Silicon Valley Rapid Transit Project
Tunnel Segment
Geotechnical Data Report
Volume IV of VI

(P0503-D300-RPT-GEO-002, Rev.0)

Silicon Valley Rapid Transit Project

Tunnel Segment Geotechnical Data Report Volume IV of VI

P0503-D300-RPT-GEO-002
Rev. 0

HMM/Bechtel

Prepared by HMM/Bechtel SVRT, a Joint Venture

B0508-C006

VOLUME IV

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CONE PENETRATION TEST (CPT) RESULTS

Fugro performed the Cone Penetration Test (CPT) program. Appendix 8 presents a description of testing equipment and procedures, along with results of the CPT program and interpretations made by Fugro based on the CPTs.

FUGRO WEST, INC.

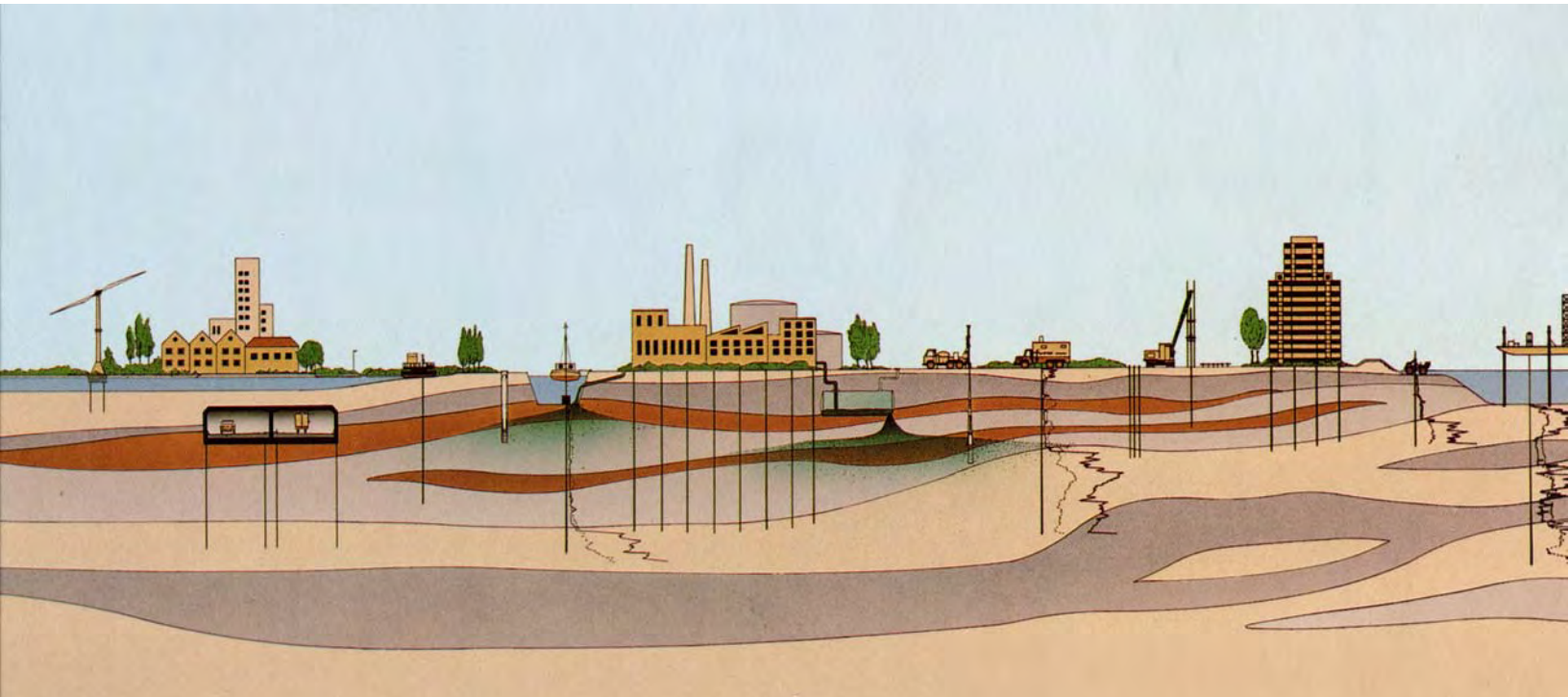
APPENDIX 8
CONE PENETRATION TEST (CPT) RESULTS

GEOTECHNICAL EXPLORATION PROGRAM
TUNNEL SEGMENT OF SILICON VALLEY
RAPID TRANSIT (SVRT) PROJECT
SAN JOSE, CALIFORNIA

Prepared for:
HMM/BECHTEL

JUNE 2005

Project No. 1637.001



REPORT DOCKET

APPROVAL

This document is approved by the following:

Name	Title	Signature	Issue Date
Roger Howard Jr., P.E.	Project Manager		June 13, 2005
Ronald L. Bajuniemi, P.E., G.E.	Project Principal		June 13, 2005
Jon Mitchell	Project Manager		September 19, 2005

REVISION HISTORY

Revision	Date	Change	Approval
0	May 4, 2005	Draft Report: Appendix 5 Cone Penetration Test (CPT) Results	RH
1	June 7, 2005	Final Report: Appendix 8 Cone Penetration Test (CPT) Results. With HMM/Bechtel Comments dated 5/23/05 incorporated	RH
2	June 13, 2005	Final Report: Appendix 8 Cone Penetration Test (CPT) Results. With HMM/Bechtel Comments dated 6/10/05 incorporated	RH
3	September 19, 2005	Final Report: Appendix 8 Cone Penetration Test (CPT) Results. With HMM/Bechtel Verbal Comments received on 9/15/05 incorporated. Resized CPT Logs: CPT 6, 55, 55A, 62, 93, 95, 157	JM

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June 13, 2005
Project No. 1637.001

HMM/Bechtel
3103 North First Street
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Attention: Mr. Ignacio Arango

Subject: Appendix 8 – Cone Penetration Test (CPT) Results
Tunnel Segment of SVRT Project
San Jose, California

Dear Mr. Arango:

Fugro West, Inc., is pleased to submit this final copy of "Appendix 8 - Cone Penetration Test (CPT) Results," describing the CPT test equipment, procedures and results for the tunnel segment of the SVRT Project in San Jose, California.

We appreciate this opportunity to be of continued service to HMM/Bechtel. Please contact Roger Howard Jr. at (510) 267-4422 if you have any questions regarding the information presented in this appendix.

Sincerely,

FUGRO WEST, INC.

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LOGS OF CPTS

1.0 INTRODUCTION

This appendix describes the cone penetration test (CPT) equipment, procedures and results conducted by Fugro West, Inc., (Fugro) for the tunnel segment of the Silicon Valley Rapid Transit (SVRT) Project. The CPTs were conducted at locations situated along the tunnel segment alignment of the SVRT Project, as shown on Figure A8-1.

1.1 PROJECT DESCRIPTION

The Santa Clara Valley Transportation Authority (VTA) intends to construct the SVRT Project in San Jose, California. This will be a 26.2-km (16.3-mile) extension of the Bay Area Rapid Transit (BART) heavy rail rapid transit system from its planned terminus at the end of the Warms Springs Extension in Fremont, to San Jose. The proposed alignment currently includes six stations (three above-grade and three below-grade), a proposed future station, and vehicle storage and maintenance facilities. The alignment is composed of two major segments;

1) A line segment which will be approximately 11.5 miles of at-grade, elevated and cut-and-cover track from Warm Springs to San Jose; and

2) A 5.1-mile-long tunnel segment, consisting of twin bored tunnels and cut-and-cover structures through downtown San Jose (see Figure A8-1)

As currently planned, the tunnel segment includes at-grade and open cut track, three (3) cut-and-cover stations, and a cut-and-cover track crossover structure. The cut-and cover stations and the crossover structures have a cumulative length of approximately 4970 feet. The remaining 4.14 miles of the alignment will be twin 19.5-foot-diameter tunnels.

This investigation and report cover the 5.1-mile-long tunnel segment section only.

1.2 GEOTECHNICAL EXPLORATION PROGRAM OVERVIEW

The joint venture of Hatch Mott MacDonald T & T, Inc., and Bechtel Infrastructure Corporation (HMM/Bechtel) are providing engineering design services for the tunnel segments (Segments 3 and 4) of the SVRT Project to the VTA. HMM/Bechtel has subcontracted with a number of companies to conduct the geotechnical field exploration program for the project. HMM/Bechtel's primary subcontractors for the geotechnical exploration program included: Fugro West, Inc., (Fugro), Parikh Consultants (Parikh) and Pitcher Drilling Company (Pitcher).

The three companies, Fugro, Parikh, and Pitcher, conducted the majority of the geotechnical field exploration program for the tunnel segments of the SVRT Project from October 15, 2004, to March 5, 2005. The intent of the geotechnical field investigation program was to obtain geotechnical data that would aid in the design and construction of the proposed tunnel and cut-and-cover structures.

In general, the geotechnical field investigations explored subsurface conditions along the proposed tunnel alignment, within the vicinity of the proposed Eastern and Western Portals, at

the two proposed ventilation structures, and at the proposed stations including Alum Rock Station, Downtown San Jose Station, and Diridon/Arena Station. The geotechnical exploration program included:

- 76 Rotary Wash Borings, and
- 146 cone penetration tests (CPTS).

Figure A8-1 provides a map of the exploration locations. These locations were selected by HMM/Bechtel based on the following considerations: 1) the requirements of the tunnel designer, 2) the location of existing geotechnical data, 3) the voidance of private property, and 4) the voidance of existing underground and overhead utilities. For CPT correlation purposes approximately 16 sets of borings and CPTs were conducted within 15 feet of each other. The CPT locations were surveyed by a subcontractor to HMM/Bechtel and the surveyed coordinates were provided to Fugro by HMM/Bechtel.

1.3 CPT PROGRAM OVERVIEW

Fugro West, Inc., and Fugro Geosciences, Inc., conducted the CPTs using a Fugro truck-mounted 25-ton cone apparatus in general accordance with ASTM D5778. The continuous CPT soundings were typically advanced to refusal, which ranged from approximately 42 to 158 feet in depth. In addition to continuous CPT soundings, Fugro also conducted dissipation tests, downhole seismic shear wave velocity measurements, and hydropunch water sampling. Dissipation tests were conducted at twenty-seven (27) CPT locations in order to monitor excess pore pressure dissipation in sands and clays. Detailed procedures, equipment specifications and interpretation of results for the dissipation testing are provided in Appendix 11, dissipation testing. Downhole Seismic shear (S) wave velocity measurements were successfully conducted at six (6) CPT locations to obtain profiles of shear wave velocity versus depth. Detailed information regarding the downhole seismic cone penetration tests including field procedures, data interpretation, and results are discussed in “Appendix 9 - Seismic Cone Testing.” Hydropunch water sampling was conducted at one (1) CPT location in order to collect groundwater for laboratory testing. Detailed information regarding the field procedures and equipment specifications for the hydropunch water sampling are provided in Appendix 10, Hydropunch Testing.

Detailed procedures and equipment specifications on the CPT operations are discussed in the following sections.

1.4 CPT TEST PROGRAM OVERVIEW

Prior to initiation of the fieldwork the appropriate permits were obtained from the Santa Clara Valley District and City of San Jose. Cone penetration testing was generally conducted every 200 to 300 feet along the tunnel sections of the alignment, and approximately every 50 to 100 feet at the proposed station and crossover locations. In addition, locations were strategically placed as close as possible to water crossing locations including Los Gatos Creek, Guadalupe River, Lower Silver Creek, and Coyote Creek. Table 1 summarizes the CPT field

testing program and indicates the test location, date completed, termination depth, and additional testing of each CPT conducted.

2.0 CPT TEST EQUIPMENT AND PROCEDURES

2.1 CPT EQUIPMENT

Equipment utilized in conducting CPTs include:

- A self-contained 25-ton CPT rig that contains the hydraulic pushing system, a power supply unit and other tools, equipment and necessary materials;
- A piezocone (CPTu) to measure tip and sleeve resistances, probe inclination and dynamic pore pressure;
- Cone rods with pre-strung electrical 10-pin copper cable and casing;
- A data acquisition system including the Analog-Digital (A/D) Conversion System and a data logging laptop computer; and
- A Support truck and trailer containing grout pump and mixer, steam cleaning operation, pressure washer.

2.1.1 CPT Rig

The CPT's were performed using an International 25-ton capacity truck mounted rig with a self-contained power supply unit. The rig was equipped with hydraulic jacking systems to lift and level the pushing platform. The "dead weight" of the rig provided the reaction weight necessary for advancing the CPT tools.

2.1.2 Piezocone

The conventional instrumented piezocone assembly used for this project includes a cone tip with a 60-degree apex and a base area of 15 square centimeters (cm^2), a sleeve segment with a surface area of 200 cm^2, an area ratio of 0.59, and a pore pressure transducer near the base (shoulder) of the cone tip (designated the u2 location).

2.1.3 Cone Rods and Casing

Fugro's CPT cone rods are manufactured from high tensile strength steel and have a cross sectional area adequate to sustain, without buckling, the thrust required to advance the penetrometer tip. Prior to testing, a 10-pin electrical cable is pre-strung through the cone rods, and is connected by a crossover cable to the data acquisition system. Push rods are 1 meter in length, and must be secured together to bear against one another at the joints to form a rigid-jointed string.

The push rods were protected from bending by $2^1/_8$-inch outside diameter and $1^7/_8$-inch inside diameter steel casing when needed. The casing was used to ensure that the maximum

possible depth of testing was reached. The steel casing was generally placed in the upper clayey strata and was generally extended to depths of 20 to 75 feet, when used.

2.1.4 Data Acquisition System

The data acquisition system utilized in conducting the CPTs consisted of an electronic signal conditioner, a three-pen analog strip chart recorder, a portable laptop computer, and a printer.

The data acquisition system converted the analog signal from the cone penetrometer to a digital signal, which was monitored, recorded and presented in near-real time on the laptop computer. As stipulated in ASTM D-5778-95, a three-pen strip chart recorder monitors and displays in real time the analog signals directly from the cone penetrometer. This provides an accurate recording of the collected data, regardless of the analog to digital conversion. Upon completion of testing, the strip chart record of the analog readings is compared to the digital readings recorded on the laptop computer. This comparison of analog to digital signals provides a quality control system that ensures accurate and highly reliable data including the initial and final calibration zeros.

2.1.5 Support Equipment

The support equipment consisted of a pickup truck/trailer operation containing the following necessities:

- Grout pump and mixer to properly abandoned CPT holes after completion;
- Pressure wash system for cleaning work area when appropriate and maintaining clean equipment throughout field program;
- Steam cleaning system for environmental protocol if needed; and
- Storing tools and supplies for daily operations.

2.2 FIELD PROCEDURES

Prior to the start of testing, the truck is jacked up and leveled on four pads to provide a stable reaction for the cone thrust. During the test, the instrumented cone is hydraulically pushed into the ground at a rate of about 2 centimeters per second (cm/s), and readings of cone tip resistance, sleeve friction, and pore pressure are digitally recorded every second. As the cone advances, additional cone rods are added such that a "string" of rods continuously advances through the soil. As the test progresses, the CPT operator monitors the cone resistance and its deviation from vertical alignment.

Information collected during a push was stored digitally as ASCII formatted data on magnetic disks readable by MS-DOS or Windows-based programs that read text files. The data files include project description and location, operator, data format information, and other pertinent information about the sounding.

Following each push, the data collected was presented in a graphical format. The preliminary field log included:

- Cone tip resistance plot in tons/ft^2 (tsf) versus depth in feet;
- Friction sleeve resistance plot in tons/ft^2 (tsf) versus depth in feet;
- Friction ratio plot in percentage versus depth in feet; and
- Pore pressure in tons/ ft^2 (tst) versus depth in feet.

As stipulated in the ASTM standard, the vertical axis is designated for the depth, while the horizontal axis displays the magnitude of the test values recorded. Final plotting scales are determined after all the tests are completed, and takes into consideration maximum test values and depths recorded for the project.

2.3 CPT COMPLETION AND ABANDONMENT

Upon completion of the CPTs, the CPT rig was moved off location. The holes were then backfilled with cement-bentonite grout by the tremie method, starting from the bottom of the hole and filling upward using the grout pump and mixer. When grout approached the surface, the tremie pipe was removed, and the sounding holes were topped off with rapid setting quickcrete. Grout mix and grouting procedures were completed in accordance with Santa Clara Valley Water District regulations. The work area was the cleaned per City of San Jose requirements and left in the condition found.

3.0 CPT SOUNDING RESULTS AND DISCUSSION

3.1 INTRODUCTION

CPT sounding logs for the 146 CPTs are attached following the figures. The CPT logs provide graphical plots versus depth showing:

- Measured Cone (Tip) resistance in tsf;
- Measured Sleeve friction in tsf;
- Friction Ratio in percentage, including color coding denominating the Soil Behavior Type according to Robertson, 1990 (see CPT correlation chart);
- Measured Pore Pressure in tsf at the u2 location;
- Estimated Soil Undrained Shear Strength in ksf. The sounding logs show the range of undrained shear strengths calculated from CPT cone tip resistances (corrected for unequal end area effects) based on cone bearing capacity factors (N_k) of 12 and 15.

Please note that some of the data presented on the CPT logs is interpreted and based on assumptions that need to be verified with the data from the boring program. The interpreted data presented on the CPT logs includes the soil behavior type; and the estimated soil undrained shear strength. The estimated undrained shear strength and are influenced by the

soil unit weight (and resulting total stress condition), and the N_k-value. These items will be discussed in additional detail below.

3.2 EVALUATION OF UNDRAINED SHEAR STRENGTH FROM CPT DATA

Undrained shear strength has been estimated from the CPT measurements using the following expression:

$$S_u = \frac{q_t - \sigma_{vo}}{N_k}$$

where: S_u = Undrained shear strength, ksf

q_t = Cone tip resistance in ksf corrected for unequal end area effects, as follows:

$$q_t = q_c + u_2(1-a)$$

where: q_c = measured cone tip resistance (ksf)

u_2 = measured pore pressure acting behind the cone

a = cone area ratio (0.59)

σ_{vo} = Estimated in situ total vertical stress, ksf

N_k = Empirical cone bearing factor

The in situ total stress (σ_{vo}) and the cone bearing factor (N_k) need to be determined in order to estimate the undrained shear strength using the above relationship. The following discussion will summarize the approaches used to reasonably estimate/evaluate those quantities.

3.2.1 Evaluation of Cone Bearing Factor (N_k)

A range of interpreted undrained shear strength (S_u) from CPT tip resistances for empirical cone bearing factor (N_k) ranging from 12 to 15, are plotted on the CPT logs. The range of selected N_k values was based on a comparison of S_u estimated from the CPT tip resistance and the S_u determined from vane shear testing in the borings.

For this N_k evaluation, all the boring vane shear data were plotted versus depth along with the Su data from the nearest 1 to 2 CPTs, for a range of N_k values. However, the vane shear S_u data that exceeded the capacity of the vane shear device (typically about 2.1 kips per square foot) were neglected in the evaluation. Examples of the plotted profiles are shown on

attached Figures A8-2a and A8-2b. These figures compare CPT and vane shear S_u data for CPT-42 and BH-23, and CPT-96 and BH-50, respectively.

From this evaluation it is appears that an N_k value of about 12 is appropriate for the overconsolidated clayey soils encountered in project area. Therefore, the selected N_k range (12 to 15) shown on the CPT logs represents a reasonable to slightly conservative (low) estimate of undrained shear strength when compared to the available vane shear data from the borings. It should be noted that this comparison is based on relatively few data points in any given boring. This is particularly true when the undrained shear strength data that exceeded the capacity of the vane shear device are removed from the evaluation (this leaves a total of approximately 40 comparable data points out of the approximately 80 reported vane shear tests).

3.2.2 Estimation of Total In Situ Stress From CPT Data

In addition to determining an appropriate range of N_k to estimate the undrained shear strength from the CPT, a reasonable estimate of the in situ total stress is required. To develop reasonable estimates of total stress, we developed and used a site-specific CPT correlation with unit weight. The basic approach to developing the site-specific correlation was to compare measured unit weight from all correlation borings (borings that were located directly adjacent to a CPT) with the CPT zone as determined from the Robertson et al. (1986) soil behavior chart. The unit weight data were then sorted by zone and then averaged to determine a reasonable estimate of unit weight for each zone on the chart. For CPT zones where no laboratory data were available, the zone was assigned a unit weight based on modified estimates of the unit weight correlations provided in Lunne et al. (1997). The following table provides a summary of the site-specific unit weight correlations for each zone of the Robertson et al. (19986) CPT tip resistance-based chart.

Table A8-2. Summary of Site-Specific Unit Weight-CPT Correlations

Zone Number	Material Description	Site-Specific Unit Weight Correlation (lbs/ft^3)
1	Sensitive fine grained	115
2	Organic material	85
3	Clay	122
4	Silty clay to clay	124
5	Clayey silt to silty clay	124
6	Sandy silty to clayey silt	126
7	Silty sand to sandy silt	127
8	Sand to silty sand	127
9	Sand	130
10	Gravelly sand to sand	135
11	Very stiff fine grained	127
12	Sand to clayey sand	127

Note: Zone number and material description are based on Robertson et al. (1986) proposed soil behavior classification system (tip resistance and friction ratio).

The unit weight correlations above were used to develop a unit weight profile for each CPT from which the total stress profile was developed. To verify the above unit weight correlation and confirm that those values resulted in reasonable estimates of total stress, unit weight and total stress profiles were developed for correlation borings BH-8, 12, 31, 35, and 77. The correlations were based on the available unit weight test data and were compared with the adjacent CPT profiles estimated using the above correlation shown in Table 2. The difference between the two total stress profiles was typically less than about 2 percent. Examples of the plotted total stress profiles are shown on attached Figures A8-3a and A8-3b. These figures compare CPT and Boring total stress profiles for CPT-23 and BH-12, and CPT-134 and BH-77, respectively.

4.0 LIMITATIONS

Our services consist of subsurface field explorations and data evaluations that are made in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

The data provided in this appendix is based on the subsurface explorations conducted for this study. These explorations indicate subsurface conditions only at specific locations and times, and only to the depths penetrated. Variations may exist and conditions not observed or described in this report could be encountered during construction. Our results are based on our standard practices and specific data obtained.

This appendix has been prepared for the exclusive use of HMM/Bechtel and their consultants for specific application to the SVRT project as described herein. In the event that there are any changes in the ownership, nature, design, or location of the proposed project, or if any future additions are planned, the results contained in this appendix should not be considered valid unless 1) the project changes are reviewed by Fugro, and 2) results presented in this appendix are modified or verified in writing. Reliance on this report by others must be at their risk unless we are consulted on the use or limitations. We cannot be responsible for the impacts of any changes in geotechnical standards, practices, or regulations subsequent to performance of services without our further consultation. We can neither vouch for the accuracy of information supplied by others, nor accept consequences for unconsulted use of segregated portions of this report.

5.0 REFERENCES

Lunne, Robertson & Powell (1997), *Cone Penetration Testing in Geotechnical Practice*, Blackie Academic & Professional, London, UK.

Robertson, P.K., Campanella, R.G., Gillespie, D. and Greig, J. (1986), “Use of Piezocone Data,” *Proceedings of the ASCE Specially Conference In Situ 1986: Use of In Situ Tests in Geotechnical Engineering*, Blacksburg, pp.1263-80.

Robertson, P.K., (1990), “Soil Classification using the Cone Penetration Test,” *Canadian Geotechnical Journal,* 27

TABLE

CPT No.	Station	Offset		Coordinants			In-Situ Test	Insitu Test Depths (ft)	CPT Completed	Casing Depth (ft)	Final Depth (Ft)	Comments
		(ft)	R/L	Northing	Easting	Elev.						
CPT-001	571+99	7	L	1955943	6163243	87.1			11/11/04	-	130.8	CPT redone due to signal interference during initial attempts in early October
CPT-002	574+03	14	L	1955813	6163403	86.8			11/11/04	-	84.6	CPT redone due to signal interference during initial attempts in early October
CPT-003	576+04	3	L	1955668	6163542	86.2			11/11/04	-	120.1	CPT redone due to signal interference during initial attempts in early October
CPT-004	580+00	63	L	1955458	6163884	86.0	3 x Dissipation	20, 38, 50	1/27/05	-	101.5	
CPT-005	584+41	10	L	1955128	6164181	87.1			1/13/05	-	120.1	
CPT-006	586+28	26	L	*	*	*			2/9/05	-	119.6	
CPT-007	587+84	32	L	1954917	6164455	86.0			2/8/05	-	119.8	
CPT-008	588+69	6	L	1954840	6164498	85.6			2/9/05	-	119.8	
CPT-009	592+28	39	L	1954561	6164736	108.8	Dissipation	67	12/15/04	24	83.3	
CPT-010	598+69	29	L	1953919	6164776	85.5			12/13/04	65	121.3	
CPT-011	611+67	25	L	1952618	6164819	88.8			1/27/05	40	99.1	
CPT-012	613+97	36	L	1952386	6164776	88.9			1/20/05	30	119.0	
CPT-013	615+74	61	L	1952267	6164615	90.1			1/21/05	30	94.8	
CPT-014	617+17	24	L	1952104	6164607	89.4			12/6/04	60	120.1	
CPT-015	618+26	89	L	1951975	6164579	90.1			12/6/04	65	120.3	
CPT-016	621+62	13	L	1951824	6164255	91.4			12/7/04	60	120.1	
CPT-017	623+52	86	L	1951664	6164127	90.9	2 x Dissipation	60 & 85	12/7/04	60	85.4	
CPT-018	624+92	12	L	1951660	6163969	91.7	2 x Dissipation	101 & 107	12/10/04	60	123.1	
CPT-019	626+39	12	L	1951585	6163842	91.4			12/15/04	59	120.3	
CPT-020	629+53	12	L	1951430	6163570	91.8			12/8/04	-	122.4	
CPT-021	631+54	12	L	1951329	6163395	92.6			12/8/04	57	119.8	
CPT-022	633+26	89	L	1951177	6163285	91.6			12/9/04	59	118.4	
CPT-023	634+46	12	L	1951184	6163142	93.2			12/9/04	68	120.1	
CPT-024	635+92	13	L	1951110	6163016	93.7			11/3/04	62	131.8	
CPT-025	638+18	14	L	1950997	6162820	94.9			11/3/04	56	79.2	
CPT-026	641+38	13	L	1950838	6162542	95.1			12/3/04	50	116.7	
CPT-027	645+69	95	L	1950552	6162210	92.0	3 x Dissipation	51, 67, 99	12/3/04	50	99.9	
CPT-028	646+94	17	L	1950557	6162062	90.2			12/16/04	59	127.3	
CPT-029	648+24	14	L	1950495	6161948	87.6			1/19/05	-	129.3	
CPT-030	652+05	105	L	1950226	6161663	83.2			12/29/04	58	130.3	
CPT-031	653+09	25	L	1950244	6161534	83.1			12/17/04	58	120.9	
CPT-032	656+81	2	L	1950082	6161198	81.1			12/21/04	56	121.2	
CPT-033	658+34	141	L	1949882	6161136	80.6			12/17/04	56	120.5	
CPT-034	662+43	20	L	1949783	6160721	80.6			12/22/04	55	115.1	
CPT-035	663+50	19	L	1949730	6160628	80.7	4 x Dissipation	50, 58, 84, 94	12/20/04	56	120.5	
CPT-036	666+21	22	L	1949593	6160394	80.8			2/9/05	55	85.0	

TABLE A8-1a

SUMMARY OF CONE PENETRATION TEST (CPT) PROGRAM

Tunnel Segment of Silicon Valley (SVRT) Project
San Jose, California

CPT No.	Station	Offset		Coordinants			In-Situ Test	Insitu Test Depths (ft)	CPT Completed	Casing Depth (ft)	Final Depth (Ft)	Comments
		(ft)	R/L	Northing	Easting	Elev.						
CPT-037	668+28	81	L	1949579	6160164	80.0			12/27/04	53	121.3	
CPT-038	672+21	115	L	1949213	6159921	81.0			1/21/05	45	113.6	
CPT-039	674+06	29	L	1949196	6159717	82.5			1/12/05	50	116.4	
CPT-040	676+69	19	L	1949073	6159484	82.4			11/1/04	57	157.9	
CPT-041	678+27	7	L	1949005	6159341	81.7			11/1/04	55	107.5	
CPT-042	690+02	52	L	1948471	6158293	81.1			10/20/04	-	75.8	
CPT-043	691+32	29	L	1948336	6158221	82.1			10/19/04	-	86.9	
CPT-044	692+88	22	L	1948264	6158082	83.0	3 x Dissipation	25, 45, 48	10/18/04	40	129.9	
CPT-045	696+45	16	L	1948091	6157770	84.6			10/29/04	45	115.7	
CPT-046	699+08	29	L	1947949	6157548	86.5	Seismic		11/10/04	30	94.6	
CPT-047	701+58	1	L	1947850	6157316	87.2			11/18/04	8	80.1	Location abandoned during initial attempt (10/26/04) due to possible obstruction at 10'. Sounding redone at offset location on 11/18/04.
CPT-048	711+88	94	L	1947255	6156471	85.1			10/26/04	45	83.3	
CPT-049	714+32	48	L	1947256	6156188	83.2			10/26/04	38	45.4	
CPT-050	714+72	83	L	1947123	6156219	83.0			10/6/04	20	104.7	
CPT-051	716+33	15	L	1947099	6156048	83.3			10/28/04		59.6	
CPT-052	718+71	17	L	1946958	6155859	82.1			10/6/04	26	122.7	
CPT-053	722+42	4	L	1946712	6155583	82.5			12/2/04	15	97.0	
CPT-055	727+90	34	L	1946361	6155166	86.8	2 x Dissipation	36, 60	2/23/05	-	60.2	Initial attempt reached 60.2 feet. Sounding repeated per JV.
CPT-055A	727+81	44	L	1946361*	6155179*	86.8	2 x Dissipation	72, 86	2/23/05		85.7	
CPT-056	729+76	69	L	1946173	6155060	85.0			1/19/05	33	105.2	
CPT-057	731+53	6	L	1946164	6154866	86.2			2/22/05	-	89.1	
CPT-060	747+64	4	L	1945963	6153271	90.2			12/21/04	50	116.0	
CPT-061	750+46	70	L	1946080	6153016	90.4			1/11/05	62	121.3	
CPT-062	751+91	51	R	1946106	6152906	90.3			1/24/05	32	120.0	
CPT-063	753+85	40	L	1946190	6152711	90.7			12/22/04	45	116.1	
CPT-064	756+97	55	L	1946320	6152410	93.6			12/2/04	30	113.6	
CPT-065	759+03	25	L	1946505	6152302	91.5			1/24/05	32	113.3	
CPT-066	761+80	4	L	1946763	6152192	89.4			12/27/04	40	106.3	
CPT-067	763+06	31	L	1946893	6152187	88.3			1/6/05	32	82.9	
CPT-068	765+22	20	L	1947093	6152096	87.4	4 x Dissipation	54, 63, 86, 88	1/20/05	-	88.2	
CPT-069	766+39	63	L	1947205	6152039	86.3			1/7/05	36	95.6	
CPT-070	768+11	64	L	1947376	6152019	85.5			1/7/05	33	104.5	
CPT-073	775+74	79	L	1948097	6151846	82.2			1/11/05	59	105.9	
CPT-074	777+24	16	L	1948270	6151874	81.1			1/4/05	50	120.7	
CPT-075	778+54	22	L	1948389	6151819	81.4			1/7/05	43	121.9	
CPT-076	781+88	15	L	1948646	6151602	81.5			1/6/05	40	120.1	
CPT-077	784+24	20	L	1948825	6151450	82.4			1/12/05	30	118.6	

TABLE A8-1b

SUMMARY OF CONE PENETRATION TEST (CPT) PROGRAM

Tunnel Segment of Silicon Valley (SVRT) Project
San Jose, California

CPT No.	Station	Offset		Coordinants			In-Situ Test	Insitu Test Depths (ft)	CPT Completed	Casing Depth (ft)	Final Depth (Ft)	Comments
		(ft)	R/L	Northing	Easting	Elev.						
CPT-078	787+08	19	L	1949043	6151266	82.7			1/6/05	40	89.0	
CPT-079	788+47	20	L	1949149	6151176	82.1	4 x Dissipation	52, 73, 78, 100	1/5/05	32	117.5	
CPT-080	791+85	18	L	1949408	6150959	80.8			1/5/05	42	123.7	
CPT-081	796+55	19	L	1949766	6150655	80.5			11/2/04	12	49.3	
CPT-082	799+92	30	L	1950017	6150429	78.4			1/14/05	46	94.0	
CPT-083	801+55	28	L	1950142	6150326	77.8			1/14/05	45	121.6	
CPT-084	804+36	46	L	1950346	6150131	76.4	4 x Dissipation	59, 82, 92, 98	1/10/05	-	121.5	
CPT-085	805+84	58	L	1950451	6150026	77.2			1/11/05	66	90.0	
CPT-086	809+89	36	L	1950769	6149778	73.8			1/10/05	29	120.1	
CPT-087	811+88	16	L	1950923	6149653	73.1			1/17/05	-	120.1	
CPT-088	815+31	70	L	1951103	6149362	72.8			12/28/04	40	120.3	
CPT-089	816+63	85	L	1951167	6149250	72.8			12/28/04	36	87.9	
CPT-090	820+27	151	L	1951307	6148914	72.2			1/25/05	1.5	83.4	
CPT-091	821+71	142	L	1951390	6148797	72.3			1/25/05	30	111.5	
CPT-092	824+25	67	L	1951586	6148619	71.5			2/18/05	-	119.7	
CPT-093	830+14	1	L	1951926	6148141	68.9	3 x Dissipation	20, 32, 47	4/19/05	-	102.8	
CPT-094	680+39	19	L	1948890	6159163	81.2			1/18/05	52	105.6	
CPT-095	652+06	155	L	1950183	6161688	83.5	3 x Dissipation	29.5, 64, 74.5	4/20/05	-	119.9	
CPT-096	681+88	5	L	1948827	6159027	80.7	2 x Dissipation	55, 61	10/25/04	50	62.3	
CPT-097	682+48	52	L	1948847	6158946	79.5			10/22/04		86.7	
CPT-098	683+62	19	L	1948728	6158883	80.8	3 x Dissipation	31, 80, 100	11/2/04	58	154.5	
CPT-100	684+95	6	L	1948673	6158761	80.5			10/21/04	-	64.1	
CPT-101	686+26	45	L	1948652	6158623	80.3			10/21/04	-	130.4	
CPT-102	685+69	6	L	1948636	6158697	80.5	1 x Dissipation	25	10/25/04	50	67.1	
CPT-103	687+61	10	L	1948537	6158533	80.9	2 x Dissipation	29, 73	10/20/04	-	129.2	
CPT-105	688+14	9	L	1948511	6158487	81.0			10/29/04	62	71.9	
CPT-106	689+00	11	L	1948467	6158413	81.3	Seismic		11/15/04	-	74.8	Inconsistent/noisy seismic data likely due to subsurface obstructions
CPT-107	566+22	38	L	1956455	6162998	90.0			2/17/05	-	136.4	
CPT-108	566+89	38	L	1956394	6163020	90.1			2/16/05	-	110.6	
CPT-109	567+66	34	L	1956323	6163045	88.9			2/16/05	-	136.7	
CPT-110	570+00	9	L	1956109	6163134	87.6			2/16/05	-	119.8	
CPT-111	571+32	21	L	1956012	6163222	86.6			11/11/04	-	134.9	CPT redone due to signal interference during initial attempts in early October
CPT-112	599+71	43	L	1953816	6164848	85.6	2 x Dissipation	40, 98	12/14/04	50	99.0	
CPT-113	600+09	38	L	1953779	6164844	87.2			1/13/05	65	102.0	
CPT-114	600+38	42	L	1953750	6164764	87.3	Seismic		2/12/05	-	108.5	
CPT-117	603+97	50	L	1953391	6164856	87.5			2/8/05	-	108.4	
CPT-118	604+75	63	L	1953313	6164869	87.9			2/12/05	-	112.9	

TABLE A8-1C

SUMMARY OF CONE PENETRATION TEST (CPT) PROGRAM
Tunnel Segment of Silicon Valley (SVRT) Project
San Jose, California

CPT No.	Station	Offset		Coordinants			In-Situ Test	Insitu Test Depths (ft)	CPT Completed	Casing Depth (ft)	Final Depth (Ft)	Comments
		(ft)	R/L	Northing	Easting	Elev.						
CPT-120	605+78	50	L	1953210	6164856	88.9	4 x Dissipation	39, 85, 90,105	2/8/05	-	104.2	
CPT-122	607+72	24	L	1953016	6164830	88.2	Seismic		2/13/05	-	88.7	
CPT-123	608+61	11	L	1952926	6164817	87.9			2/13/05	-	118.1	
CPT-124	609+83	6	L	1952805	6164799	88.3			1/26/05	35	120.0	Initial attempt on 1/25/05 reached 63.7 feet. Sounding repeated per JV.
CPT-126	690+71	9	L	1948383	6158263	82.0			10/19/04	-	87.7	
CPT-128	692+45	28	L	1948280	6158122	82.8	Seismic		11/12/04	-	78.4	Inconsistent/noisy seismic data likely due to subsurface obstructions
CPT-129	694+74	29	L	1948166	6157924	83.9			10/12/04	30	119.7	
CPT-130	694+10	31	L	1948196	6157980	83.3			10/18/04	30	125.2	
CPT-132	696+10	31	L	1948096	6157807	84.7			10/12/04	30	123.7	
CPT-133	697+72	15	L	1948029	6157659	85.6	Dissipation	26, 79	10/27/04	40	116.5	
CPT-134	698+14	17	L	1948007	6157623	86.0			11/18/04	-	42.0	Casing obstructed on first attempt on 10-27-04. Sounding was redone @ new location per JV instruction
CPT-134A	698+38	15	L	1947996	6157602	86.1	2 x Dissipation	74, 105	11/18/04	30	117.8	
CPT-135	699+74	13	L	1947931	6157483	86.8			11/4/04	45	76.4	
CPT-136	700+20	31	L	1947892	6157451	86.9			11/6/04	20	81.8	
CPT-137	702+06	29	L	1947801	6157290	88.0	3 x Dissipation	33, 85, 120	10/8/04	26	120.1	
CPT-138	702+94	29	L	1947757	6157213	88.2			10/8/04	26	120.1	
CPT-139	703+69	31	L	1947718	6157150	88.2	Seismic		11/9/04	30	118.2	
CPT-140	704+43	31	L	1947681	6157085	88.4	2 x Dissipation	53, 109	11/6/04	63.5	128.0	
CPT-141	705+61	87	L	1947574	6157011	88.6			10/28/04	40	76.6	
CPT-142	706+77	31	L	1947564	6156882	88.4			10/7/04	-	121.8	
CPT-143	708+32	85	L	1947441	6156775	87.7	4 x Dissipation	32, 74, 85, 112	10/7/04	30	111.8	
CPT-144	708+90	25	L	1947463	6156694	88.2			11/6/04	30	86.9	
CPT-145	709+82	25	L	1947417	6156615	87.1	Seismic		11/8/04	-	77.9	Inconsistent/noisy seismic data likely due to subsurface obstructions
CPT-145a	709+80	25	L	1947418	6156617	87.1	Seismic		11/17/04	30	125.7	Inconsistent/noisy seismic data likely due to subsurface obstructions
CPT-146	736+02	40	L	1946054	6154428	87.7	3 x Dissipation	20, 36, 79	12/1/04	40	79.5	
CPT-147	736+64	15	L	1946099	6154359	86.8			2/23/05	-	79.3	CPT-147 repeated per JV at offset locations following 2 refusals at ~ 31 ft.
CPT-148	737+31	37	L	1946037	6154300	87.8			12/2/04	30	153.9	
CPT-149	737+96	4	L	1946068	6154230	88.0	Seismic		2/10/05	-	110.7	
CPT-150	738+63	2	L	1946057	6154164	88.9			1/26/05	-	115.7	
CPT-151	739+26	17	L	1946062	6154099	89.7			1/26/05	-	103.9	
CPT-152	739+62	29	L	1946012	6154070	90.8			2/7/05	-	120.1	
CPT-153	740+66	31	L	1946055	6153959	91.0	4 x Dissipation	28, 69, 87, 101	2/7/05	-	111.4	
CPT-154	741+70	45	L	1946054	6153854	92.2	Seismic		2/11/05	-	94.9	
CPT-155	713+03	26	L	1947257	6156337	85.0			10/11/04	48	102.7	
CPT-156	595+92	17	L	1954198	6164813	86.2			12/14/04	50	109.4	
CPT-157	832+90	8	L	1952088	6147912	67.7			4/19/05	-	104.3	

Notes: 1. * indicates that location has not yet been surveyed. Indicated northing and easting are estimated or not given

TABLE A8-1d

SUMMARY OF CONE PENETRATION TEST (CPT) PROGRAM

Tunnel Segment of Silicon Valley (SVRT) Project

San Jose, California

FIGURES

WEST PORT
CPT-157
ST-13
CPT-93
BH-78
CPT-92
BH-49
CPT-91
CPT-90
BH-48
CPT-89
CPT-88
BH-47
CPT-87
CPT-86
BH-46
CPT-85
CPT-84
BH-45
CPT-83
CPT-82
BH-44
CPT-81
BH-80
CPT-80
BH-43
CPT-79
CPT-78
BH-42
CPT-77
BH-79
CPT-76
BH-41
CPT-75
CPT-74
BH-40
CPT-73
ST-12
CPT-70
CPT-69
BH-39
CPT-68
BH-38
CPT-66
CPT-67
BH-37
CPT-65
BH-36
CPT-64
CPT-63
CPT-62
BH-35
CPT-61
CPT-60
BH-34
DIRIDON/ARENA STATION
ST-11
BH-76
BH-75
CPT-151
ST-10
CPT-150
CPT-149
BH-73
BH-33
CPT-154
CPT-153
CPT-152
CPT-148
BH-74
CPT-147
CPT-146
BH-32
ST-9
BH-31
BH-30
CPT-57
CPT-56
CPT-55
CPT-55A
BH-29
BH-28
CPT-53
CPT-52
GUADALUPE RIVER
LOS GATOS CREEK
DOWNTOWN SAN JOSE STATION
BH-21
CPT-39
CPT-38
BH-20
CPT-37
CPT-36
BH-19
CPT-35
CPT-34
BH-18
ST-5
CPT-33
CPT-32
BH-17
CPT-31
CPT-30
BHP-1
BH-16
CPT-29
CPT-28
CPT-27
BH-15
ST-4
COYOTE CREEK
CPT-26
BH-14
BH-13
CPT-25
CPT-24
BH-12
CPT-23
CPT-22
CPT-21
CPT-20
BH-10
BH-11
CPT-19
CPT-18
CPT-17
CPT-16
BH-09
CPT-15
CPT-14
BH-08
CPT-13
CPT-12
CPT-11
BH-62
BH-63
ST-3
BH-61
BH-60
BH-59
CPT-117
CPT-118
CPT-120
CPT-122
CPT-123
BH-58
CPT-124
BH-57
BH-56
CPT-107
CPT-108
CPT-109
CPT-110
CPT-111
CPT-01
CPT-02
BH-01
CPT-03
BH-02
CPT-04
ST-1
BH-03
CPT-05
CPT-06
CPT-07
CPT-08
BH-04
CPT-09
CPT-156
CPT-10
CPT-112
CPT-113
BH-05
BH-06
EAST PORTAL
ALUM ROCK STATION
LOWER SILVER CREEK

DOWNTOWN SAN JOSE STATION
CROSSOVER
CPT-51
CPT-49
BH-26
BH-72
CPT-145A
BH-71
CPT-142
BH-68
BH-66
CPT-47
BH-25
CPT-136
CPT-46
CPT-134
CPT-133
CPT-45
BH-65
CPT-129
BH-64
BH-23
CPT-42
CPT-106
BH-55A
BH-55
BH-54
CPT-101
CPT-102
BH-52
CPT-97
BH-50
CPT-41
BH-21
BH-27
CPT-50
CPT-155
CPT-48
CPT-145
CPT-144
CPT-143
BH-70
CPT-141
CPT-140
CPT-139
CPT-138
CPT-137
CPT-135
BH-7
CPT-131
BH-24
CPT-130
CPT-44
CPT-128
CPT-43
CPT-126
ST-7
CPT-105
CPT-103
BH-53
CPT-100
CPT-98
CPT-96
ST-6
CPT-94
CPT-40

LEGEND
CPT
BORING
N
0 250 500 1,000
Feet

REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE

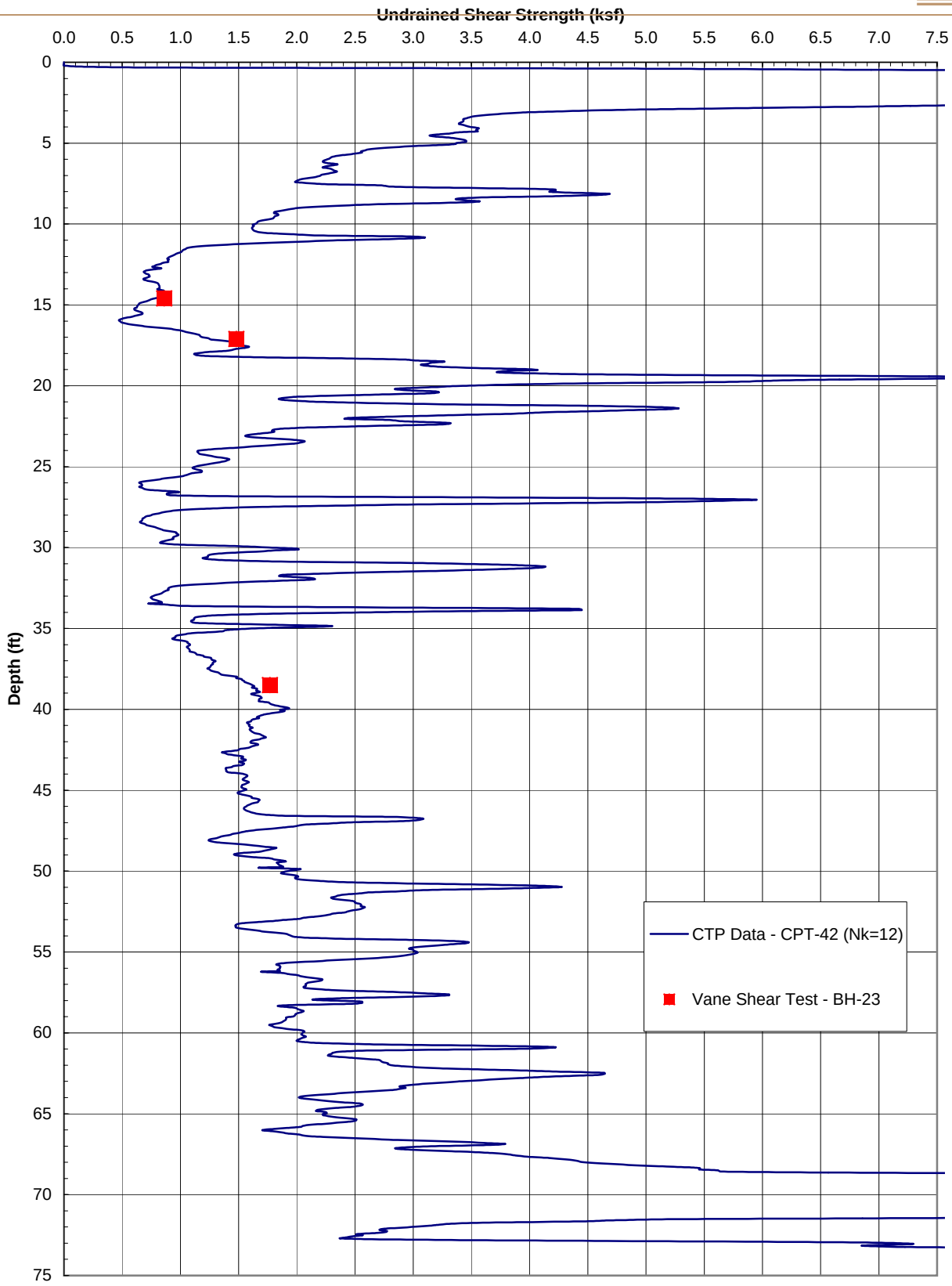
HMM / BECHTEL
A Joint Venture of Hatch Mott MacDonald T&T, Inc. and Bechtel Infrastructure Corp.
DESIGNER/SUBCONSULTANT
HMM/BECHTEL
SUBMITTED
APPROVED

BART

SILICON VALLEY RAPID TRANSIT PROJECT
SANTA CLARA Valley Transportation Authority

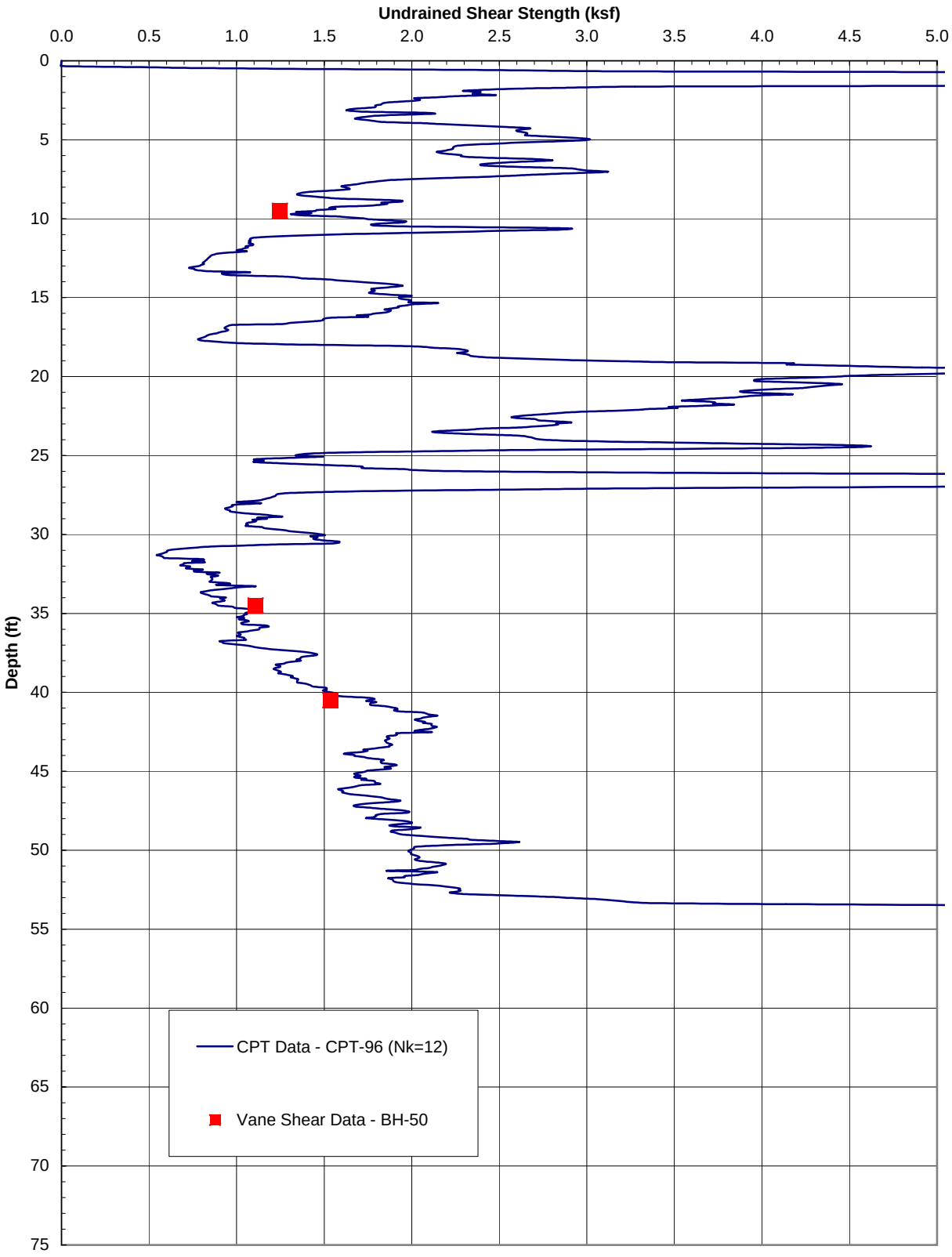
CPT LOCATION MAP
Tunnel Segment of SVRT Project
San Jose, California

FIGURE A8-1



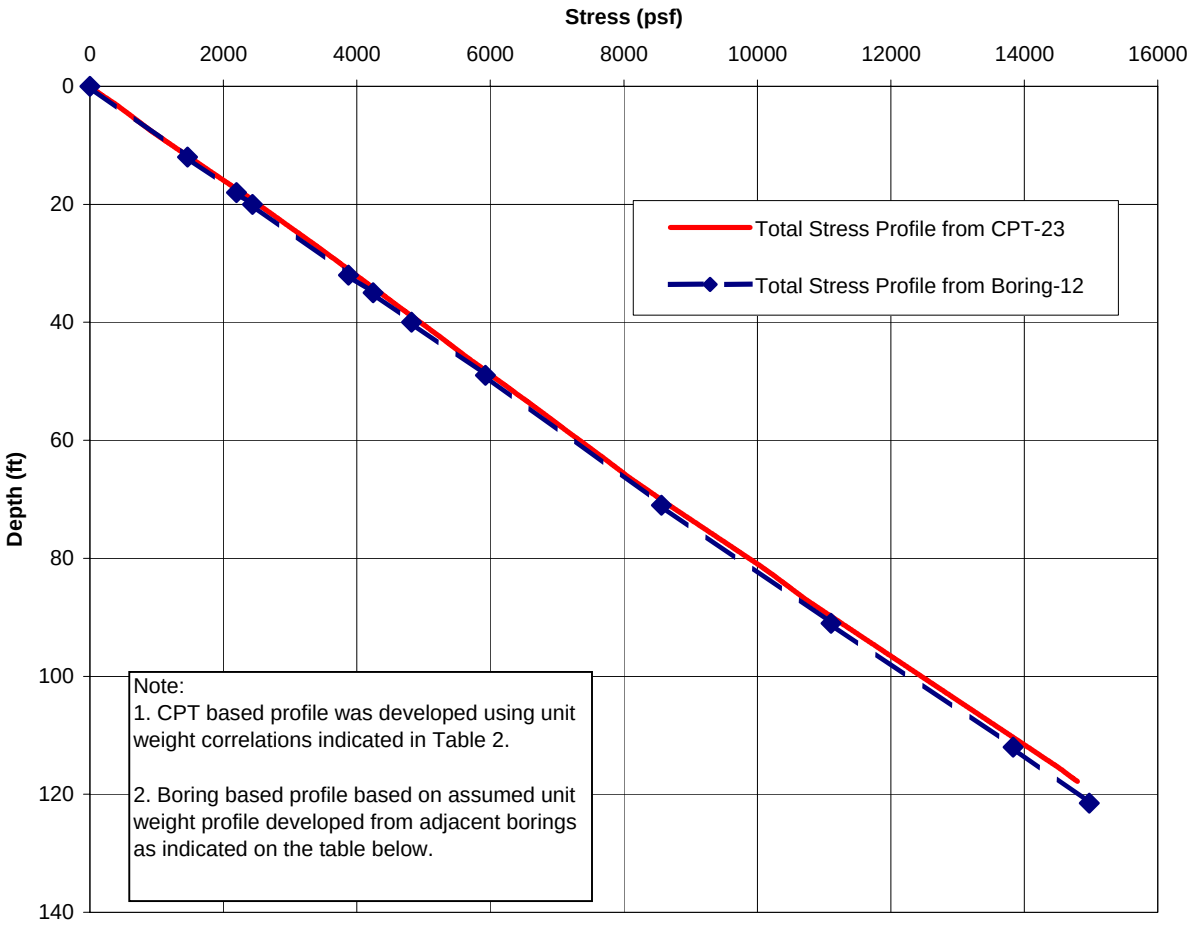
COMPARISON OF UNDRAINED SHEAR STRENGTH
CPT-42 and BH-23
Tunnel Segment of SVRT Project
San Jose, California

FIGURE A8-2a



COMPARISON OF UNDRAINED SHEAR STRENGTH
CPT-96 and BH-50
Tunnel Segment of SVRT Project
San Jose, California

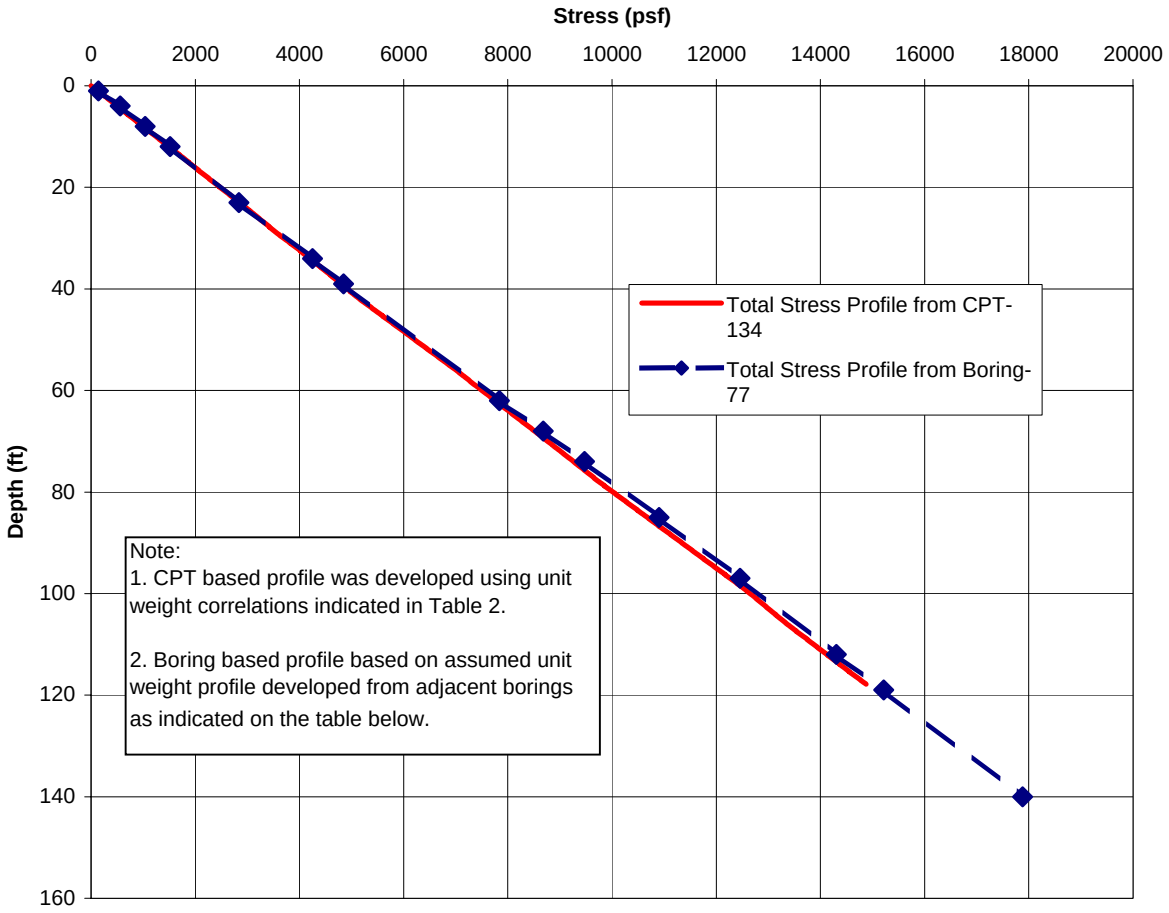
FIGURE A8-2b



Interpreted Unit Weight Profile BH-12			
Top of Layer (ft)	**Bottom of Layer (ft)**	**Total Unit Weight (pcf)**	**Bottom Total Vertical Stress (psf)**
0	12	122	1464
12	18	122	2196
18	20	120	2436
20	32	120	3876
32	35	122	4242
35	40	115	4817
40	49	123	5924
49	71	120	8564
71	91	127	11104
91	112	130	13834
112	122	120	14974

COMPARISON OF TOTAL STRESS PROFILES
CPT-23 and BH-12
Tunnel Segment of SVRT Project
San Jose, California

Figure A8-3a

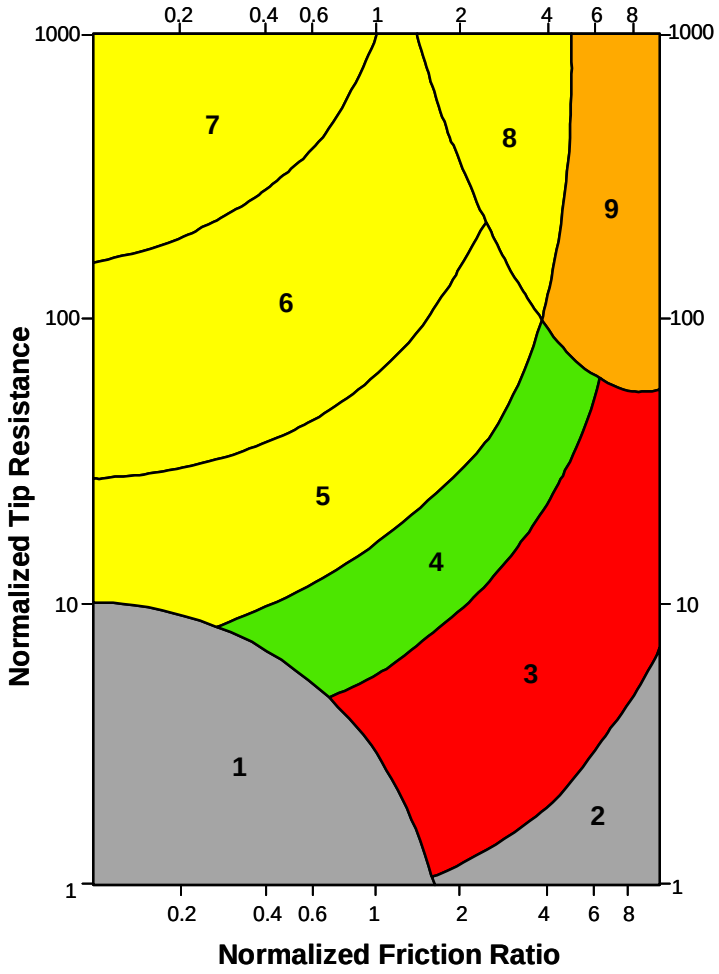


Interpreted Unit Weight Profile BH-77			
Top of Layer (ft)	**Bottom of Layer (ft)**	**Total Unit Weight (pcf)**	**Bottom Total Vertical Stress (psf)**
0	1	140	140
1	4	140	560
4	8	120	1040
8	12	120	1520
12	23	120	2840
23	34	128	4248
34	39	120	4848
39	62	130	7838
62	68	140	8678
68	74	132	9470
74	85	130	10900
85	97	130	12460
97	112	123	14305
112	119	130	15215
119	140	127	17882

COMPARISON OF TOTAL STRESS PROFILES
CPT-134 and BH-77
Tunnel Segment of SVRT Project
San Jose, California

Figure A8-3b

LOGS OF CPTs



Zone	Soil Behavior Type
1	Sensitive Fine-grained
2	Organic Material
3	Clay to Silty Clay
4	Clayey Silt to Silty Clay
5	Silty Sand to Sandy Silt
6	Clean Sands to Silty Sands
7	Gravelly Sand to Sand
8	Very Stiff Sand to Clayey Sand
9	Very Stiff Fine-grained *

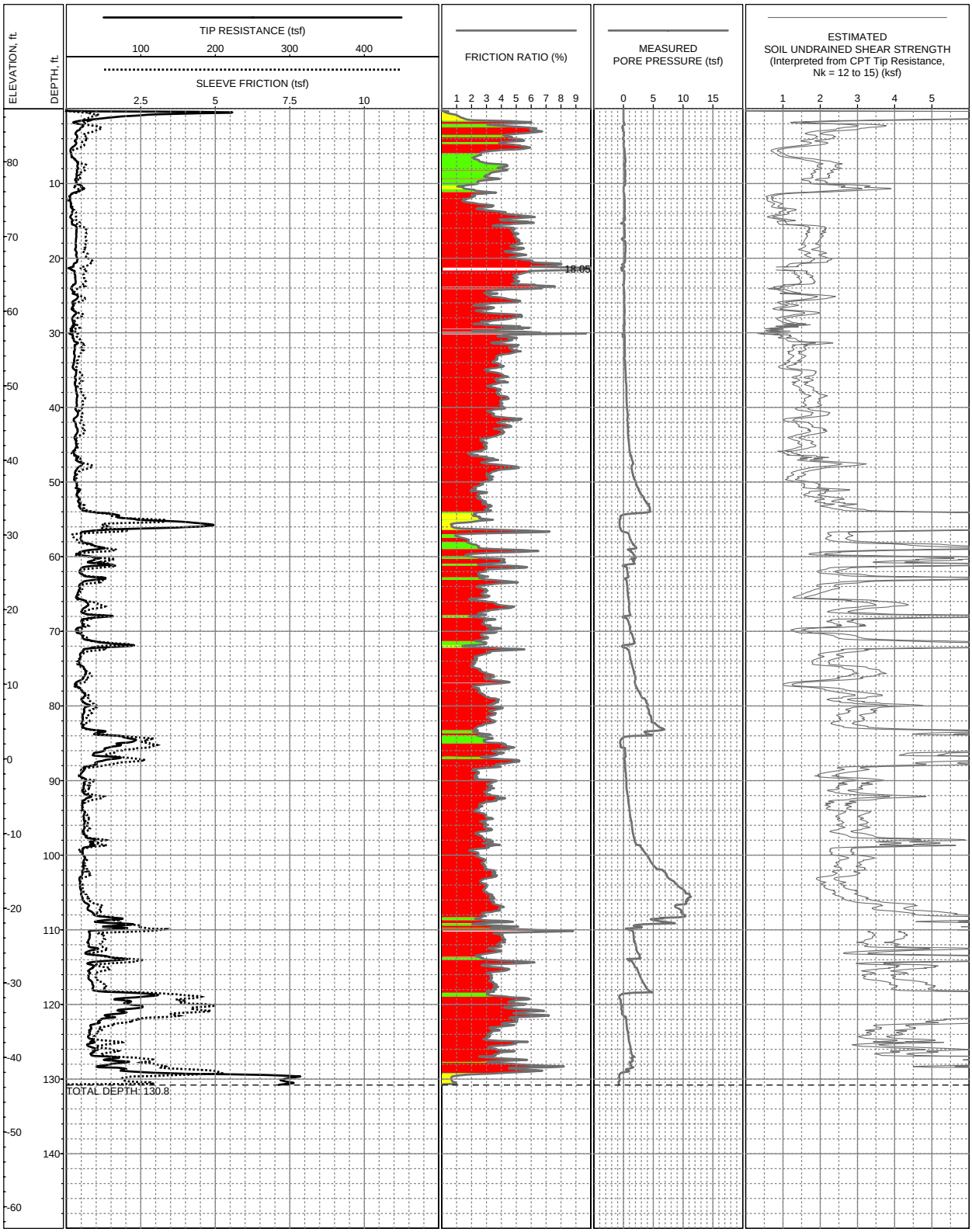
*overconsolidated or cemented

CPT CORRELATION CHART
(Modified from Robertson, 1990)

KEY TO CPT LOGS

Tunnel Segment of SVRT (BART to San Jose)
San Jose, California

G:\jobdocs\1637\1637.001\gis\mxd\CPT_LOGS\Key_CPT_Logs.mxd 07/27/05

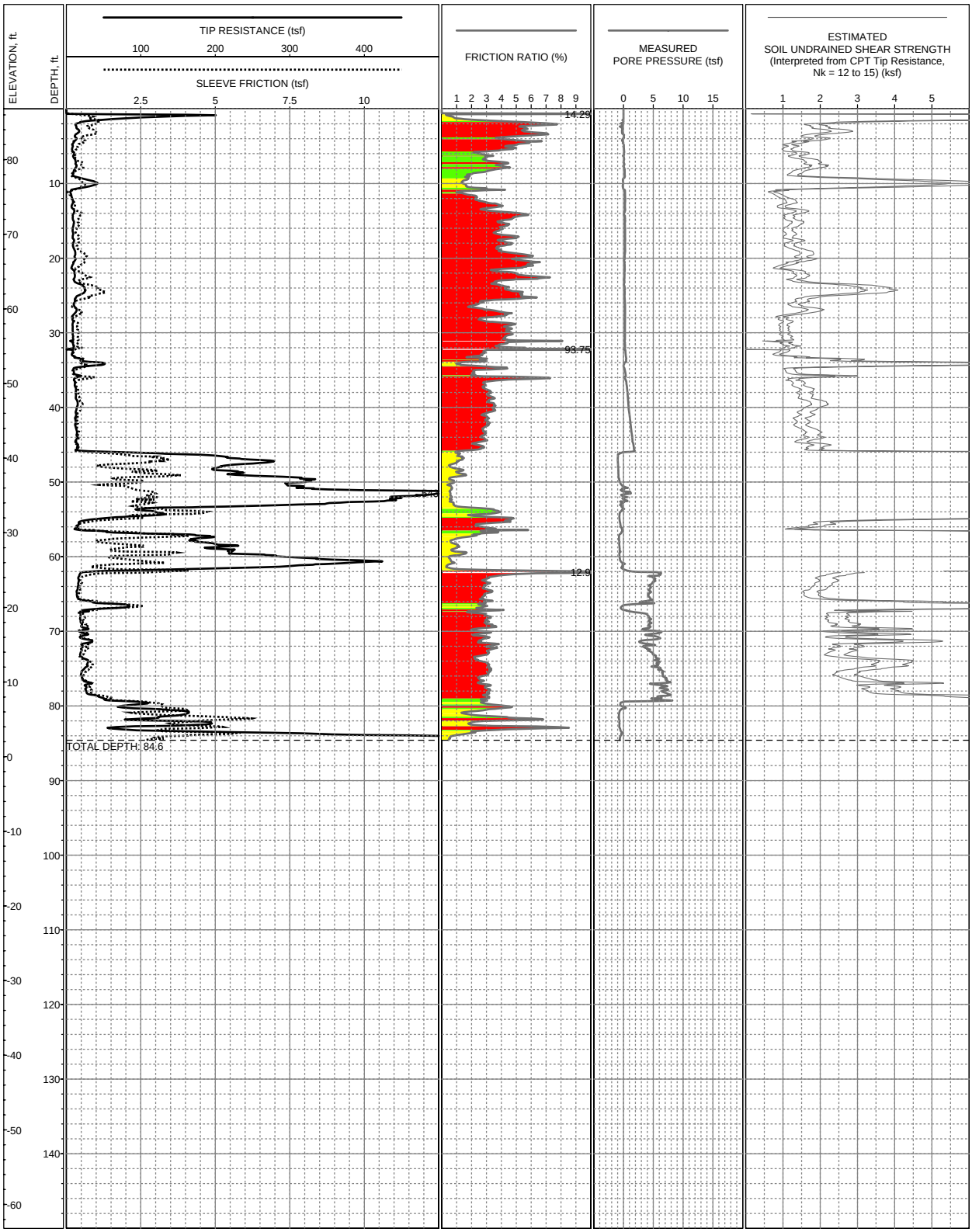


LOCATION: E6163243.2 N1955942.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 87.1ft (NAVD88)
COMPLETION DEPTH: 130.8ft
TEST DATE: 11/11/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-1

Tunnel Segment of SVRT Project
San Jose, California

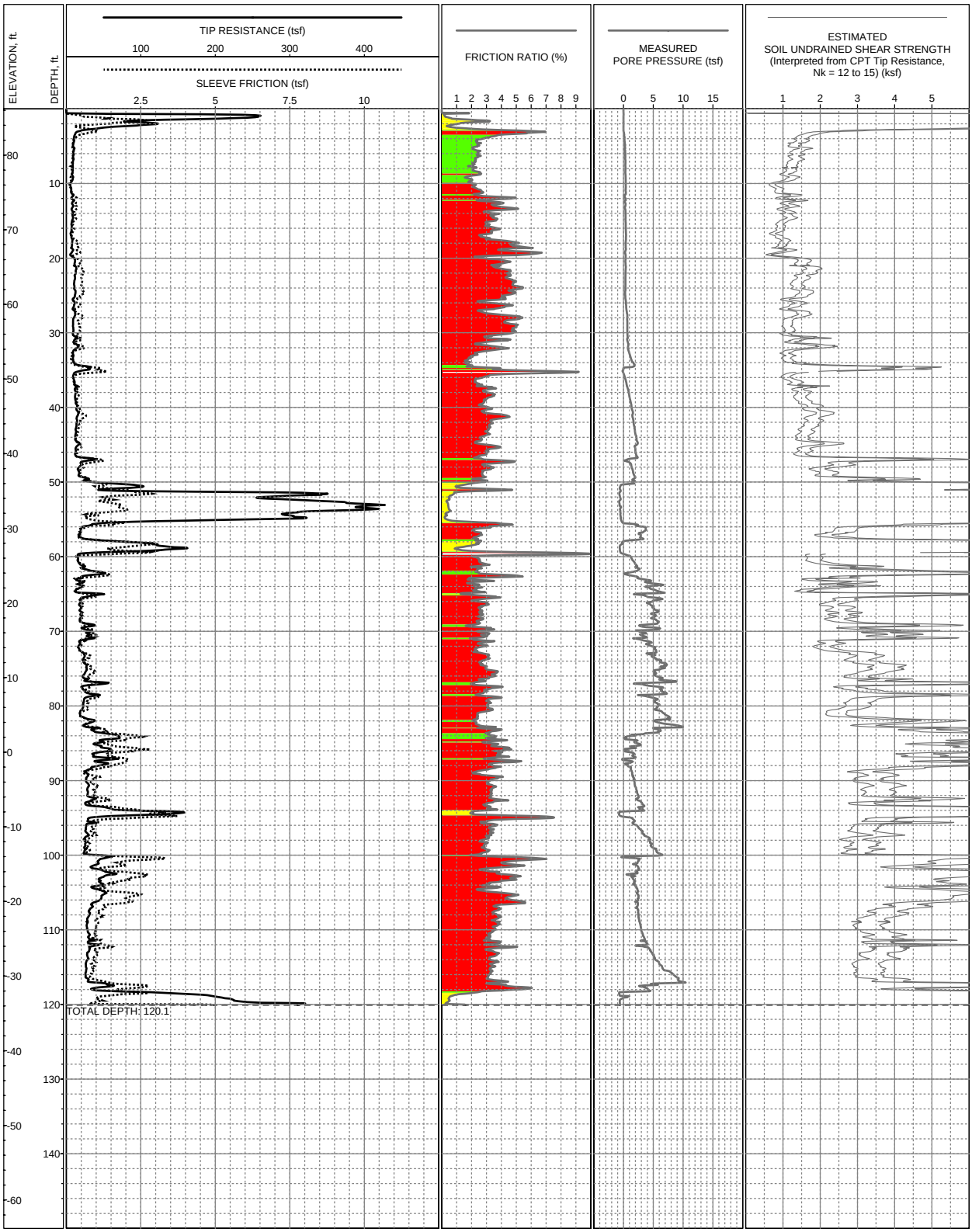


LOCATION: E6163402.8 N1955813.4 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 86.8ft (NAVD88)
COMPLETION DEPTH: 84.6ft
TEST DATE: 11/11/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-2

Tunnel Segment of SVRT Project
San Jose, California

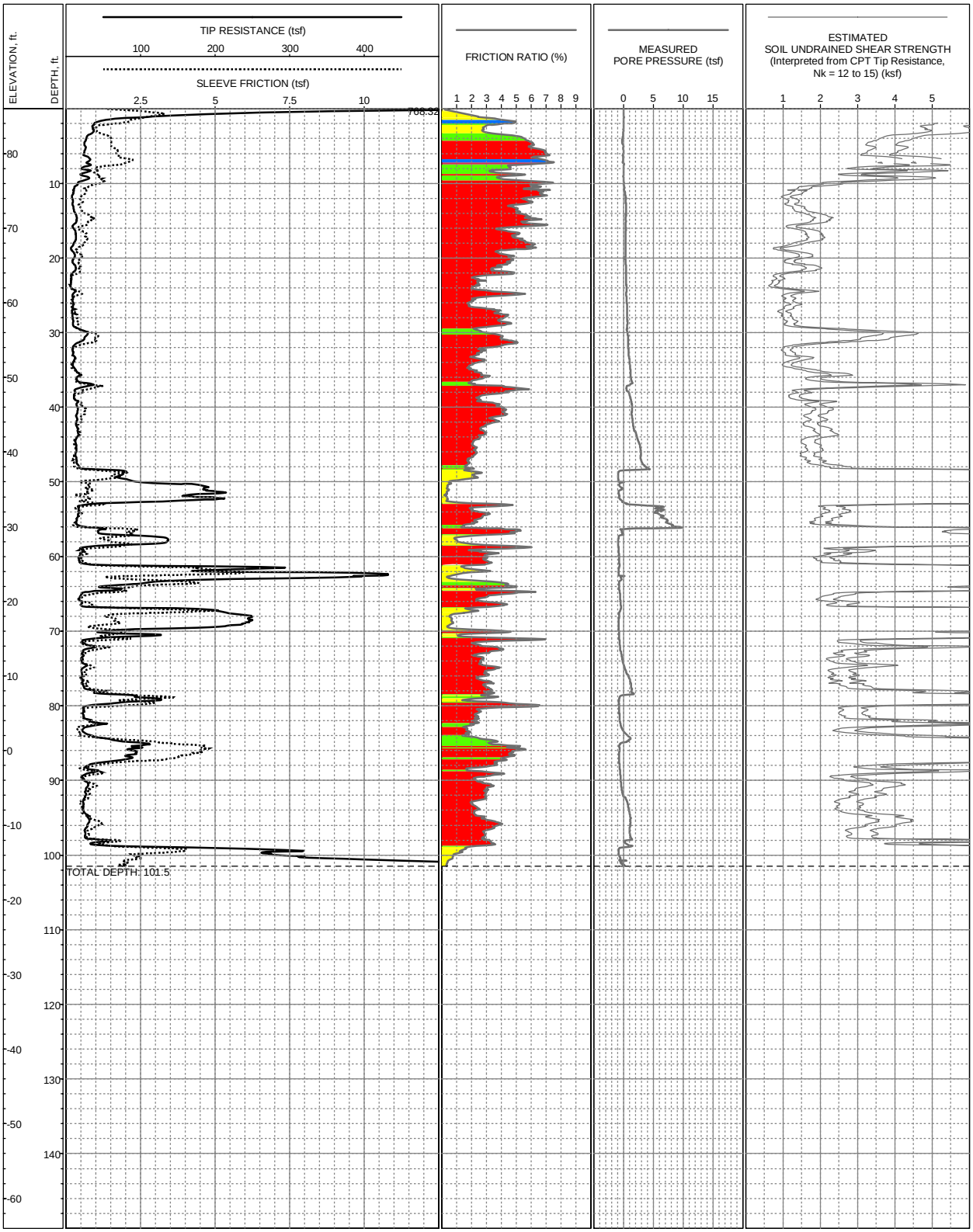


LOCATION: E6163542.3 N1955668.3 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 86.2ft (NAVD88)
COMPLETION DEPTH: 120.1ft
TEST DATE: 11/11/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-3

Tunnel Segment of SVRT Project
San Jose, California

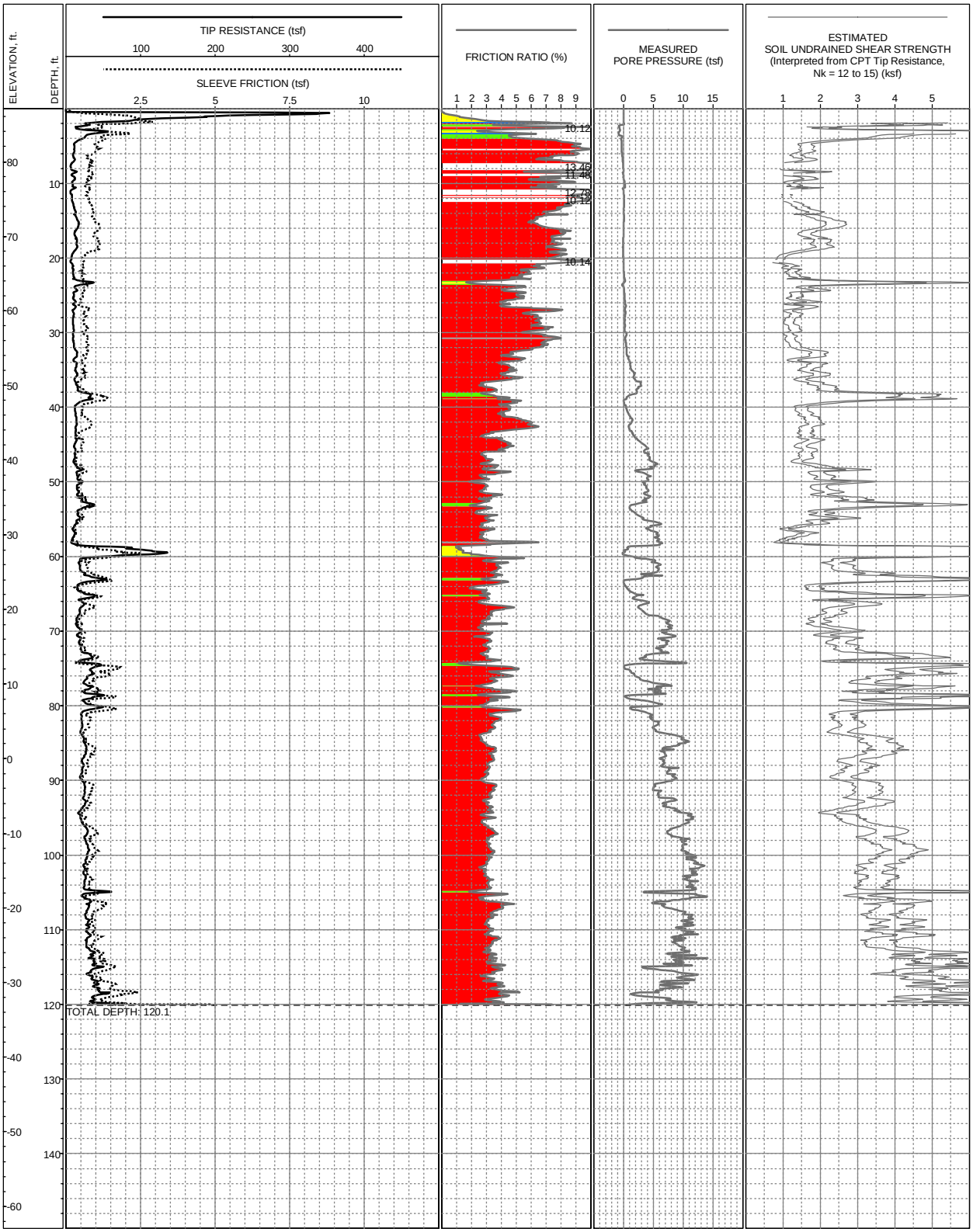


LOCATION: E6163883.6 N1955457.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 86ft (NAVD88)
COMPLETION DEPTH: 101.5ft
TEST DATE: 1/27/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-4

Tunnel Segment of SVRT Project
San Jose, California

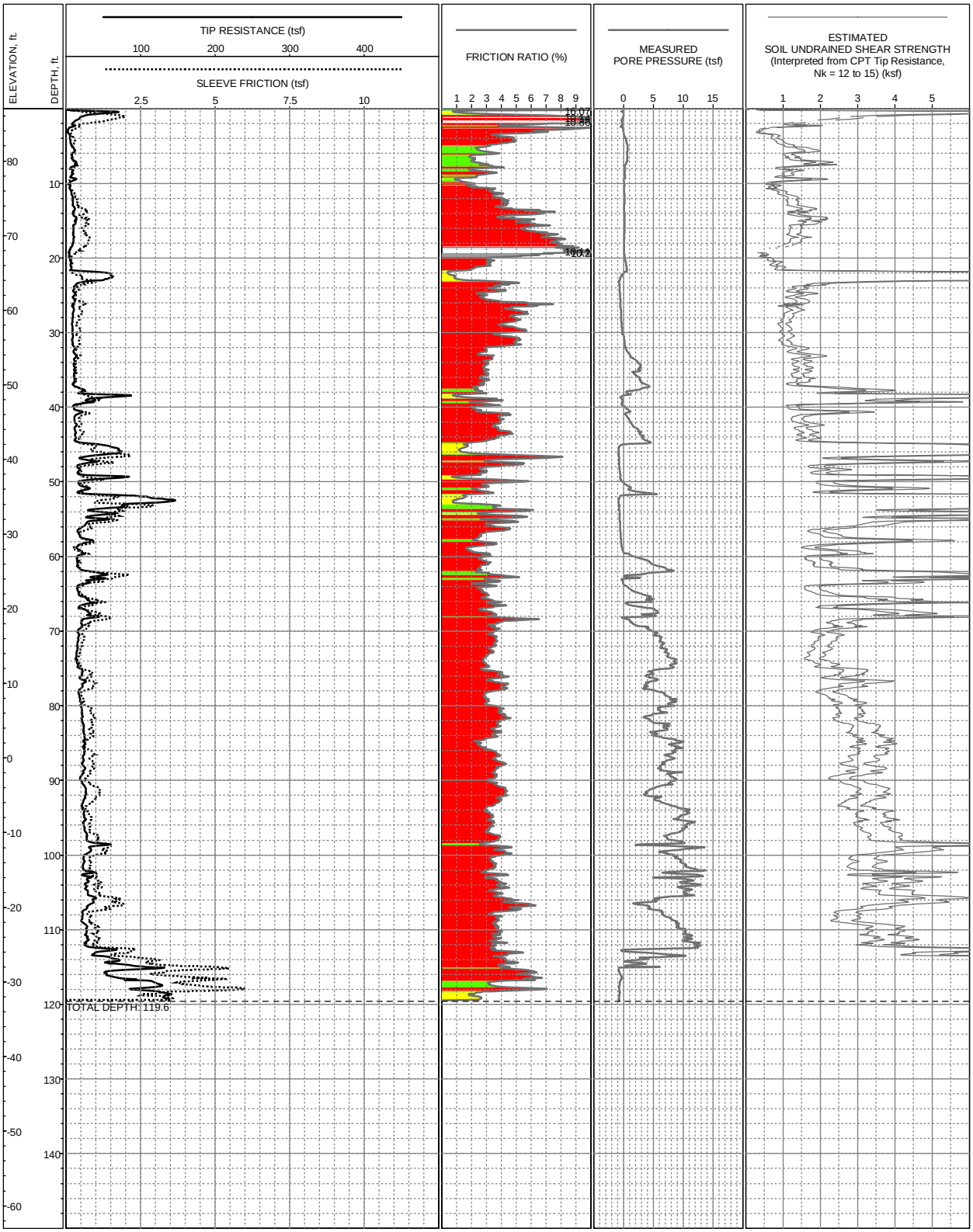


LOCATION: E6164180.7 N1955128 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 87.1ft (NAVD88)
COMPLETION DEPTH: 120.1ft
TEST DATE: 1/13/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-5

Tunnel Segment of SVRT Project
San Jose, California

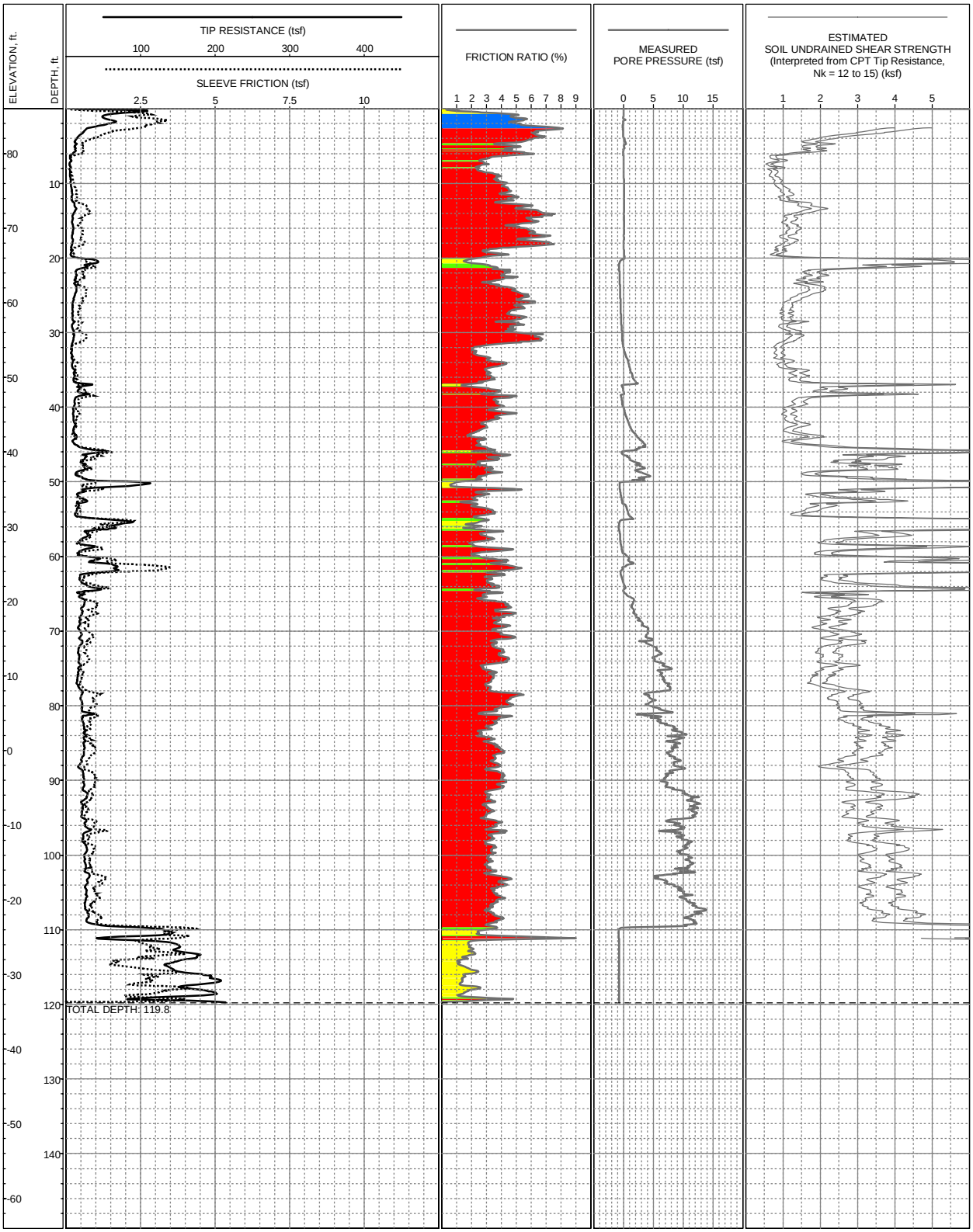


LOCATION: E6164324.7 N1955013.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 86.8ft (NAVD88)
COMPLETION DEPTH: 119.6ft
TEST DATE: 2/9/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-6

Tunnel Segment of SVRT Project
San Jose, California

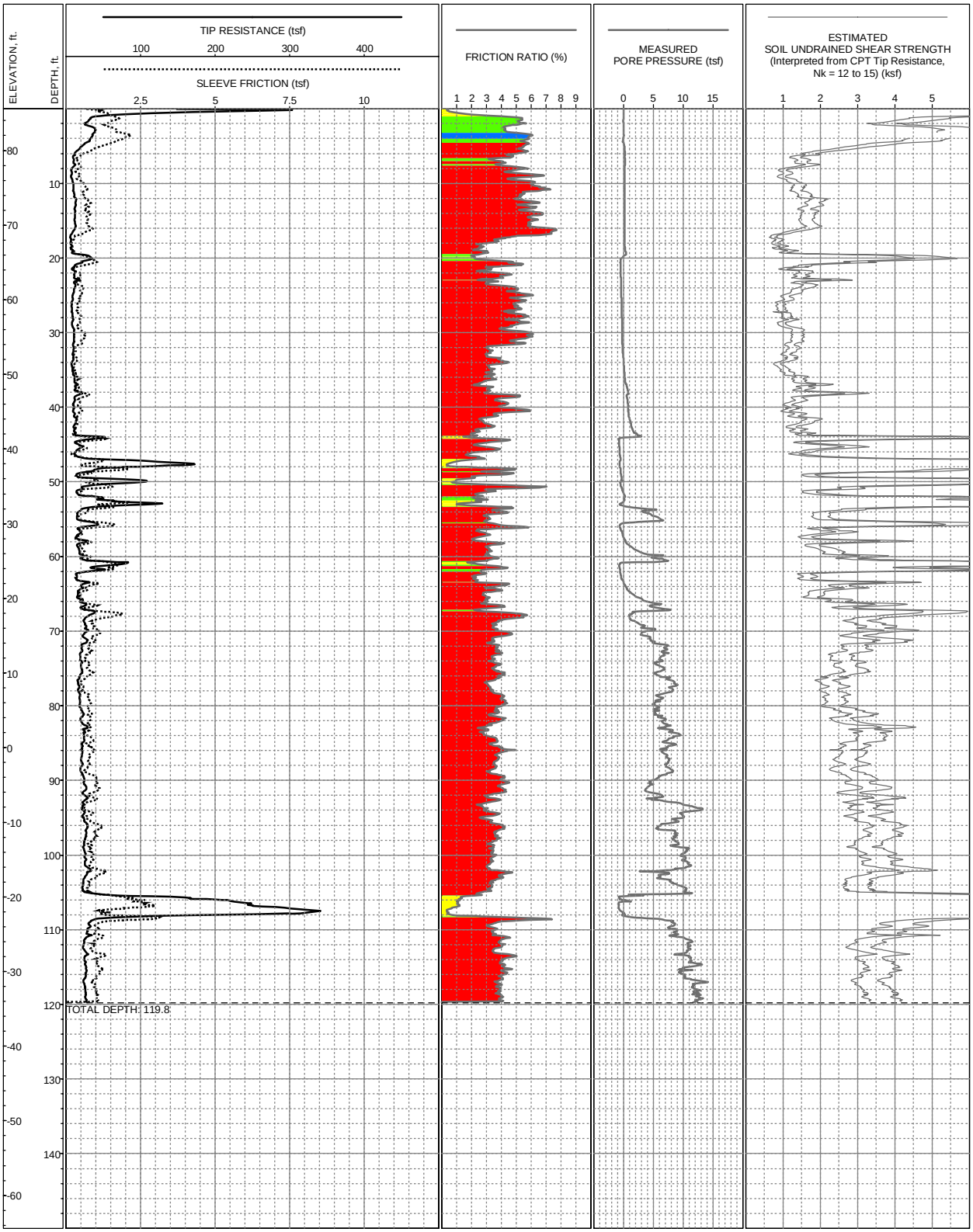


LOCATION: E6164454.7 N1954917.3 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 86ft (NAVD88)
COMPLETION DEPTH: 119.8ft
TEST DATE: 2/8/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-7

Tunnel Segment of SVRT Project
San Jose, California

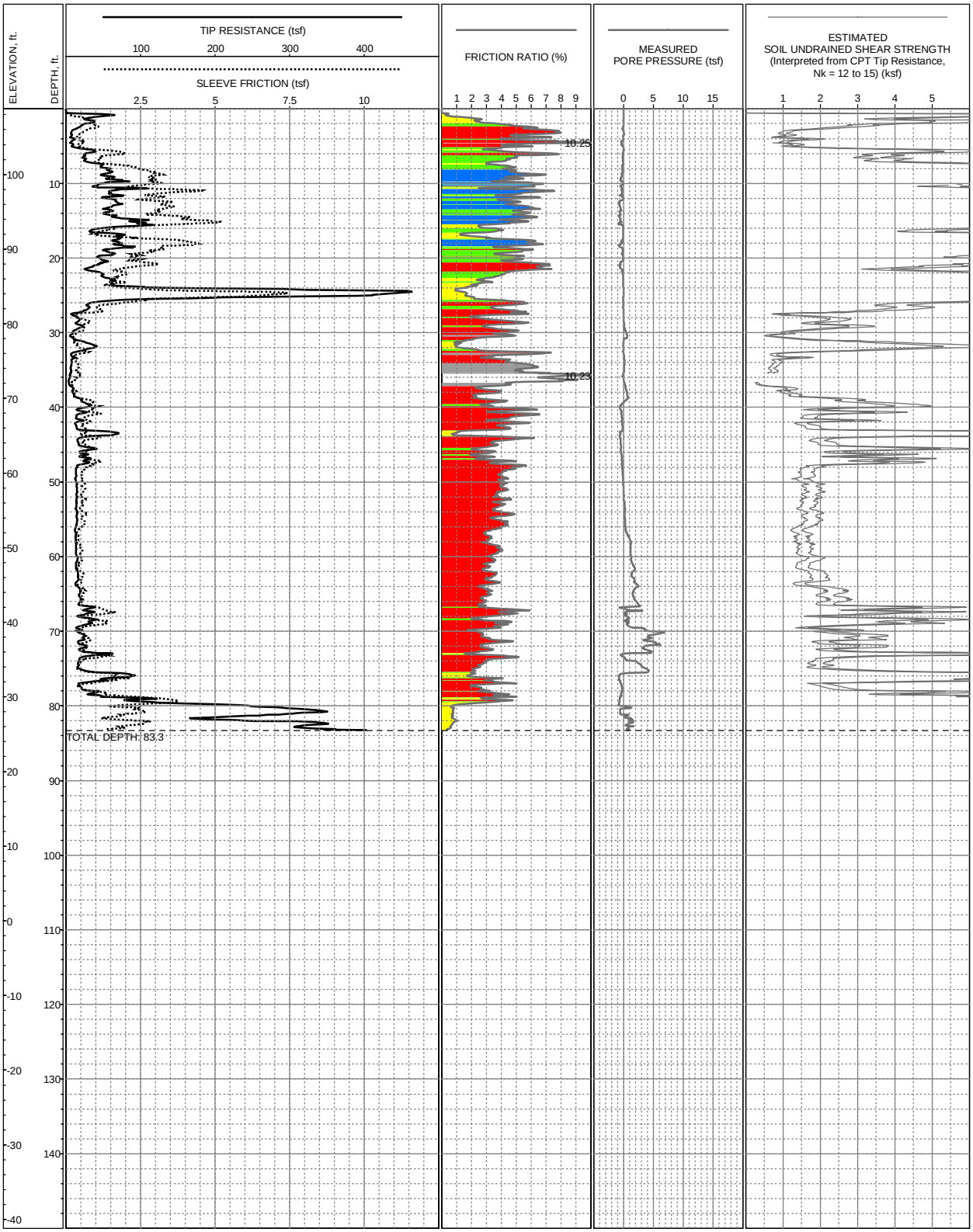


LOCATION: E6164497.6 N1954839.7 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 85.6ft (NAVD88)
COMPLETION DEPTH: 119.8ft
TEST DATE: 2/9/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-8

Tunnel Segment of SVRT Project
San Jose, California

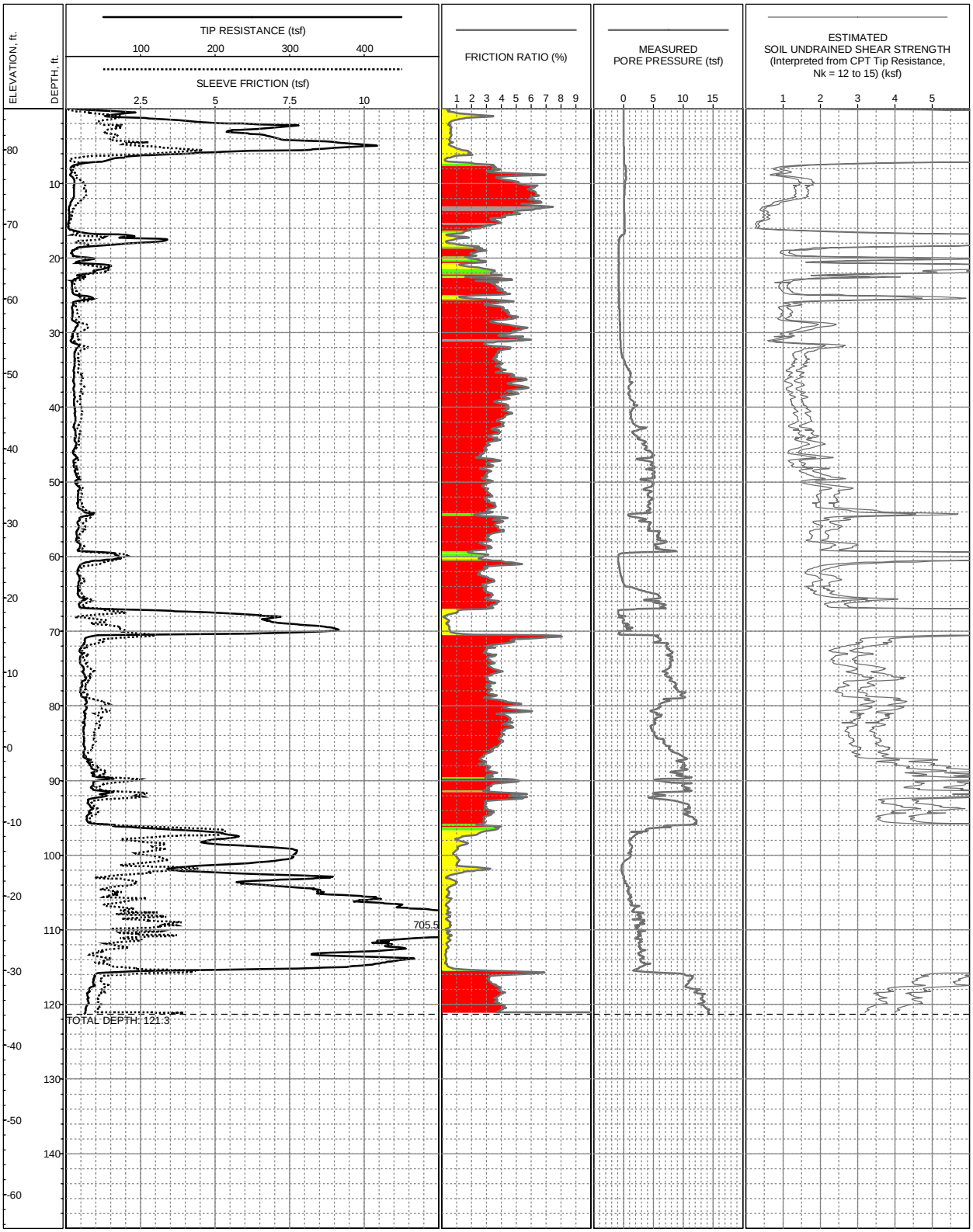


LOCATION: E6164736.4 N1954561.5 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 108.8ft (NAVD88)
COMPLETION DEPTH: 83.3ft
TEST DATE: 12/15/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-9

Tunnel Segment of SVRT Project
San Jose, California

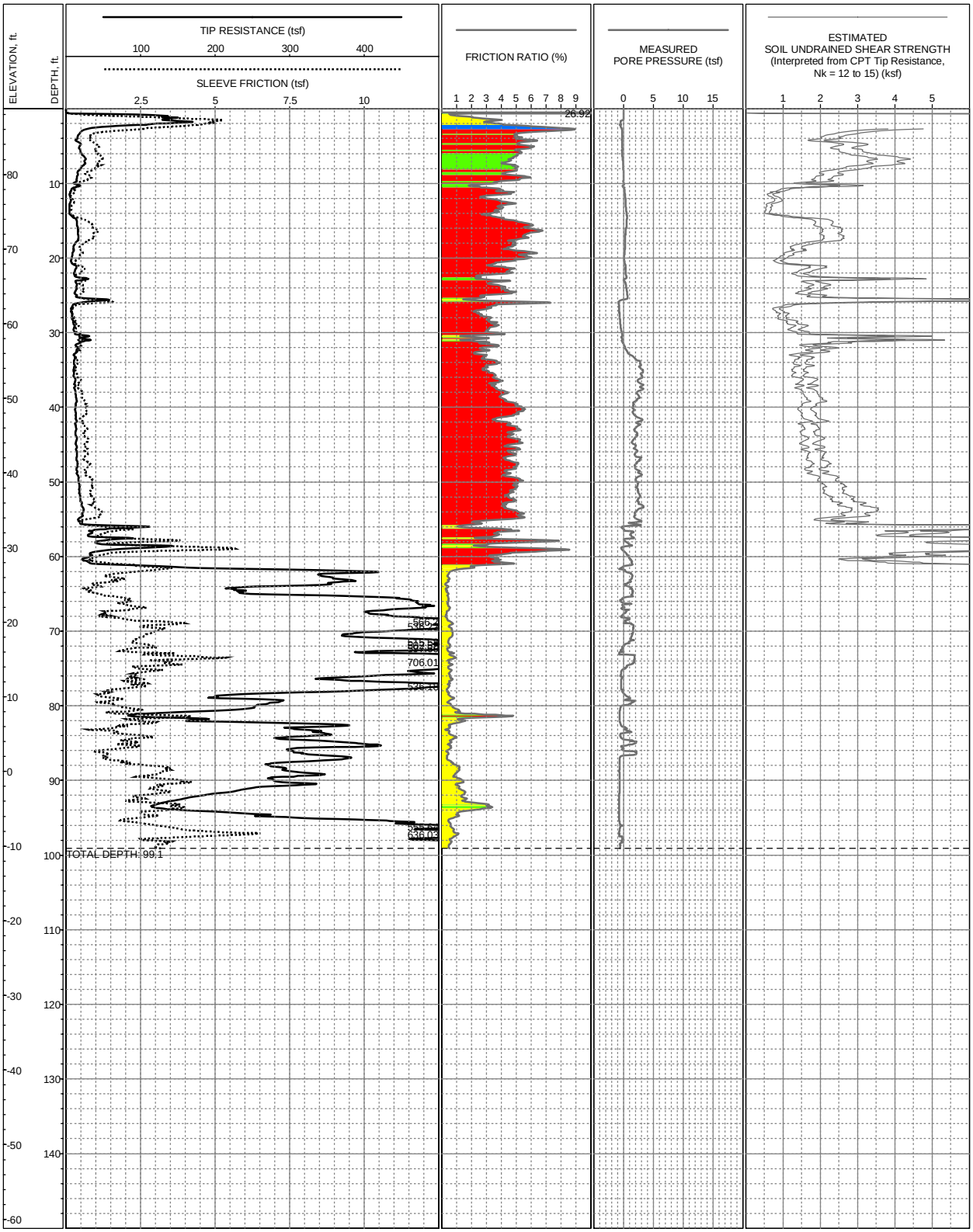


LOCATION: E6164776.5 N1953919.1 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 85.5ft (NAVD88)
COMPLETION DEPTH: 121.3ft
TEST DATE: 12/13/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-10

Tunnel Segment of SVRT Project
San Jose, California

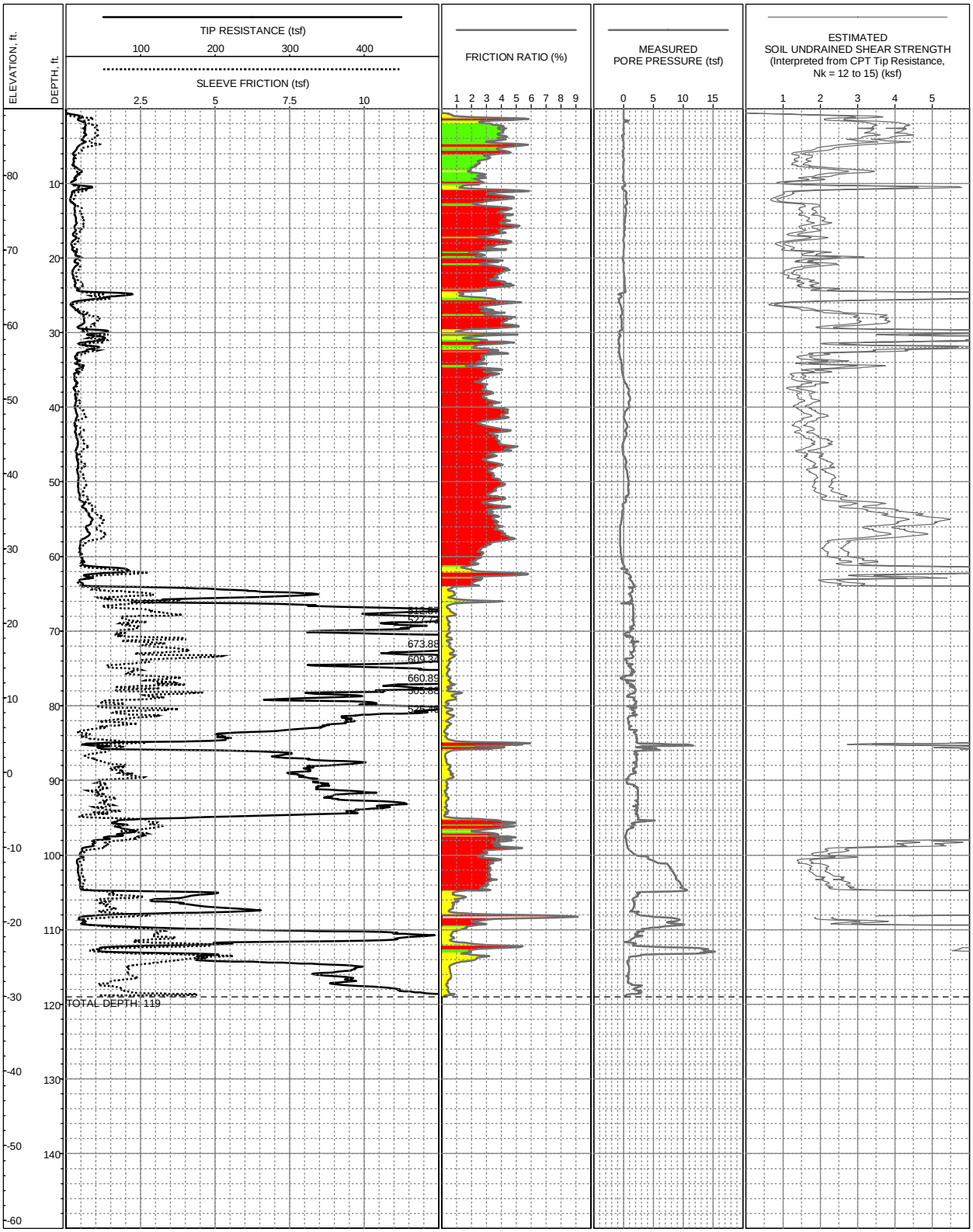


LOCATION: E6164819.4 N1952618.3 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88.8ft (NAVD88)
COMPLETION DEPTH: 99.1ft
TEST DATE: 1/27/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-11

Tunnel Segment of SVRT Project
San Jose, California

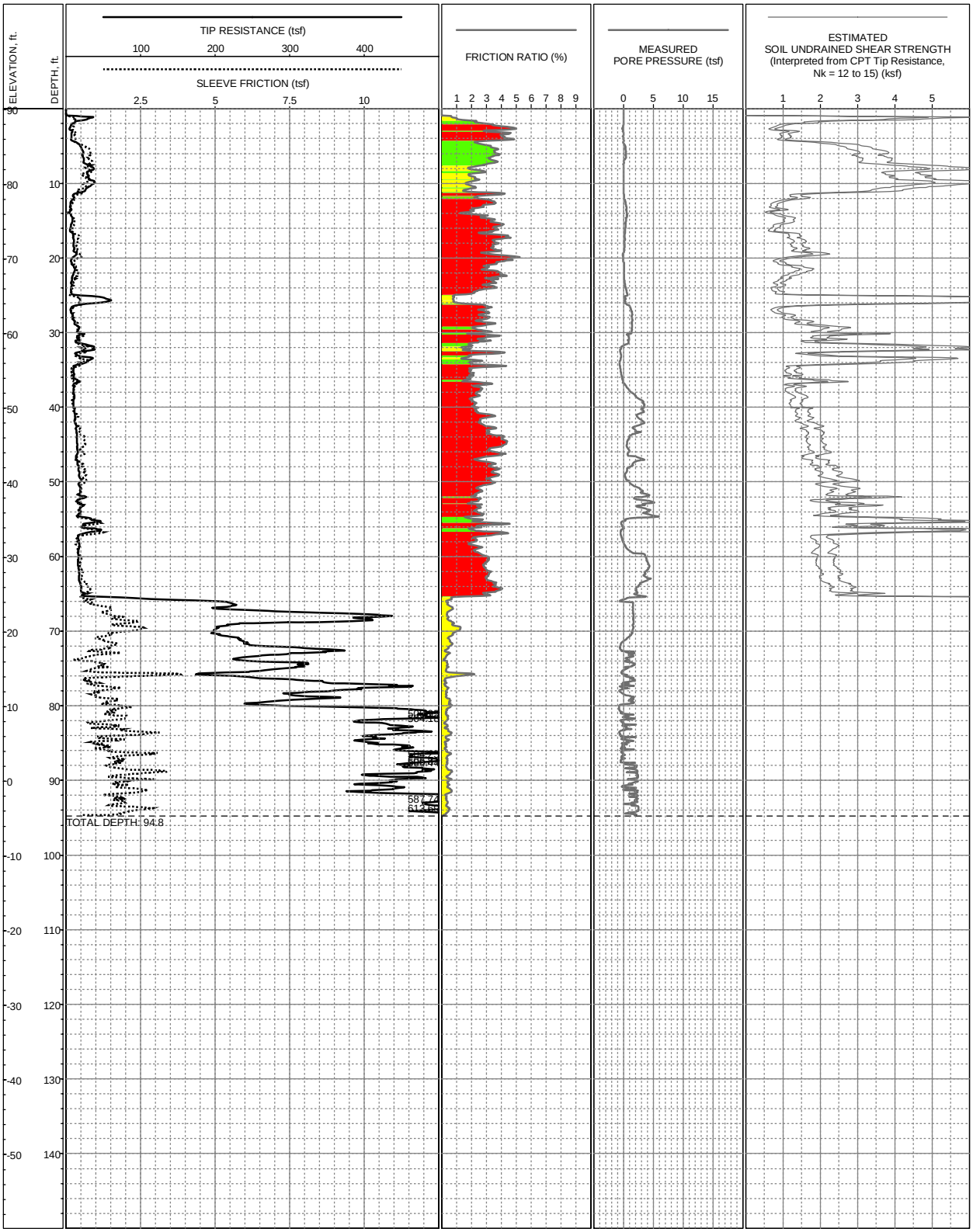


LOCATION: E6164776.3 N1952385.8 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88.9ft (NAVD88)
COMPLETION DEPTH: 119ft
TEST DATE: 1/20/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-12

Tunnel Segment of SVRT Project
San Jose, California

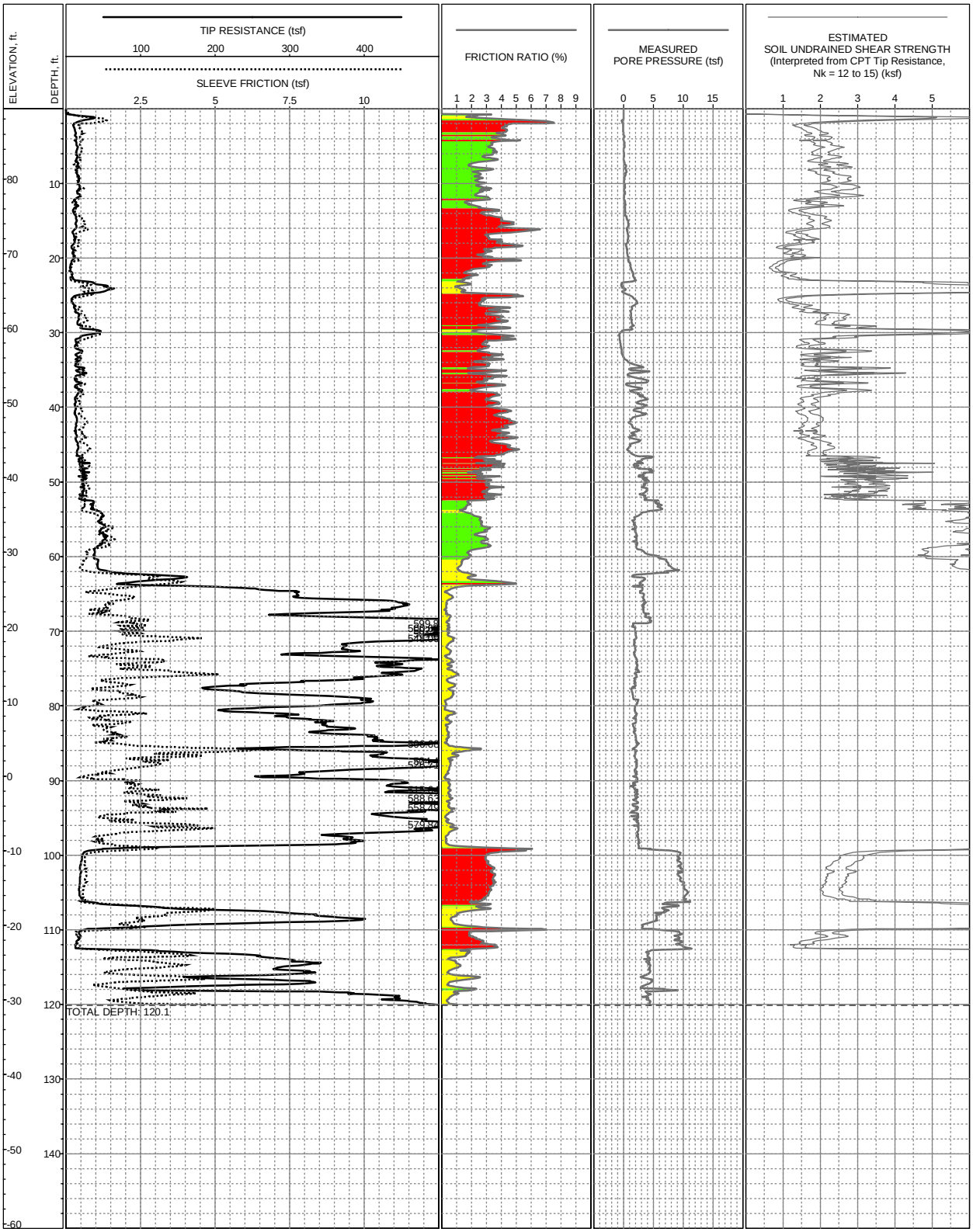


LOCATION: E6164614.6 N1952267 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 90.1ft (NAVD88)
COMPLETION DEPTH: 94.8ft
TEST DATE: 1/21/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-13

Tunnel Segment of SVRT Project
San Jose, California

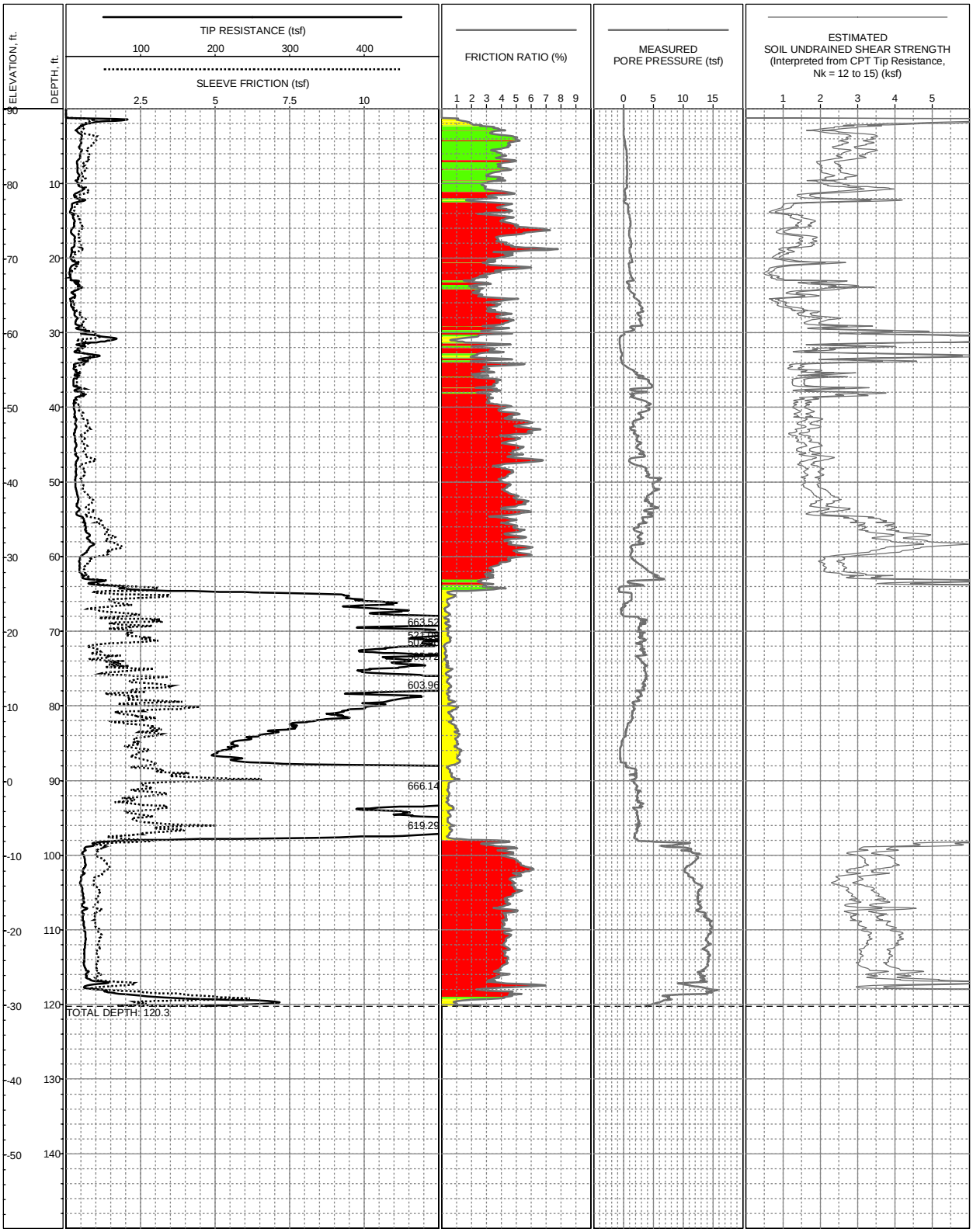


LOCATION: E6164606.9 N1952103.5 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 89.4ft (NAVD88)
COMPLETION DEPTH: 120.1ft
TEST DATE: 12/6/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-14

Tunnel Segment of SVRT Project
San Jose, California

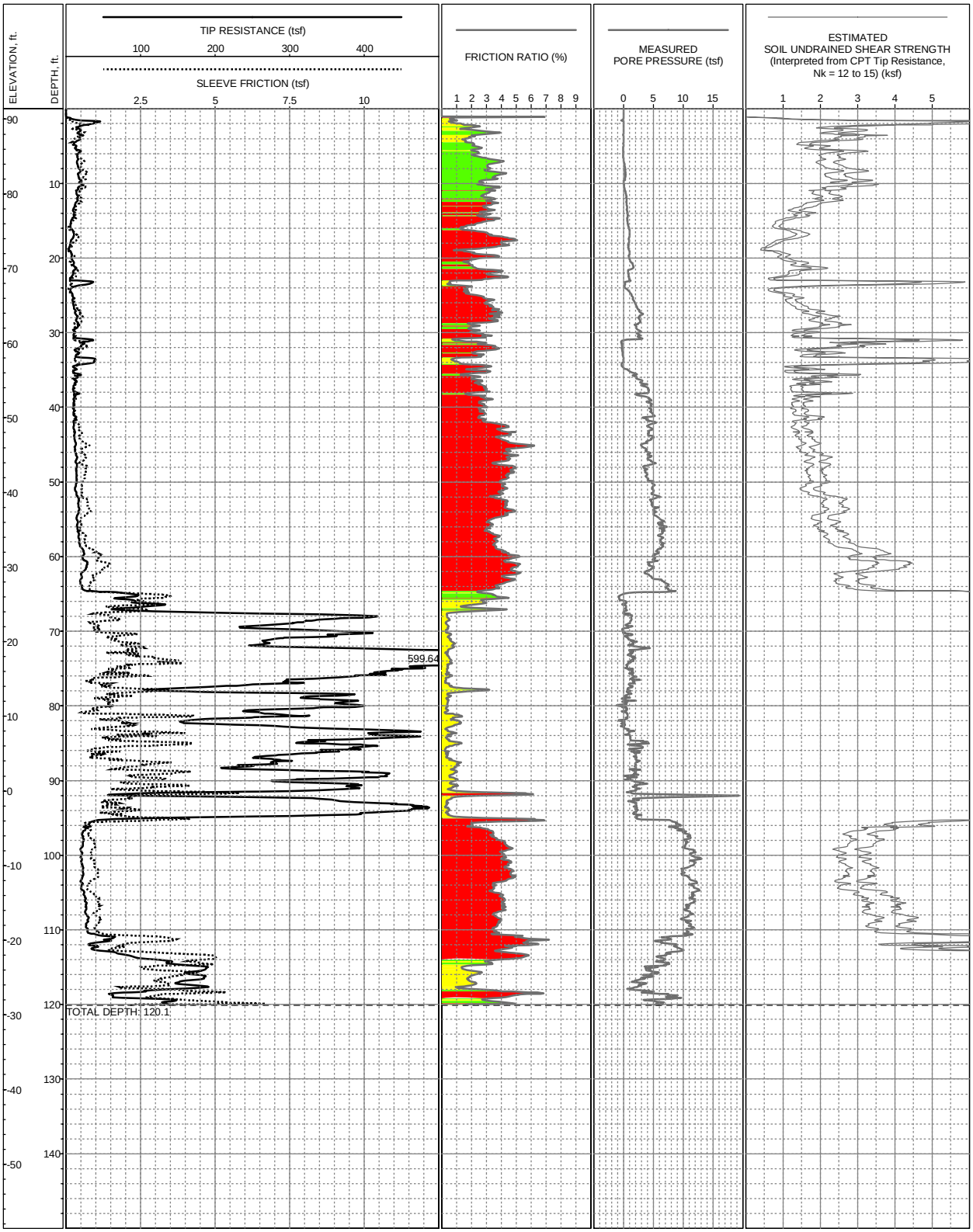


LOCATION: E6164579.3 N1951974.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 90.1ft (NAVD88)
COMPLETION DEPTH: 120.3ft
TEST DATE: 12/6/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-15

Tunnel Segment of SVRT Project
San Jose, California

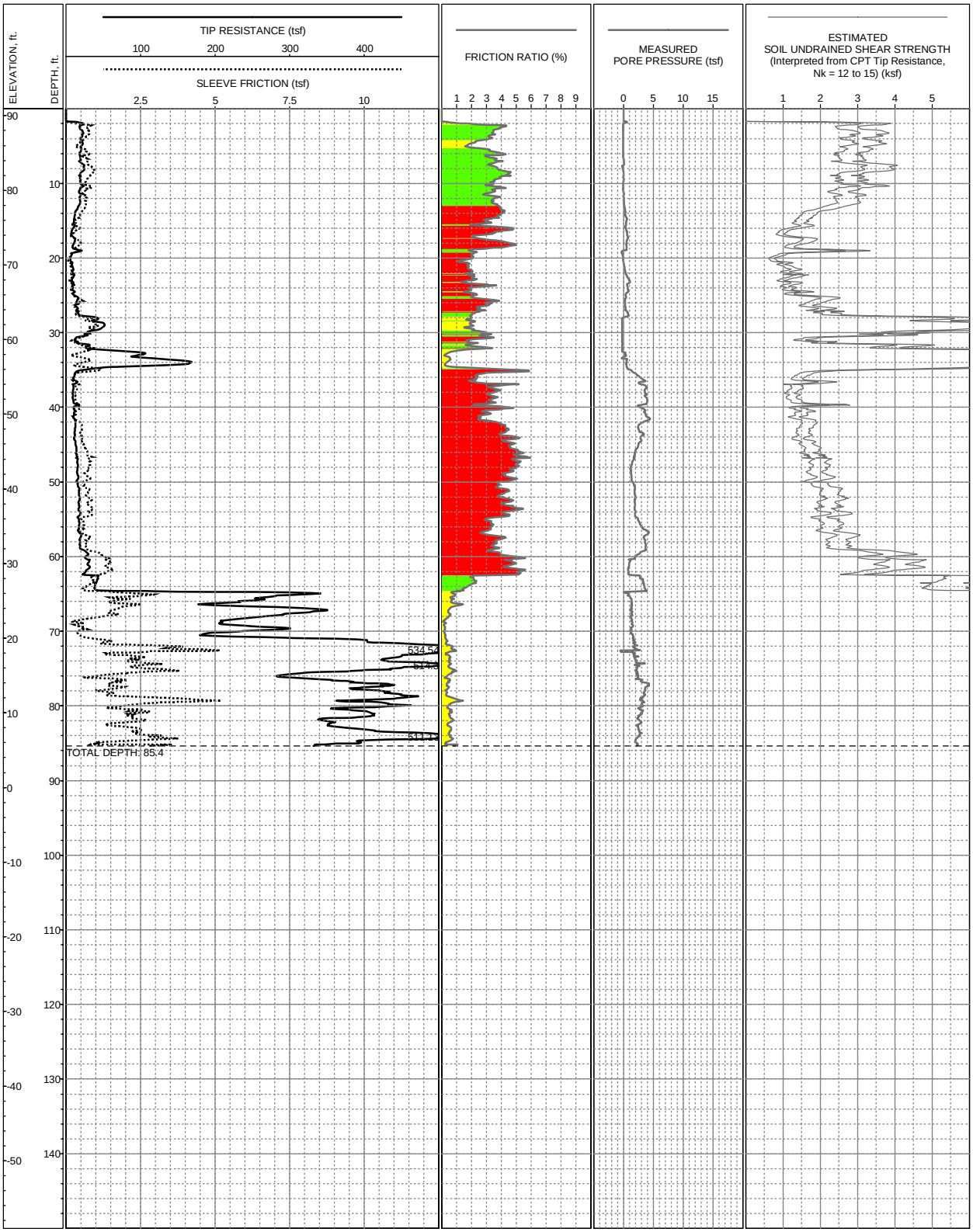


LOCATION: E6164255 N1951823.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 91.4ft (NAVD88)
COMPLETION DEPTH: 120.1ft
TEST DATE: 12/7/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-16

Tunnel Segment of SVRT Project
San Jose, California

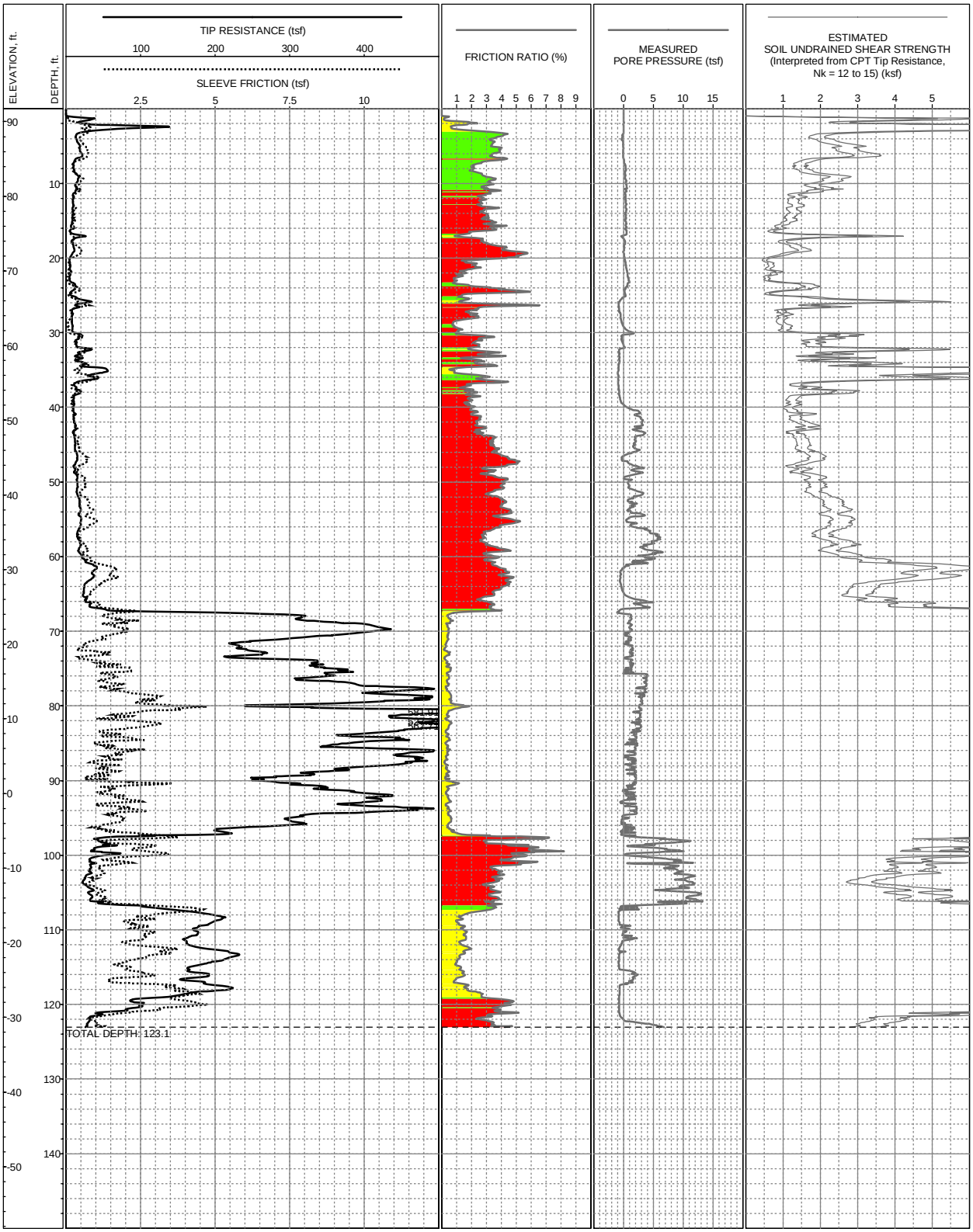


LOCATION: E6164127.3 N1951664.3 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 90.9ft (NAVD88)
COMPLETION DEPTH: 85.4ft
TEST DATE: 12/7/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-17

Tunnel Segment of SVRT Project
San Jose, California

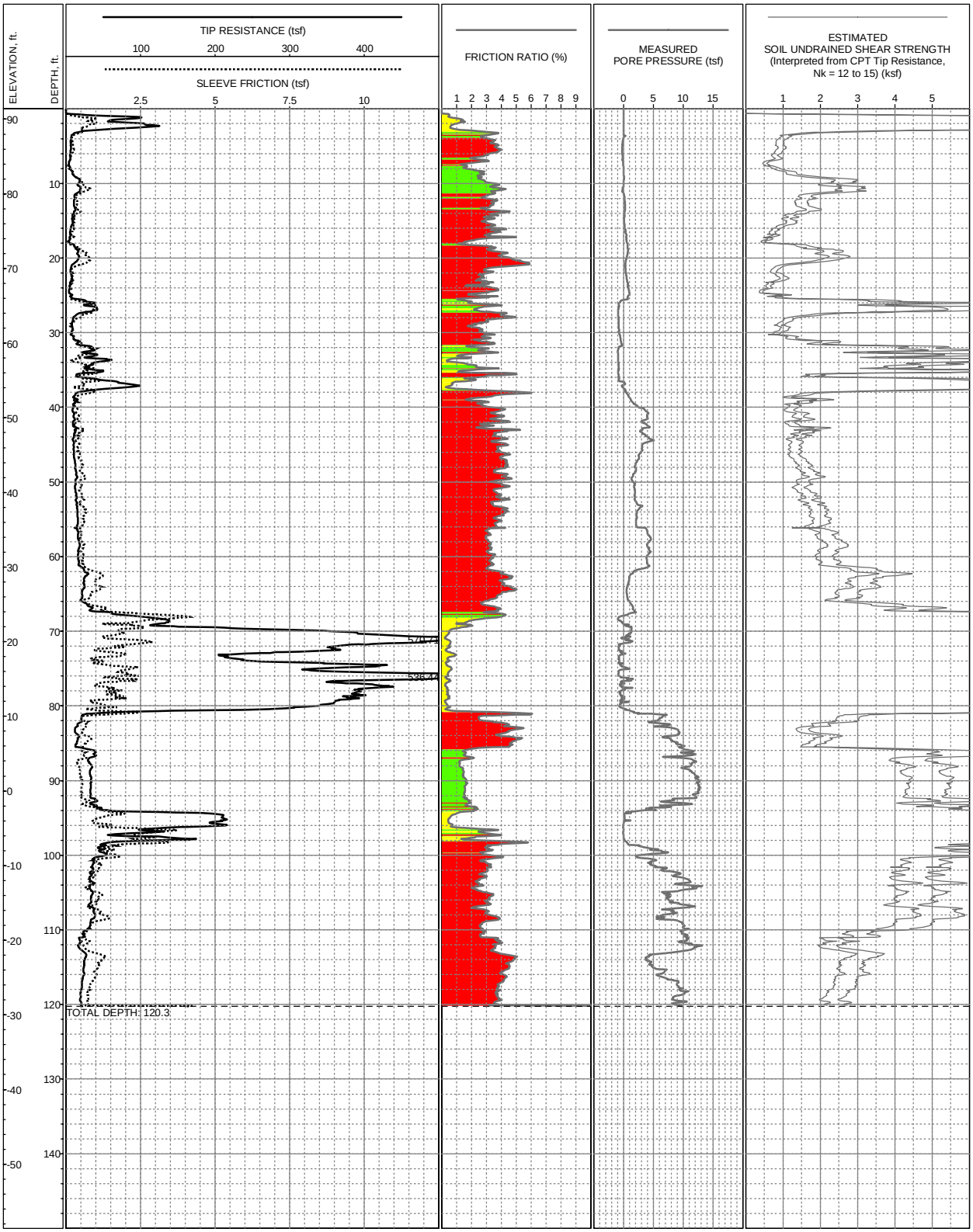


LOCATION: E6163969.2 N1951659.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 91.7ft (NAVD88)
COMPLETION DEPTH: 123.1ft
TEST DATE: 12/10/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-18

Tunnel Segment of SVRT Project
San Jose, California

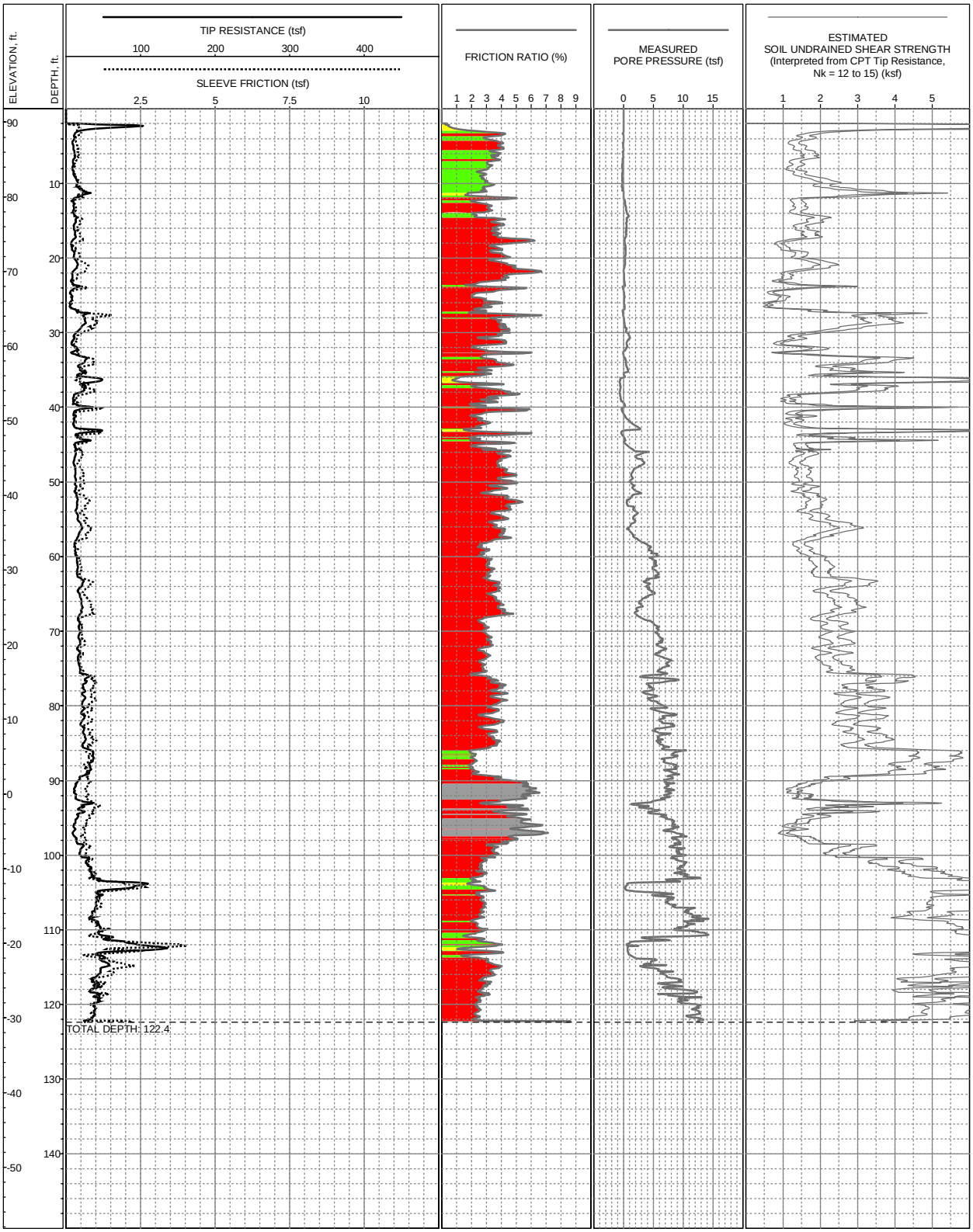


LOCATION: E6163841.6 N1951585.4 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 91.4ft (NAVD88)
COMPLETION DEPTH: 120.3ft
TEST DATE: 12/15/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-19

Tunnel Segment of SVRT Project
San Jose, California

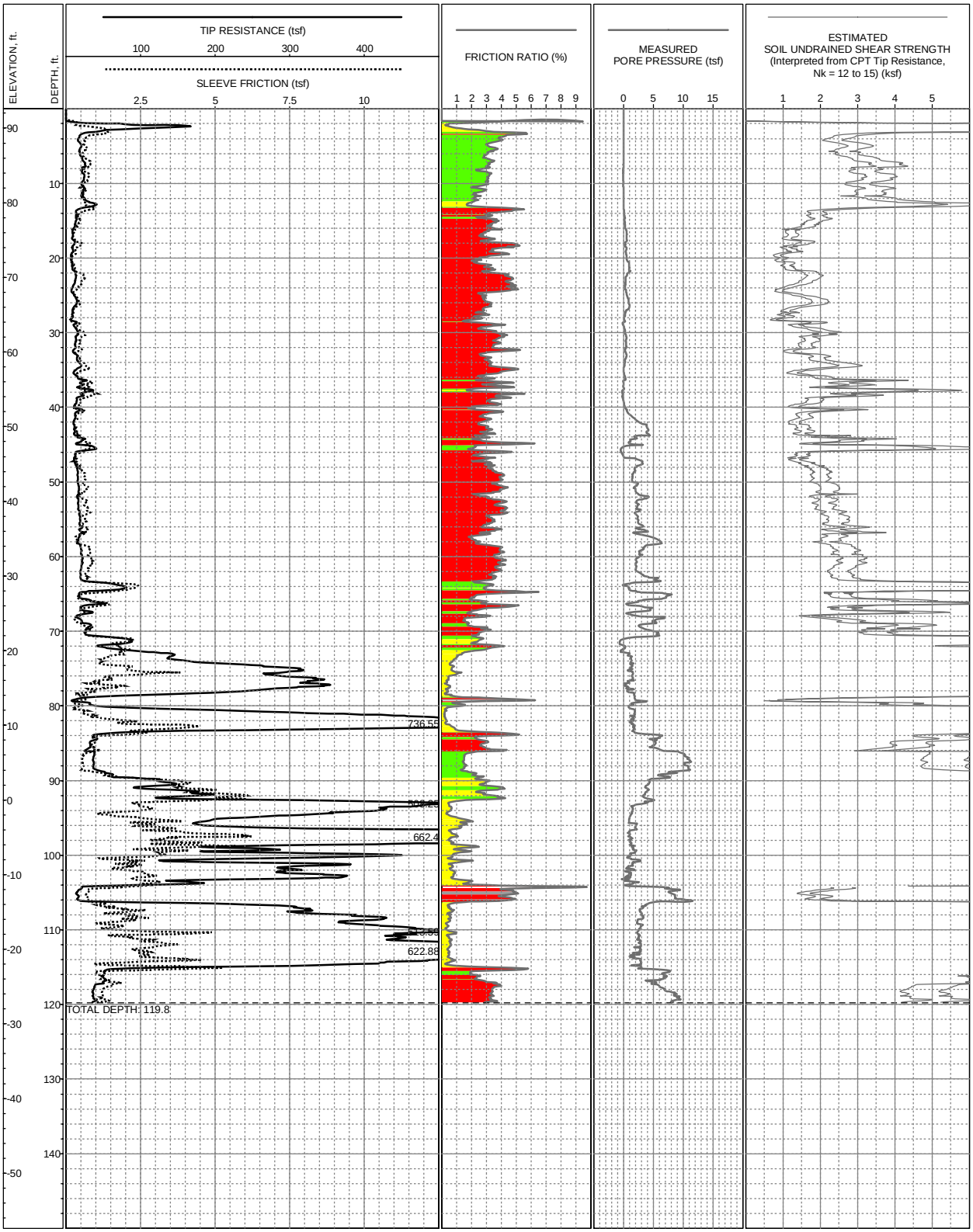


LOCATION: E6163569.7 N1951429.5 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 91.8ft (NAVD88)
COMPLETION DEPTH: 122.4ft
TEST DATE: 12/8/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-20

Tunnel Segment of SVRT Project
San Jose, California

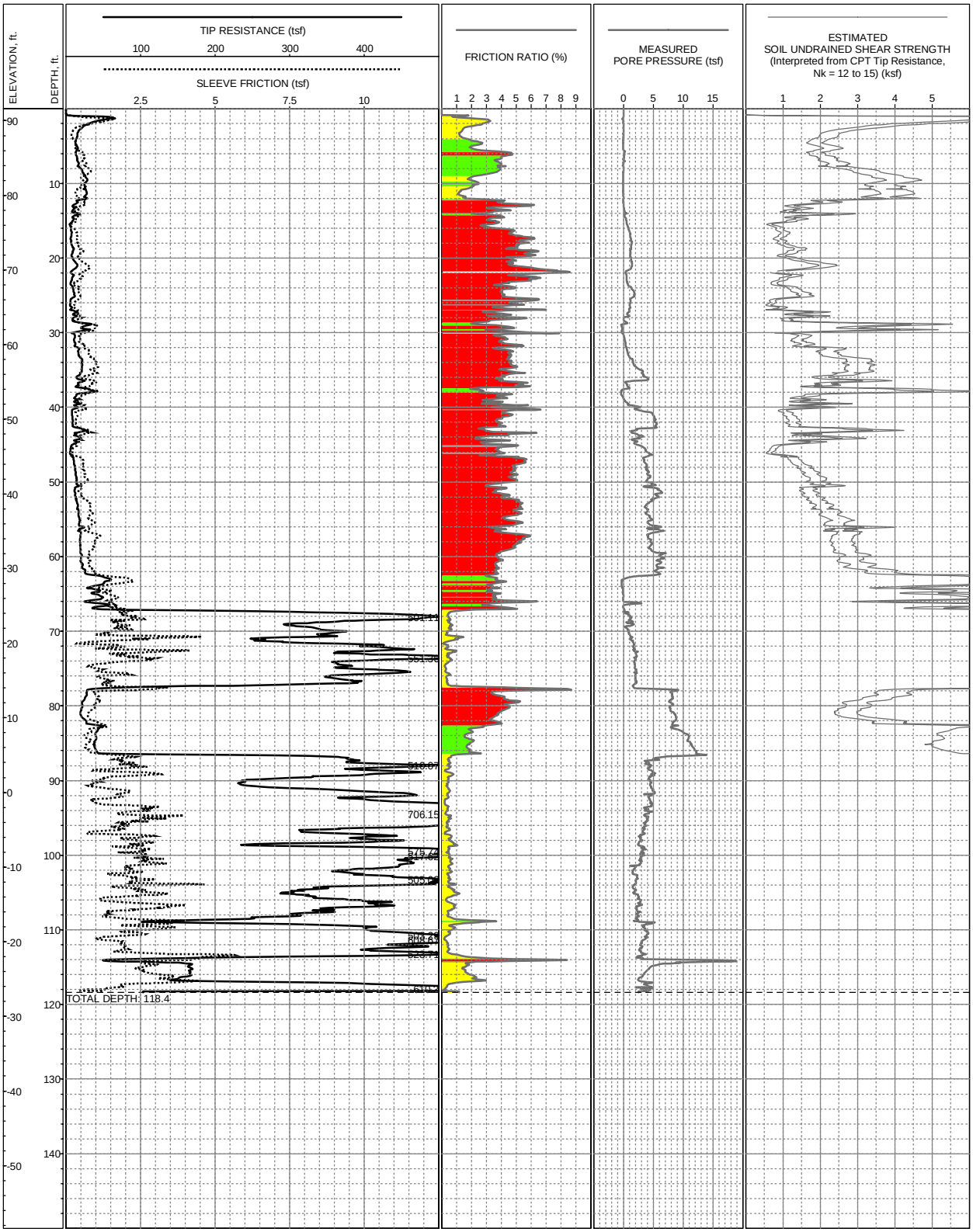


LOCATION: E6163395.2 N1951329 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 92.6ft (NAVD88)
COMPLETION DEPTH: 119.8ft
TEST DATE: 12/8/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-21

Tunnel Segment of SVRT Project
San Jose, California

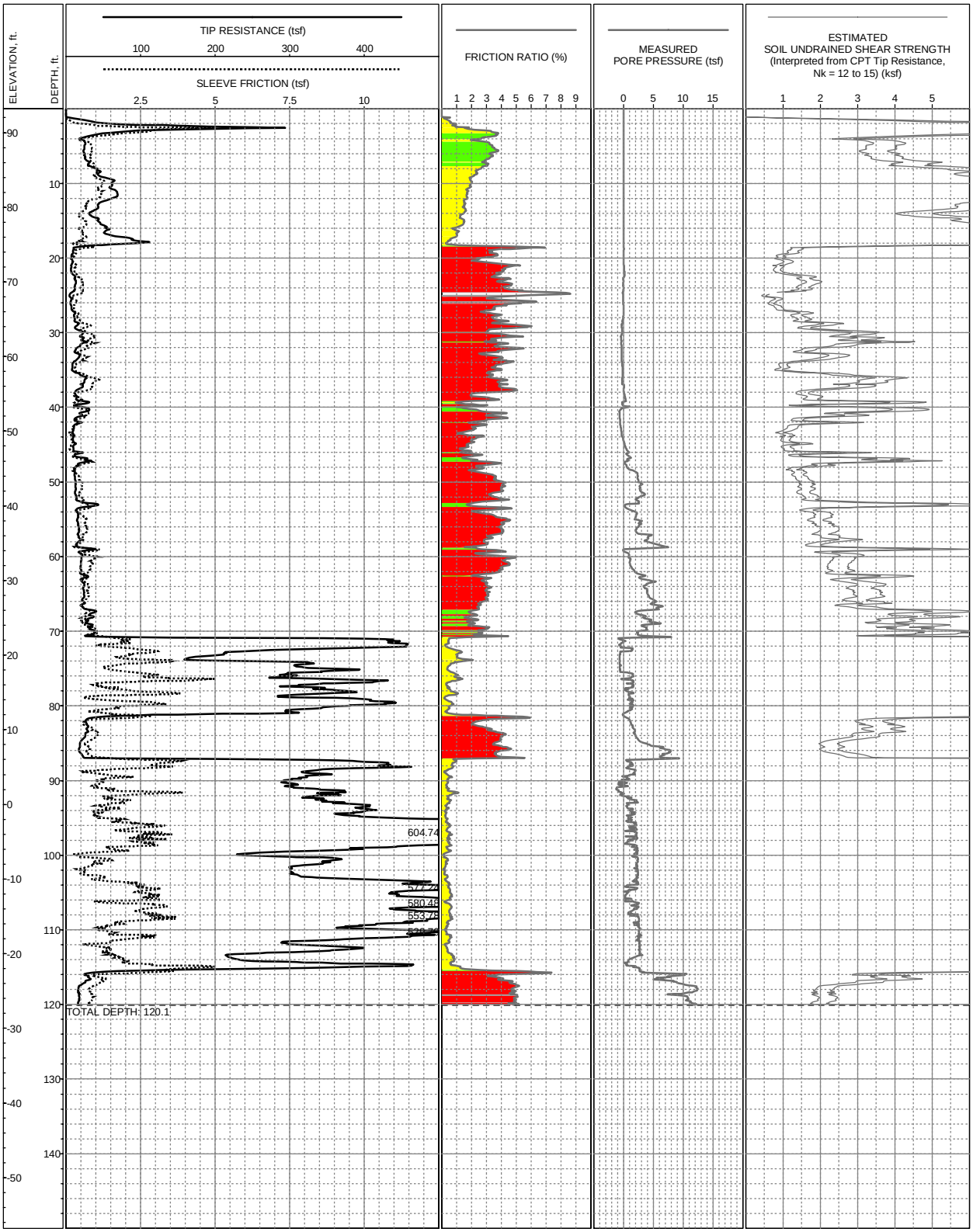


LOCATION: E6163284.6 N1951177.1 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 91.6ft (NAVD88)
COMPLETION DEPTH: 118.4ft
TEST DATE: 12/9/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-22

Tunnel Segment of SVRT Project
San Jose, California

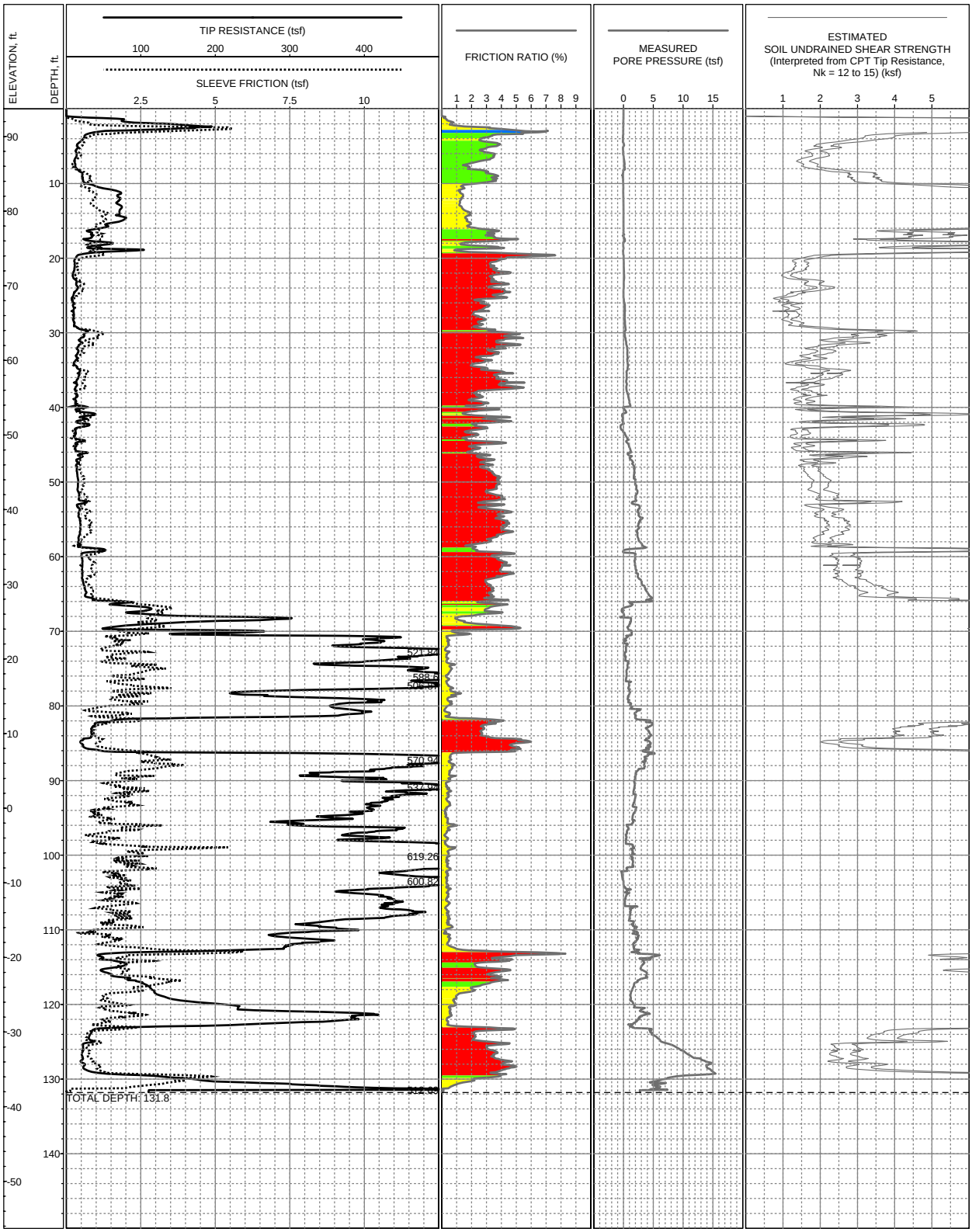


LOCATION: E6163142.3 N1951183.7 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 93.2ft (NAVD88)
COMPLETION DEPTH: 120.1ft
TEST DATE: 12/9/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-23

Tunnel Segment of SVRT Project
San Jose, California

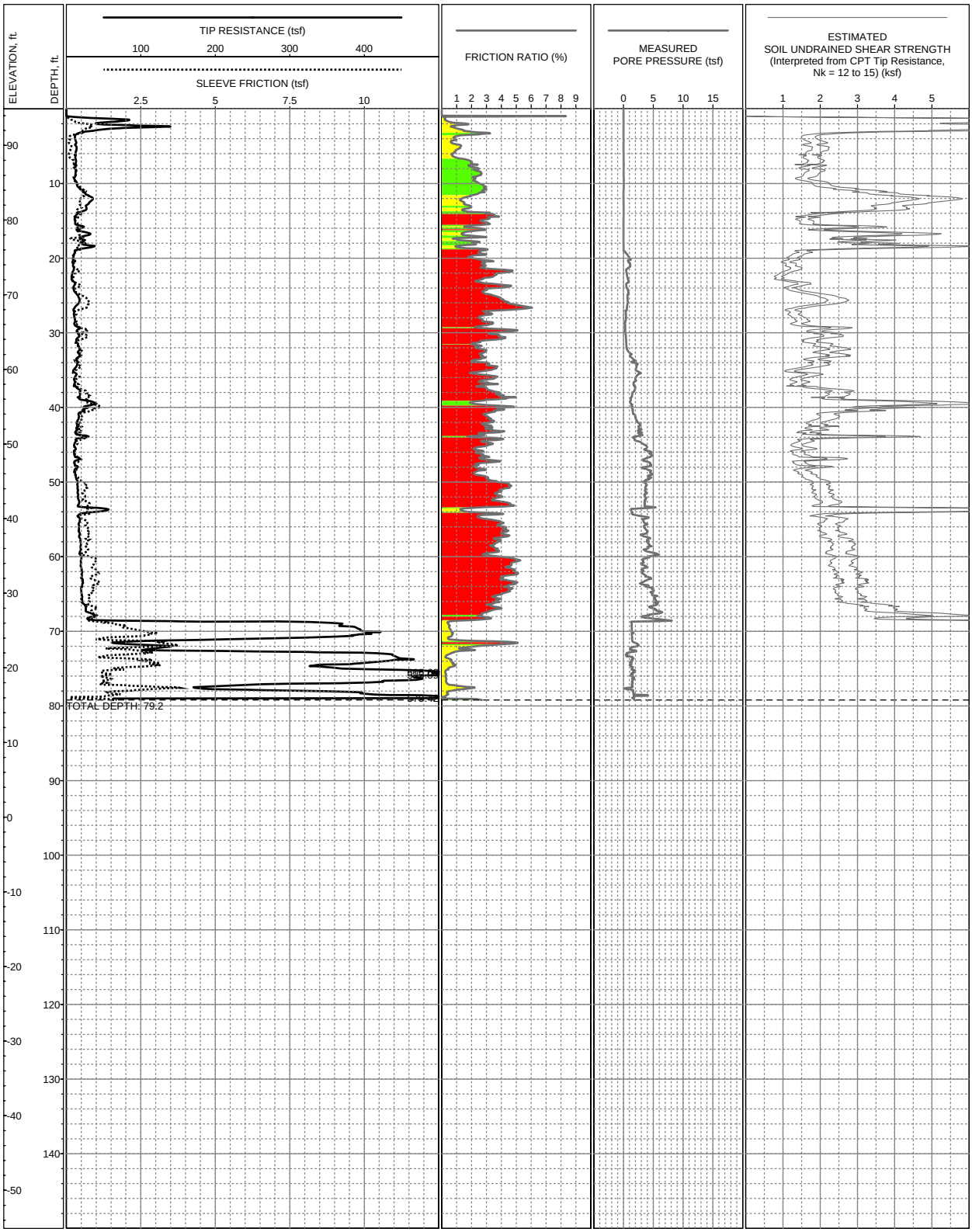


LOCATION: E6163016.2 N1951110.2 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 93.7ft (NAVD88)
COMPLETION DEPTH: 131.8ft
TEST DATE: 11/3/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-24

Tunnel Segment of SVRT Project
San Jose, California

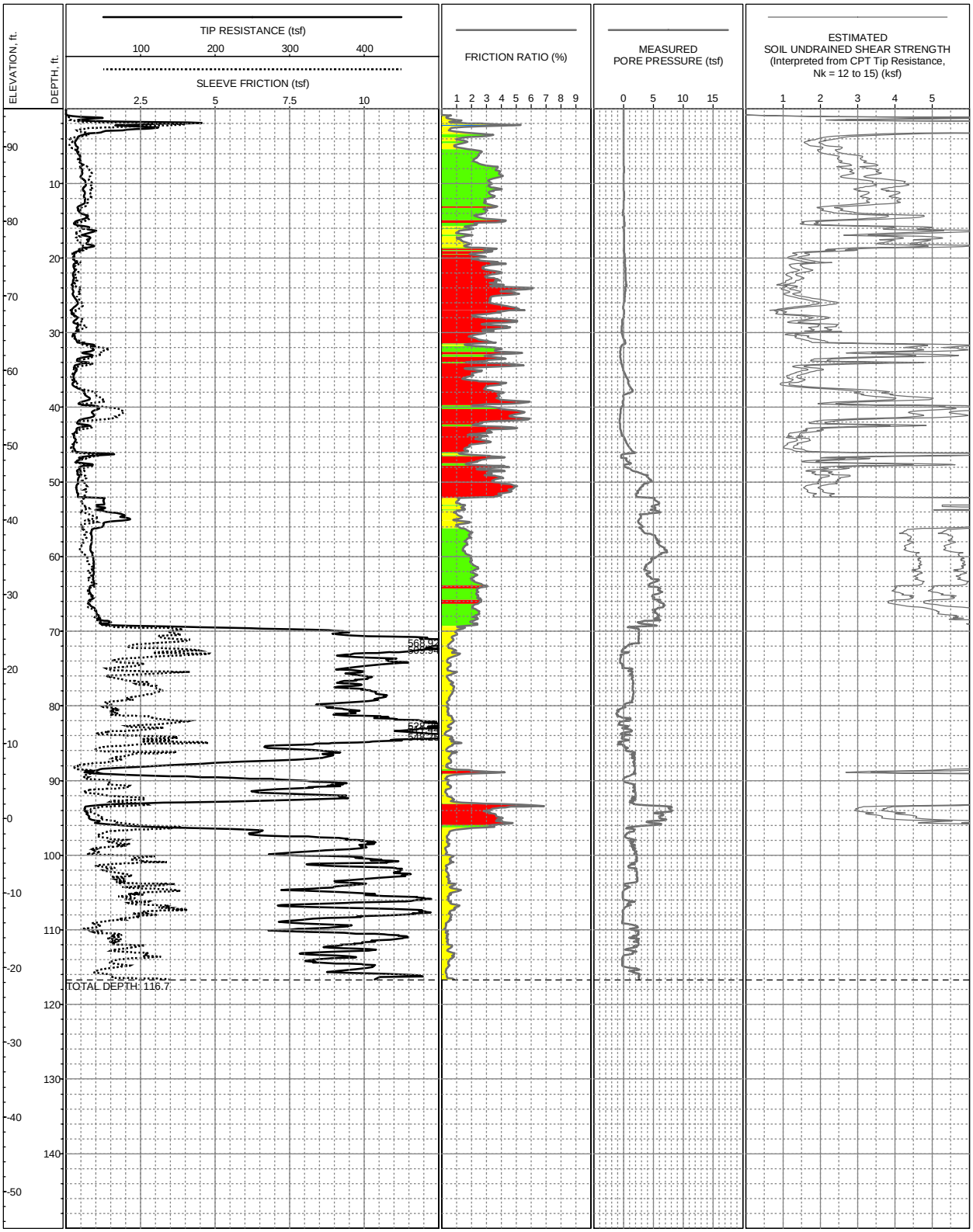


LOCATION: E6162819.9 N1950996.8 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 94.9ft (NAVD88)
COMPLETION DEPTH: 79.2ft
TEST DATE: 11/3/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-25

Tunnel Segment of SVRT Project
San Jose, California

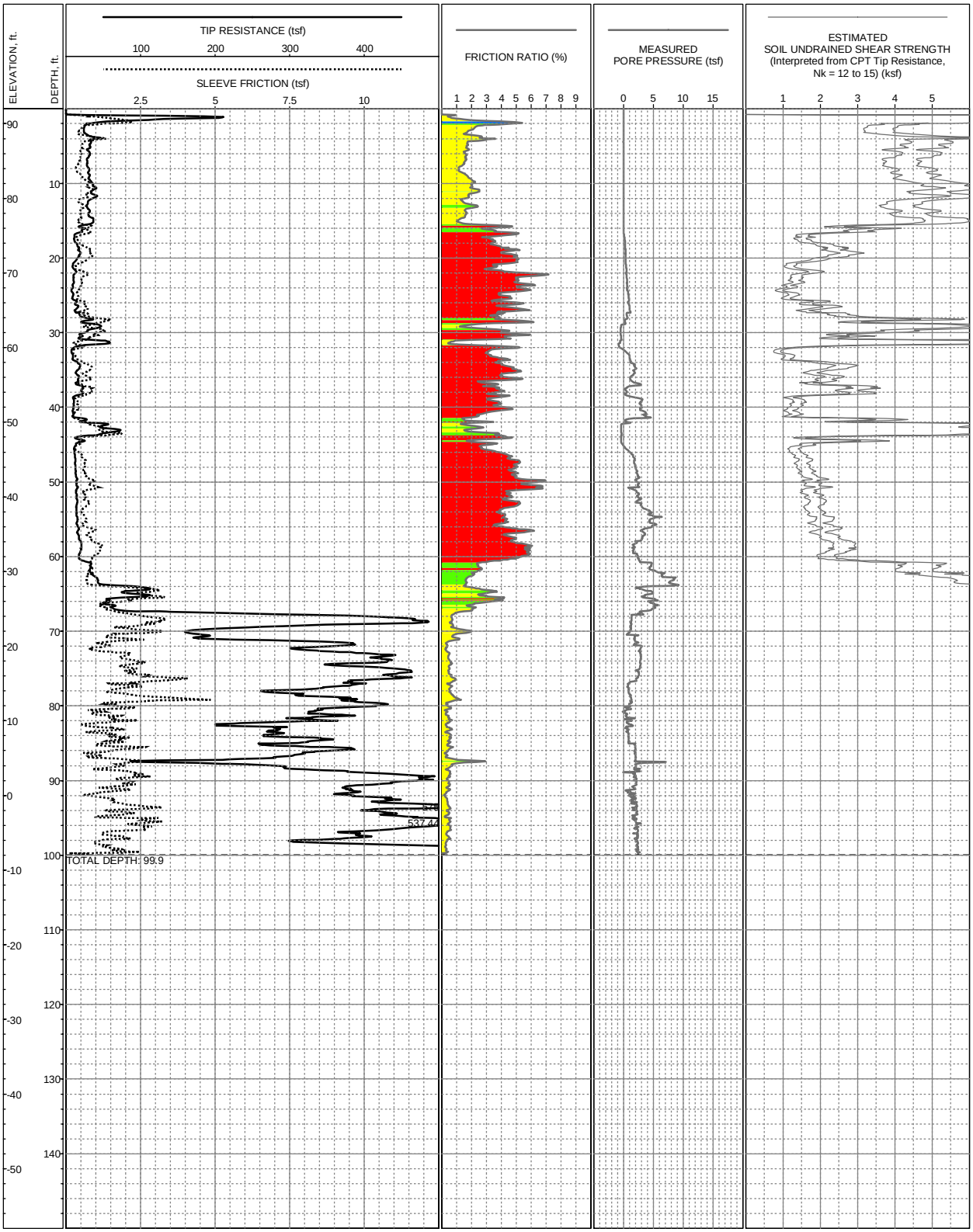


LOCATION: E6162542 N1950838 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 95.1ft (NAVD88)
COMPLETION DEPTH: 116.7ft
TEST DATE: 12/3/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-26

Tunnel Segment of SVRT Project
San Jose, California

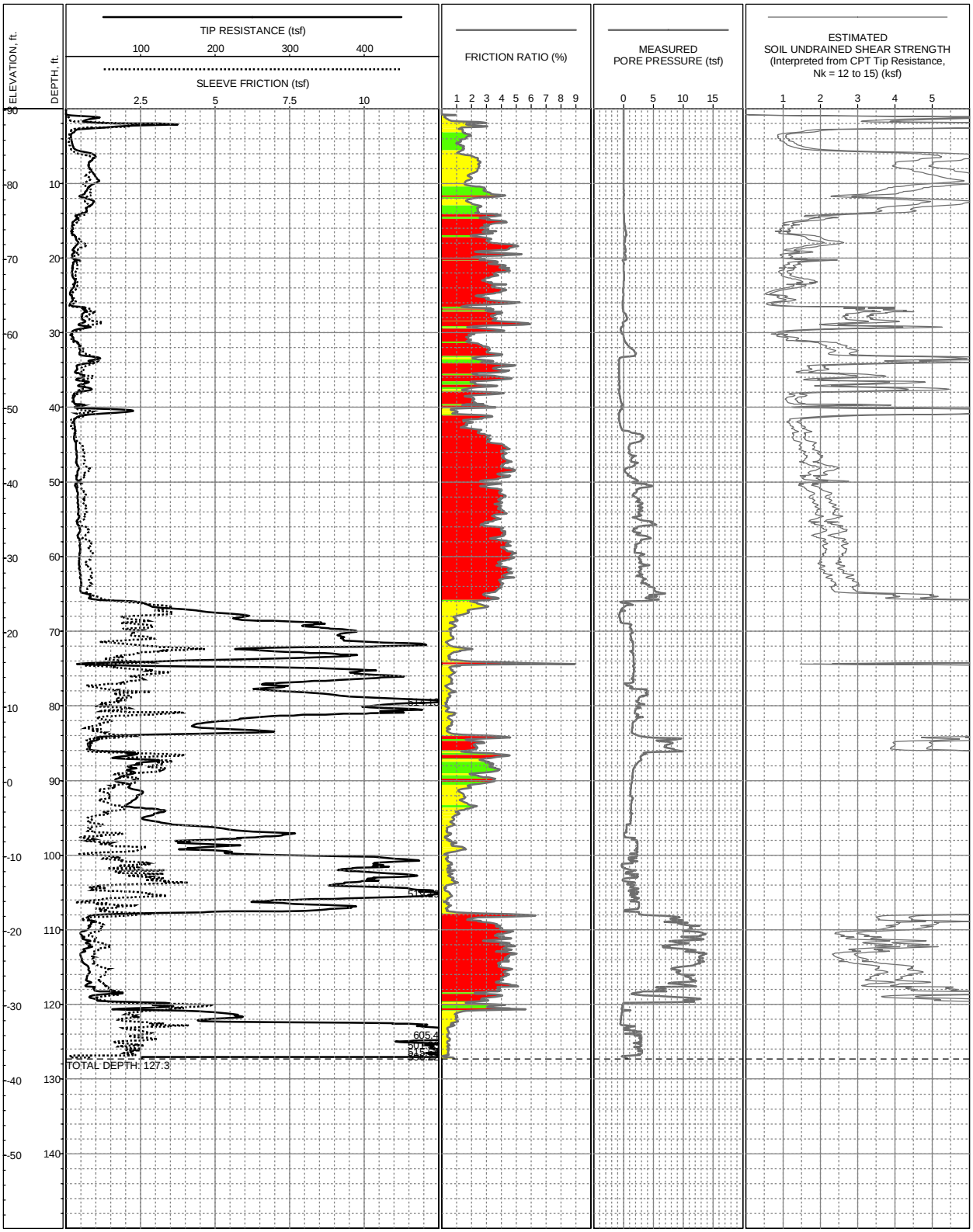


LOCATION: E6162209.8 N1950552.1 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 92ft (NAVD88)
COMPLETION DEPTH: 99.9ft
TEST DATE: 12/3/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-27

Tunnel Segment of SVRT Project
San Jose, California

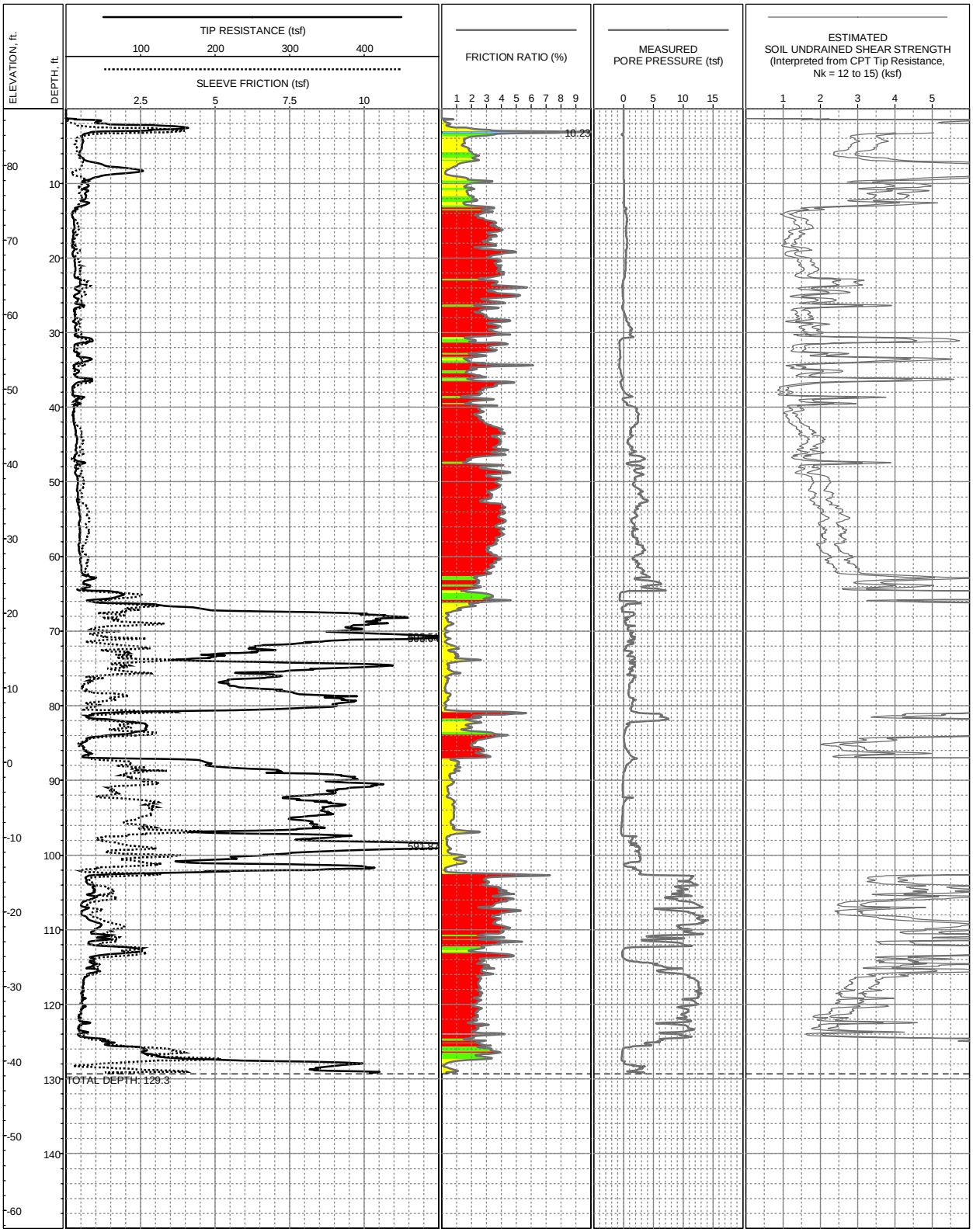


LOCATION: E6162062.4 N1950557.4 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 90.2ft (NAVD88)
COMPLETION DEPTH: 127.3ft
TEST DATE: 12/16/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-28

Tunnel Segment of SVRT Project
San Jose, California

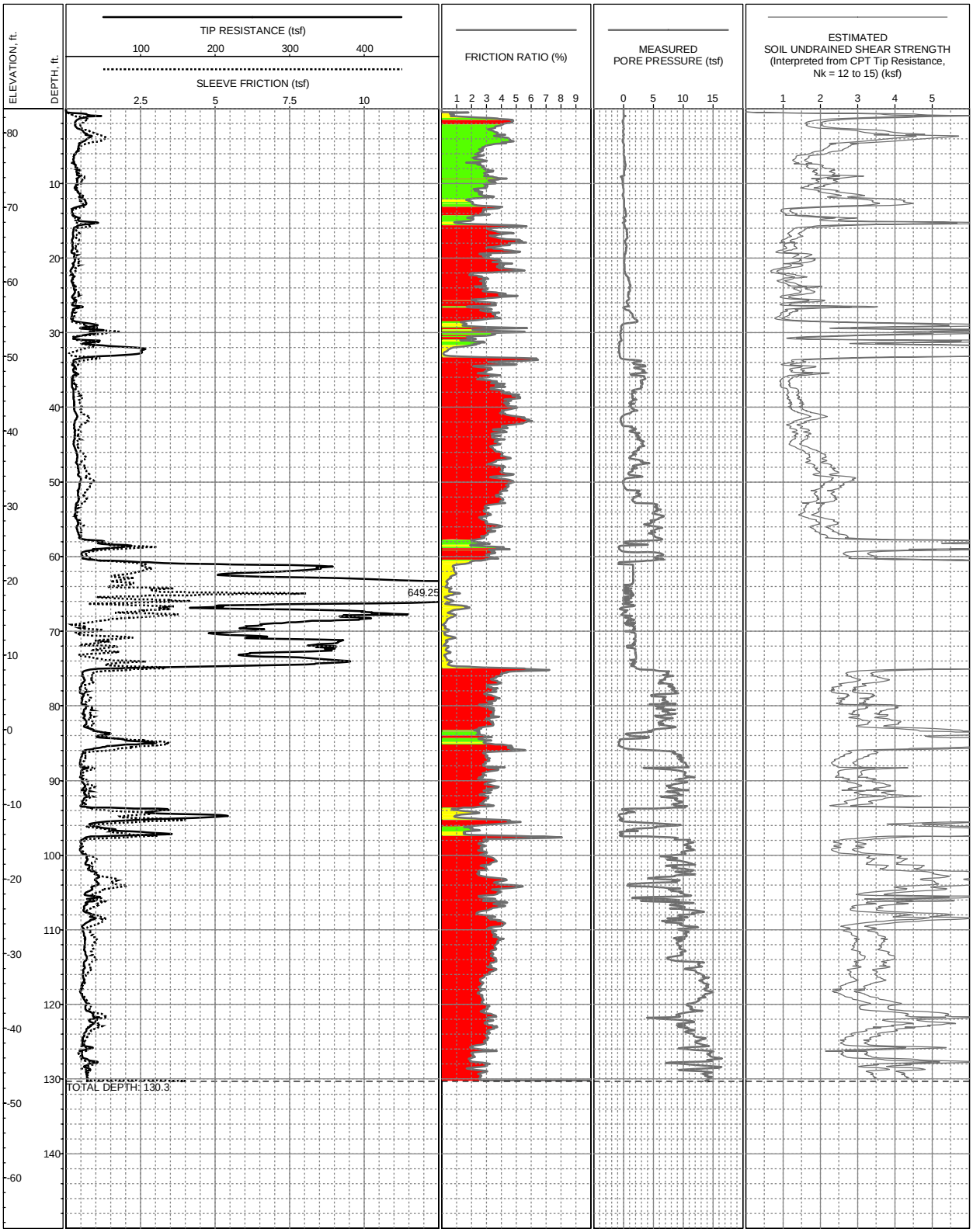


LOCATION: E6161948.2 N1950495.1 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 87.6ft (NAVD88)
COMPLETION DEPTH: 129.3ft
TEST DATE: 1/19/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-29

Tunnel Segment of SVRT Project
San Jose, California

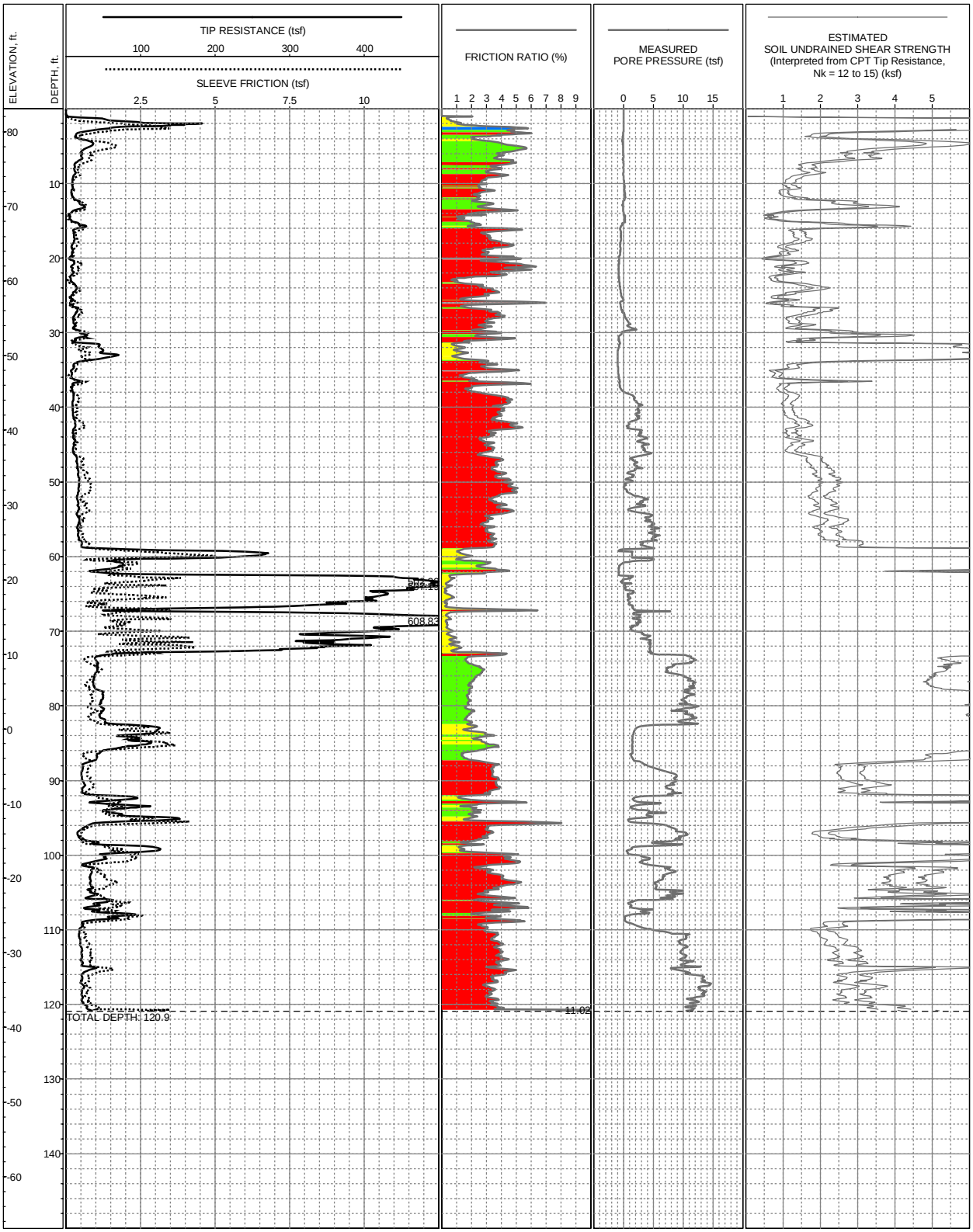


LOCATION: E6161663.4 N1950226.2 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 83.2ft (NAVD88)
COMPLETION DEPTH: 130.3ft
TEST DATE: 12/29/2004

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & J
REVIEWED BY: R Howard

LOG OF CPT-30

Tunnel Segment of SVRT Project
San Jose, California

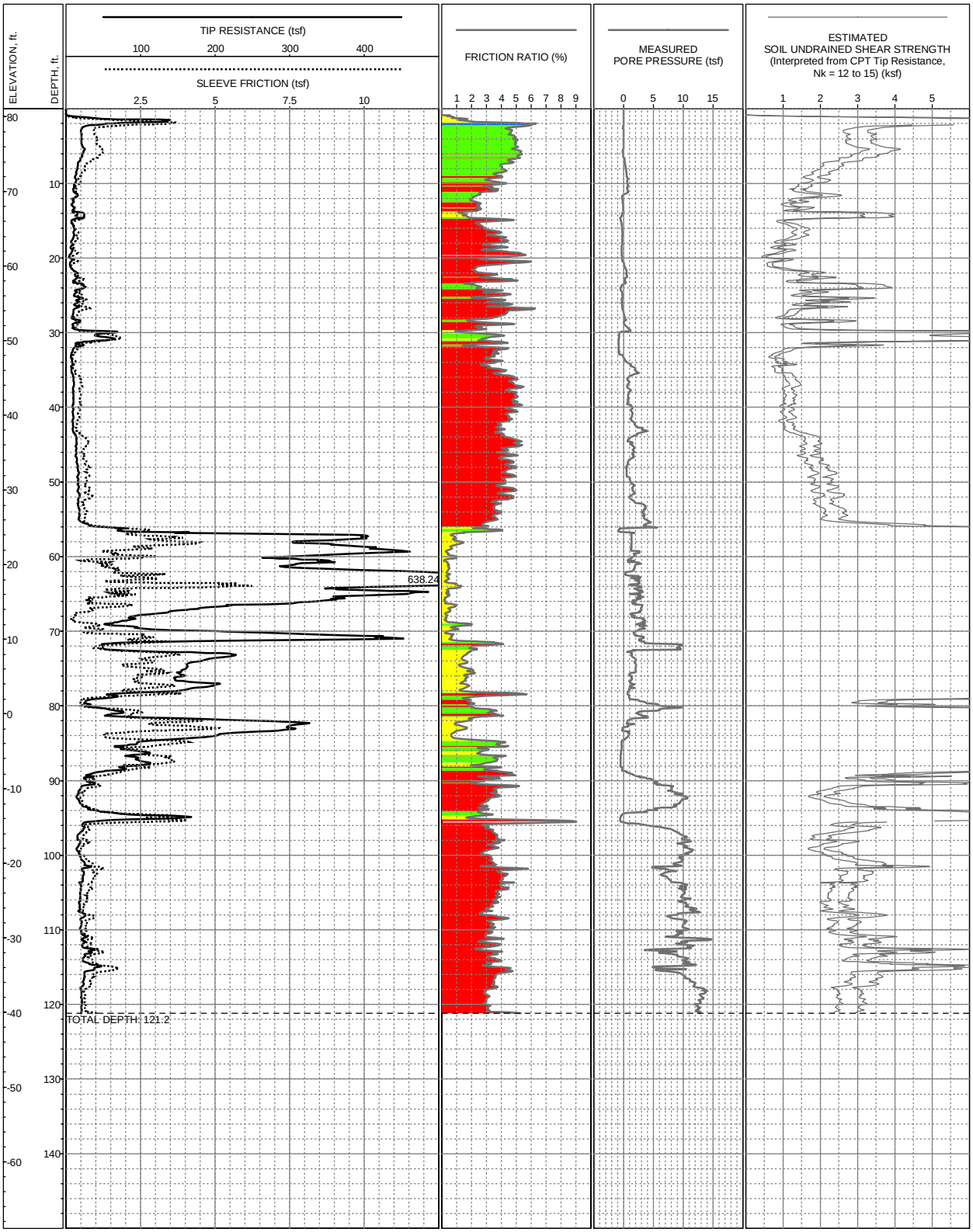


LOCATION: E6161533.6 N1950244.4 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 83.1ft (NAVD88)
COMPLETION DEPTH: 120.9ft
TEST DATE: 12/17/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-31

Tunnel Segment of SVRT Project
San Jose, California

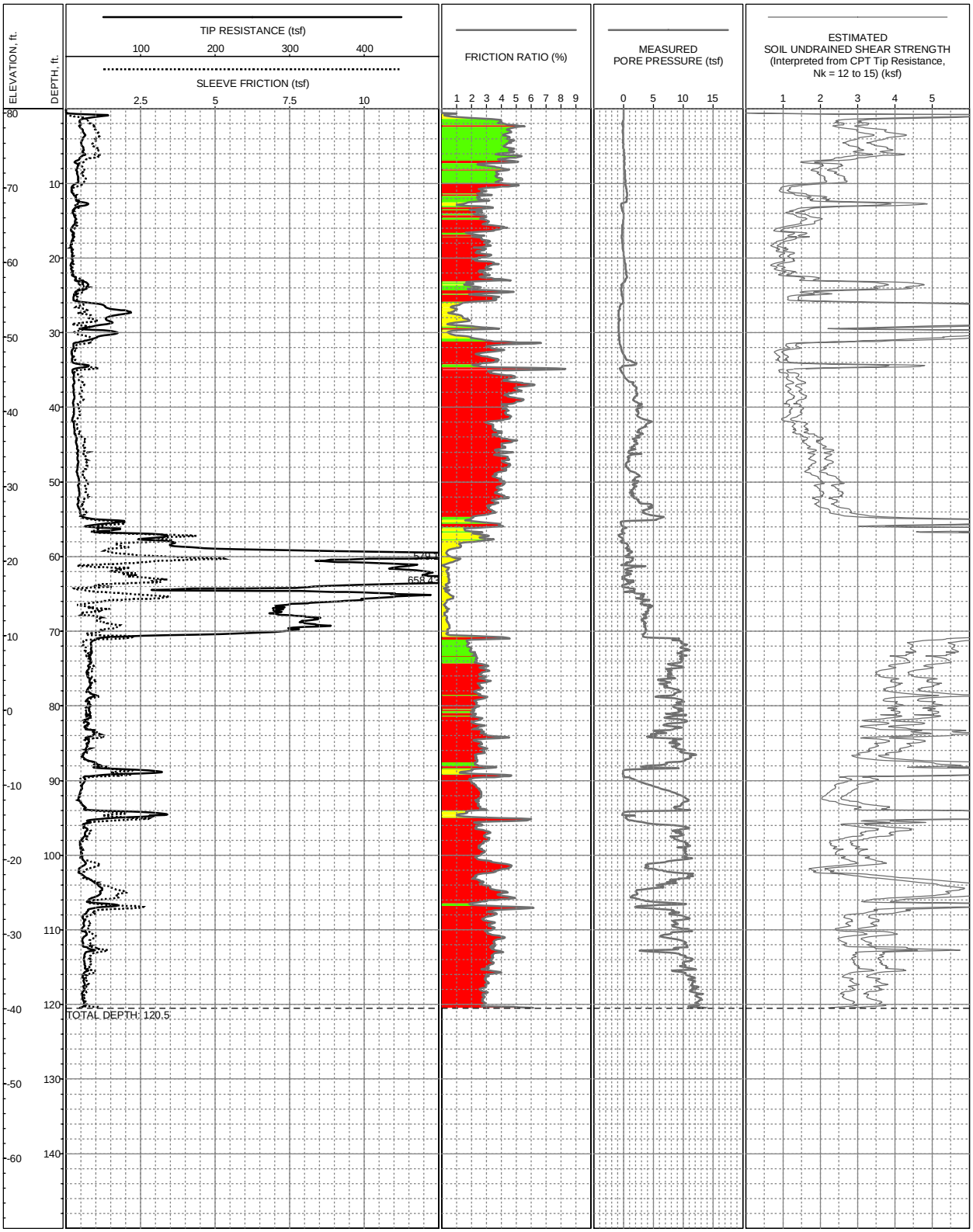


LOCATION: E6161197.7 N1950082.3 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 81.1ft (NAVD88)
COMPLETION DEPTH: 121.2ft
TEST DATE: 12/21/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-32

Tunnel Segment of SVRT Project
San Jose, California

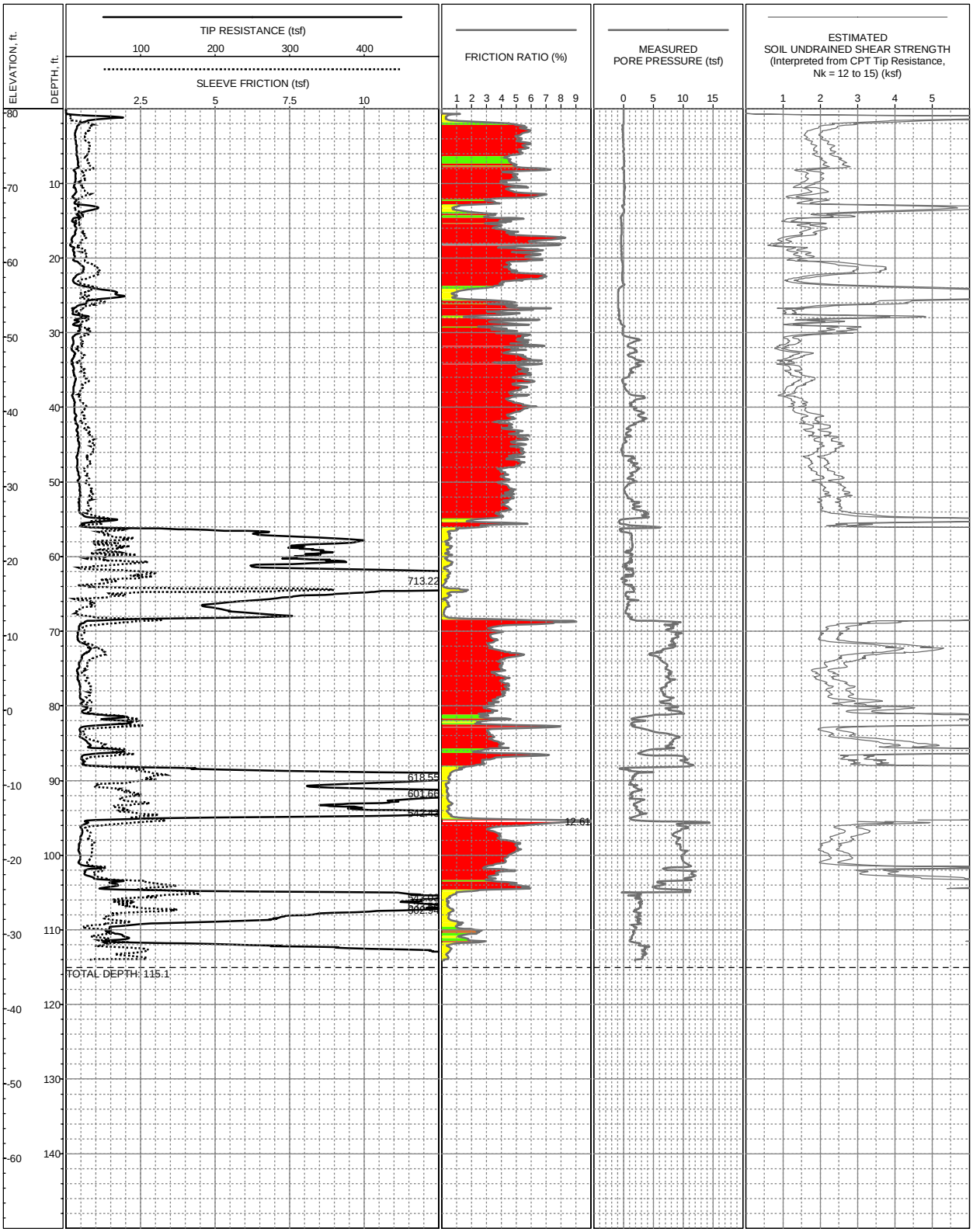


LOCATION: E6161135.7 N1949882.4 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 80.6ft (NAVD88)
COMPLETION DEPTH: 120.5ft
TEST DATE: 12/17/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-33

Tunnel Segment of SVRT Project
San Jose, California

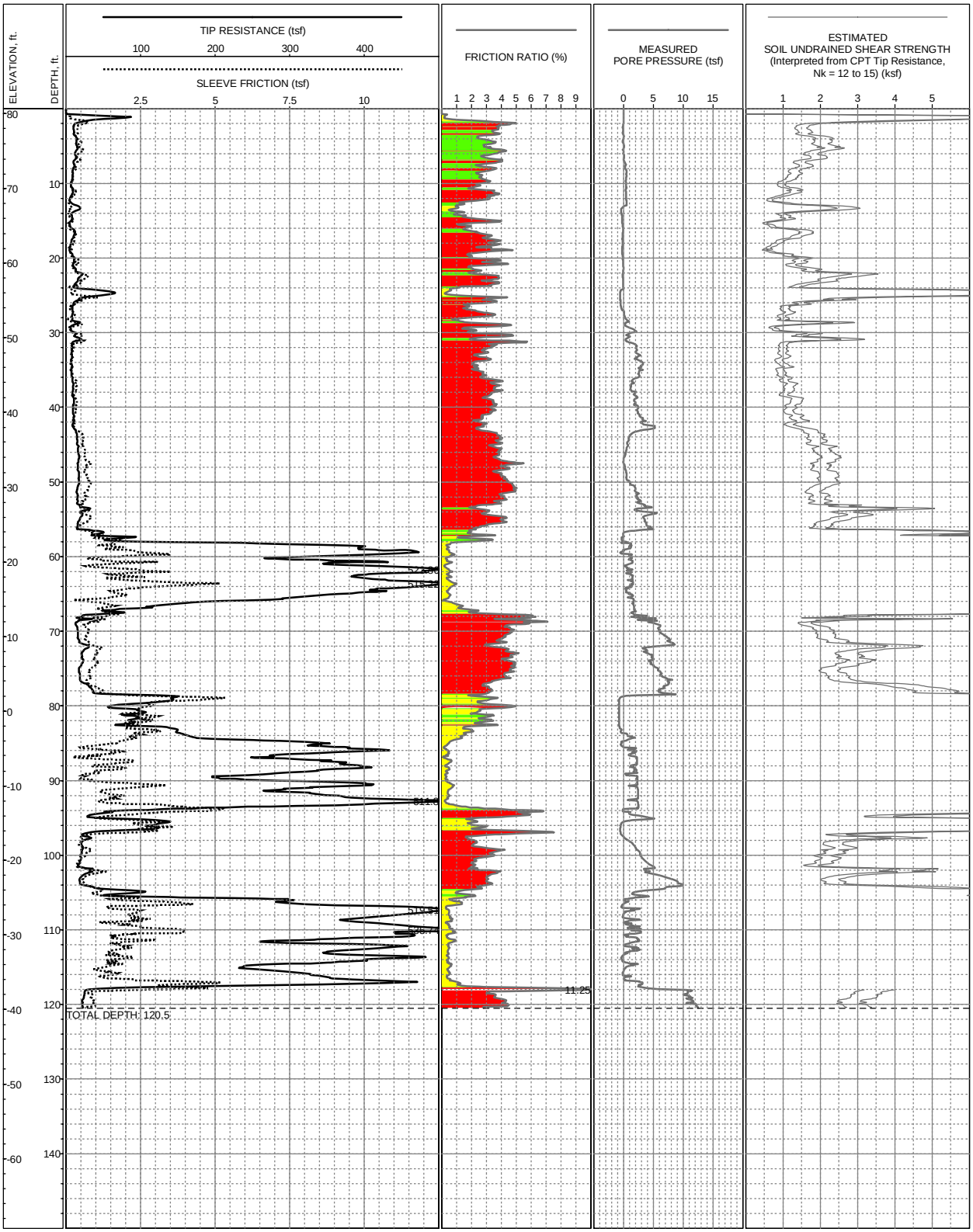


LOCATION: E6160720.7 N1949783.5 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 80.6ft (NAVD88)
COMPLETION DEPTH: 115.1ft
TEST DATE: 12/22/2004

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-34

Tunnel Segment of SVRT Project
San Jose, California

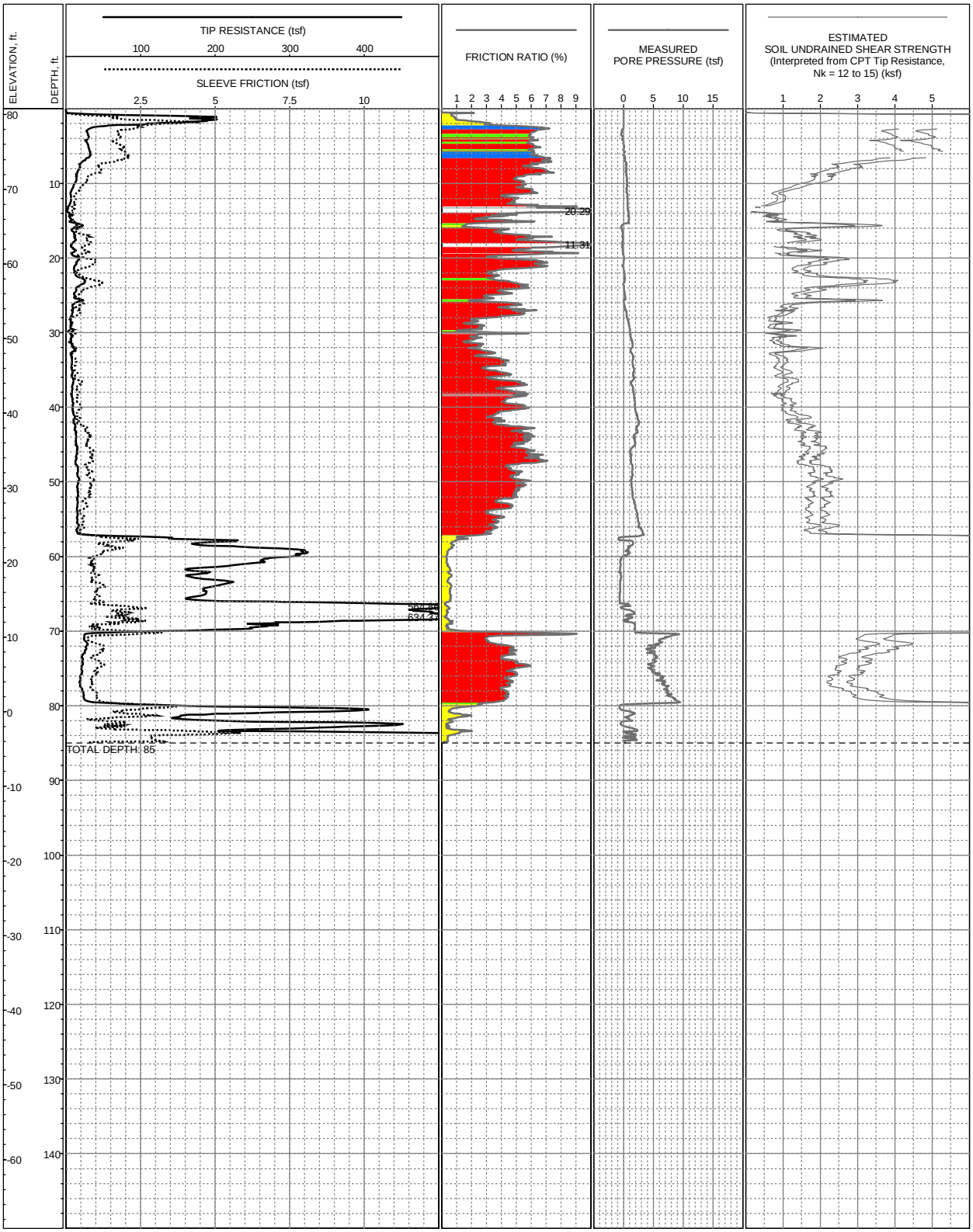


LOCATION: E6160627.9 N1949730.4 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 80.7ft (NAVD88)
COMPLETION DEPTH: 120.5ft
TEST DATE: 12/22/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & J
REVIEWED BY: R Howard

LOG OF CPT-35

Tunnel Segment of SVRT Project
San Jose, California

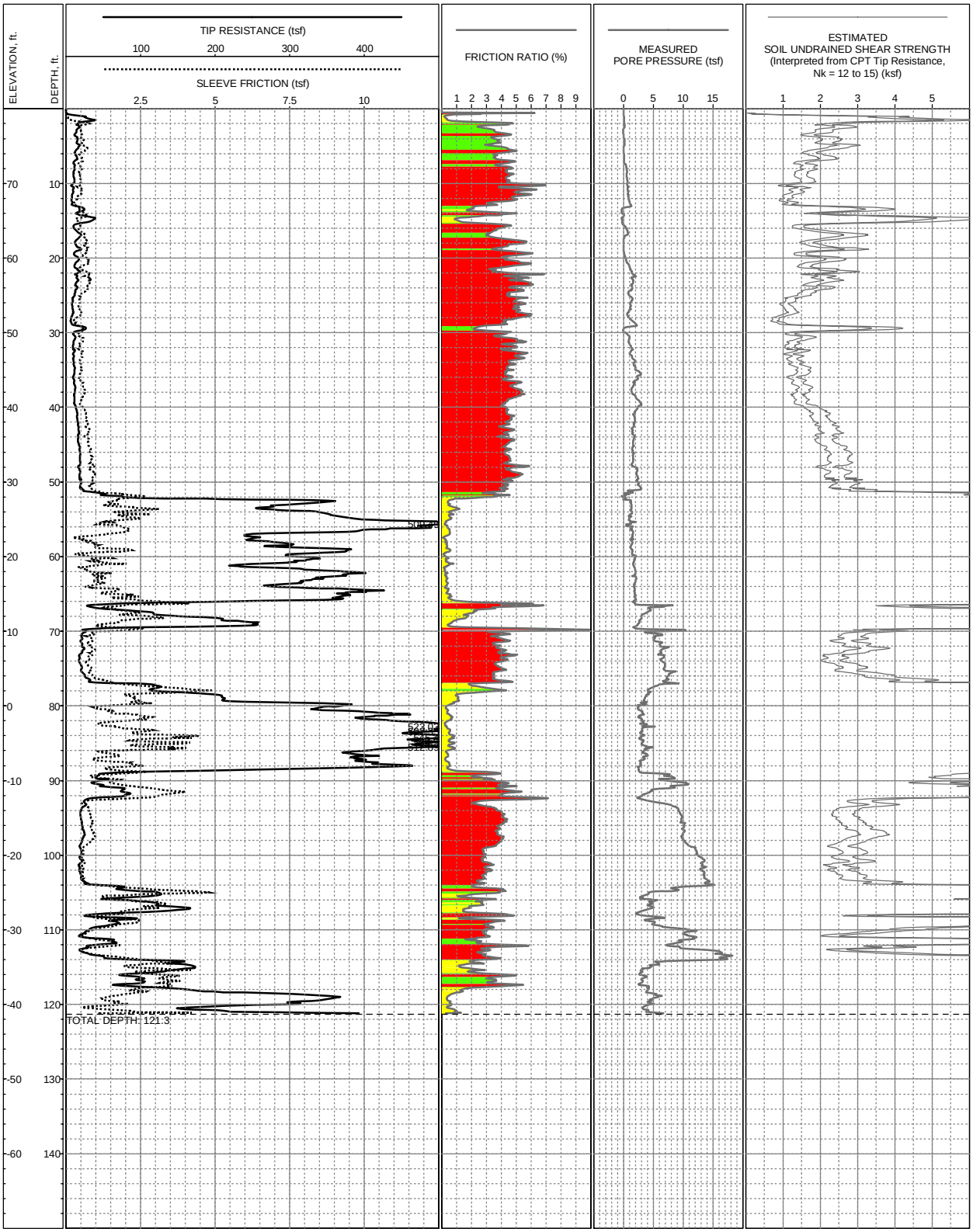


LOCATION: E6160394 N1949593 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 80.8ft (NAVD88)
COMPLETION DEPTH: 85ft
TEST DATE: 2/9/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-36

Tunnel Segment of SVRT Project
San Jose, California

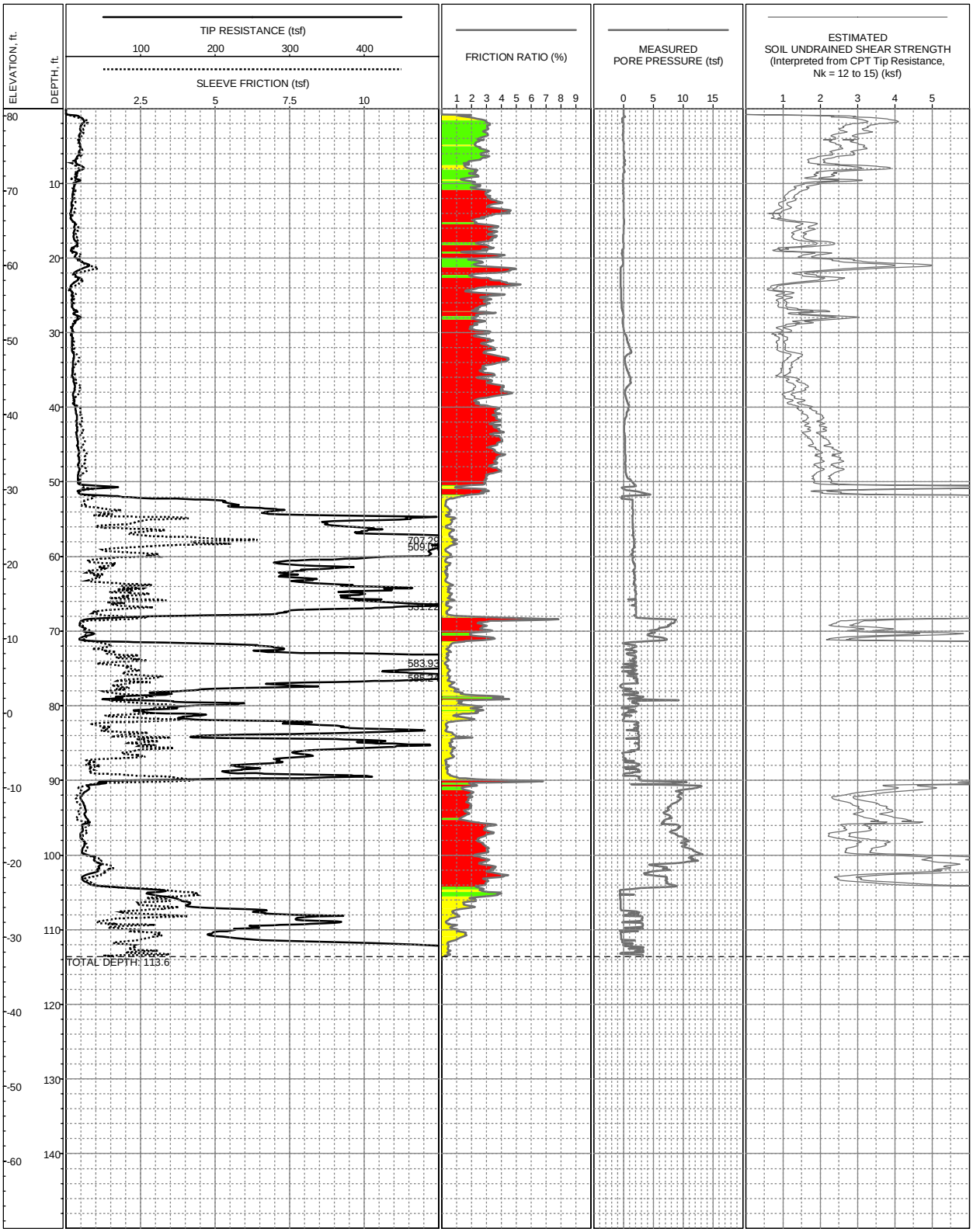


LOCATION: E6160163.5 N1949578.8 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 80ft (NAVD88)
COMPLETION DEPTH: 121.3ft
TEST DATE: 12/27/2004

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & J
REVIEWED BY: R Howard

LOG OF CPT-37

Tunnel Segment of SVRT Project
San Jose, California

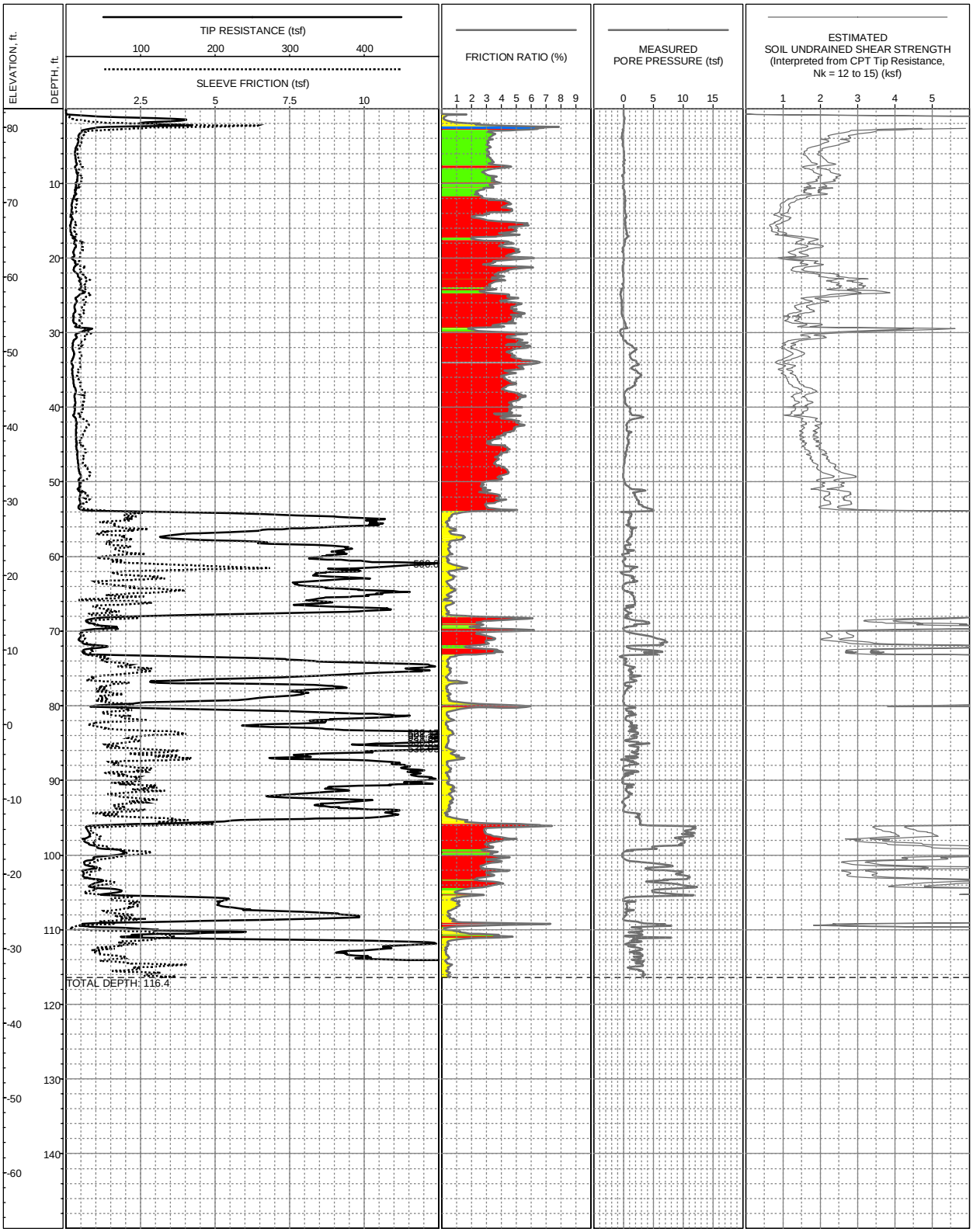


LOCATION: E6159920.6 N1949213.1 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 81ft (NAVD88)
COMPLETION DEPTH: 113.6ft
TEST DATE: 1/21/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-38

Tunnel Segment of SVRT Project
San Jose, California

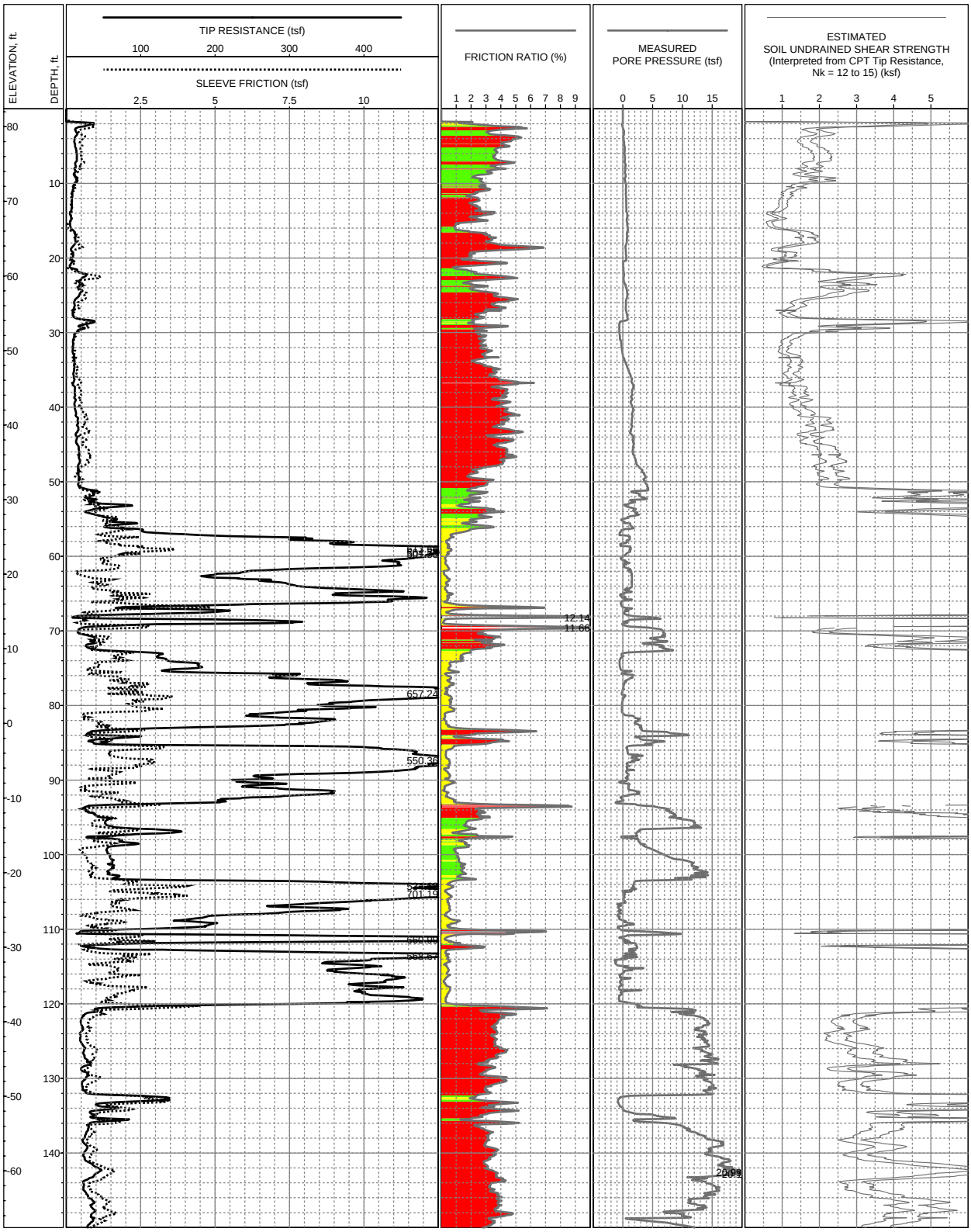


LOCATION: E6159717.3 N1949196.1 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 82.5ft (NAVD88)
COMPLETION DEPTH: 116.4ft
TEST DATE: 1/12/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-39

Tunnel Segment of SVRT Project
San Jose, California

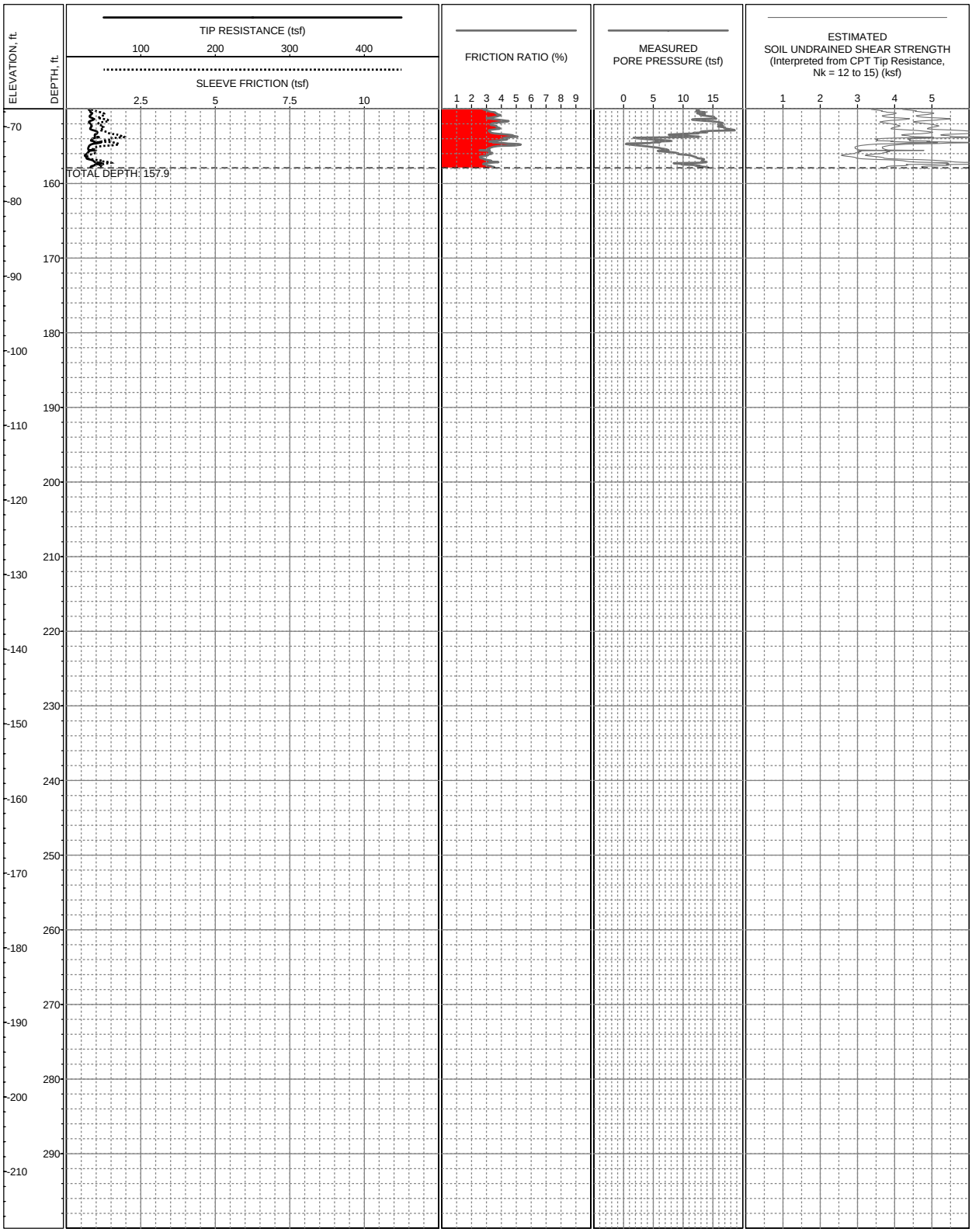


LOCATION: E6159483.9 N1949073.1 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 82.4ft (NAVD88)
COMPLETION DEPTH: 157.9ft
TEST DATE: 11/1/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-40

Tunnel Segment of SVRT Project
San Jose, California

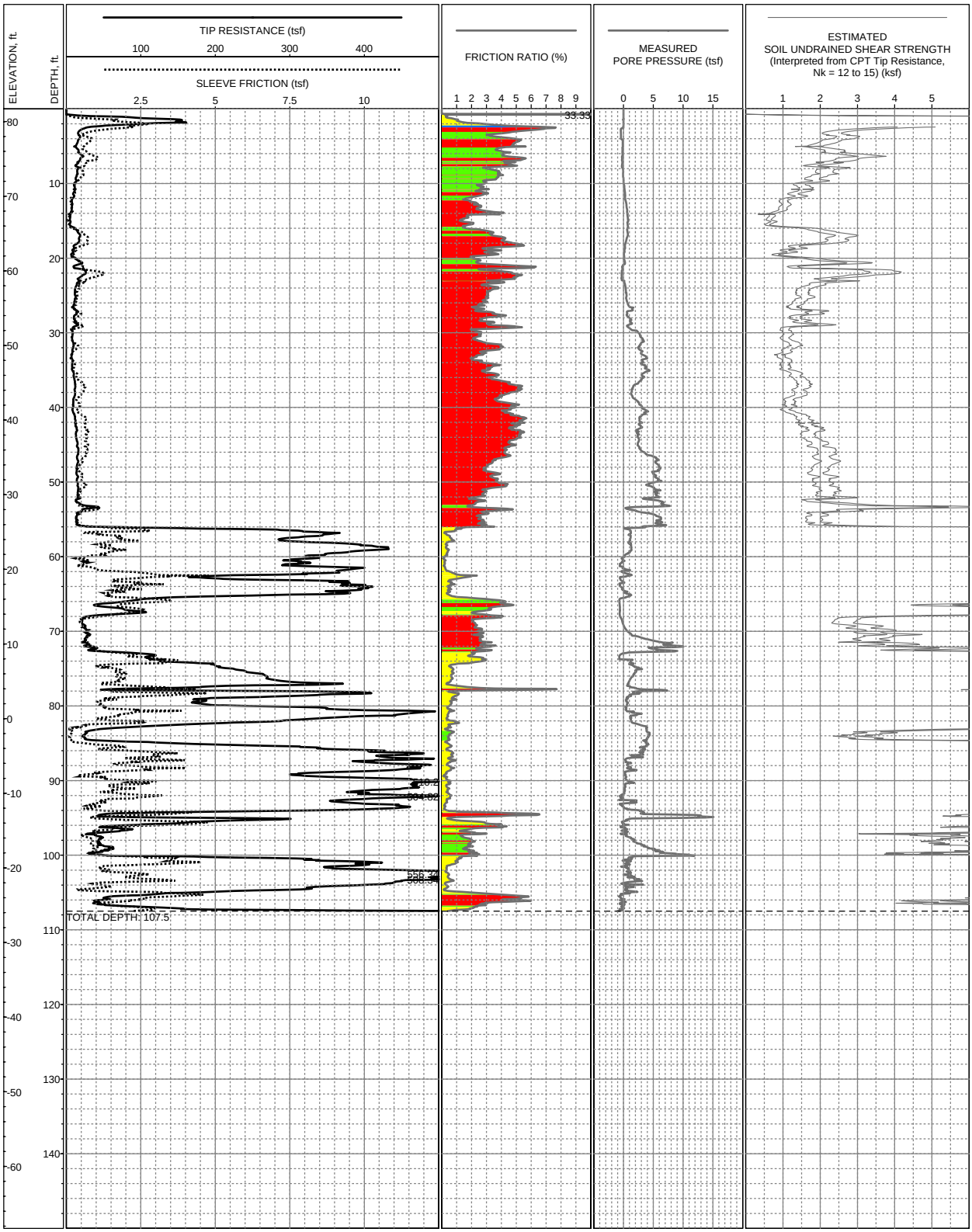


LOCATION: E6159483.9 N1949073.1 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 82.4ft (NAVD88)
COMPLETION DEPTH: 157.9ft
TEST DATE: 11/1/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-40

Tunnel Segment of SVRT Project
San Jose, California

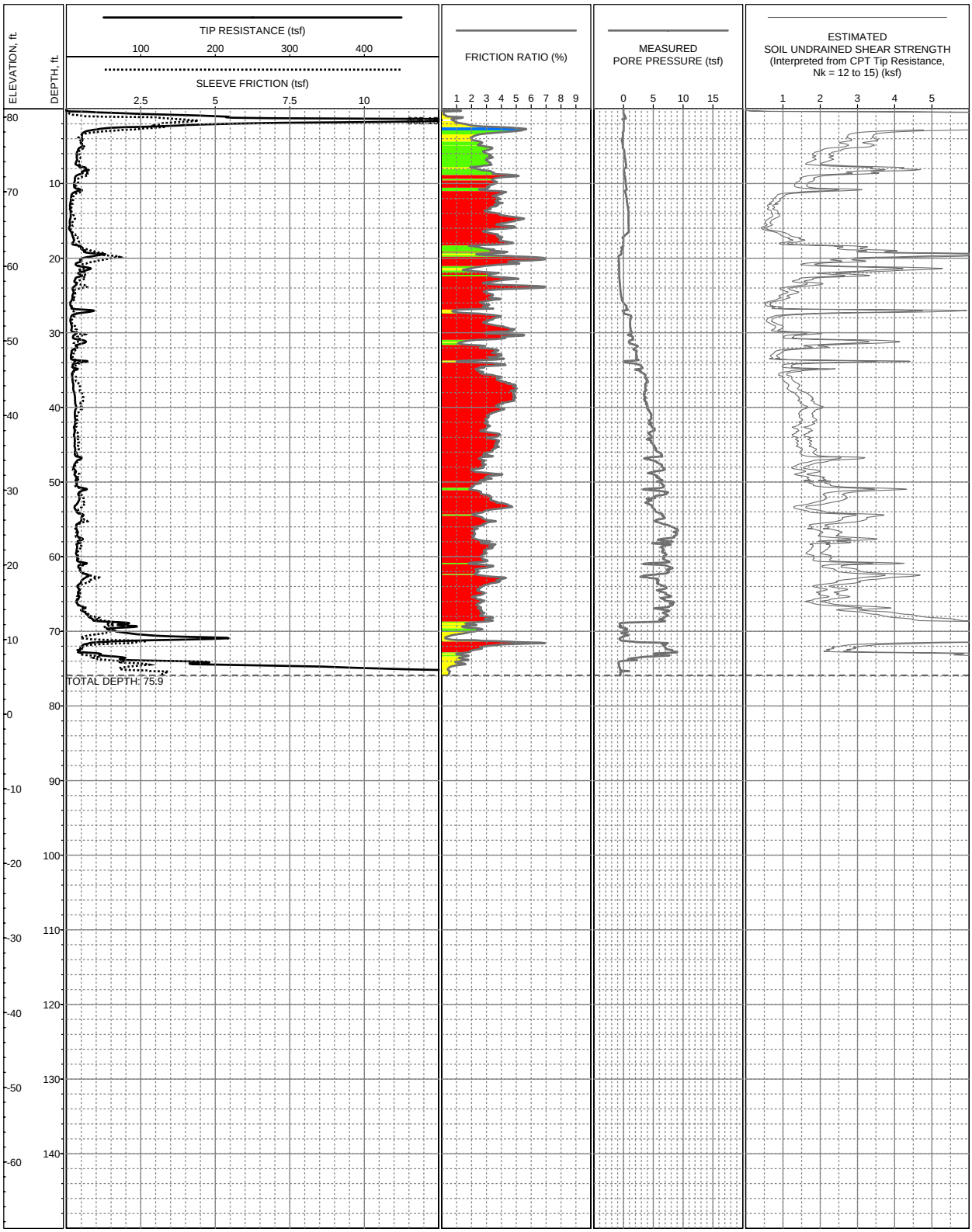


LOCATION: E6159341 N1949004.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 81.7ft (NAVD88)
COMPLETION DEPTH: 107.5ft
TEST DATE: 11/1/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-41

Tunnel Segment of SVRT Project
San Jose, California

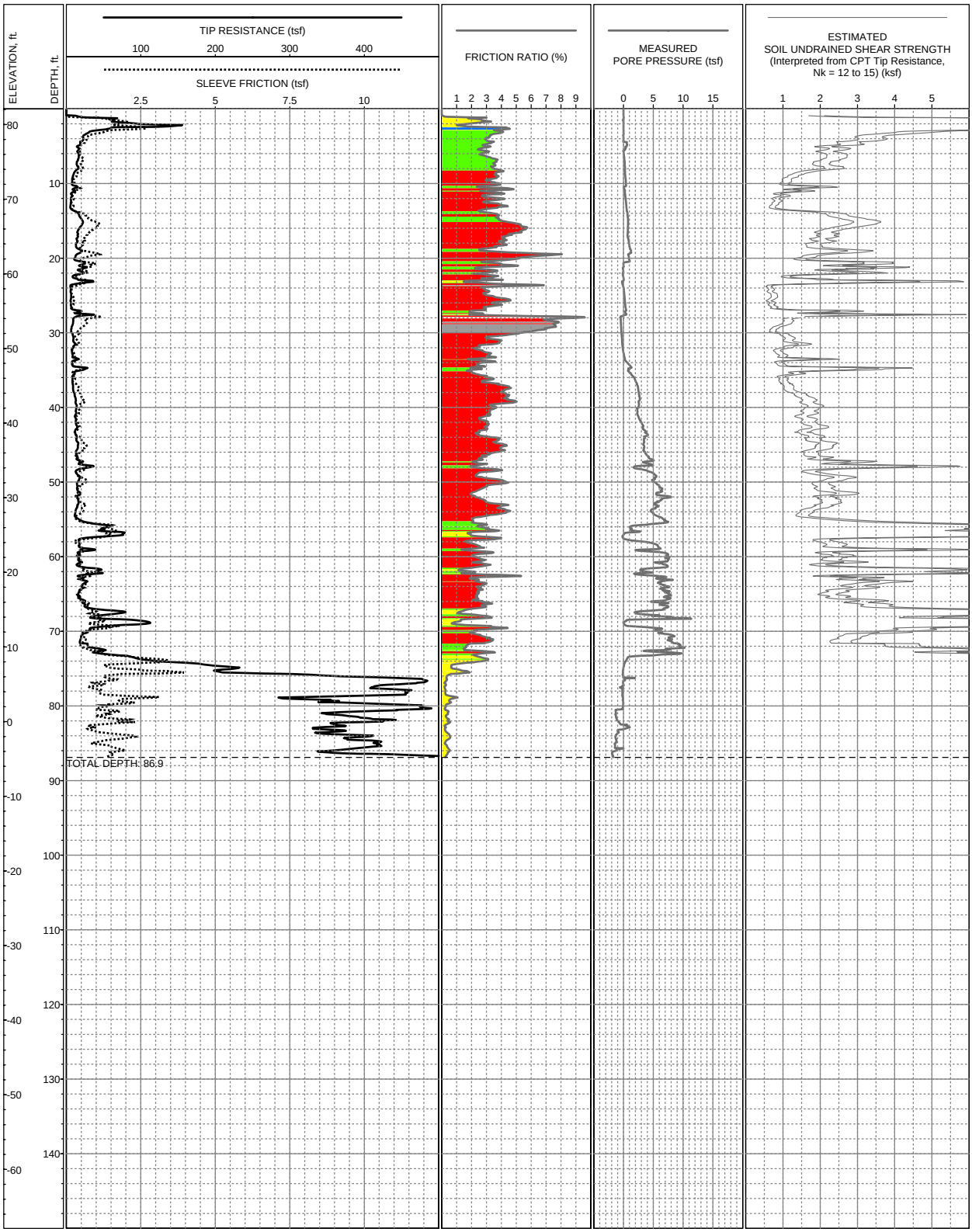


LOCATION: E6158292.7 N1948471.1 (NAD83)
SURFACE EL: 81.1ft (NAVD88)
COMPLETION DEPTH: 75.9ft
TEST DATE: 10/20/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: T Dowd & D Garza
REVIEWED BY: R Howard

LOG OF CPT-42

Tunnel Segment of SVRT Project
San Jose, California

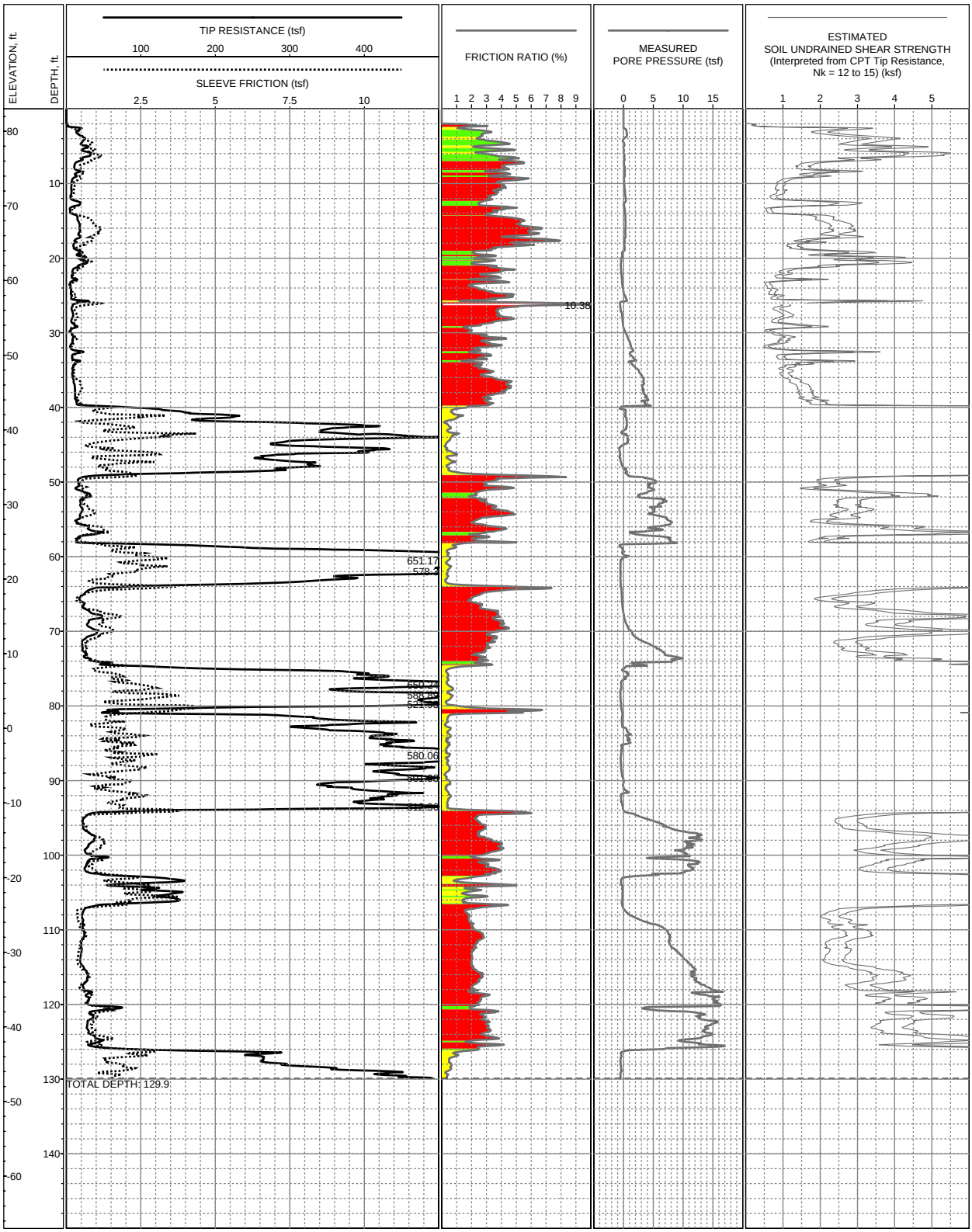


LOCATION: E6158220.6 N1948336 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 82.1ft (NAVD88)
COMPLETION DEPTH: 86.9ft
TEST DATE: 10/19/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: T Dowd & D Garza
REVIEWED BY: R Howard

LOG OF CPT-43

Tunnel Segment of SVRT Project
San Jose, California

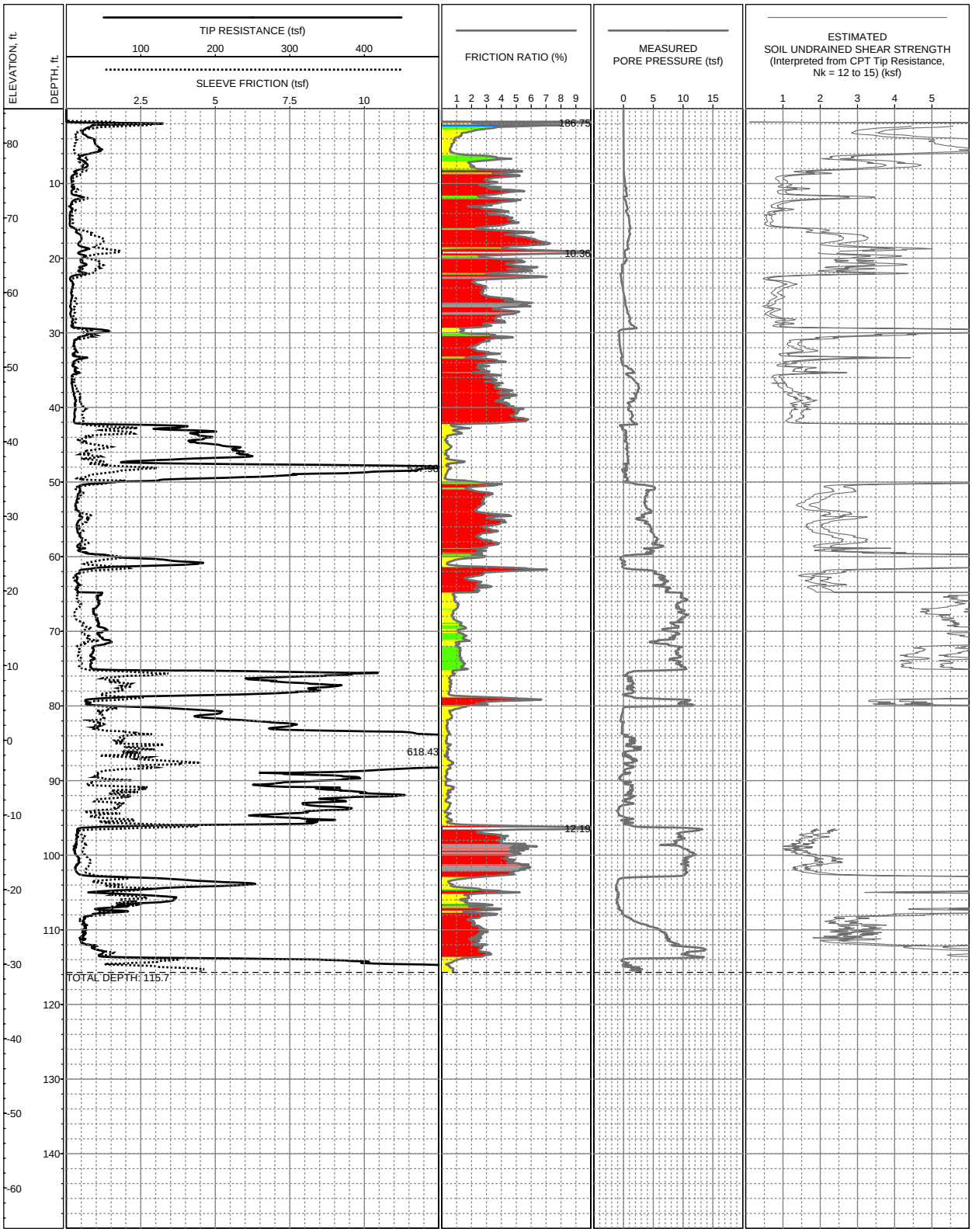


LOCATION: E6158082.2 N1948264.1 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 83ft (NAVD88)
COMPLETION DEPTH: 129.9ft
TEST DATE: 10/18/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: T Dowd & D Garza
REVIEWED BY: R Howard

LOG OF CPT-44

Tunnel Segment of SVRT Project
San Jose, California

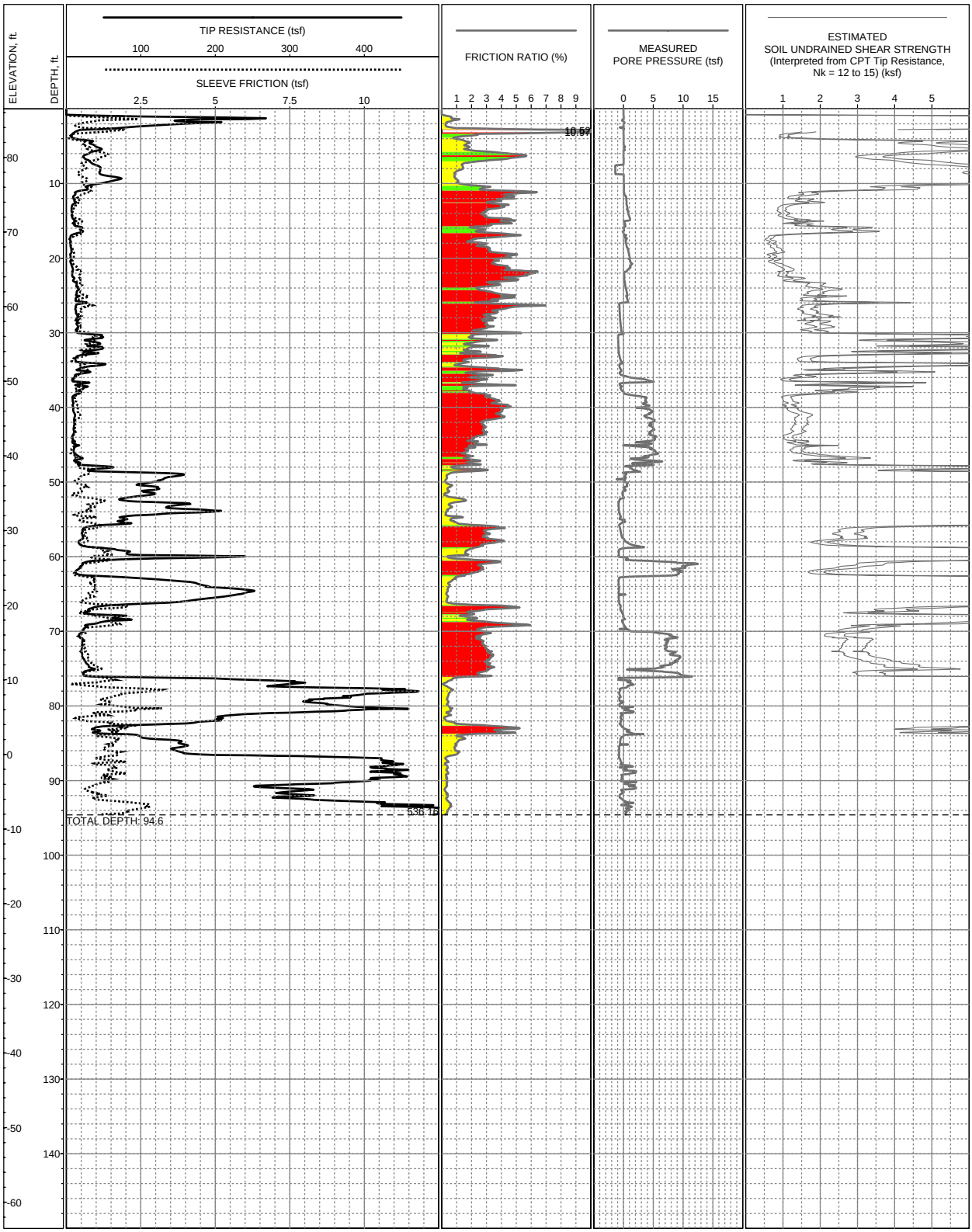


LOCATION: E6157769.8 N1948091.3 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 84.6ft (NAVD88)
COMPLETION DEPTH: 115.7ft
TEST DATE: 10/29/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-45

Tunnel Segment of SVRT Project
San Jose, California

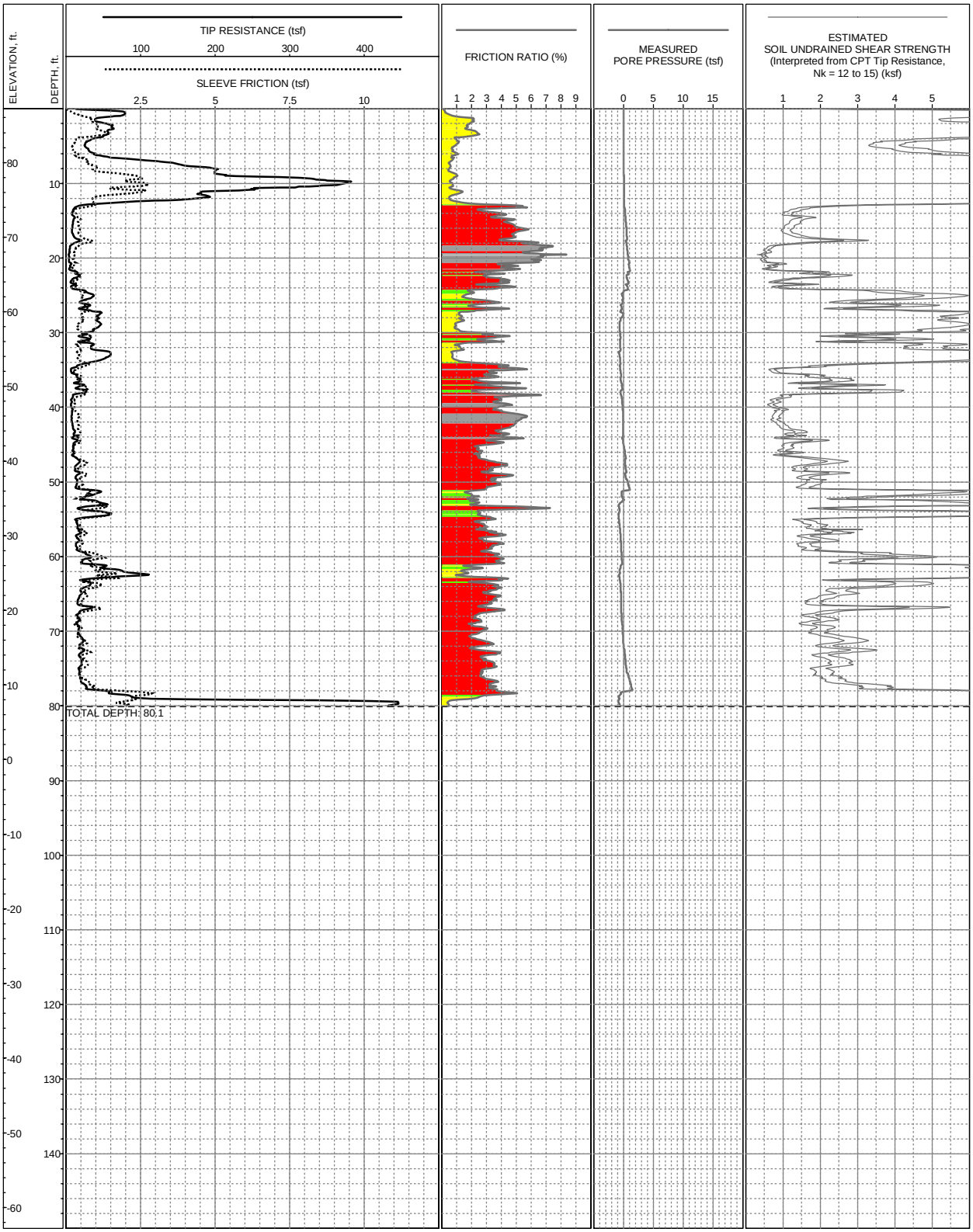


LOCATION: E6157547.7 N1947948.7 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 86.5ft (NAVD88)
COMPLETION DEPTH: 94.6ft
TEST DATE: 11/10/2004

CONE: F7.5CKEW750
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-46

Tunnel Segment of SVRT Project
San Jose, California

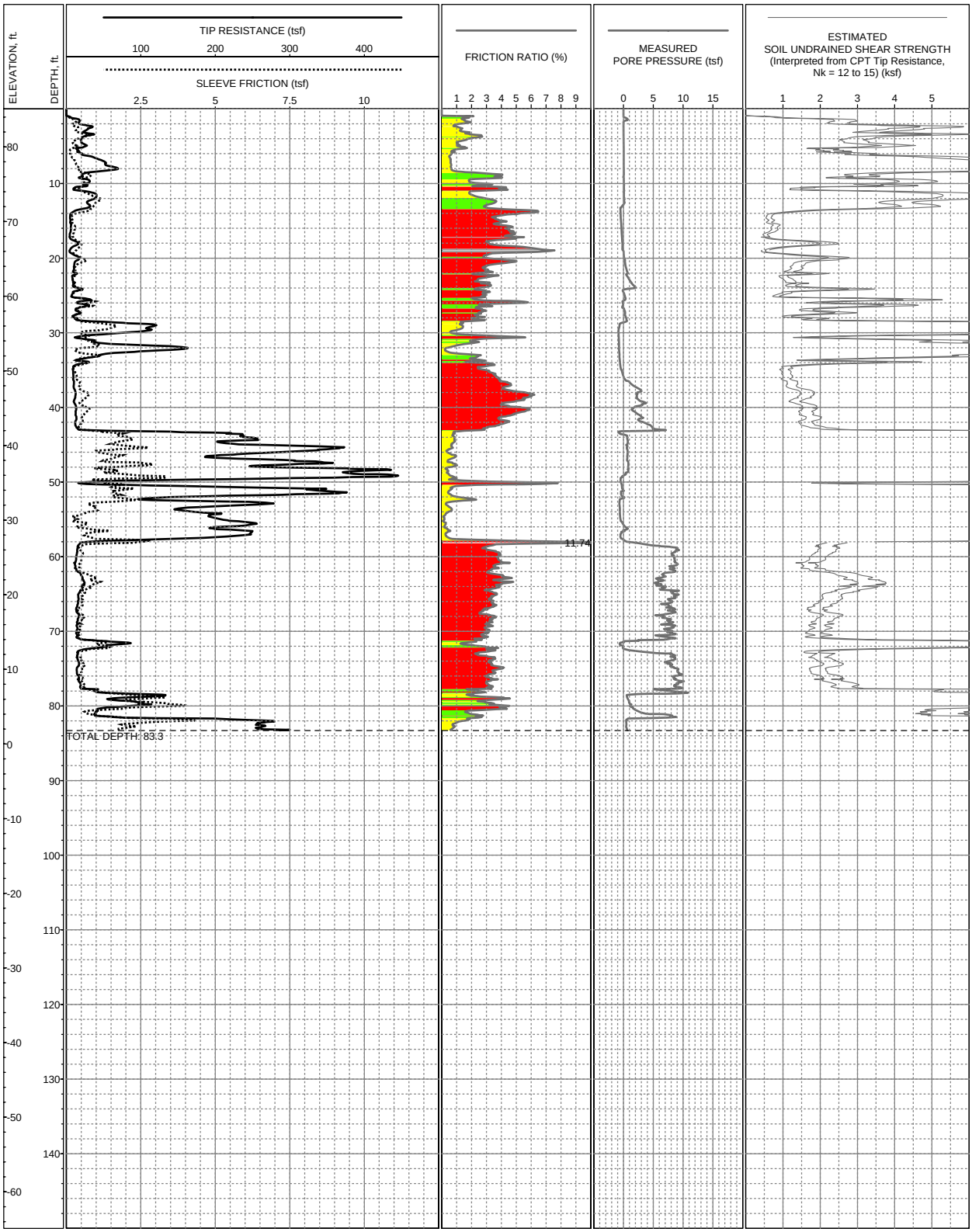


LOCATION: E6157316.2 N1947850.1 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 87.2ft (NAVD88)
COMPLETION DEPTH: 80.1ft
TEST DATE: 11/18/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-47

Tunnel Segment of SVRT Project
San Jose, California

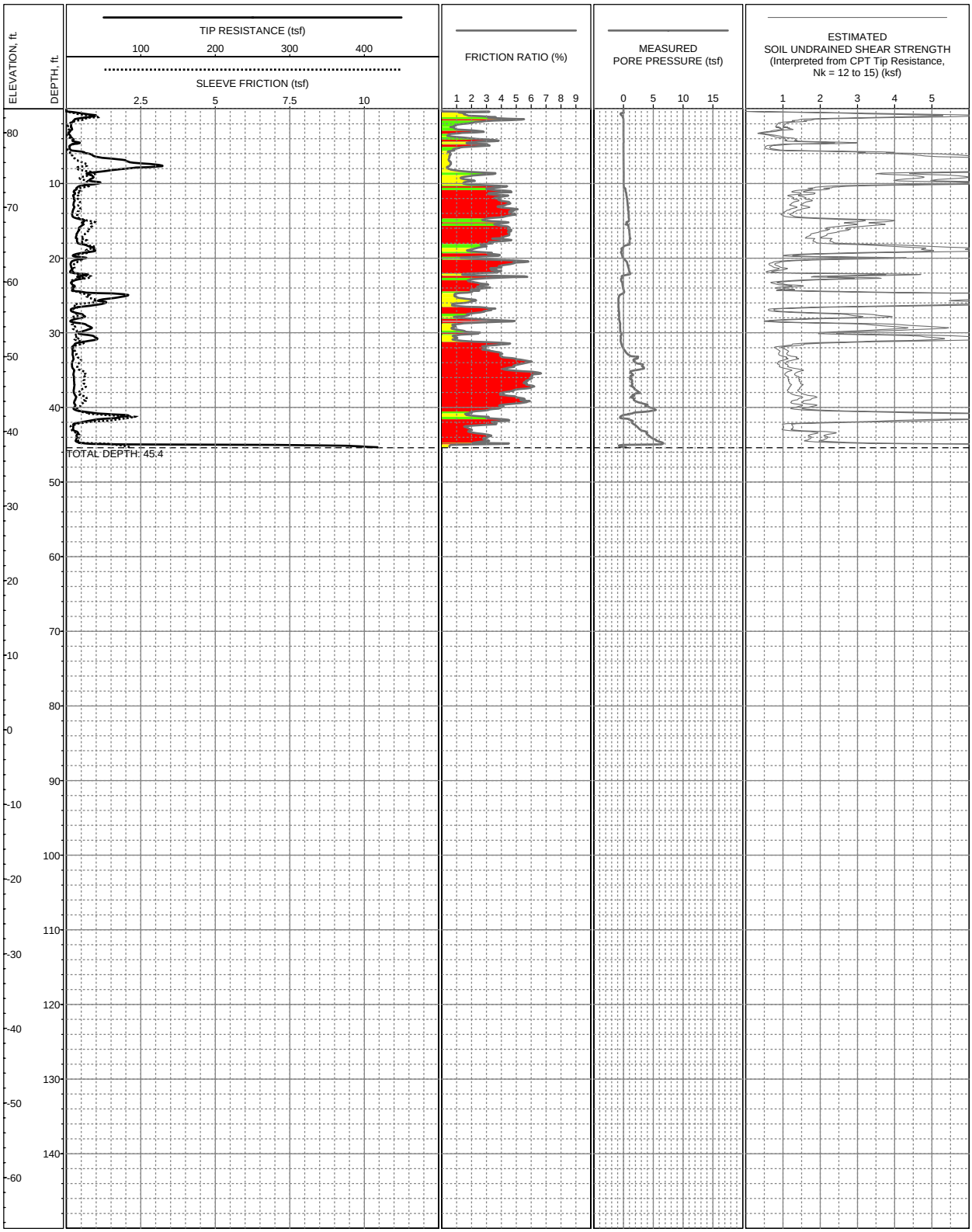


LOCATION: E6156470.5 N1947254.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 85.1ft (NAVD88)
COMPLETION DEPTH: 83.3ft
TEST DATE: 10/26/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-48

Tunnel Segment of SVRT Project
San Jose, California

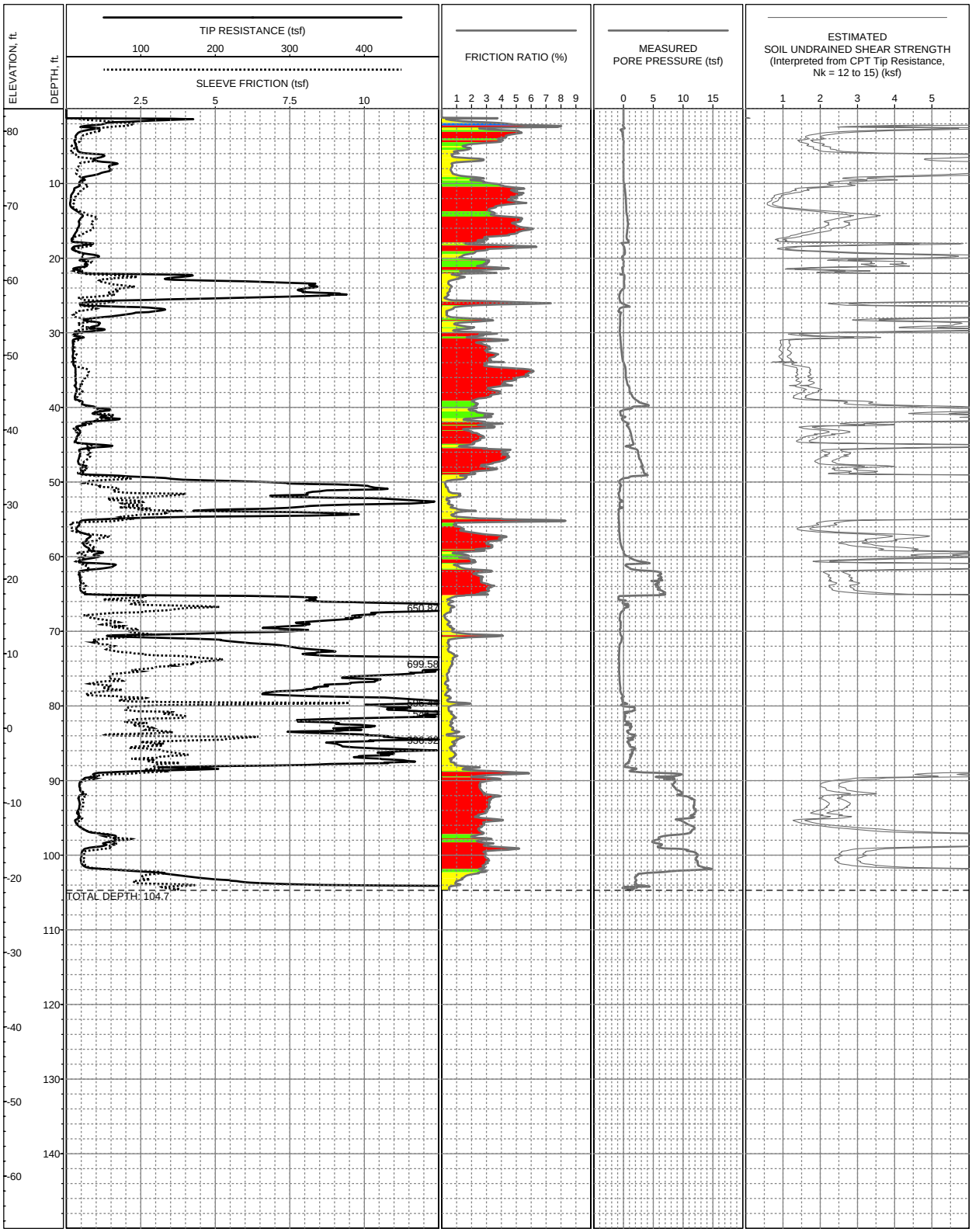


LOCATION: E6156188.4 N1947256.4 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 83.2ft (NAVD88)
COMPLETION DEPTH: 45.4ft
TEST DATE: 10/26/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-49

Tunnel Segment of SVRT Project
San Jose, California

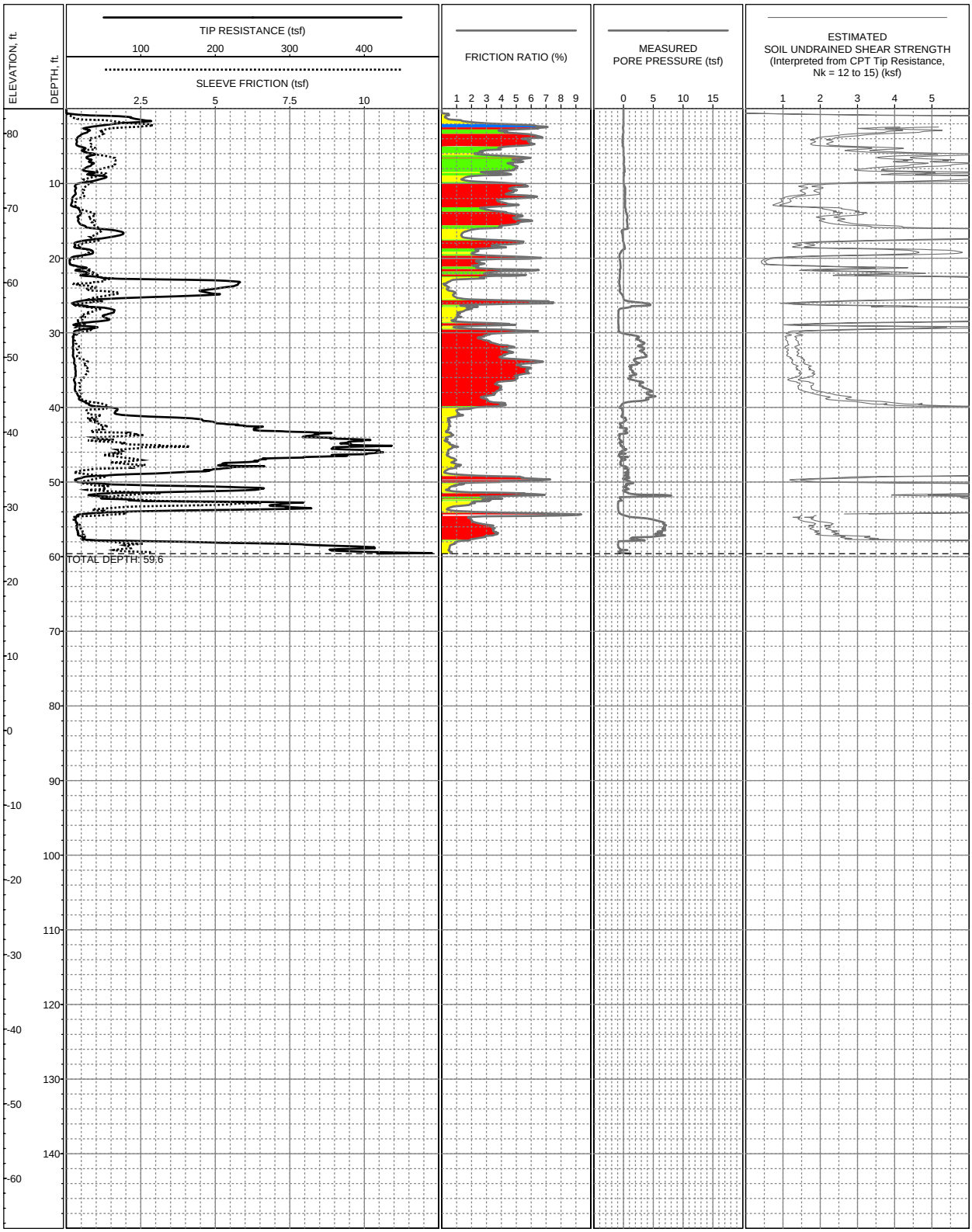


LOCATION: E6156218.6 N1947122.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 83ft (NAVD88)
COMPLETION DEPTH: 104.7ft
TEST DATE: 10/6/2004

CONE: F7.5CKEW966
PERFORMED BY: Fugro Geosciences
OPERATOR: A Fonseca & R Gundlach
REVIEWED BY: R Howard

LOG OF CPT-50

Tunnel Segment of SVRT Project
San Jose, California

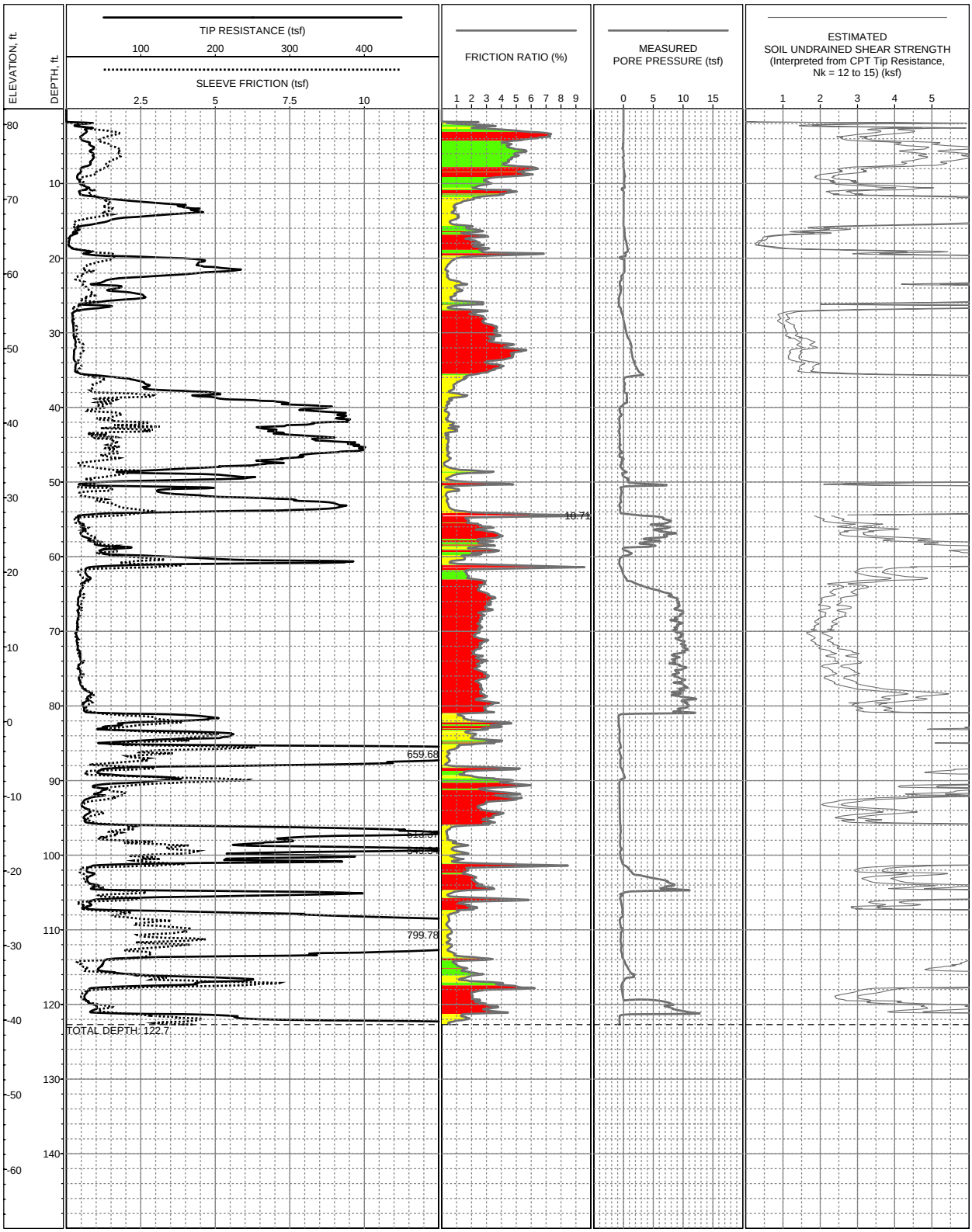


LOCATION: E6156048.4 N1947099 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 83.3ft (NAVD88)
COMPLETION DEPTH: 59.6ft
TEST DATE: 10/28/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-51

Tunnel Segment of SVRT Project
San Jose, California

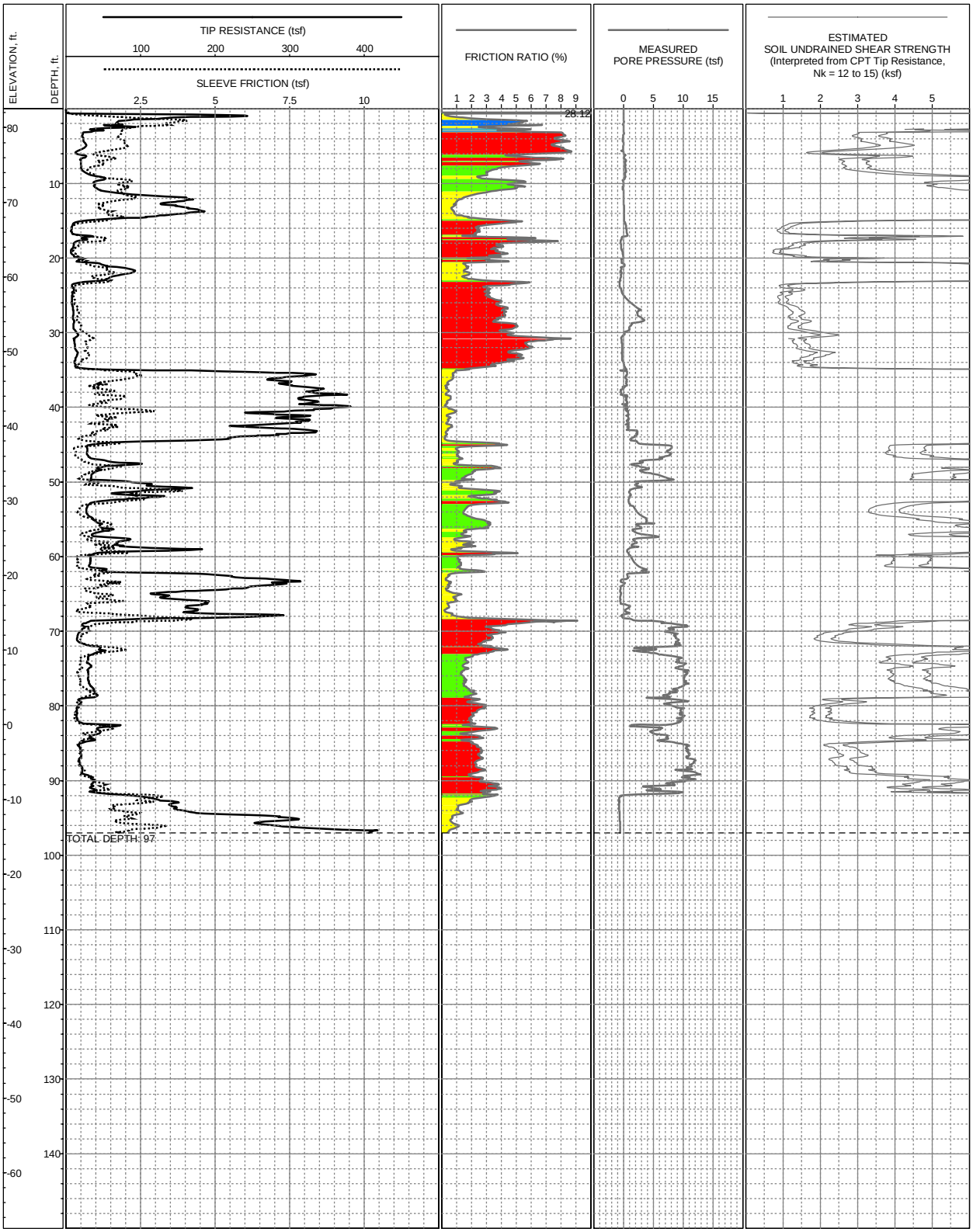


LOCATION: E6155858.6 N1946957.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 82.1ft (NAVD88)
COMPLETION DEPTH: 122.7ft
TEST DATE: 10/6/2004

CONE: F7.5CKEW966
PERFORMED BY: Fugro Geosciences
OPERATOR: A Fonseca & R Gundlach
REVIEWED BY: R Howard

LOG OF CPT-52

Tunnel Segment of SVRT Project
San Jose, California

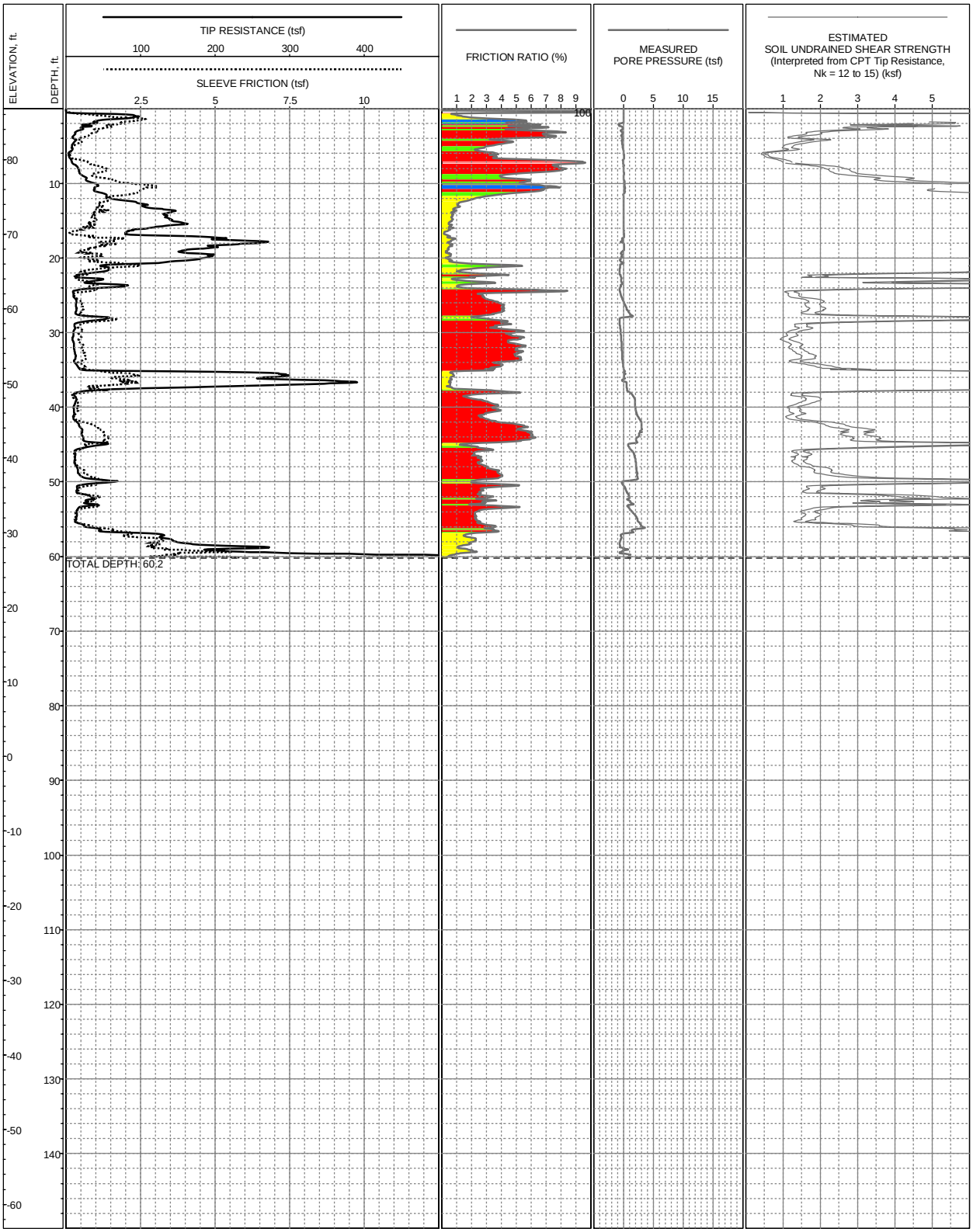


LOCATION: E6155582.6 N1946712 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 82.5ft (NAVD88)
COMPLETION DEPTH: 97ft
TEST DATE: 12/2/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-53

Tunnel Segment of SVRT Project
San Jose, California

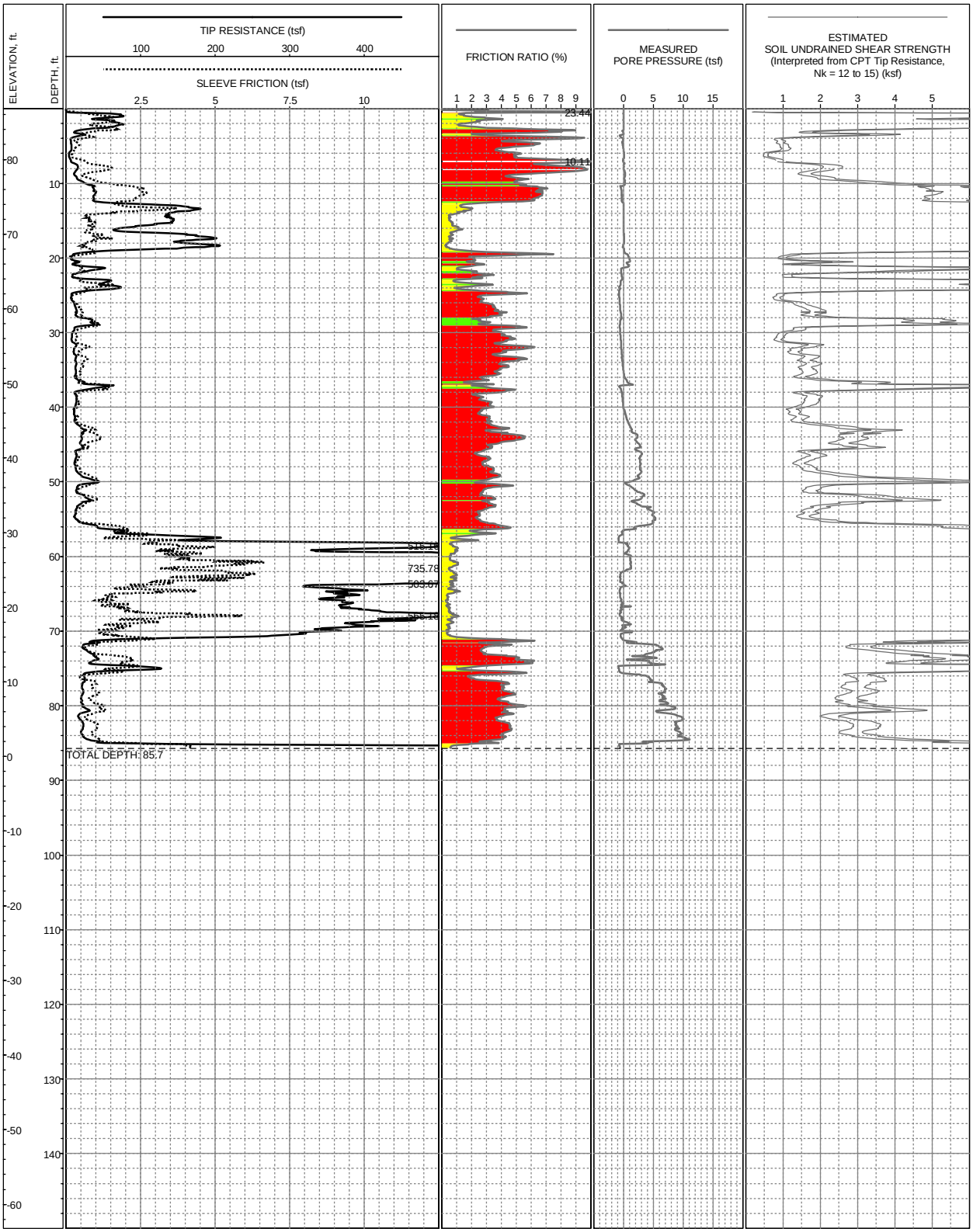


LOCATION: E6155158.6 N1946349.4 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 86.8ft (NAVD88)
COMPLETION DEPTH: 60.2ft
TEST DATE: 2/23/2005

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-55

Tunnel Segment of SVRT Project
San Jose, California

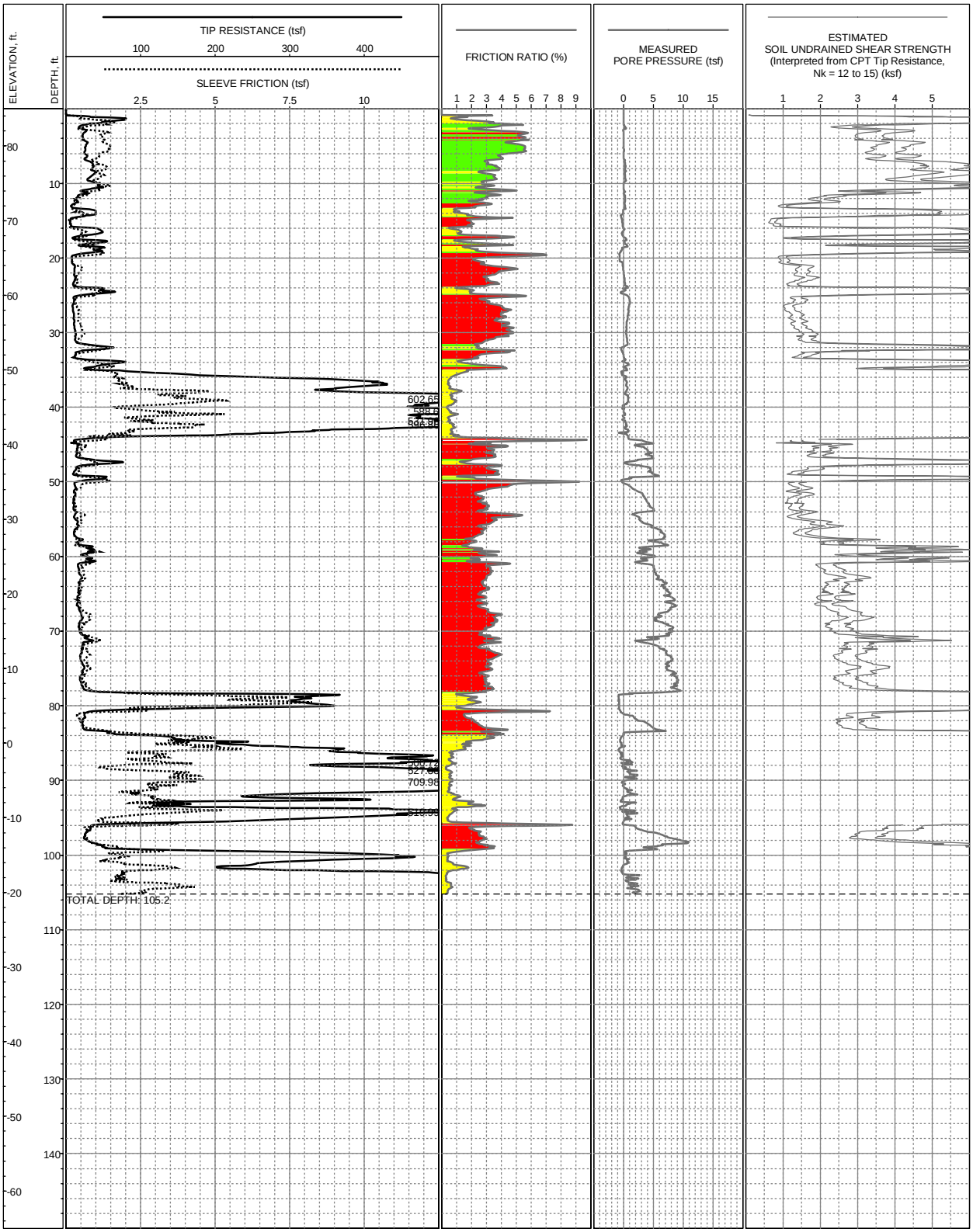


LOCATION: E6155165.8 N1946360.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 86.8ft (NAVD88)
COMPLETION DEPTH: 85.7ft
TEST DATE: 2/23/2005

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-55A

Tunnel Segment of SVRT Project
San Jose, California

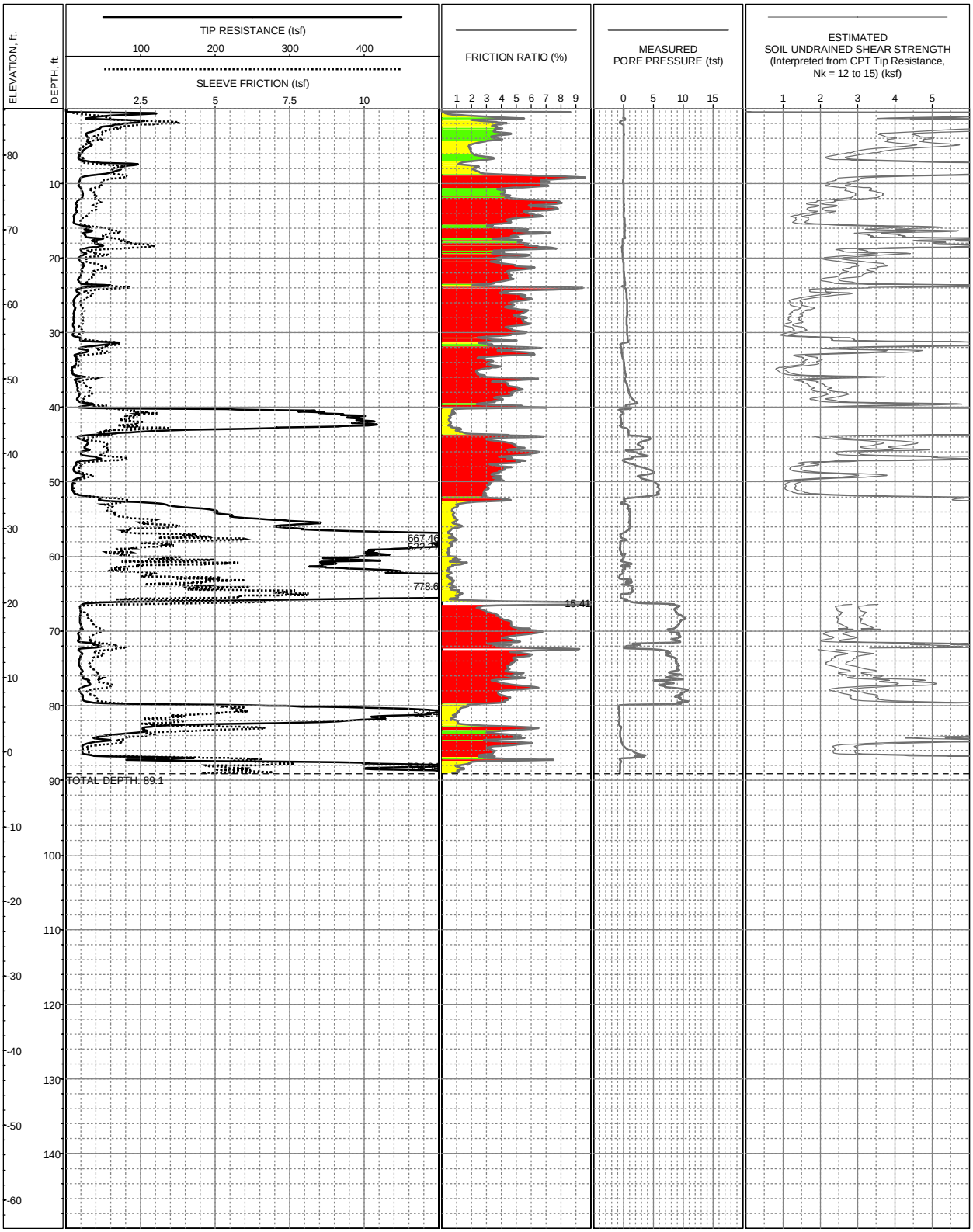


LOCATION: E6155059.6 N1946173.1 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 85ft (NAVD88)
COMPLETION DEPTH: 105.2ft
TEST DATE: 1/19/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-56

Tunnel Segment of SVRT Project
San Jose, California

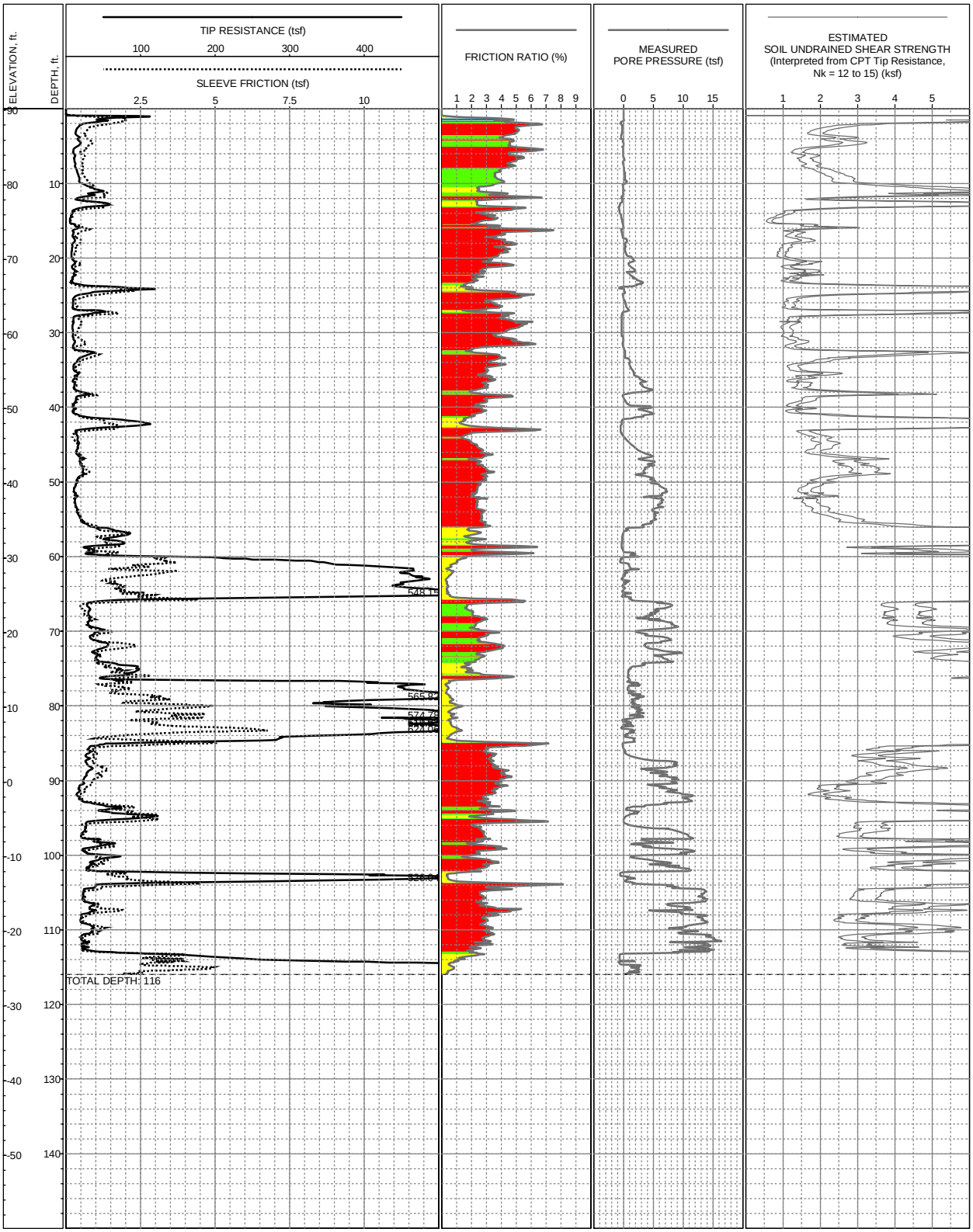


LOCATION: E6154866.4 N1946164 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 86.2ft (NAVD88)
COMPLETION DEPTH: 89.1ft
TEST DATE: 2/22/2005

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-57

Tunnel Segment of SVRT Project
San Jose, California

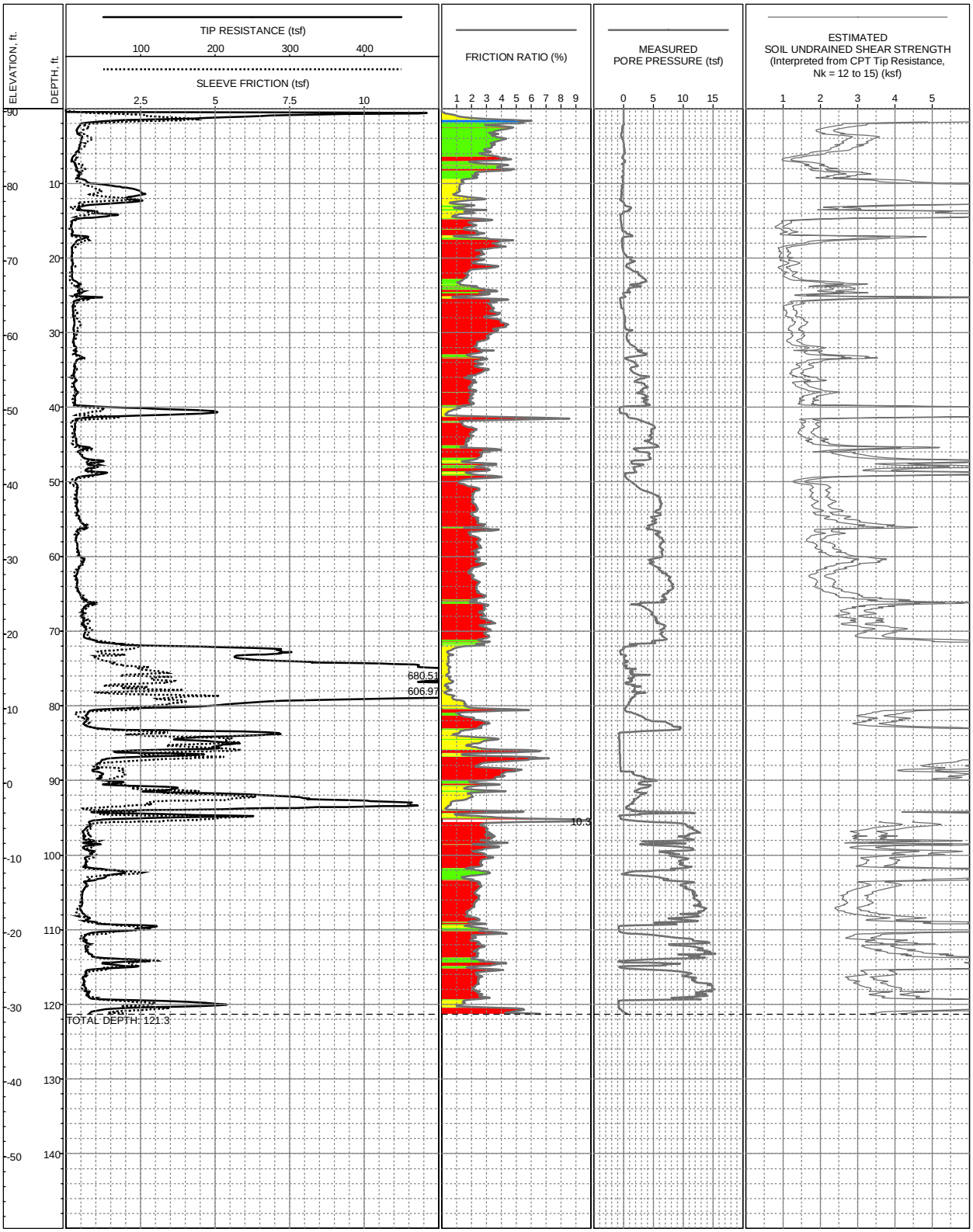


LOCATION: E6153270.8 N1945962.8 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 90.2ft (NAVD88)
COMPLETION DEPTH: 116ft
TEST DATE: 12/21/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-60

Tunnel Segment of SVRT Project
San Jose, California

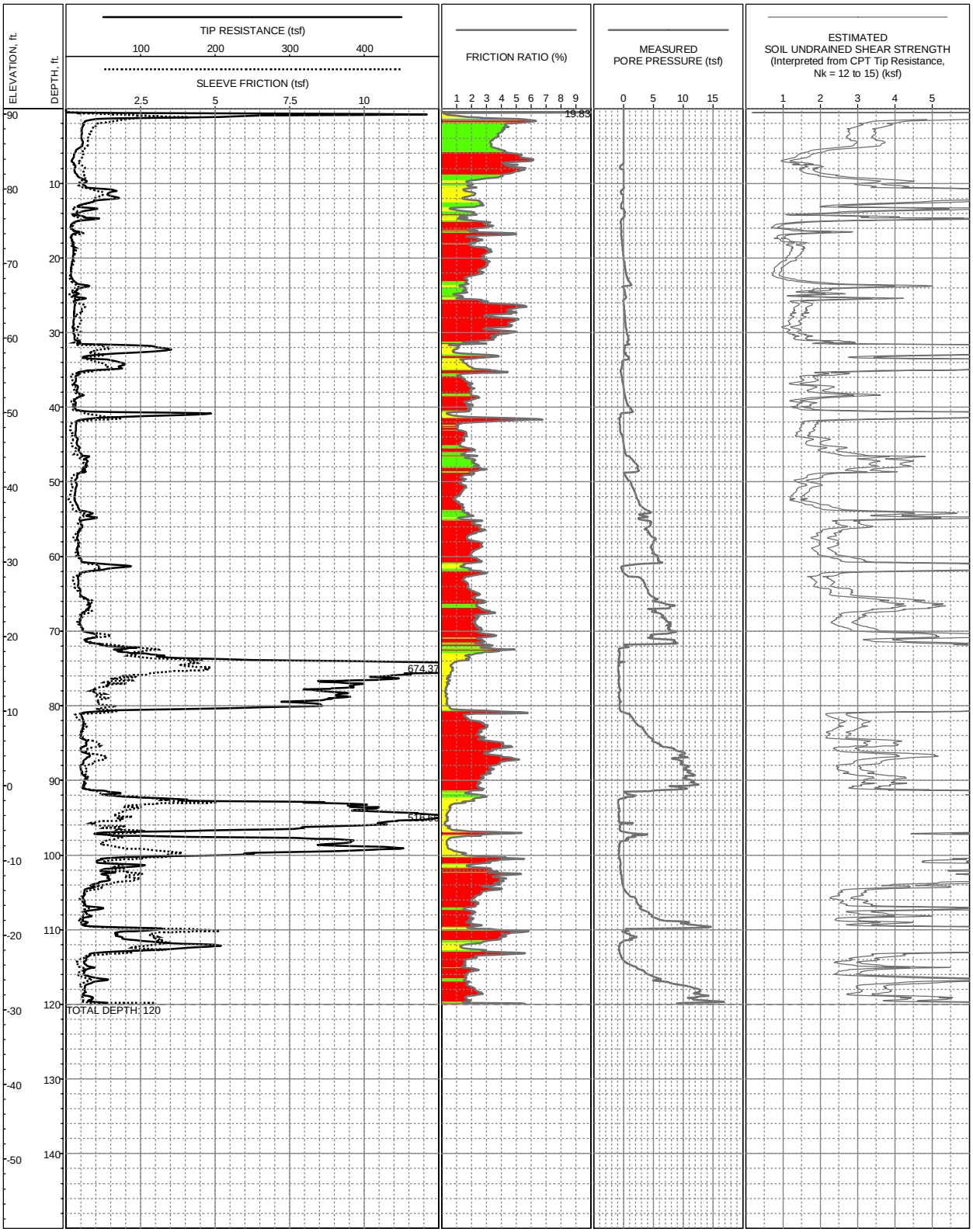


LOCATION: E6153015.6 N1946079.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 90.4ft (NAVD88)
COMPLETION DEPTH: 121.3ft
TEST DATE: 1/11/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-61

Tunnel Segment of SVRT Project
San Jose, California

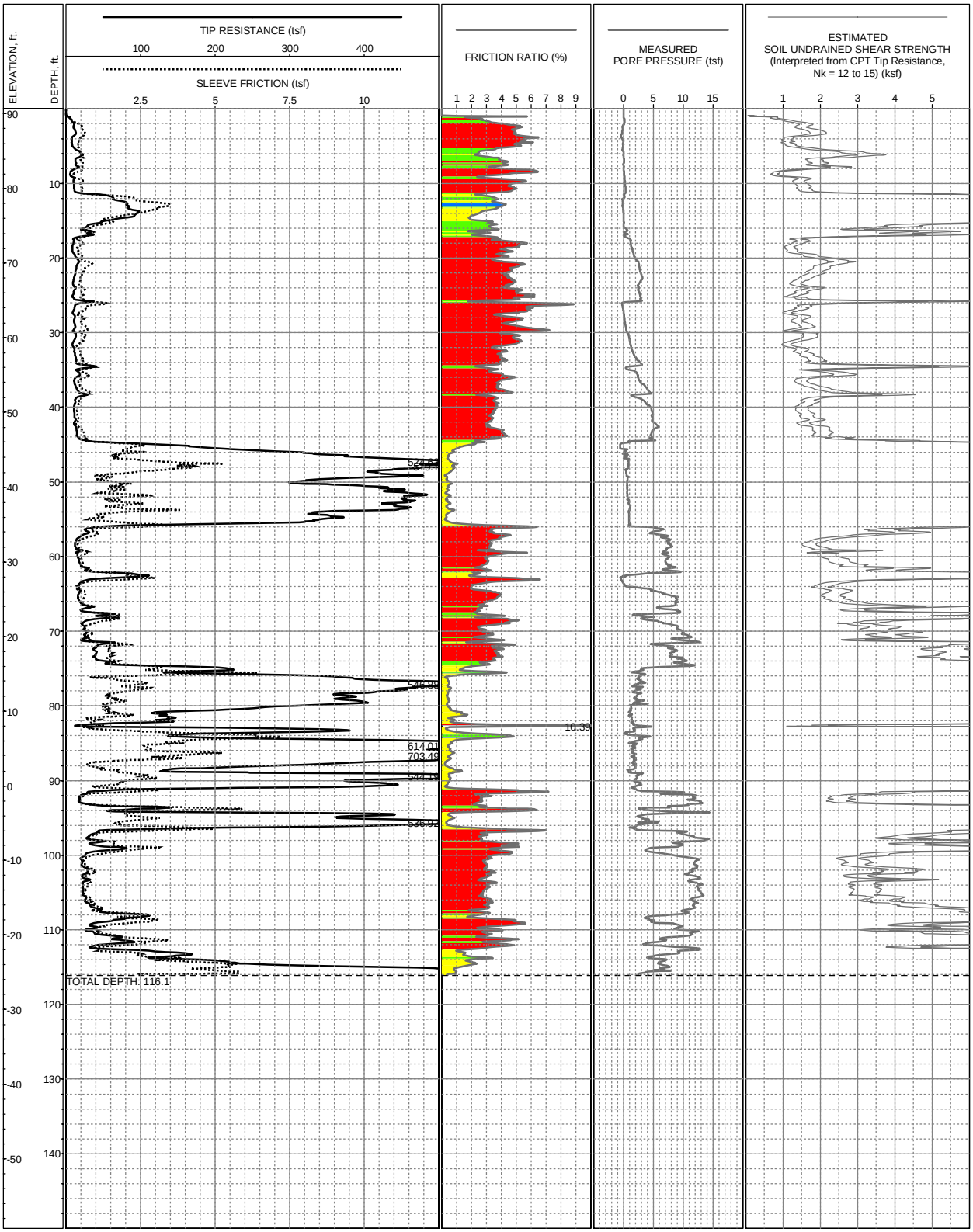


LOCATION: E6152905.6 N1946105.8 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 90.3ft (NAVD88)
COMPLETION DEPTH: 120ft
TEST DATE: 1/24/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-62

Tunnel Segment of SVRT Project
San Jose, California

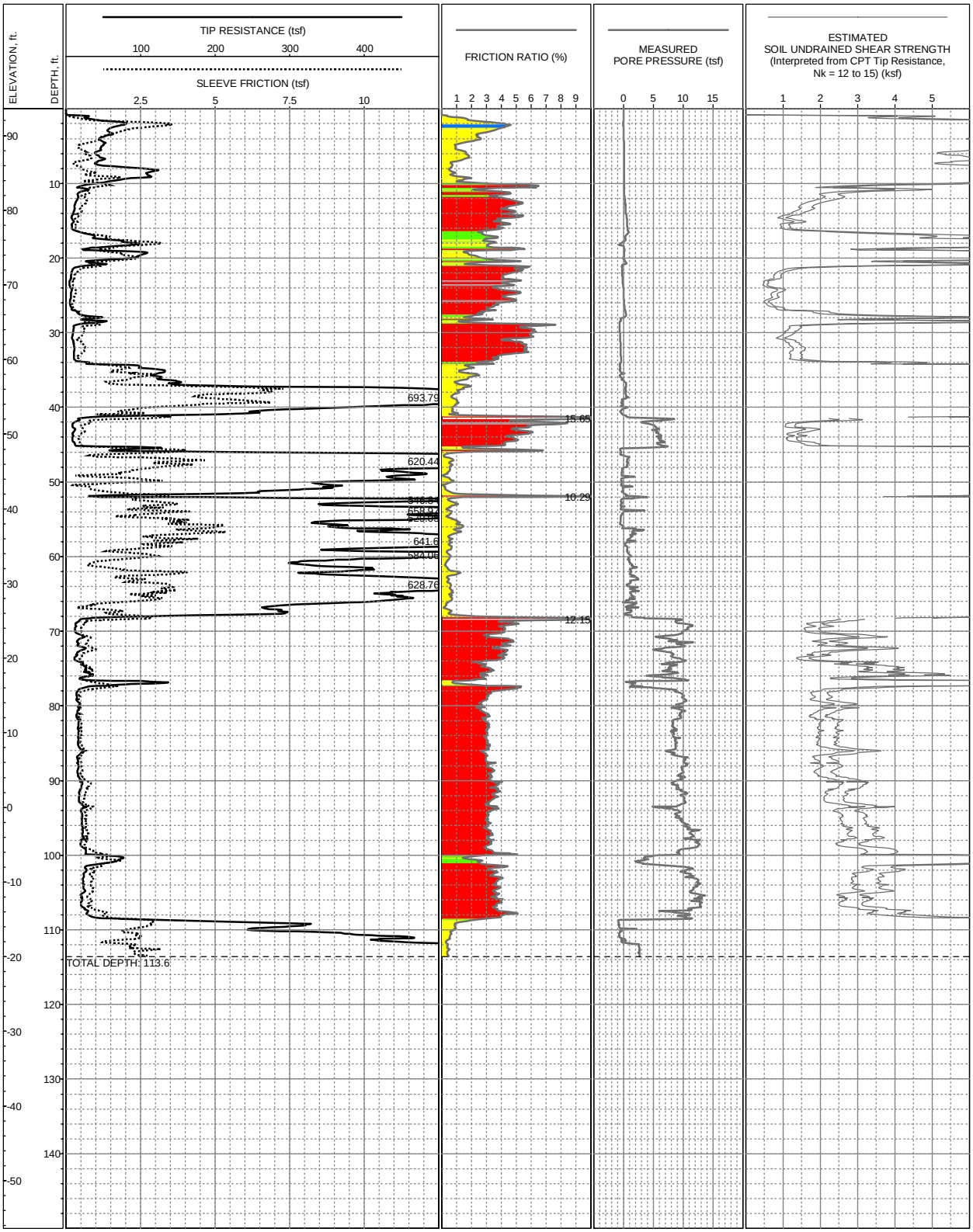


LOCATION: E6152711.1 N1946190.4 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 90.7ft (NAVD88)
COMPLETION DEPTH: 116.1ft
TEST DATE: 12/22/2004

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-63

Tunnel Segment of SVRT Project
San Jose, California

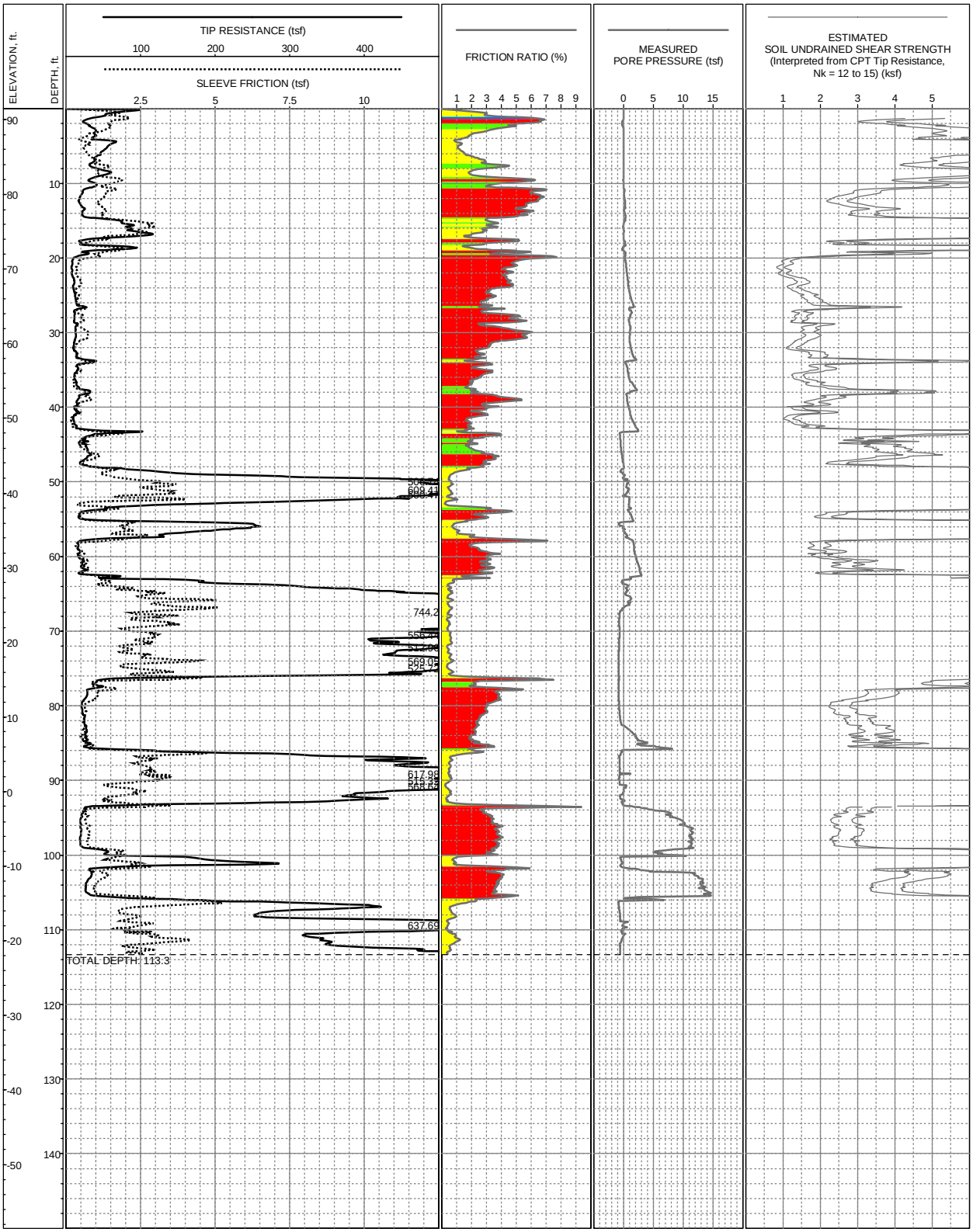


LOCATION: E6152410.2 N1946319.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 93.6ft (NAVD88)
COMPLETION DEPTH: 113.6ft
TEST DATE: 12/2/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-64

Tunnel Segment of SVRT Project
San Jose, California

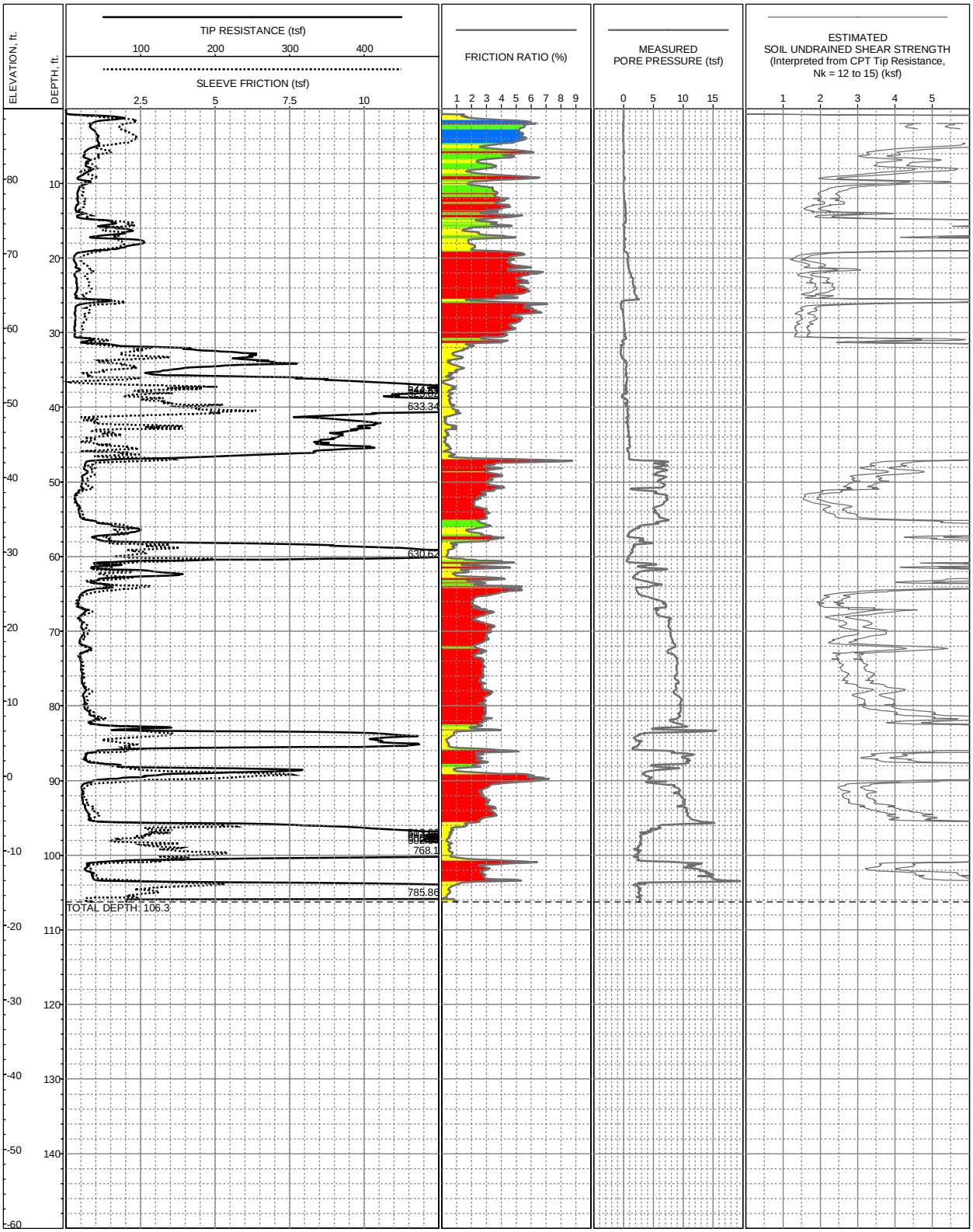


LOCATION: E6152301.9 N1946505.2 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 91.5ft (NAVD88)
COMPLETION DEPTH: 113.3ft
TEST DATE: 1/24/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-65

Tunnel Segment of SVRT Project
San Jose, California

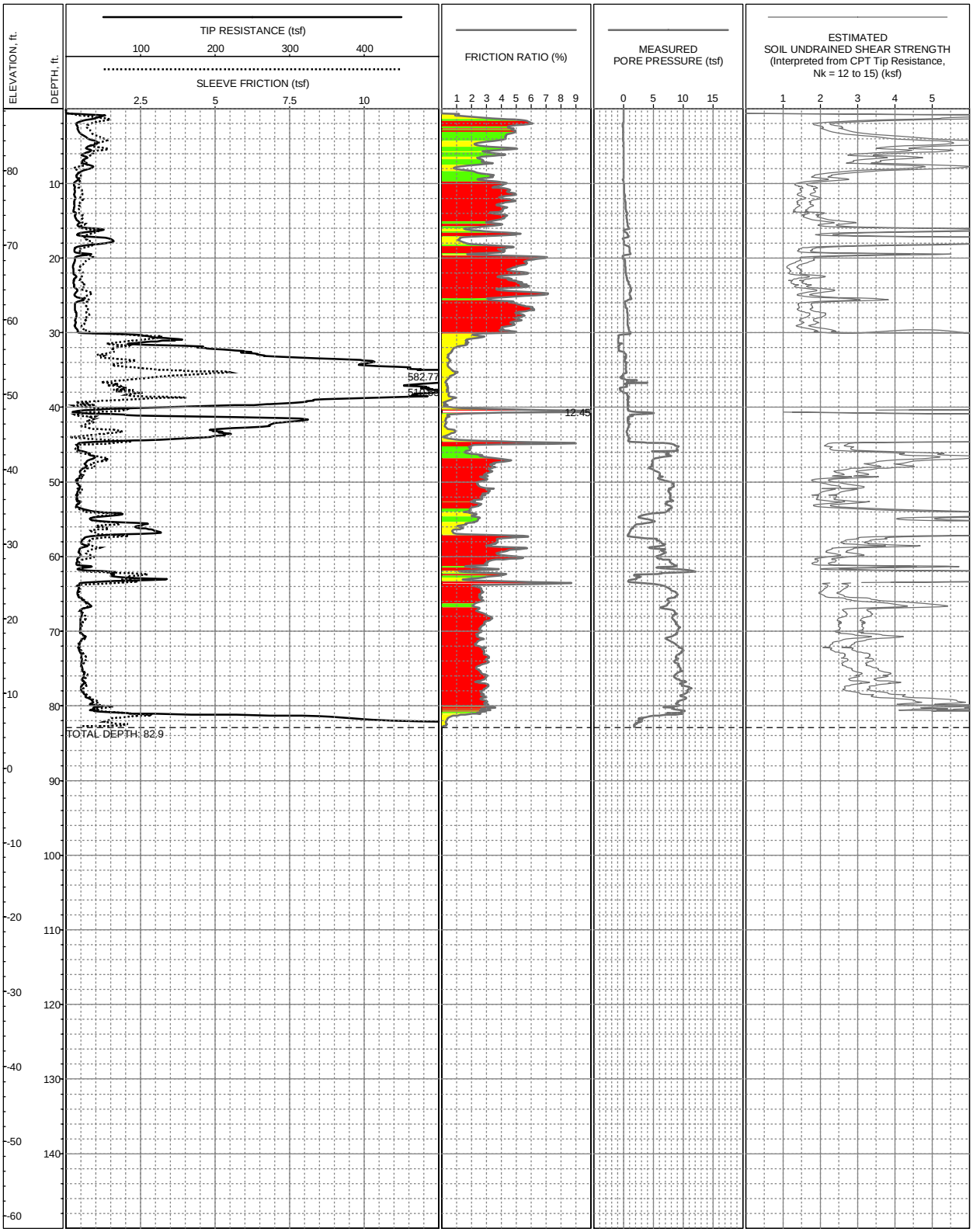


LOCATION: E6152192.4 N1946762.7 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 89.4ft (NAVD88)
COMPLETION DEPTH: 106.3ft
TEST DATE: 12/27/2004

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & J
REVIEWED BY: R Howard

LOG OF CPT-66

Tunnel Segment of SVRT Project
San Jose, California

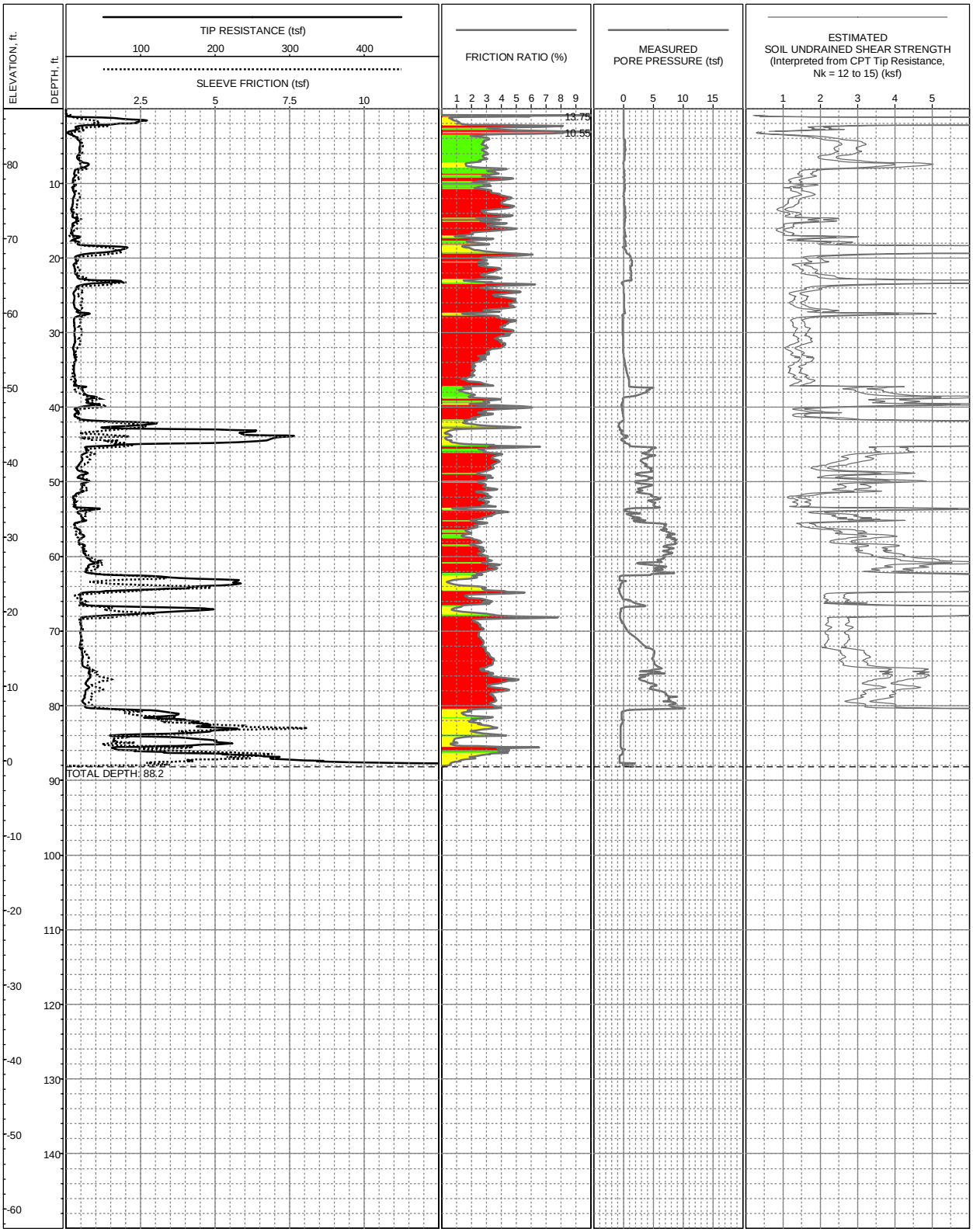


LOCATION: E6152187.3 N1946892.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88.3ft (NAVD88)
COMPLETION DEPTH: 82.9ft
TEST DATE: 1/6/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & J
REVIEWED BY: R Howard

LOG OF CPT-67

Tunnel Segment of SVRT Project
San Jose, California

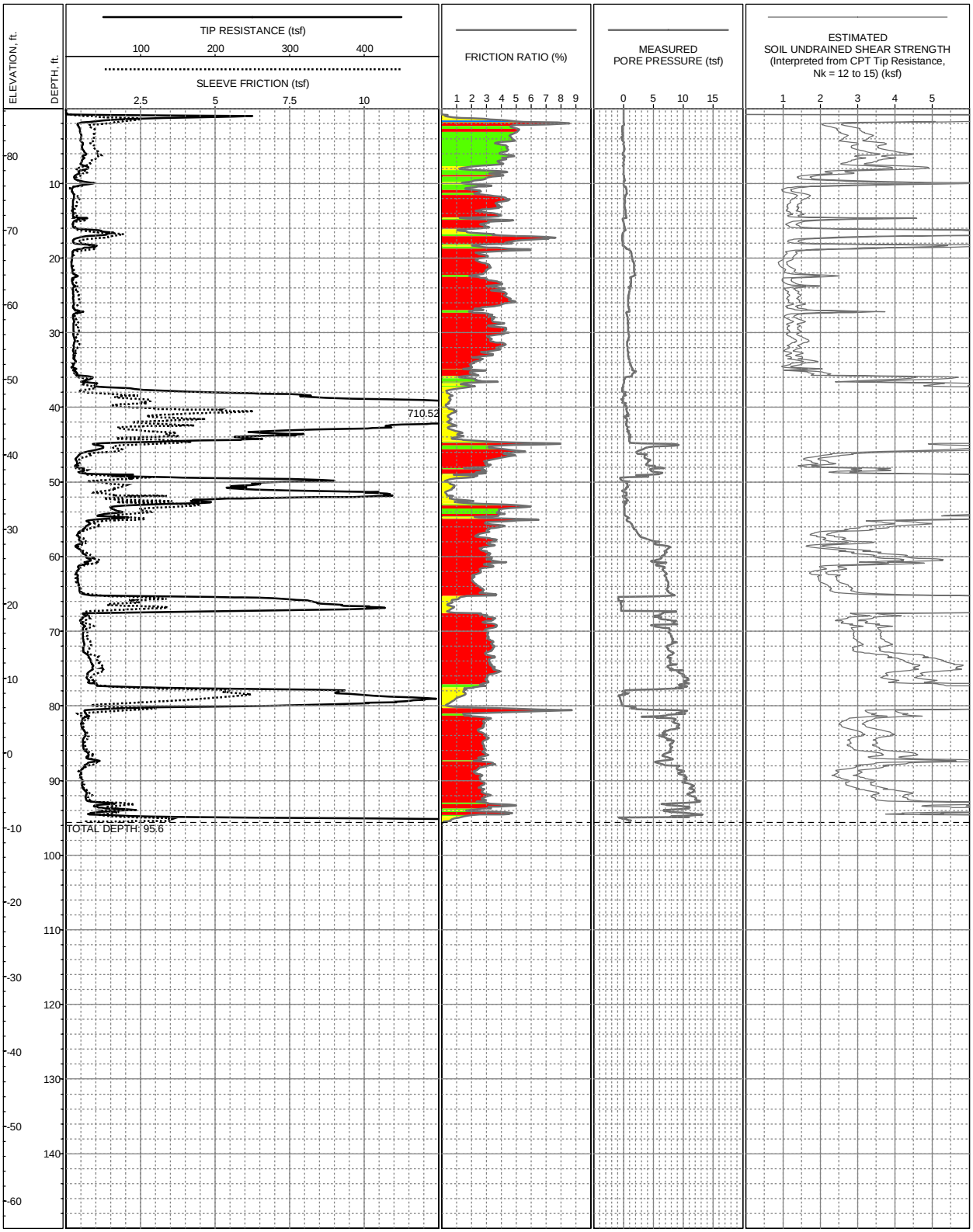


LOCATION: E6152096.3 N1947093.4 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 87.4ft (NAVD88)
COMPLETION DEPTH: 88.2ft
TEST DATE: 1/20/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-68

Tunnel Segment of SVRT Project
San Jose, California

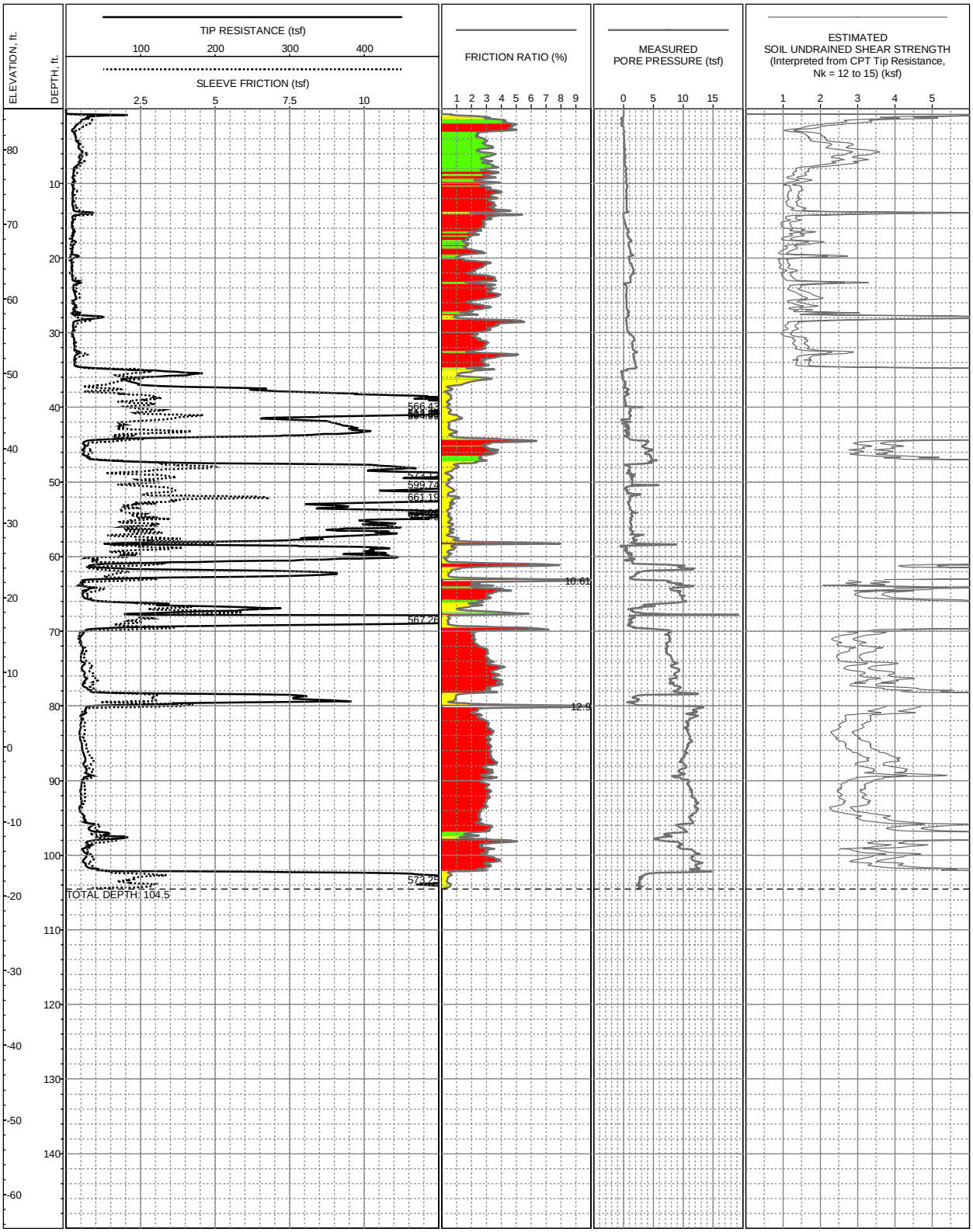


LOCATION: E6152038.7 N1947204.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 86.3ft (NAVD88)
COMPLETION DEPTH: 95.6ft
TEST DATE: 1/7/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & J
REVIEWED BY: R Howard

LOG OF CPT-69

Tunnel Segment of SVRT Project
San Jose, California

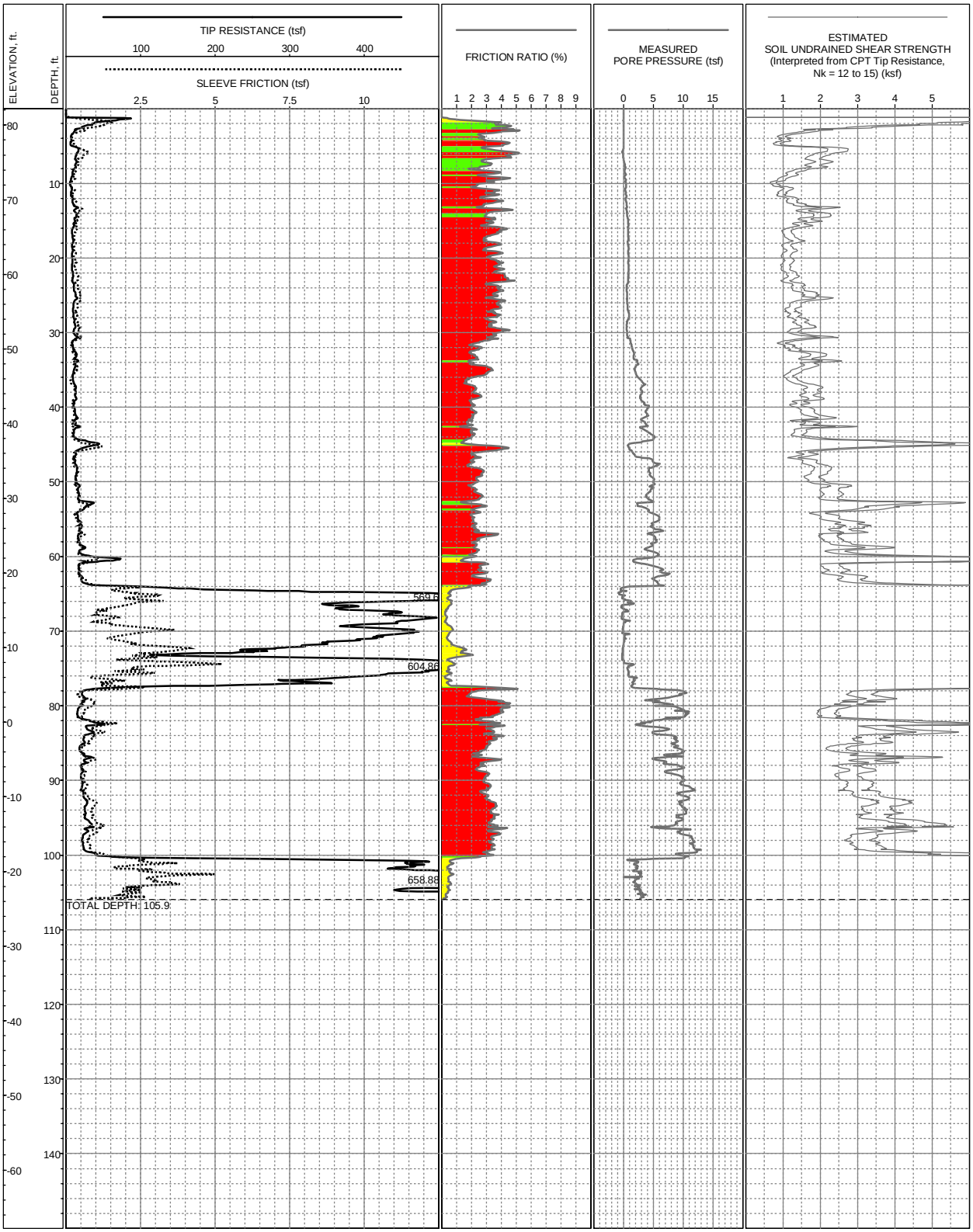


LOCATION: E6152018.5 N1947376.2 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 85.5ft (NAVD88)
COMPLETION DEPTH: 104.5ft
TEST DATE: 1/7/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & J
REVIEWED BY: R Howard

LOG OF CPT-70

Tunnel Segment of SVRT Project
San Jose, California

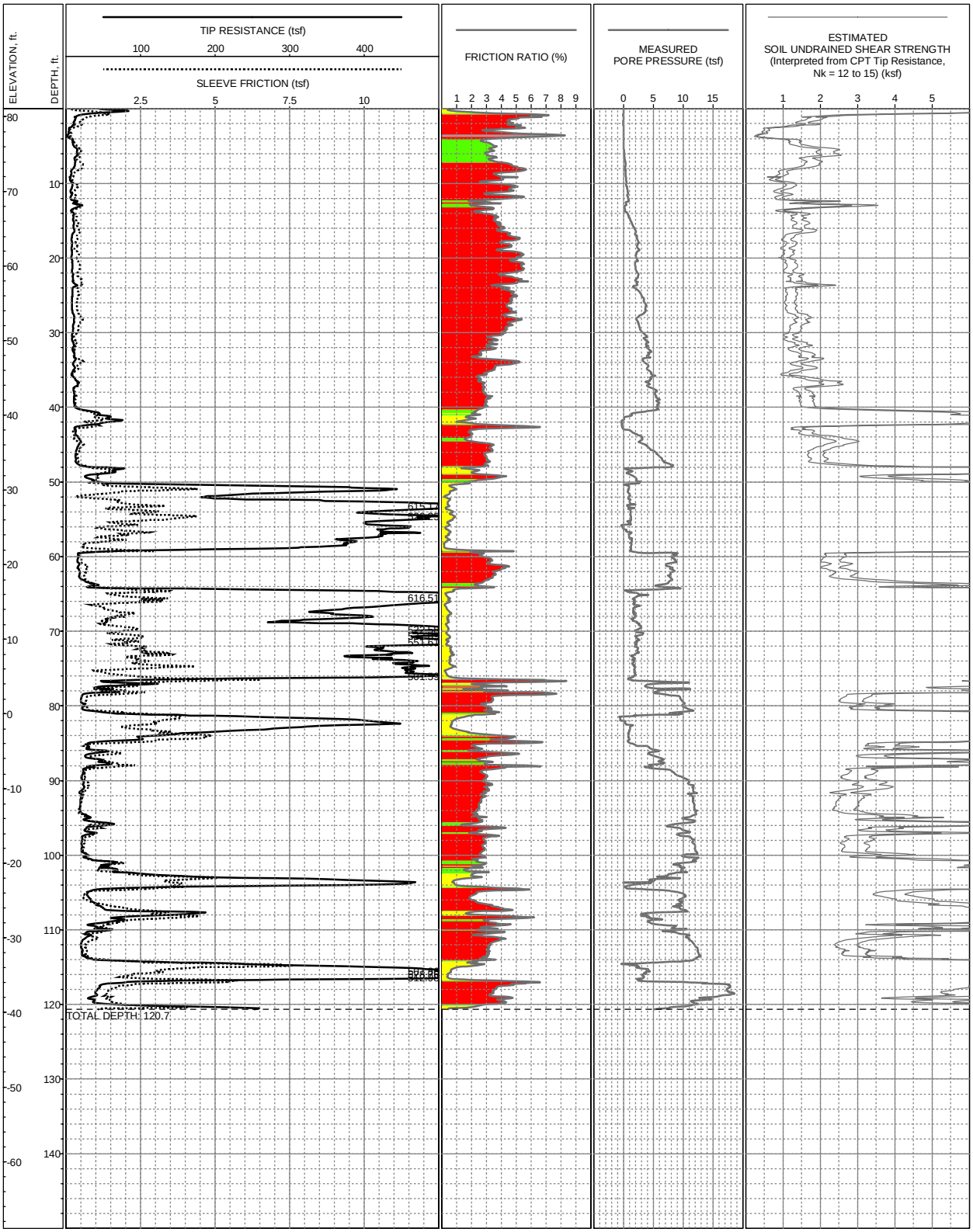


LOCATION: E6151845.5 N1948096.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 82.2ft (NAVD88)
COMPLETION DEPTH: 105.9ft
TEST DATE: 1/11/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-73

Tunnel Segment of SVRT Project
San Jose, California

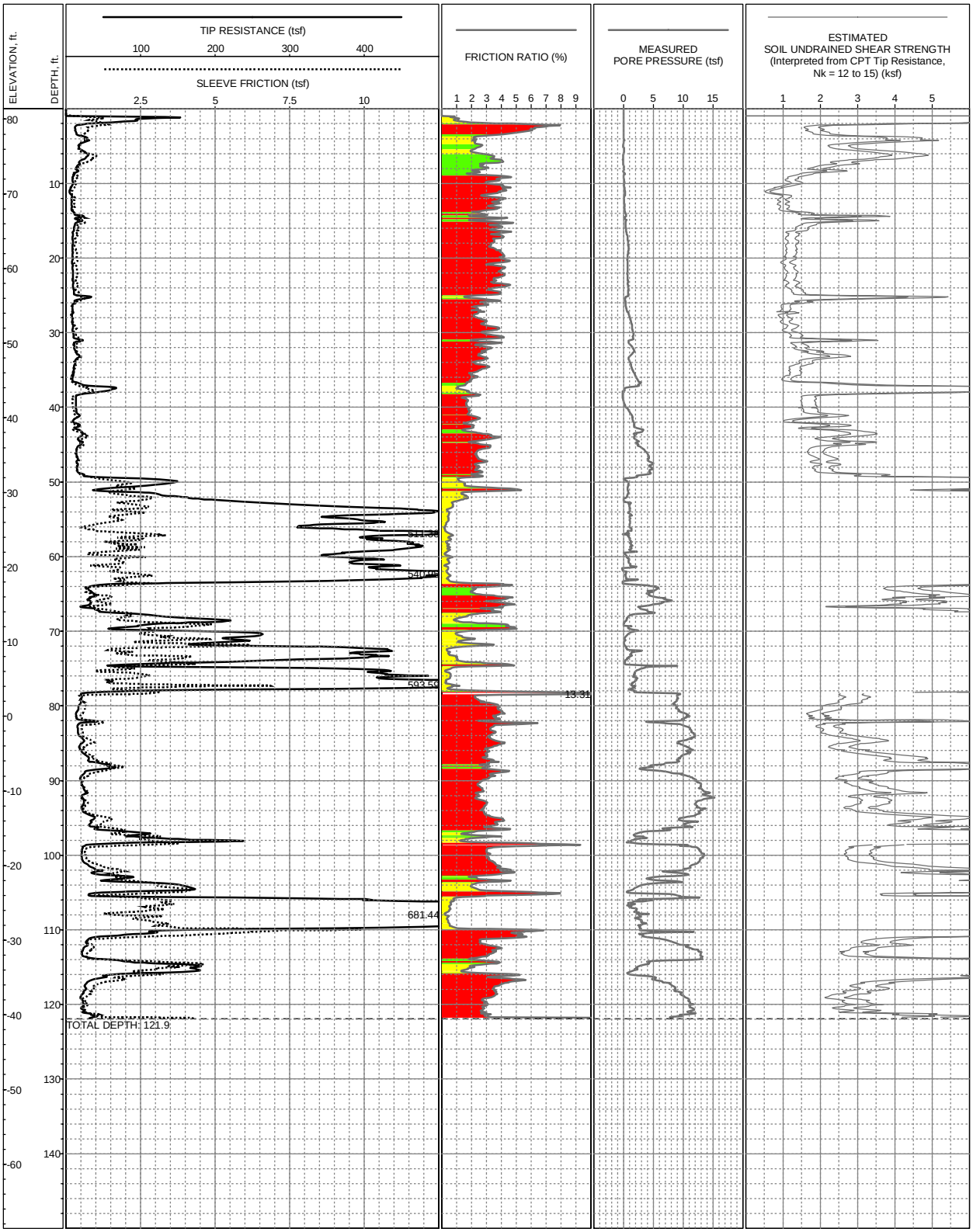


LOCATION: E6151873.6 N1948269.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 81.1ft (NAVD88)
COMPLETION DEPTH: 120.7ft
TEST DATE: 1/4/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & J
REVIEWED BY: R Howard

LOG OF CPT-74

Tunnel Segment of SVRT Project
San Jose, California

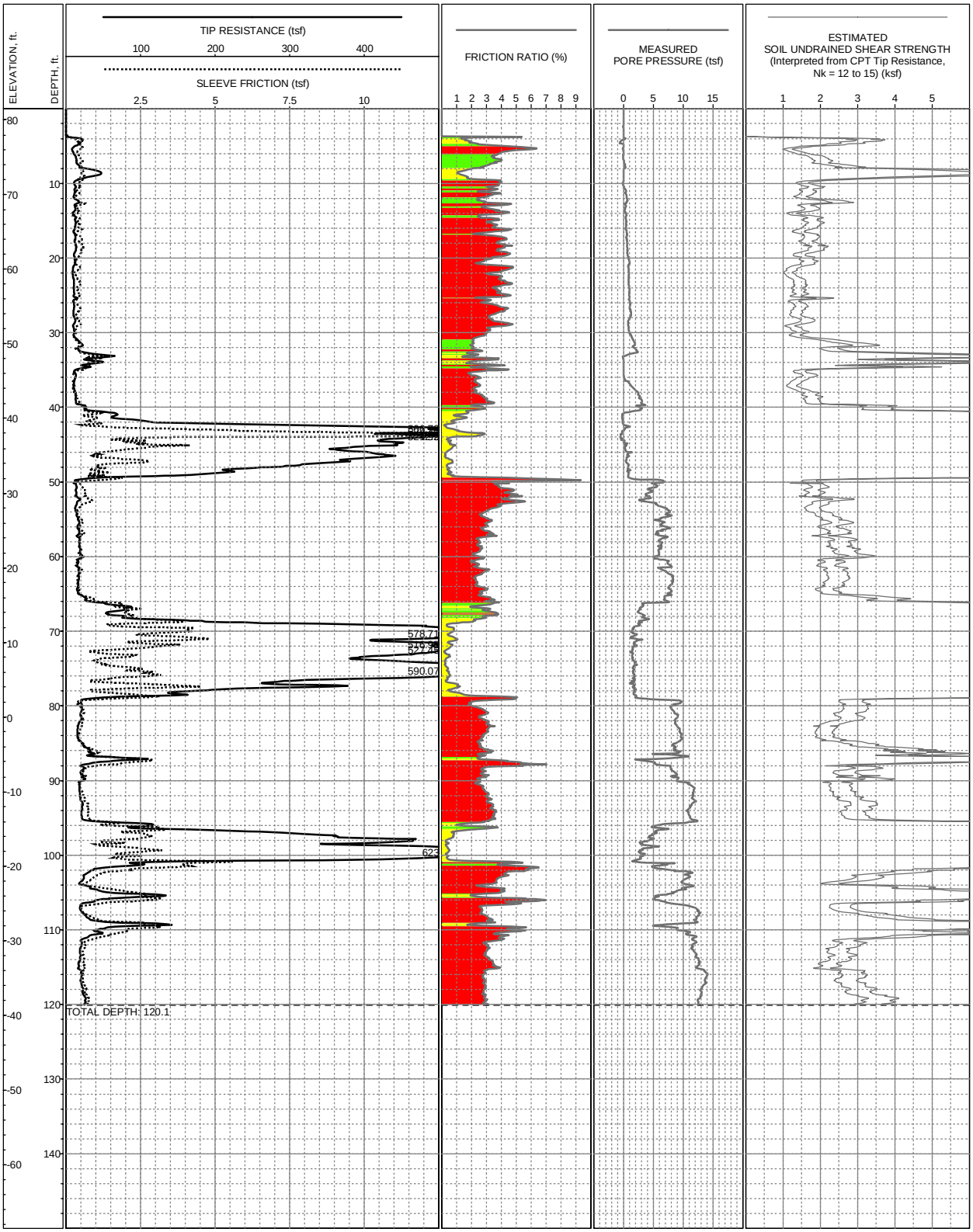


LOCATION: E6151818.8 N1948388.8 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 81.4ft (NAVD88)
COMPLETION DEPTH: 121.9ft
TEST DATE: 1/7/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & J
REVIEWED BY: R Howard

LOG OF CPT-75

Tunnel Segment of SVRT Project
San Jose, California

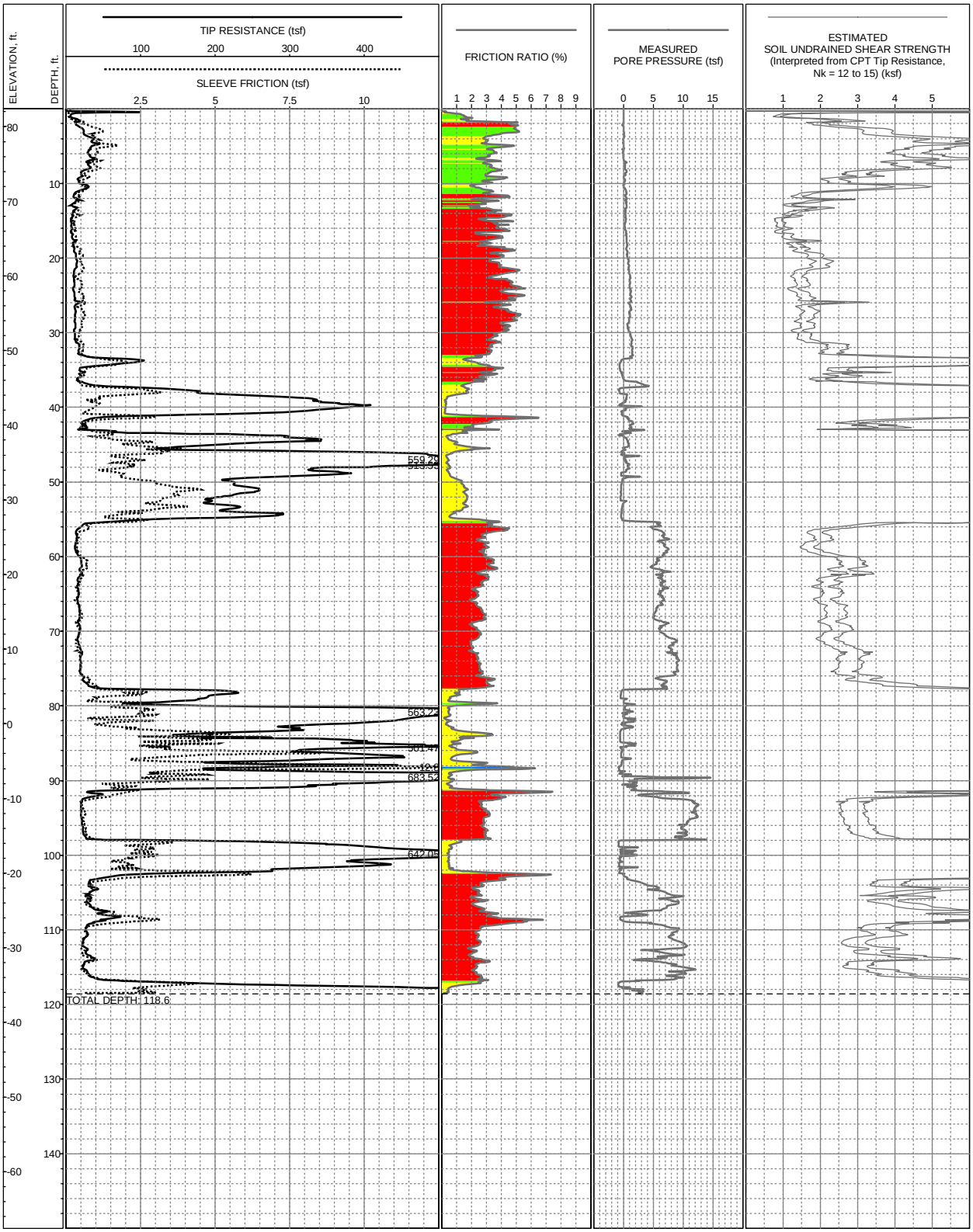


LOCATION: E6151601.5 N1948645.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 81.5ft (NAVD88)
COMPLETION DEPTH: 120.1ft
TEST DATE: 1/6/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & J
REVIEWED BY: R Howard

LOG OF CPT-76

Tunnel Segment of SVRT Project
San Jose, California

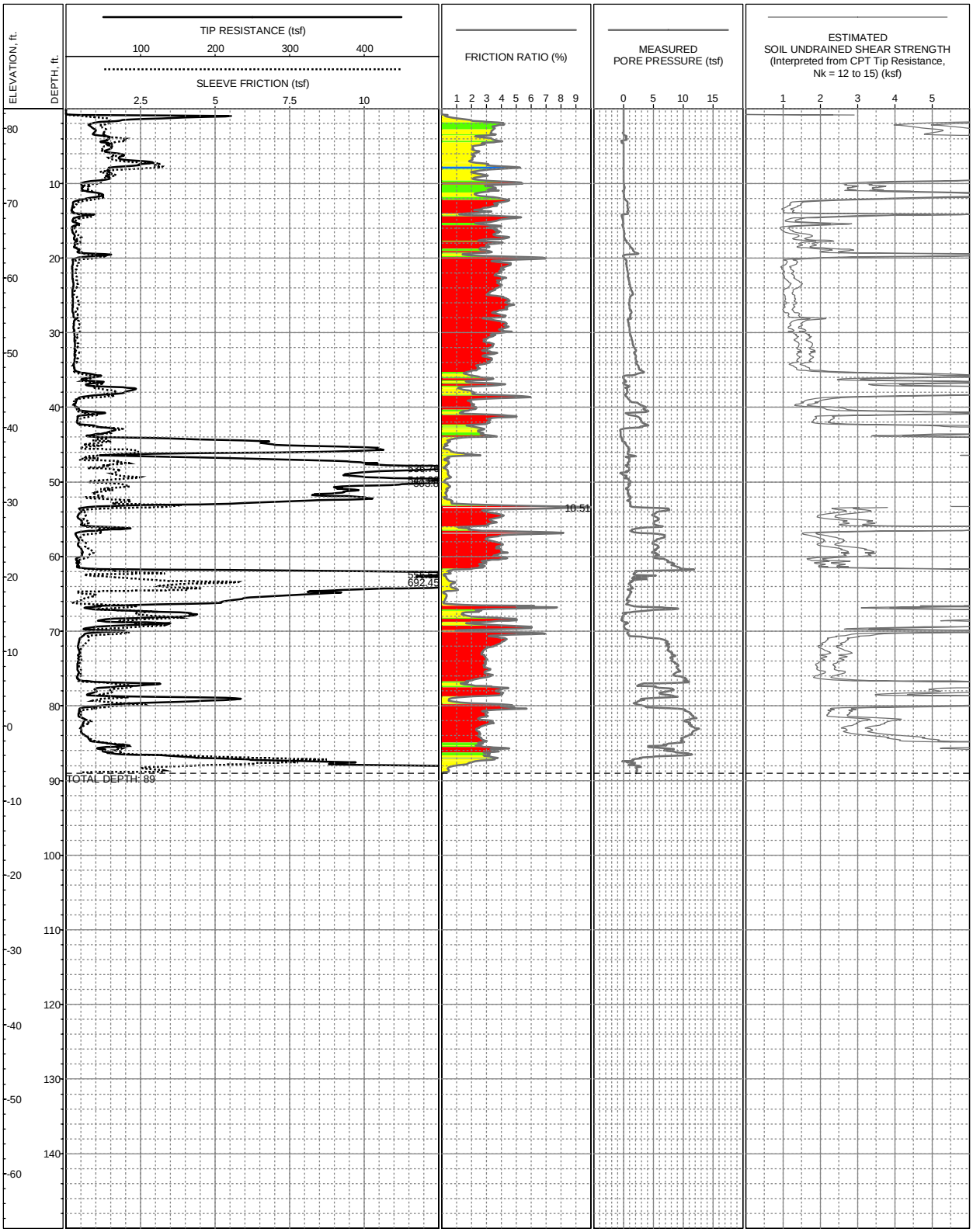


LOCATION: E6151449.7 N1948825.5 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 82.4ft (NAVD88)
COMPLETION DEPTH: 118.6ft
TEST DATE: 1/12/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-77

Tunnel Segment of SVRT Project
San Jose, California

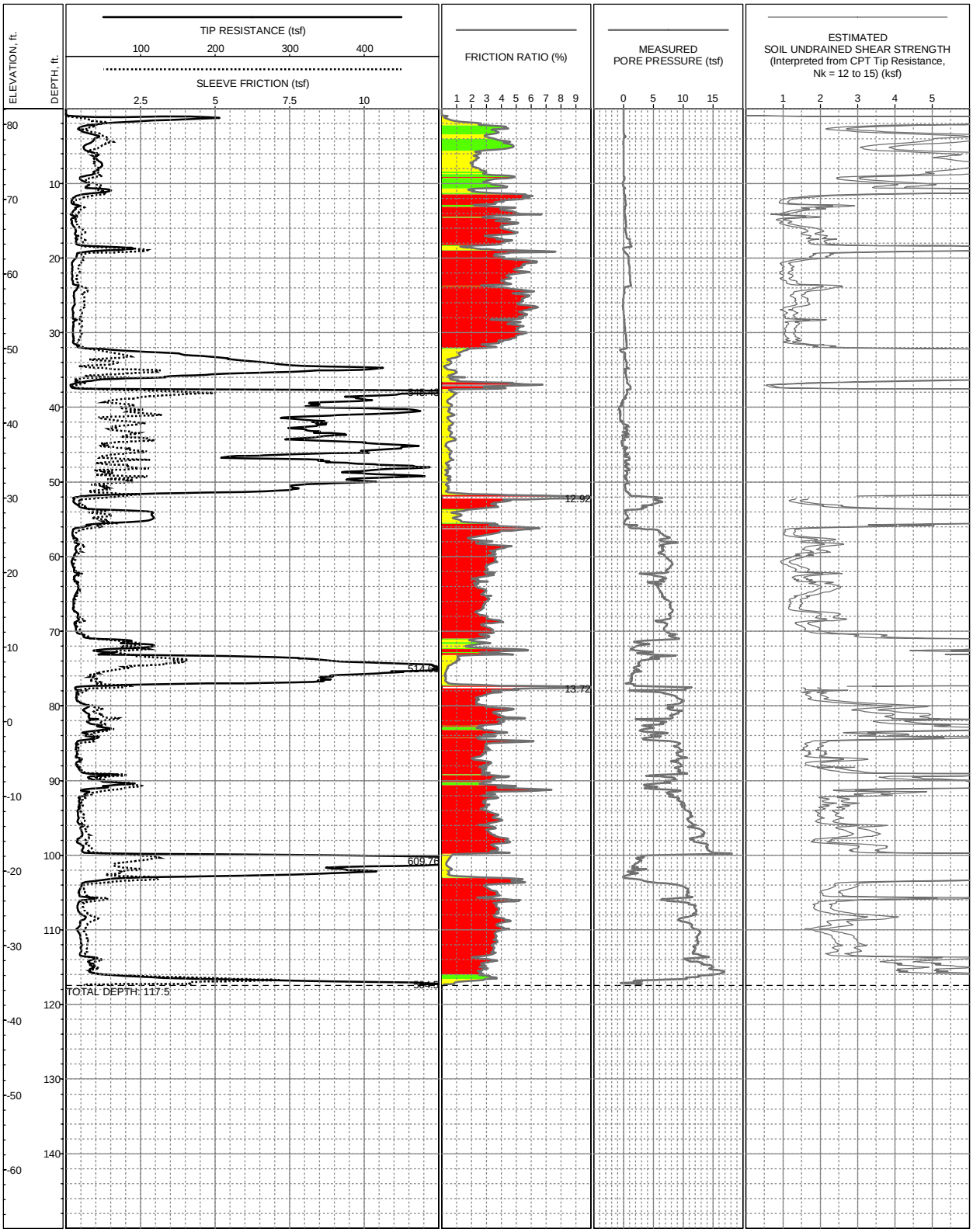


LOCATION: E6151266.4 N1949042.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 82.7ft (NAVD88)
COMPLETION DEPTH: 89ft
TEST DATE: 1/6/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & J
REVIEWED BY: R Howard

LOG OF CPT-78

Tunnel Segment of SVRT Project
San Jose, California

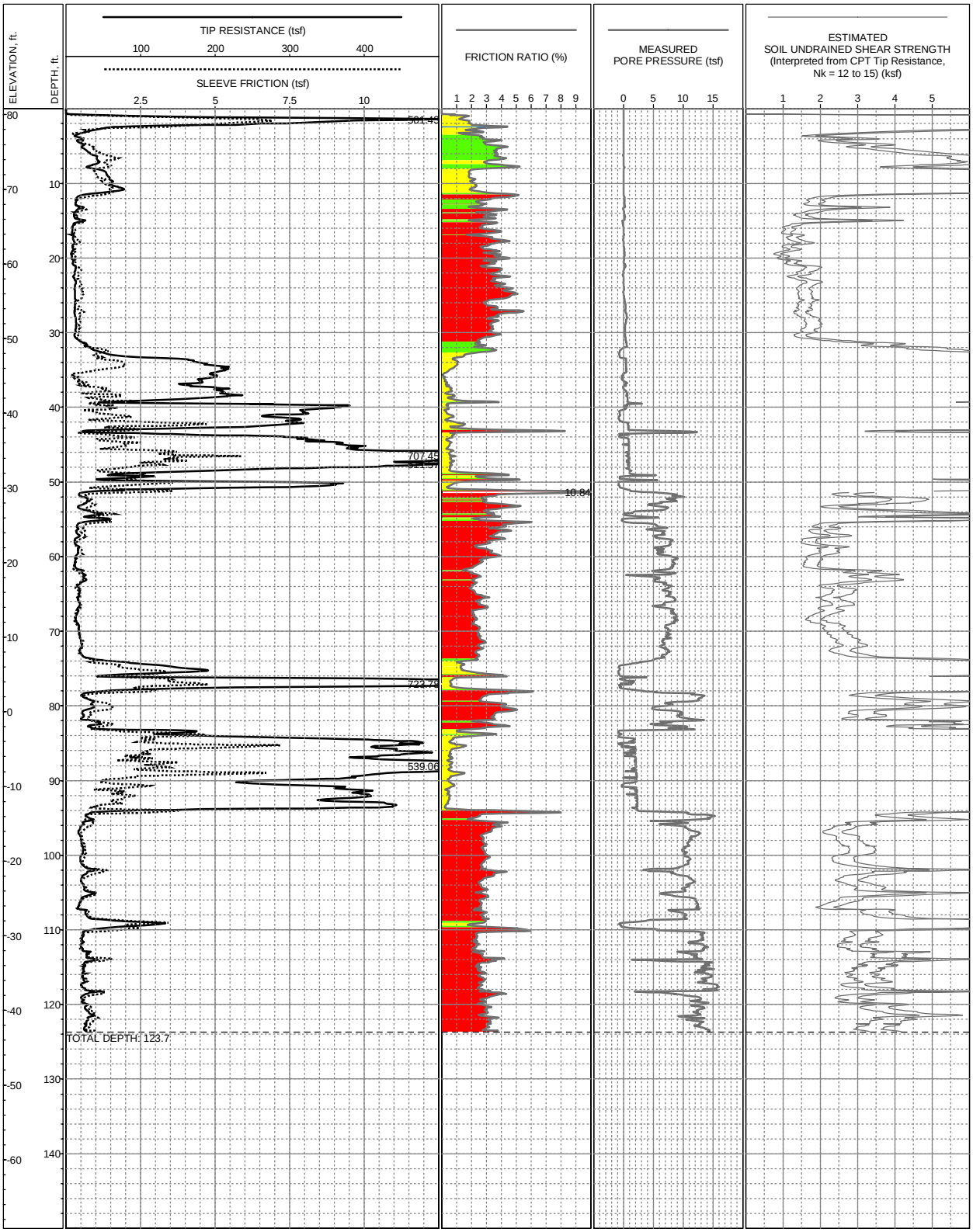


LOCATION: E6151176.5 N1949149 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 82.1ft (NAVD88)
COMPLETION DEPTH: 117.5ft
TEST DATE: 1/5/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & J
REVIEWED BY: R Howard

LOG OF CPT-79

Tunnel Segment of SVRT Project
San Jose, California

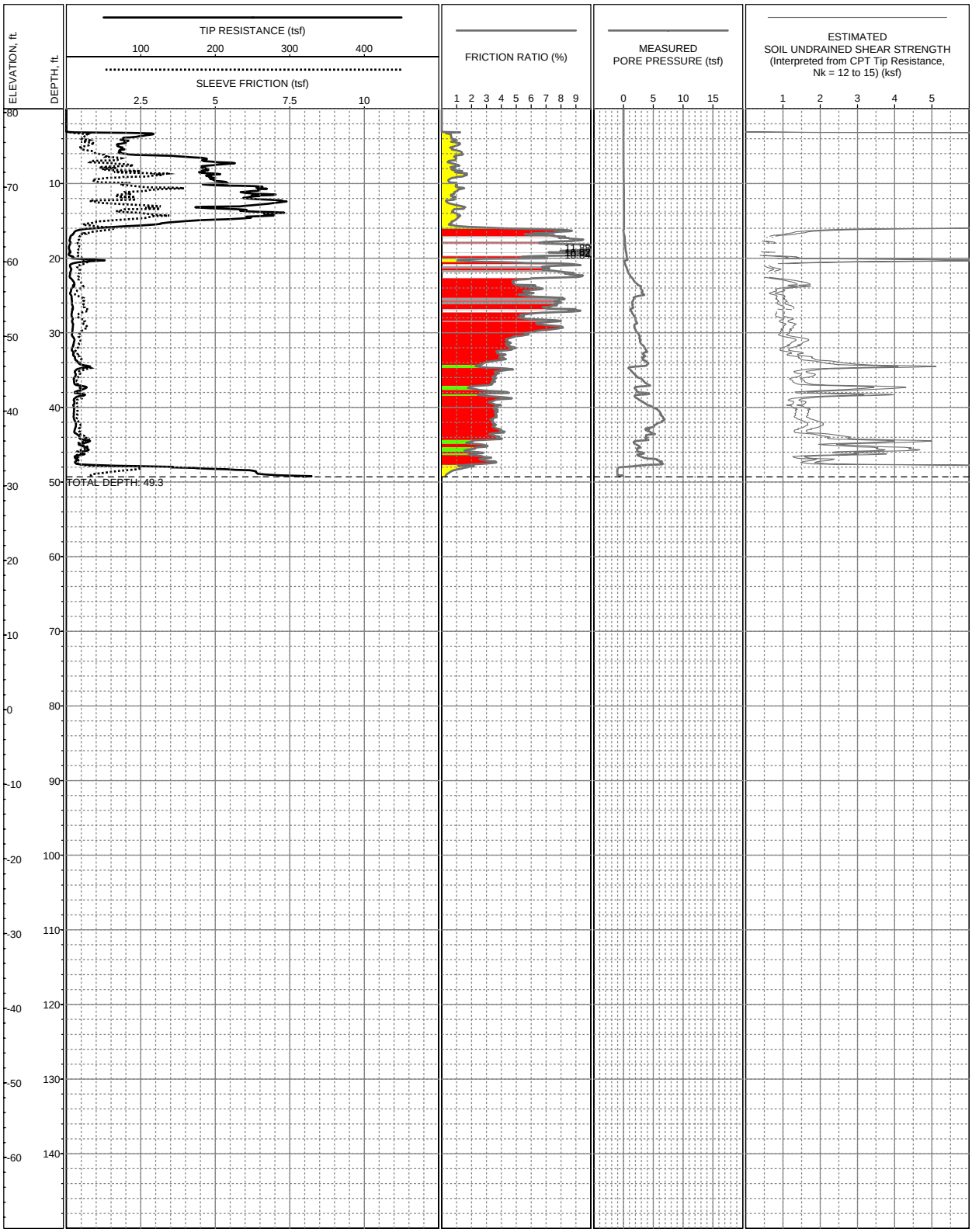


LOCATION: E6150959.1 N1949407.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 80.8ft (NAVD88)
COMPLETION DEPTH: 123.7ft
TEST DATE: 1/5/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & J
REVIEWED BY: R Howard

LOG OF CPT-80

Tunnel Segment of SVRT Project
San Jose, California

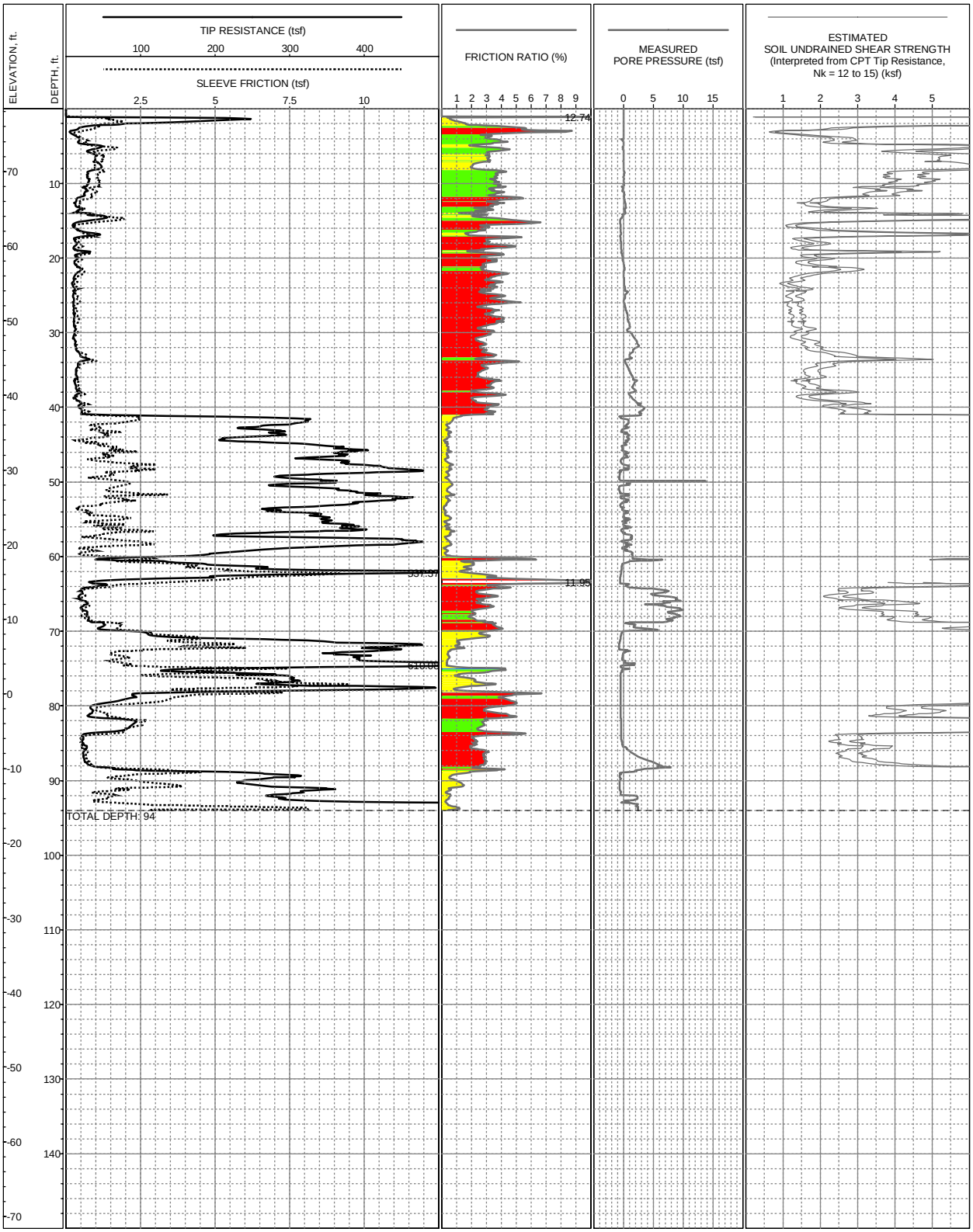


LOCATION: E6150654.9 N1949766.3 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 80.5ft (NAVD88)
COMPLETION DEPTH: 49.3ft
TEST DATE: 11/2/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-81

Tunnel Segment of SVRT Project
San Jose, California

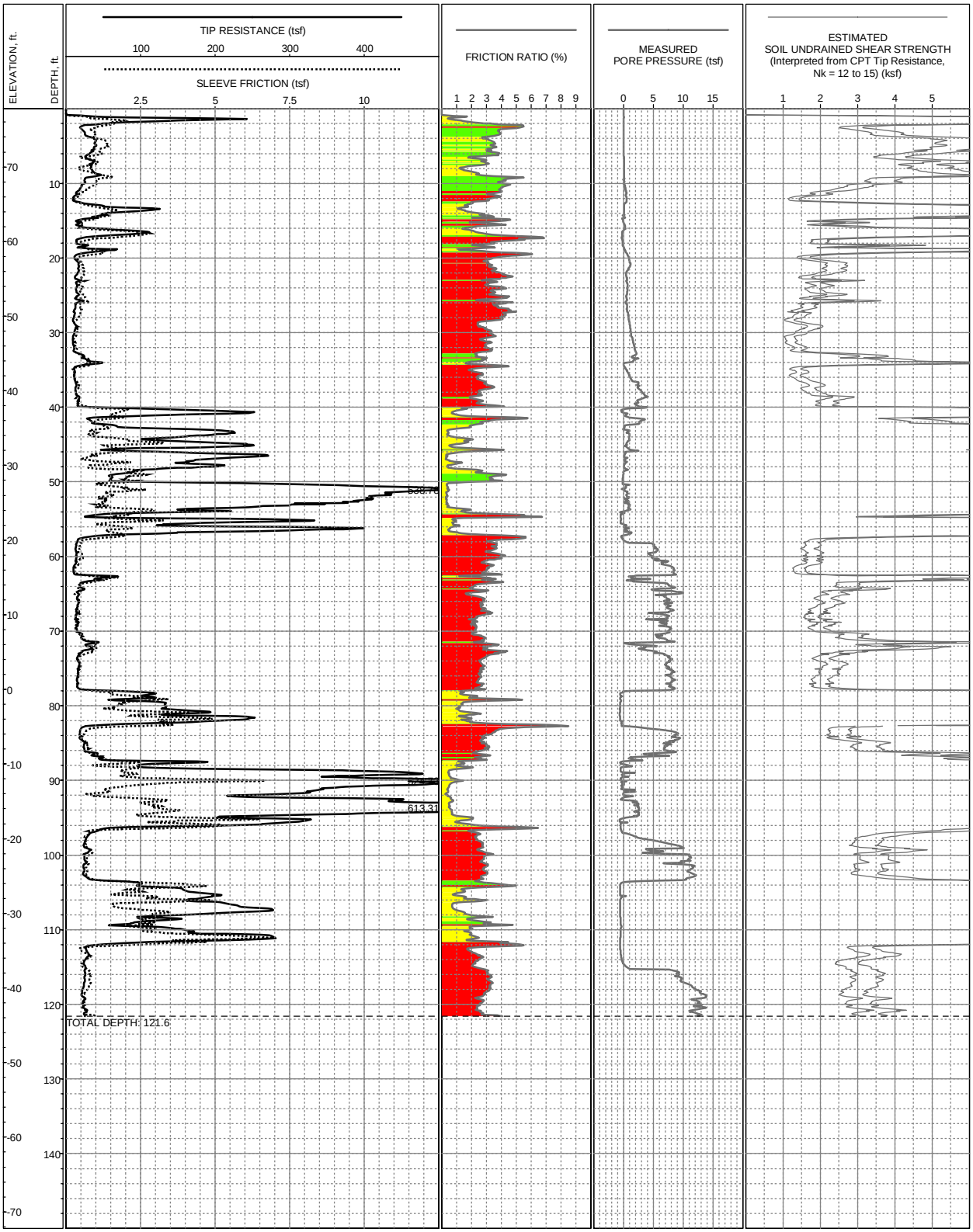


LOCATION: E6150429.4 N1950016.7 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 78.4ft (NAVD88)
COMPLETION DEPTH: 94ft
TEST DATE: 1/14/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-82

Tunnel Segment of SVRT Project
San Jose, California

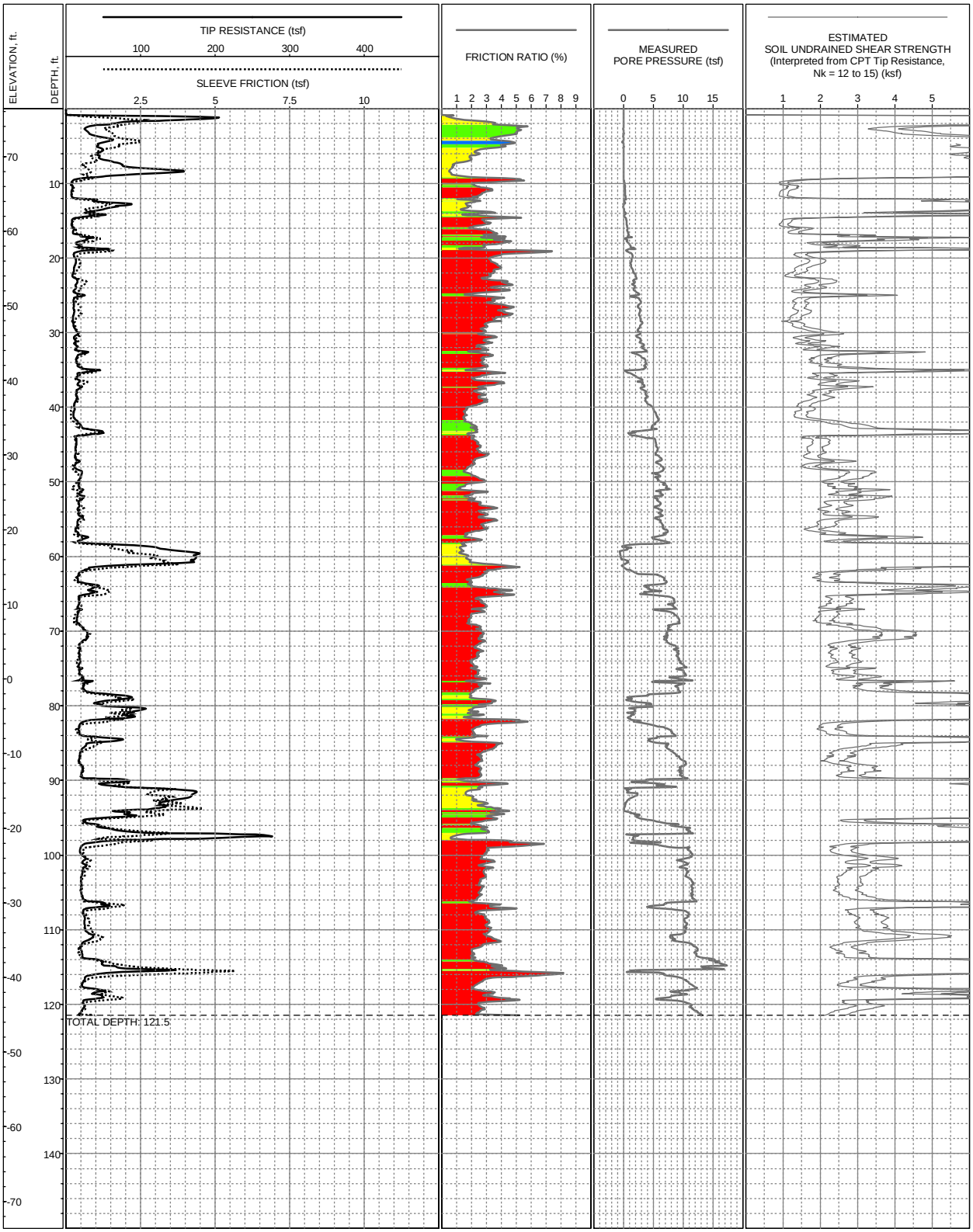


LOCATION: E6150325.8 N1950142 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 77.8ft (NAVD88)
COMPLETION DEPTH: 121.6ft
TEST DATE: 1/14/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-83

Tunnel Segment of SVRT Project
San Jose, California

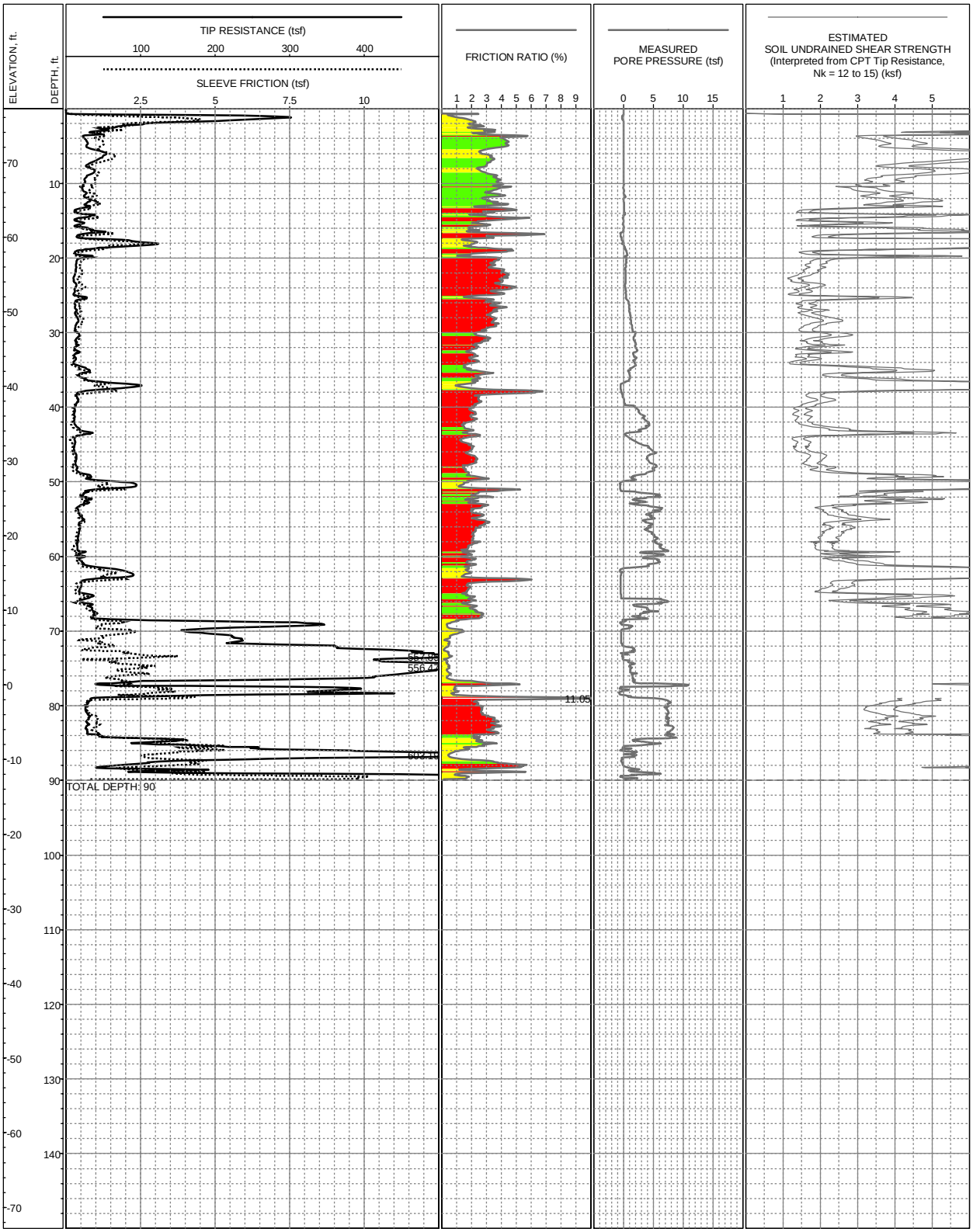


LOCATION: E6150131.1 N1950345.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 76.4ft (NAVD88)
COMPLETION DEPTH: 121.5ft
TEST DATE: 1/10/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-84

Tunnel Segment of SVRT Project
San Jose, California

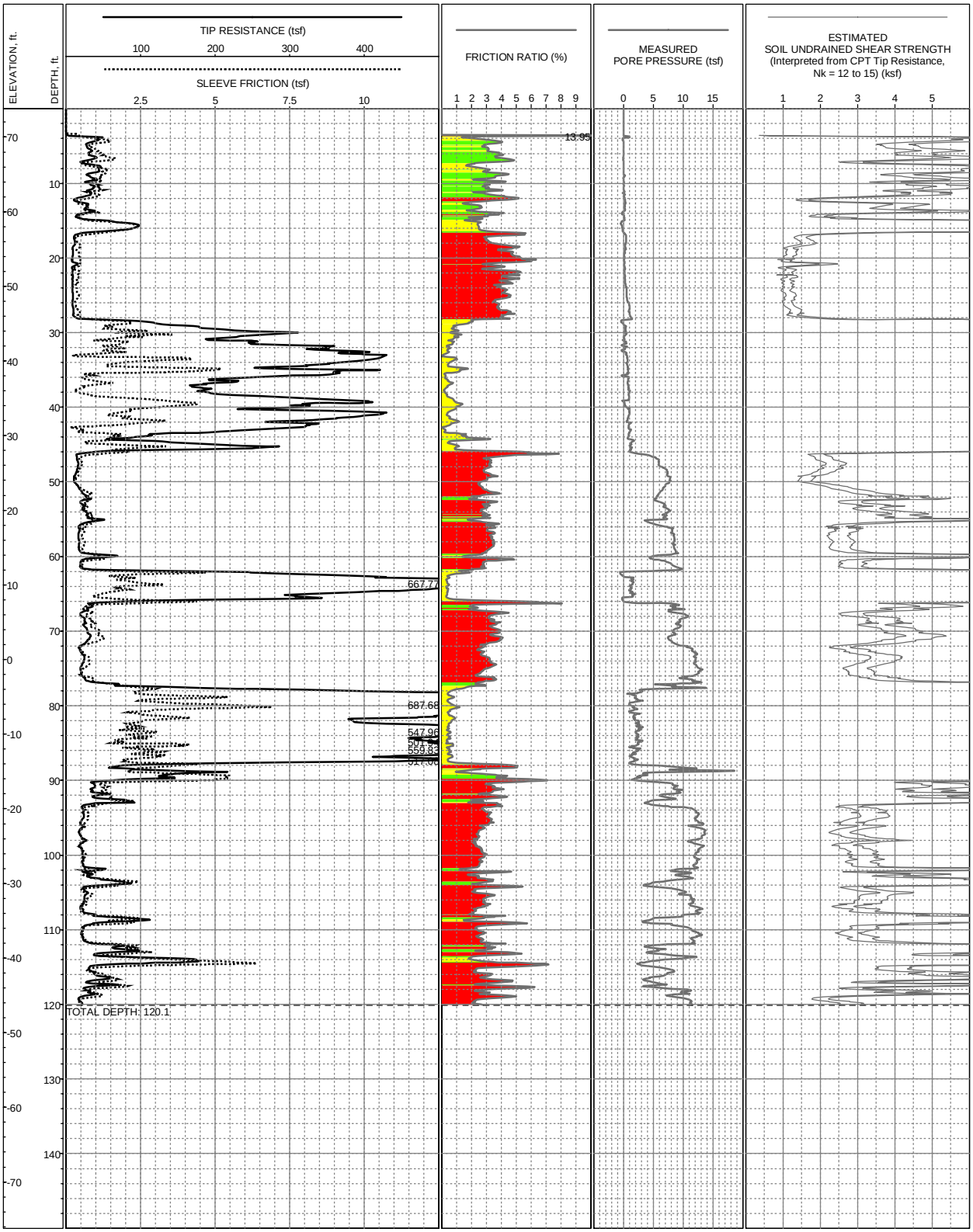


LOCATION: E6150026.4 N1950450.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 77.2ft (NAVD88)
COMPLETION DEPTH: 90ft
TEST DATE: 1/11/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-85

Tunnel Segment of SVRT Project
San Jose, California

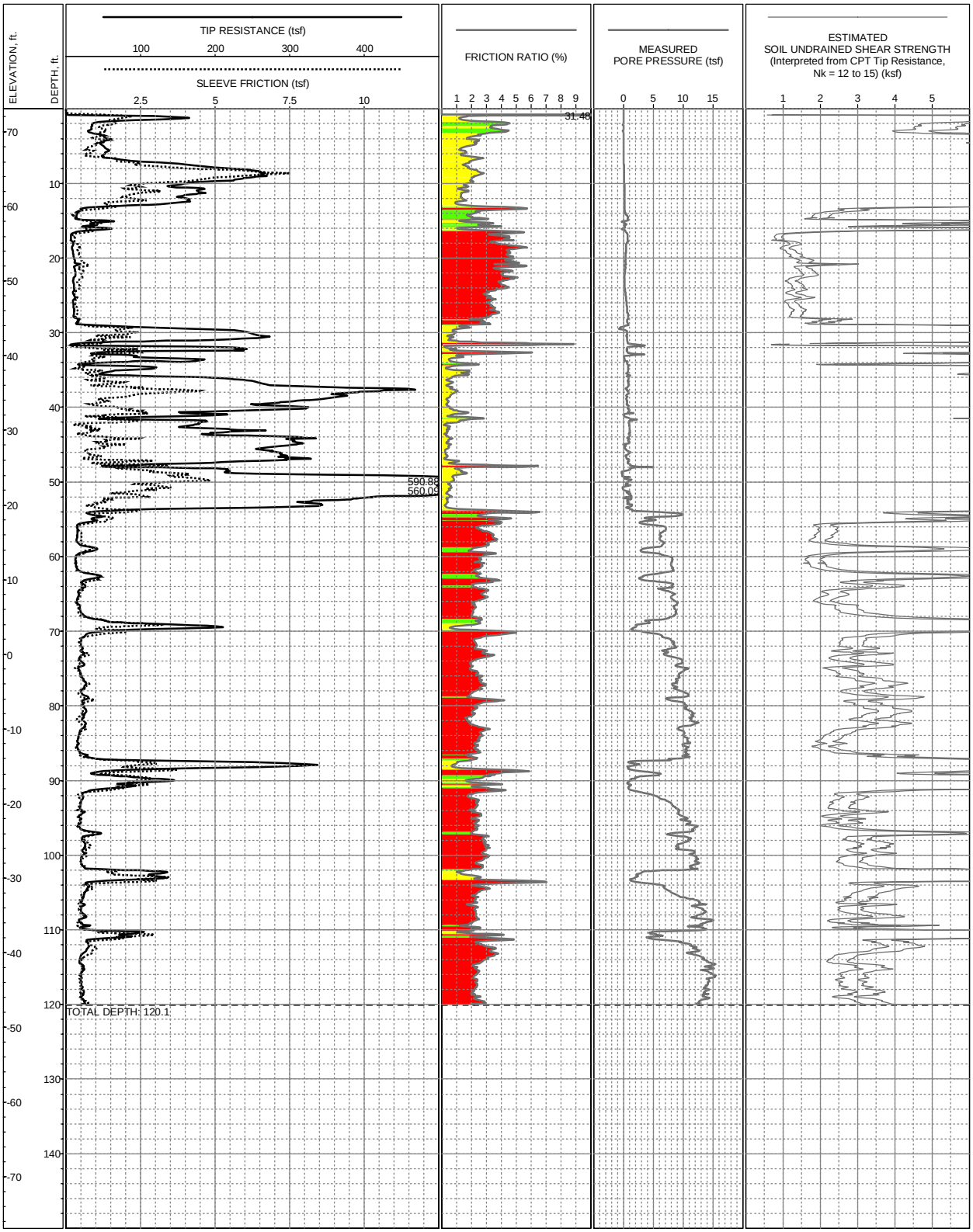


LOCATION: E6149778.5 N1950768.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 73.8ft (NAVD88)
COMPLETION DEPTH: 120.1ft
TEST DATE: 1/10/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-86

Tunnel Segment of SVRT Project
San Jose, California

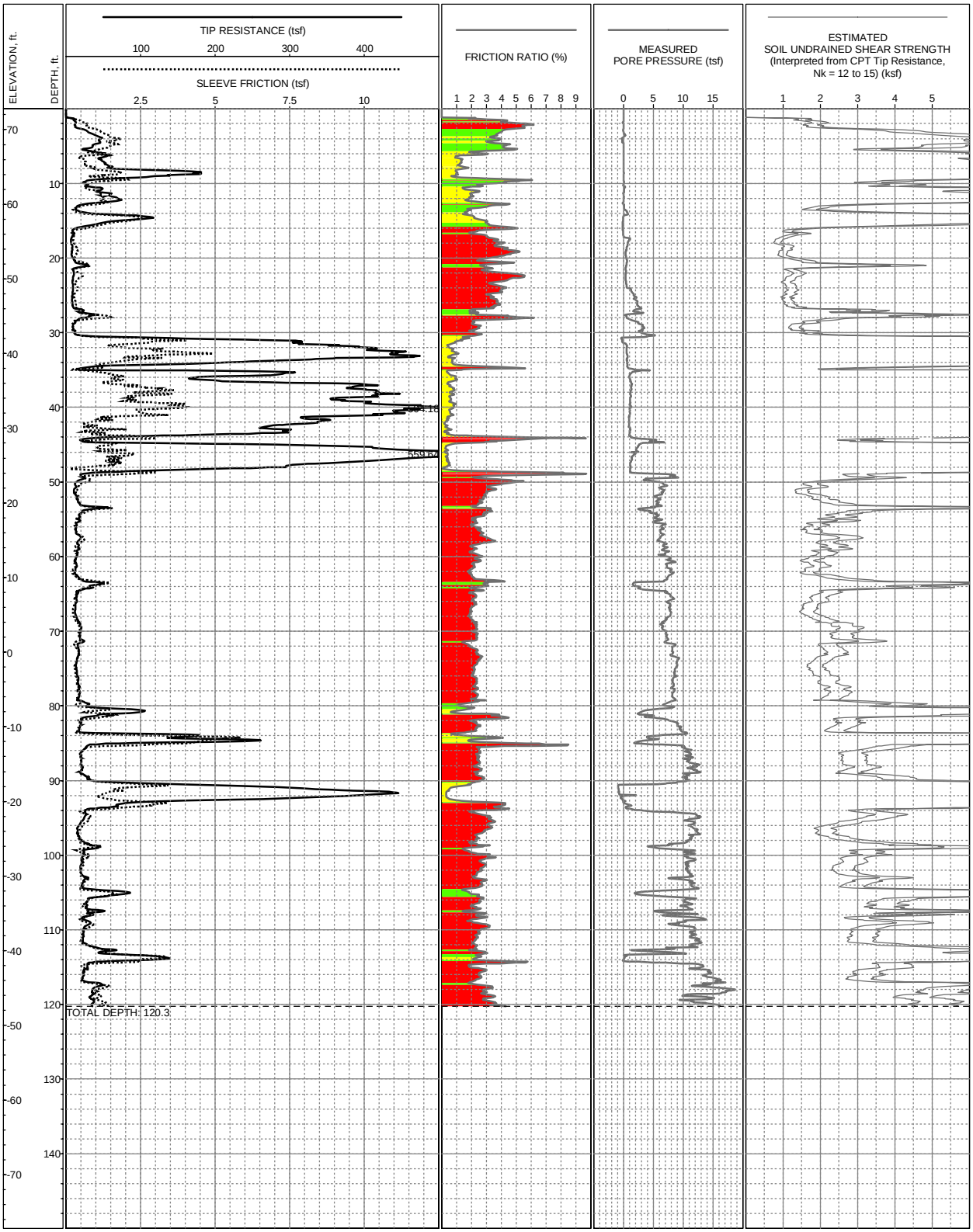


LOCATION: E6149653 N1950923.4 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 73.1ft (NAVD88)
COMPLETION DEPTH: 120.1ft
TEST DATE: 1/17/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-87

Tunnel Segment of SVRT Project
San Jose, California

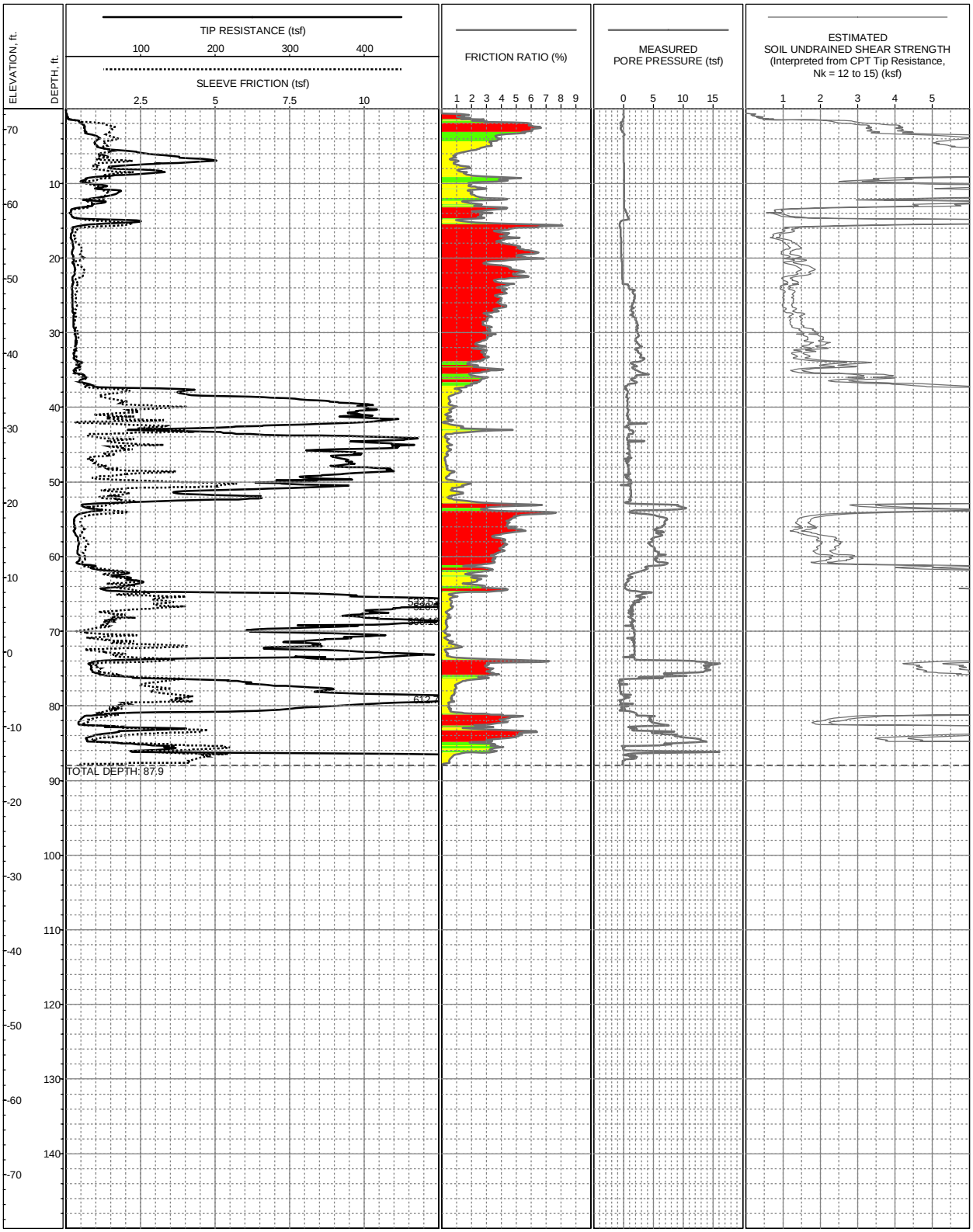


LOCATION: E6149362.2 N1951103.2 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 72.8ft (NAVD88)
COMPLETION DEPTH: 120.3ft
TEST DATE: 12/28/2004

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & J
REVIEWED BY: R Howard

LOG OF CPT-88

Tunnel Segment of SVRT Project
San Jose, California

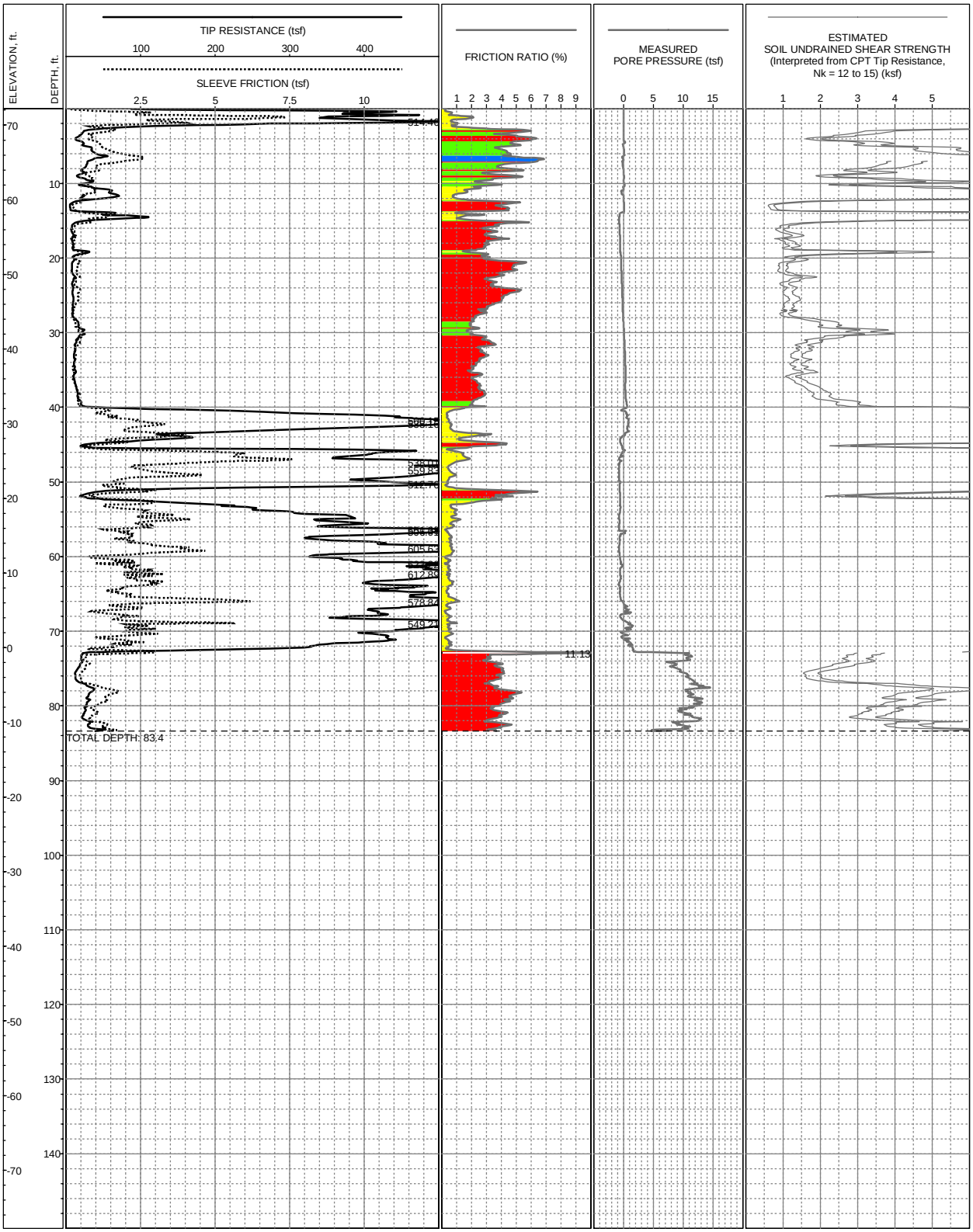


LOCATION: E6149249.9 N1951167.2 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 72.8ft (NAVD88)
COMPLETION DEPTH: 87.9ft
TEST DATE: 12/28/2004

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & J
REVIEWED BY: R Howard

LOG OF CPT-89

Tunnel Segment of SVRT Project
San Jose, California

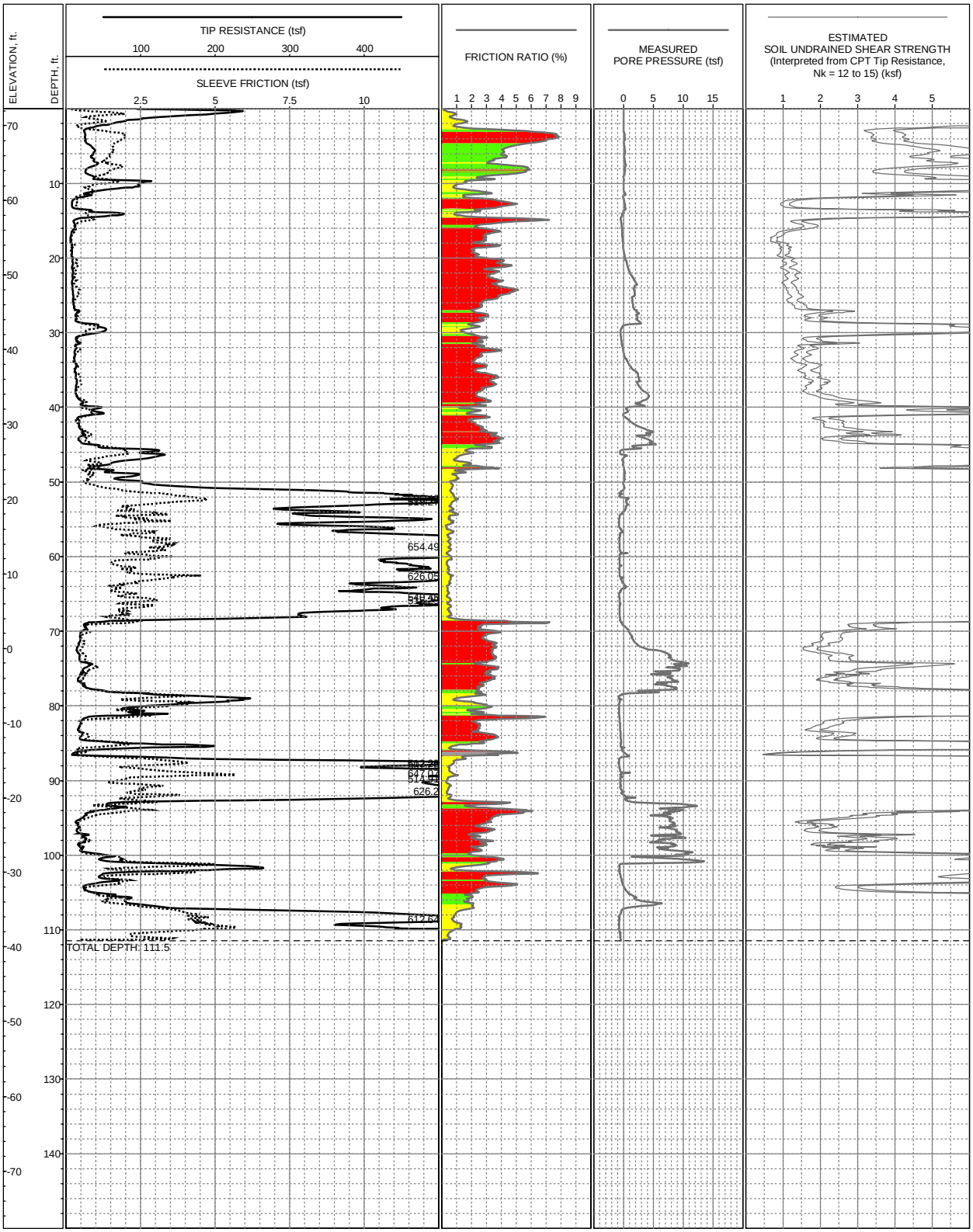


LOCATION: E6148913.9 N1951306.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 72.2ft (NAVD88)
COMPLETION DEPTH: 83.4ft
TEST DATE: 1/25/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-90

Tunnel Segment of SVRT Project
San Jose, California

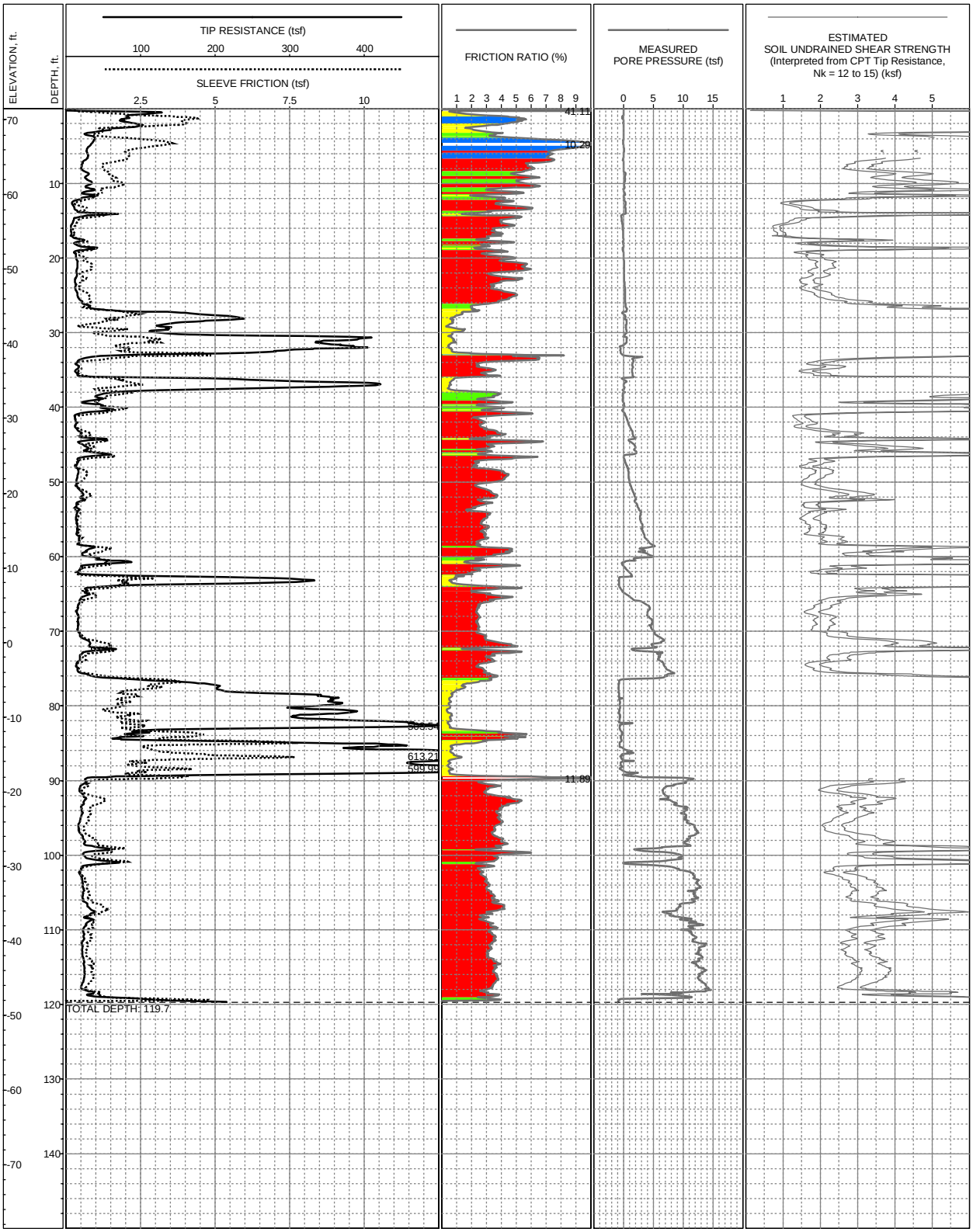


LOCATION: E6148796.6 N1951389.8 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 72.3ft (NAVD88)
COMPLETION DEPTH: 111.5ft
TEST DATE: 1/25/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-91

Tunnel Segment of SVRT Project
San Jose, California

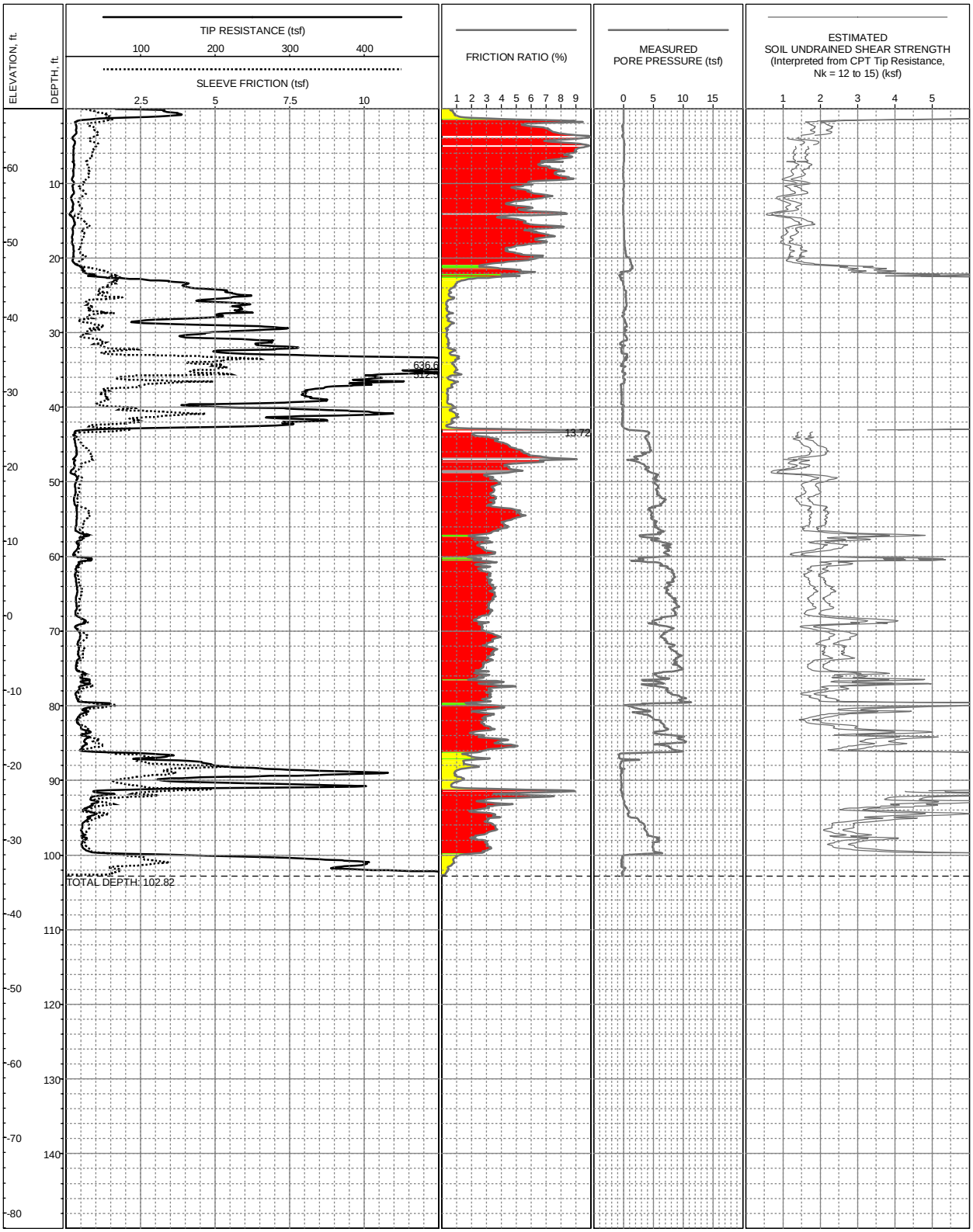


LOCATION: E6148619 N1951586.4 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 71.5ft (NAVD88)
COMPLETION DEPTH: 119.7ft
TEST DATE: 2/18/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-92

Tunnel Segment of SVRT Project
San Jose, California

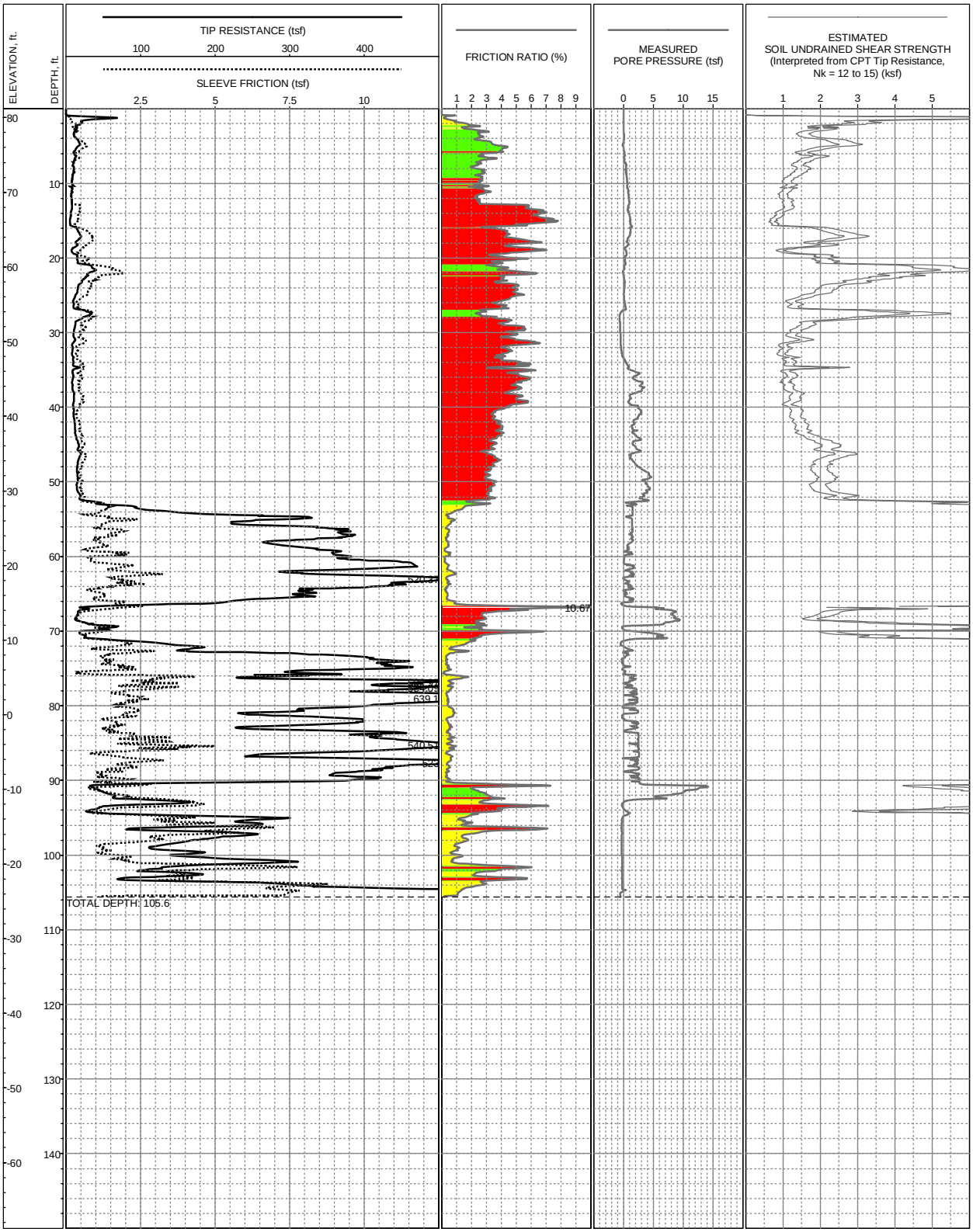


LOCATION: E6148140.5 N1951925.8 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 68.9ft (NAVD88)
COMPLETION DEPTH: 102.82ft
TEST DATE: 4/19/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: T Dowd & D Garza
REVIEWED BY: R Howard

LOG OF CPT-93

Tunnel Segment of SVRT Project
San Jose, California

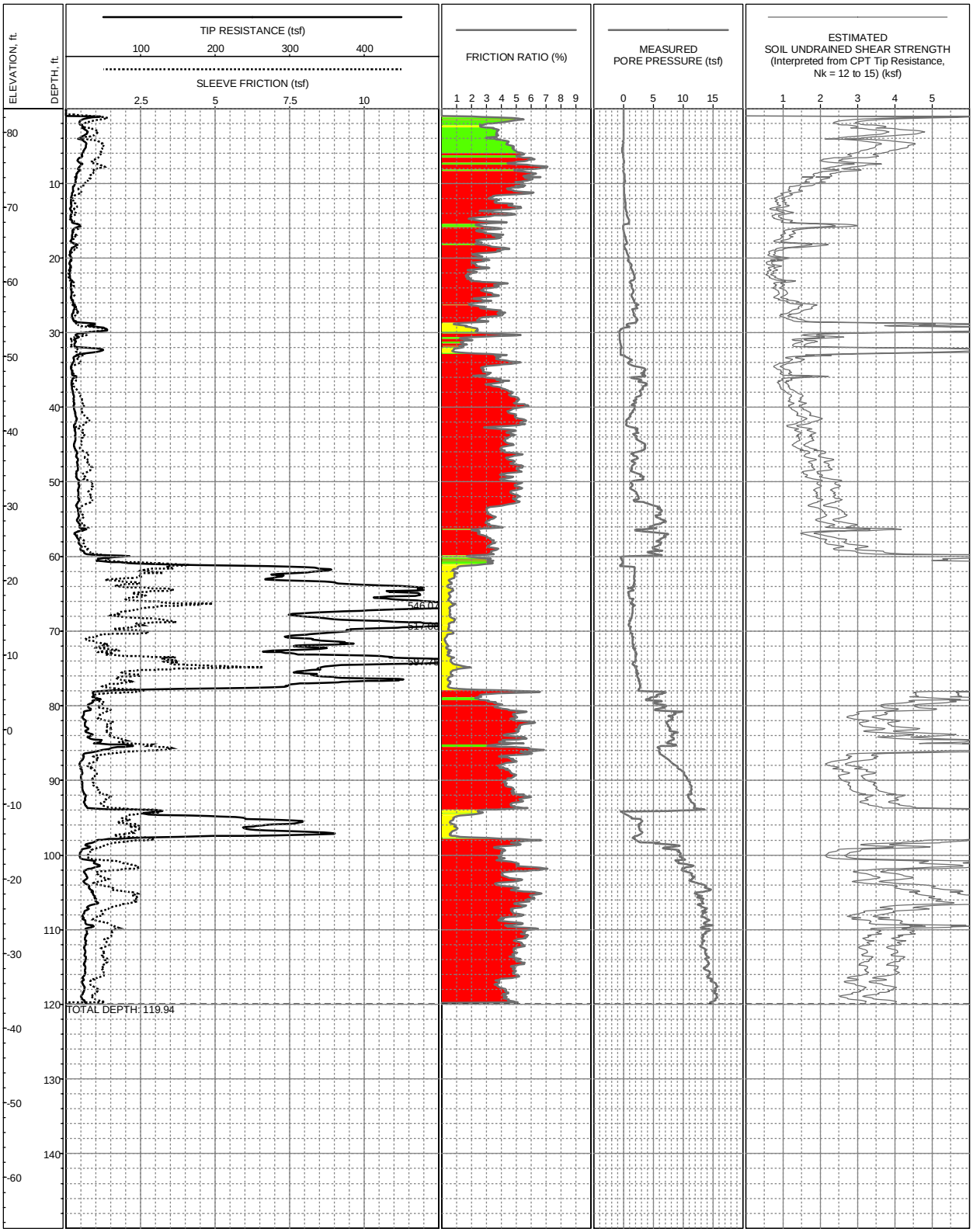


LOCATION: E6159163.4 N1948889.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 81.2ft (NAVD88)
COMPLETION DEPTH: 105.6ft
TEST DATE: 1/18/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-94

Tunnel Segment of SVRT Project
San Jose, California

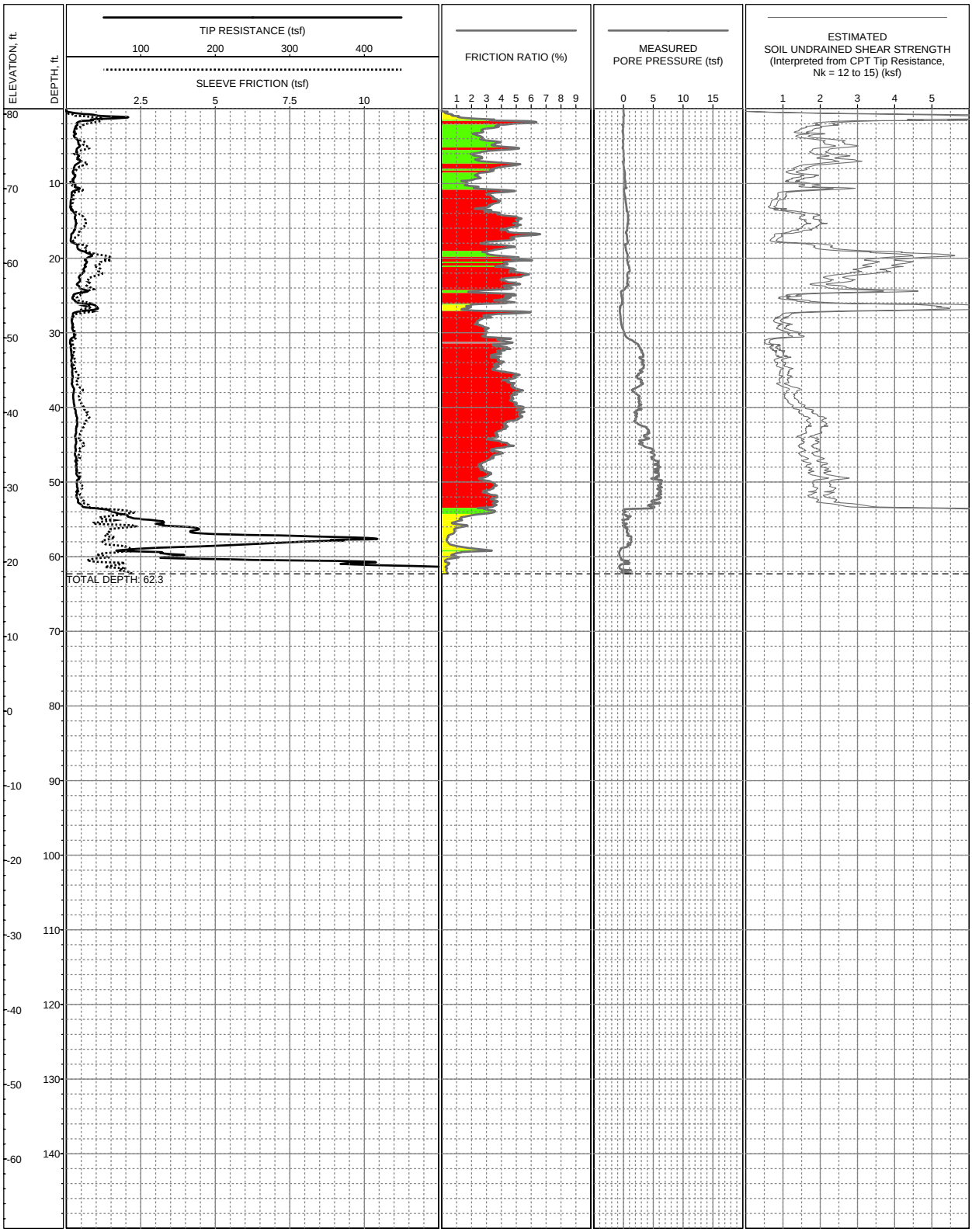


LOCATION: E6161687.7 N1950183.2 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 83.5ft (NAVD88)
COMPLETION DEPTH: 119.94ft
TEST DATE: 4/20/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: T Dowd & D Garza
REVIEWED BY: R Howard

LOG OF CPT-95

Tunnel Segment of SVRT Project
San Jose, California

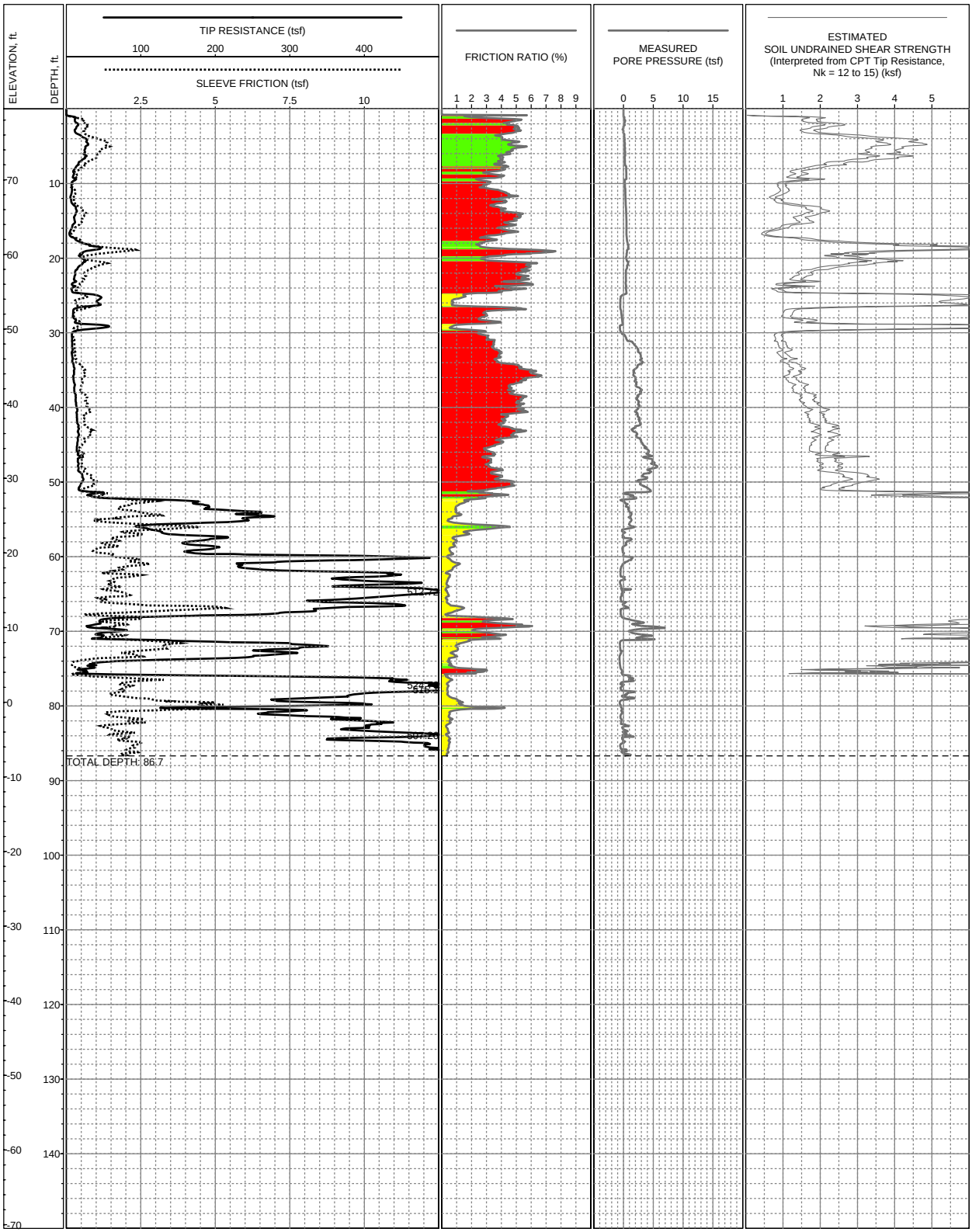


LOCATION: E6159027.2 N1948827.1 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 80.7ft (NAVD88)
COMPLETION DEPTH: 62.3ft
TEST DATE: 10/25/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-96

Tunnel Segment of SVRT Project
San Jose, California

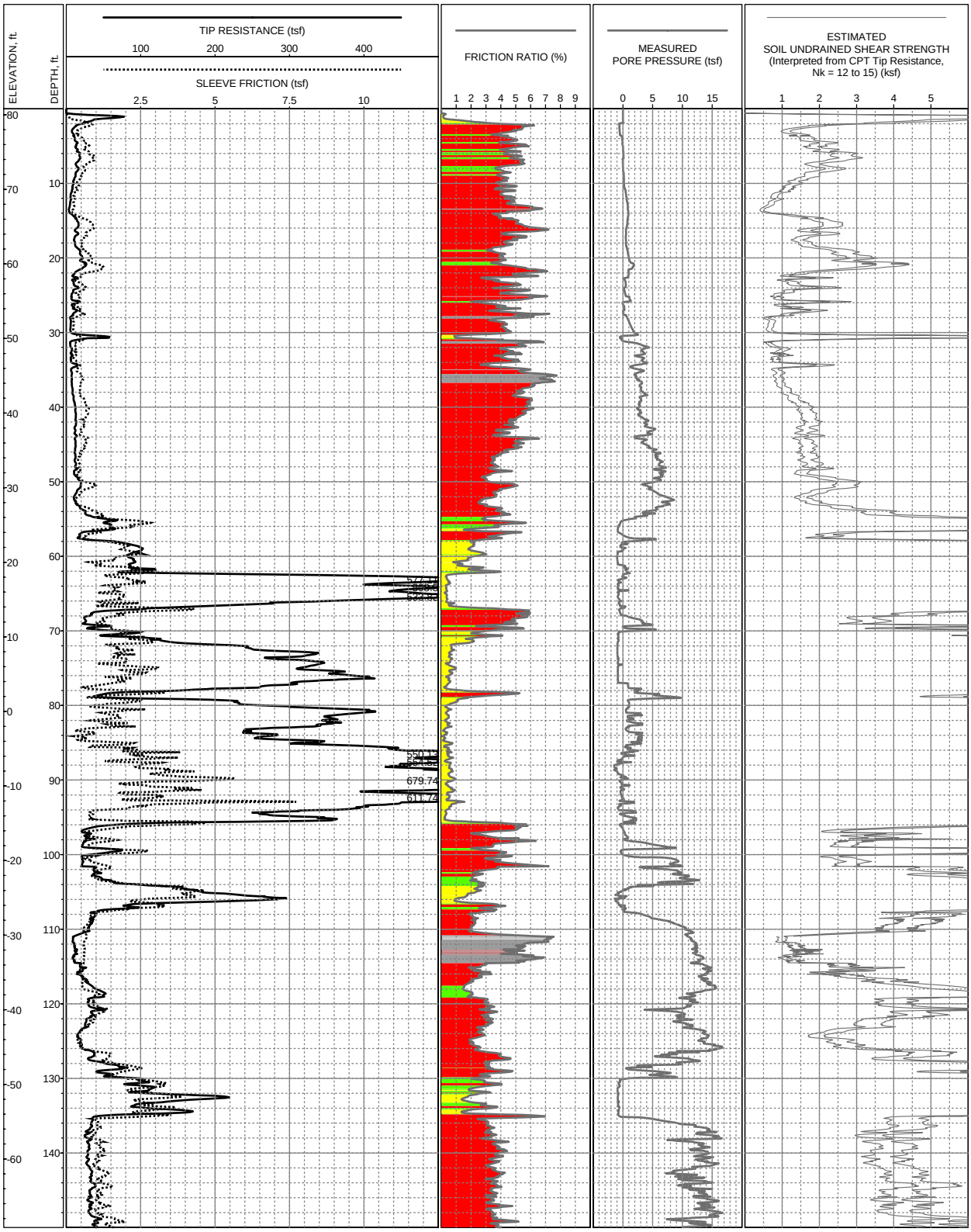


LOCATION: E6158946.3 N1948846.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 79.5ft (NAVD88)
COMPLETION DEPTH: 86.7ft
TEST DATE: 10/22/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-97

Tunnel Segment of SVRT Project
San Jose, California

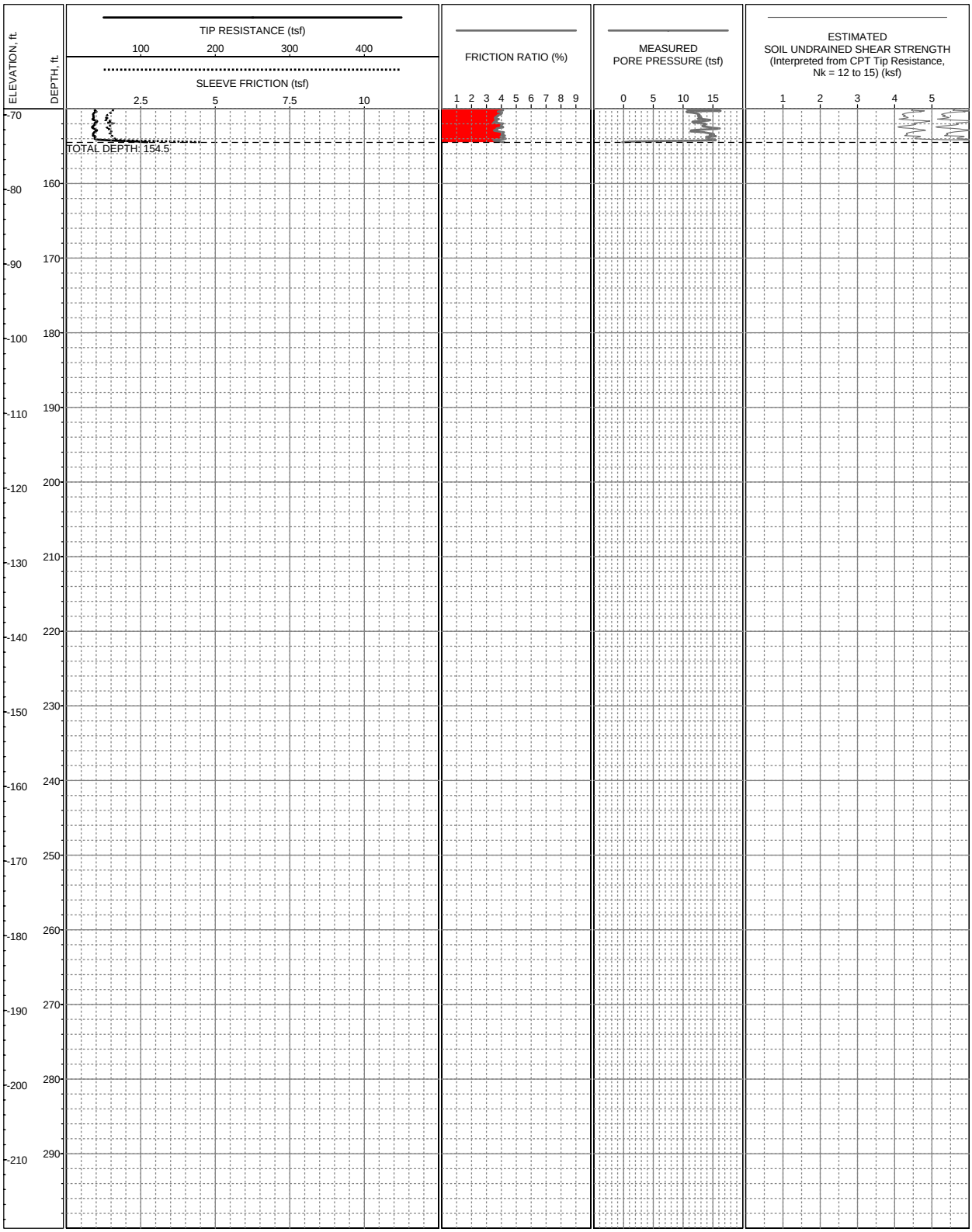


LOCATION: E6158883.1 N1948727.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 80.8ft (NAVD88)
COMPLETION DEPTH: 154.5ft
TEST DATE: 11/2/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-98

Tunnel Segment of SVRT Project
San Jose, California

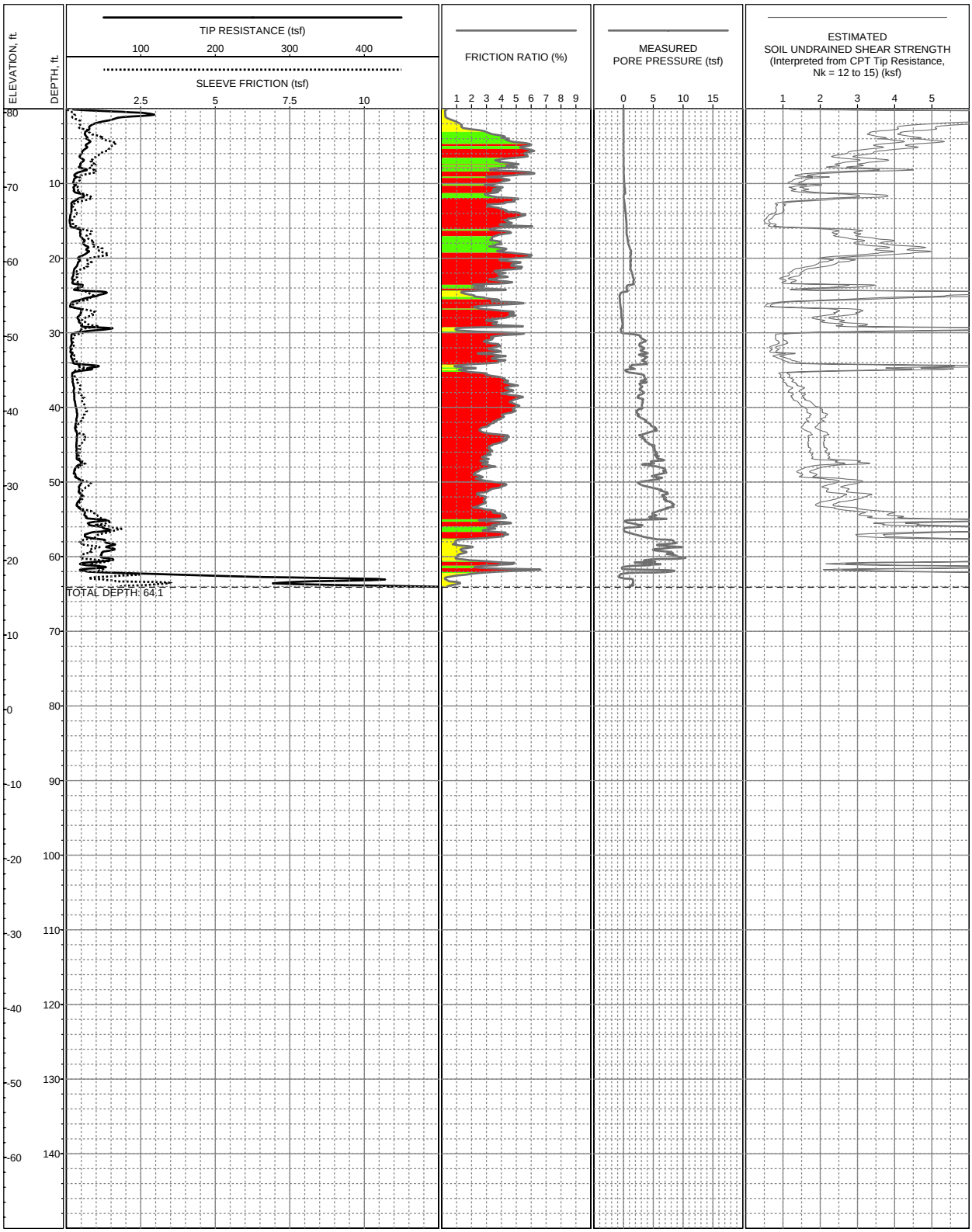


LOCATION: E6158883.1 N1948727.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 80.8ft (NAVD88)
COMPLETION DEPTH: 154.5ft
TEST DATE: 11/2/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-98

Tunnel Segment of SVRT Project
San Jose, California

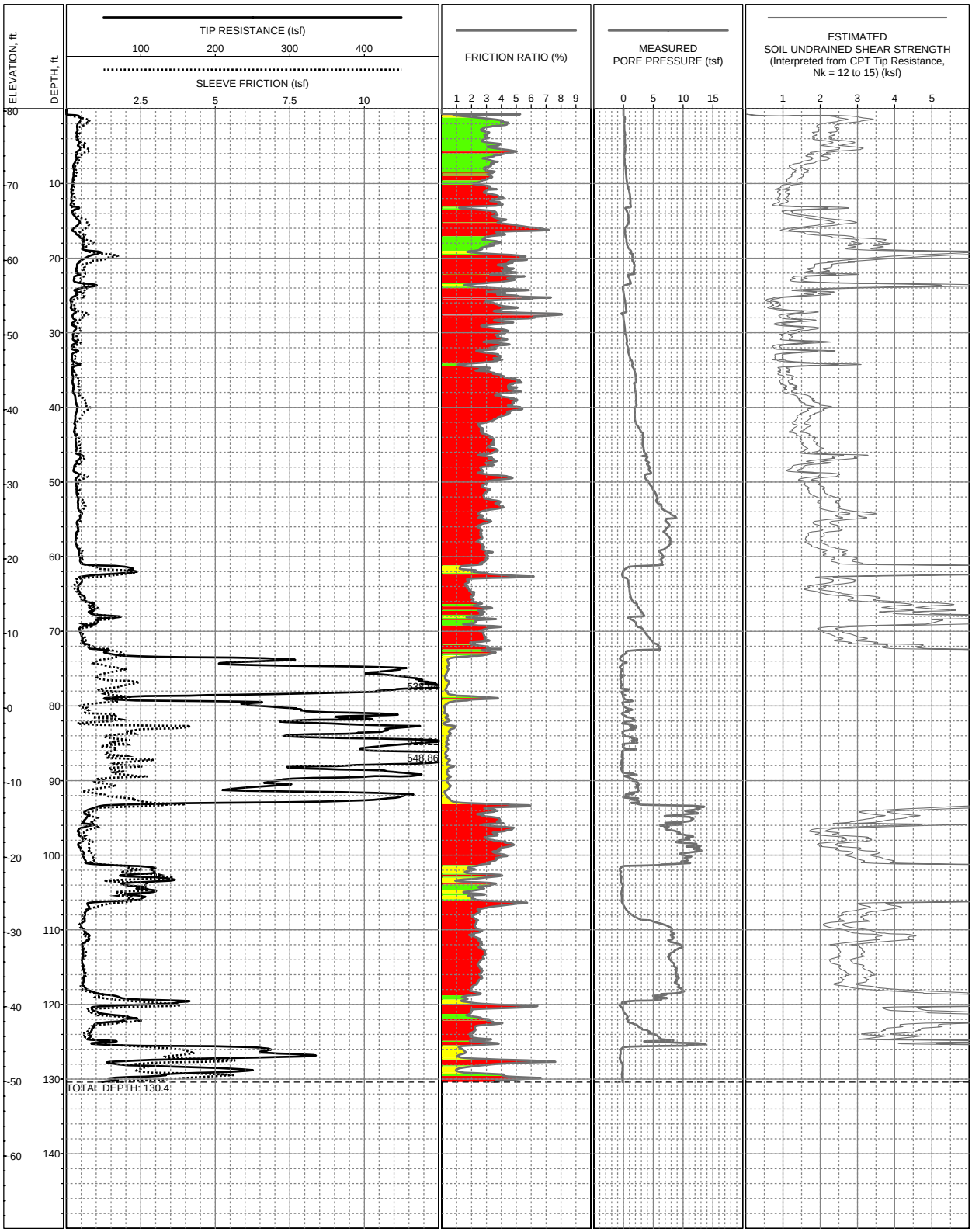


LOCATION: E6158761.2 N1948673.3 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 80.5ft (NAVD88)
COMPLETION DEPTH: 64.1ft
TEST DATE: 10/21/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-100

Tunnel Segment of SVRT Project
San Jose, California

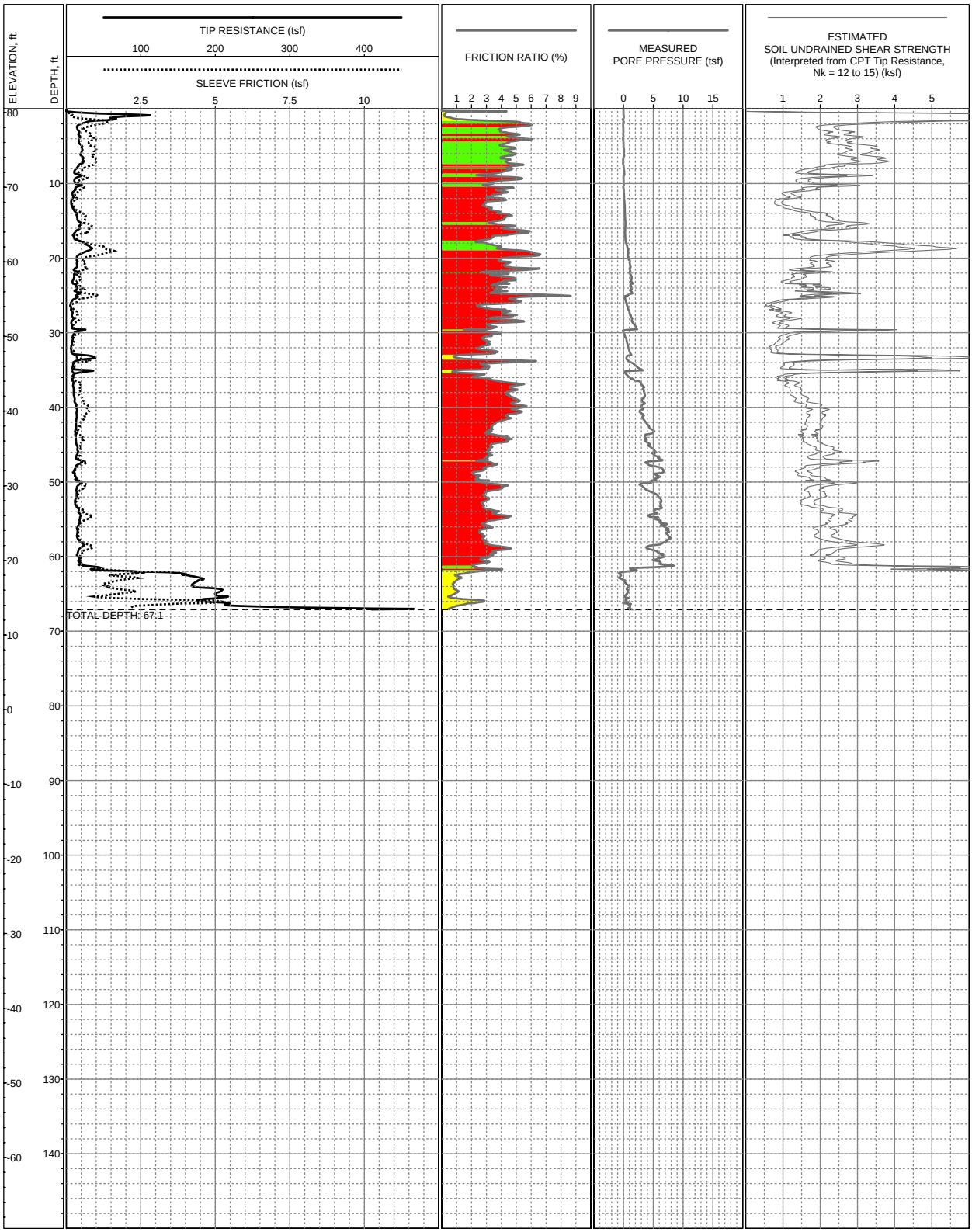


LOCATION: E6158622.5 N1948651.5 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 80.3ft (NAVD88)
COMPLETION DEPTH: 130.4ft
TEST DATE: 10/21/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: T Dowd & D Garza
REVIEWED BY: R Howard

LOG OF CPT-101

Tunnel Segment of SVRT Project
San Jose, California

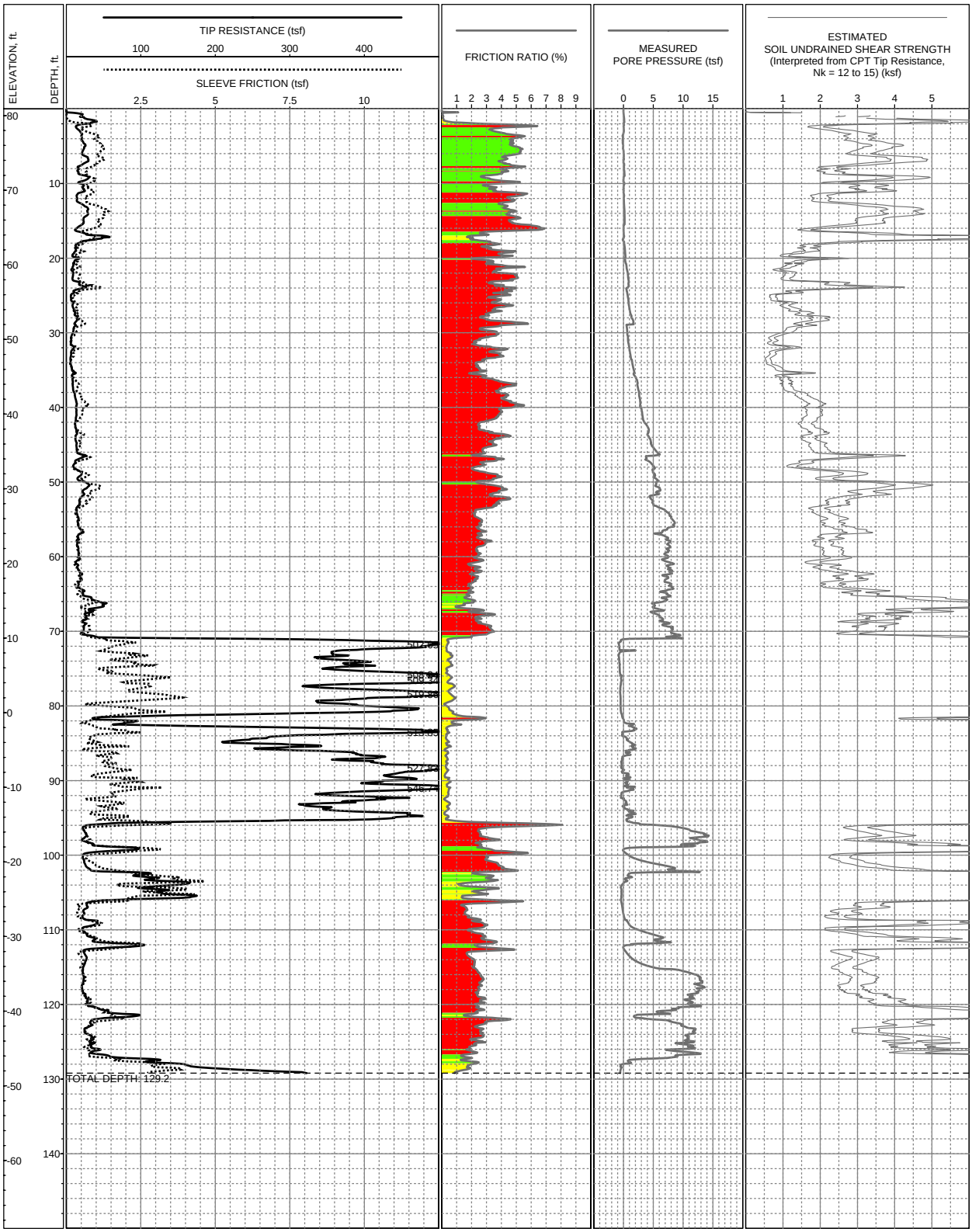


LOCATION: E6158697.3 N1948636.1 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 80.5ft (NAVD88)
COMPLETION DEPTH: 67.1ft
TEST DATE: 10/25/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-102

Tunnel Segment of SVRT Project
San Jose, California

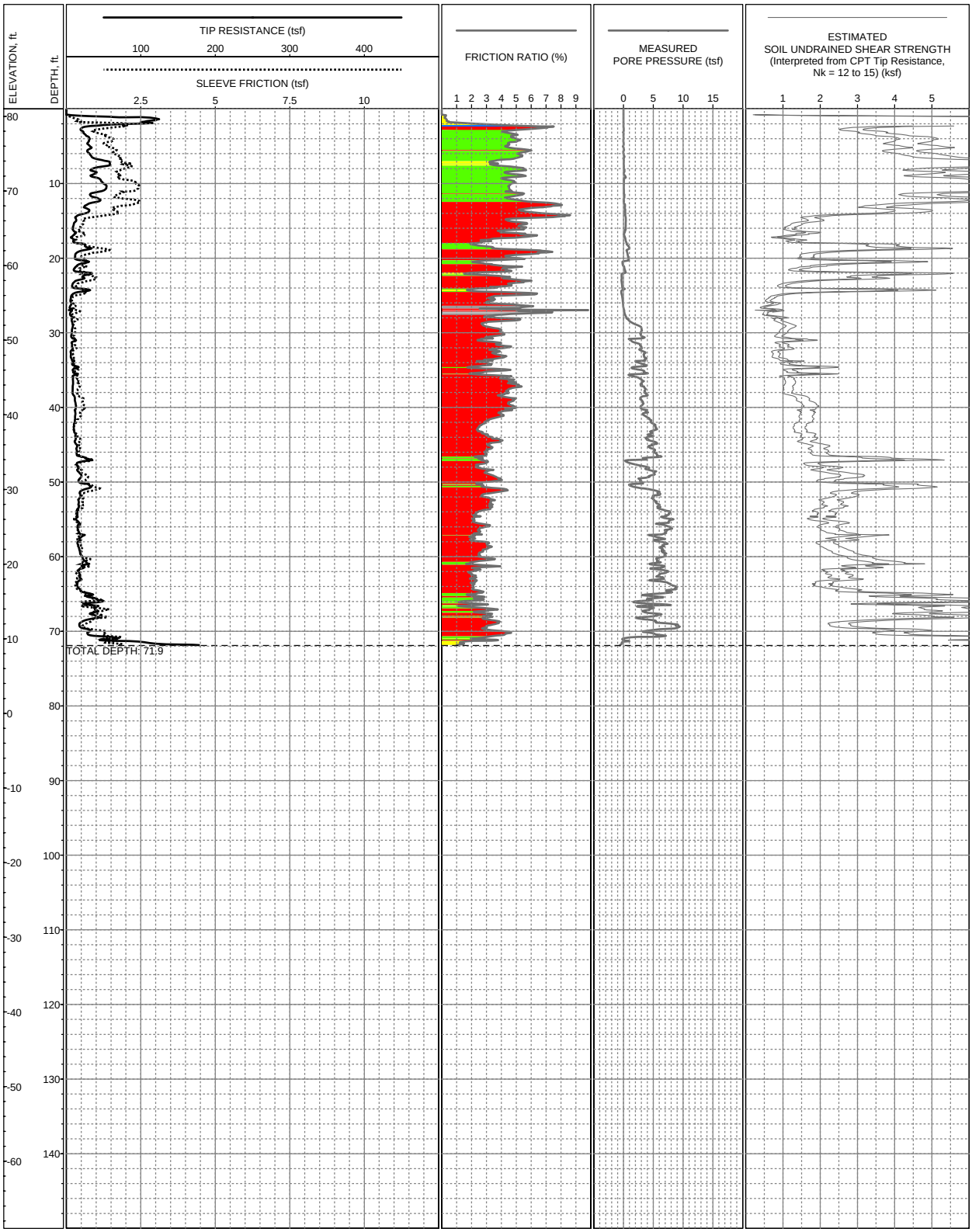


LOCATION: E6158532.6 N1948537.1 (NAD83)
SURFACE EL: 80.9ft (NAVD88)
COMPLETION DEPTH: 129.2ft
TEST DATE: 10/20/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: T Dowd & D Garza
REVIEWED BY: R Howard

LOG OF CPT-103

Tunnel Segment of SVRT Project
San Jose, California

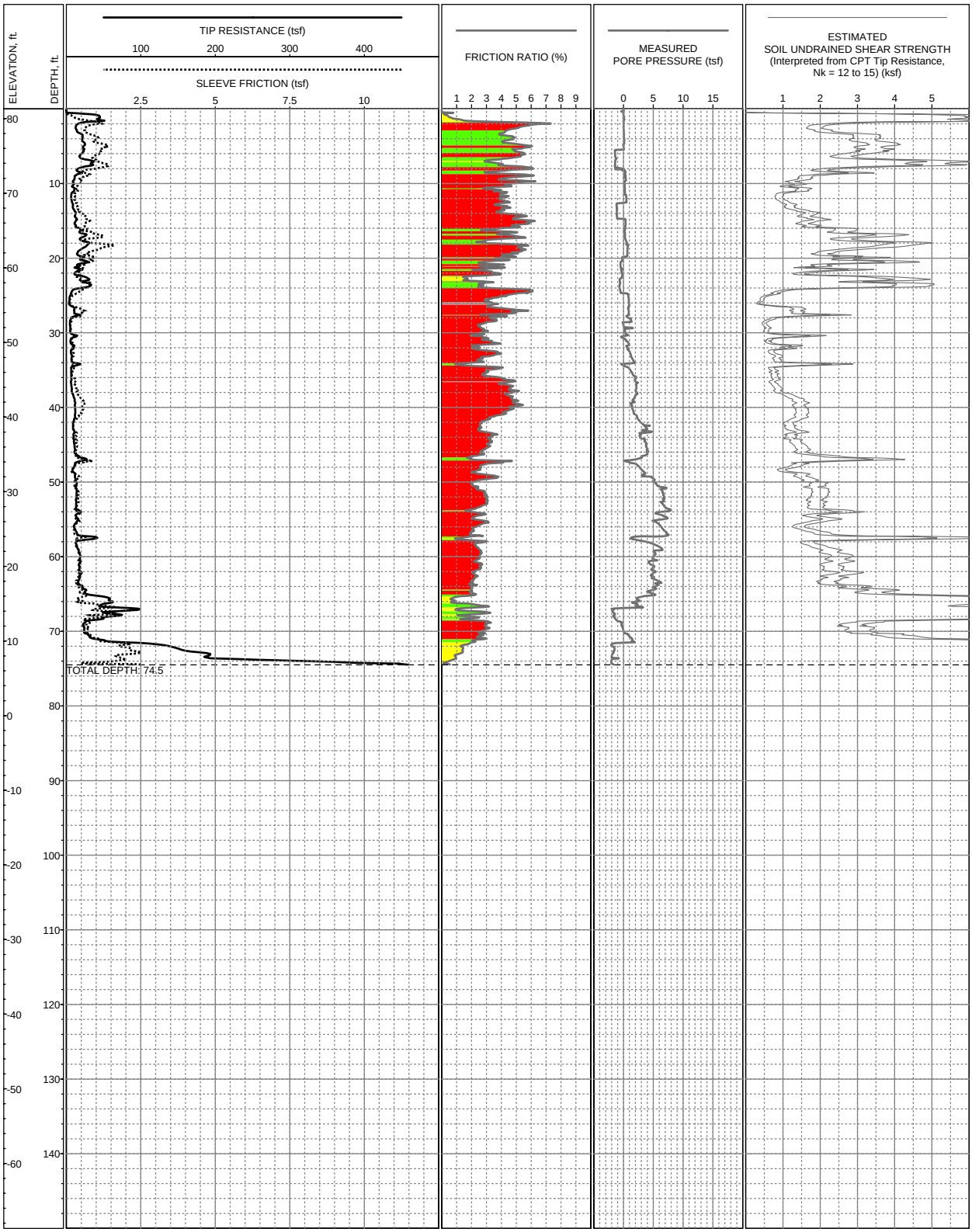


LOCATION: E6158486.8 N1948511.4 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 81ft (NAVD88)
COMPLETION DEPTH: 71.9ft
TEST DATE: 10/29/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-105

Tunnel Segment of SVRT Project
San Jose, California

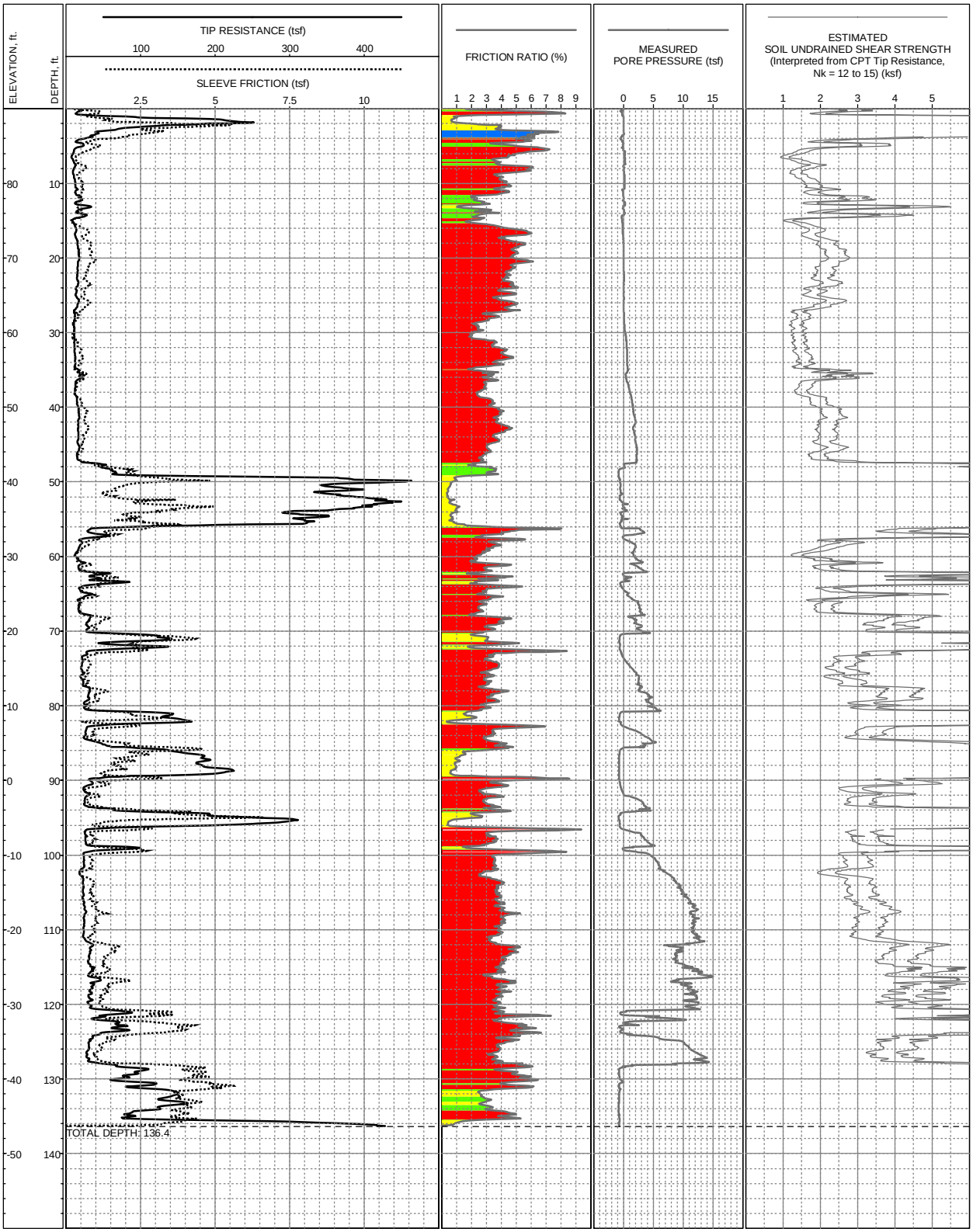


LOCATION: E6158413.1 N1948467.4 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 81.3ft (NAVD88)
COMPLETION DEPTH: 74.5ft
TEST DATE: 11/15/2004

CONE: F7.5CKEW750
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-106

Tunnel Segment of SVRT Project
San Jose, California

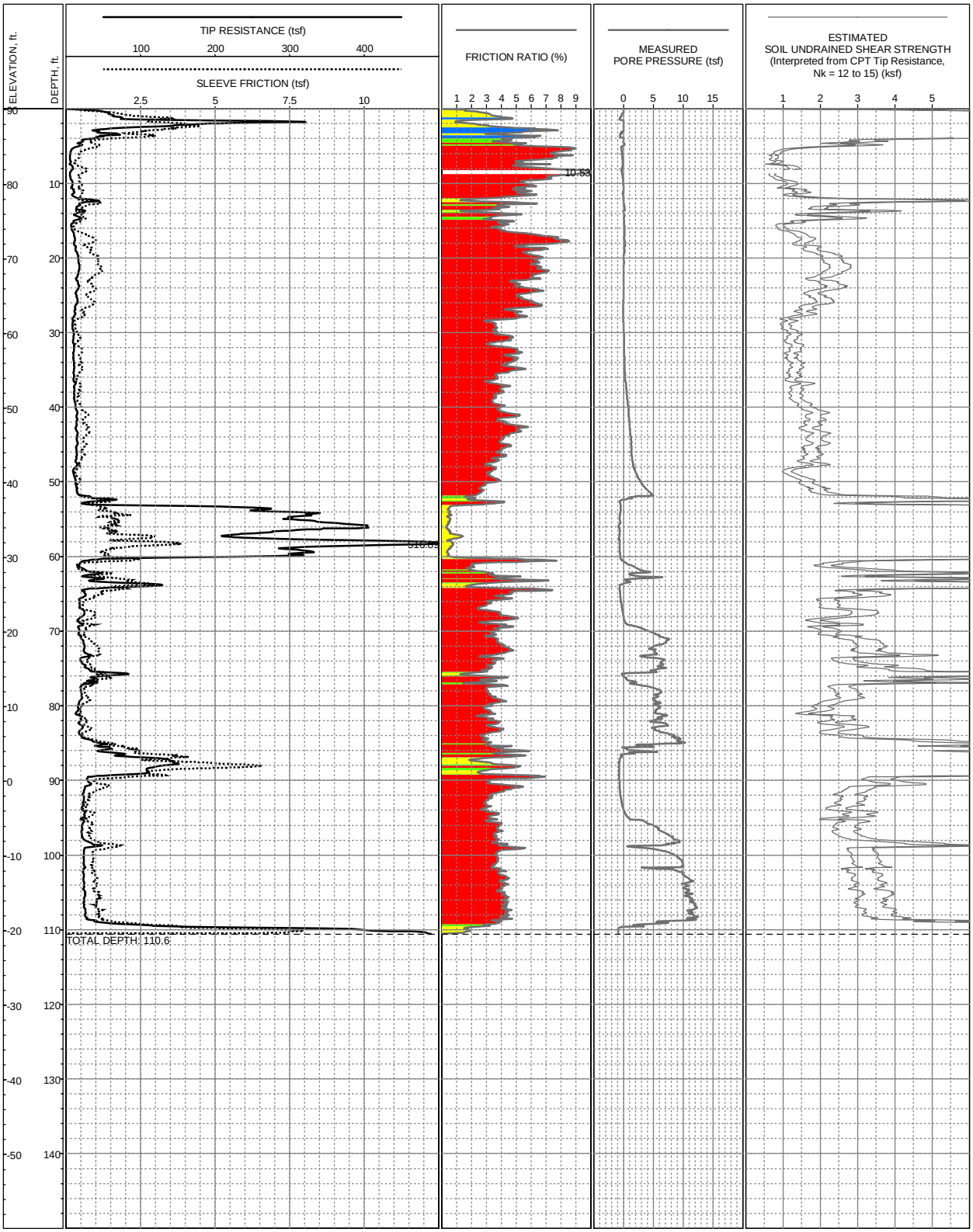


LOCATION: E6162997.8 N1956454.7 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 90ft (NAVD88)
COMPLETION DEPTH: 136.4ft
TEST DATE: 2/17/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-107

Tunnel Segment of SVRT Project
San Jose, California

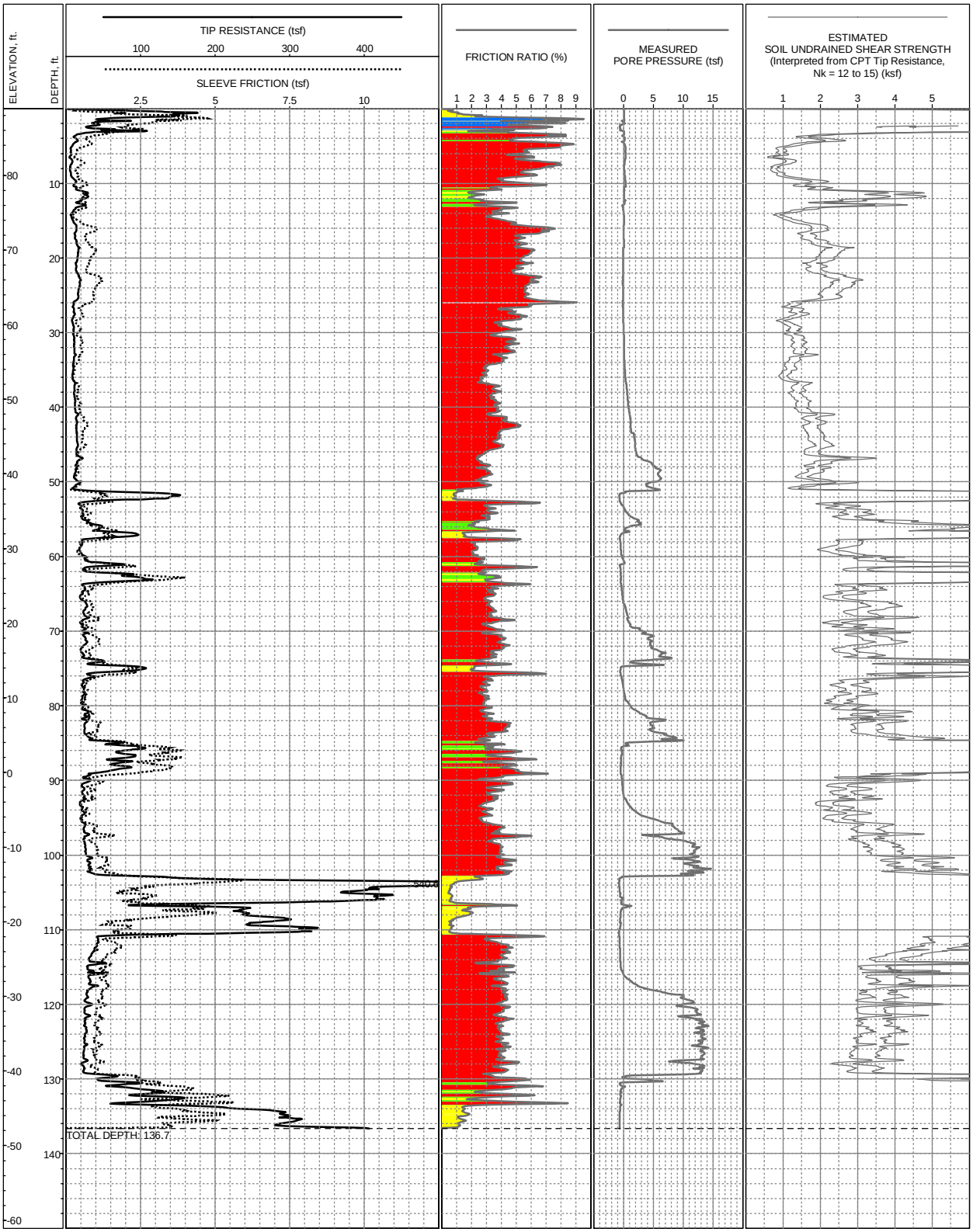


LOCATION: E6163020.1 N1956393.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 90.1ft (NAVD88)
COMPLETION DEPTH: 110.6ft
TEST DATE: 2/16/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-108

Tunnel Segment of SVRT Project
San Jose, California

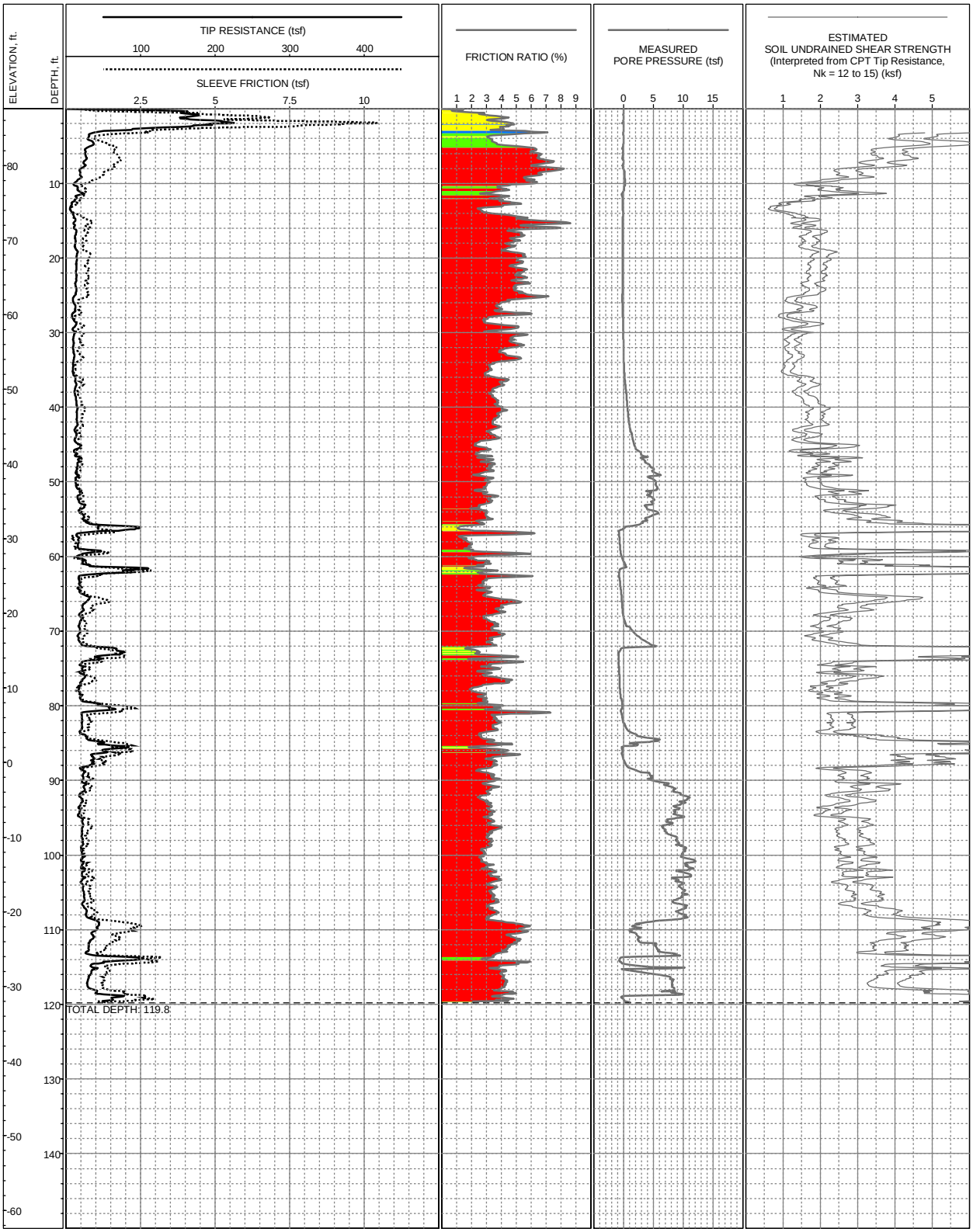


LOCATION: E6163045.1 N1956323.2 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88.9ft (NAVD88)
COMPLETION DEPTH: 136.7ft
TEST DATE: 2/16/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-109

Tunnel Segment of SVRT Project
San Jose, California

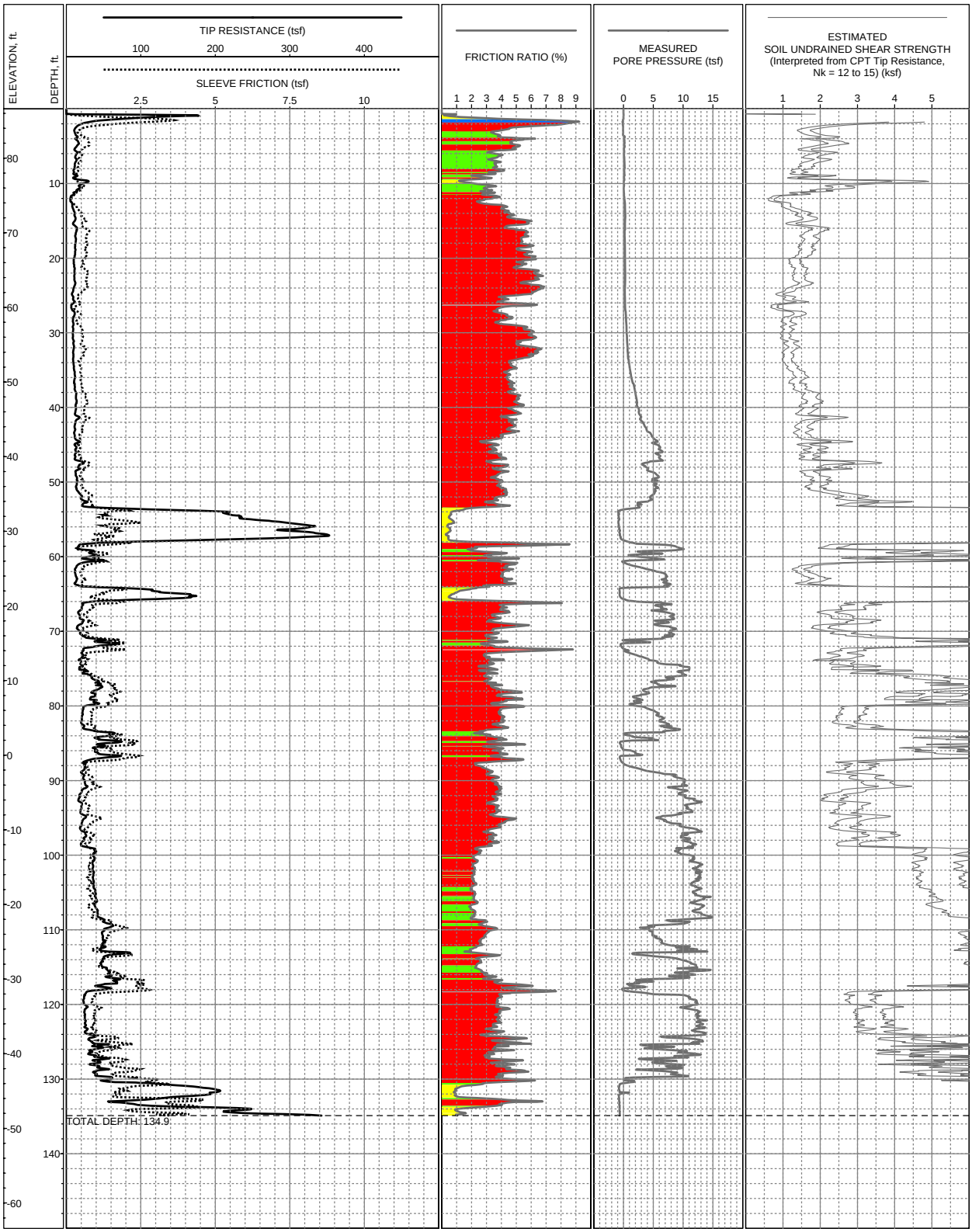


LOCATION: E6163134 N1956109.3 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 87.6ft (NAVD88)
COMPLETION DEPTH: 119.8ft
TEST DATE: 2/16/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-110

Tunnel Segment of SVRT Project
San Jose, California

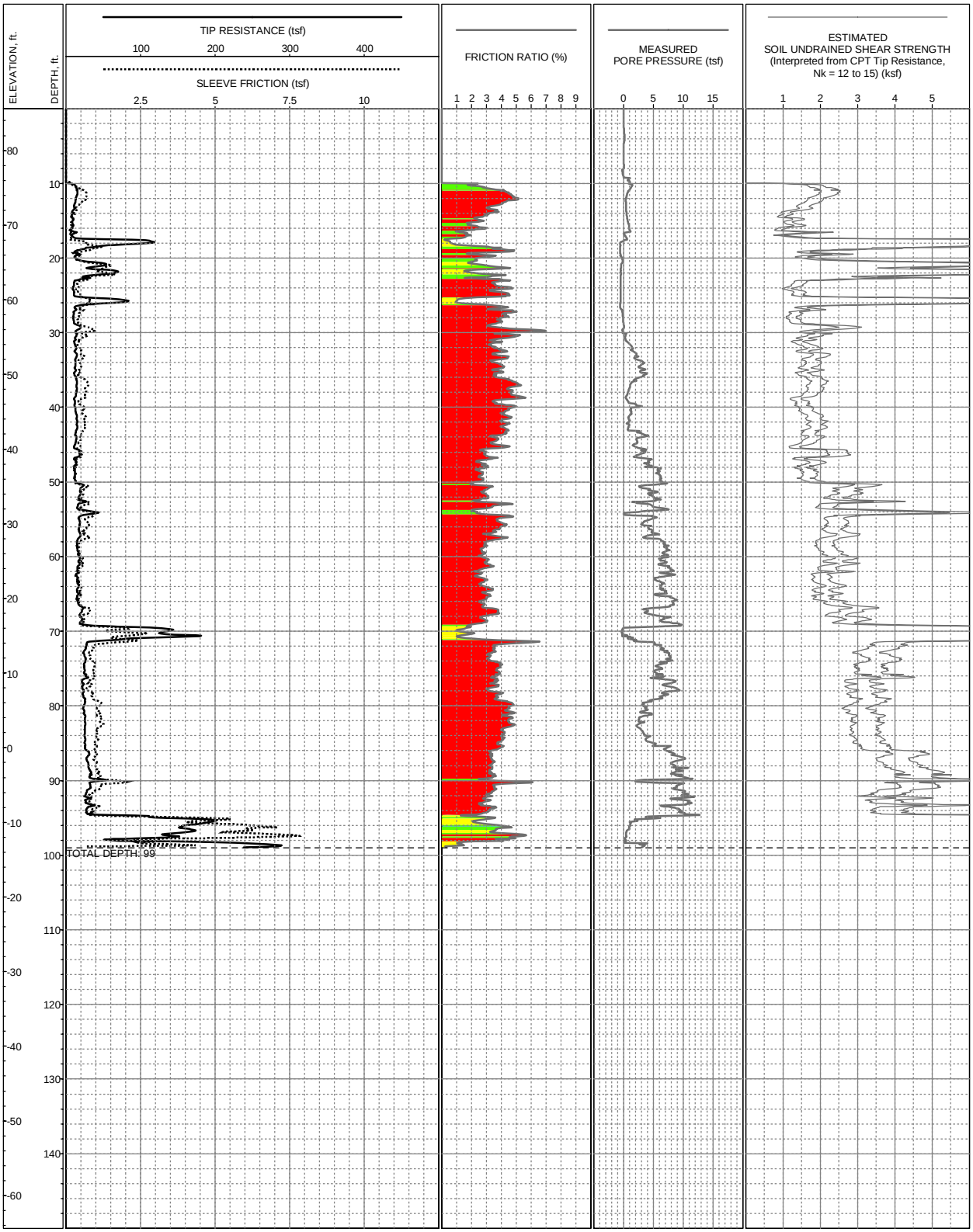


LOCATION: E6163221.6 N1956011.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 86.6ft (NAVD88)
COMPLETION DEPTH: 134.9ft
TEST DATE: 11/11/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-111

Tunnel Segment of SVRT Project
San Jose, California

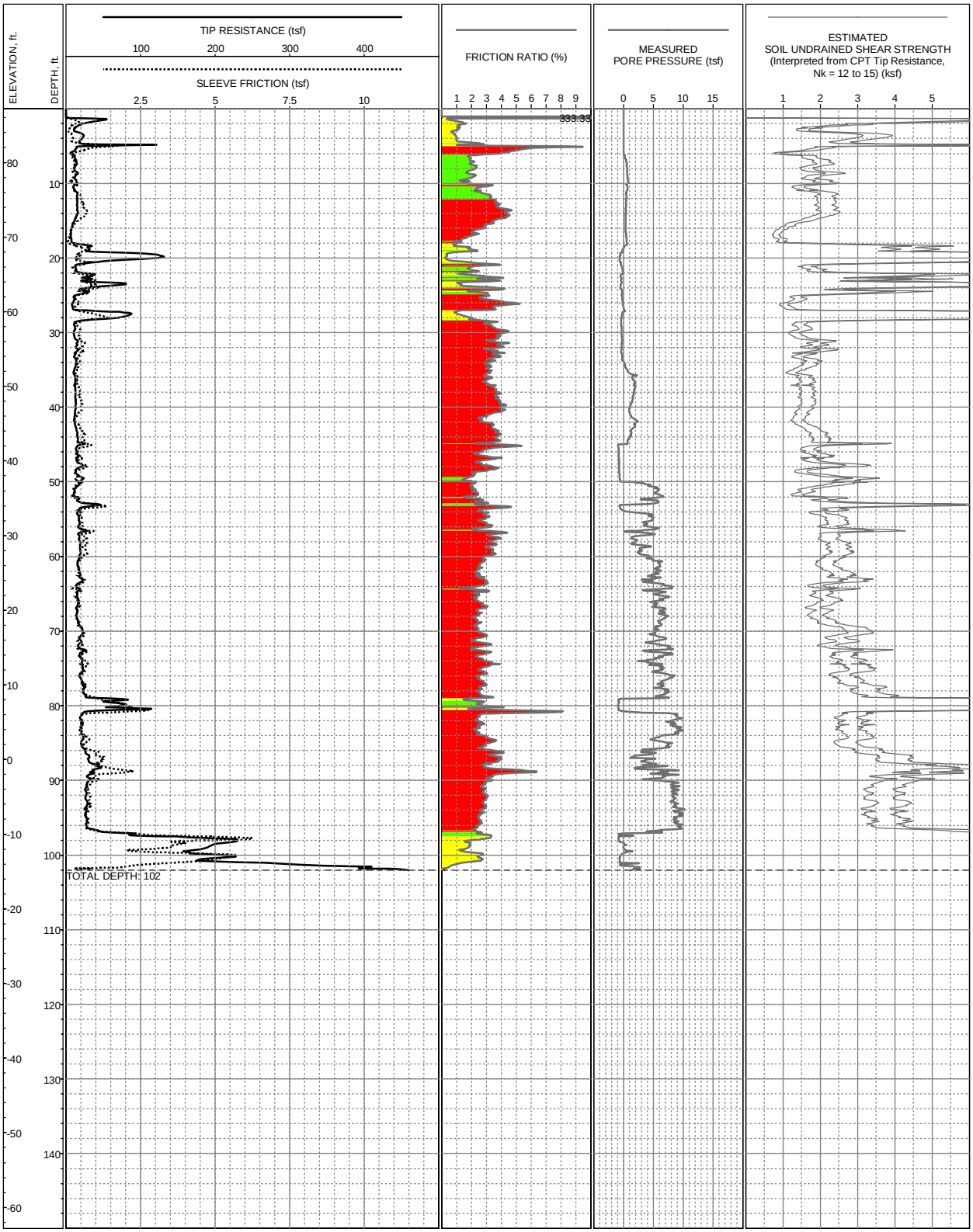


LOCATION: E6164848 N1953816.3 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 85.6ft (NAVD88)
COMPLETION DEPTH: 99ft
TEST DATE: 12/14/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-112

Tunnel Segment of SVRT Project
San Jose, California

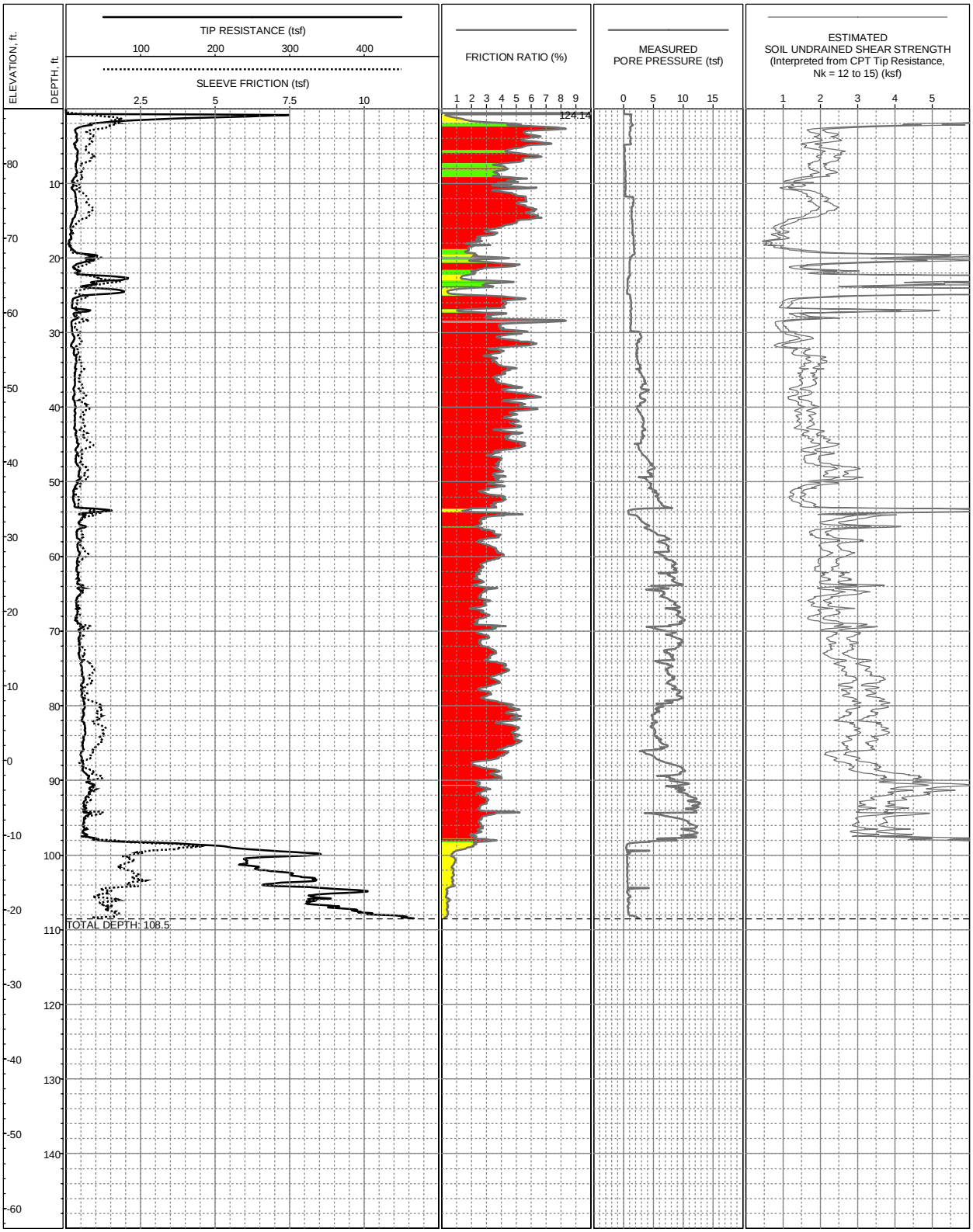


LOCATION: E6164843.7 N1953778.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 87.2ft (NAVD88)
COMPLETION DEPTH: 102ft
TEST DATE: 1/13/2005

CONE: F7.5CKEW1170
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-113

Tunnel Segment of SVRT Project
San Jose, California

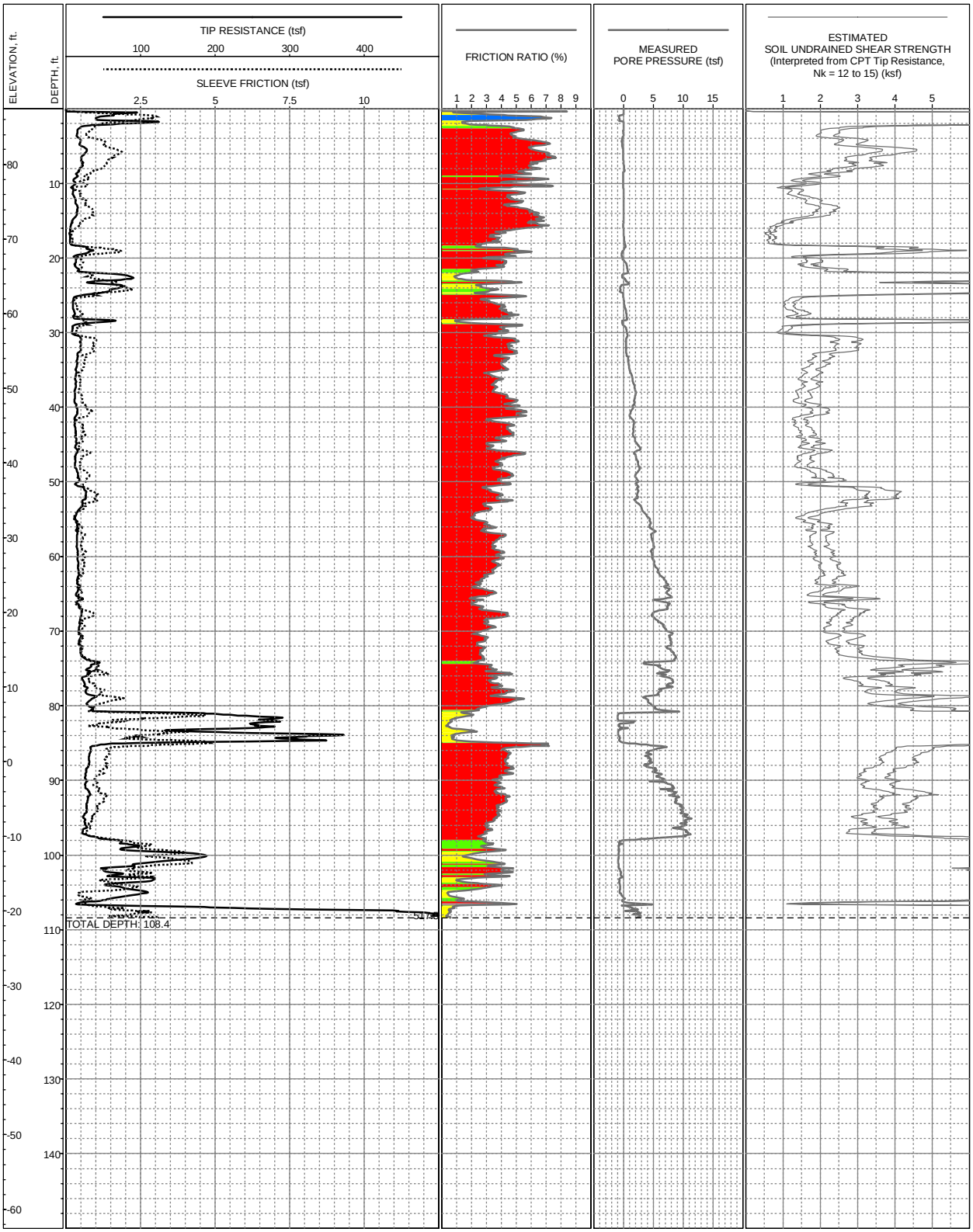


LOCATION: E6164763.7 N1953749.7 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 87.3ft (NAVD88)
COMPLETION DEPTH: 108.5ft
TEST DATE: 2/12/2005

CONE: F7.5CKEW750
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-114

Tunnel Segment of SVRT Project
San Jose, California

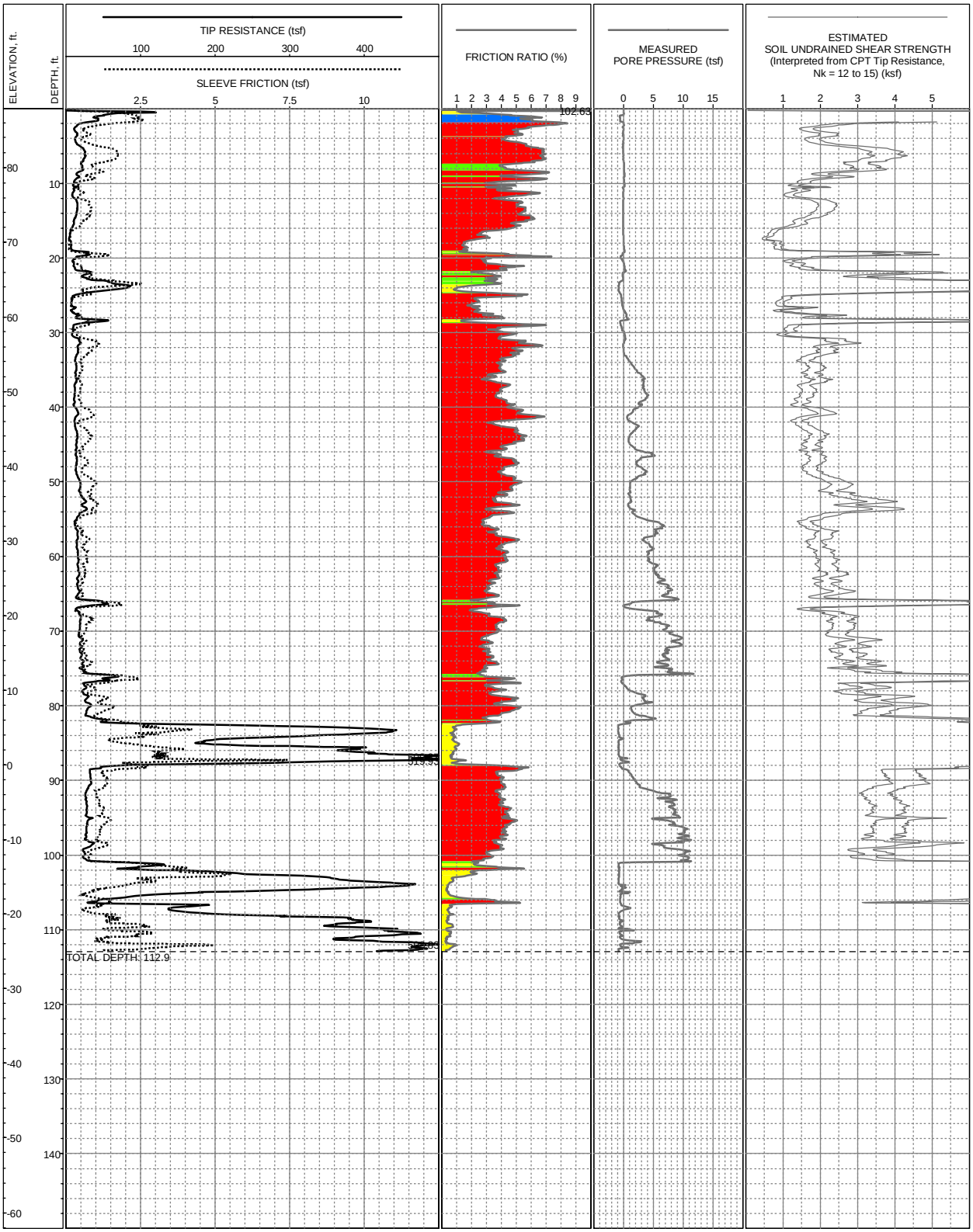


LOCATION: E6164856.1 N1953390.7 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 87.5ft (NAVD88)
COMPLETION DEPTH: 108.4ft
TEST DATE: 2/8/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-117

Tunnel Segment of SVRT Project
San Jose, California

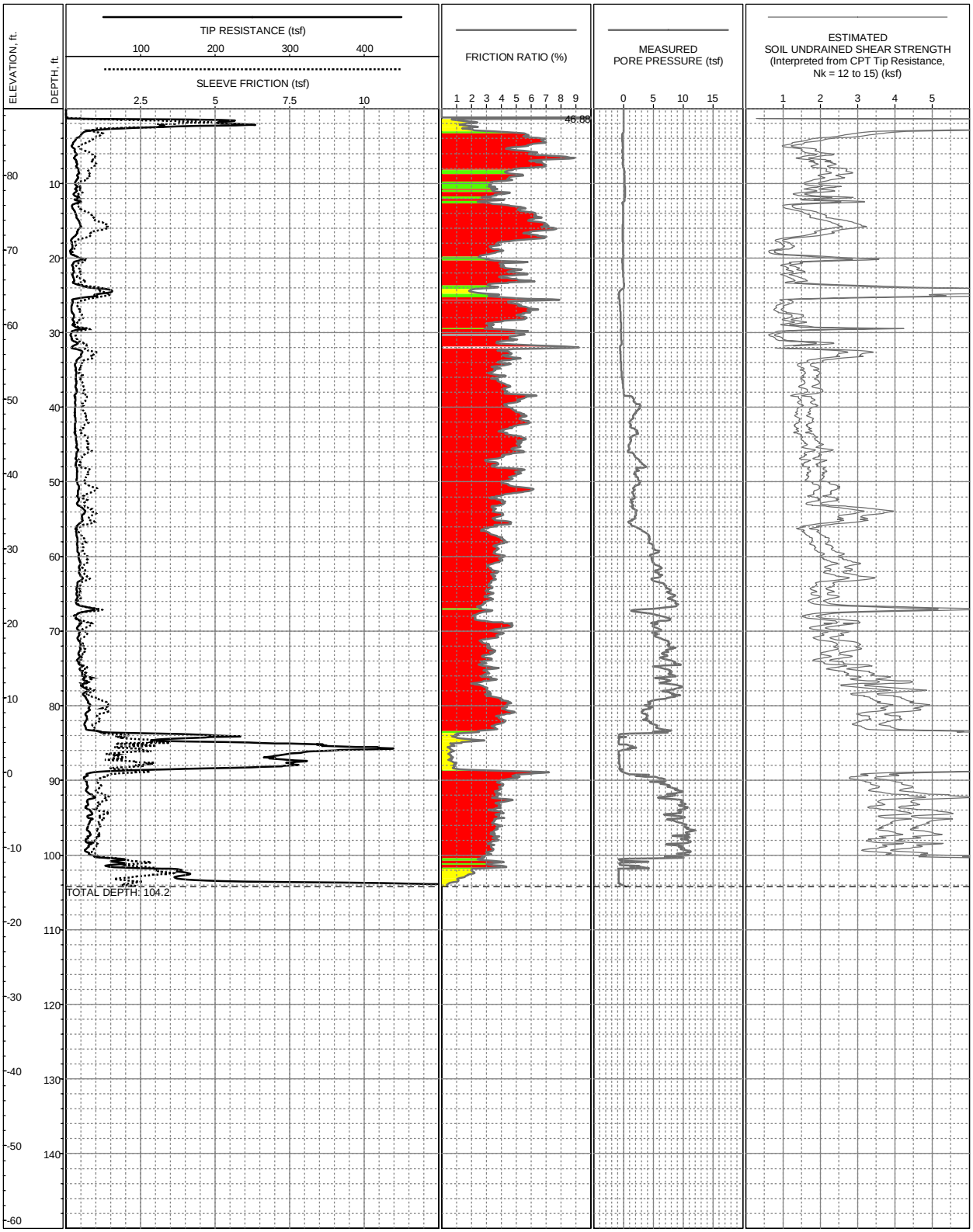


LOCATION: E6164869.2 N1953312.8 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 87.9ft (NAVD88)
COMPLETION DEPTH: 112.9ft
TEST DATE: 2/12/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-118

Tunnel Segment of SVRT Project
San Jose, California

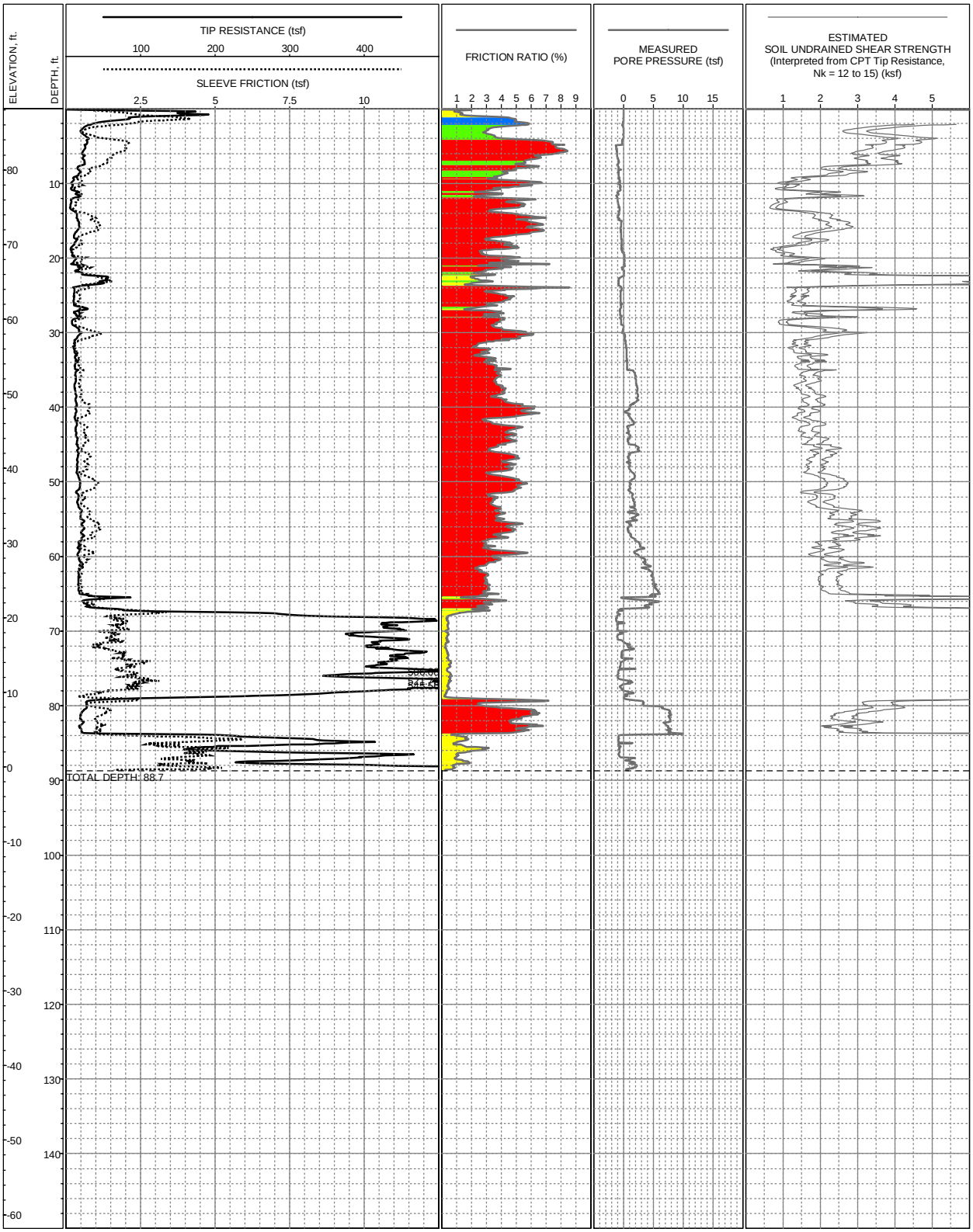


LOCATION: E6164855.9 N1953210.2 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88.9ft (NAVD88)
COMPLETION DEPTH: 104.2ft
TEST DATE: 2/8/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-120

Tunnel Segment of SVRT Project
San Jose, California

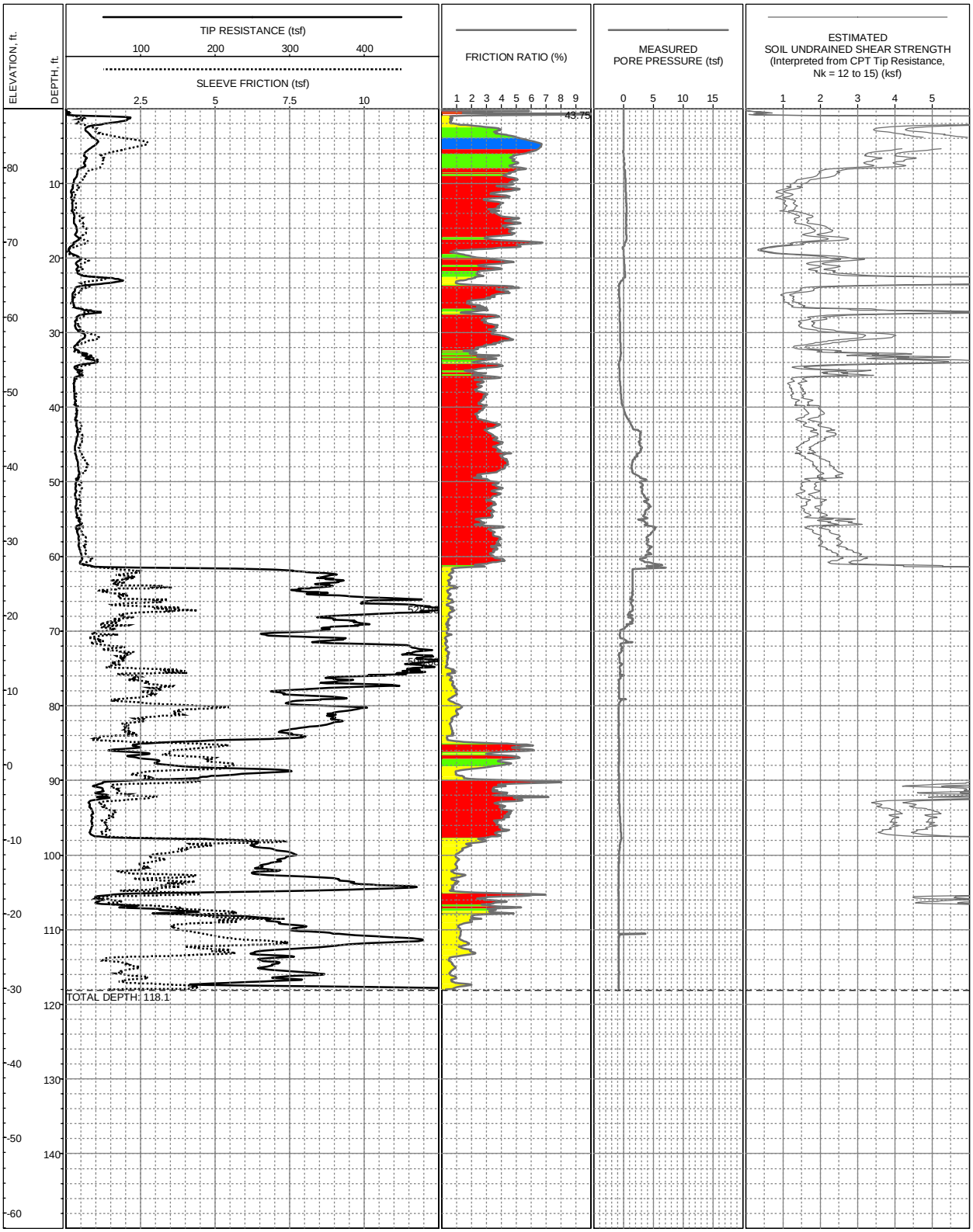


LOCATION: E6164830 N1953016 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88.2ft (NAVD88)
COMPLETION DEPTH: 88.7ft
TEST DATE: 2/13/2005

CONE: F7.5CKEW750
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-122

Tunnel Segment of SVRT Project
San Jose, California

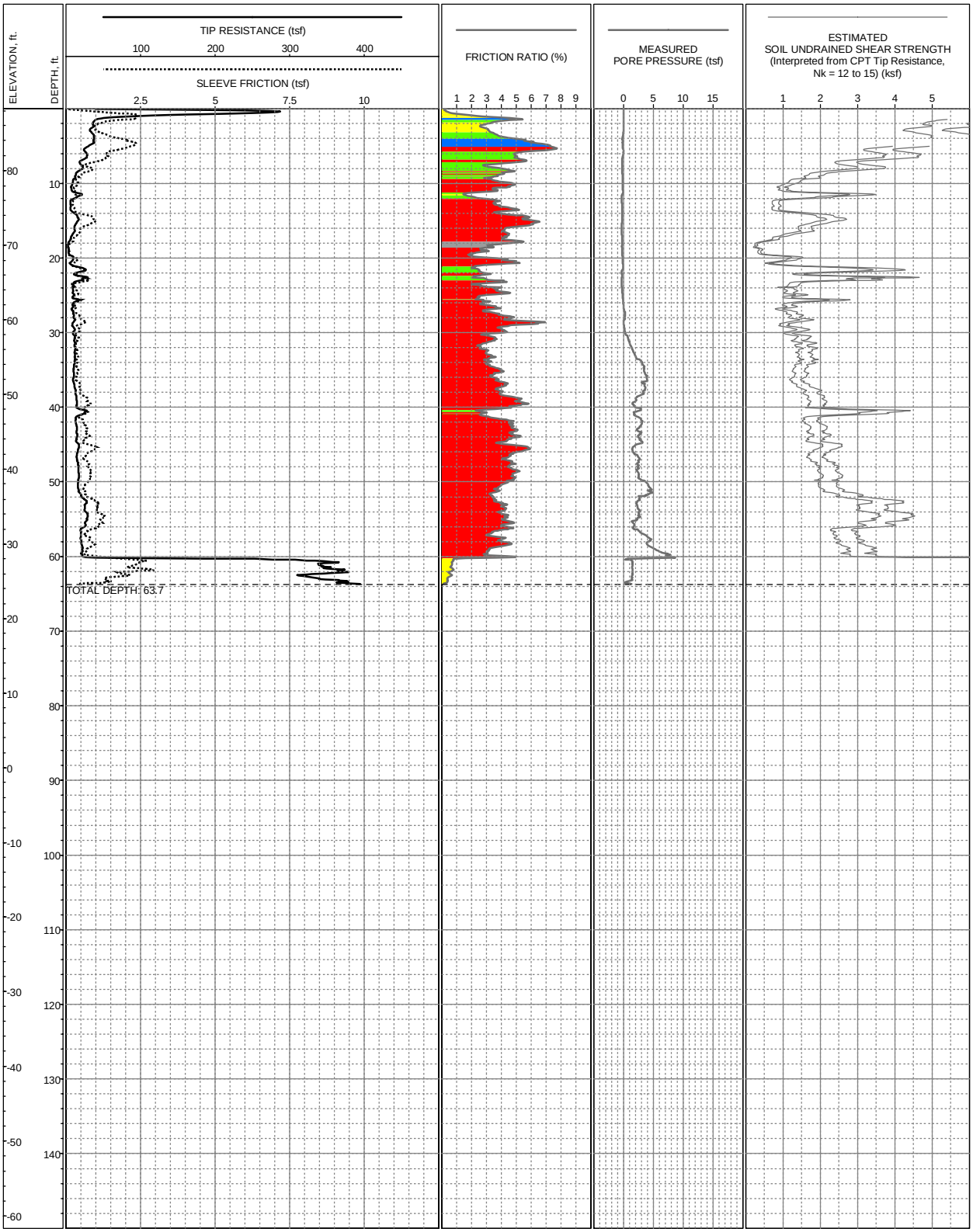


LOCATION: E6164817.2 N1952926.4 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 87.9ft (NAVD88)
COMPLETION DEPTH: 118.1ft
TEST DATE: 2/13/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-123

Tunnel Segment of SVRT Project
San Jose, California

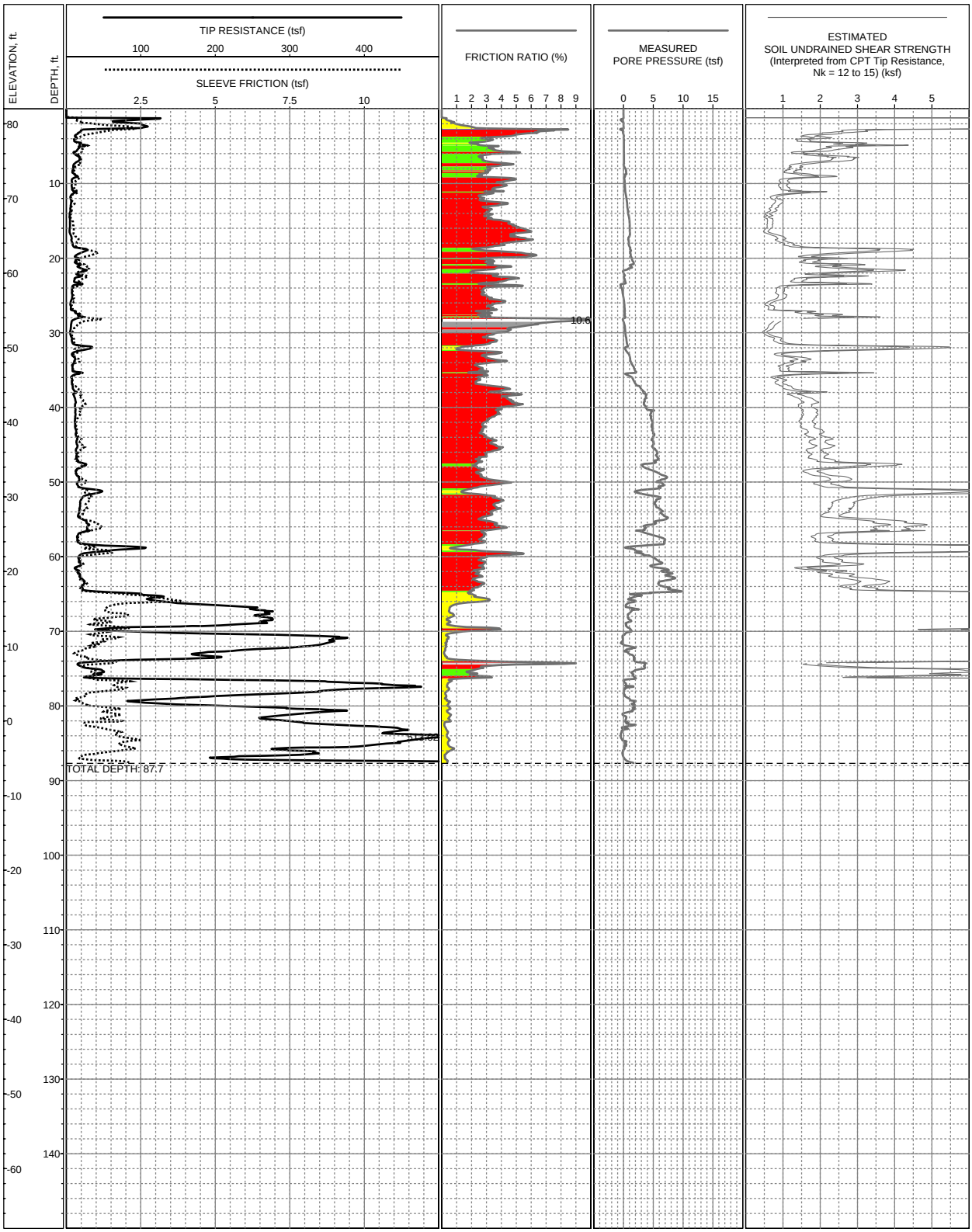


LOCATION: E6164799.3 N1952805 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88.3ft (NAVD88)
COMPLETION DEPTH: 63.7ft
TEST DATE: 1/25/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-124

Tunnel Segment of SVRT Project
San Jose, California

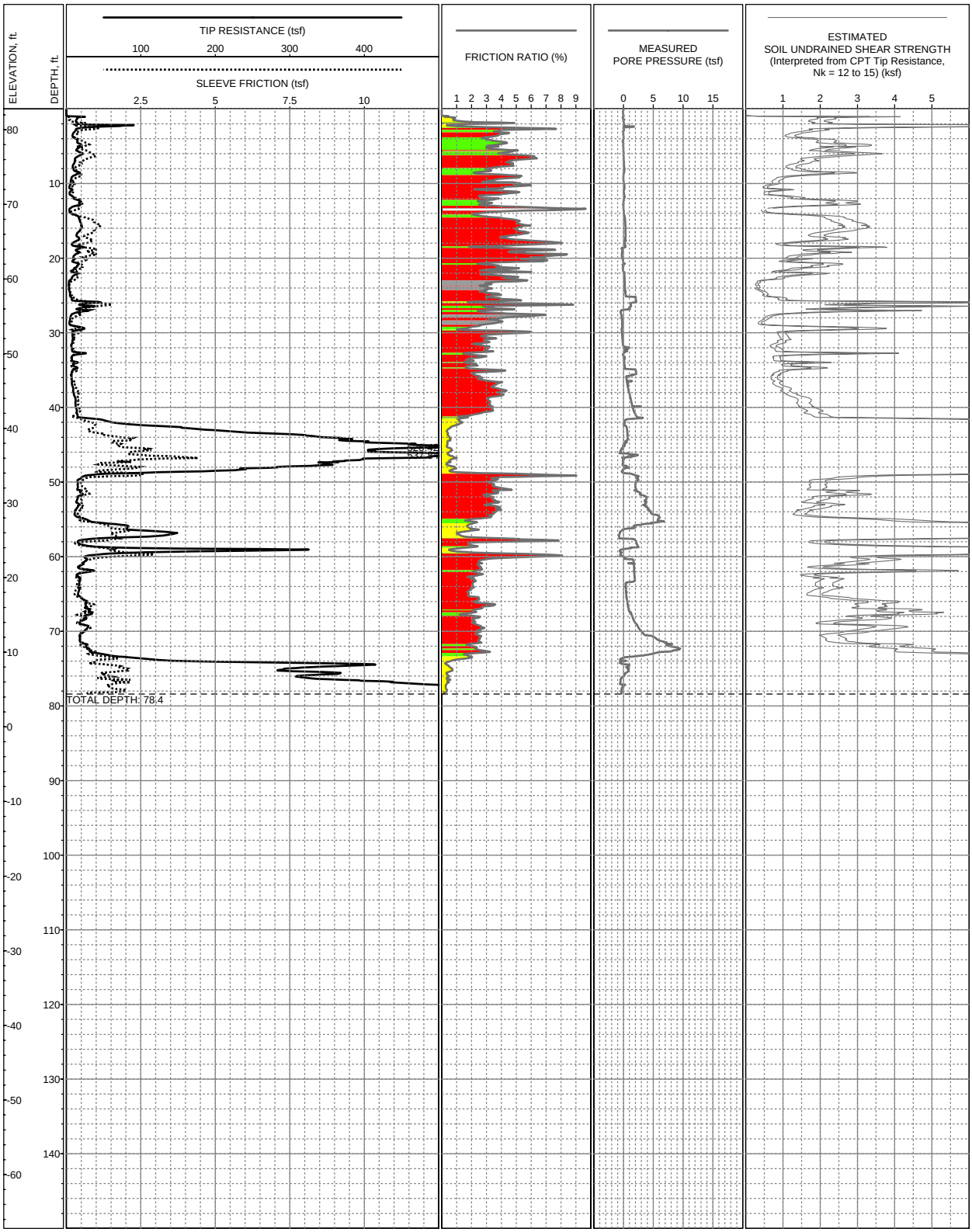


LOCATION: E6158263.4 N1948383.4 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 82ft (NAVD88)
COMPLETION DEPTH: 87.7ft
TEST DATE: 10/19/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: T Dowd & D Garza
REVIEWED BY: R Howard

LOG OF CPT-126

Tunnel Segment of SVRT Project
San Jose, California

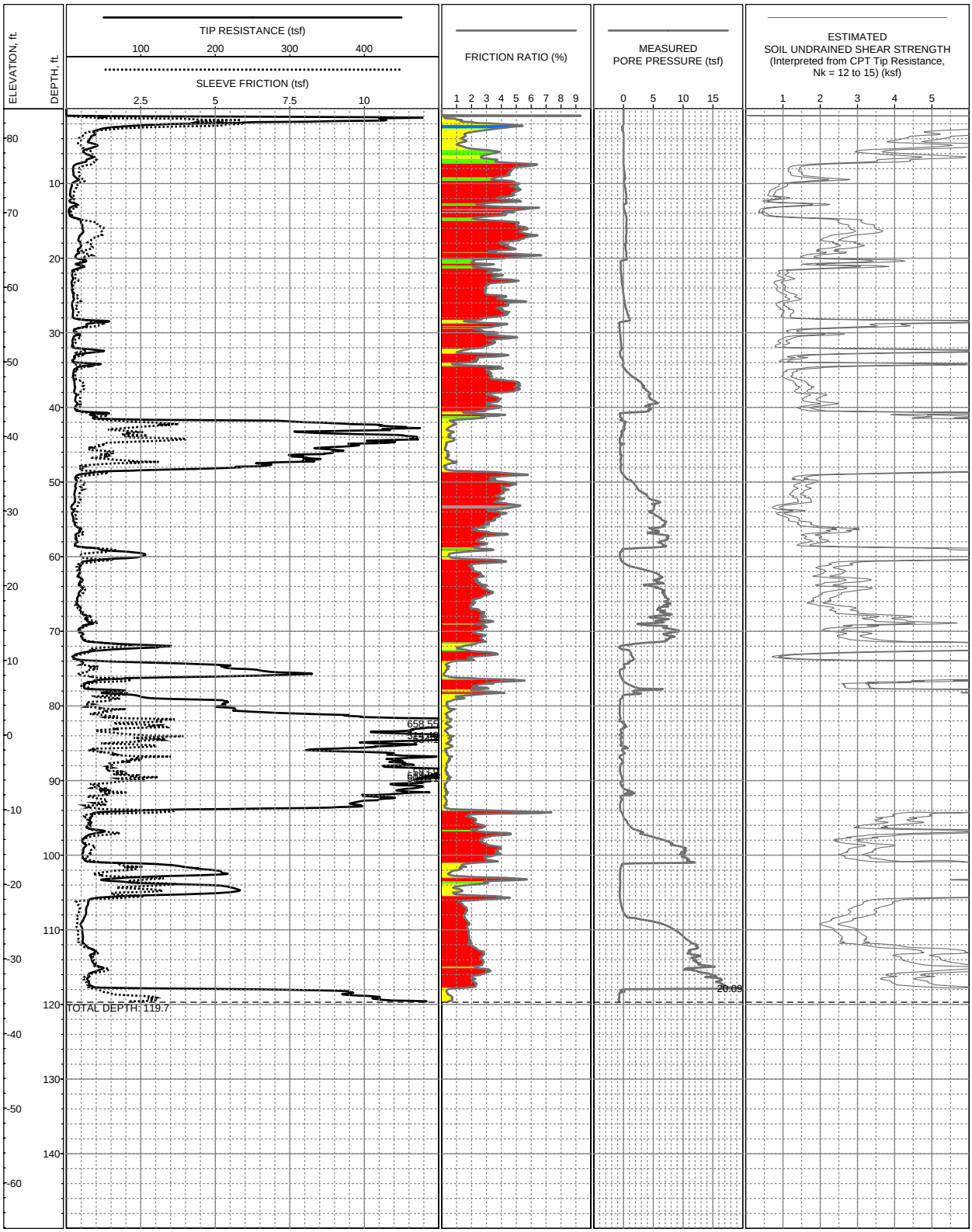


LOCATION: E6158122 N1948279.7 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 82.8ft (NAVD88)
COMPLETION DEPTH: 78.4ft
TEST DATE: 11/12/2004

CONE: F7.5CKESW750
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-128

Tunnel Segment of SVRT Project
San Jose, California

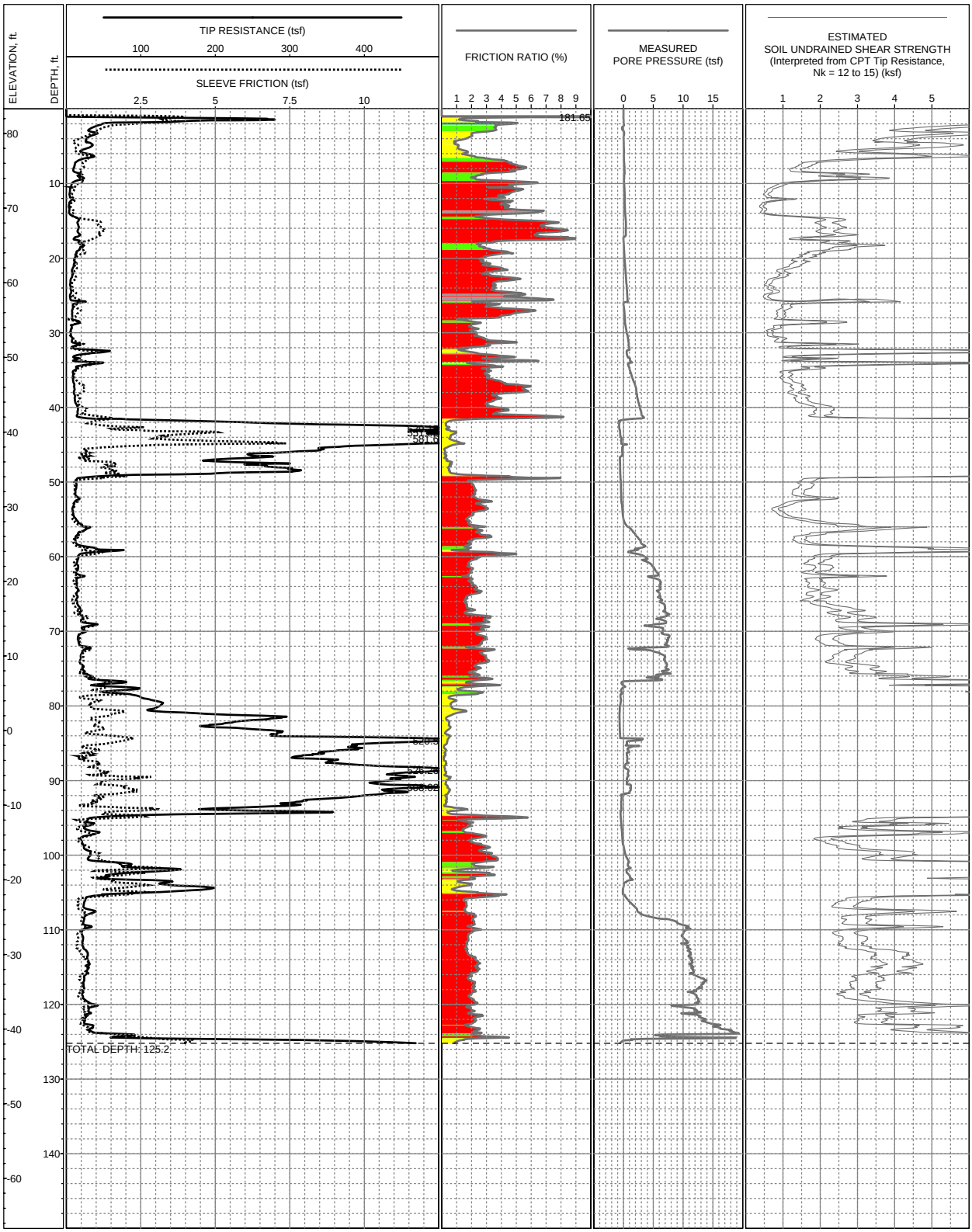


LOCATION: E6157924.2 N1948165.7 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 83.9ft (NAVD88)
COMPLETION DEPTH: 119.7ft
TEST DATE: 10/12/2004

CONE: F7.5CKEW966
PERFORMED BY: Fugro Geosciences
OPERATOR: T Dowd & D Garza
REVIEWED BY: R Howard

LOG OF CPT-129

Tunnel Segment of SVRT Project
San Jose, California

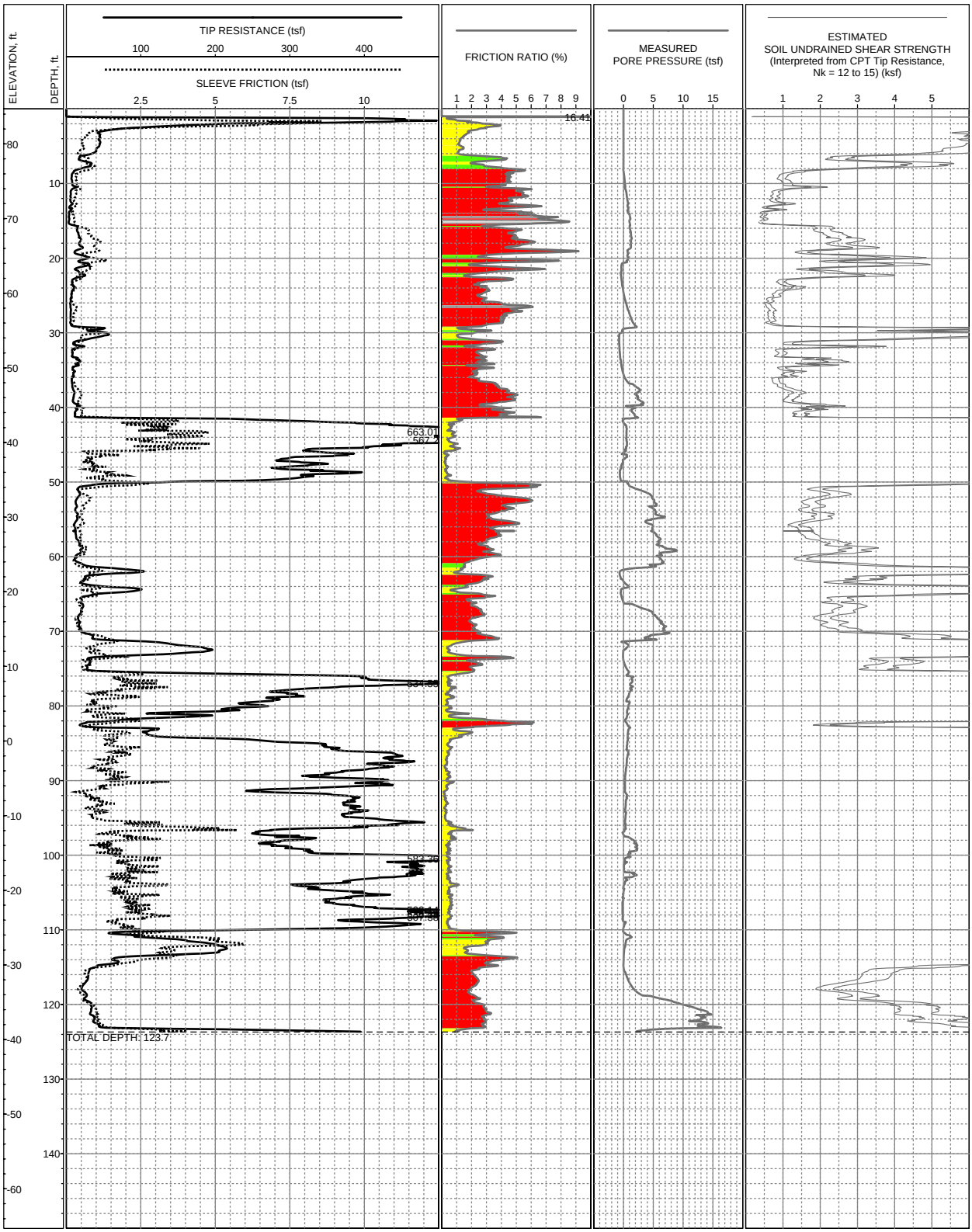


LOCATION: E6157980.1 N1948195.8 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 83.3ft (NAVD88)
COMPLETION DEPTH: 125.2ft
TEST DATE: 10/18/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: T Dowd & D Garza
REVIEWED BY: R Howard

LOG OF CPT-130

Tunnel Segment of SVRT Project
San Jose, California

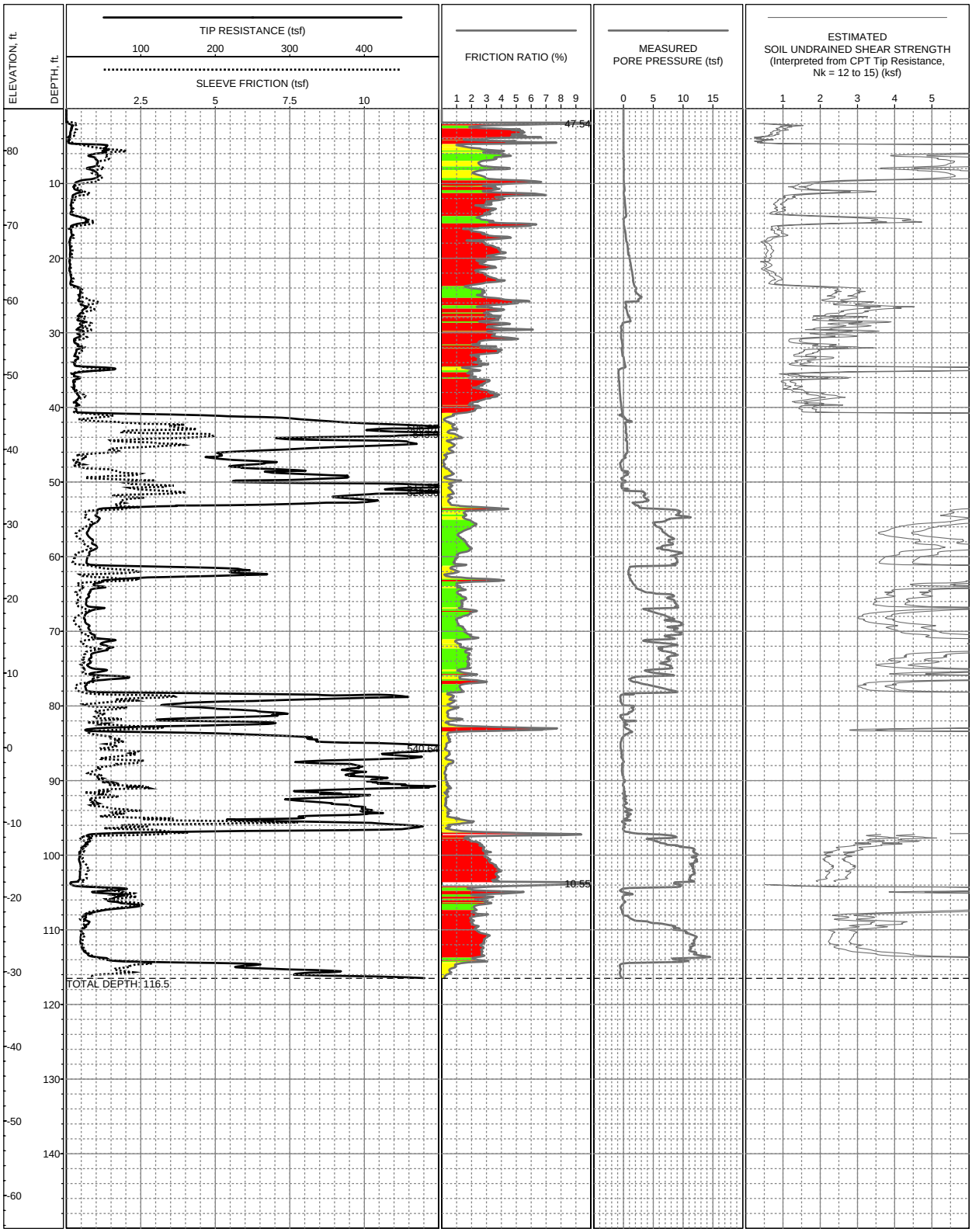


LOCATION: E6157806.9 N1948095.7 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 84.7ft (NAVD88)
COMPLETION DEPTH: 123.7ft
TEST DATE: 10/12/2004

CONE: F7.5CKEW966
PERFORMED BY: Fugro Geosciences
OPERATOR: T Dowd & D Garza
REVIEWED BY: R Howard

LOG OF CPT-132

Tunnel Segment of SVRT Project
San Jose, California

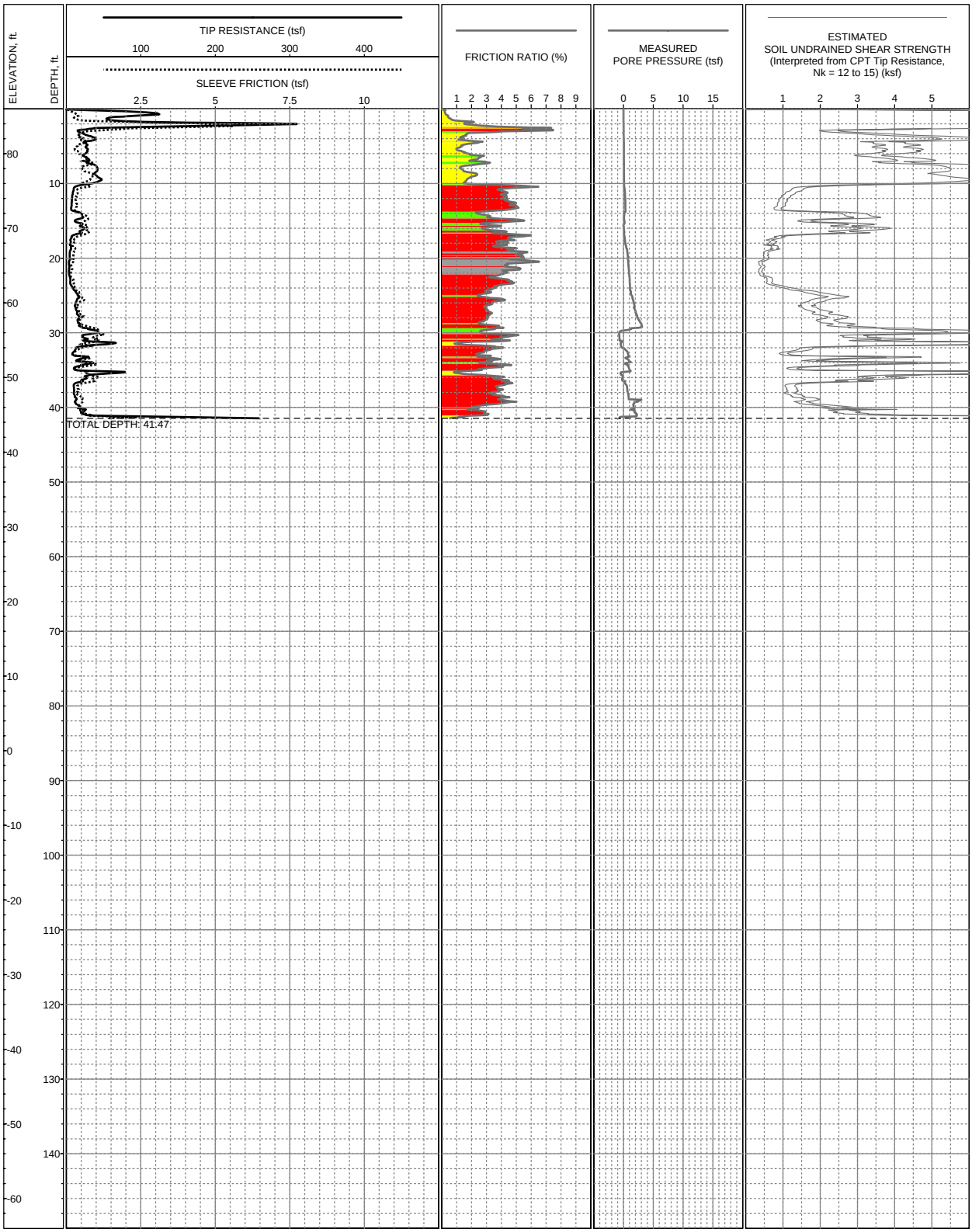


LOCATION: E6157659.2 N1948028.8 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 85.6ft (NAVD88)
COMPLETION DEPTH: 116.5ft
TEST DATE: 10/27/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-133

Tunnel Segment of SVRT Project
San Jose, California

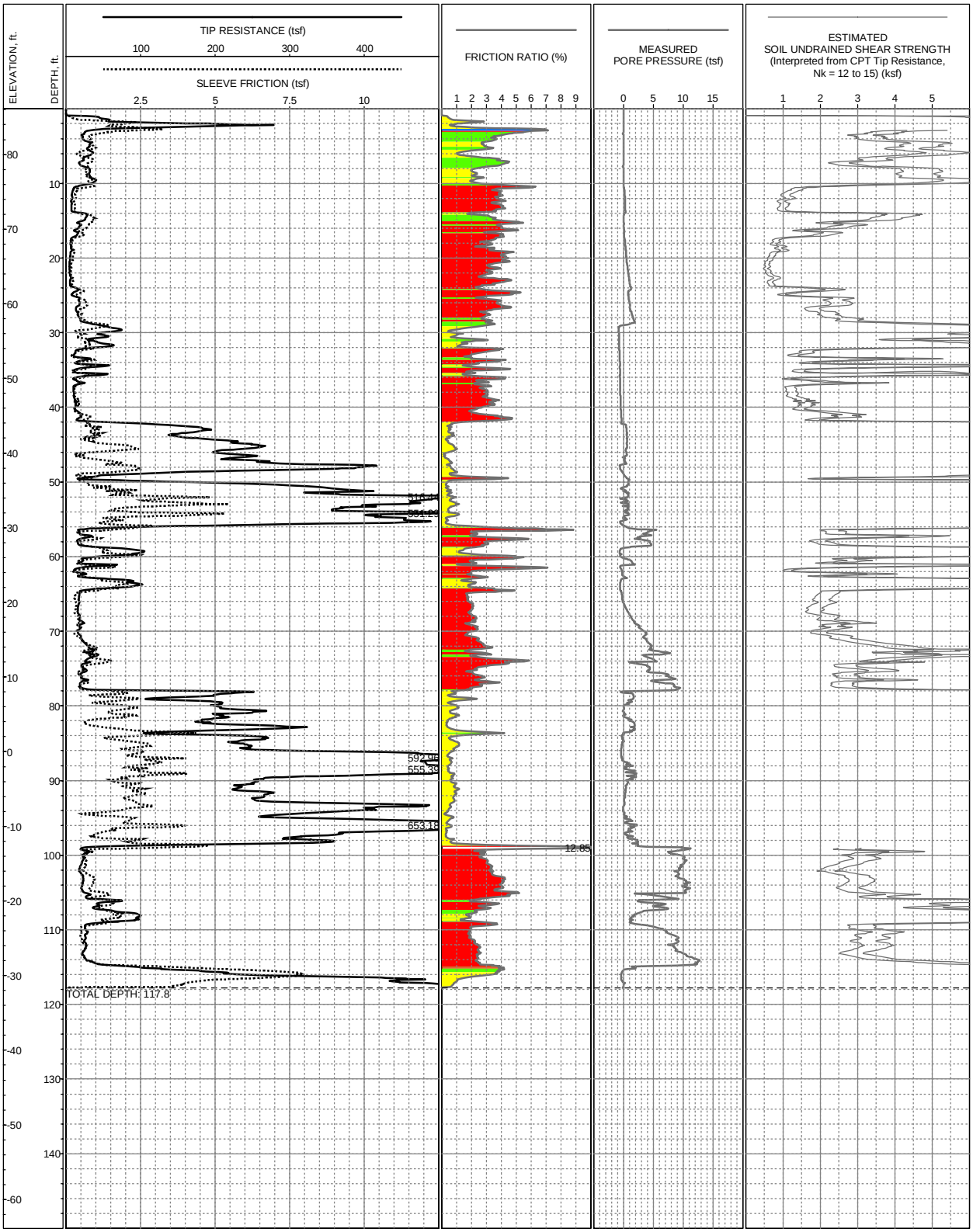


LOCATION: E6157622.8 N1948006.5 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 86ft (NAVD88)
COMPLETION DEPTH: 41.47ft
TEST DATE: 10/27/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-134

Tunnel Segment of SVRT Project
San Jose, California

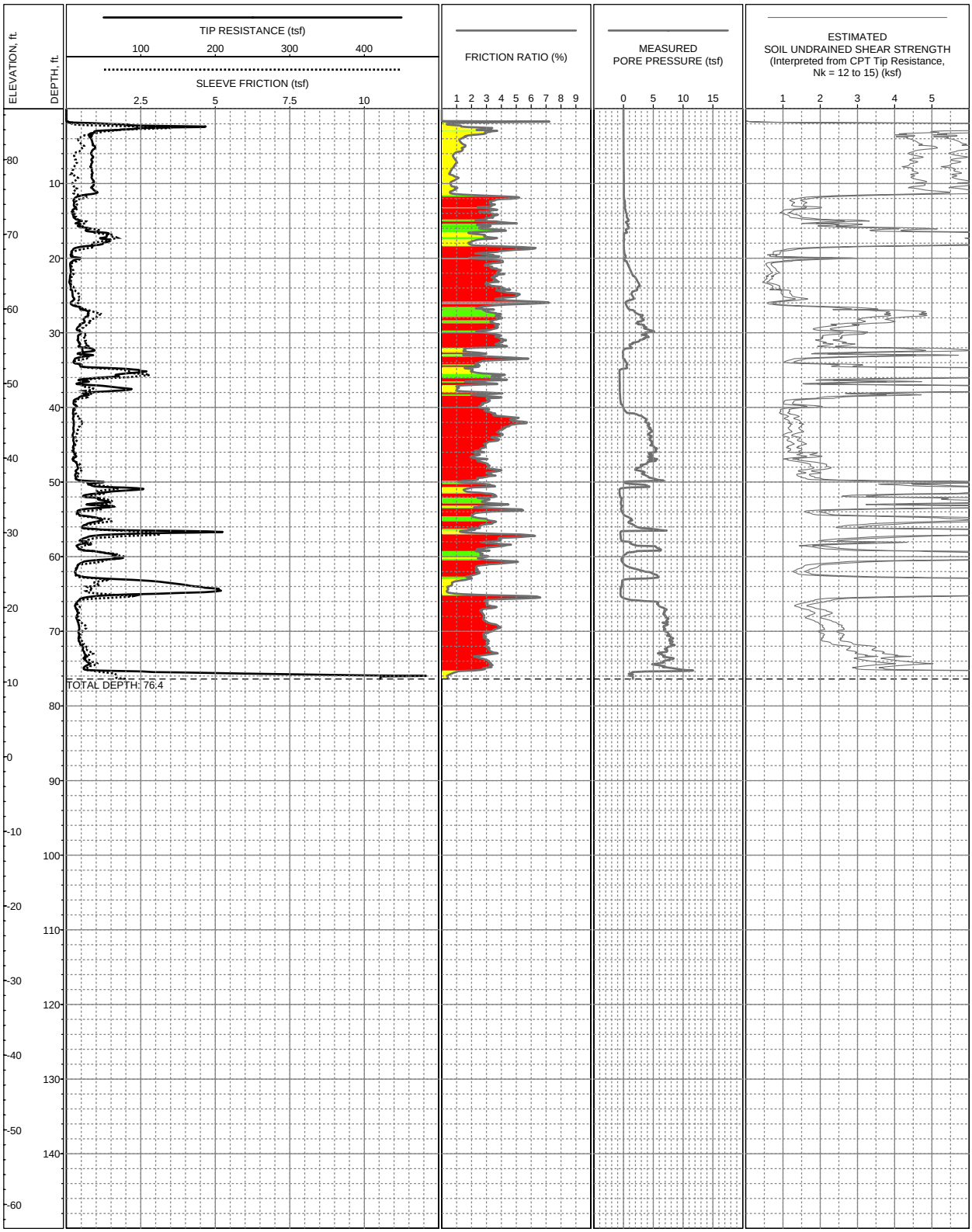


LOCATION: E6157601.7 N1947995.5 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 86.1ft (NAVD88)
COMPLETION DEPTH: 117.8ft
TEST DATE: 11/18/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-134A

Tunnel Segment of SVRT Project
San Jose, California

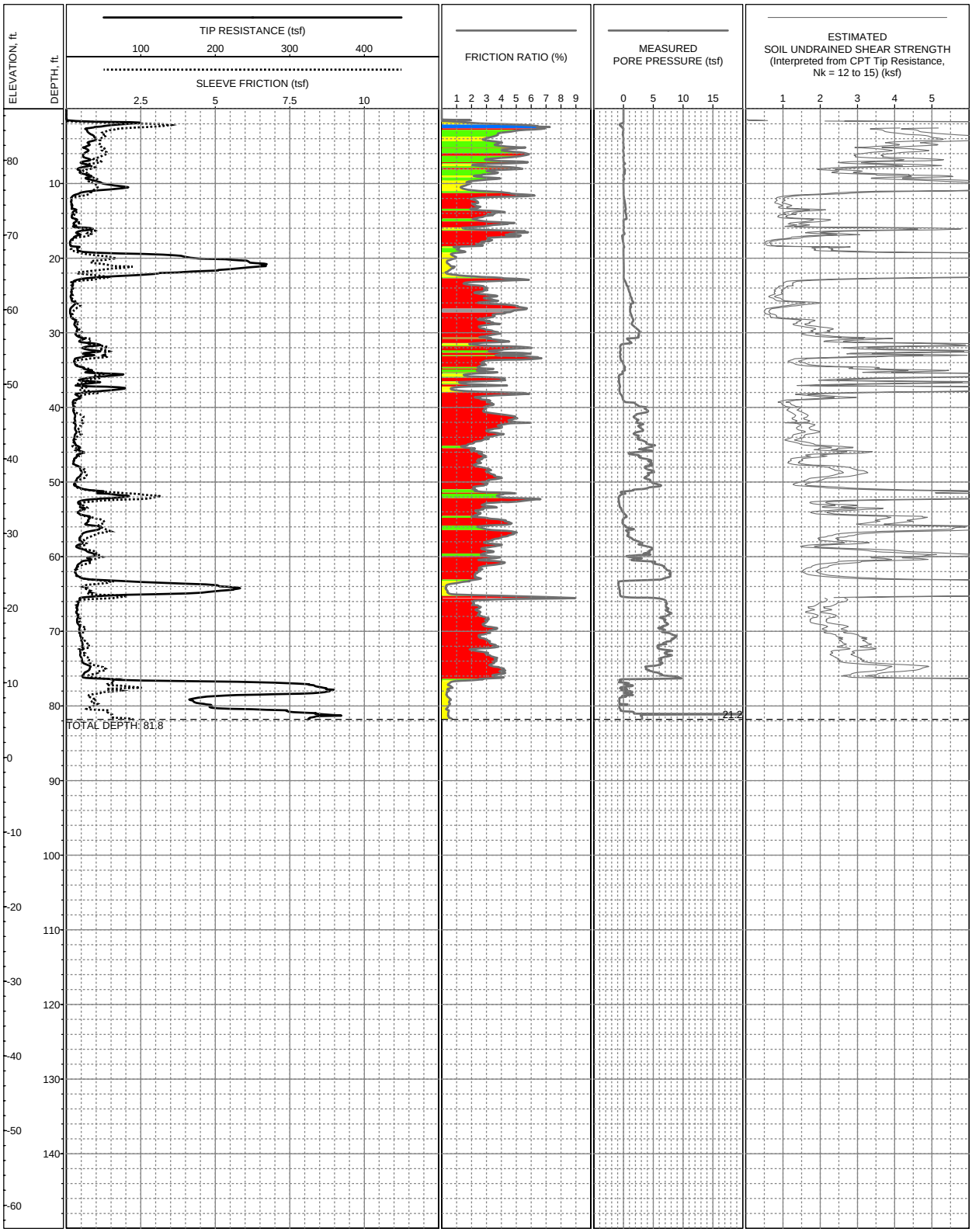


LOCATION: E6157482.8 N1947930.5 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 86.8ft (NAVD88)
COMPLETION DEPTH: 76.4ft
TEST DATE: 11/4/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-135

Tunnel Segment of SVRT Project
San Jose, California

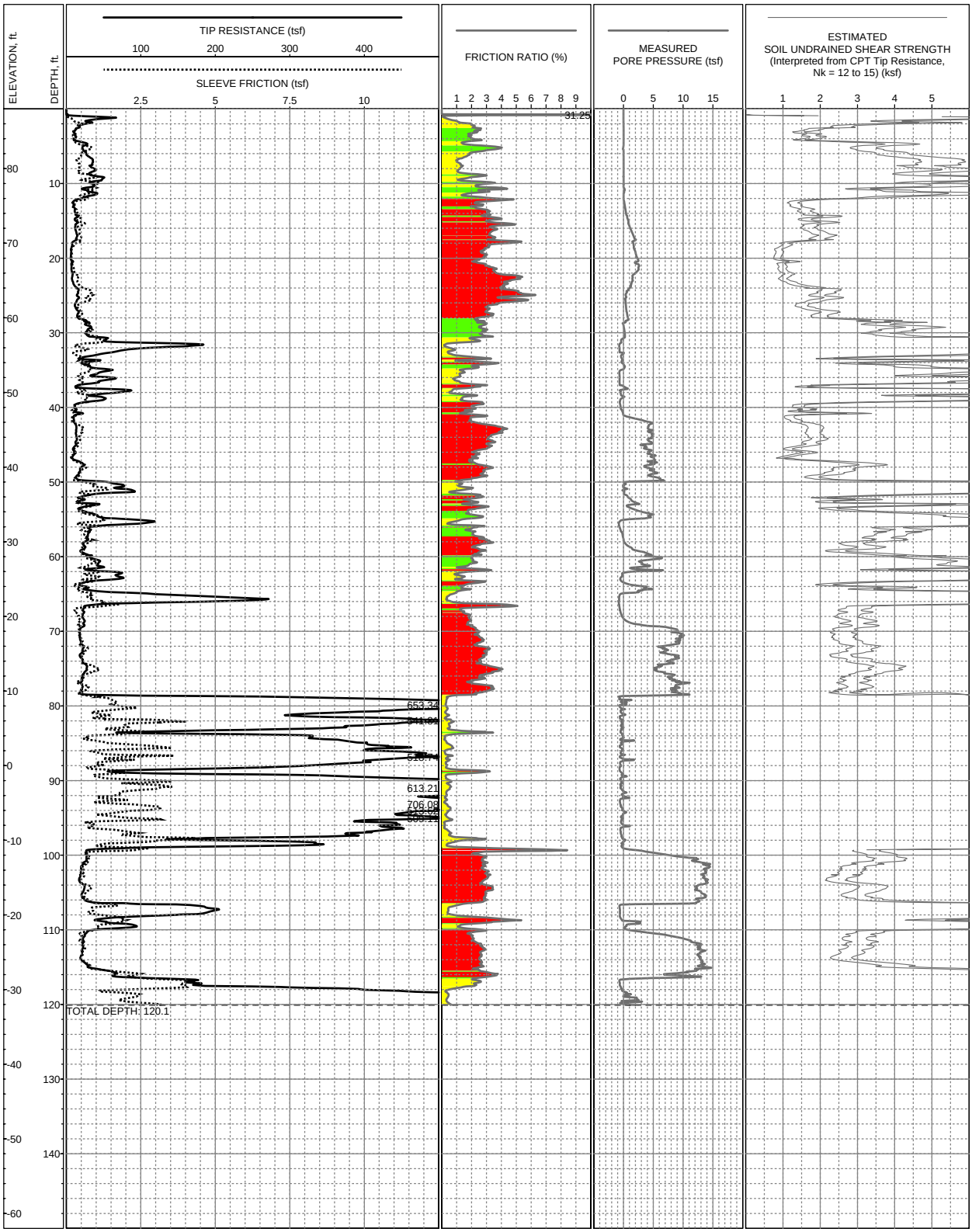


LOCATION: E6157451.2 N1947891.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 86.9ft (NAVD88)
COMPLETION DEPTH: 81.8ft
TEST DATE: 11/6/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-136

Tunnel Segment of SVRT Project
San Jose, California

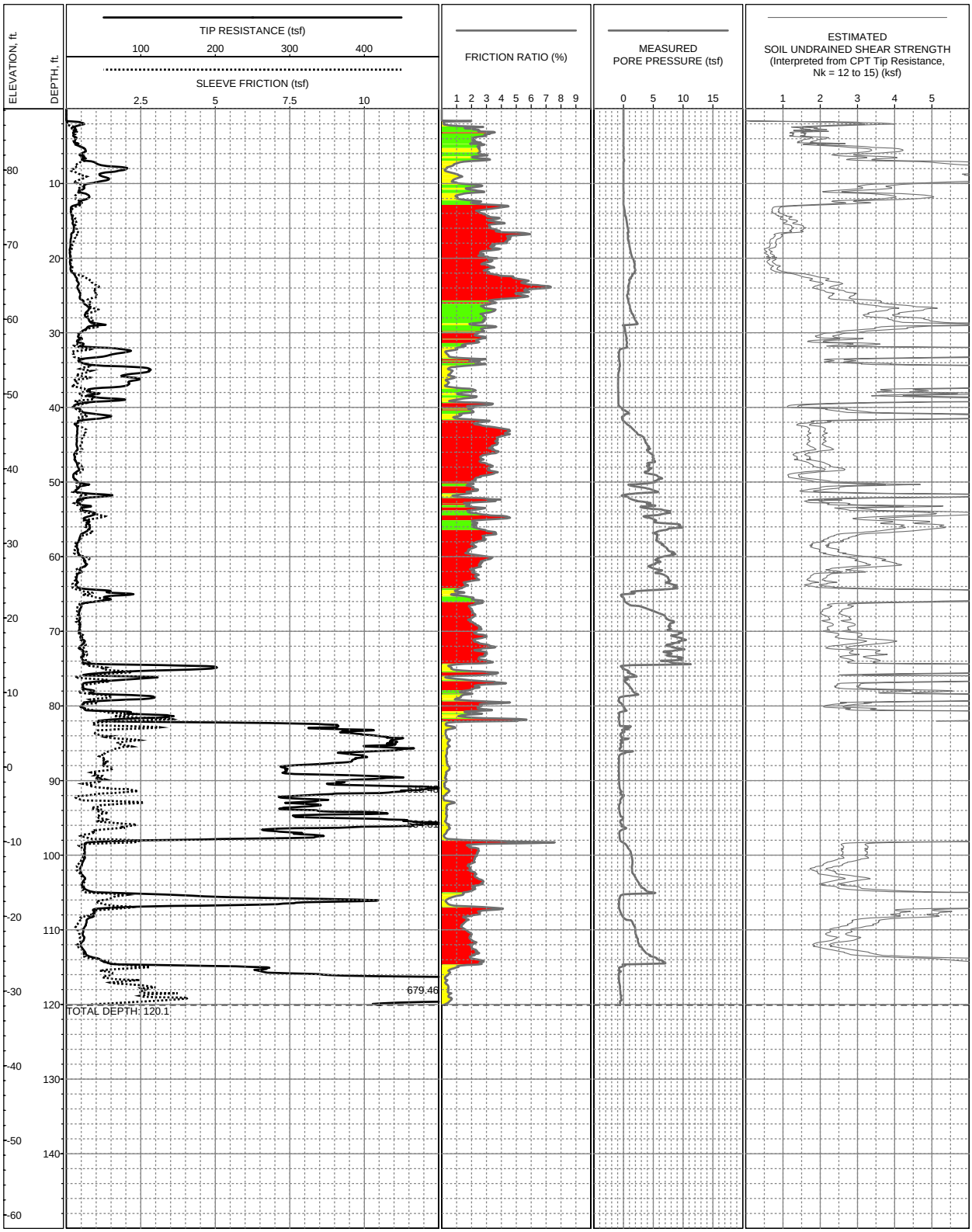


LOCATION: E6157289.5 N1947800.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88ft (NAVD88)
COMPLETION DEPTH: 120.1ft
TEST DATE: 10/8/2004

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: A Fonseca & R Gundlach
REVIEWED BY: R Howard

LOG OF CPT-137

Tunnel Segment of SVRT Project
San Jose, California

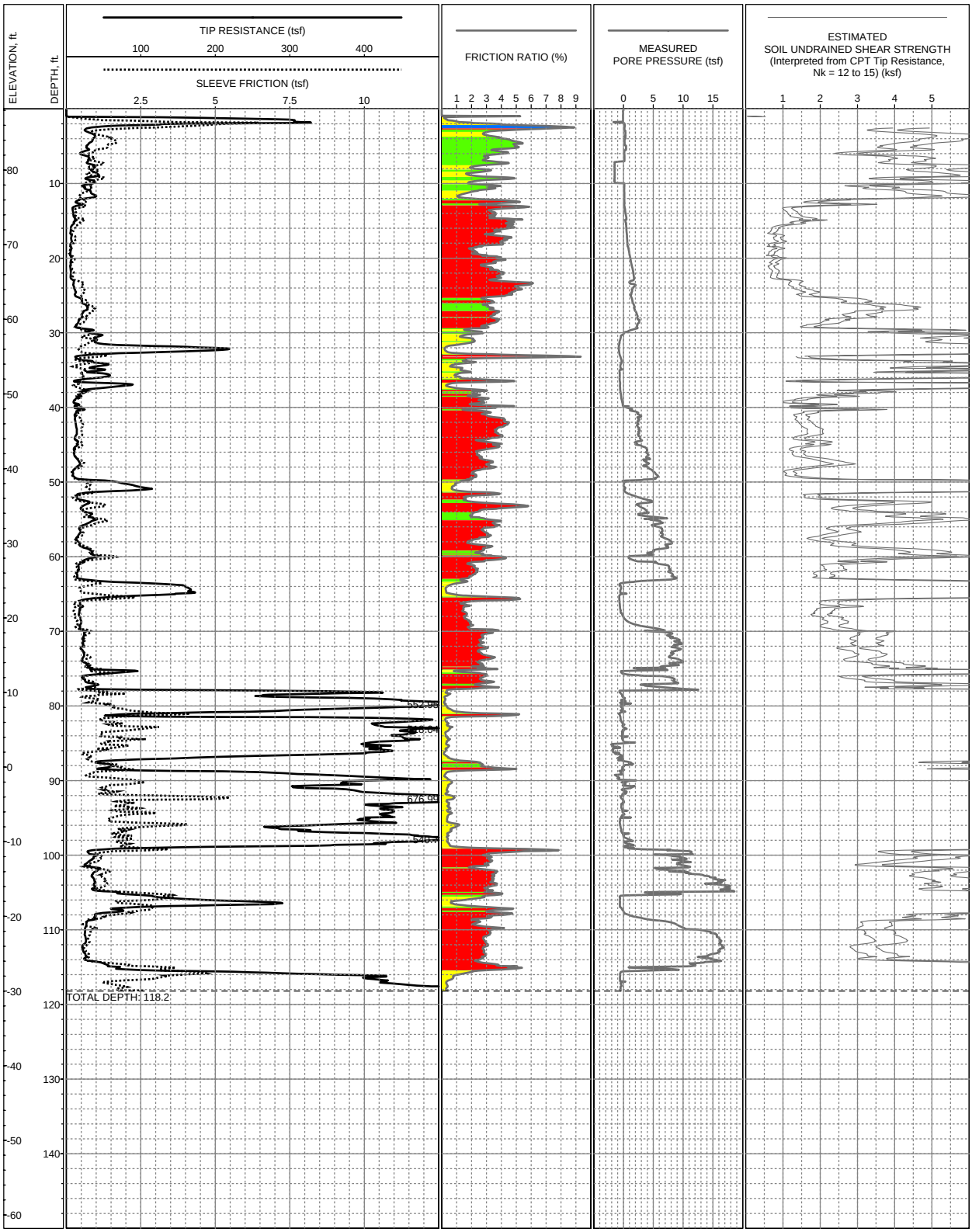


LOCATION: E6157213 N1947756.8 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88.2ft (NAVD88)
COMPLETION DEPTH: 120.1ft
TEST DATE: 10/8/2004

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: A Fonseca & R Gundlach
REVIEWED BY: R Howard

LOG OF CPT-138

Tunnel Segment of SVRT Project
San Jose, California

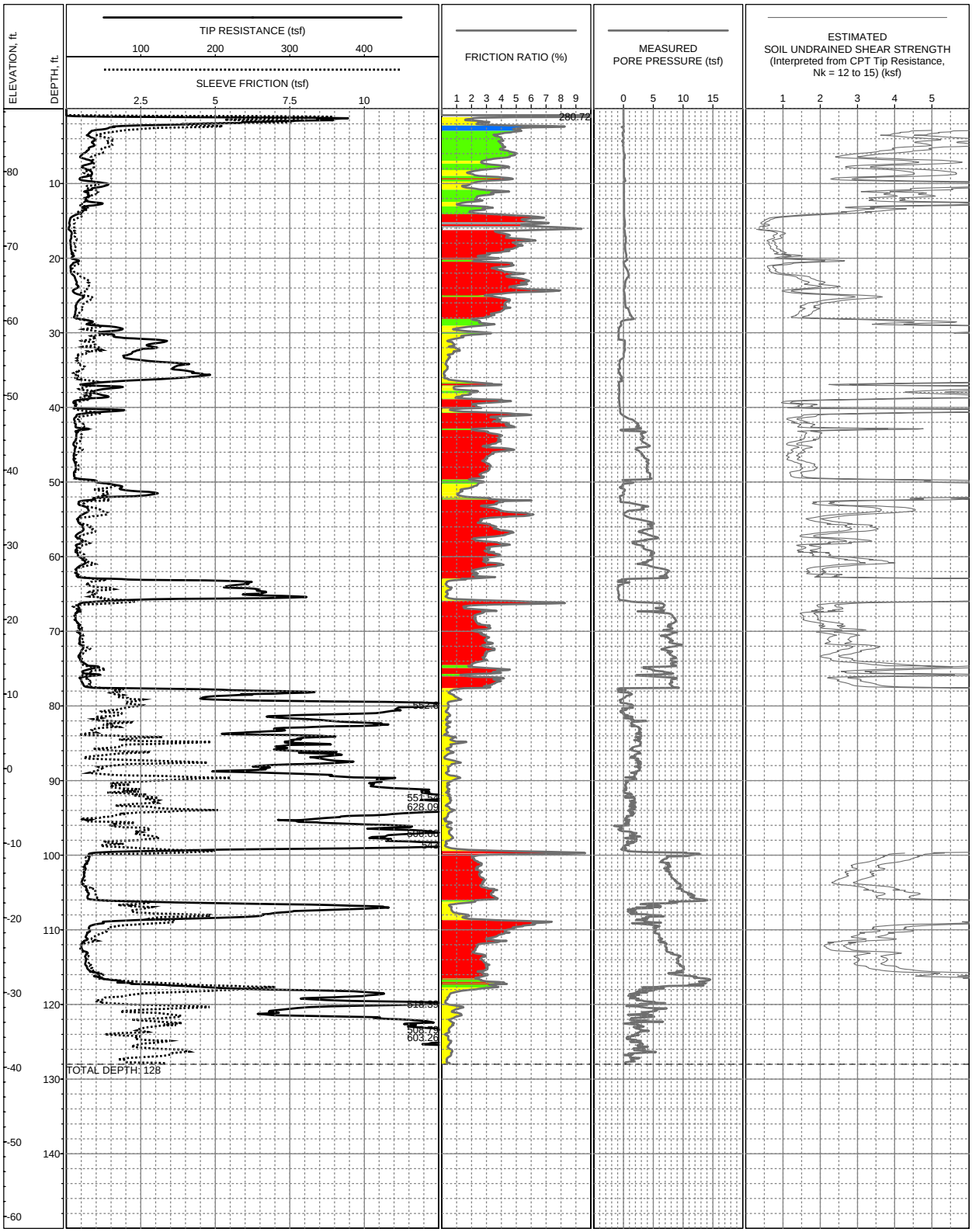


LOCATION: E6157149.5 N1947717.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88.2ft (NAVD88)
COMPLETION DEPTH: 118.2ft
TEST DATE: 11/9/2004

CONE: F7.5CKEW750
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-139

Tunnel Segment of SVRT Project
San Jose, California

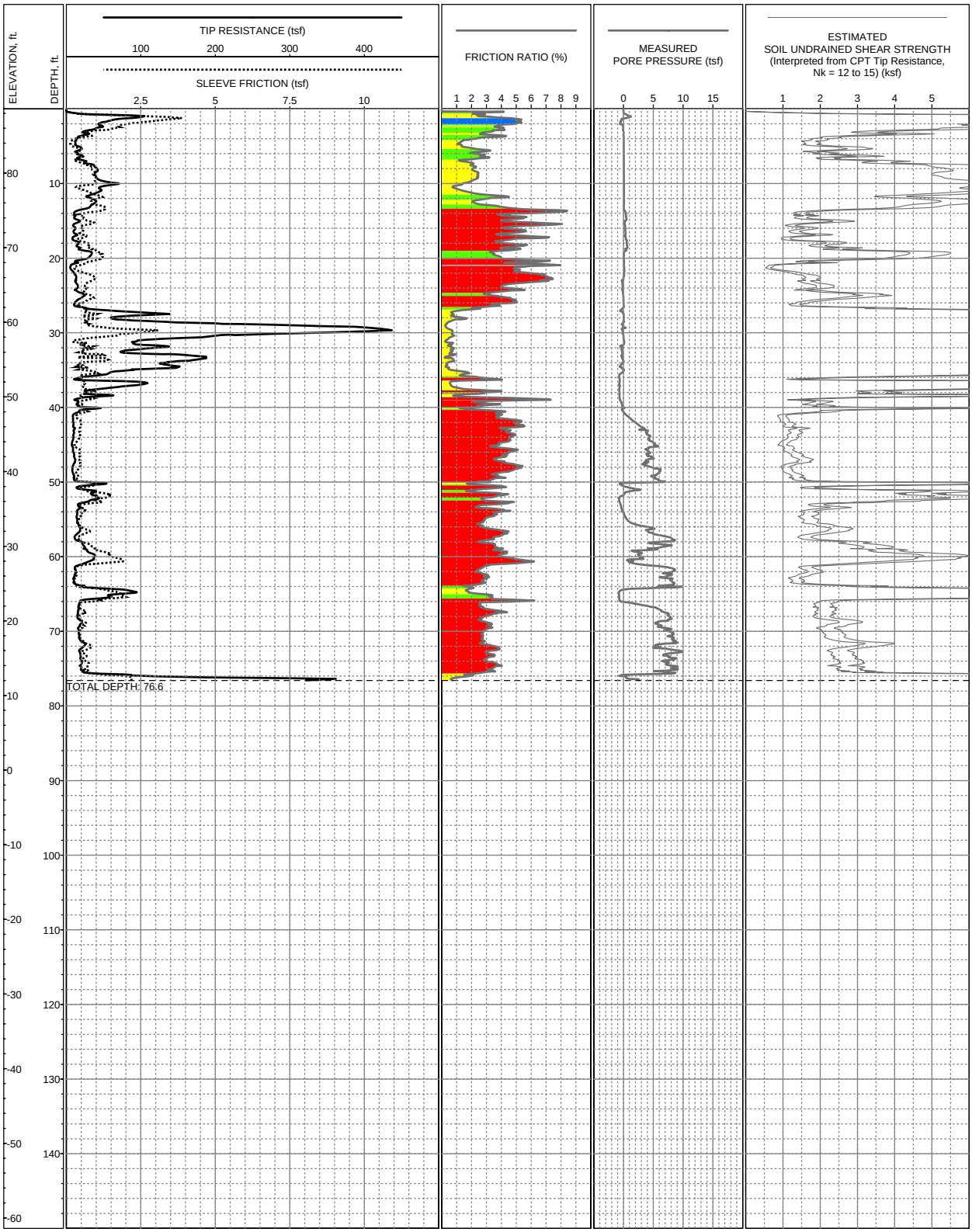


LOCATION: E6157084.6 N1947680.7 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88.4ft (NAVD88)
COMPLETION DEPTH: 128ft
TEST DATE: 11/6/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-140

Tunnel Segment of SVRT Project
San Jose, California

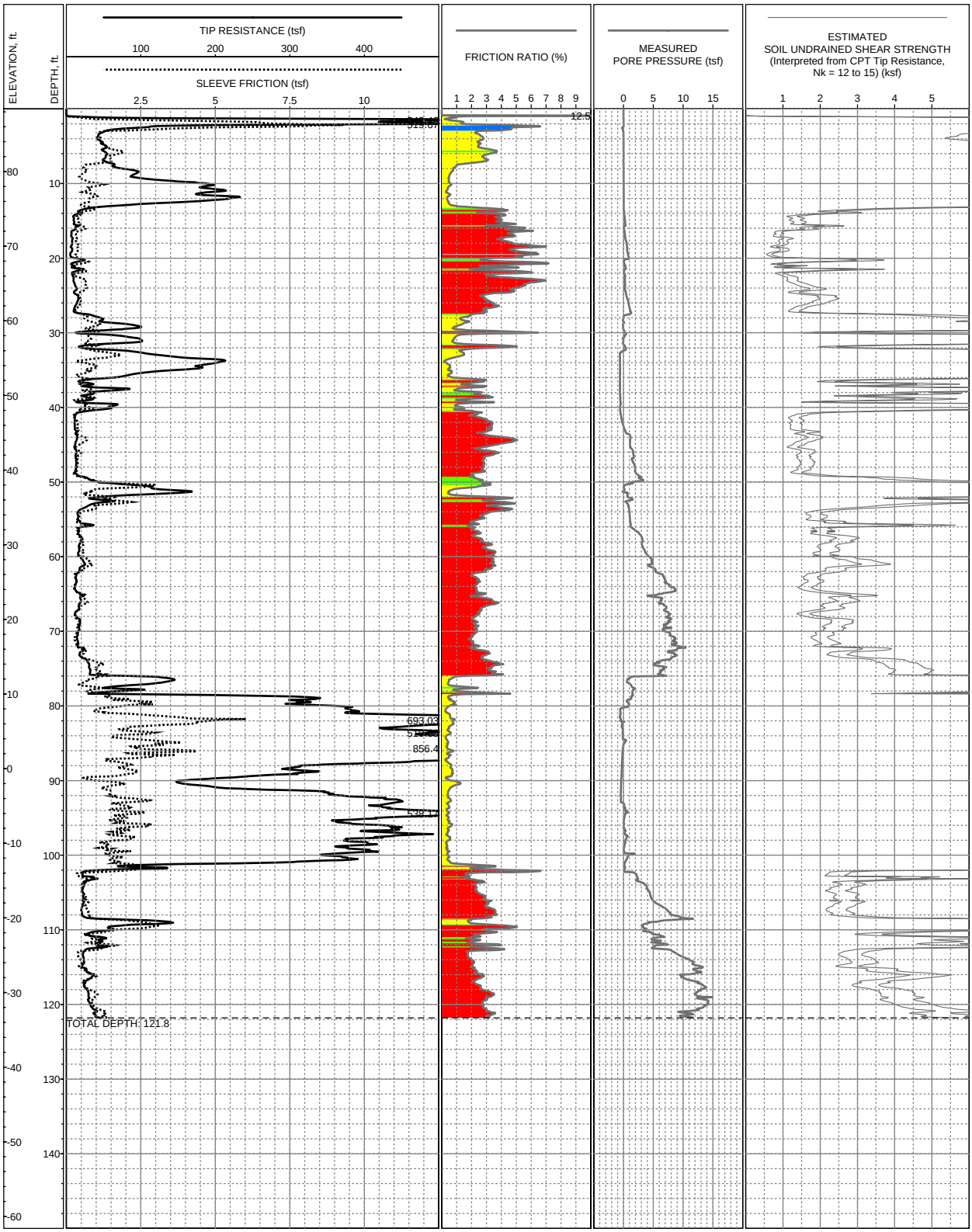


LOCATION: E6157010.8 N1947574 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88.6ft (NAVD88)
COMPLETION DEPTH: 76.6ft
TEST DATE: 10/28/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-141

Tunnel Segment of SVRT Project
San Jose, California

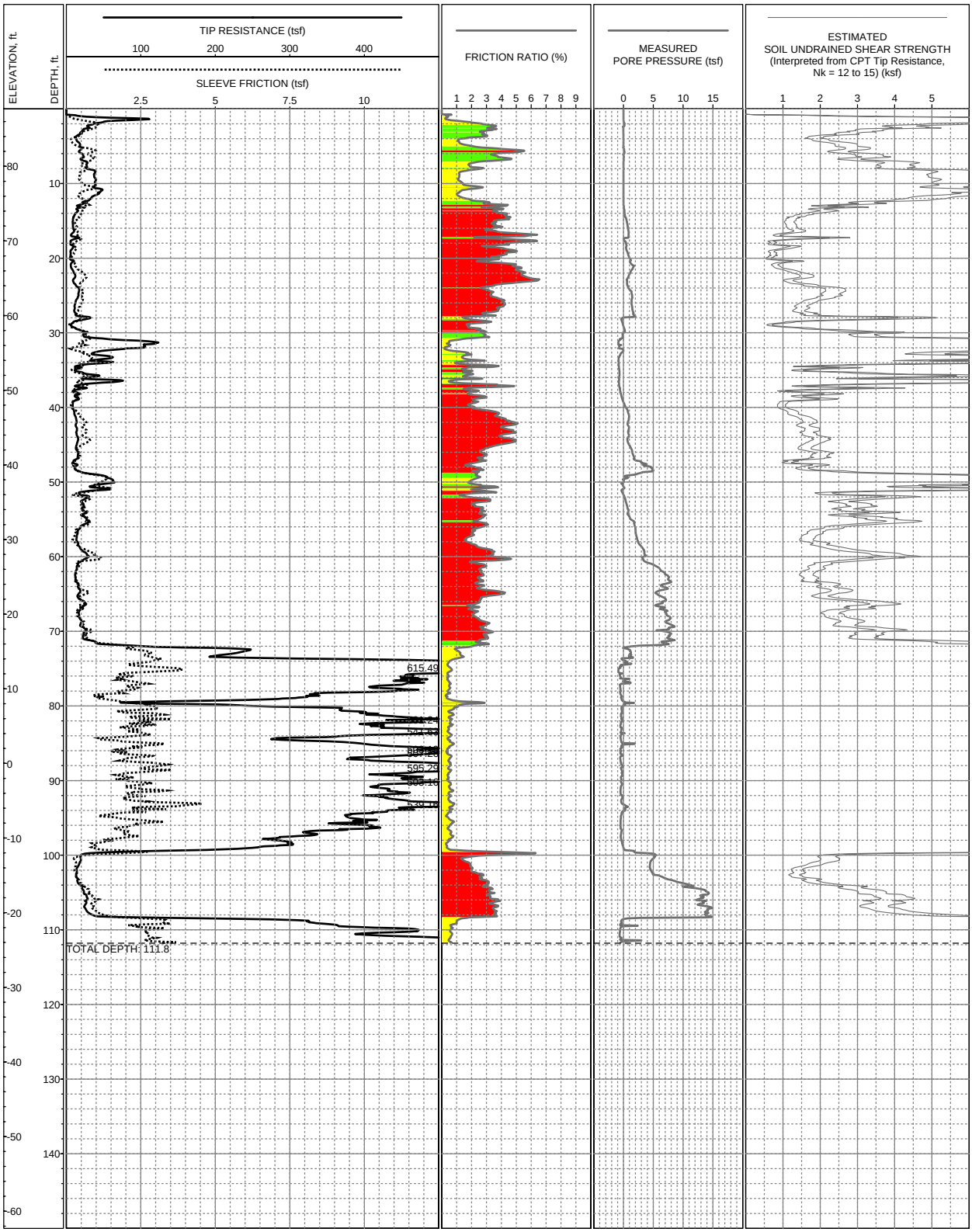


LOCATION: E6156881.5 N1947564.3 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88.4ft (NAVD88)
COMPLETION DEPTH: 121.8ft
TEST DATE: 10/7/2004

CONE: F7.5CKEW966
PERFORMED BY: Fugro Geosciences
OPERATOR: A Fonseca & R Gundlach
REVIEWED BY: R Howard

LOG OF CPT-142

Tunnel Segment of SVRT Project
San Jose, California

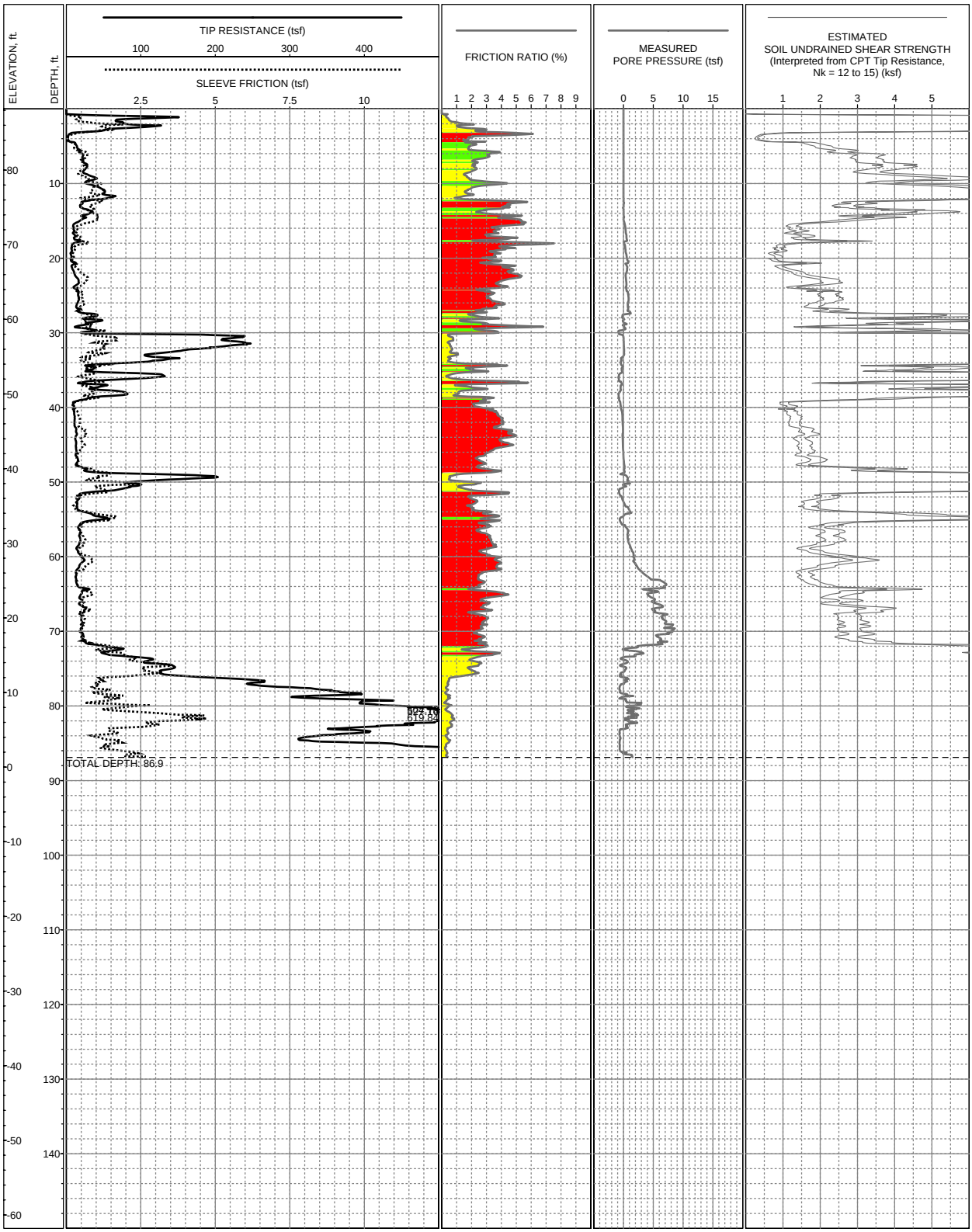


LOCATION: E6156774.7 N1947440.5 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 87.7ft (NAVD88)
COMPLETION DEPTH: 111.8ft
TEST DATE: 10/7/2004

CONE: F7.5CKEW966
PERFORMED BY: Fugro Geosciences
OPERATOR: A Fonseca & R Gundlach
REVIEWED BY: R Howard

LOG OF CPT-143

Tunnel Segment of SVRT Project
San Jose, California

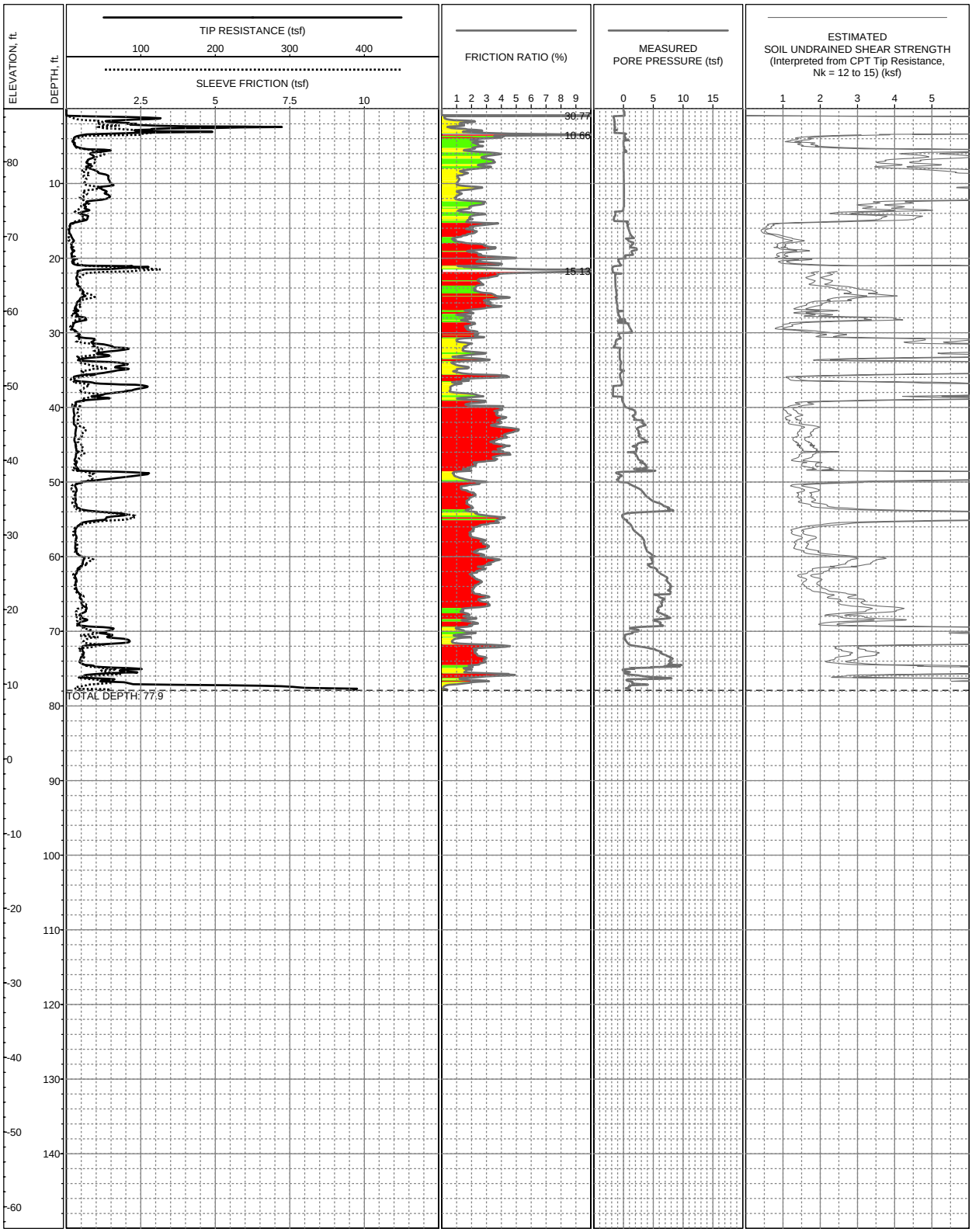


LOCATION: E6156694.3 N1947463.1 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88.2ft (NAVD88)
COMPLETION DEPTH: 86.9ft
TEST DATE: 11/6/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-144

Tunnel Segment of SVRT Project
San Jose, California

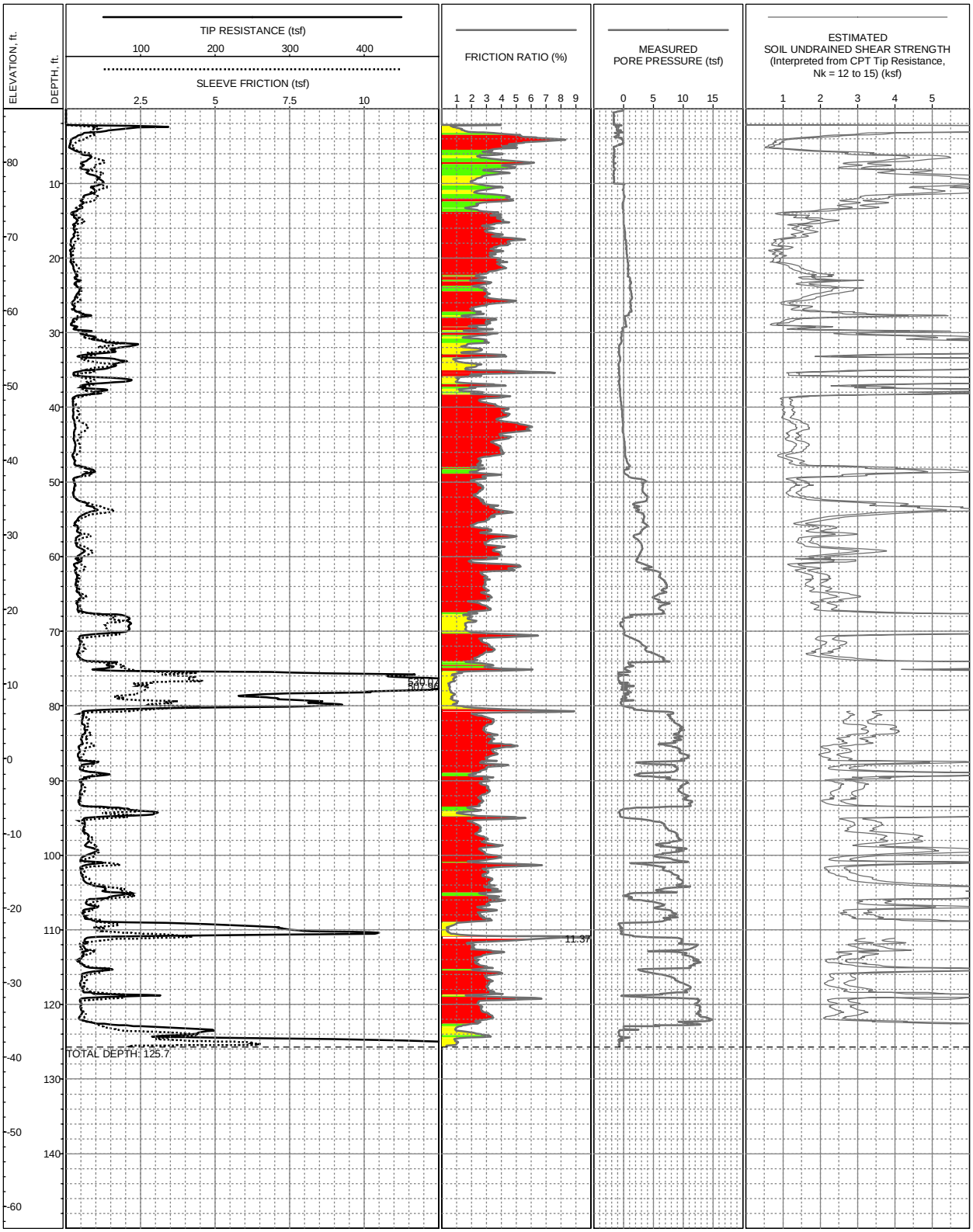


LOCATION: E6156614.8 N1947417.3 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 87.1ft (NAVD88)
COMPLETION DEPTH: 77.9ft
TEST DATE: 11/8/2004

CONE: F7.5CKEW750
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-145

Tunnel Segment of SVRT Project
San Jose, California

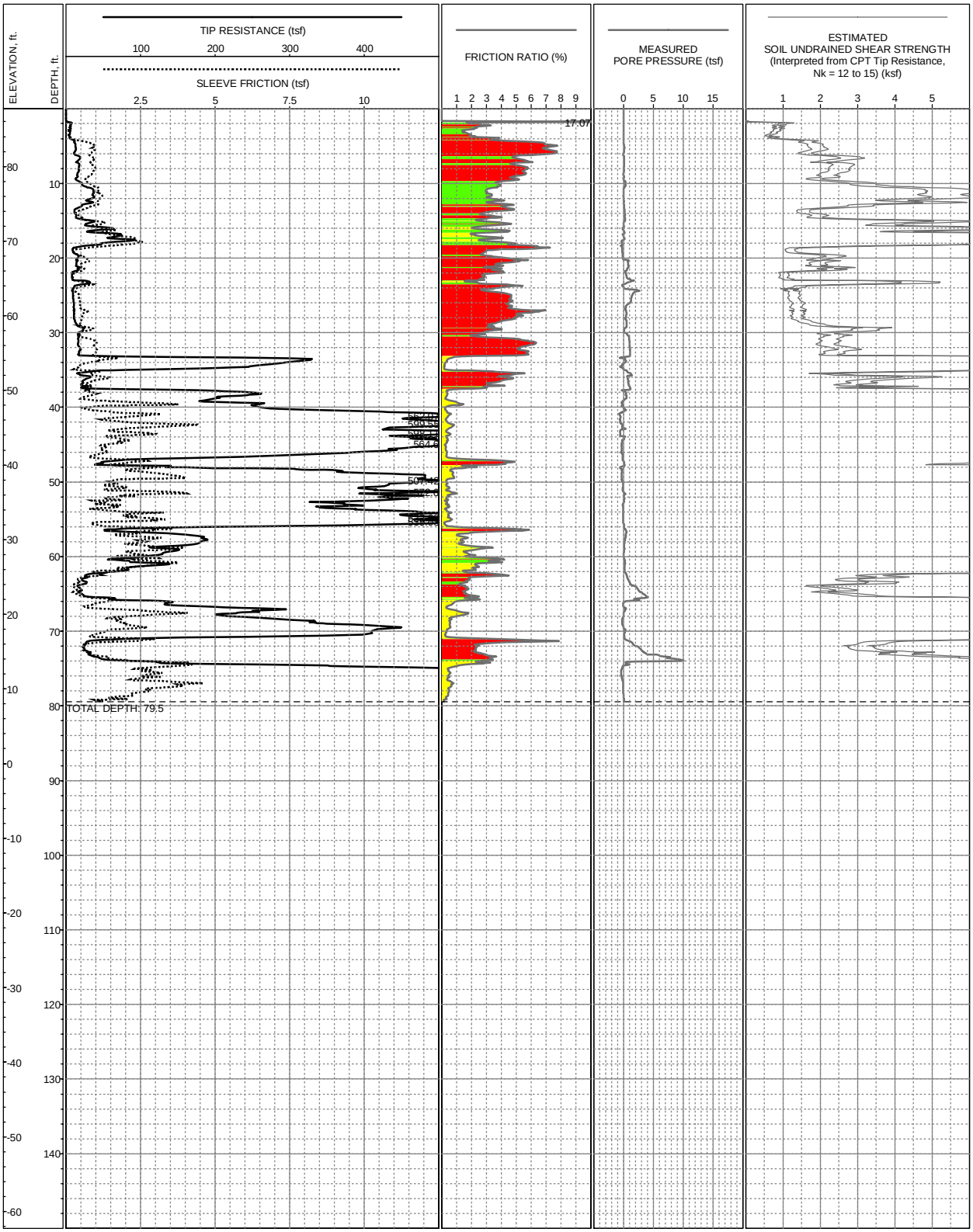


LOCATION: E6156616.8 N1947418.2 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 87.1ft (NAVD88)
COMPLETION DEPTH: 125.7ft
TEST DATE: 11/17/2004

CONE: F7.5CKESW750
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-145A

Tunnel Segment of SVRT Project
San Jose, California

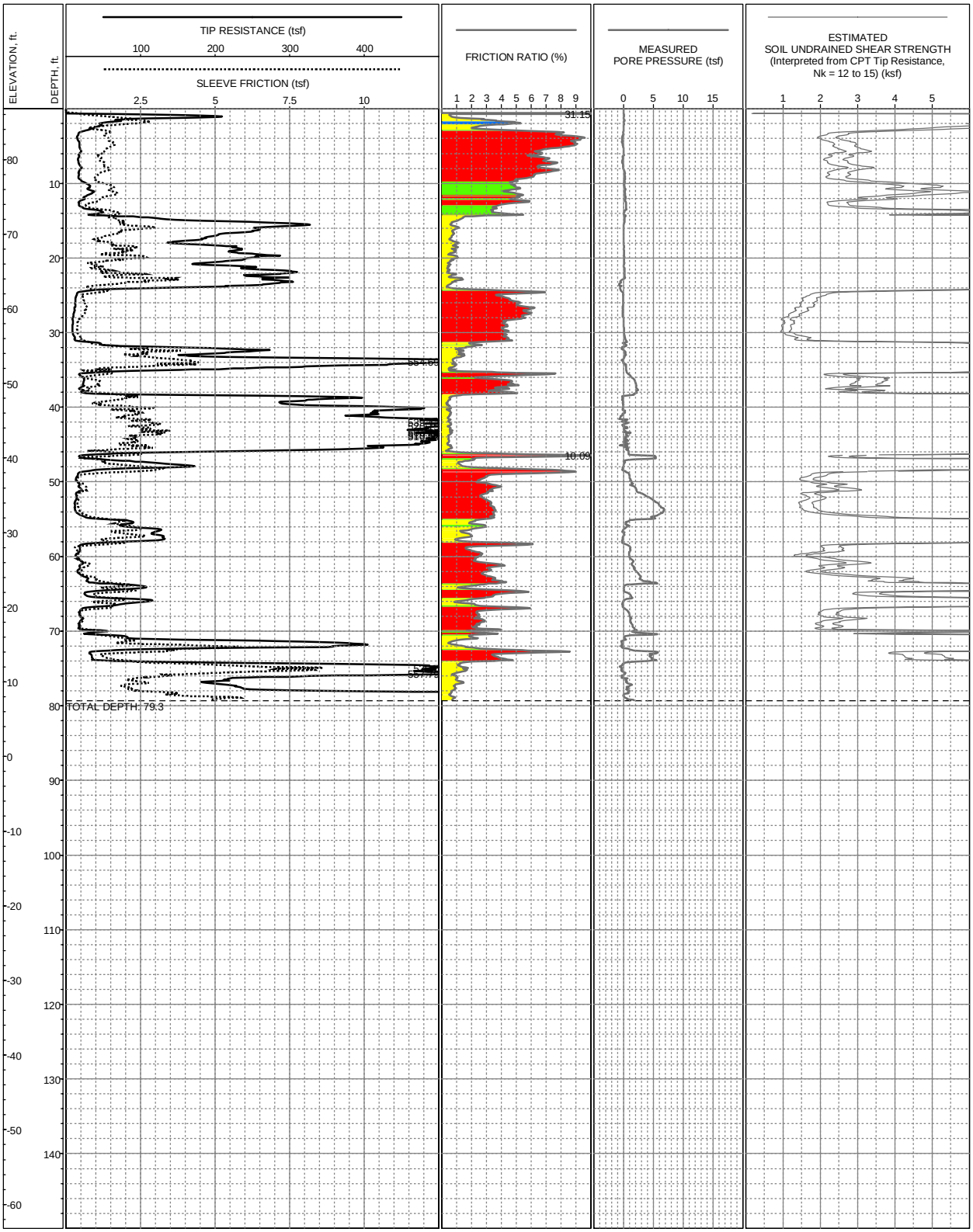


LOCATION: E6154427.9 N1946054 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 87.7ft (NAVD88)
COMPLETION DEPTH: 79.5ft
TEST DATE: 12/1/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-146

Tunnel Segment of SVRT Project
San Jose, California

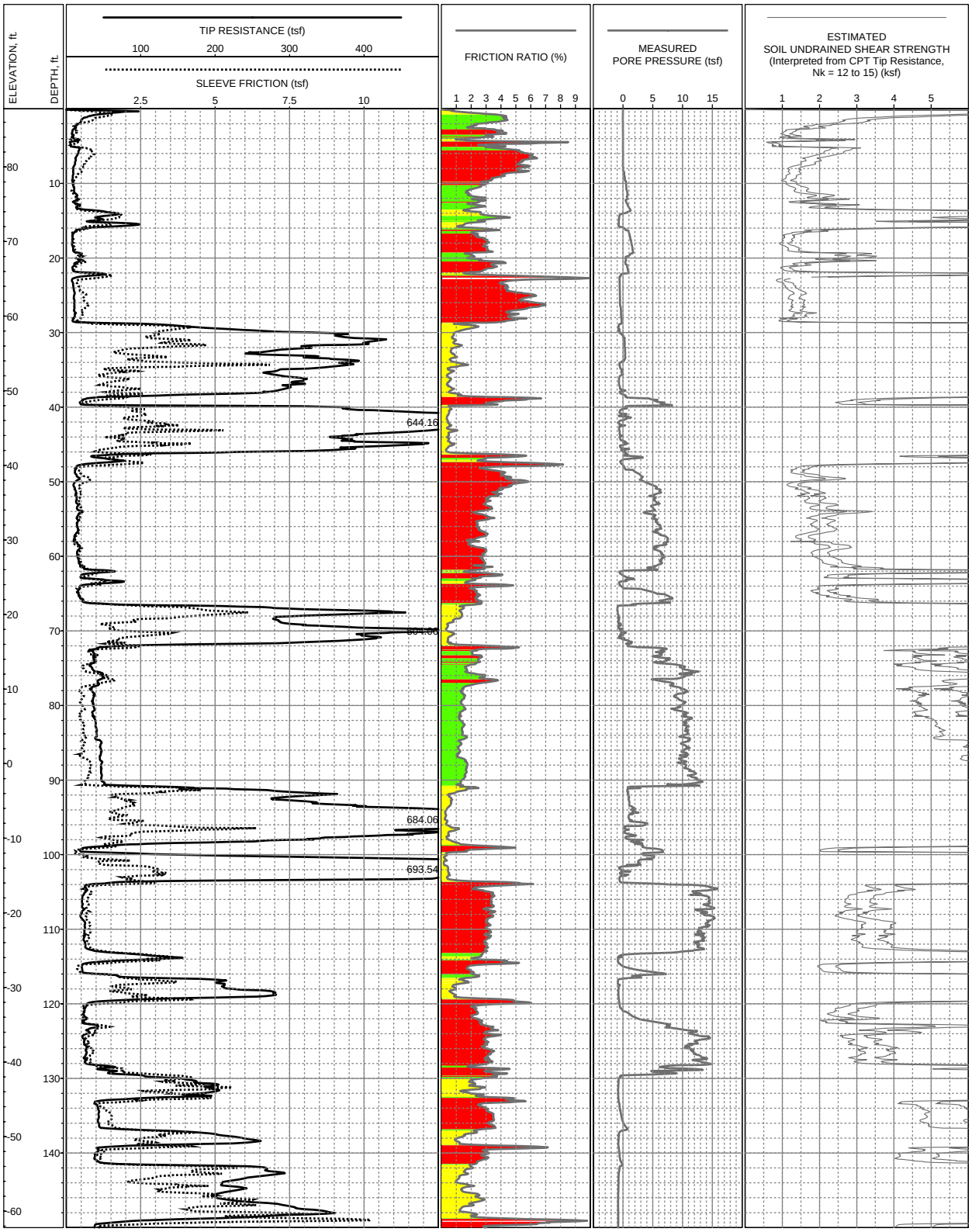


LOCATION: E6154358.8 N1946098.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 86.8ft (NAVD88)
COMPLETION DEPTH: 79.3ft
TEST DATE: 2/23/2005

CONE: F7.5CKEW1581
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-147

Tunnel Segment of SVRT Project
San Jose, California

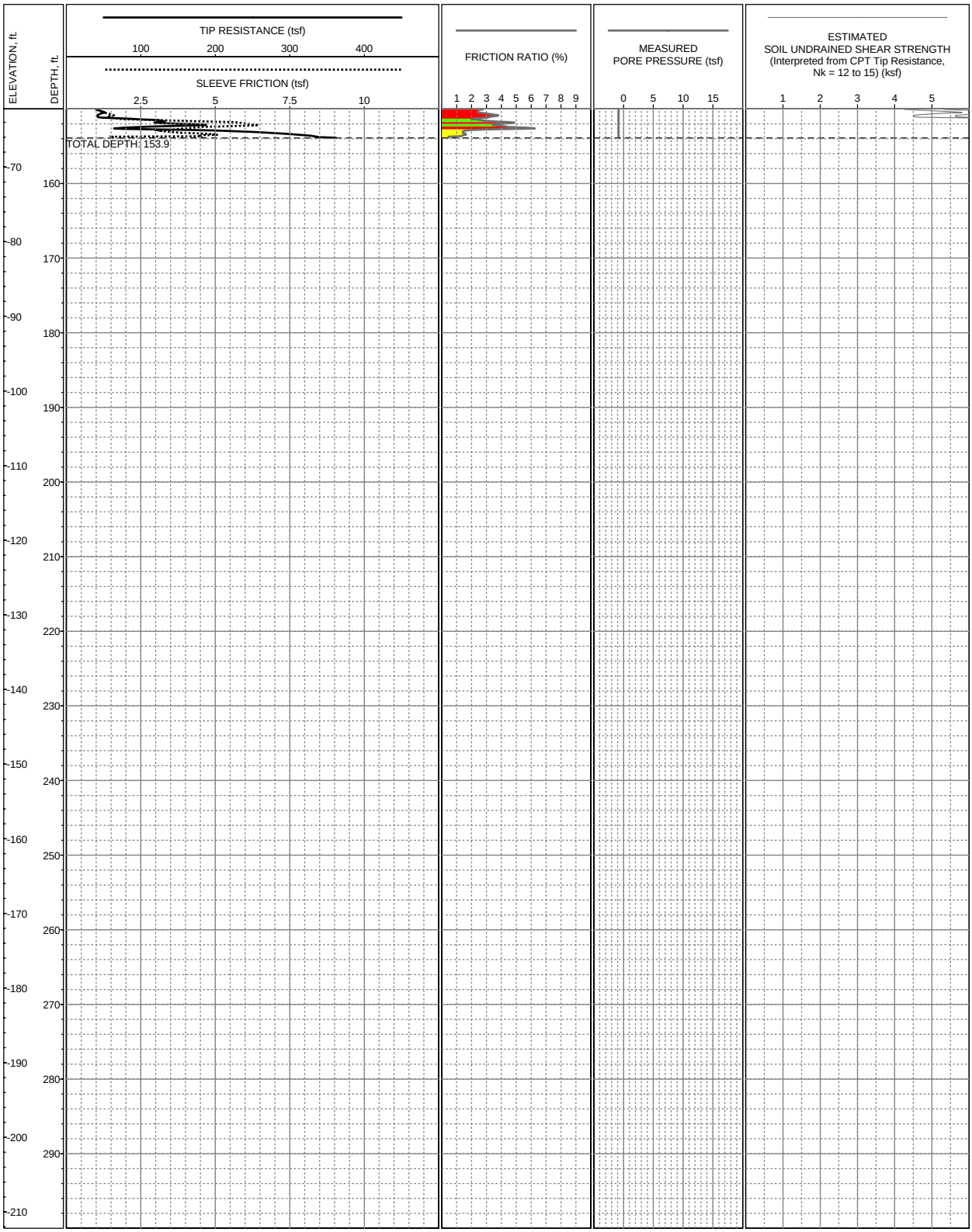


LOCATION: E6154300 N1946037.1 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 87.8ft (NAVD88)
COMPLETION DEPTH: 153.9ft
TEST DATE: 12/2/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-148

Tunnel Segment of SVRT Project
San Jose, California

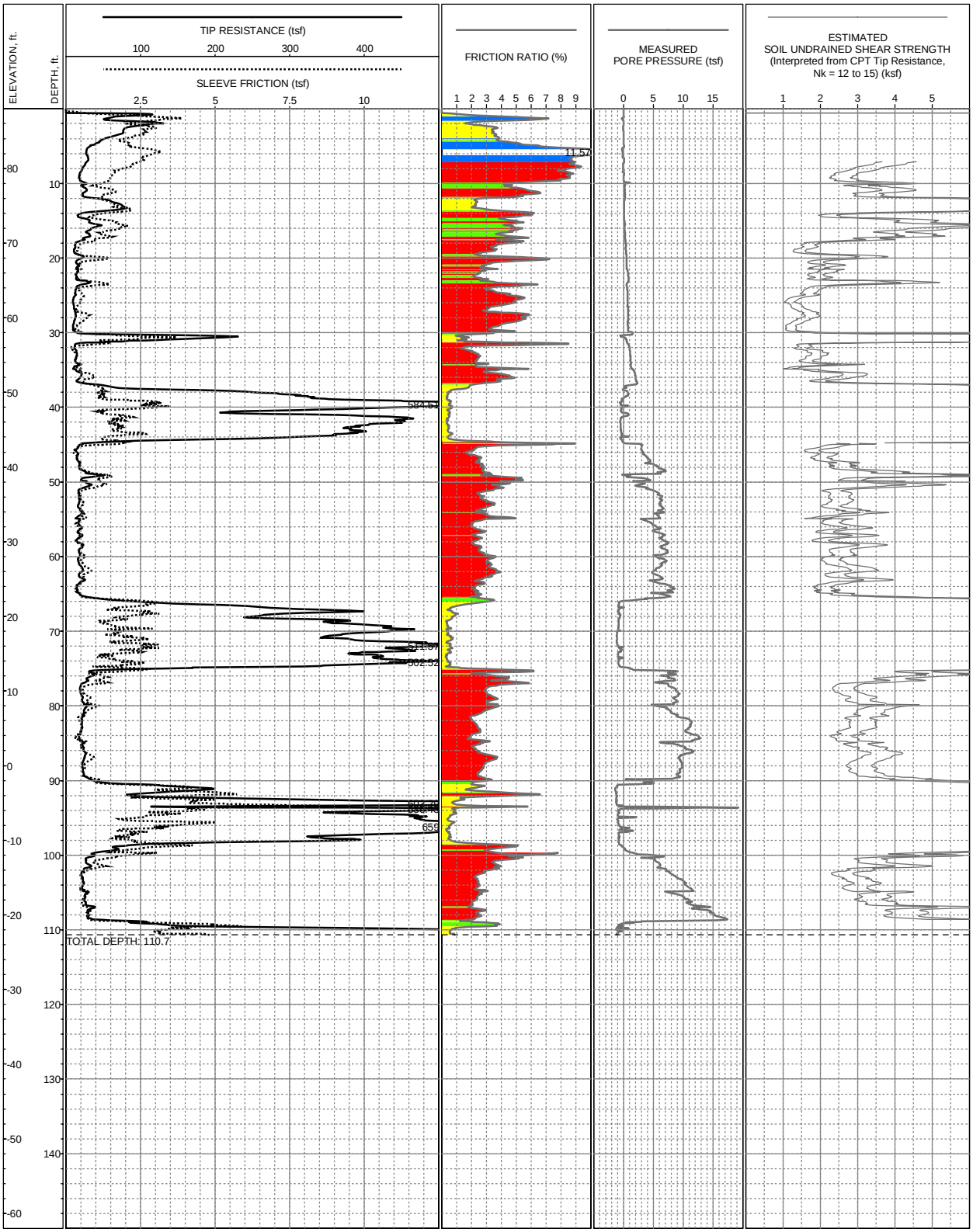


LOCATION: E6154300 N1946037.1 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 87.8ft (NAVD88)
COMPLETION DEPTH: 153.9ft
TEST DATE: 12/2/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-148

Tunnel Segment of SVRT Project
San Jose, California

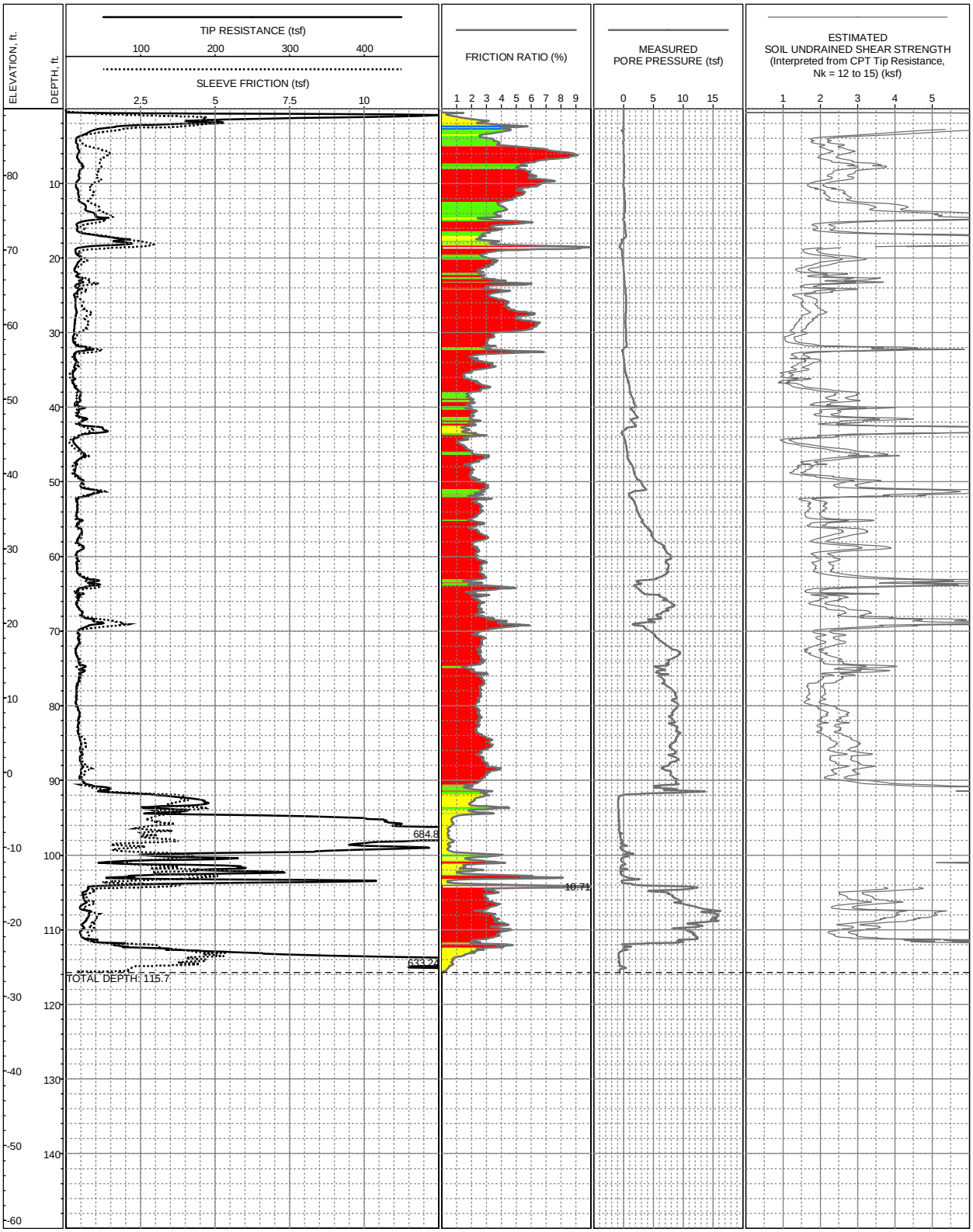


LOCATION: E6154229.6 N1946068 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88ft (NAVD88)
COMPLETION DEPTH: 110.7ft
TEST DATE: 2/10/2005

CONE: F7.5CKEW750
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-149

Tunnel Segment of SVRT Project
San Jose, California

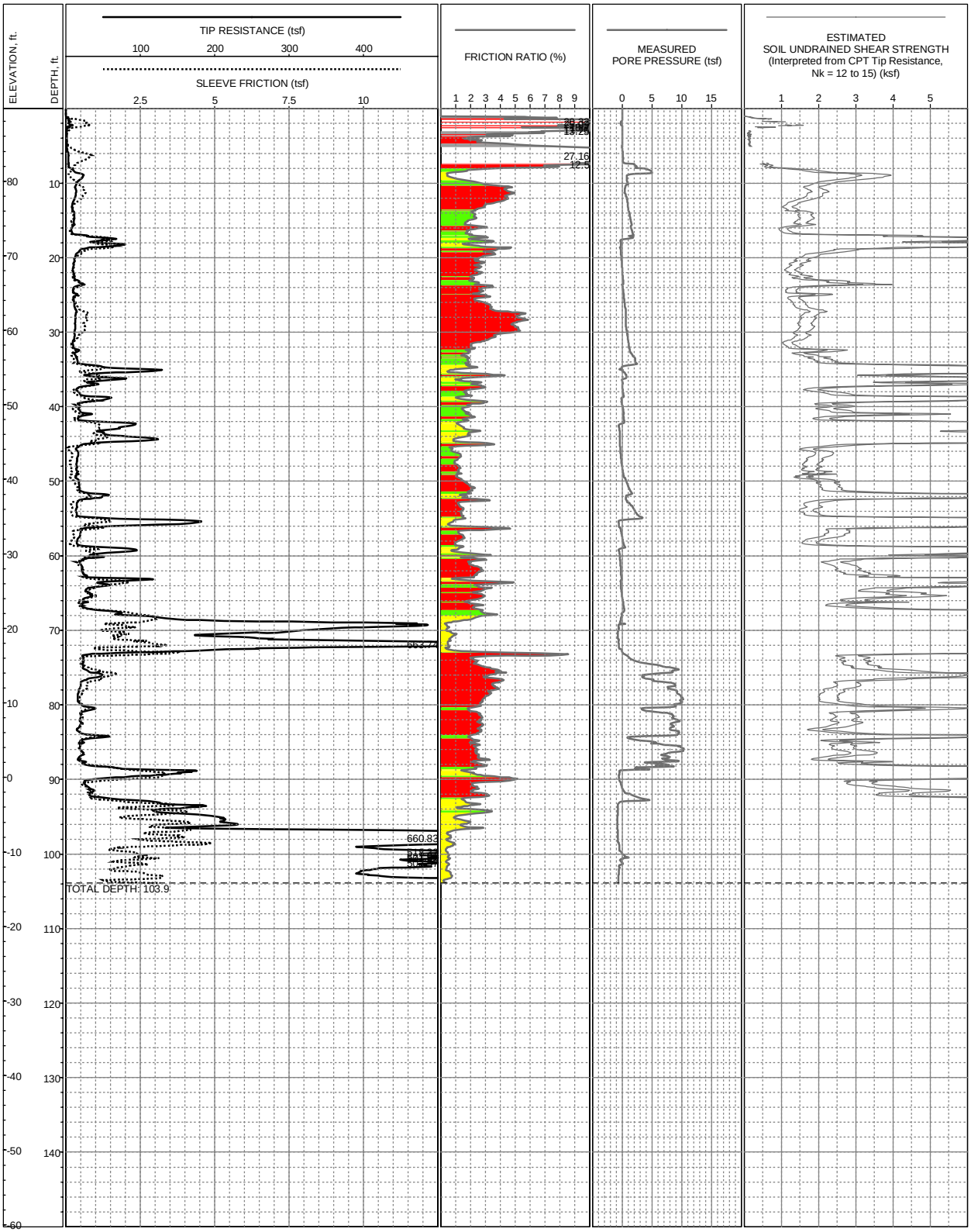


LOCATION: E6154163.7 N1946056.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88.9ft (NAVD88)
COMPLETION DEPTH: 115.7ft
TEST DATE: 1/26/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-150

Tunnel Segment of SVRT Project
San Jose, California

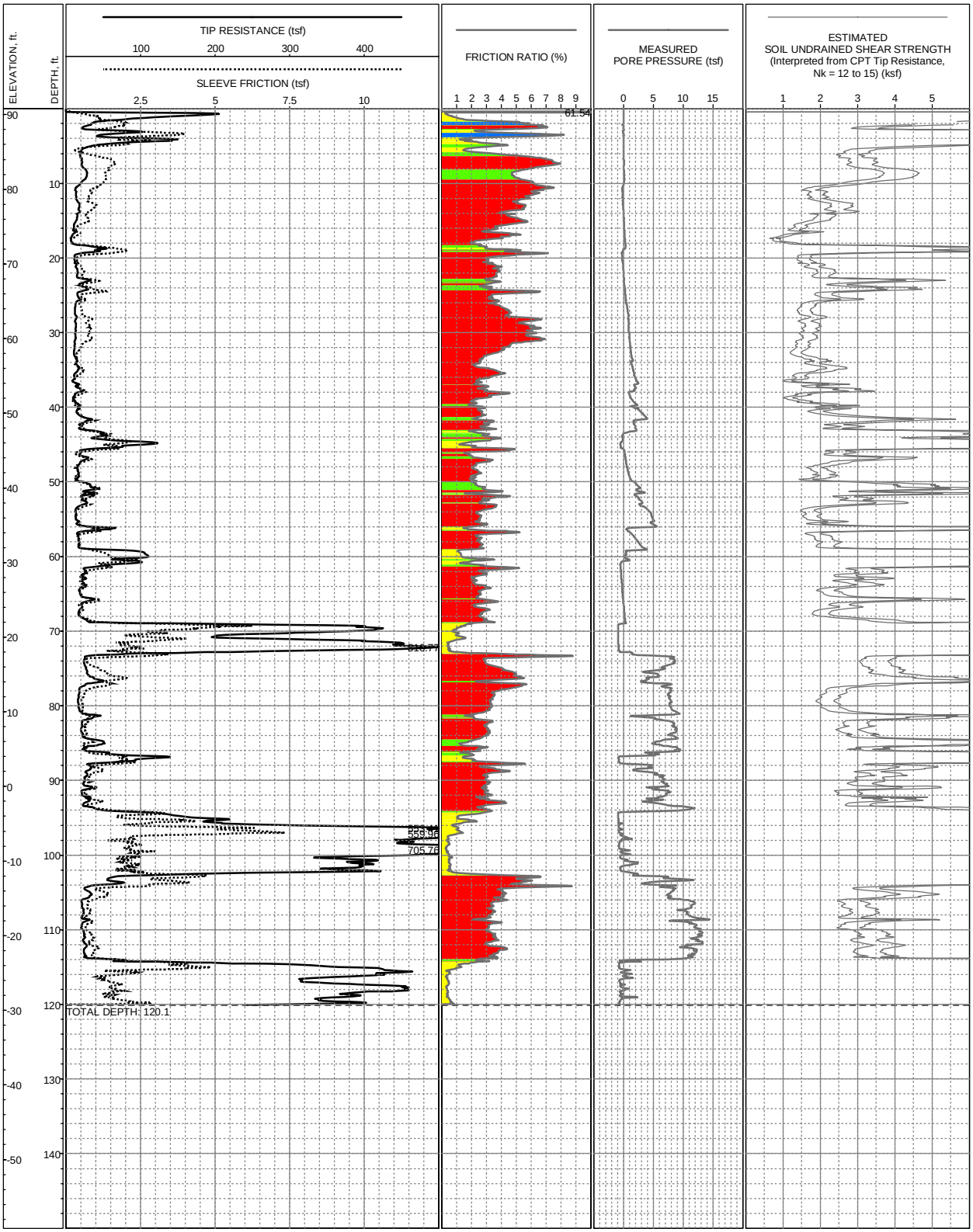


LOCATION: E6154099.4 N1946062 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 89.7ft (NAVD88)
COMPLETION DEPTH: 103.9ft
TEST DATE: 1/26/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-151

Tunnel Segment of SVRT Project
San Jose, California

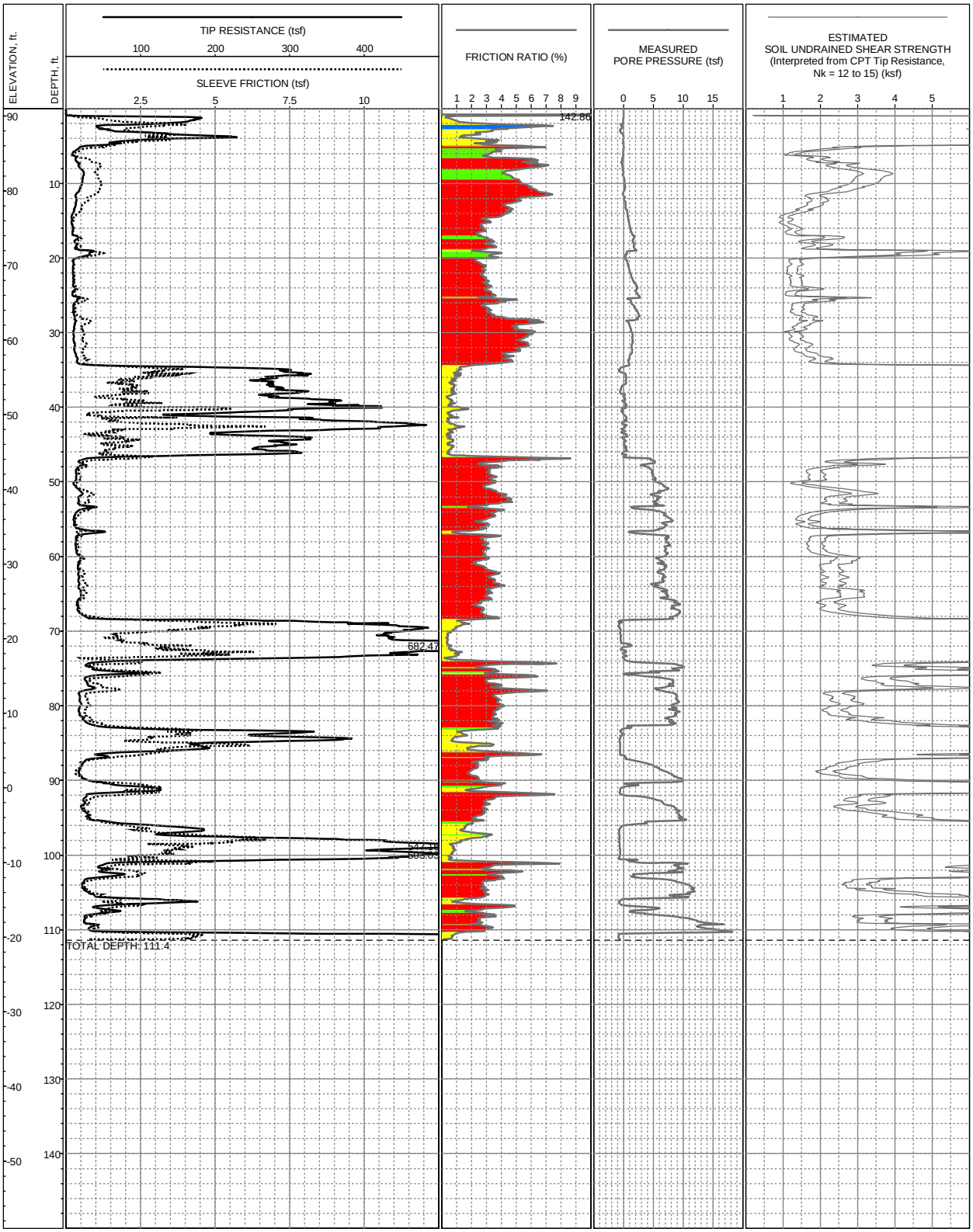


LOCATION: E6154070.3 N1946011.5 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 90.8ft (NAVD88)
COMPLETION DEPTH: 120.1ft
TEST DATE: 2/7/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-152

Tunnel Segment of SVRT Project
San Jose, California

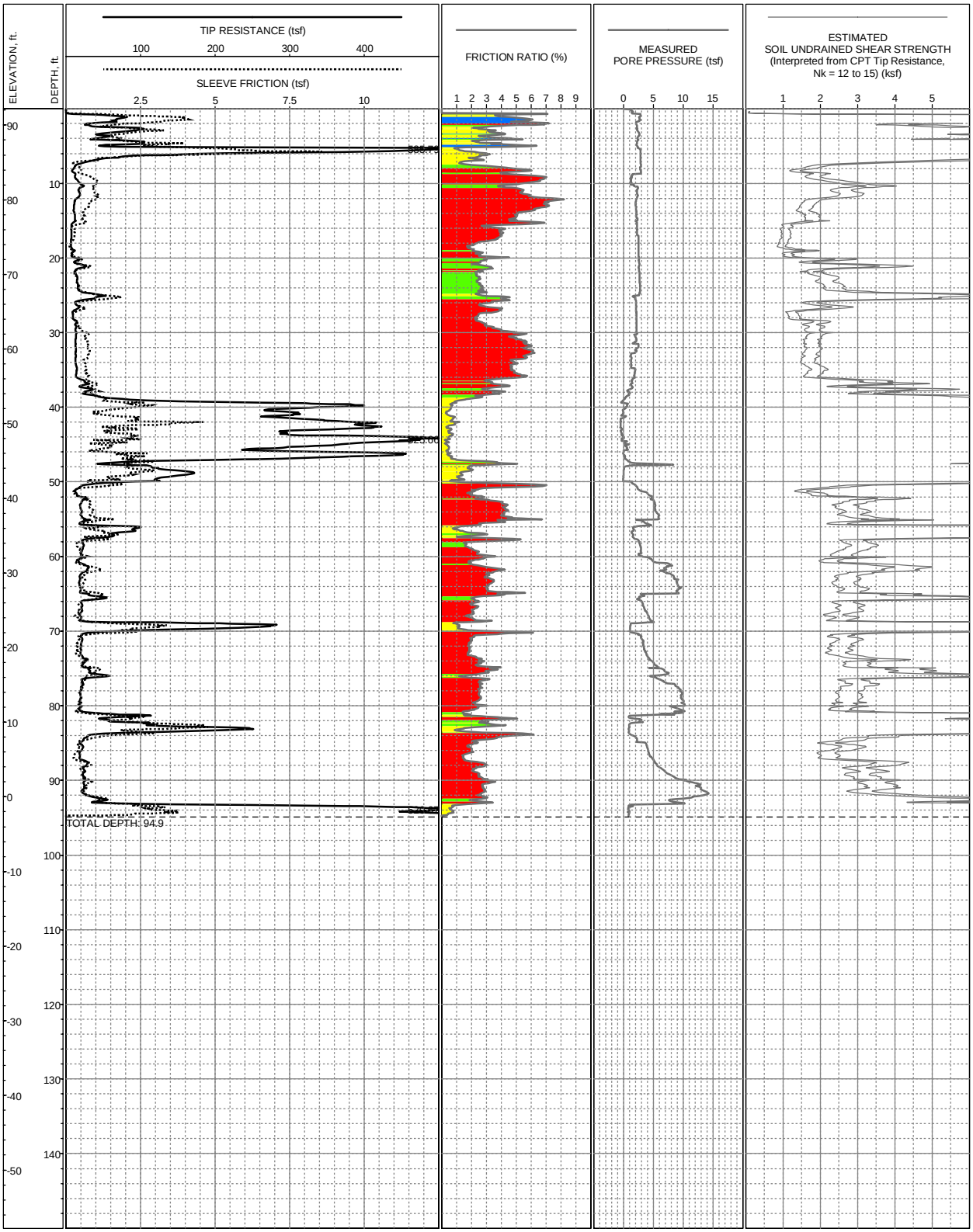


LOCATION: E6153959.2 N1946055.2 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 91ft (NAVD88)
COMPLETION DEPTH: 111.4ft
TEST DATE: 2/7/2005

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-153

Tunnel Segment of SVRT Project
San Jose, California

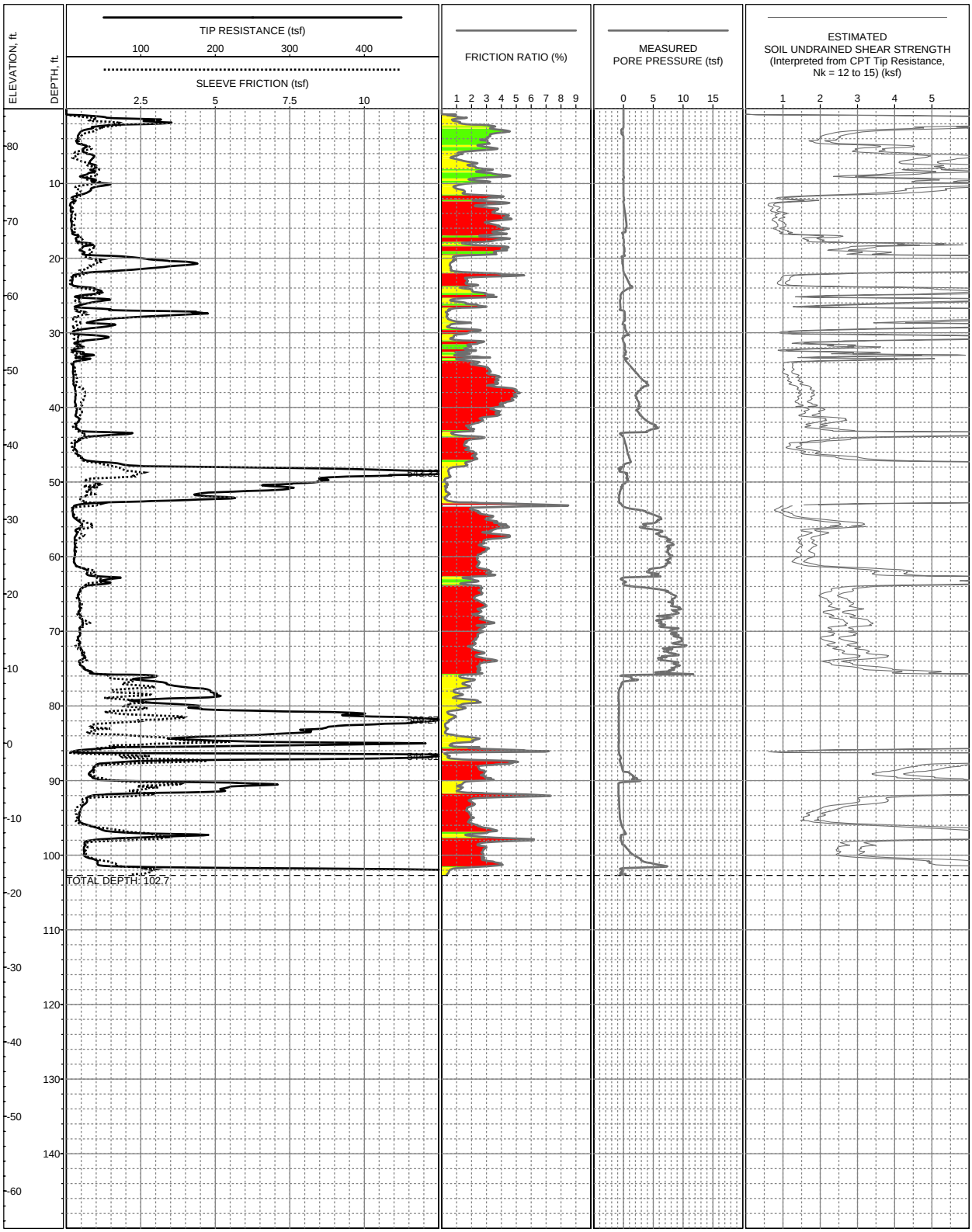


LOCATION: E6153854 N1946053.8 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 92.2ft (NAVD88)
COMPLETION DEPTH: 94.9ft
TEST DATE: 2/11/2005

CONE: F7.5CKESW750
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-154

Tunnel Segment of SVRT Project
San Jose, California

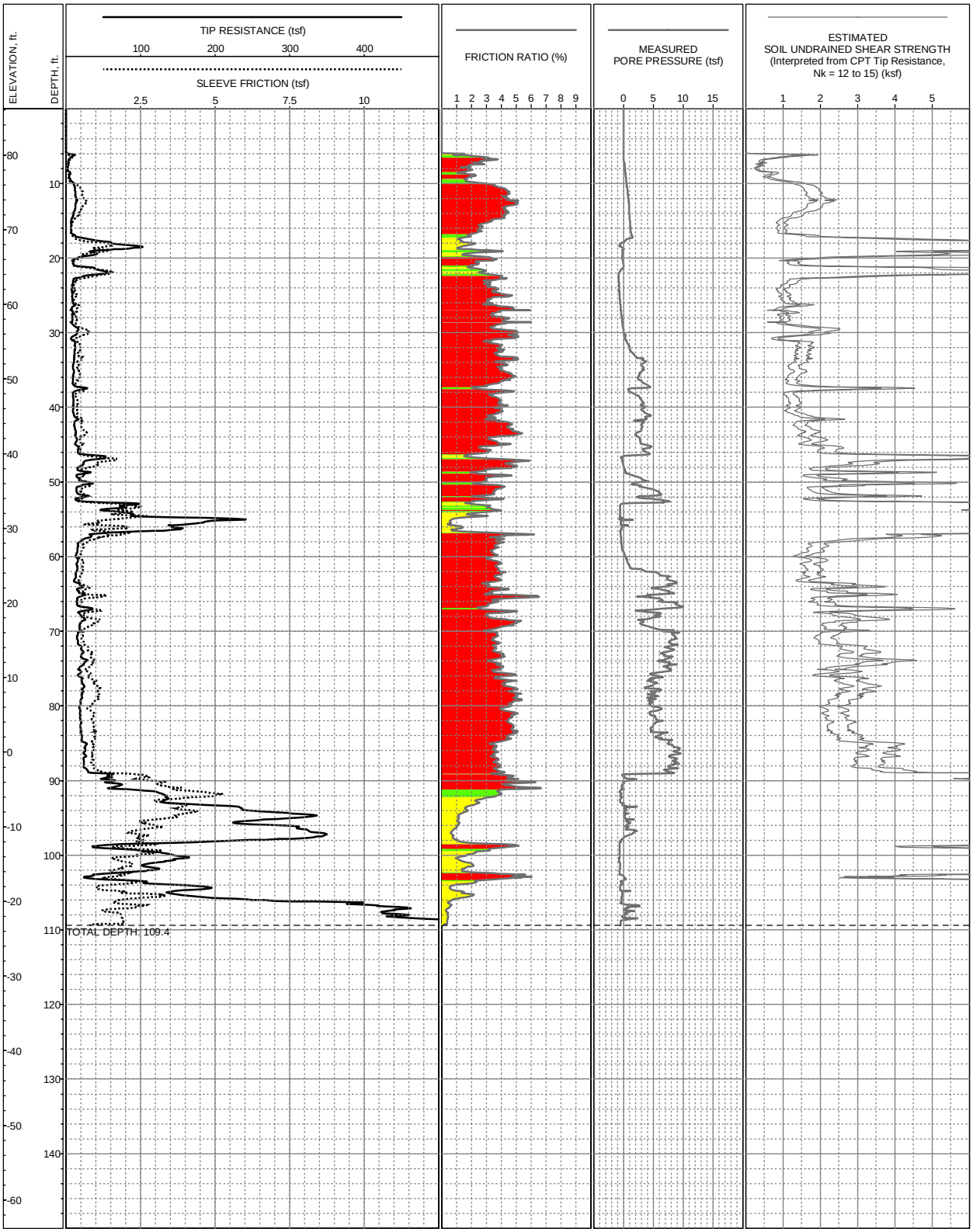


LOCATION: E6156337.2 N1947256.7 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 85ft (NAVD88)
COMPLETION DEPTH: 102.7ft
TEST DATE: 10/11/2004

CONE: F7.5CKEW895
PERFORMED BY: Fugro Geosciences
OPERATOR: T Dowd & D Garza
REVIEWED BY: R Howard

LOG OF CPT-155

Tunnel Segment of SVRT Project
San Jose, California

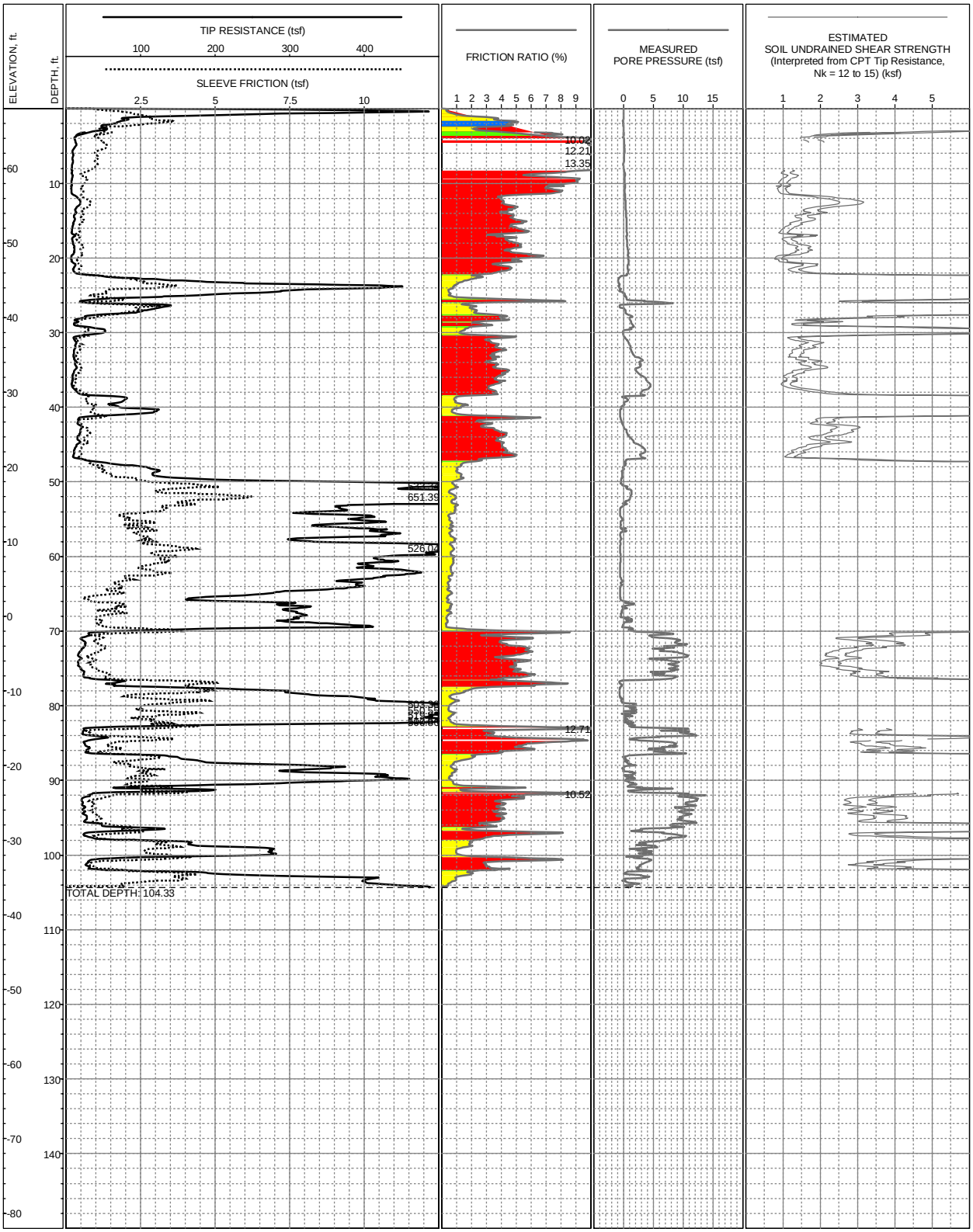


LOCATION: E6164813.2 N1954197.6 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 86.2ft (NAVD88)
COMPLETION DEPTH: 109.4ft
TEST DATE: 12/14/2004

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-156

Tunnel Segment of SVRT Project
San Jose, California



LOCATION: E6147912.0 N1952087.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 67.7ft (NAVD88)
COMPLETION DEPTH: 104.33ft
TEST DATE: 4/19/2005

CONE: F7.5CKEW1580
PERFORMED BY: Fugro Geosciences
OPERATOR: T Dowd & D Garza
REVIEWED BY: R Howard

LOG OF CPT-157

Tunnel Segment of SVRT Project
San Jose, California

APPENDIX 9

SEISMIC CONE PENETRATION TEST (SCPT) RESULTS

Fugro performed the Seismic Cone Penetration Test (SCPT) program. Appendix 9 presents a description of testing equipment and procedures, along with results of the SCPT program and interpretations made by Fugro, based on SCPTs.

FUGRO WEST, INC.

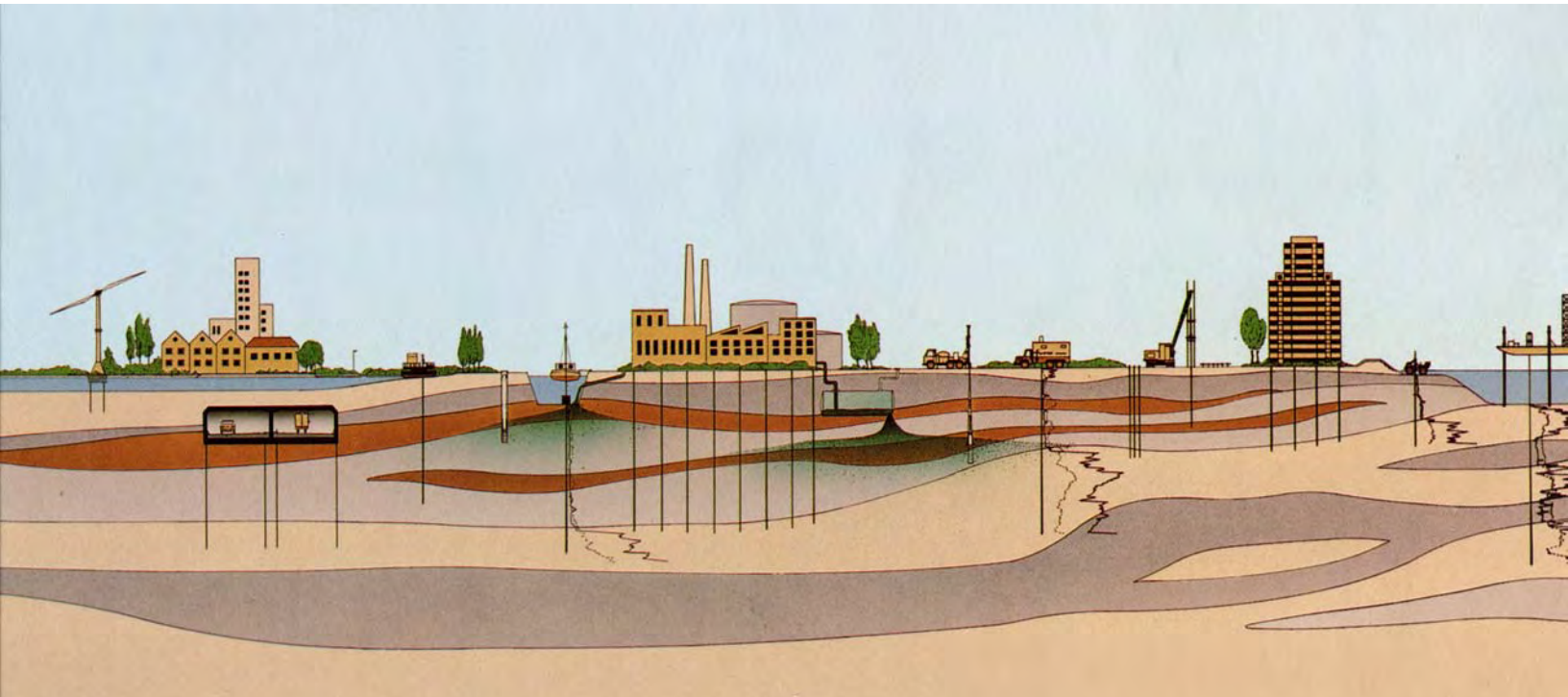
APPENDIX 9
SEISMIC CONE PENETRATION TEST (SCPT) RESULTS

GEOTECHNICAL EXPLORATION PROGRAM TUNNEL SEGMENT OF SILICON VALLEY RAPID TRANSIT (SVRT) PROJECT SAN JOSE, CALIFORNIA

Prepared for:
HMM/BECHTEL

JUNE 2005

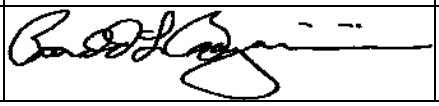
Project No. 1637.001



REPORT DOCKET

APPROVAL

This document is approved by the following:

Name	Title	Signature	Issue Date
Roger Howard Jr., P.E.	Project Manager		June 13, 2005
Ronald L. Bajuniemi, P.E., G.E.	Project Principal		June 13, 2005

REVISION HISTORY

Revision	Date	Change	Approval
0	May 4, 2005	Draft Report: Appendix 4B Seismic Cone Penetration Test (CPT) Results	RH
1	June 7, 2005	Final Report: Appendix 9 Seismic Cone Penetration Test (SCPT) Results. With HMM/Bechtel comments dated 5/23/05 incorporated	RH
2	June 13, 2005	Final Report: Appendix 9 Seismic Cone Penetration Test (SCPT) Results. With HMM/Bechtel comments dated 6/10/05 incorporated	RH

FUGRO WEST, INC.

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June 13, 2005
Project No. 1637.001

HMM/Bechtel
3103 North First Street
San Jose, California 95134

Attention: Mr. Ignacio Arango

Subject: Appendix 9 – Seismic Cone Penetration Test (SCPT) Results
Tunnel Segment of SVRT Project
San Jose, California

Attention: Mr. Ignacio Arango

Dear Mr. Arango:

Fugro West, Inc., is pleased to submit this final copy of "Appendix 9 - Seismic Cone Penetration Test (SCPT) Results," describing the seismic cone penetration test equipment, procedures, and results for the tunnel segment of the SVRT Project in San Jose, California.

We appreciate this opportunity to be of continued service to HMM/Bechtel. Please contact Roger Howard Jr. at (510) 267-4422 if you have any questions regarding the information presented in this appendix.

Sincerely,

FUGRO WEST, INC.

Jon Mitchell
Staff Engineer

Roger Howard Jr., P.E.
Senior Engineer

Ronald L. Bajuniemi, P.E., G.E.
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
RONALD L. BAJUNIEMI
No. 112
Exp. 12-31-05
GEOTECHNICAL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
ROGER W.A. HOWARD JR.
No. C-61002
Exp. 12-31-05
CIVIL
STATE OF CALIFORNIA

JM/RH/RLB:rp

Copies Submitted (6 + pdf) Addressee

CONTENTS

TABLE

FIGURE

LOGS OF SEISMIC CPTS

1.0 INTRODUCTION

This appendix discusses the equipment, procedures and results of the seismic cone penetration testing (SCPT) conducted by Fugro West, Inc., (Fugro) for the tunnel segment of the Silicon Valley Rapid Transit (SVRT) Project. The SCPTs were conducted at sounding locations situated along the tunnel segment alignment of the SVRT Project, as shown on Figure A9-1.

1.1 PROJECT DESCRIPTION

The Santa Clara Valley Transportation Authority (VTA) intends to construct the Silicon Valley Rapid Transit (SVRT) Project in San Jose, California. This will be a 26.2-km (16.3-mile) extension of the Bay Area Rapid Transit (BART) heavy rail rapid transit system from its planned terminus at the end of the Warms Springs Extension in Fremont, to San Jose. The proposed alignment currently includes six stations (three above-grade and three below-grade), a proposed future station, and vehicle storage and maintenance facilities. The alignment is composed of two major segments;

1) A line segment that will be approximately 11.5 miles of at-grade, elevated and cut-and-cover track from Warm Springs to San Jose; and

2) A 5.1-mile-long tunnel segment, consisting of twin bored tunnels and cut-and-cover structures through downtown San Jose (see Figure A9-1)

As currently planned, the tunnel segment includes at-grade and open cut track, three cut-and-cover stations, and a cut-and-cover track crossover structure. The cut-and cover stations and the crossover structures have a cumulative length of approximately 4,970 feet. The remaining 4.14 miles of the alignment will be twin 19.5-foot-diameter tunnels.

This investigation and report cover the 5.1-mile-long tunnel segment section only.

1.2 GEOTECHNICAL EXPLORATION PROGRAM OVERVIEW

The joint venture of Hatch Mott MacDonald T & T, Inc., and Bechtel Infrastructure Corporation (HMM/Bechtel) are providing engineering design services for the tunnel segments (Segments 3 and 4) of the Silicon Valley Rapid Transit (SVRT) Project to the VTA. HMM/Bechtel has subcontracted with a number of companies to conduct the geotechnical field exploration program for the project. HMM/Bechtel's primary subcontractors for the geotechnical exploration program include Fugro West, Inc., (Fugro), Parikh Consultants (Parikh) and Pitcher Drilling Company (Pitcher).

The three companies, Fugro, Parikh, and Pitcher, conducted the majority of the geotechnical field investigation program for the tunnel segments of the SVRT Project from October 15, 200, to March 5, 2005. The intent of the geotechnical field investigation program was to obtain geotechnical data that would aid in the design and construction of the proposed tunnel and cut-and-cover structures.

In general, the geotechnical field investigation explored subsurface conditions along the proposed tunnel alignment, within the vicinity of the proposed Eastern and Western Portals, at the two proposed ventilation structures, and at the proposed stations including Alum Rock Station, Downtown San Jose Station, and Diridon/Arena Station. The geotechnical investigation program included:

- 76 Rotary Wash Borings, and
- 146 Cone Penetration Tests (CPTS).

Figure A9-1 provides a map of the exploration locations. These locations were selected by HMM/Bechtel based on the following considerations: 1) the data requirements of the tunnel designer; 2) the location of existing geotechnical data; 3) the avoidance of private property; and 4) the avoidance of existing underground and overhead utilities. For CPT correlation purposes, approximately 16 sets of borings and CPTs were conducted within 15 feet of each other. The CPT locations were surveyed by a subcontractor to HMM/Bechtel and the surveyed coordinates were provided to Fugro by HMM/Bechtel.

1.3 CPT PROGRAM OVERVIEW

Fugro and Fugro Geosciences, Inc., conducted the cone penetration testing (CPT) using a Fugro truck-mounted 25-ton cone apparatus in general accordance with ASTM D5778. The continuous CPT soundings were typically advanced to refusal, which ranged from approximately 60 to 158 feet in depth. For detailed procedures and equipment specifications on the CPT operations refer to “Appendix 8 - CPT Testing.” In addition to continuous CPT soundings, Fugro also conducted dissipation tests, downhole seismic shear wave velocity measurements, and hydropunch water sampling. Dissipation tests were conducted at 27 CPT locations in order to monitor excess pore pressure dissipation in sands and clays. Detailed procedures, equipment specifications and interpretation of results for the dissipation testing are provided in “Appendix 11 -Dissipation Testing.” Hydropunch water sampling was conducted at one CPT location in order to collect groundwater for laboratory testing. Detailed information regarding the field procedures and equipment specifications for the hydropunch water sampling are provided in “Appendix 10 - Hydropunch Testing.” Downhole Seismic shear (S) wave velocity measurements were successfully conducted at six CPT locations to obtain profiles of shear wave velocity versus depth. Detailed information regarding the downhole seismic cone penetration tests including field procedures, data interpretation, and results are discussed in the following sections.

1.4 SEISMIC CONE PENETRATION TEST (SCPT) PROGRAM OVERVIEW

Prior to initiation of the fieldwork the appropriate permits were obtained from the Santa Clara Valley District and City of San Jose. Seismic Shear wave velocity tests were attempted at a total of ten locations including each of the proposed station locations and at the crossover area between the proposed Market Street Station and the proposed Civic Center Station. Table 1 summarizes the Seismic CPT test program.

Table A9-1. Summary of Seismic CPT Testing

CPT	Proposed Structure	Location					Final Seismic Test Depth	Final CPT Test Depth	Notes
		Northing	Easting	Elev.	Station	Offset			
46	Crossover	1947949	6157548	86.5	699+08	29 L	98	98	
106	Civic Plaza Station	1948647	6158413	81.3	689+00	11 L	25	75	Inconsistent/noisy data
114	Alum Rock Station	1953750	6164764	87.3	600+38	42 L	108	110	
122	Alum Rock Station	1953016	6164830	88.2	607+72	24 L	87	88	
128	Crossover	1948280	6158122	82.8	692+45	28 L	25	78.5	Inconsistent/noisy data
139	Market St Station	1947718	6157150	88.2	703+69	31 L	95	118	
145	Market St Station	1947417	6156615	87.1	709+82	25 L	75	78	Inconsistent/noisy data
145A	Market St Station	1947418	6156617	87.1	709+80	25 L	25	126	Inconsistent/noisy data
149	Diridon Station	1946068	6154230	88.0	737+96	4 L	109	111	
154	Diridon Station	1946054	6153854	92.2	741+70	45 L	94	95	

As shown in Table 1, inconsistent/noisy seismic data were obtained at CPT locations 106, 128, 145, and 145A. The seismic data at these locations was not of sufficient quality to interpret shear wave velocities. These results will be discussed in further detail below.

2.0 SEISMIC CPT TEST EQUIPMENT AND PROCEDURES

2.1 FIELD EQUIPMENT

Downhole seismic shear wave velocity measurements were conducted using Fugro's seismic CPT (SCPT) system. The SCPT system includes the basic thrust system, a seismic cone assembly, a seismic wave source, and a digital recording seismograph. SCPT testing was performed in accordance with ASTM test designation D-577-95.

The seismic cone assembly is similar to the conventional cone assembly, but includes, in addition, a three-component array of geophones. The geophones are orthogonally mounted inside the assembly at about 15 cm above the cone tip. The cone tip area of the seismic cone is 15 cm^2, an area ratio of 0.59 and a cylindrical sleeve area of 200 cm^2.

The seismic source consists of a heavy metal beam that is held firmly against the ground weight of the beam, and additional weights placed on it. Seismic waves are generated at each test depth by striking each end of the beam with a 12-pound sledgehammer. A SmartSeis 100

Seismograph manufactured by Geomatrics and integrated with Fugro's CPT equipment is utilized for the seismic wave recording.

2.2 FIELD PROCEDURES.

For CPT soundings in which seismic data are collected, conventional CPT testing is temporarily halted at 5-foot intervals to collect seismic data. Shear waves are generated by striking a heavy steel beam with a 12-pound sledgehammer. The beam is positioned parallel to the cone truck at least 10 feet from the cone rods, and is coupled to the ground surface by the weight of the beam and the weight of the operator to prevent the beam from moving when struck. The beam is struck alternatively at opposite sides, which generate shear waves with opposite polarity. Hammer blows on the beam trigger the seismograph to record the time histories of the generated seismic waves as they travel through the soil and are detected by the geophones, which monitor the waveform arrivals. Each side of the beam is struck several times, and each signal produced by a blow is closely examined for signal and noise content. If the signal appears clean, i.e., the shear wave signal is clearly defined, that waveform is selected for stacking and the arrival time of the shear wave is picked and recorded. Further signals generated by additional blows are similarly examined and stacked to minimize noise detected and improve the overall signal to noise ratio. As a standard procedure, a minimum of three stacks per side of the beam per depth is required. However, in a noisy environment, the beam is struck continuously until a clean and consistent signal is obtained for stacking. As such, the beam may be struck more times than the actual number of signals chosen for stacking. Waveforms are digitally recorded and saved in the seismograph's hard drive for further processing. After a complete set of seismic data is recorded, the cone is advanced to the next depth, and the procedure is repeated until the hole is complete.

2.3 INTERPRETATION OF SEISMIC DATA

The Seismic data at each SCPT location is interpreted as follows:

- The shear wave arrival time at each depth is first determined from the recorded "stacked" signals using software on the seismograph.
- Arrival times are determined for each of the two sides of the beam that are struck, and are designated "east" and "west" arrival times.
- The east and west arrival times are checked in the field to ensure that consistent arrival times are being recorded between the two strike directions.
- The average arrival time is then determined from the east and west arrival times.
- Based on the horizontal offset of the seismic source from the CPT rods, a strike angle is determined, and the average vertical arrival time is determined by taking the Sine of the strike angle.
- The incremental seismic velocity is then determined by taking the difference in vertical average arrival time between two depth increments, and then dividing by the length of the increment (typically 5 feet).

3.0 RESULTS AND DISCCUSION

3.1 DATA PLOTS

CPT sounding logs for the six SCPTs are presented on the Logs of Seismic CPTs. The CPT logs provide graphical plots versus depth showing:

- Measured Cone (Tip) resistance in tons per square foot (tsf);
- Measured Sleeve friction in tsf;
- Friction Ratio in percentage, including color coding denominating the Soil Behavior Type according to Robertson and Campanella, 1990 (see CPT correlation chart);
- Measured Pore Pressure in tsf at the u2 location; and
- Measured Shear Wave Velocity in feet per second.

3.2 DISCUSSION

As indicated in Table 1, noisy/inconsistent seismic data were obtained at SCPT locations CPT-106, 128, 145 and 145a. This poor quality data is believed to be related to a combination of factors that include both surface traffic conditions as well as underground obstructions/debris (Thick asphalt, concrete slabs, railroad ties, pipelines, etc.). Surface traffic tends to make the data “noisy” while subsurface “obstructions” will tend to reduce or distort the transmission of the wave energy from the surface to the seismic receiver in the cone. In the case where limited noise is present in the data (e.g., traffic noise), the data can potentially be filtered and then analyzed. However, at the four SCPT locations discussed above, the data is too noisy to be effectively filtered out. We think that the primary cause of this is the occurrence of the subsurface obstruction/debris that is limiting the transmission of a clear seismic signal and generating additional noise as the wave travels through the debris.

4.0 LIMITATIONS

Our services consist of subsurface field explorations and data evaluations that are made in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

The data provided in this appendix is based on the subsurface explorations conducted for this study. These explorations indicate subsurface conditions only at specific locations and times, and only to the depths penetrated. Variations may exist and conditions not observed or described in this report could be encountered during construction. Our results are based on our standard practices and specific data obtained.

This appendix has been prepared for the exclusive use of HMM/Bechtel and their consultants for specific application to the SVRT project as described herein. In the event that there are any changes in the ownership, nature, design, or location of the proposed project, or if any future additions are planned, the results contained in this appendix should not be considered valid unless 1) the project changes are reviewed by Fugro, and 2) results presented

in this appendix are modified or verified in writing. Reliance on this report by others must be at their risk unless we are consulted on the use or limitations. We cannot be responsible for the impacts of any changes in geotechnical standards, practices, or regulations subsequent to performance of services without our further consultation. We can neither vouch for the accuracy of information supplied by others, nor accept consequences for unconsulted use of segregated portions of this report.

5.0 REFERENCE

Lunne, Robertson and Powell (1997), *Cone Penetration Testing in Geotechnical Practice,* Blackie Academic & Professional, London.

FIGURE

WEST PORT
CPT-157
BH-78
CPT-93
CPT-92
BH-49
CPT-91
CPT-90
BH-48
CPT-89
CPT-88
BH-47
CPT-87
CPT-86
BH-46
CPT-85
CPT-84
BH-45
CPT-83
CPT-82
BH-44
CPT-81
BH-80
CPT-80
BH-43
CPT-79
CPT-78
BH-42
CPT-77
BH-79
CPT-76
BH-41
CPT-75
CPT-74
BH-40
CPT-73
CPT-70
CPT-69
CPT-68
BH-38
BH-39
CPT-66
CPT-67
BH-37
CPT-65
CPT-64
BH-36
CPT-63
CPT-62
BH-35
CPT-61
CPT-60
BH-34
DIRIDON/ARENA STATION
CPT-154
BH-76
BH-75
CPT-151
CPT-149
BH-73
CPT-153
CPT-152
CPT-150
BH-74
CPT-148
CPT-147
CPT-146
BH-33
CPT-57
CPT-56
CPT-55
CPT-55A
BH-30
BH-32
CPT-58
CPT-59
BH-28
BH-29
CPT-53
CPT-52
LOS GATOS CREEK
GUADALUPE RIVER
DOWNTOWN SAN JOSE STATION
BH-21
CPT-39
CPT-38
BH-20
CPT-36
CPT-37
BH-19
CPT-35
CPT-34
BH-18
CPT-33
CPT-32
BH-17
CPT-31
HP-1
CPT-30
BH-16
CPT-29
CPT-28
CPT-27
BH-15
COYOTE CREEK
CPT-26
BH-14
BH-13
CPT-25
CPT-24
CPT-23
BH-12
CPT-22
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CPT-20
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CPT-17
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BH-09
CPT-15
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CPT-117
BH-59
BH-58
CPT-116
CPT-114
CPT-112
CPT-115
CPT-113
BH-06
BH-05
CPT-156
BH-04
CPT-09
CPT-08
CPT-07
CPT-06
CPT-05
BH-03
CPT-04
BH-02
CPT-03
BH-01
CPT-02
CPT-01
CPT-111
CPT-110
CPT-108
BH-57
CPT-107
BH-56
CPT-109
EAST PORTAL
ALUM ROCK STATION
LOWER SILVER CREEK
DOWNTOWN SAN JOSE STATION
CROSSOVER
CPT-51
CPT-49
BH-26
BH-72
CPT-145A
BH-71
CPT-142
BH-68
BH-66
CPT-47
BH-25
CPT-136
CPT-135
CPT-134
CPT-133
CPT-45
BH-65
CPT-129
BH-64
BH-23
CPT-42
CPT-106
BH-55A
BH-55
BH-54
BH-54S
CPT-101
CPT-102
BH-52
CPT-97
BH-50
CPT-41
BH-21
CPT-40
CPT-94
CPT-96
CPT-98
CPT-100
CPT-103
CPT-105
CPT-126
CPT-43
CPT-128
CPT-44
CPT-130
BH-24
CPT-131
CPT-132
CPT-46
BH-67
CPT-139
CPT-138
CPT-137
CPT-140
CPT-141
BH-70
CPT-143
CPT-144
CPT-145
BH-27
CPT-50
CPT-155
CPT-48

LEGEND
CPT
SEISMIC CPT
SEISMIC CPT WHERE INCONSISTENT/NOISY SEISMIC DATA WERE ENCOUNTERED (SEE TEXT)
BORING
0 250 500 1,000
Feet

REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE

HMM / BECHTEL
A Joint Venture of Hatch Mott MacDonald T&T, Inc. and Bechtel Infrastructure Corp.
DESIGNER/SUBCONSULTANT
HMM/BECHTEL
SUBMITTED
APPROVED

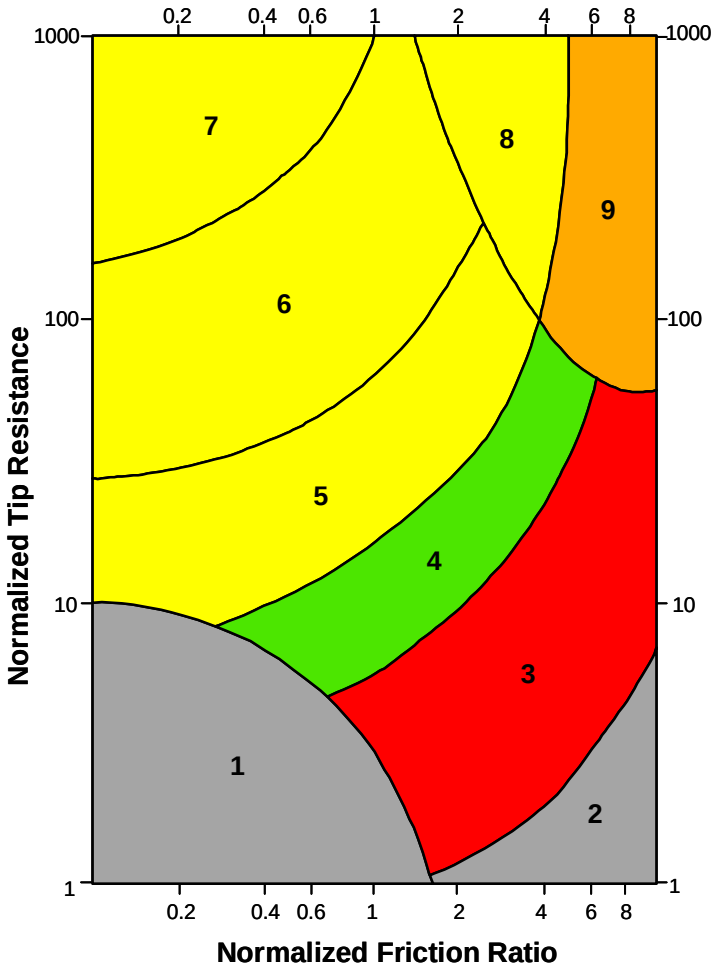
BART

SILICON VALLEY RAPID TRANSIT PROJECT
SANTA CLARA Valley Transportation Authority

SEISMIC CPT LOCATION MAP
Tunnel Segment of SVRT Project
San Jose, California

FIGURE A9-1

LOGS OF SEISMIC CPTs



Zone	Soil Behavior Type
1	Sensitive Fine-grained
2	Organic Material
3	Clay to Silty Clay
4	Clayey Silt to Silty Clay
5	Silty Sand to Sandy Silt
6	Clean Sands to Silty Sands
7	Gravelly Sand to Sand
8	Very Stiff Sand to Clayey Sand
9	Very Stiff Fine-grained *

*overconsolidated or cemented

CPT CORRELATION CHART
(Modified from Robertson, 1990)

KEY TO SEISMIC CPT LOGS

Tunnel Segment of SVRT Project
San Jose, California

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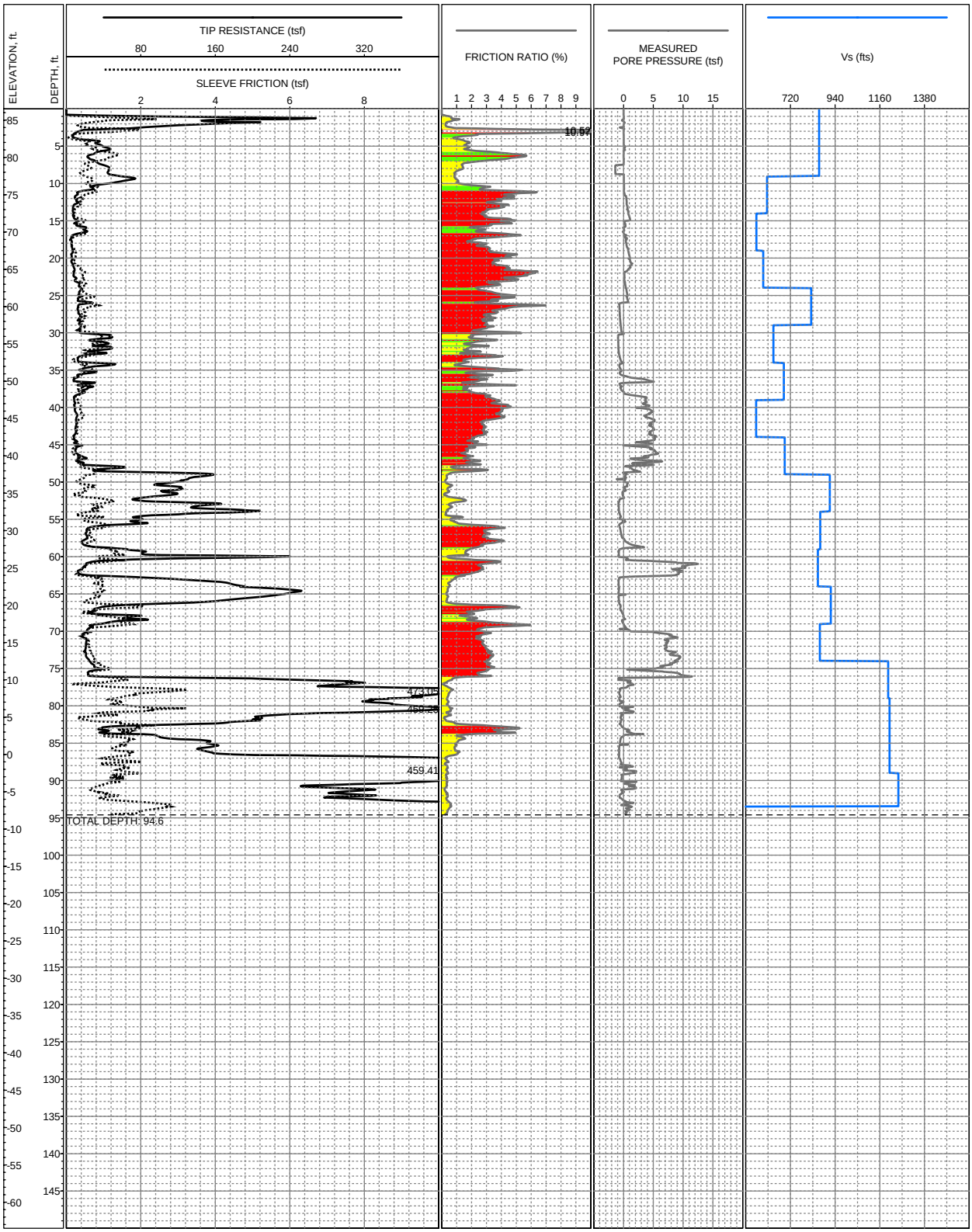
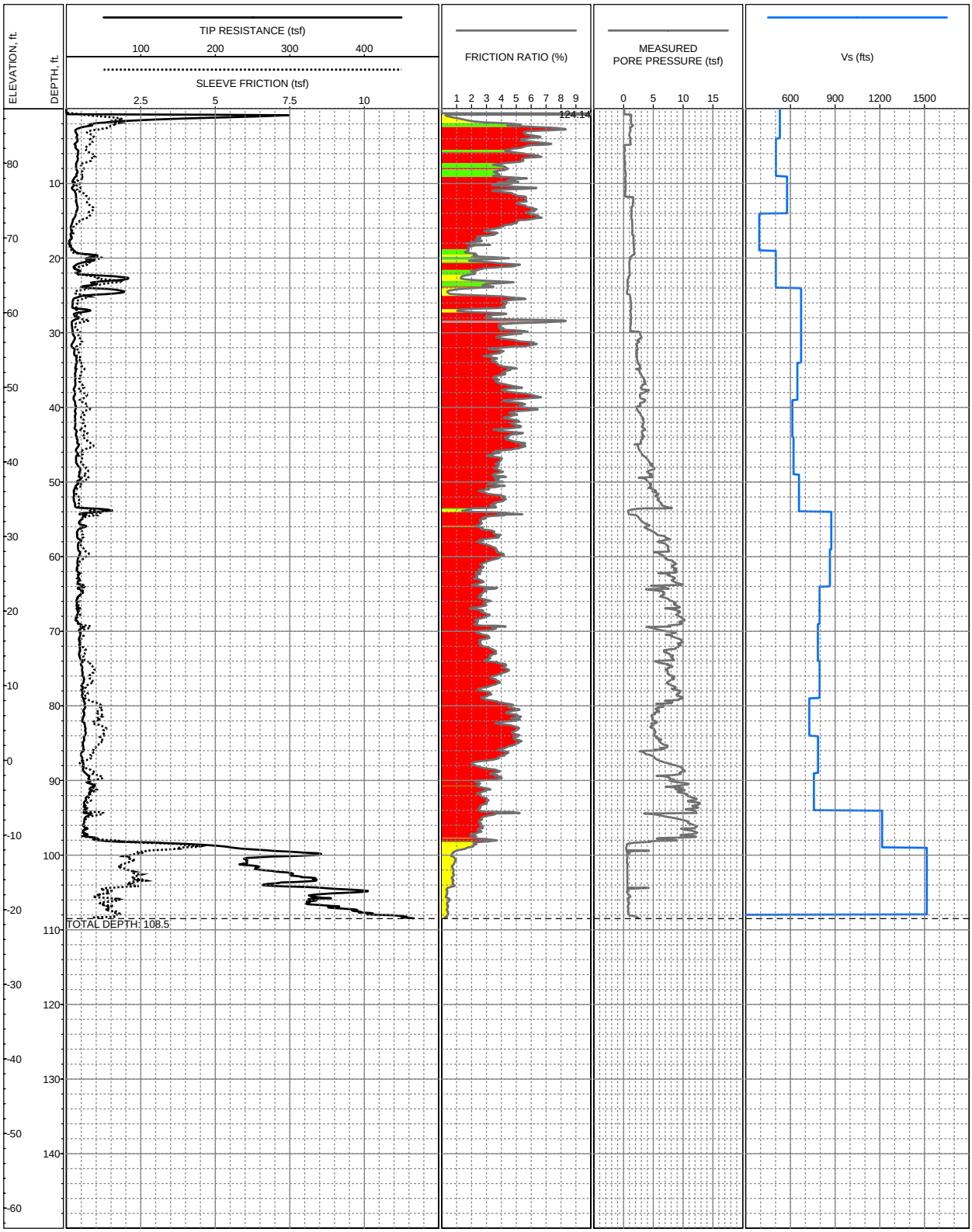


LOCATION: E6157547.7 N1947948.7 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 86.5ft +/- (NAVD88)
COMPLETION DEPTH: 94.6ft
TEST DATE: 11/10/2004

CONE: F7.5CKEW750
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-46

Tunnel Segment of SVRT Project
San Jose, California

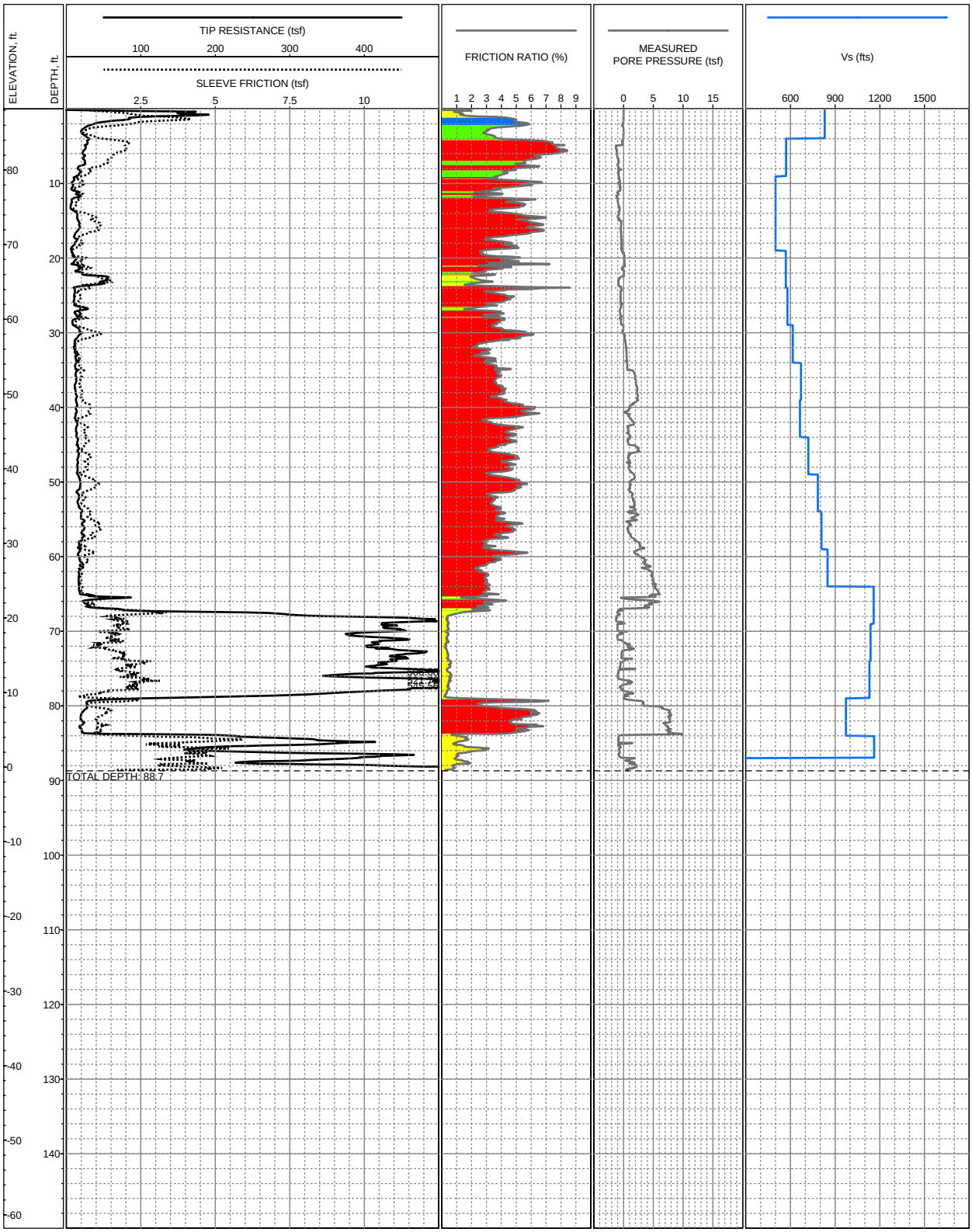


LOCATION: E6164763.7 N1953749.7 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 87.3ft +/- (NAVD88)
COMPLETION DEPTH: 108.5ft
TEST DATE: 2/12/2005

CONE: F7.5CKEW750
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-114

Tunnel Segment of SVRT Project
San Jose, California

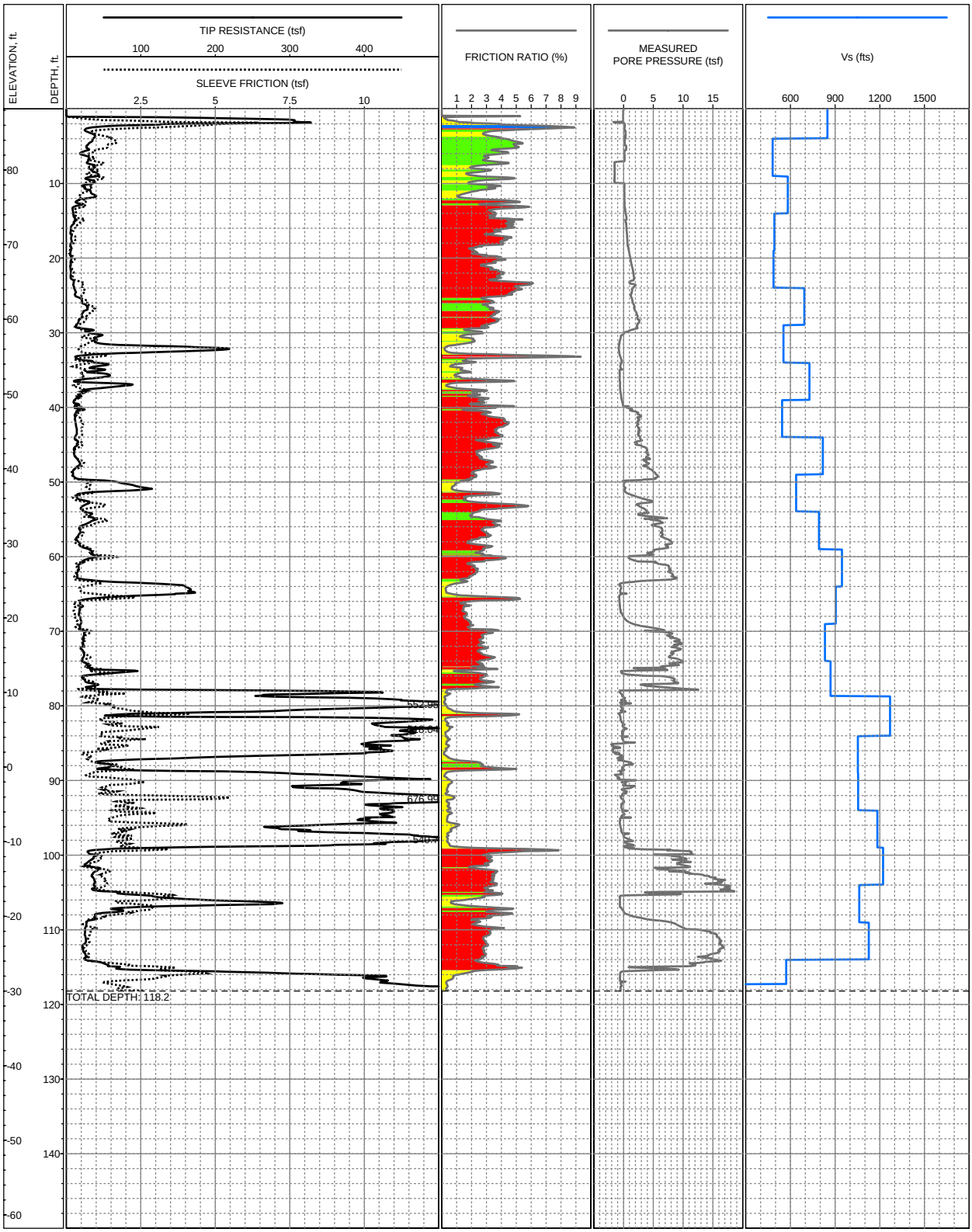


LOCATION: E6164830 N1953016 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88.2ft +/- (NAVD88)
COMPLETION DEPTH: 88.7ft
TEST DATE: 2/13/2005

CONE: F7.5CKEW750
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-122

Tunnel Segment of SVRT Project
San Jose, California

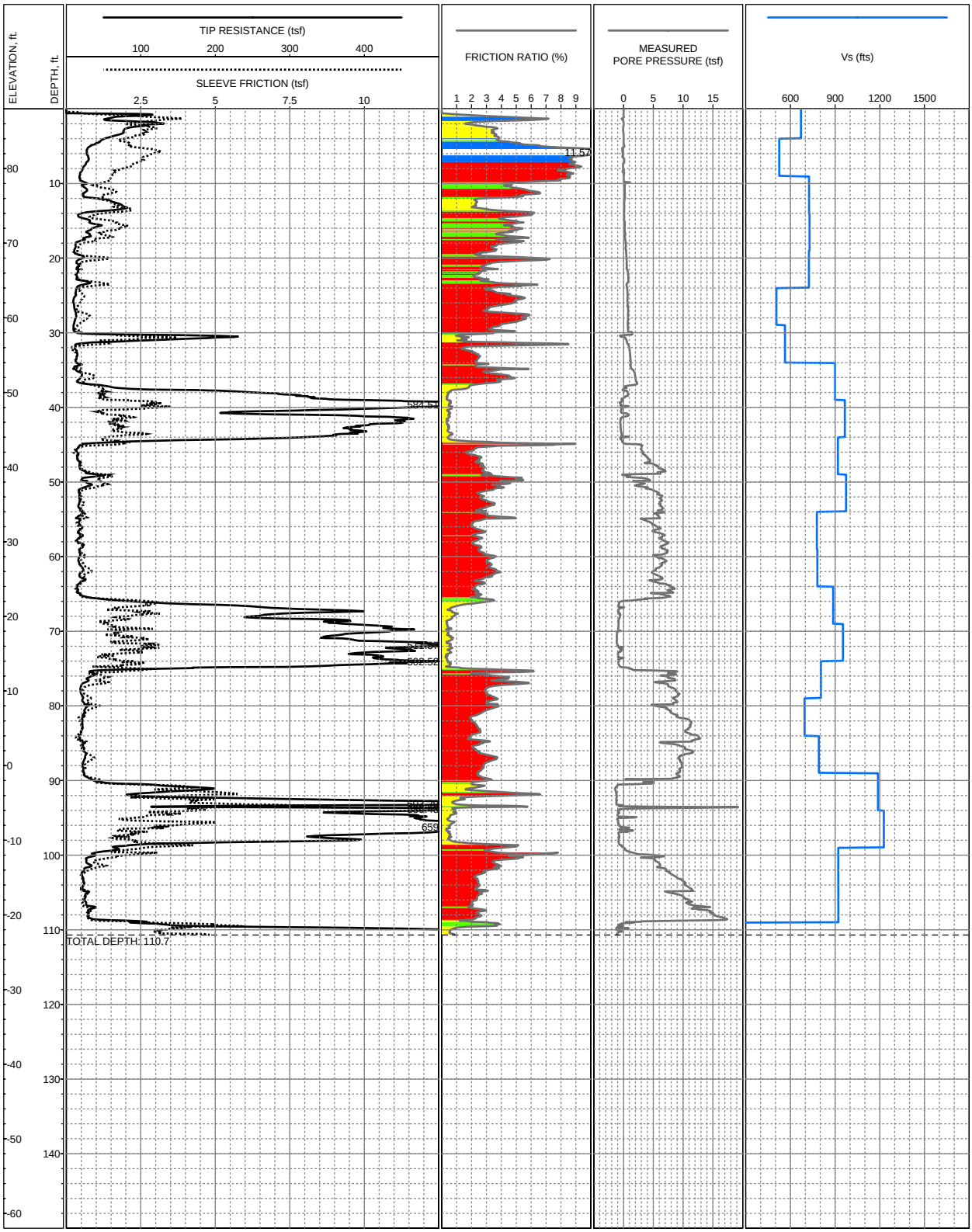


LOCATION: E6157149.5 N1947717.9 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88.2ft +/- (NAVD88)
COMPLETION DEPTH: 118.2ft
TEST DATE: 11/9/2004

CONE: F7.5CKEW750
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-139

Tunnel Segment of SVRT Project
San Jose, California

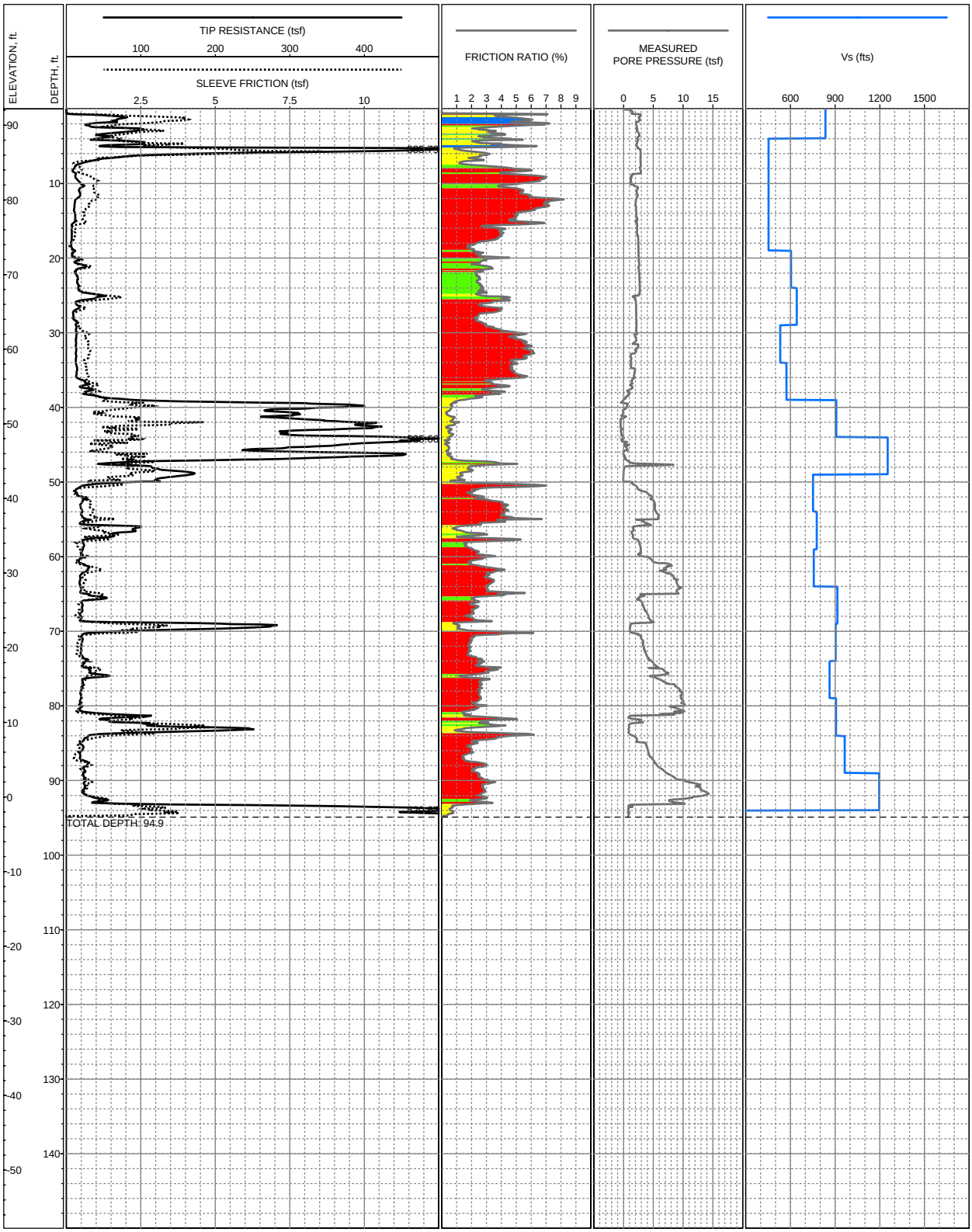


LOCATION: E6154229.6 N1946068 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 88ft +/- (NAVD88)
COMPLETION DEPTH: 110.7ft
TEST DATE: 2/10/2005

CONE: F7.5CKEW750
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-149

Tunnel Segment of SVRT Project
San Jose, California



LOCATION: E6153854 N1946053.8 (NAD83, CA State Plane Zone III, Feet)
SURFACE EL: 92.2ft +/- (NAVD88)
COMPLETION DEPTH: 94.9ft
TEST DATE: 2/11/2005

CONE: F7.5CKESW750
PERFORMED BY: Fugro Geosciences
OPERATOR: M Parras & R Norris
REVIEWED BY: R Howard

LOG OF CPT-154

Tunnel Segment of SVRT Project
San Jose, California

APPENDIX 10

HYDROPUNCH WATER SAMPLING AND LABORATORY TESTING PROGRAM

Appendix 10 presents a description of the equipment and procedures used in the Hydropunch Water Sampling conducted by Fugro. Kleinfelder performed general water quality testing on the collected water samples. The results of the general water quality tests are also included in Appendix 10.

FUGRO WEST, INC.

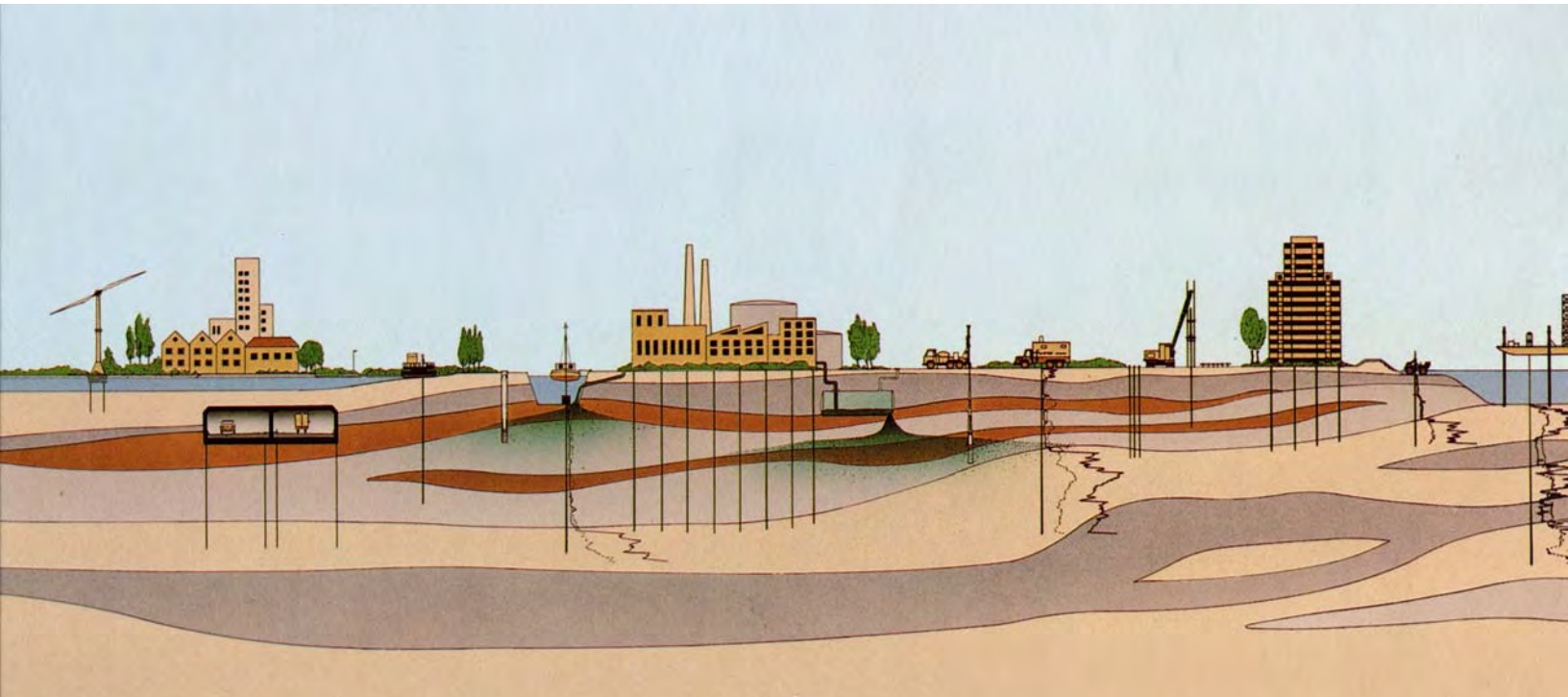
APPENDIX 10
CONE PENETRATION TEST (CPT) HYDROPUNCH WATER SAMPLING

GEOTECHNICAL EXPLORATION PROGRAM
TUNNEL SEGMENT OF SILICON VALLEY RAPID TRANSIT (SVRT) PROJECT
SAN JOSE, CALIFORNIA

Prepared for:
HMM/BECHTEL

JUNE 2005

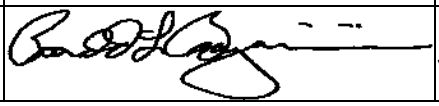
Project No. 1637.001



REPORT DOCKET

APPROVAL

This document is approved by the following:

Name	Title	Signature	Issue Date
Roger Howard Jr., P.E.	Project Manager		June 7, 2005
Ronald L. Bajuniemi, P.E., G.E.	Project Principal		June 7, 2005

REVISION HISTORY

Revision	Date	Change	Approval
0	May 4, 2005	Draft Report: Appendix 9A Cone Penetration Test (CPT) Hydropunch Water Sampling	RH
1	June 7, 2005	Final Report: Appendix 10 Cone Penetration Test (CPT) Hydropunch Water Sampling. With HMM/Bechtel Comments dated 5/23/05 incorporated	RH

FUGRO WEST, INC.

1000 Broadway, Suite 200
Oakland, California 94607
Tel: (510) 268-0461
Fax: (510) 268-0137

June 7, 2005
Project No. 1637.001

HMM/Bechtel
3103 North First Street
San Jose, California 95134

Attention: Mr. Ignacio Arango

Subject: Appendix 10 – Cone Penetration Test (CPT) Hydropunch Water Sampling
Tunnel Segment of SVRT Project
San Jose, California

Dear Mr. Arango:

Fugro West, Inc., is pleased to submit this final copy of "Appendix 10 - CPT Hydropunch Water Sampling," describing the Hydropunch test equipment and procedures for the tunnel segment of SVRT Project in San Jose, California.

We appreciate this opportunity to be of continued service to HMM/Bechtel. Please contact Roger Howard Jr. at (510) 267-4422 if you have any questions regarding the information presented in this appendix.

Sincerely,

FUGRO WEST, INC.

Jon Mitchell
Staff Engineer

Roger Howard Jr., P.E.
Senior Engineer

Ronald L. Bajuniemi, P.E., G.E.
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
RONALD L. BAJUNIEMI
No. 112
Exp. 12-31-05
GEOTECHNICAL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
ROGER W.A. HOWARD JR.
No. C-61002
Exp. 12-31-06
CIVIL
STATE OF CALIFORNIA

JM/RH/RLB:rp

Copies Submitted: (6 + pdf) Addressee

CONTENTS

FIGURES

1.0 INTRODUCTION

This appendix describes the equipment and procedures used to conduct Hydropunch water sampling using Fugro West, Inc.'s, (Fugro) cone penetration test (CPT) rig for the tunnel segment of Silicon Valley Rapid Transit (SVRT) Project. The Hydropunch CPT was conducted at one location situated along the tunnel segment alignment of the SVRT Project, as shown on the Hydropunch CPT Location Map (Figure A10-1).

1.1 PROJECT DESCRIPTION

The Santa Clara Valley Transportation Authority (VTA) intends to construct the SVRT Project in San Jose, California. This will be a 26.2-km (16.3-mile) extension of the Bay Area Rapid Transit (BART) heavy rail rapid transit system from its planned terminus at the end of the Warms Springs Extension in Fremont, to San Jose. The proposed alignment currently includes six stations (three above-grade and three below-grade), a proposed future station, and vehicle storage and maintenance facilities. The alignment is composed of two major segments;

1) A Line Segment which will be approximately 11.5 miles of at-grade, elevated and cut-and-cover track from Warm Springs to San Jose; and

2) A 5.1-mile-long tunnel segment, consisting of twin bored tunnels and cut-and-cover structures through downtown San Jose (see Figure A10-1).

As currently planned, the tunnel segment includes at-grade and open cut track, three (3) cut-and-cover stations, and a cut-and-cover track crossover structure. The cut-and cover station and the crossover structures have a cumulative length of approximately 4970 feet. The remaining 4.14 miles of the alignment will be twin 19.5-foot-diameter tunnels.

This investigation and report cover the 5.1-mile-long Tunnel Segment section only.

1.2 GEOTECHNICAL EXPLORATION PROGRAM OVERVIEW

The joint venture of Hatch Mott MacDonald T & T, Inc., and Bechtel Infrastructure Corporation (HMM/Bechtel) are providing engineering design services for the tunnel segments (Segments 3 and 4) of the SVRT Project to the VTA. HMM/Bechtel has subcontracted with a number of companies to conduct the geotechnical field exploration program for the project. HMM/Bechtel's primary subcontractors for the geotechnical exploration program included: Fugro West, Inc., (Fugro), Parikh Consultants (Parikh) and Pitcher Drilling Company (Pitcher).

The three companies, Fugro, Parikh, and Pitcher, conducted the majority of the geotechnical field exploration program for the tunnel segments of the SVRT Project from October 15, 2004, to March 5, 2005. The intent of the geotechnical field investigation program was to obtain geotechnical data that will aid in the design and construction of the proposed tunnel and cut-and-cover structures.

In general, the geotechnical field investigation explored subsurface conditions along the proposed tunnel alignment, within the vicinity of the proposed Eastern and Western Portals, at the two proposed ventilation structures, and at the proposed stations including Alum Rock Station, Market Street Station, Civic Plaza/SJSU Station, and, Diridon/Arena Station. The geotechnical exploration program included:

- 76 Rotary Wash Borings, and
- 146 cone penetration Tests (CPTS).

Figure A10-1 provides a map of the exploration locations. These locations were selected by HMM/Bechtel based on the following considerations: 1) the data requirements of the tunnel designer, 2) the location of existing geotechnical data, 3) the avoidance of private property, and 4) the avoidance of existing underground and overhead utilities. For CPT correlation purposes approximately 16 sets of borings and CPTs were conducted within 15 feet of each other. The CPT locations were surveyed by a subcontractor to HMM/Bechtel and the surveyed coordinates were provided to Fugro by HMM/Bechtel.

1.3 CPT PROGRAM OVERVIEW

Fugro West, Inc., and Fugro Geosciences, Inc., conducted the CPTs using a Fugro truck-mounted 25-ton cone apparatus in general accordance with ASTM D5778. The continuous CPT soundings were typically advanced to refusal, which ranged from approximately 60 to 158 feet in depth. For detailed procedures and equipment specifications on the CPT operations refer to Appendix 8, CPT Testing. In addition to continuous CPT soundings, Fugro also conducted dissipation tests, downhole seismic shear wave velocity measurements, and hydropunch water sampling. Dissipation tests were conducted at twenty-seven (27) CPT locations in order to monitor excess pore pressure dissipation in sands and clays. Detailed procedures, equipment specifications and interpretation of results for the dissipation testing are provided in Appendix 11, Dissipation Testing. Downhole Seismic shear (S) wave velocity measurements were successfully conducted at six (6) CPT locations to obtain profiles of shear wave velocity versus depth. Detailed information regarding the downhole seismic cone penetration tests including field procedures, data interpretation, and results are discussed in Appendix 9, Seismic Cone Testing. Hydropunch water sampling was conducted at one (1) CPT location in order to collect groundwater for laboratory testing. Detailed information regarding the field procedures and equipment specifications for the hydropunch water sampling is provided in the following sections.

1.4 HYDROPUNCH WATER SAMPLING PROGRAM OVERVIEW

Prior to initiation of the fieldwork the appropriate permits were obtained from the Santa Clara Valley District and City of San Jose. Hydropunch water sampling was conducted at a depth of about 64 feet at Hydropunch location HP-1 to retrieve water samples for subsequent chemical and gas testing. The location of HP-1 is on 15th Street just south of the intersection with Santa Clara Street. Water sampling was conducted at location HP-1 due to high water pressures encountered in that area previously when conducting CPT-30. The high water pressure resulted in the ejection of water, silt, sand and bubbles from the hole when the cone

rods were withdrawn from CPT-30. HMM/Bechtel decided to conduct the water sampling at that location to determine if any soluble gasses are present in the groundwater aquifer near the depth of the proposed tunnel alignment.

Fugro conducted the Hydropunch water sampling and provided the samples to Kleinfelder and Associates, who packaged, labeled and had the appropriate laboratory testing conducted on the water samples. The results of those laboratory tests will be provided in a separate report by Kleinfelder.

2.0 HYDROPUNCH WATER SAMPLING EQUIPMENT AND PROCEDURES

The Hydropunch water sampling system utilized the same 25-ton, truck-mounted CPT system used to conduct the CPT soundings for the project (including seismic and dissipation testing). The equipment and procedures used in the standard CPT operation are discussed in detail in Appendix 5.

The Hydropunch type sampler, illustrated in Figure A10-2, utilizes a retrievable stainless steel screen, 18 inches in length with 0.005-inch laser cut slots. The probe is pushed in a closed position to the desired depth, after which the sample push rods are retracted to expose the screen. Groundwater flows hydrostatically from the formation into the inlet screen where it is collected and brought to the surface by means of a bailer or various pump devices. Upon completion of the water sampling, the Hydropunch sampler and CPT rods are retrieved leaving the disposable tip in the ground.

For this project the CPT rods were steam-cleaned prior to the installation of the Hydropunch sampler to minimize the potential for introducing outside contaminants into the water sample. The Hydropunch sampler was then advanced to a depth of 64 feet using the truck-mounted CPT hydraulic system. The CPT rods were retracted approximately 1 foot to expose the screen and allow the groundwater to flow into the sampler. A hand pump system consisting of plastic tubing and a Waterra check valve was then used to retrieve the water samples. A total of 12 water sample bottles were filled, and the samples were then given to a representative of Kleinfelder.

The Hydropunch CPT location was backfilled as discussed in Appendix 8, Cone Penetration Test Results.

3.0 LIMITATIONS

Our services consist of subsurface field explorations and data evaluations that are made in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

The data provided in this appendix is based on the subsurface explorations conducted for this study. These explorations indicate subsurface conditions only at specific locations and times, and only to the depths penetrated. Variations may exist and conditions not observed or

described in this report could be encountered during construction. Our results are based on our standard practices and specific data obtained.

This appendix has been prepared for the exclusive use of HMM/Bechtel and their consultants for specific application to the SVRT project as described herein. In the event that there are any changes in the ownership, nature, design, or location of the proposed project, or if any future additions are planned, the results contained in this appendix should not be considered valid unless 1) the project changes are reviewed by Fugro, and 2) results presented in this appendix are modified or verified in writing. Reliance on this report by others must be at their risk unless we are consulted on the use or limitations. We cannot be responsible for the impacts of any changes in geotechnical standards, practices, or regulations subsequent to performance of services without our further consultation. We can neither vouch for the accuracy of information supplied by others, nor accept consequences for unconsulted use of segregated portions of this report.

4.0 REFERENCE

Lunne, Robertson & Powell (1997), *Cone Penetration Testing in Geotechnical Practice,* Blackie Academic & Professional, London, UK.

FIGURES

WEST PORT

EAST PORT

DIRIDON/ARENA STATION

DOWNTOWN SAN JOSE STATION

ALUM ROCK STATION

LOS GATOS CREEK

GUADALUPE RIVER

COYOTE CREEK

LOWER SILVER CREEK

HP-1

LEGEND

HYDROPUNCH

CPT

BORING

N

0 250 500 1,000

Feet

DOWNTOWN SAN JOSE STATION

CROSSOVER

REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

HMM / BECHTEL

A Joint Venture of Hatch Mott MacDonald T&T, Inc. and Bechtel Infrastructure Corp.

DESIGNER/SUBCONSULTANT

SUBMITTED

HMM/BECHTEL

APPROVED

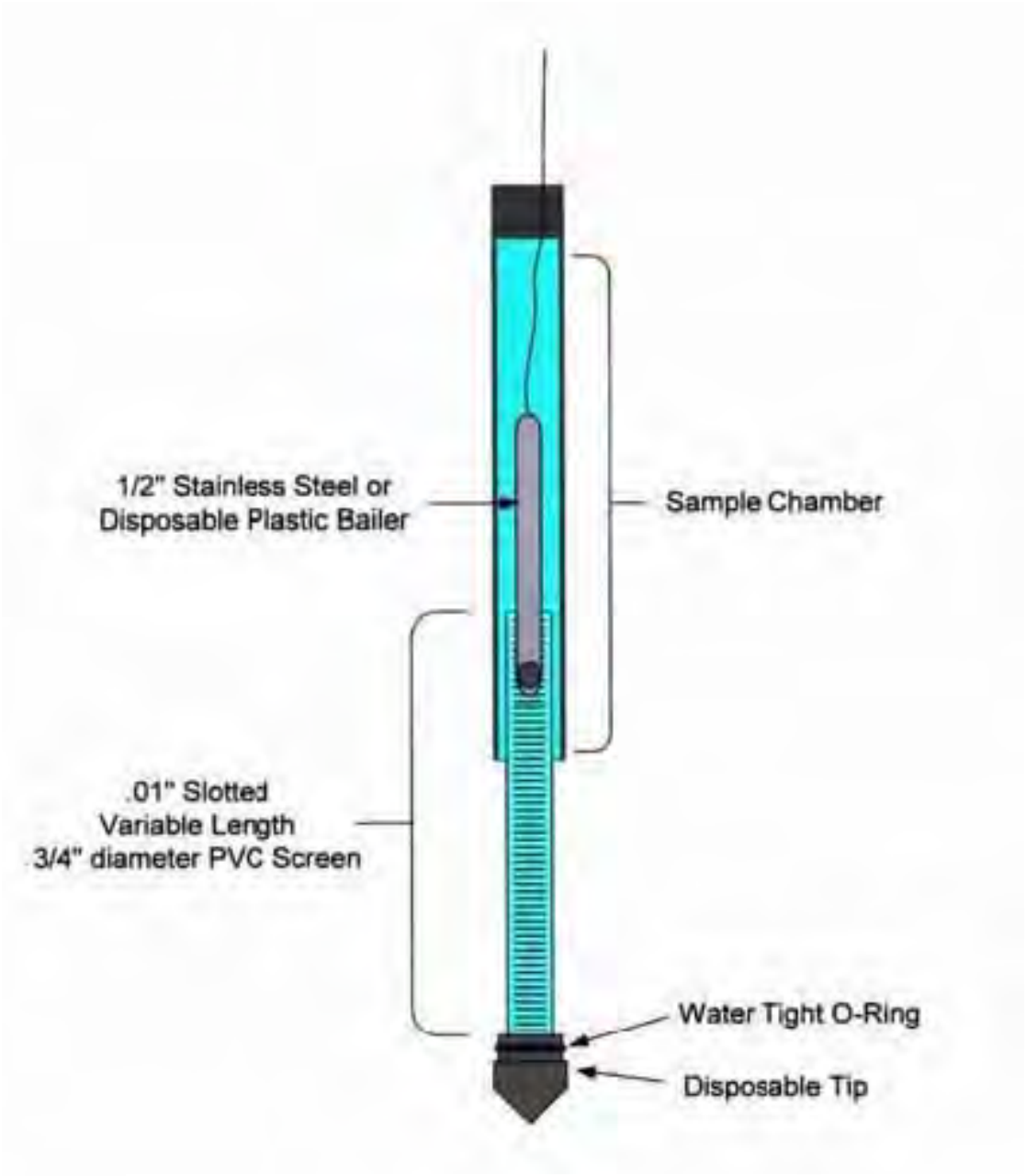
BART

SILICON VALLEY RAPID TRANSIT PROJECT

SANTA CLARA Valley Transportation Authority

HYDROPUNCH LOCATION MAP
Tunnel Segment of SVRT Project
San Jose, California

FIGURE A10-1



*Note: Waterra Check Valve inserted in plastic tubing (not shown) was used in place of bailer.

SCHEMATIC DIAGRAM OF TYPICAL HYDROPUNCH WATER SAMPLER
Tunnel Segment of SVRT Project
San Jose, California

HYDROPUNCH LABORATORY TEST RESULTS

SEVERN TRENT STL

Submission#: 2005-04-0589

Kleinfelder-San Jose

April 28, 2005

1362 Ridder Park Drive
San Jose, CA 95131

Attn.: Derby Davidson

Project#: 54509/001
Project: VTA Santa Clara Street

Attached is our report for your samples received on 04/20/2005 14:15
This report has been reviewed and approved for release. Reproduction of this report is permitted only in its entirety.

Please note that any unused portion of the samples will be discarded after 06/04/2005 unless you have requested otherwise.
We appreciate the opportunity to be of service to you. If you have any questions, please call me at (925) 484-1919.
You can also contact me via email. My email address is: dsharma@stl-inc.com

Sincerely,

Dimple Sharma
Project Manager

Oil & Grease (Total) by EPA 1664A

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Samples Reported

Sample Name	Date Sampled	Matrix	Lab #
WS-1	04/20/2005 13:05	Water	1

Oil & Grease (Total) by EPA 1664A

Kleinfelder-San Jose
Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Prep(s):	1664A	Test(s):	1664A
Sample ID:	**WS-1**	Lab ID:	2005-04-0589 - 1
Sampled:	04/20/2005 13:05	Extracted:	4/21/2005 14:51
Matrix:	Water	QC Batch#:	2005/04/21-01.23

Compound	Conc.	RL	Unit	Dilution	Analyzed	Flag
Oil & Grease (total)	ND	2.0	mg/L	1.00	04/21/2005 18:00	

Oil & Grease (Total) by EPA 1664A

Kleinfelder-San Jose
Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Batch QC Report

Prep(s): 1664A
Method Blank
MB: 2005/04/21-01.23-001

Water

Test(s): 1664A
QC Batch # 2005/04/21-01.23
Date Extracted: 04/21/2005 14:51

Compound	Conc.	RL	Unit	Analyzed	Flag
Oil & Grease (total)	ND	2	mg/L	04/21/2005 18:00	

Oil & Grease (Total) by EPA 1664A

Kleinfelder-San Jose
Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Batch QC Report

Prep(s): 1664A

Test(s): 1664A

Laboratory Control Spike **Water** **QC Batch # 2005/04/21-01.23**

LCS 2005/04/21-01.23-002 Extracted: 04/21/2005 Analyzed: 04/21/2005 18:00
LCSD 2005/04/21-01.23-003 Extracted: 04/21/2005 Analyzed: 04/21/2005 18:00

Compound	Conc. mg/L		Exp.Conc.	Recovery %		RPD	Ctrl.Limits %		Flags	
	LCS	LCSD		LCS	LCSD	%	Rec.	RPD	LCS	LCSD
Oil & Grease (total)	33.6	33.1	40.0	84.0	82.8	1.4	79-114	18		

Misc Anions by Ion Chromatograph

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Samples Reported

Sample Name	Date Sampled	Matrix	Lab #
WS-1	04/20/2005 13:05	Water	1

Misc Anions by Ion Chromatograph

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Prep(s):	300.0/9056	Test(s):	300.0/9056
Sample ID:	**WS-1**	Lab ID:	2005-04-0589 - 1
Sampled:	04/20/2005 13:05	Extracted:	4/21/2005 18:11
Matrix:	Water	QC Batch#:	2005/04/21-01.41

Compound	Conc.	RL	Unit	Dilution	Analyzed	Flag
Fluoride	ND	1.0	mg/L	5.00	04/21/2005 18:11	
Chloride	49	1.0	mg/L	5.00	04/21/2005 18:11	
Nitrite	3.4	1.0	mg/L	5.00	04/21/2005 18:11	
Bromide	ND	1.0	mg/L	5.00	04/21/2005 18:11	
Nitrate	7.1	1.0	mg/L	5.00	04/21/2005 18:11	
Orthophosphate	ND	1.0	mg/L	5.00	04/21/2005 18:11	
Sulfate	69	1.0	mg/L	5.00	04/21/2005 18:11	

Misc Anions by Ion Chromatograph

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Batch QC Report

Prep(s): 300.0/9056 — Test(s): 300.0/9056

Method Blank — **Water** — **QC Batch # 2005/04/21-01.41**

MB: 2005/04/21-01.41-001 — Date Extracted: 04/21/2005 15:18

Compound	Conc.	RL	Unit	Analyzed	Flag
Fluoride	ND	0.2	mg/L	04/21/2005 15:18	
Chloride	ND	0.2	mg/L	04/21/2005 15:18	
Nitrite	ND	0.2	mg/L	04/21/2005 15:18	
Bromide	ND	0.2	mg/L	04/21/2005 15:18	
Nitrate	ND	0.2	mg/L	04/21/2005 15:18	
Orthophosphate	ND	0.2	mg/L	04/21/2005 15:18	
Sulfate	ND	0.2	mg/L	04/21/2005 15:18	

Misc Anions by Ion Chromatograph

Kleinfelder-San Jose
Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Batch QC Report

Prep(s): 300.0/9056 Test(s): 300.0/9056

Laboratory Control Spike **Water** **QC Batch # 2005/04/21-01.41**

LCS 2005/04/21-01.41-002 Extracted: 04/21/2005 Analyzed: 04/21/2005 15:49
LCSD 2005/04/21-01.41-003 Extracted: 04/21/2005 Analyzed: 04/21/2005 16:04

Compound	Conc. mg/L		Exp.Conc.	Recovery %		RPD	Ctrl.Limits %		Flags	
	LCS	LCSD		LCS	LCSD	%	Rec.	RPD	LCS	LCSD
Fluoride	2.82	2.85	3.0	94.0	95.0	1.1	80-120	20		
Chloride	5.19	5.15	6.0	86.5	85.8	0.8	80-120	20		
Nitrite	18.0	18.0	19.7	91.4	91.4	0.0	80-120	20		
Bromide	18.5	19.1	20.0	92.5	95.5	3.2	80-120	20		
Nitrate	24.1	24.4	26.7	90.3	91.4	1.2	80-120	20		
Orthophosphate	25.2	25.3	30.6	82.4	82.7	0.4	80-120	20		
Sulfate	25.9	26.7	30.0	86.3	89.0	3.1	80-120	20		

Total Dissolved Solids (TDS)

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Samples Reported

Sample Name	Date Sampled	Matrix	Lab #
WS-1	04/20/2005 13:05	Water	1

Total Dissolved Solids (TDS)

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Prep(s):	160.1	Test(s):	160.1
Sample ID:	**WS-1**	Lab ID:	2005-04-0589 - 1
Sampled:	04/20/2005 13:05	Extracted:	4/25/2005 08:03
Matrix:	Water	QC Batch#:	2005/04/25-01.28

Analysis Flag: L2 (See Legend and Note Section)

Compound	Conc.	RL	Unit	Dilution	Analyzed	Flag
TDS	510	20	mg/L	1.00	04/26/2005 09:03	

Total Dissolved Solids (TDS)

Kleinfelder-San Jose
Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Batch QC Report

Prep(s): 160.1 Test(s): 160.1

Method Blank **Water** **QC Batch # 2005/04/25-01.28**

MB: 2005/04/25-01.28-001 Date Extracted: 04/25/2005 08:04

Compound	Conc.	RL	Unit	Analyzed	Flag
TDS	ND	20	mg/L	04/26/2005 08:52	

Total Dissolved Solids (TDS)

Kleinfelder-San Jose
Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Batch QC Report

Prep(s): 160.1 Test(s): 160.1

Laboratory Control Spike **Water** **QC Batch # 2005/04/25-01.28**

LCS 2005/04/25-01.28-002 Extracted: 04/25/2005 Analyzed: 04/26/2005 08:52
LCSD 2005/04/25-01.28-003 Extracted: 04/25/2005 Analyzed: 04/26/2005 08:53

Compound	Conc. mg/L		Exp.Conc.	Recovery %		RPD	Ctrl.Limits %		Flags	
	LCS	LCSD		LCS	LCSD	%	Rec.	RPD	LCS	LCSD
TDS	977	964	1000	97.7	96.4	1.3	80-120	20		

Total Dissolved Solids (TDS)

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Legend and Notes

Analysis Flag

L2

Reporting limits were raised due to high level of analyte present in the sample.

Metals

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Samples Reported

Sample Name	Date Sampled	Matrix	Lab #
WS-1	04/20/2005 13:05	Water	1

Metals

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Prep(s):	3010A	Test(s):	6010B
Sample ID:	**WS-1**	Lab ID:	2005-04-0589 - 1
Sampled:	04/20/2005 13:05	Extracted:	4/27/2005 06:08
Matrix:	Water	QC Batch#:	2005/04/27-01.15

Compound	Conc.	RL	Unit	Dilution	Analyzed	Flag
Copper	1.0	0.0050	mg/L	1.00	04/27/2005 12:47	
Zinc	1.6	0.010	mg/L	1.00	04/27/2005 12:47	
Calcium	240	0.20	mg/L	1.00	04/27/2005 12:47	
Magnesium	370	0.20	mg/L	1.00	04/27/2005 12:47	
Iron	850	0.20	mg/L	1.00	04/27/2005 12:47	
Manganese	11	0.0050	mg/L	1.00	04/27/2005 12:47	
Sodium	42	1.0	mg/L	1.00	04/27/2005 12:47	
Potassium	27	1.0	mg/L	1.00	04/27/2005 12:47	

Metals

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Batch QC Report

Prep(s): 3010A — Test(s): 6010B

Method Blank — **Water** — **QC Batch # 2005/04/27-01.15**

MB: 2005/04/27-01.15-050 — Date Extracted: 04/27/2005 06:08

Compound	Conc.	RL	Unit	Analyzed	Flag
Copper	ND	0.0050	mg/L	04/27/2005 12:27	
Zinc	ND	0.010	mg/L	04/27/2005 12:27	
Calcium	ND	0.20	mg/L	04/27/2005 12:27	
Magnesium	ND	0.20	mg/L	04/27/2005 12:27	
Iron	ND	0.20	mg/L	04/27/2005 12:27	
Manganese	ND	0.0050	mg/L	04/27/2005 12:27	
Sodium	ND	1.0	mg/L	04/27/2005 12:27	
Potassium	ND	1.0	mg/L	04/27/2005 12:27	

Metals

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Batch QC Report

Prep(s): 3010A

Test(s): 6010B

Laboratory Control Spike **Water** **QC Batch # 2005/04/27-01.15**

LCS 2005/04/27-01.15-051 Extracted: 04/27/2005 Analyzed: 04/27/2005 12:37

LCSD 2005/04/27-01.15-052 Extracted: 04/27/2005 Analyzed: 04/27/2005 12:40

Compound	Conc. mg/L		Exp.Conc.	Recovery %		RPD	Ctrl.Limits %		Flags	
	LCS	LCSD		LCS	LCSD	%	Rec.	RPD	LCS	LCSD
Copper	0.512	0.503	0.500	102.4	100.6	1.8	80-120	20		
Zinc	0.500	0.491	0.500	100.0	98.2	1.8	80-120	20		
Calcium	5.08	4.98	5.00	101.6	99.6	2.0	80-120	20		
Magnesium	4.97	4.87	5.00	99.4	97.4	2.0	80-120	20		
Iron	5.09	5.02	5.00	101.8	100.4	1.4	80-120	20		
Manganese	0.510	0.500	0.500	102.0	100.0	2.0	80-120	20		
Sodium	20.6	20.2	20.0	103.0	101.0	2.0	80-120	20		
Potassium	19.8	19.5	20.0	99.0	97.5	1.5	80-120	20		

Hardness (equivalent of CaCO3)

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Samples Reported

Sample Name	Date Sampled	Matrix	Lab #
WS-1	04/20/2005 13:05	Water	1

Hardness (equivalent of CaCO3)

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Prep(s):	3005A 3005A	Test(s):	2340B 6010B
Sample ID:	**WS-1**	Lab ID:	2005-04-0589 - 1
Sampled:	04/20/2005 13:05	Extracted:	5/5/2005 12:42
Matrix:	Water	QC Batch#:	2005/05/05-04.15

Compound	Conc.	RL	Unit	Dilution	Analyzed	Flag
Hardness (as CaCO3)	460	2.0	mg/L	1.00	05/06/2005 09:18	

Hardness (equivalent of CaCO3)

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Batch QC Report

Prep(s): 2340B
3005A

Test(s): 2340B
6010B

Method Blank **Water** **QC Batch # 2005/05/05-04.15**

MB: 2005/05/05-04.15-010

Date Extracted: 05/05/2005 12:42

Compound	Conc.	RL	Unit	Analyzed	Flag
Calcium	ND	0.20	mg/L	05/06/2005 09:02	
Magnesium	ND	0.20	mg/L	05/06/2005 09:02	
Hardness (as CaCO3)	ND	2.0	mg/L	05/06/2005 09:02	

Hardness (equivalent of CaCO3)

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Batch QC Report

Prep(s): 2340B
3005A

Test(s): 2340B
6010B

Laboratory Control Spike **Water** **QC Batch # 2005/05/05-04.15**

LCS 2005/05/05-04.15-011 Extracted: 05/05/2005 Analyzed: 05/06/2005 09:11
LCSD 2005/05/05-04.15-012 Extracted: 05/05/2005 Analyzed: 05/06/2005 09:14

Compound	Conc. mg/L		Exp.Conc.	Recovery %		RPD	Ctrl.Limits %		Flags	
	LCS	LCSD		LCS	LCSD	%	Rec.	RPD	LCS	LCSD
Calcium	5.14	5.33	5.00	102.8	106.6	3.6	80-120	20		
Magnesium	5.10	5.29	5.00	102.0	105.8	3.7	80-120	20		
Hardness (as CaCO3)	33.9	35.1	33.1	102.4	106.0	3.5	80-120	20		

Alkalinity (Total)

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Samples Reported

Sample Name	Date Sampled	Matrix	Lab #
WS-1	04/20/2005 13:05	Water	1

Alkalinity (Total)

Kleinfelder-San Jose
Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Prep(s):	SM2320B	Test(s):	SM2320B
Sample ID:	**WS-1**	Lab ID:	2005-04-0589 - 1
Sampled:	04/20/2005 13:05	Extracted:	5/3/2005 00:00
Matrix:	Water	QC Batch#:	2005/05/03-01.58

Compound	Conc.	RL	Unit	Dilution	Analyzed	Flag
Alkalinity, Carbonate (as CaCO3)	ND	5.0	mg/L	1.00	05/03/2005	
Alkalinity, Bicarbonate (as CaCO3)	370	5.0	mg/L	1.00	05/03/2005	
Alkalinity, Hydroxide (as CaCO3)	ND	5.0	mg/L	1.00	05/03/2005	
Alkalinity (Total)	370	5.0	mg/L	1.00	05/03/2005	

Alkalinity (Total)

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Batch QC Report

Prep(s): SM2320B — Test(s): SM2320B

Method Blank — **Water** — **QC Batch # 2005/05/03-01.58**

MB: 2005/05/03-01.58-001 — Date Extracted: 05/03/2005

Compound	Conc.	RL	Unit	Analyzed	Flag
Alkalinity (Total)	ND	5.0	mg/L	05/03/2005	

Alkalinity (Total)

Kleinfelder-San Jose
Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Batch QC Report

Prep(s): SM2320B

Test(s): SM2320B

Laboratory Control Spike **Water** **QC Batch # 2005/05/03-01.58**

LCS 2005/05/03-01.58-002 Extracted: 05/03/2005 Analyzed: 05/03/2005
LCSD 2005/05/03-01.58-003 Extracted: 05/03/2005 Analyzed: 05/03/2005

Compound	Conc. mg/L		Exp.Conc.	Recovery %		RPD	Ctrl.Limits %		Flags	
	LCS	LCSD		LCS	LCSD	%	Rec.	RPD	LCS	LCSD
Alkalinity (Total)	2370	2370	2500	94.8	94.8	0.0	80-120	20		

Gases by 3810M

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Samples Reported

Sample Name	Date Sampled	Matrix	Lab #
WS-1	04/20/2005 13:05	Water	1

Gases by 3810M

Kleinfelder-San Jose

Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Prep(s):	3810	Test(s):	3810M
Sample ID:	**WS-1**	Lab ID:	2005-04-0589 - 1
Sampled:	04/20/2005 13:05	Extracted:	5/10/2005 17:19
Matrix:	Water	QC Batch#:	2005/05/10-01.37

Analysis Flag: H1 (See Legend and Note Section)

Compound	Conc.	RL	Unit	Dilution	Analyzed	Flag
Carbon Dioxide	67	20	ug/ml	10.00	05/10/2005 17:19	

Gases by 3810M

Kleinfelder-San Jose
Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Batch QC Report

Prep(s): 3810 Test(s): 3810M

Method Blank **Water** **QC Batch # 2005/05/10-01.37**

MB: 2005/05/10-01.37-001 Date Extracted: 05/10/2005 17:00

Compound	Conc.	RL	Unit	Analyzed	Flag
Methane	ND	0.01	ug/ml	05/10/2005 17:00	
Carbon Dioxide	ND	2.0	ug/ml	05/10/2005 17:00	
Ethylene	ND	0.02	ug/ml	05/10/2005 17:00	
Ethane	ND	0.02	ug/ml	05/10/2005 17:00	

Gases by 3810M

Kleinfelder-San Jose

Attn.: Derby Davidson

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San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Batch QC Report

Prep(s): 3810

Test(s): 3810M

Laboratory Control Spike **Water** **QC Batch # 2005/05/10-01.37**

LCS 2005/05/10-01.37-002 Extracted: 05/10/2005 Analyzed: 05/10/2005 16:31

LCSD 2005/05/10-01.37-003 Extracted: 05/10/2005 Analyzed: 05/10/2005 16:44

Compound	Conc. ug/ml		Exp.Conc.	Recovery %		RPD	Ctrl.Limits %		Flags	
	LCS	LCSD		LCS	LCSD	%	Rec.	RPD	LCS	LCSD
Methane	0.0811	0.0779	0.0721	112.5	108.0	4.1	65-135	35		
Ethylene	0.143	0.137	0.126	113.5	108.7	4.3	65-135	35		
Ethane	0.153	0.146	0.135	113.3	108.1	4.7	65-135	35		

Gases by 3810M

Kleinfelder-San Jose
Attn.: Derby Davidson

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Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Batch QC Report

Prep(s): 3810 Test(s): 3810M

Matrix Spike (MS / MSD) **Water** **QC Batch # 2005/05/10-01.37**

MS/MSD Lab ID: 2005-05-0107 - 005

MS: 2005/05/10-01.37-004 Extracted: 05/10/2005 Analyzed: 05/10/2005 18:24
Dilution: 1.00

MSD: 2005/05/10-01.37-005 Extracted: 05/10/2005 Analyzed: 05/10/2005 18:37
Dilution: 1.00

Compound	Conc. ug/ml			Spk.Level	Recovery %			Limits %		Flags	
	MS	MSD	Sample	ug/ml	MS	MSD	RPD	Rec.	RPD	MS	MSD
Methane	0.0759	0.0801	ND	0.0721	105.3	111.1	5.4	65-135	35		
Ethylene	0.135	0.141	ND	0.126	107.1	111.9	4.4	65-135	35		
Ethane	0.142	0.149	ND	0.135	105.2	110.4	4.8	65-135	35		

Gases by 3810M

Kleinfelder-San Jose
Attn.: Derby Davidson

1362 Ridder Park Drive
San Jose, CA 95131
Phone: (408) 436-1155 Fax: (408) 436-1771

Project: 54509/001
VTA Santa Clara Street

Received: 04/20/2005 14:15

Legend and Notes

Analysis Flag

H1

Extracted out of holding time.

SEVERN TRENT STL

STL Chicago
2417 Bond Street
University Park, IL 60466

Tel: 708 534 5200 Fax: 708 534 5211
www.stl-inc.com

SEVERN TRENT LABORATORIES
ANALYTICAL REPORT

JOB NUMBER: 235985

Prepared For:

Severn Trent Laboratories
1220 Quarry Lane
Pleasanton, CA 94566-4756

Project: STL San Francisco

Attention: Dimple Sharma

Date: 04/25/2005

Bonnie Stadelmann
Signature

04/26/05
Date

Name: Bonnie M. Stadelmann

Title: Project Manager

E-Mail: bstadelmann@stl-inc.com

STL Chicago
2417 Bond Street
University Park, IL 60466

PHONE: (708) 534-5200
FAX..: (708) 534-5211

This Report Contains (8) Pages

STL Chicago is part of Severn Trent Laboratories, Inc.

SAMPLE INFORMATION
Date: 04/25/2005

Job Number.: 235985
Customer...: Severn Trent Laboratories
Attn.....: Dimple Sharma

Project Number.....: 20002032
Customer Project ID....: 2005-04-0589
Project Description....: STL San Francisco

Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Time Received
235985-1	WS-1	Water	04/20/2005	13:05	04/22/2005	09:30

STL Chicago is part of Severn Trent Laboratories, Inc.

LABORATORY TEST RESULTS

Job Number: 235985

Date: 04/25/2005

CUSTOMER: Severn Trent Laboratories PROJECT: 2005-04-0589 ATTN: Dimple Sharma

Customer Sample ID: WS-1
Date Sampled.....: 04/20/2005
Time Sampled.....: 13:05
Sample Matrix.....: Water

Laboratory Sample ID: 235985-1
Date Received.....: 04/22/2005
Time Received.....: 09:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
376.1	Sulfide (Titrimetric, iodine) Sulfide as H2S (Calc.)	<2.5	2.5	mg/L	04/25/05	mtb

* In Description = Dry Wgt.

STL Chicago is part of Severn Trent Laboratories, Inc.

LABORATORY CHRONICLE

Job Number: 235985 Date: 04/25/2005

CUSTOMER: Severn Trent Laboratories PROJECT: 2005-04-0589 ATTN: Dimple Sharma

Lab ID: 235985-1 Client ID: WS-1 Date Rcvd: 04/22/2005 Sample Date: 04/20/2005

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
PKG INO (WC)	PKG INO (WET CHEMISTRY)	1				
376.1	Sulfide (Titrimetric, iodine)	1	146998	146998	04/25/2005 1040	

QUALITY CONTROL RESULTS

Job Number.: 235985

Report Date.: 04/25/2005

CUSTOMER: Severn Trent Laboratories | PROJECT: 2005-04-0589 | ATTN: Dimple Sharma

Test Method.....: 376.1
Method Description.: Sulfide (Titrimetric, iodine)
Parameter.....: Sulfide

Batch.....: 146998
Equipment Code....:

Analyst...: mtb
Test Code.: SULFID

QC	Lab ID	Reagent	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	F	*	Limits	Date	Time
MB	146998-001		mg/L	0.39000 U								04/25/2005	1020
LCS	146998-002	I05BSTSF1	mg/L	3.90000		3.84000	0.39000 U	102		%	80-120	04/25/2005	1025

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

REPORT COMMENTS

1) All pages of this report are integral parts of the analytical data. Therefore, this report should be reproduced only in its entirety.
2) Soil, sediment and sludge sample results are reported on a "dry weight" basis except when analyzed for landfill disposal or incineration parameters. All other solid matrix samples are reported on an "as received" basis unless noted differently.
3) Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.
4) The test results for the noted analytical method(s) meet the requirements of NELAC. Lab Cert. ID# 100201
5) According to 40CFR Part 136.3, pH, Chlorine Residual and Dissolved Oxygen analyses are to be performed immediately after aqueous sample collection. When these parameters are not indicated as field (e.g. pH Field) they were not analyzed immediately, but as soon as possible on laboratory receipt.

Glossary of flags, qualifiers and abbreviations (any number of which may appear in the report)

Inorganic Qualifiers (Q-Column)

U	Analyte was not detected at or above the stated limit.
<	Not detected at or above the reporting limit.
J	Result is less than the RL, but greater than or equal to the method detection limit.
B	Result is less than the CRDL/RL, but greater than or equal to the IDL/MDL.
S	Result was determined by the Method of Standard Additions.
F	AFCEE: Result is less than the RL, but greater than or equal to the method detection limit.

Inorganic Flags (Flag Column)

'	ICV,CCV,ICB,CCB,ISA,ISB,CRI,CRA,MRL: Instrument related QC exceed the upper or lower control limits.
*	LCS, LCD, MD: Batch QC exceeds the upper or lower control limits.
+	MSA correlation coefficient is less than 0.995.
4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
E	SD: Serial dilution exceeds the control limits.
H	MB, EB1, EB2, EB3: Batch QC is greater than reporting limit or had a negative instrument reading lower than the absolute value of the reporting limit.
N	MS, MSD: Spike recovery exceeds the upper or lower control limits.
W	AS(GFAA) Post-digestion spike was outside 85-115% control limits.

Organic Qualifiers (Q - Column)

U	Analyte was not detected at or above the stated limit.
ND	Compound not detected.
J	Result is an estimated value below the reporting limit or a tentatively identified compound (TIC).
Q	Result was qualitatively confirmed, but not quantified.
C	Pesticide identification was confirmed by GC/MS.
Y	The chromatographic response resembles a typical fuel pattern.
Z	The chromatographic response does not resemble a typical fuel pattern.
E	Result exceeded calibration range, secondary dilution required.
F	AFCEE:Result is an estimated value below the reporting limit or a tentatively identified compound (TIC)

Organic Flags (Flags Column)

B	MB: Batch QC is greater than reporting limit.
*	LCS, LCD, ELC, ELD, CV, MS, MSD, Surrogate: Batch QC exceeds the upper or lower control limits.
'	EB1, EB2, EB3, MLE: Batch QC is greater than reporting Limit
A	Concentration exceeds the instrument calibration range
a	Concentration is below the method Reporting Limit (RL)
B	Compound was found in the blank and sample.
D	Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution will be flagged with a D.
H	Alternate peak selection upon analytical review
I	Indicates the presence of an interfence, recovery is not calculated.
M	Manually integrated compound.
P	The lower of the two values is reported when the % difference between the results of two GC columns is

greater than 25%.

Abbreviations

AS	Post Digestion Spike (GFAA Samples - See Note 1 below)
Batch	Designation given to identify a specific extraction, digestion, preparation set, or analysis set
CAP	Capillary Column CCB Continuing Calibration Blank
CCV	Continuing Calibration Verification
CF	Confirmation analysis of original
C1	Confirmation analysis of A1 or D1
C2	Confirmation analysis of A2 or D2
C3	Confirmation analysis of A3 or D3
CRA	Low Level Standard Check - GFAA; Mercury
CRI	Low Level Standard Check - ICP
CV	Calibration Verification Standard
Dil Fac	Dilution Factor - Secondary dilution analysis
D1	Dilution 1
D2	Dilution 2
D3	Dilution 3
DLFac	Detection Limit Factor
DSH	Distilled Standard - High Level
DSL	Distilled Standard - Low Level
DSM	Distilled Standard - Medium Level
EB1	Extraction Blank 1
EB2	Extraction Blank 2
EB3	DI Blank
ELC	Method Extracted LCS
ELD	Method Extracted LCD
ICAL	Initial calibration
ICB	Initial Calibration Blank
ICV	Initial Calibration Verification
IDL	Instrument Detection Limit
ISA	Interference Check Sample A - ICAP
ISB	Interference Check Sample B - ICAP
Job No.	The first six digits of the sample ID which refers to a specific client, project and sample group Lab ID An 8 number unique laboratory identification
LCD	Laboratory Control Standard Duplicate
LCS	Laboratory Control Standard with reagent grade water or a matrix free from the analyte of interest
MB	Method Blank or (PB) Preparation Blank
MD	Method Duplicate
MDL	Method Detection Limit
MLE	Medium Level Extraction Blank
MRL	Method Reporting Limit Standard
MSA	Method of Standard Additions
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not Detected
PREPF	Preparation factor used by the Laboratory's Information Management System (LIMS)
PDS	Post Digestion Spike (ICAP)
RA	Re-analysis of original
A1	Re-analysis of D1
A2	Re-analysis of D2
A3	Re-analysis of D3
RD	Re-extraction of dilution
RE	Re-extraction of original
RC	Re-extraction Confirmation
RL	Reporting Limit
RPD	Relative Percent Difference of duplicate (unrounded) analyses
RRF	Relative Response Factor
RT	Retention Time

RTW	Retention Time Window Sample ID A 9 digit number unique for each sample, the first six digits are referred as the job number
SCB	Seeded Control Blank
SD	Serial Dilution (Calculated when sample concentration exceeds 50 times the MDL)
UCB	Unseeded Control Blank
SSV	Second Source Verification Standard
SLCS	Solid Laboratory Control Standard(LCS)
PHC	pH Calibration Check LCSP pH Laboratory Control Sample
LCDP	pH Laboratory Control Sample Duplicate
MDPH	pH Sample Duplicate
MDFP	Flashpoint Sample Duplicate
LCFP	Flashpoint LCS
G1	Gelex Check Standard Range 0-1
G2	Gelex Check Standard Range 1-10
G3	Gelex Check Standard Range 10-100
G4	Gelex Check Standard Range 100-1000

Note 1: The Post Spike Designation on Batch QC for GFAA is designated with an "S" added to the current abbreviation used. EX. LCS S=LCS Post Spike (GFAA); MSS=MS Post Spike (GFAA)

Note 2: The MD calculates an absolute difference (A) when the sample concentration is less than 5 times the reporting limit. The control limit is represented as +/- the RL.

235985

SEVERN TRENT **STL**

Chain of Custody

Date Shipped: 4/20/2005

2005-04-0589 - 4

From:

STL San Francisco (CL)
1220 Quarry Lane
Pleasanton, CA 94566-4756

Project Manager: Dimple Sharma
Phone: (925) 484-1919 Ext:
Fax: (925) 484-1096
Email: dsharma@stl-inc.com

To:

STL Chicago
2417 Bond Street
University Park, IL 60466

Phone: (708) 534-5200 Ext:
Fax: (708) 534-5211
Contact: Bonnie Stadelmann
Phone: (708) 534-5200 Ext: 154

CL Submission #: 2005-04-0589
CL PO #:

Project #: 54509/001
Project Name: VTA Santa Clara Street

Client Sample ID / Analysis	CL #	Sampled	Matrix / Method	TAT
WS-1	1	4/20/2005 1:05:00PM	Water	
Subcontract - Sulfide-~~Total~~ /*HYDROGEN SULFIDE*/			376.1/9030A	5 Day

PLEASE INCLUDE QC WITH FAXED AND HARD-COPY RESULTS

Due 4-27-05

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: [signature] Time: 1500	Signature: Time:	Signature: Time:
Printed Name: Bryan Thomas Date: 4/21/05	Printed Name: Date:	Printed Name: Date:
Company: STL-SF	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature: [signature] Time: 0930	Signature: Time:	Signature: Time:
Printed Name: Date: 4/22/05	Printed Name: Date:	Printed Name: Date:
Company:	Company:	Company:

California State Certified Laboratory No.2153

CERCO analytical, inc.

3942-A Valley Avenue
Pleasanton, CA 94566-4715
Tel: 925.462.2771
Fax: 925.462.2775

Ms. Tina Totorica
STL San Francisco
1220 Quarry Lane, #C
Pleasanton, CA 94566-4756

Sample Source:
Project No.: 2005-04-0589
Project Name: VTA Santa Clara Street
Date Sampled: 04/20/05
Date Received: 04/20/05
Matrix: Water

26 April, 2005
Job No.0504161
Sample No.001
Cust. No.10176

Analyte	Results*	Detection Limit	Method	Date Analyzed
Lab No.001 Sample I.D.: WS-1 Total Coliform Bacteria	<2	-	SM 9221B	04/20-22/05

* Coliforms per 100 mL, Most Probable Number

Cheryl McMillen
Laboratory Director

QUALITY CONTROL DATA – Media Preparation
Standard Method Nos.9221B and 9221E

Prepared Media – Double Strength (LTB) – Lot No.5075
Date Received: 04/06/05 Expiration Date: 06/14/05

Quality Control – Date: 04/07/05 (CM)
pH – 6.8 Positive Control[1] - Acceptable
Negative Control[2] - Acceptable Sterility Check - Acceptable

Prepared Media – Single Strength (LTB) – Lot No.5054
Date Received: 04/06/05 Expiration Date: 05/24/05

Quality Control – Date: 04/07/05 (CM)
pH – 6.7 Positive Control[1] - Acceptable
Negative Control[2] - Acceptable Sterility Check - Acceptable

[1] Positive Control (Organism used Escherichia Coli ATCC 25922)
[2] Negative Control (Organism used Staphylococcus Aureus ATCC 29213)

0504161

SEVERN TRENT STL

Chain of Custody

Date Shipped: 4/20/2005

2005-04-0589 - 1

From:

STL San Francisco (CL)
1220 Quarry Lane
Pleasanton, CA 94566-4756

Project Manager: Dimple Sharma
Phone: (925) 484-1919 Ext:
Fax: (925) 484-1096
Email: dsharma@stl-inc.com

To:

Cerco Analytical - SUB CONTRACT ONLY
3942 Valley Avenue, Suite A
Pleasanton, CA 94566

Phone: (925) 462-2771 Ext:
Fax: (925) 462-2775
Contact: Darlene Langford
Phone: (925) 462-2771 Ext:

CL Submission #: 2005-04-0589
CL PO #:

Project #: 54509/001
Project Name: VTA Santa Clara Street

Collect Sample ID	Cont.	Sampled	Matrix	TAT
WS-1	1	4/20/2005 1:05:00PM	Water	
Subcontract - Coliform			SM9221B	10 Day

PLEASE INCLUDE QC WITH FAXED AND HARD-COPY RESULTS

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: [signature] Time: 1508	Signature Time	Signature Time
Printed Name: J Mefford Date: 4.20.05	Printed Name Date	Printed Name Date
Company: STL-SF	Company	Company

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature: [signature] Time: 1509	Signature Time	Signature Time
Printed Name: M. Millen Date: 4/20/05	Printed Name Date	Printed Name Date
Company: CERCO	Company	Company

ANALYTICAL REPORT

Job Number: 680-2864.1

Job Description: 54509/001 - VTA Santa Clara Street

For:

Severn Trent Laboratories, Inc.
1220 Quarry Lane
Pleasanton, CA 94566

Attention: Ms. Dimple Sharma

Gloria Fulwood
Project Manager I
gfulwood@stl-inc.com

04/27/2005

METHOD SUMMARY

Client: Severn Trent Laboratories, Inc. Job Number: 680-2864.1

Description	Method	Preparation Method
Matrix: Water		
Total Trihalomethane Calculation	STL-SAV TTHM_Calc	

REFERENCES

STL-SAV - Severn Trent Laboraties, Savannah, Facility Standard Operating Procedure.

SAMPLE SUMMARY

Client: Severn Trent Laboratories, Inc. Job Number: 680-2864.1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
680-2864-1	WS-1	Water	04/20/2005 0105	04/22/2005 0848

Client: Severn Trent Laboratories, Inc.

Job Number: 680-2864.1

Client Sample ID: **WS-1**

Lab Sample ID: 680-2864-1
Client Matrix: Water

Date Sampled: 04/20/2005 0105
Date Received: 04/22/2005 0848

TTHM_Calc Total Trihalomethane Calculation

Method: TTHM_Calc
Preparation: N/A
Dilution: 1.0
Date Analyzed: 04/24/2005 2352
Date Prepared: N/A

Analysis Batch: 680-8200

Instrument ID: GC/MS Volatiles - S
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 5 mL

Analyte	Result (ug/L)	Qualifier	RL
Bromoform	<1.0		1.0
Chlorodibromomethane	<1.0		1.0
Chloroform	<1.0		1.0
Dichlorobromomethane	<1.0		1.0
Trihalomethanes, Total	<1.0		1.0

DATA REPORTING QUALIFIERS

Lab Section	Qualifier	Description

Client: Severn Trent Laboratories, Inc.

Job Number: 680-2864.1

TTHM_Calc Total Trihalomethane Calculation

Method Blank - Batch: 680-8200

Lab ID: MB 680-8200/2
Matrix: Water
Date Analyzed: 04/24/2005 2023
Units: ug/L
Dilution: 1.0

Analyte	Result	Qualifier	RL
Bromoform	<1.0		1.0
Chlorodibromomethane	<1.0		1.0
Chloroform	<1.0		1.0
Dichlorobromomethane	<1.0		1.0
Trihalomethanes, Total	<1.0		1.0

Laboratory Control Sample - Batch: 680-8200

Lab ID: LCS 680-8200/3
Matrix: Water
Date Analyzed: 04/24/2005 1937
Units: ug/L
Dilution: 1.0

Analyte	Spike Amount	Result	% Rec.	Recovery Limits	Qualifier
Bromoform	20.0	19	94	70 - 130	
Chlorodibromomethane	20.0	20	98	70 - 130	
Chloroform	20.0	20	102	70 - 130	
Dichlorobromomethane	20.0	20	102	70 - 130	

Calculations are performed before rounding to avoid round-off errors in calculated results.

STL	STL Work Sharing Agreement		STL Exporting Lab	San Francisco
			Project Name	VTA Santa Clara Street

Import Lab Information		Export Lab Information	
STL Lab Name	STL Savannah	PM Contact Name	Dimple Sharma
PM Contact Name	Gloria Fwlwood	Backup Contact Name	Criselda Caparas
Backup Contact Name		Agreement Date	
Pricing Information		**Project Information**	
QA/QC (i.e. MS/MSD) Billable?		Client Company Name	Kleinfelder-San Jose
Raw Data Surcharge	%	Date First Samples to Arrive	4/21/2005
EDD Surcharge	%	Est. Duration of Sampling Event	
TAT Surcharges	%		
Penalty Terms	None		
Other Charges Not in Unit Price? (i.e. canisters, regulators, shipping, bottles)	None	Quote or Contract Reference ID	STL-SF#: 2005-04-0589

Project Details	
Non-Standard Work Product	No
Quality Assurance Plan	No
Certifications	
Analyte/Cmpd. List with RLs Attached	Yes-See Attached
Results Dry-Weight Corrected	
Special Method Holding Times	None
Internal Chain of Custody Required	No
Known Hazards/High Analyte Level	No
Saturday/Special Delivery Options	None
Special Instructions	None
Reporting Limit Convention	Report to RL with no "J" Values

Deliverable Requirements		Transmittal medium	Format Column	TAT
Preliminary Report:	Yes	Email	Sample Results Only	4/27/2005 17:00
Final Report:	Yes	Email	C	4/27/2005 17:00
EDD:	No	Email	See Attached	
mySTL:	No	NA	NA	
Custom Forms:	No	NA	See Attached	

Import and Export Lab Agreement

Import lab must acknowledge receipt of Agreement and samples *via E-Mail*

Analysis	Method	Matrix	# of Samples	Import Lab's Unit Price	Unit Price w/Surcharges	Extended Price
524.2 THMs		Water	1	$ 75.00	$ 75.00	$ 75.00
		Waste			$ -	$ -
		Filter			$ -	$ -
					$ -	$ -
					$ -	$ -
					$ -	$ -
					$ -	$ -
					$ -	$ -
					$ -	$ -
					$ -	$ -
				Approximate Total Project Value		$ 75.00

SEVERN TRENT **STL**

Chain of Custody

Date Shipped: 4/20/2005

2005-04-0589 - 3

From:

STL San Francisco (CL)
1220 Quarry Lane
Pleasanton, CA 94566-4756

Project Manager: Dimple Sharma
Phone: (925) 484-1919 Ext:
Fax: (925) 484-1096
Email: dsharma@stl-inc.com

To:

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404-6019

Phone: (912) 354-7858 Ext:
Fax: (912) 351-3673
Contact: Gloria Fwlwood
Phone: (912) 354-7858 Ext:

CL Submission #: 2005-04-0589
CL PO #:

Project #: 54509/001
Project Name: VTA Santa Clara Street

Client Sample ID / Analysis	CL#	Sampled	Matrix / Method	TAT
WS-1	1	4/20/2005 1:05:00PM	Water	
Subcontract - Others /*THM COMPOUNDS*/				5 Day

Due 4-27-05

PLEASE INCLUDE QC WITH FAXED AND HARD-COPY RESULTS

TEMP. 4.0

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: [signature] Time: 15:00	Signature Time	Signature Time
Printed Name: Bryan Thomas Date: 4/21/05	Printed Name Date	Printed Name Date
Company: STL-SF	Company	Company

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature: [signature] Time: 8:40	Signature Time	Signature Time
Printed Name: M. Tucker Date: 4/22/05	Printed Name Date	Printed Name Date
Company: STL SAV.	Company	Company

680-2864

STL Los Angeles
1721 South Grand Avenue
Santa Ana, CA 92705

Tel: 714 258 8610 Fax: 714 258 0921
www.stl-inc.com

April 29, 2005

STL LOT NUMBER: **E5D230231**

Dimple Sharma
STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Dear Ms. Sharma,

This report contains the analytical results for the sample received under chain of custody by STL Los Angeles on April 23, 2005. This sample is associated with your Submission No. 2005-04-0589 project.

The preliminary results were sent via facsimile on April 29, 2005.

STL Los Angeles certifies that the test results provided in this report meet all the requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of the report. NELAP Certification Number is 01118CA / E87652.

This report shall not be reproduced except in full, without the written approval of the laboratory.

This report contains 000018 pages.

STL Los Angeles
1721 South Grand Avenue
Santa Ana, CA 92705

Tel: 714 258 8610 Fax: 714 258 0921
www.stl-inc.com

CASE NARRATIVE

All applicable quality control procedures met method-specified acceptance criteria except as noted below. Historical control limits for the LCS are used to define the estimate of uncertainty for a method. Any matrix related anomalies are footnoted within the report.

Details:

There was no unpreserved sample received and therefore was not able to analyzed for Carbon Dioxide.

If you have any questions, please feel free to call me at (714) 258-8610.

Sincerely,

Jesse Bacwaden
Project Manager

CC: Project File

SEVERN TRENT **STL**

E5D230231

Chain of Custody

Date Shipped: 4/20/2005

2005-04-0589 - 5

From:

STL San Francisco (CL)
1220 Quarry Lane
Pleasanton, CA 94566-4756

Project Manager: Dimple Sharma
Phone: (925) 484-1919 Ext:
Fax: (925) 484-1096
Email: dsharma@stl-inc.com

To:

STL Los Angeles - Sub contract
1721 South Grand Avenue
Santa Ana, CA 92705

Phone: (714) 258-8610 Ext:
Fax: (714) 258-0921
Contact: Sample Control
Phone: (714) 258-8610 Ext:

CL Submission #: 2005-04-0589
CL PO #:

Project #: 54509/001
Project Name: VTA Santa Clara Street

Client Sample ID / Analysis	CL#	Sampled	Matrix / Method	TAT
WS-1	1	4/20/2005 1:05:00PM	Water	
Subcontract - Methane and CO2 in water /*N2 (GAS ONLY),CH4 AND CO2*/			3810	5 Day

Due 4-27-05

PLEASE INCLUDE QC WITH FAXED AND HARD-COPY RESULTS

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: [signature] Time: 15:00	Signature Time	Signature Time
Printed Name: Bryan Thomas Date: 4/21/05	Printed Name Date	Printed Name Date
Company: STL-SF	Company	Company

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature: [signature] Time: 13:00	Signature Time	Signature Time
Printed Name: Matt Crossfield Date: 4-23-05	Printed Name Date	Printed Name Date
Company: STL	Company	Company

STL LOS ANGELES - PROJECT RECEIPT CHECKLIST Date: 4-23-05

LIMS Lot #: ESD230231 Quote #: 62426

Client Name: STL S.F. Project: Valero VTA

Received by: MB Date/Time Received: 4-23-05 / 13:00

Delivered by : ☐ Client ☐ STL ☐ DHL ☒ Fed Ex ☐ UPS ☐ Other _____

********** **Initial / Date**

Custody Seal Status Cooler: ☒ Intact ☐ Broken ☐ None ..... MB 4-23-05

Custody Seal Status Samples: ☐ Intact ☐ Broken ☒ None .....

Custody Seal #(s): 650601 ☐ No Seal #.....

Sampler Signature on COC ☐ Yes ☐ No ☒ N/A...

IR Gun # A Correction Factor -.1 °C IR passed daily verification ☒ Yes ☐ No .....

Temperature - **BLANK** 2.6 °C +/- .1 CF = 2.5 °C .....

Temperature – **COOLER** (____ °C ____ °C ____ °C ____ °C) = ____ avg °C +/- ____ CF = ____ °C.....

Samples outside temperature criteria but received within 6 hours of final sampling ☐ Yes ☒ N/A...

Sample Container(s): ☐ STL-LA ☒ Client .....

One COC/Multiple coolers: ☐ Yes- # coolers ____ All within temp criteria ☐ Yes ☐ No ☒ N/A....

One or more coolers with an anomaly: ☐ Yes – (fill out PRC for each) ☒ N/A ...

Samples: ☒ Intact ☐ Broken ☐ Other _____ ... .

pH measured: ☐ Yes ☐ Anomaly (if checked, notify lab and file NCM) ☒ N/A..

Anomalies: ☒ No ☐ Yes – complete CUR and Create NCM NCM # _____ .....

Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times. ☒ Yes ☐ N/A....

Labeled by: MB Labeling checked .....

****

Turn Around Time: ☐ RUSH–24HR ☐ RUSH–48HR ☐ RUSH–72HR ☒ NORMAL .....

Short-Hold Notification: ☐ pH ☐ Wet Chem ☐ Metals (Filter/Pres) ☐ Encore ☐ >1/2 HT expired...

Outside Analysis(es) (Test/Lab/Date Sent Out) :

_____ NA ..... _____

_____ ..... _____

_____ ..... MB 4-23-05

********** LEAVE NO BLANK SPACES ; USE N/A **********

Headspace Anomaly ☒ N/A MB 4-23-05

Lab ID	Container(s) #	Headspace	Lab ID	Container(s) #	Headspace
		☐ > 6mm			☐ > 6mm
		☐ > 6mm			☐ > 6mm
		☐ > 6mm			☐ > 6mm
		☐ > 6mm			☐ > 6mm
		☐ > 6mm			☐ > 6mm
		☐ > 6mm			☐ > 6mm
		☐ > 6mm			☐ > 6mm

LIMS Lot # E5D230231

PROJECT RECEIPT CHECKLIST Cont'd

Fraction	1													
VOAH/ *														
VOA	3													

* VOA with headspace/bubbles < 6mm

H: HCL, S: H2SO4, N: HNO3, V: VOA, SL, Sleeve, E: Encore, PB: Poly Bottle, CGB: Clear Glass Bottle, AGJ: Amber Glass Jar, T: Terracore AGB: Amber Glass Bottle, n/f/l:HNO3-Lab filtered, n/f:HNO3-Field filtered, znna: Zinc Acetate/Sodium Hydroxide, Na2s2o3: sodium thiosulfate

Condition Upon Receipt Anomaly Form

☒ N/A MG 4-23-05

▪ COOLERS
- ☐ Not Received (received COC only)
- ☐ Leaking
- ☐ Other:

▪ CUSTODY SEALS (COOLER(S))
- ☐ None
- ☐ Not Intact
- ☐ Other

CONTAINER(S)
- ☐ None
- ☐ Not Intact
- ☐ Other

▪ TEMPERATURE (SPECS 4 ± 2°C)
- ☐ Cooler Temp(s)
- ☐ Temperature Blank(s)

▪ CHAIN OF CUSTODY (COC)
- ☐ Not relinquished by Client; No date/time relinquished
- ☐ Incomplete information provided
- ☐ Other ☐ COC not received – notify PM

▪ CONTAINERS
- ☐ Leaking ☐ Voa Vials with Bubbles > 6mm
- ☐ Broken
- ☐ Extra
- ☐ Without Labels
- ☐ Other:

▪ LABELS
- ☐ Not the same ID/info as in COC
- ☐ Incomplete Information
- ☐ Markings/Info illegible
- ☐ Torn

▪ SAMPLES
- ☐ Samples NOT RECEIVED but listed on COC
- ☐ Samples received but NOT LISTED on COC
- ☐ Logged based on Label Information
- ☐ Logged based on info from other samples on COC
- ☐ Logged according to Work Plan
- ☐ Logged on HOLD UNTIL FURTHER NOTICE

- ☐ Will be noted on COC--Client to send samples with new COC
- ☐ Mislabeled as to tests, preservatives, etc.
- ☐ Holding time expired – list sample ID and test
- ☐ Improper container used
- ☐ Not preserved/Improper preservative used
- ☐ Improper pH _____ Lab to preserve sample and document
- ☐ Insufficient quantities for analysis ☐ Other

Comments:

_____

_____

_____

_____

_____

☐ Corrective Action Implemented:

☐ Client Informed: verbally on _____ By: _____ ☐ In writing on _____ By: _____

☐ Sample(s) on hold until: _____ ☐ Sample(s) processed "as is."

Logged by/Date: MG 4-23-05

PM Review/Date: JB/4-25-05

SEVERN TRENT STL

Analytical Report

ANALYTICAL REPORT

PROJECT NO. 54509/001

2005-04-0589

Lot #: E5D230231

Dimple Sharma

STL San Francisco

SEVERN TRENT LABORATORIES, INC.

Jesse Bacwaden
Project Manager

April 29, 2005

EXECUTIVE SUMMARY - Detection Highlights

E5D230231

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
WS-1 04/20/05 13:05 001				
Methane	0.0095	0.0010	mg/L	RSK SOP-175
Nitrogen	13	10	mg/L	RSK SOP-175

METHODS SUMMARY

E5D230231

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Dissolved Gases in Water	RSK SOP-175	RSK RSKSOP-175

References:

RSK Sample Prep and Calculations for Dissolved Gas Analysis in Water Samples Using a GC Headspace Equilibration Technique, RSKSOP-175, REV. 0, 8/11/94, USEPA Research Lab

SAMPLE SUMMARY

E5D230231

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
G833H	001	WS-1	04/20/05	13:05

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

STL SAN FRANCISCO

Client Sample ID: WS-1

GC Volatiles

Lot-Sample #...:	E5D230231-001	**Work Order #...:**	G833H1AC	**Matrix.....:**	WG
Date Sampled...:	04/20/05 13:05	**Date Received..:**	04/23/05 13:00	**MS Run #.....:**	
Prep Date.....:	04/27/05	**Analysis Date..:**	04/27/05		
Prep Batch #...:	5118299	**Analysis Time..:**	12:16		
Dilution Factor:	1				
Analyst ID.....:	402431	**Instrument ID..:**	GC1		
		Method.....:	RSK SOP-175		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methane	**0.0095**	**0.0010**	**mg/L**
Nitrogen	**13**	**10**	**mg/L**

SEVERN TRENT STL

QA/QC

QC DATA ASSOCIATION SUMMARY

E5D230231

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WG	RSK SOP-175		5118299	

METHOD BLANK REPORT

GC Volatiles

Client Lot #...: E5D230231 **Work Order #...:** G9DV11AA **Matrix.....:** WATER
MB Lot-Sample #: M5D280000-299

Prep Date.....: 04/27/05 **Analysis Time..:** 11:53
Analysis Date..: 04/27/05 **Prep Batch #...:** 5118299 **Instrument ID..:** GC1
Dilution Factor: 1

Analyst ID.....: 402431

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Methane	ND	0.0010	mg/L	RSK SOP-175
Nitrogen	ND	10	mg/L	RSK SOP-175

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #...: E5D230231 **Work Order #...:** G9DV11AC-LCS **Matrix.....:** WATER
LCS Lot-Sample#: M5D280000-299 G9DV11AD-LCSD
Prep Date.....: 04/27/05 **Analysis Date..:** 04/27/05
Prep Batch #...: 5118299 **Analysis Time..:** 11:08
Dilution Factor: 1 **Instrument ID..:** GC1
Analyst ID.....: 402431

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Methane	**100**	**(70 - 125)**			**RSK SOP-175**
	97	**(70 - 125)**	**3.6**	**(0-30)**	**RSK SOP-175**

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE DATA REPORT

GC Volatiles

Client Lot #...: E5D230231 **Work Order #...:** G9DV11AC-LCS **Matrix.....:** WATER
LCS Lot-Sample#: M5D280000-299 G9DV11AD-LCSD
Prep Date.....: 04/27/05 **Analysis Date..:** 04/27/05
Prep Batch #...: 5118299 **Analysis Time..:** 11:08
Dilution Factor: 1 **Instrument ID..:** GC1
Analyst ID.....: 402431

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	RPD	METHOD
Methane	**0.327**	**0.327**	**mg/L**	**100**		**RSK SOP-175**
	0.327	**0.316**	**mg/L**	**97**	**3.6**	**RSK SOP-175**

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #...: E5D230231 **Work Order #...:** G9DV11AE-LCS **Matrix.....:** WATER
LCS Lot-Sample#: M5D280000-299 G9DV11AF-LCSD
Prep Date.....: 04/27/05 **Analysis Date..:** 04/27/05
Prep Batch #...: 5118299 **Analysis Time..:** 10:23
Dilution Factor: 1 **Instrument ID..:** GC1
Analyst ID.....: 402431

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Nitrogen	**89**	**(65 - 125)**			**RSK SOP-175**
	89	**(65 - 125)**	**0.060**	**(0-20)**	**RSK SOP-175**

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE DATA REPORT

GC Volatiles

Client Lot #...: E5D230231 **Work Order #...:** G9DV11AE-LCS **Matrix.....:** WATER
LCS Lot-Sample#: M5D280000-299 G9DV11AF-LCSD
Prep Date.....: 04/27/05 **Analysis Date..:** 04/27/05
Prep Batch #...: 5118299 **Analysis Time..:** 10:23
Dilution Factor: 1 **Instrument ID..:** GC1
Analyst ID.....: 402431

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	RPD	METHOD
Nitrogen	**89.1**	**79.6**	**mg/L**	**89**		**RSK SOP-175**
	89.1	**79.6**	**mg/L**	**89**	**0.060**	**RSK SOP-175**

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

KLEINFELDER

2005-04-0589

114371

PROJECT NO.	PROJECT NAME
54509/001	VTA-Santa Clara Street

L.P. NO. (P.O. NO.)

SAMPLERS: (Signature/Number) ~~Cynthia Ruelas~~ Julie Arellano

RECEIVING LAB: STL

INSTRUCTIONS/REMARKS: Standard TAT, 1 sample

	DATE MM/DD/YY	SAMPLE I.D TIME HH-MM-SS	SAMPLE I.D.	MATRIX	NO. OF CONTAINERS	TYPE OF CONTAINERS	ANALYSIS: N_2, CH_4, CO_2	Hydrogen sulfide	Oil & Grease	THM compounds	Standard anions	Total coliform	General Minerals					
1	4/20/05	1305	WS-1	Water	6	VOA	X			X								N_2 (gas only)
2	4/20/05	"	"	"	1	poly w/ NaOH + zinc acetate		X										
3	4/20/05	"	"	"	1	Amber			X									
4	4/20/05	"	"	"	1	poly					X							
5	4/20/05	"	"	"	1	Plastic cup						X						
6	4/20/05	"	"	"	2	poly							X					} for general minerals only test for TDS + general cations
7	4/20/05	↓	↓	↓	1	poly w/ HNO_3							X					
8	4/20/05	1200	WS-2	↓	1	jar												HOLD
9																		
10																		
11																		
12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
[signature]	4/24/05 1415	[signature]
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)

Instructions/Remarks:

Send Results To:

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131-1571
(408) 436-1155
Attn: Derby Davidson

M-60 White – Sampler Canary – Return Copy To Shipper Pink – Lab Copy

CHAIN OF CUSTODY

№ 1643

APPENDIX 11

DISSIPATION TEST RESULTS

Fugro performed dissipation tests during the Cone Penetration Test (CPT) program. Appendix 11 presents a description of testing equipment and procedures, along with dissipation test results and interpretations made by Fugro.

FUGRO WEST, INC.

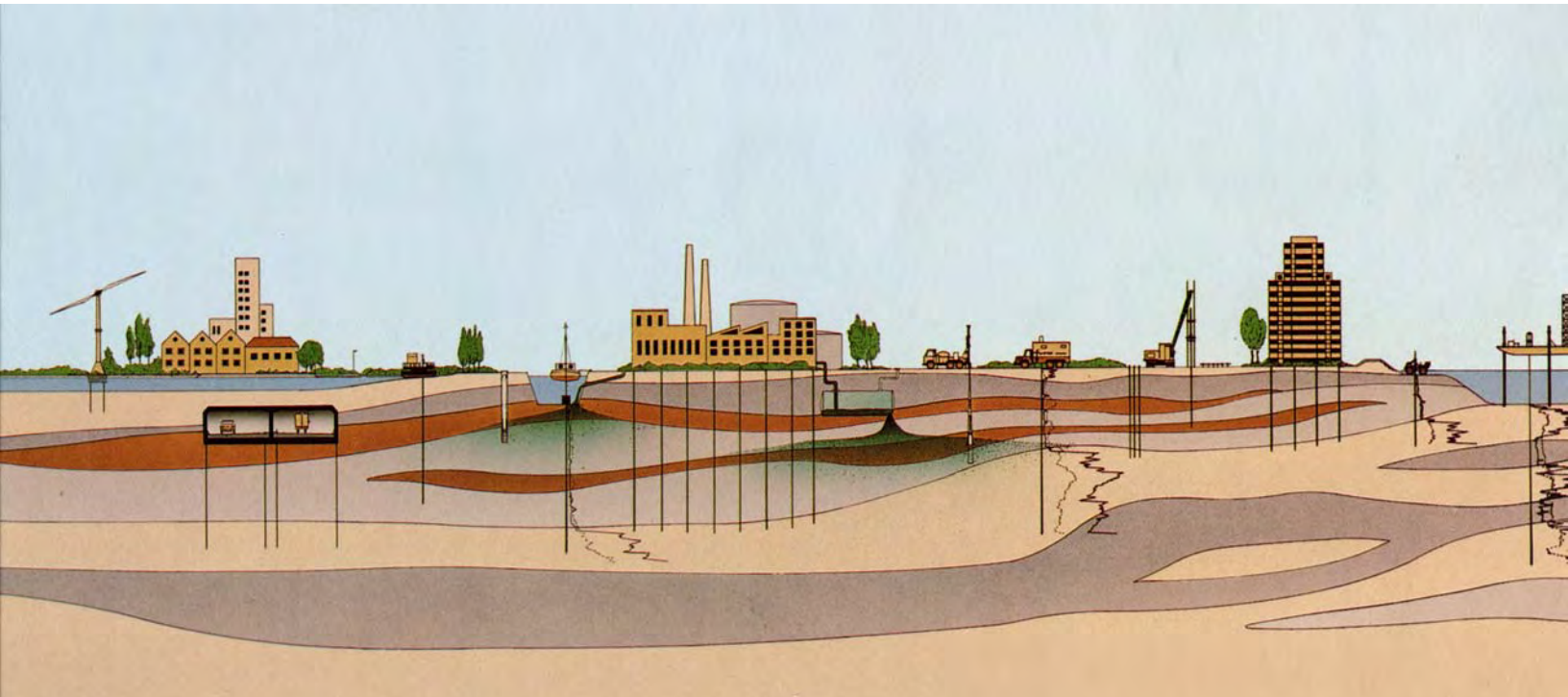
APPENDIX 11
DISSIPATION TEST RESULTS

GEOTECHNICAL EXPLORATION PROGRAM
TUNNEL SEGMENT OF SILICON VALLEY
RAPID TRANSIT (SVRT) PROJECT
SAN JOSE, CALIFORNIA

Prepared for:
HMM/BECHTEL

JUNE 2005

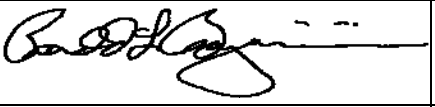
Project No. 1637.001



REPORT DOCKET

APPROVAL

This document is approved by the following:

Name	Title	Signature	Issue Date
Roger Howard Jr., P.E.	Project Manager		June 13, 2005
Ronald L. Bajuniemi, P.E., G.E.	Project Principal		June 13, 2005
Jon Mitchell	Project Manager		September 19, 2005

REVISION HISTORY

Revision	Date	Change	Approval
0	May 4, 2005	Draft Report: Appendix 10 Dissipation Test Results	RH
1	June 7, 2005	Final Report: Appendix 11 Dissipation Test Results. With HMM/Bechtel comments dated 5/23/05 incorporated	RH
2	June 13, 2005	Final Report: Appendix 11 Dissipation Test Results. With HMM/Bechtel comments dated 6/10/05 incorporated	RH
3	September 19, 2005	Final Report: Appendix 11 Dissipation Test Results. With HMM/Bechtel verbal comments received on 9/15/05 incorporated	JM

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June 13, 2005
Project No. 1637.001

HMM/Bechtel
3103 North First Street
San Jose, California 95134

Attention: Mr. Ignacio Arango

Subject: Appendix 11 - Dissipation Test Results
Tunnel Segment of SVRT Project
San Jose, California

Dear Mr. Arango:

Fugro West, Inc., (Fugro) is pleased to submit this final copy of "Appendix 11 - Dissipation Test Results," which presents the results of the dissipation tests conducted by Fugro for the tunnel segment of the SVRT Project in San Jose, California.

We appreciate this opportunity to be of continued service to HMM/Bechtel. Please contact Roger Howard Jr. at (510) 267-4422 if you have any questions regarding the information presented in this report.

Sincerely,

FUGRO WEST, INC.

Linda Al Atik
Staff Engineer

Roger Howard Jr., P.E.
Senior Engineer

Ronald L. Bajuniemi, P.E., G.E.
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Copies Submitted: (6 + pdf) Addressee

CONTENTS

TABLES

FIGURES

1.0 INTRODUCTION

This appendix describes the dissipation test equipment, procedures, results and interpretation conducted by Fugro West, Inc., (Fugro) for the Tunnel Segment of Silicon Valley Rapid Transit (SVRT) Project. The dissipation tests were conducted at sounding locations situated along the tunnel segment alignment of SVRT Project, as shown on the "Dissipation Test Location Map," Figure A11-1.

1.1 PROJECT DESCRIPTION

The Santa Clara Valley Transportation Authority (VTA) intends to construct the SVRT Project in San Jose, California. This will be a 26.2-km (16.3-mile) extension of the Bay Area Rapid Transit (BART) heavy rail rapid transit system from its planned terminus at the end of the Warms Springs Extension in Fremont, to San Jose. The proposed alignment currently includes six stations (three above-grade and three below-grade), a proposed future station, and vehicle storage and maintenance facilities. The alignment is composed of two major segments;

1) A Line Segment which will be approximately 11.5 miles of at-grade, elevated and cut-and-cover track from Warm Springs to San Jose; and

2) A 5.1-mile-long tunnel segment, consisting of twin bored tunnels and cut-and-cover structures through downtown San Jose (see Figure A11-1).

As currently planned, the tunnel segment includes at-grade and open cut track, three (3) cut-and-cover stations, and a cut-and-cover track crossover structure. The cut-and cover stations and the crossover structures have a cumulative length of approximately 4970 feet. The remaining 4.14 miles of the alignment will be twin 19.5-foot-diameter tunnels.

This investigation and report cover the 5.1-mile-long tunnel segment section only.

1.2 GEOTECHNICAL EXPLORATION PROGRAM OVERVIEW

The joint venture of Hatch Mott MacDonald T & T, Inc., and Bechtel Infrastructure Corporation (HMM/Bechtel) are providing engineering design services for the tunnel segments (Segments 3 and 4) of the SVRT Project to the VTA. HMM/Bechtel has subcontracted with a number of companies to conduct the geotechnical field exploration program for the project. HMM/Bechtel's primary subcontractors for the geotechnical exploration program included: Fugro West, Inc., (Fugro), Parikh Consultants (Parikh) and Pitcher Drilling Company (Pitcher).

The three companies, Fugro, Parikh, and Pitcher conducted the majority of the geotechnical field exploration program for the tunnel segments of the SVRT Project from October 15, 2004, to March 5, 2005. The intent of the geotechnical field investigation program was to obtain geotechnical data that will aid in the design and construction of the proposed tunnel and cut-and-cover structures.

In general, the geotechnical field investigation explored subsurface conditions along the proposed tunnel alignment, within the vicinity of the proposed Eastern and Western Portals, at the two proposed ventilation structures, and at the proposed stations including Alum Rock Station, Downtown San Jose Station, and Diridon/Arena Station. The geotechnical exploration program included:

- 76 Rotary Wash Borings; and
- 146 cone penetration tests (CPTS).

Figure A11-1 provides a map of the exploration locations. These locations were selected by HMM/Bechtel based on the following considerations: 1) the data requirements of the tunnel designer, 2) the location of existing geotechnical data, 3) the avoidance of private property, and 4) the avoidance of existing underground and overhead utilities. For CPT correlation purposes approximately 16 sets of borings and CPTs were conducted within 15 feet of each other. The CPT locations were surveyed by a subcontractor to HMM/Bechtel and the surveyed coordinates were provided to Fugro by HMM/Bechtel.

1.3 CPT PROGRAM OVERVIEW

Fugro West, Inc., and Fugro Geosciences, Inc., conducted the CPTs using a Fugro truck-mounted 25-ton cone apparatus in general accordance with ASTM D5778. The continuous CPT soundings were typically advanced to refusal, which ranged from approximately 60 to 158 feet in depth. For detailed procedures and equipment specifications on the CPT operations refer to “Appendix 8 - CPT Testing.” In addition to continuous CPT soundings, Fugro also conducted dissipation tests, downhole seismic shear wave velocity measurements, and hydropunch water sampling. Downhole Seismic shear (S) wave velocity measurements were successfully conducted at six (6) CPT locations to obtain profiles of shear wave velocity versus depth. Detailed information regarding the downhole seismic cone penetration tests including field procedures, data interpretation, and results are discussed in “Appendix 9 - Seismic Cone Testing.” Hydropunch water sampling was conducted at one (1) CPT location in order to collect groundwater for laboratory testing. Detailed information regarding the field procedures and equipment specifications for the hydropunch water sampling are provided in “Appendix 10 - Hydropunch Testing.” Dissipation tests were conducted at twenty-seven (27) CPT locations in order to monitor excess pore pressure dissipation in sands and clays. Detailed procedures, equipment specifications and interpretation of results for the dissipation testing are provided in the following sections.

1.4 DISSIPATION TEST PROGRAM

1.4.1 Test Overview

A dissipation test is typically conducted by using a standard CPT piezocone, then stopping the cone penetration at a given depth and measuring the decay of pore water pressure with time. During a pause in penetration, any excess pore pressures generated around the cone will start to dissipate. The rate of dissipation depends upon the flow and consolidation characteristics of soil, that is coefficient of consolidation, which, in turn, depends on the compressibility and permeability of the soil.

1.4.2 Dissipation Test Program

Prior to initiation of the fieldwork the appropriate permits were obtained from the Santa Clara Valley District and City of San Jose. Dissipation tests were conducted at 27 CPT locations, in order to monitor excess pore pressure dissipation in sands and clays. The dissipation test locations are shown on Figure A11-1 and summarized in Table 1. Table 1 provides the test date, coordinates, station and offset, tests depths, the estimated soil behavior type from the CPT data, the measured start and end pore water pressures, and the estimated water table depths from tests where the pore pressures were judged to have dissipated to the hydrostatic pressure or from water table measurements at adjacent boreholes.

One to four dissipation tests were conducted per CPT, at the following locations:

- 2 CPTs at Alum Rock Station (CPT-112 and CPT-120);
- 6 CPTs at Crossover and Downtown San José Station (CPT-44, CPT-134A, CPT-133, CPT-137, CPT-140 and CPT-143);
- 2 CPTs at Diridon Station (CPT-146 and CPT-153);
- 1 CPT location at the West Portal (CPT-93);
- 1 CPT location at Lower Silver Creek (CPT-04);
- 1 CPT location at Coyote Creek (CPT-27);
- 2 CPT location between Guadalupe River and Los Gatos Creek (CPT-55 and CPT-55A); and
- 12 CPT locations along the tunnel alignment (CPT-09, CPT-17, CPT-18, CPT-95, CPT-35, CPT-96, CPT-98, CPT-102, CPT-103, CPT-68, CPT-79 and CPT-84).

The target test depths were typically selected by HMM/Bechtel based on the evaluations of stratigraphy from adjacent explorations and the anticipated depth of the tunnel alignment.

2.0 DISSIPATION TEST PROCEDURES AND DATA PLOTS

2.1 FIELD PROCEDURES

CPT dissipation tests are conducted using a standard CPT piezo-cone (a cone that incorporates a pore pressure transducer). The dissipation tests may be conducted using a cone with the pore pressure transducer behind the cone tip (u2 position) or a cone with the pore pressure transducer at the face of the cone (u1 position). A pore pressure transducer located at the u2 position was used in this CPT field exploration program.

The cone is advanced in the hole to the estimated test depth and then halted. In clays, pore pressure data are then recorded until greater than approximately 50 to 75 percent of the induced excess pore pressure is dissipated. In sands, pore pressure dissipation tests are generally conducted until 90 to 100 percent of the excess pore pressure is dissipated. The

resulting dissipation test duration is on the order of ¼ to 3½ hours or more depending on soil permeability, with dissipations in sandy soils occurring faster than in clays. All pore pressure data during the test are digitally recorded for subsequent analyses. After the dissipation test data are recorded, the cone is advanced to the next test depth or the CPT termination depth.

2.2 DATA PLOTS

The recorded field data was processed in order to plot the measured pore pressure versus time. Figures A11-2 to A11-28 present the measured pore pressure versus time plots, the soil type, and the starting and end pore pressures for each dissipation test.

3.0 INTERPRETATION OF COEFFICIENT OF CONSOLIDATION AND PERMEABILITY

3.1 INTRODUCTION

As summarized in Table 1, the dissipation tests in this program were conducted in both sands and clays.

In clays, the coefficients of consolidation and permeability, c and k, vary over several orders of magnitude and are some of the most difficult parameters to measure in geotechnical engineering. Three theoretical and semi-empirical solutions (Torstensson (1977), Houlsby and Teh (1988), Teh et al., (1987)) were used for deriving the horizontal coefficient of consolidation c_h from pore pressure dissipation data. However, the meaning and use of these solutions are complicated by several phenomena such as the effects of soil disturbance due to penetration and the effects of soil anisotropy (Lunne, Robertson, and Powell (1997)). Moreover, estimation of soil permeability from CPT and dissipation data is subject to much uncertainty and should be used as a guide only.

Cone penetration testing in coarse-grained soils, such as sandy soils, is generally drained, thus excess pore pressure generally dissipates quickly in sands, typically within 15 to 30 minutes. Measured end pore pressures from dissipation tests in sands are usually used to estimate the water table depth at the specific CPT location. In very dense fine or silty sands, negative pore pressures may be recorded behind the cone (u2) due to dilatancy effects.

For intermediate soils (clayey sands to silts), cone penetration can be partially drained. To get a first estimate of the coefficient of consolidation, the same methods described above for clays are usually used. However, it should be noted that the theoretical initial pore pressure distribution used in these models is developed based on the assumption of ideal undrained response during penetration, which may be questionable in silty soils and is not considered applicable for drained soils (e.g. sand and gravel).

3.2 APPROACH

3.2.1 Coefficient of Consolidation

This section describes the three theoretical and semi-empirical solutions adopted for the interpretation of the coefficient of consolidation in clays. Interpretation was carried out for the filter located at the cylindrical extension above the cone base (u2 position).

Torstensson (1977) developed an interpretation model based on an elasto-plastic soil model assumption and spherical or cylindrical cavity expansion theory depending on the filter element's location. Since the filter in our dissipation tests was located on the cylindrical shaft some distance away from the cone (u2 position), the cylindrical solution was adopted in our calculations. Torstensson suggested that the coefficient of consolidation should be interpreted at 50 percent dissipation from the following formula:

$$C = (T_{50}/t_{50}) \times r_o^2$$

where the time factor T_{50} is found from the theoretical solutions for the filter position u2, t50 is the measured time for 50 percent dissipation and r_0 is the penetrometer radius for the cylindrical model.

Houlsby and Teh (1988) proposed an interpretation based on a finite difference analysis of the dissipation pore pressure, including the effect of varying rigidity index I_r (=G/S_u). Houlsby and Teh (1988) suggested interpreting the coefficient of horizontal consolidation using the modified dimensionless time factor T* as a function of the degree of consolidation, as defined below:

$$T^* = (C_h \times t) / (r^2 \times I_r\text{^}0.5)$$

where r is the radius of the cone (typically 35.7mm).

Teh (1987) proposed the interpretation of the consolidation data on a root time scale and suggested that the horizontal coefficient of consolidation should be interpreted according to the following formula:

$$C_h = (m/M)^2 \times I_r\text{^}0.5 \times r^2$$

where M is the gradient from theoretical curve for a specific filter location and m is the measured gradient of the initial linear dissipation plotted on a root time scale.

According to Lunne, Robertson and Powell (1997), and based on Fugro's past experience with dissipation tests interpretation, the values for the coefficient of consolidation provided by the Houlsby and Teh (1988) approach are recommended.

3.2.2 Coefficient of Permeability

Baligh and Levadoux (1980) recommended that the horizontal coefficient of permeability could be estimated from the following expression:

$$K_h = \gamma_w / (2.3 \times \sigma'_{vo}) \times C_{r\varepsilon} \times c_h$$

Where $C_{r\varepsilon}$ is the recompression ratio in the overconsolidated range interpreted from the constant rate of strain (CRS) consolidation tests performed on soil samples at corresponding depths from nearby borings, σ'_{vo} is the effective vertical stress at the test depth, and c_h is the calculated horizontal coefficient of consolidation.

The estimation of soil permeability from CPT and dissipation tests data is subject to much uncertainty and should be used as a guide only (Lunne, Robertson and Powell (1997).

3.3 METHODOLOGY AND ASSUMPTIONS

3.3.1 Procedure

Estimation of the coefficient of consolidation (c_h) was carried out using the dissipation tests data for the filter location behind the cone (u2) according to the following procedure (Lunne, Robertson and Powell (1997)):

1) Evaluating the initial pore pressure, u_i, by plotting the dissipation tests data on a square root time scale using the square-root-of-time method;
2) Defining the static pore pressure, u_0, from piezocone or piezometer tests data in adjacent sand layers;
3) Plotting the normalized excess pore pressure (U) versus time (t) on log and square root time scales, with $U = (u_t – u_0) / (u_i – u_0)$, where u_t is the pore pressure at time t;
4) Defining the time for 50 percent dissipation (t_{50});
5) Defining the slope (m) of the straight line from the first part of U versus square root of time t;
6) Using t50 to predict c_h according to the Torstensson (1977) and the Houlsby and Teh (1988) approaches discussed in section 3.2.1 of this appendix; and
7) Using m to predict c_h according to the Teh (1987) approach.

3.3.2 Assumptions Used in Interpretation

As discussed in Section 3.2 of this appendix, the estimation of the coefficients of consolidation and permeability depends on several factors and parameters including 1) water table depths, 2) effective vertical stress, and 3) rigidity index. Therefore, the following assumptions were used in the dissipation tests data interpretation:

- **Water Table Depth.** The water table depth was typically estimated from stabilized pore pressure from dissipation tests in sand layers. Interpretation of the dissipation tests in the uppermost unconfined saturated sand zones and the deeper confined aquifers located at a depth of about 60 to 70 feet and below the regional confining layer of clay (information provided by HMM/Bechtel) suggest that the water table depth is similar in both zones for a given CPT location. At CPT locations where a single dissipation test was conducted in either the unconfined or confined sand layers, the water table depth was interpreted from that test data, and was used in the estimation of the consolidation and permeability parameters. At CPT locations where dissipation tests in sands were not conducted, the water table depth was estimated from nearby boring or CPT locations.
- **Effective Vertical Stress.** An effective stress profile was developed using unit weights of 122 pcf for clayey soil shallower than 30 feet, 128 pcf for clayey soils deeper than 30 feet, and 130 and 121 pcf for sands and silts respectively. These unit

weight values were based on a summary plot of the results of the moisture content/density tests conducted by Parrikh and provided to us.

- **Rigidity Index.** The rigidity index (Ir) was estimated from the dynamic shear modulus (G) and the undrained shear strength (S_u). The dynamic shear modulus was estimated using correlations with the shear wave velocity data from the seismic cone testing and the downhole suspension logging. The undrained shear strength was estimated from CPT tip resistance data. The resulting estimated Ir values typically ranged from about 350 to 500+. For these evaluations, a value of Ir of 500 was adopted based on 1) the typical data range, and 2) the selection of high end of the Ir range indicated by Houlsby and Teh (1988) results in higher estimates of c_h, and therefore a more conservative estimate of flow quantities.

3.4 RESULTS

Table 2 summarizes the dissipation test interpretation results. Table 2 provides 1) the test location and depth, 2) the soil type, 3) the corresponding effective vertical stress, and 4) the interpreted static and initial pore water pressures. The interpreted coefficients of consolidation and permeability were determined at CPT locations where water table depth was interpreted from dissipation tests in sands or from nearby borings. For dissipation tests in clays, more than 50 percent excess pore pressure dissipation was generally achieved.

As shown in Table 2, the coefficients of horizontal consolidation (c_h) for clayey soils typically varied from 700 to 10,000 ft^2/year with higher values observed in silty and sandy clays. The coefficients of horizontal permeability (k_h) for clays ranged between 0.02 and 1.6 ft/year, with higher values generally observed in silty and sandy clays.

These interpreted coefficients of consolidation and permeability were generally consistent with vertical coefficient of consolidation and permeability values obtained from the Constant Rate of Strain (CRS) consolidation tests and typically ranging from about 150 to 3600 ft^2/year. CRS consolidation tests measure the vertical coefficients of consolidation and permeability, which are typically two to five times lower than the values measured in the horizontal direction (based on Fugro's past experience with projects in the Bay Area). Refer to Appendix 12 (CRS Tests) for detailed discussion of the coefficients of consolidation and permeability obtained from CRS tests.

As discussed above, the interpreted coefficients of consolidation and permeability from dissipation tests in clays should only be used as a guideline and are subject to several limitations and assumptions. Therefore, judgment should be applied when using the interpreted c_h and k values in analyses and design.

4.0 LIMITATIONS

Our services consist of subsurface field explorations and data evaluations that are made in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

The data provided in this appendix is based on the subsurface explorations conducted for this study. These explorations indicate subsurface conditions only at specific locations and times, and only to the depths penetrated. Variations may exist and conditions not observed or described in this report could be encountered during construction. Our results are based on our standard practices and specific data obtained.

This appendix has been prepared for the exclusive use of HMM/Bechtel and their consultants for specific application to the SVRT project as described herein. In the event that there are any changes in the ownership, nature, design, or location of the proposed project, or if any future additions are planned, the results contained in this appendix should not be considered valid unless 1) the project changes are reviewed by Fugro, and 2) results presented in this appendix are modified or verified in writing. Reliance on this report by others must be at their risk unless we are consulted on the use or limitations. We cannot be responsible for the impacts of any changes in geotechnical standards, practices, or regulations subsequent to performance of services without our further consultation. We can neither vouch for the accuracy of information supplied by others, nor accept consequences for unconsulted use of segregated portions of this report.

5.0 REFERENCES

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TABLES

CPT Location	Location	Date	Coordinants						Approx. Test Depth (ft)	Soil Type	Measured Pressure		Water Table Depth (ft)	Est. Water Table Depth at CPT Location (ft)
			Northing	Easting	Elev.	Station	Offset				Start	end		
							(ft)	R/L			(tsf)	(tsf)		
CPT-4	Tunnel Segment	27-Jan	1955458	6163884	86.0	580+00	63	L	20 38 50	Clay Clay Sand	0.3 0.6 -0.9	0.7 1.0 1.4	NA NA 7[P]	7
CPT-9	Tunnel Segment	15-Dec	1954561	6164736	108.8	592+28	39	L	67	Clay	3.5	1.2	NA	9[a]
CPT-17	Tunnel Segment	7-Dec	1951664	6164127	90.9	623+52	86	L	60 85	Clay Sand	2.0 1.7	1.5 2.0	NA 21	21
CPT-18	Tunnel Segment	10-Dec	1951660	6163969	91.7	624+92	12	L	101 107	Clay Silt to Clay	11.2 2.5	2.4 2.2	NA NA	21[b]
CPT-27	Tunnel Segment	3-Dec	1950552	6162210	92.0	645+69	95	L	51 67 99	Clay Sand Sand	3.5 3.8 2.4	0.8 3.8 2.3	NA ID 25	25
CPT-35	Tunnel Segment	22-Dec	1949730	6160628	80.7	663+50	19	L	50 58 84 94	Clay Sand Sand Clay	1.5 -0.2 1.6 2.5	4.2 1.3 2.1 2.4	NA 18 17 NA	17
CPT-44	Tunnel Segment	18-Oct	1948264	6158082	83.0	692+88	22	L	25 45 48	Clay Sand Sand	0.1 0.7 0.5	0.3 0.7 0.8	NA 24 25	24
CPT-55	Tunnel Segment	23-Feb	1946361	6155166	86.8	727+90	34	L	36 61	Sand Sand	0.4 1.2	0.5 1.3	19[p] 20	19
CPT-55a	Tunnel Segment	23-Feb	1946361*	6155179*	86.8	727+81	44	L	72 86	Clay Clay	4.5 0.7	1.7 2.1	NA NA	19[b]
CPT-68	Tunnel Segment	20-Jan	1947093	6152096	87.4	765+22	20	L	54 63 86 88	Clay Sand Clay Sand	4.2 0.1 -0.3 1.9	1.2 1.5 2.2 2.3	NA 16 NA 15	15

Notes: NA - Water table depth not determined from dissipation tests conducted in clayey and silty soils
ID - Insufficient data to determine water table depth
a - Water table depth measured at nearby borings
b - Water table depth estimated from dissipation tests conducted in sand at nearby CPT locations
p - Water table depth estimated from dissipation test conducted in the perched sand zone

SUMMARY OF DISSIPATION TESTS

Tunnel Segment of SVRT Project
San Jose, California

TABLE A11-1a

CPT Location	Location	Date	Coordinants						Approx. Test Depth (ft)	Soil Type	Measured Pressure		Water Table Depth (ft)	Est. Water Table Depth at CPT Location (ft)
			Northing	Easting	Elev.	Station	Offset				Start	end		
							(ft)	R/L			(tsf)	(tsf)		
CPT-79	Tunnel Segment	5-Jan	1949149	6151176	82.1	788+47	20	L	52 73 78 100	Clay Sand Clay Sand	5.2 -0.2 9.9 5.7	2.7 1.6 2.0 2.5	NA 21 NA 21	21
CPT-84	Tunnel Segment	10-Jan	1950346	6150131	76.4	804+36	46	L	59 82 92 98	Sand Clay Sand Clay	0.0 4.5 0.3 8.2	1.4 2.0 2.3 2.5	15[p] NA 18 NA	18
CPT-93	Tunnel Segment	19-Apr	1951926	6148141	68.9	830+14	1	L	20 32 47	Clay Sand Clay	0.5 0.0 1.4	1.0 0.6 1.2	NA 11[p] NA	11
CPT-95	Cross-over	20-Apr	1950183	6161688	83.5	652+06	155	L	30 64 75	Clay Sand Sand	-0.4 1.9 2.2	0.6 1.9 2.2	NA 4 6	4
CPT-96	Cross-over	25-Oct	1948827	6159027	80.7	681+88	5	L	55 61	Sand Sand	1.4 -0.1	1.2 1.4	16 17	17
CPT-98	Cross-over	2-Nov	1948728	6158883	80.8	683+62	19	L	31 80 100	Sand Clay Clay	-0.5 0.7 9.7	0.4 1.1 1.8	18[p] NA NA	18
CPT-102	Cross-over	25-Oct	1948636	6158697	80.5	685+69	6	L	25	Clay	0.8	0.3	NA	13[a]
CPT-103	Cross-over	20-Oct	1948537	6158533	80.9	687+61	10	L	29 73	Clay Sand	1.7 -0.6	0.5 1.8	NA 14	14
CPT-112	Alum Rock	14-Dec	1953816	6164848	85.6	599+71	43	L	40 98	Clay Sand	3.5 0.0	2.6 2.6	NA 15	15

Notes: NA - Water table depth not determined from dissipation tests conducted in clayey and silty soils
ID - Insufficient data to determine water table depth
a - Water table depth measured at nearby borings
b - Water table depth estimated from dissipation tests conducted in sand at nearby CPT locations
p - Water table depth estimated from dissipation test conducted in the perched sand zone

TABLE A11-1b

SUMMARY OF DISSIPATION TESTS
Tunnel Segment of SVRT Project
San Jose, California

CPT Location	Location	Date	Coordinants						Approx. Test Depth (ft)	Soil Type	Measured Pressure		Water Table Depth (ft)	Est. Water Table Depth at CPT Location (ft)
			Northing	Easting	Elev.	Station	Offset (ft)	Offset R/L			Start (tsf)	end (tsf)		
CPT-120	Alum Rock Station	8-Feb	1953210	6164856	88.9	605+78	50	L	39	Clay	0.1	2.0	NA	15
									85	Sand	-0.8	2.2	15	
									90	Clay	1.5	7.3	NA	
									105	Sand	1.7	2.8	16	
CPT-133	Tunnel Segment	27-Oct	1948029	6157659	85.6	697+72	15	L	26	Silt to Clay	2.7	0.4	NA	11
									79	Sand	-0.1	2.1	11	
CPT-134a	Tunnel Segment	18-Nov	1947996	6157602	86.1	698+38	16	L	74	Clay	6.7	2.3	NA	15[a]
									105	Clay	10.8	3.9	NA	
CPT-137	Market St. Station	8-Oct	1947801	6157290	88.0	702+06	29	L	33	Sand	-0.7	0.3	24[p]	24
									85	Sand	-0.5	1.9	24	
									120	Sand	-0.3	3.0	24	
CPT-140	Market St. Station	6-Nov	1947681	6157085	88.4	704+43	31	L	53	Clay	0.1	0.8	NA	25
									109	Clay	6.5	2.5	NA	
CPT-143	Market St. Station	7-Oct	1947441	6156775	87.7	708+32	85	L	32	Sand	-0.8	0.1	29[b]	26
									74	Sand	0.9	1.5	25	
									85	Sand	0.2	1.9	25	
									112	Sand	-0.6	2.6	28	
CPT-146	Diridon/Arena Station	1-Dec	1946054	6154428	87.7	736+02	40	L	20	Clay	-0.1	0.4	NA	15[a]
									36	Clay	1.6	0.7	NA	
									79	Sand	-0.1	1.7	ID	
CPT-153	Diridon/Arena Station	7-Feb	1946055	6153959	91.0	740+66	31	L	29	Clay	2.0	1.2	NA	22
									69	Sand	-0.8	1.5	22	
									87	Clay	-0.5	1.9	NA	
									101	Sand	-0.6	2.3	26	

Notes: NA - Water table depth not determined from dissipation tests conducted in clayey and silty soils
ID - Insufficient data to determine water table depth
a - Water table depth measured at nearby borings
b - Water table depth estimated from dissipation tests conducted in sand at nearby CPT locations
p - Water table depth estimated from dissipation test conducted in the perched sand zone

TABLE A11-1c

SUMMARY OF DISSIPATION TESTS
Tunnel Segment of SVRT Project
San Jose, California

Location	Approx. Test Depth (ft)	Soil Type	Est. Effective Stress (psf)	Est. Water Table Depth (ft)	Est. Static Pore Pressure Uo (tsf)	Interpreted Initial Pore Pressure Ui (tsf)	Percent Pore Pressure Dissipated	Ch Interpretation		Kh Interpretation	
								t50 (min)	Ch (ft^2/yr)	Cer	Kh (ft/yr)
CPT-4	20	Clay	1620	7	0.4	ID	ID	ID	ID	ID	ID
	38	Clay	2760		1.0	2.5	97%	12.0	1233	0.035	0.72
	50	Sand	3570		1.4	NA		NA	NA	NA	NA
CPT-9	67	Clay	6260	9	1.8	6	100%	0.2	92483	0.014	7.12
CPT-17	60	Clay	4860	21	1.2	5.6	96%	8.2	1805	0.012	0.12
	85	Sand	6530		2.0	NA		NA	NA	NA	NA
CPT-18	101	Clay	7180	21	2.5	12.42	100%	5.7	2596	0.014	0.13
	107	Silt to Clay	7580		2.7	2.7	89%	0.8	18497	0.014	0.86
CPT-27	51	Clay	4660	25	0.8	5	100%	1.4	10569	0.012	0.74
	67	Sand	5680		1.3	NA		NA	NA	NA	NA
	99	Sand	7860		2.3	2.48	95%	2.6	5691	0.012	0.28
CPT-35	50	Clay	3870	17	1.0	5.9	ID	ID	ID	ID	ID
	58	Sand	4348		1.3	NA		NA	NA	NA	NA
	84	Sand	5969		2.1	NA		NA	NA	NA	NA
	94	Clay	6699		2.4	5.6	100%	0.9	15911	0.011	0.71
CPT-44	25	Clay	2890	24	0.0	0.1	60%	38.0	389	0.012	0.04
	45	Sand	4120		0.6	NA		NA	NA	NA	NA
	48	Sand	4320		0.8	NA		NA	NA	NA	NA
CPT-55	36	Sand	3550	19	0.5	NA		NA	NA	NA	NA
	61	Sand	5040		1.3	NA		NA	NA	NA	NA
CPT-55a	72	Clay	5360	19	1.6	8.6	99%	5.0	2959	0.012	0.17
	86	Clay	6370		2.1	4.9	99%	1.9	7871	0.012	0.38
CPT-68	54	Clay	4340	15	1.2	6.2	99%	2.5	5919	0.028	1.05
	63	Sand	4910		1.5	NA		NA	NA	NA	NA
	86	Clay	6420		2.2	9.1	100%	1.0	14797	0.028	0.95
	88	Sand	6550		2.3	NA		NA	NA	NA	NA
CPT-79	52	Clay	4492	21	1.0	5.1	59%	21.4	692	0.010	0.04
	73	Sand	5668		1.6	NA		NA	NA	NA	NA
	78	Clay	6081		1.8	11.8	98%	4.5	3288	0.010	0.15
	100	Sand	7250		2.5	NA		NA	NA	NA	NA

Notes: ID - Insufficient data for parameters' interpretation
NA - Ch and Kh not calculated for dissipation tests in sand
Houlsby and Teh (1988) is used for Ch interpretation as recommended by Lunne, Robertson & Powell (1997)

SUMMARY OF INTERPRETED DISSIPATION TEST RESULTS
Tunnel Segment of SVRT Project
San Jose, California

TABLE A11-2a

Location	Approx. Test Depth (ft)	Soil Type	Est. Effective Stress (psf)	Est. Water Table Depth (ft)	Est. Static Pore Pressure Uo (tsf)	Interpreted Initial Pore Pressure Ui (tsf)	Percent Pore Pressure Dissipated	Ch Interpretation		Kh Interpretation	
								t50 (min)	Ch (ft^2/yr)	Cer	Kh (ft/yr)
CPT-84	59	Sand	4910	18	1.3	NA		NA	NA	NA	NA
	82	Clay	6420		2.0	5.5	99%	1.3	11383	0.015	0.72
	92	Sand	7060		2.3	NA		NA	NA	NA	NA
	98	Clay	7460		2.5	8.8	99%	1.2	12331	0.015	0.67
CPT-93	20	Clay	1883	11	0.3	1.85	54%	100.0	148	0.010	0.02
	32	Sand	2540		0.7	NA		NA	NA	NA	NA
	47	Clay	3709		1.1	4.4	96%	18.5	800	0.010	0.06
CPT-95	30	Clay	660	4	0.8	1.3	100%	1.5	9865	0.012	4.90
	64	Sand	3915		1.9	NA		NA	NA	NA	NA
	75	Sand	4659		2.2	NA		NA	NA	NA	NA
CPT-96	55	Sand	4340	17	1.2	1.38	93%	8.7	1711	0.028	0.30
	61	Sand	4750		1.4	NA		NA	NA	NA	NA
CPT-98	30.7	Sand	2960	18	0.4	NA		NA	NA	NA	NA
	80	Clay	3980		1.9	NA		NA	NA	NA	NA
	100	Clay	5490		2.6	12.22	100%	5.8	2551	0.018	0.22
CPT-102	25	Clay	2320	13	0.4	1.32	100%	3.5	4228	0.028	1.39
CPT-103	29	Clay	2600	14	0.5	2.04	99%	1.5	9865	0.010	1.03
	73	Sand	5240		1.8	NA		NA	NA	NA	NA
CPT-112	40	Clay	2840	15	0.8	6	66%	25.0	591	0.019	0.11
	98	Sand	6560		2.6	NA		NA	NA	NA	NA
CPT-120	39	Clay	3390	15	0.7	5	73%	22.1	670	0.012	0.07
	85	Sand	6250		2.2	NA		NA	NA	NA	NA
	90	Clay	6590		2.3	ID	41%	ID	ID	ID	ID
	105	Sand	7560		2.8	NA		NA	NA	NA	NA
CPT-133	26	Clay	2120	11	0.5	3.2	100%	3.6	4110	0.018	0.96
	79	Sand	5410		2.1	NA		NA	NA	NA	NA
CPT-134a	74	Clay	5470	15	1.8	11	96%	3.4	4352	0.018	0.39
	105	Clay	7530		2.8	16.4	93%	7.3	2027	0.018	0.13

Notes: ID - Insufficient data for parameters' interpretation
NA - Ch and Kh not calculated for dissipation tests in sand
Houlsby and Teh (1988) is used for Ch interpretation as recommended by Lunne, Robertson & Powell (1997)

SUMMARY OF INTERPRETED DISSIPATION TEST RESULTS
Tunnel Segment of SVRT Project
San Jose, California

TABLE A11-2b

Location	Approx. Test Depth (ft)	Soil Type	Est. Effective Stress (psf)	Est. Water Table Depth (ft)	Est. Static Pore Pressure Uo (tsf)	Interpreted Initial Pore Pressure Ui (tsf)	Percent Pore Pressure Dissipated	Ch Interpretation		Kh Interpretation	
								t50 (min)	Ch (ft^2/yr)	Cer	Kh (ft/yr)
CPT-137	33	Sand	3380	24	0.3	NA		NA	NA	NA	NA
	85	Sand	6550		1.9	NA		NA	NA	NA	NA
	120	Sand	8760		3.0	NA		NA	NA	NA	NA
CPT-140	53	Clay	3990	25	0.9	3.85	100%	1.5	9609	0.040	2.17
	109	Clay	7660		2.6	8	99%	2.2	6726	0.040	0.86
CPT-143	32	Sand	3500	26	0.2	NA		NA	NA	NA	NA
	74	Sand	5980		1.5	NA		NA	NA	NA	NA
	85	Sand	6730		1.8	NA		NA	NA	NA	NA
	112	Sand	8450		2.7	NA		NA	NA	NA	NA
CPT-146	20.2	Clay	2050	15	0.2	2.9	91%	11.7	1265	0.044	0.74
	35.5	Clay	3040		0.6	3.6	100%	6.1	2426	0.044	0.95
	79.2	Sand	5970		ID	ID		ID	ID	ID	ID
CPT-153	28.6	Clay	3070	22	0.2	3.2	68%	33.3	445	0.018	0.07
	69.1	Sand	5680		1.5	NA		NA	NA	NA	NA
	86.9	Clay	6850		2.0	3.04	92%	3.1	4773	0.018	0.34
	100.8	Sand	7769		2.5	NA		NA	NA	NA	NA

Notes: ID - Insufficient data for parameters' interpretation
NA - Ch and Kh not calculated for dissipation tests in sand
Houlsby and Teh (1988) is used for Ch interpretation as recommended by Lunne, Robertson & Powell (1997)

TABLE A11-2c

SUMMARY OF INTERPRETED DISSIPATION TEST RESULTS
Tunnel Segment of SVRT Project
San Jose, California

FIGURES

WEST PORTAL

EAST PORTAL

DIRIDON/ARENA STATION

DOWNTOWN SAN JOSE STATION

ALUM ROCK STATION

DOWNTOWN SAN JOSE STATION CROSSOVER

LOWER SILVER CREEK

COYOTE CREEK

GUADALUPE RIVER

LOS GATOS CREEK

LEGEND

- CPT
- DISSIPATION CPT
- HYDROPUNCH
- BORING

0 250 500 1,000 Feet

REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

HMM / BECHTEL

A Joint Venture of Hatch Mott MacDonald T&T, Inc. and Bechtel Infrastructure Corp.

DESIGNER/SUBCONSULTANT

SUBMITTED

HMM/BECHTEL

APPROVED

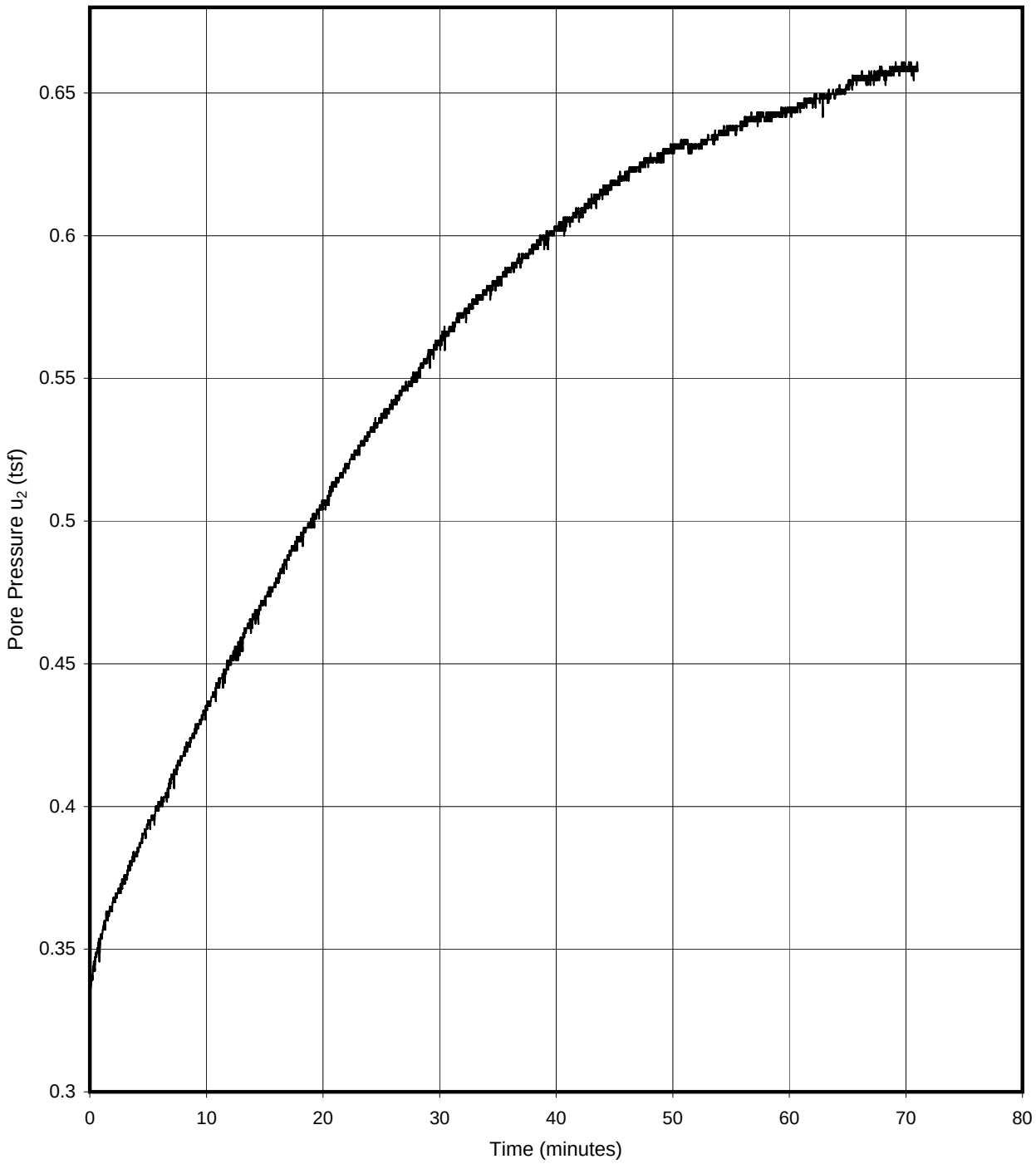
BART

SILICON VALLEY RAPID TRANSIT PROJECT

SANTA CLARA Valley Transportation Authority

CPT DISSIPATION TEST LOCATION MAP
Tunnel Segment of SVRT Project
San Jose, California

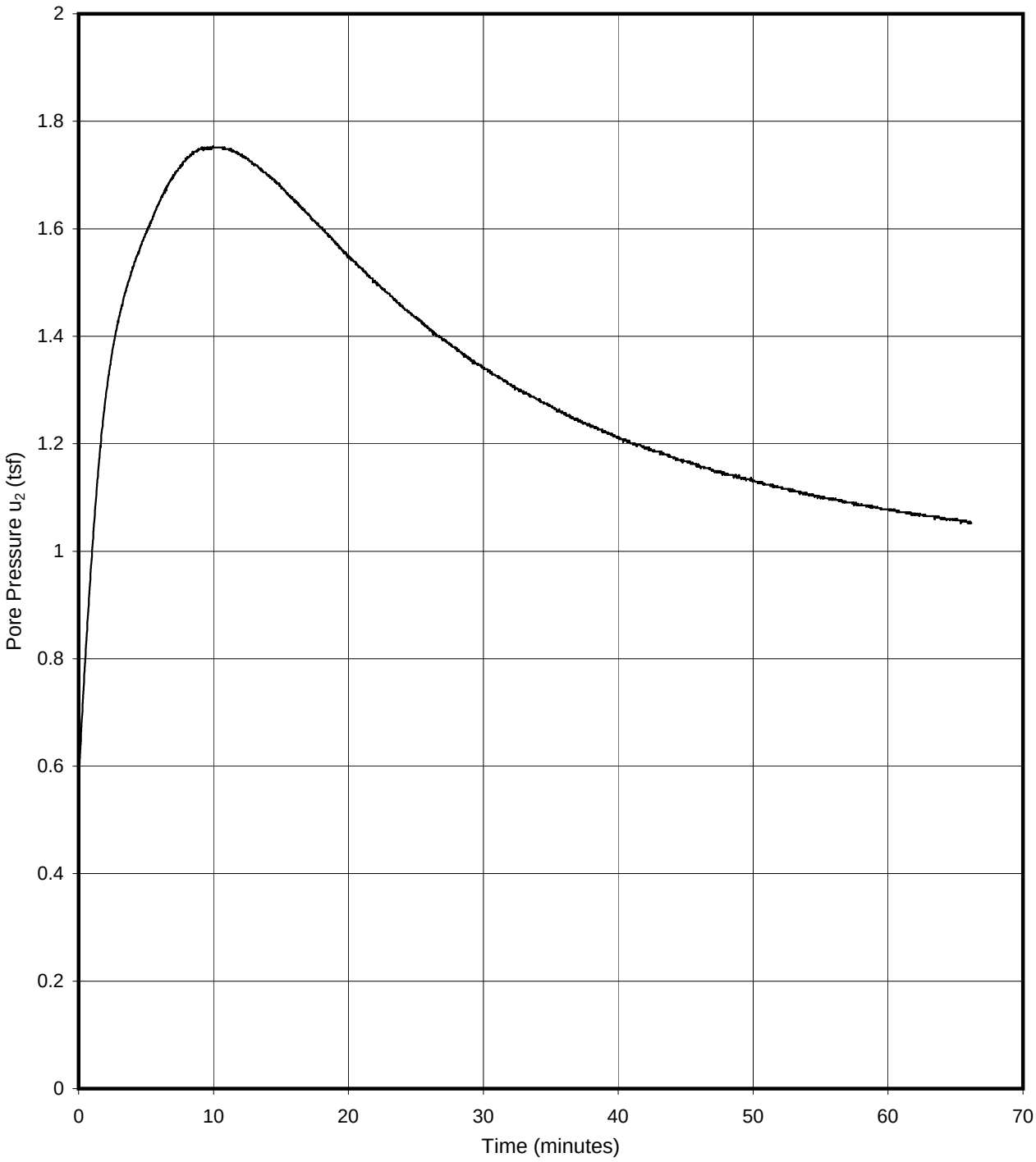
FIGURE A11-1



Test Date:	27-Jan	Pore Pressure u_2 at start:	0.33 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	0.66 tsf

DISSIPATION TEST
CPT-4, Depth: 20.1 feet
Tunnel Segment of SVRT Project
San Jose, California

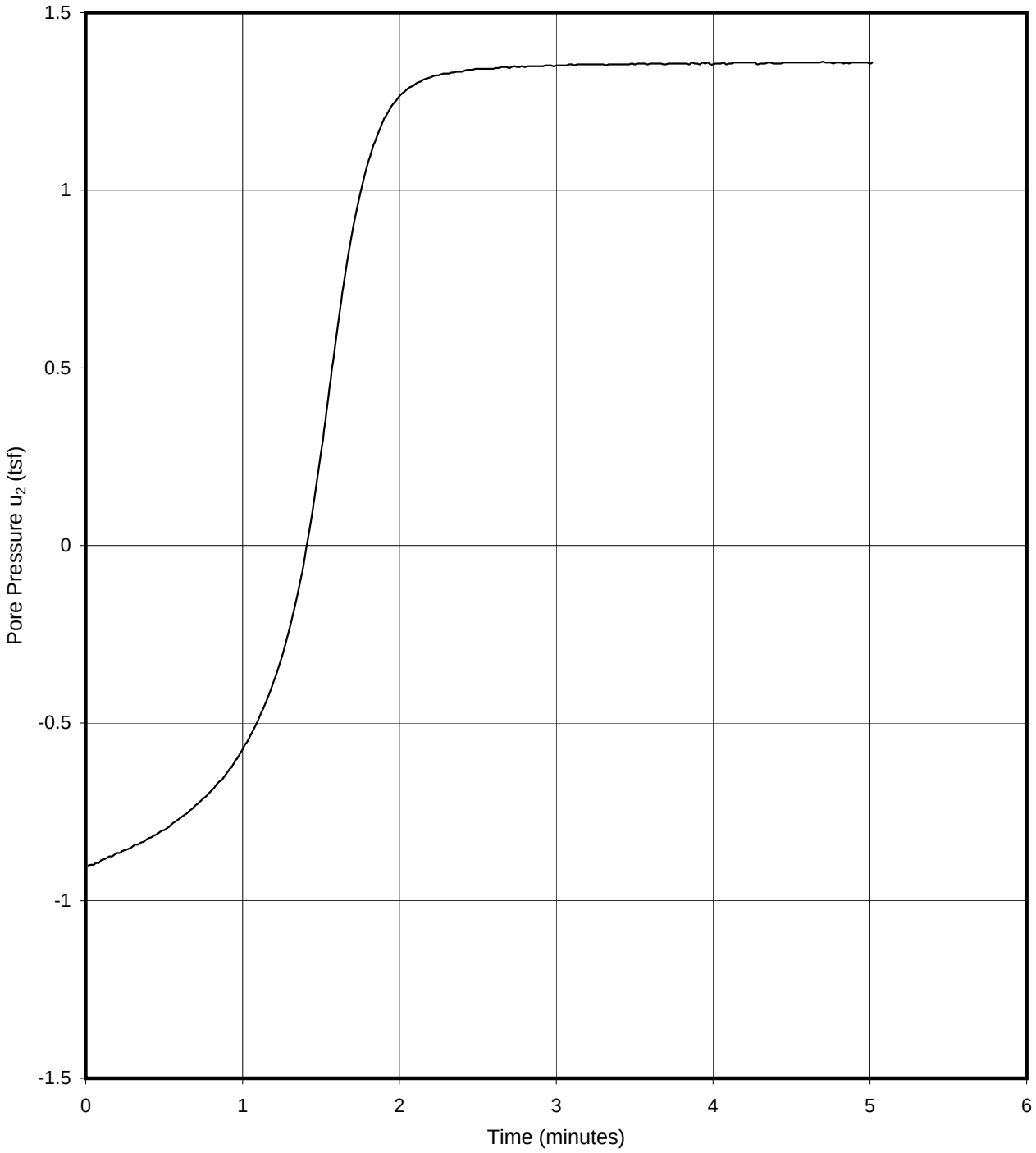
FIGURE A11-2a



Test Date:	27-Jan	Pore Pressure u_2 at start:	0.57 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	1.05 tsf

DISSIPATION TEST
CPT-4, Depth: 38 feet
Tunnel Segment of SVRT Project
San Jose, California

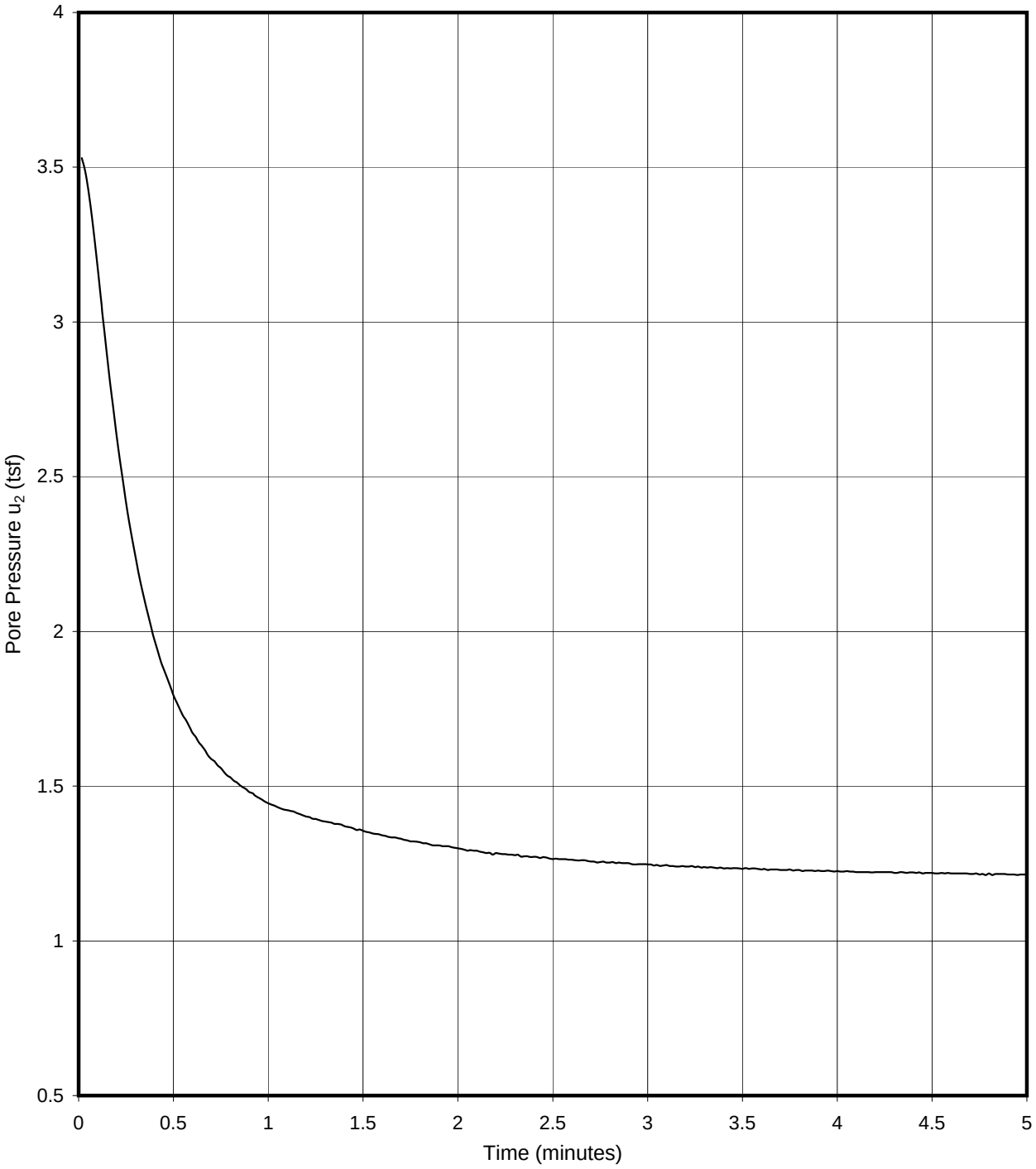
FIGURE A11-2b



Test Date:	27-Jan	Pore Pressure u_2 at start:	-0.90 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	1.36 tsf

DISSIPATION TEST
CPT-4, Depth: 50.3 feet
Tunnel Segment of SVRT Project
San Jose, California

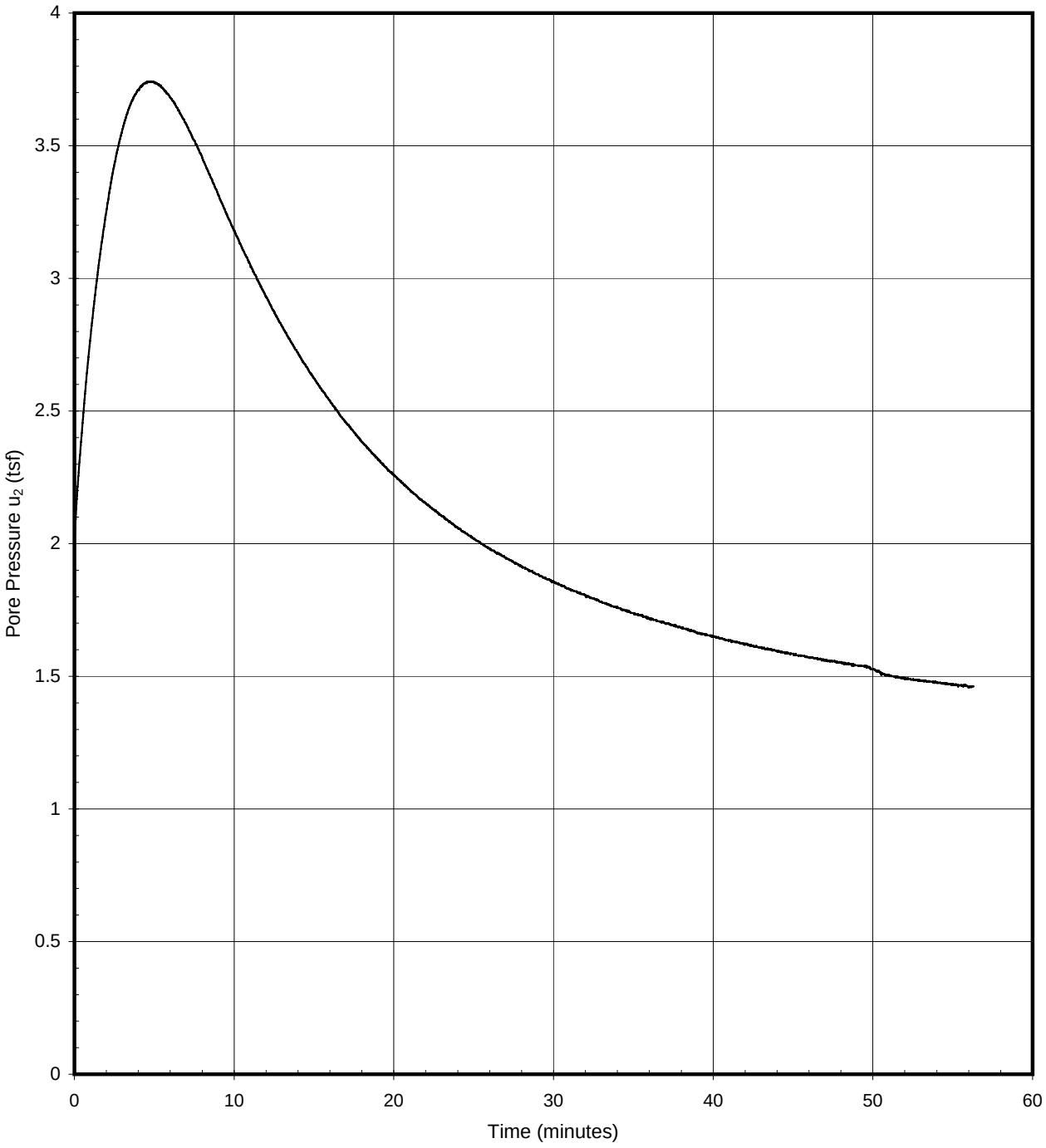
FIGURE A11-2c



Test Date:	15-Dec	Pore Pressure u_2 at start:	3.53 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	1.15 tsf

DISSIPATION TEST
CPT-09, Depth: 67.2 feet
Tunnel Segment of SVRT Project
San Jose, California

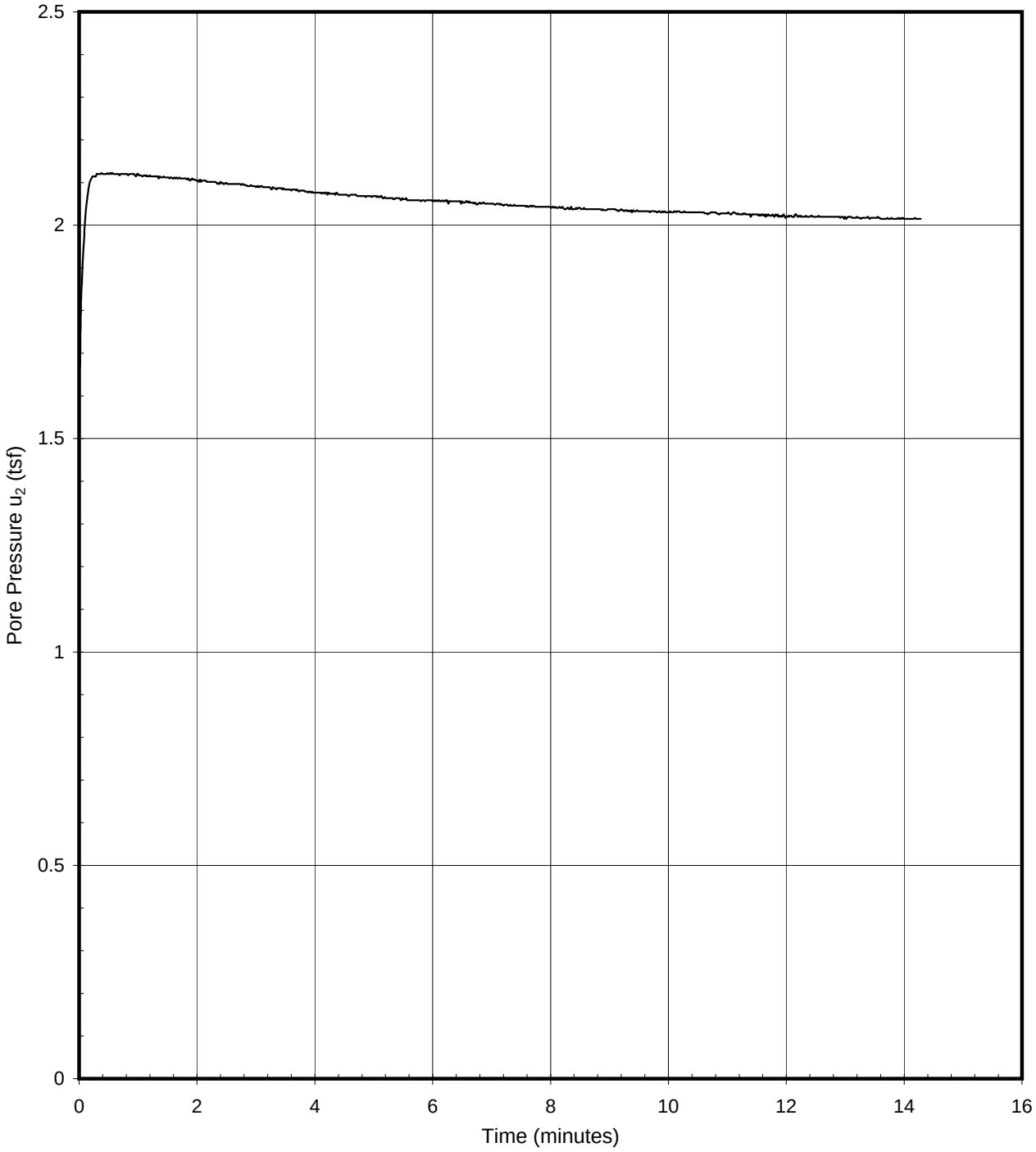
FIGURE A11-3a



Test Date:	7-Dec	Pore Pressure u_2 at start:	2.01 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	1.46 tsf

DISSIPATION TEST
CPT-17, Depth: 60.3 feet
Tunnel Segment of SVRT Project
San Jose, California

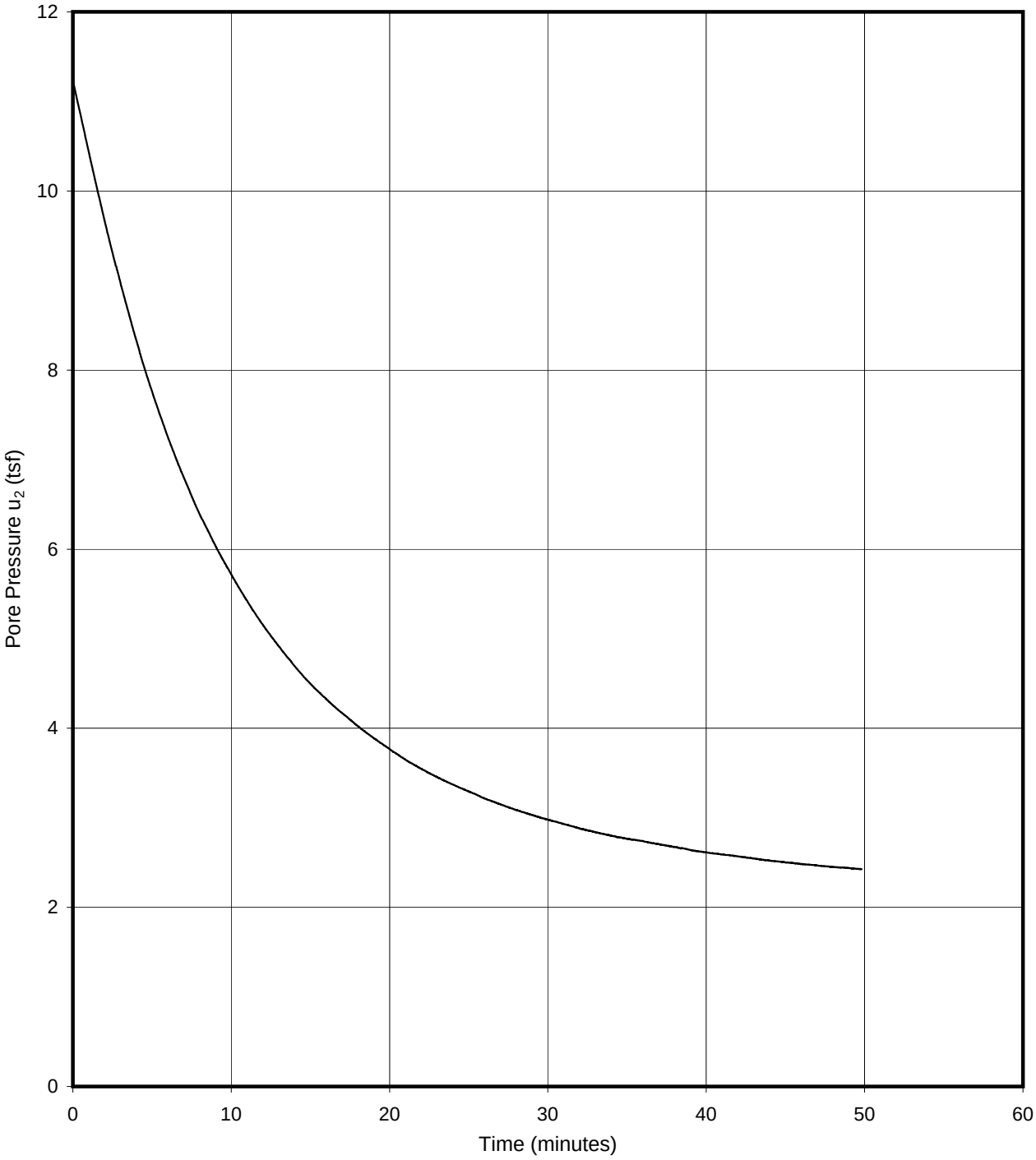
FIGURE A11-4a



Test Date:	7-Dec	Pore Pressure u_2 at start:	1.67 tsf
Soil Type:	sand	Pore Pressure u_2 at end:	2.01 tsf

DISSIPATION TEST
CPT-17, Depth: 85.3 feet
Tunnel Segment of SVRT Project
San Jose, California

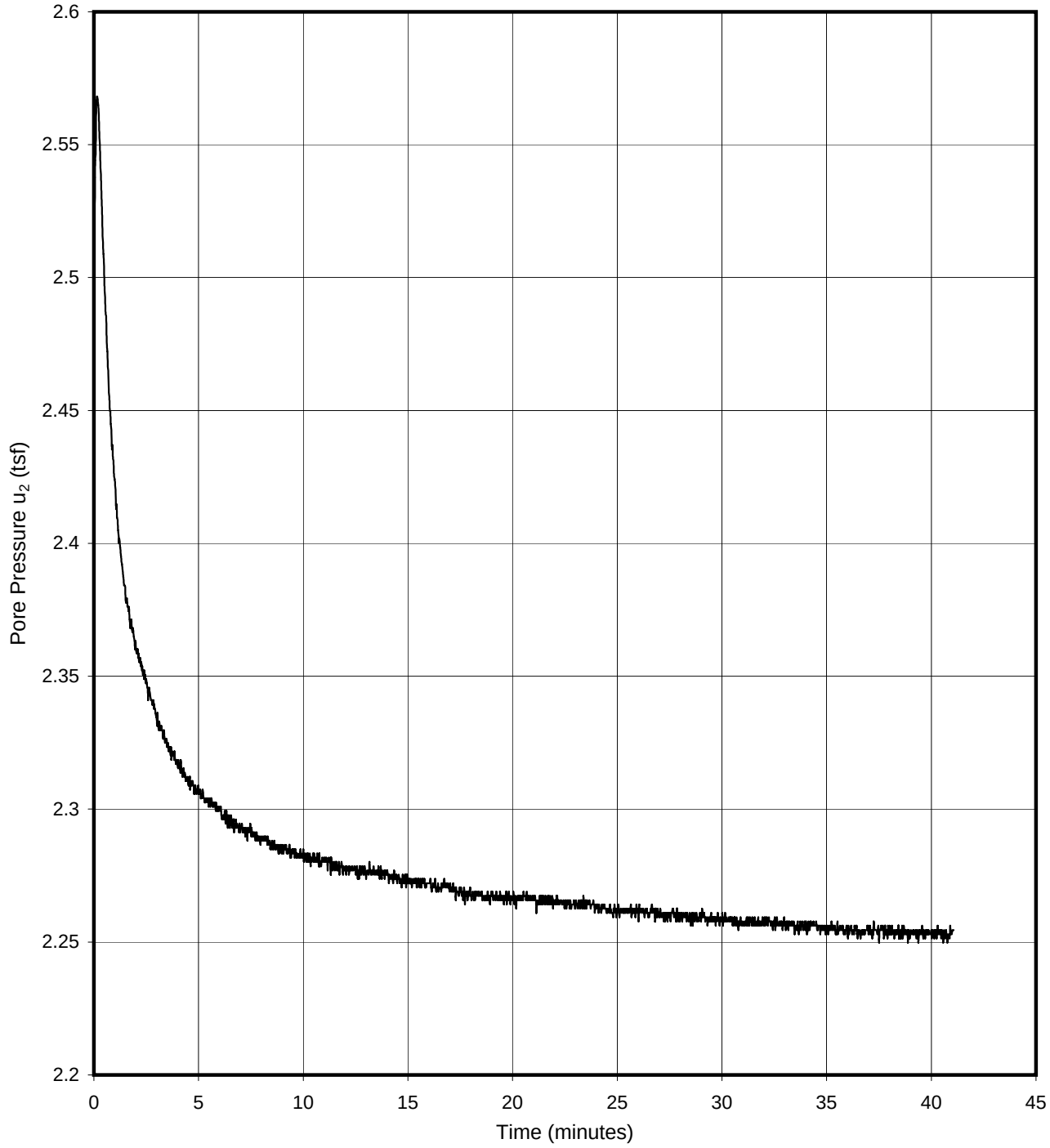
FIGURE A11-4b



Test Date:	10-Dec	Pore Pressure u_2 at start:	11.22 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	2.43 tsf

DISSIPATION TEST
CPT-18, Depth: 101 feet
Tunnel Segment of SVRT Project
San Jose, California

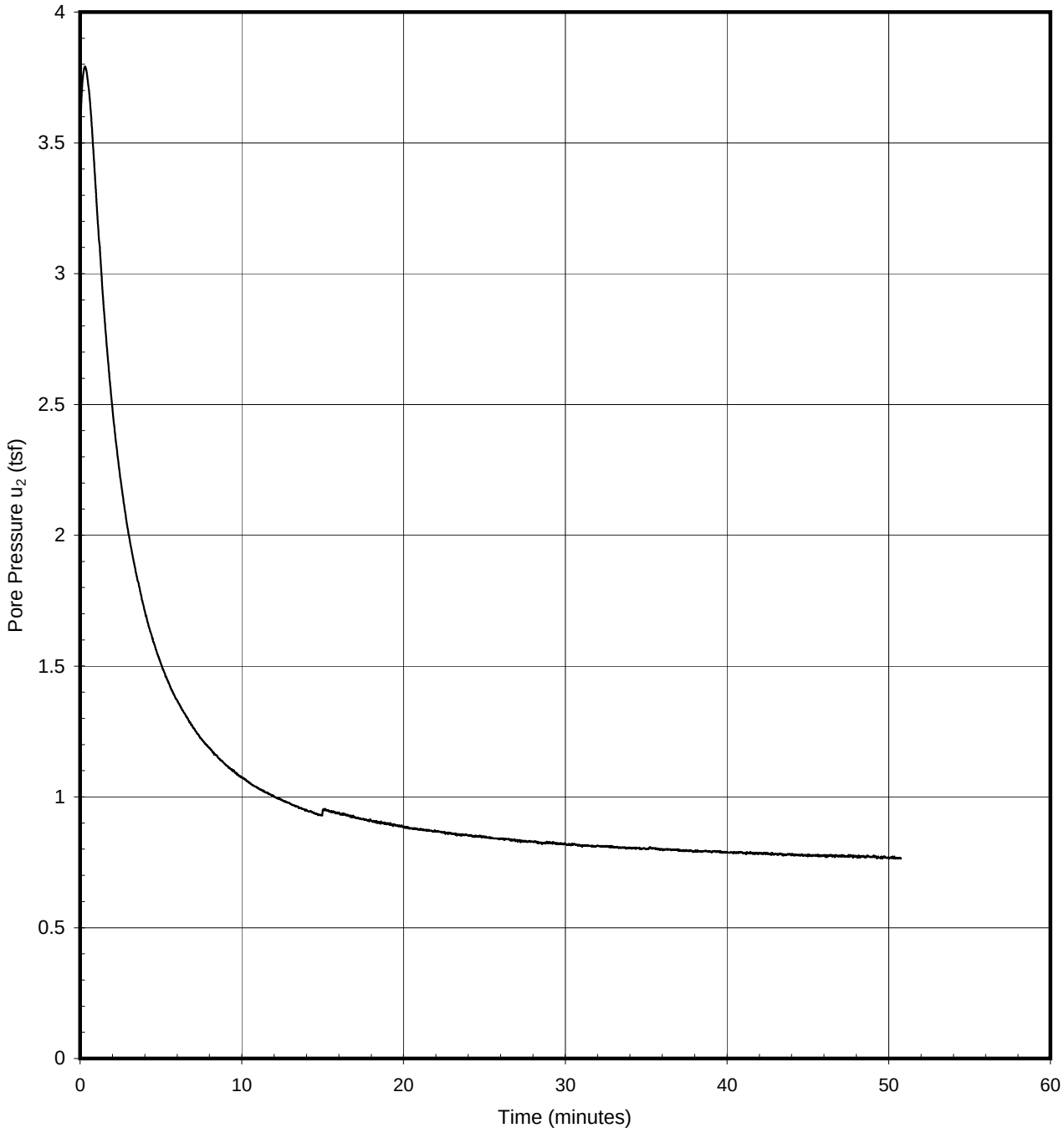
FIGURE A11-5a



Test Date:	10-Dec	Pore Pressure u_2 at start:	2.49 tsf
Soil Type:	Silt to Clay	Pore Pressure u_2 at end:	2.25 tsf

DISSIPATION TEST
CPT-18, Depth: 107 feet
Tunnel Segment of SVRT Project
San Jose, California

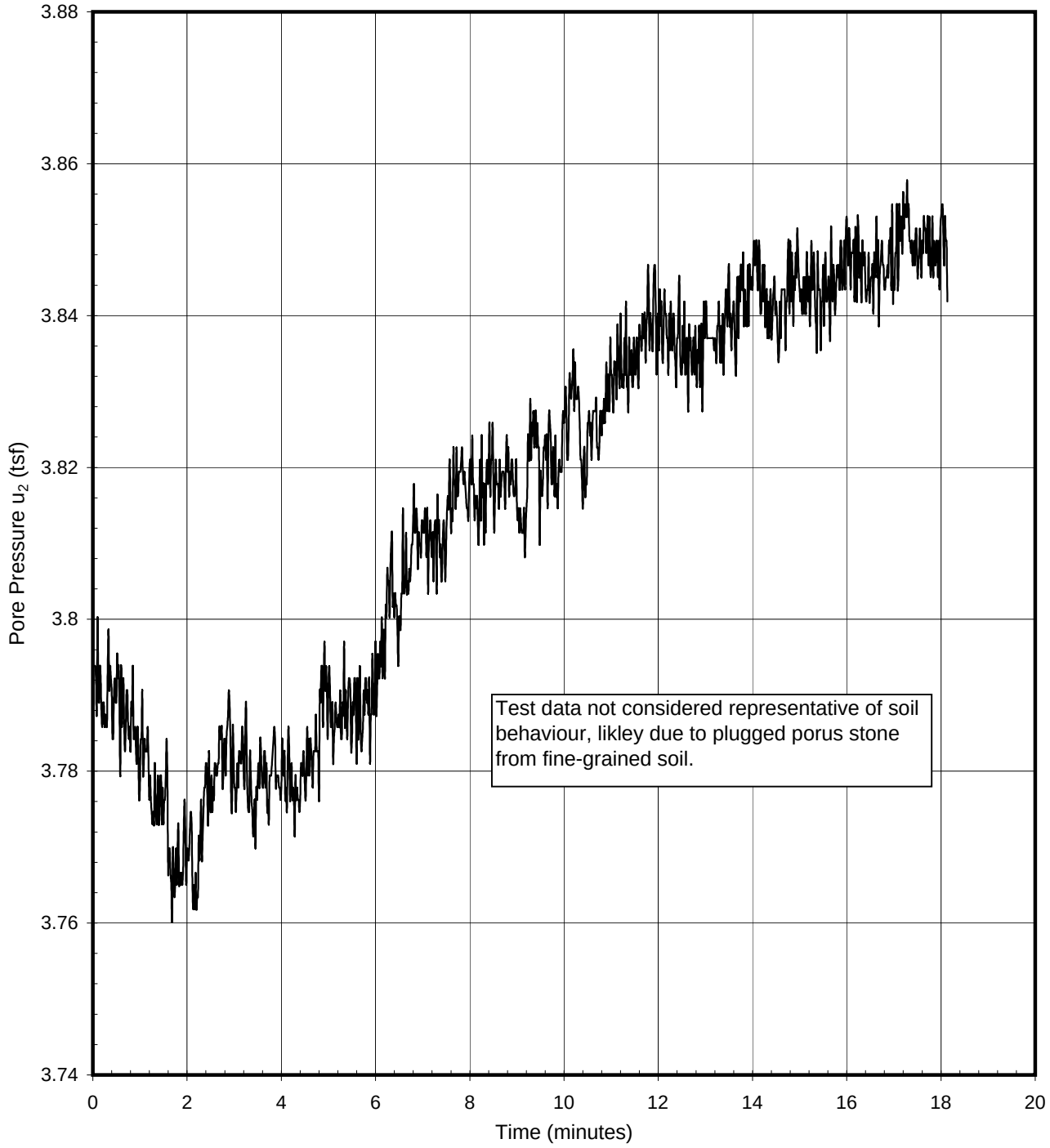
FIGURE A11-5b



Test Date:	3-Dec	Pore Pressure u_2 at start:	3.53 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	0.76 tsf

DISSIPATION TEST
CPT-27, Depth: 50.7 feet
Tunnel Segment of SVRT Project
San Jose, California

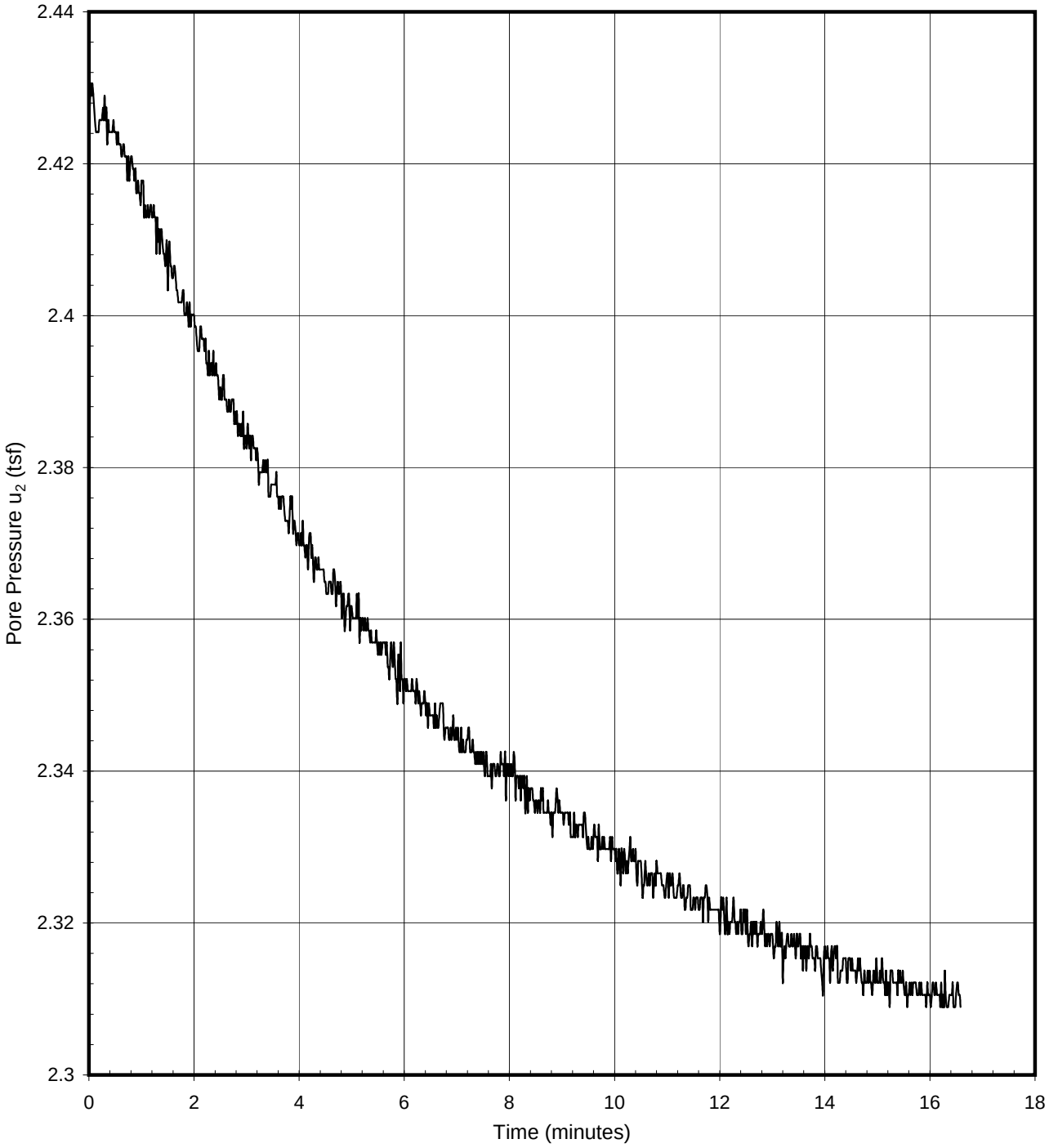
FIGURE A11-6a



Test Date:	3-Dec	Pore Pressure u_2 at start:	3.79 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	3.84 tsf

DISSIPATION TEST
CPT-27, Depth: 67.0 feet
Tunnel Segment of SVRT Project
San Jose, California

FIGURE A11-6b



Test Date:	3-Dec	Pore Pressure u_2 at start:	2.43 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	2.31 tsf

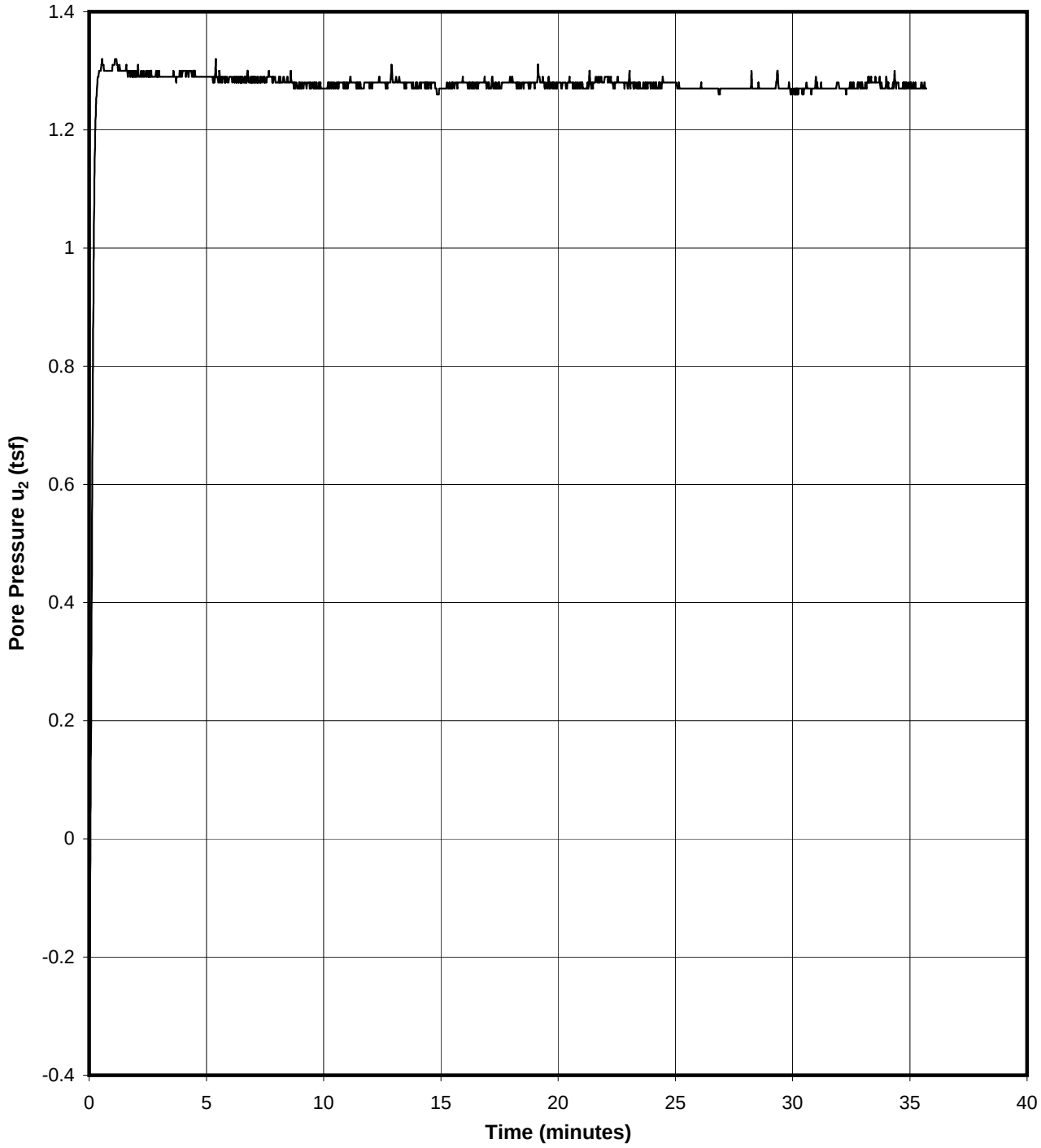
DISSIPATION TEST
CPT-27, Depth: 99.2 feet
Tunnel Segment of SVRT Project
San Jose, California

FIGURE A11-6c

Test Date:	22-Dec	Pore Pressure u_2 at start:	1.52 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	4.16 tsf

DISSIPATION TEST
CPT-35, Depth: 50.3 feet
Tunnel Segment of SVRT Project
San Jose, California

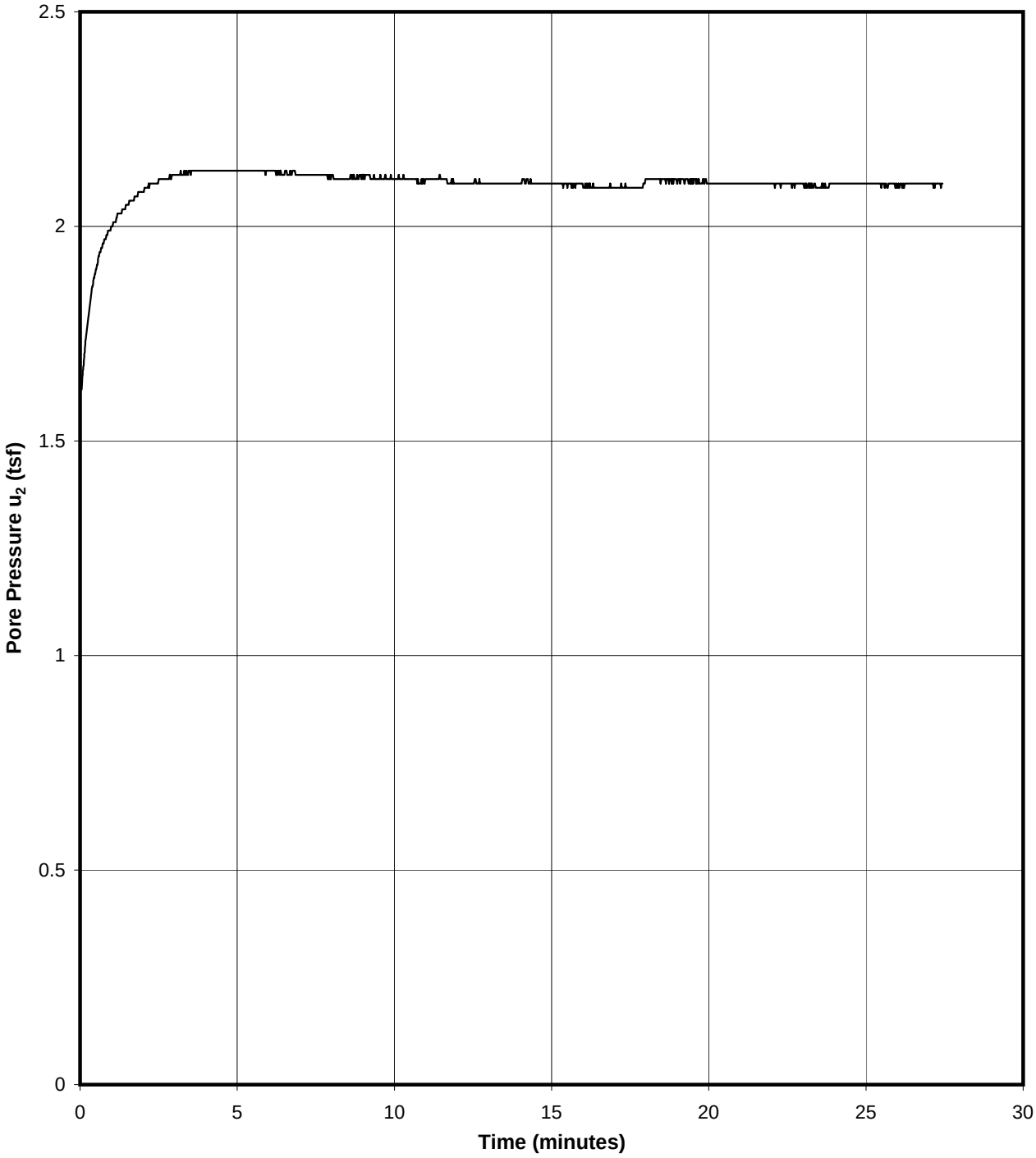
FIGURE A11-7a



Test Date:	22-Dec	Pore Pressure u_2 at start:	-0.20 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	1.27 tsf

DISSIPATION TEST
CPT-35, Depth: 58.2 feet
Tunnel Segment of SVRT Project
San Jose, California

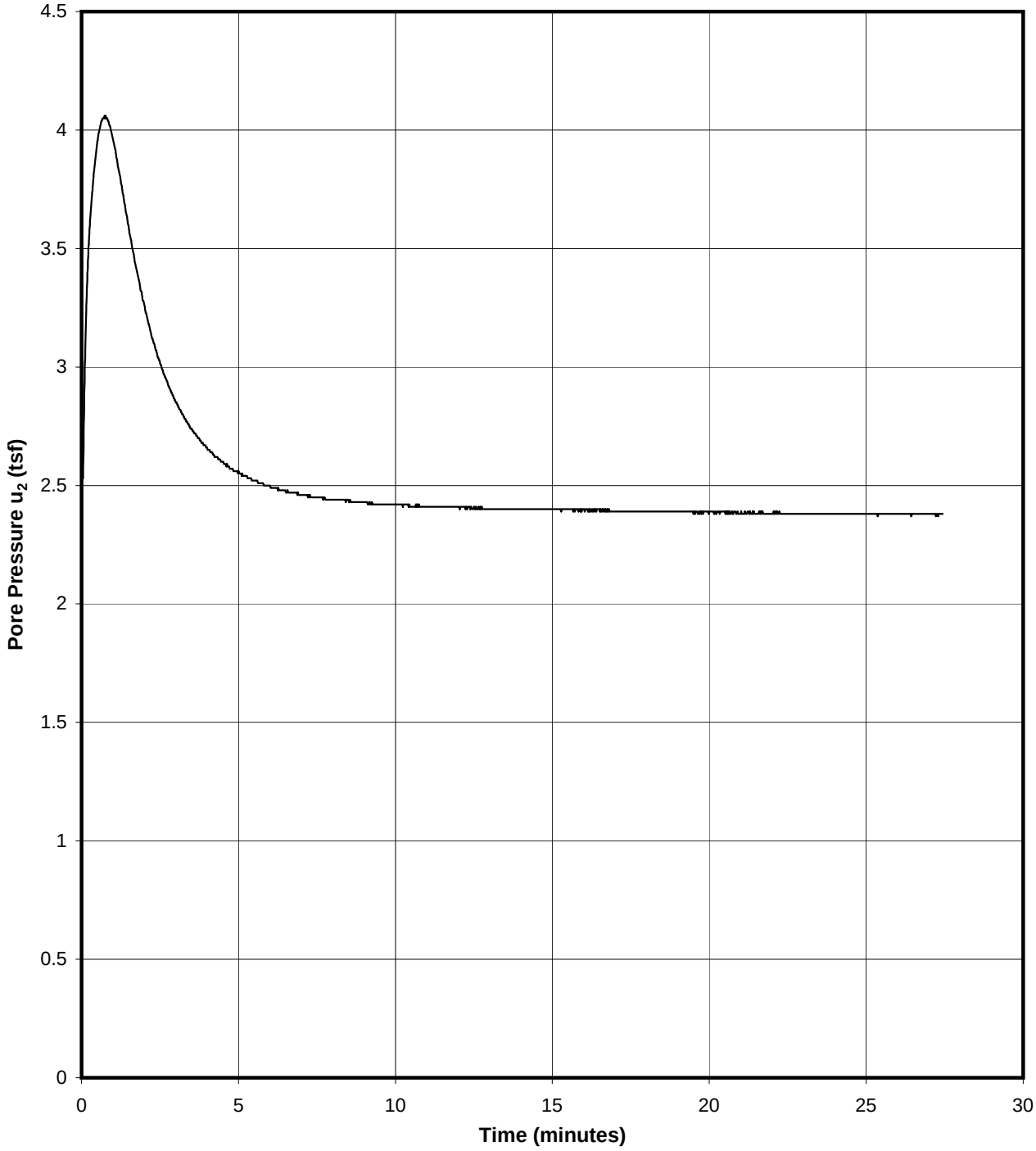
FIGURE A11-7b



Test Date:	22-Dec	Pore Pressure u_2 at start:	1.62 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	2.10 tsf

DISSIPATION TEST
CPT-35, Depth: 84.2 feet
Tunnel Segment of SVRT Project
San Jose, California

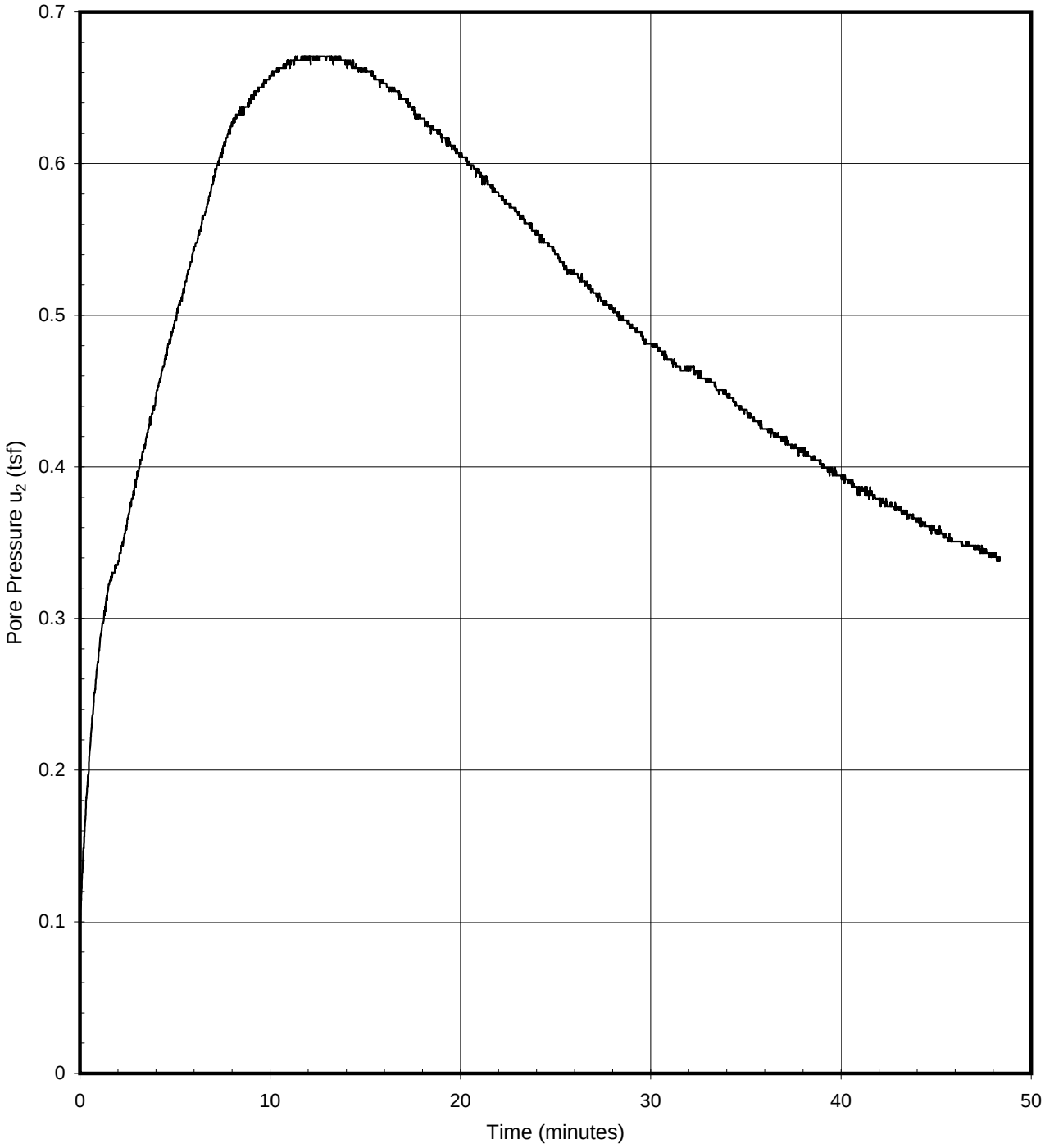
FIGURE A11-7c



Test Date:	22-Dec	Pore Pressure u_2 at start:	2.53 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	2.36 tsf

DISSIPATION TEST
CPT-35, Depth: 94.1 feet
Tunnel Segment of SVRT Project
San Jose, California

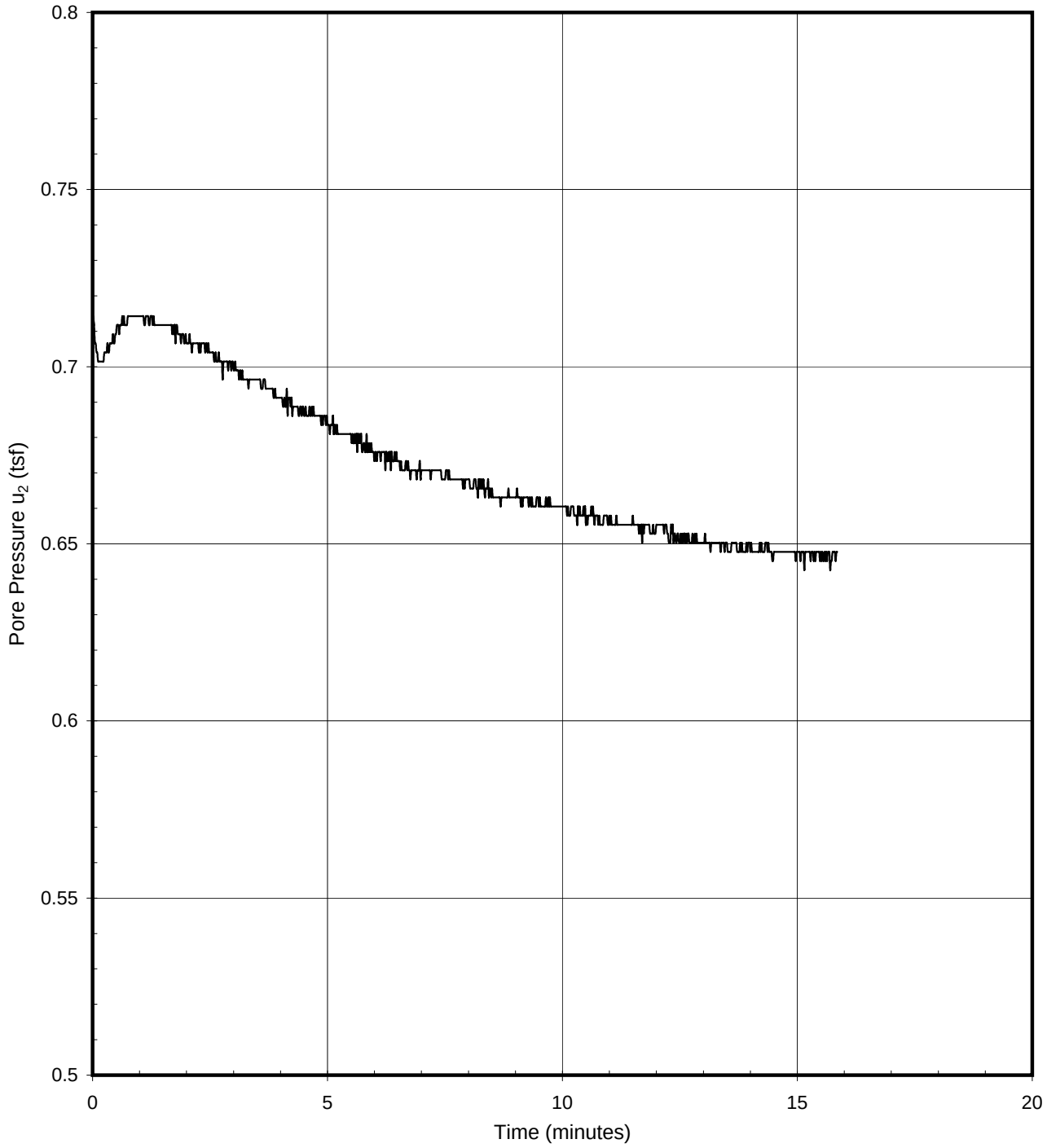
FIGURE A11-7d



Test Date:	18-Oct	Pore Pressure u_2 at start:	0.10 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	0.34 tsf

DISSIPATION TEST
CPT-44, Depth: 25.1 feet
Tunnel Segment of SVRT Project
San Jose, California

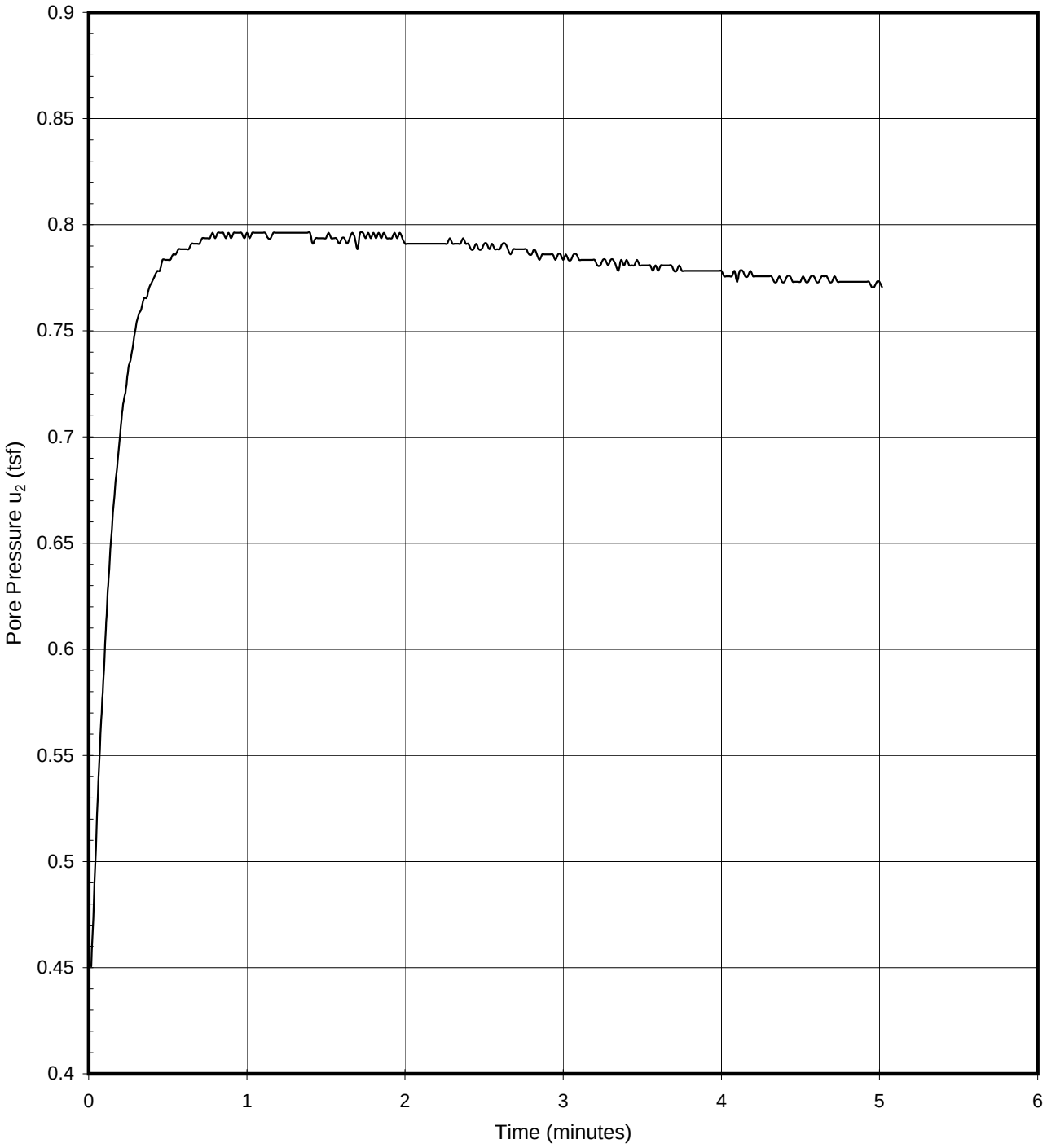
FIGURE A11-8a



Test Date:	18-Oct	Pore Pressure u_2 at start:	0.71 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	0.65 tsf

DISSIPATION TEST
CPT-44, Depth: 45.1 feet
Tunnel Segment of SVRT Project
San Jose, California

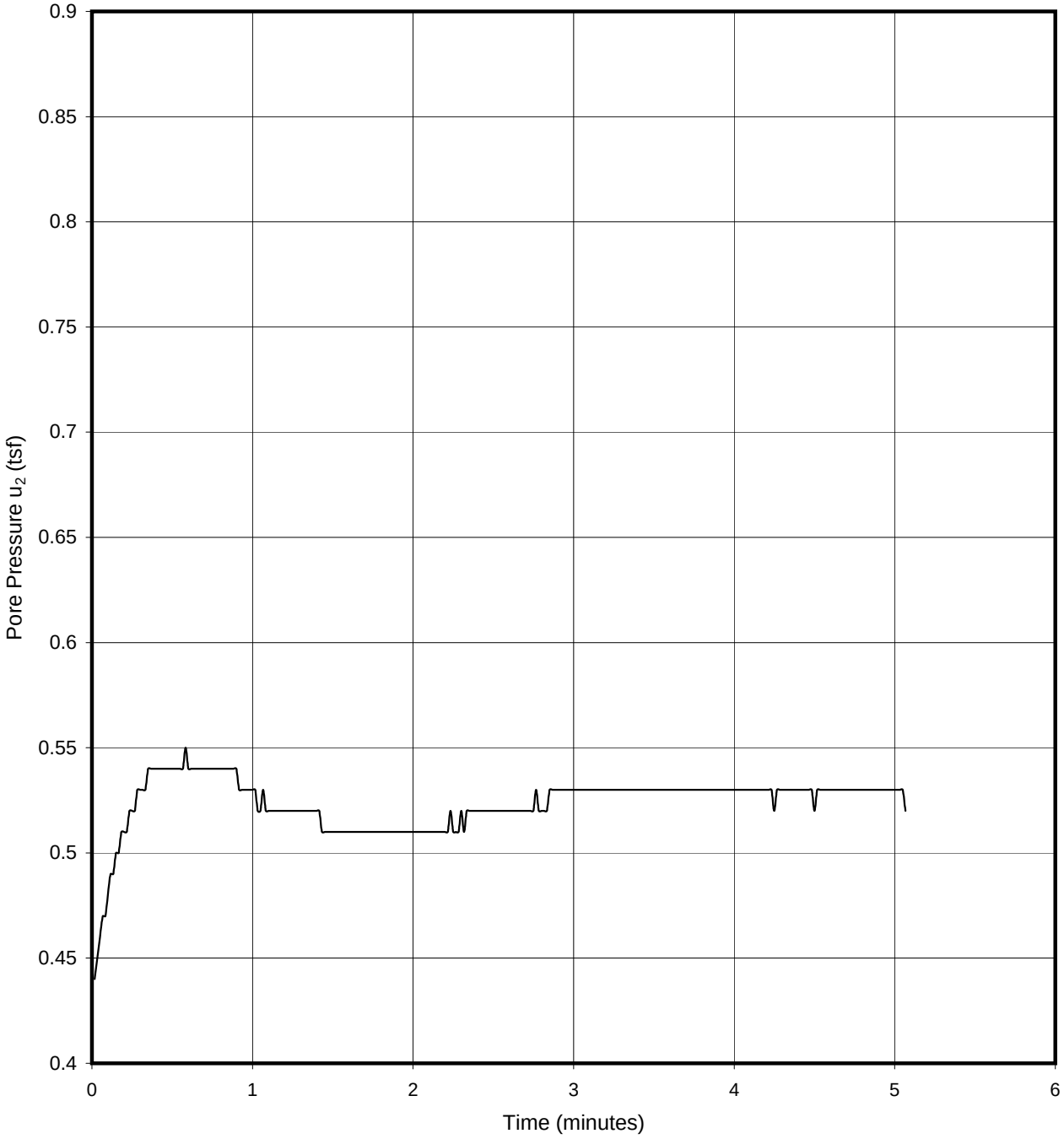
FIGURE A11-8b



Test Date:	18-Oct	Pore Pressure u_2 at start:	0.45 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	0.77 tsf

DISSIPATION TEST
CPT-44, Depth: 48.4 feet
Tunnel Segment of SVRT Project
San Jose, California

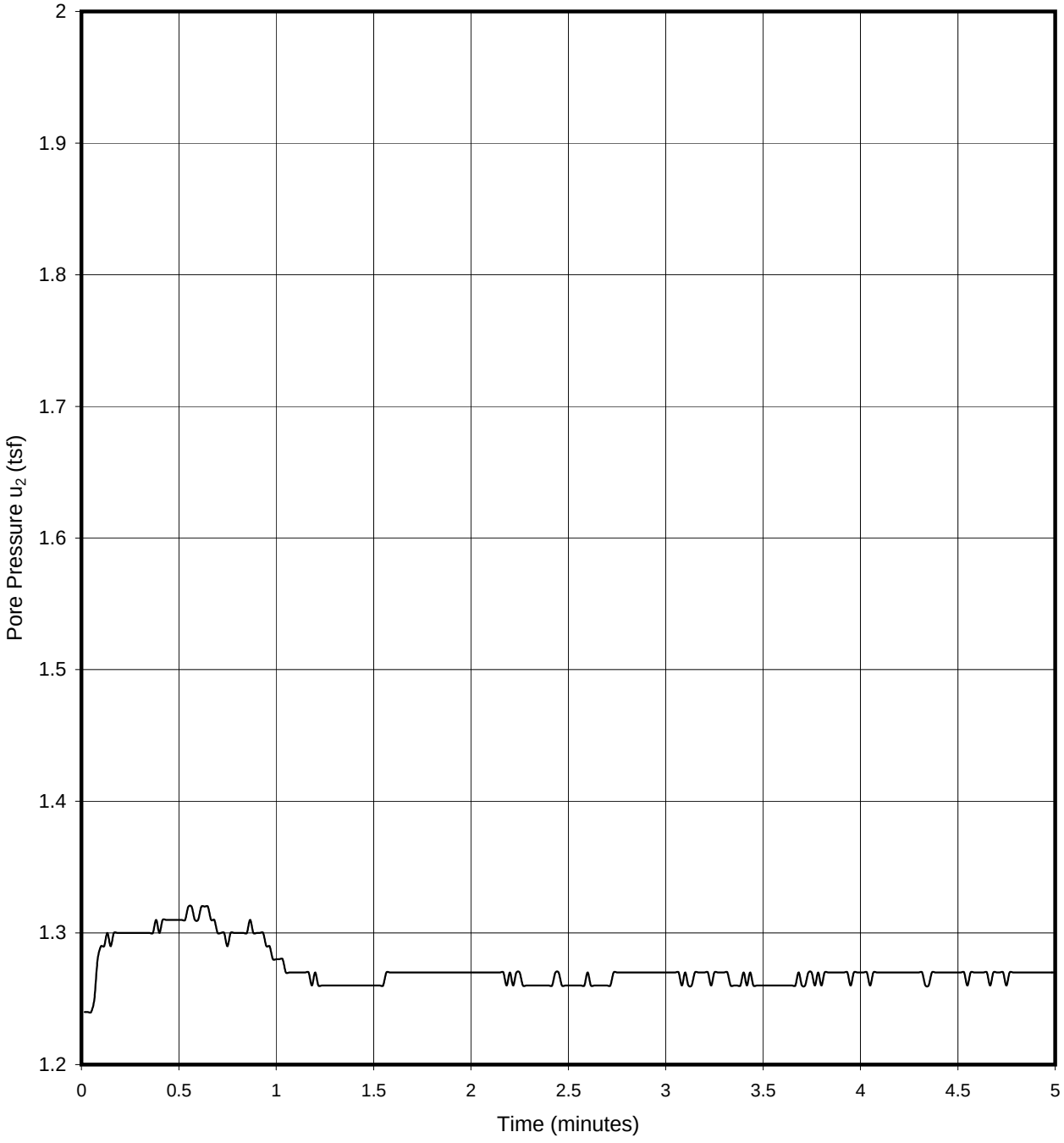
FIGURE A11-8c



Test Date:	23-Feb	Pore Pressure u_2 at start:	0.44 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	0.52 tsf

DISSIPATION TEST
CPT-55, Depth: 36.1 feet
Tunnel Segment of SVRT Project
San Jose, California

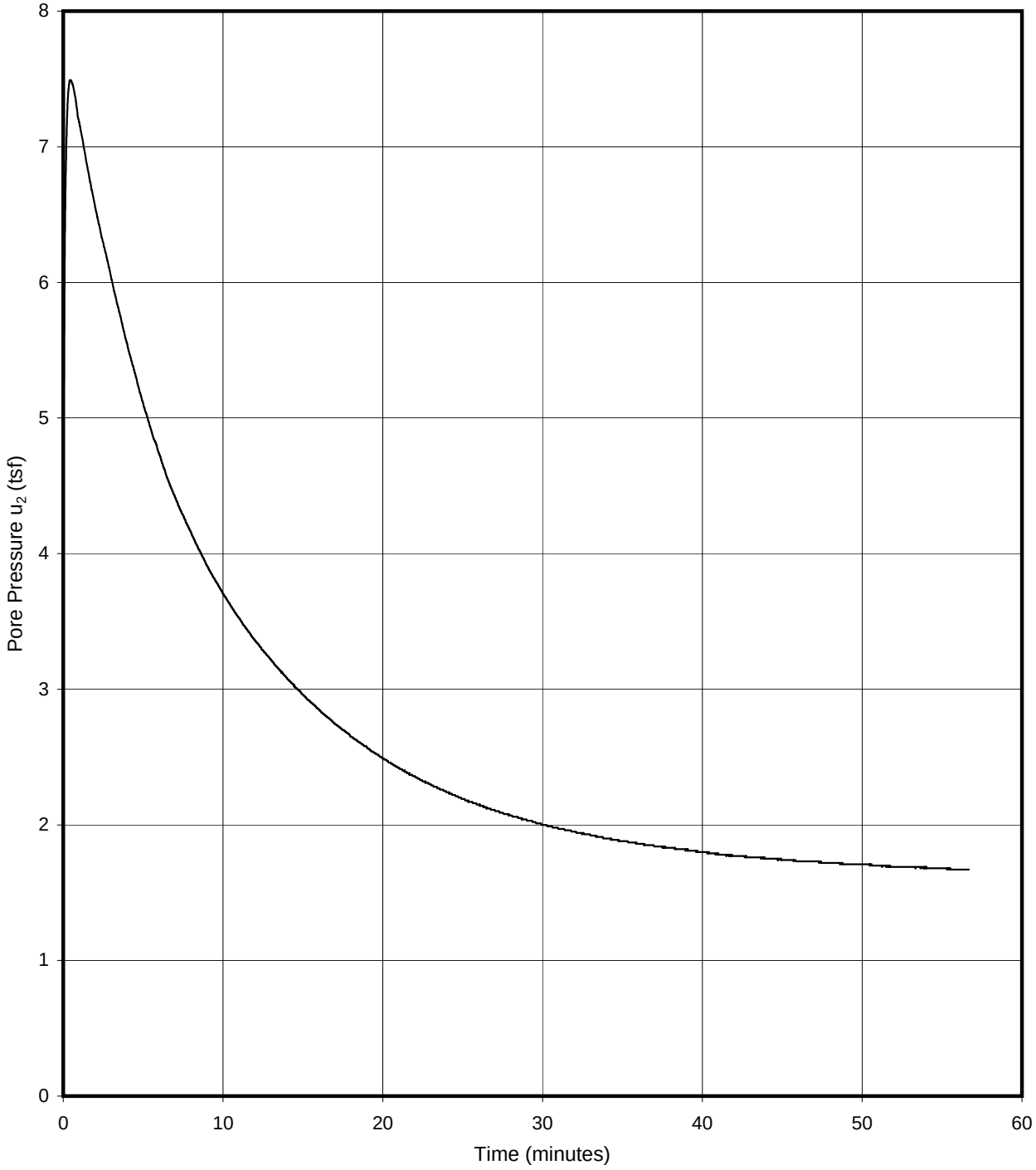
FIGURE A11-9a



Test Date:	23-Feb	Pore Pressure u_2 at start:	1.24 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	1.27 tsf

DISSIPATION TEST
CPT-55, Depth: 60.6 feet
Tunnel Segment of SVRT Project
San Jose, California

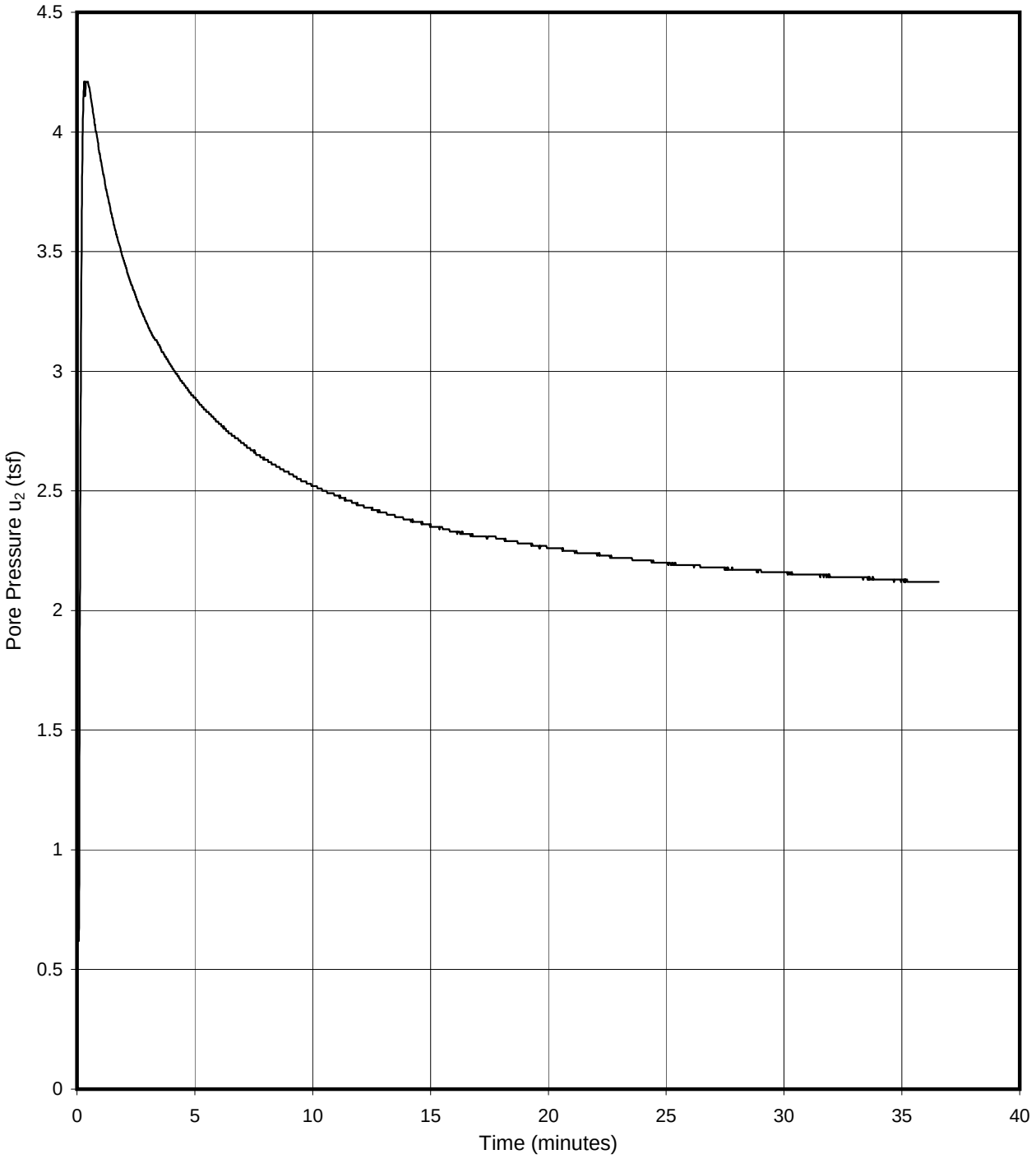
FIGURE A11-9b



Test Date:	23-Feb	Pore Pressure u_2 at start:	4.50 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	1.67 tsf

DISSIPATION TEST
CPT-55A, Depth: 71.5 feet
Tunnel Segment of SVRT Project
San Jose, California

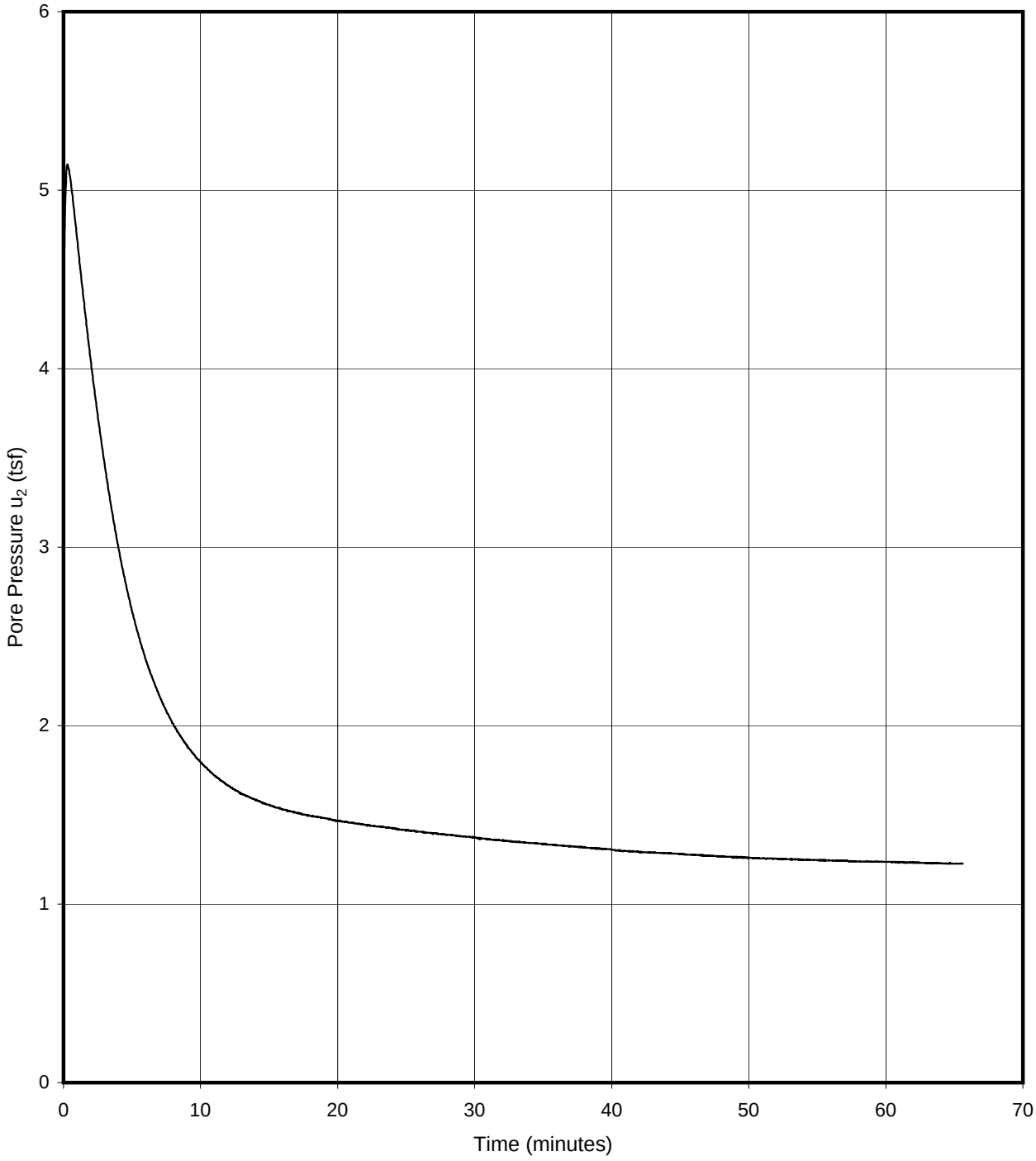
FIGURE A11-10a



Test Date:	23-Feb	Pore Pressure u_2 at start:	0.72 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	2.12 tsf

DISSIPATION TEST
CPT-55A, Depth: 86.1 feet
Tunnel Segment of SVRT Project
San Jose, California

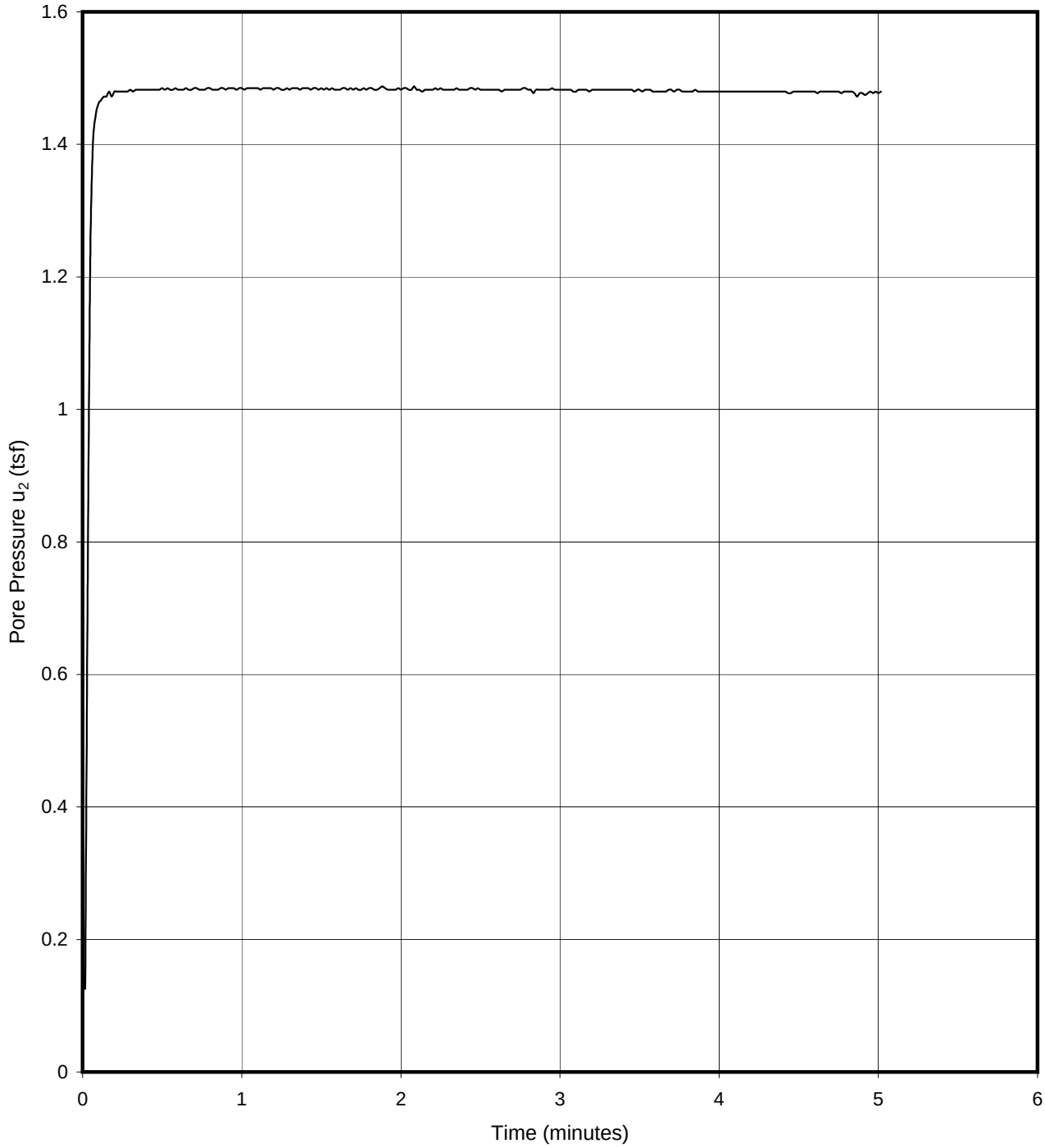
FIGURE A11-10b



Test Date:	20-Jan	Pore Pressure u_2 at start:	4.17 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	1.23 tsf

DISSIPATION TEST
CPT-68, Depth: 54.2 feet
Tunnel Segment of SVRT Project
San Jose, California

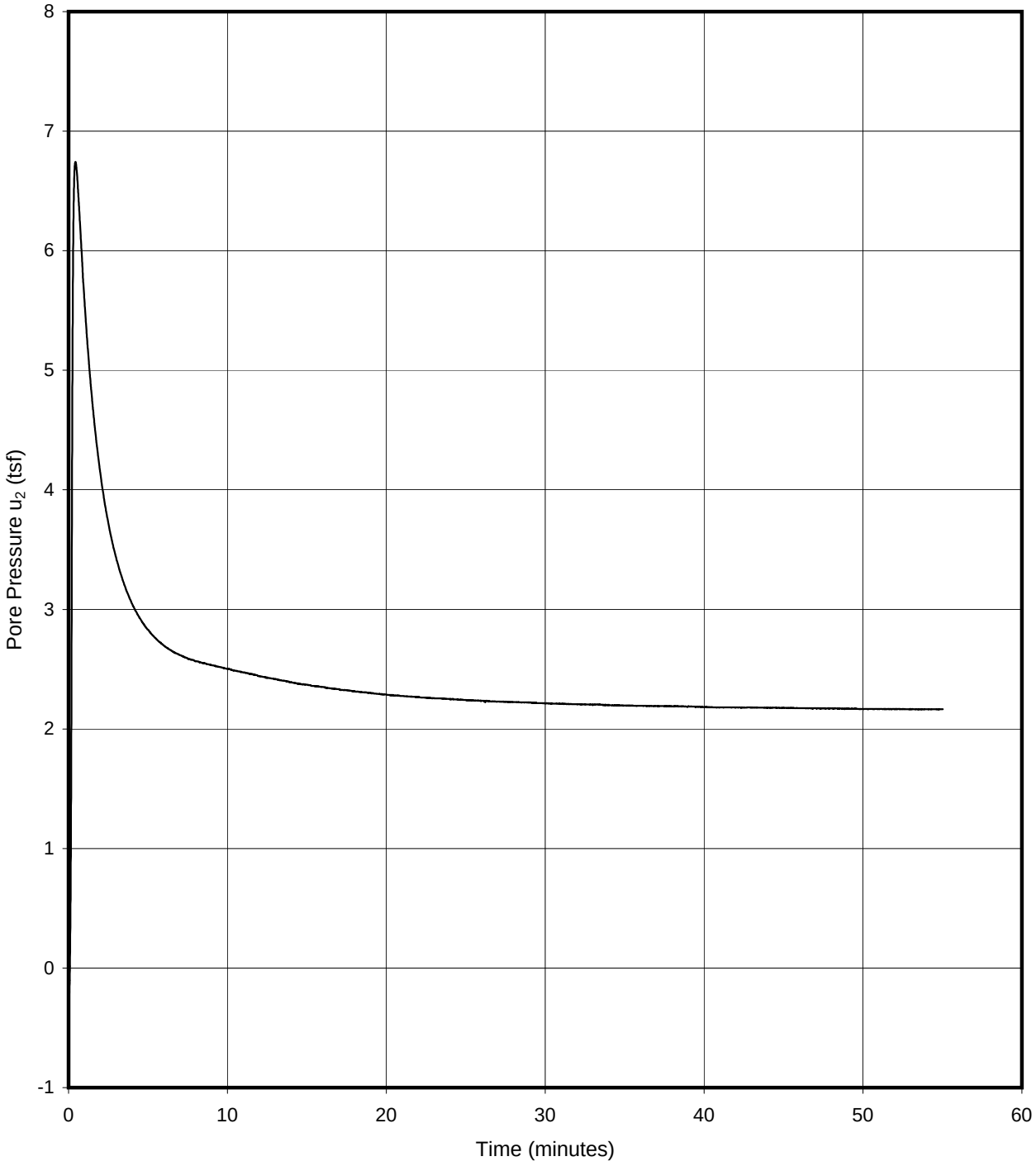
FIGURE A11-11a



Test Date:	20-Jan	Pore Pressure u_2 at start:	0.13 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	1.48 tsf

DISSIPATION TEST
CPT-68, Depth: 63.2 feet
Tunnel Segment of SVRT Project
San Jose, California

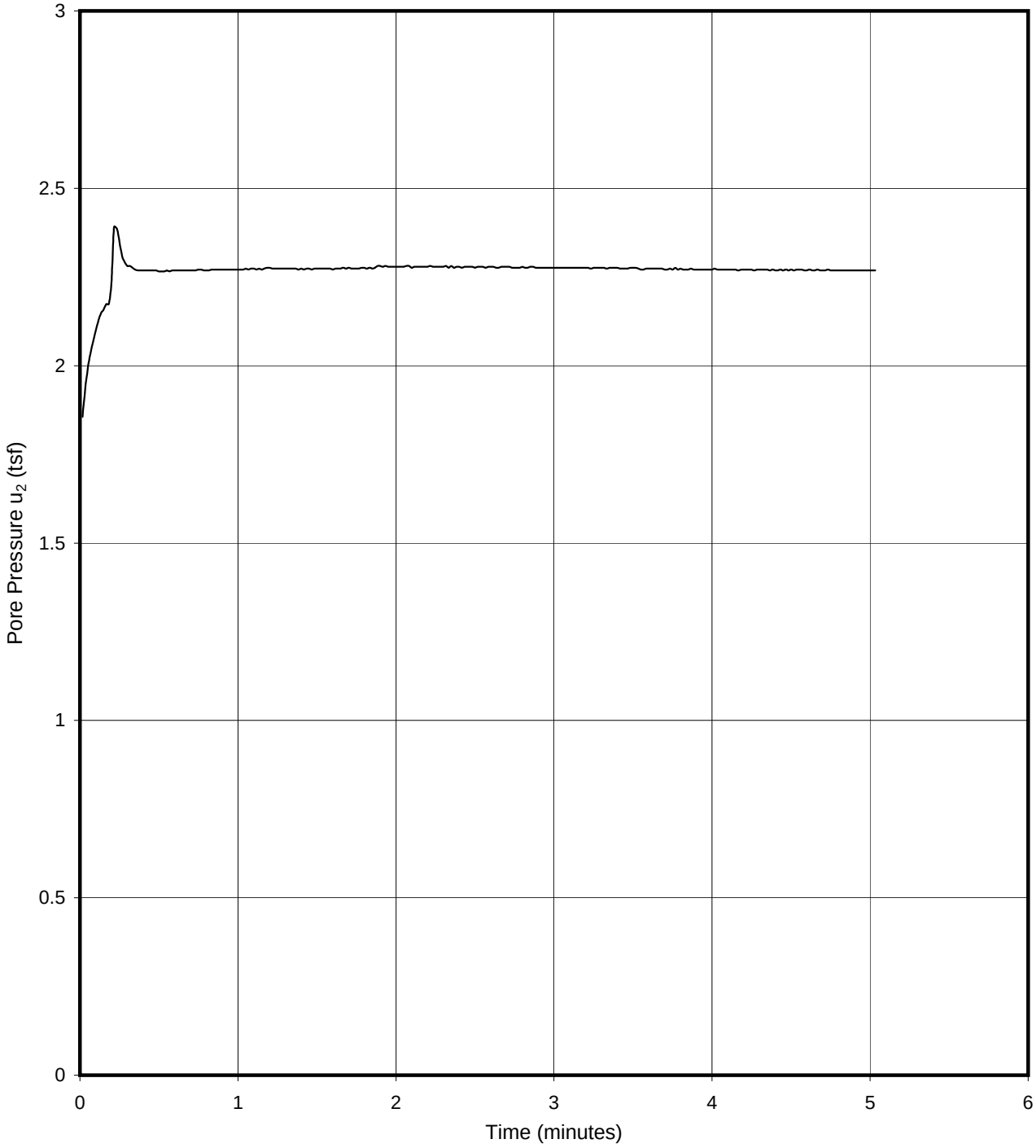
FIGURE A11-11b



Test Date:	20-Jan	Pore Pressure u_2 at start:	-0.27 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	2.17 tsf

DISSIPATION TEST
CPT-68, Depth: 85.5 feet
Tunnel Segment of SVRT Project
San Jose, California

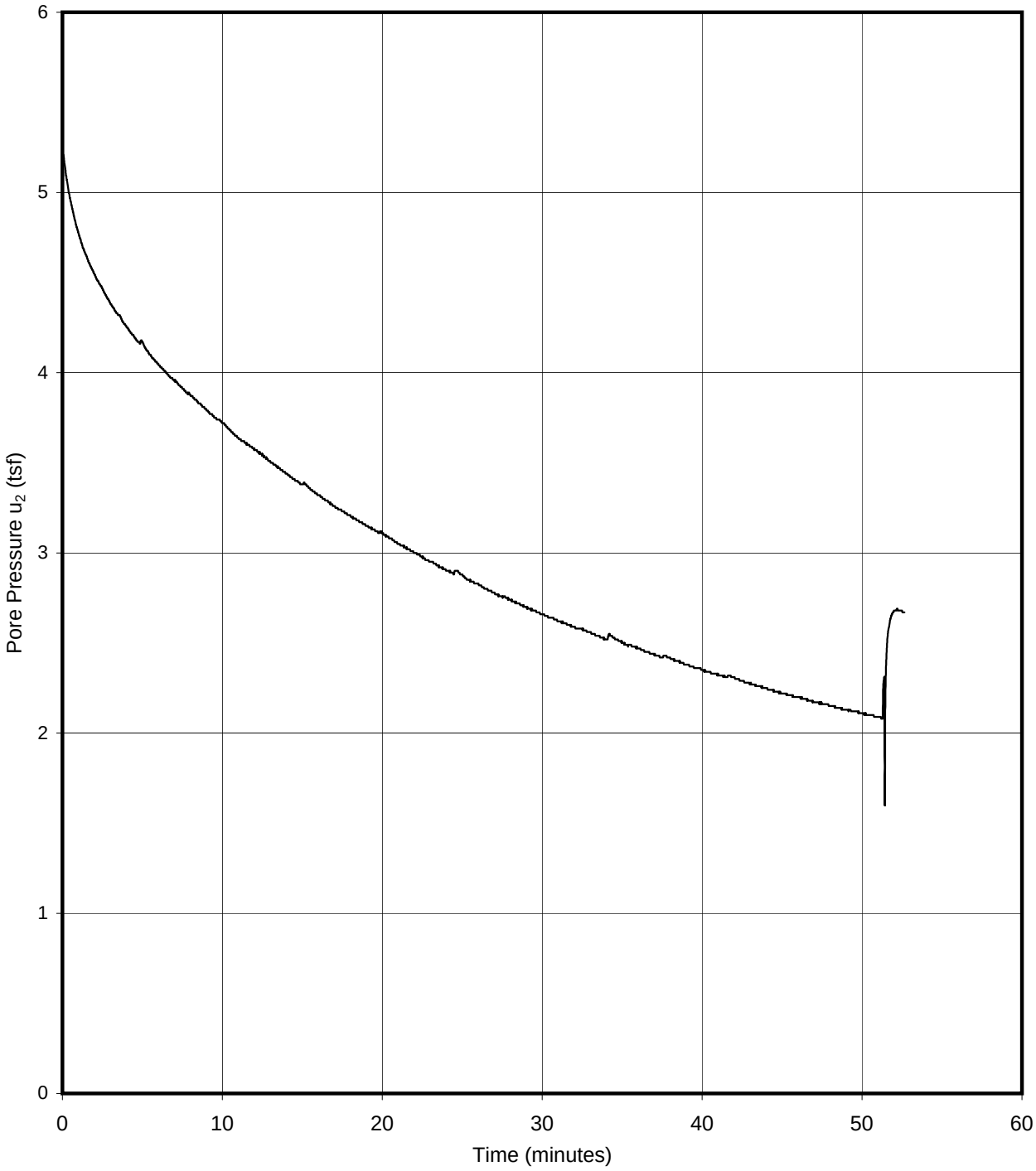
FIGURE A11-11c



Test Date:	20-Jan	Pore Pressure u_2 at start:	1.86 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	2.27 tsf

DISSIPATION TEST
CPT-68, Depth: 88.2 feet
Tunnel Segment of SVRT Project
San Jose, California

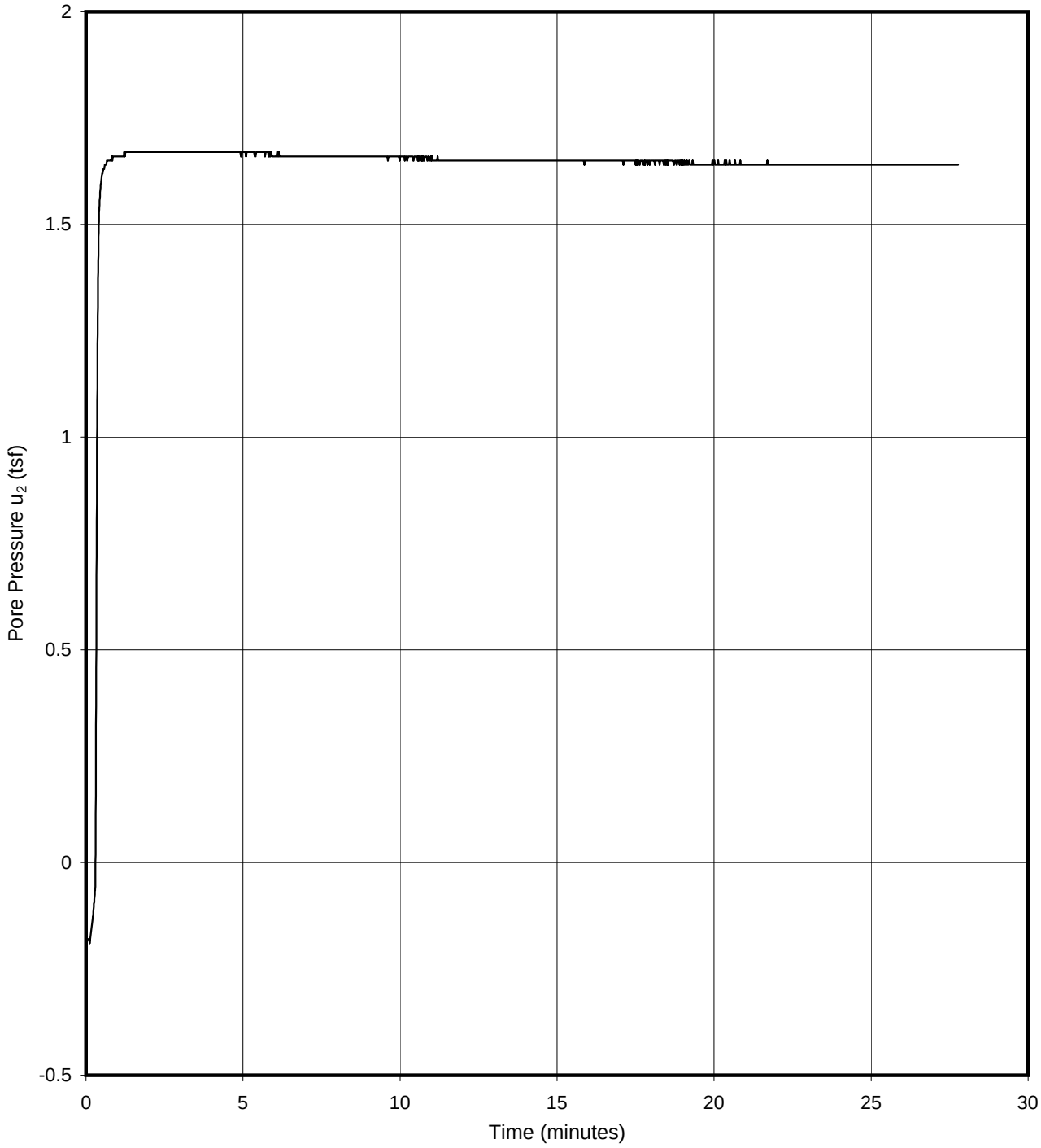
FIGURE A11-11d



Test Date:	5-Jan	Pore Pressure u_2 at start:	5.21 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	2.67 tsf

DISSIPATION TEST
CPT-79, Depth: 52.15 feet
Tunnel Segment of SVRT Project
San Jose, California

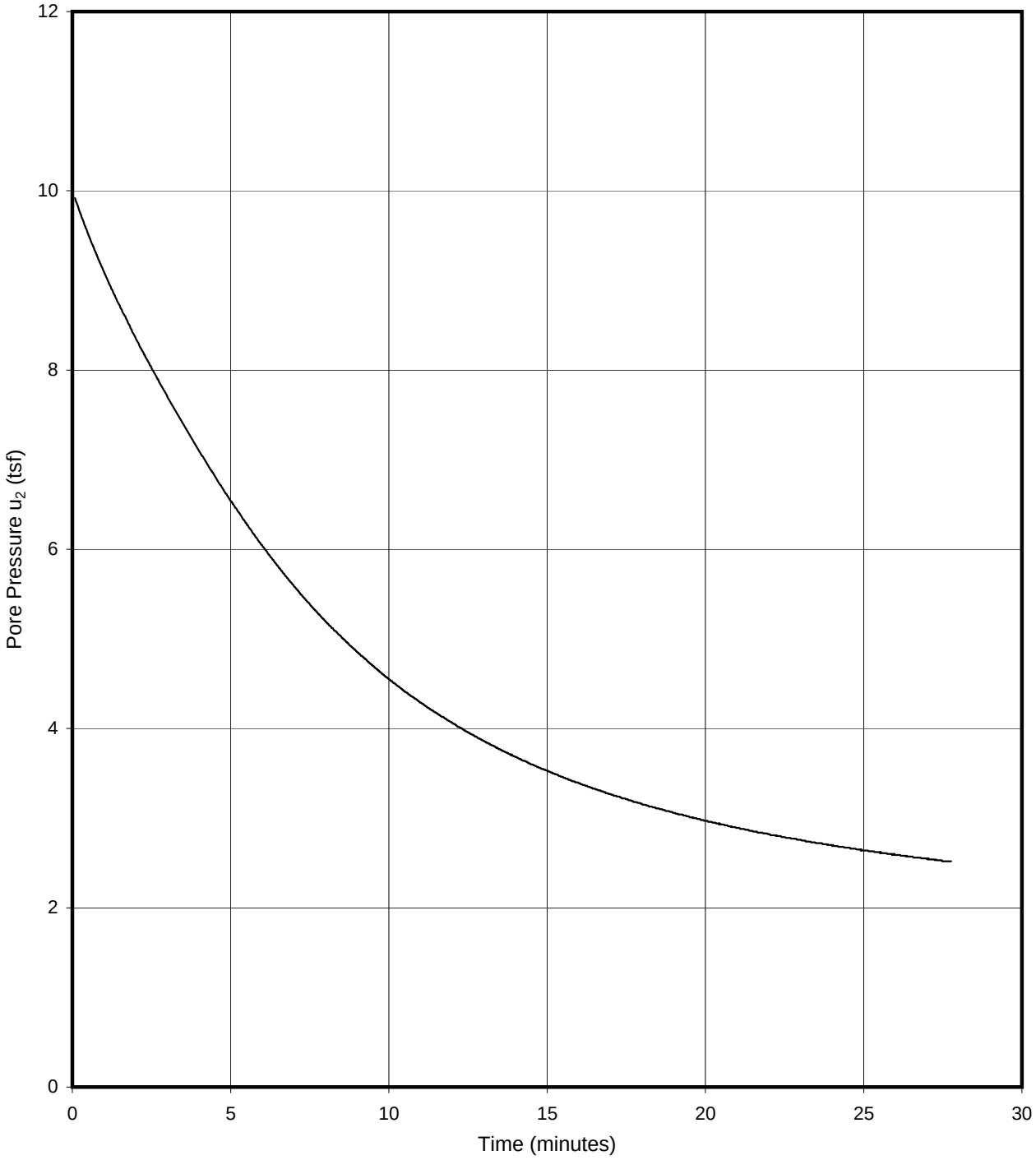
FIGURE A11-12a



Test Date:	5-Jan	Pore Pressure u_2 at start:	-0.18 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	1.64 tsf

DISSIPATION TEST
CPT-79, Depth: 73.73 feet
Tunnel Segment of SVRT Project
San Jose, California

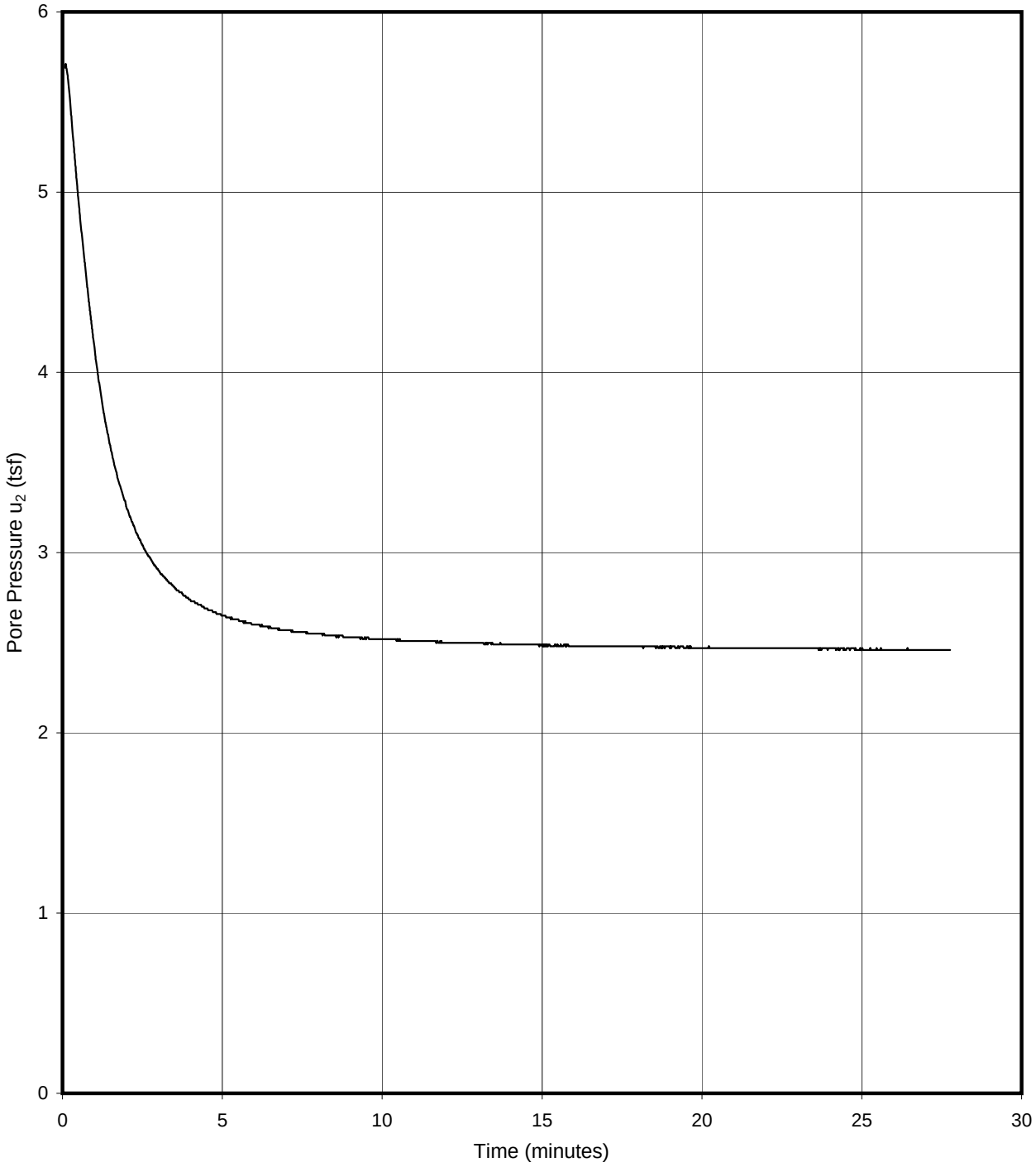
FIGURE A11-12b



Test Date:	5-Jan	Pore Pressure u_2 at start:	9.92 tsf
Soil Type:	Clayey Silts and Silty Clays	Pore Pressure u_2 at end:	1.95 tsf

DISSIPATION TEST
CPT-79, Depth: 78.00 feet
Tunnel Segment of SVRT Project
San Jose, California

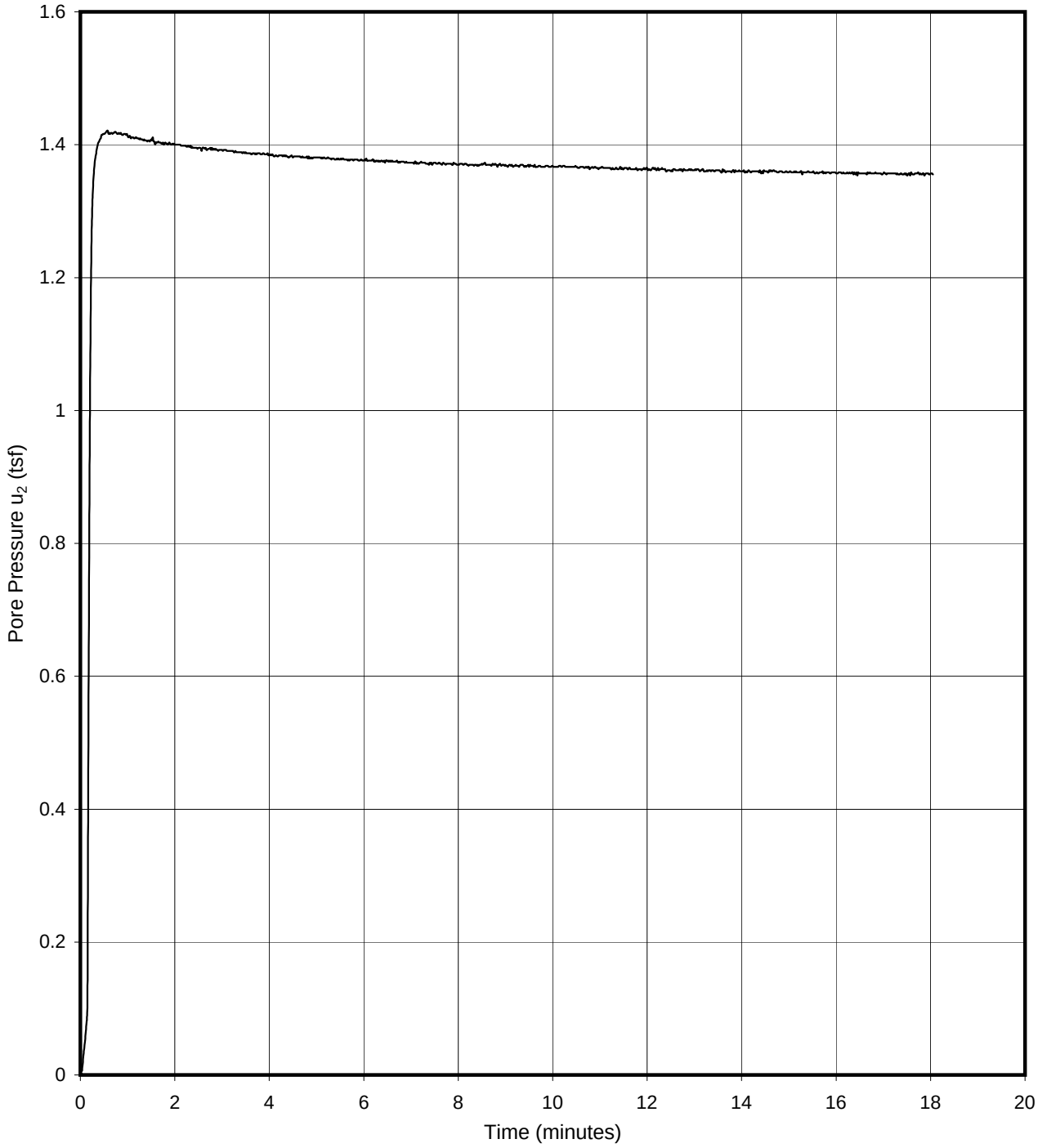
FIGURE A11-12c



Test Date:	5-Jan	Pore Pressure u_2 at start:	5.69 tsf
Soil Type:	Sands	Pore Pressure u_2 at end:	2.46 tsf

DISSIPATION TEST
CPT-79, Depth: 100.04 feet
Tunnel Segment of SVRT Project
San Jose, California

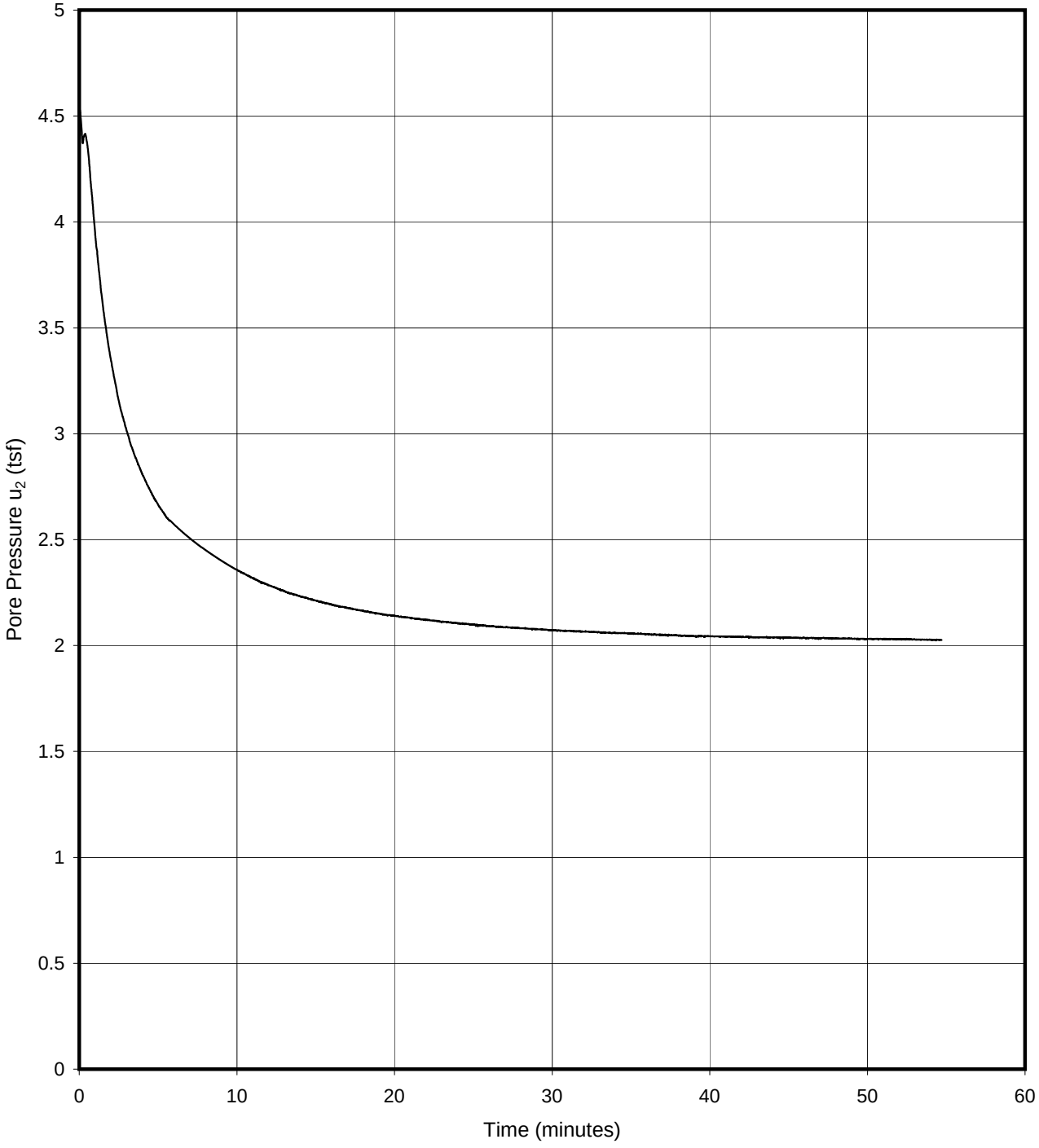
FIGURE A11-12d



Test Date:	10-Jan	Pore Pressure u_2 at start:	0.01 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	1.36 tsf

DISSIPATION TEST
CPT-84, Depth: 58.8 feet
Tunnel Segment of SVRT Project
San Jose, California

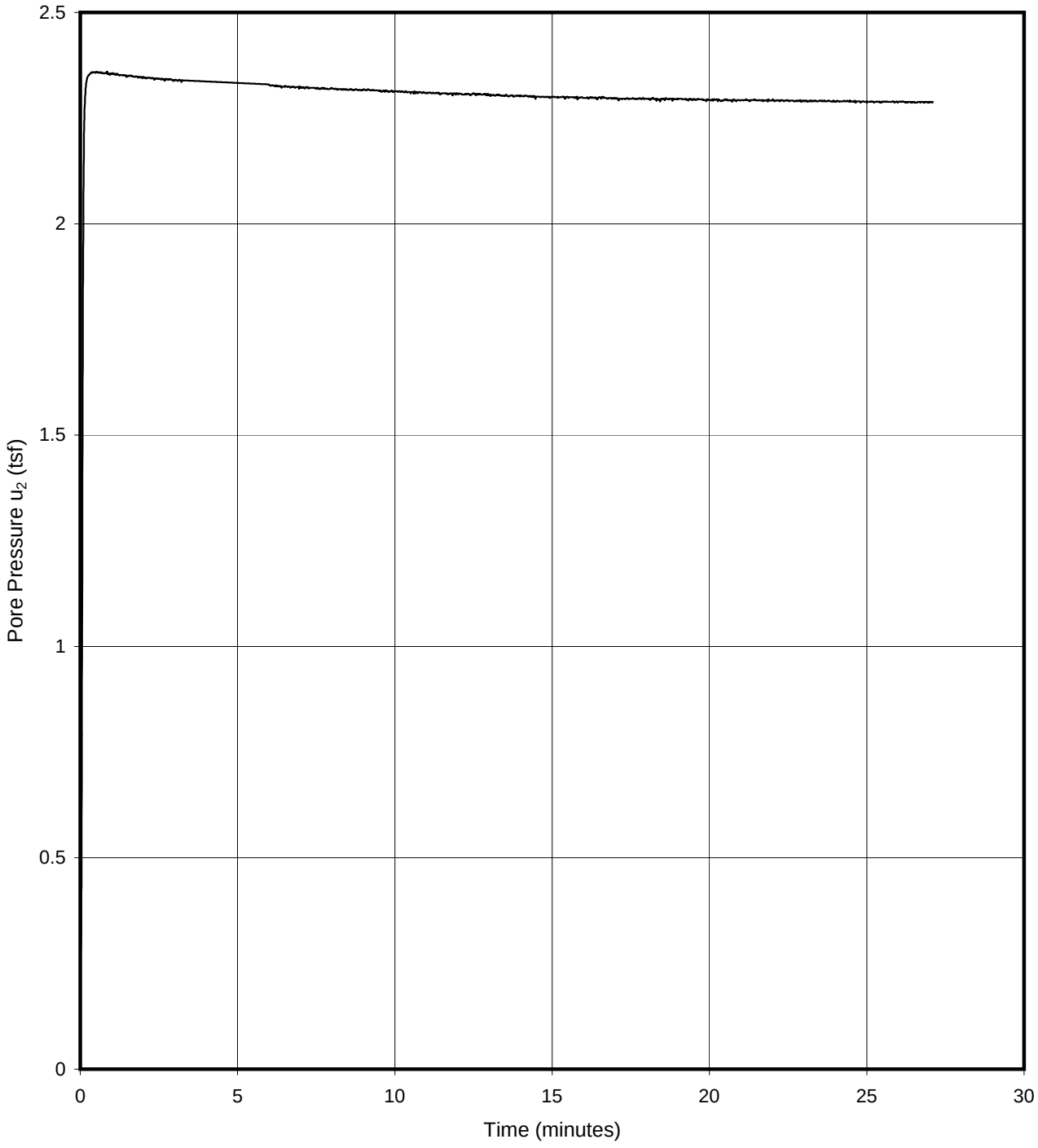
FIGURE A11-13a



Test Date:	10-Jan	Pore Pressure u_2 at start:	4.53 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	2.03 tsf

DISSIPATION TEST
CPT-84, Depth: 82.1 feet
Tunnel Segment of SVRT Project
San Jose, California

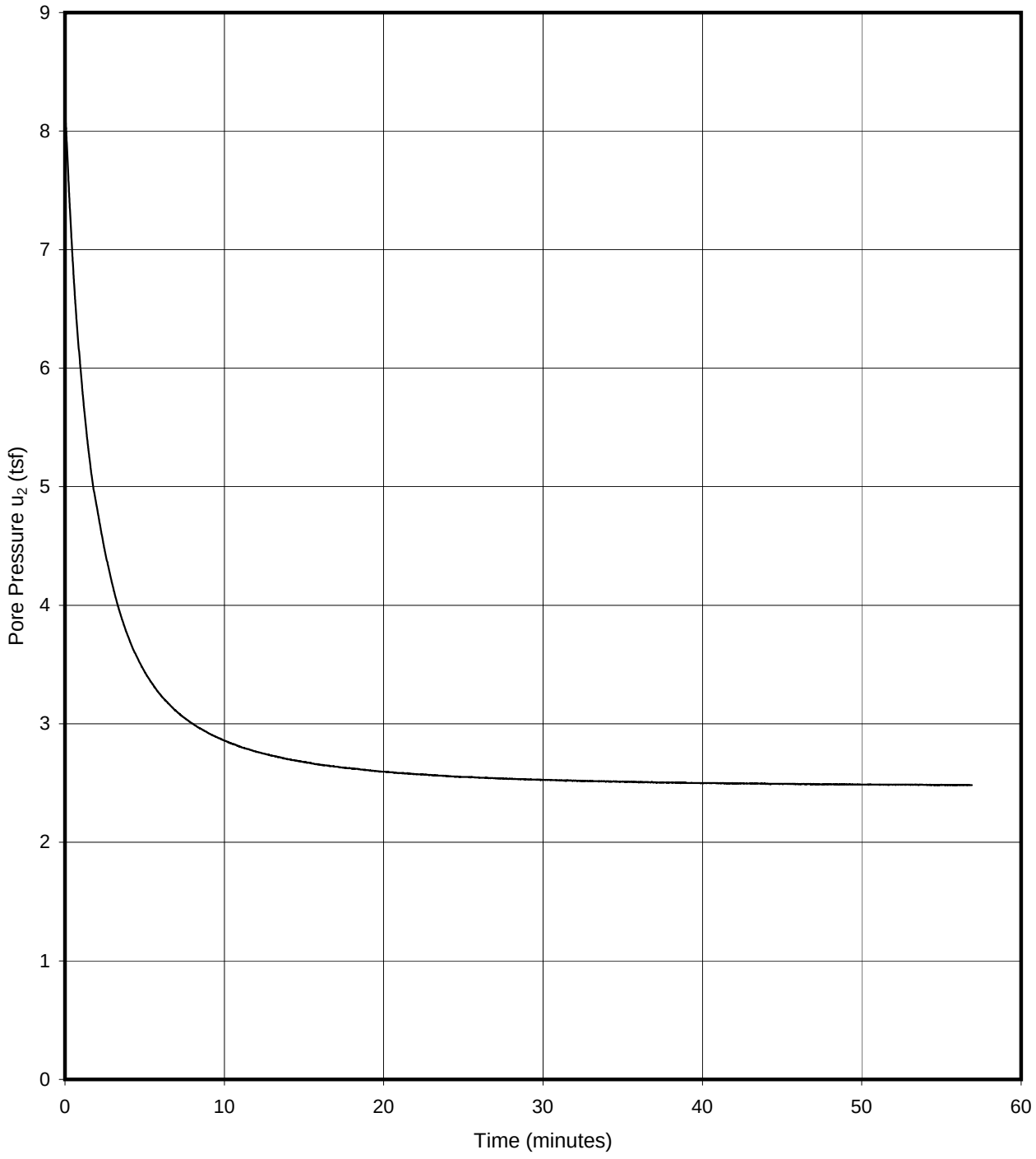
FIGURE A11-13b



Test Date:	10-Jan	Pore Pressure u_2 at start:	0.28 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	2.29 tsf

DISSIPATION TEST
CPT-84, Depth: 91.8 feet
Tunnel Segment of SVRT Project
San Jose, California

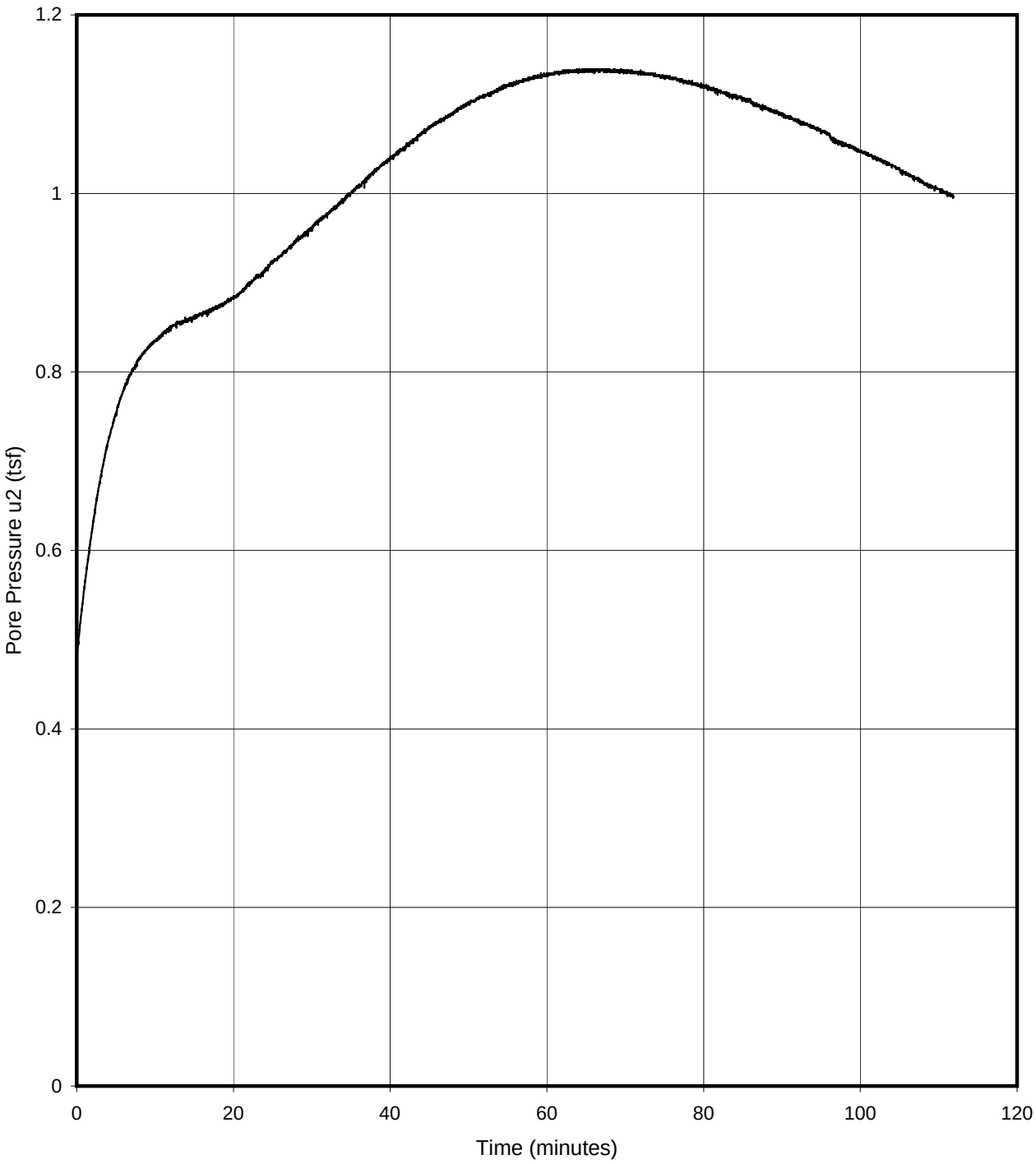
FIGURE A11-13c



Test Date:	10-Jan	Pore Pressure u_2 at start:	8.17 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	2.48 tsf

DISSIPATION TEST
CPT-84, Depth: 98.2 feet
Tunnel Segment of SVRT Project
San Jose, California

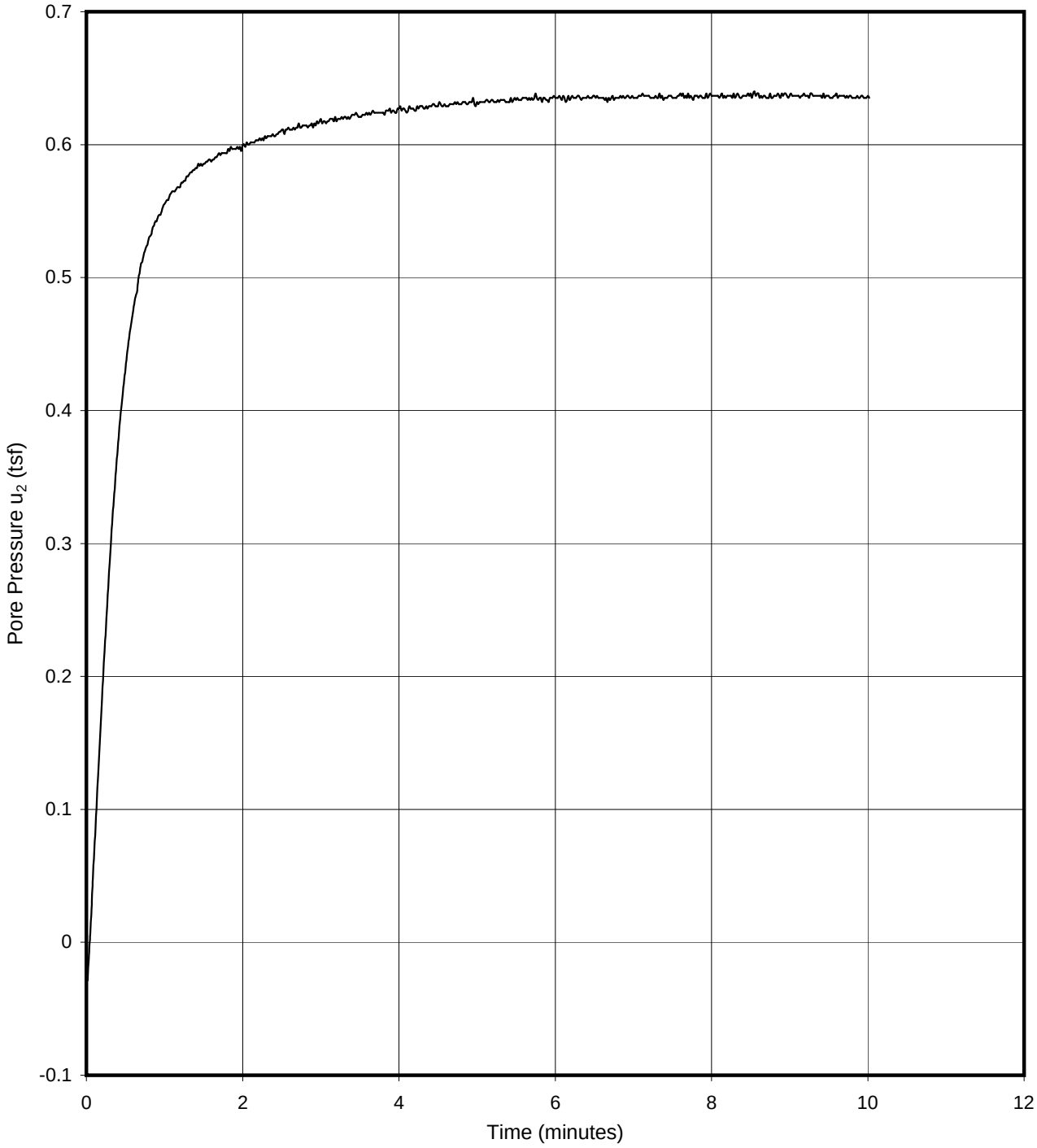
FIGURE A11-13d



Test Date:	19-Apr	Pore Pressure u_2 at start:	0.48 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	1.00 tsf

DISSIPATION TEST
CPT-93, Depth: 20.0 feet
Tunnel Segment of SVRT Project
San Jose, California

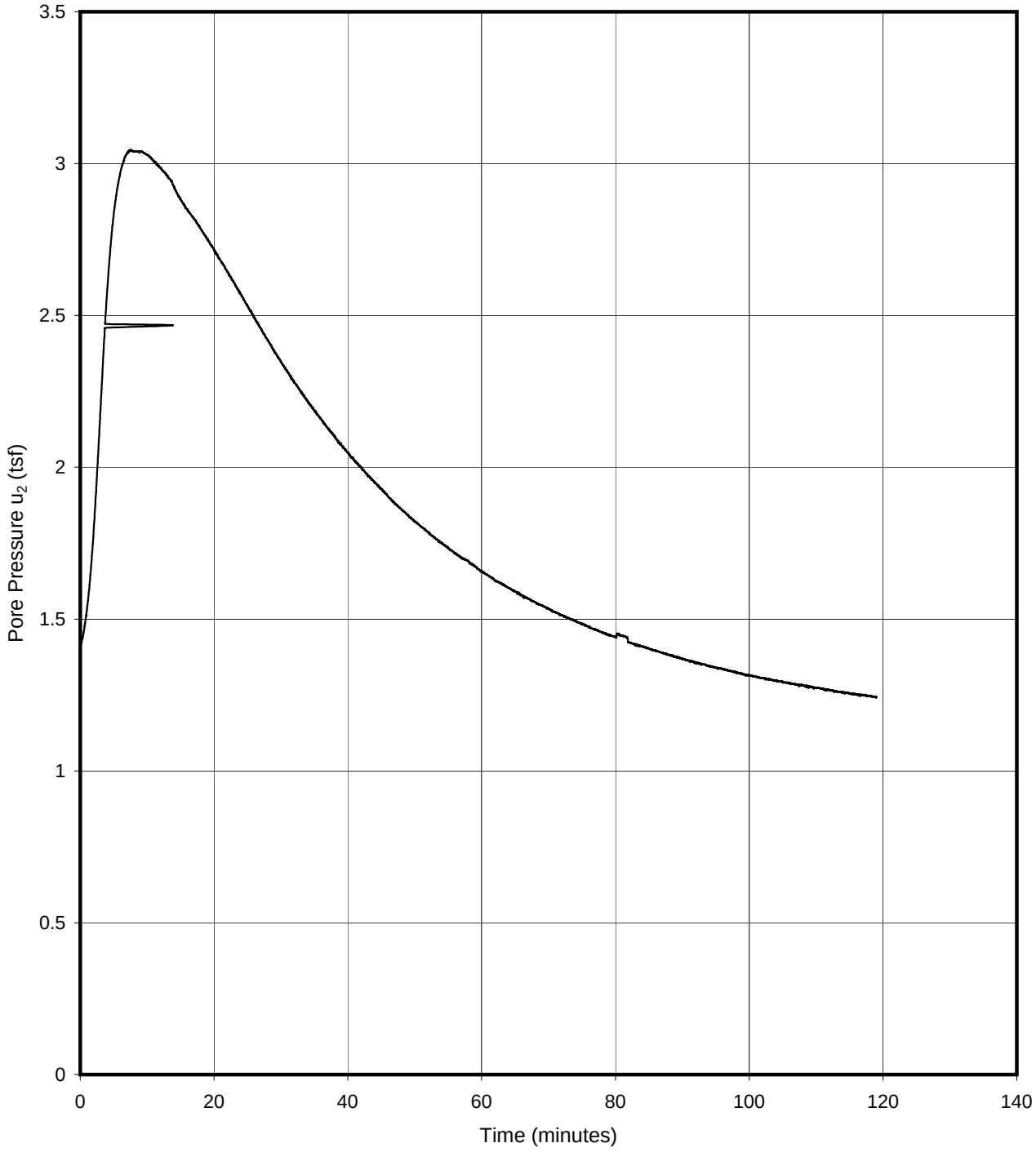
FIGURE A11-14a



Test Date:	19-Apr	Pore Pressure u_2 at start:	-0.03 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	0.64 tsf

DISSIPATION TEST
CPT-93, Depth: 31.9 feet
Tunnel Segment of SVRT Project
San Jose, California

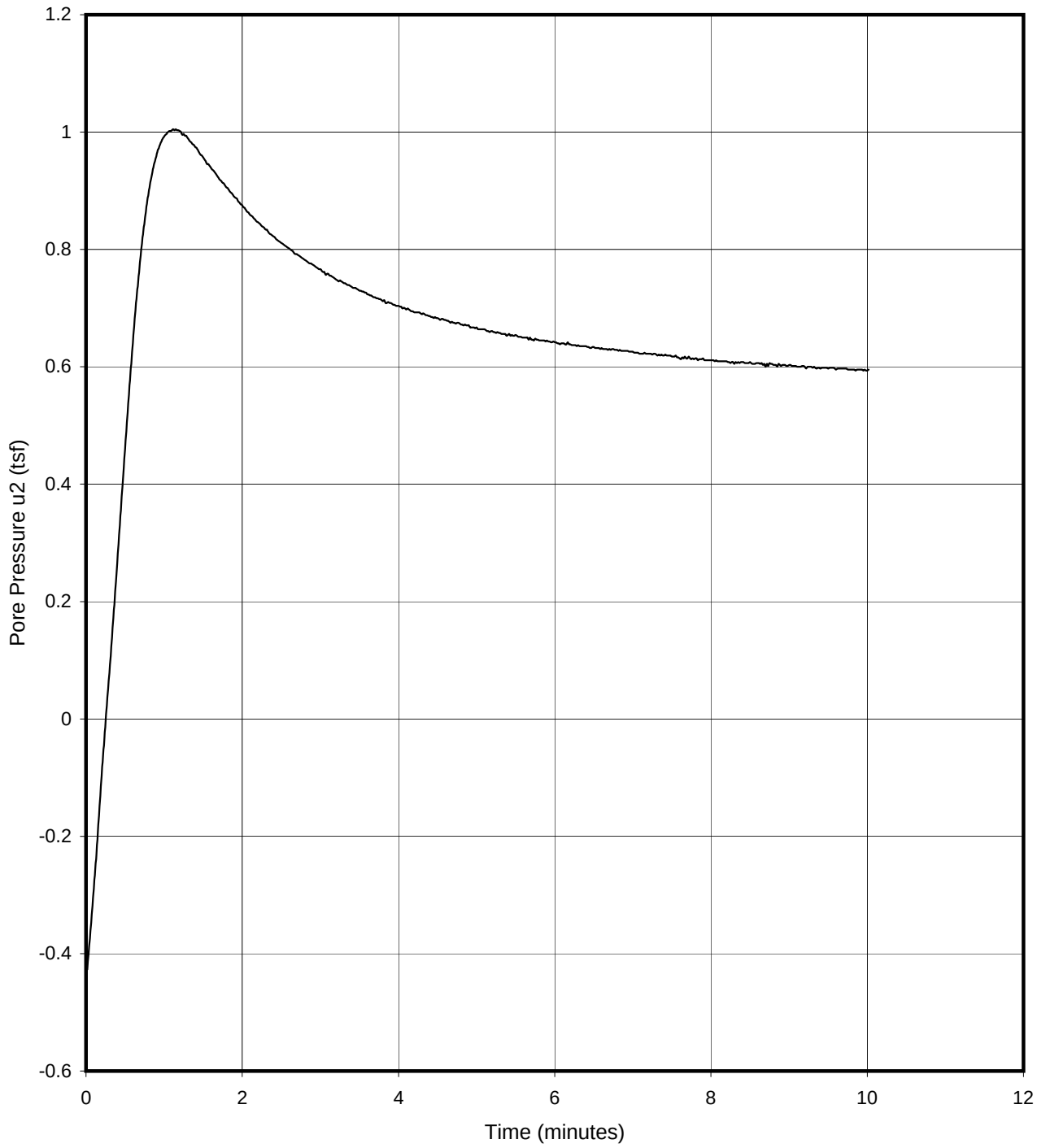
FIGURE A11-14b



Test Date:	19-Apr	Pore Pressure u_2 at start:	1.41 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	1.24 tsf

DISSIPATION TEST
CPT-93, Depth: 47.2 feet
Tunnel Segment of SVRT Project
San Jose, California

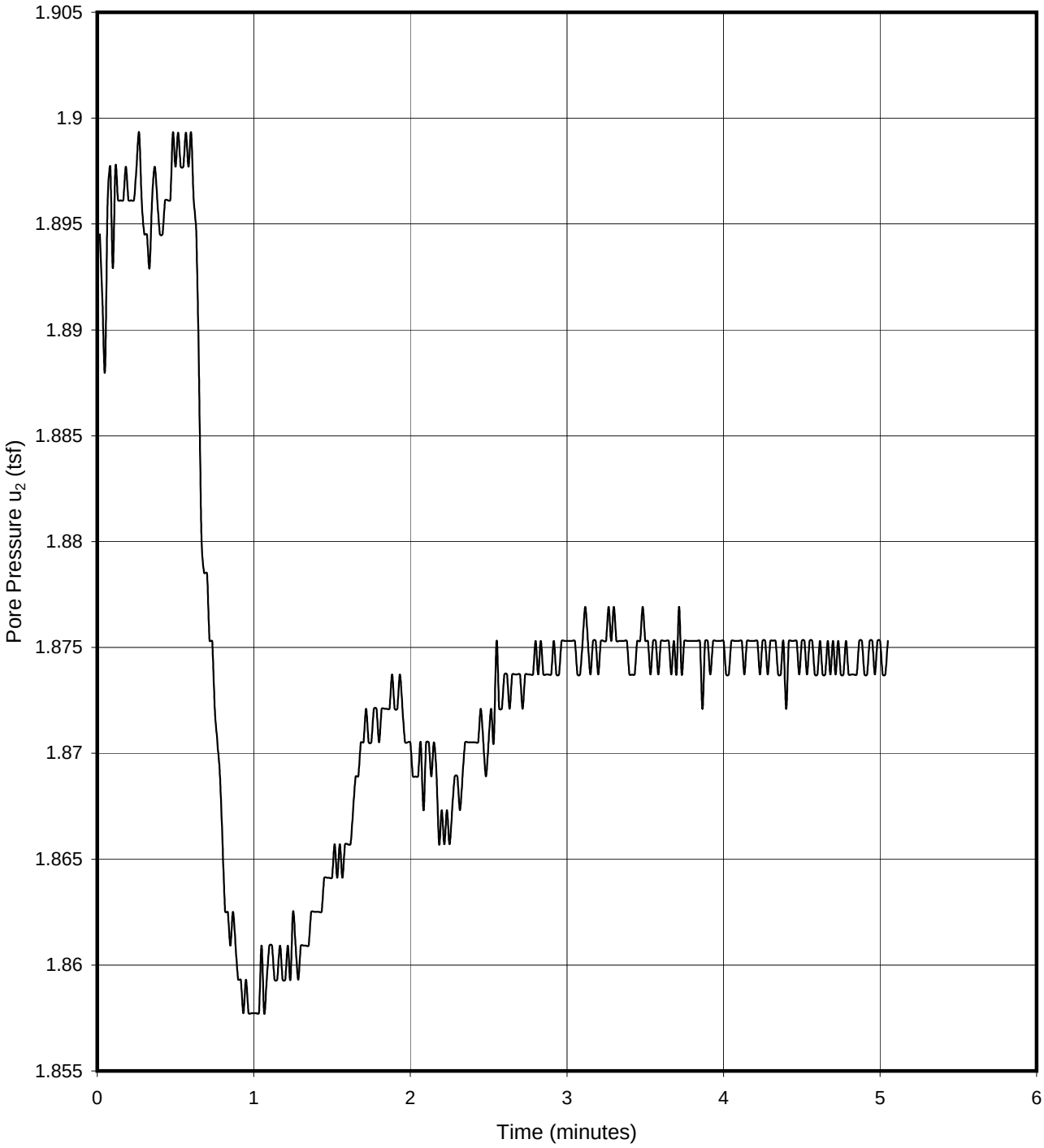
FIGURE A11-14c



Test Date:	20-Apr	Pore Pressure u_2 at start:	-0.43 tsf
Soil Type:	Clayey, silt and silty clay	Pore Pressure u_2 at end:	0.60 tsf

DISSIPATION TEST
CPT-95, Depth: 29.6 feet
Tunnel Segment of SVRT Project
San Jose, California

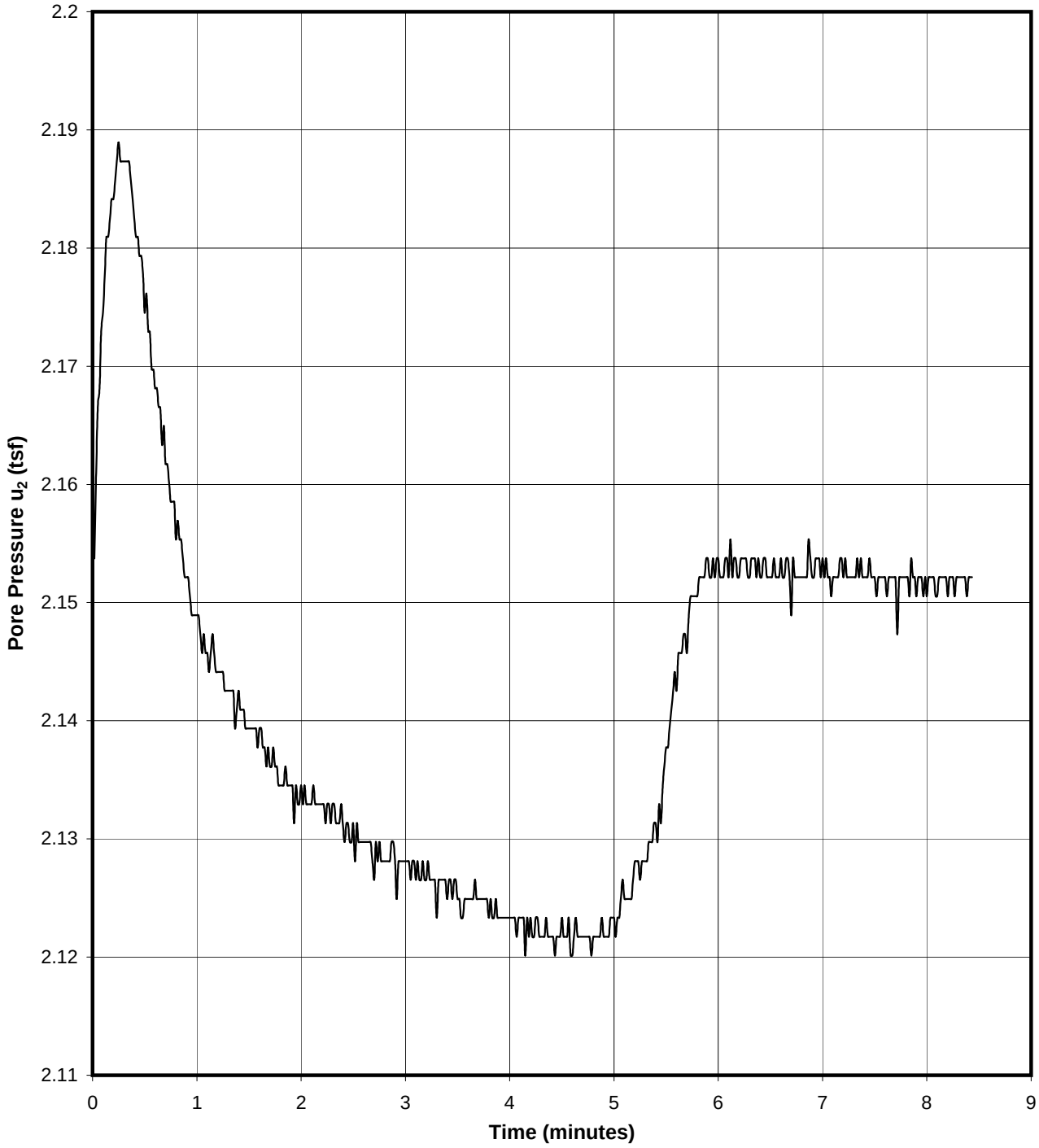
FIGURE A11-15a



Test Date:	20-Apr	Pore Pressure u_2 at start:	1.89 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	1.88 tsf

DISSIPATION TEST
CPT-95, Depth: 64.0 feet
Tunnel Segment of SVRT Project
San Jose, California

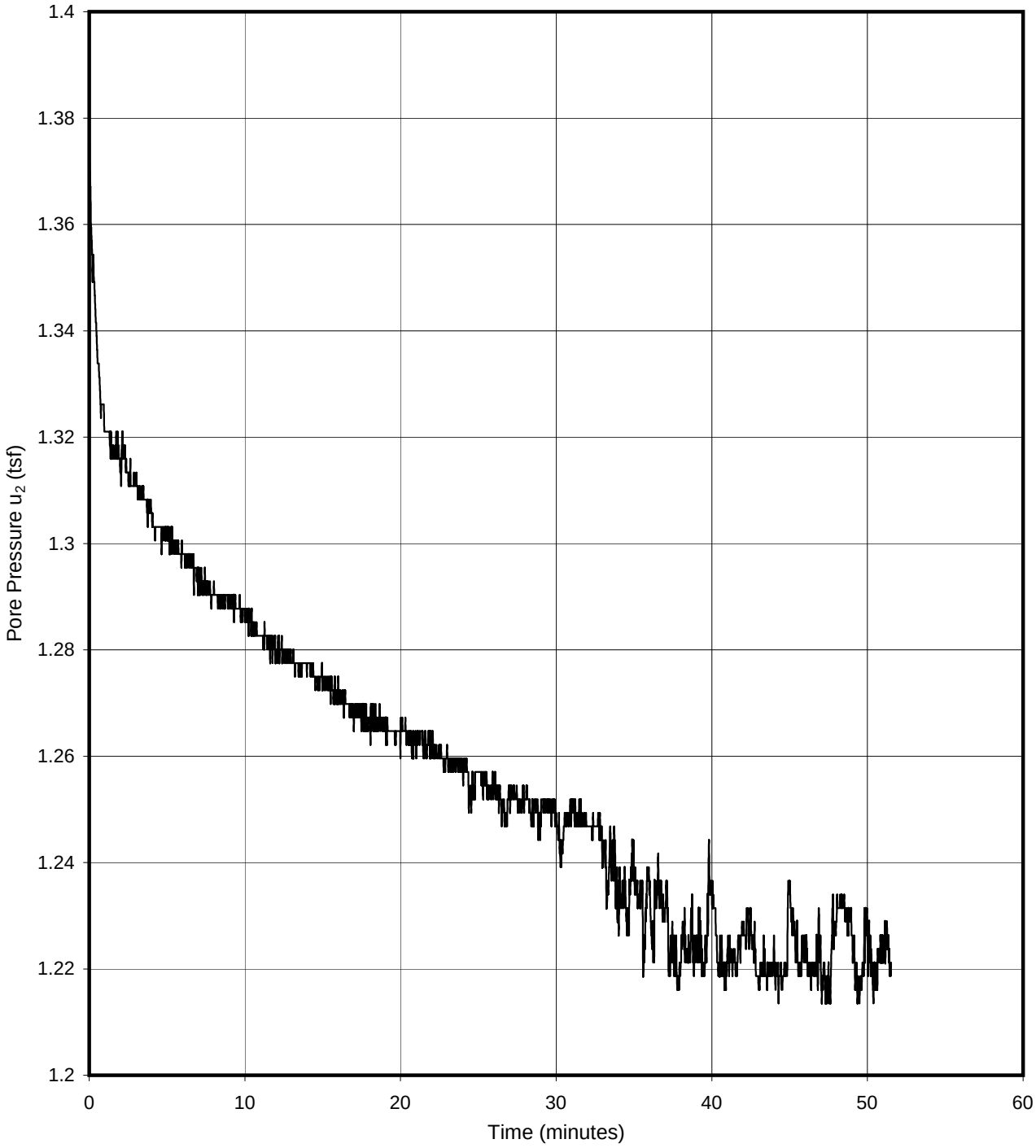
FIGURE A11-15b



Test Date:	20-Apr	Pore Pressure u_2 at start:	2.15 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	2.15 tsf

DISSIPATION TEST
CPT-95, Depth: 74.7 feet
Tunnel Segment of SVRT Project
Sam Jose, California

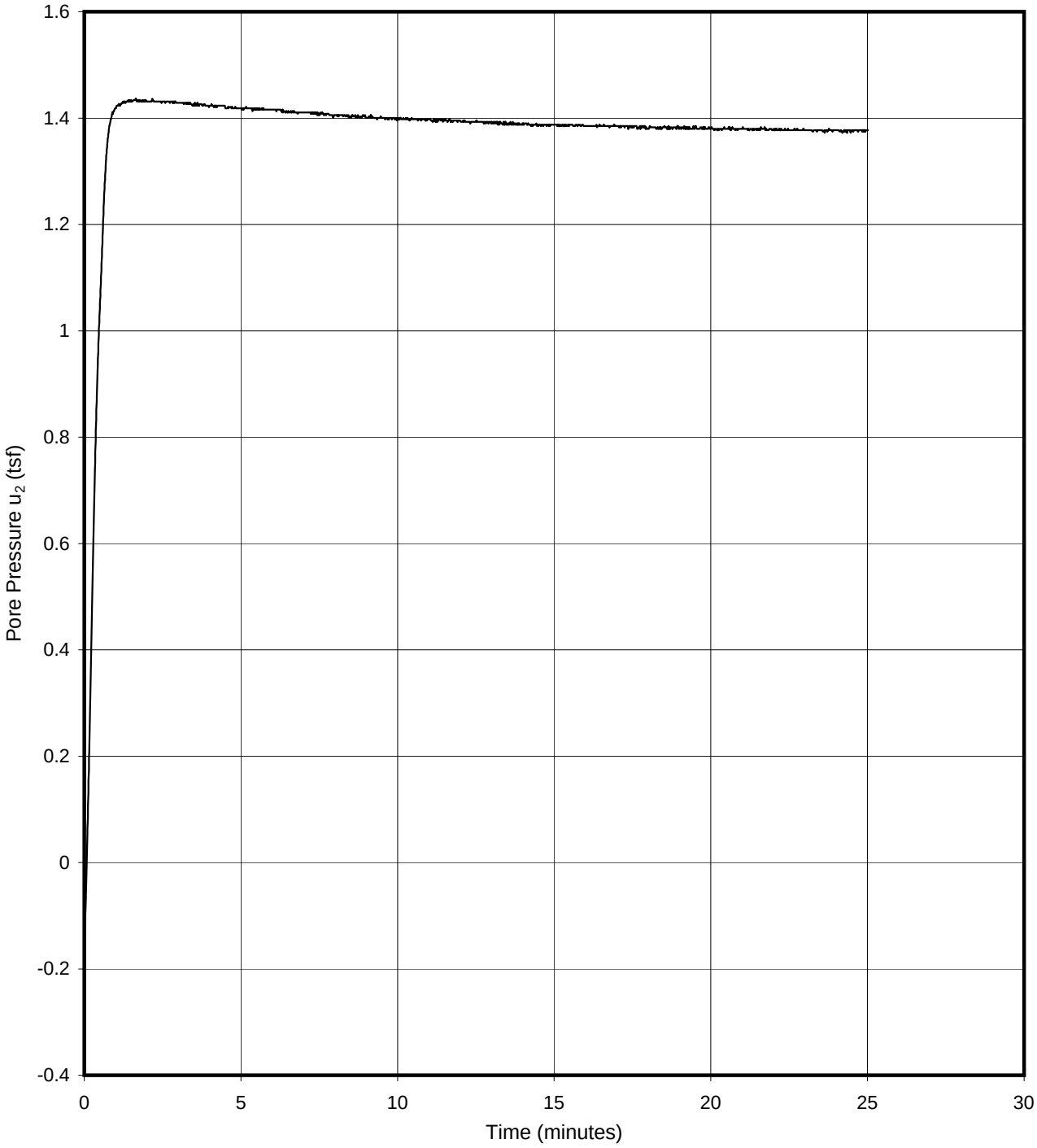
FIGURE A11-15c



Test Date:	25-Oct	Pore Pressure u_2 at start:	1.37 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	1.22 tsf

DISSIPATION TEST
CPT-96, Depth: 55.0 feet
Tunnel Segment of SVRT Project
San Jose, California

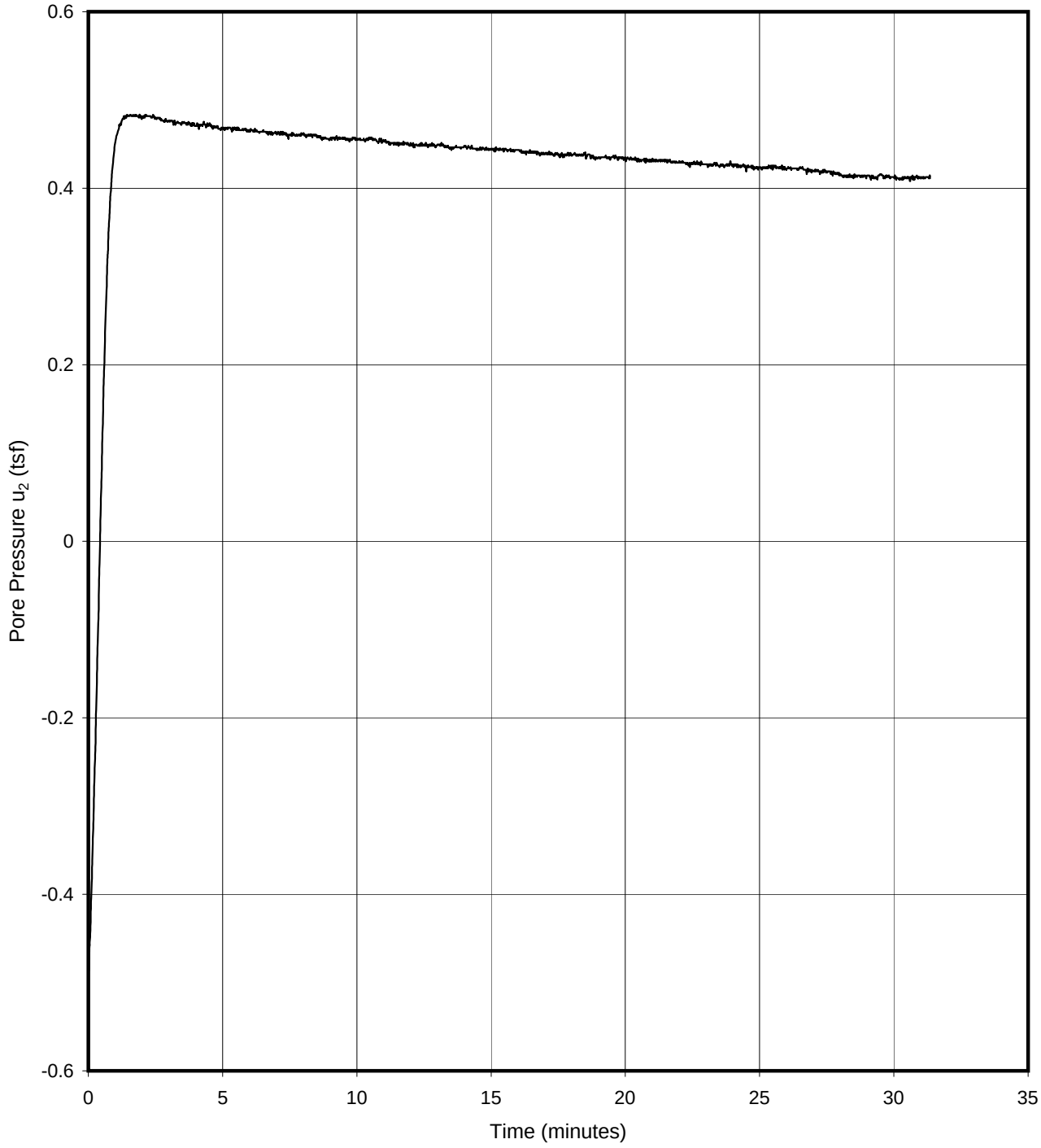
FIGURE A11-16a



Test Date:	25-Oct	Pore Pressure u_2 at start:	-0.14 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	1.38 tsf

DISSIPATION TEST
CPT-96, Depth: 60.7 feet
Tunnel Segment of SVRT Project
San Jose, California

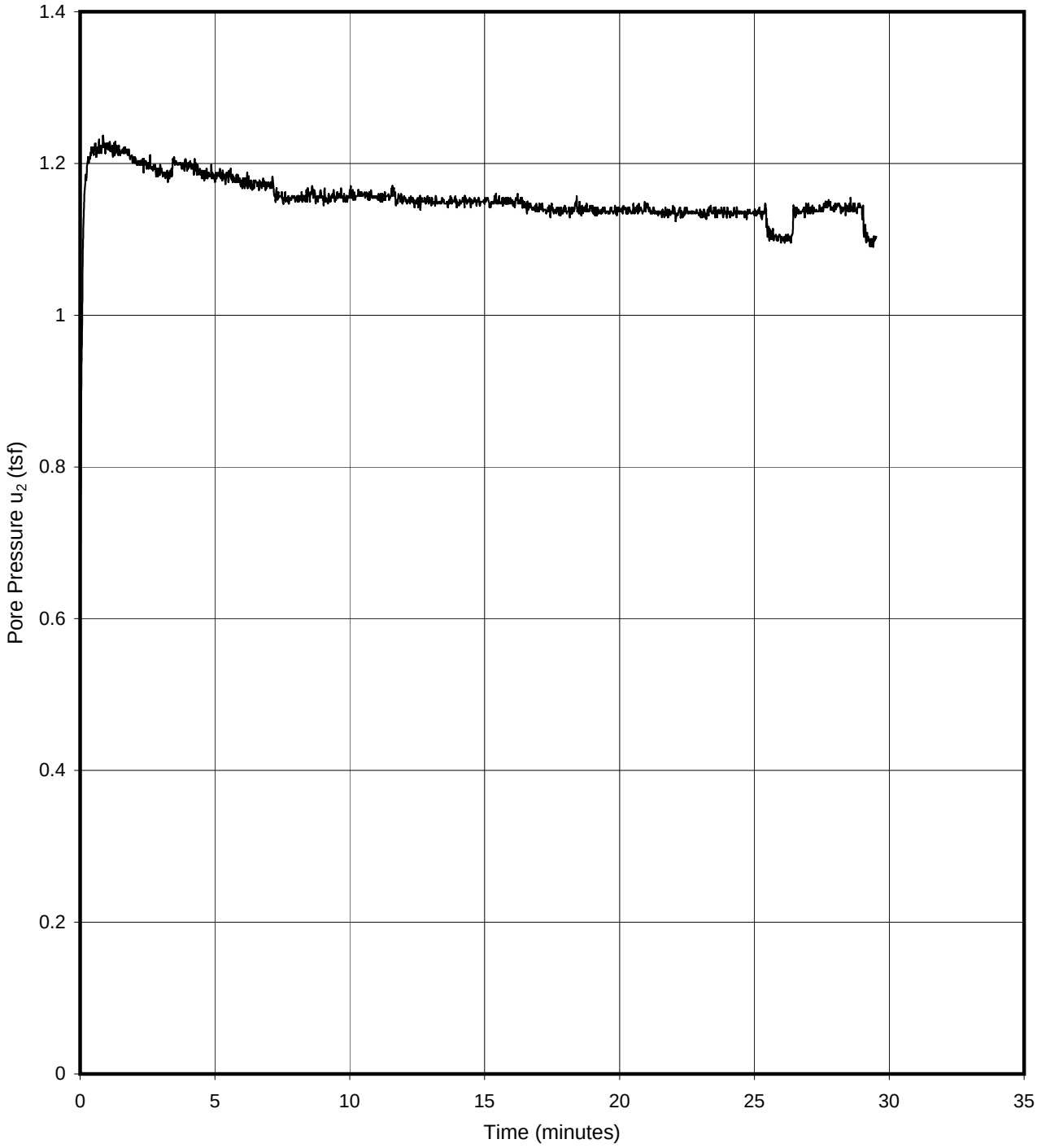
FIGURE A11-16b



Test Date:	2-Nov	Pore Pressure u_2 at start:	-0.49 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	0.41 tsf

DISSIPATION TEST
CPT-98, Depth: 30.8 feet
Tunnel Segment of SVRT Project
San Jose, California

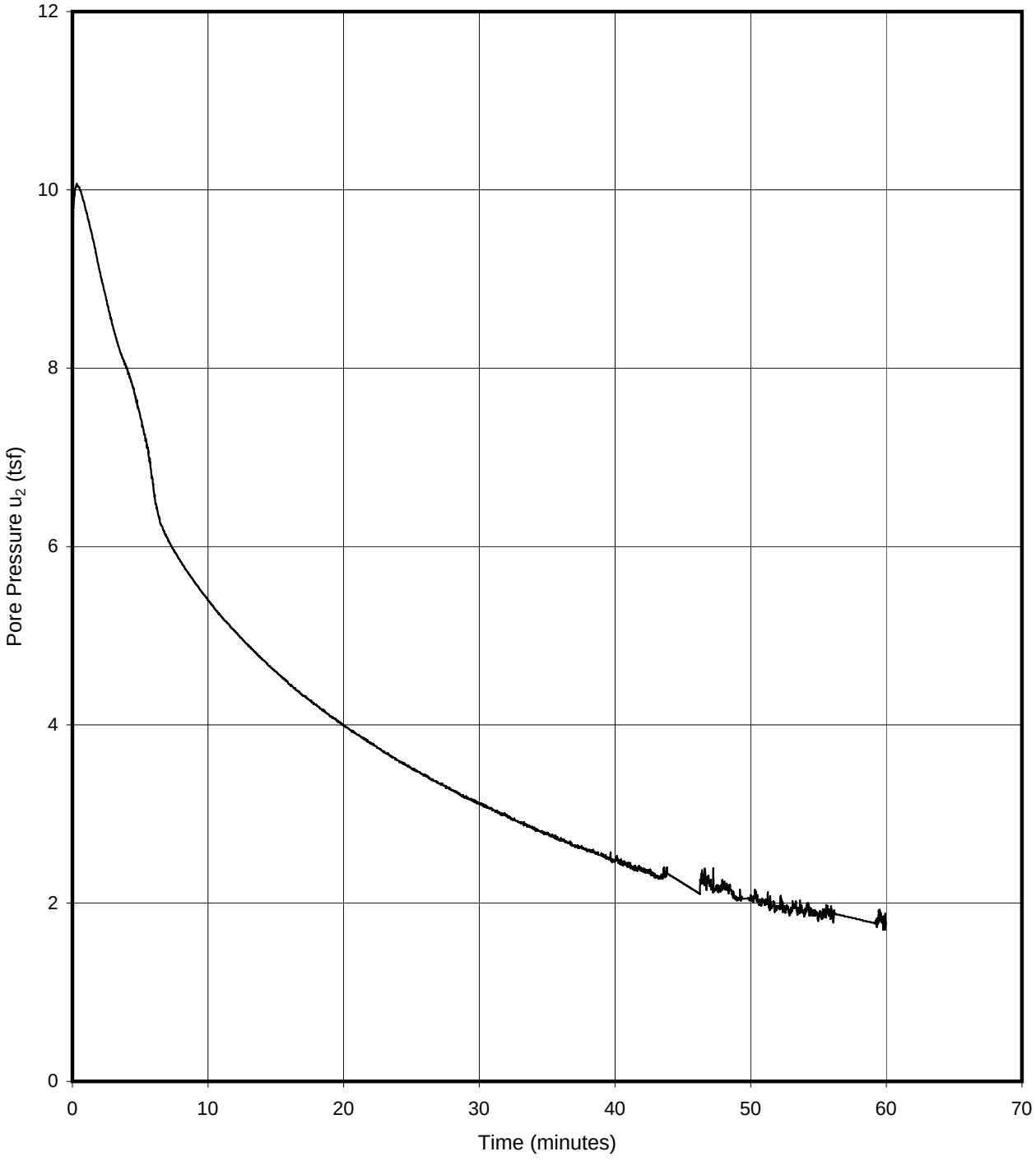
FIGURE A11-17a



Test Date:	2-Nov	Pore Pressure u_2 at start:	0.70 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	1.10 tsf

DISSIPATION TEST
CPT-98, Depth: 80.0 feet
Tunnel Segment of SVRT Project
San Jose, California

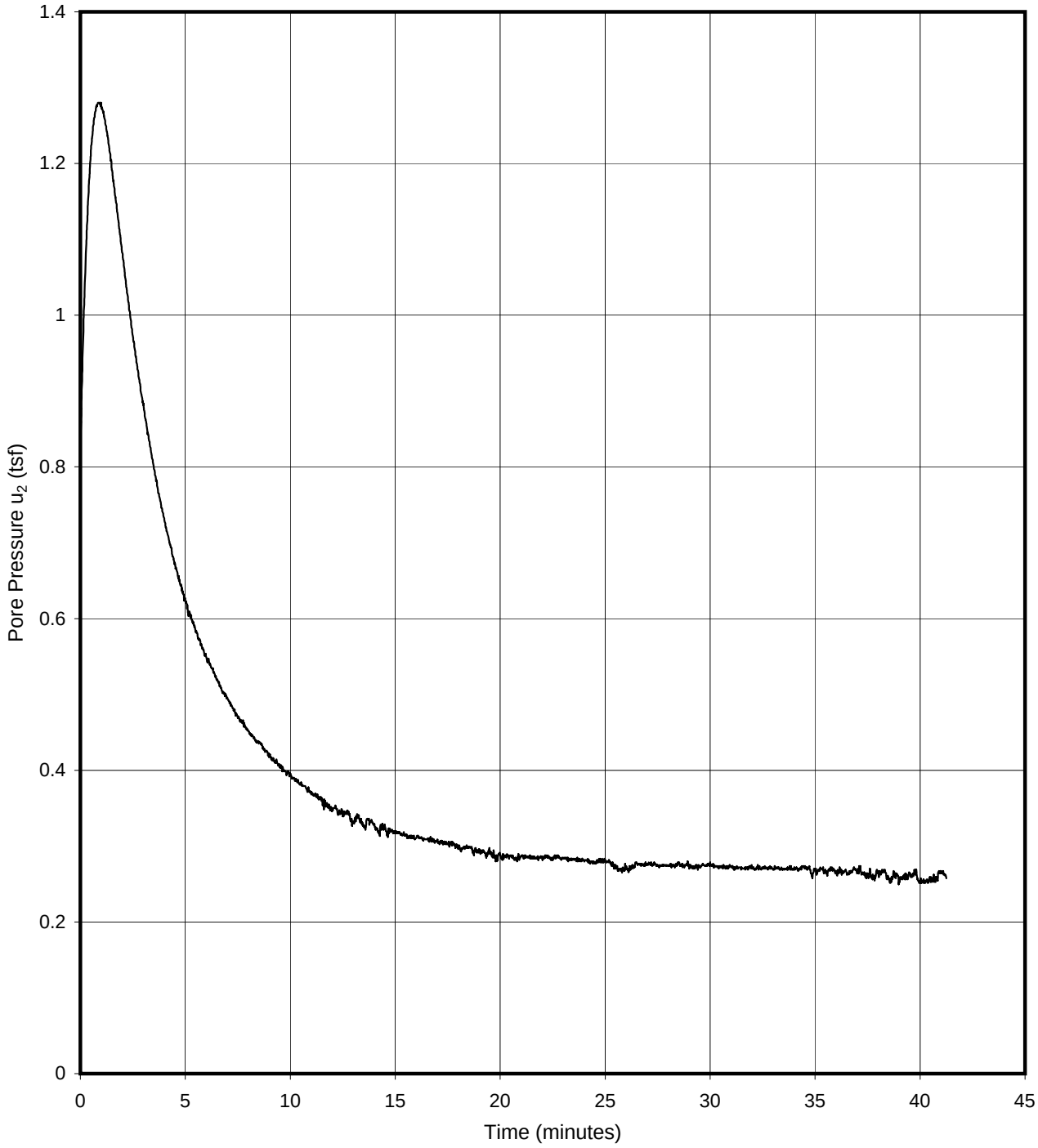
FIGURE A11-17b



Test Date:	2-Nov	Pore Pressure u_2 at start:	9.65 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	1.78 tsf

DISSIPATION TEST
CPT-98, Depth: 100.5 feet
Tunnel Segment of SVRT Project
San Jose, California

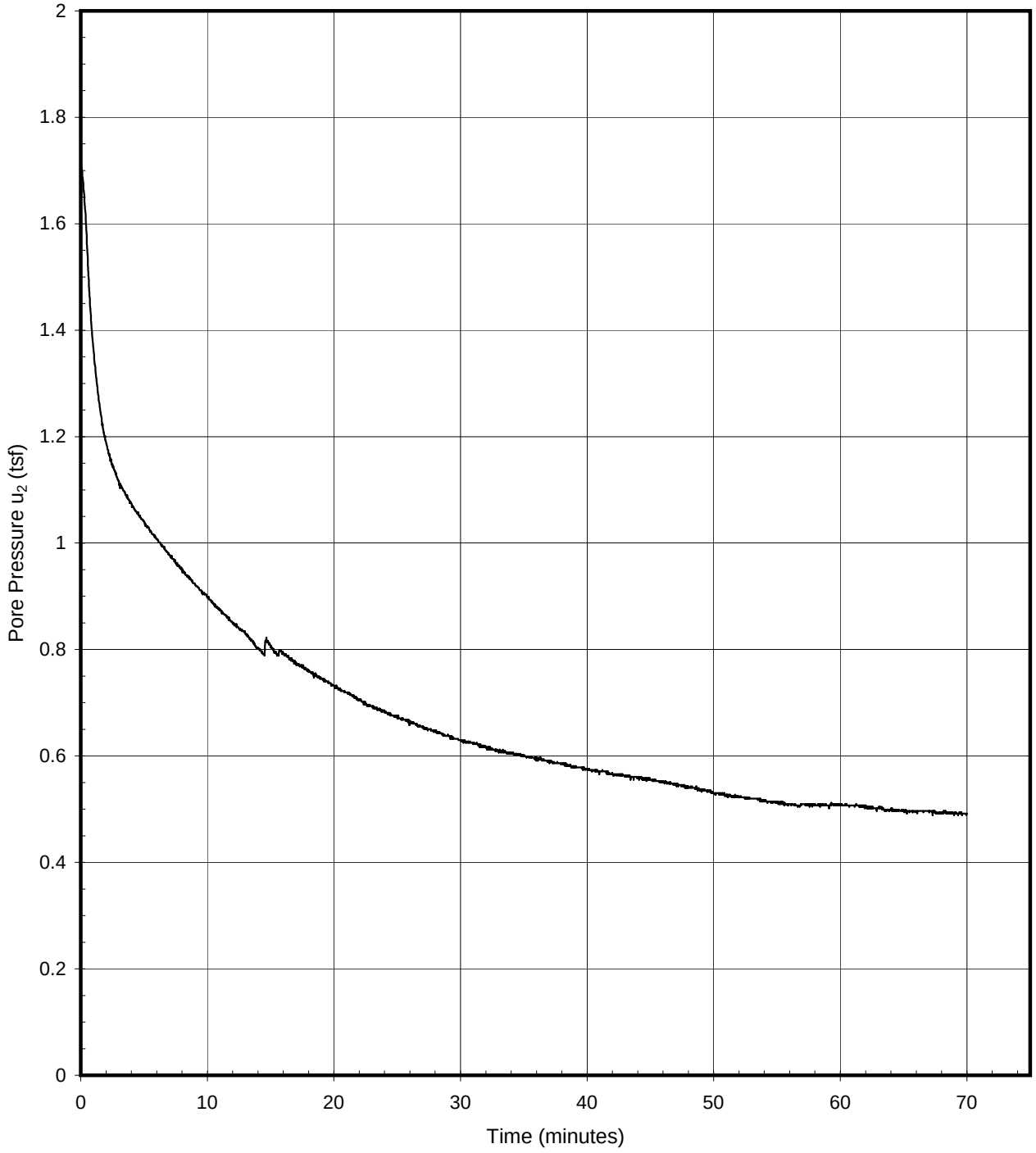
FIGURE A11-17c



Test Date:	25-Oct	Pore Pressure u_2 at start:	0.84 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	0.26 tsf

DISSIPATION TEST
CPT-102, Depth: 25.2 feet
Tunnel Segment of SVRT Project
San Jose, California

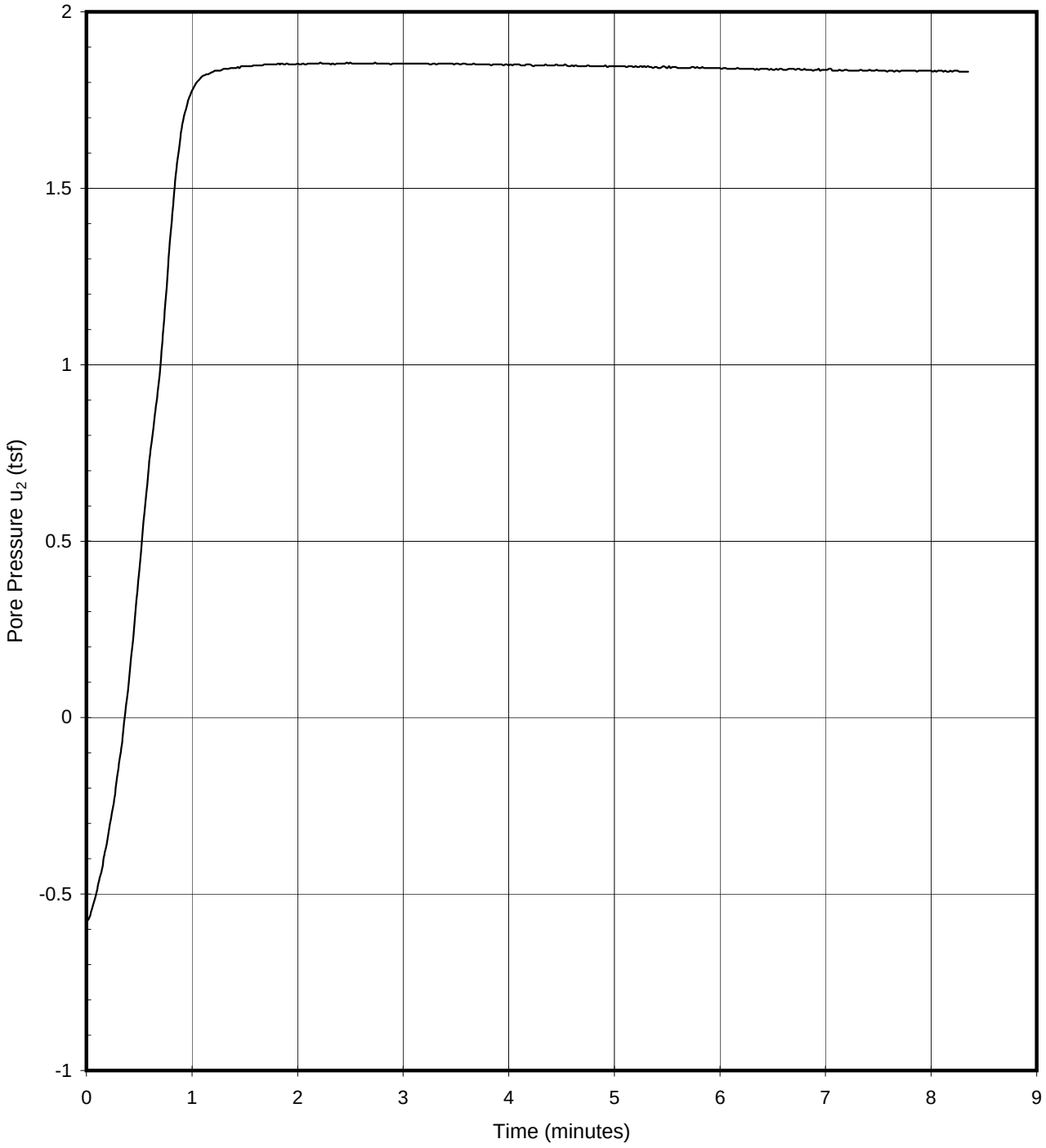
FIGURE A11-18a



Test Date:	20-Oct	Pore Pressure u_2 at start:	1.71 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	0.49 tsf

DISSIPATION TEST
CPT-103, Depth: 29.1 feet
Tunnel Segment of SVRT Project
San Jose, California

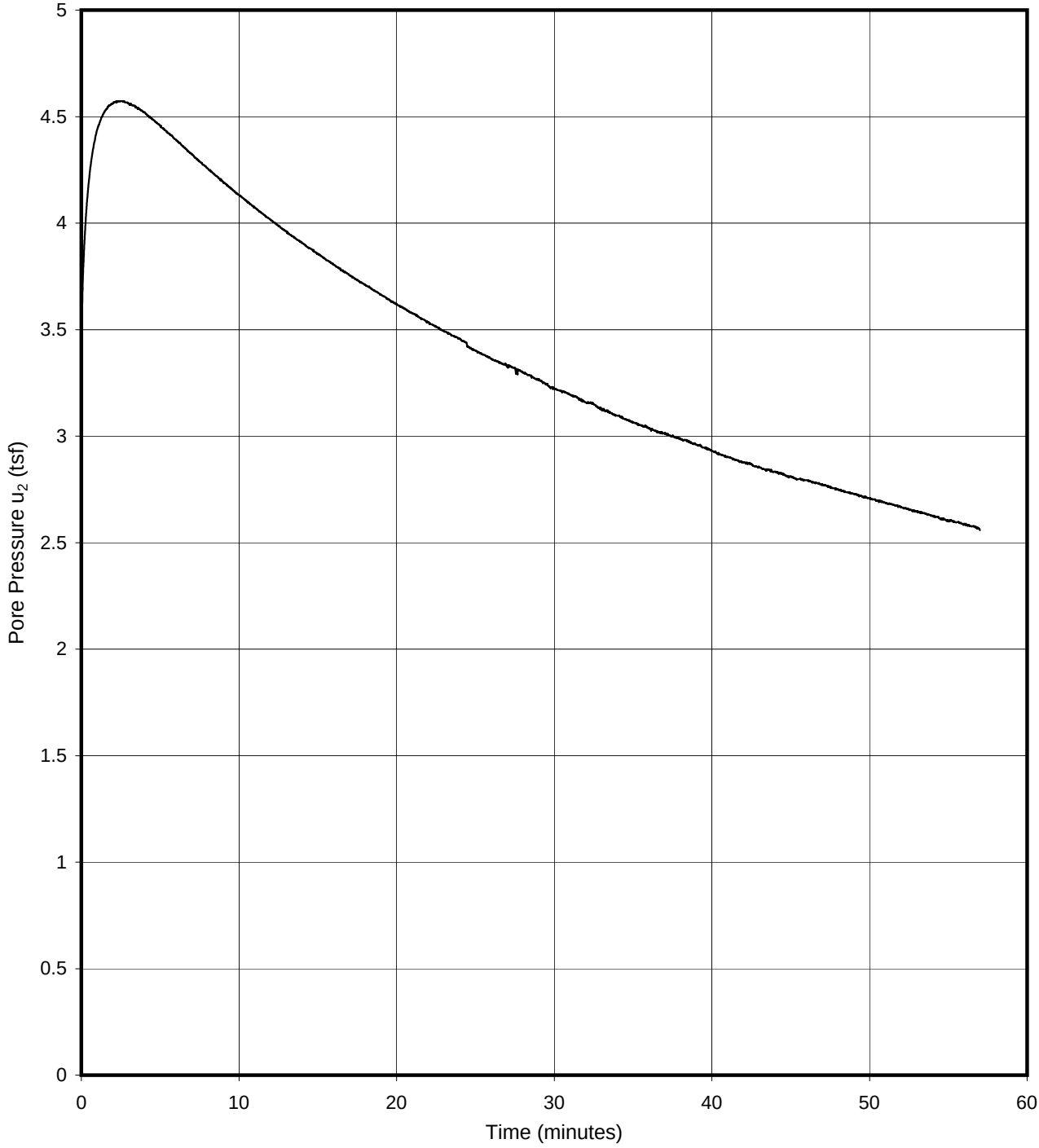
FIGURE A11-19a



Test Date:	20-Oct	Pore Pressure u_2 at start:	-0.57 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	1.83 tsf

DISSIPATION TEST
CPT-103, Depth 72.8 feet
Tunnel Segment of SVRT Project
San Jose, California

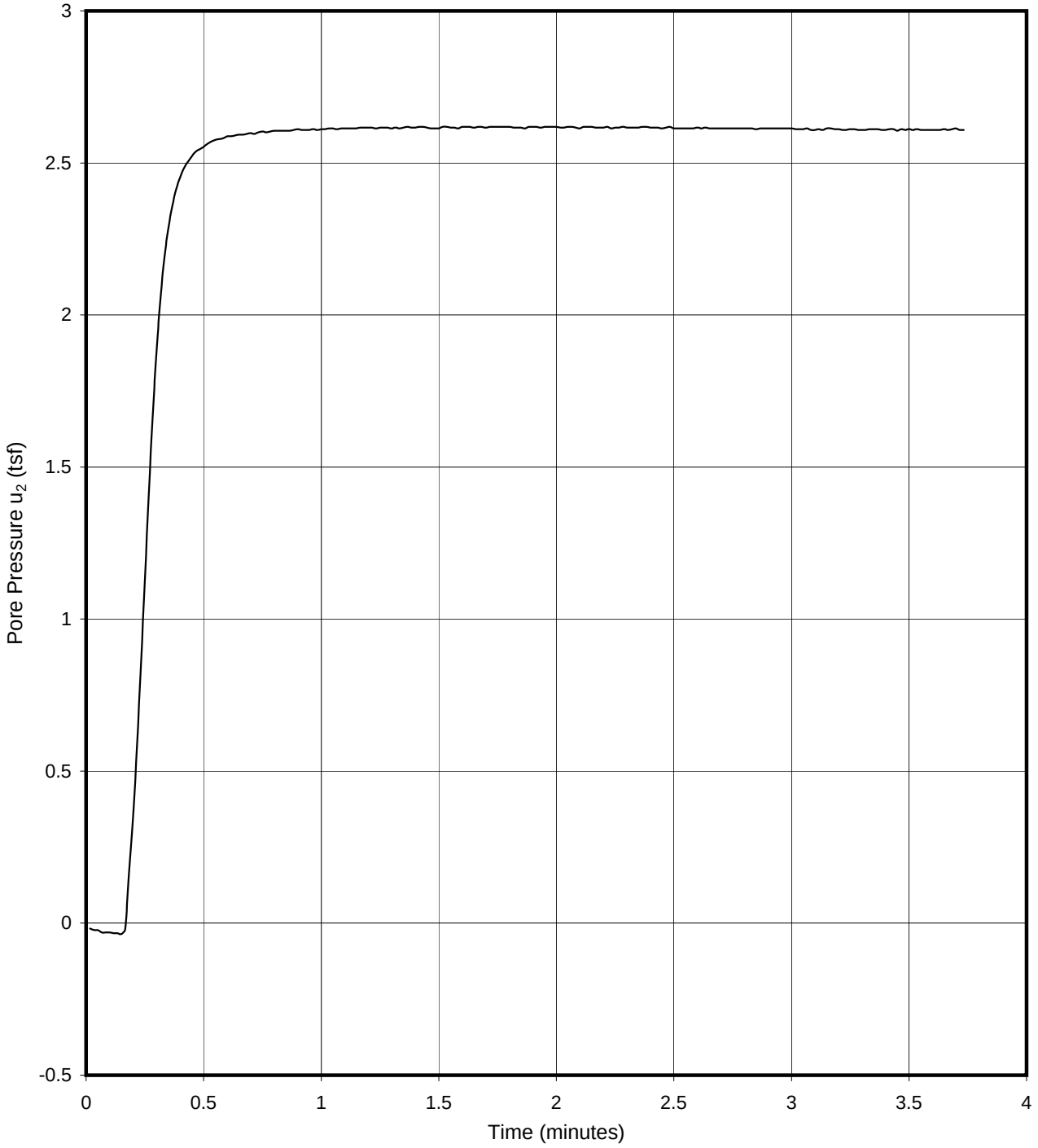
FIGURE A11-19b



Test Date:	14-Dec	Pore Pressure u_2 at start:	3.48 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	2.56 tsf

DISSIPATION TEST
CPT-112, Depth: 40.1 feet
Tunnel Segment of SVRT Project
San Jose, California

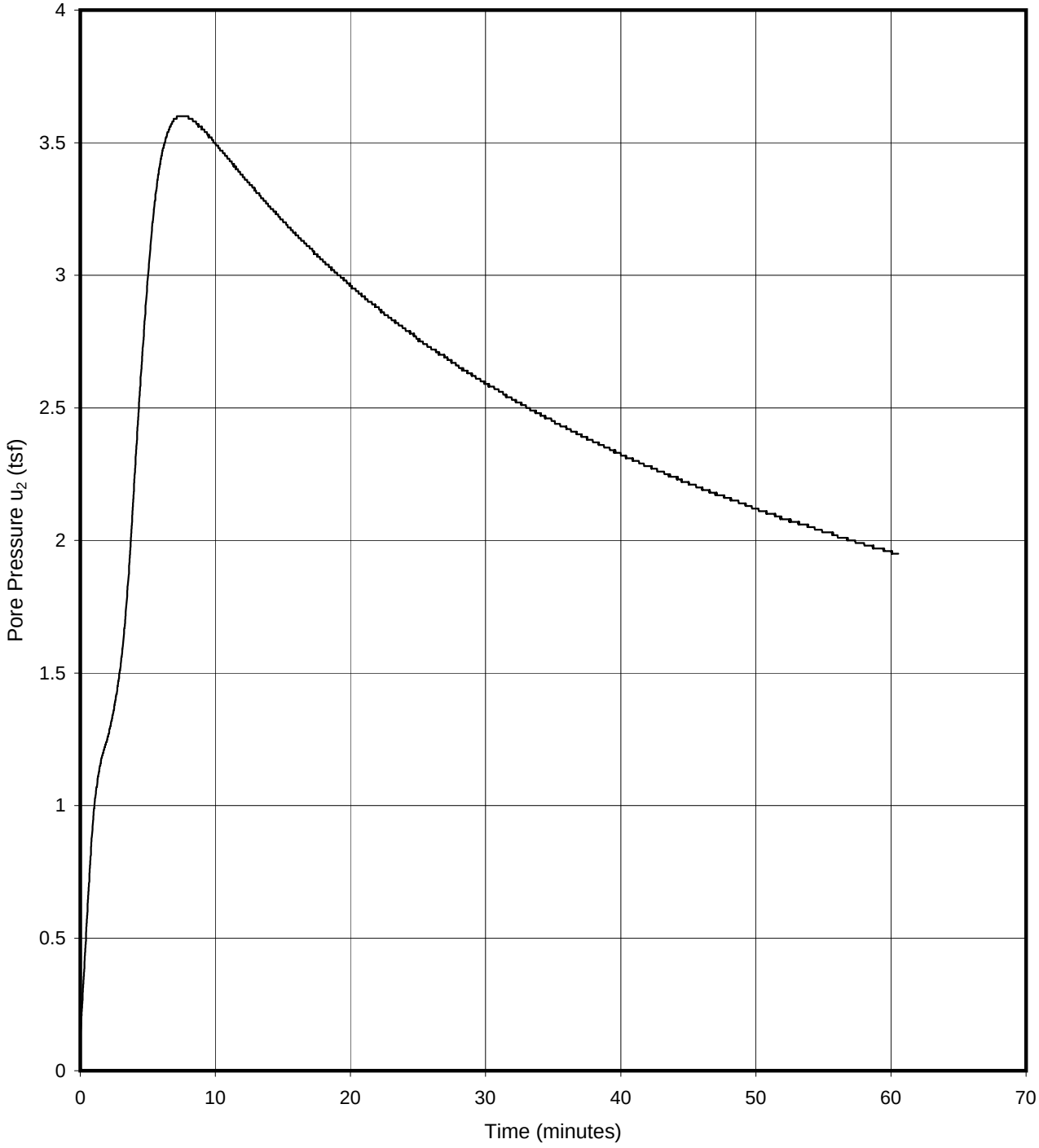
FIGURE A11-20a



Test Date:	14-Dec	Pore Pressure u_2 at start:	-0.02 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	2.61 tsf

DISSIPATION TEST
CPT-112, Depth: 98.4 feet
Tunnel Segment of SVRT Project
San Jose, California

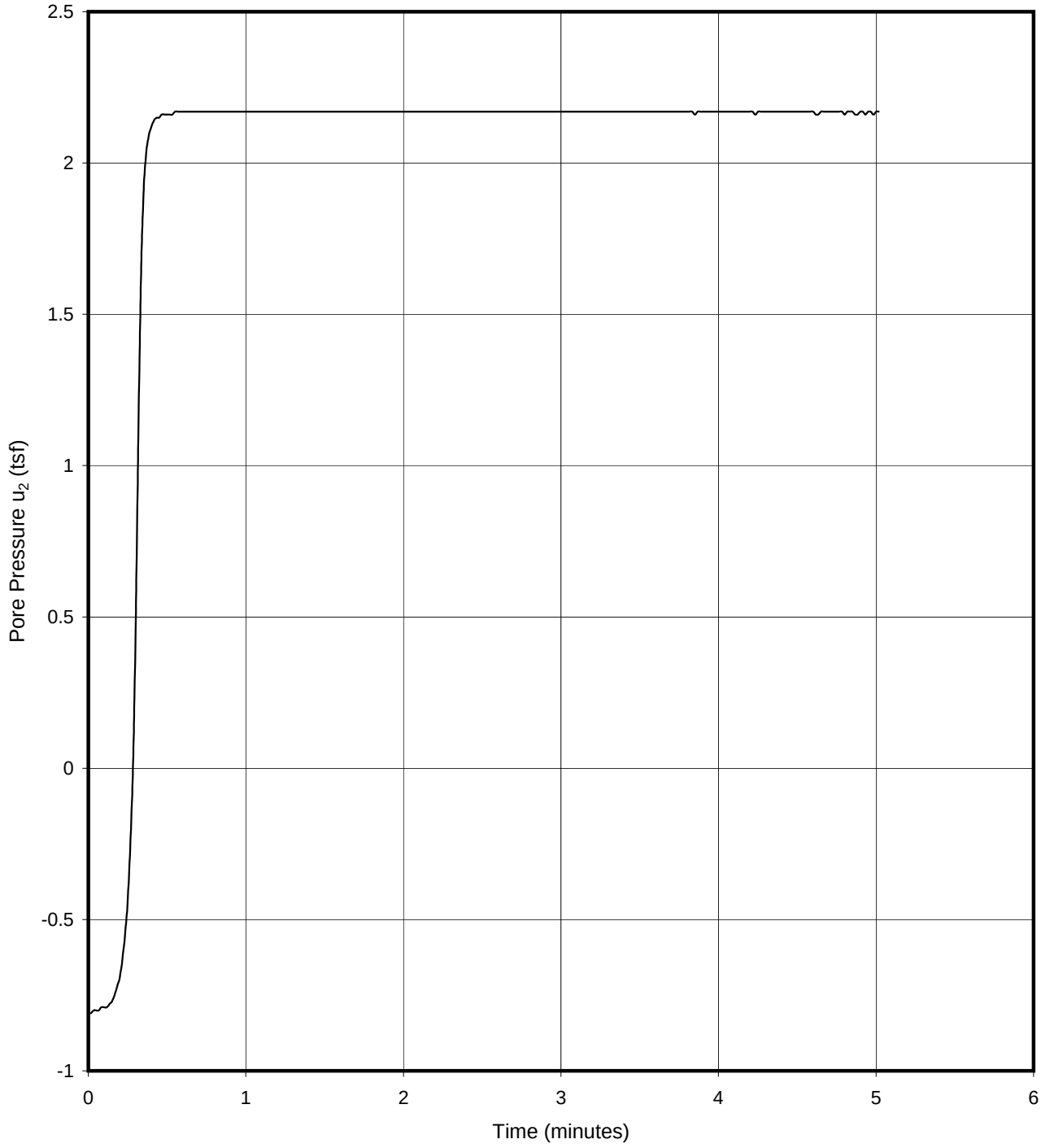
FIGURE A11-20b



Test Date:	8-Feb	Pore Pressure u_2 at start:	0.14 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	1.95 tsf

DISSIPATION TEST
CPT-120, Depth: 39 feet
Tunnel Segment of SVRT Project
San Jose, California

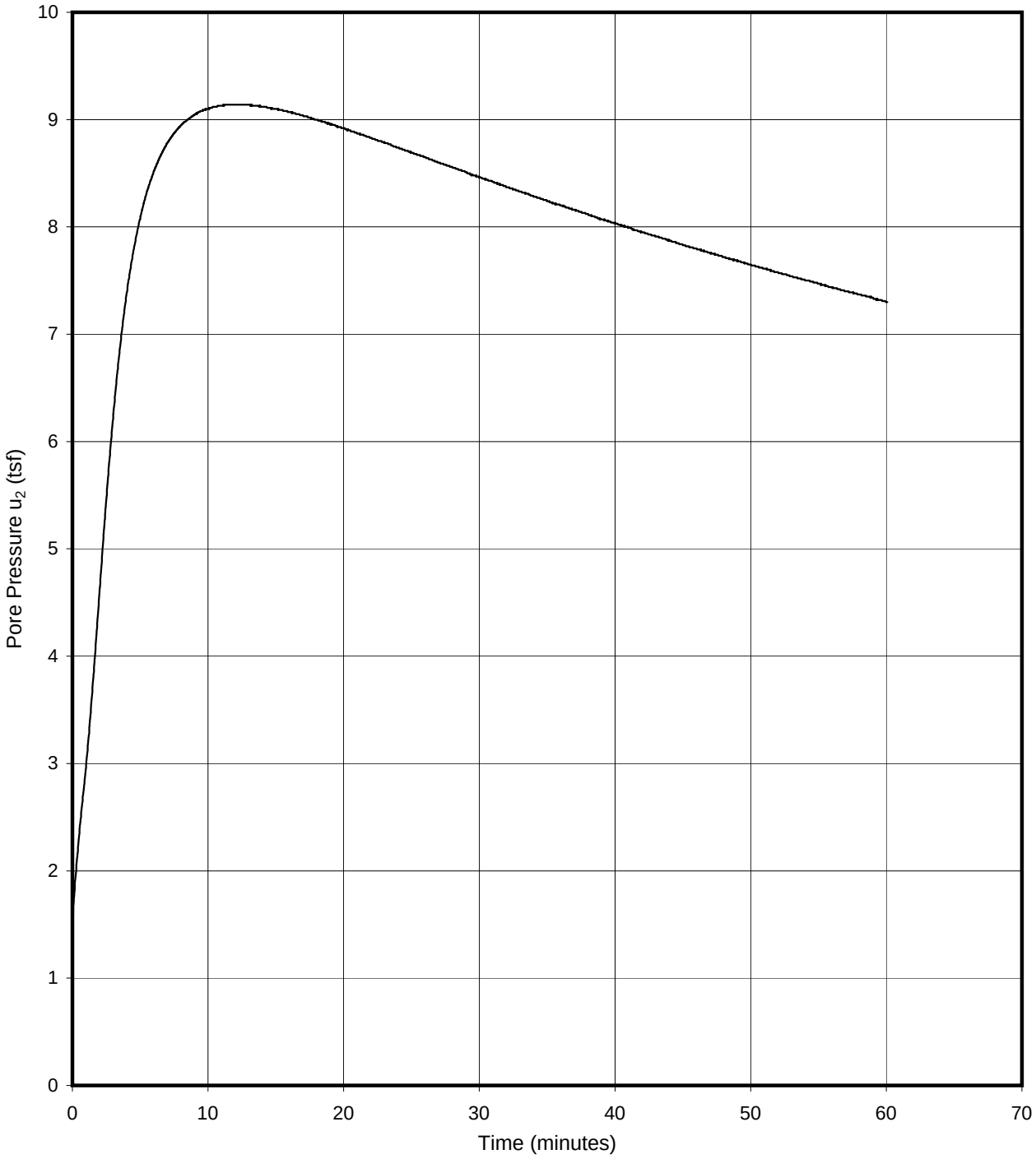
FIGURE A11-21a



Test Date:	8-Feb	Pore Pressure u_2 at start:	-0.81 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	2.17 tsf

DISSIPATION TEST
CPT-120, Depth: 84.7 feet
Tunnel Segment of SVRT Project
San Jose, California

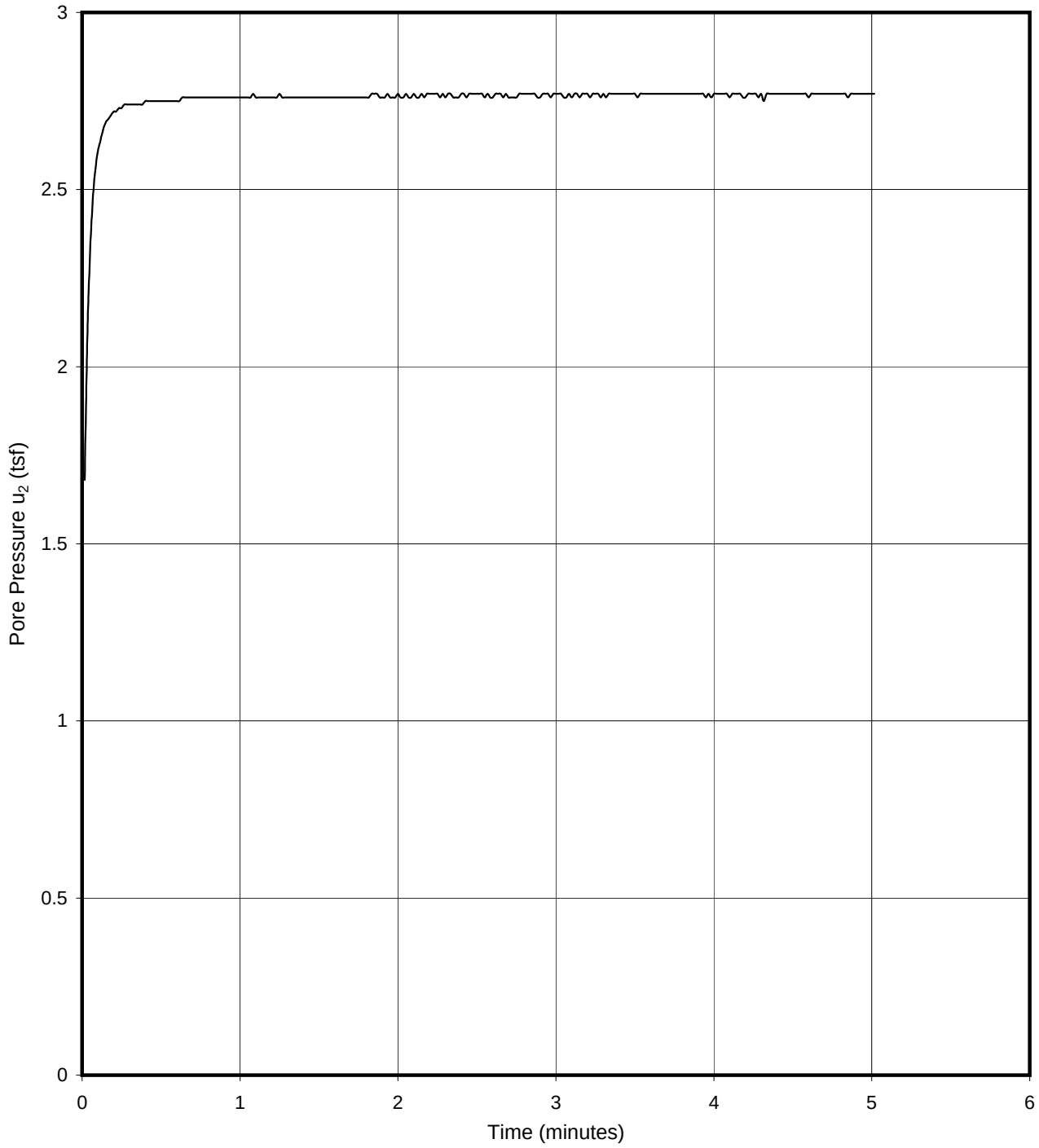
FIGURE A11-21b



Test Date:	8-Feb	Pore Pressure u_2 at start:	1.51 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	7.30 tsf

DISSIPATION TEST
CPT-120, Depth: 89.7 feet
Tunnel Segment of SVRT Project
San Jose, California

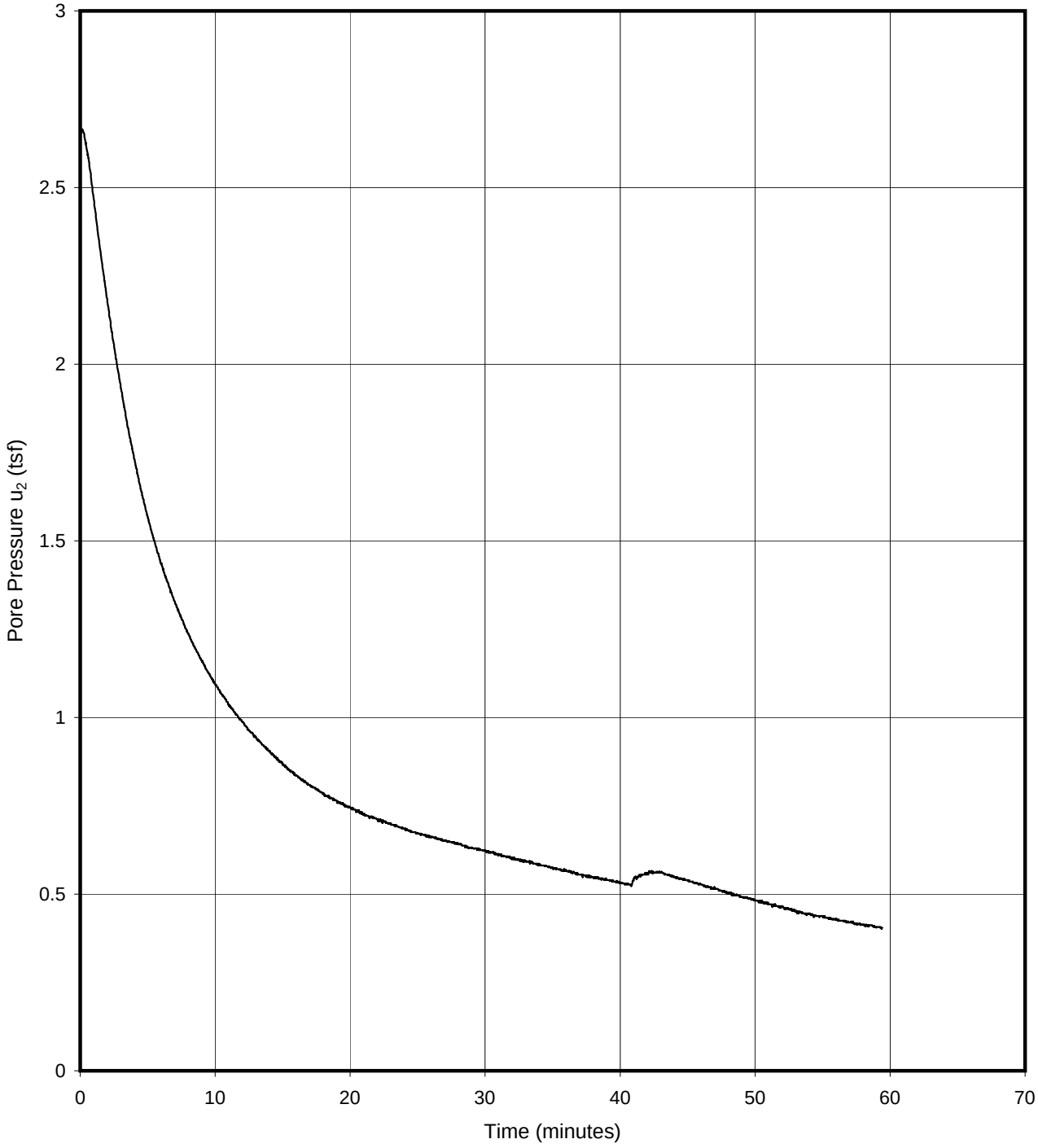
FIGURE A11-21c



Test Date:	8-Feb	Pore Pressure u_2 at start:	1.68 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	2.77 tsf

DISSIPATION TEST
CPT-120, Depth: 104.8 feet
Tunnel Segment of SVRT Project
San Jose, California

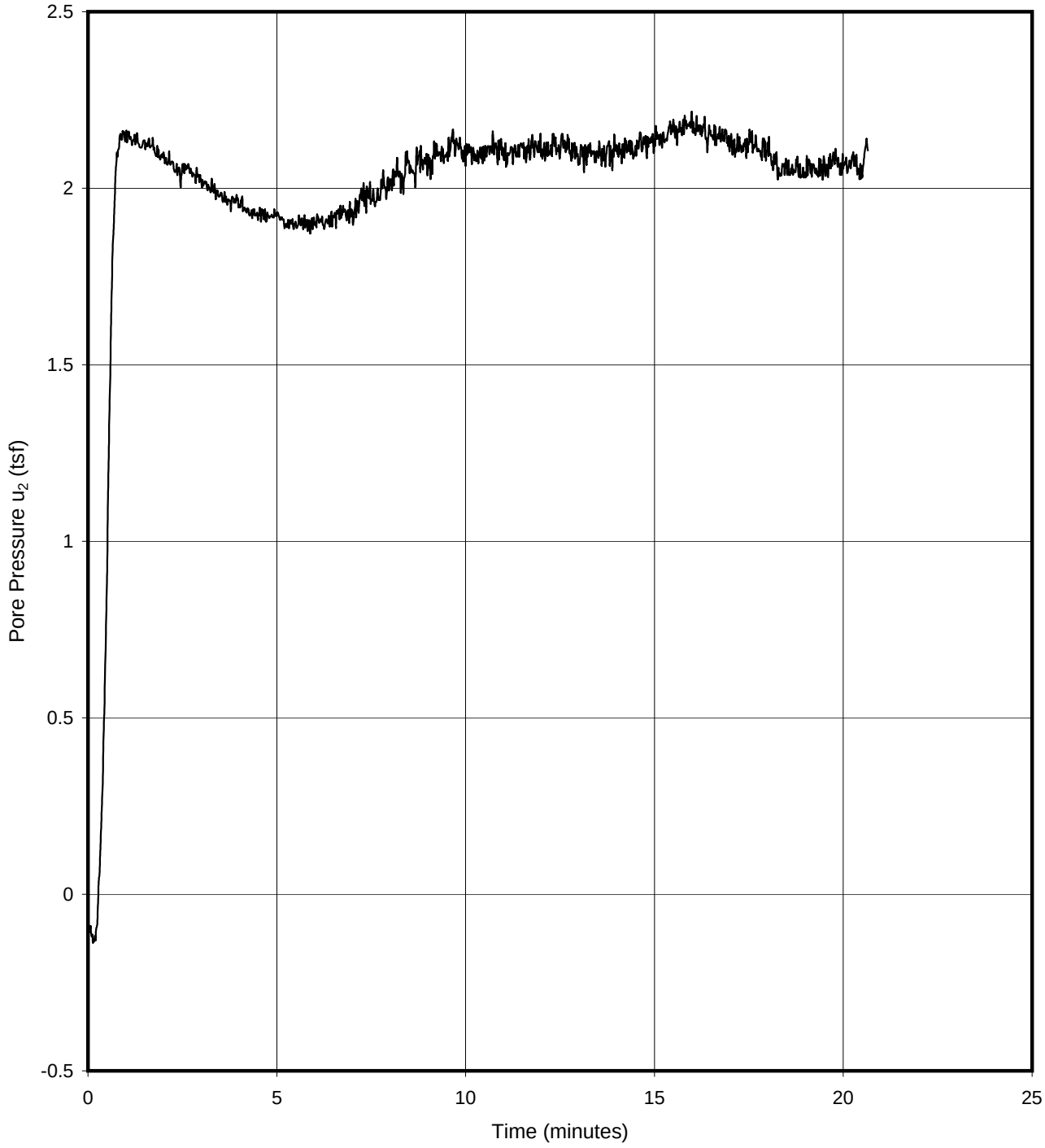
FIGURE A11-21d



Test Date:	27-Oct	Pore Pressure u_2 at start:	2.65 tsf
Soil Type:	Silt to clay	Pore Pressure u_2 at end:	0.40 tsf

DISSIPATION TEST
CPT-133, Depth: 26.4 feet
Tunnel Segment of SVRT Project
San Jose, California

FIGURE A11-22a

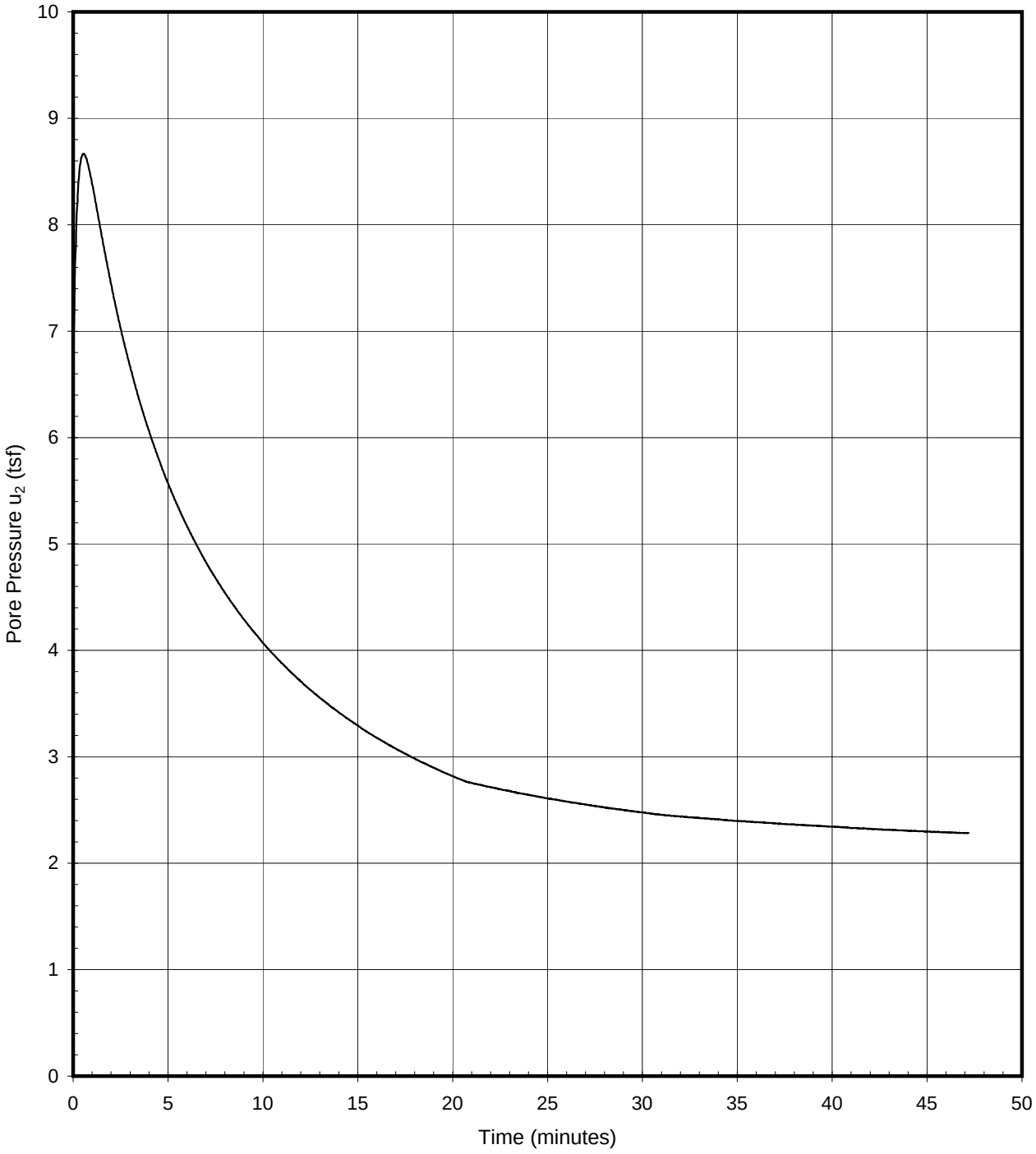


Test Date: 27-Oct
Soil Type: Sand

Pore Pressure u_2 at start: -0.08 tsf
Pore Pressure u_2 at end: 2.11 tsf

DISSIPATION TEST
CPT-133, Depth: 79.0 feet
Tunnel Segment of SVRT Project
San Jose, California

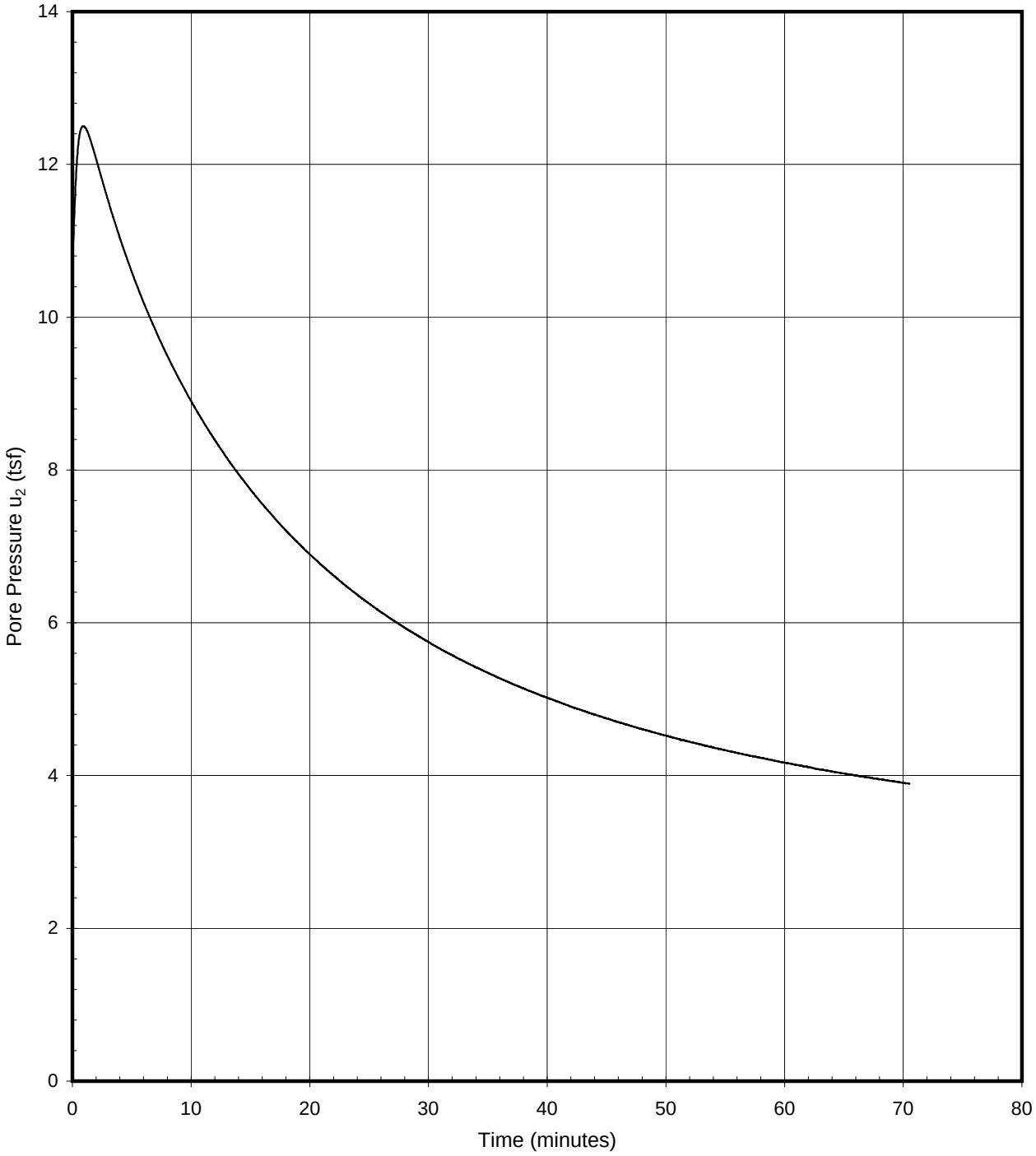
FIGURE A11-22b



Test Date:	18-Nov	Pore Pressure u_2 at start:	6.72 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	2.28 tsf

DISSIPATION TEST
CPT-134a, Depth: 74.2 feet
Tunnel Segment of SVRT Project
San Jose, California

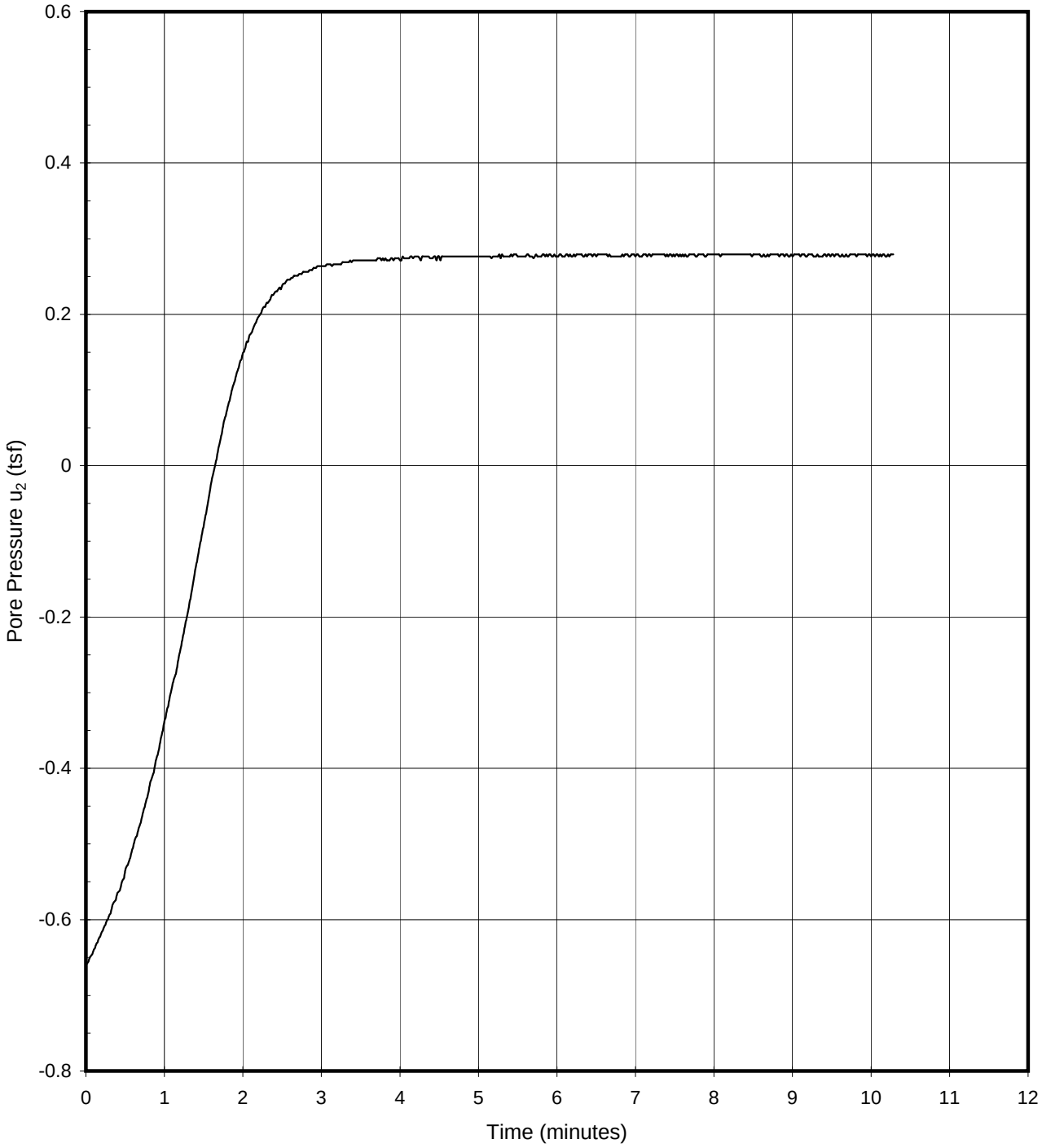
FIGURE A11-23a



Test Date:	18-Nov	Pore Pressure u_2 at start:	10.82 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	3.89 tsf

DISSIPATION TEST
CPT-134a, Depth: 105.2 feet
Tunnel Segment of SVRT Project
San Jose, California

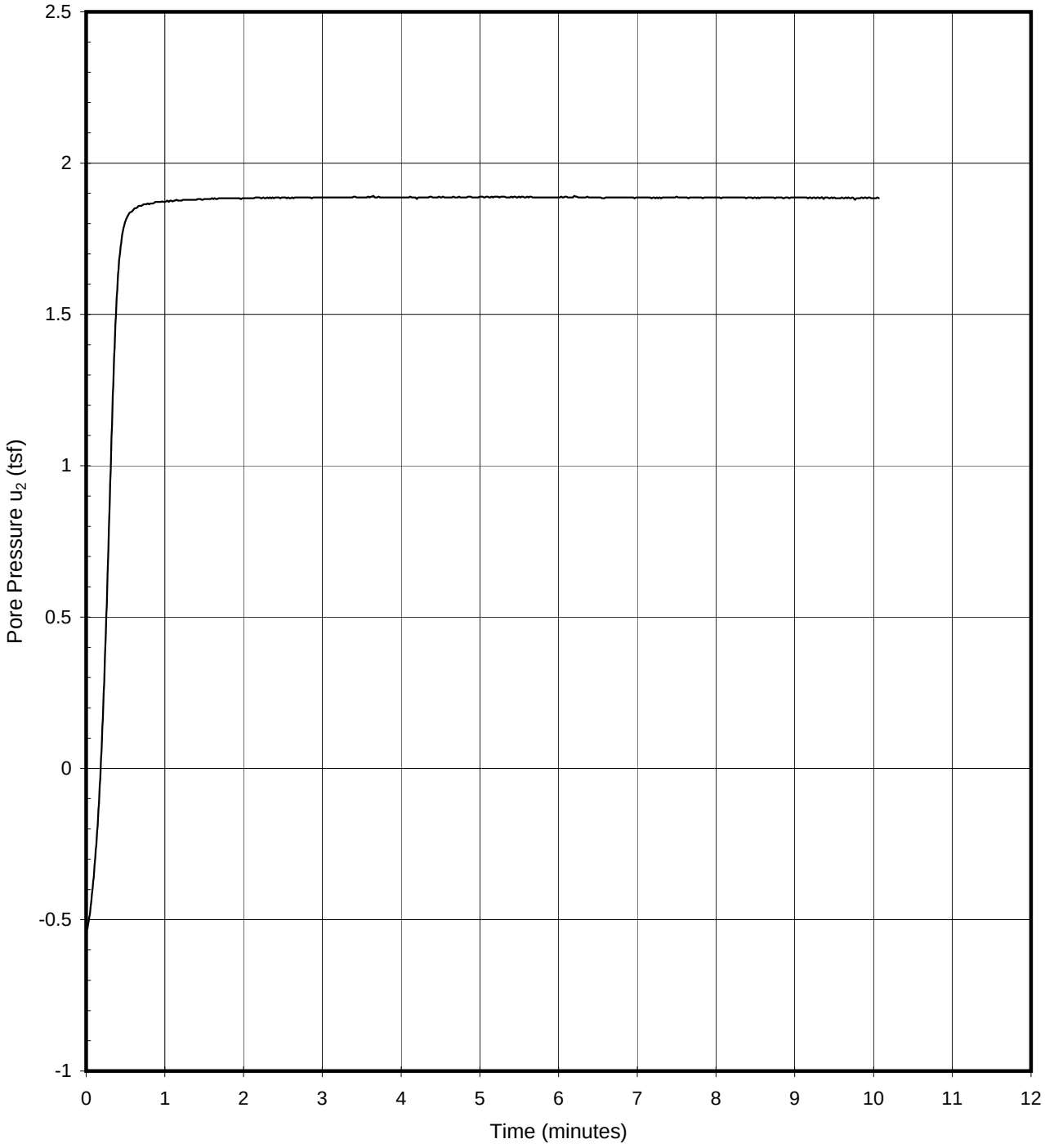
FIGURE A11-23b



Test Date:	8-Oct	Pore Pressure u_2 at start:	-0.66 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	0.28 tsf

DISSIPATION TEST
CPT-137, Depth: 32.7 feet
Tunnel Segment of SVRT Project
San Jose, California

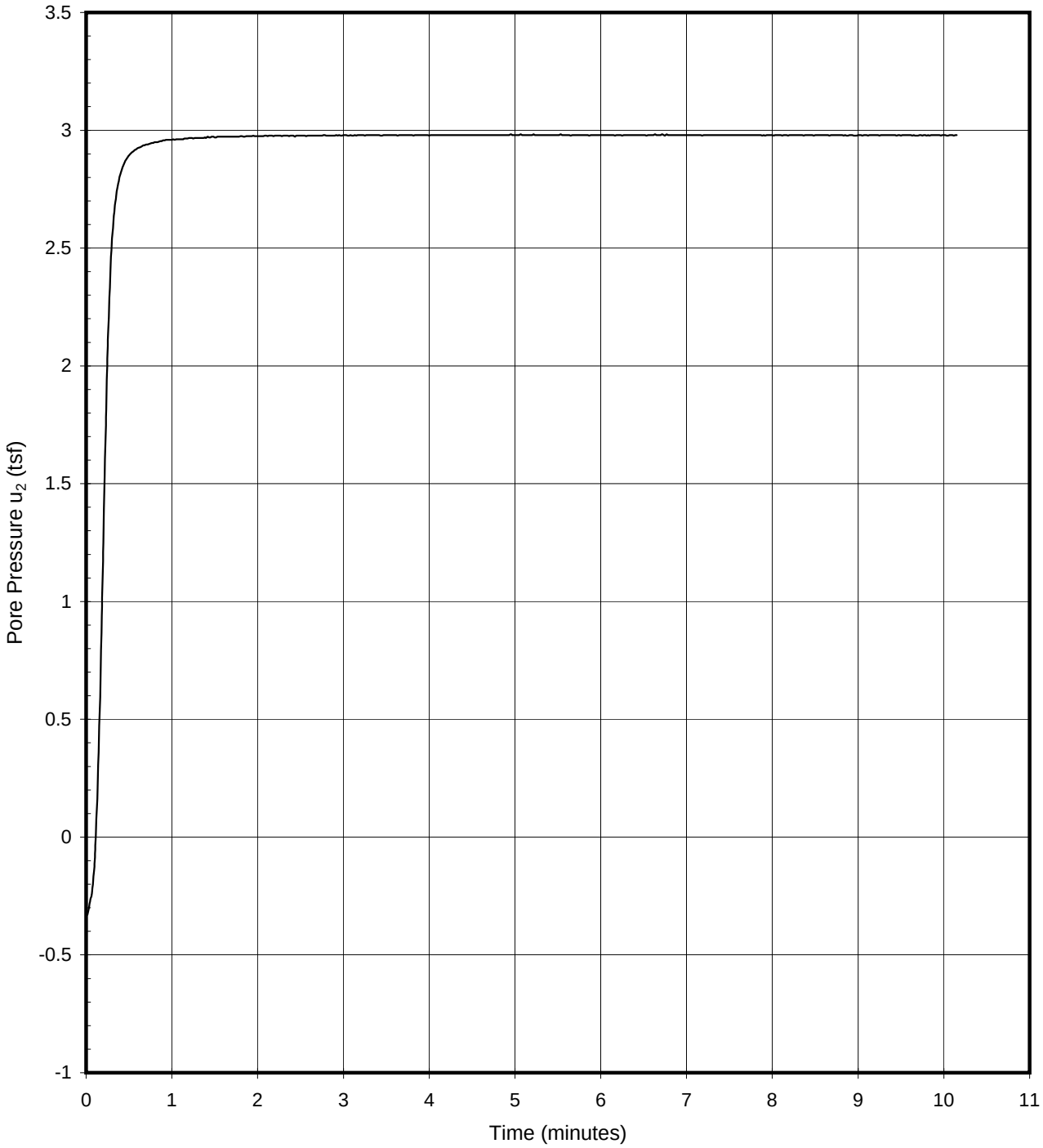
FIGURE A11-24a



Test Date:	8-Oct	Pore Pressure u_2 at start:	-0.53 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	1.88 tsf

DISSIPATION TEST
CPT-137, Depth: 84.6 feet
Tunnel Segment of SVRT Project
San Jose, California

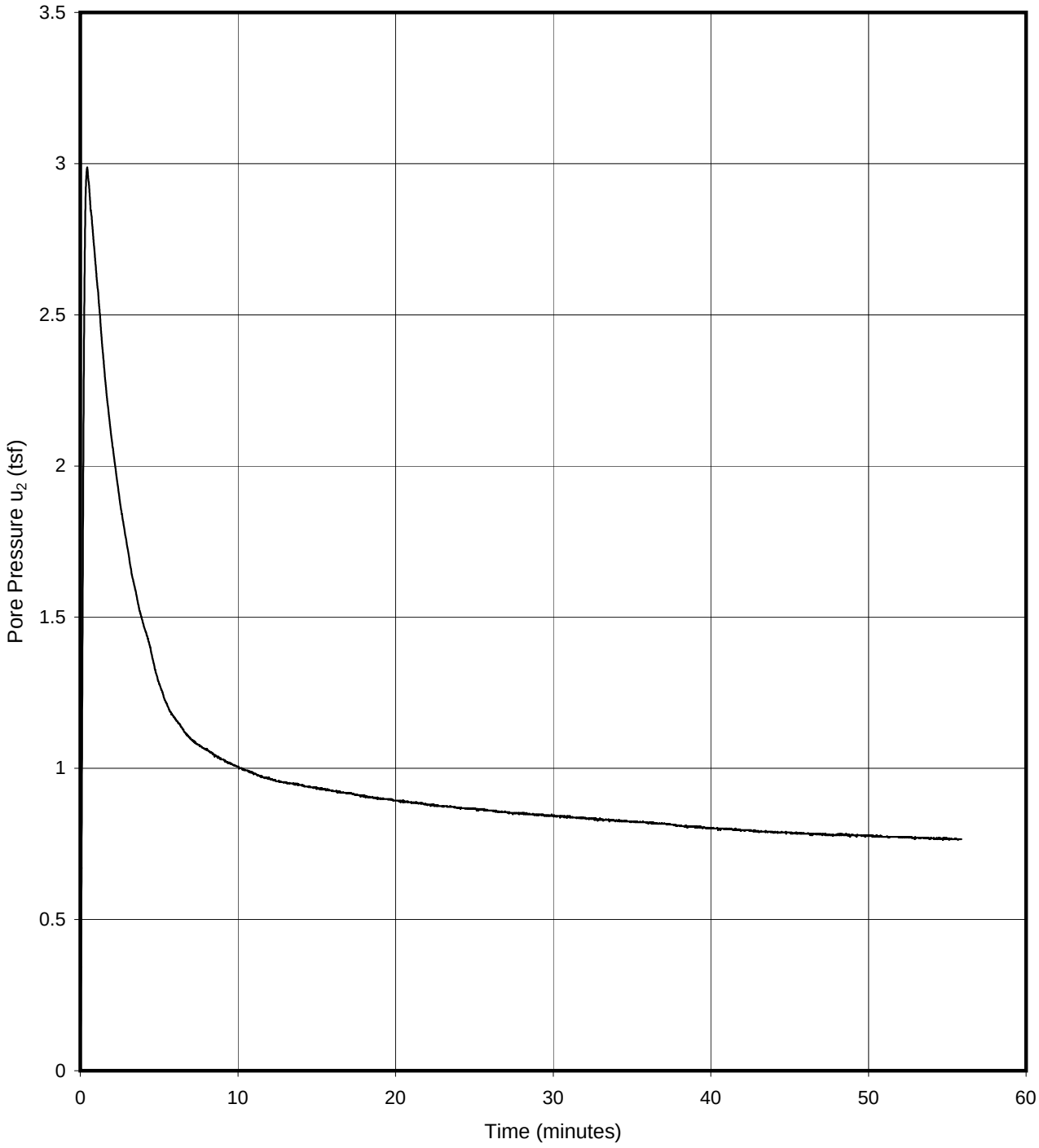
FIGURE A11-24b



Test Date:	8-Oct	Pore Pressure u_2 at start:	-0.33 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	2.98 tsf

DISSIPATION TEST
CPT-137, Depth: 119.7 feet
Tunnel Segment of SVRT Project
San Jose, California

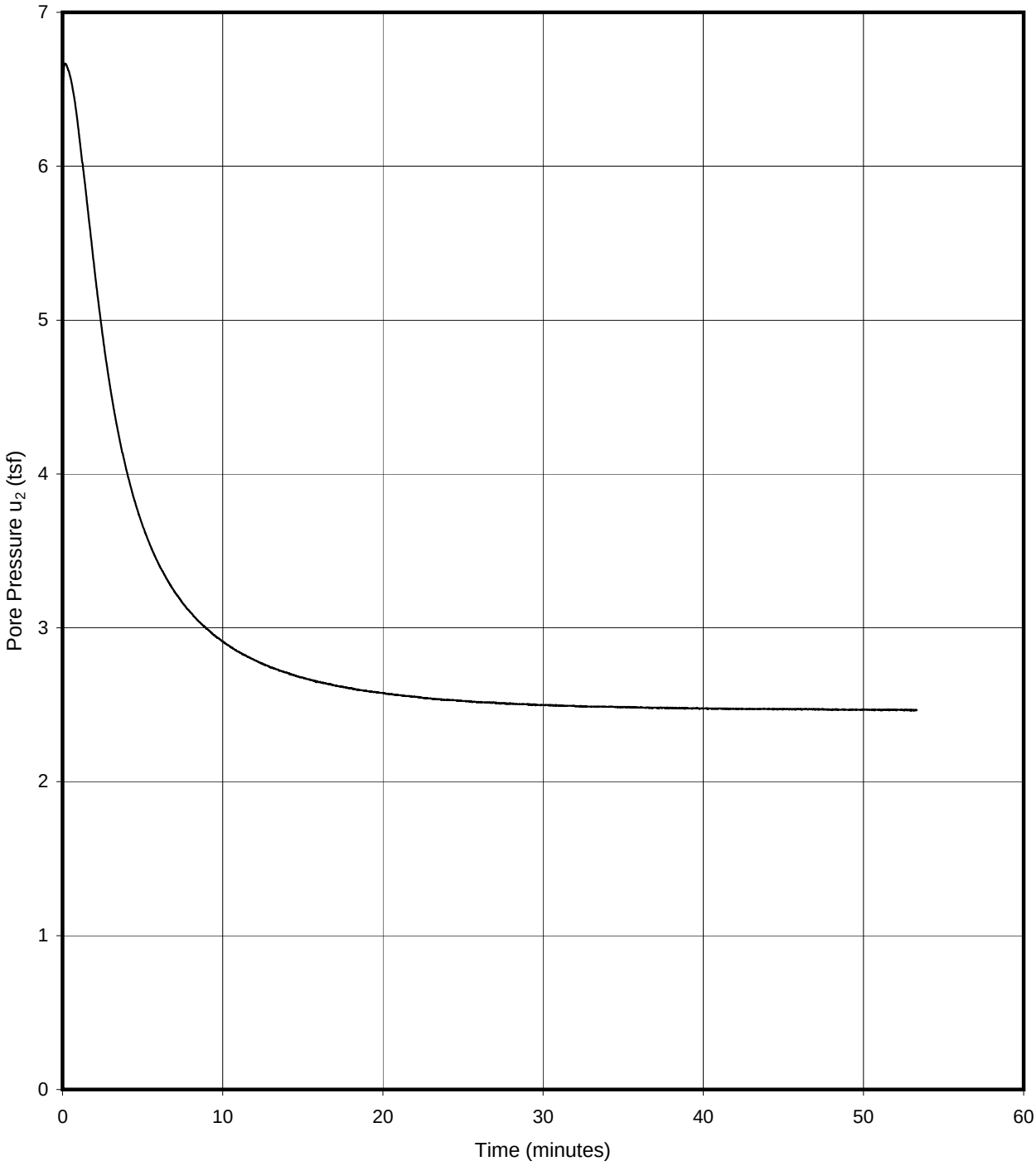
FIGURE A11-24c



Test Date:	6-Nov	Pore Pressure u_2 at start:	0.07 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	0.77 tsf

DISSIPATION TEST
CPT-140, Depth: 52.8 feet
Tunnel Segment of SVRT Project
San Jose, California

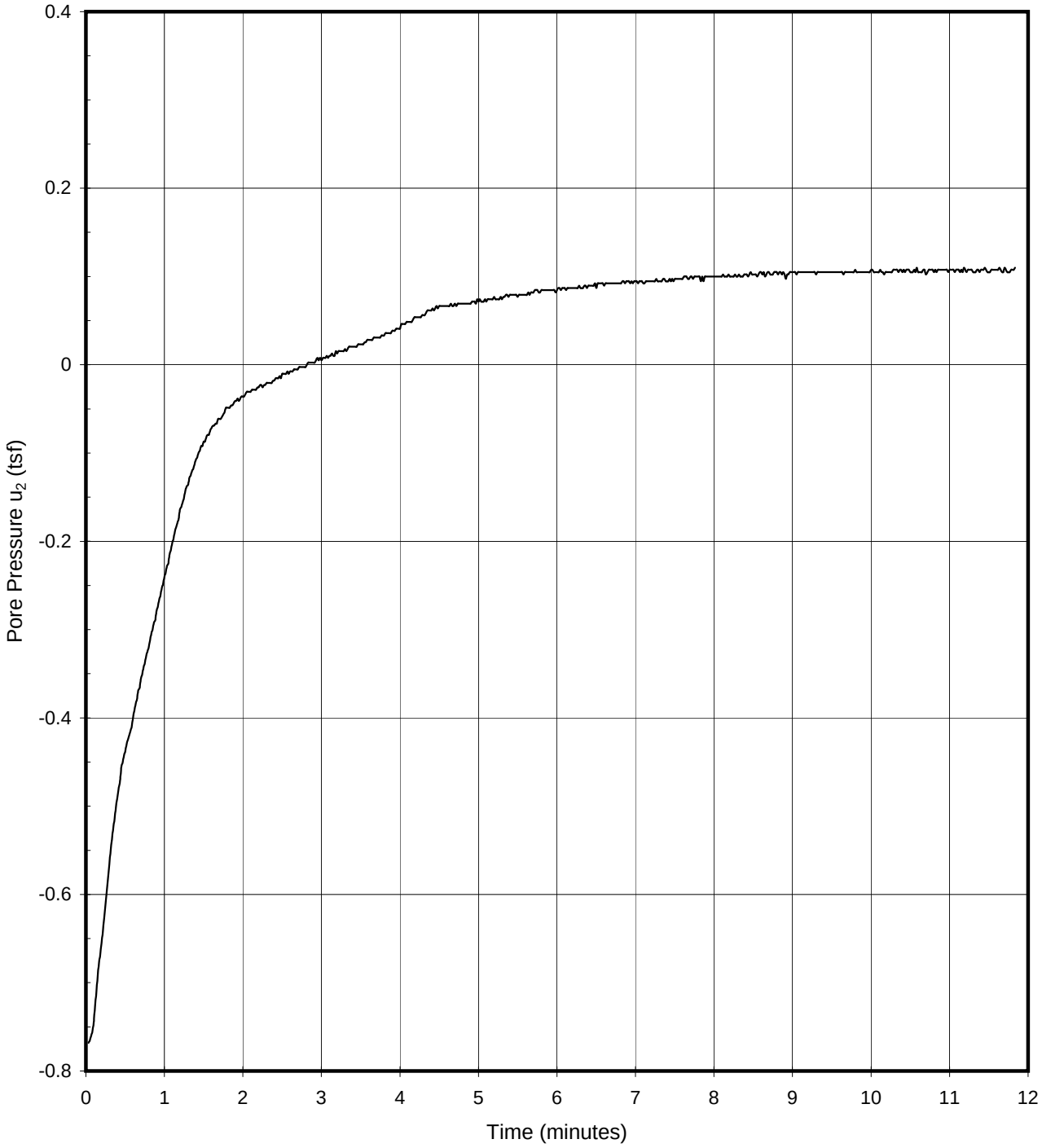
FIGURE A11-25a



Test Date:	6-Nov	Pore Pressure u_2 at start:	6.52 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	2.47 tsf

DISSIPATION TEST
CPT-140, Depth: 109.3 feet
Tunnel Segment of SVRT Project
San Jose, California

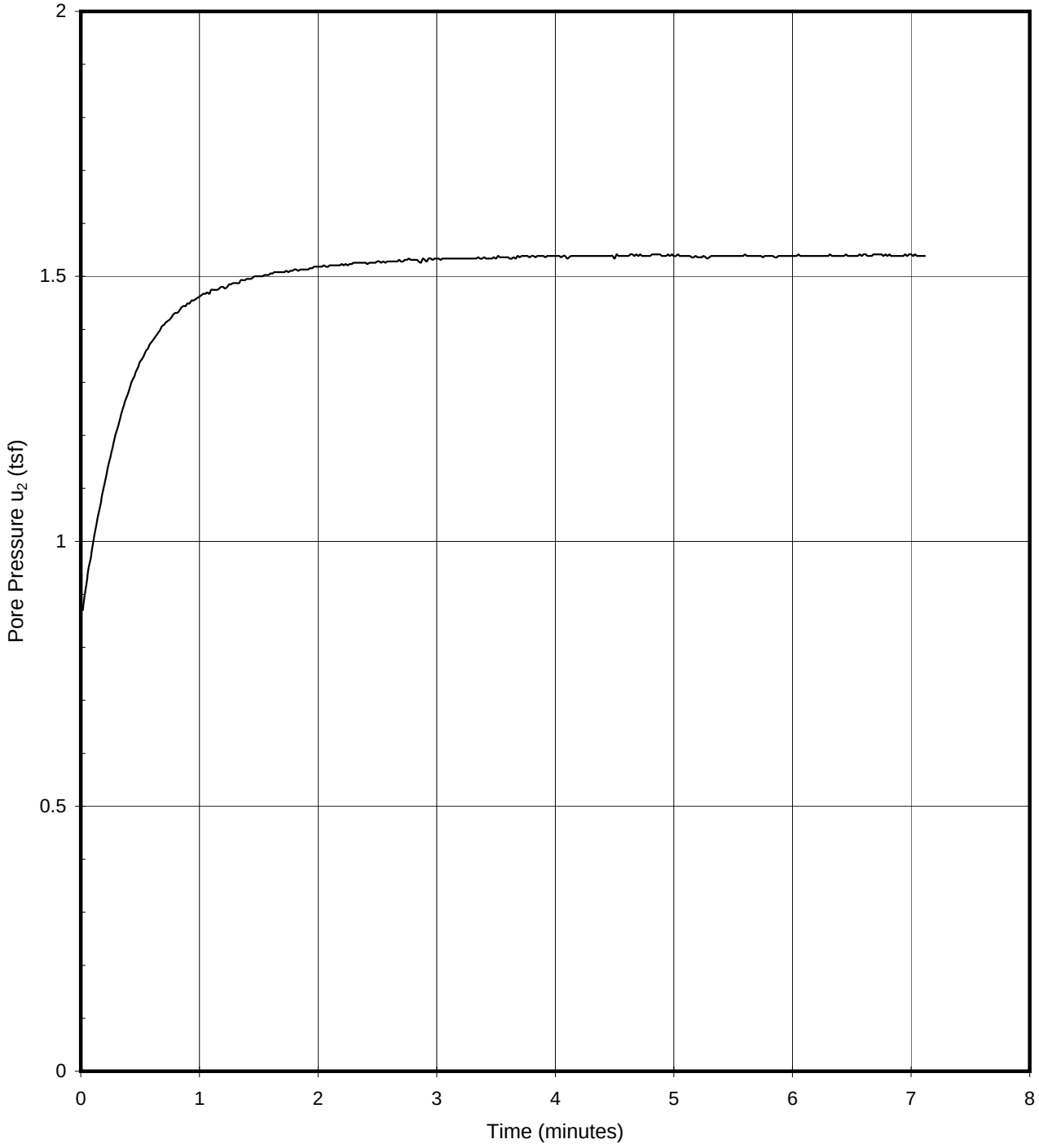
FIGURE A11-25b



Test Date:	7-Oct	Pore Pressure u_2 at start:	-0.77 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	0.11 tsf

DISSIPATION TEST
CPT-143, Depth: 32.1 feet
Tunnel Segment of SVRT Project
San Jose, California

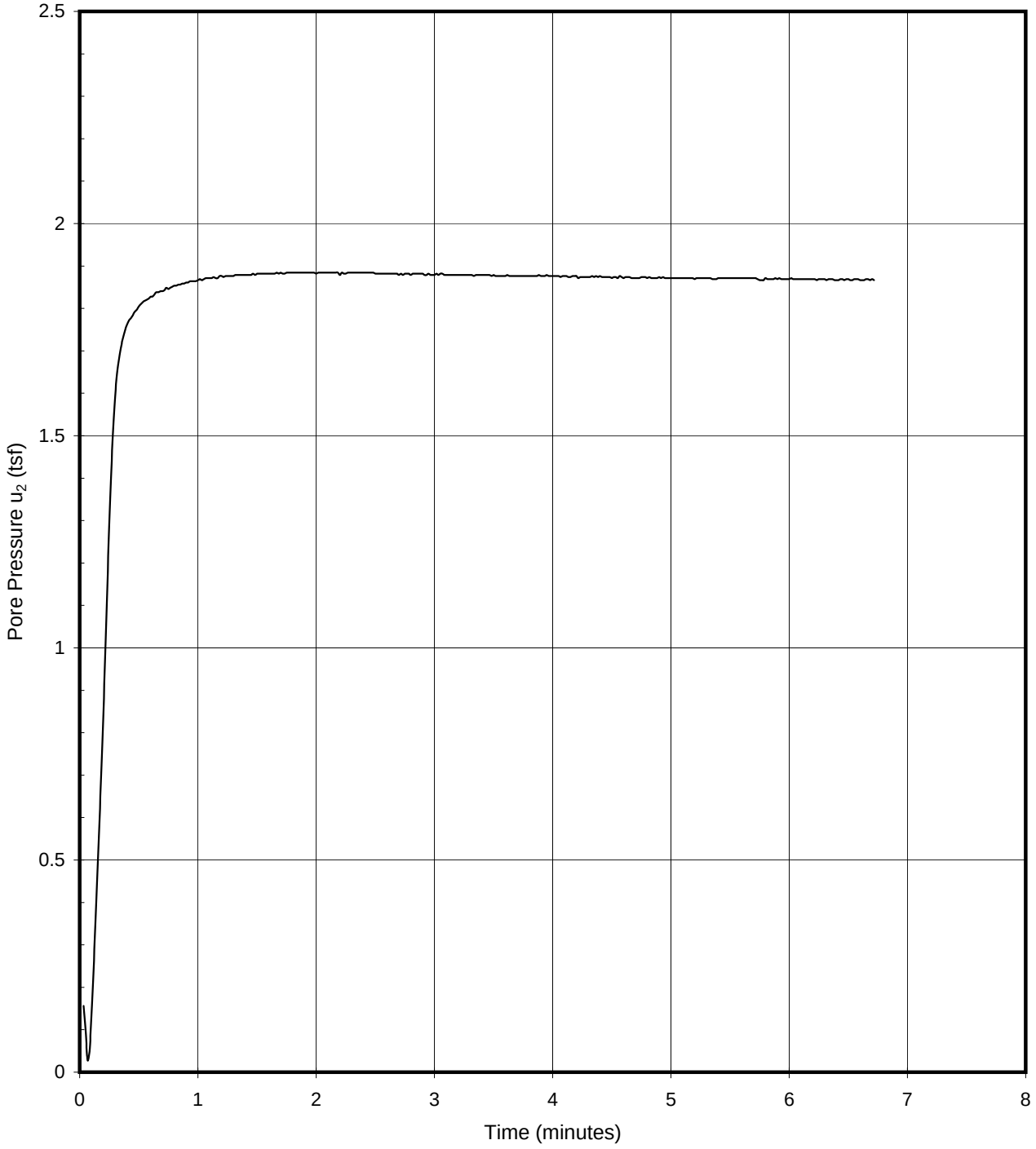
FIGURE A11-26a



Test Date:	7-Oct	Pore Pressure u_2 at start:	0.87 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	1.54 tsf

DISSIPATION TEST
CPT-143, Depth: 74.3 feet
Tunnel Segment of SVRT Project
San Jose, California

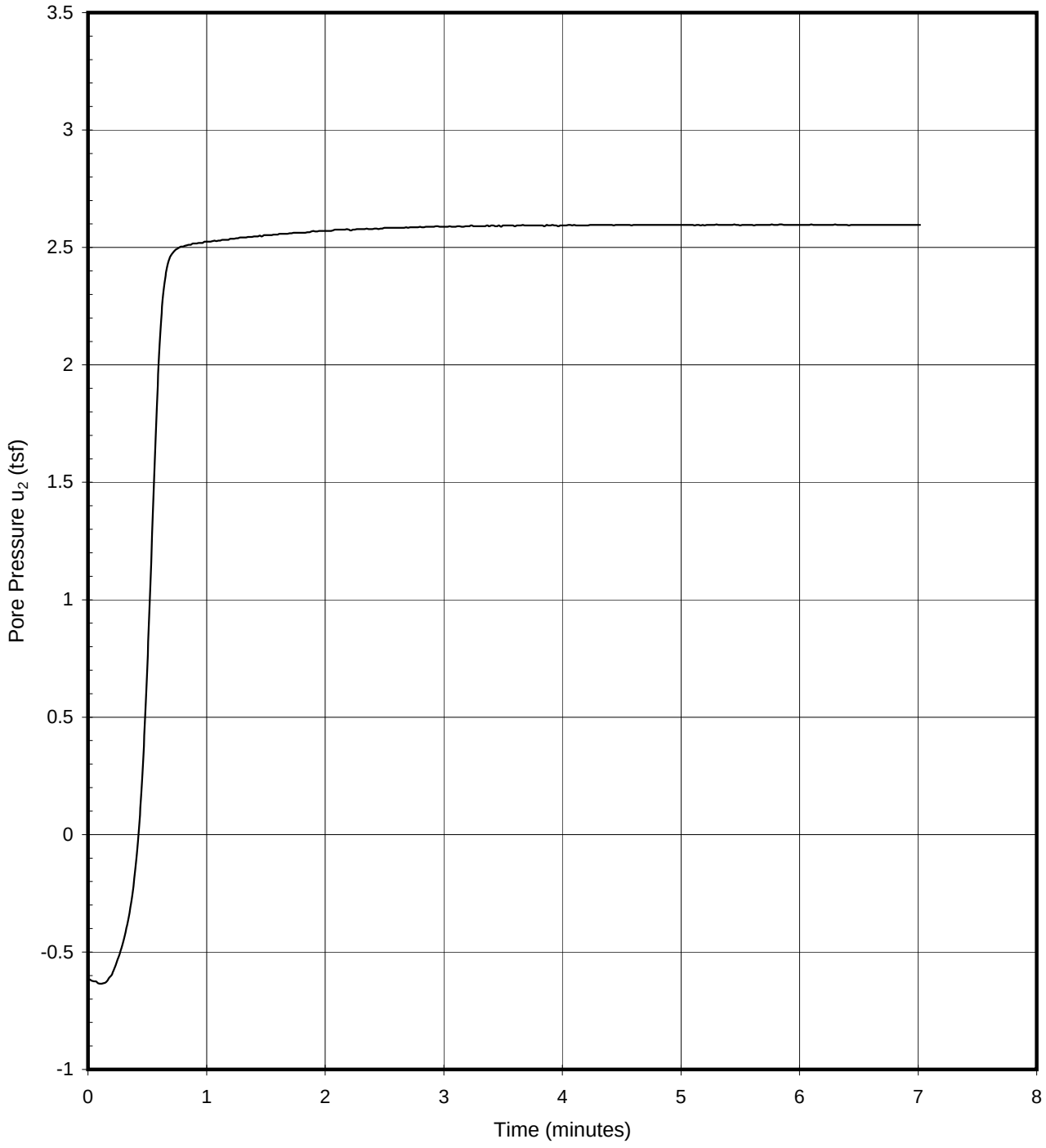
FIGURE A11-26b



Test Date:	7-Oct	Pore Pressure u_2 at start:	0.16 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	1.87 tsf

DISSIPATION TEST
CPT-143, Depth: 85.1 feet
Tunnel Segment of SVRT Project
San Jose, California

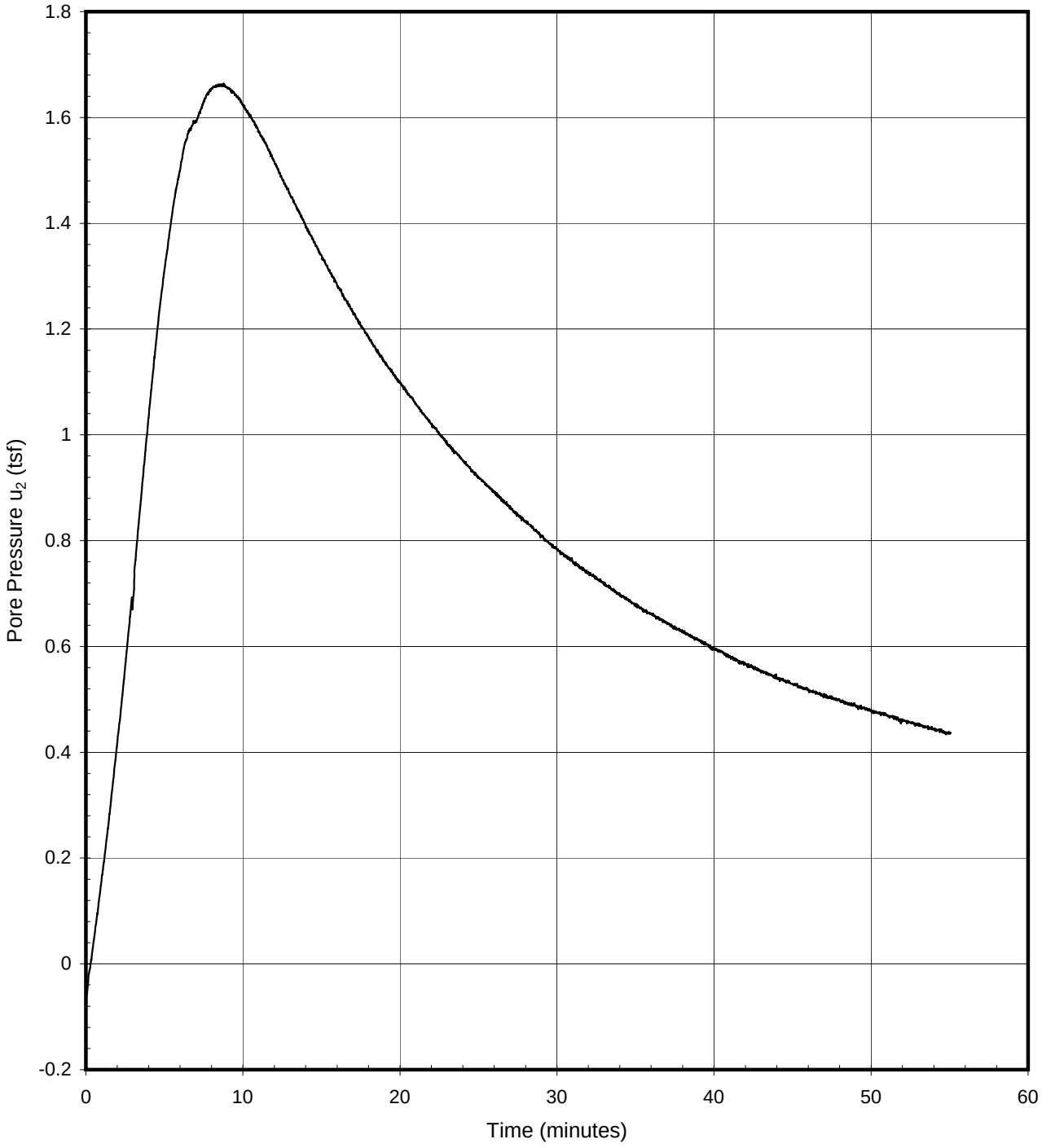
FIGURE A11-26c



Test Date:	7-Oct	Pore Pressure u_2 at start:	-0.62 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	2.60 tsf

DISSIPATION TEST
CPT-143, Depth: 111.5 feet
Tunnel Segment of SVRT Project
San Jose, California

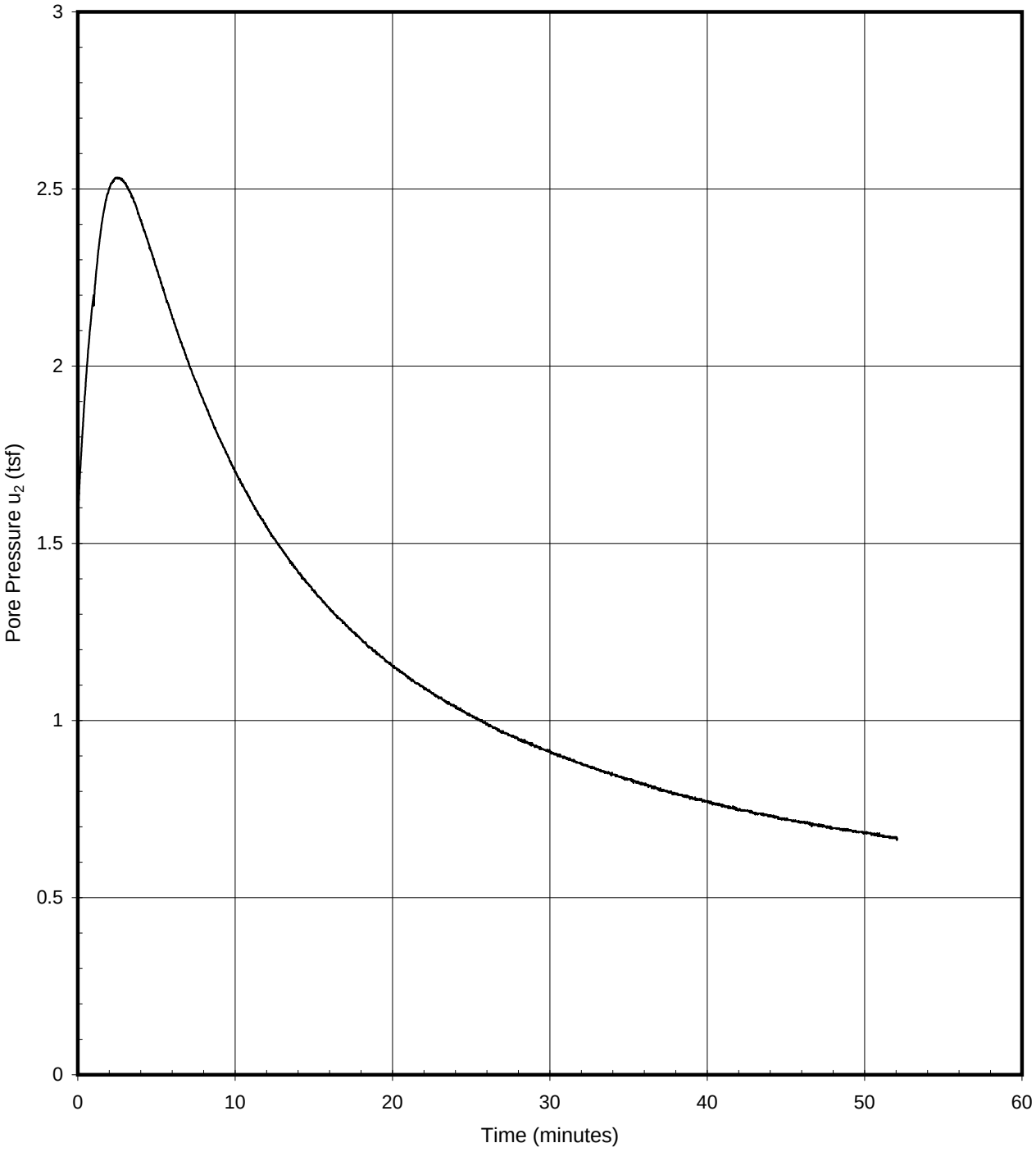
FIGURE A11-26d



Test Date:	1-Dec	Pore Pressure u_2 at start:	-0.07 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	0.44 tsf

DISSIPATION TEST
CPT-146, Depth: 20.2 feet
Tunnel Segment of SVRT Project
San Jose, California

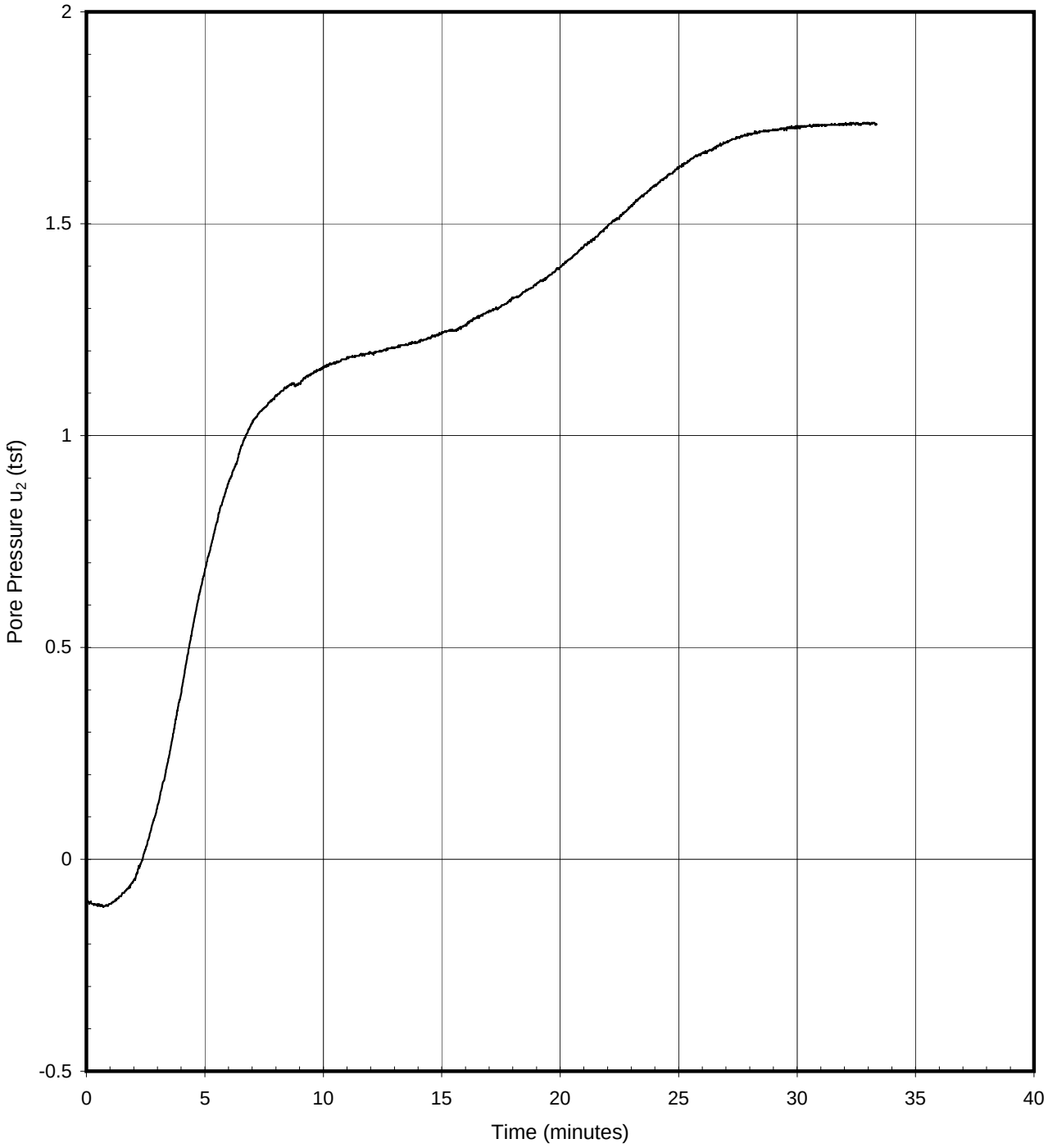
FIGURE A11-27a



Test Date:	1-Dec	Pore Pressure u_2 at start:	1.58 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	0.67 tsf

DISSIPATION TEST
CPT-146, Depth: 35.5 feet
Tunnel Segment of SVRT Project
San Jose, California

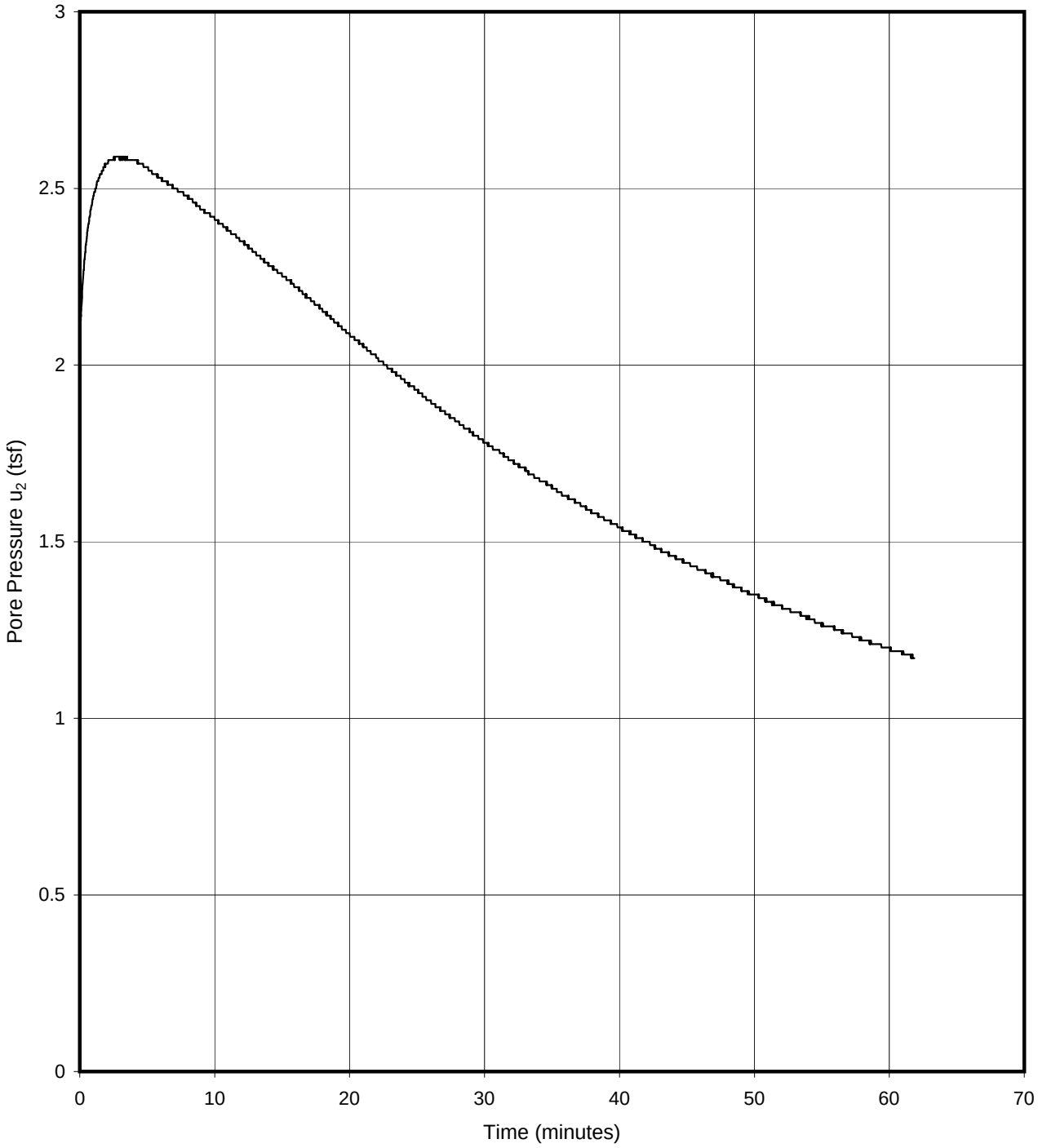
FIGURE A11-27b



Test Date:	1-Dec	Pore Pressure u_2 at start:	-0.09 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	1.74 tsf

DISSIPATION TEST
CPT-146, Depth: 79.2 feet
Tunnel Segment of SVRT Project
San Jose, California

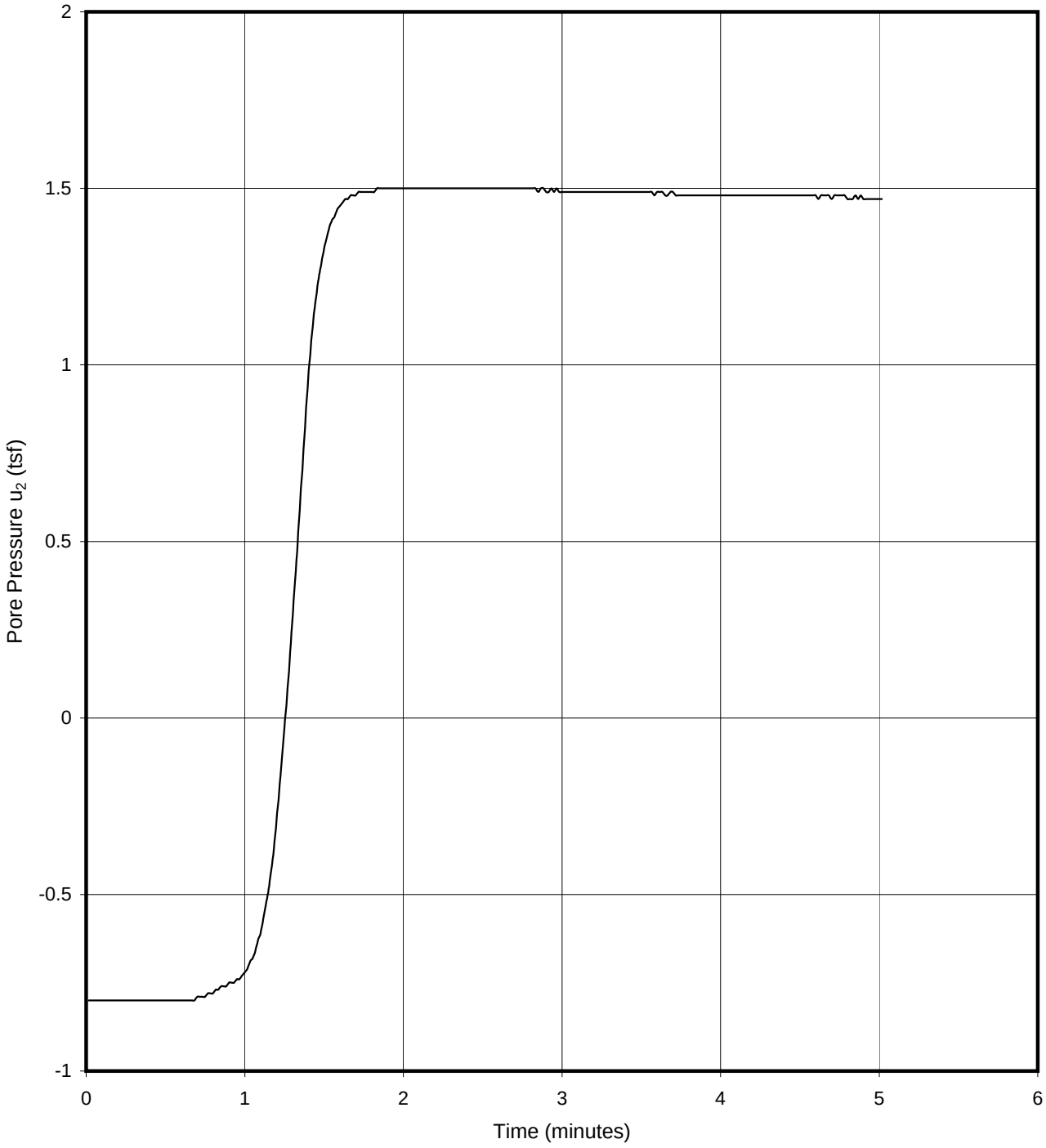
FIGURE A11-27c



Test Date:	7-Feb	Pore Pressure u_2 at start:	2.05 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	1.17 tsf

DISSIPATION TEST
CPT-153, Depth: 28.6 feet
Tunnel Segment of SVRT Project
San Jose, California

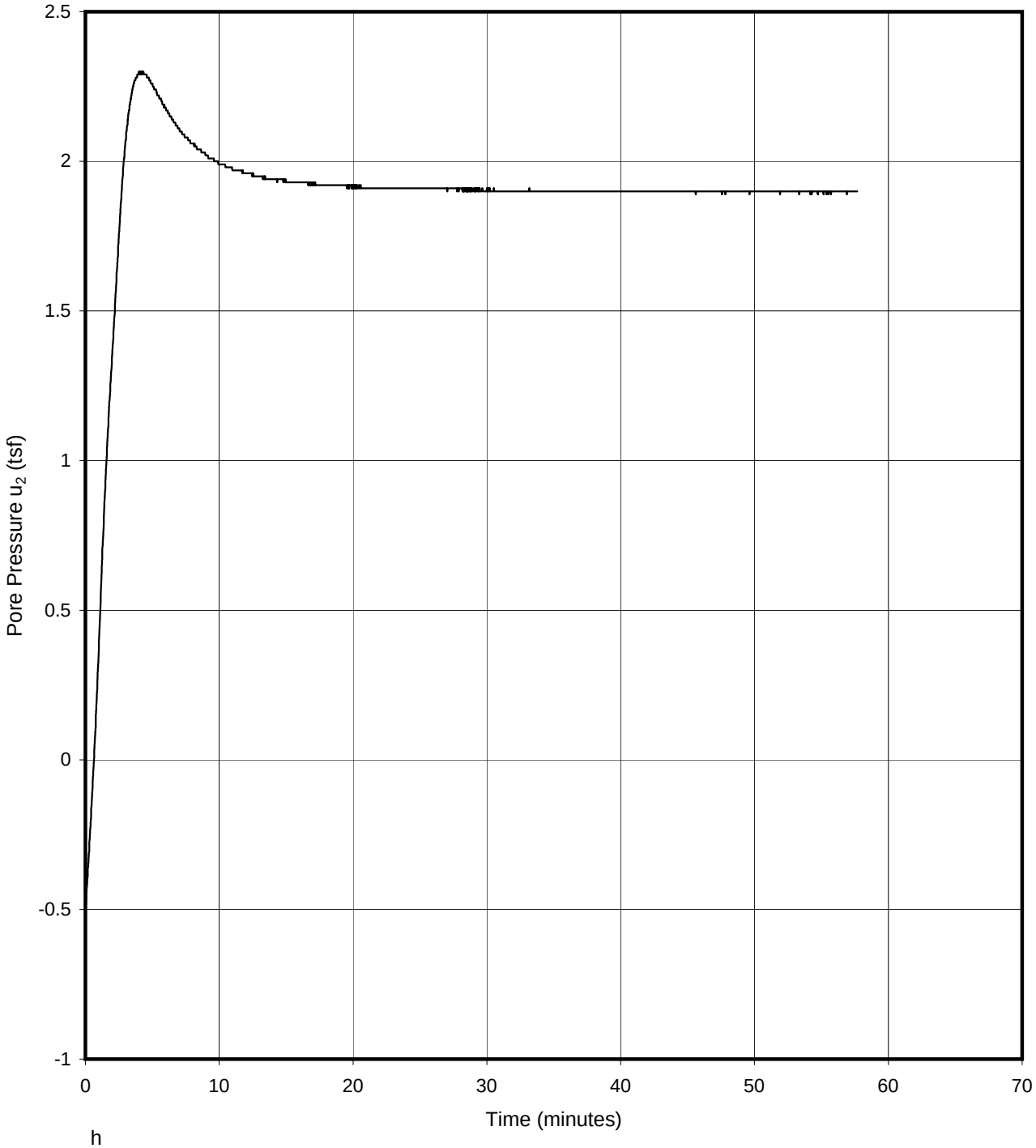
FIGURE A11-28a



Test Date:	7-Feb	Pore Pressure u_2 at start:	-0.80 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	1.47 tsf

DISSIPATION TEST
CPT-153, Depth: 69.1 feet
Tunnel Segment of SVRT Project
San Jose, California

FIGURE A11-28b



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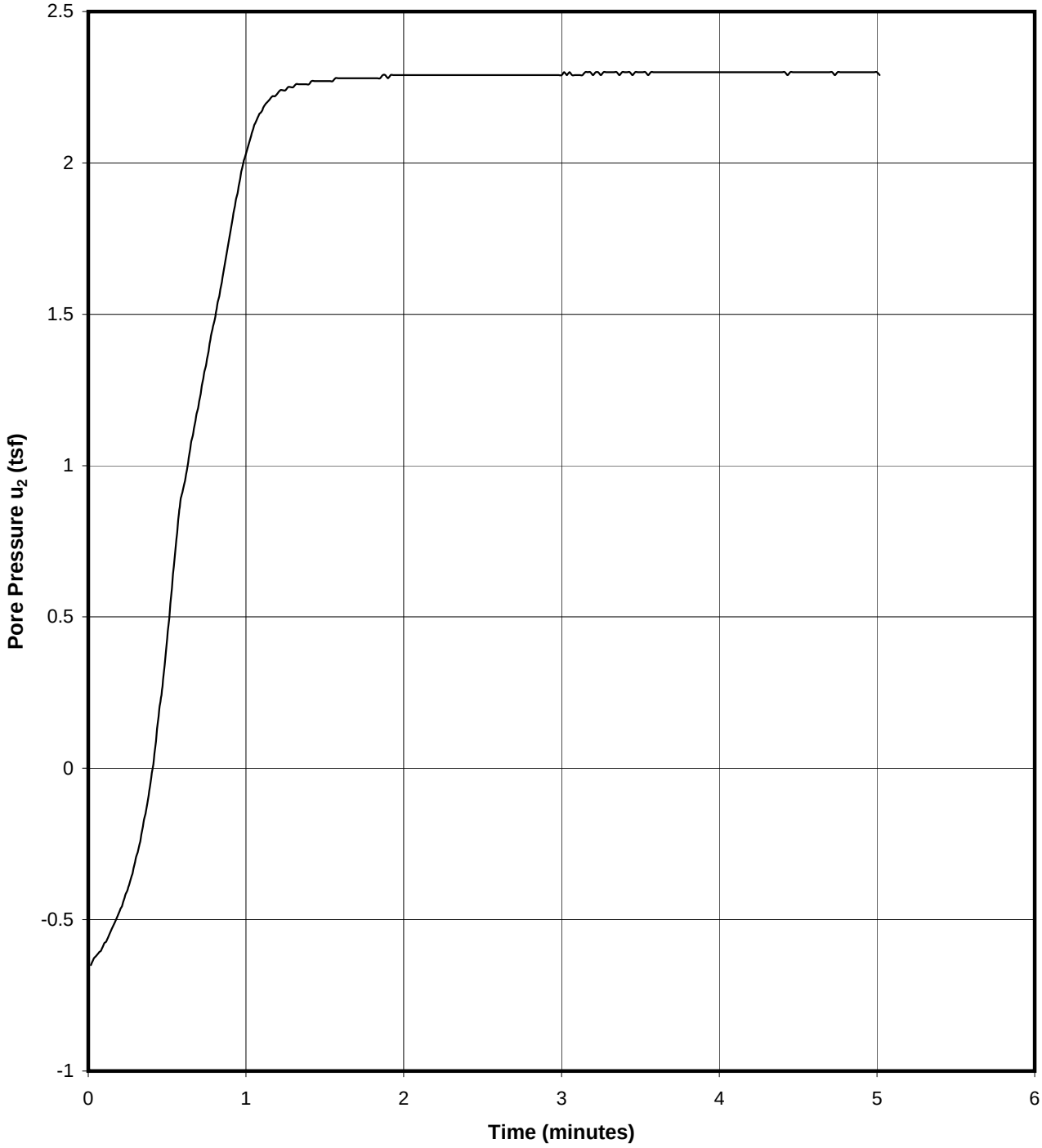
Test Date:	7-Feb	Pore Pressure u_2 at start:	-0.49 tsf
Soil Type:	Clay	Pore Pressure u_2 at end:	1.90 tsf

DISSIPATION TEST
CPT-153, Depth: 86.9 feet
Tunnel Segment of SVRT Project
San Jose, California

FIGURE A11-28c



Test Date:	7-Feb	Pore Pressure u_2 at start:	-0.65 tsf
Soil Type:	Sand	Pore Pressure u_2 at end:	2.29 tsf

DISSIPATION TEST
CPT-153, Depth: 100.83 feet
Tunnel Segment of SVRT Project
San Jose, California

FIGURE A11-28d