

Progetto di Piano Particolareggiato di iniziativa privata C.2Q "LA GRANDE"

- Committenti:

FAVA RITA (proprietaria)

- Progetto

Arch. DANIELE ZOBOLI

- Progettista

Elaborato Specialistico:

**Relazione geologica,
geotecnica e sismica**

Dott. PIER LUIGI DALLARI

**PROGETTO
RELAZIONE GEOLOGICA,
GEOTECNICA E SISMICA**

Elaborato **28**

22 Dicembre 2021

COMUNE DI NONANTOLA

PROVINCIA DI MODENA

RELAZIONE GEOLOGICA

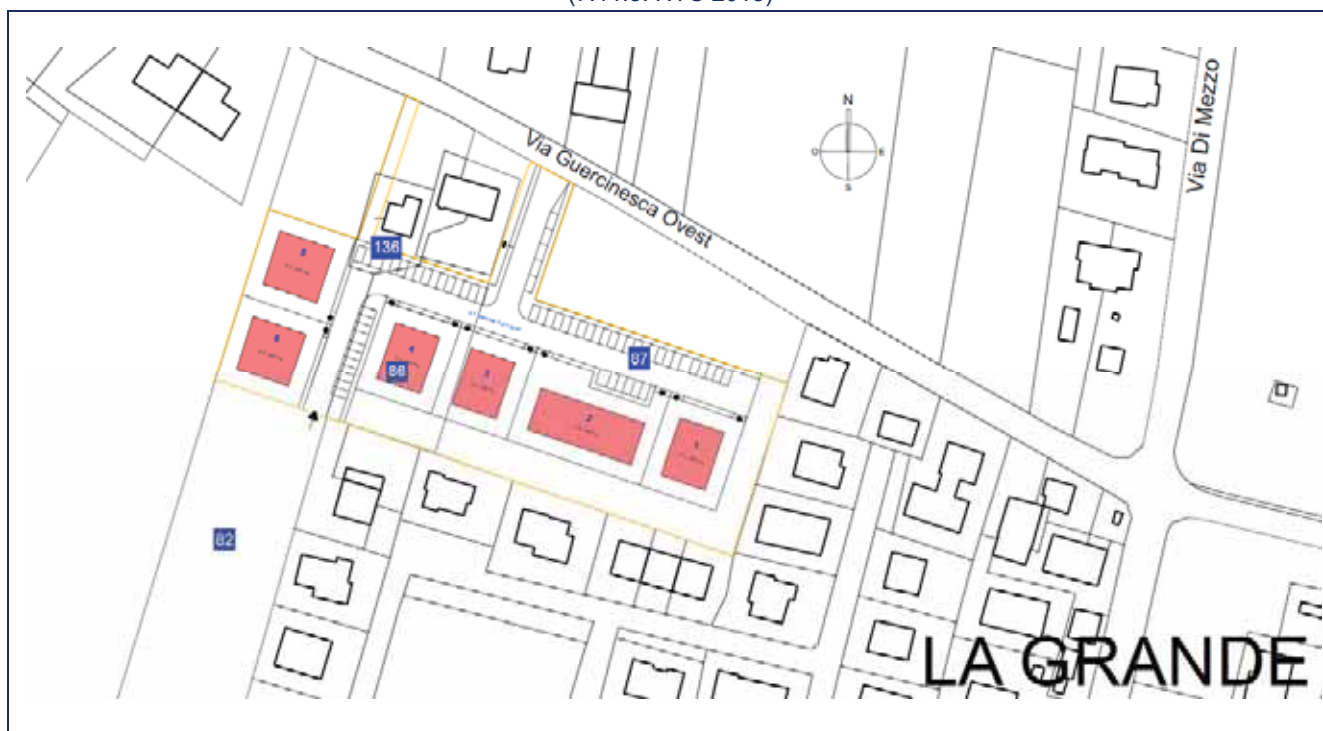
inerente la caratterizzazione e modellazione geologica del sito (6.2.1. NTC 2018)

RELAZIONE GEOTECNICA

Relativa alle indagini, alla caratterizzazione e alla modellazione geotecnica a supporto della progettazione strutturale (6.2.2. NTC 2018) nonché relativa alla verifica delle opere di fondazione (6.4. NTC 2018)

ANALISI PERICOLOSITÀ SISMICA LOCALE

Relativa alla caratterizzazione geofisica del volume significativo di terreno (3.2.2 NTC 2018), valutazione dell'azione sismica di riferimento (3.2.3. NTC 2018), Risposta sismica locale e verifica della stabilità nei confronti della liquefazione (7.11.3. NTC 2018)



OGGETTO:

Relazione geologica, geotecnica e sismica a supporto della presentazione del Piano Particolareggiato di iniziativa privata C.2Q "LA GRANDE", in fregio a via Guercinesca Ovest, in località La Grande nel Comune di Nonantola (MO)



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Dicembre 2021

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RELAZIONE TECNICA

comprendente:

RELAZIONE GEOLOGICA inerente le indagini geognostiche eseguite, la definizione delle unità litotecniche, gli eventuali processi geomorfologici al fine della modellazione geologica del sito (§6.2.1. DM 17/01/18)

RELAZIONE 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. DM 17/01/18)

Relazione concernente la "RISPOSTA SISMICA DEL SITO" (ai sensi del DM 17/01/18 NNTC) e la verifica agli Stati Limiti Ultimi (SLU) (§6.4 del DM 17/01/18) al fine della progettazione per azioni sismiche e la suscettività alla liquefazione dei terreni investigati

OGGETTO:

Relazione geologica, geotecnica e sismica a supporto della presentazione del Piano Particolareggiato di iniziativa privata C.2Q "LA GRANDE", in fregio a via Guercinesca Ovest, in località La Grande
nel Comune di Nonantola (MO)



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TAVOLE

TAV. N. 1: "CARTA COROGRAFICA"	SCALA 1: 25.000;
TAV. N. 2: "CARTA TOPOGRAFICA"	SCALA 1: 10.000;
TAV. N. 3: "RIPRESA AEREA DELL'AREA DI INTERESSE"	SCALA GRAFICA;
TAV. N. 4: "CARTA LITOLOGIA DI SUPERFICIE"	SCALA 1: 5.000;
TAV. N. 5: "INDAGINI GEOGNOSTICHE"	SCALA GRAFICA;

ALLEGATI

- ALL. N. 1** PROVE PENETROMETRICHE STATICHE CPT E CPTU CORREDATE DI INTERPRETAZIONE GEOTECNICA;
ALL. N. 2 INDAGINI GEOFISICHE E DETERMINAZIONE DELLA $V_{s,30}$;
ALL. N. 3 VERIFICA ALLA LIQUEFAZIONE.



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1 PREMESSE

Su incarico della Committenza, in accordo con i tecnici incaricati, nel mese di Dicembre 2021 è stato eseguito il presente studio geologico-geotecnico e sismico al fine di definire le caratteristiche geologiche e sismiche e determinare i parametri geotecnici caratteristici del terreno di fondazione in un'area a supporto della presentazione del Piano Particolareggiato di iniziativa provata C.2Q "LA GRANDE", in via Guercinesca Ovest, in località La Grande, nel Comune di Nonantola (MO).



Fig. 1.1 – Foto aerea dell'area in studio (tratta da Google Earth)



Fig. 1.2 – Stralcio della planimetria generale di progetto

Per ottemperare alle richieste del D.M. 17/01/2018 il succitato studio verrà suddiviso nei seguenti ambiti:

- 1) **RELAZIONE GEOLOGICA** riguardante le indagini geognostiche eseguite, la caratterizzazione e modellazione geologica del sito (§6.2.1. DM 17/01/18);
- 2) **RELAZIONE GEOTECNICA** basata sulle indagini eseguite, fornisce la caratterizzazione e la modellazione del volume significativo di terreno interessato (§6.2.2. DM 17/01/18);
- 3) Relazione concernente la **"RISPOSTA SISMICA DEL SITO"** (ai sensi del DM 17/01/18) al fine della progettazione per azioni sismiche e della verifica della suscettività alla liquefazione dei terreni investigati.

1.1 INQUADRAMENTO GEOGRAFICO

Il lotto oggetto del nuovo intervento residenziale è ubicato in via Guercinesca Ovest, in località La Grande nel Comune di Nonantola (MO), come illustrato nella "Carta corografica", estratto tavola CTR n. 202_NO, alla scala 1: 25.000 (**tav. n. 1**); nella "Carta topografica" sezioni CTR n. 202050, alla scala 1: 10.000 (**tav. n. 2**) e nella "Ripresa aerea" (**tav. n. 3**), riportate in allegato.

2 INQUADRAMENTO GEOLOGICO - GEOMORFOLOGICO

Il lotto oggetto di studio è collocato a nord del comune di Nonantola in località La Grande, ad una quota topografica media di circa 24.0 m s.l.m..

Dal punto di vista litologico nell'area affiorano i depositi di seguito illustrati e riportati nella "Carta geologica" (**tav. n. 2**), tratta dal sito della Regione Emilia Romagna, GEOLOGIA, SISMICA E SUOLI - Cartografia geologica interattiva:

SUCCESSIONE NEOGENICO-QUATERNARIA DEL MARGINE APPENNINICO PADANO



Successione neogenico-quadernaria del margine appenninico padano



AES8a - Unità di Modena
Depositi ghiaiosi passanti a sabbie e limi di terrazzo
alluvionale. Limi prevalenti nelle fasce pedecollinari di
interconoide. Unità definita dalla presenza di un suolo
a bassissimo grado di alterazione.
Litofacies limosa



Area di interesse

3 CARATTERIZZAZIONE GEOTECNICA DEL TERRENO

3.1 INDAGINI GEOTECNICHE

In relazione alla litologia individuata dalla cartografia nell'area di studio e in base alla tipologia dell'intervento in progetto, la campagna geognostica è stata espletata mediante le seguenti indagini:

- N. 4 PROVE PENETROMETRICHE STATICHE CON PUNTA MECCANICA CPT;
- N. 2 PROVE PENETROMETRICHE STATICHE CON PUNTA ELETTRICA E PIEZOCONO CPTu.

I tabulati e i diagrammi relativi alle prove penetrometriche effettuate in sito, corredati dell'interpretazione geotecnica, sono riportati in **allegato n. 1**.

3.2 PROVE PENETROMETRICHE STATICHE CPT

Nell'**allegato n. 1** sono riportati anche i grafici e le tabelle riguardanti le prove eseguite corredate dell'elaborazione geotecnica e litostratigrafica. Le caratteristiche tecniche dello strumento impiegato sono le seguenti:

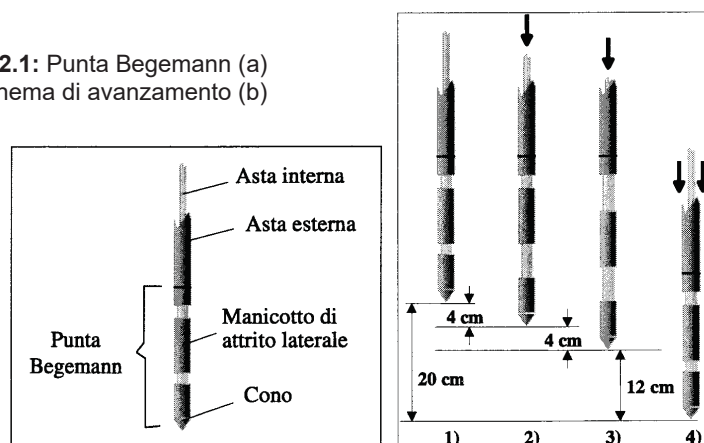
Punta meccanica	Begemann
Spinta	100 kN
Intervalli di misura	20 cm
Parametri registrati	R_p (resistenza alla punta) R_I (resistenza attrito laterale)
Area punta	10 cm²
Angolo alla punta	60°



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Fig. 3.2.1: Punta Begemann (a)
e schema di avanzamento (b)



La prova penetrometrica statica CPT (*Cone Penetration Test*) viene realizzata infiggendo nel terreno, alla velocità di 2 cm/sec, la punta meccanica Begemann (**fig. 2.2**). La punta presenta alla sua estremità inferiore un cono avente un angolo al vertice di 60° , un diametro alla base di 36 mm e quindi un'area di base di 10 cm^2 . Esso supporta lungo il suo stelo un manicotto d'attrito, la cui superficie laterale è di 150 cm^2 . I valori degli sforzi di reazione che il suolo oppone alla penetrazione della punta, allo scorrimento del manicotto laterale e l'avanzamento dell'insieme punta più aste, verranno registrati ogni 20 cm di avanzamento in profondità.

L'esecuzione della prova avviene tramite il seguente schema di avanzamento (**fig. 2.2**):

- 1) posizione di riposo con punta completamente chiusa;
- 2) spinta esercitata sulle aste interne con avanzamento di 4 cm del solo cono; visualizzazione dello sforzo di punta (R_p);
- 3) spinta esercitata sulle aste interne con avanzamento di 4 cm di cono + manicotto; visualizzazione dello sforzo di punta + attrito laterale (R_l);
- 4) spinta esercitata sulle aste esterne con avanzamento di 12 cm e ritorno alla posizione di riposo con punta completamente chiusa; visualizzazione dello sforzo di punta + attrito + attrito della batteria di aste (R_t).

Nella fase d'avanzamento in cui viene letta la resistenza alla punta, il display restituisce automaticamente il carico unitario di resistenza (R_p) tenuto conto della superficie di infissione di circa 10 cm^2 . Nella fase di avanzamento in cui viene letta la somma delle resistenze alla punta ed al manicotto di frizione il display visualizza il carico assoluto espresso in kg diviso per 10 (R_l). Ad ogni profondità di misura (x), i valori reali della resistenza alla penetrazione della punta " q_c " e dell'attrito laterale locale " f_s " possono essere calcolati tramite le seguenti formule:

$$q_c(x) = R_p(x) \text{ [kg/cm}^2\text{]}$$

dove:

$$AP \text{ (Area Punta)} = 10 \text{ cm}^2$$

$$AM \text{ (Area Manicotto Laterale)} = 150 \text{ cm}^2$$

$$f_s(X) = (RI(x+1) - R_p(x+1)) \cdot (AP/AM) = (RI(x+1) - R_p(x+1)) / 15$$

La particolare punta utilizzata per la perforazione *Friction Jacket Cone* è servita a determinare, oltre al carico di rottura, anche la litologia dei terreni investigati: dal rapporto tra la resistenza penetrometrica alla punta e la resistenza laterale locale è infatti possibile risalire, attraverso l'esperienza di **Begemann**, modificata da **Schmertmann** (di seguito descritti), alla granulometria, e di conseguenza alla litologia, dei terreni attraversati dall'indagine.

Metodo di Begemann:

Il metodo di BEGEMANN considera il **rapporto tra Rp e RI** come parametro indicativo delle variazioni litologiche. In particolare l'Autore suggerisce le seguenti correlazioni:

Rapporto Rp/RI	Litologia
$R_p/RI < 15$	Argilla organica e torba
$15 < R_p/RI < 20$	Limo e/o argilla inorganica
$30 < R_p/RI < 60$	Limo sabbioso e sabbia limosa
$R_p/RI > 60$	Sabbie o sabbia più ghiaia

Va ricordato che tali correlazioni sono valide solo per terreni immersi in falda.

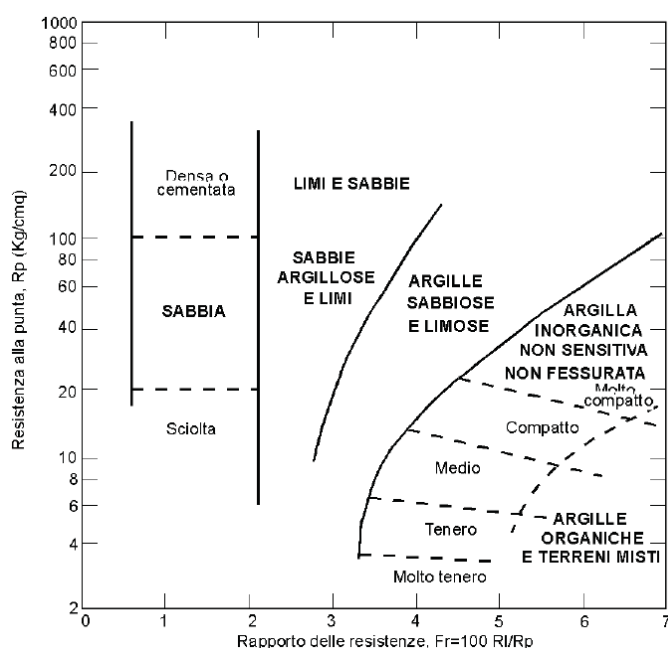
Metodo di Schmertmann:

Il metodo di SCHMERTMANN considera come indicativo della litologia della verticale indagata il rapporto delle resistenze **Fr** (con **Fr%=100 RI/Rp**), secondo il grafico seguente:



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3.3 PROVE PENETROMETRICHE CON PUNTA ELETTRICA E PIEZOCONO CPTU

La prova penetrometrica statica con punta elettrica (CPTE/U), consiste essenzialmente nella misura della resistenza alla penetrazione di una punta conica standard, connessa all'estremità inferiore di una batteria di aste cave, che viene infissa a pressione e velocità costante nel terreno tramite un dispositivo di spinta idraulico che agisce alla sommità delle aste.



Fig. 3.3.1: Attrezzatura di prova utilizzata.

La punta elettrica è strumentata con sensori elettrici e un sistema di trasmissione dei dati in superficie via cavo, che permette l'acquisizione e la registrazione dei dati quasi in continuo, ogni centimetro. I dati

misurati durante la prova sono la resistenza totale alla penetrazione Q_t , la resistenza alla penetrazione della punta Q_c e la resistenza laterale del manicotto F_s ; è possibile inoltre monitorare, durante l'esecuzione della prova, alcuni parametri di controllo quali l'inclinazione rispetto alla verticalità e la velocità di penetrazione del cono.

Una punta elettrica particolare, detta "piezocono", è dotata anche di un dispositivo di misura della pressione, attraverso il quale viene misurata la pressione dell'acqua nei pori del terreno u (CPTU). La pressione che viene misurata è la pressione $u = u_0 + \Delta u$, dove u_0 è la pressione dovuta al livello idrostatico e Δu quella generata dallo sforzo alla penetrazione nel terreno.

Il piezocono da Noi utilizzato è un Pagani, con sistema di acquisizione TGAS07 ed è dotato di un dispositivo di misura della pressione costituito da un cilindro metallico saturato con grasso, situato poco al di sopra della punta conica. Si riportano, di seguito, la composizione dell'attrezzatura di prova (**fig. 3.3.1**) e le caratteristiche del piezocono (**fig. 3.3.2**).

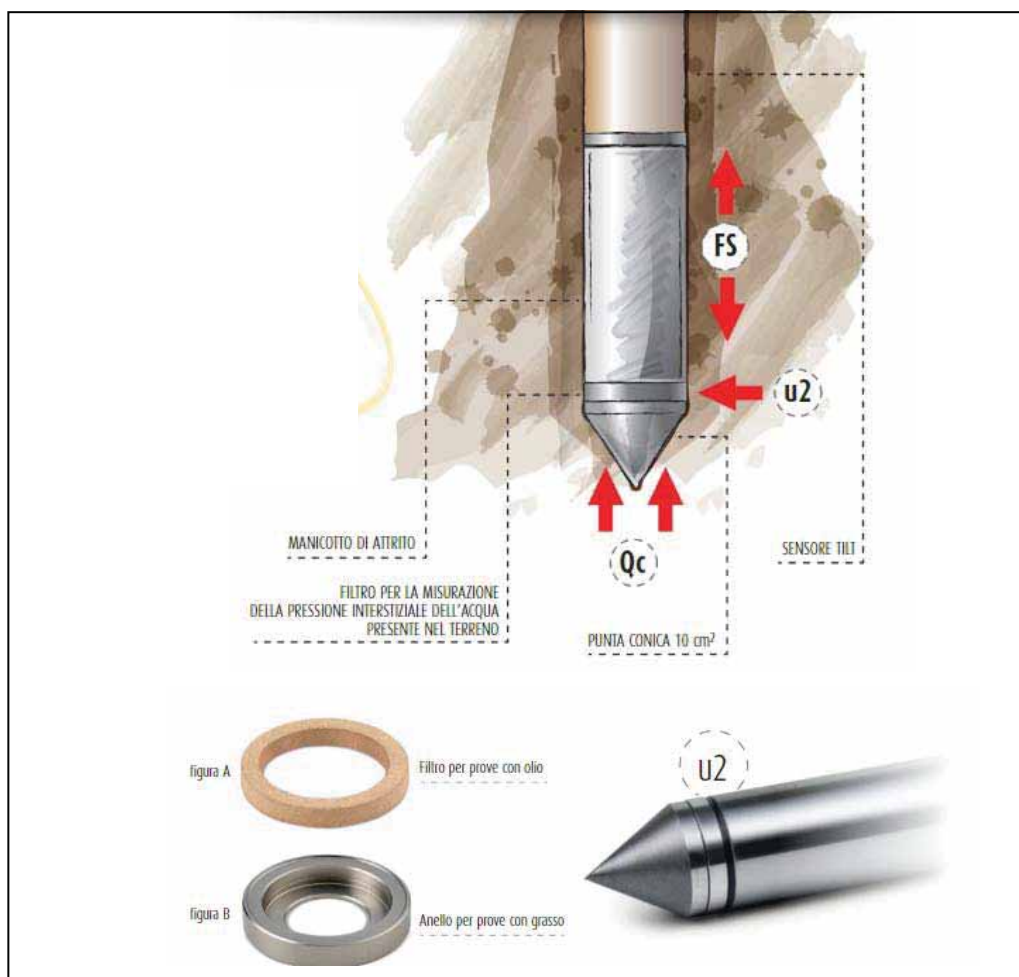


Fig. 3.3.2: Attrezzatura di prova.

SPECIFICHE TECNICHE

Sensore	Fondo scala	Risoluzione	Precisione
QC	50 - 100 MPa	24 bit	0,005 MPa
FS	1600 kPa	24 bit	0,04 MPa
U2	2500 kPa	24 bit	0,04 MPa
TILT	0° - 20°	12 bit	0,5°

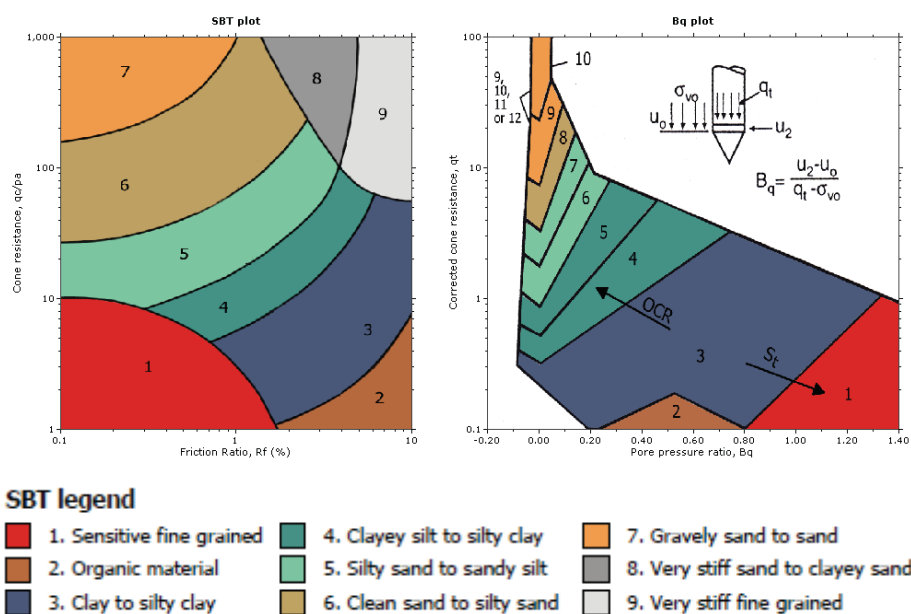
DIMENSIONI

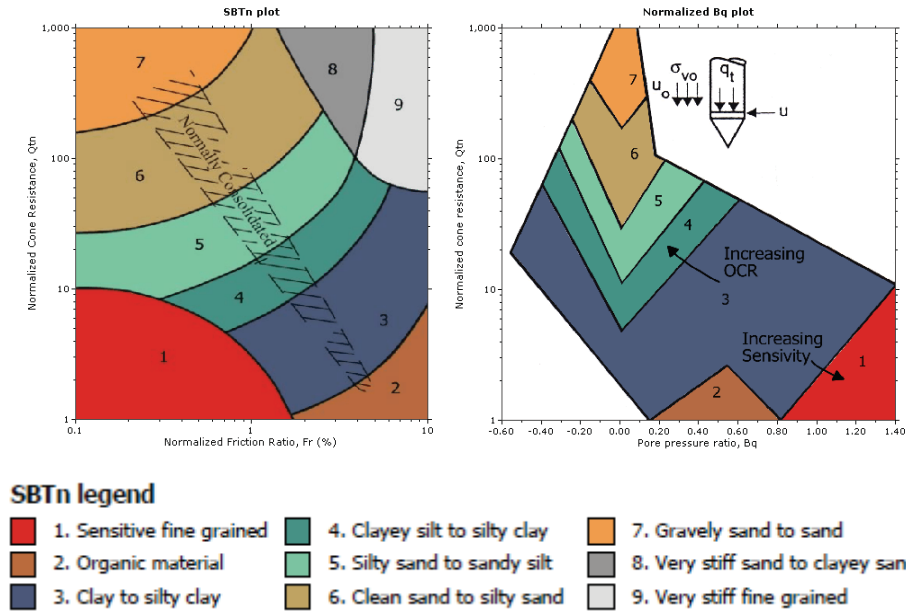
Lunghezza	320 mm	Peso	1,8 kg
Diametro	35,8 mm	Angolo di apertura punta	60°
Sezione	10 cm ²	Superficie manicotto laterale	150 cm ²

Fig. 3.3.3: Caratteristiche del Piezocono Pagani.

I dati acquisiti sono stati elaborati con software CPeT – IT v. 1.7.4.13 prodotto da GeoLogisMiki – Geotechnical Software.

La caratterizzazione litostratigrafica del terreno è stata effettuata in funzione delle carte proposte da Robertson, in cui il tipo di comportamento del terreno è definito da tre parametri: q_t , resistenza alla punta corretta, R_f , B_q , nella prima carta (1986) e con i parametri normalizzati nella seconda (1990).





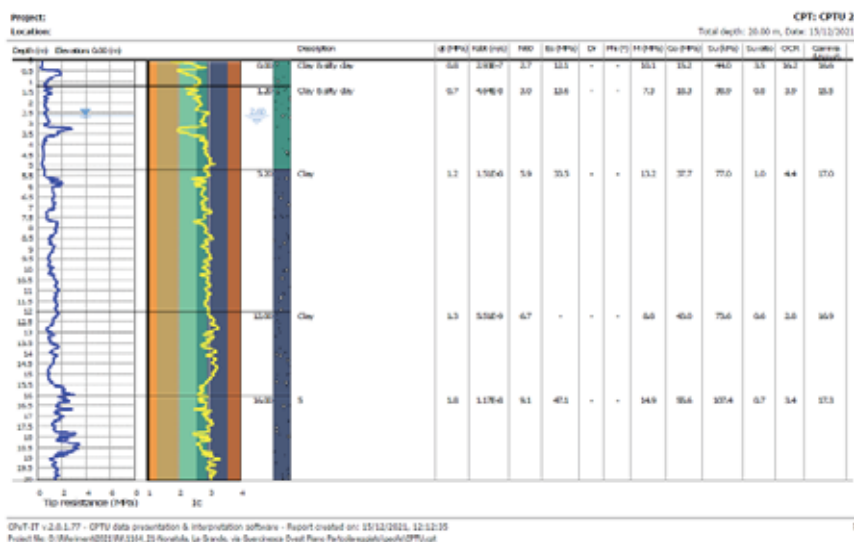
La ricerca e la disponibilità di numerosi dati ottenuti in camera di calibrazione e in campagna ha prodotto numerose correlazioni tra i dati misurati in sito e il valore dei parametri geotecnici caratteristici dei terreni. Il software utilizzato per l'elaborazione delle prove utilizza le correlazioni riportate nello schema seguente.

Unit Weight, g (kN/m³) :: $g = g_w \cdot \left(0.27 \cdot \log(R_f) + 0.36 \cdot \log\left(\frac{q_t}{p_a}\right) + 1.236 \right)$ where g_w = water unit weight Permeability, k (m/s) :: $I_c < 3.27$ and $I_p > 1.00$ then $k = 10^{0.952 - 0.04 I_c}$ $I_c \leq 4.00$ and $I_p > 3.27$ then $k = 10^{-4.52 - 1.37 I_c}$ N₆₀ (blows per 30 cm) :: $N_{60} = \left(\frac{q_t}{p_a} \right) \cdot \frac{1}{10^{1.1268 - 0.2017 I_c}}$ $N_{100} = Q_{ts} \cdot \frac{1}{10^{1.1268 - 0.2017 I_c}}$ Young's Modulus, E_s (MPa) :: $(q_t - \sigma_v) \cdot 0.015 \cdot 10^{0.55 I_c - 1.48}$ (applicable only to $I_c < I_{c,limit}$) Relative Density, D_r (%) :: $100 \cdot \sqrt{\frac{Q_{ts}}{k_{DRE}}} \quad \text{(applicable only to SBT: 5, 6, 7 and 8 or } I_c < I_{c,limit})$ State Parameter, ψ :: $\psi = 0.56 - 0.33 \cdot \log(Q_{ts})$ Peak drained friction angle, ϕ (°) :: $\phi = 17.60 + 11 \cdot \log(Q_{ts})$ (applicable only to SBT: 5, 6, 7 and 8) 1-D constrained modulus, M (MPa) :: If $I_c > 2.20$ $\alpha = 14$ for $Q_{ts} > 14$ $\alpha = Q_{ts}$ for $Q_{ts} \leq 14$ $M_{CPT} = \alpha \cdot (q_t - \sigma_v)$ If $I_c \leq 2.20$ $M_{CPT} = (q_t - \sigma_v) \cdot 0.0188 \cdot 10^{0.55 I_c - 1.48}$	Small strain shear Modulus, G_0 (MPa) :: $G_0 = (q_t - \sigma_v) \cdot 0.0188 \cdot 10^{0.55 I_c - 1.48}$ Shear Wave Velocity, V_s (m/s) :: $V_s = \left(\frac{G_0}{\rho} \right)^{0.50}$ Undrained peak shear strength, S_u (kPa) :: $N_{60} = 10.50 + 7 \cdot \log(F_1) \text{ or user defined}$ $S_u = \frac{(q_t - \sigma_v)}{N_{60}}$ (applicable only to SBT: 1, 2, 3, 4 and 9 or $I_c > I_{c,limit}$) Remolded undrained shear strength, $S_{u(rem)}$ (kPa) :: $S_{u(rem)} = f_s$ (applicable only to SBT: 1, 2, 3, 4 and 9 or $I_c > I_{c,limit}$) Overconsolidation Ratio, OCR :: $k_{OCR} = \left[\frac{Q_{ts}^{0.20}}{0.25 \cdot (10.50 + 7 \cdot \log(F_1))} \right]^{1.23} \text{ or user defined}$ $OCR = k_{OCR} \cdot Q_{ts}$ (applicable only to SBT: 1, 2, 3, 4 and 9 or $I_c > I_{c,limit}$) In situ Stress Ratio, K_0 :: $K_0 = 0.1 \cdot \left(\frac{q_t - \sigma_v}{\sigma_{v0}} \right)$ (applicable only to SBT: 1, 2, 3, 4 and 9 or $I_c > I_{c,limit}$) Soil Sensitivity, S_s :: $S_s = \frac{N_{60}}{F_1}$ (applicable only to SBT: 1, 2, 3, 4 and 9 or $I_c > I_{c,limit}$) Effective Stress Friction Angle, ϕ' (°) :: $\phi' = 29.5^\circ \cdot B_0^{0.123} \cdot (0.256 + 0.336 \cdot B_0 + \log Q_{ts})$ (applicable for $0.10 < B_0 < 1.00$)
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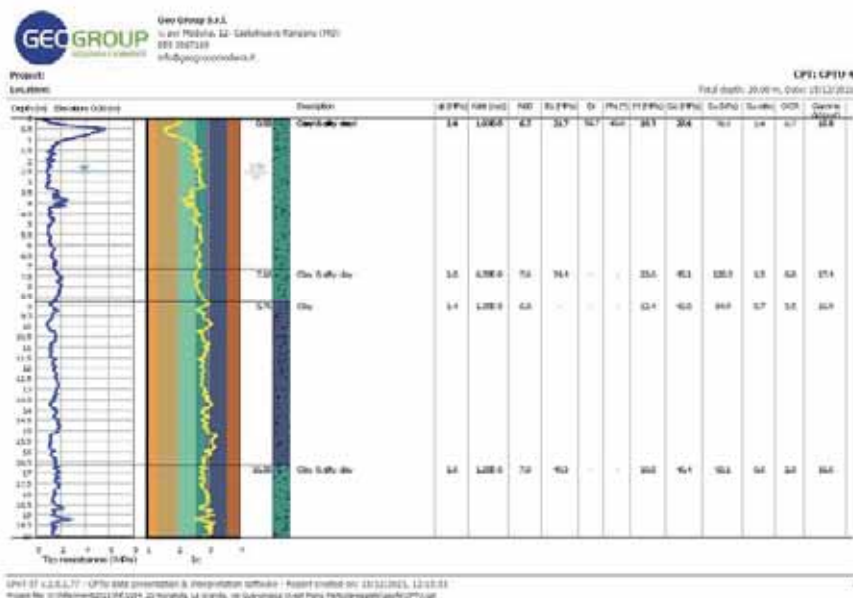
3.4 CARATTERISTICHE GEOTECNICHE E LITOSTRATIGRAFICHE DEL SOTTOSUOLO

Sulla base dei dati emersi dall'elaborazione geotecnica e litostratigrafica delle prove penetrometriche CPT e CPTu effettuate e illustrate nell'**allegato n. 1**, si può riassumere quanto segue:

CPTU2



CPTU4



- al termine delle prove penetrometriche, in data 30/11/2021 è stata rilevata la soggiacenza della **FALDA FREATICA LIBERA** all'interno dei fori di sondaggio. La verifica è stata eseguita mediante freatimetro elettroacustico.

LIVELLO FALDA FREATICA SUPERFICIALE

CPT 1	CPTu 2	CPT 3	CPTu 4	CPT 5	CPT 6
Non rilevata	-2.60 m da p.c.	-2.40 m da p.c.	-2.50 m da p.c.	-2.60 m da p.c.	-3.00 m da p.c.

3.5 MODELLO GEOTECNICO

Il modello geotecnico è finalizzato a fornire tutti i parametri geotecnici del terreno necessari per la progettazione. Sulla base dei dati emersi dall'elaborazione geotecnica e litostratigrafica delle indagini geotecniche eseguite, illustrate nell'**allegato n. 1** e precedentemente descritte, si fornisce il seguente modello.

MODELLO GEOTECNICO SCHEMATICO

Strato	Profondità	falda	Litotipo	Parametri geotecnici	
1	0.0 – 1.60 m da p.c.		Argilla o argilla limosa sovracconsolidata	γ	1800 kg/m ³ $\approx$ 18.00 kN/m ³
				γ'	2100 kg/m ³ $\approx$ 21.00 kN/m ³
				C_{uk}	0.90 kg/cm ² $\approx$ 90.0 kN/m ²
				C'_k	0.09 kg/cm ² $\approx$ 9.0 kN/m ²
				M_0	70.0 kg/cm ² $\approx$ 7000 kN/m ²
				ϕ_k	24°
				v	0.35
2	1.60 – 5.60 m da p.c.	-2.40 m da p.c.	Argilla o argilla limosa a medio- scarsa consistenza	γ	1750 kg/m ³ $\approx$ 17.50 kN/m ³
				γ'	2050 kg/m ³ $\approx$ 20.50 kN/m ³
				C_{uk}	0.35 kg/cm ² $\approx$ 35.0 kN/m ²
				C'_k	0.035 kg/cm ² $\approx$ 3.5 kN/m ²
				M_0	30.0 kg/cm ² $\approx$ 3000 kN/m ²
				ϕ_k	21°
				v	0.50
3	5.60 – 8.40 m da p.c.		Argilla o argilla limosa a media consistenza	γ	1800 kg/m ³ $\approx$ 18.00 kN/m ³
				γ'	2100 kg/m ³ $\approx$ 21.00 kN/m ³
				C_{uk}	0.60 kg/cm ² $\approx$ 60.0 kN/m ²
				C'_k	0.06 kg/cm ² $\approx$ 6.0 kN/m ²
				M_0	50.0 kg/cm ² $\approx$ 5000 kN/m ²
				ϕ_k	23°
				v	0.45
4	8.40 – 16.00 m da p.c.		Argilla o argilla limosa a medio- elevata consistenza	γ	1850 kg/m ³ $\approx$ 18.50 kN/m ³
				γ'	2150 kg/m ³ $\approx$ 21.50 kN/m ³
				C_{uk}	0.70 kg/cm ² $\approx$ 70.0 kN/m ²
				C'_k	0.07 kg/cm ² $\approx$ 7.0 kN/m ²
				M_0	50.0 kg/cm ² $\approx$ 5000 kN/m ²
				ϕ_k	24°
				v	0.45

5	Da - 16.00 m da p.c.	Argilla o argilla limosa consistente	ν	0.40
			E_s	98 kg/cm ² $\approx$ 9800 kN/m ²
			γ	1900 kg/m ³ $\approx$ 19.00 kN/m ³
			γ'	2200 kg/m ³ $\approx$ 22.00 kN/m ³
			C_{uk}	0.90 kg/cm ² $\approx$ 60.0 kN/m ²
			C'_k	0.09 kg/cm ² $\approx$ 6.0 kN/m ²
			M_0	80.0 kg/cm ² $\approx$ 8000 kN/m ²
			ϕ_k	25°
			ν	0.35
			E_s	126.0 kg/cm ² $\approx$ 12600 kN/m ²

4 CLASSIFICAZIONE E CARATTERIZZAZIONE SISMICA DEL SOTTOSUOLO

4.1 INDAGINI GEOFISICHE

Per classificare l'area da un punto di vista sismico è stata considerata la seguente indagine geofisica effettuata in sito:

- N. 1 INDAGINE SISMICA CON TECNOLOGIA MASW;
- N. 2 INDAGINI SISMICHE PASSIVE CON TECNICA HVSR.

L'elaborazione dell'indagine sismica è consultabile nell'**allegato n. 2**.

4.1.1 INDAGINE SISMICA SECONDO DISPERSIONE ATTIVA DI ONDE DI SUPERFICIE DI TIPO REYLEIGH (metodologia MASW)

Per poter caratterizzare il sottosuolo nei confronti della risposta sismica locale, in corrispondenza dell'area in oggetto è stata svolta un'acquisizione in dispersione sismica attiva di onde superficiali tipo Rayleigh (MASW-Multichannel analysis of surface waves - *Park C. B., Miller R. D., & Xia J., 1999*), registrata mediante *array* lineari. Sulla scorta di tali indagini è stato possibile definire le velocità di trasmissione delle onde di taglio S nel sottosuolo.

La tecnica in oggetto permette di ricostruire il profilo verticale delle Vs con procedimenti di modellazione diretta delle velocità di fase delle onde di superficie (tipo Rayleigh). Partendo dal sismogramma registrato, generato mediante perturbazione indotta da una sorgente energizzante in asse con lo stendimento, è possibile condurre un'analisi spettrale in termini energetici.

Successivamente, attraverso la trasformata di Fourier, si individua la distribuzione dell'energia (spettro) relativa alle velocità di fase e in funzione delle varie frequenze alle quali sono registrate. Da tale elaborazione, tramite una fase di "picking" del segnale ad elevata intensità si ottiene la curva di

dispersione. Attraverso una fase d'inversione del segnale è infine possibile calcolare il modello sismo-stratigrafico espresso in termini di velocità delle onde di taglio (V_s). Tale fase si basa sul principio che le velocità delle onde di Rayleigh sono generalmente $1/9$ delle velocità delle onde di taglio (*Park C. B., Miller R. D., & Xia J., 1999*).

La suddetta analisi è stata realizzata mediante *array* lineare costituito da n. 24 geofoni verticali, aventi frequenza propria di risonanza pari a 4.5 Hz, spazati di *offset* pari a 5.00 m. Il segnale analogico derivante dalle apparecchiature geofoni che è stato convertito in segnale digitale mediante sismografo Geode (Geometrics) 24 bit. I parametri di acquisizione utilizzati hanno previsto una velocità di campionamento (sample rate) di 0.2 millisecondi e lunghezza delle acquisizioni di 2 secondi. Le energizzazioni, eseguite attraverso massa battente da 8.00 Kg, sono state eseguite a 15.00 m, in direzione opposta al geofono corrispondente al primo canale di acquisizione della strumentazione.

Poiché il calcolo del profilo delle velocità delle onde di Rayleigh, Velocità(fase)/frequenza, rappresenta una metodologia non univoca, risulta sempre preferibile operare la modellazione in presenza di dati di *taratura (stratigrafici, geofisici, geotecnici ...)*.

4.1.2 INDAGINI SISMICHE HORIZONTAL TO VERTICAL SPECTRAL RATIO (HVSR) – Metodo di Nakamura

La caratterizzazione sismica dei terreni tramite la tecnica di **indagine sismica passiva HVSR** (*Horizontal to Vertical Spectral Ratio – Metodo di Nakamura*) è finalizzata all'individuazione delle frequenze caratteristiche di risonanza di sito. Esse sono correlabili ai cambi litologici presenti sia all'interno della copertura che nell'ammasso roccioso. L'utilizzo di algoritmi di calcolo finalizzati ad una modellizzazione sintetica dello spettro H/V, permette di correlare ogni picco spettrale con le discontinuità presenti nel sottosuolo (per esempio i cambi litologici). I dati che si possono ricavare sono spessori, profondità e velocità di propagazione delle onde di taglio all'interno del sismo-strato individuato. Tramite l'elaborazione di moti superiori e l'analisi dell'andamento delle tre componenti del moto, è possibile distinguere i picchi di origine naturale da quelli generati dai moti superiori o da artefatti, al fine di garantire una corretta interpretazione dello spettro sismico registrato. La tecnica dei rapporti spettrali (HVSR) trova la sua massima applicazione negli studi di microzonazione sismica poiché fornisce un parametro fondamentale (frequenza propria di risonanza di sito) per una corretta progettazione di edifici antisismici. Negli ultimi anni si è affermata anche per la sua versatilità poiché si è dimostrato come lo spettro sismico può rappresentare un modello sismo – stratigrafico del sottosuolo.



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La tecnica **HVSR** è totalmente **non invasiva, molto rapida**, si può applicare ovunque e non necessita di nessun tipo di perforazione, né di stendimenti di cavi, né di energizzazioni esterne diverse dal rumore ambientale che in natura esiste ovunque. Per l'acquisizione dei dati è stato utilizzato un "velocimetro triassiale" conforme alle norme SESAME.

I risultati che si possono ottenere da indagini sismiche HVSR sono:

- La **frequenza caratteristica di risonanza del sito** che rappresenta un parametro fondamentale per il corretto **dimensionamento degli edifici antisismici**. Si dovranno adottare adeguate precauzioni nell'edificare strutture aventi la stessa frequenza di vibrazione del terreno, per evitare l'effetto di "**doppia risonanza**", fenomeno estremamente pericoloso per la stabilità delle costruzioni.
- La **frequenza fondamentale di risonanza di un edificio**, qualora la misura venga effettuata all'interno dello stesso. In seguito sarà possibile confrontarla con quella caratteristica del sito e capire se, in caso di sisma, la costruzione potrà essere o meno a rischio.
- La **velocità media delle onde di taglio Vs** calcolata tramite un apposito codice di calcolo. È necessario, per l'**affidabilità del risultato**, conoscere la profondità di un riflettore noto dalla stratigrafia (prova penetrometrica, sondaggio, etc.) e riconoscibile nella **curva H/V**. È possibile calcolare la **Vs30** e la relativa categoria del suolo di fondazione come esplicitamente richiesto dalle Norme Tecniche per le Costruzioni 2018.

La **stratigrafia del sottosuolo** con un *range* di indagine compreso tra 0.5 e 700 m di profondità, anche se il dettaglio maggiore si ha nei primi 100 metri. Il principio su cui si basa la tecnica **HVSR**, in termini di **stratigrafia del sottosuolo**, è rappresentato dalla definizione di strato, inteso come unità distinta da quelle sopra e sottostanti per un **contrasto d'impedenza**, ossia per il rapporto tra i prodotti di velocità delle onde sismiche nel mezzo e densità del mezzo stesso.

4.1.3 RISULTATI OTTENUTI

Vengono illustrati successivamente i risultati ottenuti a seguito dell'elaborazione delle indagini geofisiche eseguite per la caratterizzazione sismica del sottosuolo.

MASW	$V_{s30} = 199 \text{ m/s}$	Categoria C
------	-----------------------------	-------------

Con riferimento alle categorie di sottosuolo definite dalla normativa tecnica nazionale NTC 2018 sulla base dei valori delle velocità mediate nei primi 30 m di sottosuolo, è possibile classificare il volume significativo indagato secondo la **categoria si sottosuolo C**.

4.2 SISMICITÀ DELL'AREA

Dalla consultazione della cartografia degli strumenti urbanistici, in particolare la Carta delle microzone omogenee in prospettiva sismica – MOPS - del comune di Nonantola, di cui è riportato un estratto nella figura seguente, si nota che l'area in oggetto ricade parzialmente in una zona di attenzione per instabilità.

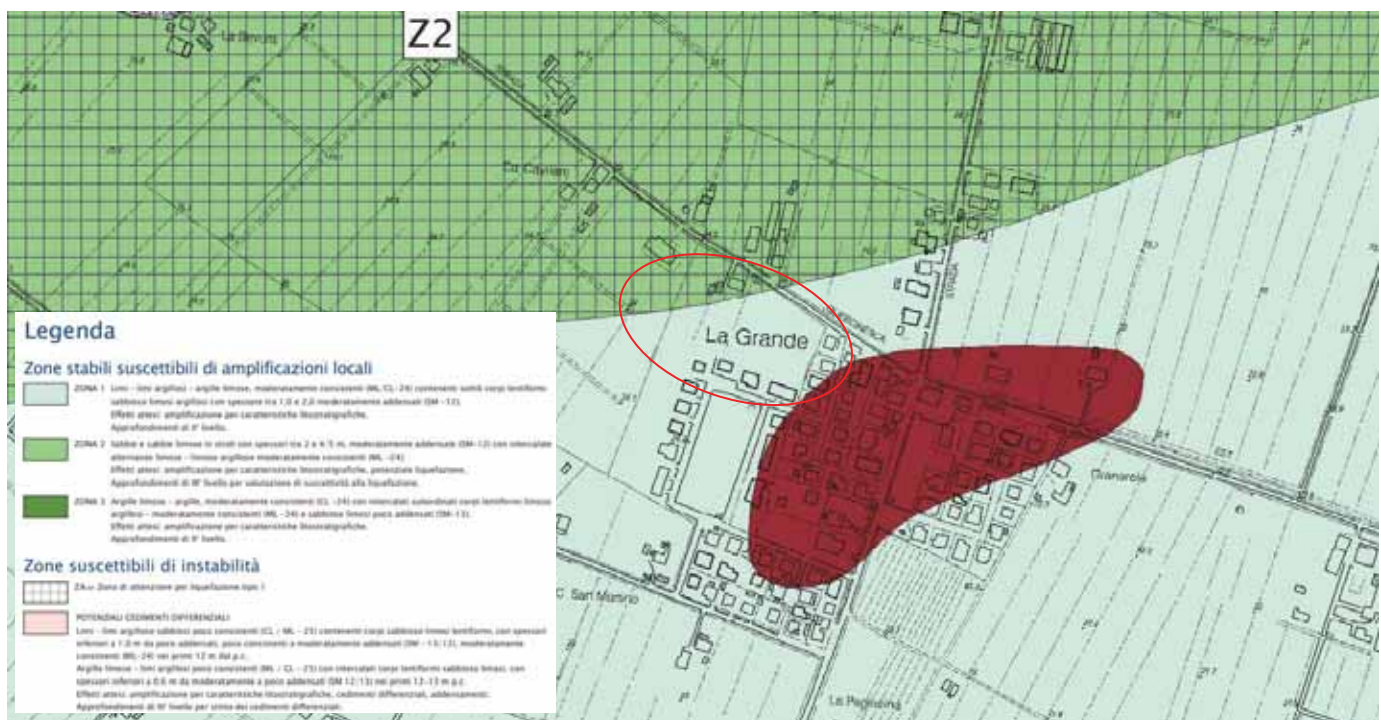


Fig. 4.2.1 – Estratto della Carta di delle microzone omogenee in prospettiva sismica – MOPS - del comune di Nonantola e relativa legenda.

Secondo la classificazione sismica del territorio nazionale proposta a partire dall'O.P.C.M. n. 3274/2003 e successive modifiche, il **Comune di Nonantola (MO)** risulta appartenente alla **classe di sismicità 3**.

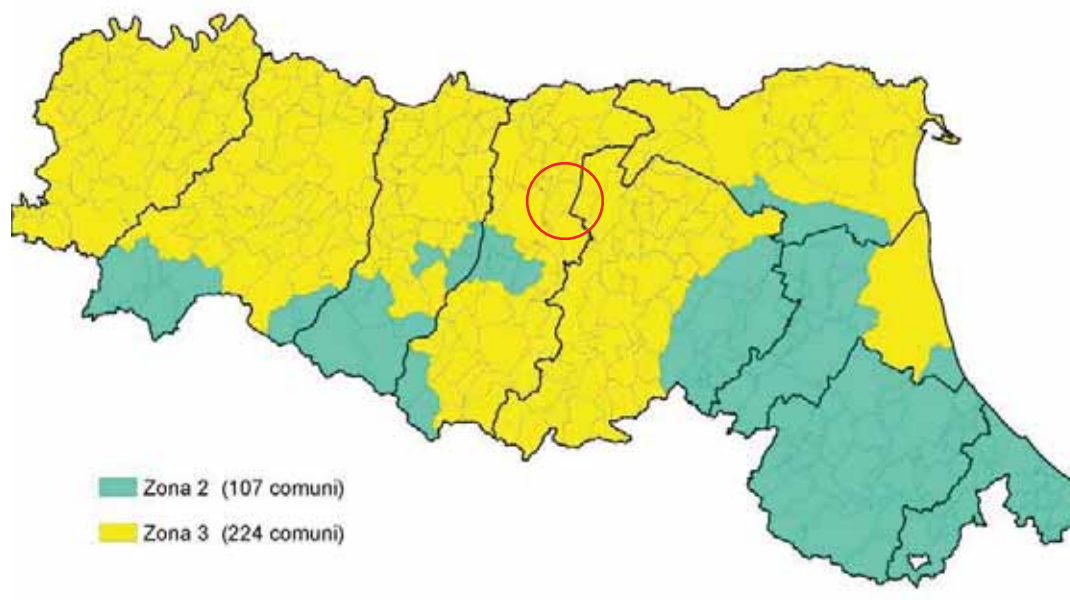
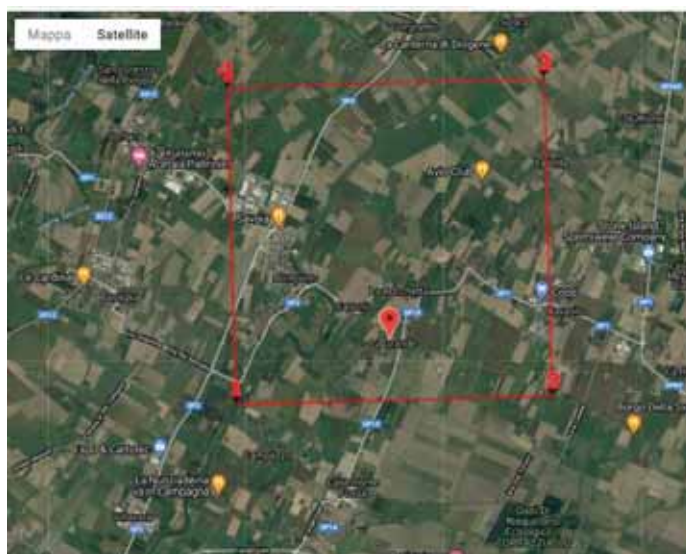


Fig. 4.2.2 – Classificazione sismica vigente dei comuni della regione Emilia-Romagna, il cerchio rosso indica il Comune di Nonantola (MO).

La suddivisione del territorio nazionale in zone a diversa classe di sismicità, caratterizzate da un valore di accelerazione di picco ed un corrispondente spettro di risposta elastico da utilizzare nella progettazione, risulta in realtà superata dall'entrata in vigore delle attuali Norme Tecniche per le Costruzioni (N.T.C. 2018), che ha limitato l'importanza della classificazione sismica alla gestione della pianificazione ed al controllo del territorio da parte degli enti pubblici.

Sulla base dei contenuti del **DM 17/01/18** - Aggiornamento delle "Norme tecniche per le costruzioni" deve essere definita un'accelerazione di riferimento propria, in funzione delle coordinate geografiche dell'area e della vita nominale dell'opera.

Per l'area in oggetto identificata dalle seguenti coordinate geografiche (**Sistema di riferimento ED50**): Latitudine: 44.719546°, Longitudine: 11.063321°, in relazione ad un periodo di riferimento T_R stimato di 475 anni per una classe del manufatto **II**, è stato definito un parametro di accelerazione massima attesa a_g pari a $a_{g\text{ attesa}} = 0.157_g$.



Stati limite



Classe Edificio

II. Affollamento normale. Assenza di funz. pubbliche e sociali...



Vita Nominale

50



Interpolazione

Media ponderata

CU = 1

Stato Limite	Tr [anni]	a_g [g]	F_0	T_c^* [s]
Operatività (SLO)	30	0.045	2.494	0.253
Danno (SLD)	50	0.056	2.508	0.268
Salvaguardia vita (SLV)	475	0.157	2.590	0.272
Prevenzione collasso (SLC)	975	0.209	2.526	0.280
Periodo di riferimento per l'azione sismica: 50				

Coefficienti	SLO	SLD	SLV	SLC
kh	0.013	0.017	0.055	0.081
kv	0.007	0.008	0.028	0.040

Tabelle 4.2.3 – Tabelle dei parametri sismici desunti dal programma "Parametri Sismici" di GEO STRU.

L'accelerazione orizzontale di picco attesa a_g è definita in condizioni di campo libero su sito di riferimento rigido (suolo categoria A) e con superficie topografica orizzontale. L'accelerazione a_g rappresenta uno dei parametri principali che definisce la **pericolosità sismica di base**, insieme ai parametri che F_0 e T_c^* dello spettro di risposta elastico, desumibili nelle tabelle riportate sopra.



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Ai fini della definizione dell'azione sismica, determinata la pericolosità sismica di base, occorre valutare gli **effetti di sito** mediante specifiche analisi di risposta sismica locale.

Per la definizione dell'azione sismica, sulla base di quanto previsto dalle N.T.C., si può fare riferimento ad un approccio semplificato che **si basa sull'individuazione della categoria di sottosuolo e le condizioni topografiche del sito**, in funzione delle quali si definiscono l'entità dell'amplificazione stratigrafica e topografica.

Sulla base del recente Aggiornamento delle "Norme Tecniche per le costruzioni" (DM 17/01/18), tenendo conto dei dati ottenuti dall'indagine geofisica eseguita in sito, si **classifica** il terreno di fondazione in oggetto, come appartenente alla **categoria C**, corrispondente a "DEPOSITI DI TERRENI A GRANA GROSSA MEDIAMENTE ADDENSATI O TERRENI A GRANA FINE MEDIAMENTE CONSISTENTI CON PROFONDITÀ DEL SUBSTRATO SUPERIORI A 30 METRI, CARATTERIZZATI DA UN MIGLIORAMENTO DELLE PROPRIETÀ MECCANICHE CON LA PROFONDITÀ E DA VALORI DI VELOCITÀ EQUIVALENTE COMPRESI TRA **180 M/S E 360 M/S**."

Si ricava quindi il **fattore stratigrafico S_s** , caratteristico del sito secondo le N.T.C. - D.M. 17/01/18, mediante la seguente relazione, valida suoli in classe B:

$$1.00 \leq S_s = 1.70 - (0.60 \cdot F_0 \cdot a_g/g) \leq 1.50 \quad (4.1.1)$$

dove:

F_0 = fattore che quantifica l'amplificazione spettrale massima, su sito di riferimento rigido orizzontale, ed ha valore minimo pari a 2.2; per il sito oggetto di studio tale valore, calcolato mediante l'utilizzo di apposito software, risulta pari a **2.590**;

a_g/g = accelerazione orizzontale del sito, con tempo di ritorno pari a 475 anni/accelerazione di gravità;

S_s = coefficiente di amplificazione stratigrafica o fattore stratigrafico, calcolato tramite la relazione 4.1.1; per il sito oggetto di studio risulta pari a 1.24, per cui si assume uguale a **1.46**;

Successivamente, sulla base delle condizioni topografiche del sito studiato, si calcola il fattore topografico **S_T** dalla seguente tabella:

Categoria topografica	Caratteristiche della superficie topografica	Fattore topografico S_T
T1	Superficie pianeggiante, pendii e rilievi isolati con inclinazione	1.0

	media $i \leq 15^\circ$	
T2	Pendii con inclinazione media $i > 15^\circ$	1.2
T3	Rilievi con larghezza in cresta molto minore che alla base e inclinazione media $15^\circ \leq i \leq 30^\circ$	1.2
T4	Rilievi con larghezza in cresta molto minore che alla base e inclinazione media $i > 30^\circ$	1.4

Per l'area studiata, sita, come suddetto in una zona pianeggiante, appartenente quindi alla categoria topografica **T1**, si ottiene un fattore topografico **S_T** pari a **1.0**.

In base a tali valori del fattore stratigrafico **S_S** e del fattore topografico **S_T** si procede al calcolo dell'accelerazione massima orizzontale **A_{max}**:

$$\mathbf{A_{max} = S_S \cdot S_T \cdot a_g = 1.46 \cdot 1.0 \cdot 0.157 \text{ g} = 0.229 \text{ g}} \quad (4.1.2)$$

4.3 ANALISI DI RISPOSTA SISMICA LOCALE

Per ottemperare ai riferimenti normativi citati l'analisi è stata svolta secondo quanto indicato al § 7.11.3 delle NTC 2018, attraverso analisi numerica monodimensionale in campo lineare equivalente. Per fare ciò è stato utilizzato come strumento di lavoro il software di calcolo STRATA (University of Texas - Austin). Ai fini della restituzione degli spettri di accelerazione, relativi allo stato limite SLV, è stata svolta la verifica dell'amplificazione del sito mediante l'utilizzo di un modello simulato in campo lineare equivalente.

Utilizzando un modello lineare equivalente è possibile ottenere una soluzione di un modello non lineare, attraverso analisi lineari complete nelle quali al termine di ogni interazione vengono aggiornati i parametri di rigidità e smorzamento che sono dipendenti dallo stato di deformazione del terreno. Attraverso un'iterazione di calcoli si raggiunge una convergenza prefissata a monte della fase di computazione.

Il software STRATA è in grado di valutare la risposta sismica di un deposito di terreno, considerando un profilo monodimensionale in cui si propagano linearmente le onde sismiche, in funzione dei parametri dinamici attribuiti al terreno. Il terreno viene schematizzato come un sistema di N strati orizzontali omogenei, isotropi e visco-elastici, sovrastanti un semispazio uniforme, attraversati da un treno di onde di taglio che incidono verticalmente le superfici. Ogni strato è descritto per mezzo dello spessore H, del modulo di taglio massimo G_{max} o dalla corrispondente velocità massima V_{max}, dal valore dello

smorzamento D , dal peso dell'unità di volume γ e dalle curve di decadimento del modulo di rigidezza a taglio normalizzato ($G / G_0 - \gamma$) e le corrispondenti curve dello smorzamento ($D - \gamma$) con la deformazione di taglio γ . Il modello lineare visco-elastico fa riferimento al modello reologico di Kelvin-Voigt, costituito da una molla e uno smorzatore viscoso in parallelo. Tale modello è descritto quindi dalla rigidezza (G) e dallo smorzamento (D). L'onda monodimensionale viene descritta dall'equazione in cui lo spostamento provocato (u) è funzione della profondità (z) e del tempo (t):

$$u(z,t) = A \exp[i(\omega t + k^* z)] + B \exp[i(\omega t - k^* z)]$$

Nell'equazione appena presentata A e B rappresentano le corrispettive amplificazioni del tetto e della base dello strato considerato. Il fattore k^* risulta dipendente dal modulo di taglio (G), dal grado di smorzamento (D) e dalla densità del terreno (ρ). Le relazioni sono le seguenti:

$$k^* = \frac{\omega}{v_s^*}$$

$$v_s^* = \sqrt{\frac{G^*}{\rho}}$$

$$G^* = G(1 - 2D^2 + i2D\sqrt{1 - D^2}) \approx G(1 + i2D)$$

Dove G^* e v_s^* rappresentano il modulo di taglio e la velocità di taglio.

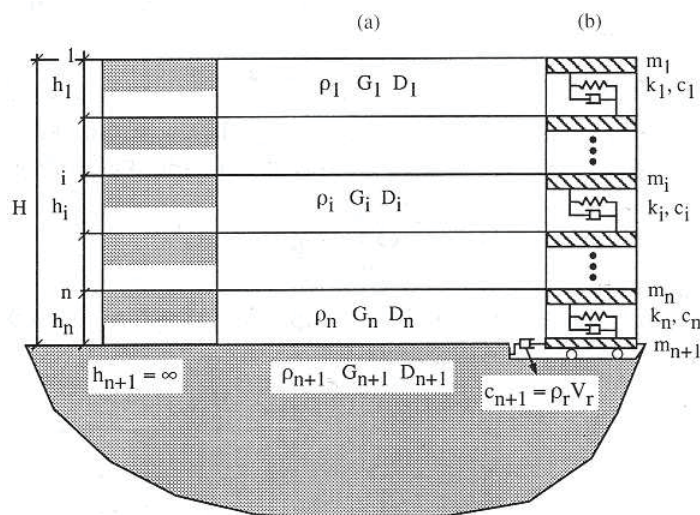


Fig.4.3.1 - Modello a strati continui adottato per la simulazione con il codice di calcolo STRATA.

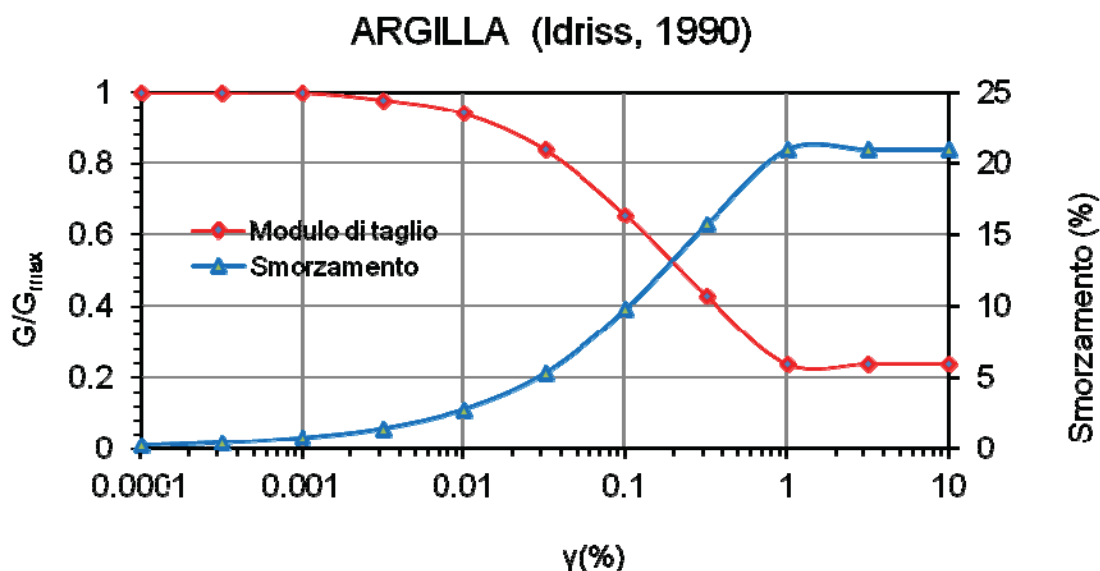
MODELLO SIMULATO

Il modello simulato deriva dai dati ottenuti dalle prove che compongono la campagna geognostica eseguita in sito. Tale profilo approssima il comportamento del sottosuolo, dal punto di vista sismico, in corrispondenza dell'area studiata. Il profilo considerato deriva dall'interpolazione dei dati provenienti dalle indagini geofisiche eseguite, e i dati, di natura bibliografica, disponibili per il sito di riferimento. Il profilo sismico del sottosuolo utilizzato per la modellazione della RSL deriva dall'elaborazione delle indagini sismiche eseguite in sito integrato con dati di bibliografici. Si illustra successivamente il modello utilizzato:

Depth at the bottom of the layer [m]	Thickness [m]	Vs [m/s]	Poisson ratio
0.00	1.00	120.00	0.43
1.00	15.00	150.00	0.43
16.00	24.00	220.00	0.43
40.00	22.00	330.00	0.42
62.00	37.00	460.00	0.42
99.0	BEDROCK	800.00	0.42

Tab.4.3.2 – Modello ottenuto dall'elaborazione delle indagini sismiche congiunte.

Per descrivere il comportamento dinamico dei terreni costituenti il modello sono state considerate curve di decadimento dei moduli di rigidezza e smorzamento, al variare della deformazione percentuale $\gamma(\%)$. Si riportano successivamente le curve di decadimento considerate per l'esecuzione del calcolo di risposta sismica locale:



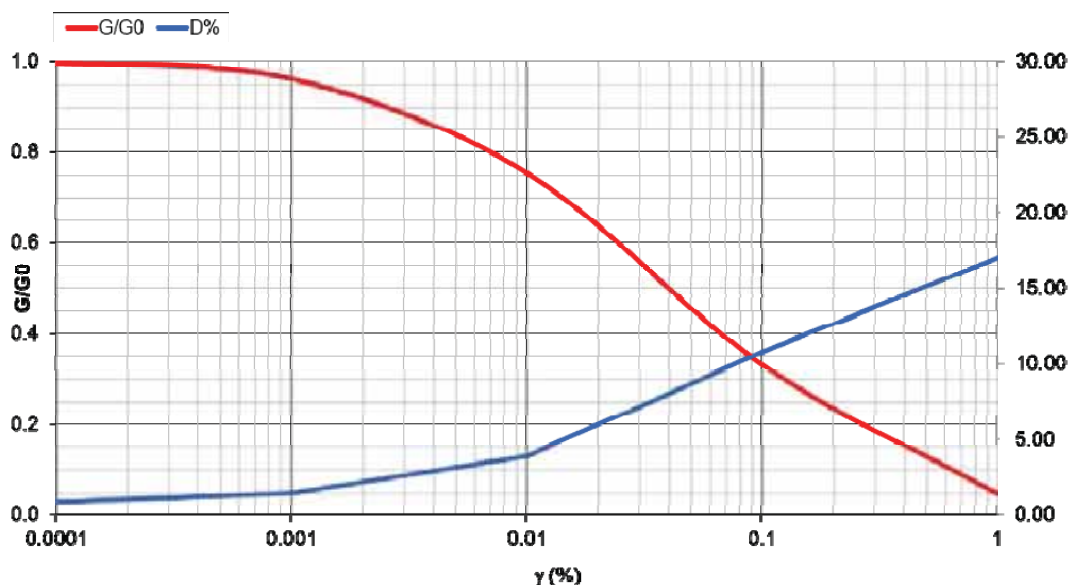


Fig.4.3.3 - Curva di decadimento dei moduli G/G_{max} e smorzamento D , utilizzate per descrivere il comportamento dei materiali che compongono il sottosuolo in oggetto.

In accordo con quanto esposto nella D.G.R. 630/19, l'analisi RSL in oggetto è stata svolta adottando come input sismico 3 accelerogrammi, corrispondenti allo stato limite SLV. I segnali di riferimento sono stati successivamente scalati per il valore di PGA_0 atteso al suolo rigido in corrispondenza dell'areale oggetto di analisi. Per fare ciò è stata considerata l'interpolazione spaziale dei valori di PGA_0 proposta da INGV per il territorio nazionale e resi disponibili per il territorio regionale sui punti di una griglia con passo 0.05 gradi.

Per il sito in oggetto tale valore è pari a **0.157g** considerando un valore di **$C_u = 1.00$** (Classe d'uso II) e **$V_n = 50$ anni** per ottenere un tempo di ritorno pari a 475 anni.

RISULTATI OTTENUTI

Sulla scorta delle verifiche svolte mediante software STRATA, in riferimento al modello considerato, è stato possibile definire, nel dominio delle frequenze, la funzione TF (Funzione di trasferimento) e rapporto spettrale di amplificazione associato. Per via grafica si inserisce successivamente la funzione di trasferimento TF ottenuta a seguito dell'analisi RSL in oggetto. Attraverso tale funzione è possibile definire il campo di frequenze entro il quale il sottosuolo, in corrispondenza del sito in oggetto, amplifica il segnale sismico, oltre che a quantificare l'amplificazione stessa.

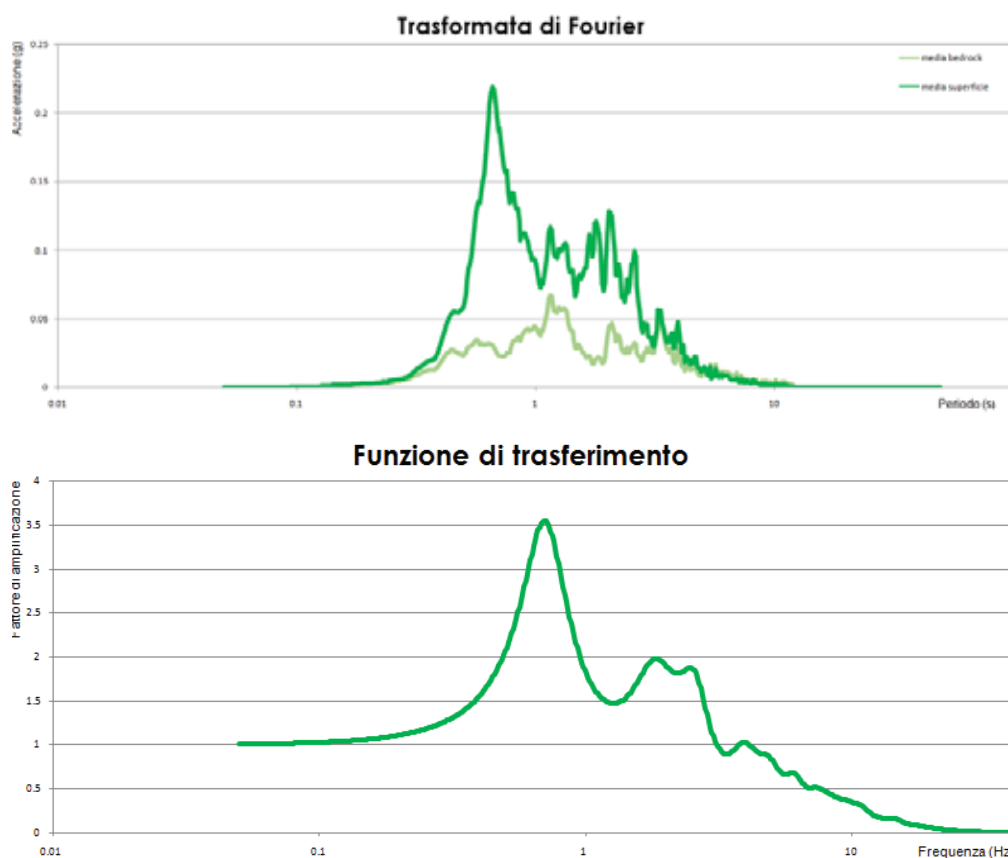
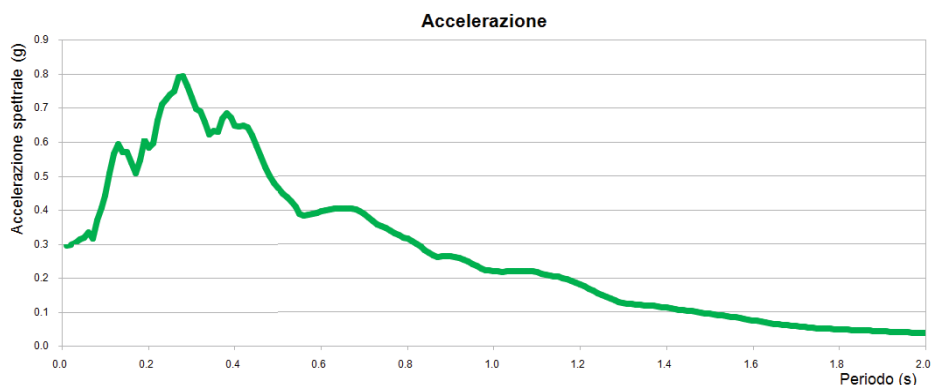
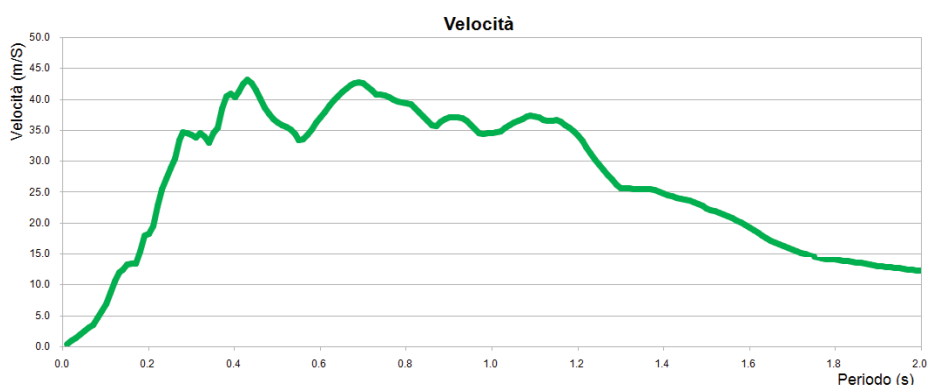


Fig.4.3.4 - Dall'alto: Funzione di Trasferimento, funzione FFT.

Definiti i parametri che descrivono il comportamento del sottosuolo nel campo elastico lineare equivalente e descritti gli accelerogrammi su suolo rigido validi per il sito in oggetto, attraverso il software STRATA sono state definite le seguenti forme spettrali, in termini accelerazione e velocità alla superficie:



Accelerazioni spettrali relative a un periodo di ritorno pari a 475 anni (SLV)



Velocità spettrali relative a un periodo di ritorno pari a 475 anni (SLV).

Dati i valori di accelerazione ottenuti dal calcolo eseguito, è stato definito lo spettro normalizzato per lo stato limite considerato. Così facendo è stato ottenuto lo spettro a probabilità uniforme, sulla base dei risultati ottenuti mediante il software STRATA. Lo spettro normalizzato RSL è stato derivato attraverso le indicazioni contenute nell'ordinanza n.55 del 24 aprile 2018 "Disciplina per la delocalizzazione temporanea delle attività economiche o produttive e dei servizi pubblici danneggiati dal sisma eseguiti e conclusi in data anteriore a quella di entrata in vigore del decreto legge n. 189 del 2016".



Sintesi esiti RSL

SLV – PARAMETRI SPETTRO NORMALIZZATO – RSL						
ag (g)	Fo	Tc*	TB(s)	TC(s)	Ss	Amax (g)
0.157	2.930	0.272	0.16	0.48	1.43	0.225

Come descritto nell'all. 2 della DGR 630/2019, la stima del fattore di amplificazione **FA** è stata calcolata considerando un tempo di ritorno TR=475 anni, con uno smorzamento $\zeta=5\%$, e relativi parametri rappresentativi dello scuotimento sismico, in particolare:

- accelerazione di picco orizzontale (PGA);
- intensità spettrale SA

$$SA = \int_{T_1}^{T_2} A(T, \zeta) dT$$

dove A è lo spettro di risposta in accelerazione, T è il periodo proprio e ζ è lo smorzamento; sono stati considerati quattro intervalli di periodo proprio T ottenendo quattro valori di intensità spettrale:

	T ₁	T ₂
SA1	0,1 s	0,5 s
SA2	0,4 s	0,8 s
SA3	0,7 s	1,1 s
SA4*	0,5 s	1,5 s

- intensità spettrale SI

$$SI = \int_{T_1}^{T_2} V(T, \zeta) dT$$

dove V è lo spettro di risposta in velocità, T è il periodo proprio e ζ è lo smorzamento³; sono stati considerati tre intervalli di periodo proprio T ottenendo tre valori di intensità

	T_1	T_2
SI1	0,1 s	0,5 s
SI2	0,5 s	1,0 s
SI3*	0,5 s	1,5 s

Di seguito si riportano i grafici degli spettri di risposta in accelerazione e velocità calcolati per l'area in studio.

SPETTRI DI RISPOSTA IN ACCELERAZIONE

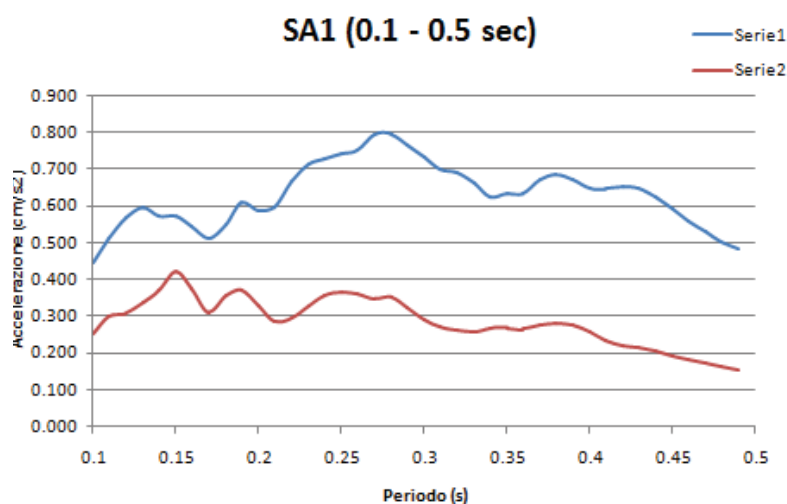


Fig.4.3.6 - Spettro di risposta in accelerazione SA1

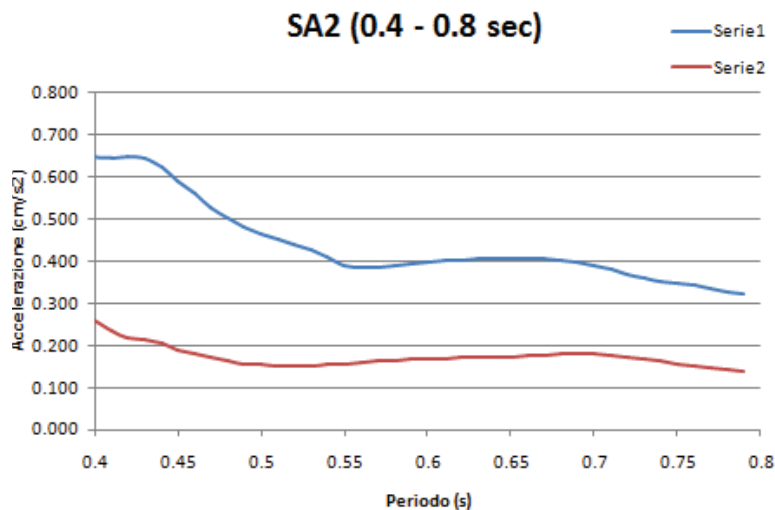


Fig.4.3.7 - Spettro di risposta in accelerazione SA2

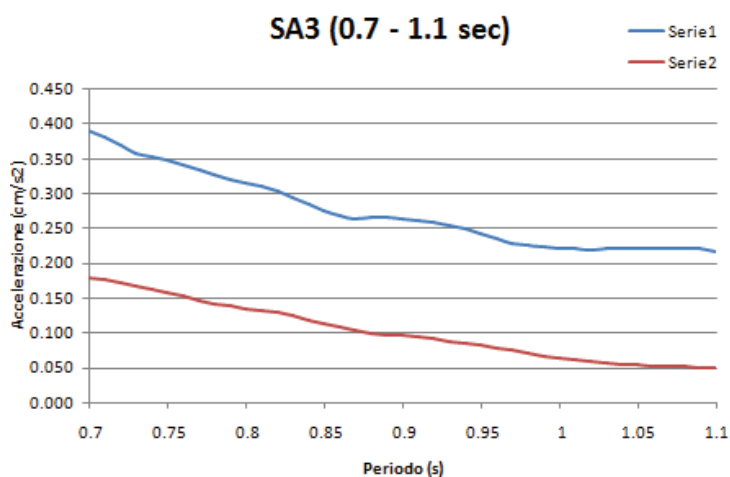


Fig.4.3.8 - Spettro di risposta in accelerazione SA3

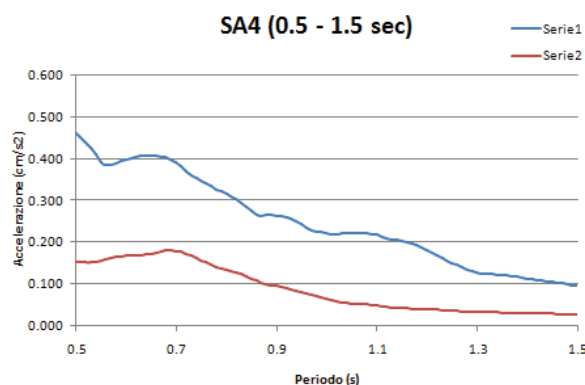


Fig.4.3.9 - Spettro di risposta in accelerazione SA4

SPETTRI DI RISPOSTA IN VELOCITÀ

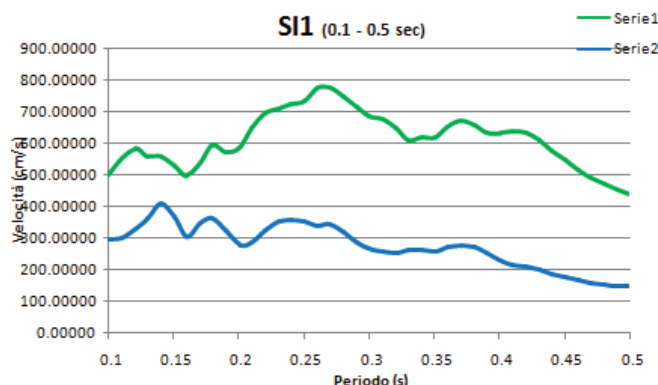


Fig.4.3.10 - Spettro di risposta in velocità SI1

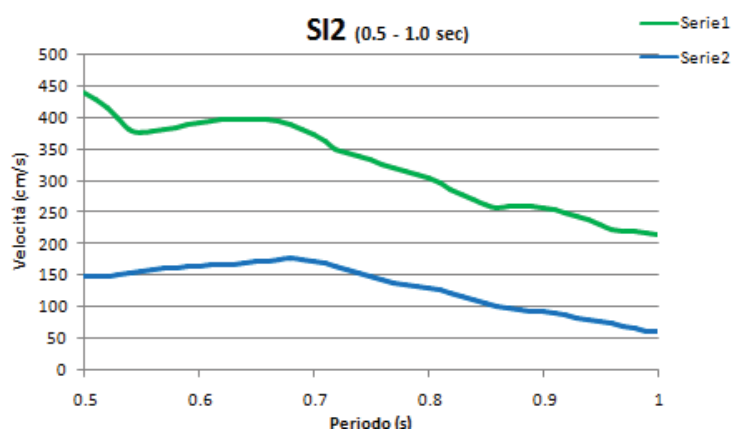


Fig.4.3.11 - Spettro di risposta in velocità SI2

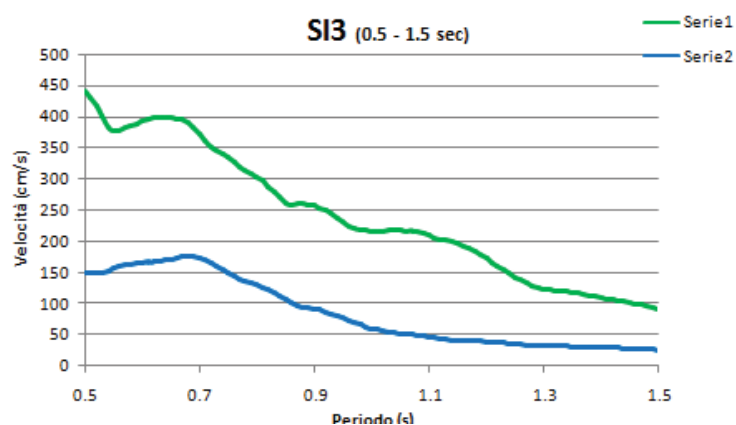


Fig.4.3.12 - Spettro di risposta in velocità SI3

Di seguito si riportano in tabella i FA:

Fattore di amplificazione	Periodo T (s)	FA
Fattore di Amplificazione SA1	$0.1s \leq T \leq 0.5s$	2.30
Fattore di Amplificazione SA2	$0.4s \leq T \leq 0.8s$	2.54
Fattore di Amplificazione SA3	$0.7s \leq T \leq 1.1s$	2.93
Fattore di Amplificazione SA4	$0.5s \leq T \leq 1.5s$	3.29

Tab.4.4 – Fattori di amplificazione SA1 –SA2 –SA3 – SA4.

Fattore di amplificazione	Periodo T (s)	FA
Fattore di Amplificazione SI1	$0.1s \leq T \leq 0.5s$	2.35
Fattore di Amplificazione SI2	$0.5s \leq T \leq 1.0s$	2.55
Fattore di Amplificazione SI3	$0.5s \leq T \leq 1.5s$	3.29

Tab.4.3.13 – Fattori di amplificazione SI1 –SI2 –SI3.

Infine si è calcolato il valore di H_{SM} , ovvero il parametro che esprime lo scuotimento atteso al sito in valore assoluto, dato dal prodotto del parametro Acceleration Spectrum Intensity (ASI_{UHS}), valore integrale dello spettro di riferimento in accelerazione calcolato per l'intervallo di periodi $0.1 \leq T \leq 0.5$ s e moltiplicato per il fattore di amplificazione in accelerazione (FA) calcolato per lo stesso intervallo di periodi:

$$H_{SM} = \frac{ASI_{UHS}}{\Delta T} \times FA$$

I valori di $ASI_{UHS}/\Delta T$, calcolati per ogni punto della griglia INGV, sono riportati nel file all_4_coord.kmz disponibili nella pagina web dedicata agli indirizzi per gli studi di microzonazione sismica a cura del Servizio Geologico, Sismico e dei Suoli, di seguito si riportano i valori della griglia INGV dell'area in studio.

La zona in studio presenta un valore di $ASI_{HS}/\Delta T$ pari a **348.38**

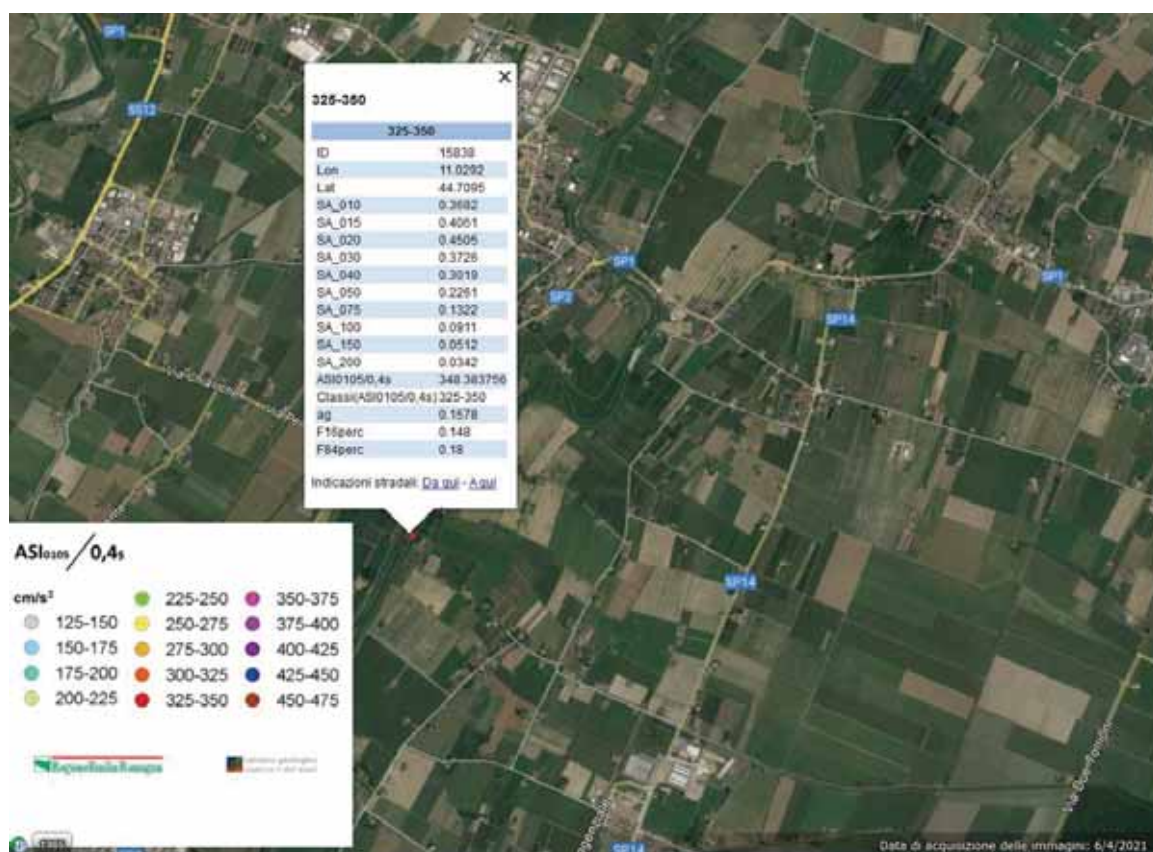


Fig.4.3.14 – Valori di ASI05/ΔT per l'area in studio - griglia INGV.

Dal confronto tra i risultati dell'analisi di risposta sismica locale eseguita con i risultati della verifica secondo approccio semplificato NTC2018 si sono ottenuti i seguenti risultati:

	RSL	NTC 2018
ag	A _{max}	A _{max}
0.157 g	0.225g	0.229g

5 STABILITA' NEI CONFRONTI DELLA VERIFICA A LIQUEFAZIONE

In accordo con la normativa regionale DGR 630/19 si è proceduto alla verifica della liquefazione per le verticali di prova CPT e CPTU.

La valutazione del fenomeno della liquefazione viene svolta attraverso il calcolo del fattore di sicurezza di ciascun livello che compone il sottosuolo analizzato nei confronti del fenomeno stesso. Il fattore di sicurezza è derivato secondo la seguente formulazione:

$$F_L(z) = \frac{CRR_{M=7.5; \sigma'_v = \text{latm}}}{CSR} \cdot MSF \cdot K_\sigma$$

Dove:

CRR è rappresentato dal rapporto di resistenza ciclica

MSF rappresenta il fattore di scala della magnitudo che è funzione della magnitudo stessa, della PGA e del valore di CRR

K_σ è il fattore di correzione che tiene conto della pressione efficace alla profondità a cui la resistenza viene valutata

CSR è il rapporto di tensione ciclica, ovvero la tensione di taglio indotta dall'azione sismica, normalizzata rispetto alla tensione verticale efficace. Tale parametro è derivabile secondo la seguente formulazione:

$$CSR = \frac{\tau_{media}}{\sigma'_{v0}} = 0.65 \cdot \frac{a_{max}}{g} \cdot \frac{\sigma_{v0}}{\sigma'_{v0}} \cdot r_d$$

I termini che compongono la seguente relazione sono rappresentati da a_{max}/g che descrive il valore dell'accelerazione orizzontale a $T = 0.00$ s, il rapporto della tensione litostatica totale ed efficace, e il coefficiente riduttivo r_d . Quest'ultimo, in accordo con la predetta normativa è stato stimato secondo la seguente formulazione:

$$r_d = \exp[\alpha(z) + \beta(z) \cdot M]$$

$$\alpha(z) = -1.012 - 1.126 \cdot \sin\left(\frac{z}{11.73} + 5.133\right)$$

$$\beta(z) = 0.106 + 0.118 \cdot \sin\left(\frac{z}{11.28} + 5.142\right)$$

dove M rappresenta il valore di magnitudo di riferimento per il sito in analisi.

Il valore **CRR** è stato ricavato attraverso la metodologia di calcolo proposta da **Boulanger&Idriss 2014**. Per le specifiche della procedura di calcolo adottata si faccia riferimento all'allegato **A2.2** della DGR

630/2019 della Regione Emilia Romagna. L'analisi di liquefazione è stata eseguita entro i -20.00 m rispetto al piano campagna come prescritto dalla normativa di riferimento.

A seguito dell'identificazione del fattore di sicurezza F_L è stato determinato l'indice potenziale di liquefazione IL (LPI) attraverso il quale è possibile definire l'esposizione del sito al rischio di liquefazione. Il potenziale di liquefazione LPI è stato determinato secondo la seguente formulazione:

$$I_L = \int_0^{z_{crit}} F(z) \cdot w(z) \cdot dz \quad \text{in cui} \quad w(z) = \frac{200}{z_{crit}} \cdot \left(1 - \frac{z}{z_{crit}}\right)$$

Dove $F(z)$ viene determinato secondo le formulazioni proposte da Somnez (2003)

In base al valore di LPI ottenuto è possibile fornire un'indicazione del rischio di liquefazione. In considerazione delle linee guida emesse dalla Regione Emilia Romagna, a seguito degli eventi sismici di Maggio e Giugno 2012, si considera la classificazione di rischio definita da **Somnez 2003**:

INDICE DI LIQUEFAZIONE	Rischio di liquefazione
LPI=0	Nulla
0<LPI≤2	Basso
2<LPI≤5	Moderato
5<LPI≤10	Alto
15>LPI	Molto alto

Si illustra successivamente i valori di LPI considerando un'accelerazione massima al suolo $A_{max} = 0.229g$ (calcolata secondo NTC2018) e una magnitudo di riferimento pari a $M=6.14$ (derivante dalla zonazione sismogenetica).

A seguito della verifica, si sono ottenuti i seguenti valori di LPI:

INDAGINE	INDICE DI LIQUEFAZIONE	RISCHIO
CPT1	0.0	MOLTO BASSO
CPTU 2	0.789	BASSO
CPT3	0.0	MOLTO BASSO
CPTU 4	2.281	MODERATO
CPT5	0.0	MOLTO BASSO
CPT6	0.0	MOLTO BASSO

6 CONCLUSIONI

Il presente studio geologico - geotecnico e sismico è stato redatto a supporto della presentazione del Piano Particolareggiato di iniziativa privata C.2Q "LA GRANDE", in fregio a via Guercinesca Ovest, in località La Grande, nel comune di Nonantola (MO).

Sulla base dei dati emersi dalle indagini geotecniche eseguite in sito, si fornisce per il terreno di fondazione, il **modello geotecnico** medio riportato nel §3.5 della presente relazione.

La caratterizzazione sismica del sito, condotta sulla base di indagini sismiche di tipo MASW e HVSR, ha permesso di determinare la velocità media delle onde di taglio nei primi 30 m di profondità e di classificare il terreno di fondazione come appartenente alla **categoria C**.

Dai risultati di un'analisi specifica di risposta sismica locale il valore di accelerazione massima al suolo ottenuto $A_{MAX,RSL} = 0.225 \text{ g}$ risulta minore rispetto al valore ottenuto mediante l'utilizzo dell'approccio semplificato dell'NTC 2018, pari a $A_{MAX,NTC} = 0.229 \text{ g}$.

Le verifiche a liquefazione sono state condotte con riferimento a questa accelerazione $A_{MAX,RSL} = 0.229 \text{ g}$, considerando una magnitudo di riferimento $M = 6.14$ e la soggiacenza della falda freatica alla quota $D_w = - 2.40 \text{ m}$ da p. campagna attuale, come rilevato in campagna al termine delle prove.

Si riassumono nella seguente tabella i risultati ottenuti:

INDAGINE	INDICE DI LIQUEFAZIONE	RISCHIO
CPT1	0.0	MOLTO BASSO
CPTU 2	0.789	BASSO
CPT3	0.0	MOLTO BASSO
CPTU 4	2.281	MODERATO
CPT5	0.0	MOLTO BASSO
CPT6	0.0	MOLTO BASSO

In riferimento ai potenziali di liquefazione ottenuti è possibile derivare un rischio di liquefazione da molto basso a basso ad eccezione della verticale di prova CPTU 4, in cui è risultato un valore di LPI pari a 2.281 (RISCHIO MODERATO).

In fase di progettazione esecutiva, si consiglia di eseguire per ogni singolo fabbricato in progetto l'esecuzione ulteriori indagini geotecniche corredate di apposite relazioni geologiche geotecniche e sismiche al fine di definire la portanza, i cedimenti e il modulo di sottofondo del terreno allo scopo di utilizzare delle idonee strutture di fondazione.

Modena, 14 Dicembre 2021

GEO GROUP S.R.L.

Dott. Geol. Pier Luigi Dallari



GEO GROUP s.r.l.

Indagini geognostiche e geofisiche – geologia applicata alle costruzioni – laboratorio geotecnico - idrogeologia
– coltivazione cave– bonifiche – consolidamenti – geologia ambientale – consulenze geologiche e geotecniche

Tavole

Indagini geognostiche, geofisiche e consulenze geologiche e geotecniche
182, via C. Costa 41100 Modena - Tel. 059/3967169 - Fax. 059/5332019- E-mail: geo.group@libero.it

Scala 1: 25.000

Legenda

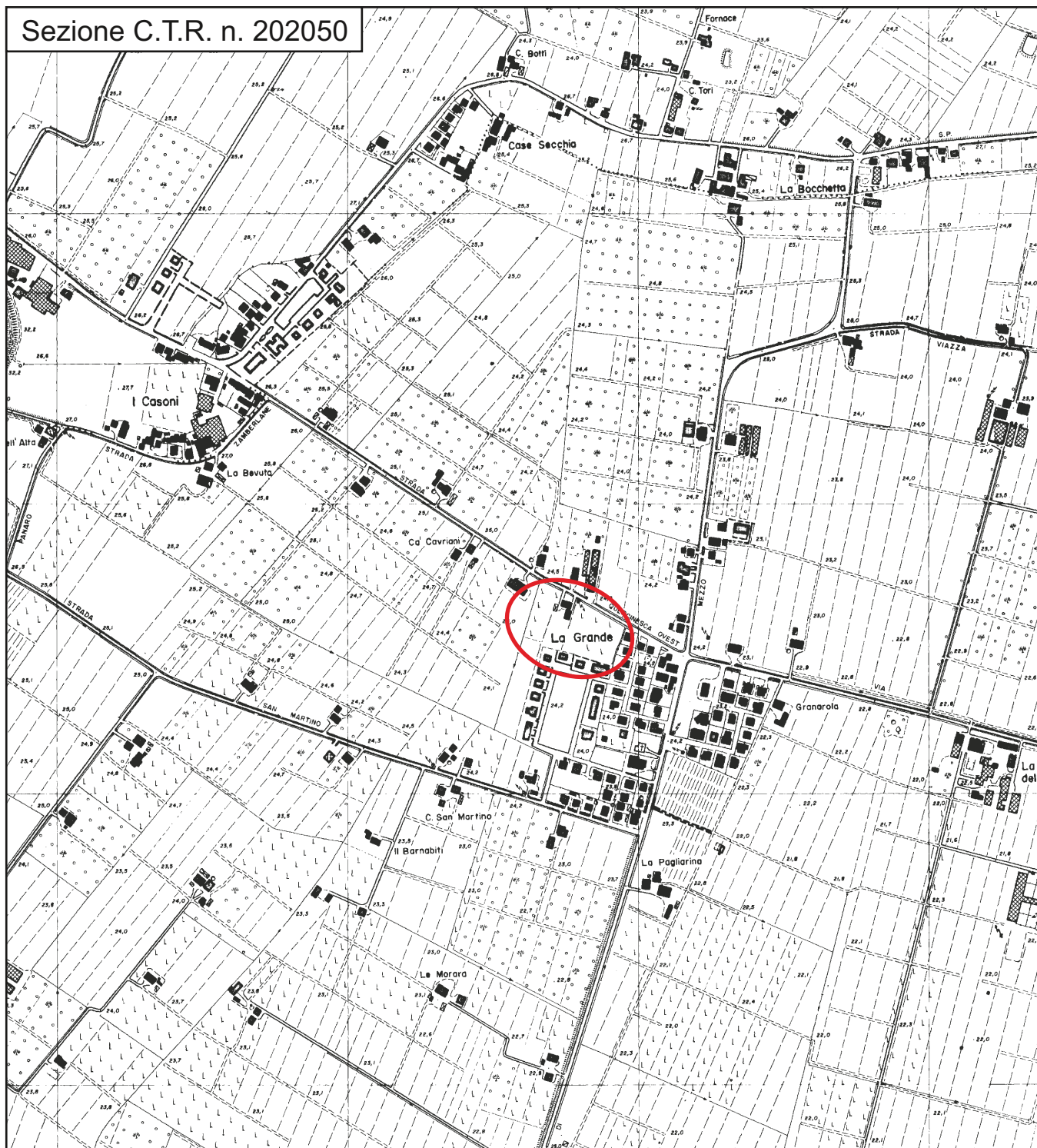


Area di interesse

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Indagini geognostiche, geofisiche e consulenze geologiche e geotecniche
182, via C. Costa 41100 Modena - Tel. 059/3967169 - Fax. 059/5332019- E-mail: geo.group@libero.it

Sezione C.T.R. n. 202050



Tav. n. 2 "Carta topografica"

Scala 1: 10000



Area di interesse

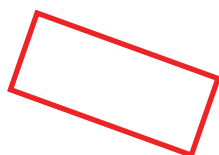
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182, via C. Costa 41100 Modena - Tel. 059/3967169 - Fax. 059/5332019- E-mail: geo.group@libero.it

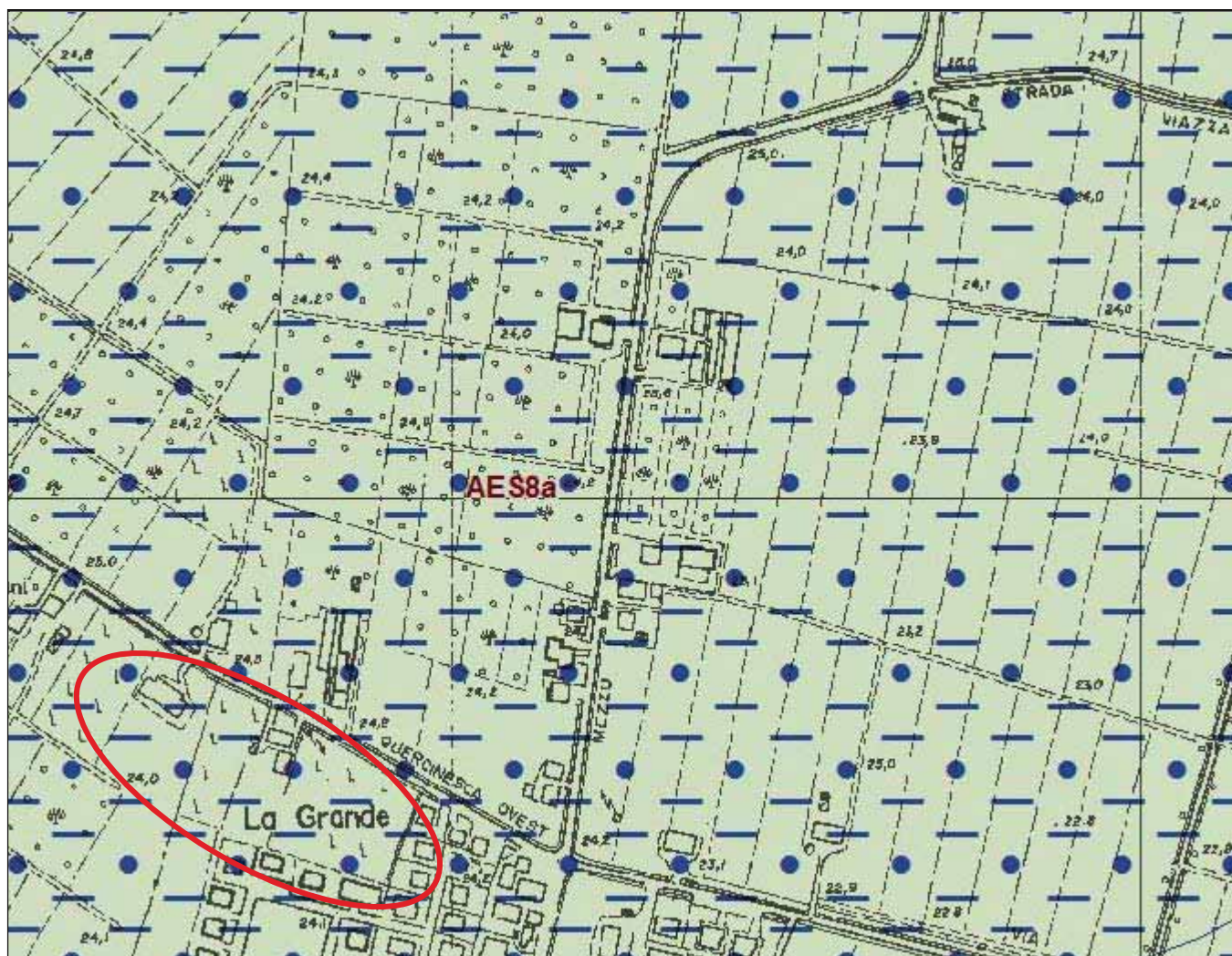


Tav. n. 3 “Ripresa fotografica generale dell’area di interesse”

(tratta da “Bing Mappe”)
Scala grafica



Area oggetto di studio



Area di interesse

10

AES8a - Unità ' di Modena

Depositi ghiaiosi passanti a sabbie e limi di terrazzo alluvionale. Limi prevalenti nelle fasce pedecollinari di interconoide.

Post-VI secolo d.C.

*Ambiente deposizionale e
litologia affiorante*



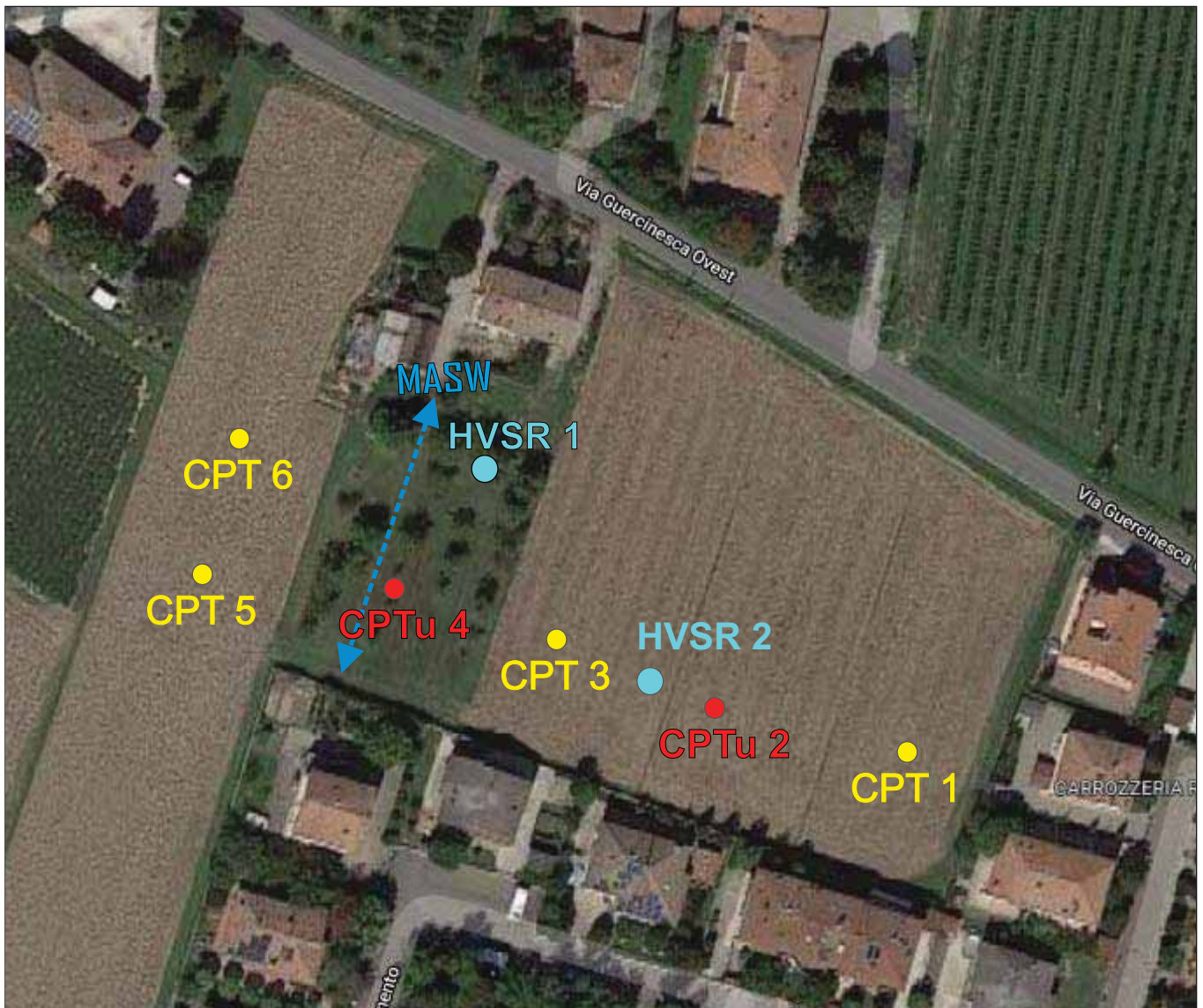
Limo sabbioso - Piana alluvionale



Limo - Piana alluvionale

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Indagini geognostiche, geofisiche e consulenze geologiche e geotecniche
182, via C. Costa 41100 Modena - Tel. 059/3967169 - Fax. 059/5332019- E-mail: geo.group@libero.it



Tav. n. 5 - "Ubicazione indagini geognostiche"

Scala grafica

LEGENDA



Prova penetrometrica statica CPT



Prova penetrometrica statica CPTu



Indagine sismica HVSR



Indagine sismica a
rifrazione MASW



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– coltivazione cave– bonifiche – consolidamenti – geologia ambientale – consulenze geologiche e geotecniche

ALLEGATO N° 1

Prove penetrometriche statiche con punta meccanica CPT

LEGENDA VALORI DI RESISTENZA FATTORI DI CONVERSIONE

Strumento utilizzato:
SP100 - GeoDeepDrill

Caratteristiche:

- punta conica meccanica $\varnothing$ 35.7 mm, area punta $A_p = 10 \text{ cm}^2$
- punta conica meccanica angolo di apertura: $\alpha = 60^\circ$
- manicotto laterale di attrito tipo 'Begemann' ($\varnothing = 35.7 \text{ mm}$ - $h = 133 \text{ mm}$ - $A_m = 150 \text{ cm}^2$)
- velocità di avanzamento costante $V = 2 \text{ cm/sec}$ ($\pm 0,5 \text{ cm / sec}$)
- spinta max nominale dello strumento S_{max} variabile a seconda del tipo
- costante di trasformazione $CT = \text{SPINTA (Kg)} / \text{LETTURA DI CAMPAGNA}$
(dato tecnico legato alle caratteristiche del penetrometro utilizzato, fornito dal costruttore)

fase 1 - resistenza alla punta: $q_c \text{ (MPa)} = (L_1) \times CT / 10$

fase 2 - resistenza laterale locale: $f_s \text{ (kPa)} = [(L_2) - (L_1)] \times CT / 150$

fase 3 - resistenza totale: $R_t \text{ (kPa)} = (L_t) \times CT$

- Prima lettura = lettura di campagna durante l'infissione della sola punta (fase 1)
- Seconda lettura = lettura di campagna relativa all'infissione di punta e manicotto (fase 2)
- Terza lettura = lettura di campagna relativa all'infissione delle aste esterne (fase 3)

N.B. : la spinta $S \text{ (Kg)}$, corrispondente a ciascuna fase, si ottiene moltiplicando la corrispondente lettura di campagna L per la costante di trasformazione CT .

N.B. : causa la distanza intercorrente (20 cm circa) fra il centro del manicotto laterale e la punta conica del penetrometro, la resistenza laterale locale f_s viene computata 20 cm sopra la punta.

CONVERSIONI

1 kN (kiloNewton) = 1000 N $\approx$ 100 kg = 0,1 t

1 MN (megaNewton) = 1.000 kN = 1.000.000 N $\approx$ 100 t

1 kPa (kiloPascal) = 1 kN/m² = 0,001 MN/m² = 0,001 MPa $\approx$ 0,1 t/m² = 0,01 kg/cm²

1 MPa (megaPascal) = 1 MN/m² = 1.000 kN/m² = 1000 kPa $\approx$ 100 t/m² = 10 kg/cm²

1 kg/cm² = 10 t/m² $\approx$ 100 kN/m² = 100 kPa = 0,1 MN/m² = 0,1 MPa

1 t = 1000 kg $\approx$ 10 kN

LEGENDA VALUTAZIONI LITOLOGICHE CORRELAZIONI GENERALI

Valutazioni in base al rapporto: $F = (q_c / f_s)$

Begemann 1965 - Raccomandazioni A.G.I. 1977

Valide in via approssimata per terreni immersi in falda :

$F = q_c / f_s$	NATURA LITOLOGICA	PROPRIETA'
$F \leq 1470 \text{ kPa}$	TORBE ED ARGILLE ORGANICHE	COESIVE
$1470 \text{ kPa} < F \leq 2940 \text{ kPa}$	LIMI ED ARGILLE	COESIVE
$2940 \text{ kPa} < F \leq 5880 \text{ kPa}$	LIMI SABBIOSI E SABBIE LIMOSE	GRANULARI
$F > 5880 \text{ kPa}$	SABBIE E SABBIE CON GHIAIA	GRANULARI

**Vengono inoltre riportate le valutazioni stratigrafiche fornite da Schmertmann (1978),
ricavabili in base ai valori di q_c e di $FR = (f_s / q_c) \% :$**

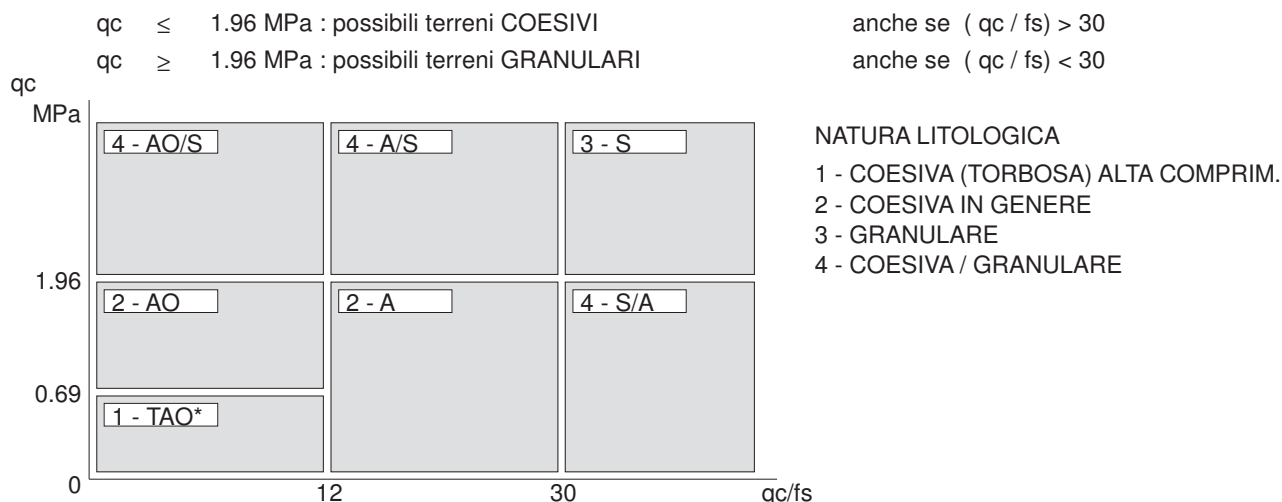
- AO = argilla organica e terreni misti
- Att = argilla (inorganica) molto tenera
- At = argilla (inorganica) tenera
- Am = argilla (inorganica) di media consistenza
- Ac = argilla (inorganica) consistente
- Acc = argilla (inorganica) molto consistente
- ASL = argilla sabbiosa e limosa
- SAL = sabbia e limo / sabbia e limo argilloso
- Ss = sabbia sciolta
- Sm = sabbia mediamente addensata
- Sd = sabbia densa o cementata
- SC = sabbia con molti fossili, calcareniti

Secondo Schmertmann il valore della resistenza laterale da usarsi, dovrebbe essere pari a:

- $1/3 \pm 1/2$ di quello misurato , per depositi sabbiosi
- quello misurato (inalterato) , per depositi coesivi.

LEGENDA PARAMETRI GEOTECNICI SPECIFICHE TECNICHE

Le scelte litologiche vengono effettuate in base al rapporto q_c / f_s (Begemann 1965 - A.G.I. 1977) prevedendo altresì la possibilità di casi dubbi :



PARAMETRI GEOTECNICI (validità orientativa) - simboli - correlazioni - bibliografia

- γ' = peso dell' unità di volume (efficace) del terreno [correlazioni : γ' - q_c - natura]
 (Terzaghi & Peck 1967 - Bowles 1982)
- σ'_{vo} = tensione verticale geostatica (efficace) del terreno (valutata in base ai valori di γ')
- C_u = coesione non drenata (terreni coesivi) [correlazioni : C_u - q_c]
- OCR = grado di sovra consolidazione (terreni coesivi) [correlazioni : OCR - C_u - σ'_{vo}]
 (Ladd et al. 1972 / 1974 / 1977 - Lancellotta 1983)
- E_u = modulo di deformazione non drenato (terreni coesivi) [correl. : E_u - C_u - OCR - I_p I_p = ind.plast.]
 E_{u50} - E_{u25} corrispondono rispettivamente ad un grado di mobilitazione dello sforzo deviatorico pari al 50-25% (Duncan & Buchigani 1976)
- E' = modulo di deformazione drenato (terreni granulari) [correlazioni : E' - q_c]
 E'_{50} - E'_{25} corrispondono rispettivamente ad un grado di mobilitazione dello sforzo deviatorico pari al 50-25% (coeff. di sicurezza $F = 2 - 4$ rispettivamente)
 Schmertmann 1970 / 1978 - Jamiolkowski ed altri 1983)
- M_o = modulo di deformazione edometrico (terreni coesivi e granulari) [correl. : M_o - q_c - natura]
 Sanglerat 1972 - Mitchell & Gardner 1975 - Ricceri et al. 1974 - Holden 1973)
- D_r = densità relativa (terreni granulari N. C. - normalmente consolidati)
 [correlazioni : D_r - R_p - σ'_{vo} (Schmertmann 1976)]
- $\emptyset'$ = angolo di attrito interno efficace (terreni granulari N.C.) [correl. : $\emptyset'$ - D_r - q_c - σ'_{vo})
 $\emptyset'_{Ca}$ - Caquot (1948) $\emptyset'_{Ko}$ - Koppejan (1948)
 $\emptyset'_{DB}$ - De Beer (1965) $\emptyset'_{Sc}$ - Schmertmann (1978)
 $\emptyset'_{DM}$ - Durgunoglu & Mitchell (1975) (sabbie N.C.) $\emptyset'_{Me}$ - Meyerhof (1956 / 1976) (sabbie limose)
- F.L. = fattore di liquefazione (F.L.1 = Sabbie Pulite, F.L.2 = Sabbie Limose)
- V_s = velocità di propagazione delle onde sismiche (Iyisan 1996)

PROVA PENETROMETRICA STATICA MECCANICA LETTURE CAMPAGNA E VALORI TRASFORMATI	CPT	1
	Riferimento	317-2021

Committente	Studio tecnico	U.M.:	MPa	Data esec.	30/11/2021
Cantiere	Studio terreno di fondazione	Pagina	1		
Località	Nonantola, strada Guercinesca Ovest	Elaborato		Falda	Non rilevata

H m	L1 -	L2 -	Lt -	qc MPa	fs kPa	F -	Rf %	H m	L1 -	L2 -	Lt -	qc MPa	fs kPa	F -	Rf %
0.20	0.0	0.0		0.00	0.00										
0.40	0.0	0.0		0.00	27.00	0									
0.60	5.0	9.0		0.49	93.00	5	18.6								
0.80	22.0	36.0		2.16	120.00	18	5.5								
1.00	26.0	44.0		2.55	167.00	16	6.4								
1.20	23.0	48.0		2.25	147.00	16	6.4								
1.40	11.0	33.0		1.08	147.00	7	13.4								
1.60	10.0	32.0		0.98	40.00	25	4.0								
1.80	6.0	12.0		0.59	80.00	8	13.3								
2.00	11.0	23.0		1.08	67.00	16	6.1								
2.20	12.0	22.0		1.18	53.00	23	4.4								
2.40	8.0	16.0		0.78	47.00	17	5.9								
2.60	7.0	14.0		0.69	53.00	13	7.6								
2.80	12.0	20.0		1.18	80.00	15	6.7								
3.00	11.0	23.0		1.08	53.00	21	4.8								
3.20	8.0	16.0		0.78	60.00	13	7.5								
3.40	8.0	17.0		0.78	60.00	13	7.5								
3.60	16.0	25.0		1.57	40.00	40	2.5								
3.80	12.0	18.0		1.18	73.00	16	6.1								
4.00	8.0	19.0		0.78	47.00	17	5.9								
4.20	7.0	14.0		0.69	53.00	13	7.6								
4.40	9.0	17.0		0.88	67.00	13	7.4								
4.60	13.0	23.0		1.27	60.00	22	4.6								
4.80	8.0	17.0		0.78	60.00	13	7.5								
5.00	9.0	18.0		0.88	47.00	19	5.2								
5.20	7.0	14.0		0.69	40.00	18	5.7								
5.40	7.0	13.0		0.69	53.00	13	7.6								
5.60	8.0	16.0		0.78	60.00	13	7.5								
5.80	10.0	19.0		0.98	93.00	11	9.3								
6.00	13.0	27.0		1.27	93.00	14	7.2								
6.20	20.0	34.0		1.96	107.00	19	5.4								
6.40	21.0	37.0		2.06	107.00	20	5.1								
6.60	16.0	32.0		1.57	107.00	15	6.7								
6.80	17.0	33.0		1.67	120.00	14	7.1								
7.00	24.0	42.0		2.35	147.00	16	6.1								
7.20	26.0	48.0		2.55	153.00	17	5.9								
7.40	22.0	45.0		2.16	113.00	19	5.1								
7.60	16.0	33.0		1.57	80.00	20	5.0								
7.80	11.0	23.0		1.08	80.00	14	7.3								
8.00	14.0	26.0		1.37	113.00	12	8.1								
8.20	25.0	42.0		2.45	160.00	16	6.4								
8.40	23.0	47.0		2.25	133.00	17	5.8								
8.60	24.0	44.0		2.35	133.00	18	5.5								
8.80	28.0	48.0		2.74	140.00	20	5.0								
9.00	18.0	39.0		1.76	107.00	17	5.9								
9.20	17.0	33.0		1.67	100.00	17	5.9								
9.40	20.0	35.0		1.96	127.00	16	6.4								
9.60	20.0	39.0		1.96	107.00	19	5.4								
9.80	19.0	35.0		1.86	120.00	16	6.3								
10.00	14.0	32.0		1.37	93.00	15	6.6								
10.20	13.0	27.0		1.27	87.00	15	6.7								
10.40	15.0	28.0		1.47	107.00	14	7.1								
10.60	13.0	29.0		1.27	93.00	14	7.2								
10.80	23.0	37.0		2.25	153.00	15	6.7								
11.00	25.0	48.0		2.45	160.00	16	6.4								
11.20	33.0	57.0		3.23	167.00	20	5.1								
11.40	31.0	56.0		3.04	187.00	17	6.0								
11.60	27.0	55.0		2.65	160.00	17	5.9								
11.80	25.0	49.0		2.45	153.00	16	6.1								
12.00	24.0	47.0		2.35	147.00	16	6.1								
12.20	24.0	46.0		2.35	173.00	14	7.2								
12.40	27.0	53.0		2.65	167.00	16	6.2								
12.60	29.0	54.0		2.84	173.00	17	6.0								
12.80	27.0	53.0		2.65	153.00	18	5.7								
13.00	25.0	48.0		2.45	140.00	18	5.6								
13.20	20.0	41.0		1.96	80.00	25	4.0								
13.40	19.0	31.0		1.86	80.00	24	4.2								
13.60	17.0	29.0		1.67	120.00	14	7.1								
13.80	14.0	32.0		1.37	93.00	15	6.6								
14.00	16.0	30.0		1.57	127.00	13	7.9								
14.20	25.0	44.0		2.45	147.00	17	5.9								
14.40	26.0	48.0		2.55	173.00	15	6.7								
14.60	23.0	49.0		2.25	153.00	15	6.7								
14.80	31.0	54.0		3.04											
15.00															

H = profondità
 L1 = prima lettura (punta)
 L2 = seconda lettura (punta + laterale)
 Lt = terza lettura (totale)
 CT = 10.00 costante di trasformazione

qc = resistenza punta
 fs = resistenza laterale
 0.20 m sopra quota qc
 F = rapporto Begemann (qc / fs)
 Rf = rapporto Schmertmann (fs / qc)*100

PROVA PENETROMETRICA STATICA MECCANICA

DIGRAMMI DI RESISTENZA E LITOLOGIA

CPT

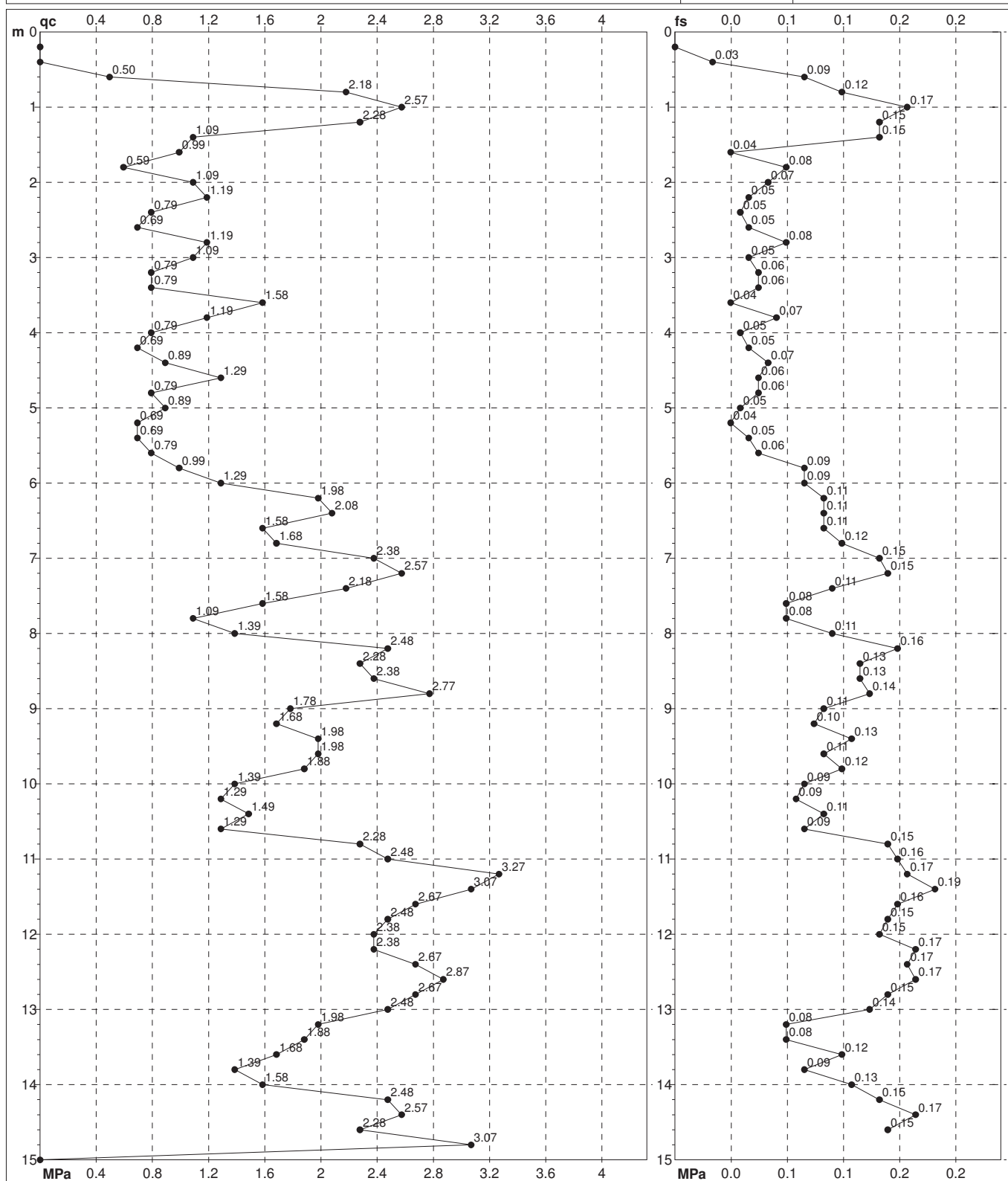
Riferimento

1**317-2021**

Committente **Studio tecnico**
 Cantiere **Studio terreno di fondazione**
 Località **Nonantola, strada Guercinesca Ovest**

U.M.: **MPa**
 Scala: 1:75
 Pagina 1
 Elaborato

Data eseg. 30/11/2021
 Quota inizio:
 Falda Non rilevata



Penetrometro: SP100

Responsabile:

Assistente:

preforo m

Corr.astine: kN/ml

Cod. tip:

FON111

PROVA PENETROMETRICA STATICA MECCANICA

DIAGRAMMI LITOLOGIA

CPT

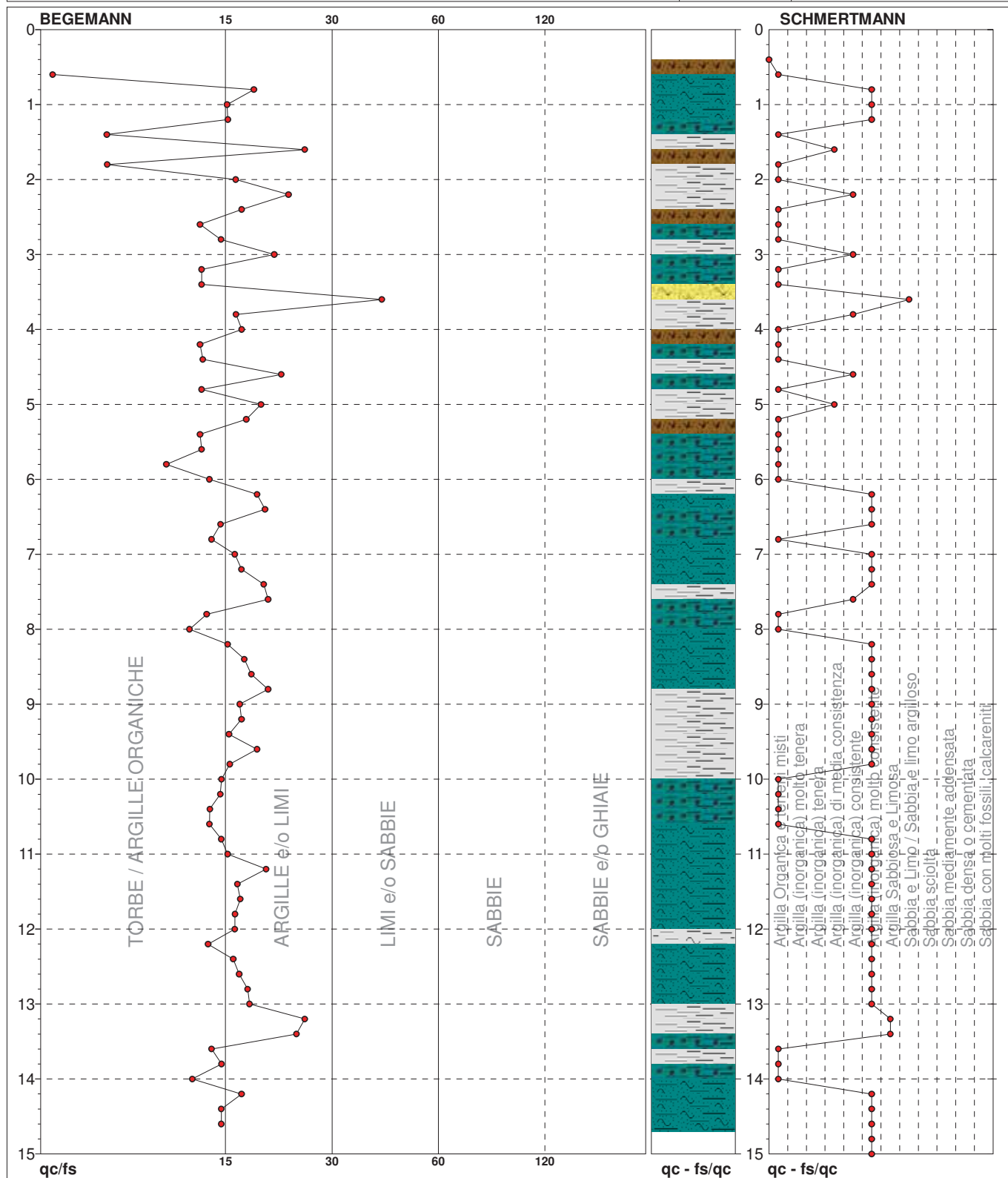
Riferimento

1

317-2021

Committente **Studio tecnico**
Cantiere **Studio terreno di fondazione**
Località **Nonantola, strada Guercinesca Ovest**

U.M.: **MPa**
Scala: **1:75**
Pagina **1**
Elaborato
Data eseg. **30/11/2021**
Falda **Non rilevata**



TORBE / ARGILLE OR	26 punti, 35.14%	Argilla Organica e terreni misti	28 punti, 37.84%	Argilla Sabbiosa e Limosa	2 punti, 2.70%
ARGILLE e/o LIMI	46 punti, 62.16%	Argilla (inorganica) di media consistenza	2 punti, 2.70%	Sabbia e Limo / Sabbia e limo argilloso	1 punti, 1.35%
LIMI e/o SABBIE	1 punti, 1.35%	Argilla (inorganica) consistente	5 punti, 6.76%		
		Argilla (inorganica) molto consistente	33 punti, 44.59%		

FON111

Software by dott. Geol. Diego Merlin +39 0425-840820

PROVA PENETROMETRICA STATICA MECCANICA										CPT	1
PARAMETRI GEOTECNICI										Riferimento	317-2021

Committente	Studio tecnico	U.M.:	MPa	Data eseg.	30/11/2021
Cantiere	Studio terreno di fondazione	Pagina	1		
Località	Nonantola, strada Guercinesca Ovest	Elaborato		Falda	Non rilevata

							NATURA COESIVA					NATURA GRANULARE											
H	qc	qc/fs	zone	γ'	σ'_{vo}	Vs	Cu	OCR	Eu50	Eu25	Mo	Dr	Sc	Ca	Ko	DB	DM	Me	E'50	E'25	Mo	FL1	FL2
m	U.M.			t/m³	kPa	m/s	kPa	%	U.M.	U.M.	U.M.	%	(°)	(°)	(°)	(°)	(°)	(°)	U.M.	U.M.	U.M.		
0.20	--	--	1	1.85	3.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
0.40	--	--	1	1.85	7.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
0.60	0.49	5.38	1	1.85	10.9	101	24.5	17.3	1.0	1.5	0.7	--	--	--	--	--	--	--	--	--	--	--	--
0.80	2.16	18.33	4	1.85	14.5	177	82.9	55.5	14.1	21.1	6.5	67	39	35	32	30	39	28	3.6	5.4	6.5	--	--
1.00	2.55	15.57	4	1.85	18.1	189	91.0	47.2	15.5	23.2	7.6	67	39	34	32	29	39	28	4.2	6.4	7.6	--	--
1.20	2.25	15.65	4	1.85	21.8	180	85.1	34.5	14.5	21.7	6.8	58	38	33	30	28	37	28	3.8	5.6	6.8	--	--
1.40	1.08	7.48	2	1.85	25.4	137	52.6	15.6	8.9	13.4	4.2	--	--	--	--	--	--	--	--	--	--	--	--
1.60	0.98	25.00	2	1.85	29.0	132	49.0	12.1	8.3	12.5	3.9	--	--	--	--	--	--	--	--	--	--	--	--
1.80	0.59	7.50	1	1.85	32.6	109	29.4	5.5	1.7	2.6	0.9	--	--	--	--	--	--	--	--	--	--	--	--
2.00	1.08	16.42	2	1.85	36.3	137	52.6	10.0	8.9	13.4	4.2	--	--	--	--	--	--	--	--	--	--	--	--
2.20	1.18	22.64	2	1.85	39.9	141	56.0	9.6	9.6	14.4	4.4	--	--	--	--	--	--	--	--	--	--	--	--
2.40	0.78	17.02	2	1.85	43.5	121	39.2	5.5	11.8	17.7	3.4	--	--	--	--	--	--	--	--	--	--	--	--
2.60	0.69	13.21	1	1.85	47.1	115	34.3	4.2	2.3	3.5	1.0	--	--	--	--	--	--	--	--	--	--	--	--
2.80	1.18	15.00	2	1.85	50.8	141	56.0	7.1	12.7	19.0	4.4	--	--	--	--	--	--	--	--	--	--	--	--
3.00	1.08	20.75	2	1.85	54.4	137	52.6	6.0	14.4	21.6	4.2	--	--	--	--	--	--	--	--	--	--	--	--
3.20	0.78	13.33	2	1.85	58.0	121	39.2	3.8	16.3	24.5	3.4	--	--	--	--	--	--	--	--	--	--	--	--
3.40	0.78	13.33	2	1.85	61.6	121	39.2	3.6	17.4	26.1	3.4	--	--	--	--	--	--	--	--	--	--	--	--
3.60	1.57	40.00	4	1.85	65.3	157	68.2	6.6	16.7	25.1	5.1	19	34	26	22	21	29	27	2.6	3.9	4.7	--	--
3.80	1.18	16.44	2	1.85	68.9	141	56.0	4.8	19.1	28.6	4.4	--	--	--	--	--	--	--	--	--	--	--	--
4.00	0.78	17.02	2	1.85	72.5	121	39.2	2.9	19.6	29.4	3.4	--	--	--	--	--	--	--	--	--	--	--	--
4.20	0.69	13.21	1	1.85	76.1	115	34.3	2.3	3.9	5.9	1.0	--	--	--	--	--	--	--	--	--	--	--	--
4.40	0.88	13.43	2	1.85	79.8	127	44.1	3.0	21.8	32.7	3.7	--	--	--	--	--	--	--	--	--	--	--	--
4.60	1.27	21.67	2	1.85	83.4	145	59.3	4.1	23.3	34.9	4.6	--	--	--	--	--	--	--	--	--	--	--	--
4.80	0.78	13.33	2	1.85	87.0	121	39.2	2.3	21.2	31.9	3.4	--	--	--	--	--	--	--	--	--	--	--	--
5.00	0.88	19.15	2	1.85	90.7	127	44.1	2.6	23.2	34.8	3.7	--	--	--	--	--	--	--	--	--	--	--	--
5.20	0.69	17.50	2	1.85	94.3	115	34.3	1.8	19.6	29.4	3.2	--	--	--	--	--	--	--	--	--	--	--	--
5.40	0.69	13.21	1	1.85	97.9	115	34.3	1.7	4.3	6.4	1.0	--	--	--	--	--	--	--	--	--	--	--	--
5.60	0.78	13.33	2	1.85	101.5	121	39.2	1.9	22.1	33.2	3.4	--	--	--	--	--	--	--	--	--	--	--	--
5.80	0.98	10.75	2	1.85	105.2	132	49.0	2.4	26.2	39.4	3.9	--	--	--	--	--	--	--	--	--	--	--	--
6.00	1.27	13.98	2	1.85	108.8	145	59.3	2.9	29.5	44.3	4.6	--	--	--	--	--	--	--	--	--	--	--	--
6.20	1.96	18.69	4	1.85	112.4	171	78.4	4.0	31.3	47.0	5.9	13	33	24	21	20	27	27	3.3	4.9	5.9	--	--
6.40	2.06	19.63	4	1.85	116.0	174	80.7	4.0	32.4	48.6	6.2	14	33	24	21	20	27	27	3.4	5.1	6.2	--	--
6.60	1.57	14.95	2	1.85	119.7	157	68.2	3.1	33.0	49.6	5.1	--	--	--	--	--	--	--	--	--	--	--	--
6.80	1.67	14.17	2	1.85	123.3	161	70.9	3.1	34.1	51.2	5.3	--	--	--	--	--	--	--	--	--	--	--	--
7.00	2.35	16.33	4	1.85	126.9	183	87.1	3.9	35.6	53.3	7.1	17	33	24	21	20	28	28	3.9	5.9	7.1	--	--
7.20	2.55	16.99	4	1.85	130.5	189	91.0	4.0	36.4	54.6	7.6	19	33	25	21	20	28	28	4.2	6.4	7.6	--	--
7.40	2.16	19.47	4	1.85	134.2	177	82.9	3.4	37.8	56.7	6.5	12	33	24	20	19	27	28	3.6	5.4	6.5	--	--
7.60	1.57	20.00	2	1.85	137.8	157	68.2	2.6	35.6	53.5	5.1	--	--	--	--	--	--	--	--	--	--	--	--
7.80	1.08	13.75	2	1.85	141.4	137	52.6	1.8	29.9	44.9	4.2	--	--	--	--	--	--	--	--	--	--	--	--
8.00	1.37	12.39	2	1.85	145.0	150	62.4	2.2	34.3	51.4	4.7	--	--	--	--	--	--	--	--	--	--	--	--
8.20	2.45	15.63	4	1.85	148.7	186	89.1	3.3	41.6	62.4	7.4	14	33	24	20	19	27	28	4.1	6.1	7.4	--	--
8.40	2.25	17.29	4	1.85	152.3	180	85.1	3.0	41.7	62.6	6.8	11	33	23	20	19	26	28	3.8	5.6	6.8	--	--
8.60	2.35	18.05	4	1.85	155.9	183	87.1	3.0	42.7	64.1	7.1	12	33	23	20	19	26	28	3.9	5.9	7.1	--	--
8.80	2.74	20.00	4	1.85	159.5	194	94.6	3.3	44.6	66.8	8.2	16	33	24	21	19	27	28	4.6	6.9	8.2	--	--
9.00	1.76	16.82	2	1.85	163.2	164	73.5	2.3	39.8	59.7	5.5	--	--	--	--	--	--	--	--	--	--	--	--
9.20	1.67	17.00	2	1.85	166.8	161	70.9	2.2	39.1	58.6	5.3	--	--	--	--	--	--	--	--	--	--	--	--
9.40	1.96	15.75	4	1.85	170.4	171	78.4	2.4	42.2	63.3	5.9	3	32	22	19	18	25	27	3.3	4.9	5.9	--	--
9.60	1.96	18.69	4	1.85	174.0	171	78.4	2.3	42.5	63.7	5.9	3	32	22	18	17	25	27	3.3	4.9	5.9	--	--
9.80	1.86	15.83	2	1.85	177.7	168	76.0	2.2	41.8	62.8	5.7	--	--	--	--	--	--	--	--	--	--	--	--
10.00	1.37	15.05	2	1.85	181.3	150	62.4	1.7	36.0	54.0	4.7	--	--	--	--	--	--	--	--	--	--	--	--
10.20	1.27	14.94	2	1.85	184.9	145	59.3	1.5	34.5	51.8	4.6	--	--	--	--	--	--	--	--	--	--	--	--
10.40	1.47	14.02	2	1.85	188.6	154	65.3	1.7	37.6	56.5	4.9	--	--	--	--	--	--	--	--	--	--	--	--
10.60	1.27	13.98	2	1.85	192.2	145	59.3	1.4	34.7	52.0	4.6	--	--	--	--	--	--	--	--	--	--	--	--
10.80	2.25	15.03	4	1.85	195.8	180	85.1	2.2	46.6	69.9	6.8	5	32	22	19	18	25	28	3.8	5.6	6.8	--	--
11.00	2.45	15.63	4	1.85	199.4	186	89.1	2.3	48.4	72.6	7.4	7	32	22	19	18	25	28	4.1	6.1	7.4	--	--
11.20	3.23	19.76	4	1.85	203.1	207	107.8	2.8	54.5	81.7	9.7	16	33	24	20	19	27	29	5.4	8.1	9.7	--	--
11.40	3.04	16.58	4	1.85	206.7	202	101.3	2.6	53.2	79.8	9.1	14	33	23	20	19	26	29	5.1	7.6	9.1	--	--
11.60	2.65	16.88	4	1.85	210.3	192	92.8	2.3	50.6	75.9	7.9	8	32	22	19	18	25	28	4.4	6.6	7.9	--	--
11.80	2.45	16.34	4	1.85	213.9	186	89.1	2.1	49.4	74.1	7.4	5	32	22	18	18	25	28	4.1	6.1	7.4	--	--
12.00	2.35	16.33	4	1.85	217.6	183	87.1	2.0	48.8	73.2	7.1	3	32	22	18	17	25	28	3.9	5.9	7.1	--	--
12.20	2.35	13.87	4	1.85	221.2	183	87.1	2.0	49.0	73.5	7.1	3	32	22	18	17	25	28	3.9	5.9	7.1	--	--
12.40	2.65	16.17	4	1.85	224.8	192	92.8	2.1	51.6	77.4	7.9	7	32	22	19	18	25	28	4.4	6.6	7.9	--	--
12.60	2.84	16.76	4	1.85	228.4	197	96.3	2.1	53.2	79.9	8.5	9	32	22	19	18	25	29	4.7	7.1	8.5	--	--
12.80	2.65	17.65	4	1.85	232.1	192	92.8	2.0	52.0	78.0	7.9	6	32	22	18	17	25	28	4.4	6.6	7.9	--	--
13.00	2.45	17.86	4	1.85	235.7	186	89.1	1.9	50.5	75.8	7.4	3	32	21	18	17	25	28	4.1	6.1	7.4	--	--
13.20	1.96	25.00	2	1.85	239.3	171	78.4	1.6	45.6	68.3	5.9	--	31	20	17	16	25	27	3.3	4.9	5.9	--	--
13.40	1.86	23.75	2	1.85	242.9	168	76.0	1.5	44.4	66.6													

PROVA PENETROMETRICA STATICA MECCANICA

LETTURE CAMPAGNA E VALORI TRASFORMATI

CPT**3**

Riferimento

317-2021

Committente **Studio tecnico**
 Cantiere **Studio terreno di fondazione**
 Località **Nonantola, strada Guercinesca Ovest**

U.M.: **MPa**

Data esec. 30/11/2021

 Pagina 1
 Elaborato

Falda -2.40 m da p.c.

H m	L1 -	L2 -	Lt -	qc MPa	fs kPa	F -	Rf %	H m	L1 -	L2 -	Lt -	qc MPa	fs kPa	F -	Rf %
0.20	0.0	0.0		0.00	0.00										
0.40	0.0	0.0		0.00	33.00	0									
0.60	4.0	9.0		0.39	87.00	5	21.8								
0.80	28.0	41.0		2.74	67.00	42	2.4								
1.00	26.0	36.0		2.55	107.00	24	4.1								
1.20	17.0	33.0		1.67	140.00	12	8.2								
1.40	14.0	35.0		1.37	120.00	12	8.6								
1.60	13.0	31.0		1.27	80.00	16	6.2								
1.80	9.0	21.0		0.88	67.00	13	7.4								
2.00	8.0	18.0		0.78	47.00	17	5.9								
2.20	6.0	13.0		0.59	60.00	10	10.0								
2.40	7.0	16.0		0.69	33.00	21	4.7								
2.60	8.0	13.0		0.78	47.00	17	5.9								
2.80	7.0	14.0		0.69	40.00	18	5.7								
3.00	11.0	17.0		1.08	53.00	21	4.8								
3.20	12.0	20.0		1.18	67.00	18	5.6								
3.40	8.0	18.0		0.78	53.00	15	6.6								
3.60	9.0	17.0		0.88	73.00	12	8.1								
3.80	17.0	28.0		1.67	60.00	28	3.5								
4.00	10.0	19.0		0.98	80.00	13	8.0								
4.20	10.0	22.0		0.98	113.00	9	11.3								
4.40	11.0	28.0		1.08	73.00	15	6.6								
4.60	14.0	25.0		1.37	47.00	30	3.4								
4.80	12.0	19.0		1.18	73.00	16	6.1								
5.00	15.0	26.0		1.47	47.00	32	3.1								
5.20	10.0	17.0		0.98	53.00	19	5.3								
5.40	6.0	14.0		0.59	33.00	18	5.5								
5.60	6.0	11.0		0.59	53.00	11	8.8								
5.80	9.0	17.0		0.88	73.00	12	8.1								
6.00	12.0	23.0		1.18	87.00	14	7.3								
6.20	13.0	26.0		1.27	80.00	16	6.2								
6.40	16.0	28.0		1.57	80.00	20	5.0								
6.60	15.0	27.0		1.47	73.00	21	4.9								
6.80	11.0	22.0		1.08	93.00	12	8.5								
7.00	19.0	33.0		1.86	120.00	16	6.3								
7.20	22.0	40.0		2.16	147.00	15	6.7								
7.40	17.0	39.0		1.67	107.00	16	6.3								
7.60	21.0	37.0		2.06	107.00	20	5.1								
7.80	15.0	31.0		1.47	93.00	16	6.2								
8.00	19.0	33.0		1.86	93.00	20	4.9								
8.20	18.0	32.0		1.76	107.00	17	5.9								
8.40	23.0	39.0		2.25	140.00	16	6.1								
8.60	25.0	46.0		2.45	160.00	16	6.4								
8.80	25.0	49.0		2.45	147.00	17	5.9								
9.00	25.0	47.0		2.45	153.00	16	6.1								
9.20	15.0	38.0		1.47	113.00	13	7.5								
9.40	18.0	35.0		1.76	47.00	38	2.6								
9.60	26.0	33.0		2.55	107.00	24	4.1								
9.80	17.0	33.0		1.67	87.00	20	5.1								
10.00	12.0	25.0		1.18	67.00	18	5.6								
10.20	12.0	22.0		1.18	53.00	23	4.4								
10.40	7.0	15.0		0.69	80.00	9	11.4								
10.60	12.0	24.0		1.18	73.00	16	6.1								
10.80	23.0	34.0		2.25	120.00	19	5.2								
11.00	21.0	39.0		2.06	147.00	14	7.0								
11.20	22.0	44.0		2.16	133.00	17	6.0								
11.40	19.0	39.0		1.86	113.00	17	5.9								
11.60	21.0	38.0		2.06	107.00	20	5.1								
11.80	17.0	33.0		1.67	100.00	17	5.9								
12.00	19.0	34.0		1.86	93.00	20	4.9								
12.20	21.0	35.0		2.06	107.00	20	5.1								
12.40	23.0	39.0		2.25	200.00	12	8.7								
12.60	25.0	55.0		2.45	153.00	16	6.1								
12.80	28.0	51.0		2.74	193.00	15	6.9								
13.00	30.0	59.0		2.94	193.00	16	6.4								
13.20	28.0	57.0		2.74	180.00	16	6.4								
13.40	29.0	56.0		2.84	180.00	16	6.2								
13.60	28.0	55.0		2.74	167.00	17	6.0								
13.80	23.0	48.0		2.25	160.00	14	7.0								
14.00	20.0	44.0		1.96	133.00	15	6.7								
14.20	16.0	36.0		1.57	100.00	16	6.3								
14.40	16.0	31.0		1.57	80.00	20	5.0								
14.60	15.0	27.0		1.47	87.00	17	5.8								
14.80	13.0	26.0		1.27	100.00	13	7.7								
15.00	17.0	32.0		1.67											

H = profondità

L1 = prima lettura (punta)

L2 = seconda lettura (punta + laterale)

Lt = terza lettura (totale)

CT = 10.00 costante di trasformazione

qc = resistenza punta

fs = resistenza laterale

0.20 m sopra quota qc

F = rapporto Begemann (qc / fs)

Rf = rapporto Schmertmann (fs / qc)*100

PROVA PENETROMETRICA STATICA MECCANICA

DIAGRAMMI LITOLOGIA

CPT

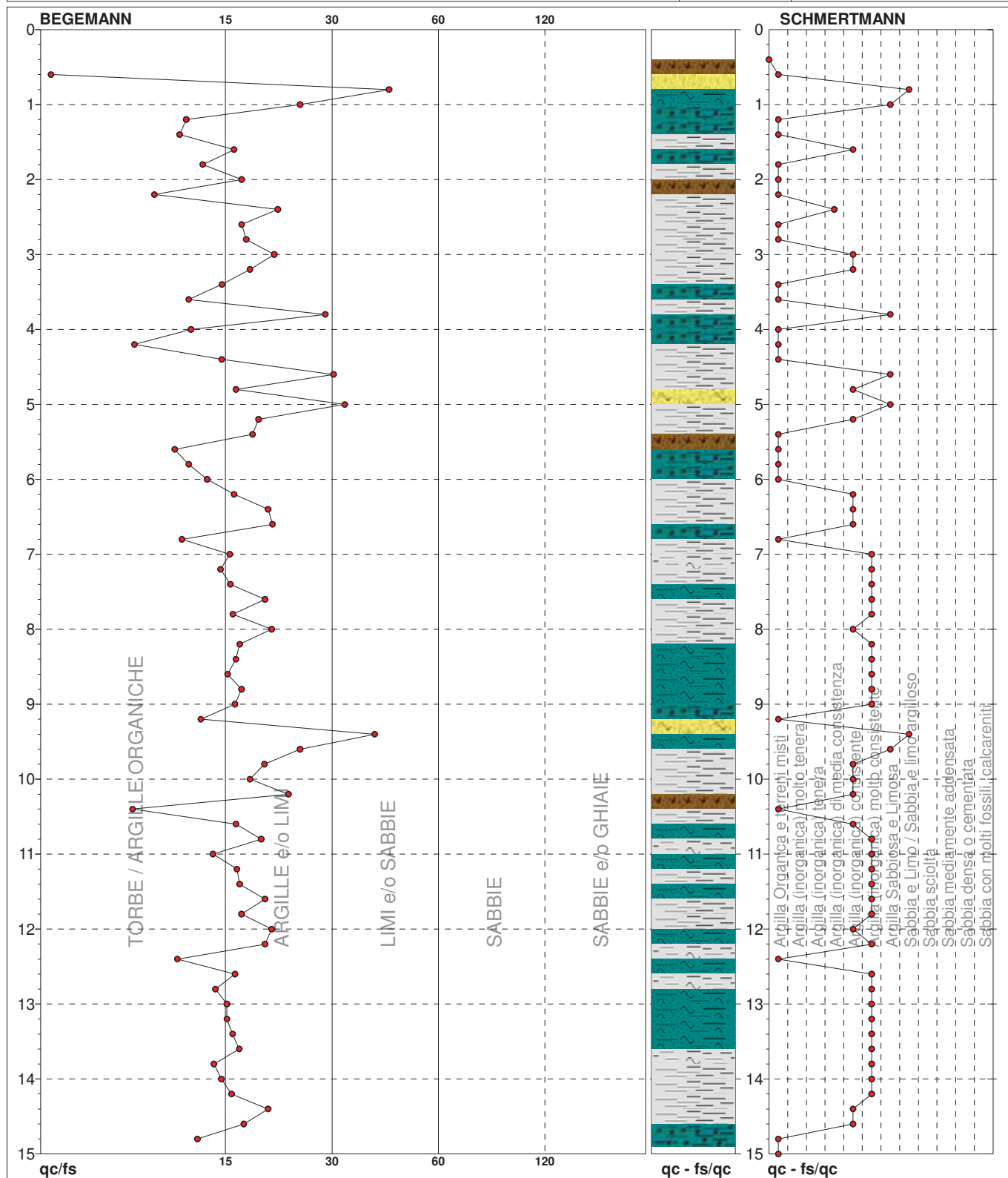
Riferimento

3

317-2021

Committente **Studio tecnico**
Cantiere **Studio terreno di fondazione**
Località **Nonantola, strada Guercinesca Ovest**

U.M.: **MPa**
Scala: **1:75**
Pagina **1**
Elaborato
Data esec. **30/11/2021**
Falda **-2.40 m da p.c.**



TORBE / ARGILLE OR	22 punti, 29.33%	Argilla Organica e terreni misti	22 punti, 29.33%	Argilla Sabbiosa e Limosa	5 punti, 6.67%
ARGILLE e/o LIM	49 punti, 65.33%	Argilla (inorganica) di media consistenza	1 punti, 1.33%	Sabbia e Limo / Sabbia e limo argilloso	2 punti, 2.67%
LIM e/o SABBIE	3 punti, 4.00%	Argilla (inorganica) consistente	16 punti, 21.33%		
		Argilla (inorganica) molto consistente	26 punti, 34.67%		

FON111

Software by dott. Geol. Diego Merlin +39 0425-840820

PROVA PENETROMETRICA STATICA MECCANICA PARAMETRI GEOTECNICI						CPT	3
						Riferimento	317-2021

Committente	Studio tecnico	U.M.:	MPa	Data esec.	30/11/2021
Cantiere	Studio terreno di fondazione	Pagina	1		
Località	Nonantola, strada Guercinesca Ovest	Elaborato		Falda	-2.40 m da p.c.

							NATURA COESIVA					NATURA GRANULARE											
H	qc	qc/fs	zone	γ'	σ'vo	Vs	Cu	OCR	Eu50	Eu25	Mo	Dr	Sc	Ca	Ko	DB	DM	Me	E'50	E'25	Mo	FL1	FL2
m	U.M.			t/m³	kPa	m/s	kPa	%	U.M.	U.M.	U.M.	%	(°)	(°)	(°)	(°)	(°)	(°)	U.M.	U.M.	U.M.		
0.20	--	--	1	1.85	3.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
0.40	--	--	1	1.85	7.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
0.60	0.39	4.60	1	1.85	10.9	93	19.6	13.1	0.8	1.2	0.6	--	--	--	--	--	--	--	--	--	--	--	--
0.80	2.74	41.79	3	1.85	14.5	194	--	--	--	--	--	75	40	36	33	31	40	28	4.6	6.9	8.2	--	--
1.00	2.55	24.30	4	1.85	18.1	189	91.0	47.2	15.5	23.2	7.6	67	39	34	32	29	39	28	4.2	6.4	7.6	--	--
1.20	1.67	12.14	2	1.85	21.8	161	70.9	27.5	12.1	18.1	5.3	--	--	--	--	--	--	--	--	--	--	--	--
1.40	1.37	11.67	2	1.85	25.4	150	62.4	19.3	10.6	15.9	4.7	--	--	--	--	--	--	--	--	--	--	--	--
1.60	1.27	16.25	2	1.85	29.0	145	59.3	15.3	10.1	15.1	4.6	--	--	--	--	--	--	--	--	--	--	--	--
1.80	0.88	13.43	2	1.85	32.6	127	44.1	9.1	7.8	11.6	3.7	--	--	--	--	--	--	--	--	--	--	--	--
2.00	0.78	17.02	2	1.85	36.3	121	39.2	6.9	9.1	13.7	3.4	--	--	--	--	--	--	--	--	--	--	--	--
2.20	0.59	10.00	1	1.85	39.9	109	29.4	4.3	2.0	3.0	0.9	--	--	--	--	--	--	--	--	--	--	--	--
2.40	0.69	21.21	2	0.84	41.5	115	34.3	4.9	11.5	17.2	3.2	--	--	--	--	--	--	--	--	--	--	--	--
2.60	0.78	17.02	2	0.86	43.2	121	39.2	5.6	11.7	17.5	3.4	--	--	--	--	--	--	--	--	--	--	--	--
2.80	0.69	17.50	2	0.84	44.9	115	34.3	4.5	12.5	18.8	3.2	--	--	--	--	--	--	--	--	--	--	--	--
3.00	1.08	20.75	2	0.91	46.6	137	52.6	7.3	11.5	17.3	4.2	--	--	--	--	--	--	--	--	--	--	--	--
3.20	1.18	17.91	2	0.92	48.5	141	56.0	7.5	11.8	17.8	4.4	--	--	--	--	--	--	--	--	--	--	--	--
3.40	0.78	15.09	2	0.86	50.1	121	39.2	4.6	14.0	20.9	3.4	--	--	--	--	--	--	--	--	--	--	--	--
3.60	0.88	12.33	2	0.88	51.9	127	44.1	5.1	14.3	21.4	3.7	--	--	--	--	--	--	--	--	--	--	--	--
3.80	1.67	28.33	2	0.97	53.8	161	70.9	8.9	12.7	19.1	5.3	--	--	--	--	--	--	--	--	--	--	--	--
4.00	0.98	12.50	2	0.90	55.5	132	49.0	5.4	15.1	22.7	3.9	--	--	--	--	--	--	--	--	--	--	--	--
4.20	0.98	8.85	2	0.90	57.3	132	49.0	5.2	15.7	23.6	3.9	--	--	--	--	--	--	--	--	--	--	--	--
4.40	1.08	15.07	2	0.91	59.1	137	52.6	5.4	16.1	24.1	4.2	--	--	--	--	--	--	--	--	--	--	--	--
4.60	1.37	29.79	2	0.94	60.9	150	62.4	6.5	15.7	23.6	4.7	--	--	--	--	--	--	--	--	--	--	--	--
4.80	1.18	16.44	2	0.92	62.7	141	56.0	5.4	17.0	25.5	4.4	--	--	--	--	--	--	--	--	--	--	--	--
5.00	1.47	31.91	4	0.89	64.5	154	65.3	6.4	16.7	25.1	4.9	17	33	25	22	21	29	27	2.5	3.7	4.4	--	--
5.20	0.98	18.87	2	0.90	66.2	132	49.0	4.3	18.5	27.7	3.9	--	--	--	--	--	--	--	--	--	--	--	--
5.40	0.59	18.18	2	0.82	67.8	109	29.4	2.2	16.1	24.2	2.8	--	--	--	--	--	--	--	--	--	--	--	--
5.60	0.59	11.32	1	0.46	68.7	109	29.4	2.2	3.4	5.2	0.9	--	--	--	--	--	--	--	--	--	--	--	--
5.80	0.88	12.33	2	0.88	70.5	127	44.1	3.5	19.9	29.8	3.7	--	--	--	--	--	--	--	--	--	--	--	--
6.00	1.18	13.79	2	0.92	72.3	141	56.0	4.6	20.1	30.2	4.4	--	--	--	--	--	--	--	--	--	--	--	--
6.20	1.27	16.25	2	0.93	74.1	145	59.3	4.7	20.6	30.9	4.6	--	--	--	--	--	--	--	--	--	--	--	--
6.40	1.57	20.00	2	0.96	76.0	157	68.2	5.5	20.6	30.9	5.1	--	--	--	--	--	--	--	--	--	--	--	--
6.60	1.47	20.55	2	0.95	77.8	154	65.3	5.0	21.5	32.2	4.9	--	--	--	--	--	--	--	--	--	--	--	--
6.80	1.08	11.83	2	0.91	79.6	137	52.6	3.7	22.5	33.7	4.2	--	--	--	--	--	--	--	--	--	--	--	--
7.00	1.86	15.83	2	0.99	81.6	168	76.0	5.7	21.9	32.8	5.7	--	--	--	--	--	--	--	--	--	--	--	--
7.20	2.16	14.97	4	0.93	83.4	177	82.9	6.2	21.8	32.7	6.5	24	34	26	23	21	29	28	3.6	5.4	6.5	--	--
7.40	1.67	15.89	2	0.97	85.3	161	70.9	5.0	23.6	35.3	5.3	--	--	--	--	--	--	--	--	--	--	--	--
7.60	2.06	19.63	4	0.93	87.1	174	80.7	5.7	23.4	35.1	6.2	21	34	25	22	21	29	27	3.4	5.1	6.2	--	--
7.80	1.47	16.13	2	0.95	89.0	154	65.3	4.3	24.9	37.3	4.9	--	--	--	--	--	--	--	--	--	--	--	--
8.00	1.86	20.43	2	0.99	90.9	168	76.0	5.0	25.1	37.6	5.7	--	--	--	--	--	--	--	--	--	--	--	--
8.20	1.76	16.82	2	0.98	92.8	164	73.5	4.7	25.8	38.7	5.5	--	--	--	--	--	--	--	--	--	--	--	--
8.40	2.25	16.43	4	0.94	94.7	180	85.1	5.5	25.7	38.5	6.8	22	34	26	22	21	29	28	3.8	5.6	6.8	--	--
8.60	2.45	15.63	4	0.94	96.5	186	89.1	5.7	26.0	38.9	7.4	25	34	26	23	21	29	28	4.1	6.1	7.4	--	--
8.80	2.45	17.01	4	0.94	98.4	186	89.1	5.5	26.6	39.9	7.4	24	34	26	23	21	29	28	4.1	6.1	7.4	--	--
9.00	2.45	16.34	4	0.94	100.2	186	89.1	5.4	27.3	40.9	7.4	24	34	26	22	21	29	28	4.1	6.1	7.4	--	--
9.20	1.47	13.27	2	0.95	102.1	154	65.3	3.6	28.8	43.2	4.9	--	--	--	--	--	--	--	--	--	--	--	--
9.40	1.76	38.30	4	0.91	103.9	164	73.5	4.1	29.0	43.5	5.5	12	33	24	21	19	27	27	2.9	4.4	5.3	--	--
9.60	2.55	24.30	4	0.95	105.8	189	91.0	5.2	29.0	43.5	7.6	24	34	26	22	21	29	28	4.2	6.4	7.6	--	--
9.80	1.67	19.54	2	0.97	107.7	161	70.9	3.7	30.4	45.6	5.3	--	--	--	--	--	--	--	--	--	--	--	--
10.00	1.18	17.91	2	0.92	109.5	141	56.0	2.7	28.8	43.3	4.4	--	--	--	--	--	--	--	--	--	--	--	--
10.20	1.18	22.64	2	0.92	111.3	141	56.0	2.7	29.1	43.6	4.4	--	--	--	--	--	--	--	--	--	--	--	--
10.40	0.69	8.75	1	0.46	112.2	115	34.3	1.4	4.4	6.5	1.0	--	--	--	--	--	--	--	--	--	--	--	--
10.60	1.18	16.44	2	0.92	114.0	141	56.0	2.6	29.4	44.0	4.4	--	--	--	--	--	--	--	--	--	--	--	--
10.80	2.25	19.17	4	0.94	115.8	180	85.1	4.3	32.3	48.5	6.8	17	33	25	21	20	28	28	3.8	5.6	6.8	--	--
11.00	2.06	14.29	4	0.93	117.6	174	80.7	3.9	33.0	49.4	6.2	14	33	24	21	20	27	27	3.4	5.1	6.2	--	--
11.20	2.16	16.54	4	0.93	119.5	177	82.9	4.0	33.4	50.0	6.5	15	33	24	21	20	27	28	3.6	5.4	6.5	--	--
11.40	1.86	16.81	2	0.99	121.4	168	76.0	3.5	34.2	51.3	5.7	--	--	--	--	--	--	--	--	--	--	--	--
11.60	2.06	19.63	4	0.93	123.2	174	80.7	3.7	34.8	52.2	6.2	13	33	24	20	19	27	27	3.4	5.1	6.2	--	--
11.80	1.67	17.00	2	0.97	125.1	161	70.9	3.1	34.5	51.7	5.3	--	--	--	--	--	--	--	--	--	--	--	--
12.00	1.86	20.43	2	0.99	127.1	168	76.0	3.3	35.6	53.3	5.7	--	--	--	--	--	--	--	--	--	--	--	--
12.20	2.06	19.63	4	0.93	128.9	174	80.7	3.5	36.3	54.5	6.2	12	33	24	20	19	27	27	3.4	5.1	6.2	--	--
12.40	2.25	11.50	4	0.94	130.7	180	85.1	3.7	36.9	55.3	6.8	14	33	24	21	19	27	28	3.8	5.6	6.8	--	--
12.60	2.45	16.34	4	0.94	1323																		

PROVA PENETROMETRICA STATICA MECCANICA

LETTURE CAMPAGNA E VALORI TRASFORMATI

CPT

Riferimento

5**317-2021**

Committente **Studio tecnico**
 Cantiere **Studio terreno di fondazione**
 Località **Nonantola, strada Guercinesca Ovest**

U.M.: **MPa**

Data esec. 30/11/2021

Pagina 1
Elaborato

Falda -2.60 m da p.c.

H m	L1 -	L2 -	Lt -	qc MPa	fs kPa	F -	Rf %	H m	L1 -	L2 -	Lt -	qc MPa	fs kPa	F -	Rf %
0.20	0.0	0.0		0.00	0.00										
0.40	0.0	0.0		0.00	27.00	0									
0.60	4.0	8.0		0.39	33.00	12	8.3								
0.80	4.0	9.0		0.39	147.00	3	36.8								
1.00	17.0	39.0		1.67	153.00	11	9.0								
1.20	35.0	58.0		3.43	213.00	16	6.1								
1.40	29.0	61.0		2.84	120.00	24	4.1								
1.60	17.0	35.0		1.67	147.00	12	8.6								
1.80	16.0	38.0		1.57	93.00	17	5.8								
2.00	12.0	26.0		1.18	87.00	14	7.3								
2.20	10.0	23.0		0.98	73.00	14	7.3								
2.40	9.0	20.0		0.88	40.00	23	4.4								
2.60	7.0	13.0		0.69	40.00	18	5.7								
2.80	6.0	12.0		0.59	93.00	6	15.5								
3.00	12.0	26.0		1.18	67.00	18	5.6								
3.20	14.0	24.0		1.37	67.00	21	4.8								
3.40	14.0	24.0		1.37	60.00	23	4.3								
3.60	7.0	16.0		0.69	40.00	18	5.7								
3.80	5.0	11.0		0.49	33.00	15	6.6								
4.00	6.0	11.0		0.59	60.00	10	10.0								
4.20	8.0	17.0		0.78	33.00	24	4.1								
4.40	8.0	13.0		0.78	53.00	15	6.6								
4.60	8.0	16.0		0.78	53.00	15	6.6								
4.80	12.0	20.0		1.18	33.00	36	2.8								
5.00	6.0	11.0		0.59	47.00	13	7.8								
5.20	8.0	15.0		0.78	53.00	15	6.6								
5.40	9.0	17.0		0.88	60.00	15	6.7								
5.60	12.0	21.0		1.18	80.00	15	6.7								
5.80	14.0	26.0		1.37	107.00	13	7.6								
6.00	14.0	30.0		1.37	93.00	15	6.6								
6.20	17.0	31.0		1.67	113.00	15	6.6								
6.40	16.0	33.0		1.57	107.00	15	6.7								
6.60	21.0	37.0		2.06	127.00	17	6.0								
6.80	19.0	38.0		1.86	140.00	14	7.4								
7.00	23.0	44.0		2.25	133.00	17	5.8								
7.20	16.0	36.0		1.57	107.00	15	6.7								
7.40	20.0	36.0		1.96	120.00	17	6.0								
7.60	22.0	40.0		2.16	120.00	18	5.5								
7.80	17.0	35.0		1.67	140.00	12	8.2								
8.00	12.0	33.0		1.18	60.00	20	5.0								
8.20	9.0	18.0		0.88	73.00	12	8.1								
8.40	18.0	29.0		1.76	87.00	21	4.8								
8.60	26.0	39.0		2.55	160.00	16	6.2								
8.80	27.0	51.0		2.65	160.00	17	5.9								
9.00	28.0	52.0		2.74	160.00	18	5.7								
9.20	18.0	42.0		1.76	107.00	17	5.9								
9.40	20.0	36.0		1.96	93.00	22	4.7								
9.60	18.0	32.0		1.76	93.00	19	5.2								
9.80	12.0	26.0		1.18	47.00	26	3.9								
10.00	8.0	15.0		0.78	80.00	10	10.0								
10.20	15.0	27.0		1.47	87.00	17	5.8								
10.40	24.0	37.0		2.35	140.00	17	5.8								
10.60	24.0	45.0		2.35	133.00	18	5.5								
10.80	23.0	43.0		2.25	140.00	16	6.1								
11.00	15.0	36.0		1.47	87.00	17	5.8								
11.20	21.0	34.0		2.06	120.00	18	5.7								
11.40	20.0	38.0		1.96	100.00	20	5.0								
11.60	13.0	28.0		1.27	80.00	16	6.2								
11.80	22.0	34.0		2.16	80.00	28	3.6								
12.00	17.0	29.0		1.67	93.00	18	5.5								
12.20	19.0	33.0		1.86	93.00	20	4.9								
12.40	20.0	34.0		1.96	127.00	16	6.4								
12.60	17.0	36.0		1.67	227.00	7	13.4								
12.80	22.0	56.0		2.16	120.00	18	5.5								
13.00	21.0	39.0		2.06	140.00	15	6.7								
13.20	25.0	46.0		2.45	153.00	16	6.1								
13.40	25.0	48.0		2.45	160.00	16	6.4								
13.60	24.0	48.0		2.35	160.00	15	6.7								
13.80	22.0	46.0		2.16	153.00	14	7.0								
14.00	18.0	41.0		1.76	120.00	15	6.7								
14.20	17.0	35.0		1.67	107.00	16	6.3								
14.40	23.0	39.0		2.25	127.00	18	5.5								
14.60	22.0	41.0		2.16	147.00	15	6.7								
14.80	23.0	45.0		2.25	153.00	15	6.7								
15.00	33.0	56.0		3.23											

H = profondità

L1 = prima lettura (punta)

L2 = seconda lettura (punta + laterale)

Lt = terza lettura (totale)

CT = 10.00 costante di trasformazione

qc = resistenza punta

fs = resistenza laterale

0.20 m sopra quota qc

F = rapporto Begemann (qc / fs)

Rf = rapporto Schmertmann (fs / qc)*100

PROVA PENETROMETRICA STATICA MECCANICA

DIGRAMMI DI RESISTENZA E LITOLOGIA

CPT

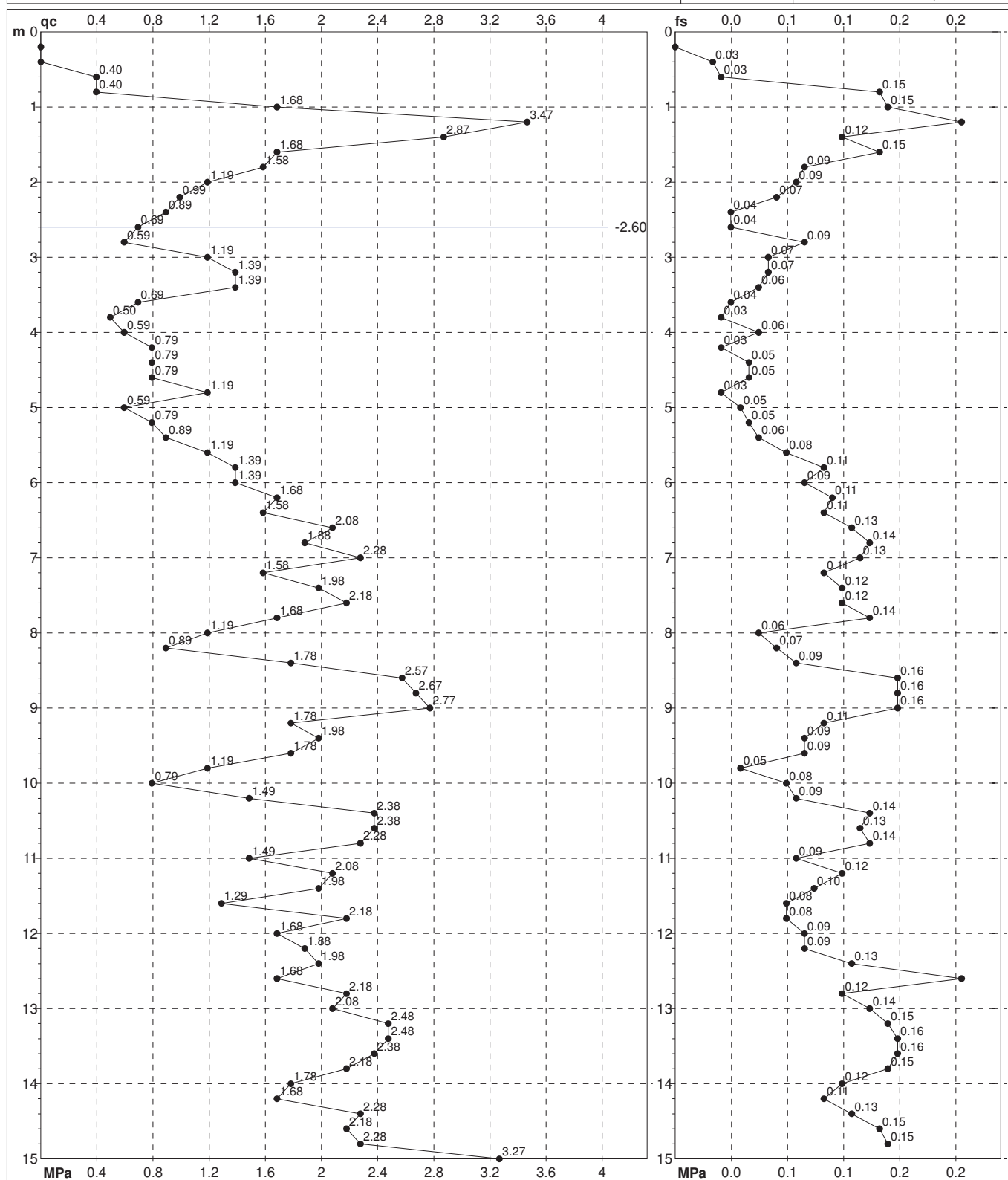
Riferimento

5**317-2021**

Committente **Studio tecnico**
 Cantiere **Studio terreno di fondazione**
 Località **Nonantola, strada Guercinesca Ovest**

U.M.: **MPa**
 Scala: **1:75**
 Pagina **1**
 Elaborato

Data esec. **30/11/2021**
 Quota inizio: .
 Falda **-2.60 m** da p.c.



Penetrometro: SP100

Responsabile:

Assistente:

preforo m

Corr.astine: kN/ml

Cod. tip:

FON111

Software by dott. Geol. Diego Merlin +39 0425-840820

PROVA PENETROMETRICA STATICA MECCANICA

DIAGRAMMI LITOLOGIA

CPT

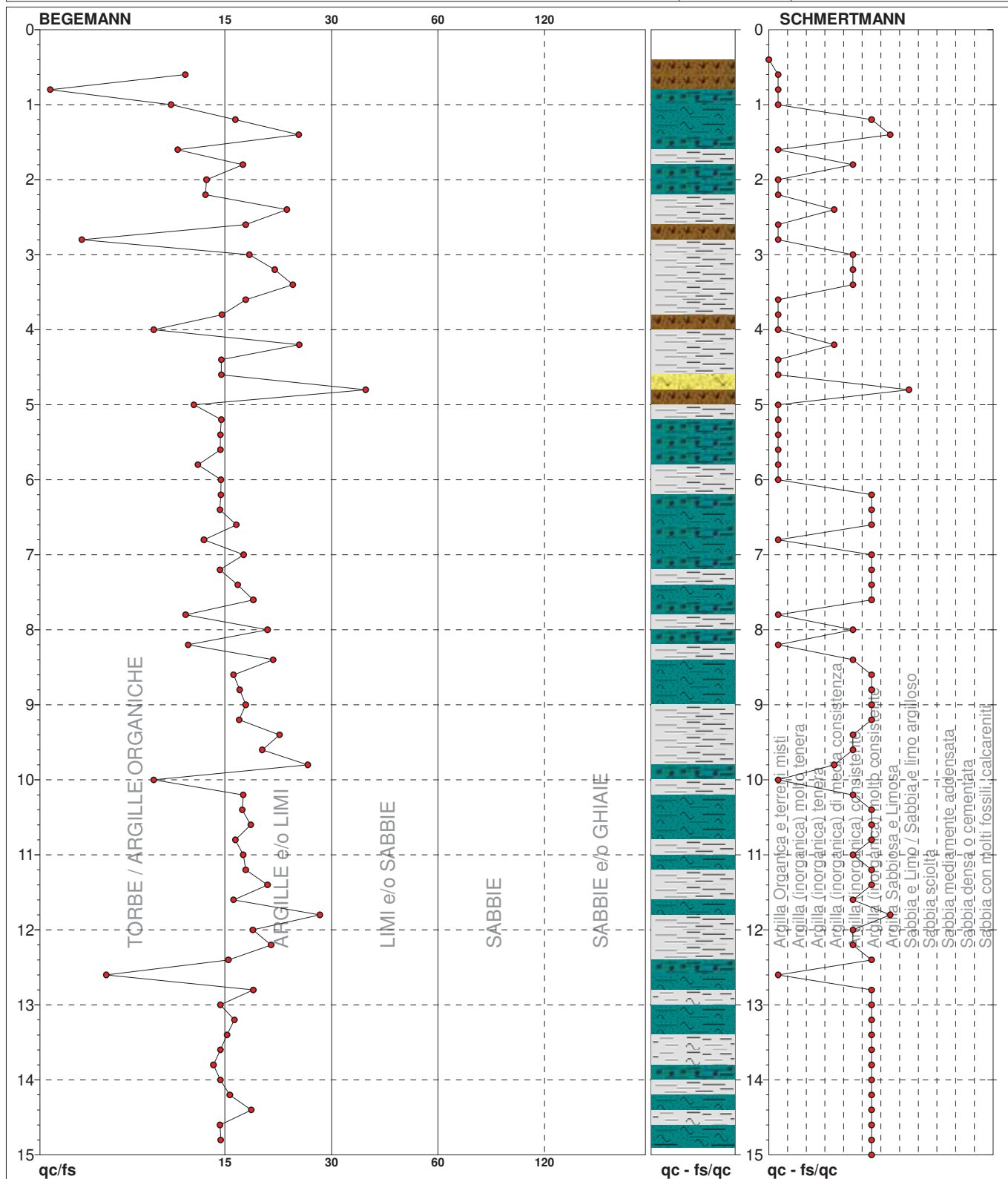
Riferimento

5

317-2021

Committente **Studio tecnico**
Cantiere **Studio terreno di fondazione**
Località **Nonantola, strada Guercinesca Ovest**

U.M.: **MPa**
Scala: **1:75**
Pagina **1**
Elaborato
Data eseg. **30/11/2021**
Falda **-2.60 m da p.c.**



TORBE / ARGILLE OR	26 punti, 34.67%	Argilla Organica e terreni misti	24 punti, 32.00%	Argilla Sabbiosa e Limosa	2 punti, 2.67%
ARGILLE e/o LIMI	47 punti, 62.67%	Argilla (inorganica) di media consistenza	3 punti, 4.00%	Sabbia e Limo / Sabbia e limo argilloso	1 punti, 1.33%
LIMI e/o SABBIE	1 punti, 1.33%	Argilla (inorganica) consistente	13 punti, 17.33%		
		Argilla (inorganica) molto consistente	29 punti, 38.67%		

FON111

Software by dott. Geol. Diego Merlin +39 0425-840820

PROVA PENETROMETRICA STATICA MECCANICA PARAMETRI GEOTECNICI						CPT	5
						Riferimento	317-2021

Committente	Studio tecnico	U.M.:	MPa	Data esec.	30/11/2021
Cantiere	Studio terreno di fondazione	Pagina	1		
Località	Nonantola, strada Guercinesca Ovest	Elaborato		Falda	-2.60 m da p.c.

							NATURA COESIVA					NATURA GRANULARE											
H	qc	qc/fs	zone	γ'	σ'vo	Vs	Cu	OCR	Eu50	Eu25	Mo	Dr	Sc	Ca	Ko	DB	DM	Me	E'50	E'25	Mo	FL1	FL2
m	U.M.			t/m³	kPa	m/s	kPa	%	U.M.	U.M.	U.M.	%	(°)	(°)	(°)	(°)	(°)	(°)	U.M.	U.M.	U.M.		
0.20	--	--	1	1.85	3.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
0.40	--	--	1	1.85	7.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
0.60	0.39	12.12	1	1.85	10.9	93	19.6	13.1	0.8	1.2	0.6	--	--	--	--	--	--	--	--	--	--	--	--
0.80	0.39	2.72	1	1.85	14.5	93	19.6	9.1	0.8	1.2	0.6	--	--	--	--	--	--	--	--	--	--	--	--
1.00	1.67	11.11	2	1.85	18.1	161	70.9	34.5	12.1	18.1	5.3	--	--	--	--	--	--	--	--	--	--	--	--
1.20	3.43	16.43	4	1.85	21.8	211	114.3	50.0	19.4	29.2	10.3	73	40	35	32	30	39	29	5.7	8.6	10.3	--	--
1.40	2.84	24.17	4	1.85	25.4	197	96.3	33.3	16.4	24.6	8.5	62	39	33	30	28	38	29	4.7	7.1	8.5	--	--
1.60	1.67	11.56	2	1.85	29.0	161	70.9	19.2	12.1	18.1	5.3	--	--	--	--	--	--	--	--	--	--	--	--
1.80	1.57	17.20	2	1.85	32.6	157	68.2	15.8	11.6	17.4	5.1	--	--	--	--	--	--	--	--	--	--	--	--
2.00	1.18	13.79	2	1.85	36.3	141	56.0	10.8	9.5	14.3	4.4	--	--	--	--	--	--	--	--	--	--	--	--
2.20	0.98	13.70	2	1.85	39.9	132	49.0	8.1	9.5	14.3	3.9	--	--	--	--	--	--	--	--	--	--	--	--
2.40	0.88	22.50	2	1.85	43.5	127	44.1	6.4	11.3	16.9	3.7	--	--	--	--	--	--	--	--	--	--	--	--
2.60	0.69	17.50	2	0.84	45.2	115	34.3	4.5	12.6	18.9	3.2	--	--	--	--	--	--	--	--	--	--	--	--
2.80	0.59	6.45	1	0.46	46.1	109	29.4	3.6	2.5	3.7	0.9	--	--	--	--	--	--	--	--	--	--	--	--
3.00	1.18	17.91	2	0.92	47.9	141	56.0	7.6	11.6	17.5	4.4	--	--	--	--	--	--	--	--	--	--	--	--
3.20	1.37	20.90	2	0.94	49.7	150	62.4	8.3	11.8	17.7	4.7	--	--	--	--	--	--	--	--	--	--	--	--
3.40	1.37	23.33	2	0.94	51.5	150	62.4	8.0	12.4	18.6	4.7	--	--	--	--	--	--	--	--	--	--	--	--
3.60	0.69	17.50	2	0.84	53.2	115	34.3	3.6	15.0	22.5	3.2	--	--	--	--	--	--	--	--	--	--	--	--
3.80	0.49	15.15	2	0.80	54.8	101	24.5	2.3	13.3	20.0	2.5	--	--	--	--	--	--	--	--	--	--	--	--
4.00	0.59	10.00	1	0.46	55.7	109	29.4	2.8	3.1	4.6	0.9	--	--	--	--	--	--	--	--	--	--	--	--
4.20	0.78	24.24	2	0.86	57.3	121	39.2	3.9	16.1	24.1	3.4	--	--	--	--	--	--	--	--	--	--	--	--
4.40	0.78	15.09	2	0.86	59.0	121	39.2	3.8	16.6	25.0	3.4	--	--	--	--	--	--	--	--	--	--	--	--
4.60	0.78	15.09	2	0.86	60.7	121	39.2	3.6	17.1	25.7	3.4	--	--	--	--	--	--	--	--	--	--	--	--
4.80	1.18	36.36	4	0.88	62.4	141	56.0	5.5	16.9	25.4	4.4	10	32	24	21	20	28	26	2.0	2.9	3.5	--	--
5.00	0.59	12.77	1	0.46	63.3	109	29.4	2.4	3.3	5.0	0.9	--	--	--	--	--	--	--	--	--	--	--	--
5.20	0.78	15.09	2	0.86	65.0	121	39.2	3.3	18.2	27.3	3.4	--	--	--	--	--	--	--	--	--	--	--	--
5.40	0.88	15.00	2	0.88	66.7	127	44.1	3.7	18.8	28.2	3.7	--	--	--	--	--	--	--	--	--	--	--	--
5.60	1.18	15.00	2	0.92	68.6	141	56.0	4.9	19.0	28.5	4.4	--	--	--	--	--	--	--	--	--	--	--	--
5.80	1.37	13.08	2	0.94	70.4	150	62.4	5.4	19.2	28.7	4.7	--	--	--	--	--	--	--	--	--	--	--	--
6.00	1.37	15.05	2	0.94	72.2	150	62.4	5.2	19.8	29.7	4.7	--	--	--	--	--	--	--	--	--	--	--	--
6.20	1.67	15.04	2	0.97	74.1	161	70.9	5.9	19.7	29.5	5.3	--	--	--	--	--	--	--	--	--	--	--	--
6.40	1.57	14.95	2	0.96	76.0	157	68.2	5.5	20.6	30.9	5.1	--	--	--	--	--	--	--	--	--	--	--	--
6.60	2.06	16.54	4	0.93	77.8	174	80.7	6.6	20.0	30.0	6.2	24	34	26	23	21	30	27	3.4	5.1	6.2	--	--
6.80	1.86	13.57	2	0.99	79.8	168	76.0	5.9	21.2	31.8	5.7	--	--	--	--	--	--	--	--	--	--	--	--
7.00	2.25	17.29	4	0.94	81.6	180	85.1	6.6	20.9	31.4	6.8	26	34	26	23	22	30	28	3.8	5.6	6.8	--	--
7.20	1.57	14.95	2	0.96	83.5	157	68.2	4.9	23.1	34.7	5.1	--	--	--	--	--	--	--	--	--	--	--	--
7.40	1.96	16.67	4	0.93	85.3	171	78.4	5.6	23.0	34.4	5.9	20	34	25	22	21	29	27	3.3	4.9	5.9	--	--
7.60	2.16	18.33	4	0.93	87.1	177	82.9	5.9	23.2	34.8	6.5	23	34	26	22	21	29	28	3.6	5.4	6.5	--	--
7.80	1.67	12.14	2	0.97	89.0	161	70.9	4.7	24.7	37.1	5.3	--	--	--	--	--	--	--	--	--	--	--	--
8.00	1.18	20.00	2	0.92	90.8	141	56.0	3.4	25.6	38.3	4.4	--	--	--	--	--	--	--	--	--	--	--	--
8.20	0.88	12.33	2	0.88	92.6	127	44.1	2.5	23.4	35.1	3.7	--	--	--	--	--	--	--	--	--	--	--	--
8.40	1.76	20.69	2	0.98	94.5	164	73.5	4.6	26.3	39.5	5.5	--	--	--	--	--	--	--	--	--	--	--	--
8.60	2.55	16.25	4	0.95	96.4	189	91.0	5.8	25.7	38.5	7.6	26	34	26	23	21	30	28	4.2	6.4	7.6	--	--
8.80	2.65	16.88	4	0.95	98.2	192	92.8	5.9	26.2	39.3	7.9	27	34	26	23	22	30	28	4.4	6.6	7.9	--	--
9.00	2.74	17.50	4	0.96	100.1	194	94.6	5.9	26.7	40.0	8.2	28	35	26	23	22	30	28	4.6	6.9	8.2	--	--
9.20	1.76	16.82	2	0.98	102.0	164	73.5	4.2	28.5	42.7	5.5	--	--	--	--	--	--	--	--	--	--	--	--
9.40	1.96	21.51	4	0.93	103.8	171	78.4	4.4	29.0	43.5	5.9	15	33	24	21	20	28	27	3.3	4.9	5.9	--	--
9.60	1.76	19.35	2	0.98	105.7	164	73.5	4.0	29.5	44.3	5.5	--	--	--	--	--	--	--	--	--	--	--	--
9.80	1.18	25.53	2	0.92	107.5	141	56.0	2.8	28.6	42.9	4.4	--	--	--	--	--	--	--	--	--	--	--	--
10.00	0.78	10.00	2	0.86	109.2	121	39.2	1.7	22.5	33.7	3.4	--	--	--	--	--	--	--	--	--	--	--	--
10.20	1.47	17.24	4	0.95	111.1	154	65.3	3.2	31.0	46.4	4.9	--	--	--	--	--	--	--	--	--	--	--	--
10.40	2.35	17.14	4	0.94	112.9	183	87.1	4.5	31.5	47.2	7.1	19	34	25	22	20	28	28	3.9	5.9	7.1	--	--
10.60	2.35	18.05	4	0.94	114.8	183	87.1	4.4	32.0	48.0	7.1	19	34	25	22	20	28	28	3.9	5.9	7.1	--	--
10.80	2.25	16.43	4	0.94	116.6	180	85.1	4.2	32.6	48.9	6.8	17	33	24	21	20	28	28	3.8	5.6	6.8	--	--
11.00	1.47	17.24	2	0.95	118.5	154	65.3	3.0	32.3	48.5	4.9	--	--	--	--	--	--	--	--	--	--	--	--
11.20	2.06	17.50	4	0.93	120.3	174	80.7	3.8	33.9	50.8	6.2	13	33	24	21	19	27	27	3.4	5.1	6.2	--	--
11.40	1.96	20.00	4	0.93	122.1	171	78.4	3.6	34.5	51.7	5.9	11	33	24	20	19	27	27	3.3	4.9	5.9	--	--
11.60	1.27	16.25	2	0.93	123.9	145	59.3	2.5	31.4	47.1	4.6	--	--	--	--	--	--	--	--	--	--	--	--
11.80	2.16	27.50	4	0.93	125.8	177	82.9	3.7	35.5	53.2	6.5	14	33	24	21	19	27	28	3.6	5.4	6.5	--	--
12.00	1.67	18.28	2	0.97	127.7	161	70.9	3.0	34.9	52.4	5.3	--	--	--	--	--	--	--	--	--	--	--	--
12.20	1.86	20.43	2	0.99	129.6	168	76.0	3.2	36.1	54.1	5.7	--	--	--	--	--	--	--	--	--	--	--	--
12.40	1.96	15.75	4	0.93	131.4	171	78.4	3.3	36.8	55.1	5.9	10	32	23	20	19	26	27	3.3	4.9	5.9	--	--
12.60																							

PROVA PENETROMETRICA STATICA MECCANICA

LETTURE CAMPAGNA E VALORI TRASFORMATI

CPT

Riferimento

6**317-2021**

Committente **Studio tecnico**
 Cantiere **Studio terreno di fondazione**
 Località **Nonantola, strada Guercinesca Ovest**

U.M.: **MPa**

Data esec. 30/11/2021

 Pagina 1
 Elaborato

Falda -3.00 m da p.c.

H m	L1 -	L2 -	Lt -	qc MPa	fs kPa	F -	Rf %	H m	L1 -	L2 -	Lt -	qc MPa	fs kPa	F -	Rf %
0.20	0.0	0.0		0.00	0.00										
0.40	0.0	0.0		0.00	27.00	0									
0.60	4.0	8.0		0.39	140.00	3	35.0								
0.80	17.0	38.0		1.67	120.00	14	7.1								
1.00	20.0	38.0		1.96	120.00	17	6.0								
1.20	27.0	45.0		2.65	153.00	18	5.7								
1.40	21.0	44.0		2.06	153.00	14	7.3								
1.60	27.0	50.0		2.65	73.00	37	2.7								
1.80	10.0	21.0		0.98	67.00	15	6.7								
2.00	9.0	19.0		0.88	87.00	10	9.7								
2.20	12.0	25.0		1.18	53.00	23	4.4								
2.40	9.0	17.0		0.88	73.00	12	8.1								
2.60	10.0	21.0		0.98	47.00	21	4.7								
2.80	8.0	15.0		0.78	60.00	13	7.5								
3.00	9.0	18.0		0.88	73.00	12	8.1								
3.20	14.0	25.0		1.37	100.00	14	7.1								
3.40	16.0	31.0		1.57	100.00	16	6.3								
3.60	18.0	33.0		1.76	107.00	17	5.9								
3.80	18.0	34.0		1.76	47.00	38	2.6								
4.00	8.0	15.0		0.78	53.00	15	6.6								
4.20	9.0	17.0		0.88	47.00	19	5.2								
4.40	8.0	15.0		0.78	53.00	15	6.6								
4.60	8.0	16.0		0.78	60.00	13	7.5								
4.80	9.0	18.0		0.88	60.00	15	6.7								
5.00	10.0	19.0		0.98	73.00	14	7.3								
5.20	12.0	23.0		1.18	33.00	36	2.8								
5.40	8.0	13.0		0.78	40.00	20	5.0								
5.60	7.0	13.0		0.69	47.00	15	6.7								
5.80	13.0	20.0		1.27	87.00	15	6.7								
6.00	14.0	27.0		1.37	93.00	15	6.6								
6.20	15.0	29.0		1.47	93.00	16	6.2								
6.40	17.0	31.0		1.67	127.00	13	7.5								
6.60	20.0	39.0		1.96	107.00	19	5.4								
6.80	19.0	35.0		1.86	120.00	16	6.3								
7.00	19.0	37.0		1.86	100.00	19	5.3								
7.20	13.0	28.0		1.27	100.00	13	7.7								
7.40	16.0	31.0		1.57	87.00	18	5.4								
7.60	21.0	34.0		2.06	113.00	19	5.4								
7.80	19.0	36.0		1.86	127.00	15	6.7								
8.00	17.0	36.0		1.67	87.00	20	5.1								
8.20	12.0	25.0		1.18	93.00	13	7.8								
8.40	13.0	27.0		1.27	47.00	28	3.6								
8.60	11.0	18.0		1.08	80.00	14	7.3								
8.80	15.0	27.0		1.47	47.00	32	3.1								
9.00	12.0	19.0		1.18	60.00	20	5.0								
9.20	16.0	25.0		1.57	80.00	20	5.0								
9.40	17.0	29.0		1.67	107.00	16	6.3								
9.60	14.0	30.0		1.37	107.00	13	7.6								
9.80	15.0	31.0		1.47	80.00	19	5.3								
10.00	15.0	27.0		1.47	100.00	15	6.7								
10.20	17.0	32.0		1.67	87.00	20	5.1								
10.40	14.0	27.0		1.37	133.00	11	9.5								
10.60	21.0	41.0		2.06	180.00	12	8.6								
10.80	25.0	52.0		2.45	153.00	16	6.1								
11.00	24.0	47.0		2.35	100.00	24	4.2								
11.20	14.0	29.0		1.37	113.00	12	8.1								
11.40	14.0	31.0		1.37	93.00	15	6.6								
11.60	19.0	33.0		1.86	93.00	20	4.9								
11.80	16.0	30.0		1.57	107.00	15	6.7								
12.00	18.0	34.0		1.76	127.00	14	7.1								
12.20	20.0	39.0		1.96	67.00	30	3.4								
12.40	23.0	33.0		2.25	73.00	32	3.2								
12.60	17.0	28.0		1.67	93.00	18	5.5								
12.80	18.0	32.0		1.76	113.00	16	6.3								
13.00	19.0	36.0		1.86	120.00	16	6.3								
13.20	20.0	38.0		1.96	133.00	15	6.7								
13.40	24.0	44.0		2.35	153.00	16	6.4								
13.60	25.0	48.0		2.45	127.00	20	5.1								
13.80	23.0	42.0		2.25	133.00	17	5.8								
14.00	16.0	36.0		1.57	140.00	11	8.8								
14.20	17.0	38.0		1.67	133.00	13	7.8								
14.40	21.0	41.0		2.06	133.00	16	6.3								
14.60	20.0	40.0		1.96	200.00	10	10.0								
14.80	27.0	57.0		2.65	160.00	17	5.9								
15.00	29.0	53.0		2.84											

H = profondità

L1 = prima lettura (punta)

L2 = seconda lettura (punta + laterale)

Lt = terza lettura (totale)

CT = 10.00 costante di trasformazione

qc = resistenza punta

fs = resistenza laterale

0.20 m sopra quota qc

F = rapporto Begemann (qc / fs)

Rf = rapporto Schmertmann (fs / qc)*100

PROVA PENETROMETRICA STATICA MECCANICA

DIGRAMMI DI RESISTENZA E LITOLOGIA

CPT

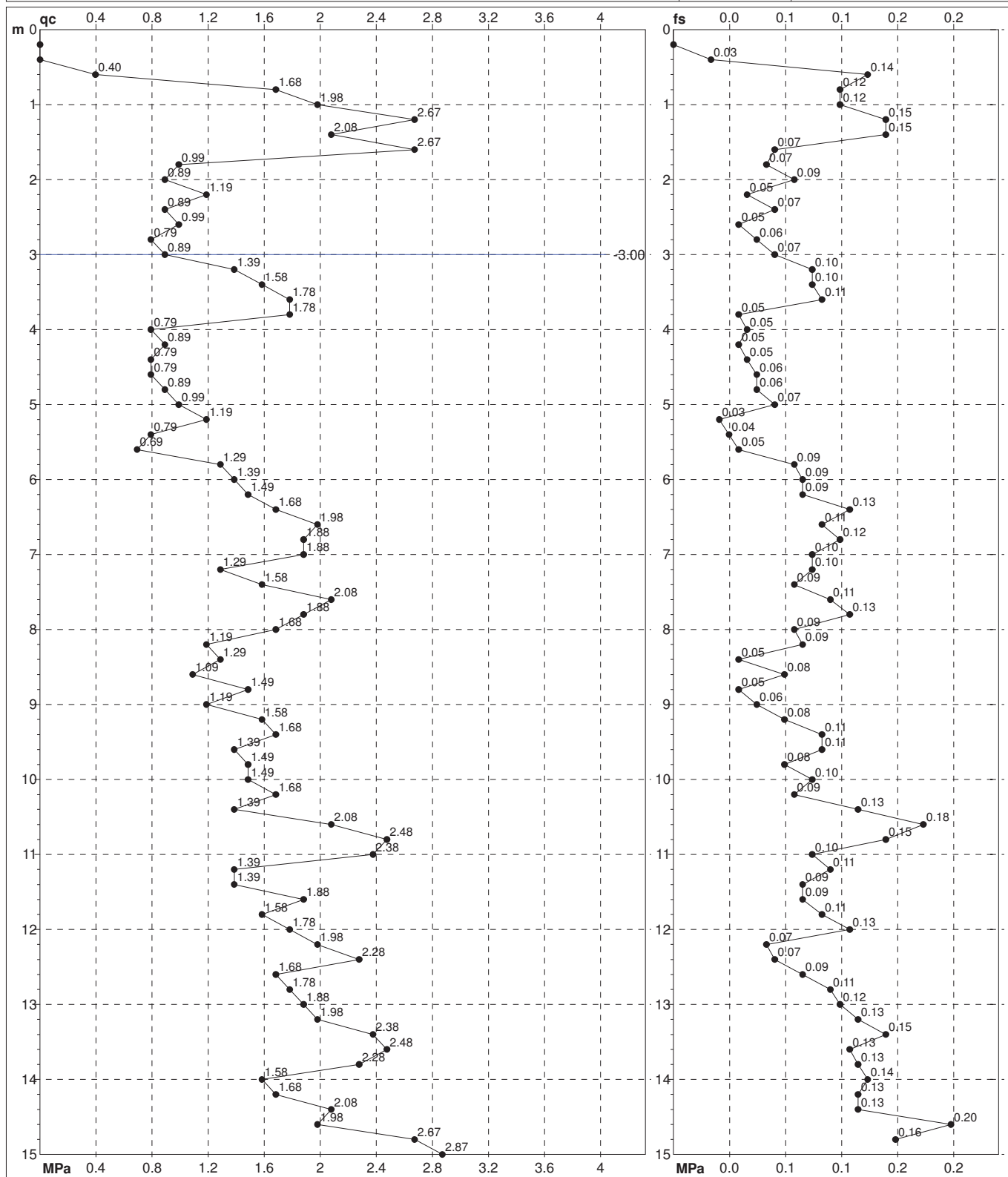
Riferimento

6**317-2021**

Committente **Studio tecnico**
 Cantiere **Studio terreno di fondazione**
 Località **Nonantola, strada Guercinesca Ovest**

U.M.: **MPa**
 Scala: **1:75**
 Pagina **1**
 Elaborato

Data esec. **30/11/2021**
 Quota inizio:
 Falda **-3.00 m** da p.c.



Penetrometro: SP100

Responsabile:

Assistente:

preforo m

Corr.astine: kN/ml

Cod. tip:

FON111

Software by dott. Geol. Diego Merlin +39 0425-840820

PROVA PENETROMETRICA STATICA MECCANICA

DIAGRAMMI LITOLOGIA

CPT

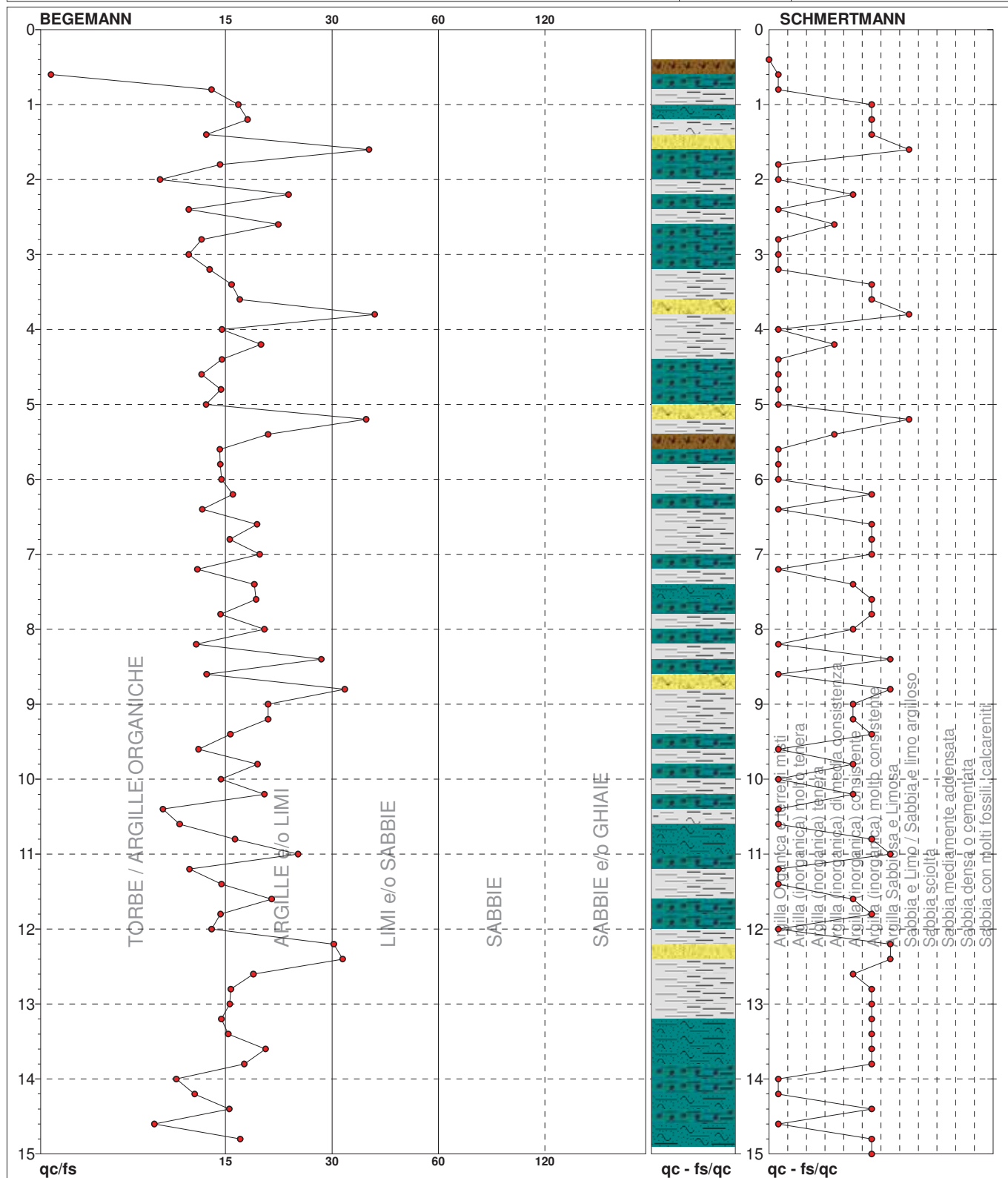
Riferimento

6

317-2021

Committente **Studio tecnico**
Cantiere **Studio terreno di fondazione**
Località **Nonantola, strada Guercinesca Ovest**

U.M.: **MPa**
Scala: **1:75**
Pagina **1**
Elaborato
Data esec. **30/11/2021**
Falda **-3.00 m da p.c.**



TORBE / ARGILLE OR	31 punti, 41.33%	Argilla Organica e terreni misti	30 punti, 40.00%	Argilla Sabbiosa e Limosa	5 punti, 6.67%
ARGILLE e/o LIMI	38 punti, 50.67%	Argilla (inorganica) di media consistenza	3 punti, 4.00%	Sabbia e Limo / Sabbia e limo argilloso	3 punti, 4.00%
LIMI e/o SABBIE	5 punti, 6.67%	Argilla (inorganica) consistente	9 punti, 12.00%		
		Argilla (inorganica) molto consistente	22 punti, 29.33%		

FON111

Software by dott. Geol. Diego Merlin +39 0425-840820

PROVA PENETROMETRICA STATICA MECCANICA PARAMETRI GEOTECNICI						CPT	6
						Riferimento	317-2021

Committente	Studio tecnico	U.M.:	MPa	Data esec.	30/11/2021
Cantiere	Studio terreno di fondazione	Pagina	1		
Località	Nonantola, strada Guercinesca Ovest	Elaborato		Falda	-3.00 m da p.c.

							NATURA COESIVA					NATURA GRANULARE														
H	qc	qc/fs	zone	γ'	σ'vo	Vs	Cu	OCR	Eu50	Eu25	Mo	Dr	Sc	Ca	Ko	DB	DM	Me	E'50	E'25	Mo	FL1	FL2			
m	U.M.			t/m³	kPa	m/s	kPa	%	U.M.	U.M.	U.M.	%	(°)	(°)	(°)	(°)	(°)	(°)	U.M.	U.M.	U.M.					
0.20	--	--	?	1.85	3.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
0.40	--	--	?	1.85	7.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
0.60	0.39	2.86	1	1.85	10.9	93	19.6	13.1	0.8	1.2	0.6	--	--	--	--	--	--	--	--	--	--	--	--			
0.80	1.67	14.17	2	1.85	14.5	161	70.9	45.6	12.1	18.1	5.3	--	--	--	--	--	--	--	--	--	--	--	--			
1.00	1.96	16.67	3	1.85	18.1	171	78.4	39.2	13.3	20.0	5.9	58	38	33	30	28	37	27	3.3	4.9	5.9	--	--			
1.20	2.65	17.65	4	1.85	21.8	192	92.8	38.5	15.8	23.7	7.9	64	39	34	31	29	38	28	4.4	6.6	7.9	--	--			
1.40	2.06	13.73	4	1.85	25.4	174	80.7	26.7	13.7	20.6	6.2	51	37	32	29	27	36	27	3.4	5.1	6.2	--	--			
1.60	2.65	36.99	3	1.85	29.0	192	--	--	--	--	--	57	38	32	29	27	36	28	4.4	6.6	7.9	--	--			
1.80	0.98	14.93	2	1.85	32.6	132	49.0	10.4	8.3	12.5	3.9	--	--	--	--	--	--	--	--	--	--	--	--			
2.00	0.88	10.34	2	1.85	36.3	127	44.1	8.0	8.7	13.1	3.7	--	--	--	--	--	--	--	--	--	--	--	--			
2.20	1.18	22.64	2	1.85	39.9	141	56.0	9.6	9.6	14.4	4.4	--	--	--	--	--	--	--	--	--	--	--	--			
2.40	0.88	12.33	2	1.85	43.5	127	44.1	6.4	11.3	16.9	3.7	--	--	--	--	--	--	--	--	--	--	--	--			
2.60	0.98	21.28	2	1.85	47.1	132	49.0	6.6	12.1	18.1	3.9	--	--	--	--	--	--	--	--	--	--	--	--			
2.80	0.78	13.33	2	1.85	50.8	121	39.2	4.5	14.1	21.2	3.4	--	--	--	--	--	--	--	--	--	--	--	--			
3.00	0.88	12.33	2	0.88	52.5	127	44.1	5.1	14.5	21.7	3.7	--	--	--	--	--	--	--	--	--	--	--	--			
3.20	1.37	14.00	2	0.94	54.3	150	62.4	7.5	13.3	20.0	4.7	--	--	--	--	--	--	--	--	--	--	--	--			
3.40	1.57	16.00	2	0.96	56.2	157	68.2	8.0	13.5	20.3	5.1	--	--	--	--	--	--	--	--	--	--	--	--			
3.60	1.76	16.82	2	0.98	58.1	164	73.5	8.4	13.8	20.7	5.5	--	--	--	--	--	--	--	--	--	--	--	--			
3.80	1.76	38.30	4	0.91	59.9	164	73.5	8.1	14.3	21.5	5.5	25	34	27	23	22	30	27	2.9	4.4	5.3	--	--			
4.00	0.78	15.09	2	0.86	61.6	121	39.2	3.6	17.4	26.1	3.4	--	--	--	--	--	--	--	--	--	--	--	--			
4.20	0.88	19.15	2	0.88	63.3	127	44.1	4.0	17.7	26.5	3.7	--	--	--	--	--	--	--	--	--	--	--	--			
4.40	0.78	15.09	2	0.86	65.0	121	39.2	3.3	18.2	27.3	3.4	--	--	--	--	--	--	--	--	--	--	--	--			
4.60	0.78	13.33	2	0.86	66.7	121	39.2	3.2	18.6	27.9	3.4	--	--	--	--	--	--	--	--	--	--	--	--			
4.80	0.88	15.00	2	0.88	68.4	127	44.1	3.6	19.3	29.0	3.7	--	--	--	--	--	--	--	--	--	--	--	--			
5.00	0.98	13.70	2	0.90	70.2	132	49.0	4.0	19.6	29.4	3.9	--	--	--	--	--	--	--	--	--	--	--	--			
5.20	1.18	36.36	4	0.88	71.9	141	56.0	4.6	20.0	30.0	4.4	7	32	24	20	19	27	26	2.0	2.9	3.5	--	--			
5.40	0.78	20.00	2	0.86	73.6	121	39.2	2.9	19.8	29.7	3.4	--	--	--	--	--	--	--	--	--	--	--	--			
5.60	0.69	14.89	1	0.86	74.5	115	34.3	2.4	3.9	5.8	1.0	--	--	--	--	--	--	--	--	--	--	--	--			
5.80	1.27	14.94	2	0.93	76.3	145	59.3	4.6	21.3	31.9	4.6	--	--	--	--	--	--	--	--	--	--	--	--			
6.00	1.37	15.05	2	0.94	78.2	150	62.4	4.7	21.7	32.6	4.7	--	--	--	--	--	--	--	--	--	--	--	--			
6.20	1.47	16.13	2	0.95	80.0	154	65.3	4.9	22.2	33.2	4.9	--	--	--	--	--	--	--	--	--	--	--	--			
6.40	1.67	13.39	2	0.97	81.9	161	70.9	5.2	22.4	33.6	5.3	--	--	--	--	--	--	--	--	--	--	--	--			
6.60	1.96	18.69	4	0.93	83.7	171	78.4	5.8	22.4	33.6	5.9	21	34	25	22	21	29	27	3.3	4.9	5.9	--	--			
6.80	1.86	15.83	2	0.99	85.7	168	76.0	5.4	23.3	35.0	5.7	--	--	--	--	--	--	--	--	--	--	--	--			
7.00	1.86	19.00	2	0.99	87.6	168	76.0	5.3	24.0	36.0	5.7	--	--	--	--	--	--	--	--	--	--	--	--			
7.20	1.27	13.00	2	0.93	89.4	145	59.3	3.8	25.2	37.8	4.6	--	--	--	--	--	--	--	--	--	--	--	--			
7.40	1.57	18.39	2	0.96	91.3	157	68.2	4.4	25.5	38.3	5.1	--	--	--	--	--	--	--	--	--	--	--	--			
7.60	2.06	18.58	4	0.93	93.1	174	80.7	5.2	25.5	38.2	6.2	20	34	25	22	21	29	27	3.4	5.1	6.2	--	--			
7.80	1.86	14.96	2	0.99	95.1	168	76.0	4.7	26.4	39.6	5.7	--	--	--	--	--	--	--	--	--	--	--	--			
8.00	1.67	19.54	2	0.97	97.0	161	70.9	4.2	27.1	40.6	5.3	--	--	--	--	--	--	--	--	--	--	--	--			
8.20	1.18	12.90	2	0.92	98.8	141	56.0	3.1	27.2	40.8	4.4	--	--	--	--	--	--	--	--	--	--	--	--			
8.40	1.27	27.66	2	0.93	100.6	145	59.3	3.2	28.1	42.1	4.6	--	--	--	--	--	--	--	--	--	--	--	--			
8.60	1.08	13.75	2	0.91	102.4	137	52.6	2.7	27.0	40.5	4.2	--	--	--	--	--	--	--	--	--	--	--	--			
8.80	1.47	31.91	4	0.89	104.2	154	65.3	3.5	29.4	44.1	4.9	5	32	23	20	19	26	27	2.5	3.7	4.4	--	--			
9.00	1.18	20.00	2	0.92	106.0	141	56.0	2.8	28.4	42.6	4.4	--	--	--	--	--	--	--	--	--	--	--	--			
9.20	1.57	20.00	2	0.96	107.8	157	68.2	3.5	30.4	45.6	5.1	--	--	--	--	--	--	--	--	--	--	--	--			
9.40	1.67	15.89	2	0.97	109.7	161	70.9	3.6	31.0	46.5	5.3	--	--	--	--	--	--	--	--	--	--	--	--			
9.60	1.37	13.08	2	0.94	111.6	150	62.4	3.0	30.6	45.9	4.7	--	--	--	--	--	--	--	--	--	--	--	--			
9.80	1.47	18.75	2	0.95	113.4	154	65.3	3.1	31.4	47.1	4.9	--	--	--	--	--	--	--	--	--	--	--	--			
10.00	1.47	15.00	2	0.95	115.3	154	65.3	3.1	31.8	47.7	4.9	--	--	--	--	--	--	--	--	--	--	--	--			
10.20	1.67	19.54	2	0.97	117.2	161	70.9	3.3	32.9	49.3	5.3	--	--	--	--	--	--	--	--	--	--	--	--			
10.40	1.37	10.53	2	0.94	119.1	150	62.4	2.8	31.7	47.6	4.7	--	--	--	--	--	--	--	--	--	--	--	--			
10.60	2.06	11.67	4	0.93	120.9	174	80.7	3.8	34.0	51.1	6.2	13	33	24	21	19	27	27	3.4	5.1	6.2	--	--			
10.80	2.45	16.34	4	0.94	122.7	186	89.1	4.2	34.3	51.4	7.4	19	34	25	21	20	28	28	4.1	6.1	7.4	--	--			
11.00	2.35	24.00	4	0.94	124.6	183	87.1	4.0	34.7	52.1	7.1	17	33	24	21	20	28	28	3.9	5.9	7.1	--	--			
11.20	1.37	12.39	2	0.94	126.4	150	62.4	2.6	32.6	49.0	4.7	--	--	--	--	--	--	--	--	--	--	--	--			
11.40	1.37	15.05	2	0.94	128.3	150	62.4	2.5	32.8	49.3	4.7	--	--	--	--	--	--	--	--	--	--	--	--			
11.60	1.86	20.43	2	0.99	130.2	168	76.0	3.2	36.2	54.3	5.7	--	--	--	--	--	--	--	--	--	--	--	--			
11.80	1.57	14.95	2	0.96	132.1	157	68.2	2.7	35.0	52.4	5.1	--	--	--	--	--	--	--	--	--	--	--	--			
12.00	1.76	14.17	2	0.98	134.0	164	73.5	3.0	36.5	54.7	5.5	--	--	--	--	--	--	--	--	--	--	--	--			
12.20	1.96	29.85	4	0.93	135.8	171	78.4	3.2	37.7	56.5	5.9	9	32	23	20	19	26	27	3.3	4.9	5.9	--	--			
12.40	2.25	31.51	3	0.86	137.5	180	--	--	--	--	--	13	33	24	20	19	27	28	3.8	5.6	6.8	--	--			
12.60	1.67	18.28	2	0.97	139.4	161	70.9	2.7	36.6	54.9	5.3	--	--	--	--	--	--	--	--	--						

GEO GROUP s.r.l.

Indagini geognostiche e geofisiche – geologia applicata alle costruzioni – laboratorio geotecnico - idrogeologia
– coltivazione cave– bonifiche – consolidamenti – geologia ambientale – consulenze geologiche e geotecniche

ALLEGATO N° 1

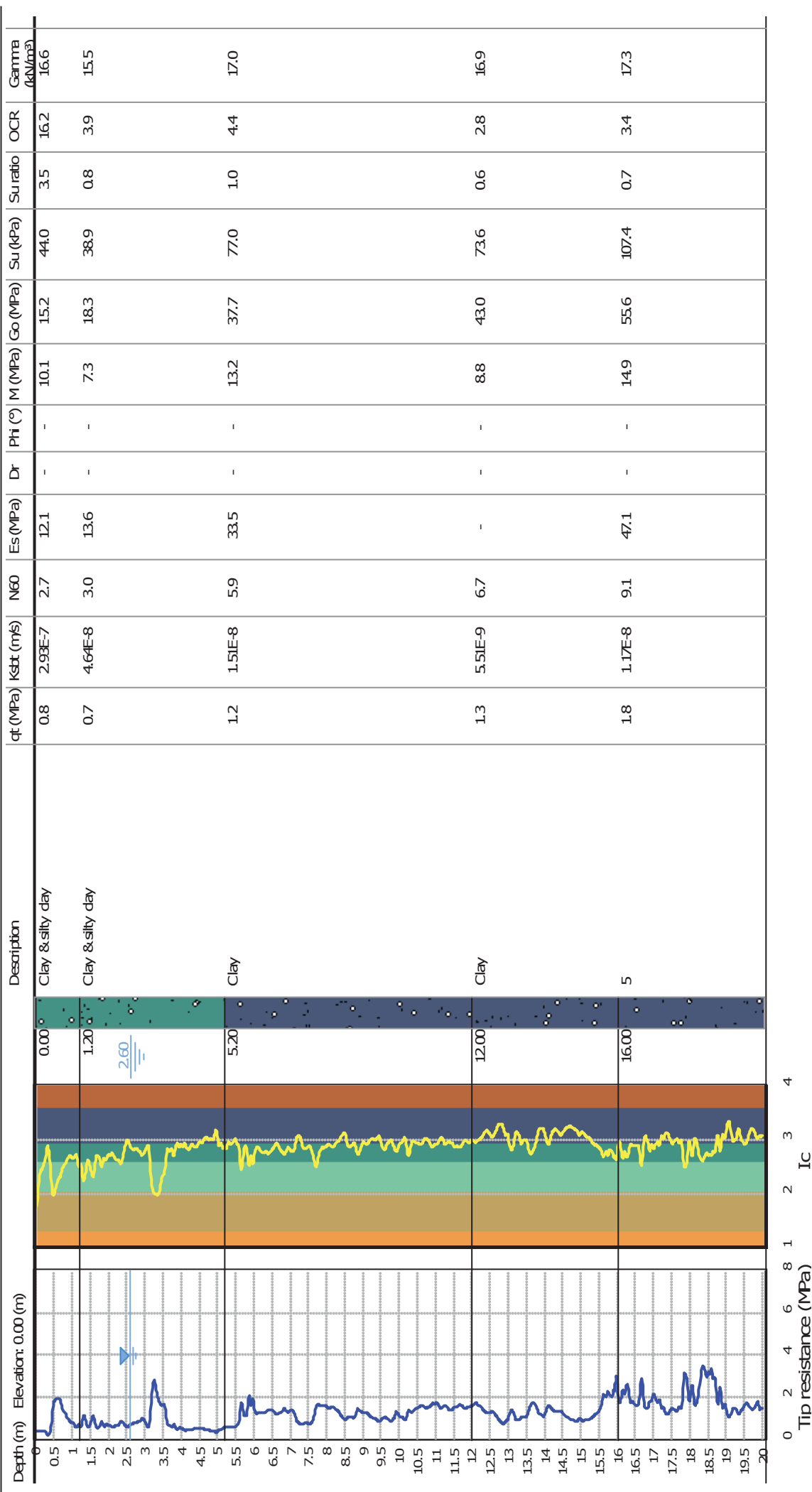
Prove penetrometriche statiche con punta elettrica e piezocono CPTu

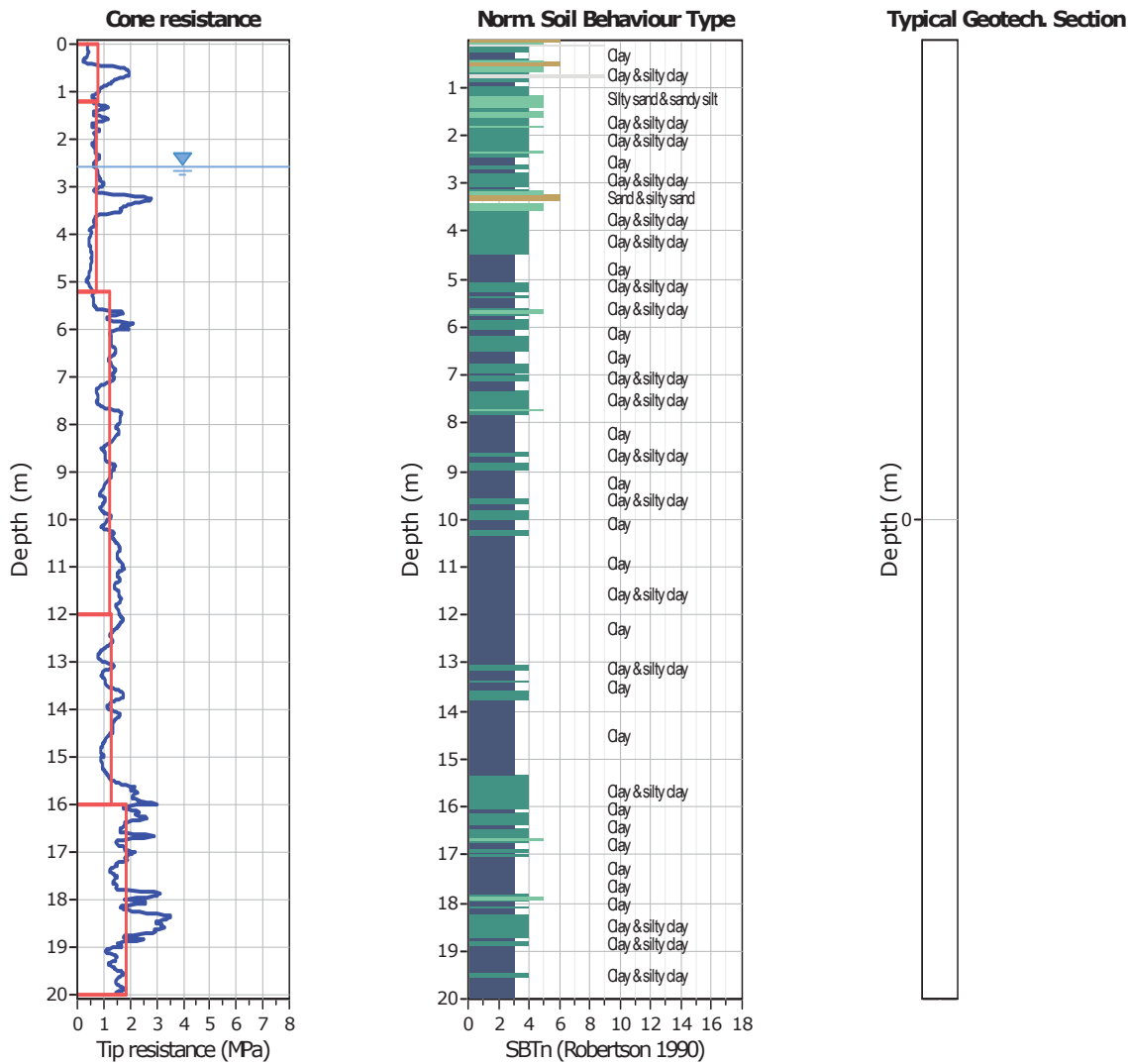
Project:

Location:

CPT: CPTU 2

Total depth: 20.00 m, Date: 15/12/2021





Tabular results

::: Layer No: 1 :::

Code: 1 **Start depth:** 0.00 (m), **End depth:** 1.20 (m)

Description: Clay & silty clay

Basic results

Total cone resistance: 0.76 ±0.60 MPa

Sleeve friction: 24.85 ±24.10 kPa

SBT_n: 4

SBT_n description: Clay & silty clay

Estimation results

Permeability: 2.93E-07 ±5.38E-06 m/s

N60: 2.74 ±1.85 blows

Es: 12.05 ±8.80 MPa

Dr (%): 0.00 ±0.00

φ (degrees): 0.00 ±0.00 °

Unit weight: 16.60 ±1.09 kN/m³

Constrained Mod.: 10.14 ±8.06 MPa

Go: 15.22 ±9.41 MPa

Su: 44.04 ±30.56 kPa

Su ratio: 3.52 ±1.49

O.C.R.: 16.24 ±6.87

::: Layer No: 2 :::**Code: 2** **Start depth: 1.20 (m), End depth: 5.20 (m)****Description:** Clay & silty clay**Basic results**

Total cone resistance: 0.71 ±0.48 MPa

Sleeve friction: 9.69 ±6.87 kPa

SBT_n: 4SBT_n description: Clay & silty clay**Estimation results**

Permeability: 4.64E-08 ±1.47E-06 m/s

N60: 3.03 ±1.17 blows

Es: 13.57 ±2.12 MPa

Dr (%): 0.00 ±0.00

φ (degrees): 0.00 ±0.00 °

Unit weight: 15.48 ±0.72 kN/m³

Constrained Mod.: 7.25 ±6.69 MPa

Go: 18.27 ±4.58 MPa

Su: 38.87 ±11.57 kPa

Su ratio: 0.84 ±0.35

O.C.R.: 3.89 ±1.61

::: Layer No: 3 :::**Code: 3** **Start depth: 5.20 (m), End depth: 12.00 (m)****Description:** Clay**Basic results**

Total cone resistance: 1.23 ±0.32 MPa

Sleeve friction: 31.43 ±18.39 kPa

SBT_n: 3SBT_n description: Clay**Estimation results**

Permeability: 1.51E-08 ±3.75E-08 m/s

N60: 5.88 ±1.44 blows

Es: 33.54 ±2.18 MPa

Dr (%): 0.00 ±0.00

φ (degrees): 0.00 ±0.00 °

Unit weight: 17.03 ±0.77 kN/m³

Constrained Mod.: 13.25 ±5.66 MPa

Go: 37.71 ±10.13 MPa

Su: 77.02 ±21.92 kPa

Su ratio: 0.96 ±0.30

O.C.R.: 4.44 ±1.39

::: Layer No: 4 :::**Code: 4** **Start depth: 12.00 (m), End depth: 16.00 (m)****Description:** Clay**Basic results**

Total cone resistance: 1.27 ±0.41 MPa

Sleeve friction: 27.46 ±19.13 kPa

SBT_n: 3SBT_n description: Clay**Estimation results**

Permeability: 5.51E-09 ±1.62E-08 m/s

N60: 6.67 ±1.56 blows

Es: 0.00 ±0.00 MPa

Dr (%): 0.00 ±0.00

φ (degrees): 0.00 ±0.00 °

Unit weight: 16.89 ±0.79 kN/m³

Constrained Mod.: 8.79 ±7.83 MPa

Go: 43.00 ±10.23 MPa

Su: 73.56 ±29.36 kPa

Su ratio: 0.62 ±0.23

O.C.R.: 2.84 ±1.08

::: Layer No: 5 :::**Code: 4** **Start depth: 16.00 (m), End depth: 20.00 (m)****Description:** 5**Basic results**

Total cone resistance: 1.84 ±0.61 MPa

Sleeve friction: 34.84 ±15.35 kPa

SBT_n: 3SBT_n description: Clay**Estimation results**

Permeability: 1.17E-08 ±3.92E-08 m/s

N60: 9.05 ±1.94 blows

Es: 47.14 ±3.17 MPa

Dr (%): 0.00 ±0.00

φ (degrees): 0.00 ±0.00 °

Unit weight: 17.31 ±0.52 kN/m³

Constrained Mod.: 14.93 ±11.82 MPa

Go: 55.62 ±10.55 MPa

Su: 107.45 ±42.32 kPa

Su ratio: 0.73 ±0.30

O.C.R.: 3.35 ±1.39

Summary table of mean values

From depth To depth (m)	Thickness (m)	Permeability (m/s)	SPT _{N60} (blows/30cm)	E _s (MPa)	D _r	Friction angle	Constrained modulus, M (MPa)	Shear modulus, G ₀ (MPa)	Undrained strength, S _u (kPa)	Undrained strength ratio	OCR	Unit weight (kN/m ³)
0.00	1.20	2.93E-07 (±5.38E-06)	2.7 (±1.9)	12.1 (±8.8)	0.0 (±0.0)	0.0 (±0.0)	10.1 (±8.1)	15.2 (±9.4)	44.0 (±30.6)	3.5 (±1.5)	16.2 (±6.9)	16.6 (±1.1)
1.20	4.00	4.64E-08 (±1.47E-06)	3.0 (±1.2)	13.6 (±2.1)	0.0 (±0.0)	0.0 (±0.0)	7.3 (±6.7)	18.3 (±4.6)	38.9 (±11.6)	0.8 (±0.3)	3.9 (±1.6)	15.5 (±0.7)
5.20	6.80	1.51E-08 (±3.75E-08)	5.9 (±1.4)	33.5 (±2.2)	0.0 (±0.0)	0.0 (±0.0)	13.2 (±5.7)	37.7 (±10.1)	77.0 (±21.9)	1.0 (±0.3)	4.4 (±1.4)	17.0 (±0.8)
12.00	4.00	5.51E-09 (±1.62E-08)	6.7 (±1.6)	0.0 (±0.0)	0.0 (±0.0)	0.0 (±0.0)	8.8 (±7.8)	43.0 (±10.2)	73.6 (±29.4)	0.6 (±0.2)	2.8 (±1.1)	16.9 (±0.8)
16.00	4.00	1.17E-08 (±3.92E-08)	9.1 (±1.9)	47.1 (±3.2)	0.0 (±0.0)	0.0 (±0.0)	14.9 (±11.8)	55.6 (±10.6)	107.4 (±42.3)	0.7 (±0.3)	3.4 (±1.4)	17.3 (±0.5)

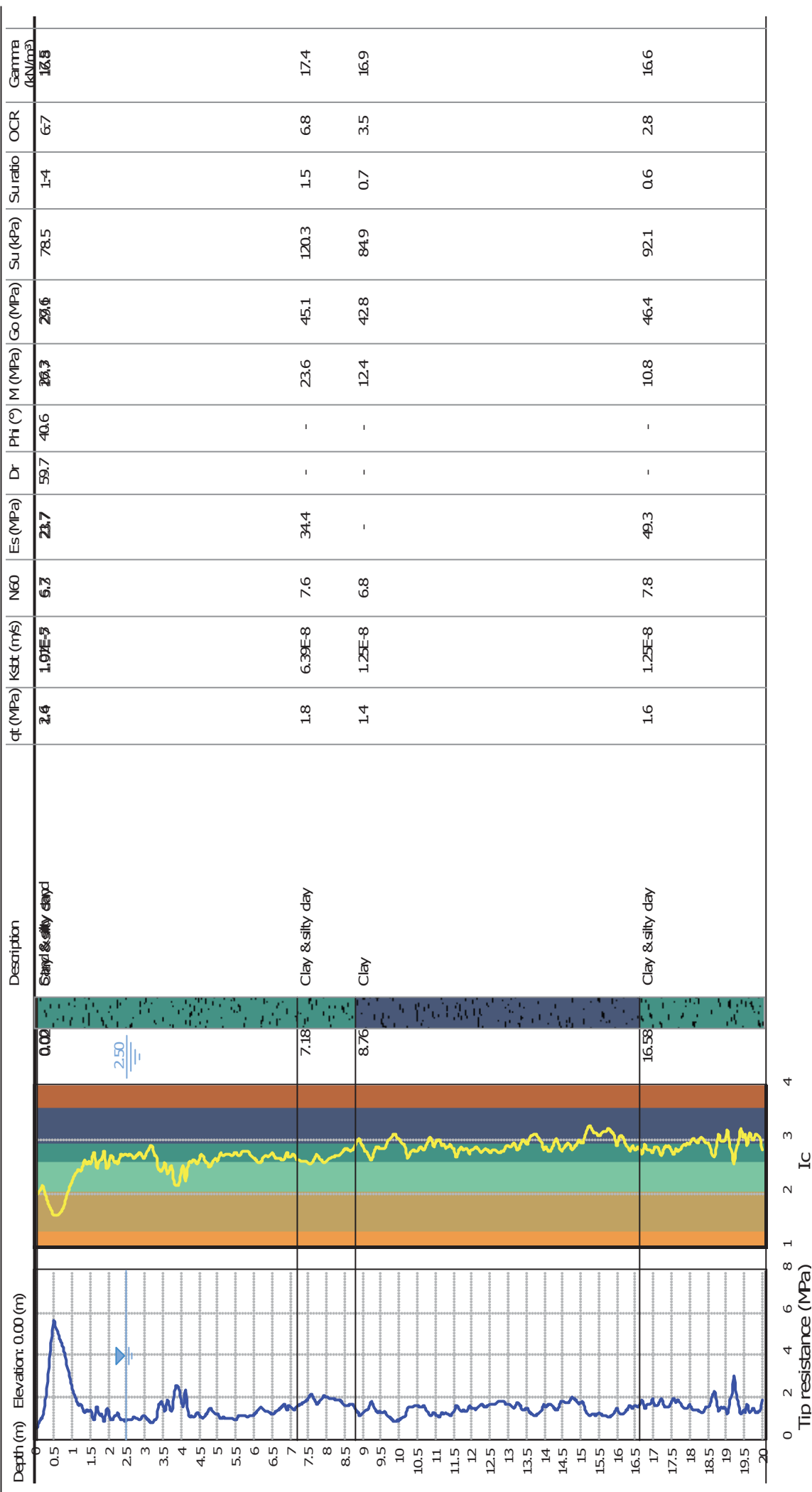
Depth values presented in this table are measured from free ground surface

Project:

Location:

CPT: CPTU 4

Total depth: 20.00 m, Date: 15/12/2021





O.C.R.: 0.00 ±0.00

::: Layer No: 2 :::**Code:** Layer_1 **Start depth:** 0.02 (m), **End depth:** 7.18 (m)**Description:** Clay & silty clay**Basic results**

Total cone resistance: 1.40 ±0.99 MPa

Sleeve friction: 24.54 ±12.03 kPa

SBT_n: 4SBT_n description: Clay & silty clay**Estimation results**

Permeability: 1.97E-07 ±2.32E-05 m/s

N60: 5.25 ±1.79 blows

Es: 23.69 ±2.13 MPa

Dr (%): 0.00 ±0.00

φ (degrees): 0.00 ±0.00 °

Unit weight: 16.80 ±0.53 kN/m³

Constrained Mod.: 17.70 ±7.36 MPa

Go: 29.14 ±5.29 MPa

Su: 78.53 ±15.14 kPa

Su ratio: 1.44 ±0.68

O.C.R.: 6.66 ±3.16

::: Layer No: 3 :::**Code:** Layer_2 **Start depth:** 7.18 (m), **End depth:** 8.76 (m)**Description:** Clay & silty clay**Basic results**

Total cone resistance: 1.82 ±0.16 MPa

Sleeve friction: 39.16 ±7.72 kPa

SBT_n: 4SBT_n description: Clay & silty clay**Estimation results**

Permeability: 6.39E-08 ±4.14E-08 m/s

N60: 7.63 ±0.55 blows

Es: 34.37 ±2.05 MPa

Dr (%): 0.00 ±0.00

φ (degrees): 0.00 ±0.00 °

Unit weight: 17.44 ±0.24 kN/m³

Constrained Mod.: 23.58 ±2.23 MPa

Go: 45.13 ±3.56 MPa

Su: 120.33 ±11.36 kPa

Su ratio: 1.46 ±0.15

O.C.R.: 6.76 ±0.71

::: Layer No: 4 :::**Code:** Layer_3 **Start depth:** 8.76 (m), **End depth:** 16.58 (m)**Description:** Clay**Basic results**

Total cone resistance: 1.41 ±0.25 MPa

Sleeve friction: 26.81 ±8.39 kPa

SBT_n: 3SBT_n description: Clay**Estimation results**

Permeability: 1.25E-08 ±1.45E-08 m/s

N60: 6.83 ±0.96 blows

Es: 0.00 ±0.00 MPa

Dr (%): 0.00 ±0.00

φ (degrees): 0.00 ±0.00 °

Unit weight: 16.90 ±0.37 kN/m³

Constrained Mod.: 12.40 ±5.14 MPa

Go: 42.77 ±5.91 MPa

Su: 84.87 ±17.19 kPa

Su ratio: 0.75 ±0.18

O.C.R.: 3.46 ±0.83

::: Layer No: 5 :::**Code:** Layer_4 **Start depth:** 16.58 (m), **End depth:** 20.00 (m)**Description:** Clay & silty clay**Basic results**

Total cone resistance: 1.60 ±0.30 MPa

Sleeve friction: 20.20 ±3.82 kPa

SBT_n: 4SBT_n description: Clay & silty clay**Estimation results**

Permeability: 1.25E-08 ±2.05E-08 m/s

N60: 7.79 ±0.89 blows

Es: 49.30 ±1.21 MPa

Dr (%): 0.00 ±0.00

φ (degrees): 0.00 ±0.00 °

Unit weight: 16.63 ±0.22 kN/m³

Constrained Mod.: 10.82 ±5.84 MPa

Go: 46.38 ±3.95 MPa

Su: 92.09 ±21.66 kPa

Su ratio: 0.60 ±0.15

O.C.R.: 2.78 ±0.70

Summary table of mean values

From depth To depth (m)	Thickness (m)	Permeability (m/s)	SPT _{N60} (blows/30cm)	E _s (MPa)	D _r	Friction angle	Constrained modulus, M (MPa)	Shear modulus, G ₀ (MPa)	Undrained strength, S _u (kPa)	Undrained strength ratio	OCR	Unit weight (kN/m ³)
0.00	1.20	1.01E-05 (±5.14E-05)	6.7 (±3.1)	21.7 (±8.5)	59.7 (±7.1)	40.6 (±1.2)	26.3 (±10.0)	27.6 (±10.2)	0.0 (±0.0)	0.0 (±0.0)	0.0 (±0.0)	17.5 (±0.6)
1.20												
0.02	7.16	1.97E-07 (±2.32E-05)	5.3 (±1.8)	23.7 (±2.1)	0.0 (±0.0)	0.0 (±0.0)	17.7 (±7.4)	29.1 (±5.3)	78.5 (±15.1)	1.4 (±0.7)	6.7 (±3.2)	16.8 (±0.5)
7.18												
7.18	1.58	6.39E-08 (±4.14E-08)	7.6 (±0.6)	34.4 (±2.1)	0.0 (±0.0)	0.0 (±0.0)	23.6 (±2.2)	45.1 (±3.6)	120.3 (±11.4)	1.5 (±0.2)	6.8 (±0.7)	17.4 (±0.2)
8.76												
8.76	7.82	1.25E-08 (±1.45E-08)	6.8 (±1.0)	0.0 (±0.0)	0.0 (±0.0)	0.0 (±0.0)	12.4 (±5.1)	42.8 (±5.9)	84.9 (±17.2)	0.7 (±0.2)	3.5 (±0.8)	16.9 (±0.4)
16.58												
16.58	3.42	1.25E-08 (±2.05E-08)	7.8 (±0.9)	49.3 (±1.2)	0.0 (±0.0)	0.0 (±0.0)	10.8 (±5.8)	46.4 (±3.9)	92.1 (±21.7)	0.6 (±0.2)	2.8 (±0.7)	16.6 (±0.2)
20.00												

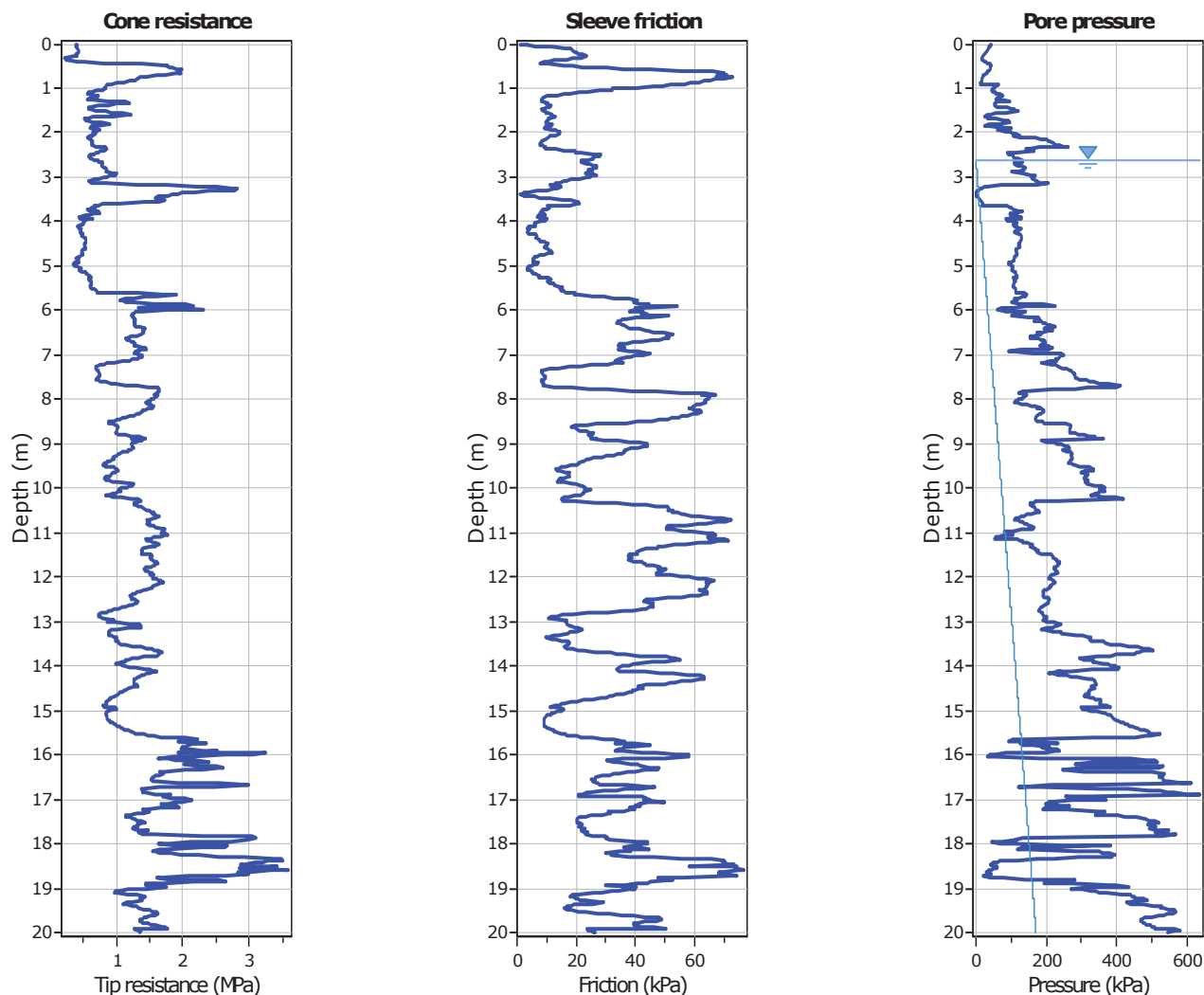
Depth values presented in this table are measured from free ground surface

Project:

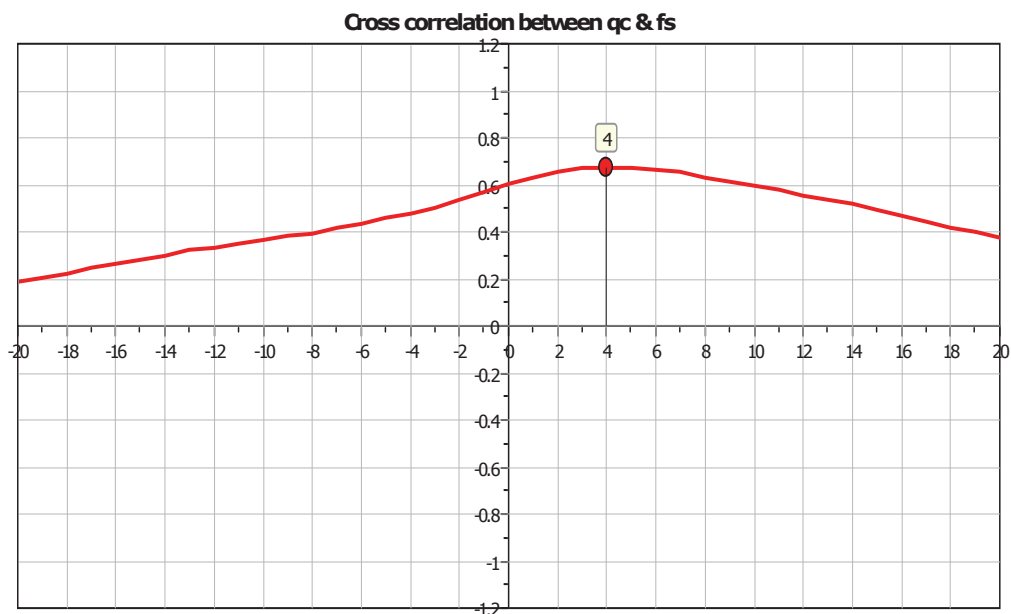
Location:

CPT: CPTU 2

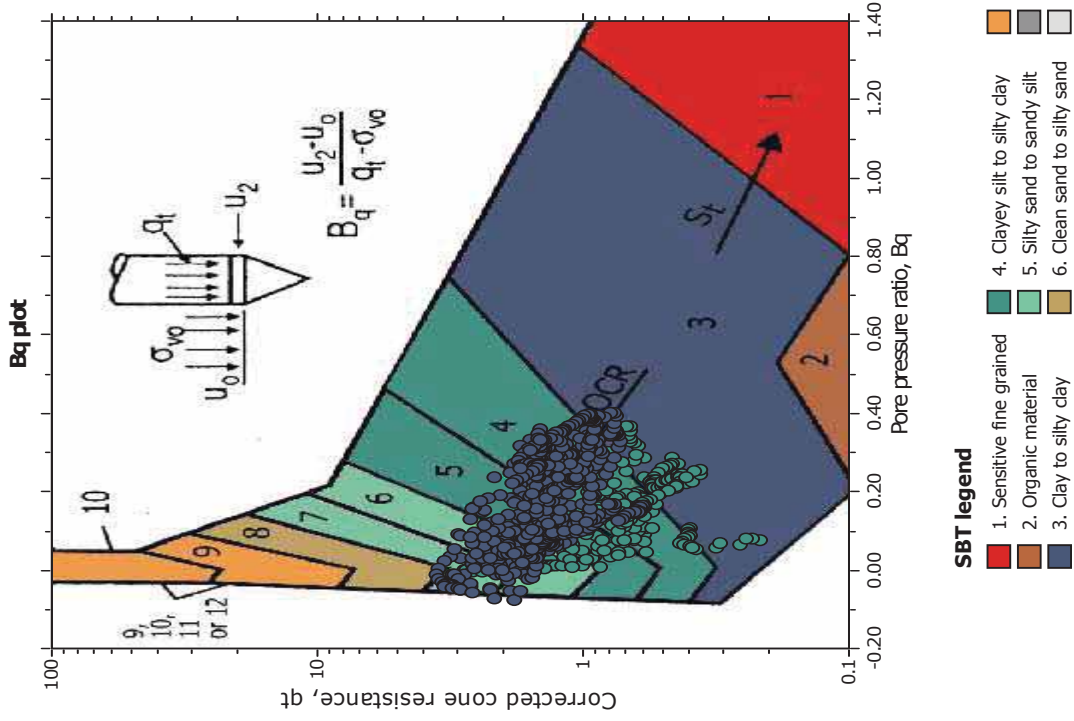
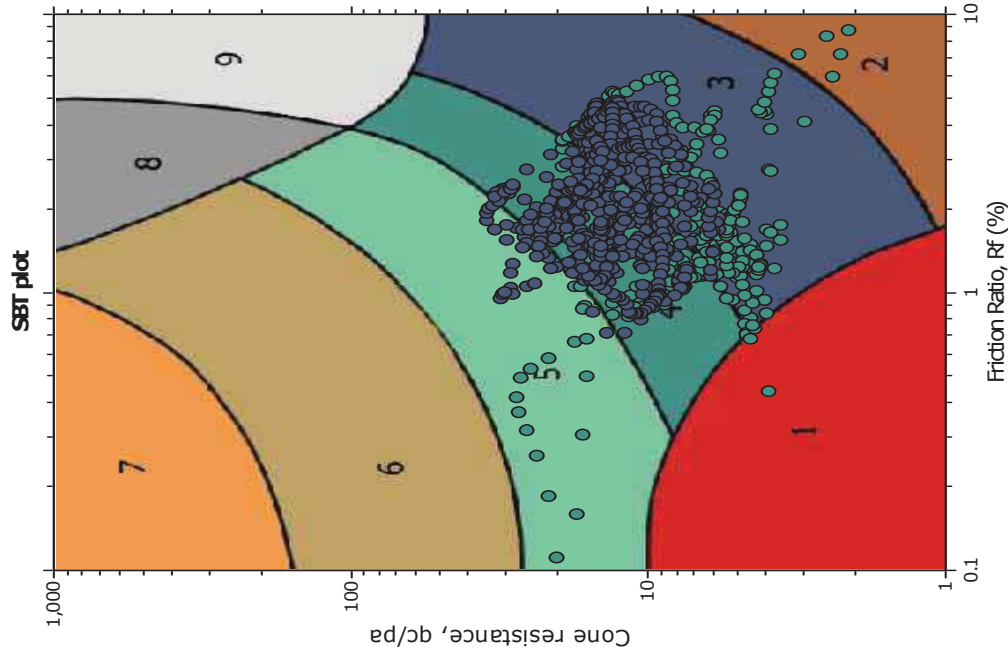
Total depth: 20.00 m, Date: 15/12/2021



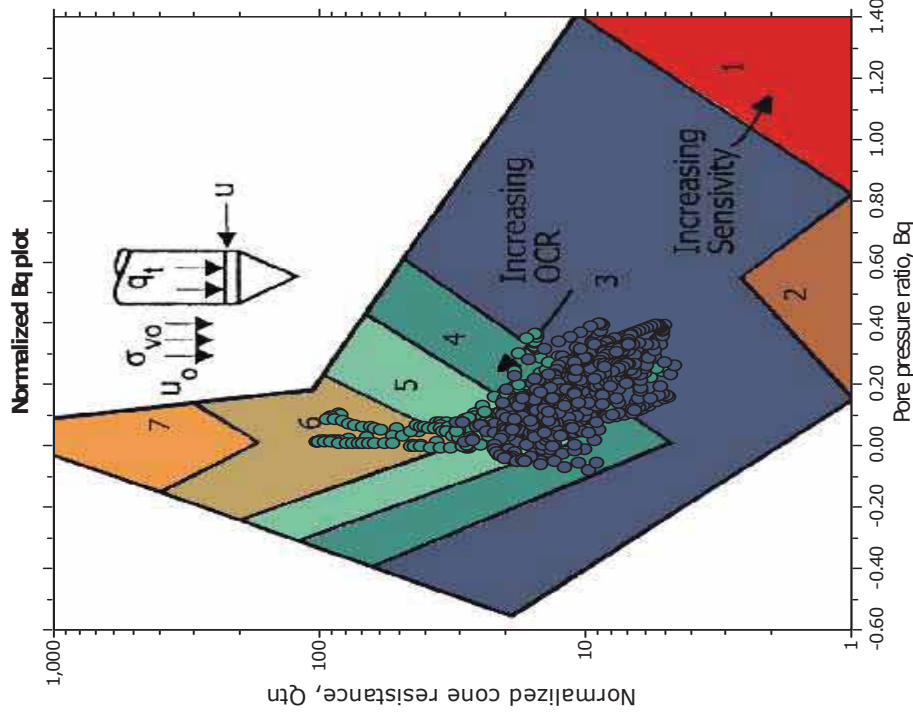
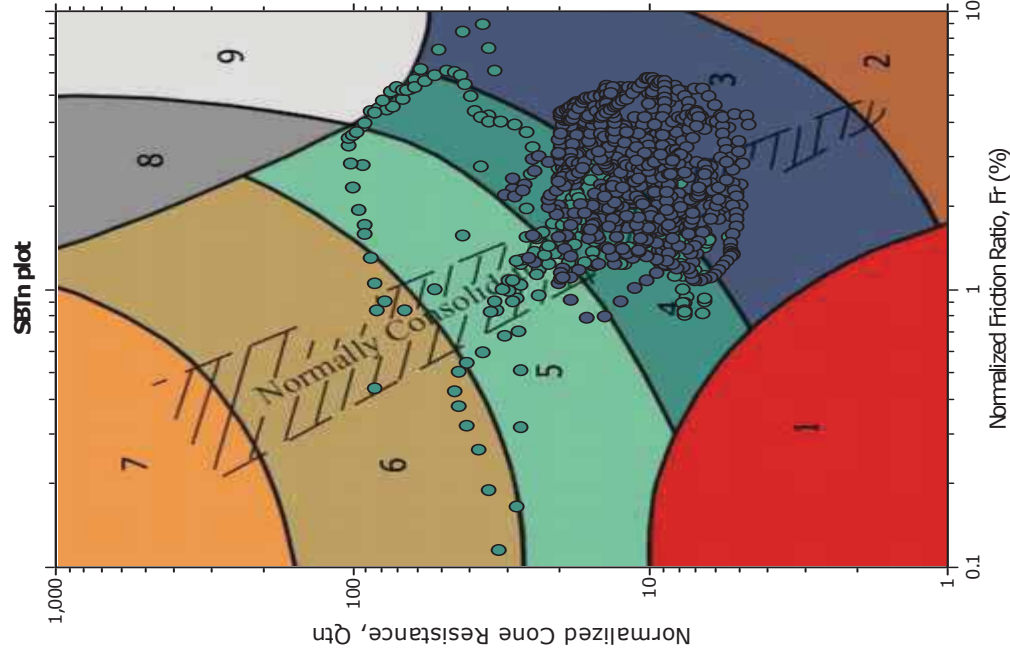
The plot below presents the cross correlation coefficient between the raw q_c and f_s values (as measured on the field). X axes presents the lag distance (one lag is the distance between two successive CPT measurements).

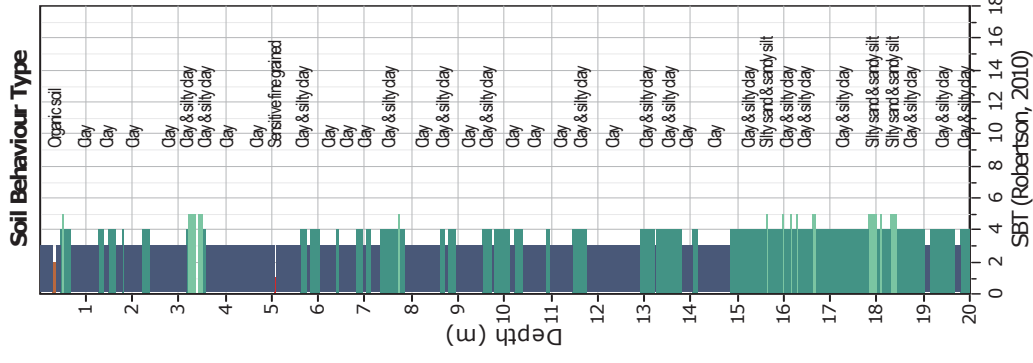
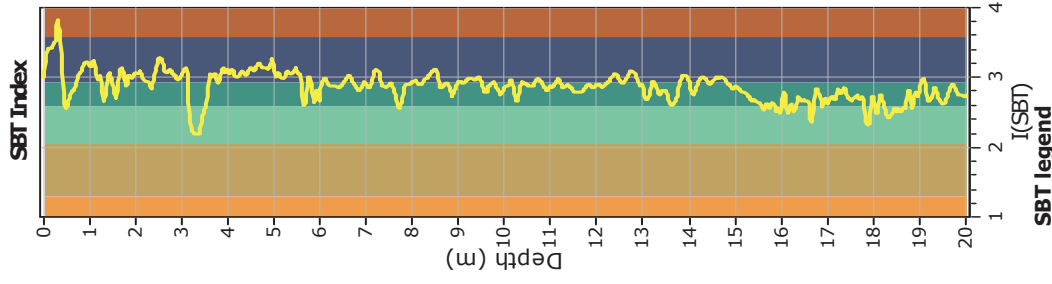
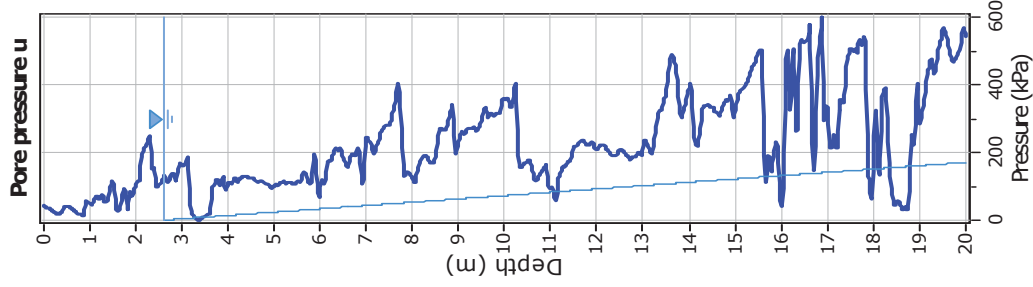
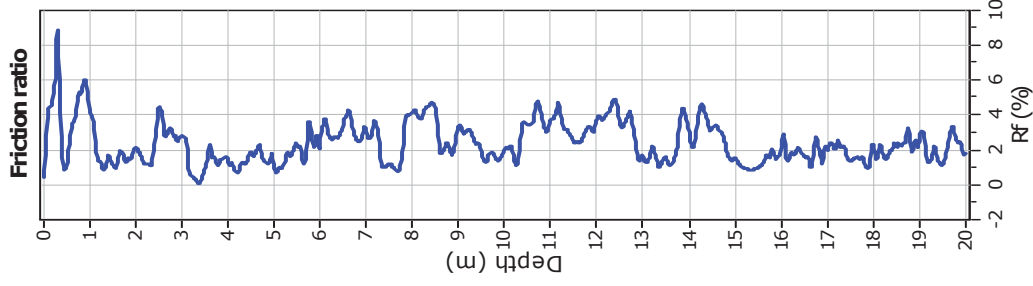
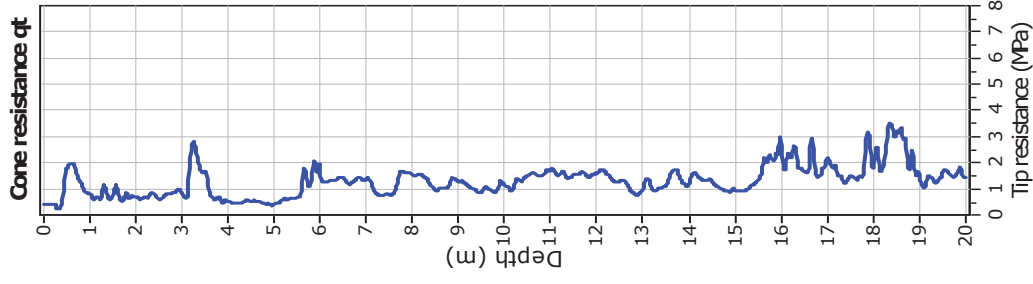


SBT - Bq plots



SBT - Bq plots (normalized)



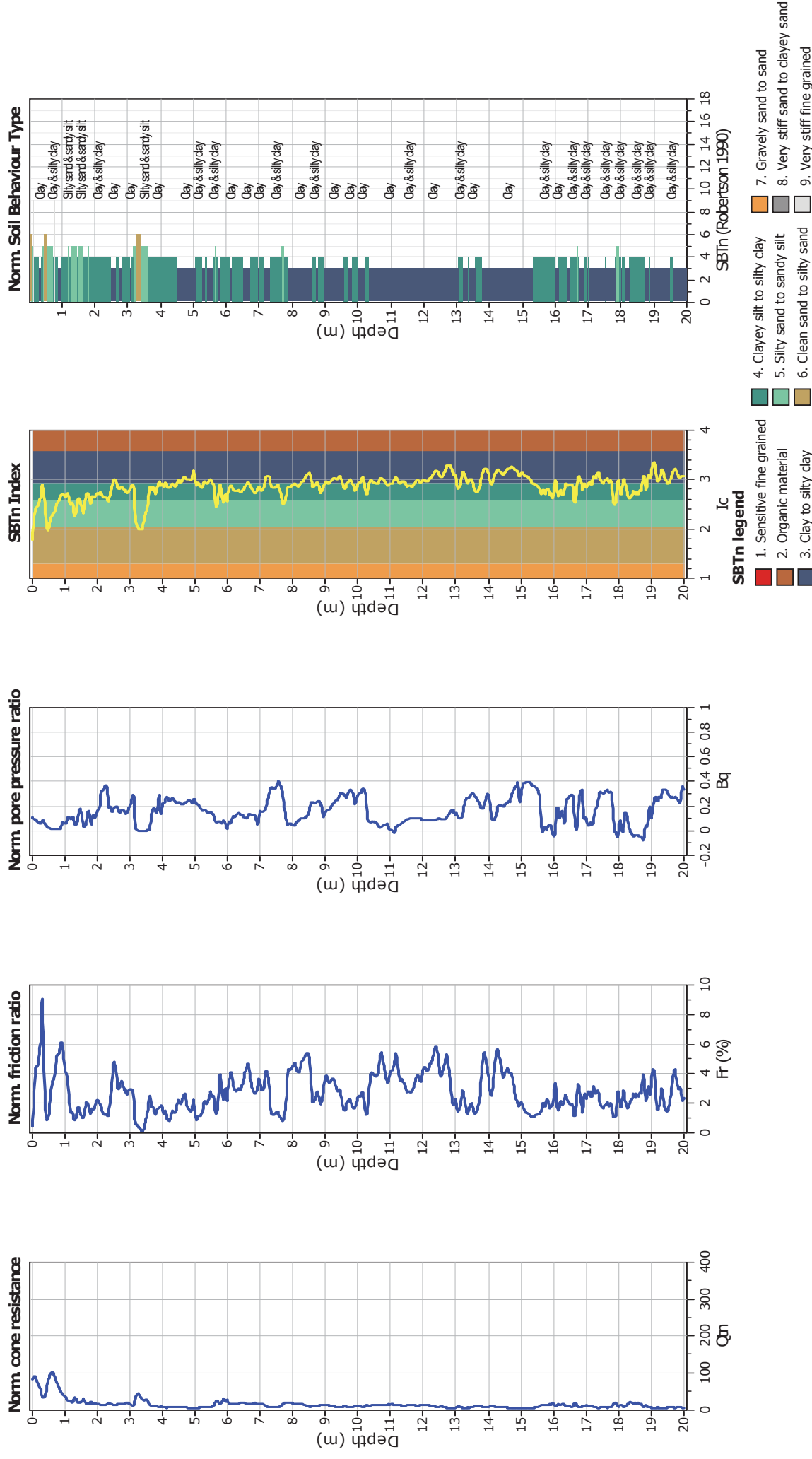


Project:

Location:

CPT: CPTU 2

Total depth: 20.00 m, Date: 15/12/2021

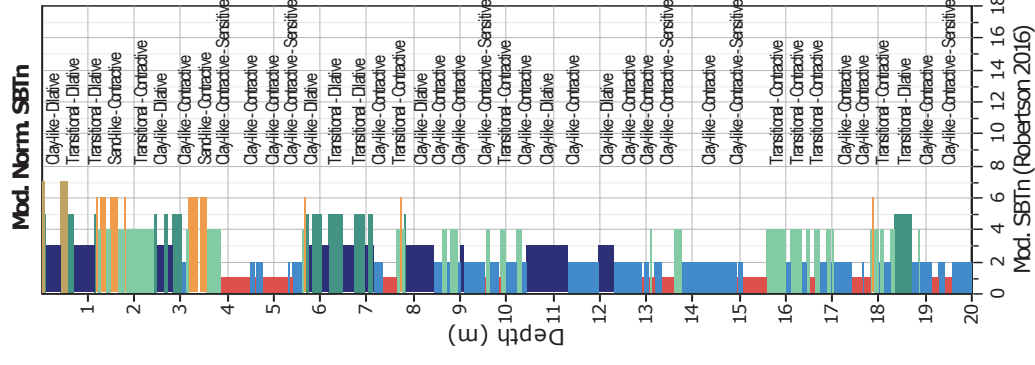
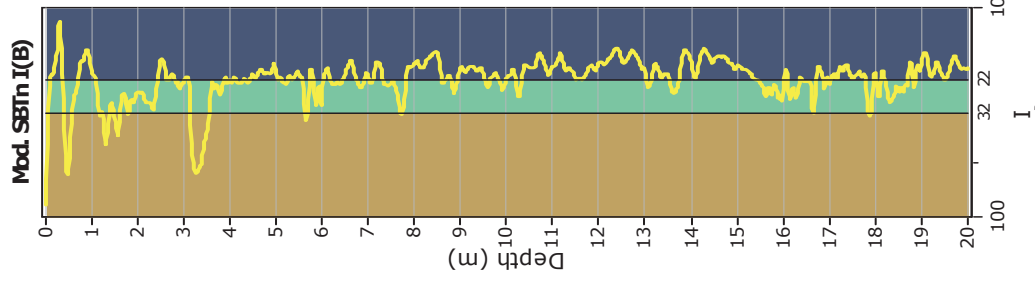
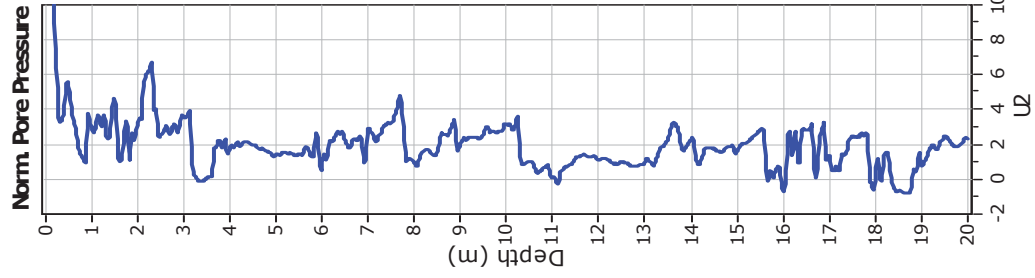
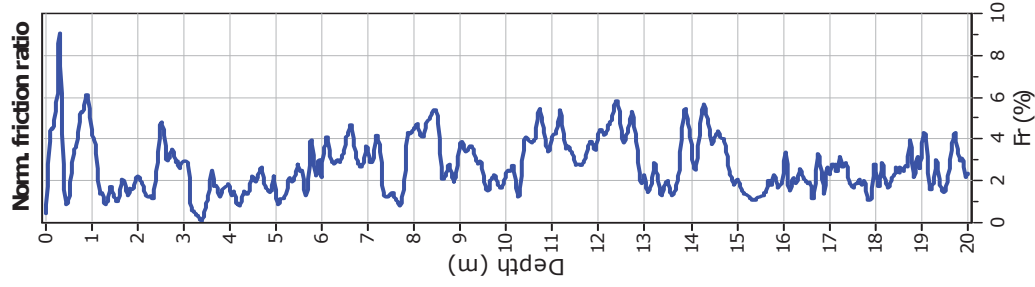
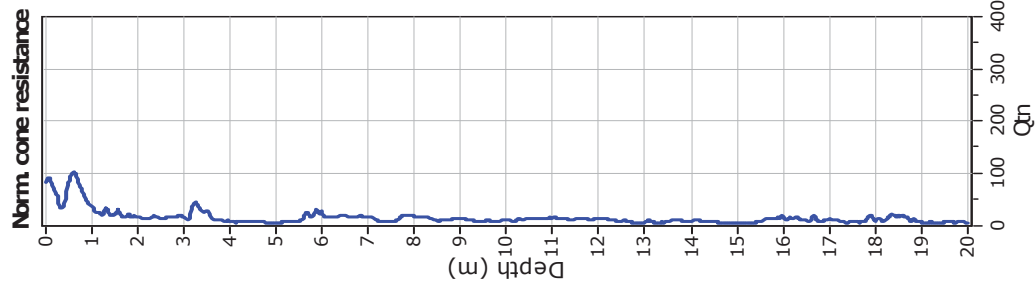


Project:

Location:

CPT: CPTU 2

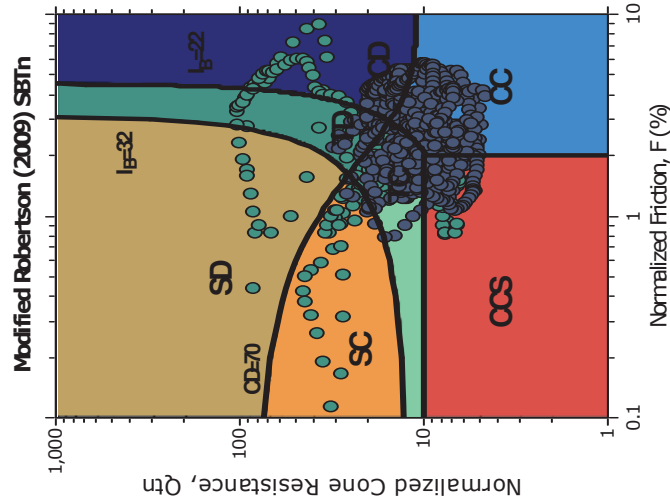
Total depth: 20.00 m, Date: 15/12/2021



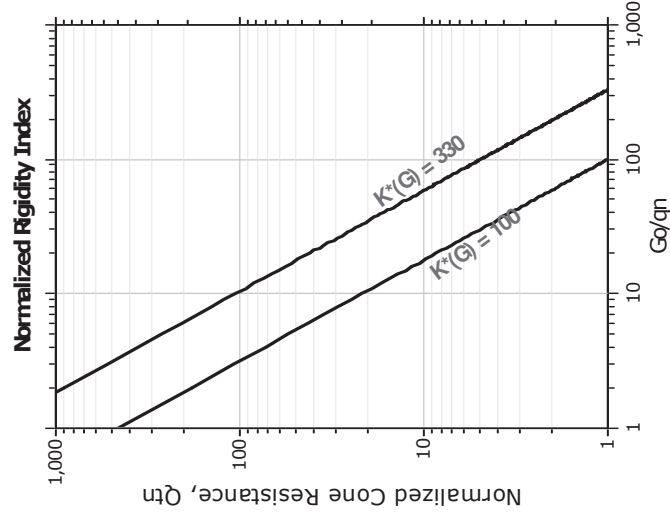
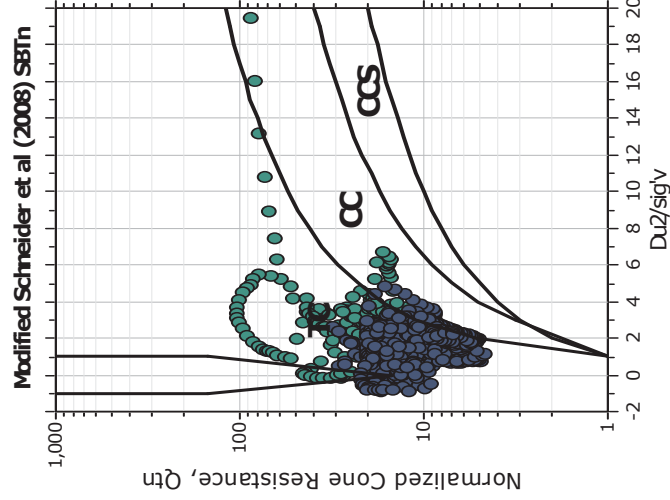
Mod. SBTn legend

- 1. CCS: ClayLike - Contractive, Sensitive
- 2. CC: Clay-like - Contractive
- 3. CD: Clay-Like: Dilative
- 4. TC: Transitional - Contractive
- 5. TD: Transitional - Dilative
- 6. SC: Sand-like - Contractive
- 7. SD: Sand-like - Dilative

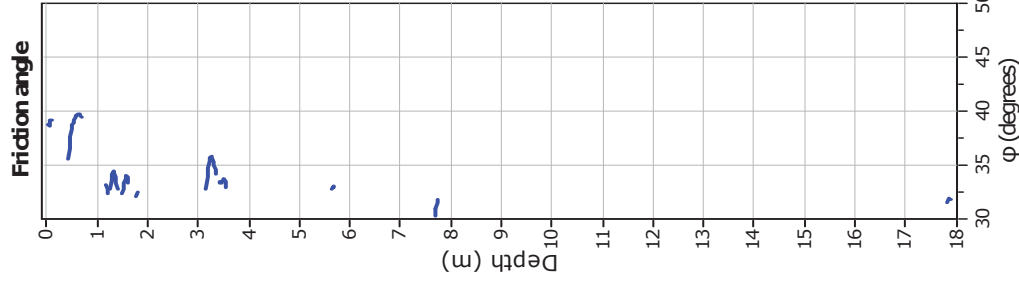
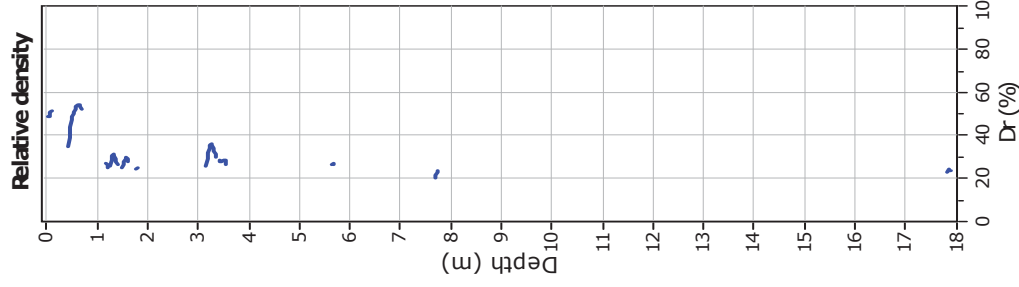
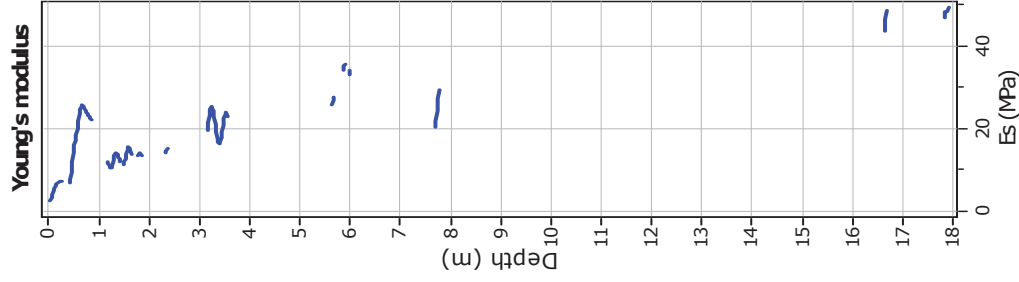
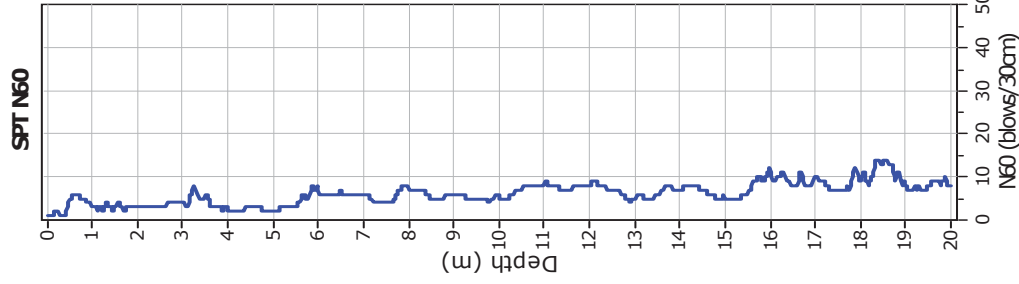
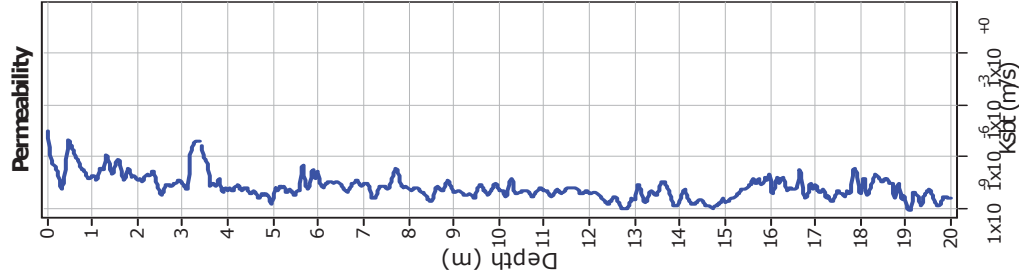
Updated SBTn plots



CCS: Clay-like - Contractive - Sensitive
CC: Clay-like - Contractive
CD: Clay-like - Dilative
TC: Transitional - Contractive
TD: Transitional - Dilative
SC: Sand-like - Contractive
SD: Sand-like - Dilative



K(G) > 330: Soils with significant microstructure
(e.g. age/cementation)



Calculation parameters

Permeability: Based on SBT_n

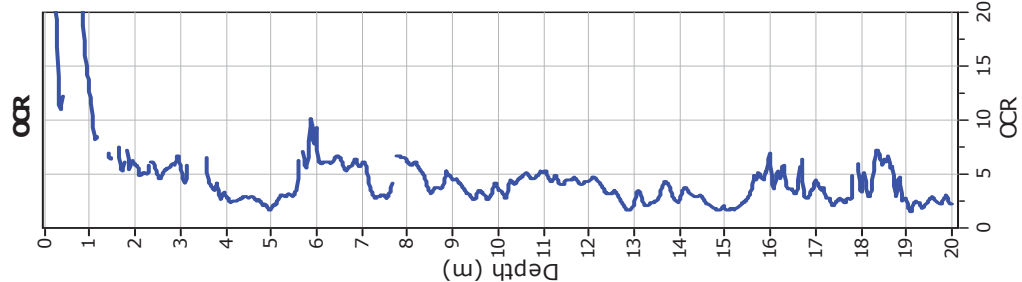
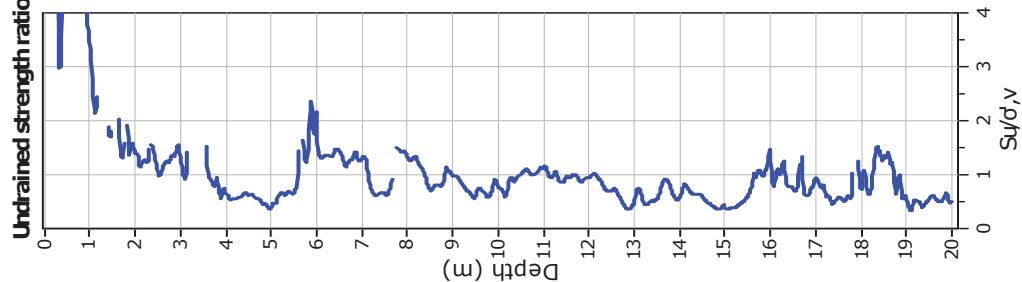
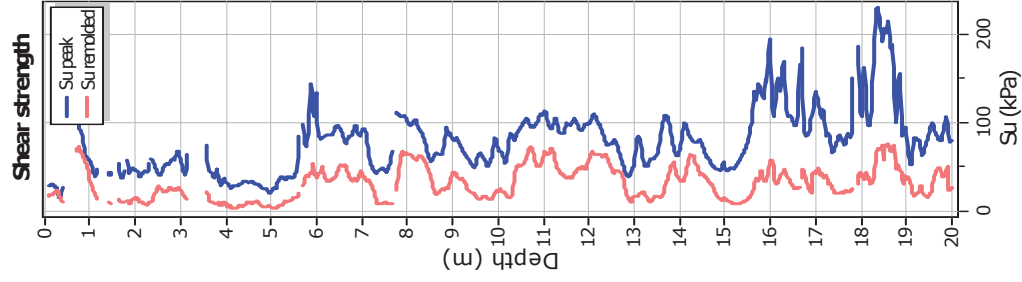
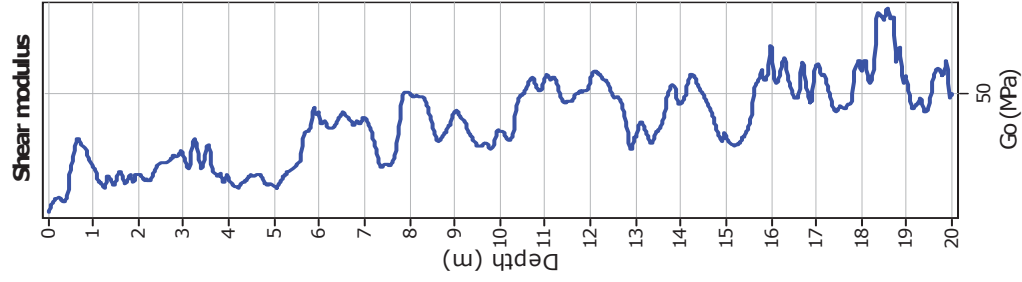
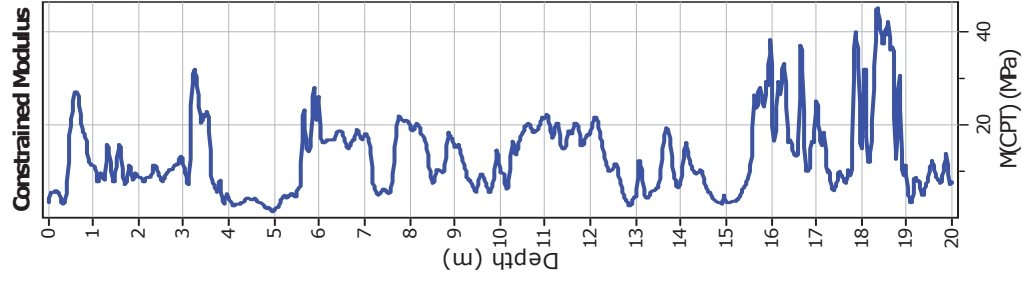
SPT N_{60} : Based on I_c and q_t

Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

Relative density constant, C_{Dr} : 350.0

Phi: Based on Kulhawy & Mayne (1990)

—●— User defined estimation data



Calculation parameters

Constrained modulus: Based on variable $\alpha/\rho/\eta$ using I_c and Q_m (Robertson, 2009)
 G_o : Based on variable $\alpha/\rho/\eta$ using I_c (Robertson, 2009)

Undrained shear strength cone factor for clays, N_{kt} : 14

OCR factor for clays, N_{kt} : 0.33

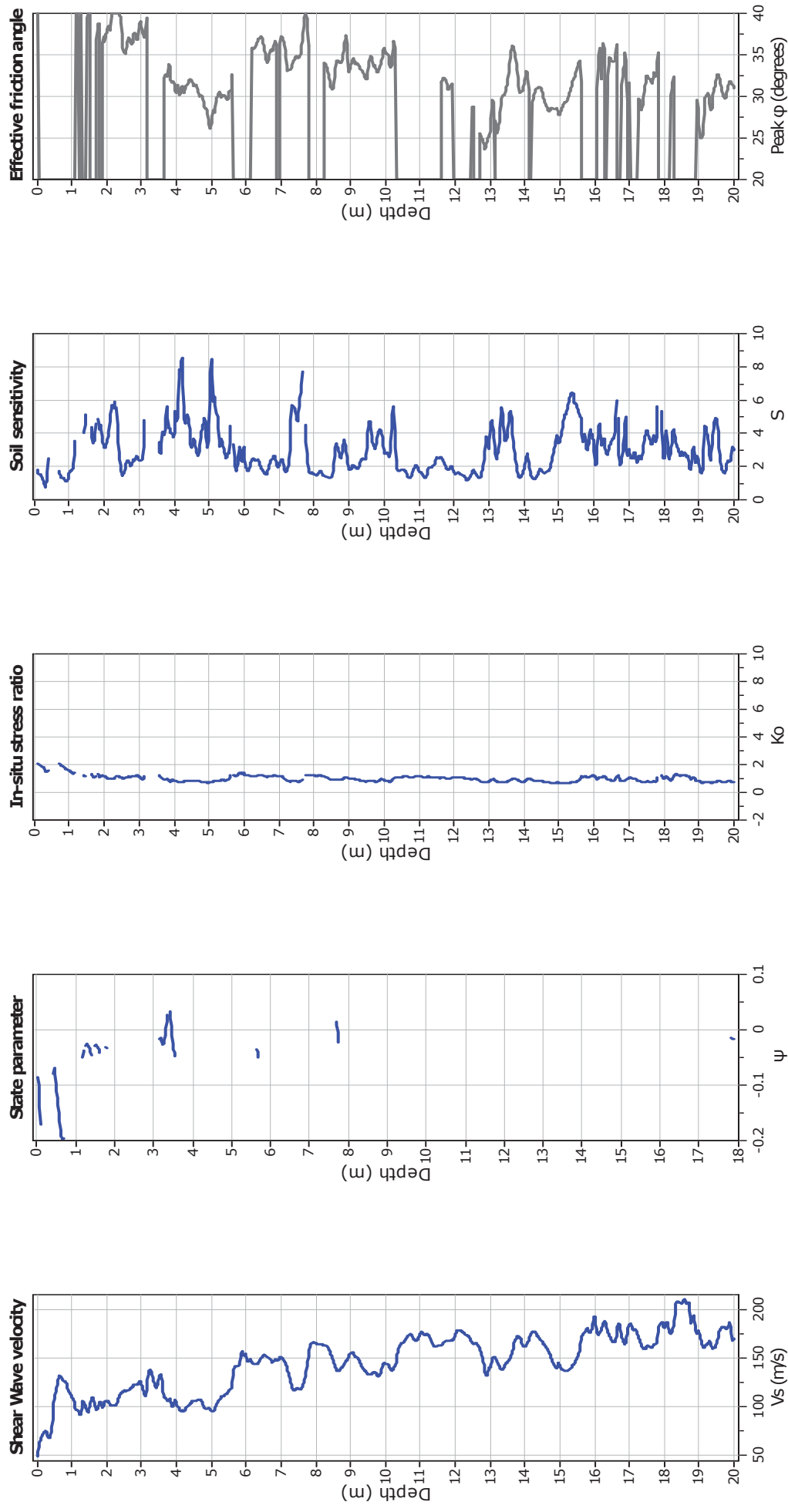
—●— User defined estimation data
—●— Flat Dilatometer Test data

Project:

Location:

CPT: CPTU 2

Total depth: 20.00 m, Date: 15/12/2021



Calculation parameters

Soil Sensitivity factor, N_s : 7.00

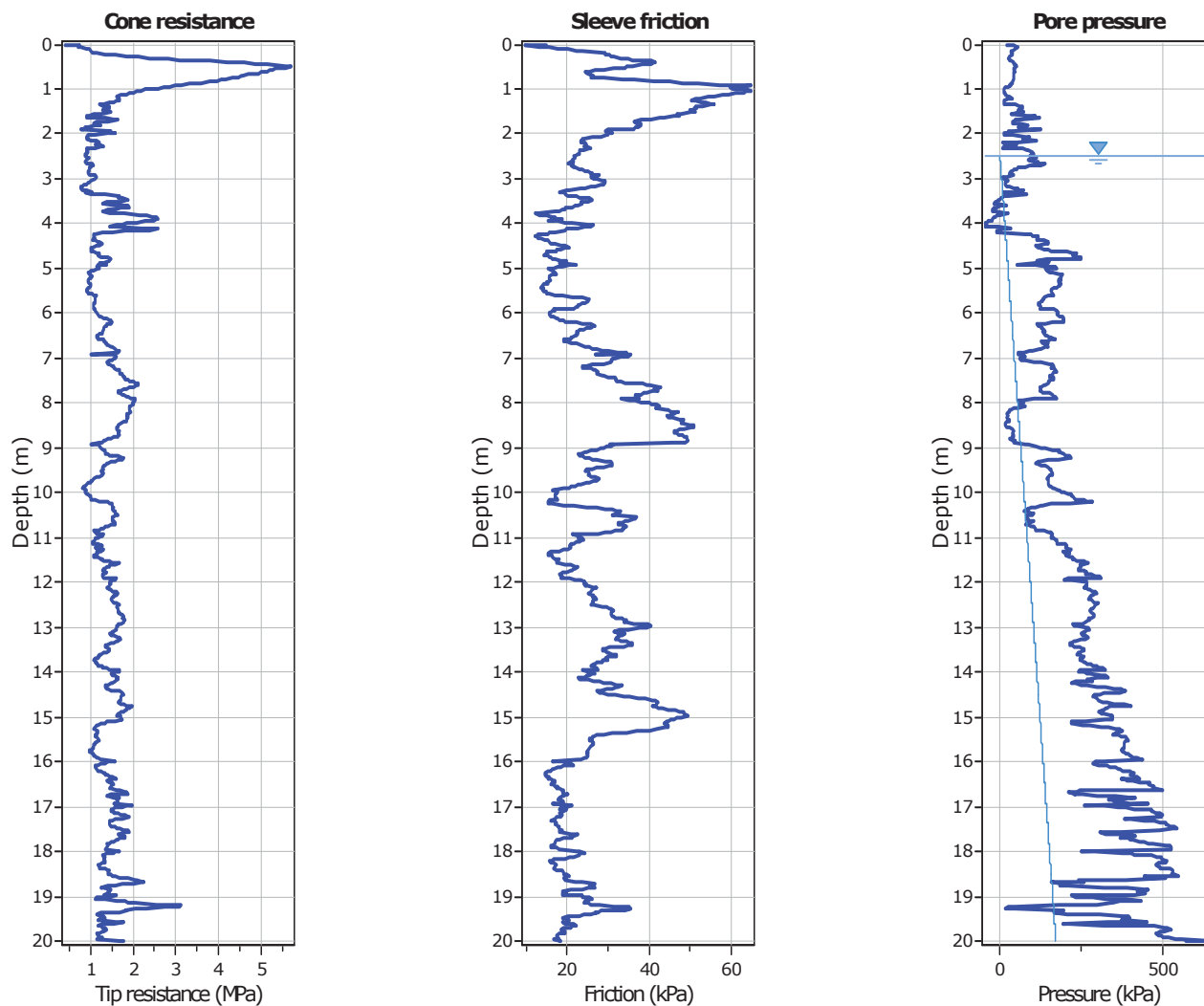
—●— User defined estimation data

Project:

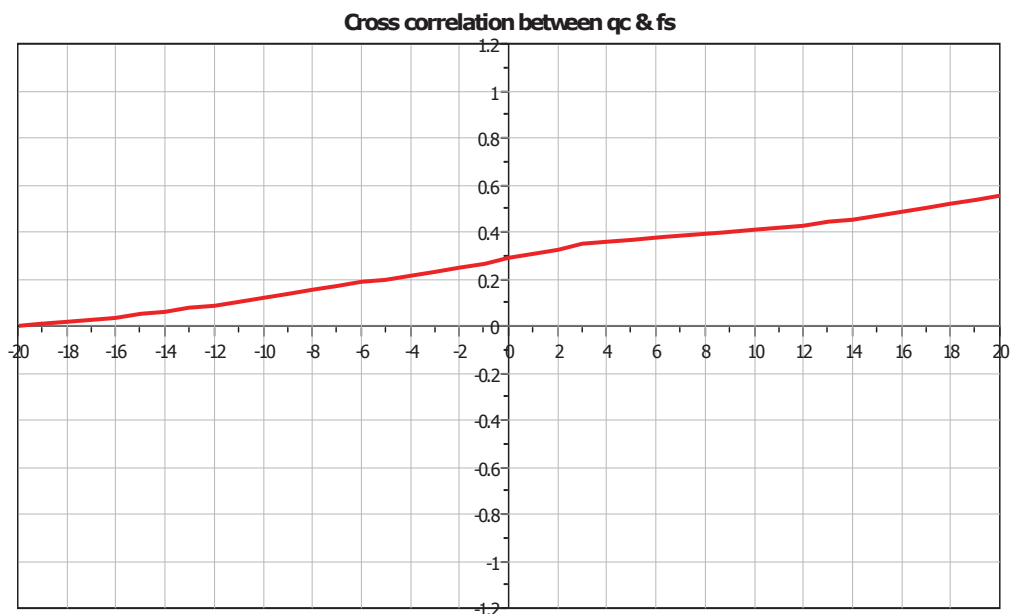
Location:

CPT: CPTU 4

Total depth: 20.00 m, Date: 15/12/2021

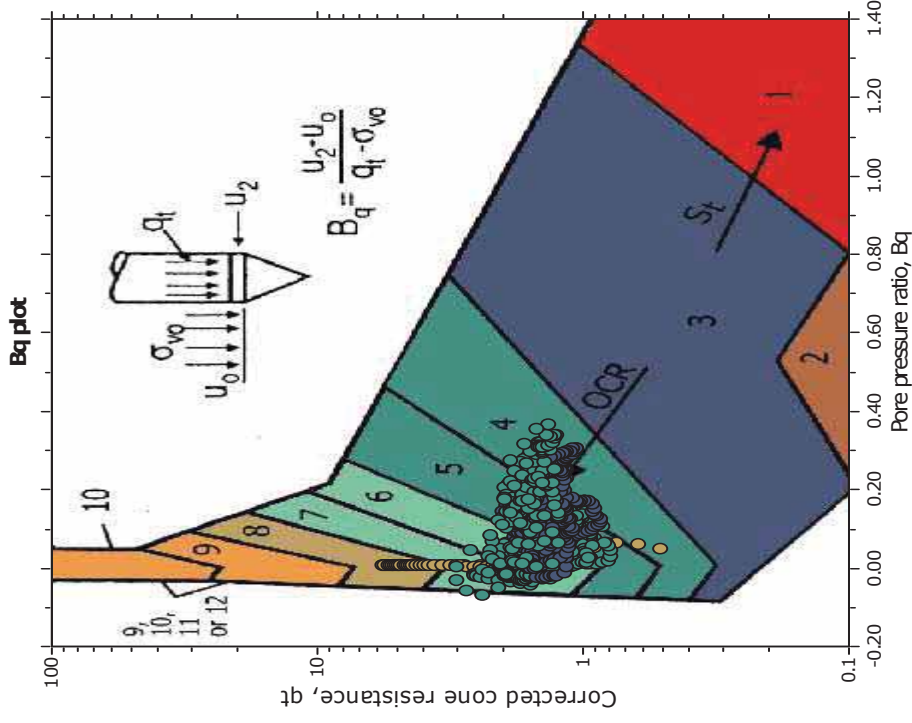
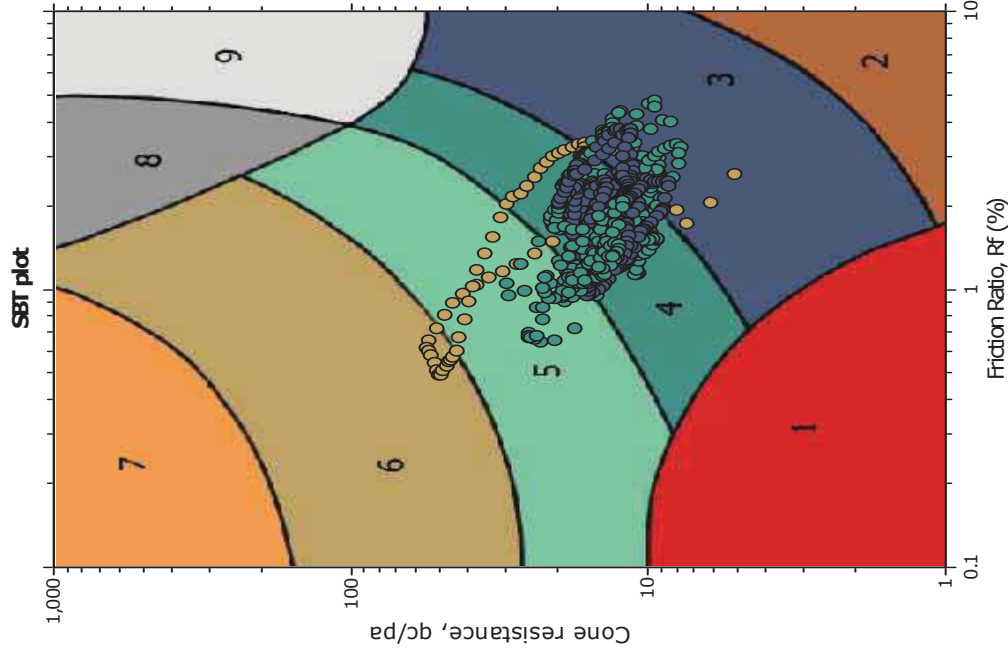


The plot below presents the cross correlation coefficient between the raw q_c and f_s values (as measured on the field). X axes presents the lag distance (one lag is the distance between two successive CPT measurements).

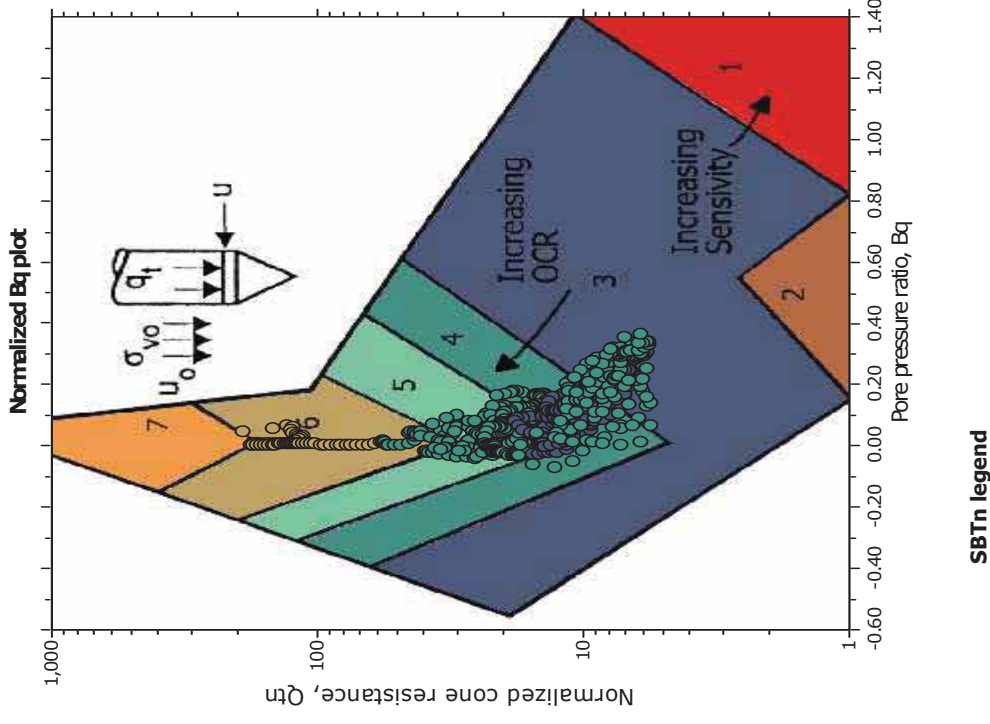
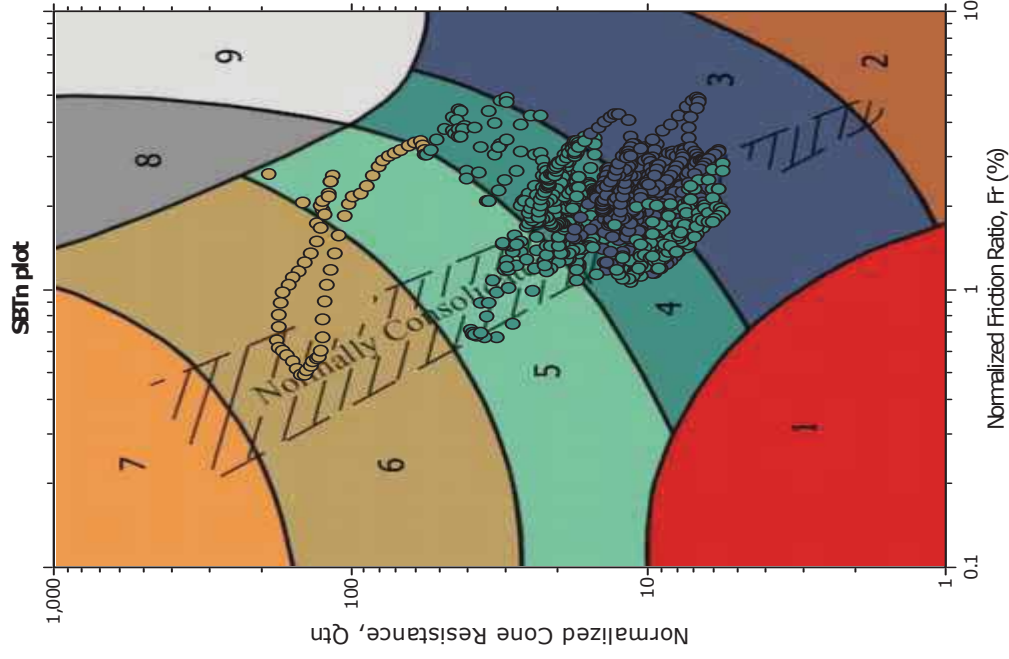


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SBT - Bq plots

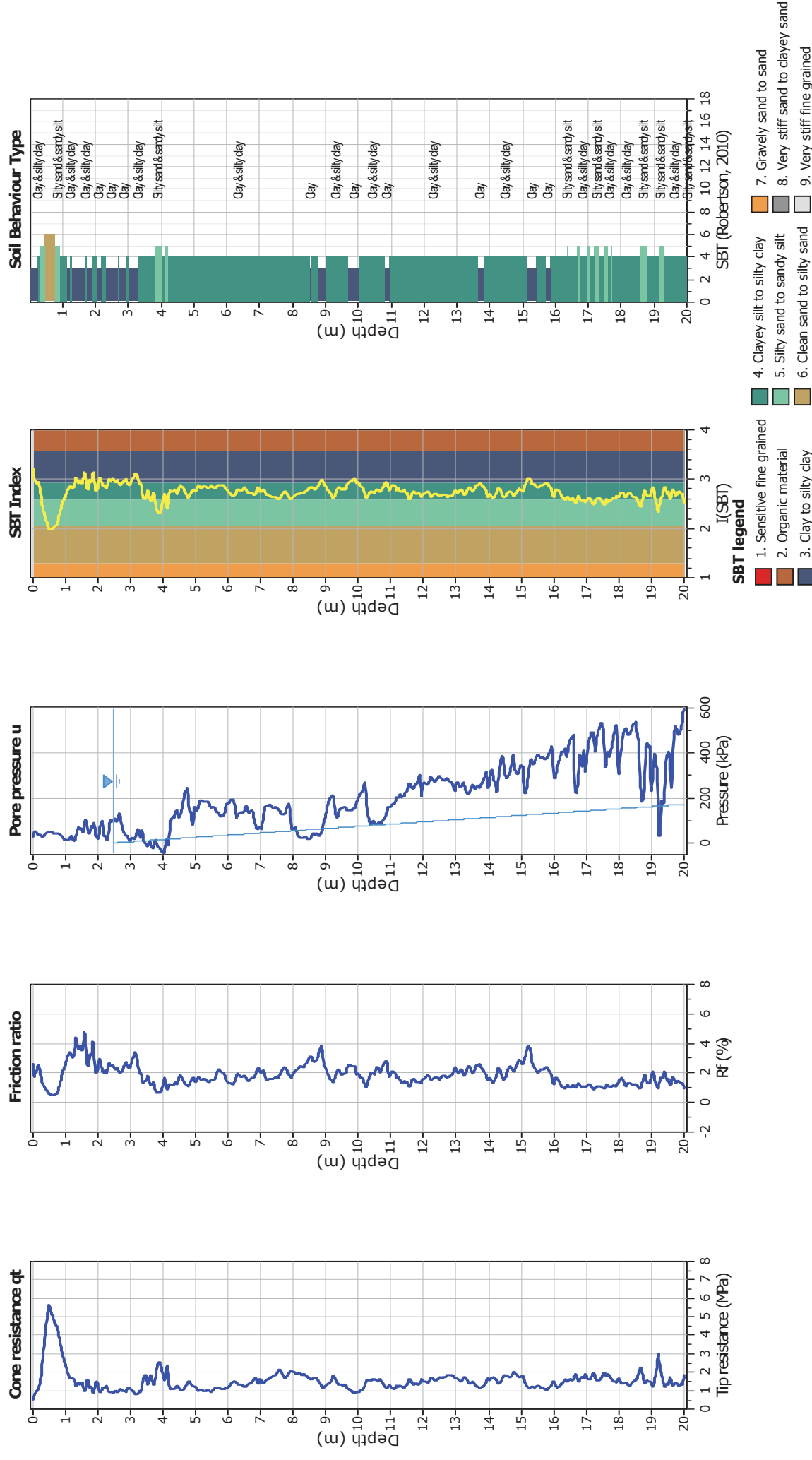


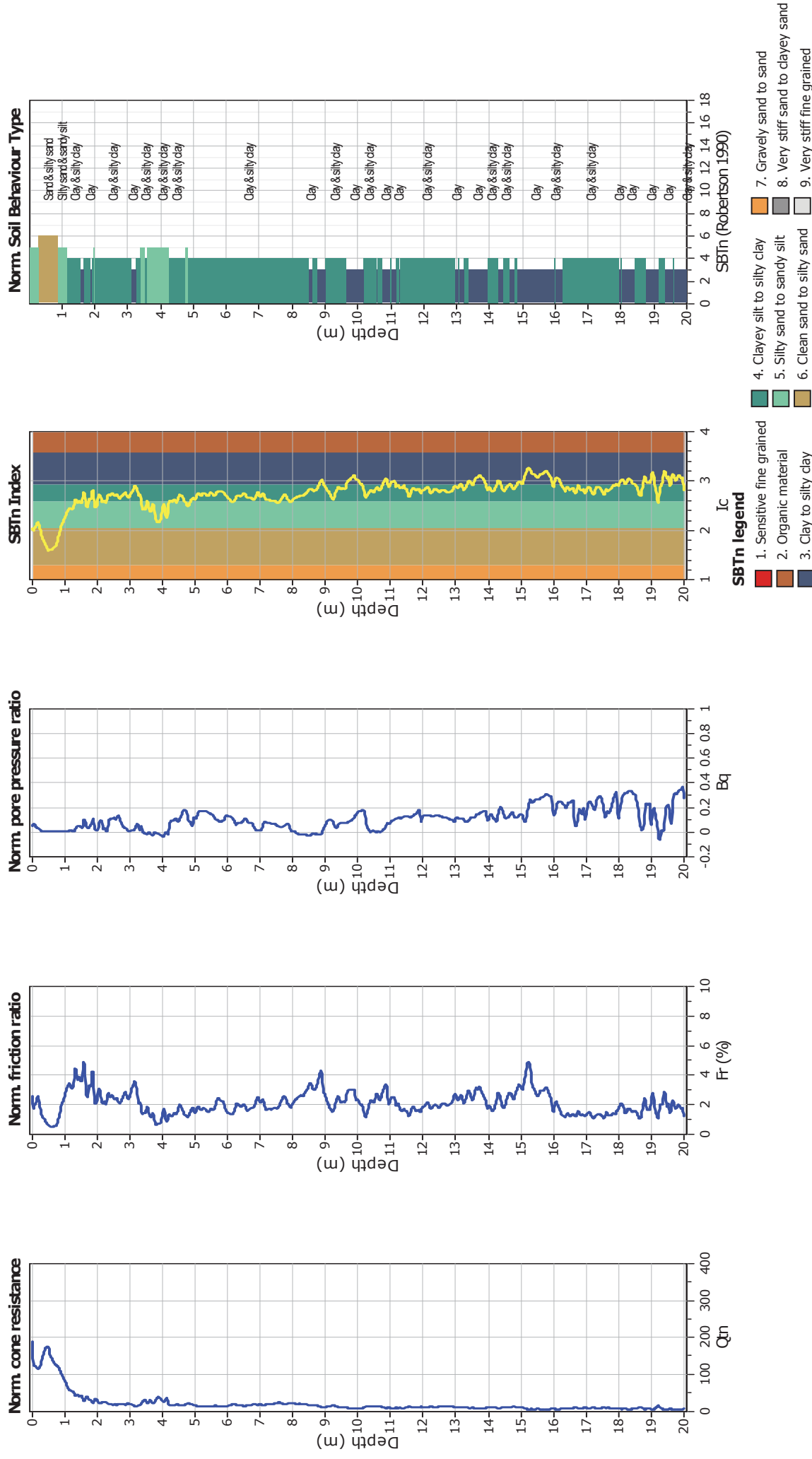
SBT - Bq plots (normalized)

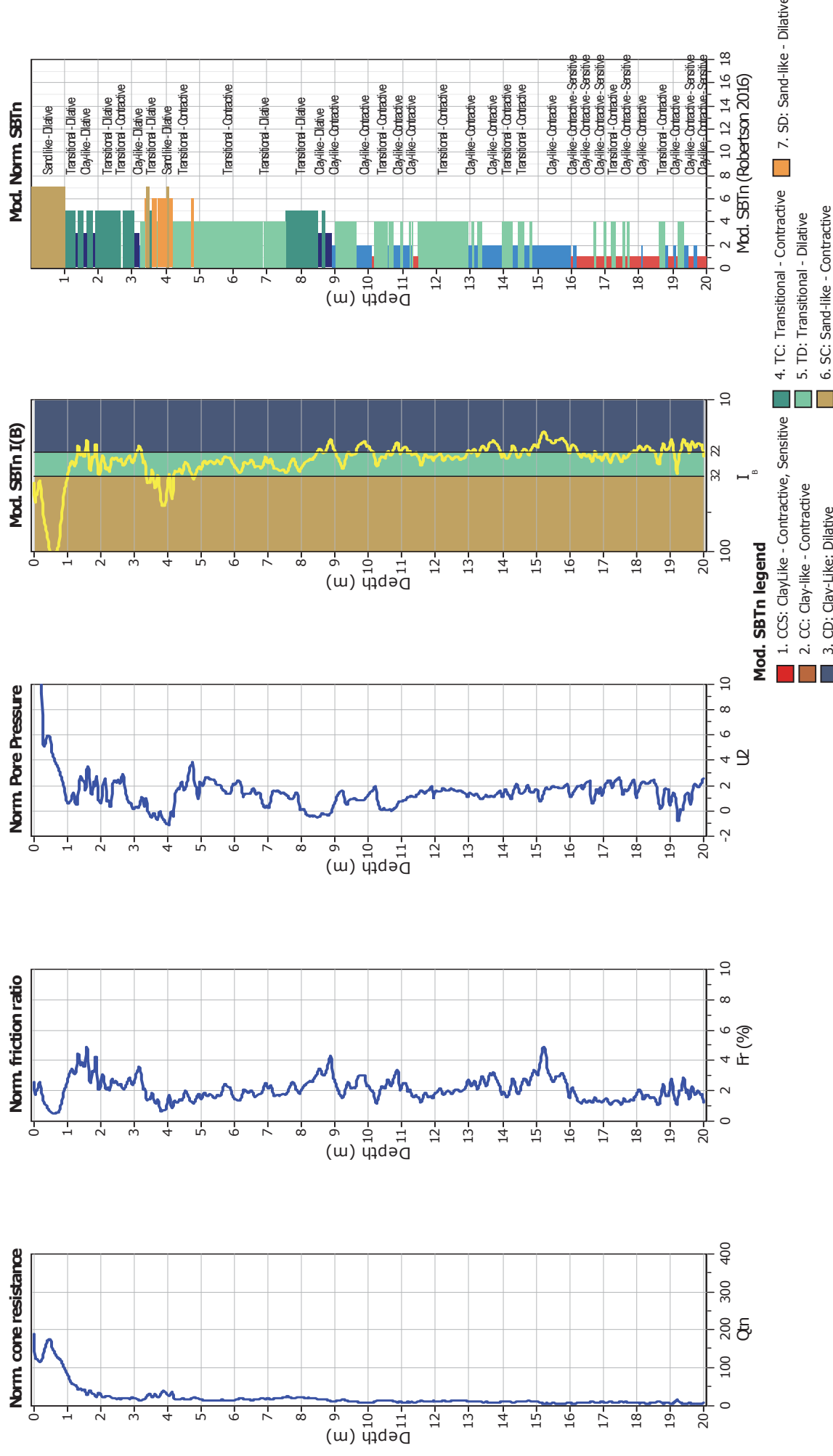


SBTn legend

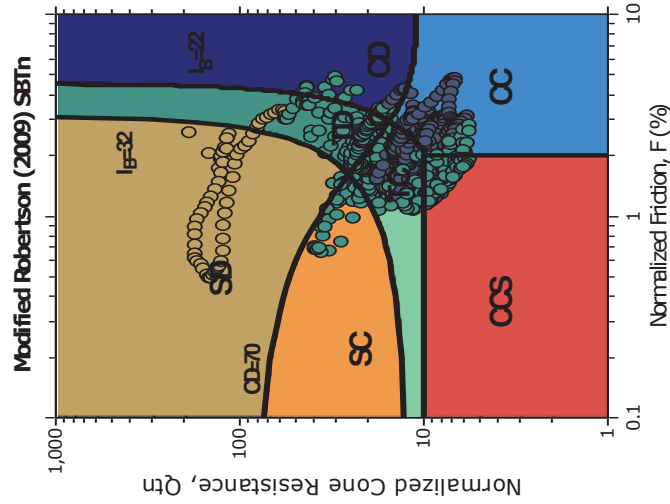
- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty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



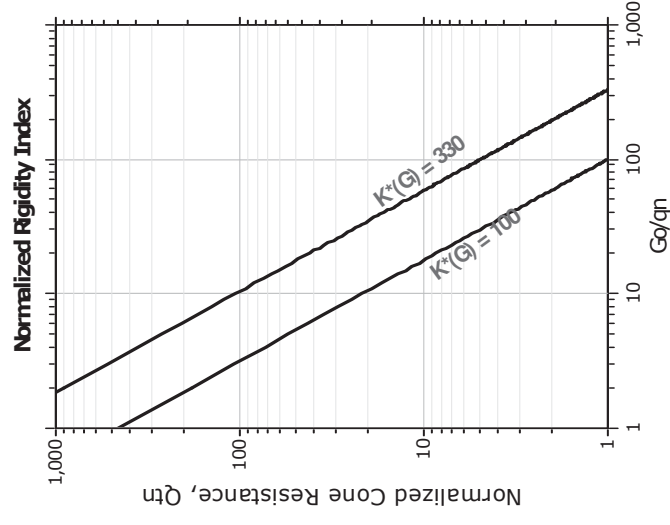
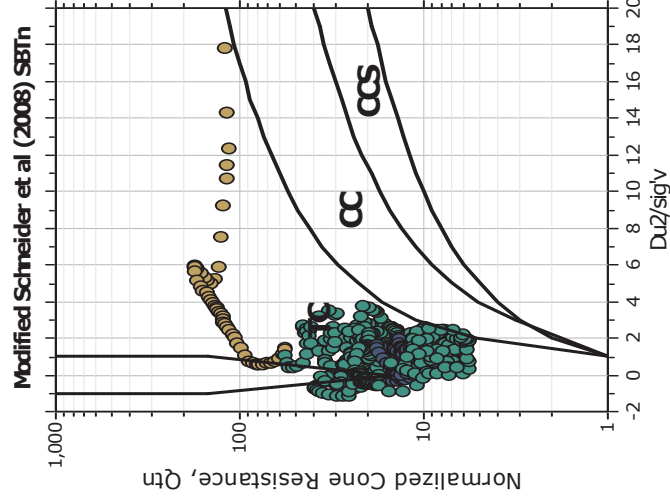




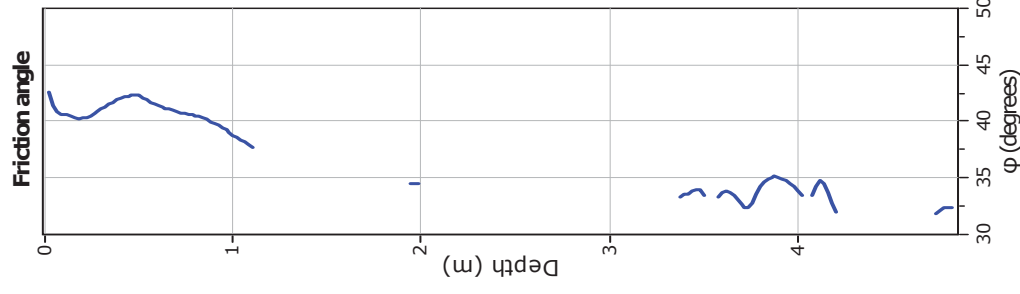
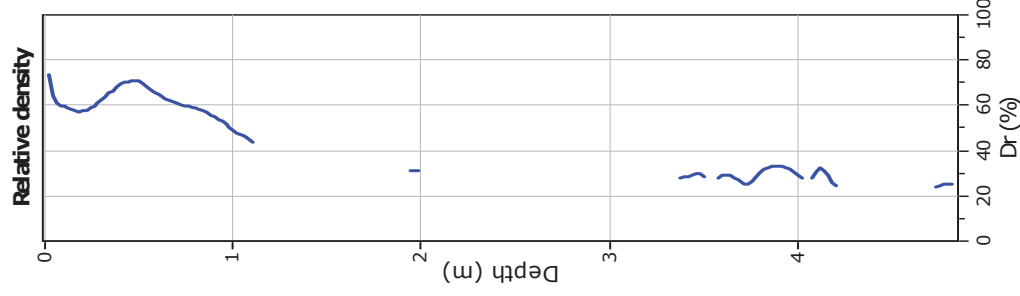
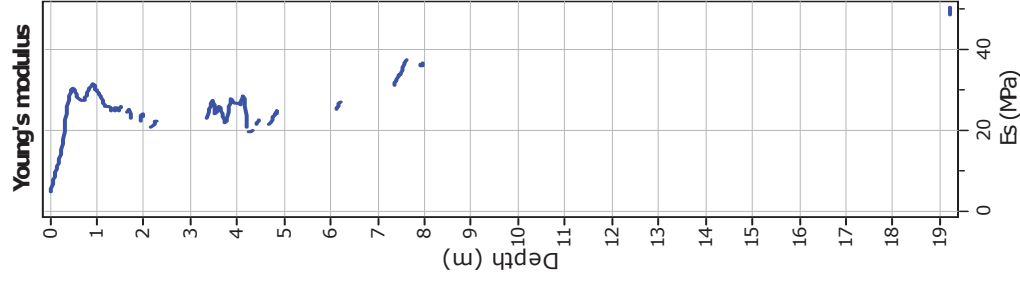
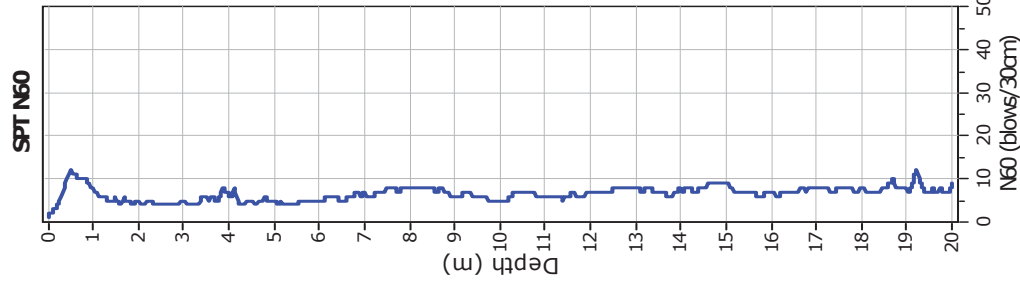
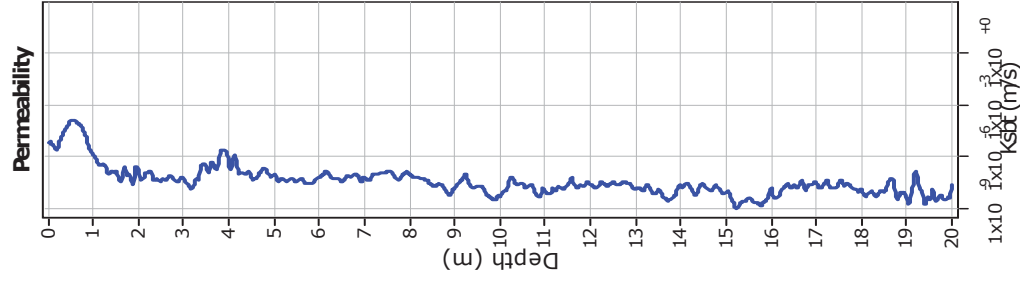
Updated SBTn plots



CCs: Clay-like - Contractive - Sensitive
CC: Clay-like - Contractive
CD: Clay-like - Dilative
TC: Transitional - Contractive
TD: Transitional - Dilative
SC: Sand-like - Contractive
SD: Sand-like - Dilative



$K(G) > 330$: Soils with significant microstructure
(e.g. age/cementation)



Calculation parameters

Permeability: Based on SBT_n

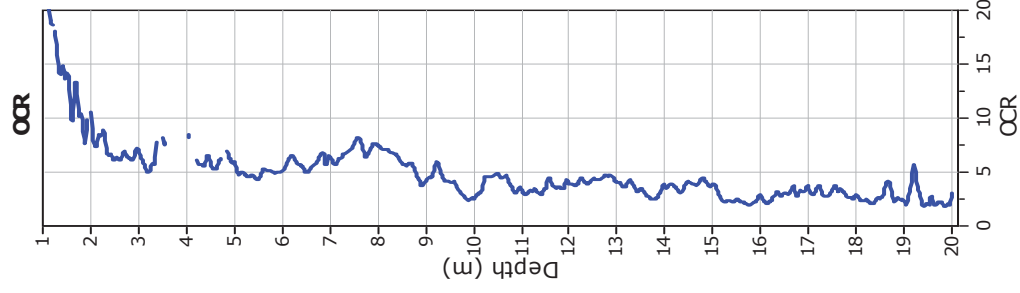
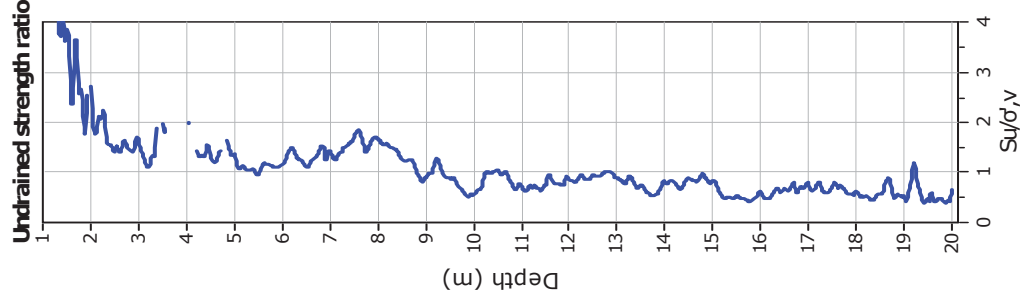
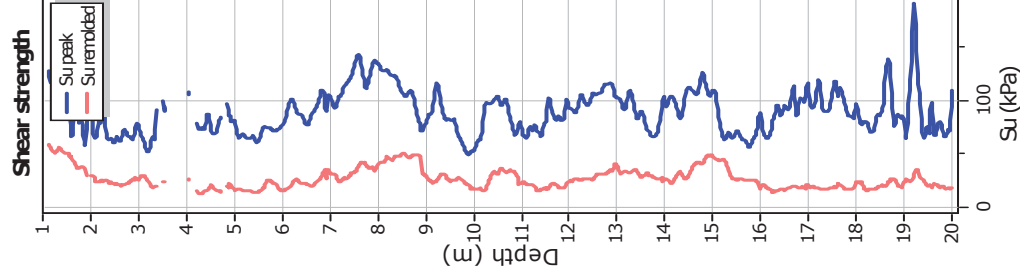
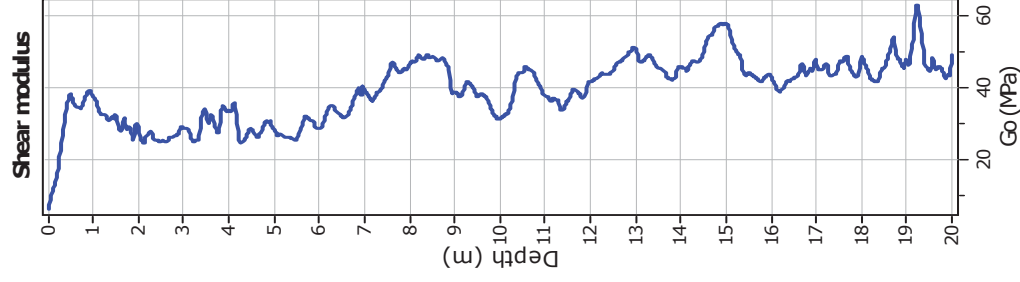
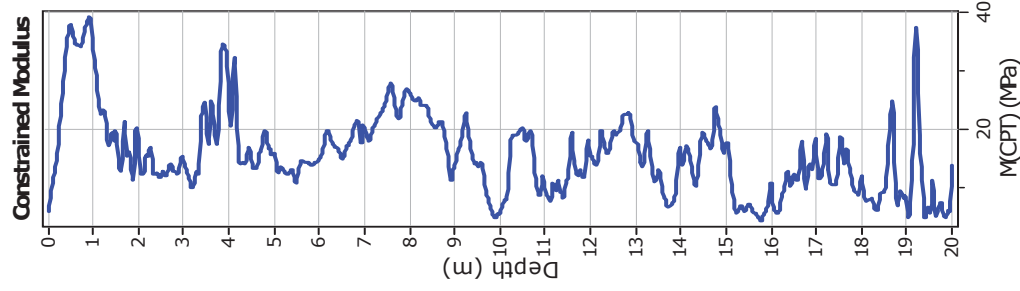
SPT N_{60} : Based on I_c and q_t

Young's modulus: Based on variable α using I_c (Robertson, 2009)

Relative density constant, C_{Dr} : 350.0

Phi: Based on Kulhawy & Mayne (1990)

—●— User defined estimation data



Calculation parameters

Constrained modulus: Based on variable α/ρ using I_c and Q_m (Robertson, 2009)
Go: Based on variable α/ρ using I_c (Robertson, 2009)

Undrained shear strength cone factor for clays, N_{kt} : 14

OCR factor for clays, N_{kt} : 0.33

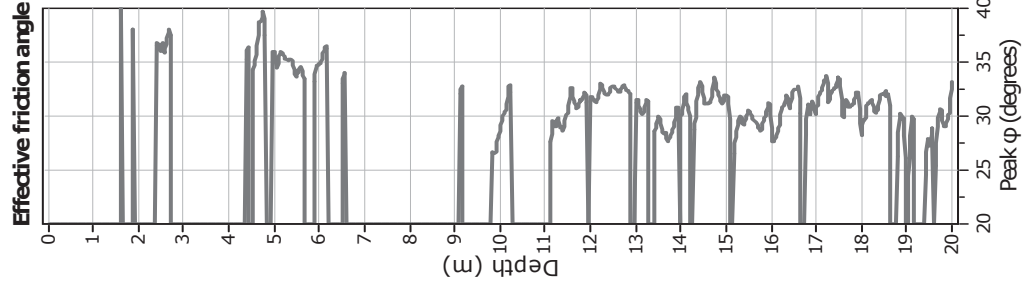
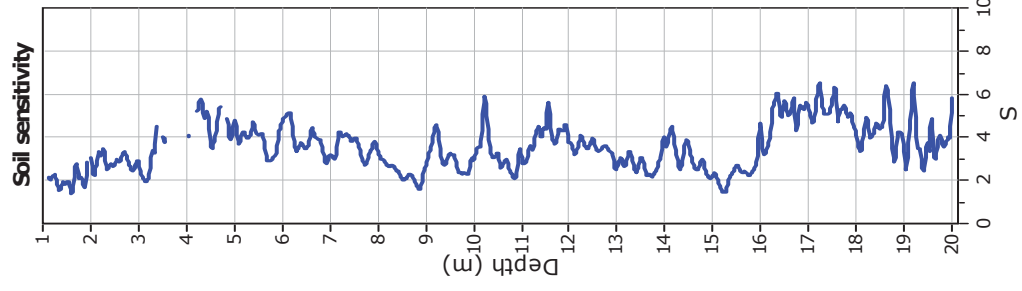
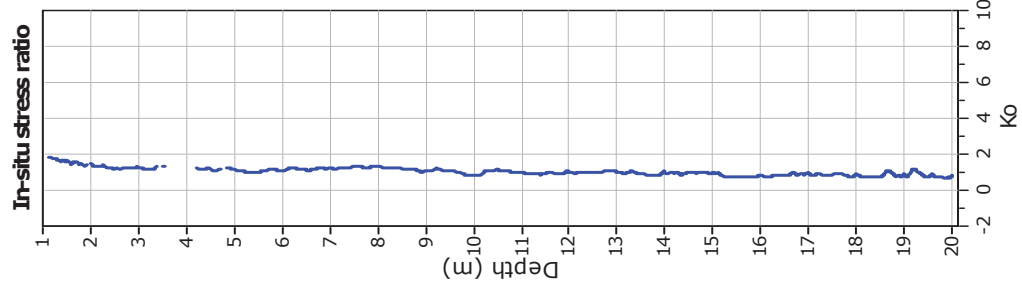
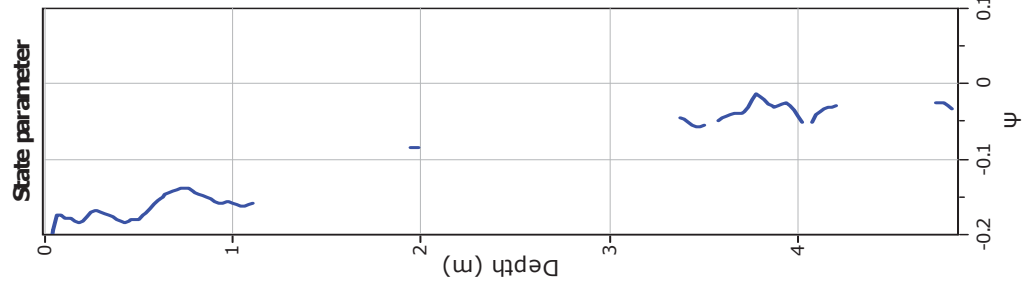
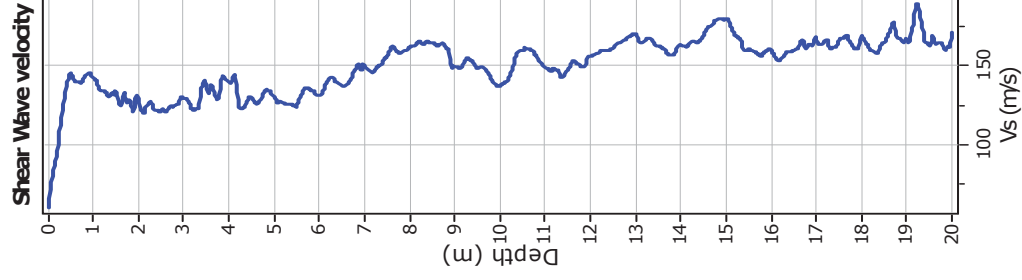
—●— User defined estimation data
—●— Flat Dilatometer Test data

Project:

Location:

CPT: CPTU 4

Total depth: 20.00 m, Date: 15/12/2021



Calculation parameters

Soil Sensitivity factor, N_s : 7.00

—●— User defined estimation data

GEO GROUP s.r.l.

Indagini geognostiche e geofisiche – geologia applicata alle costruzioni – laboratorio geotecnico - idrogeologia
– coltivazione cave– bonifiche – consolidamenti – geologia ambientale – consulenze geologiche e geotecniche

ALLEGATO N° 2

Indagini sismiche

GEO GROUP s.r.l.

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– coltivazione cave– bonifiche – consolidamenti – geologia ambientale – consulenze geologiche e geotecniche

MASW



GEO GROUP s.r.l.

Sede legale: Via C. Costa, 182 - 41123 MODENA

Sede operativa: vi Per Modena, 15 – 41051 Castelnuevo Rangone (MO)

Tel. 059/3967169 Fax. 059/5332019

E-mail: info@geogroupmodena.it

P.IVA e C.F. 02981500362

www.geogroupmodena.it

ANALISI SISMICA DI SITO SECONDO METODOLOGIA MASW

Cantiere: Nonantola, via Guercinesca Ovest (MO)

Data: 30/11/2021

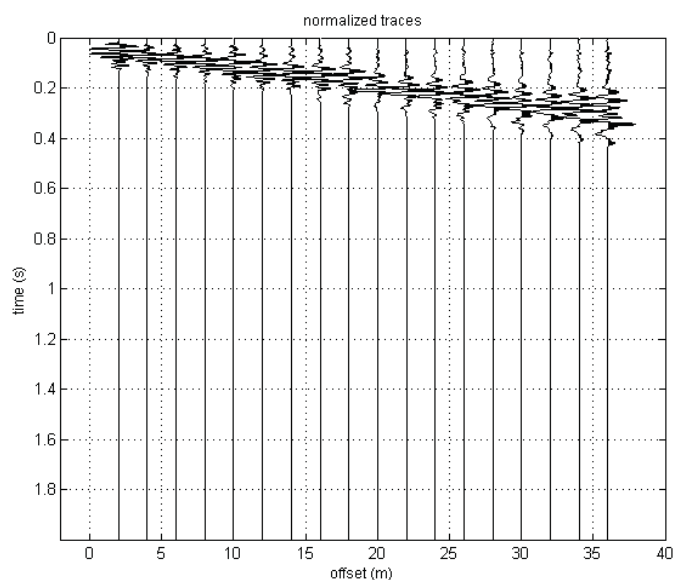
Lavoro: Studio terreno di fondazione

Responsabile: Dott. Geol. Pier Luigi Dallari

MASW



UBICAZIONE DELLO STENDIMENTO SISMICO IMPIEGATO





GEO GROUP s.r.l.

Sede legale: Via C. Costa, 182 - 41123 MODENA

Sede operativa: vi Per Modena, 15 – 41051 Castelnuevo Rangone (MO)

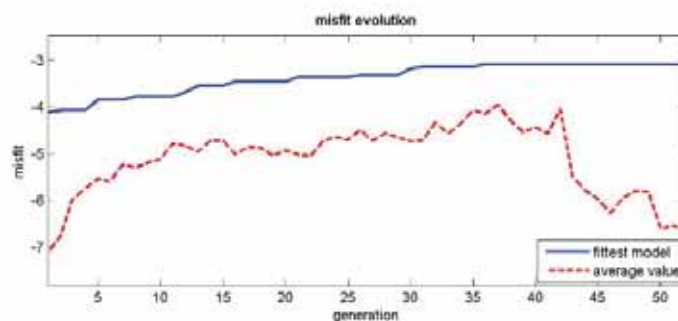
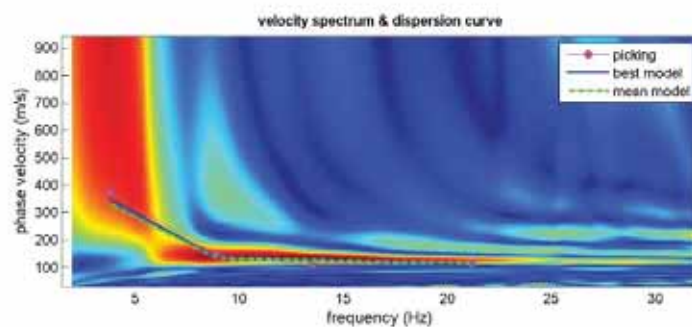
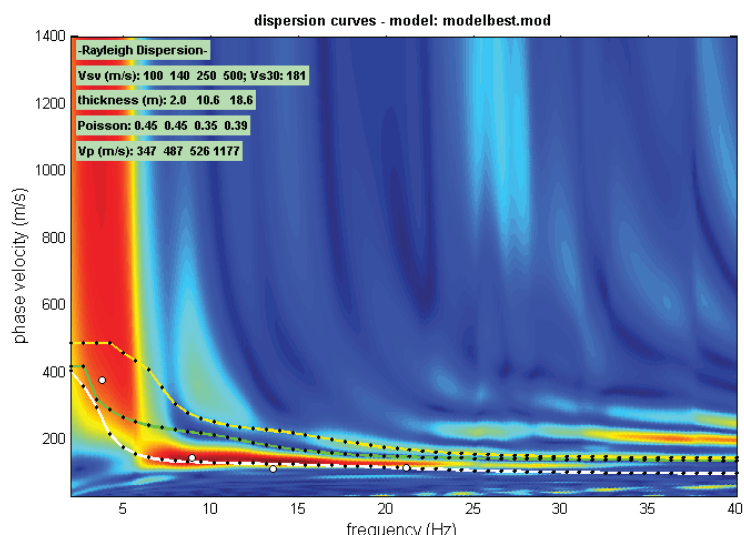
Tel. 059/3967169 Fax. 059/5332019

E-mail: info@geogroupmodena.it

P.IVA e C.F. 02981500362

www.geogroupmodena.it

SPETTRO RELATIVO ALLE VELOCITÀ DI FASE REGISTRATE NEL DOMINIO DELLE FREQUENZE



www.winmasw.com



GEO GROUP s.r.l.

Sede legale: Via C. Costa, 182 - 41123 MODENA

Sede operativa: via Per Modena, 15 – 41051 Castelnuevo Rangone (MO)

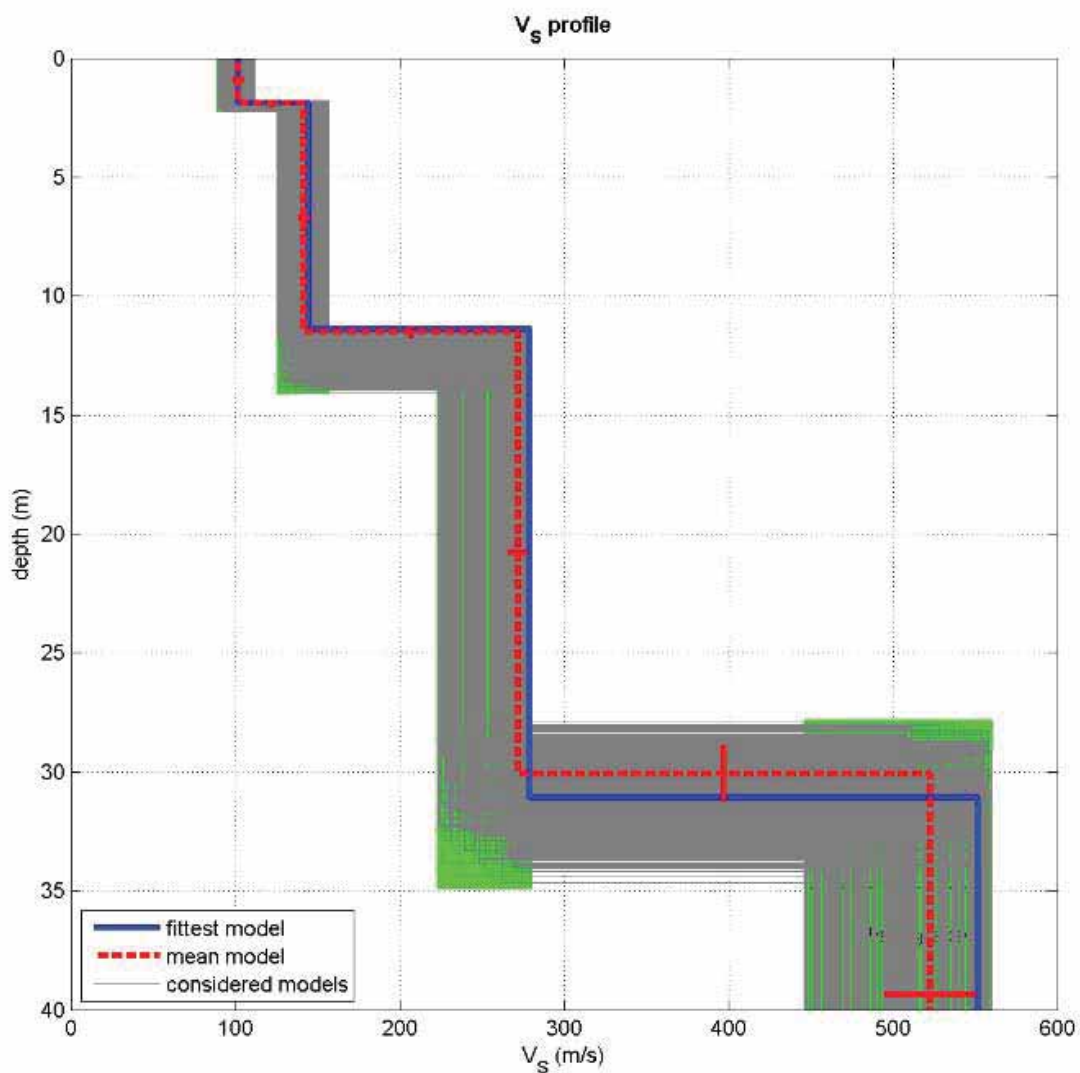
Tel. 059/3967169 Fax. 059/5332019

E-mail: info@geogroupmodena.it

P.IVA e C.F. 02981500362

www.geogroupmodena.it

MODELLO V_s30 DERIVATO DALL'INDAGINE MASW ESEGUITA



dataset: 1135.dat

dispersion curve: pick.cdp

V_s30 (best model): 199 m/s

V_s30 (mean model): 194 m/s

BEST MODEL
 $V_s30 = 199$ m/s

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HVSR

NONANTOLA VIA GUERCINESCA OVEST

Instrument: TE3-0303/01-17

Data format: 32 byte

Full scale [mV]: 51

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

GPS data not available

Trace length: 0h20'00". Analyzed 77% trace (manual window selection)

Sampling rate: 128 Hz

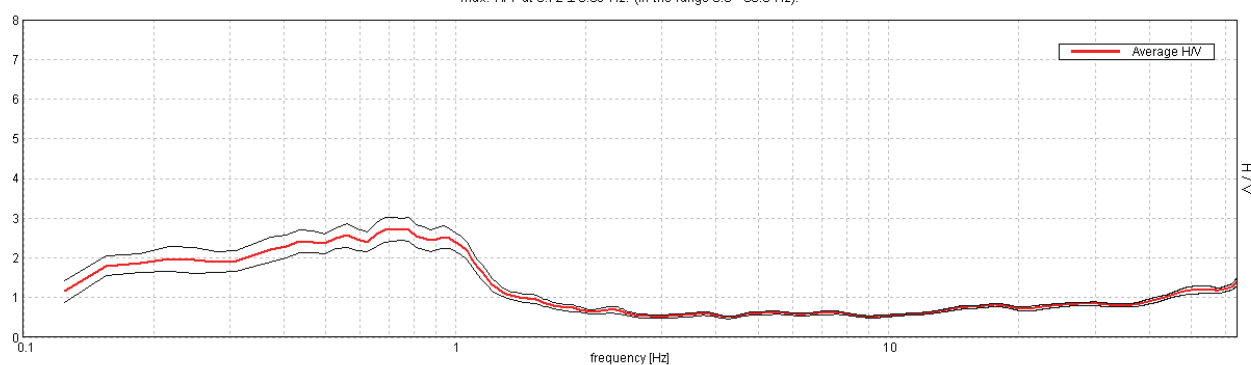
Window size: 20 s

Smoothing type: Triangular window

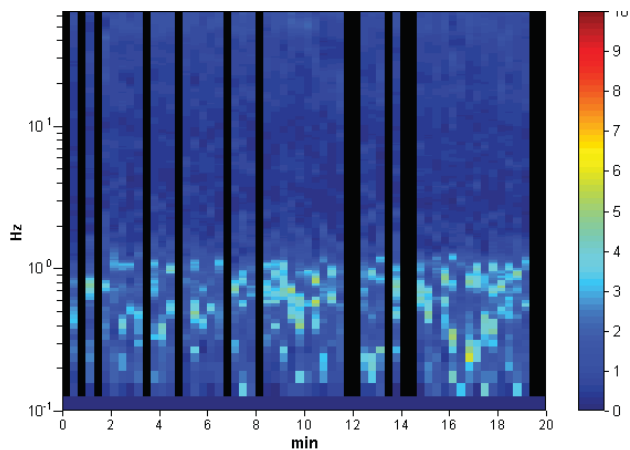
Smoothing: 10%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

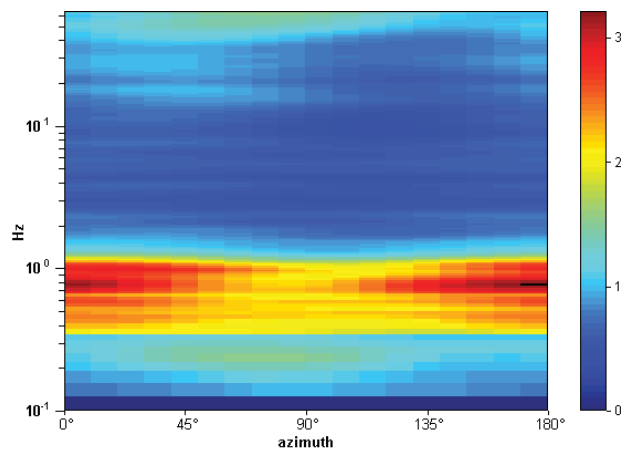
Max. H/V at 0.72 ± 0.09 Hz. (In the range 0.0 - 30.0 Hz).



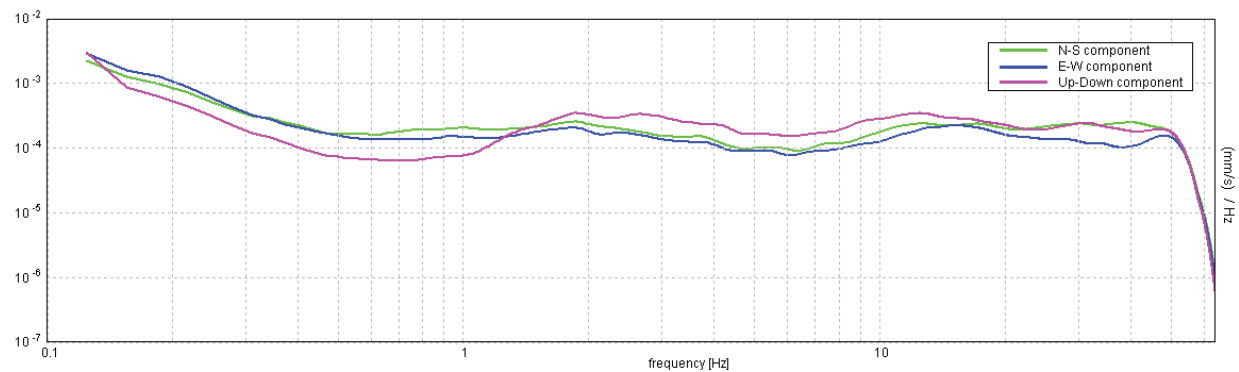
H/V TIME HISTORY



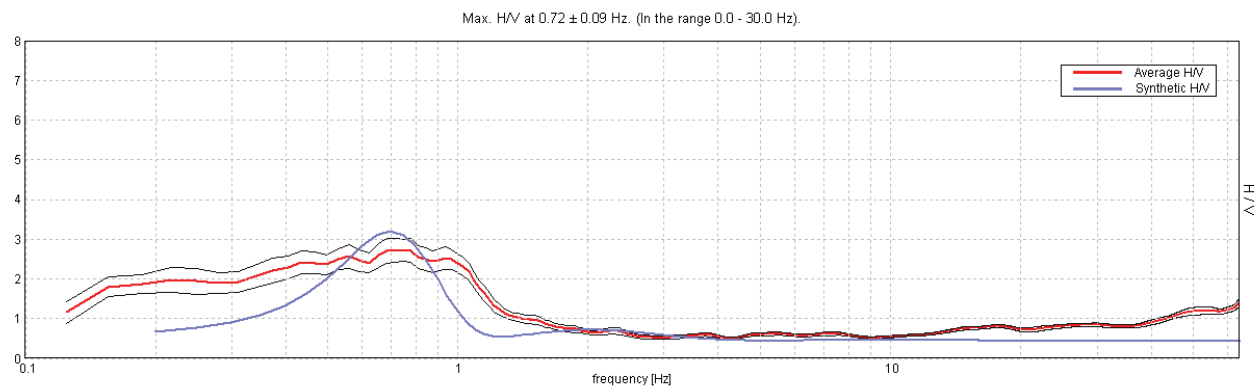
DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



EXPERIMENTAL vs. SYNTHETIC H/V



Depth at the bottom of the layer [m]	Thickness [m]	Vs [m/s]	Poisson ratio
15.00	15.00	170	0.42
35.00	20.00	230	0.42
95.00	60.00	270	0.42
inf.	inf.	500	0.42

[According to the SESAME, 2005 guidelines. **Please read carefully the Grilla manual before interpreting the following tables.**]

Max. H/V at 0.72 ± 0.09 Hz (in the range 0.0 - 30.0 Hz).

Criteria for a reliable H/V curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.72 > 0.50$	OK	
$n_c(f_0) > 200$	$661.3 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 36 times	OK	

Criteria for a clear H/V peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$			NO
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	1.219 Hz	OK	
$A_0 > 2$	$2.72 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.13138 < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.09443 < 0.10781$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.3017 < 2.0$	OK	

L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for σ_f and $\sigma_A(f_0)$

Freq. range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
$\log \theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

NONANTOLA VIA GUERCINESCA OVEST HVSR2

Instrument: TE3-0303/01-17

Data format: 32 bit

Full scale [mV]: 51

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

GPS data not available

Trace length: 0h20'00". Analyzed 48% trace (manual window selection)

Sampling rate: 128 Hz

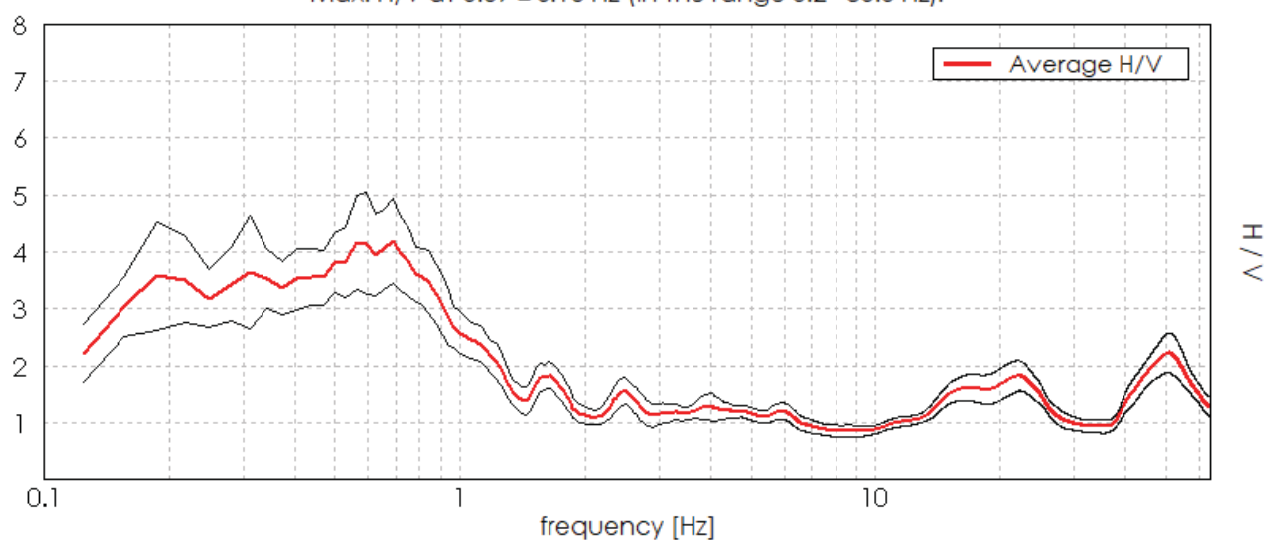
Window size: 20 s

Smoothing type: Triangular window

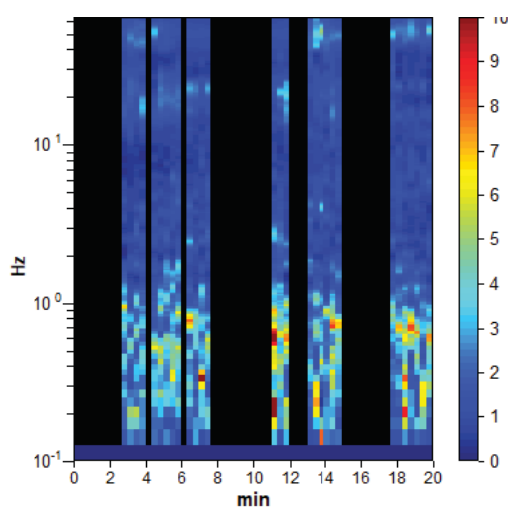
Smoothing: 10%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

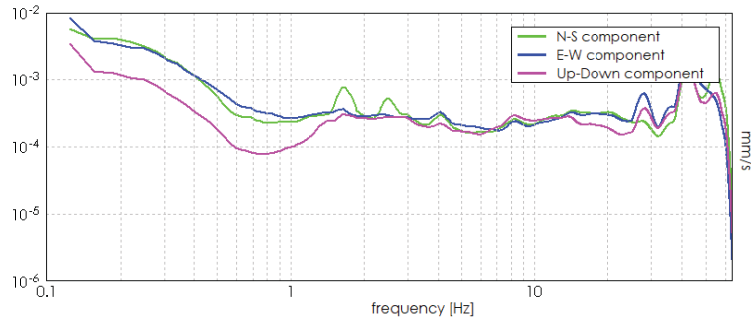
Max. H/V at 0.69 ± 0.16 Hz (in the range 0.2 - 30.0 Hz).



H/V TIME HISTORY



SINGLE COMPONENT SPECTRA



[According to the SESAME, 2005 guidelines. **Please read carefully the [Grill](#) manual before interpreting the following tables.**]

Max. H/V at 0.69 ± 0.16 Hz (in the range 0.2 - 30.0 Hz).

Criteria for a reliable H/V curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.69 > 0.50$	OK	
$n_c(f_0) > 200$	$398.8 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 34 times	OK	

Criteria for a clear H/V peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$			NO
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	1.219 Hz	OK	
$A_0 > 2$	$4.18 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.22899 < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.15743 < 0.10313$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.7382 < 2.0$	OK	

L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for σ_f and $\sigma_A(f_0)$

Freq. range [Hz]	< 0.2	$0.2 - 0.5$	$0.5 - 1.0$	$1.0 - 2.0$	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
$\log \theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

GEO GROUP s.r.l.

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– coltivazione cave– bonifiche – consolidamenti – geologia ambientale – consulenze geologiche e geotecniche

ALLEGATO N° 3

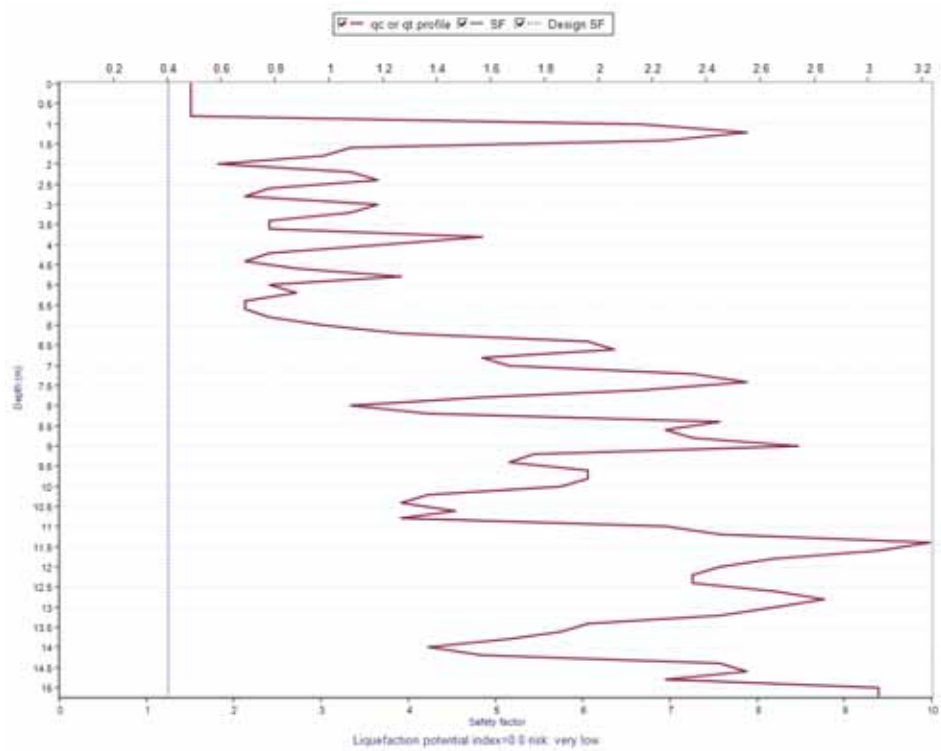
Verifica alla liquefazione

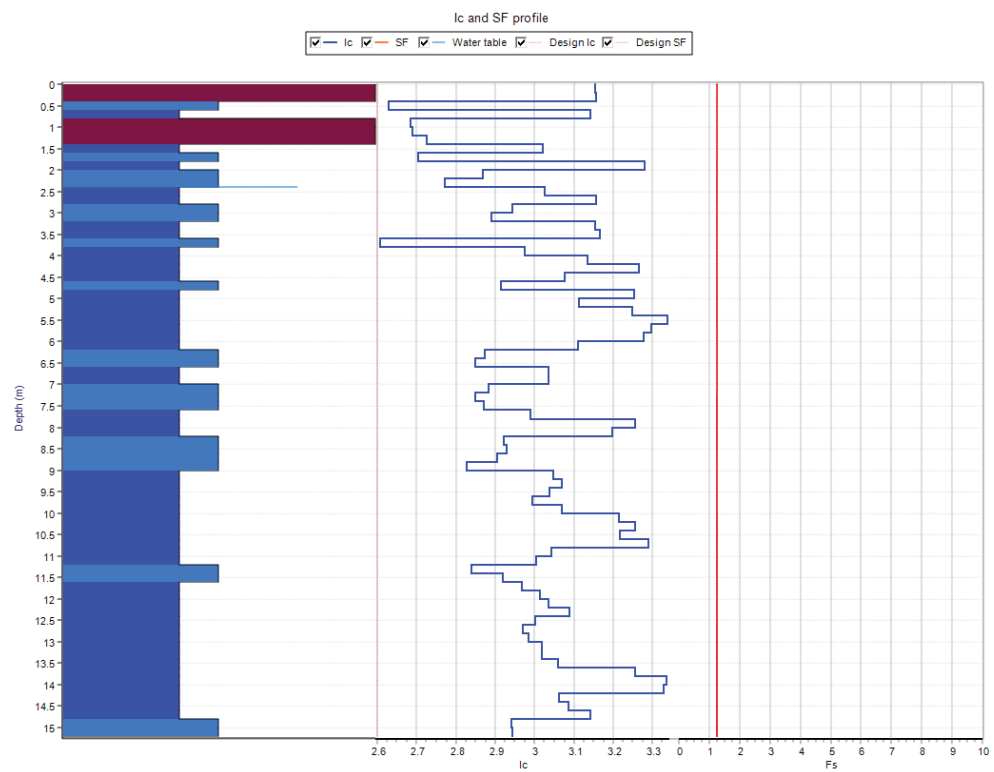
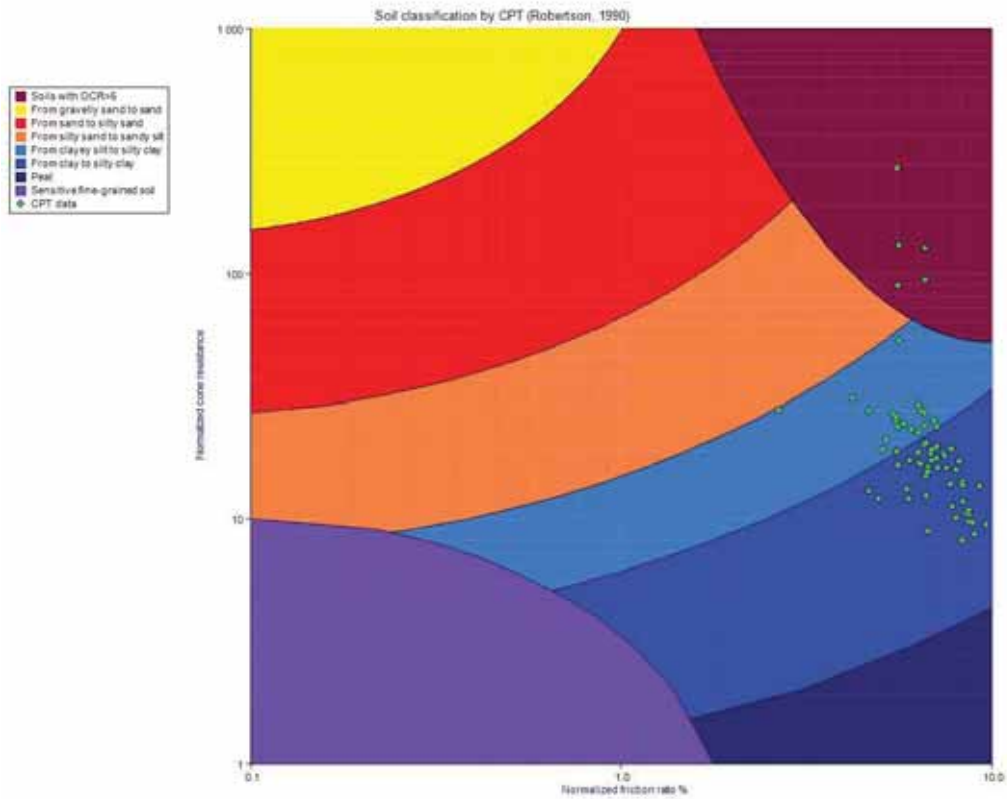
GEO GROUP s.r.l.

Indagini geognostiche e geofisiche – geologia applicata alle costruzioni – laboratorio geotecnico - idrogeologia
– coltivazione cave– bonifiche – consolidamenti – geologia ambientale – consulenze geologiche e geotecniche

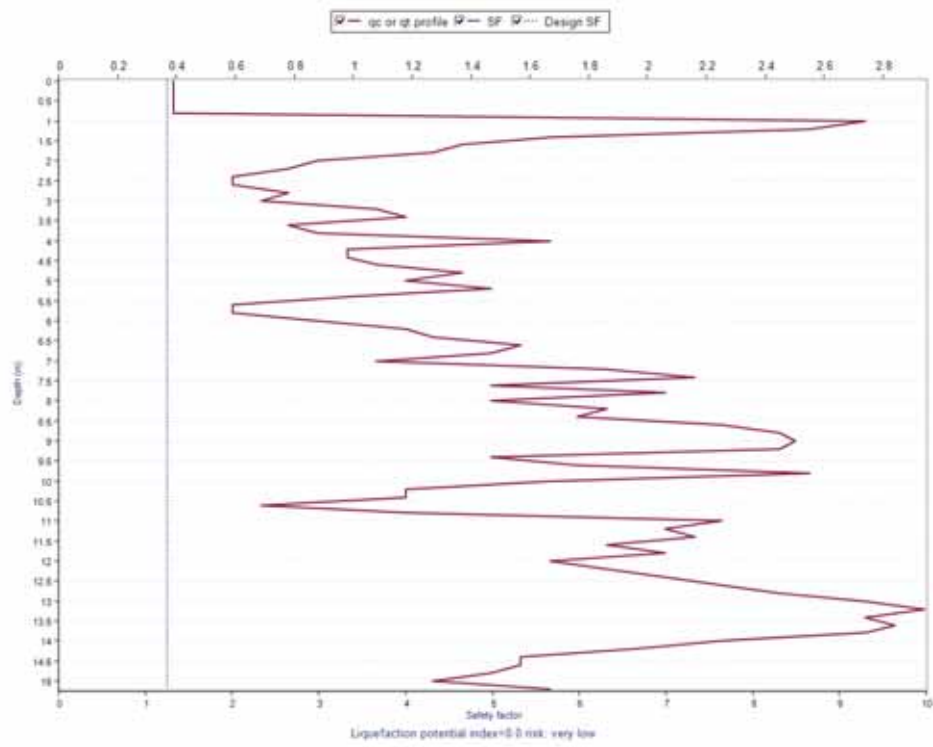
VERIFICA AL LIQUEFAZIONE SU CPT

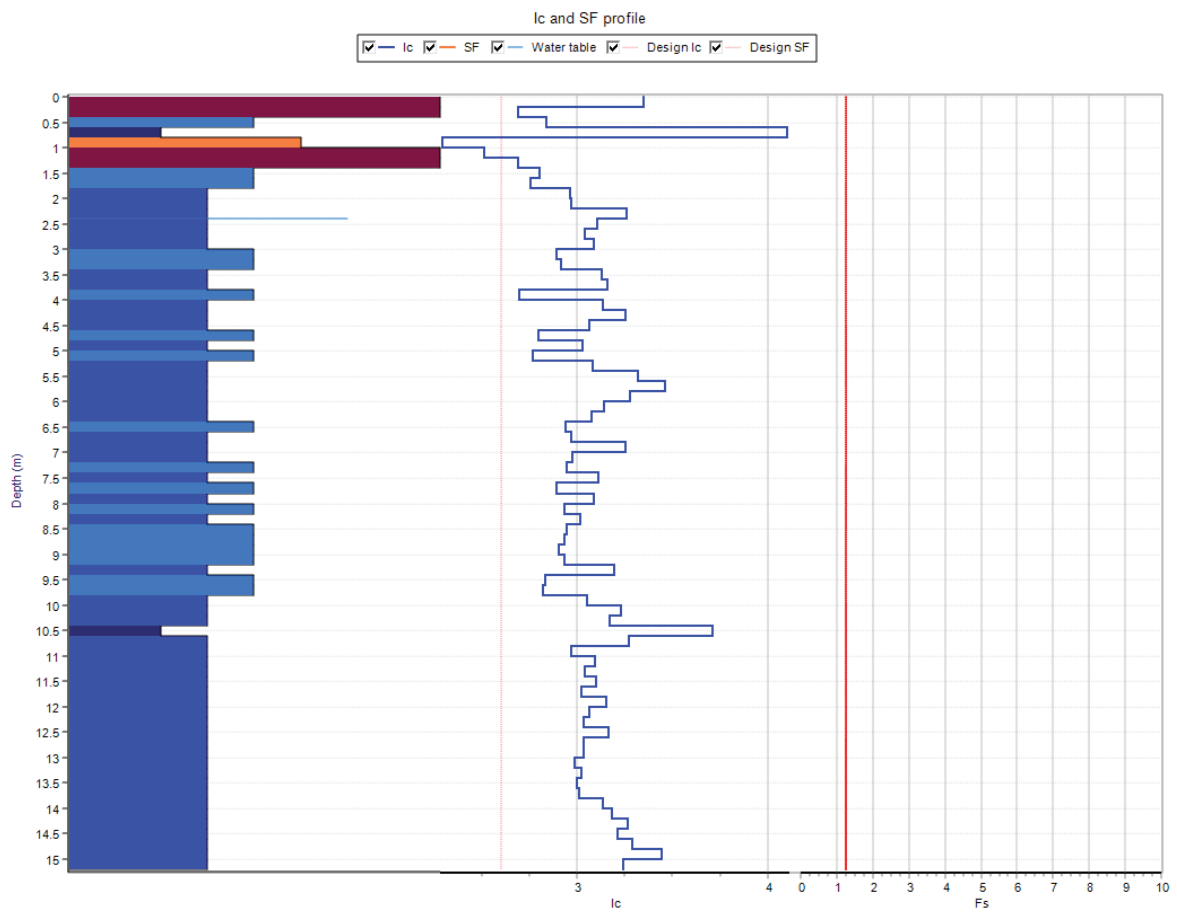
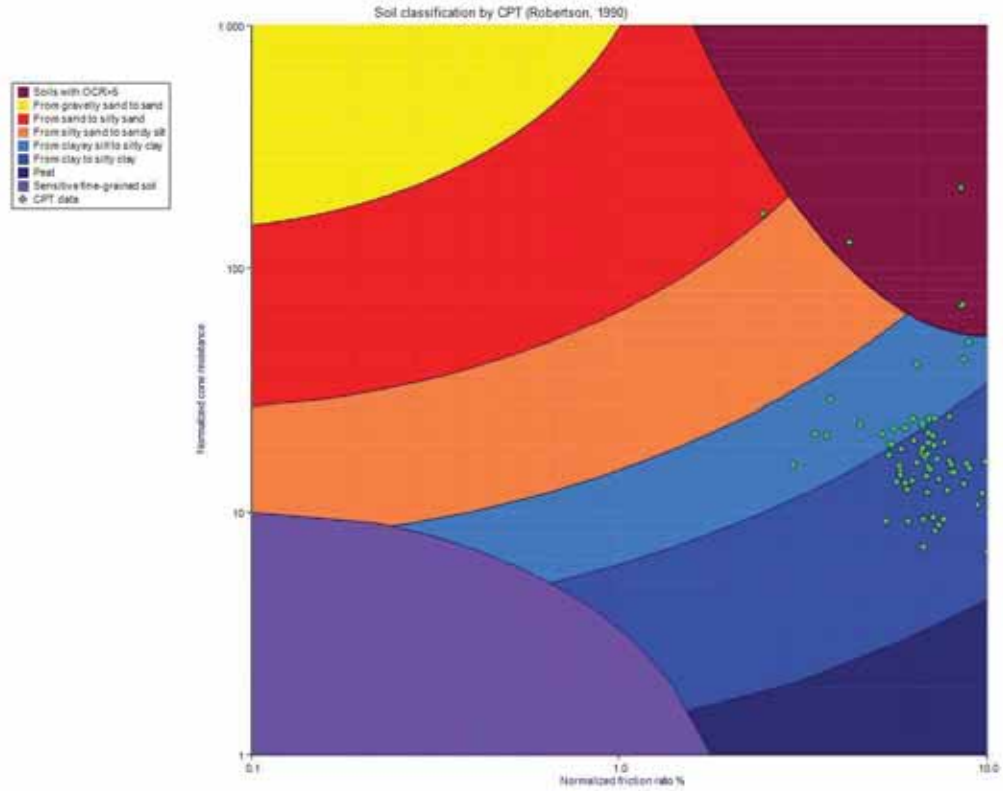
CPT1



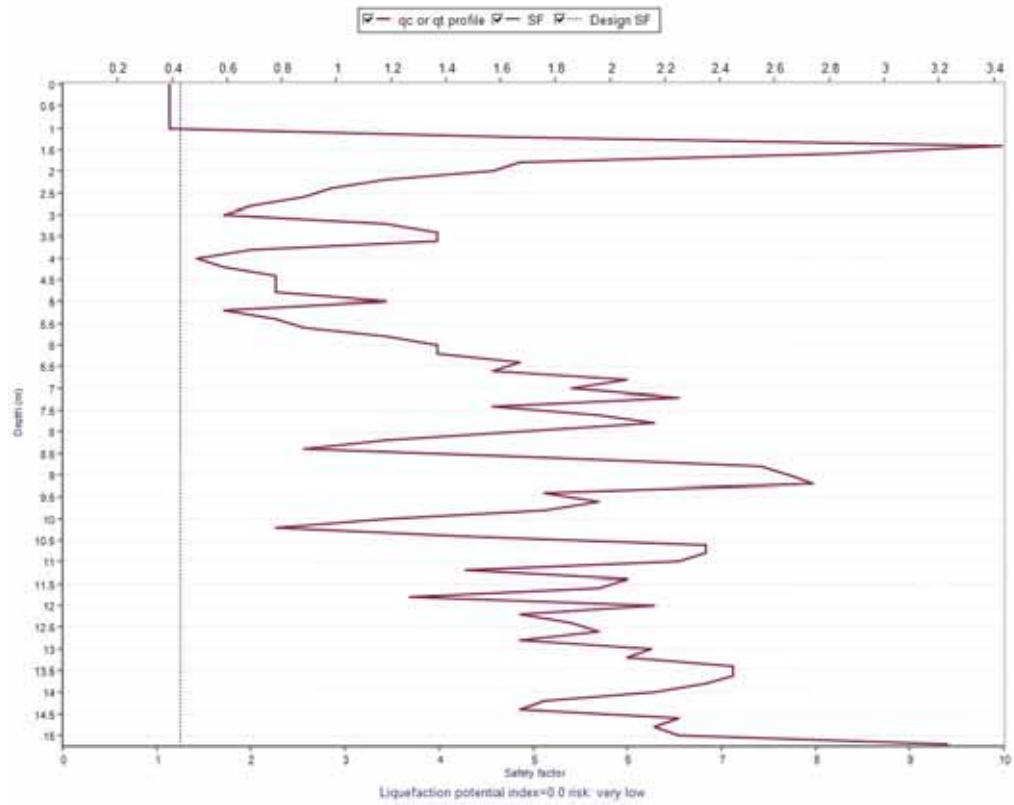


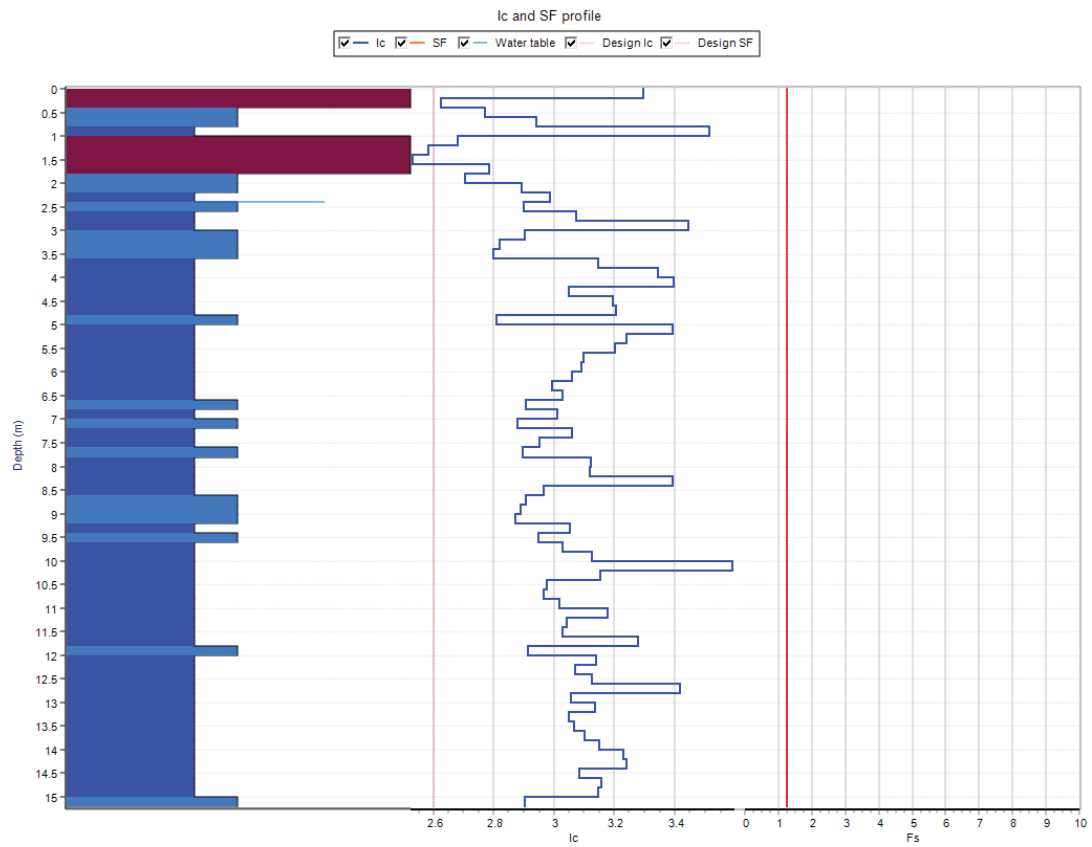
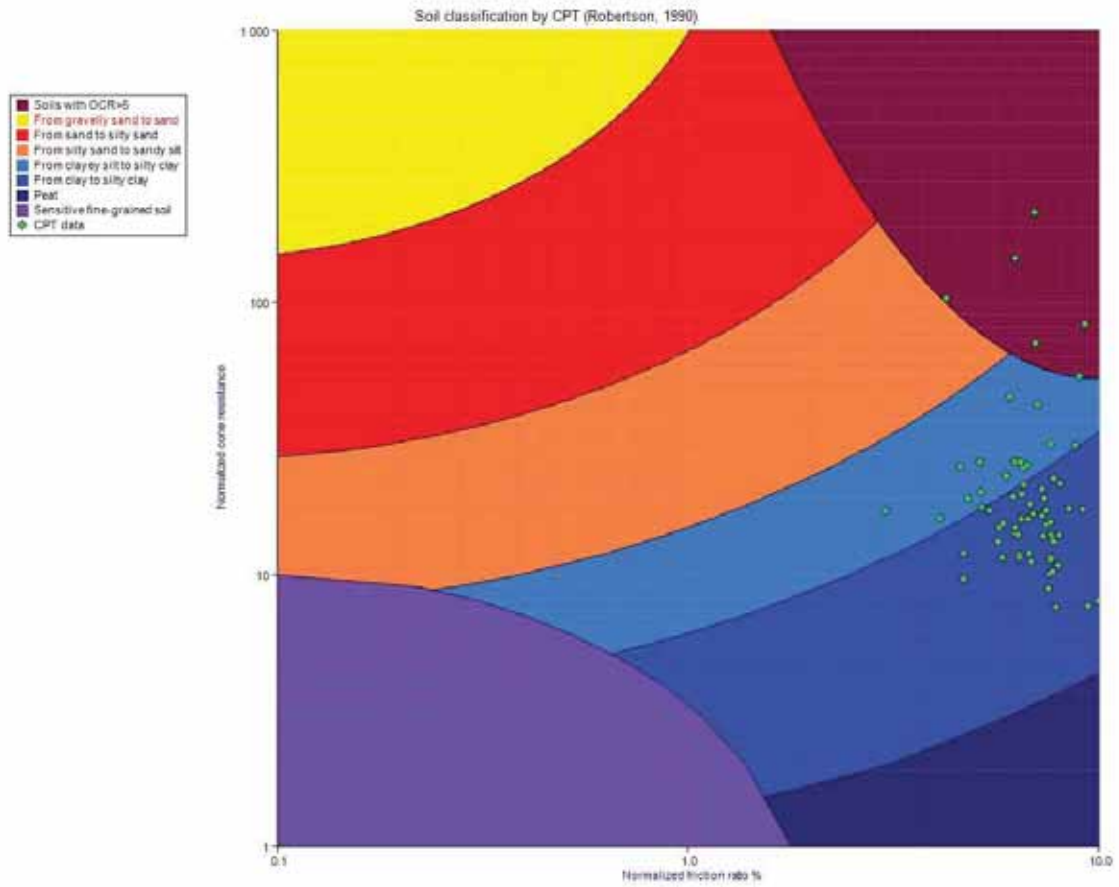
CPT3



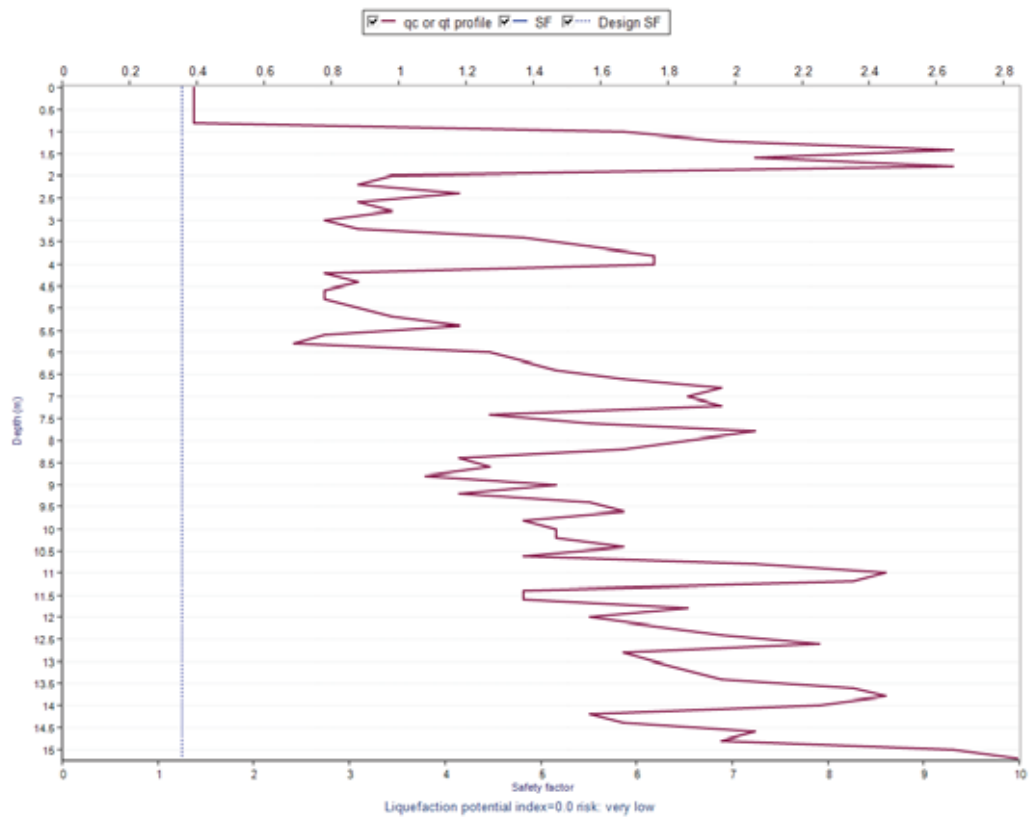


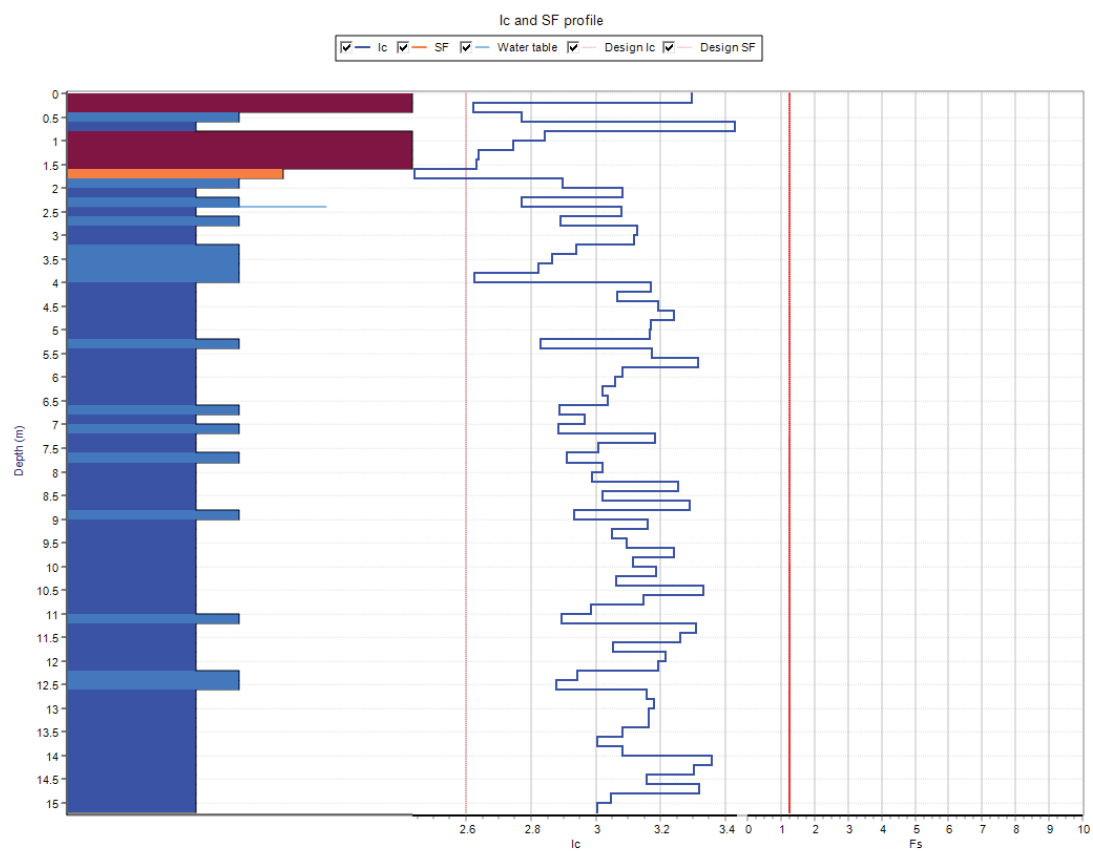
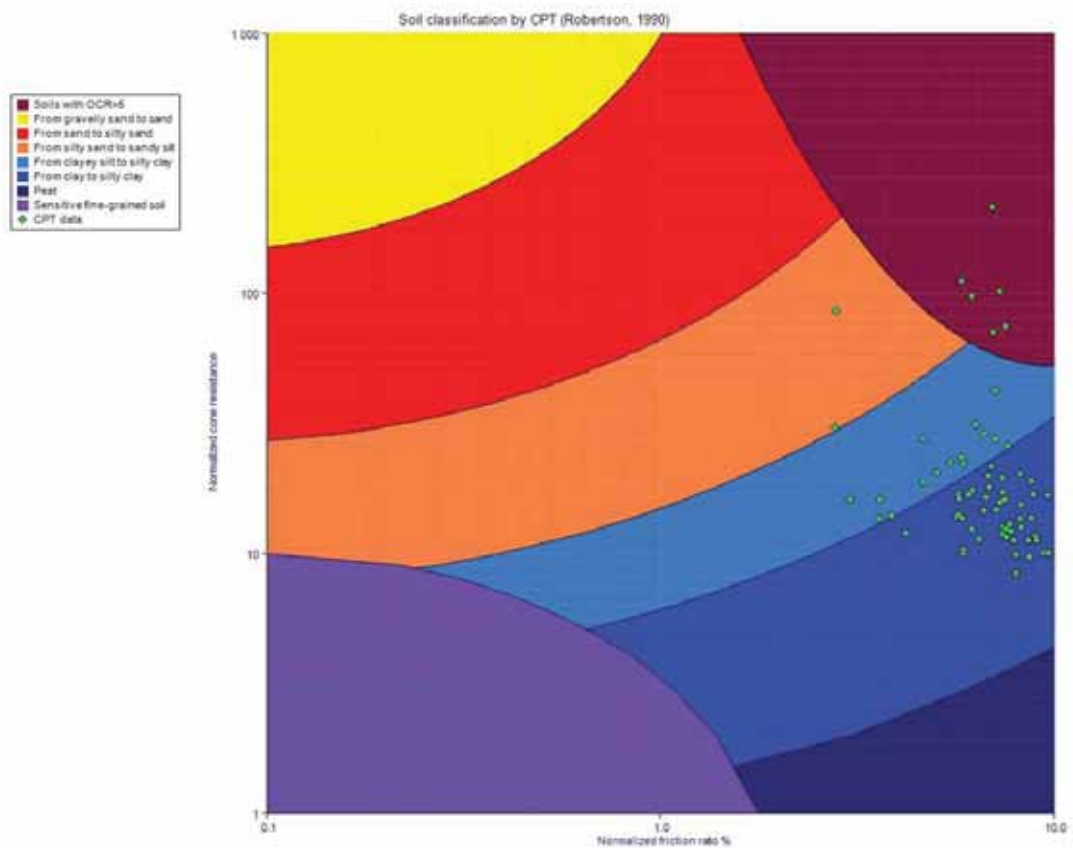
CPT5





CPT6





GEO GROUP s.r.l.

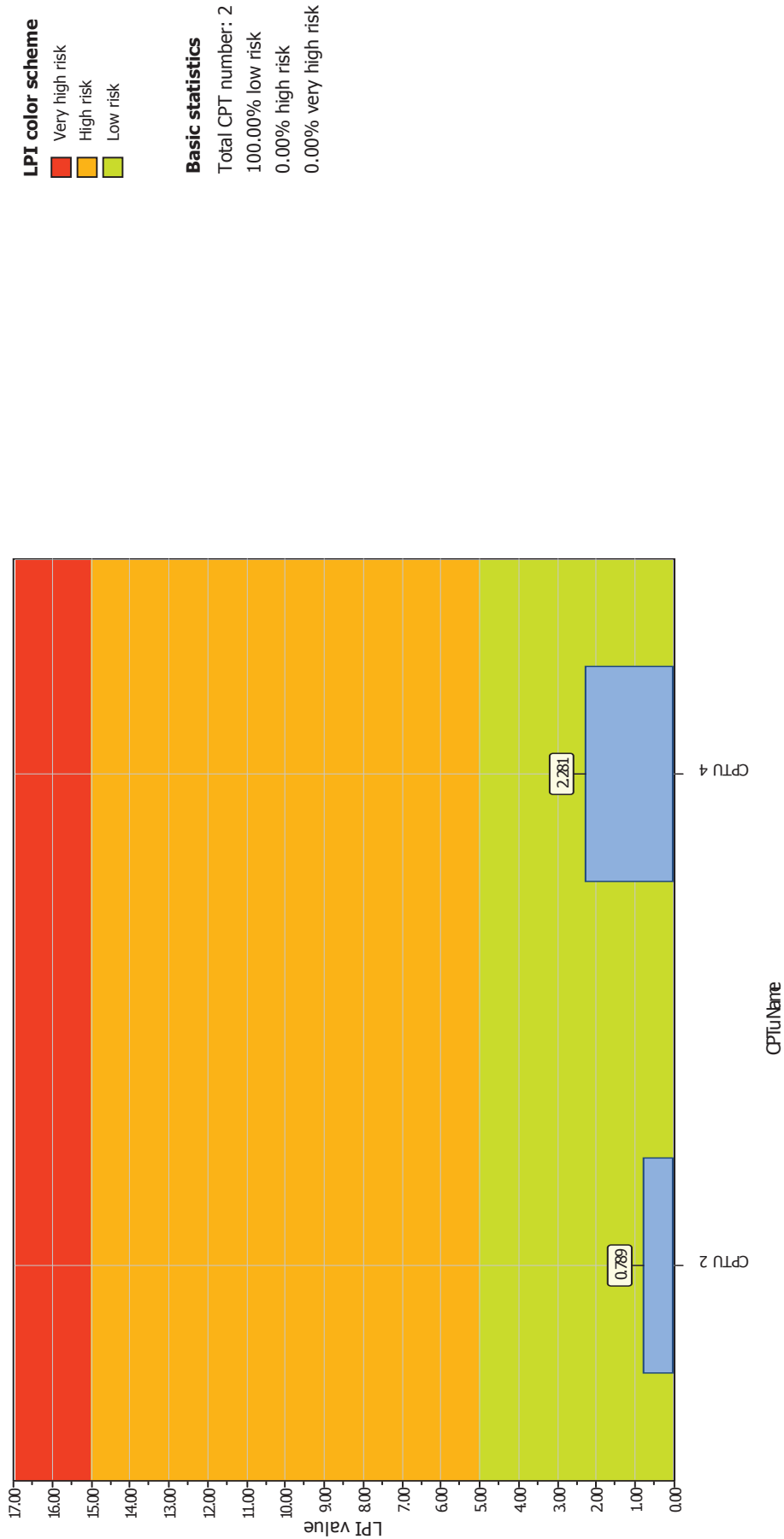
Indagini geognostiche e geofisiche – geologia applicata alle costruzioni – laboratorio geotecnico - idrogeologia
– coltivazione cave– bonifiche – consolidamenti – geologia ambientale – consulenze geologiche e geotecniche

VERIFICA AL LIQUEFAZIONE SU CPT_u

Project title : Indagini CPTu

Location : Nonantola strada Guercinesca Ovest

Overall Liquefaction Potential Index report



LIQUEFACTION ANALYSIS REPORT

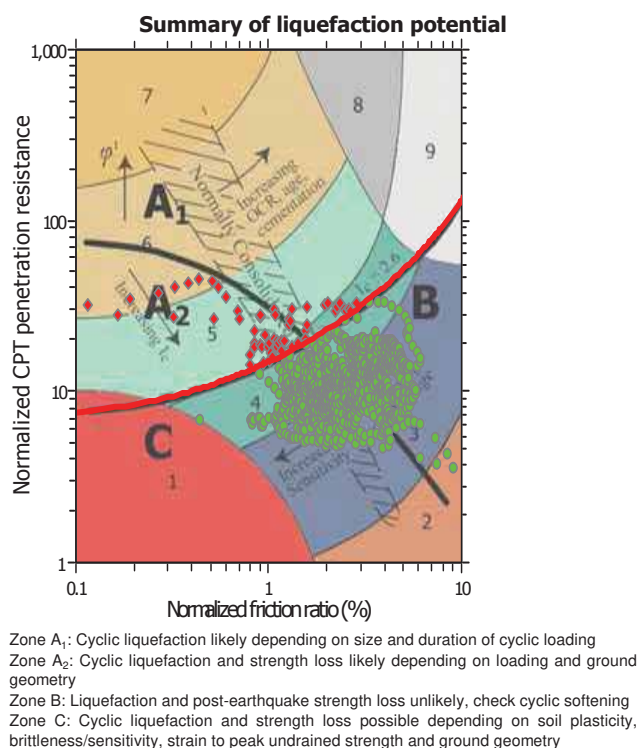
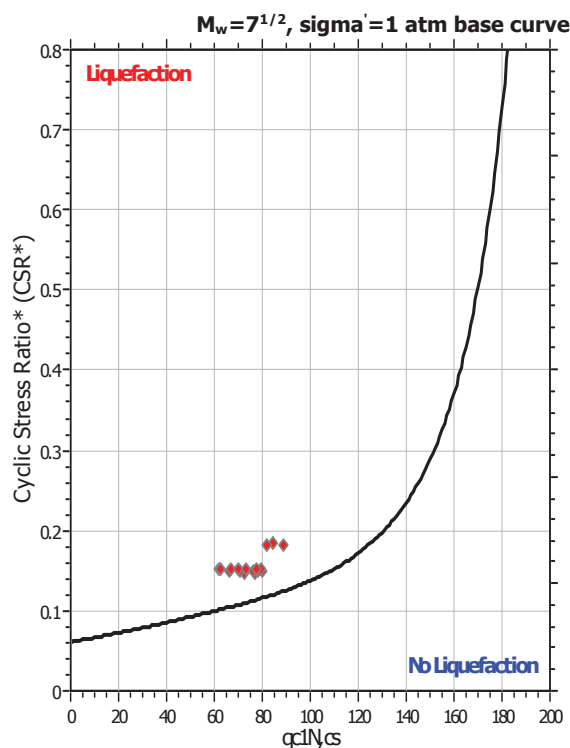
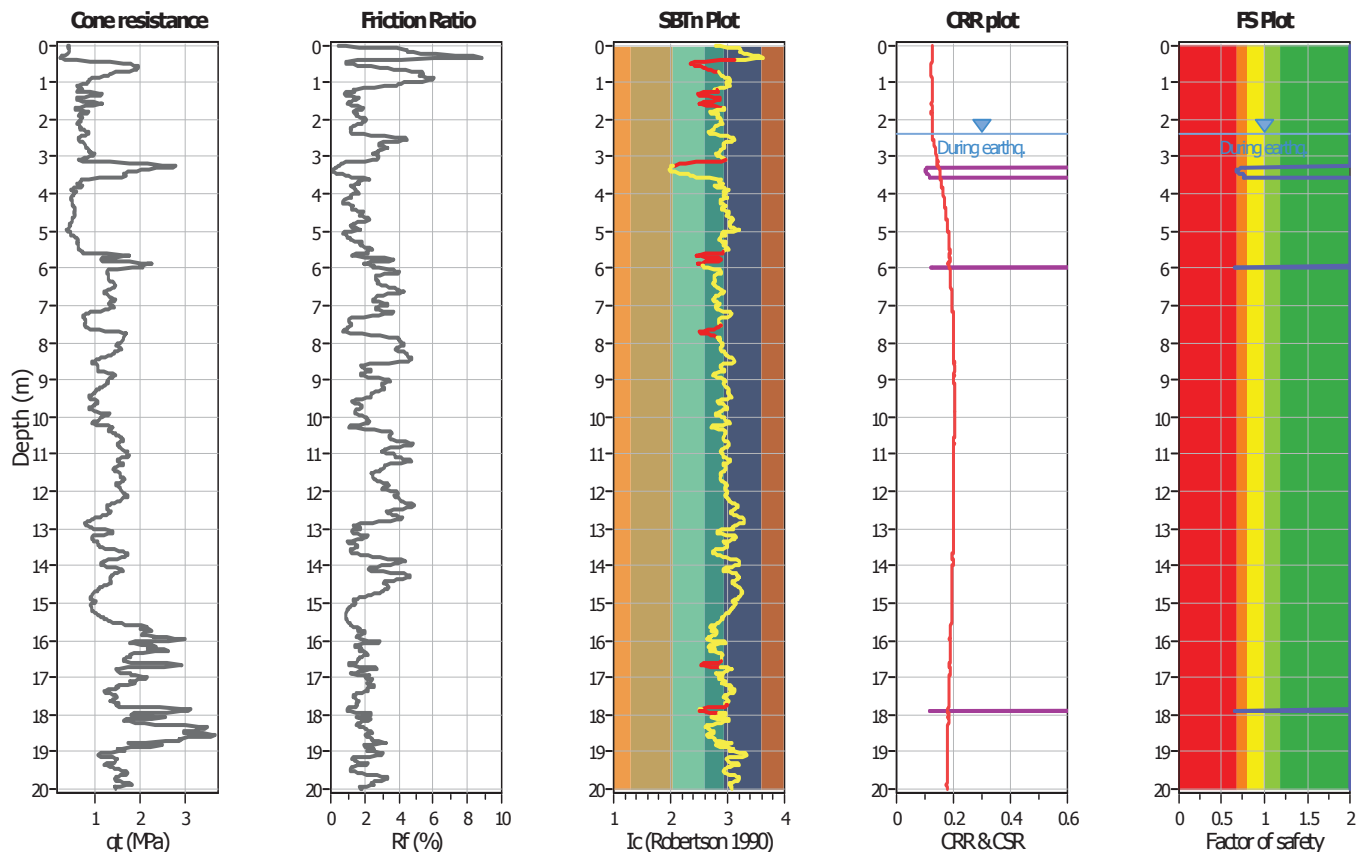
Project title : Indagini CPTu

Location : Nonantola strada Guercinesca Ovest

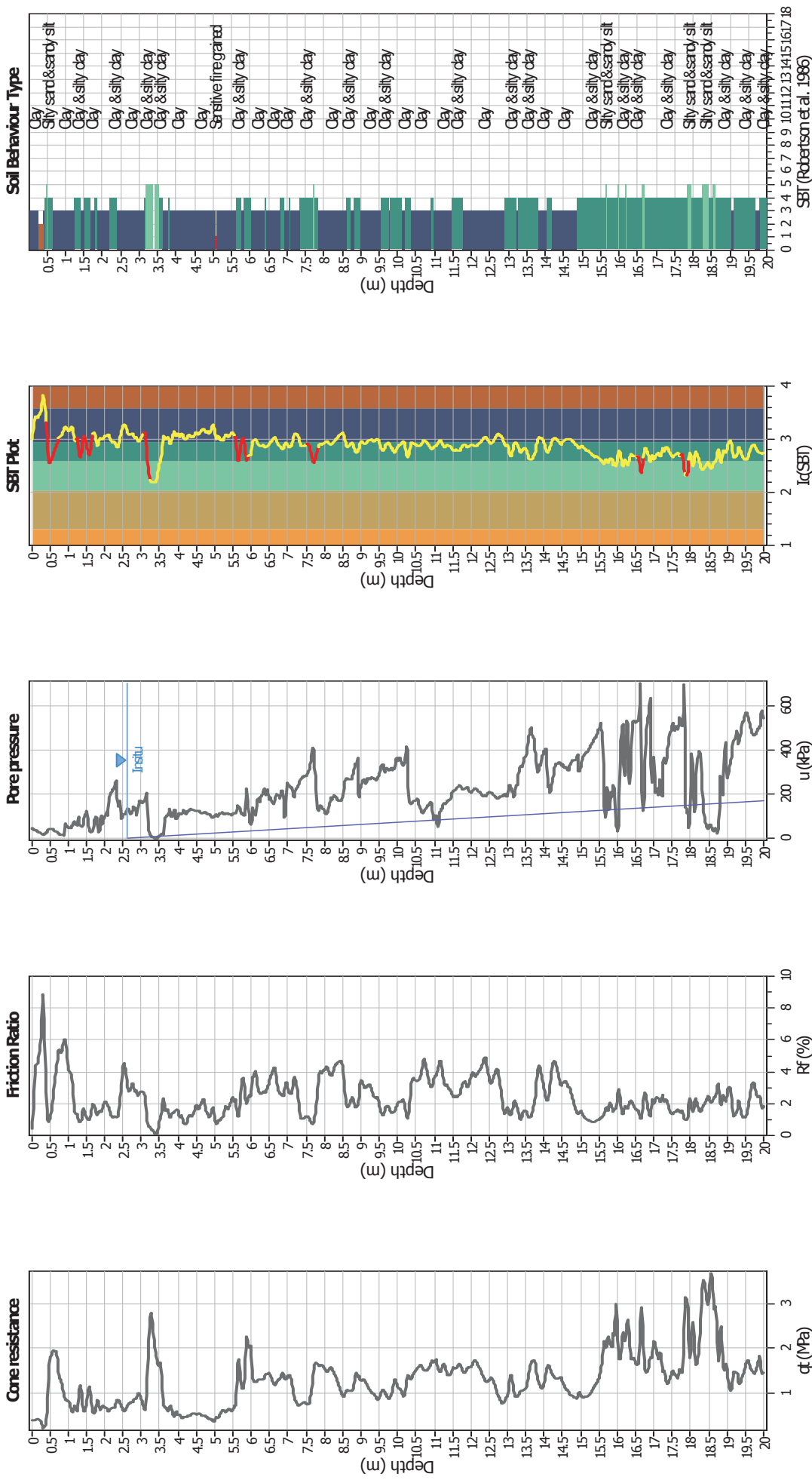
CPT file : CPTU 2

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.60 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.40 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	20.00 m
Earthquake magnitude M_w :	6.14	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.23	Unit weight calculation:	Based on SBT	K_g applied:	Yes		



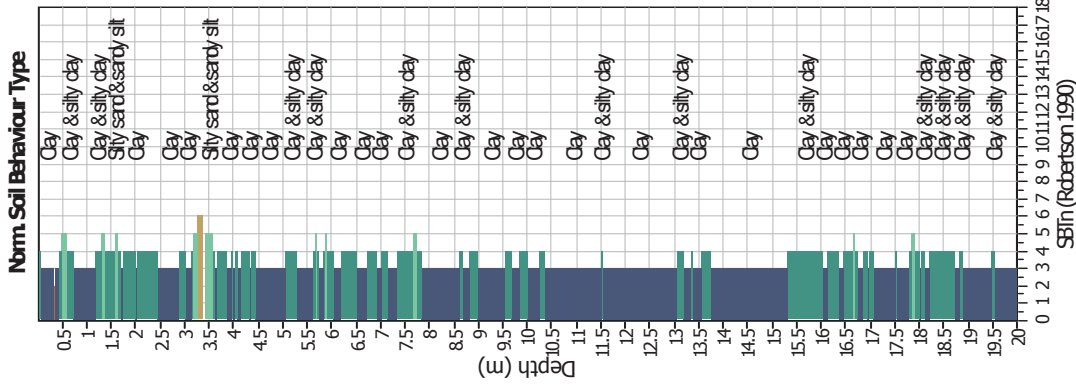
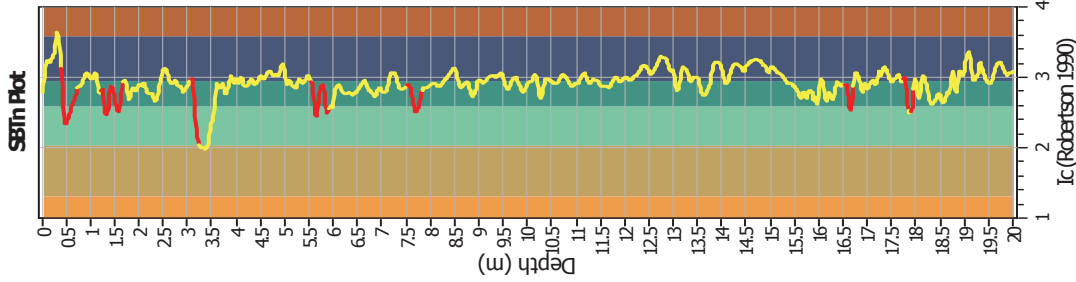
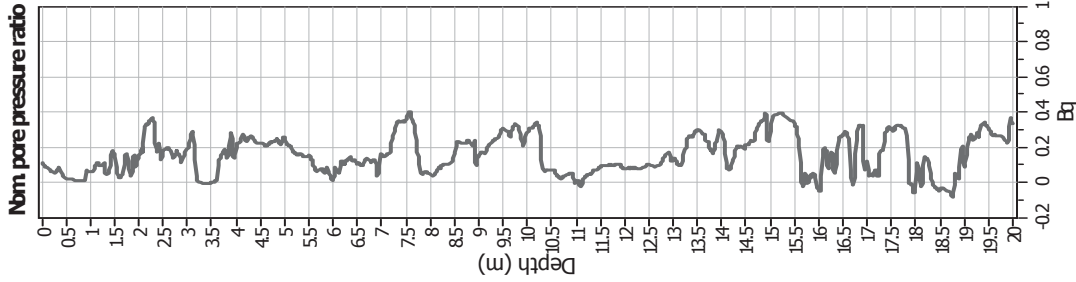
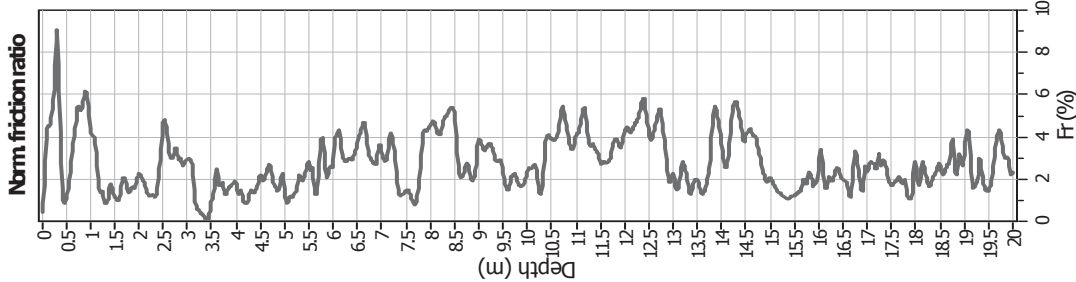
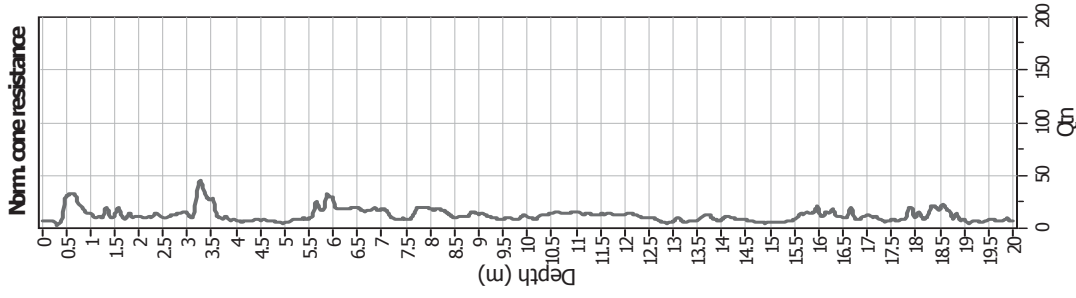
CPT basic interpretation plots



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:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _u applied:	Yes
Earthquake magnitude M _w :	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.23	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.60 m	Fill height:	N/A	Limit depth:	20.00 m

CPT basic interpretation plots (normalized)



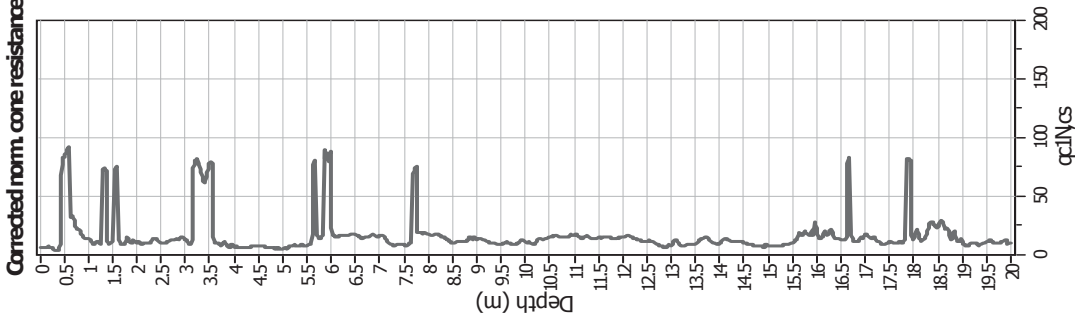
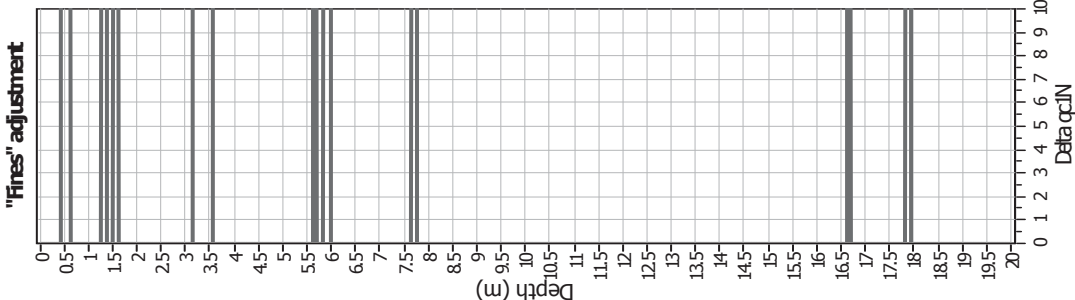
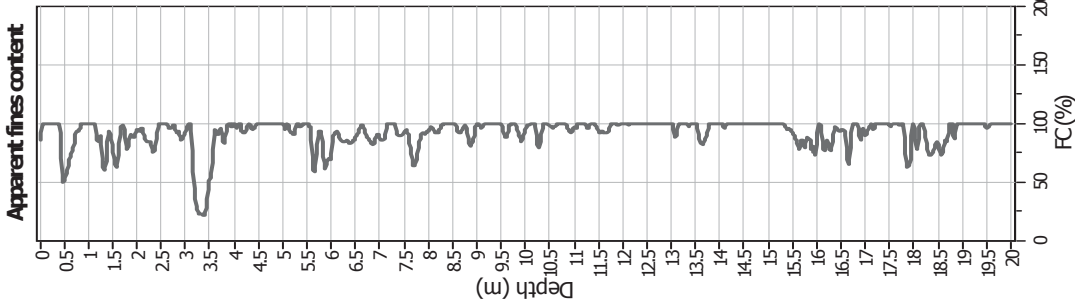
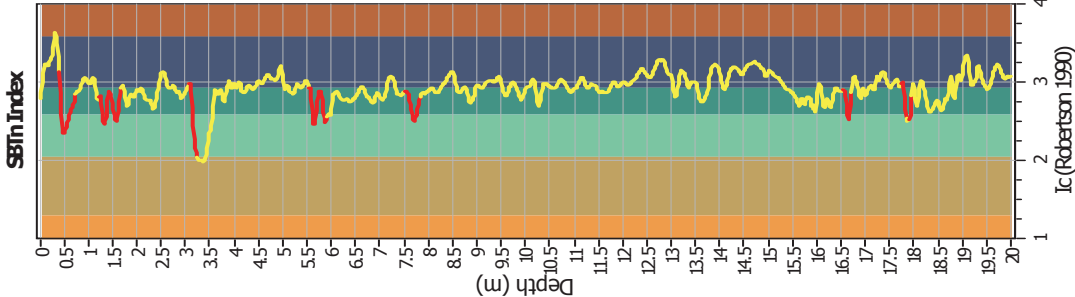
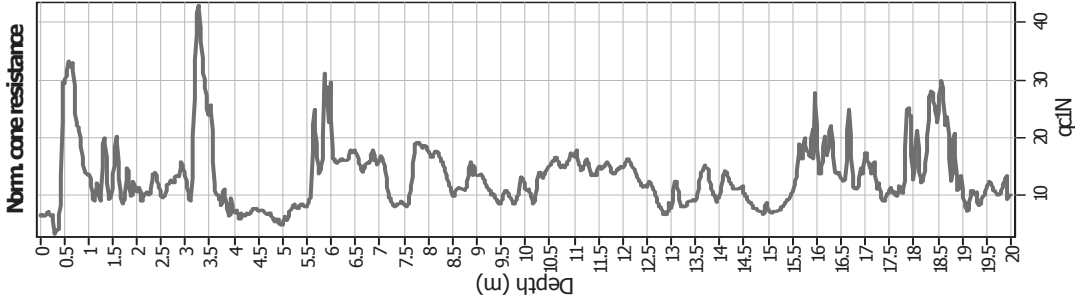
Input parameters and analysis data

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:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _a applied:	Yes
Earthquake magnitude M _w :	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.23	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.60 m	Fill height:	N/A	Limit depth:	20.00 m

SBTn legend

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

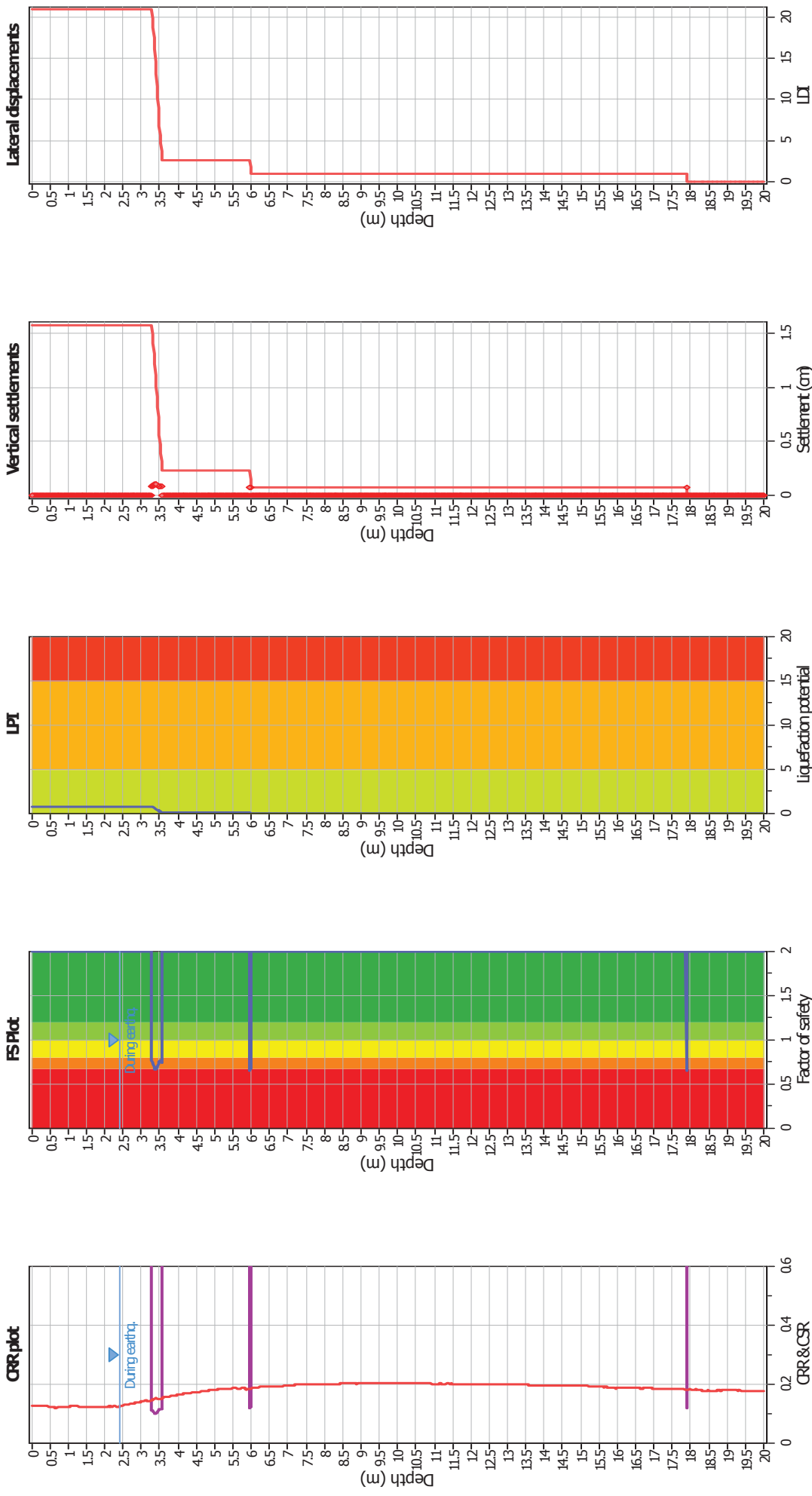
Liquefaction analysis overall plots (intermediate results)



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:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _u applied:	Yes
Earthquake magnitude M _w :	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.23	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.60 m	Fill height:	N/A	Limit depth:	20.00 m

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)
Fines correction method:	B&I (2014)
Points to test:	Based on Ic value
Earthquake magnitude M_w :	6.14
Peak ground acceleration:	0.23
Depth to water table (insitu):	2.60 m

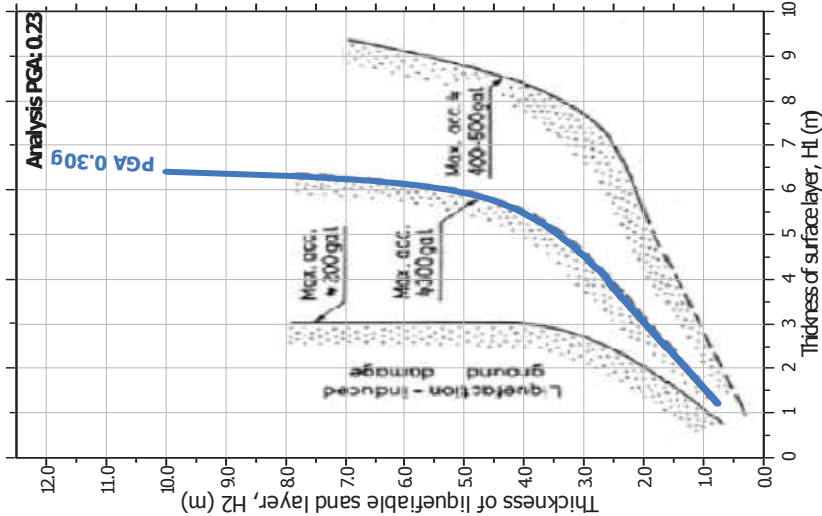
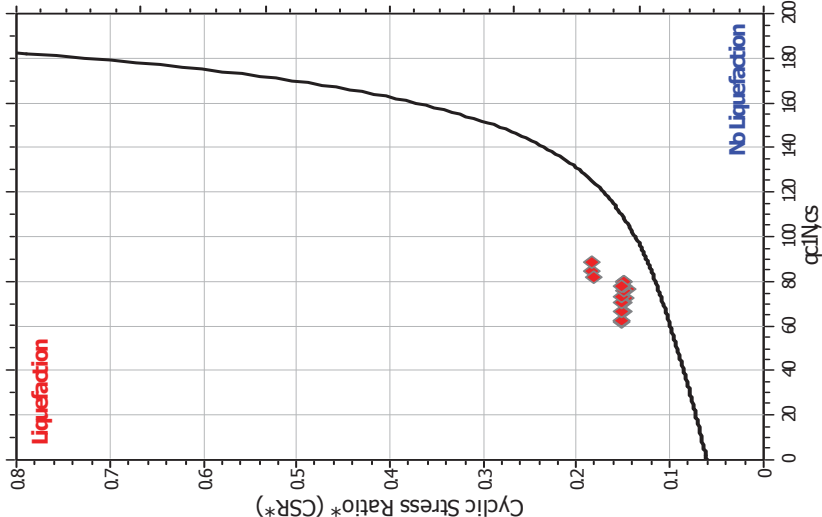
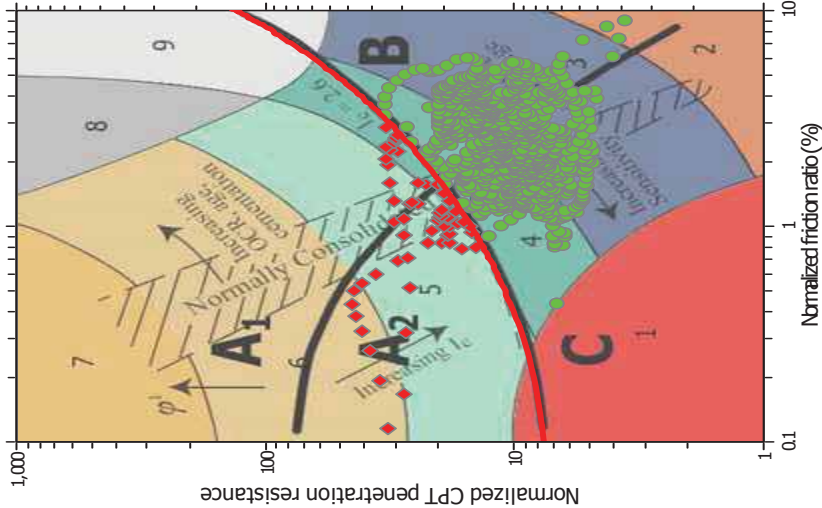
F.S. color scheme

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

LPT color scheme

Very high risk	High risk	Low risk
Red	Orange	Green

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:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _u applied:	Yes
Earthquake magnitude M _w :	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.23	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.60 m	Fill height:	N/A	Limit depth:	20.00 m

:: Liquefaction Potential Index calculation data ::

Depth (m)	FS	F _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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 _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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	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	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	0.77	0.23	8.36	0.02	0.04
3.30	0.74	0.26	8.35	0.02	0.04	3.32	0.72	0.28	8.34	0.02	0.05
3.34	0.70	0.30	8.33	0.02	0.05	3.36	0.67	0.33	8.32	0.02	0.06
3.38	0.66	0.34	8.31	0.02	0.06	3.40	0.66	0.34	8.30	0.02	0.06
3.42	0.69	0.31	8.29	0.02	0.05	3.44	0.71	0.29	8.28	0.02	0.05
3.46	0.73	0.27	8.27	0.02	0.04	3.48	0.75	0.25	8.26	0.02	0.04
3.50	0.76	0.24	8.25	0.02	0.04	3.52	0.77	0.23	8.24	0.02	0.04
3.54	0.77	0.23	8.23	0.02	0.04	3.56	0.75	0.25	8.22	0.02	0.04
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 _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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 _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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	0.65	0.35	7.02	0.02	0.05
5.98	0.68	0.32	7.01	0.02	0.04	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

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

Depth (m)	FS	F _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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	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 _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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 _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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 _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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
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 _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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 _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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	0.65	0.35	1.06	0.02	0.01
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 _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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

Overall liquefaction potential: 0.79

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_L: 1 - FSw_z: Function value of the extend of soil liquefaction according to depthd_z: Layer thickness (m)

LPI: Liquefaction potential index value for test point

:: Lateral displacement index calculation ::

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
2.40	13.57	0.00	2.00	0.00	0.00	0.00
2.42	12.42	0.00	2.00	0.00	0.00	0.00
2.44	11.93	0.00	2.00	0.00	0.00	0.00
2.46	11.39	0.00	2.00	0.00	0.00	0.00
2.48	10.84	0.00	2.00	0.00	0.00	0.00
2.50	9.93	0.00	2.00	0.00	0.00	0.00
2.52	9.63	0.00	2.00	0.00	0.00	0.00
2.54	9.72	0.00	2.00	0.00	0.00	0.00
2.56	9.85	0.00	2.00	0.00	0.00	0.00
2.58	10.14	0.00	2.00	0.00	0.00	0.00
2.60	10.77	0.00	2.00	0.00	0.00	0.00
2.62	11.85	0.00	2.00	0.00	0.00	0.00
2.64	11.84	0.00	2.00	0.00	0.00	0.00
2.66	11.82	0.00	2.00	0.00	0.00	0.00
2.68	12.68	0.00	2.00	0.00	0.00	0.00
2.70	12.53	0.00	2.00	0.00	0.00	0.00
2.72	12.27	0.00	2.00	0.00	0.00	0.00
2.74	12.40	0.00	2.00	0.00	0.00	0.00
2.76	12.21	0.00	2.00	0.00	0.00	0.00
2.78	12.95	0.00	2.00	0.00	0.00	0.00
2.80	13.26	0.00	2.00	0.00	0.00	0.00
2.82	13.50	0.00	2.00	0.00	0.00	0.00
2.84	13.59	0.00	2.00	0.00	0.00	0.00
2.86	13.44	0.00	2.00	0.00	0.00	0.00
2.88	13.19	0.00	2.00	0.00	0.00	0.00
2.90	14.75	0.00	2.00	0.00	0.00	0.00
2.92	15.76	0.00	2.00	0.00	0.00	0.00
2.94	15.46	0.00	2.00	0.00	0.00	0.00
2.96	14.88	0.00	2.00	0.00	0.00	0.00
2.98	13.99	0.00	2.00	0.00	0.00	0.00
3.00	13.37	0.00	2.00	0.00	0.00	0.00
3.02	12.59	0.00	2.00	0.00	0.00	0.00
3.04	11.30	0.00	2.00	0.00	0.00	0.00
3.06	10.40	0.00	2.00	0.00	0.00	0.00
3.08	9.30	0.00	2.00	0.00	0.00	0.00
3.10	9.01	0.00	2.00	0.00	0.00	0.00
3.12	9.60	0.00	2.00	0.00	0.00	0.00
3.14	12.89	0.00	2.00	0.00	0.00	0.00
3.16	74.29	0.57	2.00	0.94	0.00	0.00
3.18	77.45	0.52	2.00	0.93	0.00	0.00
3.20	80.53	0.49	2.00	0.91	0.00	0.00
3.22	81.17	0.48	2.00	0.91	0.00	0.00
3.24	81.53	0.48	2.00	0.91	0.00	0.00
3.26	78.84	0.51	2.00	0.92	0.00	0.00
3.28	76.76	0.53	0.77	0.93	0.53	1.07
3.30	72.74	0.59	0.74	0.94	0.59	1.17
3.32	70.45	0.62	0.72	0.94	0.62	1.24
3.34	66.31	0.68	0.70	0.94	0.68	1.37

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
3.36	62.23	0.75	0.67	0.94	0.75	1.51
3.38	61.65	0.77	0.66	0.94	0.77	1.53
3.40	62.20	0.76	0.66	0.94	0.76	1.51
3.42	66.76	0.68	0.69	0.94	0.68	1.35
3.44	70.25	0.62	0.71	0.94	0.62	1.24
3.46	73.32	0.58	0.73	0.94	0.58	1.16
3.48	76.03	0.54	0.75	0.93	0.54	1.08
3.50	78.18	0.52	0.76	0.92	0.52	1.03
3.52	79.78	0.50	0.77	0.92	0.50	0.99
3.54	79.66	0.50	0.77	0.92	0.50	1.00
3.56	77.63	0.52	0.75	0.93	0.52	1.04
3.58	15.74	0.00	2.00	0.00	0.00	0.00
3.60	11.94	0.00	2.00	0.00	0.00	0.00
3.62	10.81	0.00	2.00	0.00	0.00	0.00
3.64	10.01	0.00	2.00	0.00	0.00	0.00
3.66	10.10	0.00	2.00	0.00	0.00	0.00
3.68	10.07	0.00	2.00	0.00	0.00	0.00
3.70	9.26	0.00	2.00	0.00	0.00	0.00
3.72	8.93	0.00	2.00	0.00	0.00	0.00
3.74	8.23	0.00	2.00	0.00	0.00	0.00
3.76	8.74	0.00	2.00	0.00	0.00	0.00
3.78	10.62	0.00	2.00	0.00	0.00	0.00
3.80	11.04	0.00	2.00	0.00	0.00	0.00
3.82	9.76	0.00	2.00	0.00	0.00	0.00
3.84	8.58	0.00	2.00	0.00	0.00	0.00
3.86	7.76	0.00	2.00	0.00	0.00	0.00
3.88	6.59	0.00	2.00	0.00	0.00	0.00
3.90	6.37	0.00	2.00	0.00	0.00	0.00
3.92	6.62	0.00	2.00	0.00	0.00	0.00
3.94	9.51	0.00	2.00	0.00	0.00	0.00
3.96	8.35	0.00	2.00	0.00	0.00	0.00
3.98	7.56	0.00	2.00	0.00	0.00	0.00
4.00	7.02	0.00	2.00	0.00	0.00	0.00
4.02	7.28	0.00	2.00	0.00	0.00	0.00
4.04	7.44	0.00	2.00	0.00	0.00	0.00
4.06	7.00	0.00	2.00	0.00	0.00	0.00
4.08	6.68	0.00	2.00	0.00	0.00	0.00
4.10	5.95	0.00	2.00	0.00	0.00	0.00
4.12	6.04	0.00	2.00	0.00	0.00	0.00
4.14	6.30	0.00	2.00	0.00	0.00	0.00
4.16	6.93	0.00	2.00	0.00	0.00	0.00
4.18	6.56	0.00	2.00	0.00	0.00	0.00
4.20	6.55	0.00	2.00	0.00	0.00	0.00
4.22	6.69	0.00	2.00	0.00	0.00	0.00
4.24	6.54	0.00	2.00	0.00	0.00	0.00
4.26	6.63	0.00	2.00	0.00	0.00	0.00
4.28	6.92	0.00	2.00	0.00	0.00	0.00
4.30	6.65	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	$q_{c1N,cs}$	Gamma_{lim} (%)	FS	Fa	Gamma_{max} (%)	LDI
4.32	6.76	0.00	2.00	0.00	0.00	0.00
4.34	6.90	0.00	2.00	0.00	0.00	0.00
4.36	7.25	0.00	2.00	0.00	0.00	0.00
4.38	7.61	0.00	2.00	0.00	0.00	0.00
4.40	7.70	0.00	2.00	0.00	0.00	0.00
4.42	7.64	0.00	2.00	0.00	0.00	0.00
4.44	7.68	0.00	2.00	0.00	0.00	0.00
4.46	7.66	0.00	2.00	0.00	0.00	0.00
4.48	7.45	0.00	2.00	0.00	0.00	0.00
4.50	7.15	0.00	2.00	0.00	0.00	0.00
4.52	7.24	0.00	2.00	0.00	0.00	0.00
4.54	7.38	0.00	2.00	0.00	0.00	0.00
4.56	7.62	0.00	2.00	0.00	0.00	0.00
4.58	7.57	0.00	2.00	0.00	0.00	0.00
4.60	7.46	0.00	2.00	0.00	0.00	0.00
4.62	7.09	0.00	2.00	0.00	0.00	0.00
4.64	6.89	0.00	2.00	0.00	0.00	0.00
4.66	6.72	0.00	2.00	0.00	0.00	0.00
4.68	6.72	0.00	2.00	0.00	0.00	0.00
4.70	6.86	0.00	2.00	0.00	0.00	0.00
4.72	6.64	0.00	2.00	0.00	0.00	0.00
4.74	6.85	0.00	2.00	0.00	0.00	0.00
4.76	6.43	0.00	2.00	0.00	0.00	0.00
4.78	6.23	0.00	2.00	0.00	0.00	0.00
4.80	6.01	0.00	2.00	0.00	0.00	0.00
4.82	5.45	0.00	2.00	0.00	0.00	0.00
4.84	5.80	0.00	2.00	0.00	0.00	0.00
4.86	5.99	0.00	2.00	0.00	0.00	0.00
4.88	5.89	0.00	2.00	0.00	0.00	0.00
4.90	5.53	0.00	2.00	0.00	0.00	0.00
4.92	5.90	0.00	2.00	0.00	0.00	0.00
4.94	5.04	0.00	2.00	0.00	0.00	0.00
4.96	4.78	0.00	2.00	0.00	0.00	0.00
4.98	4.78	0.00	2.00	0.00	0.00	0.00
5.00	4.93	0.00	2.00	0.00	0.00	0.00
5.02	5.48	0.00	2.00	0.00	0.00	0.00
5.04	6.12	0.00	2.00	0.00	0.00	0.00
5.06	6.37	0.00	2.00	0.00	0.00	0.00
5.08	5.91	0.00	2.00	0.00	0.00	0.00
5.10	5.71	0.00	2.00	0.00	0.00	0.00
5.12	6.35	0.00	2.00	0.00	0.00	0.00
5.14	7.19	0.00	2.00	0.00	0.00	0.00
5.16	7.43	0.00	2.00	0.00	0.00	0.00
5.18	7.61	0.00	2.00	0.00	0.00	0.00
5.20	8.00	0.00	2.00	0.00	0.00	0.00
5.22	8.24	0.00	2.00	0.00	0.00	0.00
5.24	8.62	0.00	2.00	0.00	0.00	0.00
5.26	8.07	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	$q_{c1N,cs}$	Gamma_{lim} (%)	FS	Fa	Gamma_{max} (%)	LDI
5.28	7.71	0.00	2.00	0.00	0.00	0.00
5.30	7.70	0.00	2.00	0.00	0.00	0.00
5.32	7.85	0.00	2.00	0.00	0.00	0.00
5.34	8.18	0.00	2.00	0.00	0.00	0.00
5.36	8.32	0.00	2.00	0.00	0.00	0.00
5.38	8.50	0.00	2.00	0.00	0.00	0.00
5.40	8.53	0.00	2.00	0.00	0.00	0.00
5.42	8.23	0.00	2.00	0.00	0.00	0.00
5.44	8.07	0.00	2.00	0.00	0.00	0.00
5.46	8.12	0.00	2.00	0.00	0.00	0.00
5.48	7.92	0.00	2.00	0.00	0.00	0.00
5.50	8.25	0.00	2.00	0.00	0.00	0.00
5.52	8.89	0.00	2.00	0.00	0.00	0.00
5.54	9.33	0.00	2.00	0.00	0.00	0.00
5.56	9.36	0.00	2.00	0.00	0.00	0.00
5.58	9.49	0.00	2.00	0.00	0.00	0.00
5.60	10.02	0.00	2.00	0.00	0.00	0.00
5.62	17.68	0.00	2.00	0.00	0.00	0.00
5.64	77.52	0.52	2.00	0.93	0.00	0.00
5.66	80.71	0.49	2.00	0.91	0.00	0.00
5.68	77.09	0.53	2.00	0.93	0.00	0.00
5.70	18.99	0.00	2.00	0.00	0.00	0.00
5.72	16.60	0.00	2.00	0.00	0.00	0.00
5.74	15.03	0.00	2.00	0.00	0.00	0.00
5.76	13.89	0.00	2.00	0.00	0.00	0.00
5.78	14.48	0.00	2.00	0.00	0.00	0.00
5.80	15.01	0.00	2.00	0.00	0.00	0.00
5.82	16.28	0.00	2.00	0.00	0.00	0.00
5.84	20.45	0.00	2.00	0.00	0.00	0.00
5.86	90.08	0.39	2.00	0.86	0.00	0.00
5.88	82.20	0.47	2.00	0.91	0.00	0.00
5.90	87.05	0.42	2.00	0.88	0.00	0.00
5.92	86.46	0.43	2.00	0.89	0.00	0.00
5.94	79.86	0.50	2.00	0.92	0.00	0.00
5.96	84.64	0.44	0.65	0.90	0.44	0.89
5.98	88.85	0.40	0.68	0.87	0.40	0.80
6.00	23.06	0.00	2.00	0.00	0.00	0.00
6.02	17.95	0.00	2.00	0.00	0.00	0.00
6.04	16.48	0.00	2.00	0.00	0.00	0.00
6.06	16.35	0.00	2.00	0.00	0.00	0.00
6.08	15.92	0.00	2.00	0.00	0.00	0.00
6.10	15.71	0.00	2.00	0.00	0.00	0.00
6.12	15.85	0.00	2.00	0.00	0.00	0.00
6.14	15.91	0.00	2.00	0.00	0.00	0.00
6.16	16.15	0.00	2.00	0.00	0.00	0.00
6.18	16.17	0.00	2.00	0.00	0.00	0.00
6.20	16.31	0.00	2.00	0.00	0.00	0.00
6.22	16.28	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
6.24	16.44	0.00	2.00	0.00	0.00	0.00
6.26	16.23	0.00	2.00	0.00	0.00	0.00
6.28	16.20	0.00	2.00	0.00	0.00	0.00
6.30	16.21	0.00	2.00	0.00	0.00	0.00
6.32	16.09	0.00	2.00	0.00	0.00	0.00
6.34	16.06	0.00	2.00	0.00	0.00	0.00
6.36	16.39	0.00	2.00	0.00	0.00	0.00
6.38	16.99	0.00	2.00	0.00	0.00	0.00
6.40	18.02	0.00	2.00	0.00	0.00	0.00
6.42	17.72	0.00	2.00	0.00	0.00	0.00
6.44	17.42	0.00	2.00	0.00	0.00	0.00
6.46	17.71	0.00	2.00	0.00	0.00	0.00
6.48	17.81	0.00	2.00	0.00	0.00	0.00
6.50	17.69	0.00	2.00	0.00	0.00	0.00
6.52	17.19	0.00	2.00	0.00	0.00	0.00
6.54	17.03	0.00	2.00	0.00	0.00	0.00
6.56	16.38	0.00	2.00	0.00	0.00	0.00
6.58	15.57	0.00	2.00	0.00	0.00	0.00
6.60	15.11	0.00	2.00	0.00	0.00	0.00
6.62	14.51	0.00	2.00	0.00	0.00	0.00
6.64	14.06	0.00	2.00	0.00	0.00	0.00
6.66	14.34	0.00	2.00	0.00	0.00	0.00
6.68	14.77	0.00	2.00	0.00	0.00	0.00
6.70	15.23	0.00	2.00	0.00	0.00	0.00
6.72	15.64	0.00	2.00	0.00	0.00	0.00
6.74	15.62	0.00	2.00	0.00	0.00	0.00
6.76	15.78	0.00	2.00	0.00	0.00	0.00
6.78	15.67	0.00	2.00	0.00	0.00	0.00
6.80	16.09	0.00	2.00	0.00	0.00	0.00
6.82	17.15	0.00	2.00	0.00	0.00	0.00
6.84	17.65	0.00	2.00	0.00	0.00	0.00
6.86	17.88	0.00	2.00	0.00	0.00	0.00
6.88	16.96	0.00	2.00	0.00	0.00	0.00
6.90	16.18	0.00	2.00	0.00	0.00	0.00
6.92	16.46	0.00	2.00	0.00	0.00	0.00
6.94	15.62	0.00	2.00	0.00	0.00	0.00
6.96	15.30	0.00	2.00	0.00	0.00	0.00
6.98	15.85	0.00	2.00	0.00	0.00	0.00
7.00	16.22	0.00	2.00	0.00	0.00	0.00
7.02	16.80	0.00	2.00	0.00	0.00	0.00
7.04	16.78	0.00	2.00	0.00	0.00	0.00
7.06	16.41	0.00	2.00	0.00	0.00	0.00
7.08	16.06	0.00	2.00	0.00	0.00	0.00
7.10	15.10	0.00	2.00	0.00	0.00	0.00
7.12	14.48	0.00	2.00	0.00	0.00	0.00
7.14	13.10	0.00	2.00	0.00	0.00	0.00
7.16	11.50	0.00	2.00	0.00	0.00	0.00
7.18	10.41	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	$q_{c1N,cs}$	Γ_{lim} (%)	FS	Fa	Γ_{max} (%)	LDI
7.20	9.66	0.00	2.00	0.00	0.00	0.00
7.22	9.48	0.00	2.00	0.00	0.00	0.00
7.24	9.09	0.00	2.00	0.00	0.00	0.00
7.26	8.52	0.00	2.00	0.00	0.00	0.00
7.28	8.21	0.00	2.00	0.00	0.00	0.00
7.30	8.07	0.00	2.00	0.00	0.00	0.00
7.32	8.15	0.00	2.00	0.00	0.00	0.00
7.34	8.36	0.00	2.00	0.00	0.00	0.00
7.36	8.57	0.00	2.00	0.00	0.00	0.00
7.38	8.64	0.00	2.00	0.00	0.00	0.00
7.40	8.64	0.00	2.00	0.00	0.00	0.00
7.42	8.84	0.00	2.00	0.00	0.00	0.00
7.44	8.97	0.00	2.00	0.00	0.00	0.00
7.46	8.92	0.00	2.00	0.00	0.00	0.00
7.48	8.62	0.00	2.00	0.00	0.00	0.00
7.50	8.65	0.00	2.00	0.00	0.00	0.00
7.52	8.27	0.00	2.00	0.00	0.00	0.00
7.54	8.13	0.00	2.00	0.00	0.00	0.00
7.56	8.22	0.00	2.00	0.00	0.00	0.00
7.58	8.64	0.00	2.00	0.00	0.00	0.00
7.60	8.88	0.00	2.00	0.00	0.00	0.00
7.62	9.76	0.00	2.00	0.00	0.00	0.00
7.64	10.82	0.00	2.00	0.00	0.00	0.00
7.66	11.58	0.00	2.00	0.00	0.00	0.00
7.68	67.62	0.66	2.00	0.94	0.00	0.00
7.70	69.55	0.63	2.00	0.94	0.00	0.00
7.72	71.80	0.60	2.00	0.94	0.00	0.00
7.74	74.43	0.56	2.00	0.93	0.00	0.00
7.76	75.52	0.55	2.00	0.93	0.00	0.00
7.78	19.10	0.00	2.00	0.00	0.00	0.00
7.80	18.95	0.00	2.00	0.00	0.00	0.00
7.82	19.13	0.00	2.00	0.00	0.00	0.00
7.84	18.81	0.00	2.00	0.00	0.00	0.00
7.86	18.59	0.00	2.00	0.00	0.00	0.00
7.88	18.28	0.00	2.00	0.00	0.00	0.00
7.90	18.65	0.00	2.00	0.00	0.00	0.00
7.92	18.79	0.00	2.00	0.00	0.00	0.00
7.94	18.65	0.00	2.00	0.00	0.00	0.00
7.96	18.42	0.00	2.00	0.00	0.00	0.00
7.98	17.99	0.00	2.00	0.00	0.00	0.00
8.00	17.64	0.00	2.00	0.00	0.00	0.00
8.02	17.46	0.00	2.00	0.00	0.00	0.00
8.04	17.03	0.00	2.00	0.00	0.00	0.00
8.06	16.63	0.00	2.00	0.00	0.00	0.00
8.08	16.53	0.00	2.00	0.00	0.00	0.00
8.10	17.04	0.00	2.00	0.00	0.00	0.00
8.12	17.37	0.00	2.00	0.00	0.00	0.00
8.14	17.71	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	$q_{c1N,cs}$	Gamma_{lim} (%)	FS	Fa	Gamma_{max} (%)	LDI
8.16	17.81	0.00	2.00	0.00	0.00	0.00
8.18	17.66	0.00	2.00	0.00	0.00	0.00
8.20	17.31	0.00	2.00	0.00	0.00	0.00
8.22	16.95	0.00	2.00	0.00	0.00	0.00
8.24	16.33	0.00	2.00	0.00	0.00	0.00
8.26	15.86	0.00	2.00	0.00	0.00	0.00
8.28	15.79	0.00	2.00	0.00	0.00	0.00
8.30	15.48	0.00	2.00	0.00	0.00	0.00
8.32	15.26	0.00	2.00	0.00	0.00	0.00
8.34	14.75	0.00	2.00	0.00	0.00	0.00
8.36	14.17	0.00	2.00	0.00	0.00	0.00
8.38	13.55	0.00	2.00	0.00	0.00	0.00
8.40	12.88	0.00	2.00	0.00	0.00	0.00
8.42	12.30	0.00	2.00	0.00	0.00	0.00
8.44	11.80	0.00	2.00	0.00	0.00	0.00
8.46	11.30	0.00	2.00	0.00	0.00	0.00
8.48	10.88	0.00	2.00	0.00	0.00	0.00
8.50	9.95	0.00	2.00	0.00	0.00	0.00
8.52	9.77	0.00	2.00	0.00	0.00	0.00
8.54	9.87	0.00	2.00	0.00	0.00	0.00
8.56	10.53	0.00	2.00	0.00	0.00	0.00
8.58	11.08	0.00	2.00	0.00	0.00	0.00
8.60	11.23	0.00	2.00	0.00	0.00	0.00
8.62	11.38	0.00	2.00	0.00	0.00	0.00
8.64	11.48	0.00	2.00	0.00	0.00	0.00
8.66	11.15	0.00	2.00	0.00	0.00	0.00
8.68	11.25	0.00	2.00	0.00	0.00	0.00
8.70	11.21	0.00	2.00	0.00	0.00	0.00
8.72	11.12	0.00	2.00	0.00	0.00	0.00
8.74	10.99	0.00	2.00	0.00	0.00	0.00
8.76	11.02	0.00	2.00	0.00	0.00	0.00
8.78	11.44	0.00	2.00	0.00	0.00	0.00
8.80	12.46	0.00	2.00	0.00	0.00	0.00
8.82	13.40	0.00	2.00	0.00	0.00	0.00
8.84	14.81	0.00	2.00	0.00	0.00	0.00
8.86	15.70	0.00	2.00	0.00	0.00	0.00
8.88	15.92	0.00	2.00	0.00	0.00	0.00
8.90	13.44	0.00	2.00	0.00	0.00	0.00
8.92	15.38	0.00	2.00	0.00	0.00	0.00
8.94	14.79	0.00	2.00	0.00	0.00	0.00
8.96	14.18	0.00	2.00	0.00	0.00	0.00
8.98	13.74	0.00	2.00	0.00	0.00	0.00
9.00	13.52	0.00	2.00	0.00	0.00	0.00
9.02	13.40	0.00	2.00	0.00	0.00	0.00
9.04	13.50	0.00	2.00	0.00	0.00	0.00
9.06	13.60	0.00	2.00	0.00	0.00	0.00
9.08	13.86	0.00	2.00	0.00	0.00	0.00
9.10	13.65	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	$q_{c1N,cs}$	Γ_{lim} (%)	FS	Fa	Γ_{max} (%)	LDI
9.12	13.25	0.00	2.00	0.00	0.00	0.00
9.14	12.89	0.00	2.00	0.00	0.00	0.00
9.16	12.68	0.00	2.00	0.00	0.00	0.00
9.18	12.20	0.00	2.00	0.00	0.00	0.00
9.20	11.80	0.00	2.00	0.00	0.00	0.00
9.22	11.43	0.00	2.00	0.00	0.00	0.00
9.24	11.22	0.00	2.00	0.00	0.00	0.00
9.26	10.79	0.00	2.00	0.00	0.00	0.00
9.28	10.77	0.00	2.00	0.00	0.00	0.00
9.30	10.19	0.00	2.00	0.00	0.00	0.00
9.32	10.21	0.00	2.00	0.00	0.00	0.00
9.34	10.31	0.00	2.00	0.00	0.00	0.00
9.36	10.03	0.00	2.00	0.00	0.00	0.00
9.38	9.67	0.00	2.00	0.00	0.00	0.00
9.40	9.28	0.00	2.00	0.00	0.00	0.00
9.42	9.12	0.00	2.00	0.00	0.00	0.00
9.44	8.57	0.00	2.00	0.00	0.00	0.00
9.46	8.52	0.00	2.00	0.00	0.00	0.00
9.48	8.51	0.00	2.00	0.00	0.00	0.00
9.50	9.00	0.00	2.00	0.00	0.00	0.00
9.52	9.31	0.00	2.00	0.00	0.00	0.00
9.54	10.22	0.00	2.00	0.00	0.00	0.00
9.56	10.51	0.00	2.00	0.00	0.00	0.00
9.58	10.77	0.00	2.00	0.00	0.00	0.00
9.60	10.95	0.00	2.00	0.00	0.00	0.00
9.62	10.65	0.00	2.00	0.00	0.00	0.00
9.64	10.49	0.00	2.00	0.00	0.00	0.00
9.66	9.94	0.00	2.00	0.00	0.00	0.00
9.68	9.79	0.00	2.00	0.00	0.00	0.00
9.70	9.66	0.00	2.00	0.00	0.00	0.00
9.72	9.55	0.00	2.00	0.00	0.00	0.00
9.74	8.78	0.00	2.00	0.00	0.00	0.00
9.76	8.54	0.00	2.00	0.00	0.00	0.00
9.78	8.46	0.00	2.00	0.00	0.00	0.00
9.80	8.84	0.00	2.00	0.00	0.00	0.00
9.82	9.21	0.00	2.00	0.00	0.00	0.00
9.84	9.89	0.00	2.00	0.00	0.00	0.00
9.86	10.18	0.00	2.00	0.00	0.00	0.00
9.88	10.55	0.00	2.00	0.00	0.00	0.00
9.90	13.36	0.00	2.00	0.00	0.00	0.00
9.92	13.23	0.00	2.00	0.00	0.00	0.00
9.94	13.04	0.00	2.00	0.00	0.00	0.00
9.96	12.65	0.00	2.00	0.00	0.00	0.00
9.98	12.16	0.00	2.00	0.00	0.00	0.00
10.00	11.24	0.00	2.00	0.00	0.00	0.00
10.02	10.78	0.00	2.00	0.00	0.00	0.00
10.04	10.81	0.00	2.00	0.00	0.00	0.00
10.06	11.07	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
10.08	10.65	0.00	2.00	0.00	0.00	0.00
10.10	10.29	0.00	2.00	0.00	0.00	0.00
10.12	9.80	0.00	2.00	0.00	0.00	0.00
10.14	9.08	0.00	2.00	0.00	0.00	0.00
10.16	8.67	0.00	2.00	0.00	0.00	0.00
10.18	9.07	0.00	2.00	0.00	0.00	0.00
10.20	9.77	0.00	2.00	0.00	0.00	0.00
10.22	11.06	0.00	2.00	0.00	0.00	0.00
10.24	12.65	0.00	2.00	0.00	0.00	0.00
10.26	13.83	0.00	2.00	0.00	0.00	0.00
10.28	14.15	0.00	2.00	0.00	0.00	0.00
10.30	14.09	0.00	2.00	0.00	0.00	0.00
10.32	13.49	0.00	2.00	0.00	0.00	0.00
10.34	13.03	0.00	2.00	0.00	0.00	0.00
10.36	12.99	0.00	2.00	0.00	0.00	0.00
10.38	13.30	0.00	2.00	0.00	0.00	0.00
10.40	13.69	0.00	2.00	0.00	0.00	0.00
10.42	14.05	0.00	2.00	0.00	0.00	0.00
10.44	14.51	0.00	2.00	0.00	0.00	0.00
10.46	14.50	0.00	2.00	0.00	0.00	0.00
10.48	14.99	0.00	2.00	0.00	0.00	0.00
10.50	14.97	0.00	2.00	0.00	0.00	0.00
10.52	15.29	0.00	2.00	0.00	0.00	0.00
10.54	15.71	0.00	2.00	0.00	0.00	0.00
10.56	16.06	0.00	2.00	0.00	0.00	0.00
10.58	15.89	0.00	2.00	0.00	0.00	0.00
10.60	16.16	0.00	2.00	0.00	0.00	0.00
10.62	16.50	0.00	2.00	0.00	0.00	0.00
10.64	16.74	0.00	2.00	0.00	0.00	0.00
10.66	16.09	0.00	2.00	0.00	0.00	0.00
10.68	15.97	0.00	2.00	0.00	0.00	0.00
10.70	15.33	0.00	2.00	0.00	0.00	0.00
10.72	14.91	0.00	2.00	0.00	0.00	0.00
10.74	15.00	0.00	2.00	0.00	0.00	0.00
10.76	15.19	0.00	2.00	0.00	0.00	0.00
10.78	15.28	0.00	2.00	0.00	0.00	0.00
10.80	14.82	0.00	2.00	0.00	0.00	0.00
10.82	15.20	0.00	2.00	0.00	0.00	0.00
10.84	15.39	0.00	2.00	0.00	0.00	0.00
10.86	15.73	0.00	2.00	0.00	0.00	0.00
10.88	16.00	0.00	2.00	0.00	0.00	0.00
10.90	15.99	0.00	2.00	0.00	0.00	0.00
10.92	17.47	0.00	2.00	0.00	0.00	0.00
10.94	17.14	0.00	2.00	0.00	0.00	0.00
10.96	16.98	0.00	2.00	0.00	0.00	0.00
10.98	17.00	0.00	2.00	0.00	0.00	0.00
11.00	16.74	0.00	2.00	0.00	0.00	0.00
11.02	17.36	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
11.04	17.92	0.00	2.00	0.00	0.00	0.00
11.06	17.40	0.00	2.00	0.00	0.00	0.00
11.08	16.62	0.00	2.00	0.00	0.00	0.00
11.10	15.54	0.00	2.00	0.00	0.00	0.00
11.12	15.20	0.00	2.00	0.00	0.00	0.00
11.14	15.18	0.00	2.00	0.00	0.00	0.00
11.16	14.31	0.00	2.00	0.00	0.00	0.00
11.18	14.43	0.00	2.00	0.00	0.00	0.00
11.20	15.20	0.00	2.00	0.00	0.00	0.00
11.22	15.39	0.00	2.00	0.00	0.00	0.00
11.24	15.75	0.00	2.00	0.00	0.00	0.00
11.26	16.41	0.00	2.00	0.00	0.00	0.00
11.28	16.03	0.00	2.00	0.00	0.00	0.00
11.30	15.62	0.00	2.00	0.00	0.00	0.00
11.32	14.98	0.00	2.00	0.00	0.00	0.00
11.34	13.67	0.00	2.00	0.00	0.00	0.00
11.36	13.62	0.00	2.00	0.00	0.00	0.00
11.38	13.68	0.00	2.00	0.00	0.00	0.00
11.40	13.49	0.00	2.00	0.00	0.00	0.00
11.42	13.72	0.00	2.00	0.00	0.00	0.00
11.44	13.63	0.00	2.00	0.00	0.00	0.00
11.46	13.54	0.00	2.00	0.00	0.00	0.00
11.48	14.41	0.00	2.00	0.00	0.00	0.00
11.50	14.99	0.00	2.00	0.00	0.00	0.00
11.52	15.18	0.00	2.00	0.00	0.00	0.00
11.54	15.10	0.00	2.00	0.00	0.00	0.00
11.56	14.67	0.00	2.00	0.00	0.00	0.00
11.58	14.79	0.00	2.00	0.00	0.00	0.00
11.60	14.78	0.00	2.00	0.00	0.00	0.00
11.62	15.08	0.00	2.00	0.00	0.00	0.00
11.64	15.27	0.00	2.00	0.00	0.00	0.00
11.66	15.75	0.00	2.00	0.00	0.00	0.00
11.68	15.94	0.00	2.00	0.00	0.00	0.00
11.70	15.41	0.00	2.00	0.00	0.00	0.00
11.72	15.36	0.00	2.00	0.00	0.00	0.00
11.74	15.28	0.00	2.00	0.00	0.00	0.00
11.76	14.82	0.00	2.00	0.00	0.00	0.00
11.78	13.90	0.00	2.00	0.00	0.00	0.00
11.80	13.92	0.00	2.00	0.00	0.00	0.00
11.82	13.73	0.00	2.00	0.00	0.00	0.00
11.84	13.72	0.00	2.00	0.00	0.00	0.00
11.86	13.95	0.00	2.00	0.00	0.00	0.00
11.88	14.31	0.00	2.00	0.00	0.00	0.00
11.90	14.55	0.00	2.00	0.00	0.00	0.00
11.92	14.91	0.00	2.00	0.00	0.00	0.00
11.94	14.51	0.00	2.00	0.00	0.00	0.00
11.96	14.98	0.00	2.00	0.00	0.00	0.00
11.98	14.80	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	$q_{c1N,cs}$	Gamma_{lim} (%)	FS	Fa	Gamma_{max} (%)	LDI
12.00	14.89	0.00	2.00	0.00	0.00	0.00
12.02	14.78	0.00	2.00	0.00	0.00	0.00
12.04	15.38	0.00	2.00	0.00	0.00	0.00
12.06	15.57	0.00	2.00	0.00	0.00	0.00
12.08	16.04	0.00	2.00	0.00	0.00	0.00
12.10	16.30	0.00	2.00	0.00	0.00	0.00
12.12	16.42	0.00	2.00	0.00	0.00	0.00
12.14	16.13	0.00	2.00	0.00	0.00	0.00
12.16	15.63	0.00	2.00	0.00	0.00	0.00
12.18	15.45	0.00	2.00	0.00	0.00	0.00
12.20	14.78	0.00	2.00	0.00	0.00	0.00
12.22	14.69	0.00	2.00	0.00	0.00	0.00
12.24	14.61	0.00	2.00	0.00	0.00	0.00
12.26	14.35	0.00	2.00	0.00	0.00	0.00
12.28	13.62	0.00	2.00	0.00	0.00	0.00
12.30	13.33	0.00	2.00	0.00	0.00	0.00
12.32	12.73	0.00	2.00	0.00	0.00	0.00
12.34	12.38	0.00	2.00	0.00	0.00	0.00
12.36	12.22	0.00	2.00	0.00	0.00	0.00
12.38	11.76	0.00	2.00	0.00	0.00	0.00
12.40	11.58	0.00	2.00	0.00	0.00	0.00
12.42	11.29	0.00	2.00	0.00	0.00	0.00
12.44	11.45	0.00	2.00	0.00	0.00	0.00
12.46	11.64	0.00	2.00	0.00	0.00	0.00
12.48	11.55	0.00	2.00	0.00	0.00	0.00
12.50	11.51	0.00	2.00	0.00	0.00	0.00
12.52	12.00	0.00	2.00	0.00	0.00	0.00
12.54	12.15	0.00	2.00	0.00	0.00	0.00
12.56	12.44	0.00	2.00	0.00	0.00	0.00
12.58	12.16	0.00	2.00	0.00	0.00	0.00
12.60	11.94	0.00	2.00	0.00	0.00	0.00
12.62	11.53	0.00	2.00	0.00	0.00	0.00
12.64	11.11	0.00	2.00	0.00	0.00	0.00
12.66	10.60	0.00	2.00	0.00	0.00	0.00
12.68	10.05	0.00	2.00	0.00	0.00	0.00
12.70	9.58	0.00	2.00	0.00	0.00	0.00
12.72	8.89	0.00	2.00	0.00	0.00	0.00
12.74	8.48	0.00	2.00	0.00	0.00	0.00
12.76	8.05	0.00	2.00	0.00	0.00	0.00
12.78	7.98	0.00	2.00	0.00	0.00	0.00
12.80	7.76	0.00	2.00	0.00	0.00	0.00
12.82	7.12	0.00	2.00	0.00	0.00	0.00
12.84	6.76	0.00	2.00	0.00	0.00	0.00
12.86	6.65	0.00	2.00	0.00	0.00	0.00
12.88	6.68	0.00	2.00	0.00	0.00	0.00
12.90	6.84	0.00	2.00	0.00	0.00	0.00
12.92	7.18	0.00	2.00	0.00	0.00	0.00
12.94	7.21	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	$q_{c1N,cs}$	Γ_{lim} (%)	FS	Fa	Γ_{max} (%)	LDI
12.96	8.82	0.00	2.00	0.00	0.00	0.00
12.98	7.95	0.00	2.00	0.00	0.00	0.00
13.00	7.88	0.00	2.00	0.00	0.00	0.00
13.02	9.10	0.00	2.00	0.00	0.00	0.00
13.04	10.99	0.00	2.00	0.00	0.00	0.00
13.06	12.50	0.00	2.00	0.00	0.00	0.00
13.08	12.56	0.00	2.00	0.00	0.00	0.00
13.10	12.48	0.00	2.00	0.00	0.00	0.00
13.12	12.51	0.00	2.00	0.00	0.00	0.00
13.14	11.49	0.00	2.00	0.00	0.00	0.00
13.16	10.75	0.00	2.00	0.00	0.00	0.00
13.18	9.20	0.00	2.00	0.00	0.00	0.00
13.20	8.30	0.00	2.00	0.00	0.00	0.00
13.22	8.06	0.00	2.00	0.00	0.00	0.00
13.24	8.16	0.00	2.00	0.00	0.00	0.00
13.26	8.02	0.00	2.00	0.00	0.00	0.00
13.28	8.02	0.00	2.00	0.00	0.00	0.00
13.30	7.91	0.00	2.00	0.00	0.00	0.00
13.32	8.34	0.00	2.00	0.00	0.00	0.00
13.34	8.75	0.00	2.00	0.00	0.00	0.00
13.36	9.11	0.00	2.00	0.00	0.00	0.00
13.38	9.10	0.00	2.00	0.00	0.00	0.00
13.40	8.97	0.00	2.00	0.00	0.00	0.00
13.42	8.96	0.00	2.00	0.00	0.00	0.00
13.44	9.06	0.00	2.00	0.00	0.00	0.00
13.46	9.28	0.00	2.00	0.00	0.00	0.00
13.48	9.37	0.00	2.00	0.00	0.00	0.00
13.50	9.18	0.00	2.00	0.00	0.00	0.00
13.52	9.69	0.00	2.00	0.00	0.00	0.00
13.54	10.23	0.00	2.00	0.00	0.00	0.00
13.56	11.24	0.00	2.00	0.00	0.00	0.00
13.58	12.37	0.00	2.00	0.00	0.00	0.00
13.60	13.11	0.00	2.00	0.00	0.00	0.00
13.62	13.96	0.00	2.00	0.00	0.00	0.00
13.64	14.24	0.00	2.00	0.00	0.00	0.00
13.66	14.66	0.00	2.00	0.00	0.00	0.00
13.68	15.24	0.00	2.00	0.00	0.00	0.00
13.70	14.77	0.00	2.00	0.00	0.00	0.00
13.72	14.86	0.00	2.00	0.00	0.00	0.00
13.74	14.82	0.00	2.00	0.00	0.00	0.00
13.76	14.49	0.00	2.00	0.00	0.00	0.00
13.78	13.60	0.00	2.00	0.00	0.00	0.00
13.80	12.77	0.00	2.00	0.00	0.00	0.00
13.82	11.83	0.00	2.00	0.00	0.00	0.00
13.84	11.04	0.00	2.00	0.00	0.00	0.00
13.86	10.51	0.00	2.00	0.00	0.00	0.00
13.88	10.14	0.00	2.00	0.00	0.00	0.00
13.90	10.14	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
13.92	9.80	0.00	2.00	0.00	0.00	0.00
13.94	8.82	0.00	2.00	0.00	0.00	0.00
13.96	9.33	0.00	2.00	0.00	0.00	0.00
13.98	9.61	0.00	2.00	0.00	0.00	0.00
14.00	9.89	0.00	2.00	0.00	0.00	0.00
14.02	10.60	0.00	2.00	0.00	0.00	0.00
14.04	11.45	0.00	2.00	0.00	0.00	0.00
14.06	12.73	0.00	2.00	0.00	0.00	0.00
14.08	13.40	0.00	2.00	0.00	0.00	0.00
14.10	13.93	0.00	2.00	0.00	0.00	0.00
14.12	14.37	0.00	2.00	0.00	0.00	0.00
14.14	13.98	0.00	2.00	0.00	0.00	0.00
14.16	13.39	0.00	2.00	0.00	0.00	0.00
14.18	12.93	0.00	2.00	0.00	0.00	0.00
14.20	12.53	0.00	2.00	0.00	0.00	0.00
14.22	12.08	0.00	2.00	0.00	0.00	0.00
14.24	11.90	0.00	2.00	0.00	0.00	0.00
14.26	11.73	0.00	2.00	0.00	0.00	0.00
14.28	11.27	0.00	2.00	0.00	0.00	0.00
14.30	11.13	0.00	2.00	0.00	0.00	0.00
14.32	11.02	0.00	2.00	0.00	0.00	0.00
14.34	11.08	0.00	2.00	0.00	0.00	0.00
14.36	11.16	0.00	2.00	0.00	0.00	0.00
14.38	11.09	0.00	2.00	0.00	0.00	0.00
14.40	11.17	0.00	2.00	0.00	0.00	0.00
14.42	11.31	0.00	2.00	0.00	0.00	0.00
14.44	11.45	0.00	2.00	0.00	0.00	0.00
14.46	11.54	0.00	2.00	0.00	0.00	0.00
14.48	11.08	0.00	2.00	0.00	0.00	0.00
14.50	10.35	0.00	2.00	0.00	0.00	0.00
14.52	10.27	0.00	2.00	0.00	0.00	0.00
14.54	9.94	0.00	2.00	0.00	0.00	0.00
14.56	9.74	0.00	2.00	0.00	0.00	0.00
14.58	9.39	0.00	2.00	0.00	0.00	0.00
14.60	9.03	0.00	2.00	0.00	0.00	0.00
14.62	8.81	0.00	2.00	0.00	0.00	0.00
14.64	8.92	0.00	2.00	0.00	0.00	0.00
14.66	8.57	0.00	2.00	0.00	0.00	0.00
14.68	8.41	0.00	2.00	0.00	0.00	0.00
14.70	7.87	0.00	2.00	0.00	0.00	0.00
14.72	7.77	0.00	2.00	0.00	0.00	0.00
14.74	7.64	0.00	2.00	0.00	0.00	0.00
14.76	7.70	0.00	2.00	0.00	0.00	0.00
14.78	7.60	0.00	2.00	0.00	0.00	0.00
14.80	7.28	0.00	2.00	0.00	0.00	0.00
14.82	7.21	0.00	2.00	0.00	0.00	0.00
14.84	7.21	0.00	2.00	0.00	0.00	0.00
14.86	7.27	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
14.88	7.08	0.00	2.00	0.00	0.00	0.00
14.90	6.83	0.00	2.00	0.00	0.00	0.00
14.92	6.89	0.00	2.00	0.00	0.00	0.00
14.94	8.37	0.00	2.00	0.00	0.00	0.00
14.96	8.68	0.00	2.00	0.00	0.00	0.00
14.98	8.05	0.00	2.00	0.00	0.00	0.00
15.00	7.55	0.00	2.00	0.00	0.00	0.00
15.02	7.20	0.00	2.00	0.00	0.00	0.00
15.04	7.08	0.00	2.00	0.00	0.00	0.00
15.06	7.07	0.00	2.00	0.00	0.00	0.00
15.08	7.07	0.00	2.00	0.00	0.00	0.00
15.10	7.25	0.00	2.00	0.00	0.00	0.00
15.12	7.34	0.00	2.00	0.00	0.00	0.00
15.14	7.34	0.00	2.00	0.00	0.00	0.00
15.16	7.30	0.00	2.00	0.00	0.00	0.00
15.18	7.29	0.00	2.00	0.00	0.00	0.00
15.20	7.23	0.00	2.00	0.00	0.00	0.00
15.22	7.38	0.00	2.00	0.00	0.00	0.00
15.24	7.53	0.00	2.00	0.00	0.00	0.00
15.26	7.62	0.00	2.00	0.00	0.00	0.00
15.28	7.92	0.00	2.00	0.00	0.00	0.00
15.30	8.13	0.00	2.00	0.00	0.00	0.00
15.32	8.38	0.00	2.00	0.00	0.00	0.00
15.34	8.53	0.00	2.00	0.00	0.00	0.00
15.36	8.89	0.00	2.00	0.00	0.00	0.00
15.38	9.17	0.00	2.00	0.00	0.00	0.00
15.40	9.35	0.00	2.00	0.00	0.00	0.00
15.42	9.34	0.00	2.00	0.00	0.00	0.00
15.44	9.43	0.00	2.00	0.00	0.00	0.00
15.46	10.04	0.00	2.00	0.00	0.00	0.00
15.48	10.31	0.00	2.00	0.00	0.00	0.00
15.50	10.52	0.00	2.00	0.00	0.00	0.00
15.52	10.82	0.00	2.00	0.00	0.00	0.00
15.54	12.01	0.00	2.00	0.00	0.00	0.00
15.56	12.49	0.00	2.00	0.00	0.00	0.00
15.58	13.35	0.00	2.00	0.00	0.00	0.00
15.60	14.30	0.00	2.00	0.00	0.00	0.00
15.62	17.37	0.00	2.00	0.00	0.00	0.00
15.64	19.07	0.00	2.00	0.00	0.00	0.00
15.66	18.01	0.00	2.00	0.00	0.00	0.00
15.68	16.42	0.00	2.00	0.00	0.00	0.00
15.70	16.44	0.00	2.00	0.00	0.00	0.00
15.72	18.53	0.00	2.00	0.00	0.00	0.00
15.74	20.15	0.00	2.00	0.00	0.00	0.00
15.76	18.65	0.00	2.00	0.00	0.00	0.00
15.78	17.60	0.00	2.00	0.00	0.00	0.00
15.80	17.65	0.00	2.00	0.00	0.00	0.00
15.82	17.51	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
15.84	16.85	0.00	2.00	0.00	0.00	0.00
15.86	16.68	0.00	2.00	0.00	0.00	0.00
15.88	17.59	0.00	2.00	0.00	0.00	0.00
15.90	19.72	0.00	2.00	0.00	0.00	0.00
15.92	21.47	0.00	2.00	0.00	0.00	0.00
15.94	16.28	0.00	2.00	0.00	0.00	0.00
15.96	27.80	0.00	2.00	0.00	0.00	0.00
15.98	26.04	0.00	2.00	0.00	0.00	0.00
16.00	22.48	0.00	2.00	0.00	0.00	0.00
16.02	18.08	0.00	2.00	0.00	0.00	0.00
16.04	15.62	0.00	2.00	0.00	0.00	0.00
16.06	13.87	0.00	2.00	0.00	0.00	0.00
16.08	13.71	0.00	2.00	0.00	0.00	0.00
16.10	14.96	0.00	2.00	0.00	0.00	0.00
16.12	15.86	0.00	2.00	0.00	0.00	0.00
16.14	18.46	0.00	2.00	0.00	0.00	0.00
16.16	20.22	0.00	2.00	0.00	0.00	0.00
16.18	18.96	0.00	2.00	0.00	0.00	0.00
16.20	16.96	0.00	2.00	0.00	0.00	0.00
16.22	17.13	0.00	2.00	0.00	0.00	0.00
16.24	18.52	0.00	2.00	0.00	0.00	0.00
16.26	21.00	0.00	2.00	0.00	0.00	0.00
16.28	22.08	0.00	2.00	0.00	0.00	0.00
16.30	21.46	0.00	2.00	0.00	0.00	0.00
16.32	19.19	0.00	2.00	0.00	0.00	0.00
16.34	17.02	0.00	2.00	0.00	0.00	0.00
16.36	14.41	0.00	2.00	0.00	0.00	0.00
16.38	14.04	0.00	2.00	0.00	0.00	0.00
16.40	13.63	0.00	2.00	0.00	0.00	0.00
16.42	14.13	0.00	2.00	0.00	0.00	0.00
16.44	14.14	0.00	2.00	0.00	0.00	0.00
16.46	13.68	0.00	2.00	0.00	0.00	0.00
16.48	13.04	0.00	2.00	0.00	0.00	0.00
16.50	12.85	0.00	2.00	0.00	0.00	0.00
16.52	12.75	0.00	2.00	0.00	0.00	0.00
16.54	12.59	0.00	2.00	0.00	0.00	0.00
16.56	12.58	0.00	2.00	0.00	0.00	0.00
16.58	12.63	0.00	2.00	0.00	0.00	0.00
16.60	13.01	0.00	2.00	0.00	0.00	0.00
16.62	15.98	0.00	2.00	0.00	0.00	0.00
16.64	77.93	0.52	2.00	0.92	0.00	0.00
16.66	81.46	0.48	2.00	0.91	0.00	0.00
16.68	82.82	0.46	2.00	0.90	0.00	0.00
16.70	20.55	0.00	2.00	0.00	0.00	0.00
16.72	16.57	0.00	2.00	0.00	0.00	0.00
16.74	13.55	0.00	2.00	0.00	0.00	0.00
16.76	11.49	0.00	2.00	0.00	0.00	0.00
16.78	11.15	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
16.80	11.30	0.00	2.00	0.00	0.00	0.00
16.82	11.38	0.00	2.00	0.00	0.00	0.00
16.84	11.25	0.00	2.00	0.00	0.00	0.00
16.86	11.63	0.00	2.00	0.00	0.00	0.00
16.88	12.86	0.00	2.00	0.00	0.00	0.00
16.90	14.90	0.00	2.00	0.00	0.00	0.00
16.92	13.74	0.00	2.00	0.00	0.00	0.00
16.94	13.80	0.00	2.00	0.00	0.00	0.00
16.96	14.92	0.00	2.00	0.00	0.00	0.00
16.98	16.72	0.00	2.00	0.00	0.00	0.00
17.00	17.46	0.00	2.00	0.00	0.00	0.00
17.02	17.47	0.00	2.00	0.00	0.00	0.00
17.04	16.22	0.00	2.00	0.00	0.00	0.00
17.06	15.58	0.00	2.00	0.00	0.00	0.00
17.08	15.43	0.00	2.00	0.00	0.00	0.00
17.10	14.41	0.00	2.00	0.00	0.00	0.00
17.12	13.63	0.00	2.00	0.00	0.00	0.00
17.14	13.97	0.00	2.00	0.00	0.00	0.00
17.16	15.50	0.00	2.00	0.00	0.00	0.00
17.18	15.78	0.00	2.00	0.00	0.00	0.00
17.20	13.50	0.00	2.00	0.00	0.00	0.00
17.22	11.81	0.00	2.00	0.00	0.00	0.00
17.24	11.16	0.00	2.00	0.00	0.00	0.00
17.26	11.56	0.00	2.00	0.00	0.00	0.00
17.28	12.11	0.00	2.00	0.00	0.00	0.00
17.30	11.34	0.00	2.00	0.00	0.00	0.00
17.32	10.51	0.00	2.00	0.00	0.00	0.00
17.34	9.54	0.00	2.00	0.00	0.00	0.00
17.36	9.19	0.00	2.00	0.00	0.00	0.00
17.38	9.00	0.00	2.00	0.00	0.00	0.00
17.40	8.97	0.00	2.00	0.00	0.00	0.00
17.42	9.48	0.00	2.00	0.00	0.00	0.00
17.44	10.14	0.00	2.00	0.00	0.00	0.00
17.46	10.25	0.00	2.00	0.00	0.00	0.00
17.48	10.45	0.00	2.00	0.00	0.00	0.00
17.50	10.99	0.00	2.00	0.00	0.00	0.00
17.52	11.54	0.00	2.00	0.00	0.00	0.00
17.54	11.06	0.00	2.00	0.00	0.00	0.00
17.56	10.63	0.00	2.00	0.00	0.00	0.00
17.58	10.45	0.00	2.00	0.00	0.00	0.00
17.60	10.50	0.00	2.00	0.00	0.00	0.00
17.62	10.09	0.00	2.00	0.00	0.00	0.00
17.64	9.79	0.00	2.00	0.00	0.00	0.00
17.66	9.82	0.00	2.00	0.00	0.00	0.00
17.68	10.57	0.00	2.00	0.00	0.00	0.00
17.70	11.72	0.00	2.00	0.00	0.00	0.00
17.72	11.54	0.00	2.00	0.00	0.00	0.00
17.74	10.61	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
17.76	10.43	0.00	2.00	0.00	0.00	0.00
17.78	11.09	0.00	2.00	0.00	0.00	0.00
17.80	12.57	0.00	2.00	0.00	0.00	0.00
17.82	18.27	0.00	2.00	0.00	0.00	0.00
17.84	81.67	0.48	2.00	0.91	0.00	0.00
17.86	81.42	0.48	2.00	0.91	0.00	0.00
17.88	81.80	0.47	0.65	0.91	0.47	0.95
17.90	80.44	0.49	2.00	0.92	0.00	0.00
17.92	81.41	0.48	2.00	0.91	0.00	0.00
17.94	21.79	0.00	2.00	0.00	0.00	0.00
17.96	16.86	0.00	2.00	0.00	0.00	0.00
17.98	14.24	0.00	2.00	0.00	0.00	0.00
18.00	12.79	0.00	2.00	0.00	0.00	0.00
18.02	14.89	0.00	2.00	0.00	0.00	0.00
18.04	17.94	0.00	2.00	0.00	0.00	0.00
18.06	21.36	0.00	2.00	0.00	0.00	0.00
18.08	21.11	0.00	2.00	0.00	0.00	0.00
18.10	18.14	0.00	2.00	0.00	0.00	0.00
18.12	13.91	0.00	2.00	0.00	0.00	0.00
18.14	13.05	0.00	2.00	0.00	0.00	0.00
18.16	12.11	0.00	2.00	0.00	0.00	0.00
18.18	12.45	0.00	2.00	0.00	0.00	0.00
18.20	12.96	0.00	2.00	0.00	0.00	0.00
18.22	14.26	0.00	2.00	0.00	0.00	0.00
18.24	15.62	0.00	2.00	0.00	0.00	0.00
18.26	17.73	0.00	2.00	0.00	0.00	0.00
18.28	20.23	0.00	2.00	0.00	0.00	0.00
18.30	23.24	0.00	2.00	0.00	0.00	0.00
18.32	27.15	0.00	2.00	0.00	0.00	0.00
18.34	27.90	0.00	2.00	0.00	0.00	0.00
18.36	28.06	0.00	2.00	0.00	0.00	0.00
18.38	27.96	0.00	2.00	0.00	0.00	0.00
18.40	26.23	0.00	2.00	0.00	0.00	0.00
18.42	25.63	0.00	2.00	0.00	0.00	0.00
18.44	24.62	0.00	2.00	0.00	0.00	0.00
18.46	23.33	0.00	2.00	0.00	0.00	0.00
18.48	22.69	0.00	2.00	0.00	0.00	0.00
18.50	24.65	0.00	2.00	0.00	0.00	0.00
18.52	27.28	0.00	2.00	0.00	0.00	0.00
18.54	29.01	0.00	2.00	0.00	0.00	0.00
18.56	29.96	0.00	2.00	0.00	0.00	0.00
18.58	28.67	0.00	2.00	0.00	0.00	0.00
18.60	26.52	0.00	2.00	0.00	0.00	0.00
18.62	23.68	0.00	2.00	0.00	0.00	0.00
18.64	22.30	0.00	2.00	0.00	0.00	0.00
18.66	22.22	0.00	2.00	0.00	0.00	0.00
18.68	23.36	0.00	2.00	0.00	0.00	0.00
18.70	23.67	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
18.72	20.68	0.00	2.00	0.00	0.00	0.00
18.74	16.37	0.00	2.00	0.00	0.00	0.00
18.76	13.06	0.00	2.00	0.00	0.00	0.00
18.78	12.40	0.00	2.00	0.00	0.00	0.00
18.80	13.96	0.00	2.00	0.00	0.00	0.00
18.82	19.80	0.00	2.00	0.00	0.00	0.00
18.84	20.78	0.00	2.00	0.00	0.00	0.00
18.86	16.71	0.00	2.00	0.00	0.00	0.00
18.88	13.32	0.00	2.00	0.00	0.00	0.00
18.90	10.92	0.00	2.00	0.00	0.00	0.00
18.92	11.04	0.00	2.00	0.00	0.00	0.00
18.94	11.06	0.00	2.00	0.00	0.00	0.00
18.96	11.86	0.00	2.00	0.00	0.00	0.00
18.98	13.51	0.00	2.00	0.00	0.00	0.00
19.00	11.18	0.00	2.00	0.00	0.00	0.00
19.02	9.47	0.00	2.00	0.00	0.00	0.00
19.04	8.89	0.00	2.00	0.00	0.00	0.00
19.06	7.94	0.00	2.00	0.00	0.00	0.00
19.08	7.50	0.00	2.00	0.00	0.00	0.00
19.10	7.20	0.00	2.00	0.00	0.00	0.00
19.12	7.58	0.00	2.00	0.00	0.00	0.00
19.14	8.87	0.00	2.00	0.00	0.00	0.00
19.16	9.97	0.00	2.00	0.00	0.00	0.00
19.18	10.88	0.00	2.00	0.00	0.00	0.00
19.20	10.88	0.00	2.00	0.00	0.00	0.00
19.22	10.32	0.00	2.00	0.00	0.00	0.00
19.24	10.15	0.00	2.00	0.00	0.00	0.00
19.26	10.40	0.00	2.00	0.00	0.00	0.00
19.28	10.62	0.00	2.00	0.00	0.00	0.00
19.30	9.45	0.00	2.00	0.00	0.00	0.00
19.32	8.67	0.00	2.00	0.00	0.00	0.00
19.34	8.18	0.00	2.00	0.00	0.00	0.00
19.36	8.34	0.00	2.00	0.00	0.00	0.00
19.38	8.67	0.00	2.00	0.00	0.00	0.00
19.40	9.27	0.00	2.00	0.00	0.00	0.00
19.42	9.76	0.00	2.00	0.00	0.00	0.00
19.44	9.92	0.00	2.00	0.00	0.00	0.00
19.46	10.00	0.00	2.00	0.00	0.00	0.00
19.48	10.61	0.00	2.00	0.00	0.00	0.00
19.50	11.34	0.00	2.00	0.00	0.00	0.00
19.52	11.72	0.00	2.00	0.00	0.00	0.00
19.54	12.08	0.00	2.00	0.00	0.00	0.00
19.56	12.35	0.00	2.00	0.00	0.00	0.00
19.58	12.29	0.00	2.00	0.00	0.00	0.00
19.60	11.99	0.00	2.00	0.00	0.00	0.00
19.62	11.52	0.00	2.00	0.00	0.00	0.00
19.64	10.82	0.00	2.00	0.00	0.00	0.00
19.66	10.87	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	$q_{c1N,cs}$	Gamma_{lim} (%)	FS	Fa	Gamma_{max} (%)	LDI
19.68	10.60	0.00	2.00	0.00	0.00	0.00
19.70	10.37	0.00	2.00	0.00	0.00	0.00
19.72	10.09	0.00	2.00	0.00	0.00	0.00
19.74	10.01	0.00	2.00	0.00	0.00	0.00
19.76	10.19	0.00	2.00	0.00	0.00	0.00
19.78	10.43	0.00	2.00	0.00	0.00	0.00
19.80	10.99	0.00	2.00	0.00	0.00	0.00
19.82	11.34	0.00	2.00	0.00	0.00	0.00
19.84	11.88	0.00	2.00	0.00	0.00	0.00
19.86	12.64	0.00	2.00	0.00	0.00	0.00
19.88	13.10	0.00	2.00	0.00	0.00	0.00
19.90	13.42	0.00	2.00	0.00	0.00	0.00
19.92	9.42	0.00	2.00	0.00	0.00	0.00
19.94	9.90	0.00	2.00	0.00	0.00	0.00
19.96	10.17	0.00	2.00	0.00	0.00	0.00
19.98	10.03	0.00	2.00	0.00	0.00	0.00
20.00	10.00	0.00	2.00	0.00	0.00	0.00

Total estimated displacement: 20.94**Abbreviations**

Depth: Depth of test point
 $q_{c1N,cs}$: Adjusted and corrected cone resistance due to fines
 Gamma_{lim} : Limiting shear strain
FS: Calculated factor of safety against liquefaction
Fa:
 Gamma_{max} : Maximum cyclic shear strain
Lat. disp.: Lateral displacement

LIQUEFACTION ANALYSIS REPORT

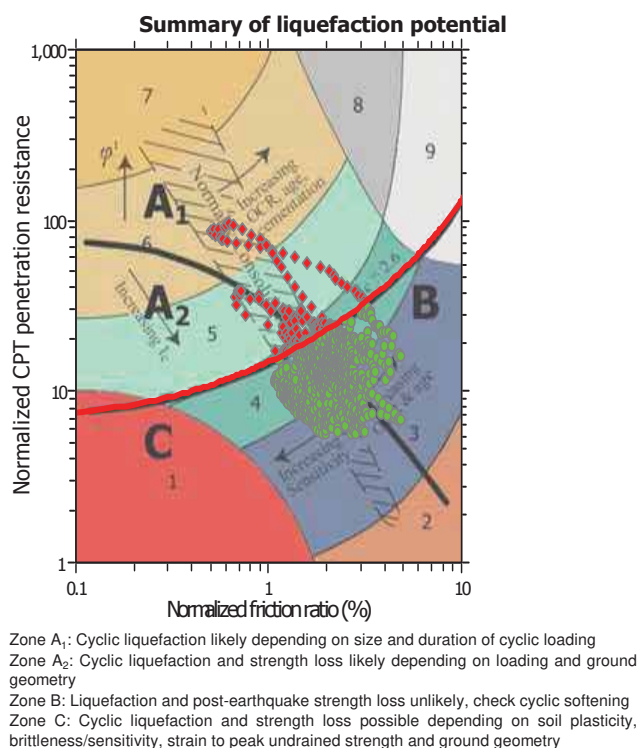
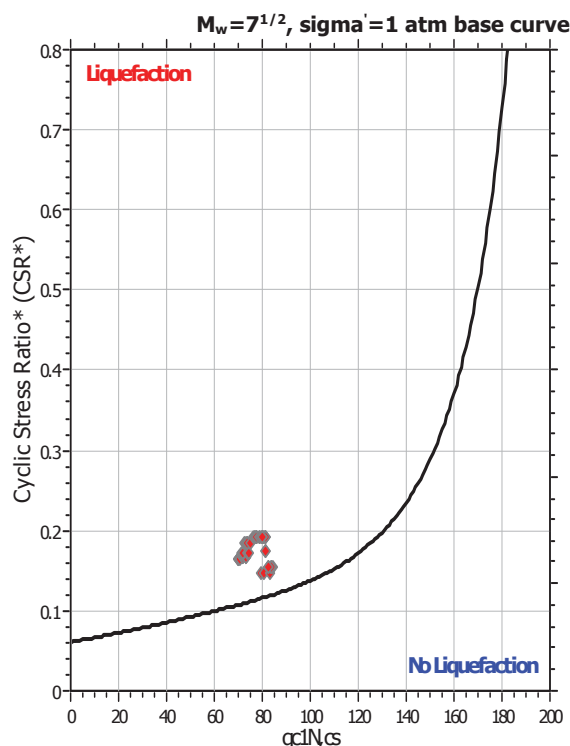
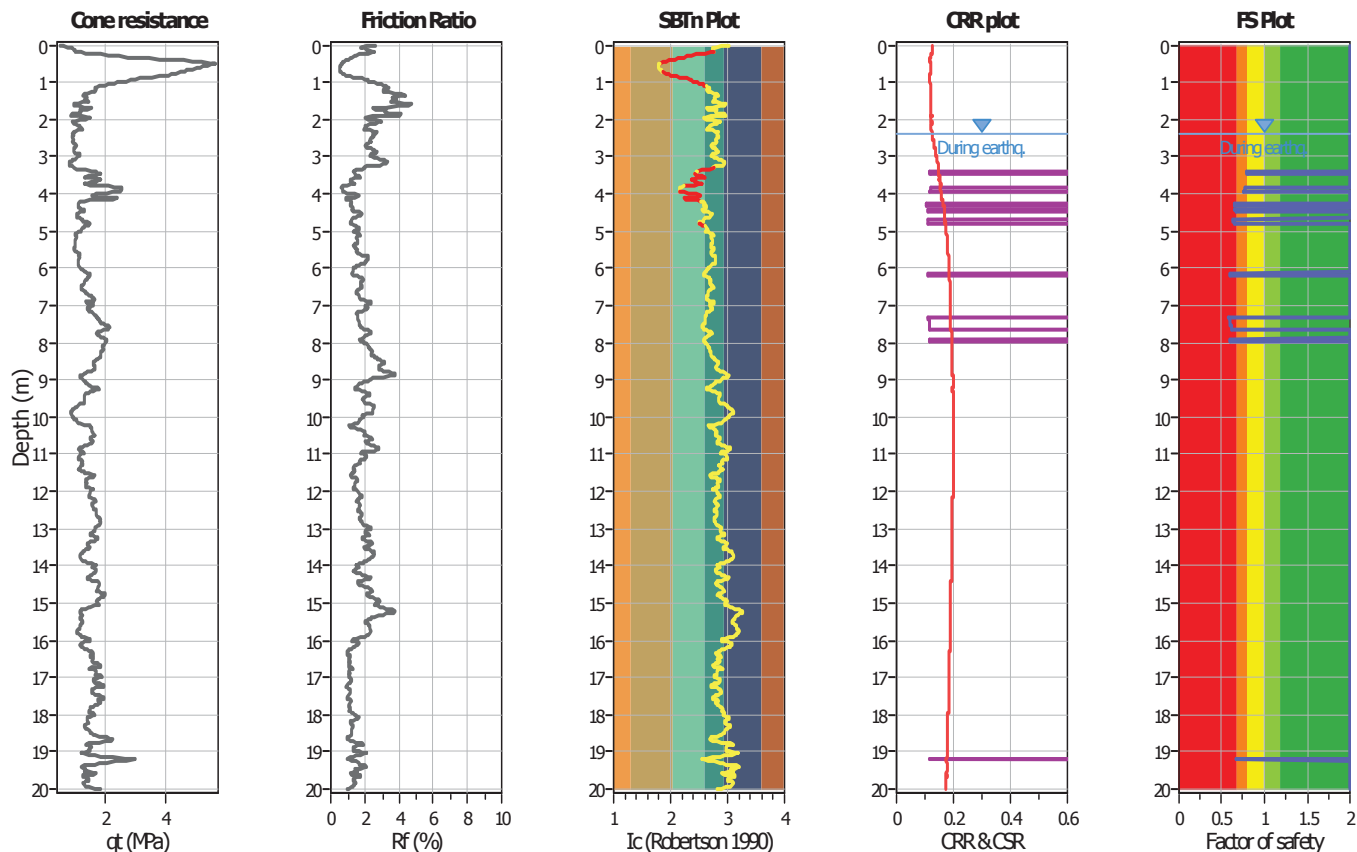
Project title : Indagini CPTu

Location : Nonantola strada Guercinesca Ovest

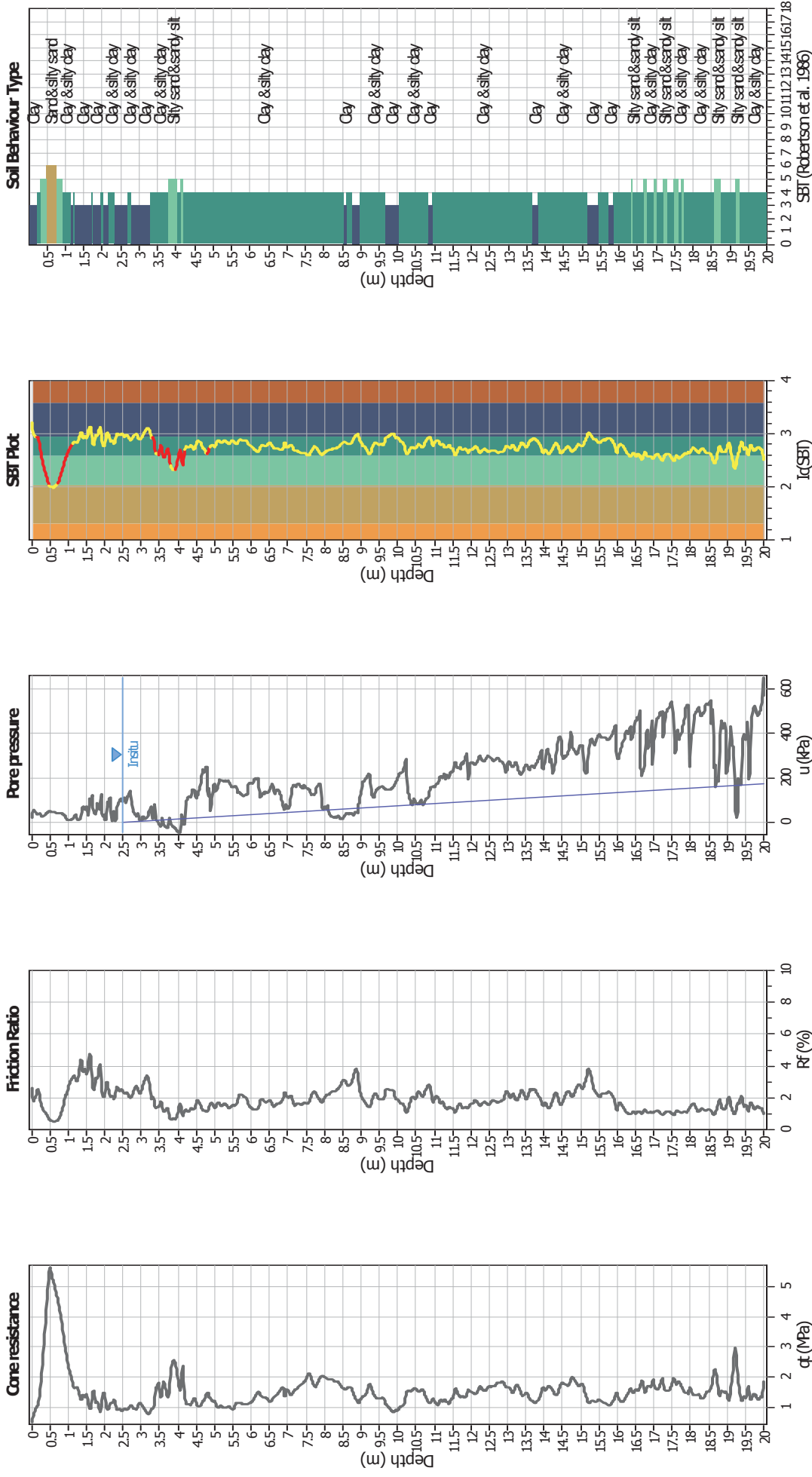
CPT file : CPTU 4

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.50 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.40 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	20.00 m
Earthquake magnitude M_w :	6.14	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.23	Unit weight calculation:	Based on SBT	K_g applied:	Yes		



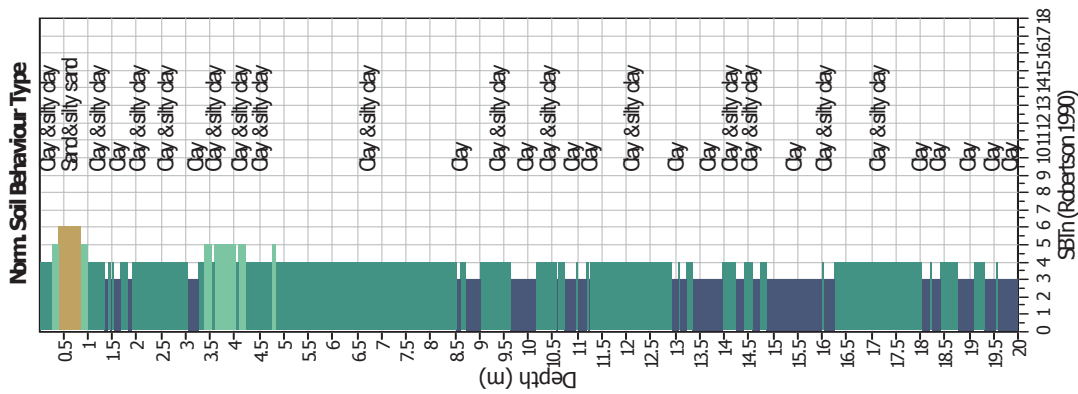
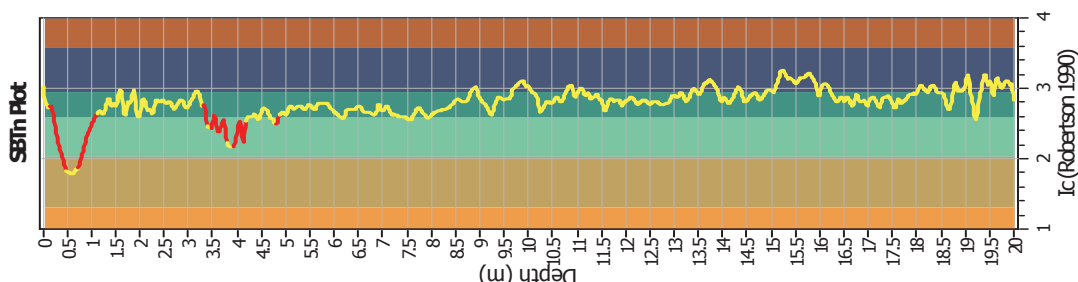
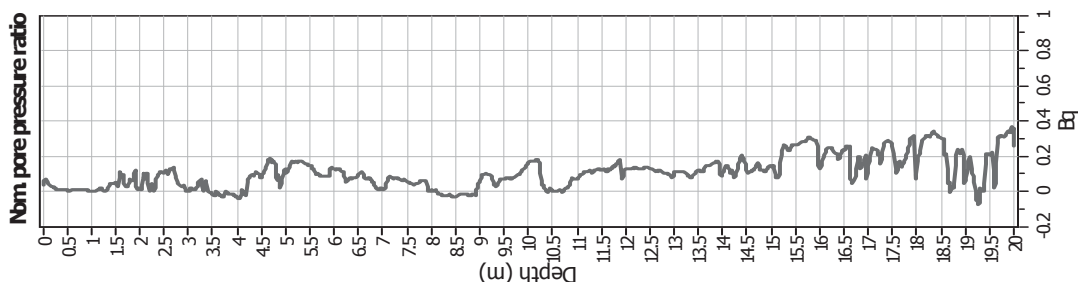
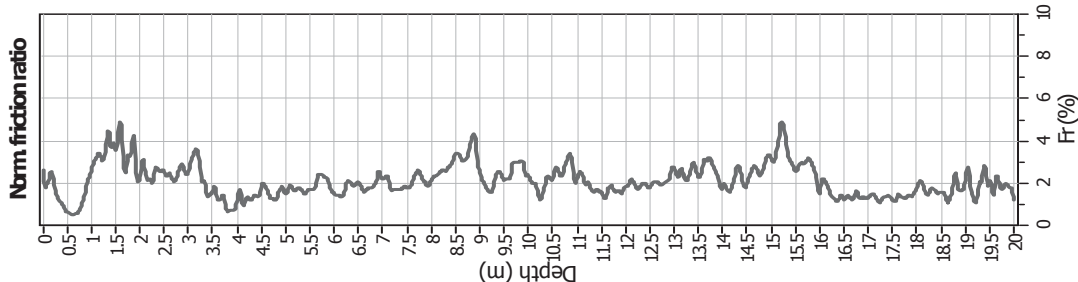
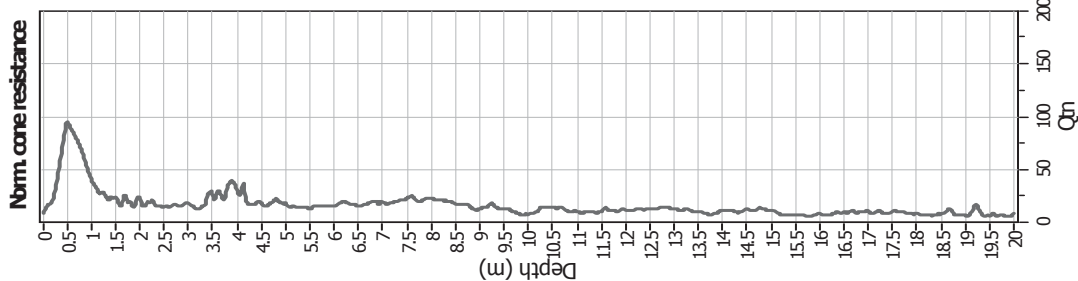
CPT basic interpretation plots



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:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _s applied:	Yes
Earthquake magnitude M _w :	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.23	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.50 m	Fill height:	N/A	Limit depth:	20.00 m

CPT basic interpretation plots (normalized)



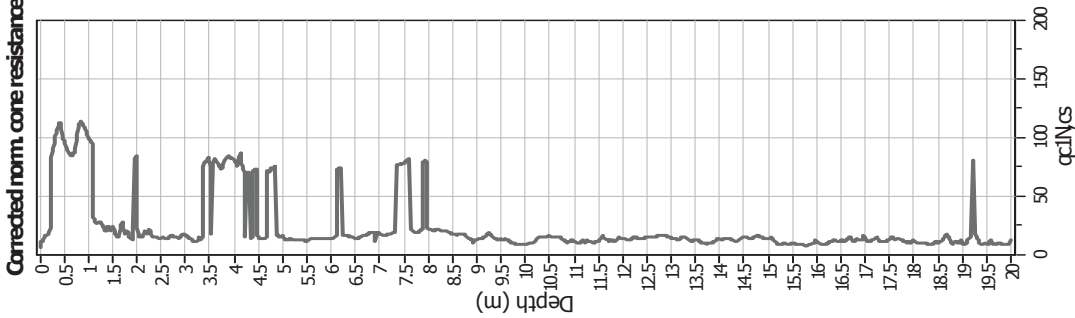
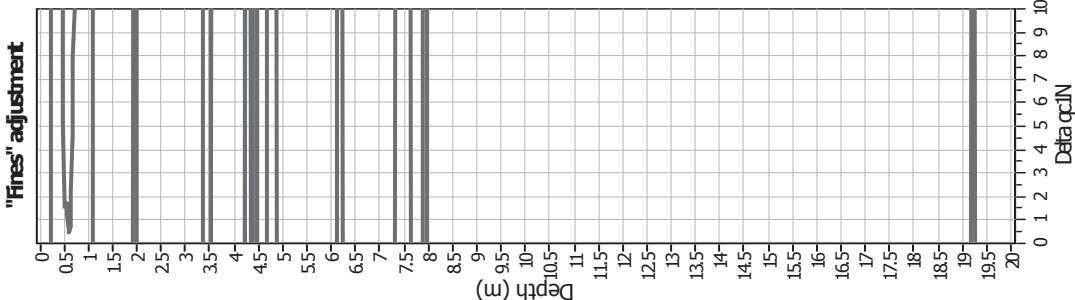
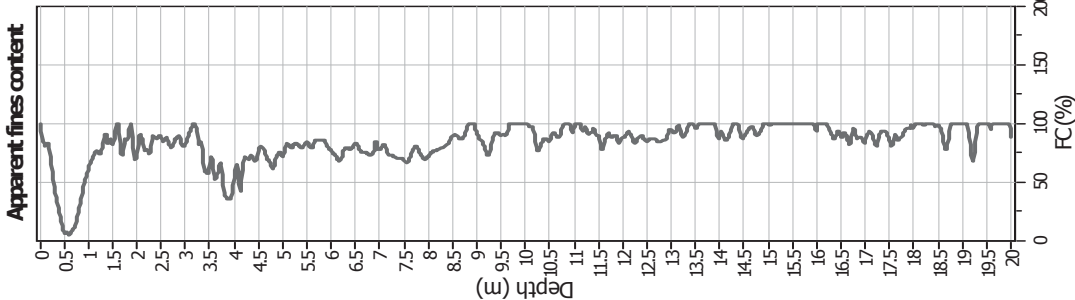
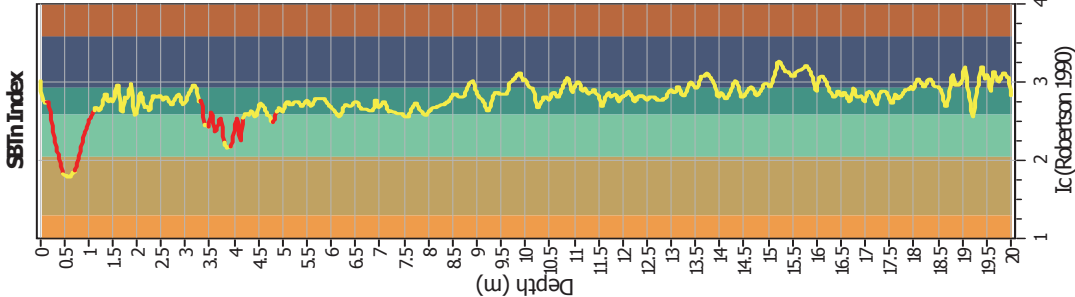
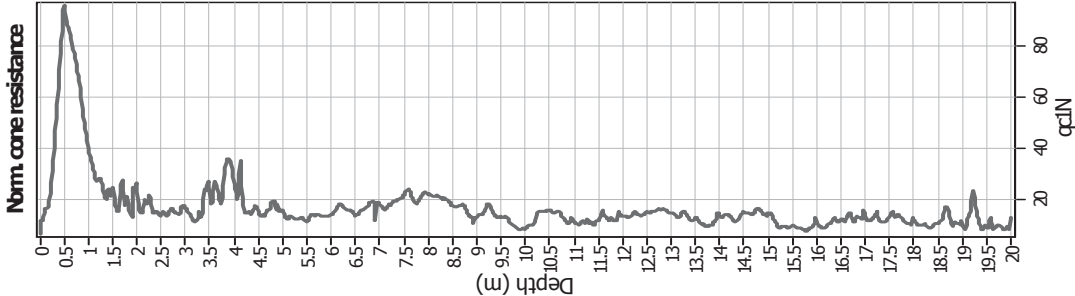
Input parameters and analysis data

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:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_p applied:	Yes
Earthquake magnitude M_w :	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.23	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.50 m	Fill height:	N/A	Limit depth:	20.00 m

SBTn legend

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

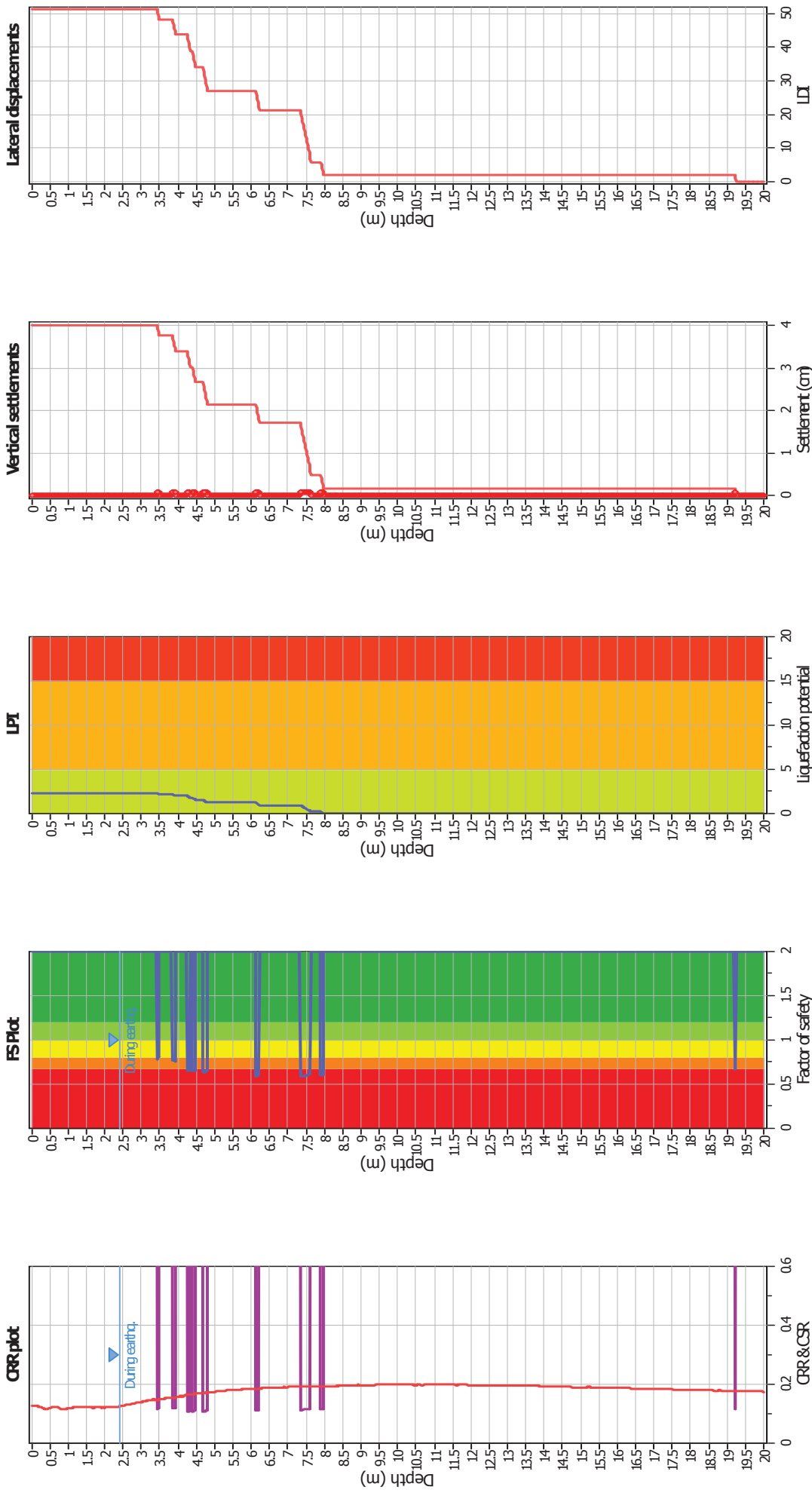
Liquefaction analysis overall plots (intermediate results)



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:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _u applied:	Yes
Earthquake magnitude M _w :	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.23	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.50 m	Fill height:	N/A	Limit depth:	20.00 m

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)
Fines correction method:	B&I (2014)
Points to test:	Based on I_c value
Earthquake magnitude M_w :	6.14
Peak ground acceleration:	0.23
Depth to water table (insitu):	2.50 m

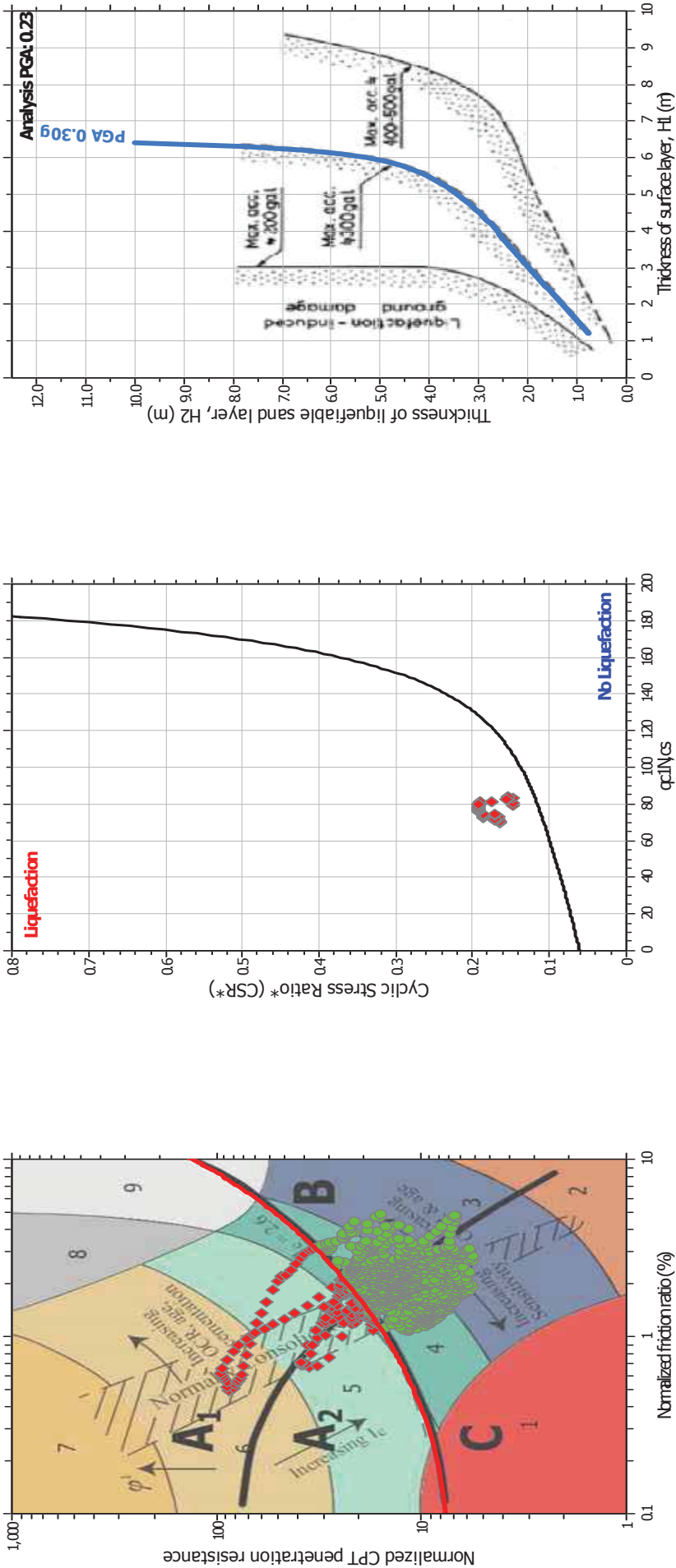
F.S. color scheme

Almost certain it will liquefy	Very high risk
Very likely to liquefy	High risk
Liquefaction and no liq. are equally likely	Low risk
Unlike to liquefy	
Almost certain it will not liquefy	

LPI color scheme

Very high risk
High risk
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:	3	Transition detect. applied:	Yes
Points to test:	Based on I_c value	I_c cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w :	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.23	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.50 m	Fill height:	N/A	Limit depth:	20.00 m

:: Liquefaction Potential Index calculation data ::

Depth (m)	FS	F _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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 _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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	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	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	0.78	0.22	8.29	0.02	0.04	3.44	0.79	0.21	8.28	0.02	0.03
3.46	0.81	0.19	8.27	0.02	0.03	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	0.77	0.23	8.08	0.02	0.04

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

Depth (m)	FS	F _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	LPI
3.86	0.77	0.23	8.07	0.02	0.04	3.88	0.78	0.22	8.06	0.02	0.04
3.90	0.77	0.23	8.05	0.02	0.04	3.92	0.76	0.24	8.04	0.02	0.04
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	0.65	0.35	7.87	0.02	0.05	4.28	0.65	0.35	7.86	0.02	0.05
4.30	0.65	0.35	7.85	0.02	0.05	4.32	0.65	0.35	7.84	0.02	0.05
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	0.65	0.35	7.80	0.02	0.05
4.42	0.65	0.35	7.79	0.02	0.05	4.44	0.66	0.34	7.78	0.02	0.05
4.46	0.66	0.34	7.77	0.02	0.05	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	0.64	0.36	7.66	0.02	0.06
4.70	0.64	0.36	7.65	0.02	0.06	4.72	0.63	0.37	7.64	0.02	0.06
4.74	0.64	0.36	7.63	0.02	0.06	4.76	0.65	0.35	7.62	0.02	0.05
4.78	0.65	0.35	7.61	0.02	0.05	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 _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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	0.59	0.41	6.94	0.02	0.06
6.14	0.59	0.41	6.93	0.02	0.06	6.16	0.60	0.40	6.92	0.02	0.06
6.18	0.60	0.40	6.91	0.02	0.06	6.20	0.60	0.40	6.90	0.02	0.06
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	0.59	0.41	6.33	0.02	0.05	7.36	0.59	0.41	6.32	0.02	0.05
7.38	0.59	0.41	6.31	0.02	0.05	7.40	0.59	0.41	6.30	0.02	0.05
7.42	0.59	0.41	6.29	0.02	0.05	7.44	0.59	0.41	6.28	0.02	0.05
7.46	0.59	0.41	6.27	0.02	0.05	7.48	0.60	0.40	6.26	0.02	0.05
7.50	0.60	0.40	6.25	0.02	0.05	7.52	0.60	0.40	6.24	0.02	0.05
7.54	0.61	0.39	6.23	0.02	0.05	7.56	0.61	0.39	6.22	0.02	0.05
7.58	0.61	0.39	6.21	0.02	0.05	7.60	0.61	0.39	6.20	0.02	0.05
7.62	0.61	0.39	6.19	0.02	0.05	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 _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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	0.60	0.40	6.05	0.02	0.05	7.92	0.60	0.40	6.04	0.02	0.05
7.94	0.60	0.40	6.03	0.02	0.05	7.96	0.60	0.40	6.02	0.02	0.05
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	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 _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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 _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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 _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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
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 _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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 _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	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	0.67	0.33	0.40	0.02	0.00

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

Depth (m)	FS	F _L	w _z	d _z	LPI	Depth (m)	FS	F _L	w _z	d _z	LPI
19.22	0.67	0.33	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

Overall liquefaction potential: 2.28

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_L: 1 - FSw_z: Function value of the extend of soil liquefaction according to depthd_z: Layer thickness (m)

LPI: Liquefaction potential index value for test point

:: Lateral displacement index calculation ::

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
2.40	14.87	0.00	2.00	0.00	0.00	0.00
2.42	15.37	0.00	2.00	0.00	0.00	0.00
2.44	14.60	0.00	2.00	0.00	0.00	0.00
2.46	14.18	0.00	2.00	0.00	0.00	0.00
2.48	13.80	0.00	2.00	0.00	0.00	0.00
2.50	14.16	0.00	2.00	0.00	0.00	0.00
2.52	15.02	0.00	2.00	0.00	0.00	0.00
2.54	15.47	0.00	2.00	0.00	0.00	0.00
2.56	14.65	0.00	2.00	0.00	0.00	0.00
2.58	14.42	0.00	2.00	0.00	0.00	0.00
2.60	13.97	0.00	2.00	0.00	0.00	0.00
2.62	14.01	0.00	2.00	0.00	0.00	0.00
2.64	14.55	0.00	2.00	0.00	0.00	0.00
2.66	15.36	0.00	2.00	0.00	0.00	0.00
2.68	16.15	0.00	2.00	0.00	0.00	0.00
2.70	16.65	0.00	2.00	0.00	0.00	0.00
2.72	16.46	0.00	2.00	0.00	0.00	0.00
2.74	15.57	0.00	2.00	0.00	0.00	0.00
2.76	15.27	0.00	2.00	0.00	0.00	0.00
2.78	15.16	0.00	2.00	0.00	0.00	0.00
2.80	15.02	0.00	2.00	0.00	0.00	0.00
2.82	15.02	0.00	2.00	0.00	0.00	0.00
2.84	14.77	0.00	2.00	0.00	0.00	0.00
2.86	14.32	0.00	2.00	0.00	0.00	0.00
2.88	14.36	0.00	2.00	0.00	0.00	0.00
2.90	15.19	0.00	2.00	0.00	0.00	0.00
2.92	17.16	0.00	2.00	0.00	0.00	0.00
2.94	17.54	0.00	2.00	0.00	0.00	0.00
2.96	17.62	0.00	2.00	0.00	0.00	0.00
2.98	17.54	0.00	2.00	0.00	0.00	0.00
3.00	16.90	0.00	2.00	0.00	0.00	0.00
3.02	16.61	0.00	2.00	0.00	0.00	0.00
3.04	15.56	0.00	2.00	0.00	0.00	0.00
3.06	15.11	0.00	2.00	0.00	0.00	0.00
3.08	14.64	0.00	2.00	0.00	0.00	0.00
3.10	14.10	0.00	2.00	0.00	0.00	0.00
3.12	13.56	0.00	2.00	0.00	0.00	0.00
3.14	12.76	0.00	2.00	0.00	0.00	0.00
3.16	12.00	0.00	2.00	0.00	0.00	0.00
3.18	11.64	0.00	2.00	0.00	0.00	0.00
3.20	11.98	0.00	2.00	0.00	0.00	0.00
3.22	11.89	0.00	2.00	0.00	0.00	0.00
3.24	11.94	0.00	2.00	0.00	0.00	0.00
3.26	13.41	0.00	2.00	0.00	0.00	0.00
3.28	15.59	0.00	2.00	0.00	0.00	0.00
3.30	14.45	0.00	2.00	0.00	0.00	0.00
3.32	12.98	0.00	2.00	0.00	0.00	0.00
3.34	14.88	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
3.36	76.01	0.54	2.00	0.93	0.00	0.00
3.38	79.77	0.50	2.00	0.92	0.00	0.00
3.40	79.70	0.50	2.00	0.92	0.00	0.00
3.42	79.22	0.50	0.78	0.92	0.50	1.01
3.44	80.78	0.49	0.79	0.91	0.49	0.97
3.46	83.02	0.46	0.81	0.90	0.46	0.92
3.48	82.40	0.47	2.00	0.91	0.00	0.00
3.50	80.69	0.49	2.00	0.91	0.00	0.00
3.52	76.26	0.54	2.00	0.93	0.00	0.00
3.54	18.49	0.00	2.00	0.00	0.00	0.00
3.56	75.08	0.55	2.00	0.93	0.00	0.00
3.58	78.37	0.51	2.00	0.92	0.00	0.00
3.60	82.06	0.47	2.00	0.91	0.00	0.00
3.62	81.43	0.48	2.00	0.91	0.00	0.00
3.64	79.51	0.50	2.00	0.92	0.00	0.00
3.66	79.27	0.50	2.00	0.92	0.00	0.00
3.68	77.43	0.52	2.00	0.93	0.00	0.00
3.70	75.37	0.55	2.00	0.93	0.00	0.00
3.72	74.36	0.56	2.00	0.94	0.00	0.00
3.74	73.15	0.58	2.00	0.94	0.00	0.00
3.76	74.24	0.57	2.00	0.94	0.00	0.00
3.78	76.99	0.53	2.00	0.93	0.00	0.00
3.80	80.21	0.49	2.00	0.92	0.00	0.00
3.82	81.32	0.48	2.00	0.91	0.00	0.00
3.84	82.76	0.46	0.77	0.91	0.46	0.93
3.86	83.72	0.45	0.77	0.90	0.45	0.91
3.88	84.10	0.45	0.78	0.90	0.45	0.90
3.90	83.77	0.45	0.77	0.90	0.45	0.91
3.92	82.52	0.47	0.76	0.91	0.47	0.93
3.94	83.20	0.46	2.00	0.90	0.00	0.00
3.96	82.51	0.47	2.00	0.91	0.00	0.00
3.98	81.73	0.47	2.00	0.91	0.00	0.00
4.00	80.17	0.49	2.00	0.92	0.00	0.00
4.02	79.64	0.50	2.00	0.92	0.00	0.00
4.04	78.49	0.51	2.00	0.92	0.00	0.00
4.06	75.95	0.54	2.00	0.93	0.00	0.00
4.08	77.59	0.52	2.00	0.93	0.00	0.00
4.10	83.74	0.45	2.00	0.90	0.00	0.00
4.12	87.21	0.42	2.00	0.88	0.00	0.00
4.14	84.83	0.44	2.00	0.89	0.00	0.00
4.16	78.37	0.51	2.00	0.92	0.00	0.00
4.18	75.52	0.55	2.00	0.93	0.00	0.00
4.20	72.78	0.59	2.00	0.94	0.00	0.00
4.22	70.84	0.61	2.00	0.94	0.00	0.00
4.24	15.05	0.00	2.00	0.00	0.00	0.00
4.26	69.90	0.63	0.65	0.94	0.63	1.25
4.28	70.07	0.62	0.65	0.94	0.62	1.25
4.30	70.16	0.62	0.65	0.94	0.62	1.25

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
4.32	70.61	0.62	0.65	0.94	0.62	1.23
4.34	14.73	0.00	2.00	0.00	0.00	0.00
4.36	14.34	0.00	2.00	0.00	0.00	0.00
4.38	15.42	0.00	2.00	0.00	0.00	0.00
4.40	71.75	0.60	0.65	0.94	0.60	1.20
4.42	72.03	0.60	0.65	0.94	0.60	1.19
4.44	72.99	0.58	0.66	0.94	0.58	1.17
4.46	73.01	0.58	0.66	0.94	0.58	1.17
4.48	16.72	0.00	2.00	0.00	0.00	0.00
4.50	15.63	0.00	2.00	0.00	0.00	0.00
4.52	14.22	0.00	2.00	0.00	0.00	0.00
4.54	13.96	0.00	2.00	0.00	0.00	0.00
4.56	13.92	0.00	2.00	0.00	0.00	0.00
4.58	14.03	0.00	2.00	0.00	0.00	0.00
4.60	13.58	0.00	2.00	0.00	0.00	0.00
4.62	13.70	0.00	2.00	0.00	0.00	0.00
4.64	14.49	0.00	2.00	0.00	0.00	0.00
4.66	15.46	0.00	2.00	0.00	0.00	0.00
4.68	71.39	0.61	0.64	0.94	0.61	1.21
4.70	71.53	0.60	0.64	0.94	0.60	1.21
4.72	71.05	0.61	0.63	0.94	0.61	1.22
4.74	71.70	0.60	0.64	0.94	0.60	1.20
4.76	73.98	0.57	0.65	0.94	0.57	1.14
4.78	74.47	0.56	0.65	0.93	0.56	1.13
4.80	74.40	0.56	2.00	0.94	0.00	0.00
4.82	74.73	0.56	2.00	0.93	0.00	0.00
4.84	75.01	0.56	2.00	0.93	0.00	0.00
4.86	73.40	0.58	2.00	0.94	0.00	0.00
4.88	16.17	0.00	2.00	0.00	0.00	0.00
4.90	18.19	0.00	2.00	0.00	0.00	0.00
4.92	16.62	0.00	2.00	0.00	0.00	0.00
4.94	15.58	0.00	2.00	0.00	0.00	0.00
4.96	15.36	0.00	2.00	0.00	0.00	0.00
4.98	16.00	0.00	2.00	0.00	0.00	0.00
5.00	16.17	0.00	2.00	0.00	0.00	0.00
5.02	15.67	0.00	2.00	0.00	0.00	0.00
5.04	14.38	0.00	2.00	0.00	0.00	0.00
5.06	13.36	0.00	2.00	0.00	0.00	0.00
5.08	12.92	0.00	2.00	0.00	0.00	0.00
5.10	12.49	0.00	2.00	0.00	0.00	0.00
5.12	12.73	0.00	2.00	0.00	0.00	0.00
5.14	13.49	0.00	2.00	0.00	0.00	0.00
5.16	13.44	0.00	2.00	0.00	0.00	0.00
5.18	13.55	0.00	2.00	0.00	0.00	0.00
5.20	13.06	0.00	2.00	0.00	0.00	0.00
5.22	12.87	0.00	2.00	0.00	0.00	0.00
5.24	12.44	0.00	2.00	0.00	0.00	0.00
5.26	12.49	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	$q_{c1N,cs}$	Gamma_{lim} (%)	FS	Fa	Gamma_{max} (%)	LDI
5.28	12.48	0.00	2.00	0.00	0.00	0.00
5.30	12.36	0.00	2.00	0.00	0.00	0.00
5.32	12.48	0.00	2.00	0.00	0.00	0.00
5.34	12.53	0.00	2.00	0.00	0.00	0.00
5.36	12.96	0.00	2.00	0.00	0.00	0.00
5.38	13.08	0.00	2.00	0.00	0.00	0.00
5.40	12.91	0.00	2.00	0.00	0.00	0.00
5.42	12.79	0.00	2.00	0.00	0.00	0.00
5.44	12.21	0.00	2.00	0.00	0.00	0.00
5.46	11.78	0.00	2.00	0.00	0.00	0.00
5.48	11.61	0.00	2.00	0.00	0.00	0.00
5.50	11.92	0.00	2.00	0.00	0.00	0.00
5.52	12.18	0.00	2.00	0.00	0.00	0.00
5.54	12.34	0.00	2.00	0.00	0.00	0.00
5.56	13.36	0.00	2.00	0.00	0.00	0.00
5.58	13.85	0.00	2.00	0.00	0.00	0.00
5.60	14.45	0.00	2.00	0.00	0.00	0.00
5.62	14.56	0.00	2.00	0.00	0.00	0.00
5.64	14.32	0.00	2.00	0.00	0.00	0.00
5.66	14.18	0.00	2.00	0.00	0.00	0.00
5.68	14.01	0.00	2.00	0.00	0.00	0.00
5.70	14.18	0.00	2.00	0.00	0.00	0.00
5.72	14.28	0.00	2.00	0.00	0.00	0.00
5.74	14.06	0.00	2.00	0.00	0.00	0.00
5.76	14.16	0.00	2.00	0.00	0.00	0.00
5.78	13.81	0.00	2.00	0.00	0.00	0.00
5.80	13.73	0.00	2.00	0.00	0.00	0.00
5.82	13.72	0.00	2.00	0.00	0.00	0.00
5.84	13.60	0.00	2.00	0.00	0.00	0.00
5.86	13.56	0.00	2.00	0.00	0.00	0.00
5.88	13.72	0.00	2.00	0.00	0.00	0.00
5.90	13.87	0.00	2.00	0.00	0.00	0.00
5.92	13.86	0.00	2.00	0.00	0.00	0.00
5.94	13.81	0.00	2.00	0.00	0.00	0.00
5.96	13.86	0.00	2.00	0.00	0.00	0.00
5.98	14.18	0.00	2.00	0.00	0.00	0.00
6.00	14.29	0.00	2.00	0.00	0.00	0.00
6.02	14.54	0.00	2.00	0.00	0.00	0.00
6.04	14.69	0.00	2.00	0.00	0.00	0.00
6.06	15.21	0.00	2.00	0.00	0.00	0.00
6.08	15.65	0.00	2.00	0.00	0.00	0.00
6.10	16.46	0.00	2.00	0.00	0.00	0.00
6.12	72.74	0.59	0.59	0.94	0.59	1.17
6.14	73.34	0.58	0.59	0.94	0.58	1.16
6.16	73.78	0.57	0.60	0.94	0.57	1.14
6.18	73.96	0.57	0.60	0.94	0.57	1.14
6.20	74.74	0.56	0.60	0.93	0.56	1.12
6.22	18.07	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
6.24	17.82	0.00	2.00	0.00	0.00	0.00
6.26	17.11	0.00	2.00	0.00	0.00	0.00
6.28	16.81	0.00	2.00	0.00	0.00	0.00
6.30	16.43	0.00	2.00	0.00	0.00	0.00
6.32	16.20	0.00	2.00	0.00	0.00	0.00
6.34	16.03	0.00	2.00	0.00	0.00	0.00
6.36	15.88	0.00	2.00	0.00	0.00	0.00
6.38	16.07	0.00	2.00	0.00	0.00	0.00
6.40	15.78	0.00	2.00	0.00	0.00	0.00
6.42	15.58	0.00	2.00	0.00	0.00	0.00
6.44	15.47	0.00	2.00	0.00	0.00	0.00
6.46	14.91	0.00	2.00	0.00	0.00	0.00
6.48	14.29	0.00	2.00	0.00	0.00	0.00
6.50	13.97	0.00	2.00	0.00	0.00	0.00
6.52	14.08	0.00	2.00	0.00	0.00	0.00
6.54	14.17	0.00	2.00	0.00	0.00	0.00
6.56	14.28	0.00	2.00	0.00	0.00	0.00
6.58	15.07	0.00	2.00	0.00	0.00	0.00
6.60	15.84	0.00	2.00	0.00	0.00	0.00
6.62	15.83	0.00	2.00	0.00	0.00	0.00
6.64	16.14	0.00	2.00	0.00	0.00	0.00
6.66	16.20	0.00	2.00	0.00	0.00	0.00
6.68	16.60	0.00	2.00	0.00	0.00	0.00
6.70	16.70	0.00	2.00	0.00	0.00	0.00
6.72	17.06	0.00	2.00	0.00	0.00	0.00
6.74	17.51	0.00	2.00	0.00	0.00	0.00
6.76	17.93	0.00	2.00	0.00	0.00	0.00
6.78	18.81	0.00	2.00	0.00	0.00	0.00
6.80	18.95	0.00	2.00	0.00	0.00	0.00
6.82	19.24	0.00	2.00	0.00	0.00	0.00
6.84	19.78	0.00	2.00	0.00	0.00	0.00
6.86	19.40	0.00	2.00	0.00	0.00	0.00
6.88	19.14	0.00	2.00	0.00	0.00	0.00
6.90	18.68	0.00	2.00	0.00	0.00	0.00
6.92	11.84	0.00	2.00	0.00	0.00	0.00
6.94	18.29	0.00	2.00	0.00	0.00	0.00
6.96	18.88	0.00	2.00	0.00	0.00	0.00
6.98	18.83	0.00	2.00	0.00	0.00	0.00
7.00	18.58	0.00	2.00	0.00	0.00	0.00
7.02	18.06	0.00	2.00	0.00	0.00	0.00
7.04	17.65	0.00	2.00	0.00	0.00	0.00
7.06	17.01	0.00	2.00	0.00	0.00	0.00
7.08	16.38	0.00	2.00	0.00	0.00	0.00
7.10	16.27	0.00	2.00	0.00	0.00	0.00
7.12	16.39	0.00	2.00	0.00	0.00	0.00
7.14	16.93	0.00	2.00	0.00	0.00	0.00
7.16	17.52	0.00	2.00	0.00	0.00	0.00
7.18	18.12	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
7.20	18.21	0.00	2.00	0.00	0.00	0.00
7.22	18.11	0.00	2.00	0.00	0.00	0.00
7.24	18.19	0.00	2.00	0.00	0.00	0.00
7.26	18.80	0.00	2.00	0.00	0.00	0.00
7.28	19.40	0.00	2.00	0.00	0.00	0.00
7.30	19.33	0.00	2.00	0.00	0.00	0.00
7.32	19.64	0.00	2.00	0.00	0.00	0.00
7.34	75.98	0.54	0.59	0.93	0.54	1.09
7.36	76.76	0.53	0.59	0.93	0.53	1.07
7.38	76.62	0.54	0.59	0.93	0.54	1.07
7.40	76.93	0.53	0.59	0.93	0.53	1.06
7.42	77.76	0.52	0.59	0.93	0.52	1.04
7.44	77.41	0.53	0.59	0.93	0.53	1.05
7.46	77.70	0.52	0.59	0.93	0.52	1.04
7.48	78.63	0.51	0.60	0.92	0.51	1.02
7.50	78.71	0.51	0.60	0.92	0.51	1.02
7.52	79.69	0.50	0.60	0.92	0.50	1.00
7.54	80.32	0.49	0.61	0.92	0.49	0.98
7.56	80.56	0.49	0.61	0.91	0.49	0.98
7.58	81.44	0.48	0.61	0.91	0.48	0.96
7.60	81.32	0.48	0.61	0.91	0.48	0.96
7.62	81.03	0.48	0.61	0.91	0.48	0.96
7.64	22.99	0.00	2.00	0.00	0.00	0.00
7.66	21.63	0.00	2.00	0.00	0.00	0.00
7.68	20.87	0.00	2.00	0.00	0.00	0.00
7.70	20.18	0.00	2.00	0.00	0.00	0.00
7.72	19.29	0.00	2.00	0.00	0.00	0.00
7.74	18.83	0.00	2.00	0.00	0.00	0.00
7.76	18.66	0.00	2.00	0.00	0.00	0.00
7.78	18.97	0.00	2.00	0.00	0.00	0.00
7.80	19.64	0.00	2.00	0.00	0.00	0.00
7.82	20.19	0.00	2.00	0.00	0.00	0.00
7.84	20.63	0.00	2.00	0.00	0.00	0.00
7.86	21.18	0.00	2.00	0.00	0.00	0.00
7.88	21.74	0.00	2.00	0.00	0.00	0.00
7.90	79.60	0.50	0.60	0.92	0.50	1.00
7.92	79.96	0.49	0.60	0.92	0.49	0.99
7.94	80.15	0.49	0.60	0.92	0.49	0.99
7.96	79.98	0.49	0.60	0.92	0.49	0.99
7.98	22.57	0.00	2.00	0.00	0.00	0.00
8.00	22.19	0.00	2.00	0.00	0.00	0.00
8.02	22.28	0.00	2.00	0.00	0.00	0.00
8.04	21.96	0.00	2.00	0.00	0.00	0.00
8.06	21.70	0.00	2.00	0.00	0.00	0.00
8.08	21.12	0.00	2.00	0.00	0.00	0.00
8.10	21.15	0.00	2.00	0.00	0.00	0.00
8.12	21.41	0.00	2.00	0.00	0.00	0.00
8.14	21.06	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	$q_{c1N,cs}$	Gamma_{lim} (%)	FS	Fa	Gamma_{max} (%)	LDI
8.16	21.19	0.00	2.00	0.00	0.00	0.00
8.18	21.65	0.00	2.00	0.00	0.00	0.00
8.20	21.34	0.00	2.00	0.00	0.00	0.00
8.22	21.53	0.00	2.00	0.00	0.00	0.00
8.24	20.66	0.00	2.00	0.00	0.00	0.00
8.26	20.51	0.00	2.00	0.00	0.00	0.00
8.28	20.44	0.00	2.00	0.00	0.00	0.00
8.30	20.79	0.00	2.00	0.00	0.00	0.00
8.32	20.34	0.00	2.00	0.00	0.00	0.00
8.34	20.53	0.00	2.00	0.00	0.00	0.00
8.36	20.27	0.00	2.00	0.00	0.00	0.00
8.38	20.39	0.00	2.00	0.00	0.00	0.00
8.40	20.17	0.00	2.00	0.00	0.00	0.00
8.42	19.39	0.00	2.00	0.00	0.00	0.00
8.44	18.85	0.00	2.00	0.00	0.00	0.00
8.46	18.75	0.00	2.00	0.00	0.00	0.00
8.48	17.97	0.00	2.00	0.00	0.00	0.00
8.50	17.81	0.00	2.00	0.00	0.00	0.00
8.52	17.84	0.00	2.00	0.00	0.00	0.00
8.54	17.46	0.00	2.00	0.00	0.00	0.00
8.56	17.38	0.00	2.00	0.00	0.00	0.00
8.58	17.30	0.00	2.00	0.00	0.00	0.00
8.60	17.33	0.00	2.00	0.00	0.00	0.00
8.62	17.65	0.00	2.00	0.00	0.00	0.00
8.64	18.08	0.00	2.00	0.00	0.00	0.00
8.66	17.89	0.00	2.00	0.00	0.00	0.00
8.68	17.93	0.00	2.00	0.00	0.00	0.00
8.70	18.16	0.00	2.00	0.00	0.00	0.00
8.72	17.86	0.00	2.00	0.00	0.00	0.00
8.74	17.68	0.00	2.00	0.00	0.00	0.00
8.76	16.77	0.00	2.00	0.00	0.00	0.00
8.78	15.96	0.00	2.00	0.00	0.00	0.00
8.80	15.14	0.00	2.00	0.00	0.00	0.00
8.82	14.49	0.00	2.00	0.00	0.00	0.00
8.84	13.92	0.00	2.00	0.00	0.00	0.00
8.86	13.64	0.00	2.00	0.00	0.00	0.00
8.88	13.27	0.00	2.00	0.00	0.00	0.00
8.90	13.07	0.00	2.00	0.00	0.00	0.00
8.92	10.62	0.00	2.00	0.00	0.00	0.00
8.94	13.04	0.00	2.00	0.00	0.00	0.00
8.96	12.82	0.00	2.00	0.00	0.00	0.00
8.98	12.94	0.00	2.00	0.00	0.00	0.00
9.00	13.27	0.00	2.00	0.00	0.00	0.00
9.02	13.34	0.00	2.00	0.00	0.00	0.00
9.04	14.04	0.00	2.00	0.00	0.00	0.00
9.06	14.39	0.00	2.00	0.00	0.00	0.00
9.08	14.19	0.00	2.00	0.00	0.00	0.00
9.10	14.18	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
9.12	14.31	0.00	2.00	0.00	0.00	0.00
9.14	14.90	0.00	2.00	0.00	0.00	0.00
9.16	15.25	0.00	2.00	0.00	0.00	0.00
9.18	15.91	0.00	2.00	0.00	0.00	0.00
9.20	17.20	0.00	2.00	0.00	0.00	0.00
9.22	18.55	0.00	2.00	0.00	0.00	0.00
9.24	18.60	0.00	2.00	0.00	0.00	0.00
9.26	18.28	0.00	2.00	0.00	0.00	0.00
9.28	17.41	0.00	2.00	0.00	0.00	0.00
9.30	16.39	0.00	2.00	0.00	0.00	0.00
9.32	15.52	0.00	2.00	0.00	0.00	0.00
9.34	14.89	0.00	2.00	0.00	0.00	0.00
9.36	14.43	0.00	2.00	0.00	0.00	0.00
9.38	13.88	0.00	2.00	0.00	0.00	0.00
9.40	13.52	0.00	2.00	0.00	0.00	0.00
9.42	13.41	0.00	2.00	0.00	0.00	0.00
9.44	13.27	0.00	2.00	0.00	0.00	0.00
9.46	13.36	0.00	2.00	0.00	0.00	0.00
9.48	13.50	0.00	2.00	0.00	0.00	0.00
9.50	13.28	0.00	2.00	0.00	0.00	0.00
9.52	13.06	0.00	2.00	0.00	0.00	0.00
9.54	13.07	0.00	2.00	0.00	0.00	0.00
9.56	13.21	0.00	2.00	0.00	0.00	0.00
9.58	13.48	0.00	2.00	0.00	0.00	0.00
9.60	13.36	0.00	2.00	0.00	0.00	0.00
9.62	13.12	0.00	2.00	0.00	0.00	0.00
9.64	12.49	0.00	2.00	0.00	0.00	0.00
9.66	11.62	0.00	2.00	0.00	0.00	0.00
9.68	11.16	0.00	2.00	0.00	0.00	0.00
9.70	10.96	0.00	2.00	0.00	0.00	0.00
9.72	10.87	0.00	2.00	0.00	0.00	0.00
9.74	10.45	0.00	2.00	0.00	0.00	0.00
9.76	10.21	0.00	2.00	0.00	0.00	0.00
9.78	9.82	0.00	2.00	0.00	0.00	0.00
9.80	9.45	0.00	2.00	0.00	0.00	0.00
9.82	9.20	0.00	2.00	0.00	0.00	0.00
9.84	8.88	0.00	2.00	0.00	0.00	0.00
9.86	8.58	0.00	2.00	0.00	0.00	0.00
9.88	8.52	0.00	2.00	0.00	0.00	0.00
9.90	8.39	0.00	2.00	0.00	0.00	0.00
9.92	8.41	0.00	2.00	0.00	0.00	0.00
9.94	9.29	0.00	2.00	0.00	0.00	0.00
9.96	9.00	0.00	2.00	0.00	0.00	0.00
9.98	8.72	0.00	2.00	0.00	0.00	0.00
10.00	8.84	0.00	2.00	0.00	0.00	0.00
10.02	9.17	0.00	2.00	0.00	0.00	0.00
10.04	9.56	0.00	2.00	0.00	0.00	0.00
10.06	9.96	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
10.08	10.18	0.00	2.00	0.00	0.00	0.00
10.10	10.14	0.00	2.00	0.00	0.00	0.00
10.12	10.37	0.00	2.00	0.00	0.00	0.00
10.14	10.19	0.00	2.00	0.00	0.00	0.00
10.16	10.40	0.00	2.00	0.00	0.00	0.00
10.18	11.10	0.00	2.00	0.00	0.00	0.00
10.20	12.07	0.00	2.00	0.00	0.00	0.00
10.22	14.32	0.00	2.00	0.00	0.00	0.00
10.24	14.69	0.00	2.00	0.00	0.00	0.00
10.26	15.38	0.00	2.00	0.00	0.00	0.00
10.28	15.34	0.00	2.00	0.00	0.00	0.00
10.30	15.25	0.00	2.00	0.00	0.00	0.00
10.32	15.29	0.00	2.00	0.00	0.00	0.00
10.34	15.38	0.00	2.00	0.00	0.00	0.00
10.36	15.24	0.00	2.00	0.00	0.00	0.00
10.38	15.28	0.00	2.00	0.00	0.00	0.00
10.40	15.57	0.00	2.00	0.00	0.00	0.00
10.42	15.68	0.00	2.00	0.00	0.00	0.00
10.44	15.90	0.00	2.00	0.00	0.00	0.00
10.46	15.77	0.00	2.00	0.00	0.00	0.00
10.48	16.32	0.00	2.00	0.00	0.00	0.00
10.50	16.29	0.00	2.00	0.00	0.00	0.00
10.52	15.83	0.00	2.00	0.00	0.00	0.00
10.54	15.37	0.00	2.00	0.00	0.00	0.00
10.56	15.03	0.00	2.00	0.00	0.00	0.00
10.58	14.90	0.00	2.00	0.00	0.00	0.00
10.60	14.89	0.00	2.00	0.00	0.00	0.00
10.62	15.12	0.00	2.00	0.00	0.00	0.00
10.64	15.46	0.00	2.00	0.00	0.00	0.00
10.66	15.61	0.00	2.00	0.00	0.00	0.00
10.68	15.73	0.00	2.00	0.00	0.00	0.00
10.70	15.64	0.00	2.00	0.00	0.00	0.00
10.72	14.76	0.00	2.00	0.00	0.00	0.00
10.74	13.80	0.00	2.00	0.00	0.00	0.00
10.76	13.13	0.00	2.00	0.00	0.00	0.00
10.78	13.01	0.00	2.00	0.00	0.00	0.00
10.80	12.31	0.00	2.00	0.00	0.00	0.00
10.82	11.78	0.00	2.00	0.00	0.00	0.00
10.84	11.10	0.00	2.00	0.00	0.00	0.00
10.86	10.67	0.00	2.00	0.00	0.00	0.00
10.88	10.92	0.00	2.00	0.00	0.00	0.00
10.90	11.16	0.00	2.00	0.00	0.00	0.00
10.92	11.17	0.00	2.00	0.00	0.00	0.00
10.94	12.86	0.00	2.00	0.00	0.00	0.00
10.96	12.58	0.00	2.00	0.00	0.00	0.00
10.98	12.08	0.00	2.00	0.00	0.00	0.00
11.00	11.42	0.00	2.00	0.00	0.00	0.00
11.02	10.93	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
11.04	10.75	0.00	2.00	0.00	0.00	0.00
11.06	10.76	0.00	2.00	0.00	0.00	0.00
11.08	10.52	0.00	2.00	0.00	0.00	0.00
11.10	10.24	0.00	2.00	0.00	0.00	0.00
11.12	10.07	0.00	2.00	0.00	0.00	0.00
11.14	10.52	0.00	2.00	0.00	0.00	0.00
11.16	11.50	0.00	2.00	0.00	0.00	0.00
11.18	12.24	0.00	2.00	0.00	0.00	0.00
11.20	11.82	0.00	2.00	0.00	0.00	0.00
11.22	11.19	0.00	2.00	0.00	0.00	0.00
11.24	10.80	0.00	2.00	0.00	0.00	0.00
11.26	11.41	0.00	2.00	0.00	0.00	0.00
11.28	12.61	0.00	2.00	0.00	0.00	0.00
11.30	11.90	0.00	2.00	0.00	0.00	0.00
11.32	10.91	0.00	2.00	0.00	0.00	0.00
11.34	10.95	0.00	2.00	0.00	0.00	0.00
11.36	11.28	0.00	2.00	0.00	0.00	0.00
11.38	10.82	0.00	2.00	0.00	0.00	0.00
11.40	10.19	0.00	2.00	0.00	0.00	0.00
11.42	10.40	0.00	2.00	0.00	0.00	0.00
11.44	11.33	0.00	2.00	0.00	0.00	0.00
11.46	12.02	0.00	2.00	0.00	0.00	0.00
11.48	12.13	0.00	2.00	0.00	0.00	0.00
11.50	11.91	0.00	2.00	0.00	0.00	0.00
11.52	12.50	0.00	2.00	0.00	0.00	0.00
11.54	13.94	0.00	2.00	0.00	0.00	0.00
11.56	14.58	0.00	2.00	0.00	0.00	0.00
11.58	16.10	0.00	2.00	0.00	0.00	0.00
11.60	14.97	0.00	2.00	0.00	0.00	0.00
11.62	13.65	0.00	2.00	0.00	0.00	0.00
11.64	13.76	0.00	2.00	0.00	0.00	0.00
11.66	12.99	0.00	2.00	0.00	0.00	0.00
11.68	12.79	0.00	2.00	0.00	0.00	0.00
11.70	12.43	0.00	2.00	0.00	0.00	0.00
11.72	12.09	0.00	2.00	0.00	0.00	0.00
11.74	12.62	0.00	2.00	0.00	0.00	0.00
11.76	12.66	0.00	2.00	0.00	0.00	0.00
11.78	12.94	0.00	2.00	0.00	0.00	0.00
11.80	12.50	0.00	2.00	0.00	0.00	0.00
11.82	12.15	0.00	2.00	0.00	0.00	0.00
11.84	12.15	0.00	2.00	0.00	0.00	0.00
11.86	12.09	0.00	2.00	0.00	0.00	0.00
11.88	12.22	0.00	2.00	0.00	0.00	0.00
11.90	12.50	0.00	2.00	0.00	0.00	0.00
11.92	15.24	0.00	2.00	0.00	0.00	0.00
11.94	15.01	0.00	2.00	0.00	0.00	0.00
11.96	14.44	0.00	2.00	0.00	0.00	0.00
11.98	13.82	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
12.00	13.64	0.00	2.00	0.00	0.00	0.00
12.02	13.82	0.00	2.00	0.00	0.00	0.00
12.04	13.62	0.00	2.00	0.00	0.00	0.00
12.06	13.56	0.00	2.00	0.00	0.00	0.00
12.08	13.43	0.00	2.00	0.00	0.00	0.00
12.10	13.23	0.00	2.00	0.00	0.00	0.00
12.12	12.91	0.00	2.00	0.00	0.00	0.00
12.14	13.06	0.00	2.00	0.00	0.00	0.00
12.16	13.45	0.00	2.00	0.00	0.00	0.00
12.18	13.80	0.00	2.00	0.00	0.00	0.00
12.20	14.24	0.00	2.00	0.00	0.00	0.00
12.22	15.08	0.00	2.00	0.00	0.00	0.00
12.24	15.30	0.00	2.00	0.00	0.00	0.00
12.26	15.47	0.00	2.00	0.00	0.00	0.00
12.28	14.96	0.00	2.00	0.00	0.00	0.00
12.30	14.37	0.00	2.00	0.00	0.00	0.00
12.32	14.31	0.00	2.00	0.00	0.00	0.00
12.34	14.14	0.00	2.00	0.00	0.00	0.00
12.36	13.84	0.00	2.00	0.00	0.00	0.00
12.38	13.76	0.00	2.00	0.00	0.00	0.00
12.40	14.07	0.00	2.00	0.00	0.00	0.00
12.42	14.17	0.00	2.00	0.00	0.00	0.00
12.44	14.38	0.00	2.00	0.00	0.00	0.00
12.46	14.51	0.00	2.00	0.00	0.00	0.00
12.48	14.84	0.00	2.00	0.00	0.00	0.00
12.50	15.50	0.00	2.00	0.00	0.00	0.00
12.52	15.32	0.00	2.00	0.00	0.00	0.00
12.54	15.05	0.00	2.00	0.00	0.00	0.00
12.56	15.04	0.00	2.00	0.00	0.00	0.00
12.58	15.14	0.00	2.00	0.00	0.00	0.00
12.60	15.29	0.00	2.00	0.00	0.00	0.00
12.62	15.22	0.00	2.00	0.00	0.00	0.00
12.64	15.25	0.00	2.00	0.00	0.00	0.00
12.66	15.37	0.00	2.00	0.00	0.00	0.00
12.68	15.29	0.00	2.00	0.00	0.00	0.00
12.70	15.84	0.00	2.00	0.00	0.00	0.00
12.72	16.17	0.00	2.00	0.00	0.00	0.00
12.74	16.36	0.00	2.00	0.00	0.00	0.00
12.76	16.42	0.00	2.00	0.00	0.00	0.00
12.78	16.35	0.00	2.00	0.00	0.00	0.00
12.80	16.15	0.00	2.00	0.00	0.00	0.00
12.82	16.43	0.00	2.00	0.00	0.00	0.00
12.84	16.55	0.00	2.00	0.00	0.00	0.00
12.86	16.35	0.00	2.00	0.00	0.00	0.00
12.88	16.26	0.00	2.00	0.00	0.00	0.00
12.90	16.29	0.00	2.00	0.00	0.00	0.00
12.92	15.56	0.00	2.00	0.00	0.00	0.00
12.94	15.14	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
12.96	14.90	0.00	2.00	0.00	0.00	0.00
12.98	14.82	0.00	2.00	0.00	0.00	0.00
13.00	14.64	0.00	2.00	0.00	0.00	0.00
13.02	14.65	0.00	2.00	0.00	0.00	0.00
13.04	14.68	0.00	2.00	0.00	0.00	0.00
13.06	14.44	0.00	2.00	0.00	0.00	0.00
13.08	14.17	0.00	2.00	0.00	0.00	0.00
13.10	13.81	0.00	2.00	0.00	0.00	0.00
13.12	13.44	0.00	2.00	0.00	0.00	0.00
13.14	12.93	0.00	2.00	0.00	0.00	0.00
13.16	12.91	0.00	2.00	0.00	0.00	0.00
13.18	13.32	0.00	2.00	0.00	0.00	0.00
13.20	13.83	0.00	2.00	0.00	0.00	0.00
13.22	14.83	0.00	2.00	0.00	0.00	0.00
13.24	15.30	0.00	2.00	0.00	0.00	0.00
13.26	15.49	0.00	2.00	0.00	0.00	0.00
13.28	15.27	0.00	2.00	0.00	0.00	0.00
13.30	14.78	0.00	2.00	0.00	0.00	0.00
13.32	14.45	0.00	2.00	0.00	0.00	0.00
13.34	13.85	0.00	2.00	0.00	0.00	0.00
13.36	13.27	0.00	2.00	0.00	0.00	0.00
13.38	12.34	0.00	2.00	0.00	0.00	0.00
13.40	12.12	0.00	2.00	0.00	0.00	0.00
13.42	12.10	0.00	2.00	0.00	0.00	0.00
13.44	11.89	0.00	2.00	0.00	0.00	0.00
13.46	12.24	0.00	2.00	0.00	0.00	0.00
13.48	12.56	0.00	2.00	0.00	0.00	0.00
13.50	12.84	0.00	2.00	0.00	0.00	0.00
13.52	12.96	0.00	2.00	0.00	0.00	0.00
13.54	12.74	0.00	2.00	0.00	0.00	0.00
13.56	12.22	0.00	2.00	0.00	0.00	0.00
13.58	11.55	0.00	2.00	0.00	0.00	0.00
13.60	11.06	0.00	2.00	0.00	0.00	0.00
13.62	10.66	0.00	2.00	0.00	0.00	0.00
13.64	10.32	0.00	2.00	0.00	0.00	0.00
13.66	10.59	0.00	2.00	0.00	0.00	0.00
13.68	10.47	0.00	2.00	0.00	0.00	0.00
13.70	9.75	0.00	2.00	0.00	0.00	0.00
13.72	9.55	0.00	2.00	0.00	0.00	0.00
13.74	9.88	0.00	2.00	0.00	0.00	0.00
13.76	9.76	0.00	2.00	0.00	0.00	0.00
13.78	9.84	0.00	2.00	0.00	0.00	0.00
13.80	9.97	0.00	2.00	0.00	0.00	0.00
13.82	10.19	0.00	2.00	0.00	0.00	0.00
13.84	10.32	0.00	2.00	0.00	0.00	0.00
13.86	10.43	0.00	2.00	0.00	0.00	0.00
13.88	11.12	0.00	2.00	0.00	0.00	0.00
13.90	11.32	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
13.92	12.13	0.00	2.00	0.00	0.00	0.00
13.94	12.56	0.00	2.00	0.00	0.00	0.00
13.96	14.67	0.00	2.00	0.00	0.00	0.00
13.98	14.64	0.00	2.00	0.00	0.00	0.00
14.00	13.93	0.00	2.00	0.00	0.00	0.00
14.02	13.24	0.00	2.00	0.00	0.00	0.00
14.04	13.05	0.00	2.00	0.00	0.00	0.00
14.06	13.35	0.00	2.00	0.00	0.00	0.00
14.08	13.98	0.00	2.00	0.00	0.00	0.00
14.10	14.23	0.00	2.00	0.00	0.00	0.00
14.12	14.53	0.00	2.00	0.00	0.00	0.00
14.14	14.23	0.00	2.00	0.00	0.00	0.00
14.16	14.42	0.00	2.00	0.00	0.00	0.00
14.18	14.18	0.00	2.00	0.00	0.00	0.00
14.20	13.67	0.00	2.00	0.00	0.00	0.00
14.22	13.66	0.00	2.00	0.00	0.00	0.00
14.24	13.24	0.00	2.00	0.00	0.00	0.00
14.26	12.76	0.00	2.00	0.00	0.00	0.00
14.28	12.21	0.00	2.00	0.00	0.00	0.00
14.30	11.55	0.00	2.00	0.00	0.00	0.00
14.32	11.59	0.00	2.00	0.00	0.00	0.00
14.34	11.68	0.00	2.00	0.00	0.00	0.00
14.36	11.80	0.00	2.00	0.00	0.00	0.00
14.38	12.29	0.00	2.00	0.00	0.00	0.00
14.40	12.75	0.00	2.00	0.00	0.00	0.00
14.42	14.10	0.00	2.00	0.00	0.00	0.00
14.44	14.47	0.00	2.00	0.00	0.00	0.00
14.46	15.10	0.00	2.00	0.00	0.00	0.00
14.48	15.11	0.00	2.00	0.00	0.00	0.00
14.50	15.37	0.00	2.00	0.00	0.00	0.00
14.52	15.18	0.00	2.00	0.00	0.00	0.00
14.54	14.95	0.00	2.00	0.00	0.00	0.00
14.56	14.89	0.00	2.00	0.00	0.00	0.00
14.58	14.80	0.00	2.00	0.00	0.00	0.00
14.60	14.72	0.00	2.00	0.00	0.00	0.00
14.62	14.63	0.00	2.00	0.00	0.00	0.00
14.64	14.36	0.00	2.00	0.00	0.00	0.00
14.66	14.24	0.00	2.00	0.00	0.00	0.00
14.68	14.28	0.00	2.00	0.00	0.00	0.00
14.70	14.81	0.00	2.00	0.00	0.00	0.00
14.72	15.18	0.00	2.00	0.00	0.00	0.00
14.74	15.93	0.00	2.00	0.00	0.00	0.00
14.76	16.68	0.00	2.00	0.00	0.00	0.00
14.78	16.92	0.00	2.00	0.00	0.00	0.00
14.80	16.46	0.00	2.00	0.00	0.00	0.00
14.82	15.90	0.00	2.00	0.00	0.00	0.00
14.84	15.80	0.00	2.00	0.00	0.00	0.00
14.86	15.61	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
14.88	15.14	0.00	2.00	0.00	0.00	0.00
14.90	14.55	0.00	2.00	0.00	0.00	0.00
14.92	14.22	0.00	2.00	0.00	0.00	0.00
14.94	14.04	0.00	2.00	0.00	0.00	0.00
14.96	13.64	0.00	2.00	0.00	0.00	0.00
14.98	14.66	0.00	2.00	0.00	0.00	0.00
15.00	14.47	0.00	2.00	0.00	0.00	0.00
15.02	14.62	0.00	2.00	0.00	0.00	0.00
15.04	14.56	0.00	2.00	0.00	0.00	0.00
15.06	14.79	0.00	2.00	0.00	0.00	0.00
15.08	13.52	0.00	2.00	0.00	0.00	0.00
15.10	12.43	0.00	2.00	0.00	0.00	0.00
15.12	11.76	0.00	2.00	0.00	0.00	0.00
15.14	11.23	0.00	2.00	0.00	0.00	0.00
15.16	10.54	0.00	2.00	0.00	0.00	0.00
15.18	9.90	0.00	2.00	0.00	0.00	0.00
15.20	9.47	0.00	2.00	0.00	0.00	0.00
15.22	9.19	0.00	2.00	0.00	0.00	0.00
15.24	9.17	0.00	2.00	0.00	0.00	0.00
15.26	8.91	0.00	2.00	0.00	0.00	0.00
15.28	9.33	0.00	2.00	0.00	0.00	0.00
15.30	9.45	0.00	2.00	0.00	0.00	0.00
15.32	9.76	0.00	2.00	0.00	0.00	0.00
15.34	9.84	0.00	2.00	0.00	0.00	0.00
15.36	9.63	0.00	2.00	0.00	0.00	0.00
15.38	9.44	0.00	2.00	0.00	0.00	0.00
15.40	9.17	0.00	2.00	0.00	0.00	0.00
15.42	9.12	0.00	2.00	0.00	0.00	0.00
15.44	9.28	0.00	2.00	0.00	0.00	0.00
15.46	9.49	0.00	2.00	0.00	0.00	0.00
15.48	9.78	0.00	2.00	0.00	0.00	0.00
15.50	9.91	0.00	2.00	0.00	0.00	0.00
15.52	10.00	0.00	2.00	0.00	0.00	0.00
15.54	9.66	0.00	2.00	0.00	0.00	0.00
15.56	9.41	0.00	2.00	0.00	0.00	0.00
15.58	9.22	0.00	2.00	0.00	0.00	0.00
15.60	9.05	0.00	2.00	0.00	0.00	0.00
15.62	8.97	0.00	2.00	0.00	0.00	0.00
15.64	8.90	0.00	2.00	0.00	0.00	0.00
15.66	8.94	0.00	2.00	0.00	0.00	0.00
15.68	8.84	0.00	2.00	0.00	0.00	0.00
15.70	8.67	0.00	2.00	0.00	0.00	0.00
15.72	8.46	0.00	2.00	0.00	0.00	0.00
15.74	8.19	0.00	2.00	0.00	0.00	0.00
15.76	8.10	0.00	2.00	0.00	0.00	0.00
15.78	8.07	0.00	2.00	0.00	0.00	0.00
15.80	8.26	0.00	2.00	0.00	0.00	0.00
15.82	8.61	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
15.84	8.86	0.00	2.00	0.00	0.00	0.00
15.86	8.92	0.00	2.00	0.00	0.00	0.00
15.88	9.15	0.00	2.00	0.00	0.00	0.00
15.90	9.29	0.00	2.00	0.00	0.00	0.00
15.92	9.76	0.00	2.00	0.00	0.00	0.00
15.94	10.18	0.00	2.00	0.00	0.00	0.00
15.96	10.54	0.00	2.00	0.00	0.00	0.00
15.98	13.05	0.00	2.00	0.00	0.00	0.00
16.00	11.65	0.00	2.00	0.00	0.00	0.00
16.02	10.93	0.00	2.00	0.00	0.00	0.00
16.04	10.14	0.00	2.00	0.00	0.00	0.00
16.06	9.66	0.00	2.00	0.00	0.00	0.00
16.08	9.36	0.00	2.00	0.00	0.00	0.00
16.10	9.16	0.00	2.00	0.00	0.00	0.00
16.12	9.13	0.00	2.00	0.00	0.00	0.00
16.14	8.97	0.00	2.00	0.00	0.00	0.00
16.16	9.20	0.00	2.00	0.00	0.00	0.00
16.18	9.28	0.00	2.00	0.00	0.00	0.00
16.20	9.45	0.00	2.00	0.00	0.00	0.00
16.22	10.04	0.00	2.00	0.00	0.00	0.00
16.24	10.58	0.00	2.00	0.00	0.00	0.00
16.26	10.92	0.00	2.00	0.00	0.00	0.00
16.28	11.00	0.00	2.00	0.00	0.00	0.00
16.30	11.45	0.00	2.00	0.00	0.00	0.00
16.32	11.85	0.00	2.00	0.00	0.00	0.00
16.34	12.39	0.00	2.00	0.00	0.00	0.00
16.36	13.02	0.00	2.00	0.00	0.00	0.00
16.38	12.32	0.00	2.00	0.00	0.00	0.00
16.40	11.75	0.00	2.00	0.00	0.00	0.00
16.42	11.41	0.00	2.00	0.00	0.00	0.00
16.44	11.22	0.00	2.00	0.00	0.00	0.00
16.46	11.76	0.00	2.00	0.00	0.00	0.00
16.48	12.17	0.00	2.00	0.00	0.00	0.00
16.50	12.59	0.00	2.00	0.00	0.00	0.00
16.52	12.36	0.00	2.00	0.00	0.00	0.00
16.54	11.97	0.00	2.00	0.00	0.00	0.00
16.56	11.90	0.00	2.00	0.00	0.00	0.00
16.58	11.63	0.00	2.00	0.00	0.00	0.00
16.60	11.94	0.00	2.00	0.00	0.00	0.00
16.62	13.02	0.00	2.00	0.00	0.00	0.00
16.64	13.60	0.00	2.00	0.00	0.00	0.00
16.66	14.66	0.00	2.00	0.00	0.00	0.00
16.68	14.87	0.00	2.00	0.00	0.00	0.00
16.70	15.13	0.00	2.00	0.00	0.00	0.00
16.72	13.90	0.00	2.00	0.00	0.00	0.00
16.74	11.88	0.00	2.00	0.00	0.00	0.00
16.76	11.20	0.00	2.00	0.00	0.00	0.00
16.78	11.23	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
16.80	12.37	0.00	2.00	0.00	0.00	0.00
16.82	13.60	0.00	2.00	0.00	0.00	0.00
16.84	13.11	0.00	2.00	0.00	0.00	0.00
16.86	13.02	0.00	2.00	0.00	0.00	0.00
16.88	13.25	0.00	2.00	0.00	0.00	0.00
16.90	13.25	0.00	2.00	0.00	0.00	0.00
16.92	12.57	0.00	2.00	0.00	0.00	0.00
16.94	12.34	0.00	2.00	0.00	0.00	0.00
16.96	16.03	0.00	2.00	0.00	0.00	0.00
16.98	14.90	0.00	2.00	0.00	0.00	0.00
17.00	13.90	0.00	2.00	0.00	0.00	0.00
17.02	12.75	0.00	2.00	0.00	0.00	0.00
17.04	12.15	0.00	2.00	0.00	0.00	0.00
17.06	12.15	0.00	2.00	0.00	0.00	0.00
17.08	11.90	0.00	2.00	0.00	0.00	0.00
17.10	11.91	0.00	2.00	0.00	0.00	0.00
17.12	12.35	0.00	2.00	0.00	0.00	0.00
17.14	12.44	0.00	2.00	0.00	0.00	0.00
17.16	13.15	0.00	2.00	0.00	0.00	0.00
17.18	13.60	0.00	2.00	0.00	0.00	0.00
17.20	14.39	0.00	2.00	0.00	0.00	0.00
17.22	15.02	0.00	2.00	0.00	0.00	0.00
17.24	15.20	0.00	2.00	0.00	0.00	0.00
17.26	13.88	0.00	2.00	0.00	0.00	0.00
17.28	12.48	0.00	2.00	0.00	0.00	0.00
17.30	12.00	0.00	2.00	0.00	0.00	0.00
17.32	11.48	0.00	2.00	0.00	0.00	0.00
17.34	11.45	0.00	2.00	0.00	0.00	0.00
17.36	11.54	0.00	2.00	0.00	0.00	0.00
17.38	11.50	0.00	2.00	0.00	0.00	0.00
17.40	11.52	0.00	2.00	0.00	0.00	0.00
17.42	11.40	0.00	2.00	0.00	0.00	0.00
17.44	11.69	0.00	2.00	0.00	0.00	0.00
17.46	12.39	0.00	2.00	0.00	0.00	0.00
17.48	12.88	0.00	2.00	0.00	0.00	0.00
17.50	13.18	0.00	2.00	0.00	0.00	0.00
17.52	14.22	0.00	2.00	0.00	0.00	0.00
17.54	14.96	0.00	2.00	0.00	0.00	0.00
17.56	15.20	0.00	2.00	0.00	0.00	0.00
17.58	14.21	0.00	2.00	0.00	0.00	0.00
17.60	13.19	0.00	2.00	0.00	0.00	0.00
17.62	13.04	0.00	2.00	0.00	0.00	0.00
17.64	13.73	0.00	2.00	0.00	0.00	0.00
17.66	14.46	0.00	2.00	0.00	0.00	0.00
17.68	14.39	0.00	2.00	0.00	0.00	0.00
17.70	13.70	0.00	2.00	0.00	0.00	0.00
17.72	13.21	0.00	2.00	0.00	0.00	0.00
17.74	13.05	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
17.76	12.60	0.00	2.00	0.00	0.00	0.00
17.78	12.05	0.00	2.00	0.00	0.00	0.00
17.80	11.55	0.00	2.00	0.00	0.00	0.00
17.82	11.32	0.00	2.00	0.00	0.00	0.00
17.84	10.85	0.00	2.00	0.00	0.00	0.00
17.86	10.92	0.00	2.00	0.00	0.00	0.00
17.88	11.04	0.00	2.00	0.00	0.00	0.00
17.90	10.75	0.00	2.00	0.00	0.00	0.00
17.92	10.75	0.00	2.00	0.00	0.00	0.00
17.94	10.61	0.00	2.00	0.00	0.00	0.00
17.96	10.44	0.00	2.00	0.00	0.00	0.00
17.98	13.25	0.00	2.00	0.00	0.00	0.00
18.00	12.41	0.00	2.00	0.00	0.00	0.00
18.02	11.95	0.00	2.00	0.00	0.00	0.00
18.04	11.24	0.00	2.00	0.00	0.00	0.00
18.06	10.58	0.00	2.00	0.00	0.00	0.00
18.08	10.25	0.00	2.00	0.00	0.00	0.00
18.10	9.95	0.00	2.00	0.00	0.00	0.00
18.12	10.27	0.00	2.00	0.00	0.00	0.00
18.14	10.42	0.00	2.00	0.00	0.00	0.00
18.16	10.28	0.00	2.00	0.00	0.00	0.00
18.18	10.17	0.00	2.00	0.00	0.00	0.00
18.20	10.21	0.00	2.00	0.00	0.00	0.00
18.22	10.51	0.00	2.00	0.00	0.00	0.00
18.24	10.37	0.00	2.00	0.00	0.00	0.00
18.26	9.77	0.00	2.00	0.00	0.00	0.00
18.28	9.36	0.00	2.00	0.00	0.00	0.00
18.30	9.14	0.00	2.00	0.00	0.00	0.00
18.32	9.22	0.00	2.00	0.00	0.00	0.00
18.34	9.27	0.00	2.00	0.00	0.00	0.00
18.36	9.21	0.00	2.00	0.00	0.00	0.00
18.38	9.53	0.00	2.00	0.00	0.00	0.00
18.40	10.34	0.00	2.00	0.00	0.00	0.00
18.42	10.78	0.00	2.00	0.00	0.00	0.00
18.44	11.03	0.00	2.00	0.00	0.00	0.00
18.46	10.97	0.00	2.00	0.00	0.00	0.00
18.48	10.81	0.00	2.00	0.00	0.00	0.00
18.50	10.88	0.00	2.00	0.00	0.00	0.00
18.52	11.32	0.00	2.00	0.00	0.00	0.00
18.54	11.74	0.00	2.00	0.00	0.00	0.00
18.56	12.04	0.00	2.00	0.00	0.00	0.00
18.58	12.82	0.00	2.00	0.00	0.00	0.00
18.60	14.55	0.00	2.00	0.00	0.00	0.00
18.62	15.81	0.00	2.00	0.00	0.00	0.00
18.64	16.00	0.00	2.00	0.00	0.00	0.00
18.66	17.23	0.00	2.00	0.00	0.00	0.00
18.68	17.33	0.00	2.00	0.00	0.00	0.00
18.70	17.09	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	q _{c1N,cs}	Gamma _{lim} (%)	FS	Fa	Gamma _{max} (%)	LDI
18.72	15.51	0.00	2.00	0.00	0.00	0.00
18.74	13.48	0.00	2.00	0.00	0.00	0.00
18.76	12.15	0.00	2.00	0.00	0.00	0.00
18.78	10.81	0.00	2.00	0.00	0.00	0.00
18.80	9.39	0.00	2.00	0.00	0.00	0.00
18.82	9.98	0.00	2.00	0.00	0.00	0.00
18.84	11.23	0.00	2.00	0.00	0.00	0.00
18.86	11.29	0.00	2.00	0.00	0.00	0.00
18.88	10.91	0.00	2.00	0.00	0.00	0.00
18.90	10.74	0.00	2.00	0.00	0.00	0.00
18.92	10.96	0.00	2.00	0.00	0.00	0.00
18.94	10.76	0.00	2.00	0.00	0.00	0.00
18.96	10.01	0.00	2.00	0.00	0.00	0.00
18.98	12.24	0.00	2.00	0.00	0.00	0.00
19.00	10.41	0.00	2.00	0.00	0.00	0.00
19.02	9.48	0.00	2.00	0.00	0.00	0.00
19.04	8.71	0.00	2.00	0.00	0.00	0.00
19.06	8.40	0.00	2.00	0.00	0.00	0.00
19.08	10.12	0.00	2.00	0.00	0.00	0.00
19.10	12.36	0.00	2.00	0.00	0.00	0.00
19.12	13.87	0.00	2.00	0.00	0.00	0.00
19.14	14.39	0.00	2.00	0.00	0.00	0.00
19.16	15.72	0.00	2.00	0.00	0.00	0.00
19.18	19.56	0.00	2.00	0.00	0.00	0.00
19.20	81.20	0.48	0.67	0.91	0.48	0.96
19.22	81.15	0.48	0.67	0.91	0.48	0.96
19.24	21.02	0.00	2.00	0.00	0.00	0.00
19.26	17.57	0.00	2.00	0.00	0.00	0.00
19.28	15.54	0.00	2.00	0.00	0.00	0.00
19.30	13.83	0.00	2.00	0.00	0.00	0.00
19.32	13.94	0.00	2.00	0.00	0.00	0.00
19.34	12.63	0.00	2.00	0.00	0.00	0.00
19.36	10.75	0.00	2.00	0.00	0.00	0.00
19.38	9.42	0.00	2.00	0.00	0.00	0.00
19.40	8.52	0.00	2.00	0.00	0.00	0.00
19.42	8.61	0.00	2.00	0.00	0.00	0.00
19.44	9.21	0.00	2.00	0.00	0.00	0.00
19.46	9.84	0.00	2.00	0.00	0.00	0.00
19.48	10.05	0.00	2.00	0.00	0.00	0.00
19.50	9.42	0.00	2.00	0.00	0.00	0.00
19.52	8.87	0.00	2.00	0.00	0.00	0.00
19.54	9.19	0.00	2.00	0.00	0.00	0.00
19.56	11.96	0.00	2.00	0.00	0.00	0.00
19.58	13.27	0.00	2.00	0.00	0.00	0.00
19.60	11.62	0.00	2.00	0.00	0.00	0.00
19.62	9.63	0.00	2.00	0.00	0.00	0.00
19.64	8.72	0.00	2.00	0.00	0.00	0.00
19.66	8.74	0.00	2.00	0.00	0.00	0.00

:: Estimation of post-earthquake lateral Displacements :: (continued)

Depth (m)	$q_{c1N,cs}$	Gamma_{lim} (%)	FS	Fa	Gamma_{max} (%)	LDI
19.68	9.13	0.00	2.00	0.00	0.00	0.00
19.70	9.58	0.00	2.00	0.00	0.00	0.00
19.72	9.92	0.00	2.00	0.00	0.00	0.00
19.74	10.20	0.00	2.00	0.00	0.00	0.00
19.76	10.17	0.00	2.00	0.00	0.00	0.00
19.78	9.73	0.00	2.00	0.00	0.00	0.00
19.80	9.35	0.00	2.00	0.00	0.00	0.00
19.82	8.92	0.00	2.00	0.00	0.00	0.00
19.84	8.52	0.00	2.00	0.00	0.00	0.00
19.86	8.58	0.00	2.00	0.00	0.00	0.00
19.88	8.72	0.00	2.00	0.00	0.00	0.00
19.90	9.04	0.00	2.00	0.00	0.00	0.00
19.92	9.33	0.00	2.00	0.00	0.00	0.00
19.94	9.54	0.00	2.00	0.00	0.00	0.00
19.96	8.38	0.00	2.00	0.00	0.00	0.00
19.98	12.46	0.00	2.00	0.00	0.00	0.00
20.00	13.25	0.00	2.00	0.00	0.00	0.00

Total estimated displacement: 51.19**Abbreviations**

Depth: Depth of test point
 $q_{c1N,cs}$: Adjusted and corrected cone resistance due to fines
 Gamma_{lim} : Limiting shear strain
FS: Calculated factor of safety against liquefaction
Fa:
 Gamma_{max} : Maximum cyclic shear strain
Lat. disp.: Lateral displacement