2022 Geotechnical References

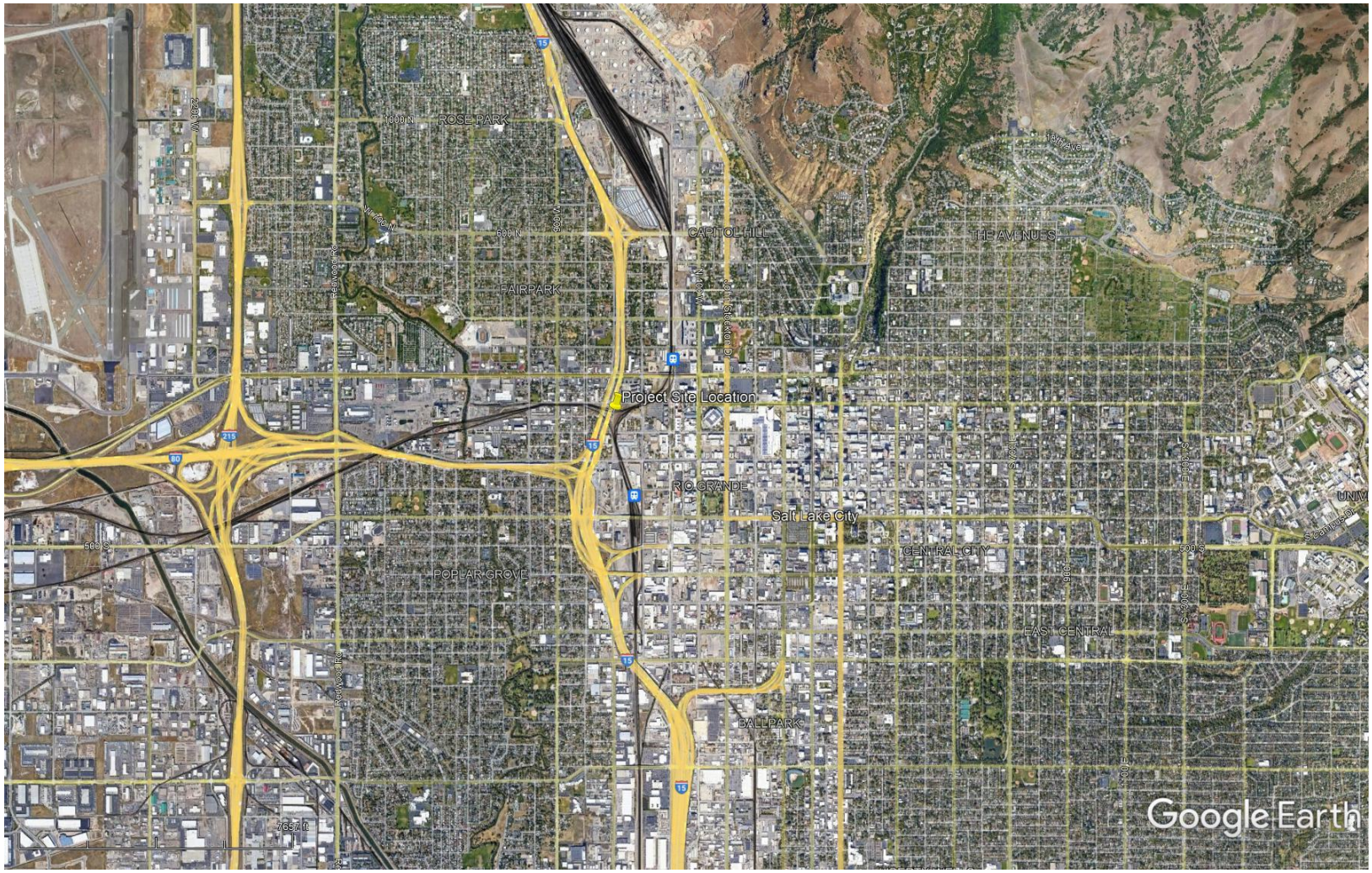


Figure 1. Project location

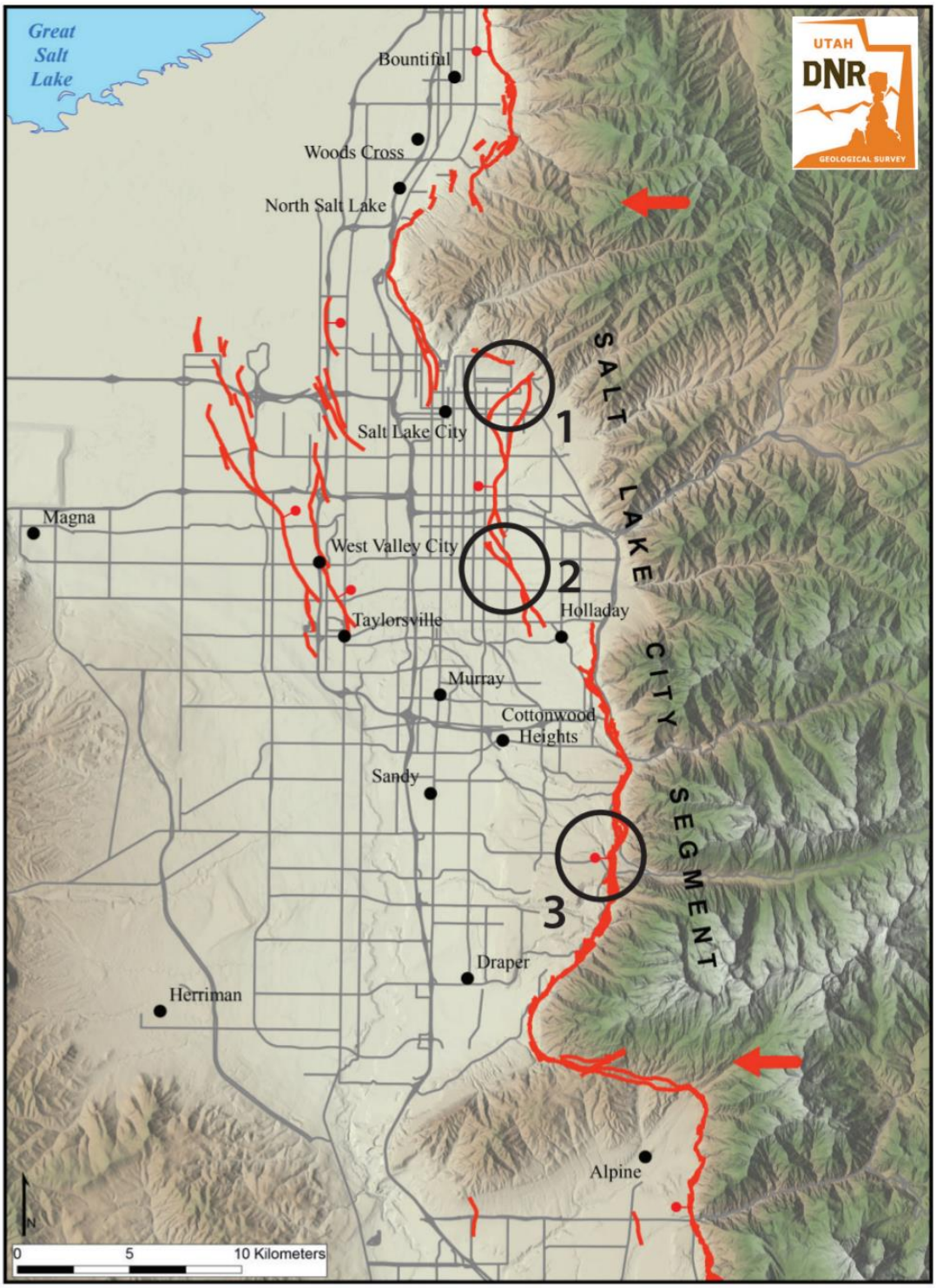
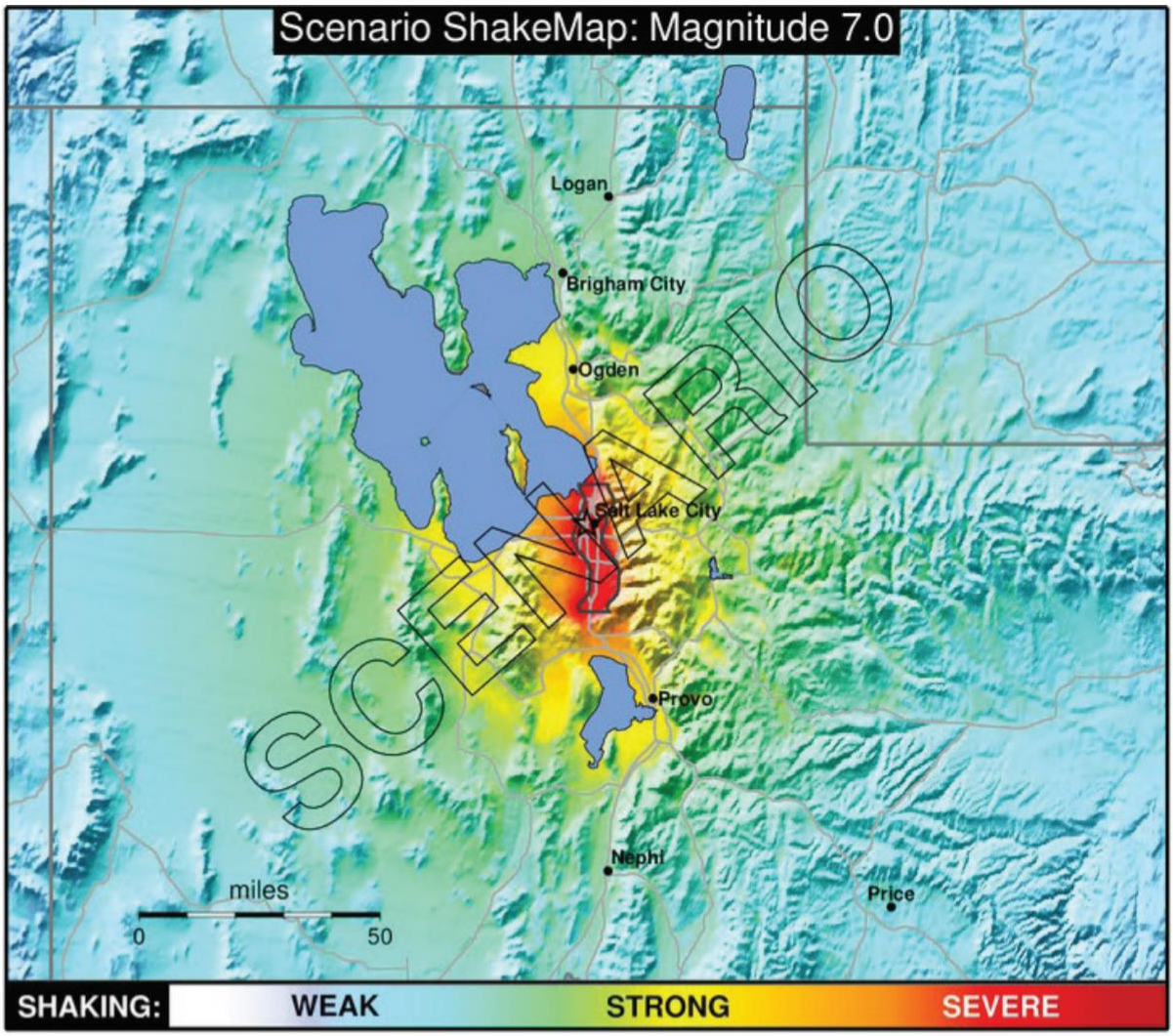


Figure 5(a). Map of the Salt Lake City segment of the Wasatch fault and the West Valley fault zone (courtesy of the Utah Geological Survey). Bold red arrows mark the segment boundaries and red lines show the surface traces of active faults forming a complex fault system in the Salt Lake Valley. Locations of features illustrated in Figure 5(b) are shown by the numbered circles.

Figure 2. Fault map of Salt Lake Valley



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	*<0.1*	*0.5*	*2.4*	*6.7*	*13*	24	44	83	>156
PEAK VEL.(cm/s)	<0.07	0.4	1.9	5.8	*11*	*22*	*43*	*83*	*>160*
INSTRUMENTAL INTENSITY	I	II–III	IV	V	VI	VII	VIII	IX	X+

Scale based upon Wald, et al.; 1999

Figure 6. SkakeMap Scenario for a magnitude 7.0 earthquake on the SLC segment. Severe shaking corresponds to peak ground velocities greater than 80 cm/sec. Most of the Salt Lake Valley will experience peak ground velocities greater than 40 cm/sec. The maximum intensity from this earthquake is IX, which corresponds to violent shaking and the potential for heavy damage.

Figure 3. Earthquake Intensity Map - Salt Lake Valley for M7 Earthquake

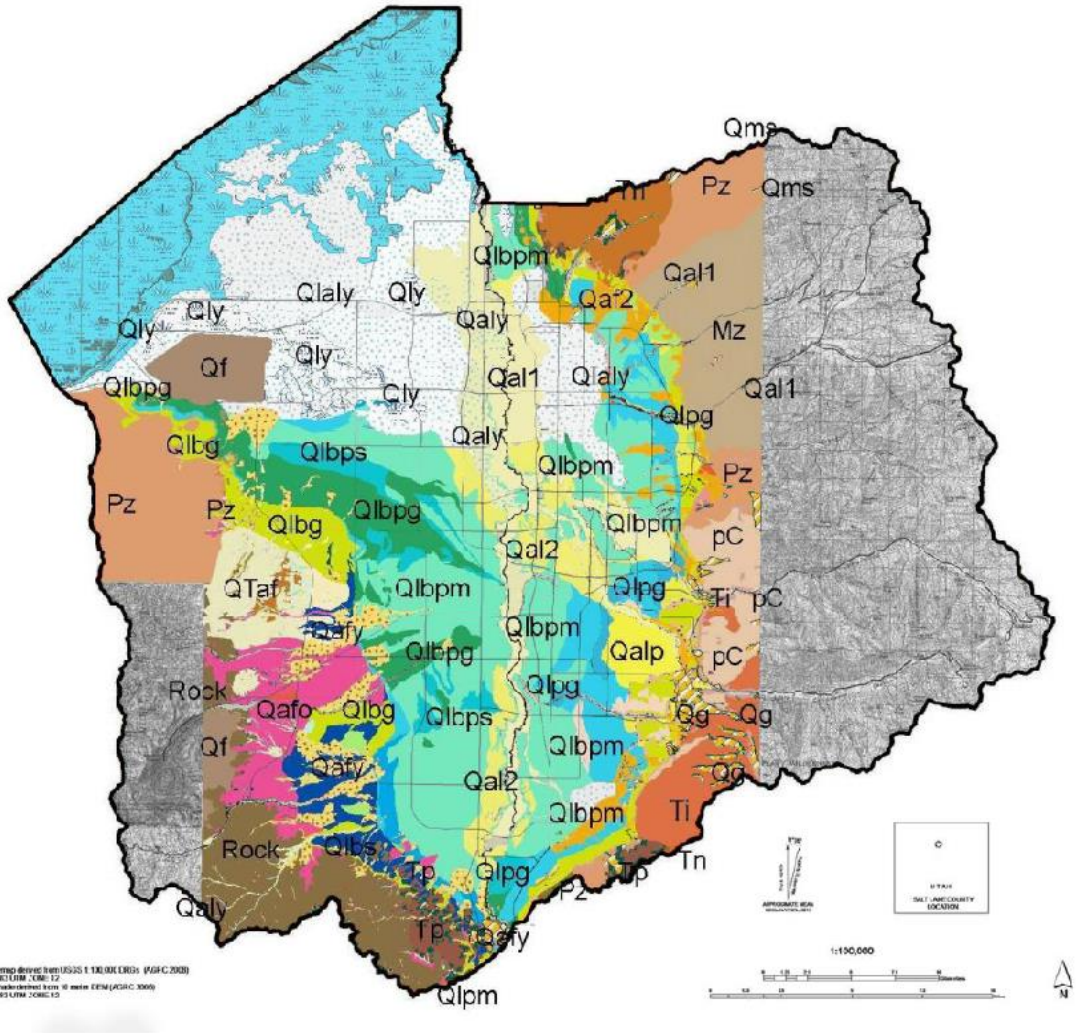


Figure 2-1. Surficial geology of the Salt Lake Valley, Utah (from Hinckley, 2010; modified from Personius and Scott, 1992; Biek et al., 2004; and Miller, 1980).

Figure 4. Surficial Geology Map of Salt Lake Valley

Table 2-1. Name, description and age of major surficial geologic units in the Salt Lake Valley (Personius and Scott, 1992; Biek et al., 2004; and Miller, 1980).

Map Symbol	Name	Description	Age
	Qal_1	Modern stream alluvium 1	Upper Holocene
	Qal_2	Stream alluvium 2	Middle Holocene to Upper Pleistocene
	Qaly	Younger stream alluvial deposits, undivided	Holocene to Upper Pleistocene
	Qalp	Stream alluvium related to the Provo (regressive) phase of the Bonneville lake cycle	Upper Pleistocene
	Qalb	Alluvial deposits related to the Bonneville (transgressive) phase of the Bonneville lake cycle	Upper Pleistocene
	Qaf_1	Modern alluvial-fan deposits 1	Upper Holocene
	Qaf_2	Alluvial-fan deposits 2	Middle Holocene to Upper Pleistocene
	Qafy	Younger alluvial-fan deposits, undivided	Holocene to Upper Pleistocene
	Qafp	Alluvial-fan deposits related to the Provo (regressive) phase of the Bonneville lake cycle	Upper Pleistocene
	Qafb	Alluvial-fan deposits related to the Bonneville (transgressive) phase of the Bonneville lake cycle	Upper Pleistocene
	Qaf_4	Alluvial-fan deposits 4	Upper to Middle Pleistocene
	Qaf_5	Alluvial-fan deposits 5	Middle Pleistocene
	Qafo	Older alluvial-fan deposits, undivided	Upper to Middle Pleistocene
	Qly	Young lacustrine and marsh deposits	Holocene
	Qlaly	Young lacustrine, marsh, and alluvial deposits	Holocene to Upper Pleistocene
	Qlpg	Lacustrine gravel and sand related to the Provo (regressive) phase of the Bonneville lake cycle	Upper Pleistocene
	Qlpm	Lacustrine clay and silt related to the Provo (regressive) phase of the Bonneville Lake Cycle	Upper Pleistocene

Map Symbol	Name	Description	Age
	Qlbg	Lacustrine gravel and sand related to the Bonneville (transgressive) phase of the Bonneville lake cycle	Upper Pleistocene
	Qlbs	Lacustrine sand and silt related to the Bonneville (transgressive) phase of the Bonneville lake cycle	Upper Pleistocene
	Qlbm	Laucstrine clay and silt related to the Bonneville (transgressive) phase of the Bonneville lake cycle	Upper Pleistocene
	Qlbpg	Lacustrine gravel and sand of the Provo and Bonneville lake cycles, undivided	Upper Pleistocene
	Qlbps	Lacustrine sand and silt of the Provo and Bonneville lake cycles, undivided	Upper Pleistocene
	Qlbpm	Lacustrine silt and clay of the Provo and Bonneville lake cycles, undivided	Upper Pleistocene
	Qmsy	Younger landslide deposits	Historical to Upper Pleistocene
	Qmls	Lateral-spread deposits	Holocene to Upper Pleistocene
	Qmt	Talus deposits	Holocene to Upper Pleistocene
	Qchs	Hillslope colluvium	Holocene to Upper Pleistocene
	Qca	Colluvium and alluvium, undivided	Holocene to Middle Pleistocene
	Qes	Eolian sand	Holocene to upper Pleistocene
	Qf	Artificial fill	Historical
	Tn	Tertiary sedimentary and volcanic rocks	Neogene
	Tp	Tertiary sedimentary and volcanic rocks	Paleogene
	Mz	Mesozoic sedimentary rocks	Cretaceous to Triassic
	Pz	Paleozoic sedimentary rocks	Permian to Cambrian
	pC	Precambrian metamorphic rocks	Proerozoic and Archean

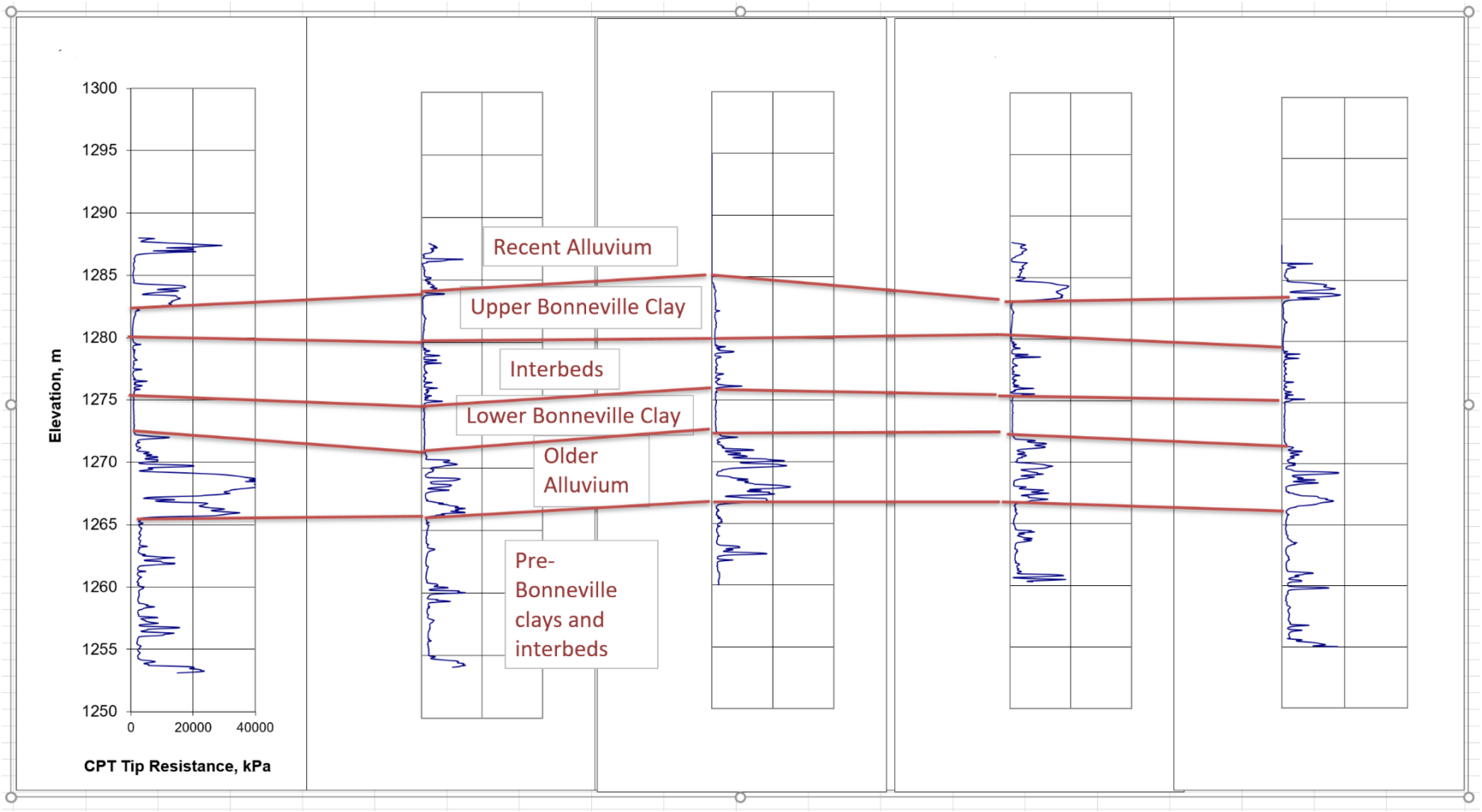


Figure 6. Fence Diagram from CPT data showing various subsurface stratigraphic units in downtown Salt Lake City.

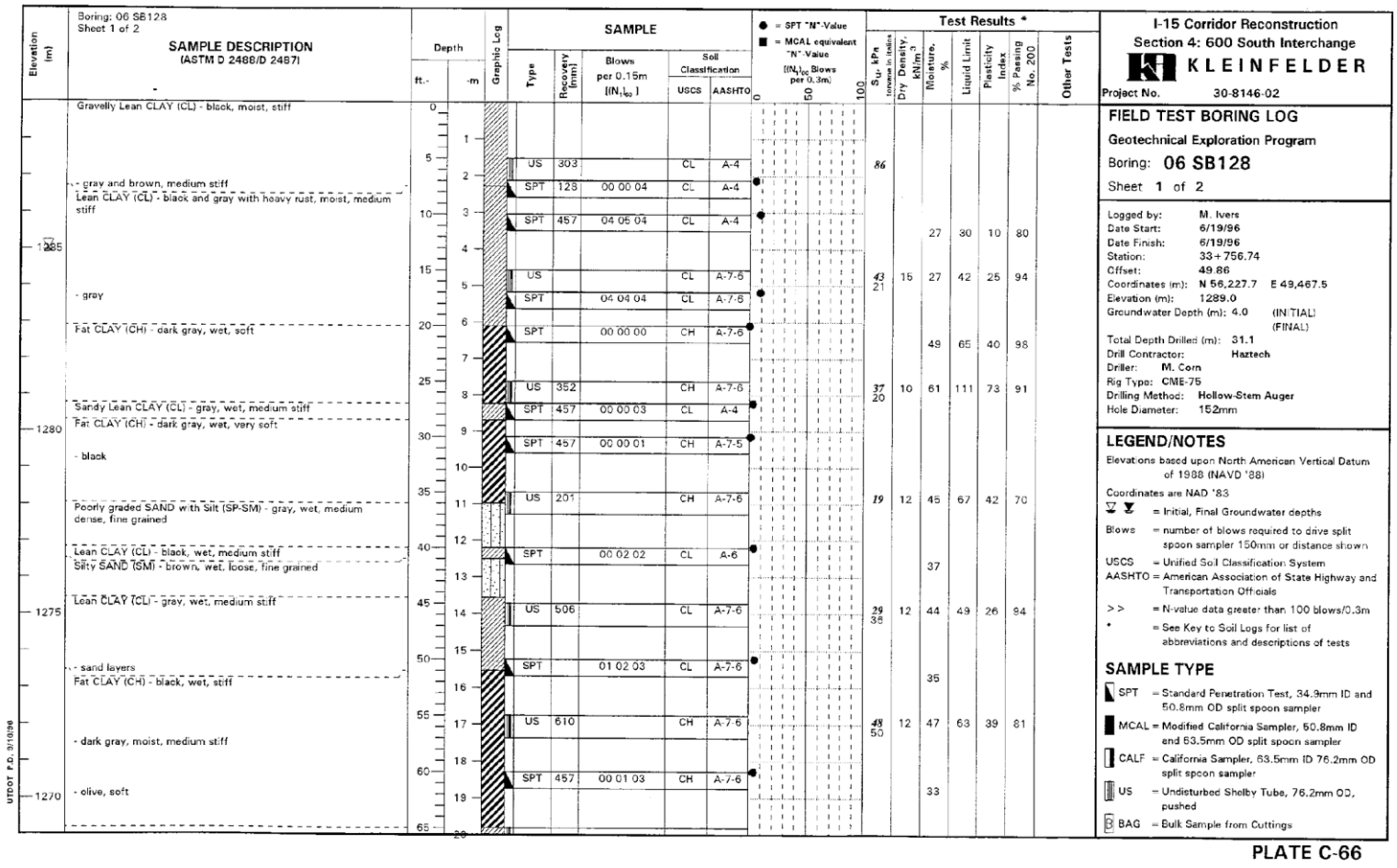


Figure 7. Borehole Log 06 SB 128

Boring: 06 SB128
Sheet 2 of 2

SAMPLE DESCRIPTION
(ASTM D 2488/D 2487)

Elevation (m)	Sample Description	Depth ft.	Depth -m	Type	Recovery (mm)	Blows per 0.15m [(N1)60]	Soil Classification USCS	Soil Classification AASHTO	Su, kPa (torvane in italics)	Dry Density, kN/m3	Moisture, %	Liquid Limit	Plasticity Index	% Passing No. 200	Other Tests
	Lean CLAY (CL) - olive-gray, wet, stiff	66	21	US	610		CL	A-7-6	117 *40*	17	23	43	25	91	
	- fine sand seam	70	22	SPT	457	03 05 06	CL	A-7-6							
		75	23	US	0		CL	A-7-6							
1265	Silty SAND (SM) - dark gray, wet, loose, fine grained	80	24	SPT	457	03 04 02	SM	A-4			28	NP	NP	44	
	Lean CLAY (CL) - dark gray, wet, medium stiff		25												
	Sandy Lean CLAY (CL) - dark gray, wet, very stiff	85	26	SPT	457	04 23 23	CL	A-4						8	GSD
	Poorly graded SAND with Silt (SP-SM) - gray, wet, very dense, grains from medium to fine with a few pebbles		27												
	Lean CLAY (CL) - gray, wet, stiff to very stiff	90	28	SPT	457	01 02 04	CL	A-6							
	- silt or sand seams	95	29	SPT		02 03 02	CL	A-6			35	37	19	95	
1260	- medium stiff		30												
	SILT (ML) - gray, wet, stiff	100	31	US			ML	A-4	*14* 72	17	21	NP	NP	65	
		105	32												
		110	33												
1255			34												
		115	35												
			36												
		120	37												
		125	38												
1250			39												
		130	40												

Graphic Log

● = SPT "N"-Value
■ = MCAL equivalent "N"-Value [(N1)60 Blows per 0.3m]
0 50 100

Test Results *

I-15 Corridor Reconstruction
Section 4: 600 South Interchange
KLEINFELDER
Project No. 30-8146-02

FIELD TEST BORING LOG

Geotechnical Exploration Program

Boring: **06 SB128**

Sheet 2 of 2

Logged by: M. Ivers
Date Start: 6/19/96
Date Finish: 6/19/96
Station: 33+756.74
Offset: 49.86
Coordinates (m): N 56,227.7 E 49,467.5
Elevation (m): 1289.0
Groundwater Depth (m): 4.0 (INITIAL) (FINAL)
Total Depth Drilled (m): 31.1
Drill Contractor: Haztech
Driller: M. Corn
Rig Type: CME-75
Drilling Method: Hollow-Stem Auger
Hole Diameter: 152mm

LEGEND/NOTES

Elevations based upon North American Vertical Datum of 1988 (NAVD '88)

Coordinates are NAD '83

▽ ▼ = Initial, Final Groundwater depths

Blows = number of blows required to drive split spoon sampler 150mm or distance shown

USCS = Unified Soil Classification System

AASHTO = American Association of State Highway and Transportation Officials

>> = N-value data greater than 100 blows/0.3m

* = See Key to Soil Logs for list of abbreviations and descriptions of tests

SAMPLE TYPE

SPT = Standard Penetration Test, 34.9mm ID and 50.8mm OD split spoon sampler

MCAL = Modified California Sampler, 50.8mm ID and 63.5mm OD split spoon sampler

CALF = California Sampler, 63.5mm ID 76.2mm OD split spoon sampler

US = Undisturbed Shelby Tube, 76.2mm OD, pushed

BAG = Bulk Sample from Cuttings

UTDOT P.D. 8/16/96

PLATE C-66

Figure 8. SPT Borehole 06 SB 128 (continued)

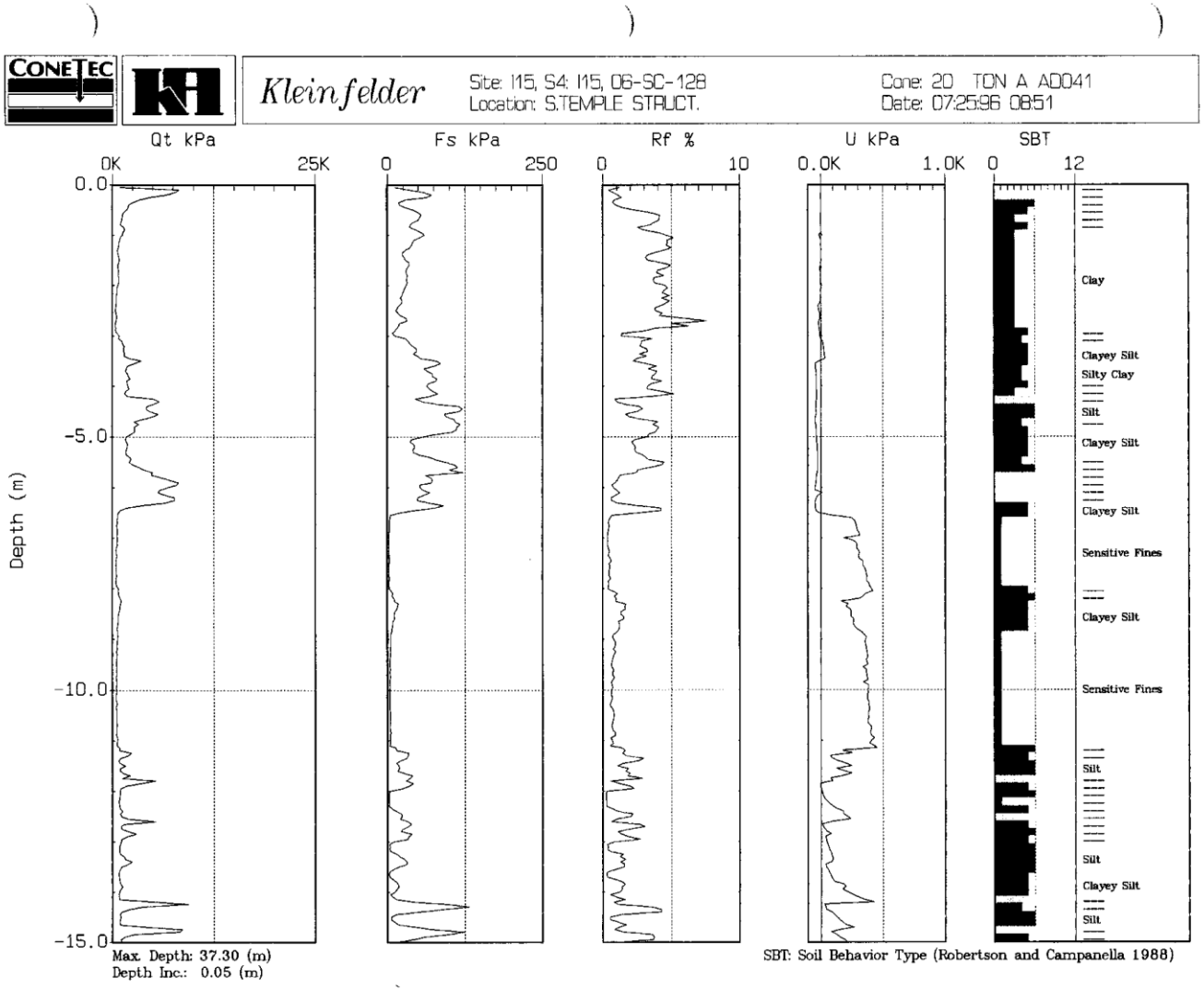


Figure 9. CPT Sounding 06 SC 128

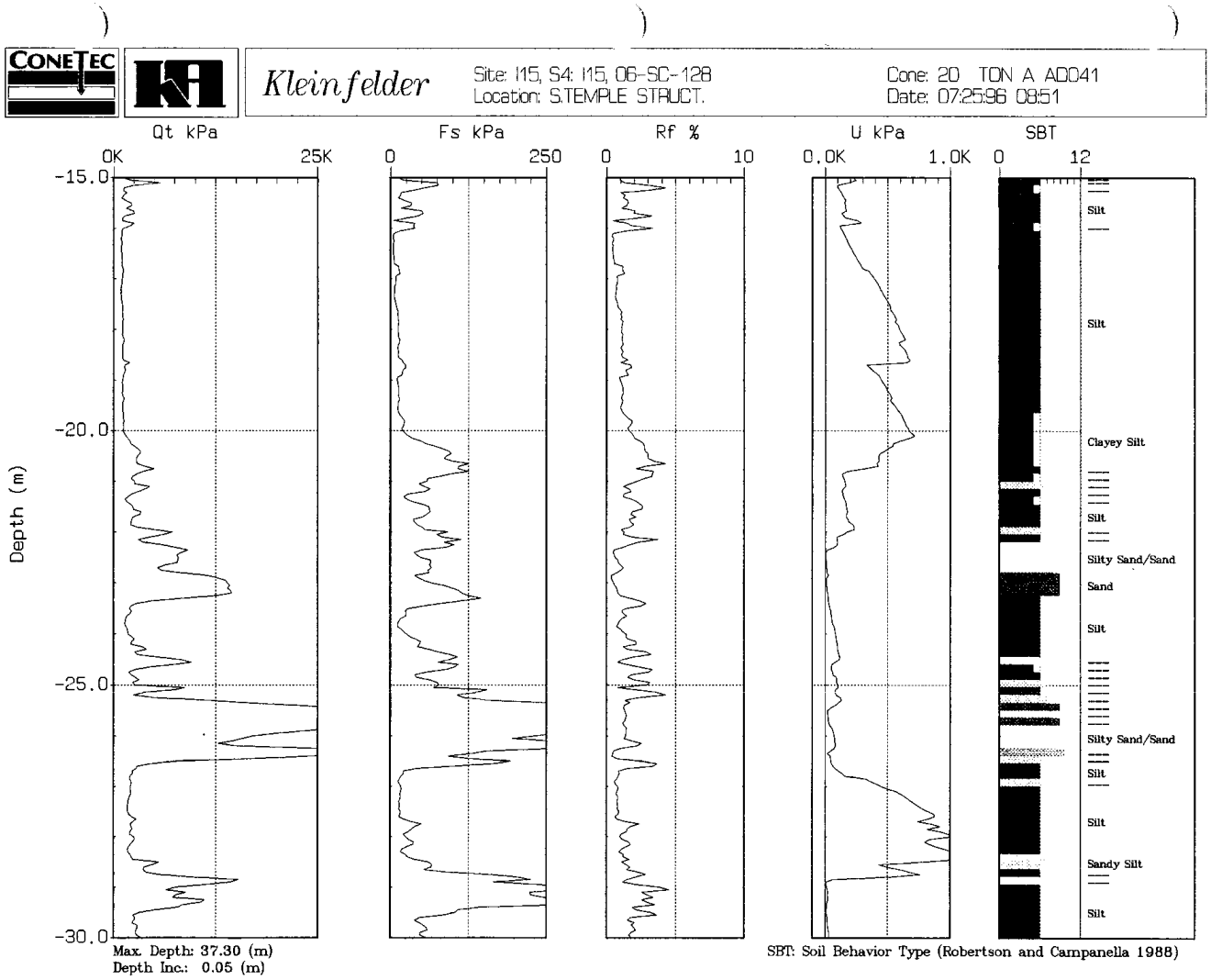
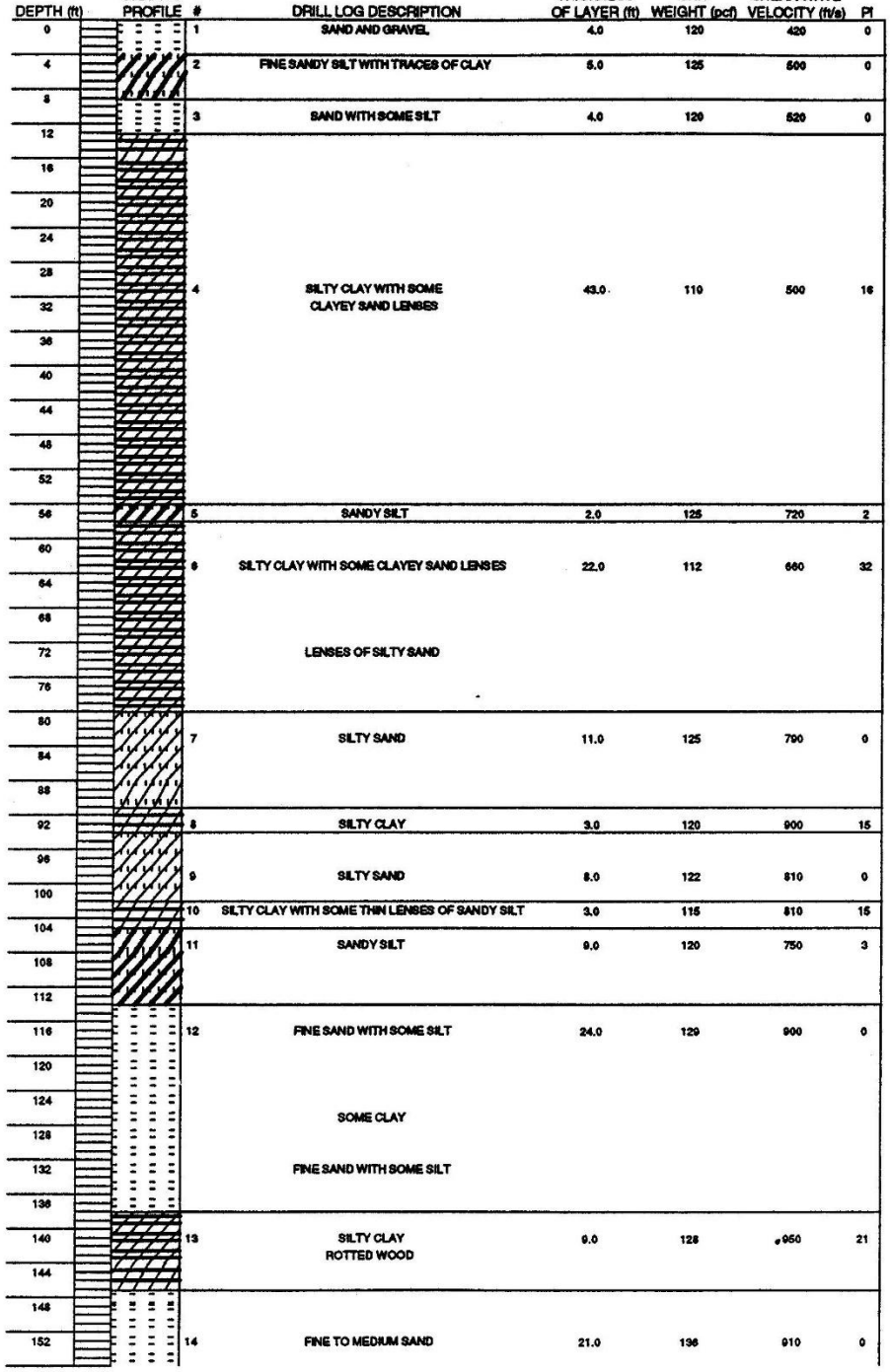


Figure 10. CPT Sounding 06 SC 128 (continued)



#	DRILL LOG DESCRIPTION	THICKNESS OF LAYER (ft)	SATURATED UNIT WEIGHT (pcf)	SHEAR WAVE VELOCITY (ft/s)	PI
1	SAND AND GRAVEL	4.0	120	420	0
2	FINE SANDY SILT WITH TRACES OF CLAY	5.0	125	500	0
3	SAND WITH SOME SILT	4.0	120	520	0
4	SILTY CLAY WITH SOME CLAYEY SAND LENSES	43.0	110	500	16
5	SANDY SILT	2.0	125	720	2
6	SILTY CLAY WITH SOME CLAYEY SAND LENSES	22.0	112	660	32
	LENSES OF SILTY SAND				
7	SILTY SAND	11.0	125	790	0
8	SILTY CLAY	3.0	120	900	15
9	SILTY SAND	8.0	122	810	0
10	SILTY CLAY WITH SOME THIN LENSES OF SANDY SILT	3.0	115	810	15
11	SANDY SILT	9.0	120	750	3
12	FINE SAND WITH SOME SILT	24.0	129	900	0
	SOME CLAY				
	FINE SAND WITH SOME SILT				
13	SILTY CLAY ROTTED WOOD	9.0	128	950	21
14	FINE TO MEDIUM SAND	21.0	136	910	0

Figure 29: *Idealized soil profile model for the 600 South Interchange. (Continued to next page).*