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# MARKTEKNISK UNDERSÖKNINGSRAPPORT, GEOTEKNIK

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SIGNS OF THE TIMES

## Detaljplanutredning Vivstavarv

UPPDRAGSNUMMER 13012189



DEL I DETALJPLAN

2020-12-07

GEOTEKNIK SUNDSVALL

JOHANNA OLSSON



## Innehållsförteckning

<b>1</b>	<b>Objekt</b>	<b>3</b>
<b>2</b>	<b>Syfte</b>	<b>3</b>
<b>3</b>	<b>Underlag</b>	<b>3</b>
<b>4</b>	<b>Styrande dokument</b>	<b>3</b>
<b>5</b>	<b>Geotekniska kategori</b>	<b>4</b>
<b>6</b>	<b>Positionering</b>	<b>4</b>
<b>7</b>	<b>Geotekniska fältundersökningar och fältprovtagningar</b>	<b>5</b>
7.1	Utförda fältförsök	5
7.2	Utförda fältprovtagningar	5
7.3	Undersökningsperiod	5
7.4	Fältingenjör	5
7.5	Övrigt	5
<b>8</b>	<b>Geotekniska laboratorieundersökningar</b>	<b>5</b>
8.1	Utförda undersökningar	5
<b>9</b>	<b>Miljötekniska undersökningar</b>	<b>5</b>
<b>10</b>	<b>Hydrologiska undersökningar</b>	<b>6</b>
<b>11</b>	<b>Härledda värden</b>	<b>6</b>
<b>12</b>	<b>Värdering av undersökning</b>	<b>9</b>
12.1	Generellt	9
12.2	Avvikelser	9

## **Bilagor**

B01 Conrad-utvärdering

B02 Laboratorieundersökningar

## **Ritningar**

G-10.1-001 Plan

G-10.2-001 Sektion A – A & B – B

## 1 Objekt

På uppdrag av Signs of the times har Sweco utfört geotekniska undersökningar för detaljplaneutredning för kontroll av jordens översiktliga hållfasthet samt parametrar vid Vivstavarv. På fastigheterna Vivstavarv 1:92 samt 1:103 planeras nybyggnation av bostäder som ligger i Vivstavarv, Timrå kommun, Västernorrlands län, se figur 1.



Figur 1 Översiktlig områdesbild

## 2 Syfte

Syftet med de geotekniska undersökningarna har varit att utreda jordens materialegenskaper, så som elasticitetsmodul och friktionsvinkel samt kontroll av grundvattennivå i området.

## 3 Underlag

Inom området har det utförts geotekniska undersökningar för kontroll av befintlig fyllning. De handlingar som har varit underlag till denna rapport är:

- SGU:s jordartskarta
- PM Utredningsbehov för detaljplan för Vivstavarv 1:92 och 1:103, Timrå Kommun

## 4 Styrande dokument

- SS-EN 1997-1 med tillhörande nationell bilaga
- TR Geo 13, version 2.
- SGF Fälthandbok 1: 2013

SGF Beteckningssystem denna rapport ansluter till SS-EN 1997-1 och SS-EN 1997-2, med tillhörande nationell bilaga BFS 2013:10 – EKS 10.

Tabell 1. Planering och redovisning

Undersökningsmetod	Standard eller annat styrande dokument
Fältplanering	SS-EN 1997-2
Fältutförande	Geoteknisk fälthandbok SGF Rapport 1:2013 samt SS-EN-ISO 22475-1, SS-EN-1997-1 och SS-EN 1997-2
Beteckningssystem	SGF/BGS beteckningssystem Version 2001:2 med kompletterande beteckningsblad 2016

Tabell 2. Fältundersökningar – sondering, in-situ

Undersökningsmetod	Standard eller annat styrande dokument
Cone penetration test (CPT)	SGF Rapport 1:93

Tabell 3. Fältundersökningar - provtagning

Undersökningsmetod	Standard eller annat styrande dokument
Störd provtagning med skruvborr (Skr)	SS-EN ISO 22475-1:2006 och SGF Rapport 3:99. Provtagningskategori B, kvalitetsklass 3-4

Tabell 4. Laboratorieundersökningar

Undersökningsmetod	Standard eller annat styrande dokument
Okulär jordartsklassning	SS-EN ISO 14688-1 och 14688-2
Jordartsförkortning	Beteckningsblad IEG 2011-05-08 (Bilaga C IEG Rapport 13:2010)
Materialtyp och tjälfarlighetsklass	AMA Anläggning 17
Lab-undersökningar	Uppgifter om standard eller andra styrande dokument ges på tabeller, diagram m.m. samt även i Försöksrapport – Lab.

## 5 Geotekniska kategori

Undersökningarna har utförts i omfattning och typ med förutsättning att de geotekniska förutsättningarna för objektet och tillhörande arbeten omfattas av geoteknisk kategori 2 (GK2).

## 6 Positionering

Inmätning och utsättning har utförts av undersökningspunkterna har utförts med GPS med nätverks RTK. Inmätning och utsättning har utförts vecka 43 år 2020 av Erik Salmelin, Sweco Civil AB.

Koordinatsystem i plan: SWEREF99 17 15  
Höjdsystem: RH 2000

4(9)

MARKTEKNISK UNDERSÖKNINGSRAPPORT, GEOTEKNIK  
2020-12-07  
DEL I DETALJPLAN  
DETALJPLANUTREDNING VIVSTAVARV

## 7 Geotekniska fältundersökningar och fältprovtagningar

### 7.1 Utförda fältförsök

Provtagning är utförd med geoteknisk borrhandsvagn Geotech 605.

Utförda fältundersökningar omfattar följande:

- Cone penetration test (CPT) 5 st

### 7.2 Utförda fältprovtagningar

Provtagning är utförd med geoteknisk borrhandsvagn Geotech 605.

Utförda fältprovtagningar omfattar följande:

- Skruvprovtagning (Skr) 4 st

### 7.3 Undersökningsperiod

Provtagningar är utförda under vecka 43 år 2020.

### 7.4 Fältingenjör

Fältarbetet med borrhandsvagn Geotech 605 har utförts under ledning av Erik Salmelin, fältingenjör på Sweco Civil AB.

### 7.5 Övrigt

Undersökningspunkterna är inlagda i en databas (GeoSuite). Lägesdata (x, y, z) kan på begäran erhållas digitalt eller i tabell.

## 8 Geotekniska laboratorieundersökningar

### 8.1 Utförda undersökningar

I detta skede har laboratorieundersökningar utförts av Swecos Geolab i Sundsvall. Laboratorieundersökningarna är utförd vecka 48 år 2020. Dessa undersökningar har utförts:

- 3 st siktanalyser

## 9 Miljötekniska undersökningar

I detta skede har fem miljötekniska undersökningspunkter undersökts där dessa är uppdelade i fyra miljöprovtagningar och ett samlingsprov intill tidigare husbyggnad. Dessa miljöprovtagningar har utförts för kontroll av eventuella bekämpningsmedel. För ingående resultat se *Markteknisk markundersökning Vivstavarv 1:92 och 1:103, Sweco Civil AB*, daterad 2020-12-07.

## 10 Hydrologiska undersökningar

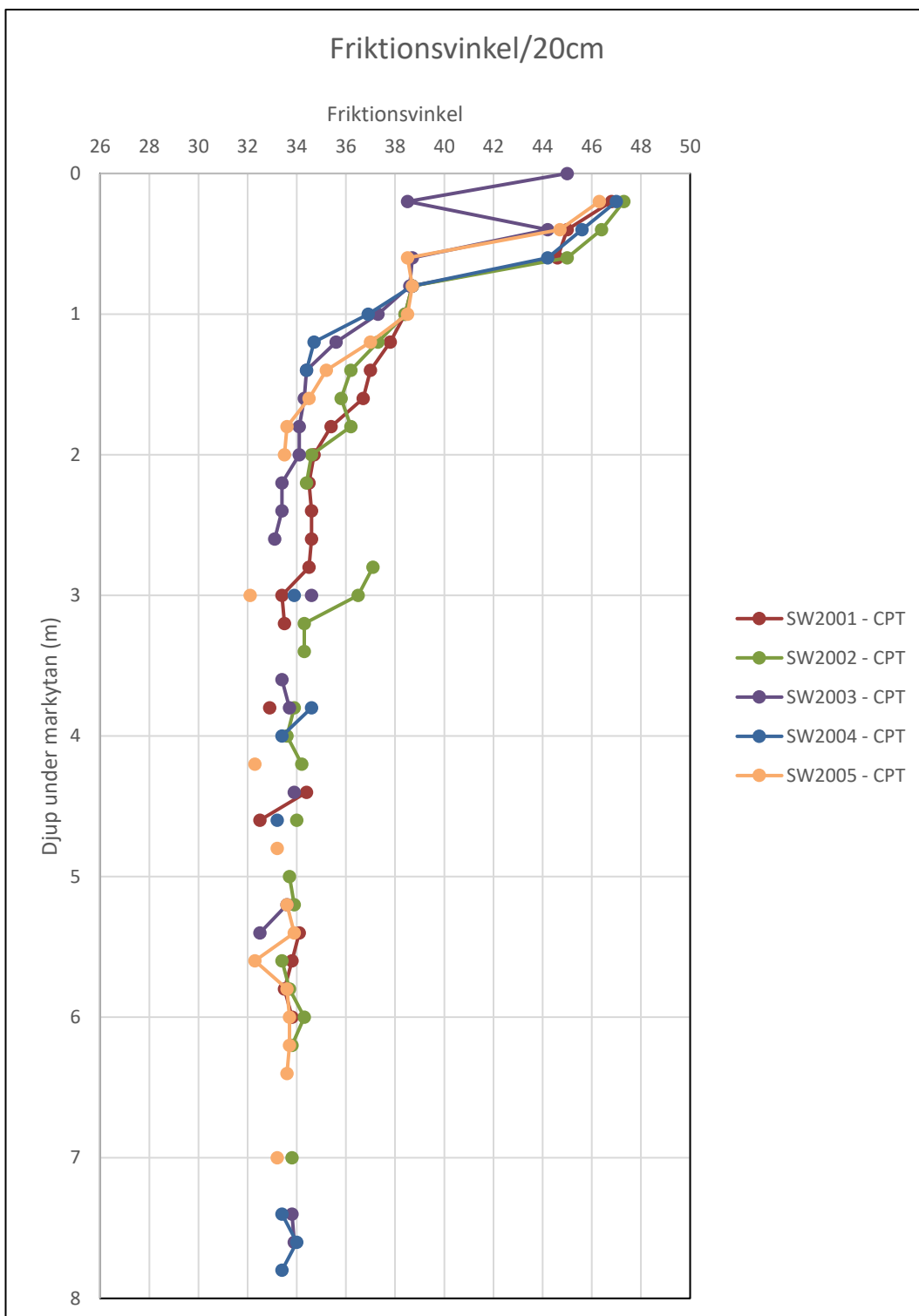
I punkt SW2004 installerades ett grundvattenrör, 25 mm PVC-rör. Grundvattenytan påträffades vid installationstillfället ligga på en nivå av +6,3 vilket ger en grundvattenyta på 0,4 m under befintlig markyta.

Ytterligare lodning utfördes 25e november år 2020 då grundvattenytan påträffades ligga på en nivå av +6,1 vilket ger en grundvattenyta på 0,6 m under befintlig markyta.

## 11 Härledda värden

Nedan (figur 2-3) kan en sammanställning av friktionsvinkel samt e-modulsutvärderingar från utförd cone penetration test, CPT. Friktionsvinkel och elasticitetsmodul från cone penetration test har utvärderats utifrån Conradutvärdering.





Figur 2 Friktionsvinkel utvärderar från CPT-sondering.



## 12 Värdering av undersökning

### 12.1 Generellt

Skruvprovtagning med borrhandsvagn och underlättaren har utförts för att bestämma jordlagerföljd.

CPT-sondering har utförts för att kontrollera jordens fasthet.

### 12.2 Avvikelser

Inga avvikelser har påträffats för utförda sonderingar.

#### **Sweco Civil AB**

Geoteknik Sundsvall/Härnösand/Östersund

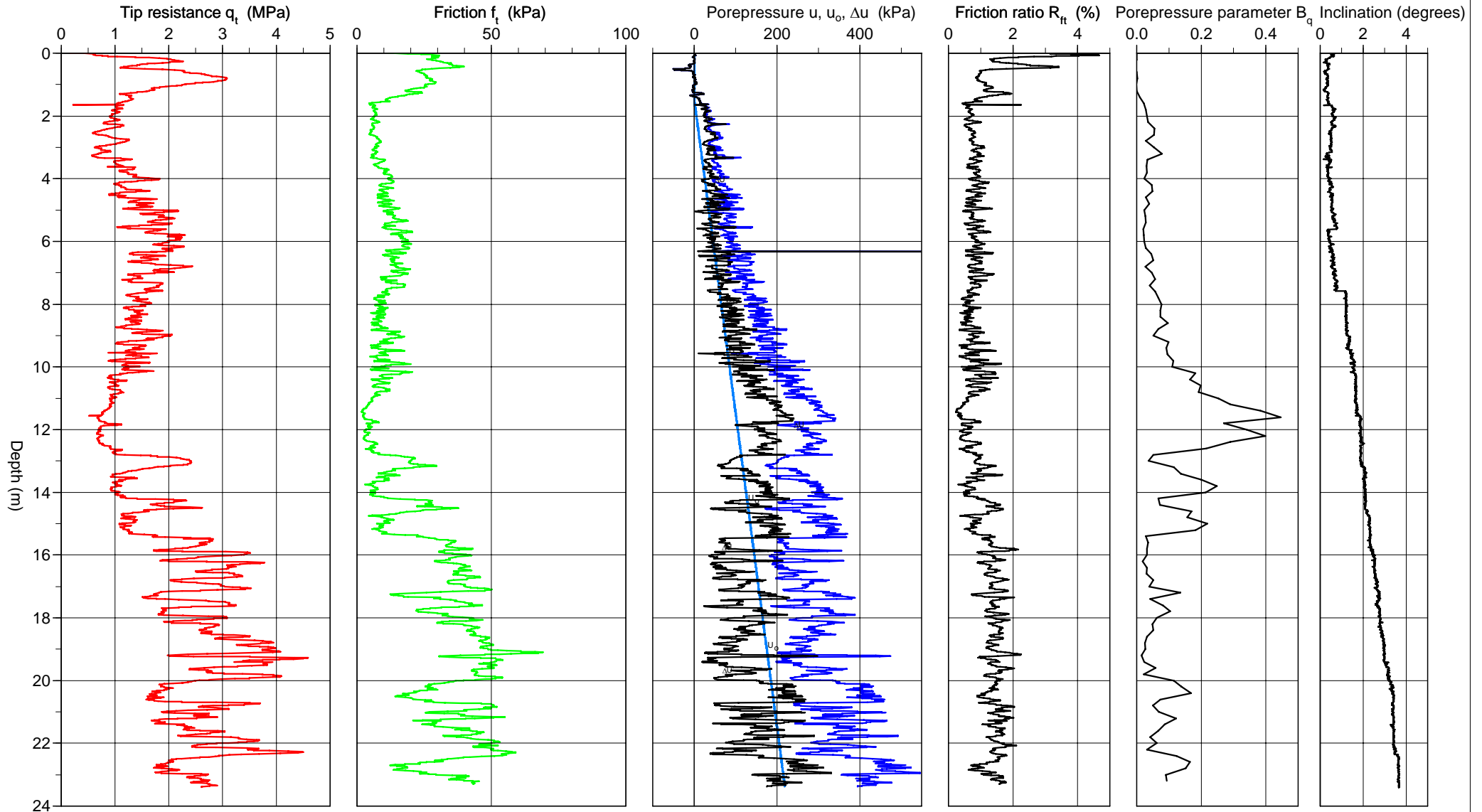
Johanna Olsson  
*Handläggare geoteknik*

Carolina Westdahl  
*Teknisk granskare geoteknik*

# CPT-test performed according to EN ISO 22476-1

Predrilling depth	0.00 m	Reference	my	Fluid in filter	Ffett och olja
Start depth	0.00 m	Level at reference		Coordinats	
Stop depth	23.43 m	Predrilled material	mulljord	Equipment	Geotech Nova cone 4921
Ground water level	1.50 m	Geometry	Normal	Cone nr	4921

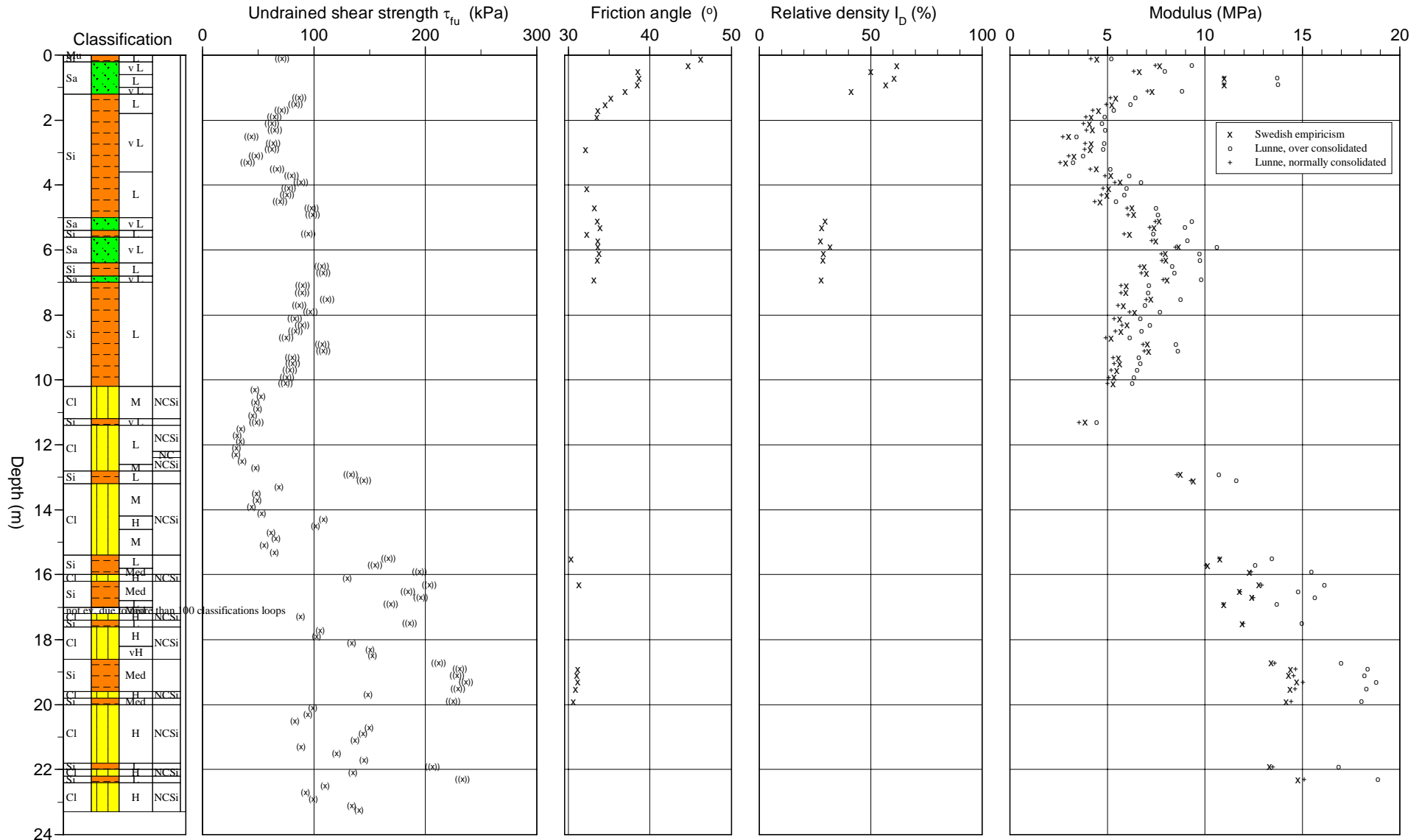
Project	Detaljplan Vivstavarv
Project nr	13012189
Site	
Designation	SW2005
Date	2020-10-15



# CPT test evaluated according to SGI Information 15 rev. 2007

Reference my                      Predrilling depth 0.00 m                      Evaluator SEJHJN  
 Level at reference                      Predrilled material mulljord                      Evaluation date 2020-11-18  
 Ground water level 1.50 m                      Equipment Geotech Nova cone 4921  
 Start depth 0.00 m                      Geometry Normal

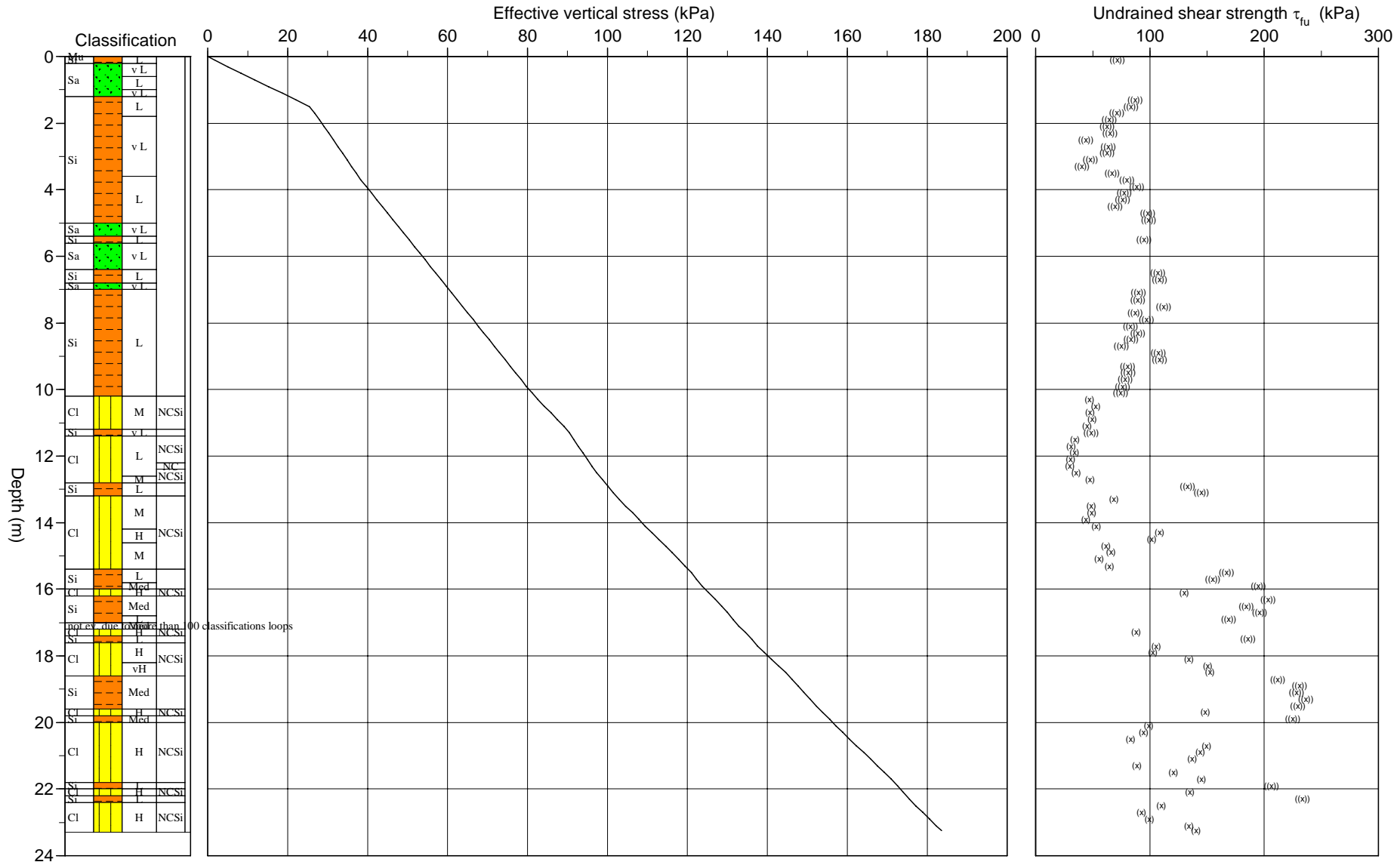
Project Detaljplan Vivstavarv  
 Project nr 13012189  
 Site  
 Designation SW2005  
 Date 2020-10-15



# CPT test evaluated according to SGI Information 15 rev. 2007

Reference my                      Predrilling depth 0.00 m                      Evaluator SEJHJN  
 Ground water level                      Predrilled material mulljord                      Evaluation date 2020-11-18  
 Grundvattenyta 1.50 m                      Equipment Geotech Nova cone 4921  
 Start depth 0.00 m                      Geometry Normal

Project Detaljplan Vivstavarv  
 Project nr 13012189  
 Site  
 Designation SW2005  
 Date 2020-10-15



# C P T - test

<b>Project</b> <b>Detaljplan Vivstavarv</b> <b>13012189</b>		<b>Site</b> <b>Designation SW2005</b> <b>Date 2020-10-15</b>																			
Predrilling depth 0.00 m Start depth 0.00 m Stop depth 23.43 m Ground water level 1.50 m Reference my Level at reference	Predrilled material mulljord Geometry Normal Fluid in filter Ffett och olja Operator Erik Salmelin Equipment Geotech Nova cone 4921 <input checked="" type="checkbox"/> Porepressure measurement																				
<b>Calibration data</b> Cone 4921 Internal friction $O_c$ 0.0 kPa Date 2020-02-25 Internal friction $O_f$ 0.0 kPa Areafactor a 0.838 Cross talk $c_1$ 0.000 Areafactor b 0.000 Cross talk $c_2$ 0.000		<b>Cero values, kPa</b> <table border="1"> <thead> <tr> <th></th> <th>Porepressure</th> <th>Friction</th> <th>Tip resistance</th> </tr> </thead> <tbody> <tr> <td>Before</td> <td>264.20</td> <td>117.20</td> <td>7.38</td> </tr> <tr> <td>After</td> <td>349.10</td> <td>113.40</td> <td>7.38</td> </tr> <tr> <td>Diff</td> <td>84.90</td> <td>-3.80</td> <td>0.00</td> </tr> </tbody> </table>			Porepressure	Friction	Tip resistance	Before	264.20	117.20	7.38	After	349.10	113.40	7.38	Diff	84.90	-3.80	0.00		
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Porepressure		Friction		Tip resistance																	
Range	Code	Range	Code	Range	Code																
<input type="checkbox"/> Use scale factors																					
<b>Porepressure observations</b> <table border="1"> <thead> <tr> <th>Depth (m)</th> <th>Porepressure (kPa)</th> </tr> </thead> <tbody> <tr> <td>1.50</td> <td>0.00</td> </tr> </tbody> </table>		Depth (m)	Porepressure (kPa)	1.50	0.00	<b>Boundaries</b> <table border="1"> <thead> <tr> <th>Depth (m)</th> </tr> </thead> <tbody> <tr> <td></td> </tr> </tbody> </table>		Depth (m)													
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<b>Notes</b>  																					

## C P T - test

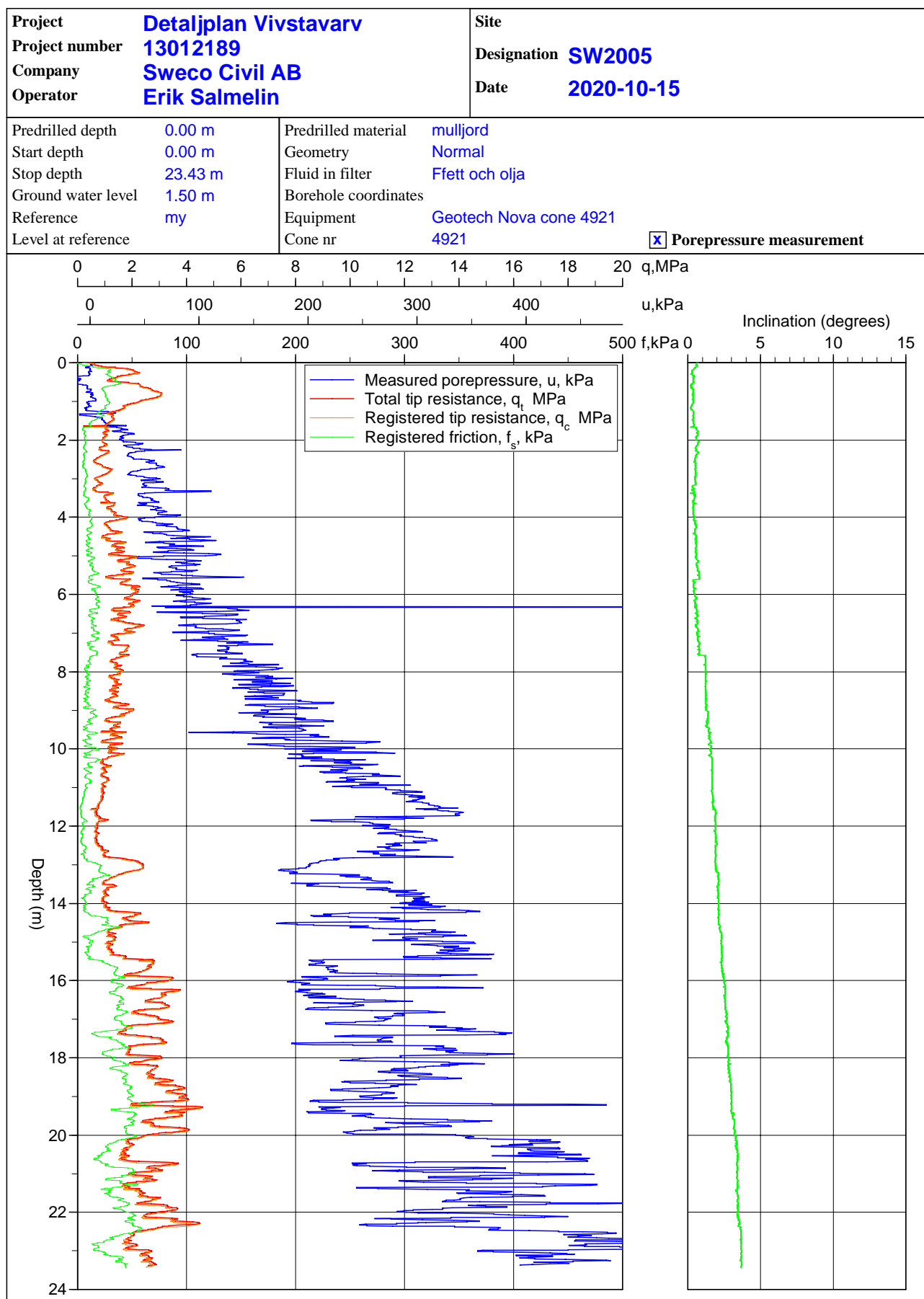
Project					Site									
Detaljplan Vivstavarv 13012189					Designation SW2005 Date 2020-10-15									
Depth (m)		Classification	$\rho$ t/m <sup>3</sup>	$w_L$	$\tau_{fu}$ kPa	$\phi$ °	$\sigma_{vo}$ kPa	$\sigma'_{vo}$ kPa	$\sigma'_c$ kPa	OCR	$I_D$ %	E MPa	$M_{OC}$ MPa	$M_{NC}$ MPa
From	To													
0.00	0.00	Mu	1.60				0.0	0.0						
0.00	0.20	Si L	1.70		((71.5))	(46.3)	1.7	1.7			4.5	5.2	4.2	
0.20	0.40	Sa v L	1.70			44.7	5.0	5.0		61.8	7.7	9.3	7.5	
0.40	0.60	Sa v L	1.70			38.5	8.3	8.3		49.9	6.6	7.9	6.4	
0.60	0.80	Sa L	1.80			38.7	11.8	11.8		60.6	11.0	13.7	11.0	
0.80	1.00	Sa L	1.80			38.5	15.3	15.3		56.9	11.0	13.7	11.0	
1.00	1.20	Sa v L	1.70			37.0	18.7	18.7		41.3	7.3	8.8	7.1	
1.20	1.40	Si L	1.70		((87.0))	(35.2)	22.1	22.1			5.4	6.4	5.1	
1.40	1.60	Si L	1.70		((83.5))	(34.5)	25.4	25.4			5.2	6.2	4.9	
1.60	1.80	Si L	1.70		((71.2))	(33.6)	28.7	26.7			4.5	5.3	4.2	
1.80	2.00	Si v L	1.60		((64.6))	(33.5)	32.0	28.0			4.2	4.8	3.9	
2.00	2.20	Si v L	1.60		((62.7))		35.1	29.1			4.1	4.7	3.8	
2.20	2.40	Si v L	1.60		((64.9))		38.3	30.3			4.2	4.9	3.9	
2.40	2.60	Si v L	1.60		((43.9))		41.4	31.4			3.0	3.4	2.7	
2.60	2.80	Si v L	1.60		((63.4))		44.5	32.5			4.2	4.8	3.9	
2.80	3.00	Si v L	1.60		((62.6))	(32.1)	47.7	33.7			4.1	4.8	3.8	
3.00	3.20	Si v L	1.60		((48.0))		50.8	34.8			3.3	3.7	3.0	
3.20	3.40	Si v L	1.60		((40.7))		54.0	36.0			2.9	3.2	2.6	
3.40	3.60	Si v L	1.60		((67.0))		57.1	37.1			4.4	5.1	4.1	
3.60	3.80	Si L	1.70		((80.2))		60.3	38.3			5.2	6.1	4.9	
3.80	4.00	Si L	1.70		((88.3))		63.7	39.7			5.7	6.7	5.4	
4.00	4.20	Si L	1.70		((77.6))	(32.3)	67.0	41.0			5.1	6.0	4.8	
4.20	4.40	Si L	1.70		((75.8))		70.3	42.3			5.0	5.8	4.7	
4.40	4.60	Si L	1.70		((69.6))		73.7	43.7			4.6	5.4	4.3	
4.60	4.80	Si L	1.70		((97.9))	(33.2)	77.0	45.0			6.3	7.5	6.0	
4.80	5.00	Si L	1.70		((99.0))		80.3	46.3			6.3	7.6	6.1	
5.00	5.20	Sa v L	1.70			33.6	83.7	47.7		29.4	7.7	9.3	7.4	
5.20	5.40	Sa v L	1.70			33.9	87.0	49.0		28.0	7.4	9.0	7.2	
5.40	5.60	Si L	1.70		((94.9))	(32.3)	90.4	50.4			6.1	7.3	5.9	
5.60	5.80	Sa v L	1.70			33.6	93.7	51.7		27.6	7.5	9.1	7.3	
5.80	6.00	Sa v L	1.70			33.7	97.0	53.0		31.6	8.6	10.6	8.5	
6.00	6.20	Sa v L	1.70			33.7	100.4	54.4		28.8	8.0	9.7	7.8	
6.20	6.40	Sa v L	1.70			33.6	103.7	55.7		28.5	8.0	9.7	7.8	
6.40	6.60	Si L	1.70		((107.2))		107.0	57.0			6.9	8.3	6.6	
6.60	6.80	Si L	1.70		((108.7))		110.4	58.4			7.0	8.4	6.7	
6.80	7.00	Sa v L	1.70			33.2	113.7	59.7		27.7	8.0	9.8	7.8	
7.00	7.20	Si L	1.70		((90.1))		117.0	61.0			6.0	7.1	5.7	
7.20	7.40	Si L	1.70		((89.6))		120.4	62.4			6.0	7.1	5.7	
7.40	7.60	Si L	1.70		((112.0))		123.7	63.7			7.2	8.7	7.0	
7.60	7.80	Si L	1.70		((86.8))		127.0	65.0			5.8	6.9	5.5	
7.80	8.00	Si L	1.70		((96.8))		130.4	66.4			6.4	7.7	6.1	
8.00	8.20	Si L	1.70		((82.9))		133.7	67.7			5.6	6.7	5.3	
8.20	8.40	Si L	1.70		((89.3))		137.0	69.0			6.0	7.2	5.7	
8.40	8.60	Si L	1.70		((83.2))		140.4	70.4			5.7	6.7	5.4	
8.60	8.80	Si L	1.70		((74.8))		143.7	71.7			5.2	6.1	4.9	
8.80	9.00	Si L	1.70		((107.4))		147.1	73.1			7.1	8.5	6.8	
9.00	9.20	Si L	1.70		((108.2))		150.4	74.4			7.1	8.6	6.9	
9.20	9.40	Si L	1.70		((80.4))		153.7	75.7			5.6	6.6	5.3	
9.40	9.60	Si L	1.70		((81.2))		157.1	77.1			5.6	6.7	5.3	
9.60	9.80	Si L	1.70		((78.7))		160.4	78.4			5.5	6.5	5.2	
9.80	10.00	Si L	1.70		((76.0))		163.7	79.7			5.4	6.3	5.1	
10.00	10.20	Si L	1.70		((74.6))		167.1	81.1			5.3	6.2	5.0	
10.20	10.40	CI M	NCSi	1.85	(47.2)		170.5	82.5		1.00				
10.40	10.60	CI M	NCSi	1.85	(52.6)		174.2	84.2		1.00				
10.60	10.80	CI M	NCSi	1.85	(47.3)		177.8	85.8		1.00				
10.80	11.00	CI M	NCSi	1.85	(49.2)		181.4	87.4		1.00				
11.00	11.20	CI M	NCSi	1.85	(45.2)		185.1	89.1		1.00				
11.20	11.40	Si v L		1.60	((48.2))		188.5	90.5			3.9	4.4	3.6	
11.40	11.60	CI L	NCSi	1.60	(34.5)		191.6	91.6		1.00				
11.60	11.80	CI L	NCSi	1.60	(31.1)		194.7	92.7		1.00				
11.80	12.00	CI L	NCSi	1.60	(34.1)		197.9	93.9		1.00				
12.00	12.20	CI L	NCSi	1.60	(30.7)		201.0	95.0		1.00				
12.20	12.40	CI L	NC	1.60	(30.2)		204.1	96.1		1.00				
12.40	12.60	CI L	NCSi	1.60	(35.5)		207.3	97.3		1.00				
12.60	12.80	CI M	NCSi	1.85	(47.7)		210.7	98.7		1.00				
12.80	13.00	Si L		1.70	((133.0))		214.2	100.2			8.7	10.7	8.6	
13.00	13.20	Si L		1.70	((144.8))		217.5	101.5			9.4	11.6	9.3	
13.20	13.40	CI M	NCSi	1.85	(68.7)		221.0	103.0		1.00				
13.40	13.60	CI M	NCSi	1.85	(48.5)		224.6	104.6		1.00				
13.60	13.80	CI M	NCSi	1.85	(49.2)		228.2	106.2		1.00				
13.80	14.00	CI M	NCSi	1.85	(44.0)		231.9	107.9		1.00				
14.00	14.20	CI M	NCSi	1.85	(53.1)		235.5	109.5		1.00				
14.20	14.40	CI H	NCSi	1.90	(108.6)		239.2	111.2		1.00				
14.40	14.60	CI H	NCSi	1.90	(101.5)		242.9	112.9		1.00				
14.60	14.80	CI M	NCSi	1.85	(61.3)		246.6	114.6		1.00				
14.80	15.00	CI M	NCSi	1.85	(66.1)		250.2	116.2		1.00				
15.00	15.20	CI M	NCSi	1.85	(55.6)		253.8	117.8		1.00				



## C P T - test

Project				Site										
Detaljplan Vilstavarv 13012189				Designation SW2005 Date 2020-10-15										
Depth (m)		Classification	$\rho$ t/m <sup>3</sup>	$w_L$	$\tau_{fu}$ kPa	$\phi$ °	$\sigma_{vo}$ kPa	$\sigma'_{vo}$ kPa	$\sigma'_c$ kPa	OCR	$I_D$ %	E MPa	$M_{OC}$ MPa	$M_{NC}$ MPa
From	To													
15.20	15.40	CI M	NCSi	1.85	(64.6)		257.5	119.5		1.00				
15.40	15.60	Si L		1.70	((167.1))	(30.3)	260.9	120.9				10.8	13.4	10.7
15.60	15.80	Si L		1.70	((155.1))		264.3	122.3				10.1	12.6	10.1
15.80	16.00	Si Med		1.80	((194.9))		267.7	123.7				12.3	15.5	12.4
16.00	16.20	CI H	NCSi	1.90	(130.0)		271.3	125.3		1.00				
16.20	16.40	Si Med		1.80	((203.5))	(31.3)	275.0	127.0				12.8	16.1	12.9
16.40	16.60	Si Med		1.80	((184.4))		278.5	128.5				11.8	14.8	11.8
16.60	16.80	Si Med		1.80	((195.9))		282.0	130.0				12.4	15.6	12.5
16.80	17.00	Si L		1.70	((169.0))		285.5	131.5				11.0	13.7	10.9
17.00	17.20	not ev. due to more than 100 classifications					288.8	132.8						
17.20	17.40	CI H	NCSi	1.90	(87.9)		292.5	134.5		1.00				
17.40	17.60	Si L		1.70	((186.0))		296.1	136.1				11.9	15.0	12.0
17.60	17.80	CI H	NCSi	1.90	(105.5)		299.6	137.6		1.00				
17.80	18.00	CI H	NCSi	1.90	(102.5)		303.3	139.3		1.00				
18.00	18.20	CI H	NCSi	1.90	(134.0)		307.1	141.1		1.00				
18.20	18.40	CI vH	NCSi	1.90	(150.7)		310.8	142.8		1.00				
18.40	18.60	CI vH	NCSi	1.90	(152.6)		314.5	144.5		1.00				
18.60	18.80	Si Med		1.80	((212.1))		318.1	146.1				13.4	17.0	13.6
18.80	19.00	Si Med		1.80	((230.7))	(31.2)	321.7	147.7				14.4	18.3	14.7
19.00	19.20	Si Med		1.80	((228.3))	(31.0)	325.2	149.2				14.3	18.2	14.5
19.20	19.40	Si Med		1.80	((236.4))	(31.2)	328.7	150.7				14.7	18.8	15.0
19.40	19.60	Si Med		1.80	((229.3))	(30.9)	332.3	152.3				14.4	18.3	14.6
19.60	19.80	CI H	NCSi	1.90	(148.4)		335.9	153.9		1.00				
19.80	20.00	Si Med		1.80	((225.1))	(30.6)	339.5	155.5				14.2	18.0	14.4
20.00	20.20	CI H	NCSi	1.90	(98.8)		343.2	157.2		1.00				
20.20	20.40	CI H	NCSi	1.90	(94.5)		346.9	158.9		1.00				
20.40	20.60	CI H	NCSi	1.90	(83.1)		350.6	160.6		1.00				
20.60	20.80	CI H	NCSi	1.90	(149.6)		354.3	162.3		1.00				
20.80	21.00	CI H	NCSi	1.90	(144.0)		358.1	164.1		1.00				
21.00	21.20	CI H	NCSi	1.90	(137.1)		361.8	165.8		1.00				
21.20	21.40	CI H	NCSi	1.90	(88.7)		365.5	167.5		1.00				
21.40	21.60	CI H	NCSi	1.90	(120.5)		369.2	169.2		1.00				
21.60	21.80	CI H	NCSi	1.90	(144.9)		373.0	171.0		1.00				
21.80	22.00	Si L		1.70	((206.5))		376.5	172.5				13.3	16.9	13.5
22.00	22.20	CI H	NCSi	1.90	(134.8)		380.0	174.0		1.00				
22.20	22.40	Si L		1.70	((233.5))		383.6	175.6				14.8	18.8	15.1
22.40	22.60	CI H	NCSi	1.90	(110.2)		387.1	177.1		1.00				
22.60	22.80	CI H	NCSi	1.90	(92.6)		390.8	178.8		1.00				
22.80	23.00	CI H	NCSi	1.90	(99.6)		394.6	180.6		1.00				
23.00	23.20	CI H	NCSi	1.90	(133.9)		398.3	182.3		1.00				
23.20	23.30	CI H	NCSi	1.90	(140.3)		401.1	183.6		1.00				

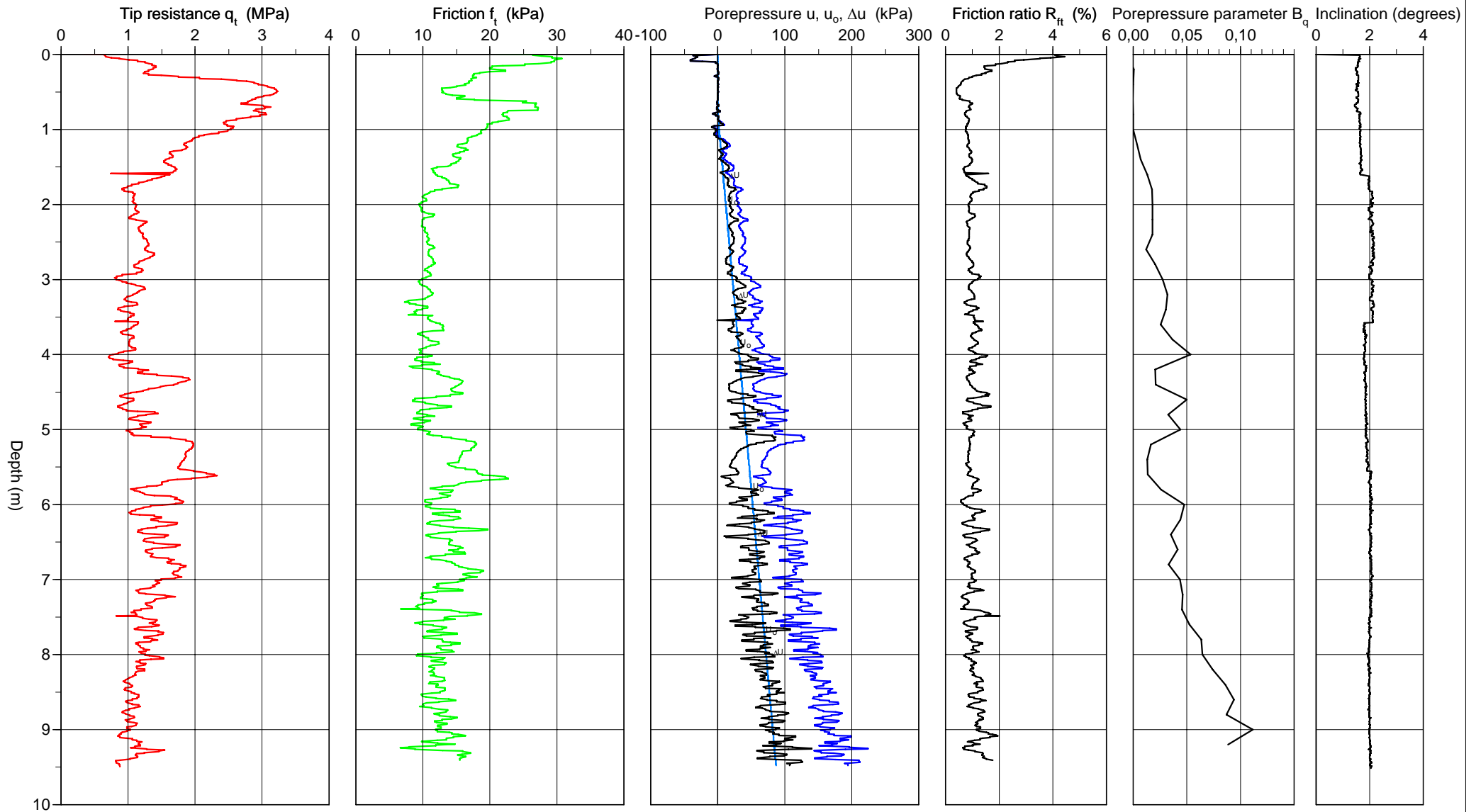
# CPT-test performed according to EN ISO 22476-1



# CPT-test performed according to EN ISO 22476-1

Predrilling depth	0,00 m	Reference	my	Fluid in filter	Fett och olja
Start depth	0,00 m	Level at reference		Coordinats	
Stop depth	9,52 m	Predrilled material	Mulljord	Equipment	Geotech Nova cone 4921
Ground water level	0,80 m	Geometry	Normal	Cone nr	4921

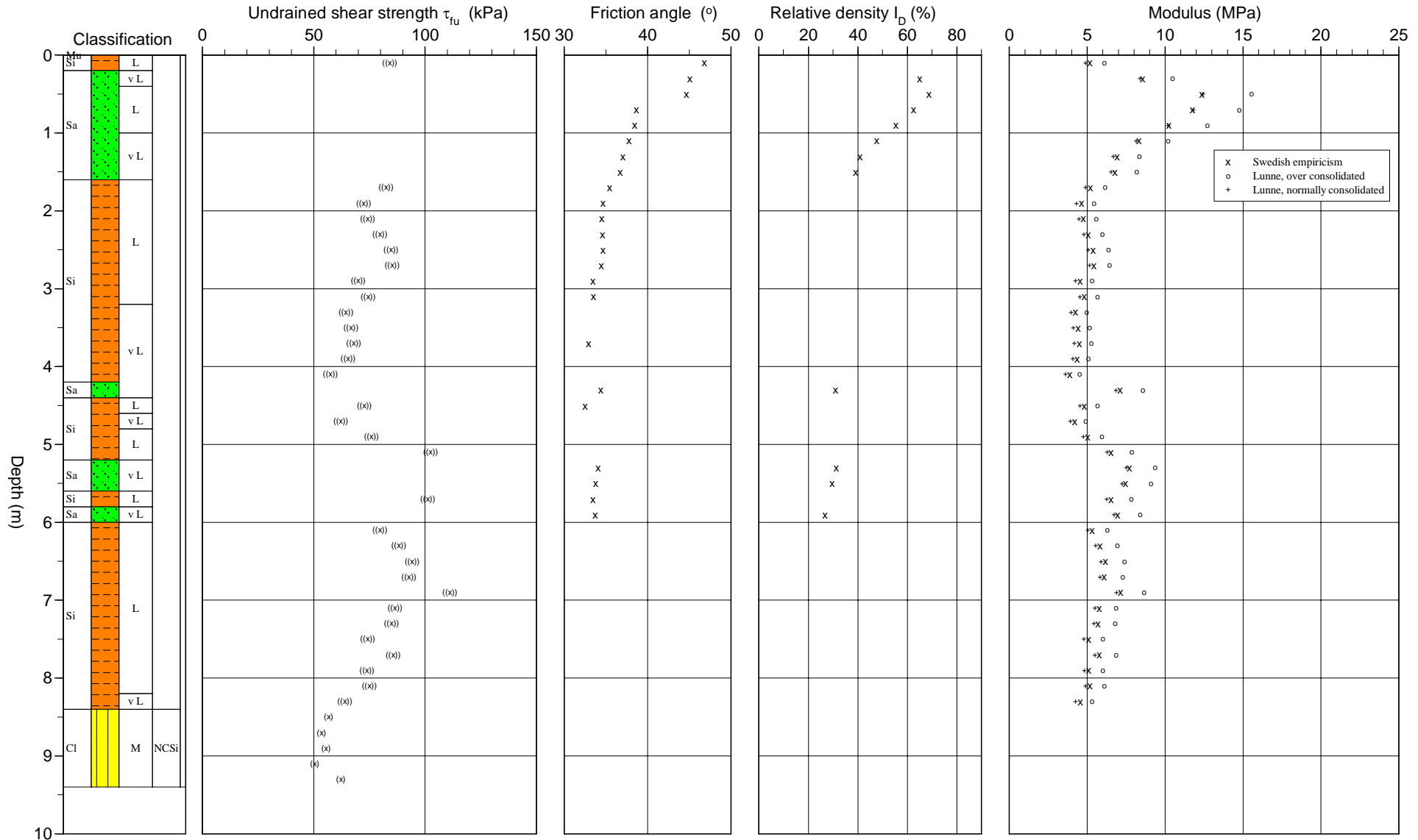
Project	Detaljplan Vivstavarv
Project nr	13012189
Site	
Designation	SW2001
Date	2020-10-15



# CPT test evaluated according to SGI Information 15 rev. 2007

Reference my                      Predrilling depth 0,00 m                      Evaluator SEJHJN  
 Level at reference                      Predrilled material Mulljord                      Evaluation date 2020-11-10  
 Ground water level 0,80 m                      Equipment Geotech Nova cone 4921  
 Start depth 0,00 m                      Geometry Normal

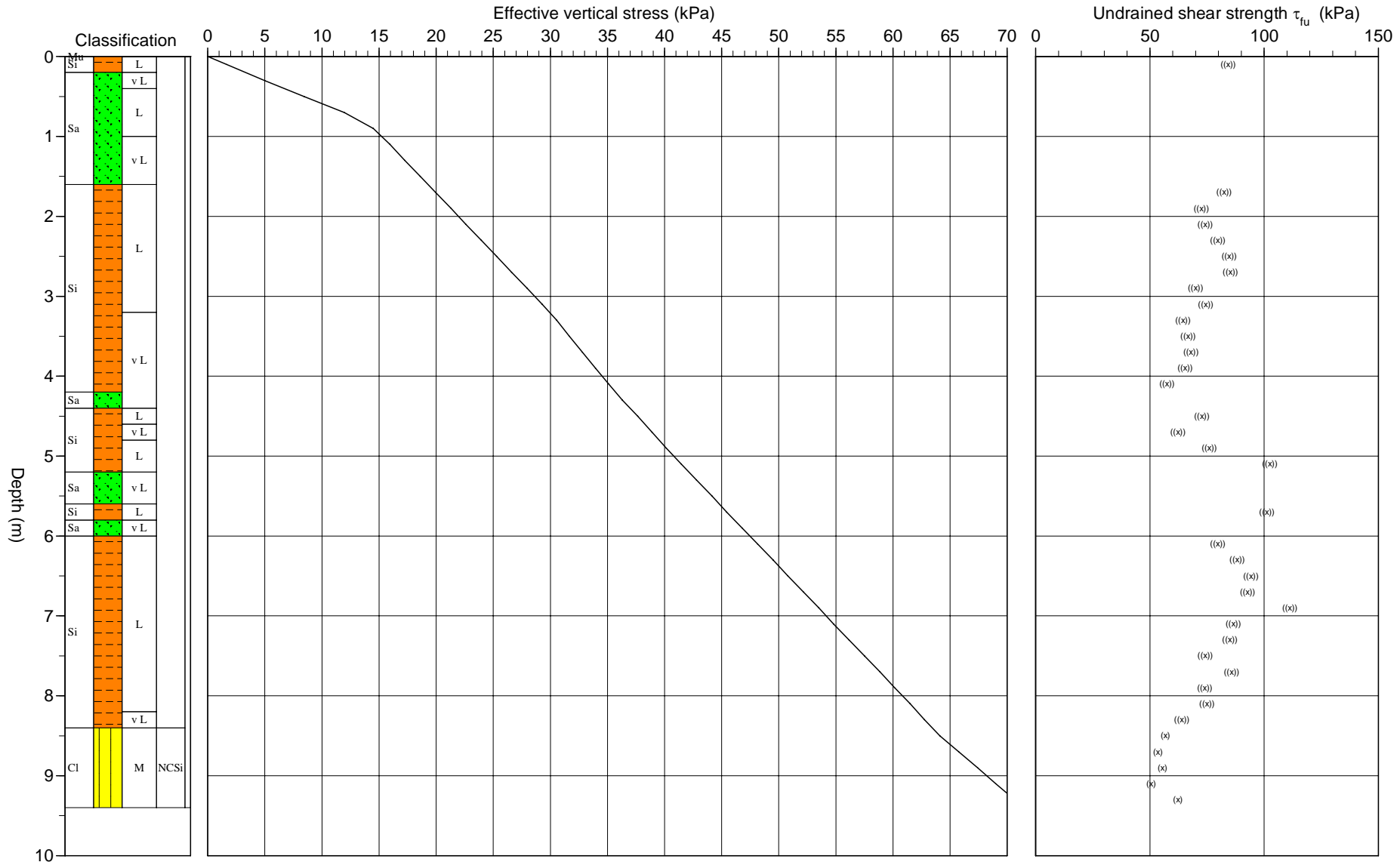
Project Detaljplan Vivstavarv  
 Project nr 13012189  
 Site  
 Designation SW2001  
 Date 2020-10-15



# CPT test evaluated according to SGI Information 15 rev. 2007

Reference my                      Predrilling depth 0,00 m                      Evaluator SEJHJN  
 Ground water level                      Predrilled material Mulljord                      Evaluation date 2020-11-10  
 Grundvattenyta 0,80 m                      Equipment Geotech Nova cone 4921  
 Start depth 0,00 m                      Geometry Normal

Project Detaljplan Vivstavarv  
 Project nr 13012189  
 Site  
 Designation SW2001  
 Date 2020-10-15



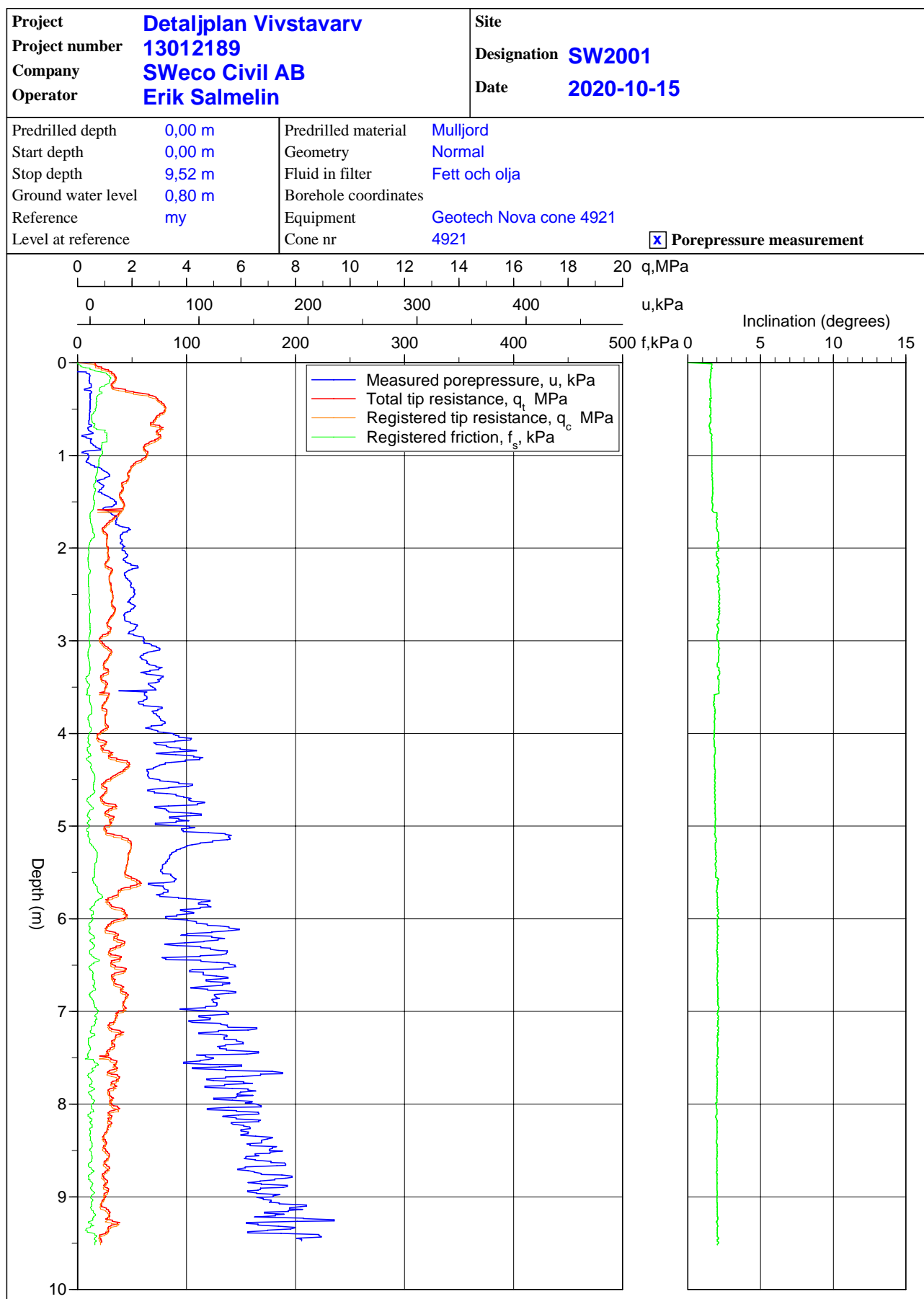
# C P T - test

<b>Project</b> <b>Detaljplan Vivstavarv</b> <b>13012189</b>		<b>Site</b> <b>Designation SW2001</b> <b>Date 2020-10-15</b>																					
Predrilling depth 0,00 m Start depth 0,00 m Stop depth 9,52 m Ground water level 0,80 m Reference my Level at reference	Predrilled material Mulljord Geometry Normal Fluid in filter Fett och olja Operator Erik Salmelin Equipment Geotech Nova cone 4921 <input checked="" type="checkbox"/> Porepressure measurement																						
<b>Calibration data</b> Cone 4921 Internal friction $O_c$ 0,0 kPa Date 2020-02-25 Internal friction $O_f$ 0,0 kPa Areafactor a 0,838 Cross talk $c_1$ 0,000 Areafactor b 0,000 Cross talk $c_2$ 0,000		<b>Cero values, kPa</b> <table border="1"> <thead> <tr> <th></th> <th>Porepressure</th> <th>Friction</th> <th>Tip resistance</th> </tr> </thead> <tbody> <tr> <td>Before</td> <td>263,70</td> <td>115,70</td> <td>7,38</td> </tr> <tr> <td>After</td> <td>318,20</td> <td>114,30</td> <td>7,37</td> </tr> <tr> <td>Diff</td> <td>54,50</td> <td>-1,40</td> <td>-0,01</td> </tr> </tbody> </table>			Porepressure	Friction	Tip resistance	Before	263,70	115,70	7,38	After	318,20	114,30	7,37	Diff	54,50	-1,40	-0,01				
	Porepressure	Friction	Tip resistance																				
Before	263,70	115,70	7,38																				
After	318,20	114,30	7,37																				
Diff	54,50	-1,40	-0,01																				
<b>Scale factors</b> <table border="1"> <thead> <tr> <th colspan="2">Porepressure</th> <th colspan="2">Friction</th> <th colspan="2">Tip resistance</th> </tr> <tr> <th>Range</th> <th>Code</th> <th>Range</th> <th>Code</th> <th>Range</th> <th>Code</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <input type="checkbox"/> Use scale factors		Porepressure		Friction		Tip resistance		Range	Code	Range	Code	Range	Code							<b>Correction</b> Porepressure (none) Friction (none) Tip resistance (none)  Estimated sounding class			
Porepressure		Friction		Tip resistance																			
Range	Code	Range	Code	Range	Code																		
<b>Porepressure observations</b> <table border="1"> <thead> <tr> <th>Depth (m)</th> <th>Porepressure (kPa)</th> </tr> </thead> <tbody> <tr> <td>0,80</td> <td>0,00</td> </tr> </tbody> </table>		Depth (m)	Porepressure (kPa)	0,80	0,00	<b>Boundaries</b> <table border="1"> <thead> <tr> <th>Depth (m)</th> </tr> </thead> <tbody> <tr> <td></td> </tr> </tbody> </table>	Depth (m)		<b>Classification</b> <table border="1"> <thead> <tr> <th colspan="2">Depth (m)</th> <th>Density</th> <th rowspan="2">Liquid limit</th> <th rowspan="2">Soil</th> </tr> <tr> <th>From</th> <th>To</th> <th>(ton/m<sup>3</sup>)</th> </tr> </thead> <tbody> <tr> <td>0,00</td> <td>0,01</td> <td>1,70</td> <td></td> <td>Mu</td> </tr> </tbody> </table>		Depth (m)		Density	Liquid limit	Soil	From	To	(ton/m <sup>3</sup> )	0,00	0,01	1,70		Mu
Depth (m)	Porepressure (kPa)																						
0,80	0,00																						
Depth (m)																							
Depth (m)		Density	Liquid limit	Soil																			
From	To	(ton/m <sup>3</sup> )																					
0,00	0,01	1,70		Mu																			
<b>Notes</b>   																							

## C P T - test

Project				Site										
Detaljplan Vivstavarv 13012189				Designation SW2001 Date 2020-10-15										
Depth (m)		Classification	$\rho$ t/m <sup>3</sup>	$w_L$	$\tau_{fu}$ kPa	$\phi$ °	$\sigma_{vo}$ kPa	$\sigma'_{vo}$ kPa	$\sigma'_c$ kPa	OCR	$I_D$ %	E MPa	$M_{OC}$ MPa	$M_{NC}$ MPa
From	To													
0,00	0,00	Mu	1,70				0,0	0,0						
0,00	0,20	Si L	1,70		((84,1))	(46,8)	1,7	1,7				5,2	6,1	4,9
0,20	0,40	Sa v L	1,70			45,0	5,0	5,0		65,1	8,6	10,5	8,4	
0,40	0,60	Sa L	1,80			44,6	8,4	8,4		68,9	12,3	15,5	12,4	
0,60	0,80	Sa L	1,80			38,7	12,0	12,0		62,4	11,8	14,8	11,8	
0,80	1,00	Sa L	1,80			38,4	15,5	14,5		55,4	10,2	12,7	10,2	
1,00	1,20	Sa v L	1,70			37,8	18,9	15,9		47,7	8,3	10,2	8,1	
1,20	1,40	Sa v L	1,70			37,0	22,3	17,3		40,9	6,9	8,3	6,7	
1,40	1,60	Sa v L	1,70			36,7	25,6	18,6		39,2	6,8	8,2	6,5	
1,60	1,80	Si L	1,70		((82,5))	(35,4)	28,9	19,9			5,2	6,1	4,9	
1,80	2,00	Si L	1,70		((72,5))	(34,7)	32,3	21,3			4,6	5,4	4,3	
2,00	2,20	Si L	1,70		((74,3))	(34,5)	35,6	22,6			4,8	5,6	4,5	
2,20	2,40	Si L	1,70		((79,8))	(34,6)	38,9	23,9			5,1	6,0	4,8	
2,40	2,60	Si L	1,70		((84,8))	(34,6)	42,3	25,3			5,4	6,4	5,1	
2,60	2,80	Si L	1,70		((85,3))	(34,5)	45,6	26,6			5,4	6,4	5,1	
2,80	3,00	Si L	1,70		((69,9))	(33,4)	49,0	28,0			4,5	5,3	4,2	
3,00	3,20	Si L	1,70		((74,4))	(33,5)	52,3	29,3			4,8	5,7	4,5	
3,20	3,40	Si v L	1,60		((64,4))		55,5	30,5			4,3	4,9	4,0	
3,40	3,60	Si v L	1,60		((66,8))		58,7	31,7			4,4	5,1	4,1	
3,60	3,80	Si v L	1,60		((67,9))	(32,9)	61,8	32,8			4,5	5,2	4,2	
3,80	4,00	Si v L	1,60		((65,4))		64,9	33,9			4,4	5,1	4,1	
4,00	4,20	Si v L	1,60		((57,5))		68,1	35,1			3,9	4,5	3,6	
4,20	4,40	Sa v L	1,70			34,4	71,3	36,3		31,0	7,1	8,6	6,9	
4,40	4,60	Si L	1,70		((72,8))	(32,5)	74,7	37,7			4,8	5,7	4,5	
4,60	4,80	Si v L	1,60		((62,2))		77,9	38,9			4,2	4,9	3,9	
4,80	5,00	Si L	1,70		((76,1))		81,1	40,1			5,0	5,9	4,7	
5,00	5,20	Si L	1,70		((102,4))		84,5	41,5			6,5	7,8	6,3	
5,20	5,40	Sa v L	1,70			34,1	87,8	42,8		31,2	7,7	9,4	7,5	
5,40	5,60	Sa v L	1,70			33,8	91,1	44,1		29,7	7,5	9,1	7,2	
5,60	5,80	Si L	1,70		((101,3))	(33,5)	94,5	45,5			6,5	7,8	6,3	
5,80	6,00	Sa v L	1,70			33,8	97,8	46,8		26,7	7,0	8,4	6,7	
6,00	6,20	Si L	1,70		((79,7))		101,1	48,1			5,3	6,3	5,0	
6,20	6,40	Si L	1,70		((88,2))		104,5	49,5			5,8	6,9	5,5	
6,40	6,60	Si L	1,70		((94,3))		107,8	50,8			6,2	7,4	5,9	
6,60	6,80	Si L	1,70		((92,8))		111,1	52,1			6,1	7,3	5,8	
6,80	7,00	Si L	1,70		((111,2))		114,5	53,5			7,1	8,6	6,9	
7,00	7,20	Si L	1,70		((86,5))		117,8	54,8			5,8	6,9	5,5	
7,20	7,40	Si L	1,70		((85,0))		121,2	56,2			5,7	6,8	5,4	
7,40	7,60	Si L	1,70		((74,2))		124,5	57,5			5,1	6,0	4,8	
7,60	7,80	Si L	1,70		((85,8))		127,8	58,8			5,8	6,9	5,5	
7,80	8,00	Si L	1,70		((73,9))		131,2	60,2			5,1	6,0	4,8	
8,00	8,20	Si L	1,70		((75,0))		134,5	61,5			5,2	6,1	4,9	
8,20	8,40	Si v L	1,60		((63,9))		137,7	62,7			4,6	5,3	4,3	
8,40	8,60	CI M	NCSi 1,85		(56,6)		141,1	64,1		1,00				
8,60	8,80	CI M	NCSi 1,85		(53,6)		144,7	65,7		1,00				
8,80	9,00	CI M	NCSi 1,85		(55,6)		148,4	67,4		1,00				
9,00	9,20	CI M	NCSi 1,85		(50,6)		152,0	69,0		1,00				
9,20	9,40	CI M	NCSi 1,85		(62,2)		155,6	70,6		1,00				

# CPT-test performed according to EN ISO 22476-1

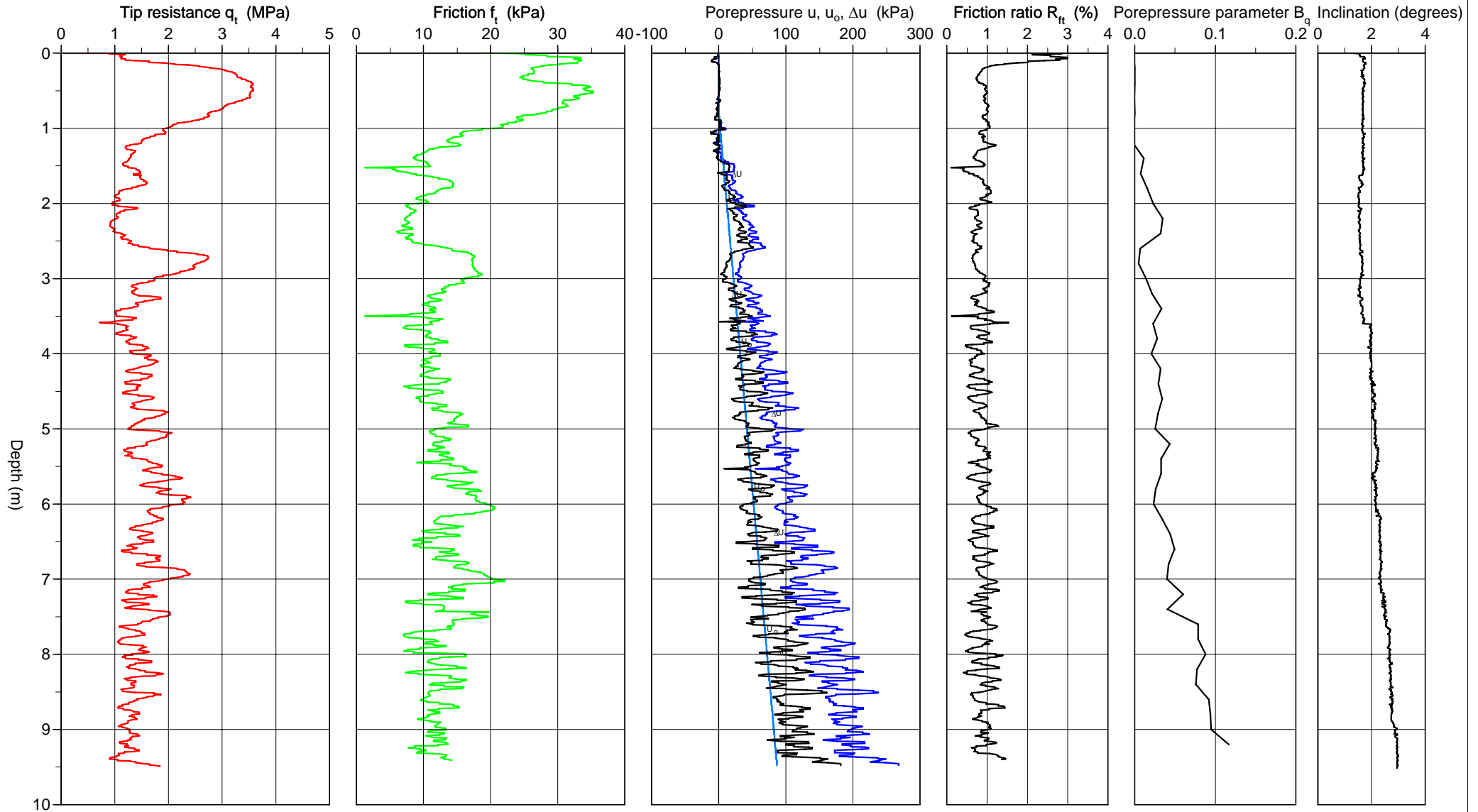




# CPT-test performed according to EN ISO 22476-1

Predrilling depth	0.00 m	Reference	My	Fluid in filter	Fett och olja
Start depth	0.00 m	Level at reference		Coordinats	
Stop depth	9.52 m	Predrilled material	Mull	Equipment	Geotech Nova cone 4921
Ground water level	0.80 m	Geometry	Normal	Cone nr	4921

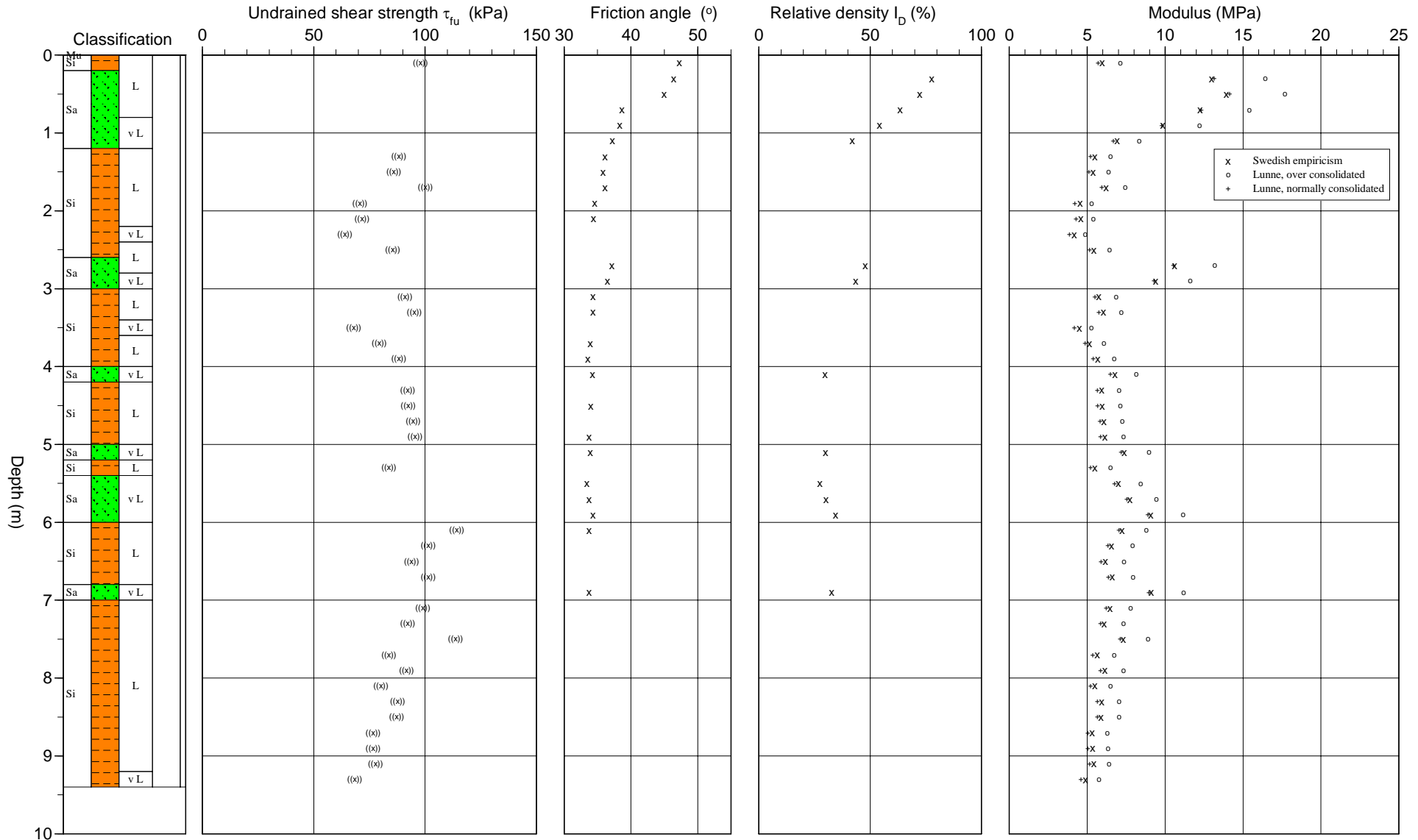
Project	Detaljplan Vivstavarv
Project nr	13012189
Site	
Designation	SW2002
Date	2020-10-15



# CPT test evaluated according to SGI Information 15 rev. 2007

Reference My      Predrilling depth 0.00 m      Evaluator SEJHJN  
 Level at reference      Predrilled material Mull      Evaluation date 2020-11-10  
 Ground water level 0.80 m      Equipment Geotech Nova cone 4921  
 Start depth 0.00 m      Geometry Normal

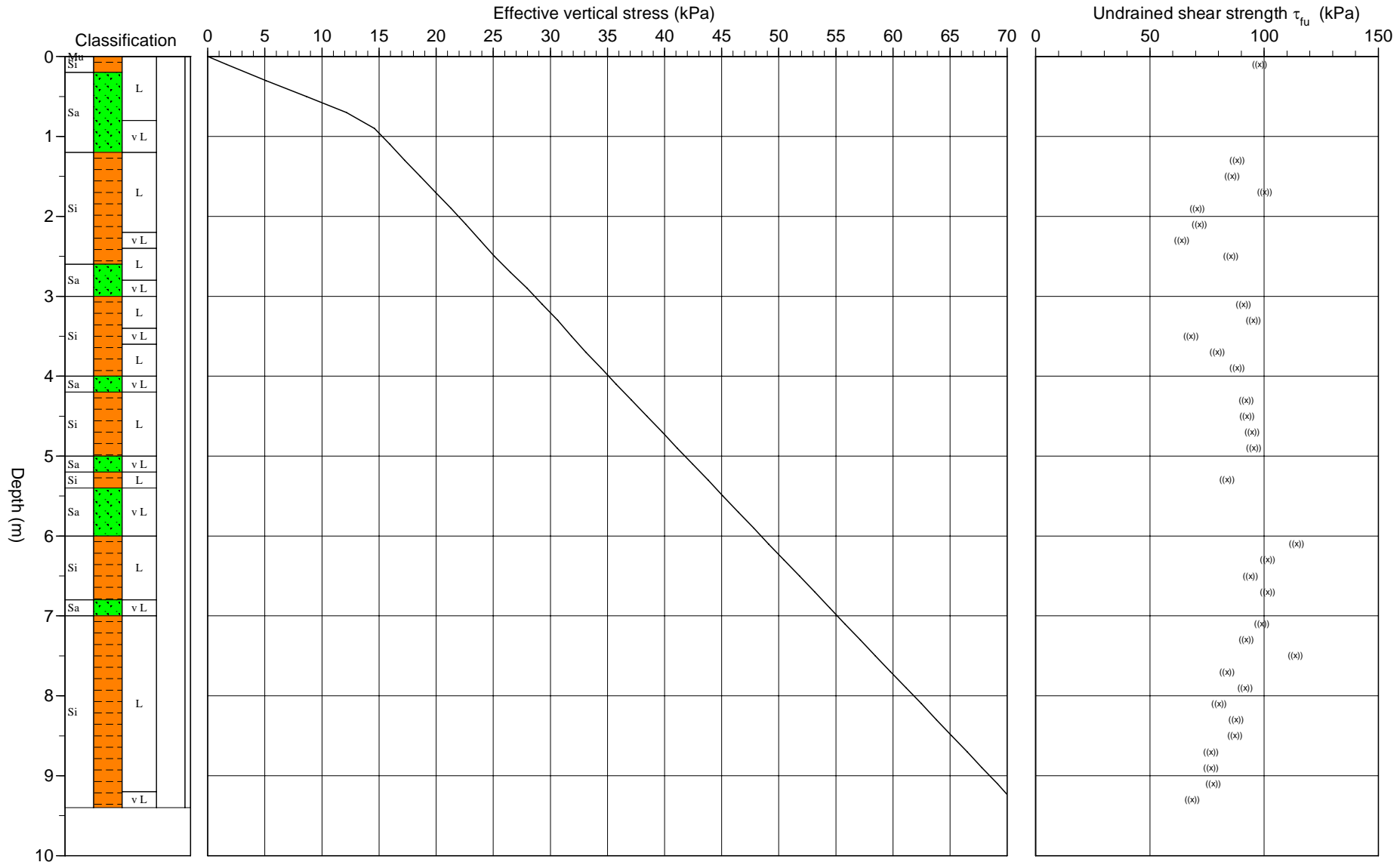
Project Detaljplan Vivstavarv  
 Project nr 13012189  
 Site  
 Designation SW2002  
 Date 2020-10-15



# CPT test evaluated according to SGI Information 15 rev. 2007

Reference My      Predrilling depth 0.00 m      Evaluator SEJHJN  
 Ground water level      Predrilled material Mull      Evaluation date 2020-11-10  
 Grundvattenyta 0.80 m      Equipment Geotech Nova cone 4921  
 Start depth 0.00 m      Geometry Normal

Project Detaljplan Vivstavarv  
 Project nr 13012189  
 Site  
 Designation SW2002  
 Date 2020-10-15



# C P T - test

<b>Project</b> <b>Detaljplan Vivstavarv</b> <b>13012189</b>		<b>Site</b> <b>Designation SW2002</b> <b>Date 2020-10-15</b>																			
Predrilling depth 0.00 m Start depth 0.00 m Stop depth 9.52 m Ground water level 0.80 m Reference My Level at reference	Predrilled material Mull Geometry Normal Fluid in filter Fett och olja Operator Erik Salmelin Equipment Geotech Nova cone 4921 <input checked="" type="checkbox"/> Porepressure measurement																				
<b>Calibration data</b> Cone 4921 Internal friction $O_c$ 0.0 kPa Date 2020-02-25 Internal friction $O_f$ 0.0 kPa Areafactor a 0.838 Cross talk $c_1$ 0.000 Areafactor b 0.000 Cross talk $c_2$ 0.000		<b>Cero values, kPa</b> <table border="1"> <thead> <tr> <th></th> <th>Porepressure</th> <th>Friction</th> <th>Tip resistance</th> </tr> </thead> <tbody> <tr> <td>Before</td> <td>263.80</td> <td>116.50</td> <td>7.38</td> </tr> <tr> <td>After</td> <td>282.90</td> <td>113.10</td> <td>7.36</td> </tr> <tr> <td>Diff</td> <td>19.10</td> <td>-3.40</td> <td>-0.02</td> </tr> </tbody> </table>			Porepressure	Friction	Tip resistance	Before	263.80	116.50	7.38	After	282.90	113.10	7.36	Diff	19.10	-3.40	-0.02		
	Porepressure	Friction	Tip resistance																		
Before	263.80	116.50	7.38																		
After	282.90	113.10	7.36																		
Diff	19.10	-3.40	-0.02																		
<b>Scale factors</b> <table border="1"> <thead> <tr> <th colspan="2">Porepressure</th> <th colspan="2">Friction</th> <th colspan="2">Tip resistance</th> </tr> <tr> <th>Range</th> <th>Code</th> <th>Range</th> <th>Code</th> <th>Range</th> <th>Code</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Porepressure		Friction		Tip resistance		Range	Code	Range	Code	Range	Code							<b>Correction</b> Porepressure (none) Friction (none) Tip resistance (none)  Estimated sounding class	
Porepressure		Friction		Tip resistance																	
Range	Code	Range	Code	Range	Code																
<input type="checkbox"/> Use scale factors																					
<b>Porepressure observations</b> <table border="1"> <thead> <tr> <th>Depth (m)</th> <th>Porepressure (kPa)</th> </tr> </thead> <tbody> <tr> <td>0.80</td> <td>0.00</td> </tr> </tbody> </table>		Depth (m)	Porepressure (kPa)	0.80	0.00	<b>Boundaries</b> <table border="1"> <thead> <tr> <th>Depth (m)</th> </tr> </thead> <tbody> <tr> <td></td> </tr> </tbody> </table>		Depth (m)													
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Depth (m)		Density (ton/m <sup>3</sup> )	Liquid limit	Soil																	
From	To																				
0.00	0.01	1.70		Mu																	
<b>Notes</b>																					

## C P T - test

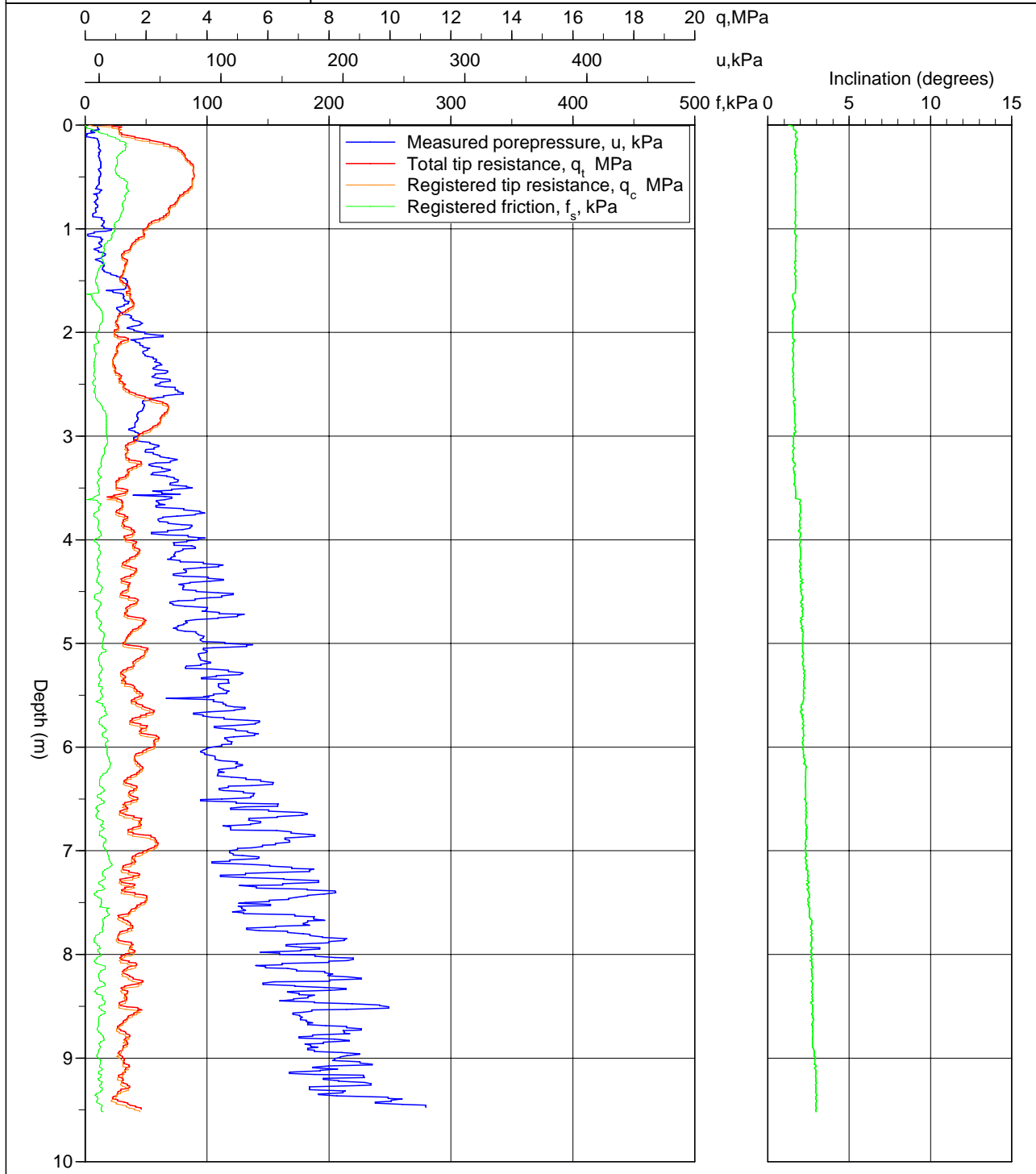
Project			Site											
Detaljplan Vivstavarv 13012189			Designation SW2002 Date 2020-10-15											
Depth (m)		Classification	$\rho$ t/m <sup>3</sup>	$w_L$	$\tau_{fu}$ kPa	$\phi$ °	$\sigma_{vo}$ kPa	$\sigma'_{vo}$ kPa	$\sigma'_c$ kPa	OCR	$I_D$ %	E MPa	$M_{OC}$ MPa	$M_{NC}$ MPa
From	To													
0.00	0.00	Mu	1.70				0.0	0.0						
0.00	0.20	Si L	1.70		((98.1))	(47.3)	1.7	1.7			6.0	7.1	5.7	
0.20	0.40	Sa L	1.80			46.4	5.1	5.1		77.8	13.0	16.4	13.1	
0.40	0.60	Sa L	1.80			45.0	8.6	8.6		72.3	13.9	17.7	14.1	
0.60	0.80	Sa L	1.80			38.7	12.2	12.2		63.4	12.2	15.4	12.3	
0.80	1.00	Sa v L	1.70			38.4	15.6	14.6		54.2	9.9	12.2	9.8	
1.00	1.20	Sa v L	1.70			37.3	18.9	15.9		42.0	6.9	8.3	6.7	
1.20	1.40	Si L	1.70		((88.1))	(36.2)	22.3	17.3			5.5	6.5	5.2	
1.40	1.60	Si L	1.70		((86.1))	(35.8)	25.6	18.6			5.4	6.4	5.1	
1.60	1.80	Si L	1.70		((100.3))	(36.2)	28.9	19.9			6.2	7.4	5.9	
1.80	2.00	Si L	1.70		((70.7))	(34.6)	32.3	21.3			4.5	5.3	4.2	
2.00	2.20	Si L	1.70		((71.7))	(34.4)	35.6	22.6			4.6	5.4	4.3	
2.20	2.40	Si v L	1.60		((64.1))		38.8	23.8			4.2	4.8	3.9	
2.40	2.60	Si L	1.70		((85.6))		42.1	25.1			5.4	6.4	5.1	
2.60	2.80	Sa L	1.80			37.1	45.5	26.5		47.8	10.6	13.2	10.5	
2.80	3.00	Sa v L	1.70			36.5	49.0	28.0		43.4	9.4	11.6	9.3	
3.00	3.20	Si L	1.70		((90.9))	(34.3)	52.3	29.3			5.8	6.9	5.5	
3.20	3.40	Si L	1.70		((95.3))	(34.3)	55.6	30.6			6.0	7.2	5.7	
3.40	3.60	Si v L	1.60		((68.1))		58.9	31.9			4.5	5.2	4.2	
3.60	3.80	Si L	1.70		((79.4))	(33.9)	62.1	33.1			5.1	6.1	4.9	
3.80	4.00	Si L	1.70		((88.3))	(33.6)	65.4	34.4			5.7	6.7	5.4	
4.00	4.20	Sa v L	1.70			34.2	68.8	35.8		29.7	6.8	8.1	6.5	
4.20	4.40	Si L	1.70		((92.1))		72.1	37.1			5.9	7.0	5.6	
4.40	4.60	Si L	1.70		((92.6))	(34.0)	75.4	38.4			6.0	7.1	5.7	
4.60	4.80	Si L	1.70		((94.6))		78.8	39.8			6.1	7.3	5.8	
4.80	5.00	Si L	1.70		((95.5))	(33.7)	82.1	41.1			6.1	7.3	5.9	
5.00	5.20	Sa v L	1.70			33.9	85.4	42.4		30.0	7.4	9.0	7.2	
5.20	5.40	Si L	1.70		((83.6))		88.8	43.8			5.5	6.5	5.2	
5.40	5.60	Sa v L	1.70			33.4	92.1	45.1		27.4	7.0	8.4	6.7	
5.60	5.80	Sa v L	1.70			33.7	95.5	46.5		30.1	7.7	9.4	7.5	
5.80	6.00	Sa v L	1.70			34.3	98.8	47.8		34.5	9.1	11.1	8.9	
6.00	6.20	Si L	1.70		((114.2))	(33.8)	102.1	49.1			7.3	8.8	7.0	
6.20	6.40	Si L	1.70		((101.6))		105.5	50.5			6.6	7.9	6.3	
6.40	6.60	Si L	1.70		((94.0))		108.8	51.8			6.2	7.4	5.9	
6.60	6.80	Si L	1.70		((101.6))		112.1	53.1			6.6	7.9	6.3	
6.80	7.00	Sa v L	1.70			33.8	115.5	54.5		32.8	9.1	11.2	8.9	
7.00	7.20	Si L	1.70		((99.0))		118.8	55.8			6.5	7.8	6.2	
7.20	7.40	Si L	1.70		((92.4))		122.1	57.1			6.1	7.3	5.8	
7.40	7.60	Si L	1.70		((113.8))		125.5	58.5			7.3	8.9	7.1	
7.60	7.80	Si L	1.70		((83.7))		128.8	59.8			5.7	6.7	5.4	
7.80	8.00	Si L	1.70		((91.8))		132.1	61.1			6.1	7.3	5.9	
8.00	8.20	Si L	1.70		((80.3))		135.5	62.5			5.5	6.5	5.2	
8.20	8.40	Si L	1.70		((87.6))		138.8	63.8			5.9	7.0	5.6	
8.40	8.60	Si L	1.70		((87.2))		142.1	65.1			5.9	7.0	5.6	
8.60	8.80	Si L	1.70		((76.8))		145.5	66.5			5.3	6.3	5.0	
8.80	9.00	Si L	1.70		((76.8))		148.8	67.8			5.3	6.3	5.0	
9.00	9.20	Si L	1.70		((77.9))		152.2	69.2			5.4	6.4	5.1	
9.20	9.40	Si v L	1.60		((68.5))		155.4	70.4			4.9	5.7	4.6	

# CPT-test performed according to EN ISO 22476-1

<b>Project</b>	<b>Detaljplan Vivstavarv</b>	<b>Site</b>	
<b>Project number</b>	<b>13012189</b>	<b>Designation</b>	<b>SW2002</b>
<b>Company</b>	<b>Sweco Civil AB</b>	<b>Date</b>	<b>2020-10-15</b>
<b>Operator</b>	<b>Erik Salmelin</b>		

Predrilled depth	0.00 m	Predrilled material	Mull
Start depth	0.00 m	Geometry	Normal
Stop depth	9.52 m	Fluid in filter	Fett och olja
Ground water level	0.80 m	Borehole coordinates	
Reference	My	Equipment	Geotech Nova cone 4921
Level at reference		Cone nr	4921

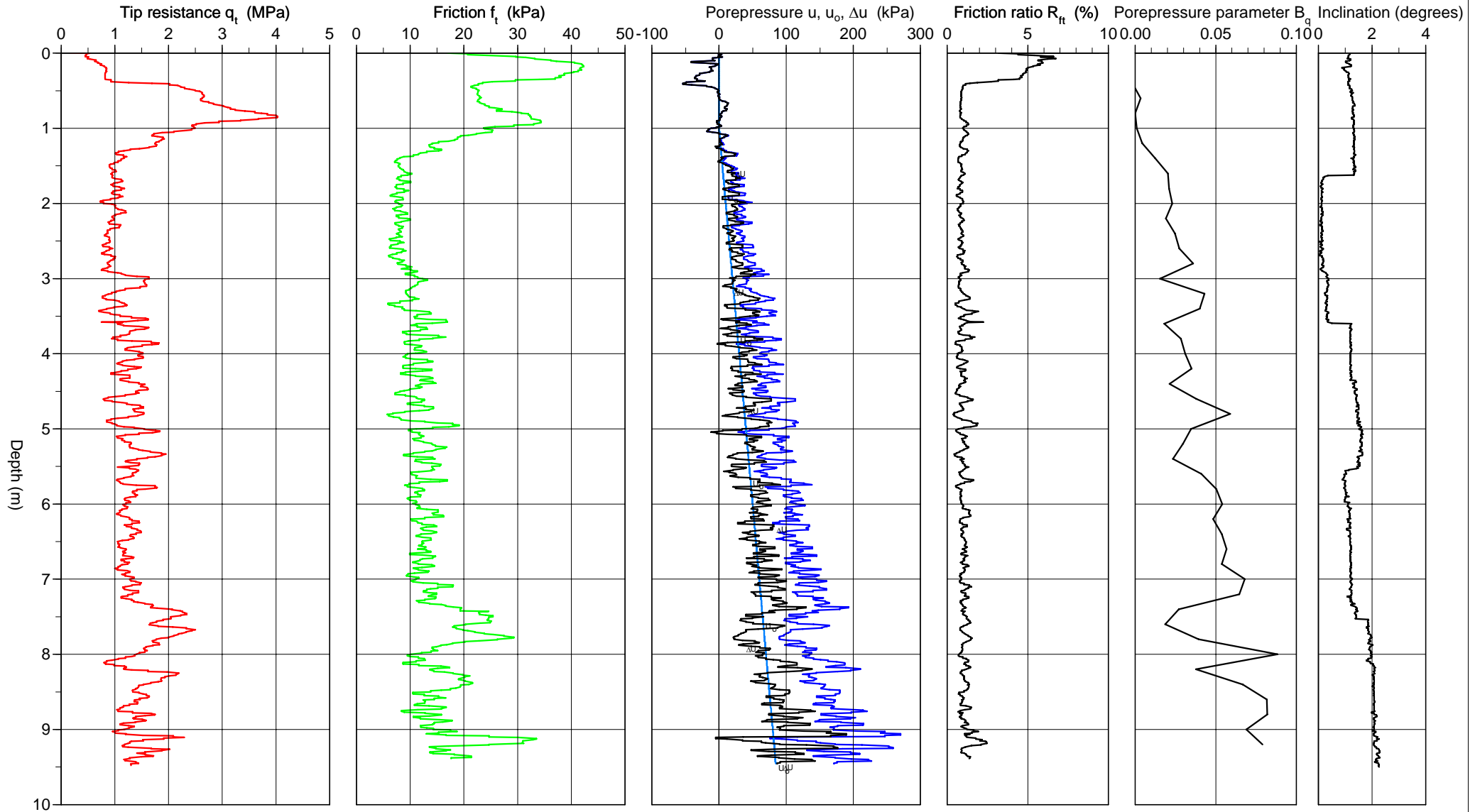
Porepressure measurement



# CPT-test performed according to EN ISO 22476-1

Predrilling depth	0.00 m	Reference	my	Fluid in filter	Fett och olja
Start depth	0.00 m	Level at reference		Coordinats	
Stop depth	9.50 m	Predrilled material	Mulljord	Equipment	Geotech Nova cone 4921
Ground water level	1.00 m	Geometry	Normal	Cone nr	4921

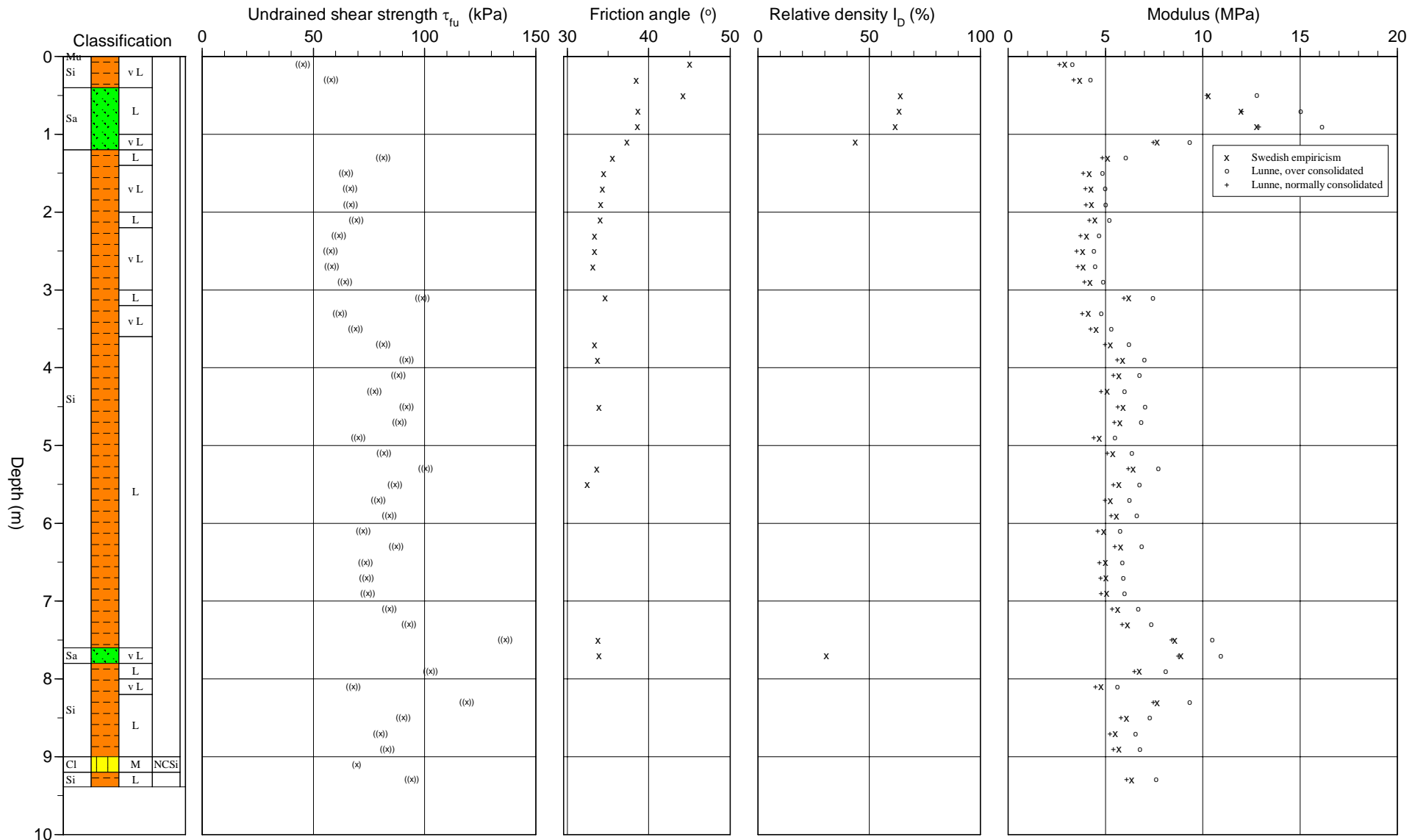
Project	Detaljplan Vivstavarv
Project nr	13012189
Site	
Designation	SW2003
Date	2020-10-15



# CPT test evaluated according to SGI Information 15 rev. 2007

Reference my                      Predrilling depth 0.00 m                      Evaluator SEJHJN  
 Level at reference                      Predrilled material Mulljord                      Evaluation date 2020-11-18  
 Ground water level 1.00 m                      Equipment Geotech Nova cone 4921  
 Start depth 0.00 m                      Geometry Normal

Project Detaljplan Vivstavarv  
 Project nr 13012189  
 Site  
 Designation SW2003  
 Date 2020-10-15

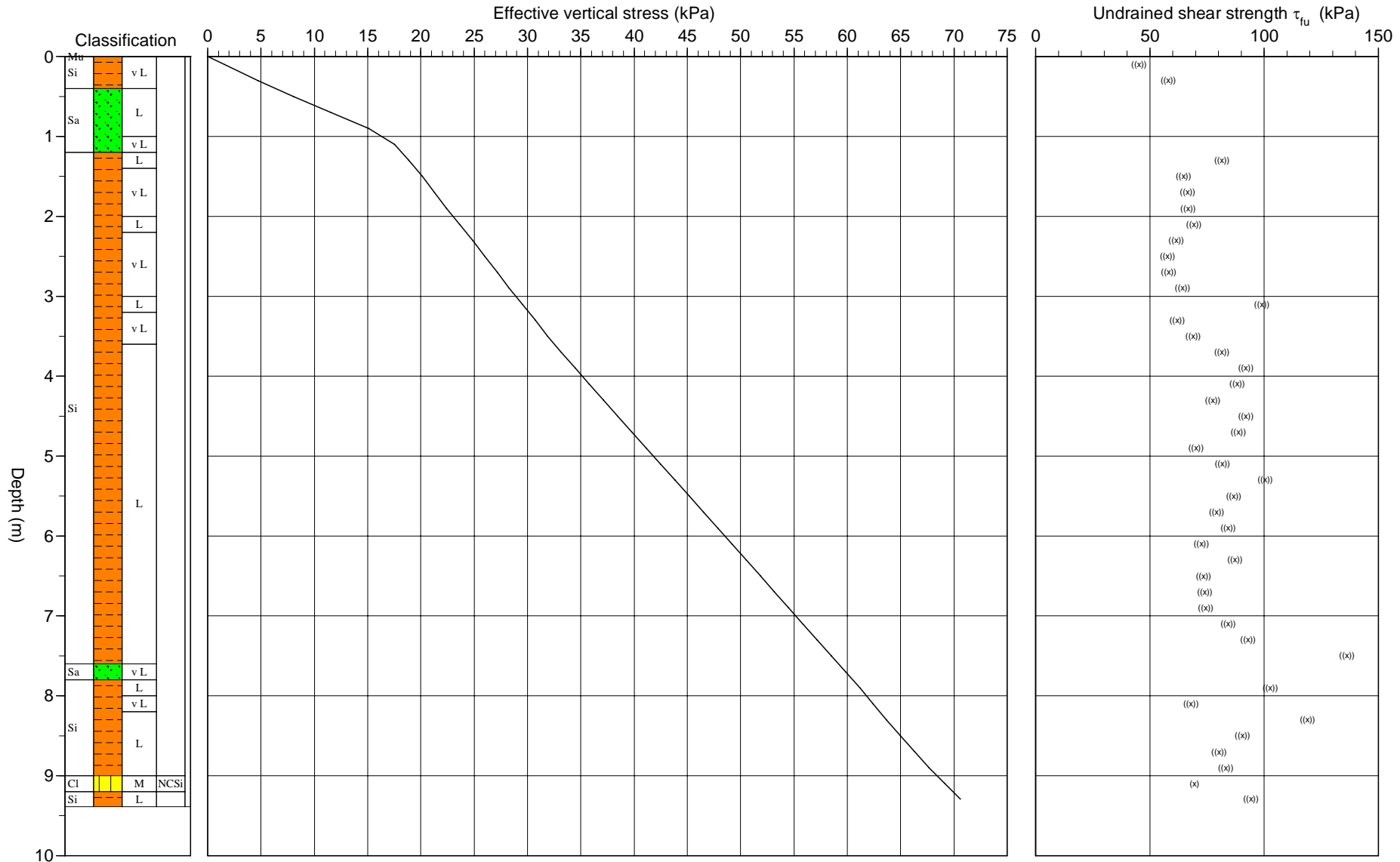




# CPT test evaluated according to SGI Information 15 rev. 2007

Reference my                      Predrilling depth 0.00 m                      Evaluator SEJHJN  
 Ground water level                      Predrilled material Mulljord                      Evaluation date 2020-11-18  
 Grundvattenyta 1.00 m                      Equipment Geotech Nova cone 4921  
 Start depth 0.00 m                      Geometry Normal

Project Detaljplan Vivstavarv  
 Project nr 13012189  
 Site  
 Designation SW2003  
 Date 2020-10-15



# CPT - test

<b>Project</b> <b>Detaljplan Vivstavarv</b> <b>13012189</b>		<b>Site</b> <b>Designation SW2003</b> <b>Date 2020-10-15</b>																					
Predrilling depth 0.00 m Start depth 0.00 m Stop depth 9.50 m Ground water level 1.00 m Reference my Level at reference	Predrilled material Mulljord Geometry Normal Fluid in filter Fett och olja Operator Erik Salmelin Equipment Geotech Nova cone 4921 <input checked="" type="checkbox"/> Porepressure measurement																						
<b>Calibration data</b> Cone 4921 Internal friction $O_c$ 0.0 kPa Date 2020-02-25 Internal friction $O_f$ 0.0 kPa Areafactor a 0.838 Cross talk $c_1$ 0.000 Areafactor b 0.000 Cross talk $c_2$ 0.000		<b>Cero values, kPa</b> <table border="1"> <thead> <tr> <th></th> <th>Porepressure</th> <th>Friction</th> <th>Tip resistance</th> </tr> </thead> <tbody> <tr> <td>Before</td> <td>263.90</td> <td>117.10</td> <td>7.38</td> </tr> <tr> <td>After</td> <td>309.40</td> <td>114.20</td> <td>7.37</td> </tr> <tr> <td>Diff</td> <td>45.50</td> <td>-2.90</td> <td>-0.01</td> </tr> </tbody> </table>			Porepressure	Friction	Tip resistance	Before	263.90	117.10	7.38	After	309.40	114.20	7.37	Diff	45.50	-2.90	-0.01				
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Before	263.90	117.10	7.38																				
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Porepressure		Friction		Tip resistance																			
Range	Code	Range	Code	Range	Code																		
<b>Porepressure observations</b> <table border="1"> <thead> <tr> <th>Depth (m)</th> <th>Porepressure (kPa)</th> </tr> </thead> <tbody> <tr> <td>1.00</td> <td>0.00</td> </tr> </tbody> </table>		Depth (m)	Porepressure (kPa)	1.00	0.00	<b>Boundaries</b> <table border="1"> <thead> <tr> <th>Depth (m)</th> </tr> </thead> <tbody> <tr> <td></td> </tr> </tbody> </table>	Depth (m)		<b>Classification</b> <table border="1"> <thead> <tr> <th colspan="2">Depth (m)</th> <th>Density</th> <th rowspan="2">Liquid limit</th> <th rowspan="2">Soil</th> </tr> <tr> <th>From</th> <th>To</th> <th>(ton/m<sup>3</sup>)</th> </tr> </thead> <tbody> <tr> <td>0.00</td> <td>0.01</td> <td>1.60</td> <td></td> <td>Mu</td> </tr> </tbody> </table>		Depth (m)		Density	Liquid limit	Soil	From	To	(ton/m <sup>3</sup> )	0.00	0.01	1.60		Mu
Depth (m)	Porepressure (kPa)																						
1.00	0.00																						
Depth (m)																							
Depth (m)		Density	Liquid limit	Soil																			
From	To	(ton/m <sup>3</sup> )																					
0.00	0.01	1.60		Mu																			
<b>Notes</b>   																							

## C P T - test

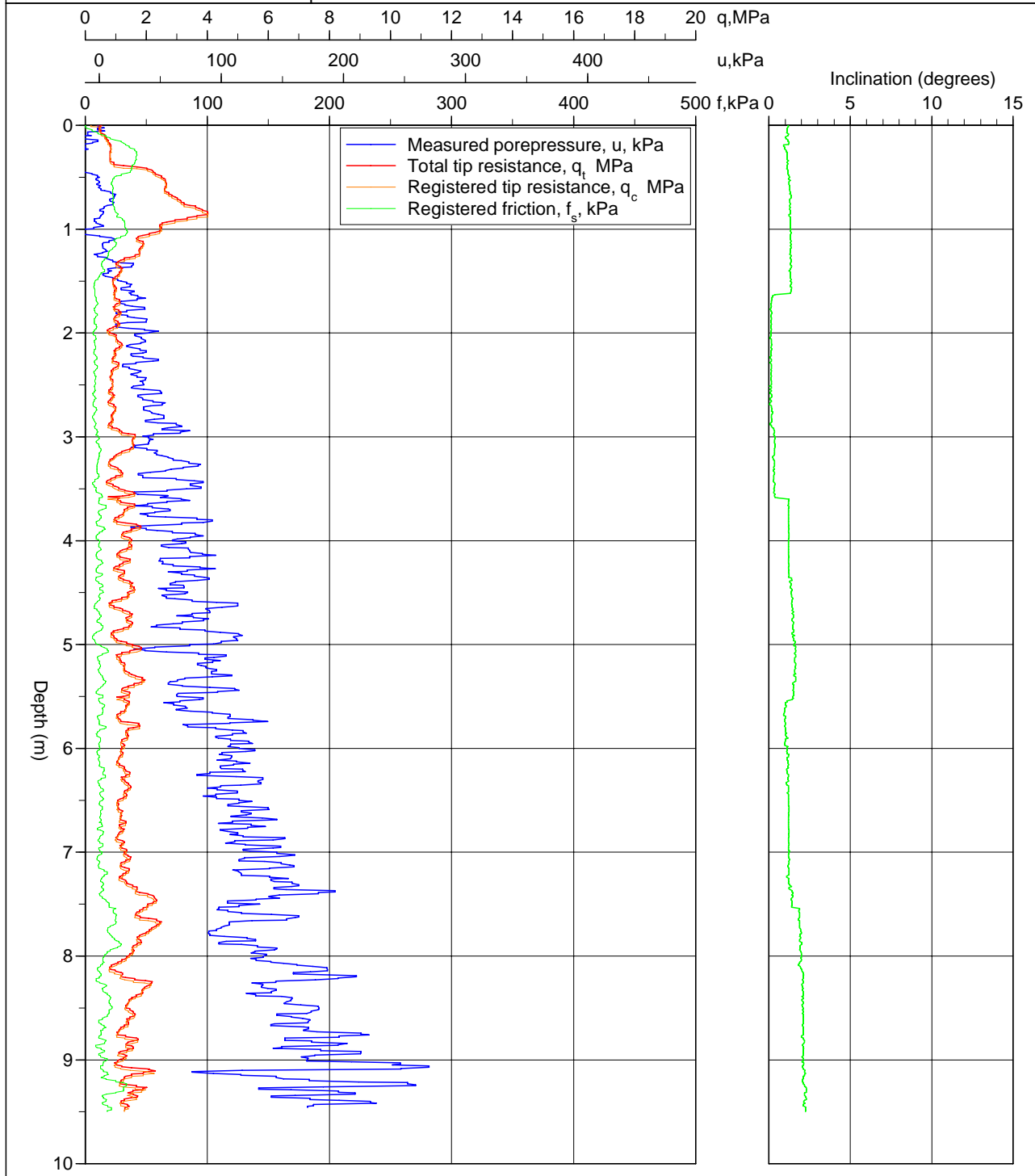
Project				Site										
Detaljplan Vilstavarv 13012189				Designation SW2003 Date 2020-10-15										
Depth (m)		Classification	$\rho$ t/m <sup>3</sup>	$w_L$	$\tau_{fu}$ kPa	$\phi$ °	$\sigma_{vo}$ kPa	$\sigma'_{vo}$ kPa	$\sigma'_c$ kPa	OCR	$I_D$ %	E MPa	$M_{OC}$ MPa	$M_{NC}$ MPa
From	To													
0.00	0.00	Mu	1.60				0.0	0.0						
0.00	0.20	Si v L	1.60		((45.2))	(45.0)	1.6	1.6				2.9	3.3	2.6
0.20	0.40	Si v L	1.60		((58.0))	(38.5)	4.7	4.7				3.7	4.2	3.4
0.40	0.60	Sa L	1.80			44.2	8.0	8.0			64.0	10.3	12.8	10.2
0.60	0.80	Sa L	1.80			38.7	11.6	11.6			63.4	12.0	15.0	12.0
0.80	1.00	Sa L	1.80			38.6	15.1	15.1			61.6	12.8	16.1	12.9
1.00	1.20	Sa v L	1.70			37.3	18.5	17.5			43.8	7.7	9.3	7.5
1.20	1.40	Si L	1.70		((81.5))	(35.6)	21.9	18.9				5.1	6.0	4.8
1.40	1.60	Si v L	1.60		((64.7))	(34.4)	25.1	20.1				4.2	4.8	3.9
1.60	1.80	Si v L	1.60		((66.5))	(34.3)	28.3	21.3				4.3	5.0	4.0
1.80	2.00	Si v L	1.60		((66.7))	(34.1)	31.4	22.4				4.3	5.0	4.0
2.00	2.20	Si L	1.70		((69.3))	(34.1)	34.6	23.6				4.5	5.2	4.2
2.20	2.40	Si v L	1.60		((61.5))	(33.4)	37.9	24.9				4.0	4.6	3.7
2.40	2.60	Si v L	1.60		((57.8))	(33.4)	41.0	26.0				3.8	4.4	3.5
2.60	2.80	Si v L	1.60		((58.3))	(33.1)	44.1	27.1				3.9	4.4	3.6
2.80	3.00	Si v L	1.60		((64.2))	(33.4)	47.3	28.3				4.2	4.9	3.9
3.00	3.20	Si L	1.70		((98.9))	(34.6)	50.5	29.5				6.2	7.4	5.9
3.20	3.40	Si v L	1.60		((61.9))	(33.4)	53.8	30.8				4.1	4.8	3.8
3.40	3.60	Si v L	1.60		((68.9))	(33.4)	56.9	31.9				4.5	5.3	4.2
3.60	3.80	Si L	1.70		((81.4))	(33.4)	60.1	33.1				5.3	6.2	5.0
3.80	4.00	Si L	1.70		((92.0))	(33.7)	63.5	34.5				5.9	7.0	5.6
4.00	4.20	Si L	1.70		((88.3))	(33.7)	66.8	35.8				5.7	6.7	5.4
4.20	4.40	Si L	1.70		((77.5))	(33.9)	70.1	37.1				5.1	6.0	4.8
4.40	4.60	Si L	1.70		((91.9))	(33.9)	73.5	38.5				5.9	7.0	5.6
4.60	4.80	Si L	1.70		((88.7))	(33.9)	76.8	39.8				5.7	6.8	5.5
4.80	5.00	Si L	1.70		((70.3))	(33.9)	80.1	41.1				4.7	5.5	4.4
5.00	5.20	Si L	1.70		((81.7))	(33.9)	83.5	42.5				5.4	6.3	5.1
5.20	5.40	Si L	1.70		((100.4))	(33.6)	86.8	43.8				6.4	7.7	6.2
5.40	5.60	Si L	1.70		((86.8))	(32.5)	90.2	45.2				5.7	6.7	5.4
5.60	5.80	Si L	1.70		((79.4))	(32.5)	93.5	46.5				5.3	6.2	5.0
5.80	6.00	Si L	1.70		((84.3))	(32.5)	96.8	47.8				5.6	6.6	5.3
6.00	6.20	Si L	1.70		((72.5))	(32.5)	100.2	49.2				4.9	5.8	4.6
6.20	6.40	Si L	1.70		((87.2))	(32.5)	103.5	50.5				5.8	6.8	5.5
6.40	6.60	Si L	1.70		((73.5))	(32.5)	106.8	51.8				5.0	5.9	4.7
6.60	6.80	Si L	1.70		((74.0))	(32.5)	110.2	53.2				5.0	5.9	4.7
6.80	7.00	Si L	1.70		((74.4))	(32.5)	113.5	54.5				5.1	6.0	4.8
7.00	7.20	Si L	1.70		((84.3))	(32.5)	116.8	55.8				5.6	6.7	5.4
7.20	7.40	Si L	1.70		((92.9))	(32.5)	120.2	57.2				6.1	7.3	5.9
7.40	7.60	Si L	1.70		((136.3))	(33.8)	123.5	58.5				8.6	10.5	8.4
7.60	7.80	Sa v L	1.70			33.9	126.8	59.8			30.7	8.9	10.9	8.7
7.80	8.00	Si L	1.70		((102.7))	(33.9)	130.2	61.2				6.7	8.1	6.5
8.00	8.20	Si v L	1.60		((68.0))	(33.9)	133.4	62.4				4.8	5.6	4.5
8.20	8.40	Si L	1.70		((119.0))	(33.9)	136.7	63.7				7.7	9.3	7.4
8.40	8.60	Si L	1.70		((90.4))	(33.9)	140.0	65.0				6.1	7.3	5.8
8.60	8.80	Si L	1.70		((80.3))	(33.9)	143.3	66.3				5.5	6.5	5.2
8.80	9.00	Si L	1.70		((83.2))	(33.9)	146.7	67.7				5.7	6.8	5.4
9.00	9.20	Cl M	NCSi 1.85		(69.6)	(33.9)	150.1	69.1		1.00				
9.20	9.39	Si L	1.70		((94.2))	(33.9)	153.5	70.6				6.3	7.6	6.1

# CPT-test performed according to EN ISO 22476-1

<b>Project</b>	<b>Detaljplan Vivstavarv</b>	<b>Site</b>	
<b>Project number</b>	<b>13012189</b>	<b>Designation</b>	<b>SW2003</b>
<b>Company</b>	<b>Sweco Civil AB</b>	<b>Date</b>	<b>2020-10-15</b>
<b>Operator</b>	<b>Erik Salmelin</b>		

Predrilled depth	0.00 m	Predrilled material	Mulljord
Start depth	0.00 m	Geometry	Normal
Stop depth	9.50 m	Fluid in filter	Fett och olja
Ground water level	1.00 m	Borehole coordinates	
Reference	my	Equipment	Geotech Nova cone 4921
Level at reference		Cone nr	4921

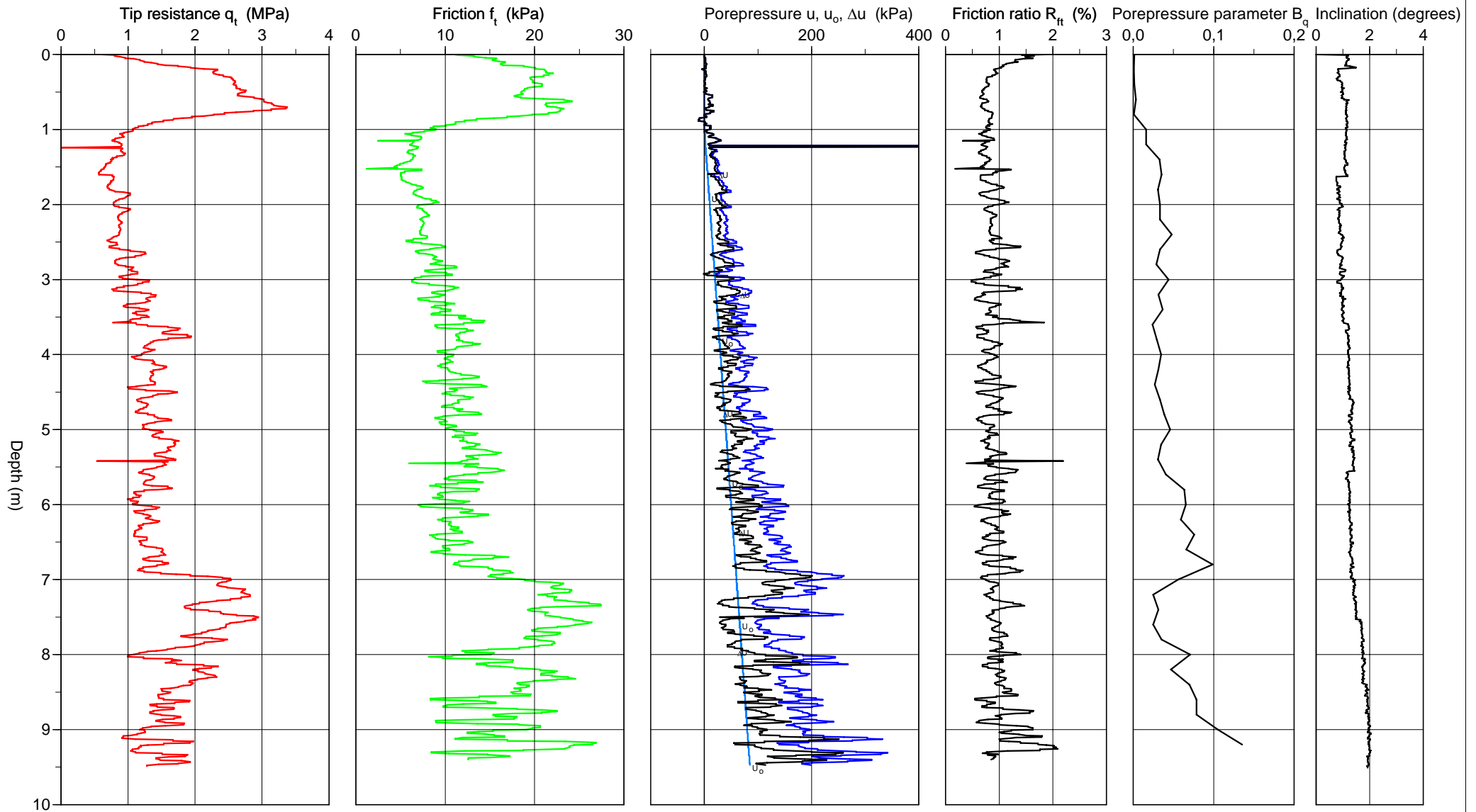
Porepressure measurement



# CPT-test performed according to EN ISO 22476-1

Predrilling depth	0,00 m	Reference	my	Fluid in filter	Fett och olja
Start depth	0,00 m	Level at reference		Coordinats	
Stop depth	9,51 m	Predrilled material	mulljord	Equipment	Geotech Nova cone 4921
Ground water level	1,00 m	Geometry	Normal	Cone nr	4921

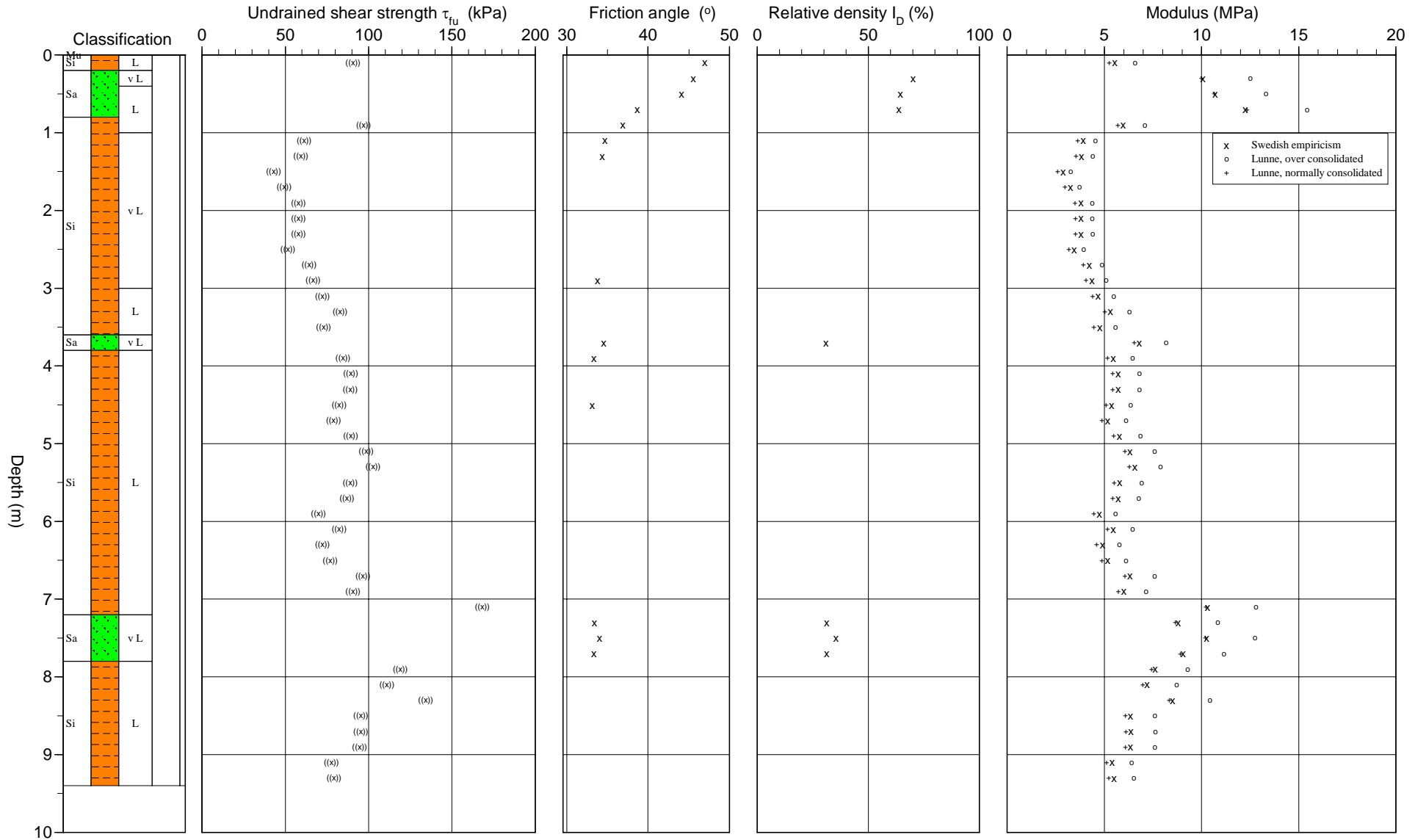
Project	Detaljplan Vivstavarv
Project nr	13012189
Site	
Designation	SW2004
Date	2020-10-15



# CPT test evaluated according to SGI Information 15 rev. 2007

Reference my                      Predrilling depth 0,00 m                      Evaluator SEJHJN  
 Level at reference                      Predrilled material mulljord                      Evaluation date 2020-11-18  
 Ground water level 1,00 m                      Equipment Geotech Nova cone 4921  
 Start depth 0,00 m                      Geometry Normal

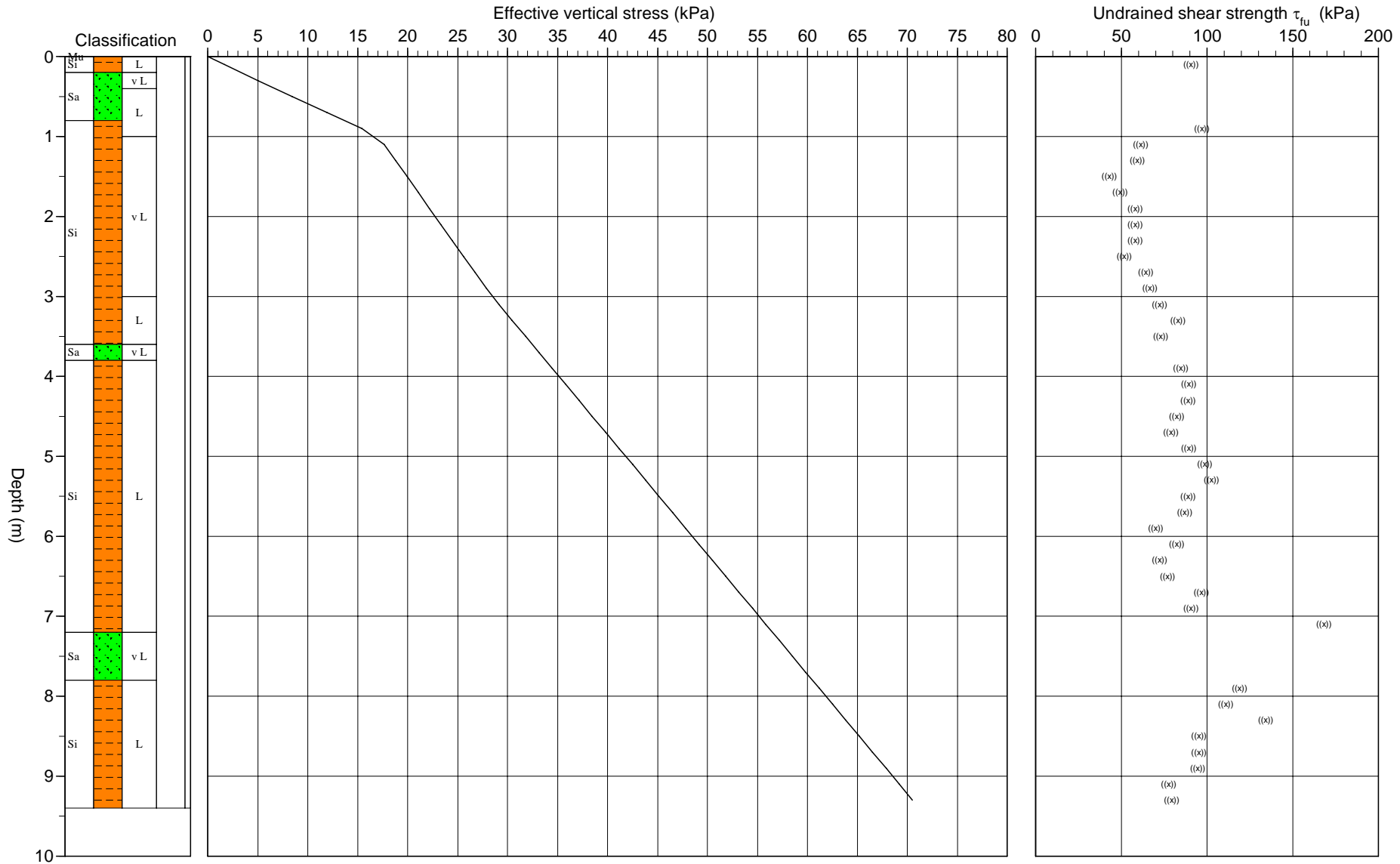
Project Detaljplan Vivstavarv  
 Project nr 13012189  
 Site  
 Designation SW2004  
 Date 2020-10-15



# CPT test evaluated according to SGI Information 15 rev. 2007

Reference my                      Predrilling depth 0,00 m                      Evaluator SEJHJN  
 Ground water level                      Predrilled material mulljord                      Evaluation date 2020-11-18  
 Grundvattenyta 1,00 m                      Equipment Geotech Nova cone 4921  
 Start depth 0,00 m                      Geometry Normal

Project Detaljplan Vivstavarv  
 Project nr 13012189  
 Site  
 Designation SW2004  
 Date 2020-10-15



# C P T - test

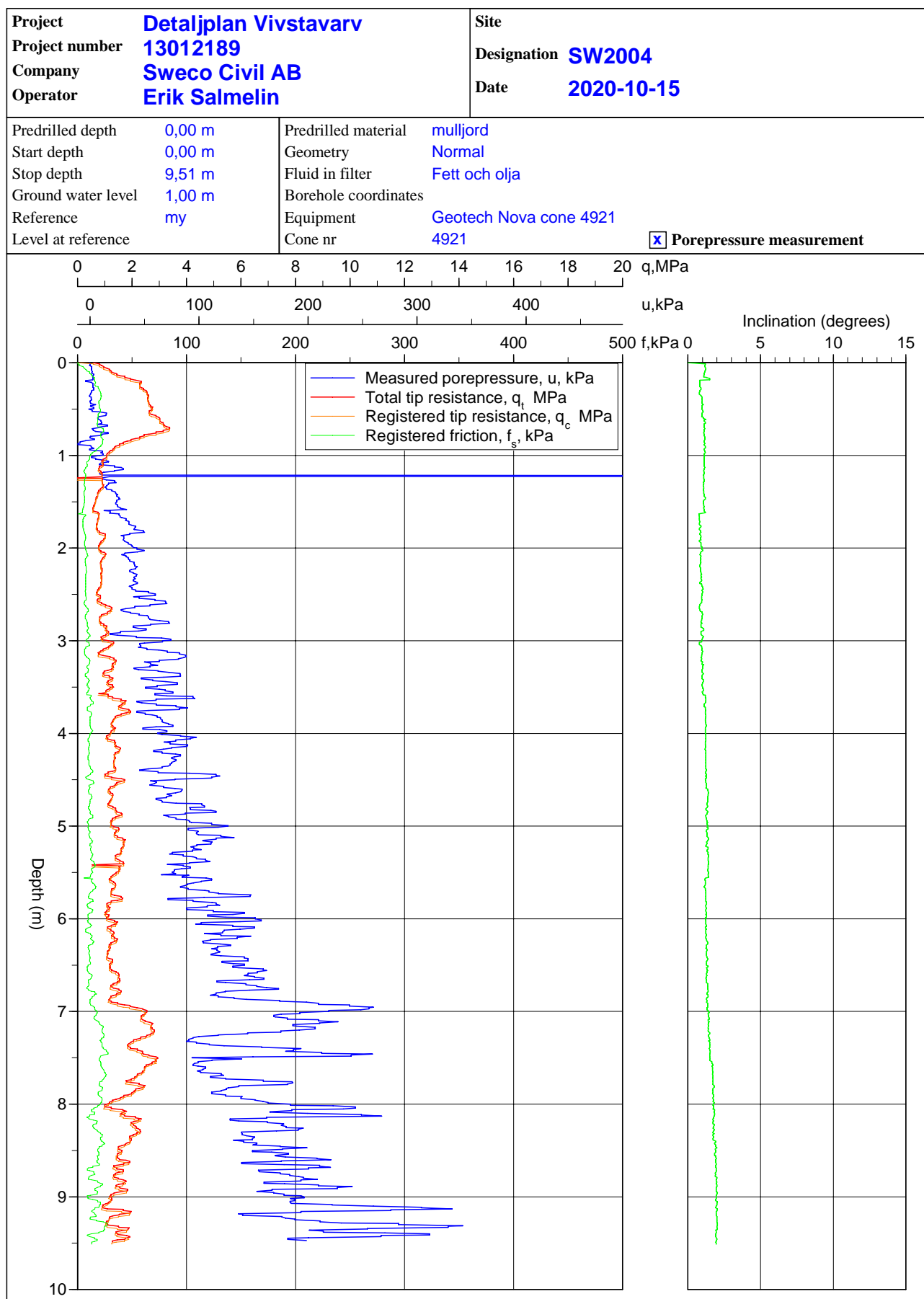
<b>Project</b> <b>Detaljplan Vivstavarv</b> <b>13012189</b>		<b>Site</b> <b>Designation SW2004</b> <b>Date 2020-10-15</b>																					
Predrilling depth 0,00 m Start depth 0,00 m Stop depth 9,51 m Ground water level 1,00 m Reference my Level at reference	Predrilled material mulljord Geometry Normal Fluid in filter Fett och olja Operator Erik Salmelin Equipment Geotech Nova cone 4921 <input checked="" type="checkbox"/> Porepressure measurement																						
<b>Calibration data</b> Cone 4921 Internal friction $O_c$ 0,0 kPa Date 2020-02-25 Internal friction $O_f$ 0,0 kPa Areafactor a 0,838 Cross talk $c_1$ 0,000 Areafactor b 0,000 Cross talk $c_2$ 0,000		<b>Cero values, kPa</b> <table border="1"> <thead> <tr> <th></th> <th>Porepressure</th> <th>Friction</th> <th>Tip resistance</th> </tr> </thead> <tbody> <tr> <td>Before</td> <td>264,20</td> <td>116,30</td> <td>7,38</td> </tr> <tr> <td>After</td> <td>274,70</td> <td>114,90</td> <td>7,36</td> </tr> <tr> <td>Diff</td> <td>10,50</td> <td>-1,40</td> <td>-0,02</td> </tr> </tbody> </table>			Porepressure	Friction	Tip resistance	Before	264,20	116,30	7,38	After	274,70	114,90	7,36	Diff	10,50	-1,40	-0,02				
	Porepressure	Friction	Tip resistance																				
Before	264,20	116,30	7,38																				
After	274,70	114,90	7,36																				
Diff	10,50	-1,40	-0,02																				
<b>Scale factors</b> <table border="1"> <thead> <tr> <th colspan="2">Porepressure</th> <th colspan="2">Friction</th> <th colspan="2">Tip resistance</th> </tr> <tr> <th>Range</th> <th>Code</th> <th>Range</th> <th>Code</th> <th>Range</th> <th>Code</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Porepressure		Friction		Tip resistance		Range	Code	Range	Code	Range	Code							<b>Correction</b> Porepressure (none) Friction (none) Tip resistance (none)  Estimated sounding class			
Porepressure		Friction		Tip resistance																			
Range	Code	Range	Code	Range	Code																		
<input type="checkbox"/> Use scale factors																							
<b>Porepressure observations</b> <table border="1"> <thead> <tr> <th>Depth (m)</th> <th>Porepressure (kPa)</th> </tr> </thead> <tbody> <tr> <td>1,00</td> <td>0,00</td> </tr> </tbody> </table>		Depth (m)	Porepressure (kPa)	1,00	0,00	<b>Boundaries</b> <table border="1"> <thead> <tr> <th>Depth (m)</th> </tr> </thead> <tbody> <tr> <td></td> </tr> </tbody> </table>	Depth (m)		<b>Classification</b> <table border="1"> <thead> <tr> <th colspan="2">Depth (m)</th> <th>Density</th> <th rowspan="2">Liquid limit</th> <th rowspan="2">Soil</th> </tr> <tr> <th>From</th> <th>To</th> <th>(ton/m<sup>3</sup>)</th> </tr> </thead> <tbody> <tr> <td>0,00</td> <td>0,01</td> <td>1,60</td> <td></td> <td>Mu</td> </tr> </tbody> </table>		Depth (m)		Density	Liquid limit	Soil	From	To	(ton/m <sup>3</sup> )	0,00	0,01	1,60		Mu
Depth (m)	Porepressure (kPa)																						
1,00	0,00																						
Depth (m)																							
Depth (m)		Density	Liquid limit	Soil																			
From	To	(ton/m <sup>3</sup> )																					
0,00	0,01	1,60		Mu																			
<b>Notes</b>																							



## C P T - test

Project				Site										
Detaljplan Vivstavarv 13012189				Designation SW2004 Date 2020-10-15										
Depth (m)		Classification	$\rho$ t/m <sup>3</sup>	$w_L$	$\tau_{fu}$ kPa	$\phi$ °	$\sigma_{vo}$ kPa	$\sigma'_{vo}$ kPa	$\sigma'_c$ kPa	OCR	$I_D$ %	E MPa	$M_{OC}$ MPa	$M_{NC}$ MPa
From	To													
0,00	0,00	Mu	1,60				0,0	0,0						
0,00	0,20	Si L	1,70		((90,6))	(47,0)	1,7	1,7				5,6	6,6	5,3
0,20	0,40	Sa v L	1,70			45,6	5,0	5,0		70,2		10,1	12,5	10,0
0,40	0,60	Sa L	1,80			44,2	8,4	8,4		64,5		10,7	13,3	10,7
0,60	0,80	Sa L	1,80			38,7	12,0	12,0		63,7		12,3	15,4	12,3
0,80	1,00	Si L	1,70		((96,8))	(36,9)	15,4	15,4				6,0	7,1	5,7
1,00	1,20	Si v L	1,60		((61,2))	(34,7)	18,6	17,6				3,9	4,5	3,6
1,20	1,40	Si v L	1,60		((59,3))	(34,4)	21,8	18,8				3,8	4,4	3,5
1,40	1,60	Si v L	1,60		((43,0))		24,9	19,9				2,9	3,2	2,6
1,60	1,80	Si v L	1,60		((49,4))		28,1	21,1				3,3	3,7	3,0
1,80	2,00	Si v L	1,60		((58,1))		31,2	22,2				3,8	4,4	3,5
2,00	2,20	Si v L	1,60		((58,0))		34,3	23,3				3,8	4,4	3,5
2,20	2,40	Si v L	1,60		((57,9))		37,5	24,5				3,8	4,4	3,5
2,40	2,60	Si v L	1,60		((51,7))		40,6	25,6				3,5	4,0	3,2
2,60	2,80	Si v L	1,60		((64,5))		43,8	26,8				4,2	4,9	3,9
2,80	3,00	Si v L	1,60		((66,8))	(33,9)	46,9	27,9				4,4	5,1	4,1
3,00	3,20	Si L	1,70		((72,2))		50,1	29,1				4,7	5,5	4,4
3,20	3,40	Si L	1,70		((82,9))		53,5	30,5				5,3	6,3	5,0
3,40	3,60	Si L	1,70		((73,1))		56,8	31,8				4,8	5,6	4,5
3,60	3,80	Sa v L	1,70			34,6	60,1	33,1				6,8	8,2	6,5
3,80	4,00	Si L	1,70		((84,8))	(33,4)	63,5	34,5		31,0		5,5	6,5	5,2
4,00	4,20	Si L	1,70		((89,2))		66,8	35,8				5,7	6,8	5,4
4,20	4,40	Si L	1,70		((88,9))		70,1	37,1				5,7	6,8	5,4
4,40	4,60	Si L	1,70		((82,4))	(33,2)	73,5	38,5				5,4	6,3	5,1
4,60	4,80	Si L	1,70		((79,0))		76,8	39,8				5,2	6,1	4,9
4,80	5,00	Si L	1,70		((89,2))		80,1	41,1				5,8	6,9	5,5
5,00	5,20	Si L	1,70		((98,5))		83,5	42,5				6,3	7,6	6,0
5,20	5,40	Si L	1,70		((102,6))		86,8	43,8				6,6	7,9	6,3
5,40	5,60	Si L	1,70		((88,9))		90,2	45,2				5,8	6,9	5,5
5,60	5,80	Si L	1,70		((87,0))		93,5	46,5				5,7	6,8	5,4
5,80	6,00	Si L	1,70		((70,0))		96,8	47,8				4,7	5,6	4,4
6,00	6,20	Si L	1,70		((82,2))		100,2	49,2				5,5	6,5	5,2
6,20	6,40	Si L	1,70		((72,3))		103,5	50,5				4,9	5,8	4,6
6,40	6,60	Si L	1,70		((76,9))		106,8	51,8				5,2	6,1	4,9
6,60	6,80	Si L	1,70		((96,7))		110,2	53,2				6,3	7,6	6,1
6,80	7,00	Si L	1,70		((90,6))		113,5	54,5				6,0	7,1	5,7
7,00	7,20	Si L	1,70		((168,4))		116,8	55,8				10,3	12,8	10,2
7,20	7,40	Sa v L	1,70			33,4	120,2	57,2		31,1		8,8	10,8	8,7
7,40	7,60	Sa v L	1,70			34,0	123,5	58,5		35,5		10,3	12,8	10,2
7,60	7,80	Sa v L	1,70			33,4	126,8	59,8		31,3		9,1	11,1	8,9
7,80	8,00	Si L	1,70		((119,0))		130,2	61,2				7,6	9,3	7,4
8,00	8,20	Si L	1,70		((111,0))		133,5	62,5				7,2	8,7	7,0
8,20	8,40	Si L	1,70		((134,2))		136,8	63,8				8,5	10,4	8,3
8,40	8,60	Si L	1,70		((95,3))		140,2	65,2				6,4	7,6	6,1
8,60	8,80	Si L	1,70		((95,4))		143,5	66,5				6,4	7,6	6,1
8,80	9,00	Si L	1,70		((94,7))		146,9	67,9				6,3	7,6	6,1
9,00	9,20	Si L	1,70		((77,8))		150,2	69,2				5,4	6,4	5,1
9,20	9,40	Si L	1,70		((79,4))		153,5	70,5				5,5	6,5	5,2

# CPT-test performed according to EN ISO 22476-1



Projekt: **Vivstavarv**

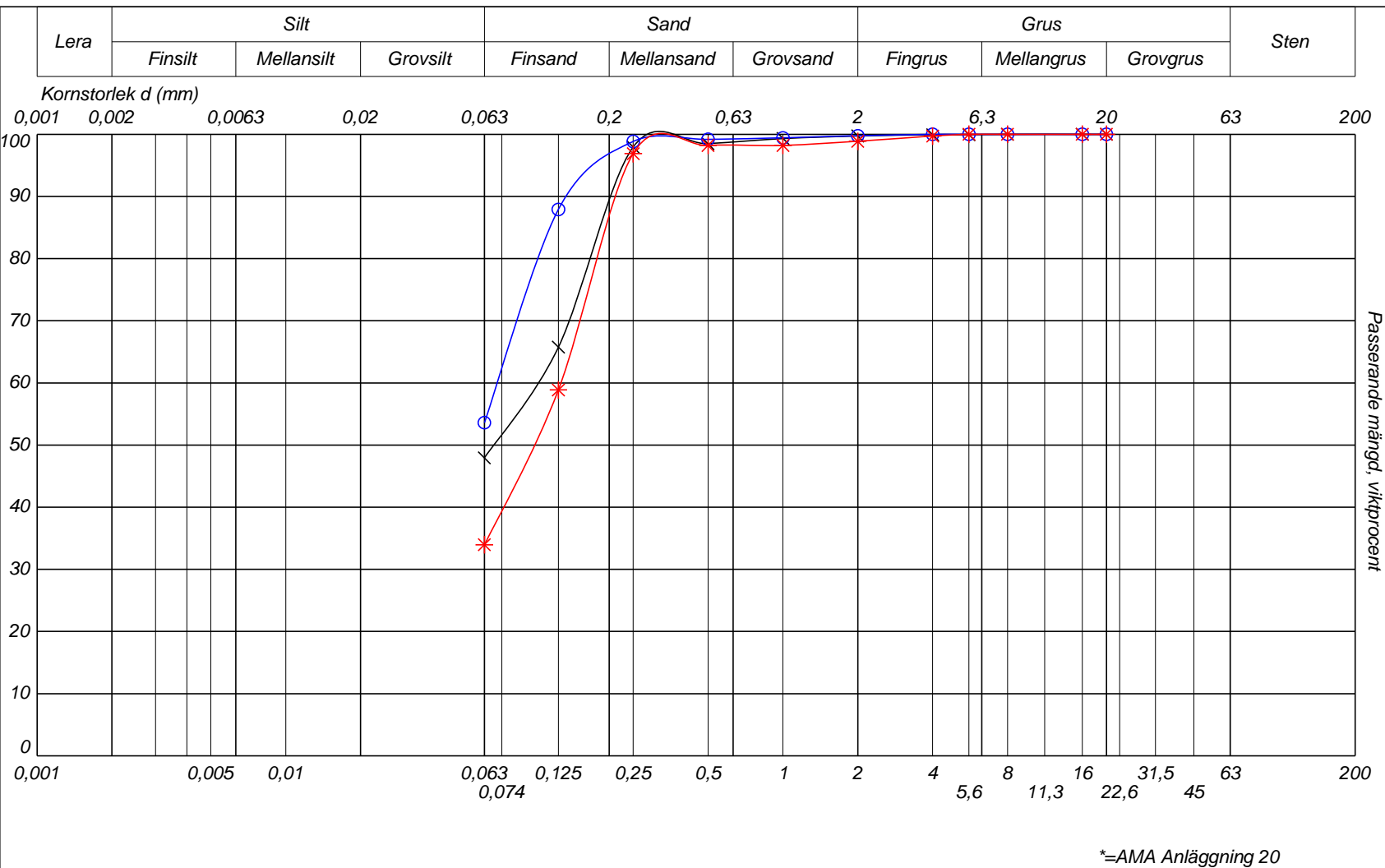
Datum: 2020-12-01

Uppdragsnr: 13012189

Provtagningsdatum: 2020-10-15

Uppdragsgivare: SWECO Civil AB, Sundsvall

Löp-nr: 01  
Gransk./Sign: SEFFABE



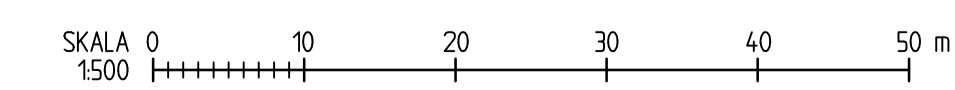
Sektion Borrhål	Prov- beteckning	Djup (m)	Gäller mellan (m)	Benämning	Siktat Prov (g)	Glödgn.- förlust %	Mtrl % > mm	Tjäl- farlighet	d10	d60	d90
SW2002	— × —		1,0-2,0	Sandig SILT	730			5A/4*		0,100	0,211
SW2004	— ○ —		0,3-2,0	Sandig SILT	860			5A/4*		0,072	0,143
SW2004	— * —		2,0-4,0	Siltig SAND	1060			4A/3*		0,128	0,221



**ANMÄRKNINGAR**  
 KOORDINATSYSTEM  
 PLAN : SWEREF 99 1715  
 HÖJD : RH 2000

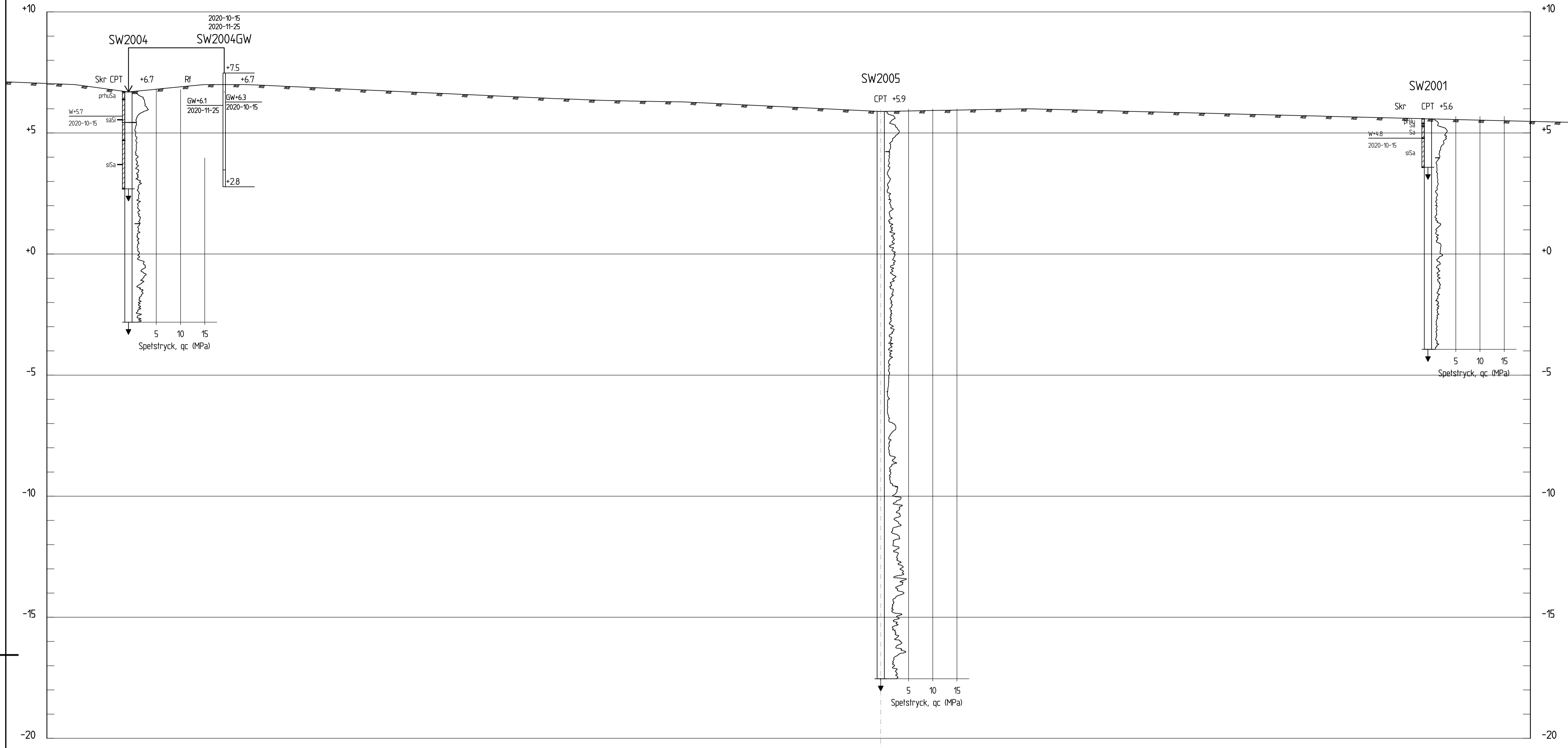
Ritningen redovisas enligt SGF/BGS Beteckningssystem, Version 2001:2 +  
 Beteckningsblad 2016, www.sgf.net

PLAN  
 1:500



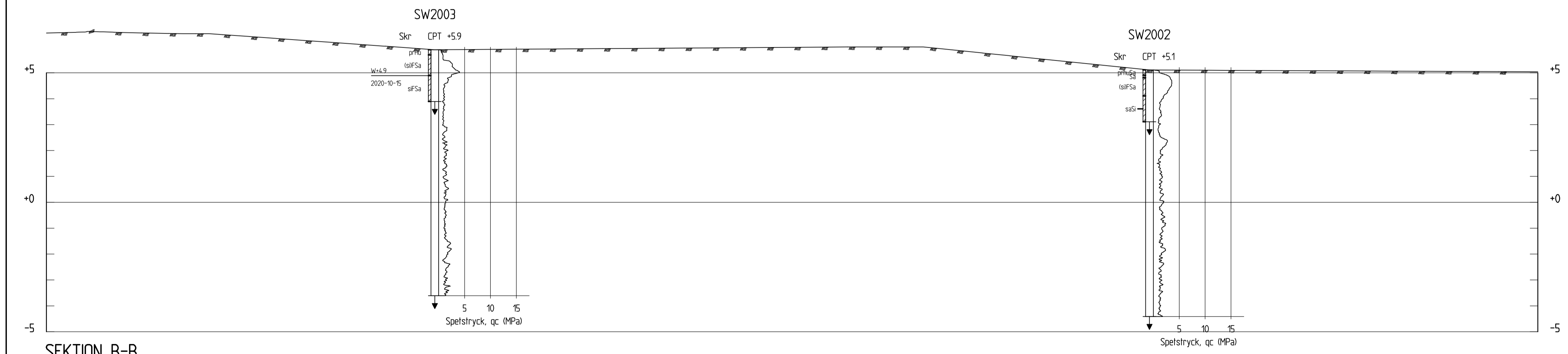
REV	ÄNDRINGEN AVSER	GÖDK	DATUR
		<b>GEOTEKNISK UTREDNING</b>	
		VIVSTAVARV 1:92 & 1:103	
		TIMRÅ KOMMUN UTREDNING FÖR NY DETALJPLAN	
		GEOTEKNISKA UNDERSÖKNINGAR	
<b>PLAN</b>			
UPPDRAGSANSVARIG SESGRU	UPPDRAGSNUMMER 13012189	KONSTRUKTIONSR	FORMAT A1
KONSTR SEBAGG	GRANSK SECARW	SKALA 1:500	REVISION RITINGSNR
Sundsvall	2020-12-07	OBJEKT NR	REV
		<b>G-10.1-001</b>	

Ritning 5 Utredning VIVSTAVARV 1:92 & 1:103 Projekt: VIVSTAVARV 1:92 & 1:103 Utgåva: 1 Dator: 2020-12-07 15:53



**ANMÄRKNINGAR**  
 KOORDINATSYSTEM  
 PLAN : SWEREF 99 1715  
 HÖJD : RH 2000  
 Ritningen redovisas enligt SGF/BGS Beteckningssystem,  
 Version 2001:2 + Beteckningsblad 2016, www.sgf.net

**SEKTION A-A**  
 1:100



**SEKTION B-B**  
 1:100

REV	ÄNDRINGEN AVSER	GODK	DATUR
<b>GEOTEKNISK UTREDNING</b>			
VIVSTAVARV 1:92 & 1:103			
TIMRÅ KOMMUN UTREDNING FÖR NY DETALJPLAN			
SEKTION A-A & B-B			
GEOTEKNISKA UNDERSÖKNINGAR			
<b>SEKTIONER</b>			
UPPDRAGSANSVARIG	UPPDRAGSNUMMER	FORMAT	SKALA
SEGRU	13012189	A1	1:100
KONSTR	GRANSK	KONSTRUKTIONSR	RITNINGSR
SEBAGG	SECARW		
Sundsvall	2020-12-07	OBJEKT NR	REV
			G-10.2-001

Ritning 5 Utvärdering VIVSTAVARV 1:92 & 1:103 - 1:100 (1:100) - 2020-12-07 - 10:37