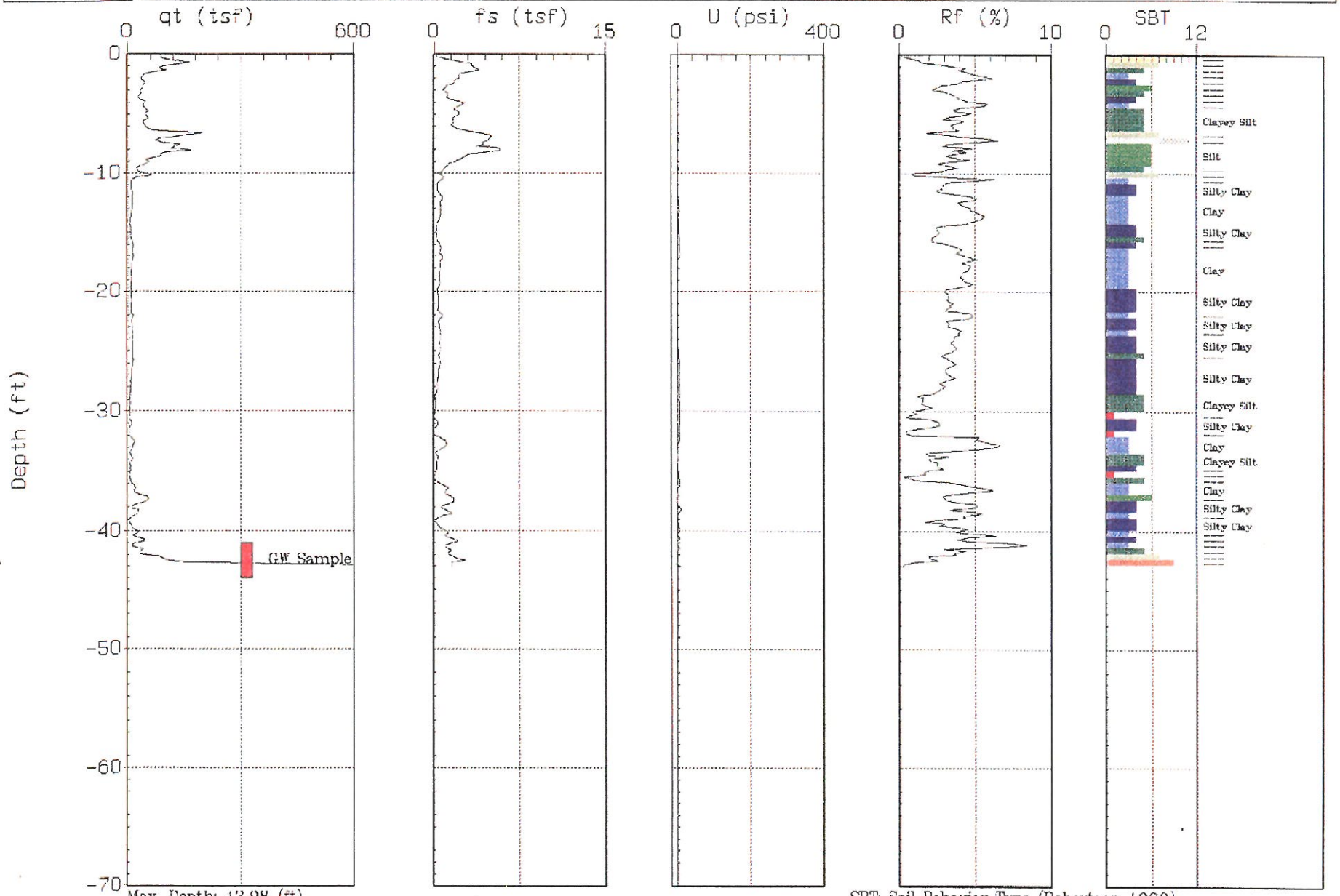
GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-EHP1

Geologist: R. GOLDBERG
Date: 04:26:04 16:03



Max. Depth: 42.98 (ft)
Depth Inc.: 0.164 (ft)

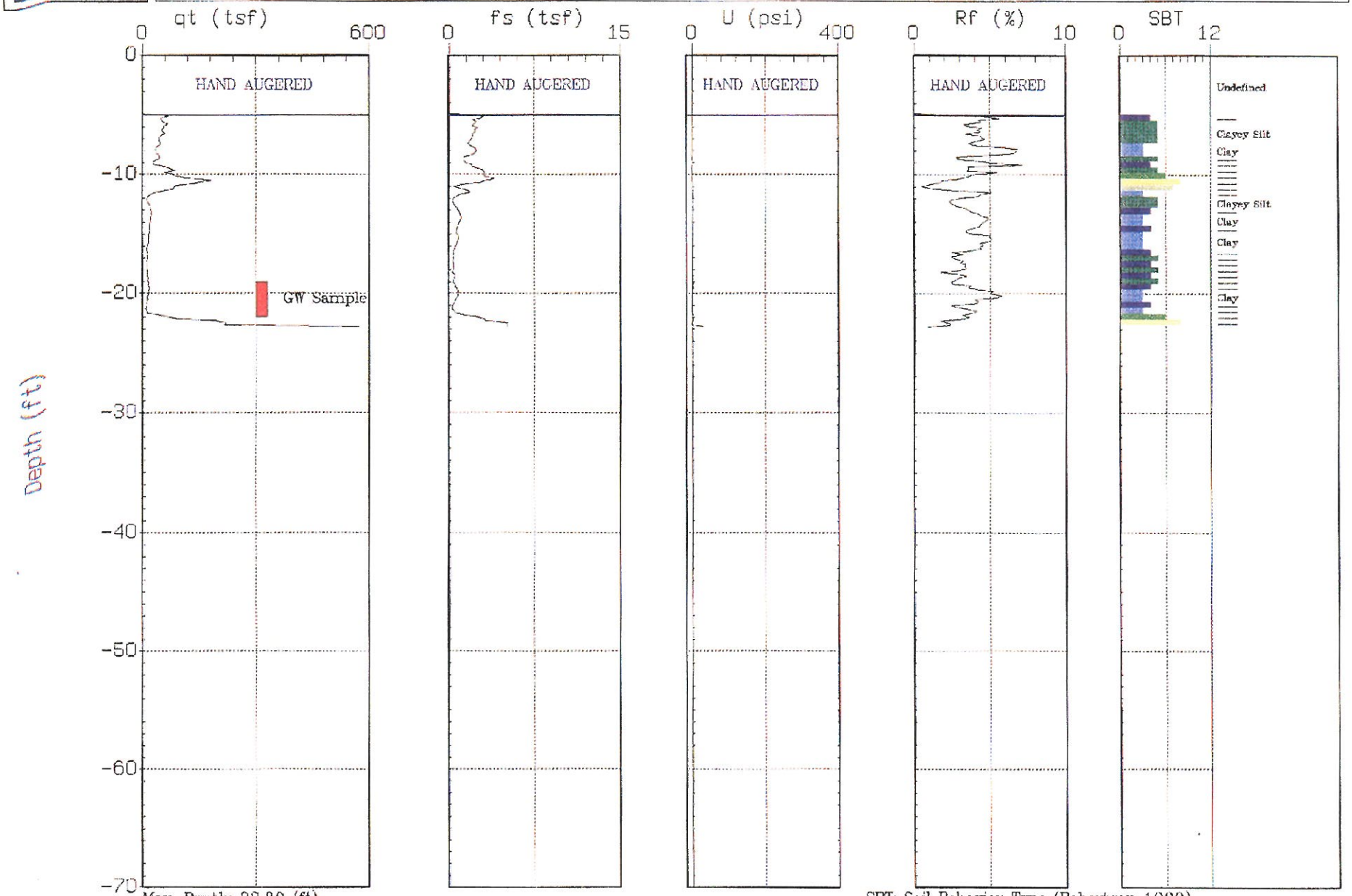
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SPUREHP2

Geologist: R. GOLDBERG
Date: 05:20:04 16:01



Max. Depth: 22.80 (ft)
Depth Inc.: 0.164 (ft)

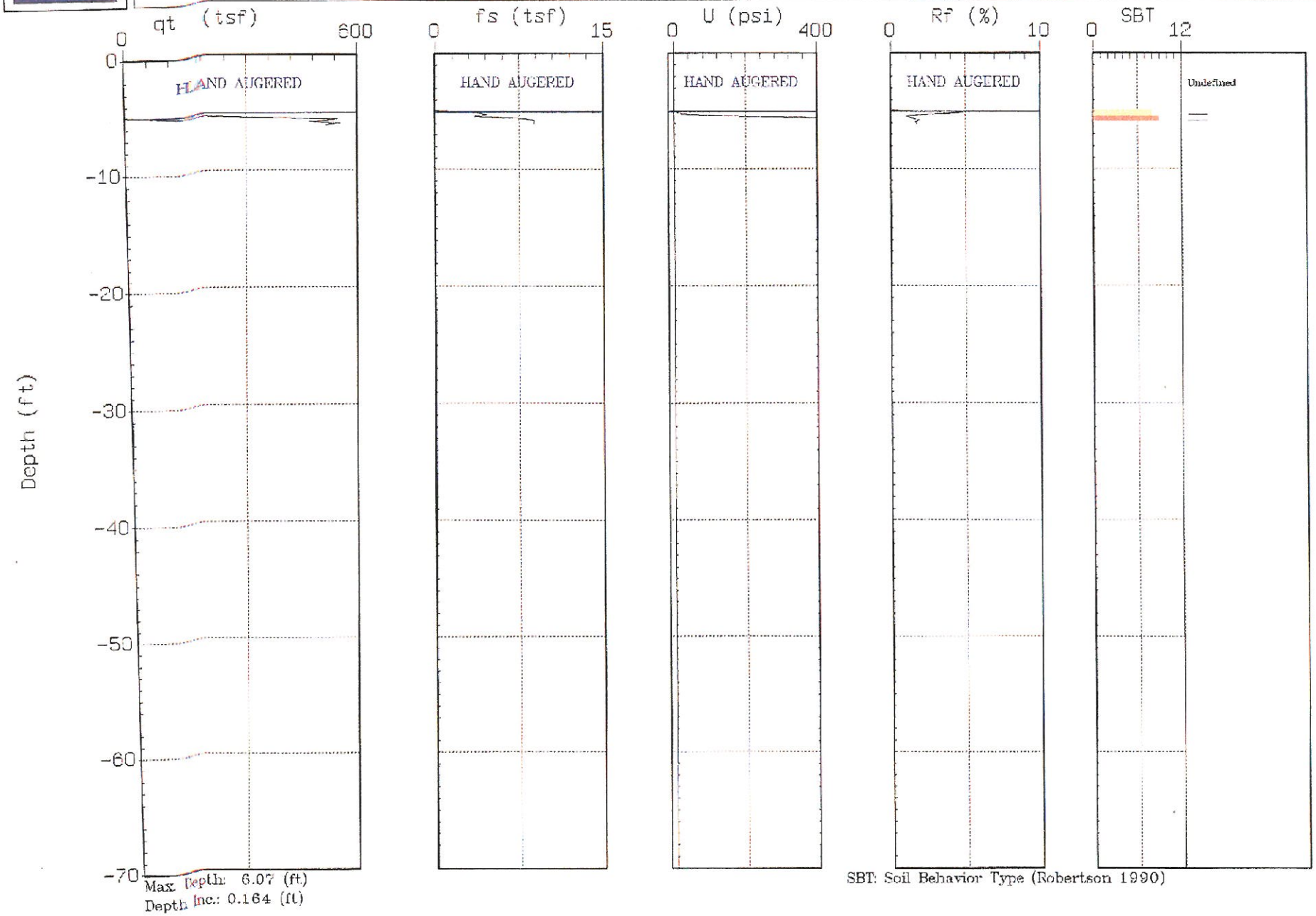
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPAHP1

Geologist: R. GOLDBERG
Date: 05:13:04 16:30



Max. Depth: 6.07 (ft)
Depth Inc.: 0.164 (ft)

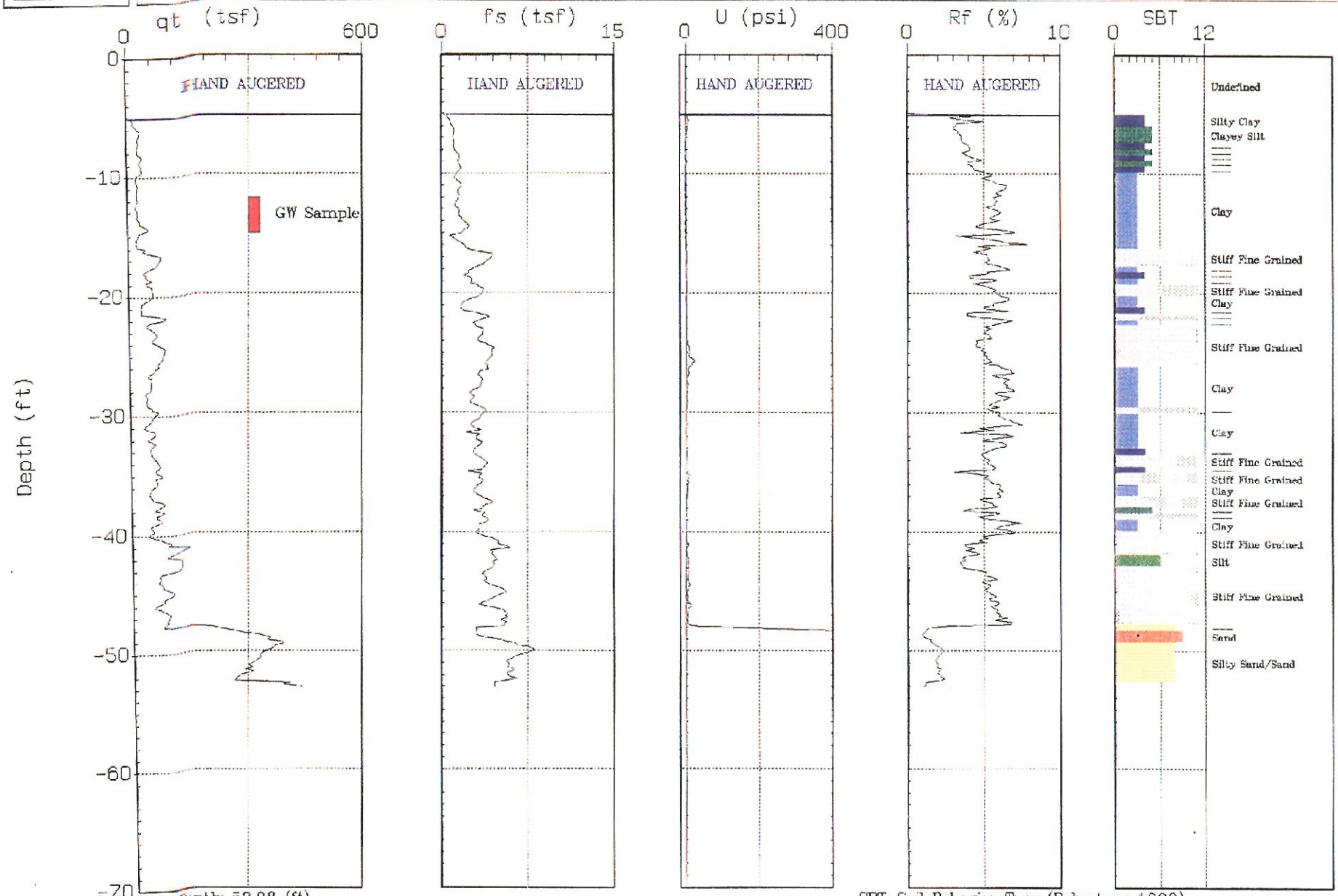
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPAHP2

Geologist: R. GOLDBERG
Date: 05:13:04 15:11



Max. Depth: 52.98 (ft)
Depth inc.: 0.164 (ft)

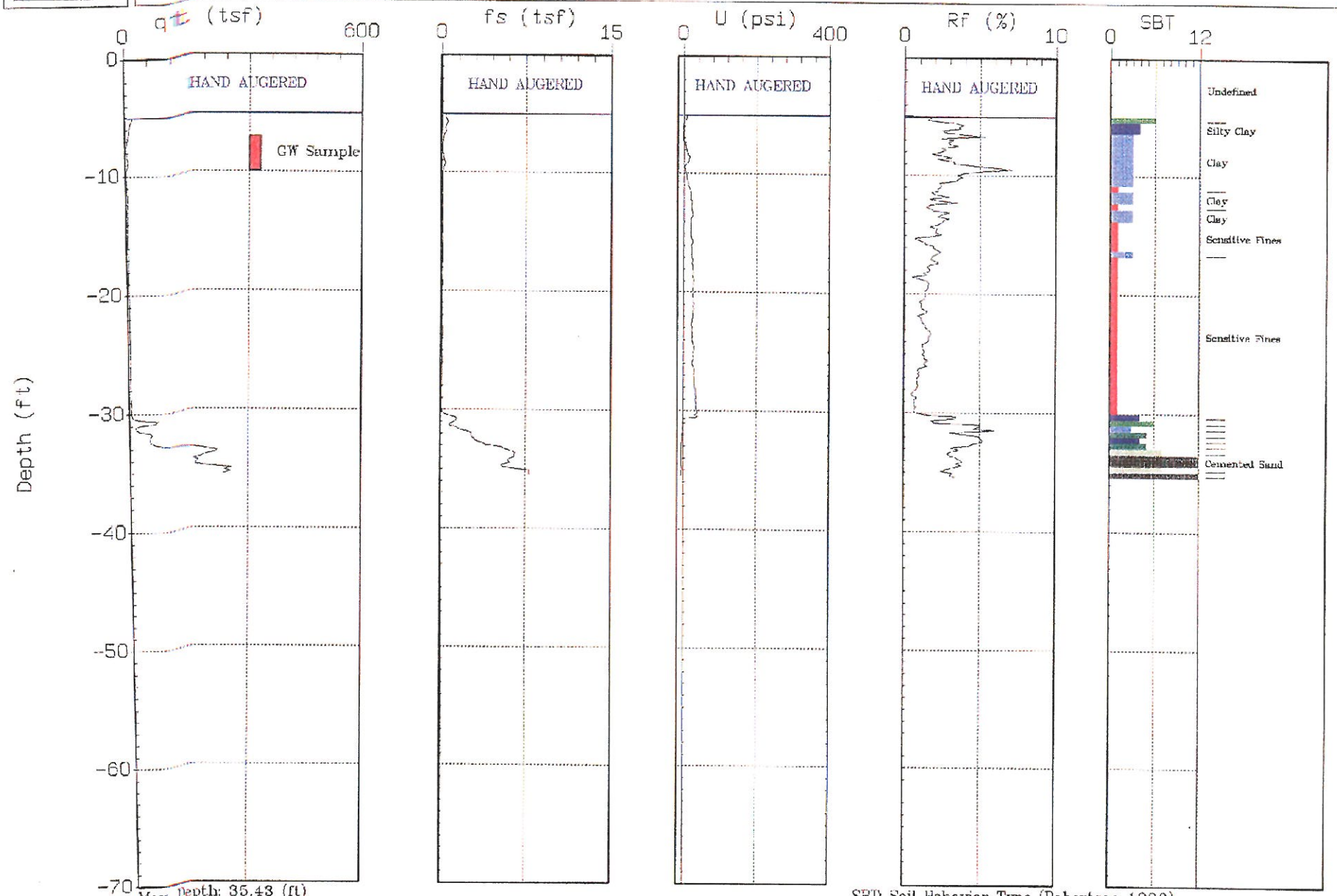
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPAHP3

Geologist: R. GOLDBERG
Date: 05:10:04 15:35



Max. Depth: 35.43 (ft)
Depth Inc.: 0.164 (ft)

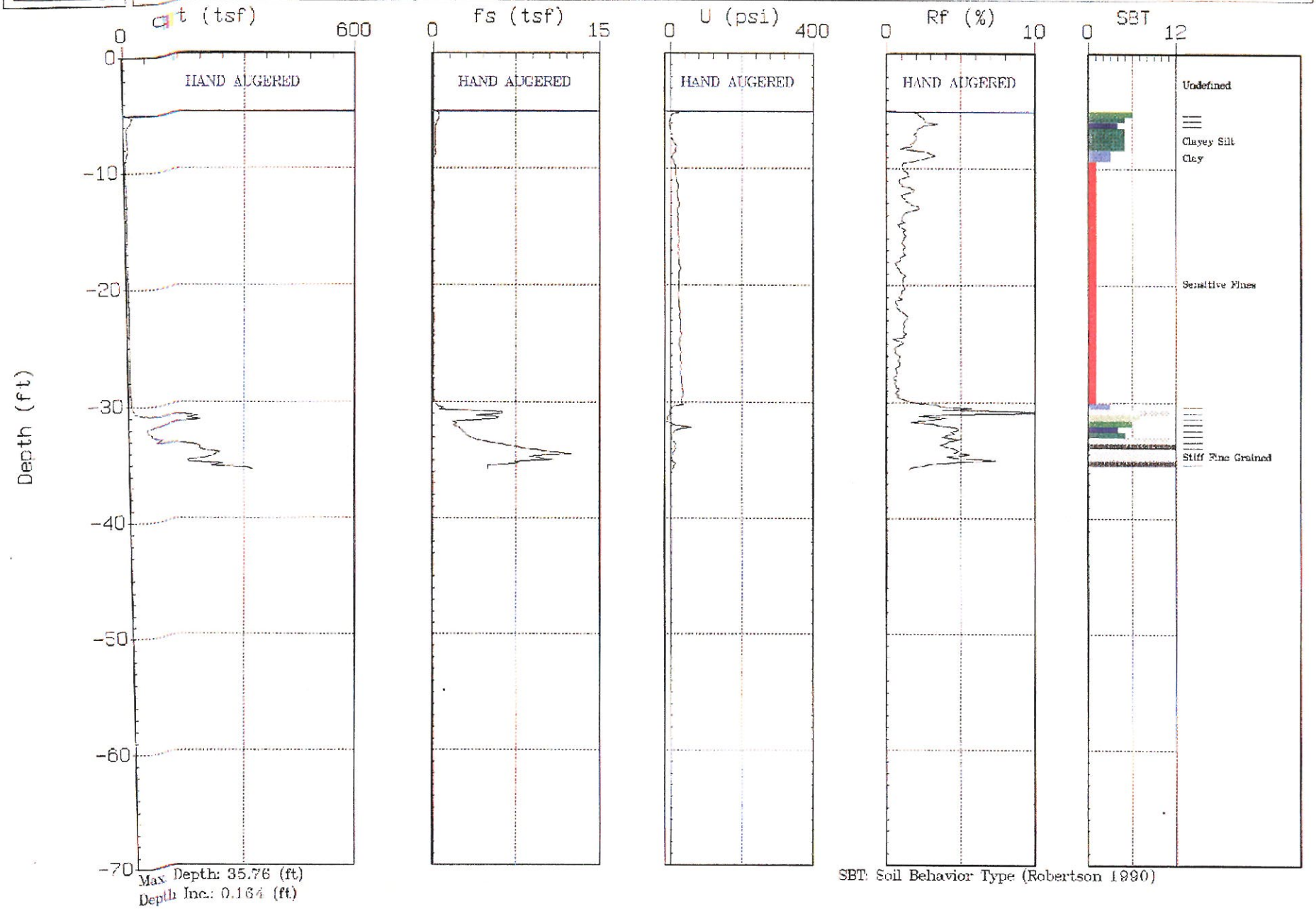
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPAHP38

Geologist: R. GOLDBERG
Date: 05:19:04 10:35



Max. Depth: 35.76 (ft)
Depth Inc.: 0.164 (ft)

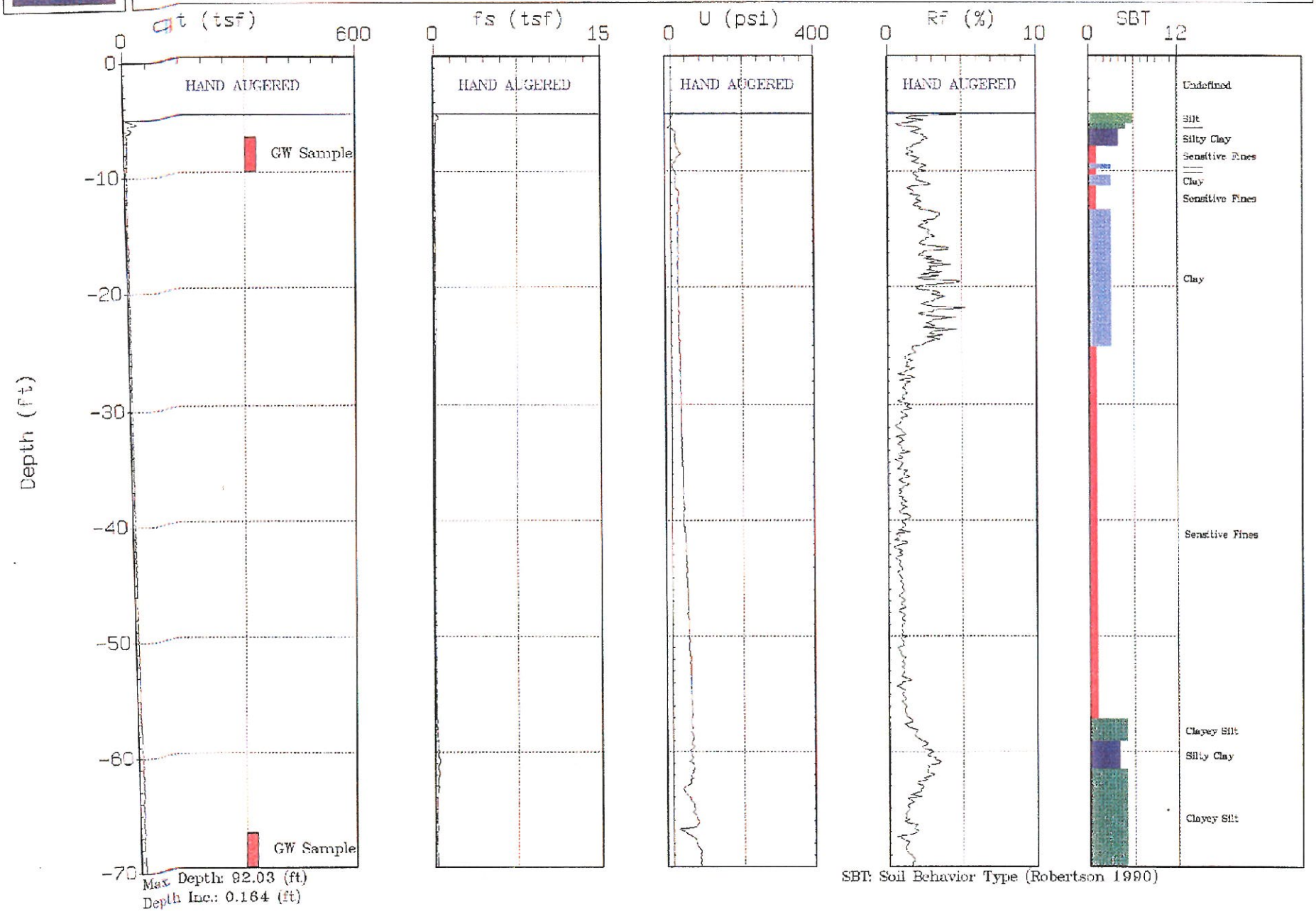
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPAHP4

Geologist: R. GOLDBERG
Date: 06:07:04 13:31



Max Depth: 82.03 (ft)
Depth Inc.: 0.164 (ft)

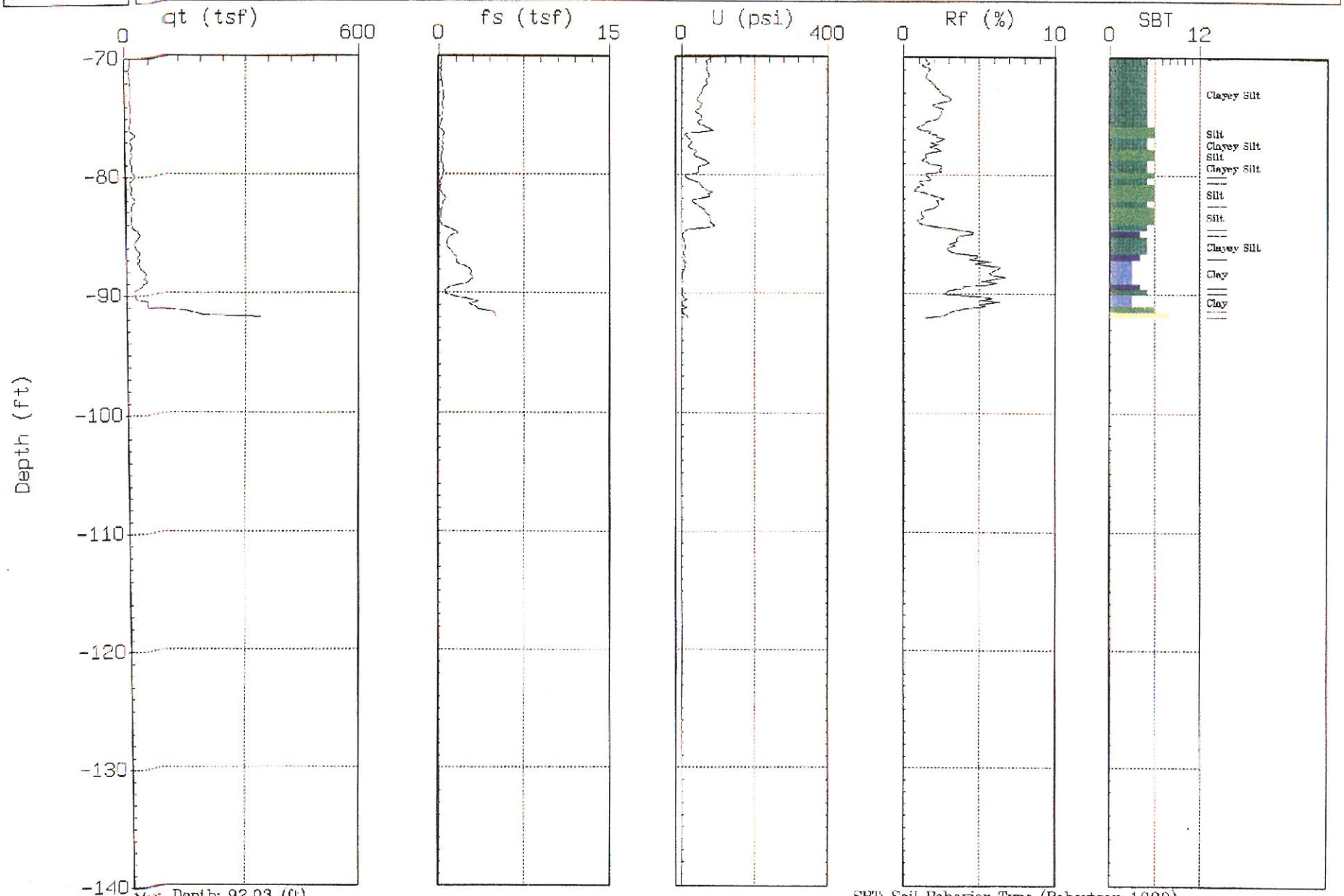
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPAHP4

Geologist: R. GOLDBERG
Date: 05:07:04 13:31



Max. Depth: 92.03 (ft)
Depth Inc.: 0.164 (ft)

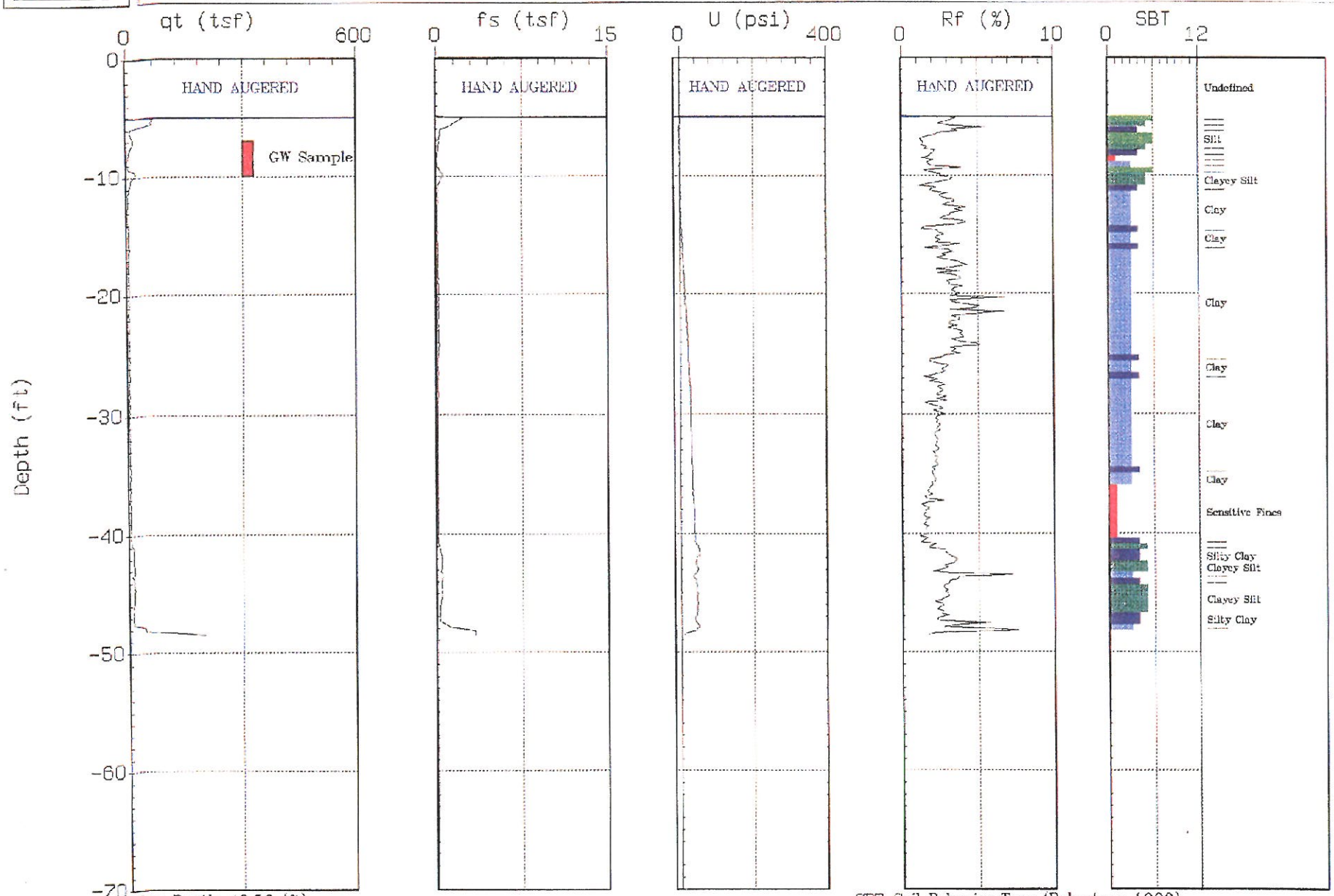
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPAHP5

Geologist: R. GOLDBERG
Date: 05:07:04 11:28



Max. Depth: 48.56 (ft)
Depth Inc.: 0.164 (ft)

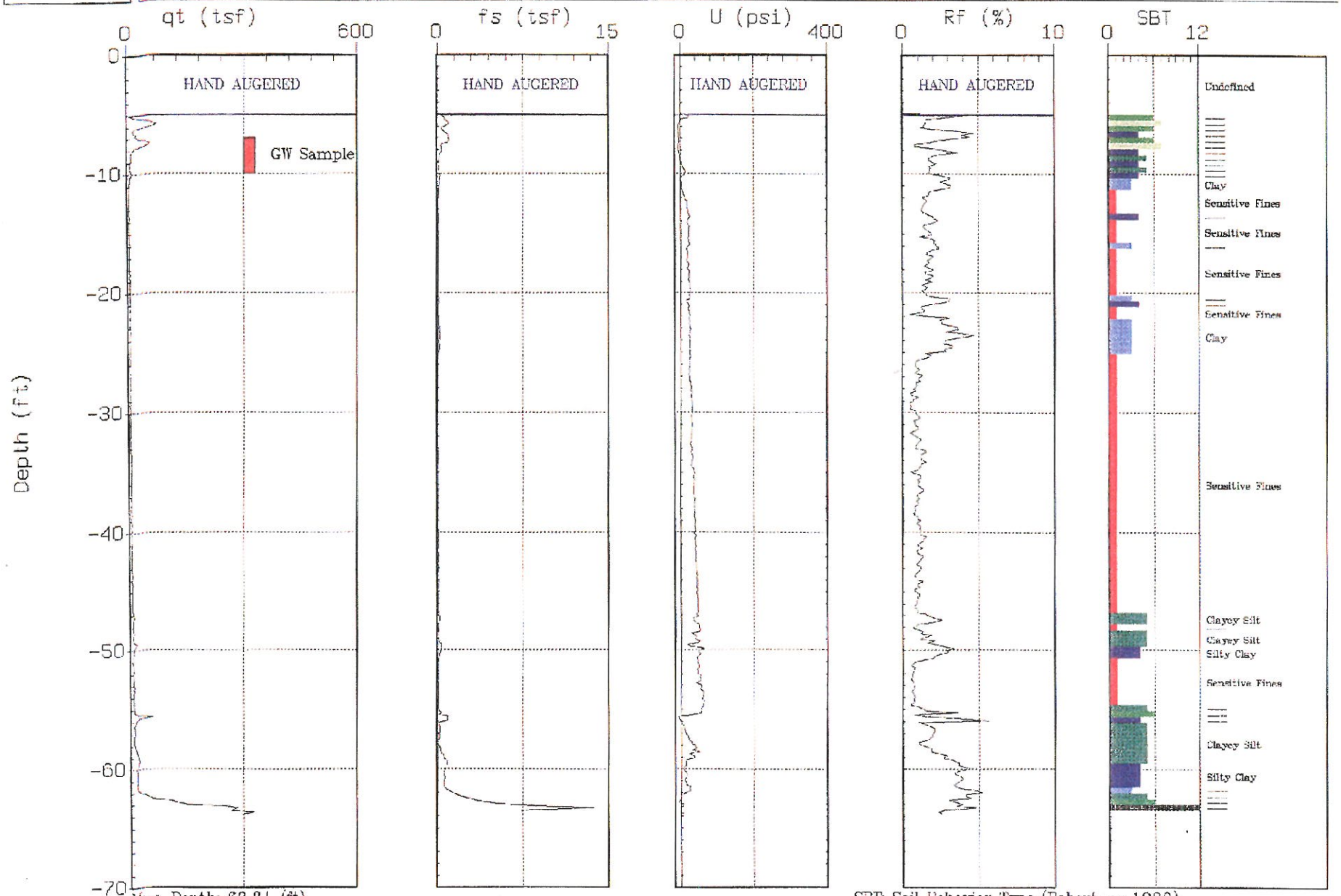
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPAHP6

Geologist: R. GOLDBERG
Date: 05:17:04 14:44



Max. Depth: 63.81 (ft)
Depth Inc.: 0.164 (ft)

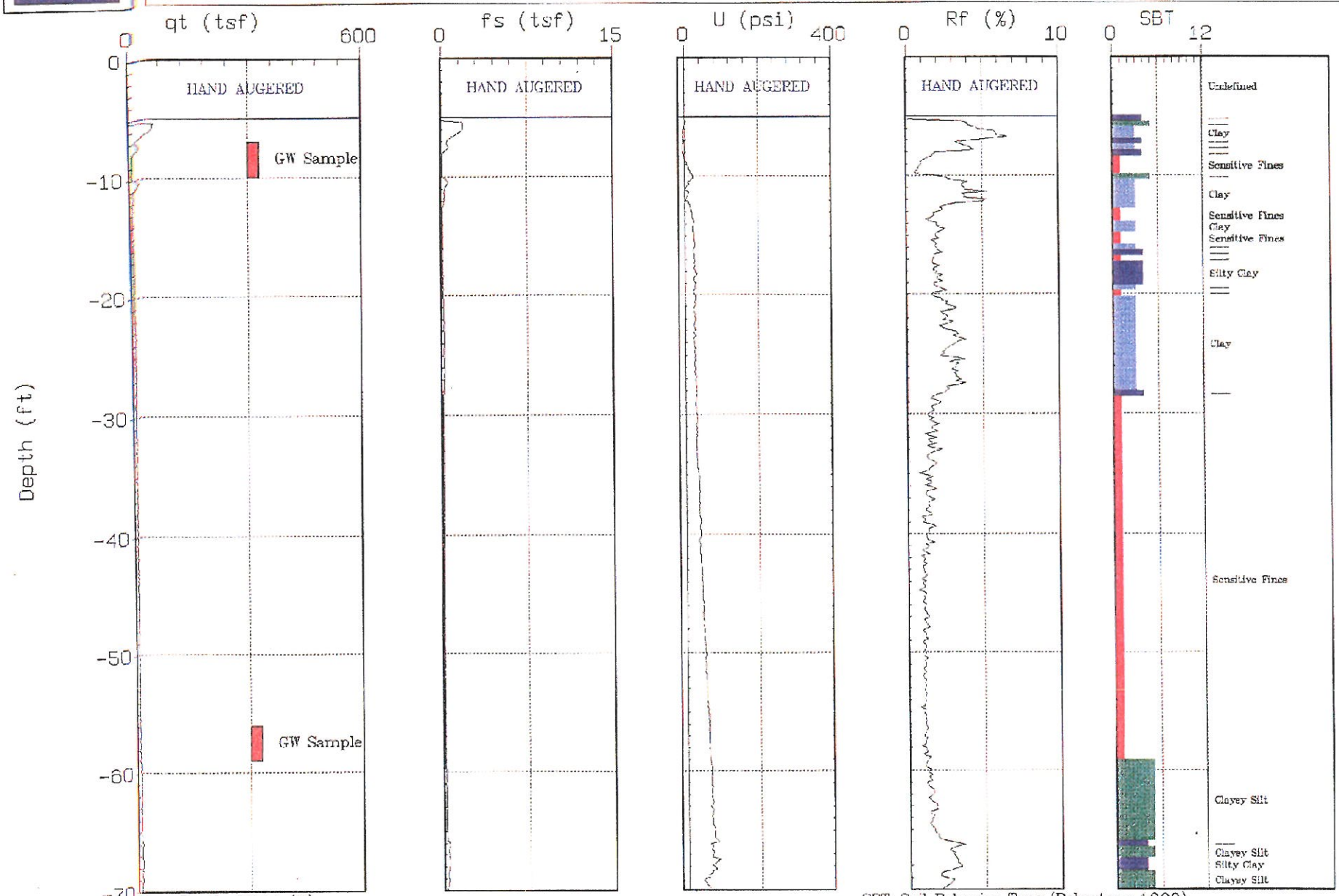
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPAHP7

Geologist: R. GOLDBERG
Date: 05:17:04 11:12



Max. Depth: 37.11 (ft)
Depth Inc.: 0.164 (ft)

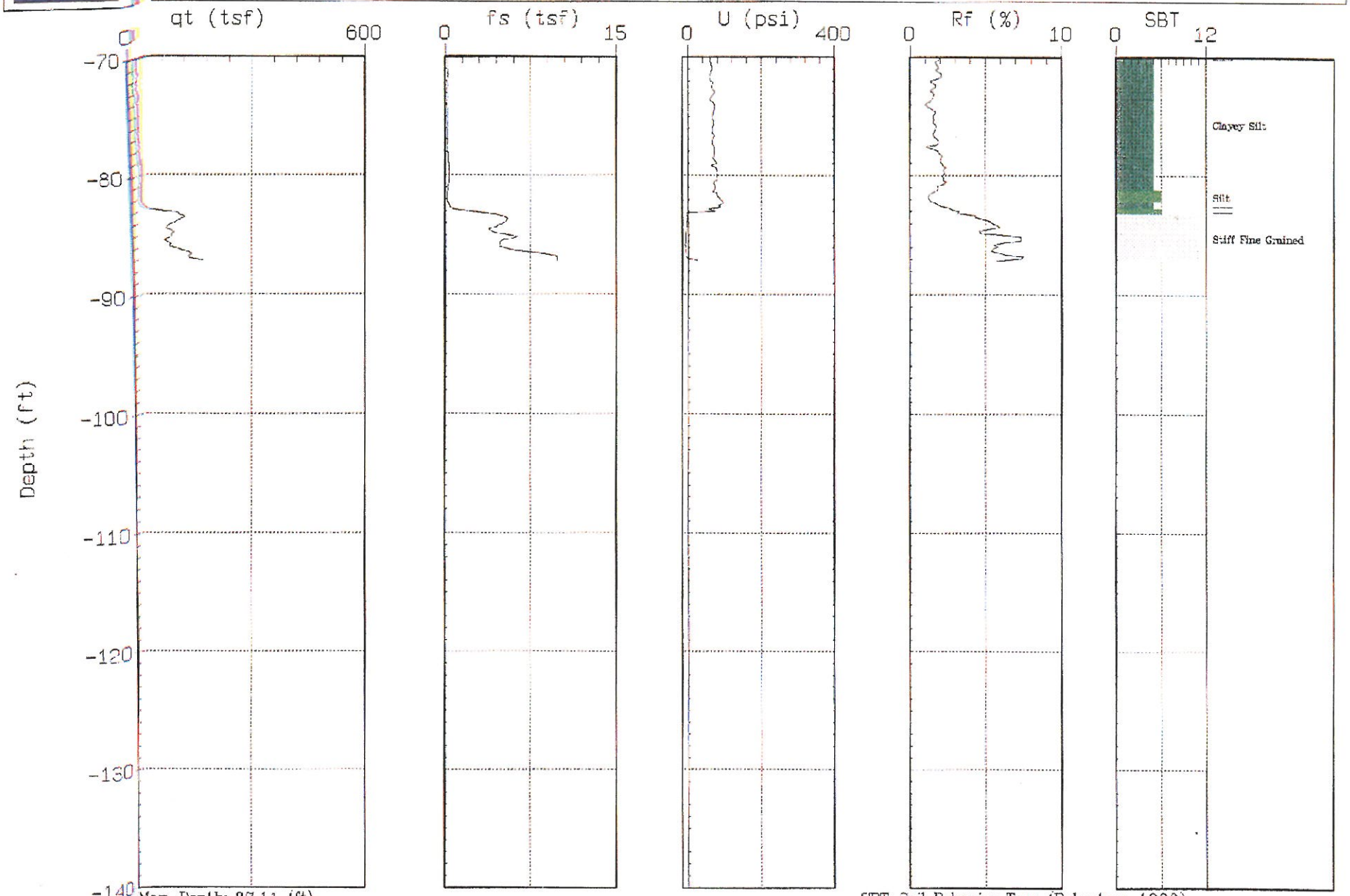
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPAHP7

Geologist: R. GOLDBERG
Date: 05:17:04 11:12



Max. Depth: 87.11 (ft)
Depth Inc.: 0.164 (ft)

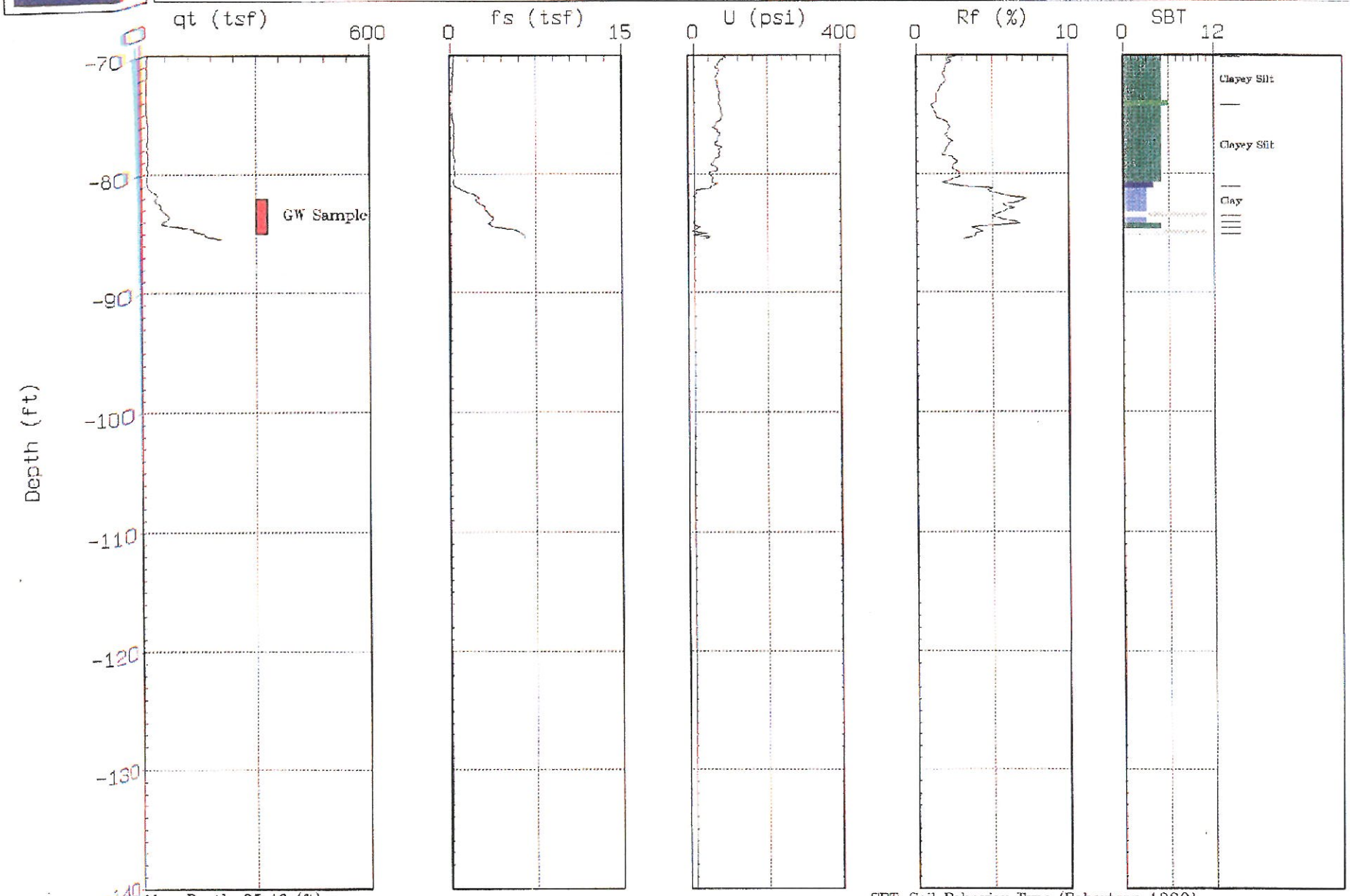
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPAHP8

Geologist: R. GOLDBERG
Date: 05:18:04 10:34



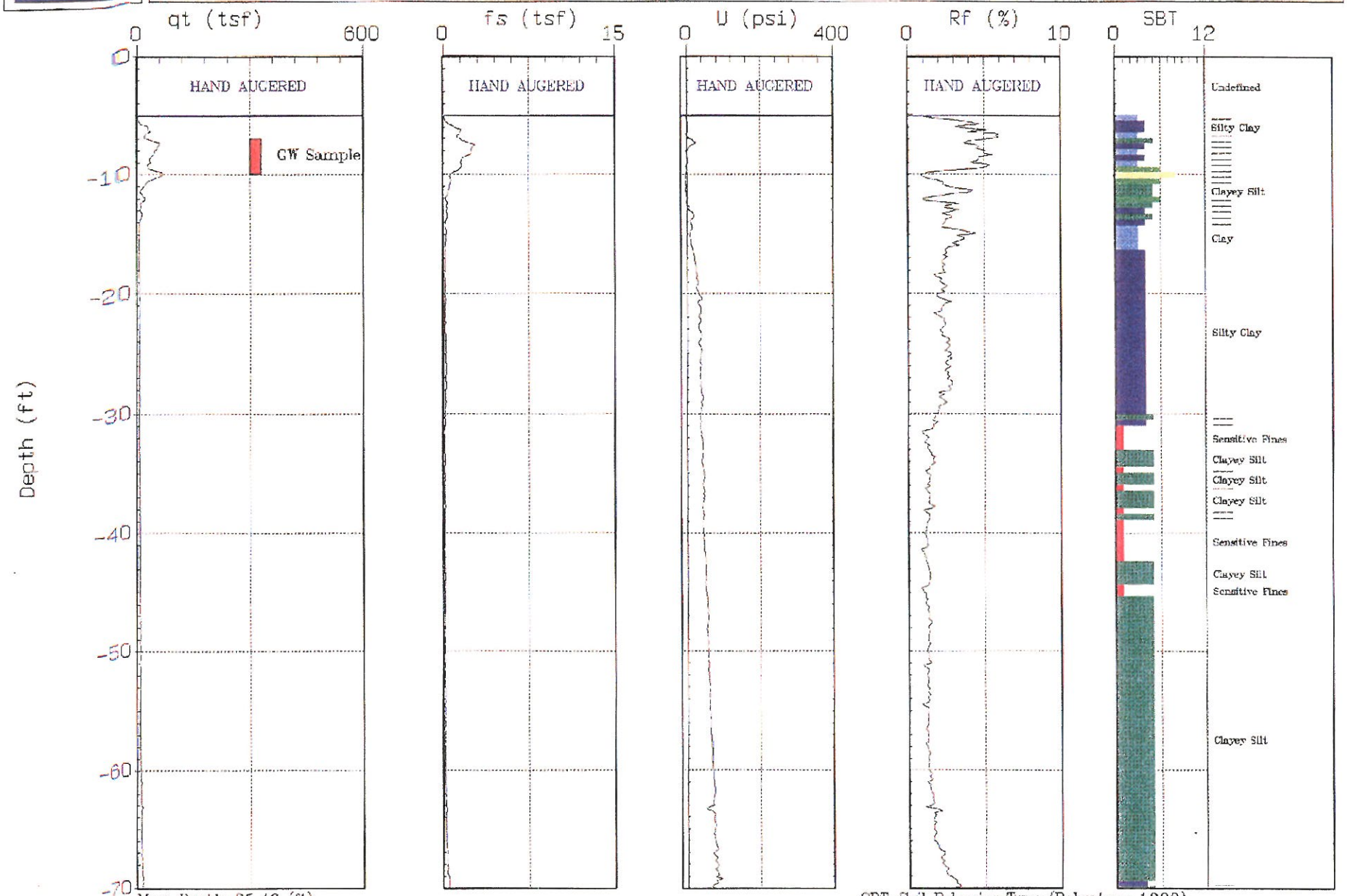
Max. Depth: 85.46 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPAHP8

Geologist: R. GOLDBERG
Date: 05:18:04 10:34



Max. Depth: 85.46 (ft)
Depth Inc.: 0.164 (ft)

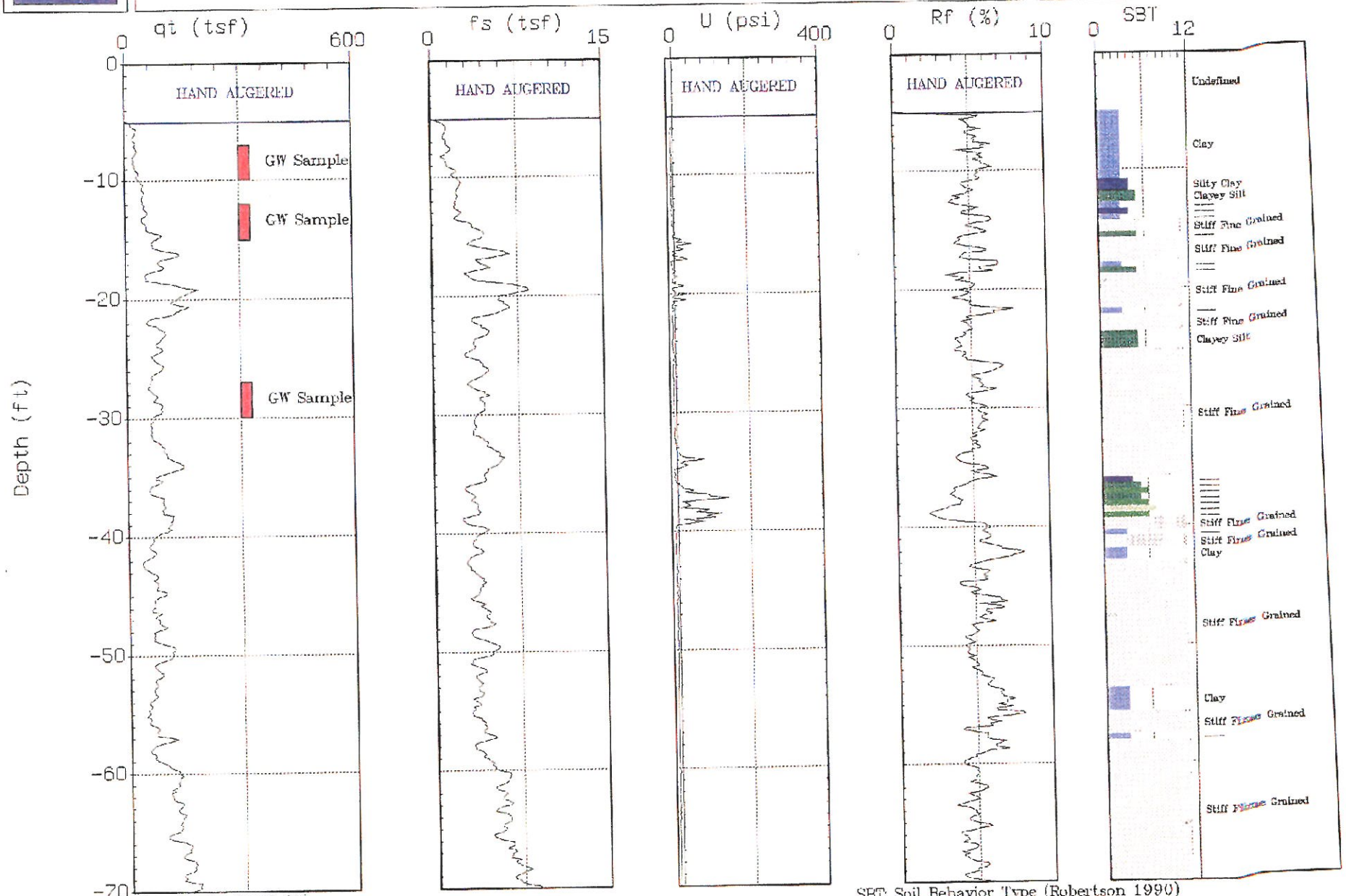
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPBHP1

Geologist: R. GOLDBERG
Date: 05:18:04 16:46



Max. Depth: 75.62 (ft)
Depth Inc.: 0.164 (ft)

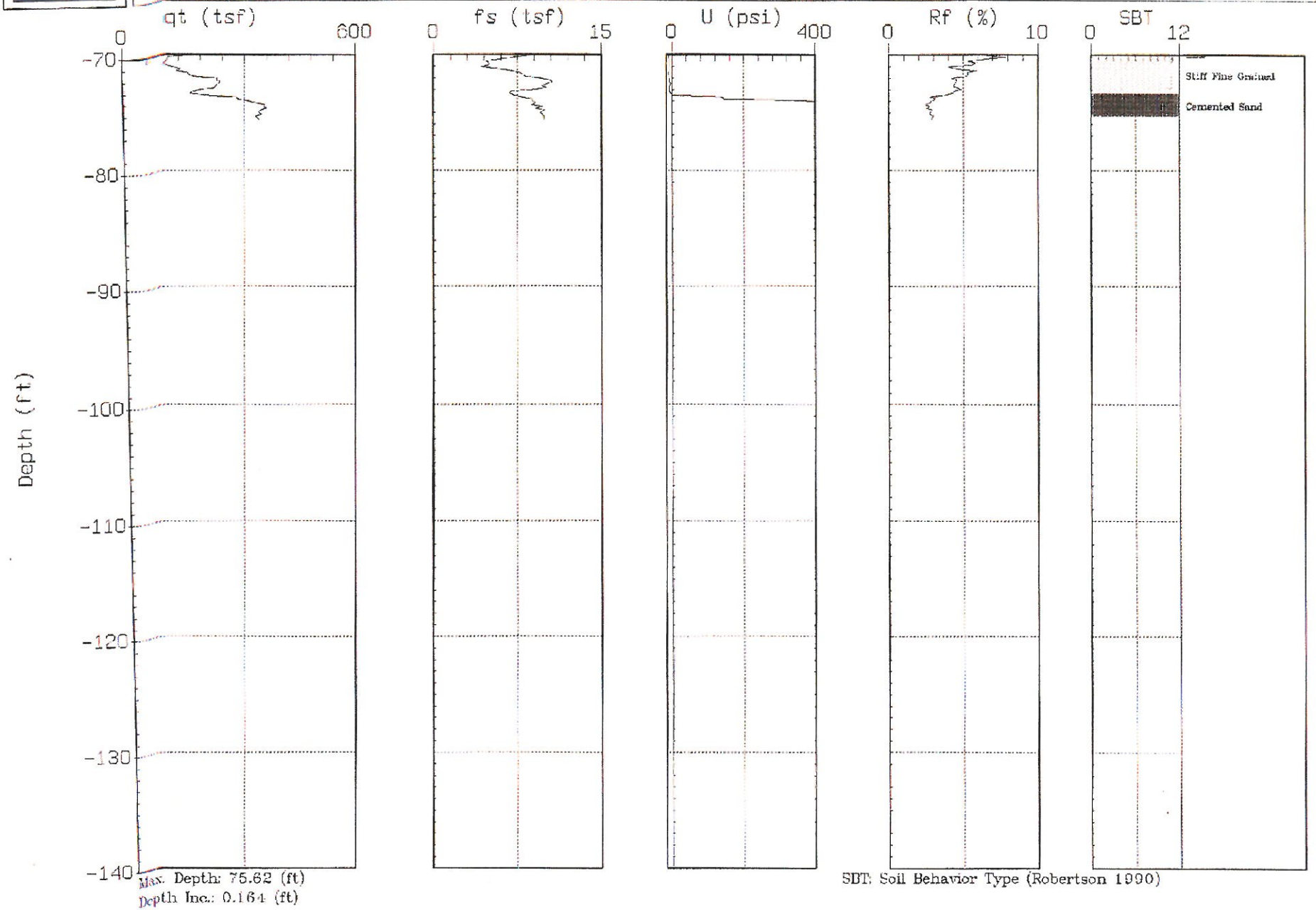
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPBHP1

Geologist: R. GOLDBERG
Date: 05:18:04 16:46

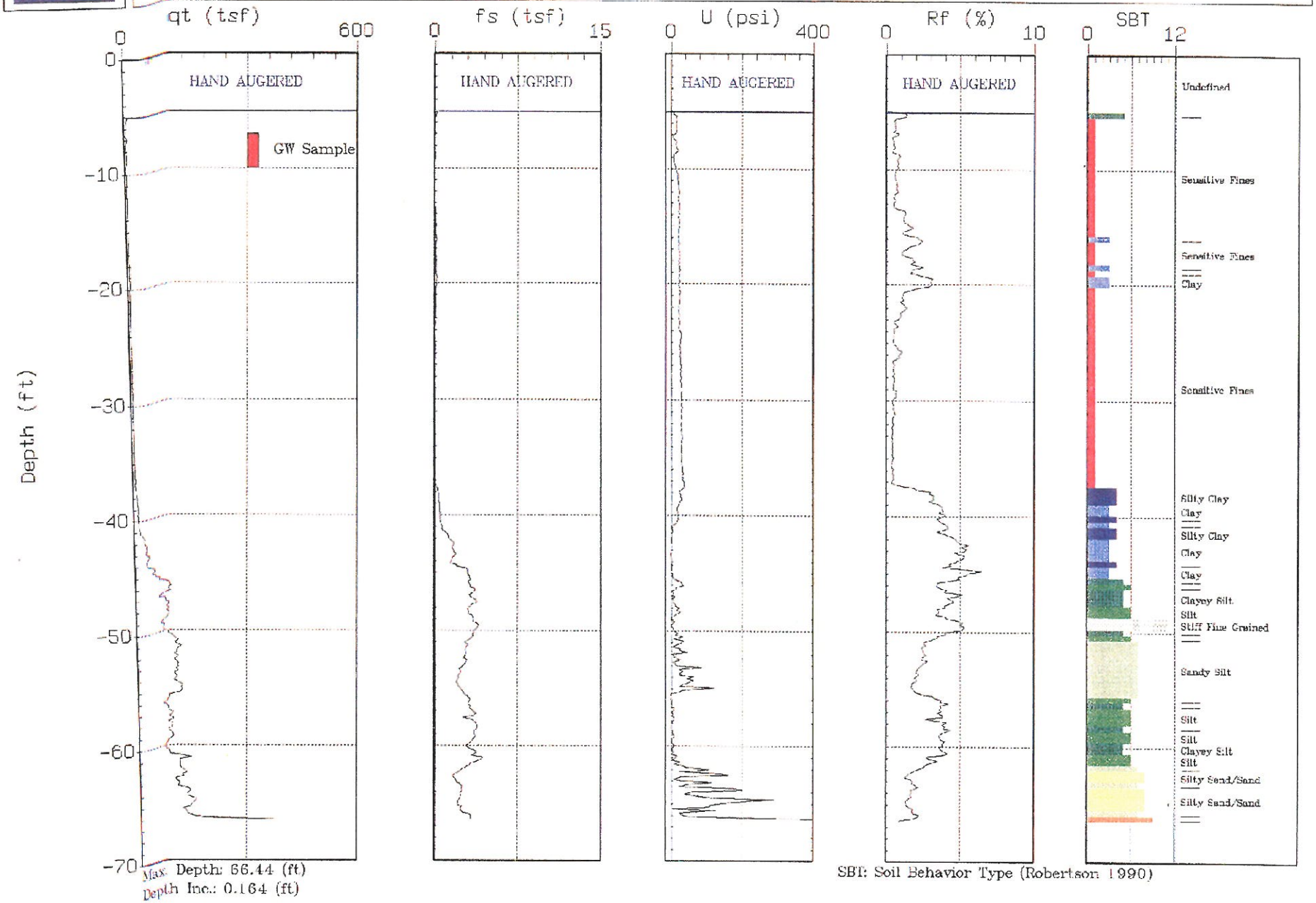


GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPBHP2

Geologist: R. GOLDBERG
Date: 05:10:04 11:12



Max. Depth: 66.44 (ft)
Depth Inc.: 0.164 (ft)

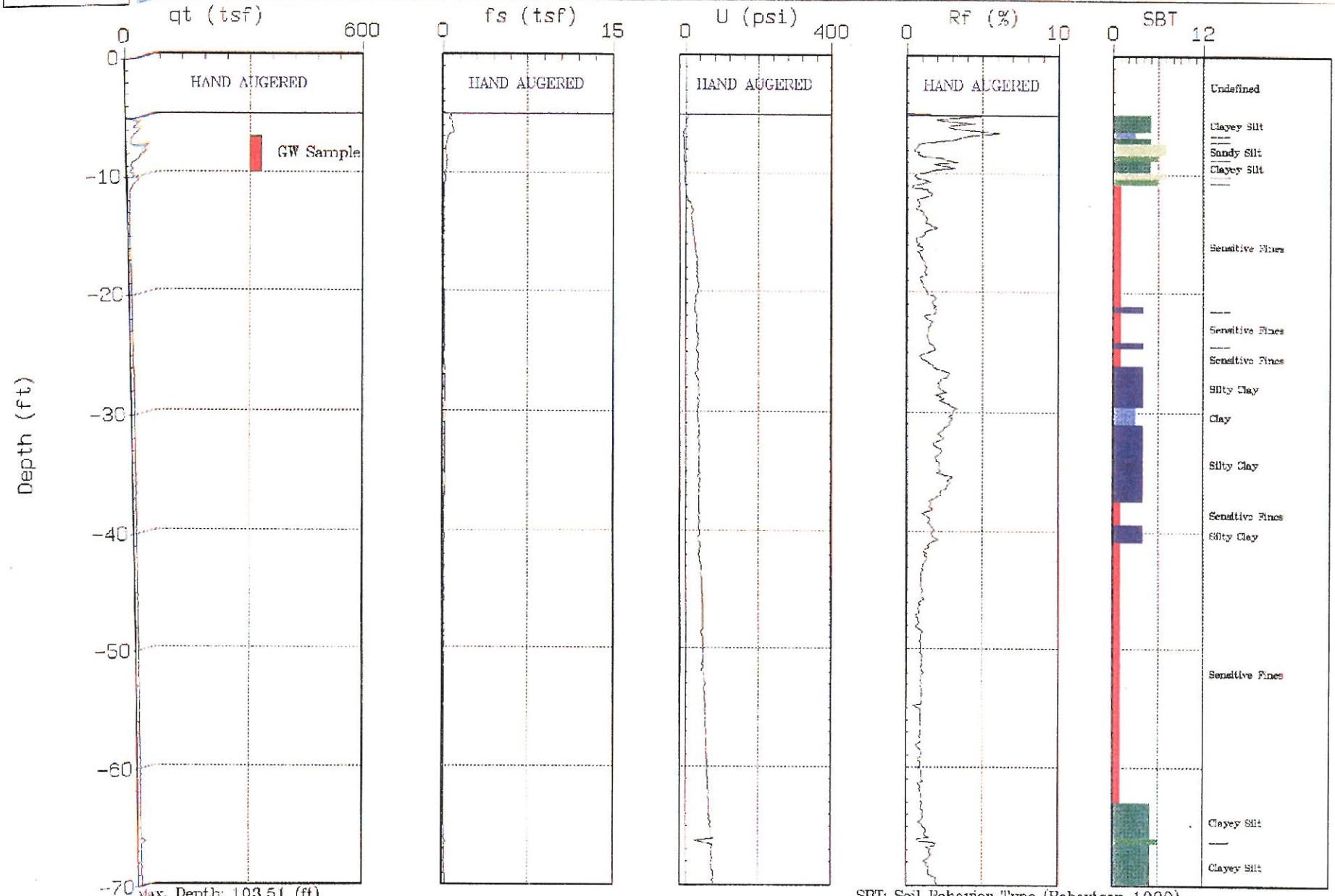
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPBHP3

Geologist: R. GOLDBERG
Date: 05:07:04 15:10



Max. Depth: 103.51 (ft)
Depth Inc.: 0.164 (ft)

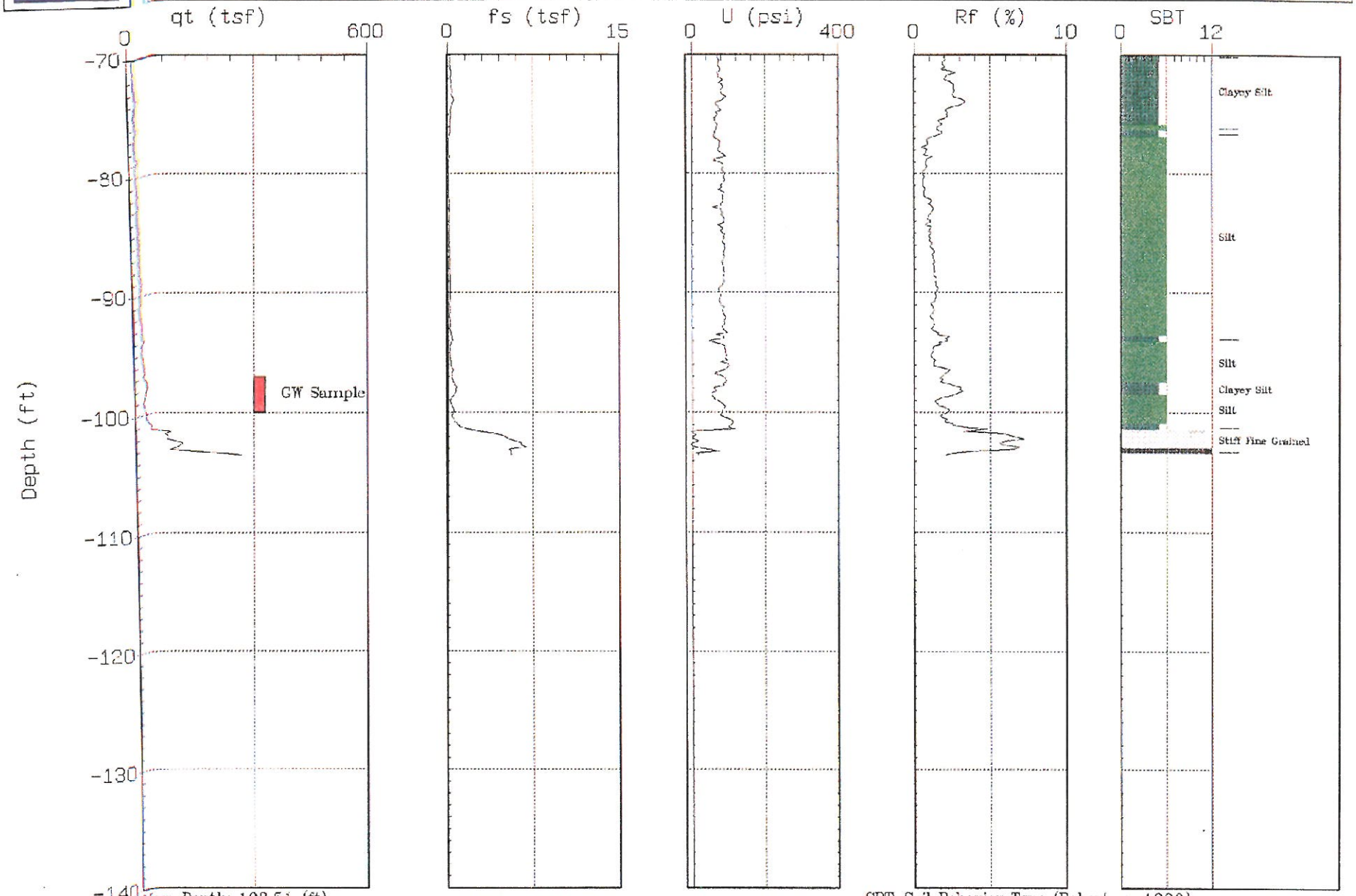
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPBHP3

Geologist: R. GOLDBERG
Date: 05:07:04 15:10



Max. Depth: 103.51 (ft)
Depth Inc.: 0.164 (ft)

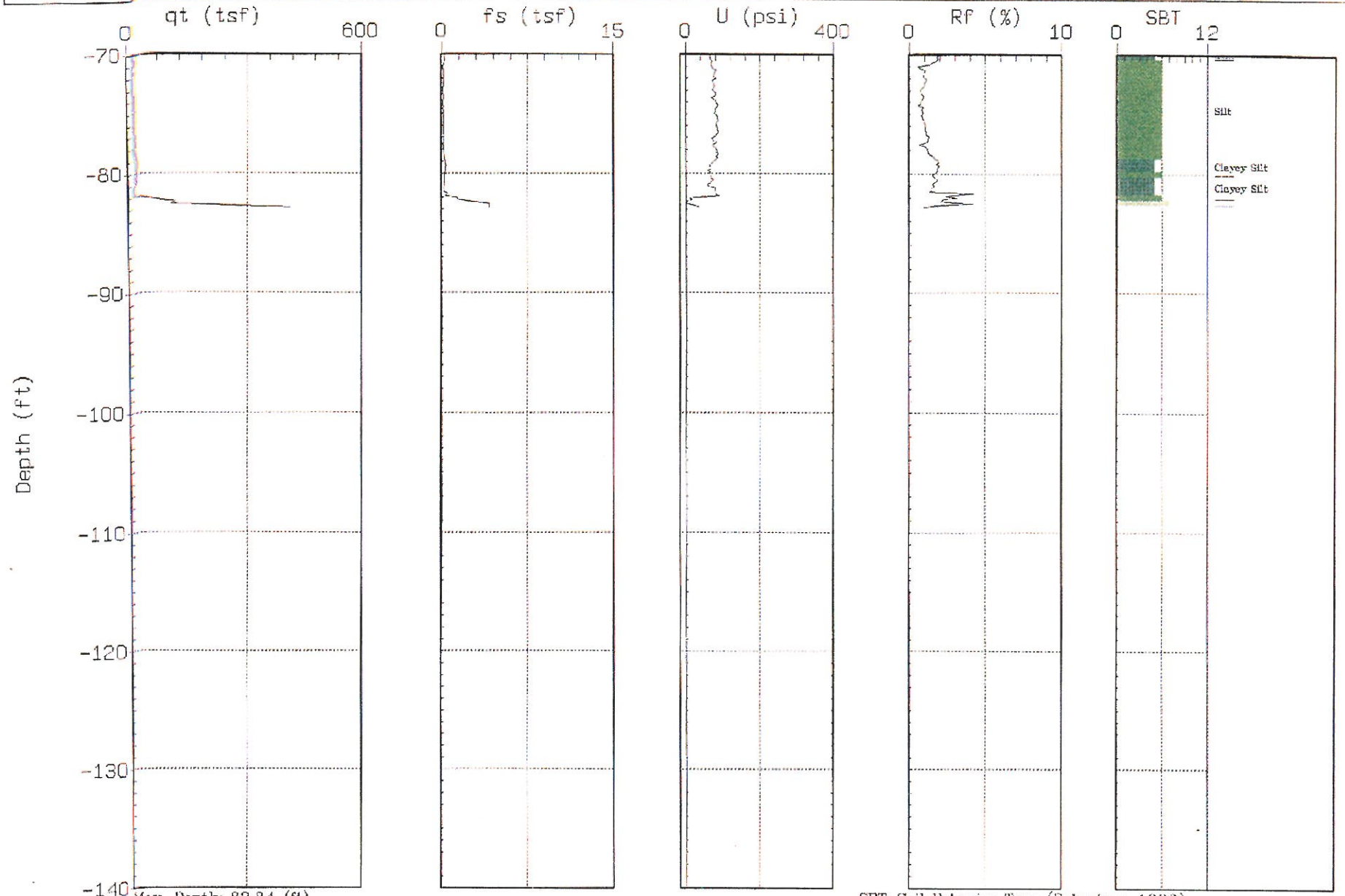
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPBHP4

Geologist: R. GOLDBERG
Date: 05:07:04 11:38



Max. Depth: 82.84 (ft)
Depth Inc.: 0.164 (ft)

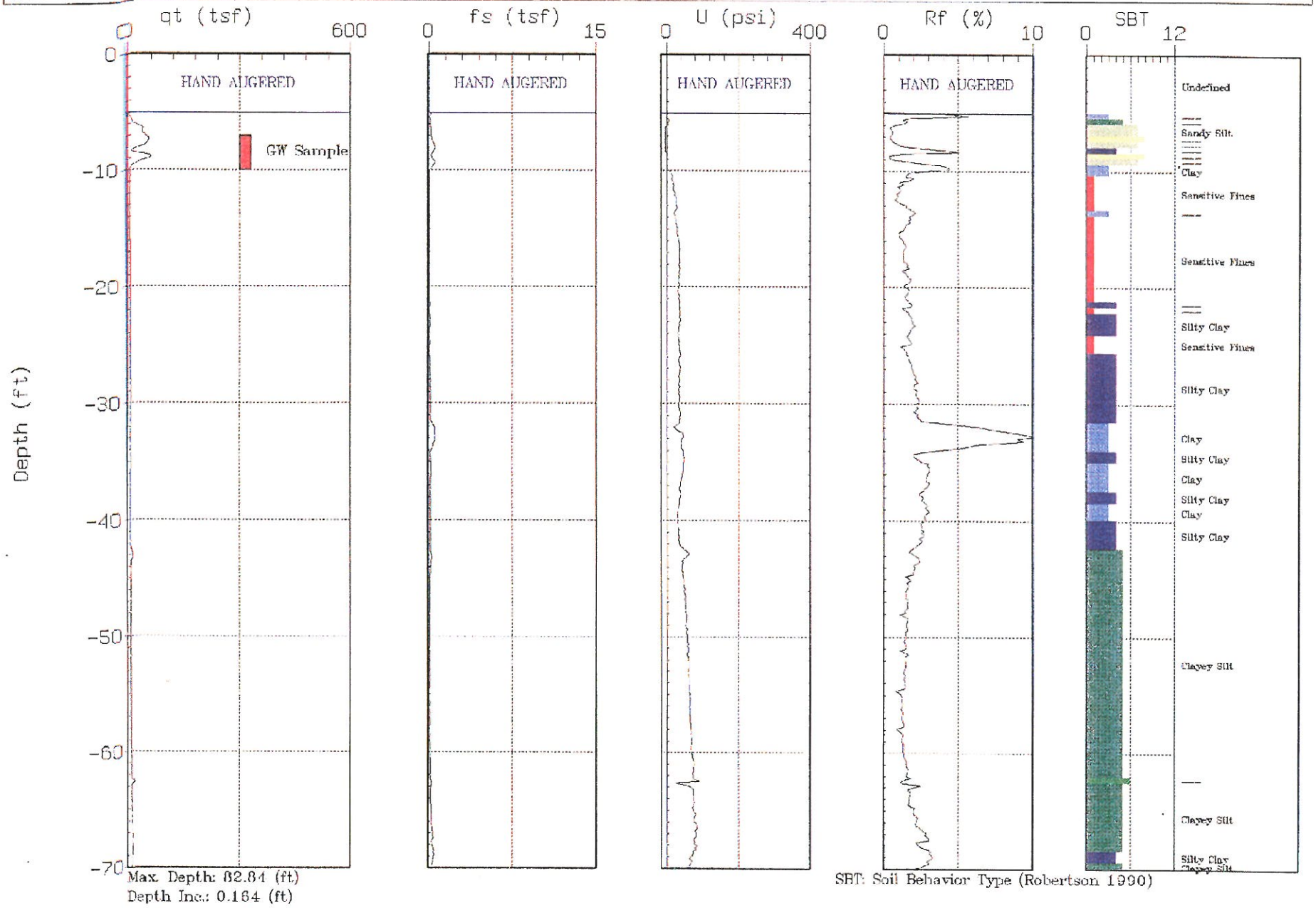
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMPBHP4

Geologist: R. GOLDBERG
Date: 05:07:04 11:38



Max. Depth: 82.84 (ft)
Depth Inc.: 0.164 (ft)

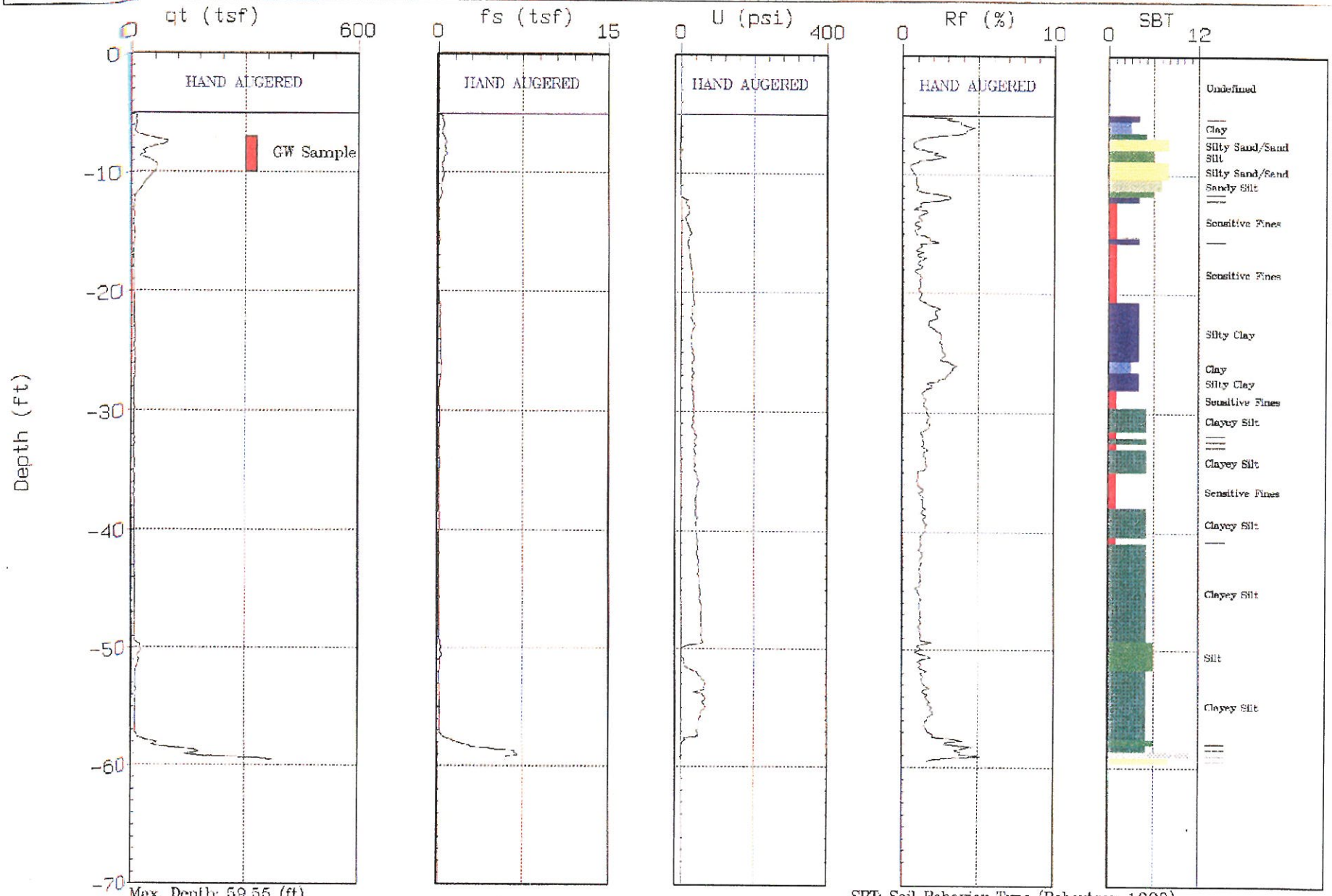
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENECIA ARSENAL
Location: CPT-SWAMPBHP5

Geologist: R. GOLDBERG
Date: 05:06:04 13:18



Max. Depth: 59.55 (ft)
Depth Inc.: 0.164 (ft)

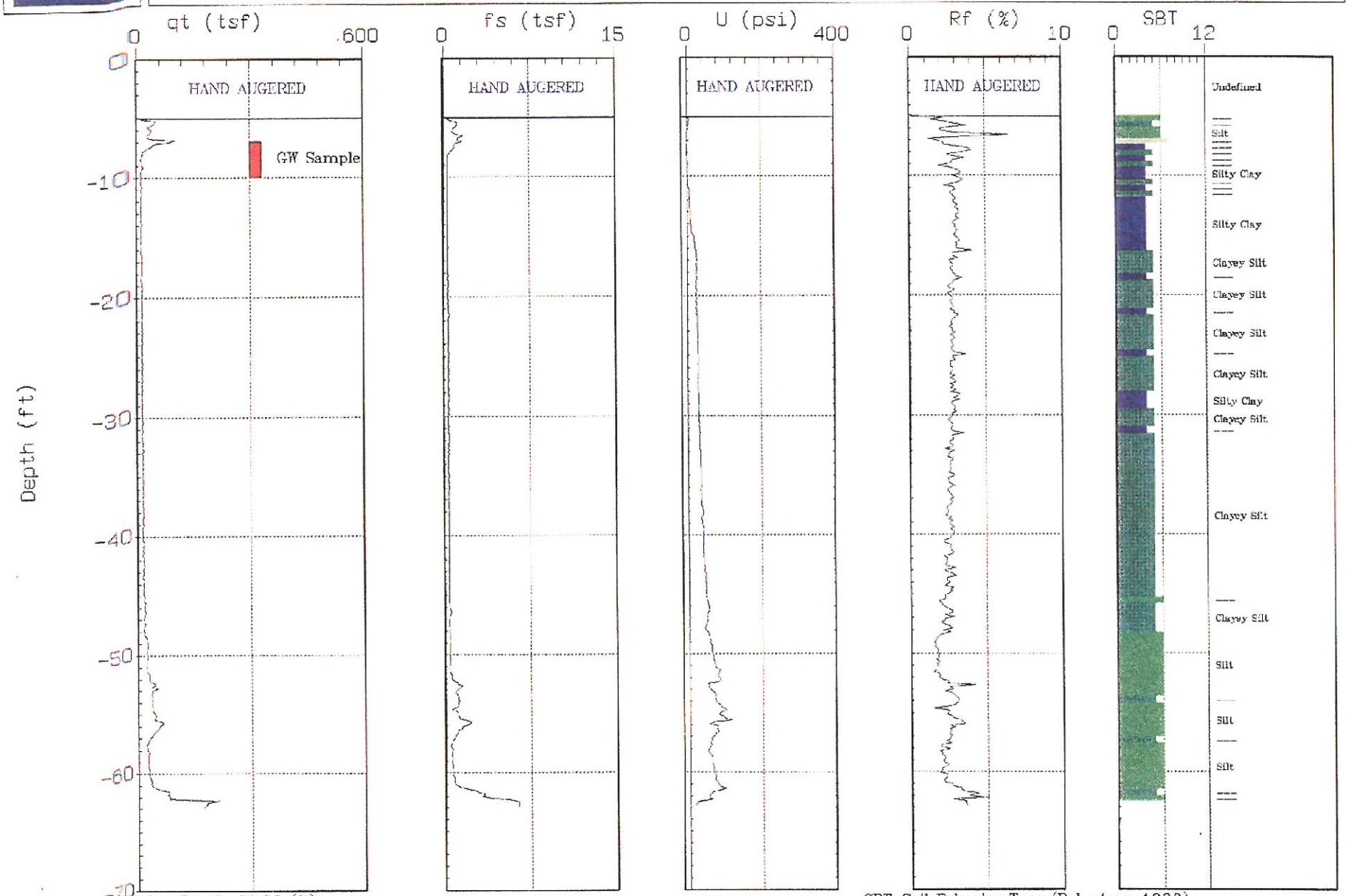
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-SWAMP3HP6

Geologist: R. GOLDBERG
Date: 05:05:04 16:11



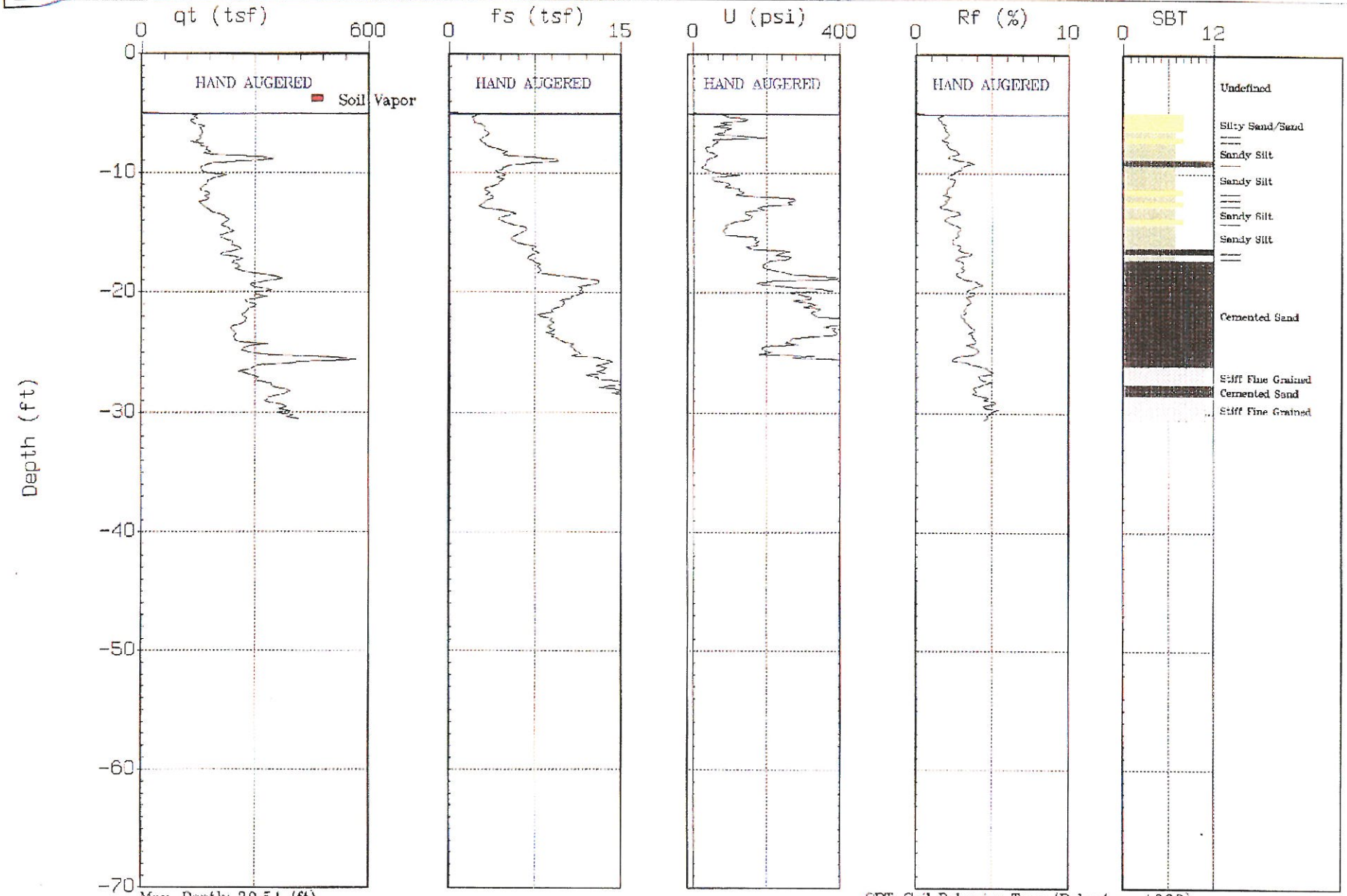
Max. Depth: 62.83 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-T073

Geologist: R. GOLDBERG
Date: 04:28:04 09:13



Max. Depth: 30.51 (ft)
Depth Inc.: 0.164 (ft)

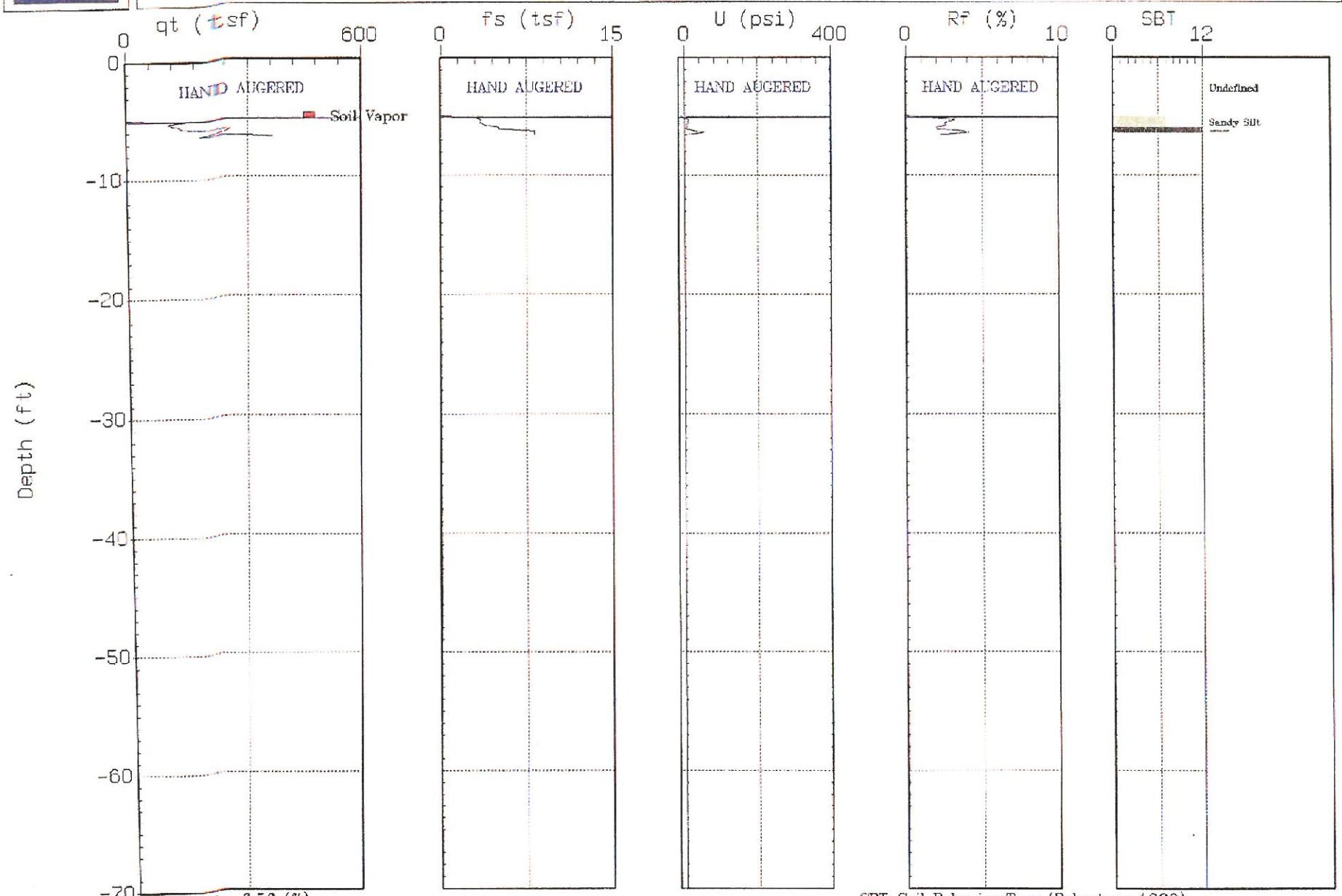
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-T0131HP1

Geologist: R. GOLDBERG
Date: 06:12:04 11:51



Max. Depth: 6.56 (ft)
Depth Inc: 0.164 (ft)

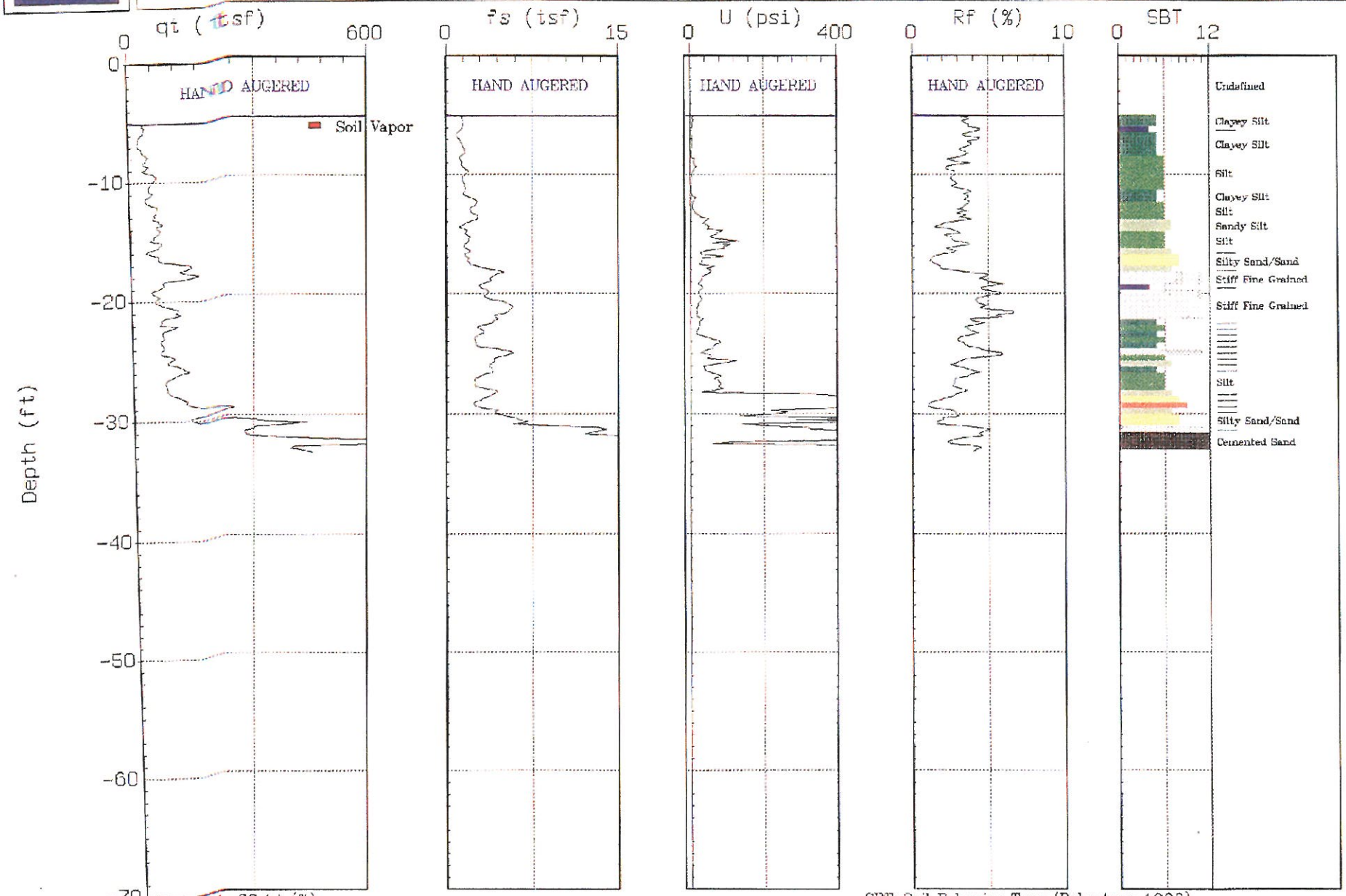
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-T222

Geologist: R. GOLDBERG
Date: 04:27:01 11:27



Max. Depth: 33.14 (ft)
Depth Inc: 0.164 (ft)

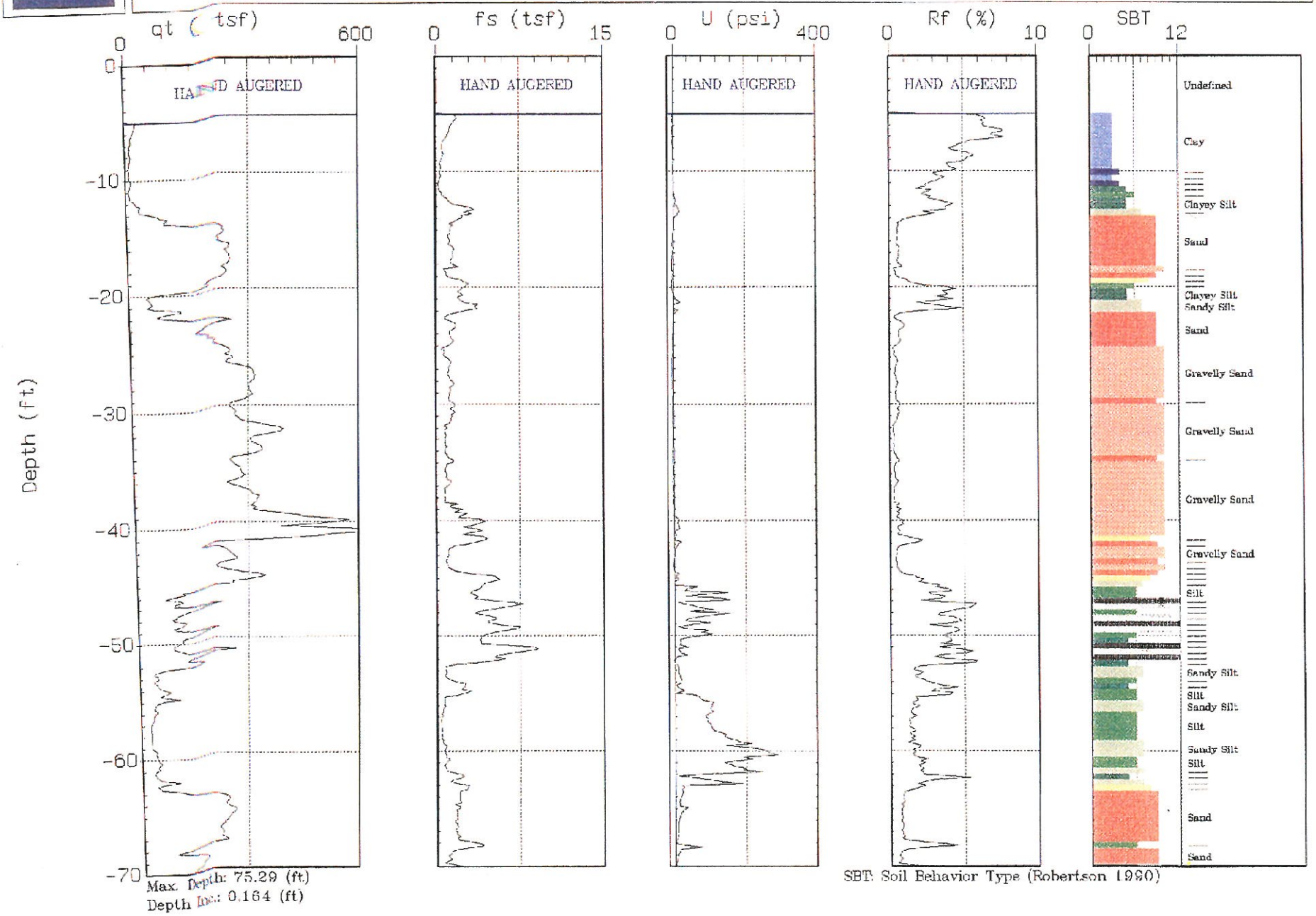
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-WAHP1

Geologist: R. GOLDBERG
Date: 04:29:04 14:11



Max. Depth: 75.29 (ft)
Depth Inc.: 0.164 (ft)

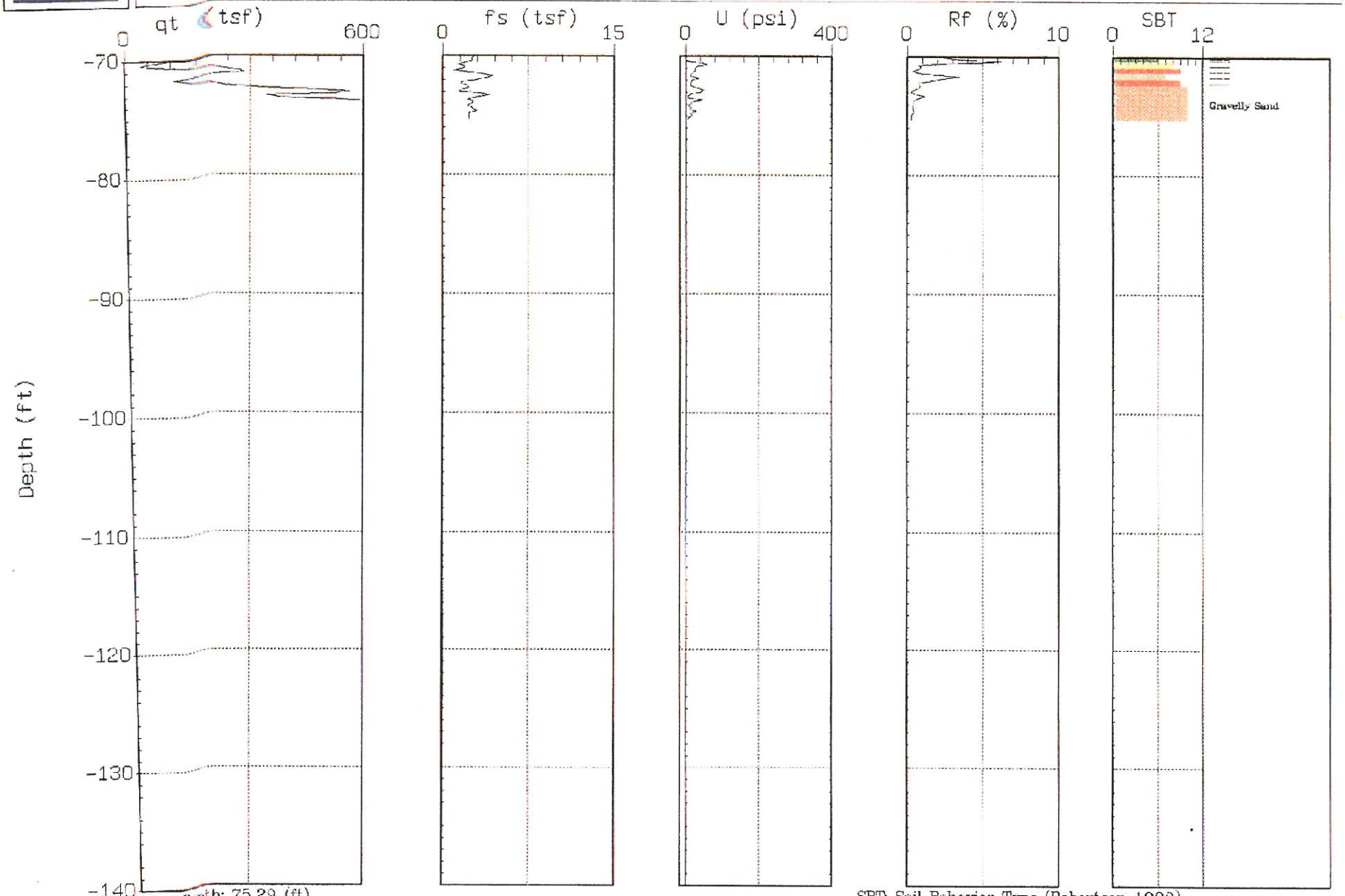
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-WAHP1

Geologist: R. GOLDBERG
Date: 04:29:04 14:11



Max. Depth: 75.29 (ft)
Depth Inc.: 0.164 (ft)

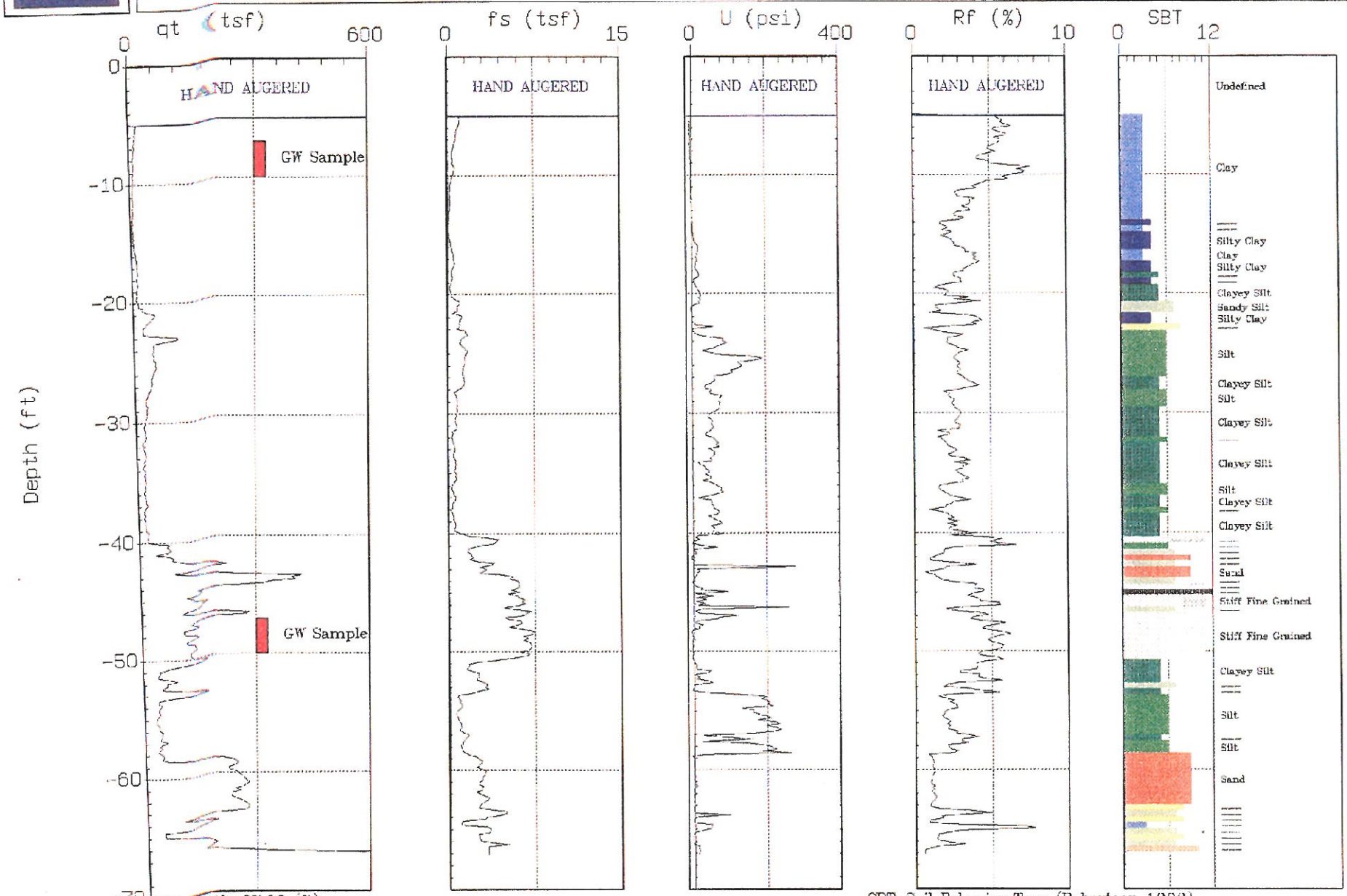
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-WA01HP2

Geologist: R. GOLDBERG
Date: 05:21:04 09:44



Max. Depth: 67.09 (ft)
Depth Inc.: 0.164 (ft)

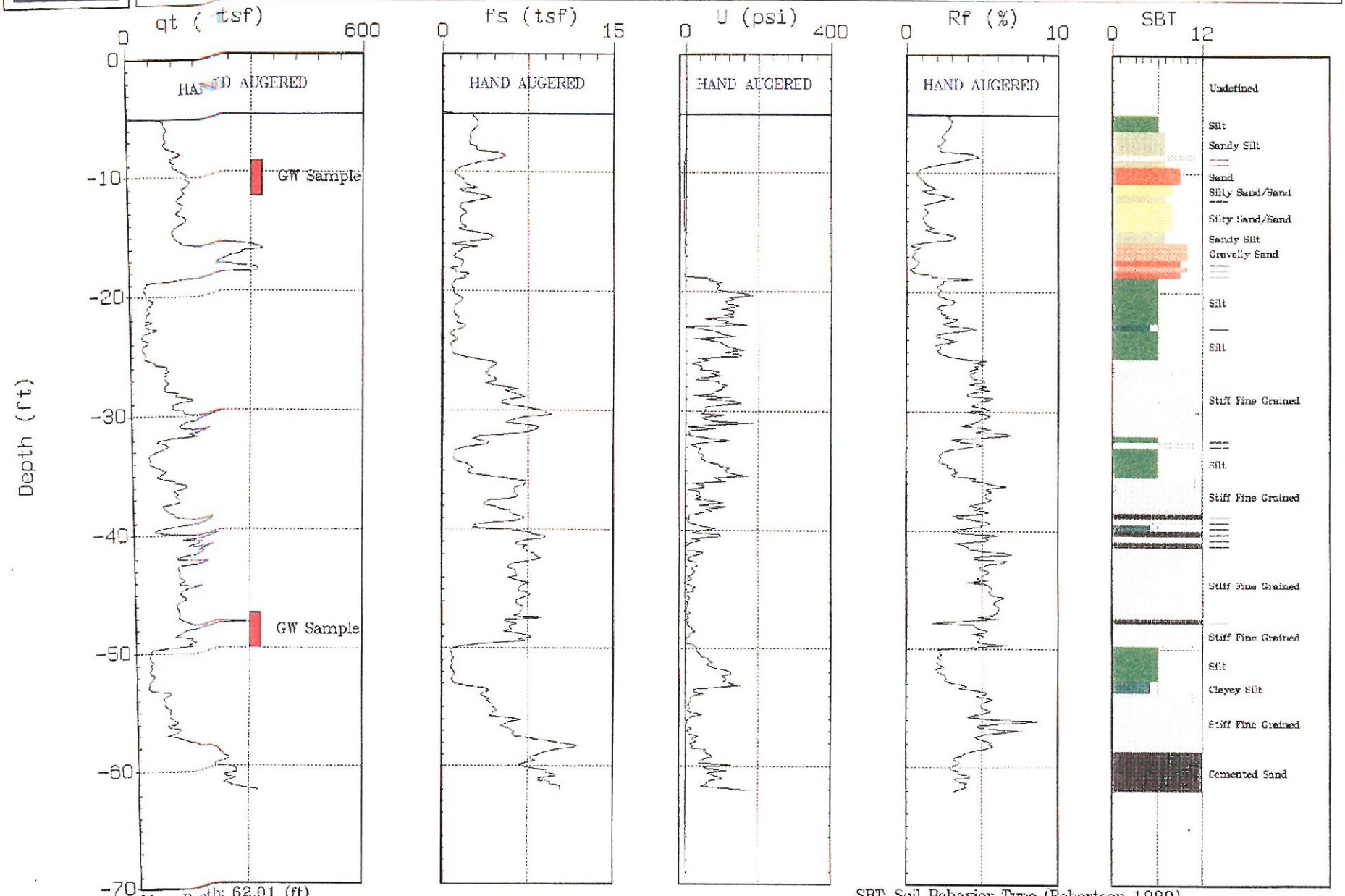
SBT: Soil Behavior Type (Robertson 1990)

GREGG

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-WAC1HP3

Geologist: R. GOLDBERG
Date: 05:21:04 13:11



Max. Depth: 62.01 (ft)
Depth Inc: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

APPENDIX PPDT

Pore Pressure Dissipation Tests (PPDT)

Pore Pressure Dissipation Tests (PPDT's) conducted at various intervals measured hydrostatic water pressures and determined the approximate depth of the ground water table. A PPDT is conducted when the cone is halted at specific intervals determined by the field representative. The variation of the penetration pore pressure (u) with time is measured behind the tip of the cone and recorded by a computer system.

Pore pressure dissipation data can be interpreted to provide estimates of:

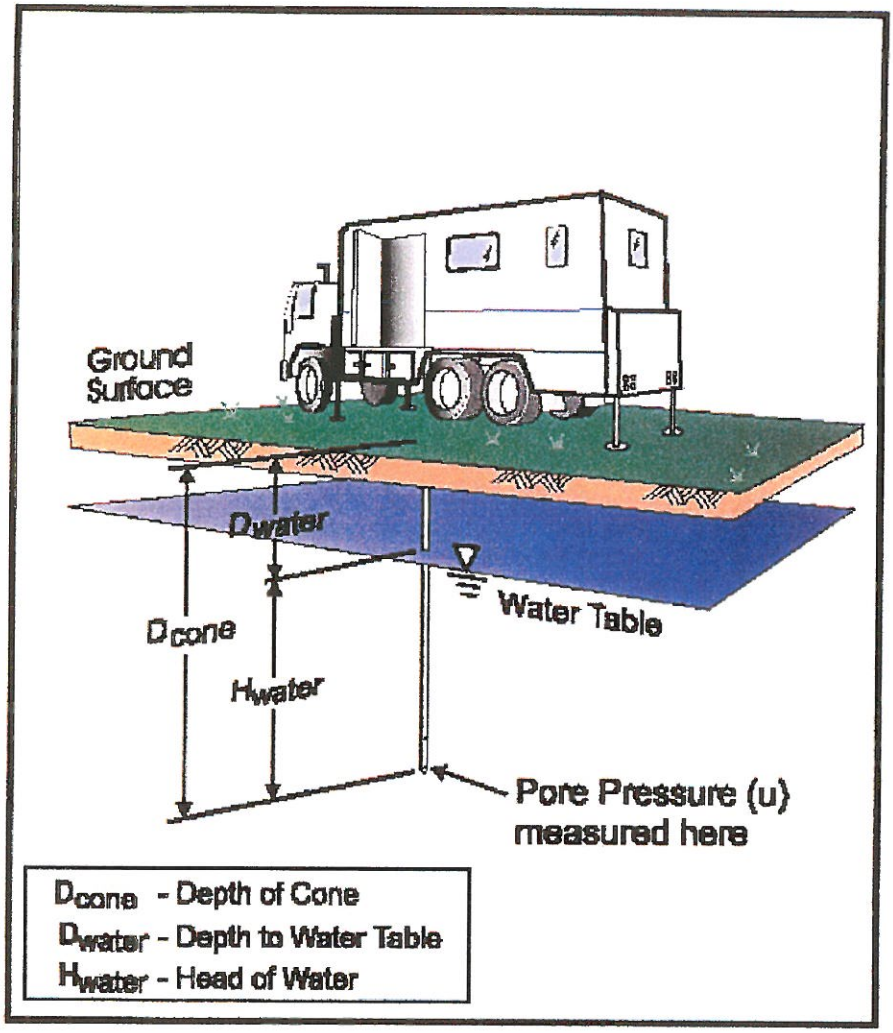
- Equilibrium piezometric pressure
- Phreatic Surface
- In situ horizontal coefficient of consolidation (c_h)
- In situ horizontal coefficient of permability (k_h)

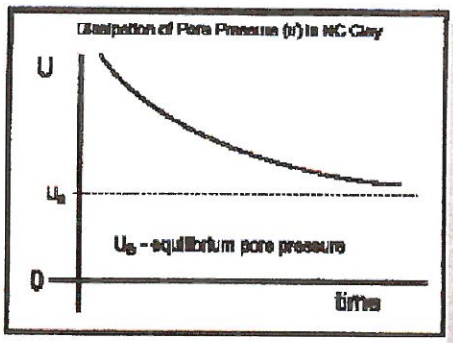
In order to correctly interpret the equilibrium piezometric pressure and/or the phreatic surface, the pore pressure must be monitored until such time as there is no variation in pore pressure with time (refer to Figure PPD). This time is commonly referred to as t_{100}, the point at which 100% of the excess pore pressure has dissipated.

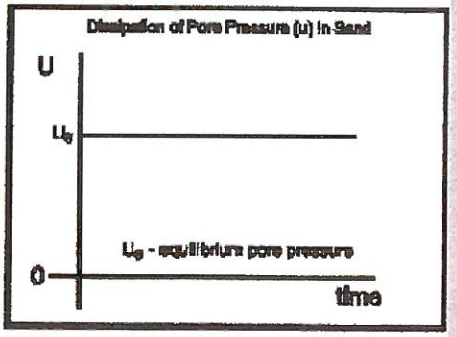
Interpretation of either c_h and k_h from dissipation results can be most easily achieved using either of two analytical approaches: cavity-expansion theory or the strain-path approach. Comparisons of the available solutions and results from field studies suggest that the cavity-expansion method of Torstensson (1977) and the strain-path approaches of Levadous (1980) and Teh (1987) all provide similar predications of consolidation parameters from CPTU dissipation data (Gillespie 1981; Kabir and Lutenegger 1990; Robertson et al. (1991). Robertson et al. (1991) have shown that these methods, although developed for normally consolidated soils, can be equally applied to overconsolidated soils. Furthermore, comparisons of field and laboratory data indicate that the trends in the measured (laboratory) and predicated (CPTU) data are consistent provided the micro fabric and nature of the soils being tested are taken into consideration. (Danziger 1990; Robertson et al. 1991).

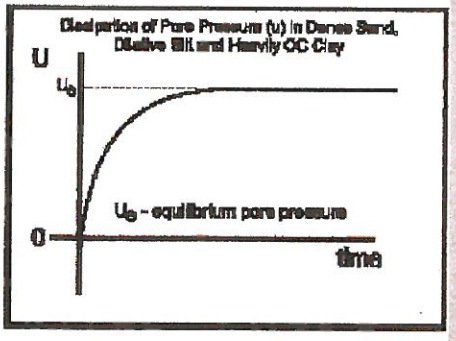
A complete reference on pore pressure dissipation tests is presented by Robertson et al. 1991.

A summary of the pore pressure dissipation tests is summarized in Table 1.
Pore pressure dissipation data is presented in graphical form in Appendix PPDT.









Water Table Calculation

$$D_{water} = D_{cone} - H_{water}$$

where $H_{water} = U_e$ (depth units)

Useful Conversion Factors:

1psi = 0.704m = 2.31 feet (water)
1tsf = 0.958 bar = 13.9 psi
1m = 3.28 feet

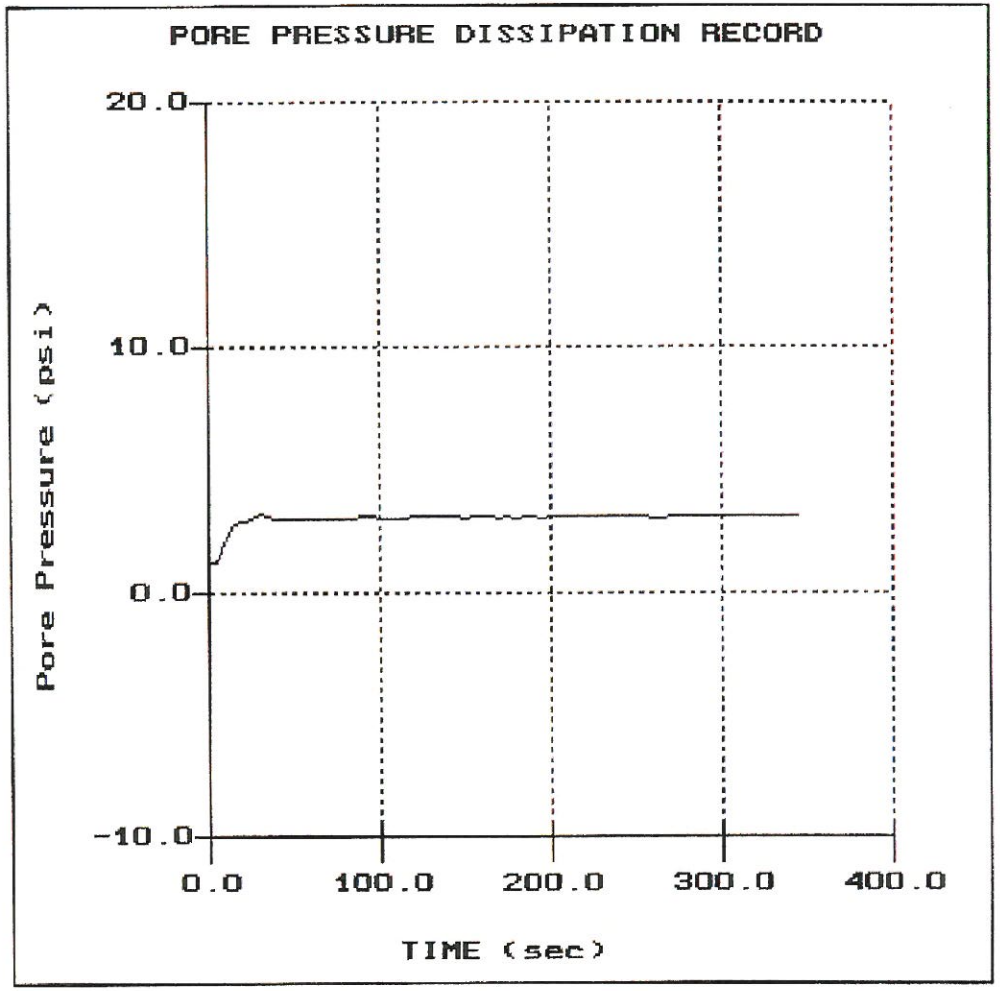
Figure PPD

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-WAHP1

Geologist: R. GOLDBE
Date:04:29:04 14:11

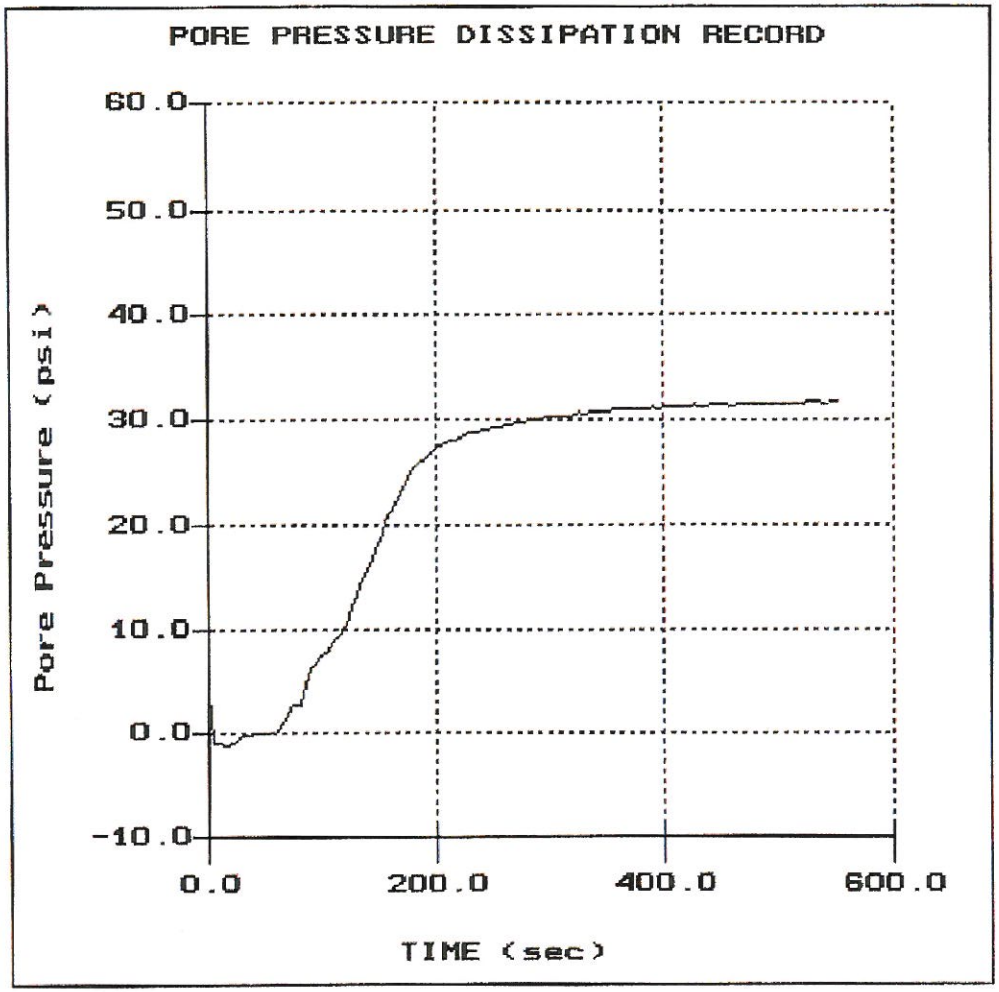
File: 138C012.PPC
Depth (m): 4.45
(ft): 14.60
Duration : 345.0s
U-min: 1.20 5.0s
U-max: 3.21 30.0s



BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-OS29-2

Geologist: R. GOLDBE
Date:04:28:04 13:43



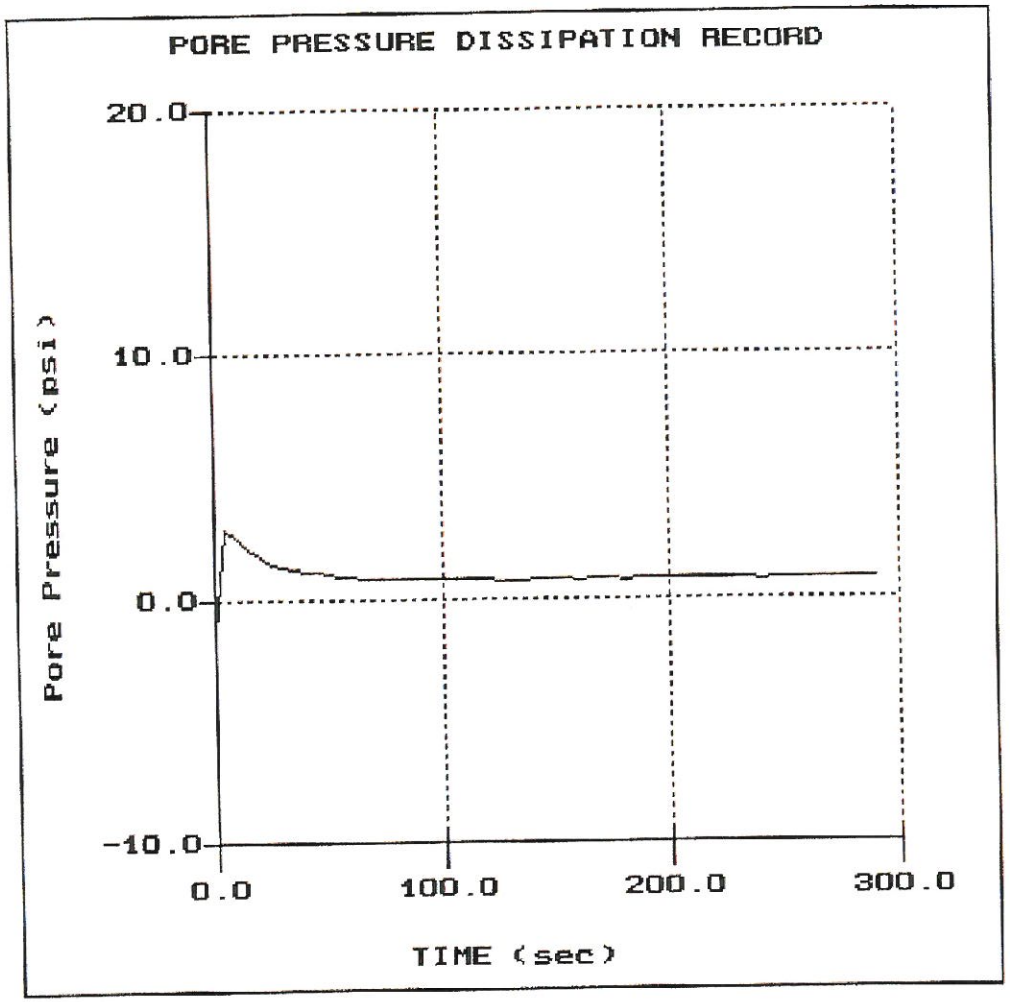
File: 138C008.PPC
Depth (m): 22.90
(ft): 75.13
Duration : 550.0s
U-min: -1.36 15.0s
U-max: 31.62 550.0s

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-165-2

Geologist: R. GOLDBE
Date:04:30:04 08:15

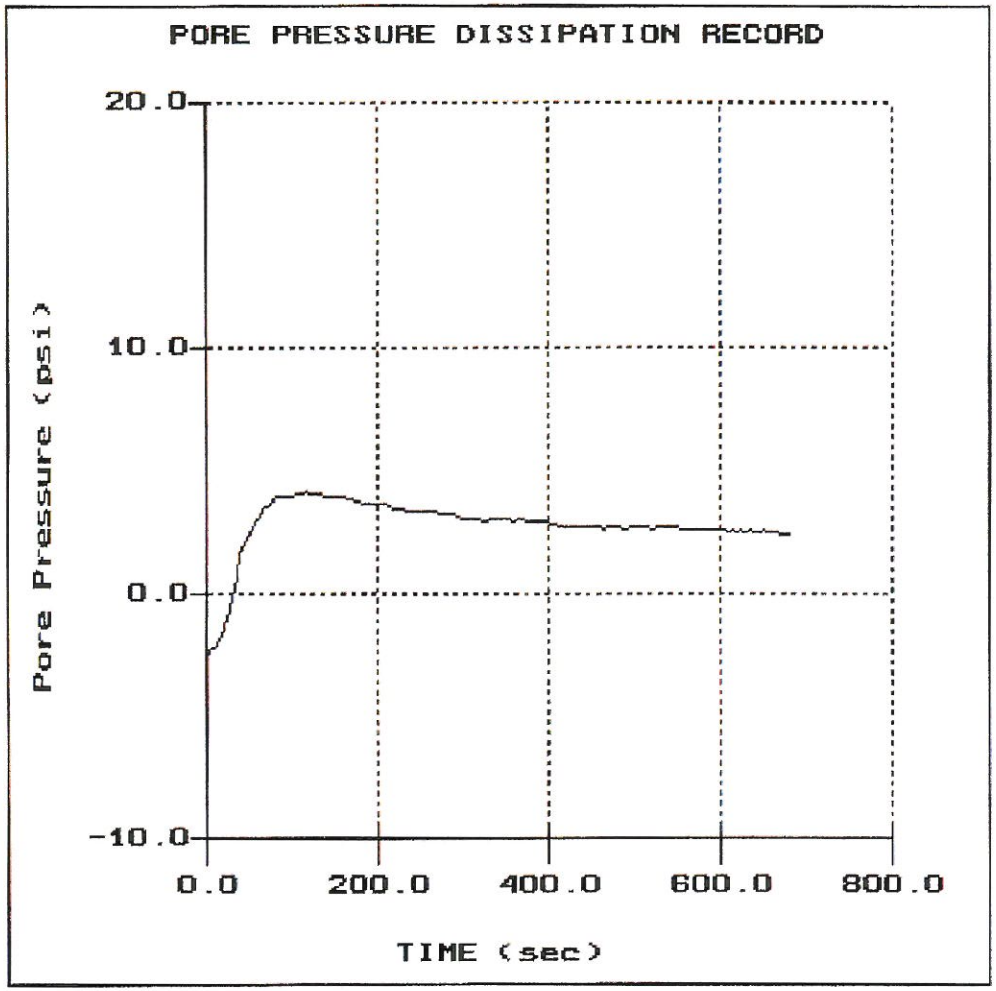
File: 138C005.PPC
Depth (m): 2.20
(ft): 7.22
Duration : 290.0s
U-min: -1.34 0.0s
U-max: 2.95 5.0s



BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-165-1

Geologist: R. GOLDBE
Date:04:30:04 10:35

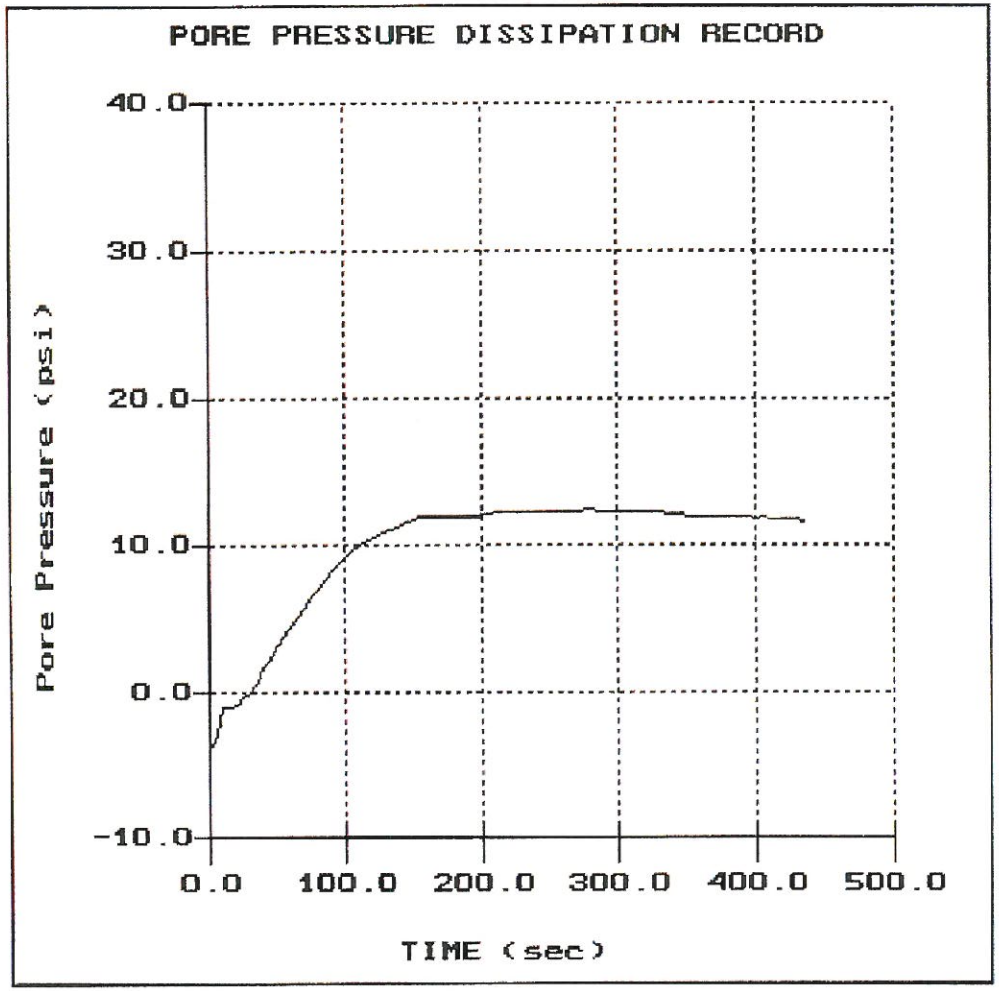


File: 138C004.PPC
Depth (m): 2.30
(ft): 7.55
Duration : 680.0s
U-min: -2.54 0.0s
U-max: 4.19 115.0s

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-FS3HP2

Geologist: R. GOLDBE
Date:04:29:04 09:04

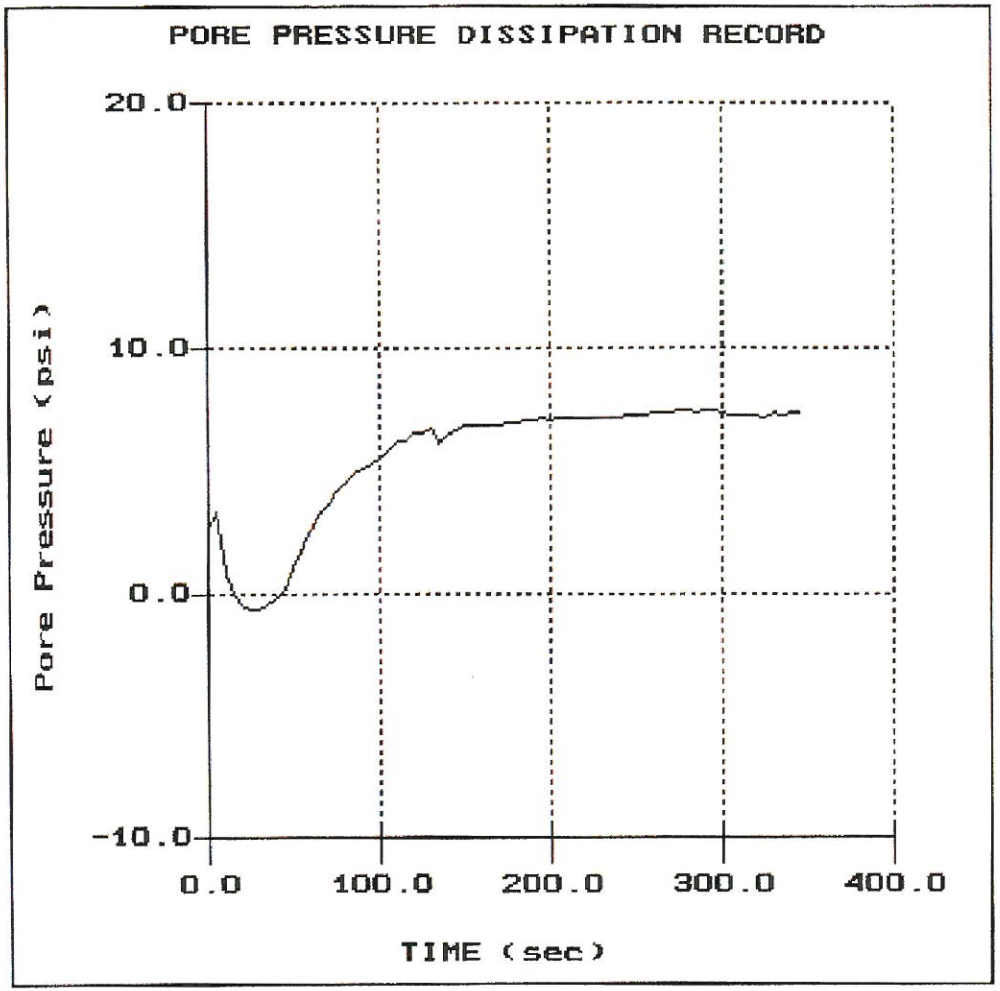


File: 138C003.PPC
Depth (m): 3.70
(ft): 12.14
Duration : 435.0s
U-min: -4.05 0.0s
U-max: 12.33 280.0s

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-FS3HP1

Geologist: R. GOLDBE
Date:04:29:04 10:58



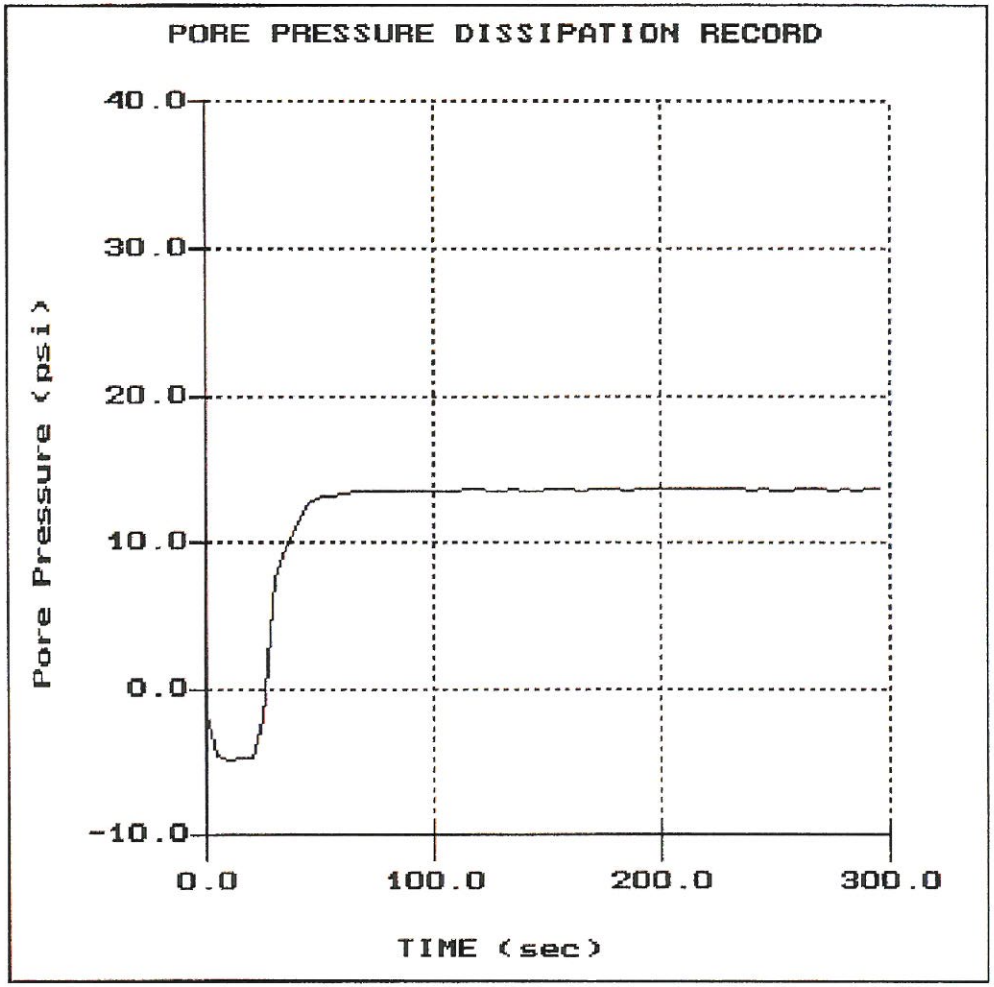
File: 138C002.PPC
Depth (m): 6.35
(ft): 20.83
Duration : 345.0s
U-min: -0.61 30.0s
U-max: 7.49 295.0s

BROWN & CALDWELL

Site: BENICIA ARSENAL
Location: CPT-EHP1

Geologist: R. GOLDBE
Date:04:26:04 16:03

File: 138C001.PPC
Depth (m): 13.00
(ft): 42.65
Duration : 295.0s
U-min: -4.92 10.0s
U-max: 13.65 265.0s



Groundwater Sampling (GWS)

Gregg In Situ, Inc. conducts groundwater sampling using a Hydropunch® type groundwater sampler, *Figure GWS*. The groundwater sampler has a retrievable stainless steel or disposable PVC screen with steel drop off tip. This allows for samples to be taken at multiple depth intervals within the same sounding location. In areas of slower water recharge, provisions may be made to set temporary PVC well screens during sampling to allow the drill rig to advance to the next sample location while the groundwater is allowed to infiltrate.

The groundwater sampler operates by advancing 1 ¾ inch hollow push rods with the filter tip in a closed configuration to the base of the desired sampling interval. Once at the desired sample depth, the push rods are retracted; exposing the encased filter screen and allowing groundwater to infiltrate hydrostatically from the formation into the inlet screen. A small diameter bailer (approximately ½ or ¾ inch) is lowered through the push rods into the screen section for sample collection. The number of downhole trips with the bailer and time necessary to complete the sample collection at each depth interval is a function of sampling protocols, volume requirements, and the yield characteristics and storage capacity of the formation. Upon completion of sample collection, the push rods and sampler, with the exception of the PVC screen and steel drop off tip are retrieved to the ground surface, decontaminated and prepared for the next sampling event.

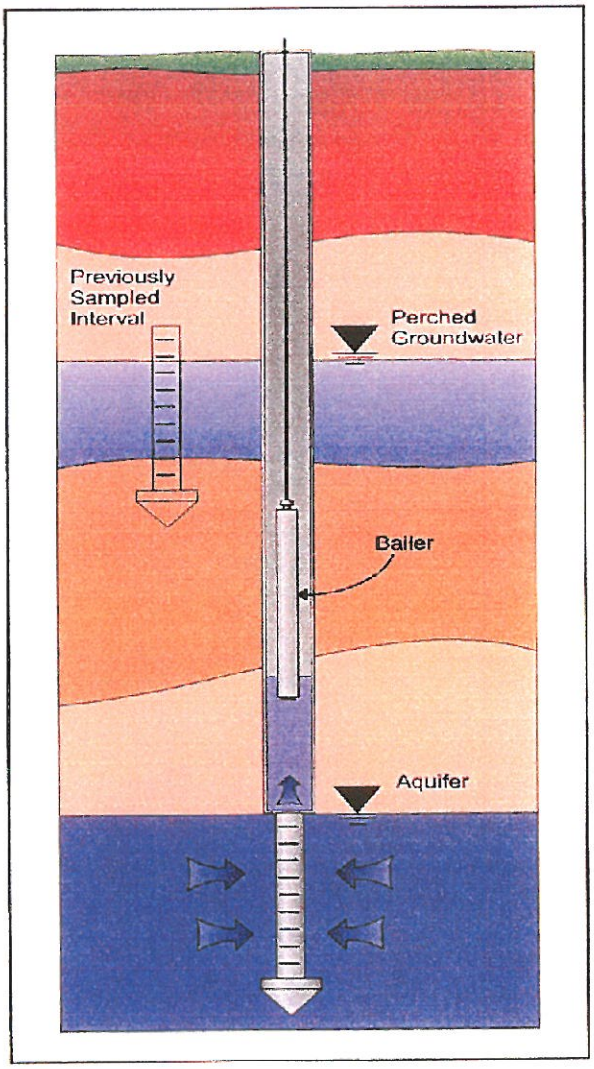


Figure GWS

A summary of the groundwater samples collected, including the sampling date, depth and location identification, is presented in Table 1 and the corresponding CPT plot .

For a detailed reference on direct push groundwater sampling, refer to Zemo et. al., 1992.

Vapor Sampling
(VS)

Gregg In Situ, Inc. performs vapor sampling using either a post run sampling system or a specially designed filter probe attached to the piezocone. Both vapor sampling probes are pushed with the hydraulic ram on the CPT or the Ram-Set system.

The post run system uses a one foot sampler that is pushed in the closed position, *Figure VS*. Once the sample interval is achieved, 1/4 inch tubing is attached to a specially designed coupling mechanism and lowered down the center of the push rods. When the tubing is coupled with the sampler, the sampler is retracted to expose a stainless steel filter screen and the sample is pulled to the surface via a vacuum pump, *Figure VS2*. After the sample has been taken, the sampler is withdrawn from the test hole, decontaminated and ready to re-deploy.

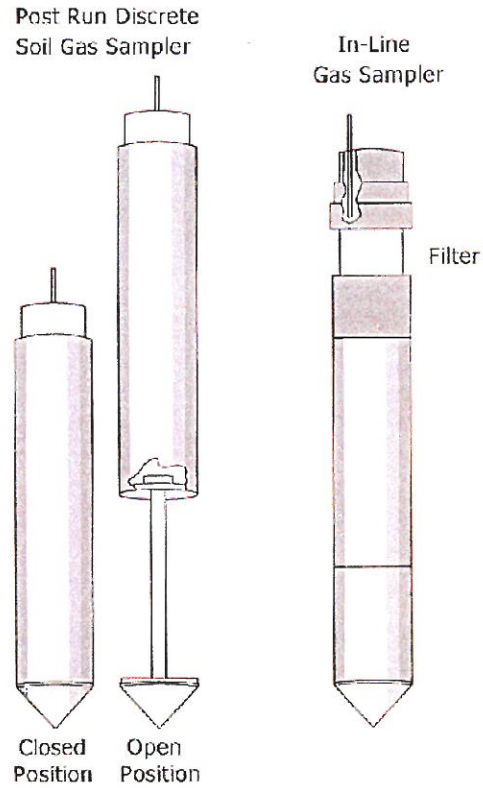


Figure VS

The second method involves using real time lithology measurements to determine appropriate sampling locations on site. The CPT sounding is then stopped at a determined interval to collect soil gas samples. The soil gas module is attached to the cone approximately two feet behind the cone tip and consists of a stainless steel filter that is slightly inset from the module to help prevent soil smearing, *Figure VS*. 1/4 inch tubing is pre strung through the rods and is attached to the sampling module.
As the module is advanced, positive pressure is applied to the sample line between sample depths to purge the line and to keep the filter clear. Once the sample interval has been achieved the positive pressure source is shut off and the line is purged by the vacuum source, generally 2 to 3 times the tubing volume. The sample is then collected into either a TEDLAR bag, SUMA canister or a syringe, *Figure VS2*. The resulting benefit is that the sounding can continue without removing the sampler from the hole between samples.

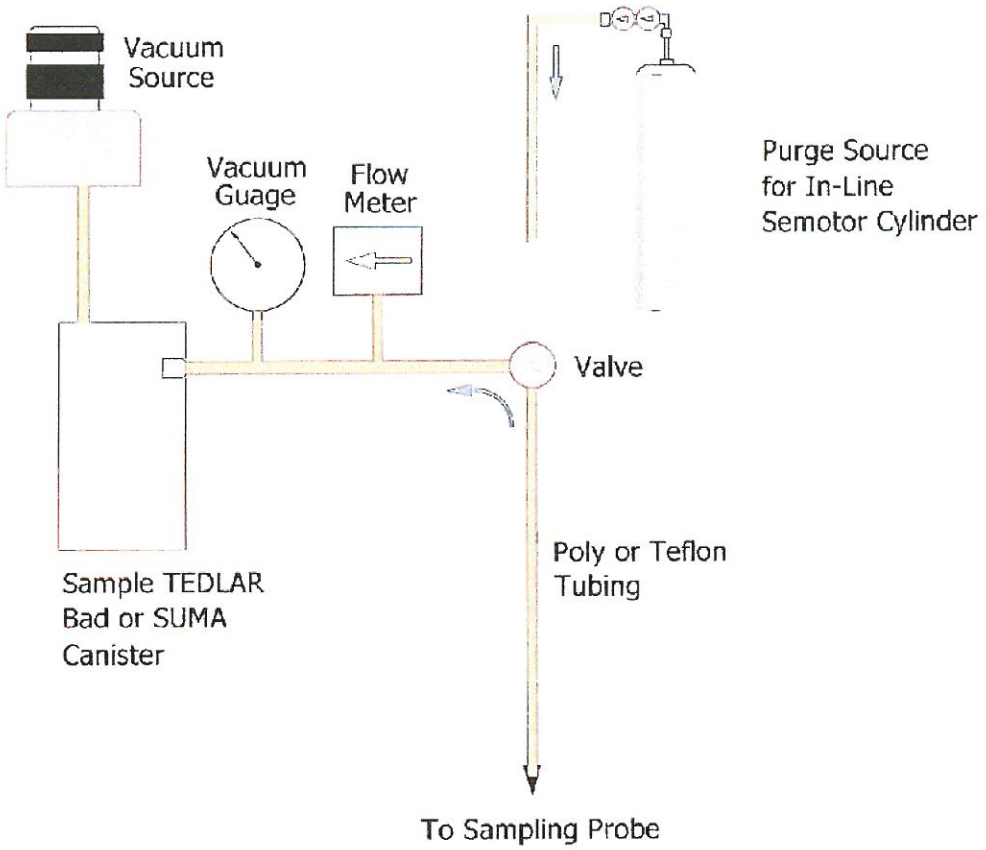


Figure VS2

A summary of the soil samples collected, including the sampling date, depth and location identification, is presented in Table 1.

For a detailed reference on soil gas sampling, refer to DeGroot et. al., 1998.

Gregg In Situ

Environmental and Geotechnical Site Investigation Contractors

Gregg In Situ CPT Interpretations as of January 7, 1999 (Release 1.00.19)

Gregg In Situ's interpretation routine should be considered a calculator of current published CPT correlations and is subject to change to reflect the current state of practice. The interpreted values are not considered valid for all soil types. The interpretations are presented only as a guide for geotechnical use and should be carefully scrutinized for consideration in any geotechnical design. Reference to current literature is strongly recommended.

The CPT interpretations are based on values of tip, sleeve friction and pore pressure averaged over a user specified interval (typically 0.25m). Note that Qt is the recorded tip value, Qc, corrected for pore pressure effects. Since all Gregg In Situ cones have equal end area friction sleeves, pore pressure corrections to sleeve friction, Fs, are not required.

The tip correction is: $Qt = Qc + (1-a) \bullet Ud$

where: *Qt* is the corrected tip load
Qc is the recorded tip load
Ud is the recorded dynamic pore pressure
a is the Net Area Ratio for the cone (typically 0.85 for Gregg In Situ cones)

Effective vertical overburden stresses are calculated based on a hydrostatic distribution of equilibrium pore pressures below the water table or from a user defined equilibrium pore pressure profile (this can be obtained from CPT dissipation tests). The stress calculations use unit weights assigned to the Soil Behavior Type zones or from a user defined unit weight profile.

Details regarding the interpretation methods for all of the interpreted parameters is given in table 1. The appropriate references referred to in table 1 are listed in table 2.

The estimated Soil Behavior Type is based on the charts developed by Robertson and Campanella shown in figure 1.

Table 1 CPT Interpretation Methods

Interpreted Parameter	Description	Equation	Ref
Depth	mid layer depth		
AvgQt	Averaged corrected tip (Qt)	$AvgQt = \frac{1}{n}\sum_{i=1}^{n} Qt_i$	
AvgFs	Averaged sleeve friction (Fs)	$AvgFs = \frac{1}{n}\sum_{i=1}^{n} Fs_i$	
AvgRf	Averaged friction ratio (Rf)	$AvgRf = 100\% \bullet \frac{AvgFs}{AvgQt}$	
AvgUd	Averaged dynamic pore pressure (Ud)	$AvgUd = \frac{1}{n}\sum_{i=1}^{n} Ud_i$	
SBT	Soil Behavior Type as defined by Robertson and Campanella		1

CPT Interpretations

U.Wt.	Unit Weight of soil determined from: 1) uniform value or 2) value assigned to each SBT zone 3) user supplied unit weight profile		
TStress	Total vertical overburden stress at mid layer depth	$TStress = \sum_{i=1}^{n} \gamma_i h_i$ where γ_i is layer unit weight h_i is layer thickness	
EStress	Effective vertical overburden stress at mid layer depth	$EStress = TStress - Ueq$	
Ueq	Equilibrium pore pressure determined from: 1) hydrostatic from water table depth 2) user supplied profile		
Cn	SPT N_{60} overburden correction factor	$Cn=(\sigma_v')^{-0.5}$ where σ_v' is in tsf $0.5 < C_n < 2.0$	
N_{60}	SPT N value at 60% energy calculated from Qt/N ratios assigned to each SBT zone		3
$(N1)_{60}$	SPT N_{60} value corrected for overburden pressure	$N1_{60} = Cn \bullet N_{60}$	3
$\Delta(N1)_{60}$	Equivalent Clean Sand Correction to $(N1)_{60}$	$\Delta(N1)_{60} = \frac{K_{SPT}}{1 - K_{SPT}} \bullet (N1)_{60}$ Where: K_{SPT} is defined as: 0.0 for FC < 5% 0.0167 • (FC - 5) for 5% < FC < 35% 0.5 for FC > 35% FC - Fines Content in %	7
$(N1)_{60cs}$	Equivalent Clean Sand $(N1)_{60}$	$(N1)_{60cs} = (N1)_{60} + \Delta(N1)_{60}$	7
Su	Undrained shear strength - Nkt is use selectable	$Su = \frac{Qt - \sigma_v}{N_{kt}}$	2
k	Coefficient of permeability (assigned to each SBT zone)		6
Bq	Pore pressure parameter	$Bq = \frac{\Delta u}{Qt - \sigma_v}$	2
Qtn	Normalized Qt for Soil Behavior Type classification as defined by Robertson, 1990	$Qtn = \frac{Qt - \sigma_v}{\sigma'_v}$	4
Rfn	Normalized Rf for Soil Behavior Type classification as defined by Robertson, 1990	$Rfn = 100\% \bullet \frac{f_s}{Qt - \sigma_v}$	4
SBTn	Normalized Soil Behavior Type (slightly modified from that published by Robertson, 1990. This version includes all the soil zones of the original non-normalized SBT chart - see figure 1)		4
Qc1	Normalized Qt for seismic analysis	$qc1 = qc \bullet (Pa/\sigma_v')^{0.5}$ where: Pa = atm. pressure	5
Qc1N	Dimensionless Normalized Qt1	qc1N = qc1 / Pa where: Pa = atm. pressure	

GREGG

CPT Interpretations

ΔQc1N1	Equivalent clean sand correction	$\Delta qc1N = \frac{K_{CPT}}{1 - K_{CPT}} \bullet qc1N$ Where: K_{CPT} is defined as: 0.0 for FC < 5% 0.0267 • (FC - 5) for 5% < FC < 35% 0.5 for FC > 35% FC - Fines Content in %	5
Qc1Ncs	Clean Sand equivalent Qc1N	*qc1Ncs = qc1N + Δqc1N*	5
Ic	Soil index for estimating grain characteristics	$Ic = [(3.47 - \log Q)^2 + (\log F + 1.22)^2]^{0.5}$	5
FC	Fines content (%)	$FC=1.75(Ic^{3.25}) - 3.7$ *FC=100 for Ic > 3.5* *FC=0 for Ic < 1.26* *FC = 5% if 1.64 < Ic < 2.6 AND Rfn<0.5*	8
PHI	Friction Angle	Campanella and Robertson Durunoglu and Mitchel Janbu	1
Dr	Relative Density	Ticino Sand Hokksund Sand Schmertmann 1976 Jamiolkowski - All Sands	1
OCR	Over Consolidation Ratio		1
State Parameter			9
CRR	Cyclic Resistance Ratio		7

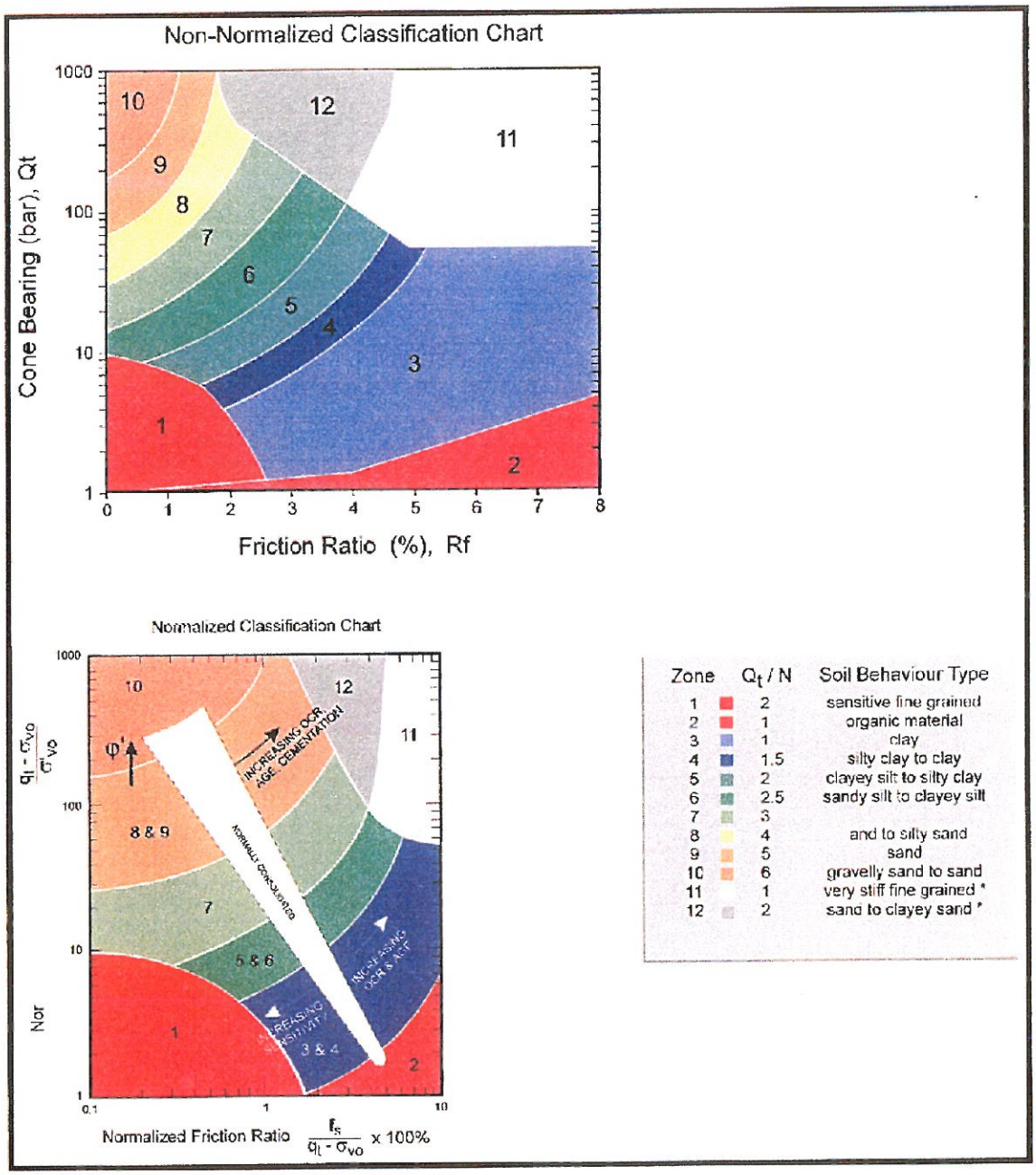


Figure 1 Non-Normalized and Normalized Soil Behavior Type Classification Charts

Table 2 References

No.	Reference
1	Robertson, P.K. and Campanella, R.G., 1986, "Guidelines for Use, Interpretation and Application of the CPT and CPTU", UBC, Soil Mechanics Series No. 105, Civil Eng. Dept., Vancouver, B.C., Canada
2	Robertson, P.K., Campanella, R.G., Gillespie, D. and Greig, J., 1986, "Use of Piezometer Cone Data", Proceedings of InSitu 86, ASCE Specialty Conference, Blacksburg, Virginia.
3	Robertson, P.K. and Campanella, R.G., 1989, "Guidelines for Geotechnical Design Using CPT and CPTU", UBC, Soil Mechanics Series No. 120, Civil Eng. Dept., Vancouver, B.C., Canada
4	Robertson, P.K., 1990, "Soil Classification Using the Cone Penetration Test", Canadian Geotechnical Journal, Volume 27.
5	Robertson, P.K. and Fear, C.E., 1995, "Liquefaction of Sands and its Evaluation", Keynote Lecture, First International Conference on Earthquake Geotechnical Engineering, Tokyo, Japan.
6	Gregg In Situ Internal Report
7	Robertson, P.K. and Wride, C.E., 1997, "Cyclic Liquefaction and its Evaluation Based on SPT and CPT", NCEER Workshop Paper, January 22, 1997
8	Wride, C.E. and Robertson, P.K., 1997, "Phase II Data Review Report (Massey and Kidd Sites, Fraser River Delta)", Volume 1 - Data Report (June 1997), University of Alberta.
9	Plewes, H.D., Davies, M.P. and Jefferies, M.G., 1992, "CPT Based Screening Procedure for Evaluating Liquefaction Susceptibility", 45th Canadian Geotechnical Conference, Toronto, Ontario, October 1992.