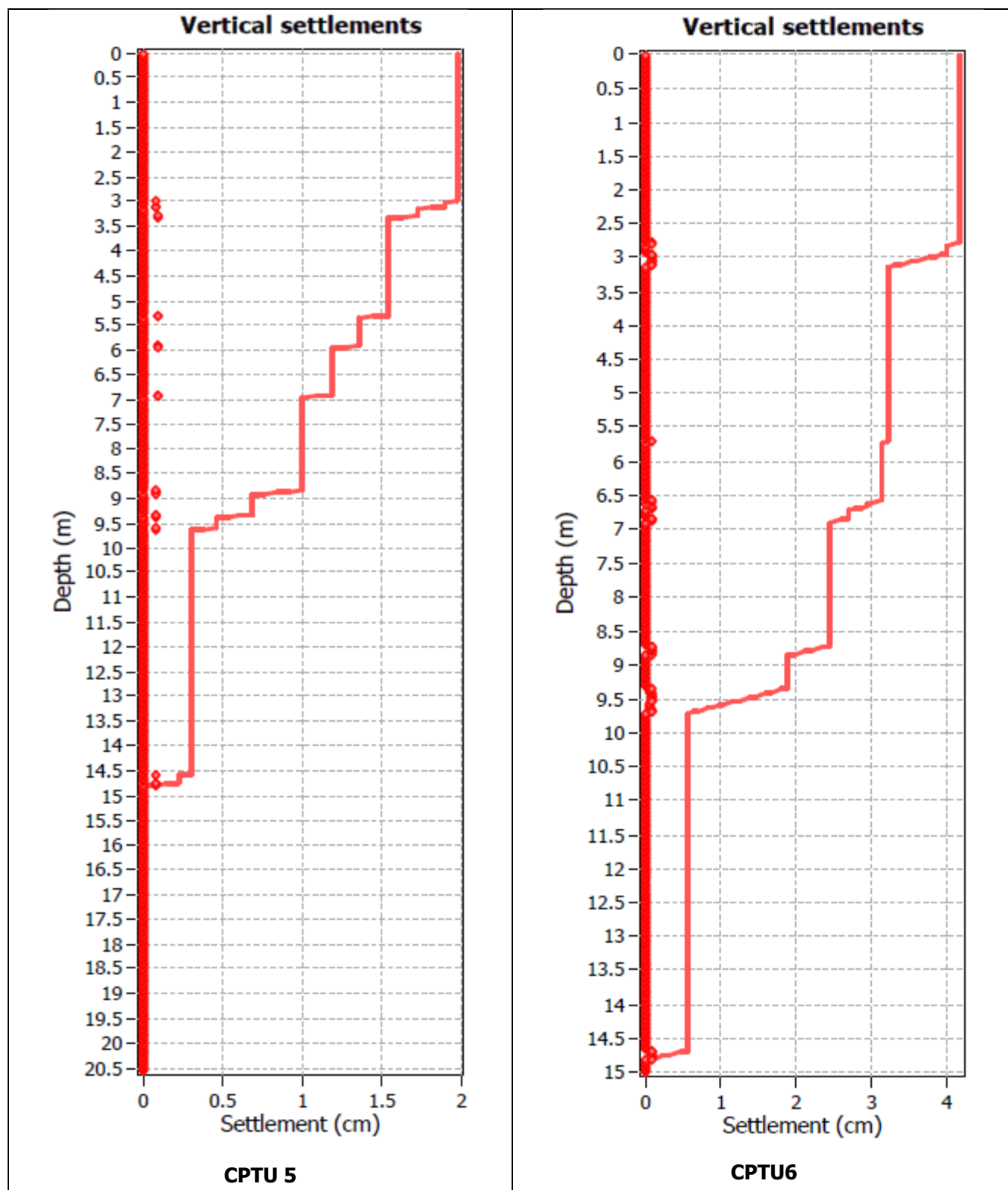


Figura 24 – Grafico della stima dei cedimenti post sismici





## 11 Considerazioni conclusive

La presente relazione, finalizzata al progetto di capannone industriale denominato "BLOCCO D" in via Gessi nel Comune di Lugo (RA) (Foglio 101, particelle 393-437-511-686), è stata redatta ai sensi del D.M. 14 gennaio 2018 "Norme Tecniche per le costruzioni".

Il capannone industriale in oggetto avrà una lunghezza di circa 150 m e una larghezza di circa 76 m e verrà realizzato in un'area libera da altri edifici attualmente adibita a seminativo (Figura 1).

### Contesto geologico e geomorfologico

L'area in esame si trova in una zona di pianura nel comune di Lugo a circa 12 metri sul livello del mare. Si tratta di un'area industriale caratterizzata da una buona stabilità generale per la morfologia e la tipologia di terreni di cui è costituita.

Dal punto di vista geologico l'area in oggetto è compresa nella cartografia geologica scala 1:25.000 del Progetto CARG. Tale cartografia è consultabile sul sito del Servizio Geologico Regionale (<http://geo.regione.emilia-romagna.it/>) e di cui si riporta un estratto nella Figura 5.

Dal punto di vista geologico e litologico, l'area entro cui ricade la zona oggetto di studio, risulta essere caratterizzata dalla presenza di depositi di piana alluvionale attribuibili alle unità oloceniche (AES8a – Unità di Modena) più superficiali della potente successione quaternaria di riempimento del bacino padano. Tali sedimenti di origine fluviale sono distribuiti secondo alternanze di litotipi a diversa granulometria (Sabbia Limoso Argillosa), organizzati in strati a geometria variabile, spesso lenticolare, e quindi arealmente discontinui, in cui i rapporti tra le diverse litologie sono da ricondurre all'evolversi di un ambiente caratterizzato da energie di trasporto e da modalità deposizionali variabili nel tempo.

### Falda acquifera

La soggiacenza della falda viene rilevata all'interno dei fori di sondaggio mediamente a 2 m dal pc (vedi **Tabella 1**).

### Modello geologico e geotecnico

In base ai risultati delle prove penetrometriche si riscontra come il primo sottosuolo dell'area mostri una buona omogeneità fino alla profondità di 20 m. È costituito principalmente da depositi argillosi, limosi intercalati da livelli decimetrici di argilla limosa e limi argillosi la cui geometria è tipica di ambienti deposizionali di piana alluvionale. La presenza di terreni sabbiosi è limitata al primo metro e mezzo circa dal pc. osservabile in modo continuo su tutte le CPT e a una circa 10 m del pc rilevabile nella CPTu1 (spessore decimetrico) e nella CPTu4 (spessore centimetrico).

### Risultati delle prove di laboratorio.

Le prove di laboratorio sono state eseguite sui campioni di terreno indisturbato C1 (da 1.20 a 1.80 m) e C2 (da 1.7 a 2.30 m), prelevati rispettivamente in corrispondenza della CPTu1 e CPTu5 tramite l'infissione di una fustella.

Litologia: limoso argilloso di colore marrone giallastro molto consistente.

C1 - Prova di taglio diretto CD	Valori dei provini a rottura				
	Provino	n°	1	2	3
	Sforzo a rottura	kPa	50.83	96.39	139.72
	Intercetta C'	KPa	6.76		
	$\phi'$	° sess	24.38		



C2 - Prova di taglio diretto CD	Valori dei provini a rottura				
	Provino	n°	1	2	3
	Sforzo a rottura	kPa	55.95	101.56	141.49
	Intercetta C'	KPa	14.13		
	$\phi'$	° sess	23.56		

### Categoria sismica del sottosuolo – da approccio semplificato

Ai fini della classificazione sismica come indicato da NTC 2018, la  **$V_{s,eq}=V_{s30}=259$  [m/s]** identifica un **suolo di tipo C** (Depositi di sabbie o ghiaie mediamente addensate o argille di media consistenza con spessori variabili da diverse decine a centinaia di metri, caratterizzati da valori di  $V_{s30}$  compresi tra 180 e 360 m/s).

Nell'intervallo da 0 a 30 Hz, la curva HVSr è caratterizzata da una debole amplificazione locale del moto del suolo per risonanza stratigrafica a basso contrasto di rigidezza. Il cui picco maggiormente significativo corrisponde a circa 1 Hz.

I parametri sismici per il sito in esame determinati tramite approccio semplificato sono da considerarsi cautelativi, considerando i fattori di amplificazione, rispetto a quanto indicato negli studi di microzonazione sismica per la stessa area (Figura 15).

### Classificazione sismica

Sulla base della classificazione sismica il Comune di Lugo è considerato in "**zona 2**" equivalente a zona a modesta sismicità.

### Analisi di III° livello di approfondimento.

#### **Verifica del potenziale di liquefazione.**

Le verifiche eseguite con falda a 1,9 da pc., magnitudo di progetto  $M_w=6,14$  e una accelerazione sismica di progetto  $a_g = 0,25$  (g) restituiscono il seguente risultato:

	IL (Boulanger & Idriss, 2014)	Rischio di liquefazione	Prof. (m dal pc.)
CPTu1	2,068	basso	20
CPTu2	1,075	basso	20
CPTu3	1,017	basso	15
CPTu4	1,399	basso	14
CPTu5	1,107	basso	20
CPTu6	2,399	moderato	20

Le verifiche mostrano un rischio di liquefazione con mediamente "basso". I risultati confermano quanto riportato nella Carta della microzonazione sismica Livello3 – FaPGA e IL – Comune di Lugo (vedi Figura 15).

Sulla base dei rilievi in campo, delle indagini geognostiche e geofisiche effettuate e dall'esame dei dati pregressi di carattere geologico e morfologico, delle condizioni di drenaggio, e dei risultati dei modelli geotecnici, l'area in esame risulta essere idonea per la realizzazione dell'opera in progetto, a meno delle normali prescrizioni ingegneristiche.



Per quello che riguarda la tipologia di fondazione, il contesto geologico e geotecnico consente l'utilizzo di fondazioni superficiali, quali ad esempio plinti o travi rovesce a seconda delle esigenze progettuali, che si suggerisce di impostare ad una profondità indicativa tra 1 e 1,5 m dal pc. in modo da escludere il primo metro di terreni agricoli (sabbiosi e limosi) e rimanere al disopra della falda freatica. I cedimenti dovranno essere valutati in relazione ai carichi effettivi.

In ogni caso tutte le scelte progettuali dovranno essere supportate da un adeguato modello geotecnico.

19-08-2021

Dott. Geol. Carlo Del Grande



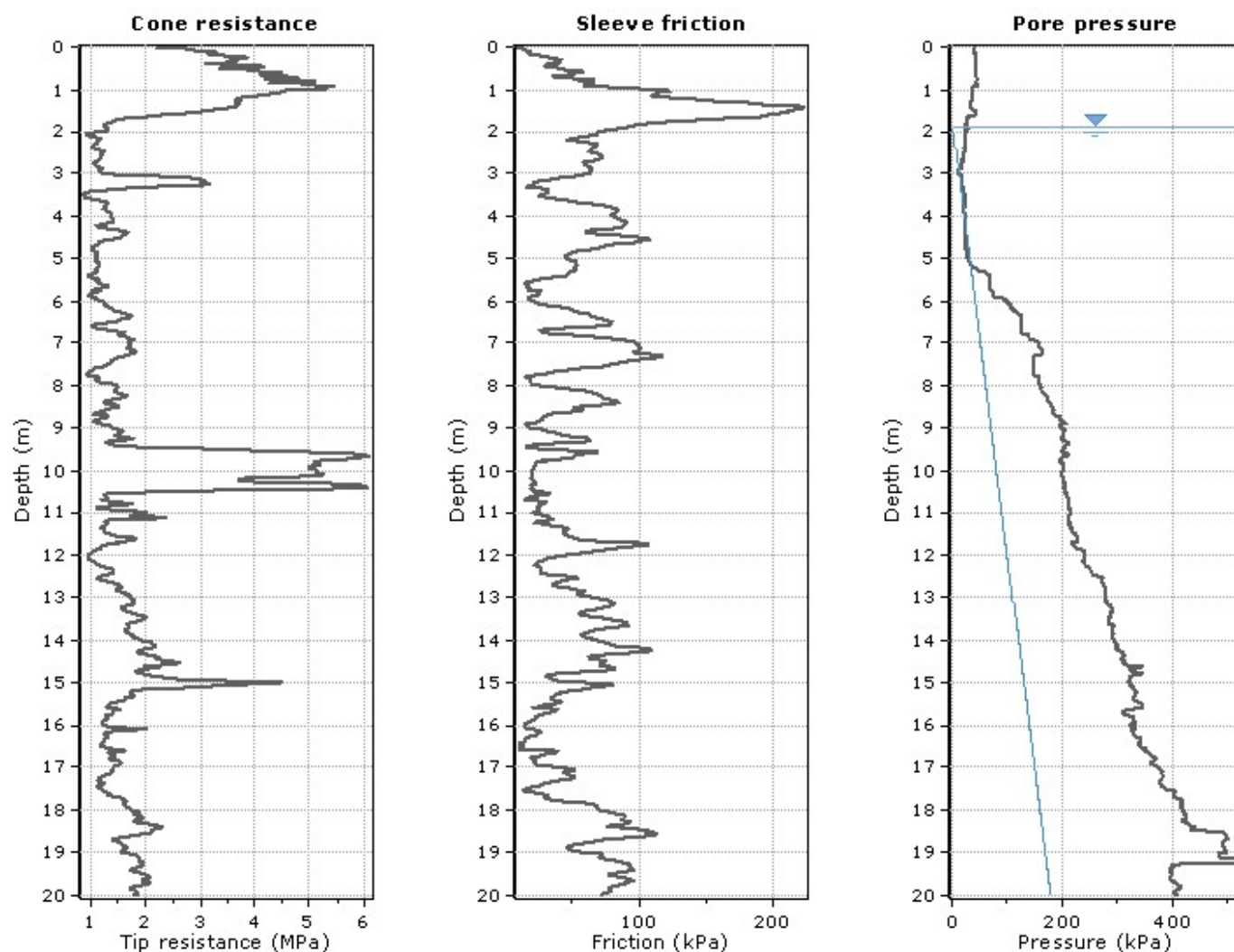


## 12 Allegati

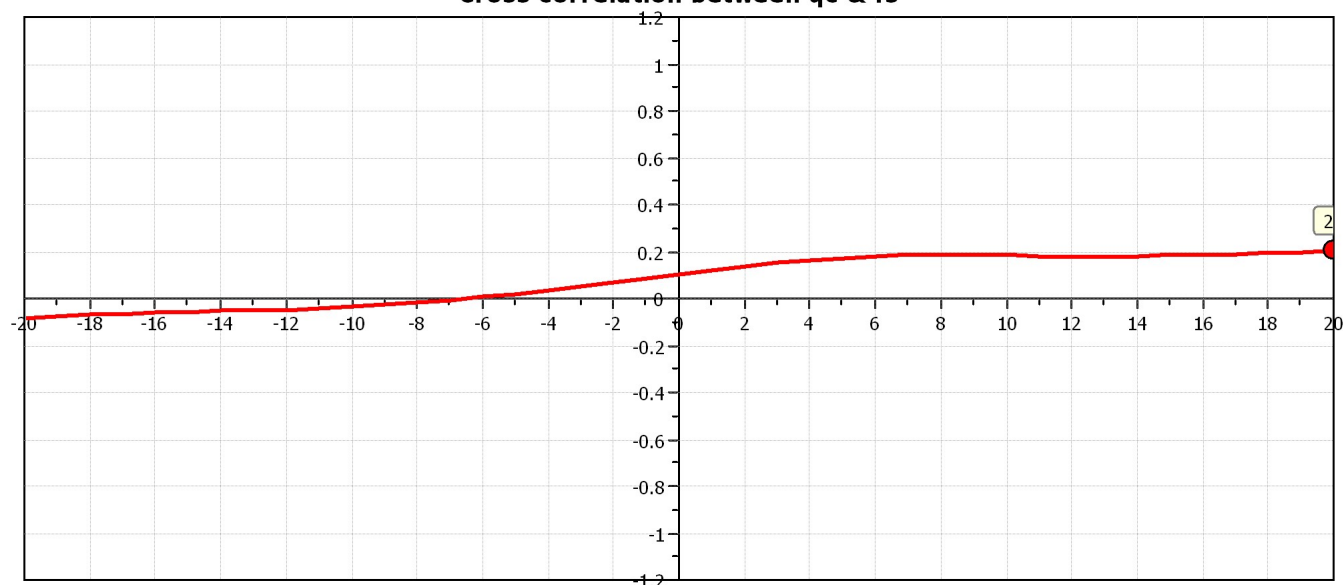




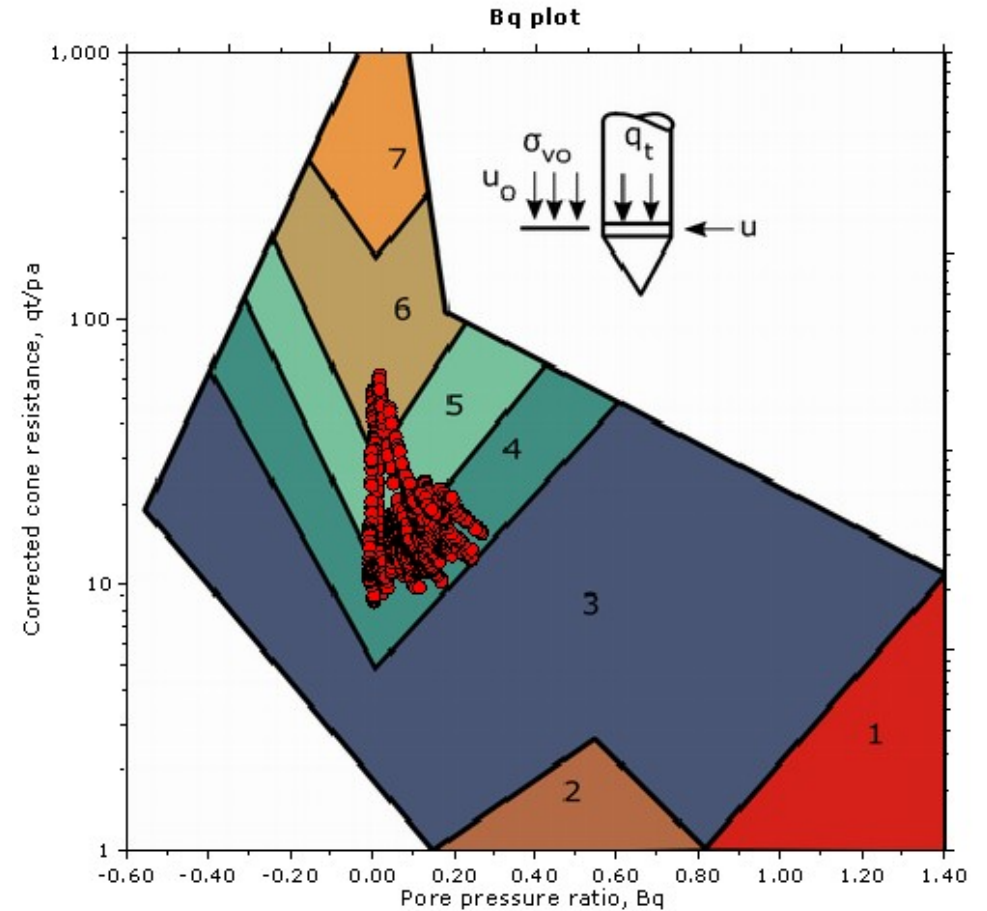
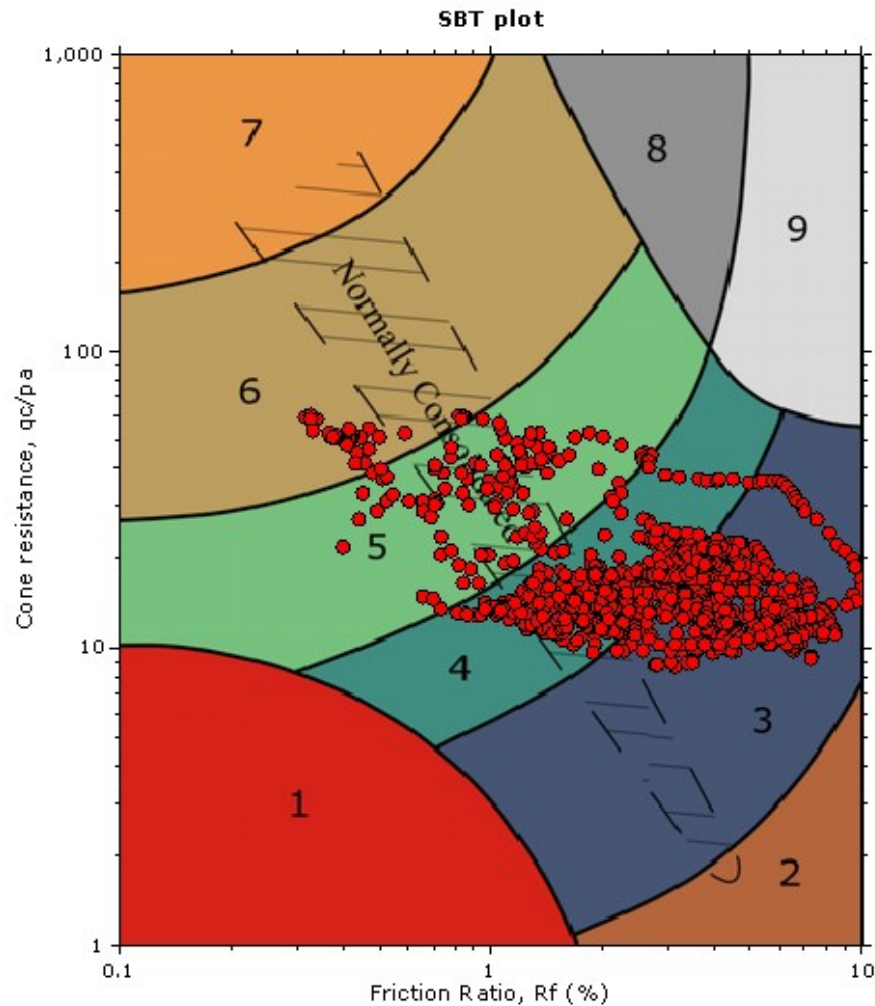
## **12.1 *Risultati prove penetrometriche - CPT***

**Project:****Location:**

The plot below presents the cross correlation coefficient between the raw  $q_c$  and  $f_s$  values (as measured on the field). X axes presents the lag distance (one lag is the distance between two successive CPT measurements).

**Cross correlation between  $q_c$  &  $f_s$** 

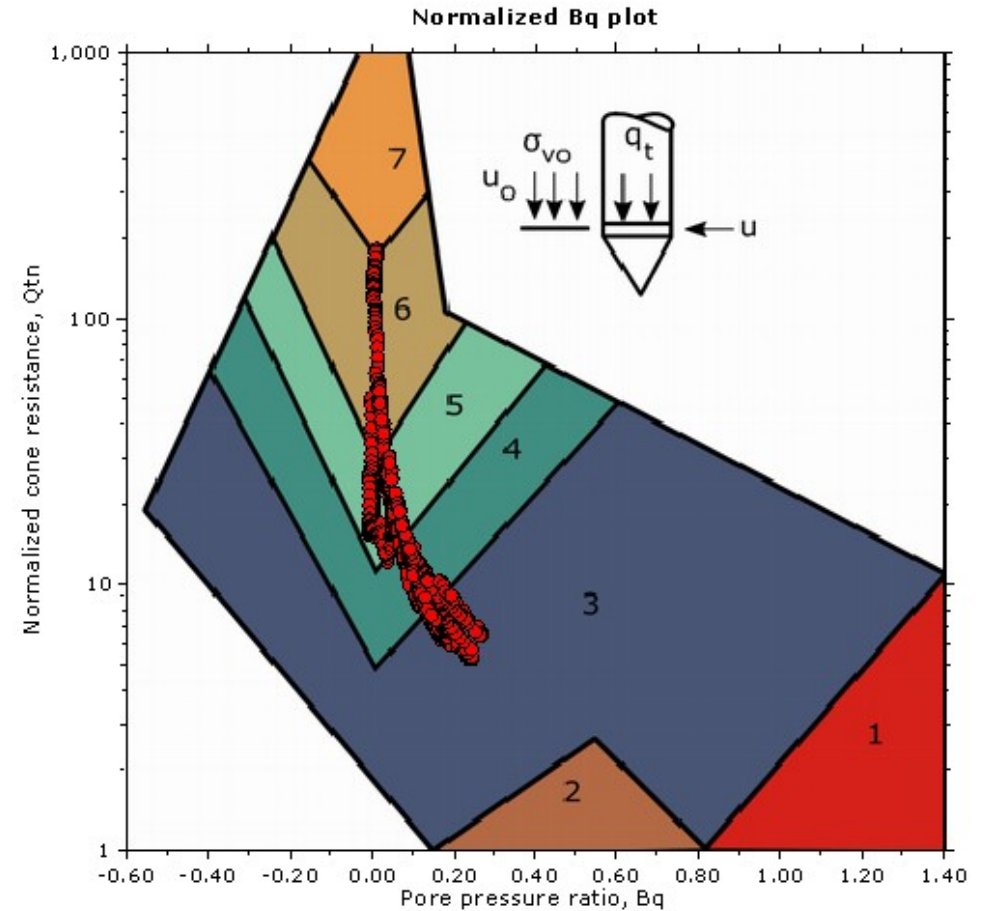
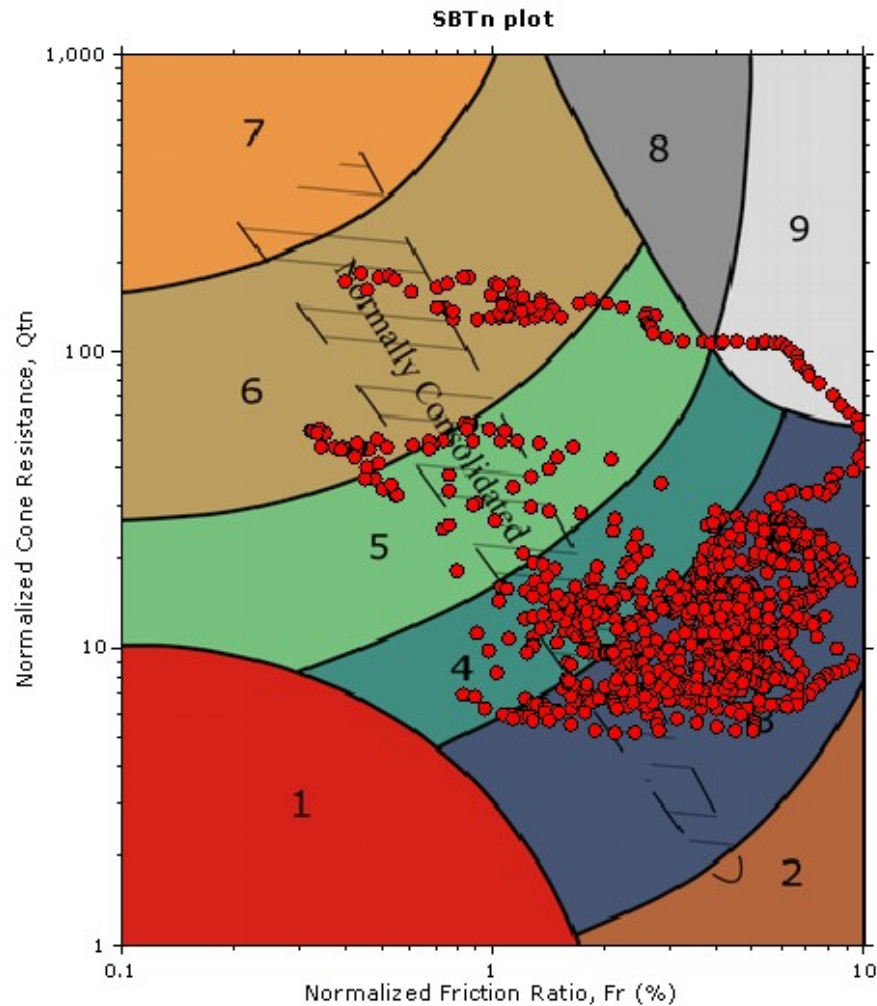
## SBT - Bq plots



## SBT legend

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

## SBT - Bq plots (normalized)



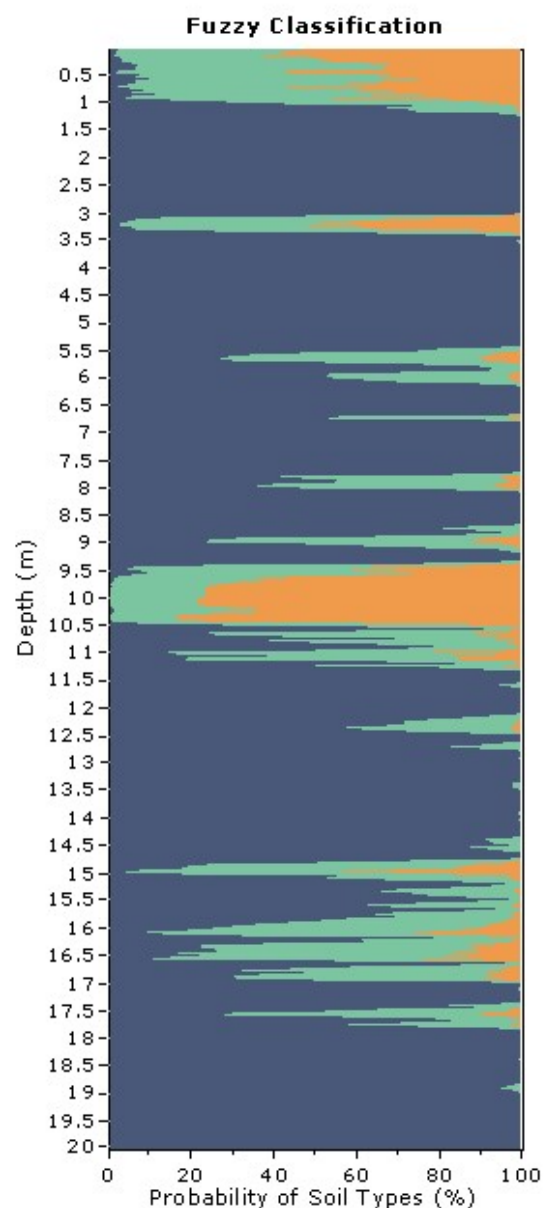
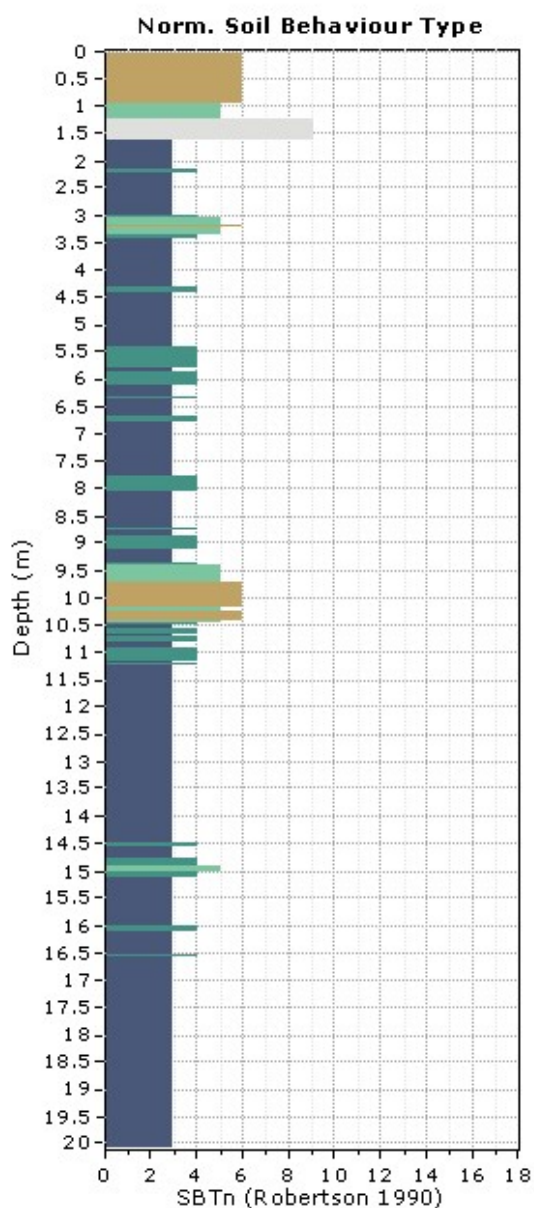
### SBTn legend

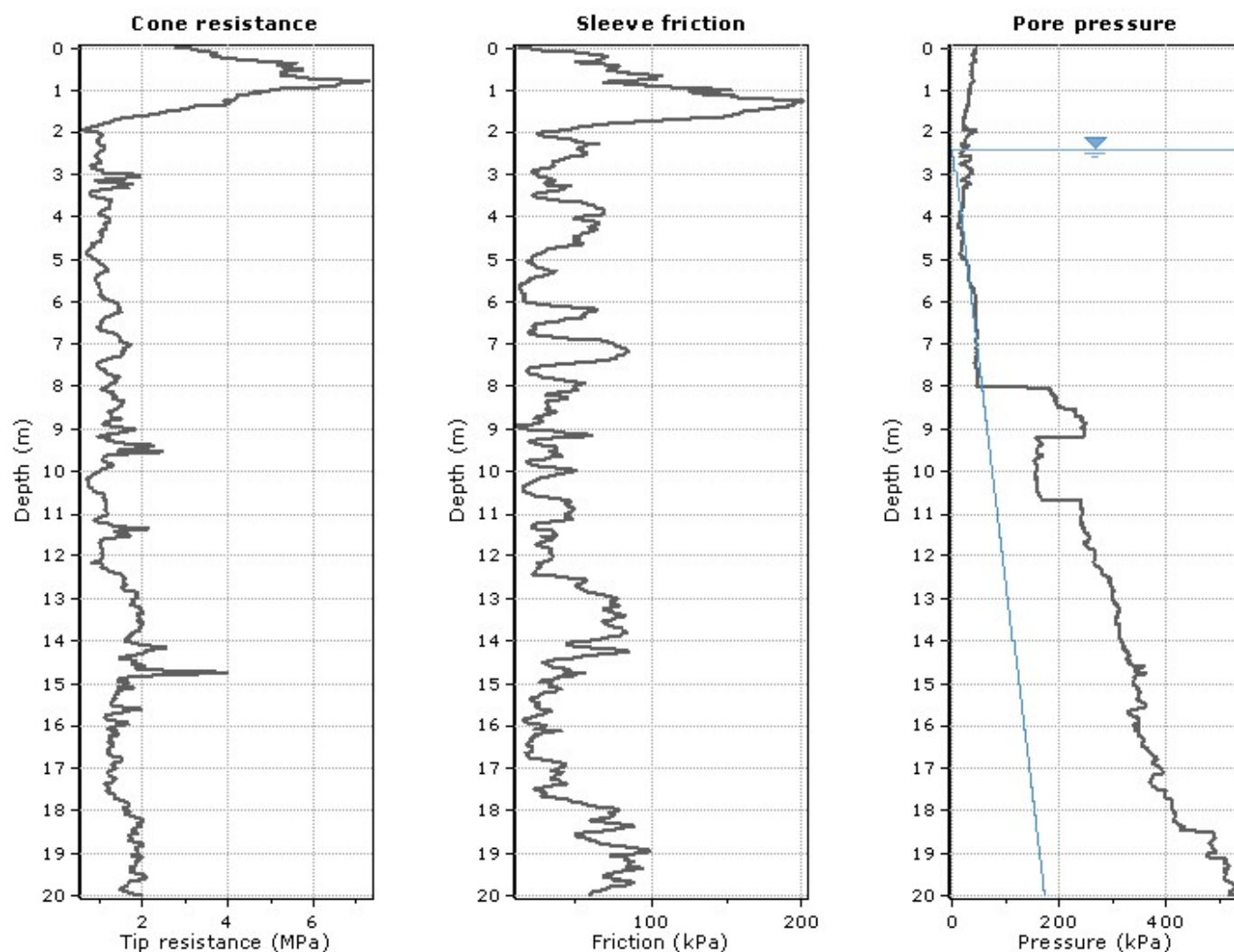
- |                           |                              |                                   |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravelly sand to sand          |
| 2. Organic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



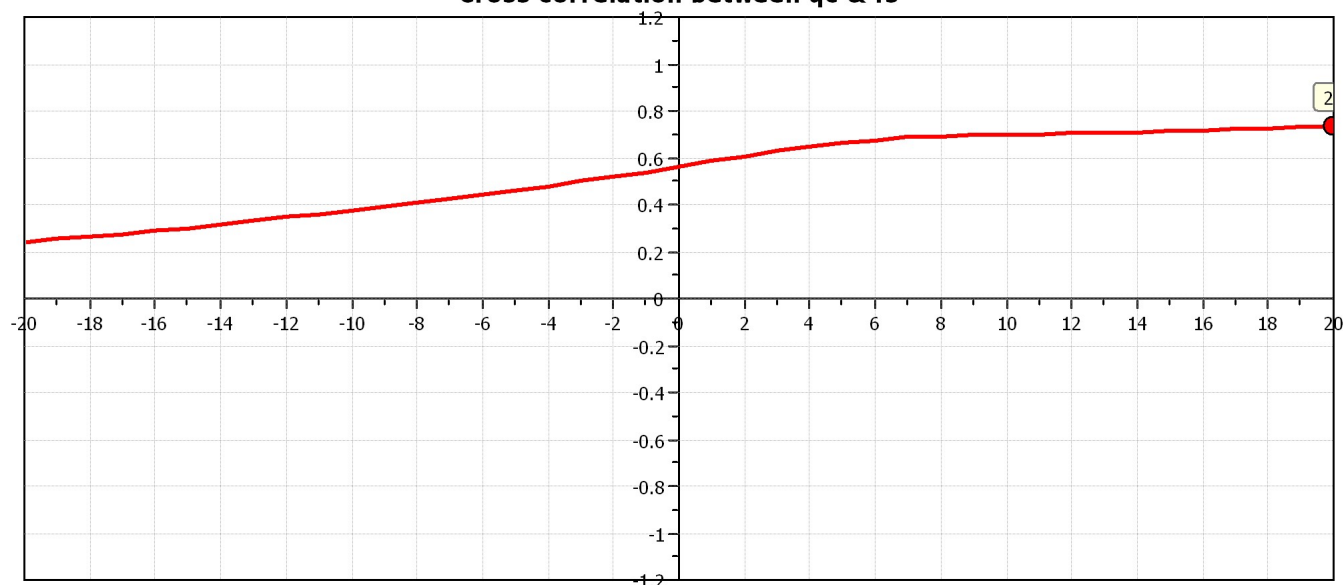
Project:

Location:

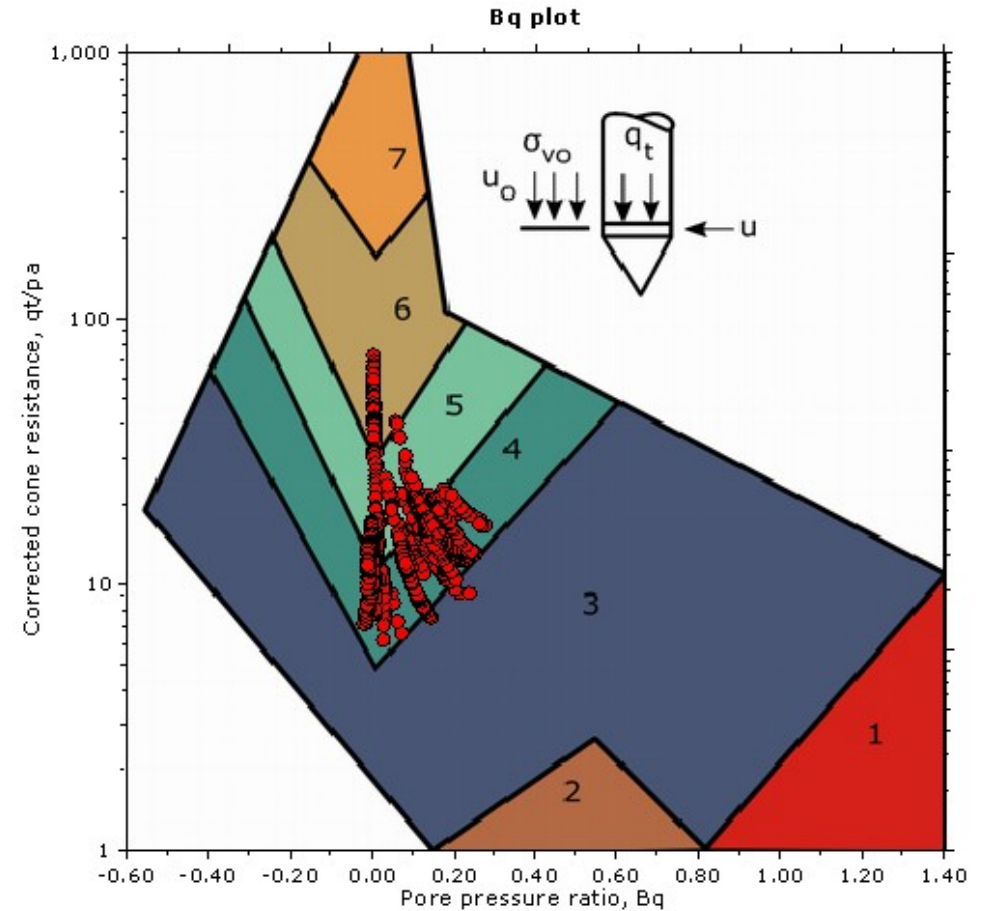
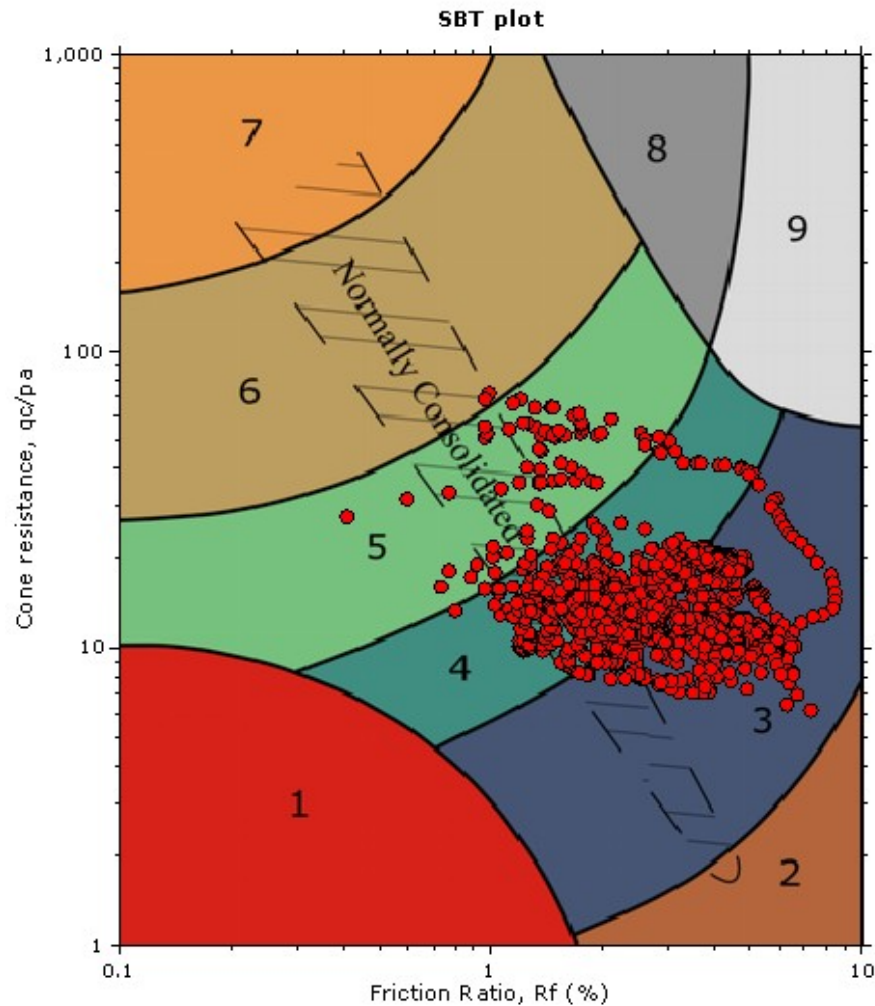


**Project:****Location:**

The plot below presents the cross correlation coefficient between the raw  $q_c$  and  $f_s$  values (as measured on the field). X axes presents the lag distance (one lag is the distance between two successive CPT measurements).

**Cross correlation between  $q_c$  &  $f_s$** 

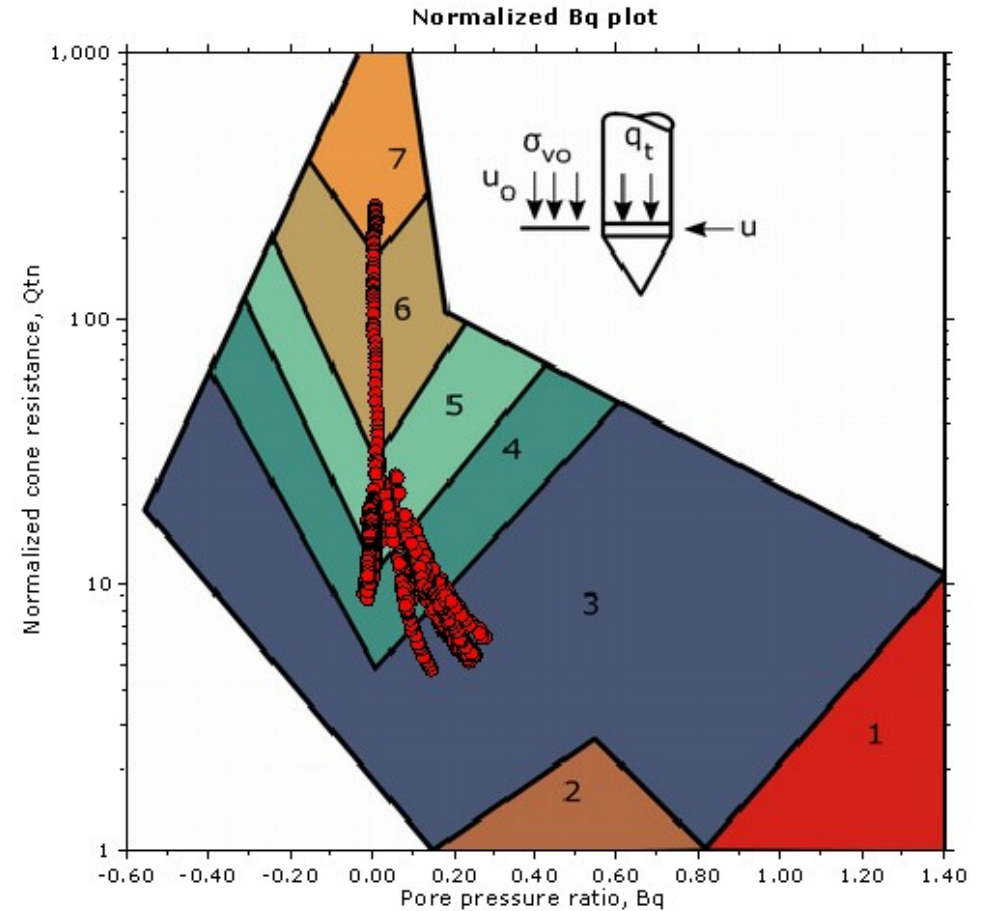
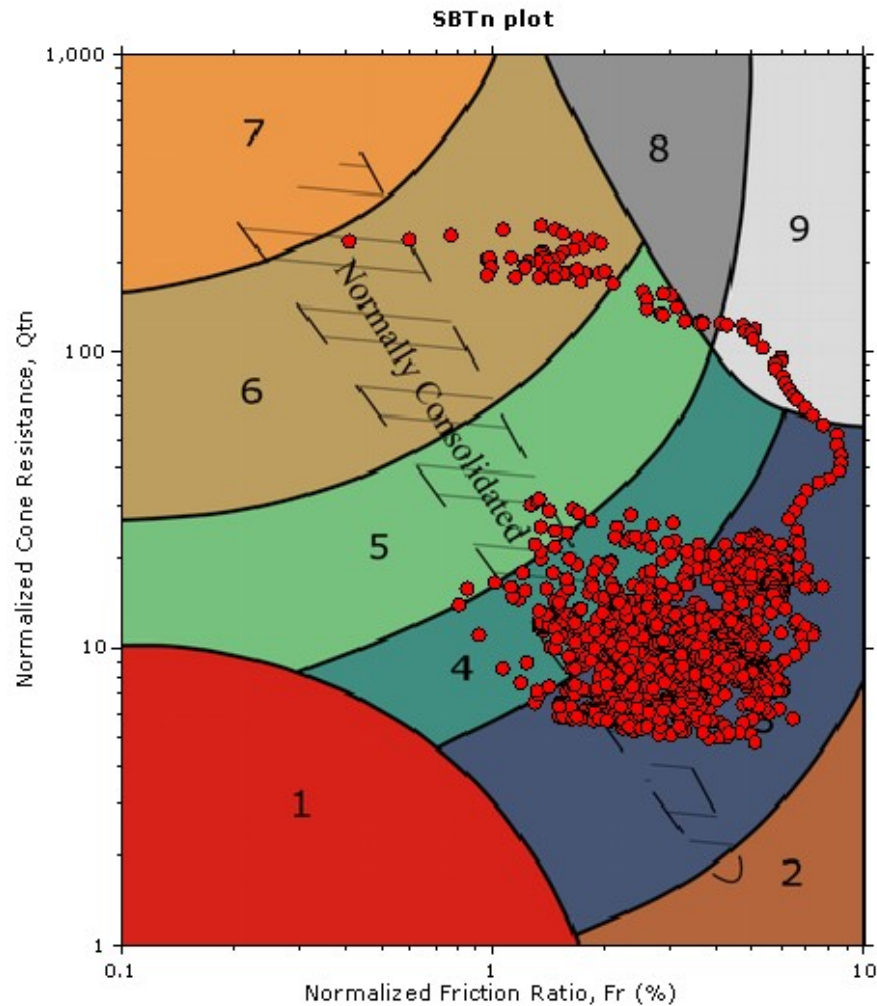
## SBT - Bq plots



## SBT legend

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

**SBT - Bq plots (normalized)**



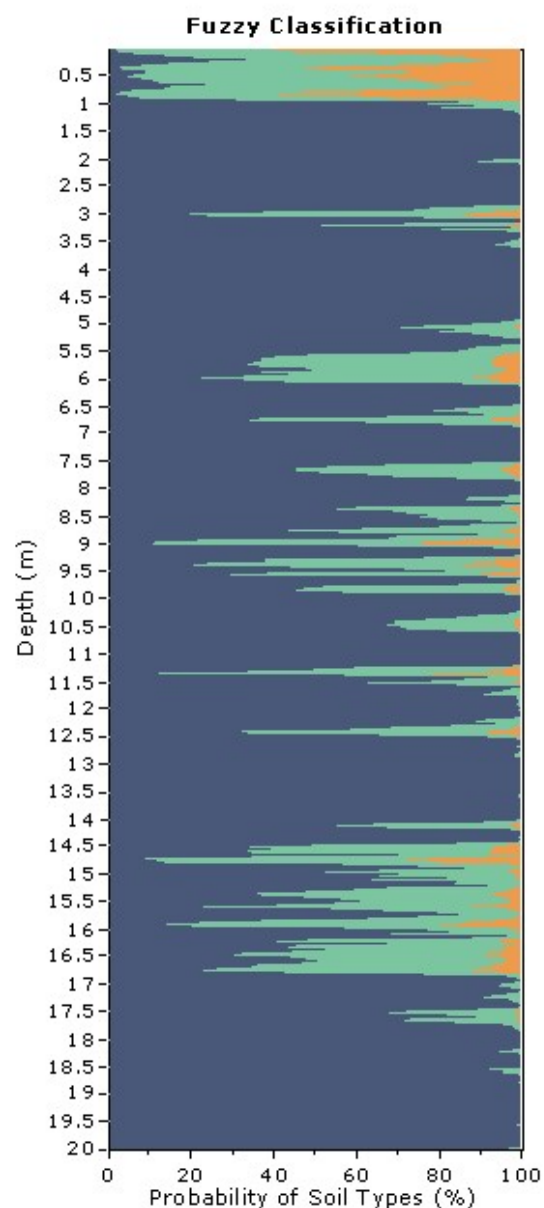
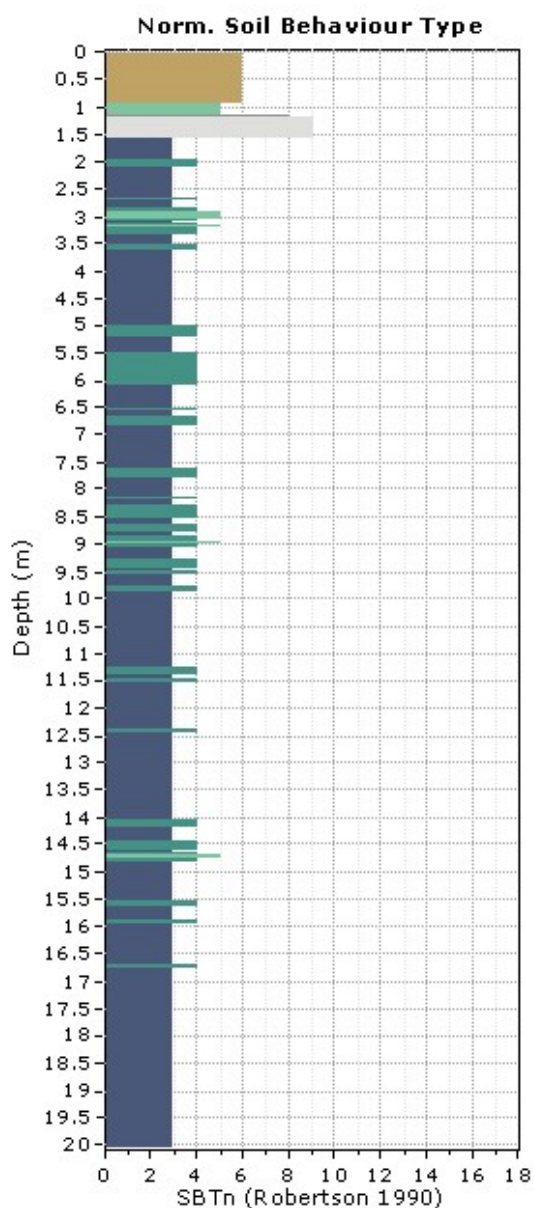
**SBTn legend**

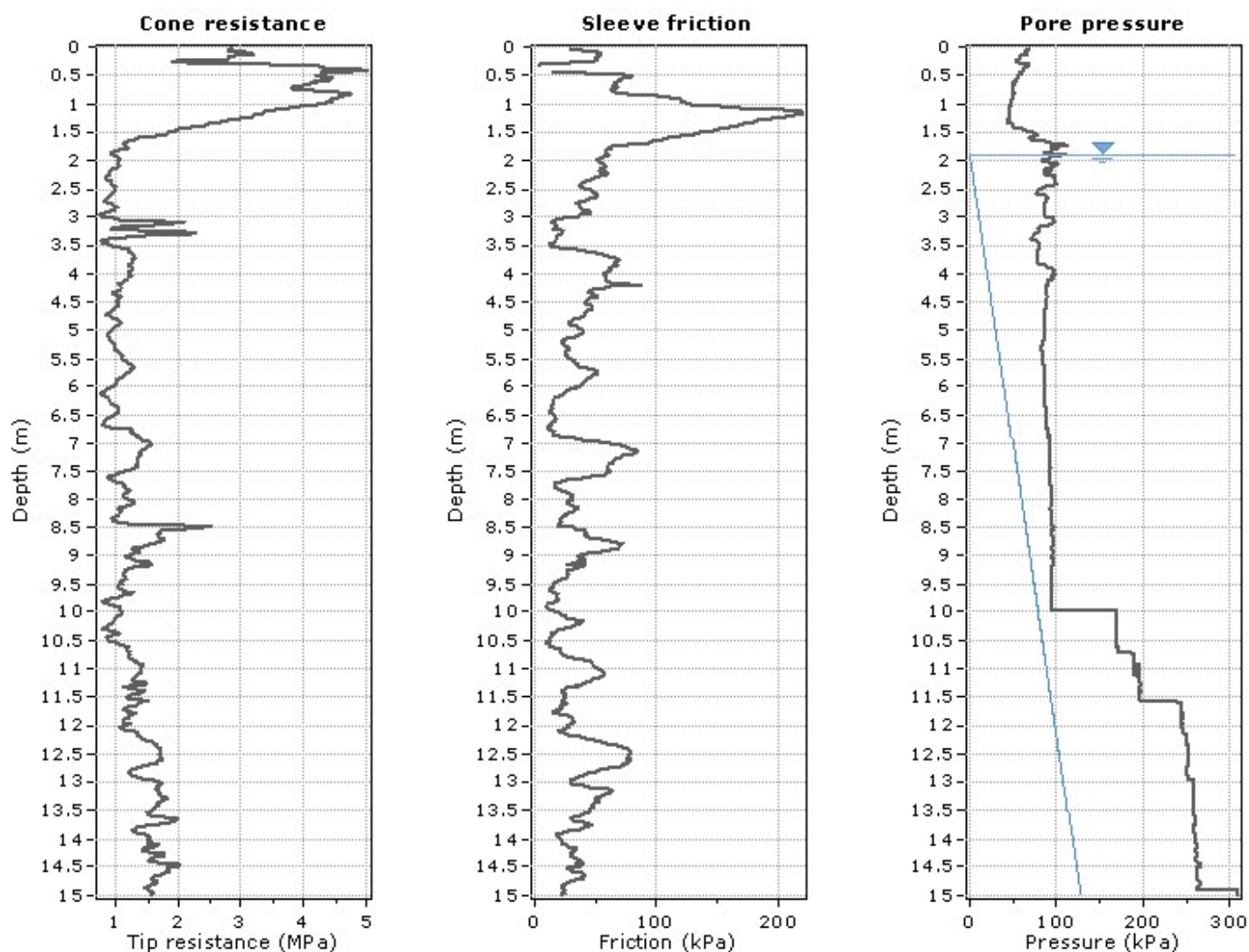
- |                           |                              |                                   |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravelly sand to sand          |
| 2. Organic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



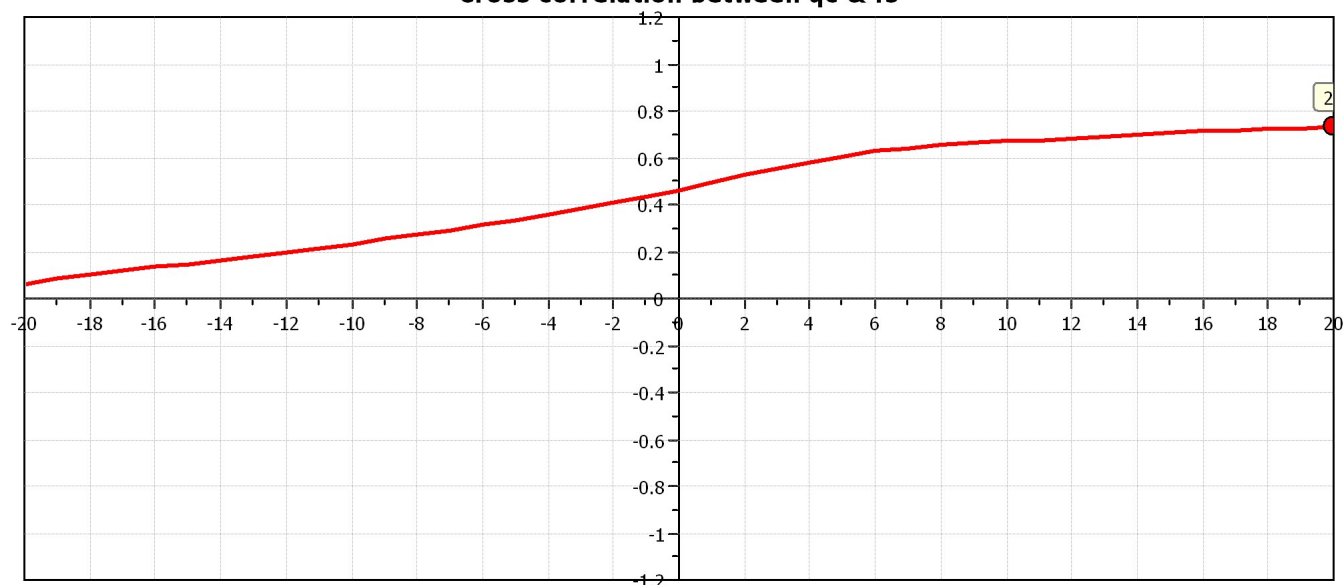
Project:

Location:

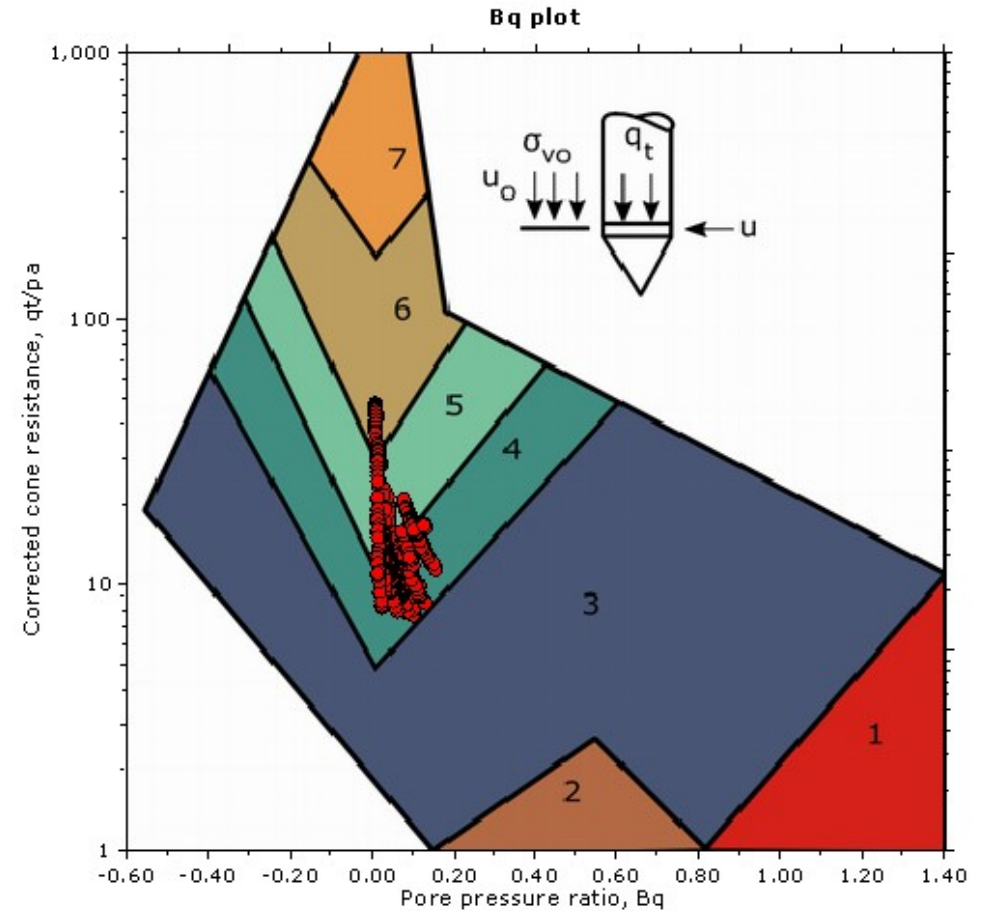
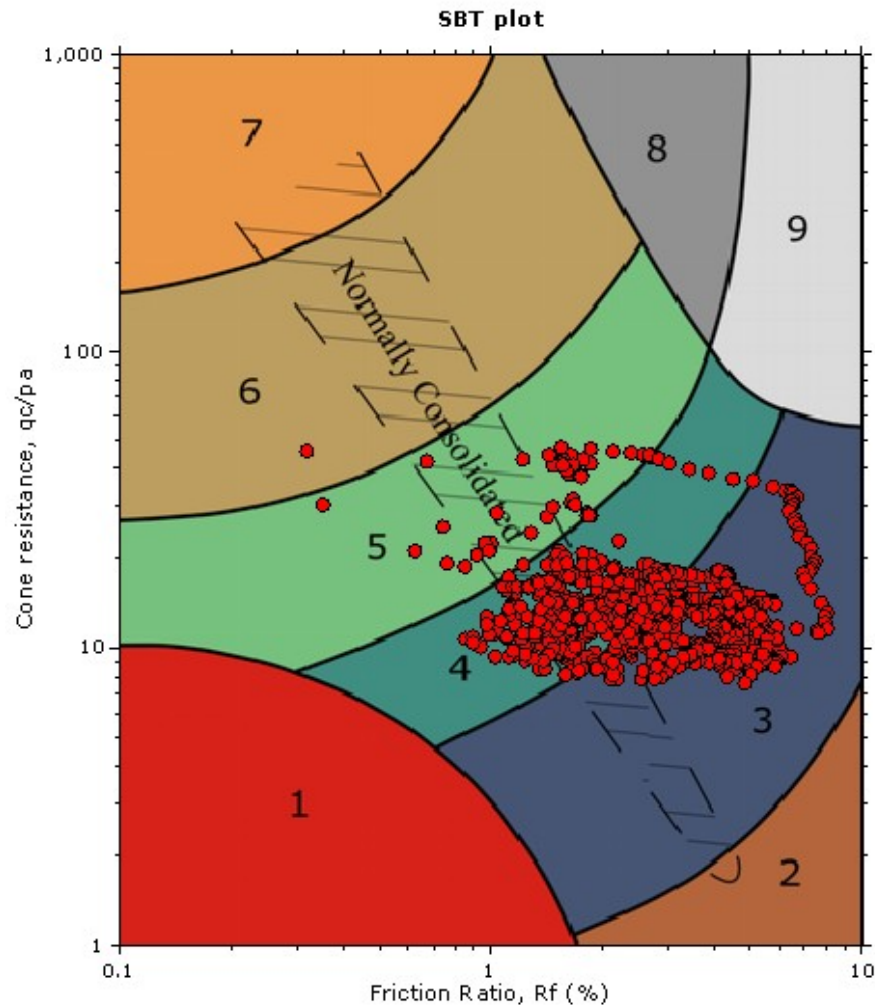


**Project:****Location:**

The plot below presents the cross correlation coefficient between the raw  $q_c$  and  $f_s$  values (as measured on the field). X axes presents the lag distance (one lag is the distance between two successive CPT measurements).

**Cross correlation between  $q_c$  &  $f_s$** 

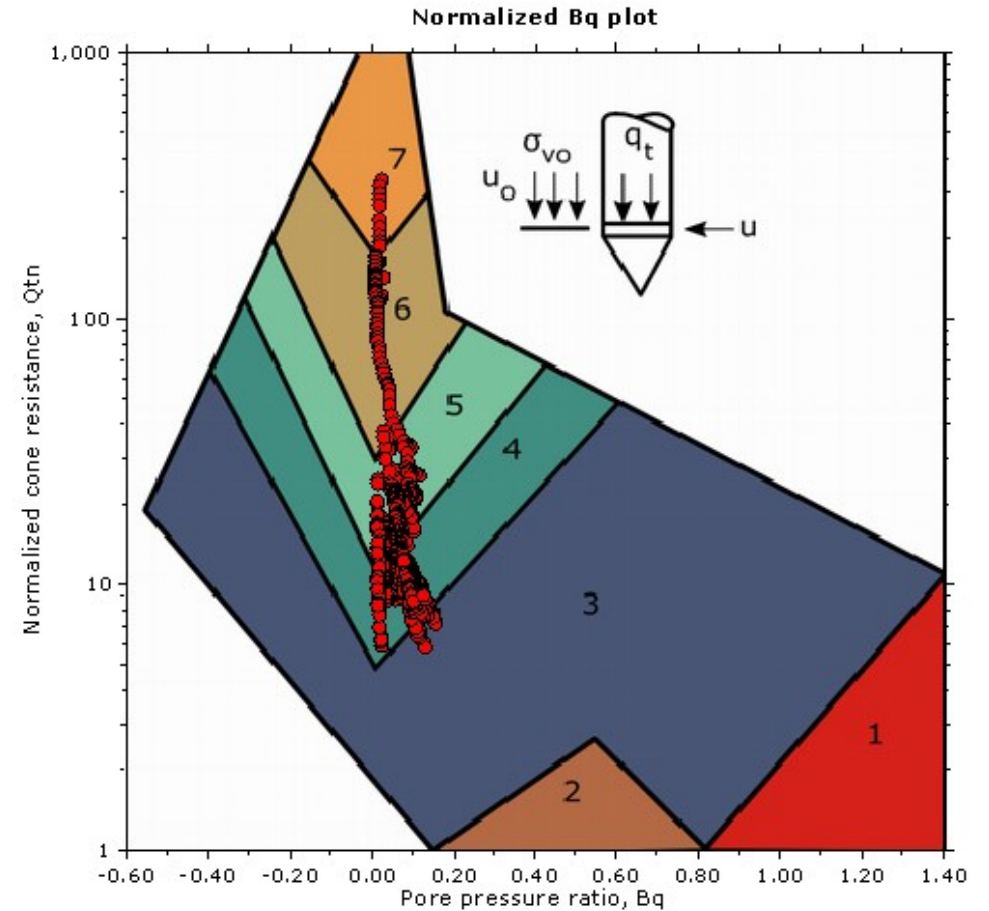
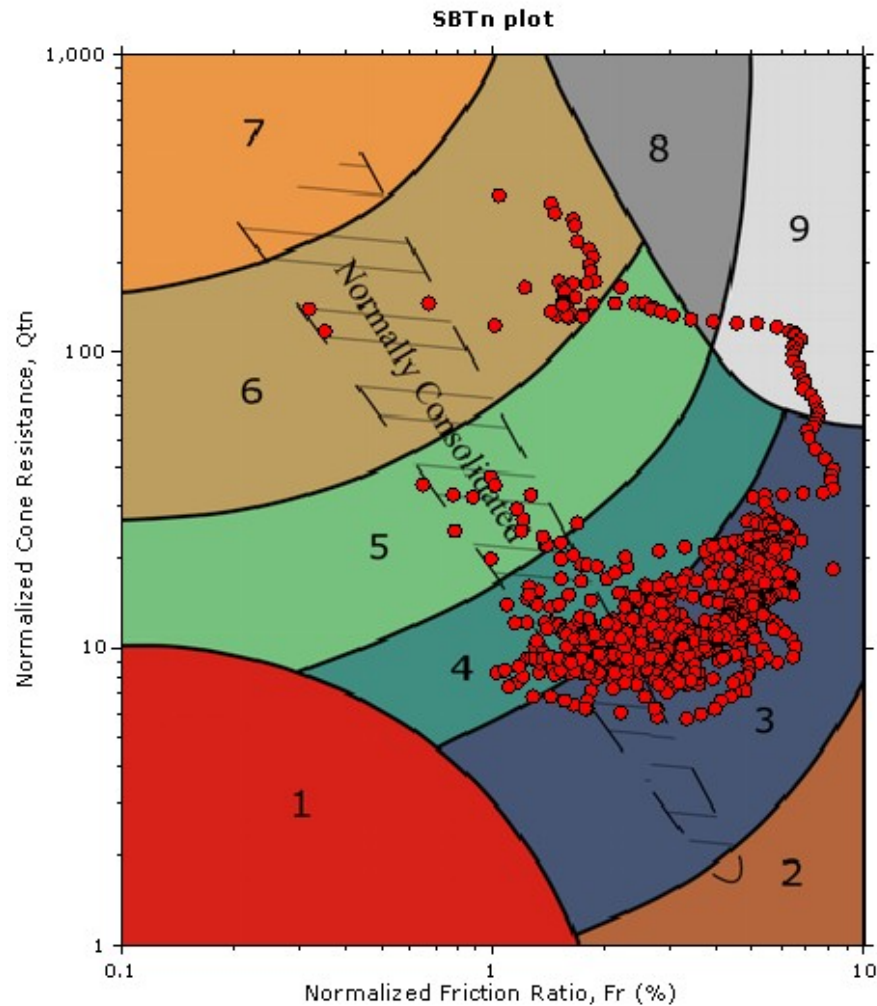
## SBT - Bq plots



## SBT legend

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

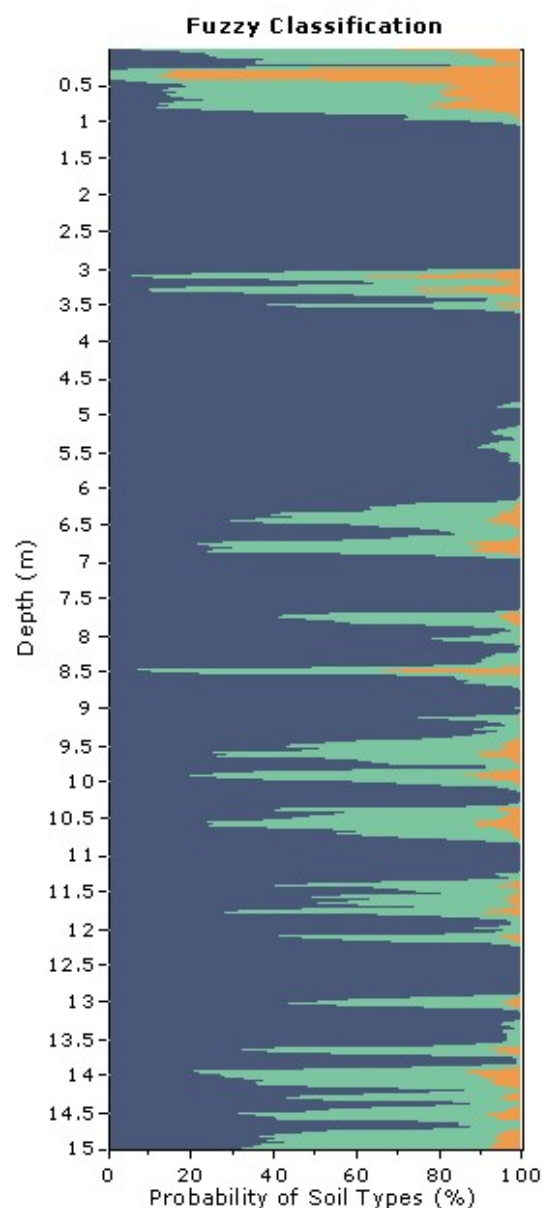
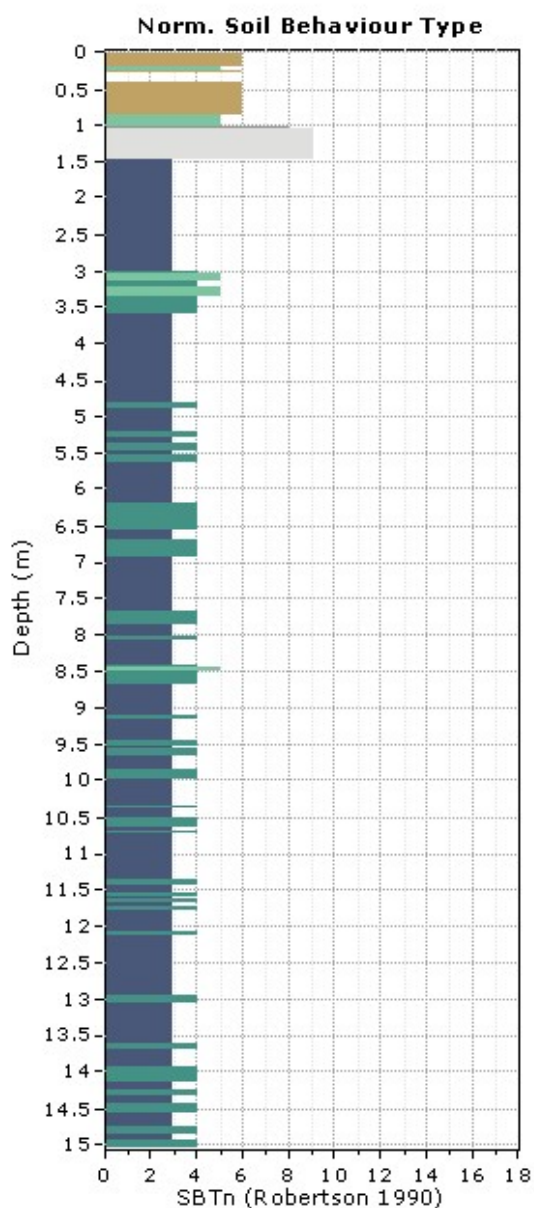
**SBT - Bq plots (normalized)**



**SBTn legend**

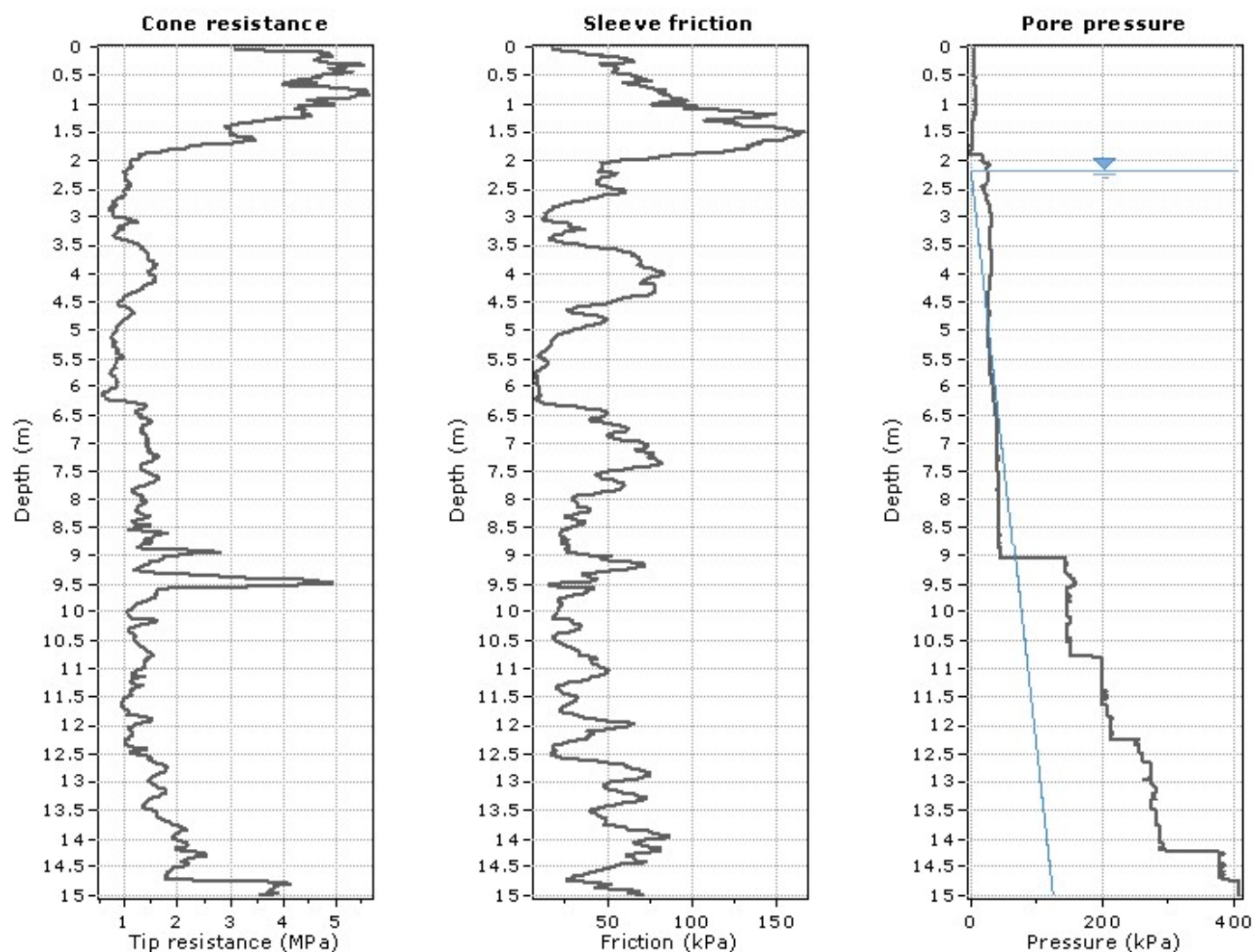
- |                           |                              |                                   |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravelly sand to sand          |
| 2. Organic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



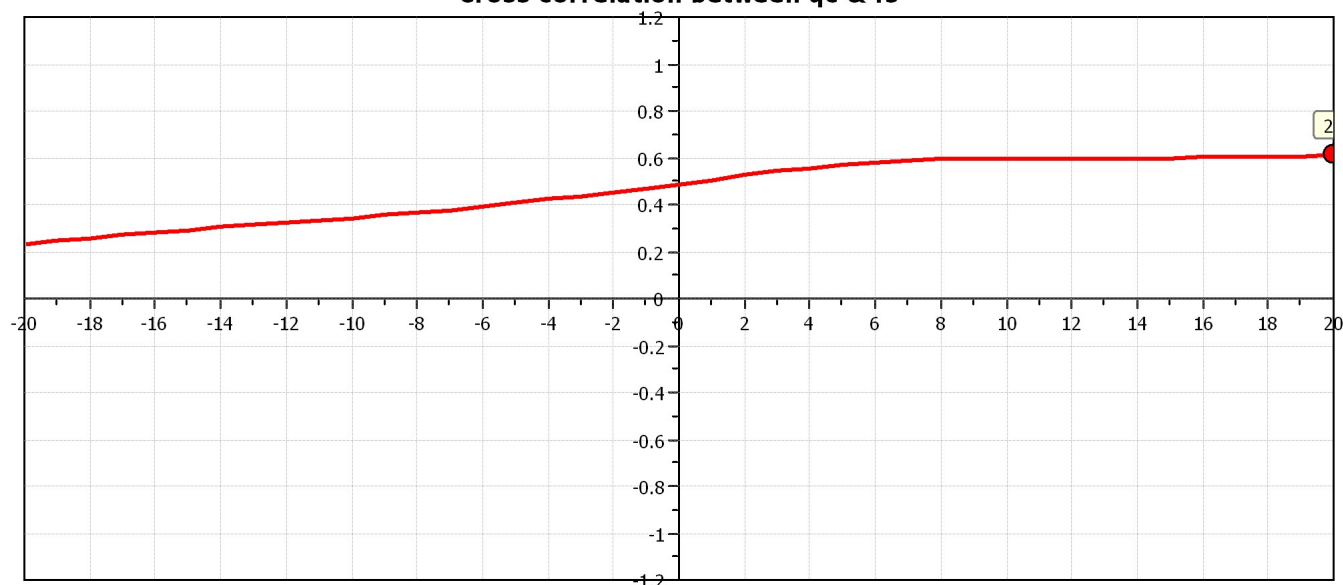


Project:

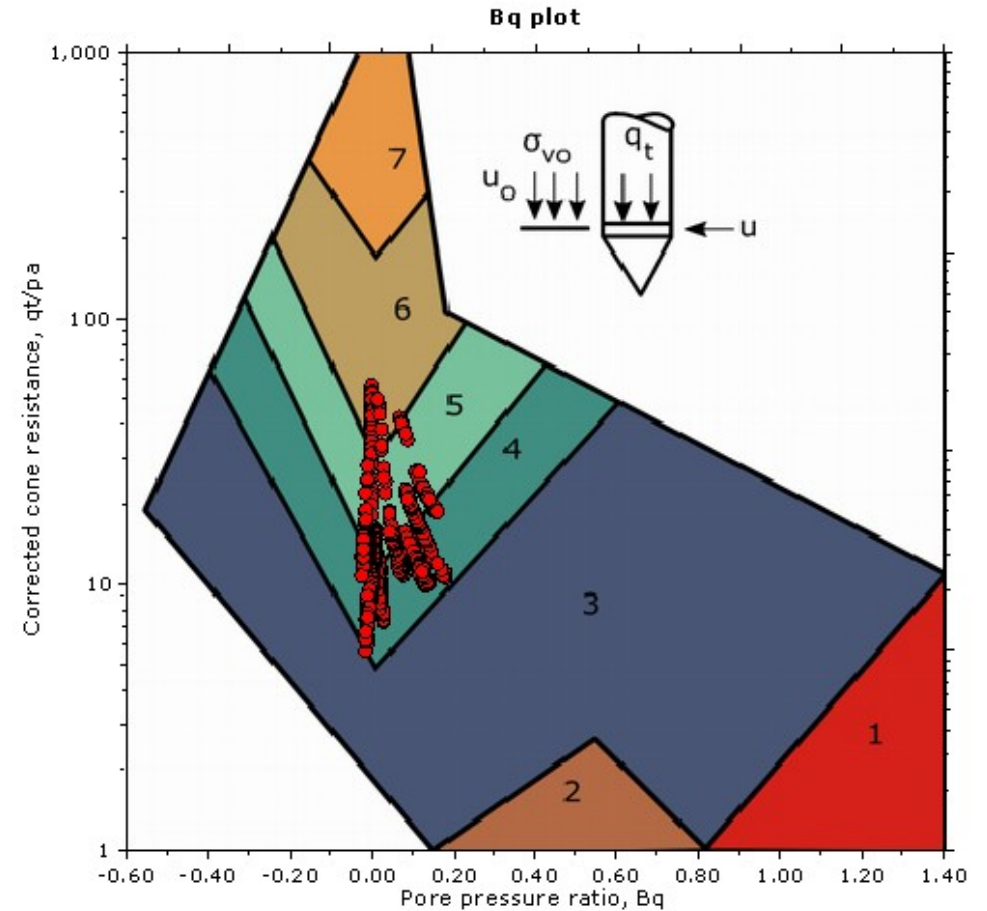
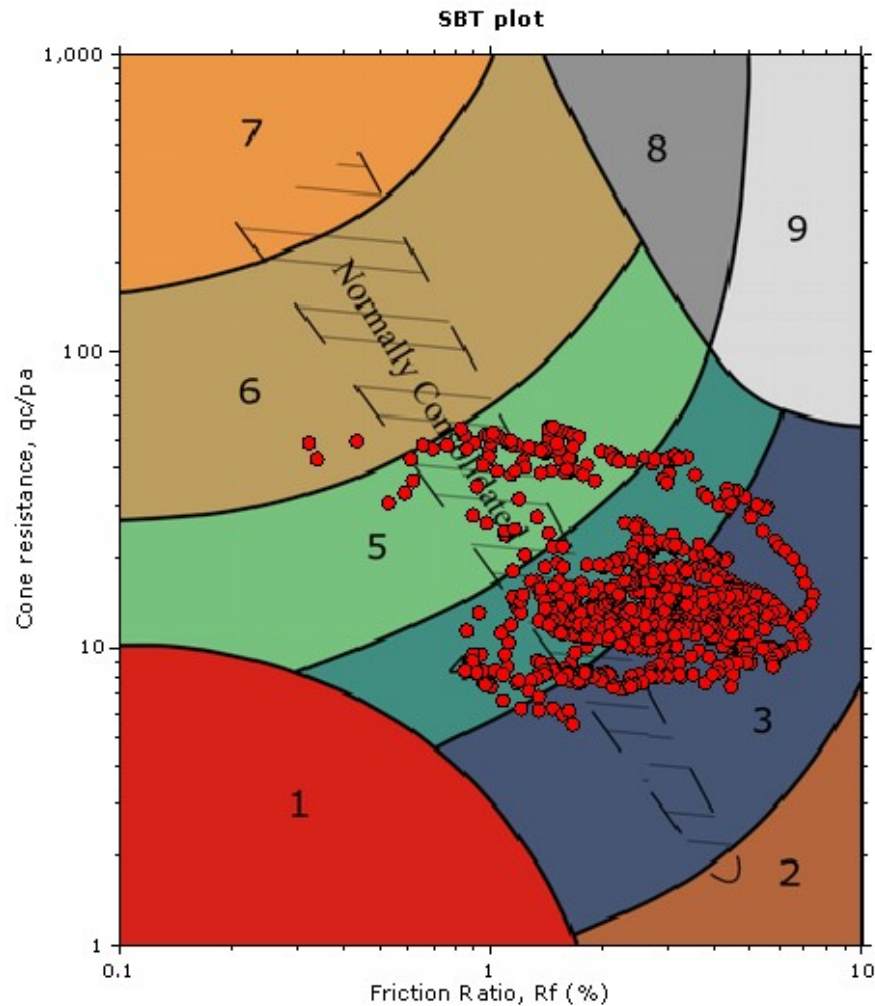
Location:



The plot below presents the cross correlation coefficient between the raw  $q_c$  and  $f_s$  values (as measured on the field). X axes presents the lag distance (one lag is the distance between two successive CPT measurements).

Cross correlation between  $q_c$  &  $f_s$ 

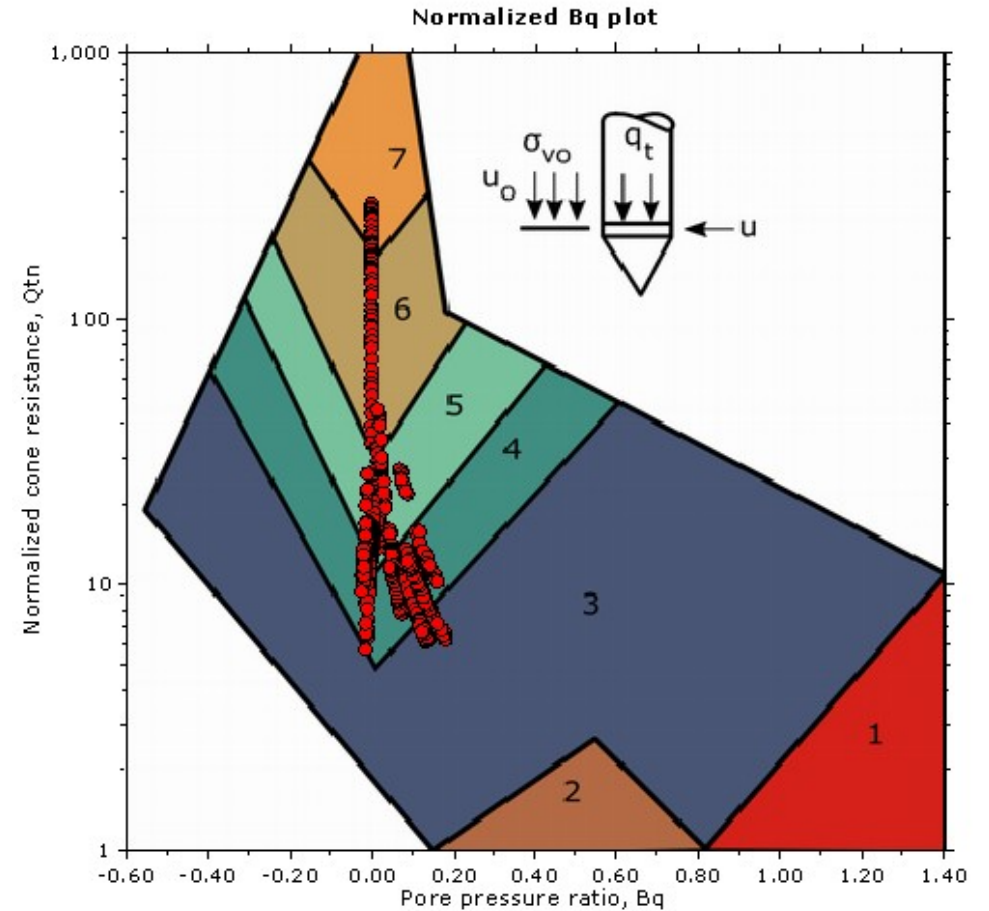
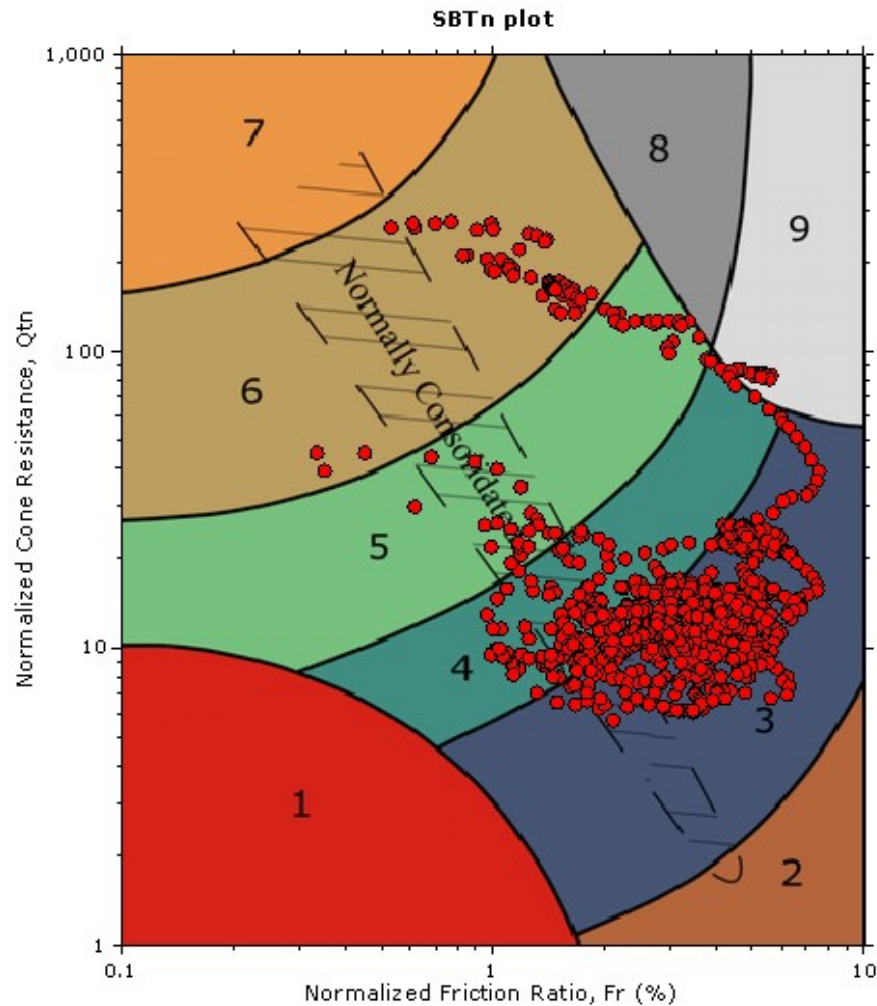
## SBT - Bq plots



## SBT legend

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

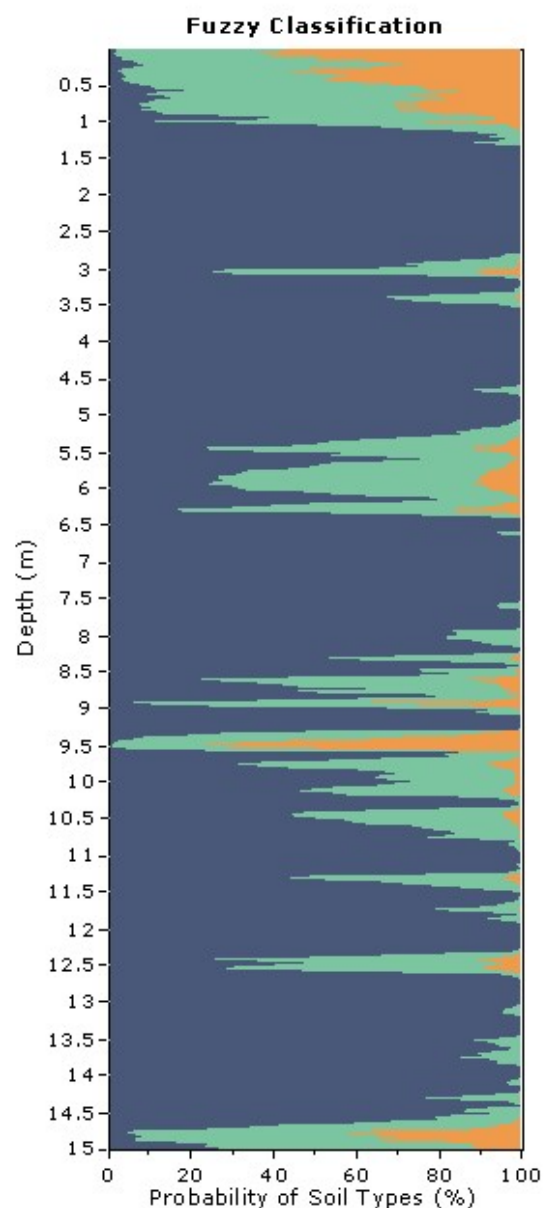
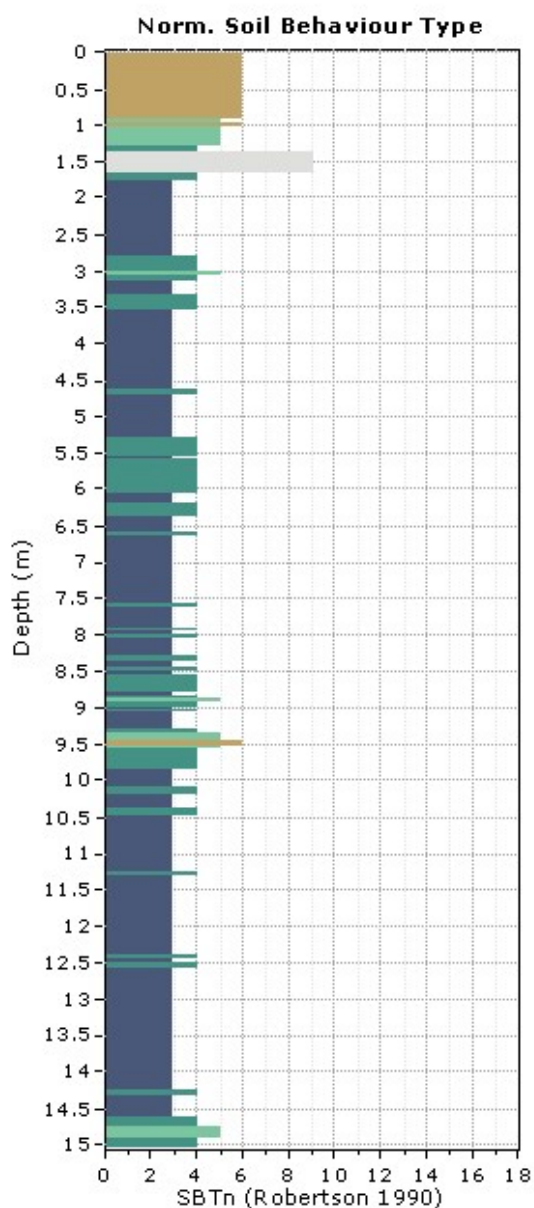
## SBT - Bq plots (normalized)



### SBTn legend

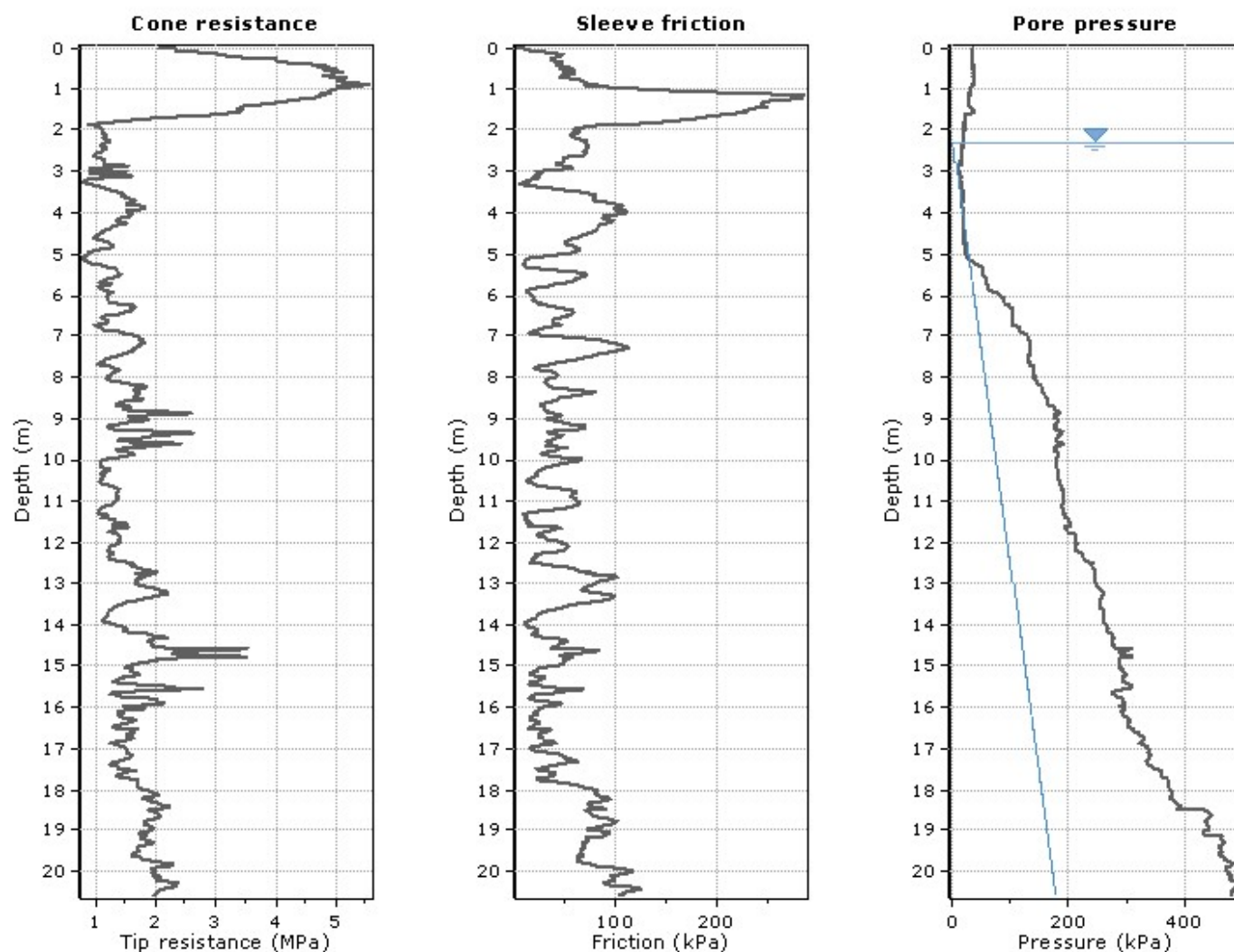
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|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravelly sand to sand          |
| 2. Organic material       | 5. Silty sand to sandy silt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



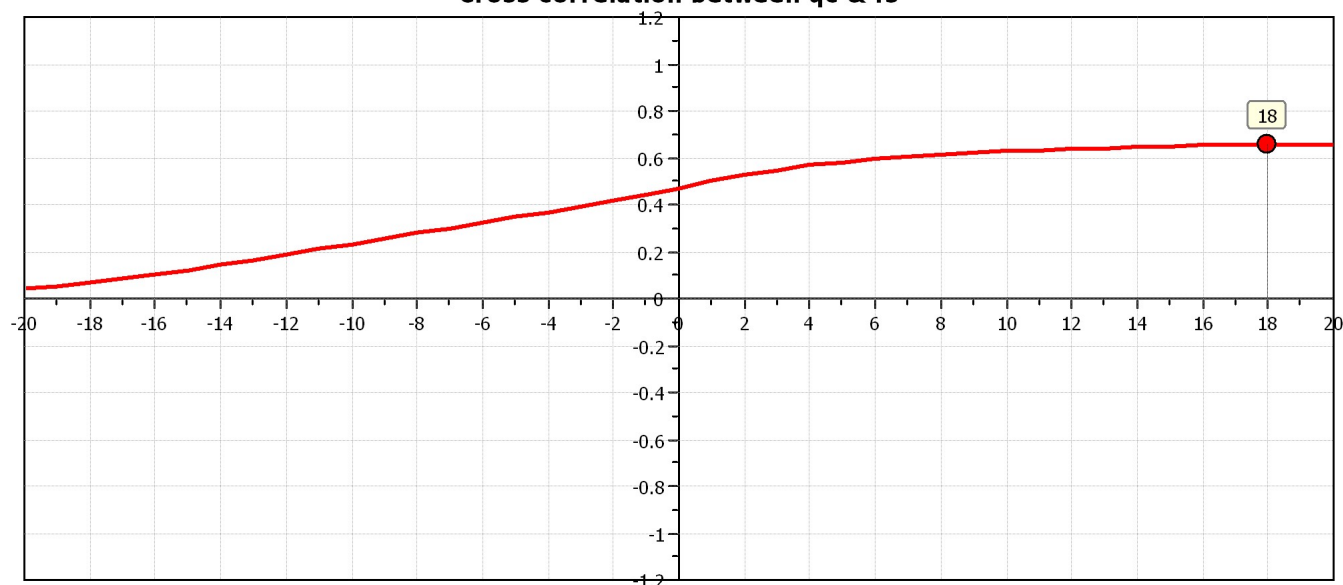


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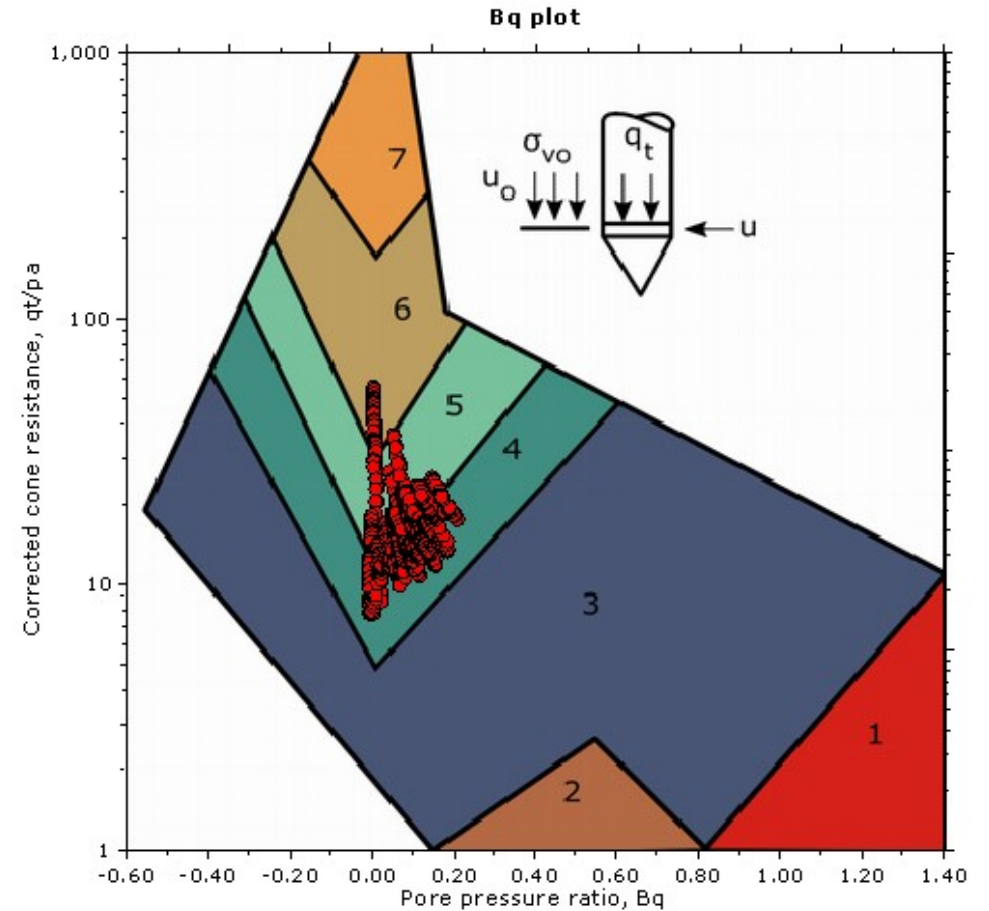
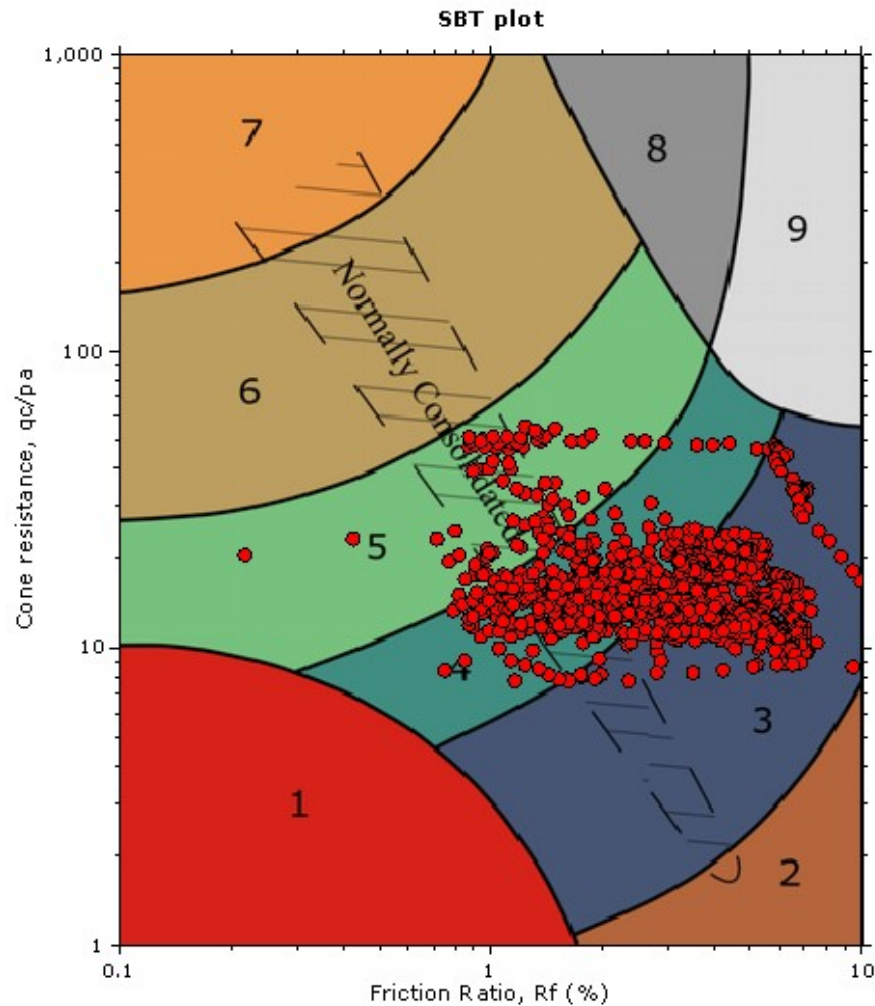
Location:



The plot below presents the cross correlation coefficient between the raw  $q_c$  and  $f_s$  values (as measured on the field). X axes presents the lag distance (one lag is the distance between two successive CPT measurements).

Cross correlation between  $q_c$  &  $f_s$ 

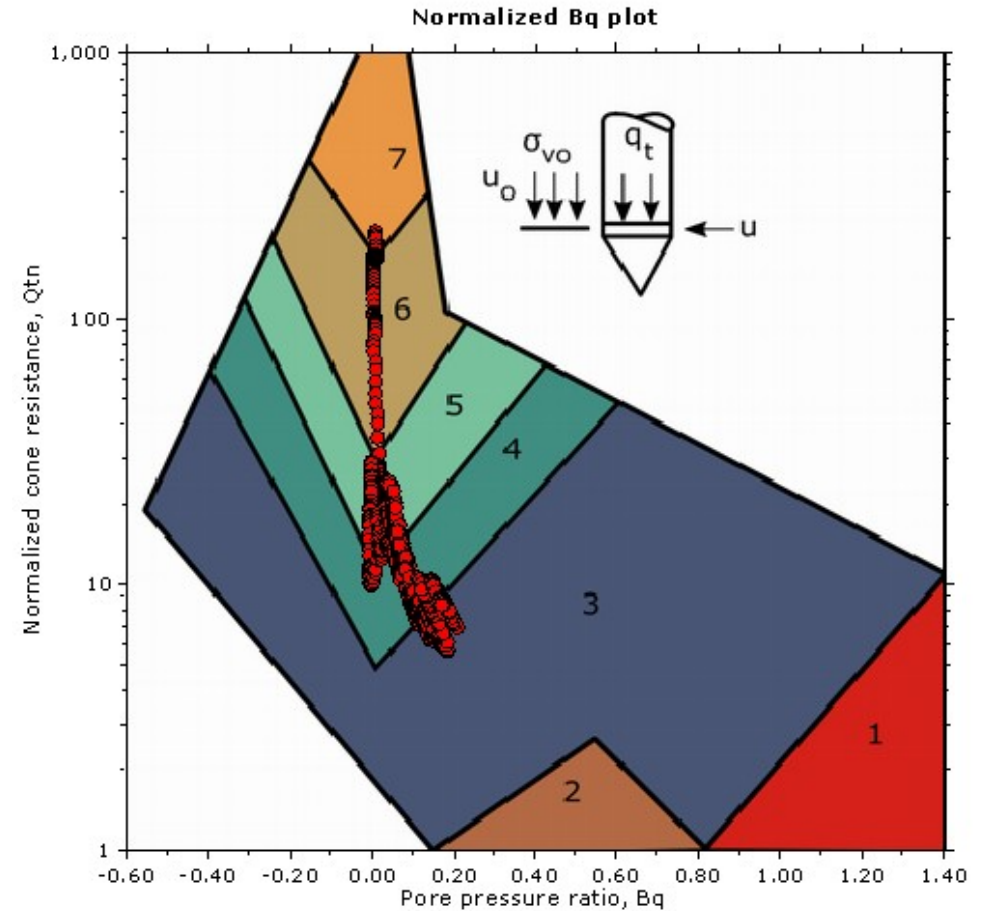
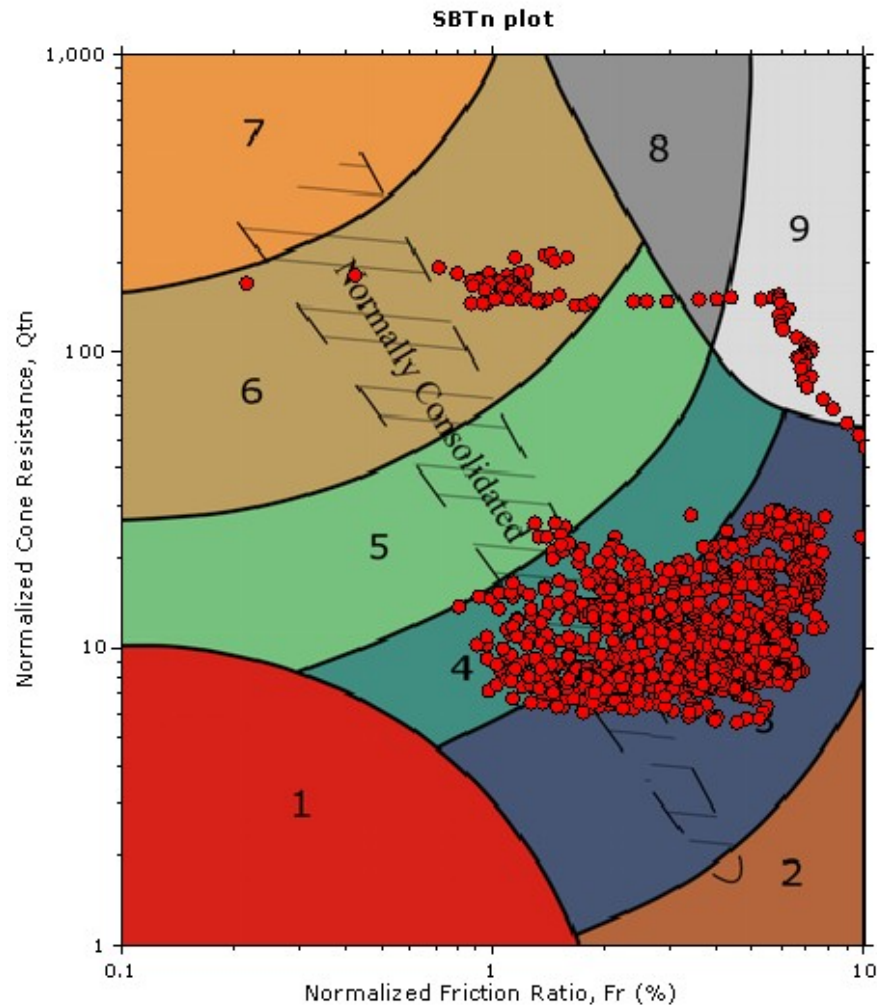
## SBT - Bq plots



## SBT legend

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

### SBT - Bq plots (normalized)



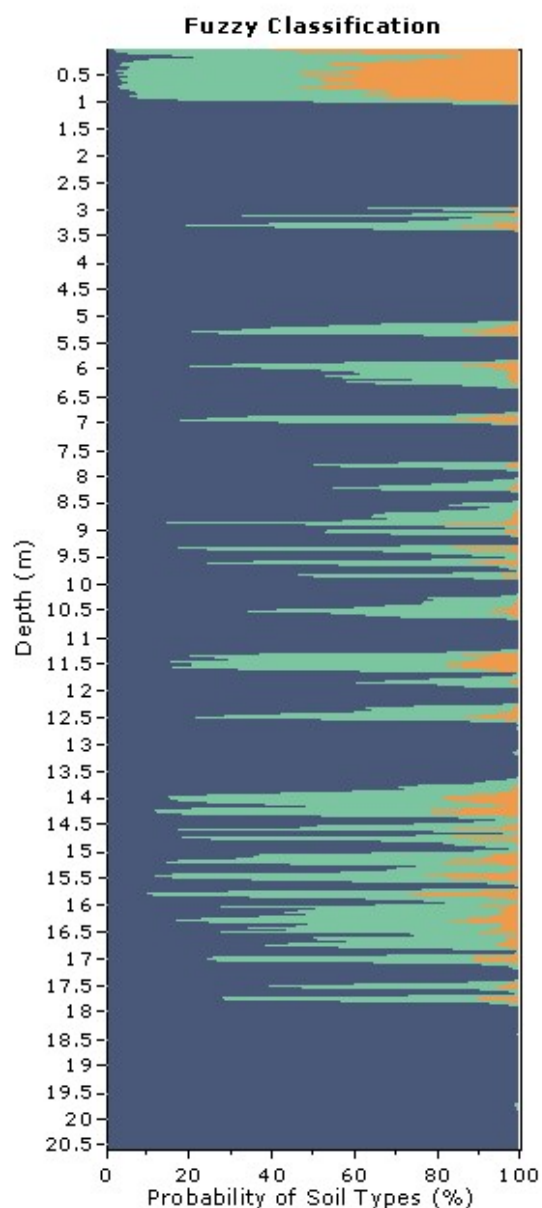
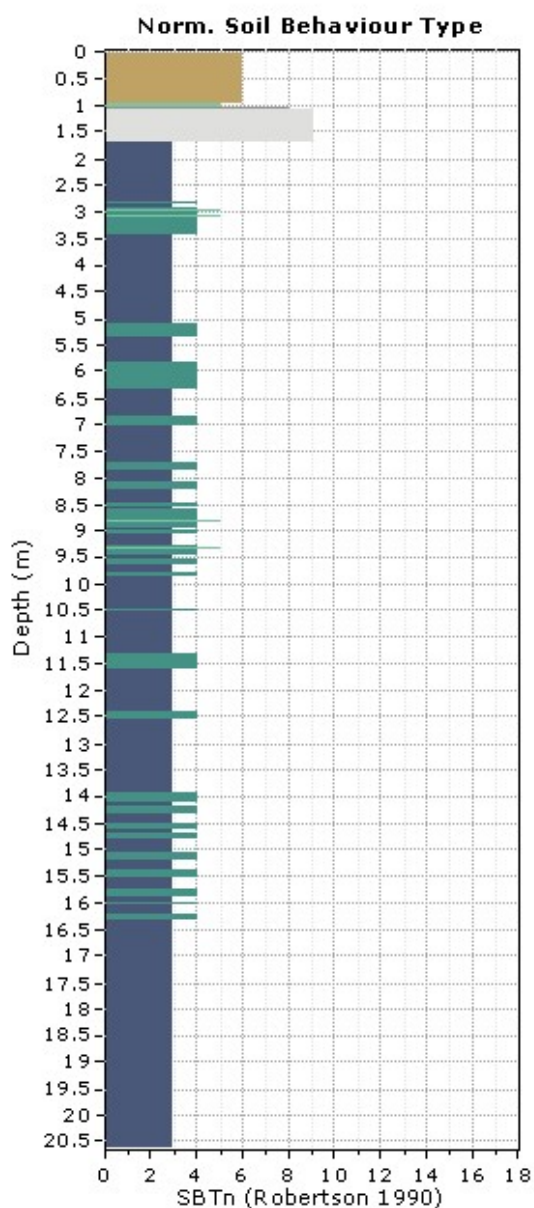
#### SBTn legend

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



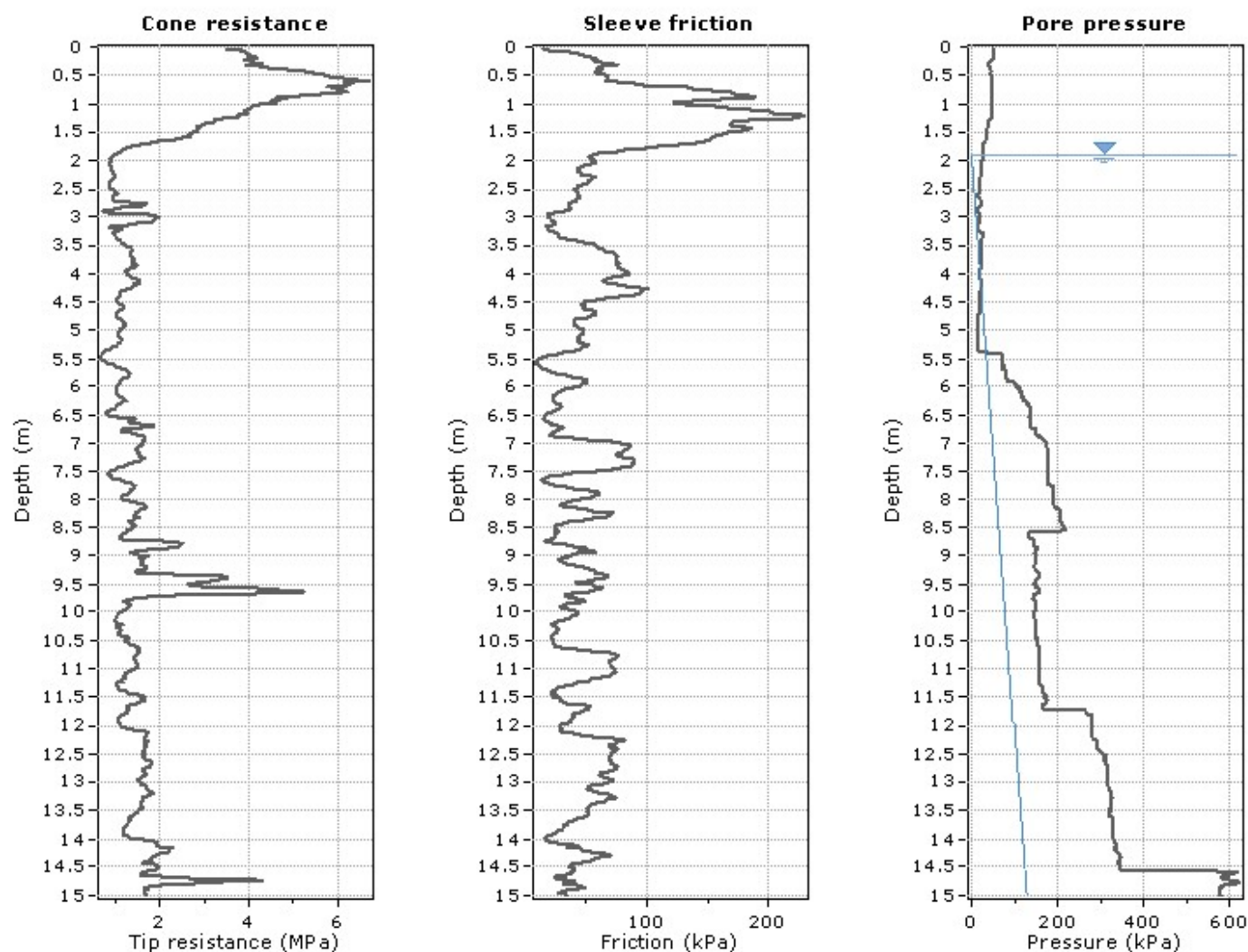
**Project:**

**Location:**

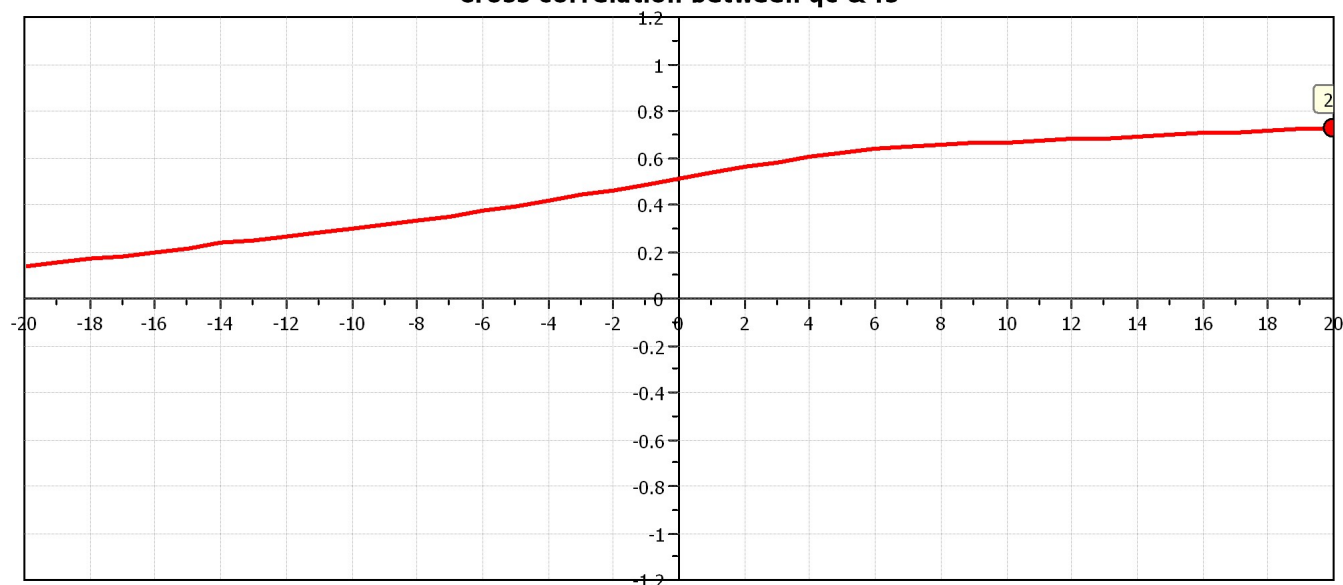


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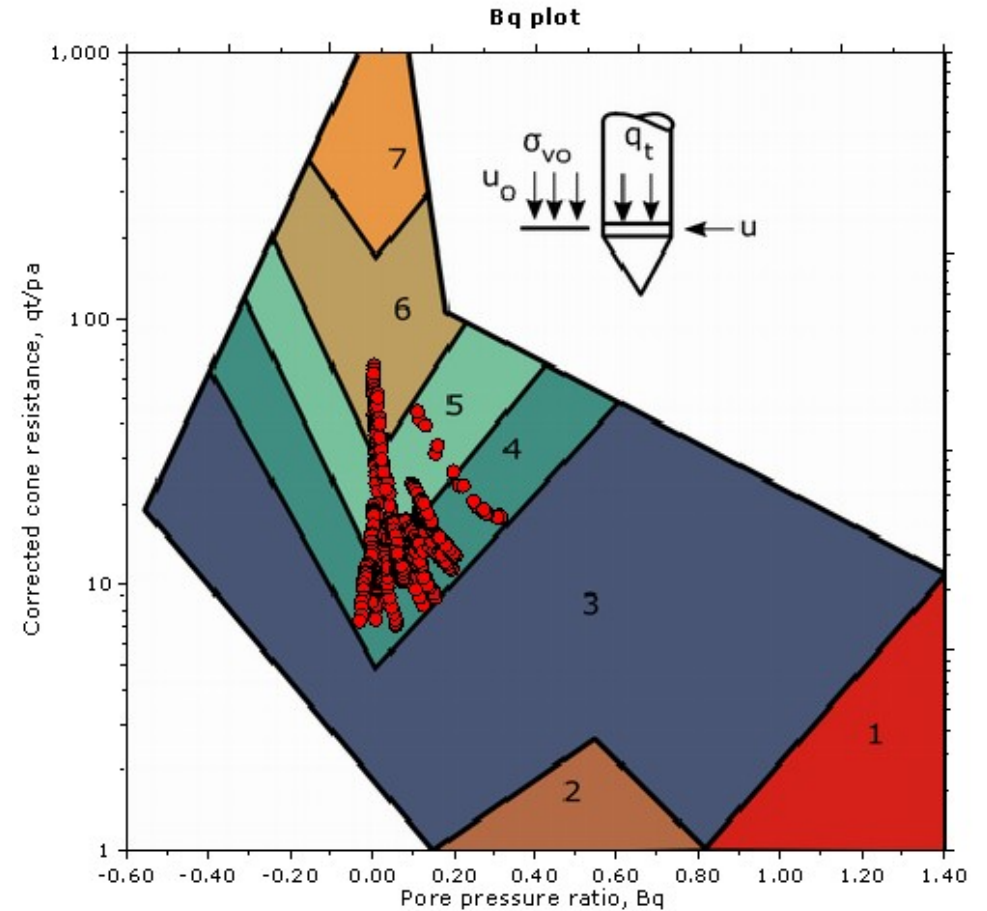
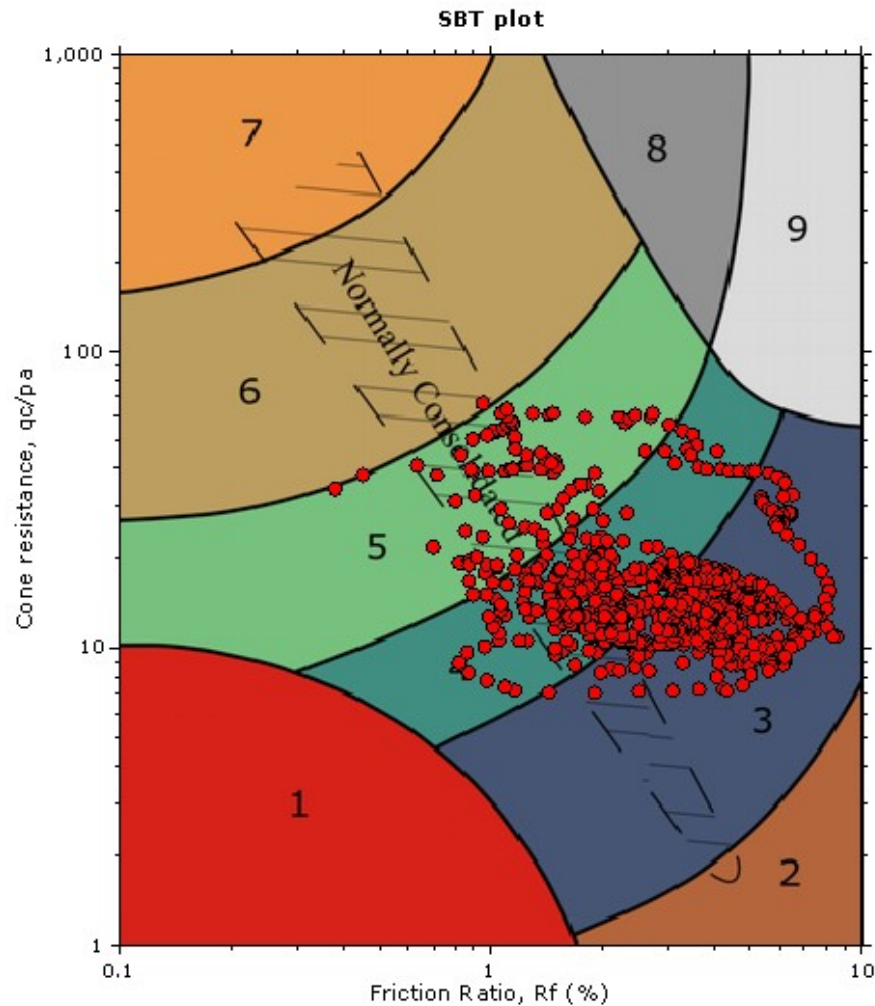
Location:



The plot below presents the cross correlation coefficient between the raw  $q_c$  and  $f_s$  values (as measured on the field). X axes presents the lag distance (one lag is the distance between two successive CPT measurements).

Cross correlation between  $q_c$  &  $f_s$ 

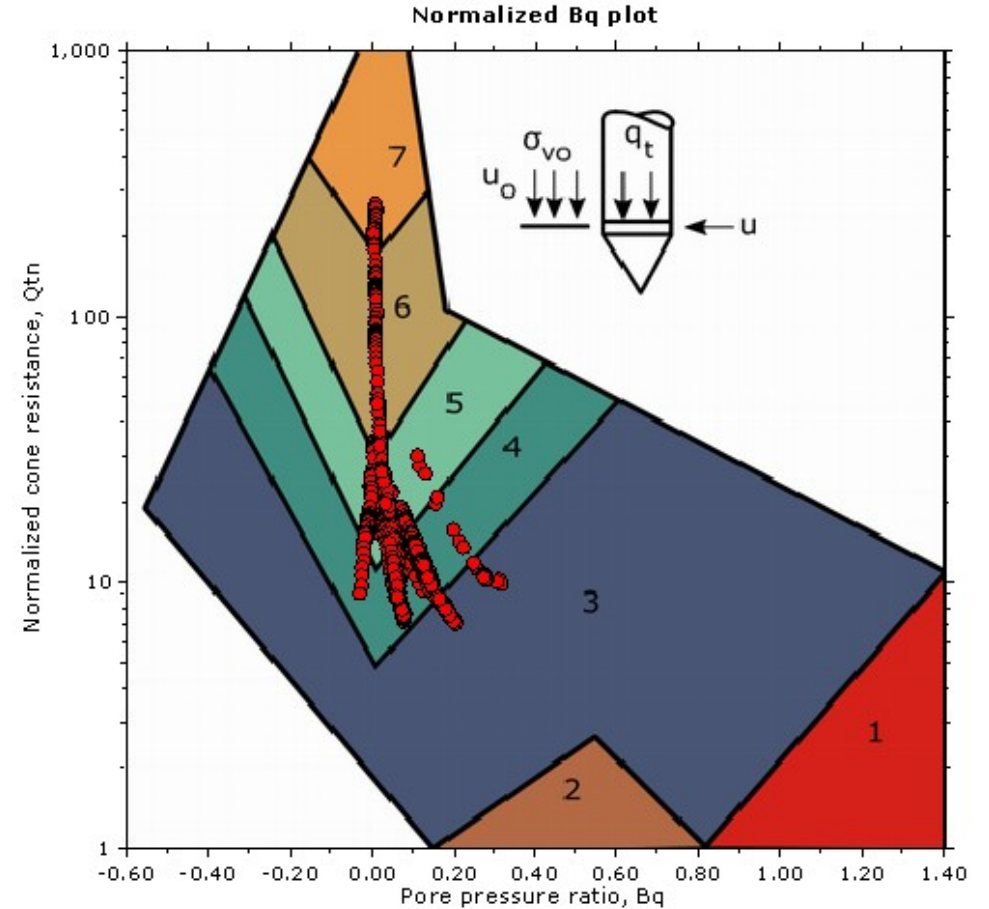
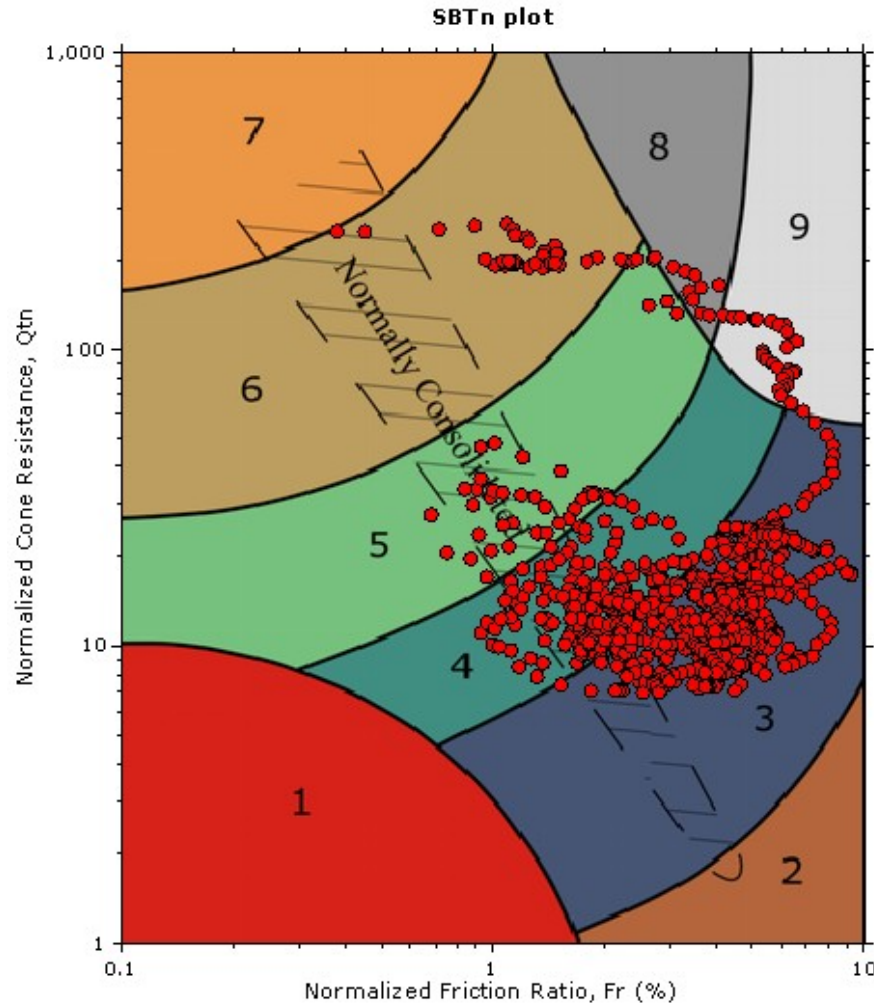
## SBT - Bq plots



## SBT legend

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

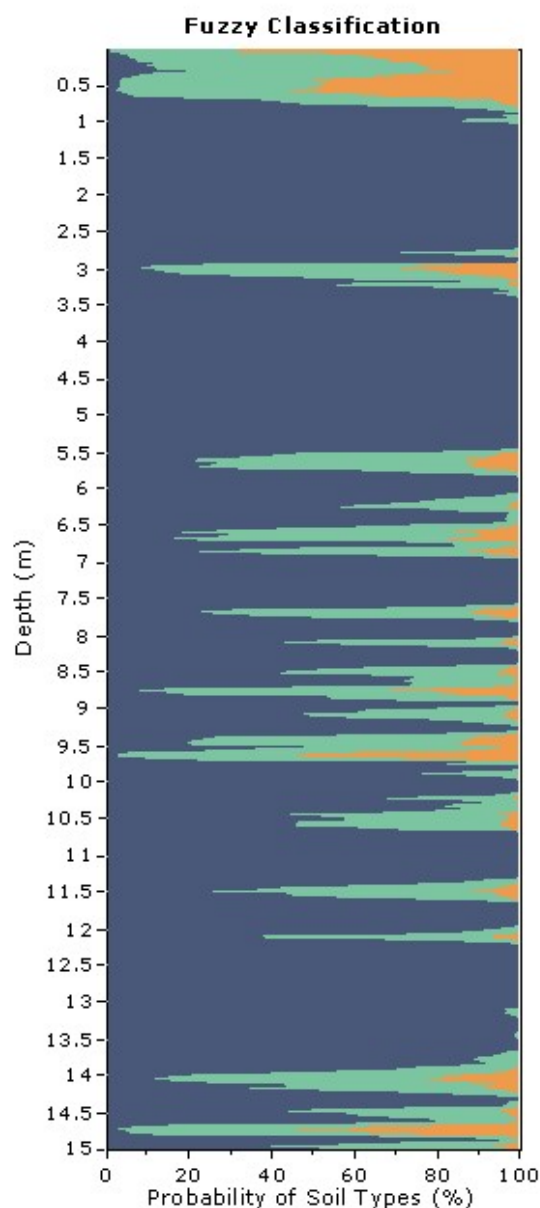
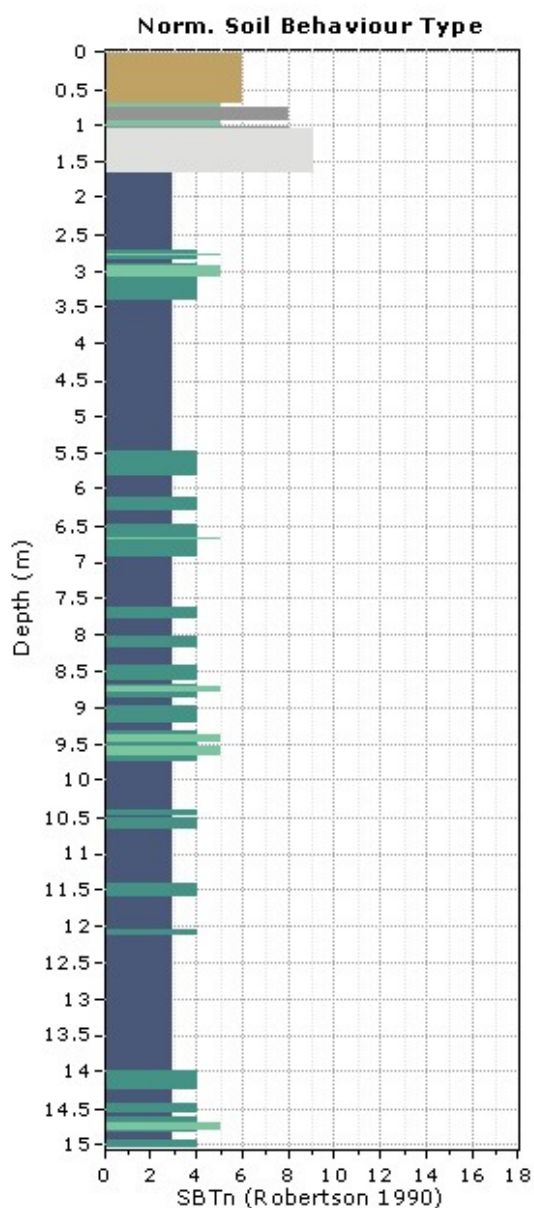
# SBT - Bq plots (normalized)



## SBTn legend

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







## 12.2 *Verifica del potenziale di liquefazione*

## LIQUEFACTION ANALYSIS REPORT

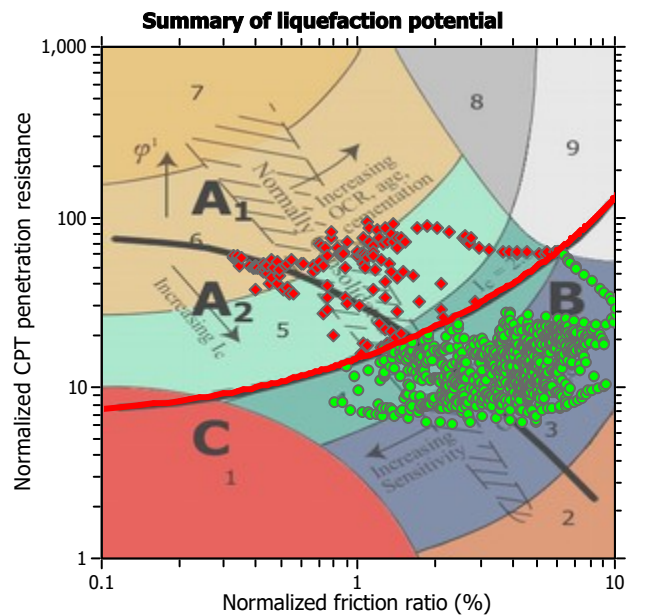
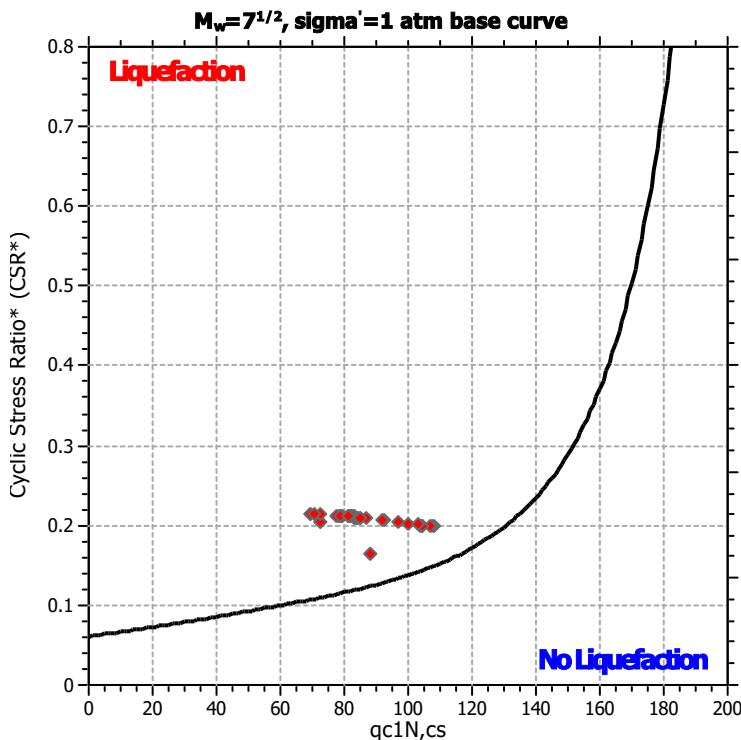
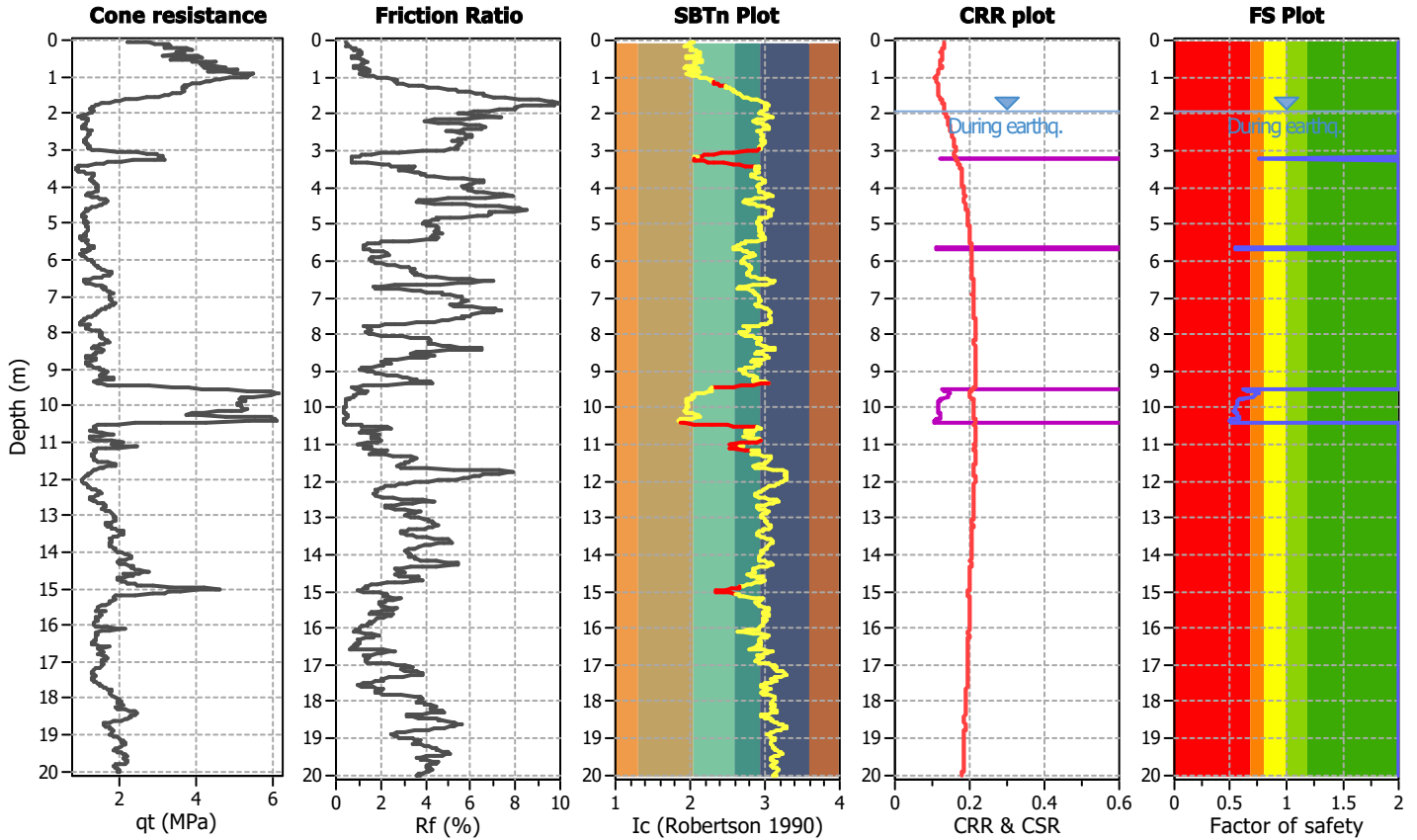
**Project title :**

**Location :**

**CPT file : cptu1**

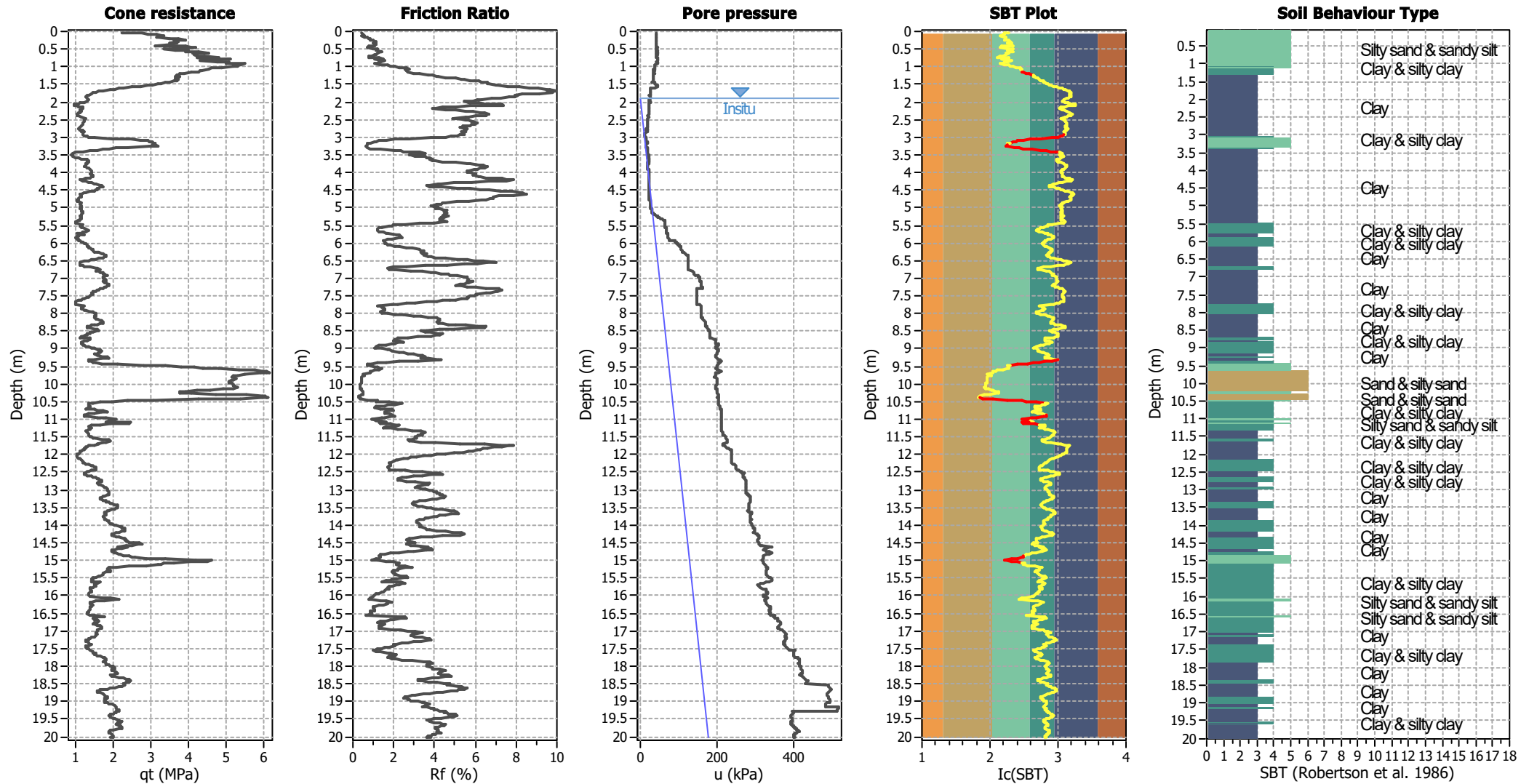
### Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.90 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.90 m	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude $M_w$ :	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.25	Unit weight calculation:	Based on SBT	$K_\sigma$ applied:	Yes	MSF method:	Method based



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

## CPT basic interpretation plots



## Input parameters and analysis data

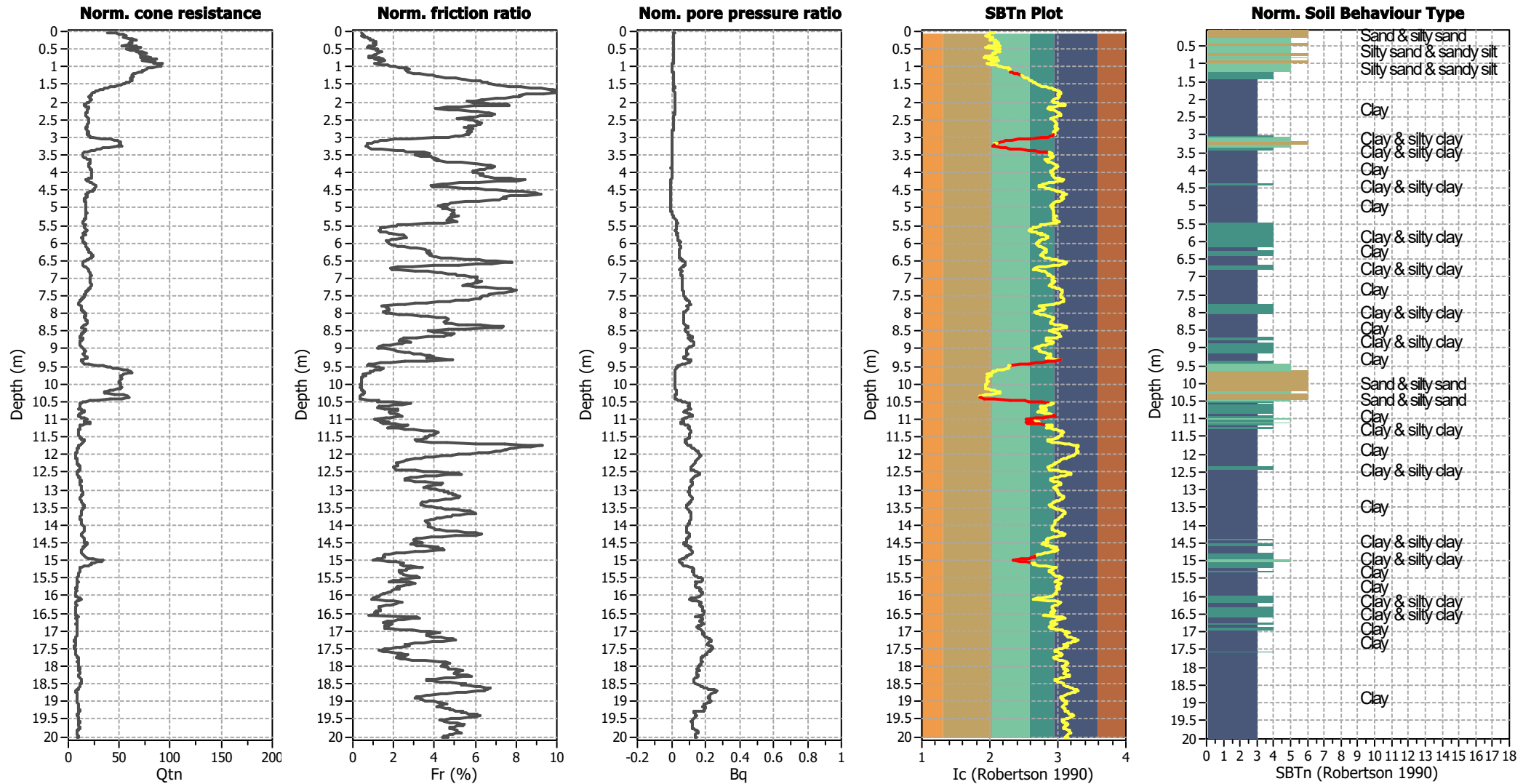
Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.90 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	Yes
Points to test:	Based on $I_c$ value	$I_c$ cut-off value:	2.60	$K_0$ applied:	Yes
Earthquake magnitude $M_w$ :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.90 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



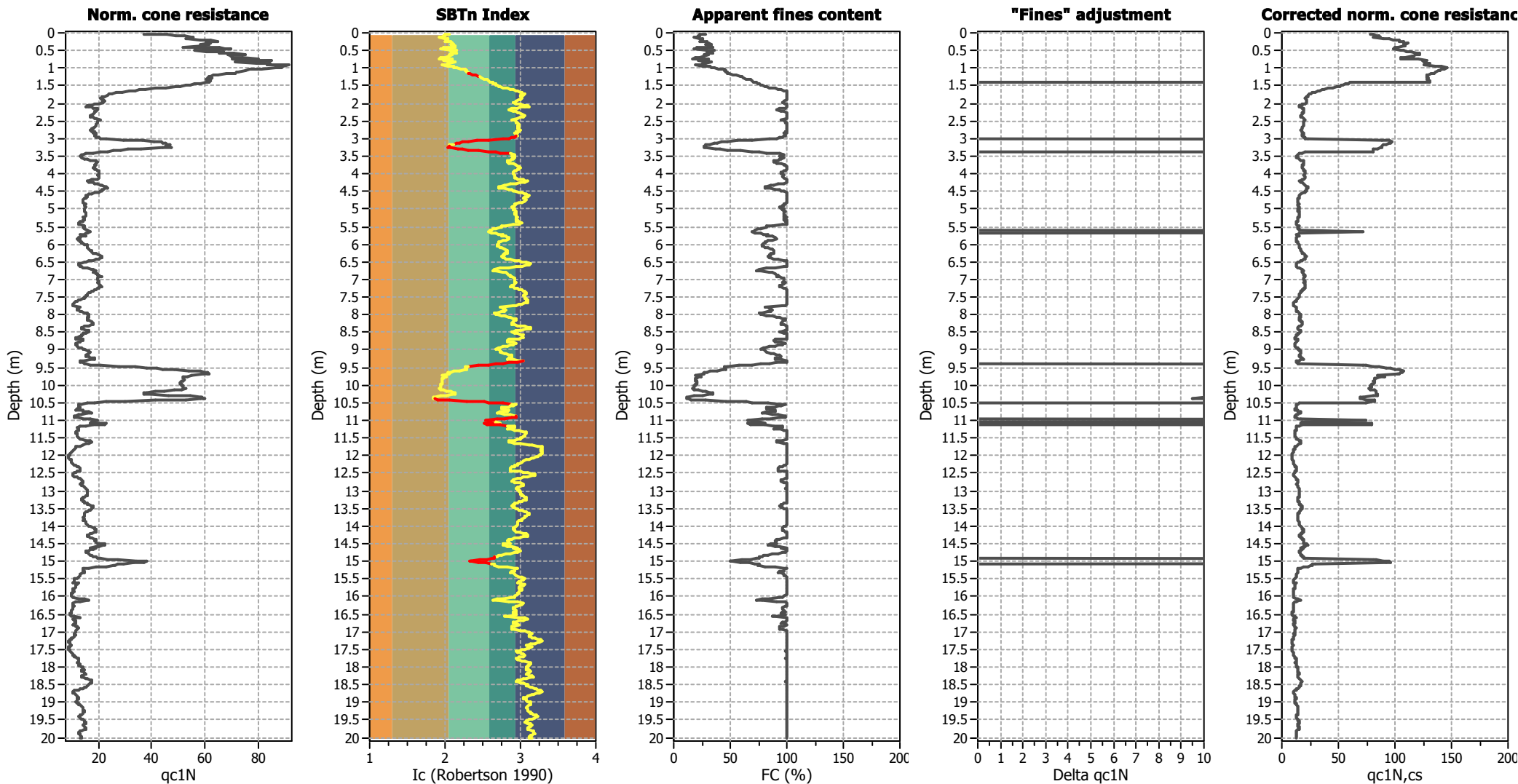
## CPT basic interpretation plots (normalized)



## Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.90 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>0</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.90 m	Fill height:	N/A	Limit depth:	N/A

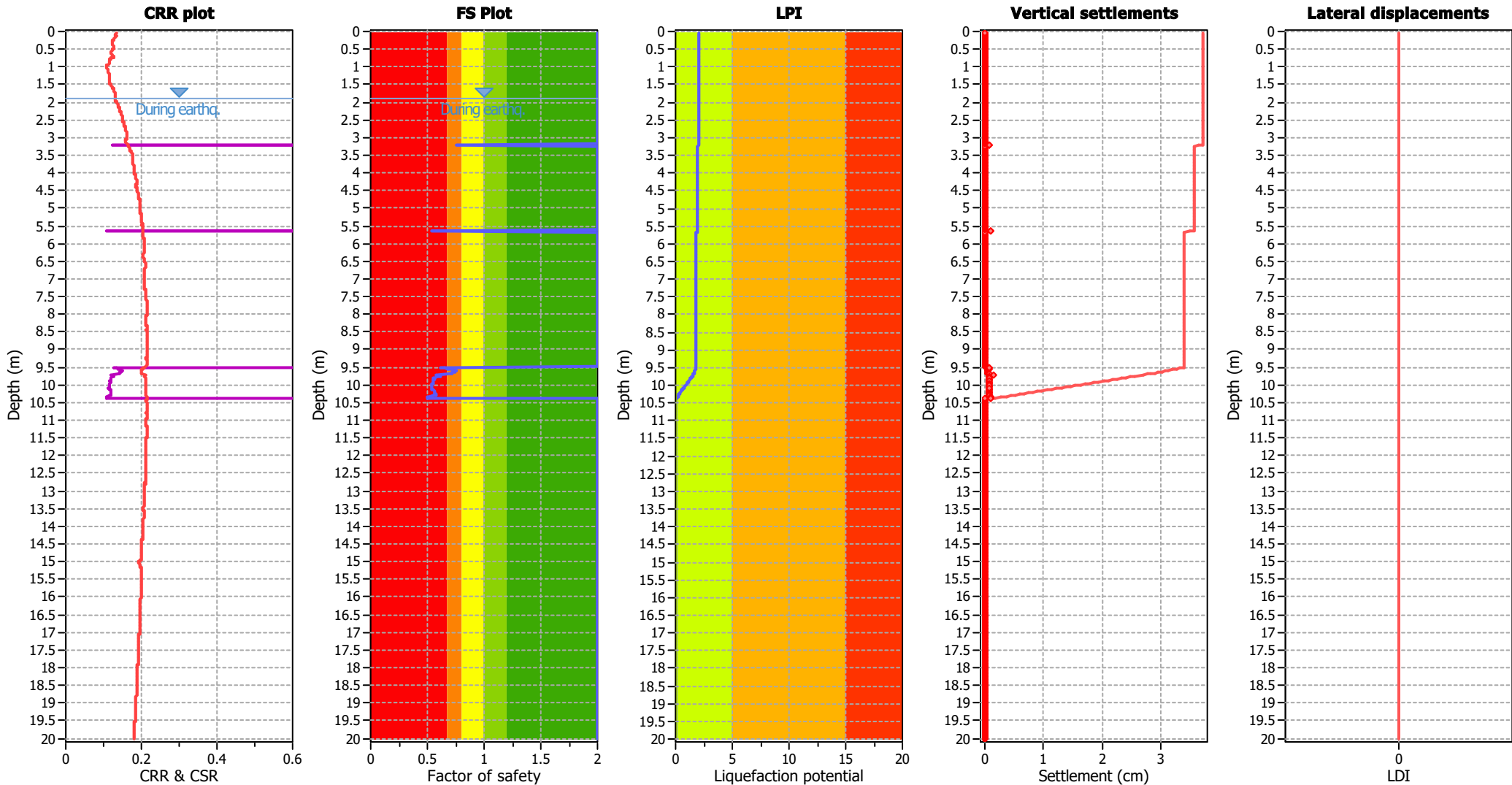
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.90 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>g</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.90 m	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.90 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>g</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.90 m	Fill height:	N/A	Limit depth:	N/A

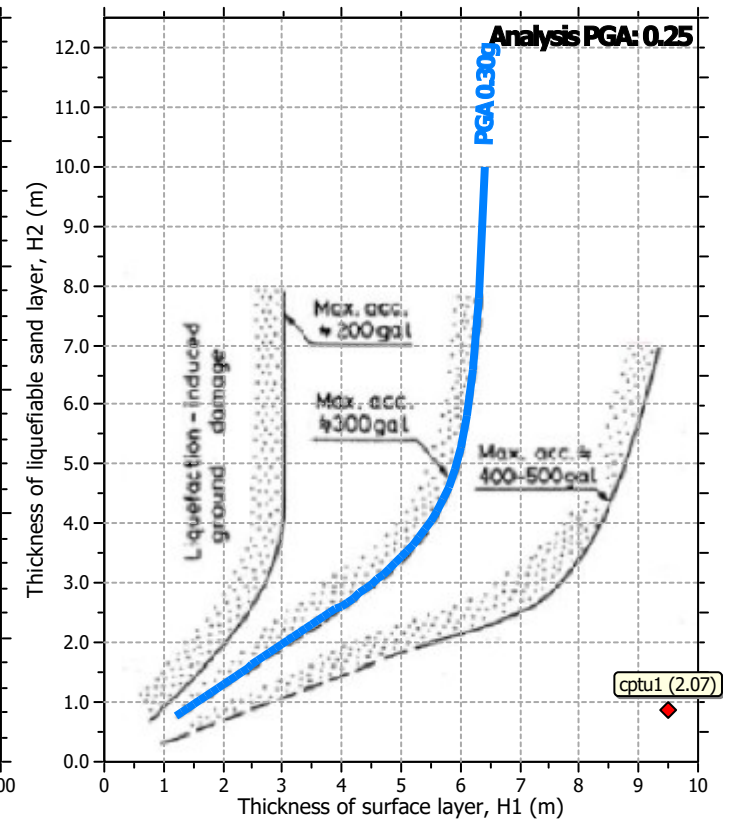
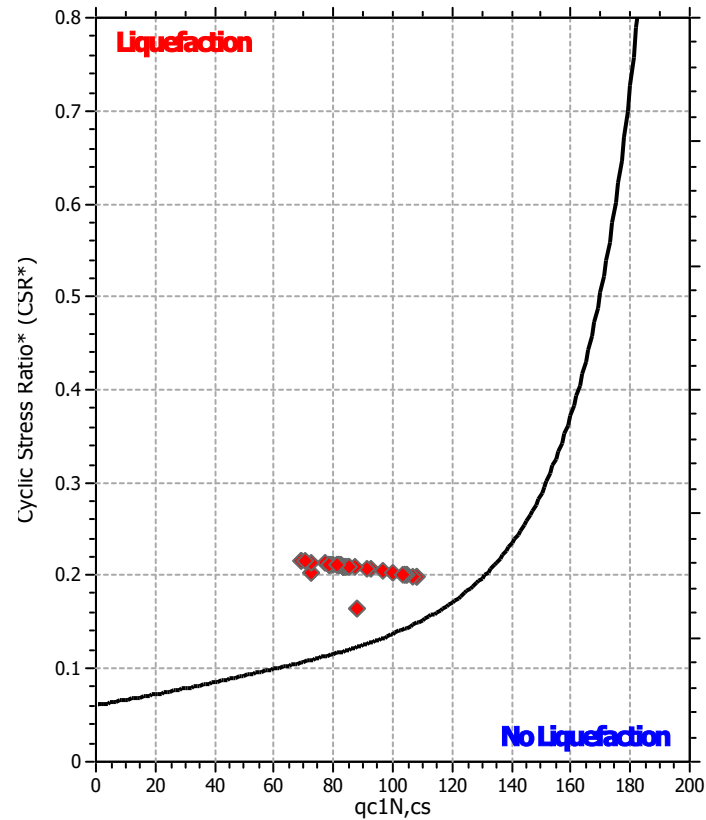
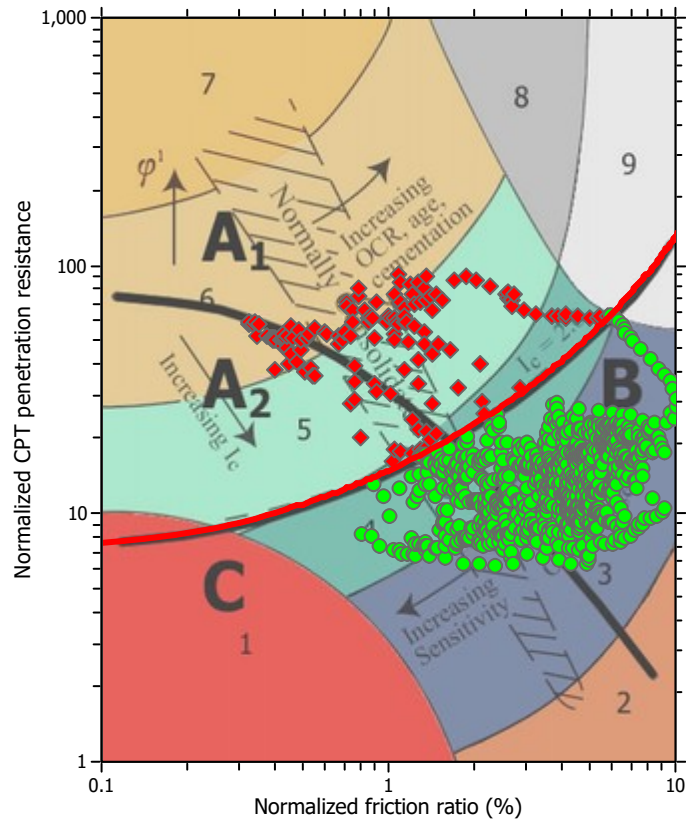
F.S. color scheme

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

LPI color scheme

Red	Very high risk
Orange	High risk
Yellow	Low risk

### Liquefaction analysis summary plots

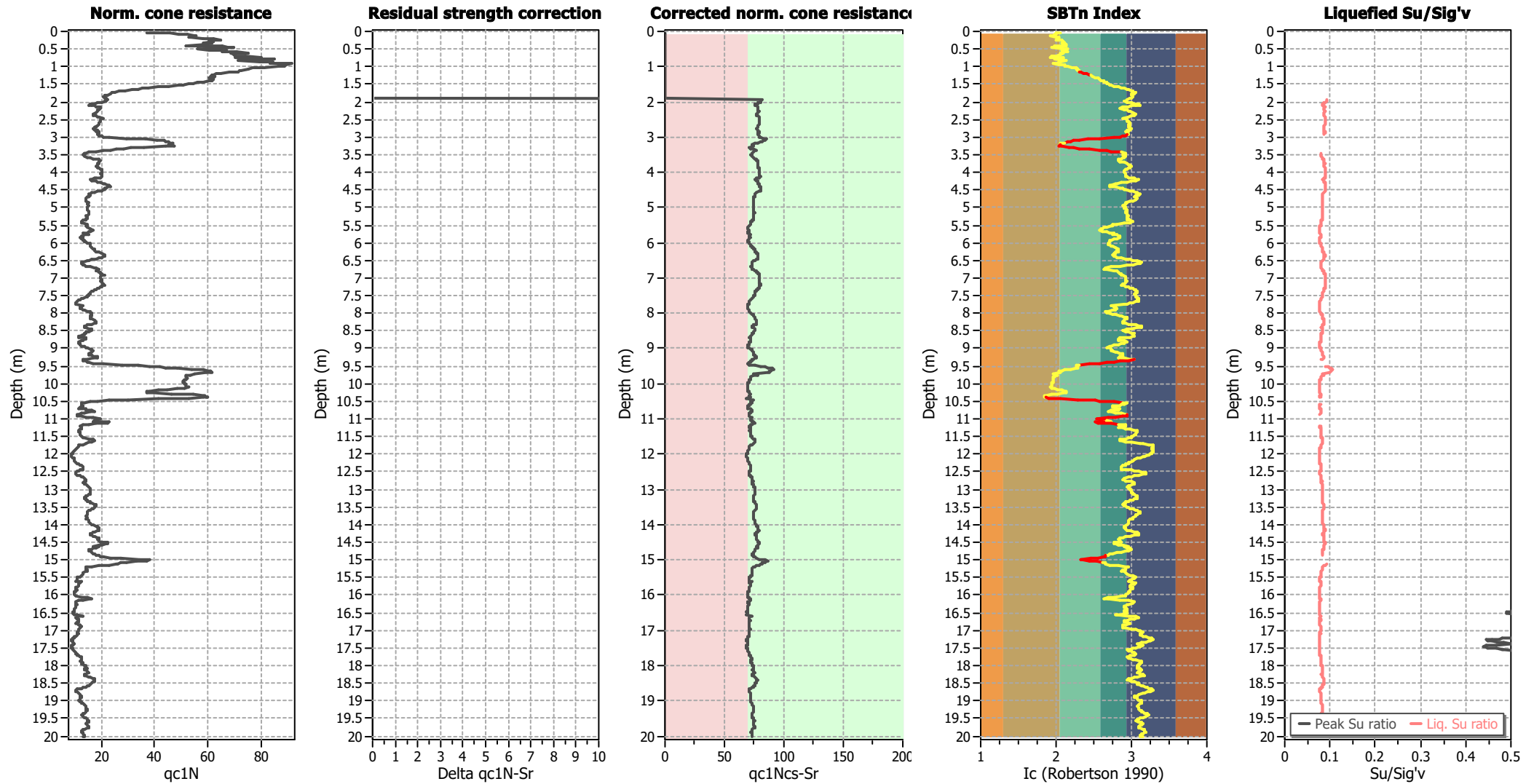


### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.90 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>a</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.90 m	Fill height:	N/A	Limit depth:	N/A



## Check for strength loss plots (Idriss & Boulanger (2008))



### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.90 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>g</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.90 m	Fill height:	N/A	Limit depth:	N/A

:: Liquefaction Potential Index calculation data ::											
Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
0.04	2.00	0.00	9.98	0.02	0.00	0.06	2.00	0.00	9.97	0.02	0.00
0.08	2.00	0.00	9.96	0.02	0.00	0.10	2.00	0.00	9.95	0.02	0.00
0.12	2.00	0.00	9.94	0.02	0.00	0.14	2.00	0.00	9.93	0.02	0.00
0.16	2.00	0.00	9.92	0.02	0.00	0.18	2.00	0.00	9.91	0.02	0.00
0.20	2.00	0.00	9.90	0.02	0.00	0.22	2.00	0.00	9.89	0.02	0.00
0.24	2.00	0.00	9.88	0.02	0.00	0.26	2.00	0.00	9.87	0.02	0.00
0.28	2.00	0.00	9.86	0.02	0.00	0.30	2.00	0.00	9.85	0.02	0.00
0.32	2.00	0.00	9.84	0.02	0.00	0.34	2.00	0.00	9.83	0.02	0.00
0.36	2.00	0.00	9.82	0.02	0.00	0.38	2.00	0.00	9.81	0.02	0.00
0.40	2.00	0.00	9.80	0.02	0.00	0.42	2.00	0.00	9.79	0.02	0.00
0.44	2.00	0.00	9.78	0.02	0.00	0.46	2.00	0.00	9.77	0.02	0.00
0.48	2.00	0.00	9.76	0.02	0.00	0.50	2.00	0.00	9.75	0.02	0.00
0.52	2.00	0.00	9.74	0.02	0.00	0.54	2.00	0.00	9.73	0.02	0.00
0.56	2.00	0.00	9.72	0.02	0.00	0.58	2.00	0.00	9.71	0.02	0.00
0.60	2.00	0.00	9.70	0.02	0.00	0.62	2.00	0.00	9.69	0.02	0.00
0.64	2.00	0.00	9.68	0.02	0.00	0.66	2.00	0.00	9.67	0.02	0.00
0.68	2.00	0.00	9.66	0.02	0.00	0.70	2.00	0.00	9.65	0.02	0.00
0.72	2.00	0.00	9.64	0.02	0.00	0.74	2.00	0.00	9.63	0.02	0.00
0.76	2.00	0.00	9.62	0.02	0.00	0.78	2.00	0.00	9.61	0.02	0.00
0.80	2.00	0.00	9.60	0.02	0.00	0.82	2.00	0.00	9.59	0.02	0.00
0.84	2.00	0.00	9.58	0.02	0.00	0.86	2.00	0.00	9.57	0.02	0.00
0.88	2.00	0.00	9.56	0.02	0.00	0.90	2.00	0.00	9.55	0.02	0.00
0.92	2.00	0.00	9.54	0.02	0.00	0.94	2.00	0.00	9.53	0.02	0.00
0.96	2.00	0.00	9.52	0.02	0.00	0.98	2.00	0.00	9.51	0.02	0.00
1.00	2.00	0.00	9.50	0.02	0.00	1.02	2.00	0.00	9.49	0.02	0.00
1.04	2.00	0.00	9.48	0.02	0.00	1.06	2.00	0.00	9.47	0.02	0.00
1.08	2.00	0.00	9.46	0.02	0.00	1.10	2.00	0.00	9.45	0.02	0.00
1.12	2.00	0.00	9.44	0.02	0.00	1.14	2.00	0.00	9.43	0.02	0.00
1.16	2.00	0.00	9.42	0.02	0.00	1.18	2.00	0.00	9.41	0.02	0.00
1.20	2.00	0.00	9.40	0.02	0.00	1.22	2.00	0.00	9.39	0.02	0.00
1.24	2.00	0.00	9.38	0.02	0.00	1.26	2.00	0.00	9.37	0.02	0.00
1.28	2.00	0.00	9.36	0.02	0.00	1.30	2.00	0.00	9.35	0.02	0.00
1.32	2.00	0.00	9.34	0.02	0.00	1.34	2.00	0.00	9.33	0.02	0.00
1.36	2.00	0.00	9.32	0.02	0.00	1.38	2.00	0.00	9.31	0.02	0.00
1.40	2.00	0.00	9.30	0.02	0.00	1.42	2.00	0.00	9.29	0.02	0.00
1.44	2.00	0.00	9.28	0.02	0.00	1.46	2.00	0.00	9.27	0.02	0.00
1.48	2.00	0.00	9.26	0.02	0.00	1.50	2.00	0.00	9.25	0.02	0.00
1.52	2.00	0.00	9.24	0.02	0.00	1.54	2.00	0.00	9.23	0.02	0.00
1.56	2.00	0.00	9.22	0.02	0.00	1.58	2.00	0.00	9.21	0.02	0.00
1.60	2.00	0.00	9.20	0.02	0.00	1.62	2.00	0.00	9.19	0.02	0.00
1.64	2.00	0.00	9.18	0.02	0.00	1.66	2.00	0.00	9.17	0.02	0.00
1.68	2.00	0.00	9.16	0.02	0.00	1.70	2.00	0.00	9.15	0.02	0.00
1.72	2.00	0.00	9.14	0.02	0.00	1.74	2.00	0.00	9.13	0.02	0.00
1.76	2.00	0.00	9.12	0.02	0.00	1.78	2.00	0.00	9.11	0.02	0.00
1.80	2.00	0.00	9.10	0.02	0.00	1.82	2.00	0.00	9.09	0.02	0.00
1.84	2.00	0.00	9.08	0.02	0.00	1.86	2.00	0.00	9.07	0.02	0.00
1.88	2.00	0.00	9.06	0.02	0.00	1.90	2.00	0.00	9.05	0.02	0.00
1.92	2.00	0.00	9.04	0.02	0.00	1.94	2.00	0.00	9.03	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
1.96	2.00	0.00	9.02	0.02	0.00	1.98	2.00	0.00	9.01	0.02	0.00
2.00	2.00	0.00	9.00	0.02	0.00	2.02	2.00	0.00	8.99	0.02	0.00
2.04	2.00	0.00	8.98	0.02	0.00	2.06	2.00	0.00	8.97	0.02	0.00
2.08	2.00	0.00	8.96	0.02	0.00	2.10	2.00	0.00	8.95	0.02	0.00
2.12	2.00	0.00	8.94	0.02	0.00	2.14	2.00	0.00	8.93	0.02	0.00
2.16	2.00	0.00	8.92	0.02	0.00	2.18	2.00	0.00	8.91	0.02	0.00
2.20	2.00	0.00	8.90	0.02	0.00	2.22	2.00	0.00	8.89	0.02	0.00
2.24	2.00	0.00	8.88	0.02	0.00	2.26	2.00	0.00	8.87	0.02	0.00
2.28	2.00	0.00	8.86	0.02	0.00	2.30	2.00	0.00	8.85	0.02	0.00
2.32	2.00	0.00	8.84	0.02	0.00	2.34	2.00	0.00	8.83	0.02	0.00
2.36	2.00	0.00	8.82	0.02	0.00	2.38	2.00	0.00	8.81	0.02	0.00
2.40	2.00	0.00	8.80	0.02	0.00	2.42	2.00	0.00	8.79	0.02	0.00
2.44	2.00	0.00	8.78	0.02	0.00	2.46	2.00	0.00	8.77	0.02	0.00
2.48	2.00	0.00	8.76	0.02	0.00	2.50	2.00	0.00	8.75	0.02	0.00
2.52	2.00	0.00	8.74	0.02	0.00	2.54	2.00	0.00	8.73	0.02	0.00
2.56	2.00	0.00	8.72	0.02	0.00	2.58	2.00	0.00	8.71	0.02	0.00
2.60	2.00	0.00	8.70	0.02	0.00	2.62	2.00	0.00	8.69	0.02	0.00
2.64	2.00	0.00	8.68	0.02	0.00	2.66	2.00	0.00	8.67	0.02	0.00
2.68	2.00	0.00	8.66	0.02	0.00	2.70	2.00	0.00	8.65	0.02	0.00
2.72	2.00	0.00	8.64	0.02	0.00	2.74	2.00	0.00	8.63	0.02	0.00
2.76	2.00	0.00	8.62	0.02	0.00	2.78	2.00	0.00	8.61	0.02	0.00
2.80	2.00	0.00	8.60	0.02	0.00	2.82	2.00	0.00	8.59	0.02	0.00
2.84	2.00	0.00	8.58	0.02	0.00	2.86	2.00	0.00	8.57	0.02	0.00
2.88	2.00	0.00	8.56	0.02	0.00	2.90	2.00	0.00	8.55	0.02	0.00
2.92	2.00	0.00	8.54	0.02	0.00	2.94	2.00	0.00	8.53	0.02	0.00
2.96	2.00	0.00	8.52	0.02	0.00	2.98	2.00	0.00	8.51	0.02	0.00
3.00	2.00	0.00	8.50	0.02	0.00	3.02	2.00	0.00	8.49	0.02	0.00
3.04	2.00	0.00	8.48	0.02	0.00	3.06	2.00	0.00	8.47	0.02	0.00
3.08	2.00	0.00	8.46	0.02	0.00	3.10	2.00	0.00	8.45	0.02	0.00
3.12	2.00	0.00	8.44	0.02	0.00	3.14	2.00	0.00	8.43	0.02	0.00
3.16	2.00	0.00	8.42	0.02	0.00	3.18	2.00	0.00	8.41	0.02	0.00
3.20	0.75	0.25	8.40	0.02	0.04	3.22	0.75	0.25	8.39	0.02	0.04
3.24	2.00	0.00	8.38	0.02	0.00	3.26	2.00	0.00	8.37	0.02	0.00
3.28	2.00	0.00	8.36	0.02	0.00	3.30	2.00	0.00	8.35	0.02	0.00
3.32	2.00	0.00	8.34	0.02	0.00	3.34	2.00	0.00	8.33	0.02	0.00
3.36	2.00	0.00	8.32	0.02	0.00	3.38	2.00	0.00	8.31	0.02	0.00
3.40	2.00	0.00	8.30	0.02	0.00	3.42	2.00	0.00	8.29	0.02	0.00
3.44	2.00	0.00	8.28	0.02	0.00	3.46	2.00	0.00	8.27	0.02	0.00
3.48	2.00	0.00	8.26	0.02	0.00	3.50	2.00	0.00	8.25	0.02	0.00
3.52	2.00	0.00	8.24	0.02	0.00	3.54	2.00	0.00	8.23	0.02	0.00
3.56	2.00	0.00	8.22	0.02	0.00	3.58	2.00	0.00	8.21	0.02	0.00
3.60	2.00	0.00	8.20	0.02	0.00	3.62	2.00	0.00	8.19	0.02	0.00
3.64	2.00	0.00	8.18	0.02	0.00	3.66	2.00	0.00	8.17	0.02	0.00
3.68	2.00	0.00	8.16	0.02	0.00	3.70	2.00	0.00	8.15	0.02	0.00
3.72	2.00	0.00	8.14	0.02	0.00	3.74	2.00	0.00	8.13	0.02	0.00
3.76	2.00	0.00	8.12	0.02	0.00	3.78	2.00	0.00	8.11	0.02	0.00
3.80	2.00	0.00	8.10	0.02	0.00	3.82	2.00	0.00	8.09	0.02	0.00
3.84	2.00	0.00	8.08	0.02	0.00	3.86	2.00	0.00	8.07	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
3.88	2.00	0.00	8.06	0.02	0.00	3.90	2.00	0.00	8.05	0.02	0.00
3.92	2.00	0.00	8.04	0.02	0.00	3.94	2.00	0.00	8.03	0.02	0.00
3.96	2.00	0.00	8.02	0.02	0.00	3.98	2.00	0.00	8.01	0.02	0.00
4.00	2.00	0.00	8.00	0.02	0.00	4.02	2.00	0.00	7.99	0.02	0.00
4.04	2.00	0.00	7.98	0.02	0.00	4.06	2.00	0.00	7.97	0.02	0.00
4.08	2.00	0.00	7.96	0.02	0.00	4.10	2.00	0.00	7.95	0.02	0.00
4.12	2.00	0.00	7.94	0.02	0.00	4.14	2.00	0.00	7.93	0.02	0.00
4.16	2.00	0.00	7.92	0.02	0.00	4.18	2.00	0.00	7.91	0.02	0.00
4.20	2.00	0.00	7.90	0.02	0.00	4.22	2.00	0.00	7.89	0.02	0.00
4.24	2.00	0.00	7.88	0.02	0.00	4.26	2.00	0.00	7.87	0.02	0.00
4.28	2.00	0.00	7.86	0.02	0.00	4.30	2.00	0.00	7.85	0.02	0.00
4.32	2.00	0.00	7.84	0.02	0.00	4.34	2.00	0.00	7.83	0.02	0.00
4.36	2.00	0.00	7.82	0.02	0.00	4.38	2.00	0.00	7.81	0.02	0.00
4.40	2.00	0.00	7.80	0.02	0.00	4.42	2.00	0.00	7.79	0.02	0.00
4.44	2.00	0.00	7.78	0.02	0.00	4.46	2.00	0.00	7.77	0.02	0.00
4.48	2.00	0.00	7.76	0.02	0.00	4.50	2.00	0.00	7.75	0.02	0.00
4.52	2.00	0.00	7.74	0.02	0.00	4.54	2.00	0.00	7.73	0.02	0.00
4.56	2.00	0.00	7.72	0.02	0.00	4.58	2.00	0.00	7.71	0.02	0.00
4.60	2.00	0.00	7.70	0.02	0.00	4.62	2.00	0.00	7.69	0.02	0.00
4.64	2.00	0.00	7.68	0.02	0.00	4.66	2.00	0.00	7.67	0.02	0.00
4.68	2.00	0.00	7.66	0.02	0.00	4.70	2.00	0.00	7.65	0.02	0.00
4.72	2.00	0.00	7.64	0.02	0.00	4.74	2.00	0.00	7.63	0.02	0.00
4.76	2.00	0.00	7.62	0.02	0.00	4.78	2.00	0.00	7.61	0.02	0.00
4.80	2.00	0.00	7.60	0.02	0.00	4.82	2.00	0.00	7.59	0.02	0.00
4.84	2.00	0.00	7.58	0.02	0.00	4.86	2.00	0.00	7.57	0.02	0.00
4.88	2.00	0.00	7.56	0.02	0.00	4.90	2.00	0.00	7.55	0.02	0.00
4.92	2.00	0.00	7.54	0.02	0.00	4.94	2.00	0.00	7.53	0.02	0.00
4.96	2.00	0.00	7.52	0.02	0.00	4.98	2.00	0.00	7.51	0.02	0.00
5.00	2.00	0.00	7.50	0.02	0.00	5.02	2.00	0.00	7.49	0.02	0.00
5.04	2.00	0.00	7.48	0.02	0.00	5.06	2.00	0.00	7.47	0.02	0.00
5.08	2.00	0.00	7.46	0.02	0.00	5.10	2.00	0.00	7.45	0.02	0.00
5.12	2.00	0.00	7.44	0.02	0.00	5.14	2.00	0.00	7.43	0.02	0.00
5.16	2.00	0.00	7.42	0.02	0.00	5.18	2.00	0.00	7.41	0.02	0.00
5.20	2.00	0.00	7.40	0.02	0.00	5.22	2.00	0.00	7.39	0.02	0.00
5.24	2.00	0.00	7.38	0.02	0.00	5.26	2.00	0.00	7.37	0.02	0.00
5.28	2.00	0.00	7.36	0.02	0.00	5.30	2.00	0.00	7.35	0.02	0.00
5.32	2.00	0.00	7.34	0.02	0.00	5.34	2.00	0.00	7.33	0.02	0.00
5.36	2.00	0.00	7.32	0.02	0.00	5.38	2.00	0.00	7.31	0.02	0.00
5.40	2.00	0.00	7.30	0.02	0.00	5.42	2.00	0.00	7.29	0.02	0.00
5.44	2.00	0.00	7.28	0.02	0.00	5.46	2.00	0.00	7.27	0.02	0.00
5.48	2.00	0.00	7.26	0.02	0.00	5.50	2.00	0.00	7.25	0.02	0.00
5.52	2.00	0.00	7.24	0.02	0.00	5.54	2.00	0.00	7.23	0.02	0.00
5.56	2.00	0.00	7.22	0.02	0.00	5.58	2.00	0.00	7.21	0.02	0.00
5.60	2.00	0.00	7.20	0.02	0.00	5.62	2.00	0.00	7.19	0.02	0.00
5.64	0.54	0.46	7.18	0.02	0.07	5.66	0.54	0.46	7.17	0.02	0.07
5.68	2.00	0.00	7.16	0.02	0.00	5.70	2.00	0.00	7.15	0.02	0.00
5.72	2.00	0.00	7.14	0.02	0.00	5.74	2.00	0.00	7.13	0.02	0.00
5.76	2.00	0.00	7.12	0.02	0.00	5.78	2.00	0.00	7.11	0.02	0.00



**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
5.80	2.00	0.00	7.10	0.02	0.00	5.82	2.00	0.00	7.09	0.02	0.00
5.84	2.00	0.00	7.08	0.02	0.00	5.86	2.00	0.00	7.07	0.02	0.00
5.88	2.00	0.00	7.06	0.02	0.00	5.90	2.00	0.00	7.05	0.02	0.00
5.92	2.00	0.00	7.04	0.02	0.00	5.94	2.00	0.00	7.03	0.02	0.00
5.96	2.00	0.00	7.02	0.02	0.00	5.98	2.00	0.00	7.01	0.02	0.00
6.00	2.00	0.00	7.00	0.02	0.00	6.02	2.00	0.00	6.99	0.02	0.00
6.04	2.00	0.00	6.98	0.02	0.00	6.06	2.00	0.00	6.97	0.02	0.00
6.08	2.00	0.00	6.96	0.02	0.00	6.10	2.00	0.00	6.95	0.02	0.00
6.12	2.00	0.00	6.94	0.02	0.00	6.14	2.00	0.00	6.93	0.02	0.00
6.16	2.00	0.00	6.92	0.02	0.00	6.18	2.00	0.00	6.91	0.02	0.00
6.20	2.00	0.00	6.90	0.02	0.00	6.22	2.00	0.00	6.89	0.02	0.00
6.24	2.00	0.00	6.88	0.02	0.00	6.26	2.00	0.00	6.87	0.02	0.00
6.28	2.00	0.00	6.86	0.02	0.00	6.30	2.00	0.00	6.85	0.02	0.00
6.32	2.00	0.00	6.84	0.02	0.00	6.34	2.00	0.00	6.83	0.02	0.00
6.36	2.00	0.00	6.82	0.02	0.00	6.38	2.00	0.00	6.81	0.02	0.00
6.40	2.00	0.00	6.80	0.02	0.00	6.42	2.00	0.00	6.79	0.02	0.00
6.44	2.00	0.00	6.78	0.02	0.00	6.46	2.00	0.00	6.77	0.02	0.00
6.48	2.00	0.00	6.76	0.02	0.00	6.50	2.00	0.00	6.75	0.02	0.00
6.52	2.00	0.00	6.74	0.02	0.00	6.54	2.00	0.00	6.73	0.02	0.00
6.56	2.00	0.00	6.72	0.02	0.00	6.58	2.00	0.00	6.71	0.02	0.00
6.60	2.00	0.00	6.70	0.02	0.00	6.62	2.00	0.00	6.69	0.02	0.00
6.64	2.00	0.00	6.68	0.02	0.00	6.66	2.00	0.00	6.67	0.02	0.00
6.68	2.00	0.00	6.66	0.02	0.00	6.70	2.00	0.00	6.65	0.02	0.00
6.72	2.00	0.00	6.64	0.02	0.00	6.74	2.00	0.00	6.63	0.02	0.00
6.76	2.00	0.00	6.62	0.02	0.00	6.78	2.00	0.00	6.61	0.02	0.00
6.80	2.00	0.00	6.60	0.02	0.00	6.82	2.00	0.00	6.59	0.02	0.00
6.84	2.00	0.00	6.58	0.02	0.00	6.86	2.00	0.00	6.57	0.02	0.00
6.88	2.00	0.00	6.56	0.02	0.00	6.90	2.00	0.00	6.55	0.02	0.00
6.92	2.00	0.00	6.54	0.02	0.00	6.94	2.00	0.00	6.53	0.02	0.00
6.96	2.00	0.00	6.52	0.02	0.00	6.98	2.00	0.00	6.51	0.02	0.00
7.00	2.00	0.00	6.50	0.02	0.00	7.02	2.00	0.00	6.49	0.02	0.00
7.04	2.00	0.00	6.48	0.02	0.00	7.06	2.00	0.00	6.47	0.02	0.00
7.08	2.00	0.00	6.46	0.02	0.00	7.10	2.00	0.00	6.45	0.02	0.00
7.12	2.00	0.00	6.44	0.02	0.00	7.14	2.00	0.00	6.43	0.02	0.00
7.16	2.00	0.00	6.42	0.02	0.00	7.18	2.00	0.00	6.41	0.02	0.00
7.20	2.00	0.00	6.40	0.02	0.00	7.22	2.00	0.00	6.39	0.02	0.00
7.24	2.00	0.00	6.38	0.02	0.00	7.26	2.00	0.00	6.37	0.02	0.00
7.28	2.00	0.00	6.36	0.02	0.00	7.30	2.00	0.00	6.35	0.02	0.00
7.32	2.00	0.00	6.34	0.02	0.00	7.34	2.00	0.00	6.33	0.02	0.00
7.36	2.00	0.00	6.32	0.02	0.00	7.38	2.00	0.00	6.31	0.02	0.00
7.40	2.00	0.00	6.30	0.02	0.00	7.42	2.00	0.00	6.29	0.02	0.00
7.44	2.00	0.00	6.28	0.02	0.00	7.46	2.00	0.00	6.27	0.02	0.00
7.48	2.00	0.00	6.26	0.02	0.00	7.50	2.00	0.00	6.25	0.02	0.00
7.52	2.00	0.00	6.24	0.02	0.00	7.54	2.00	0.00	6.23	0.02	0.00
7.56	2.00	0.00	6.22	0.02	0.00	7.58	2.00	0.00	6.21	0.02	0.00
7.60	2.00	0.00	6.20	0.02	0.00	7.62	2.00	0.00	6.19	0.02	0.00
7.64	2.00	0.00	6.18	0.02	0.00	7.66	2.00	0.00	6.17	0.02	0.00
7.68	2.00	0.00	6.16	0.02	0.00	7.70	2.00	0.00	6.15	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
7.72	2.00	0.00	6.14	0.02	0.00	7.74	2.00	0.00	6.13	0.02	0.00
7.76	2.00	0.00	6.12	0.02	0.00	7.78	2.00	0.00	6.11	0.02	0.00
7.80	2.00	0.00	6.10	0.02	0.00	7.82	2.00	0.00	6.09	0.02	0.00
7.84	2.00	0.00	6.08	0.02	0.00	7.86	2.00	0.00	6.07	0.02	0.00
7.88	2.00	0.00	6.06	0.02	0.00	7.90	2.00	0.00	6.05	0.02	0.00
7.92	2.00	0.00	6.04	0.02	0.00	7.94	2.00	0.00	6.03	0.02	0.00
7.96	2.00	0.00	6.02	0.02	0.00	7.98	2.00	0.00	6.01	0.02	0.00
8.00	2.00	0.00	6.00	0.02	0.00	8.02	2.00	0.00	5.99	0.02	0.00
8.04	2.00	0.00	5.98	0.02	0.00	8.06	2.00	0.00	5.97	0.02	0.00
8.08	2.00	0.00	5.96	0.02	0.00	8.10	2.00	0.00	5.95	0.02	0.00
8.12	2.00	0.00	5.94	0.02	0.00	8.14	2.00	0.00	5.93	0.02	0.00
8.16	2.00	0.00	5.92	0.02	0.00	8.18	2.00	0.00	5.91	0.02	0.00
8.20	2.00	0.00	5.90	0.02	0.00	8.22	2.00	0.00	5.89	0.02	0.00
8.24	2.00	0.00	5.88	0.02	0.00	8.26	2.00	0.00	5.87	0.02	0.00
8.28	2.00	0.00	5.86	0.02	0.00	8.30	2.00	0.00	5.85	0.02	0.00
8.32	2.00	0.00	5.84	0.02	0.00	8.34	2.00	0.00	5.83	0.02	0.00
8.36	2.00	0.00	5.82	0.02	0.00	8.38	2.00	0.00	5.81	0.02	0.00
8.40	2.00	0.00	5.80	0.02	0.00	8.42	2.00	0.00	5.79	0.02	0.00
8.44	2.00	0.00	5.78	0.02	0.00	8.46	2.00	0.00	5.77	0.02	0.00
8.48	2.00	0.00	5.76	0.02	0.00	8.50	2.00	0.00	5.75	0.02	0.00
8.52	2.00	0.00	5.74	0.02	0.00	8.54	2.00	0.00	5.73	0.02	0.00
8.56	2.00	0.00	5.72	0.02	0.00	8.58	2.00	0.00	5.71	0.02	0.00
8.60	2.00	0.00	5.70	0.02	0.00	8.62	2.00	0.00	5.69	0.02	0.00
8.64	2.00	0.00	5.68	0.02	0.00	8.66	2.00	0.00	5.67	0.02	0.00
8.68	2.00	0.00	5.66	0.02	0.00	8.70	2.00	0.00	5.65	0.02	0.00
8.72	2.00	0.00	5.64	0.02	0.00	8.74	2.00	0.00	5.63	0.02	0.00
8.76	2.00	0.00	5.62	0.02	0.00	8.78	2.00	0.00	5.61	0.02	0.00
8.80	2.00	0.00	5.60	0.02	0.00	8.82	2.00	0.00	5.59	0.02	0.00
8.84	2.00	0.00	5.58	0.02	0.00	8.86	2.00	0.00	5.57	0.02	0.00
8.88	2.00	0.00	5.56	0.02	0.00	8.90	2.00	0.00	5.55	0.02	0.00
8.92	2.00	0.00	5.54	0.02	0.00	8.94	2.00	0.00	5.53	0.02	0.00
8.96	2.00	0.00	5.52	0.02	0.00	8.98	2.00	0.00	5.51	0.02	0.00
9.00	2.00	0.00	5.50	0.02	0.00	9.02	2.00	0.00	5.49	0.02	0.00
9.04	2.00	0.00	5.48	0.02	0.00	9.06	2.00	0.00	5.47	0.02	0.00
9.08	2.00	0.00	5.46	0.02	0.00	9.10	2.00	0.00	5.45	0.02	0.00
9.12	2.00	0.00	5.44	0.02	0.00	9.14	2.00	0.00	5.43	0.02	0.00
9.16	2.00	0.00	5.42	0.02	0.00	9.18	2.00	0.00	5.41	0.02	0.00
9.20	2.00	0.00	5.40	0.02	0.00	9.22	2.00	0.00	5.39	0.02	0.00
9.24	2.00	0.00	5.38	0.02	0.00	9.26	2.00	0.00	5.37	0.02	0.00
9.28	2.00	0.00	5.36	0.02	0.00	9.30	2.00	0.00	5.35	0.02	0.00
9.32	2.00	0.00	5.34	0.02	0.00	9.34	2.00	0.00	5.33	0.02	0.00
9.36	2.00	0.00	5.32	0.02	0.00	9.38	2.00	0.00	5.31	0.02	0.00
9.40	2.00	0.00	5.30	0.02	0.00	9.42	2.00	0.00	5.29	0.02	0.00
9.44	2.00	0.00	5.28	0.02	0.00	9.46	2.00	0.00	5.27	0.02	0.00
9.48	2.00	0.00	5.26	0.02	0.00	9.50	0.62	0.38	5.25	0.02	0.04
9.52	0.65	0.35	5.24	0.02	0.04	9.54	0.68	0.32	5.23	0.02	0.03
9.56	0.72	0.28	5.22	0.02	0.03	9.58	0.75	0.25	5.21	0.02	0.03
9.60	0.75	0.25	5.20	0.02	0.03	9.62	0.74	0.26	5.19	0.02	0.03

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
9.64	0.72	0.28	5.18	0.02	0.03	9.66	0.71	0.29	5.17	0.02	0.03
9.68	0.72	0.28	5.16	0.02	0.03	9.70	0.71	0.29	5.15	0.02	0.03
9.74	0.57	0.43	5.13	0.04	0.09	9.76	0.62	0.38	5.12	0.02	0.04
9.78	0.59	0.41	5.11	0.02	0.04	9.80	0.57	0.43	5.10	0.02	0.04
9.82	0.56	0.44	5.09	0.02	0.05	9.84	0.56	0.44	5.08	0.02	0.04
9.86	0.56	0.44	5.07	0.02	0.04	9.88	0.56	0.44	5.06	0.02	0.04
9.90	0.55	0.45	5.05	0.02	0.05	9.92	0.56	0.44	5.04	0.02	0.04
9.94	0.56	0.44	5.03	0.02	0.04	9.96	0.55	0.45	5.02	0.02	0.04
9.98	0.54	0.46	5.01	0.02	0.05	10.00	0.54	0.46	5.00	0.02	0.05
10.02	0.54	0.46	4.99	0.02	0.05	10.04	0.54	0.46	4.98	0.02	0.05
10.06	0.54	0.46	4.97	0.02	0.05	10.08	0.54	0.46	4.96	0.02	0.05
10.10	0.53	0.47	4.95	0.02	0.05	10.12	0.54	0.46	4.94	0.02	0.05
10.14	0.56	0.44	4.93	0.02	0.04	10.16	0.56	0.44	4.92	0.02	0.04
10.18	0.57	0.43	4.91	0.02	0.04	10.20	0.56	0.44	4.90	0.02	0.04
10.22	0.57	0.43	4.89	0.02	0.04	10.24	0.57	0.43	4.88	0.02	0.04
10.26	0.57	0.43	4.87	0.02	0.04	10.28	0.58	0.42	4.86	0.02	0.04
10.30	0.55	0.45	4.85	0.02	0.04	10.32	0.51	0.49	4.84	0.02	0.05
10.34	0.50	0.50	4.83	0.02	0.05	10.36	0.49	0.51	4.82	0.02	0.05
10.38	0.50	0.50	4.81	0.02	0.05	10.40	2.00	0.00	4.80	0.02	0.00
10.42	2.00	0.00	4.79	0.02	0.00	10.44	2.00	0.00	4.78	0.02	0.00
10.46	2.00	0.00	4.77	0.02	0.00	10.48	2.00	0.00	4.76	0.02	0.00
10.50	2.00	0.00	4.75	0.02	0.00	10.52	2.00	0.00	4.74	0.02	0.00
10.54	2.00	0.00	4.73	0.02	0.00	10.56	2.00	0.00	4.72	0.02	0.00
10.58	2.00	0.00	4.71	0.02	0.00	10.60	2.00	0.00	4.70	0.02	0.00
10.62	2.00	0.00	4.69	0.02	0.00	10.64	2.00	0.00	4.68	0.02	0.00
10.66	2.00	0.00	4.67	0.02	0.00	10.68	2.00	0.00	4.66	0.02	0.00
10.70	2.00	0.00	4.65	0.02	0.00	10.72	2.00	0.00	4.64	0.02	0.00
10.74	2.00	0.00	4.63	0.02	0.00	10.76	2.00	0.00	4.62	0.02	0.00
10.78	2.00	0.00	4.61	0.02	0.00	10.80	2.00	0.00	4.60	0.02	0.00
10.82	2.00	0.00	4.59	0.02	0.00	10.84	2.00	0.00	4.58	0.02	0.00
10.86	2.00	0.00	4.57	0.02	0.00	10.88	2.00	0.00	4.56	0.02	0.00
10.90	2.00	0.00	4.55	0.02	0.00	10.92	2.00	0.00	4.54	0.02	0.00
10.94	2.00	0.00	4.53	0.02	0.00	10.96	2.00	0.00	4.52	0.02	0.00
10.98	2.00	0.00	4.51	0.02	0.00	11.00	2.00	0.00	4.50	0.02	0.00
11.02	2.00	0.00	4.49	0.02	0.00	11.04	2.00	0.00	4.48	0.02	0.00
11.06	2.00	0.00	4.47	0.02	0.00	11.08	2.00	0.00	4.46	0.02	0.00
11.10	2.00	0.00	4.45	0.02	0.00	11.12	2.00	0.00	4.44	0.02	0.00
11.14	2.00	0.00	4.43	0.02	0.00	11.16	2.00	0.00	4.42	0.02	0.00
11.18	2.00	0.00	4.41	0.02	0.00	11.20	2.00	0.00	4.40	0.02	0.00
11.22	2.00	0.00	4.39	0.02	0.00	11.24	2.00	0.00	4.38	0.02	0.00
11.26	2.00	0.00	4.37	0.02	0.00	11.28	2.00	0.00	4.36	0.02	0.00
11.30	2.00	0.00	4.35	0.02	0.00	11.32	2.00	0.00	4.34	0.02	0.00
11.34	2.00	0.00	4.33	0.02	0.00	11.36	2.00	0.00	4.32	0.02	0.00
11.38	2.00	0.00	4.31	0.02	0.00	11.40	2.00	0.00	4.30	0.02	0.00
11.42	2.00	0.00	4.29	0.02	0.00	11.44	2.00	0.00	4.28	0.02	0.00
11.46	2.00	0.00	4.27	0.02	0.00	11.48	2.00	0.00	4.26	0.02	0.00
11.50	2.00	0.00	4.25	0.02	0.00	11.52	2.00	0.00	4.24	0.02	0.00
11.54	2.00	0.00	4.23	0.02	0.00	11.56	2.00	0.00	4.22	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
11.58	2.00	0.00	4.21	0.02	0.00	11.60	2.00	0.00	4.20	0.02	0.00
11.62	2.00	0.00	4.19	0.02	0.00	11.64	2.00	0.00	4.18	0.02	0.00
11.66	2.00	0.00	4.17	0.02	0.00	11.68	2.00	0.00	4.16	0.02	0.00
11.70	2.00	0.00	4.15	0.02	0.00	11.72	2.00	0.00	4.14	0.02	0.00
11.74	2.00	0.00	4.13	0.02	0.00	11.76	2.00	0.00	4.12	0.02	0.00
11.78	2.00	0.00	4.11	0.02	0.00	11.80	2.00	0.00	4.10	0.02	0.00
11.82	2.00	0.00	4.09	0.02	0.00	11.84	2.00	0.00	4.08	0.02	0.00
11.86	2.00	0.00	4.07	0.02	0.00	11.88	2.00	0.00	4.06	0.02	0.00
11.90	2.00	0.00	4.05	0.02	0.00	11.92	2.00	0.00	4.04	0.02	0.00
11.94	2.00	0.00	4.03	0.02	0.00	11.96	2.00	0.00	4.02	0.02	0.00
11.98	2.00	0.00	4.01	0.02	0.00	12.00	2.00	0.00	4.00	0.02	0.00
12.02	2.00	0.00	3.99	0.02	0.00	12.04	2.00	0.00	3.98	0.02	0.00
12.06	2.00	0.00	3.97	0.02	0.00	12.08	2.00	0.00	3.96	0.02	0.00
12.10	2.00	0.00	3.95	0.02	0.00	12.12	2.00	0.00	3.94	0.02	0.00
12.14	2.00	0.00	3.93	0.02	0.00	12.16	2.00	0.00	3.92	0.02	0.00
12.18	2.00	0.00	3.91	0.02	0.00	12.20	2.00	0.00	3.90	0.02	0.00
12.22	2.00	0.00	3.89	0.02	0.00	12.24	2.00	0.00	3.88	0.02	0.00
12.26	2.00	0.00	3.87	0.02	0.00	12.28	2.00	0.00	3.86	0.02	0.00
12.30	2.00	0.00	3.85	0.02	0.00	12.32	2.00	0.00	3.84	0.02	0.00
12.34	2.00	0.00	3.83	0.02	0.00	12.36	2.00	0.00	3.82	0.02	0.00
12.38	2.00	0.00	3.81	0.02	0.00	12.40	2.00	0.00	3.80	0.02	0.00
12.42	2.00	0.00	3.79	0.02	0.00	12.44	2.00	0.00	3.78	0.02	0.00
12.46	2.00	0.00	3.77	0.02	0.00	12.48	2.00	0.00	3.76	0.02	0.00
12.50	2.00	0.00	3.75	0.02	0.00	12.52	2.00	0.00	3.74	0.02	0.00
12.54	2.00	0.00	3.73	0.02	0.00	12.56	2.00	0.00	3.72	0.02	0.00
12.58	2.00	0.00	3.71	0.02	0.00	12.60	2.00	0.00	3.70	0.02	0.00
12.62	2.00	0.00	3.69	0.02	0.00	12.64	2.00	0.00	3.68	0.02	0.00
12.66	2.00	0.00	3.67	0.02	0.00	12.68	2.00	0.00	3.66	0.02	0.00
12.70	2.00	0.00	3.65	0.02	0.00	12.72	2.00	0.00	3.64	0.02	0.00
12.74	2.00	0.00	3.63	0.02	0.00	12.76	2.00	0.00	3.62	0.02	0.00
12.78	2.00	0.00	3.61	0.02	0.00	12.80	2.00	0.00	3.60	0.02	0.00
12.82	2.00	0.00	3.59	0.02	0.00	12.84	2.00	0.00	3.58	0.02	0.00
12.86	2.00	0.00	3.57	0.02	0.00	12.88	2.00	0.00	3.56	0.02	0.00
12.90	2.00	0.00	3.55	0.02	0.00	12.92	2.00	0.00	3.54	0.02	0.00
12.94	2.00	0.00	3.53	0.02	0.00	12.96	2.00	0.00	3.52	0.02	0.00
12.98	2.00	0.00	3.51	0.02	0.00	13.00	2.00	0.00	3.50	0.02	0.00
13.02	2.00	0.00	3.49	0.02	0.00	13.04	2.00	0.00	3.48	0.02	0.00
13.06	2.00	0.00	3.47	0.02	0.00	13.08	2.00	0.00	3.46	0.02	0.00
13.10	2.00	0.00	3.45	0.02	0.00	13.12	2.00	0.00	3.44	0.02	0.00
13.14	2.00	0.00	3.43	0.02	0.00	13.16	2.00	0.00	3.42	0.02	0.00
13.18	2.00	0.00	3.41	0.02	0.00	13.20	2.00	0.00	3.40	0.02	0.00
13.22	2.00	0.00	3.39	0.02	0.00	13.24	2.00	0.00	3.38	0.02	0.00
13.26	2.00	0.00	3.37	0.02	0.00	13.28	2.00	0.00	3.36	0.02	0.00
13.30	2.00	0.00	3.35	0.02	0.00	13.32	2.00	0.00	3.34	0.02	0.00
13.34	2.00	0.00	3.33	0.02	0.00	13.36	2.00	0.00	3.32	0.02	0.00
13.38	2.00	0.00	3.31	0.02	0.00	13.40	2.00	0.00	3.30	0.02	0.00
13.42	2.00	0.00	3.29	0.02	0.00	13.44	2.00	0.00	3.28	0.02	0.00
13.46	2.00	0.00	3.27	0.02	0.00	13.48	2.00	0.00	3.26	0.02	0.00



**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
13.50	2.00	0.00	3.25	0.02	0.00	13.52	2.00	0.00	3.24	0.02	0.00
13.54	2.00	0.00	3.23	0.02	0.00	13.56	2.00	0.00	3.22	0.02	0.00
13.58	2.00	0.00	3.21	0.02	0.00	13.60	2.00	0.00	3.20	0.02	0.00
13.62	2.00	0.00	3.19	0.02	0.00	13.64	2.00	0.00	3.18	0.02	0.00
13.66	2.00	0.00	3.17	0.02	0.00	13.68	2.00	0.00	3.16	0.02	0.00
13.70	2.00	0.00	3.15	0.02	0.00	13.72	2.00	0.00	3.14	0.02	0.00
13.74	2.00	0.00	3.13	0.02	0.00	13.76	2.00	0.00	3.12	0.02	0.00
13.78	2.00	0.00	3.11	0.02	0.00	13.80	2.00	0.00	3.10	0.02	0.00
13.82	2.00	0.00	3.09	0.02	0.00	13.84	2.00	0.00	3.08	0.02	0.00
13.86	2.00	0.00	3.07	0.02	0.00	13.88	2.00	0.00	3.06	0.02	0.00
13.90	2.00	0.00	3.05	0.02	0.00	13.92	2.00	0.00	3.04	0.02	0.00
13.94	2.00	0.00	3.03	0.02	0.00	13.96	2.00	0.00	3.02	0.02	0.00
13.98	2.00	0.00	3.01	0.02	0.00	14.00	2.00	0.00	3.00	0.02	0.00
14.02	2.00	0.00	2.99	0.02	0.00	14.04	2.00	0.00	2.98	0.02	0.00
14.06	2.00	0.00	2.97	0.02	0.00	14.08	2.00	0.00	2.96	0.02	0.00
14.10	2.00	0.00	2.95	0.02	0.00	14.12	2.00	0.00	2.94	0.02	0.00
14.14	2.00	0.00	2.93	0.02	0.00	14.16	2.00	0.00	2.92	0.02	0.00
14.18	2.00	0.00	2.91	0.02	0.00	14.20	2.00	0.00	2.90	0.02	0.00
14.22	2.00	0.00	2.89	0.02	0.00	14.24	2.00	0.00	2.88	0.02	0.00
14.26	2.00	0.00	2.87	0.02	0.00	14.28	2.00	0.00	2.86	0.02	0.00
14.30	2.00	0.00	2.85	0.02	0.00	14.32	2.00	0.00	2.84	0.02	0.00
14.34	2.00	0.00	2.83	0.02	0.00	14.36	2.00	0.00	2.82	0.02	0.00
14.38	2.00	0.00	2.81	0.02	0.00	14.40	2.00	0.00	2.80	0.02	0.00
14.42	2.00	0.00	2.79	0.02	0.00	14.44	2.00	0.00	2.78	0.02	0.00
14.46	2.00	0.00	2.77	0.02	0.00	14.48	2.00	0.00	2.76	0.02	0.00
14.50	2.00	0.00	2.75	0.02	0.00	14.52	2.00	0.00	2.74	0.02	0.00
14.54	2.00	0.00	2.73	0.02	0.00	14.56	2.00	0.00	2.72	0.02	0.00
14.58	2.00	0.00	2.71	0.02	0.00	14.60	2.00	0.00	2.70	0.02	0.00
14.62	2.00	0.00	2.69	0.02	0.00	14.64	2.00	0.00	2.68	0.02	0.00
14.66	2.00	0.00	2.67	0.02	0.00	14.68	2.00	0.00	2.66	0.02	0.00
14.70	2.00	0.00	2.65	0.02	0.00	14.72	2.00	0.00	2.64	0.02	0.00
14.74	2.00	0.00	2.63	0.02	0.00	14.76	2.00	0.00	2.62	0.02	0.00
14.78	2.00	0.00	2.61	0.02	0.00	14.80	2.00	0.00	2.60	0.02	0.00
14.82	2.00	0.00	2.59	0.02	0.00	14.84	2.00	0.00	2.58	0.02	0.00
14.86	2.00	0.00	2.57	0.02	0.00	14.88	2.00	0.00	2.56	0.02	0.00
14.90	2.00	0.00	2.55	0.02	0.00	14.92	2.00	0.00	2.54	0.02	0.00
14.94	2.00	0.00	2.53	0.02	0.00	14.96	2.00	0.00	2.52	0.02	0.00
14.98	2.00	0.00	2.51	0.02	0.00	15.00	2.00	0.00	2.50	0.02	0.00
15.02	2.00	0.00	2.49	0.02	0.00	15.04	2.00	0.00	2.48	0.02	0.00
15.06	2.00	0.00	2.47	0.02	0.00	15.08	2.00	0.00	2.46	0.02	0.00
15.10	2.00	0.00	2.45	0.02	0.00	15.12	2.00	0.00	2.44	0.02	0.00
15.14	2.00	0.00	2.43	0.02	0.00	15.16	2.00	0.00	2.42	0.02	0.00
15.18	2.00	0.00	2.41	0.02	0.00	15.20	2.00	0.00	2.40	0.02	0.00
15.22	2.00	0.00	2.39	0.02	0.00	15.24	2.00	0.00	2.38	0.02	0.00
15.26	2.00	0.00	2.37	0.02	0.00	15.28	2.00	0.00	2.36	0.02	0.00
15.30	2.00	0.00	2.35	0.02	0.00	15.32	2.00	0.00	2.34	0.02	0.00
15.34	2.00	0.00	2.33	0.02	0.00	15.36	2.00	0.00	2.32	0.02	0.00
15.38	2.00	0.00	2.31	0.02	0.00	15.40	2.00	0.00	2.30	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
15.42	2.00	0.00	2.29	0.02	0.00	15.44	2.00	0.00	2.28	0.02	0.00
15.46	2.00	0.00	2.27	0.02	0.00	15.48	2.00	0.00	2.26	0.02	0.00
15.50	2.00	0.00	2.25	0.02	0.00	15.52	2.00	0.00	2.24	0.02	0.00
15.54	2.00	0.00	2.23	0.02	0.00	15.56	2.00	0.00	2.22	0.02	0.00
15.58	2.00	0.00	2.21	0.02	0.00	15.60	2.00	0.00	2.20	0.02	0.00
15.62	2.00	0.00	2.19	0.02	0.00	15.64	2.00	0.00	2.18	0.02	0.00
15.66	2.00	0.00	2.17	0.02	0.00	15.68	2.00	0.00	2.16	0.02	0.00
15.70	2.00	0.00	2.15	0.02	0.00	15.72	2.00	0.00	2.14	0.02	0.00
15.74	2.00	0.00	2.13	0.02	0.00	15.76	2.00	0.00	2.12	0.02	0.00
15.78	2.00	0.00	2.11	0.02	0.00	15.80	2.00	0.00	2.10	0.02	0.00
15.82	2.00	0.00	2.09	0.02	0.00	15.84	2.00	0.00	2.08	0.02	0.00
15.86	2.00	0.00	2.07	0.02	0.00	15.88	2.00	0.00	2.06	0.02	0.00
15.90	2.00	0.00	2.05	0.02	0.00	15.92	2.00	0.00	2.04	0.02	0.00
15.94	2.00	0.00	2.03	0.02	0.00	15.96	2.00	0.00	2.02	0.02	0.00
15.98	2.00	0.00	2.01	0.02	0.00	16.00	2.00	0.00	2.00	0.02	0.00
16.02	2.00	0.00	1.99	0.02	0.00	16.04	2.00	0.00	1.98	0.02	0.00
16.06	2.00	0.00	1.97	0.02	0.00	16.08	2.00	0.00	1.96	0.02	0.00
16.10	2.00	0.00	1.95	0.02	0.00	16.12	2.00	0.00	1.94	0.02	0.00
16.14	2.00	0.00	1.93	0.02	0.00	16.16	2.00	0.00	1.92	0.02	0.00
16.18	2.00	0.00	1.91	0.02	0.00	16.20	2.00	0.00	1.90	0.02	0.00
16.22	2.00	0.00	1.89	0.02	0.00	16.24	2.00	0.00	1.88	0.02	0.00
16.26	2.00	0.00	1.87	0.02	0.00	16.28	2.00	0.00	1.86	0.02	0.00
16.30	2.00	0.00	1.85	0.02	0.00	16.32	2.00	0.00	1.84	0.02	0.00
16.34	2.00	0.00	1.83	0.02	0.00	16.36	2.00	0.00	1.82	0.02	0.00
16.38	2.00	0.00	1.81	0.02	0.00	16.40	2.00	0.00	1.80	0.02	0.00
16.42	2.00	0.00	1.79	0.02	0.00	16.44	2.00	0.00	1.78	0.02	0.00
16.46	2.00	0.00	1.77	0.02	0.00	16.48	2.00	0.00	1.76	0.02	0.00
16.50	2.00	0.00	1.75	0.02	0.00	16.52	2.00	0.00	1.74	0.02	0.00
16.54	2.00	0.00	1.73	0.02	0.00	16.56	2.00	0.00	1.72	0.02	0.00
16.58	2.00	0.00	1.71	0.02	0.00	16.60	2.00	0.00	1.70	0.02	0.00
16.62	2.00	0.00	1.69	0.02	0.00	16.64	2.00	0.00	1.68	0.02	0.00
16.66	2.00	0.00	1.67	0.02	0.00	16.68	2.00	0.00	1.66	0.02	0.00
16.70	2.00	0.00	1.65	0.02	0.00	16.72	2.00	0.00	1.64	0.02	0.00
16.74	2.00	0.00	1.63	0.02	0.00	16.76	2.00	0.00	1.62	0.02	0.00
16.78	2.00	0.00	1.61	0.02	0.00	16.80	2.00	0.00	1.60	0.02	0.00
16.82	2.00	0.00	1.59	0.02	0.00	16.84	2.00	0.00	1.58	0.02	0.00
16.86	2.00	0.00	1.57	0.02	0.00	16.88	2.00	0.00	1.56	0.02	0.00
16.90	2.00	0.00	1.55	0.02	0.00	16.92	2.00	0.00	1.54	0.02	0.00
16.94	2.00	0.00	1.53	0.02	0.00	16.96	2.00	0.00	1.52	0.02	0.00
16.98	2.00	0.00	1.51	0.02	0.00	17.00	2.00	0.00	1.50	0.02	0.00
17.02	2.00	0.00	1.49	0.02	0.00	17.04	2.00	0.00	1.48	0.02	0.00
17.06	2.00	0.00	1.47	0.02	0.00	17.08	2.00	0.00	1.46	0.02	0.00
17.10	2.00	0.00	1.45	0.02	0.00	17.12	2.00	0.00	1.44	0.02	0.00
17.14	2.00	0.00	1.43	0.02	0.00	17.16	2.00	0.00	1.42	0.02	0.00
17.18	2.00	0.00	1.41	0.02	0.00	17.20	2.00	0.00	1.40	0.02	0.00
17.22	2.00	0.00	1.39	0.02	0.00	17.24	2.00	0.00	1.38	0.02	0.00
17.26	2.00	0.00	1.37	0.02	0.00	17.28	2.00	0.00	1.36	0.02	0.00
17.30	2.00	0.00	1.35	0.02	0.00	17.32	2.00	0.00	1.34	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
17.34	2.00	0.00	1.33	0.02	0.00	17.36	2.00	0.00	1.32	0.02	0.00
17.38	2.00	0.00	1.31	0.02	0.00	17.40	2.00	0.00	1.30	0.02	0.00
17.42	2.00	0.00	1.29	0.02	0.00	17.44	2.00	0.00	1.28	0.02	0.00
17.46	2.00	0.00	1.27	0.02	0.00	17.48	2.00	0.00	1.26	0.02	0.00
17.50	2.00	0.00	1.25	0.02	0.00	17.52	2.00	0.00	1.24	0.02	0.00
17.54	2.00	0.00	1.23	0.02	0.00	17.56	2.00	0.00	1.22	0.02	0.00
17.58	2.00	0.00	1.21	0.02	0.00	17.60	2.00	0.00	1.20	0.02	0.00
17.62	2.00	0.00	1.19	0.02	0.00	17.64	2.00	0.00	1.18	0.02	0.00
17.66	2.00	0.00	1.17	0.02	0.00	17.68	2.00	0.00	1.16	0.02	0.00
17.70	2.00	0.00	1.15	0.02	0.00	17.72	2.00	0.00	1.14	0.02	0.00
17.74	2.00	0.00	1.13	0.02	0.00	17.76	2.00	0.00	1.12	0.02	0.00
17.78	2.00	0.00	1.11	0.02	0.00	17.80	2.00	0.00	1.10	0.02	0.00
17.82	2.00	0.00	1.09	0.02	0.00	17.84	2.00	0.00	1.08	0.02	0.00
17.86	2.00	0.00	1.07	0.02	0.00	17.88	2.00	0.00	1.06	0.02	0.00
17.90	2.00	0.00	1.05	0.02	0.00	17.92	2.00	0.00	1.04	0.02	0.00
17.94	2.00	0.00	1.03	0.02	0.00	17.96	2.00	0.00	1.02	0.02	0.00
17.98	2.00	0.00	1.01	0.02	0.00	18.00	2.00	0.00	1.00	0.02	0.00
18.02	2.00	0.00	0.99	0.02	0.00	18.04	2.00	0.00	0.98	0.02	0.00
18.06	2.00	0.00	0.97	0.02	0.00	18.08	2.00	0.00	0.96	0.02	0.00
18.10	2.00	0.00	0.95	0.02	0.00	18.12	2.00	0.00	0.94	0.02	0.00
18.14	2.00	0.00	0.93	0.02	0.00	18.16	2.00	0.00	0.92	0.02	0.00
18.18	2.00	0.00	0.91	0.02	0.00	18.20	2.00	0.00	0.90	0.02	0.00
18.22	2.00	0.00	0.89	0.02	0.00	18.24	2.00	0.00	0.88	0.02	0.00
18.26	2.00	0.00	0.87	0.02	0.00	18.28	2.00	0.00	0.86	0.02	0.00
18.30	2.00	0.00	0.85	0.02	0.00	18.32	2.00	0.00	0.84	0.02	0.00
18.34	2.00	0.00	0.83	0.02	0.00	18.36	2.00	0.00	0.82	0.02	0.00
18.38	2.00	0.00	0.81	0.02	0.00	18.40	2.00	0.00	0.80	0.02	0.00
18.42	2.00	0.00	0.79	0.02	0.00	18.44	2.00	0.00	0.78	0.02	0.00
18.46	2.00	0.00	0.77	0.02	0.00	18.48	2.00	0.00	0.76	0.02	0.00
18.50	2.00	0.00	0.75	0.02	0.00	18.52	2.00	0.00	0.74	0.02	0.00
18.54	2.00	0.00	0.73	0.02	0.00	18.56	2.00	0.00	0.72	0.02	0.00
18.58	2.00	0.00	0.71	0.02	0.00	18.60	2.00	0.00	0.70	0.02	0.00
18.62	2.00	0.00	0.69	0.02	0.00	18.64	2.00	0.00	0.68	0.02	0.00
18.66	2.00	0.00	0.67	0.02	0.00	18.68	2.00	0.00	0.66	0.02	0.00
18.70	2.00	0.00	0.65	0.02	0.00	18.72	2.00	0.00	0.64	0.02	0.00
18.74	2.00	0.00	0.63	0.02	0.00	18.76	2.00	0.00	0.62	0.02	0.00
18.78	2.00	0.00	0.61	0.02	0.00	18.80	2.00	0.00	0.60	0.02	0.00
18.82	2.00	0.00	0.59	0.02	0.00	18.84	2.00	0.00	0.58	0.02	0.00
18.86	2.00	0.00	0.57	0.02	0.00	18.88	2.00	0.00	0.56	0.02	0.00
18.90	2.00	0.00	0.55	0.02	0.00	18.92	2.00	0.00	0.54	0.02	0.00
18.94	2.00	0.00	0.53	0.02	0.00	18.96	2.00	0.00	0.52	0.02	0.00
18.98	2.00	0.00	0.51	0.02	0.00	19.00	2.00	0.00	0.50	0.02	0.00
19.02	2.00	0.00	0.49	0.02	0.00	19.04	2.00	0.00	0.48	0.02	0.00
19.06	2.00	0.00	0.47	0.02	0.00	19.08	2.00	0.00	0.46	0.02	0.00
19.10	2.00	0.00	0.45	0.02	0.00	19.12	2.00	0.00	0.44	0.02	0.00
19.14	2.00	0.00	0.43	0.02	0.00	19.16	2.00	0.00	0.42	0.02	0.00
19.18	2.00	0.00	0.41	0.02	0.00	19.20	2.00	0.00	0.40	0.02	0.00
19.22	2.00	0.00	0.39	0.02	0.00	19.24	2.00	0.00	0.38	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
19.26	2.00	0.00	0.37	0.02	0.00	19.28	2.00	0.00	0.36	0.02	0.00
19.30	2.00	0.00	0.35	0.02	0.00	19.32	2.00	0.00	0.34	0.02	0.00
19.34	2.00	0.00	0.33	0.02	0.00	19.36	2.00	0.00	0.32	0.02	0.00
19.38	2.00	0.00	0.31	0.02	0.00	19.40	2.00	0.00	0.30	0.02	0.00
19.42	2.00	0.00	0.29	0.02	0.00	19.44	2.00	0.00	0.28	0.02	0.00
19.46	2.00	0.00	0.27	0.02	0.00	19.48	2.00	0.00	0.26	0.02	0.00
19.50	2.00	0.00	0.25	0.02	0.00	19.52	2.00	0.00	0.24	0.02	0.00
19.54	2.00	0.00	0.23	0.02	0.00	19.56	2.00	0.00	0.22	0.02	0.00
19.58	2.00	0.00	0.21	0.02	0.00	19.60	2.00	0.00	0.20	0.02	0.00
19.62	2.00	0.00	0.19	0.02	0.00	19.64	2.00	0.00	0.18	0.02	0.00
19.66	2.00	0.00	0.17	0.02	0.00	19.68	2.00	0.00	0.16	0.02	0.00
19.70	2.00	0.00	0.15	0.02	0.00	19.72	2.00	0.00	0.14	0.02	0.00
19.74	2.00	0.00	0.13	0.02	0.00	19.76	2.00	0.00	0.12	0.02	0.00
19.78	2.00	0.00	0.11	0.02	0.00	19.80	2.00	0.00	0.10	0.02	0.00
19.82	2.00	0.00	0.09	0.02	0.00	19.84	2.00	0.00	0.08	0.02	0.00
19.86	2.00	0.00	0.07	0.02	0.00	19.88	2.00	0.00	0.06	0.02	0.00
19.90	2.00	0.00	0.05	0.02	0.00	19.92	2.00	0.00	0.04	0.02	0.00
19.94	2.00	0.00	0.03	0.02	0.00	19.96	2.00	0.00	0.02	0.02	0.00
19.98	2.00	0.00	0.01	0.02	0.00	20.00	2.00	0.00	0.00	0.02	0.00
20.02	2.00	0.00	0.00	0.00	0.00						

**Overall liquefaction potential: 2.07**

LPI = 0.00 - Liquefaction risk very low

LPI between 0.00 and 5.00 - Liquefaction risk low

LPI between 5.00 and 15.00 - Liquefaction risk high

LPI &gt; 15.00 - Liquefaction risk very high

**Abbreviations**

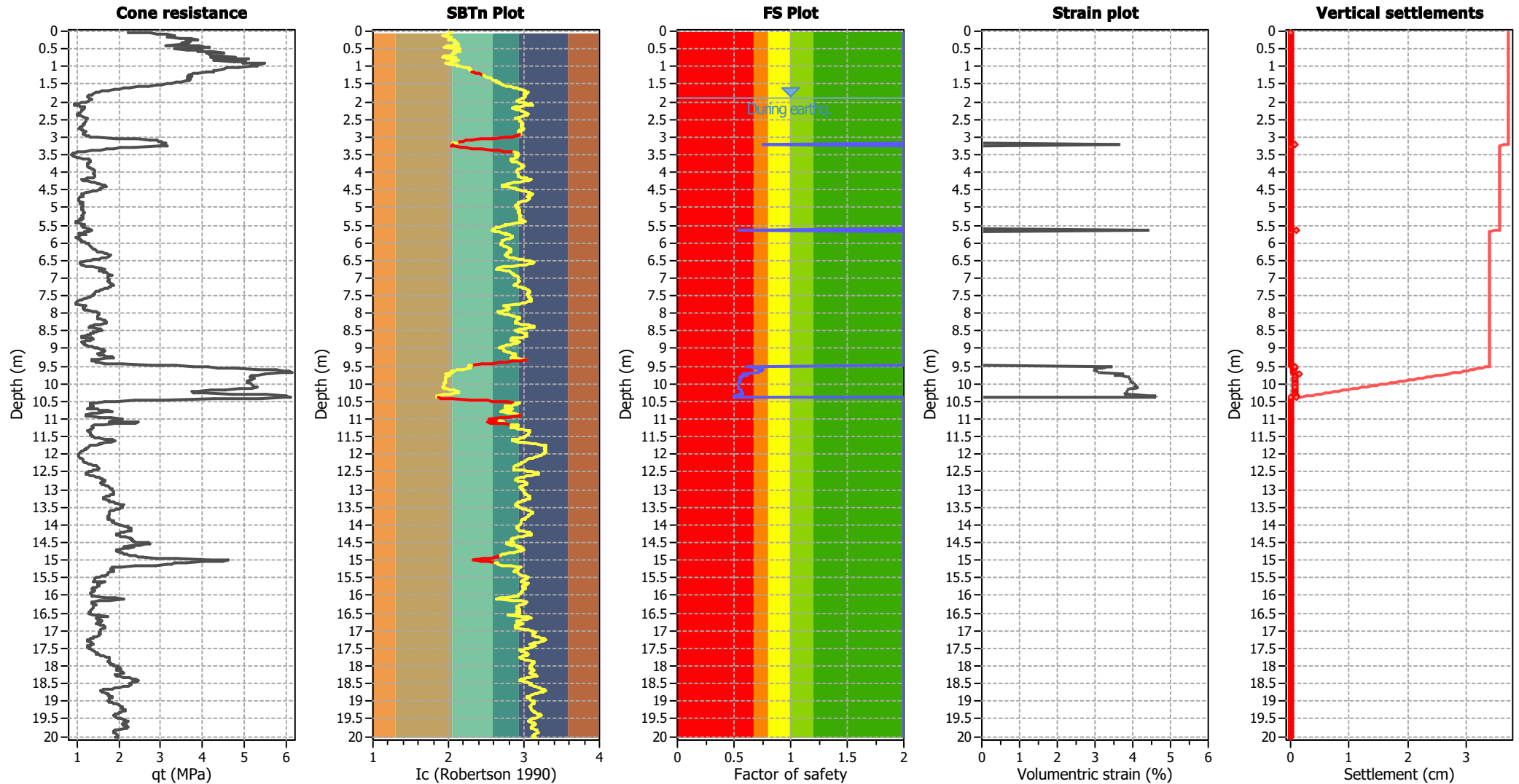
FS: Calculated factor of safety for test point

F<sub>L</sub>: 1 - FSw<sub>z</sub>: Function value of the extend of soil liquefaction according to depthd<sub>z</sub>: Layer thickness (m)

LPI: Liquefaction potential index value for test point



## Estimation of post-earthquake settlements



### Abbreviations

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

## LIQUEFACTION ANALYSIS REPORT

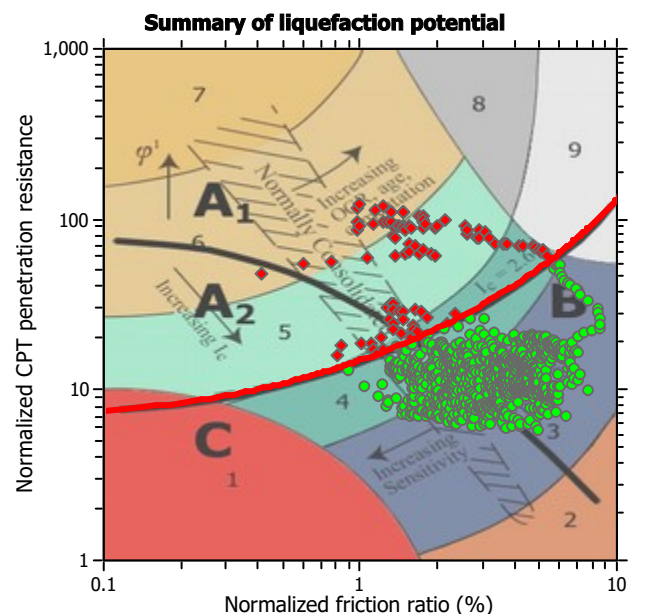
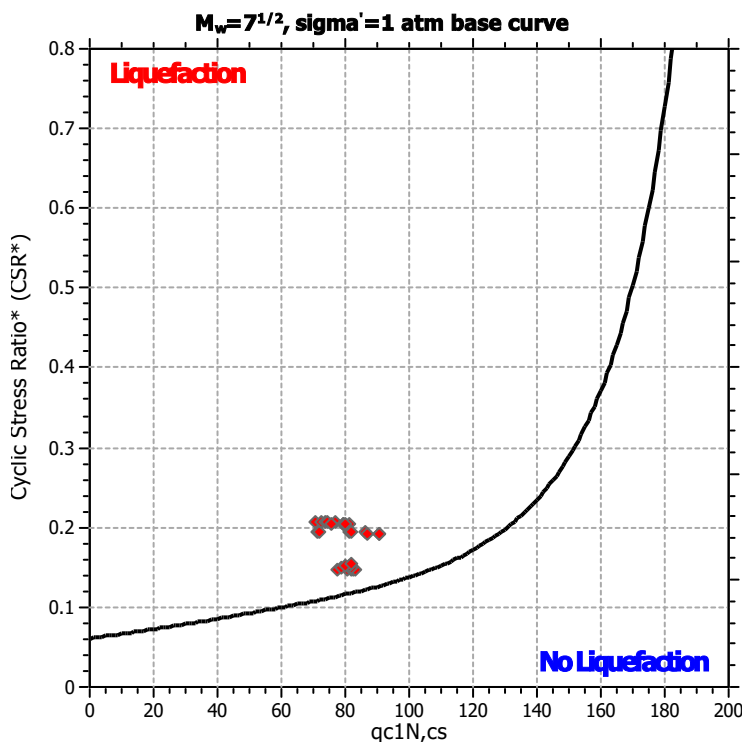
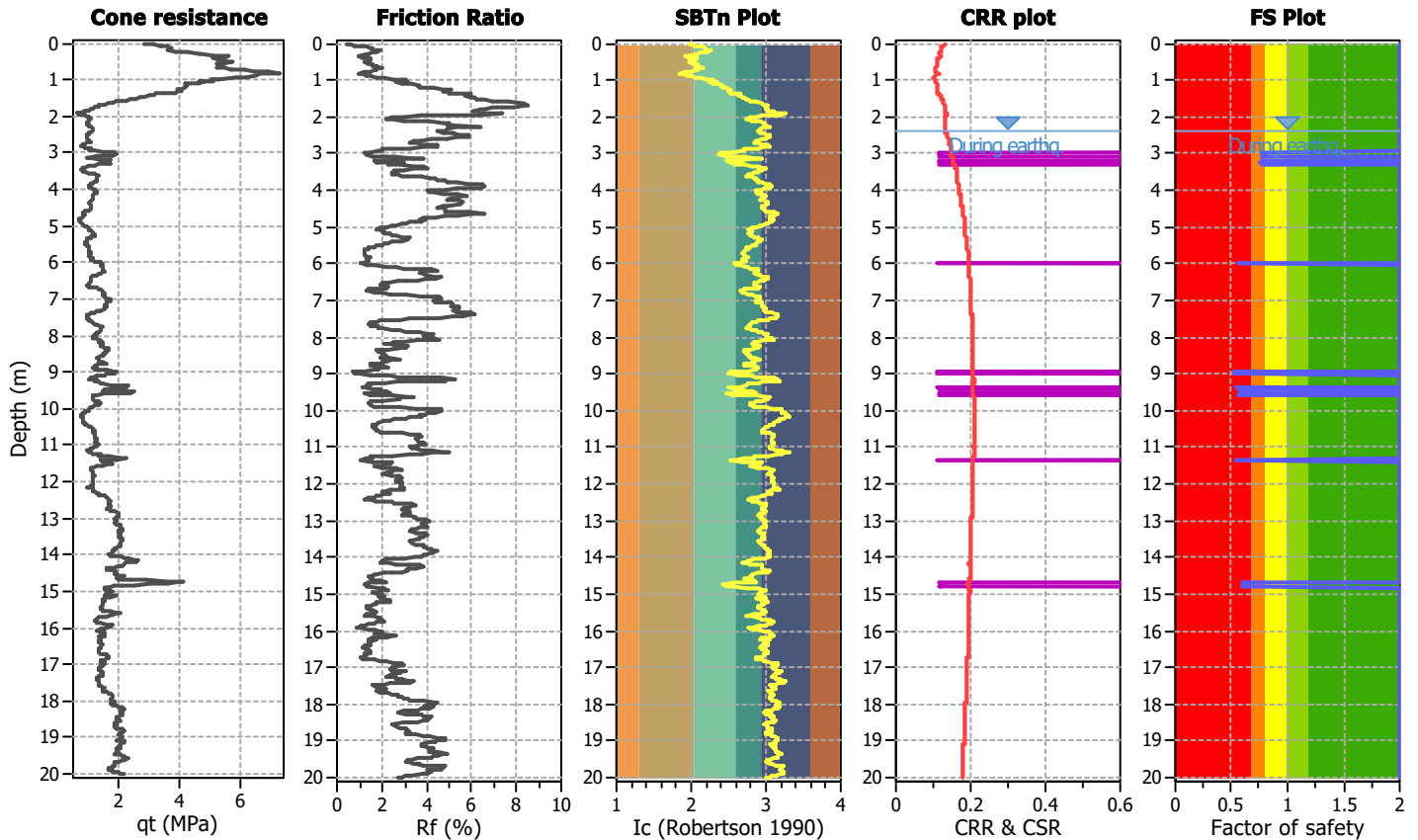
**Project title :**

**Location :**

**CPT file : cptu2**

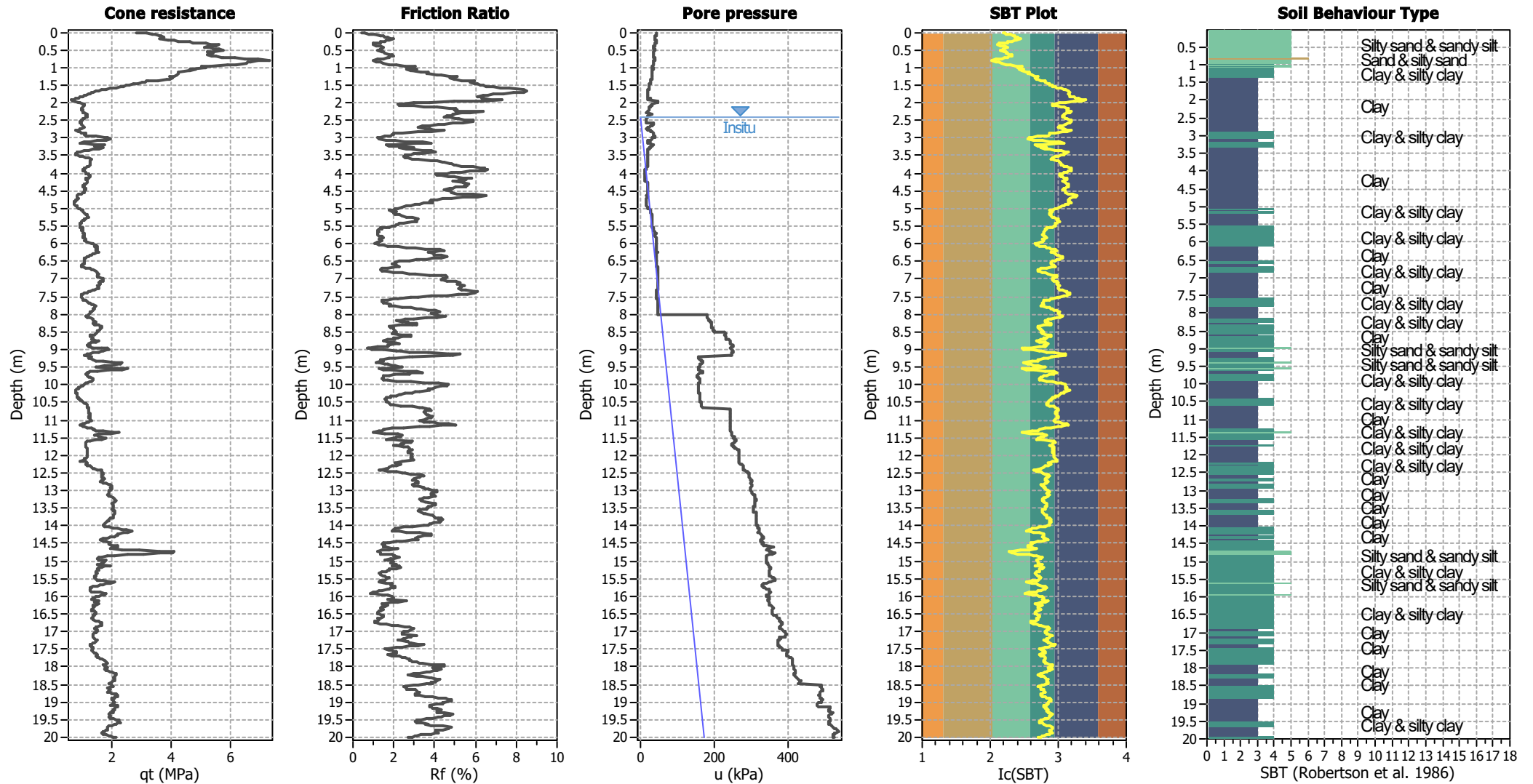
### Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.40 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.40 m	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude $M_w$ :	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.25	Unit weight calculation:	Based on SBT	$K_\sigma$ applied:	Yes	MSF method:	Method based



Zone A<sub>1</sub>: Cyclic liquefaction likely depending on size and duration of cyclic loading  
 Zone A<sub>2</sub>: Cyclic liquefaction and strength loss likely depending on loading and ground geometry  
 Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening  
 Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry










## CPT basic interpretation plots

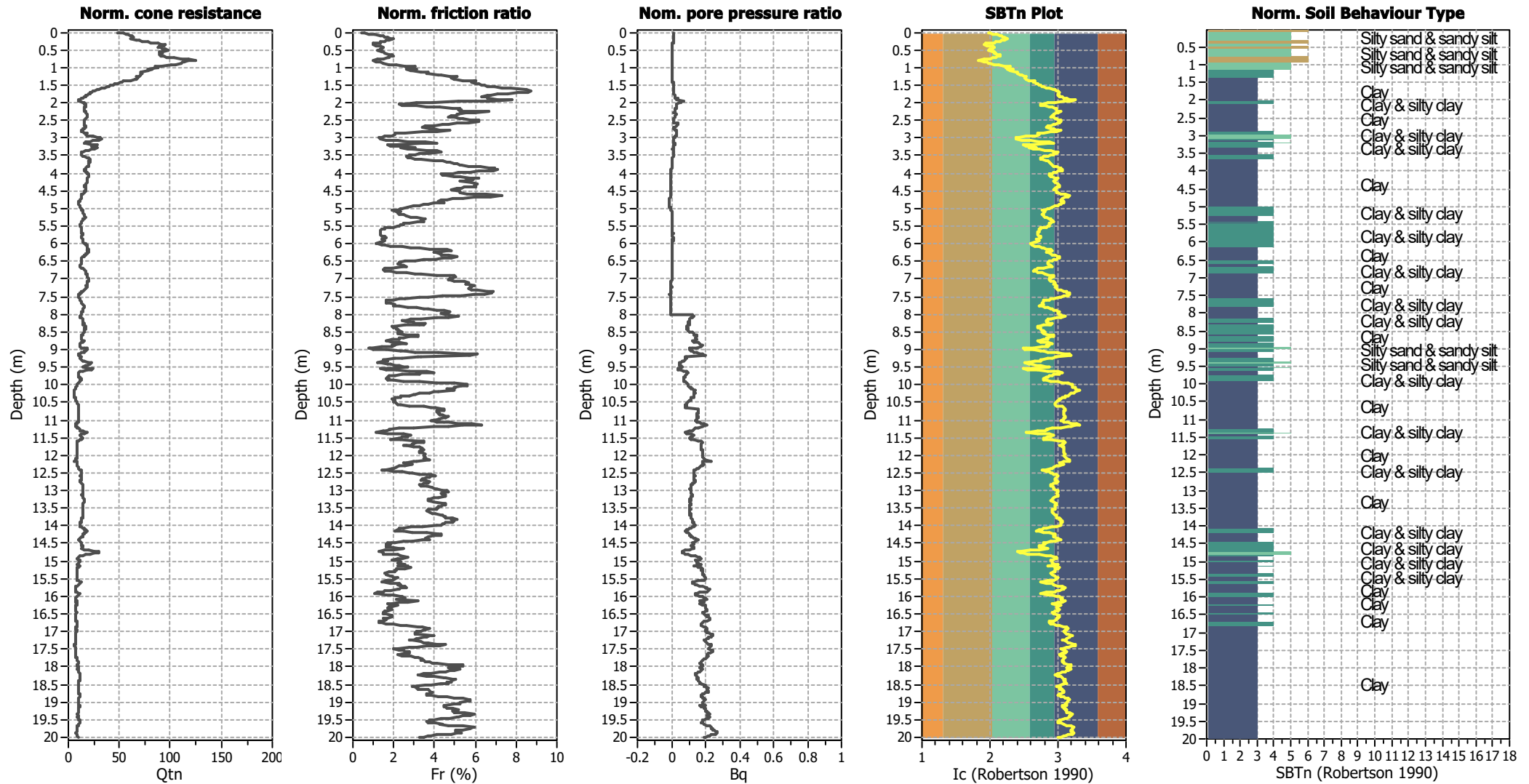


### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.40 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>a</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.40 m	Fill height:	N/A	Limit depth:	N/A

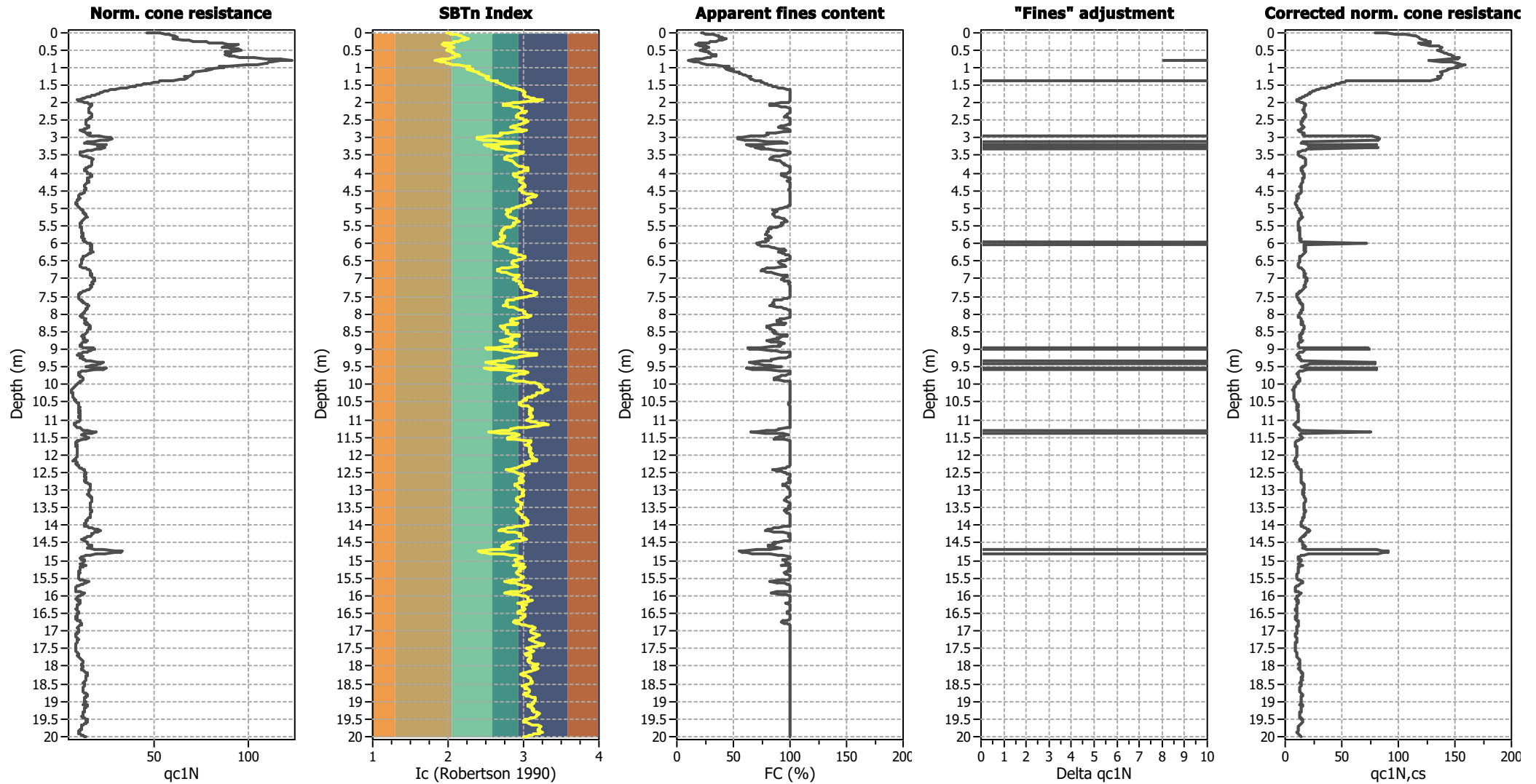
### SBT legend

	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

**CPT basic interpretation plots (normalized)****Input parameters and analysis data**

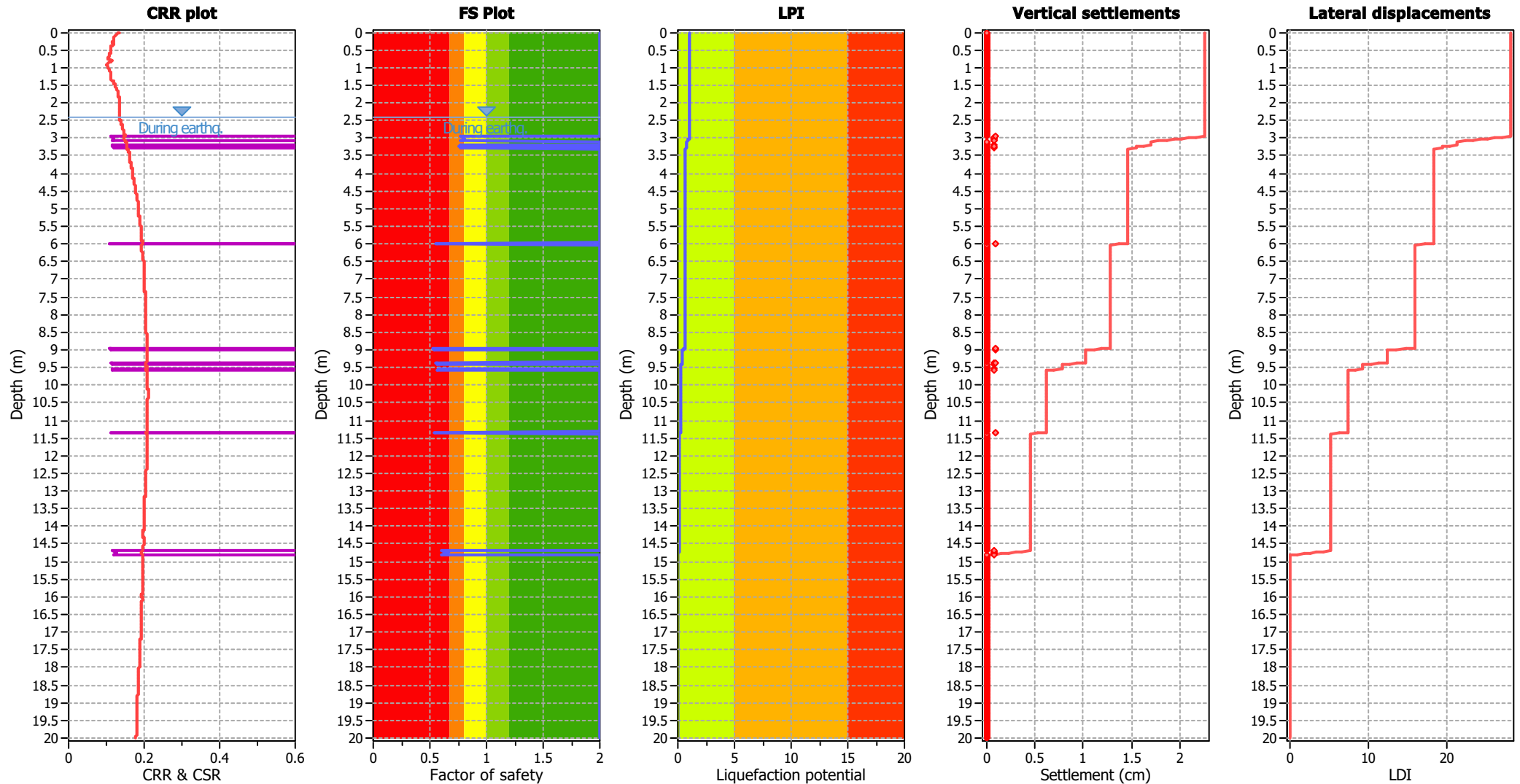
Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.40 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>0</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.40 m	Fill height:	N/A	Limit depth:	N/A



**Liquefaction analysis overall plots (intermediate results)****Input parameters and analysis data**

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.40 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>g</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.40 m	Fill height:	N/A	Limit depth:	N/A

## Liquefaction analysis overall plots



### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.40 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	$K_{\sigma}$ applied:	Yes
Earthquake magnitude $M_w$ :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.40 m	Fill height:	N/A	Limit depth:	N/A

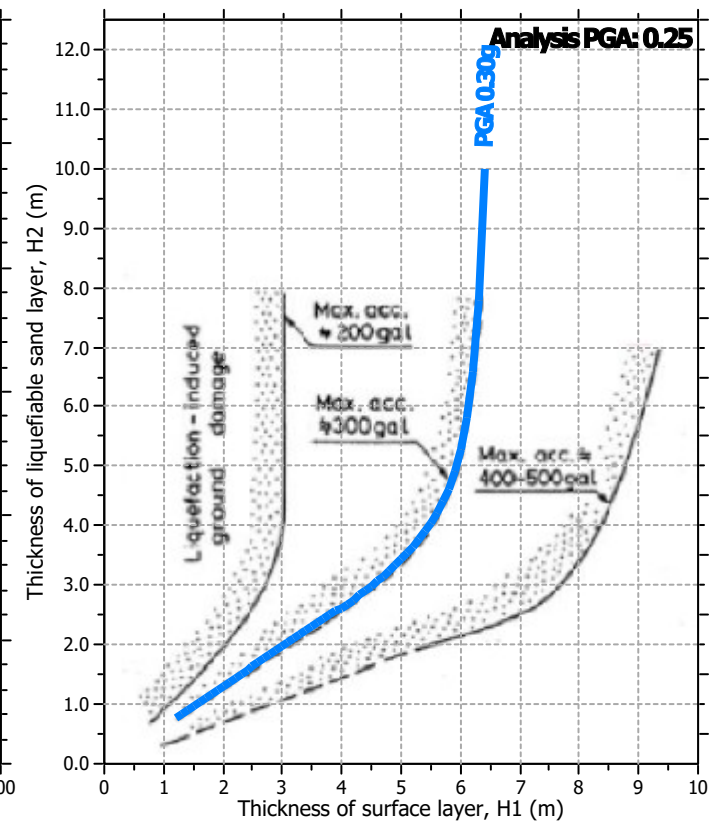
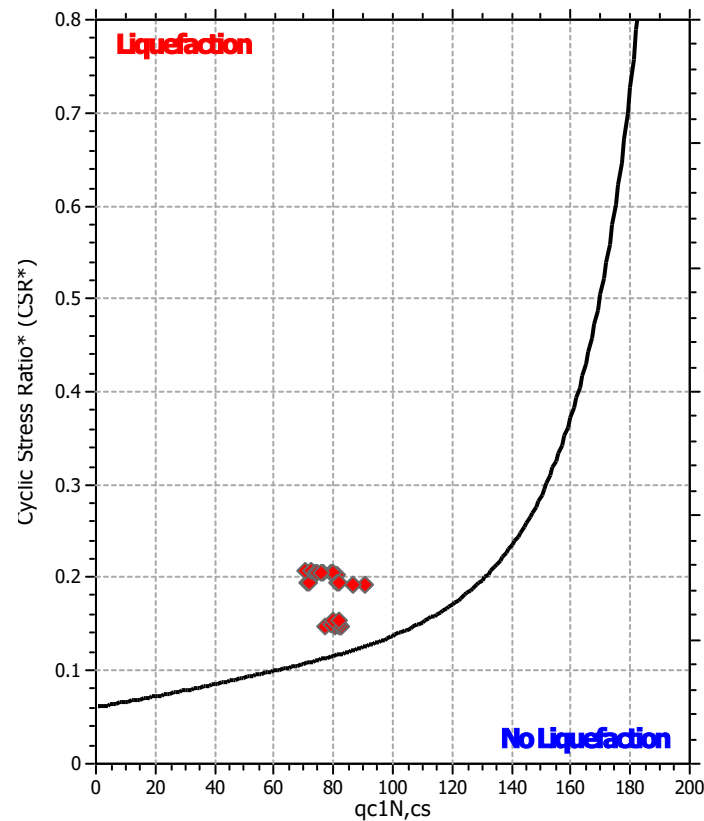
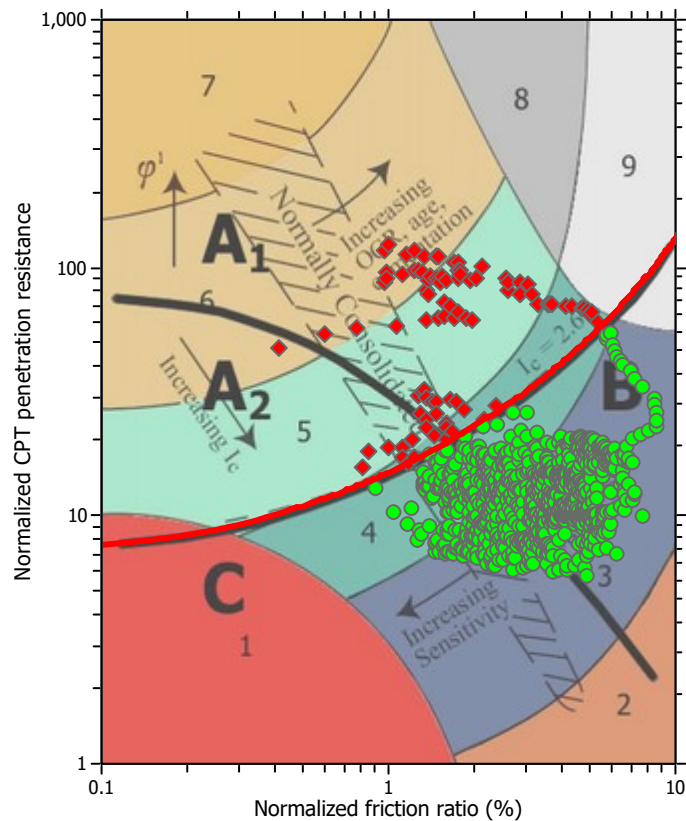
### F.S. color scheme

<span style="color: red;">■</span>	Almost certain it will liquefy
<span style="color: orange;">■</span>	Very likely to liquefy
<span style="color: yellow;">■</span>	Liquefaction and no liq. are equally likely
<span style="color: lightgreen;">■</span>	Unlike to liquefy
<span style="color: green;">■</span>	Almost certain it will not liquefy

### LPI color scheme

<span style="color: red;">■</span>	Very high risk
<span style="color: orange;">■</span>	High risk
<span style="color: yellow;">■</span>	Low risk

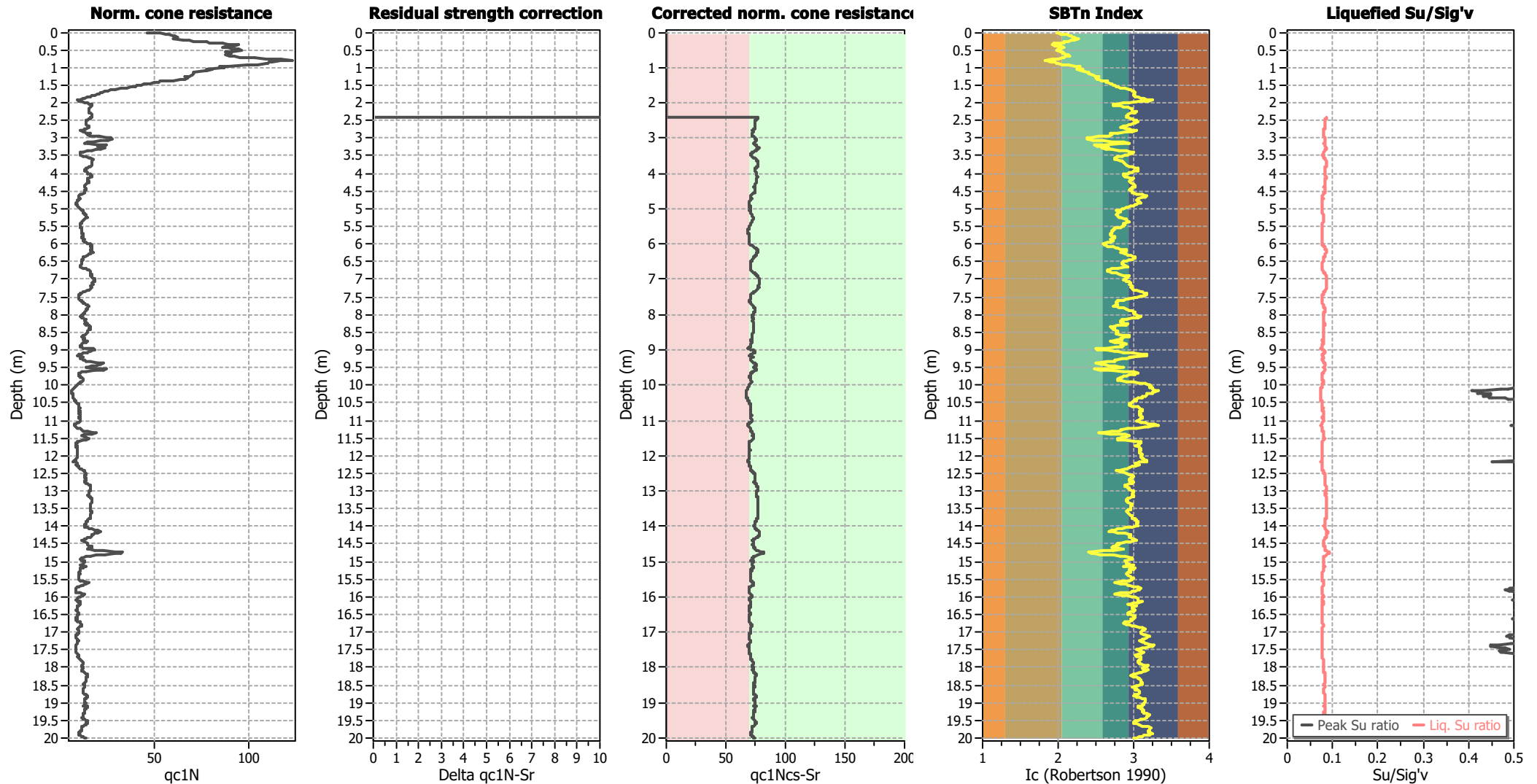
## Liquefaction analysis summary plots



### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.40 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on $I_c$ value	$I_c$ cut-off value:	2.60	$K_{\sigma}$ applied:	Yes
Earthquake magnitude $M_w$ :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.40 m	Fill height:	N/A	Limit depth:	N/A

### Check for strength loss plots (Idriss & Boulanger (2008))



#### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.40 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>g</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.40 m	Fill height:	N/A	Limit depth:	N/A



:: Liquefaction Potential Index calculation data ::											
Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
0.02	2.00	0.00	9.99	0.02	0.00	0.04	2.00	0.00	9.98	0.02	0.00
0.06	2.00	0.00	9.97	0.02	0.00	0.08	2.00	0.00	9.96	0.02	0.00
0.10	2.00	0.00	9.95	0.02	0.00	0.12	2.00	0.00	9.94	0.02	0.00
0.14	2.00	0.00	9.93	0.02	0.00	0.16	2.00	0.00	9.92	0.02	0.00
0.18	2.00	0.00	9.91	0.02	0.00	0.20	2.00	0.00	9.90	0.02	0.00
0.22	2.00	0.00	9.89	0.02	0.00	0.24	2.00	0.00	9.88	0.02	0.00
0.26	2.00	0.00	9.87	0.02	0.00	0.28	2.00	0.00	9.86	0.02	0.00
0.30	2.00	0.00	9.85	0.02	0.00	0.32	2.00	0.00	9.84	0.02	0.00
0.34	2.00	0.00	9.83	0.02	0.00	0.36	2.00	0.00	9.82	0.02	0.00
0.38	2.00	0.00	9.81	0.02	0.00	0.40	2.00	0.00	9.80	0.02	0.00
0.42	2.00	0.00	9.79	0.02	0.00	0.44	2.00	0.00	9.78	0.02	0.00
0.46	2.00	0.00	9.77	0.02	0.00	0.48	2.00	0.00	9.76	0.02	0.00
0.50	2.00	0.00	9.75	0.02	0.00	0.52	2.00	0.00	9.74	0.02	0.00
0.54	2.00	0.00	9.73	0.02	0.00	0.56	2.00	0.00	9.72	0.02	0.00
0.58	2.00	0.00	9.71	0.02	0.00	0.60	2.00	0.00	9.70	0.02	0.00
0.62	2.00	0.00	9.69	0.02	0.00	0.64	2.00	0.00	9.68	0.02	0.00
0.66	2.00	0.00	9.67	0.02	0.00	0.68	2.00	0.00	9.66	0.02	0.00
0.70	2.00	0.00	9.65	0.02	0.00	0.72	2.00	0.00	9.64	0.02	0.00
0.74	2.00	0.00	9.63	0.02	0.00	0.76	2.00	0.00	9.62	0.02	0.00
0.78	2.00	0.00	9.61	0.02	0.00	0.80	2.00	0.00	9.60	0.02	0.00
0.82	2.00	0.00	9.59	0.02	0.00	0.84	2.00	0.00	9.58	0.02	0.00
0.86	2.00	0.00	9.57	0.02	0.00	0.88	2.00	0.00	9.56	0.02	0.00
0.90	2.00	0.00	9.55	0.02	0.00	0.92	2.00	0.00	9.54	0.02	0.00
0.94	2.00	0.00	9.53	0.02	0.00	0.96	2.00	0.00	9.52	0.02	0.00
0.98	2.00	0.00	9.51	0.02	0.00	1.00	2.00	0.00	9.50	0.02	0.00
1.02	2.00	0.00	9.49	0.02	0.00	1.04	2.00	0.00	9.48	0.02	0.00
1.06	2.00	0.00	9.47	0.02	0.00	1.08	2.00	0.00	9.46	0.02	0.00
1.10	2.00	0.00	9.45	0.02	0.00	1.12	2.00	0.00	9.44	0.02	0.00
1.14	2.00	0.00	9.43	0.02	0.00	1.16	2.00	0.00	9.42	0.02	0.00
1.18	2.00	0.00	9.41	0.02	0.00	1.20	2.00	0.00	9.40	0.02	0.00
1.22	2.00	0.00	9.39	0.02	0.00	1.24	2.00	0.00	9.38	0.02	0.00
1.26	2.00	0.00	9.37	0.02	0.00	1.30	2.00	0.00	9.35	0.04	0.00
1.32	2.00	0.00	9.34	0.02	0.00	1.34	2.00	0.00	9.33	0.02	0.00
1.36	2.00	0.00	9.32	0.02	0.00	1.38	2.00	0.00	9.31	0.02	0.00
1.40	2.00	0.00	9.30	0.02	0.00	1.42	2.00	0.00	9.29	0.02	0.00
1.44	2.00	0.00	9.28	0.02	0.00	1.46	2.00	0.00	9.27	0.02	0.00
1.48	2.00	0.00	9.26	0.02	0.00	1.50	2.00	0.00	9.25	0.02	0.00
1.52	2.00	0.00	9.24	0.02	0.00	1.54	2.00	0.00	9.23	0.02	0.00
1.56	2.00	0.00	9.22	0.02	0.00	1.58	2.00	0.00	9.21	0.02	0.00
1.60	2.00	0.00	9.20	0.02	0.00	1.62	2.00	0.00	9.19	0.02	0.00
1.64	2.00	0.00	9.18	0.02	0.00	1.66	2.00	0.00	9.17	0.02	0.00
1.68	2.00	0.00	9.16	0.02	0.00	1.70	2.00	0.00	9.15	0.02	0.00
1.72	2.00	0.00	9.14	0.02	0.00	1.74	2.00	0.00	9.13	0.02	0.00
1.76	2.00	0.00	9.12	0.02	0.00	1.78	2.00	0.00	9.11	0.02	0.00
1.80	2.00	0.00	9.10	0.02	0.00	1.82	2.00	0.00	9.09	0.02	0.00
1.84	2.00	0.00	9.08	0.02	0.00	1.86	2.00	0.00	9.07	0.02	0.00
1.88	2.00	0.00	9.06	0.02	0.00	1.90	2.00	0.00	9.05	0.02	0.00
1.92	2.00	0.00	9.04	0.02	0.00	1.94	2.00	0.00	9.03	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
1.96	2.00	0.00	9.02	0.02	0.00	1.98	2.00	0.00	9.01	0.02	0.00
2.00	2.00	0.00	9.00	0.02	0.00	2.02	2.00	0.00	8.99	0.02	0.00
2.04	2.00	0.00	8.98	0.02	0.00	2.06	2.00	0.00	8.97	0.02	0.00
2.08	2.00	0.00	8.96	0.02	0.00	2.10	2.00	0.00	8.95	0.02	0.00
2.12	2.00	0.00	8.94	0.02	0.00	2.14	2.00	0.00	8.93	0.02	0.00
2.16	2.00	0.00	8.92	0.02	0.00	2.18	2.00	0.00	8.91	0.02	0.00
2.20	2.00	0.00	8.90	0.02	0.00	2.22	2.00	0.00	8.89	0.02	0.00
2.24	2.00	0.00	8.88	0.02	0.00	2.26	2.00	0.00	8.87	0.02	0.00
2.28	2.00	0.00	8.86	0.02	0.00	2.30	2.00	0.00	8.85	0.02	0.00
2.32	2.00	0.00	8.84	0.02	0.00	2.34	2.00	0.00	8.83	0.02	0.00
2.36	2.00	0.00	8.82	0.02	0.00	2.38	2.00	0.00	8.81	0.02	0.00
2.40	2.00	0.00	8.80	0.02	0.00	2.42	2.00	0.00	8.79	0.02	0.00
2.44	2.00	0.00	8.78	0.02	0.00	2.46	2.00	0.00	8.77	0.02	0.00
2.48	2.00	0.00	8.76	0.02	0.00	2.50	2.00	0.00	8.75	0.02	0.00
2.52	2.00	0.00	8.74	0.02	0.00	2.54	2.00	0.00	8.73	0.02	0.00
2.56	2.00	0.00	8.72	0.02	0.00	2.58	2.00	0.00	8.71	0.02	0.00
2.60	2.00	0.00	8.70	0.02	0.00	2.62	2.00	0.00	8.69	0.02	0.00
2.64	2.00	0.00	8.68	0.02	0.00	2.66	2.00	0.00	8.67	0.02	0.00
2.68	2.00	0.00	8.66	0.02	0.00	2.70	2.00	0.00	8.65	0.02	0.00
2.72	2.00	0.00	8.64	0.02	0.00	2.74	2.00	0.00	8.63	0.02	0.00
2.76	2.00	0.00	8.62	0.02	0.00	2.78	2.00	0.00	8.61	0.02	0.00
2.80	2.00	0.00	8.60	0.02	0.00	2.82	2.00	0.00	8.59	0.02	0.00
2.84	2.00	0.00	8.58	0.02	0.00	2.86	2.00	0.00	8.57	0.02	0.00
2.88	2.00	0.00	8.56	0.02	0.00	2.90	2.00	0.00	8.55	0.02	0.00
2.92	2.00	0.00	8.54	0.02	0.00	2.94	2.00	0.00	8.53	0.02	0.00
2.96	0.77	0.23	8.52	0.02	0.04	2.98	0.79	0.21	8.51	0.02	0.04
3.00	0.80	0.20	8.50	0.02	0.03	3.02	0.80	0.20	8.49	0.02	0.03
3.04	0.80	0.20	8.48	0.02	0.03	3.06	0.79	0.21	8.47	0.02	0.04
3.08	0.77	0.23	8.46	0.02	0.04	3.10	2.00	0.00	8.45	0.02	0.00
3.12	2.00	0.00	8.44	0.02	0.00	3.14	2.00	0.00	8.43	0.02	0.00
3.16	2.00	0.00	8.42	0.02	0.00	3.18	2.00	0.00	8.41	0.02	0.00
3.20	0.77	0.23	8.40	0.02	0.04	3.22	0.76	0.24	8.39	0.02	0.04
3.24	2.00	0.00	8.38	0.02	0.00	3.26	2.00	0.00	8.37	0.02	0.00
3.28	0.77	0.23	8.36	0.02	0.04	3.30	2.00	0.00	8.35	0.02	0.00
3.32	2.00	0.00	8.34	0.02	0.00	3.34	2.00	0.00	8.33	0.02	0.00
3.36	2.00	0.00	8.32	0.02	0.00	3.38	2.00	0.00	8.31	0.02	0.00
3.40	2.00	0.00	8.30	0.02	0.00	3.42	2.00	0.00	8.29	0.02	0.00
3.44	2.00	0.00	8.28	0.02	0.00	3.46	2.00	0.00	8.27	0.02	0.00
3.48	2.00	0.00	8.26	0.02	0.00	3.50	2.00	0.00	8.25	0.02	0.00
3.52	2.00	0.00	8.24	0.02	0.00	3.54	2.00	0.00	8.23	0.02	0.00
3.56	2.00	0.00	8.22	0.02	0.00	3.58	2.00	0.00	8.21	0.02	0.00
3.60	2.00	0.00	8.20	0.02	0.00	3.62	2.00	0.00	8.19	0.02	0.00
3.64	2.00	0.00	8.18	0.02	0.00	3.66	2.00	0.00	8.17	0.02	0.00
3.68	2.00	0.00	8.16	0.02	0.00	3.70	2.00	0.00	8.15	0.02	0.00
3.72	2.00	0.00	8.14	0.02	0.00	3.74	2.00	0.00	8.13	0.02	0.00
3.76	2.00	0.00	8.12	0.02	0.00	3.78	2.00	0.00	8.11	0.02	0.00
3.80	2.00	0.00	8.10	0.02	0.00	3.82	2.00	0.00	8.09	0.02	0.00
3.84	2.00	0.00	8.08	0.02	0.00	3.86	2.00	0.00	8.07	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
3.88	2.00	0.00	8.06	0.02	0.00	3.90	2.00	0.00	8.05	0.02	0.00
3.92	2.00	0.00	8.04	0.02	0.00	3.94	2.00	0.00	8.03	0.02	0.00
3.96	2.00	0.00	8.02	0.02	0.00	3.98	2.00	0.00	8.01	0.02	0.00
4.00	2.00	0.00	8.00	0.02	0.00	4.02	2.00	0.00	7.99	0.02	0.00
4.04	2.00	0.00	7.98	0.02	0.00	4.06	2.00	0.00	7.97	0.02	0.00
4.08	2.00	0.00	7.96	0.02	0.00	4.10	2.00	0.00	7.95	0.02	0.00
4.12	2.00	0.00	7.94	0.02	0.00	4.14	2.00	0.00	7.93	0.02	0.00
4.16	2.00	0.00	7.92	0.02	0.00	4.18	2.00	0.00	7.91	0.02	0.00
4.20	2.00	0.00	7.90	0.02	0.00	4.22	2.00	0.00	7.89	0.02	0.00
4.24	2.00	0.00	7.88	0.02	0.00	4.26	2.00	0.00	7.87	0.02	0.00
4.28	2.00	0.00	7.86	0.02	0.00	4.30	2.00	0.00	7.85	0.02	0.00
4.32	2.00	0.00	7.84	0.02	0.00	4.34	2.00	0.00	7.83	0.02	0.00
4.36	2.00	0.00	7.82	0.02	0.00	4.38	2.00	0.00	7.81	0.02	0.00
4.40	2.00	0.00	7.80	0.02	0.00	4.42	2.00	0.00	7.79	0.02	0.00
4.44	2.00	0.00	7.78	0.02	0.00	4.46	2.00	0.00	7.77	0.02	0.00
4.48	2.00	0.00	7.76	0.02	0.00	4.50	2.00	0.00	7.75	0.02	0.00
4.52	2.00	0.00	7.74	0.02	0.00	4.54	2.00	0.00	7.73	0.02	0.00
4.56	2.00	0.00	7.72	0.02	0.00	4.58	2.00	0.00	7.71	0.02	0.00
4.60	2.00	0.00	7.70	0.02	0.00	4.62	2.00	0.00	7.69	0.02	0.00
4.64	2.00	0.00	7.68	0.02	0.00	4.66	2.00	0.00	7.67	0.02	0.00
4.68	2.00	0.00	7.66	0.02	0.00	4.70	2.00	0.00	7.65	0.02	0.00
4.72	2.00	0.00	7.64	0.02	0.00	4.74	2.00	0.00	7.63	0.02	0.00
4.76	2.00	0.00	7.62	0.02	0.00	4.78	2.00	0.00	7.61	0.02	0.00
4.80	2.00	0.00	7.60	0.02	0.00	4.82	2.00	0.00	7.59	0.02	0.00
4.84	2.00	0.00	7.58	0.02	0.00	4.86	2.00	0.00	7.57	0.02	0.00
4.88	2.00	0.00	7.56	0.02	0.00	4.90	2.00	0.00	7.55	0.02	0.00
4.92	2.00	0.00	7.54	0.02	0.00	4.94	2.00	0.00	7.53	0.02	0.00
4.96	2.00	0.00	7.52	0.02	0.00	4.98	2.00	0.00	7.51	0.02	0.00
5.00	2.00	0.00	7.50	0.02	0.00	5.02	2.00	0.00	7.49	0.02	0.00
5.04	2.00	0.00	7.48	0.02	0.00	5.06	2.00	0.00	7.47	0.02	0.00
5.08	2.00	0.00	7.46	0.02	0.00	5.10	2.00	0.00	7.45	0.02	0.00
5.12	2.00	0.00	7.44	0.02	0.00	5.14	2.00	0.00	7.43	0.02	0.00
5.16	2.00	0.00	7.42	0.02	0.00	5.18	2.00	0.00	7.41	0.02	0.00
5.20	2.00	0.00	7.40	0.02	0.00	5.22	2.00	0.00	7.39	0.02	0.00
5.24	2.00	0.00	7.38	0.02	0.00	5.26	2.00	0.00	7.37	0.02	0.00
5.28	2.00	0.00	7.36	0.02	0.00	5.30	2.00	0.00	7.35	0.02	0.00
5.32	2.00	0.00	7.34	0.02	0.00	5.34	2.00	0.00	7.33	0.02	0.00
5.36	2.00	0.00	7.32	0.02	0.00	5.38	2.00	0.00	7.31	0.02	0.00
5.40	2.00	0.00	7.30	0.02	0.00	5.42	2.00	0.00	7.29	0.02	0.00
5.44	2.00	0.00	7.28	0.02	0.00	5.46	2.00	0.00	7.27	0.02	0.00
5.48	2.00	0.00	7.26	0.02	0.00	5.50	2.00	0.00	7.25	0.02	0.00
5.52	2.00	0.00	7.24	0.02	0.00	5.54	2.00	0.00	7.23	0.02	0.00
5.56	2.00	0.00	7.22	0.02	0.00	5.58	2.00	0.00	7.21	0.02	0.00
5.60	2.00	0.00	7.20	0.02	0.00	5.62	2.00	0.00	7.19	0.02	0.00
5.64	2.00	0.00	7.18	0.02	0.00	5.66	2.00	0.00	7.17	0.02	0.00
5.68	2.00	0.00	7.16	0.02	0.00	5.70	2.00	0.00	7.15	0.02	0.00
5.72	2.00	0.00	7.14	0.02	0.00	5.74	2.00	0.00	7.13	0.02	0.00
5.76	2.00	0.00	7.12	0.02	0.00	5.78	2.00	0.00	7.11	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
5.80	2.00	0.00	7.10	0.02	0.00	5.82	2.00	0.00	7.09	0.02	0.00
5.84	2.00	0.00	7.08	0.02	0.00	5.86	2.00	0.00	7.07	0.02	0.00
5.88	2.00	0.00	7.06	0.02	0.00	5.90	2.00	0.00	7.05	0.02	0.00
5.92	2.00	0.00	7.04	0.02	0.00	5.94	2.00	0.00	7.03	0.02	0.00
5.96	2.00	0.00	7.02	0.02	0.00	5.98	0.56	0.44	7.01	0.02	0.06
6.00	0.56	0.44	7.00	0.02	0.06	6.02	2.00	0.00	6.99	0.02	0.00
6.04	2.00	0.00	6.98	0.02	0.00	6.06	2.00	0.00	6.97	0.02	0.00
6.08	2.00	0.00	6.96	0.02	0.00	6.10	2.00	0.00	6.95	0.02	0.00
6.12	2.00	0.00	6.94	0.02	0.00	6.14	2.00	0.00	6.93	0.02	0.00
6.16	2.00	0.00	6.92	0.02	0.00	6.18	2.00	0.00	6.91	0.02	0.00
6.20	2.00	0.00	6.90	0.02	0.00	6.22	2.00	0.00	6.89	0.02	0.00
6.24	2.00	0.00	6.88	0.02	0.00	6.26	2.00	0.00	6.87	0.02	0.00
6.28	2.00	0.00	6.86	0.02	0.00	6.30	2.00	0.00	6.85	0.02	0.00
6.32	2.00	0.00	6.84	0.02	0.00	6.34	2.00	0.00	6.83	0.02	0.00
6.36	2.00	0.00	6.82	0.02	0.00	6.38	2.00	0.00	6.81	0.02	0.00
6.40	2.00	0.00	6.80	0.02	0.00	6.42	2.00	0.00	6.79	0.02	0.00
6.44	2.00	0.00	6.78	0.02	0.00	6.46	2.00	0.00	6.77	0.02	0.00
6.48	2.00	0.00	6.76	0.02	0.00	6.50	2.00	0.00	6.75	0.02	0.00
6.52	2.00	0.00	6.74	0.02	0.00	6.54	2.00	0.00	6.73	0.02	0.00
6.56	2.00	0.00	6.72	0.02	0.00	6.58	2.00	0.00	6.71	0.02	0.00
6.60	2.00	0.00	6.70	0.02	0.00	6.62	2.00	0.00	6.69	0.02	0.00
6.64	2.00	0.00	6.68	0.02	0.00	6.66	2.00	0.00	6.67	0.02	0.00
6.68	2.00	0.00	6.66	0.02	0.00	6.70	2.00	0.00	6.65	0.02	0.00
6.72	2.00	0.00	6.64	0.02	0.00	6.74	2.00	0.00	6.63	0.02	0.00
6.76	2.00	0.00	6.62	0.02	0.00	6.78	2.00	0.00	6.61	0.02	0.00
6.80	2.00	0.00	6.60	0.02	0.00	6.82	2.00	0.00	6.59	0.02	0.00
6.84	2.00	0.00	6.58	0.02	0.00	6.86	2.00	0.00	6.57	0.02	0.00
6.88	2.00	0.00	6.56	0.02	0.00	6.90	2.00	0.00	6.55	0.02	0.00
6.92	2.00	0.00	6.54	0.02	0.00	6.94	2.00	0.00	6.53	0.02	0.00
6.96	2.00	0.00	6.52	0.02	0.00	6.98	2.00	0.00	6.51	0.02	0.00
7.00	2.00	0.00	6.50	0.02	0.00	7.02	2.00	0.00	6.49	0.02	0.00
7.04	2.00	0.00	6.48	0.02	0.00	7.06	2.00	0.00	6.47	0.02	0.00
7.08	2.00	0.00	6.46	0.02	0.00	7.10	2.00	0.00	6.45	0.02	0.00
7.12	2.00	0.00	6.44	0.02	0.00	7.14	2.00	0.00	6.43	0.02	0.00
7.16	2.00	0.00	6.42	0.02	0.00	7.18	2.00	0.00	6.41	0.02	0.00
7.20	2.00	0.00	6.40	0.02	0.00	7.22	2.00	0.00	6.39	0.02	0.00
7.24	2.00	0.00	6.38	0.02	0.00	7.26	2.00	0.00	6.37	0.02	0.00
7.28	2.00	0.00	6.36	0.02	0.00	7.30	2.00	0.00	6.35	0.02	0.00
7.32	2.00	0.00	6.34	0.02	0.00	7.34	2.00	0.00	6.33	0.02	0.00
7.36	2.00	0.00	6.32	0.02	0.00	7.38	2.00	0.00	6.31	0.02	0.00
7.40	2.00	0.00	6.30	0.02	0.00	7.42	2.00	0.00	6.29	0.02	0.00
7.44	2.00	0.00	6.28	0.02	0.00	7.46	2.00	0.00	6.27	0.02	0.00
7.48	2.00	0.00	6.26	0.02	0.00	7.50	2.00	0.00	6.25	0.02	0.00
7.52	2.00	0.00	6.24	0.02	0.00	7.54	2.00	0.00	6.23	0.02	0.00
7.56	2.00	0.00	6.22	0.02	0.00	7.58	2.00	0.00	6.21	0.02	0.00
7.60	2.00	0.00	6.20	0.02	0.00	7.62	2.00	0.00	6.19	0.02	0.00
7.64	2.00	0.00	6.18	0.02	0.00	7.66	2.00	0.00	6.17	0.02	0.00
7.68	2.00	0.00	6.16	0.02	0.00	7.70	2.00	0.00	6.15	0.02	0.00



**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
7.72	2.00	0.00	6.14	0.02	0.00	7.74	2.00	0.00	6.13	0.02	0.00
7.76	2.00	0.00	6.12	0.02	0.00	7.78	2.00	0.00	6.11	0.02	0.00
7.80	2.00	0.00	6.10	0.02	0.00	7.82	2.00	0.00	6.09	0.02	0.00
7.84	2.00	0.00	6.08	0.02	0.00	7.86	2.00	0.00	6.07	0.02	0.00
7.88	2.00	0.00	6.06	0.02	0.00	7.90	2.00	0.00	6.05	0.02	0.00
7.92	2.00	0.00	6.04	0.02	0.00	7.94	2.00	0.00	6.03	0.02	0.00
7.96	2.00	0.00	6.02	0.02	0.00	7.98	2.00	0.00	6.01	0.02	0.00
8.00	2.00	0.00	6.00	0.02	0.00	8.02	2.00	0.00	5.99	0.02	0.00
8.04	2.00	0.00	5.98	0.02	0.00	8.06	2.00	0.00	5.97	0.02	0.00
8.08	2.00	0.00	5.96	0.02	0.00	8.10	2.00	0.00	5.95	0.02	0.00
8.12	2.00	0.00	5.94	0.02	0.00	8.14	2.00	0.00	5.93	0.02	0.00
8.16	2.00	0.00	5.92	0.02	0.00	8.18	2.00	0.00	5.91	0.02	0.00
8.20	2.00	0.00	5.90	0.02	0.00	8.22	2.00	0.00	5.89	0.02	0.00
8.24	2.00	0.00	5.88	0.02	0.00	8.26	2.00	0.00	5.87	0.02	0.00
8.28	2.00	0.00	5.86	0.02	0.00	8.30	2.00	0.00	5.85	0.02	0.00
8.32	2.00	0.00	5.84	0.02	0.00	8.34	2.00	0.00	5.83	0.02	0.00
8.36	2.00	0.00	5.82	0.02	0.00	8.38	2.00	0.00	5.81	0.02	0.00
8.40	2.00	0.00	5.80	0.02	0.00	8.42	2.00	0.00	5.79	0.02	0.00
8.44	2.00	0.00	5.78	0.02	0.00	8.46	2.00	0.00	5.77	0.02	0.00
8.48	2.00	0.00	5.76	0.02	0.00	8.50	2.00	0.00	5.75	0.02	0.00
8.52	2.00	0.00	5.74	0.02	0.00	8.54	2.00	0.00	5.73	0.02	0.00
8.56	2.00	0.00	5.72	0.02	0.00	8.58	2.00	0.00	5.71	0.02	0.00
8.60	2.00	0.00	5.70	0.02	0.00	8.62	2.00	0.00	5.69	0.02	0.00
8.64	2.00	0.00	5.68	0.02	0.00	8.66	2.00	0.00	5.67	0.02	0.00
8.68	2.00	0.00	5.66	0.02	0.00	8.70	2.00	0.00	5.65	0.02	0.00
8.72	2.00	0.00	5.64	0.02	0.00	8.74	2.00	0.00	5.63	0.02	0.00
8.76	2.00	0.00	5.62	0.02	0.00	8.78	2.00	0.00	5.61	0.02	0.00
8.80	2.00	0.00	5.60	0.02	0.00	8.82	2.00	0.00	5.59	0.02	0.00
8.84	2.00	0.00	5.58	0.02	0.00	8.86	2.00	0.00	5.57	0.02	0.00
8.88	2.00	0.00	5.56	0.02	0.00	8.90	2.00	0.00	5.55	0.02	0.00
8.92	2.00	0.00	5.54	0.02	0.00	8.94	2.00	0.00	5.53	0.02	0.00
8.96	0.52	0.48	5.52	0.02	0.05	8.98	0.53	0.47	5.51	0.02	0.05
9.00	0.54	0.46	5.50	0.02	0.05	9.02	2.00	0.00	5.49	0.02	0.00
9.04	2.00	0.00	5.48	0.02	0.00	9.06	2.00	0.00	5.47	0.02	0.00
9.08	2.00	0.00	5.46	0.02	0.00	9.10	2.00	0.00	5.45	0.02	0.00
9.12	2.00	0.00	5.44	0.02	0.00	9.14	2.00	0.00	5.43	0.02	0.00
9.16	2.00	0.00	5.42	0.02	0.00	9.18	2.00	0.00	5.41	0.02	0.00
9.20	2.00	0.00	5.40	0.02	0.00	9.22	2.00	0.00	5.39	0.02	0.00
9.24	2.00	0.00	5.38	0.02	0.00	9.26	2.00	0.00	5.37	0.02	0.00
9.28	2.00	0.00	5.36	0.02	0.00	9.30	2.00	0.00	5.35	0.02	0.00
9.32	2.00	0.00	5.34	0.02	0.00	9.34	2.00	0.00	5.33	0.02	0.00
9.36	0.55	0.45	5.32	0.02	0.05	9.38	0.56	0.44	5.31	0.02	0.05
9.40	0.56	0.44	5.30	0.02	0.05	9.42	2.00	0.00	5.29	0.02	0.00
9.44	2.00	0.00	5.28	0.02	0.00	9.46	2.00	0.00	5.27	0.02	0.00
9.48	2.00	0.00	5.26	0.02	0.00	9.50	2.00	0.00	5.25	0.02	0.00
9.52	2.00	0.00	5.24	0.02	0.00	9.54	0.57	0.43	5.23	0.02	0.04
9.56	0.57	0.43	5.22	0.02	0.05	9.58	2.00	0.00	5.21	0.02	0.00
9.60	2.00	0.00	5.20	0.02	0.00	9.62	2.00	0.00	5.19	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
9.64	2.00	0.00	5.18	0.02	0.00	9.66	2.00	0.00	5.17	0.02	0.00
9.68	2.00	0.00	5.16	0.02	0.00	9.70	2.00	0.00	5.15	0.02	0.00
9.72	2.00	0.00	5.14	0.02	0.00	9.74	2.00	0.00	5.13	0.02	0.00
9.76	2.00	0.00	5.12	0.02	0.00	9.78	2.00	0.00	5.11	0.02	0.00
9.80	2.00	0.00	5.10	0.02	0.00	9.82	2.00	0.00	5.09	0.02	0.00
9.84	2.00	0.00	5.08	0.02	0.00	9.86	2.00	0.00	5.07	0.02	0.00
9.88	2.00	0.00	5.06	0.02	0.00	9.90	2.00	0.00	5.05	0.02	0.00
9.92	2.00	0.00	5.04	0.02	0.00	9.94	2.00	0.00	5.03	0.02	0.00
9.96	2.00	0.00	5.02	0.02	0.00	9.98	2.00	0.00	5.01	0.02	0.00
10.00	2.00	0.00	5.00	0.02	0.00	10.02	2.00	0.00	4.99	0.02	0.00
10.04	2.00	0.00	4.98	0.02	0.00	10.06	2.00	0.00	4.97	0.02	0.00
10.08	2.00	0.00	4.96	0.02	0.00	10.10	2.00	0.00	4.95	0.02	0.00
10.12	2.00	0.00	4.94	0.02	0.00	10.14	2.00	0.00	4.93	0.02	0.00
10.16	2.00	0.00	4.92	0.02	0.00	10.18	2.00	0.00	4.91	0.02	0.00
10.20	2.00	0.00	4.90	0.02	0.00	10.22	2.00	0.00	4.89	0.02	0.00
10.24	2.00	0.00	4.88	0.02	0.00	10.26	2.00	0.00	4.87	0.02	0.00
10.28	2.00	0.00	4.86	0.02	0.00	10.30	2.00	0.00	4.85	0.02	0.00
10.32	2.00	0.00	4.84	0.02	0.00	10.34	2.00	0.00	4.83	0.02	0.00
10.36	2.00	0.00	4.82	0.02	0.00	10.38	2.00	0.00	4.81	0.02	0.00
10.40	2.00	0.00	4.80	0.02	0.00	10.42	2.00	0.00	4.79	0.02	0.00
10.44	2.00	0.00	4.78	0.02	0.00	10.46	2.00	0.00	4.77	0.02	0.00
10.48	2.00	0.00	4.76	0.02	0.00	10.50	2.00	0.00	4.75	0.02	0.00
10.52	2.00	0.00	4.74	0.02	0.00	10.54	2.00	0.00	4.73	0.02	0.00
10.56	2.00	0.00	4.72	0.02	0.00	10.58	2.00	0.00	4.71	0.02	0.00
10.60	2.00	0.00	4.70	0.02	0.00	10.62	2.00	0.00	4.69	0.02	0.00
10.64	2.00	0.00	4.68	0.02	0.00	10.66	2.00	0.00	4.67	0.02	0.00
10.68	2.00	0.00	4.66	0.02	0.00	10.70	2.00	0.00	4.65	0.02	0.00
10.72	2.00	0.00	4.64	0.02	0.00	10.74	2.00	0.00	4.63	0.02	0.00
10.76	2.00	0.00	4.62	0.02	0.00	10.78	2.00	0.00	4.61	0.02	0.00
10.80	2.00	0.00	4.60	0.02	0.00	10.82	2.00	0.00	4.59	0.02	0.00
10.84	2.00	0.00	4.58	0.02	0.00	10.86	2.00	0.00	4.57	0.02	0.00
10.88	2.00	0.00	4.56	0.02	0.00	10.90	2.00	0.00	4.55	0.02	0.00
10.92	2.00	0.00	4.54	0.02	0.00	10.94	2.00	0.00	4.53	0.02	0.00
10.96	2.00	0.00	4.52	0.02	0.00	10.98	2.00	0.00	4.51	0.02	0.00
11.00	2.00	0.00	4.50	0.02	0.00	11.02	2.00	0.00	4.49	0.02	0.00
11.04	2.00	0.00	4.48	0.02	0.00	11.06	2.00	0.00	4.47	0.02	0.00
11.08	2.00	0.00	4.46	0.02	0.00	11.10	2.00	0.00	4.45	0.02	0.00
11.12	2.00	0.00	4.44	0.02	0.00	11.14	2.00	0.00	4.43	0.02	0.00
11.16	2.00	0.00	4.42	0.02	0.00	11.18	2.00	0.00	4.41	0.02	0.00
11.20	2.00	0.00	4.40	0.02	0.00	11.22	2.00	0.00	4.39	0.02	0.00
11.24	2.00	0.00	4.38	0.02	0.00	11.26	2.00	0.00	4.37	0.02	0.00
11.28	2.00	0.00	4.36	0.02	0.00	11.30	2.00	0.00	4.35	0.02	0.00
11.32	2.00	0.00	4.34	0.02	0.00	11.34	0.54	0.46	4.33	0.02	0.04
11.36	0.55	0.45	4.32	0.02	0.04	11.38	2.00	0.00	4.31	0.02	0.00
11.40	2.00	0.00	4.30	0.02	0.00	11.42	2.00	0.00	4.29	0.02	0.00
11.44	2.00	0.00	4.28	0.02	0.00	11.46	2.00	0.00	4.27	0.02	0.00
11.48	2.00	0.00	4.26	0.02	0.00	11.50	2.00	0.00	4.25	0.02	0.00
11.52	2.00	0.00	4.24	0.02	0.00	11.54	2.00	0.00	4.23	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
11.56	2.00	0.00	4.22	0.02	0.00	11.58	2.00	0.00	4.21	0.02	0.00
11.60	2.00	0.00	4.20	0.02	0.00	11.62	2.00	0.00	4.19	0.02	0.00
11.64	2.00	0.00	4.18	0.02	0.00	11.66	2.00	0.00	4.17	0.02	0.00
11.68	2.00	0.00	4.16	0.02	0.00	11.70	2.00	0.00	4.15	0.02	0.00
11.72	2.00	0.00	4.14	0.02	0.00	11.74	2.00	0.00	4.13	0.02	0.00
11.76	2.00	0.00	4.12	0.02	0.00	11.78	2.00	0.00	4.11	0.02	0.00
11.80	2.00	0.00	4.10	0.02	0.00	11.82	2.00	0.00	4.09	0.02	0.00
11.84	2.00	0.00	4.08	0.02	0.00	11.86	2.00	0.00	4.07	0.02	0.00
11.88	2.00	0.00	4.06	0.02	0.00	11.90	2.00	0.00	4.05	0.02	0.00
11.92	2.00	0.00	4.04	0.02	0.00	11.94	2.00	0.00	4.03	0.02	0.00
11.96	2.00	0.00	4.02	0.02	0.00	11.98	2.00	0.00	4.01	0.02	0.00
12.00	2.00	0.00	4.00	0.02	0.00	12.02	2.00	0.00	3.99	0.02	0.00
12.04	2.00	0.00	3.98	0.02	0.00	12.06	2.00	0.00	3.97	0.02	0.00
12.08	2.00	0.00	3.96	0.02	0.00	12.10	2.00	0.00	3.95	0.02	0.00
12.12	2.00	0.00	3.94	0.02	0.00	12.14	2.00	0.00	3.93	0.02	0.00
12.16	2.00	0.00	3.92	0.02	0.00	12.18	2.00	0.00	3.91	0.02	0.00
12.20	2.00	0.00	3.90	0.02	0.00	12.22	2.00	0.00	3.89	0.02	0.00
12.24	2.00	0.00	3.88	0.02	0.00	12.26	2.00	0.00	3.87	0.02	0.00
12.28	2.00	0.00	3.86	0.02	0.00	12.30	2.00	0.00	3.85	0.02	0.00
12.32	2.00	0.00	3.84	0.02	0.00	12.34	2.00	0.00	3.83	0.02	0.00
12.36	2.00	0.00	3.82	0.02	0.00	12.38	2.00	0.00	3.81	0.02	0.00
12.40	2.00	0.00	3.80	0.02	0.00	12.42	2.00	0.00	3.79	0.02	0.00
12.44	2.00	0.00	3.78	0.02	0.00	12.46	2.00	0.00	3.77	0.02	0.00
12.48	2.00	0.00	3.76	0.02	0.00	12.50	2.00	0.00	3.75	0.02	0.00
12.52	2.00	0.00	3.74	0.02	0.00	12.54	2.00	0.00	3.73	0.02	0.00
12.56	2.00	0.00	3.72	0.02	0.00	12.58	2.00	0.00	3.71	0.02	0.00
12.60	2.00	0.00	3.70	0.02	0.00	12.62	2.00	0.00	3.69	0.02	0.00
12.64	2.00	0.00	3.68	0.02	0.00	12.66	2.00	0.00	3.67	0.02	0.00
12.68	2.00	0.00	3.66	0.02	0.00	12.70	2.00	0.00	3.65	0.02	0.00
12.72	2.00	0.00	3.64	0.02	0.00	12.74	2.00	0.00	3.63	0.02	0.00
12.76	2.00	0.00	3.62	0.02	0.00	12.78	2.00	0.00	3.61	0.02	0.00
12.80	2.00	0.00	3.60	0.02	0.00	12.82	2.00	0.00	3.59	0.02	0.00
12.84	2.00	0.00	3.58	0.02	0.00	12.86	2.00	0.00	3.57	0.02	0.00
12.88	2.00	0.00	3.56	0.02	0.00	12.90	2.00	0.00	3.55	0.02	0.00
12.92	2.00	0.00	3.54	0.02	0.00	12.94	2.00	0.00	3.53	0.02	0.00
12.96	2.00	0.00	3.52	0.02	0.00	12.98	2.00	0.00	3.51	0.02	0.00
13.00	2.00	0.00	3.50	0.02	0.00	13.02	2.00	0.00	3.49	0.02	0.00
13.04	2.00	0.00	3.48	0.02	0.00	13.06	2.00	0.00	3.47	0.02	0.00
13.08	2.00	0.00	3.46	0.02	0.00	13.10	2.00	0.00	3.45	0.02	0.00
13.12	2.00	0.00	3.44	0.02	0.00	13.14	2.00	0.00	3.43	0.02	0.00
13.16	2.00	0.00	3.42	0.02	0.00	13.18	2.00	0.00	3.41	0.02	0.00
13.20	2.00	0.00	3.40	0.02	0.00	13.22	2.00	0.00	3.39	0.02	0.00
13.24	2.00	0.00	3.38	0.02	0.00	13.26	2.00	0.00	3.37	0.02	0.00
13.28	2.00	0.00	3.36	0.02	0.00	13.30	2.00	0.00	3.35	0.02	0.00
13.32	2.00	0.00	3.34	0.02	0.00	13.34	2.00	0.00	3.33	0.02	0.00
13.36	2.00	0.00	3.32	0.02	0.00	13.38	2.00	0.00	3.31	0.02	0.00
13.40	2.00	0.00	3.30	0.02	0.00	13.42	2.00	0.00	3.29	0.02	0.00
13.44	2.00	0.00	3.28	0.02	0.00	13.46	2.00	0.00	3.27	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
13.48	2.00	0.00	3.26	0.02	0.00	13.50	2.00	0.00	3.25	0.02	0.00
13.52	2.00	0.00	3.24	0.02	0.00	13.54	2.00	0.00	3.23	0.02	0.00
13.56	2.00	0.00	3.22	0.02	0.00	13.58	2.00	0.00	3.21	0.02	0.00
13.60	2.00	0.00	3.20	0.02	0.00	13.62	2.00	0.00	3.19	0.02	0.00
13.64	2.00	0.00	3.18	0.02	0.00	13.66	2.00	0.00	3.17	0.02	0.00
13.68	2.00	0.00	3.16	0.02	0.00	13.70	2.00	0.00	3.15	0.02	0.00
13.72	2.00	0.00	3.14	0.02	0.00	13.74	2.00	0.00	3.13	0.02	0.00
13.76	2.00	0.00	3.12	0.02	0.00	13.78	2.00	0.00	3.11	0.02	0.00
13.80	2.00	0.00	3.10	0.02	0.00	13.82	2.00	0.00	3.09	0.02	0.00
13.84	2.00	0.00	3.08	0.02	0.00	13.86	2.00	0.00	3.07	0.02	0.00
13.88	2.00	0.00	3.06	0.02	0.00	13.90	2.00	0.00	3.05	0.02	0.00
13.92	2.00	0.00	3.04	0.02	0.00	13.94	2.00	0.00	3.03	0.02	0.00
13.96	2.00	0.00	3.02	0.02	0.00	13.98	2.00	0.00	3.01	0.02	0.00
14.00	2.00	0.00	3.00	0.02	0.00	14.02	2.00	0.00	2.99	0.02	0.00
14.04	2.00	0.00	2.98	0.02	0.00	14.06	2.00	0.00	2.97	0.02	0.00
14.08	2.00	0.00	2.96	0.02	0.00	14.10	2.00	0.00	2.95	0.02	0.00
14.12	2.00	0.00	2.94	0.02	0.00	14.14	2.00	0.00	2.93	0.02	0.00
14.16	2.00	0.00	2.92	0.02	0.00	14.18	2.00	0.00	2.91	0.02	0.00
14.20	2.00	0.00	2.90	0.02	0.00	14.22	2.00	0.00	2.89	0.02	0.00
14.24	2.00	0.00	2.88	0.02	0.00	14.26	2.00	0.00	2.87	0.02	0.00
14.28	2.00	0.00	2.86	0.02	0.00	14.30	2.00	0.00	2.85	0.02	0.00
14.32	2.00	0.00	2.84	0.02	0.00	14.34	2.00	0.00	2.83	0.02	0.00
14.36	2.00	0.00	2.82	0.02	0.00	14.38	2.00	0.00	2.81	0.02	0.00
14.40	2.00	0.00	2.80	0.02	0.00	14.42	2.00	0.00	2.79	0.02	0.00
14.44	2.00	0.00	2.78	0.02	0.00	14.46	2.00	0.00	2.77	0.02	0.00
14.48	2.00	0.00	2.76	0.02	0.00	14.50	2.00	0.00	2.75	0.02	0.00
14.52	2.00	0.00	2.74	0.02	0.00	14.54	2.00	0.00	2.73	0.02	0.00
14.56	2.00	0.00	2.72	0.02	0.00	14.58	2.00	0.00	2.71	0.02	0.00
14.60	2.00	0.00	2.70	0.02	0.00	14.62	2.00	0.00	2.69	0.02	0.00
14.64	2.00	0.00	2.68	0.02	0.00	14.66	2.00	0.00	2.67	0.02	0.00
14.68	2.00	0.00	2.66	0.02	0.00	14.70	0.60	0.40	2.65	0.02	0.02
14.72	0.63	0.37	2.64	0.02	0.02	14.74	0.66	0.34	2.63	0.02	0.02
14.76	0.66	0.34	2.62	0.02	0.02	14.78	0.64	0.36	2.61	0.02	0.02
14.80	0.60	0.40	2.60	0.02	0.02	14.82	2.00	0.00	2.59	0.02	0.00
14.84	2.00	0.00	2.58	0.02	0.00	14.86	2.00	0.00	2.57	0.02	0.00
14.88	2.00	0.00	2.56	0.02	0.00	14.90	2.00	0.00	2.55	0.02	0.00
14.92	2.00	0.00	2.54	0.02	0.00	14.94	2.00	0.00	2.53	0.02	0.00
14.96	2.00	0.00	2.52	0.02	0.00	14.98	2.00	0.00	2.51	0.02	0.00
15.00	2.00	0.00	2.50	0.02	0.00	15.02	2.00	0.00	2.49	0.02	0.00
15.04	2.00	0.00	2.48	0.02	0.00	15.06	2.00	0.00	2.47	0.02	0.00
15.08	2.00	0.00	2.46	0.02	0.00	15.10	2.00	0.00	2.45	0.02	0.00
15.12	2.00	0.00	2.44	0.02	0.00	15.14	2.00	0.00	2.43	0.02	0.00
15.16	2.00	0.00	2.42	0.02	0.00	15.18	2.00	0.00	2.41	0.02	0.00
15.20	2.00	0.00	2.40	0.02	0.00	15.22	2.00	0.00	2.39	0.02	0.00
15.24	2.00	0.00	2.38	0.02	0.00	15.26	2.00	0.00	2.37	0.02	0.00
15.28	2.00	0.00	2.36	0.02	0.00	15.30	2.00	0.00	2.35	0.02	0.00
15.32	2.00	0.00	2.34	0.02	0.00	15.34	2.00	0.00	2.33	0.02	0.00
15.36	2.00	0.00	2.32	0.02	0.00	15.38	2.00	0.00	2.31	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
15.40	2.00	0.00	2.30	0.02	0.00	15.42	2.00	0.00	2.29	0.02	0.00
15.44	2.00	0.00	2.28	0.02	0.00	15.46	2.00	0.00	2.27	0.02	0.00
15.48	2.00	0.00	2.26	0.02	0.00	15.50	2.00	0.00	2.25	0.02	0.00
15.52	2.00	0.00	2.24	0.02	0.00	15.54	2.00	0.00	2.23	0.02	0.00
15.56	2.00	0.00	2.22	0.02	0.00	15.58	2.00	0.00	2.21	0.02	0.00
15.60	2.00	0.00	2.20	0.02	0.00	15.62	2.00	0.00	2.19	0.02	0.00
15.64	2.00	0.00	2.18	0.02	0.00	15.66	2.00	0.00	2.17	0.02	0.00
15.68	2.00	0.00	2.16	0.02	0.00	15.70	2.00	0.00	2.15	0.02	0.00
15.72	2.00	0.00	2.14	0.02	0.00	15.74	2.00	0.00	2.13	0.02	0.00
15.76	2.00	0.00	2.12	0.02	0.00	15.78	2.00	0.00	2.11	0.02	0.00
15.80	2.00	0.00	2.10	0.02	0.00	15.82	2.00	0.00	2.09	0.02	0.00
15.84	2.00	0.00	2.08	0.02	0.00	15.86	2.00	0.00	2.07	0.02	0.00
15.88	2.00	0.00	2.06	0.02	0.00	15.90	2.00	0.00	2.05	0.02	0.00
15.92	2.00	0.00	2.04	0.02	0.00	15.94	2.00	0.00	2.03	0.02	0.00
15.96	2.00	0.00	2.02	0.02	0.00	15.98	2.00	0.00	2.01	0.02	0.00
16.00	2.00	0.00	2.00	0.02	0.00	16.02	2.00	0.00	1.99	0.02	0.00
16.04	2.00	0.00	1.98	0.02	0.00	16.06	2.00	0.00	1.97	0.02	0.00
16.08	2.00	0.00	1.96	0.02	0.00	16.10	2.00	0.00	1.95	0.02	0.00
16.12	2.00	0.00	1.94	0.02	0.00	16.14	2.00	0.00	1.93	0.02	0.00
16.16	2.00	0.00	1.92	0.02	0.00	16.18	2.00	0.00	1.91	0.02	0.00
16.20	2.00	0.00	1.90	0.02	0.00	16.22	2.00	0.00	1.89	0.02	0.00
16.24	2.00	0.00	1.88	0.02	0.00	16.26	2.00	0.00	1.87	0.02	0.00
16.28	2.00	0.00	1.86	0.02	0.00	16.30	2.00	0.00	1.85	0.02	0.00
16.32	2.00	0.00	1.84	0.02	0.00	16.34	2.00	0.00	1.83	0.02	0.00
16.36	2.00	0.00	1.82	0.02	0.00	16.38	2.00	0.00	1.81	0.02	0.00
16.40	2.00	0.00	1.80	0.02	0.00	16.42	2.00	0.00	1.79	0.02	0.00
16.44	2.00	0.00	1.78	0.02	0.00	16.46	2.00	0.00	1.77	0.02	0.00
16.48	2.00	0.00	1.76	0.02	0.00	16.50	2.00	0.00	1.75	0.02	0.00
16.52	2.00	0.00	1.74	0.02	0.00	16.54	2.00	0.00	1.73	0.02	0.00
16.56	2.00	0.00	1.72	0.02	0.00	16.58	2.00	0.00	1.71	0.02	0.00
16.60	2.00	0.00	1.70	0.02	0.00	16.62	2.00	0.00	1.69	0.02	0.00
16.64	2.00	0.00	1.68	0.02	0.00	16.66	2.00	0.00	1.67	0.02	0.00
16.68	2.00	0.00	1.66	0.02	0.00	16.70	2.00	0.00	1.65	0.02	0.00
16.72	2.00	0.00	1.64	0.02	0.00	16.74	2.00	0.00	1.63	0.02	0.00
16.76	2.00	0.00	1.62	0.02	0.00	16.78	2.00	0.00	1.61	0.02	0.00
16.80	2.00	0.00	1.60	0.02	0.00	16.82	2.00	0.00	1.59	0.02	0.00
16.84	2.00	0.00	1.58	0.02	0.00	16.86	2.00	0.00	1.57	0.02	0.00
16.88	2.00	0.00	1.56	0.02	0.00	16.90	2.00	0.00	1.55	0.02	0.00
16.92	2.00	0.00	1.54	0.02	0.00	16.94	2.00	0.00	1.53	0.02	0.00
16.96	2.00	0.00	1.52	0.02	0.00	16.98	2.00	0.00	1.51	0.02	0.00
17.00	2.00	0.00	1.50	0.02	0.00	17.02	2.00	0.00	1.49	0.02	0.00
17.04	2.00	0.00	1.48	0.02	0.00	17.06	2.00	0.00	1.47	0.02	0.00
17.08	2.00	0.00	1.46	0.02	0.00	17.10	2.00	0.00	1.45	0.02	0.00
17.12	2.00	0.00	1.44	0.02	0.00	17.14	2.00	0.00	1.43	0.02	0.00
17.16	2.00	0.00	1.42	0.02	0.00	17.18	2.00	0.00	1.41	0.02	0.00
17.20	2.00	0.00	1.40	0.02	0.00	17.22	2.00	0.00	1.39	0.02	0.00
17.24	2.00	0.00	1.38	0.02	0.00	17.26	2.00	0.00	1.37	0.02	0.00
17.28	2.00	0.00	1.36	0.02	0.00	17.30	2.00	0.00	1.35	0.02	0.00



**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
17.32	2.00	0.00	1.34	0.02	0.00	17.34	2.00	0.00	1.33	0.02	0.00
17.36	2.00	0.00	1.32	0.02	0.00	17.38	2.00	0.00	1.31	0.02	0.00
17.40	2.00	0.00	1.30	0.02	0.00	17.42	2.00	0.00	1.29	0.02	0.00
17.44	2.00	0.00	1.28	0.02	0.00	17.46	2.00	0.00	1.27	0.02	0.00
17.48	2.00	0.00	1.26	0.02	0.00	17.50	2.00	0.00	1.25	0.02	0.00
17.52	2.00	0.00	1.24	0.02	0.00	17.54	2.00	0.00	1.23	0.02	0.00
17.56	2.00	0.00	1.22	0.02	0.00	17.58	2.00	0.00	1.21	0.02	0.00
17.60	2.00	0.00	1.20	0.02	0.00	17.62	2.00	0.00	1.19	0.02	0.00
17.64	2.00	0.00	1.18	0.02	0.00	17.66	2.00	0.00	1.17	0.02	0.00
17.68	2.00	0.00	1.16	0.02	0.00	17.70	2.00	0.00	1.15	0.02	0.00
17.72	2.00	0.00	1.14	0.02	0.00	17.74	2.00	0.00	1.13	0.02	0.00
17.76	2.00	0.00	1.12	0.02	0.00	17.78	2.00	0.00	1.11	0.02	0.00
17.80	2.00	0.00	1.10	0.02	0.00	17.82	2.00	0.00	1.09	0.02	0.00
17.84	2.00	0.00	1.08	0.02	0.00	17.86	2.00	0.00	1.07	0.02	0.00
17.88	2.00	0.00	1.06	0.02	0.00	17.90	2.00	0.00	1.05	0.02	0.00
17.92	2.00	0.00	1.04	0.02	0.00	17.94	2.00	0.00	1.03	0.02	0.00
17.96	2.00	0.00	1.02	0.02	0.00	17.98	2.00	0.00	1.01	0.02	0.00
18.00	2.00	0.00	1.00	0.02	0.00	18.02	2.00	0.00	0.99	0.02	0.00
18.04	2.00	0.00	0.98	0.02	0.00	18.06	2.00	0.00	0.97	0.02	0.00
18.08	2.00	0.00	0.96	0.02	0.00	18.10	2.00	0.00	0.95	0.02	0.00
18.12	2.00	0.00	0.94	0.02	0.00	18.14	2.00	0.00	0.93	0.02	0.00
18.16	2.00	0.00	0.92	0.02	0.00	18.18	2.00	0.00	0.91	0.02	0.00
18.20	2.00	0.00	0.90	0.02	0.00	18.22	2.00	0.00	0.89	0.02	0.00
18.24	2.00	0.00	0.88	0.02	0.00	18.26	2.00	0.00	0.87	0.02	0.00
18.28	2.00	0.00	0.86	0.02	0.00	18.30	2.00	0.00	0.85	0.02	0.00
18.32	2.00	0.00	0.84	0.02	0.00	18.34	2.00	0.00	0.83	0.02	0.00
18.36	2.00	0.00	0.82	0.02	0.00	18.38	2.00	0.00	0.81	0.02	0.00
18.40	2.00	0.00	0.80	0.02	0.00	18.42	2.00	0.00	0.79	0.02	0.00
18.44	2.00	0.00	0.78	0.02	0.00	18.46	2.00	0.00	0.77	0.02	0.00
18.48	2.00	0.00	0.76	0.02	0.00	18.50	2.00	0.00	0.75	0.02	0.00
18.52	2.00	0.00	0.74	0.02	0.00	18.54	2.00	0.00	0.73	0.02	0.00
18.56	2.00	0.00	0.72	0.02	0.00	18.58	2.00	0.00	0.71	0.02	0.00
18.60	2.00	0.00	0.70	0.02	0.00	18.62	2.00	0.00	0.69	0.02	0.00
18.64	2.00	0.00	0.68	0.02	0.00	18.66	2.00	0.00	0.67	0.02	0.00
18.68	2.00	0.00	0.66	0.02	0.00	18.70	2.00	0.00	0.65	0.02	0.00
18.72	2.00	0.00	0.64	0.02	0.00	18.74	2.00	0.00	0.63	0.02	0.00
18.76	2.00	0.00	0.62	0.02	0.00	18.78	2.00	0.00	0.61	0.02	0.00
18.80	2.00	0.00	0.60	0.02	0.00	18.82	2.00	0.00	0.59	0.02	0.00
18.84	2.00	0.00	0.58	0.02	0.00	18.86	2.00	0.00	0.57	0.02	0.00
18.88	2.00	0.00	0.56	0.02	0.00	18.90	2.00	0.00	0.55	0.02	0.00
18.92	2.00	0.00	0.54	0.02	0.00	18.94	2.00	0.00	0.53	0.02	0.00
18.96	2.00	0.00	0.52	0.02	0.00	18.98	2.00	0.00	0.51	0.02	0.00
19.00	2.00	0.00	0.50	0.02	0.00	19.02	2.00	0.00	0.49	0.02	0.00
19.04	2.00	0.00	0.48	0.02	0.00	19.06	2.00	0.00	0.47	0.02	0.00
19.08	2.00	0.00	0.46	0.02	0.00	19.10	2.00	0.00	0.45	0.02	0.00
19.12	2.00	0.00	0.44	0.02	0.00	19.14	2.00	0.00	0.43	0.02	0.00
19.16	2.00	0.00	0.42	0.02	0.00	19.18	2.00	0.00	0.41	0.02	0.00
19.20	2.00	0.00	0.40	0.02	0.00	19.22	2.00	0.00	0.39	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
19.24	2.00	0.00	0.38	0.02	0.00	19.26	2.00	0.00	0.37	0.02	0.00
19.28	2.00	0.00	0.36	0.02	0.00	19.30	2.00	0.00	0.35	0.02	0.00
19.32	2.00	0.00	0.34	0.02	0.00	19.34	2.00	0.00	0.33	0.02	0.00
19.36	2.00	0.00	0.32	0.02	0.00	19.38	2.00	0.00	0.31	0.02	0.00
19.40	2.00	0.00	0.30	0.02	0.00	19.42	2.00	0.00	0.29	0.02	0.00
19.44	2.00	0.00	0.28	0.02	0.00	19.46	2.00	0.00	0.27	0.02	0.00
19.48	2.00	0.00	0.26	0.02	0.00	19.50	2.00	0.00	0.25	0.02	0.00
19.52	2.00	0.00	0.24	0.02	0.00	19.54	2.00	0.00	0.23	0.02	0.00
19.56	2.00	0.00	0.22	0.02	0.00	19.58	2.00	0.00	0.21	0.02	0.00
19.60	2.00	0.00	0.20	0.02	0.00	19.62	2.00	0.00	0.19	0.02	0.00
19.64	2.00	0.00	0.18	0.02	0.00	19.66	2.00	0.00	0.17	0.02	0.00
19.68	2.00	0.00	0.16	0.02	0.00	19.70	2.00	0.00	0.15	0.02	0.00
19.72	2.00	0.00	0.14	0.02	0.00	19.74	2.00	0.00	0.13	0.02	0.00
19.76	2.00	0.00	0.12	0.02	0.00	19.78	2.00	0.00	0.11	0.02	0.00
19.80	2.00	0.00	0.10	0.02	0.00	19.82	2.00	0.00	0.09	0.02	0.00
19.84	2.00	0.00	0.08	0.02	0.00	19.86	2.00	0.00	0.07	0.02	0.00
19.88	2.00	0.00	0.06	0.02	0.00	19.90	2.00	0.00	0.05	0.02	0.00
19.92	2.00	0.00	0.04	0.02	0.00	19.94	2.00	0.00	0.03	0.02	0.00
19.96	2.00	0.00	0.02	0.02	0.00	19.98	2.00	0.00	0.01	0.02	0.00
20.00	2.00	0.00	0.00	0.02	0.00						

**Overall liquefaction potential: 1.07**

LPI = 0.00 - Liquefaction risk very low

LPI between 0.00 and 5.00 - Liquefaction risk low

LPI between 5.00 and 15.00 - Liquefaction risk high

LPI &gt; 15.00 - Liquefaction risk very high

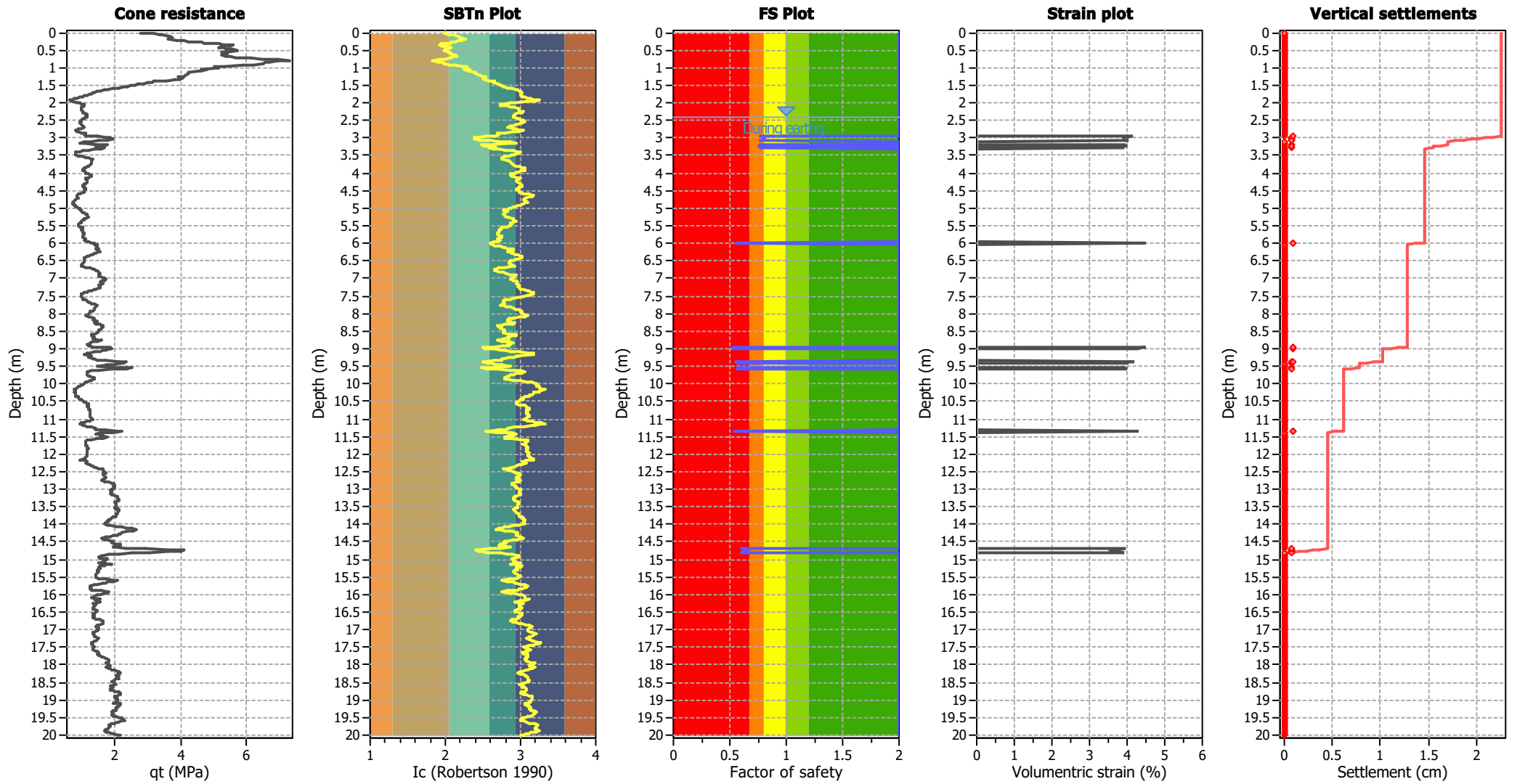
**Abbreviations**

FS: Calculated factor of safety for test point

F<sub>L</sub>: 1 - FSw<sub>z</sub>: Function value of the extend of soil liquefaction according to depthd<sub>z</sub>: Layer thickness (m)

LPI: Liquefaction potential index value for test point

Estimation of post-earthquake settlements



Abbreviations

- q<sub>c</sub>: Total cone resistance (cone resistance q<sub>c</sub> corrected for pore water effects)
- I<sub>c</sub>: Soil Behaviour Type Index
- FS: Calculated Factor of Safety against liquefaction
- Volumetric strain: Post-liquefaction volumetric strain

## LIQUEFACTION ANALYSIS REPORT

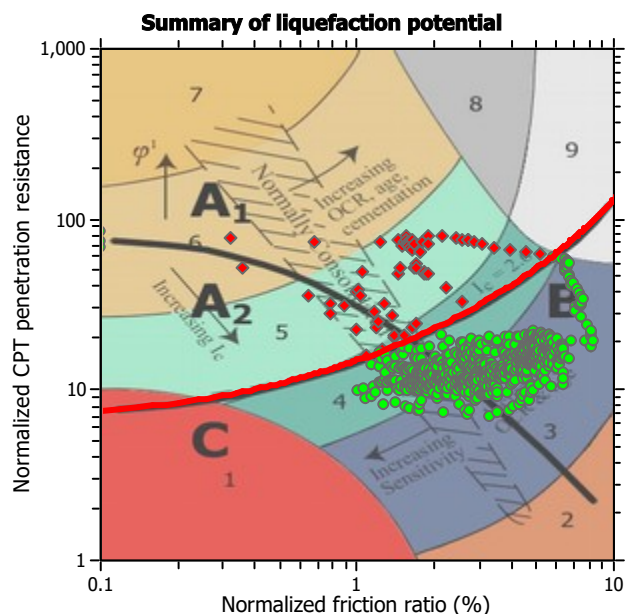
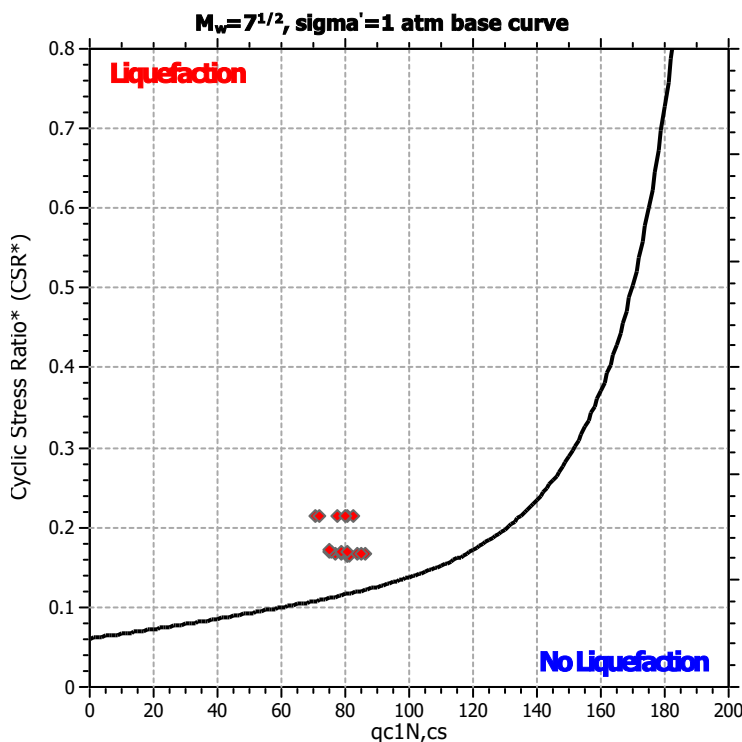
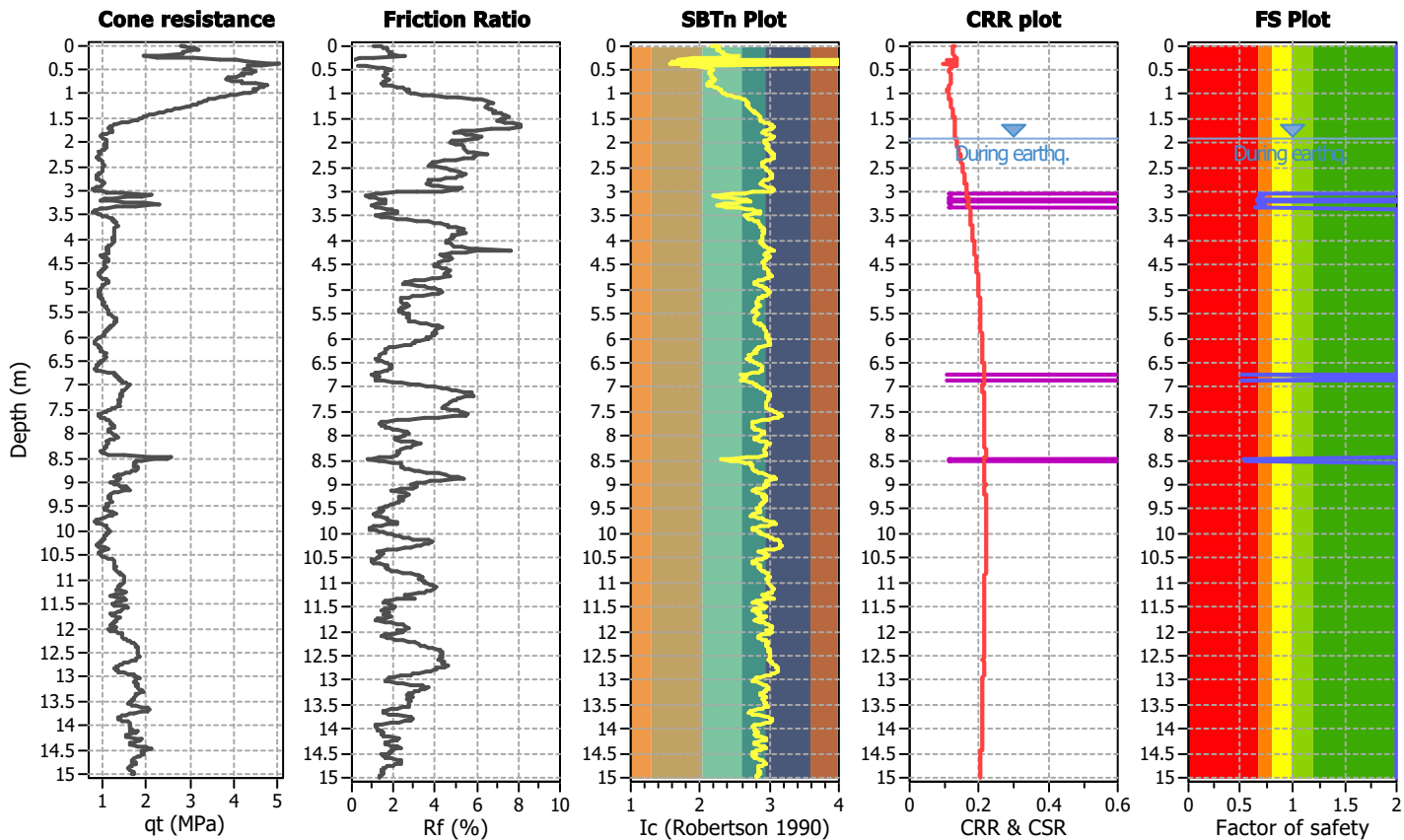
**Project title :**

**Location :**

**CPT file : cptu3**

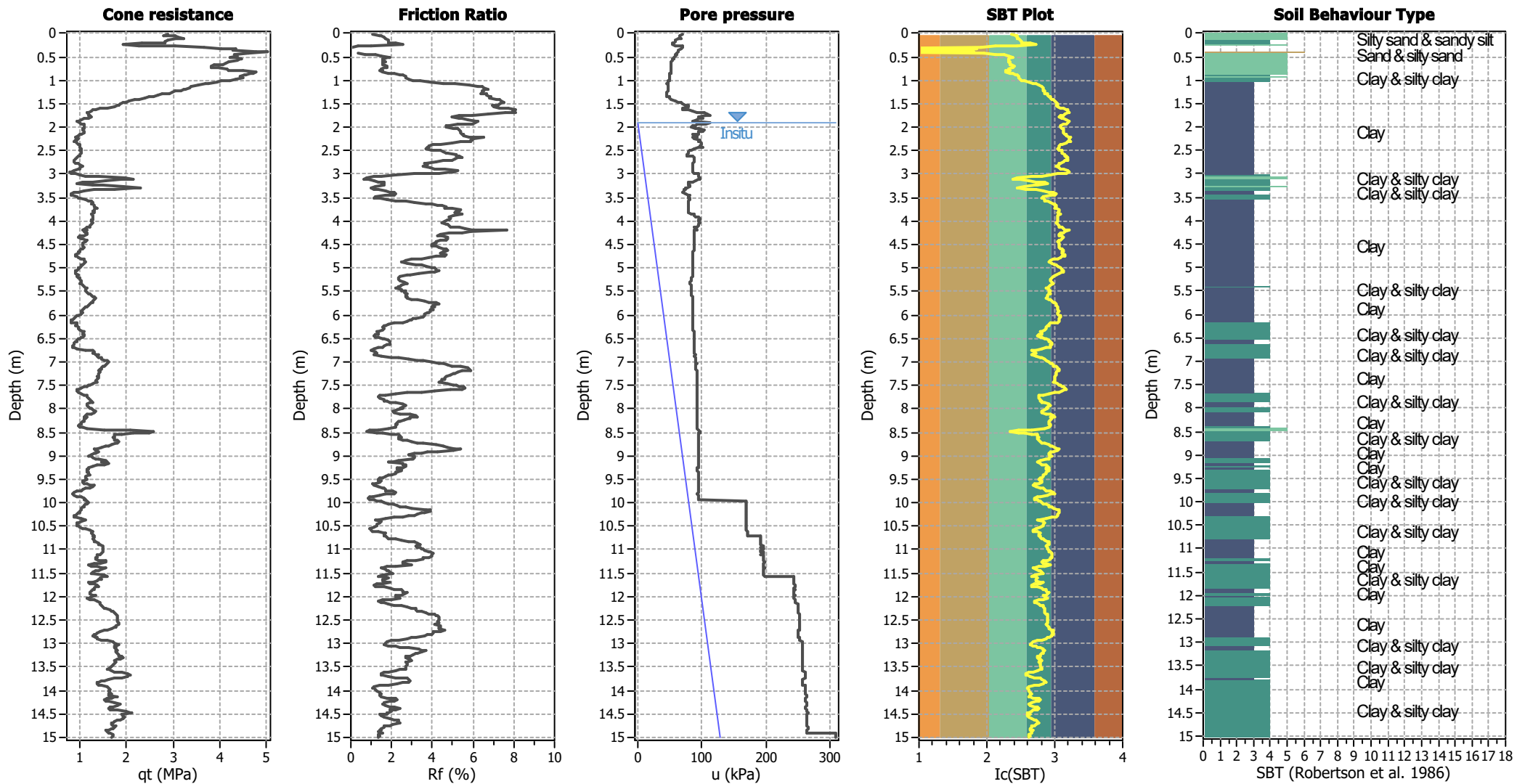
### Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.90 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.90 m	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude $M_w$ :	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.25	Unit weight calculation:	Based on SBT	$K_0$ applied:	Yes	MSF method:	Method based



Zone A<sub>1</sub>: Cyclic liquefaction likely depending on size and duration of cyclic loading  
 Zone A<sub>2</sub>: Cyclic liquefaction and strength loss likely depending on loading and ground geometry  
 Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening  
 Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



Input parameters and analysis data

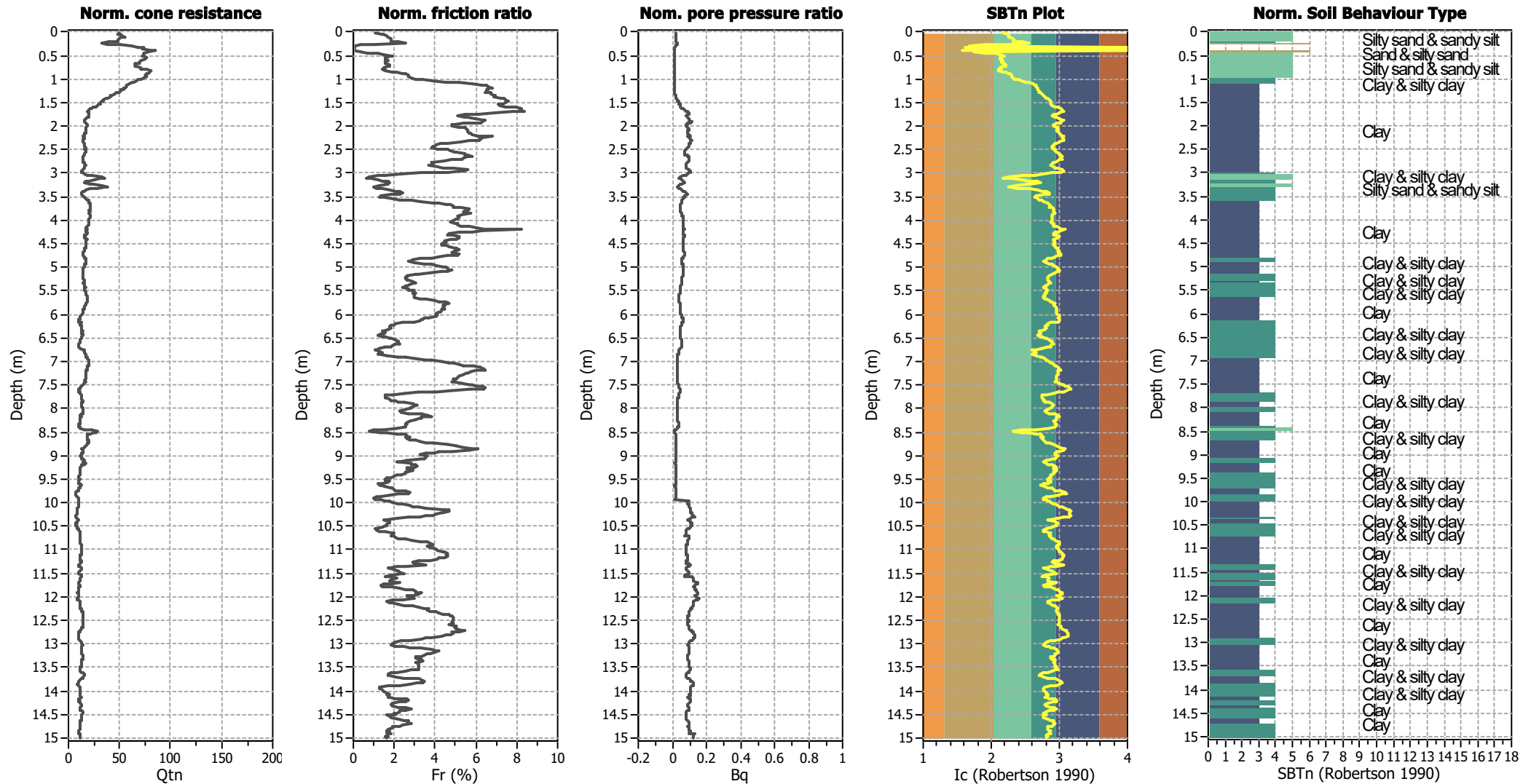
Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.90 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>g</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.90 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



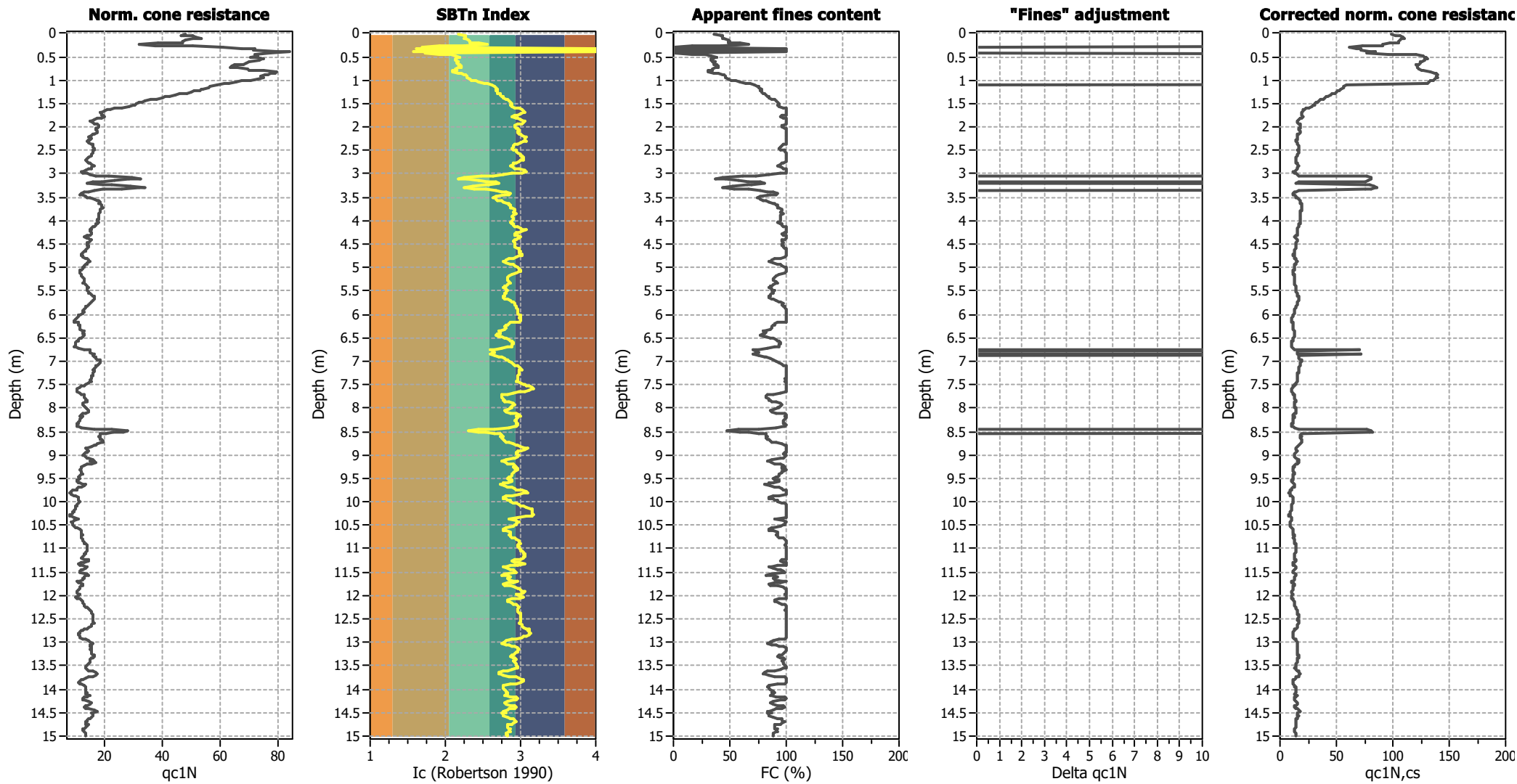
## CPT basic interpretation plots (normalized)



## Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.90 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	$K_0$ applied:	Yes
Earthquake magnitude $M_w$ :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.90 m	Fill height:	N/A	Limit depth:	N/A

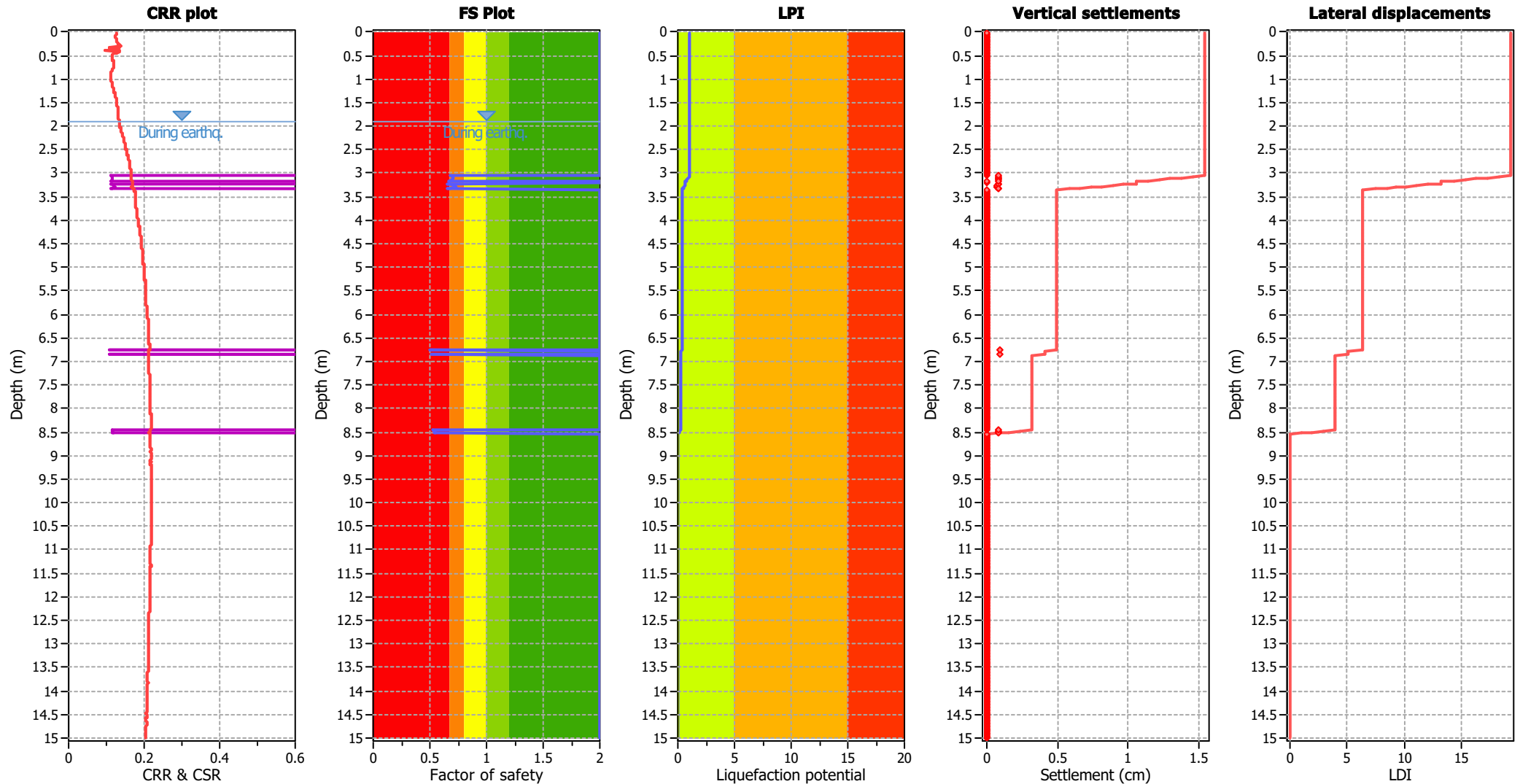
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.90 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>g</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.90 m	Fill height:	N/A	Limit depth:	N/A

## Liquefaction analysis overall plots



### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.90 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	$K_g$ applied:	Yes
Earthquake magnitude $M_w$ :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.90 m	Fill height:	N/A	Limit depth:	N/A

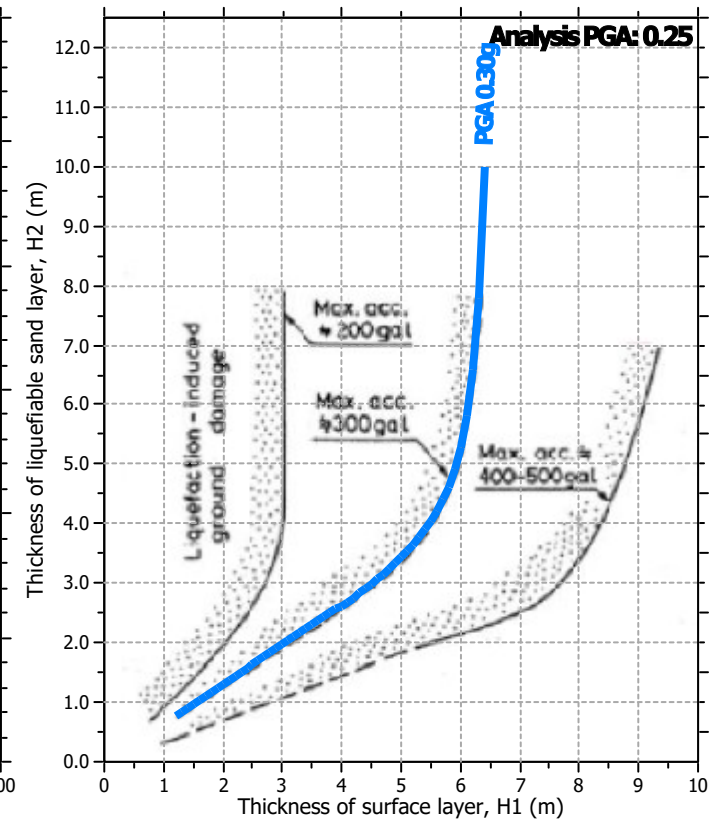
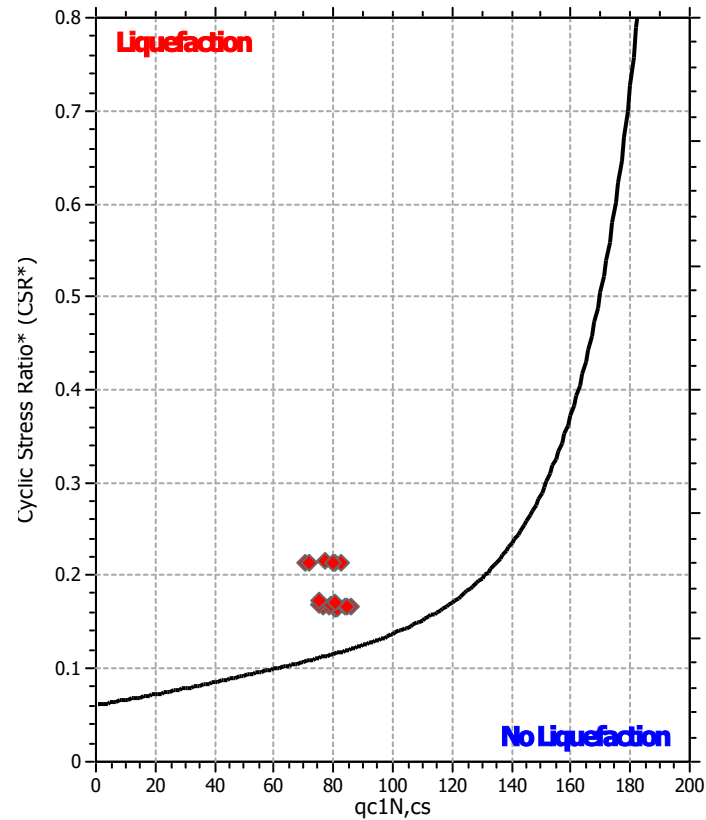
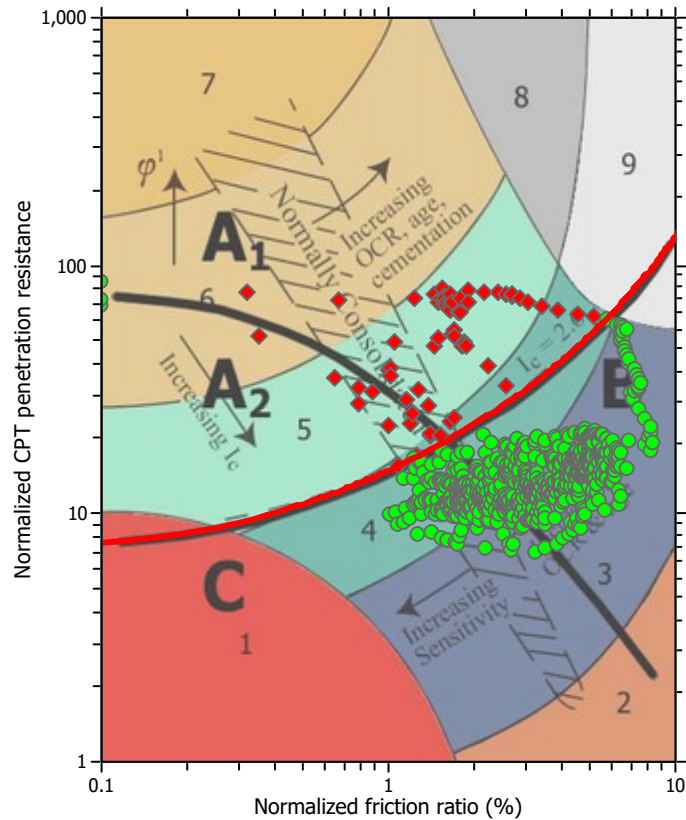
### F.S. color scheme

<span style="color: red;">■</span>	Almost certain it will liquefy
<span style="color: orange;">■</span>	Very likely to liquefy
<span style="color: yellow;">■</span>	Liquefaction and no liq. are equally likely
<span style="color: lightgreen;">■</span>	Unlike to liquefy
<span style="color: green;">■</span>	Almost certain it will not liquefy

### LPI color scheme

<span style="color: red;">■</span>	Very high risk
<span style="color: orange;">■</span>	High risk
<span style="color: yellow;">■</span>	Low risk

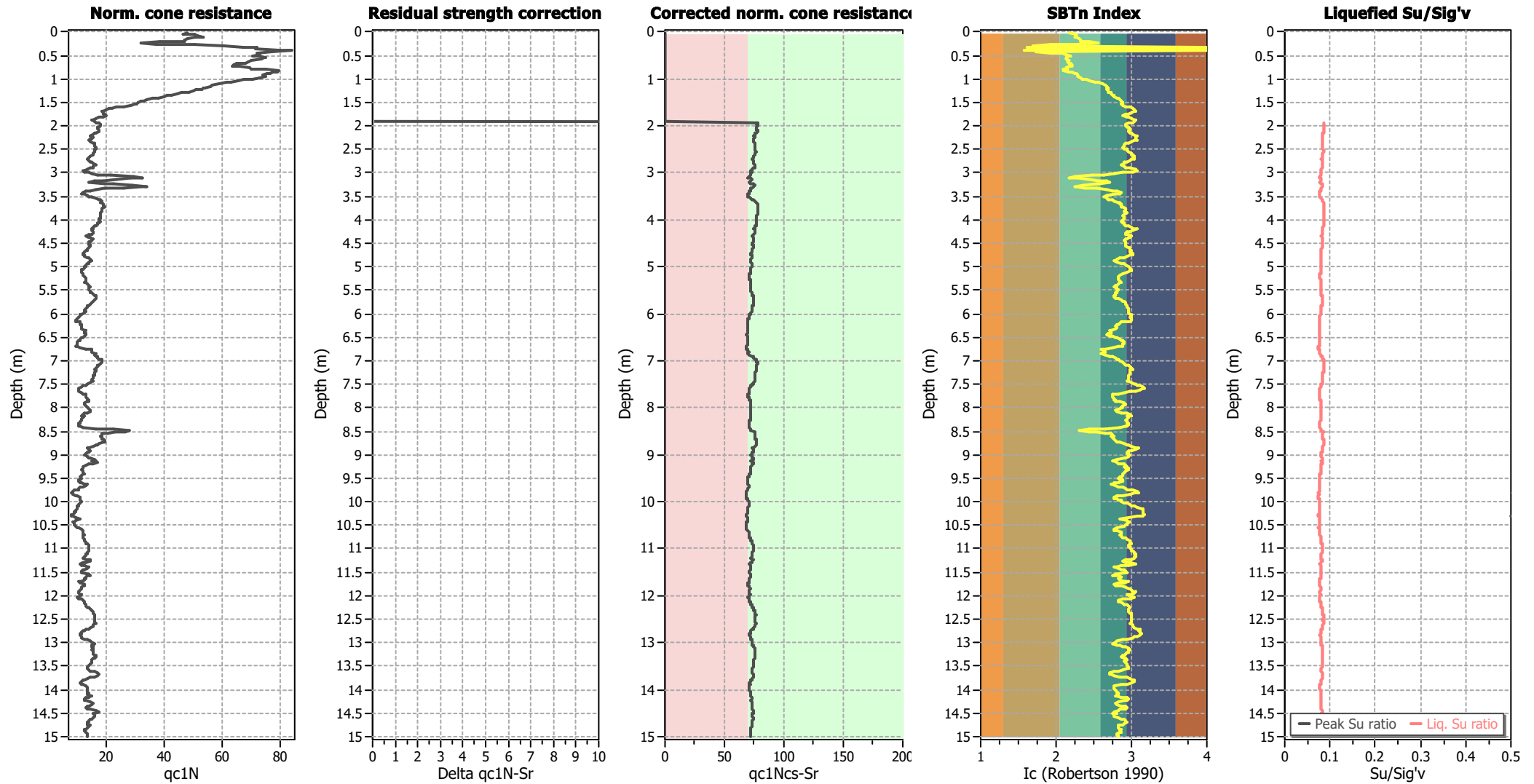
### Liquefaction analysis summary plots



### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.90 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>a</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.90 m	Fill height:	N/A	Limit depth:	N/A

## Check for strength loss plots (Idriss & Boulanger (2008))



### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.90 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on $I_c$ value	$I_c$ cut-off value:	2.60	$K_\sigma$ applied:	Yes
Earthquake magnitude $M_w$ :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.90 m	Fill height:	N/A	Limit depth:	N/A



**:: Liquefaction Potential Index calculation data ::**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
0.02	2.00	0.00	9.99	0.02	0.00	0.04	2.00	0.00	9.98	0.02	0.00
0.06	2.00	0.00	9.97	0.02	0.00	0.08	2.00	0.00	9.96	0.02	0.00
0.10	2.00	0.00	9.95	0.02	0.00	0.12	2.00	0.00	9.94	0.02	0.00
0.14	2.00	0.00	9.93	0.02	0.00	0.16	2.00	0.00	9.92	0.02	0.00
0.18	2.00	0.00	9.91	0.02	0.00	0.20	2.00	0.00	9.90	0.02	0.00
0.22	2.00	0.00	9.89	0.02	0.00	0.24	2.00	0.00	9.88	0.02	0.00
0.26	2.00	0.00	9.87	0.02	0.00	0.28	2.00	0.00	9.86	0.02	0.00
0.30	2.00	0.00	9.85	0.02	0.00	0.32	2.00	0.00	9.84	0.02	0.00
0.34	2.00	0.00	9.83	0.02	0.00	0.36	2.00	0.00	9.82	0.02	0.00
0.38	2.00	0.00	9.81	0.02	0.00	0.40	2.00	0.00	9.80	0.02	0.00
0.42	2.00	0.00	9.79	0.02	0.00	0.44	2.00	0.00	9.78	0.02	0.00
0.46	2.00	0.00	9.77	0.02	0.00	0.48	2.00	0.00	9.76	0.02	0.00
0.50	2.00	0.00	9.75	0.02	0.00	0.52	2.00	0.00	9.74	0.02	0.00
0.54	2.00	0.00	9.73	0.02	0.00	0.56	2.00	0.00	9.72	0.02	0.00
0.58	2.00	0.00	9.71	0.02	0.00	0.60	2.00	0.00	9.70	0.02	0.00
0.62	2.00	0.00	9.69	0.02	0.00	0.64	2.00	0.00	9.68	0.02	0.00
0.66	2.00	0.00	9.67	0.02	0.00	0.68	2.00	0.00	9.66	0.02	0.00
0.70	2.00	0.00	9.65	0.02	0.00	0.72	2.00	0.00	9.64	0.02	0.00
0.74	2.00	0.00	9.63	0.02	0.00	0.76	2.00	0.00	9.62	0.02	0.00
0.78	2.00	0.00	9.61	0.02	0.00	0.80	2.00	0.00	9.60	0.02	0.00
0.82	2.00	0.00	9.59	0.02	0.00	0.84	2.00	0.00	9.58	0.02	0.00
0.86	2.00	0.00	9.57	0.02	0.00	0.88	2.00	0.00	9.56	0.02	0.00
0.90	2.00	0.00	9.55	0.02	0.00	0.92	2.00	0.00	9.54	0.02	0.00
0.94	2.00	0.00	9.53	0.02	0.00	0.96	2.00	0.00	9.52	0.02	0.00
0.98	2.00	0.00	9.51	0.02	0.00	1.00	2.00	0.00	9.50	0.02	0.00
1.02	2.00	0.00	9.49	0.02	0.00	1.04	2.00	0.00	9.48	0.02	0.00
1.06	2.00	0.00	9.47	0.02	0.00	1.08	2.00	0.00	9.46	0.02	0.00
1.10	2.00	0.00	9.45	0.02	0.00	1.12	2.00	0.00	9.44	0.02	0.00
1.14	2.00	0.00	9.43	0.02	0.00	1.16	2.00	0.00	9.42	0.02	0.00
1.18	2.00	0.00	9.41	0.02	0.00	1.20	2.00	0.00	9.40	0.02	0.00
1.22	2.00	0.00	9.39	0.02	0.00	1.24	2.00	0.00	9.38	0.02	0.00
1.26	2.00	0.00	9.37	0.02	0.00	1.28	2.00	0.00	9.36	0.02	0.00
1.30	2.00	0.00	9.35	0.02	0.00	1.32	2.00	0.00	9.34	0.02	0.00
1.34	2.00	0.00	9.33	0.02	0.00	1.36	2.00	0.00	9.32	0.02	0.00
1.38	2.00	0.00	9.31	0.02	0.00	1.40	2.00	0.00	9.30	0.02	0.00
1.42	2.00	0.00	9.29	0.02	0.00	1.44	2.00	0.00	9.28	0.02	0.00
1.46	2.00	0.00	9.27	0.02	0.00	1.48	2.00	0.00	9.26	0.02	0.00
1.50	2.00	0.00	9.25	0.02	0.00	1.52	2.00	0.00	9.24	0.02	0.00
1.54	2.00	0.00	9.23	0.02	0.00	1.56	2.00	0.00	9.22	0.02	0.00
1.58	2.00	0.00	9.21	0.02	0.00	1.60	2.00	0.00	9.20	0.02	0.00
1.62	2.00	0.00	9.19	0.02	0.00	1.64	2.00	0.00	9.18	0.02	0.00
1.66	2.00	0.00	9.17	0.02	0.00	1.68	2.00	0.00	9.16	0.02	0.00
1.70	2.00	0.00	9.15	0.02	0.00	1.72	2.00	0.00	9.14	0.02	0.00
1.74	2.00	0.00	9.13	0.02	0.00	1.76	2.00	0.00	9.12	0.02	0.00
1.78	2.00	0.00	9.11	0.02	0.00	1.80	2.00	0.00	9.10	0.02	0.00
1.82	2.00	0.00	9.09	0.02	0.00	1.84	2.00	0.00	9.08	0.02	0.00
1.86	2.00	0.00	9.07	0.02	0.00	1.88	2.00	0.00	9.06	0.02	0.00
1.90	2.00	0.00	9.05	0.02	0.00	1.92	2.00	0.00	9.04	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
1.94	2.00	0.00	9.03	0.02	0.00	1.96	2.00	0.00	9.02	0.02	0.00
1.98	2.00	0.00	9.01	0.02	0.00	2.00	2.00	0.00	9.00	0.02	0.00
2.02	2.00	0.00	8.99	0.02	0.00	2.04	2.00	0.00	8.98	0.02	0.00
2.06	2.00	0.00	8.97	0.02	0.00	2.08	2.00	0.00	8.96	0.02	0.00
2.10	2.00	0.00	8.95	0.02	0.00	2.12	2.00	0.00	8.94	0.02	0.00
2.14	2.00	0.00	8.93	0.02	0.00	2.16	2.00	0.00	8.92	0.02	0.00
2.18	2.00	0.00	8.91	0.02	0.00	2.20	2.00	0.00	8.90	0.02	0.00
2.22	2.00	0.00	8.89	0.02	0.00	2.24	2.00	0.00	8.88	0.02	0.00
2.26	2.00	0.00	8.87	0.02	0.00	2.28	2.00	0.00	8.86	0.02	0.00
2.30	2.00	0.00	8.85	0.02	0.00	2.32	2.00	0.00	8.84	0.02	0.00
2.34	2.00	0.00	8.83	0.02	0.00	2.36	2.00	0.00	8.82	0.02	0.00
2.38	2.00	0.00	8.81	0.02	0.00	2.40	2.00	0.00	8.80	0.02	0.00
2.42	2.00	0.00	8.79	0.02	0.00	2.44	2.00	0.00	8.78	0.02	0.00
2.46	2.00	0.00	8.77	0.02	0.00	2.48	2.00	0.00	8.76	0.02	0.00
2.50	2.00	0.00	8.75	0.02	0.00	2.52	2.00	0.00	8.74	0.02	0.00
2.54	2.00	0.00	8.73	0.02	0.00	2.56	2.00	0.00	8.72	0.02	0.00
2.58	2.00	0.00	8.71	0.02	0.00	2.60	2.00	0.00	8.70	0.02	0.00
2.62	2.00	0.00	8.69	0.02	0.00	2.64	2.00	0.00	8.68	0.02	0.00
2.66	2.00	0.00	8.67	0.02	0.00	2.68	2.00	0.00	8.66	0.02	0.00
2.70	2.00	0.00	8.65	0.02	0.00	2.72	2.00	0.00	8.64	0.02	0.00
2.74	2.00	0.00	8.63	0.02	0.00	2.76	2.00	0.00	8.62	0.02	0.00
2.78	2.00	0.00	8.61	0.02	0.00	2.80	2.00	0.00	8.60	0.02	0.00
2.82	2.00	0.00	8.59	0.02	0.00	2.84	2.00	0.00	8.58	0.02	0.00
2.86	2.00	0.00	8.57	0.02	0.00	2.88	2.00	0.00	8.56	0.02	0.00
2.90	2.00	0.00	8.55	0.02	0.00	2.92	2.00	0.00	8.54	0.02	0.00
2.94	2.00	0.00	8.53	0.02	0.00	2.96	2.00	0.00	8.52	0.02	0.00
2.98	2.00	0.00	8.51	0.02	0.00	3.00	2.00	0.00	8.50	0.02	0.00
3.02	2.00	0.00	8.49	0.02	0.00	3.04	2.00	0.00	8.48	0.02	0.00
3.06	0.68	0.32	8.47	0.02	0.05	3.08	0.71	0.29	8.46	0.02	0.05
3.10	0.71	0.29	8.45	0.02	0.05	3.12	0.71	0.29	8.44	0.02	0.05
3.14	0.69	0.31	8.43	0.02	0.05	3.16	0.66	0.34	8.42	0.02	0.06
3.18	2.00	0.00	8.41	0.02	0.00	3.20	2.00	0.00	8.40	0.02	0.00
3.22	0.66	0.34	8.39	0.02	0.06	3.24	0.68	0.32	8.38	0.02	0.05
3.26	0.71	0.29	8.37	0.02	0.05	3.28	0.73	0.27	8.36	0.02	0.05
3.30	0.72	0.28	8.35	0.02	0.05	3.32	0.68	0.32	8.34	0.02	0.05
3.34	0.65	0.35	8.33	0.02	0.06	3.36	2.00	0.00	8.32	0.02	0.00
3.38	2.00	0.00	8.31	0.02	0.00	3.40	2.00	0.00	8.30	0.02	0.00
3.42	2.00	0.00	8.29	0.02	0.00	3.44	2.00	0.00	8.28	0.02	0.00
3.46	2.00	0.00	8.27	0.02	0.00	3.48	2.00	0.00	8.26	0.02	0.00
3.50	2.00	0.00	8.25	0.02	0.00	3.52	2.00	0.00	8.24	0.02	0.00
3.54	2.00	0.00	8.23	0.02	0.00	3.56	2.00	0.00	8.22	0.02	0.00
3.58	2.00	0.00	8.21	0.02	0.00	3.60	2.00	0.00	8.20	0.02	0.00
3.62	2.00	0.00	8.19	0.02	0.00	3.64	2.00	0.00	8.18	0.02	0.00
3.66	2.00	0.00	8.17	0.02	0.00	3.68	2.00	0.00	8.16	0.02	0.00
3.70	2.00	0.00	8.15	0.02	0.00	3.72	2.00	0.00	8.14	0.02	0.00
3.74	2.00	0.00	8.13	0.02	0.00	3.76	2.00	0.00	8.12	0.02	0.00
3.78	2.00	0.00	8.11	0.02	0.00	3.80	2.00	0.00	8.10	0.02	0.00
3.82	2.00	0.00	8.09	0.02	0.00	3.84	2.00	0.00	8.08	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
3.86	2.00	0.00	8.07	0.02	0.00	3.88	2.00	0.00	8.06	0.02	0.00
3.90	2.00	0.00	8.05	0.02	0.00	3.92	2.00	0.00	8.04	0.02	0.00
3.94	2.00	0.00	8.03	0.02	0.00	3.96	2.00	0.00	8.02	0.02	0.00
3.98	2.00	0.00	8.01	0.02	0.00	4.00	2.00	0.00	8.00	0.02	0.00
4.02	2.00	0.00	7.99	0.02	0.00	4.04	2.00	0.00	7.98	0.02	0.00
4.06	2.00	0.00	7.97	0.02	0.00	4.08	2.00	0.00	7.96	0.02	0.00
4.10	2.00	0.00	7.95	0.02	0.00	4.12	2.00	0.00	7.94	0.02	0.00
4.14	2.00	0.00	7.93	0.02	0.00	4.16	2.00	0.00	7.92	0.02	0.00
4.18	2.00	0.00	7.91	0.02	0.00	4.20	2.00	0.00	7.90	0.02	0.00
4.22	2.00	0.00	7.89	0.02	0.00	4.24	2.00	0.00	7.88	0.02	0.00
4.26	2.00	0.00	7.87	0.02	0.00	4.28	2.00	0.00	7.86	0.02	0.00
4.30	2.00	0.00	7.85	0.02	0.00	4.32	2.00	0.00	7.84	0.02	0.00
4.34	2.00	0.00	7.83	0.02	0.00	4.36	2.00	0.00	7.82	0.02	0.00
4.38	2.00	0.00	7.81	0.02	0.00	4.40	2.00	0.00	7.80	0.02	0.00
4.42	2.00	0.00	7.79	0.02	0.00	4.44	2.00	0.00	7.78	0.02	0.00
4.46	2.00	0.00	7.77	0.02	0.00	4.48	2.00	0.00	7.76	0.02	0.00
4.50	2.00	0.00	7.75	0.02	0.00	4.52	2.00	0.00	7.74	0.02	0.00
4.54	2.00	0.00	7.73	0.02	0.00	4.56	2.00	0.00	7.72	0.02	0.00
4.58	2.00	0.00	7.71	0.02	0.00	4.60	2.00	0.00	7.70	0.02	0.00
4.62	2.00	0.00	7.69	0.02	0.00	4.64	2.00	0.00	7.68	0.02	0.00
4.66	2.00	0.00	7.67	0.02	0.00	4.68	2.00	0.00	7.66	0.02	0.00
4.70	2.00	0.00	7.65	0.02	0.00	4.72	2.00	0.00	7.64	0.02	0.00
4.74	2.00	0.00	7.63	0.02	0.00	4.76	2.00	0.00	7.62	0.02	0.00
4.78	2.00	0.00	7.61	0.02	0.00	4.80	2.00	0.00	7.60	0.02	0.00
4.82	2.00	0.00	7.59	0.02	0.00	4.84	2.00	0.00	7.58	0.02	0.00
4.86	2.00	0.00	7.57	0.02	0.00	4.88	2.00	0.00	7.56	0.02	0.00
4.90	2.00	0.00	7.55	0.02	0.00	4.92	2.00	0.00	7.54	0.02	0.00
4.94	2.00	0.00	7.53	0.02	0.00	4.96	2.00	0.00	7.52	0.02	0.00
4.98	2.00	0.00	7.51	0.02	0.00	5.00	2.00	0.00	7.50	0.02	0.00
5.02	2.00	0.00	7.49	0.02	0.00	5.04	2.00	0.00	7.48	0.02	0.00
5.06	2.00	0.00	7.47	0.02	0.00	5.08	2.00	0.00	7.46	0.02	0.00
5.10	2.00	0.00	7.45	0.02	0.00	5.12	2.00	0.00	7.44	0.02	0.00
5.14	2.00	0.00	7.43	0.02	0.00	5.16	2.00	0.00	7.42	0.02	0.00
5.18	2.00	0.00	7.41	0.02	0.00	5.20	2.00	0.00	7.40	0.02	0.00
5.22	2.00	0.00	7.39	0.02	0.00	5.24	2.00	0.00	7.38	0.02	0.00
5.26	2.00	0.00	7.37	0.02	0.00	5.28	2.00	0.00	7.36	0.02	0.00
5.30	2.00	0.00	7.35	0.02	0.00	5.32	2.00	0.00	7.34	0.02	0.00
5.34	2.00	0.00	7.33	0.02	0.00	5.36	2.00	0.00	7.32	0.02	0.00
5.38	2.00	0.00	7.31	0.02	0.00	5.40	2.00	0.00	7.30	0.02	0.00
5.42	2.00	0.00	7.29	0.02	0.00	5.44	2.00	0.00	7.28	0.02	0.00
5.46	2.00	0.00	7.27	0.02	0.00	5.48	2.00	0.00	7.26	0.02	0.00
5.50	2.00	0.00	7.25	0.02	0.00	5.52	2.00	0.00	7.24	0.02	0.00
5.54	2.00	0.00	7.23	0.02	0.00	5.56	2.00	0.00	7.22	0.02	0.00
5.58	2.00	0.00	7.21	0.02	0.00	5.60	2.00	0.00	7.20	0.02	0.00
5.62	2.00	0.00	7.19	0.02	0.00	5.64	2.00	0.00	7.18	0.02	0.00
5.66	2.00	0.00	7.17	0.02	0.00	5.68	2.00	0.00	7.16	0.02	0.00
5.70	2.00	0.00	7.15	0.02	0.00	5.72	2.00	0.00	7.14	0.02	0.00
5.74	2.00	0.00	7.13	0.02	0.00	5.76	2.00	0.00	7.12	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
5.78	2.00	0.00	7.11	0.02	0.00	5.80	2.00	0.00	7.10	0.02	0.00
5.82	2.00	0.00	7.09	0.02	0.00	5.84	2.00	0.00	7.08	0.02	0.00
5.86	2.00	0.00	7.07	0.02	0.00	5.88	2.00	0.00	7.06	0.02	0.00
5.90	2.00	0.00	7.05	0.02	0.00	5.92	2.00	0.00	7.04	0.02	0.00
5.94	2.00	0.00	7.03	0.02	0.00	5.96	2.00	0.00	7.02	0.02	0.00
5.98	2.00	0.00	7.01	0.02	0.00	6.00	2.00	0.00	7.00	0.02	0.00
6.02	2.00	0.00	6.99	0.02	0.00	6.04	2.00	0.00	6.98	0.02	0.00
6.06	2.00	0.00	6.97	0.02	0.00	6.08	2.00	0.00	6.96	0.02	0.00
6.10	2.00	0.00	6.95	0.02	0.00	6.12	2.00	0.00	6.94	0.02	0.00
6.14	2.00	0.00	6.93	0.02	0.00	6.16	2.00	0.00	6.92	0.02	0.00
6.18	2.00	0.00	6.91	0.02	0.00	6.20	2.00	0.00	6.90	0.02	0.00
6.22	2.00	0.00	6.89	0.02	0.00	6.24	2.00	0.00	6.88	0.02	0.00
6.26	2.00	0.00	6.87	0.02	0.00	6.28	2.00	0.00	6.86	0.02	0.00
6.30	2.00	0.00	6.85	0.02	0.00	6.32	2.00	0.00	6.84	0.02	0.00
6.34	2.00	0.00	6.83	0.02	0.00	6.36	2.00	0.00	6.82	0.02	0.00
6.38	2.00	0.00	6.81	0.02	0.00	6.40	2.00	0.00	6.80	0.02	0.00
6.42	2.00	0.00	6.79	0.02	0.00	6.44	2.00	0.00	6.78	0.02	0.00
6.46	2.00	0.00	6.77	0.02	0.00	6.48	2.00	0.00	6.76	0.02	0.00
6.50	2.00	0.00	6.75	0.02	0.00	6.52	2.00	0.00	6.74	0.02	0.00
6.54	2.00	0.00	6.73	0.02	0.00	6.56	2.00	0.00	6.72	0.02	0.00
6.58	2.00	0.00	6.71	0.02	0.00	6.60	2.00	0.00	6.70	0.02	0.00
6.62	2.00	0.00	6.69	0.02	0.00	6.64	2.00	0.00	6.68	0.02	0.00
6.66	2.00	0.00	6.67	0.02	0.00	6.68	2.00	0.00	6.66	0.02	0.00
6.70	2.00	0.00	6.65	0.02	0.00	6.72	2.00	0.00	6.64	0.02	0.00
6.74	2.00	0.00	6.63	0.02	0.00	6.76	0.51	0.49	6.62	0.02	0.07
6.78	2.00	0.00	6.61	0.02	0.00	6.80	2.00	0.00	6.60	0.02	0.00
6.82	2.00	0.00	6.59	0.02	0.00	6.84	2.00	0.00	6.58	0.02	0.00
6.86	0.51	0.49	6.57	0.02	0.06	6.88	2.00	0.00	6.56	0.02	0.00
6.90	2.00	0.00	6.55	0.02	0.00	6.92	2.00	0.00	6.54	0.02	0.00
6.94	2.00	0.00	6.53	0.02	0.00	6.96	2.00	0.00	6.52	0.02	0.00
6.98	2.00	0.00	6.51	0.02	0.00	7.00	2.00	0.00	6.50	0.02	0.00
7.02	2.00	0.00	6.49	0.02	0.00	7.04	2.00	0.00	6.48	0.02	0.00
7.06	2.00	0.00	6.47	0.02	0.00	7.08	2.00	0.00	6.46	0.02	0.00
7.10	2.00	0.00	6.45	0.02	0.00	7.12	2.00	0.00	6.44	0.02	0.00
7.14	2.00	0.00	6.43	0.02	0.00	7.16	2.00	0.00	6.42	0.02	0.00
7.18	2.00	0.00	6.41	0.02	0.00	7.20	2.00	0.00	6.40	0.02	0.00
7.22	2.00	0.00	6.39	0.02	0.00	7.24	2.00	0.00	6.38	0.02	0.00
7.26	2.00	0.00	6.37	0.02	0.00	7.28	2.00	0.00	6.36	0.02	0.00
7.30	2.00	0.00	6.35	0.02	0.00	7.32	2.00	0.00	6.34	0.02	0.00
7.34	2.00	0.00	6.33	0.02	0.00	7.36	2.00	0.00	6.32	0.02	0.00
7.38	2.00	0.00	6.31	0.02	0.00	7.40	2.00	0.00	6.30	0.02	0.00
7.42	2.00	0.00	6.29	0.02	0.00	7.44	2.00	0.00	6.28	0.02	0.00
7.46	2.00	0.00	6.27	0.02	0.00	7.48	2.00	0.00	6.26	0.02	0.00
7.50	2.00	0.00	6.25	0.02	0.00	7.52	2.00	0.00	6.24	0.02	0.00
7.54	2.00	0.00	6.23	0.02	0.00	7.56	2.00	0.00	6.22	0.02	0.00
7.58	2.00	0.00	6.21	0.02	0.00	7.60	2.00	0.00	6.20	0.02	0.00
7.62	2.00	0.00	6.19	0.02	0.00	7.64	2.00	0.00	6.18	0.02	0.00
7.66	2.00	0.00	6.17	0.02	0.00	7.68	2.00	0.00	6.16	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
7.70	2.00	0.00	6.15	0.02	0.00	7.72	2.00	0.00	6.14	0.02	0.00
7.74	2.00	0.00	6.13	0.02	0.00	7.76	2.00	0.00	6.12	0.02	0.00
7.78	2.00	0.00	6.11	0.02	0.00	7.80	2.00	0.00	6.10	0.02	0.00
7.82	2.00	0.00	6.09	0.02	0.00	7.84	2.00	0.00	6.08	0.02	0.00
7.86	2.00	0.00	6.07	0.02	0.00	7.88	2.00	0.00	6.06	0.02	0.00
7.90	2.00	0.00	6.05	0.02	0.00	7.92	2.00	0.00	6.04	0.02	0.00
7.94	2.00	0.00	6.03	0.02	0.00	7.96	2.00	0.00	6.02	0.02	0.00
7.98	2.00	0.00	6.01	0.02	0.00	8.00	2.00	0.00	6.00	0.02	0.00
8.02	2.00	0.00	5.99	0.02	0.00	8.04	2.00	0.00	5.98	0.02	0.00
8.06	2.00	0.00	5.97	0.02	0.00	8.08	2.00	0.00	5.96	0.02	0.00
8.10	2.00	0.00	5.95	0.02	0.00	8.12	2.00	0.00	5.94	0.02	0.00
8.14	2.00	0.00	5.93	0.02	0.00	8.16	2.00	0.00	5.92	0.02	0.00
8.18	2.00	0.00	5.91	0.02	0.00	8.20	2.00	0.00	5.90	0.02	0.00
8.22	2.00	0.00	5.89	0.02	0.00	8.24	2.00	0.00	5.88	0.02	0.00
8.26	2.00	0.00	5.87	0.02	0.00	8.28	2.00	0.00	5.86	0.02	0.00
8.30	2.00	0.00	5.85	0.02	0.00	8.32	2.00	0.00	5.84	0.02	0.00
8.34	2.00	0.00	5.83	0.02	0.00	8.36	2.00	0.00	5.82	0.02	0.00
8.38	2.00	0.00	5.81	0.02	0.00	8.40	2.00	0.00	5.80	0.02	0.00
8.42	2.00	0.00	5.79	0.02	0.00	8.44	2.00	0.00	5.78	0.02	0.00
8.46	0.53	0.47	5.77	0.02	0.05	8.48	0.54	0.46	5.76	0.02	0.05
8.50	0.56	0.44	5.75	0.02	0.05	8.52	0.54	0.46	5.74	0.02	0.05
8.54	2.00	0.00	5.73	0.02	0.00	8.56	2.00	0.00	5.72	0.02	0.00
8.58	2.00	0.00	5.71	0.02	0.00	8.60	2.00	0.00	5.70	0.02	0.00
8.62	2.00	0.00	5.69	0.02	0.00	8.64	2.00	0.00	5.68	0.02	0.00
8.66	2.00	0.00	5.67	0.02	0.00	8.68	2.00	0.00	5.66	0.02	0.00
8.70	2.00	0.00	5.65	0.02	0.00	8.72	2.00	0.00	5.64	0.02	0.00
8.74	2.00	0.00	5.63	0.02	0.00	8.76	2.00	0.00	5.62	0.02	0.00
8.78	2.00	0.00	5.61	0.02	0.00	8.80	2.00	0.00	5.60	0.02	0.00
8.82	2.00	0.00	5.59	0.02	0.00	8.84	2.00	0.00	5.58	0.02	0.00
8.86	2.00	0.00	5.57	0.02	0.00	8.88	2.00	0.00	5.56	0.02	0.00
8.90	2.00	0.00	5.55	0.02	0.00	8.92	2.00	0.00	5.54	0.02	0.00
8.94	2.00	0.00	5.53	0.02	0.00	8.96	2.00	0.00	5.52	0.02	0.00
8.98	2.00	0.00	5.51	0.02	0.00	9.00	2.00	0.00	5.50	0.02	0.00
9.02	2.00	0.00	5.49	0.02	0.00	9.04	2.00	0.00	5.48	0.02	0.00
9.06	2.00	0.00	5.47	0.02	0.00	9.08	2.00	0.00	5.46	0.02	0.00
9.10	2.00	0.00	5.45	0.02	0.00	9.12	2.00	0.00	5.44	0.02	0.00
9.14	2.00	0.00	5.43	0.02	0.00	9.16	2.00	0.00	5.42	0.02	0.00
9.18	2.00	0.00	5.41	0.02	0.00	9.20	2.00	0.00	5.40	0.02	0.00
9.22	2.00	0.00	5.39	0.02	0.00	9.24	2.00	0.00	5.38	0.02	0.00
9.26	2.00	0.00	5.37	0.02	0.00	9.28	2.00	0.00	5.36	0.02	0.00
9.30	2.00	0.00	5.35	0.02	0.00	9.32	2.00	0.00	5.34	0.02	0.00
9.34	2.00	0.00	5.33	0.02	0.00	9.36	2.00	0.00	5.32	0.02	0.00
9.38	2.00	0.00	5.31	0.02	0.00	9.40	2.00	0.00	5.30	0.02	0.00
9.42	2.00	0.00	5.29	0.02	0.00	9.44	2.00	0.00	5.28	0.02	0.00
9.46	2.00	0.00	5.27	0.02	0.00	9.48	2.00	0.00	5.26	0.02	0.00
9.50	2.00	0.00	5.25	0.02	0.00	9.52	2.00	0.00	5.24	0.02	0.00
9.54	2.00	0.00	5.23	0.02	0.00	9.56	2.00	0.00	5.22	0.02	0.00
9.58	2.00	0.00	5.21	0.02	0.00	9.60	2.00	0.00	5.20	0.02	0.00



**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
9.62	2.00	0.00	5.19	0.02	0.00	9.64	2.00	0.00	5.18	0.02	0.00
9.66	2.00	0.00	5.17	0.02	0.00	9.68	2.00	0.00	5.16	0.02	0.00
9.70	2.00	0.00	5.15	0.02	0.00	9.72	2.00	0.00	5.14	0.02	0.00
9.74	2.00	0.00	5.13	0.02	0.00	9.76	2.00	0.00	5.12	0.02	0.00
9.78	2.00	0.00	5.11	0.02	0.00	9.80	2.00	0.00	5.10	0.02	0.00
9.82	2.00	0.00	5.09	0.02	0.00	9.84	2.00	0.00	5.08	0.02	0.00
9.86	2.00	0.00	5.07	0.02	0.00	9.88	2.00	0.00	5.06	0.02	0.00
9.90	2.00	0.00	5.05	0.02	0.00	9.92	2.00	0.00	5.04	0.02	0.00
9.94	2.00	0.00	5.03	0.02	0.00	9.96	2.00	0.00	5.02	0.02	0.00
9.98	2.00	0.00	5.01	0.02	0.00	10.00	2.00	0.00	5.00	0.02	0.00
10.02	2.00	0.00	4.99	0.02	0.00	10.04	2.00	0.00	4.98	0.02	0.00
10.06	2.00	0.00	4.97	0.02	0.00	10.08	2.00	0.00	4.96	0.02	0.00
10.10	2.00	0.00	4.95	0.02	0.00	10.12	2.00	0.00	4.94	0.02	0.00
10.14	2.00	0.00	4.93	0.02	0.00	10.16	2.00	0.00	4.92	0.02	0.00
10.18	2.00	0.00	4.91	0.02	0.00	10.20	2.00	0.00	4.90	0.02	0.00
10.22	2.00	0.00	4.89	0.02	0.00	10.24	2.00	0.00	4.88	0.02	0.00
10.26	2.00	0.00	4.87	0.02	0.00	10.28	2.00	0.00	4.86	0.02	0.00
10.30	2.00	0.00	4.85	0.02	0.00	10.32	2.00	0.00	4.84	0.02	0.00
10.34	2.00	0.00	4.83	0.02	0.00	10.36	2.00	0.00	4.82	0.02	0.00
10.38	2.00	0.00	4.81	0.02	0.00	10.40	2.00	0.00	4.80	0.02	0.00
10.42	2.00	0.00	4.79	0.02	0.00	10.44	2.00	0.00	4.78	0.02	0.00
10.46	2.00	0.00	4.77	0.02	0.00	10.48	2.00	0.00	4.76	0.02	0.00
10.50	2.00	0.00	4.75	0.02	0.00	10.52	2.00	0.00	4.74	0.02	0.00
10.54	2.00	0.00	4.73	0.02	0.00	10.56	2.00	0.00	4.72	0.02	0.00
10.58	2.00	0.00	4.71	0.02	0.00	10.60	2.00	0.00	4.70	0.02	0.00
10.62	2.00	0.00	4.69	0.02	0.00	10.64	2.00	0.00	4.68	0.02	0.00
10.66	2.00	0.00	4.67	0.02	0.00	10.68	2.00	0.00	4.66	0.02	0.00
10.70	2.00	0.00	4.65	0.02	0.00	10.72	2.00	0.00	4.64	0.02	0.00
10.74	2.00	0.00	4.63	0.02	0.00	10.76	2.00	0.00	4.62	0.02	0.00
10.78	2.00	0.00	4.61	0.02	0.00	10.80	2.00	0.00	4.60	0.02	0.00
10.82	2.00	0.00	4.59	0.02	0.00	10.84	2.00	0.00	4.58	0.02	0.00
10.86	2.00	0.00	4.57	0.02	0.00	10.88	2.00	0.00	4.56	0.02	0.00
10.90	2.00	0.00	4.55	0.02	0.00	10.92	2.00	0.00	4.54	0.02	0.00
10.94	2.00	0.00	4.53	0.02	0.00	10.96	2.00	0.00	4.52	0.02	0.00
10.98	2.00	0.00	4.51	0.02	0.00	11.00	2.00	0.00	4.50	0.02	0.00
11.02	2.00	0.00	4.49	0.02	0.00	11.04	2.00	0.00	4.48	0.02	0.00
11.06	2.00	0.00	4.47	0.02	0.00	11.08	2.00	0.00	4.46	0.02	0.00
11.10	2.00	0.00	4.45	0.02	0.00	11.12	2.00	0.00	4.44	0.02	0.00
11.14	2.00	0.00	4.43	0.02	0.00	11.16	2.00	0.00	4.42	0.02	0.00
11.18	2.00	0.00	4.41	0.02	0.00	11.20	2.00	0.00	4.40	0.02	0.00
11.22	2.00	0.00	4.39	0.02	0.00	11.24	2.00	0.00	4.38	0.02	0.00
11.26	2.00	0.00	4.37	0.02	0.00	11.28	2.00	0.00	4.36	0.02	0.00
11.30	2.00	0.00	4.35	0.02	0.00	11.32	2.00	0.00	4.34	0.02	0.00
11.34	2.00	0.00	4.33	0.02	0.00	11.36	2.00	0.00	4.32	0.02	0.00
11.38	2.00	0.00	4.31	0.02	0.00	11.40	2.00	0.00	4.30	0.02	0.00
11.42	2.00	0.00	4.29	0.02	0.00	11.44	2.00	0.00	4.28	0.02	0.00
11.46	2.00	0.00	4.27	0.02	0.00	11.48	2.00	0.00	4.26	0.02	0.00
11.50	2.00	0.00	4.25	0.02	0.00	11.52	2.00	0.00	4.24	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
11.54	2.00	0.00	4.23	0.02	0.00	11.56	2.00	0.00	4.22	0.02	0.00
11.58	2.00	0.00	4.21	0.02	0.00	11.60	2.00	0.00	4.20	0.02	0.00
11.62	2.00	0.00	4.19	0.02	0.00	11.64	2.00	0.00	4.18	0.02	0.00
11.66	2.00	0.00	4.17	0.02	0.00	11.68	2.00	0.00	4.16	0.02	0.00
11.70	2.00	0.00	4.15	0.02	0.00	11.72	2.00	0.00	4.14	0.02	0.00
11.74	2.00	0.00	4.13	0.02	0.00	11.76	2.00	0.00	4.12	0.02	0.00
11.78	2.00	0.00	4.11	0.02	0.00	11.80	2.00	0.00	4.10	0.02	0.00
11.82	2.00	0.00	4.09	0.02	0.00	11.84	2.00	0.00	4.08	0.02	0.00
11.86	2.00	0.00	4.07	0.02	0.00	11.88	2.00	0.00	4.06	0.02	0.00
11.90	2.00	0.00	4.05	0.02	0.00	11.92	2.00	0.00	4.04	0.02	0.00
11.94	2.00	0.00	4.03	0.02	0.00	11.96	2.00	0.00	4.02	0.02	0.00
11.98	2.00	0.00	4.01	0.02	0.00	12.00	2.00	0.00	4.00	0.02	0.00
12.02	2.00	0.00	3.99	0.02	0.00	12.04	2.00	0.00	3.98	0.02	0.00
12.06	2.00	0.00	3.97	0.02	0.00	12.08	2.00	0.00	3.96	0.02	0.00
12.10	2.00	0.00	3.95	0.02	0.00	12.12	2.00	0.00	3.94	0.02	0.00
12.14	2.00	0.00	3.93	0.02	0.00	12.16	2.00	0.00	3.92	0.02	0.00
12.18	2.00	0.00	3.91	0.02	0.00	12.20	2.00	0.00	3.90	0.02	0.00
12.22	2.00	0.00	3.89	0.02	0.00	12.24	2.00	0.00	3.88	0.02	0.00
12.26	2.00	0.00	3.87	0.02	0.00	12.28	2.00	0.00	3.86	0.02	0.00
12.30	2.00	0.00	3.85	0.02	0.00	12.32	2.00	0.00	3.84	0.02	0.00
12.34	2.00	0.00	3.83	0.02	0.00	12.36	2.00	0.00	3.82	0.02	0.00
12.38	2.00	0.00	3.81	0.02	0.00	12.40	2.00	0.00	3.80	0.02	0.00
12.42	2.00	0.00	3.79	0.02	0.00	12.44	2.00	0.00	3.78	0.02	0.00
12.46	2.00	0.00	3.77	0.02	0.00	12.48	2.00	0.00	3.76	0.02	0.00
12.50	2.00	0.00	3.75	0.02	0.00	12.52	2.00	0.00	3.74	0.02	0.00
12.54	2.00	0.00	3.73	0.02	0.00	12.56	2.00	0.00	3.72	0.02	0.00
12.58	2.00	0.00	3.71	0.02	0.00	12.60	2.00	0.00	3.70	0.02	0.00
12.62	2.00	0.00	3.69	0.02	0.00	12.64	2.00	0.00	3.68	0.02	0.00
12.66	2.00	0.00	3.67	0.02	0.00	12.68	2.00	0.00	3.66	0.02	0.00
12.70	2.00	0.00	3.65	0.02	0.00	12.72	2.00	0.00	3.64	0.02	0.00
12.74	2.00	0.00	3.63	0.02	0.00	12.76	2.00	0.00	3.62	0.02	0.00
12.78	2.00	0.00	3.61	0.02	0.00	12.80	2.00	0.00	3.60	0.02	0.00
12.82	2.00	0.00	3.59	0.02	0.00	12.84	2.00	0.00	3.58	0.02	0.00
12.86	2.00	0.00	3.57	0.02	0.00	12.88	2.00	0.00	3.56	0.02	0.00
12.90	2.00	0.00	3.55	0.02	0.00	12.92	2.00	0.00	3.54	0.02	0.00
12.94	2.00	0.00	3.53	0.02	0.00	12.96	2.00	0.00	3.52	0.02	0.00
12.98	2.00	0.00	3.51	0.02	0.00	13.00	2.00	0.00	3.50	0.02	0.00
13.02	2.00	0.00	3.49	0.02	0.00	13.04	2.00	0.00	3.48	0.02	0.00
13.06	2.00	0.00	3.47	0.02	0.00	13.08	2.00	0.00	3.46	0.02	0.00
13.10	2.00	0.00	3.45	0.02	0.00	13.12	2.00	0.00	3.44	0.02	0.00
13.14	2.00	0.00	3.43	0.02	0.00	13.16	2.00	0.00	3.42	0.02	0.00
13.18	2.00	0.00	3.41	0.02	0.00	13.20	2.00	0.00	3.40	0.02	0.00
13.22	2.00	0.00	3.39	0.02	0.00	13.24	2.00	0.00	3.38	0.02	0.00
13.26	2.00	0.00	3.37	0.02	0.00	13.28	2.00	0.00	3.36	0.02	0.00
13.30	2.00	0.00	3.35	0.02	0.00	13.32	2.00	0.00	3.34	0.02	0.00
13.34	2.00	0.00	3.33	0.02	0.00	13.36	2.00	0.00	3.32	0.02	0.00
13.38	2.00	0.00	3.31	0.02	0.00	13.40	2.00	0.00	3.30	0.02	0.00
13.42	2.00	0.00	3.29	0.02	0.00	13.44	2.00	0.00	3.28	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
13.46	2.00	0.00	3.27	0.02	0.00	13.48	2.00	0.00	3.26	0.02	0.00
13.50	2.00	0.00	3.25	0.02	0.00	13.52	2.00	0.00	3.24	0.02	0.00
13.54	2.00	0.00	3.23	0.02	0.00	13.56	2.00	0.00	3.22	0.02	0.00
13.58	2.00	0.00	3.21	0.02	0.00	13.60	2.00	0.00	3.20	0.02	0.00
13.62	2.00	0.00	3.19	0.02	0.00	13.64	2.00	0.00	3.18	0.02	0.00
13.66	2.00	0.00	3.17	0.02	0.00	13.68	2.00	0.00	3.16	0.02	0.00
13.70	2.00	0.00	3.15	0.02	0.00	13.72	2.00	0.00	3.14	0.02	0.00
13.74	2.00	0.00	3.13	0.02	0.00	13.76	2.00	0.00	3.12	0.02	0.00
13.78	2.00	0.00	3.11	0.02	0.00	13.80	2.00	0.00	3.10	0.02	0.00
13.82	2.00	0.00	3.09	0.02	0.00	13.84	2.00	0.00	3.08	0.02	0.00
13.86	2.00	0.00	3.07	0.02	0.00	13.88	2.00	0.00	3.06	0.02	0.00
13.90	2.00	0.00	3.05	0.02	0.00	13.92	2.00	0.00	3.04	0.02	0.00
13.94	2.00	0.00	3.03	0.02	0.00	13.96	2.00	0.00	3.02	0.02	0.00
13.98	2.00	0.00	3.01	0.02	0.00	14.00	2.00	0.00	3.00	0.02	0.00
14.02	2.00	0.00	2.99	0.02	0.00	14.04	2.00	0.00	2.98	0.02	0.00
14.06	2.00	0.00	2.97	0.02	0.00	14.08	2.00	0.00	2.96	0.02	0.00
14.10	2.00	0.00	2.95	0.02	0.00	14.12	2.00	0.00	2.94	0.02	0.00
14.14	2.00	0.00	2.93	0.02	0.00	14.16	2.00	0.00	2.92	0.02	0.00
14.18	2.00	0.00	2.91	0.02	0.00	14.20	2.00	0.00	2.90	0.02	0.00
14.22	2.00	0.00	2.89	0.02	0.00	14.24	2.00	0.00	2.88	0.02	0.00
14.26	2.00	0.00	2.87	0.02	0.00	14.28	2.00	0.00	2.86	0.02	0.00
14.30	2.00	0.00	2.85	0.02	0.00	14.32	2.00	0.00	2.84	0.02	0.00
14.34	2.00	0.00	2.83	0.02	0.00	14.36	2.00	0.00	2.82	0.02	0.00
14.38	2.00	0.00	2.81	0.02	0.00	14.40	2.00	0.00	2.80	0.02	0.00
14.42	2.00	0.00	2.79	0.02	0.00	14.44	2.00	0.00	2.78	0.02	0.00
14.46	2.00	0.00	2.77	0.02	0.00	14.48	2.00	0.00	2.76	0.02	0.00
14.50	2.00	0.00	2.75	0.02	0.00	14.52	2.00	0.00	2.74	0.02	0.00
14.54	2.00	0.00	2.73	0.02	0.00	14.56	2.00	0.00	2.72	0.02	0.00
14.58	2.00	0.00	2.71	0.02	0.00	14.60	2.00	0.00	2.70	0.02	0.00
14.62	2.00	0.00	2.69	0.02	0.00	14.64	2.00	0.00	2.68	0.02	0.00
14.66	2.00	0.00	2.67	0.02	0.00	14.68	2.00	0.00	2.66	0.02	0.00
14.70	2.00	0.00	2.65	0.02	0.00	14.72	2.00	0.00	2.64	0.02	0.00
14.74	2.00	0.00	2.63	0.02	0.00	14.76	2.00	0.00	2.62	0.02	0.00
14.78	2.00	0.00	2.61	0.02	0.00	14.80	2.00	0.00	2.60	0.02	0.00
14.82	2.00	0.00	2.59	0.02	0.00	14.84	2.00	0.00	2.58	0.02	0.00
14.86	2.00	0.00	2.57	0.02	0.00	14.88	2.00	0.00	2.56	0.02	0.00
14.90	2.00	0.00	2.55	0.02	0.00	14.92	2.00	0.00	2.54	0.02	0.00
14.94	2.00	0.00	2.53	0.02	0.00	14.96	2.00	0.00	2.52	0.02	0.00
14.98	2.00	0.00	2.51	0.02	0.00	15.00	2.00	0.00	2.50	0.02	0.00

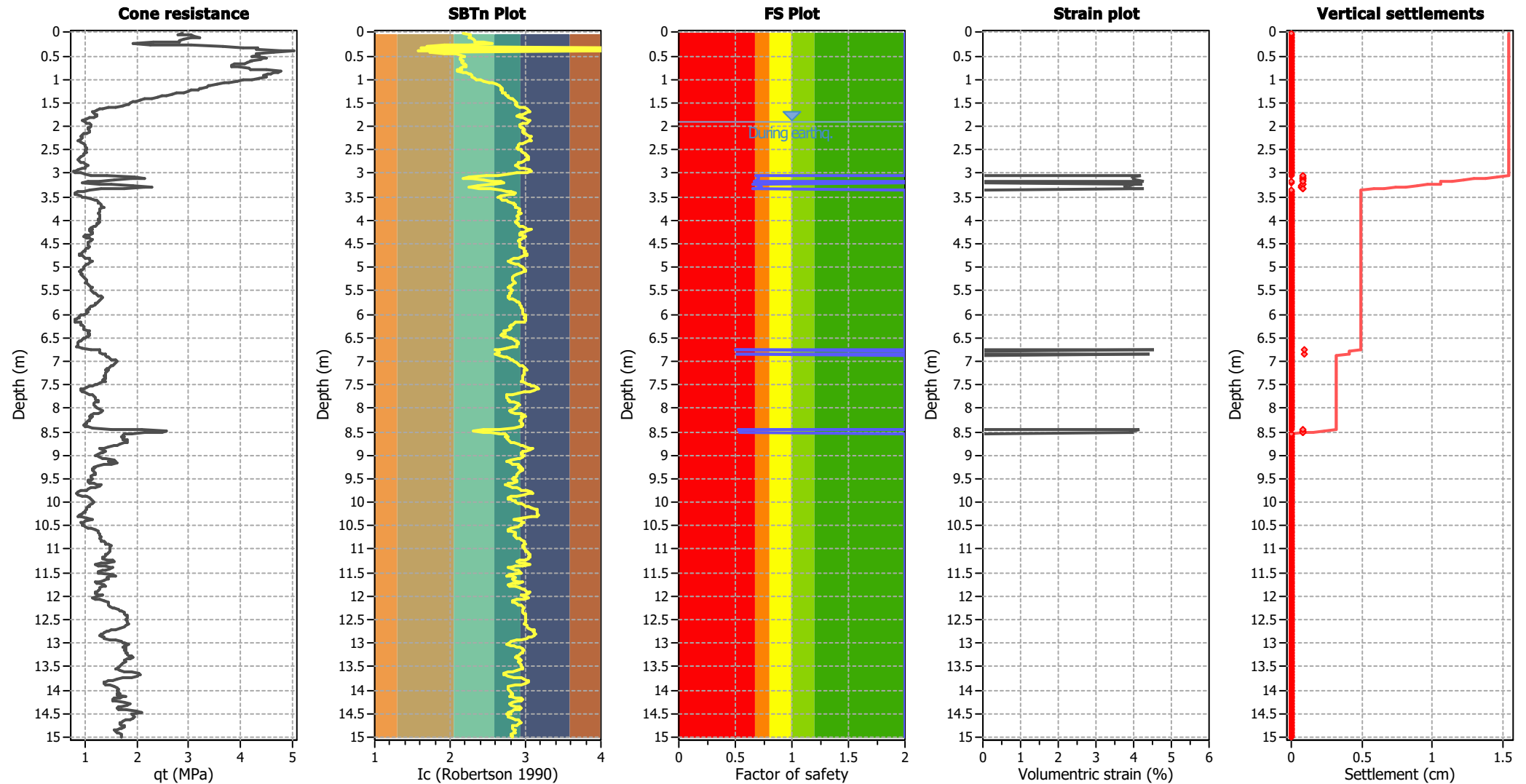
**Overall liquefaction potential: 1.02**

LPI = 0.00 - Liquefaction risk very low  
 LPI between 0.00 and 5.00 - Liquefaction risk low  
 LPI between 5.00 and 15.00 - Liquefaction risk high  
 LPI > 15.00 - Liquefaction risk very high

**Abbreviations**

FS: Calculated factor of safety for test point  
 F<sub>L</sub>: 1 - FS  
 w<sub>z</sub>: Function value of the extend of soil liquefaction according to depth  
 d<sub>z</sub>: Layer thickness (m)  
 LPI: Liquefaction potential index value for test point

## Estimation of post-earthquake settlements



### Abbreviations

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

## LIQUEFACTION ANALYSIS REPORT

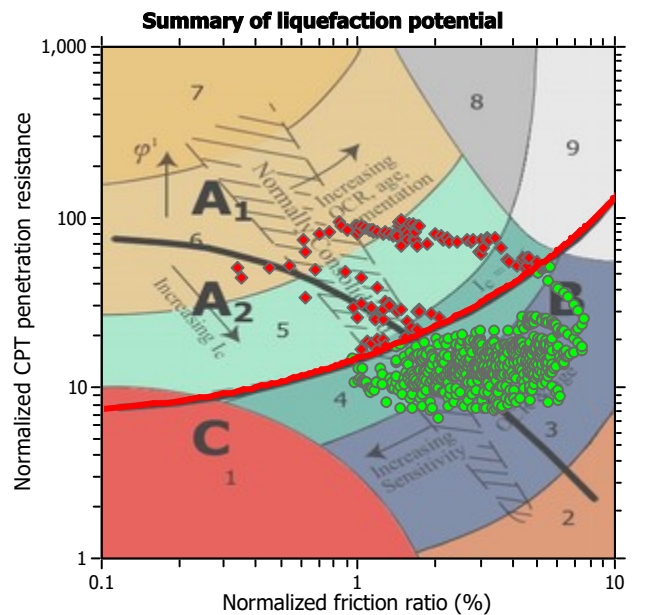
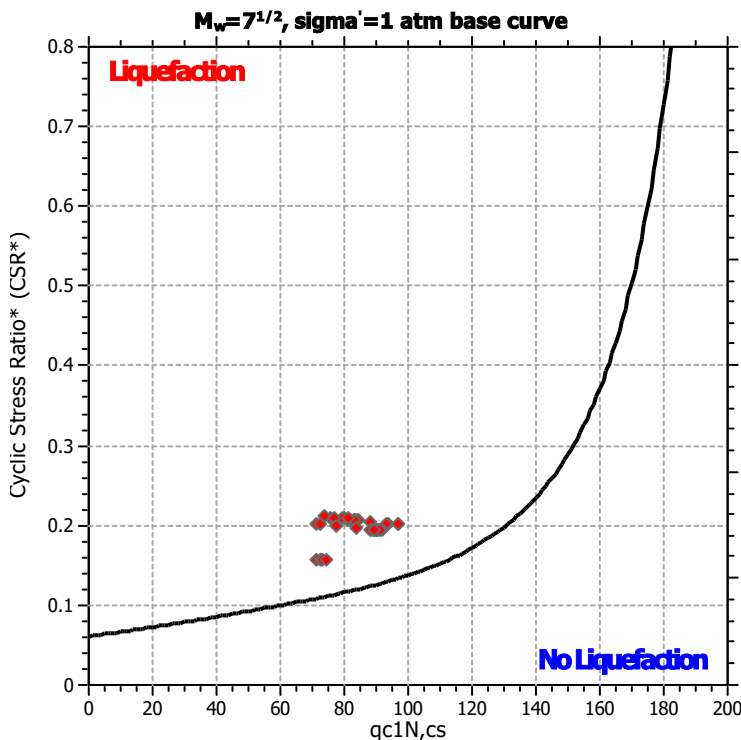
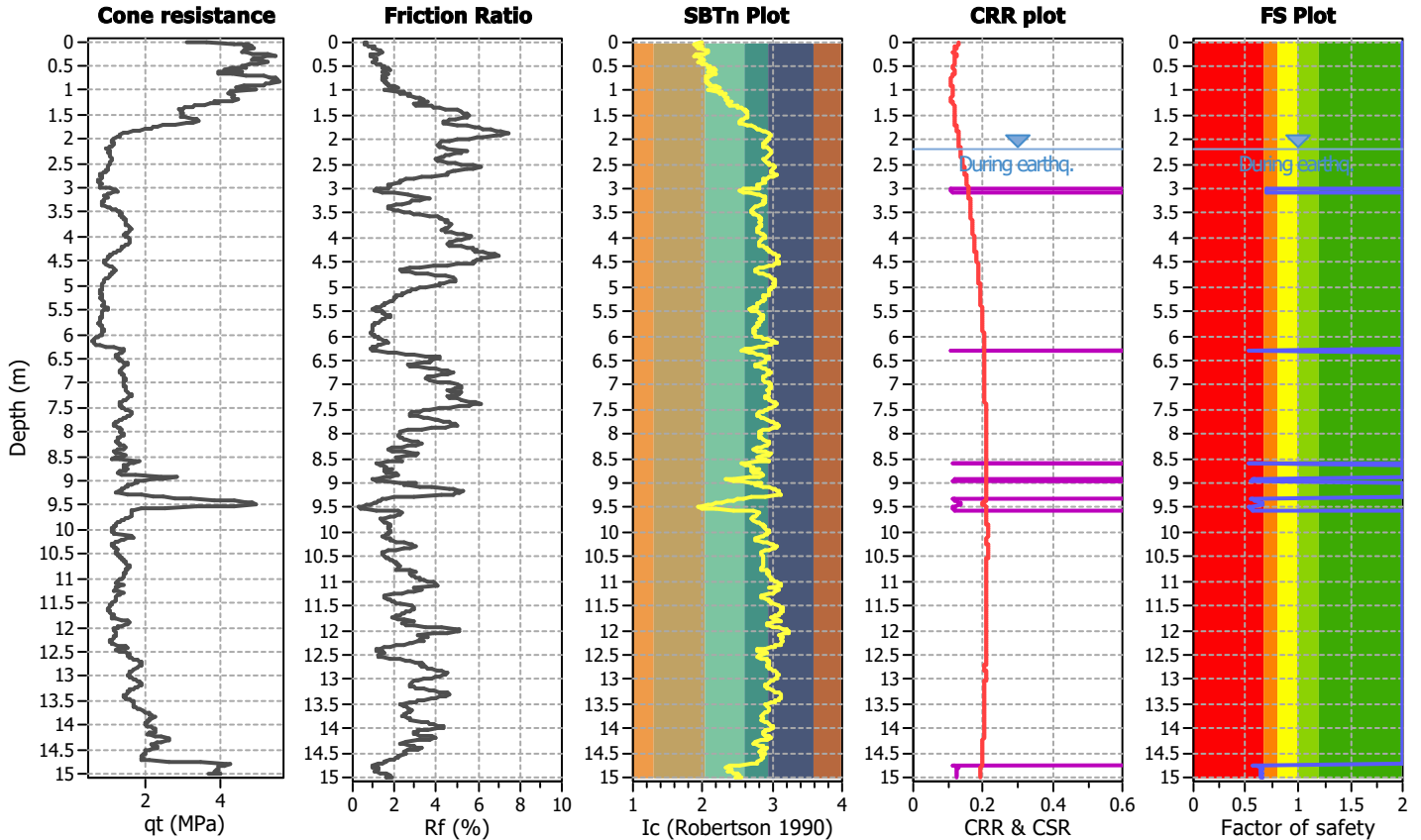
**Project title :**

**Location :**

**CPT file : cptu4**

### Input parameters and analysis data

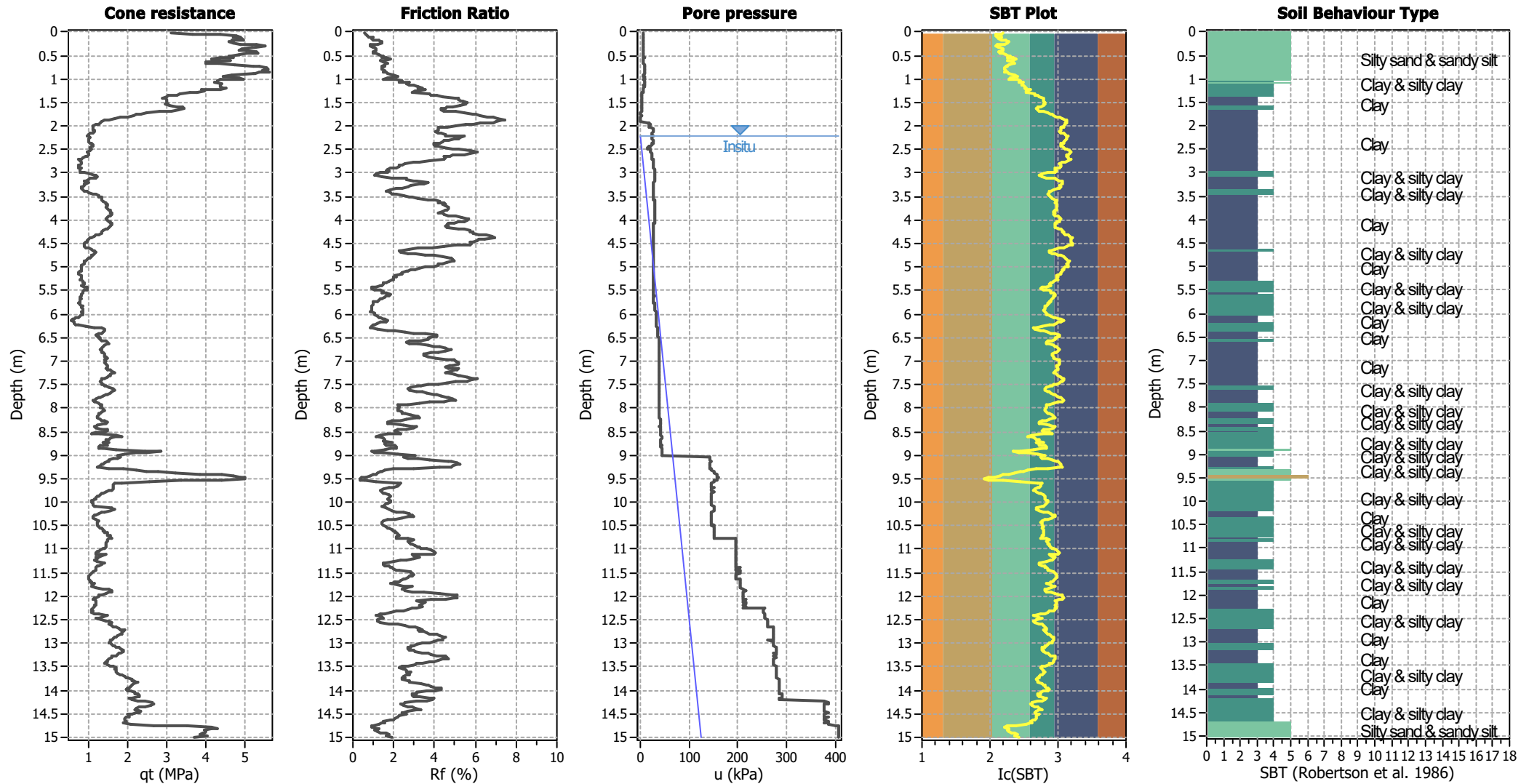
Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.20 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.20 m	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude $M_w$ :	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.25	Unit weight calculation:	Based on SBT	$K_\sigma$ applied:	Yes	MSF method:	Method based



Zone A<sub>1</sub>: Cyclic liquefaction likely depending on size and duration of cyclic loading  
 Zone A<sub>2</sub>: Cyclic liquefaction and strength loss likely depending on loading and ground geometry  
 Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening  
 Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry



## CPT basic interpretation plots



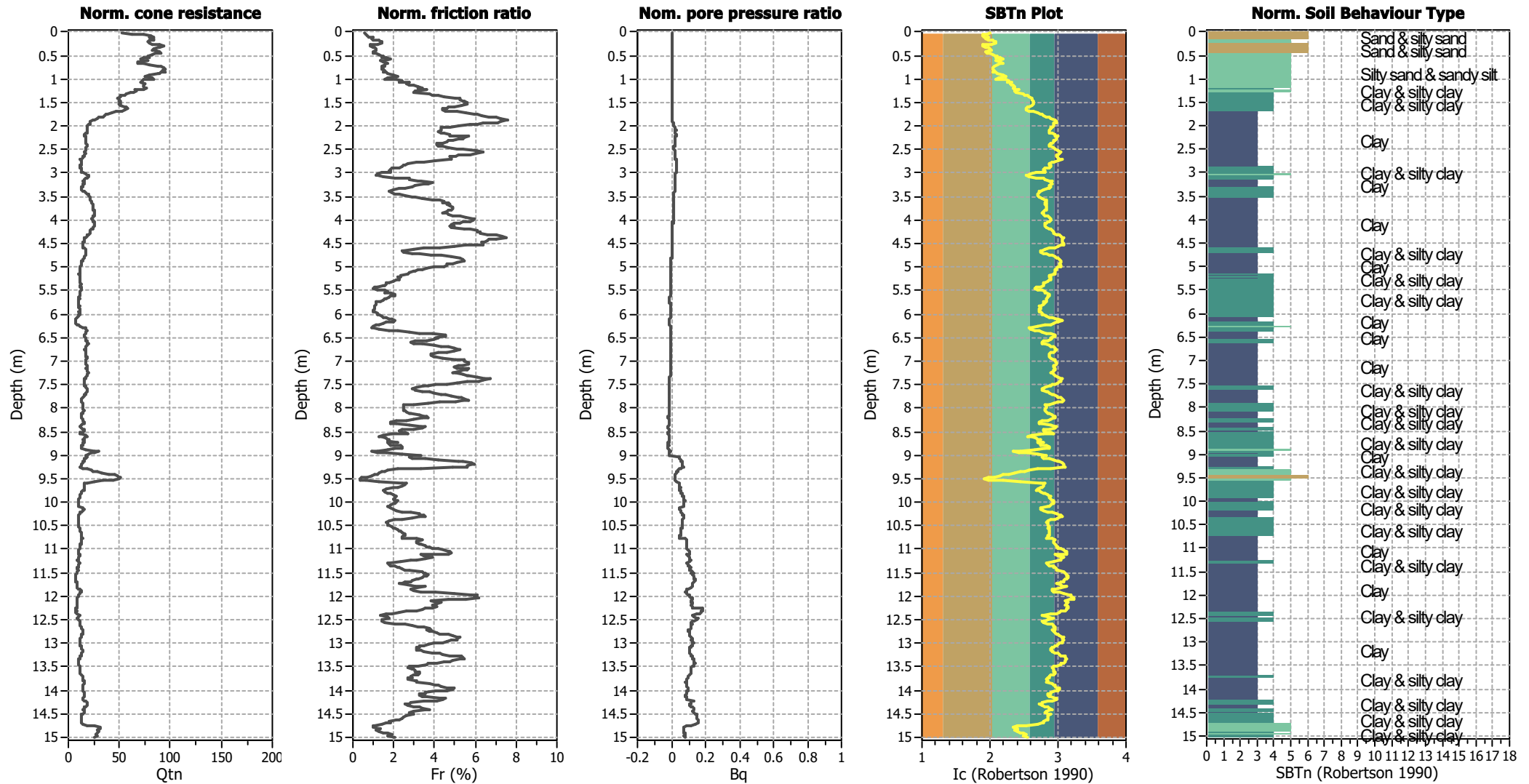
## Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on $I_c$ value	$I_c$ cut-off value:	2.60	$K_g$ applied:	Yes
Earthquake magnitude $M_w$ :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.20 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

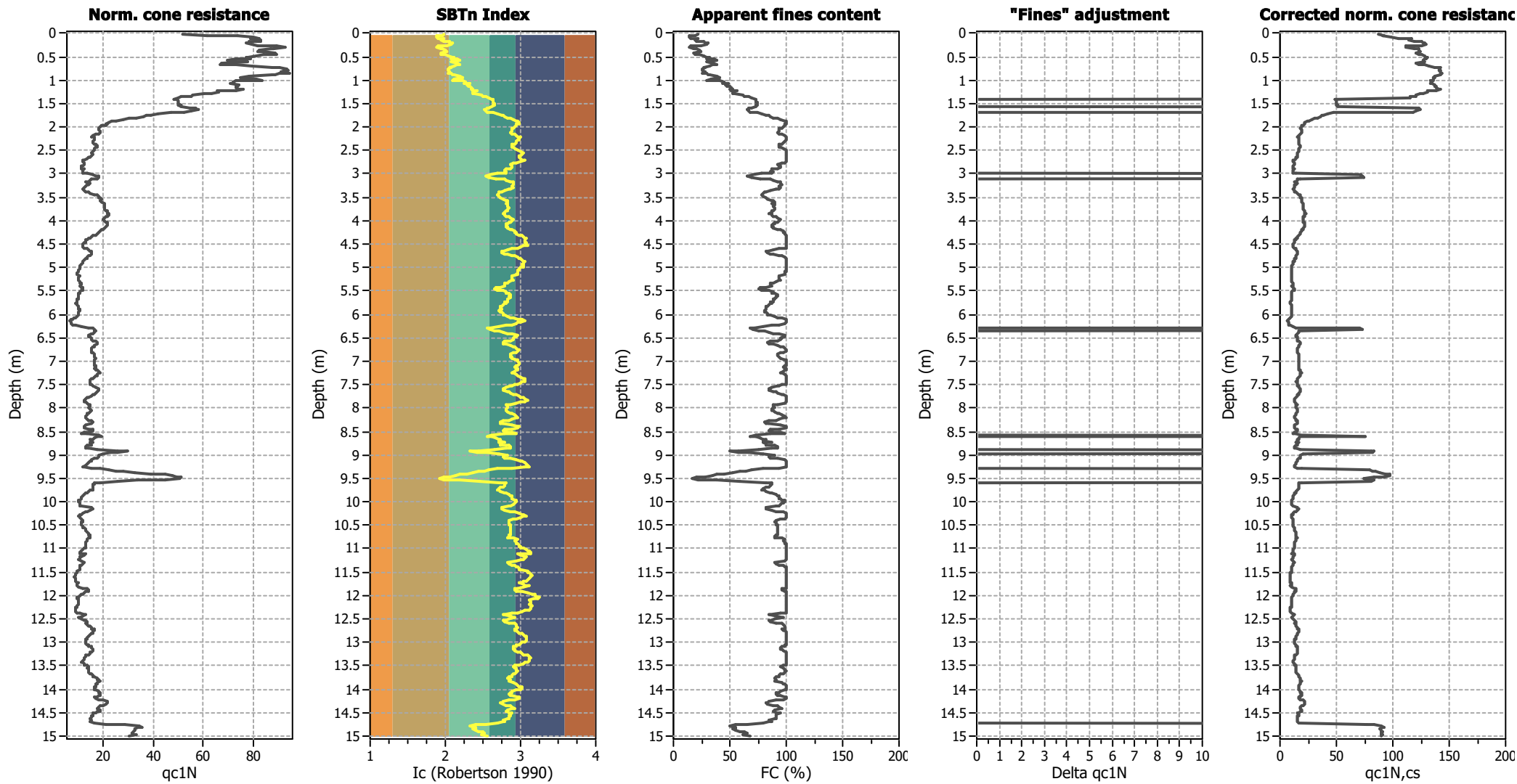
## CPT basic interpretation plots (normalized)



## Input parameters and analysis data

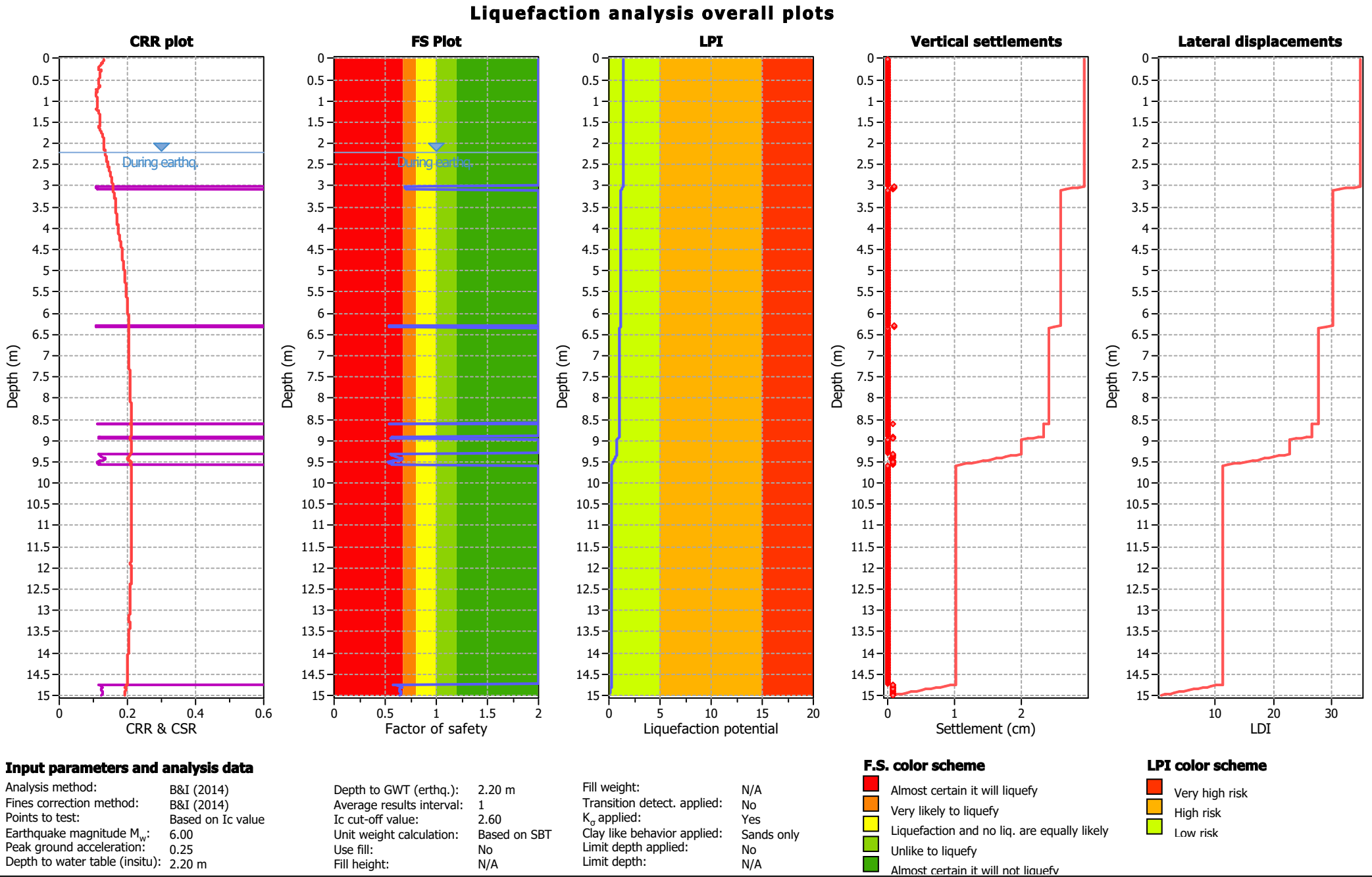
Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>0</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.20 m	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots (intermediate results)

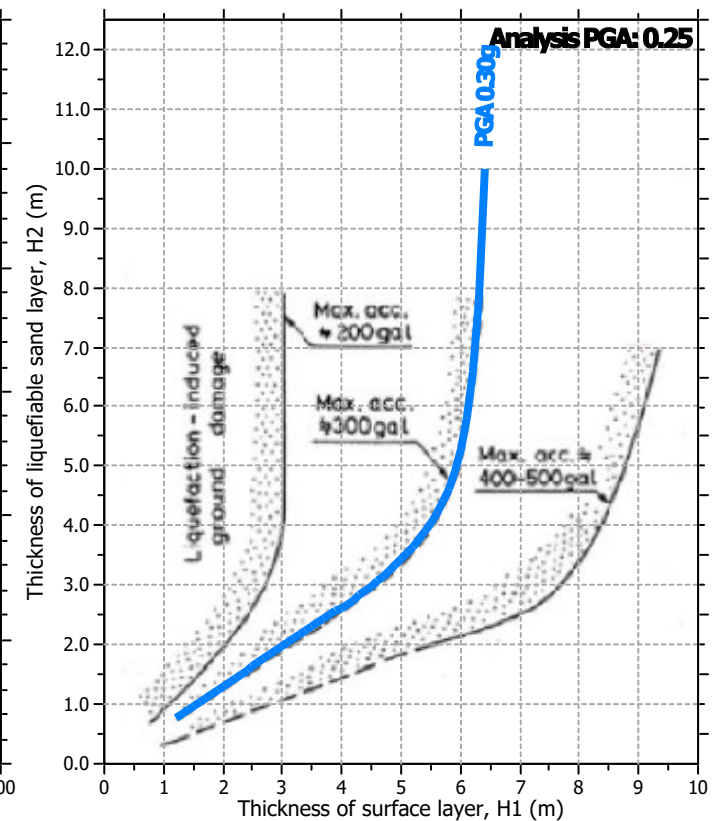
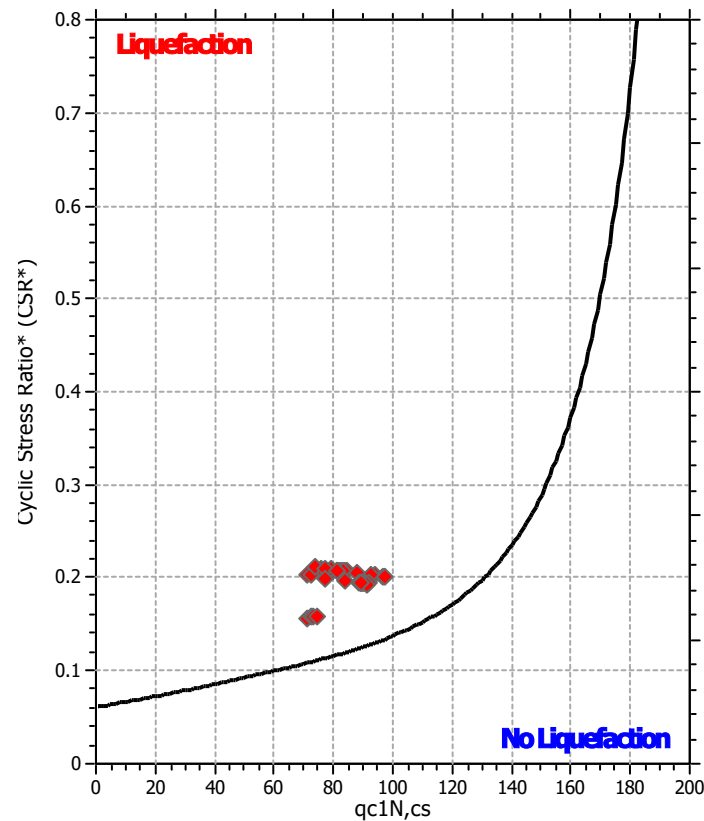
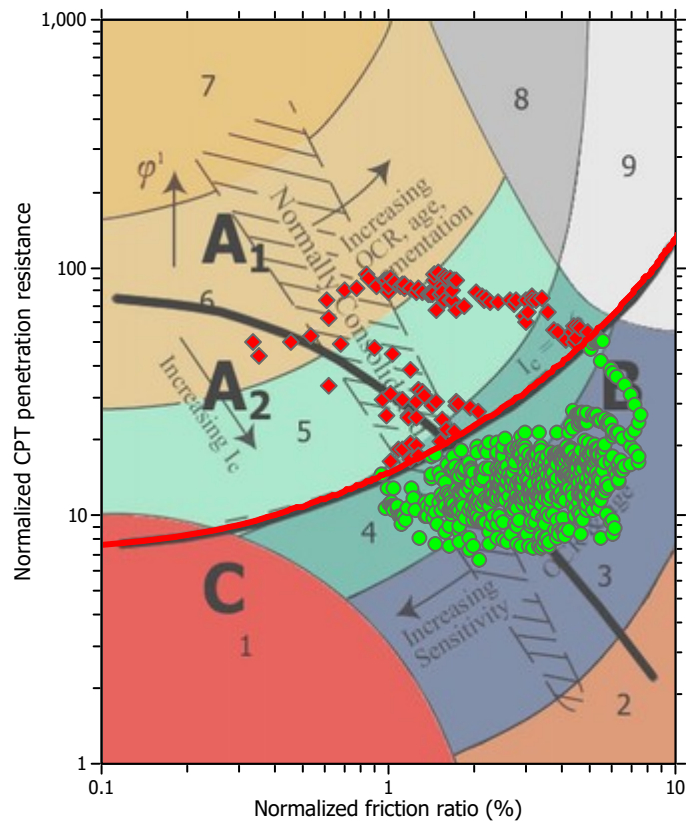


Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>g</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.20 m	Fill height:	N/A	Limit depth:	N/A



## Liquefaction analysis summary plots

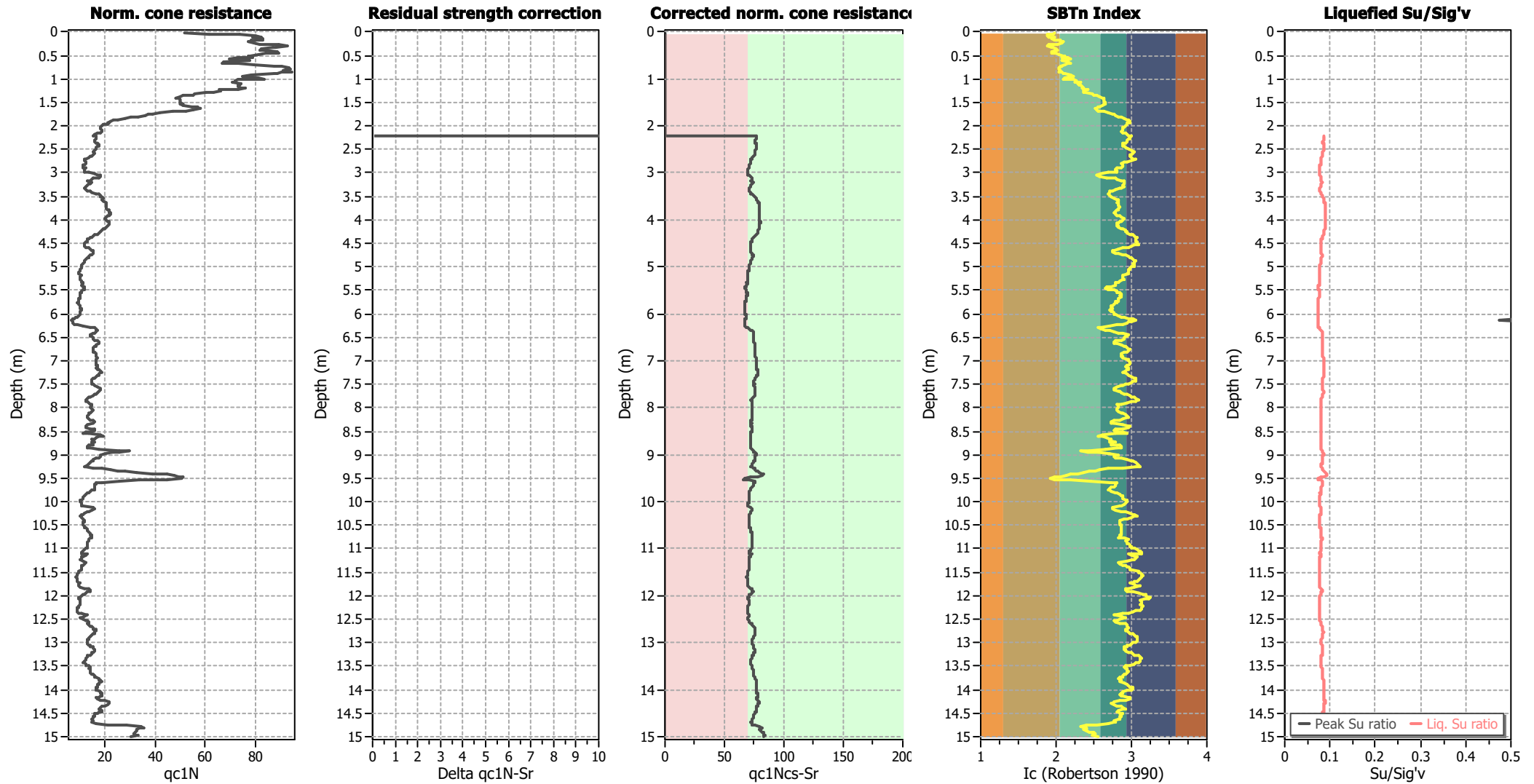


### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on I <sub>c</sub> value	I <sub>c</sub> cut-off value:	2.60	K <sub>0</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.20 m	Fill height:	N/A	Limit depth:	N/A



## Check for strength loss plots (Idriss & Boulanger (2008))



### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.20 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on $I_c$ value	$I_c$ cut-off value:	2.60	$K_g$ applied:	Yes
Earthquake magnitude $M_w$ :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.20 m	Fill height:	N/A	Limit depth:	N/A

:: Liquefaction Potential Index calculation data ::											
Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
0.02	2.00	0.00	9.99	0.02	0.00	0.04	2.00	0.00	9.98	0.02	0.00
0.06	2.00	0.00	9.97	0.02	0.00	0.08	2.00	0.00	9.96	0.02	0.00
0.10	2.00	0.00	9.95	0.02	0.00	0.12	2.00	0.00	9.94	0.02	0.00
0.14	2.00	0.00	9.93	0.02	0.00	0.16	2.00	0.00	9.92	0.02	0.00
0.18	2.00	0.00	9.91	0.02	0.00	0.20	2.00	0.00	9.90	0.02	0.00
0.22	2.00	0.00	9.89	0.02	0.00	0.24	2.00	0.00	9.88	0.02	0.00
0.26	2.00	0.00	9.87	0.02	0.00	0.28	2.00	0.00	9.86	0.02	0.00
0.30	2.00	0.00	9.85	0.02	0.00	0.32	2.00	0.00	9.84	0.02	0.00
0.34	2.00	0.00	9.83	0.02	0.00	0.36	2.00	0.00	9.82	0.02	0.00
0.38	2.00	0.00	9.81	0.02	0.00	0.40	2.00	0.00	9.80	0.02	0.00
0.42	2.00	0.00	9.79	0.02	0.00	0.44	2.00	0.00	9.78	0.02	0.00
0.46	2.00	0.00	9.77	0.02	0.00	0.48	2.00	0.00	9.76	0.02	0.00
0.50	2.00	0.00	9.75	0.02	0.00	0.52	2.00	0.00	9.74	0.02	0.00
0.54	2.00	0.00	9.73	0.02	0.00	0.56	2.00	0.00	9.72	0.02	0.00
0.58	2.00	0.00	9.71	0.02	0.00	0.60	2.00	0.00	9.70	0.02	0.00
0.62	2.00	0.00	9.69	0.02	0.00	0.64	2.00	0.00	9.68	0.02	0.00
0.66	2.00	0.00	9.67	0.02	0.00	0.68	2.00	0.00	9.66	0.02	0.00
0.70	2.00	0.00	9.65	0.02	0.00	0.72	2.00	0.00	9.64	0.02	0.00
0.74	2.00	0.00	9.63	0.02	0.00	0.76	2.00	0.00	9.62	0.02	0.00
0.78	2.00	0.00	9.61	0.02	0.00	0.80	2.00	0.00	9.60	0.02	0.00
0.82	2.00	0.00	9.59	0.02	0.00	0.84	2.00	0.00	9.58	0.02	0.00
0.86	2.00	0.00	9.57	0.02	0.00	0.88	2.00	0.00	9.56	0.02	0.00
0.90	2.00	0.00	9.55	0.02	0.00	0.92	2.00	0.00	9.54	0.02	0.00
0.94	2.00	0.00	9.53	0.02	0.00	0.96	2.00	0.00	9.52	0.02	0.00
0.98	2.00	0.00	9.51	0.02	0.00	1.00	2.00	0.00	9.50	0.02	0.00
1.02	2.00	0.00	9.49	0.02	0.00	1.04	2.00	0.00	9.48	0.02	0.00
1.06	2.00	0.00	9.47	0.02	0.00	1.08	2.00	0.00	9.46	0.02	0.00
1.10	2.00	0.00	9.45	0.02	0.00	1.12	2.00	0.00	9.44	0.02	0.00
1.14	2.00	0.00	9.43	0.02	0.00	1.16	2.00	0.00	9.42	0.02	0.00
1.18	2.00	0.00	9.41	0.02	0.00	1.20	2.00	0.00	9.40	0.02	0.00
1.22	2.00	0.00	9.39	0.02	0.00	1.24	2.00	0.00	9.38	0.02	0.00
1.26	2.00	0.00	9.37	0.02	0.00	1.28	2.00	0.00	9.36	0.02	0.00
1.30	2.00	0.00	9.35	0.02	0.00	1.32	2.00	0.00	9.34	0.02	0.00
1.34	2.00	0.00	9.33	0.02	0.00	1.36	2.00	0.00	9.32	0.02	0.00
1.38	2.00	0.00	9.31	0.02	0.00	1.40	2.00	0.00	9.30	0.02	0.00
1.42	2.00	0.00	9.29	0.02	0.00	1.44	2.00	0.00	9.28	0.02	0.00
1.46	2.00	0.00	9.27	0.02	0.00	1.48	2.00	0.00	9.26	0.02	0.00
1.50	2.00	0.00	9.25	0.02	0.00	1.52	2.00	0.00	9.24	0.02	0.00
1.54	2.00	0.00	9.23	0.02	0.00	1.56	2.00	0.00	9.22	0.02	0.00
1.58	2.00	0.00	9.21	0.02	0.00	1.60	2.00	0.00	9.20	0.02	0.00
1.62	2.00	0.00	9.19	0.02	0.00	1.64	2.00	0.00	9.18	0.02	0.00
1.66	2.00	0.00	9.17	0.02	0.00	1.68	2.00	0.00	9.16	0.02	0.00
1.70	2.00	0.00	9.15	0.02	0.00	1.72	2.00	0.00	9.14	0.02	0.00
1.74	2.00	0.00	9.13	0.02	0.00	1.76	2.00	0.00	9.12	0.02	0.00
1.78	2.00	0.00	9.11	0.02	0.00	1.80	2.00	0.00	9.10	0.02	0.00
1.82	2.00	0.00	9.09	0.02	0.00	1.84	2.00	0.00	9.08	0.02	0.00
1.86	2.00	0.00	9.07	0.02	0.00	1.88	2.00	0.00	9.06	0.02	0.00
1.90	2.00	0.00	9.05	0.02	0.00	1.92	2.00	0.00	9.04	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
1.94	2.00	0.00	9.03	0.02	0.00	1.96	2.00	0.00	9.02	0.02	0.00
1.98	2.00	0.00	9.01	0.02	0.00	2.00	2.00	0.00	9.00	0.02	0.00
2.02	2.00	0.00	8.99	0.02	0.00	2.04	2.00	0.00	8.98	0.02	0.00
2.06	2.00	0.00	8.97	0.02	0.00	2.08	2.00	0.00	8.96	0.02	0.00
2.10	2.00	0.00	8.95	0.02	0.00	2.12	2.00	0.00	8.94	0.02	0.00
2.14	2.00	0.00	8.93	0.02	0.00	2.16	2.00	0.00	8.92	0.02	0.00
2.18	2.00	0.00	8.91	0.02	0.00	2.20	2.00	0.00	8.90	0.02	0.00
2.22	2.00	0.00	8.89	0.02	0.00	2.24	2.00	0.00	8.88	0.02	0.00
2.26	2.00	0.00	8.87	0.02	0.00	2.28	2.00	0.00	8.86	0.02	0.00
2.30	2.00	0.00	8.85	0.02	0.00	2.32	2.00	0.00	8.84	0.02	0.00
2.34	2.00	0.00	8.83	0.02	0.00	2.36	2.00	0.00	8.82	0.02	0.00
2.38	2.00	0.00	8.81	0.02	0.00	2.40	2.00	0.00	8.80	0.02	0.00
2.42	2.00	0.00	8.79	0.02	0.00	2.44	2.00	0.00	8.78	0.02	0.00
2.46	2.00	0.00	8.77	0.02	0.00	2.48	2.00	0.00	8.76	0.02	0.00
2.50	2.00	0.00	8.75	0.02	0.00	2.52	2.00	0.00	8.74	0.02	0.00
2.54	2.00	0.00	8.73	0.02	0.00	2.56	2.00	0.00	8.72	0.02	0.00
2.58	2.00	0.00	8.71	0.02	0.00	2.60	2.00	0.00	8.70	0.02	0.00
2.62	2.00	0.00	8.69	0.02	0.00	2.64	2.00	0.00	8.68	0.02	0.00
2.66	2.00	0.00	8.67	0.02	0.00	2.68	2.00	0.00	8.66	0.02	0.00
2.70	2.00	0.00	8.65	0.02	0.00	2.72	2.00	0.00	8.64	0.02	0.00
2.74	2.00	0.00	8.63	0.02	0.00	2.76	2.00	0.00	8.62	0.02	0.00
2.78	2.00	0.00	8.61	0.02	0.00	2.80	2.00	0.00	8.60	0.02	0.00
2.82	2.00	0.00	8.59	0.02	0.00	2.84	2.00	0.00	8.58	0.02	0.00
2.86	2.00	0.00	8.57	0.02	0.00	2.88	2.00	0.00	8.56	0.02	0.00
2.90	2.00	0.00	8.55	0.02	0.00	2.92	2.00	0.00	8.54	0.02	0.00
2.94	2.00	0.00	8.53	0.02	0.00	2.96	2.00	0.00	8.52	0.02	0.00
2.98	2.00	0.00	8.51	0.02	0.00	3.00	2.00	0.00	8.50	0.02	0.00
3.02	0.69	0.31	8.49	0.02	0.05	3.04	0.69	0.31	8.48	0.02	0.05
3.06	0.70	0.30	8.47	0.02	0.05	3.08	0.71	0.29	8.46	0.02	0.05
3.10	2.00	0.00	8.45	0.02	0.00	3.12	2.00	0.00	8.44	0.02	0.00
3.14	2.00	0.00	8.43	0.02	0.00	3.16	2.00	0.00	8.42	0.02	0.00
3.18	2.00	0.00	8.41	0.02	0.00	3.20	2.00	0.00	8.40	0.02	0.00
3.22	2.00	0.00	8.39	0.02	0.00	3.24	2.00	0.00	8.38	0.02	0.00
3.26	2.00	0.00	8.37	0.02	0.00	3.28	2.00	0.00	8.36	0.02	0.00
3.30	2.00	0.00	8.35	0.02	0.00	3.32	2.00	0.00	8.34	0.02	0.00
3.34	2.00	0.00	8.33	0.02	0.00	3.36	2.00	0.00	8.32	0.02	0.00
3.38	2.00	0.00	8.31	0.02	0.00	3.40	2.00	0.00	8.30	0.02	0.00
3.42	2.00	0.00	8.29	0.02	0.00	3.44	2.00	0.00	8.28	0.02	0.00
3.46	2.00	0.00	8.27	0.02	0.00	3.48	2.00	0.00	8.26	0.02	0.00
3.50	2.00	0.00	8.25	0.02	0.00	3.52	2.00	0.00	8.24	0.02	0.00
3.54	2.00	0.00	8.23	0.02	0.00	3.56	2.00	0.00	8.22	0.02	0.00
3.58	2.00	0.00	8.21	0.02	0.00	3.60	2.00	0.00	8.20	0.02	0.00
3.62	2.00	0.00	8.19	0.02	0.00	3.64	2.00	0.00	8.18	0.02	0.00
3.66	2.00	0.00	8.17	0.02	0.00	3.68	2.00	0.00	8.16	0.02	0.00
3.70	2.00	0.00	8.15	0.02	0.00	3.72	2.00	0.00	8.14	0.02	0.00
3.74	2.00	0.00	8.13	0.02	0.00	3.76	2.00	0.00	8.12	0.02	0.00
3.78	2.00	0.00	8.11	0.02	0.00	3.80	2.00	0.00	8.10	0.02	0.00
3.82	2.00	0.00	8.09	0.02	0.00	3.84	2.00	0.00	8.08	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
3.86	2.00	0.00	8.07	0.02	0.00	3.88	2.00	0.00	8.06	0.02	0.00
3.90	2.00	0.00	8.05	0.02	0.00	3.92	2.00	0.00	8.04	0.02	0.00
3.94	2.00	0.00	8.03	0.02	0.00	3.96	2.00	0.00	8.02	0.02	0.00
3.98	2.00	0.00	8.01	0.02	0.00	4.00	2.00	0.00	8.00	0.02	0.00
4.02	2.00	0.00	7.99	0.02	0.00	4.04	2.00	0.00	7.98	0.02	0.00
4.06	2.00	0.00	7.97	0.02	0.00	4.08	2.00	0.00	7.96	0.02	0.00
4.10	2.00	0.00	7.95	0.02	0.00	4.12	2.00	0.00	7.94	0.02	0.00
4.14	2.00	0.00	7.93	0.02	0.00	4.16	2.00	0.00	7.92	0.02	0.00
4.18	2.00	0.00	7.91	0.02	0.00	4.20	2.00	0.00	7.90	0.02	0.00
4.22	2.00	0.00	7.89	0.02	0.00	4.24	2.00	0.00	7.88	0.02	0.00
4.26	2.00	0.00	7.87	0.02	0.00	4.28	2.00	0.00	7.86	0.02	0.00
4.30	2.00	0.00	7.85	0.02	0.00	4.32	2.00	0.00	7.84	0.02	0.00
4.34	2.00	0.00	7.83	0.02	0.00	4.36	2.00	0.00	7.82	0.02	0.00
4.38	2.00	0.00	7.81	0.02	0.00	4.40	2.00	0.00	7.80	0.02	0.00
4.42	2.00	0.00	7.79	0.02	0.00	4.44	2.00	0.00	7.78	0.02	0.00
4.46	2.00	0.00	7.77	0.02	0.00	4.48	2.00	0.00	7.76	0.02	0.00
4.50	2.00	0.00	7.75	0.02	0.00	4.52	2.00	0.00	7.74	0.02	0.00
4.54	2.00	0.00	7.73	0.02	0.00	4.56	2.00	0.00	7.72	0.02	0.00
4.58	2.00	0.00	7.71	0.02	0.00	4.60	2.00	0.00	7.70	0.02	0.00
4.62	2.00	0.00	7.69	0.02	0.00	4.64	2.00	0.00	7.68	0.02	0.00
4.66	2.00	0.00	7.67	0.02	0.00	4.68	2.00	0.00	7.66	0.02	0.00
4.70	2.00	0.00	7.65	0.02	0.00	4.72	2.00	0.00	7.64	0.02	0.00
4.74	2.00	0.00	7.63	0.02	0.00	4.76	2.00	0.00	7.62	0.02	0.00
4.78	2.00	0.00	7.61	0.02	0.00	4.80	2.00	0.00	7.60	0.02	0.00
4.82	2.00	0.00	7.59	0.02	0.00	4.84	2.00	0.00	7.58	0.02	0.00
4.86	2.00	0.00	7.57	0.02	0.00	4.88	2.00	0.00	7.56	0.02	0.00
4.90	2.00	0.00	7.55	0.02	0.00	4.92	2.00	0.00	7.54	0.02	0.00
4.94	2.00	0.00	7.53	0.02	0.00	4.96	2.00	0.00	7.52	0.02	0.00
4.98	2.00	0.00	7.51	0.02	0.00	5.00	2.00	0.00	7.50	0.02	0.00
5.02	2.00	0.00	7.49	0.02	0.00	5.04	2.00	0.00	7.48	0.02	0.00
5.06	2.00	0.00	7.47	0.02	0.00	5.08	2.00	0.00	7.46	0.02	0.00
5.10	2.00	0.00	7.45	0.02	0.00	5.12	2.00	0.00	7.44	0.02	0.00
5.14	2.00	0.00	7.43	0.02	0.00	5.16	2.00	0.00	7.42	0.02	0.00
5.18	2.00	0.00	7.41	0.02	0.00	5.20	2.00	0.00	7.40	0.02	0.00
5.22	2.00	0.00	7.39	0.02	0.00	5.24	2.00	0.00	7.38	0.02	0.00
5.26	2.00	0.00	7.37	0.02	0.00	5.28	2.00	0.00	7.36	0.02	0.00
5.30	2.00	0.00	7.35	0.02	0.00	5.32	2.00	0.00	7.34	0.02	0.00
5.34	2.00	0.00	7.33	0.02	0.00	5.36	2.00	0.00	7.32	0.02	0.00
5.38	2.00	0.00	7.31	0.02	0.00	5.40	2.00	0.00	7.30	0.02	0.00
5.42	2.00	0.00	7.29	0.02	0.00	5.44	2.00	0.00	7.28	0.02	0.00
5.46	2.00	0.00	7.27	0.02	0.00	5.48	2.00	0.00	7.26	0.02	0.00
5.50	2.00	0.00	7.25	0.02	0.00	5.52	2.00	0.00	7.24	0.02	0.00
5.54	2.00	0.00	7.23	0.02	0.00	5.56	2.00	0.00	7.22	0.02	0.00
5.58	2.00	0.00	7.21	0.02	0.00	5.60	2.00	0.00	7.20	0.02	0.00
5.62	2.00	0.00	7.19	0.02	0.00	5.64	2.00	0.00	7.18	0.02	0.00
5.66	2.00	0.00	7.17	0.02	0.00	5.68	2.00	0.00	7.16	0.02	0.00
5.70	2.00	0.00	7.15	0.02	0.00	5.72	2.00	0.00	7.14	0.02	0.00
5.74	2.00	0.00	7.13	0.02	0.00	5.76	2.00	0.00	7.12	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
5.78	2.00	0.00	7.11	0.02	0.00	5.80	2.00	0.00	7.10	0.02	0.00
5.82	2.00	0.00	7.09	0.02	0.00	5.84	2.00	0.00	7.08	0.02	0.00
5.86	2.00	0.00	7.07	0.02	0.00	5.88	2.00	0.00	7.06	0.02	0.00
5.90	2.00	0.00	7.05	0.02	0.00	5.92	2.00	0.00	7.04	0.02	0.00
5.94	2.00	0.00	7.03	0.02	0.00	5.96	2.00	0.00	7.02	0.02	0.00
5.98	2.00	0.00	7.01	0.02	0.00	6.00	2.00	0.00	7.00	0.02	0.00
6.02	2.00	0.00	6.99	0.02	0.00	6.04	2.00	0.00	6.98	0.02	0.00
6.06	2.00	0.00	6.97	0.02	0.00	6.08	2.00	0.00	6.96	0.02	0.00
6.10	2.00	0.00	6.95	0.02	0.00	6.12	2.00	0.00	6.94	0.02	0.00
6.14	2.00	0.00	6.93	0.02	0.00	6.16	2.00	0.00	6.92	0.02	0.00
6.18	2.00	0.00	6.91	0.02	0.00	6.20	2.00	0.00	6.90	0.02	0.00
6.22	2.00	0.00	6.89	0.02	0.00	6.24	2.00	0.00	6.88	0.02	0.00
6.26	2.00	0.00	6.87	0.02	0.00	6.28	2.00	0.00	6.86	0.02	0.00
6.30	0.53	0.47	6.85	0.02	0.06	6.32	0.54	0.46	6.84	0.02	0.06
6.34	2.00	0.00	6.83	0.02	0.00	6.36	2.00	0.00	6.82	0.02	0.00
6.38	2.00	0.00	6.81	0.02	0.00	6.40	2.00	0.00	6.80	0.02	0.00
6.42	2.00	0.00	6.79	0.02	0.00	6.44	2.00	0.00	6.78	0.02	0.00
6.46	2.00	0.00	6.77	0.02	0.00	6.48	2.00	0.00	6.76	0.02	0.00
6.50	2.00	0.00	6.75	0.02	0.00	6.52	2.00	0.00	6.74	0.02	0.00
6.54	2.00	0.00	6.73	0.02	0.00	6.56	2.00	0.00	6.72	0.02	0.00
6.58	2.00	0.00	6.71	0.02	0.00	6.60	2.00	0.00	6.70	0.02	0.00
6.62	2.00	0.00	6.69	0.02	0.00	6.64	2.00	0.00	6.68	0.02	0.00
6.66	2.00	0.00	6.67	0.02	0.00	6.68	2.00	0.00	6.66	0.02	0.00
6.70	2.00	0.00	6.65	0.02	0.00	6.72	2.00	0.00	6.64	0.02	0.00
6.74	2.00	0.00	6.63	0.02	0.00	6.76	2.00	0.00	6.62	0.02	0.00
6.78	2.00	0.00	6.61	0.02	0.00	6.80	2.00	0.00	6.60	0.02	0.00
6.82	2.00	0.00	6.59	0.02	0.00	6.84	2.00	0.00	6.58	0.02	0.00
6.86	2.00	0.00	6.57	0.02	0.00	6.88	2.00	0.00	6.56	0.02	0.00
6.90	2.00	0.00	6.55	0.02	0.00	6.92	2.00	0.00	6.54	0.02	0.00
6.94	2.00	0.00	6.53	0.02	0.00	6.96	2.00	0.00	6.52	0.02	0.00
6.98	2.00	0.00	6.51	0.02	0.00	7.00	2.00	0.00	6.50	0.02	0.00
7.02	2.00	0.00	6.49	0.02	0.00	7.04	2.00	0.00	6.48	0.02	0.00
7.06	2.00	0.00	6.47	0.02	0.00	7.08	2.00	0.00	6.46	0.02	0.00
7.10	2.00	0.00	6.45	0.02	0.00	7.12	2.00	0.00	6.44	0.02	0.00
7.14	2.00	0.00	6.43	0.02	0.00	7.16	2.00	0.00	6.42	0.02	0.00
7.18	2.00	0.00	6.41	0.02	0.00	7.20	2.00	0.00	6.40	0.02	0.00
7.22	2.00	0.00	6.39	0.02	0.00	7.24	2.00	0.00	6.38	0.02	0.00
7.26	2.00	0.00	6.37	0.02	0.00	7.28	2.00	0.00	6.36	0.02	0.00
7.30	2.00	0.00	6.35	0.02	0.00	7.32	2.00	0.00	6.34	0.02	0.00
7.34	2.00	0.00	6.33	0.02	0.00	7.36	2.00	0.00	6.32	0.02	0.00
7.38	2.00	0.00	6.31	0.02	0.00	7.40	2.00	0.00	6.30	0.02	0.00
7.42	2.00	0.00	6.29	0.02	0.00	7.44	2.00	0.00	6.28	0.02	0.00
7.46	2.00	0.00	6.27	0.02	0.00	7.48	2.00	0.00	6.26	0.02	0.00
7.50	2.00	0.00	6.25	0.02	0.00	7.52	2.00	0.00	6.24	0.02	0.00
7.54	2.00	0.00	6.23	0.02	0.00	7.56	2.00	0.00	6.22	0.02	0.00
7.58	2.00	0.00	6.21	0.02	0.00	7.60	2.00	0.00	6.20	0.02	0.00
7.62	2.00	0.00	6.19	0.02	0.00	7.64	2.00	0.00	6.18	0.02	0.00
7.66	2.00	0.00	6.17	0.02	0.00	7.68	2.00	0.00	6.16	0.02	0.00



**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
7.70	2.00	0.00	6.15	0.02	0.00	7.72	2.00	0.00	6.14	0.02	0.00
7.74	2.00	0.00	6.13	0.02	0.00	7.76	2.00	0.00	6.12	0.02	0.00
7.78	2.00	0.00	6.11	0.02	0.00	7.80	2.00	0.00	6.10	0.02	0.00
7.82	2.00	0.00	6.09	0.02	0.00	7.84	2.00	0.00	6.08	0.02	0.00
7.86	2.00	0.00	6.07	0.02	0.00	7.88	2.00	0.00	6.06	0.02	0.00
7.90	2.00	0.00	6.05	0.02	0.00	7.92	2.00	0.00	6.04	0.02	0.00
7.94	2.00	0.00	6.03	0.02	0.00	7.96	2.00	0.00	6.02	0.02	0.00
7.98	2.00	0.00	6.01	0.02	0.00	8.00	2.00	0.00	6.00	0.02	0.00
8.02	2.00	0.00	5.99	0.02	0.00	8.04	2.00	0.00	5.98	0.02	0.00
8.06	2.00	0.00	5.97	0.02	0.00	8.08	2.00	0.00	5.96	0.02	0.00
8.10	2.00	0.00	5.95	0.02	0.00	8.12	2.00	0.00	5.94	0.02	0.00
8.14	2.00	0.00	5.93	0.02	0.00	8.16	2.00	0.00	5.92	0.02	0.00
8.18	2.00	0.00	5.91	0.02	0.00	8.20	2.00	0.00	5.90	0.02	0.00
8.22	2.00	0.00	5.89	0.02	0.00	8.24	2.00	0.00	5.88	0.02	0.00
8.26	2.00	0.00	5.87	0.02	0.00	8.28	2.00	0.00	5.86	0.02	0.00
8.30	2.00	0.00	5.85	0.02	0.00	8.32	2.00	0.00	5.84	0.02	0.00
8.34	2.00	0.00	5.83	0.02	0.00	8.36	2.00	0.00	5.82	0.02	0.00
8.38	2.00	0.00	5.81	0.02	0.00	8.40	2.00	0.00	5.80	0.02	0.00
8.42	2.00	0.00	5.79	0.02	0.00	8.44	2.00	0.00	5.78	0.02	0.00
8.46	2.00	0.00	5.77	0.02	0.00	8.48	2.00	0.00	5.76	0.02	0.00
8.50	2.00	0.00	5.75	0.02	0.00	8.52	2.00	0.00	5.74	0.02	0.00
8.54	2.00	0.00	5.73	0.02	0.00	8.56	2.00	0.00	5.72	0.02	0.00
8.58	2.00	0.00	5.71	0.02	0.00	8.60	0.53	0.47	5.70	0.02	0.05
8.62	2.00	0.00	5.69	0.02	0.00	8.64	2.00	0.00	5.68	0.02	0.00
8.66	2.00	0.00	5.67	0.02	0.00	8.68	2.00	0.00	5.66	0.02	0.00
8.70	2.00	0.00	5.65	0.02	0.00	8.72	2.00	0.00	5.64	0.02	0.00
8.74	2.00	0.00	5.63	0.02	0.00	8.76	2.00	0.00	5.62	0.02	0.00
8.78	2.00	0.00	5.61	0.02	0.00	8.80	2.00	0.00	5.60	0.02	0.00
8.82	2.00	0.00	5.59	0.02	0.00	8.84	2.00	0.00	5.58	0.02	0.00
8.86	2.00	0.00	5.57	0.02	0.00	8.88	2.00	0.00	5.56	0.02	0.00
8.90	0.56	0.44	5.55	0.02	0.05	8.92	0.58	0.42	5.54	0.02	0.05
8.94	0.56	0.44	5.53	0.02	0.05	8.96	0.56	0.44	5.52	0.02	0.05
8.98	2.00	0.00	5.51	0.02	0.00	9.00	2.00	0.00	5.50	0.02	0.00
9.02	2.00	0.00	5.49	0.02	0.00	9.04	2.00	0.00	5.48	0.02	0.00
9.06	2.00	0.00	5.47	0.02	0.00	9.08	2.00	0.00	5.46	0.02	0.00
9.10	2.00	0.00	5.45	0.02	0.00	9.12	2.00	0.00	5.44	0.02	0.00
9.14	2.00	0.00	5.43	0.02	0.00	9.16	2.00	0.00	5.42	0.02	0.00
9.18	2.00	0.00	5.41	0.02	0.00	9.20	2.00	0.00	5.40	0.02	0.00
9.22	2.00	0.00	5.39	0.02	0.00	9.24	2.00	0.00	5.38	0.02	0.00
9.26	2.00	0.00	5.37	0.02	0.00	9.28	2.00	0.00	5.36	0.02	0.00
9.30	2.00	0.00	5.35	0.02	0.00	9.32	0.55	0.45	5.34	0.02	0.05
9.34	0.57	0.43	5.33	0.02	0.05	9.36	0.58	0.42	5.32	0.02	0.04
9.38	0.60	0.40	5.31	0.02	0.04	9.40	0.64	0.36	5.30	0.02	0.04
9.42	0.66	0.34	5.29	0.02	0.04	9.44	0.67	0.33	5.28	0.02	0.04
9.46	0.63	0.37	5.27	0.02	0.04	9.48	0.57	0.43	5.26	0.02	0.05
9.50	0.53	0.47	5.25	0.02	0.05	9.52	0.54	0.46	5.24	0.02	0.05
9.54	0.57	0.43	5.23	0.02	0.04	9.56	0.56	0.44	5.22	0.02	0.05
9.58	2.00	0.00	5.21	0.02	0.00	9.60	2.00	0.00	5.20	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
9.62	2.00	0.00	5.19	0.02	0.00	9.64	2.00	0.00	5.18	0.02	0.00
9.66	2.00	0.00	5.17	0.02	0.00	9.68	2.00	0.00	5.16	0.02	0.00
9.70	2.00	0.00	5.15	0.02	0.00	9.72	2.00	0.00	5.14	0.02	0.00
9.74	2.00	0.00	5.13	0.02	0.00	9.76	2.00	0.00	5.12	0.02	0.00
9.78	2.00	0.00	5.11	0.02	0.00	9.80	2.00	0.00	5.10	0.02	0.00
9.82	2.00	0.00	5.09	0.02	0.00	9.84	2.00	0.00	5.08	0.02	0.00
9.86	2.00	0.00	5.07	0.02	0.00	9.88	2.00	0.00	5.06	0.02	0.00
9.90	2.00	0.00	5.05	0.02	0.00	9.92	2.00	0.00	5.04	0.02	0.00
9.94	2.00	0.00	5.03	0.02	0.00	9.96	2.00	0.00	5.02	0.02	0.00
9.98	2.00	0.00	5.01	0.02	0.00	10.00	2.00	0.00	5.00	0.02	0.00
10.02	2.00	0.00	4.99	0.02	0.00	10.04	2.00	0.00	4.98	0.02	0.00
10.06	2.00	0.00	4.97	0.02	0.00	10.08	2.00	0.00	4.96	0.02	0.00
10.10	2.00	0.00	4.95	0.02	0.00	10.12	2.00	0.00	4.94	0.02	0.00
10.14	2.00	0.00	4.93	0.02	0.00	10.16	2.00	0.00	4.92	0.02	0.00
10.18	2.00	0.00	4.91	0.02	0.00	10.20	2.00	0.00	4.90	0.02	0.00
10.22	2.00	0.00	4.89	0.02	0.00	10.24	2.00	0.00	4.88	0.02	0.00
10.26	2.00	0.00	4.87	0.02	0.00	10.28	2.00	0.00	4.86	0.02	0.00
10.30	2.00	0.00	4.85	0.02	0.00	10.32	2.00	0.00	4.84	0.02	0.00
10.34	2.00	0.00	4.83	0.02	0.00	10.36	2.00	0.00	4.82	0.02	0.00
10.38	2.00	0.00	4.81	0.02	0.00	10.40	2.00	0.00	4.80	0.02	0.00
10.42	2.00	0.00	4.79	0.02	0.00	10.44	2.00	0.00	4.78	0.02	0.00
10.46	2.00	0.00	4.77	0.02	0.00	10.48	2.00	0.00	4.76	0.02	0.00
10.50	2.00	0.00	4.75	0.02	0.00	10.52	2.00	0.00	4.74	0.02	0.00
10.54	2.00	0.00	4.73	0.02	0.00	10.56	2.00	0.00	4.72	0.02	0.00
10.58	2.00	0.00	4.71	0.02	0.00	10.60	2.00	0.00	4.70	0.02	0.00
10.62	2.00	0.00	4.69	0.02	0.00	10.64	2.00	0.00	4.68	0.02	0.00
10.66	2.00	0.00	4.67	0.02	0.00	10.68	2.00	0.00	4.66	0.02	0.00
10.70	2.00	0.00	4.65	0.02	0.00	10.72	2.00	0.00	4.64	0.02	0.00
10.74	2.00	0.00	4.63	0.02	0.00	10.76	2.00	0.00	4.62	0.02	0.00
10.78	2.00	0.00	4.61	0.02	0.00	10.80	2.00	0.00	4.60	0.02	0.00
10.82	2.00	0.00	4.59	0.02	0.00	10.84	2.00	0.00	4.58	0.02	0.00
10.86	2.00	0.00	4.57	0.02	0.00	10.88	2.00	0.00	4.56	0.02	0.00
10.90	2.00	0.00	4.55	0.02	0.00	10.92	2.00	0.00	4.54	0.02	0.00
10.94	2.00	0.00	4.53	0.02	0.00	10.96	2.00	0.00	4.52	0.02	0.00
10.98	2.00	0.00	4.51	0.02	0.00	11.00	2.00	0.00	4.50	0.02	0.00
11.02	2.00	0.00	4.49	0.02	0.00	11.04	2.00	0.00	4.48	0.02	0.00
11.06	2.00	0.00	4.47	0.02	0.00	11.08	2.00	0.00	4.46	0.02	0.00
11.10	2.00	0.00	4.45	0.02	0.00	11.12	2.00	0.00	4.44	0.02	0.00
11.14	2.00	0.00	4.43	0.02	0.00	11.16	2.00	0.00	4.42	0.02	0.00
11.18	2.00	0.00	4.41	0.02	0.00	11.20	2.00	0.00	4.40	0.02	0.00
11.22	2.00	0.00	4.39	0.02	0.00	11.24	2.00	0.00	4.38	0.02	0.00
11.26	2.00	0.00	4.37	0.02	0.00	11.28	2.00	0.00	4.36	0.02	0.00
11.30	2.00	0.00	4.35	0.02	0.00	11.32	2.00	0.00	4.34	0.02	0.00
11.34	2.00	0.00	4.33	0.02	0.00	11.36	2.00	0.00	4.32	0.02	0.00
11.38	2.00	0.00	4.31	0.02	0.00	11.40	2.00	0.00	4.30	0.02	0.00
11.42	2.00	0.00	4.29	0.02	0.00	11.44	2.00	0.00	4.28	0.02	0.00
11.46	2.00	0.00	4.27	0.02	0.00	11.48	2.00	0.00	4.26	0.02	0.00
11.50	2.00	0.00	4.25	0.02	0.00	11.52	2.00	0.00	4.24	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
11.54	2.00	0.00	4.23	0.02	0.00	11.56	2.00	0.00	4.22	0.02	0.00
11.58	2.00	0.00	4.21	0.02	0.00	11.60	2.00	0.00	4.20	0.02	0.00
11.62	2.00	0.00	4.19	0.02	0.00	11.64	2.00	0.00	4.18	0.02	0.00
11.66	2.00	0.00	4.17	0.02	0.00	11.68	2.00	0.00	4.16	0.02	0.00
11.70	2.00	0.00	4.15	0.02	0.00	11.72	2.00	0.00	4.14	0.02	0.00
11.74	2.00	0.00	4.13	0.02	0.00	11.76	2.00	0.00	4.12	0.02	0.00
11.78	2.00	0.00	4.11	0.02	0.00	11.80	2.00	0.00	4.10	0.02	0.00
11.82	2.00	0.00	4.09	0.02	0.00	11.84	2.00	0.00	4.08	0.02	0.00
11.86	2.00	0.00	4.07	0.02	0.00	11.88	2.00	0.00	4.06	0.02	0.00
11.90	2.00	0.00	4.05	0.02	0.00	11.92	2.00	0.00	4.04	0.02	0.00
11.94	2.00	0.00	4.03	0.02	0.00	11.96	2.00	0.00	4.02	0.02	0.00
11.98	2.00	0.00	4.01	0.02	0.00	12.00	2.00	0.00	4.00	0.02	0.00
12.02	2.00	0.00	3.99	0.02	0.00	12.04	2.00	0.00	3.98	0.02	0.00
12.06	2.00	0.00	3.97	0.02	0.00	12.08	2.00	0.00	3.96	0.02	0.00
12.10	2.00	0.00	3.95	0.02	0.00	12.12	2.00	0.00	3.94	0.02	0.00
12.14	2.00	0.00	3.93	0.02	0.00	12.16	2.00	0.00	3.92	0.02	0.00
12.18	2.00	0.00	3.91	0.02	0.00	12.20	2.00	0.00	3.90	0.02	0.00
12.22	2.00	0.00	3.89	0.02	0.00	12.24	2.00	0.00	3.88	0.02	0.00
12.26	2.00	0.00	3.87	0.02	0.00	12.28	2.00	0.00	3.86	0.02	0.00
12.30	2.00	0.00	3.85	0.02	0.00	12.32	2.00	0.00	3.84	0.02	0.00
12.34	2.00	0.00	3.83	0.02	0.00	12.36	2.00	0.00	3.82	0.02	0.00
12.38	2.00	0.00	3.81	0.02	0.00	12.40	2.00	0.00	3.80	0.02	0.00
12.42	2.00	0.00	3.79	0.02	0.00	12.44	2.00	0.00	3.78	0.02	0.00
12.46	2.00	0.00	3.77	0.02	0.00	12.48	2.00	0.00	3.76	0.02	0.00
12.50	2.00	0.00	3.75	0.02	0.00	12.52	2.00	0.00	3.74	0.02	0.00
12.54	2.00	0.00	3.73	0.02	0.00	12.56	2.00	0.00	3.72	0.02	0.00
12.58	2.00	0.00	3.71	0.02	0.00	12.60	2.00	0.00	3.70	0.02	0.00
12.62	2.00	0.00	3.69	0.02	0.00	12.64	2.00	0.00	3.68	0.02	0.00
12.66	2.00	0.00	3.67	0.02	0.00	12.68	2.00	0.00	3.66	0.02	0.00
12.70	2.00	0.00	3.65	0.02	0.00	12.72	2.00	0.00	3.64	0.02	0.00
12.74	2.00	0.00	3.63	0.02	0.00	12.76	2.00	0.00	3.62	0.02	0.00
12.78	2.00	0.00	3.61	0.02	0.00	12.80	2.00	0.00	3.60	0.02	0.00
12.82	2.00	0.00	3.59	0.02	0.00	12.84	2.00	0.00	3.58	0.02	0.00
12.86	2.00	0.00	3.57	0.02	0.00	12.88	2.00	0.00	3.56	0.02	0.00
12.90	2.00	0.00	3.55	0.02	0.00	12.92	2.00	0.00	3.54	0.02	0.00
12.94	2.00	0.00	3.53	0.02	0.00	12.96	2.00	0.00	3.52	0.02	0.00
12.98	2.00	0.00	3.51	0.02	0.00	13.00	2.00	0.00	3.50	0.02	0.00
13.02	2.00	0.00	3.49	0.02	0.00	13.04	2.00	0.00	3.48	0.02	0.00
13.06	2.00	0.00	3.47	0.02	0.00	13.08	2.00	0.00	3.46	0.02	0.00
13.10	2.00	0.00	3.45	0.02	0.00	13.12	2.00	0.00	3.44	0.02	0.00
13.14	2.00	0.00	3.43	0.02	0.00	13.16	2.00	0.00	3.42	0.02	0.00
13.18	2.00	0.00	3.41	0.02	0.00	13.20	2.00	0.00	3.40	0.02	0.00
13.22	2.00	0.00	3.39	0.02	0.00	13.24	2.00	0.00	3.38	0.02	0.00
13.26	2.00	0.00	3.37	0.02	0.00	13.28	2.00	0.00	3.36	0.02	0.00
13.30	2.00	0.00	3.35	0.02	0.00	13.32	2.00	0.00	3.34	0.02	0.00
13.34	2.00	0.00	3.33	0.02	0.00	13.36	2.00	0.00	3.32	0.02	0.00
13.38	2.00	0.00	3.31	0.02	0.00	13.40	2.00	0.00	3.30	0.02	0.00
13.42	2.00	0.00	3.29	0.02	0.00	13.44	2.00	0.00	3.28	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
13.46	2.00	0.00	3.27	0.02	0.00	13.48	2.00	0.00	3.26	0.02	0.00
13.50	2.00	0.00	3.25	0.02	0.00	13.52	2.00	0.00	3.24	0.02	0.00
13.54	2.00	0.00	3.23	0.02	0.00	13.56	2.00	0.00	3.22	0.02	0.00
13.58	2.00	0.00	3.21	0.02	0.00	13.60	2.00	0.00	3.20	0.02	0.00
13.62	2.00	0.00	3.19	0.02	0.00	13.64	2.00	0.00	3.18	0.02	0.00
13.66	2.00	0.00	3.17	0.02	0.00	13.68	2.00	0.00	3.16	0.02	0.00
13.70	2.00	0.00	3.15	0.02	0.00	13.72	2.00	0.00	3.14	0.02	0.00
13.74	2.00	0.00	3.13	0.02	0.00	13.76	2.00	0.00	3.12	0.02	0.00
13.78	2.00	0.00	3.11	0.02	0.00	13.80	2.00	0.00	3.10	0.02	0.00
13.82	2.00	0.00	3.09	0.02	0.00	13.84	2.00	0.00	3.08	0.02	0.00
13.86	2.00	0.00	3.07	0.02	0.00	13.88	2.00	0.00	3.06	0.02	0.00
13.90	2.00	0.00	3.05	0.02	0.00	13.92	2.00	0.00	3.04	0.02	0.00
13.94	2.00	0.00	3.03	0.02	0.00	13.96	2.00	0.00	3.02	0.02	0.00
13.98	2.00	0.00	3.01	0.02	0.00	14.00	2.00	0.00	3.00	0.02	0.00
14.02	2.00	0.00	2.99	0.02	0.00	14.04	2.00	0.00	2.98	0.02	0.00
14.06	2.00	0.00	2.97	0.02	0.00	14.08	2.00	0.00	2.96	0.02	0.00
14.10	2.00	0.00	2.95	0.02	0.00	14.12	2.00	0.00	2.94	0.02	0.00
14.14	2.00	0.00	2.93	0.02	0.00	14.16	2.00	0.00	2.92	0.02	0.00
14.18	2.00	0.00	2.91	0.02	0.00	14.20	2.00	0.00	2.90	0.02	0.00
14.22	2.00	0.00	2.89	0.02	0.00	14.24	2.00	0.00	2.88	0.02	0.00
14.26	2.00	0.00	2.87	0.02	0.00	14.28	2.00	0.00	2.86	0.02	0.00
14.30	2.00	0.00	2.85	0.02	0.00	14.32	2.00	0.00	2.84	0.02	0.00
14.34	2.00	0.00	2.83	0.02	0.00	14.36	2.00	0.00	2.82	0.02	0.00
14.38	2.00	0.00	2.81	0.02	0.00	14.40	2.00	0.00	2.80	0.02	0.00
14.42	2.00	0.00	2.79	0.02	0.00	14.44	2.00	0.00	2.78	0.02	0.00
14.46	2.00	0.00	2.77	0.02	0.00	14.48	2.00	0.00	2.76	0.02	0.00
14.50	2.00	0.00	2.75	0.02	0.00	14.52	2.00	0.00	2.74	0.02	0.00
14.54	2.00	0.00	2.73	0.02	0.00	14.56	2.00	0.00	2.72	0.02	0.00
14.58	2.00	0.00	2.71	0.02	0.00	14.60	2.00	0.00	2.70	0.02	0.00
14.62	2.00	0.00	2.69	0.02	0.00	14.64	2.00	0.00	2.68	0.02	0.00
14.66	2.00	0.00	2.67	0.02	0.00	14.68	2.00	0.00	2.66	0.02	0.00
14.70	2.00	0.00	2.65	0.02	0.00	14.72	2.00	0.00	2.64	0.02	0.00
14.74	0.57	0.43	2.63	0.02	0.02	14.76	0.61	0.39	2.62	0.02	0.02
14.78	0.64	0.36	2.61	0.02	0.02	14.80	0.66	0.34	2.60	0.02	0.02
14.82	0.65	0.35	2.59	0.02	0.02	14.84	0.64	0.36	2.58	0.02	0.02
14.86	0.64	0.36	2.57	0.02	0.02	14.88	0.64	0.36	2.56	0.02	0.02
14.90	0.65	0.35	2.55	0.02	0.02	14.92	0.65	0.35	2.54	0.02	0.02
14.94	0.65	0.35	2.53	0.02	0.02	14.96	0.65	0.35	2.52	0.02	0.02
14.98	0.66	0.34	2.51	0.02	0.02	15.00	0.64	0.36	2.50	0.02	0.02

**Overall liquefaction potential: 1.40**

LPI = 0.00 - Liquefaction risk very low

LPI between 0.00 and 5.00 - Liquefaction risk low

LPI between 5.00 and 15.00 - Liquefaction risk high

LPI &gt; 15.00 - Liquefaction risk very high

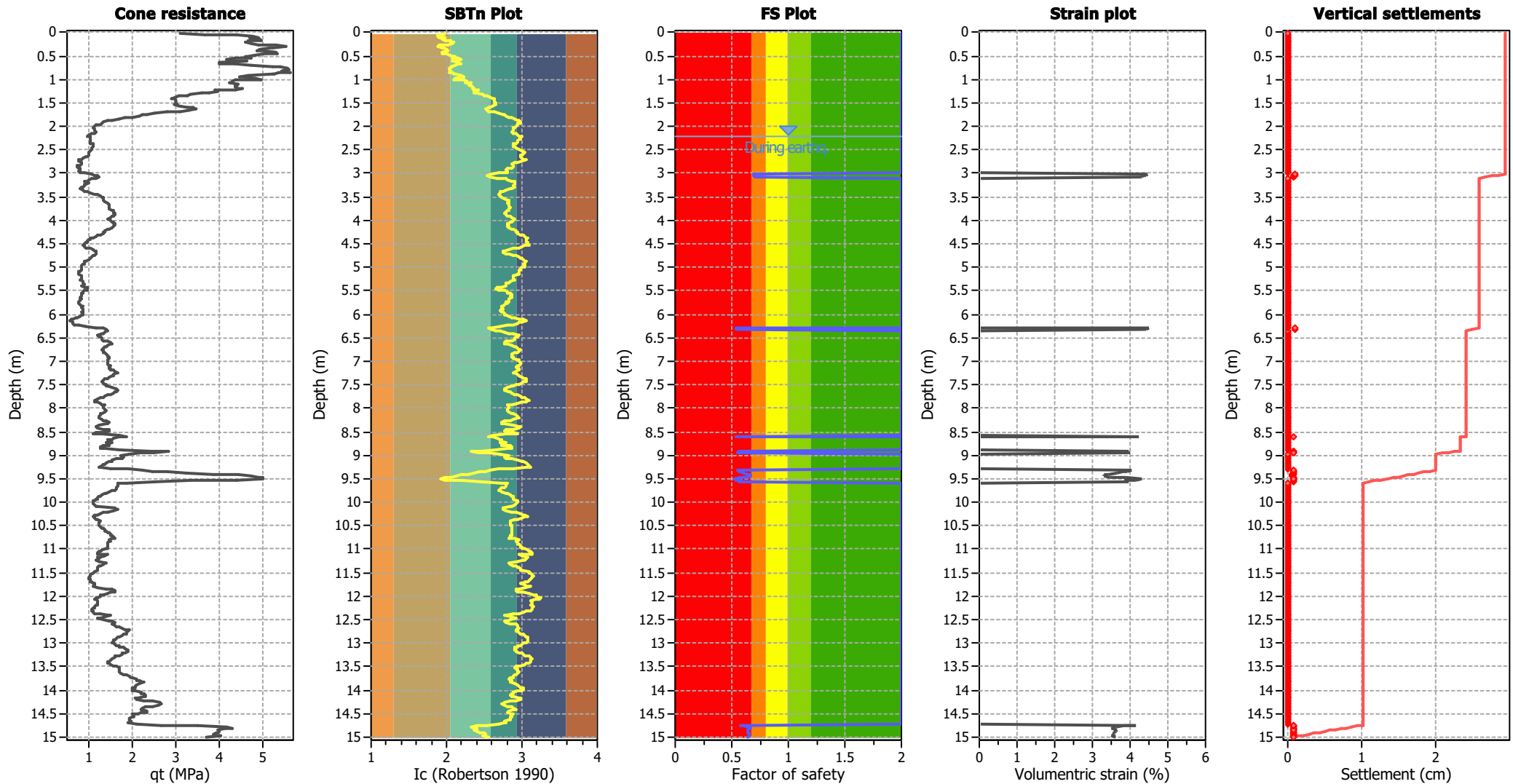
**Abbreviations**

FS: Calculated factor of safety for test point

F<sub>L</sub>: 1 - FSw<sub>z</sub>: Function value of the extend of soil liquefaction according to depthd<sub>z</sub>: Layer thickness (m)

LPI: Liquefaction potential index value for test point

Estimation of post-earthquake settlements



Abbreviations

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





## LIQUEFACTION ANALYSIS REPORT

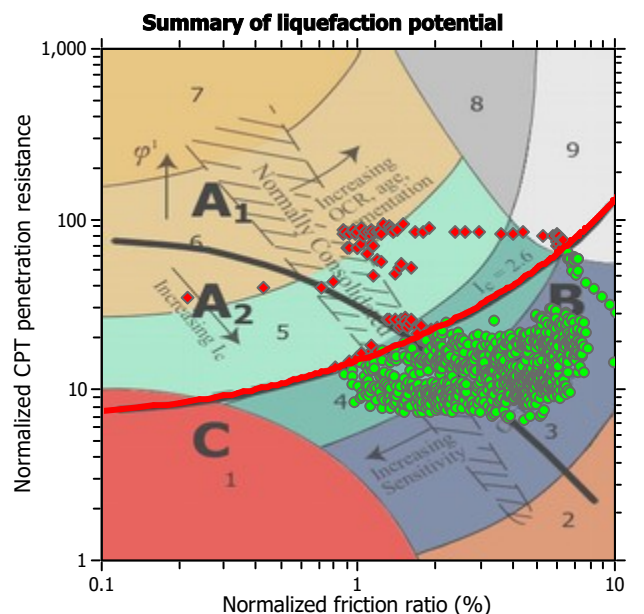
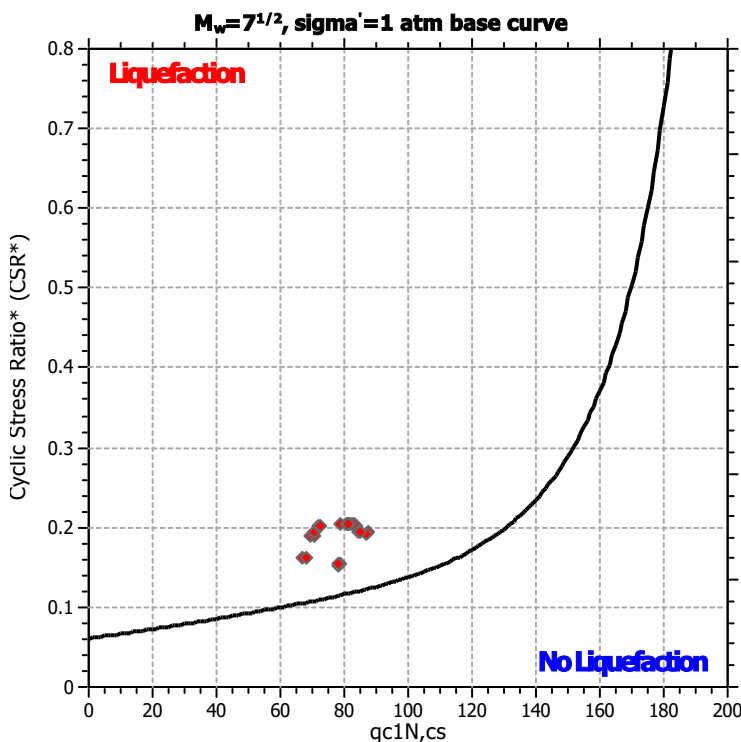
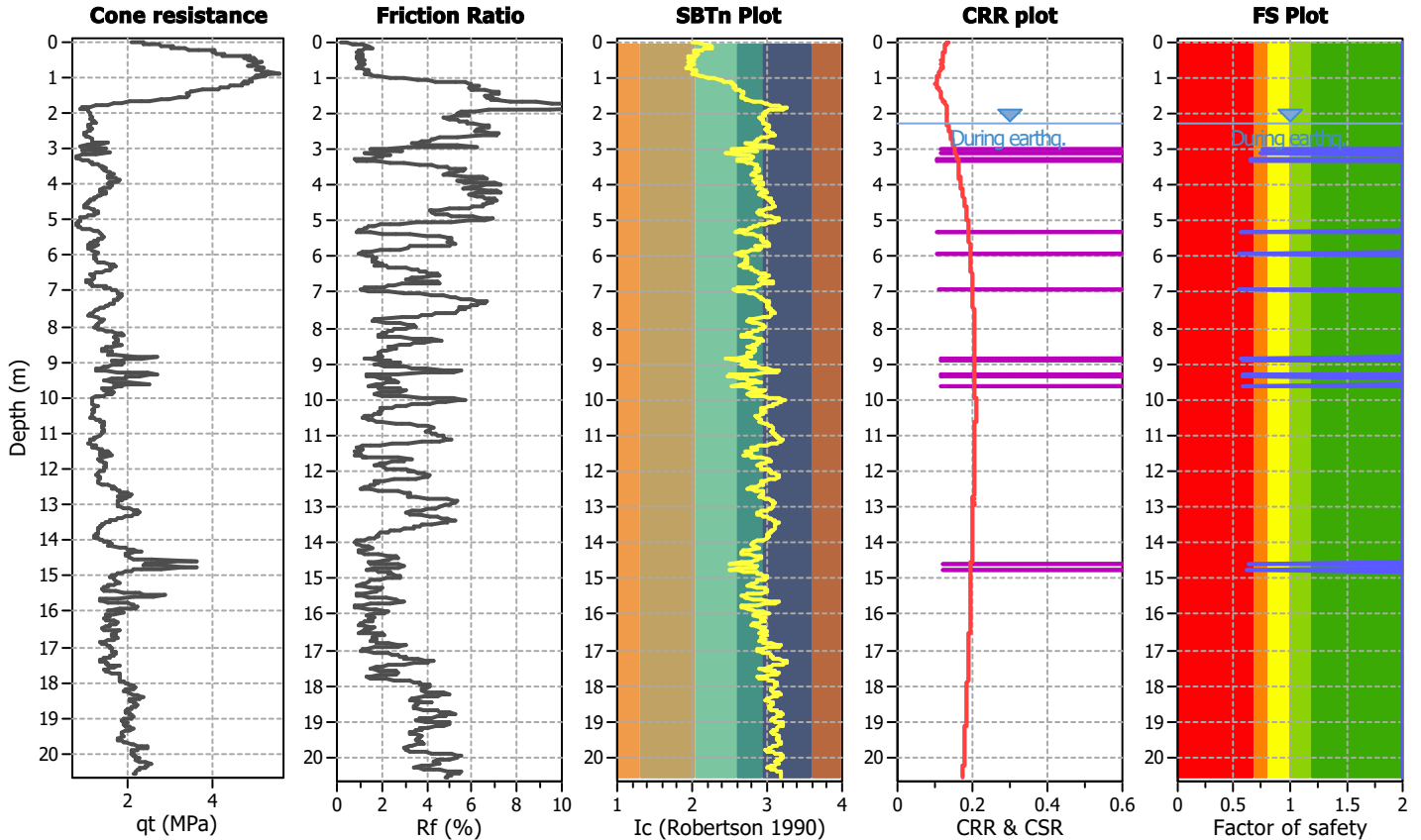
**Project title :**

**Location :**

**CPT file : cptu5**

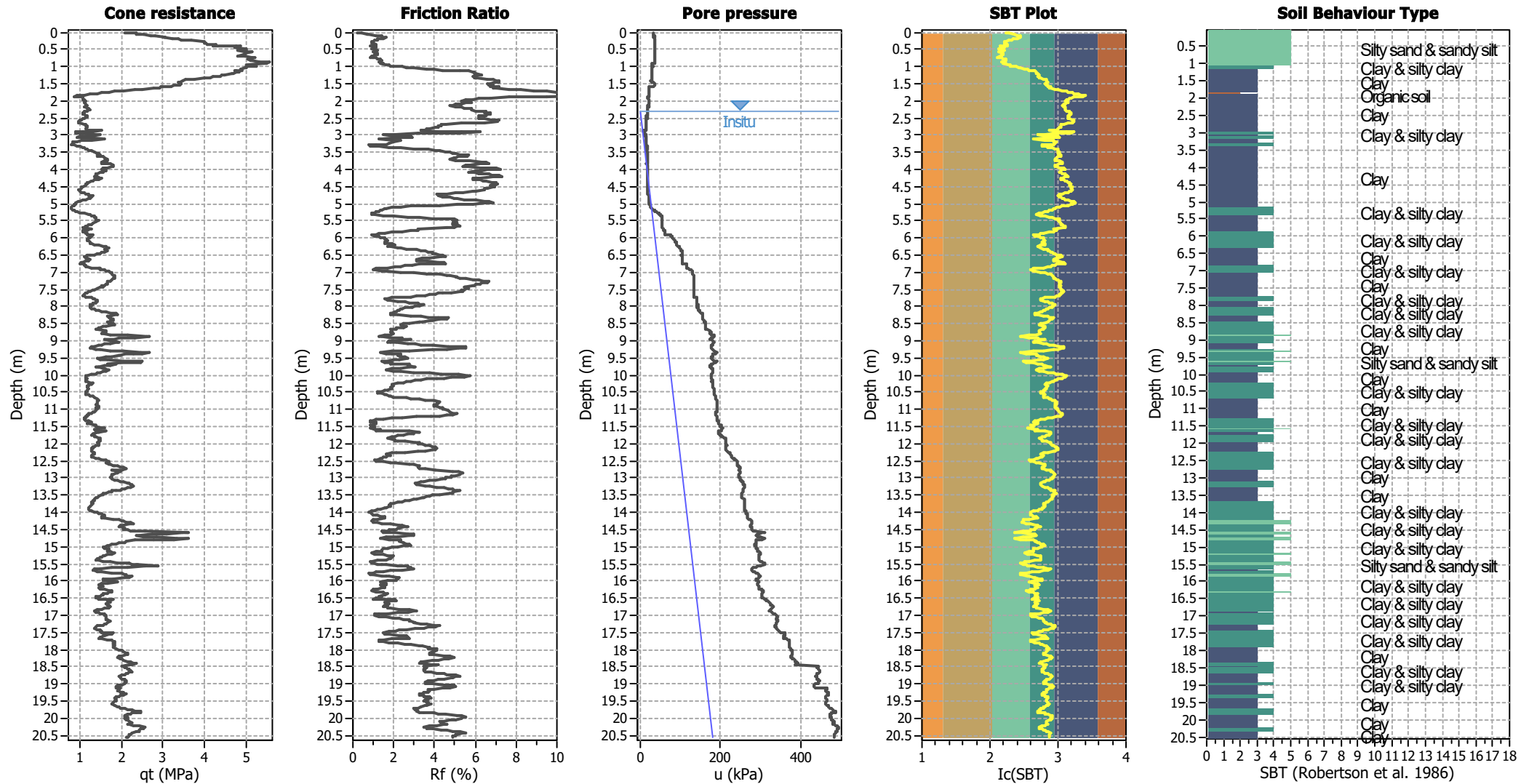
### Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.30 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.30 m	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude $M_w$ :	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.25	Unit weight calculation:	Based on SBT	$K_\sigma$ applied:	Yes	MSF method:	Method based



Zone A<sub>1</sub>: Cyclic liquefaction likely depending on size and duration of cyclic loading  
 Zone A<sub>2</sub>: Cyclic liquefaction and strength loss likely depending on loading and ground geometry  
 Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening  
 Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

## CPT basic interpretation plots



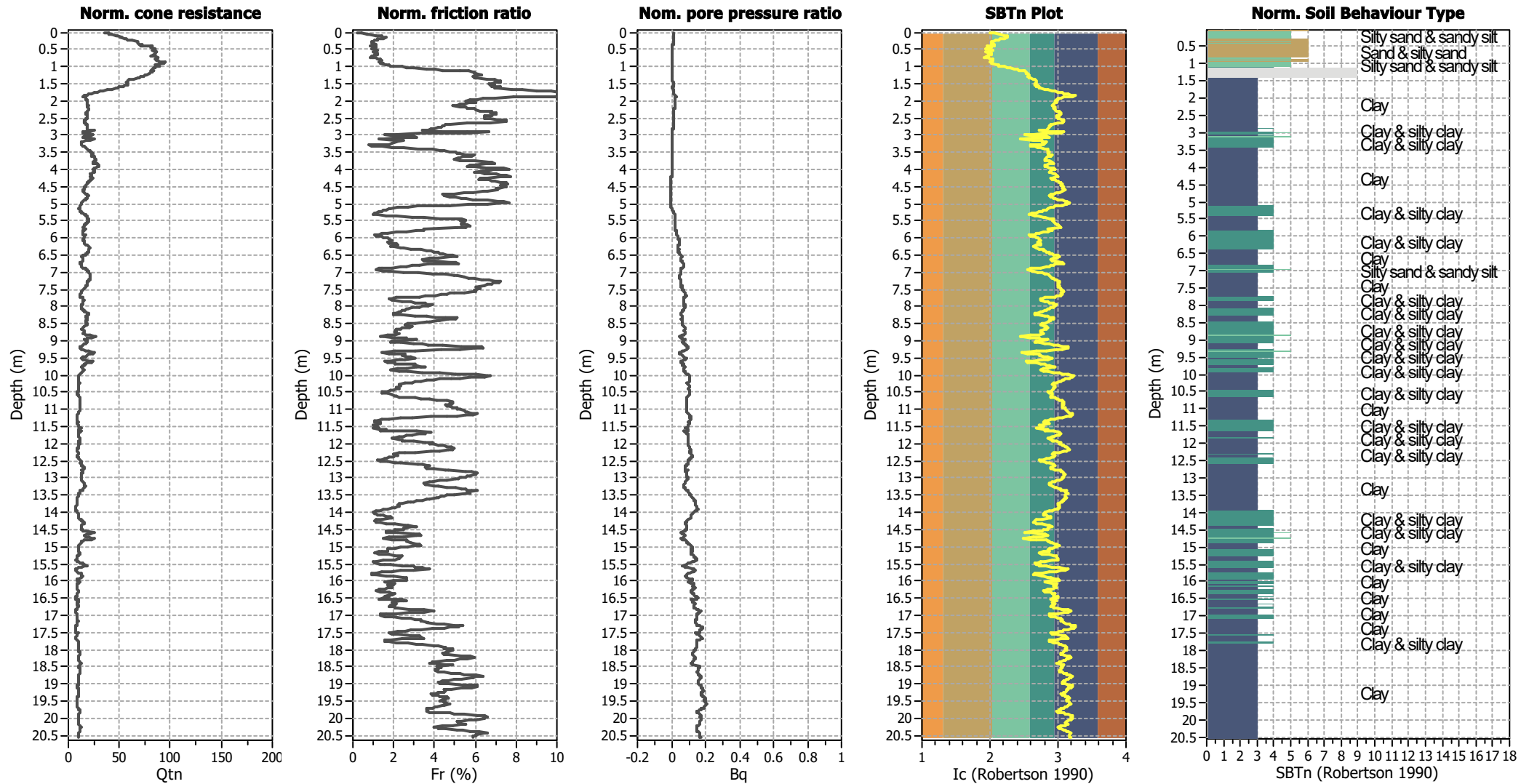
## Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.30 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on $I_c$ value	$I_c$ cut-off value:	2.60	$K_0$ applied:	Yes
Earthquake magnitude $M_w$ :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.30 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

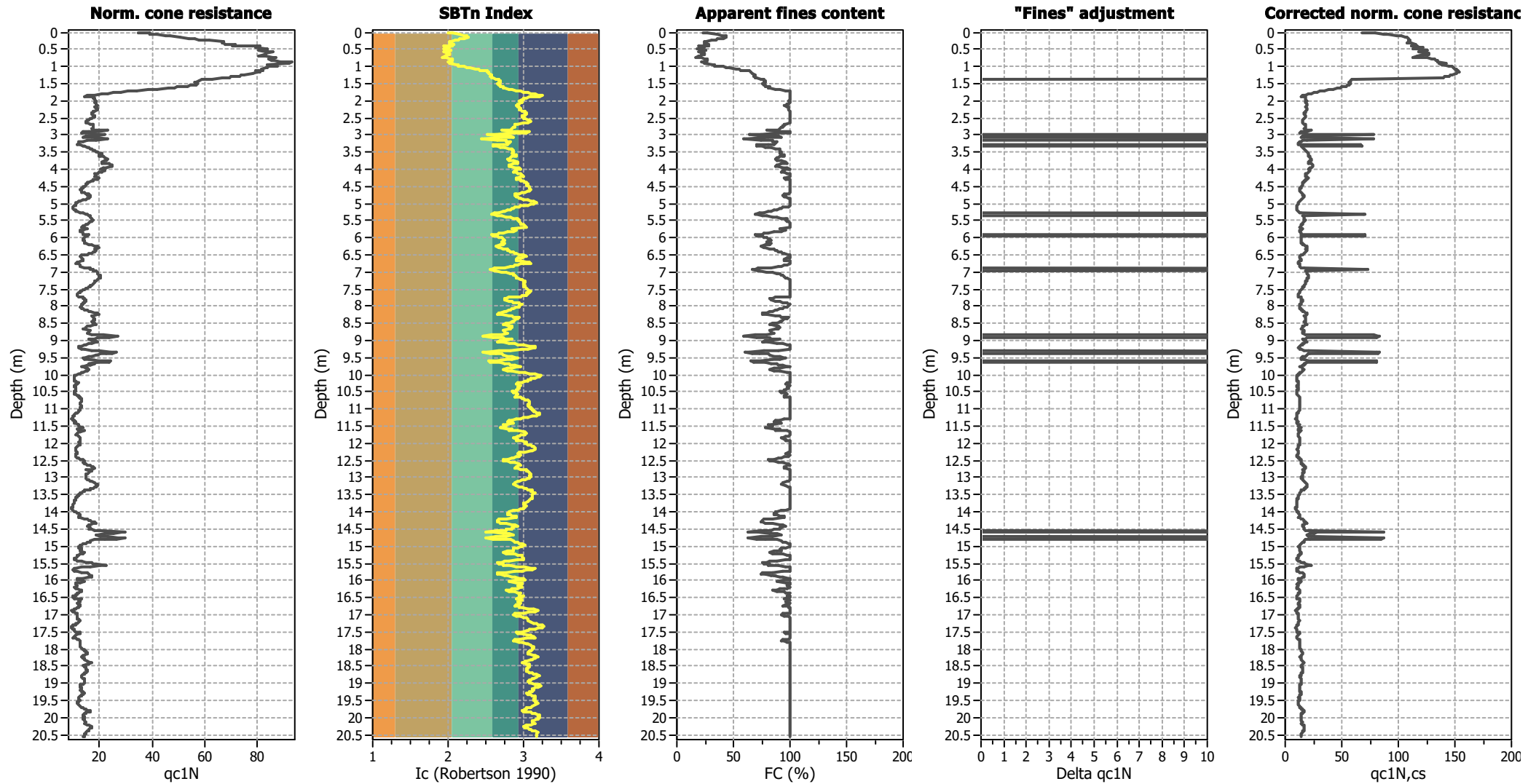
## CPT basic interpretation plots (normalized)



## Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.30 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>0</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.30 m	Fill height:	N/A	Limit depth:	N/A

## Liquefaction analysis overall plots (intermediate results)

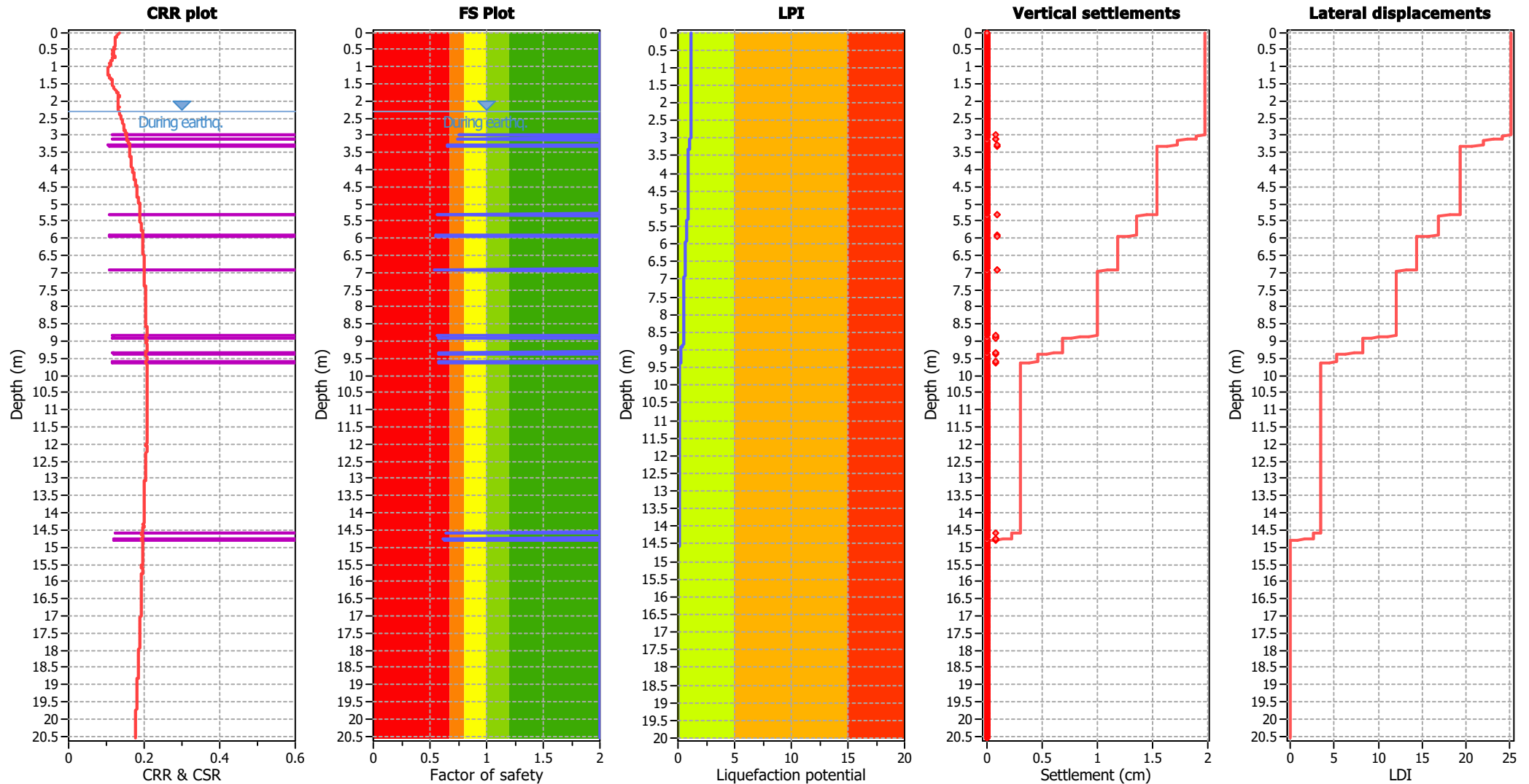


### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.30 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>g</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.30 m	Fill height:	N/A	Limit depth:	N/A



## Liquefaction analysis overall plots



### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.30 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	$K_g$ applied:	Yes
Earthquake magnitude $M_w$ :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.30 m	Fill height:	N/A	Limit depth:	N/A

### F.S. color scheme

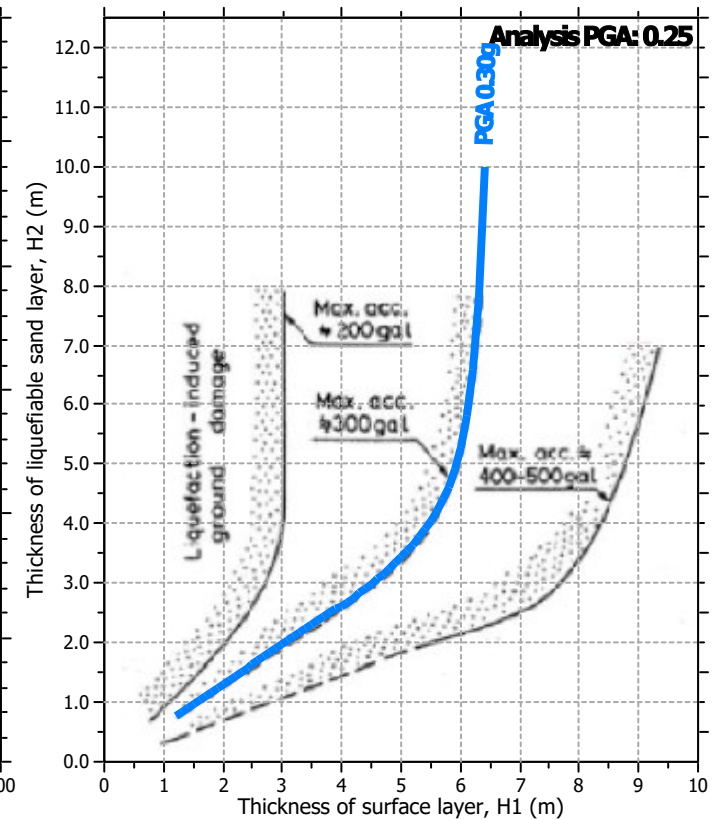
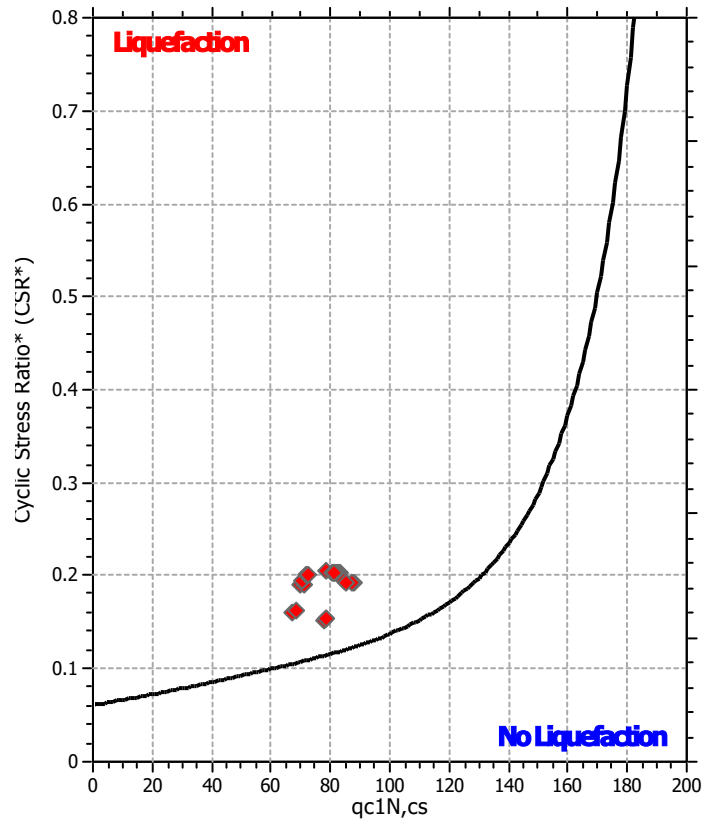
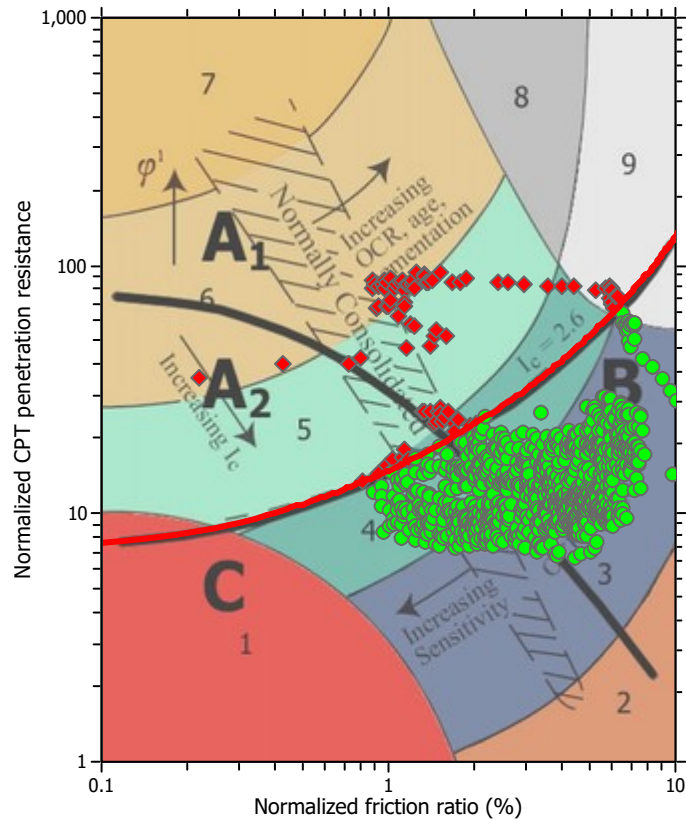
<span style="color: red;">■</span>	Almost certain it will liquefy
<span style="color: orange;">■</span>	Very likely to liquefy
<span style="color: yellow;">■</span>	Liquefaction and no liq. are equally likely
<span style="color: lightgreen;">■</span>	Unlike to liquefy
<span style="color: green;">■</span>	Almost certain it will not liquefy

### LPI color scheme

<span style="color: red;">■</span>	Very high risk
<span style="color: orange;">■</span>	High risk
<span style="color: yellow;">■</span>	Low risk



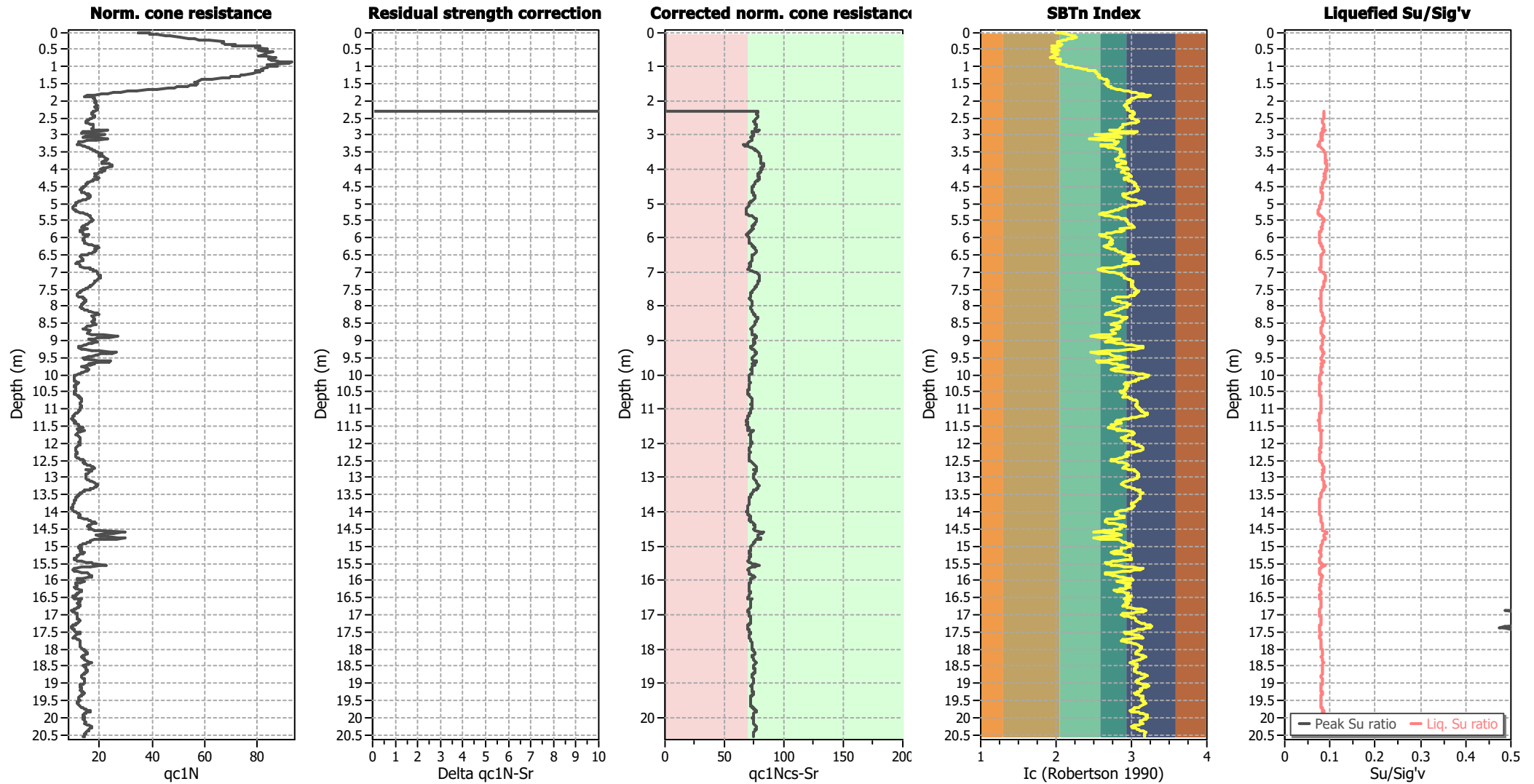
### Liquefaction analysis summary plots



### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.30 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>a</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.30 m	Fill height:	N/A	Limit depth:	N/A

### Check for strength loss plots (Idriss & Boulanger (2008))



#### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.30 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	$K_{\sigma}$ applied:	Yes
Earthquake magnitude $M_w$ :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.30 m	Fill height:	N/A	Limit depth:	N/A

:: Liquefaction Potential Index calculation data ::											
Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
0.02	2.00	0.00	9.99	0.02	0.00	0.04	2.00	0.00	9.98	0.02	0.00
0.06	2.00	0.00	9.97	0.02	0.00	0.08	2.00	0.00	9.96	0.02	0.00
0.10	2.00	0.00	9.95	0.02	0.00	0.12	2.00	0.00	9.94	0.02	0.00
0.14	2.00	0.00	9.93	0.02	0.00	0.16	2.00	0.00	9.92	0.02	0.00
0.18	2.00	0.00	9.91	0.02	0.00	0.20	2.00	0.00	9.90	0.02	0.00
0.22	2.00	0.00	9.89	0.02	0.00	0.24	2.00	0.00	9.88	0.02	0.00
0.26	2.00	0.00	9.87	0.02	0.00	0.28	2.00	0.00	9.86	0.02	0.00
0.30	2.00	0.00	9.85	0.02	0.00	0.32	2.00	0.00	9.84	0.02	0.00
0.34	2.00	0.00	9.83	0.02	0.00	0.36	2.00	0.00	9.82	0.02	0.00
0.38	2.00	0.00	9.81	0.02	0.00	0.40	2.00	0.00	9.80	0.02	0.00
0.42	2.00	0.00	9.79	0.02	0.00	0.44	2.00	0.00	9.78	0.02	0.00
0.46	2.00	0.00	9.77	0.02	0.00	0.48	2.00	0.00	9.76	0.02	0.00
0.50	2.00	0.00	9.75	0.02	0.00	0.52	2.00	0.00	9.74	0.02	0.00
0.54	2.00	0.00	9.73	0.02	0.00	0.56	2.00	0.00	9.72	0.02	0.00
0.58	2.00	0.00	9.71	0.02	0.00	0.60	2.00	0.00	9.70	0.02	0.00
0.62	2.00	0.00	9.69	0.02	0.00	0.64	2.00	0.00	9.68	0.02	0.00
0.66	2.00	0.00	9.67	0.02	0.00	0.68	2.00	0.00	9.66	0.02	0.00
0.70	2.00	0.00	9.65	0.02	0.00	0.72	2.00	0.00	9.64	0.02	0.00
0.74	2.00	0.00	9.63	0.02	0.00	0.76	2.00	0.00	9.62	0.02	0.00
0.78	2.00	0.00	9.61	0.02	0.00	0.80	2.00	0.00	9.60	0.02	0.00
0.82	2.00	0.00	9.59	0.02	0.00	0.84	2.00	0.00	9.58	0.02	0.00
0.86	2.00	0.00	9.57	0.02	0.00	0.88	2.00	0.00	9.56	0.02	0.00
0.90	2.00	0.00	9.55	0.02	0.00	0.92	2.00	0.00	9.54	0.02	0.00
0.94	2.00	0.00	9.53	0.02	0.00	0.96	2.00	0.00	9.52	0.02	0.00
0.98	2.00	0.00	9.51	0.02	0.00	1.00	2.00	0.00	9.50	0.02	0.00
1.02	2.00	0.00	9.49	0.02	0.00	1.04	2.00	0.00	9.48	0.02	0.00
1.06	2.00	0.00	9.47	0.02	0.00	1.08	2.00	0.00	9.46	0.02	0.00
1.10	2.00	0.00	9.45	0.02	0.00	1.12	2.00	0.00	9.44	0.02	0.00
1.14	2.00	0.00	9.43	0.02	0.00	1.16	2.00	0.00	9.42	0.02	0.00
1.18	2.00	0.00	9.41	0.02	0.00	1.20	2.00	0.00	9.40	0.02	0.00
1.22	2.00	0.00	9.39	0.02	0.00	1.24	2.00	0.00	9.38	0.02	0.00
1.26	2.00	0.00	9.37	0.02	0.00	1.28	2.00	0.00	9.36	0.02	0.00
1.30	2.00	0.00	9.35	0.02	0.00	1.32	2.00	0.00	9.34	0.02	0.00
1.34	2.00	0.00	9.33	0.02	0.00	1.36	2.00	0.00	9.32	0.02	0.00
1.38	2.00	0.00	9.31	0.02	0.00	1.40	2.00	0.00	9.30	0.02	0.00
1.42	2.00	0.00	9.29	0.02	0.00	1.44	2.00	0.00	9.28	0.02	0.00
1.46	2.00	0.00	9.27	0.02	0.00	1.48	2.00	0.00	9.26	0.02	0.00
1.50	2.00	0.00	9.25	0.02	0.00	1.52	2.00	0.00	9.24	0.02	0.00
1.54	2.00	0.00	9.23	0.02	0.00	1.56	2.00	0.00	9.22	0.02	0.00
1.58	2.00	0.00	9.21	0.02	0.00	1.60	2.00	0.00	9.20	0.02	0.00
1.62	2.00	0.00	9.19	0.02	0.00	1.64	2.00	0.00	9.18	0.02	0.00
1.66	2.00	0.00	9.17	0.02	0.00	1.68	2.00	0.00	9.16	0.02	0.00
1.70	2.00	0.00	9.15	0.02	0.00	1.72	2.00	0.00	9.14	0.02	0.00
1.74	2.00	0.00	9.13	0.02	0.00	1.76	2.00	0.00	9.12	0.02	0.00
1.78	2.00	0.00	9.11	0.02	0.00	1.80	2.00	0.00	9.10	0.02	0.00
1.82	2.00	0.00	9.09	0.02	0.00	1.84	2.00	0.00	9.08	0.02	0.00
1.86	2.00	0.00	9.07	0.02	0.00	1.88	2.00	0.00	9.06	0.02	0.00
1.90	2.00	0.00	9.05	0.02	0.00	1.92	2.00	0.00	9.04	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
1.94	2.00	0.00	9.03	0.02	0.00	1.96	2.00	0.00	9.02	0.02	0.00
1.98	2.00	0.00	9.01	0.02	0.00	2.00	2.00	0.00	9.00	0.02	0.00
2.02	2.00	0.00	8.99	0.02	0.00	2.04	2.00	0.00	8.98	0.02	0.00
2.06	2.00	0.00	8.97	0.02	0.00	2.08	2.00	0.00	8.96	0.02	0.00
2.10	2.00	0.00	8.95	0.02	0.00	2.12	2.00	0.00	8.94	0.02	0.00
2.14	2.00	0.00	8.93	0.02	0.00	2.16	2.00	0.00	8.92	0.02	0.00
2.18	2.00	0.00	8.91	0.02	0.00	2.20	2.00	0.00	8.90	0.02	0.00
2.22	2.00	0.00	8.89	0.02	0.00	2.24	2.00	0.00	8.88	0.02	0.00
2.26	2.00	0.00	8.87	0.02	0.00	2.28	2.00	0.00	8.86	0.02	0.00
2.30	2.00	0.00	8.85	0.02	0.00	2.32	2.00	0.00	8.84	0.02	0.00
2.34	2.00	0.00	8.83	0.02	0.00	2.36	2.00	0.00	8.82	0.02	0.00
2.38	2.00	0.00	8.81	0.02	0.00	2.40	2.00	0.00	8.80	0.02	0.00
2.42	2.00	0.00	8.79	0.02	0.00	2.44	2.00	0.00	8.78	0.02	0.00
2.46	2.00	0.00	8.77	0.02	0.00	2.48	2.00	0.00	8.76	0.02	0.00
2.50	2.00	0.00	8.75	0.02	0.00	2.52	2.00	0.00	8.74	0.02	0.00
2.54	2.00	0.00	8.73	0.02	0.00	2.56	2.00	0.00	8.72	0.02	0.00
2.58	2.00	0.00	8.71	0.02	0.00	2.60	2.00	0.00	8.70	0.02	0.00
2.62	2.00	0.00	8.69	0.02	0.00	2.64	2.00	0.00	8.68	0.02	0.00
2.66	2.00	0.00	8.67	0.02	0.00	2.68	2.00	0.00	8.66	0.02	0.00
2.70	2.00	0.00	8.65	0.02	0.00	2.72	2.00	0.00	8.64	0.02	0.00
2.74	2.00	0.00	8.63	0.02	0.00	2.76	2.00	0.00	8.62	0.02	0.00
2.78	2.00	0.00	8.61	0.02	0.00	2.80	2.00	0.00	8.60	0.02	0.00
2.82	2.00	0.00	8.59	0.02	0.00	2.84	2.00	0.00	8.58	0.02	0.00
2.86	2.00	0.00	8.57	0.02	0.00	2.88	2.00	0.00	8.56	0.02	0.00
2.90	2.00	0.00	8.55	0.02	0.00	2.92	2.00	0.00	8.54	0.02	0.00
2.94	2.00	0.00	8.53	0.02	0.00	2.96	2.00	0.00	8.52	0.02	0.00
2.98	2.00	0.00	8.51	0.02	0.00	3.00	0.76	0.24	8.50	0.02	0.04
3.02	2.00	0.00	8.49	0.02	0.00	3.04	2.00	0.00	8.48	0.02	0.00
3.06	2.00	0.00	8.47	0.02	0.00	3.08	2.00	0.00	8.46	0.02	0.00
3.10	0.75	0.25	8.45	0.02	0.04	3.12	0.74	0.26	8.44	0.02	0.04
3.14	2.00	0.00	8.43	0.02	0.00	3.16	2.00	0.00	8.42	0.02	0.00
3.18	2.00	0.00	8.41	0.02	0.00	3.20	2.00	0.00	8.40	0.02	0.00
3.22	2.00	0.00	8.39	0.02	0.00	3.24	2.00	0.00	8.38	0.02	0.00
3.26	2.00	0.00	8.37	0.02	0.00	3.28	2.00	0.00	8.36	0.02	0.00
3.30	0.65	0.35	8.35	0.02	0.06	3.32	0.66	0.34	8.34	0.02	0.06
3.34	2.00	0.00	8.33	0.02	0.00	3.36	2.00	0.00	8.32	0.02	0.00
3.38	2.00	0.00	8.31	0.02	0.00	3.40	2.00	0.00	8.30	0.02	0.00
3.42	2.00	0.00	8.29	0.02	0.00	3.44	2.00	0.00	8.28	0.02	0.00
3.46	2.00	0.00	8.27	0.02	0.00	3.48	2.00	0.00	8.26	0.02	0.00
3.50	2.00	0.00	8.25	0.02	0.00	3.52	2.00	0.00	8.24	0.02	0.00
3.54	2.00	0.00	8.23	0.02	0.00	3.56	2.00	0.00	8.22	0.02	0.00
3.58	2.00	0.00	8.21	0.02	0.00	3.60	2.00	0.00	8.20	0.02	0.00
3.62	2.00	0.00	8.19	0.02	0.00	3.64	2.00	0.00	8.18	0.02	0.00
3.66	2.00	0.00	8.17	0.02	0.00	3.68	2.00	0.00	8.16	0.02	0.00
3.70	2.00	0.00	8.15	0.02	0.00	3.72	2.00	0.00	8.14	0.02	0.00
3.74	2.00	0.00	8.13	0.02	0.00	3.76	2.00	0.00	8.12	0.02	0.00
3.78	2.00	0.00	8.11	0.02	0.00	3.80	2.00	0.00	8.10	0.02	0.00
3.82	2.00	0.00	8.09	0.02	0.00	3.84	2.00	0.00	8.08	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
3.86	2.00	0.00	8.07	0.02	0.00	3.88	2.00	0.00	8.06	0.02	0.00
3.90	2.00	0.00	8.05	0.02	0.00	3.92	2.00	0.00	8.04	0.02	0.00
3.94	2.00	0.00	8.03	0.02	0.00	3.96	2.00	0.00	8.02	0.02	0.00
3.98	2.00	0.00	8.01	0.02	0.00	4.00	2.00	0.00	8.00	0.02	0.00
4.02	2.00	0.00	7.99	0.02	0.00	4.04	2.00	0.00	7.98	0.02	0.00
4.06	2.00	0.00	7.97	0.02	0.00	4.08	2.00	0.00	7.96	0.02	0.00
4.10	2.00	0.00	7.95	0.02	0.00	4.12	2.00	0.00	7.94	0.02	0.00
4.14	2.00	0.00	7.93	0.02	0.00	4.16	2.00	0.00	7.92	0.02	0.00
4.18	2.00	0.00	7.91	0.02	0.00	4.20	2.00	0.00	7.90	0.02	0.00
4.22	2.00	0.00	7.89	0.02	0.00	4.24	2.00	0.00	7.88	0.02	0.00
4.26	2.00	0.00	7.87	0.02	0.00	4.28	2.00	0.00	7.86	0.02	0.00
4.30	2.00	0.00	7.85	0.02	0.00	4.32	2.00	0.00	7.84	0.02	0.00
4.34	2.00	0.00	7.83	0.02	0.00	4.36	2.00	0.00	7.82	0.02	0.00
4.38	2.00	0.00	7.81	0.02	0.00	4.40	2.00	0.00	7.80	0.02	0.00
4.42	2.00	0.00	7.79	0.02	0.00	4.44	2.00	0.00	7.78	0.02	0.00
4.46	2.00	0.00	7.77	0.02	0.00	4.48	2.00	0.00	7.76	0.02	0.00
4.50	2.00	0.00	7.75	0.02	0.00	4.52	2.00	0.00	7.74	0.02	0.00
4.54	2.00	0.00	7.73	0.02	0.00	4.56	2.00	0.00	7.72	0.02	0.00
4.58	2.00	0.00	7.71	0.02	0.00	4.60	2.00	0.00	7.70	0.02	0.00
4.62	2.00	0.00	7.69	0.02	0.00	4.64	2.00	0.00	7.68	0.02	0.00
4.66	2.00	0.00	7.67	0.02	0.00	4.68	2.00	0.00	7.66	0.02	0.00
4.70	2.00	0.00	7.65	0.02	0.00	4.72	2.00	0.00	7.64	0.02	0.00
4.74	2.00	0.00	7.63	0.02	0.00	4.76	2.00	0.00	7.62	0.02	0.00
4.78	2.00	0.00	7.61	0.02	0.00	4.80	2.00	0.00	7.60	0.02	0.00
4.82	2.00	0.00	7.59	0.02	0.00	4.84	2.00	0.00	7.58	0.02	0.00
4.86	2.00	0.00	7.57	0.02	0.00	4.88	2.00	0.00	7.56	0.02	0.00
4.90	2.00	0.00	7.55	0.02	0.00	4.92	2.00	0.00	7.54	0.02	0.00
4.94	2.00	0.00	7.53	0.02	0.00	4.96	2.00	0.00	7.52	0.02	0.00
4.98	2.00	0.00	7.51	0.02	0.00	5.00	2.00	0.00	7.50	0.02	0.00
5.02	2.00	0.00	7.49	0.02	0.00	5.04	2.00	0.00	7.48	0.02	0.00
5.06	2.00	0.00	7.47	0.02	0.00	5.08	2.00	0.00	7.46	0.02	0.00
5.10	2.00	0.00	7.45	0.02	0.00	5.12	2.00	0.00	7.44	0.02	0.00
5.14	2.00	0.00	7.43	0.02	0.00	5.16	2.00	0.00	7.42	0.02	0.00
5.18	2.00	0.00	7.41	0.02	0.00	5.20	2.00	0.00	7.40	0.02	0.00
5.22	2.00	0.00	7.39	0.02	0.00	5.24	2.00	0.00	7.38	0.02	0.00
5.26	2.00	0.00	7.37	0.02	0.00	5.28	2.00	0.00	7.36	0.02	0.00
5.30	0.56	0.44	7.35	0.02	0.06	5.32	0.57	0.43	7.34	0.02	0.06
5.34	2.00	0.00	7.33	0.02	0.00	5.36	2.00	0.00	7.32	0.02	0.00
5.38	2.00	0.00	7.31	0.02	0.00	5.40	2.00	0.00	7.30	0.02	0.00
5.42	2.00	0.00	7.29	0.02	0.00	5.44	2.00	0.00	7.28	0.02	0.00
5.46	2.00	0.00	7.27	0.02	0.00	5.48	2.00	0.00	7.26	0.02	0.00
5.50	2.00	0.00	7.25	0.02	0.00	5.52	2.00	0.00	7.24	0.02	0.00
5.54	2.00	0.00	7.23	0.02	0.00	5.56	2.00	0.00	7.22	0.02	0.00
5.58	2.00	0.00	7.21	0.02	0.00	5.60	2.00	0.00	7.20	0.02	0.00
5.62	2.00	0.00	7.19	0.02	0.00	5.64	2.00	0.00	7.18	0.02	0.00
5.66	2.00	0.00	7.17	0.02	0.00	5.68	2.00	0.00	7.16	0.02	0.00
5.70	2.00	0.00	7.15	0.02	0.00	5.72	2.00	0.00	7.14	0.02	0.00
5.74	2.00	0.00	7.13	0.02	0.00	5.76	2.00	0.00	7.12	0.02	0.00



**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
5.78	2.00	0.00	7.11	0.02	0.00	5.80	2.00	0.00	7.10	0.02	0.00
5.82	2.00	0.00	7.09	0.02	0.00	5.84	2.00	0.00	7.08	0.02	0.00
5.86	2.00	0.00	7.07	0.02	0.00	5.88	2.00	0.00	7.06	0.02	0.00
5.90	2.00	0.00	7.05	0.02	0.00	5.92	0.55	0.45	7.04	0.02	0.06
5.94	0.55	0.45	7.03	0.02	0.06	5.96	2.00	0.00	7.02	0.02	0.00
5.98	2.00	0.00	7.01	0.02	0.00	6.00	2.00	0.00	7.00	0.02	0.00
6.02	2.00	0.00	6.99	0.02	0.00	6.04	2.00	0.00	6.98	0.02	0.00
6.06	2.00	0.00	6.97	0.02	0.00	6.08	2.00	0.00	6.96	0.02	0.00
6.10	2.00	0.00	6.95	0.02	0.00	6.12	2.00	0.00	6.94	0.02	0.00
6.14	2.00	0.00	6.93	0.02	0.00	6.16	2.00	0.00	6.92	0.02	0.00
6.18	2.00	0.00	6.91	0.02	0.00	6.20	2.00	0.00	6.90	0.02	0.00
6.22	2.00	0.00	6.89	0.02	0.00	6.24	2.00	0.00	6.88	0.02	0.00
6.26	2.00	0.00	6.87	0.02	0.00	6.28	2.00	0.00	6.86	0.02	0.00
6.30	2.00	0.00	6.85	0.02	0.00	6.32	2.00	0.00	6.84	0.02	0.00
6.34	2.00	0.00	6.83	0.02	0.00	6.36	2.00	0.00	6.82	0.02	0.00
6.38	2.00	0.00	6.81	0.02	0.00	6.40	2.00	0.00	6.80	0.02	0.00
6.42	2.00	0.00	6.79	0.02	0.00	6.44	2.00	0.00	6.78	0.02	0.00
6.46	2.00	0.00	6.77	0.02	0.00	6.48	2.00	0.00	6.76	0.02	0.00
6.50	2.00	0.00	6.75	0.02	0.00	6.52	2.00	0.00	6.74	0.02	0.00
6.54	2.00	0.00	6.73	0.02	0.00	6.56	2.00	0.00	6.72	0.02	0.00
6.58	2.00	0.00	6.71	0.02	0.00	6.60	2.00	0.00	6.70	0.02	0.00
6.62	2.00	0.00	6.69	0.02	0.00	6.64	2.00	0.00	6.68	0.02	0.00
6.66	2.00	0.00	6.67	0.02	0.00	6.68	2.00	0.00	6.66	0.02	0.00
6.70	2.00	0.00	6.65	0.02	0.00	6.72	2.00	0.00	6.64	0.02	0.00
6.74	2.00	0.00	6.63	0.02	0.00	6.76	2.00	0.00	6.62	0.02	0.00
6.78	2.00	0.00	6.61	0.02	0.00	6.80	2.00	0.00	6.60	0.02	0.00
6.82	2.00	0.00	6.59	0.02	0.00	6.84	2.00	0.00	6.58	0.02	0.00
6.86	2.00	0.00	6.57	0.02	0.00	6.88	2.00	0.00	6.56	0.02	0.00
6.90	2.00	0.00	6.55	0.02	0.00	6.92	0.54	0.46	6.54	0.02	0.06
6.94	0.55	0.45	6.53	0.02	0.06	6.96	2.00	0.00	6.52	0.02	0.00
6.98	2.00	0.00	6.51	0.02	0.00	7.00	2.00	0.00	6.50	0.02	0.00
7.02	2.00	0.00	6.49	0.02	0.00	7.04	2.00	0.00	6.48	0.02	0.00
7.06	2.00	0.00	6.47	0.02	0.00	7.08	2.00	0.00	6.46	0.02	0.00
7.10	2.00	0.00	6.45	0.02	0.00	7.12	2.00	0.00	6.44	0.02	0.00
7.14	2.00	0.00	6.43	0.02	0.00	7.16	2.00	0.00	6.42	0.02	0.00
7.18	2.00	0.00	6.41	0.02	0.00	7.20	2.00	0.00	6.40	0.02	0.00
7.22	2.00	0.00	6.39	0.02	0.00	7.24	2.00	0.00	6.38	0.02	0.00
7.26	2.00	0.00	6.37	0.02	0.00	7.28	2.00	0.00	6.36	0.02	0.00
7.30	2.00	0.00	6.35	0.02	0.00	7.32	2.00	0.00	6.34	0.02	0.00
7.34	2.00	0.00	6.33	0.02	0.00	7.36	2.00	0.00	6.32	0.02	0.00
7.38	2.00	0.00	6.31	0.02	0.00	7.40	2.00	0.00	6.30	0.02	0.00
7.42	2.00	0.00	6.29	0.02	0.00	7.44	2.00	0.00	6.28	0.02	0.00
7.46	2.00	0.00	6.27	0.02	0.00	7.48	2.00	0.00	6.26	0.02	0.00
7.50	2.00	0.00	6.25	0.02	0.00	7.52	2.00	0.00	6.24	0.02	0.00
7.54	2.00	0.00	6.23	0.02	0.00	7.56	2.00	0.00	6.22	0.02	0.00
7.58	2.00	0.00	6.21	0.02	0.00	7.60	2.00	0.00	6.20	0.02	0.00
7.62	2.00	0.00	6.19	0.02	0.00	7.64	2.00	0.00	6.18	0.02	0.00
7.66	2.00	0.00	6.17	0.02	0.00	7.68	2.00	0.00	6.16	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
7.70	2.00	0.00	6.15	0.02	0.00	7.72	2.00	0.00	6.14	0.02	0.00
7.74	2.00	0.00	6.13	0.02	0.00	7.76	2.00	0.00	6.12	0.02	0.00
7.78	2.00	0.00	6.11	0.02	0.00	7.80	2.00	0.00	6.10	0.02	0.00
7.82	2.00	0.00	6.09	0.02	0.00	7.84	2.00	0.00	6.08	0.02	0.00
7.86	2.00	0.00	6.07	0.02	0.00	7.88	2.00	0.00	6.06	0.02	0.00
7.90	2.00	0.00	6.05	0.02	0.00	7.92	2.00	0.00	6.04	0.02	0.00
7.94	2.00	0.00	6.03	0.02	0.00	7.96	2.00	0.00	6.02	0.02	0.00
7.98	2.00	0.00	6.01	0.02	0.00	8.00	2.00	0.00	6.00	0.02	0.00
8.02	2.00	0.00	5.99	0.02	0.00	8.04	2.00	0.00	5.98	0.02	0.00
8.06	2.00	0.00	5.97	0.02	0.00	8.08	2.00	0.00	5.96	0.02	0.00
8.10	2.00	0.00	5.95	0.02	0.00	8.12	2.00	0.00	5.94	0.02	0.00
8.14	2.00	0.00	5.93	0.02	0.00	8.16	2.00	0.00	5.92	0.02	0.00
8.18	2.00	0.00	5.91	0.02	0.00	8.20	2.00	0.00	5.90	0.02	0.00
8.22	2.00	0.00	5.89	0.02	0.00	8.24	2.00	0.00	5.88	0.02	0.00
8.26	2.00	0.00	5.87	0.02	0.00	8.28	2.00	0.00	5.86	0.02	0.00
8.30	2.00	0.00	5.85	0.02	0.00	8.32	2.00	0.00	5.84	0.02	0.00
8.34	2.00	0.00	5.83	0.02	0.00	8.36	2.00	0.00	5.82	0.02	0.00
8.38	2.00	0.00	5.81	0.02	0.00	8.40	2.00	0.00	5.80	0.02	0.00
8.42	2.00	0.00	5.79	0.02	0.00	8.44	2.00	0.00	5.78	0.02	0.00
8.46	2.00	0.00	5.77	0.02	0.00	8.48	2.00	0.00	5.76	0.02	0.00
8.50	2.00	0.00	5.75	0.02	0.00	8.52	2.00	0.00	5.74	0.02	0.00
8.54	2.00	0.00	5.73	0.02	0.00	8.56	2.00	0.00	5.72	0.02	0.00
8.58	2.00	0.00	5.71	0.02	0.00	8.60	2.00	0.00	5.70	0.02	0.00
8.62	2.00	0.00	5.69	0.02	0.00	8.64	2.00	0.00	5.68	0.02	0.00
8.66	2.00	0.00	5.67	0.02	0.00	8.68	2.00	0.00	5.66	0.02	0.00
8.70	2.00	0.00	5.65	0.02	0.00	8.72	2.00	0.00	5.64	0.02	0.00
8.74	2.00	0.00	5.63	0.02	0.00	8.76	2.00	0.00	5.62	0.02	0.00
8.78	2.00	0.00	5.61	0.02	0.00	8.80	2.00	0.00	5.60	0.02	0.00
8.82	2.00	0.00	5.59	0.02	0.00	8.84	0.56	0.44	5.58	0.02	0.05
8.86	0.58	0.42	5.57	0.02	0.05	8.88	0.59	0.41	5.56	0.02	0.05
8.90	0.57	0.43	5.55	0.02	0.05	8.92	2.00	0.00	5.54	0.02	0.00
8.94	2.00	0.00	5.53	0.02	0.00	8.96	2.00	0.00	5.52	0.02	0.00
8.98	2.00	0.00	5.51	0.02	0.00	9.00	2.00	0.00	5.50	0.02	0.00
9.02	2.00	0.00	5.49	0.02	0.00	9.04	2.00	0.00	5.48	0.02	0.00
9.06	2.00	0.00	5.47	0.02	0.00	9.08	2.00	0.00	5.46	0.02	0.00
9.10	2.00	0.00	5.45	0.02	0.00	9.12	2.00	0.00	5.44	0.02	0.00
9.14	2.00	0.00	5.43	0.02	0.00	9.16	2.00	0.00	5.42	0.02	0.00
9.18	2.00	0.00	5.41	0.02	0.00	9.20	2.00	0.00	5.40	0.02	0.00
9.22	2.00	0.00	5.39	0.02	0.00	9.24	2.00	0.00	5.38	0.02	0.00
9.26	2.00	0.00	5.37	0.02	0.00	9.28	2.00	0.00	5.36	0.02	0.00
9.30	2.00	0.00	5.35	0.02	0.00	9.32	0.57	0.43	5.34	0.02	0.05
9.34	0.58	0.42	5.33	0.02	0.04	9.36	0.58	0.42	5.32	0.02	0.04
9.38	2.00	0.00	5.31	0.02	0.00	9.40	2.00	0.00	5.30	0.02	0.00
9.42	2.00	0.00	5.29	0.02	0.00	9.44	2.00	0.00	5.28	0.02	0.00
9.46	2.00	0.00	5.27	0.02	0.00	9.48	2.00	0.00	5.26	0.02	0.00
9.50	2.00	0.00	5.25	0.02	0.00	9.52	2.00	0.00	5.24	0.02	0.00
9.54	2.00	0.00	5.23	0.02	0.00	9.56	2.00	0.00	5.22	0.02	0.00
9.58	2.00	0.00	5.21	0.02	0.00	9.60	0.57	0.43	5.20	0.02	0.04

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
9.62	0.57	0.43	5.19	0.02	0.04	9.64	2.00	0.00	5.18	0.02	0.00
9.66	2.00	0.00	5.17	0.02	0.00	9.68	2.00	0.00	5.16	0.02	0.00
9.70	2.00	0.00	5.15	0.02	0.00	9.72	2.00	0.00	5.14	0.02	0.00
9.74	2.00	0.00	5.13	0.02	0.00	9.76	2.00	0.00	5.12	0.02	0.00
9.78	2.00	0.00	5.11	0.02	0.00	9.80	2.00	0.00	5.10	0.02	0.00
9.82	2.00	0.00	5.09	0.02	0.00	9.84	2.00	0.00	5.08	0.02	0.00
9.86	2.00	0.00	5.07	0.02	0.00	9.88	2.00	0.00	5.06	0.02	0.00
9.90	2.00	0.00	5.05	0.02	0.00	9.92	2.00	0.00	5.04	0.02	0.00
9.94	2.00	0.00	5.03	0.02	0.00	9.96	2.00	0.00	5.02	0.02	0.00
9.98	2.00	0.00	5.01	0.02	0.00	10.00	2.00	0.00	5.00	0.02	0.00
10.02	2.00	0.00	4.99	0.02	0.00	10.04	2.00	0.00	4.98	0.02	0.00
10.06	2.00	0.00	4.97	0.02	0.00	10.08	2.00	0.00	4.96	0.02	0.00
10.10	2.00	0.00	4.95	0.02	0.00	10.12	2.00	0.00	4.94	0.02	0.00
10.14	2.00	0.00	4.93	0.02	0.00	10.16	2.00	0.00	4.92	0.02	0.00
10.18	2.00	0.00	4.91	0.02	0.00	10.20	2.00	0.00	4.90	0.02	0.00
10.22	2.00	0.00	4.89	0.02	0.00	10.24	2.00	0.00	4.88	0.02	0.00
10.26	2.00	0.00	4.87	0.02	0.00	10.28	2.00	0.00	4.86	0.02	0.00
10.30	2.00	0.00	4.85	0.02	0.00	10.32	2.00	0.00	4.84	0.02	0.00
10.34	2.00	0.00	4.83	0.02	0.00	10.36	2.00	0.00	4.82	0.02	0.00
10.38	2.00	0.00	4.81	0.02	0.00	10.40	2.00	0.00	4.80	0.02	0.00
10.42	2.00	0.00	4.79	0.02	0.00	10.44	2.00	0.00	4.78	0.02	0.00
10.46	2.00	0.00	4.77	0.02	0.00	10.48	2.00	0.00	4.76	0.02	0.00
10.50	2.00	0.00	4.75	0.02	0.00	10.52	2.00	0.00	4.74	0.02	0.00
10.54	2.00	0.00	4.73	0.02	0.00	10.56	2.00	0.00	4.72	0.02	0.00
10.58	2.00	0.00	4.71	0.02	0.00	10.60	2.00	0.00	4.70	0.02	0.00
10.62	2.00	0.00	4.69	0.02	0.00	10.64	2.00	0.00	4.68	0.02	0.00
10.66	2.00	0.00	4.67	0.02	0.00	10.68	2.00	0.00	4.66	0.02	0.00
10.70	2.00	0.00	4.65	0.02	0.00	10.72	2.00	0.00	4.64	0.02	0.00
10.74	2.00	0.00	4.63	0.02	0.00	10.76	2.00	0.00	4.62	0.02	0.00
10.78	2.00	0.00	4.61	0.02	0.00	10.80	2.00	0.00	4.60	0.02	0.00
10.82	2.00	0.00	4.59	0.02	0.00	10.84	2.00	0.00	4.58	0.02	0.00
10.86	2.00	0.00	4.57	0.02	0.00	10.88	2.00	0.00	4.56	0.02	0.00
10.90	2.00	0.00	4.55	0.02	0.00	10.92	2.00	0.00	4.54	0.02	0.00
10.94	2.00	0.00	4.53	0.02	0.00	10.96	2.00	0.00	4.52	0.02	0.00
10.98	2.00	0.00	4.51	0.02	0.00	11.00	2.00	0.00	4.50	0.02	0.00
11.02	2.00	0.00	4.49	0.02	0.00	11.04	2.00	0.00	4.48	0.02	0.00
11.06	2.00	0.00	4.47	0.02	0.00	11.08	2.00	0.00	4.46	0.02	0.00
11.10	2.00	0.00	4.45	0.02	0.00	11.12	2.00	0.00	4.44	0.02	0.00
11.14	2.00	0.00	4.43	0.02	0.00	11.16	2.00	0.00	4.42	0.02	0.00
11.18	2.00	0.00	4.41	0.02	0.00	11.20	2.00	0.00	4.40	0.02	0.00
11.22	2.00	0.00	4.39	0.02	0.00	11.24	2.00	0.00	4.38	0.02	0.00
11.26	2.00	0.00	4.37	0.02	0.00	11.28	2.00	0.00	4.36	0.02	0.00
11.30	2.00	0.00	4.35	0.02	0.00	11.32	2.00	0.00	4.34	0.02	0.00
11.34	2.00	0.00	4.33	0.02	0.00	11.36	2.00	0.00	4.32	0.02	0.00
11.38	2.00	0.00	4.31	0.02	0.00	11.40	2.00	0.00	4.30	0.02	0.00
11.42	2.00	0.00	4.29	0.02	0.00	11.44	2.00	0.00	4.28	0.02	0.00
11.46	2.00	0.00	4.27	0.02	0.00	11.48	2.00	0.00	4.26	0.02	0.00
11.50	2.00	0.00	4.25	0.02	0.00	11.52	2.00	0.00	4.24	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
11.54	2.00	0.00	4.23	0.02	0.00	11.56	2.00	0.00	4.22	0.02	0.00
11.58	2.00	0.00	4.21	0.02	0.00	11.60	2.00	0.00	4.20	0.02	0.00
11.62	2.00	0.00	4.19	0.02	0.00	11.64	2.00	0.00	4.18	0.02	0.00
11.66	2.00	0.00	4.17	0.02	0.00	11.68	2.00	0.00	4.16	0.02	0.00
11.70	2.00	0.00	4.15	0.02	0.00	11.72	2.00	0.00	4.14	0.02	0.00
11.74	2.00	0.00	4.13	0.02	0.00	11.76	2.00	0.00	4.12	0.02	0.00
11.78	2.00	0.00	4.11	0.02	0.00	11.80	2.00	0.00	4.10	0.02	0.00
11.82	2.00	0.00	4.09	0.02	0.00	11.84	2.00	0.00	4.08	0.02	0.00
11.86	2.00	0.00	4.07	0.02	0.00	11.88	2.00	0.00	4.06	0.02	0.00
11.90	2.00	0.00	4.05	0.02	0.00	11.92	2.00	0.00	4.04	0.02	0.00
11.94	2.00	0.00	4.03	0.02	0.00	11.96	2.00	0.00	4.02	0.02	0.00
11.98	2.00	0.00	4.01	0.02	0.00	12.00	2.00	0.00	4.00	0.02	0.00
12.02	2.00	0.00	3.99	0.02	0.00	12.04	2.00	0.00	3.98	0.02	0.00
12.06	2.00	0.00	3.97	0.02	0.00	12.08	2.00	0.00	3.96	0.02	0.00
12.10	2.00	0.00	3.95	0.02	0.00	12.12	2.00	0.00	3.94	0.02	0.00
12.14	2.00	0.00	3.93	0.02	0.00	12.16	2.00	0.00	3.92	0.02	0.00
12.18	2.00	0.00	3.91	0.02	0.00	12.20	2.00	0.00	3.90	0.02	0.00
12.22	2.00	0.00	3.89	0.02	0.00	12.24	2.00	0.00	3.88	0.02	0.00
12.26	2.00	0.00	3.87	0.02	0.00	12.28	2.00	0.00	3.86	0.02	0.00
12.30	2.00	0.00	3.85	0.02	0.00	12.32	2.00	0.00	3.84	0.02	0.00
12.34	2.00	0.00	3.83	0.02	0.00	12.36	2.00	0.00	3.82	0.02	0.00
12.38	2.00	0.00	3.81	0.02	0.00	12.40	2.00	0.00	3.80	0.02	0.00
12.42	2.00	0.00	3.79	0.02	0.00	12.44	2.00	0.00	3.78	0.02	0.00
12.46	2.00	0.00	3.77	0.02	0.00	12.48	2.00	0.00	3.76	0.02	0.00
12.50	2.00	0.00	3.75	0.02	0.00	12.52	2.00	0.00	3.74	0.02	0.00
12.54	2.00	0.00	3.73	0.02	0.00	12.56	2.00	0.00	3.72	0.02	0.00
12.58	2.00	0.00	3.71	0.02	0.00	12.60	2.00	0.00	3.70	0.02	0.00
12.62	2.00	0.00	3.69	0.02	0.00	12.64	2.00	0.00	3.68	0.02	0.00
12.66	2.00	0.00	3.67	0.02	0.00	12.68	2.00	0.00	3.66	0.02	0.00
12.70	2.00	0.00	3.65	0.02	0.00	12.72	2.00	0.00	3.64	0.02	0.00
12.74	2.00	0.00	3.63	0.02	0.00	12.76	2.00	0.00	3.62	0.02	0.00
12.78	2.00	0.00	3.61	0.02	0.00	12.80	2.00	0.00	3.60	0.02	0.00
12.82	2.00	0.00	3.59	0.02	0.00	12.84	2.00	0.00	3.58	0.02	0.00
12.86	2.00	0.00	3.57	0.02	0.00	12.88	2.00	0.00	3.56	0.02	0.00
12.90	2.00	0.00	3.55	0.02	0.00	12.92	2.00	0.00	3.54	0.02	0.00
12.94	2.00	0.00	3.53	0.02	0.00	12.96	2.00	0.00	3.52	0.02	0.00
12.98	2.00	0.00	3.51	0.02	0.00	13.00	2.00	0.00	3.50	0.02	0.00
13.02	2.00	0.00	3.49	0.02	0.00	13.04	2.00	0.00	3.48	0.02	0.00
13.06	2.00	0.00	3.47	0.02	0.00	13.08	2.00	0.00	3.46	0.02	0.00
13.10	2.00	0.00	3.45	0.02	0.00	13.12	2.00	0.00	3.44	0.02	0.00
13.14	2.00	0.00	3.43	0.02	0.00	13.16	2.00	0.00	3.42	0.02	0.00
13.18	2.00	0.00	3.41	0.02	0.00	13.20	2.00	0.00	3.40	0.02	0.00
13.22	2.00	0.00	3.39	0.02	0.00	13.24	2.00	0.00	3.38	0.02	0.00
13.26	2.00	0.00	3.37	0.02	0.00	13.28	2.00	0.00	3.36	0.02	0.00
13.30	2.00	0.00	3.35	0.02	0.00	13.32	2.00	0.00	3.34	0.02	0.00
13.34	2.00	0.00	3.33	0.02	0.00	13.36	2.00	0.00	3.32	0.02	0.00
13.38	2.00	0.00	3.31	0.02	0.00	13.40	2.00	0.00	3.30	0.02	0.00
13.42	2.00	0.00	3.29	0.02	0.00	13.44	2.00	0.00	3.28	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
13.46	2.00	0.00	3.27	0.02	0.00	13.48	2.00	0.00	3.26	0.02	0.00
13.50	2.00	0.00	3.25	0.02	0.00	13.52	2.00	0.00	3.24	0.02	0.00
13.54	2.00	0.00	3.23	0.02	0.00	13.56	2.00	0.00	3.22	0.02	0.00
13.58	2.00	0.00	3.21	0.02	0.00	13.60	2.00	0.00	3.20	0.02	0.00
13.62	2.00	0.00	3.19	0.02	0.00	13.64	2.00	0.00	3.18	0.02	0.00
13.66	2.00	0.00	3.17	0.02	0.00	13.68	2.00	0.00	3.16	0.02	0.00
13.70	2.00	0.00	3.15	0.02	0.00	13.72	2.00	0.00	3.14	0.02	0.00
13.74	2.00	0.00	3.13	0.02	0.00	13.76	2.00	0.00	3.12	0.02	0.00
13.78	2.00	0.00	3.11	0.02	0.00	13.80	2.00	0.00	3.10	0.02	0.00
13.82	2.00	0.00	3.09	0.02	0.00	13.84	2.00	0.00	3.08	0.02	0.00
13.86	2.00	0.00	3.07	0.02	0.00	13.88	2.00	0.00	3.06	0.02	0.00
13.90	2.00	0.00	3.05	0.02	0.00	13.92	2.00	0.00	3.04	0.02	0.00
13.94	2.00	0.00	3.03	0.02	0.00	13.96	2.00	0.00	3.02	0.02	0.00
13.98	2.00	0.00	3.01	0.02	0.00	14.00	2.00	0.00	3.00	0.02	0.00
14.02	2.00	0.00	2.99	0.02	0.00	14.04	2.00	0.00	2.98	0.02	0.00
14.06	2.00	0.00	2.97	0.02	0.00	14.08	2.00	0.00	2.96	0.02	0.00
14.10	2.00	0.00	2.95	0.02	0.00	14.12	2.00	0.00	2.94	0.02	0.00
14.14	2.00	0.00	2.93	0.02	0.00	14.16	2.00	0.00	2.92	0.02	0.00
14.18	2.00	0.00	2.91	0.02	0.00	14.20	2.00	0.00	2.90	0.02	0.00
14.22	2.00	0.00	2.89	0.02	0.00	14.24	2.00	0.00	2.88	0.02	0.00
14.26	2.00	0.00	2.87	0.02	0.00	14.28	2.00	0.00	2.86	0.02	0.00
14.30	2.00	0.00	2.85	0.02	0.00	14.32	2.00	0.00	2.84	0.02	0.00
14.34	2.00	0.00	2.83	0.02	0.00	14.36	2.00	0.00	2.82	0.02	0.00
14.38	2.00	0.00	2.81	0.02	0.00	14.40	2.00	0.00	2.80	0.02	0.00
14.42	2.00	0.00	2.79	0.02	0.00	14.44	2.00	0.00	2.78	0.02	0.00
14.46	2.00	0.00	2.77	0.02	0.00	14.48	2.00	0.00	2.76	0.02	0.00
14.50	2.00	0.00	2.75	0.02	0.00	14.52	2.00	0.00	2.74	0.02	0.00
14.54	2.00	0.00	2.73	0.02	0.00	14.56	2.00	0.00	2.72	0.02	0.00
14.58	0.64	0.36	2.71	0.02	0.02	14.60	2.00	0.00	2.70	0.02	0.00
14.62	2.00	0.00	2.69	0.02	0.00	14.64	2.00	0.00	2.68	0.02	0.00
14.66	2.00	0.00	2.67	0.02	0.00	14.68	2.00	0.00	2.66	0.02	0.00
14.70	2.00	0.00	2.65	0.02	0.00	14.72	2.00	0.00	2.64	0.02	0.00
14.74	0.62	0.38	2.63	0.02	0.02	14.76	0.64	0.36	2.62	0.02	0.02
14.78	0.62	0.38	2.61	0.02	0.02	14.80	2.00	0.00	2.60	0.02	0.00
14.82	2.00	0.00	2.59	0.02	0.00	14.84	2.00	0.00	2.58	0.02	0.00
14.86	2.00	0.00	2.57	0.02	0.00	14.88	2.00	0.00	2.56	0.02	0.00
14.90	2.00	0.00	2.55	0.02	0.00	14.92	2.00	0.00	2.54	0.02	0.00
14.94	2.00	0.00	2.53	0.02	0.00	14.96	2.00	0.00	2.52	0.02	0.00
14.98	2.00	0.00	2.51	0.02	0.00	15.00	2.00	0.00	2.50	0.02	0.00
15.02	2.00	0.00	2.49	0.02	0.00	15.04	2.00	0.00	2.48	0.02	0.00
15.06	2.00	0.00	2.47	0.02	0.00	15.08	2.00	0.00	2.46	0.02	0.00
15.10	2.00	0.00	2.45	0.02	0.00	15.12	2.00	0.00	2.44	0.02	0.00
15.14	2.00	0.00	2.43	0.02	0.00	15.16	2.00	0.00	2.42	0.02	0.00
15.18	2.00	0.00	2.41	0.02	0.00	15.20	2.00	0.00	2.40	0.02	0.00
15.22	2.00	0.00	2.39	0.02	0.00	15.24	2.00	0.00	2.38	0.02	0.00
15.26	2.00	0.00	2.37	0.02	0.00	15.28	2.00	0.00	2.36	0.02	0.00
15.30	2.00	0.00	2.35	0.02	0.00	15.32	2.00	0.00	2.34	0.02	0.00
15.34	2.00	0.00	2.33	0.02	0.00	15.36	2.00	0.00	2.32	0.02	0.00



**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
15.38	2.00	0.00	2.31	0.02	0.00	15.40	2.00	0.00	2.30	0.02	0.00
15.42	2.00	0.00	2.29	0.02	0.00	15.44	2.00	0.00	2.28	0.02	0.00
15.46	2.00	0.00	2.27	0.02	0.00	15.48	2.00	0.00	2.26	0.02	0.00
15.50	2.00	0.00	2.25	0.02	0.00	15.52	2.00	0.00	2.24	0.02	0.00
15.54	2.00	0.00	2.23	0.02	0.00	15.56	2.00	0.00	2.22	0.02	0.00
15.58	2.00	0.00	2.21	0.02	0.00	15.60	2.00	0.00	2.20	0.02	0.00
15.62	2.00	0.00	2.19	0.02	0.00	15.64	2.00	0.00	2.18	0.02	0.00
15.66	2.00	0.00	2.17	0.02	0.00	15.68	2.00	0.00	2.16	0.02	0.00
15.70	2.00	0.00	2.15	0.02	0.00	15.72	2.00	0.00	2.14	0.02	0.00
15.74	2.00	0.00	2.13	0.02	0.00	15.76	2.00	0.00	2.12	0.02	0.00
15.78	2.00	0.00	2.11	0.02	0.00	15.80	2.00	0.00	2.10	0.02	0.00
15.82	2.00	0.00	2.09	0.02	0.00	15.84	2.00	0.00	2.08	0.02	0.00
15.86	2.00	0.00	2.07	0.02	0.00	15.88	2.00	0.00	2.06	0.02	0.00
15.90	2.00	0.00	2.05	0.02	0.00	15.92	2.00	0.00	2.04	0.02	0.00
15.94	2.00	0.00	2.03	0.02	0.00	15.96	2.00	0.00	2.02	0.02	0.00
15.98	2.00	0.00	2.01	0.02	0.00	16.00	2.00	0.00	2.00	0.02	0.00
16.02	2.00	0.00	1.99	0.02	0.00	16.04	2.00	0.00	1.98	0.02	0.00
16.06	2.00	0.00	1.97	0.02	0.00	16.08	2.00	0.00	1.96	0.02	0.00
16.10	2.00	0.00	1.95	0.02	0.00	16.12	2.00	0.00	1.94	0.02	0.00
16.14	2.00	0.00	1.93	0.02	0.00	16.16	2.00	0.00	1.92	0.02	0.00
16.18	2.00	0.00	1.91	0.02	0.00	16.20	2.00	0.00	1.90	0.02	0.00
16.22	2.00	0.00	1.89	0.02	0.00	16.24	2.00	0.00	1.88	0.02	0.00
16.26	2.00	0.00	1.87	0.02	0.00	16.28	2.00	0.00	1.86	0.02	0.00
16.30	2.00	0.00	1.85	0.02	0.00	16.32	2.00	0.00	1.84	0.02	0.00
16.34	2.00	0.00	1.83	0.02	0.00	16.36	2.00	0.00	1.82	0.02	0.00
16.38	2.00	0.00	1.81	0.02	0.00	16.40	2.00	0.00	1.80	0.02	0.00
16.42	2.00	0.00	1.79	0.02	0.00	16.44	2.00	0.00	1.78	0.02	0.00
16.46	2.00	0.00	1.77	0.02	0.00	16.48	2.00	0.00	1.76	0.02	0.00
16.50	2.00	0.00	1.75	0.02	0.00	16.52	2.00	0.00	1.74	0.02	0.00
16.54	2.00	0.00	1.73	0.02	0.00	16.56	2.00	0.00	1.72	0.02	0.00
16.58	2.00	0.00	1.71	0.02	0.00	16.60	2.00	0.00	1.70	0.02	0.00
16.62	2.00	0.00	1.69	0.02	0.00	16.64	2.00	0.00	1.68	0.02	0.00
16.66	2.00	0.00	1.67	0.02	0.00	16.68	2.00	0.00	1.66	0.02	0.00
16.70	2.00	0.00	1.65	0.02	0.00	16.72	2.00	0.00	1.64	0.02	0.00
16.74	2.00	0.00	1.63	0.02	0.00	16.76	2.00	0.00	1.62	0.02	0.00
16.78	2.00	0.00	1.61	0.02	0.00	16.80	2.00	0.00	1.60	0.02	0.00
16.82	2.00	0.00	1.59	0.02	0.00	16.84	2.00	0.00	1.58	0.02	0.00
16.86	2.00	0.00	1.57	0.02	0.00	16.88	2.00	0.00	1.56	0.02	0.00
16.90	2.00	0.00	1.55	0.02	0.00	16.92	2.00	0.00	1.54	0.02	0.00
16.94	2.00	0.00	1.53	0.02	0.00	16.96	2.00	0.00	1.52	0.02	0.00
16.98	2.00	0.00	1.51	0.02	0.00	17.00	2.00	0.00	1.50	0.02	0.00
17.02	2.00	0.00	1.49	0.02	0.00	17.04	2.00	0.00	1.48	0.02	0.00
17.06	2.00	0.00	1.47	0.02	0.00	17.08	2.00	0.00	1.46	0.02	0.00
17.10	2.00	0.00	1.45	0.02	0.00	17.12	2.00	0.00	1.44	0.02	0.00
17.14	2.00	0.00	1.43	0.02	0.00	17.16	2.00	0.00	1.42	0.02	0.00
17.18	2.00	0.00	1.41	0.02	0.00	17.20	2.00	0.00	1.40	0.02	0.00
17.22	2.00	0.00	1.39	0.02	0.00	17.24	2.00	0.00	1.38	0.02	0.00
17.26	2.00	0.00	1.37	0.02	0.00	17.28	2.00	0.00	1.36	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
17.30	2.00	0.00	1.35	0.02	0.00	17.32	2.00	0.00	1.34	0.02	0.00
17.34	2.00	0.00	1.33	0.02	0.00	17.36	2.00	0.00	1.32	0.02	0.00
17.38	2.00	0.00	1.31	0.02	0.00	17.40	2.00	0.00	1.30	0.02	0.00
17.42	2.00	0.00	1.29	0.02	0.00	17.44	2.00	0.00	1.28	0.02	0.00
17.46	2.00	0.00	1.27	0.02	0.00	17.48	2.00	0.00	1.26	0.02	0.00
17.50	2.00	0.00	1.25	0.02	0.00	17.52	2.00	0.00	1.24	0.02	0.00
17.54	2.00	0.00	1.23	0.02	0.00	17.56	2.00	0.00	1.22	0.02	0.00
17.58	2.00	0.00	1.21	0.02	0.00	17.60	2.00	0.00	1.20	0.02	0.00
17.62	2.00	0.00	1.19	0.02	0.00	17.64	2.00	0.00	1.18	0.02	0.00
17.66	2.00	0.00	1.17	0.02	0.00	17.68	2.00	0.00	1.16	0.02	0.00
17.70	2.00	0.00	1.15	0.02	0.00	17.72	2.00	0.00	1.14	0.02	0.00
17.74	2.00	0.00	1.13	0.02	0.00	17.76	2.00	0.00	1.12	0.02	0.00
17.78	2.00	0.00	1.11	0.02	0.00	17.80	2.00	0.00	1.10	0.02	0.00
17.82	2.00	0.00	1.09	0.02	0.00	17.84	2.00	0.00	1.08	0.02	0.00
17.86	2.00	0.00	1.07	0.02	0.00	17.88	2.00	0.00	1.06	0.02	0.00
17.90	2.00	0.00	1.05	0.02	0.00	17.92	2.00	0.00	1.04	0.02	0.00
17.94	2.00	0.00	1.03	0.02	0.00	17.96	2.00	0.00	1.02	0.02	0.00
17.98	2.00	0.00	1.01	0.02	0.00	18.00	2.00	0.00	1.00	0.02	0.00
18.02	2.00	0.00	0.99	0.02	0.00	18.04	2.00	0.00	0.98	0.02	0.00
18.06	2.00	0.00	0.97	0.02	0.00	18.08	2.00	0.00	0.96	0.02	0.00
18.10	2.00	0.00	0.95	0.02	0.00	18.12	2.00	0.00	0.94	0.02	0.00
18.14	2.00	0.00	0.93	0.02	0.00	18.16	2.00	0.00	0.92	0.02	0.00
18.18	2.00	0.00	0.91	0.02	0.00	18.20	2.00	0.00	0.90	0.02	0.00
18.22	2.00	0.00	0.89	0.02	0.00	18.24	2.00	0.00	0.88	0.02	0.00
18.26	2.00	0.00	0.87	0.02	0.00	18.28	2.00	0.00	0.86	0.02	0.00
18.30	2.00	0.00	0.85	0.02	0.00	18.32	2.00	0.00	0.84	0.02	0.00
18.34	2.00	0.00	0.83	0.02	0.00	18.36	2.00	0.00	0.82	0.02	0.00
18.38	2.00	0.00	0.81	0.02	0.00	18.40	2.00	0.00	0.80	0.02	0.00
18.42	2.00	0.00	0.79	0.02	0.00	18.44	2.00	0.00	0.78	0.02	0.00
18.46	2.00	0.00	0.77	0.02	0.00	18.48	2.00	0.00	0.76	0.02	0.00
18.50	2.00	0.00	0.75	0.02	0.00	18.52	2.00	0.00	0.74	0.02	0.00
18.54	2.00	0.00	0.73	0.02	0.00	18.56	2.00	0.00	0.72	0.02	0.00
18.58	2.00	0.00	0.71	0.02	0.00	18.60	2.00	0.00	0.70	0.02	0.00
18.62	2.00	0.00	0.69	0.02	0.00	18.64	2.00	0.00	0.68	0.02	0.00
18.66	2.00	0.00	0.67	0.02	0.00	18.68	2.00	0.00	0.66	0.02	0.00
18.70	2.00	0.00	0.65	0.02	0.00	18.72	2.00	0.00	0.64	0.02	0.00
18.74	2.00	0.00	0.63	0.02	0.00	18.76	2.00	0.00	0.62	0.02	0.00
18.78	2.00	0.00	0.61	0.02	0.00	18.80	2.00	0.00	0.60	0.02	0.00
18.82	2.00	0.00	0.59	0.02	0.00	18.84	2.00	0.00	0.58	0.02	0.00
18.86	2.00	0.00	0.57	0.02	0.00	18.88	2.00	0.00	0.56	0.02	0.00
18.90	2.00	0.00	0.55	0.02	0.00	18.92	2.00	0.00	0.54	0.02	0.00
18.94	2.00	0.00	0.53	0.02	0.00	18.96	2.00	0.00	0.52	0.02	0.00
18.98	2.00	0.00	0.51	0.02	0.00	19.00	2.00	0.00	0.50	0.02	0.00
19.02	2.00	0.00	0.49	0.02	0.00	19.04	2.00	0.00	0.48	0.02	0.00
19.06	2.00	0.00	0.47	0.02	0.00	19.08	2.00	0.00	0.46	0.02	0.00
19.10	2.00	0.00	0.45	0.02	0.00	19.12	2.00	0.00	0.44	0.02	0.00
19.14	2.00	0.00	0.43	0.02	0.00	19.16	2.00	0.00	0.42	0.02	0.00
19.18	2.00	0.00	0.41	0.02	0.00	19.20	2.00	0.00	0.40	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
19.22	2.00	0.00	0.39	0.02	0.00	19.24	2.00	0.00	0.38	0.02	0.00
19.26	2.00	0.00	0.37	0.02	0.00	19.28	2.00	0.00	0.36	0.02	0.00
19.30	2.00	0.00	0.35	0.02	0.00	19.32	2.00	0.00	0.34	0.02	0.00
19.34	2.00	0.00	0.33	0.02	0.00	19.36	2.00	0.00	0.32	0.02	0.00
19.38	2.00	0.00	0.31	0.02	0.00	19.40	2.00	0.00	0.30	0.02	0.00
19.42	2.00	0.00	0.29	0.02	0.00	19.44	2.00	0.00	0.28	0.02	0.00
19.46	2.00	0.00	0.27	0.02	0.00	19.48	2.00	0.00	0.26	0.02	0.00
19.50	2.00	0.00	0.25	0.02	0.00	19.52	2.00	0.00	0.24	0.02	0.00
19.54	2.00	0.00	0.23	0.02	0.00	19.56	2.00	0.00	0.22	0.02	0.00
19.58	2.00	0.00	0.21	0.02	0.00	19.60	2.00	0.00	0.20	0.02	0.00
19.62	2.00	0.00	0.19	0.02	0.00	19.64	2.00	0.00	0.18	0.02	0.00
19.66	2.00	0.00	0.17	0.02	0.00	19.68	2.00	0.00	0.16	0.02	0.00
19.70	2.00	0.00	0.15	0.02	0.00	19.72	2.00	0.00	0.14	0.02	0.00
19.74	2.00	0.00	0.13	0.02	0.00	19.76	2.00	0.00	0.12	0.02	0.00
19.78	2.00	0.00	0.11	0.02	0.00	19.80	2.00	0.00	0.10	0.02	0.00
19.82	2.00	0.00	0.09	0.02	0.00	19.84	2.00	0.00	0.08	0.02	0.00
19.86	2.00	0.00	0.07	0.02	0.00	19.88	2.00	0.00	0.06	0.02	0.00
19.90	2.00	0.00	0.05	0.02	0.00	19.92	2.00	0.00	0.04	0.02	0.00
19.94	2.00	0.00	0.03	0.02	0.00	19.96	2.00	0.00	0.02	0.02	0.00
19.98	2.00	0.00	0.01	0.02	0.00	20.00	2.00	0.00	0.00	0.02	0.00
20.02	2.00	0.00	0.00	0.00	0.00	20.04	2.00	0.00	0.00	0.00	0.00
20.06	2.00	0.00	0.00	0.00	0.00	20.08	2.00	0.00	0.00	0.00	0.00
20.10	2.00	0.00	0.00	0.00	0.00	20.12	2.00	0.00	0.00	0.00	0.00
20.14	2.00	0.00	0.00	0.00	0.00	20.16	2.00	0.00	0.00	0.00	0.00
20.18	2.00	0.00	0.00	0.00	0.00	20.20	2.00	0.00	0.00	0.00	0.00
20.22	2.00	0.00	0.00	0.00	0.00	20.24	2.00	0.00	0.00	0.00	0.00
20.26	2.00	0.00	0.00	0.00	0.00	20.28	2.00	0.00	0.00	0.00	0.00
20.30	2.00	0.00	0.00	0.00	0.00	20.32	2.00	0.00	0.00	0.00	0.00
20.34	2.00	0.00	0.00	0.00	0.00	20.36	2.00	0.00	0.00	0.00	0.00
20.38	2.00	0.00	0.00	0.00	0.00	20.40	2.00	0.00	0.00	0.00	0.00
20.42	2.00	0.00	0.00	0.00	0.00	20.44	2.00	0.00	0.00	0.00	0.00
20.46	2.00	0.00	0.00	0.00	0.00	20.48	2.00	0.00	0.00	0.00	0.00
20.50	2.00	0.00	0.00	0.00	0.00	20.52	2.00	0.00	0.00	0.00	0.00
20.54	2.00	0.00	0.00	0.00	0.00	20.56	2.00	0.00	0.00	0.00	0.00

**Overall liquefaction potential: 1.11**

LPI = 0.00 - Liquefaction risk very low

LPI between 0.00 and 5.00 - Liquefaction risk low

LPI between 5.00 and 15.00 - Liquefaction risk high

LPI &gt; 15.00 - Liquefaction risk very high

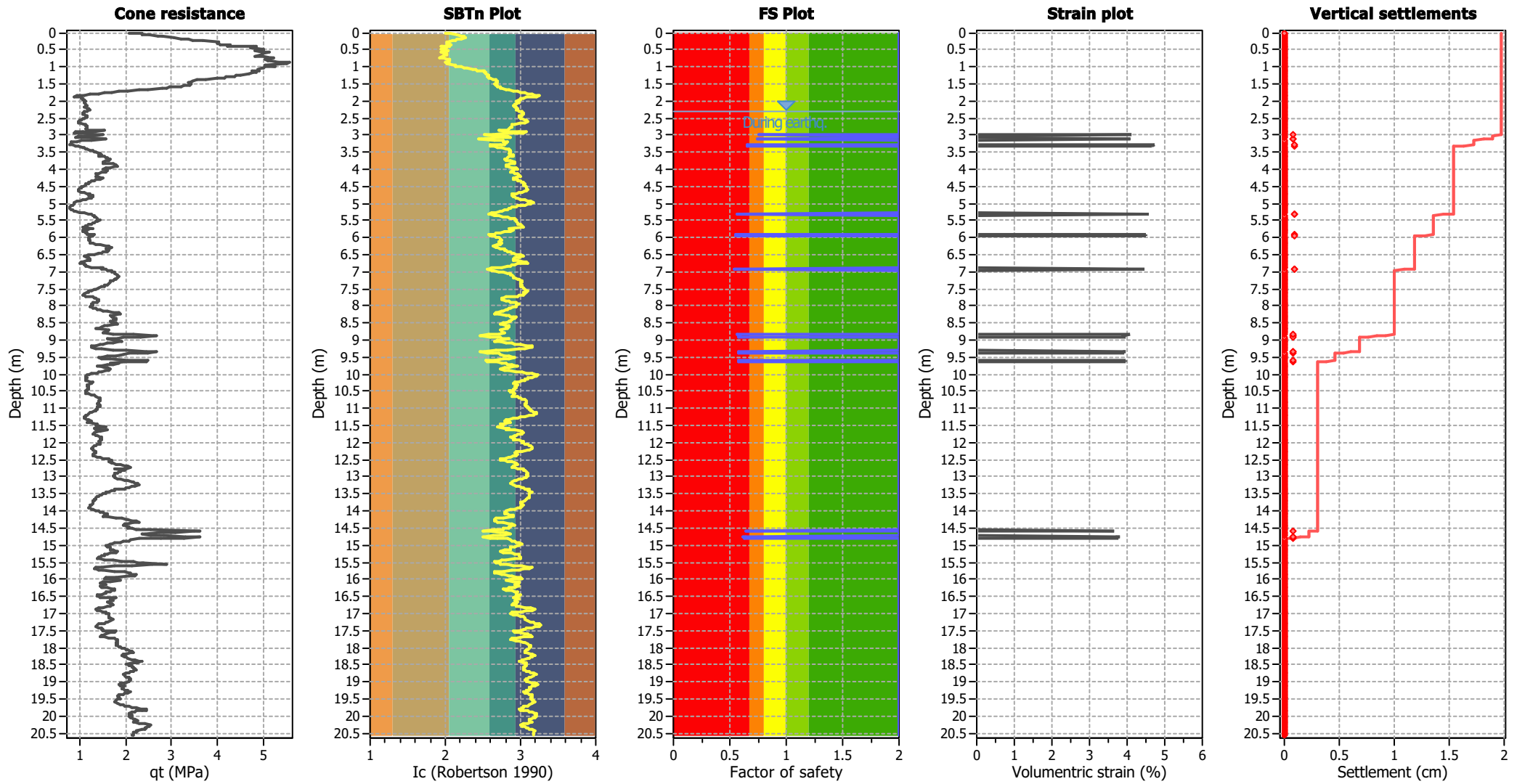
**Abbreviations**

FS: Calculated factor of safety for test point

F<sub>L</sub>: 1 - FSw<sub>z</sub>: Function value of the extend of soil liquefaction according to depthd<sub>z</sub>: Layer thickness (m)

LPI: Liquefaction potential index value for test point

### Estimation of post-earthquake settlements



**Abbreviations**

- q<sub>c</sub>: Total cone resistance (cone resistance q<sub>c</sub> corrected for pore water effects)
- I<sub>c</sub>: Soil Behaviour Type Index
- FS: Calculated Factor of Safety against liquefaction
- Volumetric strain: Post-liquefaction volumetric strain

## LIQUEFACTION ANALYSIS REPORT

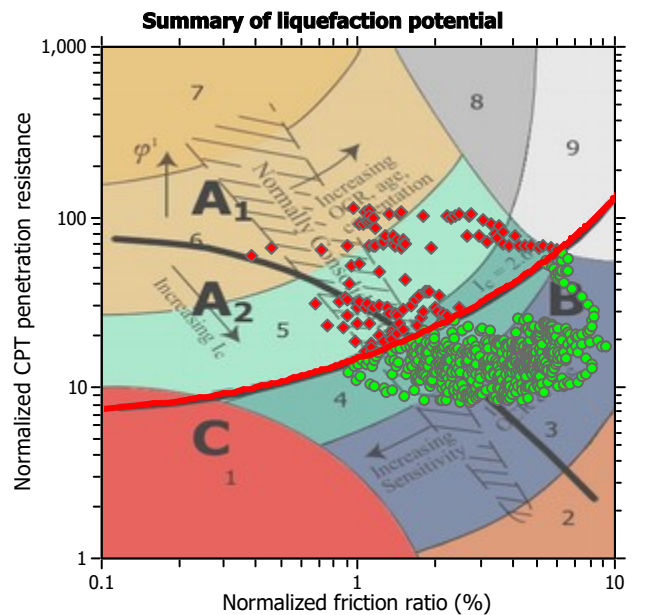
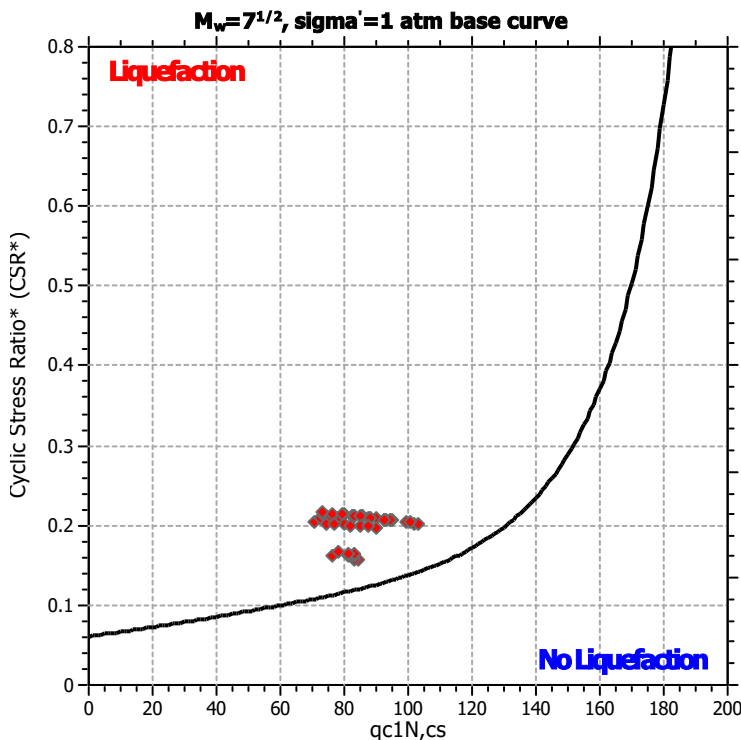
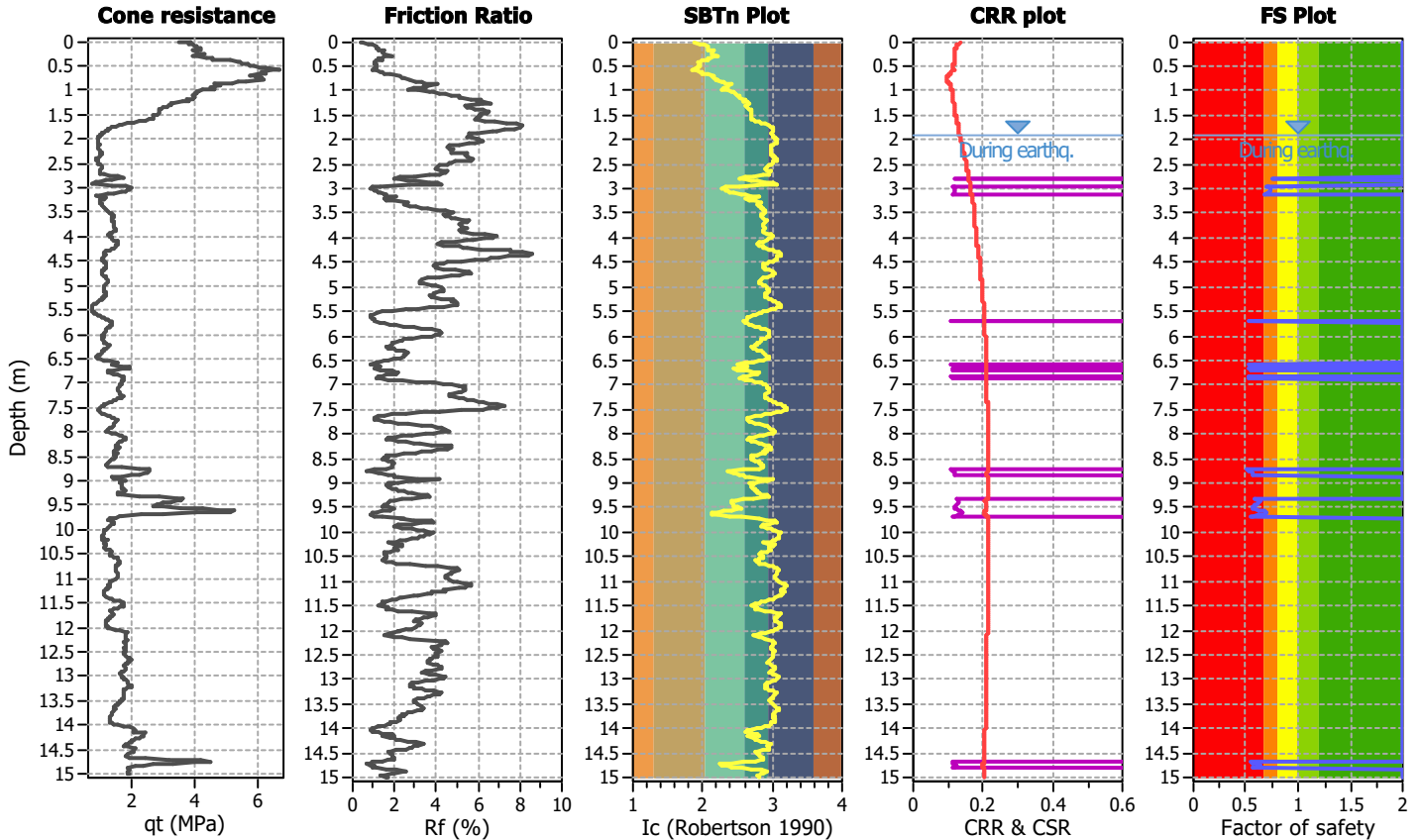
**Project title :**

**Location :**

**CPT file : cptu6**

### Input parameters and analysis data

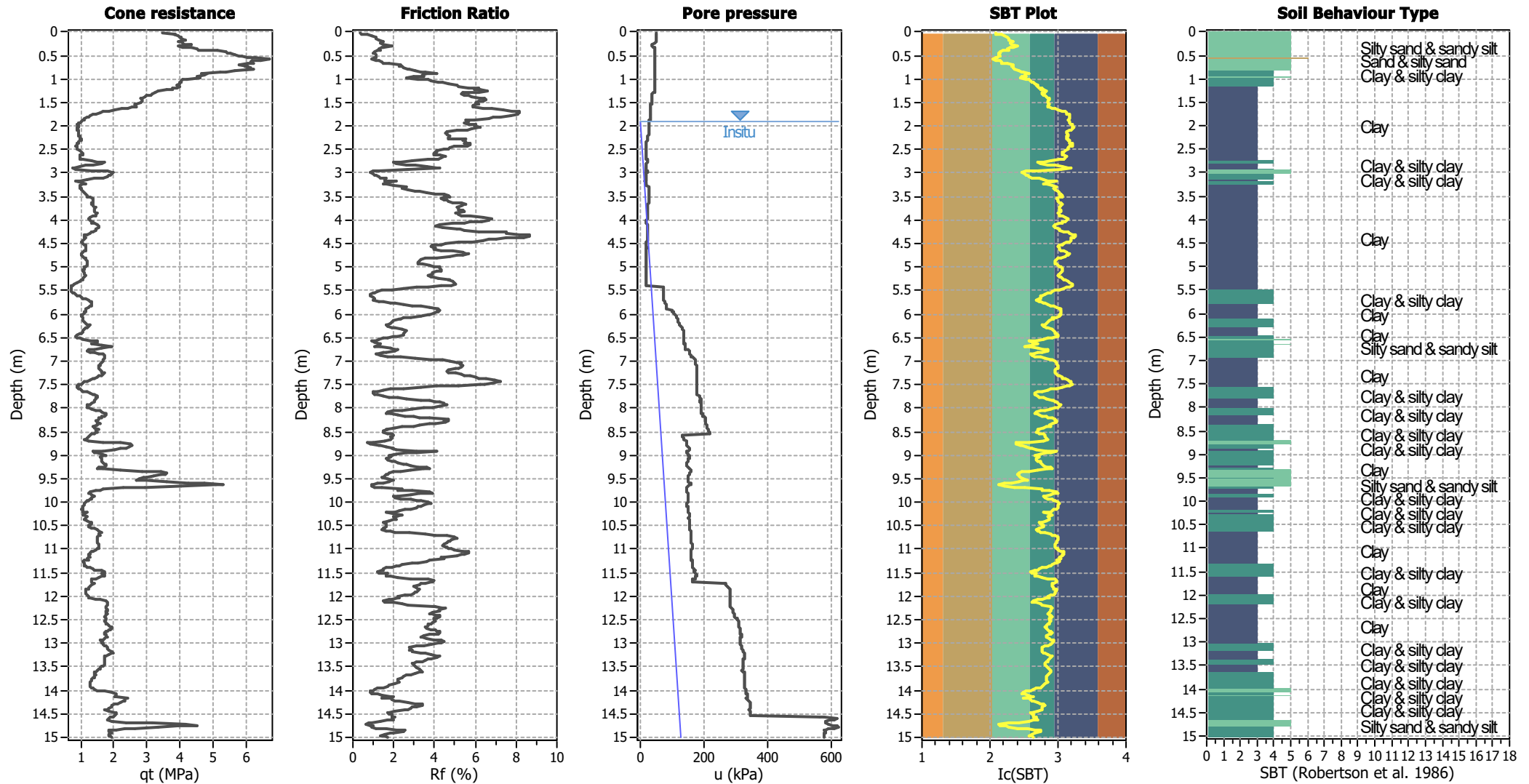
Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.90 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.90 m	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude $M_w$ :	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.25	Unit weight calculation:	Based on SBT	$K_\sigma$ applied:	Yes	MSF method:	Method based



Zone A<sub>1</sub>: Cyclic liquefaction likely depending on size and duration of cyclic loading  
 Zone A<sub>2</sub>: Cyclic liquefaction and strength loss likely depending on loading and ground geometry  
 Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening  
 Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry



## CPT basic interpretation plots



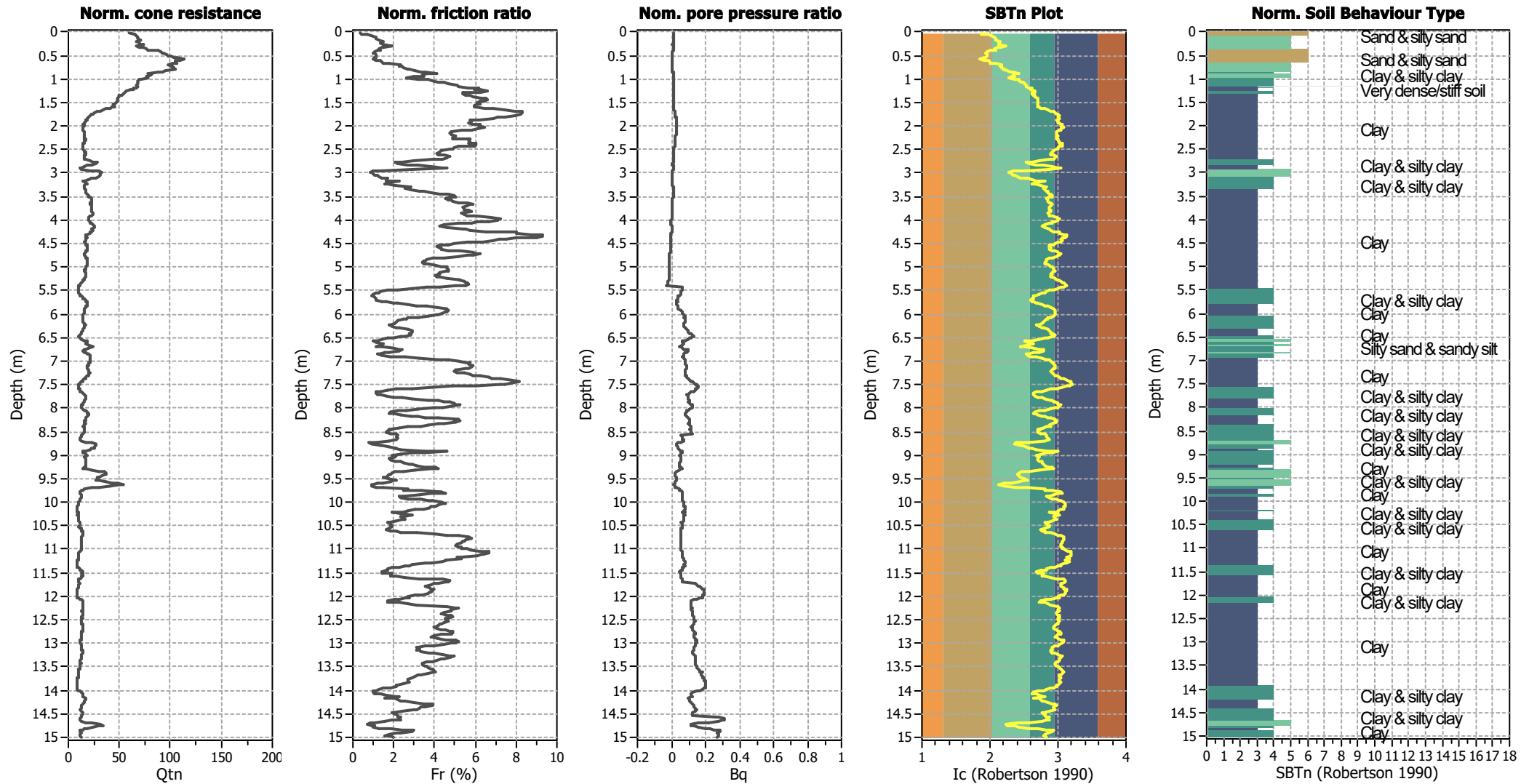
## Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.90 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>0</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.90 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

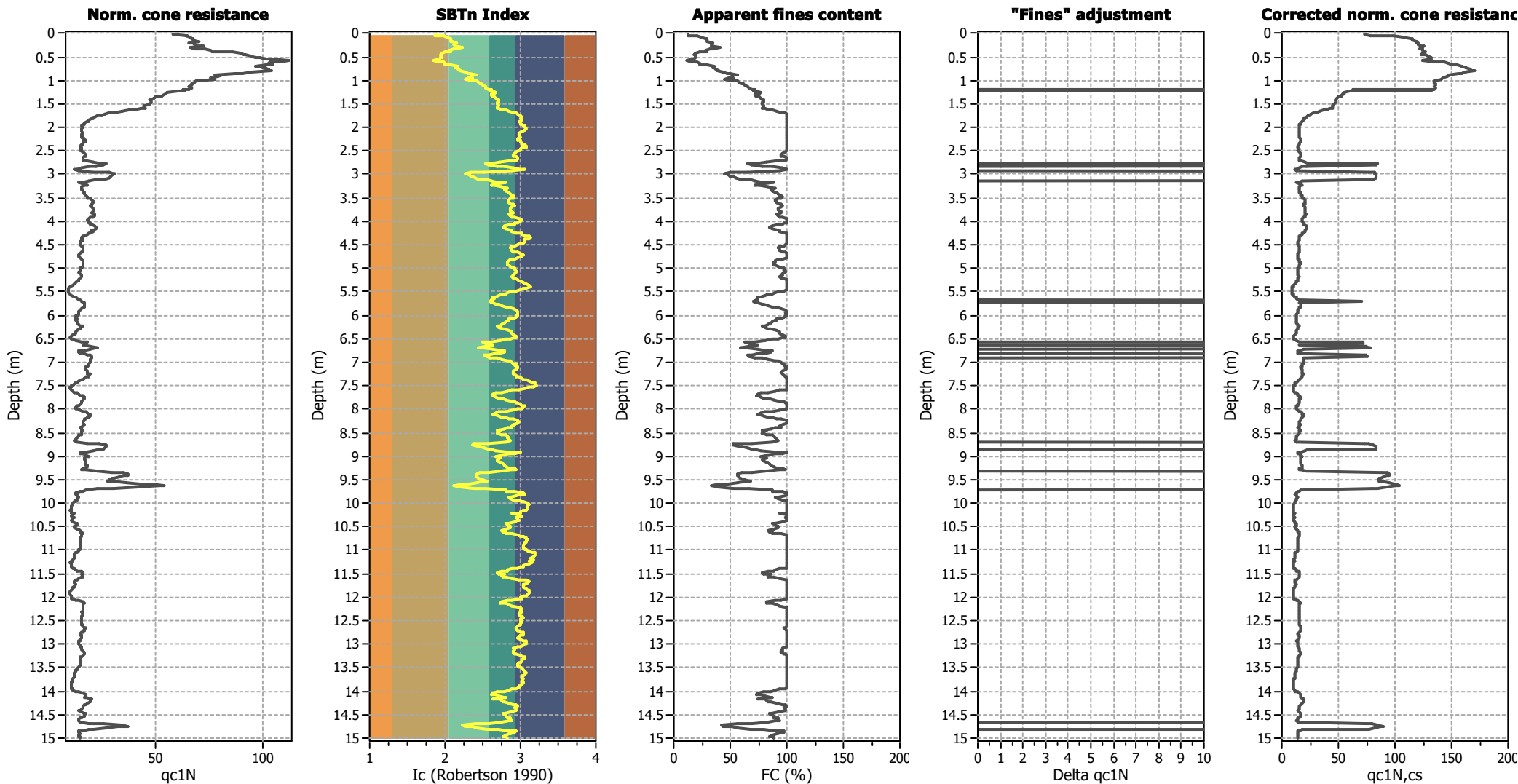
## CPT basic interpretation plots (normalized)



## Input parameters and analysis data

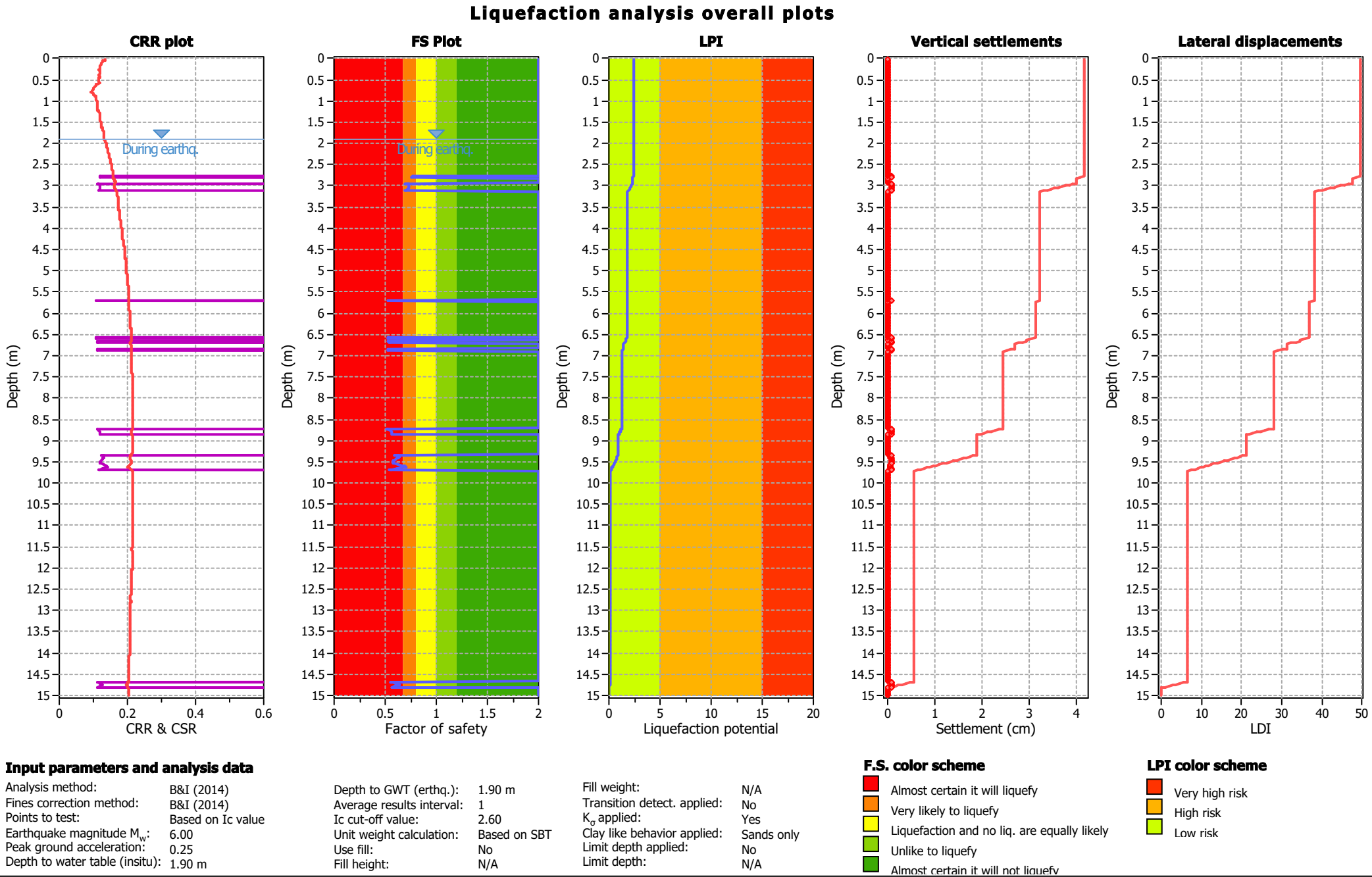
Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.90 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	$K_0$ applied:	Yes
Earthquake magnitude $M_w$ :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.90 m	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots (intermediate results)

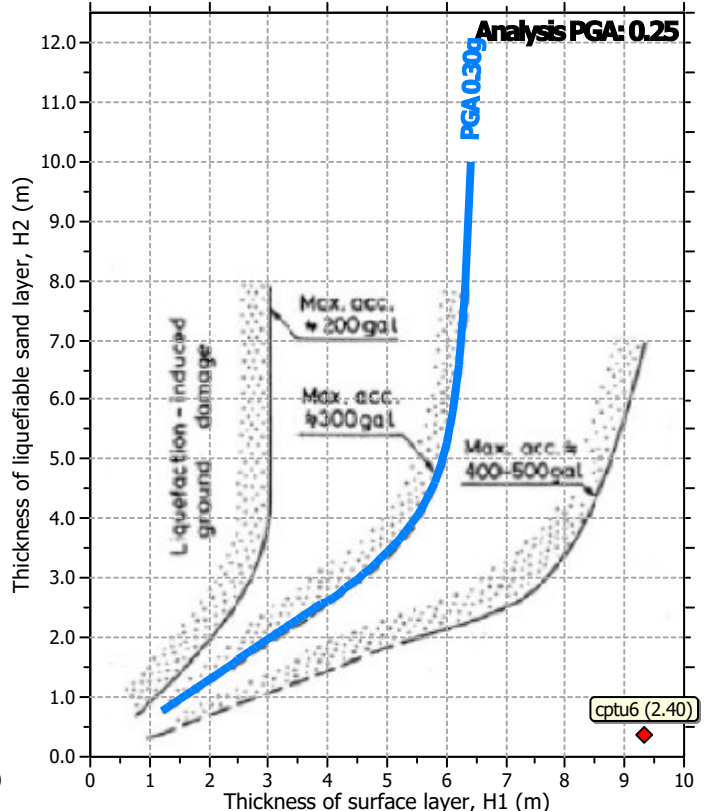
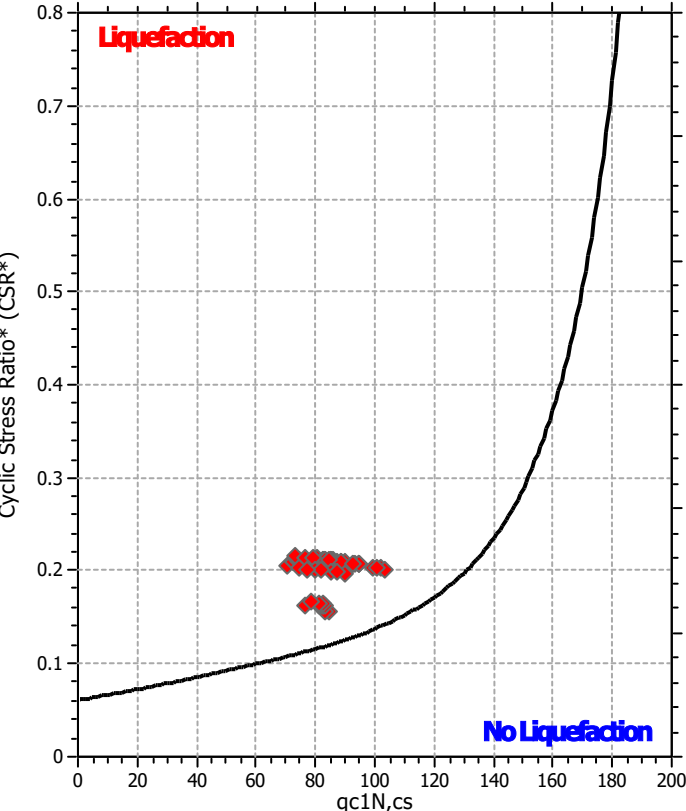
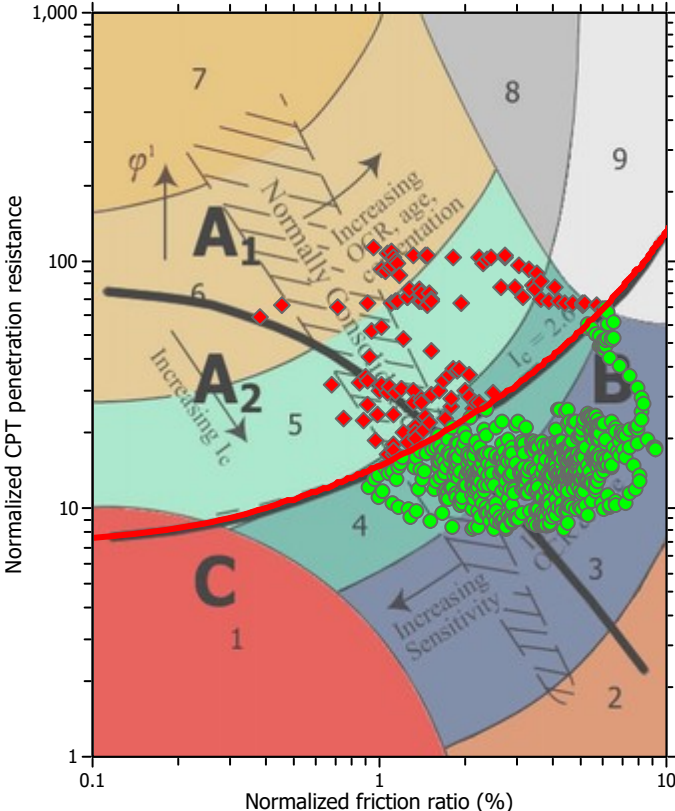


Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.90 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>g</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.90 m	Fill height:	N/A	Limit depth:	N/A



### Liquefaction analysis summary plots

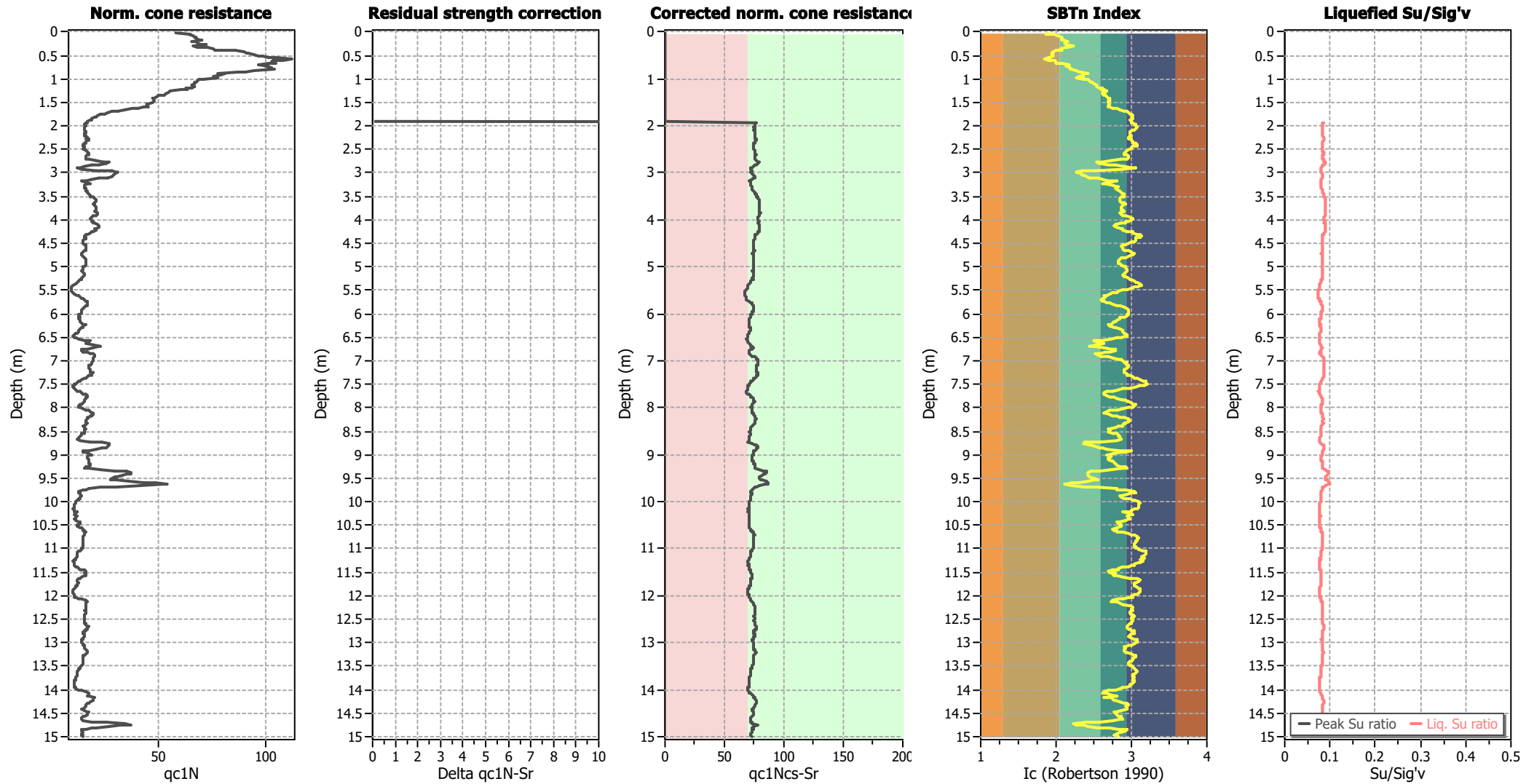


#### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.90 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on $I_c$ value	$I_c$ cut-off value:	2.60	$K_{\phi}$ applied:	Yes
Earthquake magnitude $M_w$ :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.90 m	Fill height:	N/A	Limit depth:	N/A



## Check for strength loss plots (Idriss & Boulanger (2008))



### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.90 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on $I_c$ value	$I_c$ cut-off value:	2.60	$K_\sigma$ applied:	Yes
Earthquake magnitude $M_w$ :	6.00	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.25	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.90 m	Fill height:	N/A	Limit depth:	N/A

:: Liquefaction Potential Index calculation data ::											
Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
0.02	2.00	0.00	9.99	0.02	0.00	0.04	2.00	0.00	9.98	0.02	0.00
0.06	2.00	0.00	9.97	0.02	0.00	0.08	2.00	0.00	9.96	0.02	0.00
0.10	2.00	0.00	9.95	0.02	0.00	0.12	2.00	0.00	9.94	0.02	0.00
0.14	2.00	0.00	9.93	0.02	0.00	0.16	2.00	0.00	9.92	0.02	0.00
0.18	2.00	0.00	9.91	0.02	0.00	0.20	2.00	0.00	9.90	0.02	0.00
0.22	2.00	0.00	9.89	0.02	0.00	0.24	2.00	0.00	9.88	0.02	0.00
0.26	2.00	0.00	9.87	0.02	0.00	0.28	2.00	0.00	9.86	0.02	0.00
0.30	2.00	0.00	9.85	0.02	0.00	0.32	2.00	0.00	9.84	0.02	0.00
0.34	2.00	0.00	9.83	0.02	0.00	0.36	2.00	0.00	9.82	0.02	0.00
0.38	2.00	0.00	9.81	0.02	0.00	0.40	2.00	0.00	9.80	0.02	0.00
0.42	2.00	0.00	9.79	0.02	0.00	0.44	2.00	0.00	9.78	0.02	0.00
0.46	2.00	0.00	9.77	0.02	0.00	0.48	2.00	0.00	9.76	0.02	0.00
0.50	2.00	0.00	9.75	0.02	0.00	0.52	2.00	0.00	9.74	0.02	0.00
0.54	2.00	0.00	9.73	0.02	0.00	0.56	2.00	0.00	9.72	0.02	0.00
0.58	2.00	0.00	9.71	0.02	0.00	0.60	2.00	0.00	9.70	0.02	0.00
0.62	2.00	0.00	9.69	0.02	0.00	0.64	2.00	0.00	9.68	0.02	0.00
0.66	2.00	0.00	9.67	0.02	0.00	0.68	2.00	0.00	9.66	0.02	0.00
0.70	2.00	0.00	9.65	0.02	0.00	0.72	2.00	0.00	9.64	0.02	0.00
0.74	2.00	0.00	9.63	0.02	0.00	0.76	2.00	0.00	9.62	0.02	0.00
0.78	2.00	0.00	9.61	0.02	0.00	0.80	2.00	0.00	9.60	0.02	0.00
0.82	2.00	0.00	9.59	0.02	0.00	0.84	2.00	0.00	9.58	0.02	0.00
0.86	2.00	0.00	9.57	0.02	0.00	0.88	2.00	0.00	9.56	0.02	0.00
0.90	2.00	0.00	9.55	0.02	0.00	0.92	2.00	0.00	9.54	0.02	0.00
0.94	2.00	0.00	9.53	0.02	0.00	0.96	2.00	0.00	9.52	0.02	0.00
0.98	2.00	0.00	9.51	0.02	0.00	1.00	2.00	0.00	9.50	0.02	0.00
1.02	2.00	0.00	9.49	0.02	0.00	1.04	2.00	0.00	9.48	0.02	0.00
1.06	2.00	0.00	9.47	0.02	0.00	1.08	2.00	0.00	9.46	0.02	0.00
1.10	2.00	0.00	9.45	0.02	0.00	1.12	2.00	0.00	9.44	0.02	0.00
1.14	2.00	0.00	9.43	0.02	0.00	1.16	2.00	0.00	9.42	0.02	0.00
1.18	2.00	0.00	9.41	0.02	0.00	1.20	2.00	0.00	9.40	0.02	0.00
1.22	2.00	0.00	9.39	0.02	0.00	1.24	2.00	0.00	9.38	0.02	0.00
1.26	2.00	0.00	9.37	0.02	0.00	1.28	2.00	0.00	9.36	0.02	0.00
1.30	2.00	0.00	9.35	0.02	0.00	1.32	2.00	0.00	9.34	0.02	0.00
1.34	2.00	0.00	9.33	0.02	0.00	1.36	2.00	0.00	9.32	0.02	0.00
1.38	2.00	0.00	9.31	0.02	0.00	1.40	2.00	0.00	9.30	0.02	0.00
1.42	2.00	0.00	9.29	0.02	0.00	1.44	2.00	0.00	9.28	0.02	0.00
1.46	2.00	0.00	9.27	0.02	0.00	1.48	2.00	0.00	9.26	0.02	0.00
1.50	2.00	0.00	9.25	0.02	0.00	1.52	2.00	0.00	9.24	0.02	0.00
1.54	2.00	0.00	9.23	0.02	0.00	1.56	2.00	0.00	9.22	0.02	0.00
1.58	2.00	0.00	9.21	0.02	0.00	1.60	2.00	0.00	9.20	0.02	0.00
1.62	2.00	0.00	9.19	0.02	0.00	1.64	2.00	0.00	9.18	0.02	0.00
1.66	2.00	0.00	9.17	0.02	0.00	1.68	2.00	0.00	9.16	0.02	0.00
1.70	2.00	0.00	9.15	0.02	0.00	1.72	2.00	0.00	9.14	0.02	0.00
1.74	2.00	0.00	9.13	0.02	0.00	1.76	2.00	0.00	9.12	0.02	0.00
1.78	2.00	0.00	9.11	0.02	0.00	1.80	2.00	0.00	9.10	0.02	0.00
1.82	2.00	0.00	9.09	0.02	0.00	1.84	2.00	0.00	9.08	0.02	0.00
1.86	2.00	0.00	9.07	0.02	0.00	1.88	2.00	0.00	9.06	0.02	0.00
1.90	2.00	0.00	9.05	0.02	0.00	1.92	2.00	0.00	9.04	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
1.94	2.00	0.00	9.03	0.02	0.00	1.96	2.00	0.00	9.02	0.02	0.00
1.98	2.00	0.00	9.01	0.02	0.00	2.00	2.00	0.00	9.00	0.02	0.00
2.02	2.00	0.00	8.99	0.02	0.00	2.04	2.00	0.00	8.98	0.02	0.00
2.06	2.00	0.00	8.97	0.02	0.00	2.08	2.00	0.00	8.96	0.02	0.00
2.10	2.00	0.00	8.95	0.02	0.00	2.12	2.00	0.00	8.94	0.02	0.00
2.14	2.00	0.00	8.93	0.02	0.00	2.16	2.00	0.00	8.92	0.02	0.00
2.18	2.00	0.00	8.91	0.02	0.00	2.20	2.00	0.00	8.90	0.02	0.00
2.22	2.00	0.00	8.89	0.02	0.00	2.24	2.00	0.00	8.88	0.02	0.00
2.26	2.00	0.00	8.87	0.02	0.00	2.28	2.00	0.00	8.86	0.02	0.00
2.30	2.00	0.00	8.85	0.02	0.00	2.32	2.00	0.00	8.84	0.02	0.00
2.34	2.00	0.00	8.83	0.02	0.00	2.36	2.00	0.00	8.82	0.02	0.00
2.38	2.00	0.00	8.81	0.02	0.00	2.40	2.00	0.00	8.80	0.02	0.00
2.42	2.00	0.00	8.79	0.02	0.00	2.44	2.00	0.00	8.78	0.02	0.00
2.46	2.00	0.00	8.77	0.02	0.00	2.48	2.00	0.00	8.76	0.02	0.00
2.50	2.00	0.00	8.75	0.02	0.00	2.52	2.00	0.00	8.74	0.02	0.00
2.54	2.00	0.00	8.73	0.02	0.00	2.56	2.00	0.00	8.72	0.02	0.00
2.58	2.00	0.00	8.71	0.02	0.00	2.60	2.00	0.00	8.70	0.02	0.00
2.62	2.00	0.00	8.69	0.02	0.00	2.64	2.00	0.00	8.68	0.02	0.00
2.66	2.00	0.00	8.67	0.02	0.00	2.68	2.00	0.00	8.66	0.02	0.00
2.70	2.00	0.00	8.65	0.02	0.00	2.72	2.00	0.00	8.64	0.02	0.00
2.74	2.00	0.00	8.63	0.02	0.00	2.76	2.00	0.00	8.62	0.02	0.00
2.78	0.77	0.23	8.61	0.02	0.04	2.80	0.76	0.24	8.60	0.02	0.04
2.82	2.00	0.00	8.59	0.02	0.00	2.84	2.00	0.00	8.58	0.02	0.00
2.86	2.00	0.00	8.57	0.02	0.00	2.88	2.00	0.00	8.56	0.02	0.00
2.90	2.00	0.00	8.55	0.02	0.00	2.92	2.00	0.00	8.54	0.02	0.00
2.94	0.69	0.31	8.53	0.02	0.05	2.96	0.73	0.27	8.52	0.02	0.05
2.98	0.73	0.27	8.51	0.02	0.05	3.00	0.73	0.27	8.50	0.02	0.05
3.02	0.73	0.27	8.49	0.02	0.05	3.04	0.73	0.27	8.48	0.02	0.05
3.06	0.73	0.27	8.47	0.02	0.05	3.08	0.72	0.28	8.46	0.02	0.05
3.10	0.71	0.29	8.45	0.02	0.05	3.12	0.69	0.31	8.44	0.02	0.05
3.14	2.00	0.00	8.43	0.02	0.00	3.16	2.00	0.00	8.42	0.02	0.00
3.18	2.00	0.00	8.41	0.02	0.00	3.20	2.00	0.00	8.40	0.02	0.00
3.22	2.00	0.00	8.39	0.02	0.00	3.24	2.00	0.00	8.38	0.02	0.00
3.26	2.00	0.00	8.37	0.02	0.00	3.28	2.00	0.00	8.36	0.02	0.00
3.30	2.00	0.00	8.35	0.02	0.00	3.32	2.00	0.00	8.34	0.02	0.00
3.34	2.00	0.00	8.33	0.02	0.00	3.36	2.00	0.00	8.32	0.02	0.00
3.38	2.00	0.00	8.31	0.02	0.00	3.40	2.00	0.00	8.30	0.02	0.00
3.42	2.00	0.00	8.29	0.02	0.00	3.44	2.00	0.00	8.28	0.02	0.00
3.46	2.00	0.00	8.27	0.02	0.00	3.48	2.00	0.00	8.26	0.02	0.00
3.50	2.00	0.00	8.25	0.02	0.00	3.52	2.00	0.00	8.24	0.02	0.00
3.54	2.00	0.00	8.23	0.02	0.00	3.56	2.00	0.00	8.22	0.02	0.00
3.58	2.00	0.00	8.21	0.02	0.00	3.60	2.00	0.00	8.20	0.02	0.00
3.62	2.00	0.00	8.19	0.02	0.00	3.64	2.00	0.00	8.18	0.02	0.00
3.66	2.00	0.00	8.17	0.02	0.00	3.68	2.00	0.00	8.16	0.02	0.00
3.70	2.00	0.00	8.15	0.02	0.00	3.72	2.00	0.00	8.14	0.02	0.00
3.74	2.00	0.00	8.13	0.02	0.00	3.76	2.00	0.00	8.12	0.02	0.00
3.78	2.00	0.00	8.11	0.02	0.00	3.80	2.00	0.00	8.10	0.02	0.00
3.82	2.00	0.00	8.09	0.02	0.00	3.84	2.00	0.00	8.08	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
3.86	2.00	0.00	8.07	0.02	0.00	3.88	2.00	0.00	8.06	0.02	0.00
3.90	2.00	0.00	8.05	0.02	0.00	3.92	2.00	0.00	8.04	0.02	0.00
3.94	2.00	0.00	8.03	0.02	0.00	3.96	2.00	0.00	8.02	0.02	0.00
3.98	2.00	0.00	8.01	0.02	0.00	4.00	2.00	0.00	8.00	0.02	0.00
4.02	2.00	0.00	7.99	0.02	0.00	4.04	2.00	0.00	7.98	0.02	0.00
4.06	2.00	0.00	7.97	0.02	0.00	4.08	2.00	0.00	7.96	0.02	0.00
4.10	2.00	0.00	7.95	0.02	0.00	4.12	2.00	0.00	7.94	0.02	0.00
4.14	2.00	0.00	7.93	0.02	0.00	4.16	2.00	0.00	7.92	0.02	0.00
4.18	2.00	0.00	7.91	0.02	0.00	4.20	2.00	0.00	7.90	0.02	0.00
4.22	2.00	0.00	7.89	0.02	0.00	4.24	2.00	0.00	7.88	0.02	0.00
4.26	2.00	0.00	7.87	0.02	0.00	4.28	2.00	0.00	7.86	0.02	0.00
4.30	2.00	0.00	7.85	0.02	0.00	4.32	2.00	0.00	7.84	0.02	0.00
4.34	2.00	0.00	7.83	0.02	0.00	4.36	2.00	0.00	7.82	0.02	0.00
4.38	2.00	0.00	7.81	0.02	0.00	4.40	2.00	0.00	7.80	0.02	0.00
4.42	2.00	0.00	7.79	0.02	0.00	4.44	2.00	0.00	7.78	0.02	0.00
4.46	2.00	0.00	7.77	0.02	0.00	4.48	2.00	0.00	7.76	0.02	0.00
4.50	2.00	0.00	7.75	0.02	0.00	4.52	2.00	0.00	7.74	0.02	0.00
4.54	2.00	0.00	7.73	0.02	0.00	4.56	2.00	0.00	7.72	0.02	0.00
4.58	2.00	0.00	7.71	0.02	0.00	4.60	2.00	0.00	7.70	0.02	0.00
4.62	2.00	0.00	7.69	0.02	0.00	4.64	2.00	0.00	7.68	0.02	0.00
4.66	2.00	0.00	7.67	0.02	0.00	4.68	2.00	0.00	7.66	0.02	0.00
4.70	2.00	0.00	7.65	0.02	0.00	4.72	2.00	0.00	7.64	0.02	0.00
4.74	2.00	0.00	7.63	0.02	0.00	4.76	2.00	0.00	7.62	0.02	0.00
4.78	2.00	0.00	7.61	0.02	0.00	4.80	2.00	0.00	7.60	0.02	0.00
4.82	2.00	0.00	7.59	0.02	0.00	4.84	2.00	0.00	7.58	0.02	0.00
4.86	2.00	0.00	7.57	0.02	0.00	4.88	2.00	0.00	7.56	0.02	0.00
4.90	2.00	0.00	7.55	0.02	0.00	4.92	2.00	0.00	7.54	0.02	0.00
4.94	2.00	0.00	7.53	0.02	0.00	4.96	2.00	0.00	7.52	0.02	0.00
4.98	2.00	0.00	7.51	0.02	0.00	5.00	2.00	0.00	7.50	0.02	0.00
5.02	2.00	0.00	7.49	0.02	0.00	5.04	2.00	0.00	7.48	0.02	0.00
5.06	2.00	0.00	7.47	0.02	0.00	5.08	2.00	0.00	7.46	0.02	0.00
5.10	2.00	0.00	7.45	0.02	0.00	5.12	2.00	0.00	7.44	0.02	0.00
5.14	2.00	0.00	7.43	0.02	0.00	5.16	2.00	0.00	7.42	0.02	0.00
5.18	2.00	0.00	7.41	0.02	0.00	5.20	2.00	0.00	7.40	0.02	0.00
5.22	2.00	0.00	7.39	0.02	0.00	5.24	2.00	0.00	7.38	0.02	0.00
5.26	2.00	0.00	7.37	0.02	0.00	5.28	2.00	0.00	7.36	0.02	0.00
5.30	2.00	0.00	7.35	0.02	0.00	5.32	2.00	0.00	7.34	0.02	0.00
5.34	2.00	0.00	7.33	0.02	0.00	5.36	2.00	0.00	7.32	0.02	0.00
5.38	2.00	0.00	7.31	0.02	0.00	5.40	2.00	0.00	7.30	0.02	0.00
5.42	2.00	0.00	7.29	0.02	0.00	5.44	2.00	0.00	7.28	0.02	0.00
5.46	2.00	0.00	7.27	0.02	0.00	5.48	2.00	0.00	7.26	0.02	0.00
5.50	2.00	0.00	7.25	0.02	0.00	5.52	2.00	0.00	7.24	0.02	0.00
5.54	2.00	0.00	7.23	0.02	0.00	5.56	2.00	0.00	7.22	0.02	0.00
5.58	2.00	0.00	7.21	0.02	0.00	5.60	2.00	0.00	7.20	0.02	0.00
5.62	2.00	0.00	7.19	0.02	0.00	5.64	2.00	0.00	7.18	0.02	0.00
5.66	2.00	0.00	7.17	0.02	0.00	5.68	2.00	0.00	7.16	0.02	0.00
5.70	0.53	0.47	7.15	0.02	0.07	5.72	2.00	0.00	7.14	0.02	0.00
5.74	2.00	0.00	7.13	0.02	0.00	5.76	2.00	0.00	7.12	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
5.78	2.00	0.00	7.11	0.02	0.00	5.80	2.00	0.00	7.10	0.02	0.00
5.82	2.00	0.00	7.09	0.02	0.00	5.84	2.00	0.00	7.08	0.02	0.00
5.86	2.00	0.00	7.07	0.02	0.00	5.88	2.00	0.00	7.06	0.02	0.00
5.90	2.00	0.00	7.05	0.02	0.00	5.92	2.00	0.00	7.04	0.02	0.00
5.94	2.00	0.00	7.03	0.02	0.00	5.96	2.00	0.00	7.02	0.02	0.00
5.98	2.00	0.00	7.01	0.02	0.00	6.00	2.00	0.00	7.00	0.02	0.00
6.02	2.00	0.00	6.99	0.02	0.00	6.04	2.00	0.00	6.98	0.02	0.00
6.06	2.00	0.00	6.97	0.02	0.00	6.08	2.00	0.00	6.96	0.02	0.00
6.10	2.00	0.00	6.95	0.02	0.00	6.12	2.00	0.00	6.94	0.02	0.00
6.14	2.00	0.00	6.93	0.02	0.00	6.16	2.00	0.00	6.92	0.02	0.00
6.18	2.00	0.00	6.91	0.02	0.00	6.20	2.00	0.00	6.90	0.02	0.00
6.22	2.00	0.00	6.89	0.02	0.00	6.24	2.00	0.00	6.88	0.02	0.00
6.26	2.00	0.00	6.87	0.02	0.00	6.28	2.00	0.00	6.86	0.02	0.00
6.30	2.00	0.00	6.85	0.02	0.00	6.32	2.00	0.00	6.84	0.02	0.00
6.34	2.00	0.00	6.83	0.02	0.00	6.36	2.00	0.00	6.82	0.02	0.00
6.38	2.00	0.00	6.81	0.02	0.00	6.40	2.00	0.00	6.80	0.02	0.00
6.42	2.00	0.00	6.79	0.02	0.00	6.44	2.00	0.00	6.78	0.02	0.00
6.46	2.00	0.00	6.77	0.02	0.00	6.48	2.00	0.00	6.76	0.02	0.00
6.50	2.00	0.00	6.75	0.02	0.00	6.52	2.00	0.00	6.74	0.02	0.00
6.54	2.00	0.00	6.73	0.02	0.00	6.56	2.00	0.00	6.72	0.02	0.00
6.58	0.52	0.48	6.71	0.02	0.06	6.60	0.52	0.48	6.70	0.02	0.06
6.62	2.00	0.00	6.69	0.02	0.00	6.64	2.00	0.00	6.68	0.02	0.00
6.66	0.53	0.47	6.67	0.02	0.06	6.68	0.54	0.46	6.66	0.02	0.06
6.70	0.55	0.45	6.65	0.02	0.06	6.72	2.00	0.00	6.64	0.02	0.00
6.74	2.00	0.00	6.63	0.02	0.00	6.76	2.00	0.00	6.62	0.02	0.00
6.78	2.00	0.00	6.61	0.02	0.00	6.80	2.00	0.00	6.60	0.02	0.00
6.82	2.00	0.00	6.59	0.02	0.00	6.84	0.52	0.48	6.58	0.02	0.06
6.86	0.53	0.47	6.57	0.02	0.06	6.88	0.53	0.47	6.56	0.02	0.06
6.90	2.00	0.00	6.55	0.02	0.00	6.92	2.00	0.00	6.54	0.02	0.00
6.94	2.00	0.00	6.53	0.02	0.00	6.96	2.00	0.00	6.52	0.02	0.00
6.98	2.00	0.00	6.51	0.02	0.00	7.00	2.00	0.00	6.50	0.02	0.00
7.02	2.00	0.00	6.49	0.02	0.00	7.04	2.00	0.00	6.48	0.02	0.00
7.06	2.00	0.00	6.47	0.02	0.00	7.08	2.00	0.00	6.46	0.02	0.00
7.10	2.00	0.00	6.45	0.02	0.00	7.12	2.00	0.00	6.44	0.02	0.00
7.14	2.00	0.00	6.43	0.02	0.00	7.16	2.00	0.00	6.42	0.02	0.00
7.18	2.00	0.00	6.41	0.02	0.00	7.20	2.00	0.00	6.40	0.02	0.00
7.22	2.00	0.00	6.39	0.02	0.00	7.24	2.00	0.00	6.38	0.02	0.00
7.26	2.00	0.00	6.37	0.02	0.00	7.28	2.00	0.00	6.36	0.02	0.00
7.30	2.00	0.00	6.35	0.02	0.00	7.32	2.00	0.00	6.34	0.02	0.00
7.34	2.00	0.00	6.33	0.02	0.00	7.36	2.00	0.00	6.32	0.02	0.00
7.38	2.00	0.00	6.31	0.02	0.00	7.40	2.00	0.00	6.30	0.02	0.00
7.42	2.00	0.00	6.29	0.02	0.00	7.44	2.00	0.00	6.28	0.02	0.00
7.46	2.00	0.00	6.27	0.02	0.00	7.48	2.00	0.00	6.26	0.02	0.00
7.50	2.00	0.00	6.25	0.02	0.00	7.52	2.00	0.00	6.24	0.02	0.00
7.54	2.00	0.00	6.23	0.02	0.00	7.56	2.00	0.00	6.22	0.02	0.00
7.58	2.00	0.00	6.21	0.02	0.00	7.60	2.00	0.00	6.20	0.02	0.00
7.62	2.00	0.00	6.19	0.02	0.00	7.64	2.00	0.00	6.18	0.02	0.00
7.66	2.00	0.00	6.17	0.02	0.00	7.68	2.00	0.00	6.16	0.02	0.00



**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
7.70	2.00	0.00	6.15	0.02	0.00	7.72	2.00	0.00	6.14	0.02	0.00
7.74	2.00	0.00	6.13	0.02	0.00	7.76	2.00	0.00	6.12	0.02	0.00
7.78	2.00	0.00	6.11	0.02	0.00	7.80	2.00	0.00	6.10	0.02	0.00
7.82	2.00	0.00	6.09	0.02	0.00	7.84	2.00	0.00	6.08	0.02	0.00
7.86	2.00	0.00	6.07	0.02	0.00	7.88	2.00	0.00	6.06	0.02	0.00
7.90	2.00	0.00	6.05	0.02	0.00	7.92	2.00	0.00	6.04	0.02	0.00
7.94	2.00	0.00	6.03	0.02	0.00	7.96	2.00	0.00	6.02	0.02	0.00
7.98	2.00	0.00	6.01	0.02	0.00	8.00	2.00	0.00	6.00	0.02	0.00
8.02	2.00	0.00	5.99	0.02	0.00	8.04	2.00	0.00	5.98	0.02	0.00
8.06	2.00	0.00	5.97	0.02	0.00	8.08	2.00	0.00	5.96	0.02	0.00
8.10	2.00	0.00	5.95	0.02	0.00	8.12	2.00	0.00	5.94	0.02	0.00
8.14	2.00	0.00	5.93	0.02	0.00	8.16	2.00	0.00	5.92	0.02	0.00
8.18	2.00	0.00	5.91	0.02	0.00	8.20	2.00	0.00	5.90	0.02	0.00
8.22	2.00	0.00	5.89	0.02	0.00	8.24	2.00	0.00	5.88	0.02	0.00
8.26	2.00	0.00	5.87	0.02	0.00	8.28	2.00	0.00	5.86	0.02	0.00
8.30	2.00	0.00	5.85	0.02	0.00	8.32	2.00	0.00	5.84	0.02	0.00
8.34	2.00	0.00	5.83	0.02	0.00	8.36	2.00	0.00	5.82	0.02	0.00
8.38	2.00	0.00	5.81	0.02	0.00	8.40	2.00	0.00	5.80	0.02	0.00
8.42	2.00	0.00	5.79	0.02	0.00	8.44	2.00	0.00	5.78	0.02	0.00
8.46	2.00	0.00	5.77	0.02	0.00	8.48	2.00	0.00	5.76	0.02	0.00
8.50	2.00	0.00	5.75	0.02	0.00	8.52	2.00	0.00	5.74	0.02	0.00
8.54	2.00	0.00	5.73	0.02	0.00	8.56	2.00	0.00	5.72	0.02	0.00
8.58	2.00	0.00	5.71	0.02	0.00	8.60	2.00	0.00	5.70	0.02	0.00
8.62	2.00	0.00	5.69	0.02	0.00	8.64	2.00	0.00	5.68	0.02	0.00
8.66	2.00	0.00	5.67	0.02	0.00	8.68	2.00	0.00	5.66	0.02	0.00
8.70	2.00	0.00	5.65	0.02	0.00	8.72	0.51	0.49	5.64	0.02	0.06
8.74	0.53	0.47	5.63	0.02	0.05	8.76	0.55	0.45	5.62	0.02	0.05
8.78	0.56	0.44	5.61	0.02	0.05	8.80	0.56	0.44	5.60	0.02	0.05
8.82	0.56	0.44	5.59	0.02	0.05	8.84	0.56	0.44	5.58	0.02	0.05
8.86	2.00	0.00	5.57	0.02	0.00	8.88	2.00	0.00	5.56	0.02	0.00
8.90	2.00	0.00	5.55	0.02	0.00	8.92	2.00	0.00	5.54	0.02	0.00
8.94	2.00	0.00	5.53	0.02	0.00	8.96	2.00	0.00	5.52	0.02	0.00
8.98	2.00	0.00	5.51	0.02	0.00	9.00	2.00	0.00	5.50	0.02	0.00
9.02	2.00	0.00	5.49	0.02	0.00	9.04	2.00	0.00	5.48	0.02	0.00
9.06	2.00	0.00	5.47	0.02	0.00	9.08	2.00	0.00	5.46	0.02	0.00
9.10	2.00	0.00	5.45	0.02	0.00	9.12	2.00	0.00	5.44	0.02	0.00
9.14	2.00	0.00	5.43	0.02	0.00	9.16	2.00	0.00	5.42	0.02	0.00
9.18	2.00	0.00	5.41	0.02	0.00	9.20	2.00	0.00	5.40	0.02	0.00
9.22	2.00	0.00	5.39	0.02	0.00	9.24	2.00	0.00	5.38	0.02	0.00
9.26	2.00	0.00	5.37	0.02	0.00	9.28	2.00	0.00	5.36	0.02	0.00
9.30	2.00	0.00	5.35	0.02	0.00	9.32	2.00	0.00	5.34	0.02	0.00
9.34	0.59	0.41	5.33	0.02	0.04	9.36	0.62	0.38	5.32	0.02	0.04
9.38	0.64	0.36	5.31	0.02	0.04	9.40	0.63	0.37	5.30	0.02	0.04
9.42	0.62	0.38	5.29	0.02	0.04	9.44	0.60	0.40	5.28	0.02	0.04
9.46	0.58	0.42	5.27	0.02	0.04	9.48	0.58	0.42	5.26	0.02	0.04
9.50	0.57	0.43	5.25	0.02	0.04	9.52	0.57	0.43	5.24	0.02	0.04
9.54	0.59	0.41	5.23	0.02	0.04	9.56	0.63	0.37	5.22	0.02	0.04
9.58	0.67	0.33	5.21	0.02	0.03	9.60	0.69	0.31	5.20	0.02	0.03

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
9.62	0.70	0.30	5.19	0.02	0.03	9.64	0.68	0.32	5.18	0.02	0.03
9.66	0.62	0.38	5.17	0.02	0.04	9.68	0.57	0.43	5.16	0.02	0.04
9.70	0.54	0.46	5.15	0.02	0.05	9.72	2.00	0.00	5.14	0.02	0.00
9.74	2.00	0.00	5.13	0.02	0.00	9.76	2.00	0.00	5.12	0.02	0.00
9.78	2.00	0.00	5.11	0.02	0.00	9.80	2.00	0.00	5.10	0.02	0.00
9.82	2.00	0.00	5.09	0.02	0.00	9.84	2.00	0.00	5.08	0.02	0.00
9.86	2.00	0.00	5.07	0.02	0.00	9.88	2.00	0.00	5.06	0.02	0.00
9.90	2.00	0.00	5.05	0.02	0.00	9.92	2.00	0.00	5.04	0.02	0.00
9.94	2.00	0.00	5.03	0.02	0.00	9.96	2.00	0.00	5.02	0.02	0.00
9.98	2.00	0.00	5.01	0.02	0.00	10.00	2.00	0.00	5.00	0.02	0.00
10.02	2.00	0.00	4.99	0.02	0.00	10.04	2.00	0.00	4.98	0.02	0.00
10.06	2.00	0.00	4.97	0.02	0.00	10.08	2.00	0.00	4.96	0.02	0.00
10.10	2.00	0.00	4.95	0.02	0.00	10.12	2.00	0.00	4.94	0.02	0.00
10.14	2.00	0.00	4.93	0.02	0.00	10.16	2.00	0.00	4.92	0.02	0.00
10.18	2.00	0.00	4.91	0.02	0.00	10.20	2.00	0.00	4.90	0.02	0.00
10.22	2.00	0.00	4.89	0.02	0.00	10.24	2.00	0.00	4.88	0.02	0.00
10.26	2.00	0.00	4.87	0.02	0.00	10.28	2.00	0.00	4.86	0.02	0.00
10.30	2.00	0.00	4.85	0.02	0.00	10.32	2.00	0.00	4.84	0.02	0.00
10.34	2.00	0.00	4.83	0.02	0.00	10.36	2.00	0.00	4.82	0.02	0.00
10.38	2.00	0.00	4.81	0.02	0.00	10.40	2.00	0.00	4.80	0.02	0.00
10.42	2.00	0.00	4.79	0.02	0.00	10.44	2.00	0.00	4.78	0.02	0.00
10.46	2.00	0.00	4.77	0.02	0.00	10.48	2.00	0.00	4.76	0.02	0.00
10.50	2.00	0.00	4.75	0.02	0.00	10.52	2.00	0.00	4.74	0.02	0.00
10.54	2.00	0.00	4.73	0.02	0.00	10.56	2.00	0.00	4.72	0.02	0.00
10.58	2.00	0.00	4.71	0.02	0.00	10.60	2.00	0.00	4.70	0.02	0.00
10.62	2.00	0.00	4.69	0.02	0.00	10.64	2.00	0.00	4.68	0.02	0.00
10.66	2.00	0.00	4.67	0.02	0.00	10.68	2.00	0.00	4.66	0.02	0.00
10.70	2.00	0.00	4.65	0.02	0.00	10.72	2.00	0.00	4.64	0.02	0.00
10.74	2.00	0.00	4.63	0.02	0.00	10.76	2.00	0.00	4.62	0.02	0.00
10.78	2.00	0.00	4.61	0.02	0.00	10.80	2.00	0.00	4.60	0.02	0.00
10.82	2.00	0.00	4.59	0.02	0.00	10.84	2.00	0.00	4.58	0.02	0.00
10.86	2.00	0.00	4.57	0.02	0.00	10.88	2.00	0.00	4.56	0.02	0.00
10.90	2.00	0.00	4.55	0.02	0.00	10.92	2.00	0.00	4.54	0.02	0.00
10.94	2.00	0.00	4.53	0.02	0.00	10.96	2.00	0.00	4.52	0.02	0.00
10.98	2.00	0.00	4.51	0.02	0.00	11.00	2.00	0.00	4.50	0.02	0.00
11.02	2.00	0.00	4.49	0.02	0.00	11.04	2.00	0.00	4.48	0.02	0.00
11.06	2.00	0.00	4.47	0.02	0.00	11.08	2.00	0.00	4.46	0.02	0.00
11.10	2.00	0.00	4.45	0.02	0.00	11.12	2.00	0.00	4.44	0.02	0.00
11.14	2.00	0.00	4.43	0.02	0.00	11.16	2.00	0.00	4.42	0.02	0.00
11.18	2.00	0.00	4.41	0.02	0.00	11.20	2.00	0.00	4.40	0.02	0.00
11.22	2.00	0.00	4.39	0.02	0.00	11.24	2.00	0.00	4.38	0.02	0.00
11.26	2.00	0.00	4.37	0.02	0.00	11.28	2.00	0.00	4.36	0.02	0.00
11.30	2.00	0.00	4.35	0.02	0.00	11.32	2.00	0.00	4.34	0.02	0.00
11.34	2.00	0.00	4.33	0.02	0.00	11.36	2.00	0.00	4.32	0.02	0.00
11.38	2.00	0.00	4.31	0.02	0.00	11.40	2.00	0.00	4.30	0.02	0.00
11.42	2.00	0.00	4.29	0.02	0.00	11.44	2.00	0.00	4.28	0.02	0.00
11.46	2.00	0.00	4.27	0.02	0.00	11.48	2.00	0.00	4.26	0.02	0.00
11.50	2.00	0.00	4.25	0.02	0.00	11.52	2.00	0.00	4.24	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
11.54	2.00	0.00	4.23	0.02	0.00	11.56	2.00	0.00	4.22	0.02	0.00
11.58	2.00	0.00	4.21	0.02	0.00	11.60	2.00	0.00	4.20	0.02	0.00
11.62	2.00	0.00	4.19	0.02	0.00	11.64	2.00	0.00	4.18	0.02	0.00
11.66	2.00	0.00	4.17	0.02	0.00	11.68	2.00	0.00	4.16	0.02	0.00
11.70	2.00	0.00	4.15	0.02	0.00	11.72	2.00	0.00	4.14	0.02	0.00
11.74	2.00	0.00	4.13	0.02	0.00	11.76	2.00	0.00	4.12	0.02	0.00
11.78	2.00	0.00	4.11	0.02	0.00	11.80	2.00	0.00	4.10	0.02	0.00
11.82	2.00	0.00	4.09	0.02	0.00	11.84	2.00	0.00	4.08	0.02	0.00
11.86	2.00	0.00	4.07	0.02	0.00	11.88	2.00	0.00	4.06	0.02	0.00
11.90	2.00	0.00	4.05	0.02	0.00	11.92	2.00	0.00	4.04	0.02	0.00
11.94	2.00	0.00	4.03	0.02	0.00	11.96	2.00	0.00	4.02	0.02	0.00
11.98	2.00	0.00	4.01	0.02	0.00	12.00	2.00	0.00	4.00	0.02	0.00
12.02	2.00	0.00	3.99	0.02	0.00	12.04	2.00	0.00	3.98	0.02	0.00
12.06	2.00	0.00	3.97	0.02	0.00	12.08	2.00	0.00	3.96	0.02	0.00
12.10	2.00	0.00	3.95	0.02	0.00	12.12	2.00	0.00	3.94	0.02	0.00
12.14	2.00	0.00	3.93	0.02	0.00	12.16	2.00	0.00	3.92	0.02	0.00
12.18	2.00	0.00	3.91	0.02	0.00	12.22	2.00	0.00	3.89	0.04	0.00
12.24	2.00	0.00	3.88	0.02	0.00	12.26	2.00	0.00	3.87	0.02	0.00
12.28	2.00	0.00	3.86	0.02	0.00	12.30	2.00	0.00	3.85	0.02	0.00
12.32	2.00	0.00	3.84	0.02	0.00	12.34	2.00	0.00	3.83	0.02	0.00
12.36	2.00	0.00	3.82	0.02	0.00	12.38	2.00	0.00	3.81	0.02	0.00
12.40	2.00	0.00	3.80	0.02	0.00	12.42	2.00	0.00	3.79	0.02	0.00
12.44	2.00	0.00	3.78	0.02	0.00	12.46	2.00	0.00	3.77	0.02	0.00
12.48	2.00	0.00	3.76	0.02	0.00	12.50	2.00	0.00	3.75	0.02	0.00
12.52	2.00	0.00	3.74	0.02	0.00	12.54	2.00	0.00	3.73	0.02	0.00
12.56	2.00	0.00	3.72	0.02	0.00	12.58	2.00	0.00	3.71	0.02	0.00
12.60	2.00	0.00	3.70	0.02	0.00	12.62	2.00	0.00	3.69	0.02	0.00
12.64	2.00	0.00	3.68	0.02	0.00	12.66	2.00	0.00	3.67	0.02	0.00
12.68	2.00	0.00	3.66	0.02	0.00	12.70	2.00	0.00	3.65	0.02	0.00
12.72	2.00	0.00	3.64	0.02	0.00	12.74	2.00	0.00	3.63	0.02	0.00
12.76	2.00	0.00	3.62	0.02	0.00	12.78	2.00	0.00	3.61	0.02	0.00
12.80	2.00	0.00	3.60	0.02	0.00	12.82	2.00	0.00	3.59	0.02	0.00
12.84	2.00	0.00	3.58	0.02	0.00	12.86	2.00	0.00	3.57	0.02	0.00
12.88	2.00	0.00	3.56	0.02	0.00	12.90	2.00	0.00	3.55	0.02	0.00
12.92	2.00	0.00	3.54	0.02	0.00	12.94	2.00	0.00	3.53	0.02	0.00
12.96	2.00	0.00	3.52	0.02	0.00	12.98	2.00	0.00	3.51	0.02	0.00
13.00	2.00	0.00	3.50	0.02	0.00	13.02	2.00	0.00	3.49	0.02	0.00
13.04	2.00	0.00	3.48	0.02	0.00	13.06	2.00	0.00	3.47	0.02	0.00
13.08	2.00	0.00	3.46	0.02	0.00	13.10	2.00	0.00	3.45	0.02	0.00
13.12	2.00	0.00	3.44	0.02	0.00	13.14	2.00	0.00	3.43	0.02	0.00
13.16	2.00	0.00	3.42	0.02	0.00	13.18	2.00	0.00	3.41	0.02	0.00
13.20	2.00	0.00	3.40	0.02	0.00	13.22	2.00	0.00	3.39	0.02	0.00
13.24	2.00	0.00	3.38	0.02	0.00	13.26	2.00	0.00	3.37	0.02	0.00
13.28	2.00	0.00	3.36	0.02	0.00	13.30	2.00	0.00	3.35	0.02	0.00
13.32	2.00	0.00	3.34	0.02	0.00	13.34	2.00	0.00	3.33	0.02	0.00
13.36	2.00	0.00	3.32	0.02	0.00	13.38	2.00	0.00	3.31	0.02	0.00
13.40	2.00	0.00	3.30	0.02	0.00	13.42	2.00	0.00	3.29	0.02	0.00
13.44	2.00	0.00	3.28	0.02	0.00	13.46	2.00	0.00	3.27	0.02	0.00

**:: Liquefaction Potential Index calculation data :: (continued)**

Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI	Depth (m)	FS	F <sub>L</sub>	w <sub>z</sub>	d <sub>z</sub>	LPI
13.48	2.00	0.00	3.26	0.02	0.00	13.50	2.00	0.00	3.25	0.02	0.00
13.52	2.00	0.00	3.24	0.02	0.00	13.54	2.00	0.00	3.23	0.02	0.00
13.56	2.00	0.00	3.22	0.02	0.00	13.58	2.00	0.00	3.21	0.02	0.00
13.60	2.00	0.00	3.20	0.02	0.00	13.62	2.00	0.00	3.19	0.02	0.00
13.64	2.00	0.00	3.18	0.02	0.00	13.66	2.00	0.00	3.17	0.02	0.00
13.68	2.00	0.00	3.16	0.02	0.00	13.70	2.00	0.00	3.15	0.02	0.00
13.72	2.00	0.00	3.14	0.02	0.00	13.74	2.00	0.00	3.13	0.02	0.00
13.76	2.00	0.00	3.12	0.02	0.00	13.78	2.00	0.00	3.11	0.02	0.00
13.80	2.00	0.00	3.10	0.02	0.00	13.82	2.00	0.00	3.09	0.02	0.00
13.84	2.00	0.00	3.08	0.02	0.00	13.86	2.00	0.00	3.07	0.02	0.00
13.88	2.00	0.00	3.06	0.02	0.00	13.90	2.00	0.00	3.05	0.02	0.00
13.92	2.00	0.00	3.04	0.02	0.00	13.94	2.00	0.00	3.03	0.02	0.00
13.96	2.00	0.00	3.02	0.02	0.00	13.98	2.00	0.00	3.01	0.02	0.00
14.00	2.00	0.00	3.00	0.02	0.00	14.02	2.00	0.00	2.99	0.02	0.00
14.04	2.00	0.00	2.98	0.02	0.00	14.06	2.00	0.00	2.97	0.02	0.00
14.08	2.00	0.00	2.96	0.02	0.00	14.10	2.00	0.00	2.95	0.02	0.00
14.12	2.00	0.00	2.94	0.02	0.00	14.14	2.00	0.00	2.93	0.02	0.00
14.16	2.00	0.00	2.92	0.02	0.00	14.18	2.00	0.00	2.91	0.02	0.00
14.20	2.00	0.00	2.90	0.02	0.00	14.22	2.00	0.00	2.89	0.02	0.00
14.24	2.00	0.00	2.88	0.02	0.00	14.26	2.00	0.00	2.87	0.02	0.00
14.28	2.00	0.00	2.86	0.02	0.00	14.30	2.00	0.00	2.85	0.02	0.00
14.32	2.00	0.00	2.84	0.02	0.00	14.34	2.00	0.00	2.83	0.02	0.00
14.36	2.00	0.00	2.82	0.02	0.00	14.38	2.00	0.00	2.81	0.02	0.00
14.40	2.00	0.00	2.80	0.02	0.00	14.42	2.00	0.00	2.79	0.02	0.00
14.44	2.00	0.00	2.78	0.02	0.00	14.46	2.00	0.00	2.77	0.02	0.00
14.48	2.00	0.00	2.76	0.02	0.00	14.50	2.00	0.00	2.75	0.02	0.00
14.52	2.00	0.00	2.74	0.02	0.00	14.54	2.00	0.00	2.73	0.02	0.00
14.56	2.00	0.00	2.72	0.02	0.00	14.58	2.00	0.00	2.71	0.02	0.00
14.60	2.00	0.00	2.70	0.02	0.00	14.62	2.00	0.00	2.69	0.02	0.00
14.64	2.00	0.00	2.68	0.02	0.00	14.66	2.00	0.00	2.67	0.02	0.00
14.68	0.55	0.45	2.66	0.02	0.02	14.70	0.58	0.42	2.65	0.02	0.02
14.72	0.61	0.39	2.64	0.02	0.02	14.74	0.64	0.36	2.63	0.02	0.02
14.76	0.62	0.38	2.62	0.02	0.02	14.78	0.59	0.41	2.61	0.02	0.02
14.80	0.56	0.44	2.60	0.02	0.02	14.82	2.00	0.00	2.59	0.02	0.00
14.84	2.00	0.00	2.58	0.02	0.00	14.86	2.00	0.00	2.57	0.02	0.00
14.88	2.00	0.00	2.56	0.02	0.00	14.90	2.00	0.00	2.55	0.02	0.00
14.92	2.00	0.00	2.54	0.02	0.00	14.94	2.00	0.00	2.53	0.02	0.00
14.96	2.00	0.00	2.52	0.02	0.00	14.98	2.00	0.00	2.51	0.02	0.00
15.00	2.00	0.00	2.50	0.02	0.00						

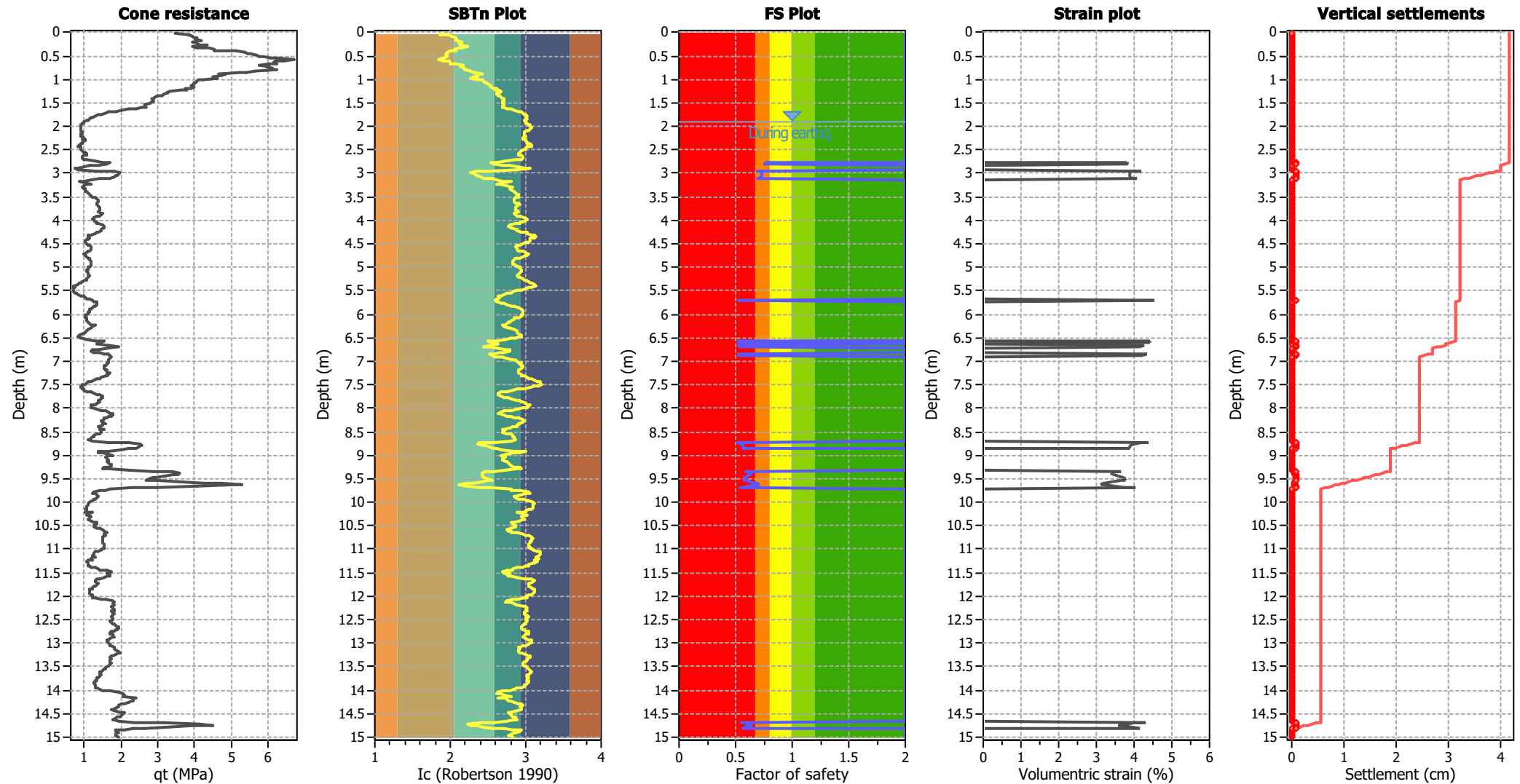
**Overall liquefaction potential: 2.40**

LPI = 0.00 - Liquefaction risk very low  
 LPI between 0.00 and 5.00 - Liquefaction risk low  
 LPI between 5.00 and 15.00 - Liquefaction risk high  
 LPI > 15.00 - Liquefaction risk very high

**Abbreviations**

FS: Calculated factor of safety for test point  
 F<sub>L</sub>: 1 - FS  
 w<sub>z</sub>: Function value of the extend of soil liquefaction according to depth  
 d<sub>z</sub>: Layer thickness (m)  
 LPI: Liquefaction potential index value for test point

## Estimation of post-earthquake settlements



### Abbreviations

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





### **12.3 *Prova geotecnica di laboratorio: Taglio diretto CD “Scatola di Casagrande”***



## 000

pagine del documento - *document pages*

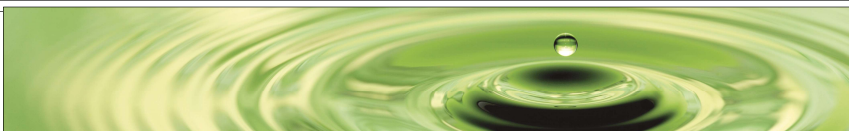
1954  
AMBIENTE TERRA STUDIO ASSOCIATO  
LUGO (RA)  
VIA GESSI 16

### Samples identification and performed tests

Note - *Remarks:*

Il nostro laboratorio esegue le prove commissionate secondo le norme di riferimento riportate su ogni certificato; il laboratorio segue inoltre le raccomandazioni contenute nella norma UNI EN 17025 "Requisiti generali per la competenza dei laboratori di prova e taratura". Questi risultati sono per uso esclusivo del cliente per il quale sono stati ottenuti. Essi sono applicabili solamente ai campioni testati e non sono indicativi di campioni apparentemente simili.  
*These results are for the exclusive use of the client for whom they were obtained. They apply only to the tested samples and are not indicative of apparently identical samples.*

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Ministero Infrastrutture e Trasporti - Settore Terre



**GEOTEA s.r.l.**AZIENDA CON SISTEMA DI GESTIONE QUALITÀ UNI EN ISO  
9001:2015 CERTIFICATO DA CERTQUALITY**TAGLIO DIRETTO****DIRECT SHEAR TEST**

Normativa di riferimento: UNI CEN ISO/TS 17892-10

**Technical specification**

Certificato - <i>Test report</i>	1954- 21.338- 001
Verbale - <i>Acceptance report</i>	1954
Committente - <i>Commissioner</i>	AMBIENTE TERRA STUDIO ASSOCIATO
Località - <i>Locality</i>	LUGO (RA)
Cantiere - <i>Site</i>	VIA GESSI 16
Sondaggio - <i>Borehole</i>	-
Campione - <i>Sample</i>	<b>C1</b>
Profondità - <i>Depth</i>	<b>1.20- 1.80 m</b>
Data ricevimento - <i>Receiving date</i>	20/07/2021
Data inizio prove - <i>Test starting date</i>	22/07/2021
Data fine prove - <i>Test ending date</i>	03/08/2021
Data certificazione - <i>Report date</i>	03/08/2021
Data apertura campione - <i>Sample opening date</i>	22/07/2021
Classe del campione - <i>Sample quality</i>	Q4

Umidità iniziale - <i>Initial water content</i>	%	22.44		
Densità naturale iniziale - <i>Initial wet density</i>	kg/m <sup>3</sup>	1910.10		
Densità secca iniziale - <i>Initial dry density</i>	kg/m <sup>3</sup>	1560.06		
Provino - <i>Specimen id</i>	n°	1	2	3
Lato - <i>Specimen side</i>	mm	60.0	60.0	60.0
Altezza iniziale - <i>Initial specimen height</i>	mm	20.0	20.0	20.0
Velocità di taglio utilizzata - <i>Strain rate</i>	mm/min	0.006	0.006	0.006
Press. di consolidazione <i>Consolidation pressure</i>	kPa	98.1	196.1	294.2
Umidità finale - <i>Final water content</i>	%	26.45	25.12	23.15

Fase di consolidazione - <i>Consolidation test</i>	Note - <i>Remarks</i>
	Limo argilloso di colore marrone giallastro molto consistente.
	Pocket Penetrometer >6 kg/cm <sup>2</sup> Tor Vane >2 kg/cm <sup>2</sup>

Direttore <i>Manager</i> 	Sperimentatore <i>Technician</i> 

Grado di incertezza delle misure degli strumenti di forza: ± 0,15%

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Autorizzazione del Consiglio Superiore dei Lavori

IOP DE 3.5 - MOD PROD 11 B31 REV2



# GEOTEA s.r.l.

AZIENDA CON SISTEMA DI GESTIONE QUALITA' UNI EN ISO 9001:2015 CERTIFICATO DA CERTQUALITY

## TAGLIO DIRETTO

### DIRECT SHEAR TEST

Normativa di riferimento: UNI CEN ISO/TS 17892-10

Technical specification

Certificato - Test report 1954- 21.338- 001  
Verbale - Acceptance report 1954

Consolidation test (0-100 kPa)		Provino 1 - Specimen 1			Provino 2 - Specimen 2			Provino 3 - Specimen 3		
time (s)	def. ↓ (mm)	def. → (mm)	def. ↓ (mm)	shear stress (kPa)	def. → (mm)	def. ↓ (mm)	shear stress (kPa)	def. → (mm)	def. ↓ (mm)	shear stress (kPa)
1		0.04	0.00	18.89	0.03	0.02	28.61	0.02	0.01	25.83
6		0.05	0.00	21.11	0.04	0.02	33.61	0.03	0.01	31.94
12		0.06	0.01	22.78	0.06	0.02	37.78	0.04	0.02	36.67
24		0.08	0.01	24.17	0.07	0.02	41.67	0.05	0.02	41.11
30		0.09	0.01	25.56	0.08	0.02	45.00	0.06	0.02	45.00
60		0.10	0.01	26.67	0.09	0.02	48.06	0.08	0.02	48.61
90		0.12	0.02	27.50	0.11	0.03	50.56	0.09	0.02	51.67
120		0.13	0.02	28.61	0.12	0.03	53.06	0.10	0.02	54.72
180		0.15	0.02	29.44	0.13	0.03	55.00	0.11	0.03	57.50
240		0.16	0.02	30.28	0.15	0.03	57.22	0.12	0.03	60.28
300		0.18	0.03	31.11	0.16	0.03	58.89	0.13	0.03	62.78
360		0.19	0.03	32.22	0.18	0.03	60.83	0.15	0.03	65.28
420		0.20	0.03	32.78	0.19	0.03	62.50	0.16	0.03	67.50
480		0.22	0.03	33.61	0.20	0.03	64.17	0.17	0.03	69.17
540		0.24	0.03	34.17	0.22	0.03	65.56	0.18	0.04	71.39
600		0.25	0.03	34.72	0.23	0.04	66.94	0.20	0.04	73.33
900		0.26	0.03	35.56	0.25	0.04	68.33	0.21	0.04	75.28
1200		0.33	0.03	37.78	0.31	0.04	73.33	0.28	0.05	83.61
1500		0.40	0.04	39.72	0.38	0.05	77.50	0.34	0.07	90.83
1800		0.48	0.05	41.39	0.45	0.05	80.83	0.42	0.07	96.94
2100		0.55	0.06	42.78	0.53	0.05	83.89	0.49	0.07	102.22
2400		0.63	0.07	43.89	0.60	0.06	86.11	0.56	0.08	106.94
2700		0.70	0.07	45.00	0.68	0.06	88.33	0.63	0.08	111.39
3000		0.77	0.08	45.83	0.75	0.06	89.72	0.70	0.08	115.00
3300		0.85	0.08	46.39	0.83	0.06	91.11	0.77	0.09	118.33
3600		0.93	0.09	47.50	0.90	0.06	91.94	0.84	0.09	120.83
4200		1.00	0.10	48.33	0.98	0.06	92.78	0.92	0.09	123.06
4800		1.07	0.11	48.61	1.05	0.07	93.61	0.99	0.09	125.56
5400		1.15	0.11	48.89	1.12	0.07	93.89	1.07	0.10	127.50
6000		1.22	0.11	49.44	1.20	0.07	94.44	1.14	0.10	129.44
7200		1.29	0.12	50.00	1.27	0.07	94.72	1.21	0.10	130.56
8400		1.37	0.12	50.56	1.34	0.07	95.00	1.28	0.10	131.67
9600		1.44	0.13	50.83	1.41	0.07	95.56	1.35	0.11	132.78
10800		1.52	0.13	50.83	1.49	0.07	96.11	1.43	0.11	133.61
12000		1.59	0.13	50.83	1.56	0.07	96.39	1.50	0.11	134.17
13200		1.67	0.14	50.83	1.64	0.07	96.39	1.58	0.12	135.00
14400		1.75	0.14	50.56	1.71	0.07	96.39	1.65	0.12	135.56
16800		2.05	0.15	49.44	2.02	0.07	95.56	1.95	0.13	138.61
19200		2.34	0.16	49.44	2.31	0.07	93.61	2.25	0.14	139.17
21600		2.64	0.16	49.44	2.62	0.08	92.22	2.54	0.14	139.72
28800		2.95	0.17	49.17	2.92	0.08	90.56	2.84	0.15	139.72
36000		3.24	0.17	48.61	3.22	0.08	88.89	3.15	0.15	138.89
45600		3.54	0.18	48.33	3.52	0.08	87.50	3.44	0.16	138.06
54000		3.85	0.18	47.22	3.83	0.08	85.83	3.75	0.16	136.11
72000		4.15	0.18	46.67	4.14	0.09	83.61	4.05	0.16	133.61
79200		4.44	0.19	46.11	4.43	0.09	82.22	4.34	0.17	132.22
82800		4.74	0.19	45.83	4.73	0.09	80.28	4.65	0.17	130.00
86400		5.04	0.20	45.28	5.04	0.10	78.61	4.95	0.17	127.78
		5.34	0.20	44.72	5.33	0.10	75.00	5.24	0.18	126.39
		5.64	0.20	44.44	5.64	0.10	73.89	5.55	0.18	124.44
		5.94	0.20	43.89	5.94	0.11	72.50	5.85	0.19	122.50
		6.24	0.20	43.61	6.24	0.11	71.67	6.15	0.19	120.56
		6.53	0.21	43.33	6.54	0.11	70.56	6.44	0.19	118.89

Note - Remarks

Direttore Manager

Sperimentatore Technician

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Autorizzazione del Consiglio Superiore dei Lavori

**GEOTEA s.r.l.**

AZIENDA CON SISTEMA DI GESTIONE QUALITÀ UNI EN ISO 9001:2015 CERTIFICATO DA CERTIQUALITY

**TAGLIO DIRETTO****DIRECT SHEAR TEST**

Normativa di riferimento: UNI CEN ISO/TS 17892-10

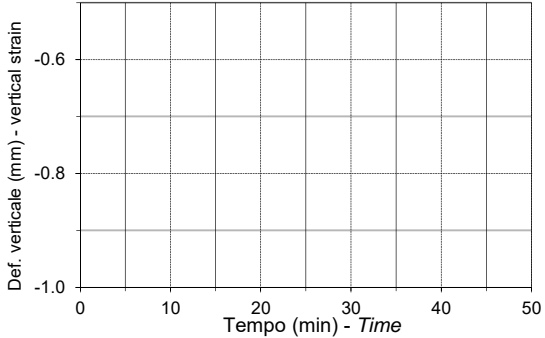
**Technical specification**

Certificato - <i>Test report</i>	1954- 21.338- 002
Verbale - <i>Acceptance report</i>	1954
Committente - <i>Commissioner</i>	AMBIENTE TERRA STUDIO ASSOCIATO
Località - <i>Locality</i>	LUGO (RA)
Cantiere - <i>Site</i>	VIA GESSI 16
Sondaggio - <i>Borehole</i>	-
Campione - <i>Sample</i>	<b>C2</b>
Profondità - <i>Depth</i>	<b>1.70- 2.30 m</b>
Data ricevimento - <i>Receiving date</i>	20/07/2021
Data inizio prove - <i>Test starting date</i>	22/07/2021
Data fine prove - <i>Test ending date</i>	03/08/2021
Data certificazione - <i>Report date</i>	03/08/2021
Data apertura campione - <i>Sample opening date</i>	22/07/2021
Classe del campione - <i>Sample quality</i>	Q4

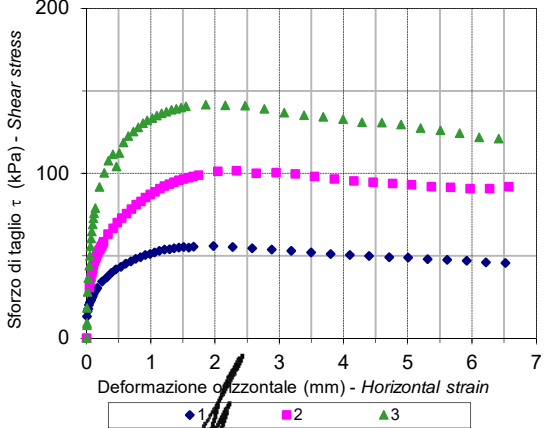
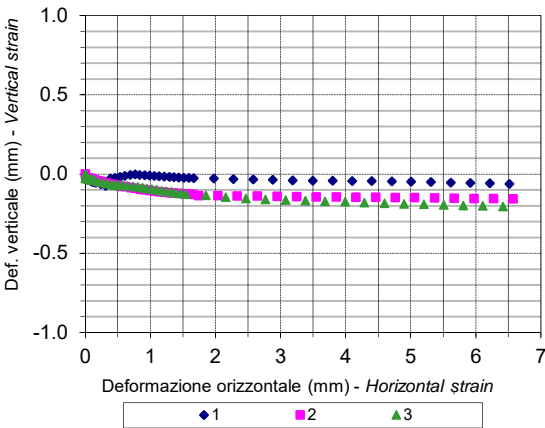
  

Umidità iniziale - <i>Initial water content</i>	%	23.12		
Densità naturale iniziale - <i>Initial wet density</i>	kg/m <sup>3</sup>	1949.74		
Densità secca iniziale - <i>Initial dry density</i>	kg/m <sup>3</sup>	1583.58		
Provino - <i>Specimen id</i>	n°	1	2	3
Lato - <i>Specimen side</i>	mm	60.0	60.0	60.0
Altezza iniziale - <i>Initial specimen height</i>	mm	20.0	20.0	20.0
Velocità di taglio utilizzata - <i>Strain rate</i>	mm/min	0.006	0.006	0.006
Press. di consolidazione - <i>Consolidation pressure</i>	kPa	98.1	196.1	294.2
Umidità finale - <i>Final water content</i>	%	26.45	25.14	24.19


Fase di consolidazione - <i>Consolidation test</i>	Note - <i>Remarks</i>
	Limo argilloso di colore marrone giallastro, molto consistente.
	Pocket Penetrometer >6 kg/cm <sup>2</sup>
	Tor Vane >2 kg/cm <sup>2</sup>

	
Direttore <i>Manager</i>	Sperimentatore <i>Technician</i>

Grado di incertezza delle misure degli strumenti di forza: ± 0,14%

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Autorizzazione del Consiglio Superiore dei Lavori



IOP DE 3.5 - MOD PROD 11 B31 REV2





# GEOTEA s.r.l.

AZIENDA CON SISTEMA DI GESTIONE QUALITA' UNI EN ISO 9001:2015 CERTIFICATO DA CERTQUALITY

## TAGLIO DIRETTO

### DIRECT SHEAR TEST

Normativa di riferimento: UNI CEN ISO/TS 17892-10

Technical specification

Certificato - Test report 1954- 21.338- 002  
Verbale - Acceptance report 1954

Consolidation test (0-100 kPa)		Provino 1 - Specimen 1			Provino 2 - Specimen 2			Provino 3 - Specimen 3		
time (s)	def. ↓ (mm)	def. → (mm)	def. ↓ (mm)	shear stress (kPa)	def. → (mm)	def. ↓ (mm)	shear stress (kPa)	def. → (mm)	def. ↓ (mm)	shear stress (kPa)
1		0.01	0.03	13.18	0.04	0.03	30.74	0.00	0.03	7.78
6		0.02	0.03	16.40	0.06	0.03	34.24	0.00	0.03	9.20
12		0.03	0.03	18.01	0.07	0.03	36.96	0.01	0.03	18.39
24		0.04	0.04	20.26	0.09	0.03	39.69	0.02	0.03	27.94
30		0.05	0.04	21.87	0.10	0.03	42.41	0.03	0.03	36.43
60		0.07	0.04	23.15	0.11	0.03	44.75	0.04	0.03	43.86
90		0.09	0.04	24.76	0.13	0.04	46.69	0.05	0.03	49.88
120		0.10	0.05	25.73	0.14	0.04	48.25	0.06	0.03	55.54
180		0.11	0.05	27.01	0.15	0.04	49.42	0.07	0.03	60.49
240		0.12	0.05	28.30	0.17	0.04	50.97	0.08	0.04	64.73
300		0.14	0.05	28.94	0.18	0.05	52.14	0.09	0.04	68.98
360		0.15	0.05	29.91	0.20	0.05	53.31	0.10	0.04	72.52
420		0.17	0.06	30.55	0.21	0.05	54.09	0.12	0.04	75.70
480		0.24	0.06	34.41	0.22	0.05	55.25	0.13	0.04	78.88
540		0.31	0.08	36.98	0.24	0.05	56.03	0.20	0.05	91.62
600		0.39	0.03	39.55	0.26	0.05	57.20	0.27	0.06	100.11
900		0.46	0.03	41.80	0.27	0.05	58.37	0.34	0.06	107.53
1200		0.54	0.02	43.41	0.33	0.06	63.04	0.41	0.07	111.43
1500		0.61	0.01	45.34	0.41	0.07	66.54	0.46	0.07	104.00
1800		0.69	0.01	46.63	0.48	0.07	70.04	0.51	0.07	112.13
2100		0.76	0.00	48.24	0.55	0.08	72.76	0.58	0.07	118.50
2400		0.84	0.01	49.20	0.62	0.08	75.49	0.65	0.08	122.39
2700		0.91	0.01	50.49	0.70	0.09	78.21	0.73	0.08	125.22
3000		0.99	0.01	51.13	0.77	0.09	80.93	0.80	0.08	127.70
3300		1.06	0.01	52.10	0.85	0.10	82.88	0.88	0.09	130.17
3600		1.13	0.01	53.06	0.92	0.10	85.21	0.94	0.09	131.94
4200		1.21	0.02	53.70	0.99	0.10	87.16	1.02	0.10	133.36
4800		1.29	0.02	54.02	1.07	0.11	88.72	1.09	0.10	134.77
5400		1.36	0.02	54.67	1.14	0.11	90.66	1.17	0.11	136.19
6000		1.43	0.02	54.99	1.21	0.12	92.22	1.24	0.11	137.25
7200		1.51	0.02	55.31	1.29	0.12	93.39	1.32	0.11	138.31
8400		1.59	0.03	54.99	1.36	0.12	94.55	1.39	0.12	139.02
9600		1.66	0.03	55.63	1.44	0.12	95.72	1.47	0.12	139.72
10800		1.97	0.03	55.95	1.51	0.13	96.50	1.55	0.13	140.43
12000		2.27	0.03	55.31	1.59	0.13	97.28	1.85	0.14	141.49
13200		2.58	0.03	54.67	1.66	0.13	98.05	2.16	0.15	141.14
14400		2.88	0.04	53.70	1.74	0.14	98.83	2.47	0.16	140.79
16800		3.19	0.04	53.06	2.04	0.14	101.17	2.77	0.16	139.02
19200		3.49	0.04	52.10	2.33	0.14	101.56	3.08	0.17	136.54
21600		3.80	0.04	51.13	2.64	0.14	100.00	3.38	0.17	135.13
28800		4.10	0.04	50.49	2.95	0.14	100.39	3.68	0.17	134.06
36000		4.40	0.05	49.84	3.25	0.14	99.61	3.99	0.18	132.65
45600		4.71	0.05	49.20	3.55	0.15	98.05	4.29	0.18	130.88
54000		5.01	0.05	48.88	3.86	0.15	96.50	4.59	0.19	130.53
72000		5.31	0.05	47.91	4.16	0.15	95.33	4.90	0.19	129.47
79200		5.61	0.06	47.59	4.46	0.15	94.55	5.20	0.19	127.34
82800		5.92	0.06	46.95	4.76	0.15	93.77	5.51	0.20	125.93
86400		6.22	0.06	45.99	5.06	0.15	93.00	5.81	0.20	124.16
		6.52	0.06	45.66	5.37	0.15	91.83	6.11	0.20	121.68
					5.67	0.15	91.44	6.42	0.21	120.98
					5.97	0.16	90.66			
					6.27	0.16	90.66			
					6.58	0.16	91.83			

Note - Remarks

Direttore Manager

Sperimentatore Technician

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Autorizzazione del Consiglio Superiore dei Lavori



#### **12.4 *Determinazione della categoria di suolo di fondazione eseguita sulla base della velocità equivalente di propagazione delle onde di taglio $S$ ( $V_{s,eq}$ ) dei terreni***

# COMUNE DI LUGO

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REGIONE EMILIA-ROMAGNA

PROVINCIA DI RAVENNA

COMUNE DI LUGO

***Determinazione della categoria di suolo di fondazione  
eseguita sulla base della velocità equivalente di  
propagazione delle onde di taglio S ( $V_{s,eq}$ ) dei terreni  
costituenti la zona di via Gessi 16 - Lugo (RA).***



GEOTEA SRL

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**Committente: A.T. STUDIO ASS.**

Dott. Geol. Stefano Maggi

Data indagine 20/07/2021

Commessa 21.338

Indagine geofisica effettuata mediante prova in array con tecnica *MASW* – REMI e misura HVSr (microtremore sismico) per la determinazione della categoria di suolo di fondazione dell'area di via Gessi 16 – Lugo (RA).

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Indagine geofisica effettuata mediante prova in array con tecnica *MASW* – REMI e misura HVSr (microtremore sismico) per la determinazione della categoria di suolo di fondazione dell'area di via Gessi 16 – Lugo (RA).

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## **2 IDENTIFICAZIONE DEL DOCUMENTO**

- ☐ Il presente documento viene identificato con il numero 21.338 rev. n° 0;
- ☐ Le indagini e il lavoro svolto sono stati coordinati dal Dott. Geol. Maggi;
- ☐ Il presente documento è stato redatto dal Dott. Geol. Stefano Maggi in data 22/07/2021;
- ☐ Il documento si compone di n° 13 fogli



Indagine geofisica effettuata mediante prova in array con tecnica *MASW* – REMI e misura HVSr (microtremore sismico) per la determinazione della categoria di suolo di fondazione dell'area di via Gessi 16 – Lugo (RA).

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### **3 PREMESSE**

Presso l'area sita in via Gessi 16, presso il comune di Lugo (RA), in data 21/07/2021 è stata effettuata un'indagine geofisica mediante prova in array con tecnica *MASW* (*Multichannel Analysis of Surface Waves*), Re.Mi. (*Refraction Microtremor*) e misura a stazione singola con tecnica *HVSr* (*Horizontal to Vertical Spectral Ratio*) al fine di ottenere la classificazione del tipo di suolo presente nel sito, sulla base della velocità media equivalente di propagazione delle onde di taglio S ( $V_s$ ,eq), in ottemperanza a quanto riportato nel decreto del Ministero delle Infrastrutture, 17 gennaio 2018.

La presente indagine geofisica è consistita in:

- N. 1 profilo in array con tecnica *MASW*-REMI
- N. 1 misura a stazione singola con tecnica *HVSr* (*HVSr*)

La misura a stazione singola è stata eseguita con tromografo digitale modello Tromino® Engy.

Il profilo in array è stato eseguito con sismografo ECHO 24 canali.

Il software utilizzato per l'elaborazione dei dati è "GRILLA"© Release 2010 ver. 6.0 beta (All rights reserved).

Indagine geofisica effettuata mediante prova in array con tecnica MASW – REMI e misura HVSr (microtremore sismico) per la determinazione della categoria di suolo di fondazione dell'area di via Gessi 16 – Lugo (RA).

## 4 DESCRIZIONE DELLE INDAGINI

### 4.1 Introduzione generale

Le tecniche basate sullo studio della propagazione delle onde superficiali vengono introdotte per la prima volta nell'ambito della comunità geofisica e geotecnica negli anni novanta. Le tecniche MASW, Re.Mi., ESAC sono metodi di indagine mediante i quali è possibile costruire un profilo di velocità delle onde di taglio ( $V_s$ ) in relazione alla profondità ( $V_s$  *versus* *profondità*), attraverso l'analisi delle onde superficiali tipo Rayleigh (onde  $R$ ). Tali tecniche permettono quindi di ottemperare a quanto previsto nel decreto del Ministero delle Infrastrutture, 14 gennaio 2008 "Approvazione delle nuove norme tecniche per le costruzioni", secondo il quale i terreni, su cui devono essere eseguite opere edili di una certa rilevanza, devono essere classificati sulla base del parametro  $V_{s30}$ . La classificazione prevista per i terreni comprende cinque categorie definite da una simbologia alfanumerica da  $A$  ad  $E$  e successive integrazioni  $S1$  e  $S2$ . A ciascuna di queste categorie corrisponde una valutazione quantitativa della risposta sismica dei terreni sottoposti ad una accelerazione sismica attesa, predefinita per ciascuna classe. Il parametro  $V_{s30}$  rappresenta la media ponderata dei valori di velocità delle onde di taglio  $S$  nei primi 30 metri di sottosuolo indagato e viene espressa matematicamente dalla seguente equazione:

$$V_{s30} = \frac{30}{\sum_{i=1}^n \frac{h_i}{v_i}} \quad \text{dove} \quad \begin{array}{ll} V_{s30} & : \text{velocità media ponderata delle onde di taglio "S";} \\ h_i & : \text{spessore dello strato esimo;} \\ v_i & : \text{velocità delle onde di taglio "S" nello strato esimo.} \end{array}$$

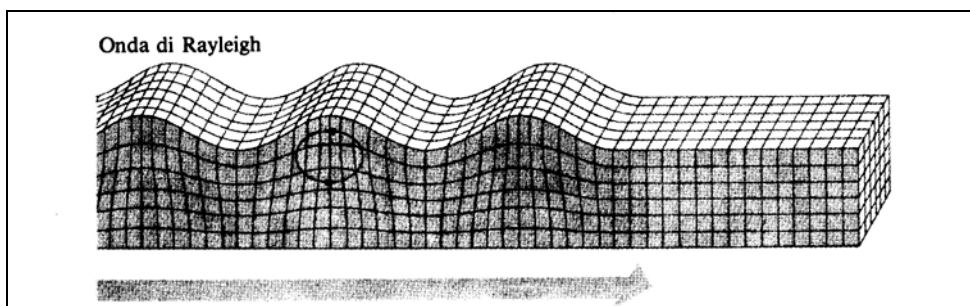
Esistono diversi tipi di onde superficiali, oltre alle già citate onde di Rayleigh ( $P+S_v$ ), si conoscono le onde di Love ( $Sh$ ) e le onde di Lamb. Le onde di Rayleigh rappresentano la componente principale delle onde superficiali e sono generate dall'interazione tra onde di compressione (o di volume)  $P$  e onde di taglio verticali  $S_v$  ogniqualevolta si è in presenza di una superficie libera in un mezzo omogeneo ed isotropo. Le onde  $R$  si propagano alla superficie libera (vedi Fig. 1) con un moto ellittico retrogrado (moto antiorario) che si inverte alla profondità di  $\lambda/2\pi$  (dove  $\lambda$  è la lunghezza d'onda). L'ampiezza di tale spostamento decresce secondo una legge esponenziale, pertanto diviene rapidamente trascurabile con la profondità.

L'utilizzo delle onde superficiali di tipo Rayleigh per la costruzione di un profilo di velocità delle onde di taglio  $V_s$  è giustificato da una serie di fattori:

- ❑ La percentuale di energia convertita in onde  $R$  è nettamente predominante (67%) rispetto a quella coinvolta nella generazione di onde  $P$  (7%) e onde  $S$  (26%);
- ❑ il metodo d'analisi basato sulle onde  $R$  non è limitato, al contrario del metodo basato sulla rifrazione, dalla presenza di inversioni di velocità in profondità;
- ❑ buona risoluzione, a differenza della tecnica a riflessione;

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- ❑ la propagazione delle onde di *Rayleigh*, anche se influenzata dalla  $V_p$  (velocità delle onde di compressione  $P$ ) e dalla densità del mezzo, è funzione innanzitutto della  $V_s$  che rappresenta appunto il parametro fondamentale per la caratterizzazione geotecnica di un sito;
- ❑ la tecnica in questione è inoltre particolarmente indicata per suoli altamente attenuanti ed ambienti rumorosi.



**Figura 1 - Modalità di propagazione delle onde R**

Tenuto conto dei fattori sopraelencati, l'elemento fondamentale che permette l'impiego di tecniche basate sulle onde superficiali e le onde *Rayleigh*, è una caratteristica chiamata *dispersione*. La dispersione è una proprietà delle onde superficiali che consiste nella deformazione di un treno d'onde dovuta alla variazione di velocità di propagazione al variare della frequenza. Per le onde *R* questa variazione si manifesta solo all'interno di un mezzo stratificato. In altre parole, ipotizzando una variazione di densità del terreno in senso verticale, ciascuna componente di frequenza dell'onda superficiale si propaga con una differente velocità (velocità di fase), e quindi con una diversa lunghezza d'onda; questa proprietà si chiama appunto dispersione.

La velocità di propagazione per una certa lunghezza d'onda  $\lambda$  (e quindi per una certa frequenza  $\nu$ ) è influenzata dalle proprietà che il mezzo possiede fino ad una profondità di  $\lambda/2$  (anche se recenti studi hanno posto questo limite a  $\lambda/2.5$ ). Inoltre, la velocità delle onde *R* ( $V_r$ ) è pari a circa il 90% della velocità delle onde di taglio ( $V_s$ ).

Secondo quanto detto appare chiaro come la costruzione di un profilo verticale di velocità delle onde di taglio  $V_s$ , ottenuto dall'analisi delle onde piane della modalità fondamentale delle onde di *Rayleigh*, sia una delle pratiche più comuni per utilizzare le proprietà dispersive delle onde superficiali.

## **4.2 Tecnica MASW**

La procedura MASW si può sintetizzare in tre stadi successivi e distinti:

- ❑ acquisizione delle onde superficiali (*ground roll*);
- ❑ costruzione della curva di dispersione : grafico velocità di fase  $V_r$  – frequenza  $\nu$ ;
- ❑ inversione della curva di dispersione per ottenere il profilo verticale della  $V_s$ .

La prima fase viene effettuata direttamente in campagna generando un treno di onde superficiali mediante l'utilizzo di una sorgente sismica attiva, quale generalmente una mazza battente, e uno stendimento lineare di geofoni ricevitori (vedi Fig. 2). L'indagine svolta nel presente lavoro è stata condotta utilizzando la

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strumentazione DOLANG JEA 24 descritta nelle premesse.

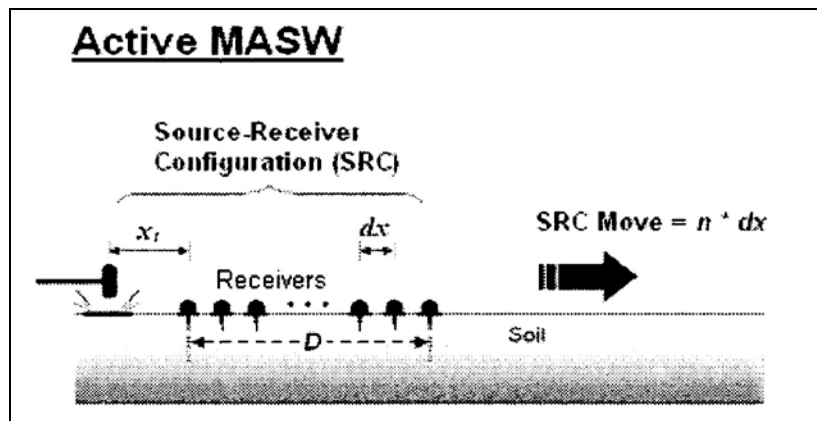


Figura 2 - MASW : stendimento lineare e sorgente attiva

Mediante il software si procede alla lettura dei dati acquisiti (*common-shot gather*) e al calcolo dello spettro di velocità di fase (trasformata di Fourier) dal quale è possibile estrarre la curva di dispersione sperimentale.

Si procede quindi alla definizione del profilo verticale di velocità delle onde di taglio S.

L'elaborazione dei dati acquisiti, avvenuta mediante software Grilla, è riportata in dettaglio nel rapporto d'indagine allegato alla presente relazione.

### 4.3 Tecnica Re.Mi.

A differenza del convenzionale metodo MASW, il quale prevede l'utilizzo di una sorgente sismica attiva (es: mazza battente), la tecnica Re.Mi. utilizza onde di superficie generate passivamente dall'ambiente circostante. L'origine di questo cosiddetto "rumore di fondo" è sia di tipo naturale (onde oceaniche di marea, perturbazioni atmosferiche) sia di tipo antropico (traffico veicolare, industrie, ferrovie, etc...).

L'utilizzo di profili di geofoni a geometria lineare, genera il problema della sovrastima della velocità di fase (velocità apparente) nello spettro di velocità che si ottiene dall'elaborazione dei dati. La velocità apparente nello spettro deriva dal fatto che la direzione di propagazione delle onde (rumore di fondo) non necessariamente è parallela allo stendimento di geofoni. Per questo motivo la pratica comune prevede che il picking sulla curva di dispersione sperimentale venga eseguito non in corrispondenza del massimo di energia, ma in corrispondenza del bordo inferiore.

Il metodo Re.Mi. eseguito nel presente studio ha sfruttato la stessa geometria di profilo utilizzata per il metodo MASW. Solitamente il campionamento complessivo è della durata di qualche minuto.

### 4.4 Misura a stazione singola H/V: procedura e strumentazione utilizzata

Il metodo HVSr (*Horizontal to Vertical Spectral Ratio*) proposto da Nogoshi e Igarashi (1970) e successivamente modificato da Nakamura (1989), si basa sull'analisi del rapporto spettrale tra le componenti orizzontale (H) e verticale (V) del rumore sismico registrato in un sito. Il rumore sismico è presente ovunque ed è generato sia da fenomeni atmosferici (onde oceaniche, vento) che dall'attività antropica. Il rumore sismico è indicato spesso come microtremore poiché è caratterizzato da oscillazioni

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molto deboli (dell'ordine dei  $\mu\text{m/s}$ ). I microtremori sono in parte costituiti da onde di volume, P o S, ma soprattutto da onde superficiali, la cui velocità è comunque prossima a quella delle onde S (Mulargia et al., 2007). La tecnica di misura del rumore sismico richiede tempi di registrazione pari a 14-30 minuti e necessita di sensori tridirezionali da sismologia con messa in bolla, digitalizzatore 24 bit con elevata dinamica, elevato guadagno ed elevata frequenza di campionamento nativo, con minimizzazione del rumore elettro/meccanico.

L'acquisizione è stata eseguita utilizzando un tromografo digitale, "TROMINO ENGY" (*Micromed S.p.A.*) dotato di 3 canali velocimetrici (N-S, E-W, Up-Down) ad alto guadagno per l'acquisizione del microtremore sismico ambientale (fino a  $\sim 1.5 \text{ mm/s}$ ); il sistema opera nell'intervallo di frequenze 0.1–1024 Hz. L'elaborazione dei dati di rumore sismico acquisiti è avvenuta mediante software *Grilla*.

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## 5 RISULTATI INDAGINE

### 5.1 TECNICA IN ARRAY

Strumentazione utilizzata.....Sismografo digitale 24 canali – 24 bit modello ECHO24  
 Numero di geofoni verticali (frq. Propria 4.5 Hz).....12  
 Spaziatura tra i geofoni.....3.00 m  
 Frequenza di campionamento.....2.000 Hz (MASW) – 250 Hz (Re.Mi.)  
 Lunghezza traccia acquisita.....1 sec (MASW) – 60 sec (Re.Mi.)  
 Sorgente.....mazza (3 Kg) e rumore ambientale

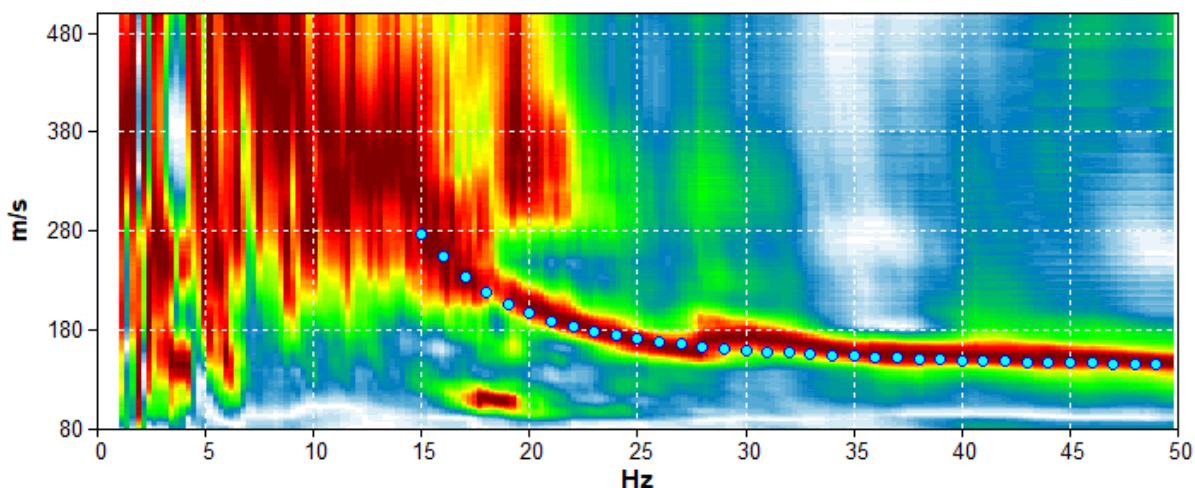


Figura 3 - Spettro di velocità di fase dell'onda di Rayleigh per il profilo sismico eseguito in array con tecnica MASW-Re.Mi. mediante sismografo digitale ECHO24. In blu il modo fondamentale della curva di dispersione teorica per il modello di sottosuolo proposto per il sito.



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## 6 TECNICA HVSr

Strumento: TROMINO MODELLO ENGY

Data registrazione: 20/07/2021

Nomi canali: NORTH SOUTH; EAST WEST ; UP DOWN

Dato GPS non disponibile

Durata registrazione: 0h20'00".

Freq. campionamento: 512 Hz

Lunghezza finestre: 20 s

Tipo di lisciamento: Triangular window

Lisciamento: 10%

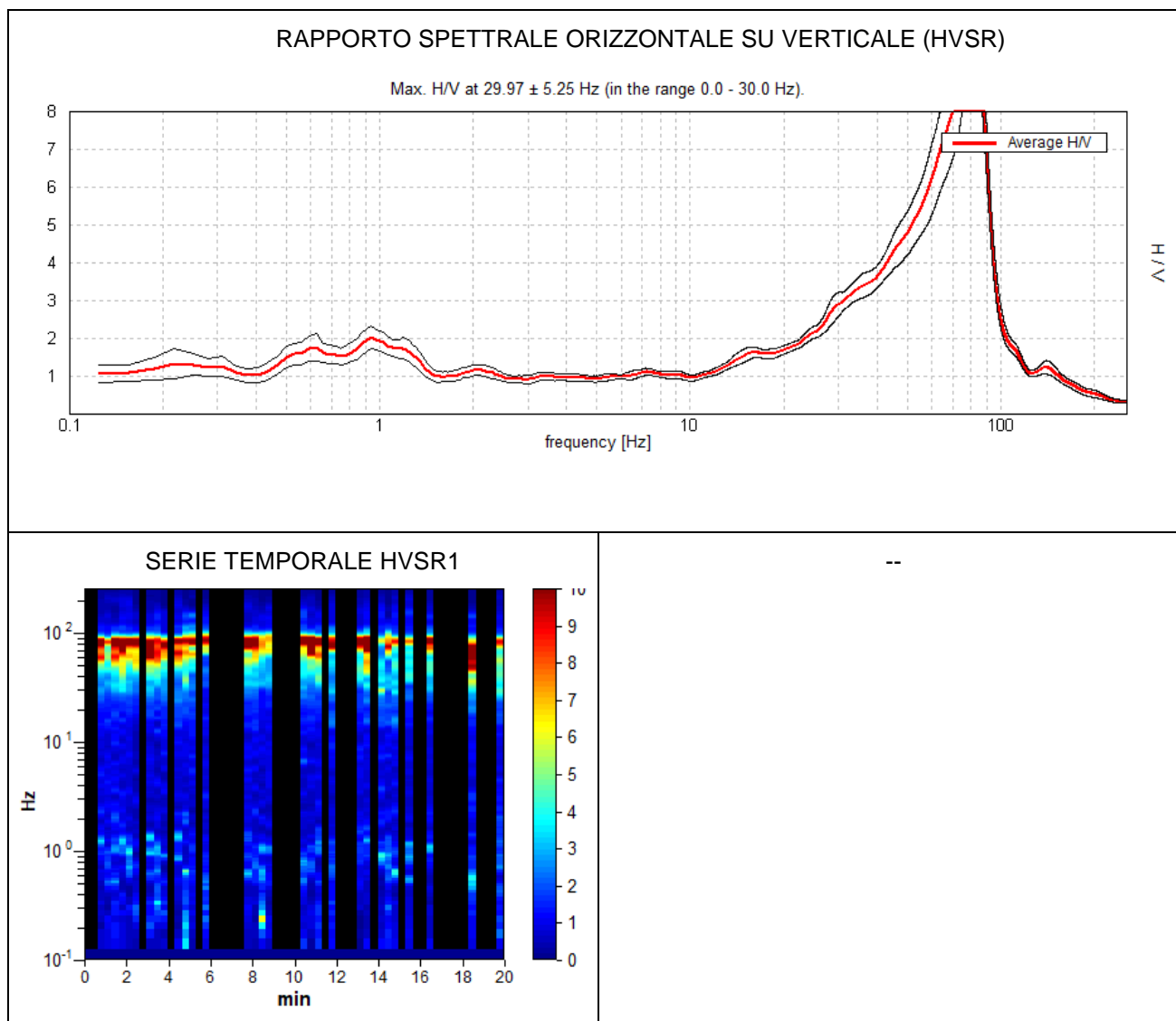


Figura 4 - Curva H/V (HVSr) registrata nel sito in esame e serie temporale considerata nell'analisi.

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### SPETTRI DELLE SINGOLE COMPONENTI HVSr1

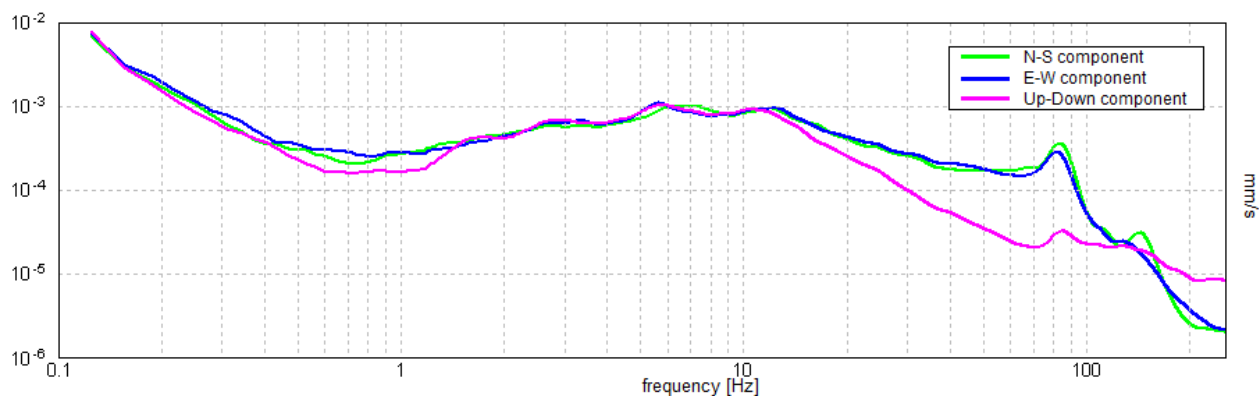


Figura 5 - spettri delle 3 componenti del moto in velocità registrate nel sito

### H/V SPERIMENTALE vs. H/V SINTETICO

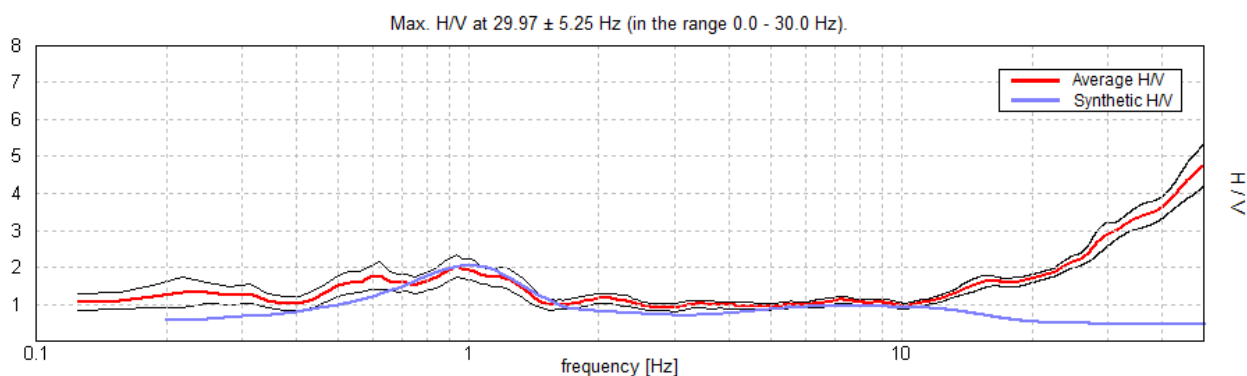


Figura 6 - confronto tra curva HVSr1 sperimentale registrata nel sito e curva teorica (blu) relativa al modello di sottosuolo proposto per il sito.

Indagine geofisica effettuata mediante prova in array con tecnica MASW – REMI e misura HVSr (microtremore sismico) per la determinazione della categoria di suolo di fondazione dell'area di via Gessi 16 – Lugo (RA).

## 7 MODELLO DI SOTTOSUOLO PROPOSTO PER IL SITO

Sulla base dei risultati ottenuti e dell'interpretazione dei dati acquisiti il modello di sottosuolo proposto per il sito in studio, in termini di profilo verticale di Vs, è il seguente (fit congiunto masw-hvsr):

Profondità base strato (m)	Spessore (m)	Vs (m/s)
1.50	1.50	150
4.00	2.50	185
12.50	8.50	250
40.50	28.00	300
105.50	65.00	430
inf.	inf.	610

Tabella 1 – Modello di sottosuolo proposto per il sito

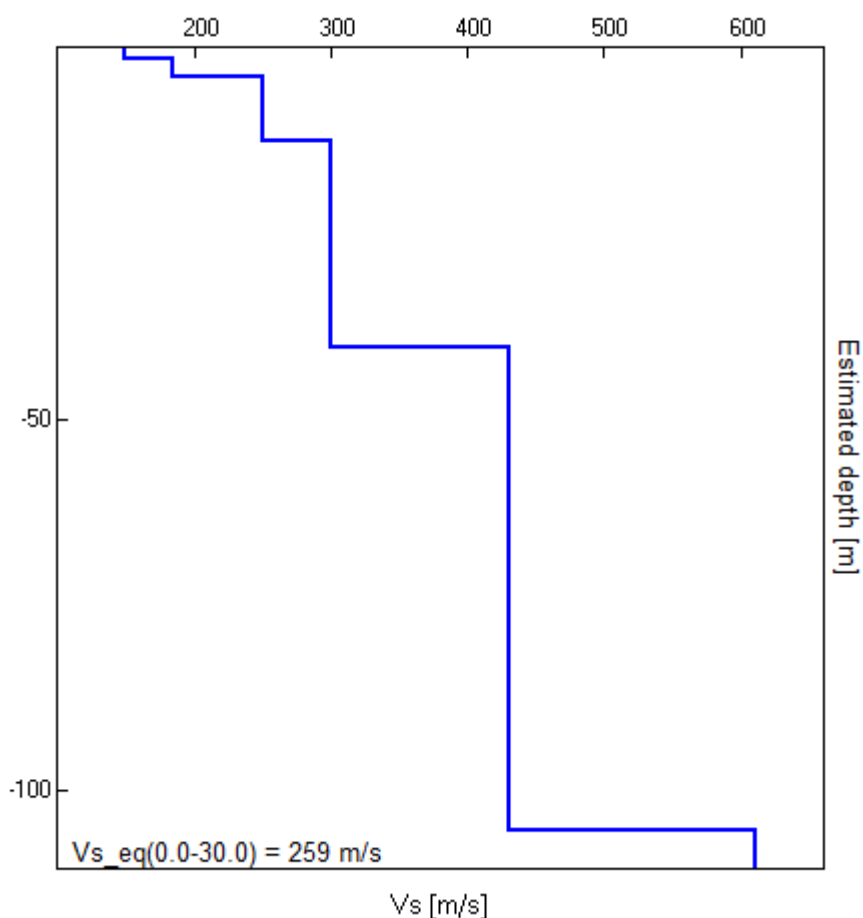


Figura 7 - Modello di velocità delle onde di taglio S

Indagine geofisica effettuata mediante prova in array con tecnica *MASW* – REMI e misura HVSR (microtremore sismico) per la determinazione della categoria di suolo di fondazione dell'area di via Gessi 16 – Lugo (RA).

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## **8 CONCLUSIONI**

**Vs,eq=Vs30 [m/s] da quota piano campagna su cui è stata eseguita l'indagine geofisica.....259**

Nel intervallo da 0 a 30 Hz, la curva HVSR è caratterizzata da una debole amplificazione locale del moto del suolo per risonanza stratigrafica a basso contrasto di rigidità. Il cui picco maggiormente significativo corrisponde a circa 1 Hz.

La normativa applicata nel presente lavoro è il DM 17 gennaio 2018.

San Lazzaro di Savena, 22/07/2021